MITSUBISHI ELECTRIC
Changes for the Better

for a greener tomorrow eco Changes

SERVO AMPLIFIERS & MOTORS

Man, machine and environment in

perfect harmony

MELSERVO-J4 — trusted technology makes an evolutionary leap forward

Introducing the MELSERVO-J4 series. Offering more than just improved performance, these servos are designed to drive the industries of tomorrow. Backed by Mitsubishi leadership in all-digital technology, MELSERVO has become one of the most globally respected names in factory automation. And now — with the safety, ease of use, and energy-efficient design of the new MELSERVO-J4 series — man, machine and environment can at last work together in perfect harmony.

A complete system lineup to meet your production and manufacturing

Responding to expanding applications such as semiconductor and LCD manufacturing, machine tools, robots, and food processing machines, Electric's product lines such as Motion controllers, servo system networks as well as displays and programmable controllers. MELSERVO-J4

HUMAN MACHINE I/F

Graphic Operation Terminal

GOT2000/GOT1000 series

PC/AT compatible computer

SOFTWARE

MELSOFT

iQ Platform

CONTROLLER

Motion controller

SSCNET III/H compatible
Motion controller
Q173DSCPU
Q172DSCPU

SSCNET III/H compatible
Stand-Alone
Motion controller
Q170MSCPU
Q170MSCPU-S1

Programmable controller

MELSEC Q series

MELSEC QS/WS 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

NETWORK

SSCNET III/H

SSCNET III/H serial bus

CC-Link IE Field

CC-Link IE Field Network

Pulse train input

SERVO AMPLIFIER*2

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)

*1

SERVO MOTOR

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

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

*1. For the combination, refer to "Combinations of 1-Axis Servo Amplifier and Servo Motor" on pp. 1-2 and 1-3, and "Combinations of Multi-Axis Servo Amplifier and Servo Motors" on p. 1-4.

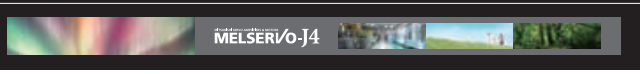
*2. Due to the addition of functions, some functions are available only with the specified version or later. Refer to relevant Servo Amplifier Instruction Manual for details.

SOLUTION

e&ecoFactory

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



MELSERVO-J4 flexibly collaborates with Mitsubishi allows you to freely create an advanced servo system.

Motion Controller Engineering Software — MELSOFT **MT Works2**

Programmable Controller Engineering Software — MELSOFT **GX Works2**

Servo Setup Software — MELSOFT **MR Configurator2**

Capacity Selection Software

MELSEC L series

MELSEC F series

Positioning module

QD75P1/2/4N
QD75D1/2/4N

QD70P4/8
QD70D4/8

LD75P1/2/4
LD75D1/2/4

FX2N-10PG

LOW-VOLTAGE SWITCHGEAR

Magnetic contactor

MS-T

Molded-case circuit breaker

WS-V

Core type
(natural/liquid cooling)

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

Coreless type

LM-U2 series
Rating: 50 to 800 N

Direct drive motor

TM-RFM series
Rating: 2 to 240 N•m

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

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MELSERVO-J4 Product Lines

■Servo amplifier

●: Compatible ○: Available in the future –: Not compatible

	Servo amplifier	Number of control axes	Power supply specifications	Rated output [kW] (Note 1)	Command interface: SSCNET III/H	Command interface: CC-Link IE Field	Command interface: Pulse train	Command interface: Analog voltage	Command interface: RS-422 multi-drop	Control mode: Position	Control mode: Speed	Control mode: Torque	Control mode: Positioning function	Control mode: Fully closed loop control (Note 2)	Compatible servo motor series: HG-KR	HG-MR	HG-SR	HG-JR	HG-RR	HG-UR	LM-H3	LM-F	LM-K2	LM-U2 (Note 5)	TM-RFM
SSCNET III/H interface	**MR-J4-B(-RJ)** (Note 4) 	1 axis	1-phase 100 V AC	0.1, 0.2, 0.4 (Released in the future)	○	–	–	–	–	○	○	○	–	○	○	○	–	–	–	–	○	–	○	○	○
			3-phase 200 V AC	0.1, 0.2, 0.4, 0.6, 0.75, 1, 2, 3.5, 5, 7, 11, 15, 22	●	–	–	–	–	●	●	●	–	●	●	●	●	●	●	●	●	●	●	●
			3-phase 400 V AC	0.6, 1, 2, 3.5, 5, 7, 11, 15, 22	●	–	–	–	–	●	●	●	–	●	–	–	●	●	–	–	–	●	–	–	–
	MR-J4W2-B 	2 axes	3-phase 200 V AC	0.2, 0.4, 0.75, 1	●	–	–	–	–	●	●	●	–	●	●	●	●	●	–	●	●	–	●	●	●
	MR-J4W3-B 	3 axes	3-phase 200 V AC	0.2, 0.4	●	–	–	–	–	●	●	●	–	–	●	●	–	–	–	–	●	–	●	●	●
CC-Link IE Field Network interface with Motion	**MR-J4-B-RJ010 +MR-J3-T10** 	1 axis	3-phase 200 V AC	0.1, 0.2, 0.4, 0.6, 0.75, 1, 2, 3.5, 5, 7, 11, 15, 22 (11, 15, and 22 kW will be released in the future.)	–	●	–	–	–	●	●	●	–	–	●	●	●	●	●	●	–	–	–	–	–
			3-phase 400 V AC	0.6, 1, 2, 3.5, 5, 7, 11, 15, 22 (Released in the future)	–	○	–	–	–	○	○	○	–	–	–	–	○	○	–	–	–	–	–	–	–
General-purpose interface	**MR-J4-A(-RJ)** (Note 4) 	1 axis	1-phase 100 V AC	0.1, 0.2, 0.4 (Released in the future)	–	–	○	○	○	○	○	○	○ (Note 3)	○	○	○	–	–	–	–	○	–	○	○	○
			3-phase 200 V AC	0.1, 0.2, 0.4, 0.6, 0.75, 1, 2, 3.5, 5, 7, 11, 15, 22	–	–	●	●	●	●	●	●	○ (Note 3)	●	●	●	●	●	●	●	●	●	●	●	●
			3-phase 400 V AC	0.6, 1, 2, 3.5, 5, 7, 11, 15, 22	–	–	●	●	●	●	●	●	○ (Note 3)	●	–	–	●	●	–	–	–	●	–	–	–

Notes: 1. The listed are the rated output of the servo amplifier. For the compatible servo motor capacities, refer to "Combinations of 1-Axis Servo Amplifier and Servo Motor" on pp. 1-2 and 1-3, and "Combinations of Multi-Axis Servo Amplifier and Servo Motors" on p. 1-4.
2. MR-J4-B/A servo amplifier is compatible only with two-wire type serial linear encoder. For four-wire type serial and pulse train interface (A/B/Z-phase differential output type) linear encoders, MR-J4-B-RJ/A-RJ servo amplifier is available.
3. Will be available with MR-J4-A-RJ.
4. MR-J4-B-RJ/A-RJ servo amplifier is compatible with two-wire and four-wire type serial, and pulse train interface (A/B/Z-phase differential output type) linear encoders.
5. MR-J4-B/A servo amplifier is compatible only with two-wire type and four-wire type serial linear encoders. For pulse train interface (A/B/Z-phase differential output type) linear encoder, MR-J4-B-RJ/A-RJ servo amplifier is available.

■Direct drive motor

Direct drive motor series	Motor outer diameter [mm]	Hollow shaft diameter [mm]	Rated speed [r/min]	Maximum speed [r/min]	Rated torque [N·m]	Maximum torque [N·m]	IP rating (Note 1)	Features	Application examples
TM-RFM series 	ø130	ø20	200	500	3 types 2, 4, 6	6, 12, 18	IP42	•Suitable for low-speed and high-torque operations. •Smooth operation with less audible noise. •The motor's low profile design contributes to compact construction and a low center of gravity for enhanced machine stability. •Clean room compatible.	•Semiconductor manufacturing devices •Liquid crystal manufacturing devices •Machine tools
	ø180	ø47	200	500	3 types 6, 12, 18	18, 36, 54	IP42		
	ø230	ø62	200	500	3 types 12, 48, 72	36, 144, 216	IP42		
	ø330	ø104	100	200	3 types 40, 120, 240	120, 360, 720	IP42		

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

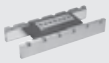
■Rotary servo motor

●: Available –: Not available

Rotary servo motor series		Rated speed (maximum speed) [r/min]	Rated output [kW] (Note 1)	Servo motor type: With electro-magnetic brake (B)	Servo motor type: With reducer (G1) (Note 2)	Servo motor type: With reducer (G5, G7) (Note 2)	IP rating (Note 3)	Replaceable series	Features	Application examples
Small capacity	**HG-KR series** 	3000 (6000)	5 types 0.05, 0.1, 0.2, 0.4, 0.75	●	●	●	IP65	HF-KP series	Low inertia Perfect for general industrial machines.	•Belt drives •Robots •Mounters •Sewing machines •X-Y tables •Food processing machines •Semiconductor manufacturing equipment •Knitting and embroidery machines
	HG-MR series 	3000 (6000)	5 types 0.05, 0.1, 0.2, 0.4, 0.75	●	–	–	IP65	HF-MP series	Ultra-low inertia Well suited for high-throughput operations.	•Inserters •Mounters
Medium capacity	**HG-SR series** 	1000 (1500)	6 types 0.5, 0.85, 1.2, 2.0, 3.0, 4.2	●	–	–	IP67	HF-SP series	Medium inertia This series is available with two rated speeds.	•Material handling systems •Robots •X-Y tables
		2000 (3000)	14 types 0.5, 1.0, 1.5, 2.0, 3.5, 5.0, 7.0 **0.5, 1.0, 1.5, 2.0, 3.5, 5.0, 7.0**	●	●	●	IP67			
Medium/large capacity	**HG-JR series** 	3000 (6000: 0.5 to 5 kW 5000: 7, 9 kW)	18 types 0.5, 0.75, 1.0, 1.5, 2.0, 3.5, 5.0, 7.0, 9.0 **0.5, 0.75, 1.0, 1.5, 2.0, 3.5, 5.0, 7.0, 9.0**	●	–	–	IP67	HF-JP series	Low inertia Well suited for high-throughput and high-acceleration/ deceleration operations.	•Food packaging machines •Printing machines
		1500 (3000: 11, 15 kW 2500: 22 kW)	6 types 11, 15, 22 **11, 15, 22**	● (Note 5)	–	–	IP67 (Note 4)			•Injection molding machines •Press machines
Medium capacity	**HG-RR series** 	3000 (4500)	5 types 1.0, 1.5, 2.0, 3.5, 5.0	●	–	–	IP65	HC-RP series	Ultra-low inertia Well suited for high-throughput operations.	•Ultra-high-throughput material handling systems
Medium capacity, flat type	**HG-UR series** 	2000 (3000: 0.75 to 2 kW 2500: 3.5, 5 kW)	5 types 0.75, 1.5, 2.0, 3.5, 5.0	●	–	–	IP65	HC-UP series	Flat type The flat design makes this unit well suited for situations where the installation space is limited.	•Robots •Food processing machines

Notes: 1. **0.5, 1.0, 1.5, 2.0, 3.5, 5.0, 7.0** : For 400 V.
2. G1 for general industrial machines. G5 and G7 for high precision applications.
3. The shaft-through portion is excluded. Refer to the asterisk 7 of "Annotations for Rotary Servo Motor Specifications" on p. 2-27 in this catalog for the shaft-through portion. For geared servo motor, IP rating of the reducer portion is equivalent to IP44.
4. 22 kW of HG-JR series is rated IP44.
5. The servo motor with electromagnetic brake is not available for 22 kW of HG-JR series.

■Linear servo motor

Linear servo motor series		Maximum speed [m/s]	Continuous thrust [N]	Maximum thrust [N]	Cooling method	Features	Application examples
Core type	**LM-H3 series** 	3.0	9 types 70, 120, 240, 360, 480, 720, 960	175, 300, 600, 900, 1200, 1800, 2400	Natural cooling	Suitable for space-saving. Compact size and high thrust. Maximum speed: 3 m/s.	•Semiconductor mounting systems •Wafer cleaning systems •LCD assembly machines •Material handlings
	LM-F series 	2.0	8 types 300, 600, 900, 1200, 1800, 2400, **3000**	1800, 3600, 5400, 7200, 10800, 14400, **18000**	Natural cooling	Compact size. The integrated liquid-cooling system doubles the continuous thrust.	•Press feeders •NC machine tools •Material handlings
		2.0	8 types 600, 1200, 1800, 2400, 3600, 4800, **6000**	1800, 3600, 5400, 7200, 10800, 14400, **18000**	Liquid cooling		
	LM-K2 series 	2.0	7 types 120, 240, 360, 720, 1200, 1440, 2400	300, 600, 900, 1800, 3000, 3600, 6000	Natural cooling	High thrust density. Magnetic attraction counter-force structure enables longer life of the linear guides and lower audible noise.	•Semiconductor mounting systems •Wafer cleaning systems •LCD assembly machines
Coreless type	**LM-U2 series** 	2.0	9 types 50, 75, 100, 150, 225, 400, 600, 800	150, 225, 300, 450, 675, 1600, 2400, 3200	Natural cooling	No cogging and small speed fluctuation. No magnetic attraction force structure extends life of the linear guides.	•Screen printing systems •Scanning exposure systems •Inspection systems •Material handlings

Note: 1. **0.5, 1.0, 1.5, 2.0, 3.5, 5.0, 7.0** : For 400 V.


Machine
MITSUBISHI SERVO AMPLIFIERS & MOTORS
MELSERVO-
J4
The leading edge in drive control, with unrivaled accuracy and response for next-generation machine performance.
Backed by Mitsubishi MELSERVO's global track record of proven reliability, the new MR-J4 takes machine performance to the highest level.

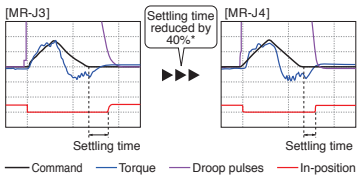
2.5 kHz speed frequency response, with servo amplifiers, servo motors, and optical networks linked in symphonic productivity

MELSERVO-J4 | Industry-leading Basic Performance

Industry-Leading Level of Servo Amplifier Basic Performance

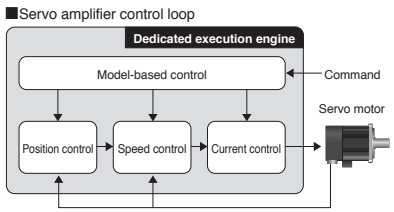
Our original high-speed servo control architecture is evolved from the conventional two-degrees-of-freedom model adaptive control and applied to the dedicated execution engine. **Speed frequency response is increased to 2.5 kHz.** Compatible servo motors are equipped with **a high-resolution absolute position 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.

[Settling time comparison with the prior model]



* The result is based on our evaluation condition.

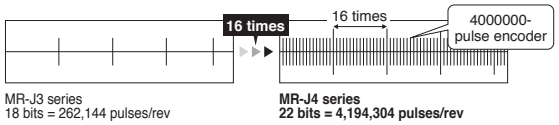
[Dedicated execution engine]



Improving Machine Performance with High-performance Servo Motors

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]



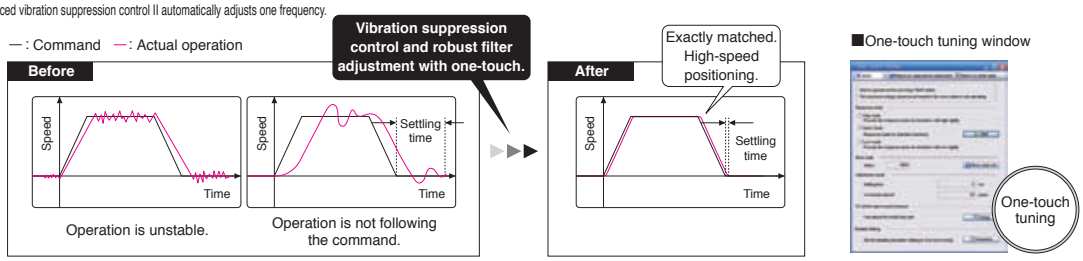
MELSERVO-J4 | Advanced Servo Gain Adjustment Function

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.

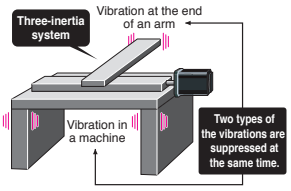
* The advanced vibration suppression control II automatically adjusts one frequency.

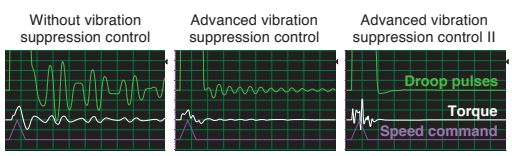


Advanced Vibration Suppression Control II

Patent pending | Enhanced functions

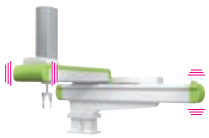
Due to vibration suppression algorithm which supports three-inertia system, two types of low frequency vibrations are suppressed at the same time. Adjustment is performed on MR Configurator2. This function is effective in suppressing vibration at the end of an arm and in reducing residual vibration in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



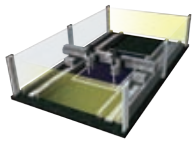


Application examples

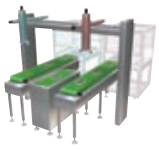
[Pick and place robots]



[Automatic assembly equipment]



[Material handling systems]

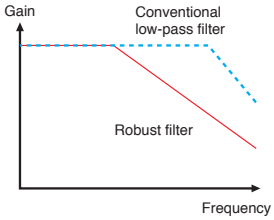


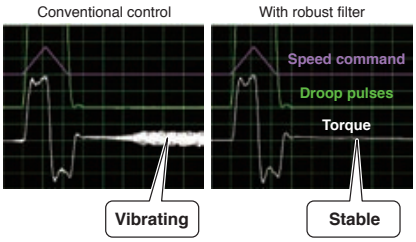
Robust Filter

Patent pending | NEW

Achieving both high responsivity and stability was difficult with the conventional control in high-inertia systems with belts and gears such as printing and packaging machines. Now, this function enables the high responsivity and the stability at the same time without adjustment. The robust filter more gradually reduces the torque with wide frequency range and achieves more stability as compared to the prior model.

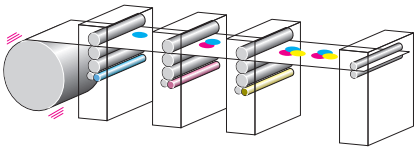
[Robust filter]





Application examples

[Printing machines]

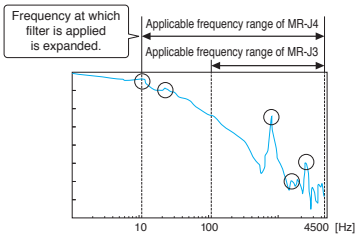


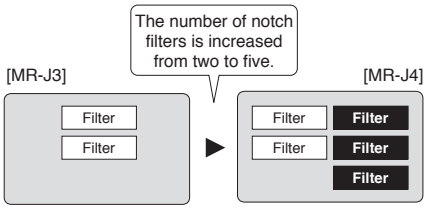
[Packaging machines]

Expanded Machine Resonance Suppression Filter

Enhanced functions

With advanced filter structure, applicable frequency range is expanded from between 100 Hz and 4500 Hz to between 10 Hz and 4500 Hz. Additionally, the number of simultaneously applicable filters is increased from two to five, improving vibration suppression performance of a machine.





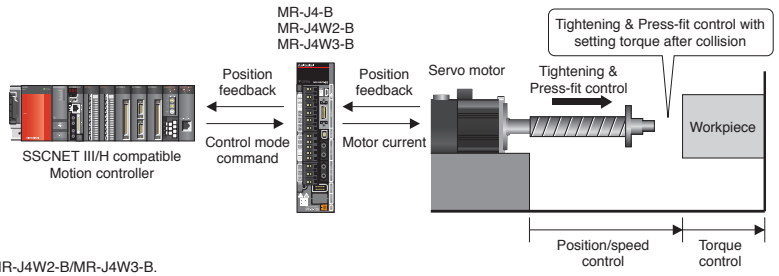
MELSERVO-J4 | A Variety of Functions for Various Applications

Tightening & Press-fit Control

Q17nDSCPU Q170MSCPU QD77MS LD77MS

Patent pending NEW

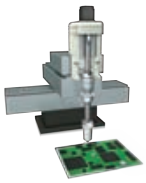
Position/speed control switches to torque control smoothly without stopping or changing the speed or the torque rapidly. Load to the machine is reduced, and high-quality molding is achieved for an application where control is switched from position to torque such as Tightening & Press-fit control or insertion of a work, and cap or screw tightening. * Available in MR-J4-B/MR-J4W2-B/MR-J4W3-B.



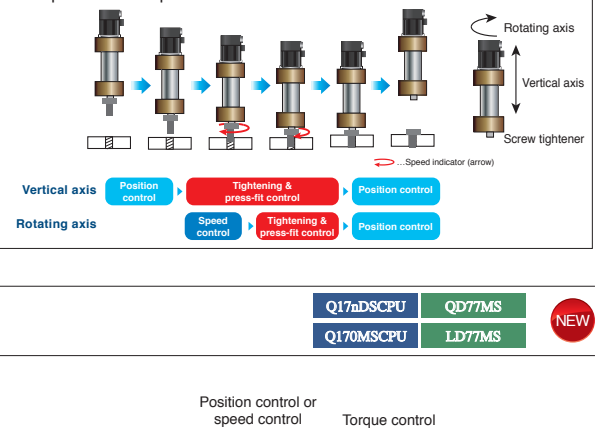
Application examples

[Press-fit machines]

[Screw tightening machines]



Operation example



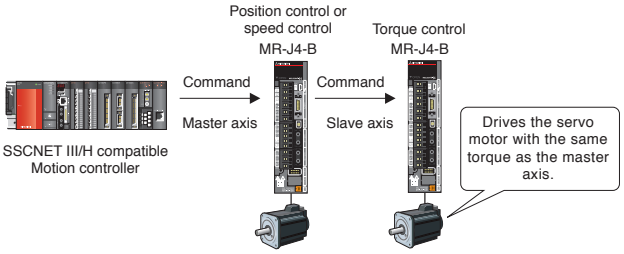
Master-slave Operation Function

Q17nDSCPU Q170MSCPU QD77MS LD77MS

NEW

For MR-J4-B, the master-slave operation function transmits a master axis torque to slave axes using driver communication, and the torque as a command drives slave axes by torque control. Since transmission of torque data from the master axis to slave axes is via SSCNET III/H, additional wiring is not required.

* Available in MR-J4-B.



Scale Measurement Function

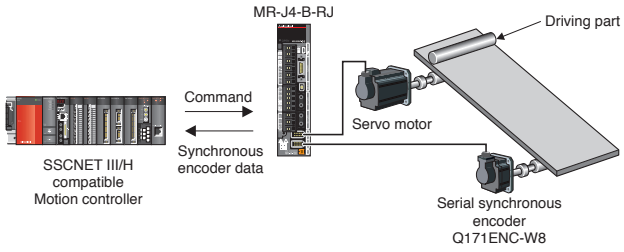
Q17nDSCPU Q170MSCPU QD77MS LD77MS

NEW

For MR-J4-B, the scale measurement function enables to transmit position information of a scale measurement encoder to the controller when the scale measurement encoder is connected in semi closed loop control.
The data of linear and synchronous encoders are transmitted to the servo system controller via the servo amplifier, achieving less wiring.

* Available in MR-J4-B/MR-J4W2-B.

[When synchronous encoder is used via the servo amplifier]



Fully closed loop control supported as standard.
Operate rotary servo motors, linear servo motors, or direct drive motors.

MELSERVO-J4 | Applicable for Various Control and Driving Systems

Compatible Servo Motors

MR-J4 series servo amplifier operates rotary servo motors, linear servo motors, and direct drive motors as standard*.

* For the combination, refer to "Product lines" on p. 35 in this catalog.

Rotary servo motor

Linear servo motor

Direct drive motor

1-axis/2-axis/3-axis Servo Amplifiers

For SSCNET III/H compatible servo amplifiers, 2-axis and 3-axis types are available in addition to 1-axis type, enabling flexible systems based on the number of control axes.

MR-J4-B

MR-J4W2-B

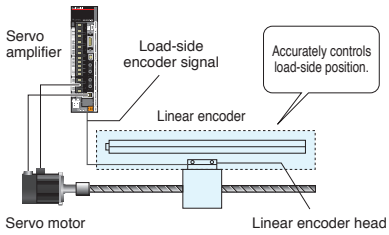
MR-J4W3-B

Compatible with Fully Closed Loop Control

Standard equipment

MR-J4-B/A servo amplifier is compatible with fully closed loop control system*. Accurate control of load-side position is achieved.

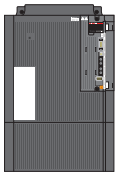
* MR-J4-B/A servo amplifier is compatible only with two-wire type serial linear encoder. For four-wire type serial and pulse train interface (A/B/Z-phase differential output type) linear encoders, MR-J4-B-RJ/A-RJ servo amplifier is available.
* Some models are not compatible with the fully closed loop control system. Refer to "Product lines" on p. 35 in this catalog.



Wide Range of Power Supplies and Capacities

For MR-J4-B/A servo amplifier, 3-phase 400 V AC main circuit power supply type is added to product lines in addition to 3-phase 200 V AC. 1-phase 100 V AC type will be also released in the future. Capacities varying from 100 W to 22 kW are available for MR-J4 series servo amplifier.

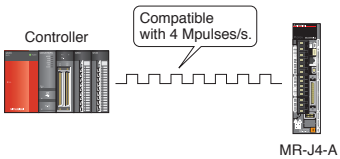
MR-J4-10B



MR-J4-22KB

Maximum Command Pulse Frequency

General-purpose interface compatible MR-J4-A supports maximum command pulse frequency of 4 Mpulses/s.

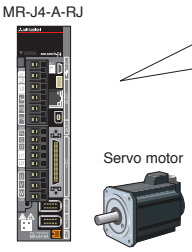


MELSERVO-J4 | Simple Positioning Function Without a Controller such as Positioning Module

Servo Amplifier with Built-in Positioning Function

Available in the future

A simple positioning system can be configured without a controller such as Positioning module since the positioning function (point table and program methods, and indexer positioning operation) is built into the MR-J4-A-RJ servo amplifier.



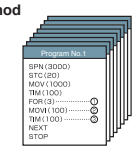
Built-in positioning function!
A controller such as Positioning module is not required!

Point table method

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

Setting position data (target position), servo motor speed, and acceleration and deceleration time in the point table is as easy as setting parameters.

Program method

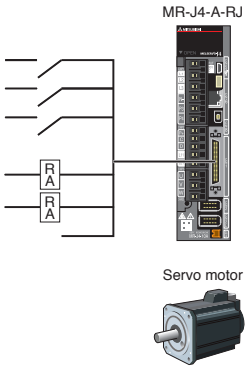


Positioning operation is performed according to the program that is created in advance.

Indexer positioning operation
Positioning to a set number of equally divided stations is possible.

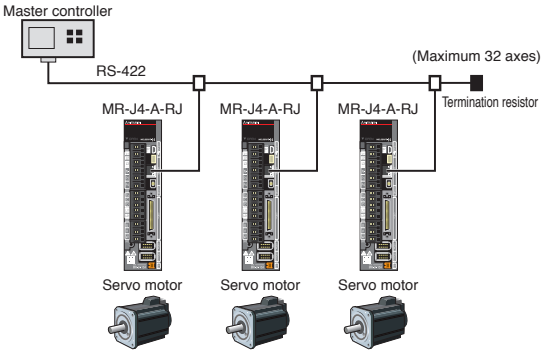
Simple positioning using DI/O

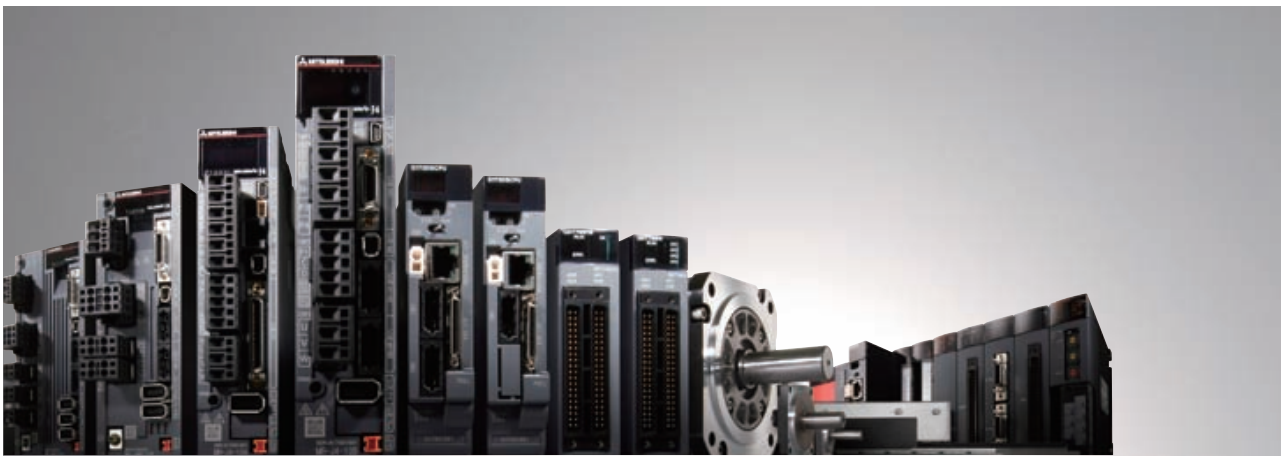
Positioning operation is performed using digital I/O.

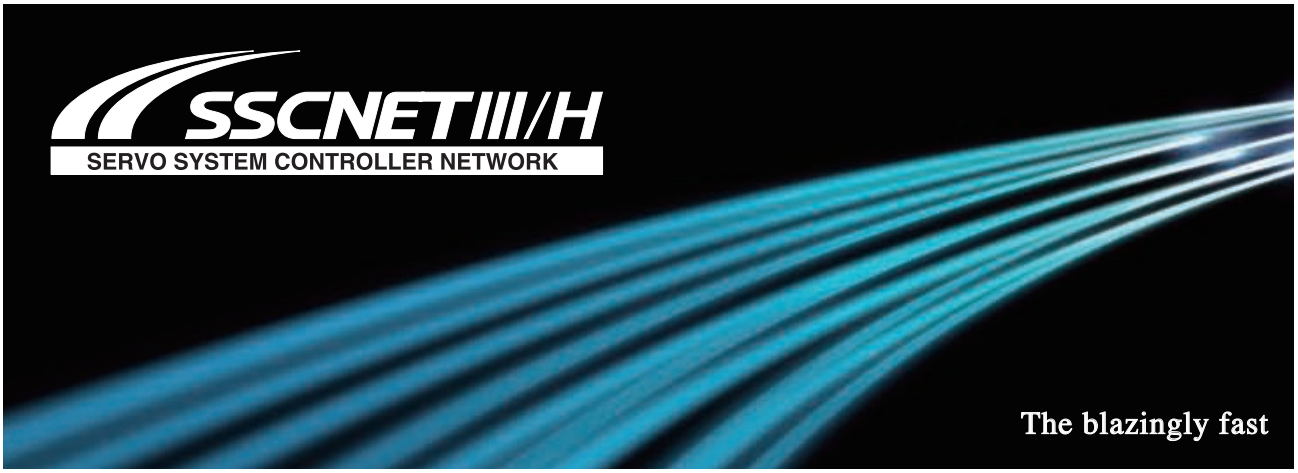


Serial communication via RS-422

Positioning operation is performed by connecting the servo amplifiers in the multi-drop configuration.
Each servo amplifier can be started from the master controller.
Since the RS-422 protocol communication specifications are disclosed, a program can be created by a customer.







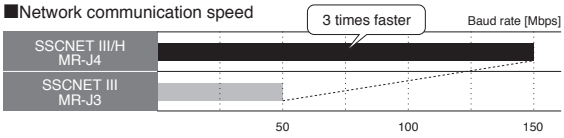
MELSERVO-J4 | High-response System Achieved with SSCNET III/H

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.

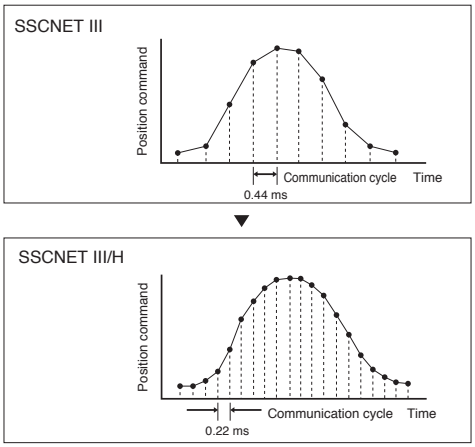
■Network communication speed



Cycle Times as Fast as 0.22 ms

Industry-leading levels

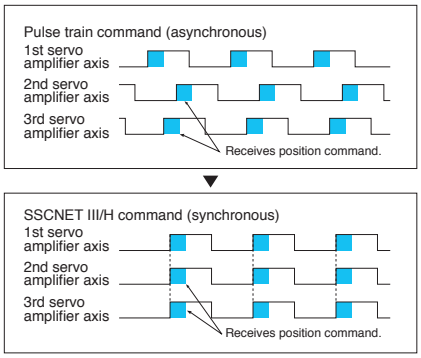
Smooth control of machine is possible using high-speed serial communication with cycle times of 0.22 ms.



Deterministic and Synchronized Communication

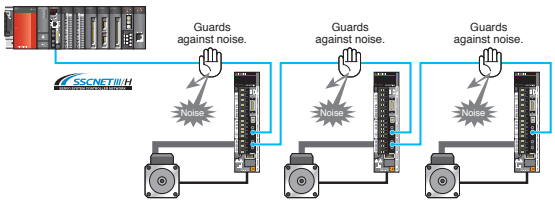
Complete deterministic and synchronized communication is achieved with SSCNET III/H, offering technical advantages in machines such as printing and food processing machines that require synchronous accuracy.

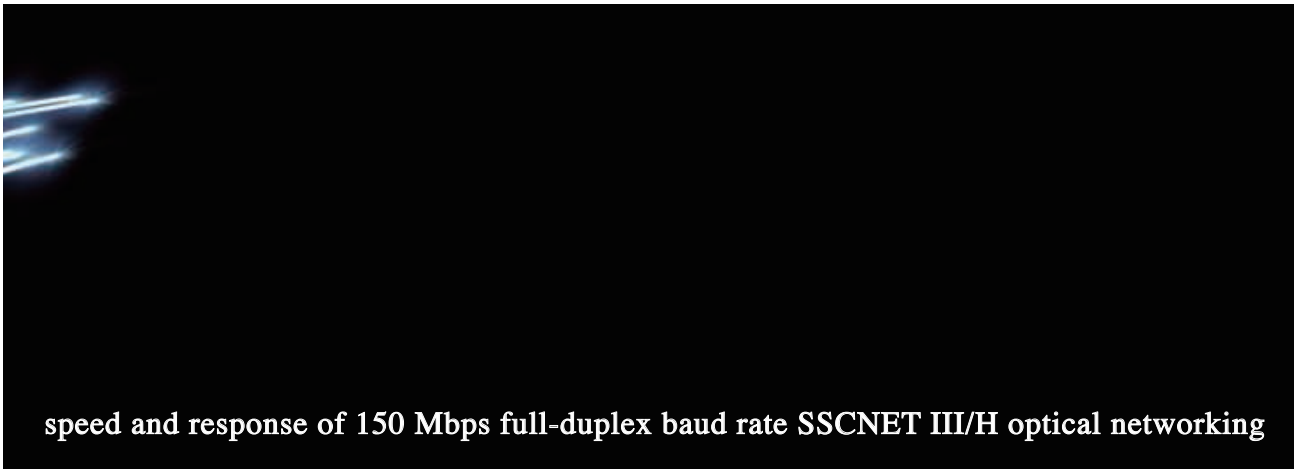
■Timing of servo amplifier processing



No Transmission Collision

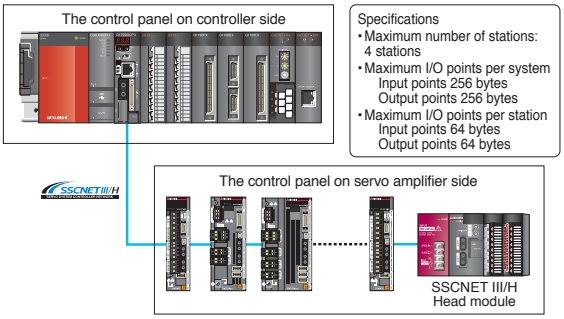
The fiber-optic cables thoroughly shut out noise that enters from the power cable or external devices. Noise tolerance is dramatically improved as compared to metal cables.





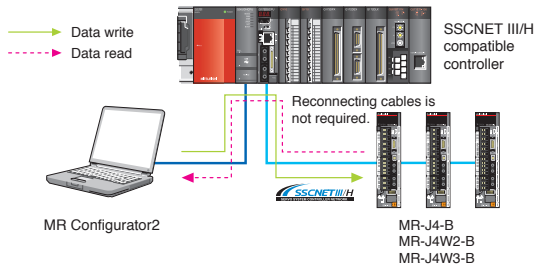
Dramatically Reduced Wiring

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.



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.

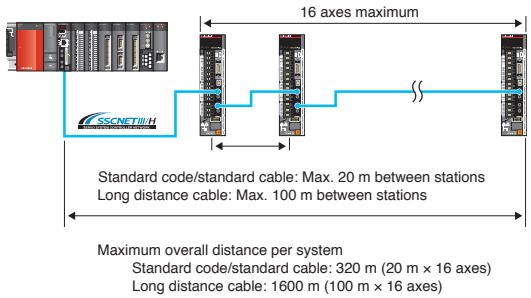


Long Distance Wiring up to 1600 m

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.

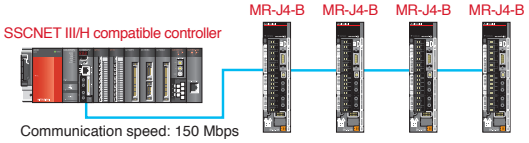


SSCNET III/H Compatible and SSCNET III Compatible Products Connected in a Same System

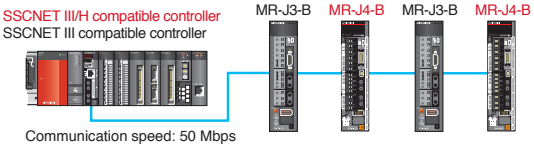
SSCNET III/H and SSCNET III compatible controllers support the use of SSCNET III/H and SSCNET III compatible servo amplifiers together in a same system.

* 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-J4W_-B



■SSCNET III compatible controller and MR-J3_-B in a same system*

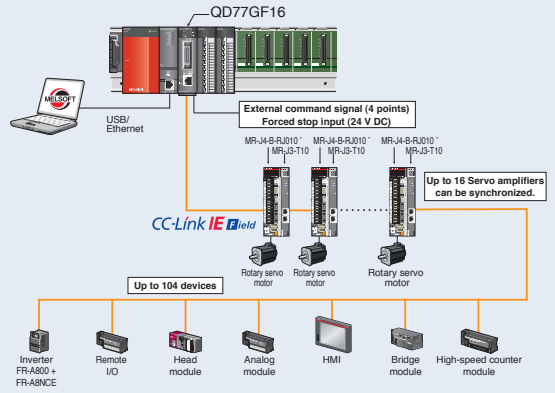


CC-Link IE Field — Ethernet-based open network

MELSERVO-J4 | All-rounder Network to Open up New Areas of Control

All-rounder Network

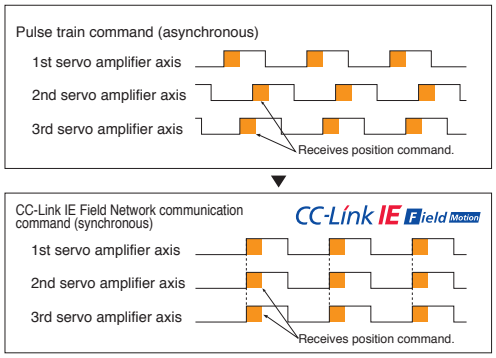
CC-Link IE Filed Network is an Ethernet-based open network. Its highly flexible wiring to match your device layout can perform high-speed controller distributed control, I/O control and safety control. Because the CC-Link IE Field Network is based on the Ethernet, cables and connectors are highly available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



* As MR-J4-B-RJ010 servo amplifier is designed exclusively for Motion control, use QD77GF Simple Motion module for a controller. (As of December 2013)

Motion Control Achieved

CC-Link IE Field Network is now equipped with 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.

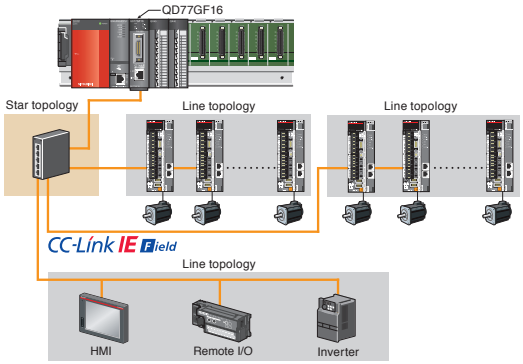


Flexible Network Topology

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

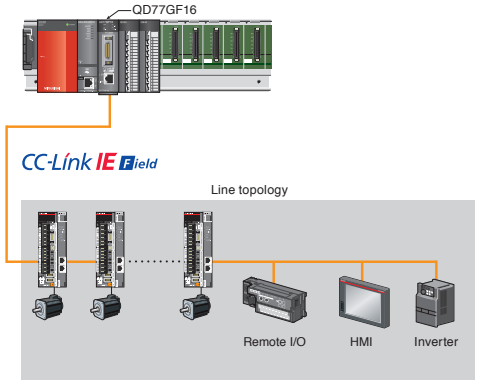
Line/star mixed topology

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



Line topology

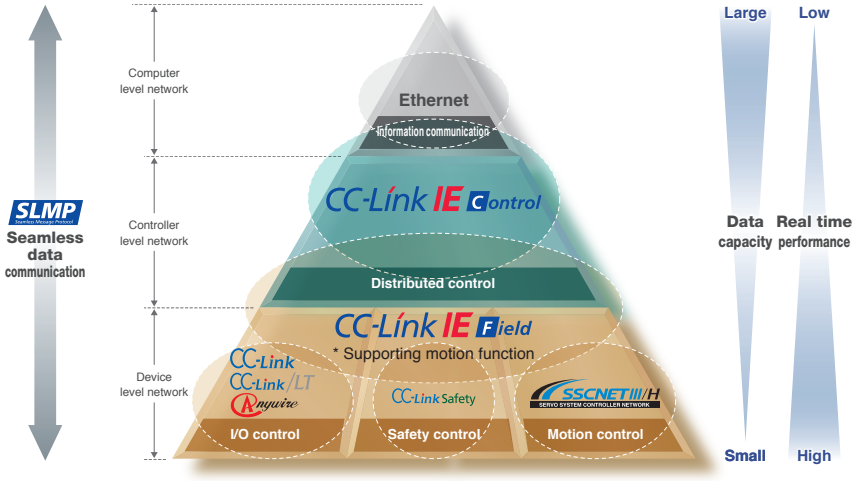
The Simple Motion modules (Master station) can be connected to slave devices without using a HUB, which reduces cost.



Seamless communication between upper-level information systems and lower-level field systems

MELSERVO-J4 | FA Integrated Network for Optimal FA Environment

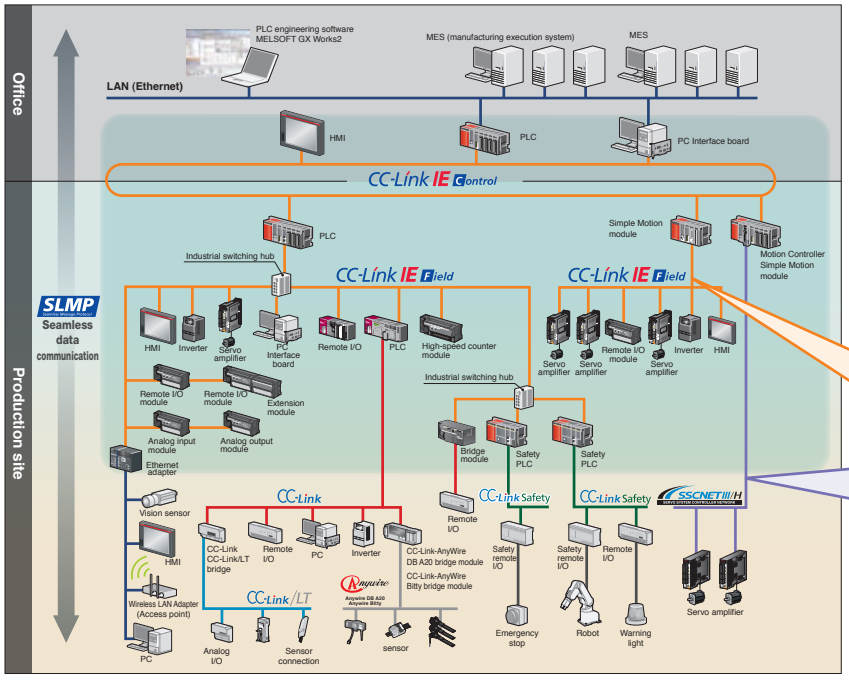
Seamless Data Communication with FA Integrated Network



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.



CC-Link IE Field
- Ethernet-based open network
- One network supports from I/O to Motion control.

SSCNET III/H
SERVO SYSTEM CONTROLLER NETWORK
- High-speed, high-performance servo network to maximize the servo performance.
- Improved noise tolerance with optical communication.

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

The easy-to-use MR-J4 was created with human needs in mind. It meets world-class safety standards and is exceptionally simple to maintain, ensuring optimum setup and operating ease for both design and manufacturing personnel.

Man

MITSUBISHI SERVO AMPLIFIERS & MOTORS

MELSERVO-J4

Advanced features for world-class safety

MELSERVO-J4 | Equipped with the Safety Observation Function

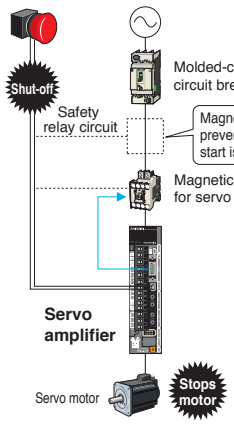
Functions According to IEC/EN 61800-5-2

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)

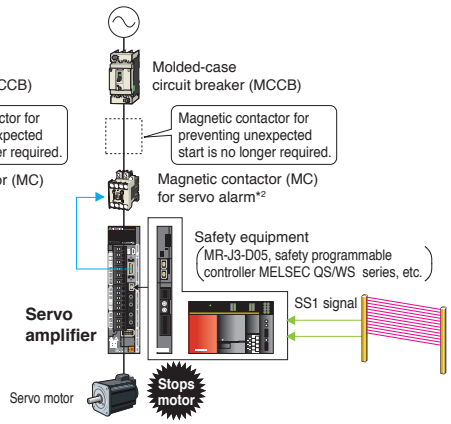
- Turning off the control power of servo amplifier is not required, cutting out the time for restart. Additionally, home position return is not required.
- Magnetic contactor for preventing unexpected motor start is not required.*2

*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.

[Shut-off by STO]



[Shut-off by STO and SS1]

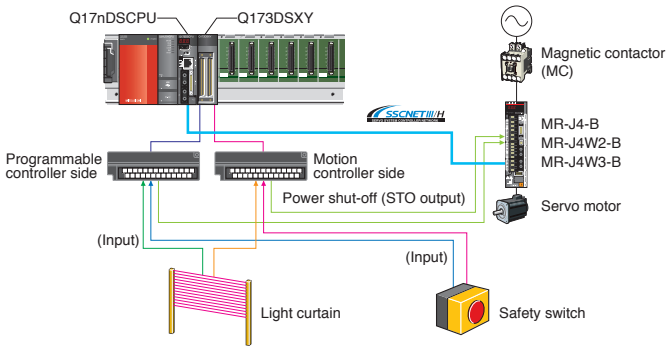


Improving Safety Level by Combining MR-J4 with Motion Controller

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

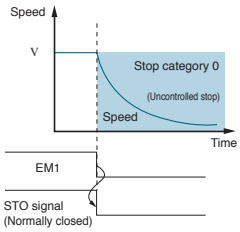
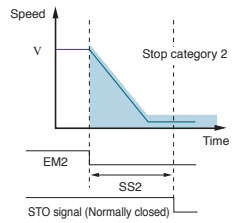
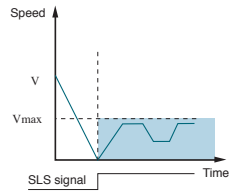
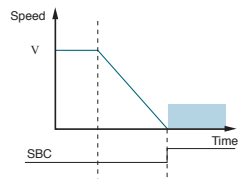


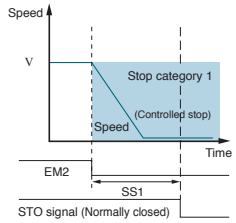
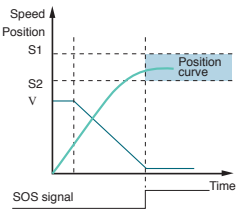
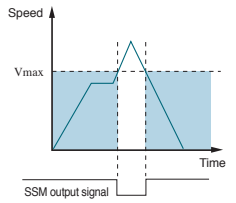
More Safety Integrated Products in the Future

Further safety integrated products will be available in the future.

Achieving IEC/EN 61800-5-2 Functions

(1) Servo amplifier only
(2) Servo amplifier + Safety logic unit "MR-J3-D05"
(3) Servo amplifier + Motion controller "Safety Observation Function"

IEC61800-5-2 Safety standard		(1)	(2)	(3)
Safe torque off (STO) The STO function shuts off power to the motor electronically using the internal circuit by responding to the input signal (EM1) from external equipment (shuts off through secondary-side output). This function corresponds to the Stop category 0 of IEC 60204-1.		○	○	○
Safe stop 2 (SS2) Responding to the input signal (EM2) from external equipment, the motor starts to decelerate. After the set delay time for motor stop is passed, execute the SOS function. This function corresponds to the Stop category 2 of IEC 60204-1.		—	—	○
Safely-limited speed (SLS) This function monitors the motor not to exceed the required speed limit. If the speed exceeds the limit, the motor power is shut off by the STO or SS1 function.		—	—	○
Safe brake control (SBC) The SBC signals are outputted for external brake control.		—	—	○

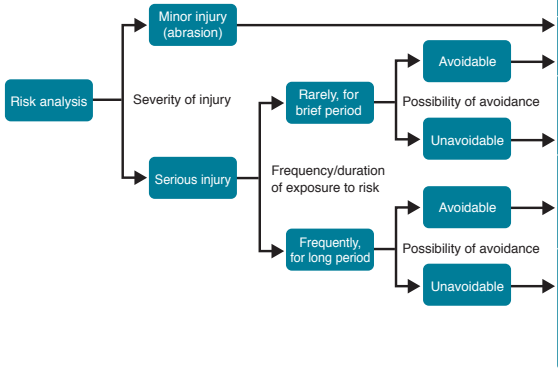
IEC61800-5-2 Safety standard		(1)	(2)	(3)
Safe stop 1 (SS1) Responding to the input signal (EM2) from external equipment, the motor starts to decelerate. After the set delay time for motor stop is passed, execute the STO function. This function corresponds to the Stop category 1 of IEC 60204-1.		—	○	○
Safe operating stop (SOS) This function monitors the position of the motor not to deviate from the specified range. Power is still supplied to the motor during the SOS function.		—	—	○
Safe speed monitor (SSM) The SSM signals are outputted when the motor speed is below the specified speed limit.		—	—	○

○: Available
—: Not available
V: Speed
Vmax: User specified speed limit value
S1, S2: Specified stop position
Ensured safety range

Safety Category

ISO13849-1 Safety categories

"Safety categories" are indicators used to determine specific safety measures based on risk assessment results.



■Safety category requirements

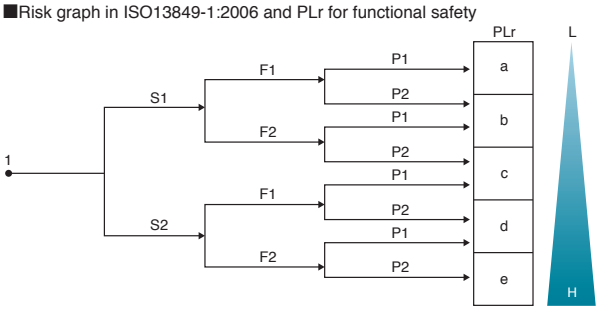
Category	Requirement summary	System behaviour
B	• Shall realize the intended functions of safety- related parts of the machine control system.	• The occurrence of a fault can lead to the loss of the safety function.
1	• Shall meet the requirements of Category B. • Shall use well-examined reliable components and observe safety principles.	• The same as Category B, but the safety-related part has more reliable safety function.
2	• Shall meet the requirements of Category B. • Shall observe safety principles. • Shall check the safety function at appropriate intervals.	• Although the loss of the safety function can be detected by checking, the safety function is lost between checks.
3	• Shall meet the requirements of Category B. • Shall observe safety principles. • Design requirements: A single fault shall not lead to the loss of the safety function. • Detect as many single faults as possible.	• The safety function is not lost by a single fault. • Some but not all faults can be detected. Accumulation of undetected faults may lead to the loss of the safety function.
4	• Shall meet the requirements of Category B. • Shall observe safety principles. • Design requirements: Detect a single fault at or before executing safety function. In cases where this is not possible, the safety function shall not be disabled by accumulated faults.	• The safety function is always in effect whenever a fault occurs. • Faults will be detected in time to prevent the loss of the safety function.

ISO13849-1:2006 Performance level

Performance levels for safety-related parts of control systems have been revised in ISO13849-1:2006.
Based on the original safety categories, frequency of a dangerous failure occurrence (the safety function does not work when needed), rate of a failure detection by diagnostics, etc. were added to evaluate comprehensively. The evaluation result is classified into five levels from "a" to "e" by the performance level (PL).

●Like the safety categories, the risk is evaluated from a perspective of "S: Severity of injury," "F: Frequency or duration of exposure to risk," and "P: Possibility of avoidance."

■Risk graph in ISO13849-1:2006 and PLr for functional safety



S	F	P
Severity of injury	Frequency or duration of exposure to risk	Possibility of avoiding or deterring risk
S1	F1	P1
Minor injury	Rarely to low frequency or for a brief period	Possible under certain conditions
S2	F2	P2
Serious injury	Frequently to continuously or for a long period	Almost impossible

Enhanced operating ease and drive stability

MELSERVO-J4 | Maintenance Function to Achieve TCO* Reduction

* TCO : Total Cost of Ownership

Compatible with SEMI-F47

MELSERVO-J4 series servo amplifier complies with SEMI-F47 standard* and therefore is useful to be used in semiconductor/LCD manufacturing systems. (The standard is not applied for 1-phase input.)

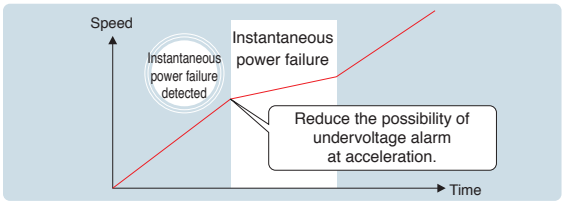
* The control power supply of the servo amplifier complies with SEMI-F47. Note that the backup capacitor may be required depending on the power impedance and operating situation for the instantaneous power failure of the main circuit power supply. Be sure to perform a test on your machine to meet the SEMI-F47 Voltage Sag Immunity Standard. Please use the 3-phase power supply for the servo amplifier input.

Tough Drive Function

Enhanced functions

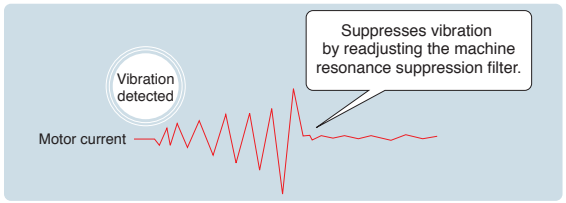
Instantaneous power failure tough drive

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



Vibration tough drive

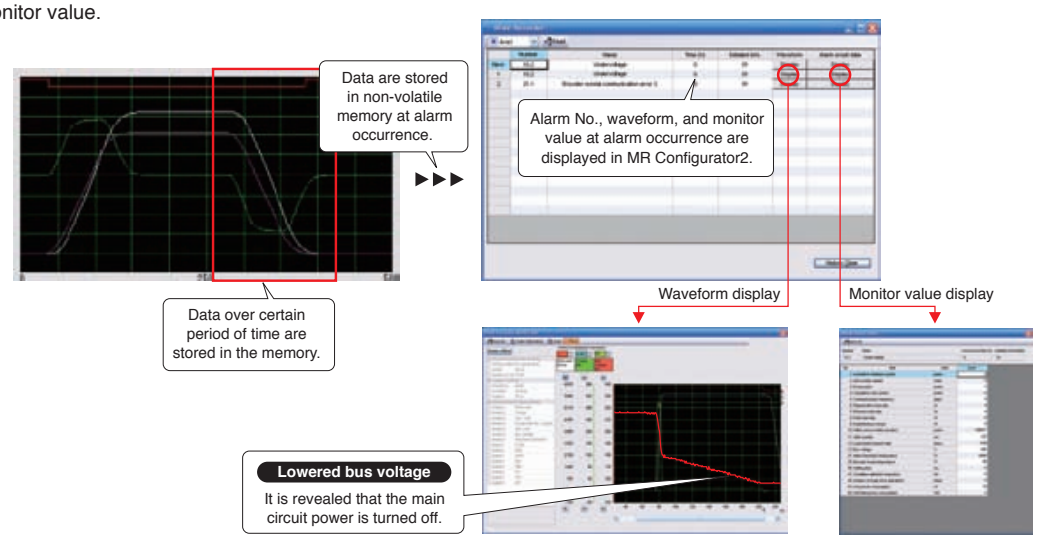
Machine resonance suppression filter is automatically readjusted when a change in machine resonance frequency is detected by the servo amplifier. Losses from the machine stop due to age-related deterioration are reduced.



Large Capacity Drive Recorder

Patent pending Enhanced functions

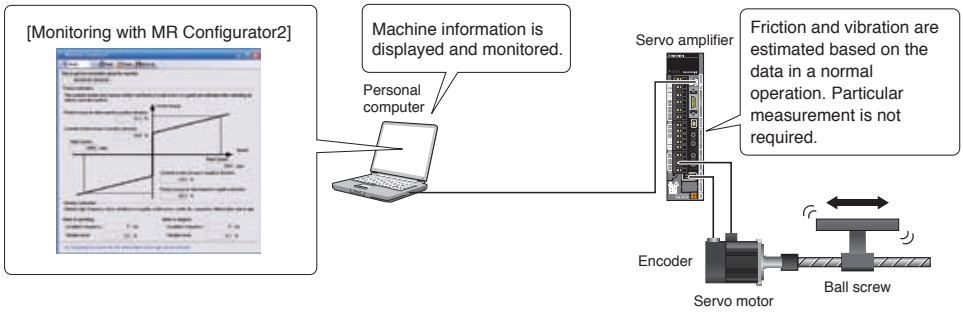
- Servo data such as motor current and position command before and after the alarm occurrence are stored in non-volatile memory of the servo amplifier.
  The data read on MR Configurator2 during restoration are used for cause analysis.
- Check the waveform ((analog 16 bits × 7 channels + digital 8 channels) × 256 points) of 16 alarms in the alarm history and the monitor value.



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.



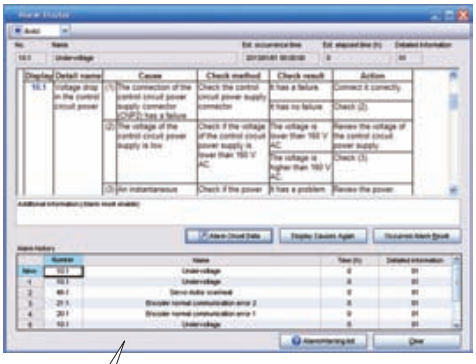
Three-digit Alarm

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

[Three-digit alarm display]

This display is of MR-J4-A.

[Example of an alarm window on MR Configurator2]



For the undervoltage alarm, whether the alarm occurred in the main or the control circuit is identified by the alarm No.

User-friendly software for easy setup, tuning and operation

Servo setup software

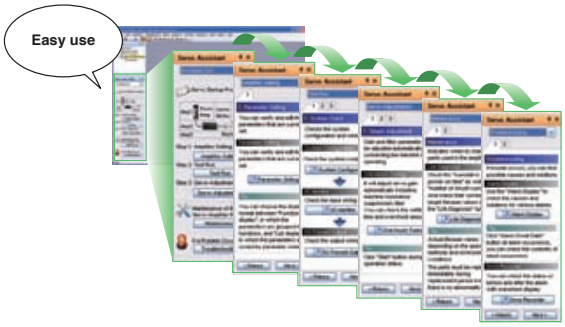
MR Configurator2 (SW1DNC-MRC2-E)

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.

MELSERVO-J4 | Preparation

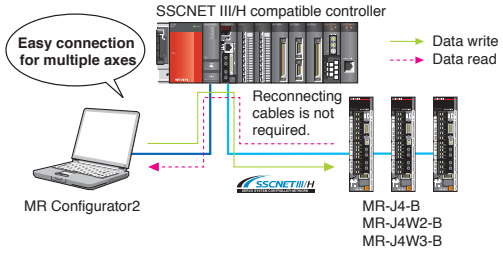
Servo Assistant Function

Complete setting up the servo amplifier just by following guidance displays. Setting parameters and tuning are easy since related functions are called up from shortcut buttons.



Using MR Configurator2 via Motion Controller

MR Configurator2 can be used with MT Developer2 on a personal computer that is connected to a Motion controller. Information such as parameter settings and monitoring for the multiple servo amplifiers is consolidated easily just by connecting the Motion controller and the personal computer with cables.



MELSERVO-J4 | Setting and Startup

Parameter Setting Function

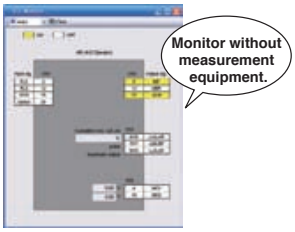
Display parameter setting in list or visual formats, and set parameters by selecting from the drop down list. Set in-position range in mechanical system unit (e.g. µm). Parameter read/write time is approximately one tenth of the conventional time.

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. Assigning input/output signals and monitoring ON/OFF status are also performed on the "I/O monitor" window.

[Display all] window

[I/O monitor] window

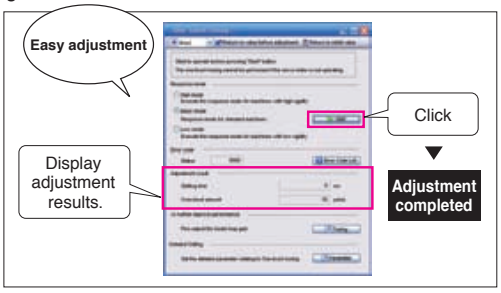


MELSERVO-J4 | Servo Adjustment

One-touch Tuning Function

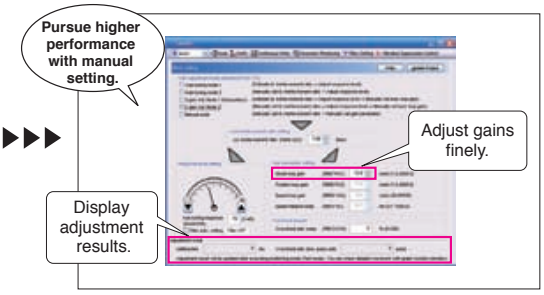
NEW

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. Check the adjustment results of settling time and overshoot.



Tuning Function

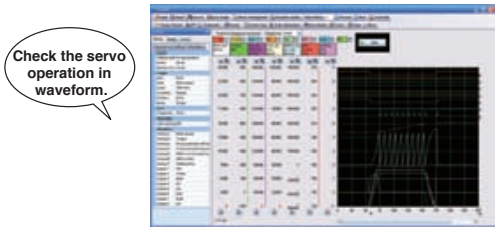
Adjust control gain finely on the [Tuning] window manually for further performance after the one-touch tuning.



Graph Function

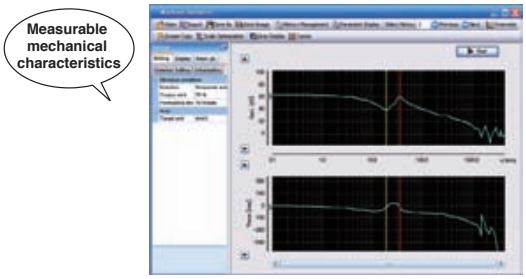
Enhanced functions

The number of measurement channels is increased to 7 channels for analog, and 8 channels for digital. Display various servo statuses in the waveform at one measurement, supporting setting and adjustment. Convenient functions such as [Overwrite] for overwriting multiple data and [Graph history] for displaying graph history are available. Waveform measurement for the connected axes is simultaneously performed via Motion controller communication.



Machine Analyzer Function

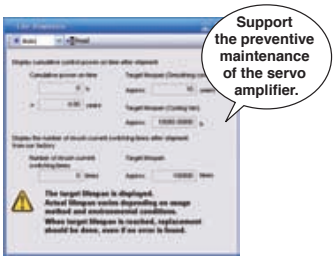
Input random torque to the servo motor automatically and analyze frequency characteristics (0.1 Hz to 4.5 kHz) of a machine system just by clicking the [Start] button. This function supports setting of machine resonance suppression filter, etc.



MELSERVO-J4 | Maintenance

Servo Amplifier Life Diagnosis Function

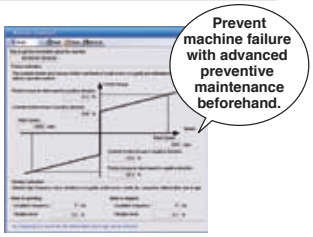
Check cumulative operation time and on/off times of inrush relay. This function provides an indication of replacement time for servo amplifier parts such as capacitor and relays.



Machine Diagnosis Function

NEW

This function estimates and displays machine friction and vibration in normal operation without any special measurement. Comparing the data of the first operation and after years of operation helps to find out the aging deterioration of machine and is beneficial for preventive maintenance.



The Environment

MITSUBISHI SERVO AMPLIFIERS & MOTORS

MELSERVO-J4

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

The MR-J4 series was designed with the environment in mind. In addition to helping you reduce your energy consumption, MR-J4 servos have a small footprint and simple wiring requirements that help save space and valuable resources.

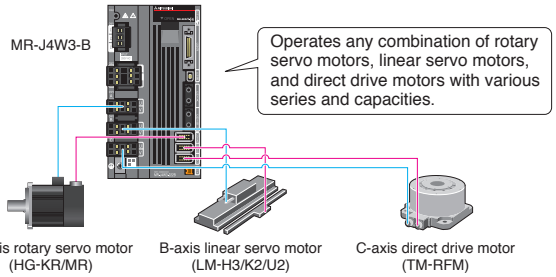
Designed to cut waste and save on space, wiring, and energy use

MELSERVO-J4 | 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*.

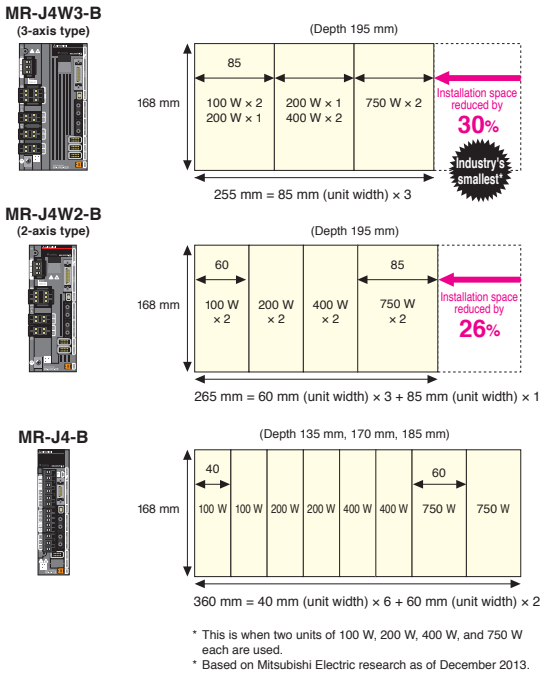
* For the combination, refer to "Combinations of Multi-Axis Servo Amplifier and Servo Motors" on p. 1-4 in this catalog.



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]

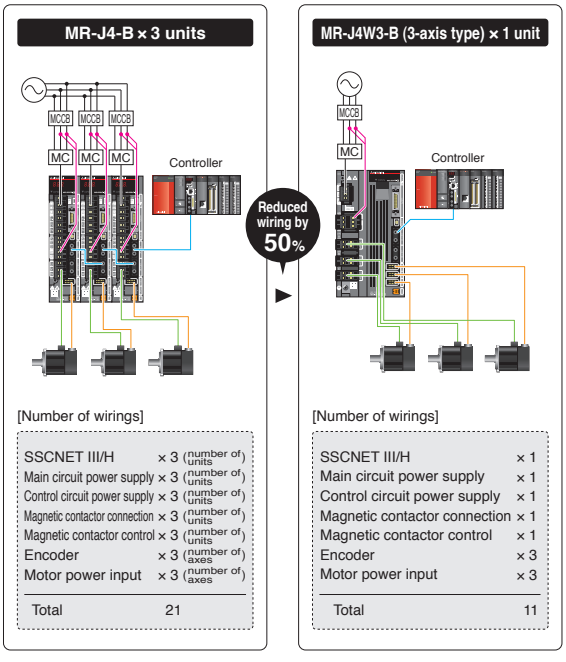


* This is when two units of 100 W, 200 W, 400 W, and 750 W each are used.
* Based on Mitsubishi Electric research as of December 2013.

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]



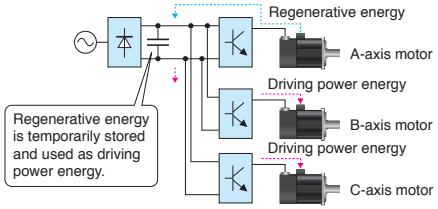
Eco-friendly performance, designed to save energy in every detail

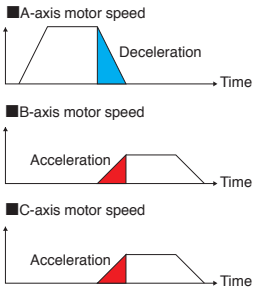
MELSERVO-J4 | Optimal Energy-conservative System for Your System

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 option 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.



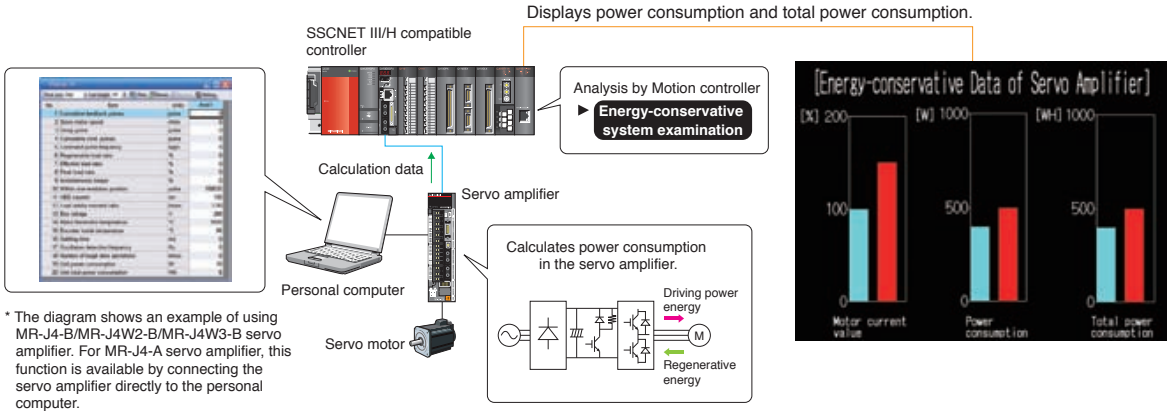


[Reusable energy]

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

Power Monitor Function

Driving power and regenerative energy are calculated from the data in the servo amplifier such as speed and current. Motor current value, power consumption, and total power consumption are monitored with MR Configurator2. In SSCNET III/H system, data are transmitted to a Motion controller, and the power consumption is analyzed and displayed.

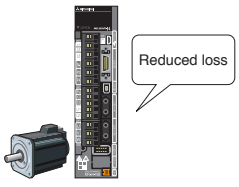


* The diagram shows an example of using MR-J4-B/MR-J4W2-B/MR-J4W3-B servo amplifier. For MR-J4-A servo amplifier, this function is available by connecting the servo amplifier directly to the personal computer.

Advanced Function and Performance for More Energy-conservation

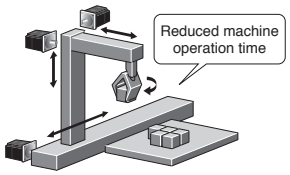
Reduced energy loss of servo amplifier and servo motor

[Servo amplifier]
Efficiency is increased by the use of a new power module.
[Servo motor]
Motor efficiency is increased by optimized design of magnetic circuit.



Energy-conservation due to the improved machine performance

Thanks to the driving system configured by servo amplifier and servo motor with industry-leading level of high performance, machine tact time and operation time are reduced, achieving energy-conservation.

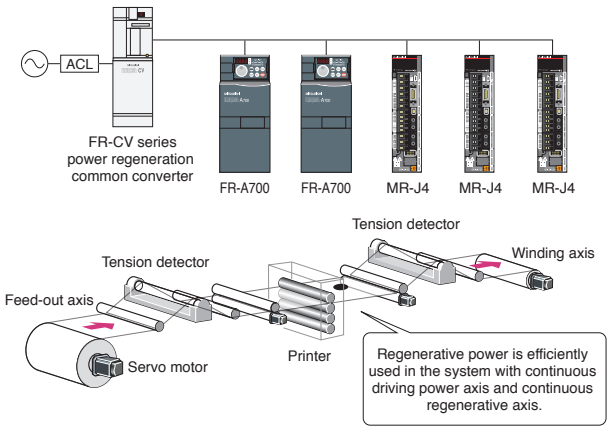


Optimal Energy-conservative Machine System

PN bus voltage connection + power regeneration common converter

Regenerative energy is used efficiently when multiple servo amplifiers and inverters are connected through common PN bus to the power regeneration common converter.

* System only with common PN bus connection is also possible to be configured without using the power regeneration common converter. However, there are restrictions depending on the system. Contact your local sales office for more details.
* Refer to MR-J4-B(-RJ)/A(-RJ) Servo Amplifier Instruction Manual for selection of FR-CV series power regeneration common converter.



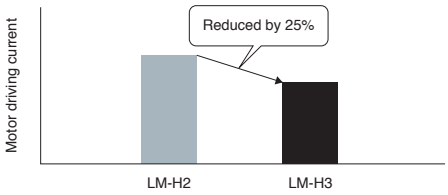
Energy-conservation Achieved by LM-H3 Linear Servo Motor Series

NEW

Reduced motor driving power

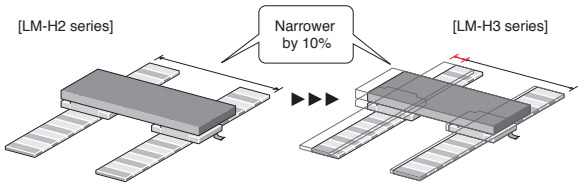
LM-H3 has achieved a reduction of 25% in motor driving current due to a new magnetic design with optimized magnet form, contributing to power conservation for machines. The motor coil is lighter as compared to the prior model, which also contributes to saving energy for driving the moving part.

* For 720 N rated linear servo motor.



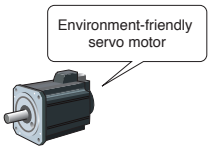
Space saving

For LM-H3, widths of the motor coil and the magnet are reduced by 10% from the prior model. Increased thrust to current ratio results in using the servo amplifier in smaller capacity, contributing to more compact machine (the reduction of materials).



Contribution to Resource-saving

The new environment-friendly HG rotary servo motor series uses 30% less permanent magnet than the prior HF series due to the optimized design of magnetic circuit. The total mass is also reduced. * For HG-KR43.



Heritage

MITSUBISHI SERVO AMPLIFIERS & MOTORS

MELSERVO-J4

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

The MR-J4 series integrates seamlessly with your existing manufacturing assets, ensuring a smooth transition to the speed and cost benefits of leading-edge MELSERVO technology.

The speed and cost benefits achieved with the existing manufacturing assets

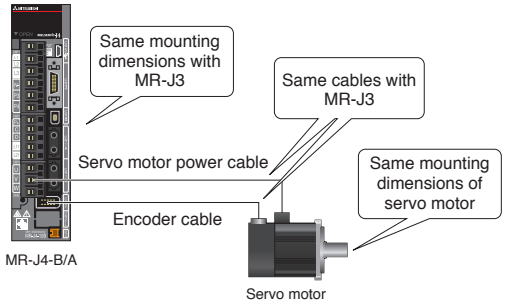
MELSERVO-J4 | Seamless Integration with Existing System

Easy Replacement of MR-J3 Series

Compatible mounting

●MR-J4-B/A has the same mounting dimensions*1 with MR-J3-B/A. 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.

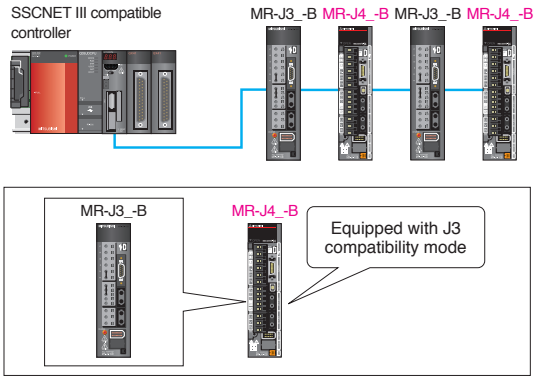
*1. Mounting dimensions are smaller for 200 V 5 kW, 400 V 3.5 kW, 200 V/400 V 11 kW, and 200 V/400 V 15 kW servo amplifiers.
*2. 200 V/400 V 11 kW and 15 kW of HG-JR series use a different encoder cable from HF-JP series.



When not changing the controller to SSCNET III/H controller

●MR-J4-B/MR-J4W2-B/MR-J4W3-B servo amplifier has J3 compatibility mode. By operating in J3 compatibility mode, MR-J4 series servo amplifier and MR-J3 series servo amplifier can be used together in a same system without changing the existing controller. Some of the new functions of MR-J4 series such as the advanced one-touch tuning function can be used with the J3 extension function.

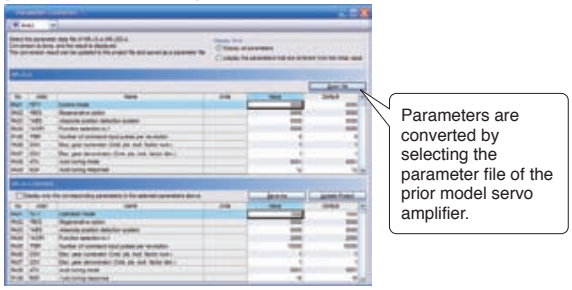
* When the SSCNET III compatible products are in the system, the communication speed is 50 Mbps, and the function and the performance are equivalent to those of MR-J3.
* Some functions may not be available in the J3 compatibility mode. Refer to relevant Servo Amplifier Instruction Manual for details.



Parameter conversion

●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.)

[Parameter converter window]

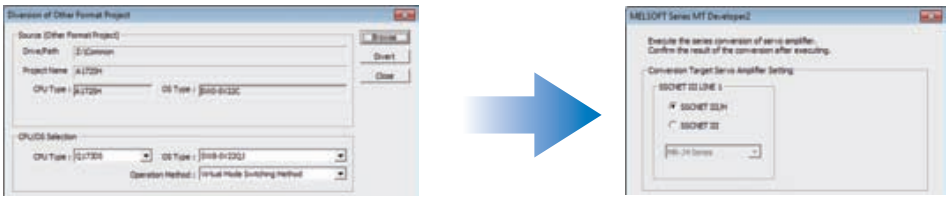


Easy Replacement of MR-J2-Super Series

For renewing the units to MR-J4 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.)

[MT Works2 window]



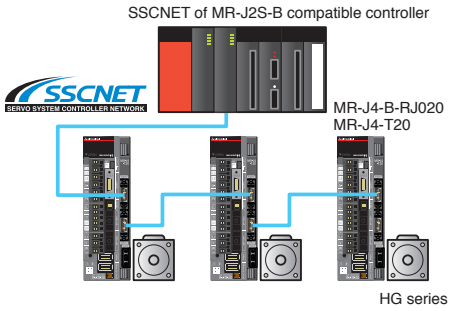
Diversion of other format project window

Servo amplifier conversion window

When not changing the controller to SSCNET III/H controller

●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.*
Thus, renewing the units other than the controller to MR-J4 series is possible without changing the existing controller.

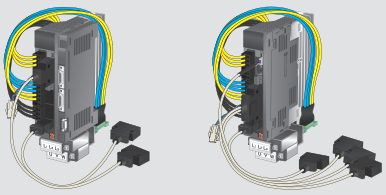
* The function and performance are equivalent to those of MR-J2S-B. (J2S compatibility mode)
* Refer to "New Product Release of Conversion Unit for SSCNET of MR-J2S-B" and "MR-J4-_B_-RJ020 MR-J4-T20 Servo Amplifier Instruction Manual" for details.



The set of MR-J4-B-RJ020 and MR-J4-T20 is compatible with the following servo system controllers:
A171SHCPU(N), A172SHCPU(N), A173UHCPU, A1SD75M, QD75M, Q172CPU(N), and Q173CPU(N)

When using the existing connections

●MR-J2S-B renewal tool manufactured by Mitsubishi Electric System & Service Co., Ltd. is available when using the existing HC/HA series servo motors or when replacing MR-J2S-B using the existing connections.
This renewal tool enables to use the existing mounting holes and wiring, and the replacement and wiring can be completed in a short period of time.
For MR-J2S-B renewal tool, contact your local sales office.



Renewal tool
MR-J4-B-RJ020
MR-J4-T20

Renewal tool
MR-J4-A

Mitsubishi Electric System & Service Co., Ltd.

Renewal related materials

●We provide support for the renewal with the following materials from the catalog of renewal introduction, the handbook with detailed information to the instruction manual for the renewal tool to use the existing connections.

MELSERVO-J2-Super
Transition Guide catalog
L(NA)03091

Upgrading MR-J2S to MR-J4 is introduced.

Transition from
MELSERVO-J2-Super/J2M Series to
J4 Series Handbook
L(NA)03093

This handbook explains how to replace your MR-J2S/J2M to MR-J4 series.

New Product Release of Conversion Unit for SSCNET of MR-J2S-B
SV1306-1

This brochure announces a new release of MR-J4-B-RJ020 and a conversion unit for connecting to SSCNET of MR-J2S-B. Specifications of the servo amplifier and the conversion unit are also listed.

Conversion Unit for SSCNET of MR-J2S-B Compatible
MR-J4-_B_-RJ020/MR-J4-T20
SERVO AMPLIFIER INSTRUCTION MANUAL
SH-030125

This instruction manual describes MR-J4-B-RJ020 and MR-J4-T20 conversion unit for SSCNET of MR-J2S-B.

MR-J2S Renewal Tool Catalog
X901307-312

This guide introduces a renewal tool for replacing MR-J2S to MR-J4. The renewal tool allows to use the existing wiring and mounting holes, making the replacement simple and fast.

Manual for Replacement from
MELSERVO-J2S Series Using
MR-J2S Renewal Tool
X903130707

This handbook explains how to replace your MR-J2S to MR-J4, using the renewal tool. Be sure to read through this handbook when considering and implementing the replacement.

Mitsubishi Electric System & Service Co., Ltd.

Various Basic Functions

Position/Speed/Torque control

Position/Speed/Torque control is available. With position control, positioning is performed following the position command. Position control is suitable when synchronous control or interpolation control is used. Speed control keeps the speed constant following the speed command. Torque control controls the torque to be constant using the torque command.

* MR-J4-B-RJ010 will be compatible with speed and torque controls in the future.

Control switching

Control can be switched among position, speed, and torque controls.

* Control can be switched between two of the controls for MR-J4-A.
* MR-J4-B-RJ010 will be compatible with speed and torque controls in the future.

Real-time auto tuning

The load to motor inertia ratio of a machine is always estimated from the servo motor current and speed during acceleration/deceleration. Therefore, gains such as model loop gain, position loop gain, and speed loop gain are automatically set just by setting the response level.

Model adaptive control

Control with high responsivity and high stability is achieved according to the model control.
The two-degrees-of-freedom model adaptive control enables to set the response for command and disturbance respectively.

Adaptive filter II

Adaptive filter II is a function in which the servo amplifier detects machine resonance for a predetermined period of time and sets the filter characteristics automatically to suppress mechanical system vibration. Since the filter characteristics (frequency and depth) are set automatically, it is not required to consider the resonance frequency of a mechanical system.

Low-pass filter

The low-pass filter suppresses high-frequency resonance which occurs as servo system response is increased. The filter is enabled as default, and the set frequency is automatically adjusted.

Slight vibration suppression control

This function suppresses vibration of ±1 pulse produced at a servo motor stop.

Gain switching function

This function enables to switch gains. Gains during rotation and during stop can be switched. Using a switching signal to switch gains is also possible during operation.

* Will be available with MR-J4-B-RJ010 in the future.

Internal speed command

Up to seven internal speed commands can be stored in parameters. Speed control is possible without using the analog voltage command by selecting the internal speed command with input device (DI).

* Available only with MR-J4-A.

Absolute position detection system

Merely setting a home position once makes home position return unnecessary at every power-on.

Built-in regenerative resistor

The 0.2 kW to 7 kW servo amplifiers have the built-in regenerative resistor. The compact system is achieved by the reduced option installation space.

Regenerative option

The regenerative option is used when the built-in regenerative resistor of the servo amplifier does not have sufficient regenerative capability. For 5 kW or larger servo amplifier, the brake unit is available when the regenerative option does not provide enough regenerative power.

* Available as an option.

Power regenerative common converter

The power regenerative common converter is used when the regenerative option does not provide enough regenerative power. The excessive regenerative energy is returned to the power supply, which contributes to energy-conservation.

* Available as an option.
* Available with 200 V 100 W to 22 kW and 400V 11 kW to 22 kW servo amplifiers.

Some functions may not be available depending on the models.
Refer to relevant Servo Amplifier Instruction Manual for details.

Dynamic brake

The dynamic brake is designed to stop the servo motor immediately at an alarm occurrence, power failure, or forced stop.
The dynamic brake is not for holding a shaft at a stop.

* The dynamic brake is built in the 7 kW or smaller servo amplifier.
* The external dynamic brake is required for the 11 kW or larger servo amplifier.

Close mounting

Close mounting is possible for 200 V 3.5 kW or smaller servo amplifier. Mounting space efficiency is significantly improved.

* When the servo amplifiers are closely mounted, the operation environment condition is different.

Input signal selection (device settings)

Function assigned to each pin for digital input can be changed by setting parameters.

* Available only with MR-J4-A.

Output signal selection (device settings)

Function assigned to each pin for digital output can be changed by setting parameters.

Encoder output pulse

Encoder output pulses can be outputted in the differential line driver type as A/B/Z-phase pulse. Output pulse per servo motor revolution can be set.

* MR-J4W3-B is not compatible with this function.

Monitoring (Status display)

Servo status such as regenerative load ratio, effective load ratio, instantaneous torque, servo motor speed, or droop pulses can be monitored on MR Configurator2. For MR-J4-A, the status is also confirmed on the seven-segment LED display.

Analog monitor output

Servo status such as torque, servo motor speed, and droop pulses is outputted in terms of voltage in real time.

* MR-J4W2-B/MR-J4-W3-B is not compatible with this function.

Alarm history

The last 16 alarms are recorded in the servo amplifier. The alarms can be confirmed in list using MR Configurator2.

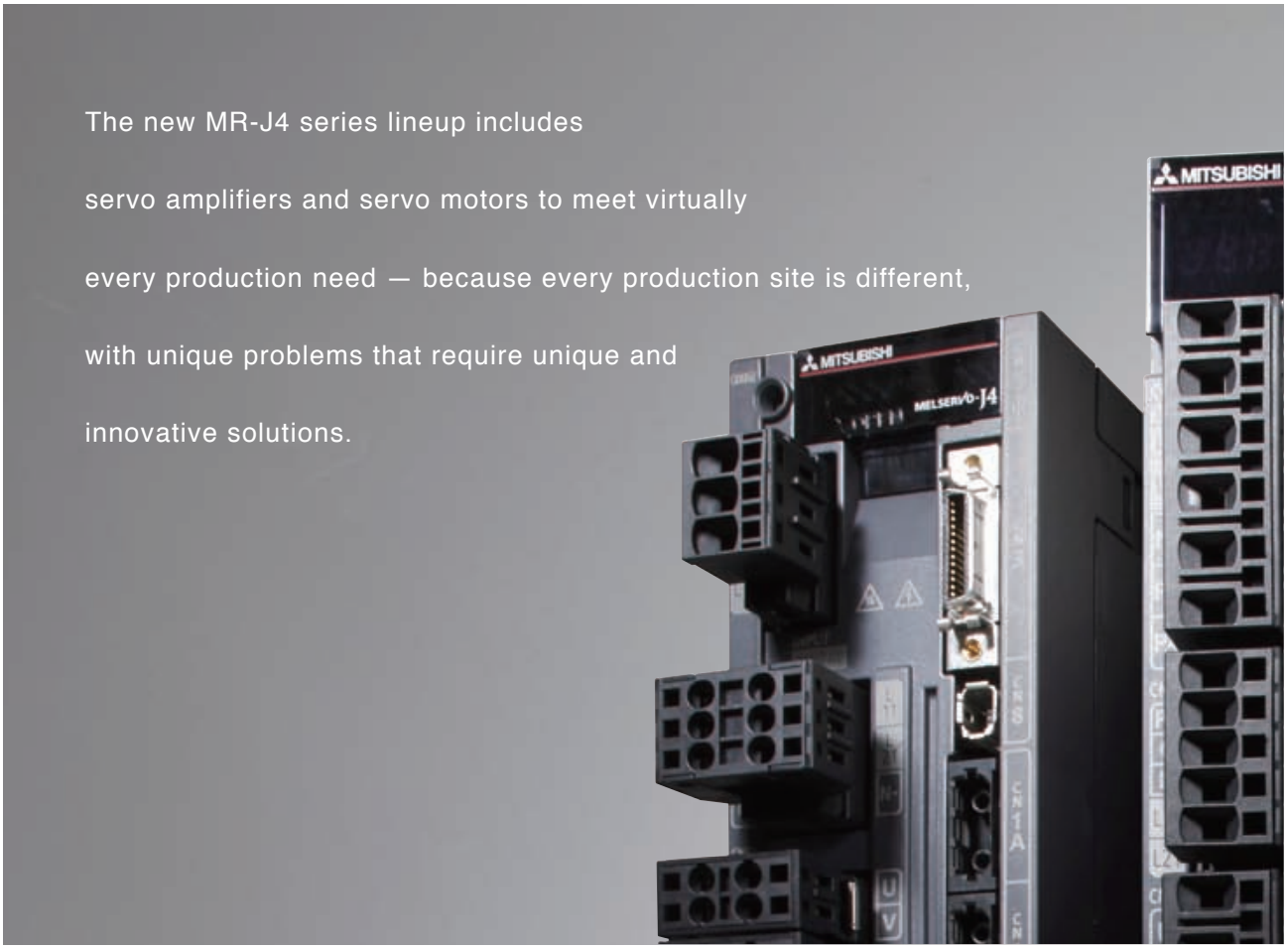
Test operation

Before starting actual operation, perform test operation to make sure that the machine operates normally. The following can be performed using MR Configurator2.

- JOG operation
  Speed control operation can be performed without the command from the controller.
- Positioning operation
  Positioning operation with position control can be performed without the command from the controller.
- Motor-less operation
  Without connecting the servo motor, output signals or status display can be provided in response to the input device as if the servo motor is actually running. This operation can be used to check the sequence of a controller, etc.
- Program operation
  Positioning operation can be performed in two or more operation patterns combined, without using the controller.
- Output signal (DO) forced output
  Output signals can be switched on/off forcibly independently of the servo status. This function is used for output signal wiring check, etc.

Some functions may not be available depending on the models.
Refer to relevant Servo Amplifier Instruction Manual for details.

A wide-ranging lineup to meet virtually every drive control need



2-axis and 3-axis types are available for your system.

Servo amplifier

MR-J4-B(-RJ)

With the SSCNET III/H compatible servo amplifier, a complete synchronous system can be configured using high-speed serial optical communication. Servo system performance and functions are utilized to the fullest when MR-J4-B(-RJ) is used combined with the servo system controller.

MR-J4W2-B

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

■Product lines

SSCNET III/H compatible, CC-Link IE Field Network interface with Motion compatible, and general-purpose interface compatible products are available.

Model	Power supply	Command interface	Compatible servo motor				
			Fully closed loop control*2	Rotary	Linear*3	Direct drive	
MR-J4-B(-RJ)*1	1-phase 100 V AC	SSCNET III/H	○ (Released in the future)	○ (Released in the future)	○ (Released in the future)	○ (Released in the future)	
	3-phase 200 V AC		●	●	●	●	
	3-phase 400 V AC		●	●	● *4	–	
MR-J4W2-B	3-phase 200 V AC 2-axis		●	●	●	●	
MR-J4W3-B	3-phase 200 V AC 3-axis		–	●	●	●	
MR-J4-B-RJ010 + MR-J3-T10	3-phase 200 V AC	CC-Link IE Field Network with Motion	–	●	–	–	
	3-phase 400 V AC		–	○ (Released in the future)	–	–	
MR-J4-A(-RJ)*1	1-phase 100 V AC	General-purpose pulse train/ analog voltage	○ (Released in the future)	○ (Released in the future)	○ (Released in the future)	○ (Released in the future)	
	3-phase 200 V AC		●	●	●	●	
	3-phase 400 V AC		●	●	● *4	–	

MR-J4W3-B

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

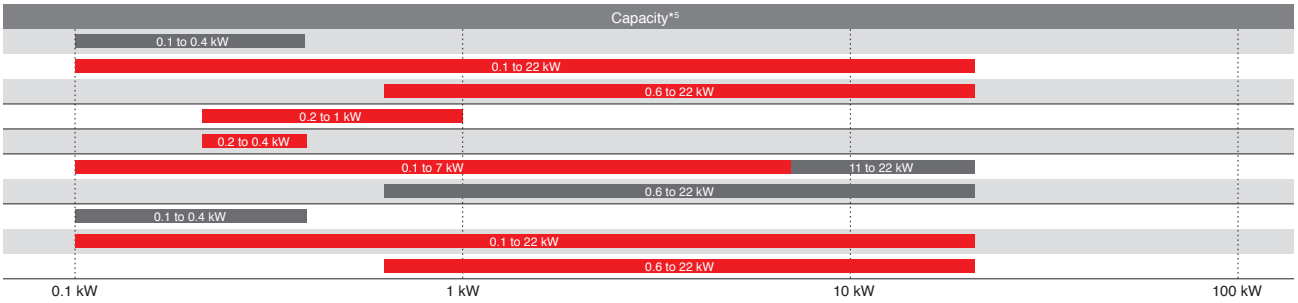
MR-J4-B-RJ010 +MR-J3-T10

The CC-Link IE Field Network interface servo amplifier with Motion is compatible with the Motion control in the Ethernet-based open network.

MR-J4-A(-RJ)

The general-purpose interface compatible servo amplifier enables position control by pulse train command and speed/torque control by analog voltage command.
The maximum command pulse frequency is 4 Mpulses/s.

*1. MR-J4-B-RJ/A-RJ servo amplifier is compatible with two-wire and four-wire type serial, and pulse train interface (A/B/Z-phase differential output type) linear encoders.
*2. MR-J4-B/A servo amplifier is compatible only with two-wire type serial linear encoder. For four-wire type serial and pulse train interface (A/B/Z-phase differential output type) linear encoders, MR-J4-B-RJ/A-RJ servo amplifier is available.
*3. MR-J4-B/A servo amplifier is compatible only with two-wire type and four-wire type serial linear encoders. For pulse train interface (A/B/Z-phase differential output type) linear encoder, MR-J4-B-RJ/A-RJ servo amplifier is available.
*4. Available only in some models. *5. ▬ will be released in the future.

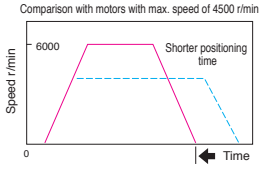


High-speed, high-torque servo motors for fast, precise machine operation

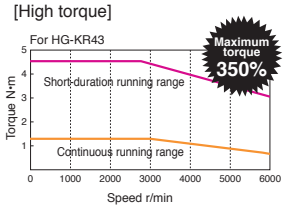
HG-KR/HG-MR Series

Rated speed: 3000 r/min
Maximum speed: 6000 r/min
Maximum torque is 350%* of the rated torque, and high torque is achieved during high-speed. * Available only in HG-KR.

[High speed]



[High torque]



HG-SR Series

This medium capacity, medium inertia servo motor enables stable operation. The industry's shortest length is achieved by optimizing the structural design.

HG-JR Series

This medium/large capacity, low inertia servo motor is suitable for high-throughput and high-acceleration/deceleration operations.

HG-RR Series

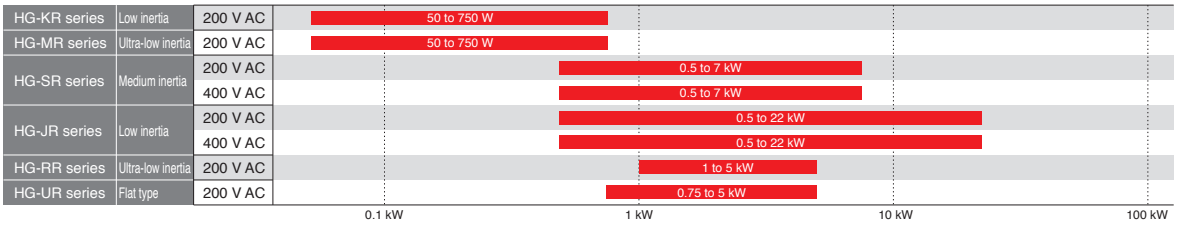
This medium capacity, ultra-low inertia servo motor is perfect for high-throughput operations.

HG-UR Series

This medium capacity, flat type servo motor is well suited for situations where the installation space is limited.

Product Lines

Wide range of series and capacities are available.



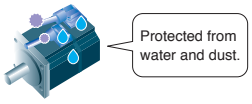
Equipped with High-resolution Absolute Position Encoder

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

Improved Environmental Safety

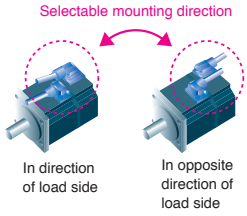
HG-KR/HG-MR/HG-RR/HG-UR and HG-SR/HG-JR are rated IP65 and IP67*1, respectively.*2

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



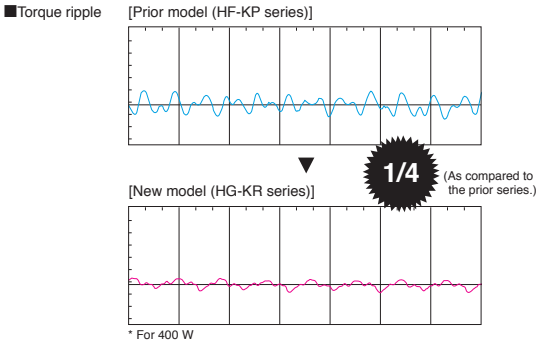
Cable Leading Direction

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)



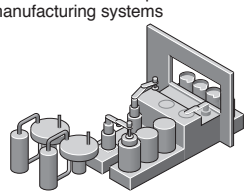
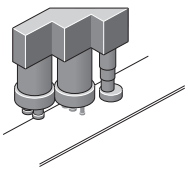
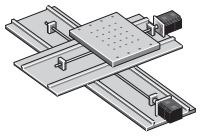
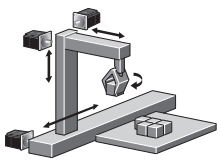
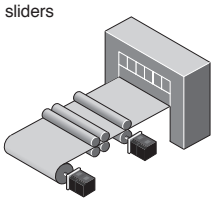
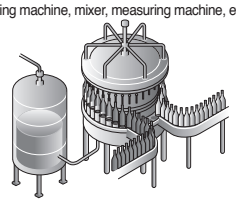
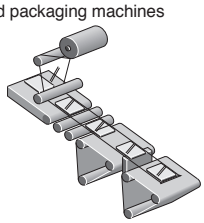
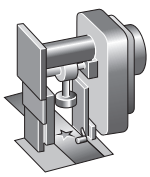
Reduced Torque Ripple during Conduction

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.



Application Examples

For various applications of every kinds of machine.

Semiconductor/LCD/photovoltaic manufacturing systems 	Mounters/bonders 	X-Y tables 	Robots 
Loaders/unloaders, feeders and sliders 	Food processing machines (filling machine, mixer, measuring machine, etc.) 	Food packaging machines 	Press machines 

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

Sophisticated Performance

- Maximum speed: 3 m/s (LM-H3 series)
- Maximum thrust range: 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.
- Four series are available: core, liquid-cooling core, magnetic attraction counter-force core, and coreless types.
- The linear servo motors are compatible with a variety of serial interface linear encoders including A/B/Z-phase differential output type linear encoders*. The linear encoder resolution ranges from 0.005 μm and up.
  * A/B/Z-phase differential output type linear encoder is compatible with MR-J4-B-RJ/A-RJ servo amplifier.
- High-performance systems such as high-accuracy tandem synchronous control are achieved using MR-J4 series servo amplifier and an SSCNET III/H compatible Motion controller.

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.

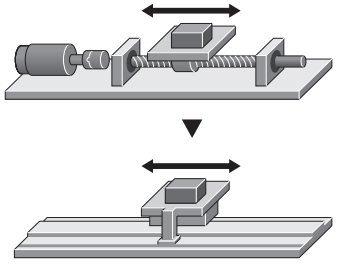
For easier use

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

For flexible machine configurations

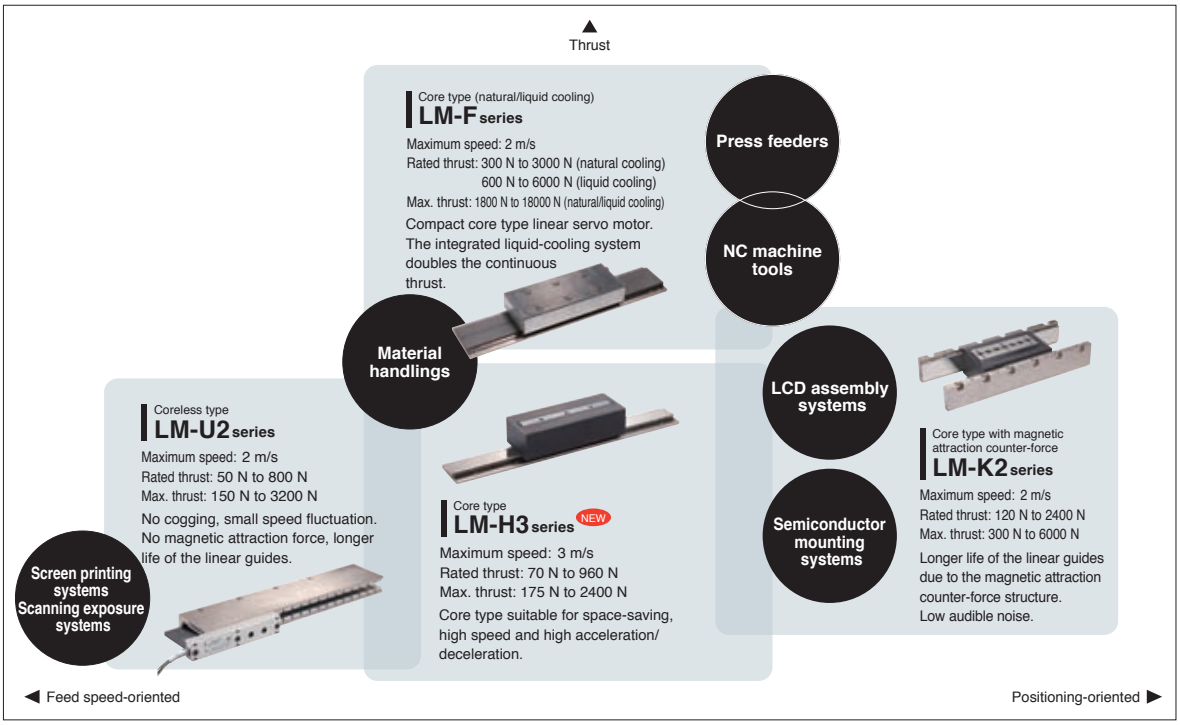
- Multi-head and tandem systems are easily configured.
- The linear servo motor is suitable for long-stroke applications.

[Offers more advantage than conventional ball screw driving systems]



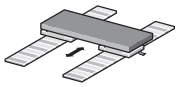
Product Lines

Four series are available depending on applications.



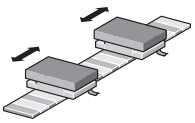
Application Examples

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



Tandem configuration

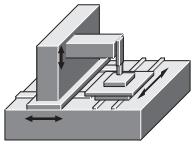
The linear servo motors configured in tandem are suitable for large systems that require highly accurate synchronous operation between two axes.



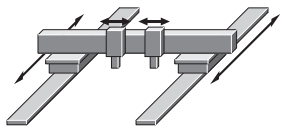
Multi-head configuration

Multi-head systems enable control of two motor coils independently, thereby simplifying machine mechanisms. This system is suitable for machines that require short tact time.

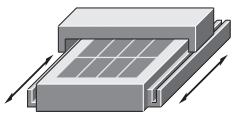
Machine tools XYZ stage



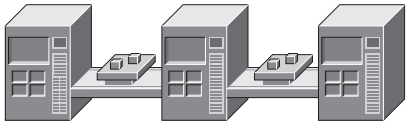
Semiconductor/LCD manufacturing systems
Electrical parts assembling/manufacturing systems



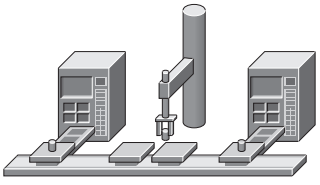
Screen printing systems and large LCD coaters



Material handling systems



Multi-head material handling between machines



Compact and robust direct drive motors for high-accuracy applications

Direct drive motor

TM-RFM Series

Sophisticated Performance

High performance due to the latest technologies

Our latest magnetic design and winding technologies enable high torque density. In addition, extremely smooth rotation is achieved by minimizing torque ripple.

Compact and low-profile design

Due to high level of structural design technology, compact and low-profile design is achieved. This design enables a small mounting space and a low center of gravity.

20-bit high-resolution absolute position encoder

The servo motor is equipped with 20-bit high-resolution absolute position encoder (1,048,576 pulses/rev) as standard. High-accuracy machine is achieved.

Hollow shaft diameter range: ø20 mm to 104 mm

The motor is equipped with a large hollow shaft resulting from using bearing and encoder with large diameter. It allows cables and air tubing to pass through.

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.

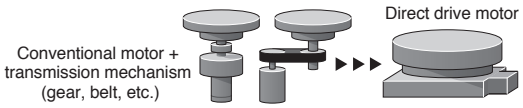
For easier use

- 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

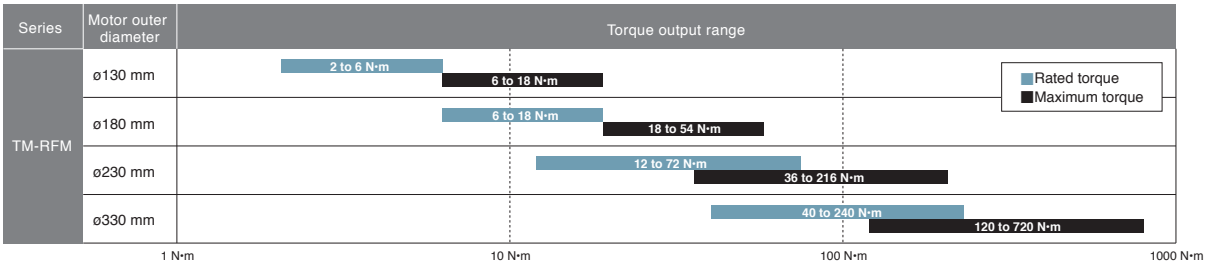
- Simple, compact, and rigid machine is achieved.
- Machine stability is enhanced due to the low-profile design and a low center of gravity.
- The motor has an inner rotor with hollow shaft that allows cables and pipes to pass through.

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



Product Lines

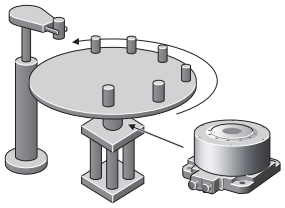
12 models with 4 different diameters are available.



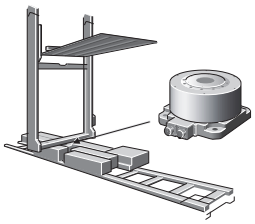
Application Examples

Suitable for low speed and high torque applications.

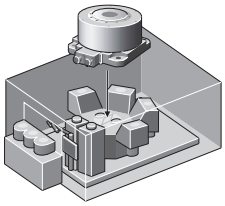
Index table for machine tools



Rotary axis for material handling robots

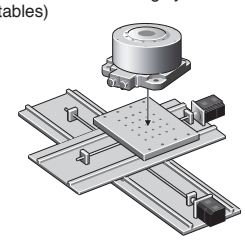


Painting and vapor deposition systems

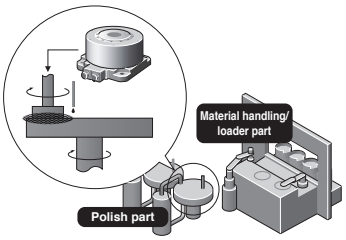


LCD/semiconductor spin-type cleaning systems

LCD/semiconductor testing systems (XYθ tables)



Rotary axis for polishing systems



Motion controller

SSCNET III/H compatible
Motion controller

Q173DSCPU
Q172DSCPU

- Achieves the high-speed operation cycle of 0.22 ms/4 axes
- Q173DSCPU controls up to 32 axes. (up to 96 axes by use of three modules of Q173DSCPU)
- Supports the safety observation function and vision system

SSCNET III/H compatible
Stand-Alone Motion controller

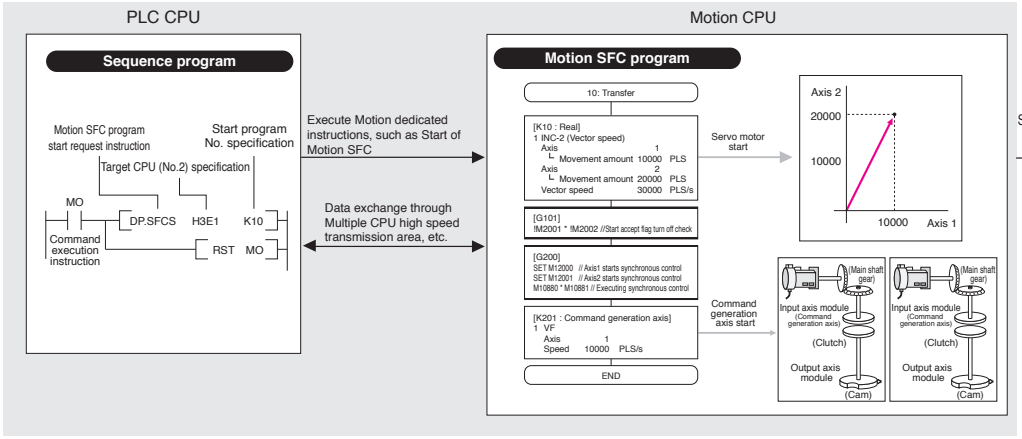
Q170MSCPU
Q170MSCPU-S1

- Integrates a power supply, a PLC, and a Motion controller
- Equipped with an incremental synchronous encoder interface and the mark detection function
- Supports the vision system

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.



Comparison with QD77MS: Superior Equivalent Others

	Q173DSCPU	Q172DSCPU	Q170MSCPU-S1	Q170MSCPU
Number of control axes	Up to 32 axes	Up to 16 axes		
Operation cycle	0.22 ms or more		0.22 ms or more / Q06UDH or equivalent	0.22 ms or more / Q03UD or equivalent
Programming language	Motion SFC			
Control mode	Position control, Speed control, Torque control, Tightening & press-fit control, Synchronous control, Cam control, Advanced synchronous control			
Positioning control	Linear interpolation, Circular interpolation, Trajectory control, Helical interpolation, Position follow-up control, Speed control with fixed position stop, High-speed oscillation control, Speed/position switching control			
Sub function	Forced stop, Hardware stroke limit, Software stroke limit, Absolute position system, Amplifier-less operation, Unlimited length feed, Optional data monitor, Mark detection, ROM operation, M-code output, Error history, Digital oscilloscope, Safety observation*, Vision system connection, Software security key, Cam auto-generation, High-speed reading, Limit switch output			

* Available only with Q173DSCPU/Q172DSCPU.

Simple Motion module

MELSEC-Q series

SSCNET III/H compatible
Simple Motion module

QD77MS16
QD77MS4
QD77MS2

CC-Link IE Field Network
Simple Motion module

QD77GF16

MELSEC-L series

SSCNET III/H compatible
Simple Motion module

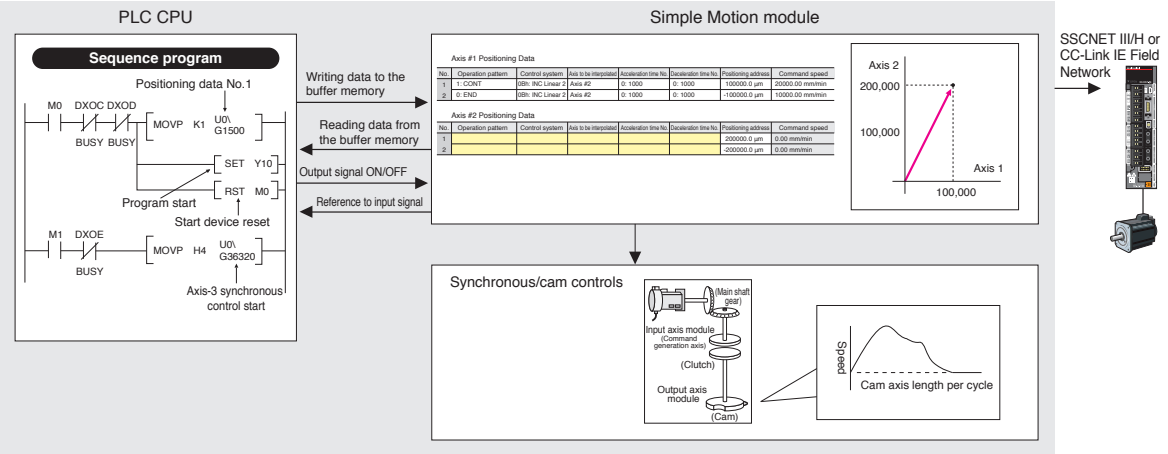
LD77MS16
LD77MS4
LD77MS2

Our extensive product line includes various Simple Motion modules such as SSCNET III/H compatible QD77MS and LD77MS, and CC-Link IE Field Network compatible QD77GF.

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.

- 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.
- Positioning/synchronous/cam controls are performed with simple parameter setting and a start from a sequence program.
- Supports only GX Works2 as engineering software.



	QD77MS16	QD77MS4	QD77MS2	LD77MS16	LD77MS4	LD77MS2	QD77GF16
Number of control axes	Up to 16 axes	Up to 4 axes	Up to 2 axes	Up to 16 axes	Up to 4 axes	Up to 2 axes	Up to 16 axes
Operation cycle	0.88 / 1.77 ms	0.88 ms		0.88 / 1.77 ms	0.88 ms		0.88 / 1.77 / 3.55 ms
Programming language	—						
Control mode	Position control, Speed control*1, Torque control*2, Tightening & press-fit control*2, Synchronous control					Cam control	
Positioning control	Linear interpolation, Circular interpolation, Trajectory control, Speed/position switching control (INC), Position/speed switching control					Speed/position switching control (ABS)	
Sub function	Forced stop, Hardware stroke limit, Software stroke limit, Absolute position system, Amplifier-less operation, Unlimited length feed, Optional data monitor*2, Mark detection, Flash ROM backup, M-code output, Error history, Digital oscilloscope, Cam auto-generation						

*1. The QD77GF can perform only speed control with position loop.
*2. Available only with QD77MS/LD77MS.

Positioning Module

The Positioning module is an intelligent function module which performs positioning control easily by following the instructions of PLC CPU. The Positioning module is compatible with the general-purpose pulse train as the command I/F and is used with MR-J4-A.

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
- 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

- 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

- 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

Pulse train compatible
MELSEC-F series

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

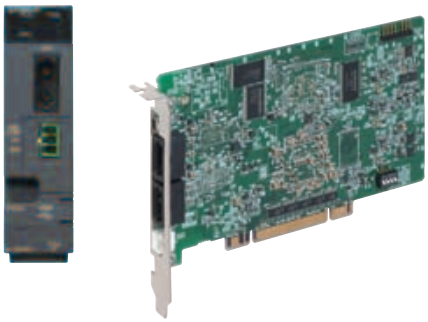
- Maximum number of controlled axes:
  2 axes (FX_{2N}-20GM), 1 axis (FX_{2N}-10GM)
- Equipped with various positioning operation modes

Pulse train compatible
MELSEC-F series

$FX_{3U(C)}$ series

- Controls up to 3 axes
- Programmable controller equipped with the built-in positioning function

C Controller/Personal Computer Embedded Type Servo System Controller



C Controller Interface Module

Q173SCCF

Connected directly to a C Controller through PCI Express®, this module is used for controlling MR-J4_-B, through a user program.

- High-speed access and interrupt detection are achieved with PCI Express®.
- Event-driven method programs, which use interrupts, are possible.

SSCNET III/H compatible Position Board

MR-MC210
MR-MC211

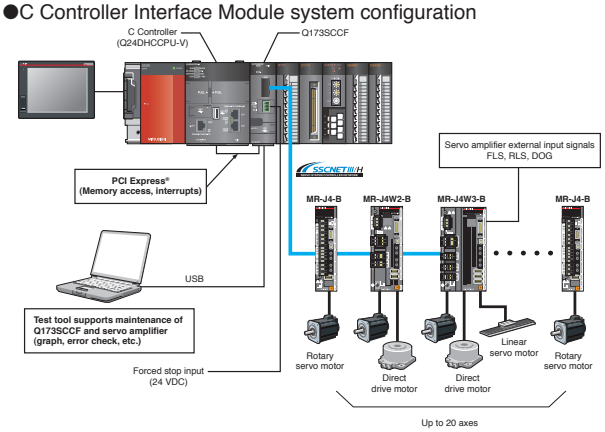
Connected to a personal computer through PCI bus, this board type controller is used for controlling MR-J4_-B, through a user program.

- Event-driven method programs, which use interrupts, are possible.
- Various conventional boards and programs for PC can be effectively used.
- Real-time OS is supported.

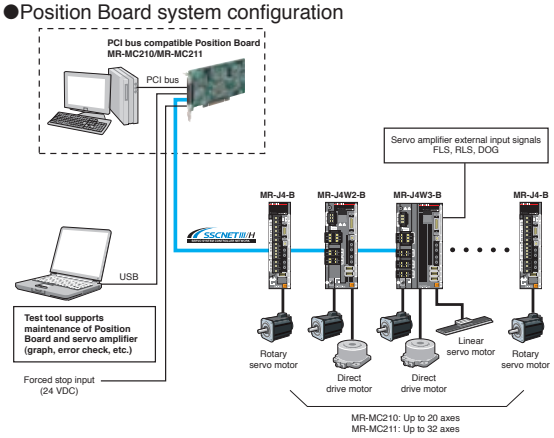
Features of C Controller/Personal Computer Embedded Type Servo System Controller

- C Controller or a personal computer is selectable
- Programmable controllers are not required in the system
- Equipped with Point to Point positioning functionality as standard (set with Point table)
- High-speed processing (1 cycle startup, 0.22 ms/8 axes)
- Various API functions and test tools are available

●C Controller Interface Module system configuration



●Position Board system configuration

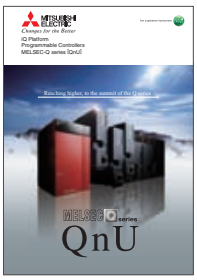


●Main basic functions

JOG operation, Incremental feed, Automatic operation, Linear interpolation, Home position return, Electronic gear, Speed units setting, Smoothing filter, S-curve acceleration/deceleration, Stop function, Command change, Stroke limit, Interlock, Rough match output, Torque limit, Backlash compensation, Interference check, Position switch, Home position search limit, Absolute position detection system, Other axes start, Tandem operation, Pass position interrupt, Log function, etc.

Related Catalogs

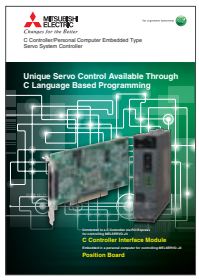
Mitsubishi Servo System Controllers catalog
L(NA)03062



iQ Platform Programmable Controllers MELSEC-Q series [QnU] catalog
L(NA)08101E

Programmable Controllers MELSEC-L series catalog
L(NA)08159E

PROGRAMMABLE LOGIC CONTROLLERS MELSEC FX catalog
HIME-B215



C Controller/Personal Computer Embedded Type Servo System Controller catalog
L(NA)03097

Our total solution for your satisfaction

MELSERVO Solution

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

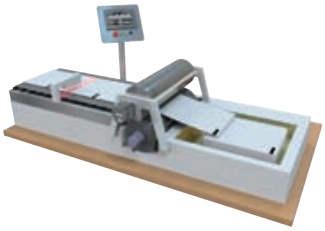
Vertical Form, Fill & Seal For food/beverage bag filling and packing

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

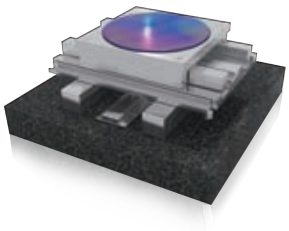
Rotary Knife For steel & paper cutting, stamping and labeling



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

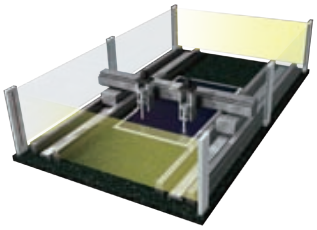


Solution 01 — More accurate positioning
→ COGNEX Vision System

Solution 02 — More precise drive operation
→ Direct Drive Motor

Solution 03 — Shorter tact time
→ Target Position Change Function

Gantry Application For material handling, automatic 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

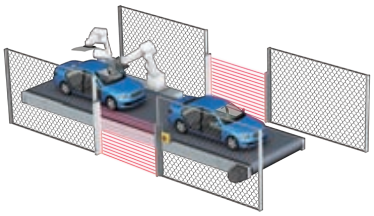
Solution 03 — Smaller size machine
→ 3-axis Type Servo Amplifier

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

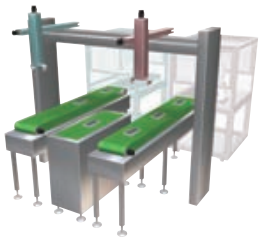
Conveyor System Utilizing Safety Observation Function For safety observation of printing, packing, and other lines



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

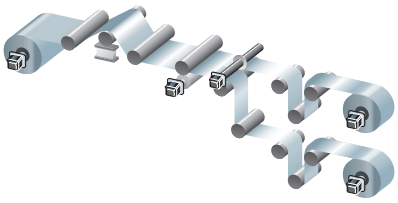


Solution 01 Managing of total power consumption
→ Power Monitor Function

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

Solution 03 Minimizing waste of power
→ Capacity Selection Software

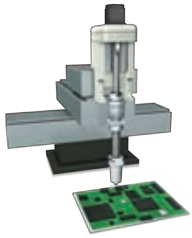
Film Slitting Machine For equipment with rollers



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



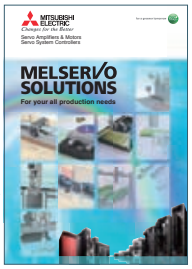
Solution 01 Tightening screws without using a torque sensor
→ Tightening & Press-fit Control

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

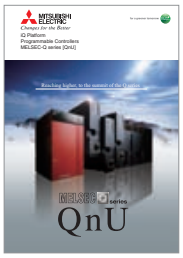
Refer to "MELSERVO SOLUTIONS catalog (L(NA)03094)" for details.



MELSEC Q series

QnU

Continuously evolving Universal Model



Refer to "iQ Platform Programmable Controllers MELSEC-Q series [QnU] catalog" for details.

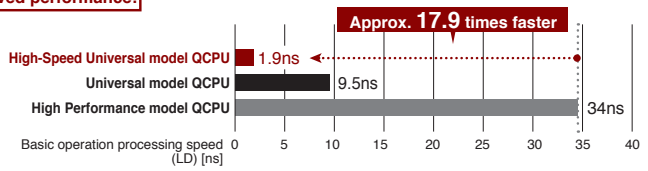
Current production requirements are calling for an increase in productivity and carrying out production processes even faster due to an increase in production information such as production results and traceability. The MELSEC-Q series new generation programmable controller “Universal Model QnU” is a leader for these market needs. High-speed basic instruction processing on a micro scale dramatically increases your system and machine performance. Inheriting the high robust and ease of use design of the Q series.

MELSEC-Q series Universal Model

■Improved production time with ultra-high-speed processing

Improved performance!

As applications are getting larger and more complex it is essential to shorten the system operation cycle time. To achieve this, the ultra high-speed of 1.9ns (LD instruction) processing enables to realize shorter operating cycles. System performance can be improved by reducing the overall scan time, preventing any variances in performance.



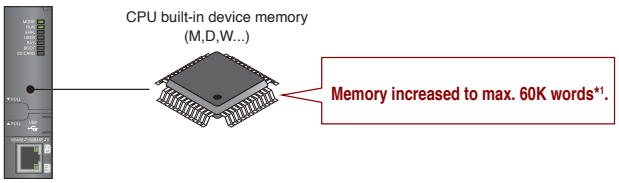
■Improved basic functions

Improved performance!

The CPU’s built-in device memory capacity has been increased to a max. of 60K words*1.

Support increasing control and quality data with high-speed processing.

*1: Only for Q13UDVCPU and Q26UDVCPU.



■SD memory card

Improved functionality!

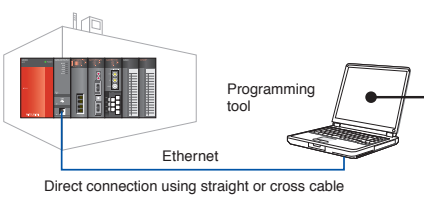
SD memory card are supported by High-Speed Universal model QCPU allowing easy data exchange between the PC. The SD memory card and Extended SRAM cassette can be used at the same time allowing extension of file registers (with Extended SRAM cassette), data file logging , boot data, and storing of large comment data (SD memory card).

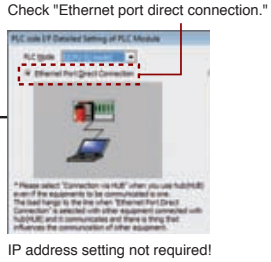
■Easy logging without a program

Save collected data in CSV format on a SD memory card just by completing easy settings with the dedicated setting tool wizard. Various reference materials including daily reports, form creation and general reports can be created easily within the saved CSV file. This data can be used for a wide variety of applications requiring traceability, production data, etc.

■Easily connect to CPUs via Ethernet

IP address settings are not required to connect to CPU modules directly (one-to-one connection) using GX Works2 or GX Developer. Both straight and cross cables can be used, and are automatically identified by the CPU module. Therefore this connection method is as easy as using USB. Even operators who are not familiar with network settings can easily establish a connection. (Patent pending)





GOT2000

Graphic Operation Terminal

Your window to better production control

Refer to "iQ Platform Graphic Operation Terminal GOT2000 Series catalog" for details.

The Mitsubishi Electric Graphic Operation Terminal GOT2000 series continues to impress with solutions that fulfill all demands.

The GOT2000 boasts advanced functionality, acts as a seamless gateway to other industrial automation devices, all while increasing productivity and efficiency. The high quality display is designed to optimize operator control and monitoring of device and line statuses. If you are looking for an intuitive operation terminal, the new tablet-like operability and the higher functionality of operation terminal makes the GOT2000 the ideal choice.

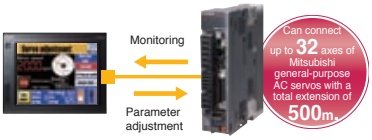
Graphic Operation Terminal

●GOT2000/GOT1000 series **GT27, GT16, GT15, GT14, GT11, GT10**

All models

Connection to AC servos

Direct connection to Mitsubishi AC servo amplifiers with RS-485 makes it easy to adjust parameter settings etc.



All models

FA transparent function

The GOT acts as a transparent gateway to enable programming, start up, and adjustment of equipment using MT Works2, GX Configurator-QP, MR Configurator2, or GX Works2. Users do not have to bother with opening the cabinet or changing cable connections.

GT27, GT16, GT15

Servo amplifier monitor function

In a system which outputs pulse train, the GOT can be connected to a servo amplifier in a serial connection to perform the following operations: monitoring, alarm display, diagnosis, parameter setting, and test operations.

GT27, GT16, GT15

Q series motion monitor function

The GOT enables easy monitoring of motion controllers (Q series), changing of servo parameters, and display of errors on the screen.

Q series Motion monitor window

GT27, GT16, GT15

Intelligent module monitor function

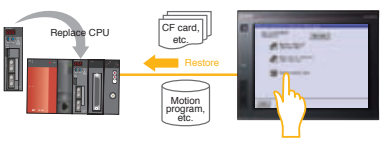
Buffer memory values of modules such as the QD77MS and I/O information can be monitored and changed.

Intelligent module monitor window

GT27, GT16, GT15, GT14

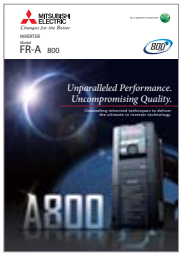
Backup/restoration function

Motion controller (Q series) programs and parameters can be backed up to the CF card or USB memory in the GOT. Users can then perform batch operation to restore the data to the motion controller.



FR-A 800

Unparalleled Performance.
Uncompromising Quality.



Refer to "Inverter FR-A800 catalog" for details.

Achieving higher drive performance and energy conservation with inverters

The inverter is a variable frequency power device that can easily and freely change the speed of a 3-phase induction motor.
The Mitsubishi inverter is high-performance and environment-conscious, and complies with global standards.
Select a model from our diverse lineup to match your needs.

FR-A800 series

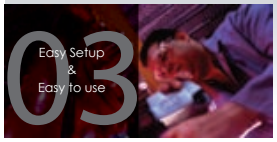
Introducing our high-value, next-generation inverter delivering outstanding drive performance in any environment, and a wealth of functionality covering startup to maintenance.
We offer a comprehensive line-up in response to the challenges of globalization.

LEADING DRIVE PERFORMANCE

The new series is equipped with the new state-of-the-art high-speed processor developed by Mitsubishi. With better control performance and response level, safe and accurate operation is assured in a diverse range of applications.

SECURITY & SAFETY

Swift recovery ensured by preventing trouble beforehand.
The FR-A800 has been developed with reliability and safety foremost in mind.

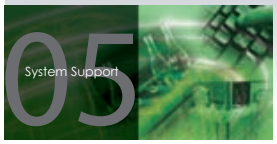


EASY SETUP & EASY TO USE

A range of equipment and functions are prepared allowing work to be performed anywhere to suit product life cycles.

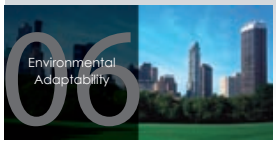
ECO-FRIENDLY FACTORIES

The power consumption by motors is said to amount about the half of all power consumption made by the Japanese manufacturing industry.
Factories can save more energy without dropping their production.
Less energy and more production—the FR-A800 series will help you to get the both.



SYSTEM SUPPORT

Numerous functions and the extensive lineup of models are ready to support various systems.



ENVIRONMENTAL ADAPTABILITY

The FR-A800 series complies with various standards and is usable in different scenes.

MELFA

Performing like humans and surpassing their abilities

The Mitsubishi Electric industrial robot will revolutionize your manufacturing site with faster, more intrinsic and simpler functions.

Mitsubishi Electric aims to easily achieve automated production equipment. We propose the “MELFA F series” which is equipped with the improved performance and with intelligent technology that we have developed and verified at our own production facilities.

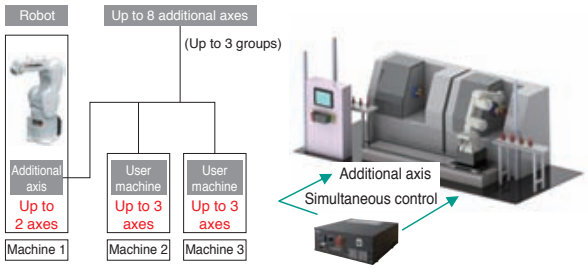
The iQ Platform compatible robot controller increases the speed of data communications between CPUs and dramatically reduces I/O processing times using a high-speed standard base between multiple CPUs.

Refer to "Mitsubishi INDUSTRIAL ROBOT MELFA F Series catalog" for details.

Industrial robot MELFA F series

◎Additional axis function

- The layout can be set up to include the robot traveling axis and turntable as well as user machines separate from the robot such as loaders and positioning devices.
- Up to 8 additional axes can be controlled by the controller.
- Additional axes and user machines can be operated from the robot program and teaching pendant without any additional motion control hardware. The same JOG operation as for the robot can be used. Robot language can be used for control operations.
- The robot controller has plug-and-play compatibility with MR-J4-B. (J3 compatibility mode)
- Standard interface function (Separate servo amplifier and servo motor required.)



◎Intelligence solution

By utilizing the force sensor to adjust the power, automation of the procedures with high difficulty is now achieved.

Force sensor | **Collision avoidance** | **Coordinated control**

Product lines

■ RV-F series

RV-2F
Load capacity: 2kg
Reach: 504mm

RV-4F
Load capacity: 4kg
Reach: 515mm

RV-4FL
Load capacity: 4kg
Reach: 649mm

RV-7F
Load capacity: 7kg
Reach: 713mm

RV-7FL
Load capacity: 7kg
Reach: 908mm

RV-7FLL
Load capacity: 7kg
Reach: 1503mm

RV-13F
Load capacity: 13kg
Reach: 1094mm

RV-13FL
Load capacity: 13kg
Reach: 1388mm

RV-20F
Load capacity: 20kg
Reach: 1094mm

■ RH-F series

RH-3FH
Load capacity: 3kg
Reach:350•450•550mm

RH-6FH
Load capacity: 6kg
Reach:350•450•550mm

RH-12FH
Load capacity: 12kg
Reach:550•700•850mm

RH-20FH
Load capacity: 20kg
Reach:850•1,000mm

As a recognized leader in factory automation,
Mitsubishi Electric offers a world-class level of customer satisfaction.

Production/Development System

For more than 80 years from the start of operations in 1924, Mitsubishi Electric Nagoya Works has manufactured various universal devices including motors, programmable controllers and inverters. The history of AC servo production at Nagoya Works spans over 30 years. We have expanded our production system based on the technology and tradition amassed during this time, and have incorporated world-class research and development to create high-performance, high-quality products that can be supplied for a long time.

Production system

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; Mitsubishi Electric Automation Manufacturing (Changshu) Co., Ltd., a manufacturing base; and Nagoya Works at the core. Mitsubishi Electric responds to various needs throughout the world by uniting technologies and know-how of these facilities. Mitsubishi Electric's FA energy solutions, "e&eco-F@ctory", are at work in the servo motor factory at the Nagoya Works. They are being used to boost capacity utilization and product quality, and reduce energy consumption.

Development system

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. Furthermore, we have established strong connections between our Advanced Technology R&D Center, which pushes technology development beyond the limits of FA, 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.

Mitsubishi Electric Nagoya Works

FA Development Center

e&eco-F@ctory implementation

EDC (Europe Development Center)

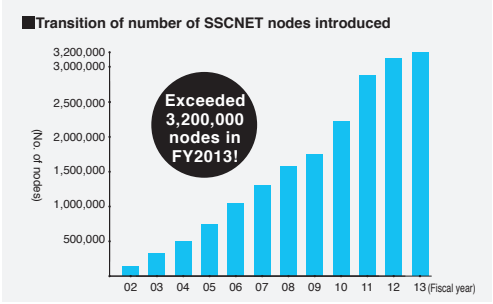
Promoting the popularity of SSCNET in Japan and around the world

SSCNET Partner Association

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

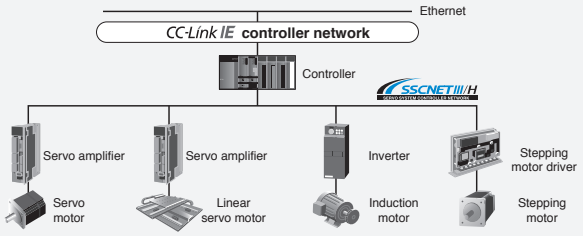
SSCNET III/H
SERVO SYSTEM CONTROLLER NETWORK

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.



(As of December 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.

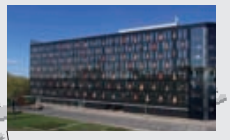
A global support network for MELSERVO users

Global FA Center

Across the globe, FA Centers provide customers with local assistance for purchasing Mitsubishi Electric products and with after-sales service. 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.

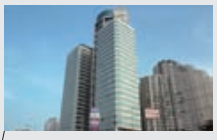
Ratingen, Germany
German FA Center/
Europe Development Center

Krakowska, Poland
European FA Center (Poland)



St. Petersburg, Russia
Russian FA Center

Pune/Gurgaon/Bangalore, India
India FA Center

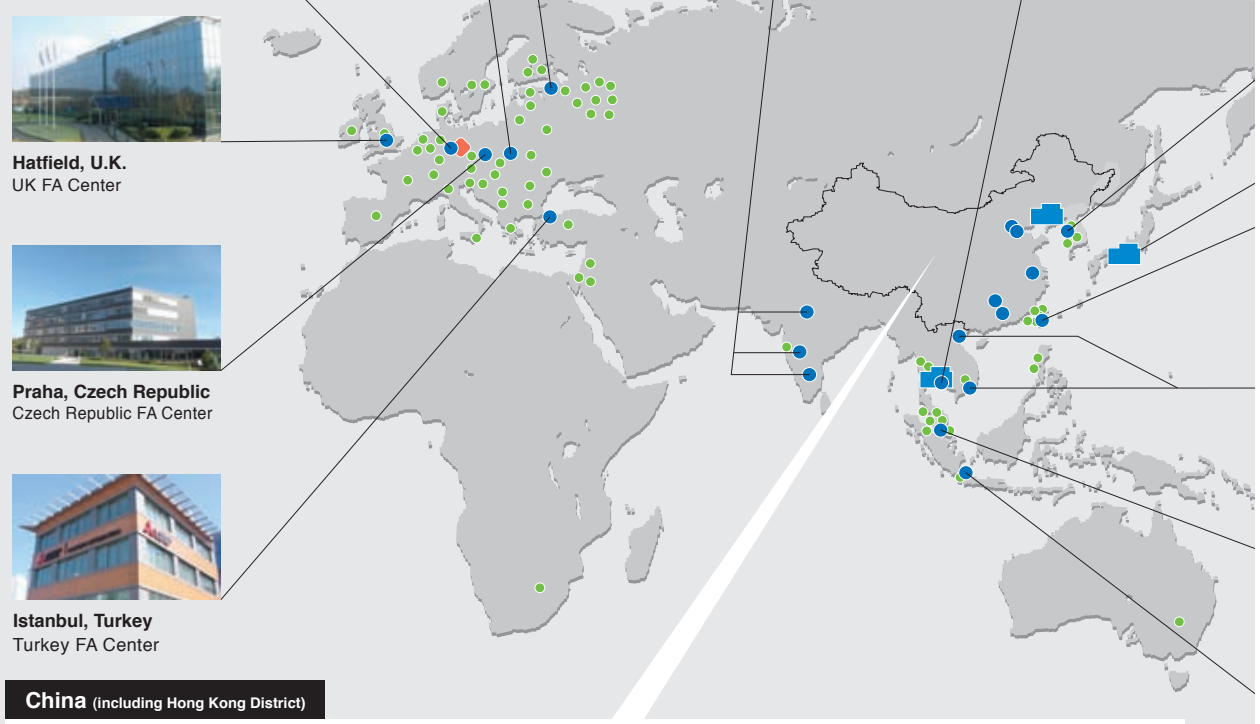


Bangkok, Thailand
Thailand FA Center

Hatfield, U.K.
UK FA Center

Praha, Czech Republic
Czech Republic FA Center

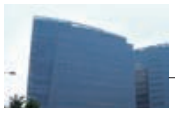
Istanbul, Turkey
Turkey FA Center



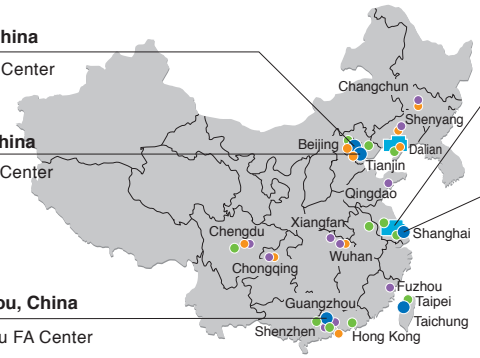
China (including Hong Kong District)

Beijing, China
Beijing FA Center

Tianjin, China
Tianjin FA Center

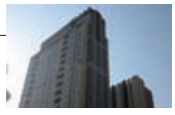


Guangzhou, China
Guangzhou FA Center



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 American FA Center/
North American Development Center

Tlalnepantla Edo., Mexico
Mexico FA Center

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

Singapore
ASEAN FA Center

Jakarta, Indonesia
Indonesia FA Center

Sao Paulo SP, Brazil
Brazil 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).

Conformity with Global Standards and Regulations

MELSERVO-J4 series conforms to global standards.

For corresponding standards and models, contact your local sales office.

Servo amplifier

European EC directive	Low voltage directive	EN 61800-5-1
	EMC directive	EN 61800-3
	Machinery directive	EN ISO 13849-1 Category 3 PL d / IEC 61508 SIL 2 / EN 62061 SIL CL 2 / EN 61800-5-2 SIL 2
	RoHS directive	Compliant
UL standard		UL 508C
CSA standard		CSA C22.2 No.14
Measures for Administration of the Pollution Control of Electronic Information Products (Chinese RoHS)		Compliant (optional cables and connectors)
China Compulsory Certification (CCC)		N/A
Korea Radio Wave Law (KC)		Compliant

Rotary servo motor

European EC directive	Low voltage directive	EN 60034-1
	EMC directive	EN 60034-1
	Machinery directive	-
	RoHS directive	Compliant
UL standard		UL 1004-1 / UL 1004-6
CSA standard		CSA C22.2 No.100
Measures for Administration of the Pollution Control of Electronic Information Products (Chinese RoHS)		Compliant (optional cables and connectors)
China Compulsory Certification (CCC)		N/A
Korea Radio Wave Law (KC)		N/A

Linear servo motor

European EC directive	Low voltage directive	DIN VDE 0580
	EMC directive	-
	Machinery directive	-
	RoHS directive	Compliant
UL standard		UL-1004-6
CSA standard		CSA C22.2 No.100
Measures for Administration of the Pollution Control of Electronic Information Products (Chinese RoHS)		Compliant (optional cables and connectors)
China Compulsory Certification (CCC)		N/A
Korea Radio Wave Law (KC)		N/A

Direct drive motor

European EC directive	Low voltage directive	EN 60034-1
	EMC directive	EN 60034-1
	Machinery directive	-
	RoHS directive	Compliant
UL standard		-
CSA standard		-
Measures for Administration of the Pollution Control of Electronic Information Products (Chinese RoHS)		Compliant (optional cables and connectors)
China Compulsory Certification (CCC)		N/A
Korea Radio Wave Law (KC)		N/A

1

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B MR-J4-B B-RJ MR-J4-B-RJ WB MR-J4W2-B/MR-J4W3-B B-RJ010 MR-J4-B-RJ010 A MR-J4-A A-RJ MR-J4-A-RJ

* Note that some servo amplifiers are available in the future.
* Refer to p. 5-65 in this catalog for conversion of units.

Servo Amplifiers

1-Axis Servo Amplifier Model Designation

B | B-RJ | B-RJ010 | A | A-RJ

MR-J4-10B__-___

Mitsubishi general-purpose AC servo amplifier MELSERVO-J4 Series

Symbol	Interface
B	SSCNET III/H (Note 7)
A	General-purpose

Symbol	Rated output [kW]
10	0.1
20	0.2
40	0.4
60	0.6
70	0.75
100	1
200	2
350	3.5
500	5
700	7
11K	11
15K	15
22K	22

Symbol	Power supply
None	3-phase 200 V AC or 1-phase 200 V AC (Note 3)
1	1-phase 100 V AC (Note 8)
4	3-phase 400 V AC (Note 4)

Symbol	Special specification
None	Standard
RJ	Fully closed loop control four-wire type/load-side encoder A/B/Z-phase input compatible
RJ010	CC-Link IE Field Network interface with Motion (Note 5)
ED	Without a dynamic brake (Note 1)
PX	Without an enclosed regenerative resistor (Note 6)
RU	MR-J4-_-RJ without a dynamic brake (Note 1)
RZ	MR-J4-_-RJ without an enclosed regenerative resistor (Note 6)
RU010	MR-J4-_B-RJ010 without a dynamic brake (Note 1)
RZ010	MR-J4-_B-RJ010 without an enclosed regenerative resistor (Note 6)
EG	DC power input type (Note 10)
KJ	Fully closed loop control four-wire type/load-side encoder A/B/Z-phase input compatible/ DC power input type (Note 10)
LL	Pressure control type (Note 9)

Multi-Axis Servo Amplifier Model Designation

WB

MR-J4W2-22B-___

Mitsubishi general-purpose AC servo amplifier MELSERVO-J4 Series

Symbol	Number of axes
W2	2 axes
W3	3 axes

Symbol	Interface
B	SSCNET III/H

Symbol	Rated output [kW]		
	A-axis (Note 2)	B-axis (Note 2)	C-axis (Note 2)
22	0.2	0.2	-
44	0.4	0.4	-
77	0.75	0.75	-
1010	1	1	-
222	0.2	0.2	0.2
444	0.4	0.4	0.4

Symbol	Special specification
None	Standard
ED	Without a dynamic brake (Note 1)
EG	DC power input type (Note 10)

Notes: 1. Dynamic brake which is built in 7 kW or smaller servo amplifiers is removed. When using the servo amplifier without a dynamic brake, the servo motor does not stop immediately at alarm occurrence or power failure. Take measures to ensure safety on the entire system.
When the following servo motors are used, an electronic dynamic brake may operate at alarm occurrence.
HG-KR053, HG-KR13, HG-KR23, HG-KR43, HG-MR053, HG-MR13, HG-MR23, HG-MR43, HG-SR51, and HG-SR52
Disable the electronic dynamic brake by setting the following parameter to "_ _ _ 2."
For MR-J4-B(-RJ)/MR-J4-B-RJ010: [Pr. PF06]
For MR-J4W_-B: Disable the electronic dynamic brake for all axes with [Pr. PF06]
For MR-J4-A(-RJ): [Pr. PF09]
In addition, when "2 _ _ _" (initial value) is set to [Pr. PA04], the servo motor may be decelerated to a stop forcibly at alarm occurrence. The forced stop deceleration function will be disabled by setting "0 _ _ _" to [Pr. PA04].
2. A-axis, B-axis, and C-axis indicate names of axes of the multi-axis servo amplifier. The C-axis is available for the 3-axis servo amplifier.
3. 0.75 kW or smaller servo amplifiers are available for 1-phase 200 V AC.
4. 0.6 kW, and 1 kW or larger servo amplifiers are available.
5. CC-Link IE Field Network interface with Motion is available only with MR-J4-_B-RJ010. CC-Link IE Field Network interface unit (MR-J3-T10) is required.
6. Available in 11 kW to 22 kW servo amplifier. A regenerative resistor (standard accessory) is not enclosed.
7. MR-J4-_B-RJ010 has CC-Link IE Field Network interface with Motion.
8. 0.4 kW or smaller servo amplifiers are available.
9. MR-J4-_B_-LL is available. Contact your local sales office for the pressure control compatible servo amplifiers.
10. Contact your local sales office for the DC power input type servo amplifier.

Combinations of 1-Axis Servo Amplifier and Servo Motor

B B-RJ A A-RJ

With MR-J4-B(-RJ)/MR-J4-A(-RJ) servo amplifiers (200 V)

Servo amplifier	Rotary servo motor	Linear servo motor (primary side) (Note 1)	Direct drive motor
MR-J4-10B(-RJ) MR-J4-10A(-RJ)	HG-KR053, 13 HG-MR053, 13	-	-
MR-J4-20B(-RJ) MR-J4-20A(-RJ)	HG-KR23 HG-MR23	LM-U2PAB-05M-0SS0 LM-U2PBB-07M-1SS0	TM-RFM002C20
MR-J4-40B(-RJ) MR-J4-40A(-RJ)	HG-KR43 HG-MR43	LM-H3P2A-07P-BSS0 LM-H3P3A-12P-CSS0 LM-K2P1A-01M-2SS1 LM-U2PAD-10M-0SS0 LM-U2PAF-15M-0SS0	TM-RFM004C20
MR-J4-60B(-RJ) MR-J4-60A(-RJ)	HG-SR51, 52 HG-JR53	LM-U2PBD-15M-1SS0	TM-RFM006C20 TM-RFM006E20
MR-J4-70B(-RJ) MR-J4-70A(-RJ)	HG-KR73 HG-MR73 HG-JR73 HG-UR72	LM-H3P3B-24P-CSS0 LM-H3P3C-36P-CSS0 LM-H3P7A-24P-ASS0 LM-K2P2A-02M-1SS1 LM-U2PBF-22M-1SS0	TM-RFM012E20 TM-RFM012G20 TM-RFM040J10
MR-J4-100B(-RJ) MR-J4-100A(-RJ)	HG-SR81, 102 HG-JR53 (Note 2), 103	-	TM-RFM018E20
MR-J4-200B(-RJ) MR-J4-200A(-RJ)	HG-SR121, 201, 152, 202 HG-JR73 (Note 2), 103 (Note 2), 153, 203 HG-RR103, 153 HG-UR152	LM-H3P3D-48P-CSS0 LM-H3P7B-48P-ASS0 LM-H3P7C-72P-ASS0 LM-FP2B-06M-1SS0 LM-K2P1C-03M-2SS1 LM-U2P2B-40M-2SS0	-
MR-J4-350B(-RJ) MR-J4-350A(-RJ)	HG-SR301, 352 HG-JR153 (Note 2), 203 (Note 2), 353 HG-RR203 HG-UR202	LM-H3P7D-96P-ASS0 LM-K2P2C-07M-1SS1 LM-K2P3C-14M-1SS1 LM-U2P2C-60M-2SS0	TM-RFM048G20 TM-RFM072G20 TM-RFM120J10
MR-J4-500B(-RJ) MR-J4-500A(-RJ)	HG-SR421, 502 HG-JR353 (Note 2), 503 HG-RR353, 503 HG-UR352, 502	LM-FP2D-12M-1SS0 LM-FP4B-12M-1SS0 LM-K2P2E-12M-1SS1 LM-K2P3E-24M-1SS1 LM-U2P2D-80M-2SS0	TM-RFM240J10
MR-J4-700B(-RJ) MR-J4-700A(-RJ)	HG-SR702 HG-JR503 (Note 2), 703	LM-FP2F-18M-1SS0 LM-FP4D-24M-1SS0	-
MR-J4-11KB(-RJ) MR-J4-11KA(-RJ)	HG-JR903, 11K1M	LM-FP4F-36M-1SS0	-
MR-J4-15KB(-RJ) MR-J4-15KA(-RJ)	HG-JR15K1M	LM-FP4H-48M-1SS0	-
MR-J4-22KB(-RJ) MR-J4-22KA(-RJ)	HG-JR22K1M	-	-

Notes: 1. Models of the linear servo motor primary side are listed in this page. For compatible models of the secondary side, refer to "Combinations of Linear Servo Motor and Servo Amplifier" under section 3 Linear Servo Motor in this catalog.
2. The maximum torque can be increased from 300% to 400% of the rated torque with this combination.

With MR-J4-B1(-RJ)/MR-J4-A1(-RJ) servo amplifiers (100 V)

Servo amplifier	Rotary servo motor	Linear servo motor	Direct drive motor
MR-J4-10B1(-RJ) MR-J4-10A1(-RJ)	HG-KR053, 13 HG-MR053, 13	Will be compatible	Will be compatible
MR-J4-20B1(-RJ) MR-J4-20A1(-RJ)	HG-KR23 HG-MR23		
MR-J4-40B1(-RJ) MR-J4-40A1(-RJ)	HG-KR43 HG-MR43		

Combinations of 1-Axis Servo Amplifier and Servo Motor

B | B-RJ | B-RJ010 | A | A-RJ

With MR-J4-B4(-RJ)/MR-J4-A4(-RJ) servo amplifier (400 V)

Servo amplifier	Rotary servo motor	Linear servo motor (primary side) (Note 1)	Direct drive motor
MR-J4-60B4(-RJ) MR-J4-60A4(-RJ)	HG-SR524 HG-JR534	-	-
MR-J4-100B4(-RJ) MR-J4-100A4(-RJ)	HG-SR1024 HG-JR534 (Note 2), 734, 1034	-	-
MR-J4-200B4(-RJ) MR-J4-200A4(-RJ)	HG-SR1524, 2024 HG-JR734 (Note 2), 1034 (Note 2), 1534, 2034	-	-
MR-J4-350B4(-RJ) MR-J4-350A4(-RJ)	HG-SR3524 HG-JR1534 (Note 2), 2034 (Note 2), 3534	-	-
MR-J4-500B4(-RJ) MR-J4-500A4(-RJ)	HG-SR5024 HG-JR3534 (Note 2), 5034	-	-
MR-J4-700B4(-RJ) MR-J4-700A4(-RJ)	HG-SR7024 HG-JR5034 (Note 2), 7034	-	-
MR-J4-11KB4(-RJ) MR-J4-11KA4(-RJ)	HG-JR9034, 11K1M4	-	-
MR-J4-15KB4(-RJ) MR-J4-15KA4(-RJ)	HG-JR15K1M4	-	-
MR-J4-22KB4(-RJ) MR-J4-22KA4(-RJ)	HG-JR22K1M4	LM-FP5H-60M-1SS0	-

With MR-J4-B-RJ010 servo amplifier (200 V)

Servo amplifier	Rotary servo motor
MR-J4-10B-RJ010	HG-KR053, 13 HG-MR053, 13
MR-J4-20B-RJ010	HG-KR23 HG-MR23
MR-J4-40B-RJ010	HG-KR43 HG-MR43
MR-J4-60B-RJ010	HG-SR51, 52 HG-JR53
MR-J4-70B-RJ010	HG-KR73 HG-MR73 HG-JR73 HG-UR72
MR-J4-100B-RJ010	HG-SR81, 102 HG-JR53 (Note 2), 103
MR-J4-200B-RJ010	HG-SR121, 201, 152, 202 HG-JR73 (Note 2), 103 (Note 2), 153, 203 HG-RR103, 153 HG-UR152
MR-J4-350B-RJ010	HG-SR301, 352 HG-JR153 (Note 2), 203 (Note 2), 353 HG-RR203 HG-UR202
MR-J4-500B-RJ010	HG-SR421, 502 HG-JR353 (Note 2), 503 HG-RR353, 503 HG-UR352, 502
MR-J4-700B-RJ010	HG-SR702 HG-JR503 (Note 2), 703
MR-J4-11KB-RJ010	HG-JR903, 11K1M
MR-J4-15KB-RJ010	HG-JR15K1M
MR-J4-22KB-RJ010	HG-JR22K1M

With MR-J4-B4-RJ010 servo amplifier (400 V)

Servo amplifier	Rotary servo motor
MR-J4-60B4-RJ010	HG-SR524 HG-JR534
MR-J4-100B4-RJ010	HG-SR1024 HG-JR534 (Note 2), 734, 1034
MR-J4-200B4-RJ010	HG-SR1524, 2024 HG-JR734 (Note 2), 1034 (Note 2), 1534, 2034
MR-J4-350B4-RJ010	HG-SR3524 HG-JR1534 (Note 2), 2034 (Note 2), 3534
MR-J4-500B4-RJ010	HG-SR5024 HG-JR3534 (Note 2), 5034
MR-J4-700B4-RJ010	HG-SR7024 HG-JR5034 (Note 2), 7034
MR-J4-11KB4-RJ010	HG-JR9034, 11K1M4
MR-J4-15KB4-RJ010	HG-JR15K1M4
MR-J4-22KB4-RJ010	HG-JR22K1M4

Notes: 1. Models of the linear servo motor primary side are listed in this page. For compatible models of the secondary side, refer to "Combinations of Linear Servo Motor and Servo Amplifier" under section 3 Linear Servo Motor in this catalog.
2. The maximum torque can be increased from 300% to 400% of the rated torque with this combination.

Combinations of Multi-Axis Servo Amplifier and Servo Motors

WB

With MR-J4W2-B servo amplifier

Any combination of the servo motors with different series and capacities is possible as long as the servo motors are compatible with the servo amplifier.

Servo amplifier	Rotary servo motor	Linear servo motor (primary side) (Note 1)	Direct drive motor
MR-J4W2-22B	HG-KR053, 13, 23 HG-MR053, 13, 23	LM-U2PAB-05M-0SS0 LM-U2PBB-07M-1SS0	TM-RFM002C20
MR-J4W2-44B	HG-KR053, 13, 23, 43 HG-MR053, 13, 23, 43	LM-H3P2A-07P-BSS0 LM-H3P3A-12P-CSS0 LM-K2P1A-01M-2SS1 LM-U2PAB-05M-0SS0 LM-U2PAD-10M-0SS0 LM-U2PAF-15M-0SS0 LM-U2PBB-07M-1SS0	TM-RFM002C20 TM-RFM004C20
MR-J4W2-77B	HG-KR43, 73 HG-MR43, 73 HG-SR51, 52 HG-JR53, 73 HG-UR72	LM-H3P2A-07P-BSS0 LM-H3P3A-12P-CSS0 LM-H3P3B-24P-CSS0 LM-H3P3C-36P-CSS0 LM-H3P7A-24P-ASS0 LM-K2P1A-01M-2SS1 LM-K2P2A-02M-1SS1 LM-U2PAD-10M-0SS0 LM-U2PAF-15M-0SS0 LM-U2PBD-15M-1SS0 LM-U2PBF-22M-1SS0	TM-RFM004C20 TM-RFM006C20 TM-RFM006E20 TM-RFM012E20 TM-RFM012G20 TM-RFM040J10
MR-J4W2-1010B	HG-KR43, 73 HG-MR43, 73 HG-SR51, 81, 52, 102 HG-JR53 (Note 2), 73, 103 HG-UR72	LM-H3P2A-07P-BSS0 LM-H3P3A-12P-CSS0 LM-H3P3B-24P-CSS0 LM-H3P3C-36P-CSS0 LM-H3P7A-24P-ASS0 LM-K2P1A-01M-2SS1 LM-K2P2A-02M-1SS1 LM-U2PAD-10M-0SS0 LM-U2PAF-15M-0SS0 LM-U2PBD-15M-1SS0 LM-U2PBF-22M-1SS0	TM-RFM004C20 TM-RFM006C20 TM-RFM006E20 TM-RFM012E20 TM-RFM018E20 TM-RFM012G20 TM-RFM040J10

With MR-J4W3-B servo amplifier

Any combination of the servo motors with different series and capacities is possible as long as the servo motors are compatible with the servo amplifier.

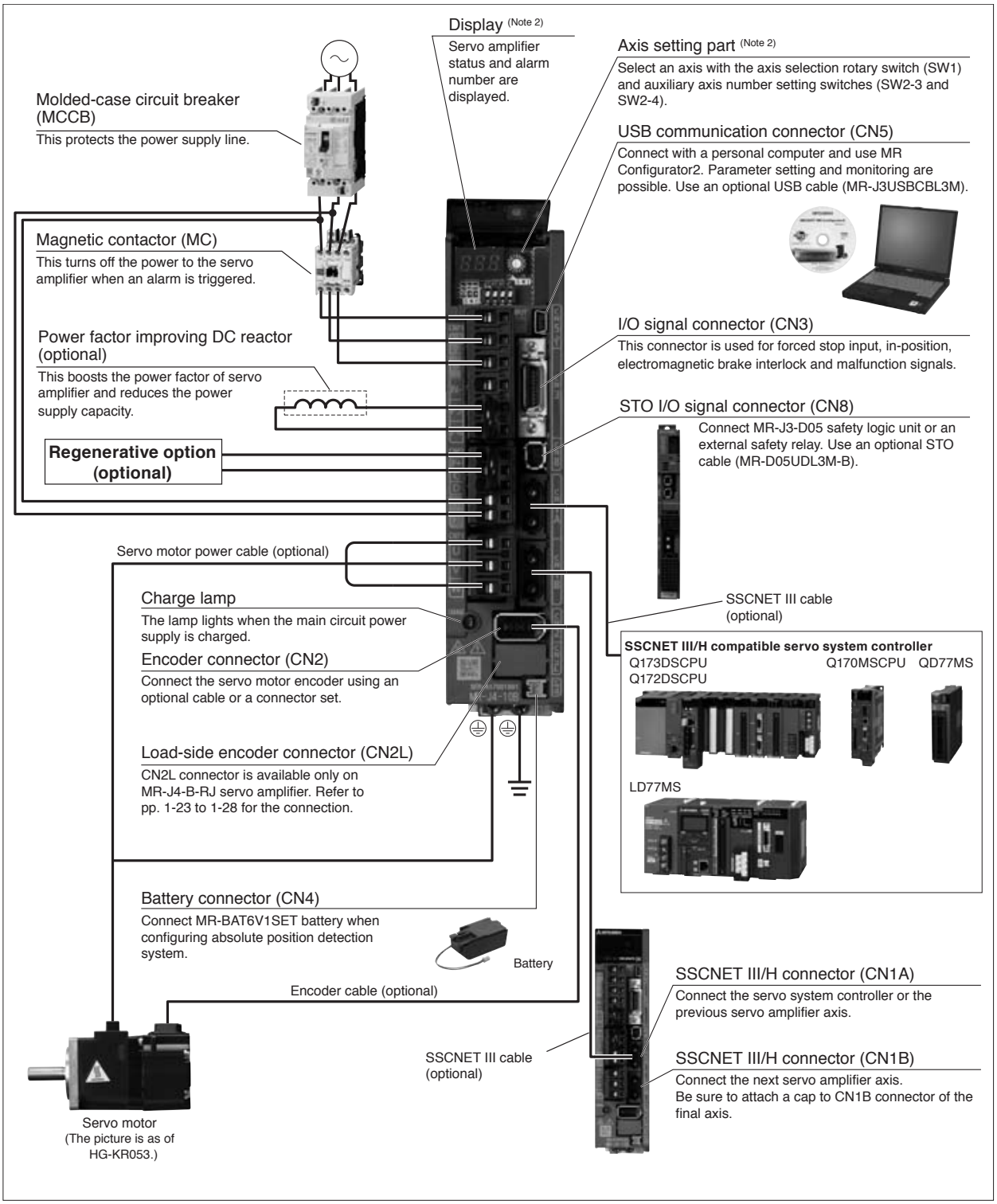
Servo amplifier	Rotary servo motor	Linear servo motor (primary side) (Note 1)	Direct drive motor
MR-J4W3-222B	HG-KR053, 13, 23 HG-MR053, 13, 23	LM-U2PAB-05M-0SS0 LM-U2PBB-07M-1SS0	TM-RFM002C20
MR-J4W3-444B	HG-KR053, 13, 23, 43 HG-MR053, 13, 23, 43	LM-H3P2A-07P-BSS0 LM-H3P3A-12P-CSS0 LM-K2P1A-01M-2SS1 LM-U2PAB-05M-0SS0 LM-U2PAD-10M-0SS0 LM-U2PAF-15M-0SS0 LM-U2PBB-07M-1SS0	TM-RFM002C20 TM-RFM004C20

Notes: 1. Models of the linear servo motor primary side are listed in this page. For compatible models of the secondary side, refer to "Combinations of Linear Servo Motor and Servo Amplifier" under section 3 Linear Servo Motor in this catalog.
2. The maximum torque can be increased from 300% to 400% of the rated torque with this combination.

MR-J4-B(-RJ) Connections with Peripheral Equipment (Note 1)

B B-RJ

Peripheral equipment is connected to MR-J4-B(-RJ) as described below. Connectors, cables, options, and other necessary equipment are available so that users can set up the servo amplifier easily and start using it right away.



Notes: 1. The connection with the peripheral equipment is an example for MR-J4-350B(-RJ) or smaller servo amplifiers. Refer to "MR-J4-_B(-RJ) MR-J4-_B4(-RJ) Servo Amplifier Instruction Manual" for the actual connections.
2. This picture shows when the display cover is open.

MR-J4-B(1)(-RJ) (SSCNET III/H Interface) Specifications (200 V/100 V)

B B-RJ

Servo amplifier model MR-J4-_(-RJ)			10B	20B	40B	60B	70B	100B	200B	350B	500B	700B	11KB	15KB	22KB	10B1	20B1	40B1
																(Released in the future)		
Output	Rated voltage		3-phase 170 V AC															
	Rated current	[A]	1.1	1.5	2.8	3.2	5.8	6.0	11.0	17.0	28.0	37.0	68.0	87.0	126.0	1.1	1.5	2.8
Main circuit power supply input	Voltage/frequency (Note 1)		3-phase or 1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz					3-phase 200 V AC to 240 V AC, 50 Hz/60 Hz								1-phase 100 V AC to 120 V AC, 50 Hz/60 Hz		
	Rated current	[A]	0.9	1.5	2.6	3.2 (Note 8)	3.8	5.0	10.5	16.0	21.7	28.9	46.0	64.0	95.0	3.0	5.0	9.0
	Permissible voltage fluctuation		3-phase or 1-phase 170 V AC to 264 V AC					3-phase 170 V AC to 264 V AC								1-phase 85 V AC to 132 V AC		
	Permissible frequency fluctuation		±5% maximum															
Control circuit power supply input	Voltage/frequency		1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz													1-phase 100 V AC to 120 V AC, 50 Hz/60 Hz		
	Rated current	[A]	0.2								0.3					0.4		
	Permissible voltage fluctuation		1-phase 170 V AC to 264 V AC													1-phase 85 V AC to 132 V AC		
	Permissible frequency fluctuation		±5% maximum															
	Power consumption	[W]	30								45					30		
Interface power supply			24 V DC ± 10% (required current capacity: 0.3 A (including CN8 connector signals))															
Control method			Sine-wave PWM control/current control method															
Tolerable regenerative power	Built-in regenerative resistor (Note 2, 3)	[W]	-	10	10	10	20	20	100	100	130	170	-	-	-	-	10	10
	External regenerative resistor (standard accessory) (Note 2, 3, 11, 12)	[W]	-	-	-	-	-	-	-	-	-	-	500 (800)	850 (1300)	850 (1300)	-	-	-
Dynamic brake			Built-in (Note 4)										External option (Note 13)			Built-in (Note 4)		
SSCNET III/H command communication cycle (Note 10)			0.222 ms, 0.444 ms, 0.888 ms															
Communication function			USB: Connect a personal computer (MR Configurator2 compatible)															
Encoder output pulse			Compatible (A/B/Z-phase pulse)															
Analog monitor			2 channels															
Fully closed loop control	MR-J4-B(1)		Two-wire type communication method (Note 9)															
	MR-J4-B(1)-RJ		Two-wire/four-wire type communication method															
Servo function			Advanced vibration suppression control II, adaptive filter II, robust filter, auto tuning, one-touch tuning, tough drive function, drive recorder function, tightening & press-fit control, machine diagnosis function, power monitoring function, master-slave operation function (Note 14), scale measurement function (Note 14), J3 compatibility mode															
Load-side encoder interface	MR-J4-B(1)		Mitsubishi high-speed serial communication															
	MR-J4-B(1)-RJ		Mitsubishi high-speed serial communication, A/B/Z-phase differential input signal															
Protective functions			Overcurrent shut-off, regenerative overvoltage shut-off, overload shut-off (electronic thermal), servo motor overheat protection, encoder error protection, regenerative error protection, undervoltage protection, instantaneous power failure protection, overspeed protection, error excessive protection, magnetic pole detection protection, linear servo control fault protection															
Functional safety			STO (IEC/EN 61800-5-2)															
Safety performance	Standards certified by CB		EN ISO 13849-1 Category 3 PL d, IEC 61508 SIL 2, EN 62061 SIL CL 2, EN 61800-5-2 SIL 2															
	Response performance		8 ms or less (STO input OFF → energy shut-off)															
	Test pulse input (STO) (Note 7)		Test pulse interval: 1 Hz to 25 Hz, test pulse off time: 1 ms maximum															
	Mean time to dangerous failure (MTTFd)		100 years or longer															
	Diagnostic coverage (DC)		Medium (90% to 99%)															
	Probability of dangerous Failure per Hour (PFH)		1.68×10^{-10} [1/h]															
Compliance to standards			Refer to "Conformity with Global Standards and Regulations" on p. 57 in this catalog.															
Structure (IP rating)			Natural cooling, open (IP20)				Force cooling, open (IP20)				Force cooling, open (IP20) (Note 5)					Natural cooling, open (IP20)		
Close mounting			Possible (Note 6)								Not possible					Possible (Note 6)		
Environment	Ambient temperature		0 °C to 55 °C (non-freezing), storage: -20 °C to 65 °C (non-freezing)															
	Ambient humidity		90 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)															
	Ambience		Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust															
	Altitude		1000 m or less above sea level															
	Vibration resistance		5.9 m/s² at 10 Hz to 55 Hz (directions of X, Y and Z axes)															
Mass		[kg]	0.8	0.8	1.0	1.0	1.4	1.4	2.1	2.3	4.0	6.2	13.4	13.4	18.2	0.8	0.8	1.0

MR-J4-B(1)(-RJ) (SSCNET III/H Interface) Specifications (200 V/100 V)

B B-RJ

Notes: 1. Rated output and speed of a rotary servo motor and a direct drive motor; and continuous thrust and maximum speed of a linear servo motor are applicable when the servo amplifier, combined with the servo motor, is operated within the specified power supply voltage and frequency.
2. Select the most suitable regenerative option for your system with our capacity selection software.
3. Refer to "Regenerative Option" in this catalog for the tolerable regenerative power [W] when regenerative option is used.
4. When using the built-in dynamic brake, refer to "MR-J4-_B(-RJ) MR-J4-_B4(-RJ) Servo Amplifier Instruction Manual" for the permissible load to motor inertia ratio and the permissible load to mass ratio.
5. Terminal blocks are excluded.
6. When the servo amplifiers are closely mounted, keep the ambient temperature within 0 °C to 45 °C, or use them with 75% or less of the effective load ratio.
7. The test pulse is a signal for the external circuit to perform self-diagnosis by turning off the signals to the servo amplifier instantaneously at regular intervals.
8. The rated current is 2.9 A when the servo amplifier is used with UL or CSA compliant servo motor.
9. Fully closed loop control is compatible with the servo amplifiers with software version A3 or later.
10. The command communication cycle depends on the controller specifications and the number of axes connected.
11. The value in brackets is applicable when cooling fans (2 units of 92 mm × 92 mm, minimum air flow: 1.0 m^3/min) are installed, and then [Pr. PA02] is changed.
12. Servo amplifiers without an enclosed regenerative resistor are also available. Refer to "1-Axis Servo Amplifier Model Designation" in this catalog for details.
13. Use an optional external dynamic brake with the servo amplifier. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc. Take measures to ensure safety on the entire system when not using the dynamic brake.
14. This function is available with the servo amplifiers with software version A8 or later.

MR-J4-B4(-RJ) (SSCNET III/H Interface) Specifications (400 V)

B B-RJ

Servo amplifier model MR-J4-_(-RJ)			60B4	100B4	200B4	350B4	500B4	700B4	11KB4	15KB4	22KB4
Output	Rated voltage		3-phase 323 V AC								
	Rated current	[A]	1.5	2.8	5.4	8.6	14.0	17.0	32.0	41.0	63.0
Main circuit power supply input	Voltage/frequency (Note 1)		3-phase 380 V AC to 480 V AC, 50 Hz/60 Hz								
	Rated current	[A]	1.4	2.5	5.1	7.9	10.8	14.4	23.1	31.8	47.6
	Permissible voltage fluctuation		3-phase 323 V AC to 528 V AC								
	Permissible frequency fluctuation		±5% maximum								
Control circuit power supply input	Voltage/frequency		1-phase 380 V AC to 480 V AC, 50 Hz/60 Hz								
	Rated current	[A]	0.1			0.2					
	Permissible voltage fluctuation		1-phase 323 V AC to 528 V AC								
	Permissible frequency fluctuation		±5% maximum								
	Power consumption	[W]	30			45					
Interface power supply			24 V DC ± 10% (required current capacity: 0.3 A (including CN8 connector signals))								
Control method			Sine-wave PWM control/current control method								
Tolerable regenerative power	Built-in regenerative resistor (Note 2, 3)	[W]	15	15	100	100	130 (Note 11)	170 (Note 11)	-	-	-
	External regenerative resistor (standard accessory) (Note 2, 3, 8, 9)	[W]	-	-	-	-	-	-	500 (800)	850 (1300)	850 (1300)
Dynamic brake			Built-in (Note 4)						External option (Note 10)		
SSCNET III/H command communication cycle (Note 7)			0.222 ms, 0.444 ms, 0.888 ms								
Communication function			USB: Connect a personal computer (MR Configurator2 compatible)								
Encoder output pulse			Compatible (A/B/Z-phase pulse)								
Analog monitor			2 channels								
Fully closed loop control	MR-J4-B4		Two-wire type communication method								
	MR-J4-B4-RJ		Two-wire/four-wire type communication method								
Servo function			Advanced vibration suppression control II, adaptive filter II, robust filter, auto tuning, one-touch tuning, tough drive function, drive recorder function, tightening & press-fit control, machine diagnosis function, power monitoring function, master-slave operation function (Note 12), scale measurement function (Note 12), J3 compatibility mode								
Load-side encoder interface	MR-J4-B4		Mitsubishi high-speed serial communication								
	MR-J4-B4-RJ		Mitsubishi high-speed serial communication, A/B/Z-phase differential input signal								
Protective functions			Overcurrent shut-off, regenerative overvoltage shut-off, overload shut-off (electronic thermal), servo motor overheat protection, encoder error protection, regenerative error protection, undervoltage protection, instantaneous power failure protection, overspeed protection, error excessive protection, magnetic pole detection protection, linear servo control fault protection								
Functional safety			STO (IEC/EN 61800-5-2)								
Safety performance	Standards certified by CB		EN ISO 13849-1 Category 3 PL d, IEC 61508 SIL 2, EN 62061 SIL CL 2, EN 61800-5-2 SIL 2								
	Response performance		8 ms or less (STO input OFF → energy shut-off)								
	Test pulse input (STO) (Note 6)		Test pulse interval: 1 Hz to 25 Hz, test pulse off time: 1 ms maximum								
	Mean time to dangerous failure (MTTFd)		100 years or longer								
	Diagnostic coverage (DC)		Medium (90% to 99%)								
	Probability of dangerous Failure per Hour (PFH)		1.68×10^{-10} [1/h]								
Compliance to standards			Refer to "Conformity with Global Standards and Regulations" on p. 57 in this catalog.								
Structure (IP rating)			Natural cooling, open (IP20)		Force cooling, open (IP20)		Force cooling, open (IP20) (Note 5)				
Close mounting			Not possible								
Environment	Ambient temperature		0 °C to 55 °C (non-freezing), storage: -20 °C to 65 °C (non-freezing)								
	Ambient humidity		90 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)								
	Ambience		Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust								
	Altitude		1000 m or less above sea level								
	Vibration resistance		5.9 m/s^2 at 10 Hz to 55 Hz (directions of X, Y and Z axes)								
Mass		[kg]	1.7	1.7	2.1	3.6	4.3	6.5	13.4	13.4	18.2

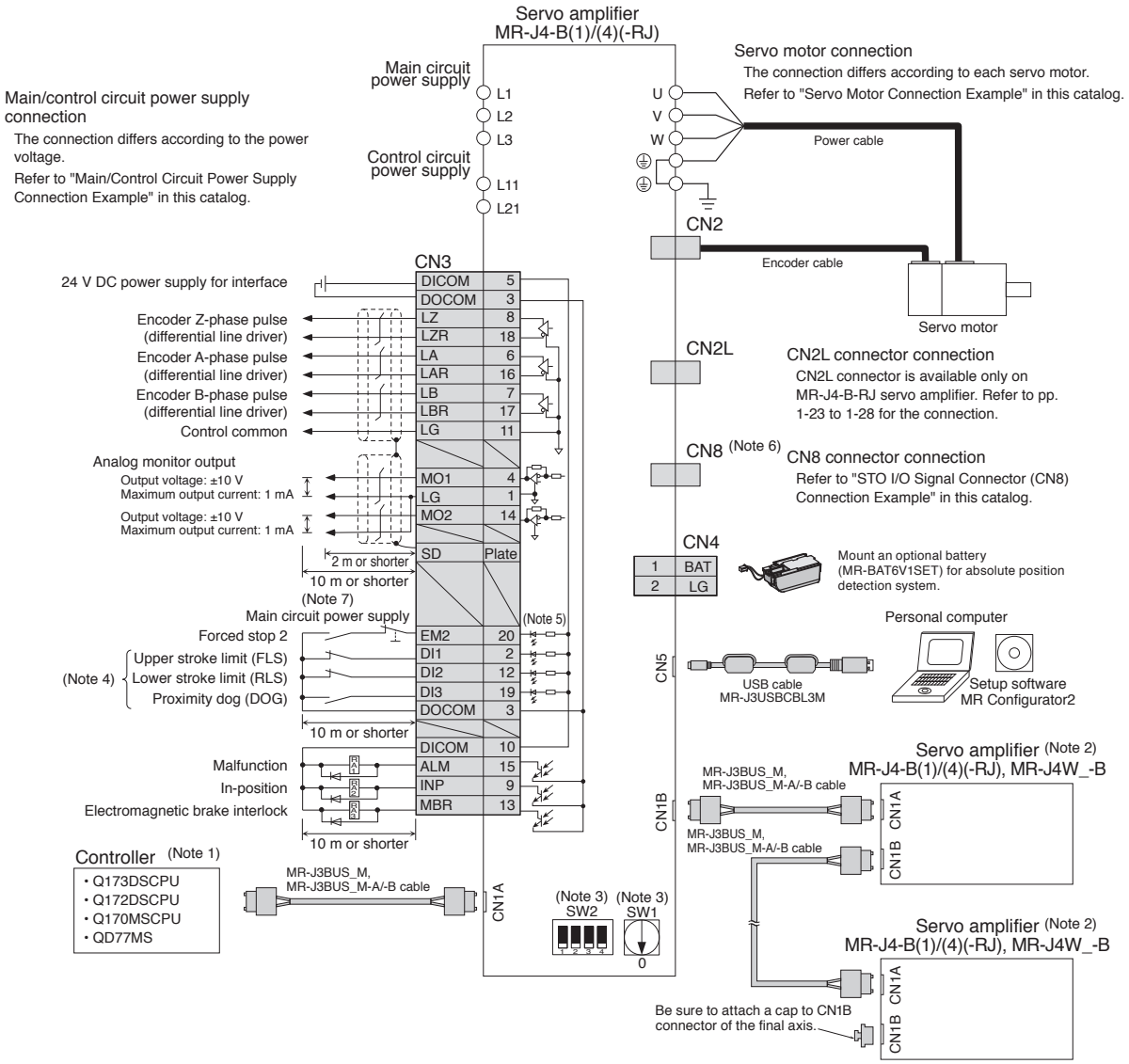
MR-J4-B4(-RJ) (SSCNET III/H Interface) Specifications (400 V)

B B-RJ

Notes: 1. Rated output and speed of a rotary servo motor, and continuous thrust and maximum speed of a linear servo motor are applicable when the servo amplifier, combined with the servo motor, is operated within the specified power supply voltage and frequency.
2. Select the most suitable regenerative option for your system with our capacity selection software.
3. Refer to "Regenerative Option" in this catalog for the tolerable regenerative power [W] when regenerative option is used.
4. When using the built-in dynamic brake, refer to "MR-J4-_B(-RJ) MR-J4-_B4(-RJ) Servo Amplifier Instruction Manual" for the permissible load to motor inertia ratio and the permissible load to mass ratio.
5. Terminal blocks are excluded.
6. The test pulse is a signal for the external circuit to perform self-diagnosis by turning off the signals to the servo amplifier instantaneously at regular intervals.
7. The command communication cycle depends on the controller specifications and the number of axes connected.
8. The value in brackets is applicable when cooling fans (2 units of 92 mm × 92 mm, minimum air flow: 1.0 m^3/min) are installed, and then [Pr. PA02] is changed.
9. Servo amplifiers without an enclosed regenerative resistor are also available. Refer to "1-Axis Servo Amplifier Model Designation" in this catalog for details.
10. Use an optional external dynamic brake with the servo amplifier. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc. Take measures to ensure safety on the entire system when not using the dynamic brake.
11. The servo amplifier built-in regenerative resistor is compatible with the maximum torque deceleration when the servo motor is used within the rated speed and the recommended load to motor inertia ratio. Contact your local sales office if the operating motor speed or the load to motor inertia ratio exceeds the rated speed or the recommended ratio.
12. This function is available with the servo amplifiers with software version A8 or later.

MR-J4-B(1)/(4)(-RJ) Standard Wiring Diagram Example

B B-RJ



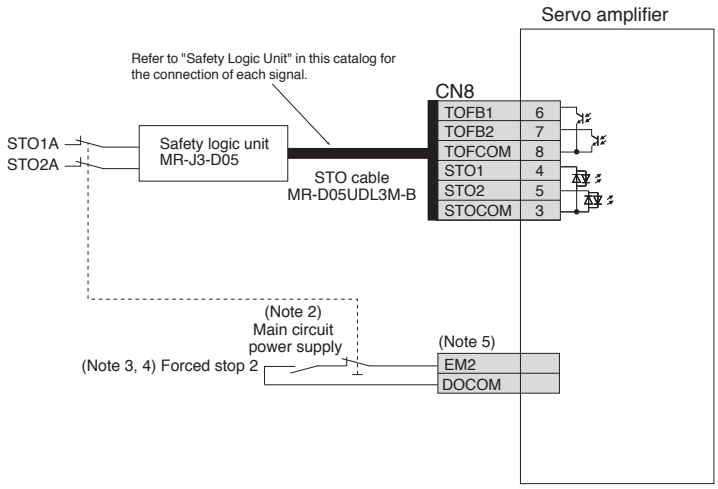
Notes: 1. For details such as setting the controllers, refer to programming manual or user's manual for the controllers.
2. Connections for the second and following axes are omitted.
3. Up to 64 axes are set by using a combination of an axis selection rotary switch (SW1) and auxiliary axis number setting switches (SW2-3 and SW2-4). Note that the number of the connectable axes depends on the controller specifications.
4. Devices can be assigned for DI1, DI2 and DI3 with controller setting. Refer to the controller instruction manuals for details on setting.
5. This is for sink wiring. Source wiring is also possible.
6. Be sure to attach a short-circuit connector supplied with the servo amplifier when the STO function is not used.
7. Create a circuit to turn off EM2 (Forced stop 2) when the main circuit power is turned off to prevent an unexpected restart of the servo amplifier.

⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

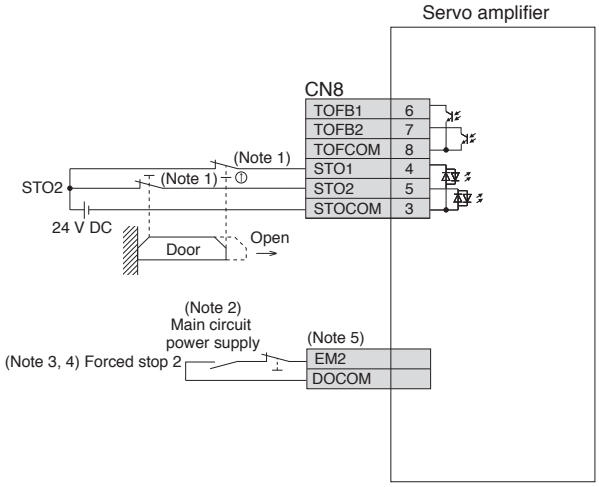
STO I/O Signal Connector (CN8) Connection Example

B | B-RJ | WB | B-RJ010 | A | A-RJ

●When used with MR-J3-D05



●When using a safety door



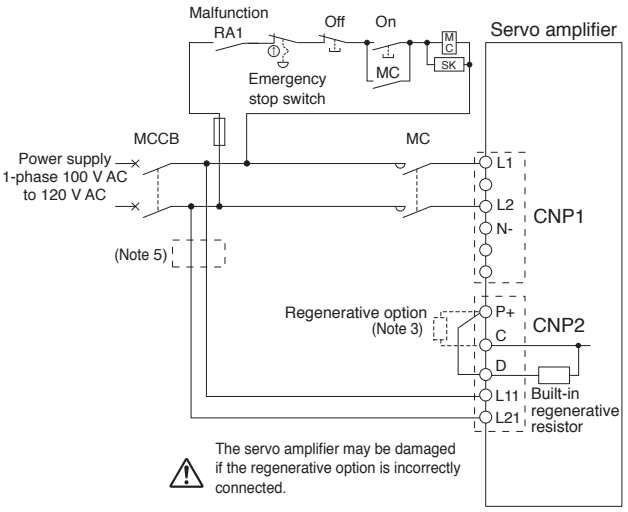
Notes: 1. When using the STO function, turn off STO1 and STO2 at the same time. Be sure to turn off STO1 and STO2 after the servo motor stops in servo-off state or after the servo motor stops with deceleration by turning off EM2 (Forced stop 2).
2. Create a circuit to turn off EM2 (Forced stop 2) when the main circuit power is turned off to prevent an unexpected restart of the servo amplifier.
3. If the controller does not have a forced stop function, install a forced stop 2 switch (normally closed contact).
4. Turn on EM2 (Forced stop 2) before starting the operation.
5. The connector and the pin numbers for each signal vary depending on the servo amplifier. Refer to the standard wiring diagram example for relevant servo amplifier in this catalog for details.

⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

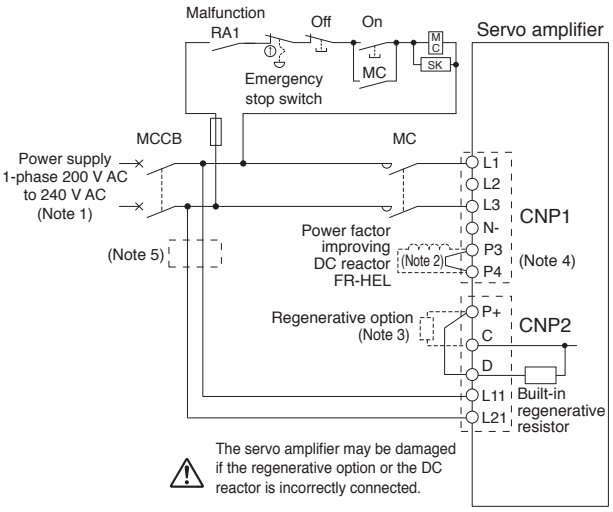
Main/Control Circuit Power Supply Connection Example

B | B-RJ | B-RJ010 | A | A-RJ

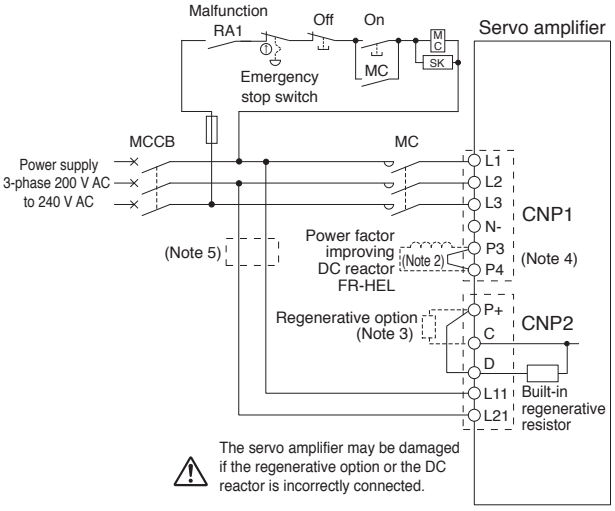
●For 1-phase 100 V AC (released in the future)



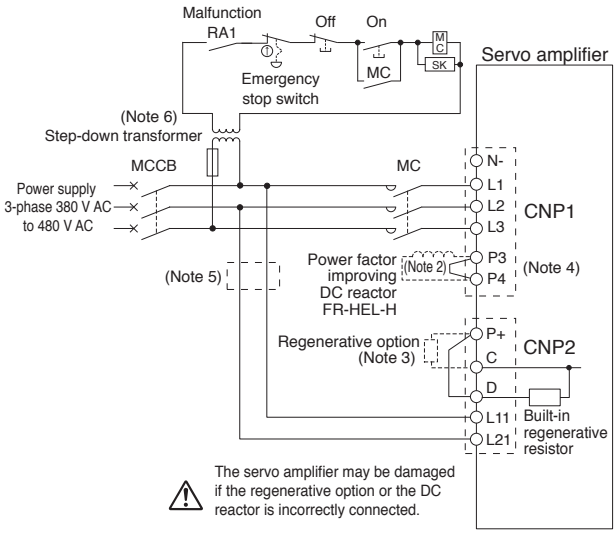
●For 1-phase 200 V AC



●For 3-phase 200 V AC, 3.5 kW or smaller



●For 3-phase 400 V AC, 3.5 kW or smaller



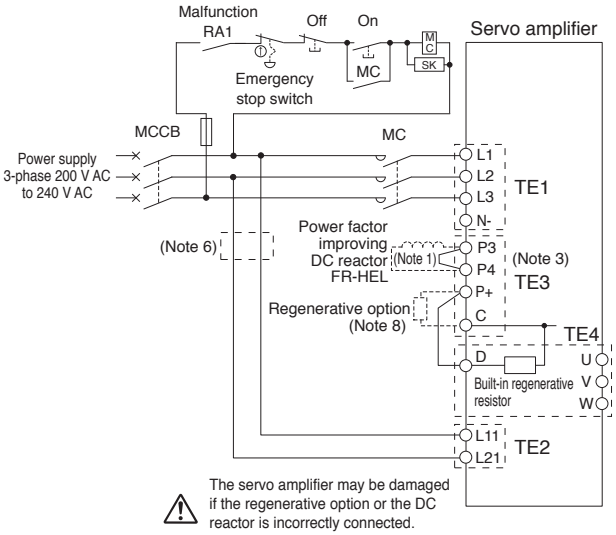
Notes: 1. For 1-phase 200 V AC to 240 V AC, connect the power supply to L1 and L3 terminals. Do not connect anything to L2. The connections are different from MR-J3 series servo amplifiers. Be careful not to make a connection error when replacing MR-J3 with MR-J4.
2. Disconnect a short-circuit bar between P3 and P4 when using the power factor improving DC reactor.
3. Disconnect a short-circuit bar between P+ and D when connecting the regenerative option externally.
4. MR-J4 series servo amplifiers have P3 and P4 in the upstream of the inrush current suppression circuit. They are different from P1 and P2 (downstream of the inrush current suppression circuit) of MR-J3 series servo amplifiers. Refer to relevant Servo Amplifier Instruction Manual for details.
5. When wires used for L11 and L21 are thinner than those for L1, L2, and L3, use a molded-case circuit breaker.
6. A step-down transformer is required if coil voltage of the magnetic contactor is in 200 V class.

⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

Main/Control Circuit Power Supply Connection Example

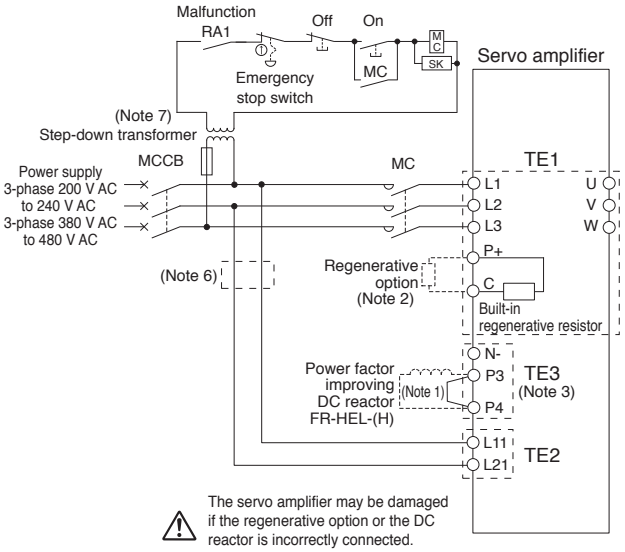
B | B-RJ | B-RJ010 | A | A-RJ

●For 3-phase 200 V AC, 5 kW

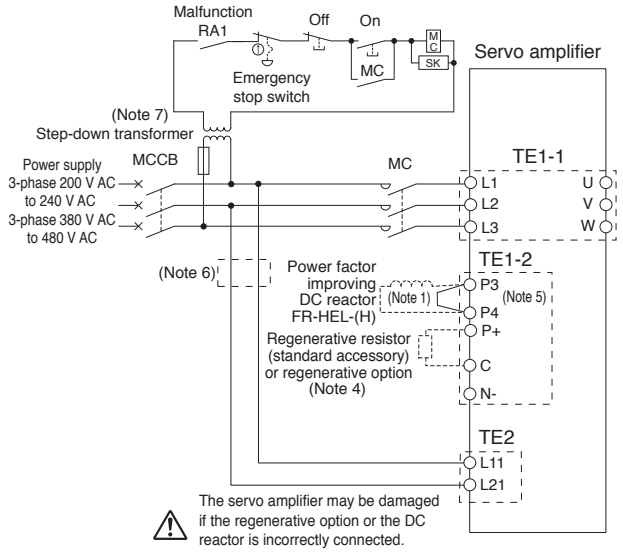


●For 3-phase 400 V AC, 5 kW

●For 3-phase 200 V AC/400 V AC, 7 kW



●For 3-phase 200 V AC/400 V AC, 11 kW to 22 kW



Notes: 1. Disconnect a short-circuit bar between P3 and P4 when using the power factor improving DC reactor.
2. Disconnect the wires for the built-in regenerative resistor (P+ and C) when connecting the regenerative option externally.
3. MR-J4 series servo amplifiers have P3 and P4 in the upstream of the inrush current suppression circuit. They are different from P1 and P2 (downstream of the inrush current suppression circuit) of MR-J3 series servo amplifiers. Refer to relevant Servo Amplifier Instruction Manual for details.
4. 11 kW or larger servo amplifiers do not have a built-in regenerative resistor.
5. MR-J4 series servo amplifiers have P3 and P4 in the upstream of the inrush current suppression circuit. They are different from P1 and P (downstream of the inrush current suppression circuit) of MR-J3 series servo amplifiers. Refer to relevant Servo Amplifier Instruction Manual for details.
6. When wires used for L11 and L21 are thinner than those for L1, L2, and L3, use a molded-case circuit breaker.
7. A step-down transformer is required if the servo amplifier is in 400 V class, and coil voltage of the magnetic contactor is in 200 V class.
8. Disconnect a short-circuit bar between P+ and D when connecting the regenerative option externally.

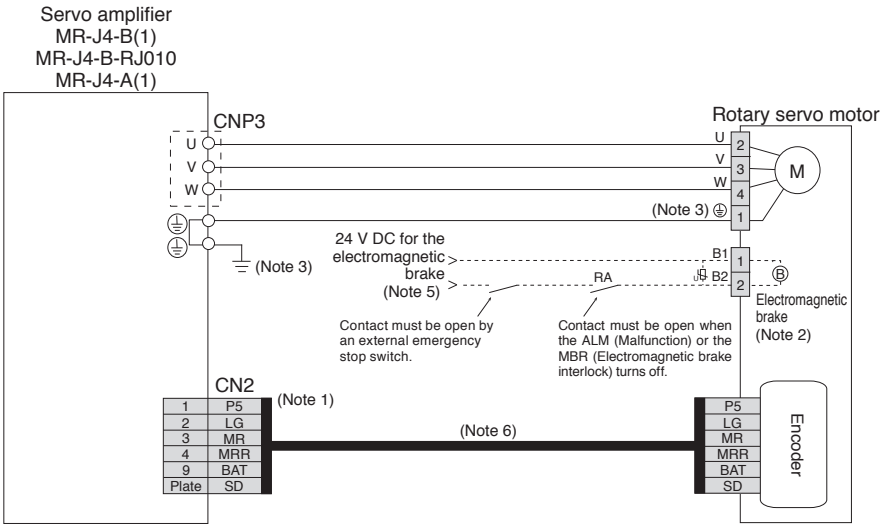
⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

Servo Motor Connection Example (Rotary Servo Motor)

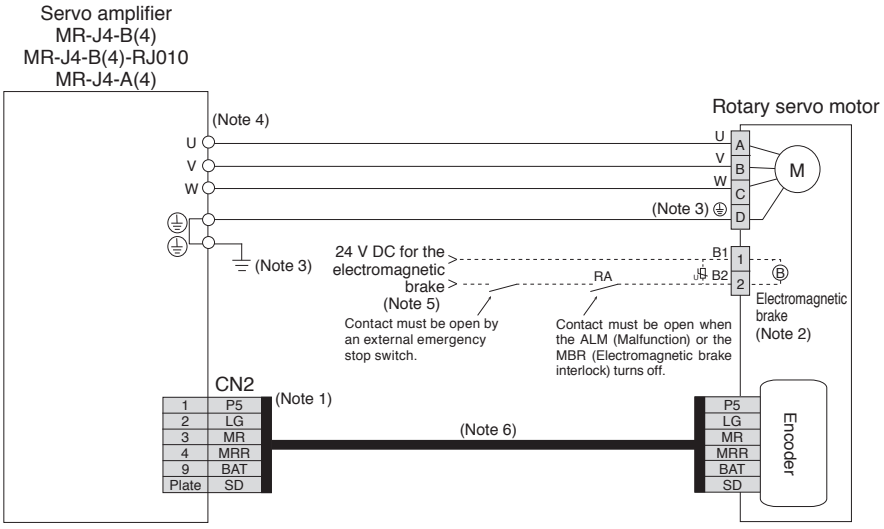
B | B-RJ010 | A

Semi Closed Loop Control System with MR-J4-B(-RJ010)/MR-J4-A

●For HG-KR/HG-MR series



●For HG-SR/HG-JR (9 kW or smaller) series



Notes: 1. The signals shown is applicable when using a two-wire type encoder cable. Four-wire type is also compatible.
2. This is for the servo motor with electromagnetic brake. The electromagnetic brake terminals (B1, B2) do not have polarity.
3. Connect the grounding wire to the cabinet protective earth (PE) terminal via the servo amplifier protective earth (PE) terminal for grounding.
4. Connector or terminal varies depending on the servo amplifier capacities. Refer to the dimensions of the relevant servo amplifier in this catalog for details.
5. Do not use the 24 V DC interface power supply for the electromagnetic brake. Provide a dedicated power supply to the electromagnetic brake.
6. Encoder cable is available as an option. Refer to "Servo Motor Instruction Manual (Vol. 3)" when fabricating the cables.

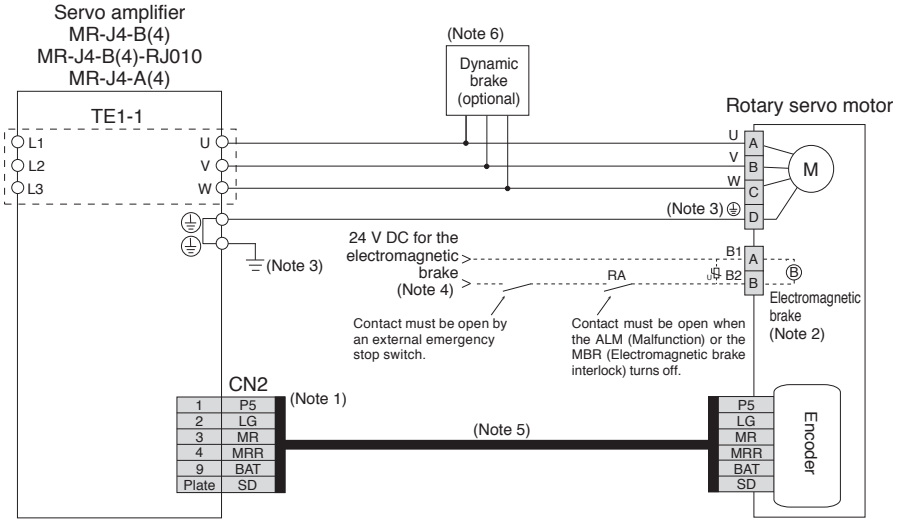
⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

Servo Motor Connection Example (Rotary Servo Motor)

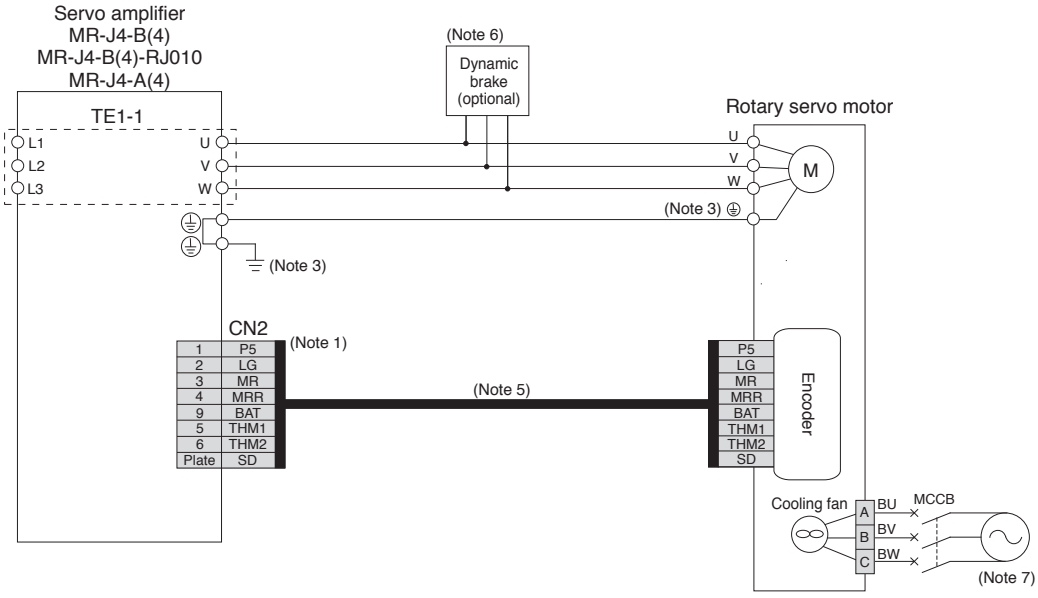
B | B-RJ010 | A

Semi Closed Loop Control System with MR-J4-B(-RJ010)/MR-J4-A

●For HG-JR series (11 kW and 15 kW)



●For HG-JR series (22 kW)



Notes: 1. The signals shown is applicable when using a two-wire type encoder cable. Four-wire type is also compatible.
2. This is for the servo motor with electromagnetic brake. The electromagnetic brake terminals (B1, B2) do not have polarity.
3. Connect the grounding wire to the cabinet protective earth (PE) terminal via the servo amplifier protective earth (PE) terminal for grounding.
4. Do not use the 24 V DC interface power supply for the electromagnetic brake. Provide a dedicated power supply to the electromagnetic brake.
5. Encoder cable is available as an option. Refer to "Servo Motor Instruction Manual (Vol. 3)" when fabricating the cables.
6. Use an optional external dynamic brake with the servo amplifier. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc.
7. Be sure to supply power to the cooling fan terminals. Refer to the cooling fan power supply described in the servo motor specifications in this catalog for the required power.

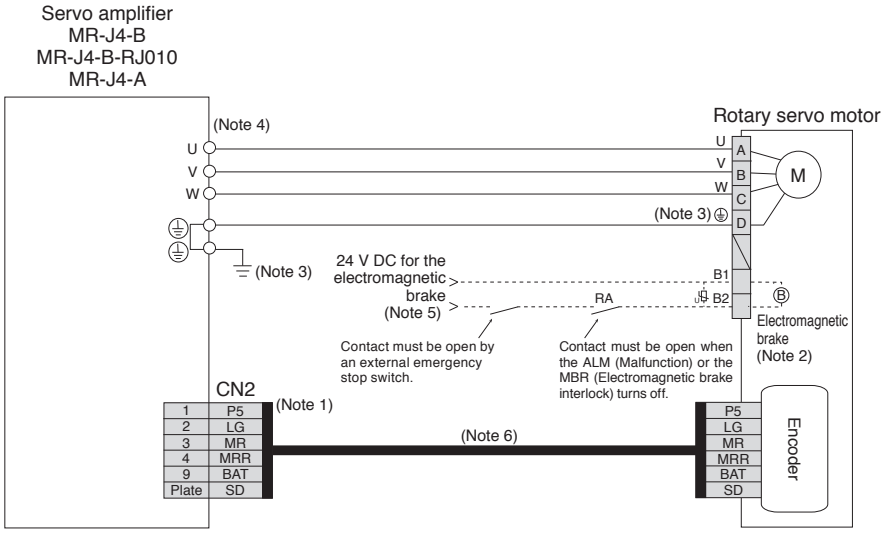
⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

Servo Motor Connection Example (Rotary Servo Motor)

B | B-RJ010 | A

Semi Closed Loop Control System with MR-J4-B(-RJ010)/MR-J4-A

●For HG-RR/HG-UR series



Notes: 1. The signals shown is applicable when using a two-wire type encoder cable. Four-wire type is also compatible.
2. This is for the servo motor with electromagnetic brake. The electromagnetic brake terminals (B1, B2) do not have polarity. A separate connector from the motor power connector is prepared as an electromagnetic brake connector for HG-UR202B to HG-UR502B. The pin numbers vary depending on the servo motor capacity. Refer to the dimensions of the relevant servo motor in this catalog for details.
3. Connect the grounding wire to the cabinet protective earth (PE) terminal via the servo amplifier protective earth (PE) terminal for grounding.
4. Connector or terminal varies depending on the servo amplifier capacities. Refer to the dimensions of the relevant servo amplifier in this catalog for details.
5. Do not use the 24 V DC interface power supply for the electromagnetic brake. Provide a dedicated power supply to the electromagnetic brake.
6. Encoder cable is available as an option. Refer to "Servo Motor Instruction Manual (Vol. 3)" when fabricating the cables.

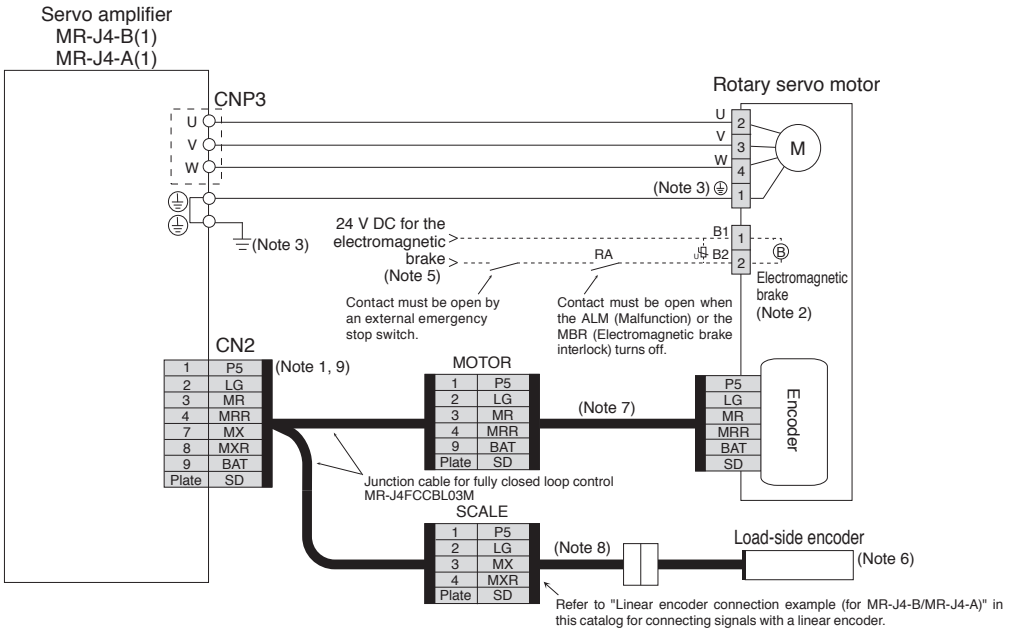
⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

Servo Motor Connection Example (Rotary Servo Motor)

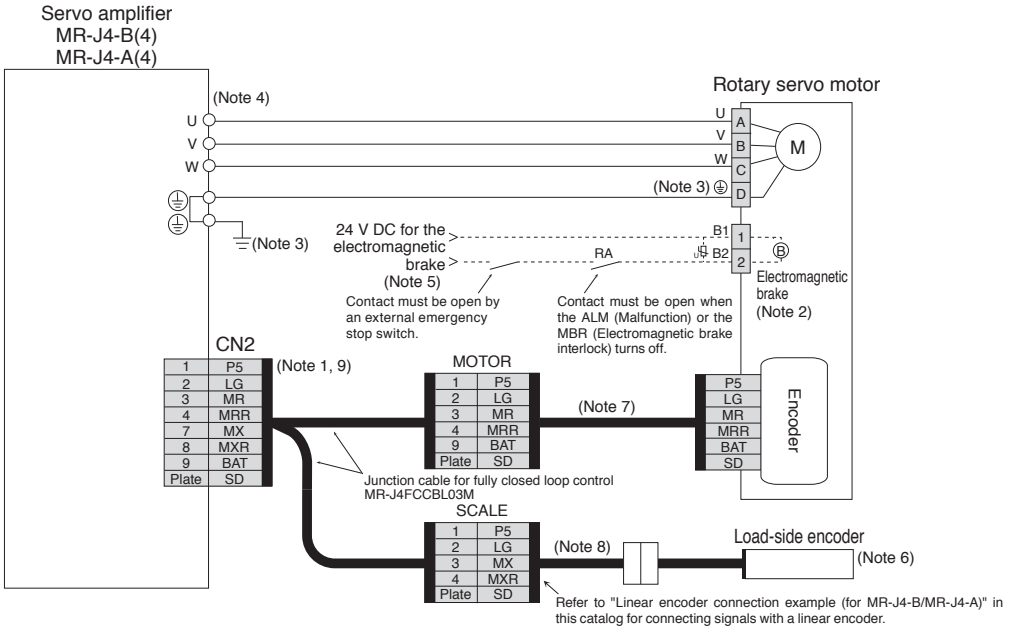
B A

Fully Closed Loop Control System with MR-J4-B/MR-J4-A

●For HG-KR/HG-MR series



●For HG-SR/HG-JR (9 kW or smaller) series



Notes: 1. For fully closed loop control, the load-side encoder and the servo motor encoder are compatible only with two-wire type communication method. Four-wire type cannot be used.
2. This is for the servo motor with electromagnetic brake. The electromagnetic brake terminals (B1, B2) do not have polarity.
3. Connect the grounding wire to the cabinet protective earth (PE) terminal via the servo amplifier protective earth (PE) terminal for grounding.
4. Connector or terminal varies depending on the servo amplifier capacities. Refer to the dimensions of the relevant servo amplifier in this catalog for details.
5. Do not use the 24 V DC interface power supply for the electromagnetic brake. Provide a dedicated power supply to the electromagnetic brake.
6. For linear encoders, refer to "List of Linear Encoders" under section 3 Linear Servo Motors in this catalog. Refer to relevant Servo Amplifier Instruction Manual for the fully closed loop control with a rotary encoder.
7. Encoder cable is available as an option. Refer to "Servo Motor Instruction Manual (Vol. 3)" when fabricating the cables.
8. Necessary encoder cables vary depending on the load-side encoder. Refer to relevant Instruction Manual.
9. When configuring a fully closed loop control system with MR-J4-B(1)/(4) or MR-J4-A(1)/(4) servo amplifier, be sure to connect MR-J4FCCBL03M junction cable or a junction cable fabricated using MR-J3THMCN2 connector set to CN2 connector.

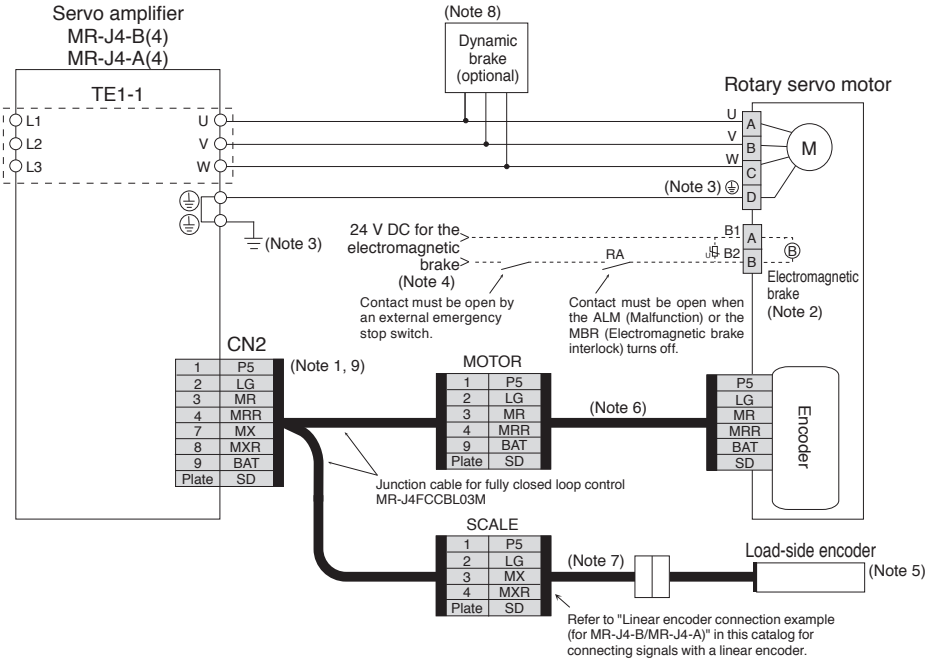
⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

Servo Motor Connection Example (Rotary Servo Motor)

B A

Fully Closed Loop Control System with MR-J4-B/MR-J4-A

●For HG-JR series (11 kW and 15 kW)



Notes: 1. For fully closed loop control, the load-side encoder and the servo motor encoder are compatible only with two-wire type communication method. Four-wire type cannot be used.
2. This is for the servo motor with electromagnetic brake. The electromagnetic brake terminals (B1, B2) do not have polarity.
3. Connect the grounding wire to the cabinet protective earth (PE) terminal via the servo amplifier protective earth (PE) terminal for grounding.
4. Do not use the 24 V DC interface power supply for the electromagnetic brake. Provide a dedicated power supply to the electromagnetic brake.
5. For linear encoders, refer to "List of Linear Encoders" under section 3 Linear Servo Motors in this catalog. Refer to relevant Servo Amplifier Instruction Manual for the fully closed loop control with a rotary encoder.
6. Encoder cable is available as an option. Refer to "Servo Motor Instruction Manual (Vol. 3)" when fabricating the cables.
7. Necessary encoder cables vary depending on the load-side encoder. Refer to relevant Instruction Manual.
8. Use an optional external dynamic brake with the servo amplifier. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc.
9. When configuring a fully closed loop control system with MR-J4-B(4)/MR-J4-A(4) servo amplifier, be sure to connect MR-J4FCCBL03M junction cable or a junction cable fabricated using MR-J3THMCN2 connector set to CN2 connector.

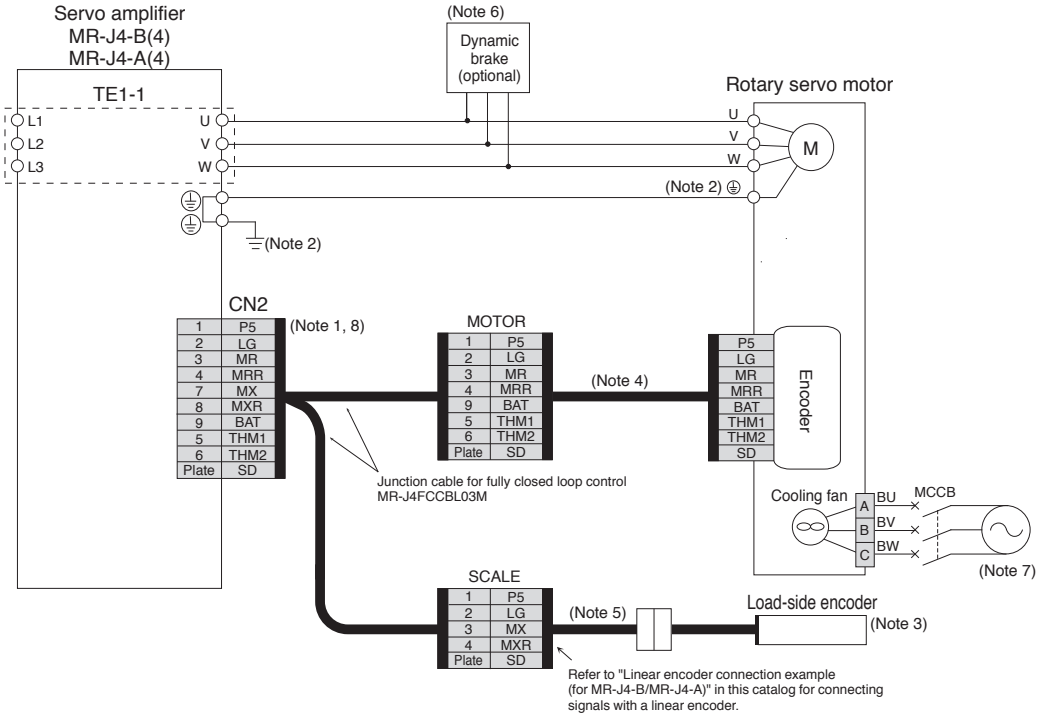
⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

Servo Motor Connection Example (Rotary Servo Motor)

B A

Fully Closed Loop Control System with MR-J4-B/MR-J4-A

●For HG-JR series (22 kW)



Notes: 1. For fully closed loop control, the load-side encoder and the servo motor encoder are compatible only with two-wire type communication method. Four-wire type cannot be used.
2. Connect the grounding wire to the cabinet protective earth (PE) terminal via the servo amplifier protective earth (PE) terminal for grounding.
3. For linear encoders, refer to "List of Linear Encoders" under section 3 Linear Servo Motors in this catalog. Refer to relevant Servo Amplifier Instruction Manual for the fully closed loop control with a rotary encoder.
4. Encoder cable is available as an option. Refer to "Servo Motor Instruction Manual (Vol. 3)" when fabricating the cables.
5. Necessary encoder cables vary depending on the load-side encoder. Refer to relevant Instruction Manual.
6. Use an optional external dynamic brake with the servo amplifier. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc.
7. Be sure to supply power to the cooling fan terminals. Refer to the cooling fan power supply described in the servo motor specifications in this catalog for the required power.
8. When configuring a fully closed loop control system with MR-J4-B(4)/MR-J4-A(4) servo amplifier, be sure to connect MR-J4FCCBL03M junction cable or a junction cable fabricated using MR-J3THMCN2 connector set to CN2 connector.

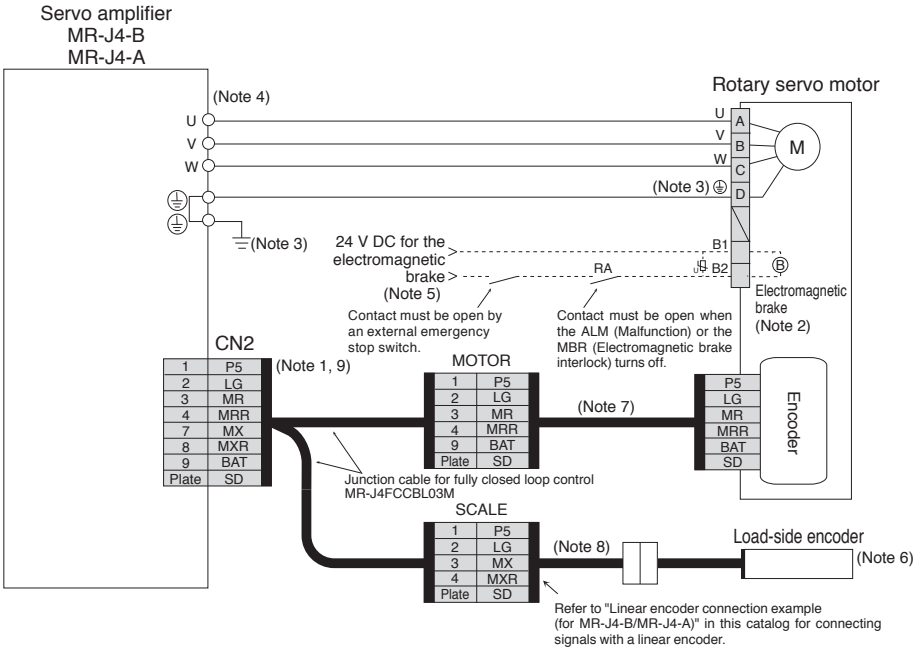
⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

Servo Motor Connection Example (Rotary Servo Motor)

B A

Fully Closed Loop Control System with MR-J4-B/MR-J4-A

●For HG-RR/HG-UR series



Notes: 1. For fully closed loop control, the load-side encoder and the servo motor encoder are compatible only with two-wire type communication method. Four-wire type cannot be used.
2. This is for the servo motor with electromagnetic brake. The electromagnetic brake terminals (B1, B2) do not have polarity. A separate connector from the motor power connector is prepared as an electromagnetic brake connector for HG-UR202B to HG-UR502B. The pin numbers vary depending on the servo motor capacity. Refer to the dimensions of the relevant servo motor in this catalog for details.
3. Connect the grounding wire to the cabinet protective earth (PE) terminal via the servo amplifier protective earth (PE) terminal for grounding.
4. Connector or terminal varies depending on the servo amplifier capacities. Refer to the dimensions of the relevant servo amplifier in this catalog for details.
5. Do not use the 24 V DC interface power supply for the electromagnetic brake. Provide a dedicated power supply to the electromagnetic brake.
6. For linear encoders, refer to "List of Linear Encoders" under section 3 Linear Servo Motors in this catalog. Refer to relevant Servo Amplifier Instruction Manual for the fully closed loop control with a rotary encoder.
7. Encoder cable is available as an option. Refer to "Servo Motor Instruction Manual (Vol. 3)" when fabricating the cables.
8. Necessary encoder cables vary depending on the load-side encoder. Refer to relevant Instruction Manual.
9. When configuring a fully closed loop control system with MR-J4-B/MR-J4-A servo amplifier, be sure to connect MR-J4FCCBL03M junction cable or a junction cable fabricated using MR-J3THMCN2 connector set to CN2 connector.

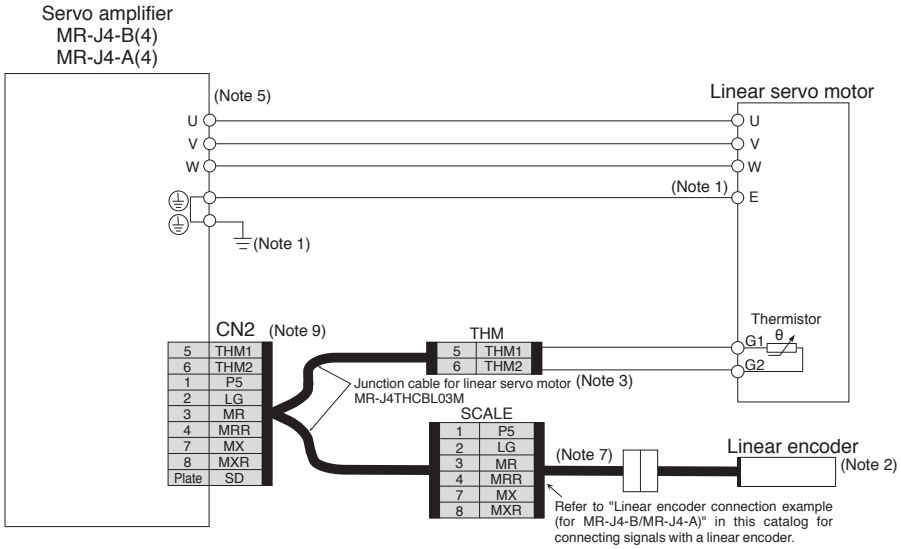
⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

Servo Motor Connection Example (Linear Servo Motor)

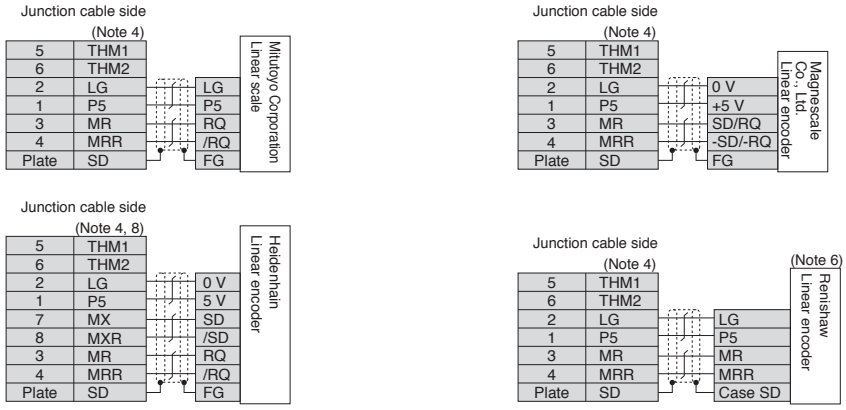
B A

Linear Servo Motor System with MR-J4-B/MR-J4-A

●For LM-H3/LM-F/LM-K2/LM-U2 series



●Linear encoder connection example (for MR-J4-B/MR-J4-A)



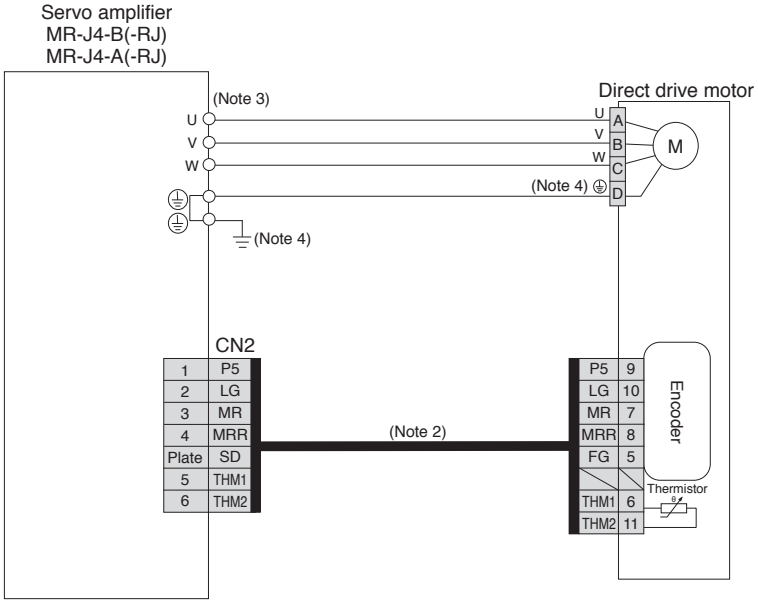
Notes: 1. Connect the grounding wire to the cabinet protective earth (PE) terminal via the servo amplifier protective earth (PE) terminal for grounding.
2. For linear encoders, refer to "List of Linear Encoders" under section 3 Linear Servo Motors in this catalog.
3. MR-J4THCBL03M junction cable for linear servo motor is compatible with both two-wire and four-wire type linear encoders.
4. For the number of the wire pairs for LG and P5, refer to "Linear Encoder Instruction Manual."
5. Connector or terminal varies depending on the servo amplifier capacities. Refer to the dimensions of the relevant servo amplifier in this catalog for details.
6. Wiring varies depending on the linear encoder series. Refer to "Linear Encoder Instruction Manual" for details.
7. Necessary encoder cables vary depending on the linear encoder. Refer to relevant Instruction Manual.
8. When fully closed loop control is configured with a rotary servo motor, the load-side encoder and the servo motor encoder are compatible only with two-wire type communication method. Four-wire type cannot be used.
9. When using a linear servo motor with MR-J4-B(4)/MR-J4-A(4) servo amplifier, be sure to connect MR-J4THCBL03M junction cable or a junction cable fabricated using MR-J3THMCN2 connector set to CN2 connector.

⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

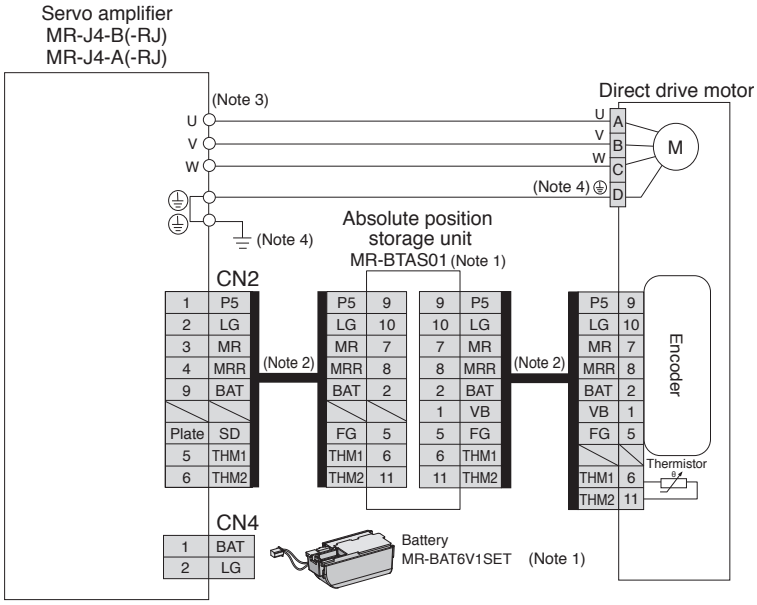
Servo Motor Connection Example (Direct Drive Motor)

B B-RJ A A-RJ

●For TM-RFM series (incremental system)



●For TM-RFM series (absolute position detection system)



Notes: 1. Optional MR-BTAS01 absolute position storage unit and MR-BAT6V1SET battery are required for absolute position detection system. Refer to relevant Servo Amplifier Instruction Manual and "Direct Drive Motor Instruction Manual" for details.
2. Fabricate this encoder cable. Refer to "Direct Drive Motor Instruction Manual" for fabricating the encoder cable.
3. Connector or terminal varies depending on the servo amplifier capacities. Refer to the dimensions of the relevant servo amplifier in this catalog for details.
4. Connect the grounding wire to the cabinet protective earth (PE) terminal via the servo amplifier protective earth (PE) terminal for grounding.

⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

Encoder Connection Specifications

When configuring a linear servo motor system or a fully closed loop control system, or when using the scale measurement function, use the servo amplifier with the following software version.
Refer to the following tables for the encoder communication method compatible with each system and for the servo amplifier connector to which a load-side encoder should be connected.

For MR-J4-B(-RJ)/MR-J4-A(-RJ)/MR-J4W_-B servo amplifier

B B-RJ WB A A-RJ

Operation mode	External encoder communication method	Connector to be connected with the external encoder					
		MR-J4-B	MR-J4-B-RJ	MR-J4-A	MR-J4-A-RJ	MR-J4W2-B	MR-J4W3-B
Linear servo motor system	Two-wire type	CN2 (Note 1)	CN2 (Note 1)	CN2 (Note 1, 6)	CN2 (Note 1)	CN2A (Note 1) CN2B (Note 1)	CN2A (Note 1) CN2B (Note 1) CN2C (Note 1)
	Four-wire type						
	A/B/Z-phase differential output type		CN2L (Note 8)		CN2L (Note 8)		
Fully closed loop control system	Two-wire type	CN2 (Note 2, 3, 5)	CN2L	CN2 (Note 2, 3, 6)	CN2L	CN2A (Note 2, 4, 5) CN2B (Note 2, 4, 5)	
	Four-wire type						
	A/B/Z-phase differential output type						
Scale measurement function	Two-wire type	CN2 (Note 2, 3, 7)	CN2L (Note 7)			CN2A (Note 2, 4, 7) CN2B (Note 2, 4, 7)	
	Four-wire type						
	A/B/Z-phase differential output type						

For MR-J4-B4(-RJ)/MR-J4-A4(-RJ) servo amplifier

B B-RJ A A-RJ

Operation mode	External encoder communication method	Connector to be connected with the external encoder			
		MR-J4-B4	MR-J4-B4-RJ	MR-J4-A4	MR-J4-A4-RJ
Linear servo motor system	Two-wire type	CN2 (Note 1)	CN2 (Note 1)	CN2 (Note 1)	CN2 (Note 1)
	Four-wire type				
	A/B/Z-phase differential output type		CN2L (Note 8)		CN2L (Note 8)
Fully closed loop control system	Two-wire type	CN2 (Note 2, 3)	CN2L	CN2 (Note 2, 3)	CN2L
	Four-wire type				
	A/B/Z-phase differential output type				
Scale measurement function	Two-wire type	CN2 (Note 2, 3, 7)	CN2L (Note 7)		
	Four-wire type				
	A/B/Z-phase differential output type				

For MR-J4-B1(-RJ)/MR-J4-A1(-RJ) servo amplifier

B B-RJ A A-RJ

Operation mode	External encoder communication method	Connector to be connected with the external encoder			
		MR-J4-B1	MR-J4-B1-RJ	MR-J4-A1	MR-J4-A1-RJ
Fully closed loop control system	Two-wire type	CN2 (Note 2, 3)	CN2L	CN2 (Note 2, 3)	CN2L
	Four-wire type				
	A/B/Z-phase differential output type				
Scale measurement function	Two-wire type	CN2 (Note 2, 3)	CN2L		
	Four-wire type				
	A/B/Z-phase differential output type				

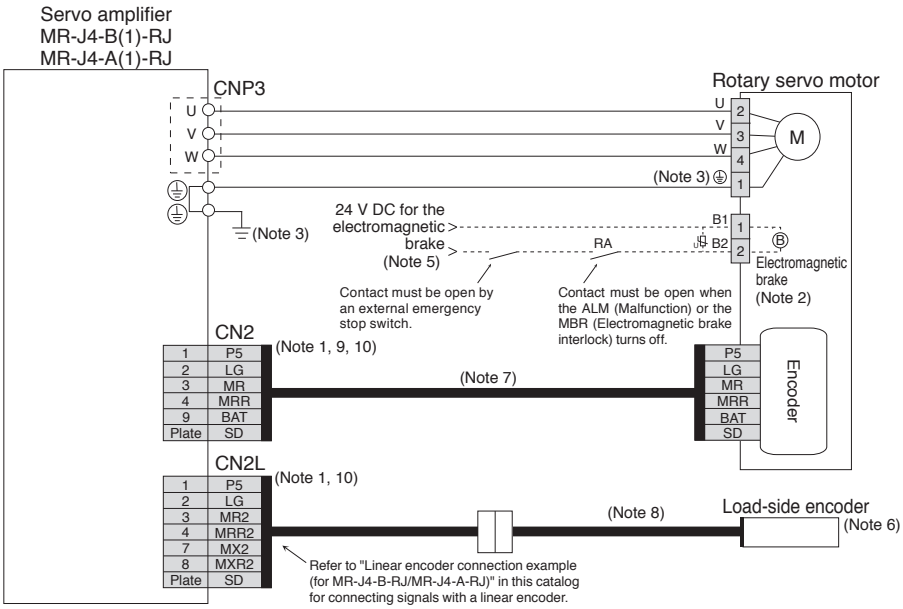
Notes: 1. MR-J4THCBL03M junction cable is required.
2. MR-J4FCCBL03M junction cable is required.
3. MR-J4-B(1)/(4) and MR-J4-A(1)/(4) servo amplifiers are not compatible with a servo motor encoder with four-wire type communication method. Use MR-J4-B(1)/(4)-RJ or MR-J4-A(1)/(4)-RJ servo amplifiers.
4. MR-J4W2-B servo amplifier is not compatible with a servo motor encoder with four-wire communication method. Use MR-J4-B-RJ servo amplifier.
5. The servo amplifier with software version A3 or later is compatible.
6. The servo amplifier with software version A5 or later is compatible.
7. The servo amplifier with software version A8 or later is compatible.
8. Connect a thermistor to CN2 connector.

Servo Motor Connection Example (Rotary Servo Motor)

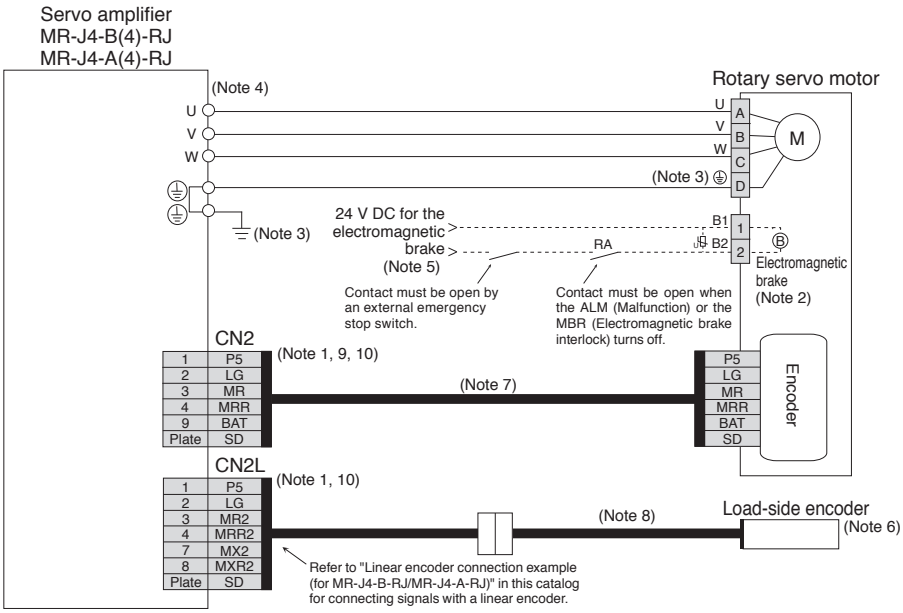
B-RJ A-RJ

Fully Closed Loop Control System with MR-J4-B-RJ/MR-J4-A-RJ

●For HG-KR/HG-MR series



●For HG-SR/HG-JR (9 kW or smaller) series



Notes: 1. The load-side encoder and the servo motor encoder are compatible with both two-wire and four-wire type communication methods.
2. This is for the servo motor with electromagnetic brake. The electromagnetic brake terminals (B1, B2) do not have polarity.
3. Connect the grounding wire to the cabinet protective earth (PE) terminal via the servo amplifier protective earth (PE) terminal for grounding.
4. Connector or terminal varies depending on the servo amplifier capacities. Refer to the dimensions of the relevant servo amplifier in this catalog for details.
5. Do not use the 24 V DC interface power supply for the electromagnetic brake. Provide a dedicated power supply to the electromagnetic brake.
6. For linear encoders, refer to "List of Linear Encoders" under section 3 Linear Servo Motors in this catalog. Refer to relevant Servo Amplifier Instruction Manual for the fully closed loop control with a rotary encoder.
7. Encoder cable is available as an option. Refer to "Servo Motor Instruction Manual (Vol. 3)" when fabricating the cables.
8. Necessary encoder cables vary depending on the load-side encoder. Refer to relevant Instruction Manual.
9. This wiring of the servo motor encoder is applicable for the two-wire type communication method.
10. When configuring a fully closed loop control system with MR-J4-B(1)/(4)-RJ or MR-J4-A(1)/(4)-RJ servo amplifier, be sure to connect a servo motor encoder to CN2 connector and a load-side encoder to CN2L connector. Do not use MR-J4FCCBL03M junction cable or a junction cable fabricated using MR-J3THMCN2 connector set.

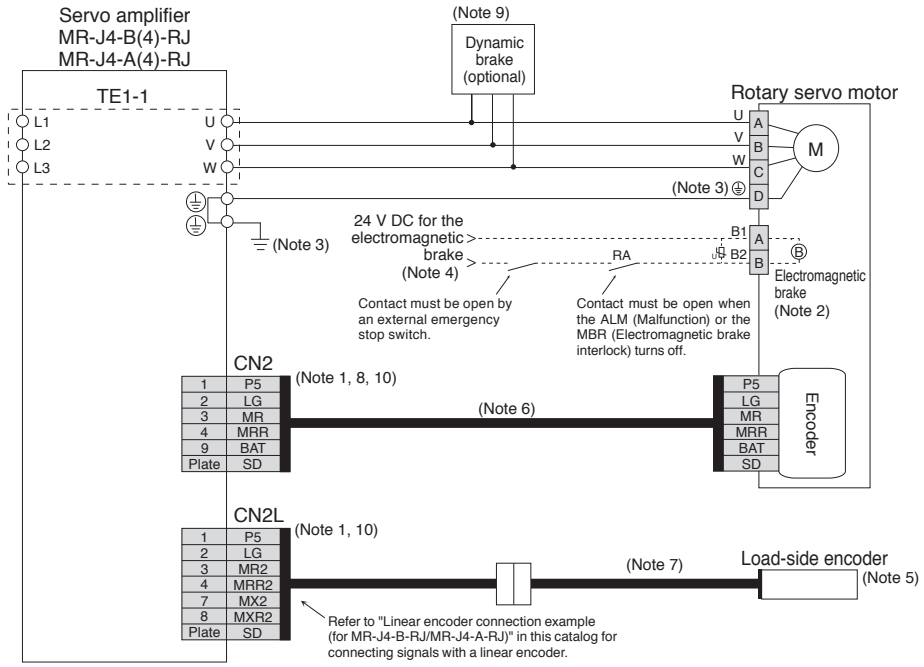
⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

Servo Motor Connection Example (Rotary Servo Motor)

B-RJ A-RJ

Fully Closed Loop Control System with MR-J4-B-RJ/MR-J4-A-RJ

●For HG-JR series (11 kW and 15 kW)



Notes: 1. The load-side encoder and the servo motor encoder are compatible with both two-wire and four-wire type communication methods.
2. This is for the servo motor with electromagnetic brake. The electromagnetic brake terminals (B1, B2) do not have polarity.
3. Connect the grounding wire to the cabinet protective earth (PE) terminal via the servo amplifier protective earth (PE) terminal for grounding.
4. Do not use the 24 V DC interface power supply for the electromagnetic brake. Provide a dedicated power supply to the electromagnetic brake.
5. For linear encoders, refer to "List of Linear Encoders" under section 3 Linear Servo Motors in this catalog. Refer to relevant Servo Amplifier Instruction Manual for the fully closed loop control with a rotary encoder.
6. Encoder cable is available as an option. Refer to "Servo Motor Instruction Manual (Vol. 3)" when fabricating the cables.
7. Necessary encoder cables vary depending on the load-side encoder. Refer to relevant Instruction Manual.
8. This wiring of the servo motor encoder is applicable for the two-wire type communication method.
9. Use an optional external dynamic brake with the servo amplifier. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc.
10. When configuring a fully closed loop control system with MR-J4-B(4)-RJ/MR-J4-A(4)-RJ servo amplifier, be sure to connect a servo motor encoder to CN2 connector and a load-side encoder to CN2L connector. Do not use MR-J4FCCBL03M junction cable or a junction cable fabricated using MR-J3THMCN2 connector set.

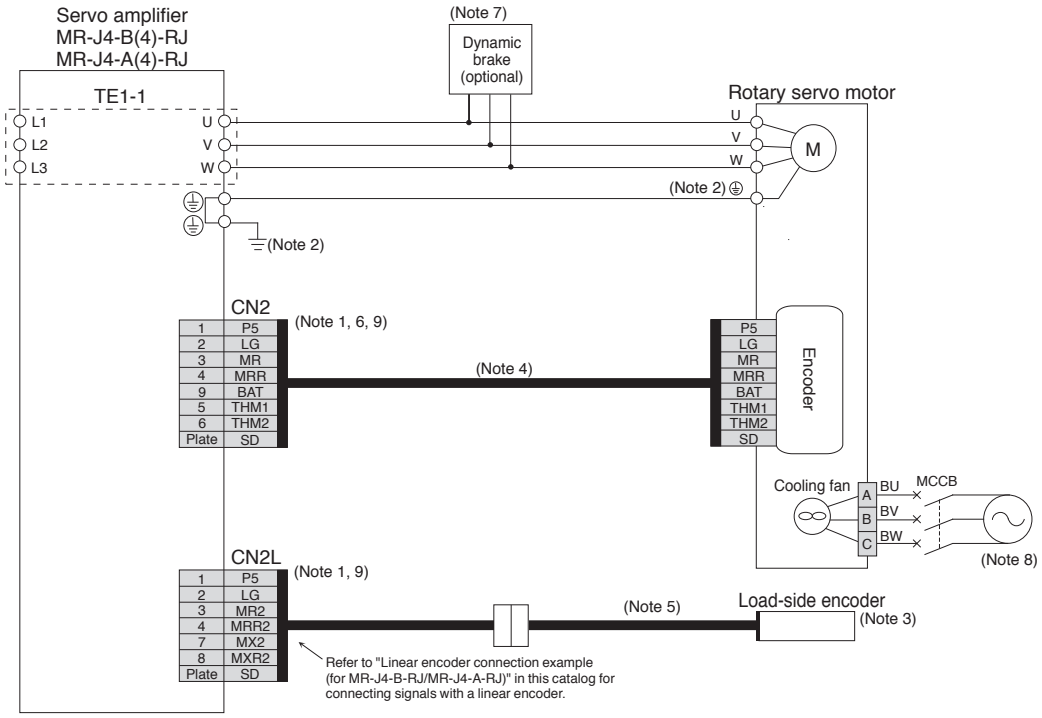
⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

Servo Motor Connection Example (Rotary Servo Motor)

B-RJ A-RJ

Fully Closed Loop Control System with MR-J4-B-RJ/MR-J4-A-RJ

●For HG-JR series (22 kW)



Notes: 1. The load-side encoder and the servo motor encoder are compatible with both two-wire and four-wire type communication methods.
2. Connect the grounding wire to the cabinet protective earth (PE) terminal via the servo amplifier protective earth (PE) terminal for grounding.
3. For linear encoders, refer to "List of Linear Encoders" under section 3 Linear Servo Motors in this catalog. Refer to relevant Servo Amplifier Instruction Manual for the fully closed loop control with a rotary encoder.
4. Encoder cable is available as an option. Refer to "Servo Motor Instruction Manual (Vol. 3)" when fabricating the cables.
5. Necessary encoder cables vary depending on the load-side encoder. Refer to relevant Instruction Manual.
6. This wiring of the servo motor encoder is applicable for the two-wire type communication method.
7. Use an optional external dynamic brake with the servo amplifier. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc.
8. Be sure to supply power to the cooling fan terminals. Refer to the cooling fan power supply described in the servo motor specifications in this catalog for the required power.
9. When configuring a fully closed loop control system with MR-J4-B(4)-RJ/MR-J4-A(4)-RJ servo amplifier, be sure to connect a servo motor encoder to CN2 connector and a load-side encoder to CN2L connector. Do not use MR-J4FCCBL03M junction cable or a junction cable fabricated using MR-J3THMCN2 connector set.

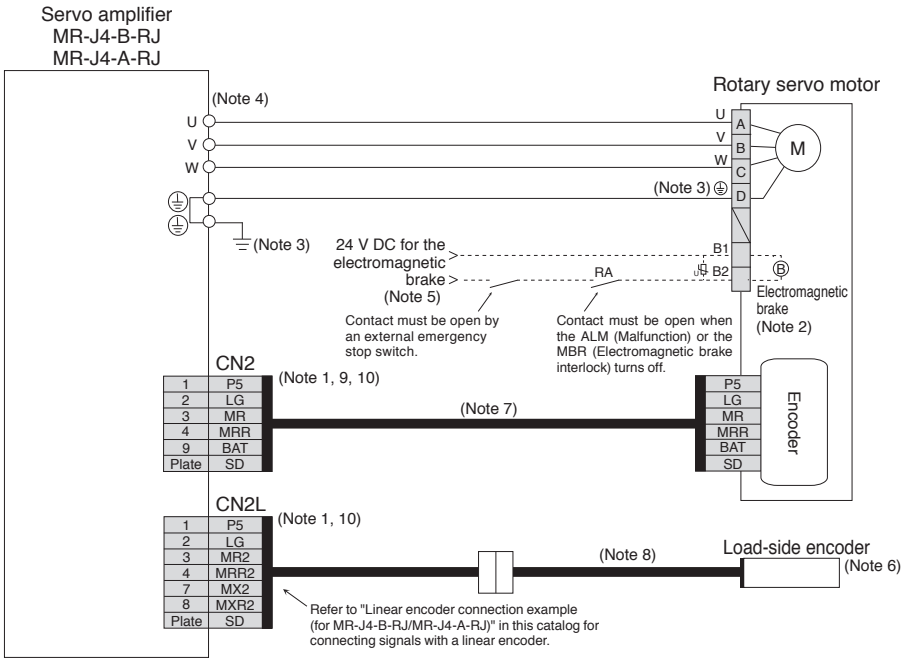
⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

Servo Motor Connection Example (Rotary Servo Motor)

B-RJ A-RJ

Fully Closed Loop Control System with MR-J4-B-RJ/MR-J4-A-RJ

●For HG-RR/HG-UR series



Notes: 1. The load-side encoder and the servo motor encoder are compatible with both two-wire and four-wire type communication methods.
2. This is for the servo motor with electromagnetic brake. The electromagnetic brake terminals (B1, B2) do not have polarity. A separate connector from the motor power connector is prepared as an electromagnetic brake connector for HG-UR202B to HG-UR502B. The pin numbers vary depending on the servo motor capacity. Refer to the dimensions of the relevant servo motor in this catalog for details.
3. Connect the grounding wire to the cabinet protective earth (PE) terminal via the servo amplifier protective earth (PE) terminal for grounding.
4. Connector or terminal varies depending on the servo amplifier capacities. Refer to the dimensions of the relevant servo amplifier in this catalog for details.
5. Do not use the 24 V DC interface power supply for the electromagnetic brake. Provide a dedicated power supply to the electromagnetic brake.
6. For linear encoders, refer to "List of Linear Encoders" under section 3 Linear Servo Motors in this catalog. Refer to relevant Servo Amplifier Instruction Manual for the fully closed loop control with a rotary encoder.
7. Encoder cable is available as an option. Refer to "Servo Motor Instruction Manual (Vol. 3)" when fabricating the cables.
8. Necessary encoder cables vary depending on the load-side encoder. Refer to relevant Instruction Manual.
9. This wiring of the servo motor encoder is applicable for the two-wire type communication method.
10. When configuring a fully closed loop control system with MR-J4-B-RJ/MR-J4-A-RJ servo amplifier, be sure to connect a servo motor encoder to CN2 connector and a load-side encoder to CN2L connector. Do not use MR-J4FCCBL03M junction cable or a junction cable fabricated using MR-J3THMCN2 connector set.

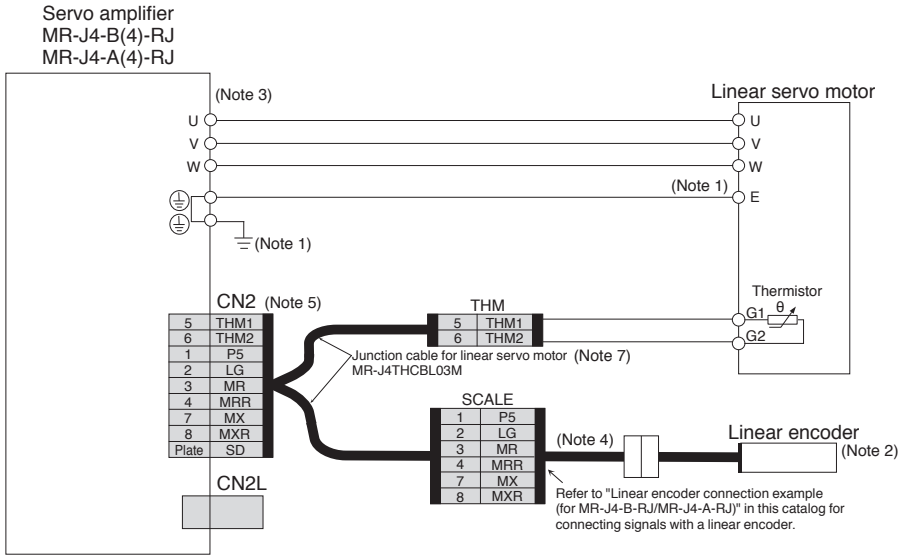
⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

Servo Motor Connection Example (Linear Servo Motor)

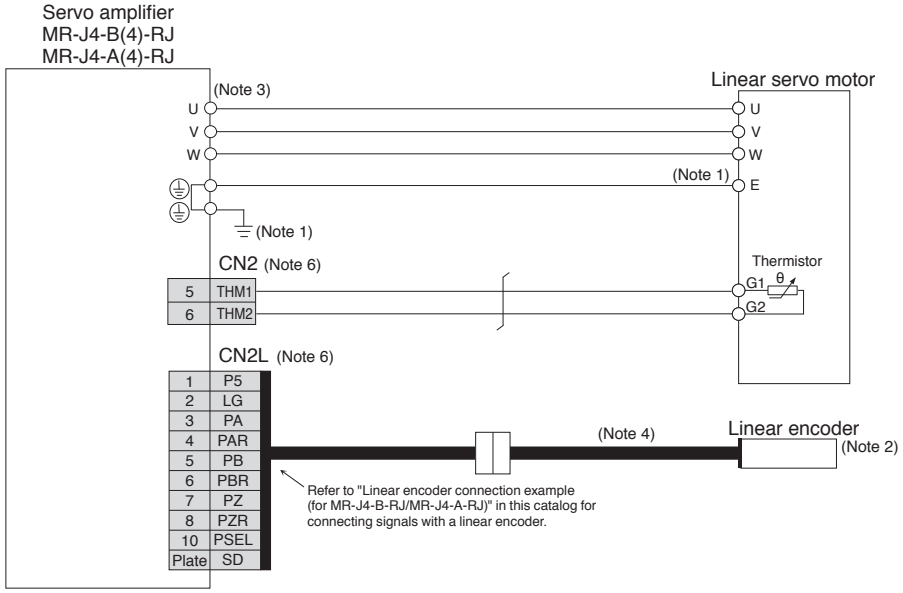
B-RJ A-RJ

Linear Servo Motor System with MR-J4-B-RJ/MR-J4-A-RJ (LM-H3, LM-F, LM-K2, LM-U2 Series)

●Connecting a serial linear encoder



●Connecting an A/B/Z-phase differential output linear encoder



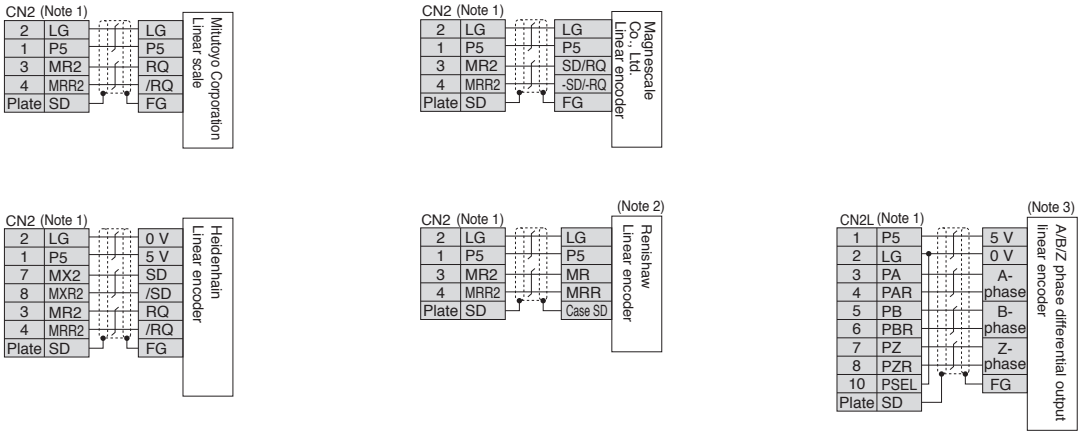
Notes: 1. Connect the grounding wire to the cabinet protective earth (PE) terminal via the servo amplifier protective earth (PE) terminal for grounding.
2. For linear encoders, refer to "List of Linear Encoders" under section 3 Linear Servo Motors in this catalog.
3. Connector or terminal varies depending on the servo amplifier capacities. Refer to the dimensions of the relevant servo amplifier in this catalog for details.
4. Necessary encoder cables vary depending on the linear encoder. Refer to "Linear Encoder Instruction Manual."
5. When configuring a linear servo system with MR-J4-B(4)-RJ/MR-J4-A(4)-RJ servo amplifier and a serial linear encoder, be sure to connect MR-J4THCBL03M junction cable or a junction cable fabricated using MR-J3THMCN2 connector set to CN2 connector.
6. When configuring a linear servo system with MR-J4-B(4)-RJ/MR-J4-A(4)-RJ servo amplifier and an A/B/Z-phase differential output type linear encoder, be sure to connect a thermistor to CN2 connector and the linear encoder to CN2L connector. Do not use MR-J4THCBL03M junction cable or a junction cable fabricated using MR-J3THMCN2 connector set.
7. MR-J4THCBL03M junction cable for linear servo motor is compatible with two-wire and four-wire type linear encoders.

⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

Servo Motor Connection Example (Linear Servo Motor)

B-RJ A-RJ

●Linear encoder connection example (for MR-J4-B-RJ/MR-J4-A-RJ)



Notes: 1. For the number of the wire pairs for LG and P5, refer to "Linear Encoder Instruction Manual."
2. Wiring varies depending on the linear encoder series. Refer to "Linear Encoder Instruction Manual" for details.
3. If the encoder's current consumption exceeds 350 mA, supply power from an external source.

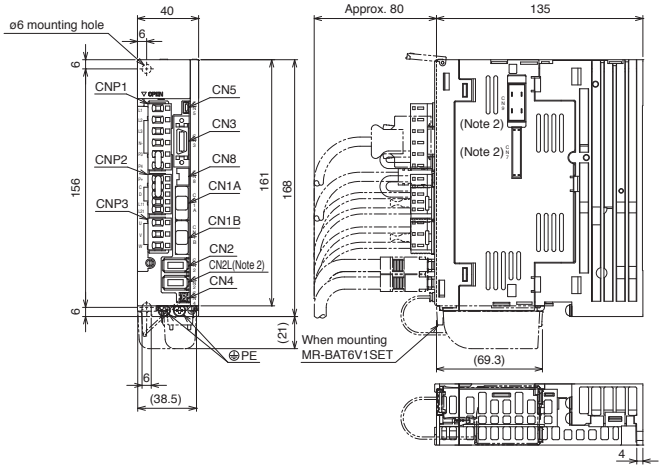
⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

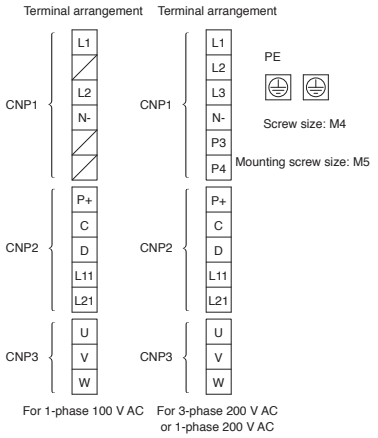
MR-J4-B(-RJ) Dimensions

B B-RJ

●MR-J4-10B(-RJ) (Note 1), MR-J4-10B1(-RJ) (released in the future) (Note 1)

●MR-J4-20B(-RJ) (Note 1), MR-J4-20B1(-RJ) (released in the future) (Note 1)

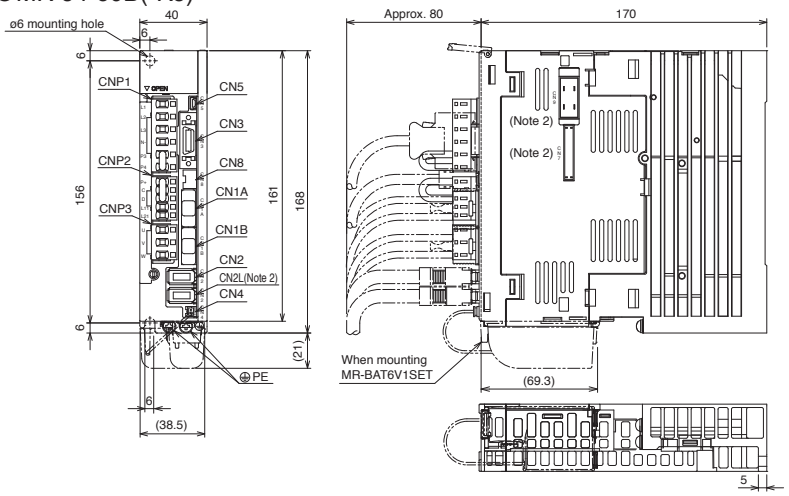


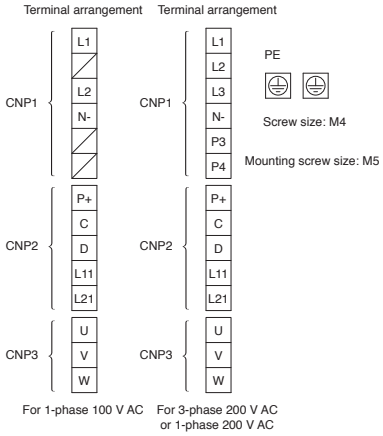


[Unit: mm]

●MR-J4-40B(-RJ) (Note 1), MR-J4-40B1(-RJ) (released in the future) (Note 1)

●MR-J4-60B(-RJ) (Note 1)

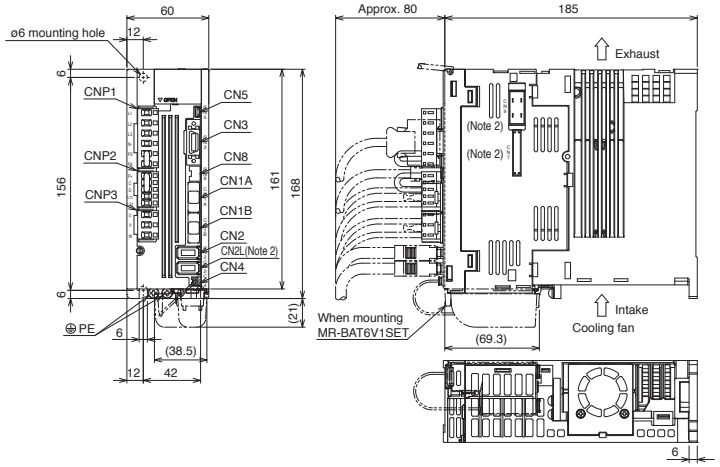


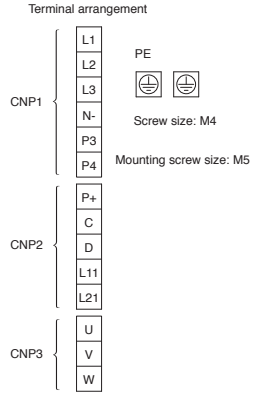


[Unit: mm]

●MR-J4-70B(-RJ) (Note 1)

●MR-J4-100B(-RJ) (Note 1)





[Unit: mm]

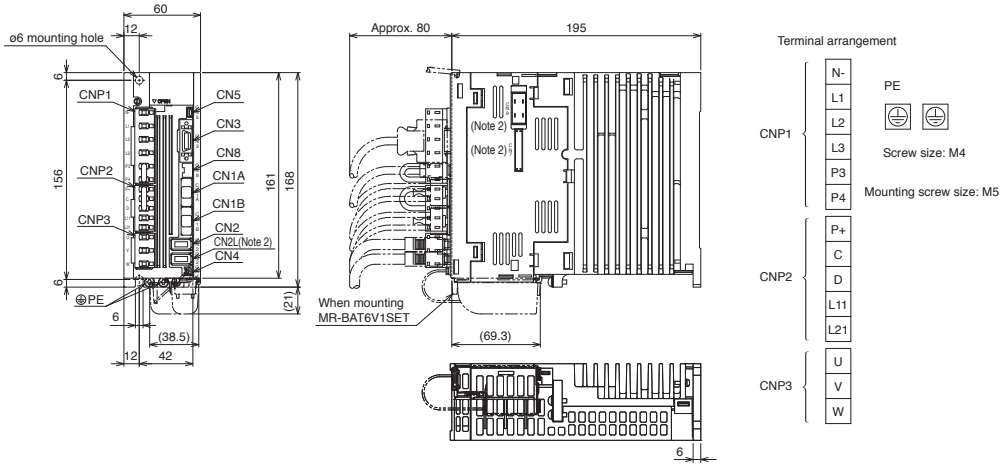
Notes: 1. CNP1, CNP2 and CNP3 connectors (insertion type) are supplied with the servo amplifier.
2. CN2L, CN7, and CN9 connectors are not available for MR-J4-B servo amplifier.

MR-J4-B(-RJ) Dimensions

B B-RJ

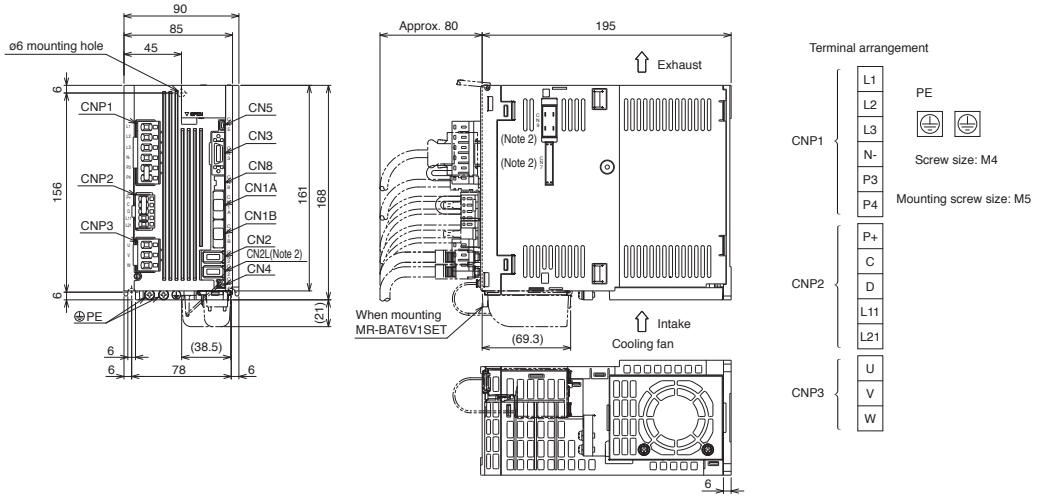
●MR-J4-60B4(-RJ) (Note 1)

●MR-J4-100B4(-RJ) (Note 1)



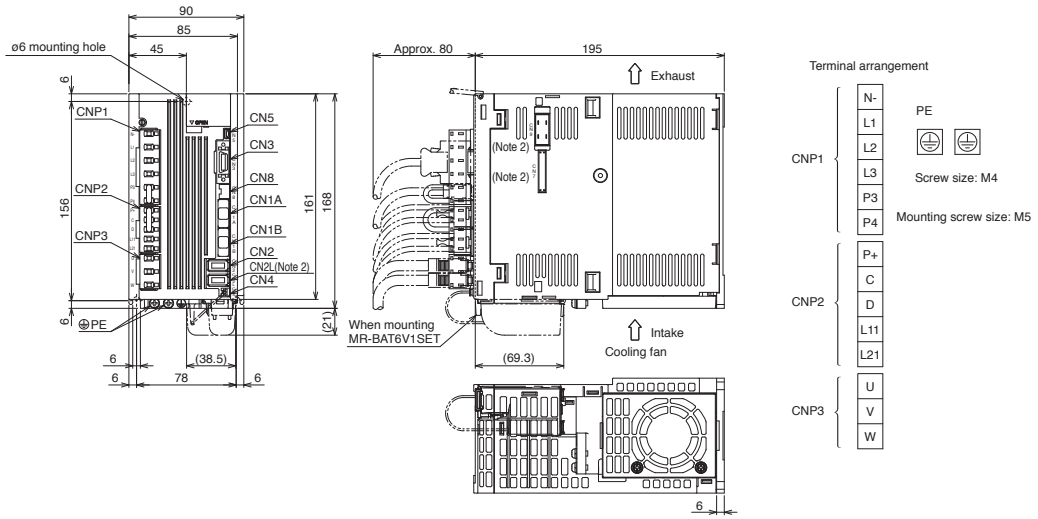
[Unit: mm]

●MR-J4-200B(-RJ) (Note 1)



[Unit: mm]

●MR-J4-200B4(-RJ) (Note 1)



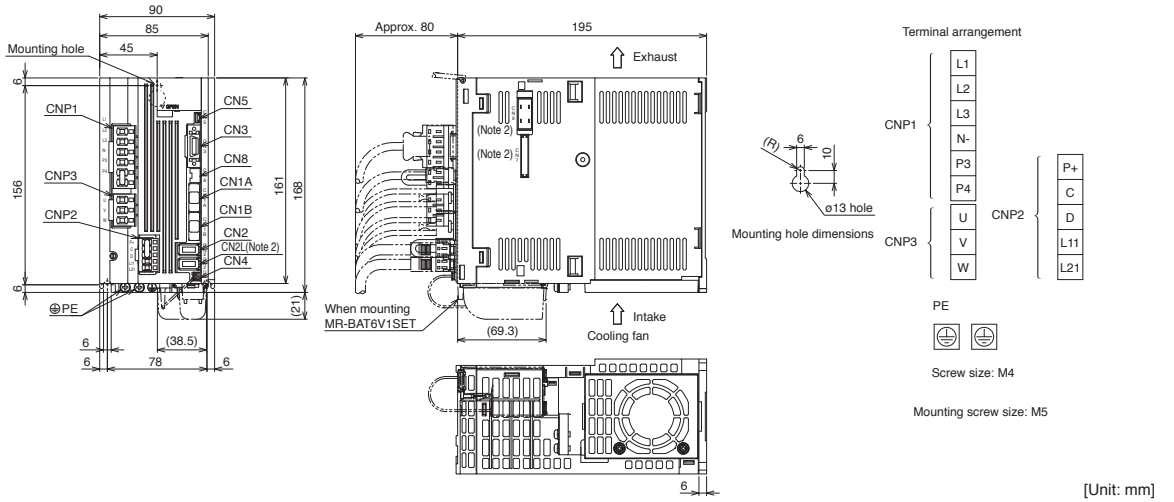
[Unit: mm]

Notes: 1. CNP1, CNP2 and CNP3 connectors (insertion type) are supplied with the servo amplifier.
2. CN2L, CN7, and CN9 connectors are not available for MR-J4-B servo amplifier.

MR-J4-B(-RJ) Dimensions

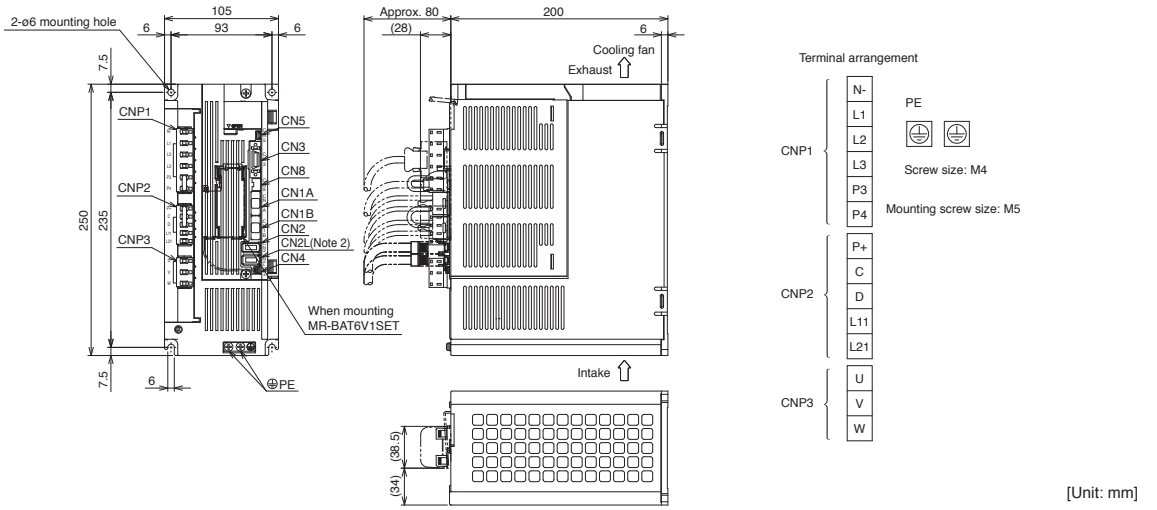
B B-RJ

●MR-J4-350B(-RJ) (Note 1)



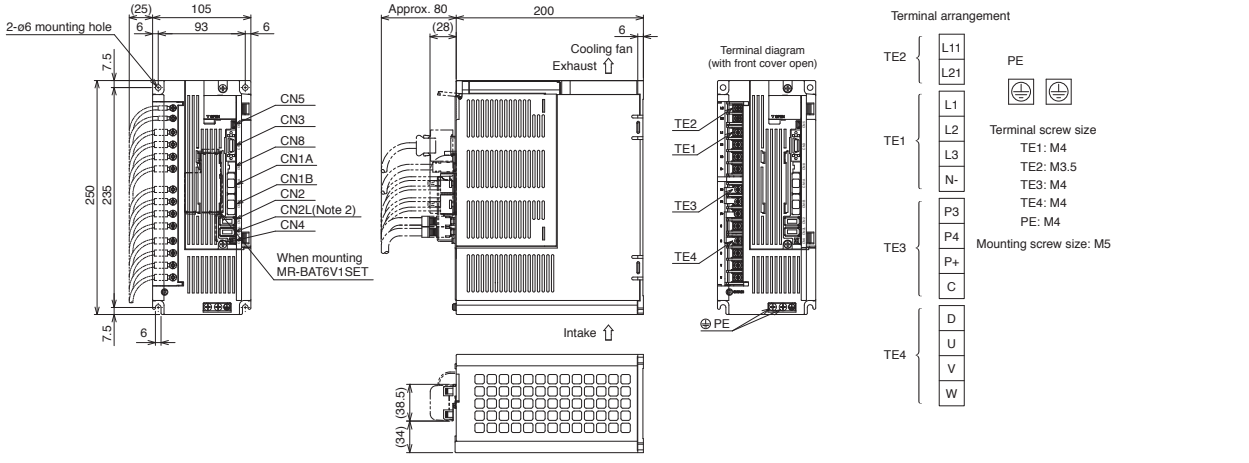
[Unit: mm]

●MR-J4-350B4(-RJ) (Note 1)



[Unit: mm]

●MR-J4-500B(-RJ)



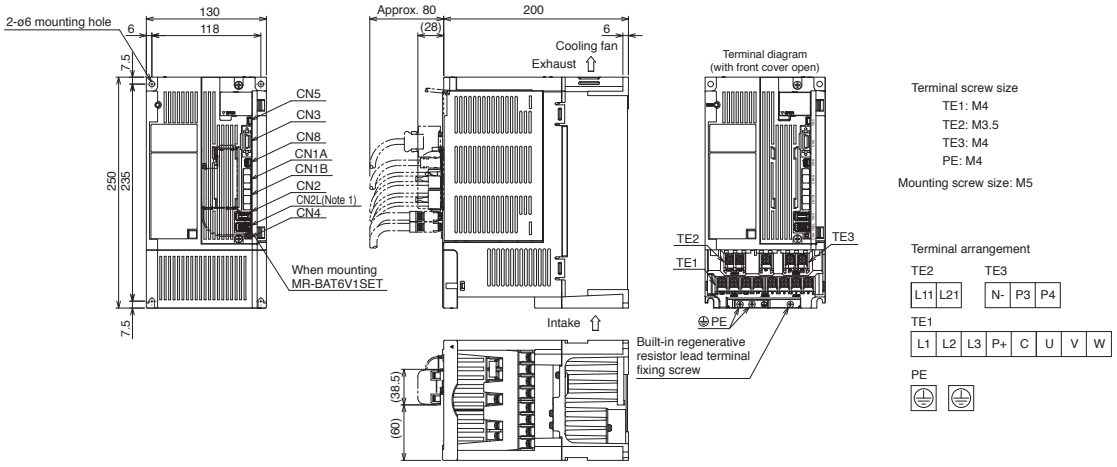
[Unit: mm]

Notes: 1. CNP1, CNP2 and CNP3 connectors (insertion type) are supplied with the servo amplifier.
2. CN2L, CN7, and CN9 connectors are not available for MR-J4-B servo amplifier.

MR-J4-B(-RJ) Dimensions

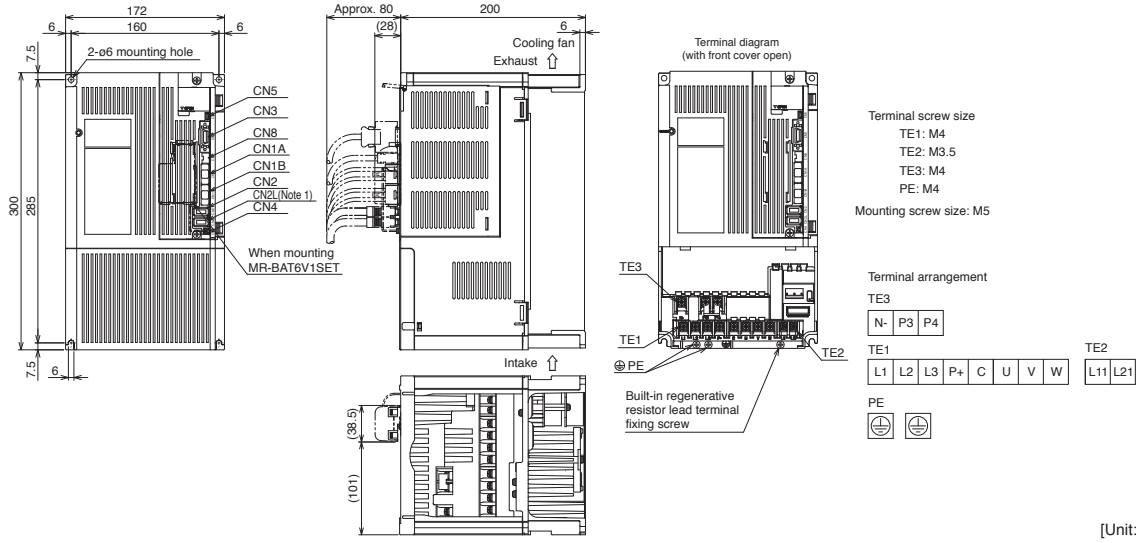
B B-RJ

●MR-J4-500B4(-RJ)



[Unit: mm]

●MR-J4-700B(-RJ), MR-J4-700B4(-RJ)



[Unit: mm]

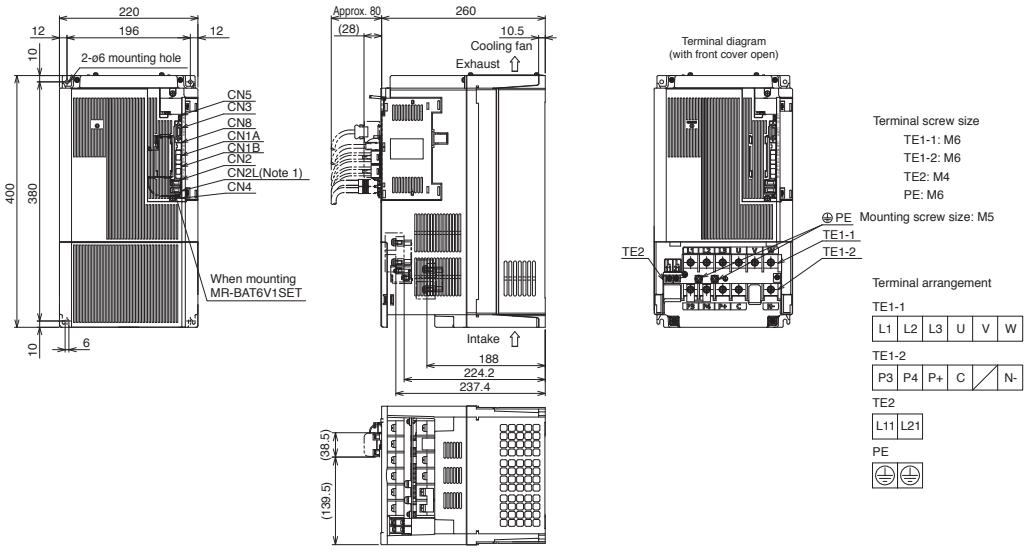
Notes: 1. CN2L, CN7, and CN9 connectors are not available for MR-J4-B servo amplifier.

MR-J4-B(-RJ) Dimensions

B B-RJ

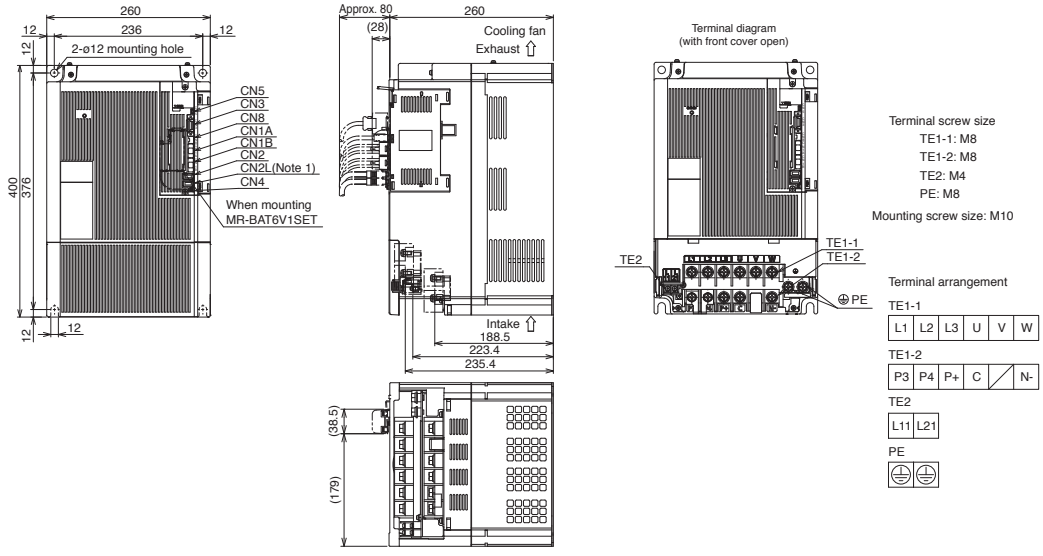
●MR-J4-11KB(-RJ), MR-J4-11KB4(-RJ)

●MR-J4-15KB(-RJ), MR-J4-15KB4(-RJ)



[Unit: mm]

●MR-J4-22KB(-RJ), MR-J4-22KB4(-RJ)



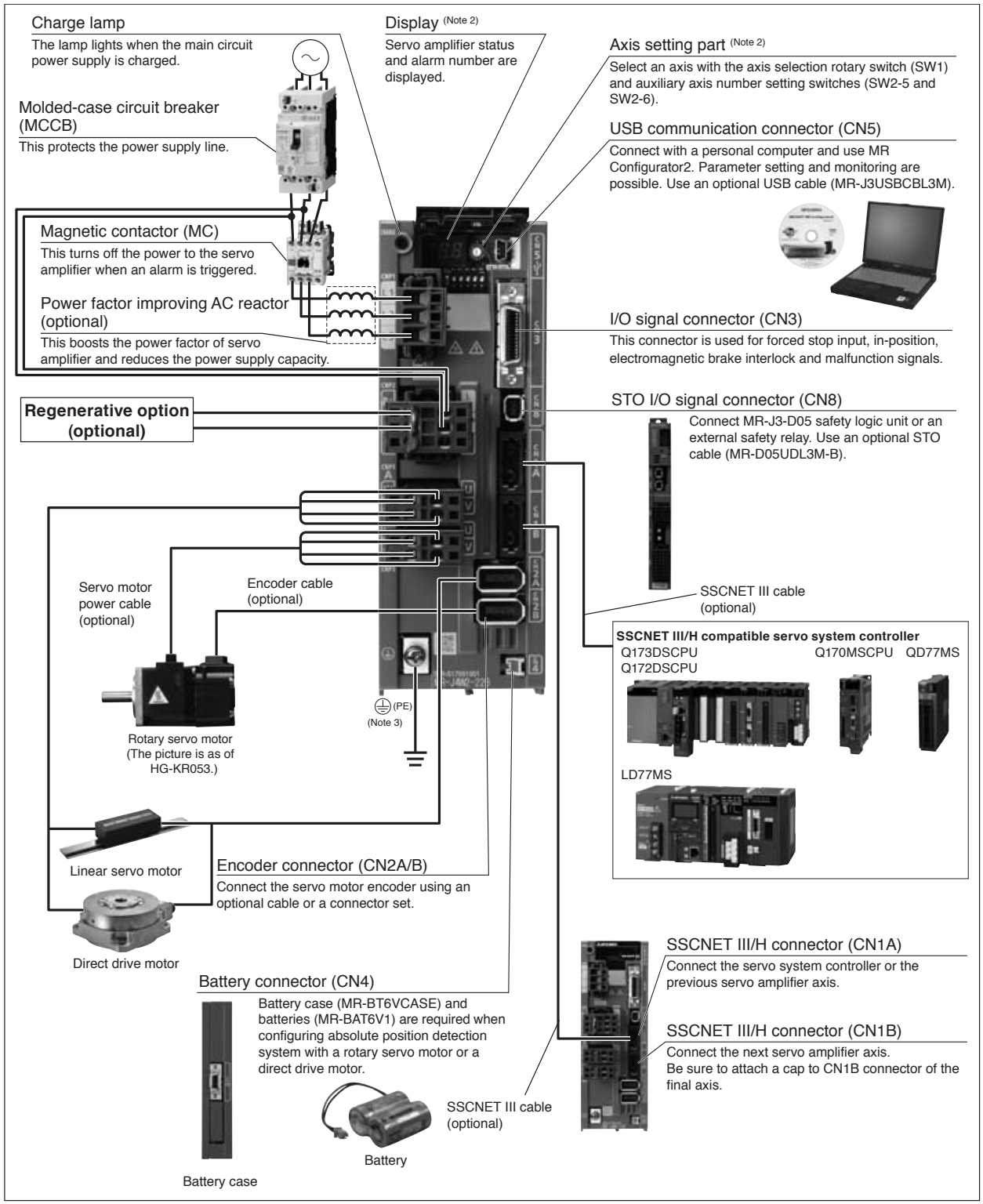
[Unit: mm]

Notes: 1. CN2L, CN7, and CN9 connectors are not available for MR-J4-B servo amplifier.

MR-J4W_-B Connections with Peripheral Equipment (Note 1)

WB

Peripheral equipment is connected to MR-J4W_-B as described below. Connectors, cables, options, and other necessary equipment are available so that users can set up the servo amplifier easily and start using it right away.



Notes: 1. The connection with the peripheral equipment is an example for MR-J4W2-22B. CNP3C and CN2C connectors are available for MR-J4W3-B servo amplifier. Refer to "MR-J4W_-_B Servo Amplifier Instruction Manual" for the actual connections of the multi-axis servo amplifier.
2. This picture shows when the display cover is open.
3. Connect the grounding terminal of the servo motor to ⏚of CNP3A, CNP3B, and CNP3C. Connect the protective earth (PE) terminal (⏚) located on the lower front of the servo amplifier to the cabinet protective earth (PE).

MR-J4W2-B (2-axis, SSCNET III/H Interface) Specifications

WB

Servo amplifier model MR-J4W2-			22B	44B	77B	1010B
Output	Rated voltage		3-phase 170 V AC			
	Rated current (each axis)	[A]	1.5	2.8	5.8	6.0
Main circuit power supply input	Voltage/frequency (Note 1)		3-phase or 1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz			3-phase 200 V AC to 240 V AC, 50Hz/60 Hz
	Rated current	[A]	2.9	5.2	7.5	9.8
	Permissible voltage fluctuation		3-phase or 1-phase 170 V AC to 264 V AC			3-phase 170 V AC to 264 V AC
	Permissible frequency fluctuation		±5% maximum			
Control circuit power supply input	Voltage/frequency		1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz			
	Rated current	[A]	0.4			
	Permissible voltage fluctuation		1-phase 170 V AC to 264 V AC			
	Permissible frequency fluctuation		±5% maximum			
	Power consumption	[W]	55			
Interface power supply			24 V DC ± 10% (required current capacity: 0.35 A (including CN8 connector signals))			
Control method			Sine-wave PWM control/current control method			
Capacitor regeneration	Reusable regenerative energy (Note 5)	[J]	17	21	44	
	Moment of inertia (J) equivalent to permissible charging amount (Note 6)	[× 10^{-4} kg•m^2]	3.45	4.26	8.92	
	Mass equivalent to permissible charging amount (Note 7)	LM-H3 [kg]	3.8	4.7	9.8	
		LM-K2 LM-U2 [kg]	8.5	10.5	22.0	
Tolerable regenerative power of the built-in regenerative resistor (Note 2, 3)		[W]	20		100	
Dynamic brake			Built-in (Note 4)			
SSCNET III/H command communication cycle (Note 13)			0.222 ms, 0.444 ms, 0.888 ms			
Communication function			USB: Connect a personal computer (MR Configurator2 compatible)			
Encoder output pulse			Compatible (A/B-phase pulse)			
Analog monitor			None			
Fully closed loop control (Note 11)			Available (Note 12)			
Servo function			Advanced vibration suppression control II, adaptive filter II, robust filter, auto tuning, one-touch tuning, tough drive function, drive recorder function, tightening & press-fit control, machine diagnosis function, power monitoring function, scale measurement function (Note 14), J3 compatibility mode			
Load-side encoder interface (Note 9)			Mitsubishi high-speed serial communication			
Protective functions			Overcurrent shut-off, regenerative overvoltage shut-off, overload shut-off (electronic thermal), servo motor overheat protection, encoder error protection, regenerative error protection, undervoltage protection, instantaneous power failure protection, overspeed protection, error excessive protection, magnetic pole detection protection, linear servo control fault protection			

MR-J4W2-B (2-axis, SSCNET III/H Interface) Specifications

WB

Servo amplifier model MR-J4W2-		22B	44B	77B	1010B
Functional safety		STO (IEC/EN 61800-5-2) (Note 10)			
Safety performance	Standards certified by CB	EN ISO 13849-1 Category 3 PL d, IEC 61508 SIL 2, EN 62061 SIL CL 2, EN 61800-5-2 SIL 2			
	Response performance	8 ms or less (STO input OFF → energy shut-off)			
	Test pulse input (STO) (Note 8)	Test pulse interval: 1 Hz to 25 Hz, test pulse off time: 1 ms maximum			
	Mean time to dangerous failure (MTTFd)	100 years or longer			
	Diagnostic coverage (DC)	Medium (90% to 99%)			
	Probability of dangerous Failure per Hour (PFH)	1.68×10^{-10} [1/h]			
Compliance to standards		Refer to "Conformity with Global Standards and Regulations" on p. 57 in this catalog.			
Structure (IP rating)		Natural cooling, open (IP20)	Force cooling, open (IP20)		
Close mounting		Possible			
Environment	Ambient temperature	0 °C to 55 °C (non-freezing), storage: -20 °C to 65 °C (non-freezing)			
	Ambient humidity	90 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)			
	Ambience	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust			
	Altitude	1000 m or less above sea level			
	Vibration resistance	5.9 m/s^2 at 10 Hz to 55 Hz (directions of X, Y and Z axes)			
Mass	[kg]	1.5	1.5	2.0	2.0

Notes: 1. Rated output and speed of a rotary servo motor and a direct drive motor; and continuous thrust and maximum speed of a linear servo motor are applicable when the servo amplifier, combined with the servo motor, is operated within the specified power supply voltage and frequency.
2. Select the most suitable regenerative option for your system with our capacity selection software.
3. Refer to "Regenerative Option" in this catalog for the tolerable regenerative power [W] when regenerative option is used.
4. When using the built-in dynamic brake, refer to "MR-J4W_-_B Servo Amplifier Instruction Manual" for the permissible load to motor inertia ratio and the permissible load to mass ratio.
5. Reusable regenerative energy is equivalent to the energy generated under the following conditions.
For rotary servo motor: the energy that is generated when the machine, whose moment of inertia is equivalent to the permissible charging amount, decelerates from the rated speed to a stop.
For linear servo motor: the energy that is generated when the machine, whose mass is equivalent to the permissible charging amount, decelerates from the maximum speed to a stop.
For direct drive motor: the energy that is generated when the machine, whose moment of inertia is equivalent to the permissible charging amount, decelerates from the rated speed to a stop.
6. This value is the moment of inertia when the rotary servo motor decelerates from the rated speed to a stop. When two axes are simultaneously decelerated, the permissible charging amount is equivalent to the total moments of inertia of the two axes. Otherwise, the permissible charging amount is equivalent to the moment of inertia of each axis. The value also applies to the direct drive motor.
7. This value is the mass when the linear servo motor decelerates from maximum speed to a stop. Mass of primary side (coil) is included. When two axes are simultaneously decelerated, the permissible charging amount is equivalent to the total masses of the two axes. Otherwise, the permissible charging amount is equivalent to the mass of each axis.
8. The test pulse is a signal for the external circuit to perform self-diagnosis by turning off the signals to the servo amplifier instantaneously at regular intervals.
9. Not compatible with pulse train interface (A/B/Z-phase differential output type).
10. STO is common for all axes.
11. The load-side encoder and the servo motor encoder are compatible only with two-wire type communication method.
12. Fully closed loop control is compatible with the servo amplifiers with software version A3 or later.
13. The command communication cycle depends on the controller specifications and the number of axes connected.
14. This function is available with the servo amplifiers with software version A8 or later.

MR-J4W3-B (3-axis, SSCNET III/H Interface) Specifications

WB

Servo amplifier model MR-J4W3-			222B	444B
Output	Rated voltage		3-phase 170 V AC	
	Rated current (each axis)	[A]	1.5	2.8
Main circuit power supply input	Voltage/frequency (Note 1)		3-phase or 1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz	
	Rated current	[A]	4.3	7.8
	Permissible voltage fluctuation		3-phase or 1-phase 170 V AC to 264 V AC	
	Permissible frequency fluctuation		±5% maximum	
Control circuit power supply input	Voltage/frequency		1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz	
	Rated current	[A]	0.4	
	Permissible voltage fluctuation		1-phase 170 V AC to 264 V AC	
	Permissible frequency fluctuation		±5% maximum	
	Power consumption	[W]	55	
Interface power supply			24 V DC ± 10% (required current capacity: 0.45 A (including CN8 connector signals))	
Control method			Sine-wave PWM control/current control method	
Capacitor regeneration	Reusable regenerative energy (Note 5)	[J]	21	30
	Moment of inertia (J) equivalent to permissible charging amount (Note 6)	[× 10^{-4} kg•m^2]	4.26	6.08
	Mass equivalent to permissible charging amount (Note 7)	LM-H3 [kg]	4.7	6.7
		LM-K2 LM-U2 [kg]	10.5	15.0
Tolerable regenerative power of the built-in regenerative resistor (Note 2, 3)		[W]	30	
Dynamic brake			Built-in (Note 4)	
SSCNET III/H command communication cycle (Note 10)			0.222 ms (Note 11), 0.444 ms, 0.888 ms	
Communication function			USB: Connect a personal computer (MR Configurator2 compatible)	
Encoder output pulse			Not compatible	
Analog monitor			None	
Fully closed loop control			Not compatible	
Servo function			Advanced vibration suppression control II, adaptive filter II, robust filter, auto tuning, one-touch tuning, tough drive function, drive recorder function, tightening & press-fit control, machine diagnosis function, power monitoring function, J3 compatibility mode	
Protective functions			Overcurrent shut-off, regenerative overvoltage shut-off, overload shut-off (electronic thermal), servo motor overheat protection, encoder error protection, regenerative error protection, undervoltage protection, instantaneous power failure protection, overspeed protection, error excessive protection, magnetic pole detection protection, linear servo control fault protection	

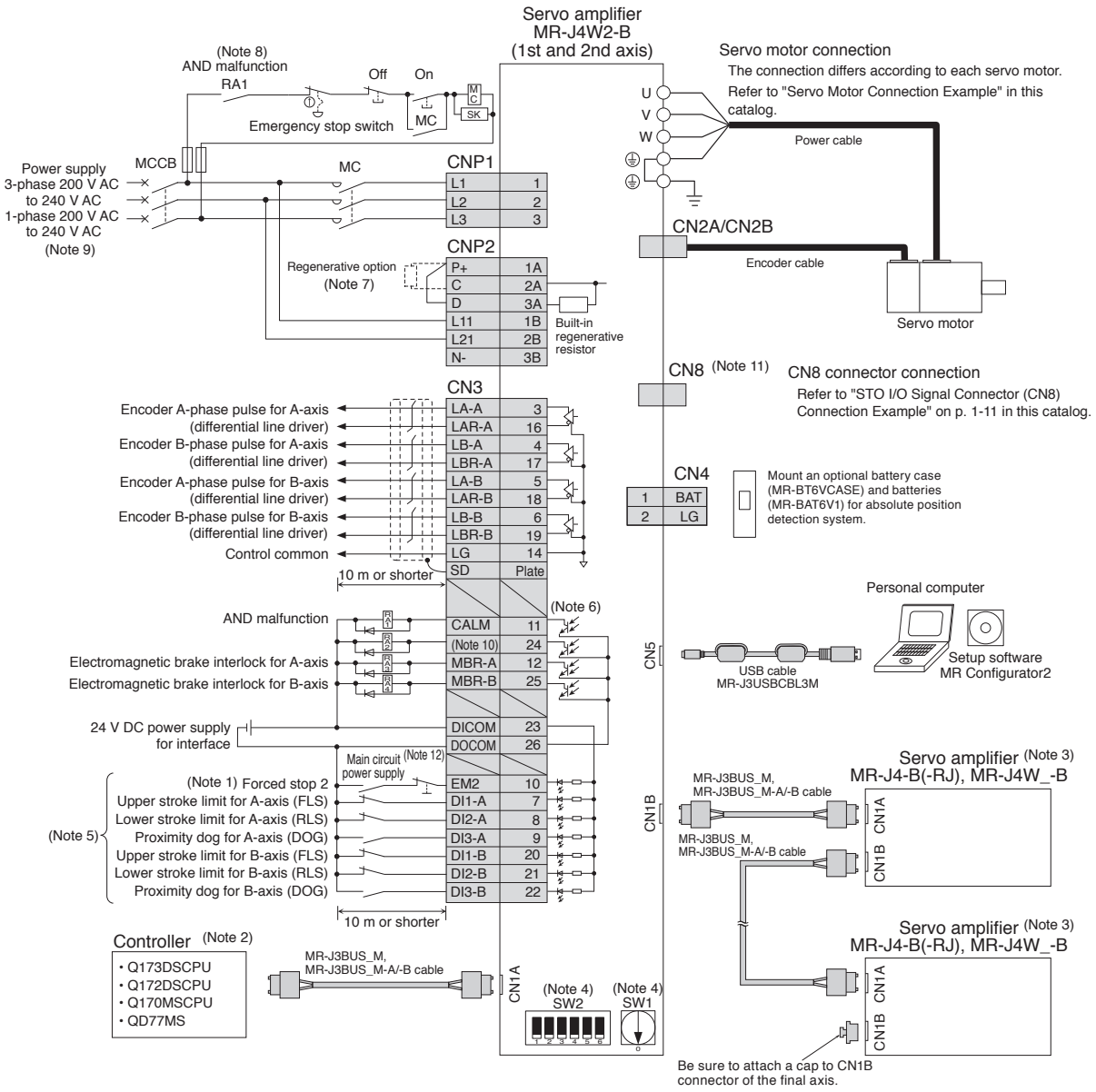
MR-J4W3-B (3-axis, SSCNET III/H Interface) Specifications

WB

Servo amplifier model MR-J4W3-		222B	444B
Functional safety		STO (IEC/EN 61800-5-2) (Note 9)	
Safety performance	Standards certified by CB	EN ISO 13849-1 Category 3 PL d, IEC 61508 SIL 2, EN 62061 SIL CL 2, EN 61800-5-2 SIL 2	
	Response performance	8 ms or less (STO input OFF → energy shut-off)	
	Test pulse input (STO) (Note 8)	Test pulse interval: 1 Hz to 25 Hz Test pulse off time: 1 ms maximum	
	Mean time to dangerous failure (MTTFd)	100 years or longer	
	Diagnostic coverage (DC)	Medium (90% to 99%)	
	Probability of dangerous Failure per Hour (PFH)	1.68×10^{-10} [1/h]	
Compliance to standards		Refer to "Conformity with Global Standards and Regulations" on p. 57 in this catalog.	
Structure (IP rating)		Force cooling, open (IP20)	
Close mounting		Possible	
Environment	Ambient temperature	0 °C to 55 °C (non-freezing), storage: -20 °C to 65 °C (non-freezing)	
	Ambient humidity	90 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)	
	Ambience	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust	
	Altitude	1000 m or less above sea level	
	Vibration resistance	5.9 m/s^2 at 10 Hz to 55 Hz (directions of X, Y and Z axes)	
Mass	[kg]	1.9	1.9

Notes:1. Rated output and speed of a rotary servo motor and a direct drive motor; and continuous thrust and maximum speed of a linear servo motor are applicable when the servo amplifier, combined with the servo motor, is operated within the specified power supply voltage and frequency.
2. Select the most suitable regenerative option for your system with our capacity selection software.
3. Refer to "Regenerative Option" in this catalog for the tolerable regenerative power [W] when regenerative option is used.
4. When using the built-in dynamic brake, refer to "MR-J4W_-_B Servo Amplifier Instruction Manual" for the permissible load to motor inertia ratio and the permissible load to mass ratio.
5. Reusable regenerative energy is equivalent to the energy generated under the following conditions.
For rotary servo motor: the energy that is generated when the machine, whose moment of inertia is equivalent to the permissible charging amount, decelerates from the rated speed to a stop.
For linear servo motor: the energy that is generated when the machine, whose mass is equivalent to the permissible charging amount, decelerates from the maximum speed to a stop.
For direct drive motor: the energy that is generated when the machine, whose moment of inertia is equivalent to the permissible charging amount, decelerates from the rated speed to a stop.
6. This value is the moment of inertia when the rotary servo motor decelerates from the rated speed to a stop. When three axes are simultaneously decelerated, the permissible charging amount is equivalent to the total moments of inertia of the three axes. Otherwise, the permissible charging amount is equivalent to the moment of inertia of each axis. The value also applies to the direct drive motor.
7. This value is the mass when the linear servo motor decelerates from maximum speed to a stop. Mass of primary side (coil) is included. When three axes are simultaneously decelerated, the permissible charging amount is equivalent to the total masses of the three axes. Otherwise, the permissible charging amount is equivalent to the mass of each axis.
8. The test pulse is a signal for the external circuit to perform self-diagnosis by turning off the signals to the servo amplifier instantaneously at regular intervals.
9. STO is common for all axes.
10. The command communication cycle depends on the controller specifications and the number of axes connected.
11. Servo amplifier with software version A3 or later is compatible with the command communication cycle of 0.222 ms. However, note that the following functions are not available when 0.222 ms is used: auto tuning (real time, one-touch, and vibration suppression control), adaptive filter II, vibration tough drive, and power monitoring.

MR-J4W2-B Standard Wiring Diagram Example

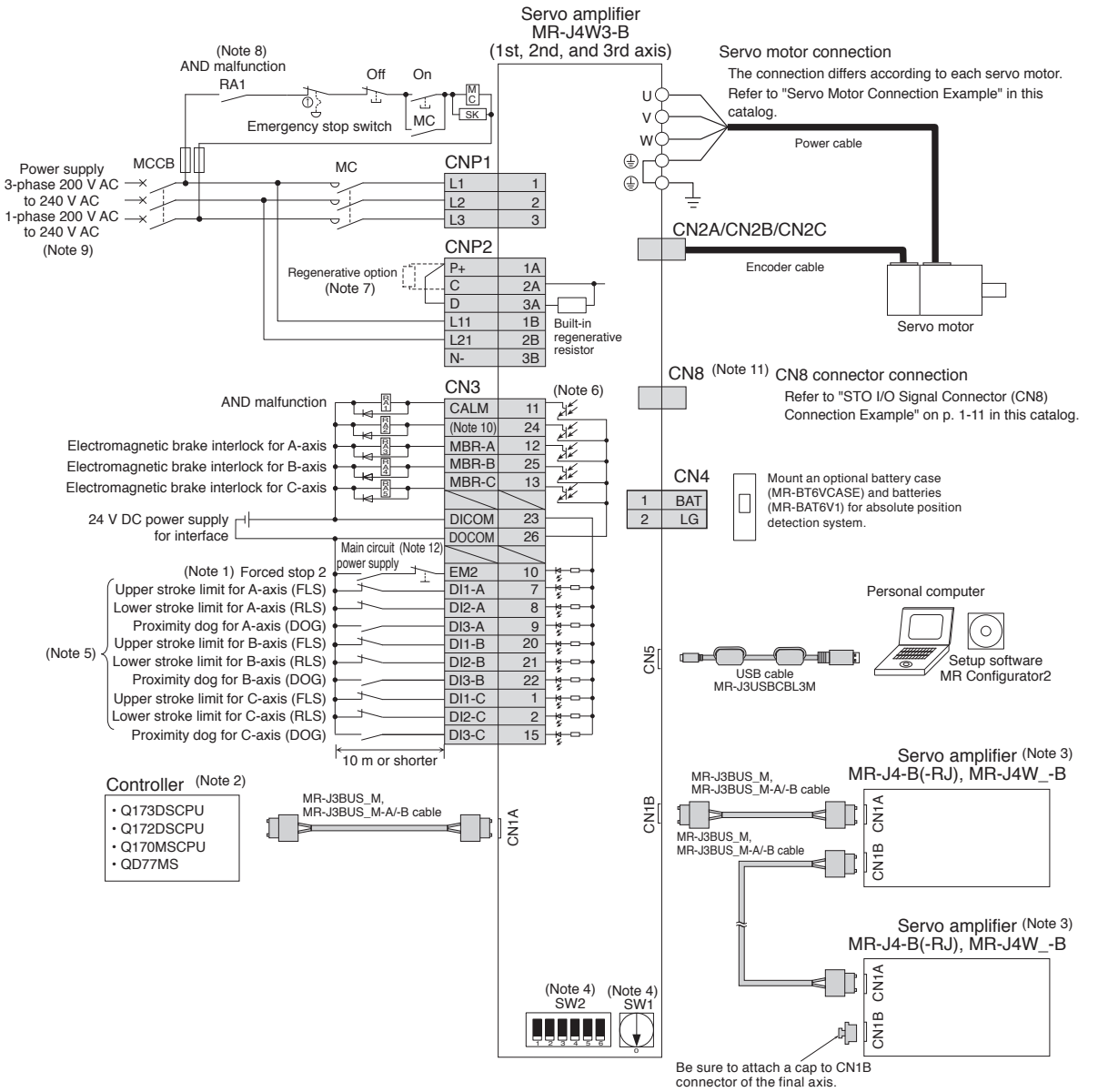


Notes: 1. The forced stop signal is issued for two axes of the servo amplifier. For overall system, apply the emergency stop on the controller side.
2. For details such as setting the controllers, refer to programming manual or user's manual for the controllers.
3. Connections for the third and following axes are omitted.
4. Up to 64 axes can be set by using a combination of an axis selection rotary switch (SW1) and auxiliary axis number setting switches (SW2-5 and SW2-6). Note that the number of the connectable axes depends on the controller specifications.
5. Devices can be assigned for DI1-A/B, DI2-A/B and DI3-A/B with controller setting. Refer to the controller instruction manuals for details on setting.
6. This is for sink wiring. Source wiring is also possible.
7. When not using a regenerative option, connect a short-circuit bar between P+ and D to use the built-in regenerative resistor. When using a regenerative option, disconnect the short-circuit bar between P+ and D, and then connect the regenerative option to P+ and C.
8. Select either of the following functions for CALM (AND malfunction) with the controller.
1) The contact opens when an alarm occurs on one of the axes.
2) The contact opens when an alarm occurs on all axes.
9. For 1-phase 200 V AC to 240 V AC, connect the power supply to L1 and L3 terminals. Do not connect anything to L2. The connections are different from MR-J3W-B series servo amplifiers. Be careful not to make a connection error when replacing MR-J3W-B with MR-J4W2-B. Refer to "MR-J4W2-B (2-axis, SSCNET III/H Interface) Specifications" in this catalog for power supply specifications.
10. CINP (AND in-position) is assigned to this pin as default. Device for this pin can be changed by [Pr. PD07], [Pr. PD08], or [Pr. PD09].
11. Be sure to attach a short-circuit connector supplied with the servo amplifier when the STO function is not used.
12. Create a circuit to turn off EM2 (Forced stop 2) when the main circuit power is turned off to prevent an unexpected restart of the servo amplifier.

⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

MR-J4W3-B Standard Wiring Diagram Example

WB

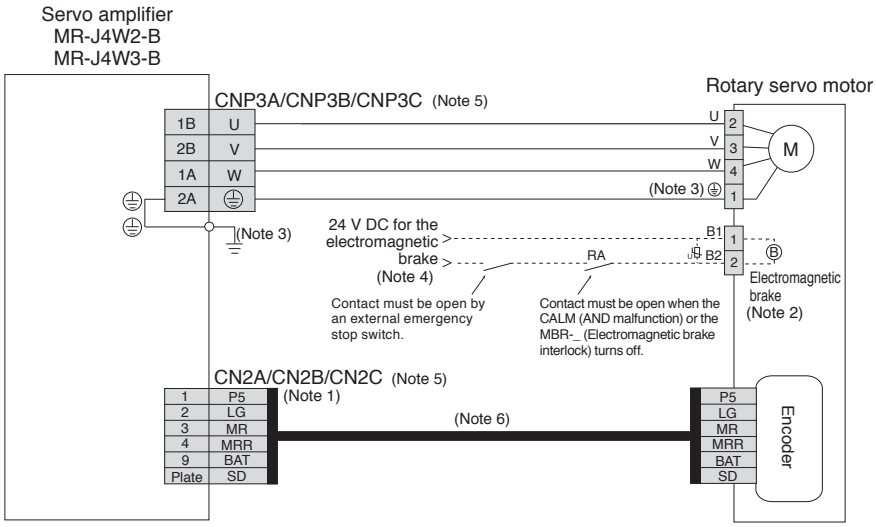


Notes: 1. The forced stop signal is issued for three axes of the servo amplifier. For overall system, apply the emergency stop on the controller side.
2. For details such as setting the controllers, refer to programming manual or user's manual for the controllers.
3. Connections for the fourth and following axes are omitted.
4. Up to 64 axes can be set by using a combination of an axis selection rotary switch (SW1) and auxiliary axis number setting switches (SW2-5 and SW2-6). Note that the number of the connectable axes depends on the controller specifications.
5. Devices can be assigned for DI1-A/B/C, DI2-A/B/C and DI3-A/B/C with controller setting. Refer to the controller instruction manuals for details on setting.
6. This is for sink wiring. Source wiring is also possible.
7. When not using a regenerative option, connect a short-circuit bar between P+ and D to use the built-in regenerative resistor. When using a regenerative option, disconnect the short-circuit bar between P+ and D, and then connect the regenerative option to P+ and C.
8. Select either of the following functions for CALM (AND malfunction) with the controller.
1) The contact opens when an alarm occurs on one of the axes.
2) The contact opens when an alarm occurs on all axes.
9. For 1-phase 200 V AC to 240 V AC, connect the power supply to L1 and L3 terminals. Do not connect anything to L2. Refer to "MR-J4W3-B (3-axis, SSCNET III/H Interface) Specifications" in this catalog for power supply specifications.
10. CINP (AND in-position) is assigned to this pin as default. Device for this pin can be changed by [Pr. PD07], [Pr. PD08], or [Pr. PD09].
11. Be sure to attach a short-circuit connector supplied with the servo amplifier when the STO function is not used.
12. Create a circuit to turn off EM2 (Forced stop 2) when the main circuit power is turned off to prevent an unexpected restart of the servo amplifier.

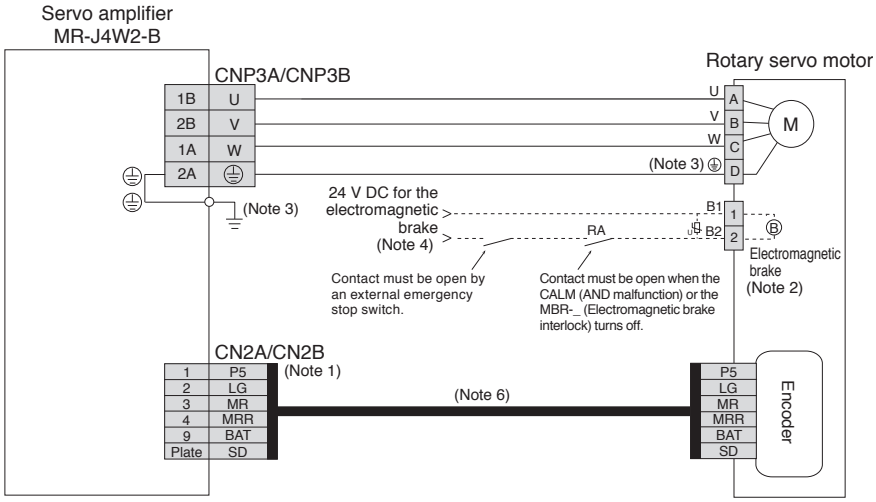
⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

Servo Motor Connection Example
(Rotary Servo Motor, Semi-Closed Loop Control System)

●For HG-KR/HG-MR series



●For HG-SR series

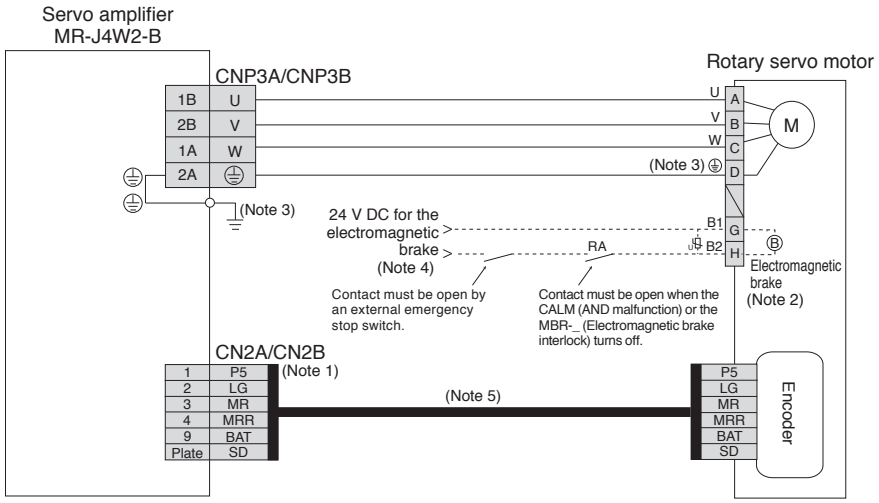


Notes: 1. The signals shown is applicable when using a two-wire type encoder cable. Four-wire type is also compatible.
2. This is for the servo motor with electromagnetic brake. The electromagnetic brake terminals (B1, B2) do not have polarity.
3. Connect the grounding terminal of the servo motor to ⏚ of CNP3A, CNP3B, and CNP3C. Connect the protective earth (PE) terminal (⏚) located on the lower front of the servo amplifier to the cabinet protective earth (PE).
4. Do not use the 24 V DC interface power supply for the electromagnetic brake. Provide a dedicated power supply to the electromagnetic brake.
5. CNP3C and CN2C connectors are available for MR-J4W3-B servo amplifier.
6. Encoder cable is available as an option. Refer to "Servo Motor Instruction Manual (Vol. 3)" when fabricating the cables.

⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

Servo Motor Connection Example (Rotary Servo Motor, Semi-Closed Loop Control System) WB

●For HG-UR series

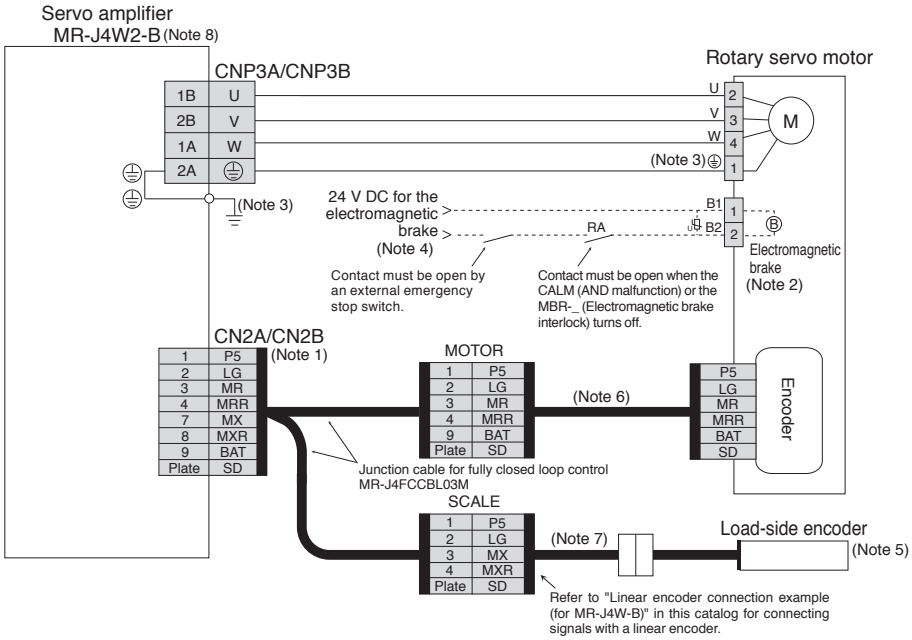


Notes: 1. The signals shown is applicable when using a two-wire type encoder cable. Four-wire type is also compatible.
2. This is for the servo motor with electromagnetic brake. The electromagnetic brake terminals (B1, B2) do not have polarity.
3. Connect the grounding terminal of the servo motor to ⏚ of CNP3A and CNP3B. Connect the protective earth (PE) terminal (⏚) located on the lower front of the servo amplifier to the cabinet protective earth (PE).
4. Do not use the 24 V DC interface power supply for the electromagnetic brake. Provide a dedicated power supply to the electromagnetic brake.
5. Encoder cable is available as an option. Refer to "Servo Motor Instruction Manual (Vol. 3)" when fabricating the cables.

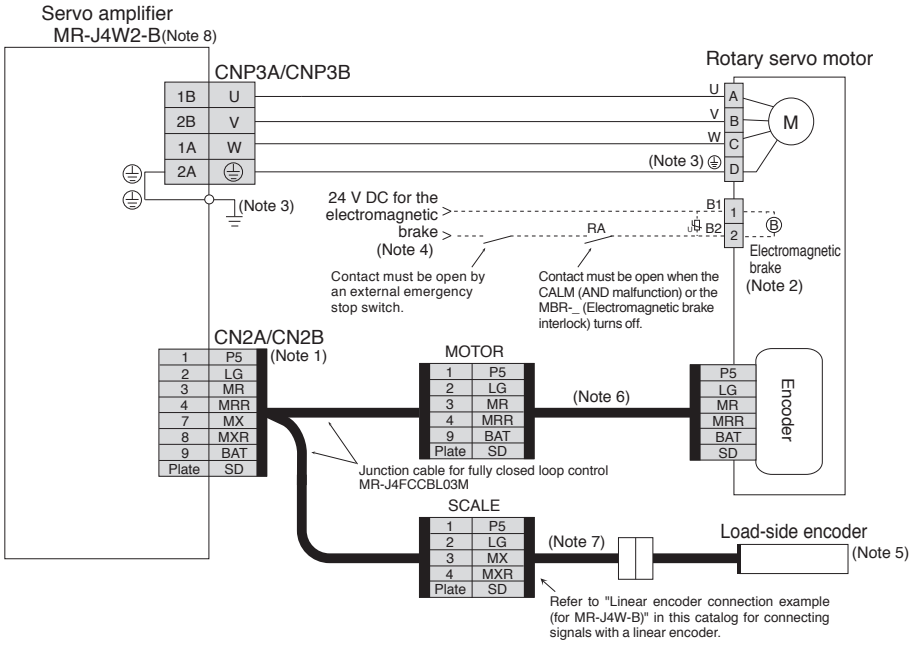
⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

Servo Motor Connection Example (Rotary Servo Motor, Fully Closed Loop Control System) WB

●For HG-KR/HG-MR series



●For HG-SR/HG-JR series

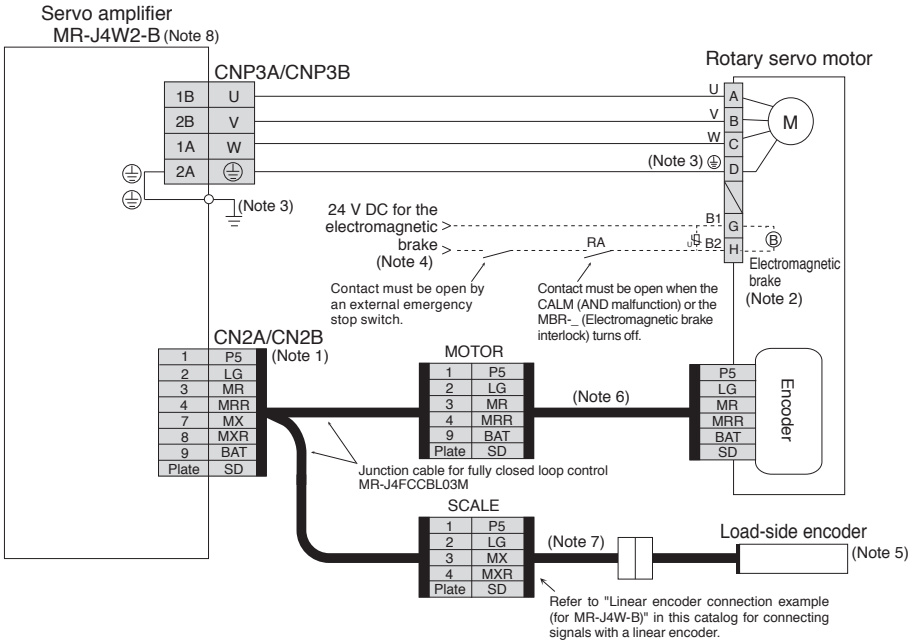


Notes: 1. For fully closed loop control, the load-side encoder and the servo motor encoder are compatible only with two-wire type communication method. Four-wire type cannot be used.
2. This is for the servo motor with electromagnetic brake. The electromagnetic brake terminals (B1, B2) do not have polarity.
3. Connect the grounding terminal of the servo motor to ⏚ of CNP3A, CNP3B, and CNP3C. Connect the protective earth (PE) terminal (⏚) located on the lower front of the servo amplifier to the cabinet protective earth (PE).
4. Do not use the 24 V DC interface power supply for the electromagnetic brake. Provide a dedicated power supply to the electromagnetic brake.
5. For linear encoders, refer to "List of Linear Encoders" under section 3 Linear Servo Motors in this catalog. Refer to "MR-J4W_-_B Servo Amplifier Instruction Manual" for the fully closed loop control with rotary encoder.
6. Encoder cable is available as an option. Refer to "Servo Motor Instruction Manual (Vol. 3)" when fabricating the cables.
7. Necessary encoder cables vary depending on the load-side encoder. Refer to relevant Instruction Manual.
8. MR-J4W3-B is not compatible with fully closed loop control.

⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

Servo Motor Connection Example (Rotary Servo Motor, Fully Closed Loop Control System) WB

●For HG-UR series

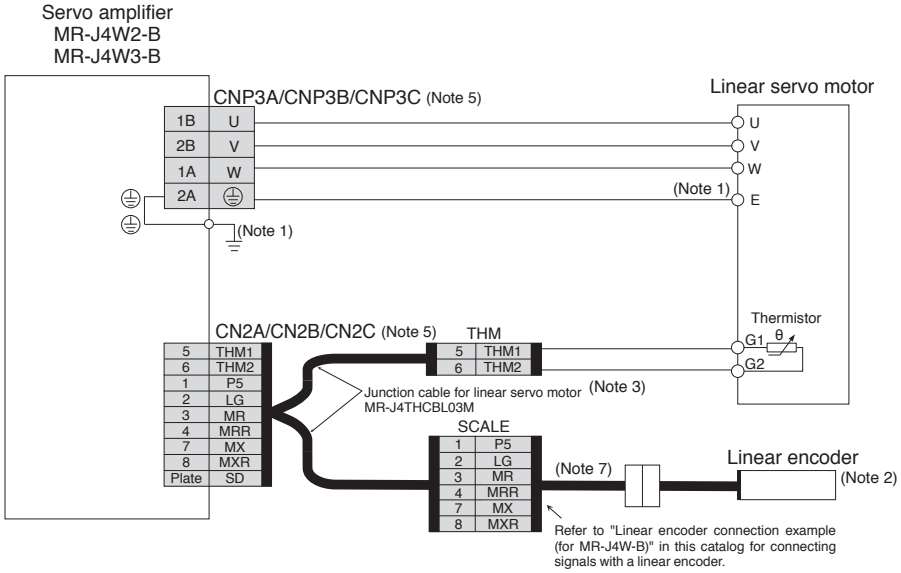


Notes: 1. For fully closed loop control, the load-side encoder and the servo motor encoder are compatible only with two-wire type communication method. Four-wire type cannot be used.
2. This is for the servo motor with electromagnetic brake. The electromagnetic brake terminals (B1, B2) do not have polarity.
3. Connect the grounding terminal of the servo motor to ⏚ of CNP3A and CNP3B. Connect the protective earth (PE) terminal (⏚) located on the lower front of the servo amplifier to the cabinet protective earth (PE).
4. Do not use the 24 V DC interface power supply for the electromagnetic brake. Provide a dedicated power supply to the electromagnetic brake.
5. For linear encoders, refer to "List of Linear Encoders" under section 3 Linear Servo Motors in this catalog. Refer to "MR-J4W_-_B Servo Amplifier Instruction Manual" for the fully closed loop control with rotary encoder.
6. Encoder cable is available as an option. Refer to "Servo Motor Instruction Manual (Vol. 3)" when fabricating the cables.
7. Necessary encoder cables vary depending on the load-side encoder. Refer to relevant Instruction Manual.
8. MR-J4W3-B is not compatible with fully closed loop control.

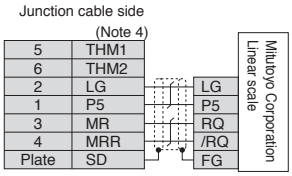
⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

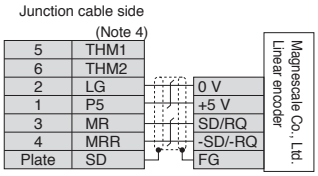
Servo Motor Connection Example (Linear Servo Motor)

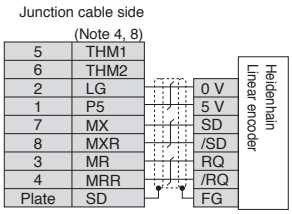
●For LM-H3/LM-K2/LM-U2 series

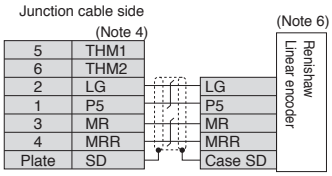


●Linear encoder connection example (for MR-J4W-B)









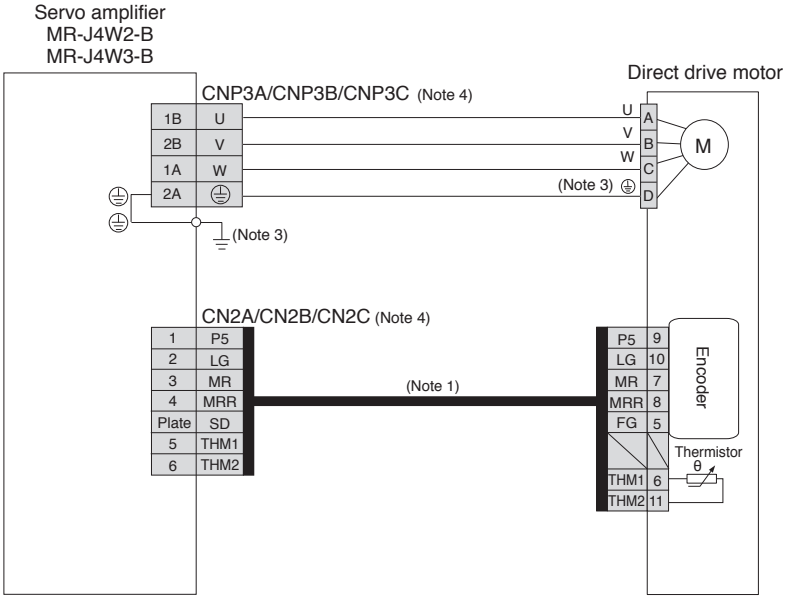
Notes: 1. Connect the grounding terminal of the servo motor to ⏚ of CNP3A, CNP3B, and CNP3C. Connect the protective earth (PE) terminal (⏚) located on the lower front of the servo amplifier to the cabinet protective earth (PE).
2. For linear encoders, refer to "List of Linear Encoders" under section 3 Linear Servo Motors in this catalog.
3. MR-J4THCBL03M junction cable for linear servo motor is compatible with both two-wire and four-wire type linear encoders.
4. For the number of the wire pairs for LG and P5, refer to "Linear Encoder Instruction Manual."
5. CNP3C and CN2C connectors are available for MR-J4W3-B servo amplifier.
6. Wiring varies depending on the linear encoder series. Refer to "Linear Encoder Instruction Manual" for details.
7. Necessary encoder cables vary depending on the linear encoder. Refer to relevant Instruction Manual.
8. For fully closed loop control, the load-side encoder and the servo motor encoder are compatible only with two-wire type communication method. Four-wire type cannot be used.

⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

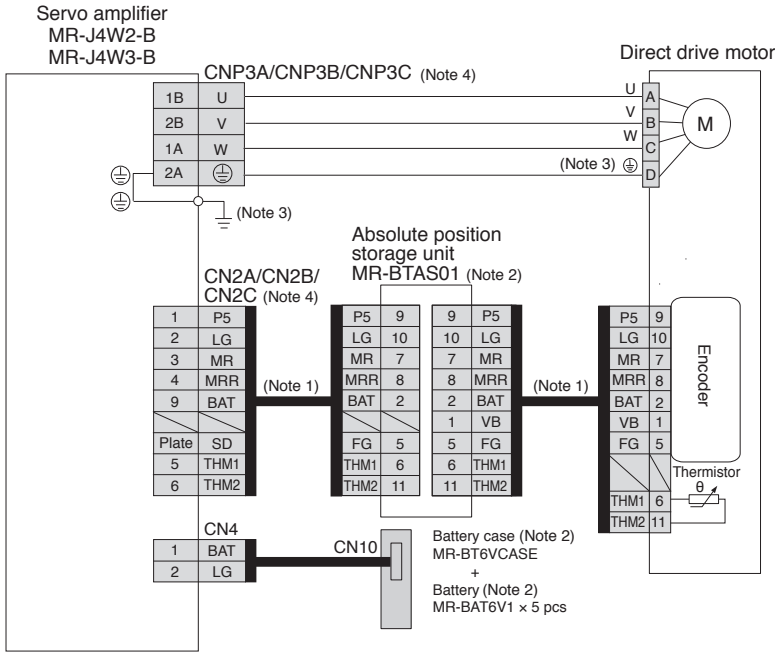
Servo Motor Connection Example (Direct Drive Motor)

WB

●For TM-RFM series (incremental system)



●For TM-RFM series (absolute position detection system)



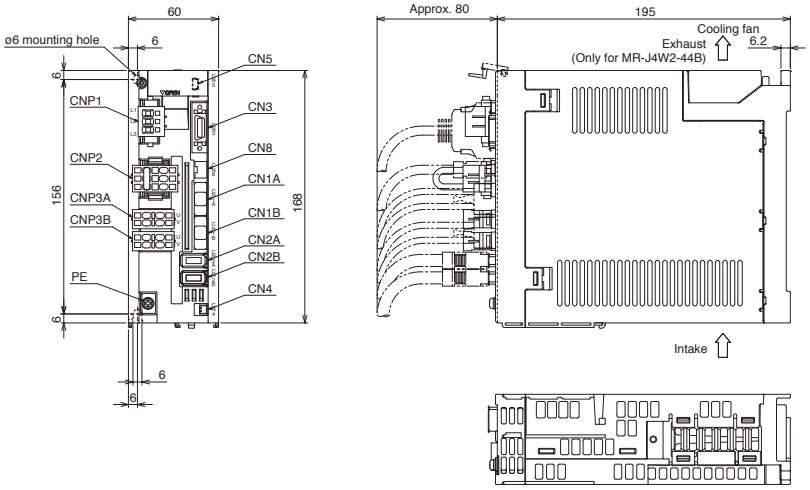
Notes: 1. Fabricate this encoder cable. Refer to "Direct Drive Motor Instruction Manual" for fabricating the encoder cable.
2. Optional MR-BTAS01 absolute position storage unit, MR-BT6VCASE battery case, and MR-BAT6V1 batteries are required for absolute position detection system. Refer to relevant Servo Amplifier Instruction Manual and "Direct Drive Motor Instruction Manual" for details.
3. Connect the grounding terminal of the servo motor to ⏚ of CNP3A, CNP3B, and CNP3C. Connect the protective earth (PE) terminal (⏚) located on the lower front of the servo amplifier to the cabinet protective earth (PE).
4. CNP3C and CN2C connectors are available for MR-J4W3-B servo amplifier.

⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

MR-J4W2-B Dimensions

●MR-J4W2-22B (Note 1)

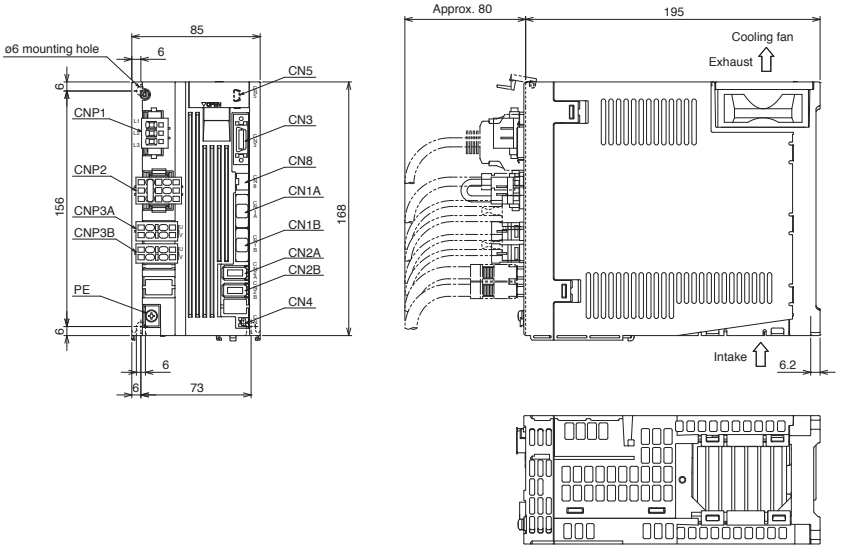
●MR-J4W2-44B (Note 1)



[Unit: mm]

●MR-J4W2-77B (Note 1)

●MR-J4W2-1010B (Note 1)



[Unit: mm]

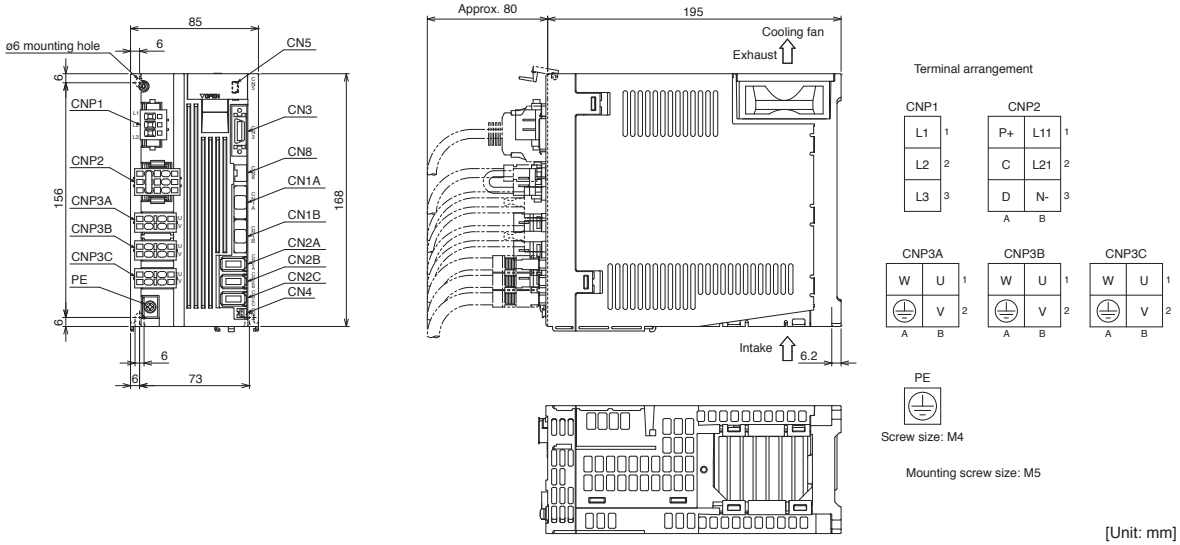
Notes: 1. CNP1, CNP2, CNP3A and CNP3B connectors (insertion type) are supplied with the servo amplifier.

MR-J4W3-B Dimensions

WB

●MR-J4W3-222B (Note 1)

●MR-J4W3-444B (Note 1)



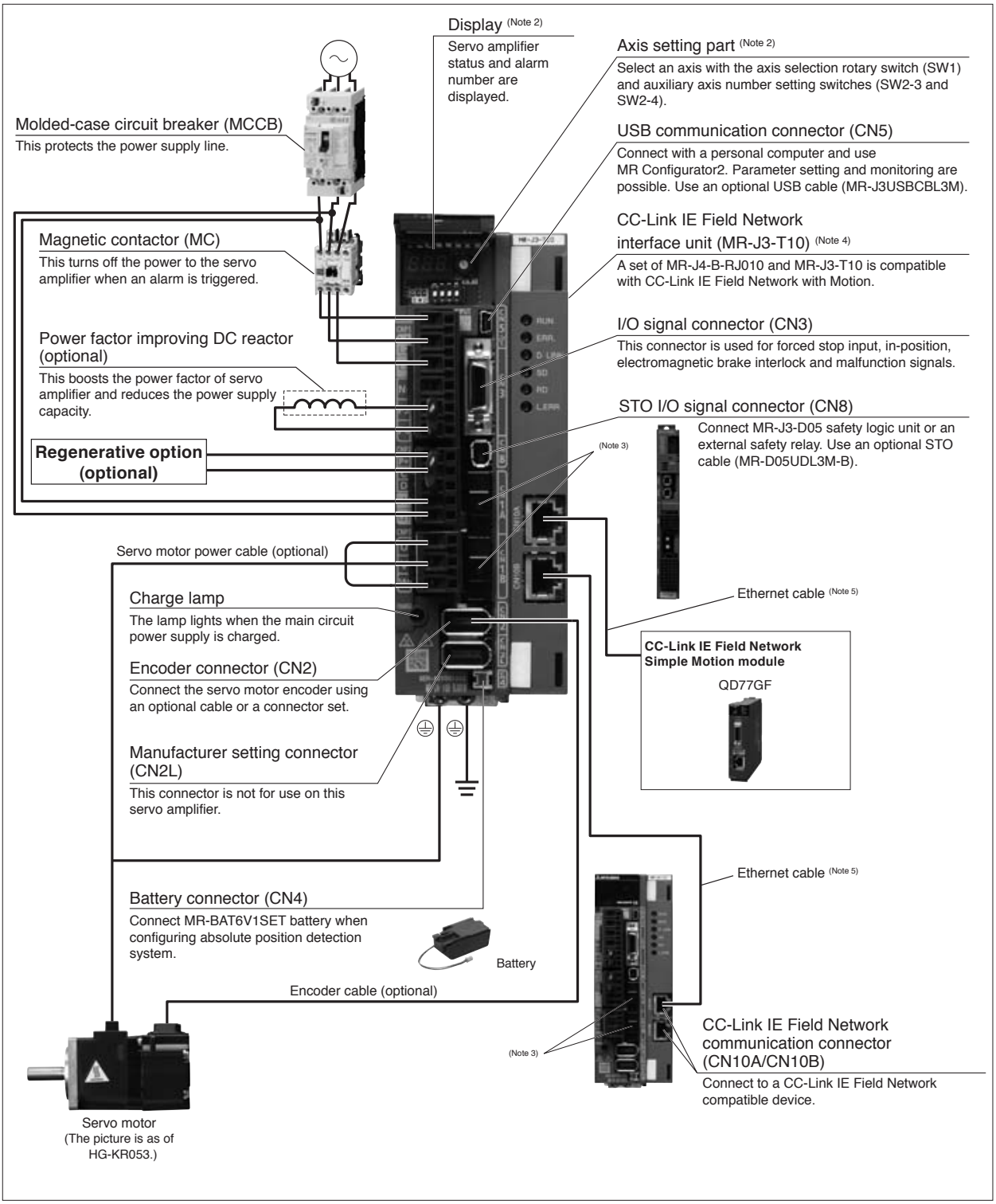
[Unit: mm]

Notes: 1. CNP1, CNP2, CNP3A, CNP3B and CNP3C connectors (insertion type) are supplied with the servo amplifier.

MR-J4-B-RJ010 Connections with Peripheral Equipment (Note 1)

B-RJ010

Peripheral equipment is connected to MR-J4-B-RJ010 as described below. Connectors, cables, options, and other necessary equipment are available so that users can set up the servo amplifier easily and start using it right away.



Notes: 1. The connection with the peripheral equipment is an example for MR-J4-350B-RJ010 or smaller servo amplifiers. Refer to "MR-J4-_B-RJ010 MR-J3-T10 Servo Amplifier Instruction Manual" for the actual connections.
2. This picture shows when the display cover is open.
3. This connector is not for use. Be sure to attach a cap supplied with the servo amplifier.
4. Refer to "CC-Link IE Field Network Interface Unit" in this catalog for details on CC-Link IE Field Network Interface Unit (MR-J3-T10).
5. For specifications of the Ethernet cable, refer to "Ethernet cable specifications" on p. 5-31 in this catalog.

MR-J4-B-RJ010

B-RJ010

(CC-Link IE Field Network interface with Motion) Specifications (200 V AC)

Servo amplifier model MR-J4-_-RJ010		10B	20B	40B	60B	70B	100B	200B	350B	500B	700B	11KB	15KB	22KB
												(Released in the future)		
Output	Rated voltage	3-phase 170 V AC												
	Rated current [A]	1.1	1.5	2.8	3.2	5.8	6.0	11.0	17.0	28.0	37.0	68.0	87.0	126.0
Main circuit power supply input	Voltage/frequency (Note 1)	3-phase or 1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz					3-phase 200 V AC to 240 V AC, 50 Hz/60 Hz							
	Rated current [A]	0.9	1.5	2.6	3.2 (Note 8)	3.8	5.0	10.5	16.0	21.7	28.9	46.0	64.0	95.0
	Permissible voltage fluctuation	3-phase or 1-phase 170 V AC to 264 V AC					3-phase 170 V AC to 264 V AC							
	Permissible frequency fluctuation	±5% maximum												
Control circuit power supply input	Voltage/frequency	1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz												
	Rated current [A]	0.2								0.3				
	Permissible voltage fluctuation	1-phase 170 V AC to 264 V AC												
	Permissible frequency fluctuation	±5% maximum												
	Power consumption [W]	30								45				
Interface power supply		24 V DC ± 10% (required current capacity: 0.3 A (including CN8 connector signals))												
Control method		Sine-wave PWM control/current control method												
Tolerable regenerative power	Built-in regenerative resistor (Note 2, 3) [W]	-	10	10	10	20	20	100	100	130	170	-	-	-
	External regenerative resistor (standard accessory) (Note 2, 3, 9, 10) [W]	-	-	-	-	-	-	-	-	-	-	500 (800)	850 (1300)	850 (1300)
Dynamic brake		Built-in (Note 4)										External option (Note 11)		
Communication function		USB: Connect a personal computer (MR Configurator2 compatible)												
Encoder output pulse		Compatible (A/B/Z-phase pulse)												
Analog monitor		2 channels												
Fully closed loop control		Not compatible												
Servo function		Advanced vibration suppression control II, adaptive filter II, robust filter, auto tuning, one-touch tuning, tough drive function, drive recorder function, machine diagnosis function, power monitoring function												
Load-side encoder interface		Not compatible												
Protective functions		Overcurrent shut-off, regenerative overvoltage shut-off, overload shut-off (electronic thermal), servo motor overheat protection, encoder error protection, regenerative error protection, undervoltage protection, instantaneous power failure protection, overspeed protection, error excessive protection												
Functional safety		STO (IEC/EN 61800-5-2)												
Safety performance	Standards certified by CB	EN ISO 13849-1 Category 3 PL d, IEC 61508 SIL 2, EN 62061 SIL CL 2, EN 61800-5-2 SIL 2												
	Response performance	8 ms or less (STO input OFF → energy shut-off)												
	Test pulse input (STO) (Note 7)	Test pulse interval: 1 Hz to 25 Hz, test pulse off time: 1 ms maximum												
	Mean time to dangerous failure (MTTFd)	100 years or longer												
	Diagnostic coverage (DC)	Medium (90% to 99%)												
	Probability of dangerous Failure per Hour (PFH)	1.68×10^{-10} [1/h]												
Compliance to standards		Refer to "Conformity with Global Standards and Regulations" on p. 57 in this catalog.												
Structure (IP rating)		Natural cooling, open (IP20)				Force cooling, open (IP20)				Force cooling, open (IP20) (Note 5)				
Close mounting		Possible (Note 6)								Not possible				
Environment	Ambient temperature	0 °C to 55 °C (non-freezing), storage: -20 °C to 65 °C (non-freezing)												
	Ambient humidity	90 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)												
	Ambience	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust												
	Altitude	1000 m or less above sea level												
	Vibration resistance	5.9 m/s^2 at 10 Hz to 55 Hz (directions of X, Y and Z axes)												
Mass (Note 12) [kg]		0.8	0.8	1.0	1.0	1.4	1.4	2.1	2.3	4.0	6.2	13.4	13.4	18.2

MR-J4-B-RJ010

B-RJ010

(CC-Link IE Field Network interface with Motion) Specifications (200 V AC)

Notes: 1. Rated output and speed of a rotary servo motor are applicable when the servo amplifier, combined with the rotary servo motor, is operated within the specified power supply voltage and frequency.
2. Select the most suitable regenerative option for your system with our capacity selection software.
3. Refer to "Regenerative Option" in this catalog for the tolerable regenerative power [W] when regenerative option is used.
4. When using the built-in dynamic brake, refer to "MR-J4-_B(-RJ) MR-J4-_B4(-RJ) Servo Amplifier Instruction Manual" for the permissible load to motor inertia ratio.
5. Terminal blocks are excluded.
6. When the servo amplifiers are closely mounted, keep the ambient temperature within 0 °C to 45 °C, or use them with 75% or less of the effective load ratio.
7. The test pulse is a signal for the external circuit to perform self-diagnosis by turning off the signals to the servo amplifier instantaneously at regular intervals.
8. The rated current is 2.9 A when the servo amplifier is used with UL or CSA compliant servo motor.
9. The value in brackets is applicable when cooling fans (2 units of 92 mm × 92 mm, minimum air flow: 1.0 m^3/min) are installed, and then [Pr. PA02] is changed.
10. Servo amplifiers without an enclosed regenerative resistor are also available. Refer to "1-Axis Servo Amplifier Model Designation" in this catalog for details.
11. Use an optional external dynamic brake with the servo amplifier. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc. Take measures to ensure safety on the entire system when not using the dynamic brake.
12. The value is applicable for the MR-J4-_B-RJ010 servo amplifier only.

MR-J4-B4-RJ010

B-RJ010

(CC-Link IE Field Network interface with Motion) Specifications (400 V AC)

Servo amplifier model MR-J4-_-RJ010			60B4	100B4	200B4	350B4	500B4	700B4	11KB4	15KB4	22KB4
			(Released in the future)								
Output	Rated voltage		3-phase 323 V AC								
	Rated current	[A]	1.5	2.8	5.4	8.6	14.0	17.0	32.0	41.0	63.0
Main circuit power supply input	Voltage/frequency (Note 1)		3-phase 380 V AC to 480 V AC, 50 Hz/60 Hz								
	Rated current	[A]	1.4	2.5	5.1	7.9	10.8	14.4	23.1	31.8	47.6
	Permissible voltage fluctuation		3-phase 323 V AC to 528 V AC								
	Permissible frequency fluctuation		±5% maximum								
Control circuit power supply input	Voltage/frequency		1-phase 380 V AC to 480 V AC, 50 Hz/60 Hz								
	Rated current	[A]	0.1			0.2					
	Permissible voltage fluctuation		1-phase 323 V AC to 528 V AC								
	Permissible frequency fluctuation		±5% maximum								
	Power consumption	[W]	30			45					
Interface power supply			24 V DC ± 10% (required current capacity: 0.3 A (including CN8 connector signals))								
Control method			Sine-wave PWM control/current control method								
Tolerable regenerative power	Built-in regenerative resistor (Note 2, 3)	[W]	15	15	100	100	130 (Note 10)	170 (Note 10)	-	-	-
	External regenerative resistor (standard accessory) (Note 2, 3, 7, 8)	[W]	-	-	-	-	-	-	500 (800)	850 (1300)	850 (1300)
Dynamic brake			Built-in (Note 4)						External option (Note 9)		
Communication function			USB: Connect a personal computer (MR Configurator2 compatible)								
Encoder output pulse			Compatible (A/B/Z-phase pulse)								
Analog monitor			2 channels								
Fully closed loop control			Not compatible								
Servo function			Advanced vibration suppression control II, adaptive filter II, robust filter, auto tuning, one-touch tuning, tough drive function, drive recorder function, machine diagnosis function, power monitoring function								
Load-side encoder interface			Not compatible								
Protective functions			Overcurrent shut-off, regenerative overvoltage shut-off, overload shut-off (electronic thermal), servo motor overheat protection, encoder error protection, regenerative error protection, undervoltage protection, instantaneous power failure protection, overspeed protection, error excessive protection								
Functional safety			STO (IEC/EN 61800-5-2)								
Safety performance	Standards certified by CB		EN ISO 13849-1 Category 3 PL d, IEC 61508 SIL 2, EN 62061 SIL CL 2, EN 61800-5-2 SIL 2								
	Response performance		8 ms or less (STO input OFF → energy shut-off)								
	Test pulse input (STO) (Note 6)		Test pulse interval: 1 Hz to 25 Hz, test pulse off time: 1 ms maximum								
	Mean time to dangerous failure (MTTFd)		100 years or longer								
	Diagnostic coverage (DC)		Medium (90% to 99%)								
	Probability of dangerous Failure per Hour (PFH)		1.68×10^{-10} [1/h]								
Compliance to standards			Refer to "Conformity with Global Standards and Regulations" on p. 57 in this catalog.								
Structure (IP rating)			Natural cooling, open (IP20)		Force cooling, open (IP20)		Force cooling, open (IP20) (Note 5)				
Close mounting			Not possible								
Environment	Ambient temperature		0 °C to 55 °C (non-freezing), storage: -20 °C to 65 °C (non-freezing)								
	Ambient humidity		90 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)								
	Ambience		Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust								
	Altitude		1000 m or less above sea level								
	Vibration resistance		5.9 m/s^2 at 10 Hz to 55 Hz (directions of X, Y and Z axes)								
Mass (Note 11)		[kg]	1.7	1.7	2.1	3.6	4.3	6.5	13.4	13.4	18.2

MR-J4-B4-RJ010

B-RJ010

(CC-Link IE Field Network interface with Motion) Specifications (400 V AC)

Notes: 1. Rated output and speed of a rotary servo motor are applicable when the servo amplifier, combined with the rotary servo motor, is operated within the specified power supply voltage and frequency.
2. Select the most suitable regenerative option for your system with our capacity selection software.
3. Refer to "Regenerative Option" in this catalog for the tolerable regenerative power [W] when regenerative option is used.
4. When using the built-in dynamic brake, refer to "MR-J4-_B(-RJ) MR-J4-_B4(-RJ) Servo Amplifier Instruction Manual" for the permissible load to motor inertia ratio and the permissible load to mass ratio.
5. Terminal blocks are excluded.
6. The test pulse is a signal for the external circuit to perform self-diagnosis by turning off the signals to the servo amplifier instantaneously at regular intervals.
7. The value in brackets is applicable when cooling fans (2 units of 92 mm × 92 mm, minimum air flow: 1.0 m^3/min) are installed, and then [Pr. PA02] is changed.
8. Servo amplifiers without an enclosed regenerative resistor are also available. Refer to "1-Axis Servo Amplifier Model Designation" in this catalog for details.
9. Use an optional external dynamic brake with the servo amplifier. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc. Take measures to ensure safety on the entire system when not using the dynamic brake.
10. The servo amplifier built-in regenerative resistor is compatible with the maximum torque deceleration when the servo motor is used within the rated speed and the recommended load to motor inertia ratio. Contact your local sales office if the operating motor speed or the load to motor inertia ratio exceeds the rated speed or the recommended ratio.
11. The value is applicable for the MR-J4-_B4-RJ010 servo amplifier only.

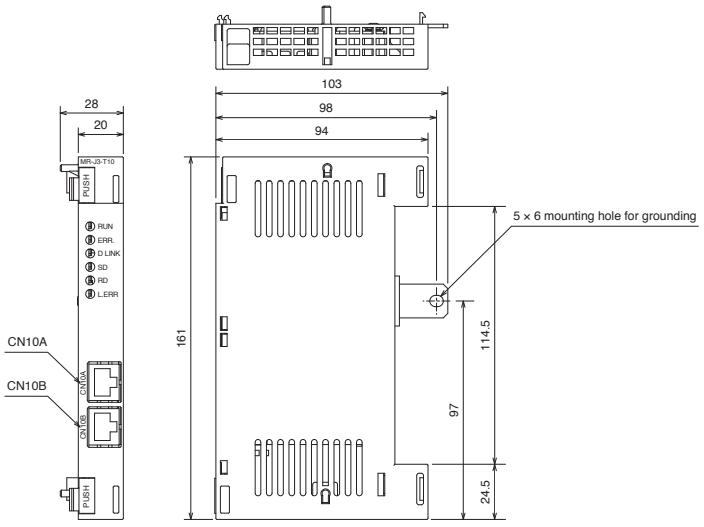
CC-Link IE Field Network Interface Unit (MR-J3-T10)

B-RJ010

Specifications

Item		Description
Model		MR-J3-T10
Control circuit power supply	Voltage	5 V DC (Control circuit power for the CC-Link IE Field Network interface unit is supplied from the servo amplifier.)
	Rated current [A]	0.8
Input/output interface		CC-Link IE Field Network
Number of communication ports		2 ports (CN10A and CN10B connectors)
Structure (IP rating)		Natural cooling, open (IP00)
Environment	Ambient temperature	0 °C to 55 °C (non-freezing), storage: -20 °C to 65 °C (non-freezing)
	Ambient humidity	90 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)
	Ambience	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust
	Altitude	1000 m or less above sea level
	Vibration resistance	5.9 m/s^2 at 10 Hz to 55 Hz (directions of X, Y and Z axes)
Mass [g]		150

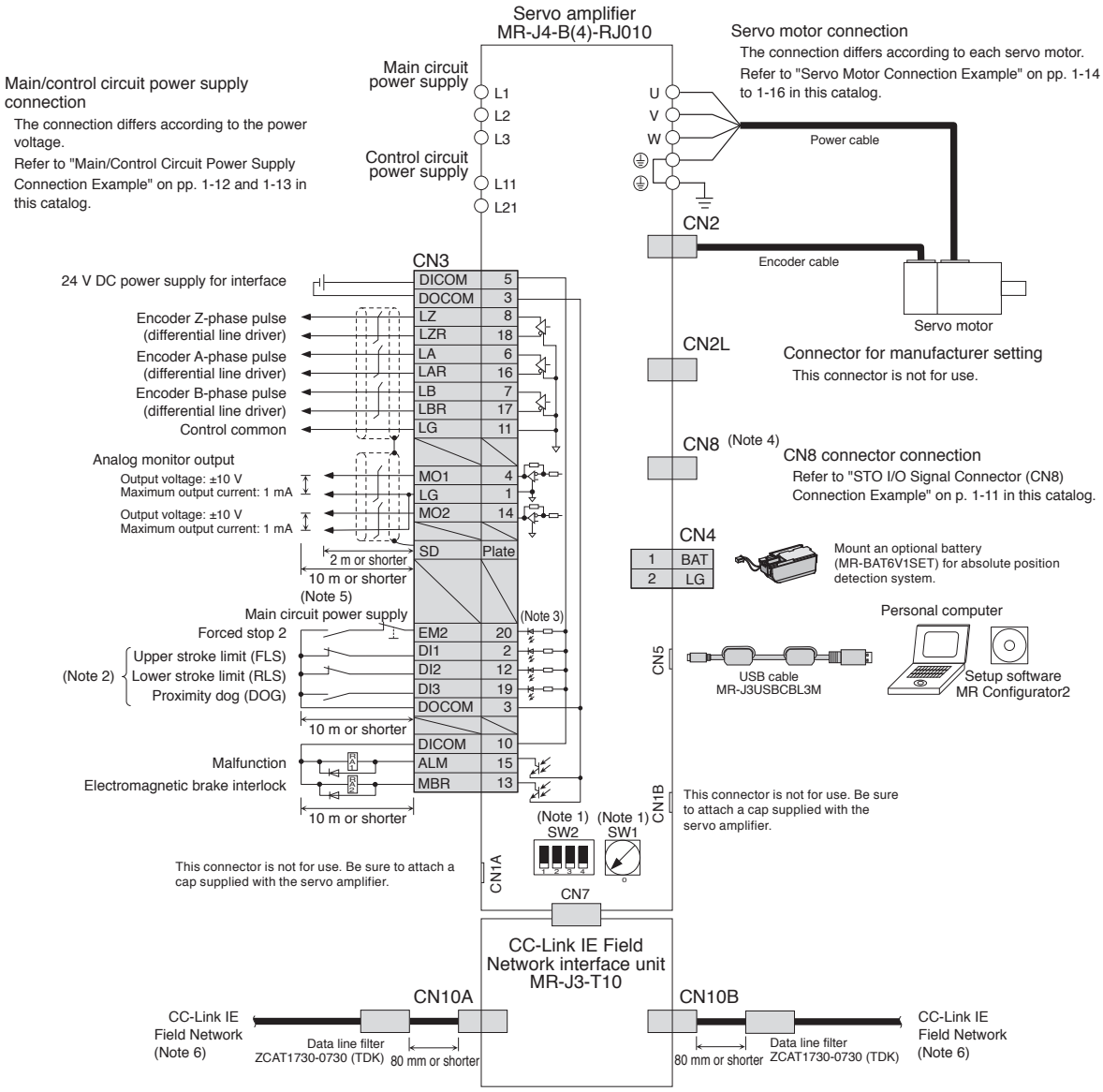
Dimensions



[Unit: mm]

MR-J4-B(4)-RJ010 Standard Wiring Diagram Example

B-RJ010



Notes: 1. Up to 63 stations are set by using a combination of a station selection rotary switch (SW1) and auxiliary station number setting switches (SW2-3 and SW2-4). Note that the number of the connectable stations depends on the controller specifications.
2. Devices can be assigned for DI1, DI2 and DI3 with controller setting. Refer to the controller instruction manuals for details on setting.
3. This is for sink wiring. Source wiring is also possible.
4. Be sure to attach a short-circuit connector supplied with the servo amplifier when the STO function is not used.
5. Create a circuit to turn off EM2 (Forced stop 2) when the main circuit power is turned off to prevent an unexpected restart of the servo amplifier.
6. When branching off CC-Link IE Field Network with a switching HUB, use DT135TX (Mitsubishi Electric System & Service Co., Ltd.).

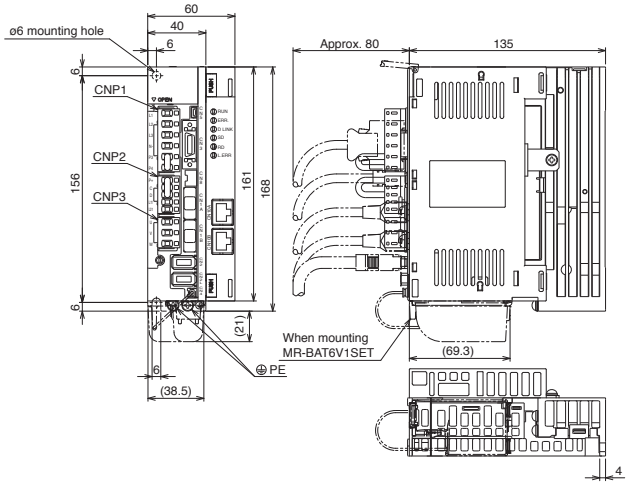
⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

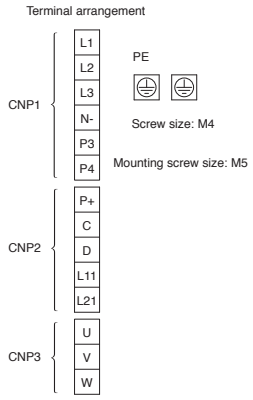
MR-J4-B-RJ010 Dimensions (Note 2)

B-RJ010

●MR-J4-10B-RJ010 (Note 1)

●MR-J4-20B-RJ010 (Note 1)

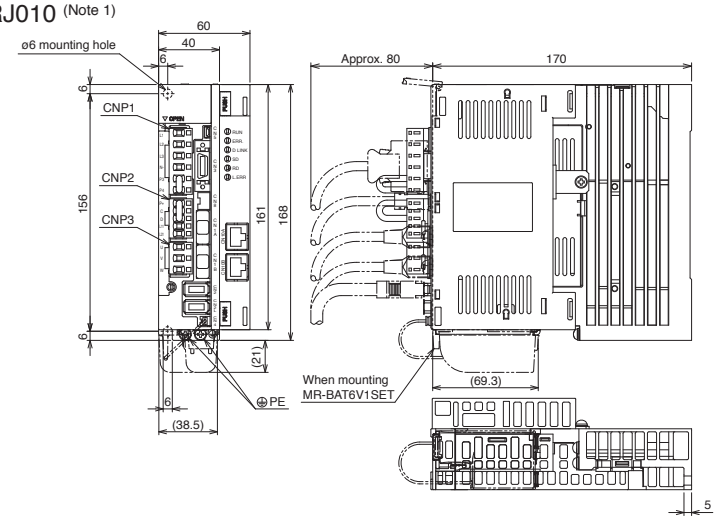


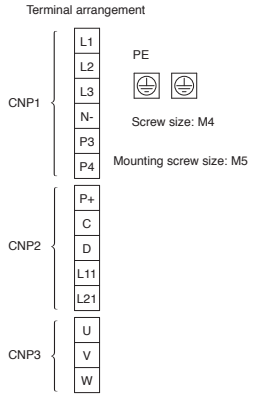


[Unit: mm]

●MR-J4-40B-RJ010 (Note 1)

●MR-J4-60B-RJ010 (Note 1)

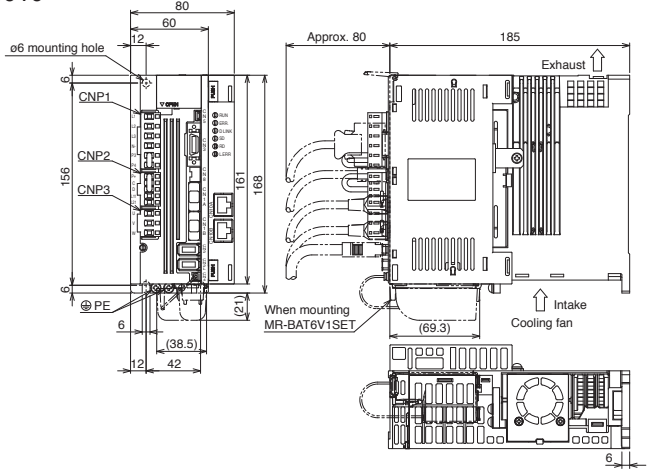


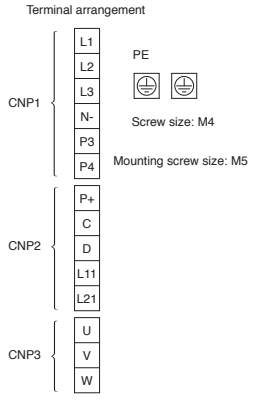


[Unit: mm]

●MR-J4-70B-RJ010 (Note 1)

●MR-J4-100B-RJ010 (Note 1)





[Unit: mm]

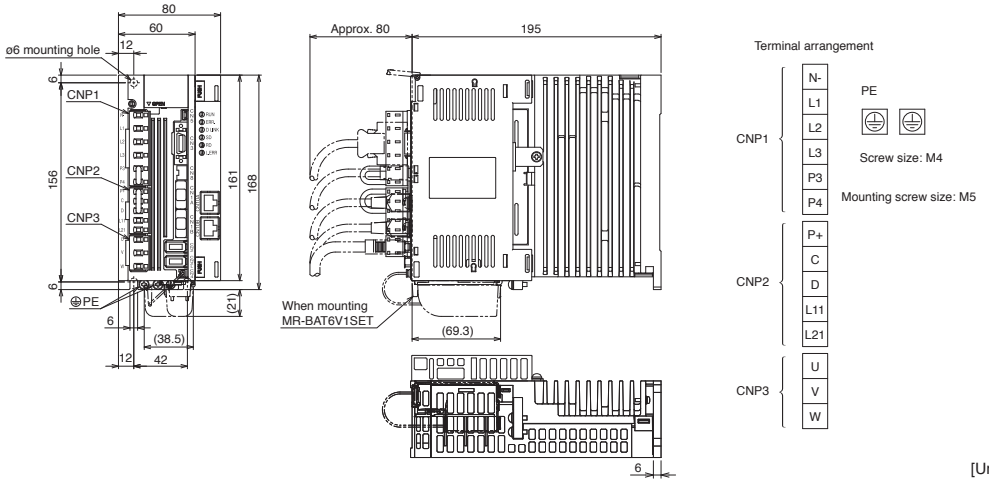
Notes: 1. CNP1, CNP2 and CNP3 connectors (insertion type) are supplied with the servo amplifier.
2. The dimensions are applicable when MR-J4-B-RJ010 and MR-J3-T10 are combined. Refer to "MR-J4-B(-RJ) Dimensions" in this catalog for the dimensions of MR-J4-B-RJ010 servo amplifiers alone.

MR-J4-B-RJ010 Dimensions (Note 2)

B-RJ010

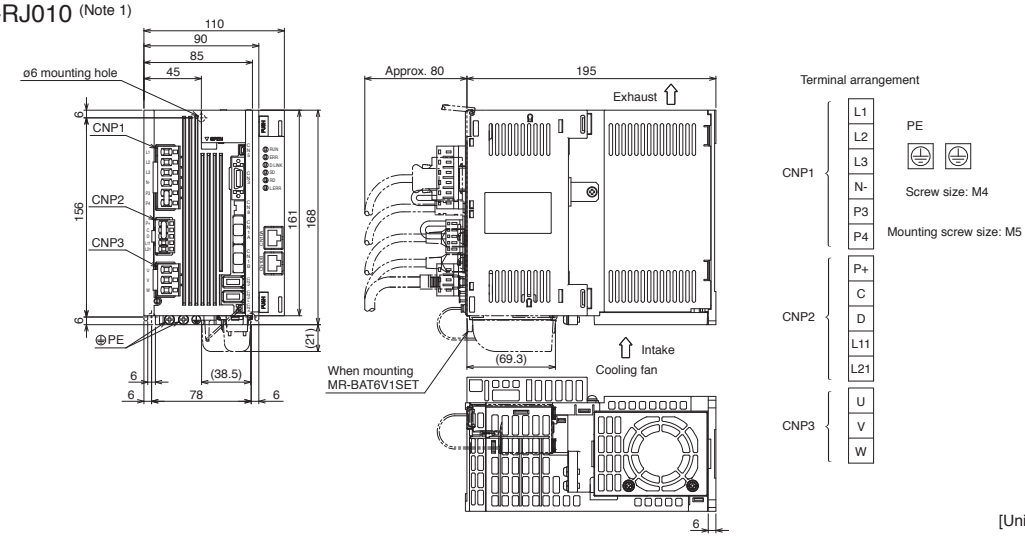
●MR-J4-60B4-RJ010 (released in the future) (Note 1)

●MR-J4-100B4-RJ010 (released in the future) (Note 1)



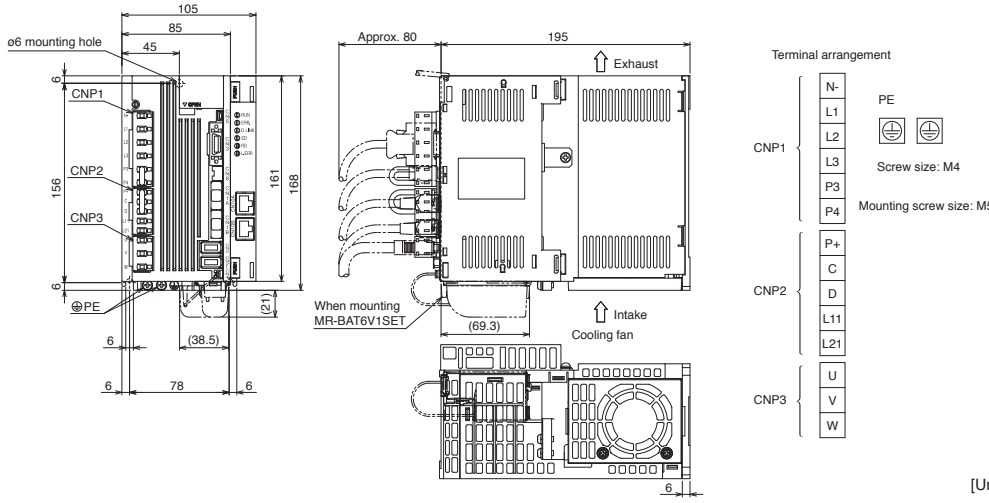
[Unit: mm]

●MR-J4-200B-RJ010 (Note 1)



[Unit: mm]

●MR-J4-200B4-RJ010 (released in the future) (Note 1)



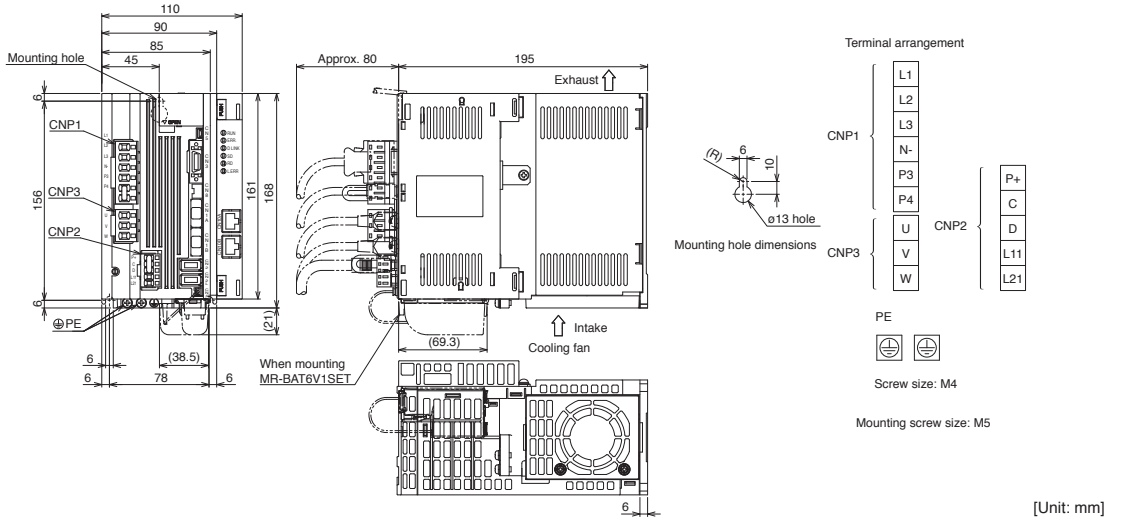
[Unit: mm]

Notes: 1. CNP1, CNP2 and CNP3 connectors (insertion type) are supplied with the servo amplifier.
2. The dimensions are applicable when MR-J4-B-RJ010 and MR-J3-T10 are combined. Refer to "MR-J4-B(-RJ) Dimensions" in this catalog for the dimensions of MR-J4-B-RJ010 servo amplifiers alone.

MR-J4-B-RJ010 Dimensions (Note 2)

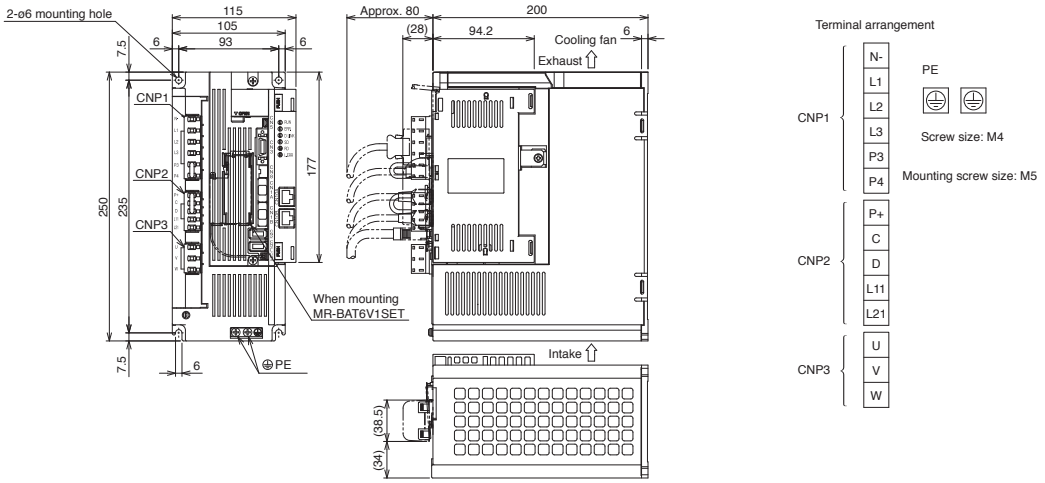
B-RJ010

●MR-J4-350B-RJ010 (Note 1)



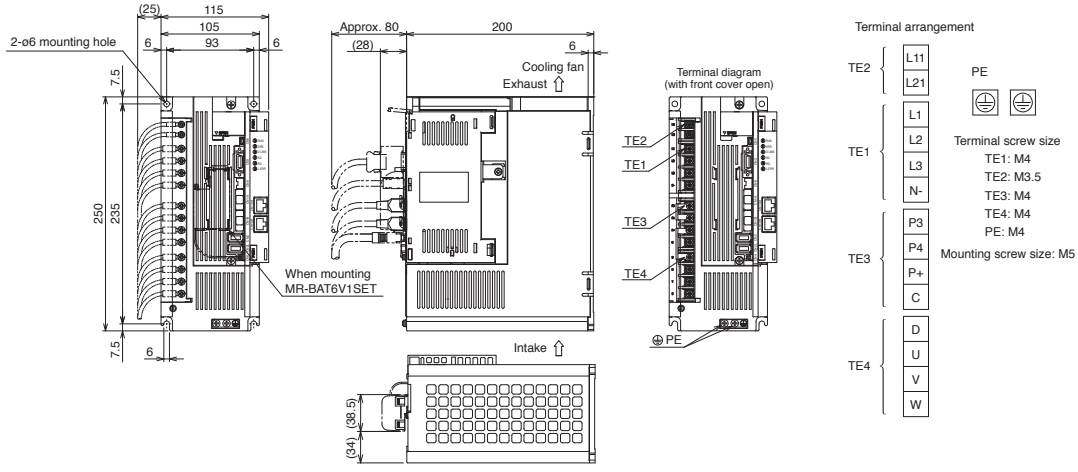
[Unit: mm]

●MR-J4-350B4-RJ010 (released in the future) (Note 1)



[Unit: mm]

●MR-J4-500B-RJ010



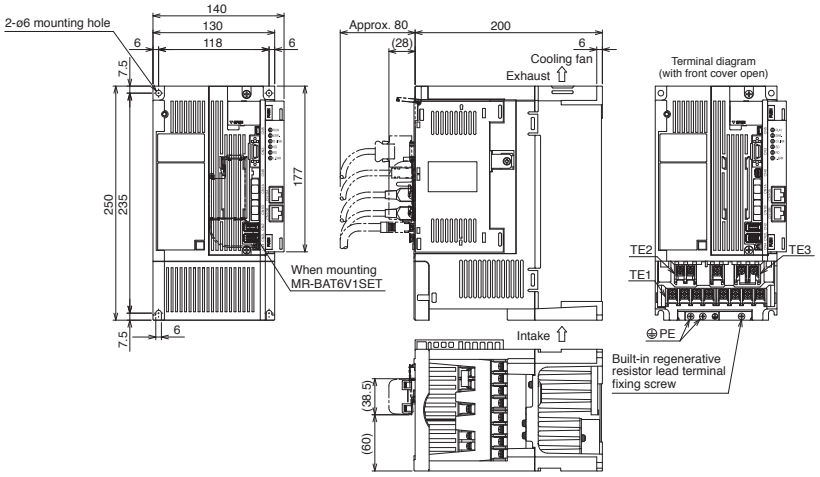
[Unit: mm]

Notes: 1. CNP1, CNP2 and CNP3 connectors (insertion type) are supplied with the servo amplifier.
2. The dimensions are applicable when MR-J4-B-RJ010 and MR-J3-T10 are combined. Refer to "MR-J4-B(-RJ) Dimensions" in this catalog for the dimensions of MR-J4-B-RJ010 servo amplifiers alone.

MR-J4-B-RJ010 Dimensions (Note 1)

B-RJ010

●MR-J4-500B4-RJ010 (released in the future)



Terminal screw size
TE1: M4
TE2: M3.5
TE3: M4
PE: M4

Mounting screw size: M5

Terminal arrangement

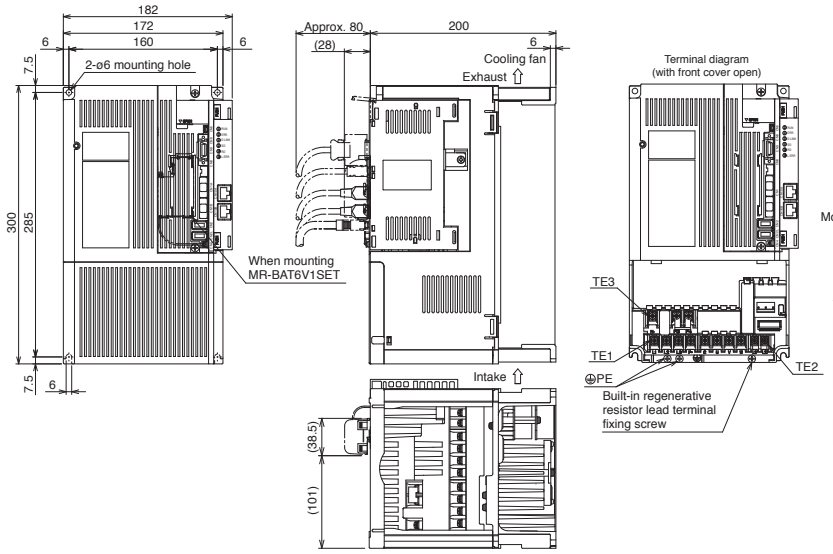
TE2		TE3		
L11	L21	N-	P3	P4

TE1							
L1	L2	L3	P+	C	U	V	W

PE

[Unit: mm]

●MR-J4-700B-RJ010, MR-J4-700B4-RJ010 (released in the future)



Terminal screw size
TE1: M4
TE2: M3.5
TE3: M4
PE: M4

Mounting screw size: M5

Terminal arrangement

TE3		
N-	P3	P4

TE1								TE2	
L1	L2	L3	P+	C	U	V	W	L11	L21

PE

[Unit: mm]

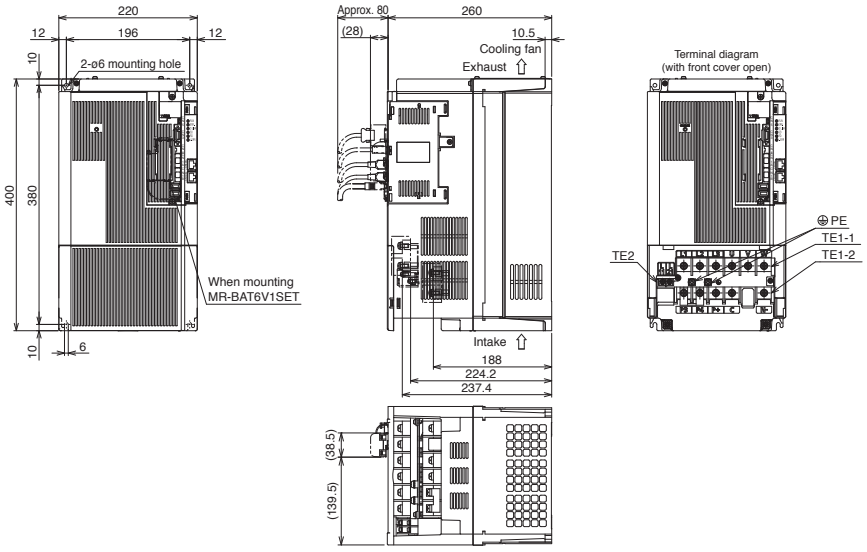
Notes: 1. The dimensions are applicable when MR-J4-B-RJ010 and MR-J3-T10 are combined. Refer to "MR-J4-B(-RJ) Dimensions" in this catalog for the dimensions of MR-J4-B-RJ010 servo amplifiers alone.

MR-J4-B-RJ010 Dimensions (Note 1)

B-RJ010

●MR-J4-11KB-RJ010 (released in the future), MR-J4-11KB4-RJ010 (released in the future)

●MR-J4-15KB-RJ010 (released in the future), MR-J4-15KB4-RJ010 (released in the future)



Terminal screw size
TE1-1: M6
TE1-2: M6
TE2: M4
PE: M6

Mounting screw size: M5

Terminal arrangement

TE1-1

L1	L2	L3	U	V	W

TE1-2

P3	P4	P+	C		N-

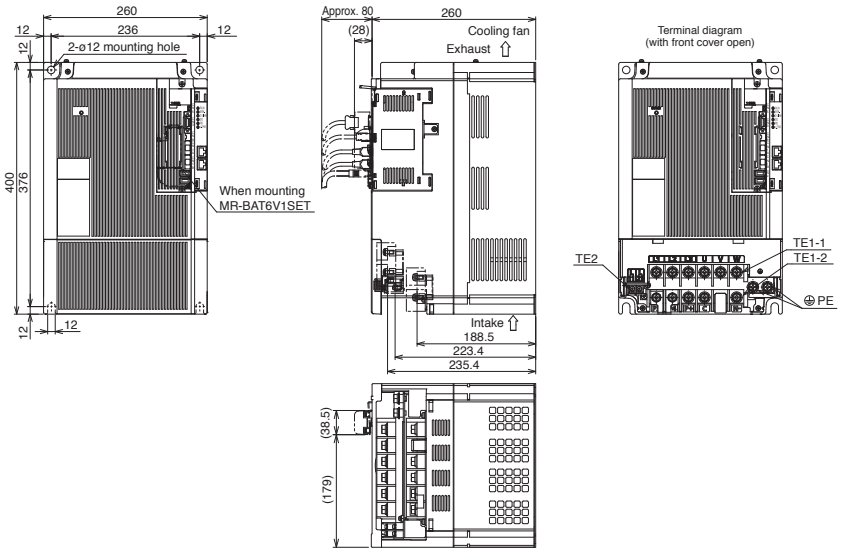
TE2

L11	L21

PE

[Unit: mm]

●MR-J4-22KB-RJ010 (released in the future), MR-J4-22KB4-RJ010 (released in the future)



Terminal screw size
TE1-1: M8
TE1-2: M8
TE2: M4
PE: M8

Mounting screw size: M10

Terminal arrangement

TE1-1

L1	L2	L3	U	V	W

TE1-2

P3	P4	P+	C		N-

TE2

L11	L21

PE

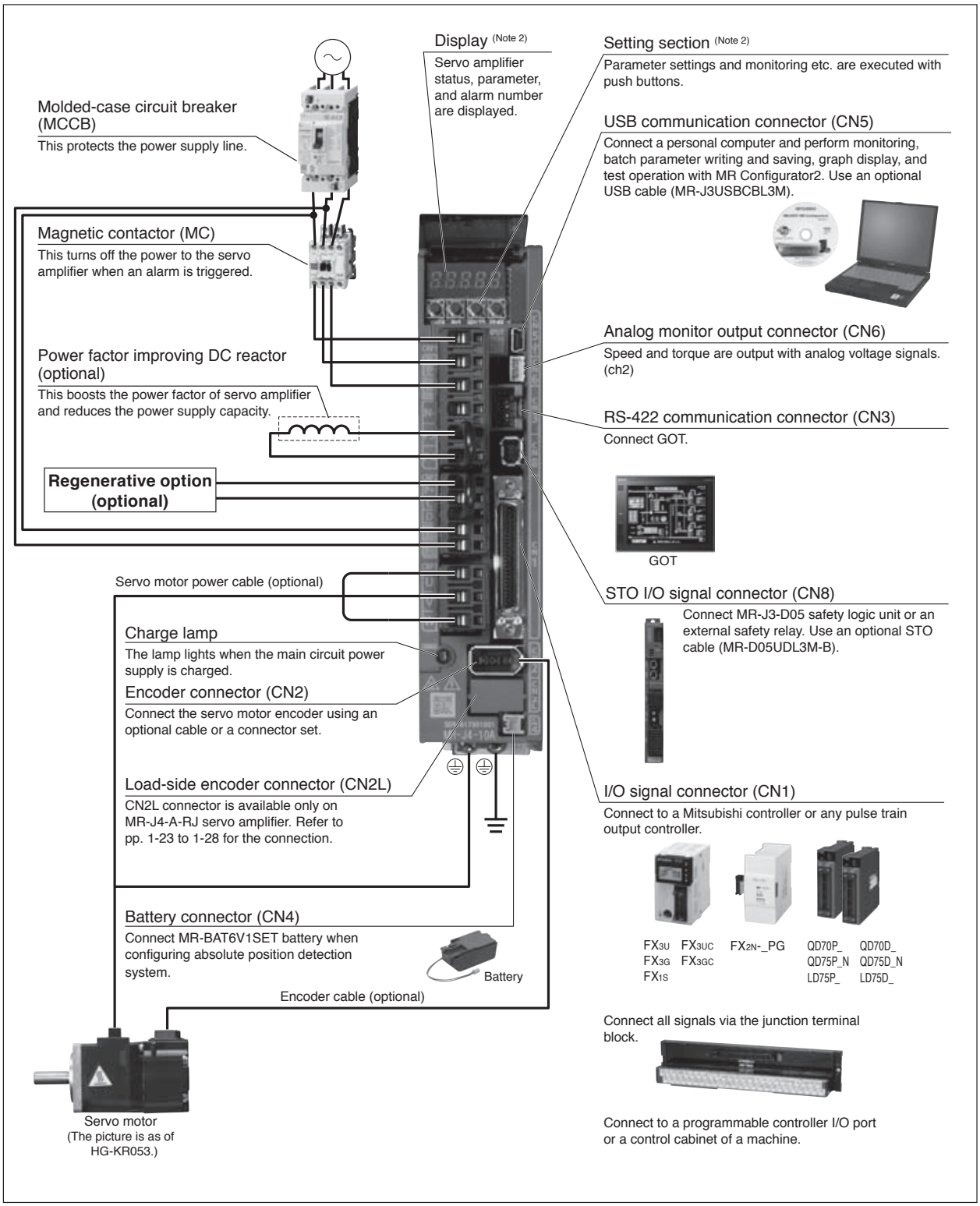
[Unit: mm]

Notes: 1. The dimensions are applicable when MR-J4-B-RJ010 and MR-J3-T10 are combined. Refer to "MR-J4-B(-RJ) Dimensions" in this catalog for the dimensions of MR-J4-B-RJ010 servo amplifiers alone.

MR-J4-A(-RJ) Connections with Peripheral Equipment (Note 1)

A A-RJ

Peripheral equipment is connected to MR-J4-A(-RJ) as described below. Connectors, cables, options, and other necessary equipment are available so that users can set up the servo amplifier easily and start using it right away.



Notes: 1. The connection with the peripheral equipment is an example for MR-J4-350A(-RJ) or smaller servo amplifiers. Refer to "MR-J4-_A(-RJ) MR-J4-_A4(-RJ) Servo Amplifier Instruction Manual" for the actual connections.
2. This picture shows when the display cover is open.

MR-J4-A(1)(-RJ) (General-purpose Interface) Specifications (200 V/100 V)

A A-RJ

Servo amplifier model MR-J4-_(-RJ)			10A	20A	40A	60A	70A	100A	200A	350A	500A	700A	11KA	15KA	22KA	10A1 (Released in the future)	20A1 (Released in the future)	40A1 (Released in the future)
Output	Rated voltage		3-phase 170 V AC															
	Rated current	[A]	1.1	1.5	2.8	3.2	5.8	6.0	11.0	17.0	28.0	37.0	68.0	87.0	126.0	1.1	1.5	2.8
Main circuit power supply input	Voltage/frequency (Note 1)		3-phase or 1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz					3-phase 200 V AC to 240 V AC, 50 Hz/60 Hz								1-phase 100 V AC to 120 V AC, 50 Hz/60 Hz		
	Rated current	[A]	0.9	1.5	2.6	3.2 (Note 8)	3.8	5.0	10.5	16.0	21.7	28.9	46.0	64.0	95.0	3.0	5.0	9.0
	Permissible voltage fluctuation		3-phase or 1-phase 170 V AC to 264 V AC					3-phase 170 V AC to 264 V AC								1-phase 85 V AC to 132 V AC		
	Permissible frequency fluctuation		±5% maximum															
Control circuit power supply input	Voltage/frequency		1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz													1-phase 100 V AC to 120 V AC, 50 Hz/60 Hz		
	Rated current	[A]	0.2								0.3					0.4		
	Permissible voltage fluctuation		1-phase 170 V AC to 264 V AC													1-phase 85 V AC to 132 V AC		
	Permissible frequency fluctuation		±5% maximum															
	Power consumption	[W]	30								45					30		
Interface power supply			24 V DC ± 10% (required current capacity: 0.5 A (including CN8 connector signals))															
Control method			Sine-wave PWM control/current control method															
Tolerable regenerative power	Built-in regenerative resistor (Note 2, 3)	[W]	-	10	10	10	20	20	100	100	130	170	-	-	-	-	10	10
	External regenerative resistor (standard accessory) (Note 2, 3, 11, 12)	[W]	-	-	-	-	-	-	-	-	-	-	500 (800)	850 (1300)	850 (1300)	-	-	-
Dynamic brake			Built-in (Note 4)										External option (Note 13)			Built-in (Note 4)		
Communication function			USB: Connect a personal computer (MR Configurator2 compatible)															
			RS-422: 1 : n communication (up to 32 axes) (Note 10)															
Encoder output pulse			Compatible (A/B/Z-phase pulse)															
Analog monitor			2 channels															
Position control mode	Maximum input pulse frequency		4 Mpulses/s (when using differential receiver), 200 kpulses/s (when using open collector)															
	Positioning feedback pulse		Encoder resolution: 22 bits															
	Command pulse multiplying factor		Electronic gear A/B multiple, A: 1 to 16777215, B: 1 to 16777215, 1/10 < A/B < 4000															
	Positioning complete width setting		0 pulse to ±65535 pulses (command pulse unit)															
	Error excessive		±3 rotations															
	Torque limit		Set by parameters or external analog input (0 V DC to +10 V DC/maximum torque)															
Speed control mode	Speed control range		Analog speed command 1:2000, internal speed command 1:5000															
	Analog speed command input		0 V DC to ±10 V DC/rated speed (Speed at 10 V is changeable with [Pr. PC12].)															
	Speed fluctuation rate		±0.01% maximum (load fluctuation 0% to 100%), 0% (power fluctuation: ±10%) ±0.2% maximum (ambient temperature: 25 °C ± 10 °C) only when using analog speed command															
	Torque limit		Set by parameters or external analog input (0 V DC to +10 V DC/maximum torque)															
Torque control mode	Analog torque command input		0 V DC to ±8 V DC/maximum torque (input impedance: 10 kΩ to 12 kΩ)															
	Speed limit		Set by parameters or external analog input (0 V DC to ± 10 V DC/rated speed)															
Fully closed loop control		MR-J4-A(1)	Two-wire type communication method (Note 9)															
		MR-J4-A(1)-RJ	Two-wire/four-wire type communication method															
Servo function			Advanced vibration suppression control II, adaptive filter II, robust filter, auto tuning, one-touch tuning, tough drive function, drive recorder function, machine diagnosis function, power monitoring function															
Load-side encoder interface		MR-J4-A(1)	Mitsubishi high-speed serial communication															
		MR-J4-A(1)-RJ	Mitsubishi high-speed serial communication, A/B/Z-phase differential input signal															
Protective functions			Overcurrent shut-off, regenerative overvoltage shut-off, overload shut-off (electronic thermal), servo motor overheat protection, encoder error protection, regenerative error protection, undervoltage protection, instantaneous power failure protection, overspeed protection, error excessive protection, magnetic pole detection protection, linear servo control fault protection															

MR-J4-A(1)(-RJ) (General-purpose Interface) Specifications (200 V/100 V)

A A-RJ

Servo amplifier model MR-J4-_(-RJ)		10A	20A	40A	60A	70A	100A	200A	350A	500A	700A	11KA	15KA	22KA	10A1 (Released in the future)	20A1 (Released in the future)	40A1 (Released in the future)
Functional safety		STO (IEC/EN 61800-5-2)															
Safety performance	Standards certified by CB	EN ISO 13849-1 Category 3 PL d, IEC 61508 SIL 2, EN 62061 SIL CL 2, EN 61800-5-2 SIL 2															
	Response performance	8 ms or less (STO input OFF → energy shut-off)															
	Test pulse input (STO) (Note 7)	Test pulse interval: 1 Hz to 25 Hz, test pulse off time: 1 ms maximum															
	Mean time to dangerous failure (MTTFd)	100 years or longer															
	Diagnostic coverage (DC)	Medium (90% to 99%)															
	Probability of dangerous Failure per Hour (PFH)	1.68×10^{-10} [1/h]															
Compliance to standards		Refer to "Conformity with Global Standards and Regulations" on p. 57 in this catalog.															
Structure (IP rating)		Natural cooling, open (IP20)				Force cooling, open (IP20)				Force cooling, open (IP20) (Note 5)					Natural cooling, open (IP20)		
Close mounting		Possible (Note 6)								Not possible					Possible (Note 6)		
Environment	Ambient temperature	0 °C to 55 °C (non-freezing), storage: -20 °C to 65 °C (non-freezing)															
	Ambient humidity	90 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)															
	Ambience	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust															
	Altitude	1000 m or less above sea level															
	Vibration resistance	5.9 m/s² at 10 Hz to 55 Hz (directions of X, Y and Z axes)															
Mass [kg]		0.8	0.8	1.0	1.0	1.4	1.4	2.1	2.3	4.0	6.2	13.4	13.4	18.2	0.8	0.8	1.0

Notes: 1. Rated output and speed of a rotary servo motor and a direct drive motor; and continuous thrust and maximum speed of a linear servo motor are applicable when the servo amplifier, combined with the servo motor, is operated within the specified power supply voltage and frequency.
2. Select the most suitable regenerative option for your system with our capacity selection software.
3. Refer to "Regenerative Option" in this catalog for the tolerable regenerative power [W] when regenerative option is used.
4. When using the built-in dynamic brake, refer to "MR-J4-_A(-RJ) MR-J4-_A4(-RJ) Servo Amplifier Instruction Manual" for the permissible load to motor inertia ratio and the permissible load to mass ratio.
5. Terminal blocks are excluded.
6. When the servo amplifiers are closely mounted, keep the ambient temperature within 0 °C to 45 °C, or use them with 75% or less of the effective load ratio.
7. The test pulse is a signal for the external circuit to perform self-diagnosis by turning off the signals to the servo amplifier instantaneously at regular intervals.
8. The rated current is 2.9 A when the servo amplifier is used with UL or CSA compliant servo motor.
9. Fully closed loop control is compatible with the servo amplifiers with software version A5 or later.
10. RS-422 communication is compatible with the servo amplifiers with software version A3 or later.
11. The value in brackets is applicable when cooling fans (2 units of 92 mm × 92 mm, minimum air flow: 1.0 m³/min) are installed, and then [Pr. PA02] is changed.
12. Servo amplifiers without an enclosed regenerative resistor are also available. Refer to "1-Axis Servo Amplifier Model Designation" in this catalog for details.
13. Use an optional external dynamic brake with the servo amplifier. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc. Take measures to ensure safety on the entire system when not using the dynamic brake.

MR-J4-A4(-RJ) (General-purpose Interface) Specifications (400 V)

A A-RJ

Servo amplifier model MR-J4-_(-RJ)			60A4	100A4	200A4	350A4	500A4	700A4	11KA4	15KA4	22KA4
Output	Rated voltage		3-phase 323 V AC								
	Rated current	[A]	1.5	2.8	5.4	8.6	14.0	17.0	32.0	41.0	63.0
Main circuit power supply input	Voltage/frequency (Note 1)		3-phase 380 V AC to 480 V AC, 50 Hz/60 Hz								
	Rated current	[A]	1.4	2.5	5.1	7.9	10.8	14.4	23.1	31.8	47.6
	Permissible voltage fluctuation		3-phase 323 V AC to 528 V AC								
	Permissible frequency fluctuation		±5% maximum								
Control circuit power supply input	Voltage/frequency		1-phase 380 V AC to 480 V AC, 50 Hz/60 Hz								
	Rated current	[A]	0.1			0.2					
	Permissible voltage fluctuation		1-phase 323 V AC to 528 V AC								
	Permissible frequency fluctuation		±5% maximum								
	Power consumption	[W]	30			45					
Interface power supply			24 V DC ± 10% (required current capacity: 0.5 A (including CN8 connector signals))								
Control method			Sine-wave PWM control/current control method								
Tolerable regenerative power	Built-in regenerative resistor (Note 2, 3)	[W]	15	15	100	100	130 (Note 10)	170 (Note 10)	-	-	-
	External regenerative resistor (standard accessory) (Note 2, 3, 7, 8)	[W]	-	-	-	-	-	-	500 (800)	850 (1300)	850 (1300)
Dynamic brake			Built-in (Note 4)						External option (Note 9)		
Communication function			USB: Connect a personal computer (MR Configurator2 compatible)								
			RS-422: 1 : n communication (up to 32 axes)								
Encoder output pulse			Compatible (A/B/Z-phase pulse)								
Analog monitor			2 channels								
Position control mode	Maximum input pulse frequency		4 Mpulses/s (when using differential receiver), 200 kpulses/s (when using open collector)								
	Positioning feedback pulse		Encoder resolution: 22 bits								
	Command pulse multiplying factor		Electronic gear A/B multiple, A: 1 to 16777215, B: 1 to 16777215, 1/10 < A/B < 4000								
	Positioning complete width setting		0 pulse to ±65535 pulses (command pulse unit)								
	Error excessive		±3 rotations								
	Torque limit		Set by parameters or external analog input (0 V DC to +10 V DC/maximum torque)								
Speed control mode	Speed control range		Analog speed command 1:2000, internal speed command 1:5000								
	Analog speed command input		0 V DC to ±10 V DC/rated speed (Speed at 10 V is changeable with [Pr. PC12].)								
	Speed fluctuation rate		±0.01% maximum (load fluctuation 0% to 100%), 0% (power fluctuation: ±10%) ±0.2% maximum (ambient temperature: 25 °C ± 10 °C) only when using analog speed command								
	Torque limit		Set by parameters or external analog input (0 V DC to +10 V DC/maximum torque)								
Torque control mode	Analog torque command input		0 V DC to ±8 V DC/maximum torque (input impedance: 10 kΩ to 12 kΩ)								
	Speed limit		Set by parameters or external analog input (0 V DC to ± 10 V DC/rated speed)								
Fully closed loop control		MR-J4-A4	Two-wire type communication method								
		MR-J4-A4-RJ	Two-wire/four-wire type communication method								
Servo function			Advanced vibration suppression control II, adaptive filter II, robust filter, auto tuning, one-touch tuning, tough drive function, drive recorder function, machine diagnosis function, power monitoring function								
Load-side encoder interface		MR-J4-A4	Mitsubishi high-speed serial communication								
		MR-J4-A4-RJ	Mitsubishi high-speed serial communication, A/B/Z-phase differential input signal								
Protective functions			Overcurrent shut-off, regenerative overvoltage shut-off, overload shut-off (electronic thermal), servo motor overheat protection, encoder error protection, regenerative error protection, undervoltage protection, instantaneous power failure protection, overspeed protection, error excessive protection, magnetic pole detection protection, linear servo control fault protection								

MR-J4-A4(-RJ) (General-purpose Interface) Specifications (400 V)

A A-RJ

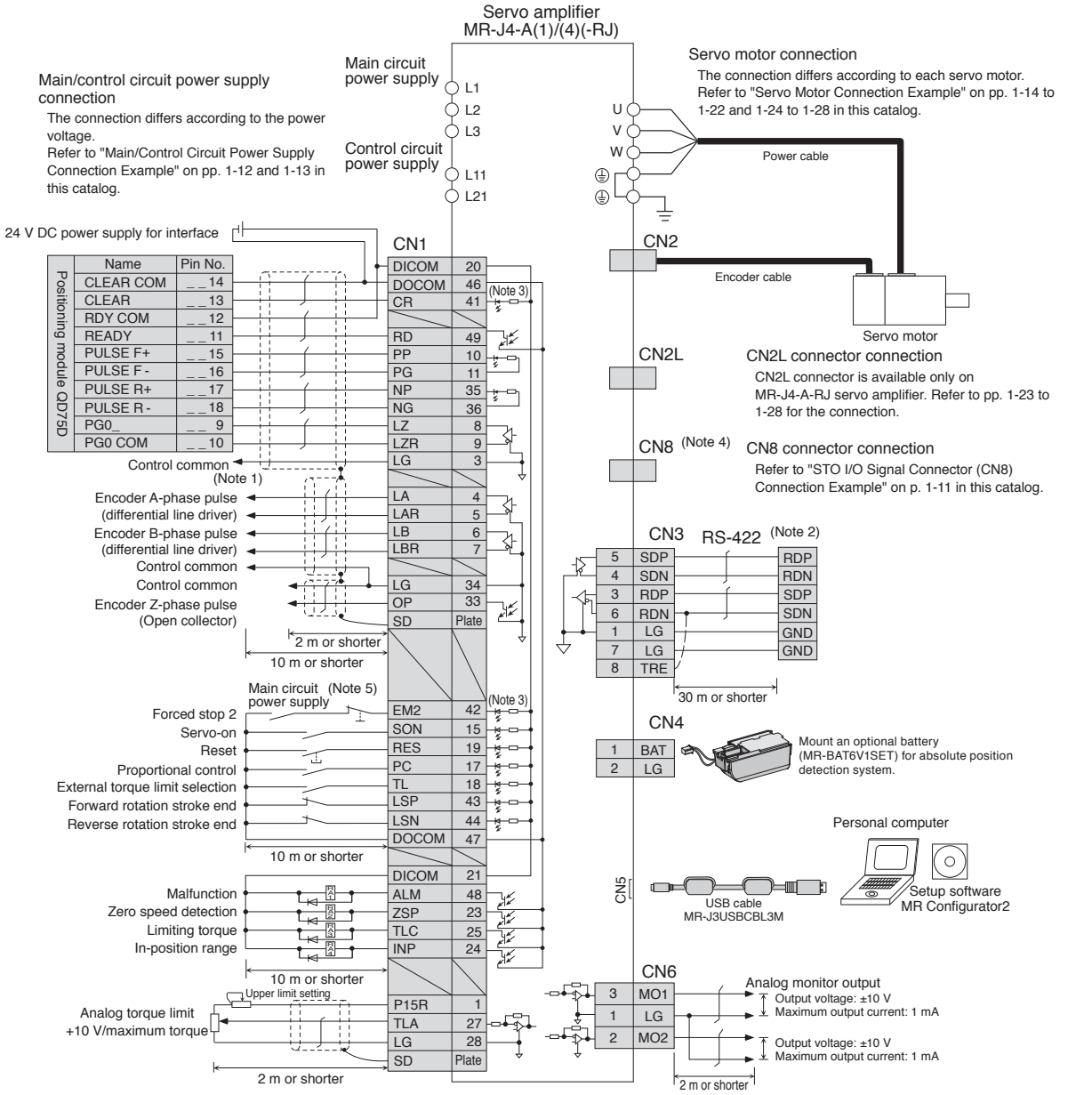
Servo amplifier model MR-J4-_(-RJ)		60A4	100A4	200A4	350A4	500A4	700A4	11KA4	15KA4	22KA4
Functional safety		STO (IEC/EN 61800-5-2)								
Safety performance	Standards certified by CB	EN ISO 13849-1 Category 3 PL d, IEC 61508 SIL 2, EN 62061 SIL CL 2, EN 61800-5-2 SIL 2								
	Response performance	8 ms or less (STO input OFF → energy shut-off)								
	Test pulse input (STO) (Note 6)	Test pulse interval: 1 Hz to 25 Hz, test pulse off time: 1 ms maximum								
	Mean time to dangerous failure (MTTFd)	100 years or longer								
	Diagnostic coverage (DC)	Medium (90% to 99%)								
	Probability of dangerous Failure per Hour (PFH)	1.68×10^{-10} [1/h]								
Compliance to standards		Refer to "Conformity with Global Standards and Regulations" on p. 57 in this catalog.								
Structure (IP rating)		Natural cooling, open (IP20)		Force cooling, open (IP20)		Force cooling, open (IP20) (Note 5)				
Close mounting		Not possible								
Environment	Ambient temperature	0 °C to 55 °C (non-freezing), storage: -20 °C to 65 °C (non-freezing)								
	Ambient humidity	90 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)								
	Ambience	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust								
	Altitude	1000 m or less above sea level								
	Vibration resistance	5.9 m/s^2 at 10 Hz to 55 Hz (directions of X, Y and Z axes)								
Mass	[kg]	1.7	1.7	2.1	3.6	4.3	6.5	13.4	13.4	18.2

Notes: 1. Rated output and speed of a rotary servo motor, and continuous thrust and maximum speed of a linear servo motor are applicable when the servo amplifier, combined with the servo motor, is operated within the specified power supply voltage and frequency.
2. Select the most suitable regenerative option for your system with our capacity selection software.
3. Refer to "Regenerative Option" in this catalog for the tolerable regenerative power [W] when regenerative option is used.
4. When using the built-in dynamic brake, refer to "MR-J4-_A(-RJ) MR-J4-_A4(-RJ) Servo Amplifier Instruction Manual" for the permissible load to motor inertia ratio and the permissible load to mass ratio.
5. Terminal blocks are excluded.
6. The test pulse is a signal for the external circuit to perform self-diagnosis by turning off the signals to the servo amplifier instantaneously at regular intervals.
7. The value in brackets is applicable when cooling fans (2 units of 92 mm × 92 mm, minimum air flow: 1.0 m^3/min) are installed, and then [Pr. PA02] is changed.
8. Servo amplifiers without an enclosed regenerative resistor are also available. Refer to "1-Axis Servo Amplifier Model Designation" in this catalog for details.
9. Use an optional external dynamic brake with the servo amplifier. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc. Take measures to ensure safety on the entire system when not using the dynamic brake.
10. The servo amplifier built-in regenerative resistor is compatible with the maximum torque deceleration when the servo motor is used within the rated speed and the recommended load to motor inertia ratio. Contact your local sales office if the operating motor speed or the load to motor inertia ratio exceeds the rated speed or the recommended ratio.

MR-J4-A(1)/(4)(-RJ) Standard Wiring Diagram Example: Position Control Operation

A A-RJ

Connecting to QD75D (position servo, incremental)

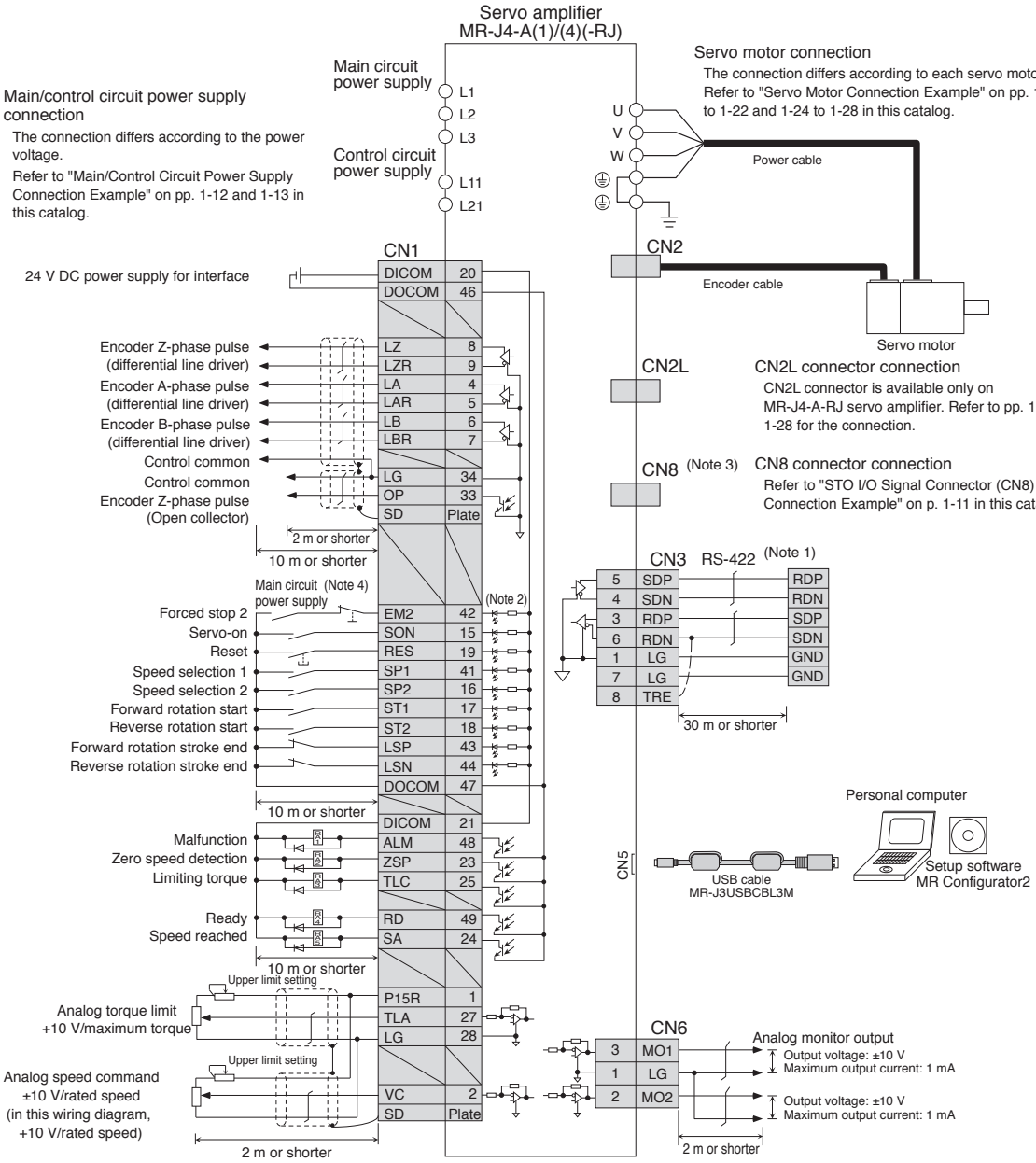


Notes: 1. This connection is not necessary for QD75D Positioning module. Note that the connection between LG and control common terminal is recommended for some Positioning modules to improve noise tolerance.
2. It is also possible to connect a personal computer to CN3 connector with an RS-422/RS-232C conversion cable. However, USB interface (CN5 connector) and RS-422 interface (CN3 connector) are mutually exclusive. Do not use them at the same time. Refer to "Products on the Market for Servo Amplifiers" in this catalog for the RS-422/RS-232C conversion cable.
3. This is for sink wiring. Source wiring is also possible.
4. Be sure to attach a short-circuit connector supplied with the servo amplifier when the STO function is not used.
5. Create a circuit to turn off EM2 (Forced stop 2) when the main circuit power is turned off to prevent an unexpected restart of the servo amplifier.

⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

MR-J4-A(1)/(4)(-RJ) Standard Wiring Diagram Example: Speed Control Operation

A A-RJ

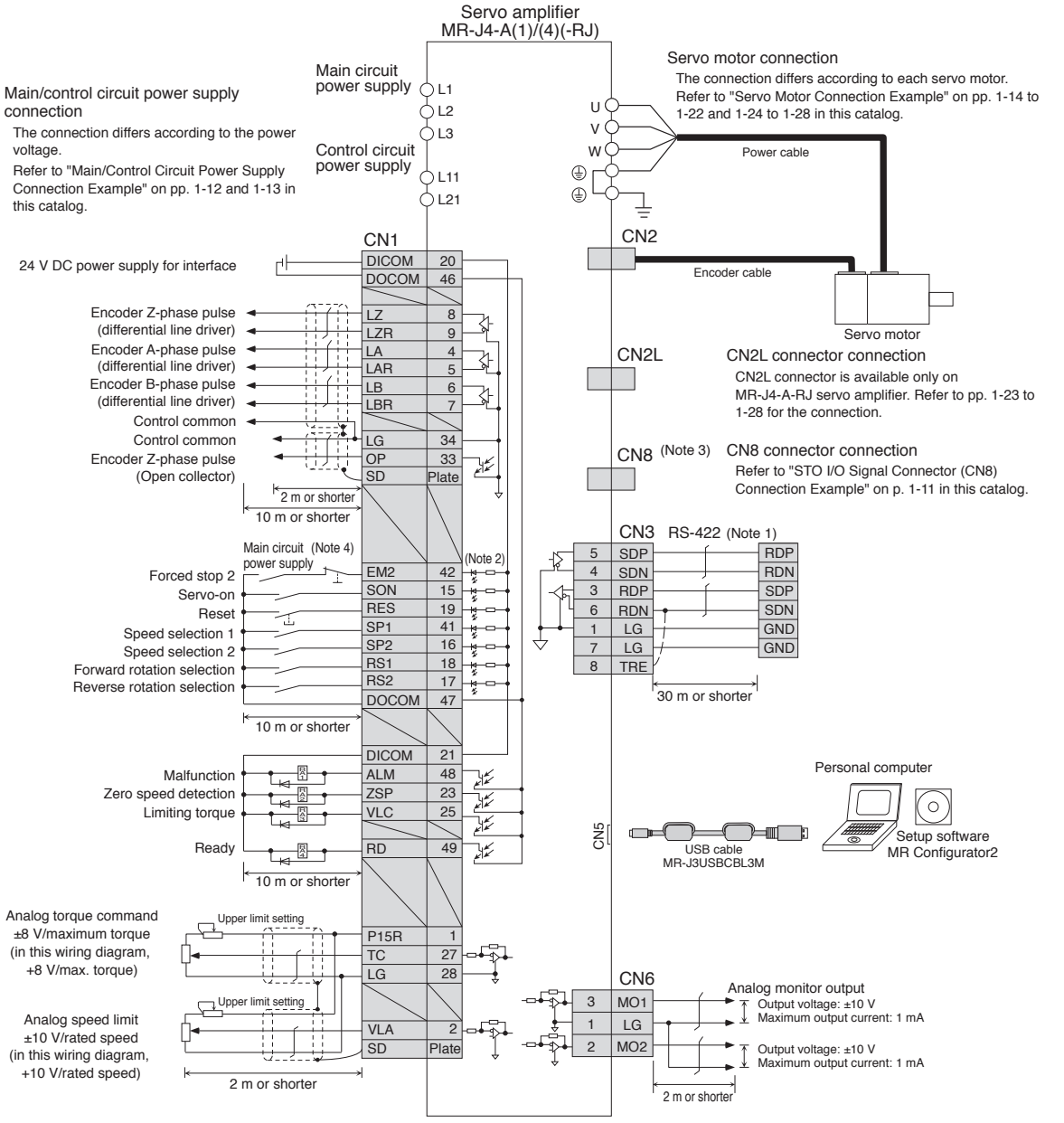


Notes: 1. It is also possible to connect a personal computer to CN3 connector with an RS-422/RS-232C conversion cable. However, USB interface (CN5 connector) and RS-422 interface (CN3 connector) are mutually exclusive. Do not use them at the same time. Refer to "Products on the Market for Servo Amplifiers" in this catalog for the RS-422/RS-232C conversion cable.
2. This is for sink wiring. Source wiring is also possible.
3. Be sure to attach a short-circuit connector supplied with the servo amplifier when the STO function is not used.
4. Create a circuit to turn off EM2 (Forced stop 2) when the main circuit power is turned off to prevent an unexpected restart of the servo amplifier.

⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

MR-J4-A(1)/(4)(-RJ) Standard Wiring Diagram Example: Torque Control Operation

A A-RJ



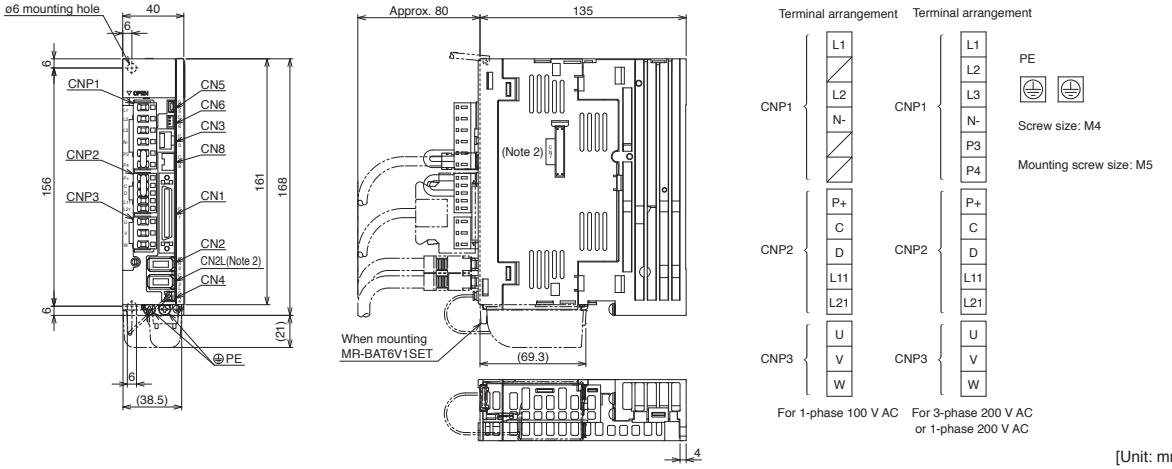
Notes: 1. It is also possible to connect a personal computer to CN3 connector with an RS-422/RS-232C conversion cable. However, USB interface (CN5 connector) and RS-422 interface (CN3 connector) are mutually exclusive. Do not use them at the same time. Refer to "Products on the Market for Servo Amplifiers" in this catalog for the RS-422/RS-232C conversion cable.
2. This is for sink wiring. Source wiring is also possible.
3. Be sure to attach a short-circuit connector supplied with the servo amplifier when the STO function is not used.
4. Create a circuit to turn off EM2 (Forced stop 2) when the main circuit power is turned off to prevent an unexpected restart of the servo amplifier.

⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

MR-J4-A(-RJ) Dimensions

●MR-J4-10A(-RJ) (Note 1), MR-J4-10A1(-RJ) (released in the future) (Note 1)

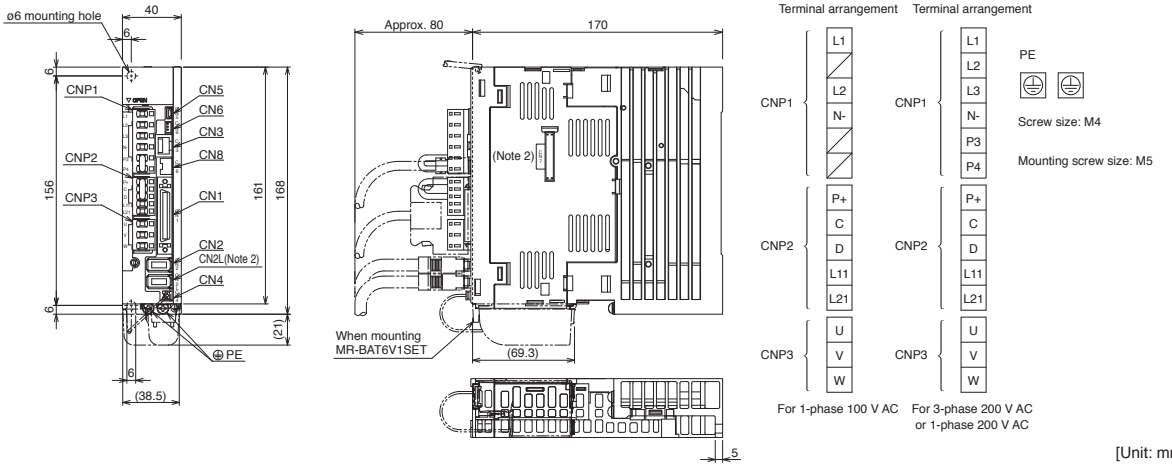
●MR-J4-20A(-RJ) (Note 1), MR-J4-20A1(-RJ) (released in the future) (Note 1)



[Unit: mm]

●MR-J4-40A(-RJ) (Note 1), MR-J4-40A1(-RJ) (released in the future) (Note 1)

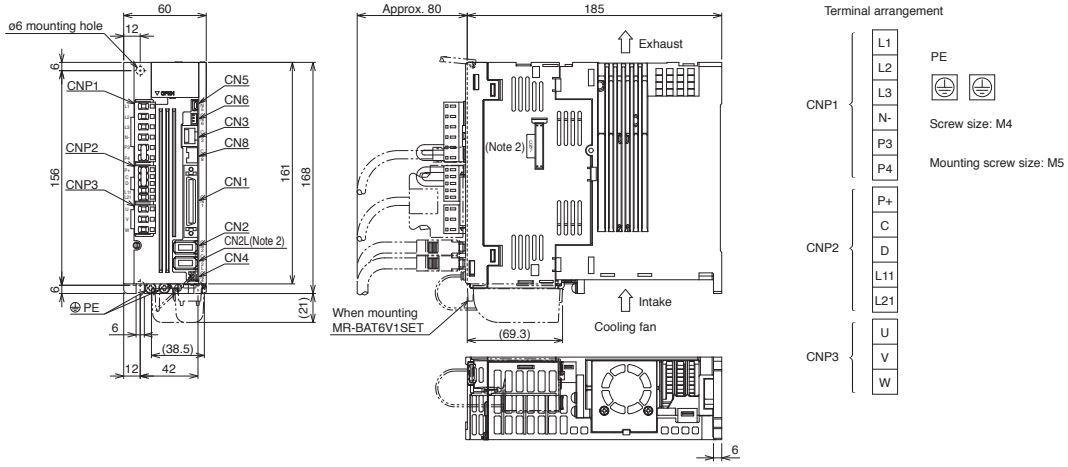
●MR-J4-60A(-RJ) (Note 1)



[Unit: mm]

●MR-J4-70A(-RJ) (Note 1)

●MR-J4-100A(-RJ) (Note 1)



[Unit: mm]

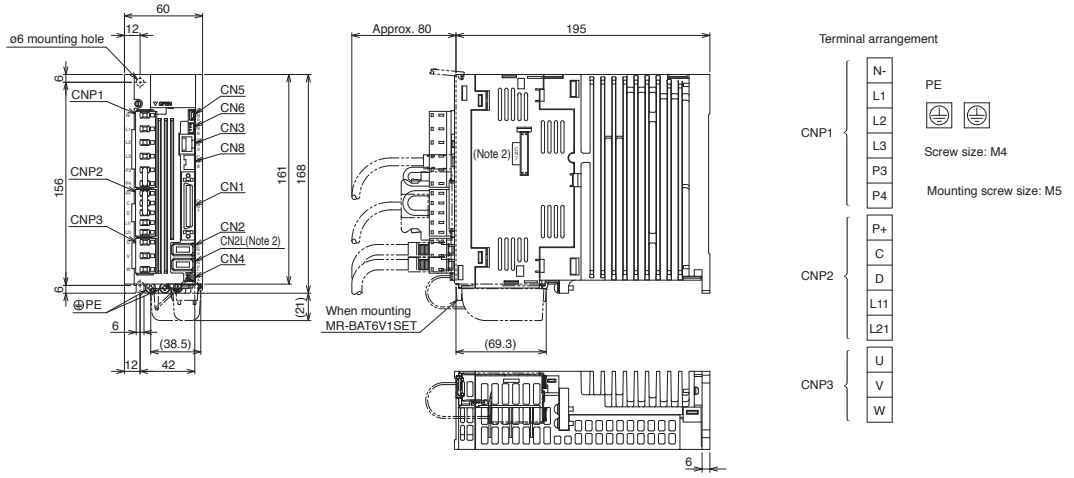
Notes: 1. CNP1, CNP2 and CNP3 connectors (insertion type) are supplied with the servo amplifier.
2. CN2L and CN7 connectors are not available for MR-J4-A servo amplifier.

MR-J4-A(-RJ) Dimensions

A A-RJ

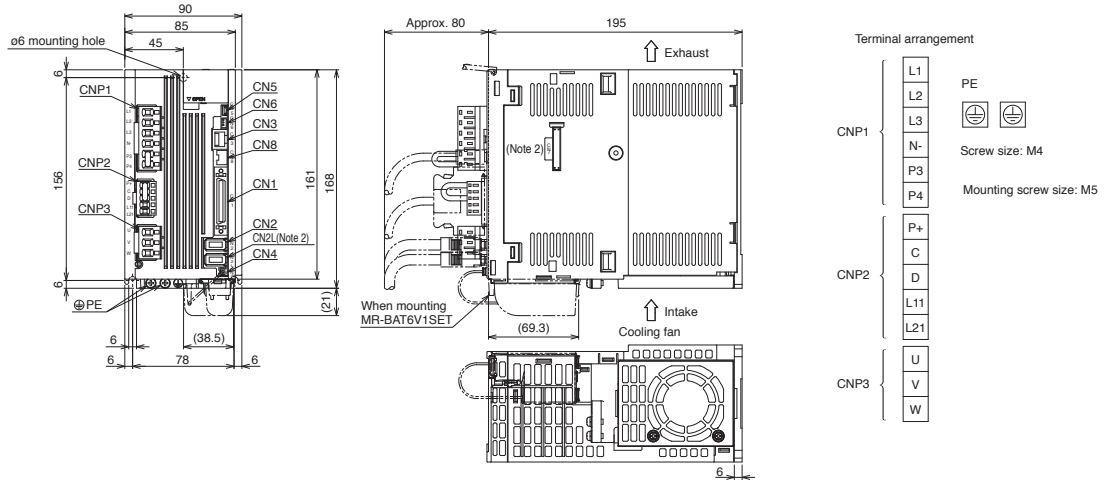
●MR-J4-60A4(-RJ) (Note 1)

●MR-J4-100A4(-RJ) (Note 1)



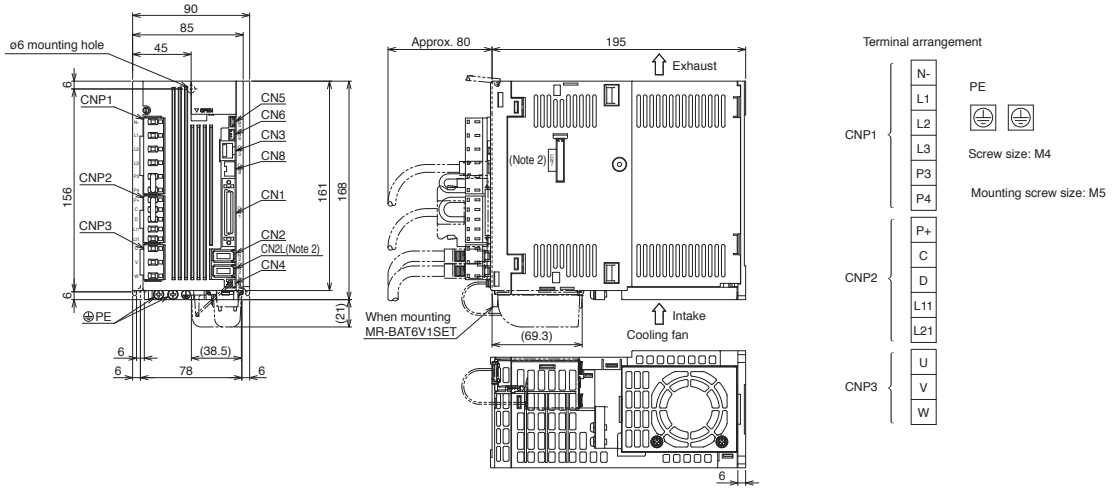
[Unit: mm]

●MR-J4-200A(-RJ) (Note 1)



[Unit: mm]

●MR-J4-200A4(-RJ) (Note 1)



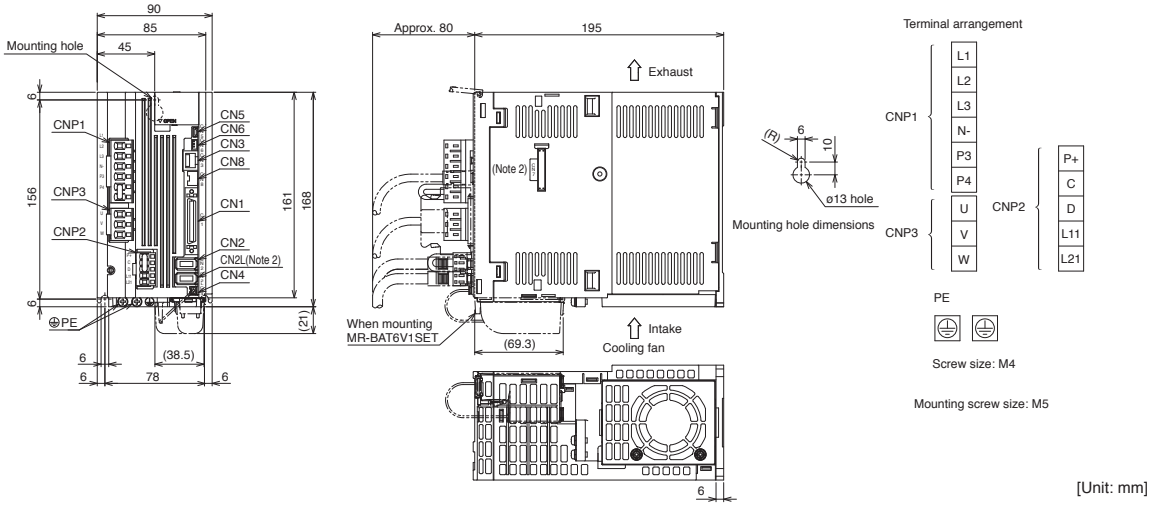
[Unit: mm]

Notes: 1. CNP1, CNP2 and CNP3 connectors (insertion type) are supplied with the servo amplifier.
2. CN2L and CN7 connectors are not available for MR-J4-A servo amplifier.

MR-J4-A(-RJ) Dimensions

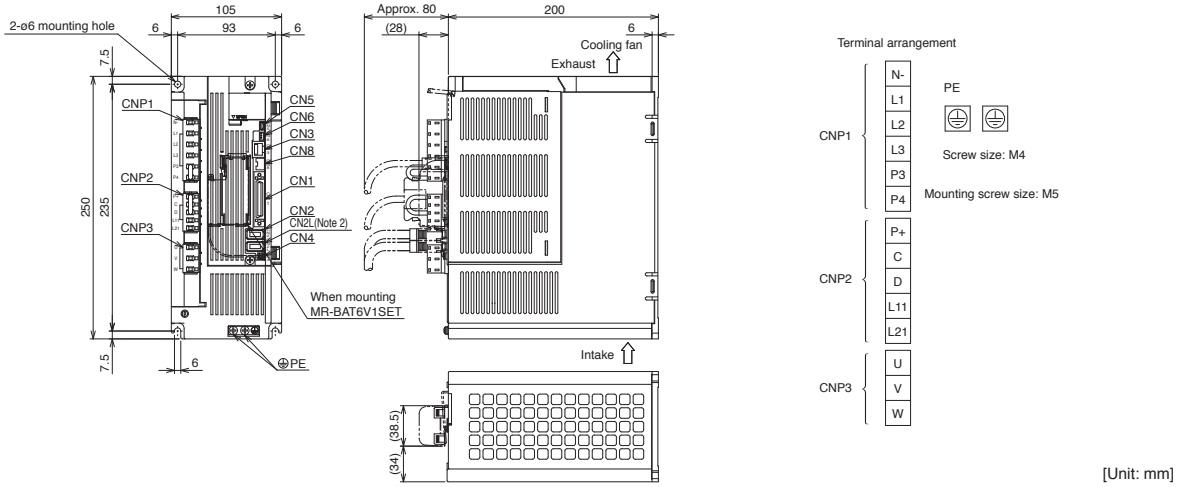
A A-RJ

●MR-J4-350A(-RJ) (Note 1)



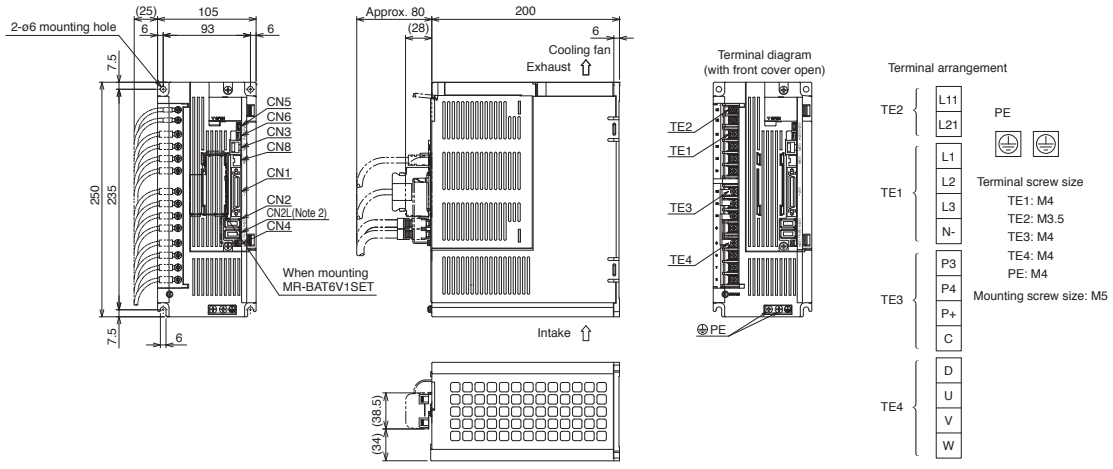
[Unit: mm]

●MR-J4-350A4(-RJ) (Note 1)



[Unit: mm]

●MR-J4-500A(-RJ)



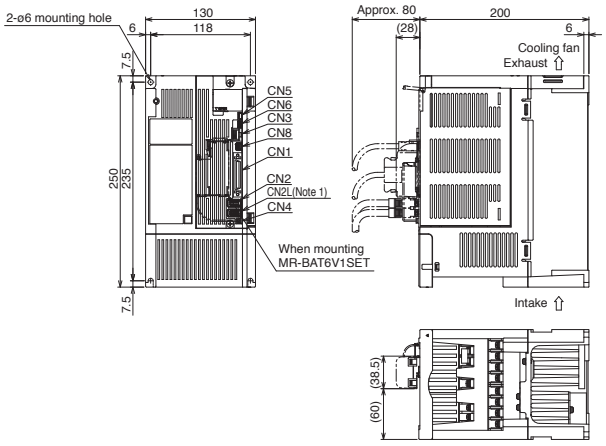
[Unit: mm]

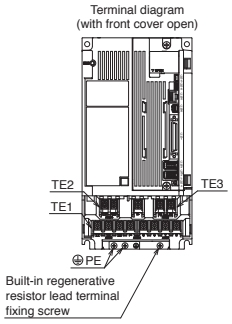
Notes: 1. CNP1, CNP2 and CNP3 connectors (insertion type) are supplied with the servo amplifier.
2. CN2L and CN7 connectors are not available for MR-J4-A servo amplifier.

MR-J4-A(-RJ) Dimensions

A A-RJ

●MR-J4-500A4(-RJ)





Terminal screw size
TE1: M4
TE2: M3.5
TE3: M4
PE: M4

Mounting screw size: M5

Terminal arrangement

TE2: L11 | L21

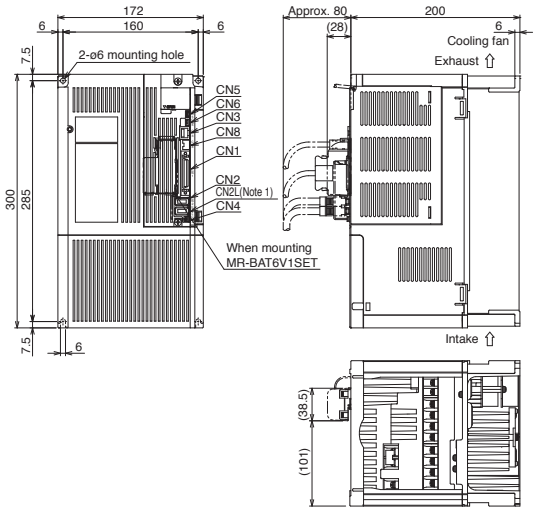
TE3: N- | P3 | P4

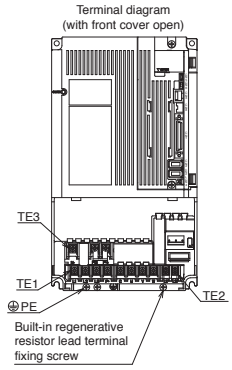
TE1: L1 | L2 | L3 | P+ | C | U | V | W

PE

[Unit: mm]

●MR-J4-700A(-RJ), MR-J4-700A4(-RJ)





Terminal screw size
TE1: M4
TE2: M3.5
TE3: M4
PE: M4

Mounting screw size: M5

Terminal arrangement

TE3: N- | P3 | P4

TE1: L1 | L2 | L3 | P+ | C | U | V | W

TE2: L11 | L21

PE

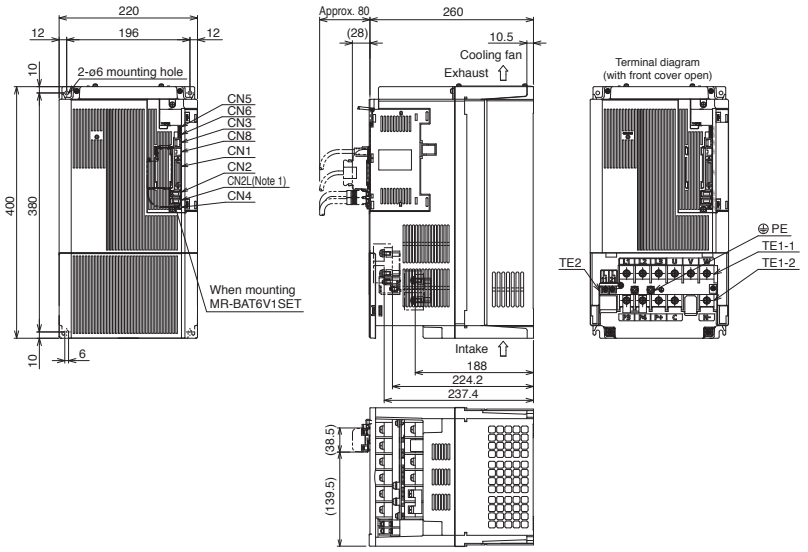
[Unit: mm]

Notes: 1. CN2L and CN7 connectors are not available for MR-J4-A servo amplifier.

MR-J4-A(-RJ) Dimensions

●MR-J4-11KA(-RJ), MR-J4-11KA4(-RJ)

●MR-J4-15KA(-RJ), MR-J4-15KA4(-RJ)



Terminal screw size
TE1-1: M6
TE1-2: M6
TE2: M4
PE: M6

Mounting screw size: M5

Terminal arrangement

TE1-1

L1	L2	L3	U	V	W

TE1-2

P3	P4	P+	C	⏚	N-

TE2

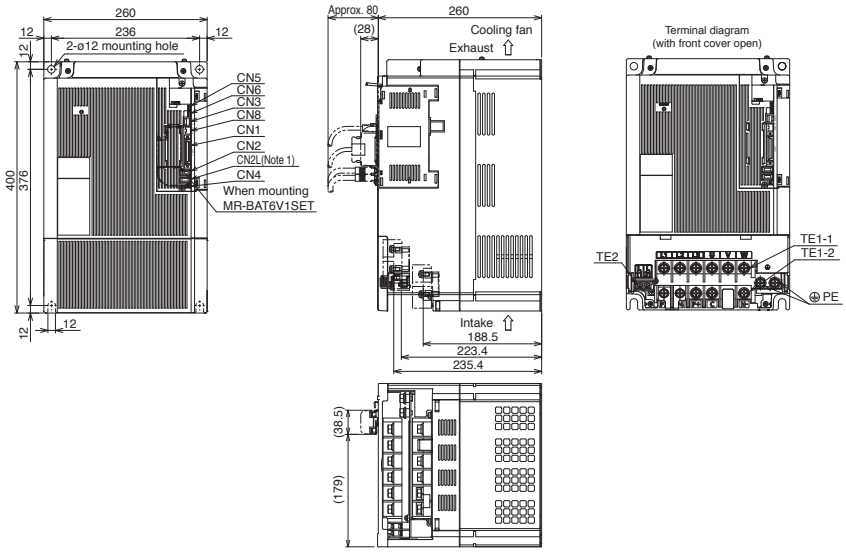
L11	L21

PE

⏚	⏚

[Unit: mm]

●MR-J4-22KA(-RJ), MR-J4-22KA4(-RJ)



Terminal screw size
TE1-1: M8
TE1-2: M8
TE2: M4
PE: M8

Mounting screw size: M10

Terminal arrangement

TE1-1

L1	L2	L3	U	V	W

TE1-2

P3	P4	P+	C	⏚	N-

TE2

L11	L21

PE

⏚	⏚

[Unit: mm]

Notes: 1. CN2L and CN7 connectors are not available for MR-J4-A servo amplifier.

MEMO

2

Model Designation....2-1
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* Note that some servo amplifiers are available in the future.
* Refer to p. 5-65 in this catalog for conversion of units.

Rotary Servo Motors

Model Designation

For 200 V class

HG-KR 05 3 B □ □ □

Symbol	Shaft end
None	Standard (Straight shaft) (Note 6)
K	Key shaft (with/without key) (Note 7)
D	D-cut shaft (Note 7)

Symbol	Reducer (Note 5)
None	None
G1	With reducer for general industrial machines, flange mounting
G1H	With reducer for general industrial machines, foot mounting
G5	With flange-output type reducer for high precision applications, flange mounting
G7	With shaft-output type reducer for high precision applications, flange mounting

Symbol	Oil seal
None	None (Note 8)
J	Installed (Note 2, 3, 4)

Symbol	Electromagnetic brake
None	None
B	Installed (Note 1)

Symbol	Rated speed [r/min]
1	1000
1M	1500
2	2000
3	3000

Symbol	Rated output [kW]
05	0.05
1	0.1
2	0.2
4	0.4
5	0.5
7	0.75
8	0.85
10	1.0
12	1.2
15	1.5
20	2.0
30	3.0
35	3.5 (Note 9)
42	4.2
50	5.0
70	7.0
90	9.0
11K	11
15K	15
22K	22

Symbol	Inertia/capacity
HG-KR	Low inertia, small capacity
HG-MR	Ultra-low inertia, small capacity
HG-SR	Medium inertia, medium capacity
HG-JR	Low inertia, medium-large capacity
HG-RR	Ultra-low inertia, medium capacity
HG-UR	Flat type, medium capacity

Notes: 1. Refer to electromagnetic brake specifications of each servo motor series in this catalog for the available models and detailed specifications.
2. Available in 0.1 kW or larger HG-KR/HG-MR series and all HG-SR series.
3. Oil seal is not installed in the geared servo motor.
4. Dimensions for HG-KR/HG-MR series with oil seal are different from those for the standard models. Contact your local sales office for more details.
5. Refer to "Geared Servo Motor Specifications" in this catalog for the available models and detailed specifications.
6. Standard HG-SR G1/G1H has a key shaft (with key).
7. Refer to special shaft end specifications of each servo motor series in this catalog for the available models and detailed specifications.
8. Oil seal is installed in HG-JR, HG-RR, and HG-UR series as a standard.
9. For HG-JR353(B), the rated output varies depending on the servo amplifier to be combined. Refer to "HG-JR 3000 r/min Series (Low Inertia, Medium Capacity) (200 V Class) Specifications" for details.

Model Designation

For 400 V class

HG-SR 5 2 4 B □ □ □

Symbol	Shaft end
None	Standard (Straight shaft) (Note 6)
K	Key shaft (with/without key) (Note 7)

Symbol	Reducer (Note 5)
None	None
G1	With reducer for general industrial machines, flange mounting
G1H	With reducer for general industrial machines, foot mounting
G5	With flange-output type reducer for high precision applications, flange mounting
G7	With shaft-output type reducer for high precision applications, flange mounting

Symbol	Oil seal
None	None (Note 4)
J	Installed (Note 2, 3)

Symbol	Electromagnetic brake
None	None
B	Installed (Note 1)

400 V class

Symbol	Rated speed [r/min]
1M	1500
2	2000
3	3000

Symbol	Rated output [kW]
5	0.5
7	0.75
10	1.0
15	1.5
20	2.0
35	3.5 (Note 8)
50	5.0
70	7.0
90	9.0
11K	11K
15K	15K
22K	22K

Symbol	Inertia/capacity
HG-SR	Medium inertia, medium capacity
HG-JR	Low inertia, medium-large capacity

Notes: 1. Refer to electromagnetic brake specifications of each servo motor series in this catalog for the available models and detailed specifications.
2. Available in HG-SR series.
3. Oil seal is not installed in the geared servo motor.
4. Oil seal is installed in HG-JR series as a standard.
5. Refer to "Geared Servo Motor Specifications" in this catalog for the available models and detailed specifications.
6. Standard HG-SR G1/G1H has a key shaft (with key).
7. Refer to special shaft end specifications of each servo motor series in this catalog for the available models and detailed specifications.
8. For HG-JR3534(B), the rated output varies depending on the servo amplifier to be combined. Refer to "HG-JR 3000 r/min Series (Low Inertia, Medium Capacity) (400 V Class) Specifications" for details.

Combinations of Rotary Servo Motor and Servo Amplifier (200 V/100 V Class)

Rotary servo motor		Servo amplifier		
		MR-J4	MR-J4W2 (Note 1)	MR-J4W3 (Note 1)
HG-KR series	HG-KR053(B)	MR-J4-10B(1)(-RJ), MR-J4-10B-RJ010, MR-J4-10A(1)(-RJ)	MR-J4W2-22B, MR-J4W2-44B	MR-J4W3-222B, MR-J4W3-444B
	HG-KR13(B)	MR-J4-10B(1)(-RJ), MR-J4-10B-RJ010, MR-J4-10A(1)(-RJ)	MR-J4W2-22B, MR-J4W2-44B	MR-J4W3-222B, MR-J4W3-444B
	HG-KR23(B)	MR-J4-20B(1)(-RJ), MR-J4-20B-RJ010, MR-J4-20A(1)(-RJ)	MR-J4W2-22B, MR-J4W2-44B	MR-J4W3-222B, MR-J4W3-444B
	HG-KR43(B)	MR-J4-40B(1)(-RJ), MR-J4-40B-RJ010, MR-J4-40A(1)(-RJ)	MR-J4W2-44B, MR-J4W2-77B, MR-J4W2-1010B	MR-J4W3-444B
	HG-KR73(B)	MR-J4-70B(-RJ/-RJ010), MR-J4-70A(-RJ)	MR-J4W2-77B, MR-J4W2-1010B	-
HG-MR series	HG-MR053(B)	MR-J4-10B(1)(-RJ), MR-J4-10B-RJ010, MR-J4-10A(1)(-RJ)	MR-J4W2-22B, MR-J4W2-44B	MR-J4W3-222B, MR-J4W3-444B
	HG-MR13(B)	MR-J4-10B(1)(-RJ), MR-J4-10B-RJ010, MR-J4-10A(1)(-RJ)	MR-J4W2-22B, MR-J4W2-44B	MR-J4W3-222B, MR-J4W3-444B
	HG-MR23(B)	MR-J4-20B(1)(-RJ), MR-J4-20B-RJ010, MR-J4-20A(1)(-RJ)	MR-J4W2-22B, MR-J4W2-44B	MR-J4W3-222B, MR-J4W3-444B
	HG-MR43(B)	MR-J4-40B(1)(-RJ), MR-J4-40B-RJ010, MR-J4-40A(1)(-RJ)	MR-J4W2-44B, MR-J4W2-77B, MR-J4W2-1010B	MR-J4W3-444B
	HG-MR73(B)	MR-J4-70B(-RJ/-RJ010), MR-J4-70A(-RJ)	MR-J4W2-77B, MR-J4W2-1010B	-
HG-SR 1000 r/min series	HG-SR51(B)	MR-J4-60B(-RJ/-RJ010), MR-J4-60A(-RJ)	MR-J4W2-77B, MR-J4W2-1010B	-
	HG-SR81(B)	MR-J4-100B(-RJ/-RJ010), MR-J4-100A(-RJ)	MR-J4W2-1010B	-
	HG-SR121(B)	MR-J4-200B(-RJ/-RJ010), MR-J4-200A(-RJ)	-	-
	HG-SR201(B)	MR-J4-200B(-RJ/-RJ010), MR-J4-200A(-RJ)	-	-
	HG-SR301(B)	MR-J4-350B(-RJ/-RJ010), MR-J4-350A(-RJ)	-	-
	HG-SR421(B)	MR-J4-500B(-RJ/-RJ010), MR-J4-500A(-RJ)	-	-
HG-SR 2000 r/min series	HG-SR52(B)	MR-J4-60B(-RJ/-RJ010), MR-J4-60A(-RJ)	MR-J4W2-77B, MR-J4W2-1010B	-
	HG-SR102(B)	MR-J4-100B(-RJ/-RJ010), MR-J4-100A(-RJ)	MR-J4W2-1010B	-
	HG-SR152(B)	MR-J4-200B(-RJ/-RJ010), MR-J4-200A(-RJ)	-	-
	HG-SR202(B)	MR-J4-200B(-RJ/-RJ010), MR-J4-200A(-RJ)	-	-
	HG-SR352(B)	MR-J4-350B(-RJ/-RJ010), MR-J4-350A(-RJ)	-	-
	HG-SR502(B)	MR-J4-500B(-RJ/-RJ010), MR-J4-500A(-RJ)	-	-
	HG-SR702(B)	MR-J4-700B(-RJ/-RJ010), MR-J4-700A(-RJ)	-	-
HG-JR 3000 r/min series	HG-JR53(B)	MR-J4-60B(-RJ/-RJ010), MR-J4-60A(-RJ)	MR-J4W2-77B	-
	HG-JR73(B)	MR-J4-70B(-RJ/-RJ010), MR-J4-70A(-RJ)	MR-J4W2-77B, MR-J4W2-1010B	-
	HG-JR103(B)	MR-J4-100B(-RJ/-RJ010), MR-J4-100A(-RJ)	MR-J4W2-1010B	-
	HG-JR153(B)	MR-J4-200B(-RJ/-RJ010), MR-J4-200A(-RJ)	-	-
	HG-JR203(B)	MR-J4-200B(-RJ/-RJ010), MR-J4-200A(-RJ)	-	-
	HG-JR353(B)	MR-J4-350B(-RJ/-RJ010), MR-J4-350A(-RJ)	-	-

Notes: 1. Any combination of the servo motors is possible as long as the servo motors are compatible with the servo amplifier. Refer to "Combinations of Multi-Axis Servo Amplifier and Servo Motors" on p. 1-4 in this catalog.

Combinations of Rotary Servo Motor and Servo Amplifier (200 V Class)

Rotary servo motor		Servo amplifier		
		MR-J4	MR-J4W2 (Note 1)	MR-J4W3 (Note 1)
HG-JR 3000 r/min series	HG-JR503(B)	MR-J4-500B(-RJ/-RJ010), MR-J4-500A(-RJ)	-	-
	HG-JR703(B)	MR-J4-700B(-RJ/-RJ010), MR-J4-700A(-RJ)	-	-
	HG-JR903(B)	MR-J4-11KB(-RJ/-RJ010), MR-J4-11KA(-RJ)	-	-
HG-JR 1500 r/min series	HG-JR11K1M(B)	MR-J4-11KB(-RJ/-RJ010), MR-J4-11KA(-RJ)	-	-
	HG-JR15K1M(B)	MR-J4-15KB(-RJ/-RJ010), MR-J4-15KA(-RJ)	-	-
	HG-JR22K1M	MR-J4-22KB(-RJ/-RJ010), MR-J4-22KA(-RJ)	-	-
HG-RR series	HG-RR103(B)	MR-J4-200B(-RJ/-RJ010), MR-J4-200A(-RJ)	-	-
	HG-RR153(B)	MR-J4-200B(-RJ/-RJ010), MR-J4-200A(-RJ)	-	-
	HG-RR203(B)	MR-J4-350B(-RJ/-RJ010), MR-J4-350A(-RJ)	-	-
	HG-RR353(B)	MR-J4-500B(-RJ/-RJ010), MR-J4-500A(-RJ)	-	-
	HG-RR503(B)	MR-J4-500B(-RJ/-RJ010), MR-J4-500A(-RJ)	-	-
HG-UR series	HG-UR72(B)	MR-J4-70B(-RJ/-RJ010), MR-J4-70A(-RJ)	MR-J4W2-77B MR-J4W2-1010B	-
	HG-UR152(B)	MR-J4-200B(-RJ/-RJ010), MR-J4-200A(-RJ)	-	-
	HG-UR202(B)	MR-J4-350B(-RJ/-RJ010), MR-J4-350A(-RJ)	-	-
	HG-UR352(B)	MR-J4-500B(-RJ/-RJ010), MR-J4-500A(-RJ)	-	-
	HG-UR502(B)	MR-J4-500B(-RJ/-RJ010), MR-J4-500A(-RJ)	-	-

Notes: 1. Any combination of the servo motors is possible as long as the servo motors are compatible with the servo amplifier. Refer to "Combinations of Multi-Axis Servo Amplifier and Servo Motors" on p. 1-4 in this catalog.

Combinations of Rotary Servo Motor and Servo Amplifier (400 V Class)

Rotary servo motor		Servo amplifier		
		MR-J4	MR-J4W2	MR-J4W3
HG-SR 2000 r/min series	HG-SR524(B)	MR-J4-60B4(-RJ/-RJ010), MR-J4-60A4(-RJ)	-	-
	HG-SR1024(B)	MR-J4-100B4(-RJ/-RJ010), MR-J4-100A4(-RJ)	-	-
	HG-SR1524(B)	MR-J4-200B4(-RJ/-RJ010), MR-J4-200A4(-RJ)	-	-
	HG-SR2024(B)	MR-J4-200B4(-RJ/-RJ010), MR-J4-200A4(-RJ)	-	-
	HG-SR3524(B)	MR-J4-350B4(-RJ/-RJ010), MR-J4-350A4(-RJ)	-	-
	HG-SR5024(B)	MR-J4-500B4(-RJ/-RJ010), MR-J4-500A4(-RJ)	-	-
	HG-SR7024(B)	MR-J4-700B4(-RJ/-RJ010), MR-J4-700A4(-RJ)	-	-
HG-JR 3000 r/min series	HG-JR534(B)	MR-J4-60B4(-RJ/-RJ010), MR-J4-60A4(-RJ)	-	-
	HG-JR734(B)	MR-J4-100B4(-RJ/-RJ010), MR-J4-100A4(-RJ)	-	-
	HG-JR1034(B)	MR-J4-100B4(-RJ/-RJ010), MR-J4-100A4(-RJ)	-	-
	HG-JR1534(B)	MR-J4-200B4(-RJ/-RJ010), MR-J4-200A4(-RJ)	-	-
	HG-JR2034(B)	MR-J4-200B4(-RJ/-RJ010), MR-J4-200A4(-RJ)	-	-
	HG-JR3534(B)	MR-J4-350B4(-RJ/-RJ010), MR-J4-350A4(-RJ)	-	-
	HG-JR5034(B)	MR-J4-500B4(-RJ/-RJ010), MR-J4-500A4(-RJ)	-	-
	HG-JR7034(B)	MR-J4-700B4(-RJ/-RJ010), MR-J4-700A4(-RJ)	-	-
	HG-JR9034(B)	MR-J4-11KB4(-RJ/-RJ010), MR-J4-11KA4(-RJ)	-	-
HG-JR 1500 r/min series	HG-JR11K1M4(B)	MR-J4-11KB4(-RJ/-RJ010), MR-J4-11KA4(-RJ)	-	-
	HG-JR15K1M4(B)	MR-J4-15KB4(-RJ/-RJ010), MR-J4-15KA4(-RJ)	-	-
	HG-JR22K1M4	MR-J4-22KB4(-RJ/-RJ010), MR-J4-22KA4(-RJ)	-	-

Combinations of HG-JR Servo Motor Series and Servo Amplifier (200 V Class) for Increasing the Maximum Torque to 400% of the Rated Torque

The following combination of the HG-JR servo motor and the servo amplifier increases the maximum torque from 300% to 400% of the rated torque.

Rotary servo motor		Servo amplifier		
		MR-J4	MR-J4W2 (Note 1)	MR-J4W3 (Note 1)
HG-JR 3000 r/min series	HG-JR53(B)	MR-J4-100B(-RJ/-RJ010), MR-J4-100A(-RJ)	MR-J4W2-1010B	-
	HG-JR73(B)	MR-J4-200B(-RJ/-RJ010), MR-J4-200A(-RJ)	-	-
	HG-JR103(B)	MR-J4-200B(-RJ/-RJ010), MR-J4-200A(-RJ)	-	-
	HG-JR153(B)	MR-J4-350B(-RJ/-RJ010), MR-J4-350A(-RJ)	-	-
	HG-JR203(B)	MR-J4-350B(-RJ/-RJ010), MR-J4-350A(-RJ)	-	-
	HG-JR353(B)	MR-J4-500B(-RJ/-RJ010), MR-J4-500A(-RJ)	-	-
	HG-JR503(B)	MR-J4-700B(-RJ/-RJ010), MR-J4-700A(-RJ)	-	-

Notes: 1. Any combination of the servo motors is possible as long as the servo motors are compatible with the servo amplifier. Refer to "Combinations of Multi-Axis Servo Amplifier and Servo Motors" on p. 1-4 in this catalog.

Combinations of HG-JR Servo Motor Series and Servo Amplifier (400 V Class) for Increasing the Maximum Torque to 400% of the Rated Torque

The following combination of the HG-JR servo motor and the servo amplifier increases the maximum torque from 300% to 400% of the rated torque.

Rotary servo motor		Servo amplifier		
		MR-J4	MR-J4W2 (Note 1)	MR-J4W3 (Note 1)
HG-JR 3000 r/min series	HG-JR534(B)	MR-J4-100B4(-RJ/-RJ010), MR-J4-100A4(-RJ)	-	-
	HG-JR734(B)	MR-J4-200B4(-RJ/-RJ010), MR-J4-200A4(-RJ)	-	-
	HG-JR1034(B)	MR-J4-200B4(-RJ/-RJ010), MR-J4-200A4(-RJ)	-	-
	HG-JR1534(B)	MR-J4-350B4(-RJ/-RJ010), MR-J4-350A4(-RJ)	-	-
	HG-JR2034(B)	MR-J4-350B4(-RJ/-RJ010), MR-J4-350A4(-RJ)	-	-
	HG-JR3534(B)	MR-J4-500B4(-RJ/-RJ010), MR-J4-500A4(-RJ)	-	-
	HG-JR5034(B)	MR-J4-700B4(-RJ/-RJ010), MR-J4-700A4(-RJ)	-	-

Notes: 1. Any combination of the servo motors is possible as long as the servo motors are compatible with the servo amplifier. Refer to "Combinations of Multi-Axis Servo Amplifier and Servo Motors" on p. 1-4 in this catalog.

HG-KR Series (Low Inertia, Small Capacity) Specifications

Rotary servo motor model		HG-KR	053(B)	13(B)	23(B)	43(B)	73(B)
Compatible servo amplifier model		MR-J4-	Refer to "Combinations of Rotary Servo Motor and Servo Amplifier" on p. 2-3 in this catalog.				
		MR-J4W_-					
Power supply capacity *1		[kVA]	0.3	0.3	0.5	0.9	1.3
Continuous running duty	Rated output	[W]	50	100	200	400	750
	Rated torque (Note 3)	[N•m]	0.16	0.32	0.64	1.3	2.4
Maximum torque		[N•m]	0.56	1.1	2.2	4.5	8.4
Rated speed		[r/min]	3000				
Maximum speed		[r/min]	6000				
Permissible instantaneous speed		[r/min]	6900				
Power rate at continuous rated torque	Standard	[kW/s]	5.63	13.0	18.3	43.7	45.2
	With electromagnetic brake	[kW/s]	5.37	12.1	16.7	41.3	41.6
Rated current		[A]	0.9	0.8	1.3	2.6	4.8
Maximum current		[A]	3.2	2.5	4.6	9.1	17
Regenerative braking frequency *2	MR-J4-	[times/min]	(Note 4)	(Note 4)	453	268	157
	MR-J4W_-	[times/min]	2500	1350	451	268	393
Moment of inertia J	Standard	[× 10^{-4} kg•m^2]	0.0450	0.0777	0.221	0.371	1.26
	With electromagnetic brake	[× 10^{-4} kg•m^2]	0.0472	0.0837	0.243	0.393	1.37
Recommended load to motor inertia ratio (Note 1)			17 times or less		26 times or less	25 times or less	17 times or less
Speed/position detector			Absolute/incremental 22-bit encoder (resolution: 4194304 pulses/rev)				
Oil seal			None	None (Servo motors with oil seal are available. (HG-KR_J))			
Insulation class			130 (B)				
Structure			Totally enclosed, natural cooling (IP rating: IP65) (Note 2)				
Environment *3	Ambient temperature		0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)				
	Ambient humidity		80 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)				
	Ambience		Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust				
	Altitude		1000 m or less above sea level				
	Vibration resistance *4		X: 49 m/s^2 Y: 49 m/s^2				
Vibration rank			V10 *6				
Compliance to standards			Refer to "Conformity with Global Standards and Regulations" on p. 57 in this catalog.				
Permissible load for the shaft *5	L	[mm]	25	25	30	30	40
	Radial	[N]	88	88	245	245	392
	Thrust	[N]	59	59	98	98	147
Mass	Standard	[kg]	0.34	0.54	0.91	1.4	2.8
	With electromagnetic brake	[kg]	0.54	0.74	1.3	1.8	3.8

Notes: 1. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
2. The shaft-through portion is excluded. For geared servo motor, IP rating of the reducer portion is equivalent to IP44. Refer to the asterisk 7 of "Annotations for Rotary Servo Motor Specifications" on p. 2-27 in this catalog for the shaft-through portion.
3. When unbalanced torque is generated, such as in a vertical lift machine, it is recommended that the unbalanced torque of the machine be kept under 70% of the servo motor rated torque.
4. When the servo motor decelerates to a stop from the rated speed, the regenerative frequency will not be limited if the effective torque is within the rated torque range. When the servo motor decelerates to a stop from the maximum speed, the regenerative frequency will not be limited if the following requirements are met.
• HG-KR053(B): The load to motor inertia ratio is 8 times or less, and the effective torque is within the rated torque range.
• HG-KR13(B): The load to motor inertia ratio is 4 times or less, and the effective torque is within the rated torque range.

Refer to "Annotations for Rotary Servo Motor Specifications" on p. 2-27 in this catalog for the asterisks 1 to 6.

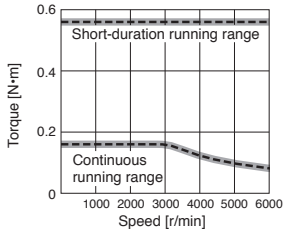
HG-KR Series Electromagnetic Brake Specifications (Note 1)

Model		HG-KR	053B	13B	23B	43B	73B
Type			Spring actuated type safety brake				
Rated voltage			24 V DC $^{0}_{-10}$%				
Power consumption		[W] at 20 °C	6.3	6.3	7.9	7.9	10
Electromagnetic brake static friction torque		[N•m]	0.32	0.32	1.3	1.3	2.4
Permissible braking work	Per braking	[J]	5.6	5.6	22	22	64
	Per hour	[J]	56	56	220	220	640
Electromagnetic brake life (Note 2)	Number of brakings	[Times]	20000	20000	20000	20000	20000
	Work per braking	[J]	5.6	5.6	22	22	64

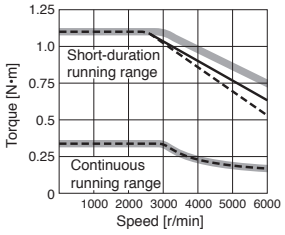
Notes: 1. The electromagnetic brake is for holding. It should not be used for deceleration applications.
2. Brake gap is not adjustable. Electromagnetic brake life is defined as the time period until the readjustment is needed.

HG-KR Series Torque Characteristics

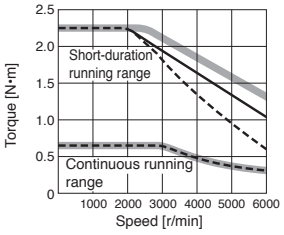
HG-KR053(B) (Note 1, 2, 3, 4)



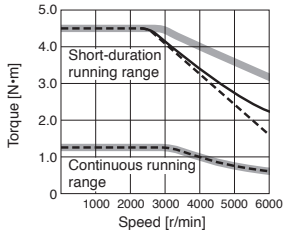
HG-KR13(B) (Note 1, 2, 3, 4)



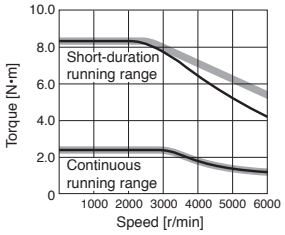
HG-KR23(B) (Note 1, 2, 3, 4)



HG-KR43(B) (Note 1, 2, 3, 4)



HG-KR73(B) (Note 1, 3, 4)

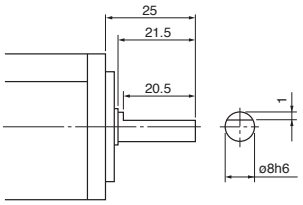


Notes: 1. ▬ : For 3-phase 200 V AC or 1-phase 230 V AC.
2. - - - : For 1-phase 100 V AC.
3. ▬ : For 1-phase 200 V AC. This line is drawn only where differs from the other two lines.
4. Torque drops when the power supply voltage is below the specified value.

HG-KR Series Special Shaft End Specifications

Motors with the following specifications are also available.

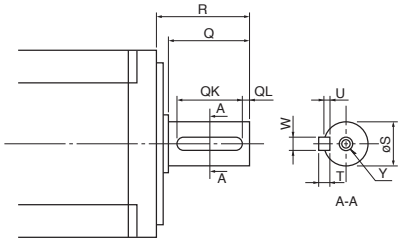
D-cut shaft (Note 1): 50 W and 100 W



[Unit: mm]

Key shaft (with key) (Note 1, 2): 200 W, 400 W, and 750 W

Model	Variable dimensions								
	T	S	R	Q	W	QK	QL	U	Y
HG-KR23(B)K, 43(B)K	5	14h6	30	26	5	20	3	3	M4 screw Depth: 15
HG-KR73(B)K	6	19h6	40	36	6	25	5	3.5	M5 screw Depth: 20



[Unit: mm]

Notes: 1. The servo motors with special shaft end are not suitable for frequent start/stop applications.
2. 2 round end key is attached.

HG-MR Series (Ultra-low Inertia, Small Capacity) Specifications

Rotary servo motor model		HG-MR	053(B)	13(B)	23(B)	43(B)	73(B)
Compatible servo amplifier model		MR-J4-	Refer to "Combinations of Rotary Servo Motor and Servo Amplifier" on p. 2-3 in this catalog.				
		MR-J4W_-					
Power supply capacity *1		[kVA]	0.3	0.3	0.5	0.9	1.3
Continuous running duty	Rated output	[W]	50	100	200	400	750
	Rated torque (Note 3)	[N•m]	0.16	0.32	0.64	1.3	2.4
Maximum torque		[N•m]	0.48	0.95	1.9	3.8	7.2
Rated speed		[r/min]	3000				
Maximum speed		[r/min]	6000				
Permissible instantaneous speed		[r/min]	6900				
Power rate at continuous rated torque	Standard	[kW/s]	15.6	33.8	46.9	114.2	97.3
	With electromagnetic brake	[kW/s]	11.3	28.0	37.2	98.8	82.1
Rated current		[A]	1.0	0.9	1.5	2.6	5.8
Maximum current		[A]	3.1	2.5	5.3	9.0	20
Regenerative braking frequency *2	MR-J4-	[times/min]	(Note 4)	(Note 4)	1180	713	338
	MR-J4W_-	[times/min]	7310	3620	1170	710	846
Moment of inertia J	Standard	[× 10^{-4} kg•m^2]	0.0162	0.0300	0.0865	0.142	0.586
	With electromagnetic brake	[× 10^{-4} kg•m^2]	0.0224	0.0362	0.109	0.164	0.694
Recommended load to motor inertia ratio (Note 1)			35 times or less	32 times or less			
Speed/position detector			Absolute/incremental 22-bit encoder (resolution: 4194304 pulses/rev)				
Oil seal			None	None (Servo motors with oil seal are available. (HG-MR_J))			
Insulation class			130 (B)				
Structure			Totally enclosed, natural cooling (IP rating: IP65) (Note 2)				
Environment *3	Ambient temperature		0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)				
	Ambient humidity		80 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)				
	Ambience		Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust				
	Altitude		1000 m or less above sea level				
	Vibration resistance *4		X: 49 m/s^2 Y: 49 m/s^2				
Vibration rank			V10 *6				
Compliance to standards			Refer to "Conformity with Global Standards and Regulations" on p. 57 in this catalog.				
Permissible load for the shaft *5	L	[mm]	25	25	30	30	40
	Radial	[N]	88	88	245	245	392
	Thrust	[N]	59	59	98	98	147
Mass	Standard	[kg]	0.34	0.54	0.91	1.4	2.8
	With electromagnetic brake	[kg]	0.54	0.74	1.3	1.8	3.8

Notes: 1. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
2. The shaft-through portion is excluded. Refer to the asterisk 7 of "Annotations for Rotary Servo Motor Specifications" on p. 2-27 in this catalog for the shaft-through portion.
3. When unbalanced torque is generated, such as in a vertical lift machine, it is recommended that the unbalanced torque of the machine be kept under 70% of the servo motor rated torque.
4. When the servo motor decelerates to a stop from the rated speed, the regenerative frequency will not be limited if the effective torque is within the rated torque range.
When the servo motor decelerates to a stop from the maximum speed, the regenerative frequency will not be limited if the following requirements are met.
• HG-MR053(B): The load to motor inertia ratio is 24 times or less, and the effective torque is within the rated torque range.
• HG-MR13(B): The load to motor inertia ratio is 12 times or less, and the effective torque is within the rated torque range.

Refer to "Annotations for Rotary Servo Motor Specifications" on p. 2-27 in this catalog for the asterisks 1 to 6.

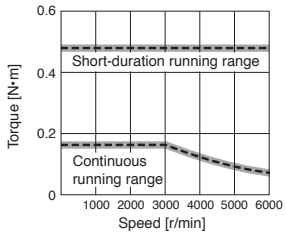
HG-MR Series Electromagnetic Brake Specifications (Note 1)

Model		HG-MR	053B	13B	23B	43B	73B
Type			Spring actuated type safety brake				
Rated voltage			24 V DC$^{0}_{-10}$%				
Power consumption		[W] at 20 °C	6.3	6.3	7.9	7.9	10
Electromagnetic brake static friction torque		[N•m]	0.32	0.32	1.3	1.3	2.4
Permissible braking work	Per braking	[J]	5.6	5.6	22	22	64
	Per hour	[J]	56	56	220	220	640
Electromagnetic brake life (Note 2)	Number of brakings	[Times]	20000	20000	20000	20000	20000
	Work per braking	[J]	5.6	5.6	22	22	64

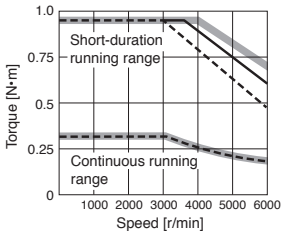
Notes: 1. The electromagnetic brake is for holding. It should not be used for deceleration applications.
2. Brake gap is not adjustable. Electromagnetic brake life is defined as the time period until the readjustment is needed.

HG-MR Series Torque Characteristics

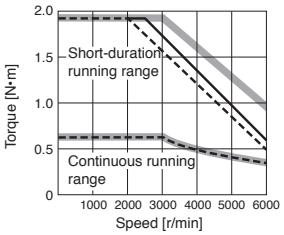
HG-MR053(B) (Note 1, 2, 3, 4)



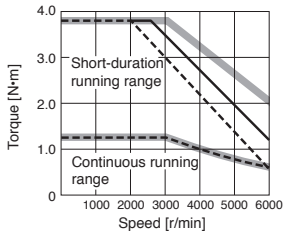
HG-MR13(B) (Note 1, 2, 3, 4)



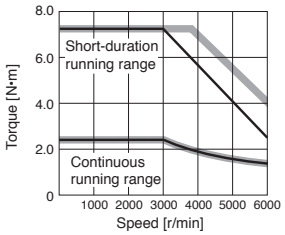
HG-MR23(B) (Note 1, 2, 3, 4)



HG-MR43(B) (Note 1, 2, 3, 4)



HG-MR73(B) (Note 1, 3, 4)

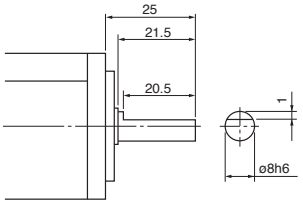


Notes: 1. : For 3-phase 200 V AC or 1-phase 230 V AC.
2. : For 1-phase 100 V AC.
3. : For 1-phase 200 V AC. This line is drawn only where differs from the other two lines.
4. Torque drops when the power supply voltage is below the specified value.

HG-MR Series Special Shaft End Specifications

Motors with the following specifications are also available.

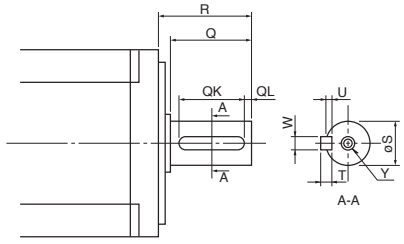
D-cut shaft (Note 1): 50 W and 100 W



[Unit: mm]

Key shaft (with key) (Note 1, 2): 200 W, 400 W, and 750 W

Model	Variable dimensions								
	T	S	R	Q	W	QK	QL	U	Y
HG-MR23(B)K, 43(B)K	5	14h6	30	26	5	20	3	3	M4 screw Depth: 15
HG-MR73(B)K	6	19h6	40	36	6	25	5	3.5	M5 screw Depth: 20



[Unit: mm]

Notes: 1. The servo motors with special shaft end are not suitable for frequent start/stop applications.
2. 2 round end key is attached.

HG-SR 1000 r/min Series (Medium Inertia, Medium Capacity) Specifications

Rotary servo motor model		HG-SR	51(B)	81(B)	121(B)	201(B)	301(B)	421(B)
Compatible servo amplifier model		MR-J4- MR-J4W_-	Refer to "Combinations of Rotary Servo Motor and Servo Amplifier" on p. 2-3 in this catalog.					
Power supply capacity *1		[kVA]	1.0	1.5	2.1	3.5	4.8	6.3
Continuous running duty	Rated output	[kW]	0.5	0.85	1.2	2.0	3.0	4.2
	Rated torque (Note 3)	[N•m]	4.8	8.1	11.5	19.1	28.6	40.1
Maximum torque		[N•m]	14.3	24.4	34.4	57.3	85.9	120
Rated speed		[r/min]	1000					
Maximum speed		[r/min]	1500					
Permissible instantaneous speed		[r/min]	1725					
Power rate at continuous rated torque	Standard	[kW/s]	19.7	41.2	28.1	46.4	82.3	107
	With electromagnetic brake	[kW/s]	16.5	36.2	23.2	41.4	75.3	99.9
Rated current		[A]	2.8	5.2	7.1	9.4	13	19
Maximum current		[A]	9.0	17	23	30	42	61
Regenerative braking frequency *2	MR-J4-	[times/min]	77	114	191	113	89	76
	MR-J4W_-	[times/min]	392	286	-	-	-	-
Moment of inertia J	Standard	[× 10^{-4} kg•m^2]	11.6	16.0	46.8	78.6	99.7	151
	With electromagnetic brake	[× 10^{-4} kg•m^2]	13.8	18.2	56.5	88.2	109	161
Recommended load to motor inertia ratio (Note 1)			17 times or less		15 times or less			
Speed/position detector			Absolute/incremental 22-bit encoder (resolution: 4194304 pulses/rev)					
Oil seal			None (Servo motors with oil seal are available. (HG-SR_J))					
Insulation class			155 (F)					
Structure			Totally enclosed, natural cooling (IP rating: IP67) (Note 2)					
Environment *3	Ambient temperature		0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)					
	Ambient humidity		80 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)					
	Ambience		Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust					
	Altitude		1000 m or less above sea level					
	Vibration resistance *4		X: 24.5 m/s^2 Y: 24.5 m/s^2		X: 24.5 m/s^2 Y: 49 m/s^2		X: 24.5 m/s^2 Y: 29.4 m/s^2	
Vibration rank			V10 *6					
Compliance to standards			Refer to "Conformity with Global Standards and Regulations" on p. 57 in this catalog.					
Permissible load for the shaft *5	L	[mm]	55	55	79	79	79	79
	Radial	[N]	980	980	2058	2058	2058	2058
	Thrust	[N]	490	490	980	980	980	980
Mass	Standard	[kg]	6.2	7.3	11	16	20	27
	With electromagnetic brake	[kg]	8.2	9.3	17	22	26	33

Notes: 1. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
2. The shaft-through portion is excluded. The servo motor with oil seal is rated IP67 as well (excluding the shaft-through portion). Refer to the asterisk 7 of "Annotations for Rotary Servo Motor Specifications" on p. 2-27 in this catalog for the shaft-through portion.
3. When unbalanced torque is generated, such as in a vertical lift machine, it is recommended that the unbalanced torque of the machine be kept under 70% of the servo motor rated torque.

Refer to "Annotations for Rotary Servo Motor Specifications" on p. 2-27 in this catalog for the asterisks 1 to 6.

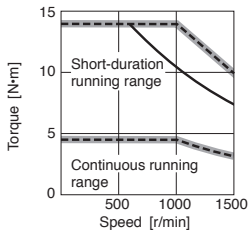
HG-SR 1000 r/min Series Electromagnetic Brake Specifications (Note 1)

Model		HG-SR	51B	81B	121B	201B	301B	421B
Type			Spring actuated type safety brake					
Rated voltage			24 V DC$^{0}_{-10}$%					
Power consumption		[W] at 20 °C	20	20	34	34	34	34
Electromagnetic brake static friction torque		[N•m]	8.5	8.5	44	44	44	44
Permissible braking work	Per braking	[J]	400	400	4500	4500	4500	4500
	Per hour	[J]	4000	4000	45000	45000	45000	45000
Electromagnetic brake life (Note 2)	Number of brakings	[Times]	20000	20000	20000	20000	20000	20000
	Work per braking	[J]	200	200	1000	1000	1000	1000

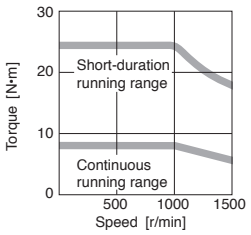
Notes: 1. The electromagnetic brake is for holding. It should not be used for deceleration applications.
2. Brake gap is not adjustable. Electromagnetic brake life is defined as the time period until the readjustment is needed.

HG-SR 1000 r/min Series Torque Characteristics

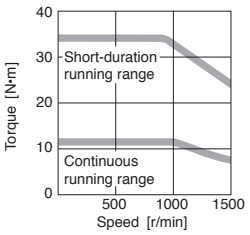
HG-SR51(B) (Note 1, 2, 3, 4)



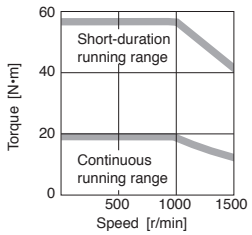
HG-SR81(B) (Note 1, 4)



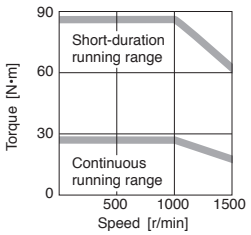
HG-SR121(B) (Note 1, 4)



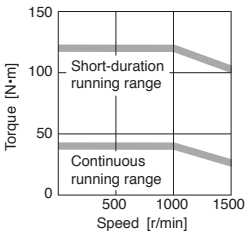
HG-SR201(B) (Note 1, 4)



HG-SR301(B) (Note 1, 4)



HG-SR421(B) (Note 1, 4)



Notes: 1. ——— : For 3-phase 200 V AC.
2. - - - - : For 1-phase 230 V AC.
3. ——— : For 1-phase 200 V AC.
This line is drawn only where differs from the other two lines.
4. Torque drops when the power supply voltage is below the specified value.

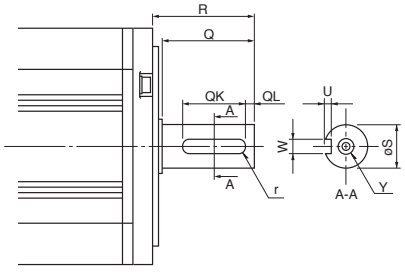
HG-SR 1000 r/min Series Special Shaft End Specifications

Motors with the following specifications are also available.

Key shaft (without key) (Note 1, 2)

Model	Variable dimensions								
	S	R	Q	W	QK	QL	U	r	Y
HG-SR51(B)K, 81(B)K	24h6	55	50	8 $^{0}_{-0.036}$	36	5	4 $^{+0.2}_{0}$	4	M8 screw Depth: 20
HG-SR121(B)K, 201(B)K, 301(B)K, 421(B)K	35 $^{+0.010}_{0}$	79	75	10 $^{0}_{-0.036}$	55	5	5 $^{+0.2}_{0}$	5	

Notes: 1. The servo motors with special shaft end are not suitable for frequent start/stop applications.
2. A key is not supplied with the servo motor. The key shall be installed by the user.



[Unit: mm]

HG-SR 2000 r/min Series (Medium Inertia, Medium Capacity) (200 V Class) Specifications

Rotary servo motor model		HG-SR	52(B)	102(B)	152(B)	202(B)	352(B)	502(B)	702(B)
Compatible servo amplifier model		MR-J4-	Refer to "Combinations of Rotary Servo Motor and Servo Amplifier" on p. 2-3 in this catalog.						
		MR-J4W_-							
Power supply capacity *1		[kVA]	1.0	1.7	2.5	3.5	5.5	7.5	10
Continuous running duty	Rated output	[kW]	0.5	1.0	1.5	2.0	3.5	5.0	7.0
	Rated torque (Note 3)	[N•m]	2.4	4.8	7.2	9.5	16.7	23.9	33.4
Maximum torque		[N•m]	7.2	14.3	21.5	28.6	50.1	71.6	100
Rated speed		[r/min]	2000						
Maximum speed		[r/min]	3000						
Permissible instantaneous speed		[r/min]	3450						
Power rate at continuous rated torque	Standard	[kW/s]	7.85	19.7	32.1	19.5	35.5	57.2	74.0
	With electromagnetic brake	[kW/s]	6.01	16.5	28.2	16.1	31.7	52.3	69.4
Rated current		[A]	2.9	5.6	9.4	9.6	14	22	26
Maximum current		[A]	9.0	17	29	31	45	70	83
Regenerative braking frequency *2	MR-J4-	[times/min]	31	38	139	47	28	29	25
	MR-J4W_-	[times/min]	154	96	-	-	-	-	-
Moment of inertia J	Standard	[× 10^{-4} kg•m^2]	7.26	11.6	16.0	46.8	78.6	99.7	151
	With electromagnetic brake	[× 10^{-4} kg•m^2]	9.48	13.8	18.2	56.5	88.2	109	161
Recommended load to motor inertia ratio (Note 1)			15 times or less	17 times or less		15 times or less			
Speed/position detector			Absolute/incremental 22-bit encoder (resolution: 4194304 pulses/rev)						
Oil seal			None (Servo motors with oil seal are available. (HG-SR_J))						
Insulation class			155 (F)						
Structure			Totally enclosed, natural cooling (IP rating: IP67) (Note 2)						
Environment *3	Ambient temperature		0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)						
	Ambient humidity		80 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)						
	Ambience		Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust						
	Altitude		1000 m or less above sea level						
	Vibration resistance *4		X: 24.5 m/s^2 Y: 24.5 m/s^2			X: 24.5 m/s^2 Y: 49 m/s^2		X: 24.5 m/s^2 Y: 29.4 m/s^2	
Vibration rank			V10 *6						
Compliance to standards			Refer to "Conformity with Global Standards and Regulations" on p. 57 in this catalog.						
Permissible load for the shaft *5	L	[mm]	55	55	55	79	79	79	79
	Radial	[N]	980	980	980	2058	2058	2058	2058
	Thrust	[N]	490	490	490	980	980	980	980
Mass	Standard	[kg]	4.8	6.2	7.3	11	16	20	27
	With electromagnetic brake	[kg]	6.7	8.2	9.3	17	22	26	33

Notes: 1. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
2. The shaft-through portion is excluded. The servo motor with oil seal is rated IP67 as well (excluding the shaft-through portion), and for geared servo motor, IP rating of the reducer portion is equivalent to IP44. Refer to the asterisk 7 of "Annotations for Rotary Servo Motor Specifications" on p. 2-27 in this catalog for the shaft-through portion.
3. When unbalanced torque is generated, such as in a vertical lift machine, it is recommended that the unbalanced torque of the machine be kept under 70% of the servo motor rated torque.

Refer to "Annotations for Rotary Servo Motor Specifications" on p. 2-27 in this catalog for the asterisks 1 to 6.

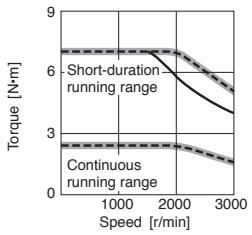
HG-SR 2000 r/min Series (200 V Class) Electromagnetic Brake Specifications (Note 1)

Model		HG-SR	52B	102B	152B	202B	352B	502B	702B
Type			Spring actuated type safety brake						
Rated voltage			24 V DC$^{0}_{-10}$%						
Power consumption		[W] at 20 °C	20	20	20	34	34	34	34
Electromagnetic brake static friction torque		[N•m]	8.5	8.5	8.5	44	44	44	44
Permissible braking work	Per braking	[J]	400	400	400	4500	4500	4500	4500
	Per hour	[J]	4000	4000	4000	45000	45000	45000	45000
Electromagnetic brake life (Note 2)	Number of brakings	[Times]	20000	20000	20000	20000	20000	20000	20000
	Work per braking	[J]	200	200	200	1000	1000	1000	1000

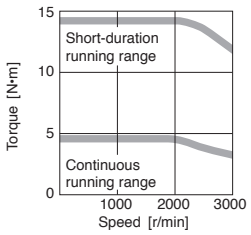
Notes: 1. The electromagnetic brake is for holding. It should not be used for deceleration applications.
2. Brake gap is not adjustable. Electromagnetic brake life is defined as the time period until the readjustment is needed.

HG-SR 2000 r/min Series (200 V Class) Torque Characteristics

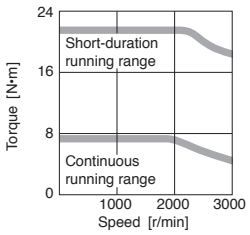
HG-SR52(B) (Note 1, 2, 3, 4)



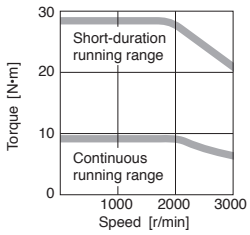
HG-SR102(B) (Note 1, 4)



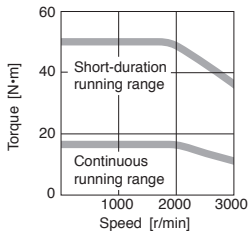
HG-SR152(B) (Note 1, 4)



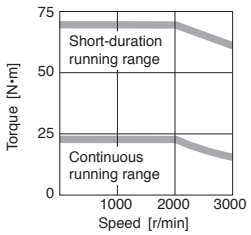
HG-SR202(B) (Note 1, 4)



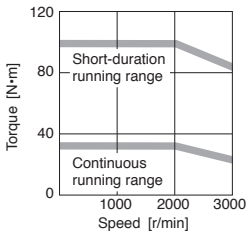
HG-SR352(B) (Note 1, 4)



HG-SR502(B) (Note 1, 4)



HG-SR702(B) (Note 1, 4)



Notes: 1. ▬▬ : For 3-phase 200 V AC.
2. - - - - : For 1-phase 230 V AC.
3. ——— : For 1-phase 200 V AC.
This line is drawn only where differs from the other two lines.
4. Torque drops when the power supply voltage is below the specified value.

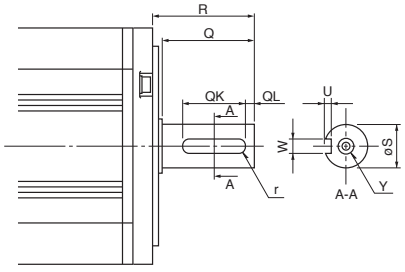
HG-SR 2000 r/min Series (200 V Class) Special Shaft End Specifications

Motors with the following specifications are also available.

Key shaft (without key) (Note 1, 2)

Model	Variable dimensions								
	S	R	Q	W	QK	QL	U	r	Y
HG-SR52(B)K, 102(B)K, 152(B)K	24h6	55	50	8 $^{0}_{-0.036}$	36	5	4 $^{+0.2}_{0}$	4	M8 screw Depth: 20
HG-SR202(B)K, 352(B)K, 502(B)K, 702(B)K	35 $^{+0.010}_{0}$	79	75	10 $^{0}_{-0.036}$	55	5	5 $^{+0.2}_{0}$	5	

Notes: 1. The servo motors with special shaft end are not suitable for frequent start/stop applications.
2. A key is not supplied with the servo motor. The key shall be installed by the user.



[Unit: mm]

HG-SR 2000 r/min Series (Medium Inertia, Medium Capacity) (400 V Class) Specifications

Rotary servo motor model		HG-SR	524(B)	1024(B)	1524(B)	2024(B)	3524(B)	5024(B)	7024(B)
Compatible servo amplifier model		MR-J4-	Refer to "Combinations of Rotary Servo Motor and Servo Amplifier" on p. 2-5 in this catalog.						
Power supply capacity *1		[kVA]	1.0	1.7	2.5	3.5	5.5	7.5	10
Continuous running duty	Rated output	[kW]	0.5	1.0	1.5	2.0	3.5	5.0	7.0
	Rated torque (Note 3)	[N•m]	2.4	4.8	7.2	9.5	16.7	23.9	33.4
Maximum torque		[N•m]	7.2	14.3	21.5	28.6	50.1	71.6	100
Rated speed		[r/min]	2000						
Maximum speed		[r/min]	3000						
Permissible instantaneous speed		[r/min]	3450						
Power rate at continuous rated torque	Standard	[kW/s]	7.85	19.7	32.1	19.5	35.5	57.2	74.0
	With electromagnetic brake	[kW/s]	6.01	16.5	28.2	16.1	31.7	52.3	69.4
Rated current		[A]	1.5	2.8	4.7	4.9	7.0	11	13
Maximum current		[A]	4.5	8.9	17	17	27	42	59
Regenerative braking frequency *2	MR-J4-	[times/min]	46	29	139	47	34	29	25
Moment of inertia J	Standard	[× 10^{-4} kg•m^2]	7.26	11.6	16.0	46.8	78.6	99.7	151
	With electromagnetic brake	[× 10^{-4} kg•m^2]	9.48	13.8	18.2	56.5	88.2	109	161
Recommended load to motor inertia ratio (Note 1)			15 times or less	17 times or less		15 times or less			
Speed/position detector			Absolute/incremental 22-bit encoder (resolution: 4194304 pulses/rev)						
Oil seal			None (Servo motors with oil seal are available. (HG-SR_J))						
Insulation class			155 (F)						
Structure			Totally enclosed, natural cooling (IP rating: IP67) (Note 2)						
Environment *3	Ambient temperature		0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)						
	Ambient humidity		80 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)						
	Ambience		Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust						
	Altitude		1000 m or less above sea level						
	Vibration resistance *4		X: 24.5 m/s^2 Y: 24.5 m/s^2			X: 24.5 m/s^2 Y: 49 m/s^2		X: 24.5 m/s^2 Y: 29.4 m/s^2	
Vibration rank			V10 *6						
Compliance to standards			Refer to "Conformity with Global Standards and Regulations" on p. 57 in this catalog.						
Permissible load for the shaft *5	L	[mm]	55	55	55	79	79	79	79
	Radial	[N]	980	980	980	2058	2058	2058	2058
	Thrust	[N]	490	490	490	980	980	980	980
Mass	Standard	[kg]	4.8	6.2	7.3	11	16	20	27
	With electromagnetic brake	[kg]	6.7	8.2	9.3	17	22	26	33

Notes: 1. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
2. The shaft-through portion is excluded. The servo motor with oil seal is rated IP67 as well (excluding the shaft-through portion), and for geared servo motor, IP rating of the reducer portion is equivalent to IP44. Refer to the asterisk 7 of "Annotations for Rotary Servo Motor Specifications" on p. 2-27 in this catalog for the shaft-through portion.
3. When unbalanced torque is generated, such as in a vertical lift machine, it is recommended that the unbalanced torque of the machine be kept under 70% of the servo motor rated torque.

Refer to "Annotations for Rotary Servo Motor Specifications" on p. 2-27 in this catalog for the asterisks 1 to 6.

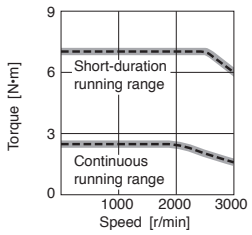
HG-SR 2000 r/min Series (400 V Class) Electromagnetic Brake Specifications (Note 1)

Model		HG-SR	524B	1024B	1524B	2024B	3524B	5024B	7024B
Type			Spring actuated type safety brake						
Rated voltage			24 V DC$^{0}_{-10}$%						
Power consumption		[W] at 20 °C	20	20	20	34	34	34	34
Electromagnetic brake static friction torque		[N•m]	8.5	8.5	8.5	44	44	44	44
Permissible braking work	Per braking	[J]	400	400	400	4500	4500	4500	4500
	Per hour	[J]	4000	4000	4000	45000	45000	45000	45000
Electromagnetic brake life (Note 2)	Number of brakings	[Times]	20000	20000	20000	20000	20000	20000	20000
	Work per braking	[J]	200	200	200	1000	1000	1000	1000

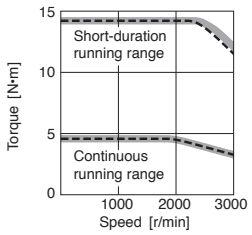
Notes: 1. The electromagnetic brake is for holding. It should not be used for deceleration applications.
2. Brake gap is not adjustable. Electromagnetic brake life is defined as the time period until the readjustment is needed.

HG-SR 2000 r/min Series (400 V Class) Torque Characteristics

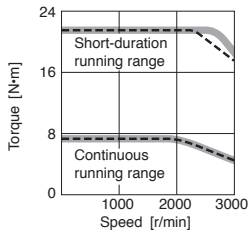
HG-SR524(B) (Note 1, 2, 3)



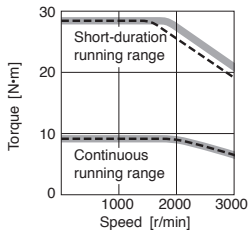
HG-SR1024(B) (Note 1, 2, 3)



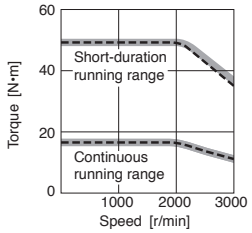
HG-SR1524(B) (Note 1, 2, 3)



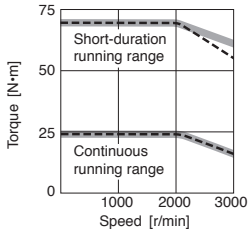
HG-SR2024(B) (Note 1, 2, 3)



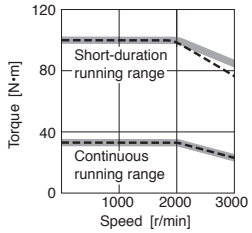
HG-SR3524(B) (Note 1, 2, 3)



HG-SR5024(B) (Note 1, 2, 3)



HG-SR7024(B) (Note 1, 2, 3)



Notes: 1. ▬ : For 3-phase 400 V AC.
2. - - - - : For 3-phase 380 V AC.
3. Torque drops when the power supply voltage is below the specified value.

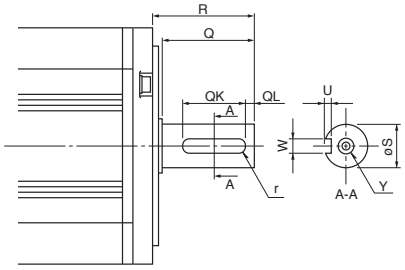
HG-SR 2000 r/min Series (400 V Class) Special Shaft End Specifications

Motors with the following specifications are also available.

Key shaft (without key) (Note 1, 2)

Model	Variable dimensions								
	S	R	Q	W	QK	QL	U	r	Y
HG-SR524(B)K, 1024(B)K, 1524(B)K	24h6	55	50	8 $^{0}_{-0.036}$	36	5	4 $^{+0.2}_{0}$	4	M8 screw Depth: 20
HG-SR2024(B)K, 3524(B)K, 5024(B)K, 7024(B)K	35 $^{+0.010}_{0}$	79	75	10 $^{0}_{-0.036}$	55	5	5 $^{+0.2}_{0}$	5	

Notes: 1. The servo motors with special shaft end are not suitable for frequent start/stop applications.
2. A key is not supplied with the servo motor. The key shall be installed by the user.



[Unit: mm]

HG-JR 3000 r/min Series (Low Inertia, Medium Capacity) (200 V Class) Specifications

Rotary servo motor model		HG-JR	53(B)	73(B)	103(B)	153(B)	203(B)	353(B)	503(B)	703(B)	903(B)
Compatible servo amplifier model		MR-J4-	Refer to "Combinations of Rotary Servo Motor and Servo Amplifier" on pp. 2-3 and 2-4 in this catalog.								
		MR-J4W_-									
Power supply capacity *1		[kVA]	1.0	1.3	1.7	2.5	3.5	5.5	7.5	10	13
Continuous running duty	Rated output	[kW]	0.5	0.75	1.0	1.5	2.0	3.3 <3.5> (Note 4)	5.0	7.0	9.0
	Rated torque (Note 3)	[N•m]	1.6	2.4	3.2	4.8	6.4	10.5 <11.1> (Note 4)	15.9	22.3	28.6
Maximum torque (Note 5)		[N•m]	4.8 <6.4>	7.2 <9.6>	9.6 <12.7>	14.3 <19.1>	19.1 <25.5>	32.0 <44.6>	47.7 <63.7>	66.8	85.8
Rated speed		[r/min]	3000								
Maximum speed		[r/min]	6000							5000	
Permissible instantaneous speed		[r/min]	6900							5750	
Power rate at continuous rated torque	Standard	[kW/s]	16.7	27.3	38.2	60.2	82.4	83.5	133	115	147
	With electromagnetic brake	[kW/s]	12.5	22.0	32.2	53.1	74.8	71.6	119	93.9	125
Rated current		[A]	3.0	5.6	5.6	11	11	17 <18> (Note 4)	27	34	41
Maximum current (Note 5)		[A]	9.0 <12>	17 <23>	17 <23>	32 <43>	32 <43>	51 <71>	81 <108>	103	134
Regenerative braking frequency *2 (Note 5)	MR-J4-	[times/min]	67 <137>	98 <511>	76 <396>	271 <271>	206 <206>	73 <98>	68 <89>	56	204 (Note 6)
	MR-J4W_-	[times/min]	328 <328>	237	186	-	-	-	-	-	-
Moment of inertia J	Standard	[× 10^{-4} kg•m^2]	1.52	2.09	2.65	3.79	4.92	13.2	19.0	43.3	55.8
	With electromagnetic brake	[× 10^{-4} kg•m^2]	2.02	2.59	3.15	4.29	5.42	15.4	21.2	52.9	65.4
Recommended load to motor inertia ratio (Note 1)			10 times or less								
Speed/position detector			Absolute/incremental 22-bit encoder (resolution: 4194304 pulses/rev)								
Oil seal			Attached								
Insulation class			155 (F)								
Structure			Totally enclosed, natural cooling (IP rating: IP67) (Note 2)								
Environment *3	Ambient temperature		0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)								
	Ambient humidity		80 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)								
	Ambience		Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust								
	Altitude		1000 m or less above sea level								
	Vibration resistance *4		X: 24.5 m/s^2 Y: 24.5 m/s^2							X: 24.5 m/s^2 Y: 29.4 m/s^2	
Vibration rank			V10 *6								
Compliance to standards			Refer to "Conformity with Global Standards and Regulations" on p. 57 in this catalog.								
Permissible load for the shaft *5	L	[mm]	40	40	40	40	40	55	55	79	79
	Radial	[N]	323	323	323	323	323	980	980	2450	2450
	Thrust	[N]	284	284	284	284	284	490	490	980	980
Mass	Standard	[kg]	3.0	3.7	4.5	5.9	7.5	13	18	29	36
	With electromagnetic brake	[kg]	4.4	5.1	5.9	7.3	8.9	15	20	35	42

Notes: 1. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
2. The shaft-through portion is excluded. Refer to the asterisk 7 of "Annotations for Rotary Servo Motor Specifications" on p. 2-27 in this catalog for the shaft-through portion.
3. When unbalanced torque is generated, such as in a vertical lift machine, it is recommended that the unbalanced torque of the machine be kept under 70% of the servo motor rated torque.
4. The value in angle brackets is applicable when the servo motor is used with MR-J4-500B(-RJ/-RJ010) or MR-J4-500A(-RJ).
5. The value in angle brackets is applicable when the maximum torque is increased. The maximum torque will be increased by changing the servo amplifier to be combined. Refer to "Combinations of HG-JR Servo Motor Series and Servo Amplifier (200 V Class) for Increasing the Maximum Torque to 400% of the Rated Torque" on p. 2-6 in this catalog for the available combinations.
6. The value is applicable when the external regenerative resistors, GRZG400-_Ω (standard accessory) are used with cooling fans (2 units of 92 mm × 92 mm, minimum airflow: 1.0 m^3/min). Note that [Pr. PA02] must be changed.

Refer to "Annotations for Rotary Servo Motor Specifications" on p. 2-27 in this catalog for the asterisks 1 to 6.

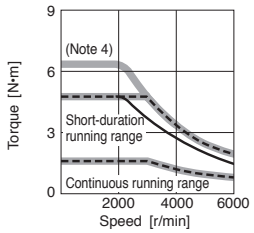
HG-JR 3000 r/min Series (200 V Class) Electromagnetic Brake Specifications (Note 1)

Model		HG-JR	53B	73B	103B	153B	203B	353B	503B	703B	903B
Type			Spring actuated type safety brake								
Rated voltage			24 V DC$^{0}_{-10}$%								
Power consumption		[W] at 20 °C	11.7	11.7	11.7	11.7	11.7	23	23	34	34
Electromagnetic brake static friction torque		[N•m]	6.6	6.6	6.6	6.6	6.6	16	16	44	44
Permissible braking work	Per braking	[J]	64	64	64	64	64	400	400	4500	4500
	Per hour	[J]	640	640	640	640	640	4000	4000	45000	45000
Electromagnetic brake life (Note 2)	Number of brakings	[Times]	5000	5000	5000	5000	5000	5000	5000	20000	20000
	Work per braking	[J]	64	64	64	64	64	400	400	1000	1000

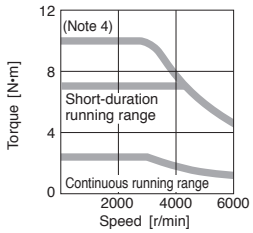
Notes: 1. The electromagnetic brake is for holding. It should not be used for deceleration applications.
2. Brake gap is not adjustable. Electromagnetic brake life is defined as the time period until the readjustment is needed.

HG-JR 3000 r/min Series (200 V Class) Torque Characteristics

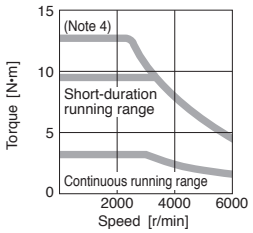
HG-JR53(B) (Note 1, 2, 3, 5)



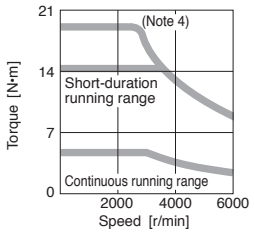
HG-JR73(B) (Note 1, 5)



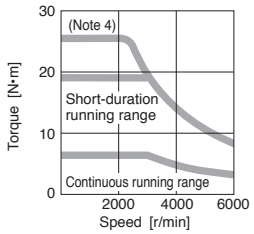
HG-JR103(B) (Note 1, 5)



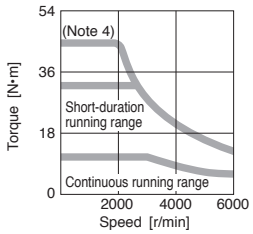
HG-JR153(B) (Note 1, 5)



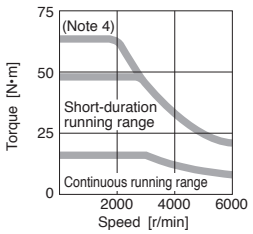
HG-JR203(B) (Note 1, 5)



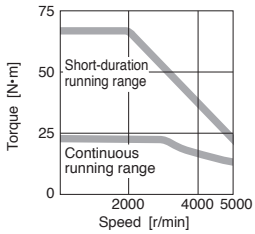
HG-JR353(B) (Note 1, 5)



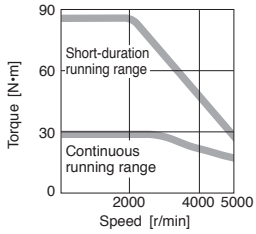
HG-JR503(B) (Note 1, 5)



HG-JR703(B) (Note 1, 5)



HG-JR903(B) (Note 1, 5)



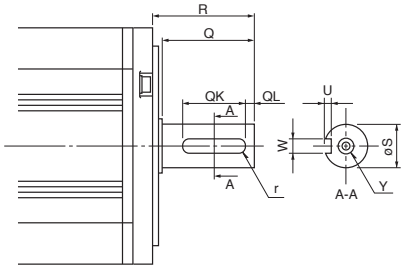
Notes: 1. ▬▬ : For 3-phase 200 V AC.
2. - - - - : For 1-phase 230 V AC.
3. ——— : For 1-phase 200 V AC.
This line is drawn only where differs from the other two lines.
4. This value is applicable when the torque is maximally increased. Refer to "Combinations of HG-JR Servo Motor Series and Servo Amplifier (200 V Class) for Increasing the Maximum Torque to 400% of the Rated Torque" on p. 2-6 in this catalog.
5. Torque drops when the power supply voltage is below the specified value.

HG-JR 3000 r/min Series (200 V Class) Special Shaft End Specifications

Motors with the following specifications are also available.

Key shaft (without key) (Note 1, 2)

Model	Variable dimensions								
	S	R	Q	W	QK	QL	U	r	Y
HG-JR53(B)K, 73(B)K, 103(B)K, 153(B)K, 203(B)K	16h6	40	30	5 $^{0}_{-0.030}$	25	2	3 $^{+0.1}_{0}$	2.5	M4 screw Depth: 15
HG-JR353(B)K, 503(B)K	28h6	55	50	8 $^{0}_{-0.036}$	36	5	4 $^{+0.2}_{0}$	4	M8 screw Depth: 20
HG-JR703(B)K, 903(B)K	35 $^{+0.010}_{0}$	79	75	10 $^{0}_{-0.036}$	55	5	5 $^{+0.2}_{0}$	5	



Notes: 1. The servo motors with special shaft end are not suitable for frequent start/stop applications.
2. A key is not supplied with the servo motor. The key shall be installed by the user.

[Unit: mm]

HG-JR 3000 r/min Series (Low Inertia, Medium Capacity) (400 V Class) Specifications

Rotary servo motor model		HG-JR	534(B)	734(B)	1034(B)	1534(B)	2034(B)	3534(B)	5034(B)	7034(B)	9034(B)
Compatible servo amplifier model		MR-J4-	Refer to "Combinations of Rotary Servo Motor and Servo Amplifier" on p. 2-5 in this catalog.								
Power supply capacity *1		[kVA]	1.0	1.3	1.7	2.5	3.5	5.5	7.5	10	13
Continuous running duty	Rated output	[kW]	0.5	0.75	1.0	1.5	2.0	3.3 <3.5> (Note 4)	5.0	7.0	9.0
	Rated torque (Note 3)	[N•m]	1.6	2.4	3.2	4.8	6.4	10.5 <11.1> (Note 4)	15.9	22.3	28.6
Maximum torque (Note 5)		[N•m]	4.8 <6.4>	7.2 <9.6>	9.6 <12.7>	14.3 <19.1>	19.1 <25.5>	32.0 <44.6>	47.7 <63.7>	66.8	85.8
Rated speed		[r/min]	3000								
Maximum speed		[r/min]	6000							5000	
Permissible instantaneous speed		[r/min]	6900							5750	
Power rate at continuous rated torque	Standard	[kW/s]	16.7	27.3	38.2	60.2	82.4	83.5	133	115	147
	With electromagnetic brake	[kW/s]	12.5	22.0	32.2	53.1	74.8	71.6	119	93.9	125
Rated current		[A]	1.5	2.8	2.8	5.4	5.4	8.3 <8.8> (Note 4)	14	17	21
Maximum current (Note 5)		[A]	4.5 <6.0>	8.4 <12>	8.4 <12>	17 <22>	17 <22>	26 <36>	41 <54>	52	67
Regenerative braking frequency *2 (Note 5)	MR-J4-	[times/min]	99 <100>	72 <489>	56 <382>	265 <275>	203 <209>	75 <98>	68 <89>	56	205 (Note 6)
Moment of inertia J	Standard	[× 10^{-4} kg•m^2]	1.52	2.09	2.65	3.79	4.92	13.2	19.0	43.3	55.8
	With electromagnetic brake	[× 10^{-4} kg•m^2]	2.02	2.59	3.15	4.29	5.42	15.4	21.2	52.9	65.4
Recommended load to motor inertia ratio (Note 1)			10 times or less								
Speed/position detector			Absolute/incremental 22-bit encoder (resolution: 4194304 pulses/rev)								
Oil seal			Attached								
Insulation class			155 (F)								
Structure			Totally enclosed, natural cooling (IP rating: IP67) (Note 2)								
Environment *3	Ambient temperature		0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)								
	Ambient humidity		80 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)								
	Ambience		Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust								
	Altitude		1000 m or less above sea level								
	Vibration resistance *4		X: 24.5 m/s^2 Y: 24.5 m/s^2							X: 24.5 m/s^2 Y: 29.4 m/s^2	
Vibration rank			V10 *6								
Compliance to standards			Refer to "Conformity with Global Standards and Regulations" on p. 57 in this catalog.								
Permissible load for the shaft *5	L	[mm]	40	40	40	40	40	55	55	79	79
	Radial	[N]	323	323	323	323	323	980	980	2450	2450
	Thrust	[N]	284	284	284	284	284	490	490	980	980
Mass	Standard	[kg]	3.0	3.7	4.5	5.9	7.5	13	18	29	36
	With electromagnetic brake	[kg]	4.4	5.1	5.9	7.3	8.9	15	20	35	42

Notes: 1. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
2. The shaft-through portion is excluded. Refer to the asterisk 7 of "Annotations for Rotary Servo Motor Specifications" on p. 2-27 in this catalog for the shaft-through portion.
3. When unbalanced torque is generated, such as in a vertical lift machine, it is recommended that the unbalanced torque of the machine be kept under 70% of the servo motor rated torque.
4. The value in angle brackets is applicable when the servo motor is used with MR-J4-500B4(-RJ/-RJ010) or MR-J4-500A4(-RJ).
5. The value in angle brackets is applicable when the maximum torque is increased. The maximum torque will be increased by changing the servo amplifier to be combined. Refer to "Combinations of HG-JR Servo Motor Series and Servo Amplifier (400 V Class) for Increasing the Maximum Torque to 400% of the Rated Torque" on p. 2-6 in this catalog for the available combinations.
6. The value is applicable when the external regenerative resistors, GRZG400-_Ω (standard accessory) are used with cooling fans (2 units of 92 mm × 92 mm, minimum airflow: 1.0 m^3/min). Note that [Pr. PA02] must be changed.

Refer to "Annotations for Rotary Servo Motor Specifications" on p. 2-27 in this catalog for the asterisks 1 to 6.

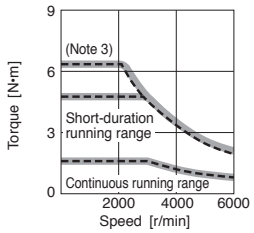
HG-JR 3000 r/min Series (400 V Class) Electromagnetic Brake Specifications (Note 1)

Model		HG-JR	534B	734B	1034B	1534B	2034B	3534B	5034B	7034B	9034B
Type			Spring actuated type safety brake								
Rated voltage			24 V DC$^{0}_{-10}$%								
Power consumption		[W] at 20 °C	11.7	11.7	11.7	11.7	11.7	23	23	34	34
Electromagnetic brake static friction torque		[N•m]	6.6	6.6	6.6	6.6	6.6	16	16	44	44
Permissible braking work	Per braking	[J]	64	64	64	64	64	400	400	4500	4500
	Per hour	[J]	640	640	640	640	640	4000	4000	45000	45000
Electromagnetic brake life (Note 2)	Number of brakings	[Times]	5000	5000	5000	5000	5000	5000	5000	20000	20000
	Work per braking	[J]	64	64	64	64	64	400	400	1000	1000

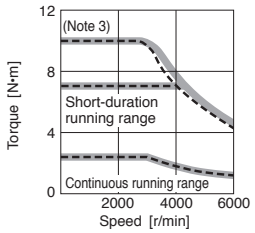
Notes: 1. The electromagnetic brake is for holding. It should not be used for deceleration applications.
2. Brake gap is not adjustable. Electromagnetic brake life is defined as the time period until the readjustment is needed.

HG-JR 3000 r/min Series (400 V Class) Torque Characteristics

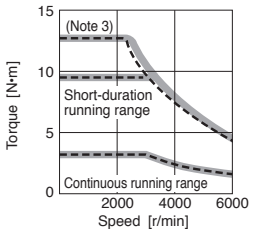
HG-JR534(B) (Note 1, 2, 4)



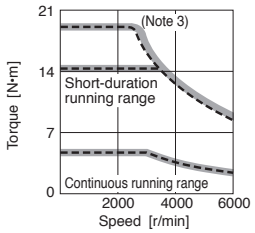
HG-JR734(B) (Note 1, 2, 4)



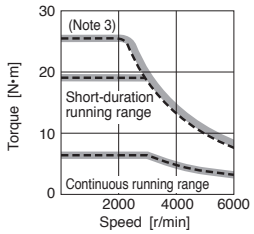
HG-JR1034(B) (Note 1, 2, 4)



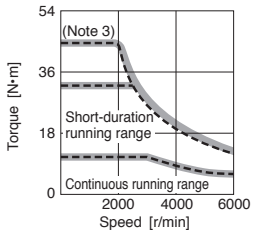
HG-JR1534(B) (Note 1, 2, 4)



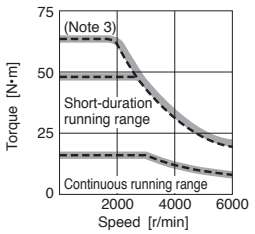
HG-JR2034(B) (Note 1, 2, 4)



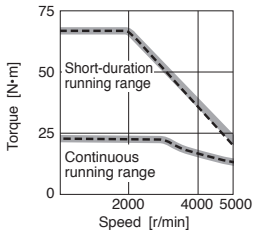
HG-JR3534(B) (Note 1, 2, 4)



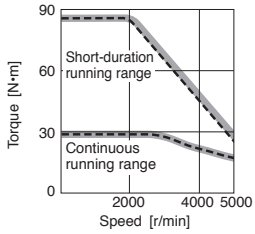
HG-JR5034(B) (Note 1, 2, 4)



HG-JR7034(B) (Note 1, 2, 4)



HG-JR9034(B) (Note 1, 2, 4)



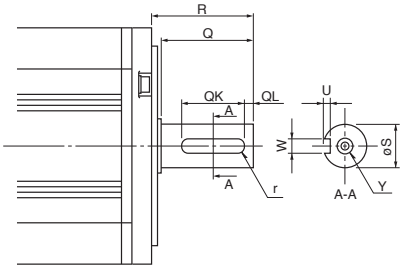
Notes: 1. ——— : For 3-phase 400 V AC.
2. - - - - : For 3-phase 380 V AC.
3. This value is applicable when the torque is maximally increased. Refer to "Combinations of HG-JR Servo Motor Series and Servo Amplifier (400 V Class) for Increasing the Maximum Torque to 400% of the Rated Torque" on p. 2-6 in this catalog.
4. Torque drops when the power supply voltage is below the specified value.

HG-JR 3000 r/min Series (400 V Class) Special Shaft End Specifications

Motors with the following specifications are also available.

Key shaft (without key) (Note 1, 2)

Model	Variable dimensions								
	S	R	Q	W	QK	QL	U	r	Y
HG-JR534(B)K, 734(B)K, 1034(B)K, 1534(B)K, 2034(B)K	16h6	40	30	5 $^{0}_{-0.030}$	25	2	3 $^{+0.1}_{0}$	2.5	M4 screw Depth: 15
HG-JR3534(B)K, 5034(B)K	28h6	55	50	8 $^{0}_{-0.036}$	36	5	4 $^{+0.2}_{0}$	4	M8 screw Depth: 20
HG-JR7034(B)K, 9034(B)K	35 $^{+0.010}_{0}$	79	75	10 $^{0}_{-0.036}$	55	5	5 $^{+0.2}_{0}$	5	



Notes: 1. The servo motors with special shaft end are not suitable for frequent start/stop applications.
2. A key is not supplied with the servo motor. The key shall be installed by the user.

[Unit: mm]

HG-JR 1500 r/min Series (Low Inertia, Large Capacity) (200 V/400 V Class) Specifications

Rotary servo motor model			HG-JR	11K1M(B)	15K1M(B)	22K1M	11K1M4(B)	15K1M4(B)	22K1M4
Compatible servo amplifier model			MR-J4-	Refer to "Combinations of Rotary Servo Motor and Servo Amplifier" on p. 2-4 in this catalog.			Refer to "Combinations of Rotary Servo Motor and Servo Amplifier" on p. 2-5 in this catalog.		
Power supply capacity *1			[kVA]	16	22	33	16	22	33
Continuous running duty	Rated output		[kW]	11	15	22	11	15	22
	Rated torque (Note 3)		[N•m]	70.0	95.5	140	70.0	95.5	140
Maximum torque			[N•m]	210	286	420	210	286	420
Rated speed			[r/min]	1500					
Maximum speed			[r/min]	3000		2500	3000		2500
Permissible instantaneous speed			[r/min]	3450		2875	3450		2875
Power rate at continuous rated torque	Standard		[kW/s]	223	290	401	223	290	401
	With electromagnetic brake		[kW/s]	204	271	-	204	271	-
Rated current			[A]	61	76	99	31	38	50
Maximum current			[A]	200	246	315	100	123	170
Regenerative braking frequency *2 (Note 4)	MR-J4-		[times/min]	143	162	104	143	162	104
Moment of inertia J	Standard		[× 10^{-4} kg•m^2]	220	315	489	220	315	489
	With electromagnetic brake		[× 10^{-4} kg•m^2]	240	336	-	240	336	-
Recommended load to motor inertia ratio (Note 1)				10 times or less					
Speed/position detector				Absolute/incremental 22-bit encoder (resolution: 4194304 pulses/rev)					
Oil seal				Attached					
Insulation class				155 (F)					
Structure				Totally enclosed, natural cooling (IP rating: IP67) (Note 2)		Totally enclosed, force cooling (IP rating: IP44) (Note 2)	Totally enclosed, natural cooling (IP rating: IP67) (Note 2)		Totally enclosed, force cooling (IP rating: IP44) (Note 2)
Environment *3	Ambient temperature			0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)					
	Ambient humidity			80 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)					
	Ambience			Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust					
	Altitude			1000 m or less above sea level					
	Vibration resistance *4			X: 24.5 m/s^2 Y: 24.5 m/s^2					
Vibration rank				V10 *6					
Compliance to standards				Refer to "Conformity with Global Standards and Regulations" on p. 57 in this catalog.					
Permissible load for the shaft *5	L		[mm]	116	116	140	116	116	140
	Radial		[N]	2940	2940	3234	2940	2940	3234
	Thrust		[N]	980	980	1470	980	980	1470
Mass	Standard		[kg]	62	86	120	62	86	120
	With electromagnetic brake		[kg]	74	97	-	74	97	-
Cooling fan	Power supply	Voltage/ frequency		-	-	3-phase 200 V AC to 230 V AC, 50 Hz/60 Hz	-	-	3-phase 380 V AC to 480 V AC, 50 Hz/60 Hz
		Input	[W]	-	-	60 (50 Hz)/ 80 (60 Hz)	-	-	58 (50 Hz)/ 72 (60 Hz)
	Rated current		[A]	-	-	0.20 (50 Hz)/ 0.27 (60 Hz)	-	-	0.12 (50 Hz)/ 0.14 (60 Hz)

Notes: 1. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
2. The shaft-through portion is excluded. Refer to the asterisk 7 of "Annotations for Rotary Servo Motor Specifications" on p. 2-27 in this catalog for the shaft-through portion.
3. When unbalanced torque is generated, such as in a vertical lift machine, it is recommended that the unbalanced torque of the machine be kept under 70% of the servo motor rated torque.
4. The value is applicable when the external regenerative resistors, GRZG400-_Ω (standard accessory) are used with cooling fans (2 units of 92 mm × 92 mm, minimum airflow: 1.0 m^3/min). Note that [Pr. PA02] must be changed.

Refer to "Annotations for Rotary Servo Motor Specifications" on p. 2-27 in this catalog for the asterisks 1 to 6.

HG-JR 1500 r/min Series (200 V/400 V Class) Electromagnetic Brake Specifications (Note 1)

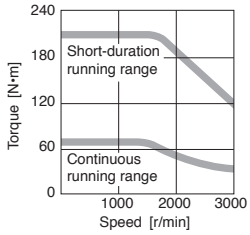
Model		HG-JR	11K1MB	15K1MB	11K1M4B	15K1M4B
Type			Spring actuated type safety brake			
Rated voltage			24 V DC $^{0}_{-10}$%			
Power consumption		[W] at 20 °C	32	32	32	32
Electromagnetic brake static friction torque		[N•m]	126	126	126	126
Permissible braking work	Per braking	[J]	5000	5000	5000	5000
	Per hour	[J]	45200	45200	45200	45200
Electromagnetic brake life (Note 2)	Number of brakings	[Times]	20000	20000	20000	20000
	Work per braking	[J]	400	400	400	400

Notes: 1. The electromagnetic brake is for holding. It should not be used for deceleration applications.
2. Brake gap is not adjustable. Electromagnetic brake life is defined as the time period until the readjustment is needed.

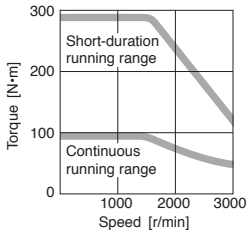
HG-JR 1500 r/min Series Torque Characteristics

200 V Class

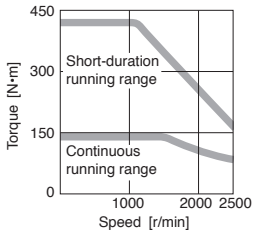
HG-JR11K1M(B) (Note 1, 4)



HG-JR15K1M(B) (Note 1, 4)

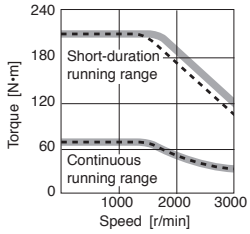


HG-JR22K1M (Note 1, 4)

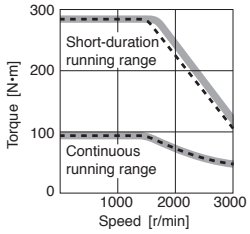


400 V Class

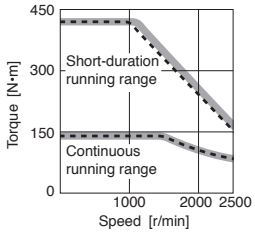
HG-JR11K1M4(B) (Note 2, 3, 4)



HG-JR15K1M4(B) (Note 2, 3, 4)



HG-JR22K1M4 (Note 2, 3, 4)



Notes: 1. ▬ : For 3-phase 200 V AC.
2. ▬ : For 3-phase 400 V AC.
3. - - - - : For 3-phase 380 V AC.
4. Torque drops when the power supply voltage is below the specified value.

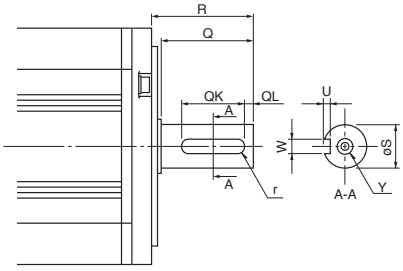
HG-JR 1500 r/min Series (200 V/400 V Class) Special Shaft End Specifications

Motors with the following specifications are also available.

Key shaft (without key) (Note 1, 2)

Model	Variable dimensions								
	S	R	Q	W	QK	QL	U	r	Y
HG-JR11K1M(B)K, 15K1M(B)K, 11K1M4(B)K, 15K1M4(B)K	55m6	116	110	16 $^{0}_{-0.040}$	90	5	6 $^{+0.2}_{0}$	8	M10 screw Depth: 27
HG-JR22K1MK, 22K1M4K	65m6	140	130	18 $^{0}_{-0.040}$	120	5	7 $^{+0.2}_{0}$	9	M12 screw Depth: 25

Notes: 1. The servo motors with special shaft end are not suitable for frequent start/stop applications.
2. A key is not supplied with the servo motor. The key shall be installed by the user.



[Unit: mm]

HG-RR Series (Ultra-low Inertia, Medium Capacity) Specifications

Rotary servo motor model		HG-RR	103(B)	153(B)	203(B)	353(B)	503(B)
Compatible servo amplifier model		MR-J4-	Refer to "Combinations of Rotary Servo Motor and Servo Amplifier" on p. 2-4 in this catalog.				
Power supply capacity *1		[kVA]	1.7	2.5	3.5	5.5	7.5
Continuous running duty	Rated output	[kW]	1.0	1.5	2.0	3.5	5.0
	Rated torque (Note 3)	[N•m]	3.2	4.8	6.4	11.1	15.9
Maximum torque		[N•m]	8.0	11.9	15.9	27.9	39.8
Rated speed		[r/min]	3000				
Maximum speed		[r/min]	4500				
Permissible instantaneous speed		[r/min]	5175				
Power rate at continuous rated torque	Standard	[kW/s]	67.4	120	176	150	211
	With electromagnetic brake	[kW/s]	54.8	101	153	105	163
Rated current		[A]	6.1	8.8	14	23	28
Maximum current		[A]	18	23	37	58	70
Regenerative braking frequency *2	MR-J4-	[times/min]	1090	860	710	174	125
Moment of inertia J	Standard	[× 10^{-4} kg•m^2]	1.50	1.90	2.30	8.30	12.0
	With electromagnetic brake	[× 10^{-4} kg•m^2]	1.85	2.25	2.65	11.8	15.5
Recommended load to motor inertia ratio (Note 1)			5 times or less				
Speed/position detector			Absolute/incremental 22-bit encoder (resolution: 4194304 pulses/rev)				
Oil seal			Attached				
Insulation class			155 (F)				
Structure			Totally enclosed, natural cooling (IP rating: IP65) (Note 2)				
Environment *3	Ambient temperature		0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)				
	Ambient humidity		80 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)				
	Ambience		Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust				
	Altitude		1000 m or less above sea level				
	Vibration resistance *4		X: 24.5 m/s^2 Y: 24.5 m/s^2				
Vibration rank			V10 *6				
Compliance to standards			Refer to "Conformity with Global Standards and Regulations" on p. 57 in this catalog.				
Permissible load for the shaft *5	L	[mm]	45	45	45	63	63
	Radial	[N]	686	686	686	980	980
	Thrust	[N]	196	196	196	392	392
Mass	Standard	[kg]	3.9	5.0	6.2	12	17
	With electromagnetic brake	[kg]	6.0	7.0	8.3	15	21

Notes: 1. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
2. The shaft-through portion is excluded. Refer to the asterisk 7 of "Annotations for Rotary Servo Motor Specifications" on p. 2-27 in this catalog for the shaft-through portion.
3. When unbalanced torque is generated, such as in a vertical lift machine, it is recommended that the unbalanced torque of the machine be kept under 70% of the servo motor rated torque.

Refer to "Annotations for Rotary Servo Motor Specifications" on p. 2-27 in this catalog for the asterisks 1 to 6.

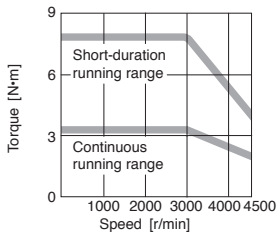
HG-RR Series Electromagnetic Brake Specifications (Note 1)

Model		HG-RR	103B	153B	203B	353B	503B
Type			Spring actuated type safety brake				
Rated voltage			24 V DC$^{0}_{-10}$%				
Power consumption		[W] at 20 °C	19	19	19	23	23
Electromagnetic brake static friction torque		[N•m]	7.0	7.0	7.0	17	17
Permissible braking work	Per braking	[J]	400	400	400	400	400
	Per hour	[J]	4000	4000	4000	4000	4000
Electromagnetic brake life (Note 2)	Number of brakings	[Times]	20000	20000	20000	20000	20000
	Work per braking	[J]	200	200	200	200	200

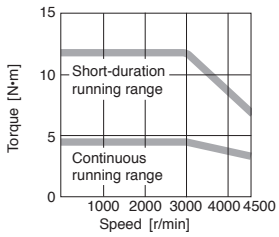
Notes: 1. The electromagnetic brake is for holding. It should not be used for deceleration applications.
2. Brake gap is not adjustable. Electromagnetic brake life is defined as the time period until the readjustment is needed.

HG-RR Series Torque Characteristics

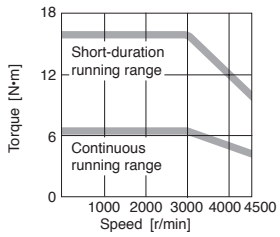
HG-RR103(B) (Note 1, 2)



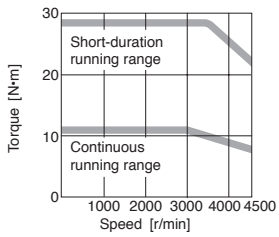
HG-RR153(B) (Note 1, 2)



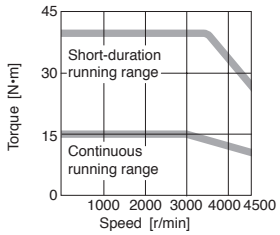
HG-RR203(B) (Note 1, 2)



HG-RR353(B) (Note 1, 2)



HG-RR503(B) (Note 1, 2)



Notes: 1. : For 3-phase 200 V AC.
2. Torque drops when the power supply voltage is below the specified value.

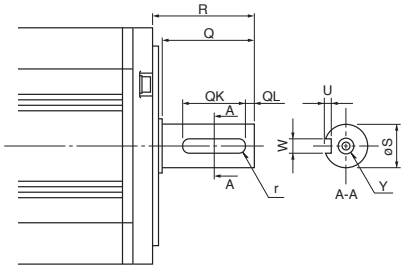
HG-RR Series Special Shaft End Specifications

Motors with the following specifications are also available.

Key shaft (without key) (Note 1, 2)

Model	Variable dimensions								
	S	R	Q	W	QK	QL	U	r	Y
HG-RR103(B)K, 153(B)K, 203(B)K	24h6	45	40	8 $^{0}_{-0.036}$	25	5	4 $^{+0.2}_{0}$	4	M8 screw Depth: 20
HG-RR353(B)K, 503(B)K	28h6	63	58	8 $^{0}_{-0.036}$	53	3	4 $^{+0.2}_{0}$	4	

Notes: 1. The servo motors with special shaft end are not suitable for frequent start/stop applications.
2. A key is not supplied with the servo motor. The key shall be installed by the user.



[Unit: mm]

HG-UR Series (Flat Type, Medium Capacity) Specifications

Rotary servo motor model		HG-UR	72(B)	152(B)	202(B)	352(B)	502(B)
Compatible servo amplifier model		MR-J4-	Refer to "Combinations of Rotary Servo Motor and Servo Amplifier" on p. 2-4 in this catalog.				
		MR-J4W_-					
Power supply capacity *1		[kVA]	1.3	2.5	3.5	5.5	7.5
Continuous running duty	Rated output	[kW]	0.75	1.5	2.0	3.5	5.0
	Rated torque (Note 3)	[N•m]	3.6	7.2	9.5	16.7	23.9
Maximum torque		[N•m]	10.7	21.5	28.6	50.1	71.6
Rated speed		[r/min]	2000				
Maximum speed		[r/min]	3000			2500	
Permissible instantaneous speed		[r/min]	3450			2875	
Power rate at continuous rated torque	Standard	[kW/s]	12.3	23.2	23.9	36.5	49.6
	With electromagnetic brake	[kW/s]	10.3	21.2	19.5	32.8	46.0
Rated current		[A]	5.4	9.7	14	23	28
Maximum current		[A]	16	29	42	69	84
Regenerative braking frequency *2	MR-J4-	[times/min]	53	124	68	44	31
	MR-J4W_-	[times/min]	107	-	-	-	-
Moment of inertia J	Standard	[× 10^{-4} kg•m^2]	10.4	22.1	38.2	76.5	115
	With electromagnetic brake	[× 10^{-4} kg•m^2]	12.5	24.2	46.8	85.1	124
Recommended load to motor inertia ratio (Note 1)			15 times or less				
Speed/position detector			Absolute/incremental 22-bit encoder (resolution: 4194304 pulses/rev)				
Oil seal			Attached				
Insulation class			155 (F)				
Structure			Totally enclosed, natural cooling (IP rating: IP65) (Note 2)				
Environment *3	Ambient temperature		0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)				
	Ambient humidity		80 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)				
	Ambience		Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust				
	Altitude		1000 m or less above sea level				
	Vibration resistance *4		X: 24.5 m/s^2 Y: 24.5 m/s^2		X: 24.5 m/s^2 Y: 49 m/s^2		
Vibration rank			V10 *6				
Compliance to standards			Refer to "Conformity with Global Standards and Regulations" on p. 57 in this catalog.				
Permissible load for the shaft *5	L	[mm]	55	55	65	65	65
	Radial	[N]	637	637	882	1176	1176
	Thrust	[N]	490	490	784	784	784
Mass	Standard	[kg]	8.0	11	16	20	24
	With electromagnetic brake	[kg]	10	13	22	26	30

Notes: 1. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
2. The shaft-through portion is excluded. Refer to the asterisk 7 of "Annotations for Rotary Servo Motor Specifications" on p. 2-27 in this catalog for the shaft-through portion.
3. When unbalanced torque is generated, such as in a vertical lift machine, it is recommended that the unbalanced torque of the machine be kept under 70% of the servo motor rated torque.

Refer to "Annotations for Rotary Servo Motor Specifications" on p. 2-27 in this catalog for the asterisks 1 to 6.

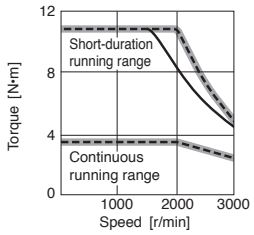
HG-UR Series Electromagnetic Brake Specifications (Note 1)

Model		HG-UR	72B	152B	202B	352B	502B
Type			Spring actuated type safety brake				
Rated voltage			24 V DC$^{0}_{-10}$%				
Power consumption		[W] at 20 °C	19	19	34	34	34
Electromagnetic brake static friction torque		[N•m]	8.5	8.5	44	44	44
Permissible braking work	Per braking	[J]	400	400	4500	4500	4500
	Per hour	[J]	4000	4000	45000	45000	45000
Electromagnetic brake life (Note 2)	Number of brakings	[Times]	20000	20000	20000	20000	20000
	Work per braking	[J]	200	200	1000	1000	1000

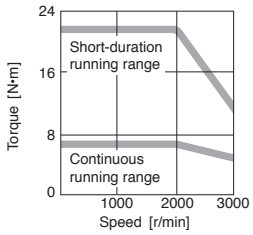
Notes: 1. The electromagnetic brake is for holding. It should not be used for deceleration applications.
2. Brake gap is not adjustable. Electromagnetic brake life is defined as the time period until the readjustment is needed.

HG-UR Series Torque Characteristics

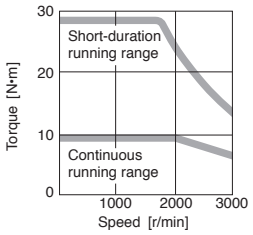
HG-UR72(B) (Note 1, 2, 3, 4)



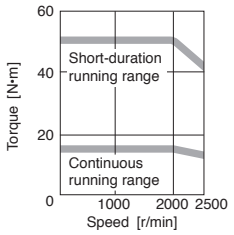
HG-UR152(B) (Note 1, 4)



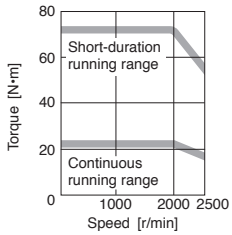
HG-UR202(B) (Note 1, 4)



HG-UR352(B) (Note 1, 4)



HG-UR502(B) (Note 1, 4)



Notes: 1. ——— : For 3-phase 200 V AC.
2. - - - - : For 1-phase 230 V AC.
3. ——— : For 1-phase 200 V AC.
This line is drawn only where differs from the other two lines.
4. Torque drops when the power supply voltage is below the specified value.

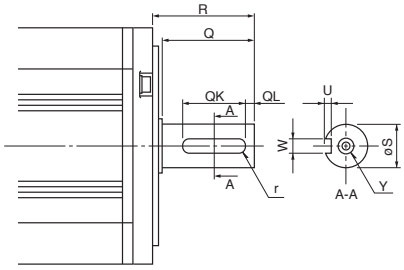
HG-UR Series Special Shaft End Specifications

Motors with the following specifications are also available.

Key shaft (without key) (Note 1, 2)

Model	Variable dimensions								
	S	R	Q	W	QK	QL	U	r	Y
HG-UR72(B)K	22h6	55	50	6 $^{0}_{-0.036}$	42	3	3.5 $^{+0.1}_{0}$	3	M8 screw Depth: 20
HG-UR152(B)K	28h6	55	50	8 $^{0}_{-0.036}$	40	3	4 $^{+0.2}_{0}$	4	
HG-UR202(B)K, 352(B)K, 502(B)K	35 $^{+0.010}_{0}$	65	60	10 $^{0}_{-0.036}$	50	5	5 $^{+0.2}_{0}$	5	

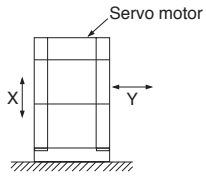
Notes: 1. The servo motors with special shaft end are not suitable for frequent start/stop applications.
2. A key is not supplied with the servo motor. The key shall be installed by the user.



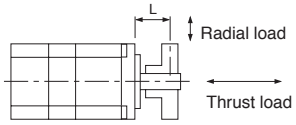
[Unit: mm]

Annotations for Rotary Servo Motor Specifications

* 1. The power supply capacity varies depending on the power supply impedance.
* 2. The regenerative braking frequency shows the permissible frequency when the servo motor, without a load and a regenerative option, decelerates from the rated speed to a stop. When a load is connected; however, the value will be the table value/(m+1), where m = Moment of inertia of load/Moment of inertia of servo motor.
When the operating speed exceeds the rated speed, the regenerative braking frequency is inversely proportional to the square of (operating speed/rated speed). Take measures to keep the regenerative power [W] during operation below the tolerable regenerative power [W]. Use caution, especially when the operating speed changes frequently or when the regeneration is constant (as with vertical feeds). Select the most suitable regenerative option for your system with our capacity selection software.
Refer to "Regenerative Option" in this catalog for the tolerable regenerative power [W] when regenerative option is used.
* 3. In the environment where the servo motor is exposed to oil mist, oil and/or water, a standard specification servo motor may not be usable. Contact your local sales office for more details.
* 4. The vibration direction is shown in the diagram below. The numerical value indicates the maximum value of the component (commonly the bracket in the opposite direction of the servo motor shaft).
Fretting more likely occurs on the bearing when the servo motor stops. Thus, maintain vibration level at approximately one-half of the allowable value.

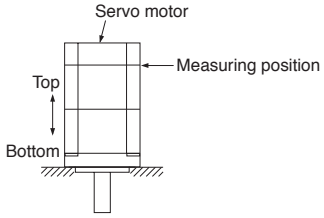


* 5. Refer to the diagram below for the permissible load for the shaft. Do not apply a load exceeding the value specified in the table on the shaft. The values in the table are applicable when each load is applied singly.

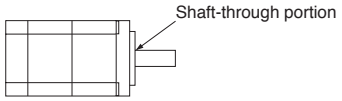


L: Distance between the flange mounting surface and the center of load

* 6. V10 indicates that the amplitude of the servo motor itself is 10 μm or less. The following shows mounting posture and measuring position of the servo motor during the measurement:



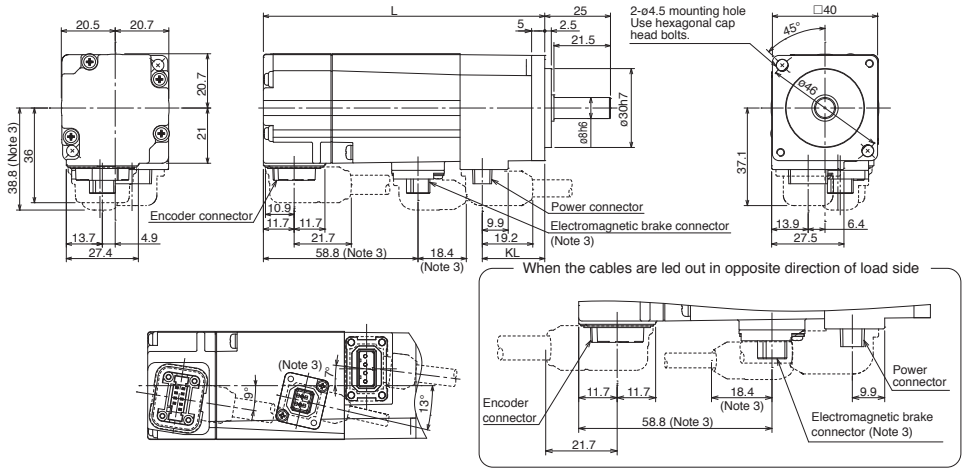
* 7. Refer to the diagram below for shaft-through portion.



HG-KR/HG-MR Series Dimensions (Note 1, 5, 6)

●HG-KR053(B), HG-KR13(B)

●HG-MR053(B), HG-MR13(B)



Power connector

Pin No.	Signal name
1	⏚ (PE)
2	U
3	V
4	W

Electromagnetic brake connector (Note 2)

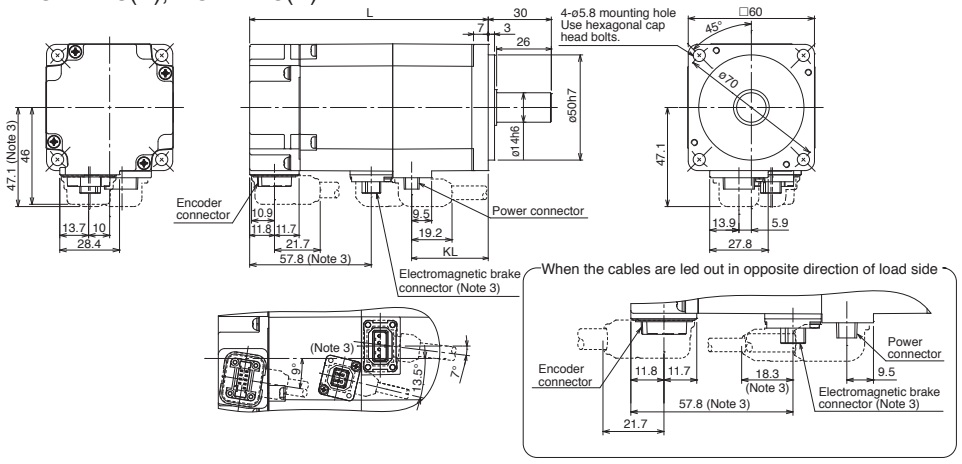
Pin No.	Signal name
1	B1
2	B2

Model	Variable dimensions (Note 4)	
	L	KL
HG-KR053(B) HG-MR053(B)	66.4 (107)	23.8
HG-KR13(B) HG-MR13(B)	82.4 (123)	39.8

[Unit: mm]

●HG-KR23(B), HG-KR43(B)

●HG-MR23(B), HG-MR43(B)



Power connector

Pin No.	Signal name
1	⏚ (PE)
2	U
3	V
4	W

Electromagnetic brake connector (Note 2)

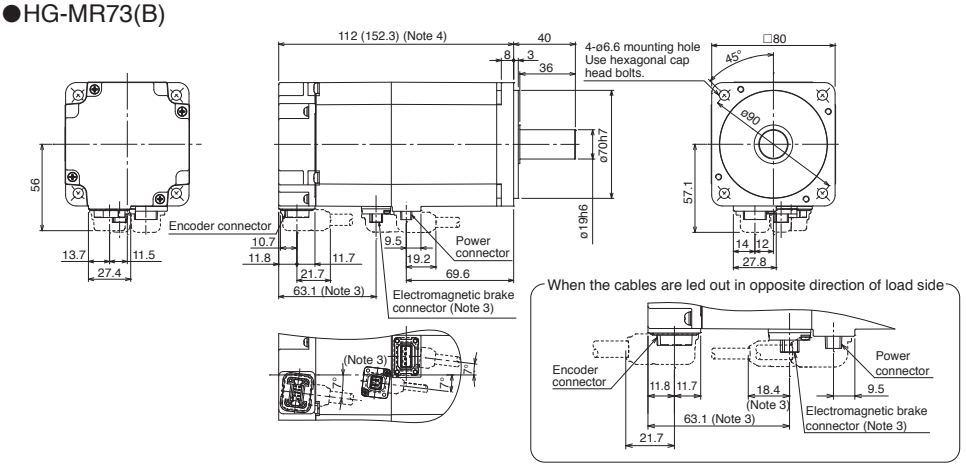
Pin No.	Signal name
1	B1
2	B2

Model	Variable dimensions (Note 4)	
	L	KL
HG-KR23(B) HG-MR23(B)	76.6 (113.4)	36.4
HG-KR43(B) HG-MR43(B)	98.3 (135.1)	58.1

[Unit: mm]

●HG-KR73(B)

●HG-MR73(B)



Power connector

Pin No.	Signal name
1	⏚ (PE)
2	U
3	V
4	W

Electromagnetic brake connector (Note 2)

Pin No.	Signal name
1	B1
2	B2

[Unit: mm]

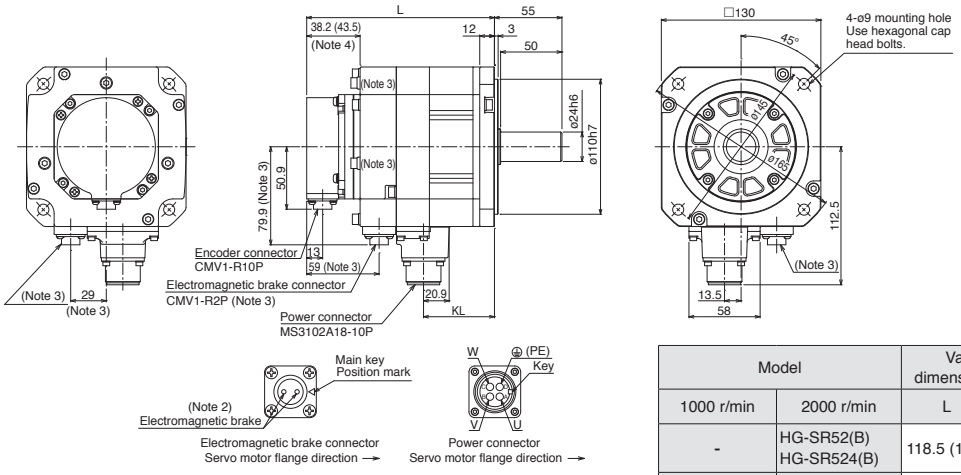
Notes: 1. For dimensions without tolerance, general tolerance applies.
2. The electromagnetic brake terminals (B1, B2) do not have polarity.
3. Only for the models with electromagnetic brake.
4. Dimensions in brackets are for the models with electromagnetic brake.
5. Use a friction coupling to fasten a load.
6. Servo motors with oil seal (HG-KR_J and HG-MR_J) have different dimensions. Contact your local sales office for more details.

HG-SR Series Dimensions (Note 1, 5)

●HG-SR51(B), HG-SR81(B)

●HG-SR52(B), HG-SR102(B), HG-SR152(B)

●HG-SR524(B), HG-SR1024(B), HG-SR1524(B)



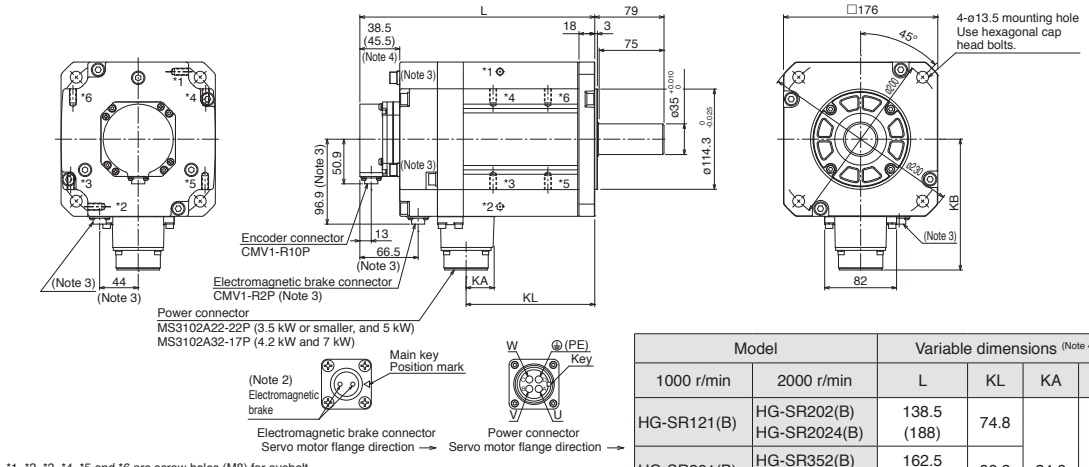
Model		Variable dimensions (Note 4)	
1000 r/min	2000 r/min	L	KL
-	HG-SR52(B) HG-SR524(B)	118.5 (153)	57.8
HG-SR51(B)	HG-SR102(B) HG-SR1024(B)	132.5 (167)	71.8
HG-SR81(B)	HG-SR152(B) HG-SR1524(B)	146.5 (181)	85.8

[Unit: mm]

●HG-SR121(B), HG-SR201(B), HG-SR301(B), HG-SR421(B)

●HG-SR202(B), HG-SR352(B), HG-SR502(B), HG-SR702(B)

●HG-SR2024(B), HG-SR3524(B), HG-SR5024(B), HG-SR7024(B)



*1, *2, *3, *4, *5 and *6 are screw holes (M8) for eyebolt.
•HG-SR201(B), 301(B), 352(4)(B), 502(4)(B): *1, *2
•HG-SR421(B), 702(4)(B): *3, *4, *5, *6

Model		Variable dimensions (Note 4)			
1000 r/min	2000 r/min	L	KL	KA	KB
HG-SR121(B)	HG-SR202(B) HG-SR2024(B)	138.5 (188)	74.8	24.8	140.9
HG-SR201(B)	HG-SR352(B) HG-SR3524(B)	162.5 (212)	98.8		
HG-SR301(B)	HG-SR502(B) HG-SR5024(B)	178.5 (228)	114.8		
HG-SR421(B)	HG-SR702(B) HG-SR7024(B)	218.5 (268)	146.8	32	149.1

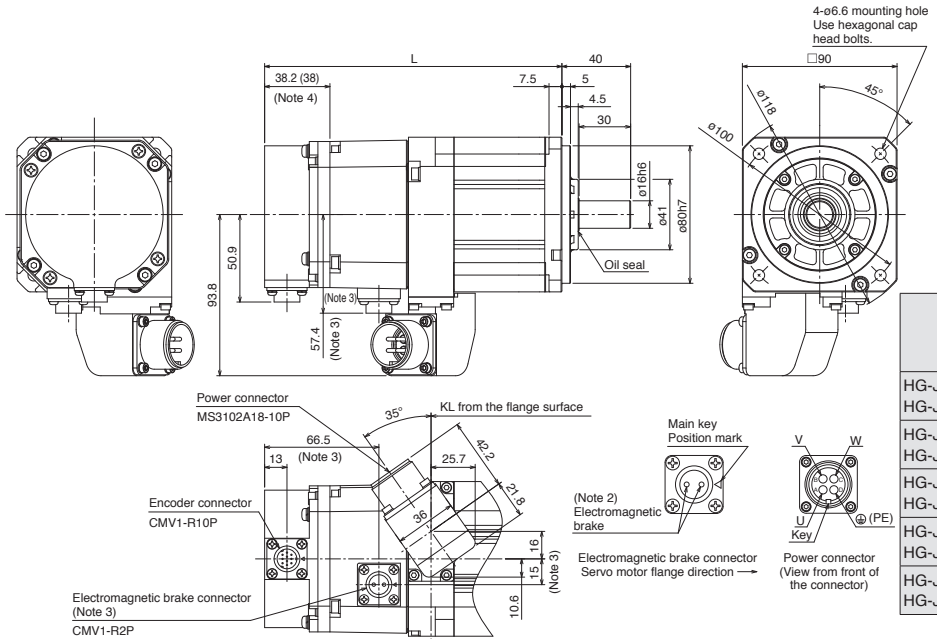
[Unit: mm]

Notes: 1. For dimensions without tolerance, general tolerance applies.
2. The electromagnetic brake terminals do not have polarity.
3. Only for the models with electromagnetic brake.
4. Dimensions in brackets are for the models with electromagnetic brake.
5. Use a friction coupling to fasten a load.

HG-JR Series Dimensions (Note 1, 5)

●HG-JR53(B), HG-JR73(B), HG-JR103(B), HG-JR153(B), HG-JR203(B)

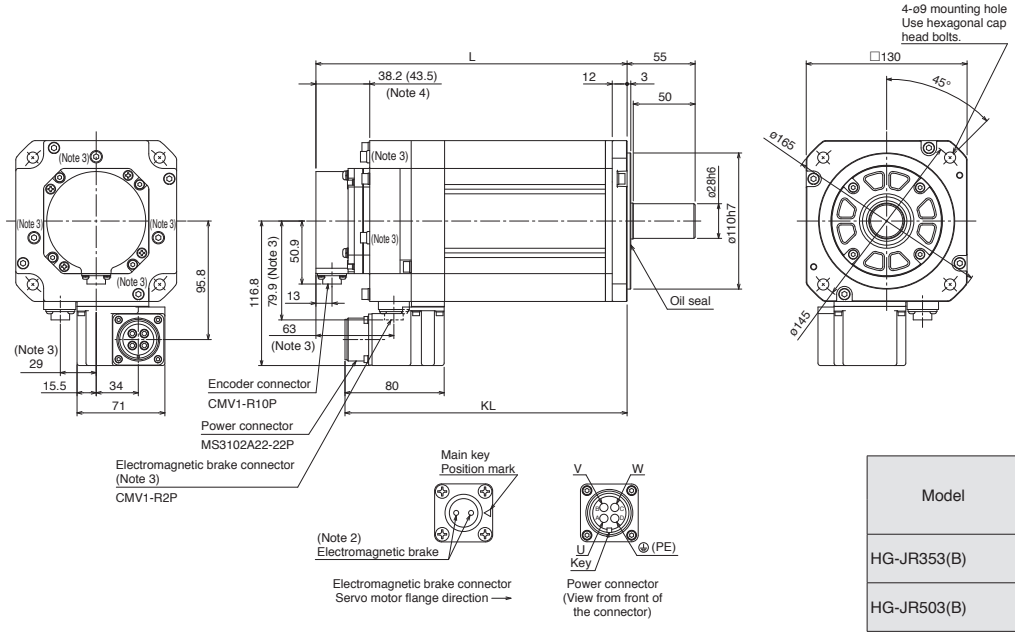
●HG-JR534(B), HG-JR734(B), HG-JR1034(B), HG-JR1534(B), HG-JR2034(B)



Model	Variable dimensions (Note 4)	
	L	KL
HG-JR53(B) HG-JR534(B)	127.5 (173)	76
HG-JR73(B) HG-JR734(B)	145.5 (191)	94
HG-JR103(B) HG-JR1034(B)	163.5 (209)	112
HG-JR153(B) HG-JR1534(B)	199.5 (245)	148
HG-JR203(B) HG-JR2034(B)	235.5 (281)	184

[Unit: mm]

●HG-JR353(B), HG-JR503(B)



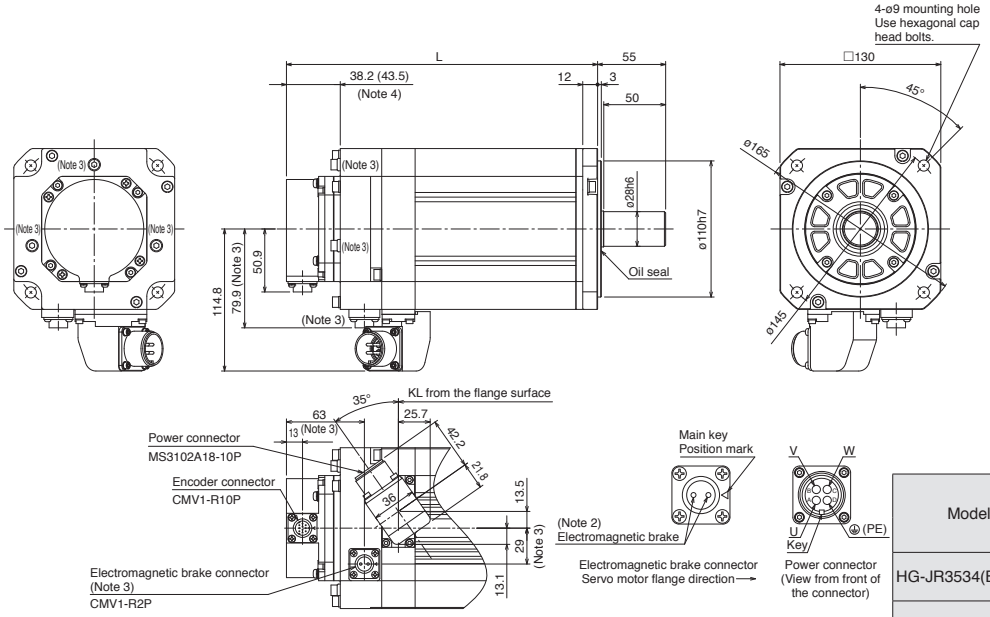
Model	Variable dimensions (Note 4)	
	L	KL
HG-JR353(B)	213 (251.5)	228
HG-JR503(B)	267 (305.5)	282

[Unit: mm]

Notes: 1. For dimensions without tolerance, general tolerance applies.
2. The electromagnetic brake terminals do not have polarity.
3. Only for the models with electromagnetic brake.
4. Dimensions in brackets are for the models with electromagnetic brake.
5. Use a friction coupling to fasten a load.

HG-JR Series Dimensions (Note 1, 5)

●HG-JR3534(B), HG-JR5034(B)

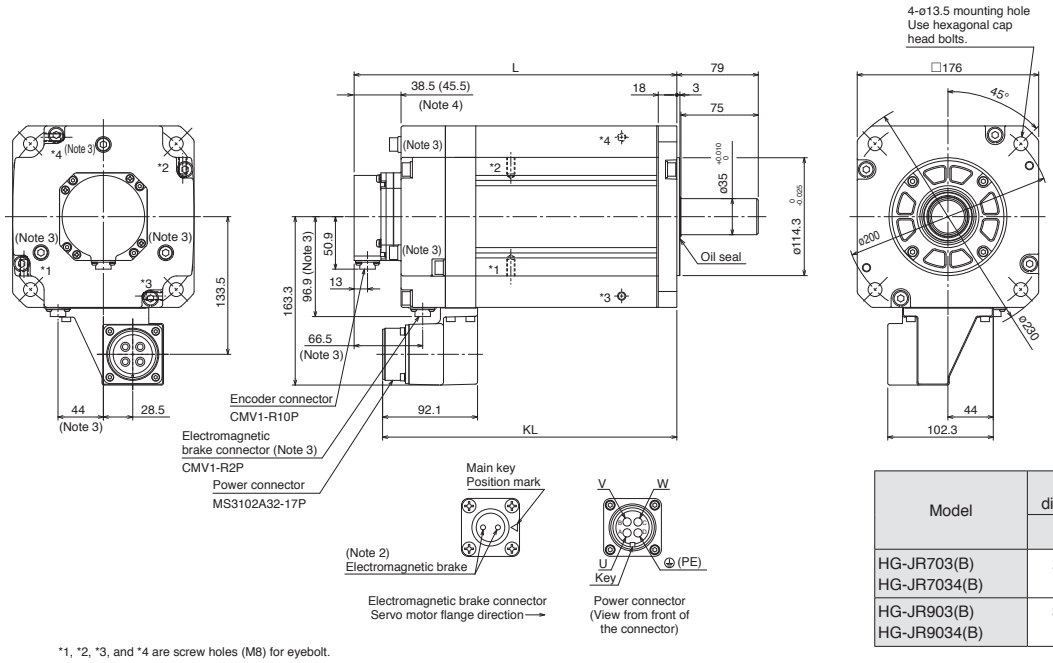


Model	Variable dimensions (Note 4)	
	L	KL
HG-JR3534(B)	213 (251.5)	161
HG-JR5034(B)	267 (305.5)	215

[Unit: mm]

●HG-JR703(B), HG-JR903(B)

●HG-JR7034(B), HG-JR9034(B)



Model	Variable dimensions (Note 4)	
	L	KL
HG-JR703(B) HG-JR7034(B)	263.5 (313)	285.4
HG-JR903(B) HG-JR9034(B)	303.5 (353)	325.4

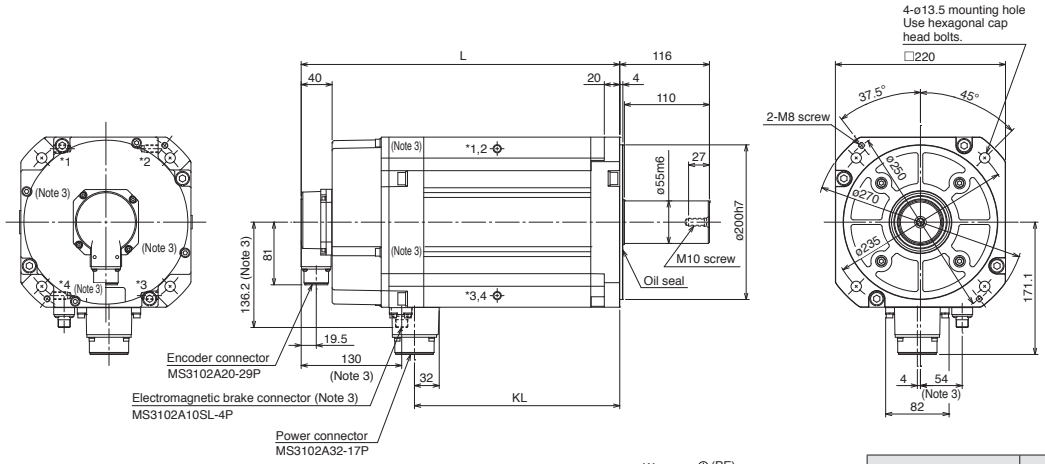
[Unit: mm]

Notes: 1. For dimensions without tolerance, general tolerance applies.
2. The electromagnetic brake terminals do not have polarity.
3. Only for the models with electromagnetic brake.
4. Dimensions in brackets are for the models with electromagnetic brake.
5. Use a friction coupling to fasten a load.

HG-JR Series Dimensions (Note 1, 5)

●HG-JR11K1M(B), HG-JR15K1M(B)

●HG-JR11K1M4(B), HG-JR15K1M4(B)



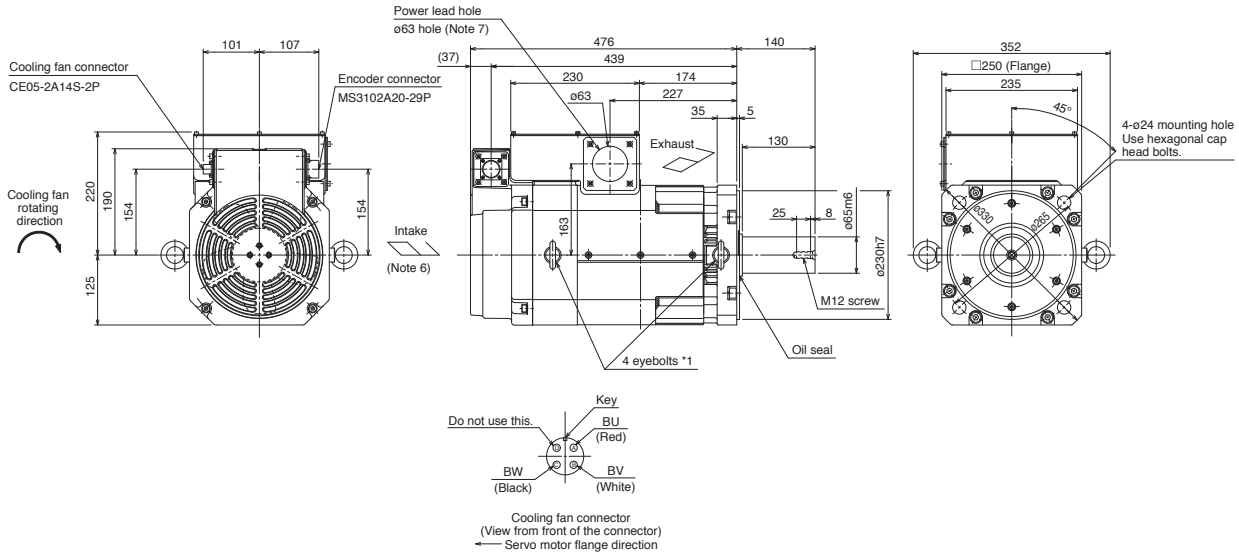
Model	Variable dimensions (Note 4)	
	L	KL
HG-JR11K1M(B) HG-JR11K1M4(B)	339.5 (412)	265.5
HG-JR15K1M(B) HG-JR15K1M4(B)	439.5 (512)	365.5

*1, *2, *3, and *4 are screw holes (M10) for eyebolt.

[Unit: mm]

●HG-JR22K1M

●HG-JR22K1M4



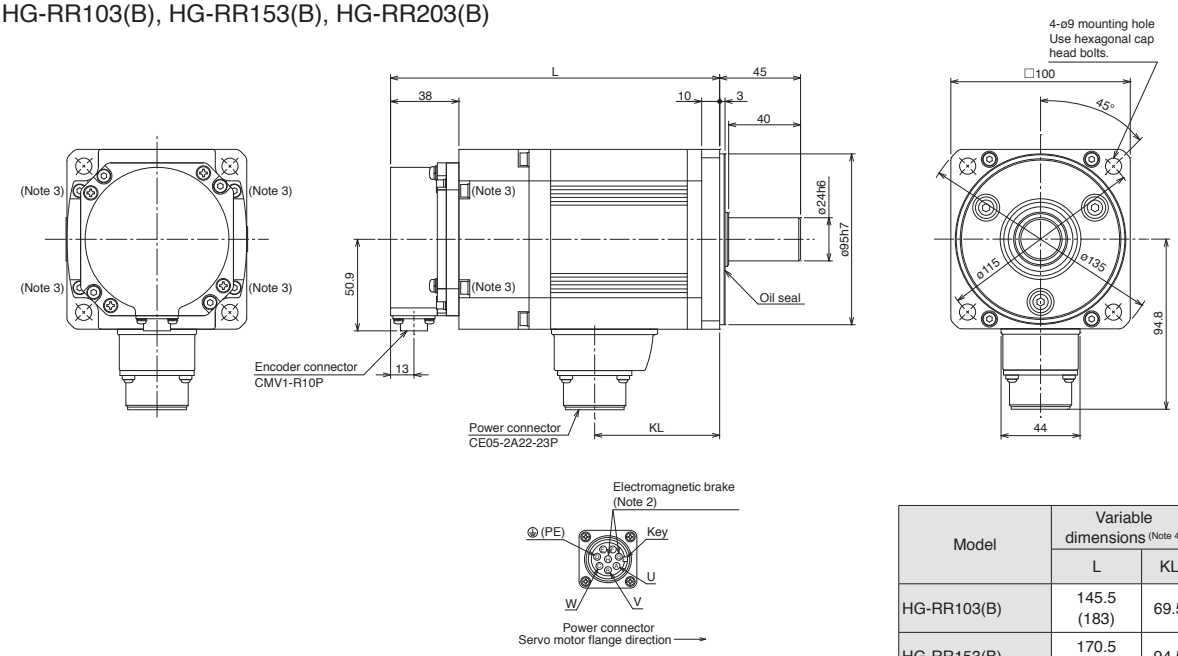
*1. When using the servo motor without the eyebolt, plug the threaded hole with a bolt of M12 × 20 or shorter.
*2. The terminal block in the terminal box consists of M10 screws for the motor power input (U, V, and W), and M3.5 screws for the thermistors (OHS1 and OHS2).

[Unit: mm]

Notes: 1. For dimensions without tolerance, general tolerance applies.
2. The electromagnetic brake terminals do not have polarity.
3. Only for the models with electromagnetic brake.
4. Dimensions in brackets are for the models with electromagnetic brake.
5. Use a friction coupling to fasten a load.
6. Leave a clearance of at least 150 mm between the intake side of the servo motor and wall.
7. Prevent oil, water, dust, and other foreign matter from entering the servo motor through the lead hole.
8. A washer is placed between the eyebolt and the servo motor to adjust the bolt angle.

HG-RR Series Dimensions (Note 1, 5)

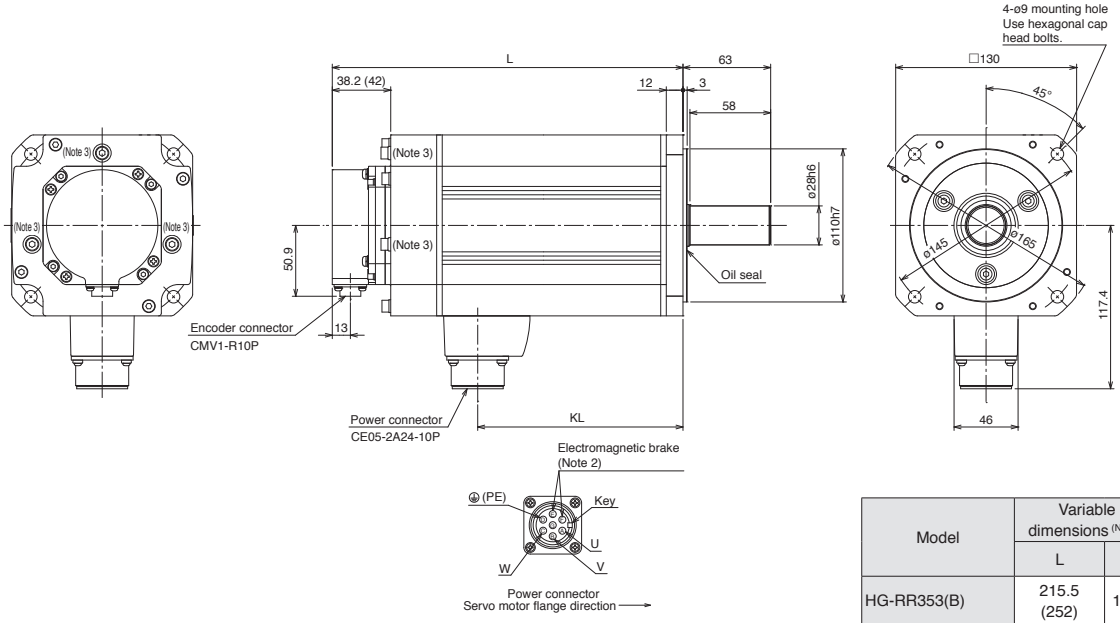
●HG-RR103(B), HG-RR153(B), HG-RR203(B)



Model	Variable dimensions (Note 4)	
	L	KL
HG-RR103(B)	145.5 (183)	69.5
HG-RR153(B)	170.5 (208)	94.5
HG-RR203(B)	195.5 (233)	119.5

[Unit: mm]

●HG-RR353(B), HG-RR503(B)



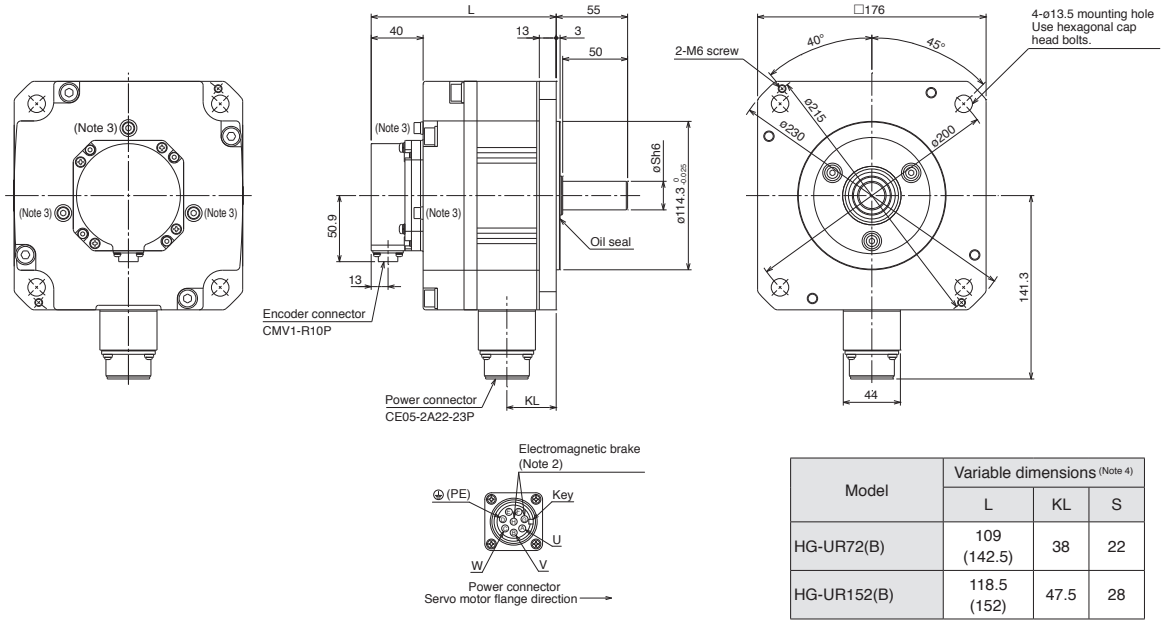
Model	Variable dimensions (Note 4)	
	L	KL
HG-RR353(B)	215.5 (252)	147.5
HG-RR503(B)	272.5 (309)	204.5

[Unit: mm]

Notes: 1. For dimensions without tolerance, general tolerance applies.
2. The electromagnetic brake terminals do not have polarity.
3. Only for the models with electromagnetic brake.
4. Dimensions in brackets are for the models with electromagnetic brake.
5. Use a friction coupling to fasten a load.

HG-UR Series Dimensions (Note 1, 5)

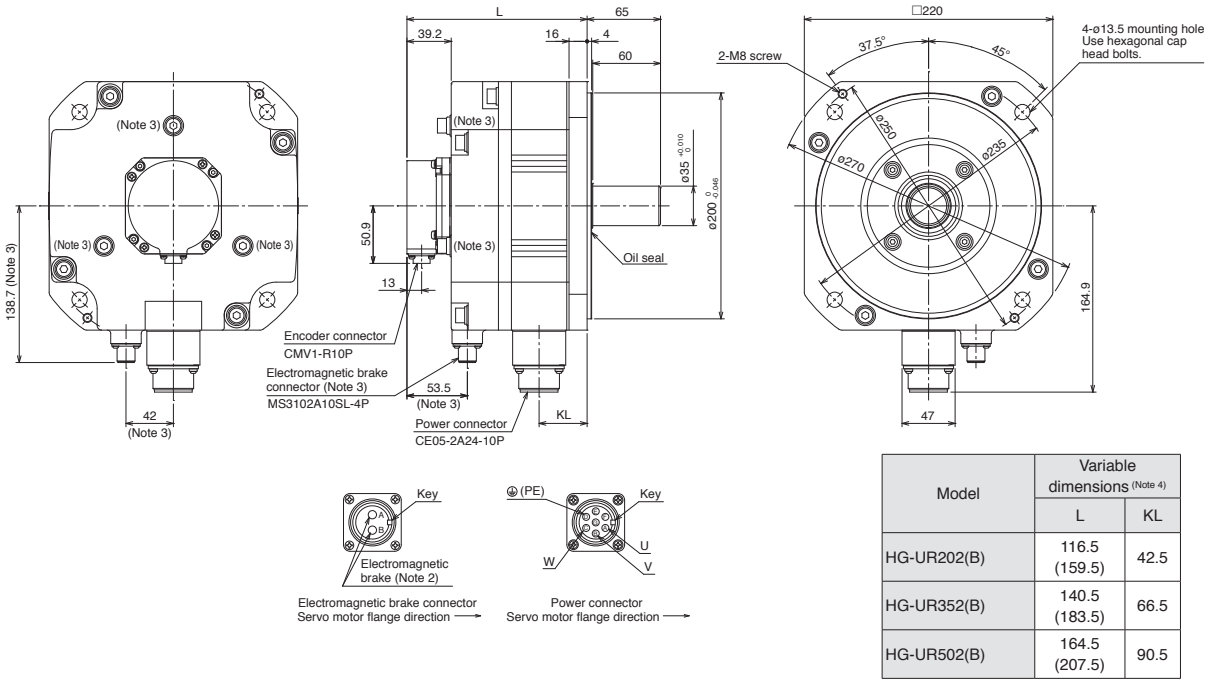
●HG-UR72(B), HG-UR152(B)



Model	Variable dimensions (Note 4)		
	L	KL	S
HG-UR72(B)	109 (142.5)	38	22
HG-UR152(B)	118.5 (152)	47.5	28

[Unit: mm]

●HG-UR202(B), HG-UR352(B), HG-UR502(B)



Model	Variable dimensions (Note 4)	
	L	KL
HG-UR202(B)	116.5 (159.5)	42.5
HG-UR352(B)	140.5 (183.5)	66.5
HG-UR502(B)	164.5 (207.5)	90.5

[Unit: mm]

Notes: 1. For dimensions without tolerance, general tolerance applies.
2. The electromagnetic brake terminals do not have polarity.
3. Only for the models with electromagnetic brake.
4. Dimensions in brackets are for the models with electromagnetic brake.
5. Use a friction coupling to fasten a load.

HG-KR Series Geared Servo Motor Specifications

With reducer for general industrial machines: G1

Model	Output [W]	Reduction ratio	Actual reduction ratio	Moment of inertia J [× 10^{-4} kg•m^2] (Note 1)		Permissible load to motor inertia ratio (Note 2) (when converted into the servo motor shaft)	Mass [kg]		Lubrication method	Mounting direction
				Standard	With electromagnetic brake		Standard	With electromagnetic brake		
HG-KR053(B)G1	50	1/5	9/44	0.0820	0.0840	5 times or less	1.4	1.6	Grease (filled)	Any direction
		1/12	49/576	0.104	0.106		1.8	2.0		
		1/20	25/484	0.0860	0.0880					
HG-KR13(B)G1	100	1/5	9/44	0.115	0.121	5 times or less	1.6	1.8		
		1/12	49/576	0.137	0.143		2.0	2.2		
		1/20	25/484	0.119	0.125					
HG-KR23(B)G1	200	1/5	19/96	0.375	0.397	7 times or less	3.3	3.7		
		1/12	961/11664	0.418	0.440		3.9	4.3		
		1/20	513/9984	0.391	0.413					
HG-KR43(B)G1	400	1/5	19/96	0.525	0.547	7 times or less	3.7	4.1		
		1/12	961/11664	0.568	0.590		4.3	4.7		
		1/20	7/135	0.881	0.903		5.4	5.8		
HG-KR73(B)G1	750	1/5	1/5	1.68	1.79	5 times or less	6.0	7.0		
		1/12	7/87	2.35	2.46		7.1	8.1		
		1/20	625/12544	2.41	2.52		10	11		

Item	Specifications
Mounting method	Flange mounting
Output shaft rotating direction	Same as the servo motor output shaft direction
Backlash (Note 4)	60 minutes or less at reducer output shaft
Maximum torque	Three times of the rated torque (Refer to HG-KR series specifications in this catalog for the rated torque.)
Permissible speed (at servo motor shaft)	4500 r/min (permissible instantaneous speed: 5175 r/min)
IP rating (reducer part)	Equivalent to IP44
Reducer efficiency (Note 3)	45% to 75%

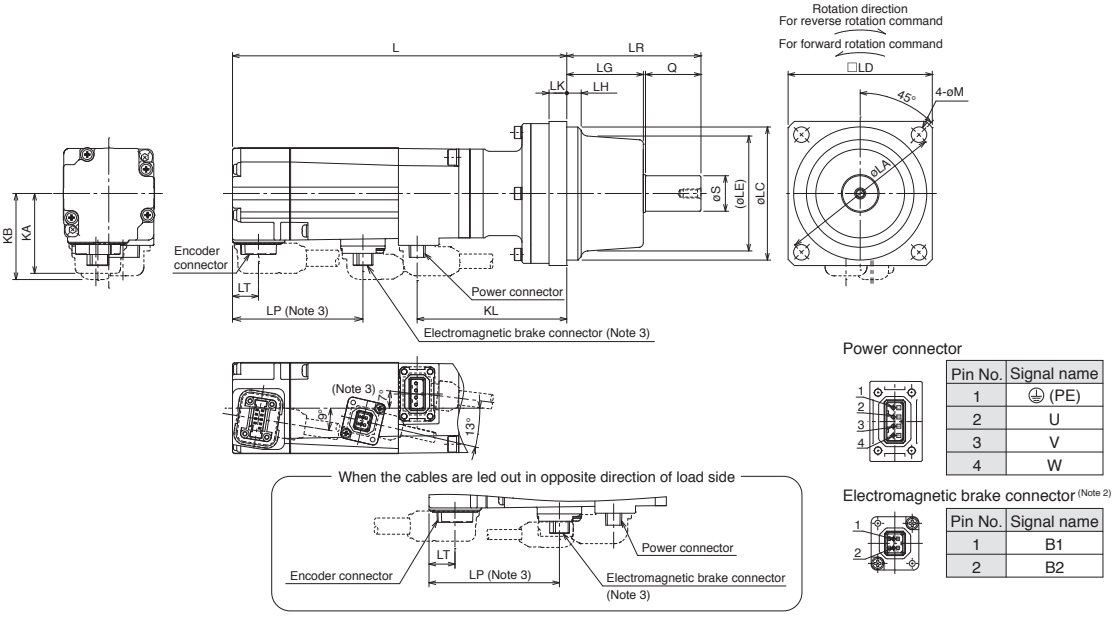
Notes: 1. The moments of inertia in the table are the values that are converted into motor shaft for the servo motor with reducer (and with electromagnetic brake).
2. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
3. The reducer efficiency varies depending on the reduction ratio. It also changes depending on the conditions of use, such as output torque, speed, and temperature. The values in the table represent typical values at the rated torque and speed and at the normal temperature. They are not guaranteed values.
4. The backlash can be converted: 1 minute = 0.0167°

HG-KR Series Geared Servo Motor Dimensions (Note 1, 5)

With reducer for general industrial machines

●HG-KR_(B)G1

Drawing is schematic only, and the shapes or the mounting screws may differ from those of the actual servo motor. Refer to "Servo Motor Instruction Manual (Vol. 3)" for details.



Power connector

Pin No.	Signal name
1	⏚ (PE)
2	U
3	V
4	W

Electromagnetic brake connector (Note 2)

Pin No.	Signal name
1	B1
2	B2

[Unit: mm]

Model	Reduction ratio (Actual reduction ratio)	Variable dimensions (Note 4)																
		L	LA	LC	LD	LE	S	LH	LK	KL	LG	Q	LR	M	KA	KB	LT	LP
HG-KR053(B)G1	1/5 (9/44)	110.1 (150.7)	75	60h7	65	51	16h6	6.5	8	67.5	34.5	25	60.5	7	36	37.1 (38.8)	11.7	– (58.8)
	1/12 (49/576)	128.9 (169.5)								86.3								
	1/20 (25/484)																	
HG-KR13(B)G1	1/5 (9/44)	126.1 (166.7)								83.5								
	1/12 (49/576)	144.9 (185.5)								102.3								
	1/20 (25/484)																	
HG-KR23(B)G1	1/5 (19/96)	129.8 (166.6)	100	82h7	90	76	25h6	8	10	89.6	38	35	74	9	46	47.1 (47.1)	11.8	– (57.8)
	1/12 (961/11664)	149.6 (186.4)				75				109.4								
	1/20 (513/9984)																	
HG-KR43(B)G1	1/5 (19/96)	151.5 (188.3)				76				111.3								
	1/12 (961/11664)	171.3 (208.1)				75				131.1								
	1/20 (7/135)	175.3 (212.1)	115	95h7	100	83	32h6	9.5		135.1	39	50	90		56	57.1 (57.1)		– (63.1)
HG-KR73(B)G1	1/5 (1/5)	177 (217.3)				81		10		134.6								
	1/12 (7/87)	199 (239.3)				83		9.5		156.6								
	1/20 (625/12544)	212 (252.3)	140	115h7	120	98	40h6	11.5	15	169.6	44.5	60	105.5	14				

Notes: 1. For dimensions without tolerance, general tolerance applies. The actual dimensions may be 1 mm to 3 mm larger than the dimensions indicated since the outer frame of the reducer is made by casting. Make allowance for the actual dimensions in the design of a machine.
2. The electromagnetic brake terminals (B1, B2) do not have polarity.
3. Only for the models with electromagnetic brake.
4. Dimensions in brackets are for the models with electromagnetic brake.
5. Use a friction coupling to fasten a load.

HG-KR Series Geared Servo Motor Specifications

With flange-output type reducer for high precision applications, flange mounting: G5

Model	Output [W]	Reduction ratio	Moment of inertia J [× 10^{-4} kg•m^2] (Note 1)		Permissible load to motor inertia ratio (Note 2) (when converted into the servo motor shaft)	Mass [kg]		Lubrication method	Mounting direction
			Standard	With electromagnetic brake		Standard	With electromagnetic brake		
HG-KR053(B)G5	50	1/5 (40 × 40)	0.0485	0.0507	10 times or less	0.55	0.75	Grease (filled)	Any direction
		1/5 (60 × 60)	0.113	0.115		1.1	1.3		
		1/9	0.0475	0.0497		0.56	0.76		
		1/11	0.105	0.107		1.2	1.4		
		1/21	0.0960	0.0980					
		1/33	0.0900	0.0920					
		1/45	0.0900	0.0920					
HG-KR13(B)G5	100	1/5 (40 × 40)	0.0812	0.0872	10 times or less	0.75	0.95		
		1/5 (60 × 60)	0.146	0.152		1.3	1.5		
		1/11	0.138	0.144		1.4	1.6		
		1/21	0.129	0.135					
		1/33	0.140	0.146		2.6	2.8		
		1/45	0.139	0.145					
HG-KR23(B)G5	200	1/5	0.422	0.444	14 times or less	1.8	2.2		
		1/11	0.424	0.446		1.9	2.3		
		1/21	0.719	0.741		3.4	3.8		
		1/33	0.673	0.695					
		1/45	0.672	0.694					
HG-KR43(B)G5	400	1/5	0.572	0.594	14 times or less	2.3	2.7		
		1/11	0.947	0.969		3.9	4.3		
		1/21	0.869	0.891					
		1/33	0.921	0.943		6.0	6.4		
		1/45	0.915	0.937					
HG-KR73(B)G5	750	1/5	1.91	2.02	10 times or less	4.8	5.8		
		1/11	1.82	1.93		5.1	6.1		
		1/21	2.01	2.12		7.2	8.2		
		1/33	1.79	1.90					
		1/45	1.79	1.90					

Item	Specifications
Mounting method	Flange mounting
Output shaft rotating direction	Same as the servo motor output shaft direction
Backlash (Note 4)	3 minutes or less at reducer output shaft
Maximum torque	Three times of the rated torque (Refer to HG-KR series specifications in this catalog for the rated torque.)
Permissible speed (at servo motor shaft)	6000 r/min (permissible instantaneous speed: 6900 r/min)
IP rating (reducer part)	Equivalent to IP44
Reducer efficiency (Note 3)	1/5 (60 × 60), 1/11, 1/21, 1/33 and 1/45 of HG-KR053(B)G5: 22% to 41% 1/5 (40 × 40) and 1/9 of HG-KR053(B)G5, and HG-KR13(B)G5 to HG-KR73(B)G5: 58% to 87%

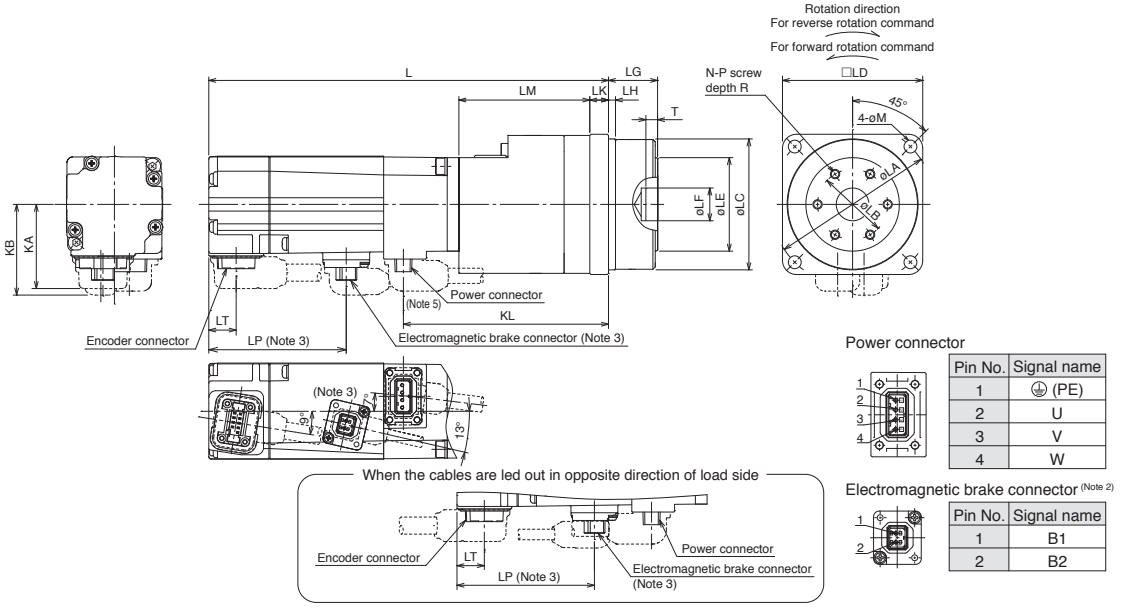
Notes: 1. The moments of inertia in the table are the values that are converted into motor shaft for the servo motor with reducer (and with electromagnetic brake).
2. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
3. The reducer efficiency varies depending on the reduction ratio. It also changes depending on the conditions of use, such as output torque, speed, and temperature. The values in the table represent typical values at the rated torque and speed and at the normal temperature. They are not guaranteed values.
4. The backlash can be converted: 1 minute = 0.0167°

HG-KR Series Geared Servo Motor Dimensions (Note 1)

With flange-output type reducer for high precision applications, flange mounting

●HG-KR_(B)G5

Drawing is schematic only, and the shapes or the mounting screws may differ from those of the actual servo motor. Refer to "Servo Motor Instruction Manual (Vol. 3)" for details.



Power connector

Pin No.	Signal name
1	⏚ (PE)
2	U
3	V
4	W

Electromagnetic brake connector (Note 2)

Pin No.	Signal name
1	B1
2	B2

[Unit: mm]

Model	Reduction ratio	Variable dimensions (Note 4)																				
		L	LA	LB	LC	LD	LE	LF	LG	LH	LK	LM	KL	T	N	P	R	M	KA	KB	LT	LP
HG-KR053(B)G5	1/5 (40 × 40)	105.9 (146.5)	46	18	40h7	40	24	5H7	15 +0.25 -0.20	2.5	5	34.5	63.3	3	3	M4	6	3.4	36	37.1 (38.8)	11.7	– (58.8)
	1/5 (60 × 60) (Note 5)	130.4 (171)	70	30	56h7	60	40	14H7	21 +0.4 -0.5	3	8	56	87.8	5	6		7	5.5				
	1/9	105.9 (146.5)	46	18	40h7	40	24	5H7	15 +0.25 -0.20	2.5	5	34.5	63.3	3	3		6	3.4				
	1/11 (Note 5)	130.4 (171)	70	30	56h7	60	40	14H7	21 +0.4 -0.5	3	8	56	87.8	5	6		7	5.5				
	1/21 (Note 5)																					
	1/33 (Note 5)																					
	1/45 (Note 5)																					
HG-KR13(B)G5	1/5 (40 × 40)	121.9 (162.5)	46	18	40h7	40	24	5H7	15 +0.25 -0.20	2.5	5	34.5	79.3	3	3	M4	6	3.4	46	47.1 (47.1)	11.8	– (57.8)
	1/5 (60 × 60) (Note 5)	146.4 (187)	70	30	56h7	60	40	14H7	21 +0.4 -0.5	3	8	56	103.8	5	6		7	5.5				
	1/11 (Note 5)																					
	1/21 (Note 5)																					
	1/33 (Note 5)	148.9 (189.5)	105	45	85h7	90	59	24H7	27 +0.4 -0.5	8	10	56.5	106.3			M6	10	9				
	1/45 (Note 5)																					
HG-KR23(B)G5	1/5	140.6 (177.4)	70	30	56h7	60	40	14H7	21 +0.4 -0.5	3	8	56	100.4			M4	7	5.5				
	1/11																					
	1/21 (Note 5)	147.6 (184.4)	105	45	85h7	90	59	24H7	27 +0.4 -0.5	8	10	61	107.4			M6	10	9				
	1/33 (Note 5)																					
	1/45 (Note 5)																					
HG-KR43(B)G5	1/5	162.3 (199.1)	70	30	56h7	60	40	14H7	21 +0.4 -0.5	3	8	56	122.1			M4	7	5.5				
	1/11	169.3 (206.1)	105	45	85h7	90	59	24H7	27 +0.4 -0.5	8	10	61	129.1			M6	10	9				
	1/21																					
	1/33	181.3 (218.1)	135	60	115h7	120	84	32H7	35 +0.4 -0.5	13	13	70	141.1			M8	12	11				
	1/45																					
HG-KR73(B)G5	1/5	190 (230.3)	105	45	85h7	90	59	24H7	27 +0.4 -0.5	8	10	68	147.6			M6	10	9	56	57.1 (57.1)		– (63.1)
	1/11																					
	1/21	200 (240.3)	135	60	115h7	120	84	32H7	35 +0.4 -0.5	13	13	75	157.6			M8	12	11				
	1/33																					
	1/45																					

Notes: 1. For dimensions without tolerance, general tolerance applies. The actual dimensions may be 1 mm to 3 mm larger than the dimensions indicated since the outer frame of the reducer is made by casting. Make allowance for the actual dimensions in the design of a machine.
2. The electromagnetic brake terminals (B1, B2) do not have polarity.
3. Only for the models with electromagnetic brake.
4. Dimensions in brackets are for the models with electromagnetic brake.
5. Lead out the power cable in opposite direction of the motor shaft.

HG-KR Series Geared Servo Motor Specifications

With shaft-output type reducer for high precision applications, flange mounting: G7

Model	Output [W]	Reduction ratio	Moment of inertia J [× 10^{-4} kg•m^2] (Note 1)		Permissible load to motor inertia ratio (Note 2) (when converted into the servo motor shaft)	Mass [kg]		Lubrication method	Mounting direction
			Standard	With electromagnetic brake		Standard	With electromagnetic brake		
HG-KR053(B)G7	50	1/5 (40 × 40)	0.0512	0.0534	10 times or less	0.58	0.78	Grease (filled)	Any direction
		1/5 (60 × 60)	0.119	0.121		1.2	1.4		
		1/9	0.0492	0.0514		0.58	0.78		
		1/11	0.106	0.108		1.3	1.5		
		1/21	0.0960	0.0980					
		1/33	0.0900	0.0920					
		1/45	0.0900	0.0920					
HG-KR13(B)G7	100	1/5 (40 × 40)	0.0839	0.0899	10 times or less	0.78	0.98		
		1/5 (60 × 60)	0.152	0.158		1.4	1.6		
		1/11	0.139	0.145		1.5	1.7		
		1/21	0.129	0.135					
		1/33	0.141	0.147		3.0	3.2		
		1/45	0.139	0.145					
HG-KR23(B)G7	200	1/5	0.428	0.450	14 times or less	1.9	2.3		
		1/11	0.424	0.446		2.0	2.4		
		1/21	0.721	0.743		3.8	4.2		
		1/33	0.674	0.696					
		1/45	0.672	0.694					
HG-KR43(B)G7	400	1/5	0.578	0.600	14 times or less	2.4	2.8		
		1/11	0.955	0.977		4.3	4.7		
		1/21	0.871	0.893					
		1/33	0.927	0.949		7.4	7.8		
		1/45	0.918	0.940					
HG-KR73(B)G7	750	1/5	1.95	2.06	10 times or less	5.2	6.2		
		1/11	1.83	1.94		5.5	6.5		
		1/21	2.03	2.14		8.6	9.6		
		1/33	1.80	1.91					
		1/45	1.79	1.90					

Item	Specifications
Mounting method	Flange mounting
Output shaft rotating direction	Same as the servo motor output shaft direction
Backlash (Note 4)	3 minutes or less at reducer output shaft
Maximum torque	Three times of the rated torque (Refer to HG-KR series specifications in this catalog for the rated torque.)
Permissible speed (at servo motor shaft)	6000 r/min (permissible instantaneous speed: 6900 r/min)
IP rating (reducer part)	Equivalent to IP44
Reducer efficiency (Note 3)	1/5 (60 × 60), 1/11, 1/21, 1/33 and 1/45 of HG-KR053(B)G7: 22% to 41% 1/5 (40 × 40) and 1/9 of HG-KR053(B)G7, and HG-KR13(B)G7 to HG-KR73(B)G7: 58% to 87%

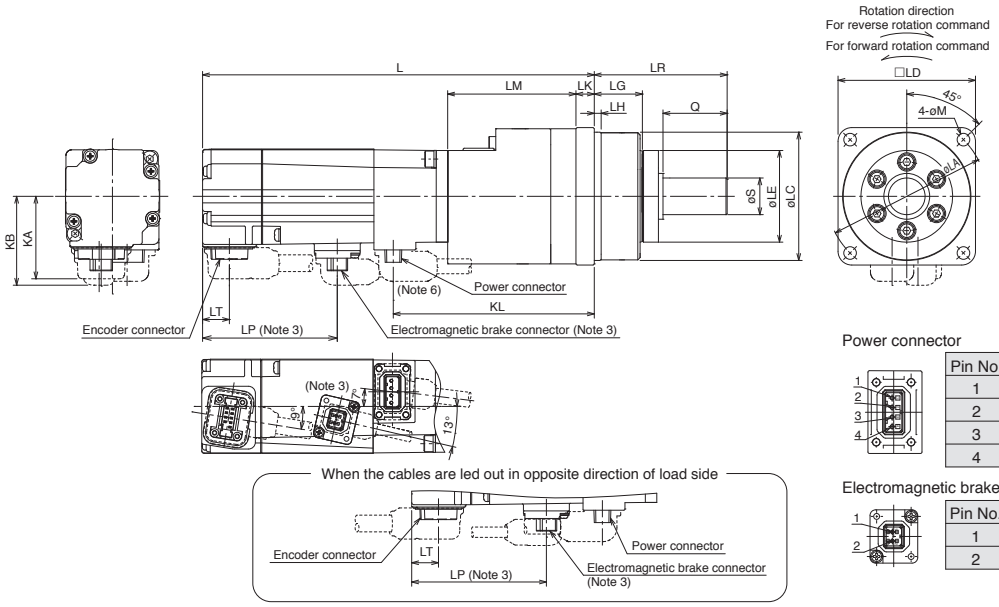
Notes: 1. The moments of inertia in the table are the values that are converted into motor shaft for the servo motor with reducer (and with electromagnetic brake).
2. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
3. The reducer efficiency varies depending on the reduction ratio. It also changes depending on the conditions of use, such as output torque, speed, and temperature. The values in the table represent typical values at the rated torque and speed and at the normal temperature. They are not guaranteed values.
4. The backlash can be converted: 1 minute = 0.0167°

HG-KR Series Geared Servo Motor Dimensions (Note 1, 5, 7)

With shaft-output type reducer for high precision applications, flange mounting

●HG-KR_(B)G7

Drawing is schematic only, and the shapes or the mounting screws may differ from those of the actual servo motor. Refer to "Servo Motor Instruction Manual (Vol. 3)" for details.



Power connector

Pin No.	Signal name
1	⏚ (PE)
2	U
3	V
4	W

Electromagnetic brake connector (Note 2)

Pin No.	Signal name
1	B1
2	B2

[Unit: mm]

Model	Reduction ratio	Variable dimensions (Note 4)																	
		L	LA	LC	LD	LE	S	LG	LH	Q	LR	LK	LM	KL	M	KA	KB	LT	LP
HG-KR053(B)G7	1/5 (40 × 40)	105.9 (146.5)	46	40h7	40	29	10h7	15	2.5	20	42	5	34.5	63.3	3.4	36	37.1 (38.8)	11.7	– (58.8)
	1/5 (60 × 60) (Note 6)	130.4 (171)	70	56h7	60	40	16h7	21	3	28	58	8	56	87.8	5.5				
	1/9	105.9 (146.5)	46	40h7	40	29	10h7	15	2.5	20	42	5	34.5	63.3	3.4				
	1/11 (Note 6)	130.4 (171)	70	56h7	60	40	16h7	21	3	28	58	8	56	87.8	5.5				
	1/21 (Note 6)																		
	1/33 (Note 6)																		
	1/45 (Note 6)																		
HG-KR13(B)G7	1/5 (40 × 40)	121.9 (162.5)	46	40h7	40	29	10h7	15	2.5	20	42	5	34.5	79.3	3.4				
	1/5 (60 × 60) (Note 6)	146.4 (187)	70	56h7	60	40	16h7	21	3	28	58	8	56	103.8	5.5				
	1/11 (Note 6)																		
	1/21 (Note 6)																		
	1/33 (Note 6)	148.9 (189.5)	105	85h7	90	59	25h7	27	8	42	80	10	56.5	106.3	9				
	1/45 (Note 6)																		
HG-KR23(B)G7	1/5	140.6 (177.4)	70	56h7	60	40	16h7	21	3	28	58	8	56	100.4	5.5	46	47.1 (47.1)	11.8	– (57.8)
	1/11																		
	1/21 (Note 6)	147.6 (184.4)	105	85h7	90	59	25h7	27	8	42	80	10	61	107.4	9				
	1/33 (Note 6)																		
	1/45 (Note 6)																		
HG-KR43(B)G7	1/5	162.3 (199.1)	70	56h7	60	40	16h7	21	3	28	58	8	56	122.1	5.5				
	1/11	169.3 (206.1)	105	85h7	90	59	25h7	27	8	42	80	10	61	129.1	9				
	1/21																		
	1/33	181.3 (218.1)	135	115h7	120	84	40h7	35	13	82	133	13	70	141.1	11				
	1/45																		
HG-KR73(B)G7	1/5	190 (230.3)	105	85h7	90	59	25h7	27	8	42	80	10	68	147.6	9	56	57.1 (57.1)		– (63.1)
	1/11																		
	1/21	200 (240.3)	135	115h7	120	84	40h7	35	13	82	133	13	75	157.6	11				
	1/33																		
	1/45																		

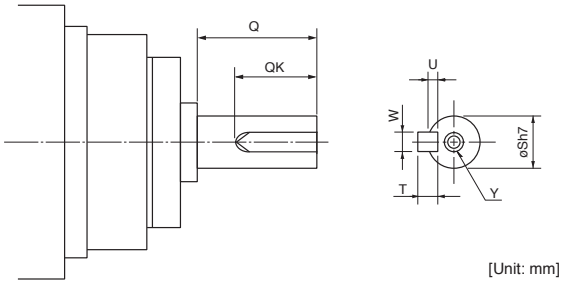
Notes: 1. For dimensions without tolerance, general tolerance applies. The actual dimensions may be 1 mm to 3 mm larger than the dimensions indicated since the outer frame of the reducer is made by casting. Make allowance for the actual dimensions in the design of a machine.
2. The electromagnetic brake terminals (B1, B2) do not have polarity.
3. Only for the models with electromagnetic brake.
4. Dimensions in brackets are for the models with electromagnetic brake.
5. Use a friction coupling to fasten a load.
6. Lead out the power cable in opposite direction of the motor shaft.
7. HG-KR_(B)G7K is also available for key shaft motor (with key). Refer to the following page for the shaft-end shape.

HG-KR Series Geared Servo Motor Special Shaft End Specifications

Standard HG-KR_(B)G1 (with reducer for general industrial machines) has a straight shaft. Key shaft (with key) is also available as a special specification. Contact your local sales office for more details.
Standard HG-KR_(B)G7 (with shaft-output type reducer for high precision applications, flange mounting) has a straight shaft. HG-KR_(B)G7K is also available for key shaft motor (with key). Refer to the following for the shaft-end shape.

Key shaft (with key) (Note 1, 2, 3)

Model	Reduction ratio	Variable dimensions						
		S	Q	W	QK	U	T	Y
HG-KR053(B)G7K	1/5 (40 × 40)	10	20	4	15	2.5	4	M3 screw Depth: 6
	1/5 (60 × 60)	16	28	5	25	3	5	M4 screw Depth: 8
	1/9	10	20	4	15	2.5	4	M3 screw Depth: 6
	1/11	16	28	5	25	3	5	M4 screw Depth: 8
	1/21							
	1/33							
	1/45							
HG-KR13(B)G7K	1/5 (40 × 40)	10	20	4	15	2.5	4	M3 screw Depth: 6
	1/5 (60 × 60)	16	28	5	25	3	5	M4 screw Depth: 8
	1/11							
	1/21							
	1/33	25	42	8	36	4	7	M6 screw Depth: 12
	1/45							
HG-KR23(B)G7K	1/5	16	28	5	25	3	5	M4 screw Depth: 8
	1/11							
	1/21	25	42	8	36	4	7	M6 screw Depth: 12
	1/33							
	1/45							
HG-KR43(B)G7K	1/5	16	28	5	25	3	5	M4 screw Depth: 8
	1/11	25	42	8	36	4	7	M6 screw Depth: 12
	1/21							
	1/33	40	82	12	70	5	8	M10 screw Depth: 20
	1/45							
HG-KR73(B)G7K	1/5	25	42	8	36	4	7	M6 screw Depth: 12
	1/11							
	1/21	40	82	12	70	5	8	M10 screw Depth: 20
	1/33							
	1/45							



[Unit: mm]

Notes: 1. The servo motors with special shaft end are not suitable for frequent start/stop applications.
2. Single pointed key is attached.
3. The dimensions not mentioned in the drawings are the same as those of the straight shaft. Refer to HG-KR_(B)G7 dimensions in this catalog.

HG-SR Series Geared Servo Motor Specifications

With reducer for general industrial machines, flange mounting: G1

Model	Output [kW]	Reduction ratio	Moment of inertia J [× 10^{-4} kg•m^2] (Note 1)		Permissible load to motor inertia ratio (Note 2) (when converted into the servo motor shaft)	Mass [kg]		Lubrication method (Note 5)	Mounting direction
			Standard	With electromagnetic brake		Standard	With electromagnetic brake		
HG-SR52(B)G1 HG-SR524(B)G1	0.5	1/6	8.08	10.3	4 times or less	18	20	Grease (filled)	Any direction
		1/11	7.65	9.85					
		1/17	7.53	9.73					
		1/29	7.47	9.67					
		1/35	8.26	10.5		27	29		
		1/43	8.22	10.4					
		1/59	8.18	10.4					
HG-SR102(B)G1 HG-SR1024(B)G1	1.0	1/6	14.8	17.0	4 times or less	30	32	Grease (filled)	Any direction
		1/11	13.3	15.5					
		1/17	12.9	15.1					
		1/29	12.6	14.8					
		1/35	12.6	14.8					
		1/43	13.8	16.0		49	51	Oil (Note 3)	Shaft horizontal (Note 4)
		1/59	19.1	21.3		81	83		
HG-SR152(B)G1 HG-SR1524(B)G1	1.5	1/6	19.2	21.4	4 times or less	31	33	Grease (filled)	Any direction
		1/11	17.7	19.9					
		1/17	17.3	19.5					
		1/29	18.4	20.6		50	52	Oil (Note 3)	Shaft horizontal (Note 4)
		1/35	18.3	20.5					
		1/43	23.6	25.8		82	84		
		1/59	23.5	25.7					
HG-SR202(B)G1 HG-SR2024(B)G1	2.0	1/6	50.0	59.4	4 times or less	36	42	Grease (filled)	Any direction
		1/11	48.4	57.8					
		1/17	48.1	57.5					
		1/29	54.8	64.2		87	93	Oil (Note 3)	Shaft horizontal (Note 4)
		1/35	54.5	63.9					
		1/43	54.3	63.7					
		1/59	54.2	63.6					
HG-SR352(B)G1 HG-SR3524(B)G1	3.5	1/6	87.1	96.5	4 times or less	60	66	Oil (Note 3)	Shaft horizontal (Note 4)
		1/11	82.8	92.2					
		1/17	81.5	90.9					
		1/29	86.6	96.0		92	98		
		1/35	86.3	95.7					
		1/43	105	114		134	140	Oil	
		1/59	104	113					
HG-SR502(B)G1 HG-SR5024(B)G1	5.0	1/6	126	135	4 times or less	96	102	Oil (Note 3)	Shaft horizontal (Note 4)
		1/11	114	123					
		1/17	110	119					
		1/29	141	150		165	171	Oil	
		1/35	140	150					
		1/43	139	149					
		1/59	138	147					
HG-SR702(B)G1 HG-SR7024(B)G1	7.0	1/6	177	187	4 times or less	103	109	Oil (Note 3)	Shaft horizontal (Note 4)
		1/11	190	199		145	151	Oil	
		1/17	182	192					
		1/29	192	202		172	178		
		1/35	192	201					
		1/43	267	277		240	246		
		1/59	266	275					

Notes: 1. The moments of inertia in the table are the values that are converted into motor shaft for the servo motor with reducer (and with electromagnetic brake).
2. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
3. Use the grease lubricated servo motor (special specification) instead of the oil lubricated for applications where the servo motor moves.
4. Do not mount the servo motor in a way tilted to the shaft direction or to the shaft rotation direction. Refer to the asterisk 1 of "Annotations for Geared Servo Motor Specifications" on p. 2-52 in this catalog. Note that servo motors with special specifications may be available to be mounted with other than the shaft horizontal. Refer to "Servo Motor Instruction Manual (Vol. 3)" for the available models.
5. Be sure to fill the reducer with lubricant oil since the oil is removed before the shipment.

HG-SR Series Geared Servo Motor Specifications

With reducer for general industrial machines, flange mounting: G1

Item	Specifications
Mounting method	Flange mounting
Output shaft rotating direction	Opposite from the servo motor output shaft direction
Backlash (Note 3)	40 minutes to 2° at reducer output shaft (Note 2)
Maximum torque	Three times of the rated torque (Refer to HG-SR 2000 r/min series specifications in this catalog for the rated torque.)
Permissible speed (at servo motor shaft)	For grease lubrication: 3000 r/min (permissible instantaneous speed: 3450 r/min) For oil lubrication: 2000 r/min (permissible instantaneous speed: 2300 r/min)
IP rating (reducer part)	Equivalent to IP44
Reducer efficiency (Note 1)	85% to 94%

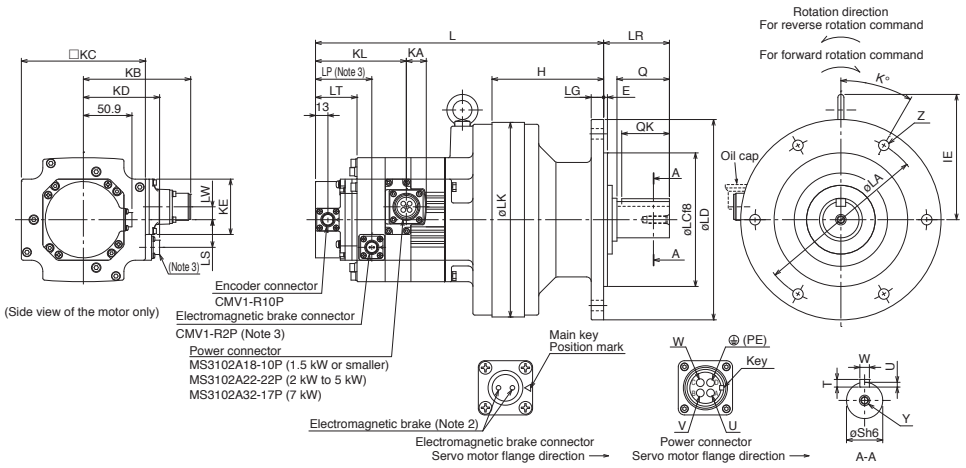
Notes: 1. The reducer efficiency varies depending on the reduction ratio. It also changes depending on the conditions of use, such as output torque, speed, and temperature.
The values in the table represent typical values at the rated torque and speed and at the normal temperature. They are not guaranteed values.
2. This is a designed value, not guaranteed value.
3. The backlash can be converted: 1 minute = 0.0167°

HG-SR Series Geared Servo Motor Dimensions (Note 1, 5)

With reducer for general industrial machines, flange mounting

●HG-SR_(B)G1

Drawing is schematic only, and the oil cap, the shapes, or the mounting screws may differ from those of the actual servo motor. Refer to "Servo Motor Instruction Manual (Vol. 3)" for details.



[Unit: mm]

Model	Reduction ratio	Variable dimensions (Note 4)																											
		L	LA	LC	LD	LG	LK	LR	IE	KL	KA	LP	LT	LW	LS	KE	Z	K	E	H	KB	KD	KC	Q	QK	S	T	U	W	Y
HG-SR52(B)G1 HG-SR524(B)G1	1/6	275 (309.5)	134	110	160	9	150	48	119	60.7 (95.2)	20.9	(59)	38.2 (43.5)	13.5	(29)	58	4-φ11	45	3	108	112.5	(79.9)	130	35	32	28	7	4	8	M8 screw Depth: 20
	1/11																												
	1/17																												
	1/29																												
	1/35	267.5 (302)	180	140	210	13	204	69	132	60.7 (95.2)	20.9	(59)	38.2 (43.5)	13.5	(29)	58	6-φ11	30	4	117	112.5	(79.9)	130	55	50	38	8	5	10	
	1/43																												
	1/59																												
HG-SR102(B)G1 HG-SR1024(B)G1	1/6	281.5 (316)	180	140	210	13	204	69	132	60.7 (95.2)	20.9	(59)	38.2 (43.5)	13.5	(29)	58	6-φ11	30	4	117	112.5	(79.9)	130	55	50	38	8	5	10	M8 screw Depth: 20
	1/11																												
	1/17																												
	1/29																												
	1/35																												
	1/43	327 (361.5)	230	200	260	15	230	76	145	60.7 (95.2)	20.9	(59)	38.2 (43.5)	13.5	(29)	58	6-φ11	60	4	164	112.5	(79.9)	130	70	56	50	9	5.5	14	M10 screw Depth: 18
	1/59	384.5 (419)	310	270	340	20	300	89	192	60.7 (95.2)	20.9	(59)	38.2 (43.5)	13.5	(29)	58	6-φ11	60	4	219	112.5	(79.9)	130	90	80	60	11	7	18	
HG-SR152(B)G1 HG-SR1524(B)G1	1/6	295.5 (330)	180	140	210	13	204	69	132	60.7 (95.2)	20.9	(59)	38.2 (43.5)	13.5	(29)	58	6-φ11	30	4	117	112.5	(79.9)	130	55	50	38	8	5	10	M8 screw Depth: 20
	1/11																												
	1/17																												
	1/29	341 (375.5)	230	200	260	15	230	76	145	60.7 (95.2)	20.9	(59)	38.2 (43.5)	13.5	(29)	58	6-φ11	60	4	164	112.5	(79.9)	130	70	56	50	9	5.5	14	M10 screw Depth: 18
	1/35																												
	1/43	398.5 (433)	310	270	340	20	300	89	192	60.7 (95.2)	20.9	(59)	38.2 (43.5)	13.5	(29)	58	6-φ11	60	4	219	112.5	(79.9)	130	90	80	60	11	7	18	
	1/59																												
HG-SR202(B)G1 HG-SR2024(B)G1	1/6	305.5 (355)	180	140	210	13	204	69	142	63.7 (113.2)	24.8	(66.5)	38.5 (45.5)	0	(44)	82	6-φ11	30	4	117	140.9	(96.9)	176	55	50	38	8	5	10	M8 screw Depth: 20
	1/11																												
	1/17																												
	1/29	402.5 (452)	310	270	340	20	300	89	181	63.7 (113.2)	24.8	(66.5)	38.5 (45.5)	0	(44)	82	6-φ11	60	4	219	140.9	(96.9)	176	90	80	60	11	7	18	M10 screw Depth: 18
	1/35																												
	1/43																												
	1/59																												
HG-SR352(B)G1 HG-SR3524(B)G1	1/6	372 (421.5)	230	200	260	15	230	76	145	63.7 (113.2)	24.8	(66.5)	38.5 (45.5)	0	(44)	82	6-φ11	60	4	164	140.9	(96.9)	176	70	56	50	9	5.5	14	M10 screw Depth: 18
	1/11																												
	1/17																												
	1/29	426.5 (476)	310	270	340	20	300	89	181	63.7 (113.2)	24.8	(66.5)	38.5 (45.5)	0	(44)	82	6-φ11	60	4	219	140.9	(96.9)	176	90	80	60	11	7	18	
	1/35																												
	1/43	466 (515.5)	360	316	400	22	340	94	181	63.7 (113.2)	24.8	(66.5)	38.5 (45.5)	0	(44)	82	8-φ14	22.5	5	258	140.9	(96.9)	176	90	80	70	12	7.5	20	M12 screw Depth: 24
	1/59																												
HG-SR502(B)G1 HG-SR5024(B)G1	1/6	442.5 (492)	310	270	340	20	300	89	181	63.7 (113.2)	24.8	(66.5)	38.5 (45.5)	0	(44)	82	6-φ11	60	4	219	140.9	(96.9)	176	90	80	60	11	7	18	M10 screw Depth: 18
	1/11																												
	1/17																												
	1/29	506 (555.5)	390	345	430	22	370	110	176	63.7 (113.2)	24.8	(66.5)	38.5 (45.5)	0	(44)	82	8-φ18	22.5	5	279	140.9	(96.9)	176	110	100	80	14	9	22	M12 screw Depth: 24
	1/35																												
	1/43																												
	1/59																												
HG-SR702(B)G1 HG-SR7024(B)G1	1/6	482.5 (532)	310	270	340	20	300	89	181	71.7 (121.2)	32	(66.5)	38.5 (45.5)	0	(44)	82	6-φ11	60	4	219	149.1	(96.9)	176	90	80	60	11	7	18	M10 screw Depth: 18
	1/11	522 (571.5)	360	316	400	22	340	94	181	71.7 (121.2)	32	(66.5)	38.5 (45.5)	0	(44)	82	8-φ14	22.5	5	258	149.1	(96.9)	176	90	80	70	12	7.5	20	M12 screw Depth: 24
	1/17																												
	1/29	546 (595.5)	390	345	430	22	370	110	176	71.7 (121.2)	32	(66.5)	38.5 (45.5)	0	(44)	82	8-φ18	22.5	5	279	149.1	(96.9)	176	110	100	80	14	9	22	
	1/35																												
	1/43	602 (651.5)	450	400	490	30	430	145	210	71.7 (121.2)	32	(66.5)	38.5 (45.5)	0	(44)	82	12-φ18	15	6	320	149.1	(96.9)	176	135	125	95	14	9	25	M20 screw Depth: 34
	1/59																												

Notes: 1. For dimensions without tolerance, general tolerance applies. The actual dimensions may be 1 mm to 3 mm larger than the dimensions indicated since the outer frame of the reducer is made by casting. Make allowance for the actual dimensions in the design of a machine.
2. The electromagnetic brake terminals do not have polarity.
3. Only for the models with electromagnetic brake.
4. Dimensions in brackets are for the models with electromagnetic brake.
5. Be sure to fill the reducer with lubricant oil since the oil is removed before the shipment.

HG-SR Series Geared Servo Motor Specifications

With reducer for general industrial machines, foot mounting: G1H

Model	Output [kW]	Reduction ratio	Moment of inertia J [× 10^{-4} kg•m^2] (Note 1)		Permissible load to motor inertia ratio (Note 2) (when converted into the servo motor shaft)	Mass [kg]		Lubrication method (Note 5)	Mounting direction
			Standard	With electromagnetic brake		Standard	With electromagnetic brake		
HG-SR52(B)G1H HG-SR524(B)G1H	0.5	1/6	8.08	10.3	4 times or less	20	22	Grease (filled)	Any direction
		1/11	7.65	9.85					
		1/17	7.53	9.73					
		1/29	7.47	9.67					
		1/35	8.26	10.5		28	30		
		1/43	8.22	10.4					
		1/59	8.18	10.4					
HG-SR102(B)G1H HG-SR1024(B)G1H	1.0	1/6	14.8	17.0	4 times or less	31	33	Grease (filled)	Any direction
		1/11	13.3	15.5					
		1/17	12.9	15.1					
		1/29	12.6	14.8					
		1/35	12.6	14.8					
		1/43	13.8	16.0		50	52	Oil (Note 3)	Shaft horizontal (Note 4)
		1/59	19.1	21.3		86	88		
HG-SR152(B)G1H HG-SR1524(B)G1H	1.5	1/6	19.2	21.4	4 times or less	32	34	Grease (filled)	Any direction
		1/11	17.7	19.9					
		1/17	17.3	19.5					
		1/29	18.4	20.6		51	53	Oil (Note 3)	Shaft horizontal (Note 4)
		1/35	18.3	20.5					
		1/43	23.6	25.8		87	89		
		1/59	23.5	25.7					
HG-SR202(B)G1H HG-SR2024(B)G1H	2.0	1/6	50.0	59.4	4 times or less	37	43	Grease (filled)	Any direction
		1/11	48.4	57.8					
		1/17	48.1	57.5					
		1/29	54.8	64.2		92	98	Oil (Note 3)	Shaft horizontal (Note 4)
		1/35	54.5	63.9					
		1/43	54.3	63.7					
		1/59	54.2	63.6					
HG-SR352(B)G1H HG-SR3524(B)G1H	3.5	1/6	87.1	96.5	4 times or less	61	67	Oil (Note 3)	Shaft horizontal (Note 4)
		1/11	82.8	92.2					
		1/17	81.5	90.9					
		1/29	86.6	96.0		97	103		
		1/35	86.3	95.7					
		1/43	105	114		137	143	Oil	
		1/59	104	113					
HG-SR502(B)G1H HG-SR5024(B)G1H	5.0	1/6	126	135	4 times or less	101	107	Oil (Note 3)	Shaft horizontal (Note 4)
		1/11	114	123					
		1/17	110	119					
		1/29	141	150		178	184	Oil	
		1/35	140	150					
		1/43	139	149					
		1/59	138	147					
HG-SR702(B)G1H HG-SR7024(B)G1H	7.0	1/6	177	187	4 times or less	108	114	Oil (Note 3)	Shaft horizontal (Note 4)
		1/11	190	199		148	154	Oil	
		1/17	182	192					
		1/29	192	202		185	191		
		1/35	192	201					
		1/43	267	277		256	262		
		1/59	266	275					

Notes: 1. The moments of inertia in the table are the values that are converted into motor shaft for the servo motor with reducer (and with electromagnetic brake).
2. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
3. Use the grease lubricated servo motor (special specification) instead of the oil lubricated for applications where the servo motor moves.
4. Do not mount the servo motor in a way tilted to the shaft direction or to the shaft rotation direction. Refer to the asterisk 1 of "Annotations for Geared Servo Motor Specifications" on p. 2-52 in this catalog. Note that servo motors with special specifications may be available to be mounted with other than the shaft horizontal. Refer to "Servo Motor Instruction Manual (Vol. 3)" for the available models.
5. Be sure to fill the reducer with lubricant oil since the oil is removed before the shipment.

HG-SR Series Geared Servo Motor Specifications

With reducer for general industrial machines, foot mounting: G1H

Item	Specifications
Mounting method	Foot mounting
Output shaft rotating direction	Opposite from the servo motor output shaft direction
Backlash (Note 3)	40 minutes to 2° at reducer output shaft (Note 2)
Maximum torque	Three times of the rated torque (Refer to HG-SR 2000 r/min series specifications in this catalog for the rated torque.)
Permissible speed (at servo motor shaft)	For grease lubrication: 3000 r/min (permissible instantaneous speed: 3450 r/min) For oil lubrication: 2000 r/min (permissible instantaneous speed: 2300 r/min)
IP rating (reducer part)	Equivalent to IP44
Reducer efficiency (Note 1)	85% to 94%

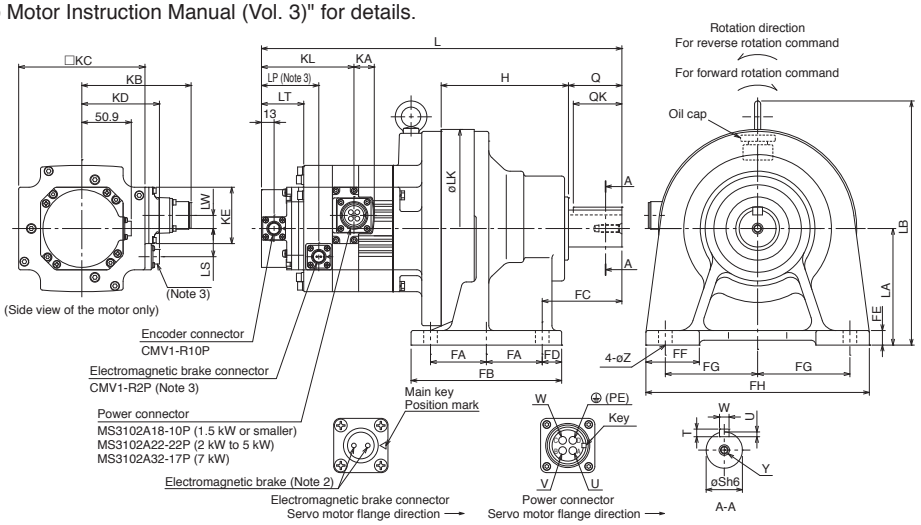
Notes: 1. The reducer efficiency varies depending on the reduction ratio. It also changes depending on the conditions of use, such as output torque, speed, and temperature.
The values in the table represent typical values at the rated torque and speed and at the normal temperature. They are not guaranteed values.
2. This is a designed value, not guaranteed value.
3. The backlash can be converted: 1 minute = 0.0167°

HG-SR Series Geared Servo Motor Dimensions (Note 1, 5)

With reducer for general industrial machines, foot mounting

●HG-SR_(B)G1H

Drawing is schematic only, and the oil cap, the shapes, or the mounting screws may differ from those of the actual servo motor. Refer to "Servo Motor Instruction Manual (Vol. 3)" for details.



[Unit: mm]

Model	Reduction ratio	Variable dimensions (Note 4)																													
		L	LA	LB	LK	LS	LT	LP	LW	H	KL	KA	KB	KD	KC	KE	Z	FA	FB	FC	FD	FE	FF	FG	FH	Q	QK	S	T	U	W	Y
HG-SR52(B)G1H HG-SR524(B)G1H	1/6	323 (357.5)	100	219	150	(29)	38.2 (43.5)	(59)	13.5	121	60.7 (95.2)	20.9	112.5	(79.9)	130	58	11	45	135	60	15	12	40	75	180	35	32	28	7	4	8	M8 screw Depth: 20
	1/11																														
	1/17																														
	1/29																														
	1/35	336.5 (371)	120	252	204	(29)	38.2 (43.5)	(59)	13.5	131	60.7 (95.2)	20.9	112.5	(79.9)	130	58	14	57.5	155	82	20	15	55	95	230	55	50	38	8	5	10	
	1/43																														
	1/59																														
HG-SR102(B)G1H HG-SR1024(B)G1H	1/6	350.5 (385)	120	252	204	(29)	38.2 (43.5)	(59)	13.5	131	60.7 (95.2)	20.9	112.5	(79.9)	130	58	14	57.5	155	82	20	15	55	95	230	55	50	38	8	5	10	M8 screw Depth: 20
	1/11																														
	1/17																														
	1/29																														
	1/35																														
	1/43	403 (437.5)	150	295	230	(29)	38.2 (43.5)	(59)	13.5	170	60.7 (95.2)	20.9	112.5	(79.9)	130	58	18	72.5	195	100	25	22	65	145	330	70	56	50	9	5.5	14	M10 screw Depth: 18
	1/59	473.5 (508)	160	352	300	(29)	38.2 (43.5)	(59)	13.5	218	60.7 (95.2)	20.9	112.5	(79.9)	130	58	18	75	238	139	44	25	75	185	410	90	80	60	11	7	18	
HG-SR152(B)G1H HG-SR1524(B)G1H	1/6	364.5 (399)	120	252	204	(29)	38.2 (43.5)	(59)	13.5	131	60.7 (95.2)	20.9	112.5	(79.9)	130	58	14	57.5	155	82	20	15	55	95	230	55	50	38	8	5	10	M8 screw Depth: 20
	1/11																														
	1/17																														
	1/29	417 (451.5)	150	295	230	(29)	38.2 (43.5)	(59)	13.5	170	60.7 (95.2)	20.9	112.5	(79.9)	130	58	18	72.5	195	100	25	22	65	145	330	70	56	50	9	5.5	14	M10 screw Depth: 18
	1/35																														
	1/43	487.5 (522)	160	352	300	(29)	38.2 (43.5)	(59)	13.5	218	60.7 (95.2)	20.9	112.5	(79.9)	130	58	18	75	238	139	44	25	75	185	410	90	80	60	11	7	18	
	1/59																														
HG-SR202(B)G1H HG-SR2024(B)G1H	1/6	374.5 (424)	120	262	204	(44)	38.5 (45.5)	(66.5)	0	131	63.7 (113.2)	24.8	140.9	(96.9)	176	82	14	57.5	155	82	20	15	55	95	230	55	50	38	8	5	10	M8 screw Depth: 20
	1/11																														
	1/17																														
	1/29	491.5 (541)	160	341	300	(44)	38.5 (45.5)	(66.5)	0	218	63.7 (113.2)	24.8	140.9	(96.9)	176	82	18	75	238	139	44	25	75	185	410	90	80	60	11	7	18	M10 screw Depth: 18
	1/35																														
	1/43																														
	1/59																														
HG-SR352(B)G1H HG-SR3524(B)G1H	1/6	448 (497.5)	150	295	230	(44)	38.5 (45.5)	(66.5)	0	170	63.7 (113.2)	24.8	140.9	(96.9)	176	82	18	72.5	195	100	25	22	65	145	330	70	56	50	9	5.5	14	M10 screw Depth: 18
	1/11																														
	1/17																														
	1/29	515.5 (565)	160	341	300	(44)	38.5 (45.5)	(66.5)	0	218	63.7 (113.2)	24.8	140.9	(96.9)	176	82	18	75	238	139	44	25	75	185	410	90	80	60	11	7	18	
	1/35																														
	1/43	560 (609.5)	200	381	340	(44)	38.5 (45.5)	(66.5)	0	262	63.7 (113.2)	24.8	140.9	(96.9)	176	82	22	137.5	335	125	30	30	80	190	430	90	80	70	12	7.5	20	M12 screw Depth: 24
	1/59																														
HG-SR502(B)G1H HG-SR5024(B)G1H	1/6	531.5 (581)	160	341	300	(44)	38.5 (45.5)	(66.5)	0	218	63.7 (113.2)	24.8	140.9	(96.9)	176	82	18	75	238	139	44	25	75	185	410	90	80	60	11	7	18	M10 screw Depth: 18
	1/11																														
	1/17																														
	1/29	616 (665.5)	220	405	370	(44)	38.5 (45.5)	(66.5)	0	279	63.7 (113.2)	24.8	140.9	(96.9)	176	82	22	160	380	145	30	30	85	210	470	110	100	80	14	9	22	M12 screw Depth: 24
	1/35																														
	1/43																														
	1/59																														
HG-SR702(B)G1H HG-SR7024(B)G1H	1/6	571.5 (621)	160	341	300	(44)	38.5 (45.5)	(66.5)	0	218	71.7 (121.2)	32	149.1	(96.9)	176	82	18	75	238	139	44	25	75	185	410	90	80	60	11	7	18	M10 screw Depth: 18
	1/11	616 (665.5)	200	381	340	(44)	38.5 (45.5)	(66.5)	0	262	71.7 (121.2)	32	149.1	(96.9)	176	82	22	137.5	335	125	30	30	80	190	430	90	80	70	12	7.5	20	M12 screw Depth: 24
	1/17																														
	1/29	656 (705.5)	220	405	370	(44)	38.5 (45.5)	(66.5)	0	279	71.7 (121.2)	32	149.1	(96.9)	176	82	22	160	380	145	30	30	85	210	470	110	100	80	14	9	22	
	1/35																														
	1/43	747 (796.5)	250	465	430	(44)	38.5 (45.5)	(66.5)	0	330	71.7 (121.2)	32	149.1	(96.9)	176	82	26	190	440	170	30	35	90	240	530	135	125	95	14	9	25	M20 screw Depth: 34
	1/59																														

Notes: 1. For dimensions without tolerance, general tolerance applies. The actual dimensions may be 1 mm to 3 mm larger than the dimensions indicated since the outer frame of the reducer is made by casting. Make allowance for the actual dimensions in the design of a machine.
2. The electromagnetic brake terminals do not have polarity.
3. Only for the models with electromagnetic brake.
4. Dimensions in brackets are for the models with electromagnetic brake.
5. Be sure to fill the reducer with lubricant oil since the oil is removed before the shipment.

HG-SR Series Geared Servo Motor Specifications

With flange-output type reducer for high precision applications, flange mounting: G5

Model	Output [kW]	Reduction ratio	Moment of inertia J [× 10^{-4} kg•m^2] (Note 1)		Permissible load to motor inertia ratio (Note 2) (when converted into the servo motor shaft)	Mass [kg]		Lubrication method	Mounting direction
			Standard	With electromagnetic brake		Standard	With electromagnetic brake		
HG-SR52(B)G5 HG-SR524(B)G5	0.5	1/5	7.91	10.1	10 times or less	7.6	9.5	Grease (filled)	Any direction
		1/11	7.82	10.0		7.8	9.7		
		1/21	10.2	12.4		12	14		
		1/33	9.96	12.2					
		1/45	9.96	12.2					
HG-SR102(B)G5 HG-SR1024(B)G5	1.0	1/5	12.3	14.5	10 times or less	9.0	11		
		1/11	14.9	17.1		13	15		
		1/21	14.5	16.7					
		1/33	16.3	18.5		23	25		
		1/45	16.2	18.4					
HG-SR152(B)G5 HG-SR1524(B)G5	1.5	1/5	16.7	18.9	10 times or less	11	13		
		1/11	19.3	21.5		14	16		
		1/21	21.7	23.9		24	26		
		1/33	20.7	22.9					
		1/45	20.6	22.8					
HG-SR202(B)G5 HG-SR2024(B)G5	2.0	1/5	51.4	61.1	10 times or less	19	25		
		1/11	51.2	60.9					
		1/21	53.2	62.9		29	35		
		1/33	52.2	61.9					
		1/45	52.2	61.9					
HG-SR352(B)G5 HG-SR3524(B)G5	3.5	1/5	83.2	92.8	10 times or less	24	30		
		1/11	86.7	96.3		34	40		
		1/21	85.0	94.6					
HG-SR502(B)G5 HG-SR5024(B)G5	5.0	1/5	110	119	10 times or less	36	42		
		1/11	108	117		38	44		
HG-SR702(B)G5 HG-SR7024(B)G5	7.0	1/5	161	171	10 times or less	43	49		

Item	Specifications
Mounting method	Flange mounting
Output shaft rotating direction	Same as the servo motor output shaft direction
Backlash (Note 4)	3 minutes or less at reducer output shaft
Maximum torque	Three times of the rated torque (Refer to HG-SR 2000 r/min series specifications in this catalog for the rated torque.)
Permissible speed (at servo motor shaft)	3000 r/min (permissible instantaneous speed: 3450 r/min)
IP rating (reducer part)	Equivalent to IP44
Reducer efficiency (Note 3)	77% to 92%

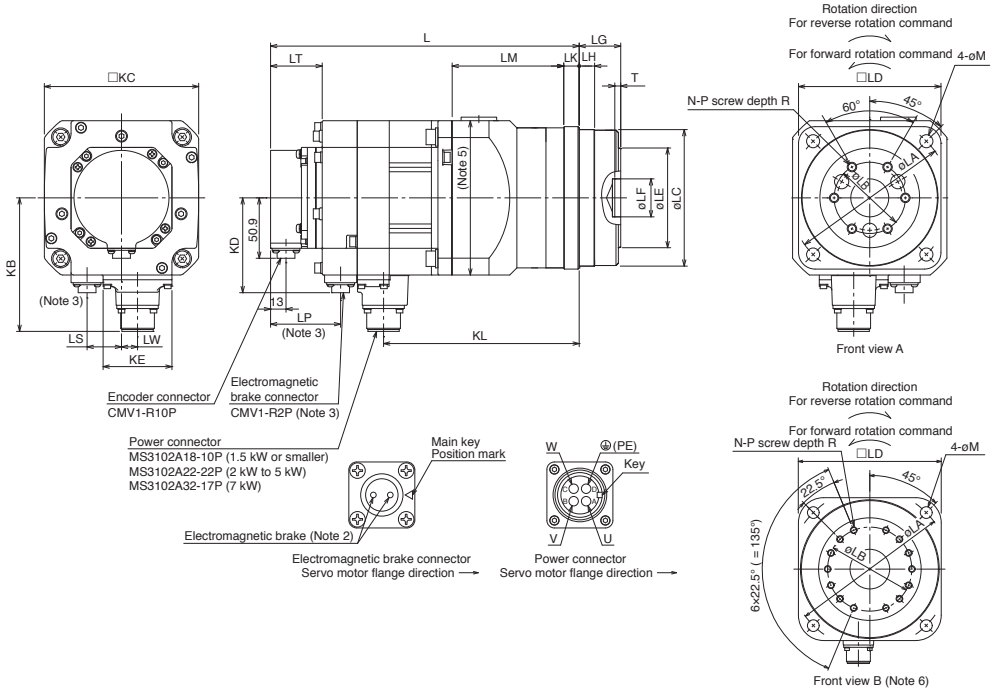
Notes: 1. The moments of inertia in the table are the values that are converted into motor shaft for the servo motor with reducer (and with electromagnetic brake).
2. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
3. The reducer efficiency varies depending on the reduction ratio. It also changes depending on the conditions of use, such as output torque, speed, and temperature. The values in the table represent typical values at the rated torque and speed and at the normal temperature. They are not guaranteed values.
4. The backlash can be converted: 1 minute = 0.0167°

HG-SR Series Geared Servo Motor Dimensions (Note 1)

With flange-output type reducer for high precision applications, flange mounting

●HG-SR_(B)G5

Drawing is schematic only, and the shapes or the mounting screws may differ from those of the actual servo motor. Refer to "Servo Motor Instruction Manual (Vol. 3)" for details.



[Unit: mm]

Model	Reduction ratio	Variable dimensions (Note 4)																								Front view
		L	LA	LB	LC	LD	LE	LF	LG	LH	LK	LM	LT	KL	LP	LW	LS	T	N	P	R	M	KB	KD	KC	KE	
HG-SR52(B)G5 HG-SR524(B)G5	1/5	213.5 (248)	105	45	85h7	90	59	24H7	27 +0.4 -0.5	8	10	85	38.2 (43.5)	152.8	(59)	13.5	(29)	5	6	M6	10	9	112.5	(79.9)	130	58	A
	1/11																									
	1/21	225.5 (260)	135	60	115h7	120	84	32H7	35 +0.4 -0.5	13	13	94	38.2 (43.5)	164.8	(59)	13.5	(29)	5	6	M8	12	11	112.5	(79.9)	130	58	A
	1/33																									
	1/45																									
HG-SR102(B)G5 HG-SR1024(B)G5	1/5	227.5 (262)	105	45	85h7	90	59	24H7	27 +0.4 -0.5	8	10	85	38.2 (43.5)	166.8	(59)	13.5	(29)	5	6	M6	10	9	112.5	(79.9)	130	58	A
	1/11	239.5 (274)	135	60	115h7	120	84	32H7	35 +0.4 -0.5	13	13	94	38.2 (43.5)	178.8	(59)	13.5	(29)	5	6	M8	12	11	112.5	(79.9)	130	58	A
	1/21																									
	1/33	255.5 (290)	190	100	165h8	170	122	47H7	53 +0.5 -0.8	13	16	107	38.2 (43.5)	194.8	(59)	13.5	(29)	7	14	M8	12	14	112.5	(79.9)	130	58	B
	1/45																									
HG-SR152(B)G5 HG-SR1524(B)G5	1/5	241.5 (276)	105	45	85h7	90	59	24H7	27 +0.4 -0.5	8	10	85	38.2 (43.5)	180.8	(59)	13.5	(29)	5	6	M6	10	9	112.5	(79.9)	130	58	A
	1/11	253.5 (288)	135	60	115h7	120	84	32H7	35 +0.4 -0.5	13	13	94	38.2 (43.5)	192.8	(59)	13.5	(29)	5	6	M8	12	11	112.5	(79.9)	130	58	A
	1/21																									
	1/33	269.5 (304)	190	100	165h8	170	122	47H7	53 +0.5 -0.8	13	16	107	38.2 (43.5)	208.8	(59)	13.5	(29)	7	14	M8	12	14	112.5	(79.9)	130	58	B
	1/45																									
HG-SR202(B)G5 HG-SR2024(B)G5	1/5	267.5 (317)	135	60	115h7	120	84	32H7	35 +0.4 -0.5	13	13	116 (Note 5)	38.5 (45.5)	203.8	(66.5)	0	(44)	5	6	M8	12	11	140.9	(96.9)	176	82	A
	1/11																									
	1/21	287.5 (337)	190	100	165h8	170	122	47H7	53 +0.5 -0.8	13	16	133 (Note 5)	38.5 (45.5)	223.8	(66.5)	0	(44)	7	14	M8	12	14	140.9	(96.9)	176	82	B
	1/33																									
	1/45																									
HG-SR352(B)G5 HG-SR3524(B)G5	1/5	291.5 (341)	135	60	115h7	120	84	32H7	35 +0.4 -0.5	13	13	116 (Note 5)	38.5 (45.5)	227.8	(66.5)	0	(44)	5	6	M8	12	11	140.9	(96.9)	176	82	A
	1/11	311.5 (361)	190	100	165h8	170	122	47H7	53 +0.5 -0.8	13	16	133 (Note 5)	38.5 (45.5)	247.8	(66.5)	0	(44)	7	14	M8	12	14	140.9	(96.9)	176	82	B
	1/21																									
HG-SR502(B)G5 HG-SR5024(B)G5	1/5	327.5 (377)	190	100	165h8	170	122	47H7	53 +0.5 -0.8	13	16	133 (Note 5)	38.5 (45.5)	263.8	(66.5)	0	(44)	7	14	M8	12	14	140.9	(96.9)	176	82	B
	1/11																									
HG-SR702(B)G5 HG-SR7024(B)G5	1/5	367.5 (417)	190	100	165h8	170	122	47H7	53 +0.5 -0.8	13	16	133 (Note 5)	38.5 (45.5)	295.8	(66.5)	0	(44)	7	14	M8	12	14	149.1	(96.9)	176	82	B

Notes: 1. For dimensions without tolerance, general tolerance applies. The actual dimensions may be 1 mm to 3 mm larger than the dimensions indicated since the outer frame of the reducer is made by casting. Make allowance for the actual dimensions in the design of a machine.
2. The electromagnetic brake terminals do not have polarity.
3. Only for the models with electromagnetic brake.
4. Dimensions in brackets are for the models with electromagnetic brake.
5. The models with (Note 5) in the LM column of the variable dimension table have the maximum dimension of 180 mm × 180 mm in this part.
6. For the front view B, the screws are not placed at equal intervals.

HG-SR Series Geared Servo Motor Specifications

With shaft-output type reducer for high precision applications, flange mounting: G7

Model	Output [kW]	Reduction ratio	Moment of inertia J [× 10^{-4} kg•m^2] (Note 1)		Permissible load to motor inertia ratio (Note 2) (when converted into the servo motor shaft)	Mass [kg]		Lubrication method	Mounting direction
			Standard	With electromagnetic brake		Standard	With electromagnetic brake		
HG-SR52(B)G7 HG-SR524(B)G7	0.5	1/5	7.95	10.2	10 times or less	8.0	9.9	Grease (filled)	Any direction
		1/11	7.82	10.0		8.2	11		
		1/21	10.2	12.4		13	15		
		1/33	9.96	12.2					
		1/45	9.96	12.2					
HG-SR102(B)G7 HG-SR1024(B)G7	1.0	1/5	12.3	14.5	10 times or less	9.4	12		
		1/11	15.0	17.2		15	17		
		1/21	14.5	16.7					
		1/33	16.3	18.5		26	28		
		1/45	16.3	18.5					
HG-SR152(B)G7 HG-SR1524(B)G7	1.5	1/5	16.7	18.9	10 times or less	11	13		
		1/11	19.4	21.6		16	18		
		1/21	21.7	23.9		27	29		
		1/33	20.7	22.9					
		1/45	20.7	22.9					
HG-SR202(B)G7 HG-SR2024(B)G7	2.0	1/5	51.7	61.4	10 times or less	20	26		
		1/11	51.3	61.0		21	27		
		1/21	53.3	63.0		32	38		
		1/33	52.2	61.9					
		1/45	52.2	61.9					
HG-SR352(B)G7 HG-SR3524(B)G7	3.5	1/5	83.5	93.1	10 times or less	25	31		
		1/11	87.0	96.6		37	43		
		1/21	85.1	94.7					
HG-SR502(B)G7 HG-SR5024(B)G7	5.0	1/5	111	121	10 times or less	39	45		
		1/11	108	117		41	47		
HG-SR702(B)G7 HG-SR7024(B)G7	7.0	1/5	163	173	10 times or less	46	52		

Item	Specifications
Mounting method	Flange mounting
Output shaft rotating direction	Same as the servo motor output shaft direction
Backlash (Note 4)	3 minutes or less at reducer output shaft
Maximum torque	Three times of the rated torque (Refer to HG-SR 2000 r/min series specifications in this catalog for the rated torque.)
Permissible speed (at servo motor shaft)	3000 r/min (permissible instantaneous speed: 3450 r/min)
IP rating (reducer part)	Equivalent to IP44
Reducer efficiency (Note 3)	77% to 92%

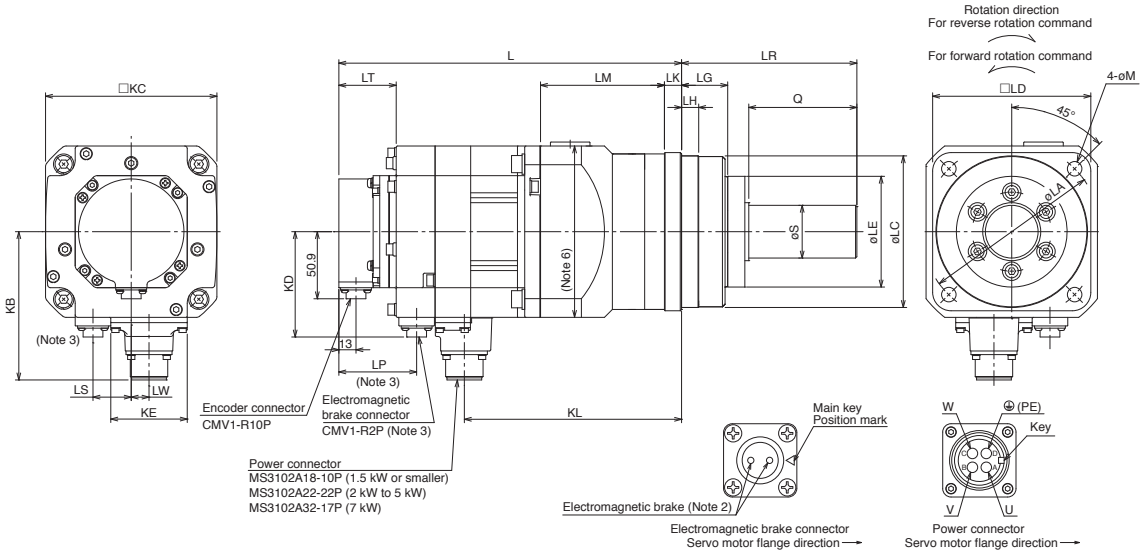
Notes: 1. The moments of inertia in the table are the values that are converted into motor shaft for the servo motor with reducer (and with electromagnetic brake).
2. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
3. The reducer efficiency varies depending on the reduction ratio. It also changes depending on the conditions of use, such as output torque, speed, and temperature. The values in the table represent typical values at the rated torque and speed and at the normal temperature. They are not guaranteed values.
4. The backlash can be converted: 1 minute = 0.0167°

HG-SR Series Geared Servo Motor Dimensions (Note 1, 5, 7)

With shaft-output type reducer for high precision applications, flange mounting

●HG-SR_(B)G7

Drawing is schematic only, and the shapes or the mounting screws may differ from those of the actual servo motor. Refer to "Servo Motor Instruction Manual (Vol. 3)" for details.



[Unit: mm]

Model	Reduction ratio	Variable dimensions (Note 4)																				
		L	LA	LC	LD	LE	S	LG	LH	Q	LR	LK	LM	LT	KL	LP	LW	LS	M	KB	KD	KC	KE
HG-SR52(B)G7 HG-SR524(B)G7	1/5	213.5 (248)	105	85h7	90	59	25h7	27	8	42	80	10	85	38.2 (43.5)	152.8	(59)	13.5	(29)	9	112.5	(79.9)	130	58
	1/11																						
	1/21	225.5 (260)	135	115h7	120	84	40h7	35	13	82	133	13	94	38.2 (43.5)	164.8	(59)	13.5	(29)	11	112.5	(79.9)	130	58
	1/33																						
	1/45																						
HG-SR102(B)G7 HG-SR1024(B)G7	1/5	227.5 (262)	105	85h7	90	59	25h7	27	8	42	80	10	85	38.2 (43.5)	166.8	(59)	13.5	(29)	9	112.5	(79.9)	130	58
	1/11	239.5 (274)	135	115h7	120	84	40h7	35	13	82	133	13	94	38.2 (43.5)	178.8	(59)	13.5	(29)	11	112.5	(79.9)	130	58
	1/21																						
	1/33	255.5 (290)	190	165h8	170	122	50h7	53	13	82	156	16	107	38.2 (43.5)	194.8	(59)	13.5	(29)	14	112.5	(79.9)	130	58
	1/45																						
HG-SR152(B)G7 HG-SR1524(B)G7	1/5	241.5 (276)	105	85h7	90	59	25h7	27	8	42	80	10	85	38.2 (43.5)	180.8	(59)	13.5	(29)	9	112.5	(79.9)	130	58
	1/11	253.5 (288)	135	115h7	120	84	40h7	35	13	82	133	13	94	38.2 (43.5)	192.8	(59)	13.5	(29)	11	112.5	(79.9)	130	58
	1/21	269.5 (304)	190	165h8	170	122	50h7	53	13	82	156	16	107	38.2 (43.5)	208.8	(59)	13.5	(29)	14	112.5	(79.9)	130	58
	1/33																						
	1/45																						
HG-SR202(B)G7 HG-SR2024(B)G7	1/5	267.5 (317)	135	115h7	120	84	40h7	35	13	82	133	13	116 (Note 6)	38.5 (45.5)	203.8	(66.5)	0	(44)	11	140.9	(96.9)	176	82
	1/11																						
	1/21	287.5 (337)	190	165h8	170	122	50h7	53	13	82	156	16	133 (Note 6)	38.5 (45.5)	223.8	(66.5)	0	(44)	14	140.9	(96.9)	176	82
	1/33																						
	1/45																						
HG-SR352(B)G7 HG-SR3524(B)G7	1/5	291.5 (341)	135	115h7	120	84	40h7	35	13	82	133	13	116 (Note 6)	38.5 (45.5)	227.8	(66.5)	0	(44)	11	140.9	(96.9)	176	82
	1/11	311.5 (361)	190	165h8	170	122	50h7	53	13	82	156	16	133 (Note 6)	38.5 (45.5)	247.8	(66.5)	0	(44)	14	140.9	(96.9)	176	82
	1/21																						
HG-SR502(B)G7 HG-SR5024(B)G7	1/5	327.5 (377)	190	165h8	170	122	50h7	53	13	82	156	16	133 (Note 6)	38.5 (45.5)	263.8	(66.5)	0	(44)	14	140.9	(96.9)	176	82
	1/11																						
HG-SR702(B)G7 HG-SR7024(B)G7	1/5	367.5 (417)	190	165h8	170	122	50h7	53	13	82	156	16	133 (Note 6)	38.5 (45.5)	295.8	(66.5)	0	(44)	14	149.1	(96.9)	176	82

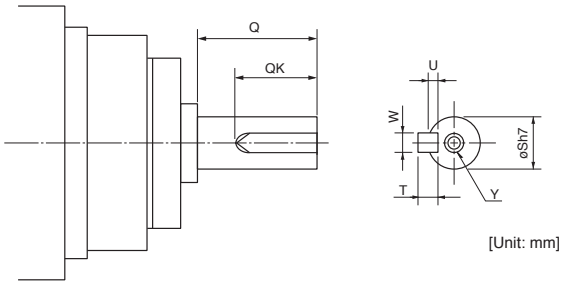
Notes: 1. For dimensions without tolerance, general tolerance applies. The actual dimensions may be 1 mm to 3 mm larger than the dimensions indicated since the outer frame of the reducer is made by casting. Make allowance for the actual dimensions in the design of a machine.
2. The electromagnetic brake terminals do not have polarity.
3. Only for the models with electromagnetic brake.
4. Dimensions in brackets are for the models with electromagnetic brake.
5. Use a friction coupling to fasten a load.
6. The models with (Note 6) in the LM column of the variable dimension table have the maximum dimension of 180 mm × 180 mm in this part.
7. HG-SR_(B)G7K is also available for key shaft motor (with key). Refer to the following page for the shaft-end shape.

HG-SR Series Geared Servo Motor Special Shaft End Specifications

Standard HG-SR_(B)G1/G1H (with reducer for general industrial machines) has a key shaft (with key).
Standard HG-SR_(B)G7 (with shaft-output type reducer for high precision applications, flange mounting) has a straight shaft.
HG-SR_(B)G7K is also available for key shaft motor (with key). Refer to the following for the shaft-end shape.

Key shaft (with key) (Note 1, 2, 3)

Model	Reduction ratio	Variable dimensions						
		S	Q	W	QK	U	T	Y
HG-SR52(B)G7K HG-SR524(B)G7K	1/5	25	42	8	36	4	7	M6 screw Depth: 12
	1/11							
	1/21	40	82	12	70	5	8	M10 screw Depth: 20
	1/33							
	1/45							
HG-SR102(B)G7K HG-SR1024(B)G7K	1/5	25	42	8	36	4	7	M6 screw Depth: 12
	1/11	40	82	12	70	5	8	M10 screw Depth: 20
	1/21							
	1/33	50	82	14	70	5.5	9	M10 screw Depth: 20
	1/45							
HG-SR152(B)G7K HG-SR1524(B)G7K	1/5	25	42	8	36	4	7	M6 screw Depth: 12
	1/11	40	82	12	70	5	8	M10 screw Depth: 20
	1/21	50	82	14	70	5.5	9	M10 screw Depth: 20
	1/33							
	1/45							
HG-SR202(B)G7K HG-SR2024(B)G7K	1/5	40	82	12	70	5	8	M10 screw Depth: 20
	1/11							
	1/21	50	82	14	70	5.5	9	M10 screw Depth: 20
	1/33							
	1/45							
HG-SR352(B)G7K HG-SR3524(B)G7K	1/5	40	82	12	70	5	8	M10 screw Depth: 20
	1/11	50	82	14	70	5.5	9	M10 screw Depth: 20
	1/21							
HG-SR502(B)G7K HG-SR5024(B)G7K	1/5							
	1/11							
HG-SR702(B)G7K HG-SR7024(B)G7K	1/5							

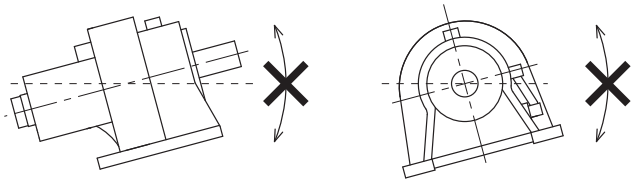


[Unit: mm]

Notes: 1. The servo motors with special shaft end are not suitable for frequent start/stop applications.
2. Single pointed key is attached.
3. The dimensions not mentioned in the drawings are the same as those of the straight shaft. Refer to HG-SR_(B)G7 dimensions in this catalog.

Annotations for Geared Servo Motor Specifications

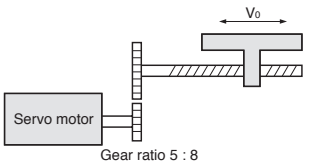
* 1. Do not mount the following servo motor in a way tilted to the shaft direction or to the shaft rotation direction.
- HG-SR102(4)(B)G1/G1H 1/43, 1/59
- HG-SR152(4)(B)G1/G1H 1/29, 1/35, 1/43, 1/59
- HG-SR202(4)(B)G1/G1H 1/29, 1/35, 1/43, 1/59
- HG-SR352(4)(B)G1/G1H all reduction ratios
- HG-SR502(4)(B)G1/G1H all reduction ratios
- HG-SR702(4)(B)G1/G1H all reduction ratios



Rotary Servo Motor Sizing Example

1. Selection criteria

(1) Configurations



Feed speed of moving part	V_0 = 30000 mm/min	D_B = ball screw diameter	20 mm
Feed length per cycle	ℓ = 400 mm	L_B = ball screw length	500 mm
Positioning time	t_0 = within 1 s	D_{G1} = gear diameter (servo motor shaft)	25 mm
Number of feed times	40 times/min	D_{G2} = gear diameter (load shaft)	40 mm
(Operating cycle	t_f = 1.5 s)	L_G = gear tooth thickness	10 mm
Reduction ratio	1/n = 5/8		
Moving part mass	W = 60 kg		
Drive system efficiency	η = 0.8		
Friction coefficient	μ = 0.2		
Ball screw lead	P_B = 16 mm		

(2) Servo motor speed

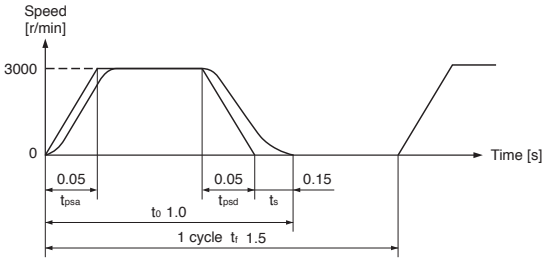
$$N_0 = \frac{V_0}{P_B} \times \frac{1}{1/n} = \frac{30000}{16} \times \frac{8}{5} = 3000 \text{ r/min}$$

(3) Acceleration/deceleration time constant

$$t_{psa} = t_{psd} = t_0 - \frac{\ell}{V_0/60} - t_s = 0.05 \text{ s}$$

t_s: settling time. Here assumed 0.15 s.

(4) Operating pattern



2. Selecting rotary servo motor

(1) Load torque (converted into the servo motor shaft)

Travel distance per servo motor revolution

$$\triangle S = P_B \times \frac{1}{n} = 10 \text{ mm}$$

$$T_L = \frac{\mu \times W \times g \times \triangle S}{2 \times 10^3 \pi \eta} = 0.23 \text{ N•m}$$

(2) Moment of inertia of load (converted into the servo motor shaft)

Moving part

$$J_{L1} = W \times \left(\frac{\triangle S \times 10^{-3}}{2\pi}\right)^2 = 1.52 \times 10^{-4} \text{ kg•m}^2$$

Ball screw

$$J_{L2} = \frac{\pi \times \rho \times L_B}{32} \times D_B^4 \times \left(\frac{1}{n}\right)^2 = 0.24 \times 10^{-4} \text{ kg•m}^2$$

$\rho = 7.8 \times 10^3$ kg/m^3 (iron)

Gear (servo motor shaft)

$$J_{L3} = \frac{\pi \times \rho \times L_G}{32} \times D_{G1}^4 = 0.03 \times 10^{-4} \text{ kg•m}^2$$

Gear (load shaft)

$$J_{L4} = \frac{\pi \times \rho \times L_G}{32} \times D_{G2}^4 \times \left(\frac{1}{n}\right)^2 = 0.08 \times 10^{-4} \text{ kg•m}^2$$

Moment of inertia of all loads (converted into the servo motor shaft)

$$J_L = J_{L1} + J_{L2} + J_{L3} + J_{L4} = 1.87 \times 10^{-4} \text{ kg•m}^2$$

(3) Select a servo motor

Selection criteria

Load torque < Rated torque of servo motor

Moment of inertia of all loads < J_R × Moment of inertia of servo motor

J_R: Recommended load to motor inertia ratio

Select the following servo motor to meet the criteria above.

HG-KR23 (rated torque: 0.64 N•m, max. torque: 2.2 N•m, moment of inertia: 0.221 × 10^{-4} kg•m^2)

(4) Acceleration/deceleration torque

Torque required during acceleration

$$T_{Ma} = \frac{(J_L/\eta + J_M) \times N_0}{9.55 \times 10^4 \times t_{psa}} + T_L = 1.84 \text{ N•m}$$

J_M: moment of inertia of servo motor

Torque required during deceleration

$$T_{Md} = -\frac{(J_L \times \eta + J_M) \times N_0}{9.55 \times 10^4 \times t_{psd}} + T_L = -0.85 \text{ N•m}$$

Torque required during acceleration/deceleration must be equal to or lower than the max. torque of the servo motor.

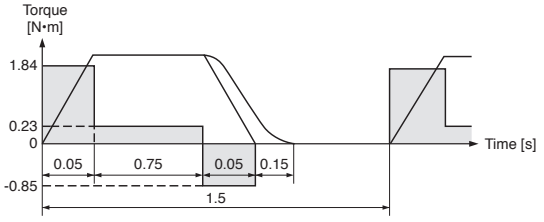
(5) Continuous effective load torque

$$T_{rms} = \sqrt{\frac{T_{Ma}^2 \times t_{psa} + T_L^2 \times t_c + T_{Md}^2 \times t_{psd}}{t_f}} = 0.40 \text{ N•m}$$

$t_c = t_0 - t_s - t_{psa} - t_{psd}$

Continuous effective load torque must be equal to or lower than the rated torque of the servo motor.

(6) Torque pattern



(7) Result

Select the following:

Servo motor: HG-KR23

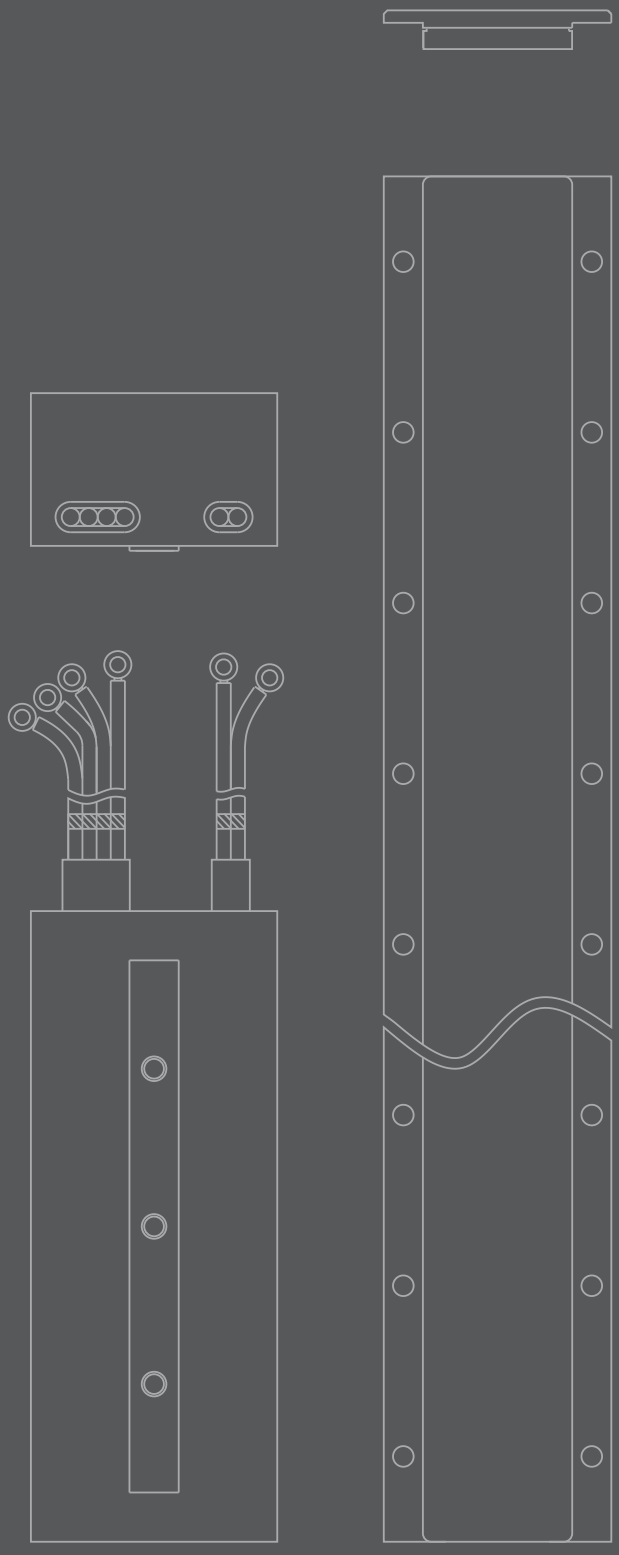
Servo amplifier: MR-J4-20B

[Free capacity selection software]

Capacity selection software (MRZJW3-MOTSZ111E) does all the calculations for you. The capacity selection software is available for free download. Contact your local sales office for more details.

* MRZJW3-MOTSZ111E software version C5 or later is compatible.

3



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* Note that some servo amplifiers are available in the future.
* Refer to p. 5-65 in this catalog for conversion of units.

Linear Servo Motors

Model Designation

●LM-H3 series

L M - H 3 P 2 A - 0 7 P - □ (Primary side: coil)

Symbol	Linear servo motor model
BSS0	LM-H3P2A-07P
CSS0	LM-H3P3A-12P
	LM-H3P3B-24P
	LM-H3P3C-36P
	LM-H3P3D-48P
ASS0	LM-H3P7A-24P
	LM-H3P7B-48P
	LM-H3P7C-72P
	LM-H3P7D-96P

Symbol	Maximum speed [m/s]
P	3.0

Symbol	Continuous thrust [N]
07	70
12	120
24	240
36	360
48	480
72	720
96	960

Symbol	Length (nominal) [mm]
A	128
B	224
C	320
D	416

Symbol	Width (nominal) [mm]
2	50
3	65
7	100

Primary side (coil)

L M - H 3 S 2 0 - 2 8 8 - □ (Secondary side: magnet)

Symbol	Linear servo motor model
BSS0	LM-H3S20-288
	LM-H3S20-384
	LM-H3S20-480
	LM-H3S20-768
CSS0	LM-H3S30-288
	LM-H3S30-384
	LM-H3S30-480
	LM-H3S30-768
ASS0	LM-H3S70-288
	LM-H3S70-384
	LM-H3S70-480
	LM-H3S70-768

Symbol	Length (nominal) [mm]
288	288
384	384
480	480
768	768

Symbol	Width (nominal) [mm]
2	42
3	60
7	95

Secondary side (magnet)

Model Designation

●LM-F series

L M - F P 2 B - 0 6 M - □ (primary side: coil)

Symbol	Linear servo motor model
1SS0	LM-FP2B-06M
	LM-FP2D-12M
	LM-FP2F-18M
	LM-FP4B-12M
	LM-FP4D-24M
	LM-FP4F-36M
	LM-FP4H-48M
	LM-FP5H-60M

Symbol	Maximum speed [m/s]
M	2.0

Symbol	Continuous thrust [N]	
	Natural cooling	Liquid cooling
06	300	600
12	600	1200
18	900	1800
24	1200	2400
36	1800	3600
48	2400	4800
60	3000	6000

Symbol	Length (nominal) [mm]
B	290
D	530
F	770
H	1010

Symbol	Width (nominal) [mm]
2	120
4	200
5	240

Primary side (coil)

L M - F S 2 0 - 4 8 0 - □ (Secondary side: magnet)

Symbol	Linear servo motor model
1SS0	LM-FS20-480
	LM-FS20-576
	LM-FS40-480
	LM-FS40-576
	LM-FS50-480
	LM-FS50-576

Symbol	Length (nominal) [mm]
480	480
576	576

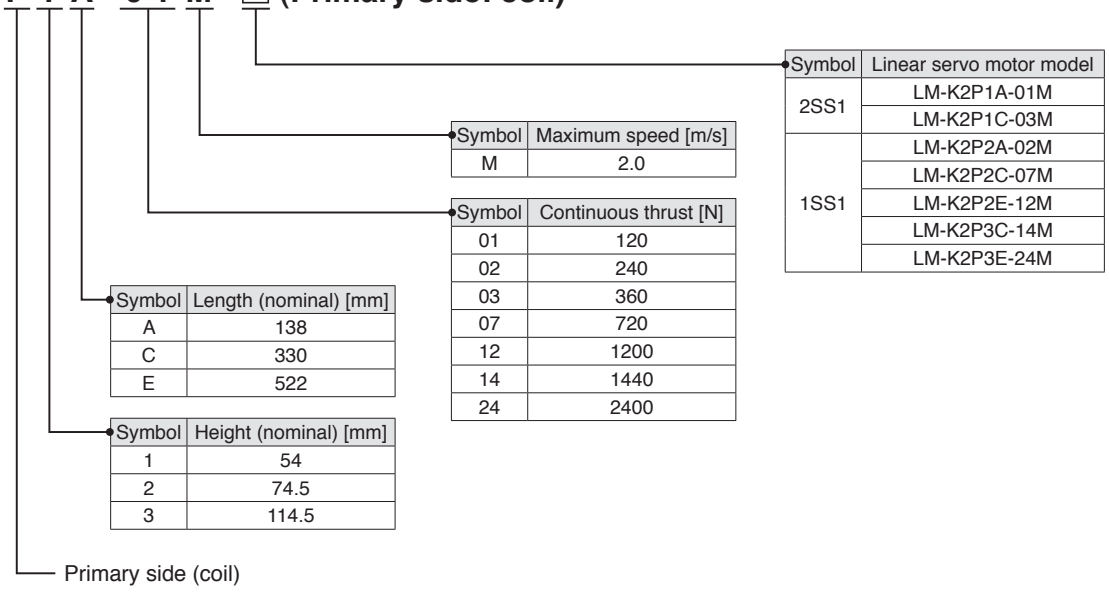
Symbol	Width (nominal) [mm]
2	120
4	200
5	240

Secondary side (magnet)

Model Designation

●LM-K2 series

L M - K 2 P 1 A - 0 1 M - □ (Primary side: coil)



Symbol	Linear servo motor model
2SS1	LM-K2P1A-01M
	LM-K2P1C-03M
1SS1	LM-K2P2A-02M
	LM-K2P2C-07M
	LM-K2P2E-12M
	LM-K2P3C-14M
	LM-K2P3E-24M

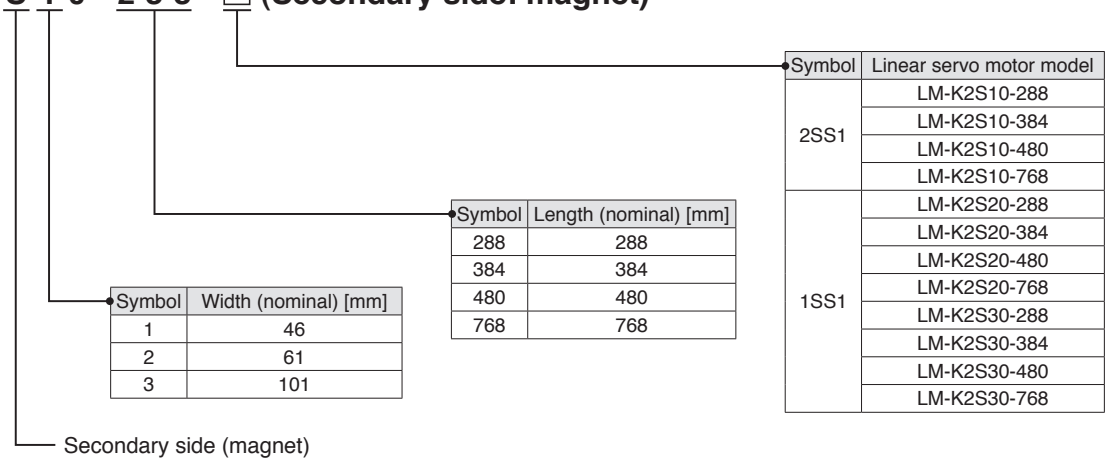
Symbol	Maximum speed [m/s]
M	2.0

Symbol	Continuous thrust [N]
01	120
02	240
03	360
07	720
12	1200
14	1440
24	2400

Symbol	Length (nominal) [mm]
A	138
C	330
E	522

Symbol	Height (nominal) [mm]
1	54
2	74.5
3	114.5

L M - K 2 S 1 0 - 2 8 8 - □ (Secondary side: magnet)



Symbol	Linear servo motor model
2SS1	LM-K2S10-288
	LM-K2S10-384
	LM-K2S10-480
	LM-K2S10-768
1SS1	LM-K2S20-288
	LM-K2S20-384
	LM-K2S20-480
	LM-K2S20-768
	LM-K2S30-288
	LM-K2S30-384
	LM-K2S30-480
	LM-K2S30-768

Symbol	Length (nominal) [mm]
288	288
384	384
480	480
768	768

Symbol	Width (nominal) [mm]
1	46
2	61
3	101

Model Designation

●LM-U2 (medium thrust) series

L M - U 2 P A B - 0 5 M - □ (Primary side: coil)

Symbol	Linear servo motor model
0SS0	LM-U2PAB-05M
	LM-U2PAD-10M
	LM-U2PAF-15M
1SS0	LM-U2PBB-07M
	LM-U2PBD-15M
	LM-U2PBF-22M

Symbol	Maximum speed [m/s]
M	2.0

Symbol	Continuous thrust [N]
05	50
07	75
10	100
15	150
22	225

Symbol	Length (nominal) [mm]
B	130
D	250
F	370

Symbol	Width (nominal) [mm]
A	66.5
B	86.5

Primary side (coil)

L M - U 2 S A 0 - 2 4 0 - □ (Secondary side: magnet)

Symbol	Linear servo motor model
0SS0	LM-U2SA0-240
	LM-U2SA0-300
	LM-U2SA0-420
1SS0	LM-U2SB0-240
	LM-U2SB0-300
	LM-U2SB0-420

Symbol	Length (nominal) [mm]
240	240
300	300
420	420

Symbol	Width (nominal) [mm]
A	62
B	82

Secondary side (magnet)

●LM-U2 (large thrust) series

L M - U 2 P 2 B - 4 0 M - □ (Primary side: coil)

Symbol	Linear servo motor model
2SS0	LM-U2P2B-40M
	LM-U2P2C-60M
	LM-U2P2D-80M

Symbol	Maximum speed [m/s]
M	2.0

Symbol	Continuous thrust [N]
40	400
60	600
80	800

Symbol	Length (nominal) [mm]
B	286
C	406
D	526

Primary side (coil)

L M - U 2 S 2 0 - 3 0 0 - □ (Secondary side: magnet)

Symbol	Linear servo motor model
2SS0	LM-U2S20-300
	LM-U2S20-480

Symbol	Length (nominal) [mm]
300	300
480	480

Secondary side (magnet)

Combinations of Linear Servo Motor and Servo Amplifier

Linear servo motor			Servo amplifier		
	Primary side (coil)	Secondary side (magnet)	MR-J4	MR-J4W2 (Note 1)	MR-J4W3 (Note 1)
LM-H3 series	LM-H3P2A-07P-BSS0	LM-H3S20-288-BSS0, LM-H3S20-384-BSS0, LM-H3S20-480-BSS0, LM-H3S20-768-BSS0	MR-J4-40B(-RJ), MR-J4-40A(-RJ)	MR-J4W2-44B, MR-J4W2-77B, MR-J4W2-1010B	MR-J4W3-444B
	LM-H3P3A-12P-CSS0	LM-H3S30-288-CSS0, LM-H3S30-384-CSS0, LM-H3S30-480-CSS0, LM-H3S30-768-CSS0	MR-J4-40B(-RJ), MR-J4-40A(-RJ)	MR-J4W2-44B, MR-J4W2-77B, MR-J4W2-1010B	MR-J4W3-444B
	LM-H3P3B-24P-CSS0		MR-J4-70B(-RJ), MR-J4-70A(-RJ)	MR-J4W2-77B, MR-J4W2-1010B	-
	LM-H3P3C-36P-CSS0		MR-J4-70B(-RJ), MR-J4-70A(-RJ)	MR-J4W2-77B, MR-J4W2-1010B	-
	LM-H3P3D-48P-CSS0		MR-J4-200B(-RJ), MR-J4-200A(-RJ)	-	-
	LM-H3P7A-24P-ASS0	LM-H3S70-288-ASS0, LM-H3S70-384-ASS0, LM-H3S70-480-ASS0, LM-H3S70-768-ASS0	MR-J4-70B(-RJ), MR-J4-70A(-RJ)	MR-J4W2-77B, MR-J4W2-1010B	-
	LM-H3P7B-48P-ASS0		MR-J4-200B(-RJ), MR-J4-200A(-RJ)	-	-
	LM-H3P7C-72P-ASS0		MR-J4-200B(-RJ), MR-J4-200A(-RJ)	-	-
	LM-H3P7D-96P-ASS0		MR-J4-350B(-RJ), MR-J4-350A(-RJ)	-	-
LM-F series	LM-FP2B-06M-1SS0	LM-FS20-480-1SS0, LM-FS20-576-1SS0	MR-J4-200B(-RJ), MR-J4-200A(-RJ)	-	-
	LM-FP2D-12M-1SS0		MR-J4-500B(-RJ), MR-J4-500A(-RJ)	-	-
	LM-FP2F-18M-1SS0		MR-J4-700B(-RJ), MR-J4-700A(-RJ)	-	-
	LM-FP4B-12M-1SS0	LM-FS40-480-1SS0, LM-FS40-576-1SS0	MR-J4-500B(-RJ), MR-J4-500A(-RJ)	-	-
	LM-FP4D-24M-1SS0		MR-J4-700B(-RJ), MR-J4-700A(-RJ)	-	-
	LM-FP4F-36M-1SS0		MR-J4-11KB(-RJ), MR-J4-11KA(-RJ)	-	-
	LM-FP4H-48M-1SS0		MR-J4-15KB(-RJ), MR-J4-15KA(-RJ)	-	-
	LM-FP5H-60M-1SS0	LM-FS50-480-1SS0, LM-FS50-576-1SS0	MR-J4-22KB4(-RJ), MR-J4-22KA4(-RJ)	-	-

Notes: 1. Any combination of the servo motors is available. Refer to "Combinations of Multi-Axis Servo Amplifier and Servo Motors" on p. 1-4 in this catalog.

Combinations of Linear Servo Motor and Servo Amplifier

	Linear servo motor		Servo amplifier		
	Primary side (coil)	Secondary side (magnet)	MR-J4	MR-J4W2 (Note 1)	MR-J4W3 (Note 1)
LM-K2 series	LM-K2P1A-01M-2SS1	LM-K2S10-288-2SS1, LM-K2S10-384-2SS1, LM-K2S10-480-2SS1, LM-K2S10-768-2SS1	MR-J4-40B(-RJ), MR-J4-40A(-RJ)	MR-J4W2-44B, MR-J4W2-77B, MR-J4W2-1010B	MR-J4W3-444B
	LM-K2P1C-03M-2SS1		MR-J4-200B(-RJ), MR-J4-200A(-RJ)	-	-
	LM-K2P2A-02M-1SS1	LM-K2S20-288-1SS1, LM-K2S20-384-1SS1, LM-K2S20-480-1SS1, LM-K2S20-768-1SS1	MR-J4-70B(-RJ), MR-J4-70A(-RJ)	MR-J4W2-77B, MR-J4W2-1010B	-
	LM-K2P2C-07M-1SS1		MR-J4-350B(-RJ), MR-J4-350A(-RJ)	-	-
	LM-K2P2E-12M-1SS1		MR-J4-500B(-RJ), MR-J4-500A(-RJ)	-	-
	LM-K2P3C-14M-1SS1	LM-K2S30-288-1SS1, LM-K2S30-384-1SS1, LM-K2S30-480-1SS1, LM-K2S30-768-1SS1	MR-J4-350B(-RJ), MR-J4-350A(-RJ)	-	-
	LM-K2P3E-24M-1SS1		MR-J4-500B(-RJ), MR-J4-500A(-RJ)	-	-
LM-U2 series	LM-U2PAB-05M-0SS0	LM-U2SA0-240-0SS0, LM-U2SA0-300-0SS0, LM-U2SA0-420-0SS0	MR-J4-20B(-RJ), MR-J4-20A(-RJ)	MR-J4W2-22B, MR-J4W2-44B	MR-J4W3-222B, MR-J4W3-444B
	LM-U2PAD-10M-0SS0		MR-J4-40B(-RJ), MR-J4-40A(-RJ)	MR-J4W2-44B, MR-J4W2-77B, MR-J4W2-1010B	MR-J4W3-444B
	LM-U2PAF-15M-0SS0		MR-J4-40B(-RJ), MR-J4-40A(-RJ)	MR-J4W2-44B, MR-J4W2-77B, MR-J4W2-1010B	MR-J4W3-444B
	LM-U2PBB-07M-1SS0	LM-U2SB0-240-1SS0, LM-U2SB0-300-1SS0, LM-U2SB0-420-1SS0	MR-J4-20B(-RJ), MR-J4-20A(-RJ)	MR-J4W2-22B, MR-J4W2-44B	MR-J4W3-222B, MR-J4W3-444B
	LM-U2PBD-15M-1SS0		MR-J4-60B(-RJ), MR-J4-60A(-RJ)	MR-J4W2-77B, MR-J4W2-1010B	-
	LM-U2PBF-22M-1SS0		MR-J4-70B(-RJ), MR-J4-70A(-RJ)	MR-J4W2-77B, MR-J4W2-1010B	-
	LM-U2P2B-40M-2SS0	LM-U2S20-300-2SS0, LM-U2S20-480-2SS0	MR-J4-200B(-RJ), MR-J4-200A(-RJ)	-	-
	LM-U2P2C-60M-2SS0		MR-J4-350B(-RJ), MR-J4-350A(-RJ)	-	-
	LM-U2P2D-80M-2SS0		MR-J4-500B(-RJ), MR-J4-500A(-RJ)	-	-

Notes: 1. Any combination of the servo motors is available. Refer to "Combinations of Multi-Axis Servo Amplifier and Servo Motors" on p. 1-4 in this catalog.

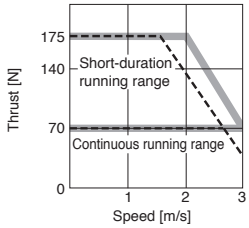
LM-H3 Series Specifications

Linear servo motor model	Primary side (coil)	LM-H3	P2A-07P-BSS0	P3A-12P-CSS0	P3B-24P-CSS0	P3C-36P-CSS0	P3D-48P-CSS0	P7A-24P-ASS0	P7B-48P-ASS0	P7C-72P-ASS0	P7D-96P-ASS0
	Secondary side (magnet)	LM-H3	S20-288-BSS0 S20-384-BSS0 S20-480-BSS0 S20-768-BSS0	S30-288-CSS0 S30-384-CSS0 S30-480-CSS0 S30-768-CSS0				S70-288-ASS0 S70-384-ASS0 S70-480-ASS0 S70-768-ASS0			
Compatible servo amplifier model		MR-J4- MR-J4W_-	Refer to "Combinations of Linear Servo Motor and Servo Amplifier" on p. 3-5 in this catalog.								
Power supply capacity		[kVA]	0.9	0.9	1.3	1.9	3.5	1.3	3.5	3.8	5.5
Cooling method			Natural cooling								
Thrust	Continuous (Note 5)	[N]	70	120	240	360	480	240	480	720	960
	Maximum	[N]	175	300	600	900	1200	600	1200	1800	2400
Maximum speed (Note 1)		[m/s]	3.0								
Magnetic attraction force		[N]	630	1100	2200	3300	4400	2200	4400	6600	8800
Rated current		[A]	1.8	1.7	3.4	5.1	6.8	3.4	6.8	10.2	13.6
Maximum current		[A]	5.8	5.0	9.9	14.9	19.8	9.6	19.1	28.6	38.1
Regenerative braking frequency (Note 2)	MR-J4-	[times/min]	175	95	108	78	300	108	308	210	159
	MR-J4W_-	[times/min]	173 (Note 3)	95 (Note 4)	271	197	-	241	-	-	-
Recommended load to motor mass ratio			Maximum of 35 times the mass of the linear servo motor primary side								
Insulation class			155 (F)								
Structure			Open (IP rating: IP00)								
Environment	Ambient temperature		0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)								
	Ambient humidity		80 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)								
	Ambience		Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust								
	Altitude		1000 m or less above sea level								
	Vibration resistance		49 m/s^2								
Compliance to standards			Refer to "Conformity with Global Standards and Regulations" on p. 57 in this catalog.								
Mass	Primary side (coil)	[kg]	0.9	1.3	2.3	3.3	4.3	2.2	3.9	5.6	7.3
	Secondary side (magnet)	[kg]	288 mm/pc: 0.7 384 mm/pc: 0.9 480 mm/pc: 1.1 768 mm/pc: 1.8	288 mm/pc: 1.0 384 mm/pc: 1.4 480 mm/pc: 1.7 768 mm/pc: 2.7				288 mm/pc: 2.8 384 mm/pc: 3.7 480 mm/pc: 4.7 768 mm/pc: 7.4			

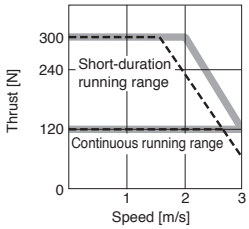
Notes: 1. The maximum speed of the linear servo motor or the rated speed of the linear encoder, whichever is smaller, is the upper limit of the linear servo motor speed.
2. The regenerative braking frequency shows the permissible frequency when the linear servo motor, without a load and a regenerative option, decelerates from the maximum speed to a stop. When a load is connected; however, the value will be the table value/(m+1), where m = Mass of load/Mass of motor primary side (coil). Take measures to keep the regenerative power [W] during operation below the tolerable regenerative power [W]. Use caution, especially when the operating speed changes frequently or when the regeneration is constant (as with vertical feeds). Select the most suitable regenerative option for your system with our capacity selection software. Refer to "Regenerative Option" in this catalog for the tolerable regenerative power [W] when regenerative option is used.
3. This value is applicable when MR-J4W2-44B or MR-J4W3-444B is used. The value is 942 for MR-J4W2-77B or MR-J4W2-1010B.
4. This value is applicable when MR-J4W2-44B or MR-J4W3-444B is used. The value is 497 for MR-J4W2-77B or MR-J4W2-1010B.
5. Use the linear servo motor with 70% or less of the effective load ratio when it is in the servo lock state or in a small reciprocating motion.

LM-H3 Series Thrust Characteristics

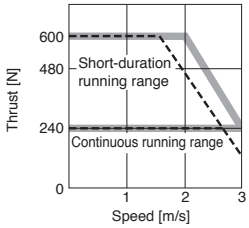
LM-H3P2A-07P-BSS0 (Note 1, 2, 3)



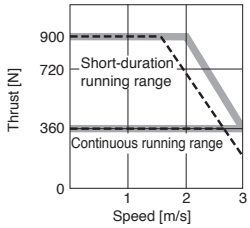
LM-H3P3A-12P-CSS0 (Note 1, 2, 3)



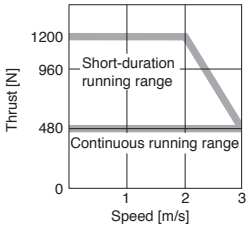
LM-H3P3B-24P-CSS0 (Note 1, 2, 3)



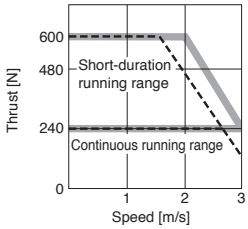
LM-H3P3C-36P-CSS0 (Note 1, 2, 3)



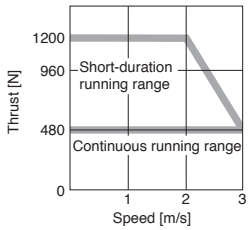
LM-H3P3D-48P-CSS0 (Note 1, 3)



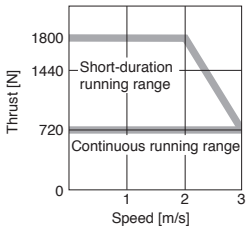
LM-H3P7A-24P-ASS0 (Note 1, 2, 3)



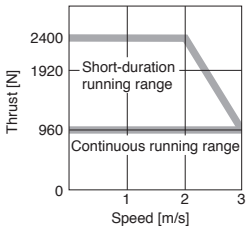
LM-H3P7B-48P-ASS0 (Note 1, 3)



LM-H3P7C-72P-ASS0 (Note 1, 3)



LM-H3P7D-96P-ASS0 (Note 1, 3)



Notes: 1. ▬ : For 3-phase 200 V AC.
2. - - - - : For 1-phase 200 V AC.
3. Thrust drops when the power supply voltage is below the specified value.

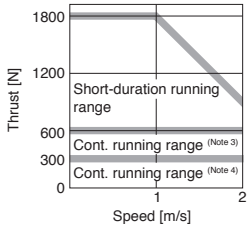
LM-F Series Specifications

Linear servo motor model	Primary side (coil)	LM-F	P2B-06M-1SS0	P2D-12M-1SS0	P2F-18M-1SS0	P4B-12M-1SS0	P4D-24M-1SS0	P4F-36M-1SS0	P4H-48M-1SS0	P5H-60M-1SS0 (Note 3)
	Secondary side (magnet)	LM-F	S20-480-1SS0 S20-576-1SS0			S40-480-1SS0 S40-576-1SS0				S50-480-1SS0 (Note 3) S50-576-1SS0 (Note 3)
Compatible servo amplifier model		MR-J4-	Refer to "Combinations of Linear Servo Motor and Servo Amplifier" on p. 3-5 in this catalog.							
Power supply capacity		[kVA]	3.5	7.5	10	7.5	10	14	18	22
Cooling method			Natural cooling or liquid cooling							
Thrust	Continuous (natural cooling) (Note 4)	[N]	300	600	900	600	1200	1800	2400	3000
	Continuous (liquid cooling) (Note 4)	[N]	600	1200	1800	1200	2400	3600	4800	6000
	Maximum	[N]	1800	3600	5400	3600	7200	10800	14400	18000
Maximum speed (Note 1)		[m/s]	2.0							
Magnetic attraction force		[N]	4500	9000	13500	9000	18000	27000	36000	45000
Rated current	Natural cooling	[A]	4.0	7.8	12	7.8	15	21	28	22
	Liquid cooling	[A]	7.8	16	23	17	31	44	59	45
Maximum current		[A]	30	58	87	57	109	159	212	157
Regenerative braking frequency (Note 2) MR-J4-	Natural cooling	[times/min]	348	264	318	393	169	577	715	4230
	Liquid cooling	[times/min]	671	396	No limit	366	224	859	1050	No limit
Recommended load to motor mass ratio			Maximum of 15 times the mass of the linear servo motor primary side							
Insulation class			155 (F)							
Structure			Open (IP rating: IP00)							
Environment	Ambient temperature		0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)							
	Ambient humidity		80 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)							
	Ambience		Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust							
	Altitude		1000 m or less above sea level							
	Vibration resistance		49 m/s^2							
Compliance to standards			Refer to "Conformity with Global Standards and Regulations" on p. 57 in this catalog.							
Mass	Primary side (coil)	[kg]	9.0	18	27	14	28	42	56	67
	Secondary side (magnet)	[kg]	480 mm/pc: 7.0 576 mm/pc: 9.0			480 mm/pc: 12 576 mm/pc: 15				480 mm/pc: 20 576 mm/pc: 24

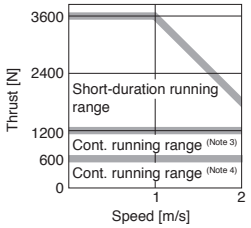
Notes: 1. The maximum speed of the linear servo motor or the rated speed of the linear encoder, whichever is smaller, is the upper limit of the linear servo motor speed.
2. The regenerative braking frequency shows the permissible frequency when the linear servo motor, without a load and a regenerative option, decelerates from the maximum speed to a stop. When a load is connected; however, the value will be the table value/(m+1), where m = Mass of load/Mass of motor primary side (coil). Take measures to keep the regenerative power [W] during operation below the tolerable regenerative power [W]. Use caution, especially when the operating speed changes frequently or when the regeneration is constant (as with vertical feeds). Select the most suitable regenerative option for your system with our capacity selection software. Refer to "Regenerative Option" in this catalog for the tolerable regenerative power [W] when regenerative option is used.
3. Use 400 V AC rated servo amplifier for this linear servo motor.
4. Use the linear servo motor with 70% or less of the effective load ratio when it is in the servo lock state or in a small reciprocating motion.

LM-F Series Thrust Characteristics

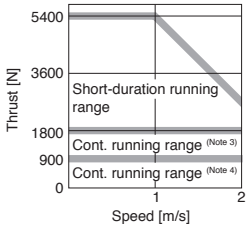
LM-FP2B-06M-1SS0 (Note 1, 5)



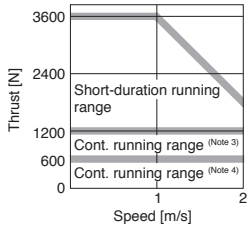
LM-FP2D-12M-1SS0 (Note 1, 5)



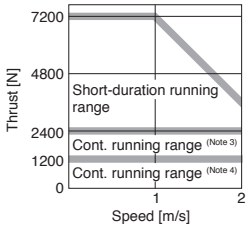
LM-FP2F-18M-1SS0 (Note 1, 5)



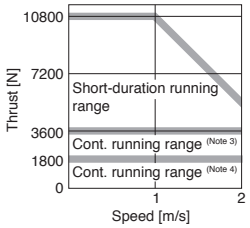
LM-FP4B-12M-1SS0 (Note 1, 5)



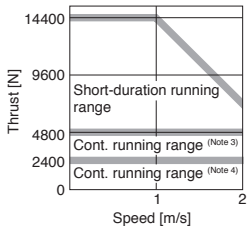
LM-FP4D-24M-1SS0 (Note 1, 5)



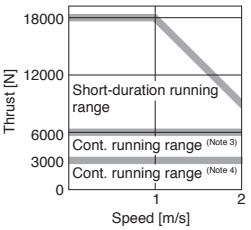
LM-FP4F-36M-1SS0 (Note 1, 5)



LM-FP4H-48M-1SS0 (Note 1, 5)



LM-FP5H-60M-1SS0 (Note 2, 5)



Notes: 1. ▬ : For 3-phase 200 V AC.
2. ▬ : For 3-phase 400 V AC.
3. Continuous running range (liquid cooling)
4. Continuous running range (natural cooling)
5. Thrust drops when the power supply voltage is below the specified value.

LM-K2 Series Specifications

Linear servo motor model	Primary side (coil)	LM-K2	P1A-01M-2SS1	P1C-03M-2SS1	P2A-02M-1SS1	P2C-07M-1SS1	P2E-12M-1SS1	P3C-14M-1SS1	P3E-24M-1SS1
	Secondary side (magnet) (Note 4)	LM-K2	S10-288-2SS1 S10-384-2SS1 S10-480-2SS1 S10-768-2SS1		S20-288-1SS1 S20-384-1SS1 S20-480-1SS1 S20-768-1SS1			S30-288-1SS1 S30-384-1SS1 S30-480-1SS1 S30-768-1SS1	
Compatible servo amplifier model		MR-J4-	Refer to "Combinations of Linear Servo Motor and Servo Amplifier" on p. 3-6 in this catalog.						
		MR-J4W_-							
Power supply capacity		[kVA]	0.9	3.5	1.3	5.5	7.5	5.5	7.5
Cooling method			Natural cooling						
Thrust	Continuous (Note 5)	[N]	120	360	240	720	1200	1440	2400
	Maximum	[N]	300	900	600	1800	3000	3600	6000
Maximum speed (Note 1)		[m/s]	2.0						
Magnetic attraction force		[N]	0						
Rated current		[A]	2.3	6.8	3.7	12	19	15	25
Maximum current		[A]	7.6	23	13	39	65	47	79
Regenerative braking frequency (Note 2)	MR-J4-	[times/min]	111	427	142	281	226	152	124
	MR-J4W_-	[times/min]	110 (Note 3)	-	355	-	-	-	-
Recommended load to motor mass ratio			Maximum of 30 times the mass of the linear servo motor primary side						
Insulation class			155 (F)						
Structure			Open (IP rating: IP00)						
Environment	Ambient temperature		0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)						
	Ambient humidity		80 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)						
	Ambience		Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust						
	Altitude		1000 m or less above sea level						
	Vibration resistance		49 m/s^2						
Compliance to standards			Refer to "Conformity with Global Standards and Regulations" on p. 57 in this catalog.						
Mass	Primary side (coil)	[kg]	2.5	6.5	4.0	10	16	18	27
	Secondary side (magnet)	[kg]	288 mm/pc: 1.5 384 mm/pc: 2.0 480 mm/pc: 2.5 768 mm/pc: 3.9		288 mm/pc: 1.9 384 mm/pc: 2.5 480 mm/pc: 3.2 768 mm/pc: 5.0			288 mm/pc: 5.5 384 mm/pc: 7.3 480 mm/pc: 9.2 768 mm/pc: 14.6	

Notes: 1. The maximum speed of the linear servo motor or the rated speed of the linear encoder, whichever is smaller, is the upper limit of the linear servo motor speed.

2. The regenerative braking frequency shows the permissible frequency when the linear servo motor, without a load and a regenerative option, decelerates from the maximum speed to a stop. When a load is connected; however, the value will be the table value/(m+1), where m = Mass of load/Mass of motor primary side (coil). Take measures to keep the regenerative power [W] during operation below the tolerable regenerative power [W]. Use caution, especially when the operating speed changes frequently or when the regeneration is constant (as with vertical feeds). Select the most suitable regenerative option for your system with our capacity selection software. Refer to "Regenerative Option" in this catalog for the tolerable regenerative power [W] when regenerative option is used.

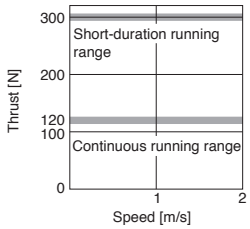
3. This value is applicable when MR-J4W2-44B or MR-J4W3-444B is used. The value is 584 for MR-J4W2-77B or MR-J4W2-1010B.

4. LM-K2 series has a structure of magnetic attraction counter-force and requires at least two blocks of identical secondary side (magnet).

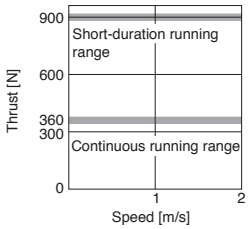
5. Use the linear servo motor with 70% or less of the effective load ratio when it is in the servo lock state or in a small reciprocating motion.

LM-K2 Series Thrust Characteristics

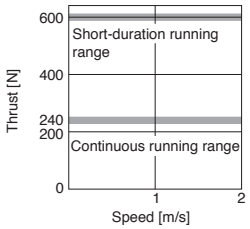
LM-K2P1A-01M-2SS1 (Note 1, 3)



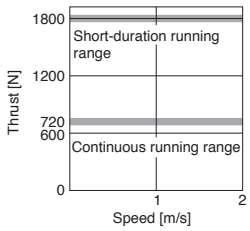
LM-K2P1C-03M-2SS1 (Note 2, 3)



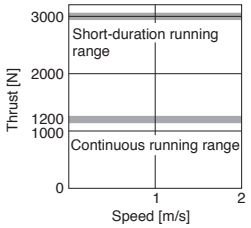
LM-K2P2A-02M-1SS1 (Note 1, 3)



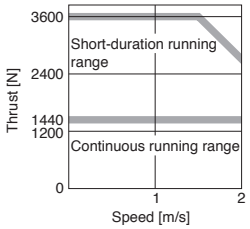
LM-K2P2C-07M-1SS1 (Note 2, 3)



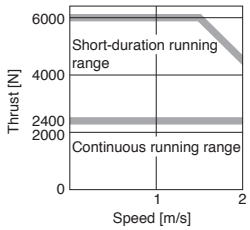
LM-K2P2E-12M-1SS1 (Note 2, 3)



LM-K2P3C-14M-1SS1 (Note 2, 3)



LM-K2P3E-24M-1SS1 (Note 2, 3)



Notes: 1. ▬ : For 3-phase 200 V AC or 1-phase 200 V AC.
2. ▬ : For 3-phase 200 V AC.
3. Thrust drops when the power supply voltage is below the specified value.

LM-U2 Series Specifications

Linear servo motor model	Primary side (coil) LM-U2		PAB-05M-0SS0	PAD-10M-0SS0	PAF-15M-0SS0	PBB-07M-1SS0	PBD-15M-1SS0	PBF-22M-1SS0	P2B-40M-2SS0	P2C-60M-2SS0	P2D-80M-2SS0
	Secondary side (magnet) LM-U2		SA0-240-0SS0 SA0-300-0SS0 SA0-420-0SS0			SB0-240-1SS0 SB0-300-1SS0 SB0-420-1SS0			S20-300-2SS0 S20-480-2SS0		
Compatible servo amplifier model	MR-J4-		Refer to "Combinations of Linear Servo Motor and Servo Amplifier" on p. 3-6 in this catalog.								
	MR-J4W_-										
Power supply capacity		[kVA]	0.5	0.9	0.9	0.5	1.0	1.3	3.5	5.5	7.5
Cooling method			Natural cooling								
Thrust	Continuous (Note 3)	[N]	50	100	150	75	150	225	400	600	800
	Maximum	[N]	150	300	450	225	450	675	1600	2400	3200
Maximum speed (Note 1)		[m/s]	2.0								
Magnetic attraction force		[N]	0								
Rated current		[A]	0.9	1.9	2.7	1.5	3.0	4.6	6.6	9.8	13.1
Maximum current		[A]	2.7	5.5	8.3	4.5	8.9	13.7	26.7	40.3	53.7
Regenerative braking frequency (Note 2)	MR-J4-	[times/min]	No limit	No limit	No limit	No limit	3480	No limit	1820	2800	1190
	MR-J4W_-	[times/min]	No limit	No limit	No limit	6030	No limit	No limit	-	-	-
Recommended load to motor mass ratio			Maximum of 30 times the mass of the linear servo motor primary side								
Insulation class			155 (F)								
Structure			Open (IP rating: IP00)								
Environment	Ambient temperature		0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)								
	Ambient humidity		80 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)								
	Ambience		Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust								
	Altitude		1000 m or less above sea level								
	Vibration resistance		49 m/s^2								
Compliance to standards			Refer to "Conformity with Global Standards and Regulations" on p. 57 in this catalog.								
Mass	Primary side (coil)	[kg]	0.3	0.6	0.8	0.4	0.8	1.1	2.9	4.2	5.5
	Secondary side (magnet)	[kg]	240 mm/pc: 2.0 300 mm/pc: 2.5 420 mm/pc: 3.5			240 mm/pc: 2.6 300 mm/pc: 3.2 420 mm/pc: 4.5			300 mm/pc: 9.6 480 mm/pc: 15.3		

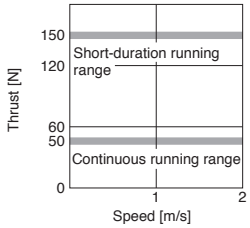
Notes: 1. The maximum speed of the linear servo motor or the rated speed of the linear encoder, whichever is smaller, is the upper limit of the linear servo motor speed.

2. The regenerative braking frequency shows the permissible frequency when the linear servo motor, without a load and a regenerative option, decelerates from the maximum speed to a stop. When a load is connected; however, the value will be the table value/(m+1), where m = Mass of load/Mass of motor primary side (coil). Take measures to keep the regenerative power [W] during operation below the tolerable regenerative power [W]. Use caution, especially when the operating speed changes frequently or when the regeneration is constant (as with vertical feeds). Select the most suitable regenerative option for your system with our capacity selection software. Refer to "Regenerative Option" in this catalog for the tolerable regenerative power [W] when regenerative option is used.

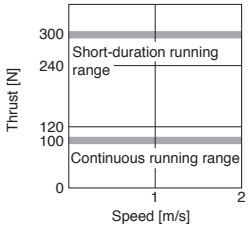
3. Use the linear servo motor with 70% or less of the effective load ratio when it is in the servo lock state or in a small reciprocating motion.

LM-U2 Series Thrust Characteristics

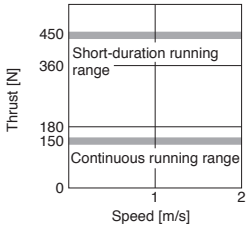
LM-U2PAB-05M-0SS0 (Note 1, 3)



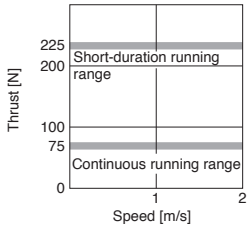
LM-U2PAD-10M-0SS0 (Note 1, 3)



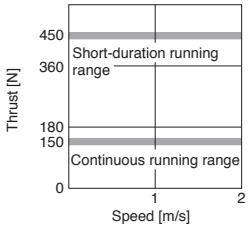
LM-U2PAF-15M-0SS0 (Note 1, 3)



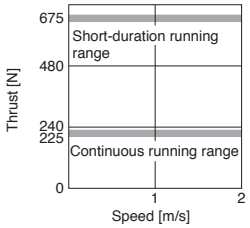
LM-U2PBB-07M-1SS0 (Note 1, 3)



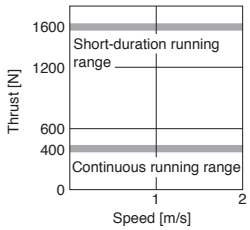
LM-U2PBD-15M-1SS0 (Note 1, 3)



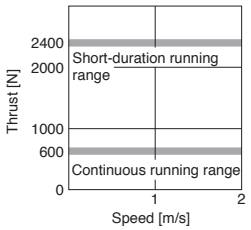
LM-U2PBF-22M-1SS0 (Note 1, 3)



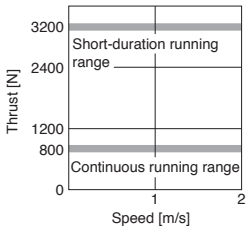
LM-U2P2B-40M-2SS0 (Note 2, 3)



LM-U2P2C-60M-2SS0 (Note 2, 3)



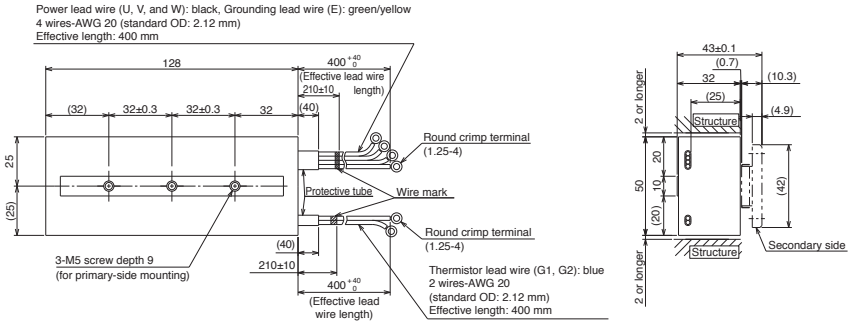
LM-U2P2D-80M-2SS0 (Note 2, 3)



Notes: 1. ▬ : For 3-phase 200 V AC or 1-phase 200 V AC.
2. ▬ : For 3-phase 200 V AC.
3. Thrust drops when the power supply voltage is below the specified value.

LM-H3 Series Primary Side (Coil) Dimensions (Note 1, 2)

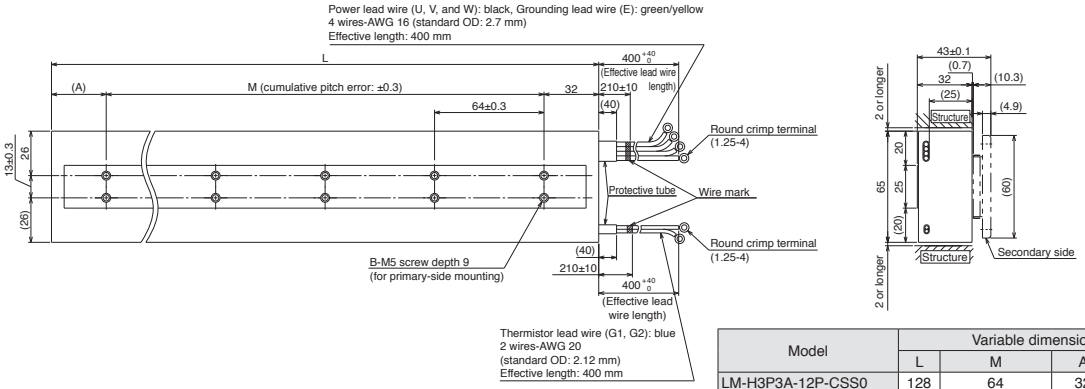
●LM-H3P2A-07P-BSS0



[Unit: mm]

●LM-H3P3A-12P-CSS0 ●LM-H3P3B-24P-CSS0 ●LM-H3P3C-36P-CSS0

●LM-H3P3D-48P-CSS0

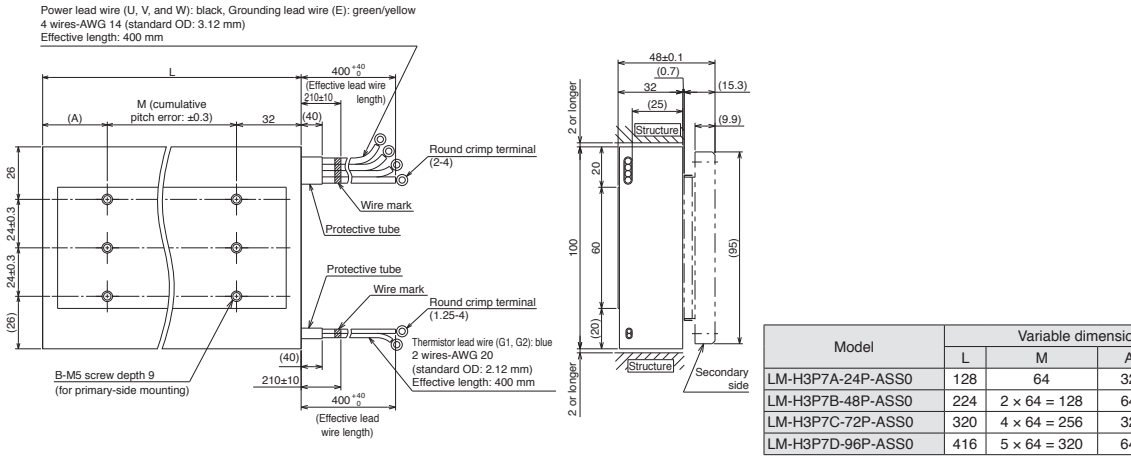


[Unit: mm]

Model	Variable dimensions			
	L	M	A	B
LM-H3P3A-12P-CSS0	128	64	32	2 × 2
LM-H3P3B-24P-CSS0	224	2 × 64 = 128	64	2 × 3
LM-H3P3C-36P-CSS0	320	4 × 64 = 256	32	2 × 5
LM-H3P3D-48P-CSS0	416	5 × 64 = 320	64	2 × 6

●LM-H3P7A-24P-ASS0 ●LM-H3P7B-48P-ASS0 ●LM-H3P7C-72P-ASS0

●LM-H3P7D-96P-ASS0



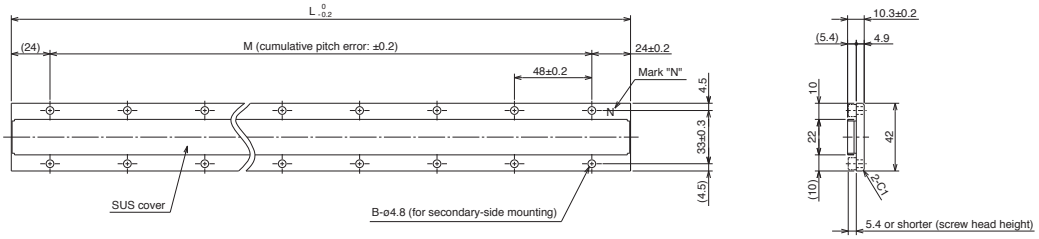
[Unit: mm]

Model	Variable dimensions			
	L	M	A	B
LM-H3P7A-24P-ASS0	128	64	32	3 × 2
LM-H3P7B-48P-ASS0	224	2 × 64 = 128	64	3 × 3
LM-H3P7C-72P-ASS0	320	4 × 64 = 256	32	3 × 5
LM-H3P7D-96P-ASS0	416	5 × 64 = 320	64	3 × 6

Notes: 1. Power, grounding and thermistor lead wires do not have a long bending life. Fix the lead wires led from the primary side (coil) to a moving part to prevent the lead wires from repetitive bending.
2. Minimum bending radius of the lead wire equals to six times the standard overall diameter of the lead wire.

LM-H3 Series Secondary Side (Magnet) Dimensions

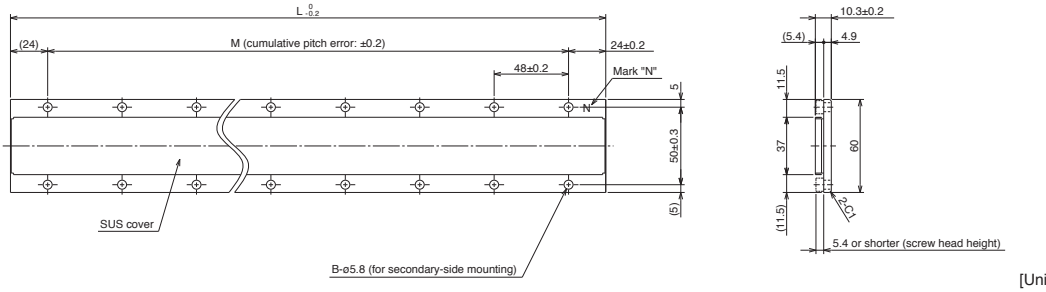
●LM-H3S20-288-BSS0 ●LM-H3S20-384-BSS0 ●LM-H3S20-480-BSS0
●LM-H3S20-768-BSS0



[Unit: mm]

Model	Variable dimensions		
	L	M	B
LM-H3S20-288-BSS0	288	5 × 48 = 240	2 × 6
LM-H3S20-384-BSS0	384	7 × 48 = 336	2 × 8
LM-H3S20-480-BSS0	480	9 × 48 = 432	2 × 10
LM-H3S20-768-BSS0	768	15 × 48 = 720	2 × 16

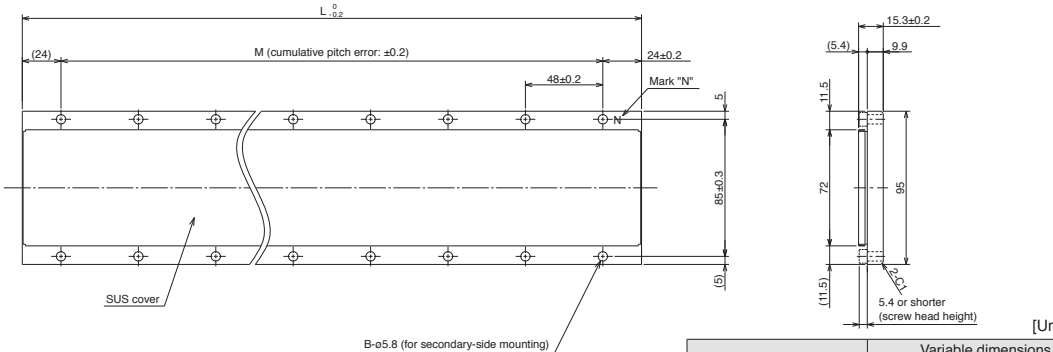
●LM-H3S30-288-CSS0 ●LM-H3S30-384-CSS0 ●LM-H3S30-480-CSS0
●LM-H3S30-768-CSS0



[Unit: mm]

Model	Variable dimensions		
	L	M	B
LM-H3S30-288-CSS0	288	5 × 48 = 240	2 × 6
LM-H3S30-384-CSS0	384	7 × 48 = 336	2 × 8
LM-H3S30-480-CSS0	480	9 × 48 = 432	2 × 10
LM-H3S30-768-CSS0	768	15 × 48 = 720	2 × 16

●LM-H3S70-288-ASS0 ●LM-H3S70-384-ASS0 ●LM-H3S70-480-ASS0
●LM-H3S70-768-ASS0

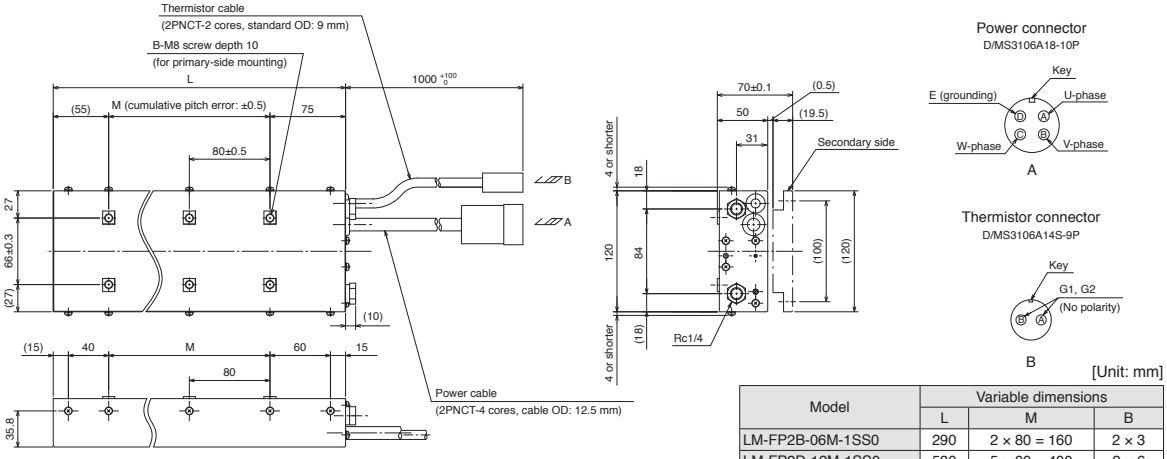


[Unit: mm]

Model	Variable dimensions		
	L	M	B
LM-H3S70-288-ASS0	288	5 × 48 = 240	2 × 6
LM-H3S70-384-ASS0	384	7 × 48 = 336	2 × 8
LM-H3S70-480-ASS0	480	9 × 48 = 432	2 × 10
LM-H3S70-768-ASS0	768	15 × 48 = 720	2 × 16

LM-F Series Primary Side (Coil) Dimensions (Note 1, 2)

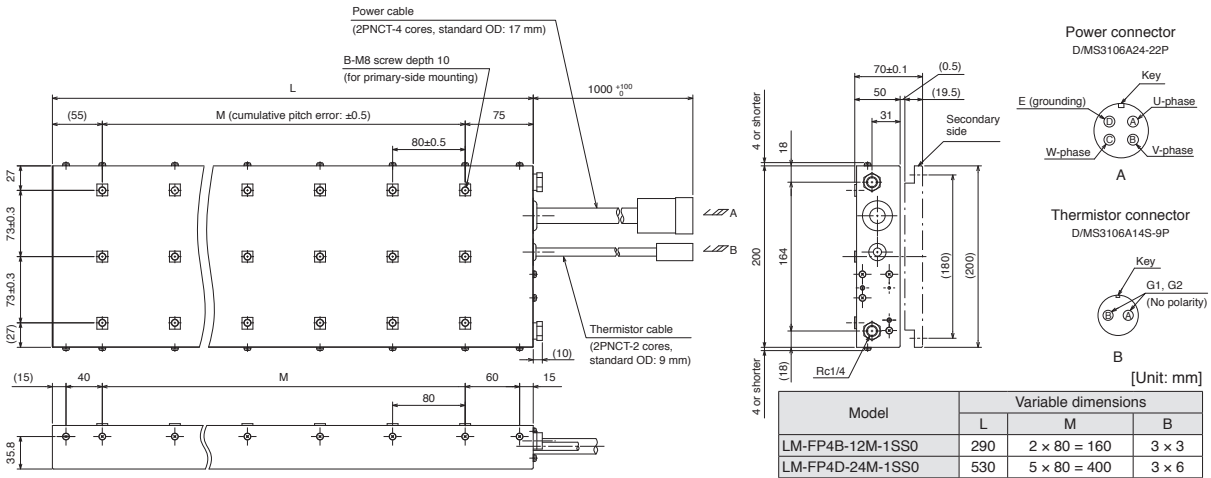
●LM-FP2B-06M-1SS0 ●LM-FP2D-12M-1SS0 ●LM-FP2F-18M-1SS0



[Unit: mm]

Model	Variable dimensions		
	L	M	B
LM-FP2B-06M-1SS0	290	2 × 80 = 160	2 × 3
LM-FP2D-12M-1SS0	530	5 × 80 = 400	2 × 6
LM-FP2F-18M-1SS0	770	8 × 80 = 640	2 × 9

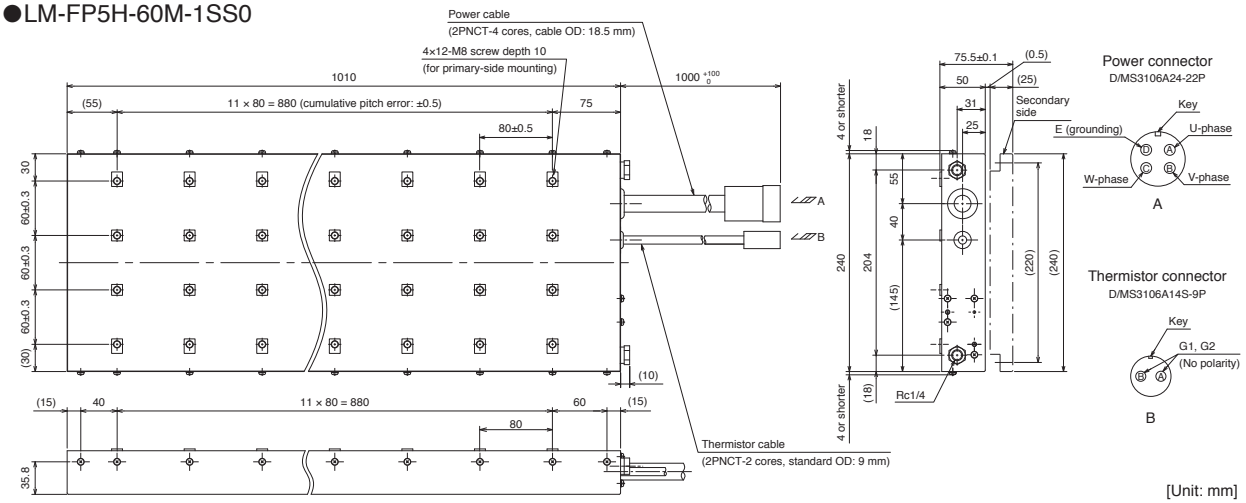
●LM-FP4B-12M-1SS0 ●LM-FP4D-24M-1SS0 ●LM-FP4F-36M-1SS0 ●LM-FP4H-48M-1SS0



[Unit: mm]

Model	Variable dimensions		
	L	M	B
LM-FP4B-12M-1SS0	290	2 × 80 = 160	3 × 3
LM-FP4D-24M-1SS0	530	5 × 80 = 400	3 × 6
LM-FP4F-36M-1SS0	770	8 × 80 = 640	3 × 9
LM-FP4H-48M-1SS0	1010	11 × 80 = 880	3 × 12

●LM-FP5H-60M-1SS0

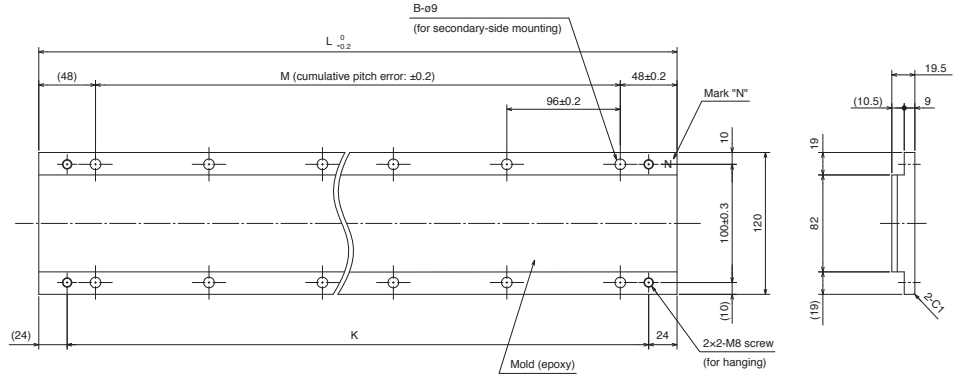


[Unit: mm]

Notes: 1. Power and thermistor cables do not have a long bending life. Fix the cables led from the primary side (coil) to a moving part to prevent the cables from repetitive bending.
2. Minimum bending radius of the cable equals to six times the standard overall diameter of the cable.

LM-F Series Secondary Side (Magnet) Dimensions

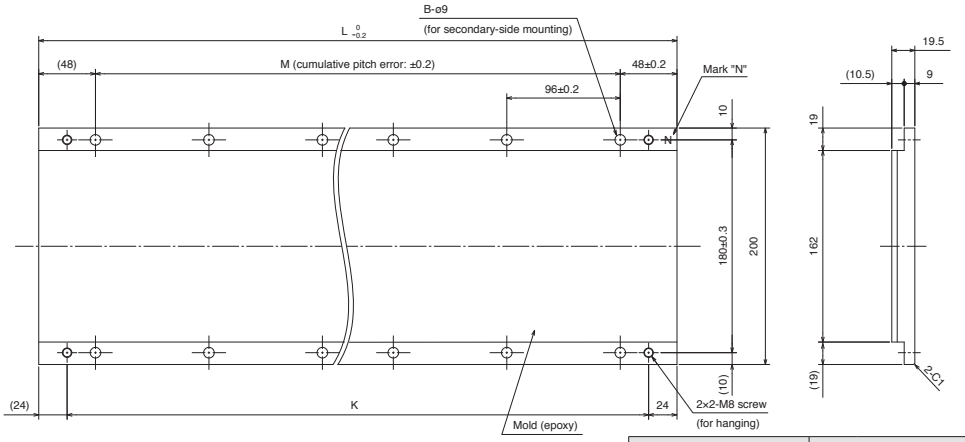
●LM-FS20-480-1SS0 ●LM-FS20-576-1SS0



[Unit: mm]

Model	Variable dimensions			
	L	M	B	K
LM-FS20-480-1SS0	480	4 × 96 = 384	2 × 5	432
LM-FS20-576-1SS0	576	5 × 96 = 480	2 × 6	528

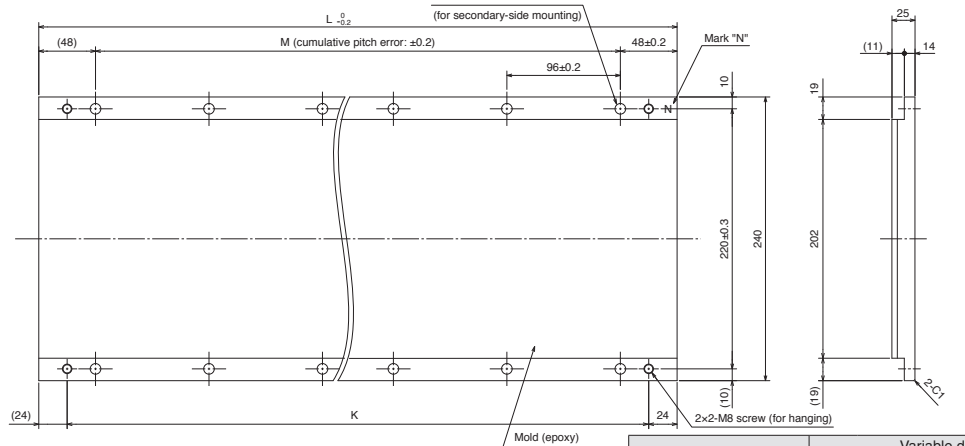
●LM-FS40-480-1SS0 ●LM-FS40-576-1SS0



[Unit: mm]

Model	Variable dimensions			
	L	M	B	K
LM-FS40-480-1SS0	480	4 × 96 = 384	2 × 5	432
LM-FS40-576-1SS0	576	5 × 96 = 480	2 × 6	528

●LM-FS50-480-1SS0 ●LM-FS50-576-1SS0 B-ø9

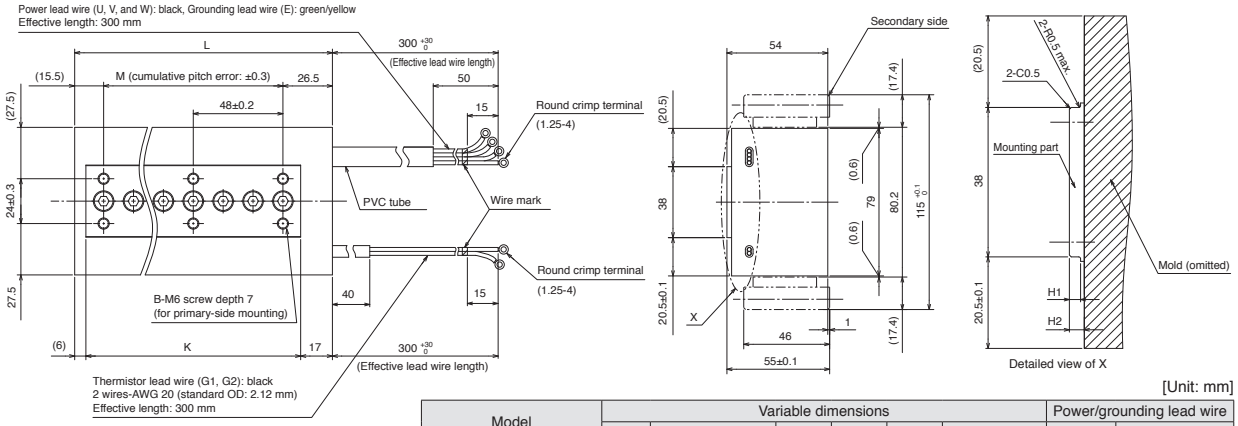


[Unit: mm]

Model	Variable dimensions			
	L	M	B	K
LM-FS50-480-1SS0	480	4 × 96 = 384	2 × 5	432
LM-FS50-576-1SS0	576	5 × 96 = 480	2 × 6	528

LM-K2 Series Primary Side (Coil) Dimensions (Note 1, 2)

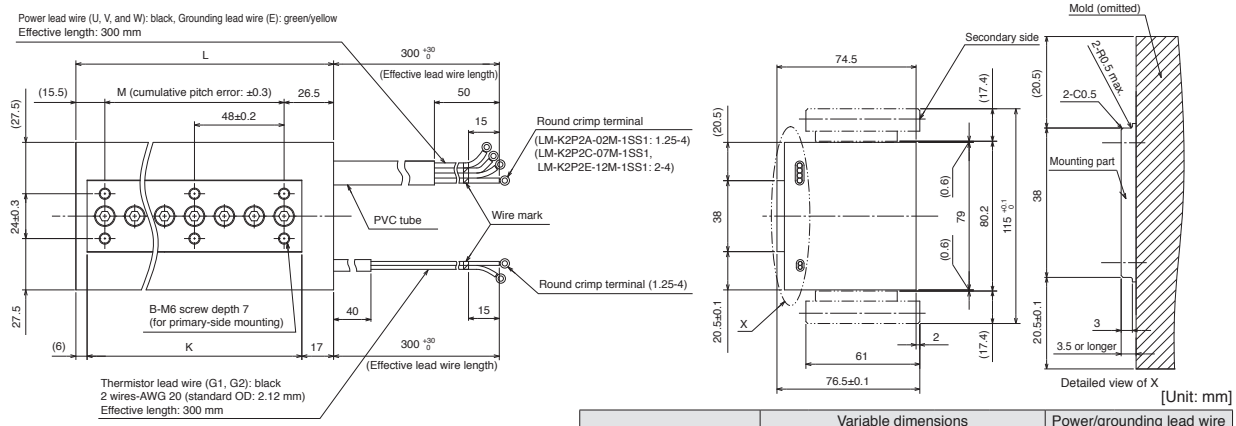
●LM-K2P1A-01M-2SS1 ●LM-K2P1C-03M-2SS1



[Unit: mm]

Model	Variable dimensions						Power/grounding lead wire	
	L	M	K	B	H1	H2	Size	Standard OD
LM-K2P1A-01M-2SS1	138	2 × 48 = 96	115	2 × 3	3	3.5 or longer	AWG 20	2.12
LM-K2P1C-03M-2SS1	330	6 × 48 = 288	307	2 × 7	1.5	2.5 or longer	AWG 16	2.7

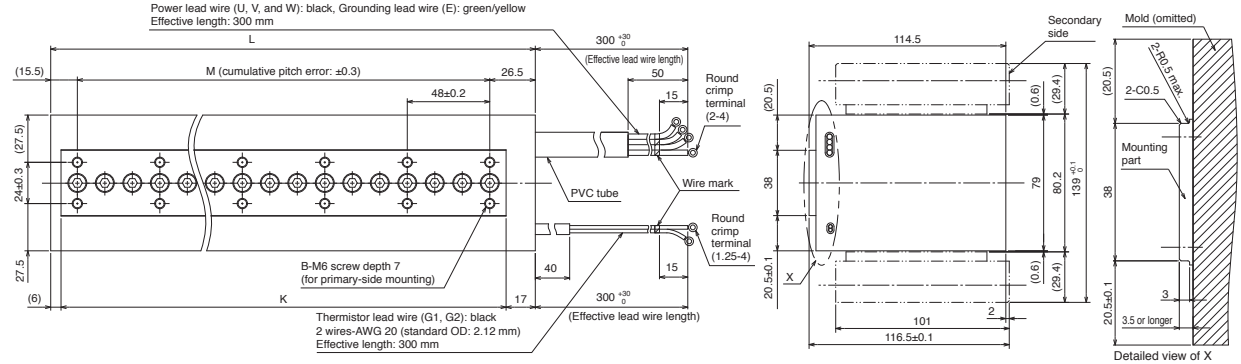
●LM-K2P2A-02M-1SS1 ●LM-K2P2C-07M-1SS1 ●LM-K2P2E-12M-1SS1



[Unit: mm]

Model	Variable dimensions				Power/grounding lead wire	
	L	M	K	B	Size	Standard OD
LM-K2P2A-02M-1SS1	138	2 × 48 = 96	115	2 × 3	AWG 16	2.7
LM-K2P2C-07M-1SS1	330	6 × 48 = 288	307	2 × 7	AWG 14	3.12
LM-K2P2E-12M-1SS1	522	10 × 48 = 480	499	2 × 11		

●LM-K2P3C-14M-1SS1 ●LM-K2P3E-24M-1SS1



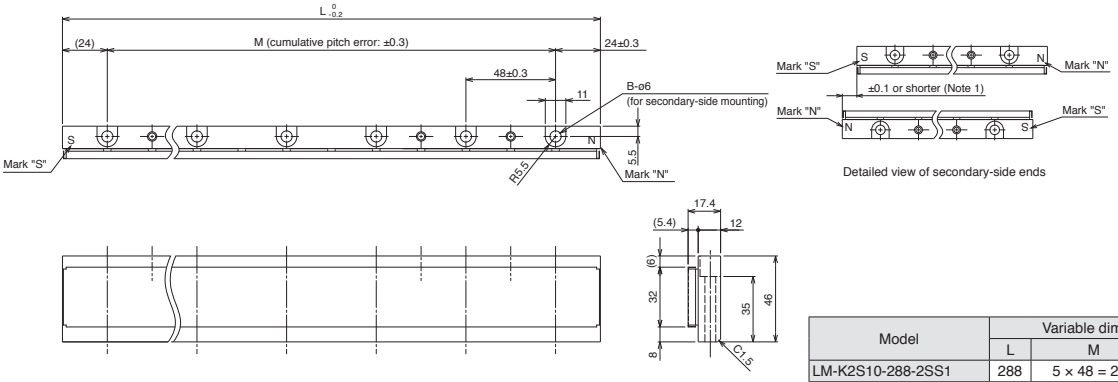
[Unit: mm]

Model	Variable dimensions				Power/grounding lead wire	
	L	M	K	B	Size	Standard OD
LM-K2P3C-14M-1SS1	330	6 × 48 = 288	307	2 × 7	AWG 14	3.12
LM-K2P3E-24M-1SS1	522	10 × 48 = 480	499	2 × 11		

Notes: 1. Power, grounding and thermistor lead wires do not have a long bending life. Fix the lead wires led from the primary side (coil) to a moving part to prevent the lead wires from repetitive bending.
2. Minimum bending radius of the lead wire equals to six times the standard overall diameter of the lead wire.

LM-K2 Series Secondary Side (Magnet) Dimensions

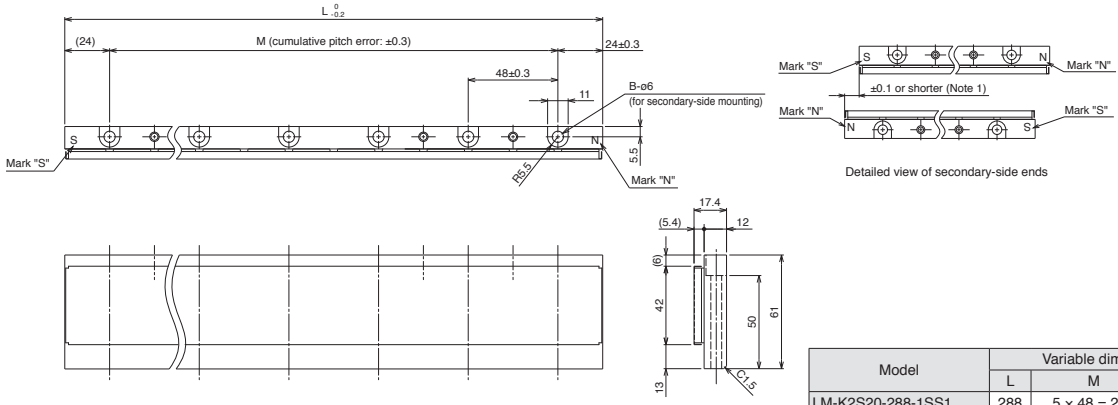
●LM-K2S10-288-2SS1 ●LM-K2S10-384-2SS1 ●LM-K2S10-480-2SS1
●LM-K2S10-768-2SS1



[Unit: mm]

Model	Variable dimensions		
	L	M	B
LM-K2S10-288-2SS1	288	5 × 48 = 240	6
LM-K2S10-384-2SS1	384	7 × 48 = 336	8
LM-K2S10-480-2SS1	480	9 × 48 = 432	10
LM-K2S10-768-2SS1	768	15 × 48 = 720	16

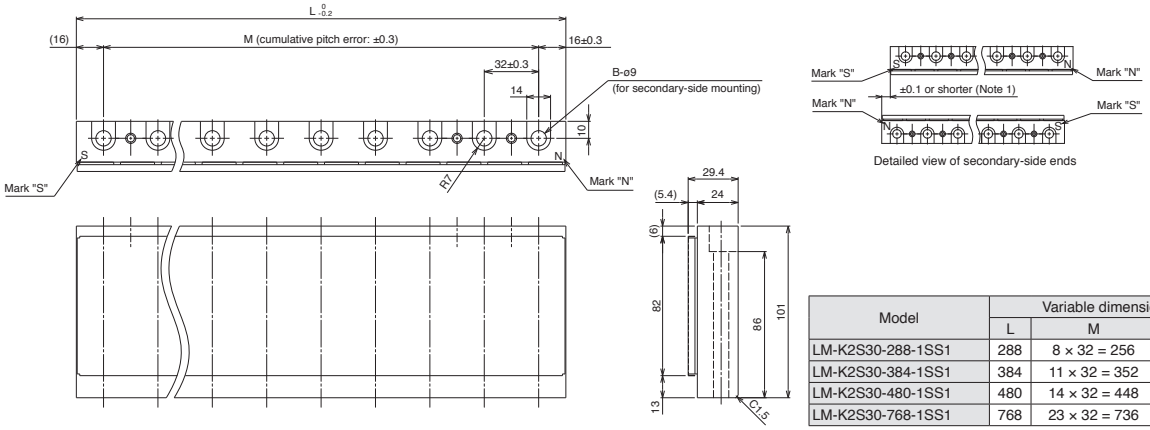
●LM-K2S20-288-1SS1 ●LM-K2S20-384-1SS1 ●LM-K2S20-480-1SS1
●LM-K2S20-768-1SS1



[Unit: mm]

Model	Variable dimensions		
	L	M	B
LM-K2S20-288-1SS1	288	5 × 48 = 240	6
LM-K2S20-384-1SS1	384	7 × 48 = 336	8
LM-K2S20-480-1SS1	480	9 × 48 = 432	10
LM-K2S20-768-1SS1	768	15 × 48 = 720	16

●LM-K2S30-288-1SS1 ●LM-K2S30-384-1SS1 ●LM-K2S30-480-1SS1
●LM-K2S30-768-1SS1



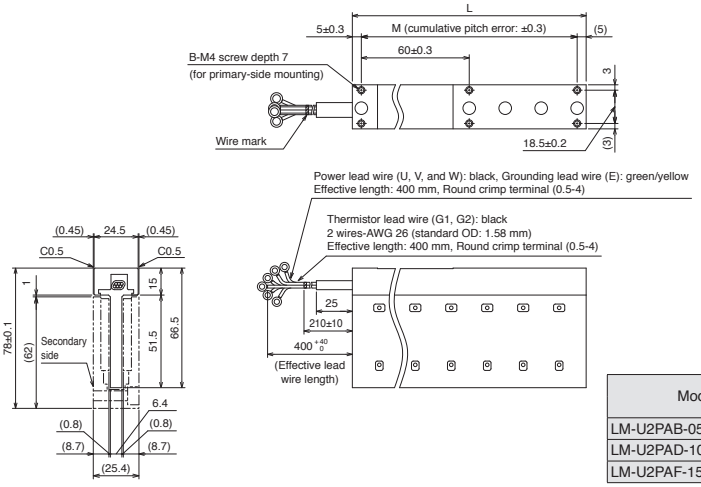
[Unit: mm]

Model	Variable dimensions		
	L	M	B
LM-K2S30-288-1SS1	288	8 × 32 = 256	9
LM-K2S30-384-1SS1	384	11 × 32 = 352	12
LM-K2S30-480-1SS1	480	14 × 32 = 448	15
LM-K2S30-768-1SS1	768	23 × 32 = 736	24

Notes: 1. Longitudinal deviation of the secondary side must be within ±0.1 mm.

LM-U2 Series Primary Side (Coil) Dimensions (Note 1, 2)

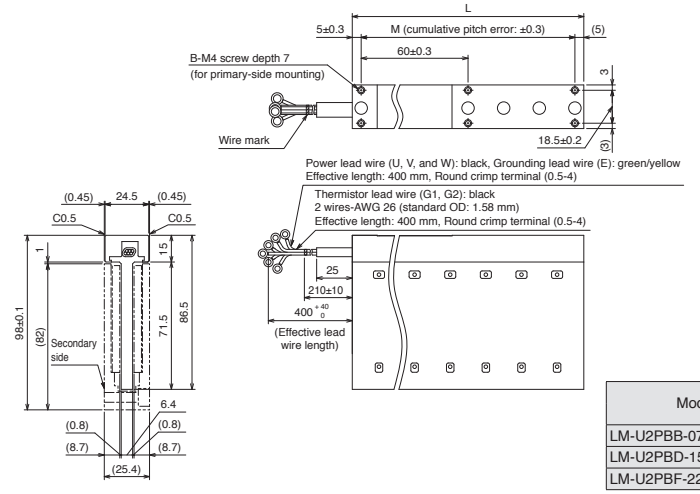
●LM-U2PAB-05M-0SS0 ●LM-U2PAD-10M-0SS0 ●LM-U2PAF-15M-0SS0



[Unit: mm]

Model	Variable dimensions			Power/grounding lead wire	
	L	M	B	Size	Standard OD
LM-U2PAB-05M-0SS0	130	2 × 60 = 120	2 × 3	AWG 26	1.58
LM-U2PAD-10M-0SS0	250	4 × 60 = 240	2 × 5		
LM-U2PAF-15M-0SS0	370	6 × 60 = 360	2 × 7		

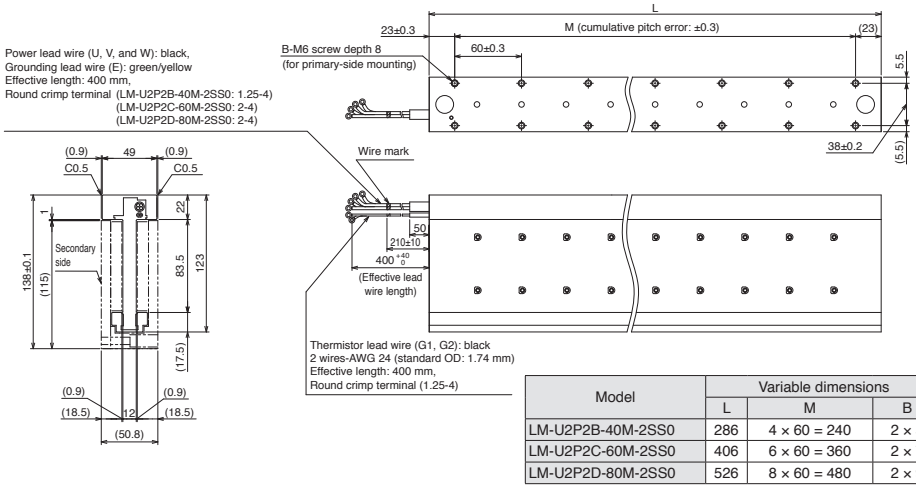
●LM-U2PBB-07M-1SS0 ●LM-U2PBD-15M-1SS0 ●LM-U2PBF-22M-1SS0



[Unit: mm]

Model	Variable dimensions			Power/grounding lead wire	
	L	M	B	Size	Standard OD
LM-U2PBB-07M-1SS0	130	2 × 60 = 120	2 × 3	AWG 26	1.58
LM-U2PBD-15M-1SS0	250	4 × 60 = 240	2 × 5		
LM-U2PBF-22M-1SS0	370	6 × 60 = 360	2 × 7		

●LM-U2P2B-40M-2SS0 ●LM-U2P2C-60M-2SS0 ●LM-U2P2D-80M-2SS0



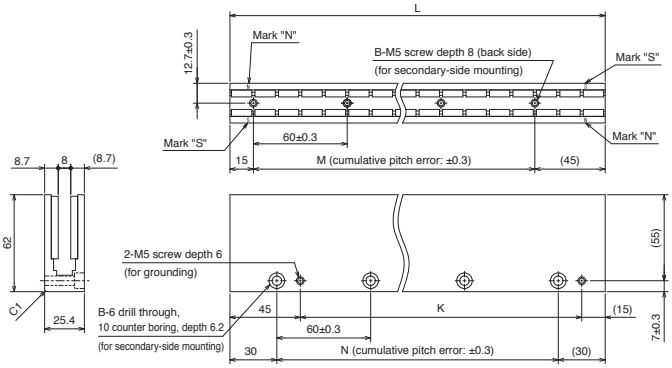
[Unit: mm]

Model	Variable dimensions			Power/grounding lead wire	
	L	M	B	Size	Standard OD
LM-U2P2B-40M-2SS0	286	4 × 60 = 240	2 × 5	AWG 16	2.7
LM-U2P2C-60M-2SS0	406	6 × 60 = 360	2 × 7	AWG 14	3.12
LM-U2P2D-80M-2SS0	526	8 × 60 = 480	2 × 9		

Notes: 1. Power, grounding and thermistor lead wires do not have a long bending life. Fix the lead wires led from the primary side (coil) to a moving part to prevent the lead wires from repetitive bending.
2. Minimum bending radius of the lead wire equals to six times the standard overall diameter of the lead wire.

LM-U2 Series Secondary Side (Magnet) Dimensions

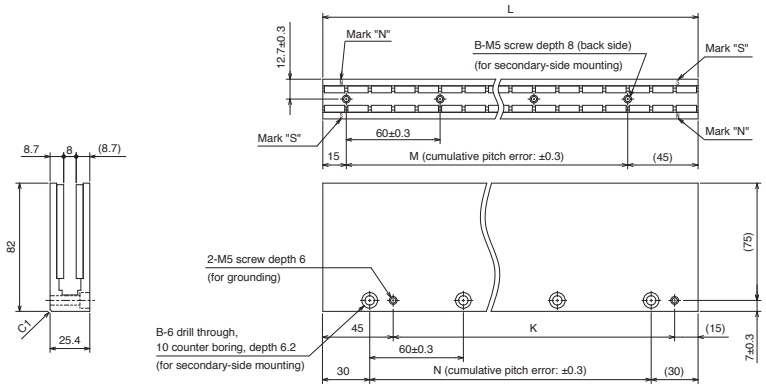
●LM-U2SA0-240-0SS0 ●LM-U2SA0-300-0SS0 ●LM-U2SA0-420-0SS0



[Unit: mm]

Model	Variable dimensions				
	L	M	B	K	N
LM-U2SA0-240-0SS0	240	3 × 60 = 180	4	180	3 × 60 = 180
LM-U2SA0-300-0SS0	300	4 × 60 = 240	5	240	4 × 60 = 240
LM-U2SA0-420-0SS0	420	6 × 60 = 360	7	360	6 × 60 = 360

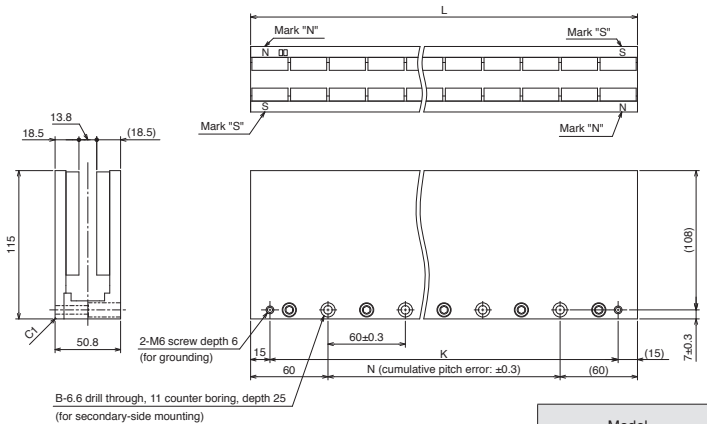
●LM-U2SB0-240-1SS0 ●LM-U2SB0-300-1SS0 ●LM-U2SB0-420-1SS0



[Unit: mm]

Model	Variable dimensions				
	L	M	B	K	N
LM-U2SB0-240-1SS0	240	3 × 60 = 180	4	180	3 × 60 = 180
LM-U2SB0-300-1SS0	300	4 × 60 = 240	5	240	4 × 60 = 240
LM-U2SB0-420-1SS0	420	6 × 60 = 360	7	360	6 × 60 = 360

●LM-U2S20-300-2SS0 ●LM-U2S20-480-2SS0



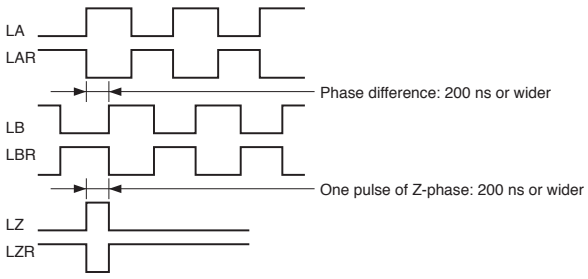
[Unit: mm]

Model	Variable dimensions			
	L	N	B	K
LM-U2S20-300-2SS0	300	3 × 60 = 180	4	270
LM-U2S20-480-2SS0	480	6 × 60 = 360	7	450

List of Linear Encoders (Note 1)

Linear encoder type		Manufacturer	Model		Resolution	Rated speed (Note 2)	Maximum effective measurement length (Note 3)	Communication method
Mitsubishi serial interface compatible	Absolute type	Magnescale Co., Ltd.	SR77		0.05 μm/0.01 μm	3.3 m/s	2040 mm	Two-wire type
			SR87				3040 mm	
		Mitutoyo Corporation	AT343A		0.05 μm	2.0 m/s	3000 mm	Two-wire type
			AT543A-SC			2.5 m/s	2200 mm	
			AT545A-SC		20 μm/4096 (Approx. 0.005 μm)	2.5 m/s	2200 mm	
			ST741A		0.5 μm	4.0 m/s	6000 mm	
			ST742A					
			ST743A		0.1 μm			
			ST744A					
			ST748A					
		Renishaw	RESOLUTE RL40M		1 nm/50 nm	4.0 m/s	10000 mm	Two-wire type
		Heidenhain	LC 493M		0.05 μm/0.01 μm	3.0 m/s	2040 mm	Four-wire type (Note 4)
			LC 193M				4240 mm	
			LIC 4193M		0.01 μm	4.0 m/s	3040 mm	Two-wire/ Four-wire type (Note 4)
			LIC 4195M				28040 mm	
			LIC 4197M				6040 mm	
			LIC 4199M				1020 mm	
	Incremental type	Magnescale Co., Ltd.	SR75		0.05 μm/0.01 μm	3.3 m/s	2040 mm	Two-wire type
			SR85				3040 mm	
			SL710 + PL101-RM/RHM		0.1 μm	4.0 m/s	100000 mm	
		Renishaw	RGH26P		5 μm	4.0 m/s	70000 mm	Two-wire type
			RGH26Q		1 μm	3.2 m/s		
			RGH26R		0.5 μm	1.6 m/s		
		Heidenhain	LIDA 483	+ EIB 392M (/16384)	20 μm/16384 (Approx. 1.22 nm)	4.0 m/s	3040 mm	Four-wire type (Note 4)
			LIDA 485				30040 mm	
			LIDA 487				6040 mm	
			LIDA 489				1020 mm	
			LIDA 287	+ EIB 392M (/16384)	200 μm/16384 (Approx. 12.2 nm)		10000 mm	
			LIDA 289					
			LIF 481	+ EIB 392M (/4096)	4 μm/4096 (Approx. 0.977 nm)	1.2 m/s	1020 mm	
			LIP 581				1440 mm	
A/B/Z-phase differential output type (Note 5, 7)		Not designated	-		0.001 μm to 5 μm (Note 6)	Depends on the linear encoder	Depends on the linear encoder	A/B/Z-phase differential output method

Notes: 1. Contact the relevant linear encoder manufacturer for details on operating environment and specifications of the linear encoder such as ambient temperature, vibration resistance and IP rating.
2. The rated speed of the linear encoder is applicable when the linear encoder is used with MR-J4 series servo amplifier. The values may differ from the manufacturers' specifications.
3. The length is specified by the linear encoder manufacturers. The maximum length of the encoder cable between linear encoder and servo amplifier is 30 m.
4. When using the four-wire type linear encoder in fully closed loop control system, use MR-J4-B-RJ or MR-J4-A-RJ servo amplifier. When using four-wire type linear encoder with the scale measurement function, use MR-J4-B-RJ servo amplifier.
5. When using the A/B/Z-phase differential output type linear encoder, use MR-J4-B-RJ or MR-J4-A-RJ servo amplifier.
6. Select the linear encoder within this range.
7. Output A-phase, B-phase, and Z-phase signals in the differential line driver. The phase difference of the A-phase pulse and the B-phase pulse, and the width of the Z-phase pulse must be 200 ns or wider. The output pulse of A-phase and B-phase of the A/B/Z-phase differential output linear encoder is in the multiply-by-four count method. Home position return is not possible with a linear encoder without Z-phase.



Selecting Linear Servo Motor

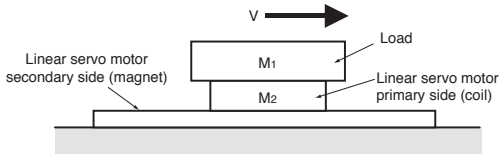
- **Linear servo motor must be selected according to the purpose of the application. Select the optimal linear servo motor after completely understanding the characteristics of the guides, the linear encoders and the linear servo motors.**
- **The maximum speed is 3.0 m/s for LM-H3 series, and 2.0 m/s for LM-F, LM-K2 and LM-U2 series. Note that the maximum speed may not be reached, depending on the selected linear encoder.**

Linear Servo Motor Sizing Example

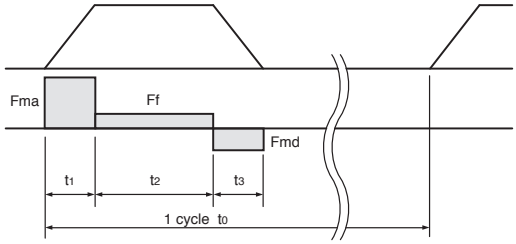
- **In order to select a suitable linear servo motor, it is necessary to calculate the maximum thrust required during acceleration/deceleration and the continuous effective load thrust according to the machine specifications and the operating patterns. Here the linear servo motor is selected according to linear acceleration/deceleration operating patterns.**

1. Selection criteria

(1) Configurations



(2) Operating pattern



Load mass	M_1 = 20 kg
Linear servo motor primary-side (coil) mass	M_2 = kg
(Determined after the motor is selected.)	
Acceleration	a = 14.4 m/s^2
Deceleration	d = 14.4 m/s^2
Resistive force (including friction, unbalance and cable chain)	Ff = N
(Determined after the motor is selected.)	
Feed speed	V = 1.8 m/s
Operating cycle	t_0 = 2 s
Acceleration time	t_1 = 0.125 s
Constant velocity time	t_2 = 0.75 s
Deceleration time	t_3 = 0.125 s
Mechanical efficiency	η = 1.0
Friction coefficient	μ = 0.020 (for iron)

2. Method of selecting linear servo motor (theoretical value)

(1) Select a linear servo motor

From the linear servo motor series that is suitable for your application or machine, select a linear servo motor with the mass ratio of load to primary side (coil) which is equal to or less than the recommended load to motor mass ratio.

For LM-H3 series: 35 times (Note 1) $\geq M_1/M_2$

Select linear servo motors that satisfy the above formula, e.g., LM-H3P2A-07P-BSS0, LM-H3P3A-12P-CSS0, and LM-H3P3B-24P-CSS0.

Calculate thrusts during acceleration and deceleration, and continuous effective load thrust for each linear servo motor selected in (1).

The following is an example of calculation for LM-H3P3B-24P-CSS0.

(2) Calculate necessary thrust

Resistive force

$M = M_1 + M_2 = 22.3$ kg

$Ff = \mu \cdot (M \cdot 9.8 + \text{Magnetic attraction force [N]})$ (when considering friction only) = 48.4 N

Thrust during acceleration and deceleration

$Fma = M \cdot a + Ff = 369.5$ N

$Fmd = -M \cdot d + Ff = -272.7$ N

Continuous effective load thrust

$Frms = \sqrt{(Fma^2 \cdot t_1 + Ff^2 \cdot t_2 + Fmd^2 \cdot t_3) / t_0} = 118.6$ N

(3) Verify the selected linear servo motor.

$Frms/\eta \leq$ Continuous thrust [N] of the selected linear servo motor

$Fma/\eta \leq$ Maximum thrust [N] of the selected linear servo motor

If the above criteria are not satisfied, select one rank larger capacity linear servo motor and recalculate.

(4) Result

Select the following:

Linear servo motor: LM-H3P3B-24P-CSS0

Servo amplifier: MR-J4-70B

Notes: 1. The ratio of 35 times is applicable for LM-H3 series. Select a linear servo motor with the mass ratio of 30 times or less for LM-K2 or LM-U2 series, and 15 times or less for LM-F series.

[Free capacity selection software]

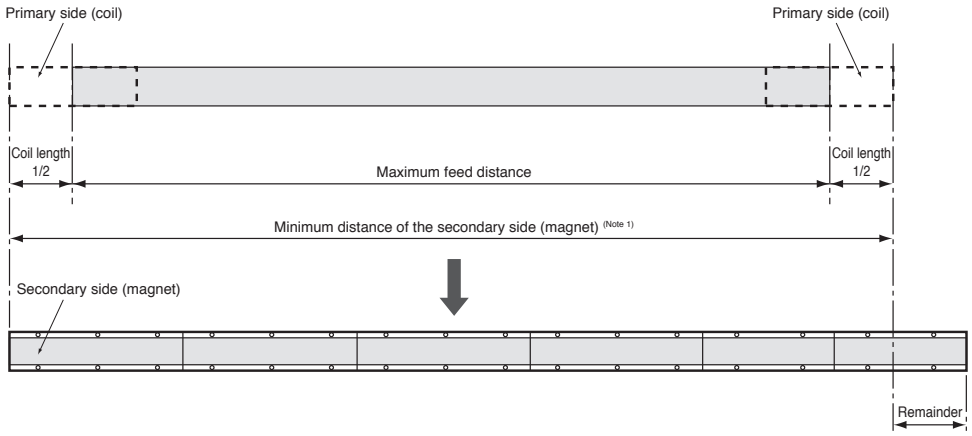
Capacity selection software (MRZJW3-MOTSZ111E) does all the calculations for you. The capacity selection software is available for free download. Contact your local sales office for more details.

* MRZJW3-MOTSZ111E software version C5 or later is compatible.

3. Determining the number of the secondary-side (magnet) blocks

The number of the secondary-side (magnet) blocks is determined according to the total distance calculated from the following equation (Note 2) :

(Total length of aligned secondary side (magnet)) ≥ (Maximum feed distance) + (Length of the primary side (coil))



Notes: 1. Keep the cumulative pitch error of the mounting screw holes within ±0.2 mm. When two or more secondary sides (magnets) are aligned, spaces may exist between each secondary side (magnet) block, depending on the mounting method and the number of the secondary-side blocks.
2. LM-K2 series has a structure of magnetic attraction counter-force and requires at least two blocks of identical secondary side (magnet). Therefore, the total number of the secondary side necessary equals to twice the number determined from the equation.

4. Selecting regenerative option

The following table shows the energy charged into the capacitor of the servo amplifier and the inverse efficiency of the linear servo motor.

The energy consumed by a regenerative resistor is calculated as follows:

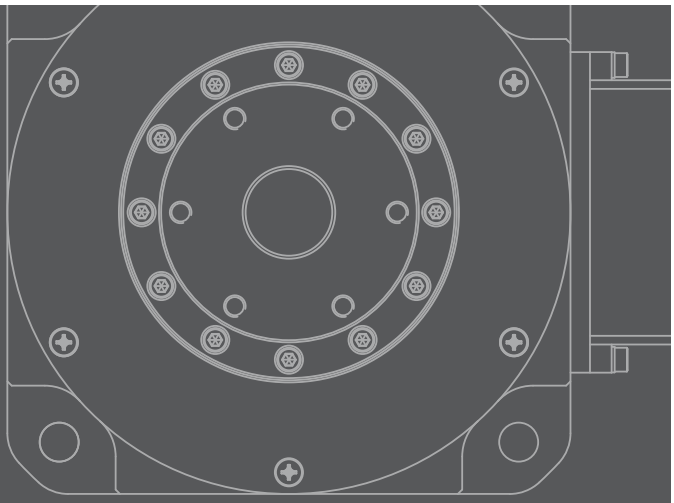
Regenerative energy P [W] = {-Fmd • (t_3 • Speed/2) • (Inverse efficiency/100) - Capacitor charging}/t_0

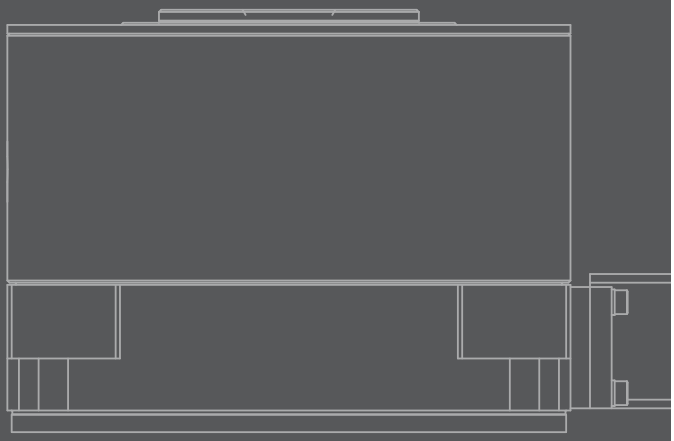
Select a suitable regenerative option as necessary to keep the consumed regenerative energy below the regenerative power shown in the following table:

Servo Amplifier (Note 2)	Capacitor charging [J]	Inverse efficiency [%]	Tolerable regenerative power of built-in regenerative resistor [W]	Tolerable regenerative power of external regenerative resistor (standard accessory) [W] (Note 4)	Tolerable regenerative power of regenerative option [W]											
					MR-RB (Note 3)											
					032	12	30	3N	31	32	50 (Note 1)	5N (Note 1)	51 (Note 1)	5R (Note 4)	9F (Note 4)	6K-4 (Note 4)
					40 Ω	40 Ω	13 Ω	9 Ω	6.7 Ω	40 Ω	13 Ω	9 Ω	6.7 Ω	3.2 Ω	3 Ω	10 Ω
MR-J4-20_(-RJ)	9	75	10	-	30	100	-	-	-	-	-	-	-	-	-	-
MR-J4-40_(-RJ)	11	85	10	-	30	100	-	-	-	-	-	-	-	-	-	-
MR-J4-60_(-RJ)	11	85	10	-	30	100	-	-	-	-	-	-	-	-	-	-
MR-J4-70_(-RJ)	18	85	20	-	30	100	-	-	-	300	-	-	-	-	-	-
MR-J4-200_(-RJ)	36	85	100	-	-	-	300	-	-	-	500	-	-	-	-	-
MR-J4-350_(-RJ)	40	85	100	-	-	-	-	300	-	-	-	500	-	-	-	-
MR-J4-500_(-RJ)	45	90	130	-	-	-	-	-	300	-	-	-	500	-	-	-
MR-J4-700_(-RJ)	70	90	170	-	-	-	-	-	300	-	-	-	500	-	-	-
MR-J4-11K_(-RJ)	120	90	-	500 (800)	-	-	-	-	-	-	-	-	-	500 (800)	-	-
MR-J4-15K_(-RJ)	170	90	-	850 (1300)	-	-	-	-	-	-	-	-	-	-	850 (1300)	-
MR-J4-22K_4(-RJ)	250	90	-	850 (1300)	-	-	-	-	-	-	-	-	-	-	-	850 (1300)

Notes: 1. Be sure to cool the unit forcibly with a cooling fan (92 mm × 92 mm, minimum air flow: 1.0 m^3/min). The cooling fan must be prepared by user.
2. For selecting a regenerative option for MR-J4W_-B, refer to "MR-J4W_-_B Servo Amplifier Instruction Manual" for details.
3. Refer to "Regenerative Option" in this catalog for details on the regenerative option.
4. The value in brackets is applicable when cooling fans (two units of 92 mm × 92 mm, minimum air flow: 1.0 m^3/min) are installed, and then [Pr. PA02] is changed.

4





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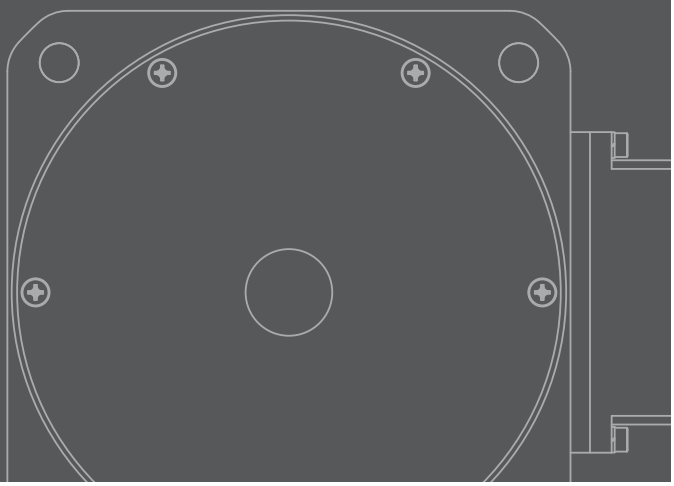


* Note that some servo amplifiers are available in the future.
* Refer to p. 5-65 in this catalog for conversion of units.

Direct Drive Motors

Model Designation

TM-RFM □ □ □

Direct drive motor series

Symbol	Rated torque [N•m]
002	2
004	4
006	6
012	12
018	18
040	40
048	48
072	72
120	120
240	240

Symbol	Motor outer diameter [mm] (Frame dimensions)
C	ø130
E	ø180
G	ø230
J	ø330

Symbol	Rated speed [r/min]
10	100
20	200

Combinations of Direct Drive Motor and Servo Amplifier

Direct drive motor		Servo amplifier		
		MR-J4	MR-J4W2 (Note 1)	MR-J4W3 (Note 1)
TM-RFM series	TM-RFM002C20	MR-J4-20B(-RJ), MR-J4-20A(-RJ)	MR-J4W2-22B, MR-J4W2-44B	MR-J4W3-222B, MR-J4W3-444B
	TM-RFM004C20	MR-J4-40B(-RJ), MR-J4-40A(-RJ)	MR-J4W2-44B, MR-J4W2-77B MR-J4W2-1010B	MR-J4W3-444B
	TM-RFM006C20	MR-J4-60B(-RJ), MR-J4-60A(-RJ)	MR-J4W2-77B, MR-J4W2-1010B	-
	TM-RFM006E20	MR-J4-60B(-RJ), MR-J4-60A(-RJ)	MR-J4W2-77B, MR-J4W2-1010B	-
	TM-RFM012E20	MR-J4-70B(-RJ), MR-J4-70A(-RJ)	MR-J4W2-77B, MR-J4W2-1010B	-
	TM-RFM018E20	MR-J4-100B(-RJ), MR-J4-100A(-RJ)	MR-J4W2-1010B	-
	TM-RFM012G20	MR-J4-70B(-RJ), MR-J4-70A(-RJ)	MR-J4W2-77B, MR-J4W2-1010B	-
	TM-RFM048G20	MR-J4-350B(-RJ), MR-J4-350A(-RJ)	-	-
	TM-RFM072G20	MR-J4-350B(-RJ), MR-J4-350A(-RJ)	-	-
	TM-RFM040J10	MR-J4-70B(-RJ), MR-J4-70A(-RJ)	MR-J4W2-77B, MR-J4W2-1010B	-
	TM-RFM120J10	MR-J4-350B(-RJ), MR-J4-350A(-RJ)	-	-
	TM-RFM240J10	MR-J4-500B(-RJ), MR-J4-500A(-RJ)	-	-

Notes: 1. Any combination of the servo motors is available. Refer to "Combinations of Multi-Axis Servo Amplifier and Servo Motors" on p. 1-4 in this catalog.

TM-RFM Series Specifications

Direct drive motor model		TM-RFM	002C20	004C20	006C20	006E20	012E20	018E20
Compatible servo amplifier model		MR-J4-	Refer to "Combinations of Direct Drive Motor and Servo Amplifier" on p. 4-1 in this catalog.					
		MR-J4W_-						
Motor outer diameter (frame dimensions) [mm]			ø130			ø180		
Power supply capacity *1 [kVA]			0.25	0.38	0.53	0.46	0.81	1.3
Continuous running duty	Rated output [W]		42	84	126	126	251	377
	Rated torque (Note 3) [N•m]		2	4	6	6	12	18
Maximum torque [N•m]			6	12	18	18	36	54
Rated speed [r/min]			200					
Maximum speed [r/min]			500					
Permissible instantaneous speed [r/min]			575					
Power rate at continuous rated torque [kW/s]			3.7	9.6	16.1	4.9	12.9	21.8
Rated current [A]			1.3	2.1	3.2	3.2	3.8	5.9
Maximum current [A]			3.9	6.3	9.6	9.6	12	18
Regenerative braking frequency *2	MR-J4- [times/min]		No limit	5830	2950	464	572	421
	MR-J4W_- [times/min]		No limit	5620	No limit	2370	1430	1050
Moment of inertia J [× 10^{-4} kg•m^2]			10.9	16.6	22.4	74.0	111	149
Recommended load to motor inertia ratio (Note 1)			50 times or less					
Absolute accuracy [s]			±15			±12.5		
Speed/position detector			Absolute/incremental 20-bit encoder *3 (resolution: 1048576 pulses/rev)					
Insulation class			155 (F)					
Structure			Totally enclosed, natural cooling (IP rating: IP42) (Note 2)					
Environment *4	Ambient temperature		0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)					
	Ambient humidity		80 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)					
	Ambience		Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist, dust or splash of oil or water					
	Altitude		1000 m or less above sea level					
	Vibration resistance *5		X: 49 m/s^2 Y: 49 m/s^2					
Vibration rank			V10 *7					
Compliance to standards			Refer to "Conformity with Global Standards and Regulations" on p. 57 in this catalog.					
Rotor permissible load *6	Moment load [N•m]		22.5			70		
	Axial load [N]		1100			3300		
Mass [kg]			5.2	6.8	8.4	11	15	18

Notes: 1. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
2. Connectors and gap between rotor and stator are excluded.
3. When unbalanced torque is generated, such as in a vertical lift machine, be sure to use the absolute position detection system. It is also recommended that the unbalanced torque be kept under 70% of the servo motor rated torque.

Refer to "Annotations for Direct Drive Motor Specifications" on p. 4-5 in this catalog for the asterisks 1 to 7.

TM-RFM Series Specifications

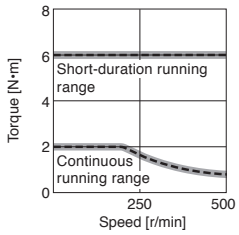
Direct drive motor model		TM-RFM	012G20	048G20	072G20	040J10	120J10	240J10
Compatible servo amplifier model		MR-J4-	Refer to "Combinations of Direct Drive Motor and Servo Amplifier" on p. 4-1 in this catalog.					
		MR-J4W_-						
Motor outer diameter (frame dimensions)		[mm]	ø230			ø330		
Power supply capacity *1		[kVA]	0.71	2.7	3.8	1.2	3.4	6.6
Continuous running duty	Rated output	[W]	251	1005	1508	419	1257	2513
	Rated torque (Note 3)	[N•m]	12	48	72	40	120	240
Maximum torque		[N•m]	36	144	216	120	360	720
Rated speed		[r/min]	200			100		
Maximum speed		[r/min]	500			200		
Permissible instantaneous speed		[r/min]	575			230		
Power rate at continuous rated torque		[kW/s]	6.0	37.5	59.3	9.4	40.9	91.4
Rated current		[A]	3.6	11	16	4.3	11	19
Maximum current		[A]	11	33	48	13	33	57
Regenerative braking frequency *2	MR-J4-	[times/min]	202	373	251	125	281	171
	MR-J4W_-	[times/min]	507	-	-	313	-	-
Moment of inertia J		[× 10^{-4} kg•m^2]	238	615	875	1694	3519	6303
Recommended load to motor inertia ratio (Note 1)			50 times or less					
Absolute accuracy		[s]	±12.5			±10		
Speed/position detector			Absolute/incremental 20-bit encoder *3 (resolution: 1048576 pulses/rev)					
Insulation class			155 (F)					
Structure			Totally enclosed, natural cooling (IP rating: IP42) (Note 2)					
Environment *4	Ambient temperature		0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)					
	Ambient humidity		80 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)					
	Ambience		Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist, dust or splash of oil or water					
	Altitude		1000 m or less above sea level					
	Vibration resistance *5		X: 49 m/s^2 Y: 49 m/s^2			X: 24.5 m/s^2 Y: 24.5 m/s^2		
Vibration rank			V10 *7					
Compliance to standards			Refer to "Conformity with Global Standards and Regulations" on p. 57 in this catalog.					
Rotor permissible load *6	Moment load	[N•m]	93			350		
	Axial load	[N]	5500			16000		
Mass		[kg]	17	38	52	48	85	150

Notes: 1. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
2. Connectors and gap between rotor and stator are excluded.
3. When unbalanced torque is generated, such as in a vertical lift machine, be sure to use the absolute position detection system. It is also recommended that the unbalanced torque be kept under 70% of the servo motor rated torque.

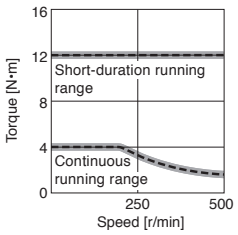
Refer to "Annotations for Direct Drive Motor Specifications" on p. 4-5 in this catalog for the asterisks 1 to 7.

TM-RFM Series Torque Characteristics

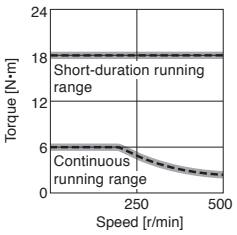
TM-RFM002C20 (Note 1, 2, 3, 4)



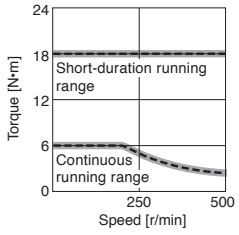
TM-RFM004C20 (Note 1, 2, 3, 4)



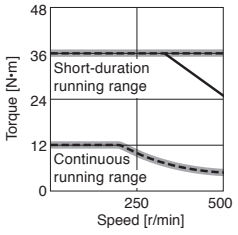
TM-RFM006C20 (Note 1, 2, 3, 4)



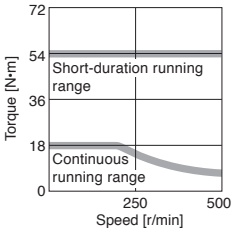
TM-RFM006E20 (Note 1, 2, 3, 4)



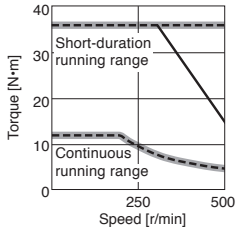
TM-RFM012E20 (Note 1, 2, 3, 4)



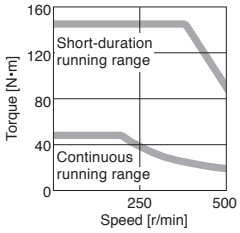
TM-RFM018E20 (Note 1, 4)



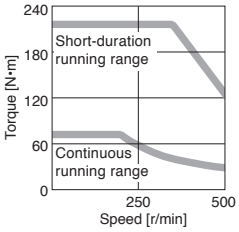
TM-RFM012G20 (Note 1, 2, 3, 4)



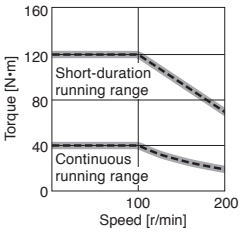
TM-RFM048G20 (Note 1, 4)



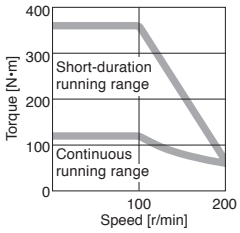
TM-RFM072G20 (Note 1, 4)



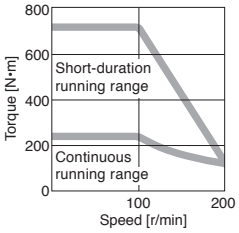
TM-RFM040J10 (Note 1, 2, 3, 4)



TM-RFM120J10 (Note 1, 4)



TM-RFM240J10 (Note 1, 4)

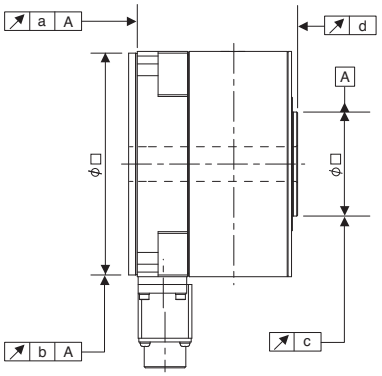


Notes: 1. ▬▬ : For 3-phase 200 V AC.
2. - - - - : For 1-phase 230 V AC.
3. ——— : For 1-phase 200 V AC.
This line is drawn only where differs from the other two lines.
4. Torque drops when the power supply voltage is below the specified value.

Direct Drive Motor Machine Accuracy

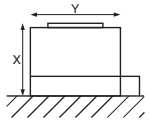
The machine accuracy related to the direct drive motor rotor (output shaft) and installation is indicated below:

Item	Measuring position	Accuracy [mm]
Runout of flange surface about rotor (output shaft)	a	0.05
Runout of fitting outer diameter of flange surface	b	0.07
Runout of rotor (output shaft)	c	0.04
Runout of rotor (output shaft) end	d	0.02

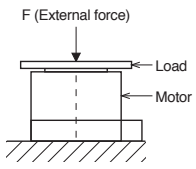


Annotations for Direct Drive Motor Specifications

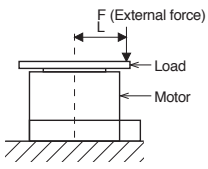
* 1. The power supply capacity varies depending on the power supply impedance.
* 2. The regenerative braking frequency shows the permissible frequency when the direct drive motor, without a load and a regenerative option, decelerates from the rated speed to a stop. When a load is connected; however, the value will be the table value/(m + 1), where m = Moment of inertia of load/Moment of inertia of direct drive motor. When the operating speed exceeds the rated speed, the regenerative braking frequency is inversely proportional to the square of (operating speed/rated speed). Take measures to keep the regenerative power [W] during operation below the tolerable regenerative power [W]. Use caution, especially when the operating speed changes frequently or when the regeneration is constant (as with vertical feeds). Select the most suitable regenerative option for your system with our capacity selection software. Refer to "Regenerative Option" in this catalog for the tolerable regenerative power [W] when regenerative option is used.
* 3. Be sure to connect the following options for absolute position detection system.
  • MR-J4: battery (MR-BAT6V1SET) and absolute position storage unit (MR-BTAS01)
  • MR-J4W_: battery case (MR-BT6VCASE), battery (MR-BAT6V1) × 5 pcs, and absolute position storage unit (MR-BTAS01).
  Refer to relevant Servo Amplifier Instruction Manual for details.
* 4. In the environment where the direct drive motor is exposed to oil mist, oil and/or water, a standard specification direct drive motor may not be usable. Contact your local sales office for more details.
* 5. The vibration direction is shown in the diagram below. The numerical value indicates the maximum value of the component.
  Fretting more likely occurs on the bearing when the direct drive motor stops. Thus, maintain vibration level at approximately one-half of the allowable value.



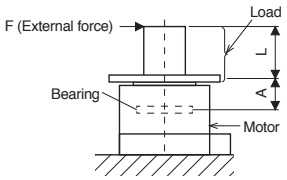
* 6. The following is calculation examples of axial and moment loads to the rotor (output shaft) of the direct drive motor. The axial and moment loads must be maintained equal to or below the permissible value.



Axial load
= F + Load mass



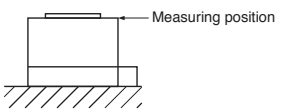
Axial load
= F + Load mass
Moment load
= F × L



Axial load = Load mass
Moment load = F × (L + A)

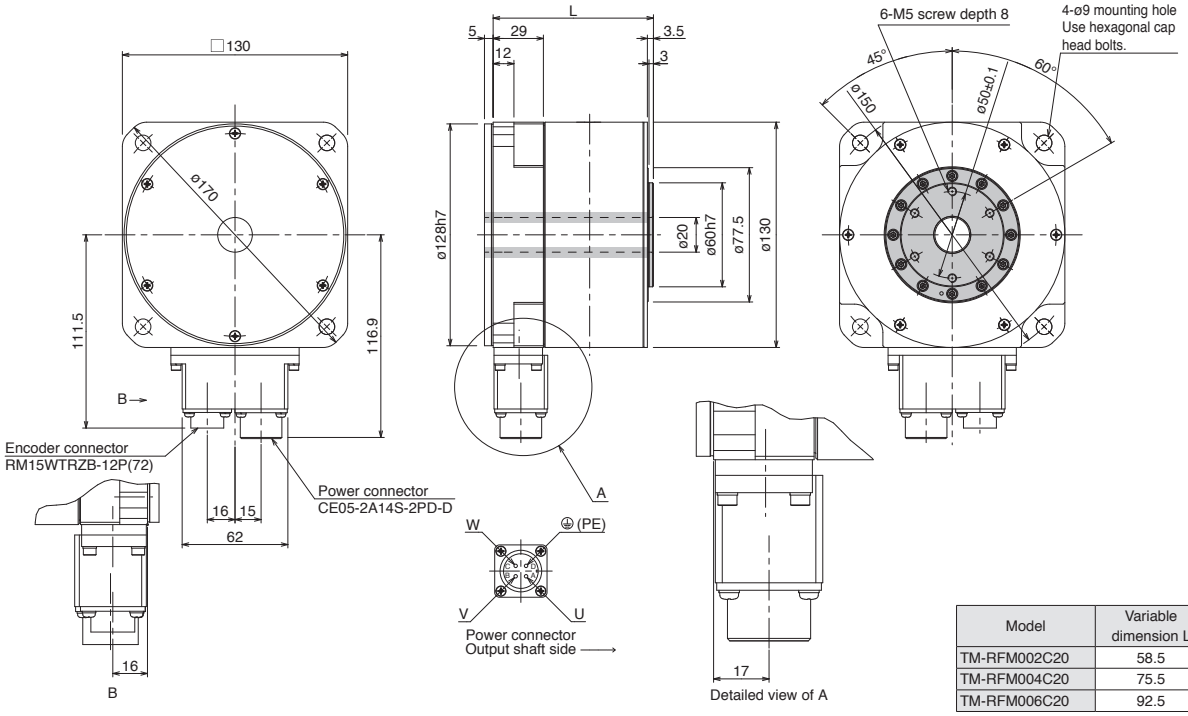
Motor outer diameter [mm] (Frame dimensions)	Dimension A [mm]
ø130	19.1
ø180	20.2
ø230	24.4
ø330	32.5

* 7. V10 indicates that the amplitude of the direct drive motor itself is 10 μm or less. The following shows mounting posture and measuring position of the direct drive motor during the measurement:



TM-RFM Series Dimensions (Note 1, 2)

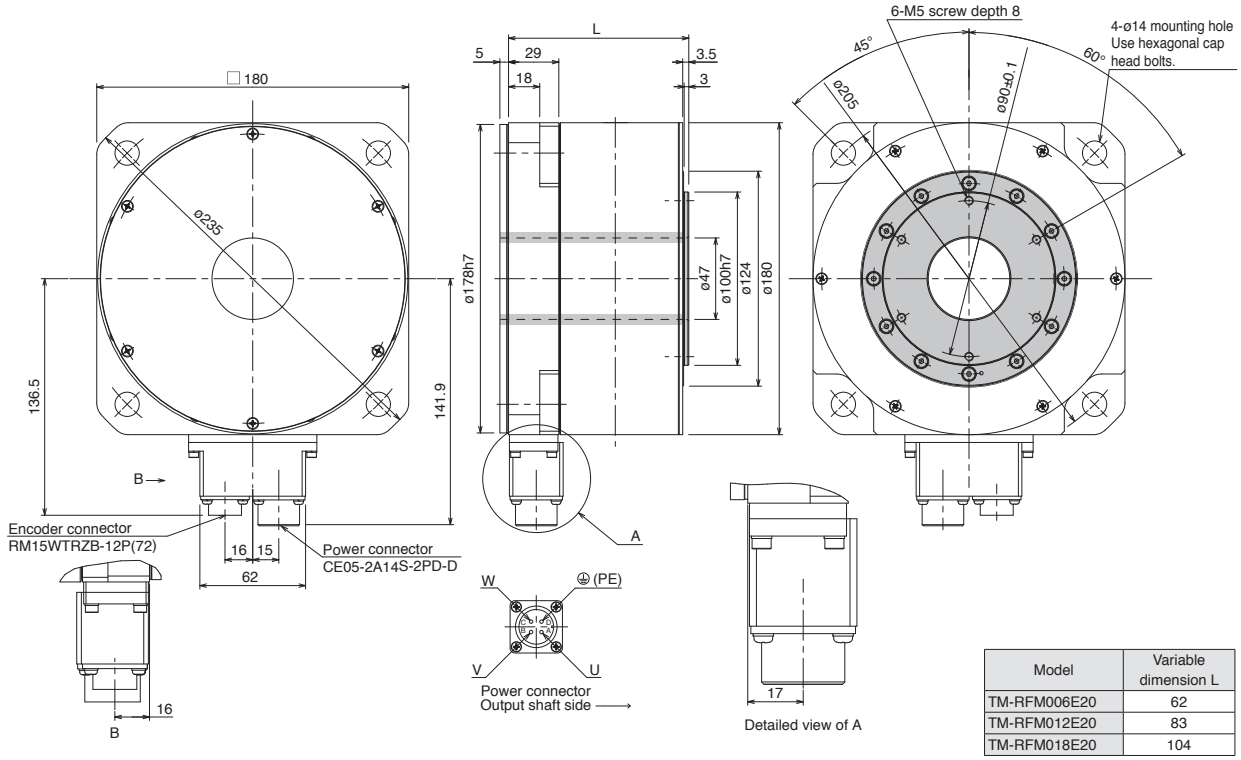
●TM-RFM002C20, TM-RFM004C20, TM-RFM006C20



Model	Variable dimension L
TM-RFM002C20	58.5
TM-RFM004C20	75.5
TM-RFM006C20	92.5

[Unit: mm]

●TM-RFM006E20, TM-RFM012E20, TM-RFM018E20



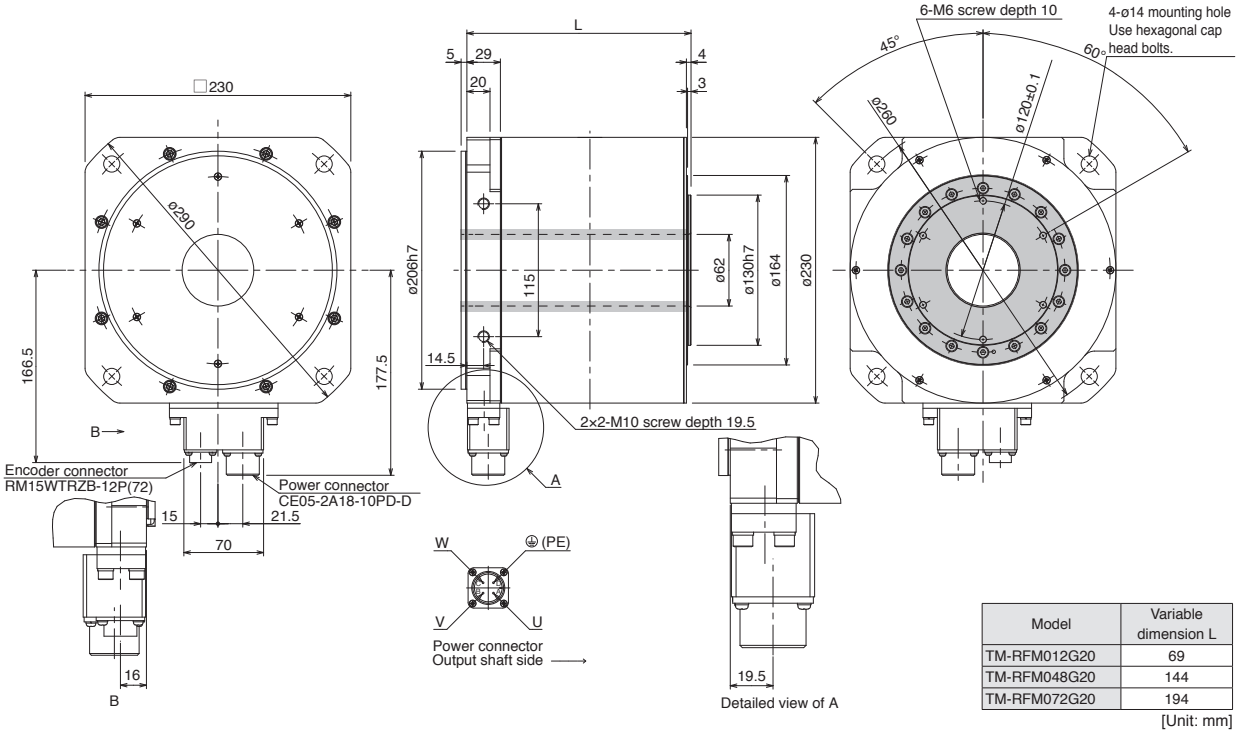
Model	Variable dimension L
TM-RFM006E20	62
TM-RFM012E20	83
TM-RFM018E20	104

[Unit: mm]

Notes: 1. For dimensions without tolerance, general tolerance applies. The actual dimensions may be 1 mm to 3 mm larger than the dimensions indicated. Make allowances for the tolerance when designing a machine.
2. ▒ indicates rotor.

TM-RFM Series Dimensions (Note 1, 2)

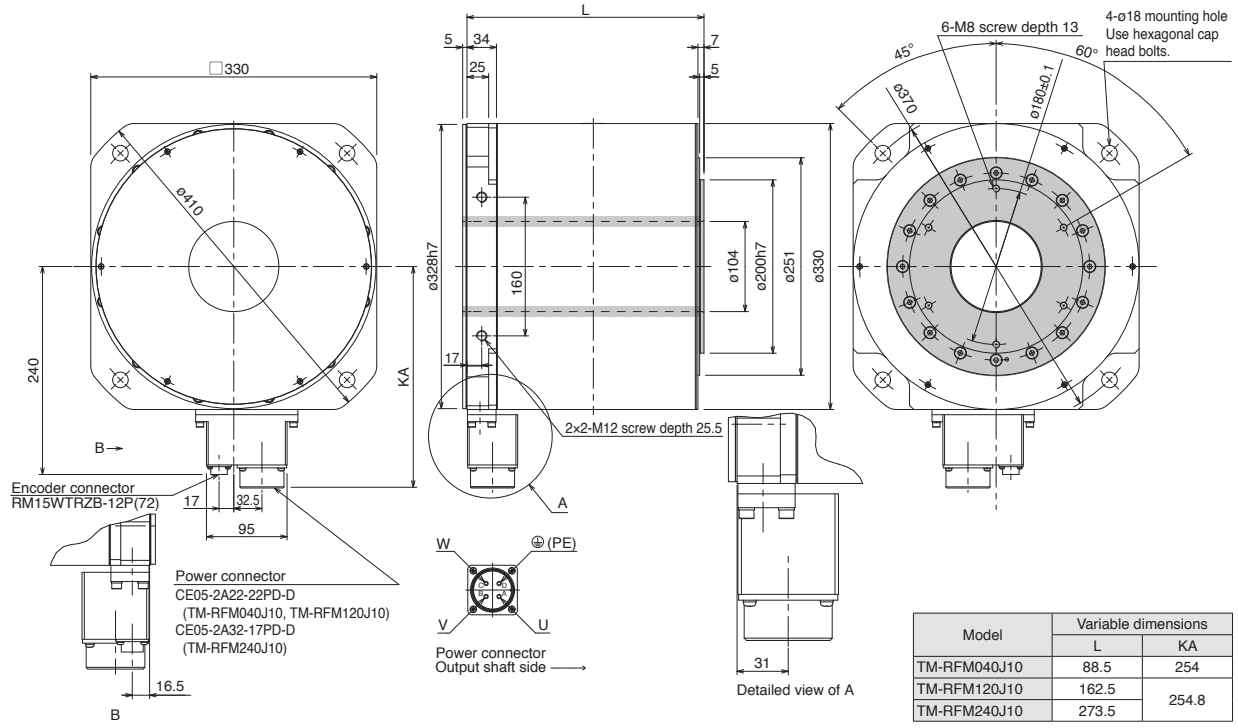
●TM-RFM012G20, TM-RFM048G20, TM-RFM072G20



Model	Variable dimension L
TM-RFM012G20	69
TM-RFM048G20	144
TM-RFM072G20	194

[Unit: mm]

●TM-RFM040J10, TM-RFM120J10, TM-RFM240J10



Model	Variable dimensions	
	L	KA
TM-RFM040J10	88.5	254
TM-RFM120J10	162.5	254.8
TM-RFM240J10	273.5	

[Unit: mm]

Notes: 1. For dimensions without tolerance, general tolerance applies. The actual dimensions may be 1 mm to 3 mm larger than the dimensions indicated. Make allowances for the tolerance when designing a machine.
2. ▭ indicates rotor.

Direct Drive Motor Sizing Example

1. Selection criteria

(1) Configurations

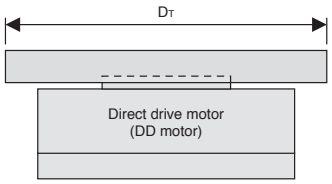


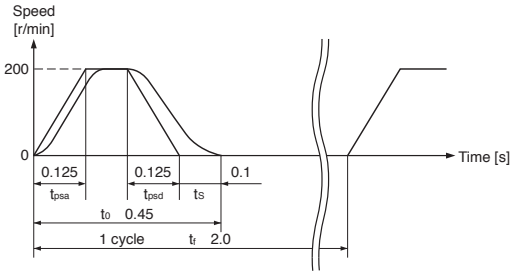
Table mass	W	= 19 kg
Rotation table diameter	D_T	= 300 mm
Rotation angle per cycle	θ	= 270 deg
Positioning time	t_0	= Within 0.45 s
Acceleration/deceleration time	$t_p = t_{psa} = t_{psd}$	= 0.125 s
Operating cycle	t_f	= 2.0 s
Load torque	T_L	= 0 N•m

(2) Direct drive motor speed

$$N_0 = \frac{\theta}{360} \times \frac{60}{(t_0 - t_p - t_s)}$$
$$= \frac{270}{360} \times \frac{60}{(0.45 - 0.125 - 0.1)} = 200 \text{ r/min}$$

t_s: settling time. Here assumed 0.1 s.

(3) Operating pattern



2. Selecting direct drive motor

(1) Moment of inertia of load

$$J_L = \frac{1}{8} \times D_T^2 \times W$$
$$= \frac{1}{8} \times (300 \times 10^{-3})^2 \times 19 = 0.214 \text{ kg•m}^2$$

(2) Torque required to accelerate/decelerate load

$$T_a = J_L \times \left(\frac{2\pi}{60} \times N_0 \right) \div t_p$$
$$= \frac{J_L \times N_0}{\frac{60}{2\pi} \times t_p}$$
$$= \frac{0.214 \times 200}{9.55 \times 0.125}$$
$$= 35.9 \text{ N•m}$$

(3) Select a direct drive motor

Selection criteria

Load torque during accel./decel. < Max. torque of DD motor

Moment of inertia of load < J_R × Moment of inertia of DD motor

J_R: Recommended load to motor inertia ratio

Select the following direct drive motor to meet the criteria above.

TM-RFM018E20 (rated torque: 18 N•m, max. torque: 54 N•m, moment of inertia: 149 × 10^{-4} kg•m^2)

(4) Acceleration/deceleration torque

Torque required during acceleration

$$T_{Ma} = \frac{(J_L + J_M) \times N_0}{9.55 \times t_{psa}} = 38.3 \text{ N•m}$$

J_M: moment of inertia of DD motor

Torque required during deceleration

$$T_{Md} = -\frac{(J_L + J_M) \times N_0}{9.55 \times t_{psd}} = -38.3 \text{ N•m}$$

Torque required during acceleration/deceleration must be equal to or lower than the max. torque of the DD motor.

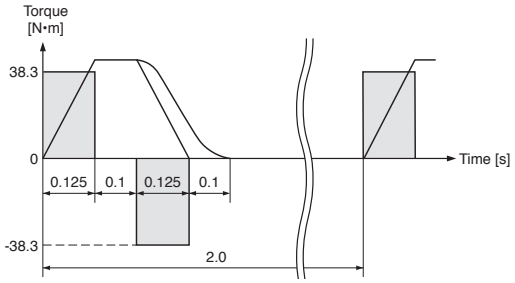
(5) Continuous effective load torque

$$T_{rms} = \sqrt{\frac{T_{Ma}^2 \times t_{psa} + T_L^2 \times t_c + T_{Md}^2 \times t_{psd}}{t_f}} = 13.5 \text{ N•m}$$

$$t_c = t_0 - t_s - t_{psa} - t_{psd}$$

Continuous effective load torque must be equal to or lower than the rated torque of the DD motor.

(6) Torque pattern



(7) Result

Select the following:

Direct drive motor: TM-RFM018E20

Servo amplifier: MR-J4-100B

[Free capacity selection software]

Capacity selection software (MRZJW3-MOTSZ111E) does all the calculations for you. The capacity selection software is available for free download. Contact your local sales office for more details.

* MRZJW3-MOTSZ111E software version C5 or later is compatible.

MEMO

5

	Servo amplifier						●: Applicable
	B	B-RJ	WB	B-RJ010	A	A-RJ	
Basic Cable Configurations for Servo Motors	●	●	●	●	●	●	 5-1
Configuration Example for Servo Motors	●	●	●	●	●	●	 5-3
Details of Optional Cables and Connectors for Servo Motors	●	●	●	●	●	●	 5-17
Products on the Market for Servo Motors	●	●	●	●	●	●	 5-21
Configuration Example for MR-J4-B(-RJ)	●	●					 5-29
Configuration Example for MR-J4W_-B			●				 5-30
Configuration Example for MR-J4-B-RJ010				●			 5-31
Configuration Example for MR-J4-A(-RJ)					●	●	 5-32
Configuration Example for MR-J3-D05	●	●	●	●	●	●	 5-36
Details of Optional Cables and Connectors for Servo Amplifiers	●	●	●	●	●	●	 5-37
Details of Optional Cables and Connectors for MR-J3-D05	●	●	●	●	●	●	 5-39
Products on the Market for Servo Amplifiers	●	●	●	●	●	●	 5-40
Safety Logic Unit	●	●	●	●	●	●	 5-41
Regenerative Option	●	●	●	●	●	●	 5-43
Power Regeneration Common Converter	●	●		●	●	●	 5-47
Dynamic Brake	●	●		●	●	●	 5-49
Battery	●	●		●	●	●	 5-50
Battery Case and Battery			●				 5-50
Battery for Junction Battery Cable and Junction Battery Cable	●	●		●	●	●	 5-51
Absolute Position Storage Unit	●	●	●		●	●	 5-52
Heat Sink Outside Mounting Attachment	●	●		●	●	●	 5-52
Junction Terminal Block			●		●	●	 5-53
Radio Noise Filter	●	●	●	●	●	●	 5-54
Line Noise Filter	●	●	●	●	●	●	 5-54
Data Line Filter	●	●	●	●	●	●	 5-54
Surge Killer	●	●	●	●	●	●	 5-54
EMC Filter	●	●	●	●	●	●	 5-55
Power Factor Improving Reactor	●	●	●	●	●	●	 5-57
Servo Support Software	●	●	●	●	●	●	 5-63
Unit Conversion Table	●	●	●	●	●	●	 5-65

B MR-J4-B **B-RJ** MR-J4-B-RJ **WB** MR-J4W2-B/MR-J4W3-B **B-RJ010** MR-J4-B-RJ010 **A** MR-J4-A **A-RJ** MR-J4-A-RJ

* Only MR-J4-B and MR-J4-A servo amplifiers are mentioned in this section. Note that options necessary for MR-J4-B-RJ and MR-J4-B-RJ010 are the same as those for MR-J4-B, and MR-J4-A-RJ for MR-J4-A. For the options for MR-J4-B-RJ, MR-J4-B-RJ010, and MR-J4-A-RJ, refer to those for MR-J4-B and MR-J4-A with the same rated capacity.
* Note that some servo amplifiers are available in the future.
* Refer to p. 5-65 in this catalog for conversion of units.

Options/Peripheral Equipment

Basic Cable Configurations for Servo Motors

Necessary optional cables and connectors vary depending on the servo amplifier type and the servo motor series.
Refer to the following tables for necessary options.

Selecting options for servo motor

Use the cables in the following tables.
For the cable descriptions, refer to the relevant numbers in each list.

Capacity	Servo motor	Reference list		
		Encoder cable	Servo motor power cable	Electromagnetic brake cable (Note 1)
Small capacity	HG-KR	Column A in encoder cable list	Column A in servo motor power cable list	Column A in electromagnetic brake cable list
	HG-MR	Column A in encoder cable list	Column A in servo motor power cable list	Column A in electromagnetic brake cable list
Medium capacity	HG-SR	Column B in encoder cable list	Column B in servo motor power cable list	Column B in electromagnetic brake cable list
	HG-JR 9 kW or smaller	Column B in encoder cable list	Column B in servo motor power cable list	Column B in electromagnetic brake cable list
	HG-RR	Column B in encoder cable list	Column C in servo motor power cable list	- (Note 2)
	HG-UR	Column B in encoder cable list	Column C in servo motor power cable list	Column C in electromagnetic brake cable list (Note 2)
Large capacity	HG-JR 11 kW and 15 kW	Column C in encoder cable list	Column B in servo motor power cable list	Column C in electromagnetic brake cable list
	HG-JR 22 kW	Column C in encoder cable list	-	-

Notes: 1. An electromagnetic brake cable is required only for servo motor with electromagnetic brake.
2. An electromagnetic brake connector set is not required for HG-RR series and 1.5 kW or smaller of HG-UR series as the power connector has electromagnetic brake terminals.

Encoder cable list

	Cable length	IP rating (Note 1)	Cable lead out direction	Bending life	Model	Reference	Note
A	10 m or shorter (direct connection type)	IP65	In direction of load side	Long bending life	MR-J3ENCBL_M-A1-H	p. 5-11	Select one from this list.
				Standard	MR-J3ENCBL_M-A1-L		
			In opposite direction of load side	Long bending life	MR-J3ENCBL_M-A2-H	p. 5-11	
				Standard	MR-J3ENCBL_M-A2-L		
	Exceeding 10 m (junction type)	IP20	In direction of load side	Long bending life	Two types of cables are required: MR-J3JCBL03M-A1-L, MR-EKCBL_M-H	p. 5-11	
				Standard	Two types of cables are required: MR-J3JCBL03M-A1-L, MR-EKCBL_M-L		
			In opposite direction of load side	Long bending life	Two types of cables are required: MR-J3JCBL03M-A2-L, MR-EKCBL_M-H	p. 5-11	
				Standard	Two types of cables are required: MR-J3JCBL03M-A2-L, MR-EKCBL_M-L		
		IP65	In direction of load side	Long bending life	Two types of cables are required: MR-J3JSCBL03M-A1-L, MR-J3ENSCBL_M-H	pp. 5-11 and 5-12	
				Standard	Two types of cables are required: MR-J3JSCBL03M-A1-L, MR-J3ENSCBL_M-L		
			In opposite direction of load side	Long bending life	Two types of cables are required: MR-J3JSCBL03M-A2-L, MR-J3ENSCBL_M-H	pp. 5-11 and 5-12	
				Standard	Two types of cables are required: MR-J3JSCBL03M-A2-L, MR-J3ENSCBL_M-L		
B	2 m to 50 m	IP67	-	Long bending life	MR-J3ENSCBL_M-H	p. 5-12	Select one from this list.
	2 m to 30 m			Standard	MR-J3ENSCBL_M-L		
C	2 m to 50 m	IP67	-	Long bending life	MR-ENECBL_M-H-MTH	p. 5-13	-

Notes: 1. The IP rating indicated is for the connector's protection against ingress of dust and water when coupled to a servo amplifier/servo motor. If the IP rating of the servo amplifier/servo motor differs from that of these connectors, overall IP rating depends on the lowest of all.

Servo motor power cable list

	Cable length	IP rating (Note 1)	Cable lead out direction	Bending life	Model	Reference	Note
A	10 m or shorter (direct connection type)	IP65	In direction of load side	Long bending life	MR-PWS1CBL_M-A1-H	p. 5-14	Select one from this list.
				Standard	MR-PWS1CBL_M-A1-L		
			In opposite direction of load side	Long bending life	MR-PWS1CBL_M-A2-H	p. 5-14	
				Standard	MR-PWS1CBL_M-A2-L		
	Exceeding 10 m (junction type)	IP55	In direction of load side	Standard	Connect a user-fabricated cable to MR-PWS2CBL03M-A1-L (optional cable).	p. 5-14	
			In opposite direction of load side		Connect a user-fabricated cable to MR-PWS2CBL03M-A2-L (optional cable).	p. 5-14	

	IP rating (Note 1)	Compatible servo motor	Model	Reference	Note
B	IP67	HG-SR51, 81, 52(4), 102(4), 152(4)/ HG-JR53(4), 73(4), 103(4), 153(4), 203(4), 3534, 5034	Fabricate a cable that fits to MR-PWCNS4 (optional connector set).	p. 5-14	Select one that is compatible with the servo motor.
		HG-SR121, 201, 301, 202(4), 352(4), 502(4)/HG-JR353, 503	Fabricate a cable that fits to MR-PWCNS5 (optional connector set).	p. 5-14	
		HG-SR421, 702(4)/ HG-JR703(4), 903(4), 11K1M(4), 15K1M(4)	Fabricate a cable that fits to MR-PWCNS3 (optional connector set).	p. 5-14	
C	IP67	HG-RR103, 153, 203/ HG-UR72, 152	Fabricate a cable that fits to MR-PWCNS1 (optional connector set).	p. 5-15	
		HG-RR353, 503/ HG-UR202, 352, 502	Fabricate a cable that fits to MR-PWCNS2 (optional connector set).	p. 5-15	

Electromagnetic brake cable list

	Cable length	IP rating (Note 1)	Cable lead out direction	Bending life	Model	Reference	Note
A	10 m or shorter (direct connection type)	IP65	In direction of load side	Long bending life	MR-BKS1CBL_M-A1-H	p. 5-16	Select one from this list.
				Standard	MR-BKS1CBL_M-A1-L		
			In opposite direction of load side	Long bending life	MR-BKS1CBL_M-A2-H	p. 5-16	
				Standard	MR-BKS1CBL_M-A2-L		
	Exceeding 10 m (junction type)	IP55	In direction of load side	Standard	Connect a user-fabricated cable to MR-BKS2CBL03M-A1-L (optional cable).	p. 5-16	
			In opposite direction of load side		Connect a user-fabricated cable to MR-BKS2CBL03M-A2-L (optional cable).	p. 5-16	

	IP rating (Note 1)	Compatible servo motor	Model	Reference	Note
B	IP67	HG-SR series HG-JR53(4)B, 73(4)B, 103(4)B, 153(4)B, 203(4)B, 353(4)B, 503(4)B, 703(4)B, 903(4)B	Fabricate a cable that fits to MR-BKCNS1 or MR-BKCNS2 (optional connector set) (straight type).	p. 5-16	Select one that is compatible with the servo motor.
			Fabricate a cable that fits to MR-BKCNS1A or MR-BKCNS2A (optional connector set) (angle type).	p. 5-16	
C	IP67	HG-JR11K1M(4)B, 15K1M(4)B/ HG-UR202B, 352B, 502B	Fabricate a cable that fits to MR-BKCN (optional connector set).	p. 5-16	

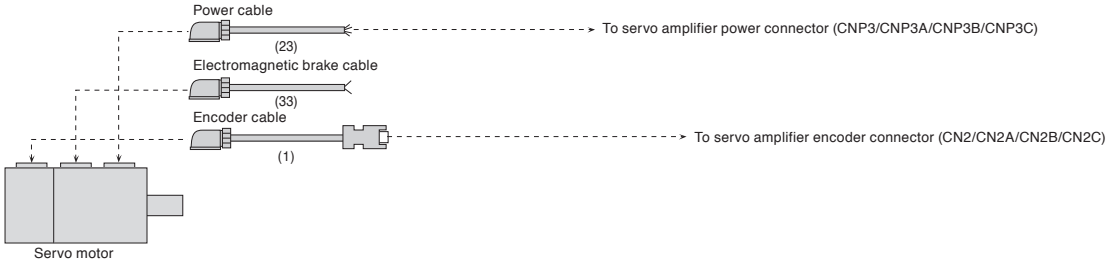
Notes: 1. The IP rating indicated is for the connector's protection against ingress of dust and water when coupled to a servo amplifier/servo motor. If the IP rating of the servo amplifier/servo motor differs from that of these connectors, overall IP rating depends on the lowest of all.

Configuration Example for Servo Motors

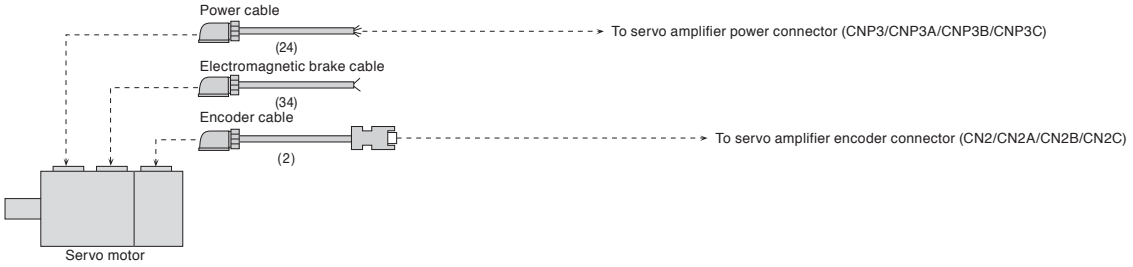
B | B-RJ | WB | B-RJ010 | A | A-RJ

For HG-KR/HG-MR rotary servo motor series: encoder cable length 10 m or shorter

● For leading the cables out in direction of load side (Note 1)



● For leading the cables out in opposite direction of load side (Note 1)



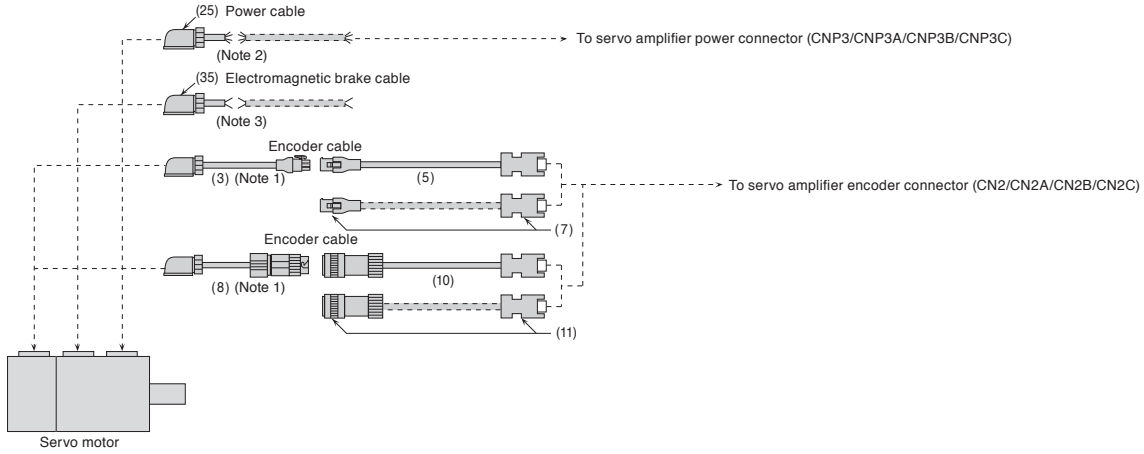
Notes: 1. Cables for leading two different directions may be used for one servo motor.

Configuration Example for Servo Motors (Note 5)

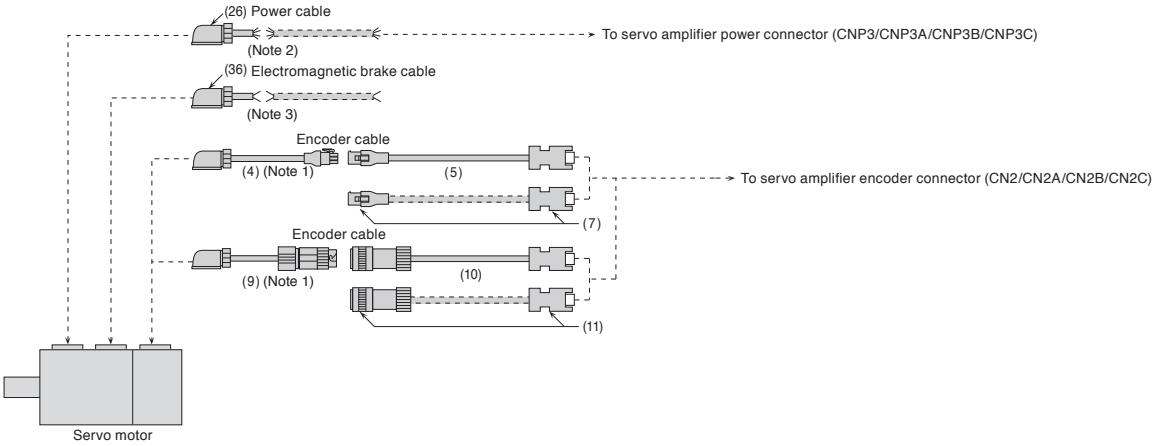
B | B-RJ | WB | B-RJ010 | A | A-RJ

For HG-KR/HG-MR rotary servo motor series: encoder cable length over 10 m

● For leading the cables out in direction of load side (Note 4)



● For leading the cables out in opposite direction of load side (Note 4)

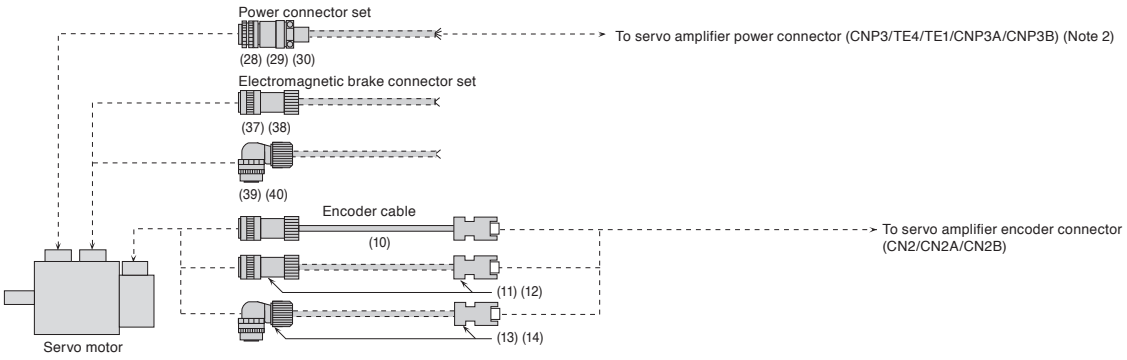


Notes: 1. This cable does not have a long bending life. Thus, be sure to fix the cable before using.
2. Relay a cable using MR-PWS2CBL03M-A1-L or MR-PWS2CBL03M-A2-L. This cable does not have a long bending life. Thus, be sure to fix the cable before using.
3. Relay a cable using MR-BKS2CBL03M-A1-L or MR-BKS2CBL03M-A2-L. This cable does not have a long bending life. Thus, be sure to fix the cable before using.
4. Cables for leading two different directions may be used for one servo motor.
5. Cables drawn with dashed lines need to be fabricated by user. Refer to relevant Servo Motor Instruction Manual for fabricating the cables.

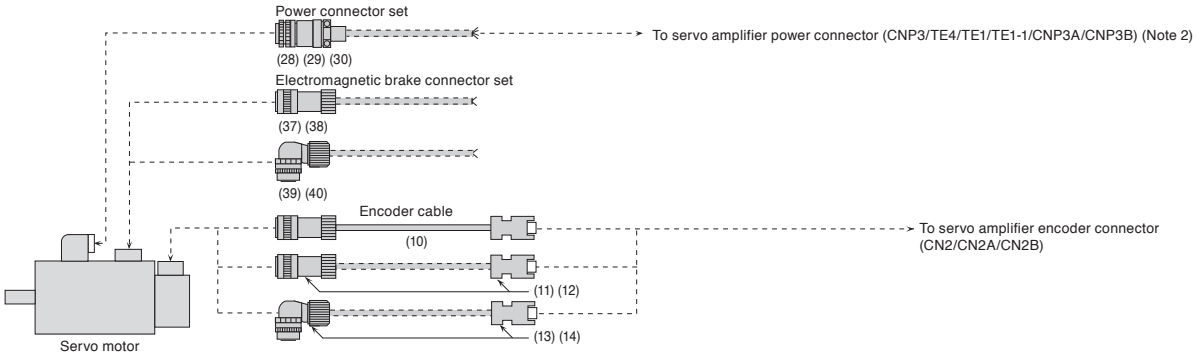
Configuration Example for Servo Motors (Note 1)

B | B-RJ | WB | B-RJ010 | A | A-RJ

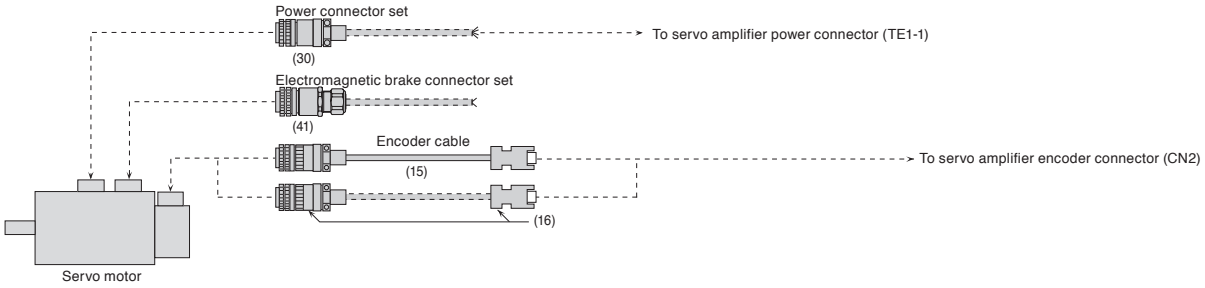
For HG-SR rotary servo motor series



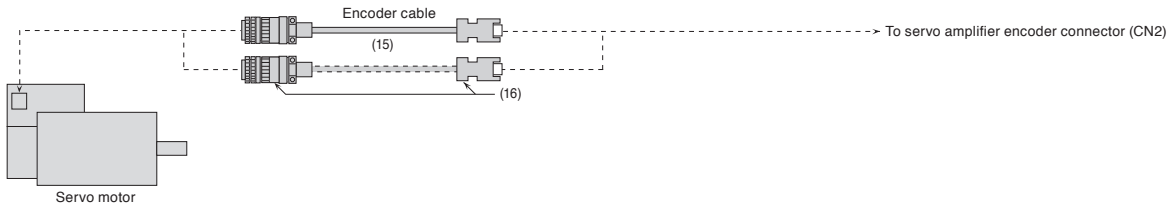
For HG-JR rotary servo motor series (9 kW or smaller)



For HG-JR rotary servo motor series (11 kW and 15 kW)



For HG-JR rotary servo motor series (22 kW)

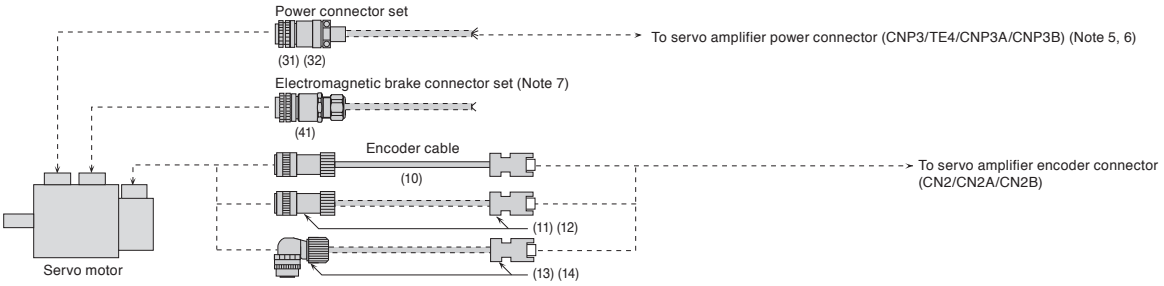


Notes: 1. Cables drawn with dashed lines need to be fabricated by user. Refer to relevant Servo Motor Instruction Manual for fabricating the cables.
2. The connector for U, V, and W varies depending on the servo amplifier capacities. Refer to the dimensions of the relevant servo amplifier in this catalog for details.

Configuration Example for Servo Motors (Note 2)

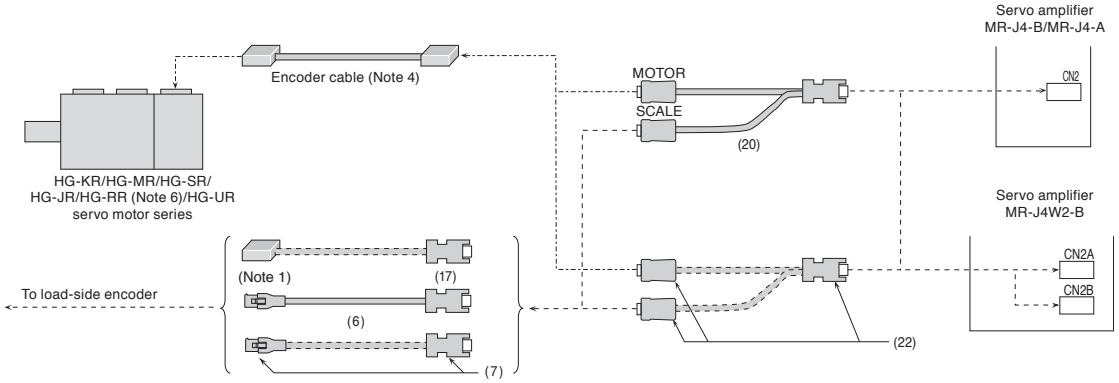
For HG-RR/HG-UR rotary servo motor series

B | B-RJ | WB | B-RJ010 | A | A-RJ



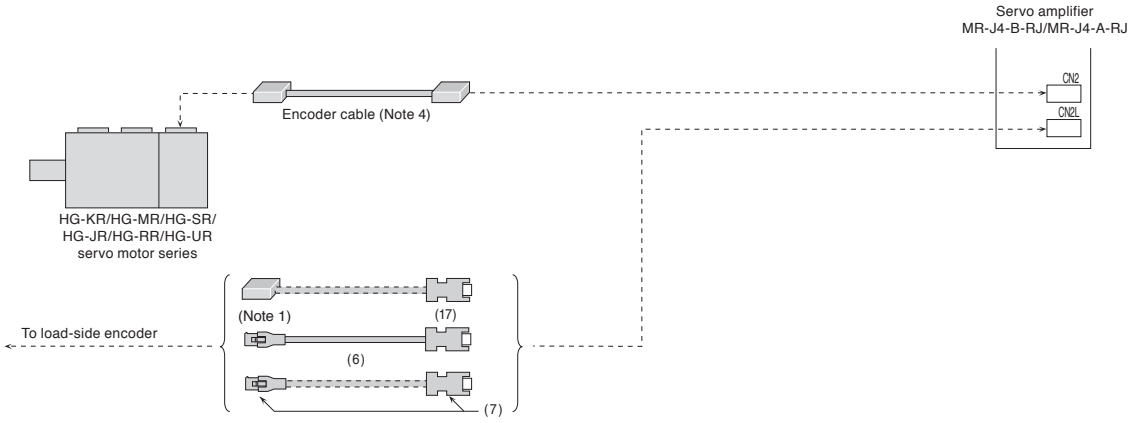
For fully closed loop control (MR-J4-B/A or MR-J4W2-B, and rotary servo motor) (Note 3)

B | WB | A



For fully closed loop control (MR-J4-B-RJ/A-RJ and rotary servo motor) (Note 3)

B-RJ | A-RJ



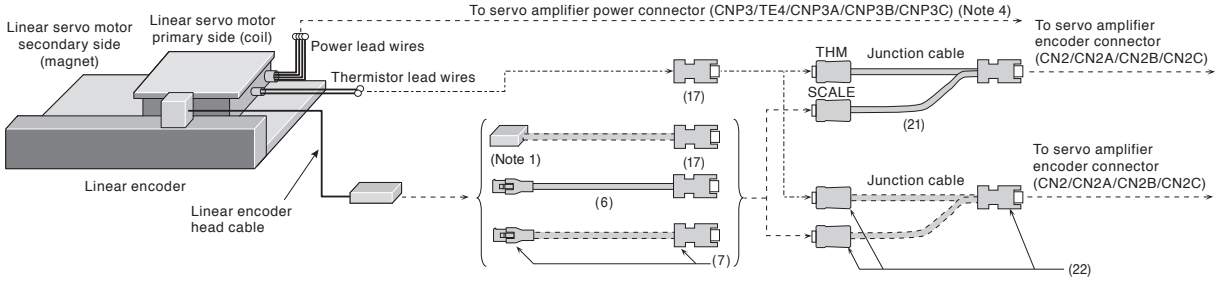
Notes: 1. Contact the relevant linear encoder manufacturers for connectors to connect with the head cables.
2. Cables drawn with dashed lines need to be fabricated by user. Refer to relevant Servo Motor Instruction Manual for fabricating the cables.
3. Connections other than mentioned are the same as those for each rotary servo motor. Refer to cables and connectors for relevant servo motors in this catalog.
4. Necessary encoder cables vary depending on the servo motor series. Refer to cables and connectors for relevant servo motors in this catalog.
5. The connector for U, V, and W varies depending on the servo amplifier capacities. Refer to the dimensions of the relevant servo amplifier in this catalog for details.
6. HG-RR series is compatible only with the 1-axis servo amplifier.
7. An electromagnetic brake connector set is not required for HG-RR series and 1.5 kW or smaller of HG-UR series as the power connector has electromagnetic brake terminals.

Configuration Example for Servo Motors (Note 3)

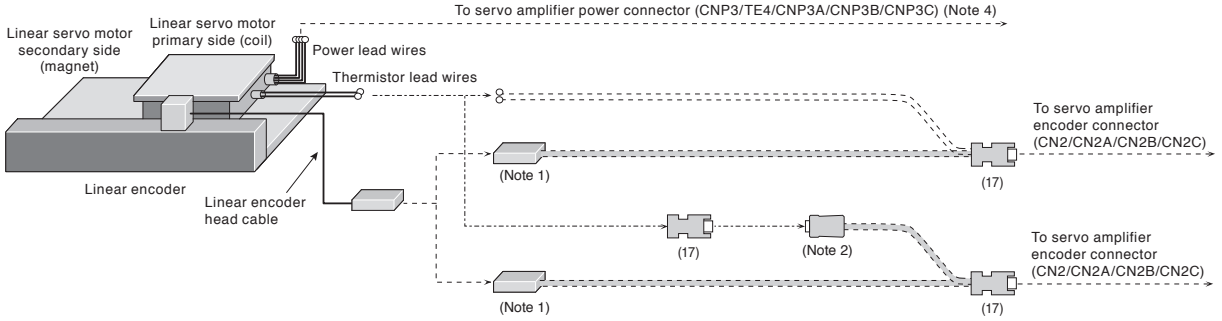
B WB A

For MR-J4-B/A or MR-J4W_-B, and LM-H3/LM-K2/LM-U2 linear servo motor

●When using a junction cable for linear servo motor

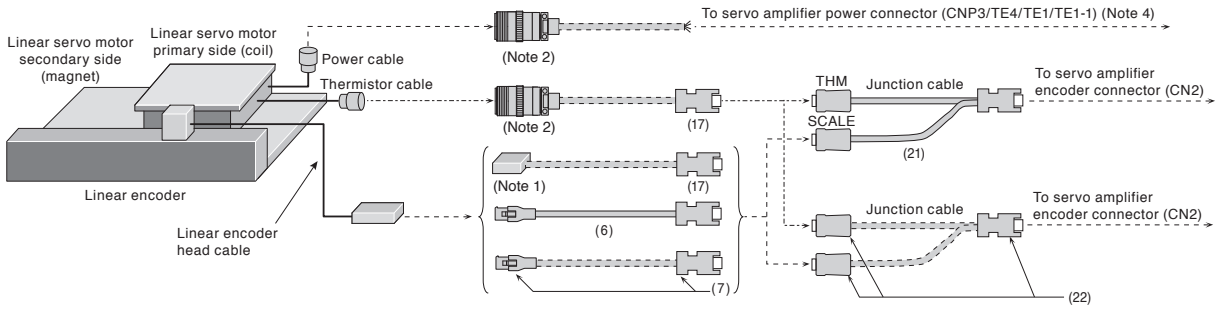


●When not using a junction cable for linear servo motor

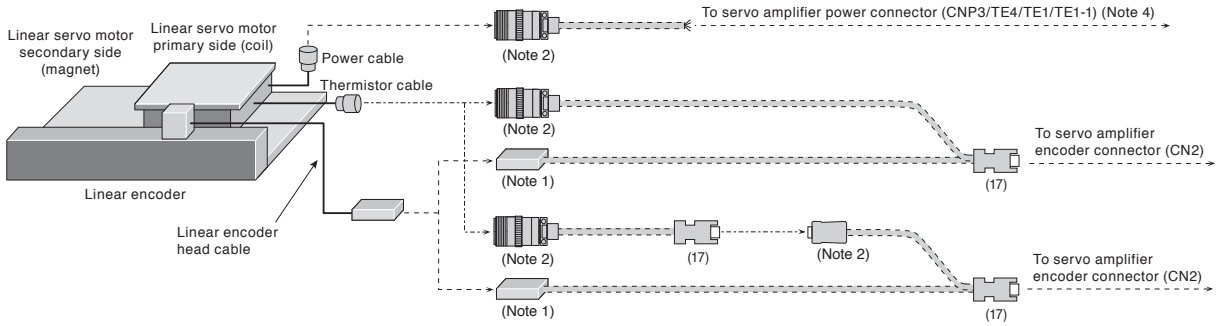


For MR-J4-B/A and LM-F linear servo motor

●When using a junction cable for linear servo motor



●When not using a junction cable for linear servo motor



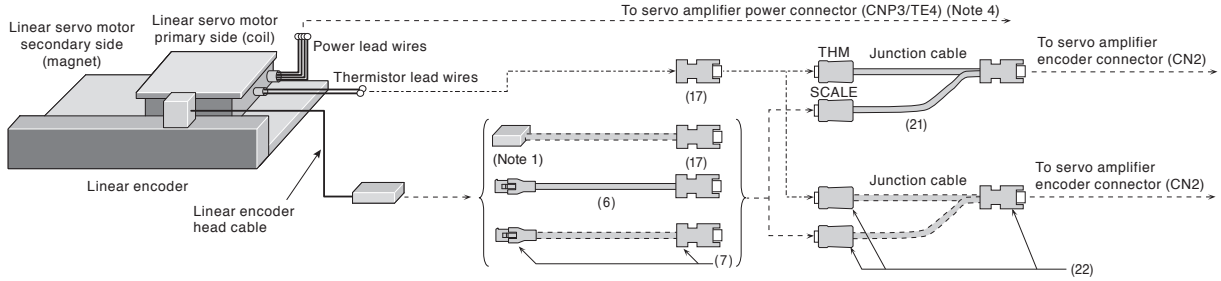
Notes: 1. Contact the relevant linear encoder manufacturers for connectors to connect with the head cables.
2. Refer to "Products on the Market for Servo Motors" in this catalog for these connectors.
3. Cables drawn with dashed lines need to be fabricated by user. Refer to relevant Servo Motor Instruction Manual for fabricating the cables.
4. The connector for U, V, and W varies depending on the servo amplifier capacities. Refer to the dimensions of the relevant servo amplifier in this catalog for details.

Configuration Example for Servo Motors (Note 3)

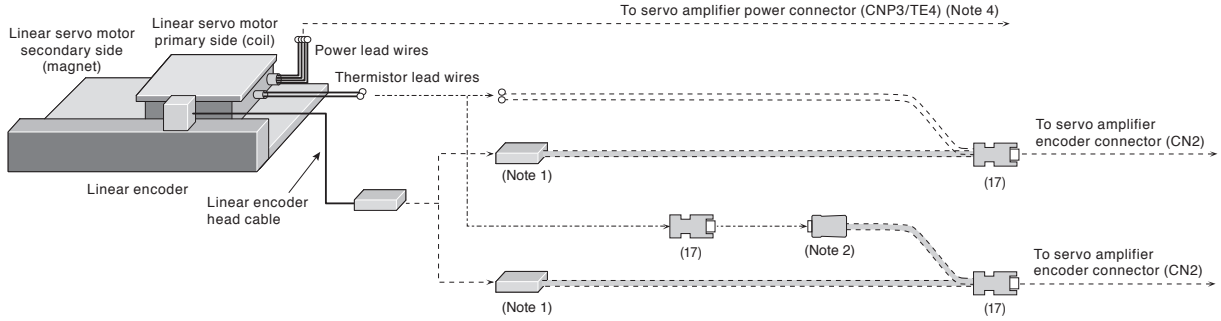
B-RJ A-RJ

For MR-J4-B-RJ/MR-J4-A-RJ and LM-H3/LM-K2/LM-U2 linear servo motor with a serial linear encoder

●When using a junction cable for linear servo motor

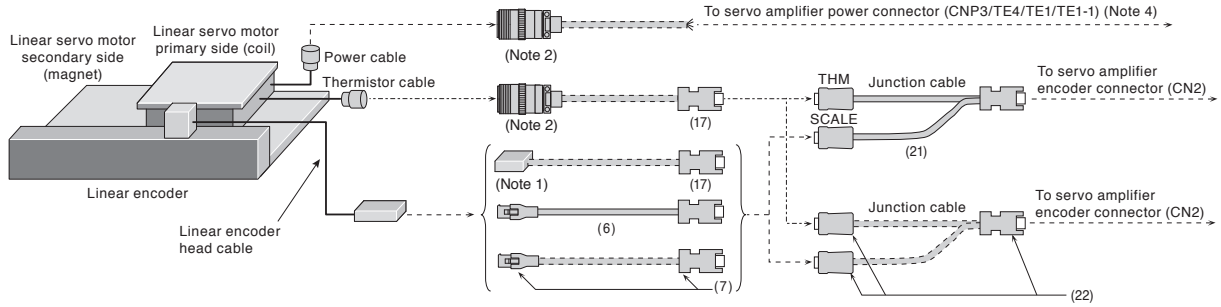


●When not using a junction cable for linear servo motor

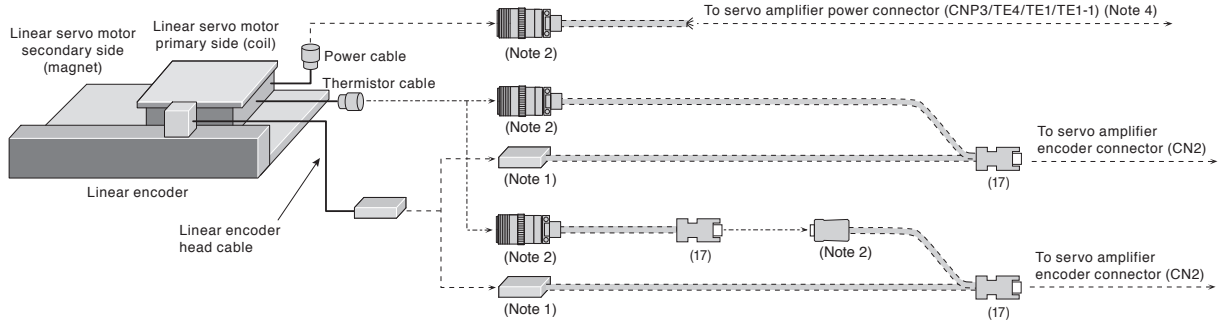


For MR-J4-B-RJ/MR-J4-A-RJ and LM-F linear servo motor with a serial linear encoder

●When using a junction cable for linear servo motor



●When not using a junction cable for linear servo motor

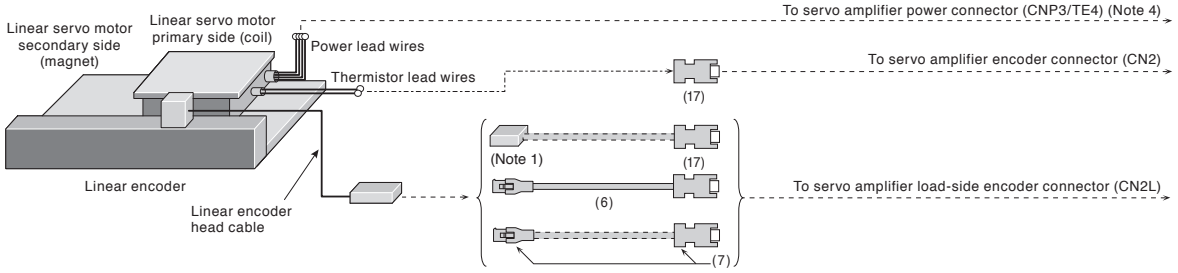


Notes: 1. Contact the relevant linear encoder manufacturers for connectors to connect with the head cables.
2. Refer to "Products on the Market for Servo Motors" in this catalog for these connectors.
3. Cables drawn with dashed lines need to be fabricated by user. Refer to relevant Servo Motor Instruction Manual for fabricating the cables.
4. The connector for U, V, and W varies depending on the servo amplifier capacities. Refer to the dimensions of the relevant servo amplifier in this catalog for details.

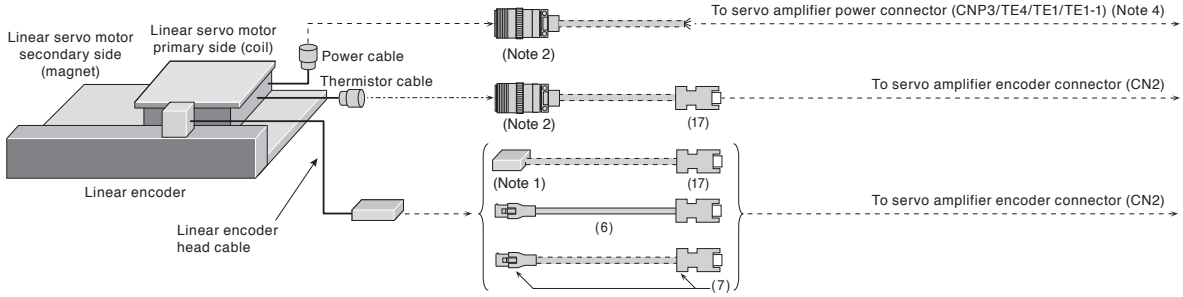
Configuration Example for Servo Motors (Note 3)

B-RJ A-RJ

For MR-J4-B-RJ/A-RJ and LM-H3/LM-K2/LM-U2 linear servo motor with an A/B/Z-phase differential output type linear encoder



For MR-J4-B-RJ/A-RJ and LM-F linear servo motor with an A/B/Z-phase differential output type linear encoder



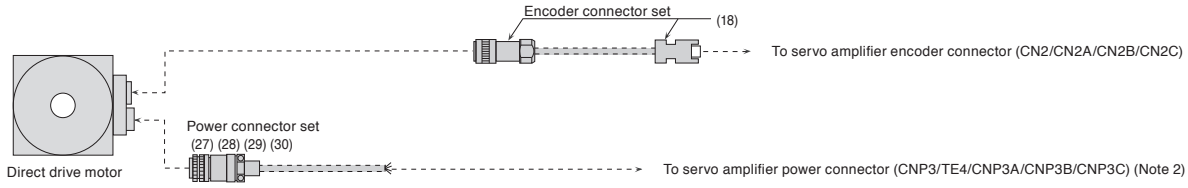
Notes: 1. Contact the relevant linear encoder manufacturers for connectors to connect with the head cables.
2. Refer to "Products on the Market for Servo Motors" in this catalog for these connectors.
3. Cables drawn with dashed lines need to be fabricated by user. Refer to relevant Servo Motor Instruction Manual for fabricating the cables.
4. The connector for U, V, and W varies depending on the servo amplifier capacities. Refer to the dimensions of the relevant servo amplifier in this catalog for details.

Configuration Example for Servo Motors (Note 1)

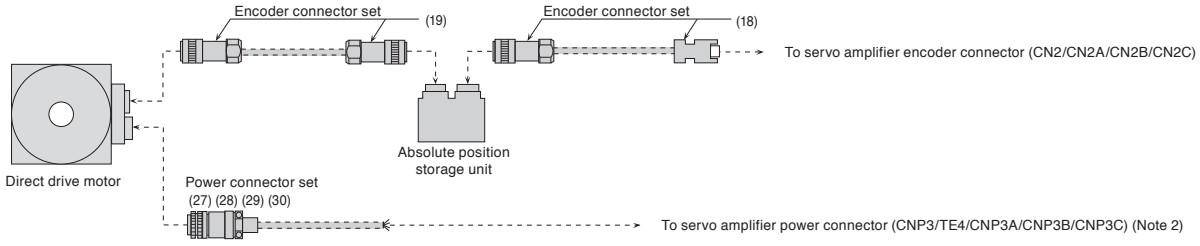
B | B-RJ | WB | A | A-RJ

For TM-RFM direct drive motor series

●For incremental system



●For absolute position detection system



Notes: 1. Cables drawn with dashed lines need to be fabricated by user. Refer to relevant Servo Motor Instruction Manual for fabricating the cables.
2. The connector for U, V, and W varies depending on the servo amplifier capacities. Refer to the dimensions of the relevant servo amplifier in this catalog for details.

Cables and Connectors for Servo Motor Encoder

Refer to "Details of Optional Cables and Connectors for Servo Motors" in this catalog for the detailed models.

	Item	Model	Cable length	IP rating (Note 1)	Application	Description
(1)	Encoder cable (Note 2) (load-side lead)	MR-J3ENCBL2M-A1-H *1	2 m	IP65	For HG-KR/HG-MR (direct connection type)	Encoder connector Servo amplifier connector 
		MR-J3ENCBL5M-A1-H *1	5 m			
		MR-J3ENCBL10M-A1-H *1	10 m			
		MR-J3ENCBL2M-A1-L *1	2 m			
		MR-J3ENCBL5M-A1-L *1	5 m			
		MR-J3ENCBL10M-A1-L *1	10 m			
(2)	Encoder cable (Note 2) (opposite to load-side lead)	MR-J3ENCBL2M-A2-H *1	2 m	IP65	For HG-KR/HG-MR (direct connection type)	
		MR-J3ENCBL5M-A2-H *1	5 m			
		MR-J3ENCBL10M-A2-H *1	10 m			
		MR-J3ENCBL2M-A2-L *1	2 m			
		MR-J3ENCBL5M-A2-L *1	5 m			
		MR-J3ENCBL10M-A2-L *1	10 m			
(3)	Encoder cable (Note 2) (load-side lead)	MR-J3JCBL03M-A1-L *1	0.3 m	IP20	For HG-KR/HG-MR (junction type)	Encoder connector Junction connector  Use this in combination with (5) or (7).
(4)	Encoder cable (Note 2) (opposite to load-side lead)	MR-J3JCBL03M-A2-L *1	0.3 m	IP20	For HG-KR/HG-MR (junction type)	
(5)	Encoder cable (Note 2)	MR-EKCBL20M-H *1	20 m	IP20	For HG-KR/HG-MR (junction type)	Junction connector Servo amplifier connector  Use this in combination with (3) or (4).
		MR-EKCBL30M-H (Note 3) *1	30 m			
		MR-EKCBL40M-H (Note 3) *1	40 m			
		MR-EKCBL50M-H (Note 3) *1	50 m			
		MR-EKCBL20M-L *1	20 m			
		MR-EKCBL30M-L (Note 3) *1	30 m			
(6)	Encoder cable (Note 2, 5)	MR-EKCBL2M-H *1	2 m	IP20	For connecting load-side encoder, or linear encoder	Junction connector Servo amplifier connector 
		MR-EKCBL5M-H *1	5 m			
(7)	Encoder connector set (Note 5)	MR-ECNM	-	IP20	For HG-KR/HG-MR (junction type) For connecting load-side encoder, or linear encoder	Junction connector Servo amplifier connector  Use this in combination with (3) or (4) for HG-KR/HG-MR series. Applicable cable Wire size: 0.3 mm² (AWG 22) Cable OD: 8.2 mm Crimping tool (91529-1) is required.
(8)	Encoder cable (Note 2) (load-side lead)	MR-J3JSCBL03M-A1-L *1	0.3 m	IP65 (Note 4)	For HG-KR/HG-MR (junction type)	Encoder connector Junction connector  Use this in combination with (10) or (11).
(9)	Encoder cable (Note 2) (opposite to load-side lead)	MR-J3JSCBL03M-A2-L *1	0.3 m	IP65 (Note 4)	For HG-KR/HG-MR (junction type)	

Notes: 1. The IP rating indicated is for the connector's protection against ingress of dust and water when coupled to a servo amplifier/servo motor. If the IP rating of the servo amplifier/servo motor differs from that of these connectors, overall IP rating depends on the lowest of all.
2. -H and -L indicate a bending life. -H indicates a long bending life, and -L indicates a standard bending life.
3. This encoder cable is available in four-wire type. Parameter setting is required to use the four-wire type encoder cable. Refer to relevant Servo Amplifier Instruction Manual for details.
4. The encoder cable is rated IP65 while the junction connector itself is rated IP67.
5. Use MR-EKCBL_M-H and MR-ECNM to connect to an output cable for AT343A, AT543A-SC or AT545A-SC scales manufactured by Mitutoyo Corporation.

For unlisted lengths

*1. For unlisted lengths of the cables, please contact Mitsubishi Electric System & Service Co., Ltd. OVERSEAS BUSINESS PROMOTION DIVISION (Email: osb.webmaster@melsc.jp)

Cables and Connectors for Servo Motor Encoder

Refer to "Details of Optional Cables and Connectors for Servo Motors" in this catalog for the detailed models.

	Item	Model	Cable length	IP rating (Note 1)	Application	Description
(10)	Encoder cable (Note 2)	MR-J3ENSCBL2M-H *1	2 m	IP67	For HG-KR/HG-MR (junction type) For HG-SR/HG-JR53, 73, 103, 153, 203, 353, 503, 703, 903, 534, 734, 1034, 1534, 2034, 3534, 5034, 7034, 9034/HG-RR/ HG-UR (direct connection type)	Junction connector or encoder connector / Servo amplifier connector  Use this in combination with (8) or (9) for HG-KR/HG-MR series.
		MR-J3ENSCBL5M-H *1	5 m			
		MR-J3ENSCBL10M-H *1	10 m			
		MR-J3ENSCBL20M-H *1	20 m			
		MR-J3ENSCBL30M-H *1	30 m			
		MR-J3ENSCBL40M-H *1	40 m			
		MR-J3ENSCBL50M-H *1	50 m			
		MR-J3ENSCBL2M-L *1	2 m			
		MR-J3ENSCBL5M-L *1	5 m			
		MR-J3ENSCBL10M-L *1	10 m			
		MR-J3ENSCBL20M-L *1	20 m			
		MR-J3ENSCBL30M-L *1	30 m			
(11)	Encoder connector set (one-touch connection type)	MR-J3SCNS	-	IP67	For HG-KR/HG-MR (junction type) For HG-SR/HG-JR53, 73, 103, 153, 203, 353, 503, 703, 903, 534, 734, 1034, 1534, 2034, 3534, 5034, 7034, 9034/HG-RR/ HG-UR (direct connection type) (straight type)	Junction connector or encoder connector / Servo amplifier connector  Use this in combination with (8) or (9) for HG-KR/HG-MR series. Applicable cable Wire size: 0.5 mm² (AWG 20) or smaller Cable OD: 5.5 mm to 9.0 mm (Note 4)
(12)	Encoder connector set (Note 3) (screw type)	MR-ENCNS2 *2	-	IP67	For HG-SR/HG-JR53, 73, 103, 153, 203, 353, 503, 703, 903, 534, 734, 1034, 1534, 2034, 3534, 5034, 7034, 9034/ HG-RR/HG-UR (straight type)	Encoder connector / Servo amplifier connector  Applicable cable Wire size: 0.5 mm² (AWG 20) or smaller Cable OD: 5.5 mm to 9.0 mm (Note 4)
(13)	Encoder connector set (one-touch connection type)	MR-J3SCNSA *2	-	IP67	For HG-SR/HG-JR53, 73, 103, 153, 203, 353, 503, 703, 903, 534, 734, 1034, 1534, 2034, 3534, 5034, 7034, 9034/HG-RR/ HG-UR (angle type)	Encoder connector / Servo amplifier connector  Applicable cable Wire size: 0.5 mm² (AWG 20) or smaller Cable OD: 5.5 mm to 9.0 mm (Note 4)
(14)	Encoder connector set (Note 3) (screw type)	MR-ENCNS2A *2	-	IP67		

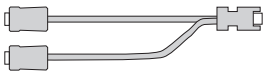
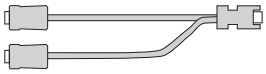
Notes: 1. The IP rating indicated is for the connector's protection against ingress of dust and water when coupled to a servo amplifier/servo motor. If the IP rating of the servo amplifier/servo motor differs from that of these connectors, overall IP rating depends on the lowest of all.
2. -H and -L indicate a bending life. -H indicates a long bending life, and -L indicates a standard bending life.
3. A screw thread is cut on the encoder connector of HG-SR/HG-JR/HG-RR/HG-UR series, and the screw type connector can be used.
4. Cable clamps and bushings for cable OD of 5.5 mm to 7.5 mm and of 7.0 mm to 9.0 mm are included in the set.

For unlisted lengths and fabricating cables

*1. For unlisted lengths of the cables, please contact Mitsubishi Electric System & Service Co., Ltd. OVERSEAS BUSINESS PROMOTION DIVISION (Email: osb.webmaster@melsc.jp)
*2. For fabricating encoder cables with these connectors, please contact Mitsubishi Electric System & Service Co., Ltd. OVERSEAS BUSINESS PROMOTION DIVISION (Email: osb.webmaster@melsc.jp)

Cables and Connectors for Servo Motor Encoder

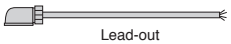
Refer to "Details of Optional Cables and Connectors for Servo Motors" in this catalog for the detailed models.

	Item	Model	Cable length	IP rating (Note 1)	Application	Description
(15)	Encoder cable (Note 2)	MR-ENECBL2M-H-MTH	2 m	IP67	For HG-JR11K1M, 15K1M, 22K1M, 11K1M4, 15K1M4, 22K1M4	Encoder connector — Servo amplifier connector 
		MR-ENECBL5M-H-MTH	5 m			
		MR-ENECBL10M-H-MTH	10 m			
		MR-ENECBL20M-H-MTH	20 m			
		MR-ENECBL30M-H-MTH	30 m			
		MR-ENECBL40M-H-MTH	40 m			
		MR-ENECBL50M-H-MTH	50 m			
(16)	Encoder connector set	MR-ENECNS	-	IP67	For HG-JR11K1M, 15K1M, 22K1M, 11K1M4, 15K1M4, 22K1M4	Encoder connector — Servo amplifier connector  Applicable cable Wire size: 0.3 mm² to 1.25 mm² (AWG 22 to 16) Cable OD: 6.8 mm to 10 mm
(17)	Encoder connector set	MR-J3CN2	-	-	For connecting load-side encoder, linear encoder, or thermistor	Servo amplifier connector 
(18)	Encoder connector set	MR-J3DDCNS	-	IP67	For TM-RFM (connecting direct drive motor and servo amplifier, or absolute position storage unit and servo amplifier)	Encoder connector or absolute position storage unit connector — Servo amplifier connector  Applicable cable Wire size: 0.25 mm² to 0.5 mm² (AWG 23 to 20) Cable OD: 7.8 mm to 8.2 mm
(19)	Encoder connector set	MR-J3DDSPS	-	IP67	For TM-RFM (connecting direct drive motor and absolute position storage unit)	Encoder connector — Absolute position storage unit connector  Applicable cable Wire size: 0.25 mm² to 0.5 mm² (AWG 23 to 20) Cable OD: 7.8 mm to 8.2 mm
(20)	Junction cable for fully closed loop control (Note 3)	MR-J4FCCBL03M	0.3 m	-	For branching load-side encoder	Junction connector — Servo amplifier connector 
(21)	Junction cable for linear servo motor (Note 3)	MR-J4THCBL03M	0.3 m	-	For branching thermistor	Junction connector — Servo amplifier connector 
(22)	Connector set	MR-J3THMCN2	-	-	For fully closed loop control or branching thermistor	Junction connector — Servo amplifier connector 

Notes: 1. The IP rating indicated is for the connector's protection against ingress of dust and water when coupled to a servo amplifier/servo motor/absolute position storage unit. If the IP rating of the servo amplifier/servo motor/absolute position storage unit differs from that of these connectors, overall IP rating depends on the lowest of all.
2. -H and -L indicate a bending life. -H indicates a long bending life, and -L indicates a standard bending life.
3. Servo system will not operate correctly when the junction cables for fully closed loop control and for linear servo motor are used mistakenly or interchangeably. Make sure of the model before placing an order.

Cables and Connectors for Servo Motor Power

Refer to "Details of Optional Cables and Connectors for Servo Motors" in this catalog for the detailed models.

	Item	Model	Cable length	IP rating (Note 1)	Application	Description
(23)	Power cable (Note 2) (load-side lead)	MR-PWS1CBL2M-A1-H *1	2 m	IP65	For HG-KR/HG-MR (direct connection type)	Power connector  Lead-out * The cable is not shielded.
		MR-PWS1CBL5M-A1-H *1	5 m			
		MR-PWS1CBL10M-A1-H *1	10 m			
		MR-PWS1CBL2M-A1-L *1 (Note 3)	2 m			
		MR-PWS1CBL5M-A1-L *1 (Note 3)	5 m			
		MR-PWS1CBL10M-A1-L *1 (Note 3)	10 m			
(24)	Power cable (Note 2) (opposite to load-side lead)	MR-PWS1CBL2M-A2-H *1	2 m	IP65	For HG-KR/HG-MR (direct connection type)	
		MR-PWS1CBL5M-A2-H *1	5 m			
		MR-PWS1CBL10M-A2-H *1	10 m			
		MR-PWS1CBL2M-A2-L *1 (Note 3)	2 m			
		MR-PWS1CBL5M-A2-L *1 (Note 3)	5 m			
		MR-PWS1CBL10M-A2-L *1 (Note 3)	10 m			
(25)	Power cable (Note 2) (load-side lead)	MR-PWS2CBL03M-A1-L	0.3 m	IP55	For HG-KR/HG-MR (junction type)	Power connector  Lead-out * The cable is not shielded.
(26)	Power cable (Note 2) (opposite to load-side lead)	MR-PWS2CBL03M-A2-L	0.3 m	IP55	For HG-KR/HG-MR (junction type)	
(27)	Power connector set	MR-PWCNF *2	-	IP67	For TM-RFM_C20/ TM-RFM_E20	Power connector  Applicable cable Wire size: 0.3 mm² to 1.25 mm² (AWG 22 to 16) Cable OD: 8.3 mm to 11.3 mm
(28)	Power connector set	MR-PWCNS4 *2	-	IP67	For HG-SR51, 81, 52, 102, 152, 524, 1024, 1524/ HG-JR53, 73, 103, 153, 203, 534, 734, 1034, 1534, 2034, 3534, 5034/ TM-RFM_G20	Power connector  Applicable cable Wire size: 2 mm² to 3.5 mm² (AWG 14 to 12) Cable OD: 10.5 mm to 14.1 mm
(29)	Power connector set	MR-PWCNS5 *2	-	IP67	For HG-SR121, 201, 301, 202, 352, 502, 2024, 3524, 5024/ HG-JR353, 503/ TM-RFM040J10, TM-RFM120J10	Power connector  Applicable cable Wire size: 5.5 mm² to 8 mm² (AWG 10 to 8) Cable OD: 12.5 mm to 16 mm
(30)	Power connector set	MR-PWCNS3 *2	-	IP67	For HG-SR421, 702, 7024/ HG-JR703, 903, 11K1M, 15K1M, 7034, 9034, 11K1M4, 15K1M4/ TM-RFM240J10	Power connector  Applicable cable Wire size: 14 mm² to 22 mm² (AWG 6 to 4) Cable OD: 22 mm to 23.8 mm

Notes: 1. The IP rating indicated is for the connector's protection against ingress of dust and water when coupled to a servo amplifier/servo motor. If the IP rating of the servo amplifier/servo motor differs from that of these connectors, overall IP rating depends on the lowest of all.
2. -H and -L indicate a bending life. -H indicates a long bending life, and -L indicates a standard bending life.
3. Shielded power cable MR-PWS3CBL_M-A_-L is also available. Contact your local sales office.

For unlisted lengths and fabricating cables

*1. For unlisted lengths of the cables, please contact Mitsubishi Electric System & Service Co., Ltd. OVERSEAS BUSINESS PROMOTION DIVISION (Email: osb.webmaster@melsc.jp)
*2. For fabricating servo motor power cables or electromagnetic brake cables, please contact Mitsubishi Electric System & Service Co., Ltd. OVERSEAS BUSINESS PROMOTION DIVISION (Email: osb.webmaster@melsc.jp)

Cables and Connectors for Servo Motor Power

Refer to "Details of Optional Cables and Connectors for Servo Motors" in this catalog for the detailed models.

	Item	Model	Cable length	IP rating (Note 1)	Application	Description
(31)	Power connector set	MR-PWCNS1 *1	-	IP67	For HG-RR103, 153, 203/ HG-UR72, 152	Power connector  Applicable cable Wire size: 2 mm² to 3.5 mm² (AWG 14 to 12) Cable OD: 9.5 mm to 13 mm
(32)	Power connector set	MR-PWCNS2 *1	-	IP67	For HG-RR353, 503/ HG-UR202, 352, 502	Power connector  Applicable cable Wire size: 5.5 mm² to 8 mm² (AWG 10 to 8) Cable OD: 13 mm to 15.5 mm

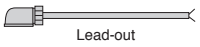
Notes: 1. The IP rating indicated is for the connector's protection against ingress of dust and water when coupled to a servo amplifier/servo motor. If the IP rating of the servo amplifier/servo motor differs from that of these connectors, overall IP rating depends on the lowest of all.

For fabricating cables

*1. For fabricating servo motor power cables or electromagnetic brake cables, please contact Mitsubishi Electric System & Service Co., Ltd. OVERSEAS BUSINESS PROMOTION DIVISION (Email: osb.webmaster@melsc.jp)

Cables and Connectors for Servo Motor Electromagnetic Brake

Refer to "Details of Optional Cables and Connectors for Servo Motors" in this catalog for the detailed models.

	Item	Model	Cable length	IP rating (Note 1)	Application	Description
(33)	Electromagnetic brake cable (Note 2) (load-side lead)	MR-BKS1CBL2M-A1-H *1	2 m	IP65	For HG-KR/HG-MR (direct connection type)	Electromagnetic brake connector  Lead-out * The cable is not shielded.
		MR-BKS1CBL5M-A1-H *1	5 m			
		MR-BKS1CBL10M-A1-H *1	10 m			
		MR-BKS1CBL2M-A1-L *1	2 m			
		MR-BKS1CBL5M-A1-L *1	5 m			
		MR-BKS1CBL10M-A1-L *1	10 m			
(34)	Electromagnetic brake cable (Note 2) (opposite to load-side lead)	MR-BKS1CBL2M-A2-H *1	2 m	IP65	For HG-KR/HG-MR (direct connection type)	
		MR-BKS1CBL5M-A2-H *1	5 m			
		MR-BKS1CBL10M-A2-H *1	10 m			
		MR-BKS1CBL2M-A2-L *1	2 m			
		MR-BKS1CBL5M-A2-L *1	5 m			
		MR-BKS1CBL10M-A2-L *1	10 m			
(35)	Electromagnetic brake cable (Note 2) (load-side lead)	MR-BKS2CBL03M-A1-L	0.3 m	IP55	For HG-KR/HG-MR (junction type)	Electromagnetic brake connector  Lead-out * The cable is not shielded.
(36)	Electromagnetic brake cable (Note 2) (opposite to load-side lead)	MR-BKS2CBL03M-A2-L	0.3 m	IP55	For HG-KR/HG-MR (junction type)	
(37)	Electromagnetic brake connector set (one-touch connection type)	MR-BKCNS1 *2	-	IP67	For HG-SR/ HG-JR53B, 73B, 103B, 153B, 203B, 353B, 503B, 703B, 903B, 534B, 734B, 1034B, 1534B, 2034B, 3534B, 5034B, 7034B, 9034B (straight type)	Electromagnetic brake connector  Applicable cable Wire size: 1.25 mm² (AWG 16) or smaller Cable OD: 9.0 mm to 11.6 mm
(38)	Electromagnetic brake connector set (Note 3) (screw type)	MR-BKCNS2 *2	-	IP67		
(39)	Electromagnetic brake connector set (one-touch connection type)	MR-BKCNS1A *2	-	IP67	For HG-SR/ HG-JR53B, 73B, 103B, 153B, 203B, 353B, 503B, 703B, 903B, 534B, 734B, 1034B, 1534B, 2034B, 3534B, 5034B, 7034B, 9034B (angle type)	Electromagnetic brake connector  Applicable cable Wire size: 1.25 mm² (AWG 16) or smaller Cable OD: 9.0 mm to 11.6 mm
(40)	Electromagnetic brake connector set (Note 3) (screw type)	MR-BKCNS2A *2	-	IP67		
(41)	Electromagnetic brake connector set	MR-BKCN	-	IP67	For HG-JR11K1MB, 15K1MB, 11K1M4B, 15K1M4B/ HG-UR202B, 352B, 502B (straight type)	Electromagnetic brake connector  Applicable cable Wire size: 0.3 mm² to 1.25 mm² (AWG 22 to 16) Cable OD: 5.0 mm to 8.3 mm

Notes: 1. The IP rating indicated is for the connector's protection against ingress of dust and water when coupled to a servo amplifier/servo motor. If the IP rating of the servo amplifier/servo motor differs from that of these connectors, overall IP rating depends on the lowest of all.
2. -H and -L indicate a bending life. -H indicates a long bending life, and -L indicates a standard bending life.
3. A screw thread is cut on the electromagnetic brake connector of HG-SR/HG-JR series, and the screw type connector can be used.

For unlisted lengths and fabricating cables

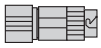
*1. For unlisted lengths of the cables, please contact Mitsubishi Electric System & Service Co., Ltd. OVERSEAS BUSINESS PROMOTION DIVISION (Email: osb.webmaster@melsc.jp)
*2. For fabricating servo motor power cables or electromagnetic brake cables, please contact Mitsubishi Electric System & Service Co., Ltd. OVERSEAS BUSINESS PROMOTION DIVISION (Email: osb.webmaster@melsc.jp)

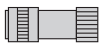
Details of Optional Cables and Connectors for Servo Motors

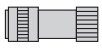
Model	Encoder connector	Servo amplifier connector
MR-J3ENCBL_M-A1-H (Note 2) MR-J3ENCBL_M-A1-L (Note 2) MR-J3ENCBL_M-A2-H (Note 2) MR-J3ENCBL_M-A2-L (Note 2)	 2174053-1 (TE Connectivity Ltd. Company)	 Receptacle: 36210-0100PL Shell kit: 36310-3200-008 (3M) or Connector set: 54599-1019 (Molex)

Model	Encoder connector	Junction connector
MR-J3JCBL03M-A1-L (Note 2) MR-J3JCBL03M-A2-L (Note 2)	 2174053-1 (TE Connectivity Ltd. Company)	 Contact: 1473226-1 (with ring) Housing: 1-172169-9 Cable clamp: 316454-1 (TE Connectivity Ltd. Company)

Model	Junction connector	Servo amplifier connector
MR-EKCBL_M-H MR-EKCBL_M-L MR-ECNM	 Housing: 1-172161-9 Connector pin: 170359-1 (TE Connectivity Ltd. Company) or an equivalent product Cable clamp: MTI-0002 (Toa Electric Industrial Co., Ltd.)	 Receptacle: 36210-0100PL Shell kit: 36310-3200-008 (3M) or Connector set: 54599-1019 (Molex)

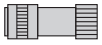
Model	Encoder connector	Junction connector
MR-J3JSCBL03M-A1-L (Note 2) MR-J3JSCBL03M-A2-L (Note 2)	 2174053-1 (TE Connectivity Ltd. Company)	 Cable receptacle: CM10-CR10P-M (DDK Ltd.)

Model	Encoder connector	Servo amplifier connector
MR-J3ENSCBL_M-H (Note 2) MR-J3ENSCBL_M-L (Note 2)	 For 10 m or shorter cable Straight plug: CMV1-SP10S-M1 Socket contact: CMV1-#22ASC-C1-100 For 20 m or longer cable Straight plug: CMV1-SP10S-M1 (long bending life) CMV1-SP10S-M2 (standard) Socket contact: CMV1-#22ASC-C2-100 (DDK Ltd.)	 Receptacle: 36210-0100PL Shell kit: 36310-3200-008 (3M) or Connector set: 54599-1019 (Molex)

Model	Junction connector or encoder connector	Servo amplifier connector
MR-J3SCNS (Note 2)	 Straight plug: CMV1-SP10S-M2 (Note 1) Socket contact: CMV1-#22ASC-S1-100 (DDK Ltd.)	 Receptacle: 36210-0100PL Shell kit: 36310-3200-008 (3M) or Connector set: 54599-1019 (Molex)

Notes: 1. Cable clamps and bushings for cable OD of 5.5 mm to 7.5 mm and of 7.0 mm to 9.0 mm are included in the set.
2. The cable or the connector set may contain different connectors but still usable.

Details of Optional Cables and Connectors for Servo Motors

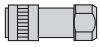
Model	Encoder connector	Servo amplifier connector
MR-ENCNS2	 Straight plug: CMV1S-SP10S-M2 (Note 1) Socket contact: CMV1-#22ASC-S1-100 (DDK Ltd.)	 Receptacle: 36210-0100PL Shell kit: 36310-3200-008 (3M) or Connector set: 54599-1019 (Molex)

Model	Encoder connector	Servo amplifier connector
MR-J3SCNSA (Note 2)	 Angle plug: CMV1-AP10S-M2 (Note 1) Socket contact: CMV1-#22ASC-S1-100 (DDK Ltd.)	 Receptacle: 36210-0100PL Shell kit: 36310-3200-008 (3M) or Connector set: 54599-1019 (Molex)

Model	Encoder connector	Servo amplifier connector
MR-ENCNS2A	 Angle plug: CMV1S-AP10S-M2 (Note 1) Socket contact: CMV1-#22ASC-S1-100 (DDK Ltd.)	 Receptacle: 36210-0100PL Shell kit: 36310-3200-008 (3M) or Connector set: 54599-1019 (Molex)

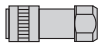
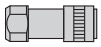
Model	Encoder connector	Servo amplifier connector
MR-ENECBL_M-H-MTH MR-ENECNS	 Plug: D/MS3106A20-29S(D190) Backshell: CE02-20BS-S-D (straight) Cable clamp: CE3057-12A-3-D	 Receptacle: 36210-0100PL Shell kit: 36310-3200-008 (3M) or Connector set: 54599-1019 (Molex)

Model	Servo amplifier connector
MR-J3CN2	 Receptacle: 36210-0100PL Shell kit: 36310-3200-008 (3M) or Connector set: 54599-1019 (Molex)

Model	Encoder connector or absolute position storage unit connector	Servo amplifier connector
MR-J3DDCNS	 Plug: RM15WTPZK-12S Cord clamp: JR13WCCA-8(72) (Hirose Electric Co., Ltd.)	 Receptacle: 36210-0100PL Shell kit: 36310-3200-008 (3M) or Connector set: 54599-1019 (Molex)

Notes: 1. Cable clamps and bushings for cable OD of 5.5 mm to 7.5 mm and of 7.0 mm to 9.0 mm are included in the set.
2. The cable or the connector set may contain different connectors but still usable.

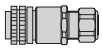
Details of Optional Cables and Connectors for Servo Motors

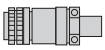
Model	Encoder connector	Absolute position storage unit connector
MR-J3DDSPS	 Plug: RM15WTPZK-12S Cord clamp: JR13WCCA-8(72) (Hirose Electric Co., Ltd.)	 Plug: RM15WTPZ-12P(72) Cord clamp: JR13WCCA-8(72) (Hirose Electric Co., Ltd.)

Model	Junction connector	Servo amplifier connector
MR-J4FCCBL03M MR-J4THCBL03M MR-J3THMCN2	 Plug: 36110-3000FD Shell kit: 36310-F200-008 (3M)	 Receptacle: 36210-0100PL Shell kit: 36310-3200-008 (3M)

Model	Power connector
MR-PWS1CBL_M-A1-H (Note 1) MR-PWS1CBL_M-A1-L (Note 1) MR-PWS1CBL_M-A2-H (Note 1) MR-PWS1CBL_M-A2-L (Note 1)	 Plug: KN4FT04SJ1-R Socket contact: ST-TMH-S-C1B-100-(A534G) (Japan Aviation Electronics Industry, Limited)

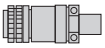
Model	Power connector
MR-PWS2CBL03M-A1-L (Note 1) MR-PWS2CBL03M-A2-L (Note 1)	 Plug: KN4FT04SJ2-R Socket contact: ST-TMH-S-C1B-100-(A534G) (Japan Aviation Electronics Industry, Limited)

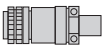
Model	Power connector
MR-PWCNF	 Plug: CE05-6A14S-2SD-D (straight) (DDK Ltd.) Cable clamp: YSO14-9 to 11 (Daiwa Dengyo Co., Ltd.)

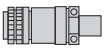
Model	Power connector
MR-PWCNS4	 Plug: CE05-6A18-10SD-D-BSS (straight) Cable clamp: CE3057-10A-1-D (DDK Ltd.)

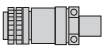
Notes: 1. The cable or the connector set may contain different connectors but still usable.

Details of Optional Cables and Connectors for Servo Motors

Model	Power connector
MR-PWCNS5	 Plug: CE05-6A22-22SD-D-BSS (straight) Cable clamp: CE3057-12A-1-D (DDK Ltd.)

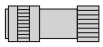
Model	Power connector
MR-PWCNS3	 Plug: CE05-6A32-17SD-D-BSS (straight) Cable clamp: CE3057-20A-1-D (DDK Ltd.)

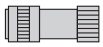
Model	Power connector
MR-PWCNS1	 Plug: CE05-6A22-23SD-D-BSS (straight) Cable clamp: CE3057-12A-2-D (DDK Ltd.)

Model	Power connector
MR-PWCNS2	 Plug: CE05-6A24-10SD-D-BSS (straight) Cable clamp: CE3057-16A-2-D (DDK Ltd.)

Model	Electromagnetic brake connector
MR-BKS1CBL_M-A1-H MR-BKS1CBL_M-A1-L MR-BKS1CBL_M-A2-H MR-BKS1CBL_M-A2-L	 Plug: JN4FT02SJ1-R Socket contact: ST-TMH-S-C1B-100-(A534G) (Japan Aviation Electronics Industry, Limited)

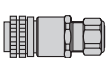
Model	Electromagnetic brake connector
MR-BKS2CBL03M-A1-L MR-BKS2CBL03M-A2-L	 Plug: JN4FT02SJ2-R Socket contact: ST-TMH-S-C1B-100-(A534G) (Japan Aviation Electronics Industry, Limited)

Model	Electromagnetic brake connector
MR-BKCNS1 (Note 1)	 Straight plug: CMV1-SP2S-L Socket contact: CMV1-#22BSC-S2-100 (DDK Ltd.)

Model	Electromagnetic brake connector
MR-BKCNS2	 Straight plug: CMV1S-SP2S-L Socket contact: CMV1-#22BSC-S2-100 (DDK Ltd.)

Model	Electromagnetic brake connector
MR-BKCNS1A (Note 1)	 Angle plug: CMV1-AP2S-L Socket contact: CMV1-#22BSC-S2-100 (DDK Ltd.)

Model	Electromagnetic brake connector
MR-BKCNS2A	 Angle plug: CMV1S-AP2S-L Socket contact: CMV1-#22BSC-S2-100 (DDK Ltd.)

Model	Electromagnetic brake connector
MR-BKCN	 Plug: D/MS3106A10SL-4S(D190) (DDK Ltd.) Cable clamp: YSO10-5 to 8 (straight) (Daiwa Dengyo Co., Ltd.)

Notes: 1. The cable or the connector set may contain different connectors but still usable.

Products on the Market for Servo Motors

Contact the relevant manufacturers directly. When fabricating a cable with the following connectors, refer to the relevant manufacturers' instruction manuals for wiring and assembling procedures.

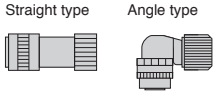
Encoder connector (servo amplifier-side)

Application	Connector (3M)
Servo amplifier CN2 connector	Receptacle: 36210-0100PL Shell kit: 36310-3200-008
	Connector (Molex)
	54599-1019 (gray)
	54599-1016 (black)

Encoder connector for HG-KR/HG-MR series **Rotary**

Applicable servo motor	Feature (Note 1)	Connector (TE Connectivity Ltd. Company)	Crimping tools (TE Connectivity Ltd. Company)	Applicable cable example
HG-KR/ HG-MR	IP65	2174053-1	For ground clip: 1596970-1 For receptacle contact: 1596847-1	Wire size: 0.13 mm² to 0.33 mm² (AWG 26 to 22) Cable OD: 6.8 mm to 7.4 mm Wire example: Fluorine resin wire (Vinyl jacket cable TPE. SVP 70/0.08(AWG#22)-3P KB-2237-2 Bando Densen Co., Ltd. (Note 2) or an equivalent product)

Encoder connector for HG-SR/HG-JR (9 kW or smaller) /HG-RR/HG-UR series **Rotary**



Applicable servo motor	Feature (Note 1)	Connector (DDK Ltd.)				Applicable cable example
		Type	Type of connection	Plug	Socket contact	Cable OD [mm]
HG-SR/ HG-JR53, 73, 103, 153, 203, 353, 503, 703, 903, 534, 734, 1034, 1534, 2034, 3534, 5034, 7034, 9034/HG-RR/ HG-UR	IP67	Straight	One-touch connection type	CMV1-SP10S-M1	Select from solder or press bonding type. (Refer to the table below.)	5.5 to 7.5
				CMV1-SP10S-M2		7.0 to 9.0
			Screw type	CMV1S-SP10S-M1		5.5 to 7.5
				CMV1S-SP10S-M2		7.0 to 9.0
		Angle	One-touch connection type	CMV1-AP10S-M1		5.5 to 7.5
				CMV1-AP10S-M2		7.0 to 9.0
			Screw type	CMV1S-AP10S-M1		5.5 to 7.5
				CMV1S-AP10S-M2		7.0 to 9.0

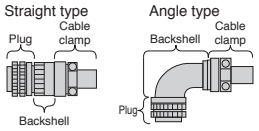
Contact	Socket contact (DDK Ltd.)	Wire size (Note 3)
Solder type	CMV1-#22ASC-S1-100	0.5 mm² (AWG 20) or smaller
Press bonding type	CMV1-#22ASC-C1-100	0.2 mm² to 0.5 mm² (AWG 24 to 20) Crimping tool (357J-53162T) is required.
	CMV1-#22ASC-C2-100	0.08 mm² to 0.2 mm² (AWG 28 to 24) Crimping tool (357J-53163T) is required.

Notes: 1. The IP rating indicated is for the connector's protection against ingress of dust and water when coupled to a servo amplifier/servo motor. If the IP rating of the servo amplifier/servo motor differs from that of these connectors, overall IP rating depends on the lowest of all.
2. Contact Toa Electric Industrial Co., Ltd.
3. The wire size shows wiring specification of the connector.

Rotary Rotary servo motor **Linear** Linear servo motor **Direct** Direct drive motor

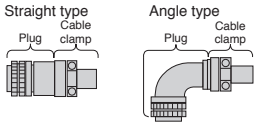
Products on the Market for Servo Motors

Contact the relevant manufacturers directly. When fabricating a cable with the following connectors, refer to the relevant manufacturers' instruction manuals for wiring and assembling procedures.



Encoder connector for HG-JR (11 kW to 22 kW) series (IP67 rated) Rotary

Applicable servo motor	Feature (Note 1)	Plug (DDK Ltd.)	Backshell (DDK Ltd.)		Cable clamp (DDK Ltd.)	Applicable cable example	
		Model	Type	Model	Model	Wire size (Note 2)	Cable OD [mm]
HG-JR11K1M, 15K1M, 22K1M, 11K1M4, 15K1M4, 22K1M4	IP67	D/MS3106A20-29S(D190)	Straight	CE02-20BS-S-D	CE3057-12A-3-D	0.3 mm² to 1.25 mm² (AWG 22 to 16)	6.8 to 10
			Angle	CE-20BA-S-D			



Encoder connector for HG-JR (11 kW to 22 kW) series (general environment) Rotary

Applicable servo motor	Feature (Note 1)	Plug (with backshell) (DDK Ltd.)		Cable clamp (DDK Ltd.)	Applicable cable example	
		Type	Model	Model	Wire size (Note 2)	Cable OD [mm]
HG-JR11K1M, 15K1M, 22K1M, 11K1M4, 15K1M4, 22K1M4	General environment	Straight	D/MS3106B20-29S	D/MS3057-12A	0.3 mm² to 1.25 mm² (AWG 22 to 16)	15.9 or smaller (bushing ID)
		Angle	D/MS3108B20-29S			

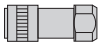
Notes: 1. The IP rating indicated is for the connector's protection against ingress of dust and water when coupled to a servo amplifier/servo motor. If the IP rating of the servo amplifier/servo motor differs from that of these connectors, overall IP rating depends on the lowest of all.
2. The wire size shows wiring specification of the connector.

Rotary Rotary servo motor **Linear** Linear servo motor **Direct** Direct drive motor

Products on the Market for Servo Motors

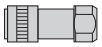
Contact the relevant manufacturers directly. When fabricating a cable with the following connectors, refer to the relevant manufacturers' instruction manuals for wiring and assembling procedures.

Encoder connector for TM-RFM series and absolute position storage unit connector (servo amplifier side) **Direct**



Applicable servo motor	Application	Feature (Note 1)	Plug (Hirose Electric Co., Ltd.)			Applicable cable example
			Type	Plug	Cord clamp	
TM-RFM	For encoder or absolute position storage unit (servo amplifier side)	IP67	Straight	RM15WTPZK-12S	JR13WCCA-8(72)	Wire size: 0.5 mm² (AWG 20) or smaller Cable OD: 7.8 mm to 8.2 mm Wire example: Vinyl jacket cable 20276 VSVPAWG#23 × 6P KB-0492 Bando Densen Co., Ltd. (Note 3)

Encoder connector for TM-RFM series and absolute position storage unit connector (encoder side) **Direct**



Applicable servo motor	Application	Feature (Note 1)	Plug (Hirose Electric Co., Ltd.)			Applicable cable example
			Type	Plug	Cord clamp	
TM-RFM	For absolute position storage unit (encoder side)	IP67	Straight	RM15WTPZ-12P(72)	JR13WCCA-8(72)	Wire size: 0.5 mm² (AWG 20) or smaller Cable OD: 7.8 mm to 8.2 mm Wire example: Vinyl jacket cable 20276 VSVPAWG#23 × 6P KB-0492 Bando Densen Co., Ltd. (Note 3)

Thermistor junction connector for LM-H3/LM-K2/LM-U2/LM-F series **Linear**

Applicable servo motor	Feature (Note 1)	Connector (3M)		Applicable cable example
		Plug	Shell kit	
LM-H3/ LM-K2/ LM-U2/ LM-F	General environment	36110-3000FD	36310-F200-008	Wire size: 0.3 mm² (AWG 22) or smaller Cable OD: 7 mm to 9 mm

Thermistor connector for LM-F series **Linear**

Applicable servo motor	Feature (Note 1)	Cable receptacle (DDK Ltd.)	Cable clamp (DDK Ltd.)	Applicable cable example
LM-F	General environment	D/MS3101A14S-9S	D/MS3057A-6A	Wire size: 0.3 mm² to 1.25 mm² (AWG 22 to 16) Cable OD: up to 7.9 mm

Power connector for HG-KR/HG-MR series **Rotary**

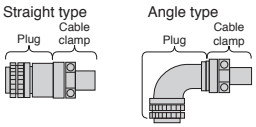
Applicable servo motor	Feature (Note 1)	Connector (Japan Aviation Electronics Industry, Limited)	Crimping tools (Japan Aviation Electronics Industry, Limited)	Applicable cable example
HG-KR/ HG-MR	IP65	Plug: KN4FT04SJ1-R Socket contact: ST-TMH-S-C1B-100-(A534G)	For contactor: CT160-3-TMH5B	Wire size: 0.3 mm² to 0.75 mm² (AWG 22 to 18) Cable OD: 5.3 mm to 6.5 mm Wire example: Fluorine resin wire (Vinyl jacket cable RMFES-A (CL3X) AWG 19, 4 cores Dyden Corporation (Note 2) or an equivalent product)

Notes: 1. The IP rating indicated is for the connector's protection against ingress of dust and water when coupled to a servo amplifier/servo motor/absolute position storage unit. If the IP rating of the servo amplifier/servo motor/absolute position storage unit differs from that of these connectors, overall IP rating depends on the lowest of all.
2. Contact Taisei Co., Ltd.
3. Contact Toa Electric Industrial Co., Ltd.

Rotary Rotary servo motor **Linear** Linear servo motor **Direct** Direct drive motor

Products on the Market for Servo Motors

Contact the relevant manufacturers directly. When fabricating a cable with the following connectors, refer to the relevant manufacturers' instruction manuals for wiring and assembling procedures.



Power connector for HG-SR/HG-JR/TM-RFM series **Rotary** **Direct**

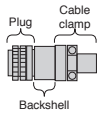
Applicable servo motor	Feature (Note 1)	Plug (with backshell) (DDK Ltd.)		Cable clamp (DDK Ltd.)	Applicable cable example	
		Type	Model	Model	Wire size (Note 3)	Cable OD [mm]
HG-SR51, 81, 52, 102, 152, 524, 1024, 1524/ HG-JR53, 73, 103, 153, 203, 534, 734, 1034, 1534, 2034, 3534, 5034/ TM-RFM012G20, 048G20, 072G20	IP67 EN compliant	Straight	CE05-6A18-10SD-D-BSS	CE3057-10A-2-D	2 mm² to 3.5 mm² (AWG 14 to 12)	8.5 to 11
				CE3057-10A-1-D		10.5 to 14.1
	General environment (Note 2)		D/MS3106B18-10S	D/MS3057-10A	2 mm² to 3.5 mm² (AWG 14 to 12)	14.3 or smaller (bushing ID)
HG-SR121, 201, 301, 202, 352, 502, 2024, 3524, 5024/ HG-JR353, 503/ TM-RFM040J10, 120J10	IP67 EN compliant		CE05-6A22-22SD-D-BSS	CE3057-12A-2-D	5.5 mm² to 8 mm² (AWG 10 to 8)	9.5 to 13
				CE3057-12A-1-D		12.5 to 16
	General environment (Note 2)		D/MS3106B22-22S	D/MS3057-12A	5.5 mm² to 8 mm² (AWG 10 to 8)	15.9 or smaller (bushing ID)
HG-SR421, 702, 7024/ HG-JR703, 903, 11K1M, 15K1M, 7034, 9034, 11K1M4, 15K1M4/ TM-RFM240J10	IP67 EN compliant		CE05-6A32-17SD-D-BSS	CE3057-20A-1-D	14 mm² to 22 mm² (AWG 6 to 4)	22 to 23.8
	General environment (Note 2)		D/MS3106B32-17S	D/MS3057-20A	14 mm² to 22 mm² (AWG 6 to 4)	23.8 or smaller (bushing ID)
HG-SR51, 81, 52, 102, 152, 524, 1024, 1524/ HG-JR53, 73, 103, 153, 203, 534, 734, 1034, 1534, 2034, 3534, 5034	IP67 EN compliant	Angle	CE05-8A18-10SD-D-BAS	CE3057-10A-2-D	2 mm² to 3.5 mm² (AWG 14 to 12)	8.5 to 11
				CE3057-10A-1-D		10.5 to 14.1
	General environment (Note 2)		D/MS3108B18-10S	D/MS3057-10A	2 mm² to 3.5 mm² (AWG 14 to 12)	14.3 or smaller (bushing ID)
HG-SR121, 201, 301, 202, 352, 502, 2024, 3524, 5024/ HG-JR353, 503	IP67 EN compliant		CE05-8A22-22SD-D-BAS	CE3057-12A-2-D	5.5 mm² to 8 mm² (AWG 10 to 8)	9.5 to 13
				CE3057-12A-1-D		12.5 to 16
	General environment (Note 2)		D/MS3108B22-22S	D/MS3057-12A	5.5 mm² to 8 mm² (AWG 10 to 8)	15.9 or smaller (bushing ID)
HG-SR421, 702, 7024/ HG-JR703, 903, 11K1M, 15K1M, 7034, 9034, 11K1M4, 15K1M4	IP67 EN compliant		CE05-8A32-17SD-D-BAS	CE3057-20A-1-D	14 mm² to 22 mm² (AWG 6 to 4)	22 to 23.8
	General environment (Note 2)		D/MS3108B32-17S	D/MS3057-20A	14 mm² to 22 mm² (AWG 6 to 4)	23.8 or smaller (bushing ID)

Notes: 1. The IP rating indicated is for the connector's protection against ingress of dust and water when coupled to a servo amplifier/servo motor. If the IP rating of the servo amplifier/servo motor differs from that of these connectors, overall IP rating depends on the lowest of all.
2. Not compliant with EN.
3. The wire size shows wiring specification of the connector. Refer to "Selection Example in HIV Wires for Servo Motors" in this catalog for examples of wire size selection.

Rotary Rotary servo motor **Linear** Linear servo motor **Direct** Direct drive motor

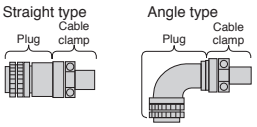
Products on the Market for Servo Motors

Contact the relevant manufacturers directly. When fabricating a cable with the following connectors, refer to the relevant manufacturers' instruction manuals for wiring and assembling procedures.



Power connector for HG-JR (11 kW and 15 kW) series (Note 4) Rotary

Applicable servo motor	Feature (Note 1)	Plug (DDK Ltd.)	Backshell (DDK Ltd.)		Cable clamp (DDK Ltd.)	Applicable cable example	
		Model	Type	Model	Model	Wire size (Note 2)	Cable OD [mm]
HG-JR11K1M, 15K1M, 11K1M4, 15K1M4	IP67	CE05-6A32-17SD-D	Straight	CE05-32BS-S-D-OB	CE3057-24A-1-D	22 mm² (AWG 4)	30 to 32.5
					CE3057-24A-2-D		27.5 to 29.6



Power connector for HG-RR/HG-UR series Rotary

Applicable servo motor	Feature (Note 1)	Plug (with backshell) (DDK Ltd.)		Cable clamp (DDK Ltd.)	Applicable cable example	
		Type	Model	Model	Wire size (Note 2)	Cable OD [mm]
HG-RR103, 153, 203/ HG-UR72, 152	IP67 EN compliant	Straight	CE05-6A22-23SD-D-BSS	CE3057-12A-2-D	2 mm² to 3.5 mm² (AWG 14 to 12)	9.5 to 13
				CE3057-12A-1-D		12.5 to 16
	General environment (Note 3)		D/MS3106B22-23S	D/MS3057-12A		15.9 or smaller (bushing ID)
HG-RR353, 503/ HG-UR202, 352, 502	IP67 EN compliant		CE05-6A24-10SD-D-BSS	CE3057-16A-2-D	5.5 mm² to 8 mm² (AWG 10 to 8)	13 to 15.5
				CE3057-16A-1-D		15 to 19.1
	General environment (Note 3)		D/MS3106B24-10S	D/MS3057-16A		19.1 or smaller (bushing ID)
HG-RR103, 153, 203/ HG-UR72, 152	IP67 EN compliant	Angle	CE05-8A22-23SD-D-BAS	CE3057-12A-2-D	2 mm² to 3.5 mm² (AWG 14 to 12)	9.5 to 13
				CE3057-12A-1-D		12.5 to 16
	General environment (Note 3)		D/MS3108B22-23S	D/MS3057-12A		15.9 or smaller (bushing ID)
HG-RR353, 503/ HG-UR202, 352, 502	IP67 EN compliant		CE05-8A24-10SD-D-BAS	CE3057-16A-2-D	5.5 mm² to 8 mm² (AWG 10 to 8)	13 to 15.5
				CE3057-16A-1-D		15 to 19.1
	General environment (Note 3)		D/MS3108B24-10S	D/MS3057-16A		19.1 or smaller (bushing ID)

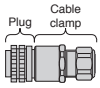
Notes: 1. The IP rating indicated is for the connector's protection against ingress of dust and water when coupled to a servo amplifier/servo motor. If the IP rating of the servo amplifier/servo motor differs from that of these connectors, overall IP rating depends on the lowest of all.
2. The wire size shows wiring specification of the connector. Refer to "Selection Example in HIV Wires for Servo Motors" in this catalog for examples of wire size selection.
3. Not compliant with EN.
4. This connector is usable only when the outer diameter of the cable used for HG-JR11K1M(4) and HG-JR15K1M(4) is larger than 23.8 mm.

Rotary Rotary servo motor Linear Linear servo motor Direct Direct drive motor

Products on the Market for Servo Motors

Contact the relevant manufacturers directly. When fabricating a cable with the following connectors, refer to the relevant manufacturers' instruction manuals for wiring and assembling procedures.

Power connector for TM-RFM series **Direct**



Applicable servo motor	Feature (Note 1)	Plug (DDK Ltd.)	Cable clamp (with backshell)			Applicable cable example	
			Type	Model	Manufacturer	Wire size (Note 2)	Cable OD [mm]
TM-RFM002C20, 004C20, 006C20, 006E20, 012E20, 018E20	IP67 EN compliant	CE05-6A14S-2SD-D	Straight	ACS-08RL-MS14F	Nippon Flex Co., Ltd.	0.3 mm² to 1.25 mm² (AWG 22 to 16)	4 to 8
				ACS-12RL-MS14F			8 to 12
				YSO14-5 to 8	Daiwa Dengyo Co., Ltd.		5 to 8.3
				YSO14-9 to 11			8.3 to 11.3
	General environment (Note 3)	D/MS3106B14S-2S	Straight	D/MS3057-6A	DDK Ltd.	0.3 mm² to 1.25 mm² (AWG 22 to 16)	7.9 or smaller (bushing ID)

Power connector for LM-F series **Linear**

Applicable servo motor	Feature (Note 1)	Cable receptacle (DDK Ltd.)	Cable clamp (DDK Ltd.)	Applicable cable example	
				Wire size (Note 2)	Cable OD [mm]
LM-FP2B, 2D, 2F	General environment (Note 3)	D/MS3101A18-10S	D/MS3057-10A	2 mm² to 3.5 mm² (AWG 14 to 12)	14.3 or smaller (bushing ID)
LM-FP4B, 4D, 4F, 4H, 5H	General environment (Note 3)	D/MS3101A24-22S	D/MS3057-16A	5.5 mm² to 8 mm² (AWG 10 to 8)	19.1 or smaller (bushing ID)

Notes: 1. The IP rating indicated is for the connector's protection against ingress of dust and water when coupled to a servo amplifier/servo motor. If the IP rating of the servo amplifier/servo motor differs from that of these connectors, overall IP rating depends on the lowest of all.
2. The wire size shows wiring specification of the connector. Refer to "Selection Example in HIV Wires for Servo Motors" in this catalog for examples of wire size selection.
3. Not compliant with EN.

Rotary Rotary servo motor **Linear** Linear servo motor **Direct** Direct drive motor

Products on the Market for Servo Motors

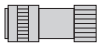
Contact the relevant manufacturers directly. When fabricating a cable with the following connectors, refer to the relevant manufacturers' instruction manuals for wiring and assembling procedures.

Electromagnetic brake connector for HG-KR/HG-MR series **Rotary**

Applicable servo motor	Feature (Note 1)	Connector (Japan Aviation Electronics Industry, Limited)	Crimping tool (Japan Aviation Electronics Industry, Limited)	Applicable cable example
HG-KR/ HG-MR	IP65	Plug: JN4FT02SJ1-R Socket contact: ST-TMH-S-C1B-100-(A534G)	For contactor: CT160-3-TMH5B	Wire size: 0.3 mm^2 to 0.5 mm^2 (AWG 22 to 20) Cable OD: 3.6 mm to 4.8 mm Wire example: Fluorine resin wire (Vinyl jacket cable RMFES-A (CL3X) AWG 20, 2 cores Dyden Corporation (Note 3) or an equivalent product)

Electromagnetic brake connector for HG-SR/ HG-JR (9 kW or smaller) series **Rotary**

Straight type



Angle type

Applicable servo motor	Feature (Note 1)	Connector (DDK Ltd.)				Applicable cable example
		Type	Type of connection	Plug	Socket contact	Cable OD [mm]
HG-SR/ HG-JR53B, 73B, 103B, 153B, 203B, 353B, 503B, 703B, 903B, 534B, 734B, 1034B, 1534B, 2034B, 3534B, 5034B, 7034B, 9034B	IP67	Straight	One-touch connection type	CMV1-SP2S-S	Select from solder or press bonding type. (Refer to the table below.)	4.0 to 6.0
				CMV1-SP2S-M1		5.5 to 7.5
				CMV1-SP2S-M2		7.0 to 9.0
				CMV1-SP2S-L		9.0 to 11.6
			Screw type	CMV1S-SP2S-S		4.0 to 6.0
				CMV1S-SP2S-M1		5.5 to 7.5
				CMV1S-SP2S-M2		7.0 to 9.0
				CMV1S-SP2S-L		9.0 to 11.6
		Angle	One-touch connection type	CMV1-AP2S-S		4.0 to 6.0
				CMV1-AP2S-M1		5.5 to 7.5
				CMV1-AP2S-M2		7.0 to 9.0
				CMV1-AP2S-L		9.0 to 11.6
			Screw type	CMV1S-AP2S-S		4.0 to 6.0
				CMV1S-AP2S-M1		5.5 to 7.5
				CMV1S-AP2S-M2		7.0 to 9.0
				CMV1S-AP2S-L		9.0 to 11.6

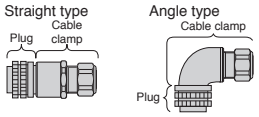
Contact	Socket contact (DDK Ltd.)	Wire size (Note 2)
Solder type	CMV1-#22BSC-S2-100	1.25 mm^2 (AWG 16) or smaller
Press bonding type	CMV1-#22BSC-C3-100	0.5 mm^2 to 1.25 mm^2 (AWG 20 to 16) Crimping tool (357J-53164T) is required.

Notes: 1. The IP rating indicated is for the connector's protection against ingress of dust and water when coupled to a servo amplifier/servo motor. If the IP rating of the servo amplifier/servo motor differs from that of these connectors, overall IP rating depends on the lowest of all.
2. The wire size shows wiring specification of the connector. Refer to "Selection Example in HIV Wires for Servo Motors" in this catalog for examples of wire size selection.
3. Contact Taisei Co., Ltd.

Rotary Rotary servo motor **Linear** Linear servo motor **Direct** Direct drive motor

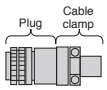
Products on the Market for Servo Motors

Contact the relevant manufacturers directly. When fabricating a cable with the following connectors, refer to the relevant manufacturers' instruction manuals for wiring and assembling procedures.



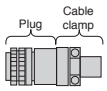
Electromagnetic brake connector for HG-JR (11 kW and 15 kW)/ HG-UR (2 kW or larger) series (IP67 rated) Rotary

Applicable servo motor	Feature (Note 1)	Plug (DDK Ltd.)	Cable clamp (with backshell)			Applicable cable example	
		Model	Type	Model	Manufacturer	Wire size (Note 2)	Cable OD [mm]
HG-JR11K1MB, 15K1MB, 11K1M4B, 15K1M4B/ HG-UR202B, 352B, 502B	IP67	D/MS3106A10SL-4S(D190)	Straight	ACS-08RL-MS10F	Nippon Flex Co., Ltd.	0.3 mm² to 1.25 mm² (AWG 22 to 16)	4 to 8
				ACS-12RL-MS10F			8 to 12
				YSO10-5 to 8	Daiwa Dengyo Co., Ltd.		5 to 8.3
			Angle	ACA-08RL-MS10F	Nippon Flex Co., Ltd.		4 to 8
				ACA-12RL-MS10F			8 to 12
				YLO10-5 to 8	Daiwa Dengyo Co., Ltd.		5 to 8.3



Electromagnetic brake connector for HG-JR (11 kW and 15 kW)/ HG-UR (2 kW or larger) series (general environment) Rotary

Applicable servo motor	Feature (Note 1)	Plug (with backshell) (DDK Ltd.)		Cable clamp (DDK Ltd.)	Applicable cable example	
		Type	Model	Model	Wire size (Note 2)	Cable OD [mm]
HG-JR11K1MB, 15K1MB, 11K1M4B, 15K1M4B/ HG-UR202B, 352B, 502B	General environment	Straight	D/MS3106A10SL-4S	D/MS3057-4A	0.3 mm² to 1.25 mm² (AWG 22 to 16)	5.6 or smaller (bushing ID)



Cooling fan power connector for HG-JR (22 kW) series Rotary

Applicable servo motor	Feature (Note 1)	Plug (with backshell) (DDK Ltd.)		Cable clamp (DDK Ltd.)	Applicable cable example	
		Type	Model	Model	Wire size (Note 2)	Cable OD [mm]
HG-JR22K1M, 22K1M4	IP67	Straight	CE05-6A14S-2SD-D-BSS	CE3057-6A-1-D	0.3 mm² to 1.25 mm² (AWG 22 to 16)	7.0 to 9.0

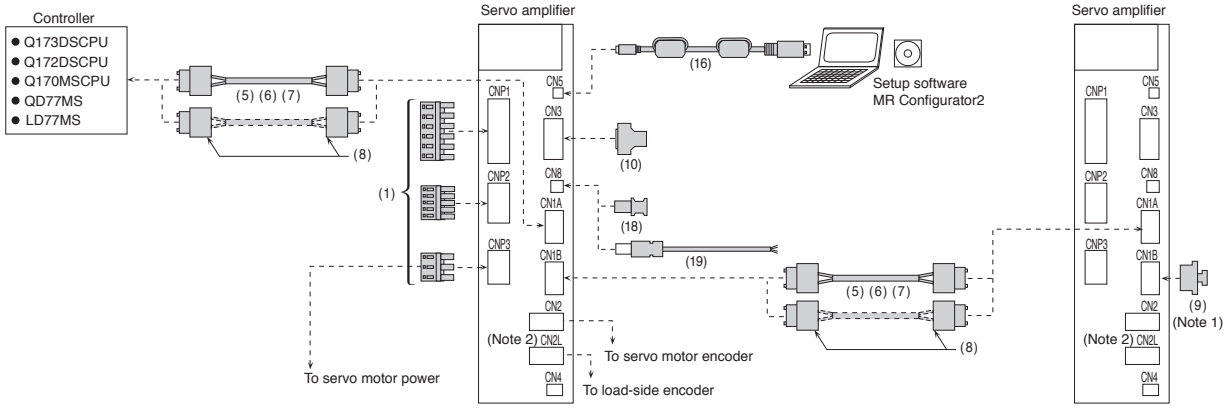
Notes: 1. The IP rating indicated is for the connector's protection against ingress of dust and water when coupled to a servo amplifier/servo motor. If the IP rating of the servo amplifier/servo motor differs from that of these connectors, overall IP rating depends on the lowest of all.
2. The wire size shows wiring specification of the connector. Refer to "Selection Example in HIV Wires for Servo Motors" in this catalog for examples of wire size selection.

Rotary Rotary servo motor **Linear** Linear servo motor **Direct** Direct drive motor

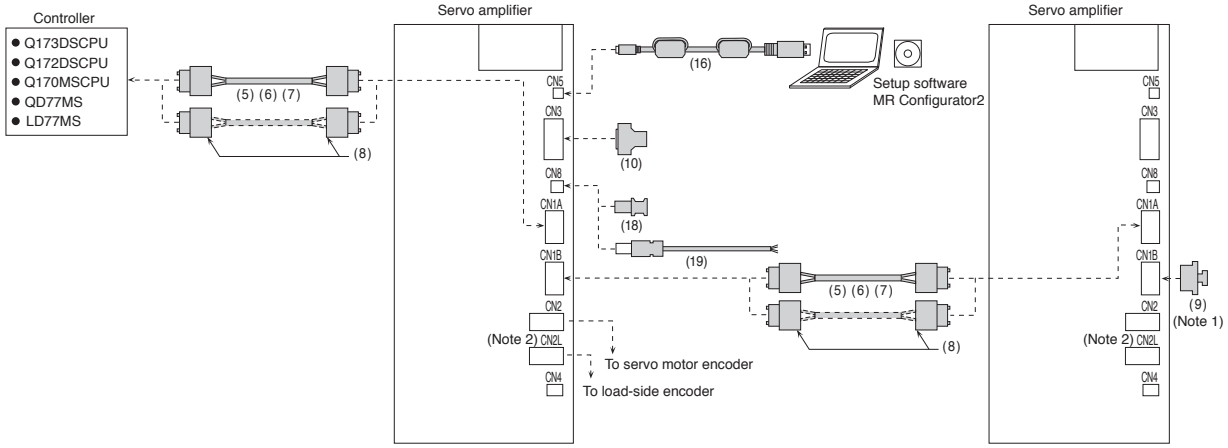
Configuration Example for MR-J4-B(-RJ)

B B-RJ

For 3.5 kW or smaller



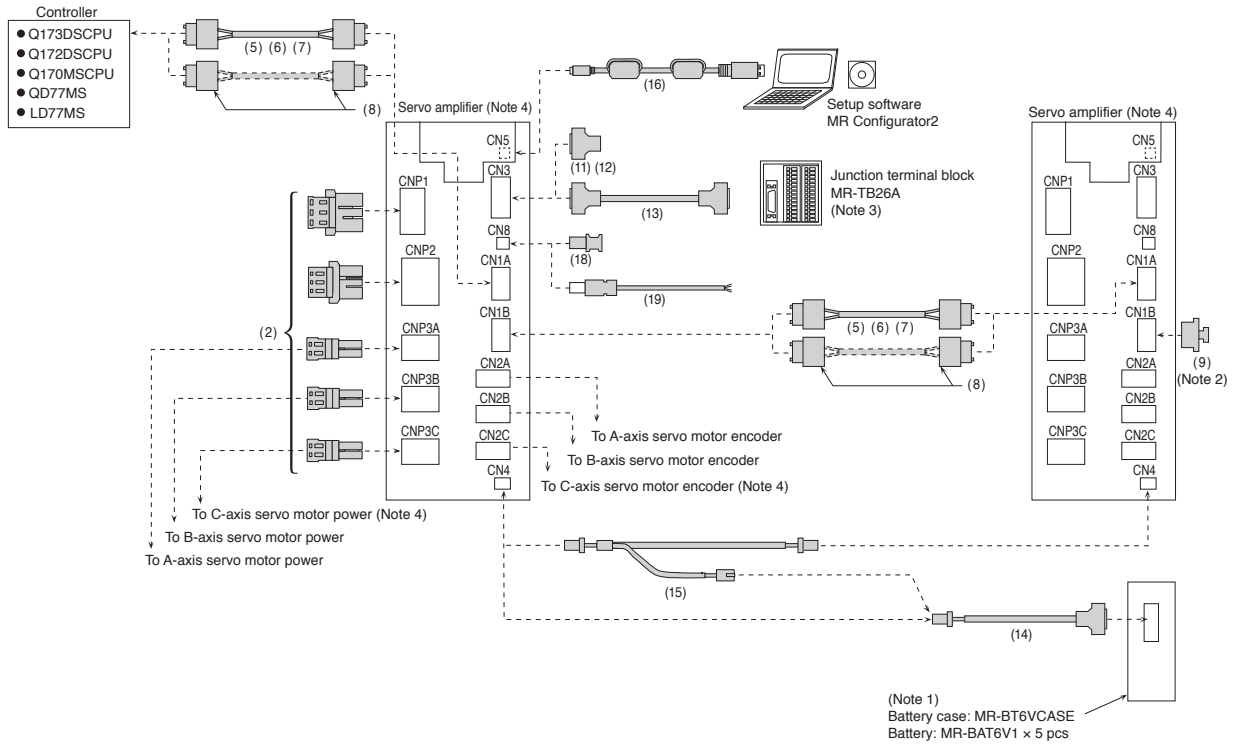
For 5 kW or larger



Notes: 1. Be sure to attach a cap to CN1B connector of the final axis.
2. CN2L connector is available for MR-J4-B-RJ servo amplifier.

Configuration Example for MR-J4W2-B and MR-J4W3-B

WB

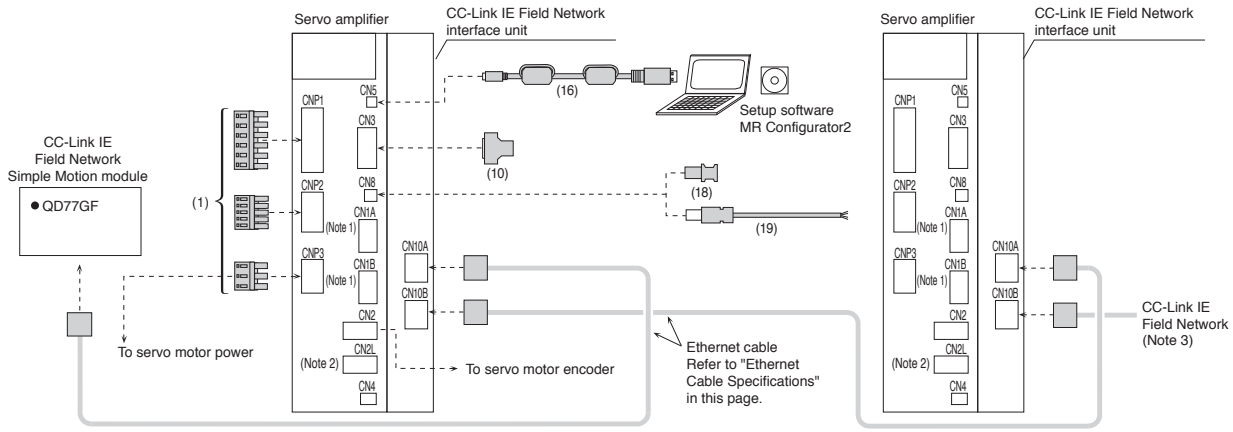


Notes: 1. MR-BT6VCASE and MR-BAT6V1 are not required when using the linear servo motor or when configuring incremental system with the MR-J4W_-B servo amplifier.
2. Be sure to attach a cap to CN1B connector of the final axis.
3. Refer to "Junction Terminal Block" in this catalog.
4. CNP3C and CN2C connectors are available for MR-J4W3-B servo amplifier.

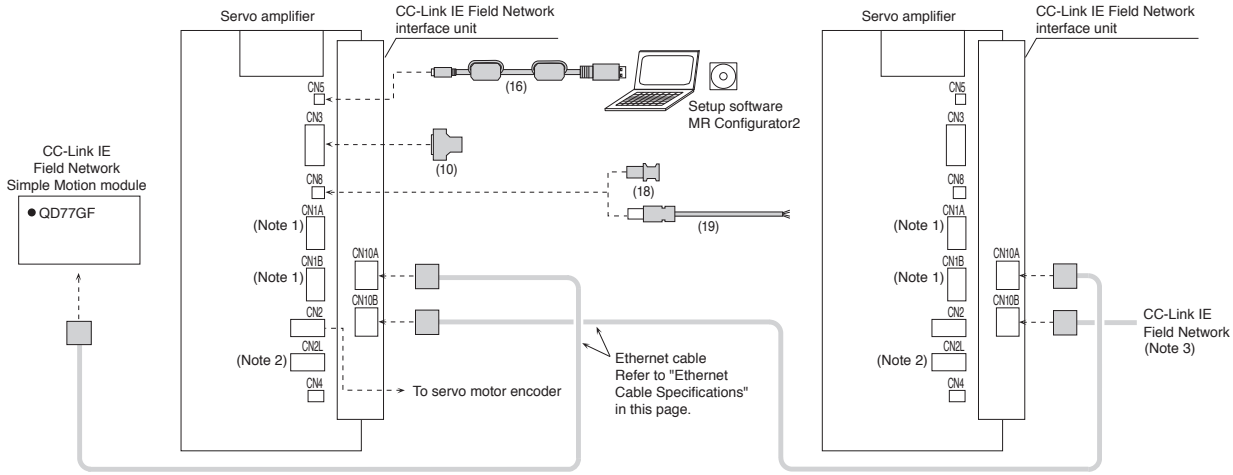
Configuration Example for MR-J4-B-RJ010

B-RJ010

For 3.5 kW or smaller



For 5 kW or larger



Notes: 1. This connector is not for use. Be sure to attach a cap supplied with the servo amplifier.
2. This connector is not for use.
3. When branching off CC-Link IE Field Network with a switching HUB, use DT135TX (Mitsubishi Electric System & Service Co., Ltd.).

Ethernet Cable Specifications (Note 1, 2)

Item		Description
Ethernet cable		Category 5e or higher, (double shielded/STP) straight cable
	Standard	The cable must meet either of the following standards: • IEEE802.3 1000BASE-T • ANSI/TIA/EIA-568-B (Category 5e)
	Connector	RJ-45 connector with shield

Notes: 1. Use wiring parts recommended by CC-Link Partner Association for wiring the CC-Link IE Field Network.
2. CC-Link IE Field Network cables are not compatible with CC-Link IE Controller Network.

[Products on the Market]

Ethernet Cable

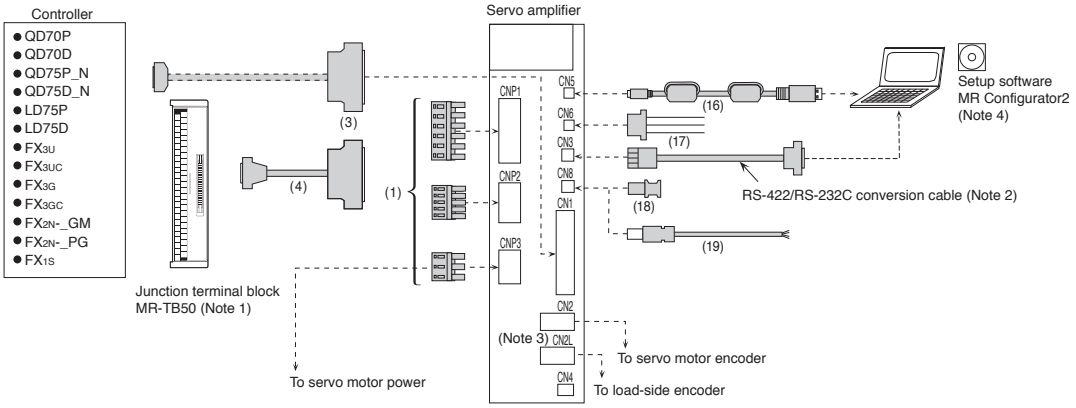
Item		Model		Note
Ethernet cable for CC-Link IE Field Network	For indoor	SC-E5EW-S_M	_: cable length (100 m max., unit of 1 m)	Double shielded cable (Category 5e) for CC-Link IE Field Network
	For moving part, indoor	SC-E5EW-S_M-MV	_: cable length (45 m max., unit of 1 m)	
	For indoor/outdoor	SC-E5EW-S_M-L	_: cable length (100 m max., unit of 1 m)	

For details, please contact Mitsubishi Electric System & Service Co., Ltd. OVERSEAS BUSINESS PROMOTION DIVISION (Email: osb.webmaster@melsc.jp)

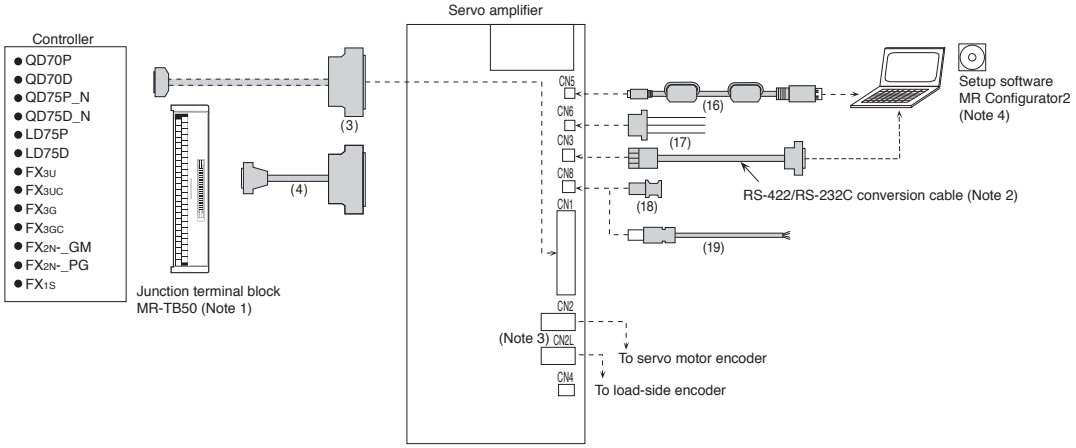
Configuration Example for MR-J4-A(-RJ)

A A-RJ

For 3.5 kW or smaller



For 5 kW or larger



Notes: 1. Refer to "Junction Terminal Block" in this catalog.
2. A conversion cable is required for using RS-422 serial communication function. Refer to "Products on the Market for Servo Amplifiers" in this catalog for the RS-422/RS-232C conversion cable.
3. CN2L connector is available for MR-J4-A-RJ servo amplifier.
4. MR Configurator2 supports only USB communication.

Cables and Connectors for Servo Amplifiers

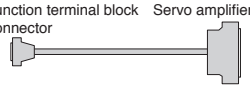
Refer to "Details of Optional Cables and Connectors for Servo Amplifiers" in this catalog for the detailed models.

		Item	Model	Cable length	IP rating	Application	Description
For CNP1/CNP2/CNP3	(1)	Servo amplifier power connector set (Note 1) (insertion type)	(Standard accessory)	-	-	For MR-J4-100B(-RJ) or smaller/ MR-J4-40B1(-RJ) or smaller/ MR-J4-100B-RJ010 or smaller/ MR-J4-100A(-RJ) or smaller/ MR-J4-40A1(-RJ) or smaller	CNP1 connector, CNP2 connector, CNP3 connector, Open tool  Applicable wire size (Note 2): AWG 18 to 14 Insulator OD: up to 3.9 mm
						For MR-J4-200B(-RJ)/ MR-J4-200B-RJ010/ MR-J4-200A(-RJ)/ MR-J4-350B(-RJ)/ MR-J4-350B-RJ010/ MR-J4-350A(-RJ)	CNP1 connector, CNP2 connector, CNP3 connector, Open tool  CNP1/CNP3 connector Applicable wire size (Note 2): AWG 16 to 10 Insulator OD: up to 4.7 mm CNP2 connector Applicable wire size (Note 2): AWG 18 to 14 Insulator OD: up to 3.9 mm
						For MR-J4-350B4(-RJ) or smaller/ MR-J4-350A4(-RJ) or smaller	CNP1 connector, CNP2 connector, CNP3 connector, Open tool  Applicable wire size (Note 2): AWG 16 to 14 Insulator OD: up to 3.9 mm
For CNP1/CNP2/CNP3_	(2)	Servo amplifier power connector set (Note 3) (insertion type)	(Standard accessory)	-	-	For MR-J4W2-B/ MR-J4W3-B	CNP1 connector  Applicable wire size (Note 2): AWG 16 to 14 Insulator OD: up to 4.2 mm CNP2 connector  Applicable wire size (Note 2): AWG 16 to 14 Insulator OD: up to 3.8 mm CNP3A/CNP3B/CNP3C connector, Open tool  Applicable wire size (Note 2): AWG 18 to 14 Insulator OD: up to 3.8 mm

Notes: 1. This connector set is not required for 5 kW or larger servo amplifiers since terminal blocks are mounted. Refer to servo amplifier dimensions in this catalog for details.
2. The wire size shows wiring specification of the connector. Refer to "Selection Example in HIV Wires for Servo Motors" in this catalog for examples of wire size selection.
3. Press bonding type is also available. Refer to "MR-J4W_-_B Servo Amplifier Instruction Manual" for details.

Cables and Connectors for Servo Amplifiers

Refer to "Details of Optional Cables and Connectors for Servo Amplifiers" in this catalog for the detailed models.

		Item	Model	Cable length	IP rating	Application	Description
For CN1	(3)	Connector set	MR-J3CN1	-	-	For MR-J4-A(-RJ)	 Servo amplifier connector
	(4)	Junction terminal block cable	MR-J2M-CN1TBL05M	0.5 m	-	For connecting MR-J4-A(-RJ) and MR-TB50	Junction terminal block connector Servo amplifier connector 
			MR-J2M-CN1TBL1M	1 m			
For controller/CN1A/CN1B	(5)	SSCNET III cable (Note 1) (standard cord inside cabinet) Compatible with SSCNET III(/H)	MR-J3BUS015M	0.15 m	-	For MR-J4-B(-RJ)/ MR-J4W2-B/ MR-J4W3-B	SSCNET III/(H) connector SSCNET III/(H) connector 
			MR-J3BUS03M	0.3 m	-		
			MR-J3BUS05M	0.5 m	-		
			MR-J3BUS1M	1 m	-		
			MR-J3BUS3M	3 m	-		
	(6)	SSCNET III cable (Note 1) (standard cable outside cabinet) Compatible with SSCNET III(/H)	MR-J3BUS5M-A	5 m	-	For MR-J4-B(-RJ)/ MR-J4W2-B/ MR-J4W3-B	
			MR-J3BUS10M-A	10 m	-		
			MR-J3BUS20M-A	20 m	-		
	(7)	SSCNET III cable (Note 1, 3) (long distance cable, long bending life) Compatible with SSCNET III(/H)	MR-J3BUS30M-B *1	30 m	-	For MR-J4-B(-RJ)/ MR-J4W2-B/ MR-J4W3-B	
			MR-J3BUS40M-B *1	40 m	-		
			MR-J3BUS50M-B *1	50 m	-		
	(8)	SSCNET III connector set (Note 1, 2) Compatible with SSCNET III(/H)	MR-J3BCN1	-	-	For MR-J4-B(-RJ)/ MR-J4W2-B/ MR-J4W3-B	SSCNET III/(H) connector SSCNET III/(H) connector 
For CN1B	(9)	SSCNET III connector cap Compatible with SSCNET III(/H)	(Standard accessory)	-	-	For MR-J4-B(-RJ)/ MR-J4W2-B/ MR-J4W3-B	

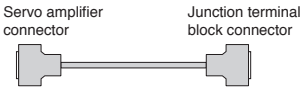
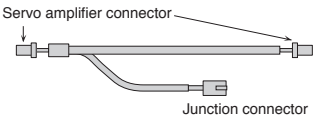
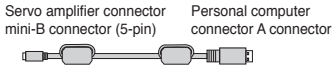
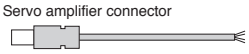
Notes: 1. Read carefully through the precautions enclosed with the options before use.
2. Dedicated tools are required. Contact your local sales office for more details.
3. When SSCNET III/H is used, refer to "Products on the Market for Servo Amplifiers" in this catalog for cables over 50 m or with ultra-long bending life.

For unlisted lengths

*1. For unlisted lengths of the cables, please contact Mitsubishi Electric System & Service Co., Ltd. OVERSEAS BUSINESS PROMOTION DIVISION (Email: osb.webmaster@melsc.jp)

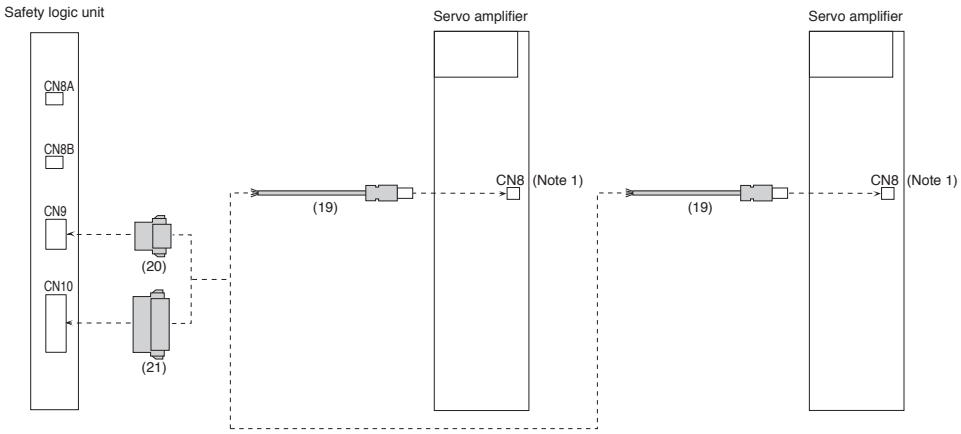
Cables and Connectors for Servo Amplifiers

Refer to "Details of Optional Cables and Connectors for Servo Amplifiers" in this catalog for the detailed models.

		Item	Model	Cable length	IP rating	Application	Description
For CN3	(10)	Connector set	MR-CCN1	-	-	For MR-J4-B(-RJ)/ MR-J4-B-RJ010	 Servo amplifier connector
	(11)	Connector set (Qty: 1 pc)	MR-J2CMP2	-	-	For MR-J4W2-B/ MR-J4W3-B	 Servo amplifier connector
	(12)	Connector set (Qty: 20 pcs)	MR-ECN1	-	-	For MR-J4W2-B/ MR-J4W3-B	
	(13)	Junction terminal block cable	MR-TBNATBL05M	0.5 m	-	For connecting MR-J4W2-B/ MR-J4W3-B and MR-TB26A	 Servo amplifier connector; Junction terminal block connector
			MR-TBNATBL1M	1 m			
For CN4	(14)	Battery cable	MR-BT6V1CBL03M	0.3 m	-	For connecting MR-J4W2-B/ MR-J4W3-B and MR-BT6VCASE	 Servo amplifier connector; Battery case connector
			MR-BT6V1CBL1M	1 m			
	(15)	Junction battery cable	MR-BT6V2CBL03M	0.3 m	-	For MR-J4W2-B/ MR-J4W3-B	 Servo amplifier connector; Junction connector
			MR-BT6V2CBL1M	1 m			
For CN5	(16)	Personal computer communication cable (USB cable)	MR-J3USBCBL3M	3 m	-	For MR-J4-B(-RJ)/ MR-J4-B-RJ010/ MR-J4-A(-RJ)/ MR-J4W2-B/ MR-J4W3-B	 Servo amplifier connector mini-B connector (5-pin); Personal computer connector A connector; * Do not use this cable for SSCNET III(/H) compatible controller.
For CN6	(17)	Monitor cable	MR-J3CN6CBL1M	1 m	-	For MR-J4-A(-RJ)	 Servo amplifier connector
For CN8	(18)	Short-circuit connector	(Standard accessory)	-	-	For MR-J4-B(-RJ)/ MR-J4-B-RJ010/ MR-J4-A(-RJ)/ MR-J4W2-B/ MR-J4W3-B	 This connector is required when the STO function is not used.
	(19)	STO cable	MR-D05UDL3M-B	3 m	-	For connecting servo amplifier with MR-J3-D05 or other safety control device	 Servo amplifier connector

Configuration Example for MR-J3-D05 (For MR-J4-B(-RJ/-RJ010)/A(-RJ), MR-J4W_-B)

B | B-RJ | WB | B-RJ010 | A | A-RJ



Cables and Connectors for MR-J3-D05

Refer to "Details of Optional Cables and Connectors for MR-J3-D05" in this catalog for the detailed models.

		Item	Model	Cable length	IP rating	Application	Description
For CN8	(19)	STO cable	MR-D05UDL3M-B	3 m	-	For connecting servo amplifier with MR-J3-D05 or other safety control device	Servo amplifier connector
For CN9	(20)	Connector	(Standard accessory of MR-J3-D05)	-	-	For MR-J3-D05	Safety logic unit connector
For CN10	(21)	Connector	(Standard accessory of MR-J3-D05)	-	-	For MR-J3-D05	Safety logic unit connector

Notes: 1. Be sure to attach a short-circuit connector supplied with the servo amplifier when the STO function is not used.

Details of Optional Cables and Connectors for Servo Amplifiers

Model	CNP1 connector	CNP2 connector	CNP3 connector	Open tool
Servo amplifier power connector set For MR-J4-100B(-RJ) or smaller/ MR-J4-40B1(-RJ) or smaller MR-J4-100B-RJ010 or smaller/ MR-J4-100A(-RJ) or smaller/ MR-J4-40A1(-RJ) or smaller (Standard accessory)	 06JFAT-SAXGDK-H7.5 (J.S.T. Mfg. Co., Ltd.)	 05JFAT-SAXGDK-H5.0 (J.S.T. Mfg. Co., Ltd.)	 03JFAT-SAXGDK-H7.5 (J.S.T. Mfg. Co., Ltd.)	 J-FAT-OT (J.S.T. Mfg. Co., Ltd.)

Model	CNP1 connector	CNP2 connector	CNP3 connector	Open tool
Servo amplifier power connector set For MR-J4-200B(-RJ)/ MR-J4-200B-RJ010/ MR-J4-200A(-RJ)/ MR-J4-350B(-RJ)/ MR-J4-350B-RJ010/ MR-J4-350A(-RJ) (Standard accessory)	 06JFAT-SAXGFK-XL (J.S.T. Mfg. Co., Ltd.)	 05JFAT-SAXGDK-H5.0 (J.S.T. Mfg. Co., Ltd.)	 03JFAT-SAXGFK-XL (J.S.T. Mfg. Co., Ltd.)	 J-FAT-OT-EXL (J.S.T. Mfg. Co., Ltd.)

Model	CNP1 connector	CNP2 connector	CNP3 connector	Open tool
Servo amplifier power connector set For MR-J4-350B4(-RJ)/ MR-J4-350A4(-RJ) (Standard accessory)	 06JFAT-SAXGDK-HT10.5 (J.S.T. Mfg. Co., Ltd.)	 05JFAT-SAXGDK-HT7.5 (J.S.T. Mfg. Co., Ltd.)	 03JFAT-SAXGDK-HT10.5 (J.S.T. Mfg. Co., Ltd.)	 J-FAT-OT-XL (J.S.T. Mfg. Co., Ltd.)

Model	CNP1 connector	CNP2 connector	CNP3A/B/C connector	Open tool
Servo amplifier power connector set For MR-J4W2-B/MR-J4W3-B (Standard accessory)	 03JFAT-SAXGFK-43 (J.S.T. Mfg. Co., Ltd.)	 06JFAT-SAXYGG-F-KK (J.S.T. Mfg. Co., Ltd.)	 04JFAT-SAGG-G-KK (J.S.T. Mfg. Co., Ltd.)	 J-FAT-OT-EXL (J.S.T. Mfg. Co., Ltd.)

Model	Servo amplifier connector
MR-J3CN1	 Connector: 10150-3000PE Shell kit: 10350-52F0-008 (3M) or an equivalent product

Model	Junction terminal block connector	Servo amplifier connector
MR-J2M-CN1TBL_M	 Connector: D7950-B500FL (3M)	 Press bonding type (Note 1) Connector: 10150-6000EL Shell kit: 10350-3210-000 (3M)

Model	SSCNET III(/H) connector	SSCNET III(/H) connector
MR-J3BUS_M MR-J3BUS_M-A MR-J3BCN1	 Connector: PF-2D103 (Japan Aviation Electronics Industry, Limited)	 Connector: PF-2D103 (Japan Aviation Electronics Industry, Limited)

Notes: 1. Solder type (connector: 10150-3000PE and shell kit: 10350-52F0-008) (3M) is also usable. Contact the manufacturer directly.

Details of Optional Cables and Connectors for Servo Amplifiers

Model	SSCNET III(/H) connector	SSCNET III(/H) connector
MR-J3BUS_M-B	 Connector: CF-2D103-S (Japan Aviation Electronics Industry, Limited)	 Connector: CF-2D103-S (Japan Aviation Electronics Industry, Limited)

Model	Servo amplifier connector
MR-CCN1	 Solder type (Note 1) Connector: 10120-3000PE Shell kit: 10320-52F0-008 (3M) or an equivalent product

Model	Servo amplifier connector	Junction terminal block connector
MR-J2HBUS_M	 Connector: 52316-2019 Shell kit: 52370-2070 (Molex) or an equivalent product or Press bonding type (Note 2) Connector: 10120-6000EL Shell kit: 10320-3210-000 (3M) or an equivalent product	 Connector: 52316-2019 Shell kit: 52370-2070 (Molex) or an equivalent product or Press bonding type (Note 2) Connector: 10120-6000EL Shell kit: 10320-3210-000 (3M) or an equivalent product

Model	Servo amplifier connector
MR-J2CMP2 MR-ECN1	 Connector: 10126-3000PE Shell kit: 10326-52F0-008 (3M) or an equivalent product

Model	Servo amplifier connector	Junction terminal block connector
MR-TBNATBL_M	 Connector: 10126-6000EL Shell kit: 10326-3210-000 (3M) or an equivalent product	 Connector: 10126-6000EL Shell kit: 10326-3210-000 (3M) or an equivalent product

Model	Servo amplifier connector	Battery case connector
MR-BT6V1CBL_M	 Contact: SPHD-001G-P0.5 Housing: PAP-02V-0 (J.S.T. Mfg. Co., Ltd.)	 Solder type (Note 3) Connector: 10114-3000PE Shell kit: 10314-52F0-008 (3M) or an equivalent product

Model	Servo amplifier connector	Junction connector
MR-BT6V2CBL_M	 Contact: SPHD-001G-P0.5 Housing: PAP-02V-0 (J.S.T. Mfg. Co., Ltd.)	 Contact: SPAL-001GU-P0.5 Housing: PALR-02VF-O (J.S.T. Mfg. Co., Ltd.)

Model	Servo amplifier connector
MR-J3CN6CBL1M	 Housing: 51004-0300 Terminal: 50011-8100 (Molex)

Notes: 1. Press bonding type (connector: 10120-6000EL and shell kit: 10320-3210-000) (3M) is also usable. Contact the manufacturer directly.
2. Solder type (connector: 10120-3000PE and shell kit: 10320-52F0-008) (3M) is also usable. Contact the manufacturer directly.
3. Press bonding type (connector: 10140-6000EL and shell kit: 10314-3210-000) (3M) is also usable. Contact the manufacturer directly.

Details of Optional Cables and Connectors for MR-J3-D05

Model	Servo amplifier connector
MR-D05UDL3M-B	 Connector set: 2069250-1 (TE Connectivity Ltd. Company)

Model	Safety logic unit connector
Connector for CN9 of safety logic unit (Standard accessory of MR-J3-D05)	 Connector: 1-1871940-4 (TE Connectivity Ltd. Company)

Model	Safety logic unit connector
Connector for CN10 of safety logic unit (Standard accessory of MR-J3-D05)	 Connector: 1-1871940-8 (TE Connectivity Ltd. Company)

Products on the Market for Servo Amplifiers

Contact the relevant manufacturers directly. When fabricating a cable with the following connectors, refer to the relevant manufacturers' instruction manuals for wiring and assembling procedures.

Personal computer communication cable

A A-RJ

Application	Model	Description
RS-422/RS-232C conversion cable	DSV-CABV	Servo amplifier connector — Personal computer connector — Diatrend Corp.

RS-422 connector

A A-RJ

Application	Model	Description
RS-422 connector	TM10P-88P	Hirose Electric Co., Ltd.

RS-422 branch connector (for multi-drop)

A A-RJ

Application	Model	Description
Branch connector	BMJ-8	Hachiko Electric Co., Ltd.

SSCNET III cable

B B-RJ WB

Application	Model	Description
Ultra-long bending life fiber-optic cable for SSCNET III(/H)	SC-J3BUS_M-C _ = cable length (100 m max. (Note 1), unit of 1 m)	Mitsubishi Electric System & Service Co., Ltd.

Notes: 1. The maximum wiring distance between stations is 100 m for SSCNET III/H and 50 m for SSCNET III.

Products on the Market for MR-J4W_-B

WB

Contact Mitsubishi Electric System & Service Co., Ltd. for power cables with a press bonding type connector for MR-J4W_-B servo amplifiers and power cables for servo motors.

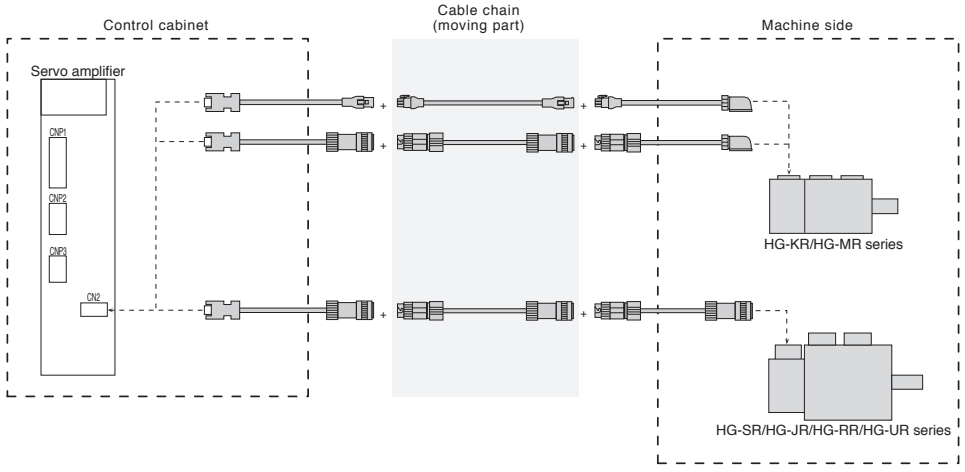
Application of connecting encoder junction cable

B B-RJ WB B-RJ010 A A-RJ

Unlisted lengths of cables between servo amplifier and servo motor, EMC cables, and special cables for connecting servo amplifier and servo motor with multiple cables are available. Please contact Mitsubishi Electric System & Service Co., Ltd. OVERSEAS BUSINESS PROMOTION DIVISION (Email: osb.webmaster@melsc.jp)

Example) Configuration using three encoder junction cables

- Replacing only the cable of the moving part in the cable chain is possible.
- Resetting after transporting a machine is easy because the servo amplifier side and the servo motor side can be separated.



Safety Logic Unit (MR-J3-D05)

B B-RJ WB B-RJ010 A A-RJ

The safety logic unit has SS1 and STO functions. Servo amplifier achieves Safe stop 1 (SS1) function by adding the MR-J3-D05.

Specifications

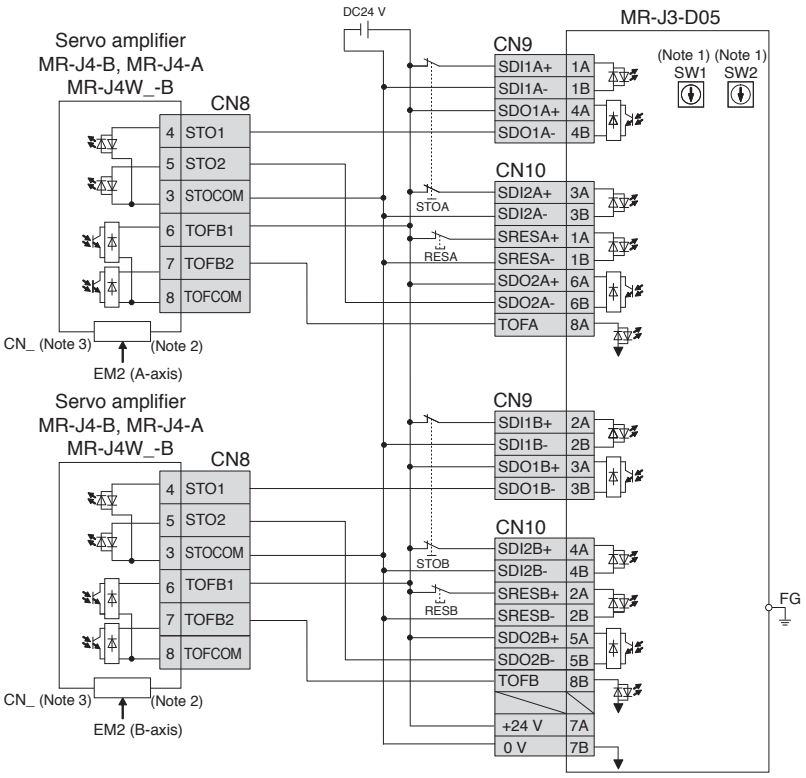
Safety logic unit model		MR-J3-D05
Control circuit power supply	Voltage	24 V DC
	Permissible voltage fluctuation	24 V DC ± 10%
	Required current capacity [A]	0.5 (Note 1, 2)
Compatible system		2 systems (A-axis, B-axis independent)
Shut-off input		4 points (2 points × 2 systems) SDI_ : source/sink compatible (Note 3)
Shut-off release input		2 points (1 point × 2 systems) SRES_ : source/sink compatible (Note 3)
Feedback input		2 points (1 point × 2 systems) TOF_ : source compatible (Note 3)
Input type		Photocoupler insulation, 24 V DC (external supply), internal limited resistance 5.4 kΩ
Shut-off output		8 points (4 points × 2 systems) STO_ : source compatible (Note 3) SDO_ : source/sink compatible (Note 3)
Output type		Photocoupler insulation, open-collector type Permissible current: 40 mA or less per output, Inrush current: 100 mA or less per output
Delay time setting		A-axis: select from 0 s, 1.4 s, 2.8 s, 5.6 s, 9.8 s or 30.8 s B-axis: select from 0 s, 1.4 s, 2.8 s, 9.8 s or 30.8 s Accuracy: ±2%
Functional safety		STO, SS1 (IEC/EN 61800-5-2) EMG STOP, EMG OFF (IEC/EN 60204-1)
Safety performance	Standards certified by CB	EN ISO 13849-1 Category 3 PL d, IEC 61508 SIL 2, EN 62061 SIL CL 2, EN 61800-5-2 SIL 2
	Response performance (when delay time is set to 0 s) (Note 4)	10 ms or less (STO input OFF → shut-off output OFF)
	Mean time to dangerous failure (MTTFd)	516 years
	Average diagnostic coverage (DC_{avg})	93.1%
	Probability of dangerous Failure per Hour (PFH)	4.75×10^{-9} [1/h]
Compliance to standards	CE marking	LVD: EN 61800-5-1 EMC: EN 61800-3 MD: EN ISO 13849-1, EN 61800-5-2, EN 62061
Structure (IP rating)		Natural cooling, open (IP00)
Environment	Ambient temperature	0 °C to 55 °C (non-freezing), storage: -20 °C to 65 °C (non-freezing)
	Ambient humidity	90 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)
	Ambience	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust
	Altitude	1000 m or less above sea level
	Vibration resistance	5.9 m/s^2 at 10 Hz to 55 Hz (directions of X, Y and Z axes)
Mass [kg]		0.2 (including CN9 and CN10 connectors)

Notes: 1. Inrush current of approximately 1.5 A flows instantaneously when the power is switched on. Select an appropriate capacity of a power supply considering the inrush current.
2. Power-on duration of the safety logic unit is 100,000 times.
3. _ in signal name represents a symbol which indicates a number and axis name.
4. Contact your local sales office for test pulse input.

Safety Logic Unit (MR-J3-D05)

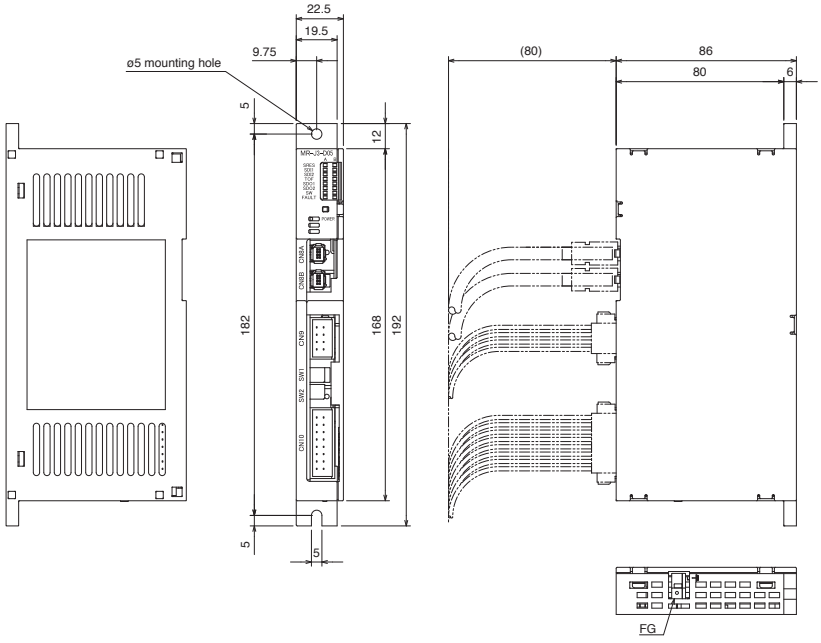
B | B-RJ | WB | B-RJ010 | A | A-RJ

Connection example



Notes: 1. Set delay time of STO output with SW1 and SW2.
2. This connection is for source interface.
3. This connector is CN3 for MR-J4-B and MR-J4W_-B, and CN1 for MR-J4-A.

Dimensions



Mounting screw size: M4

[Unit: mm]

Regenerative Option

B | B-RJ | WB | B-RJ010 | A | A-RJ

200 V/100 V

Servo amplifier model	Tolerable regenerative power [W]																	
	Built-in regenerative resistor	External regenerative resistor (standard accessory) (Note 4)			Regenerative option (Note 4)													
		GRZG400-			MR-RB													
		0.8 Ω × 4 (Note 2)	0.6 Ω × 5 (Note 2)	0.5 Ω × 5 (Note 2)	032	12	30	3N	31	32	50 (Note 1)	5N (Note 1)	51 (Note 1)	5R (Note 2)	9F (Note 2)	9T (Note 2)	14	34
		40 Ω	40 Ω	13 Ω	9 Ω	6.7 Ω	40 Ω	13 Ω	9 Ω	6.7 Ω	3.2 Ω	3 Ω	2.5 Ω	26 Ω	26 Ω			
MR-J4-10B(1)/A(1)	-	-	-	-	30	-	-	-	-	-	-	-	-	-	-	-	-	-
MR-J4-20B(1)/A(1)	10	-	-	-	30	100	-	-	-	-	-	-	-	-	-	-	-	-
MR-J4-40B(1)/A(1)	10	-	-	-	30	100	-	-	-	-	-	-	-	-	-	-	-	-
MR-J4-60B/A	10	-	-	-	30	100	-	-	-	-	-	-	-	-	-	-	-	-
MR-J4-70B/A	20	-	-	-	30	100	-	-	-	300	-	-	-	-	-	-	-	-
MR-J4-100B/A	20	-	-	-	30	100	-	-	-	300	-	-	-	-	-	-	-	-
MR-J4-200B/A	100	-	-	-	-	-	300	-	-	-	500	-	-	-	-	-	-	-
MR-J4-350B/A	100	-	-	-	-	-	-	300	-	-	-	500	-	-	-	-	-	-
MR-J4-500B/A	130	-	-	-	-	-	-	-	300	-	-	-	500	-	-	-	-	-
MR-J4-700B/A	170	-	-	-	-	-	-	-	300	-	-	-	500	-	-	-	-	-
MR-J4-11KB/A	-	500 (800)	-	-	-	-	-	-	-	-	-	-	-	500 (800)	-	-	-	-
MR-J4-15KB/A	-	-	850 (1300)	-	-	-	-	-	-	-	-	-	-	-	850 (1300)	-	-	-
MR-J4-22KB/A	-	-	-	850 (1300)	-	-	-	-	-	-	-	-	-	-	-	850 (1300)	-	-
MR-J4W2-22B	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100	-
MR-J4W2-44B	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100	-
MR-J4W2-77B	100	-	-	-	-	-	-	300	-	-	-	-	-	-	-	-	-	-
MR-J4W2-1010B	100	-	-	-	-	-	-	300	-	-	-	-	-	-	-	-	-	-
MR-J4W3-222B	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100	300
MR-J4W3-444B	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100	300

400 V

Servo amplifier model	Tolerable regenerative power [W]												
	Built-in regenerative resistor	External regenerative resistor (standard accessory) (Note 4)		Regenerative option (Note 4)									
		GRZG400-		MR-RB									
		2.5 Ω × 4 (Note 2)	2 Ω × 5 (Note 2)	1H-4	3M-4 (Note 1)	3G-4 (Note 1)	34-4 (Note 1)	3U-4 (Note 1)	5G-4 (Note 1)	54-4 (Note 1)	5U-4 (Note 1)	5K-4 (Note 2)	6K-4 (Note 2)
				82 Ω	120 Ω	47 Ω	26 Ω	22 Ω	47 Ω	26 Ω	22 Ω	10 Ω	10 Ω
MR-J4-60B4/A4	15	-	-	100	300	-	-	-	-	-	-	-	-
MR-J4-100B4/A4	15	-	-	100	300	-	-	-	-	-	-	-	-
MR-J4-200B4/A4	100	-	-	-	-	300	-	-	500	-	-	-	-
MR-J4-350B4/A4	100	-	-	-	-	300	-	-	500	-	-	-	-
MR-J4-500B4/A4	130 (Note 3)	-	-	-	-	-	300	-	-	500	-	-	-
MR-J4-700B4/A4	170 (Note 3)	-	-	-	-	-	-	300	-	-	500	-	-
MR-J4-11KB4/A4	-	500 (800)	-	-	-	-	-	-	-	-	-	500 (800)	-
MR-J4-15KB4/A4	-	-	850 (1300)	-	-	-	-	-	-	-	-	-	850 (1300)
MR-J4-22KB4/A4	-	-	850 (1300)	-	-	-	-	-	-	-	-	-	850 (1300)

Notes: 1. Be sure to cool the unit forcibly with a cooling fan (92 mm × 92 mm, minimum air flow: 1.0 m^3/min). The cooling fan must be prepared by user.
2. The value in brackets is applicable when cooling fans (2 units of 92 mm × 92 mm, minimum air flow: 1.0 m^3/min) are installed, and then [Pr. PA02] is changed.
3. The servo amplifier built-in regenerative resistor is compatible with the maximum torque deceleration when the servo motor is used within the rated speed and the recommended load to motor inertia ratio. Contact your local sales office if the operating motor speed or the load to motor inertia ratio exceeds the rated speed or the recommended ratio.
4. The power values in this table are resistor-generated powers, not rated powers.

* Cautions when connecting the regenerative option

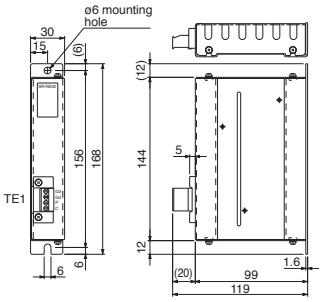
1. The regenerative option causes a temperature rise of 100 °C or higher relative to the ambient temperature. Fully examine heat dissipation, installation position, wires used before installing the unit. Use flame-retardant wires or apply flame retardant on wires, and keep the wires clear of the unit.
2. Use twisted wires for connecting the regenerative option to the servo amplifier, and keep the wire length to a maximum of 5 m.
3. Use twisted wires for connecting a thermal sensor, and make sure that the sensor does not fail to work properly due to inducted noise.

Regenerative Option

B | B-RJ | WB | B-RJ010 | A | A-RJ

[Unit: mm]

MR-RB032 (for 200 V/100 V)



Terminal arrangement

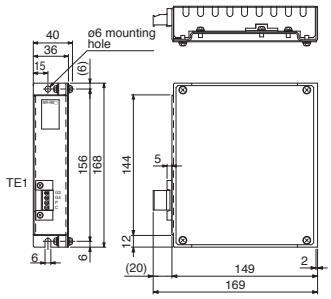
TE1

G3
G4
P
C

Applicable wire size (Note 3):
0.2 mm² to 2.5 mm² (AWG 24 to 12)
Mounting screw size: M5

Model	Mass [kg]
MR-RB032	0.5

MR-RB12(for 200 V/100 V), MR-RB14 (for 200 V)



Terminal arrangement

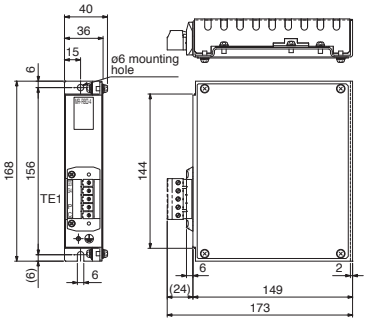
TE1

G3
G4
P
C

Applicable wire size (Note 3):
0.2 mm² to 2.5 mm² (AWG 24 to 12)
Mounting screw size: M5

Model	Mass [kg]
MR-RB12 MR-RB14	1.1

MR-RB1H-4 (for 400 V)



Terminal arrangement

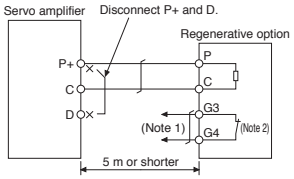
TE1

G3
G4
P
C

Applicable wire size (Note 3):
0.2 mm² to 4.0 mm² (AWG 24 to 10)
Mounting screw size: M5

Model	Mass [kg]
MR-RB1H-4	1.1

Connections



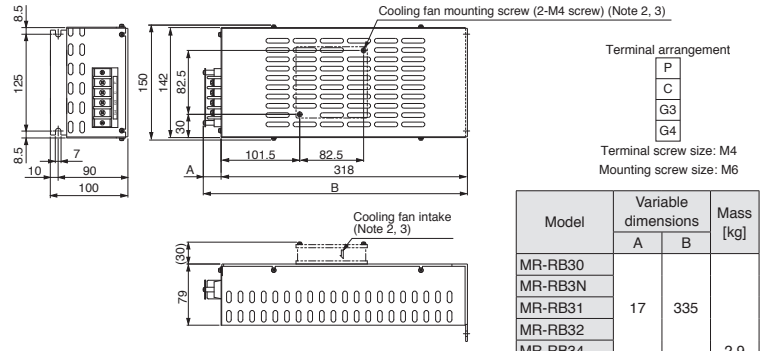
Notes: 1. Create a sequence circuit that turns off the magnetic contactor when abnormal overheating occurs.
2. G3 and G4 terminals are thermal sensor. G3-G4 opens when the regenerative option overheats abnormally.
3. The wire size shows wiring specification of the connector. Refer to "Wires, Molded-Case Circuit Breakers and Magnetic Contactors" in this catalog for examples of wire size selection.

Regenerative Option

B | B-RJ | WB | B-RJ010 | A | A-RJ

Dimensions [Unit: mm]

MR-RB30, MR-RB3N, MR-RB31, MR-RB32, MR-RB34 (for 200 V)
MR-RB3M-4, MR-RB3G-4, MR-RB34-4, MR-RB3U-4 (for 400 V)



Terminal arrangement

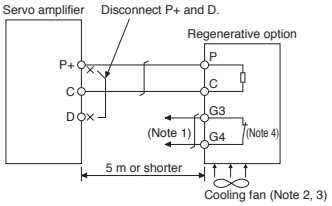
P
C
G3
G4

Terminal screw size: M4
Mounting screw size: M6

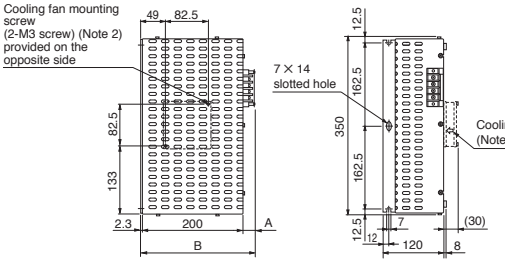
Model	Variable dimensions A	Variable dimensions B	Mass [kg]
MR-RB30	17	335	2.9
MR-RB31			
MR-RB32			
MR-RB34			
MR-RB3M-4	23	341	
MR-RB3G-4			
MR-RB34-4			
MR-RB3U-4			

Connections

For MR-J4-500B/A or smaller,
MR-J4-350B4/A4 or smaller, and MR-J4W_-B



MR-RB50, MR-RB5N, MR-RB51 (for 200 V)
MR-RB5G-4, MR-RB54-4, MR-RB5U-4 (for 400 V)



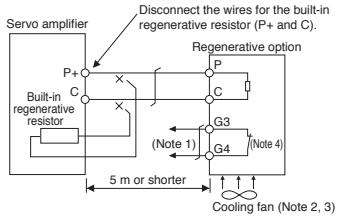
Terminal arrangement

P
C
G3
G4

Terminal screw size: M4
Mounting screw size: M6

Model	Variable dimensions A	Variable dimensions B	Mass [kg]
MR-RB50	17	217	5.6
MR-RB5N			
MR-RB51			
MR-RB5G-4	23	223	
MR-RB54-4			
MR-RB5U-4			

For MR-J4-500B4/A4 and
MR-J4-700B(4)/A(4)



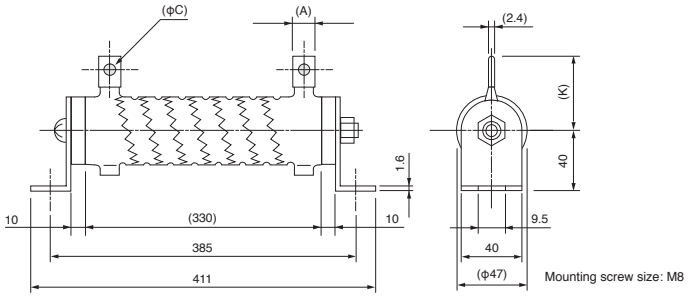
Notes: 1. Create a sequence circuit that turns off the magnetic contactor when abnormal overheating occurs.
2. When using MR-RB3M-4, MR-RB3G-4, MR-RB34-4, MR-RB3U-4, MR-RB50, MR-RB5N, MR-RB51, MR-RB5G-4, MR-RB54-4, or MR-RB5U-4, cool the unit forcibly with a cooling fan (92 mm × 92 mm, minimum air flow: 1.0 m³/min). The cooling fan must be prepared by user.
3. When using MR-RB30, MR-RB3N, MR-RB31, MR-RB32, or MR-RB34, it may be necessary to cool the unit forcibly with a cooling fan (92 mm × 92 mm, minimum air flow: 1.0 m³/min), depending on the operating environment. Refer to relevant Servo Amplifier Instruction Manual for details. The cooling fan must be prepared by user.
4. G3 and G4 terminals are thermal sensor. G3-G4 opens when the regenerative option overheats abnormally.

Regenerative Option

B | B-RJ | B-RJ010 | A | A-RJ

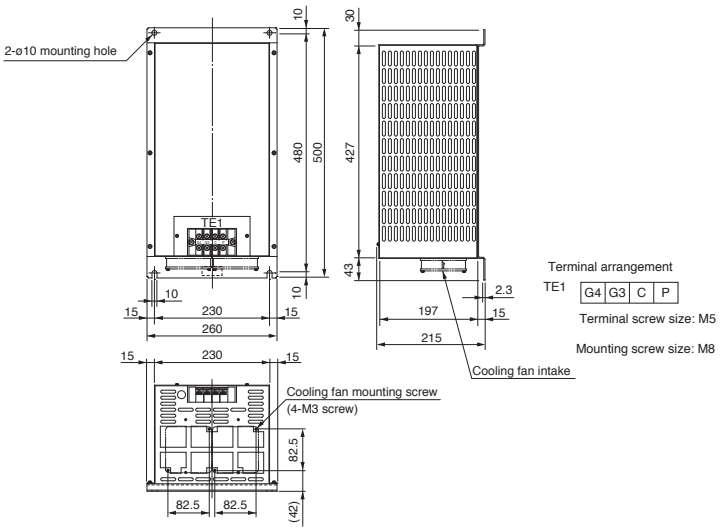
Dimensions [Unit: mm]

Standard accessory (Note 1)
GRZG400-0.8Ω, GRZG400-0.6Ω, GRZG400-0.5Ω (for 200 V)
GRZG400-2.5Ω, GRZG400-2Ω (for 400 V)



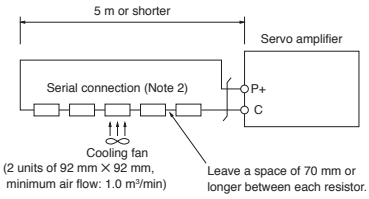
Model	Qty.	Tolerable regenerative power [W]	With cooling fan [W]	Resistance value [Ω]	Variable dimensions A	C	K	Mass/ unit [kg]
GRZG400-0.8Ω	4	500	800	3.2 (0.8 Ω × 4)	10	5.5	39	0.8
GRZG400-0.6Ω	5	850	1300	3 (0.6 Ω × 5)	16	8.2	46	
GRZG400-0.5Ω	5	850	1300	2.5 (0.5 Ω × 5)				
GRZG400-2.5Ω	4	500	800	10 (2.5 Ω × 4)	10	5.5	39	
GRZG400-2Ω	5	850	1300	10 (2 Ω × 5)				

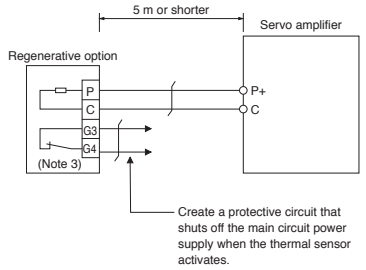
MR-RB5R, MR-RB9F, MR-RB9T (for 200 V) (Note 1)
MR-RB5K-4, MR-RB6K-4 (for 400 V) (Note 1)



Model	Tolerable regenerative power [W]	With cooling fan [W]	Description	Mass [kg]
MR-RB5R	500	800	GRZG400-0.8Ω × 4	10
MR-RB9F	850	1300	GRZG400-0.6Ω × 5	11
MR-RB9T	850	1300	GRZG400-0.5Ω × 5	11
MR-RB5K-4	500	800	GRZG400-2.5Ω × 4	10
MR-RB6K-4	850	1300	GRZG400-2Ω × 5	11

Connections





Notes: 1. To increase the regenerative braking frequency, install cooling fans (2 units of 92 mm × 92 mm, minimum air flow: 1.0 m³/min), and then change [Pr. PA02]. The cooling fans must be prepared by user.
2. By installing a thermal sensor, create a safety circuit that shuts off the main circuit power supply when abnormal overheating occurs.
3. G3 and G4 terminals are thermal sensor. G3-G4 opens when the regenerative option overheats abnormally.

Power Regeneration Common Converter (FR-CV, FR-CV-H)

B B-RJ B-RJ010 A A-RJ

FR-CV power regeneration common converter is suitable for 200 V class servo amplifiers ranged from 100 W to 22 kW, and FR-CV-H for 400 V class servo amplifiers ranged from 11 kW to 22 kW.

200 V class

Power regeneration common converter			FR-CV-	7.5K	11K	15K	22K	30K	37K	55K
Capacity			[kW]	7.5	11	15	22	30	37	55
Maximum number of connectable servo amplifiers				6						
Total capacity of connectable servo amplifiers			[kW]	3.75	5.5	7.5	11	15	18.5	27.5
Maximum servo amplifier capacity			[kW]	3.5	5	7	11	15	15	22
Output	Total rated current of connectable servo motors		[A]	33	46	61	90	115	145	215
	Regenerative braking torque	Short-time rating		Total capacity of applicable servo motors, 300% torque, 60 s (Note 1)						
		Continuous rating		100% Torque						
Power supply	Rated input AC voltage/frequency			3-phase 200 V AC to 220 V AC, 50 Hz, or 3-phase 200 V AC to 230 V AC, 60 Hz						
	Permissible AC voltage fluctuation			3-phase 170 V AC to 242 V AC, 50 Hz, or 3-phase 170 V AC to 253 V AC, 60 Hz						
	Permissible frequency fluctuation			±5%						
	Power supply capacity (Note 2)		[kVA]	17	20	28	41	52	66	100
IP rating (JEM 1030), cooling method				Open type (IP00), forced cooling						
Environment	Ambient temperature			-10 ˚C to 50 ˚C (non-freezing)						
	Ambient humidity			90 %RH maximum (non-condensing)						
	Ambience			Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust						
	Altitude			1000 m or less above sea level						
	Vibration resistance			5.9 m/s^2						
Molded-case circuit breaker or earth-leakage current breaker				30AF 30A	50AF 50A	100AF 75A	100AF 100A	125AF 125A	125AF 125A	225AF 175A
Magnetic contactor				S-N20	S-N35	S-N50	S-N65	S-N80	S-N95	S-N125

400 V class

Power regeneration common converter			FR-CV-H	22K	30K	37K	55K
Capacity			[kW]	22	30	37	55
Maximum number of connectable servo amplifiers				1			2
Total capacity of connectable servo amplifiers			[kW]	11	15	18.5	27.5
Maximum servo amplifier capacity			[kW]	11	15	15	22
Output	Total rated current of connectable servo motors		[A]	43	57	71	110
	Regenerative braking torque	Short-time rating		Total capacity of applicable servo motors, 300% torque, 60 s (Note 1)			
		Continuous rating		100% Torque			
Power supply	Rated input AC voltage/frequency			3-phase 380 V AC to 480 V AC, 50 Hz/60 Hz			
	Permissible AC voltage fluctuation			3-phase 323 V AC to 528 V AC, 50 Hz/60 Hz			
	Permissible frequency fluctuation			±5%			
	Power supply capacity (Note 2)		[kVA]	41	52	66	100
IP rating (JEM 1030), cooling method				Open type (IP00), forced cooling			
Environment	Ambient temperature			-10 ˚C to 50 ˚C (non-freezing)			
	Ambient humidity			90 %RH maximum (non-condensing)			
	Ambience			Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust			
	Altitude			1000 m or less above sea level			
	Vibration resistance			5.9 m/s^2			
Molded-case circuit breaker or earth-leakage current breaker				50AF 50A	60AF 60A	100AF 75A	100AF 100A
Magnetic contactor				S-N25	S-N35	S-N50	S-N65

Notes: 1. This is a time for the protective function of FR-CV-(H) to activate. Refer to relevant Servo Amplifier Instruction Manual for the time for the protective function of the servo amplifier to activate.
2. The mentioned value is a power supply capacity for FR-CV-(H). The actually required capacity depends on the sum of the power supply capacities for the servo amplifiers connected.

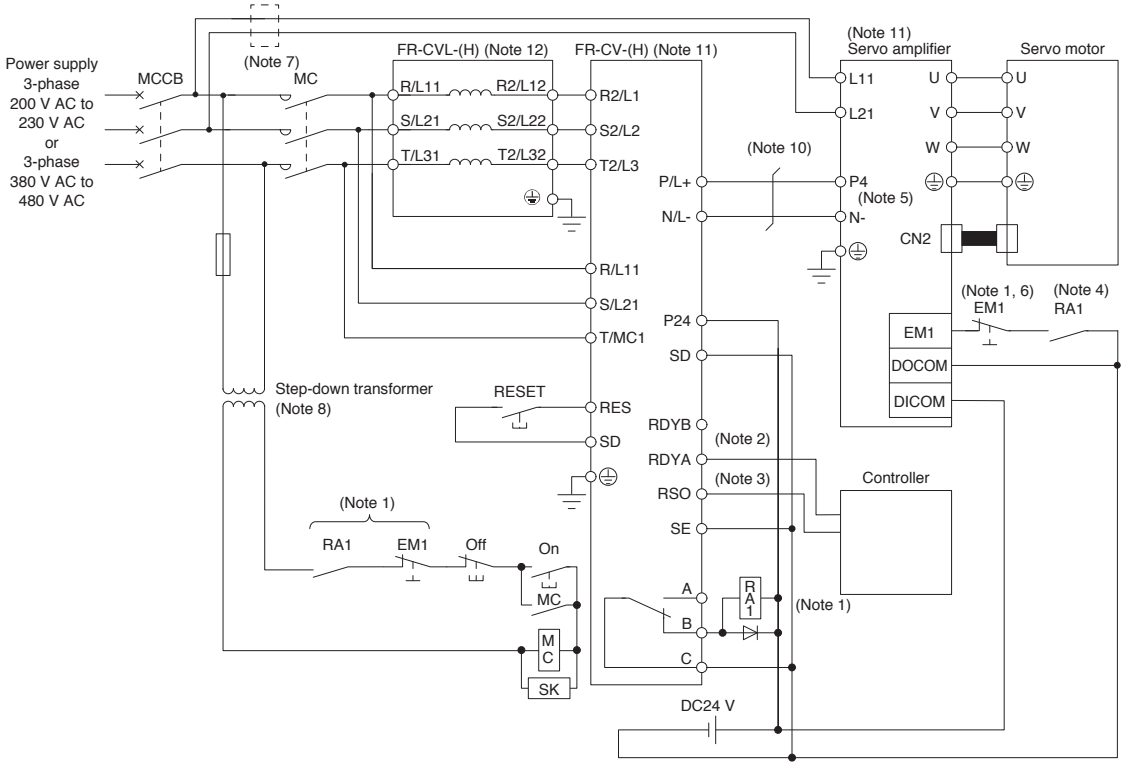
*** Cautions when selecting the power regeneration common converter**

1. Capacity of FR-CV-(H) [W] ≥ Total rated capacity of servo amplifiers connected to FR-CV-(H) [W] × 2
2. Keep the total rated current of the servo motors to be used equal to or below the applicable current [A] of FR-CV-(H).
3. The number of the servo amplifiers and the total capacities for the servo amplifiers to be connected must be equal to or lower than the mentioned values in the specifications.

Power Regeneration Common Converter (FR-CV, FR-CV-H)

B | B-RJ | B-RJ010 | A | A-RJ

Connection example (Note 9)



Notes: 1. Create a sequence that shuts off the main circuit power when either:
An alarm occurs on FR-CV-(H) or the servo amplifier, or
EM1 (Forced stop 1) is validated.
2. For the servo amplifier, create a sequence that switches the servo-on after FR-CV-(H) is ready.
3. RSO signal turns off when FR-CV-(H) is ready to run after the reset signal is input to FR-CV-(H). Create a sequence that makes the servo inoperative when the RSO signal is on.
4. Create a sequence that stops the servo motor with the emergency stop input to the servo system controller when an alarm occurs on FR-CV-(H). When the emergency stop input is not available in the servo system controller, stop the servo motor with the forced stop input to the servo amplifier as shown in the diagram.
5. Disconnect the short-circuit bar between P3 and P4 when using FR-CV-(H).
6. Set [Pr. PA04] to "0 0 _ _" to enable EM1 (Forced stop 1).
7. When wires used for L11 and L21 are thinner than those for L1, L2, and L3, use a molded-case circuit breaker.
8. When FR-CV-H is used, a step-down transformer is required if coil voltage of the magnetic contactor is in 200 V class.
9. Refer to relevant Servo Amplifier Instruction Manual for the examples of selecting wire sizes.
10. Use twisted wires for connecting the DC power supply between FR-CV-(H) and the servo amplifiers, and keep the wire length to a maximum of 5 m.
11. Inputs/outputs (main circuit) of FR-CV-(H) and the servo amplifier include high frequency components, and they may interfere with peripheral communication devices. In this case, the interference can be reduced by installing radio noise filter (FR-BIF or FR-BIF-H) or line noise filter (FR-BSF01 or FR-BLF).
12. When using FR-CV-(H), be sure to use a dedicated stand-alone reactor (FR-CVL or FR-CVL-H). Do not use a power factor improving AC reactor (FR-HAL or FR-HAL-H) or a power factor improving DC reactor (FR-HEL or FR-HEL-H) with FR-CV-(H).

Power regeneration common converter	Dedicated stand-alone reactor
FR-CV-7.5K(-AT)	FR-CVL-7.5K
FR-CV-11K(-AT)	FR-CVL-11K
FR-CV-15K(-AT)	FR-CVL-15K
FR-CV-22K(-AT)	FR-CVL-22K
FR-CV-30K(-AT)	FR-CVL-30K
FR-CV-37K	FR-CVL-37K
FR-CV-55K	FR-CVL-55K

Power regeneration common converter	Dedicated stand-alone reactor
FR-CV-H22K(-AT)	FR-CVL-H22K
FR-CV-H30K(-AT)	FR-CVL-H30K
FR-CV-H37K	FR-CVL-H37K
FR-CV-H55K	FR-CVL-H55K

Dynamic Brake

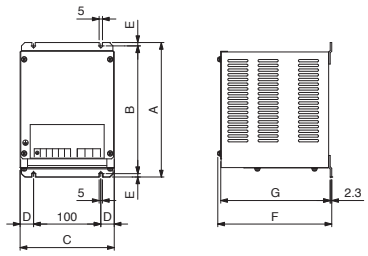
B B-RJ B-RJ010 A A-RJ

Use the following optional external dynamic brake with the 11 kW or larger servo amplifiers.
Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc. Take measures to ensure safety on the entire system when not using the dynamic brake.

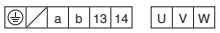
Servo amplifier model	Dynamic brake model	Fig.
MR-J4-11KB/A	DBU-11K	A
MR-J4-15KB/A	DBU-15K	
MR-J4-22KB/A	DBU-22K-R1	
MR-J4-11KB4/A4	DBU-11K-4	B
MR-J4-15KB4/A4 MR-J4-22KB4/A4	DBU-22K-4	

Dimensions [Unit: mm]

A



Terminal arrangement

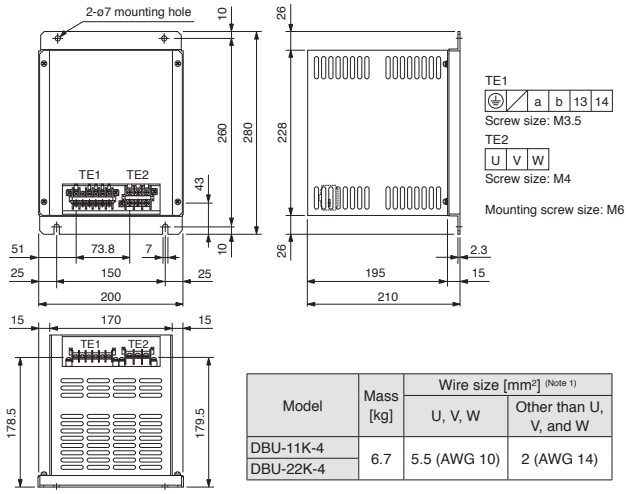


Screw size: M3.5 Screw size: M4

Mounting screw size: M4

Model	A	B	C	D	E	F	G	Mass [kg]	Wire size [mm²] (Note 1)	
									U, V, W	Other than U, V, and W
DBU-11K	200	190	140	20	5	170	163.5	2	5.5 (AWG 10)	2 (AWG 14)
DBU-15K DBU-22K-R1	250	238	150	25	6	235	228	6		

B



TE1

Screw size: M3.5

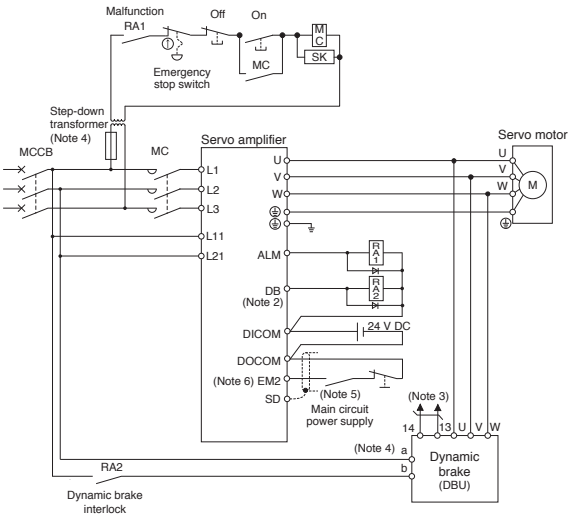
TE2

Screw size: M4

Mounting screw size: M6

Model	Mass [kg]	Wire size [mm²] (Note 1)	
		U, V, W	Other than U, V, and W
DBU-11K-4	6.7	5.5 (AWG 10)	2 (AWG 14)
DBU-22K-4			

Connections

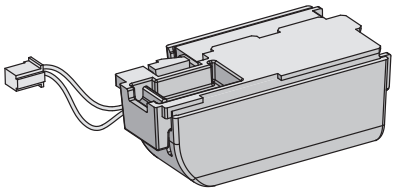
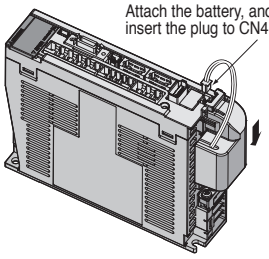
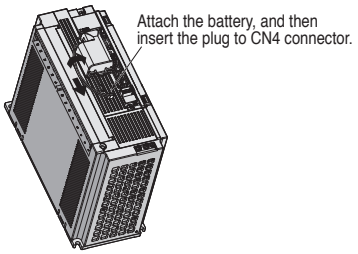


Notes: 1. The wire size is applicable when 600 V grade heat-resistant polyvinyl chloride insulated wire (HIV wires) is used.
2. Validate DB (Dynamic brake interlock) by [Pr. PD07] to [Pr. PD09] for MR-J4-B(4).
3. The terminals 13 and 14 are normally opened outputs. If the dynamic brake is welded, the terminals 13 and 14 will be opened. Thus, create an external sequence circuit that SON (Servo-on) does not turn on when the terminals 13 and 14 are opened.
4. A step-down transformer is required if the servo amplifier is in 400 V class, and coil voltage of the magnetic contactor is in 200 V class.
5. When using DBU-11K-4 or DBU-22K-4, the power supply voltage must be between 1-phase 380 V AC and 463 V AC, 50 Hz/60 Hz. Refer to relevant Servo Amplifier Instruction Manual for details.
6. Create a circuit to turn off EM2 when the main circuit power is turned off to prevent an unexpected restart of the servo amplifier.

Battery (MR-BAT6V1SET) (Note 1)

B | B-RJ | B-RJ010 | A | A-RJ

The absolute position data can be retained by mounting the battery on the 1-axis servo amplifier.
MR-BAT6V1SET is not required for the linear servo motor system or the incremental system.

Appearance	Mounting method
 Model: MR-BAT6V1SET Nominal voltage: 6 V Nominal capacity: 1650 mAh Lithium content: 1.2 g Primary battery: 2CR17335A Mass: 55 g	For MR-J4-350B/A or smaller, MR-J4-40B1/A1 or smaller, and MR-J4-200B4/A4 or smaller  For MR-J4-500B/A or larger and MR-J4-350B4/A4 or larger  * MR-J3BAT battery cannot be used because of the difference in voltage.

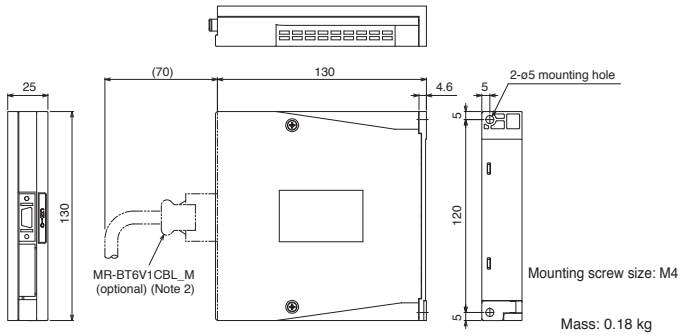
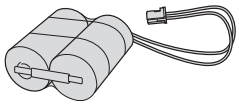
Notes: 1. MR-BAT6V1SET is an assembled battery composed of lithium metal batteries of CR17335A. This battery is not subject to the dangerous goods (Class 9) of the UN Recommendations. To transport lithium metal batteries and lithium metal batteries contained in equipment by means of transport subject to the UN Recommendations, take actions to comply with the following regulations: the United Nations Recommendations on the Transport of Dangerous Goods, the Technical Instruction (ICAO-TI) by the International Civil Aviation Organization (ICAO), and the International Maritime Dangerous Goods Code (IMDG Code) by the International Maritime Organization (IMO). To transport the batteries, check the latest standards or the laws of the destination country and take actions. Contact your local sales office for more details.

Battery Case (MR-BT6VCASE), Battery (MR-BAT6V1) (Note 1)

WB

Absolute position data of up to eight axes of the servo motors can be retained by using the battery case and the batteries. When using only the direct drive motors, up to four axes are connectable. Refer to the following table for the connectable number of the each servo motor.
The case stores five batteries by connecting to the connectors. The batteries are not included in the battery case. Please purchase the batteries separately.

Servo motor	Number of axes								
Rotary servo motor	0	1	2	3	4	5	6	7	8
Direct drive motor	4	4	4	4	4	3	2	1	0

Dimensions (assembled) [Unit: mm]	MR-BAT6V1
	 Model: MR-BAT6V1 Nominal voltage: 6 V Nominal capacity: 1650 mAh Lithium content: 1.2 g Primary battery: 2CR17335A Mass: 34 g

Notes: 1. MR-BAT6V1 is an assembled battery composed of lithium metal batteries of CR17335A. This battery is not subject to the dangerous goods (Class 9) of the UN Recommendations. To transport lithium metal batteries and lithium metal batteries contained in equipment by means of transport subject to the UN Recommendations, take actions to comply with the following regulations: the United Nations Recommendations on the Transport of Dangerous Goods, the Technical Instruction (ICAO-TI) by the International Civil Aviation Organization (ICAO), and the International Maritime Dangerous Goods Code (IMDG Code) by the International Maritime Organization (IMO). To transport the batteries, check the latest standards or the laws of the destination country and take actions. Contact your local sales office for more details.
2. Use optional MR-BT6V1CBL_M battery cable. When using the battery case with multiple servo amplifiers, also use optional MR-BT6V2CBL_M junction battery cable. Refer to "Cables and Connectors for Servo Amplifiers" in this catalog.

Battery for Junction Battery Cable (MR-BAT6V1BJ) (Note 1)

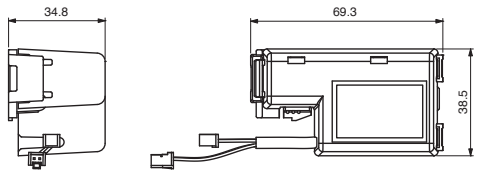
B | B-RJ | B-RJ010 | A | A-RJ

Junction Battery Cable (MR-BT6VCBL03M)

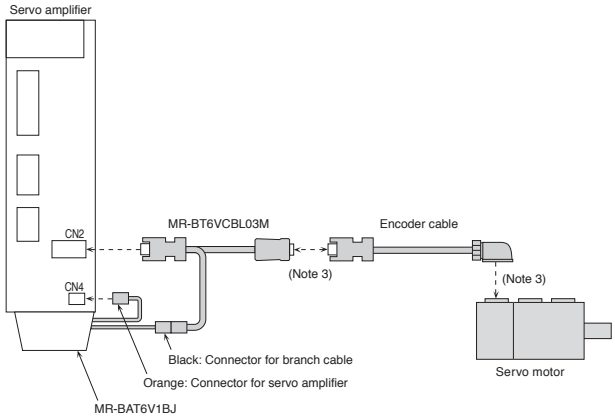
This relay cable is used to hold the absolute position data if the servo amplifier has to be removed from the servo motor for shipping. The servo motor does not have a super capacitor (for holding an absolute position data for a short period) in the encoder. When MR-BAT6V1BJ and MR-BT6VCBL03M are used together, the absolute position data can be held even when the servo amplifier is disconnected from the servo motor. These battery and cable are compatible with the 1-axis servo amplifier used with HG servo motor series (Note 2).

When purchasing MR-BAT6V1BJ for the first time, please purchase MR-BT6VCBL03M together.

Dimensions	Connections (Note 4)



Model: MR-BAT6V1BJ
System: Electronic battery backup type
Nominal voltage: 6 V
Nominal capacity: 1650 mAh
Primary battery: 2CR17335A
Mass: 66 g



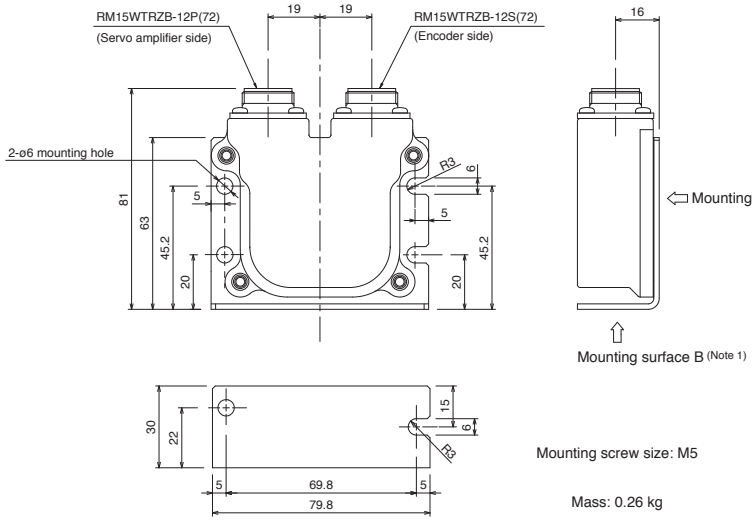
Notes: 1. MR-BAT6V1BJ is an assembled battery composed of lithium metal batteries of CR17335A. This battery is not subject to the dangerous goods (Class 9) of the UN Recommendations. To transport lithium metal batteries and lithium metal batteries contained in equipment by means of transport subject to the UN Recommendations, take actions to comply with the following regulations: the United Nations Recommendations on the Transport of Dangerous Goods, the Technical Instruction (ICAO-TI) by the International Civil Aviation Organization (ICAO), and the International Maritime Dangerous Goods Code (IMDG Code) by the International Maritime Organization (IMO). To transport the batteries, check the latest standards or the laws of the destination country and take actions. Contact your local sales office for more details.
2. These battery and cable will be compatible with the direct drive motors in the future.
3. To hold the absolute position data, keep the connections from the battery to the encoder. Connections to CN2 and CN4 connectors can be disconnected.
4. Start up the absolute position detection system after MR-BAT6V1BJ and MR-BT6VCBL03M are connected.

Absolute Position Storage Unit (MR-BTAS01)

B B-RJ WB A A-RJ

This absolute position storage unit is required for configuring absolute position detection system using the direct drive motor. This unit is not required when the servo system is used in incremental method.

Dimensions [Unit: mm]



Mounting screw size: M5

Mass: 0.26 kg

Item	Environment
Ambient temperature	0 °C to 55 °C (non-freezing), storage: -20 °C to 65 °C (non-freezing)
Ambient humidity	90 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)
Ambience	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist, dust or splash of oil or water
Altitude	1000 m or less above sea level
Vibration resistance	When the surface A is mounted: 49 m/s^2 (directions of X, Y, and Z axes) When the surface B is mounted: 5.9 m/s^2 (directions of X, Y, and Z axes)

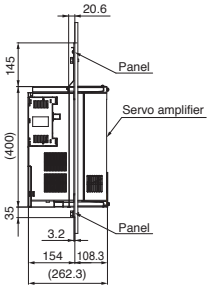
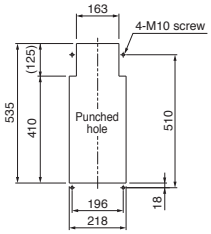
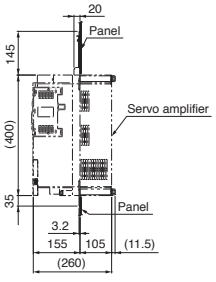
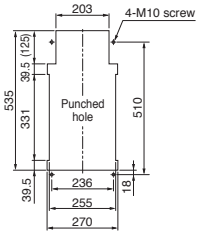
Notes: 1. When mounting the absolute position storage unit outside a cabinet, be sure to mount the surface A with 4 screws. When mounting the unit inside a cabinet, mounting the surface B with 2 screws is also possible.

Heat Sink Outside Mounting Attachment (MR-J4ACN15K, MR-J3ACN)

B B-RJ B-RJ010 A A-RJ

By using the heat sink outside mounting attachment on the servo amplifier of 11 kW to 22 kW, the heat generating section can be mounted outside a cabinet, enabling to dissipate about 50% of the heat from the unit to outside the cabinet. This allows smaller cabinet size.

Servo amplifier model	Heat sink outside mounting attachment model	Fig.
MR-J4-11KB(4) MR-J4-15KB(4)	MR-J4ACN15K	A
MR-J4-22KB(4)	MR-J3ACN	B

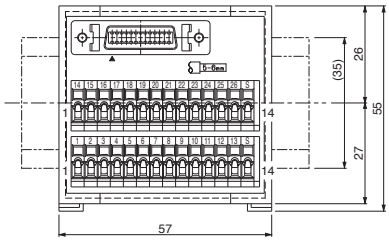
	Mounting [Unit: mm]	Panel cut dimensions [Unit: mm]
A		
B		

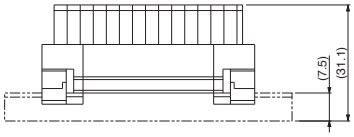
Junction Terminal Block (MR-TB26A)

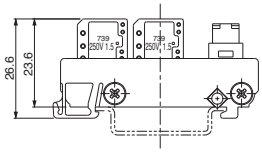
WB

Connect all signals via the junction terminal block.

Dimensions (Note 1) [Unit: mm]







Specifications

Rating		32 V AC/DC 0.5A
Applicable wire (terminal side)	Stranded wire	0.08 mm² to 1.5 mm² (AWG 28 to 14)
	Solid wire	ø0.32 mm to 1.2 mm
	Insulator OD	3.4 mm or shorter
Operating tool		210-619 (WAGO) or an equivalent 210-119SB (WAGO) or an equivalent
Strip length		5 mm to 6 mm

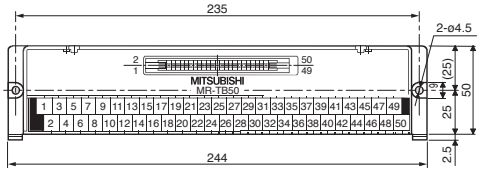
Notes: 1. The lengths in brackets apply when the junction terminal block is mounted on a 35 mm wide DIN rail.

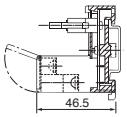
Junction Terminal Block (MR-TB50)

A A-RJ

Connect all signals via the junction terminal block.

Dimensions [Unit: mm]



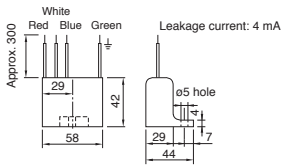
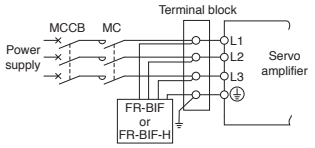
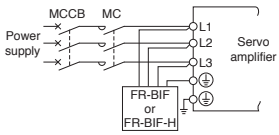


Terminal screw size: M3.5
Applicable wire: 2 mm² maximum
Crimping terminal width: 7.2 mm or shorter
Mounting screw size: M4

Radio Noise Filter (FR-BIF, FR-BIF-H)

B B-RJ WB B-RJ010 A A-RJ

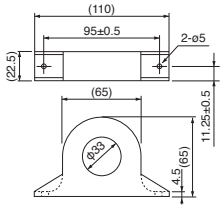
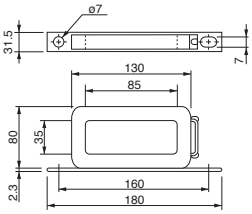
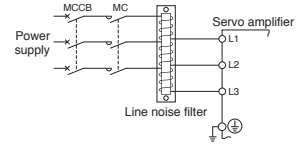
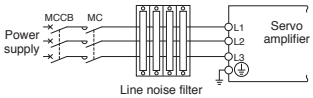
This filter effectively controls noise emitted from the power supply side of the servo amplifier and is especially effective for radio frequency bands 10 MHz or lower. The FR-BIF(-H) is designed for the input only.

Dimensions [Unit: mm]	Connections
	The FR-BIF(-H) is designed to be connected with the input only. Wiring should be as short as possible. Grounding is required. Be sure to insulate the unused wire when using FR-BIF with 1-phase power. For MR-J4-350B(4)/A(4) or smaller, MR-J4-40B1/A1 or smaller, and MR-J4W_-B  For MR-J4-500B(4)/A(4) or larger  200 V /100 V class: FR-BIF 400 V class: FR-BIF-H

Line Noise Filter (FR-BSF01, FR-BLF)

B B-RJ WB B-RJ010 A A-RJ

This filter is effective in suppressing radio noise emitted from the power supply side or the output side of the servo amplifier, and also in suppressing high-frequency leakage current (zero-phase current), especially within 0.5 MHz to 5 MHz band.

Dimensions [Unit: mm]	Connections
FR-BSF01 For wire size of 3.5 mm^2 (AWG 12) or smaller  FR-BLF For wire size of 5.5 mm^2 (AWG 10) or larger 	Use the line noise filter for wires of the main circuit power supply (L1, L2, and L3) of the servo amplifier, and of the motor power (U, V, and W). Pass each of the wires through the line noise filter equal times in a same direction. For the main circuit power supply, the effect of the filter rises as the number of passes increases, but generally four passes would be appropriate. For the servo motor power, passes must be four times or less. Do not pass the grounding wire through the filter. Otherwise, the effect of the filter is reduced. Wind the wires to pass through the filter as the required number of passes as shown in Fig.1. If the wires are too thick to wind, use two or more filters to have the required number of passes as shown in Fig.2. Place the line noise filters as close to the servo amplifier as possible for their best performance. Fig. 1  Fig. 2 

Data Line Filter

B B-RJ WB B-RJ010 A A-RJ

This filter is effective in preventing noise when attached to the pulse output cable of the pulse train output controller or the motor encoder cable.

Example) ESD-SR-250 (manufactured by NEC TOKIN Corporation)
ZCAT3035-1330 (manufactured by TDK)
GRFC-13 (manufactured by Kitagawa Industries Co., Ltd.)
E04SRM563218 (manufactured by Seiwa Electric Mfg. Co. Ltd.)

Surge Killer

B B-RJ WB B-RJ010 A A-RJ

Attach surge killers to AC relays and AC valves around the servo amplifier. Attach diodes to DC relays and DC valves.

Example) Surge killer: CR-50500 (manufactured by Okaya Electric Industries Co., Ltd.)
Diode: A diode with breakdown voltage four or more times greater than the relay drive voltage, and with current capacity two or more times greater than the relay drive current.

EMC Filter

B B-RJ WB B-RJ010 A A-RJ

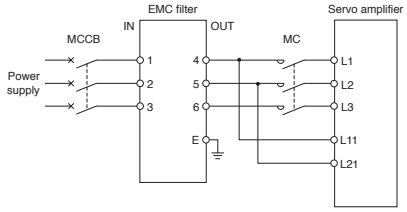
The following filters are recommended as a filter compliant with the EMC directive for the power supply of the servo amplifier.

Servo amplifier model	EMC filter model (Note 1, 3)	Rated current [A]	Rated voltage [V AC]	Leakage current [mA]	Mass [kg]	Fig.
MR-J4-10B/A to MR-J4-100B/A MR-J4-10B1/A1 to MR-J4-40B1/A1 MR-J4W2-22B MR-J4W3-222B	HF3010A-UN (Note 2)	10	250	5	3.5	A
MR-J4W2-44B	HF3010A-UN2 (Note 2)	10	250	5	3.5	
MR-J4-200B/A, MR-J4-350B/A MR-J4W2-77B, MR-J4W2-1010B MR-J4W3-444B	HF3030A-UN (Note 2)	30	250	5	5.5	B
MR-J4-500B/A, MR-J4-700B/A	HF3040A-UN (Note 2)	40	250	6.5	6.0	
MR-J4-11KB/A to MR-J4-22KB/A	HF3100A-UN (Note 2)	100	250	6.5	12	C
MR-J4-60B4/A4, MR-J4-100B4/A4	TF3005C-TX	5	500	5.5	6.0	D
MR-J4-200B4/A4 to MR-J4-700B4/A4	TF3020C-TX	20	500	5.5	6.0	
MR-J4-11KB4/A4	TF3030C-TX	30	500	5.5	7.5	
MR-J4-15KB4/A4	TF3040C-TX	40	500	5.5	12.5	E
MR-J4-22KB4/A4	TF3060C-TX	60	500	5.5	12.5	

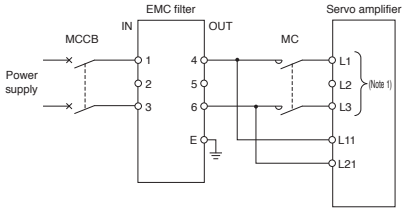
Notes: 1. Manufactured by Soshin Electric Co., Ltd.
2. A surge protector is separately required to use this EMC filter. Refer to "EMC Installation Guidelines."
3. When using the EMC filter, install one EMC filter for each servo amplifier.

Connections

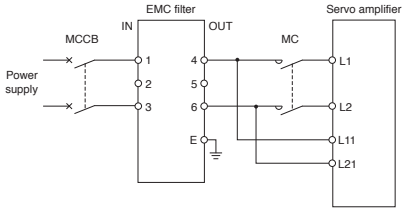
3-phase 200 V AC to 240 V AC or
3-phase 380 V AC to 480 V AC



1-phase 200 V AC to 240 V AC



1-phase 100 V AC to 120 V AC

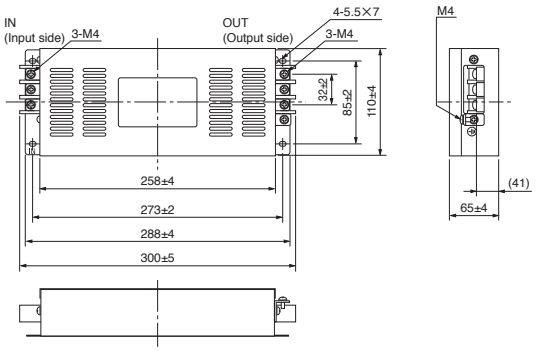


Notes: 1. Connect the power supply to L1 and L3 terminals. Do not connect anything to L2. The connections are different from MR-J3 series servo amplifiers. Be careful not to make a connection error when replacing MR-J3 with MR-J4.

Dimensions [Unit: mm]

A

HF3010A-UN, HF3010A-UN2

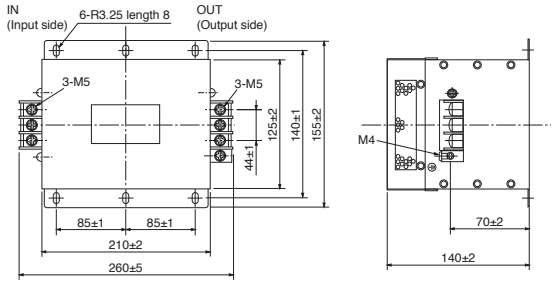


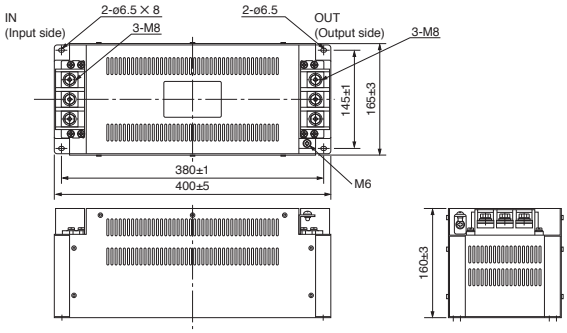
EMC Filter

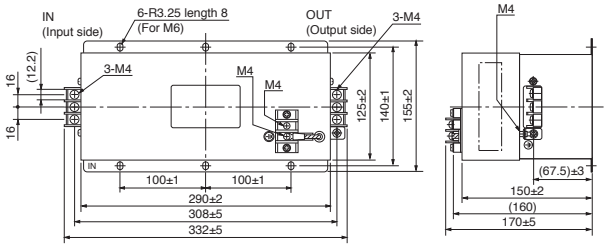
B | B-RJ | WB | B-RJ010 | A | A-RJ

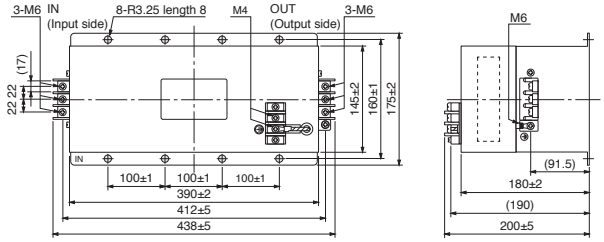
[Unit: mm]

	Dimensions
B	HF3030A-UN, HF3040A-UN
C	HF-3100A-UN
D	HF3005C-TX, HF-3020C-TX, HF3030C-TX
E	HF-3040C-TX, TF3060C-TX









Power Factor Improving DC Reactor (FR-HEL, FR-HEL-H)

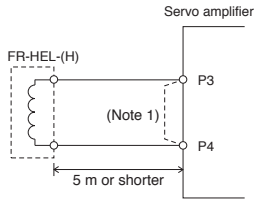
B | B-RJ | B-RJ010 | A | A-RJ

This boosts the power factor of servo amplifier and reduces the power supply capacity. Use either the DC reactor or the AC reactor. As compared to the AC reactor (FR-HAL or FR-HAL-H), the DC reactor (FR-HEL or FR-HEL-H) is more recommended since the DC reactor is more effective in power factor improvement, smaller and lighter, and its wiring is easier. (The DC reactor uses two wires, while the AC reactor uses six wires.)

Servo amplifier model	Power factor improving DC reactor model	Fig.
MR-J4-10B/A	FR-HEL-0.4K	A
MR-J4-20B/A		
MR-J4-40B/A	FR-HEL-0.75K	
MR-J4-60B/A	FR-HEL-1.5K	
MR-J4-70B/A		
MR-J4-100B/A	FR-HEL-2.2K	
MR-J4-200B/A	FR-HEL-3.7K	B
MR-J4-350B/A	FR-HEL-7.5K	
MR-J4-500B/A	FR-HEL-11K	
MR-J4-700B/A	FR-HEL-15K	
MR-J4-11KB/A		
MR-J4-15KB/A	FR-HEL-22K	C
MR-J4-22KB/A	FR-HEL-30K	

Servo amplifier model	Power factor improving DC reactor model	Fig.
MR-J4-60B4/A4	FR-HEL-H1.5K	D
MR-J4-100B4/A4	FR-HEL-H2.2K	
MR-J4-200B4/A4	FR-HEL-H3.7K	E
MR-J4-350B4/A4	FR-HEL-H7.5K	
MR-J4-500B4/A4	FR-HEL-H11K	
MR-J4-700B4/A4	FR-HEL-H15K	F
MR-J4-11KB4/A4		
MR-J4-15KB4/A4	FR-HEL-H22K	
MR-J4-22KB4/A4	FR-HEL-H30K	

Connections

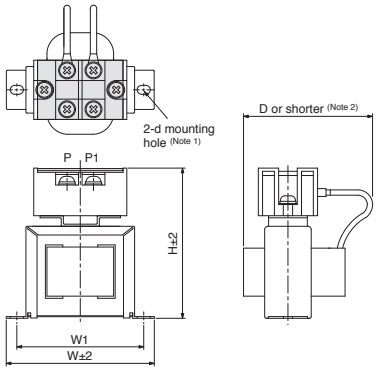


Notes: 1. Disconnect the short-circuit bar between P3 and P4 when using the DC reactor.

Dimensions

[Unit: mm]

A



Model	Variable dimensions					Mass [kg]	Terminal screw size	Wire size (Note 3) [mm²]
	W	W1	H	D	d			
FR-HEL-0.4K	70	60	71	61	M4	0.4	M4	2 (AWG 14)
FR-HEL-0.75K	85	74	81	61	M4	0.5	M4	2 (AWG 14)
FR-HEL-1.5K	85	74	81	70	M4	0.8	M4	2 (AWG 14)
FR-HEL-2.2K	85	74	81	70	M4	0.9	M4	2 (AWG 14)

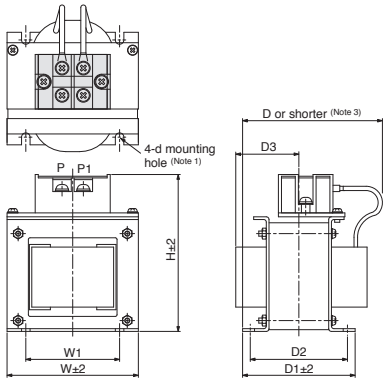
Notes: 1. Use this mounting hole for grounding.
2. This indicates the maximum dimension. The dimension varies depending on the bending degree of the input line.
3. The wire size is applicable when 600 V grade heat-resistant polyvinyl chloride insulated wire (HIV wires) is used.

Power Factor Improving DC Reactor (FR-HEL, FR-HEL-H)

B | B-RJ | B-RJ010 | A | A-RJ

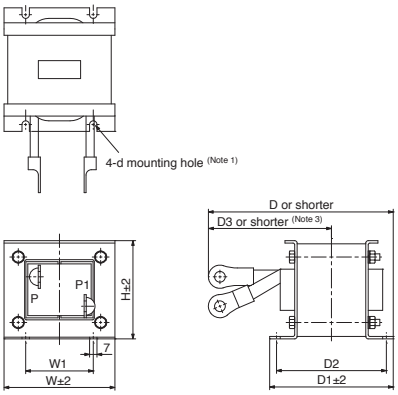
Dimensions [Unit: mm]

B



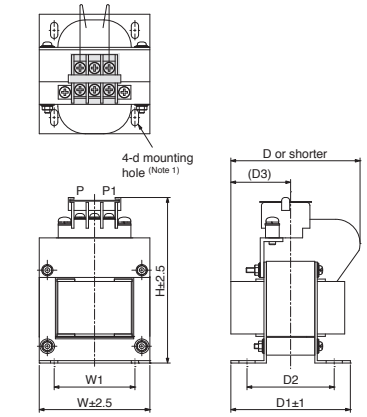
Model	Variable dimensions								Mass [kg]	Terminal screw size	Wire size (Note 4) [mm²]
	W	W1	H	D	D1	D2	D3	d			
FR-HEL-3.7K	77	55	92	82	66	57	37	M4	1.5	M4	2 (AWG 14)
FR-HEL-7.5K	86	60	113	98	81	72	43	M4	2.5	M5	3.5 (AWG 12)
FR-HEL-11K	105	64	133	112	92	79	47	M6	3.3	M6	5.5 (AWG 10)
FR-HEL-15K	105	64	133	115	97	84	48.5	M6	4.1	M6	8 (AWG 8) 14 (AWG 6) (Note 2)

C



Model	Variable dimensions								Mass [kg]	Terminal screw size	Wire size (Note 4) [mm²]
	W	W1	H	D	D1	D2	D3	d			
FR-HEL-22K	105	64	93	175	117	104	115	M6	5.6	M10	22 (AWG 4)
FR-HEL-30K	114	72	100	200	125	101	135	M6	7.8	M10	38 (AWG 2)

D



Model	Variable dimensions								Mass [kg]	Terminal screw size	Wire size (Note 4) [mm²]
	W	W1	H	D	D1	D2	D3	d			
FR-HEL-H1.5K	66	50	100	80	74	54	37	M4	1.0	M3.5	2 (AWG 14)
FR-HEL-H2.2K	76	50	110	80	74	54	37	M4	1.3	M3.5	2 (AWG 14)

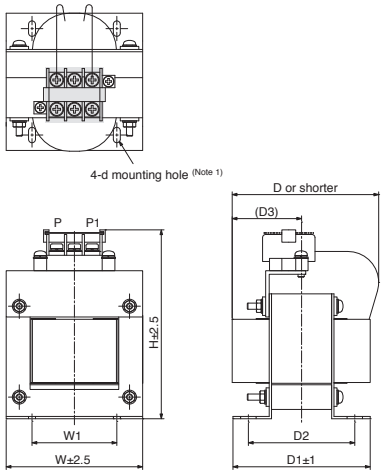
Notes: 1. Use this mounting hole for grounding.
2. When using FR-HEL-15K, select a wire of 8 mm² (AWG 8) for MR-J4-700B/A, and 14 mm² (AWG 6) for MR-J4-11KB/A.
3. This indicates the maximum dimension. The dimension varies depending on the bending degree of the input line.
4. The wire size is applicable when 600 V grade heat-resistant polyvinyl chloride insulated wire (HIV wires) is used.

Power Factor Improving DC Reactor (FR-HEL, FR-HEL-H)

B | B-RJ | B-RJ010 | A | A-RJ

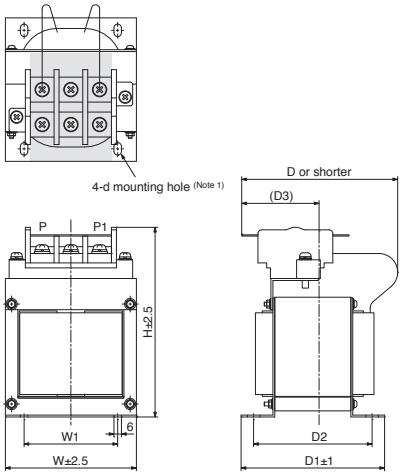
Dimensions [Unit: mm]

E



Model	Variable dimensions								Mass [kg]	Terminal screw size	Wire size (Note 3) [mm²]
	W	W1	H	D	D1	D2	D3	d			
FR-HEL-H3.7K	86	55	120	95	89	69	45	M4	2.3	M4	2 (AWG 14)
FR-HEL-H7.5K	96	60	128	105	100	80	50	M5	3.5	M4	2 (AWG 14)
FR-HEL-H11K	105	75	137	110	105	85	53	M5	4.5	M5	3.5 (AWG 12)

F



Model	Variable dimensions								Mass [kg]	Terminal screw size	Wire size (Note 3) [mm²]
	W	W1	H	D	D1	D2	D3	d			
FR-HEL-H15K	105	75	152	125	115	95	62	M5	5.0	M6	5.5 (AWG 10) 8 (AWG 8) (Note 2)
FR-HEL-H22K	133	90	178	120	95	75	53	M5	6.0	M6	8 (AWG 8)
FR-HEL-H30K	133	90	178	120	100	80	56	M5	6.5	M6	14 (AWG 6)

Notes: 1. Use this mounting hole for grounding.
2. When using FR-HEL-H15K, select a wire of 5.5 mm² (AWG 10) for MR-J4-700B4/A4, and 8 mm² (AWG 8) for MR-J4-11KB4/A4.
3. The wire size is applicable when 600 V grade heat-resistant polyvinyl chloride insulated wire (HIV wires) is used.

Power Factor Improving AC Reactor (FR-HAL, FR-HAL-H)

B | B-RJ | WB | B-RJ010 | A | A-RJ

This boosts the power factor of servo amplifier and reduces the power supply capacity.

For MR-J4-B/A

Servo amplifier model	Power factor improving AC reactor model (Note 2)	Fig.
MR-J4-10B(1)/A(1)	FR-HAL-0.4K	A
MR-J4-20B(1)/A(1)		
MR-J4-40B(1)/A(1)	FR-HAL-0.75K	
MR-J4-60B/A	FR-HAL-1.5K	
MR-J4-70B/A		
MR-J4-100B/A	FR-HAL-2.2K	
MR-J4-200B/A	FR-HAL-3.7K	
MR-J4-350B/A	FR-HAL-7.5K	B
MR-J4-500B/A	FR-HAL-11K	
MR-J4-700B/A	FR-HAL-15K	
MR-J4-11KB/A		
MR-J4-15KB/A	FR-HAL-22K	C
MR-J4-22KB/A	FR-HAL-30K	
MR-J4-60B4/A4	FR-HAL-H1.5K	D
MR-J4-100B4/A4	FR-HAL-H2.2K	
MR-J4-200B4/A4	FR-HAL-H3.7K	
MR-J4-350B4/A4	FR-HAL-H7.5K	E
MR-J4-500B4/A4	FR-HAL-H11K	
MR-J4-700B4/A4	FR-HAL-H15K	
MR-J4-11KB4/A4		
MR-J4-15KB4/A4	FR-HAL-H22K	F
MR-J4-22KB4/A4	FR-HAL-H30K	

For MR-J4W2-B (Note 1)

Total output of rotary servo motors	Total continuous thrust of linear servo motors	Total output of direct drive motors	Power factor improving AC reactor model (Note 2)	Fig.
450 W or less	150 N or less	100 W or less	FR-HAL-0.75K	A
Over 450 W to 600 W	Over 150 N to 240 N	Over 100 W to 377 W	FR-HAL-1.5K	
Over 600 W to 1 kW	Over 240 N to 300 N	Over 377 W to 545 W	FR-HAL-2.2K	
Over 1 kW to 2 kW	Over 300 N to 720 N	Over 545 W to 838 W	FR-HAL-3.7K	

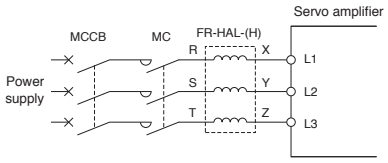
For MR-J4W3-B (Note 1)

Total output of rotary servo motors	Total continuous thrust of linear servo motors	Total output of direct drive motors	Power factor improving AC reactor model (Note 2)	Fig.
450 W or less	150 N or less	-	FR-HAL-0.75K	A
Over 450 W to 600 W	Over 150 N to 240 N	378 W or less	FR-HAL-1.5K	
Over 600 W to 1 kW	Over 240 N to 300 N	-	FR-HAL-2.2K	
Over 1 kW to 2 kW	Over 300 N to 450 N	-	FR-HAL-3.7K	

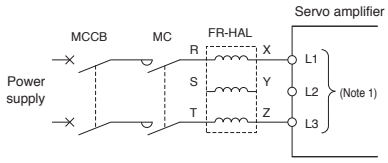
Notes: 1. Refer to "MR-J4W_-_B Servo Amplifier Instruction Manual" for selecting a power factor improving AC reactor when combining multiple servo motors among the rotary servo motor, the linear servo motor or the direct drive motor.
2. When using the power factor improving AC reactor, install one reactor for each servo amplifier.

Connections

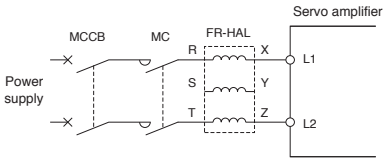
3-phase 200 V AC to 240 V AC or
3-phase 380 V AC to 480 V AC



1-phase 200 V AC to 240 V AC



1-phase 100 V AC to 120 V AC



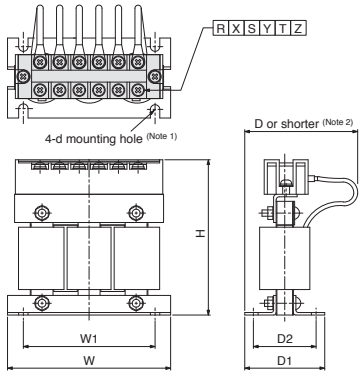
Notes: 1. Connect the power supply to L1 and L3 terminals. Do not connect anything to L2. The connections are different from MR-J3 series servo amplifiers. Be careful not to make a connection error when replacing MR-J3 with MR-J4.

Power Factor Improving AC Reactor (FR-HAL, FR-HAL-H)

B | B-RJ | WB | B-RJ010 | A | A-RJ

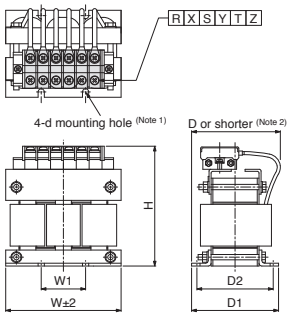
Dimensions [Unit: mm]

A



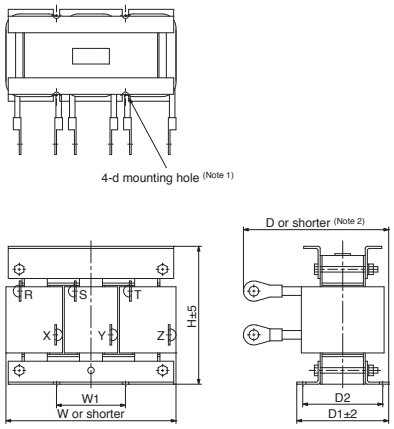
Model	Variable dimensions							Mass [kg]	Terminal screw size
	W	W1	H	D	D1	D2	d		
FR-HAL-0.4K	104	84	99	72	51	40	M5	0.6	M4
FR-HAL-0.75K	104	84	99	74	56	44	M5	0.8	M4
FR-HAL-1.5K	104	84	99	77	61	50	M5	1.1	M4
FR-HAL-2.2K	115±2	40	115	77	71	57	M6	1.5	M4
FR-HAL-3.7K	115±2	40	115	83	81	67	M6	2.2	M4

B



Model	Variable dimensions							Mass [kg]	Terminal screw size
	W	W1	H	D	D1	D2	d		
FR-HAL-7.5K	130	50	135	100	98	86	M6	4.2	M5
FR-HAL-11K	160	75	164	111	109	92	M6	5.2	M6
FR-HAL-15K	160	75	167	126	124	107	M6	7.0	M6

C



Model	Variable dimensions							Mass [kg]	Terminal screw size
	W	W1	H	D	D1	D2	d		
FR-HAL-22K	185	75	150	158	100	87	M6	9.0	M8
FR-HAL-30K	185	75	150	168	100	87	M6	9.7	M10

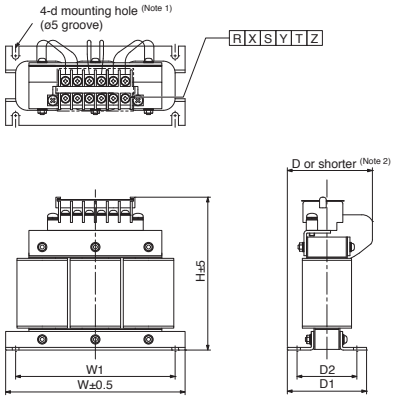
Notes: 1. Use this mounting hole for grounding.
2. This indicates the maximum dimension. The dimension varies depending on the bending degree of the input line.

Power Factor Improving AC Reactor (FR-HAL, FR-HAL-H)

B | B-RJ | B-RJ010 | A | A-RJ

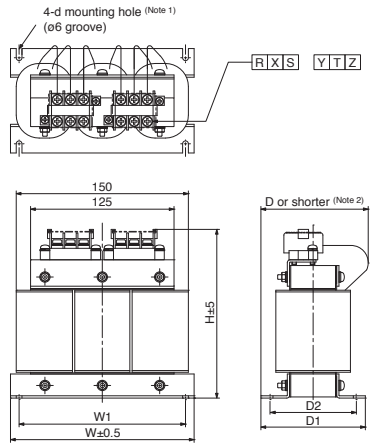
Dimensions [Unit: mm]

D



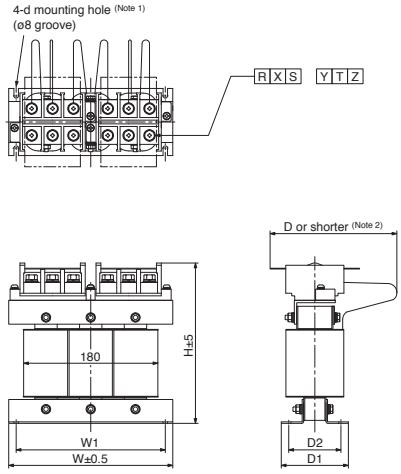
Model	Variable dimensions							Mass [kg]	Terminal screw size
	W	W1	H	D	D1	D2	d		
FR-HAL-H1.5K	135	120	115	59	59.6	45	M4	1.5	M3.5
FR-HAL-H2.2K	135	120	115	59	59.6	45	M4	1.5	M3.5
FR-HAL-H3.7K	135	120	115	69	70.6	57	M4	2.5	M3.5

E



Model	Variable dimensions							Mass [kg]	Terminal screw size
	W	W1	H	D	D1	D2	d		
FR-HAL-H7.5K	160	145	142	91	91	75	M4	5.0	M4
FR-HAL-H11K	160	145	146	91	91	75	M4	6.0	M5
FR-HAL-H15K	220	200	195	105	90	70	M5	9.0	M5

F



Model	Variable dimensions							Mass [kg]	Terminal screw size
	W	W1	H	D	D1	D2	d		
FR-HAL-H22K	220	200	215	170	90	70	M5	9.5	M8
FR-HAL-H30K	220	200	215	170	96	75	M5	11	M8

Notes: 1. Use this mounting hole for grounding.
2. This indicates the maximum dimension. The dimension varies depending on the bending degree of the input line.

Servo Support Software

Capacity selection software (MRZJW3-MOTSZ111E)

B | B-RJ | WB | B-RJ010 | A | A-RJ

Specifications

Item		Description
Types of machine component		Horizontal ball screws, vertical ball screws, rack and pinions, roll feeds, rotating tables, carts, elevators, conveyors, linear servo, other (direct inertia input) devices
Output of results	Item	Servo amplifier, servo motor, regenerative option, moment of inertia of load, load to motor inertia ratio, peak torque, peak torque ratio, effective torque, effective torque ratio, regenerative power (Note 4), regenerative power ratio
	Printing	Prints entered specifications, operating pattern, calculation process, graph of selection process feed speed (or motor speed) and torque, and sizing results.
	Data saving	Entered specifications, operating patterns and sizing results are saved with a file name.
Moment of inertia calculation function		Cylinder, square block, variable speed, linear movement, hanging, conical, conical base

System requirements

IBM PC/AT compatible model running with the following requirements.

Components		Capacity selection software (MRZJW3-MOTSZ111E) (Note 1)
Personal computer (Note 2)	OS (Note 3)	Microsoft® Windows® 7 Enterprise Operating System Microsoft® Windows® 7 Ultimate Operating System Microsoft® Windows® 7 Professional Operating System Microsoft® Windows® 7 Home Premium Operating System Microsoft® Windows® 7 Starter Operating System Microsoft® Windows Vista® Enterprise Operating System Microsoft® Windows Vista® Ultimate Operating System Microsoft® Windows Vista® Business Operating System Microsoft® Windows Vista® Home Premium Operating System Microsoft® Windows Vista® Home Basic Operating System Microsoft® Windows® XP Professional Operating System Microsoft® Windows® XP Home Edition Operating System Microsoft® Windows® 2000 Professional Operating System Microsoft® Windows® ME Operating System Microsoft® Windows® 98 Operating System
	CPU	Pentium® 133 MHz or more (Windows® 98, Windows® 2000 Professional) Pentium® 150 MHz or more (Windows® Me) Pentium® 300 MHz or more (Windows® XP Home Edition/Professional) 1 GHz or more 32-bit (×86) processor (Windows Vista® Home Basic/Home Premium/Business/Ultimate/Enterprise) 1 GHz or more 32-bit (×86) or 64-bit (×64) processor (Windows® 7 Starter/Home Premium/Professional/Ultimate/Enterprise)
	Memory	24 MB or more (Windows® 98) 32 MB or more (Windows® Me, Windows® 2000 Professional) 128 MB or more (Windows® XP Home Edition/Professional) 512 MB or more (Windows Vista® Home Basic) 1 GB or more (Windows Vista® Home Premium/Business/Ultimate/Enterprise, Windows® 7 Starter/Home Premium/Professional/Ultimate/Enterprise)
	Free hard disk space	40 MB or more
Browser		Windows® Internet Explorer® 4.0 or later
Monitor		Resolution 800 × 600 or more, 16-bit high color, Compatible with above personal computers.
Keyboard		Compatible with above personal computers.
Mouse		Compatible with above personal computers.
Printer		Compatible with above personal computers.
Communication cable		Not required

Notes: 1. Be sure to use the latest version of this software. Contact your local sales office for updating your software.
2. This software may not run correctly, depending on a personal computer being used.
3. For 64-bit operating system, this software is compatible with Windows® 7.
4. MR-J4W_ outputs regenerative energy.

Servo Support Software
MR Configurator2 (SW1DNC-MRC2-E)

B | B-RJ | WB | B-RJ010 | A | A-RJ | MELSOFT

MR Configurator2 can be obtained by either of the following:
- Purchase MR Configurator2 alone.
- Purchase MT Works2: MR Configurator2 is included in MT Works2 with software version 1.34L or later.
- Download MR Configurator2: If you have GX Works2 or MT Works2 with software version earlier than 1.34L, you can download MR Configurator2 from website free of charge.

Specifications

Item	Description
Project	Create/open/save/delete project, read/write other format, system setting, print
Parameter	Parameter setting, axis name setting (Note 3), parameter converter (Note 4)
Monitor	Display all, I/O monitor, graph, ABS data display
Diagnosis	Alarm display, alarm onset data, drive recorder, no motor rotation, system configuration, life diagnosis, machine diagnosis, fully closed loop diagnosis (Note 5), linear diagnosis (Note 6)
Test mode	JOG mode (Note 7), positioning mode, motor-less operation (Note 1), DO forced output, program operation, test mode information
Adjustment	One-touch tuning, tuning, machine analyzer
Others	Servo assistant, parameter setting range update, machine unit conversion setting (Note 2), help display

Notes: 1. Available only in the standard control mode. The motor-less operation is currently available only in the standard control mode and will be available in the fully closed loop control mode, the linear servo motor control mode, and the direct drive motor control mode in the future.
2. Available only with MR-J4-B(4)(-RJ), MR-J4W_-B, and MR-J4-B-RJ010.
3. Available only with MR-J4-A(4)(-RJ).
4. Available only in the standard control mode with MR-J4-A(4)(-RJ).
5. Available only in the fully closed loop control mode.
6. Available only in the linear servo motor control mode.
7. Available only in the standard control mode, the fully closed loop control mode, and the direct drive motor control mode.

System requirements

IBM PC/AT compatible model running with the following requirements.

Components		MR Configurator2 (Note 3)
Personal computer (Note 1)	OS (Note 2)	Microsoft® Windows® 8 Enterprise Operating System Microsoft® Windows® 8 Pro Operating System Microsoft® Windows® 8 Operating System Microsoft® Windows® 7 Enterprise Operating System Microsoft® Windows® 7 Ultimate Operating System Microsoft® Windows® 7 Professional Operating System Microsoft® Windows® 7 Home Premium Operating System Microsoft® Windows® 7 Starter Operating System Microsoft® Windows Vista® Enterprise Operating System Microsoft® Windows Vista® Ultimate Operating System Microsoft® Windows Vista® Business Operating System Microsoft® Windows Vista® Home Premium Operating System Microsoft® Windows Vista® Home Basic Operating System Microsoft® Windows® XP Professional Operating System, Service Pack2 or later Microsoft® Windows® XP Home Edition Operating System, Service Pack2 or later Microsoft® Windows® 2000 Professional Operating System, Service Pack4 or later
	CPU (recommended)	Desktop PC: Intel® Celeron® processor 2.8 GHz or more Laptop PC: Intel® Pentium® M processor 1.7 GHz or more
	Memory (recommended)	512 MB or more (32-bit OS), 1 GB or more (64-bit OS)
	Free hard disk space	1 GB or more
	Communication interface	Use USB port
Browser		Windows® Internet Explorer® 4.0 or later
Monitor		Resolution 1024 × 768 or more, 16-bit high color, Compatible with above personal computers.
Keyboard		Compatible with above personal computers.
Mouse		Compatible with above personal computers.
Printer		Compatible with above personal computers.
Communication cable		MR-J3USBCBL3M

Notes: 1. This software may not run correctly, depending on a personal computer being used.
2. For 64-bit operating system, this software is compatible with Windows® 7 and Windows® 8.
3. Be sure to use the latest version of this software. Contact your local sales office for updating your software.

Unit Conversion Table

Quantity	SI (metric) unit	U.S. customary unit
Mass	1 [kg]	2.2046 [lb]
Length	1 [mm]	0.03937 [in]
Torque	1 [N•m]	141.6 [oz•in]
Moment of inertia	1 [($\times 10^{-4}$ kg•m^2)]	5.4675 [oz•in^2]
Load (thrust load/axial load)	1 [N]	0.2248 [lbf]
Temperature	n [°C] × 9/5 + 32	n [°F]

6

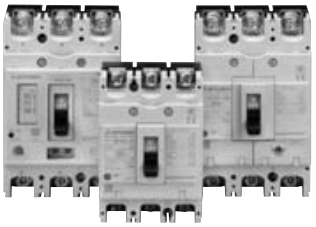
	Servo amplifier						
	B	B-RJ	WB	B-RJ010	A	A-RJ	●: Applicable
Features of Low-Voltage Switchgear	●	●	●	●	●	●	 6-1
Wires, Molded-Case Circuit Breakers and Magnetic Contactors	●	●	●	●	●	●	 6-4
Selection Example in HIV Wires for Servo Motors	●	●	●	●	●	●	 6-6

B MR-J4-B B-RJ MR-J4-B-RJ WB MR-J4W2-B/MR-J4W3-B B-RJ010 MR-J4-B-RJ010 A MR-J4-A A-RJ MR-J4-A-RJ

* Only MR-J4-B and MR-J4-A servo amplifiers are mentioned in this section. Note that low-voltage switchgear and wires for MR-J4-B-RJ and MR-J4-B-RJ010 are the same as those for MR-J4-B, and MR-J4-A-RJ for MR-J4-A. For the low-voltage switchgear and wires for MR-J4-B-RJ, MR-J4-B-RJ010, and MR-J4-A-RJ, refer to those for MR-J4-B and MR-J4-A with the same rated capacity.
* Note that some servo amplifiers are available in the future.
* Refer to p. 5-65 in this catalog for conversion of units.

Low-Voltage Switchgear/Wires

Mitsubishi Molded Case Circuit Breakers and Earth Leakage Circuit Breakers WS-V Series



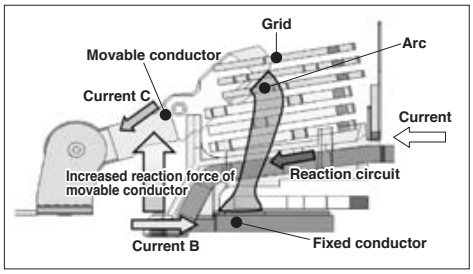
"WS-V Series" is the new circuit breakers that have a lot of superior aspects such as higher breaking capacity, design for easy use, standardization of accessory parts, and compliance to the global standards.

Features

Technologies based on long years of experience are brought together to achieve improved performance

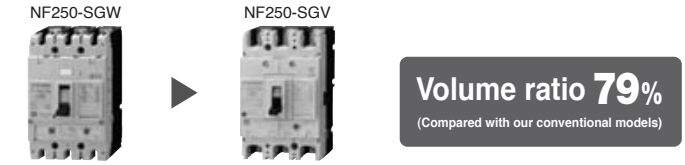
The new circuit breaking technology "Expanded ISTAC" has improved the current-limiting performance and upgraded the overall breaking capacity.
Expansion of the conductor under the stator shortens the contact parting time of the mover as compared to the conventional ISTAC structure.
The current-limiting performance has been improved remarkably. (The maximum peak current value has been reduced by approx. 10%.)

New circuit breaking technology (Expanded ISTAC)



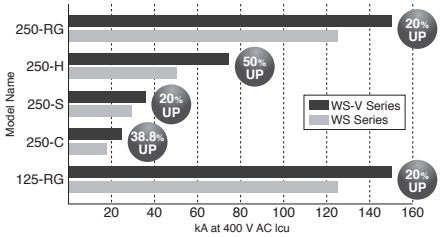
Compact design for ease of use

The thermal adjustable circuit breakers and electronic circuit breakers are smaller.



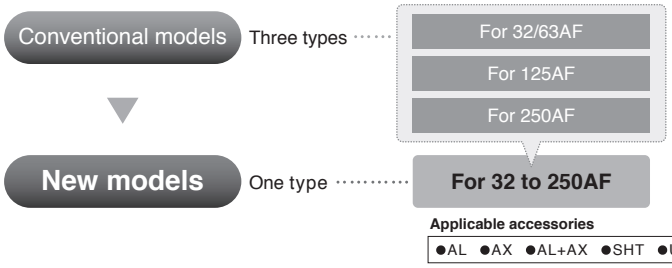
Volume ratio 79%
(Compared with our conventional models)

■ Breaking capacity comparison with a conventional model



Types of internal accessories are reduced from 3 types to 1 type

Standardization of internal accessories contributes to a reduction of stock and delivery time.



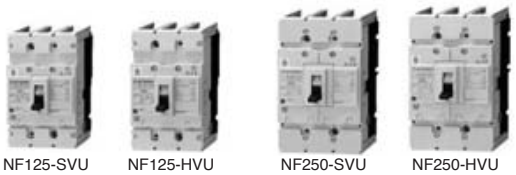
Lineup of UL 489 listed circuit breakers with 54 mm width *"Small Fit"* F Style

The compact breakers contribute to a size reduction of machines, and IEC 35 mm rail mounting is standard.

For security and standard compliance of machines, F-type and V-type operating handles are available for breakers with 54 mm width.

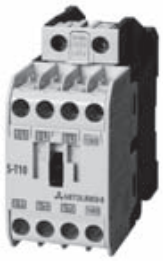
Lineup of UL 489 listed circuit breakers for 480 V AC *"High Performance"*

The breaking capacity has been improved to satisfy the request for SCCR upgrading.



Breaking capacity of UL 489 listed circuit breakers for 480 V AC (UL 489)
- NF125-SVU/NV125-SVU: 30 kA
- NF125-HVU/NV125-HVU: 50 kA
- NF250-SVU/NV250-SVU: 35 kA
- NF250-HVU/NV250-HVU: 50 kA

Mitsubishi Magnetic Motor Starters and Magnetic Contactors MS-T Series



S-T10

MS-T series is newly released!
The MS-T series is smaller than ever, enabling more compact control panel. The MS-T series is suitable for MELSERVO-J4 series as well as other Mitsubishi FA equipment. In addition, the MS-T conforms to a variety of global standards, supporting the global use.

Features

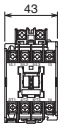
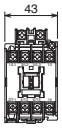
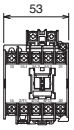
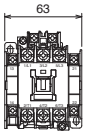
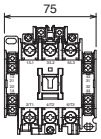
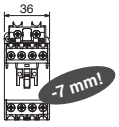
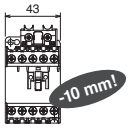
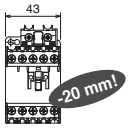
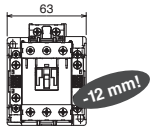
Compact

Just 36 mm wide for 10 A-frame type!

General-purpose magnetic contactor with smallest width* in the industry.
The width of MS-T series is reduced by 32% as compared to the prior MS-N series, enabling a more compact panel.

*Based on Mitsubishi Electric research as of September 2012 in the general-purpose magnetic contactor industry for 10 A-frame class.

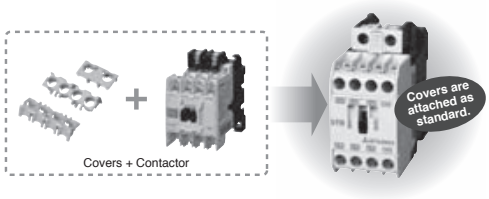
[Unit: mm]

Frame size		11 A	13 A		20 A	25 A
MS-N series	Front view	 43	 43	 53	 63	 75
		S-N10	S-N11 (Auxiliary 1-pole)	S-N12 (Auxiliary 2-pole)	S-N20	S-N25
New MS-T series	Front view	 36 -7 mm!	 43 -10 mm!		 43 -20 mm!	 63 -12 mm!
		S-T10	S-T12 (Auxiliary 2-pole)		S-T20	S-T25

Standardization

Covers provided as standard equipment

Terminal cover and auxiliary contact unit covers are provided as standard equipment. Not only ensuring your safety, but also saving you time and cost of selecting and purchasing the covers separately.



Covers + Contactor

Wide-ranged operation coil rating

The prior series had 14 types of the operation coil rating. Owing to the wide-ranged operation coil rating, the number of the rating types for the MS-T series is reduced to half, making it easier to select as compared to the prior model.
Consolidating the number of the produced coils type allows not just the reduction of customer storage, but also shortening of delivery time.

Coil designation	Rated voltage [V]	
	50 Hz	60 Hz
AC12 V	12	12
AC24 V	24	24
AC48 V	48 to 50	48 to 50
AC100 V	100	100 to 110
AC120 V	110 to 120	115 to 120
AC127 V	125 to 127	127
AC200 V	200	200 to 220
AC220 V	208 to 220	220
AC230 V	220 to 240	230 to 240
AC260 V	240 to 260	260 to 280
AC380 V	346 to 380	380
AC400 V	380 to 415	400 to 440
AC440 V	415 to 440	460 to 480
AC500 V	500	500 to 550

Coil designation	Rated voltage [V]
	50 Hz/60 Hz
AC24 V	24
AC48 V	48 to 50
AC100 V	100 to 127
AC200 V	200 to 240
AC300 V	260 to 300
AC400 V	380 to 440
AC500 V	460 to 550

* 12 V type is an order-made product.

Global Standard

Conforms to various global standards

Not only major global standards such as IEC, JIS, UL, CE, and CCC but also ship standards and other country standards are planned to be certified.

◎: Compliant as standard

Model	Applicable Standard				Safety Standard		EC Directive	Certification Body	CCC
	IEC	JIS	DIN/VDE	BS/EN	UL	CSA	CE Marking	TÜV	GB
	International	Japan	Germany	England Europe	U.S.A	Canada	Europe	Germany	China
S-T10 to S-T32 MSO-T10 to MSO-T25 TH-T18(KP) to TH-T25(KP)	◎	◎	◎	◎	◎	◎	◎	◎ *1, 2	◎ *1

*1. CCC and TÜV approval will be obtained soon.
*2. The Motor Starters will be certified under each type name of the Magnetic contactors and the Thermal Overload Relays on the condition that the Magnetic contactors and the Thermal Overload Relays are used in combination.

Mitsubishi Magnetic Motor Starters and Magnetic Contactors MS-N Series

Environment-friendly Mitsubishi MS-N series ensures safety and conforms to various global standards. Its compact size contributes to space-saving in a machine. The MS-N series is suitable for MELSERVO-J4 series as well as other Mitsubishi FA equipment and can be used globally.

S-N35CX

Features

Bifurcated contact adopted to achieve high contact reliability

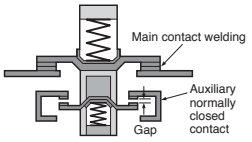
Contact reliability is greatly improved by combining bifurcated moving contact and stationary contact. This series responds to the various needs such as the application to safety circuit.

* The MS-T series also has bifurcated contacts.

Mirror contact (auxiliary contact off at main contact welding)

The MS-N series meets requirements of "Control functions in the event of failure" described in EN 60204-1 "Electrical equipment of machines", being suitable as interlock circuit contact. The MS-N series is applicable for category 4 safety circuit. We ensure safety for our customers.

* The MS-T series also has mirror contacts.



Various option units

Various options including surge absorbers and additional auxiliary contact blocks are available.

Conforms to various global standards

◎: Compliant as standard

Model	Applicable Standard				Safety Standard		EC Directive	Certification Body	CCC
	IEC	JIS	DIN/VDE	BS/EN	UL	CSA	CE Marking	TÜV	GB
	International	Japan	Germany	England Europe	U.S.A	Canada	Europe	Germany	China
S-N10 to S-N400 MSO-N10 to MSO-N400 TH-N12KP to TH-N400KP	◎	◎	◎	◎	◎	◎	◎	◎ *1	◎

*1. The Motor Starters are certified under each type name of the Magnetic contactors and the Thermal Overload Relays on the condition that the Magnetic contactors and the Thermal Overload Relays are used in combination.

Wires, Molded-Case Circuit Breakers and Magnetic Contactors (Example of Selection for MR-J4-B/A)

B | B-RJ | B-RJ010 | A | A-RJ

The following are examples of wire sizes when 600 V grade heat-resistant polyvinyl chloride insulated wires (HIV wires) are used. The wire size for U, V, W, and ⏚ varies depending on the servo motor. Refer to "Selection Example in HIV Wires for Servo Motors" in this catalog for details on wires for each servo motor.

Servo amplifier model	Molded-case circuit breaker (Note 5, 7)	Magnetic contactor (Note 3, 7)	Wire size [mm²] (Note 5)			
			L1, L2, L3, ⏚	L11, L21	P+, C	U, V, W, ⏚
MR-J4-10B(1)/A(1)	30 A frame 5 A (30 A frame 5 A)	S-N10, S-T10	2 (AWG 14)	1.25 to 2 (AWG 16 to 14) (Note 5)	2 (AWG 14) (Note 1)	AWG 18 to 14 (Note 4)
MR-J4-20B/A	30 A frame 5 A (30 A frame 5 A)	S-N10, S-T10				
MR-J4-20B1/A1	30 A frame 10 A (30 A frame 10 A)	S-N10, S-T10				
MR-J4-40B/A	30 A frame 10 A (30 A frame 5 A)	S-N10, S-T10				
MR-J4-40B1/A1	30 A frame 15 A (30 A frame 10 A)	S-N10, S-T10				
MR-J4-60B/A	30 A frame 15 A (30 A frame 10 A)	S-N10, S-T10				
MR-J4-70B/A	30 A frame 15 A (30 A frame 10 A)	S-N10, S-T10				
MR-J4-100B/A	30 A frame 15 A (30 A frame 10 A)	S-N10, S-T10				
MR-J4-200B/A	30 A frame 20 A (30 A frame 20 A)	S-N20 (Note 6), S-T21				AWG 16 to 10 (Note 4)
MR-J4-350B/A	30 A frame 30 A (30 A frame 30 A)	S-N20, S-T21	3.5 (AWG 12)			
MR-J4-500B/A (Note 2)	50 A frame 50 A (50 A frame 50 A)	S-N35	5.5 (AWG 10)			2 to 5.5 (AWG 14 to 10)
MR-J4-700B/A (Note 2)	100 A frame 75 A (60 A frame 60 A)	S-N50	8 (AWG 8)			2 to 8 (AWG 14 to 8)
MR-J4-11KB/A (Note 2)	100 A frame 100 A (100 A frame 100 A)	S-N50	14 (AWG 6)		3.5 (AWG 12) (Note 1)	5.5 (AWG 10), 8 (AWG 8), 14 (AWG 6)
MR-J4-15KB/A (Note 2)	125 A frame 125 A (125 A frame 125 A)	S-N65	22 (AWG 4)		5.5 (AWG 10) (Note 1)	8 (AWG 8), 22 (AWG 4)
MR-J4-22KB/A (Note 2)	225 A frame 175 A (225 A frame 175 A)	S-N95	38 (AWG 2)			38 (AWG 2)
MR-J4-60B4/A4	30 A frame 5 A (30 A frame 5 A)	S-N10, S-T10	2 (AWG 14)		2 (AWG 14) (Note 1)	AWG 16 to14 (Note 4)
MR-J4-100B4/A4	30 A frame 10 A (30 A frame 5 A)	S-N10, S-T10	2 (AWG 14)			
MR-J4-200B4/A4	30 A frame 15 A (30 A frame 10 A)	S-N10, S-T10	2 (AWG 14)			
MR-J4-350B4/A4	30 A frame 20 A (30 A frame 15 A)	S-N20 (Note 6), S-T21	2 (AWG 14)			
MR-J4-500B4/A4 (Note 2)	30 A frame 20 A (30 A frame 20 A)	S-N20 (Note 6), S-T21	2 (AWG 14)			3.5 (AWG 12)
MR-J4-700B4/A4 (Note 2)	30 A frame 30 A (30 A frame 30 A)	S-N20, S-T21	3.5 (AWG 12)			5.5 (AWG 10)
MR-J4-11KB4/A4 (Note 2)	50 A frame 50 A (50 A frame 50 A)	S-N25	5.5 (AWG 10)			8 (AWG 8)
MR-J4-15KB4/A4 (Note 2)	60 A frame 60 A (60 A frame 60 A)	S-N35	8 (AWG 8)		3.5 (AWG 12) (Note 1)	
MR-J4-22KB4/A4 (Note 2)	100 A frame 100 A (100 A frame 100 A)	S-N50	14 (AWG 6)			5.5 (AWG 10), 8 (AWG 8), 14 (AWG 6)

Notes: 1. Keep the wire length to the regenerative option within 5 m.
2. When connecting the wires to the terminal blocks, be sure to use the screws attached to the terminal blocks.
3. Be sure to use a magnetic contactor with an operation delay time of 80 ms or less. The operation delay time is the time interval from current being applied to the coil until closure of contacts.
4. The wire size shows applicable size for the servo amplifier connector.
5. When complying with IEC/EN/UL/CSA standard, refer to "MELSERVO-J4 Instructions and Cautions for Safe Use of AC Servos" enclosed with the servo amplifier. When using a power improving reactor, use a molded-case circuit breaker listed in the brackets.
6. S-N18 can be used when auxiliary contact is not required.
7. Install one molded-case circuit breaker and one magnetic contactor for each servo amplifier.

Wires (Example of Selection for MR-J4W2-B and MR-J4W3-B)

WB

The following are examples of wire sizes when 600 V grade heat-resistant polyvinyl chloride insulated wires (HIV wires) are used. The wire size for U, V, W, and ⏚ varies depending on the servo motor. Refer to "Selection Example in HIV Wires for Servo Motors" in this catalog for details on wires for each servo motor.

Servo amplifier model	Molded-case circuit breaker	Magnetic contactor	Wire size [mm²] (Note 3)			
			L1, L2, L3, ⏚	L11, L21	P+, C (Note 6)	U, V, W, ⏚
MR-J4W2-22B	Refer to the following tables.	Refer to the following tables.	2 (AWG 14)			AWG 18 to 14 (Note 2)
MR-J4W2-44B						
MR-J4W2-77B						
MR-J4W2-1010B						
MR-J4W3-222B						
MR-J4W3-444B						

Molded-Case Circuit Breakers and Magnetic Contactors (Example of Selection for MR-J4W2-B) (Note 4)

WB

Total output of rotary servo motors	Total continuous thrust of linear servo motors	Total output of direct drive motors	Molded-case circuit breaker (Note 3, 7)	Magnetic contactor (Note 1, 7)
300 W or less	-	-	30 A frame 5 A	S-N10
Over 300 W to 600 W	150 N or less	100 W or less	30 A frame 10 A	S-N10
Over 600 W to 1 kW	Over 150 N to 300 N	Over 100 W to 252 W	30 A frame 15 A	S-N10
Over 1 kW to 2 kW	Over 300 N to 720 N	Over 252 W to 838 W	30 A frame 20 A	S-N20 (Note 5)

Molded-Case Circuit Breakers and Magnetic Contactors (Example of Selection for MR-J4W3-B) (Note 4)

WB

Total output of rotary servo motors	Total continuous thrust of linear servo motors	Total output of direct drive motors	Molded-case circuit breaker (Note 3, 7)	Magnetic contactor (Note 1, 7)
450 W or less	150 N or less	-	30 A frame 10 A	S-N10
Over 450 W to 800 W	Over 150 N to 300 N	252 W or less	30 A frame 15 A	S-N10
Over 800 W to 1.5 kW	Over 300 N to 450 N	Over 252 W to 378 W	30 A frame 20 A	S-N20

Notes: 1. Be sure to use a magnetic contactor with an operation delay time of 80 ms or less. The operation delay time is the time interval from current being applied to the coil until closure of contacts.
2. The wire size shows applicable size for the servo amplifier connector.
3. When complying with IEC/EN/UL/CSA standard, refer to "MELSERVO-J4 Instructions and Cautions for Safe Use of AC Servos" enclosed with the servo amplifier.
4. Refer to "MR-J4W_-_B Servo Amplifier Instruction Manual" for selecting a molded-case circuit breaker when combining multiple servo motors among the rotary servo motor, the linear servo motor or the direct drive motor.
5. S-N18 can be used when auxiliary contact is not required.
6. Keep the wire length to the regenerative option within 5 m.
7. Install one molded-case circuit breaker and one magnetic contactor for each servo amplifier.

Selection Example in HIV Wires for Servo Motors

B | B-RJ | WB | B-RJ010 | A | A-RJ

The following are examples of wire sizes when 600 V grade heat-resistant polyvinyl chloride insulated wires (HIV wires) with a length of 30 m are used. Refer to "Servo Motor Instruction Manual (Vol. 3)" when using cab-tire cables for supplying power (U, V, and W) to HG-SR/HG-JR/HG-RR/HG-UR series.

Rotary servo motor	Wire size [mm²]		
	For power and grounding (U, V, W, ⏚) (general environment)	For electromagnetic brake (B1, B2)	For cooling fan (BU, BV, BW)
HG-KR053, 13, 23, 43, 73	0.75 (AWG 18) (Note 1, 2, 3)	0.5 (AWG 20) (Note 4, 7)	-
HG-MR053, 13, 23, 43, 73			
HG-SR51, 81	1.25 (AWG 16) (Note 5)	1.25 (AWG 16)	
HG-SR121, 201	2 (AWG 14)		
HG-SR301	3.5 (AWG 12)		
HG-SR421	5.5 (AWG 10)		
HG-SR52, 102	1.25 (AWG 16) (Note 5)		
HG-SR152, 202	2 (AWG 14)		
HG-SR352	3.5 (AWG 12)		
HG-SR502	5.5 (AWG 10)		
HG-SR702	8 (AWG 8)		
HG-SR524, 1024	1.25 (AWG 16) (Note 5)		
HG-SR1524, 2024, 3524	2 (AWG 14)		
HG-SR5024	3.5 (AWG 12)		
HG-SR7024	5.5 (AWG 10)		
HG-JR53, 73, 103	1.25 (AWG 16) (Note 5, 6)		
HG-JR153, 203	2 (AWG 14) (Note 6)		
HG-JR353	3.5 (AWG 12) (Note 6)		
HG-JR503	5.5 (AWG 10) (Note 6)		
HG-JR703	8 (AWG 8)		
HG-JR903, 11K1M	14 (AWG 6)		
HG-JR15K1M	22 (AWG 4)		
HG-JR22K1M	38 (AWG 2)	-	1.25 (AWG 16)
HG-JR534, 734, 1034	1.25 (AWG 16) (Note 5, 6)	1.25 (AWG 16)	-
HG-JR1534, 2034, 3534	2 (AWG 14) (Note 6)		
HG-JR5034	3.5 (AWG 12) (Note 6)		
HG-JR7034	5.5 (AWG 10)		
HG-JR9034, 11K1M4, 15K1M4	8 (AWG 8)		
HG-JR22K1M4	14 (AWG 6)	-	1.25 (AWG 16)
HG-RR103, 153	2 (AWG 14)	1.25 (AWG 16)	-
HG-RR203	3.5 (AWG 12)		
HG-RR353, 503	5.5 (AWG 10)		
HG-UR72	1.25 (AWG 16) (Note 5)		
HG-UR152	2 (AWG 14)		
HG-UR202	3.5 (AWG 12)		
HG-UR352, 502	5.5 (AWG 10)		

Notes: 1. Use a fluorine resin wire of 0.75 mm² (AWG 18) for wiring to the servo motor power connector.
2. This size is applicable for wiring length of 10 m or shorter. For over 10 m, use MR-PWS2CBL03M-A_-L and extend it with HIV wire of 1.25 mm² (AWG 16).
3. When complying with UL/CSA standard, extend the wire using MR-PWS2CBL03M-A_-L and HIV wire of 2 mm² (AWG 14).
4. Use a fluorine resin wire of 0.5 mm² (AWG 20) when connecting to servo motor electromagnetic brake connector.
5. When complying with UL/CSA standard, use 2 mm² (AWG 14). Refer to "Servo Motor Instruction Manual (Vol. 3)" for details.
6. The same wire size is applicable when the torque is maximally increased.
7. This size is applicable for wiring length of 10 m or shorter. For over 10 m, extend the wire with HIV wire of 1.25 mm² (AWG 16).

Selection Example in HIV Wires for Servo Motors

B B-RJ WB A A-RJ

The following are examples of wire sizes when 600 V grade heat-resistant polyvinyl chloride insulated wires (HIV wires) with a length of 30 m are used.

Linear servo motor Primary side		Wire size [mm²]	
		For power and grounding (U, V, W, E) (general environment)	For thermistor (G1, G2)
LM-H3P2A-07P-BSS0		1.25 (AWG 16) (Note 1)	0.2 (AWG 24)
LM-H3P3A-12P-CSS0		1.25 (AWG 16) (Note 1)	
LM-H3P3B-24P-CSS0		1.25 (AWG 16) (Note 1)	
LM-H3P3C-36P-CSS0		1.25 (AWG 16) (Note 1)	
LM-H3P3D-48P-CSS0		2 (AWG 14)	
LM-H3P7A-24P-ASS0		1.25 (AWG 16) (Note 1)	
LM-H3P7B-48P-ASS0		2 (AWG 14)	
LM-H3P7C-72P-ASS0		2 (AWG 14)	
LM-H3P7D-96P-ASS0		3.5 (AWG 12)	
LM-FP2B-06M-1SS0	Natural cooling	2 (AWG 14)	
	Liquid cooling		
LM-FP2D-12M-1SS0	Natural cooling	2 (AWG 14)	
	Liquid cooling	3.5 (AWG 12)	
LM-FP2F-18M-1SS0	Natural cooling	2 (AWG 14)	
	Liquid cooling	3.5 (AWG 12) (Note 2)	
LM-FP4B-12M-1SS0	Natural cooling	5.5 (AWG 10)	
	Liquid cooling		
LM-FP4D-24M-1SS0	Natural cooling	5.5 (AWG 10)	
	Liquid cooling		
LM-FP4F-36M-1SS0	Natural cooling	5.5 (AWG 10)	
	Liquid cooling	8 (AWG 8) (Note 2)	
LM-FP4H-48M-1SS0	Natural cooling	8 (AWG 8)	
	Liquid cooling	8 (AWG 8) (Note 3)	
LM-FP5H-60M-1SS0	Natural cooling	5.5 (AWG 10)	
	Liquid cooling	8 (AWG 8)	
LM-K2P1A-01M-2SS1		1.25 (AWG 16)	
LM-K2P1C-03M-2SS1		2 (AWG 14)	
LM-K2P2A-02M-1SS1		1.25 (AWG 16)	
LM-K2P2C-07M-1SS1		3.5 (AWG 12)	
LM-K2P2E-12M-1SS1		5.5 (AWG 10)	
LM-K2P3C-14M-1SS1		3.5 (AWG 12)	
LM-K2P3E-24M-1SS1		5.5 (AWG 10)	
LM-U2PAB-05M-0SS0, LM-U2PAD-10M-0SS0, LM-U2PAF-15M-0SS0, LM-U2PBB-07M-1SS0, LM-U2PBD-15M-1SS0, LM-U2PBF-22M-1SS0		1.25 (AWG 16)	
LM-U2P2B-40M-2SS0		2 (AWG 14)	
LM-U2P2C-60M-2SS0		3.5 (AWG 12)	
LM-U2P2D-80M-2SS0		5.5 (AWG 10)	

Direct drive motor	Wire size [mm²]
	For power and grounding (U, V, W, ⏚)
TM-RFM002C20, TM-RFM004C20, TM-RFM006C20, TM-RFM006E20, TM-RFM012E20, TM-RFM018E20, TM-RFM012G20	1.25 (AWG 16)
TM-RFM048G20, TM-RFM072G20	3.5 (AWG 12)
TM-RFM040J10	1.25 (AWG 16)
TM-RFM120J10	3.5 (AWG 12)
TM-RFM240J10	5.5 (AWG 10)

Notes: 1. When complying with UL/CSA standard, use 2 mm² (AWG 14). Refer to relevant Servo Amplifier Instruction Manual for details.
2. Use a wire which has a heat resistance temperature of 105 °C for wiring to the servo motor power connector.
3. Use a wire which has a heat resistance temperature of 150 °C for wiring to the servo motor power connector.

MEMO

Servo amplifiers

Item		Model	Rated output	Main circuit power supply
MR-J4-B	200 V class	MR-J4-10B	0.1 kW	3-phase or 1-phase 200 V AC to 240 V AC
		MR-J4-20B	0.2 kW	3-phase or 1-phase 200 V AC to 240 V AC
		MR-J4-40B	0.4 kW	3-phase or 1-phase 200 V AC to 240 V AC
		MR-J4-60B	0.6 kW	3-phase or 1-phase 200 V AC to 240 V AC
		MR-J4-70B	0.75 kW	3-phase or 1-phase 200 V AC to 240 V AC
		MR-J4-100B	1 kW	3-phase 200 V AC to 240 V AC
		MR-J4-200B	2 kW	3-phase 200 V AC to 240 V AC
		MR-J4-350B	3.5 kW	3-phase 200 V AC to 240 V AC
		MR-J4-500B	5 kW	3-phase 200 V AC to 240 V AC
		MR-J4-700B	7 kW	3-phase 200 V AC to 240 V AC
		MR-J4-11KB	11 kW	3-phase 200 V AC to 240 V AC
		MR-J4-15KB	15 kW	3-phase 200 V AC to 240 V AC
		MR-J4-22KB	22 kW	3-phase 200 V AC to 240 V AC
	100 V class	MR-J4-10B1	0.1 kW	1-phase 100 V AC to 120 V AC
		MR-J4-20B1	0.2 kW	1-phase 100 V AC to 120 V AC
		MR-J4-40B1	0.4 kW	1-phase 100 V AC to 120 V AC
	400 V class	MR-J4-60B4	0.6 kW	3-phase 380 V AC to 480 V AC
		MR-J4-100B4	1 kW	3-phase 380 V AC to 480 V AC
		MR-J4-200B4	2 kW	3-phase 380 V AC to 480 V AC
		MR-J4-350B4	3.5 kW	3-phase 380 V AC to 480 V AC
		MR-J4-500B4	5 kW	3-phase 380 V AC to 480 V AC
		MR-J4-700B4	7 kW	3-phase 380 V AC to 480 V AC
		MR-J4-11KB4	11 kW	3-phase 380 V AC to 480 V AC
		MR-J4-15KB4	15 kW	3-phase 380 V AC to 480 V AC
		MR-J4-22KB4	22 kW	3-phase 380 V AC to 480 V AC
MR-J4-B-RJ	200 V class	MR-J4-10B-RJ	0.1 kW	3-phase or 1-phase 200 V AC to 240 V AC
		MR-J4-20B-RJ	0.2 kW	3-phase or 1-phase 200 V AC to 240 V AC
		MR-J4-40B-RJ	0.4 kW	3-phase or 1-phase 200 V AC to 240 V AC
		MR-J4-60B-RJ	0.6 kW	3-phase or 1-phase 200 V AC to 240 V AC
		MR-J4-70B-RJ	0.75 kW	3-phase or 1-phase 200 V AC to 240 V AC
		MR-J4-100B-RJ	1 kW	3-phase 200 V AC to 240 V AC
		MR-J4-200B-RJ	2 kW	3-phase 200 V AC to 240 V AC
		MR-J4-350B-RJ	3.5 kW	3-phase 200 V AC to 240 V AC
		MR-J4-500B-RJ	5 kW	3-phase 200 V AC to 240 V AC
		MR-J4-700B-RJ	7 kW	3-phase 200 V AC to 240 V AC
		MR-J4-11KB-RJ	11 kW	3-phase 200 V AC to 240 V AC
		MR-J4-15KB-RJ	15 kW	3-phase 200 V AC to 240 V AC
		MR-J4-22KB-RJ	22 kW	3-phase 200 V AC to 240 V AC
	100 V class	MR-J4-10B1-RJ	0.1 kW	1-phase 100 V AC to 120 V AC
		MR-J4-20B1-RJ	0.2 kW	1-phase 100 V AC to 120 V AC
		MR-J4-40B1-RJ	0.4 kW	1-phase 100 V AC to 120 V AC
	400 V class	MR-J4-60B4-RJ	0.6 kW	3-phase 380 V AC to 480 V AC
		MR-J4-100B4-RJ	1 kW	3-phase 380 V AC to 480 V AC
		MR-J4-200B4-RJ	2 kW	3-phase 380 V AC to 480 V AC
		MR-J4-350B4-RJ	3.5 kW	3-phase 380 V AC to 480 V AC
		MR-J4-500B4-RJ	5 kW	3-phase 380 V AC to 480 V AC
		MR-J4-700B4-RJ	7 kW	3-phase 380 V AC to 480 V AC
		MR-J4-11KB4-RJ	11 kW	3-phase 380 V AC to 480 V AC
		MR-J4-15KB4-RJ	15 kW	3-phase 380 V AC to 480 V AC
		MR-J4-22KB4-RJ	22 kW	3-phase 380 V AC to 480 V AC
MR-J4W2-B		MR-J4W2-22B	0.2 kW × 2 axes	3-phase or 1-phase 200 V AC to 240 V AC
		MR-J4W2-44B	0.4 kW × 2 axes	3-phase or 1-phase 200 V AC to 240 V AC
		MR-J4W2-77B	0.75 kW × 2 axes	3-phase or 1-phase 200 V AC to 240 V AC
		MR-J4W2-1010B	1 kW × 2 axes	3-phase 200 V AC to 240 V AC
MR-J4W3-B		MR-J4W3-222B	0.2 kW × 3 axes	3-phase or 1-phase 200 V AC to 240 V AC
		MR-J4W3-444B	0.4 kW × 3 axes	3-phase or 1-phase 200 V AC to 240 V AC

Servo amplifiers

Item		Model	Rated output	Main circuit power supply
MR-J4-B-RJ010 (Note 1)	200 V class	MR-J4-10B-RJ010	0.1 kW	3-phase or 1-phase 200 V AC to 240 V AC
		MR-J4-20B-RJ010	0.2 kW	3-phase or 1-phase 200 V AC to 240 V AC
		MR-J4-40B-RJ010	0.4 kW	3-phase or 1-phase 200 V AC to 240 V AC
		MR-J4-60B-RJ010	0.6 kW	3-phase or 1-phase 200 V AC to 240 V AC
		MR-J4-70B-RJ010	0.75 kW	3-phase or 1-phase 200 V AC to 240 V AC
		MR-J4-100B-RJ010	1 kW	3-phase 200 V AC to 240 V AC
		MR-J4-200B-RJ010	2 kW	3-phase 200 V AC to 240 V AC
		MR-J4-350B-RJ010	3.5 kW	3-phase 200 V AC to 240 V AC
		MR-J4-500B-RJ010	5 kW	3-phase 200 V AC to 240 V AC
		MR-J4-700B-RJ010	7 kW	3-phase 200 V AC to 240 V AC
		MR-J4-11KB-RJ010	11 kW	3-phase 200 V AC to 240 V AC
		MR-J4-15KB-RJ010	15 kW	3-phase 200 V AC to 240 V AC
		MR-J4-22KB-RJ010	22 kW	3-phase 200 V AC to 240 V AC
	400 V class	MR-J4-60B4-RJ010	0.6 kW	3-phase 380 V AC to 480 V AC
		MR-J4-100B4-RJ010	1 kW	3-phase 380 V AC to 480 V AC
		MR-J4-200B4-RJ010	2 kW	3-phase 380 V AC to 480 V AC
		MR-J4-350B4-RJ010	3.5 kW	3-phase 380 V AC to 480 V AC
		MR-J4-500B4-RJ010	5 kW	3-phase 380 V AC to 480 V AC
		MR-J4-700B4-RJ010	7 kW	3-phase 380 V AC to 480 V AC
		MR-J4-11KB4-RJ010	11 kW	3-phase 380 V AC to 480 V AC
		MR-J4-15KB4-RJ010	15 kW	3-phase 380 V AC to 480 V AC
		MR-J4-22KB4-RJ010	22 kW	3-phase 380 V AC to 480 V AC
MR-J4-A	200 V class	MR-J4-10A	0.1 kW	3-phase or 1-phase 200 V AC to 240 V AC
		MR-J4-20A	0.2 kW	3-phase or 1-phase 200 V AC to 240 V AC
		MR-J4-40A	0.4 kW	3-phase or 1-phase 200 V AC to 240 V AC
		MR-J4-60A	0.6 kW	3-phase or 1-phase 200 V AC to 240 V AC
		MR-J4-70A	0.75 kW	3-phase or 1-phase 200 V AC to 240 V AC
		MR-J4-100A	1 kW	3-phase 200 V AC to 240 V AC
		MR-J4-200A	2 kW	3-phase 200 V AC to 240 V AC
		MR-J4-350A	3.5 kW	3-phase 200 V AC to 240 V AC
		MR-J4-500A	5 kW	3-phase 200 V AC to 240 V AC
		MR-J4-700A	7 kW	3-phase 200 V AC to 240 V AC
		MR-J4-11KA	11 kW	3-phase 200 V AC to 240 V AC
		MR-J4-15KA	15 kW	3-phase 200 V AC to 240 V AC
		MR-J4-22KA	22 kW	3-phase 200 V AC to 240 V AC
	100 V class	MR-J4-10A1	0.1 kW	1-phase 100 V AC to 120 V AC
		MR-J4-20A1	0.2 kW	1-phase 100 V AC to 120 V AC
		MR-J4-40A1	0.4 kW	1-phase 100 V AC to 120 V AC
	400 V class	MR-J4-60A4	0.6 kW	3-phase 380 V AC to 480 V AC
		MR-J4-100A4	1 kW	3-phase 380 V AC to 480 V AC
		MR-J4-200A4	2 kW	3-phase 380 V AC to 480 V AC
		MR-J4-350A4	3.5 kW	3-phase 380 V AC to 480 V AC
		MR-J4-500A4	5 kW	3-phase 380 V AC to 480 V AC
		MR-J4-700A4	7 kW	3-phase 380 V AC to 480 V AC
		MR-J4-11KA4	11 kW	3-phase 380 V AC to 480 V AC
		MR-J4-15KA4	15 kW	3-phase 380 V AC to 480 V AC
		MR-J4-22KA4	22 kW	3-phase 380 V AC to 480 V AC

Notes:

1. Optional CC-Link IE Field Network interface unit (MR-J3-T10) is required.

Servo amplifiers

Item		Model	Rated output	Main circuit power supply
MR-J4-A-RJ	200 V class	MR-J4-10A-RJ	0.1 kW	3-phase or 1-phase 200 V AC to 240 V AC
		MR-J4-20A-RJ	0.2 kW	3-phase or 1-phase 200 V AC to 240 V AC
		MR-J4-40A-RJ	0.4 kW	3-phase or 1-phase 200 V AC to 240 V AC
		MR-J4-60A-RJ	0.6 kW	3-phase or 1-phase 200 V AC to 240 V AC
		MR-J4-70A-RJ	0.75 kW	3-phase or 1-phase 200 V AC to 240 V AC
		MR-J4-100A-RJ	1 kW	3-phase 200 V AC to 240 V AC
		MR-J4-200A-RJ	2 kW	3-phase 200 V AC to 240 V AC
		MR-J4-350A-RJ	3.5 kW	3-phase 200 V AC to 240 V AC
		MR-J4-500A-RJ	5 kW	3-phase 200 V AC to 240 V AC
		MR-J4-700A-RJ	7 kW	3-phase 200 V AC to 240 V AC
		MR-J4-11KA-RJ	11 kW	3-phase 200 V AC to 240 V AC
		MR-J4-15KA-RJ	15 kW	3-phase 200 V AC to 240 V AC
		MR-J4-22KA-RJ	22 kW	3-phase 200 V AC to 240 V AC
	100 V class	MR-J4-10A1-RJ	0.1 kW	1-phase 100 V AC to 120 V AC
		MR-J4-20A1-RJ	0.2 kW	1-phase 100 V AC to 120 V AC
		MR-J4-40A1-RJ	0.4 kW	1-phase 100 V AC to 120 V AC
	400 V class	MR-J4-60A4-RJ	0.6 kW	3-phase 380 V AC to 480 V AC
		MR-J4-100A4-RJ	1 kW	3-phase 380 V AC to 480 V AC
		MR-J4-200A4-RJ	2 kW	3-phase 380 V AC to 480 V AC
		MR-J4-350A4-RJ	3.5 kW	3-phase 380 V AC to 480 V AC
		MR-J4-500A4-RJ	5 kW	3-phase 380 V AC to 480 V AC
		MR-J4-700A4-RJ	7 kW	3-phase 380 V AC to 480 V AC
		MR-J4-11KA4-RJ	11 kW	3-phase 380 V AC to 480 V AC
		MR-J4-15KA4-RJ	15 kW	3-phase 380 V AC to 480 V AC
		MR-J4-22KA4-RJ	22 kW	3-phase 380 V AC to 480 V AC

Rotary servo motors

Item	Model	Rated output	Rated speed	Reduction ratio
HG-KR series B: With electromagnetic brake	HG-KR053(B)	50 W	3000 r/min	-
	HG-KR13(B)	100 W	3000 r/min	-
	HG-KR23(B)	200 W	3000 r/min	-
	HG-KR43(B)	400 W	3000 r/min	-
	HG-KR73(B)	750 W	3000 r/min	-
HG-KR series With reducer for general industrial machines B: With electromagnetic brake	HG-KR053(B)G1 1/5	50 W	3000 r/min	1/5
	HG-KR053(B)G1 1/12	50 W	3000 r/min	1/12
	HG-KR053(B)G1 1/20	50 W	3000 r/min	1/20
	HG-KR13(B)G1 1/5	100 W	3000 r/min	1/5
	HG-KR13(B)G1 1/12	100 W	3000 r/min	1/12
	HG-KR13(B)G1 1/20	100 W	3000 r/min	1/20
	HG-KR23(B)G1 1/5	200 W	3000 r/min	1/5
	HG-KR23(B)G1 1/12	200 W	3000 r/min	1/12
	HG-KR23(B)G1 1/20	200 W	3000 r/min	1/20
	HG-KR43(B)G1 1/5	400 W	3000 r/min	1/5
	HG-KR43(B)G1 1/12	400 W	3000 r/min	1/12
	HG-KR43(B)G1 1/20	400 W	3000 r/min	1/20
	HG-KR73(B)G1 1/5	750 W	3000 r/min	1/5
	HG-KR73(B)G1 1/12	750 W	3000 r/min	1/12
	HG-KR73(B)G1 1/20	750 W	3000 r/min	1/20
HG-KR series With flange-output type reducer for high precision applications, flange mounting B: With electromagnetic brake	HG-KR053(B)G5 1/5 (40 × 40)	50 W	3000 r/min	1/5 (flange dimensions: 40 mm × 40 mm)
	HG-KR053(B)G5 1/5 (60 × 60)	50 W	3000 r/min	1/5 (flange dimensions: 60 mm × 60 mm)
	HG-KR053(B)G5 1/9	50 W	3000 r/min	1/9
	HG-KR053(B)G5 1/11	50 W	3000 r/min	1/11
	HG-KR053(B)G5 1/21	50 W	3000 r/min	1/21
	HG-KR053(B)G5 1/33	50 W	3000 r/min	1/33
	HG-KR053(B)G5 1/45	50 W	3000 r/min	1/45
	HG-KR13(B)G5 1/5 (40 × 40)	100 W	3000 r/min	1/5 (flange dimensions: 40 mm × 40 mm)
	HG-KR13(B)G5 1/5 (60 × 60)	100 W	3000 r/min	1/5 (flange dimensions: 60 mm × 60 mm)
	HG-KR13(B)G5 1/11	100 W	3000 r/min	1/11
	HG-KR13(B)G5 1/21	100 W	3000 r/min	1/21
	HG-KR13(B)G5 1/33	100 W	3000 r/min	1/33
	HG-KR13(B)G5 1/45	100 W	3000 r/min	1/45
	HG-KR23(B)G5 1/5	200 W	3000 r/min	1/5
	HG-KR23(B)G5 1/11	200 W	3000 r/min	1/11
	HG-KR23(B)G5 1/21	200 W	3000 r/min	1/21
	HG-KR23(B)G5 1/33	200 W	3000 r/min	1/33
	HG-KR23(B)G5 1/45	200 W	3000 r/min	1/45
	HG-KR43(B)G5 1/5	400 W	3000 r/min	1/5
	HG-KR43(B)G5 1/11	400 W	3000 r/min	1/11
	HG-KR43(B)G5 1/21	400 W	3000 r/min	1/21
	HG-KR43(B)G5 1/33	400 W	3000 r/min	1/33
	HG-KR43(B)G5 1/45	400 W	3000 r/min	1/45
	HG-KR73(B)G5 1/5	750 W	3000 r/min	1/5
	HG-KR73(B)G5 1/11	750 W	3000 r/min	1/11
	HG-KR73(B)G5 1/21	750 W	3000 r/min	1/21
	HG-KR73(B)G5 1/33	750 W	3000 r/min	1/33
	HG-KR73(B)G5 1/45	750 W	3000 r/min	1/45
HG-KR series With shaft-output type reducer for high precision applications, flange mounting B: With electromagnetic brake	HG-KR053(B)G7 1/5 (40 × 40)	50 W	3000 r/min	1/5 (flange dimensions: 40 mm × 40 mm)
	HG-KR053(B)G7 1/5 (60 × 60)	50 W	3000 r/min	1/5 (flange dimensions: 60 mm × 60 mm)
	HG-KR053(B)G7 1/9	50 W	3000 r/min	1/9
	HG-KR053(B)G7 1/11	50 W	3000 r/min	1/11
	HG-KR053(B)G7 1/21	50 W	3000 r/min	1/21

Rotary servo motors

Item		Model	Rated output	Rated speed	Reduction ratio
HG-KR series With shaft-output type reducer for high precision applications, flange mounting B: With electromagnetic brake		HG-KR053(B)G7 1/33	50 W	3000 r/min	1/33
		HG-KR053(B)G7 1/45	50 W	3000 r/min	1/45
		HG-KR13(B)G7 1/5 (40 × 40)	100 W	3000 r/min	1/5 (flange dimensions: 40 mm × 40 mm)
		HG-KR13(B)G7 1/5 (60 × 60)	100 W	3000 r/min	1/5 (flange dimensions: 60 mm × 60 mm)
		HG-KR13(B)G7 1/11	100 W	3000 r/min	1/11
		HG-KR13(B)G7 1/21	100 W	3000 r/min	1/21
		HG-KR13(B)G7 1/33	100 W	3000 r/min	1/33
		HG-KR13(B)G7 1/45	100 W	3000 r/min	1/45
		HG-KR23(B)G7 1/5	200 W	3000 r/min	1/5
		HG-KR23(B)G7 1/11	200 W	3000 r/min	1/11
		HG-KR23(B)G7 1/21	200 W	3000 r/min	1/21
		HG-KR23(B)G7 1/33	200 W	3000 r/min	1/33
		HG-KR23(B)G7 1/45	200 W	3000 r/min	1/45
		HG-KR43(B)G7 1/5	400 W	3000 r/min	1/5
		HG-KR43(B)G7 1/11	400 W	3000 r/min	1/11
		HG-KR43(B)G7 1/21	400 W	3000 r/min	1/21
		HG-KR43(B)G7 1/33	400 W	3000 r/min	1/33
		HG-KR43(B)G7 1/45	400 W	3000 r/min	1/45
		HG-KR73(B)G7 1/5	750 W	3000 r/min	1/5
		HG-KR73(B)G7 1/11	750 W	3000 r/min	1/11
		HG-KR73(B)G7 1/21	750 W	3000 r/min	1/21
		HG-KR73(B)G7 1/33	750 W	3000 r/min	1/33
		HG-KR73(B)G7 1/45	750 W	3000 r/min	1/45
HG-MR series B: With electromagnetic brake		HG-MR053(B)	50 W	3000 r/min	-
		HG-MR13(B)	100 W	3000 r/min	-
		HG-MR23(B)	200 W	3000 r/min	-
		HG-MR43(B)	400 W	3000 r/min	-
		HG-MR73(B)	750 W	3000 r/min	-
HG-SR 1000 r/min series B: With electromagnetic brake		HG-SR51(B)	0.5 kW	1000 r/min	-
		HG-SR81(B)	0.85 kW	1000 r/min	-
		HG-SR121(B)	1.2 kW	1000 r/min	-
		HG-SR201(B)	2.0 kW	1000 r/min	-
		HG-SR301(B)	3.0 kW	1000 r/min	-
		HG-SR421(B)	4.2 kW	1000 r/min	-
HG-SR 2000 r/min series B: With electromagnetic brake	200 V class	HG-SR52(B)	0.5 kW	2000 r/min	-
		HG-SR102(B)	1.0 kW	2000 r/min	-
		HG-SR152(B)	1.5 kW	2000 r/min	-
		HG-SR202(B)	2.0 kW	2000 r/min	-
		HG-SR352(B)	3.5 kW	2000 r/min	-
		HG-SR502(B)	5.0 kW	2000 r/min	-
		HG-SR702(B)	7.0 kW	2000 r/min	-
	400 V class	HG-SR524(B)	0.5 kW	2000 r/min	-
		HG-SR1024(B)	1.0 kW	2000 r/min	-
		HG-SR1524(B)	1.5 kW	2000 r/min	-
		HG-SR2024(B)	2.0 kW	2000 r/min	-
		HG-SR3524(B)	3.5 kW	2000 r/min	-
		HG-SR5024(B)	5.0 kW	2000 r/min	-
		HG-SR7024(B)	7.0 kW	2000 r/min	-

Rotary servo motors

Item		Model	Rated output	Rated speed	Reduction ratio
HG-SR 2000 r/min series With reducer for general industrial machines B: With electromagnetic brake G1: Flange mounting G1H: Foot mounting	200 V class	HG-SR52(B)G1(H) 1/6	0.5 kW	2000 r/min	1/6
		HG-SR52(B)G1(H) 1/11	0.5 kW	2000 r/min	1/11
		HG-SR52(B)G1(H) 1/17	0.5 kW	2000 r/min	1/17
		HG-SR52(B)G1(H) 1/29	0.5 kW	2000 r/min	1/29
		HG-SR52(B)G1(H) 1/35	0.5 kW	2000 r/min	1/35
		HG-SR52(B)G1(H) 1/43	0.5 kW	2000 r/min	1/43
		HG-SR52(B)G1(H) 1/59	0.5 kW	2000 r/min	1/59
		HG-SR102(B)G1(H) 1/6	1.0 kW	2000 r/min	1/6
		HG-SR102(B)G1(H) 1/11	1.0 kW	2000 r/min	1/11
		HG-SR102(B)G1(H) 1/17	1.0 kW	2000 r/min	1/17
		HG-SR102(B)G1(H) 1/29	1.0 kW	2000 r/min	1/29
		HG-SR102(B)G1(H) 1/35	1.0 kW	2000 r/min	1/35
		HG-SR102(B)G1(H) 1/43	1.0 kW	2000 r/min	1/43
		HG-SR102(B)G1(H) 1/59	1.0 kW	2000 r/min	1/59
		HG-SR152(B)G1(H) 1/6	1.5 kW	2000 r/min	1/6
		HG-SR152(B)G1(H) 1/11	1.5 kW	2000 r/min	1/11
		HG-SR152(B)G1(H) 1/17	1.5 kW	2000 r/min	1/17
		HG-SR152(B)G1(H) 1/29	1.5 kW	2000 r/min	1/29
		HG-SR152(B)G1(H) 1/35	1.5 kW	2000 r/min	1/35
		HG-SR152(B)G1(H) 1/43	1.5 kW	2000 r/min	1/43
		HG-SR152(B)G1(H) 1/59	1.5 kW	2000 r/min	1/59
		HG-SR202(B)G1(H) 1/6	2.0 kW	2000 r/min	1/6
		HG-SR202(B)G1(H) 1/11	2.0 kW	2000 r/min	1/11
		HG-SR202(B)G1(H) 1/17	2.0 kW	2000 r/min	1/17
		HG-SR202(B)G1(H) 1/29	2.0 kW	2000 r/min	1/29
		HG-SR202(B)G1(H) 1/35	2.0 kW	2000 r/min	1/35
		HG-SR202(B)G1(H) 1/43	2.0 kW	2000 r/min	1/43
		HG-SR202(B)G1(H) 1/59	2.0 kW	2000 r/min	1/59
		HG-SR352(B)G1(H) 1/6	3.5 kW	2000 r/min	1/6
		HG-SR352(B)G1(H) 1/11	3.5 kW	2000 r/min	1/11
		HG-SR352(B)G1(H) 1/17	3.5 kW	2000 r/min	1/17
		HG-SR352(B)G1(H) 1/29	3.5 kW	2000 r/min	1/29
		HG-SR352(B)G1(H) 1/35	3.5 kW	2000 r/min	1/35
		HG-SR352(B)G1(H) 1/43	3.5 kW	2000 r/min	1/43
		HG-SR352(B)G1(H) 1/59	3.5 kW	2000 r/min	1/59
		HG-SR502(B)G1(H) 1/6	5.0 kW	2000 r/min	1/6
		HG-SR502(B)G1(H) 1/11	5.0 kW	2000 r/min	1/11
		HG-SR502(B)G1(H) 1/17	5.0 kW	2000 r/min	1/17
		HG-SR502(B)G1(H) 1/29	5.0 kW	2000 r/min	1/29
		HG-SR502(B)G1(H) 1/35	5.0 kW	2000 r/min	1/35
		HG-SR502(B)G1(H) 1/43	5.0 kW	2000 r/min	1/43
		HG-SR502(B)G1(H) 1/59	5.0 kW	2000 r/min	1/59
		HG-SR702(B)G1(H) 1/6	7.0 kW	2000 r/min	1/6
		HG-SR702(B)G1(H) 1/11	7.0 kW	2000 r/min	1/11
		HG-SR702(B)G1(H) 1/17	7.0 kW	2000 r/min	1/17
		HG-SR702(B)G1(H) 1/29	7.0 kW	2000 r/min	1/29
		HG-SR702(B)G1(H) 1/35	7.0 kW	2000 r/min	1/35
		HG-SR702(B)G1(H) 1/43	7.0 kW	2000 r/min	1/43
		HG-SR702(B)G1(H) 1/59	7.0 kW	2000 r/min	1/59

Rotary servo motors

Item		Model	Rated output	Rated speed	Reduction ratio
HG-SR 2000 r/min series With reducer for general industrial machines B: With electromagnetic brake G1: Flange mounting G1H: Foot mounting	400 V class	HG-SR524(B)G1(H) 1/6	0.5 kW	2000 r/min	1/6
		HG-SR524(B)G1(H) 1/11	0.5 kW	2000 r/min	1/11
		HG-SR524(B)G1(H) 1/17	0.5 kW	2000 r/min	1/17
		HG-SR524(B)G1(H) 1/29	0.5 kW	2000 r/min	1/29
		HG-SR524(B)G1(H) 1/35	0.5 kW	2000 r/min	1/35
		HG-SR524(B)G1(H) 1/43	0.5 kW	2000 r/min	1/43
		HG-SR524(B)G1(H) 1/59	0.5 kW	2000 r/min	1/59
		HG-SR1024(B)G1(H) 1/6	1.0 kW	2000 r/min	1/6
		HG-SR1024(B)G1(H) 1/11	1.0 kW	2000 r/min	1/11
		HG-SR1024(B)G1(H) 1/17	1.0 kW	2000 r/min	1/17
		HG-SR1024(B)G1(H) 1/29	1.0 kW	2000 r/min	1/29
		HG-SR1024(B)G1(H) 1/35	1.0 kW	2000 r/min	1/35
		HG-SR1024(B)G1(H) 1/43	1.0 kW	2000 r/min	1/43
		HG-SR1024(B)G1(H) 1/59	1.0 kW	2000 r/min	1/59
		HG-SR1524(B)G1(H) 1/6	1.5 kW	2000 r/min	1/6
		HG-SR1524(B)G1(H) 1/11	1.5 kW	2000 r/min	1/11
		HG-SR1524(B)G1(H) 1/17	1.5 kW	2000 r/min	1/17
		HG-SR1524(B)G1(H) 1/29	1.5 kW	2000 r/min	1/29
		HG-SR1524(B)G1(H) 1/35	1.5 kW	2000 r/min	1/35
		HG-SR1524(B)G1(H) 1/43	1.5 kW	2000 r/min	1/43
		HG-SR1524(B)G1(H) 1/59	1.5 kW	2000 r/min	1/59
		HG-SR2024(B)G1(H) 1/6	2.0 kW	2000 r/min	1/6
		HG-SR2024(B)G1(H) 1/11	2.0 kW	2000 r/min	1/11
		HG-SR2024(B)G1(H) 1/17	2.0 kW	2000 r/min	1/17
		HG-SR2024(B)G1(H) 1/29	2.0 kW	2000 r/min	1/29
		HG-SR2024(B)G1(H) 1/35	2.0 kW	2000 r/min	1/35
		HG-SR2024(B)G1(H) 1/43	2.0 kW	2000 r/min	1/43
		HG-SR2024(B)G1(H) 1/59	2.0 kW	2000 r/min	1/59
		HG-SR3524(B)G1(H) 1/6	3.5 kW	2000 r/min	1/6
		HG-SR3524(B)G1(H) 1/11	3.5 kW	2000 r/min	1/11
		HG-SR3524(B)G1(H) 1/17	3.5 kW	2000 r/min	1/17
		HG-SR3524(B)G1(H) 1/29	3.5 kW	2000 r/min	1/29
		HG-SR3524(B)G1(H) 1/35	3.5 kW	2000 r/min	1/35
		HG-SR3524(B)G1(H) 1/43	3.5 kW	2000 r/min	1/43
		HG-SR3524(B)G1(H) 1/59	3.5 kW	2000 r/min	1/59
		HG-SR5024(B)G1(H) 1/6	5.0 kW	2000 r/min	1/6
		HG-SR5024(B)G1(H) 1/11	5.0 kW	2000 r/min	1/11
		HG-SR5024(B)G1(H) 1/17	5.0 kW	2000 r/min	1/17
		HG-SR5024(B)G1(H) 1/29	5.0 kW	2000 r/min	1/29
		HG-SR5024(B)G1(H) 1/35	5.0 kW	2000 r/min	1/35
		HG-SR5024(B)G1(H) 1/43	5.0 kW	2000 r/min	1/43
		HG-SR5024(B)G1(H) 1/59	5.0 kW	2000 r/min	1/59
		HG-SR7024(B)G1(H) 1/6	7.0 kW	2000 r/min	1/6
		HG-SR7024(B)G1(H) 1/11	7.0 kW	2000 r/min	1/11
		HG-SR7024(B)G1(H) 1/17	7.0 kW	2000 r/min	1/17
		HG-SR7024(B)G1(H) 1/29	7.0 kW	2000 r/min	1/29
		HG-SR7024(B)G1(H) 1/35	7.0 kW	2000 r/min	1/35
		HG-SR7024(B)G1(H) 1/43	7.0 kW	2000 r/min	1/43
		HG-SR7024(B)G1(H) 1/59	7.0 kW	2000 r/min	1/59

Rotary servo motors

Item		Model	Rated output	Rated speed	Reduction ratio
HG-SR 2000 r/min series With flange-output type reducer for high precision applications, flange mounting B: With electromagnetic brake	200 V class	HG-SR52(B)G5 1/5	0.5 kW	2000 r/min	1/5
		HG-SR52(B)G5 1/11	0.5 kW	2000 r/min	1/11
		HG-SR52(B)G5 1/21	0.5 kW	2000 r/min	1/21
		HG-SR52(B)G5 1/33	0.5 kW	2000 r/min	1/33
		HG-SR52(B)G5 1/45	0.5 kW	2000 r/min	1/45
		HG-SR102(B)G5 1/5	1.0 kW	2000 r/min	1/5
		HG-SR102(B)G5 1/11	1.0 kW	2000 r/min	1/11
		HG-SR102(B)G5 1/21	1.0 kW	2000 r/min	1/21
		HG-SR102(B)G5 1/33	1.0 kW	2000 r/min	1/33
		HG-SR102(B)G5 1/45	1.0 kW	2000 r/min	1/45
		HG-SR152(B)G5 1/5	1.5 kW	2000 r/min	1/5
		HG-SR152(B)G5 1/11	1.5 kW	2000 r/min	1/11
		HG-SR152(B)G5 1/21	1.5 kW	2000 r/min	1/21
		HG-SR152(B)G5 1/33	1.5 kW	2000 r/min	1/33
		HG-SR152(B)G5 1/45	1.5 kW	2000 r/min	1/45
		HG-SR202(B)G5 1/5	2.0 kW	2000 r/min	1/5
		HG-SR202(B)G5 1/11	2.0 kW	2000 r/min	1/11
		HG-SR202(B)G5 1/21	2.0 kW	2000 r/min	1/21
		HG-SR202(B)G5 1/33	2.0 kW	2000 r/min	1/33
		HG-SR202(B)G5 1/45	2.0 kW	2000 r/min	1/45
		HG-SR352(B)G5 1/5	3.5 kW	2000 r/min	1/5
		HG-SR352(B)G5 1/11	3.5 kW	2000 r/min	1/11
		HG-SR352(B)G5 1/21	3.5 kW	2000 r/min	1/21
		HG-SR502(B)G5 1/5	5.0 kW	2000 r/min	1/5
		HG-SR502(B)G5 1/11	5.0 kW	2000 r/min	1/11
		HG-SR702(B)G5 1/5	7.0 kW	2000 r/min	1/5
	400 V class	HG-SR524(B)G5 1/5	0.5 kW	2000 r/min	1/5
		HG-SR524(B)G5 1/11	0.5 kW	2000 r/min	1/11
		HG-SR524(B)G5 1/21	0.5 kW	2000 r/min	1/21
		HG-SR524(B)G5 1/33	0.5 kW	2000 r/min	1/33
		HG-SR524(B)G5 1/45	0.5 kW	2000 r/min	1/45
		HG-SR1024(B)G5 1/5	1.0 kW	2000 r/min	1/5
		HG-SR1024(B)G5 1/11	1.0 kW	2000 r/min	1/11
		HG-SR1024(B)G5 1/21	1.0 kW	2000 r/min	1/21
		HG-SR1024(B)G5 1/33	1.0 kW	2000 r/min	1/33
		HG-SR1024(B)G5 1/45	1.0 kW	2000 r/min	1/45
		HG-SR1524(B)G5 1/5	1.5 kW	2000 r/min	1/5
		HG-SR1524(B)G5 1/11	1.5 kW	2000 r/min	1/11
		HG-SR1524(B)G5 1/21	1.5 kW	2000 r/min	1/21
		HG-SR1524(B)G5 1/33	1.5 kW	2000 r/min	1/33
		HG-SR1524(B)G5 1/45	1.5 kW	2000 r/min	1/45
		HG-SR2024(B)G5 1/5	2.0 kW	2000 r/min	1/5
		HG-SR2024(B)G5 1/11	2.0 kW	2000 r/min	1/11
		HG-SR2024(B)G5 1/21	2.0 kW	2000 r/min	1/21
		HG-SR2024(B)G5 1/33	2.0 kW	2000 r/min	1/33
		HG-SR2024(B)G5 1/45	2.0 kW	2000 r/min	1/45
		HG-SR3524(B)G5 1/5	3.5 kW	2000 r/min	1/5
		HG-SR3524(B)G5 1/11	3.5 kW	2000 r/min	1/11
		HG-SR3524(B)G5 1/21	3.5 kW	2000 r/min	1/21
		HG-SR5024(B)G5 1/5	5.0 kW	2000 r/min	1/5
		HG-SR5024(B)G5 1/11	5.0 kW	2000 r/min	1/11
		HG-SR7024(B)G5 1/5	7.0 kW	2000 r/min	1/5

Rotary servo motors

Item		Model	Rated output	Rated speed	Reduction ratio
HG-SR 2000 r/min series With shaft-output type reducer for high precision applications, flange mounting B: With electromagnetic brake	200 V class	HG-SR52(B)G7 1/5	0.5 kW	2000 r/min	1/5
		HG-SR52(B)G7 1/11	0.5 kW	2000 r/min	1/11
		HG-SR52(B)G7 1/21	0.5 kW	2000 r/min	1/21
		HG-SR52(B)G7 1/33	0.5 kW	2000 r/min	1/33
		HG-SR52(B)G7 1/45	0.5 kW	2000 r/min	1/45
		HG-SR102(B)G7 1/5	1.0 kW	2000 r/min	1/5
		HG-SR102(B)G7 1/11	1.0 kW	2000 r/min	1/11
		HG-SR102(B)G7 1/21	1.0 kW	2000 r/min	1/21
		HG-SR102(B)G7 1/33	1.0 kW	2000 r/min	1/33
		HG-SR102(B)G7 1/45	1.0 kW	2000 r/min	1/45
		HG-SR152(B)G7 1/5	1.5 kW	2000 r/min	1/5
		HG-SR152(B)G7 1/11	1.5 kW	2000 r/min	1/11
		HG-SR152(B)G7 1/21	1.5 kW	2000 r/min	1/21
		HG-SR152(B)G7 1/33	1.5 kW	2000 r/min	1/33
		HG-SR152(B)G7 1/45	1.5 kW	2000 r/min	1/45
		HG-SR202(B)G7 1/5	2.0 kW	2000 r/min	1/5
		HG-SR202(B)G7 1/11	2.0 kW	2000 r/min	1/11
		HG-SR202(B)G7 1/21	2.0 kW	2000 r/min	1/21
		HG-SR202(B)G7 1/33	2.0 kW	2000 r/min	1/33
		HG-SR202(B)G7 1/45	2.0 kW	2000 r/min	1/45
		HG-SR352(B)G7 1/5	3.5 kW	2000 r/min	1/5
		HG-SR352(B)G7 1/11	3.5 kW	2000 r/min	1/11
		HG-SR352(B)G7 1/21	3.5 kW	2000 r/min	1/21
		HG-SR502(B)G7 1/5	5.0 kW	2000 r/min	1/5
		HG-SR502(B)G7 1/11	5.0 kW	2000 r/min	1/11
		HG-SR702(B)G7 1/5	7.0 kW	2000 r/min	1/5
	400 V class	HG-SR524(B)G7 1/5	0.5 kW	2000 r/min	1/5
		HG-SR524(B)G7 1/11	0.5 kW	2000 r/min	1/11
		HG-SR524(B)G7 1/21	0.5 kW	2000 r/min	1/21
		HG-SR524(B)G7 1/33	0.5 kW	2000 r/min	1/33
		HG-SR524(B)G7 1/45	0.5 kW	2000 r/min	1/45
		HG-SR1024(B)G7 1/5	1.0 kW	2000 r/min	1/5
		HG-SR1024(B)G7 1/11	1.0 kW	2000 r/min	1/11
		HG-SR1024(B)G7 1/21	1.0 kW	2000 r/min	1/21
		HG-SR1024(B)G7 1/33	1.0 kW	2000 r/min	1/33
		HG-SR1024(B)G7 1/45	1.0 kW	2000 r/min	1/45
		HG-SR1524(B)G7 1/5	1.5 kW	2000 r/min	1/5
		HG-SR1524(B)G7 1/11	1.5 kW	2000 r/min	1/11
		HG-SR1524(B)G7 1/21	1.5 kW	2000 r/min	1/21
		HG-SR1524(B)G7 1/33	1.5 kW	2000 r/min	1/33
		HG-SR1524(B)G7 1/45	1.5 kW	2000 r/min	1/45
		HG-SR2024(B)G7 1/5	2.0 kW	2000 r/min	1/5
		HG-SR2024(B)G7 1/11	2.0 kW	2000 r/min	1/11
		HG-SR2024(B)G7 1/21	2.0 kW	2000 r/min	1/21
		HG-SR2024(B)G7 1/33	2.0 kW	2000 r/min	1/33
		HG-SR2024(B)G7 1/45	2.0 kW	2000 r/min	1/45
		HG-SR3524(B)G7 1/5	3.5 kW	2000 r/min	1/5
		HG-SR3524(B)G7 1/11	3.5 kW	2000 r/min	1/11
		HG-SR3524(B)G7 1/21	3.5 kW	2000 r/min	1/21
		HG-SR5024(B)G7 1/5	5.0 kW	2000 r/min	1/5
		HG-SR5024(B)G7 1/11	5.0 kW	2000 r/min	1/11
		HG-SR7024(B)G7 1/5	7.0 kW	2000 r/min	1/5

Rotary servo motors

Item		Model	Rated output	Rated speed	Reduction ratio
HG-JR 1500 r/min series B: With electromagnetic brake	200 V class	HG-JR11K1M(B)	11 kW	1500 r/min	-
		HG-JR15K1M(B)	15 kW	1500 r/min	-
		HG-JR22K1M	22 kW	1500 r/min	-
	400 V class	HG-JR11K1M4(B)	11 kW	1500 r/min	-
		HG-JR15K1M4(B)	15 kW	1500 r/min	-
		HG-JR22K1M4	22 kW	1500 r/min	-
HG-JR 3000 r/min series B: With electromagnetic brake	200 V class	HG-JR53(B)	0.5 kW	3000 r/min	-
		HG-JR73(B)	0.75 kW	3000 r/min	-
		HG-JR103(B)	1.0 kW	3000 r/min	-
		HG-JR153(B)	1.5 kW	3000 r/min	-
		HG-JR203(B)	2.0 kW	3000 r/min	-
		HG-JR353(B)	3.3 kW (3.5 kW)	3000 r/min	-
		HG-JR503(B)	5.0 kW	3000 r/min	-
		HG-JR703(B)	7.0 kW	3000 r/min	-
		HG-JR903(B)	9.0 kW	3000 r/min	-
	400 V class	HG-JR534(B)	0.5 kW	3000 r/min	-
		HG-JR734(B)	0.75 kW	3000 r/min	-
		HG-JR1034(B)	1.0 kW	3000 r/min	-
		HG-JR1534(B)	1.5 kW	3000 r/min	-
		HG-JR2034(B)	2.0 kW	3000 r/min	-
		HG-JR3534(B)	3.3 kW (3.5 kW)	3000 r/min	-
		HG-JR5034(B)	5.0 kW	3000 r/min	-
		HG-JR7034(B)	7.0 kW	3000 r/min	-
		HG-JR9034(B)	9.0 kW	3000 r/min	-
HG-RR series B: With electromagnetic brake		HG-RR103(B)	1.0 kW	3000 r/min	-
		HG-RR153(B)	1.5 kW	3000 r/min	-
		HG-RR203(B)	2.0 kW	3000 r/min	-
		HG-RR353(B)	3.5 kW	3000 r/min	-
		HG-RR503(B)	5.0 kW	3000 r/min	-
HG-UR series B: With electromagnetic brake		HG-UR72(B)	0.75 kW	2000 r/min	-
		HG-UR152(B)	1.5 kW	2000 r/min	-
		HG-UR202(B)	2.0 kW	2000 r/min	-
		HG-UR352(B)	3.5 kW	2000 r/min	-
		HG-UR502(B)	5.0 kW	2000 r/min	-

Linear servo motors

Item		Model	Continuous thrust	Maximum thrust	Maximum speed	Length
LM-H3 series Primary side (coil)		LM-H3P2A-07P-BSS0	70 N	175 N	3.0 m/s	-
		LM-H3P3A-12P-CSS0	120 N	300 N	3.0 m/s	-
		LM-H3P3B-24P-CSS0	240 N	600 N	3.0 m/s	-
		LM-H3P3C-36P-CSS0	360 N	900 N	3.0 m/s	-
		LM-H3P3D-48P-CSS0	480 N	1200 N	3.0 m/s	-
		LM-H3P7A-24P-ASS0	240 N	600 N	3.0 m/s	-
		LM-H3P7B-48P-ASS0	480 N	1200 N	3.0 m/s	-
		LM-H3P7C-72P-ASS0	720 N	1800 N	3.0 m/s	-
		LM-H3P7D-96P-ASS0	960 N	2400 N	3.0 m/s	-
LM-H3 series Secondary side (magnet)		LM-H3S20-288-BSS0	-	-	-	288 mm
		LM-H3S20-384-BSS0	-	-	-	384 mm
		LM-H3S20-480-BSS0	-	-	-	480 mm
		LM-H3S20-768-BSS0	-	-	-	768 mm
		LM-H3S30-288-CSS0	-	-	-	288 mm
		LM-H3S30-384-CSS0	-	-	-	384 mm
		LM-H3S30-480-CSS0	-	-	-	480 mm
		LM-H3S30-768-CSS0	-	-	-	768 mm
		LM-H3S70-288-ASS0	-	-	-	288 mm
		LM-H3S70-384-ASS0	-	-	-	384 mm
		LM-H3S70-480-ASS0	-	-	-	480 mm
		LM-H3S70-768-ASS0	-	-	-	768 mm
LM-F series Primary side (coil)	200 V class	LM-FP2B-06M-1SS0	300 N (natural cooling) /600 N (liquid cooling)	1800 N	2.0 m/s	-
		LM-FP2D-12M-1SS0	600 N (natural cooling) /1200 N (liquid cooling)	3600 N	2.0 m/s	-
		LM-FP2F-18M-1SS0	900 N (natural cooling) /1800 N (liquid cooling)	5400 N	2.0 m/s	-
		LM-FP4B-12M-1SS0	600 N (natural cooling) /1200 N (liquid cooling)	3600 N	2.0 m/s	-
		LM-FP4D-24M-1SS0	1200 N (natural cooling) /2400 N (liquid cooling)	7200 N	2.0 m/s	-
		LM-FP4F-36M-1SS0	1800 N (natural cooling) /3600 N (liquid cooling)	10800 N	2.0 m/s	-
		LM-FP4H-48M-1SS0	2400 N (natural cooling) /4800 N (liquid cooling)	14400 N	2.0 m/s	-
	400 V class	LM-FP5H-60M-1SS0	3000 N (natural cooling) /6000 N (liquid cooling)	18000 N	2.0 m/s	-
LM-F series Secondary side (magnet)	200 V class	LM-FS20-480-1SS0	-	-	-	480 mm
		LM-FS20-576-1SS0	-	-	-	576 mm
		LM-FS40-480-1SS0	-	-	-	480 mm
		LM-FS40-576-1SS0	-	-	-	576 mm
	400 V class	LM-FS50-480-1SS0	-	-	-	480 mm
		LM-FS50-576-1SS0	-	-	-	576 mm
LM-K2 series Primary side (coil)		LM-K2P1A-01M-2SS1	120 N	300 N	2.0 m/s	-
		LM-K2P1C-03M-2SS1	360 N	900 N	2.0 m/s	-
		LM-K2P2A-02M-1SS1	240 N	600 N	2.0 m/s	-
		LM-K2P2C-07M-1SS1	720 N	1800 N	2.0 m/s	-
		LM-K2P2E-12M-1SS1	1200 N	3000 N	2.0 m/s	-
		LM-K2P3C-14M-1SS1	1440 N	3600 N	2.0 m/s	-
		LM-K2P3E-24M-1SS1	2400 N	6000 N	2.0 m/s	-
LM-K2 series Secondary side (magnet)		LM-K2S10-288-2SS1	-	-	-	288 mm
		LM-K2S10-384-2SS1	-	-	-	384 mm
		LM-K2S10-480-2SS1	-	-	-	480 mm
		LM-K2S10-768-2SS1	-	-	-	768 mm
		LM-K2S20-288-1SS1	-	-	-	288 mm
		LM-K2S20-384-1SS1	-	-	-	384 mm
		LM-K2S20-480-1SS1	-	-	-	480 mm
		LM-K2S20-768-1SS1	-	-	-	768 mm
		LM-K2S30-288-1SS1	-	-	-	288 mm
		LM-K2S30-384-1SS1	-	-	-	384 mm
		LM-K2S30-480-1SS1	-	-	-	480 mm
		LM-K2S30-768-1SS1	-	-	-	768 mm

Linear servo motors

Item	Model	Continuous thrust	Maximum thrust	Maximum speed	Length
LM-U2 series Primary side (coil)	LM-U2PAB-05M-0SS0	50 N	150 N	2.0 m/s	-
	LM-U2PAD-10M-0SS0	100 N	300 N	2.0 m/s	-
	LM-U2PAF-15M-0SS0	150 N	450 N	2.0 m/s	-
	LM-U2PBB-07M-1SS0	75 N	225 N	2.0 m/s	-
	LM-U2PBD-15M-1SS0	150 N	450 N	2.0 m/s	-
	LM-U2PBF-22M-1SS0	225 N	675 N	2.0 m/s	-
	LM-U2P2B-40M-2SS0	400 N	1600 N	2.0 m/s	-
	LM-U2P2C-60M-2SS0	600 N	2400 N	2.0 m/s	-
	LM-U2P2D-80M-2SS0	800 N	3200 N	2.0 m/s	-
LM-U2 series Secondary side (magnet)	LM-U2SA0-240-0SS0	-	-	-	240 mm
	LM-U2SA0-300-0SS0	-	-	-	300 mm
	LM-U2SA0-420-0SS0	-	-	-	420 mm
	LM-U2SB0-240-1SS0	-	-	-	240 mm
	LM-U2SB0-300-1SS0	-	-	-	300 mm
	LM-U2SB0-420-1SS0	-	-	-	420 mm
	LM-U2S20-300-2SS0	-	-	-	300 mm
	LM-U2S20-480-2SS0	-	-	-	480 mm

Direct drive motors

Item	Model	Rated torque	Maximum torque	Rated speed
TM-RFM series	TM-RFM002C20	2 N•m	6 N•m	200 r/min
	TM-RFM004C20	4 N•m	12 N•m	200 r/min
	TM-RFM006C20	6 N•m	18 N•m	200 r/min
	TM-RFM006E20	6 N•m	18 N•m	200 r/min
	TM-RFM012E20	12 N•m	36 N•m	200 r/min
	TM-RFM018E20	18 N•m	54 N•m	200 r/min
	TM-RFM012G20	12 N•m	36 N•m	200 r/min
	TM-RFM048G20	48 N•m	144 N•m	200 r/min
	TM-RFM072G20	72 N•m	216 N•m	200 r/min
	TM-RFM040J10	40 N•m	120 N•m	100 r/min
	TM-RFM120J10	120 N•m	360 N•m	100 r/min
	TM-RFM240J10	240 N•m	720 N•m	100 r/min

Encoder cables/Junction cables

Item	Model	Length	Bending life	IP rating	Application
Encoder cable (load-side lead)	MR-J3ENCBL2M-A1-H	2 m	Long bending life	IP65	For HG-KR/HG-MR (direct connection type)
	MR-J3ENCBL5M-A1-H	5 m	Long bending life	IP65	For HG-KR/HG-MR (direct connection type)
	MR-J3ENCBL10M-A1-H	10 m	Long bending life	IP65	For HG-KR/HG-MR (direct connection type)
	MR-J3ENCBL2M-A1-L	2 m	Standard	IP65	For HG-KR/HG-MR (direct connection type)
	MR-J3ENCBL5M-A1-L	5 m	Standard	IP65	For HG-KR/HG-MR (direct connection type)
	MR-J3ENCBL10M-A1-L	10 m	Standard	IP65	For HG-KR/HG-MR (direct connection type)
Encoder cable (opposite to load-side lead)	MR-J3ENCBL2M-A2-H	2 m	Long bending life	IP65	For HG-KR/HG-MR (direct connection type)
	MR-J3ENCBL5M-A2-H	5 m	Long bending life	IP65	For HG-KR/HG-MR (direct connection type)
	MR-J3ENCBL10M-A2-H	10 m	Long bending life	IP65	For HG-KR/HG-MR (direct connection type)
	MR-J3ENCBL2M-A2-L	2 m	Standard	IP65	For HG-KR/HG-MR (direct connection type)
	MR-J3ENCBL5M-A2-L	5 m	Standard	IP65	For HG-KR/HG-MR (direct connection type)
	MR-J3ENCBL10M-A2-L	10 m	Standard	IP65	For HG-KR/HG-MR (direct connection type)
Encoder cable (load-side lead)	MR-J3JCBL03M-A1-L	0.3 m	Standard	IP20	For HG-KR/HG-MR (junction type) (Note 1)
Encoder cable (opposite to load-side lead)	MR-J3JCBL03M-A2-L	0.3 m	Standard	IP20	For HG-KR/HG-MR (junction type) (Note 1)
Encoder cable	MR-EKCBL20M-H	20 m	Long bending life	IP20	For HG-KR/HG-MR (junction type) (Note 2)
	MR-EKCBL30M-H	30 m	Long bending life	IP20	For HG-KR/HG-MR (junction type) (Note 2)
	MR-EKCBL40M-H	40 m	Long bending life	IP20	For HG-KR/HG-MR (junction type) (Note 2)
	MR-EKCBL50M-H	50 m	Long bending life	IP20	For HG-KR/HG-MR (junction type) (Note 2)
	MR-EKCBL20M-L	20 m	Standard	IP20	For HG-KR/HG-MR (junction type) (Note 2)
	MR-EKCBL30M-L	30 m	Standard	IP20	For HG-KR/HG-MR (junction type) (Note 2)
	MR-EKCBL2M-H	2 m	Long bending life	IP20	For connecting load-side encoder or linear encoder
	MR-EKCBL5M-H	5 m	Long bending life	IP20	For connecting load-side encoder or linear encoder
Encoder cable (load-side lead)	MR-J3JSCBL03M-A1-L	0.3 m	Standard	IP65	For HG-KR/HG-MR (junction type) (Note 3)
Encoder cable (opposite to load-side lead)	MR-J3JSCBL03M-A2-L	0.3 m	Standard	IP65	For HG-KR/HG-MR (junction type) (Note 3)
Encoder cable	MR-J3ENSCBL2M-H	2 m	Long bending life	IP67	For HG-KR/HG-MR (junction type) (Note 4), For HG-SR/HG-JR53(4), 73(4), 103(4), 153(4), 203(4), 353(4), 503(4), 703(4), 903(4)/ HG-RR/HG-UR (direct connection type)
	MR-J3ENSCBL5M-H	5 m	Long bending life	IP67	
	MR-J3ENSCBL10M-H	10 m	Long bending life	IP67	
	MR-J3ENSCBL20M-H	20 m	Long bending life	IP67	
	MR-J3ENSCBL30M-H	30 m	Long bending life	IP67	
	MR-J3ENSCBL40M-H	40 m	Long bending life	IP67	
	MR-J3ENSCBL50M-H	50 m	Long bending life	IP67	
	MR-J3ENSCBL2M-L	2 m	Standard	IP67	For HG-KR/HG-MR (junction type) (Note 4), For HG-SR/HG-JR53(4), 73(4), 103(4), 153(4), 203(4), 353(4), 503(4), 703(4), 903(4)/ HG-RR/HG-UR (direct connection type)
	MR-J3ENSCBL5M-L	5 m	Standard	IP67	
	MR-J3ENSCBL10M-L	10 m	Standard	IP67	
	MR-J3ENSCBL20M-L	20 m	Standard	IP67	
	MR-J3ENSCBL30M-L	30 m	Standard	IP67	
	MR-ENECBL2M-H-MTH	2 m	Long bending life	IP67	For HG-JR11K1M(4), 15K1M(4), 22K1M(4)
	MR-ENECBL5M-H-MTH	5 m	Long bending life	IP67	
	MR-ENECBL10M-H-MTH	10 m	Long bending life	IP67	
	MR-ENECBL20M-H-MTH	20 m	Long bending life	IP67	
	MR-ENECBL30M-H-MTH	30 m	Long bending life	IP67	
	MR-ENECBL40M-H-MTH	40 m	Long bending life	IP67	
	MR-ENECBL50M-H-MTH	50 m	Long bending life	IP67	
Junction cable for fully closed loop control	MR-J4FCCBL03M	0.3 m	-	-	For branching load-side encoder
Junction cable for linear servo motor	MR-J4THCBL03M	0.3 m	-	-	For branching thermistor

Notes:

1. Use this in combination with MR-EKCBL_M-H (20 m to 50 m), MR-EKCBL_M-L (20 m or 30 m), or MR-ECNM.
2. Use this in combination with MR-J3JCBL03M-A1-L or MR-J3JCBL03M-A2-L.
3. Use this in combination with MR-J3ENSCBL_M-H, MR-J3ENSCBL_M-L, or MR-J3SCNS.
4. Use this in combination with MR-J3JSCBL03M-A1-L or MR-J3JSCBL03M-A2-L when using for HG-KR or HG-MR series.

Encoder connector sets/Junction connector sets

Item	Model	Description	IP rating	Application
Encoder connector set (one-touch connection type)	MR-J3SCNS	Straight type Junction connector or encoder connector × 1, Servo amplifier connector × 1	IP67	For HG-KR/HG-MR (junction type) (Note 2) For HG-SR/HG-JR53(4), 73(4), 103(4), 153(4), 203(4), 353(4), 503(4), 703(4), 903(4)/ HG-RR/HG-UR (direct connection type)
Encoder connector set (screw type)	MR-ENCNS2	Straight type Encoder connector × 1, Servo amplifier connector × 1	IP67	For HG-SR/HG-JR53(4), 73(4), 103(4), 153(4), 203(4), 353(4), 503(4), 703(4), 903(4)/ HG-RR/HG-UR
Encoder connector set (one-touch connection type)	MR-J3SCNSA	Angle type Encoder connector × 1, Servo amplifier connector × 1	IP67	For HG-SR/HG-JR53(4), 73(4), 103(4), 153(4), 203(4), 353(4), 503(4), 703(4), 903(4)/ HG-RR/HG-UR
Encoder connector set (screw type)	MR-ENCNS2A	Angle type Encoder connector × 1, Servo amplifier connector × 1	IP67	For HG-SR/HG-JR53(4), 73(4), 103(4), 153(4), 203(4), 353(4), 503(4), 703(4), 903(4)/ HG-RR/HG-UR
Encoder connector set	MR-ECNM	Junction connector × 1, Servo amplifier connector × 1	IP20	For HG-KR/HG-MR (junction type) (Note 1), For connecting load-side encoder or linear encoder
	MR-ENECNS	Straight type Encoder connector × 1, Servo amplifier connector × 1	IP67	For HG-JR11K1M(4), 15K1M(4), 22K1M(4)
	MR-J3CN2	Servo amplifier connector × 1	-	For connecting load-side encoder, linear encoder, or thermistor
	MR-J3DDCNS	Encoder connector or absolute position storage unit connector × 1, Servo amplifier connector × 1	IP67	For TM-RFM (connecting direct drive motor and servo amplifier, or absolute position storage unit and servo amplifier)
	MR-J3DDSPS	Encoder connector × 1, Absolute position storage unit connector × 1	IP67	For TM-RFM (connecting direct drive motor and absolute position storage unit)
Connector set	MR-J3THMCN2	Junction connector × 2, Servo amplifier connector × 1	-	For fully closed loop control or branching thermistor

Notes:

1. Use this in combination with MR-J3JCBL03M-A1-L or MR-J3JCBL03M-A2-L.
2. Use this in combination with MR-J3JSCBL03M-A1-L or MR-J3JSCBL03M-A2-L when using for HG-KR or HG-MR series.

Servo motor power cables

Item	Model	Length	Bending life	IP rating	Application
Servo motor power cable (load-side lead, lead-out)	MR-PWS1CBL2M-A1-H	2 m	Long bending life	IP65	For HG-KR/HG-MR (direct connection type)
	MR-PWS1CBL5M-A1-H	5 m	Long bending life	IP65	For HG-KR/HG-MR (direct connection type)
	MR-PWS1CBL10M-A1-H	10 m	Long bending life	IP65	For HG-KR/HG-MR (direct connection type)
	MR-PWS1CBL2M-A1-L	2 m	Standard	IP65	For HG-KR/HG-MR (direct connection type)
	MR-PWS1CBL5M-A1-L	5 m	Standard	IP65	For HG-KR/HG-MR (direct connection type)
	MR-PWS1CBL10M-A1-L	10 m	Standard	IP65	For HG-KR/HG-MR (direct connection type)
Servo motor power cable (opposite to load-side lead, lead-out)	MR-PWS1CBL2M-A2-H	2 m	Long bending life	IP65	For HG-KR/HG-MR (direct connection type)
	MR-PWS1CBL5M-A2-H	5 m	Long bending life	IP65	For HG-KR/HG-MR (direct connection type)
	MR-PWS1CBL10M-A2-H	10 m	Long bending life	IP65	For HG-KR/HG-MR (direct connection type)
	MR-PWS1CBL2M-A2-L	2 m	Standard	IP65	For HG-KR/HG-MR (direct connection type)
	MR-PWS1CBL5M-A2-L	5 m	Standard	IP65	For HG-KR/HG-MR (direct connection type)
	MR-PWS1CBL10M-A2-L	10 m	Standard	IP65	For HG-KR/HG-MR (direct connection type)
Servo motor power cable (load-side lead, lead-out)	MR-PWS2CBL03M-A1-L	0.3 m	Standard	IP55	For HG-KR/HG-MR (junction type)
Servo motor power cable (opposite to load-side lead, lead-out)	MR-PWS2CBL03M-A2-L	0.3 m	Standard	IP55	For HG-KR/HG-MR (junction type)

Servo motor power connector sets

Item	Model	Description	IP rating	Application
Servo motor power connector set EN compliant	MR-PWCNF	Straight type Power connector × 1	IP67	For TM-RFM_C20, _E20
	MR-PWCNS4	Straight type Power connector × 1	IP67	For HG-SR51, 81, 52(4), 102(4), 152(4)/ HG-JR53(4), 73(4), 103(4), 153(4), 203(4), 3534, 5034/ TM-RFM_G20
	MR-PWCNS5	Straight type Power connector × 1	IP67	For HG-SR121, 201, 301, 202(4), 352(4), 502(4)/HG-JR353, 503/ TM-RFM040J10, 120J10
	MR-PWCNS3	Straight type Power connector × 1	IP67	For HG-SR421, 702(4)/HG-JR703(4), 903(4), 11K1M(4), 15K1M(4)/ TM-RFM240J10
	MR-PWCNS1	Straight type Power connector × 1	IP67	For HG-RR103, 153, 203/ HG-UR72, 152
	MR-PWCNS2	Straight type Power connector × 1	IP67	For HG-RR353, 503/ HG-UR202, 352, 502

Electromagnetic brake cables

Item	Model	Length	Bending life	IP rating	Application
Electromagnetic brake cable (load-side lead, lead-out)	MR-BKS1CBL2M-A1-H	2 m	Long bending life	IP65	For HG-KR/HG-MR (direct connection type)
	MR-BKS1CBL5M-A1-H	5 m	Long bending life	IP65	For HG-KR/HG-MR (direct connection type)
	MR-BKS1CBL10M-A1-H	10 m	Long bending life	IP65	For HG-KR/HG-MR (direct connection type)
	MR-BKS1CBL2M-A1-L	2 m	Standard	IP65	For HG-KR/HG-MR (direct connection type)
	MR-BKS1CBL5M-A1-L	5 m	Standard	IP65	For HG-KR/HG-MR (direct connection type)
	MR-BKS1CBL10M-A1-L	10 m	Standard	IP65	For HG-KR/HG-MR (direct connection type)
Electromagnetic brake cable (opposite to load-side lead, lead-out)	MR-BKS1CBL2M-A2-H	2 m	Long bending life	IP65	For HG-KR/HG-MR (direct connection type)
	MR-BKS1CBL5M-A2-H	5 m	Long bending life	IP65	For HG-KR/HG-MR (direct connection type)
	MR-BKS1CBL10M-A2-H	10 m	Long bending life	IP65	For HG-KR/HG-MR (direct connection type)
	MR-BKS1CBL2M-A2-L	2 m	Standard	IP65	For HG-KR/HG-MR (direct connection type)
	MR-BKS1CBL5M-A2-L	5 m	Standard	IP65	For HG-KR/HG-MR (direct connection type)
	MR-BKS1CBL10M-A2-L	10 m	Standard	IP65	For HG-KR/HG-MR (direct connection type)
Electromagnetic brake cable (load-side lead, lead-out)	MR-BKS2CBL03M-A1-L	0.3 m	Standard	IP55	For HG-KR/HG-MR (junction type)
Electromagnetic brake cable (opposite to load-side lead, lead-out)	MR-BKS2CBL03M-A2-L	0.3 m	Standard	IP55	For HG-KR/HG-MR (junction type)

Electromagnetic brake connector sets

Item	Model	Description	IP rating	Application
Electromagnetic brake connector set (one-touch connection type)	MR-BKCNS1	Straight type, Electromagnetic brake connector × 1	IP67	For HG-SR/HG-JR53(4)B, 73(4)B, 103(4)B, 153(4)B, 203(4)B, 353(4)B, 503(4)B, 703(4)B, 903(4)B
Electromagnetic brake connector set (screw type)	MR-BKCNS2	Straight type, Electromagnetic brake connector × 1	IP67	For HG-SR/HG-JR53(4)B, 73(4)B, 103(4)B, 153(4)B, 203(4)B, 353(4)B, 503(4)B, 703(4)B, 903(4)B
Electromagnetic brake connector set (one-touch connection type)	MR-BKCNS1A	Angle type, Electromagnetic brake connector × 1	IP67	For HG-SR/HG-JR53(4)B, 73(4)B, 103(4)B, 153(4)B, 203(4)B, 353(4)B, 503(4)B, 703(4)B, 903(4)B
Electromagnetic brake connector set (screw type)	MR-BKCNS2A	Angle type, Electromagnetic brake connector × 1	IP67	For HG-SR/HG-JR53(4)B, 73(4)B, 103(4)B, 153(4)B, 203(4)B, 353(4)B, 503(4)B, 703(4)B, 903(4)B
Electromagnetic brake connector set	MR-BKCN	Straight type, Electromagnetic brake connector × 1	IP67	For HG-JR11K1M(4)B, 15K1M(4)B/ HG-UR202B, 352B, 502B

SSCNET III cables/SSCNET III connector set

Item	Model	Length	Bending life	IP rating	Application
SSCNET III cable (standard cord inside cabinet) compatible with SSCNETⅢ(/H)	MR-J3BUS015M	0.15 m	Standard	-	For MR-J4-B_/ B_-RJ, MR-J4W_-B
	MR-J3BUS03M	0.3 m	Standard	-	For MR-J4-B_/ B_-RJ, MR-J4W_-B
	MR-J3BUS05M	0.5 m	Standard	-	For MR-J4-B_/ B_-RJ, MR-J4W_-B
	MR-J3BUS1M	1 m	Standard	-	For MR-J4-B_/ B_-RJ, MR-J4W_-B
	MR-J3BUS3M	3 m	Standard	-	For MR-J4-B_/ B_-RJ, MR-J4W_-B
SSCNET III cable (standard cable outside cabinet) compatible with SSCNETⅢ(/H)	MR-J3BUS5M-A	5 m	Standard	-	For MR-J4-B_/ B_-RJ, MR-J4W_-B
	MR-J3BUS10M-A	10 m	Standard	-	For MR-J4-B_/ B_-RJ, MR-J4W_-B
	MR-J3BUS20M-A	20 m	Standard	-	For MR-J4-B_/ B_-RJ, MR-J4W_-B
SSCNET III cable (long distance cable) compatible with SSCNETⅢ(/H)	MR-J3BUS30M-B	30 m	Long bending life	-	For MR-J4-B_/ B_-RJ, MR-J4W_-B
	MR-J3BUS40M-B	40 m	Long bending life	-	For MR-J4-B_/ B_-RJ, MR-J4W_-B
	MR-J3BUS50M-B	50 m	Long bending life	-	For MR-J4-B_/ B_-RJ, MR-J4W_-B
SSCNET III connector set compatible with SSCNETⅢ(/H)	MR-J3BCN1	-	-	-	For MR-J4-B_/ B_-RJ, MR-J4W_-B
					For MR-J4-B_/ B_-RJ, MR-J4W_-B

Junction terminal blocks/Junction terminal block cables

Item	Model	Length	Application
Junction terminal block (26 pins)	MR-TB26A	-	For MR-J4W_-B
Junction terminal block cable (for MR-TB26A)	MR-TBNATBL05M	0.5 m	For connecting MR-J4W_-B and MR-TB26A
	MR-TBNATBL1M	1 m	For connecting MR-J4W_-B and MR-TB26A
Junction terminal block (50 pins)	MR-TB50	-	For MR-J4-A_/ A_-RJ
Junction terminal block cable (for MR-TB50)	MR-J2M-CN1TBL05M	0.5 m	For connecting MR-J4-A_/ A_-RJ and MR-TB50
	MR-J2M-CN1TBL1M	1 m	For connecting MR-J4-A_/ A_-RJ and MR-TB50

Batteries/Battery case/Battery cables

Item	Model	Length	Application
Battery	MR-BAT6V1SET	-	For MR-J4-B_/ B_-RJ/ B_-RJ010, MR-J4-A_/ A_-RJ
	MR-BAT6V1	-	For MR-BT6VCASE
Battery for junction battery cable	MR-BAT6V1BJ	-	For MR-BT6VCBL03M
Junction battery cable	MR-BT6VCBL03M	0.3 m	For MR-J4-B_/ B_-RJ/ B_-RJ010, MR-J4-A_/ A_-RJ
Battery case	MR-BT6VCASE	-	For MR-J4W_-B
Battery cable	MR-BT6V1CBL03M	0.3 m	For connecting MR-J4W_-B and MR-BT6VCASE
	MR-BT6V1CBL1M	1 m	For connecting MR-J4W_-B and MR-BT6VCASE
Junction battery cable	MR-BT6V2CBL03M	0.3 m	For connecting MR-J4W_-B and MR-BT6V1CBL_M
	MR-BT6V2CBL1M	1 m	For connecting MR-J4W_-B and MR-BT6V1CBL_M

Regenerative options

Item	Model	Tolerable regenerative power	Resistance value	Application
Regenerative option (200 V AC/100 V AC)	MR-RB032	30 W	40 Ω	For MR-J4-10B(1)/ B(1)-RJ/ B-RJ010 to 100B/ B-RJ/ B-RJ010 and MR-J4-10A(1)/ A(1)-RJ to 100A/ A-RJ
	MR-RB12	100 W	40 Ω	For MR-J4-20B(1)/ B(1)-RJ/ B-RJ010 to 100B/ B-RJ/ B-RJ010 and MR-J4-20A(1)/ A(1)-RJ to 100A/ A-RJ
	MR-RB30	300 W	13 Ω	For MR-J4-200B/ B-RJ/ B-RJ010 and MR-J4-200A/ A-RJ
	MR-RB3N	300 W	9 Ω	For MR-J4-350B/ B-RJ/ B-RJ010, MR-J4-350A/ A-RJ, and MR-J4W2-77B, 1010B
	MR-RB31	300 W	6.7 Ω	For MR-J4-500B/ B-RJ/ B-RJ010, 700B/ B-RJ/ B-RJ010 and MR-J4-500A/ A-RJ, 700A/ A-RJ
	MR-RB32	300 W	40 Ω	For MR-J4-70B/ B-RJ/ B-RJ010, 100B/ B-RJ/ B-RJ010 and MR-J4-70A/ A-RJ, 100A/ A-RJ
	MR-RB50	500 W	13 Ω	For MR-J4-200B/ B-RJ/ B-RJ010 and MR-J4-200A/ A-RJ
	MR-RB5N	500 W	9 Ω	For MR-J4-350B/ B-RJ/ B-RJ010 and MR-J4-350A/ A-RJ
	MR-RB51	500 W	6.7 Ω	For MR-J4-500B/ B-RJ/ B-RJ010, 700B/ B-RJ/ B-RJ010 and MR-J4-500A/ A-RJ, 700A/ A-RJ
	MR-RB5R	500 (800) W	3.2 Ω	For MR-J4-11KB/ B-RJ/ B-RJ010 and MR-J4-11KA/ A-RJ
	MR-RB9F	850 (1300) W	3 Ω	For MR-J4-15KB/ B-RJ/ B-RJ010 and MR-J4-15KA/ A-RJ
	MR-RB9T	850 (1300) W	2.5 Ω	For MR-J4-22KB/ B-RJ/ B-RJ010 and MR-J4-22KA/ A-RJ
	MR-RB14	100 W	26 Ω	For MR-J4W2-22B, 44B and MR-J4W3-222B, 444B
	MR-RB34	300 W	26 Ω	For MR-J4W3-222B, 444B
Regenerative option (400 V AC)	MR-RB1H-4	100 W	82 Ω	For MR-J4-60B4/ B4-RJ, 100B4/ B4-RJ and MR-J4-60A4/ A4-RJ, 100A4/ A4-RJ
	MR-RB3M-4	300 W	120 Ω	For MR-J4-60B4/ B4-RJ, 100B4/ B4-RJ and MR-J4-60A4/ A4-RJ, 100A4/ A4-RJ
	MR-RB3G-4	300 W	47 Ω	For MR-J4-200B4/ B4-RJ, 350B4/ B4-RJ and MR-J4-200A4/ A4-RJ, 350A4/ A4-RJ
	MR-RB34-4	300 W	26 Ω	For MR-J4-500B4/ B4-RJ and MR-J4-500A4/ A4-RJ
	MR-RB3U-4	300 W	22 Ω	For MR-J4-700B4/ B4-RJ and MR-J4-700A4/ A4-RJ
	MR-RB5G-4	500 W	47 Ω	For MR-J4-200B4/ B4-RJ, 350B4/ B4-RJ and MR-J4-200A4/ A4-RJ, 350A4/ A4-RJ
	MR-RB54-4	500 W	26 Ω	For MR-J4-500B4/ B4-RJ and MR-J4-500A4/ A4-RJ
	MR-RB5U-4	500 W	22 Ω	For MR-J4-700B4/ B4-RJ and MR-J4-700A4/ A4-RJ
	MR-RB5K-4	500 (800) W	10 Ω	For MR-J4-11KB4/ B4-RJ and MR-J4-11KA4/ A4-RJ
	MR-RB6K-4	850 (1300) W	10 Ω	For MR-J4-15KB4/ B4-RJ, 22KB4/ B4-RJ and MR-J4-15KA4/ A4-RJ, 22KA4/ A4-RJ

Peripheral units

Item	Model	Application
CC-Link IE Field Network interface unit	MR-J3-T10	For MR-J4-B-RJ010
Safety logic unit	MR-J3-D05	For MR-J4-B_/ B_-RJ/ B_-RJ010, MR-J4-A_/ A_-RJ, and MR-J4W_-B
Absolute position storage unit	MR-BTAS01	For MR-J4-B_/ B_-RJ, MR-J4-A_/ A_-RJ, and MR-J4W_-B
Dynamic brake (200 V AC)	DBU-11K	For MR-J4-11KB/ B-RJ/ B-RJ010 and MR-J4-11KA/ A-RJ
	DBU-15K	For MR-J4-15KB/ B-RJ/ B-RJ010 and MR-J4-15KA/ A-RJ
	DBU-22K-R1	For MR-J4-22KB/ B-RJ/ B-RJ010 and MR-J4-22KA/ A-RJ
Dynamic brake (400 V AC)	DBU-11K-4	For MR-J4-11KB4/ B4-RJ and MR-J4-11KA4/ A4-RJ
	DBU-22K-4	For MR-J4-15KB4/ B4-RJ, 22KB4/ B4-RJ and MR-J4-15KA4/ A4-RJ, 22KA4/ A4-RJ
Heat sink outside mounting attachment	MR-J4ACN15K	For MR-J4-11KB(4)/ B(4)-RJ/ B-RJ010, 15KB(4)/ B(4)-RJ/ B-RJ010 and MR-J4-11KA(4)/ A(4)-RJ, 15KA(4)/ A(4)-RJ
	MR-J3ACN	For MR-J4-22KB(4)/ B(4)-RJ/ B-RJ010 and MR-J4-22KA(4)/ A(4)-RJ

Peripheral cables/Connector sets

Item	Model	Length	Application
STO cable	MR-D05UDL3M-B	3 m	For connecting MR-J4-B_/ B_-RJ/ B_-RJ010, MR-J4-A_/ A_-RJ, or MR-J4W_-B with MR-J3-D05 and other safety control devices
Monitor cable	MR-J3CN6CBL1M	1 m	For analog monitor output of MR-J4-A_/ A_-RJ
Personal computer communication cable (USB cable)	MR-J3USBCBL3M	3 m	For MR-J4-B_/ B_-RJ/ B_-RJ010, MR-J4-A_/ A_-RJ, and MR-J4W_-B
Connector set	MR-J3CN1	-	For I/O signals of MR-J4-A_/ A_-RJ
	MR-CCN1	-	For I/O signals of MR-J4-B_/ B_-RJ/ B_-RJ010
	MR-J2CMP2	-	For MR-J4W_-B (Qty: 1 pc)
	MR-ECN1	-	For MR-J4W_-B (Qty: 20 pcs)

Servo support software

Item	Model	Application
MR Configurator2 (Note 1)	SW1DNC-MRC2-E	Servo setup software for AC servo

Notes:

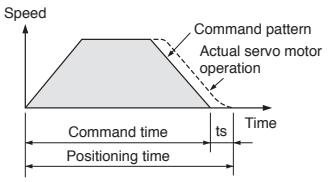
1. MR Configurator2 is included in MT Works2 with software version 1.34L or later.
   If you have MT Works2 with software version earlier than 1.34L or GX works2, you can download MR Configurator2 from website.

To ensure safe use

●To use the products given in this catalog properly, always read the "Installation Guide" and "Instruction Manual" before starting to use them.

Cautions for model selection

●Select a rotary servo motor or a direct drive motor which has the rated torque equal to or higher than the continuous effective torque.
●Select a linear servo motor which has the continuous thrust equal to or higher than the continuous effective load thrust.
●When the linear servo motor is used for vertical axis, it is necessary to have anti-drop mechanism such as spring and counter balance in the machine side.
●When unbalanced torque is generated, such as in a vertical lift machine, it is recommended that the unbalanced torque of the machine be kept under 70% of the servo motor rated torque.
●Create the operating pattern by considering the settling time (ts).
●Load to motor inertia ratio or load to mass ratio must be below the recommended ratio. If the ratio is too large, the expected performance may not be achieved, and the dynamic brake may be damaged.



General safety precautions

1. Transportation/installation

●Combinations of the servo motor and the servo amplifier are predetermined. Confirm the models of the servo motor and the servo amplifier to be used before installation.
●Do not drop or apply strong impact on the servo amplifier and the servo motor as they are precision devices. They may be damaged from such stress or shock.
●When fumigants that contain halogen materials such as fluorine, chlorine, bromine, and iodine are used for disinfecting and protecting wooden packaging from insects, they cause malfunction when entering our products. Please take necessary precautions to ensure that remaining materials from fumigant do not enter our products, or treat packaging with methods other than fumigation (heat method). Additionally, disinfect and protect wood from insects before packing products.
●Do not get on or place heavy objects on the servo amplifier or the servo motor. Doing so may result in injury or damage.
●The system must withstand high speeds and high acceleration/deceleration.
●To enable high-accuracy positioning, ensure the machine rigidity, and keep the machine resonance point at a high level.
●Mount the servo amplifier and the servo motor on nonflammable material. Mounting them directly on or near flammable material may result in fires.
●The regenerative option becomes hot (the temperature rise of 100 °C or higher) with frequent use. Do not install within flammable objects or objects subject to thermal deformation. Make sure that wires do not come into contact with the unit.
●Securely fix the servo motor onto the machine. Insufficient fixing may cause the servo motor to dislocate during operation.
●Install electrical and mechanical stoppers at the stroke end.
●Mount the servo amplifier vertically on a wall.
●Do not block intake and exhaust areas of the servo amplifier. Doing so may cause the servo amplifier to malfunction.
●When installing multiple servo amplifiers in a row in a sealed cabinet, leave space around the servo amplifiers as described in Servo Amplifier Instruction Manual. To ensure the life and reliability of the servo amplifiers, prevent heat accumulation by keeping space as open as possible toward the top plate.

2. Environment

●Use the servo amplifier and the servo motor in the designated environment.
●Avoid installing the servo amplifier and the servo motor in areas with oil mist or dust. When installing in such areas, be sure to enclose the servo amplifier in a sealed cabinet, and protect the servo motor by furnishing a cover or by taking similar measures.
●Do not use in areas where the servo motor may be constantly subject to cutting fluid or lubricant oil, or where dew could condense because of oil mist, overcooling or excessive humidity. Doing so may deteriorate the insulation of the servo motor.

3. Grounding

●Securely ground to prevent electric shocks and to stabilize the potential in the control circuit.
●Connect the grounding wire to the cabinet protective earth (PE) terminal via the servo amplifier protective earth (PE) terminal for the servo motor grounding.
●Faults such as a position mismatch may occur if the grounding is insufficient.

4. Wiring

●Do not supply power to the output terminals (U, V, and W) of the servo amplifier or the input terminals (U, V, and W) of the servo motor. Doing so damages the servo amplifier and the servo motor.
●Connect the servo motor to the output terminals (U, V, and W) of the servo amplifier.
●Match the phase of the input terminals (U, V, and W) of the servo motor to the output terminals (U, V, and W) of the servo amplifier when connecting them. If they do not match, the servo motor does not operate properly.
●Check the wiring and sequence program thoroughly before switching the power on.
●Carefully select the cable clamping method, and make sure that bending stress and the stress of the cable's own weight are not applied on the cable connection section.
●In an application where the servo motor moves, determine the cable bending radius according to the cable bending life and wire type.

5. Initial settings

●For MR-J4-A(-RJ), select a control mode from position, speed or torque by [Pr. PA01]. Position control mode is set as default. Change the parameter setting value when using the other control modes. For MR-J4-B(-RJ) or MR-J4W_-B, the control mode is set by the controller.
●When using the regenerative option, change [Pr. PA02]. The regenerative option is disabled as default.

6. Operation

●Do not use a product which is damaged or has missing parts. In that case, replace the product.
●Turn on FLS and RLS (Upper/Lower stroke limit), or LSP and LSN (Forward/Reverse rotation stroke end) in position or speed control mode. The servo motor will not start if the signals are off.
●When a magnetic contactor is installed on the primary side of the servo amplifier, do not perform frequent starts and stops with the magnetic contactor. Doing so may damage the servo amplifier.
●When an error occurs, the servo amplifier stops outputting the power with activation of the protective function, and the servo motor stops immediately with the dynamic brake. Servo amplifiers without dynamic brake are also available for free-running the servo motor. Contact your local sales office for more details.

●The dynamic brake is a function for emergency stop. Do not use it to stop the servo motor in normal operations.
●As a rough guide, the dynamic brake withstands 1000 times of use when a machine which has load to motor inertia ratio equals to or lower than the recommended ratio stops from the rated speed every 10 minutes.
●If the protective functions of the servo amplifier activate, turn the power off immediately. Remove the cause before turning the power on again. If operation is continued without removing the cause of the error, the servo motor may malfunction, resulting in injury or damage.
●The servo amplifier, the regenerative resistor, and the servo motor can be very hot during or after operation. Take safety measures such as covering them to prevent your hand and/or parts including cables from coming in contact with them.

7. Others

●Do not touch the servo amplifier or the servo motor with wet hands.
●Do not modify the servo amplifier or the servo motor.

Cautions for SSCNET III cables

●Do not apply excessive tension on the SSCNET III cable when cabling.
●The minimum bending radius of the SSCNET III cable is 25 mm for MR-J3BUS_M and 50 mm for MR-J3BUS_M-A/-B. If using these cables under the minimum bending radius, performance cannot be guaranteed.
●If the ends of the SSCNET III cable are dirty, the light will be obstructed, causing malfunctions. Keep the ends clean.
●Do not tighten the SSCNET III cable with cable ties, etc.
●Do not look at the light directly when the SSCNET III cable is not connected.

Cautions for rotary servo motors and direct drive motors

●Do not hammer the shaft of the rotary servo motor and the rotor of the direct drive motor when installing a pulley or a coupling. Doing so may damage the encoder. When installing the pulley or the coupling to the key shaft servo motor, use the screw hole on the shaft end. Use a pulley extractor when removing the pulley.
●Do not apply a load exceeding the tolerable load onto the rotary servo motor shaft or the direct drive motor rotor. The shaft or the rotor may break.
●When the rotary servo motor is mounted with the shaft vertical (shaft up), take measures on the machine side so that oil from the gear box does not get into the servo motor.
●Mount the geared servo motor in a direction described in "Servo Motor Instruction Manual (Vol. 3)."
●When the direct drive motor is used in a machine such as vertical axis which generates unbalanced torque, be sure to use it in absolute position detection system.
●Do not use the 24 V DC interface power supply for the electromagnetic brake. Provide a dedicated power supply to the electromagnetic brake.
●Do not apply the electromagnetic brake when the servo is on. Doing so may cause the servo amplifier overload or shorten the brake life. Apply the electromagnetic brake when the servo is off.
●Torque may drop due to temperature increase of the rotary servo motor or the direct drive motor. Be sure to use the motor within the specified ambient temperature.

Cautions for linear encoders

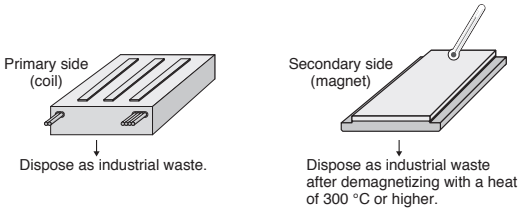
●If the linear encoder is improperly mounted, an alarm or a positioning deviation may occur. Refer to the following general inspections of linear encoder to verify the mounting state. Contact the relevant linear encoder manufacturers for more details.
●General inspections of linear encoder
(a) Verify that the gap between the linear encoder head and the linear encoder is appropriate.
(b) Check for any rolling or yawing (looseness) on the linear encoder head.
(c) Check for contaminations and scratches on the linear encoder head and scale surface.
(d) Verify that vibration and temperature are within the specified range.
(e) Verify that the speed is within the tolerable range even when overshooting.

Cautions for linear servo motors

- The linear servo system uses powerful magnets on the secondary side. Magnetic force is inversely proportional to the square of the distance from the magnetic material. Therefore, the magnetic force will be significantly stronger as closer to the magnetic material. Persons installing the linear servo motor as well as operating the machine must be fully cautious. Persons with pacemakers or other medical devices must keep away from the machine.
- Keep cell phones, watches, calculators and other products which may malfunction or fail due to the magnetic force away from the machine. Avoid wearing metals including earrings and necklaces when handling the machine.
- Give a marking such as "CAUTION! POWERFUL MAGNET" to give warning against the machine.
- Use non-magnetic tools, when installing or working near the linear servo motor.
  e.g., explosion-proof beryllium copper alloy safety tools (BEALON manufactured by NGK Insulators, Ltd.)
- The permanent magnets on the secondary side generate attraction force, and there is a risk that your hand may be caught. Handle the linear servo motor carefully to avoid serious injury especially when installing the primary side after installing the secondary side.
- If the linear servo motor is used in such an environment where there is magnetic powder, the powder may adhere to the permanent magnets of the secondary side and cause a damage. In that case, take measures to prevent the magnetic powder or pieces from being attracted to the permanent magnets of the secondary side or from going into the gap between primary side and secondary side.
- The linear servo motor is rated IP00. Provide protection measures to prevent dust and oil, etc., as necessary.
- Install the moving part in such manner that the center of gravity of the moving part comes directly above the center of the primary side.
- Lead wires or cables led from the primary side do not have a long bending life. Fix the lead wires or cables to a moving part to prevent the lead wires or cables from repetitive bending.
- Thrust may drop due to temperature increase of the linear servo motor. Be sure to use the motor within the specified ambient temperature.

Disposal of linear servo motors

- Dispose the primary side as industrial waste.
- Demagnetize the secondary side with a heat of 300 °C or higher, and dispose as industrial waste. If not possible to demagnetize, return the secondary side to us in an appropriate package.
- Do not leave the product unattended.



For safety standard certification

Even though the MR-J4 series servo amplifier and MR-J3-D05 safety logic unit are certified to various safety standards, this does not guarantee that the systems in which they are installed will also be certified. The entire system shall observe the following:

(1) For safety circuits, use parts and/or devices whose safety are confirmed or which satisfy safety standards.
(2) For details regarding the use of the servo amplifiers and other cautionary information, refer to relevant Servo Amplifier Instruction Manual.
(3) Perform risk assessment on the entire machine/system. It is recommended to use a Certification Body for final safety certification.

Warranty

1. Warranty period and coverage

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

[Term]

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

[Limitations]

(1) You are requested to conduct an initial failure diagnosis by yourself, as a general rule. It can also be carried out by us or our service company upon your request and the actual cost will be charged. However, it will not be charged if we are responsible for the cause of the failure.

(2) This limited warranty applies only when the condition, method, environment, etc. of use are in compliance with the terms and conditions and instructions that are set forth in the instruction manual and user manual for the Product and the caution label affixed to the Product.

(3) Even during the term of warranty, the repair cost will be charged on you in the following cases;

(i) a failure caused by your improper storing or handling, carelessness or negligence, etc., and a failure caused by your hardware or software problem

(ii) a failure caused by any alteration, etc. to the Product made on your side without our approval

(iii) a failure which may be regarded as avoidable, if your equipment in which the Product is incorporated is equipped with a safety device required by applicable laws and has any function or structure considered to be indispensable according to a common sense in the industry

(iv) a failure which may be regarded as avoidable if consumable parts designated in the instruction manual, etc. are duly maintained and replaced

(v) any replacement of consumable parts (battery, fan, smoothing capacitor, etc.)

(vi) a failure caused by external factors such as inevitable accidents, including without limitation fire and abnormal fluctuation of voltage, and acts of God, including without limitation earthquake, lightning and natural disasters

(vii) a failure generated by an unforeseeable cause with a scientific technology that was not available at the time of the shipment of the Product from our company

(viii) any other failures which we are not responsible for or which you acknowledge we are not responsible for

2. Term of warranty after the stop of production

(1) We may accept the repair at charge for another seven (7) years after the production of the product is discontinued. The announcement of the stop of production for each model can be seen in our Sales and Service, etc.

(2) Please note that the Product (including its spare parts) cannot be ordered after its stop of production.

3. Service in overseas countries

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

4. Exclusion of responsibility for compensation against loss of opportunity, secondary loss, etc.

Whether under or after the term of warranty, we assume no responsibility for any damages arisen from causes for which we are not responsible, any losses of opportunity and/or profit incurred by you due to a failure of the Product, any damages, secondary damages or compensation for accidents arisen under a specific circumstance that are foreseen or unforeseen by our company, any damages to products other than the Product, and also compensation for any replacement work, readjustment, start-up test run of local machines and the Product and any other operations conducted by you.

5. Change of Product specifications

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

6. Application and use of the Product

(1) For the use of our General-Purpose AC Servo, its applications should be those that may not result in a serious damage even if any failure or malfunction occurs in General-Purpose AC Servo, and a backup or fail-safe function should operate on an external system to General-Purpose AC Servo when any failure or malfunction occurs.

(2) Our General-Purpose AC Servo is designed and manufactured as a general purpose product for use at general industries. Therefore, applications substantially influential on the public interest for such as atomic power plants and other power plants of electric power companies, and also which require a special quality assurance system, including applications for railway companies and government or public offices are not recommended, and we assume no responsibility for any failure caused by these applications when used.

In addition, applications which may be substantially influential to human lives or properties for such as airlines, medical treatments, railway service, incineration and fuel systems, man-operated material handling equipment, entertainment machines, safety machines, etc. are not recommended, and we assume no responsibility for any failure caused by these applications when used.

We will review the acceptability of the abovementioned applications, if you agree not to require a specific quality for a specific application. Please contact us for consultation.

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 10k step small capacity to 1000k 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)	120 ns to 1.9 ns
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

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 an 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%)

Inverter | FR-A800 Series

High-functionality, high-performance inverter

◎Realize even higher responsiveness during real sensor-less vector control or vector control, and achieve faster operating frequencies.
◎The latest automatic tuning function supports various induction motors and also sensor-less PM motors.
◎The standard model is compatible with EU Safety Standards STO (PLd, SIL2). Add options to support higher level safety standards.
◎A variety of useful functions provide USB memory support and customization with a PLC function.

Product Specifications

Inverter capacity	200V class: 0.4kW to 90kW, 400V class: 0.4kW to 500kW
Control method	High-carrier frequency PWM control (Select from V/F, advanced flux vector, real sensor-less vector or PM sensor-less vector control), vector control (when using options)
Output frequency range	0.2 to 590Hz (when using V/F control or advanced flux vector control)
Regenerative braking torque (Maximum tolerable usage rate)	200V class: 0.4K to 1.5K (150% at 3%ED) 2.2K/3.7K (100% at 3%ED) 5.5K/7.5K (100% at 2%ED) 11K to 55K (20% continuous) 75K or more (10% continuous), 400V class: 0.4K to 7.5K (100% at 2%ED) 11K to 55K (20% continuous) 75K or more (10% continuous)
Starting torque	200% 0.3Hz (3.7K or less), 150% 0.3Hz (5.5K or more) (when using real sensor-less vector, vector control)

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 Starter | MS-T Series

Exceed your expectations.

◎10A frame model is over 16% smaller with a width of just 36mm!!
◎New integrated terminal covers.
◎Reduce your coil inventory by up to 50%.
◎Be certified to the highest international levels while work is ongoing to gain other country.

Product specifications

Frame	10 A to 32 A
Applicable standards	Certification to various standards including IEC, JIS, CE, UL, TÜV, CCC.
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 7 types and simplifies selection.
Option units	Diverse lineup includes Auxiliary Contact Block, Operation Coil Surge Absorber Unit, 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

FA Products

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

For detailed information, please refer to: http://www.mitsubishielectric.com/fa/worldwide/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.

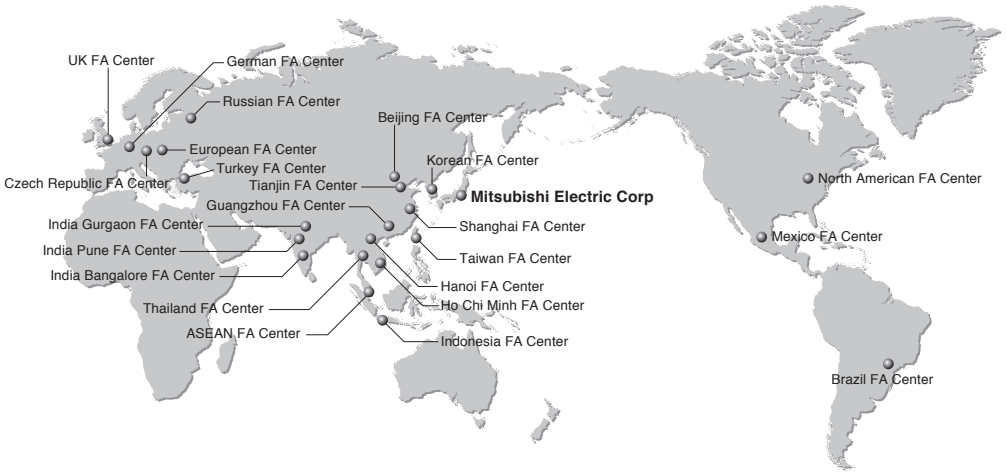
◎Can be driven by inverters as standard. Advanced magnetic-flux vector control by our FR-A800 achieves steady torque drive up to 0.5Hz.

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.)

MEMO

Global FA Centers



China

Shanghai FA Center
MITSUBISHI ELECTRIC AUTOMATION (CHINA) LTD.
10F, Mitsubishi Electric Automation Center, No.1386 Hongqiao Road, Changning District, Shanghai, China
Tel: 86-21-2322-3030 Fax: 86-21-2322-3000 (9611#)

Beijing FA Center
MITSUBISHI ELECTRIC AUTOMATION (CHINA) LTD. Beijing Office
Unit 908, Office Tower 1, Henderson Centre, 18 Jianguomennei Avenue, Dongcheng District, Beijing, China
Tel: 86-10-6518-8830 Fax: 86-10-6518-3907

Tianjin FA Center
MITSUBISHI ELECTRIC AUTOMATION (CHINA) LTD. Tianjin Office
Room 2003 City Tower, No.35, Youyi Road, Hexi District, Tianjin, China
Tel: 86-22-2813-1015 Fax: 86-22-2813-1017

Guangzhou FA Center
MITSUBISHI ELECTRIC AUTOMATION (CHINA) LTD. Guangzhou Office
Room 1609, North Tower, The Hub Center, No.1068, Xingang East Road, Haizhu District, Guangzhou, China
Tel: 86-20-8923-6730 Fax: 86-20-8923-6715

Taiwan

Taiwan FA Center
SETSUYO ENTERPRISE CO., LTD.
3F, No.105, Wugong 3rd Road, Wugu District, New Taipei City 24889, Taiwan, R.O.C.
Tel: 886-2-2299-9917 Fax: 886-2-2299-9963

Korea

Korean FA Center
MITSUBISHI ELECTRIC AUTOMATION KOREA CO., LTD.
B1F, 2F, 1480-6, Gayang-Dong, Gangseo-Gu, Seoul, 157-200, Korea
Tel: 82-2-3660-9630 Fax: 82-2-3663-0475

Thailand

Thailand FA Center
MITSUBISHI ELECTRIC FACTORY AUTOMATION (THAILAND) CO., LTD.
12th Floor, SV.City Building, Office Tower 1, No. 896/19 and 20 Rama 3 Road, Kwaeng Bangpongpang, Khet Yannawa, Bangkok 10120, Thailand
Tel: 66-2682-6522 to 6531 Fax: 66-2682-6020

ASEAN

ASEAN FA Center
MITSUBISHI ELECTRIC ASIA PTE. LTD.
307, Alexandra Road, Mitsubishi Electric Building, Singapore 159943
Tel: 65-6470-2480 Fax: 65-6476-7439

Indonesia

Indonesia FA Center
PT. MITSUBISHI ELECTRIC INDONESIA
Gedung Jaya 11th Floor, JL MH. Thamrin No.12, Jakarta, Pusat 10340, Indonesia
Tel: 62-21-3192-6461 Fax: 62-21-3192-3942

Vietnam

Hanoi FA Center
MITSUBISHI ELECTRIC VIETNAM COMPANY LIMITED Hanoi Branch
Unit 9-05, 9th Floor, Hanoi Central Office Building, 44B Ly Thuong Kiet Street, Hoan Kiem District, Hanoi City, Vietnam
Tel: 84-4-3937-8075 Fax: 84-4-3937-8076

Ho Chi Minh FA Center
MITSUBISHI ELECTRIC VIETNAM COMPANY LIMITED
Unit 01-04, 10th Floor, Vincom Center, 72 Le Thanh Ton Street, District 1, Ho Chi Minh City, Vietnam
Tel: 84-8-3910-5945 Fax: 84-8-3910-5947

India

India Pune FA Center
MITSUBISHI ELECTRIC INDIA PVT. LTD.
Pune Branch
Emerald House, EL-3, J Block, M.I.D.C., Bhosari, Pune, 411026, Maharashtra State, India
Tel: 91-20-2710-2000 Fax: 91-20-2710-2100

India Gurgaon FA Center
MITSUBISHI ELECTRIC INDIA PVT. LTD.
Gurgaon Head Office
2nd Floor, Tower A & B, Cyber Greens, DLF Cyber City, DLF Phase - III, Gurgaon - 122002 Haryana, India
Tel: 91-124-463-0300 Fax: 91-124-463-0399

India Bangalore FA Center
MITSUBISHI ELECTRIC INDIA PVT. LTD.
Bangalore Branch
Prestige Emerald, 6th Floor, Municipal No.2, Madras Bank Road, Bangalore 560001, India
Tel: 91-80-4020-1600 Fax: 91-80-4020-1699

America

North American FA Center
MITSUBISHI ELECTRIC AUTOMATION, INC.
500 Corporate Woods Parkway, Vernon Hills, IL 60061, U.S.A.
Tel: 1-847-478-2100 Fax: 1-847-478-2253

Mexico

Mexico FA Center
MITSUBISHI ELECTRIC AUTOMATION, INC.
Mexico Branch
Mariano Escobedo #69, Col.Zona Industrial, Tlalnepantla Edo, C.P.54030, México
Tel: 52-55-3067-7511 Fax: -

Brazil

Brazil FA Center
MITSUBISHI ELECTRIC DO BRASIL COMÉRCIO E SERVIÇOS LTDA.
Rua Jussara, 1750- Bloco B Anexo, Jardim Santa Cecilia, CEP 06465-070, Barueri - SP, Brasil
Tel: 55-11-4689-3000 Fax: 55-11-4689-3016

Europe

European FA Center
MITSUBISHI ELECTRIC EUROPE B.V.
Polish Branch
32-083 Balice ul. Krakowska 50, Poland
Tel: 48-12-630-47-00 Fax: 48-12-630-47-01

German FA Center
MITSUBISHI ELECTRIC EUROPE B.V.
German Branch
Gothaer Strasse 8, D-40880 Ratingen, Germany
Tel: 49-2102-486-0 Fax: 49-2102-486-1120

UK FA Center
MITSUBISHI ELECTRIC EUROPE B.V.
UK Branch
Travellers Lane, Hatfield, Hertfordshire, AL10 8XB, U.K.
Tel: 44-1707-28-8780 Fax: 44-1707-27-8695

Czech Republic FA Center
MITSUBISHI ELECTRIC EUROPE B.V.
Czech Branch
Avenir Business Park, Radicka 751/113e, 158 00 Praha5, Czech Republic
Tel: 420-251-551-470 Fax: 420-251-551-471

Russian FA Center
MITSUBISHI ELECTRIC EUROPE B.V.
Russian Branch St. Petersburg office
Piskarevsky pr. 2, bld 2, lit "Sch", BC "Benua", office 720; 195027, St. Petersburg, Russia
Tel: 7-812-633-3497 Fax: 7-812-633-3499

Turkey FA Center
MITSUBISHI ELECTRIC TURKEY A.Ş
Ümraniye Branch
Şerifali Mahallesi Nutuk Sokak No:5 TR-34775 Ümraniye, İstanbul, Türkey
Tel: 90-216-526-3990 Fax: 90-216-526-3995

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

⚠ Safety Warning

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

Country/Region	Sales office	Tel/Fax
USA	MITSUBISHI ELECTRIC AUTOMATION, INC. 500 Corporate Woods Parkway, Vernon Hills, IL 60061, U.S.A.	Tel : +1-847-478-2100 Fax : +1-847-478-2253
Mexico	MITSUBISHI ELECTRIC AUTOMATION, INC. Mexico Branch Mariano Escobedo #69, Col.Zona Industrial, Tlalnepantla Edo, C.P.54030, México	Tel : +52-55-9171-7600 Fax : +52-55-9171-7649
Brazil	MITSUBISHI ELECTRIC DO BRASIL COMÉRCIO E SERVIÇOS LTDA. Rua Jussara, 1750- Bloco B Anexo, Jardim Santa Cecilia, CEP 06465-070, Barueri - SP, Brasil	Tel : +55-11-4689-3000 Fax : +55-11-4689-3016
Germany	MITSUBISHI ELECTRIC EUROPE B.V. German Branch Gothaer Strasse 8, D-40880 Ratingen, Germany	Tel : +49-2102-486-0 Fax : +49-2102-486-1120
UK	MITSUBISHI ELECTRIC EUROPE B.V. UK Branch Travellers Lane, Hatfield, Hertfordshire, AL10 8XB, U.K.	Tel : +44-1707-28-8780 Fax : +44-1707-27-8695
Italy	MITSUBISHI ELECTRIC EUROPE B.V. Italian Branch Centro Direzionale Colleoni - Palazzo Sirio Viale Colleoni 7, 20864 Agrate Brianza(Milano) Italy	Tel : +39-039-60531 Fax : +39-039-6053-312
Spain	MITSUBISHI ELECTRIC EUROPE, B.V. Spanish Branch Carretera de Rubí, 76-80-Apdo. 420, 08173 Sant Cugat del Vallés (Barcelona), Spain	Tel : +34-935-65-3131 Fax : +34-935-89-1579
France	MITSUBISHI ELECTRIC EUROPE B.V. French Branch 25, Boulevard des Bouvets, F-92741 Nanterre Cedex, France	Tel : +33-1-55-68-55-68 Fax : +33-1-55-68-57-57
Czech Republic	MITSUBISHI ELECTRIC EUROPE B.V. Czech Branch Avenir Business Park, Radicka 751/113e, 158 00 Praha5, Czech Republic	Tel : +420-251-551-470 Fax : +420-251-551-471
Poland	MITSUBISHI ELECTRIC EUROPE B.V. Polish Branch ul. Krakowska 50, 32-083 Balice, Poland	Tel : +48-12-630-47-00 Fax : +48-12-630-47-01
Russia	MITSUBISHI ELECTRIC EUROPE B.V. Russian Branch St. Petersburg office Piskarevsky pr. 2, bld 2, lit "Sch", BC "Benua", office 720; RU-195027 St. Petersburg, Russia	Tel : +7-812-633-3497 Fax : +7-812-633-3499
Turkey	MITSUBISHI ELECTRIC TURKEY A.Ş Ümraniye Branch Şerifali Mahallesi Nutuk Sokak No:5 TR-34775 Ümraniye, İstanbul, Türkey	Tel : +90-216-526-3990 Fax : +90-216-526-3995
South Africa	ADROIT TECHNOLOGIES 20 Waterford Office Park, 189 Witkoppen Road, ZA-Fourways, South Africa	Tel : +27-11-658-8100 Fax : +27-11-658-8101
China	MITSUBISHI ELECTRIC AUTOMATION (CHINA) LTD. No.1386 Hongqiao Road, Mitsubishi Electric Automation Center, Changning District, Shanghai, China	Tel : +86-21-2322-3030 Fax : +86-21-2322-3000
Taiwan	SETSUYO ENTERPRISE CO., LTD. 6F, No.105, Wugong 3rd Road, Wugu District, New Taipei City 24889, Taiwan, R.O.C.	Tel : +886-2-2299-2499 Fax : +886-2-2299-2509
Korea	MITSUBISHI ELECTRIC AUTOMATION KOREA CO., LTD. 1480-6, Gayang-Dong, Gangseo-Gu, Seoul, 157-200, Korea	Tel : +82-2-3660-9510 Fax : +82-2-3664-8372/8335
Singapore	MITSUBISHI ELECTRIC ASIA PTE. LTD. 307, Alexandra Road, Mitsubishi Electric Building, Singapore 159943	Tel : +65-6473-2308 Fax : +65-6476-7439
Thailand	MITSUBISHI ELECTRIC FACTORY AUTOMATION (THAILAND) CO., LTD. 12th Floor, SV.City Building, Office Tower 1, No. 896/19 and 20 Rama 3 Road, Kwaeng Bangpongpang, Khet Yannawa, Bangkok 10120,Thailand	Tel : +66-2682-6522 to 6531 Fax : +66-2682-6020
Indonesia	PT. MITSUBISHI ELECTRIC INDONESIA Gedung Jaya 11th Floor, JL. MH. Thamrin No.12, Jakarta Pusat 10340, Indonesia	Tel : +62-21-3192-6461 Fax : +62-21-3192-3942
Vietnam	MITSUBISHI ELECTRIC VIETNAM COMPANY LIMITED Unit 01 - 04, 10th Floor, Vincom Center, 72 Le Thanh Ton Street, District 1, Ho Chi Minh City, Vietnam	Tel : +84-8-3910-5945 Fax : +84-8-3910-5947
India	MITSUBISHI ELECTRIC INDIA PVT. LTD. Pune Branch Emerald House, EL-3, J Block, M.I.D.C., Bhosari, Pune, 411026, Maharashtra State, India	Tel : +91-20-2710-2000 Fax : +91-20-2710-2100
Australia	MITSUBISHI ELECTRIC AUSTRALIA PTY. LTD. 348 Victoria Road, P.O. Box 11, Rydalmere, N.S.W 2116, Australia	Tel : +61-2-9684-7777 Fax : +61-2-9684-7245

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE: TOKYO BUILDING, 2-7-3, MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN
NAGOYA WORKS: 1-14, YADA-MINAMI 5, HIGASHI-KU, NAGOYA, JAPAN

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