

MITSUBISHI SERVO AMPLIFIERS & MOTORS

MELSERVO IE

Ethernet-Compatible MR-JE-C
is Now Available

CC-Link **IE** Field Basic

reliable basic performance and advanced ease-of-use!

High Performance

Compatible with Various Field Networks

MR-JE series is compatible with various networks including CC-Link IE Field Network Basic, SSCNET III/H, and MODBUS®.

Fast and Accurate

The dedicated engine enables a speed frequency response of 2.0 kHz, shortening the cycle time.

High-Resolution Encoder

The servo motor is equipped with 131072 pulses/rev (17-bit) high-resolution encoder, achieving high accuracy.

Energy Conservation

The large capacity main circuit capacitor allows the regenerative energy to be used effectively, reducing energy consumption.

Global Standard

Compliance with Global Standards

Global servo, MR-JE series, complies with global standards as standard.

Sink and Source Connections

Command pulse input and digital input/output are compatible with both sink and source type connections.

*For MR-JE-C, command pulse input is available only with sink wiring.

Global Support

FA Centers located throughout the world provide attentive services to support users.

With Mitsubishi Electric's commitment to total system solutions and global supports, the MELSERVO-JE becomes the answer to the world-wide needs in driving control.

CONTROLLER



MELSEC iQ-R series



MELSEC-Q series



MELSEC iQ-F/F series



MELSEC-L series

Motion controller

Added



RnMTCPU



Q17nDSCPU



Q170MSCPU

Simple Motion module

SSCNET III/H



**RD77MS
QD77MS**



**FX5-SSC-S
LD77MS**

Position board



MR-MC_

INTERFACE

SSCNET III/H



SERVO AMPLIFIER SENSING MODULE

SSCNET III/H-compatible servo amplifier



MR-JE-B

SSCNET III/H-compatible sensing module



MR-MT2000 series

SERVO MOTOR

Servo motor



HG-KN series
Capacity: 100 to 750 W



HG-SN series
Capacity: 0.5 to 3 kW

LINEUP

Servo amplifier²

Model	Power supply specification ¹	Rated output ¹ [kW]	Command interface						Control mode				
			SSCNET III/H	CC-Link IEF Basic	MODBUS [®] /TCP	MODBUS [®] RTU	Pulse train	Analog voltage	Position	Speed	Torque	Profile	Positioning function
MR-JE-_C	3-phase 200 V AC	0.1, 0.2, 0.4, 0.75, 1, 2, 3	—	●	●	●	●	●	●	●	●	●	●
MR-JE-_B	1-phase 200 V AC		●	—	—	—	—	—	●	●	●	—	—
MR-JE-_A			—	—	—	●	●	●	●	●	●	—	●

¹ For servo amplifiers with a rated output of 3 kW, only 3-phase is available.

² This list shows the functions supported by the latest version of servo amplifiers. For version-specific functions, refer to the relevant Instruction Manual.

To satisfy your needs of advanced driving control systems, Mitsubishi Electric provides an extensive range of automation products from servo amplifiers and servo motors to programmable controllers, Motion controllers, Positioning modules, Human Machine Interfaces, and highly developed solutions. With our global support network which provides attentive services including product purchases, after-sales services, technical consulting, and practical training, we assure you the maximum performance of MELSERVO-JE throughout the world.

Controller



Personal computer

Graphic Operation Terminal



GOT2000 series

SOFTWARE

- MELSOFT GX Works3
- MELSOFT MT Works2
- MELSOFT MR Configurator2
- MELSOFT Motorizer

Positioning module

Pulse train



RD75_



QD75_



LD75_



FX5-20PG-
FX3U-1PG

Pulse train, analog voltage,
MODBUS® RTU

Pulse train, analog voltage,
MODBUS®/TCP, MODBUS® RTU

CC-Link IE Field
Network Basic

CC-Link IE Field Basic

General-purpose interface-compatible servo amplifier



MR-JE-A

Ethernet-compatible servo amplifier



MR-JE-C

SOLUTION



Mitsubishi Electric's e-F@ctory concept utilizes both FA and IT technologies, to reduce the total cost of development, production and maintenance, with the aim of achieving manufacturing that is a "step ahead of the times". It is supported by the e-F@ctory Alliance Partners covering software, devices, and system integration, creating the optimal e-F@ctory architecture to meet the end users needs and investment plans.

PLATFORM



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

Servo Motor ● : Available

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

*1. The maximum speed of HG-SN302J is 2500 r/min.
 *2. The shaft-through portion is excluded.
 *3. The default speed is 5000 r/min. The speed can be set to 6000 r/min with the parameter of servo amplifiers.



SSCNET III/H-Compatible MR-JE-B



One step forward for your machine performance

MR-JE-B is compatible with SSCNET III/H, optical servo system controller network that enables a high-response and multi-axis system with high synchronous performance and less wiring. Together with Simple Motion modules which enable various motion controls including mark detection, electronic cam and advanced synchronous control, MR-JE-B offers the performance that your application demands.

High System Performance by SSCNET III/H

Improving system response

JE-B

High-Speed Communication

Industry-leading levels

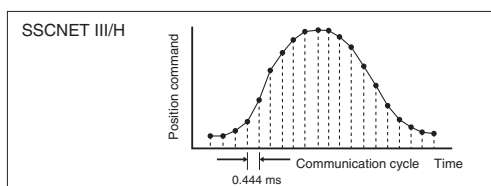
Communication speed has achieved 150 Mbps full duplex (equivalent to 300 Mbps half duplex). System response is dramatically improved.

Smooth control

JE-B

Communication Cycle of 0.444 ms

Smooth control of machine is possible using high-speed serial communication with a cycle time of 0.444 ms.



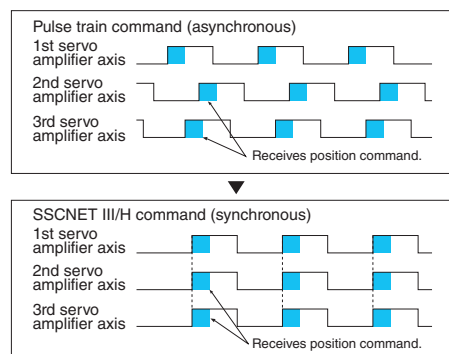
Increasing machine performance

JE-B

Synchronous Communication

Synchronous communication is achieved with SSCNET III/H, offering technical advantages for machines in printing and food processing industry that require deterministic control.

Timing of servo amplifier processing

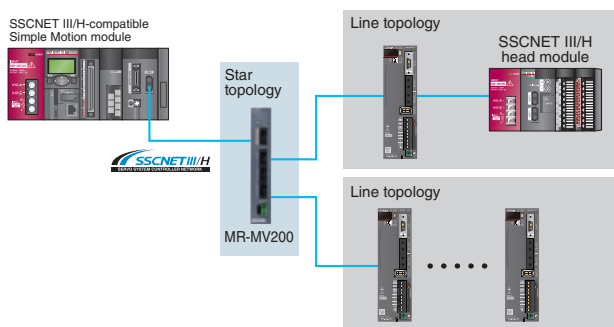


Flexible configuration

JE-B

Network Topology

Star and line topologies are available with MR-MV200 optical hub unit through SSCNET III/H for a network configuration.

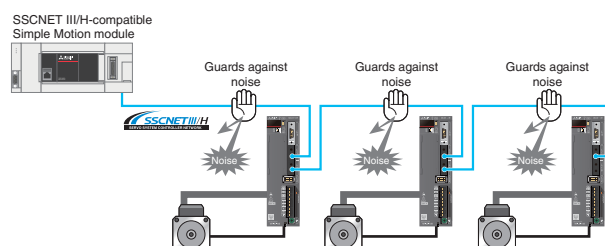


No transmission collision

JE-B

Improved Noise Tolerance

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.



Servo Amplifiers

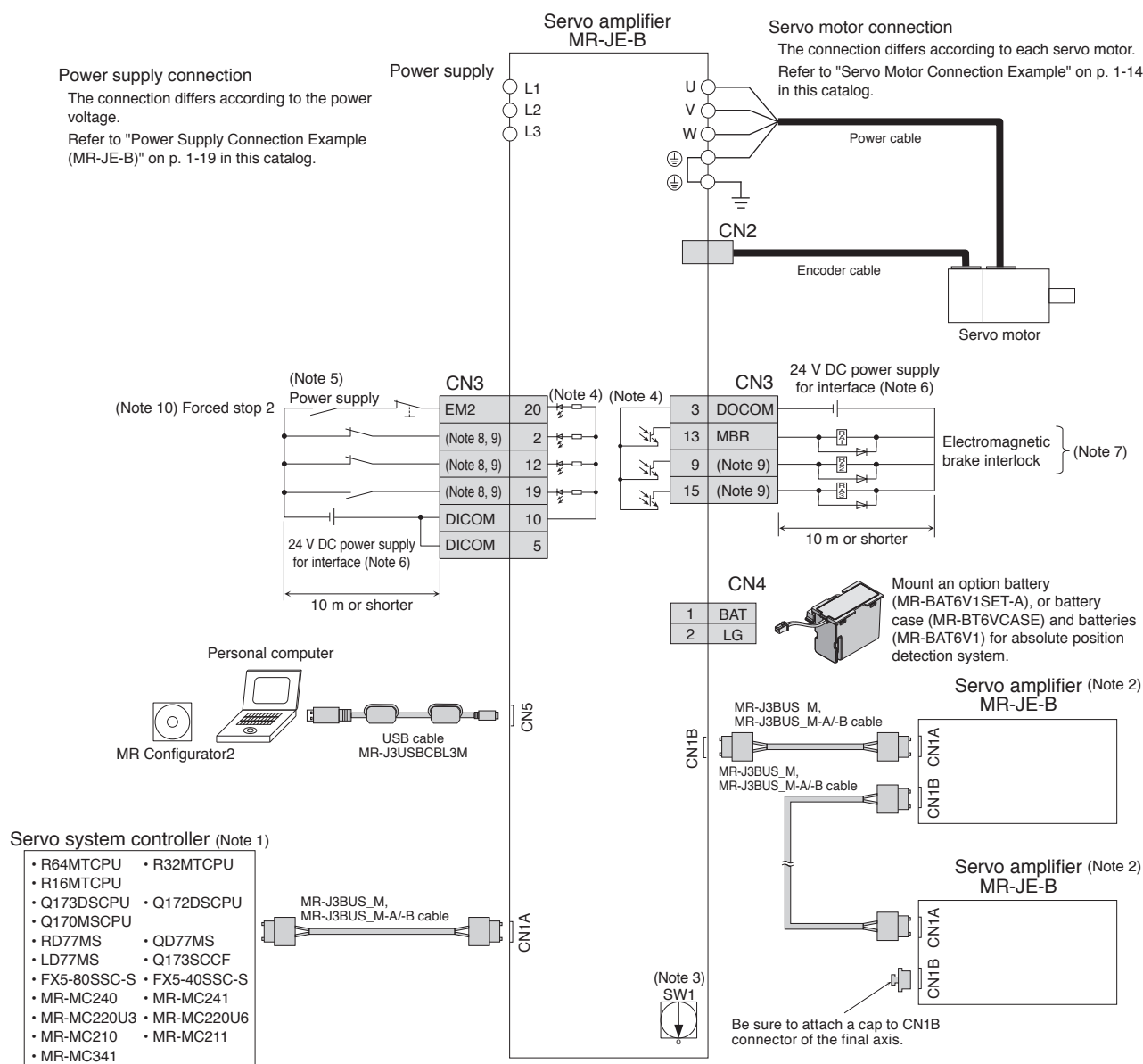
MR-JE-B (SSCNET III/H Interface) Specifications

B

Servo amplifier model MR-JE-		10B	20B	40B	70B	100B	200B	300B
Output	Rated voltage	3-phase 170 V AC						
	Rated current [A]	1.1	1.5	2.8	5.8	6.0	11.0	11.0
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 or 1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz ^(Note 8)		3-phase 200 V AC to 240 V AC, 50 Hz/60 Hz
	Rated current ^(Note 7) [A]	0.9 (1.5)	1.5 (2.5)	2.6 (4.5)	3.8 (6.5)	5.0 (10.5)	10.5 (15.8)	14.0
	Permissible voltage fluctuation	3-phase or 1-phase 170 V AC to 264 V AC				3-phase or 1-phase 170 V AC to 264 V AC ^(Note 8)		3-phase 170 V AC to 264 V AC
	Permissible frequency fluctuation	±5% maximum						
Interface power supply		24 V DC ± 10% (required current capacity: 0.3 A) ^(Note 11)						
Control method		Sine-wave PWM control/current control method						
Permissible regenerative power of the built-in regenerative resistor ^(Note 2, 3) [W]		-	-	10	20	20	100	100
Dynamic brake ^(Note 4)		Built-in						
SSCNET III/H command communication cycle ^(Note 6)		0.444 ms, 0.888 ms						
Communication function	USB	Connect a personal computer (MR Configurator2 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, lost motion compensation function						
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, hotline forced stop function ^(Note 9)						
Structure (IP rating)		Natural cooling, open (IP20)					Force cooling, open (IP20)	
Close mounting ^(Note 5)	3-phase power supply input	Possible						
	1-phase power supply input	Possible				Not possible		-
Environment	Ambient temperature	Operation: 0 °C to 55 °C (non-freezing), storage: -20 °C to 65 °C (non-freezing)						
	Ambient humidity	Operation/storage: 5 %RH to 90 %RH (non-condensing)						
	Ambience	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust						
	Altitude	2000 m or less above sea level ^(Note 10)						
	Vibration resistance	5.9 m/s ² at 10 Hz to 55 Hz (directions of X, Y and Z axes)						
Mass [kg]		0.8	0.8	0.8	1.5	1.5	2.1	2.1

- Notes: 1. Rated output and speed of a servo motor are applicable when the servo amplifier is operated within the specified power supply voltage and frequency.
2. Select the most suitable regenerative option for your system with our Drive System Sizing Software Motorizer.
3. Refer to "Regenerative Option" in this catalog for the permissible regenerative power [W] when a regenerative option is used.
4. When using the dynamic brake, refer to "MR-JE-_B Servo Amplifier Instruction Manual" for the permissible load to motor inertia ratio.
5. When the servo amplifiers are closely mounted, keep the ambient temperature within 0 °C to 45 °C, or use the servo amplifiers at 75% or less of the effective load ratio.
6. The command communication cycle depends on the servo system controller specifications and the number of axes connected.
7. The value in brackets indicates the rated current when a 1-phase power supply input is used.
8. When a 1-phase 200 V AC to 240 V AC power supply is used, use the servo amplifiers at 75% or less of the effective load ratio.
9. When an alarm occurs on MR-JE-B servo amplifier, the hot line forced stop signal will be sent to other servo amplifiers through a servo system controller, and all the servo motors that are operated normally by MR-JE-B servo amplifiers decelerate to a stop. Refer to "MR-JE-_B Servo Amplifier Instruction Manual" for details.
10. Refer to "MR-JE-_B Servo Amplifier Instruction Manual" for the restrictions when using the servo amplifiers at altitude exceeding 1000 m and up to 2000 m above sea level.
11. A current capacity is 0.1 A for the servo amplifiers manufactured in April 2016 or earlier (May 2016 or earlier if manufactured in China).

MR-JE-B Standard Wiring Diagram Example



- Notes: 1. For details such as setting the servo system 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 16 axes are set with an axis selection rotary switch (SW1). Note that the number of the connectable axes depends on the servo system controller specifications.
4. This is for sink wiring. Source wiring is also possible.
5. To prevent an unexpected restart of the servo amplifier, create a circuit to turn off EM2 (Forced stop 2) when the power is turned off.
6. For convenience of illustration, the diagram shows separate 24 V DC power supplies for input and output signals. However, the input and output signals can share a common power supply.
7. Devices assigned to CN3-13, CN3-9, and CN3-15 pins can be changed with [Pr. PD07], [Pr. PD08], and [Pr. PD09]. No signal is assigned to CN3-9 and CN3-15 pins by default. Assign ALM (Malfunction) to a pin of CN3 connector by setting [Pr. PD08] or [Pr. PD09] to "0 3".
8. Devices assigned to CN3-2, CN3-12, and CN3-19 pins can be changed with [Pr. PD03], [Pr. PD04], and [Pr. PD05].
9. CN3-2, CN3-9, CN3-12, CN3-15, and CN3-19 pins are available with the servo amplifiers with software version C5 or later, and manufactured in May 2016 or later. For the servo amplifiers manufactured in China, these pins have been available from June 2016 production. In addition, use MR Configurator2 with software version 1.60N or later.
10. The forced stop signal is issued for the servo amplifier. For overall system, apply the emergency stop on the controller side.



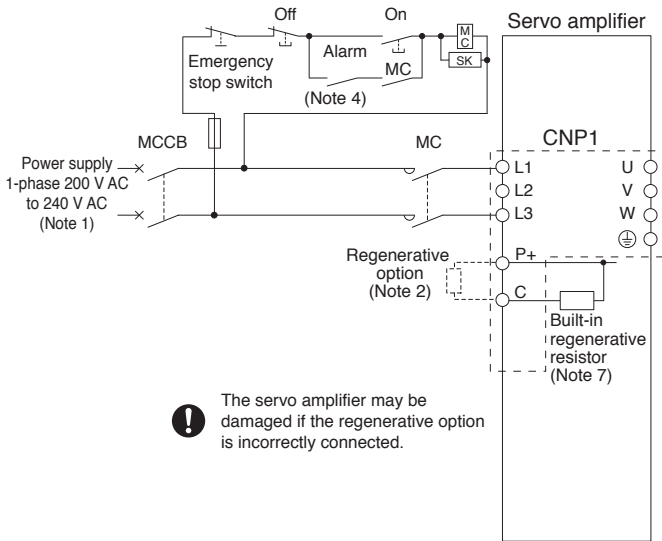
Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

Servo Amplifiers

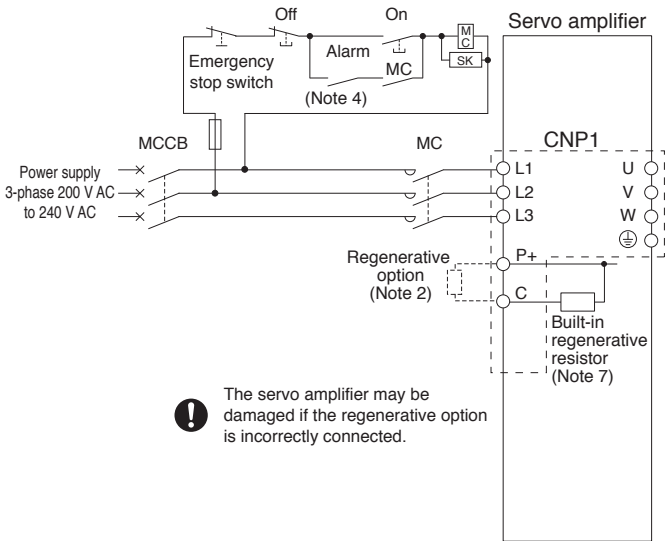
Power Supply Connection Example (MR-JE-B)

B

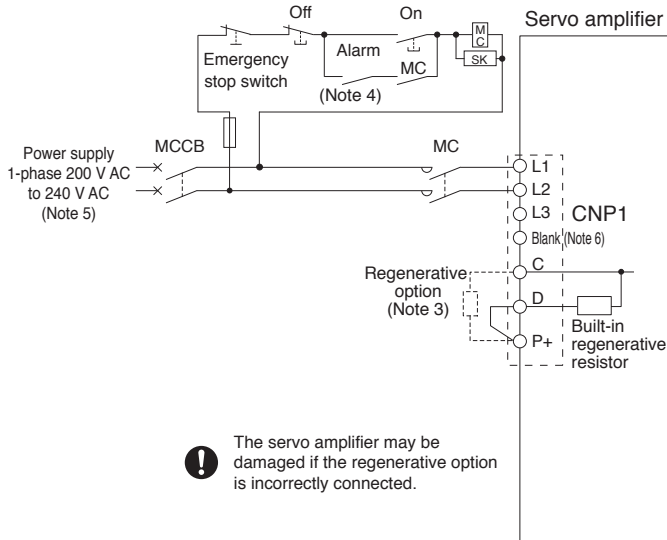
● For 1-phase 200 V AC, 1 kW or smaller



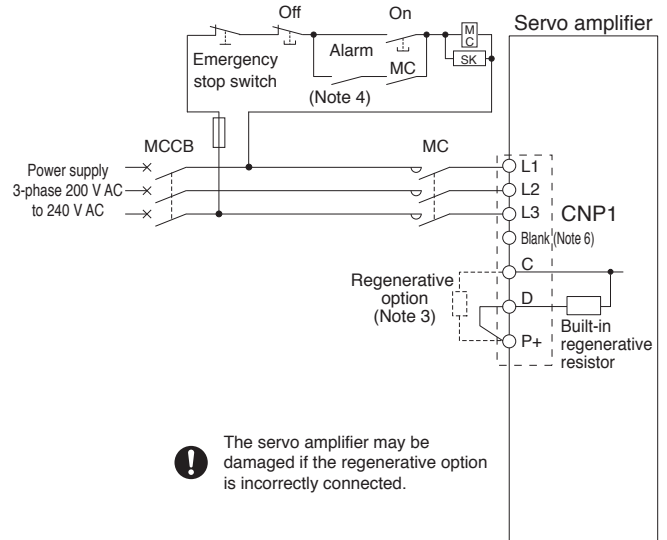
● For 3-phase 200 V AC, 1 kW or smaller



● For 1-phase 200 V AC, 2 kW



● For 3-phase 200 V AC, 2 kW and 3 kW



- 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.
2. Disconnect the wires for the built-in regenerative resistor (P+ and C), and remove the resistor when connecting the regenerative option externally.
3. Disconnect a short-circuit bar between P+ and D when connecting the regenerative option externally.
4. Create a power circuit to turn off the magnetic contactors of all the servo amplifiers after an alarm is detected on the servo system controller side.
5. For 1-phase 200 V AC to 240 V AC, connect the power supply to L1 and L2 terminals. Do not connect anything to L3.
6. The servo amplifiers manufactured in December 2016 or later do not have an N- terminal.
7. The servo amplifiers of 0.2 kW or smaller do not have a built-in regenerative resistor.



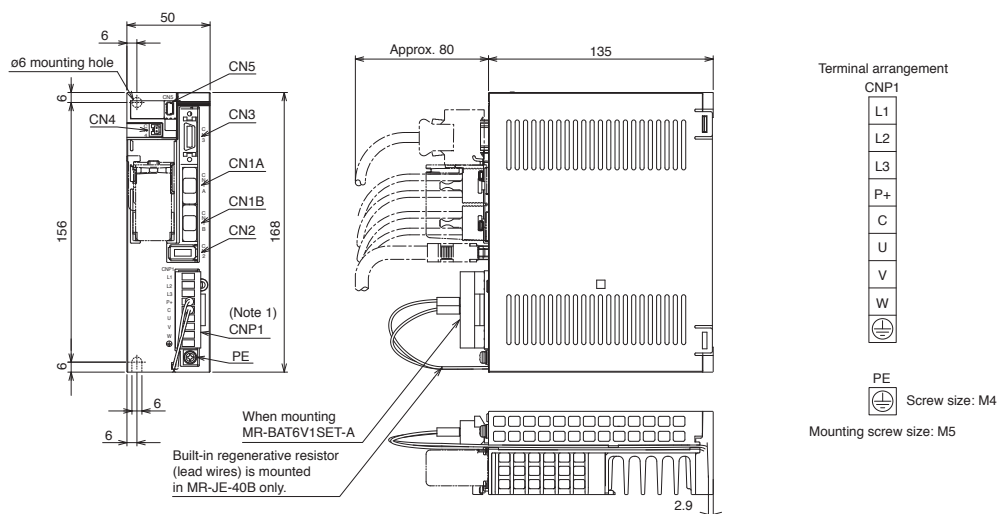
Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

MR-JE-B Dimensions

●MR-JE-10B

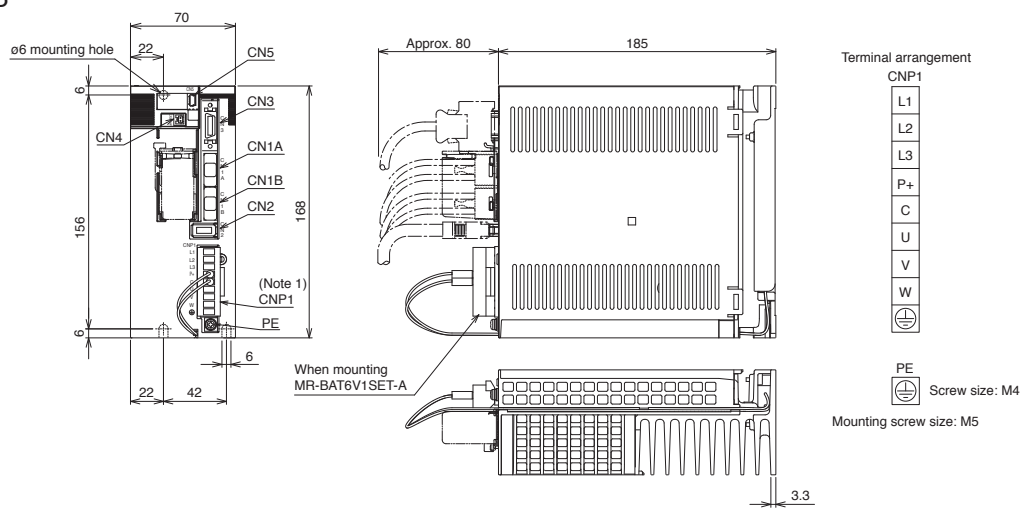
●MR-JE-20B

●MR-JE-40B



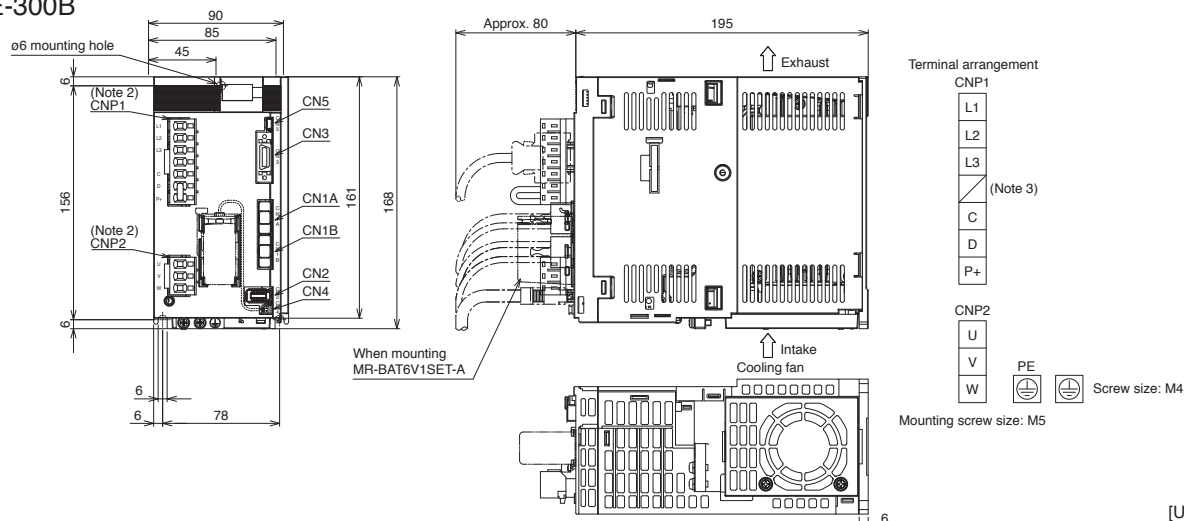
●MR-JE-70B

●MR-JE-100B



●MR-JE-200B

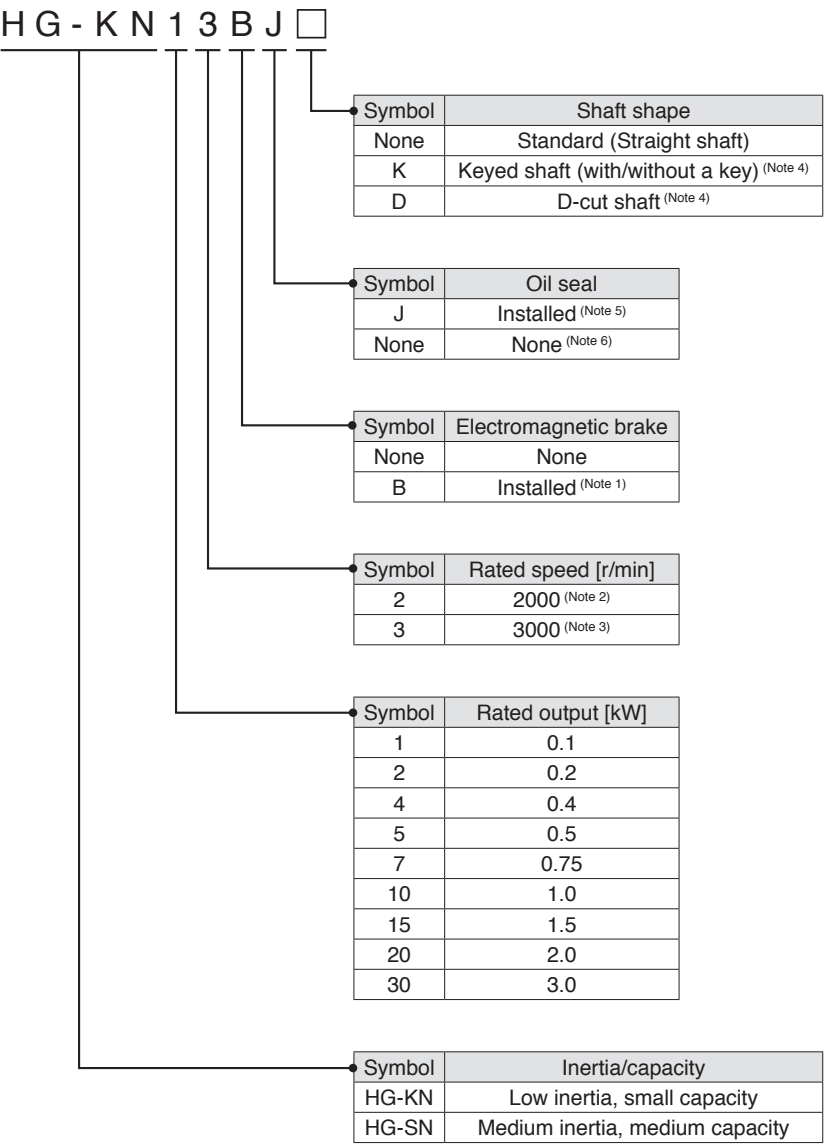
●MR-JE-300B



Notes: 1. CNP1 connector is supplied with the servo amplifier.
2. CNP1 and CNP2 connectors are supplied with the servo amplifier.
3. The servo amplifiers manufactured in December 2016 or later do not have an N- terminal.

Servo Motors

Model Designation (Note 7)



Notes: 1. Refer to electromagnetic brake specifications of each servo motor series in this catalog for the detailed specifications.
2. 2000 r/min is for HG-SN series only.
3. 3000 r/min is for HG-KN series only.
4. Refer to special shaft specifications of each servo motor series in this catalog for the available models and detailed specifications.
5. An oil seal is attached as a standard for all servo motors.
6. Available in HG-KN13 to HG-KN43.
7. This section describes what each symbol in a model name indicates. Some combinations of symbols are not available.

Combinations of Servo Motor and Servo Amplifier

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

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

Servo motor model		HG-KN	13(B)J	23(B)J	43(B)J	73(B)J
Compatible servo amplifier model		Refer to "Combinations of Servo Motor and Servo Amplifier" on p. 2-1 in this catalog.				
Power supply capacity ^{*1}		[kVA]	0.3	0.5	0.9	1.3
Continuous running duty ^(Note 9)	Rated output	[W]	100	200	400	750
	Rated torque ^(Note 3)	[N•m]	0.32	0.64	1.3	2.4
Maximum torque		[N•m]	0.95	1.9	3.8	7.2
Rated speed ^(Note 9)		[r/min]	3000			
Maximum speed ^(Note 9)		[r/min]	5000 (6000) ^(Note 6)			
Permissible instantaneous speed		[r/min]	5750 (6900) ^(Note 6)			
Power rate at continuous rated torque	Standard	[kW/s]	12.9	18.0	43.2	44.5
	With electromagnetic brake	[kW/s]	12.0	16.4	40.8	41.0
Rated current		[A]	0.8	1.3	2.6	4.8
Maximum current		[A]	2.4	3.9	7.8	14
Regenerative braking frequency ^{*2, *3}		[times/min]	(Note 4)	(Note 5)	276	159
Moment of inertia J	Standard	[× 10 ⁻⁴ kg•m ²]	0.0783	0.225	0.375	1.28
	With electromagnetic brake	[× 10 ⁻⁴ kg•m ²]	0.0843	0.247	0.397	1.39
Recommended load to motor inertia ratio ^(Note 1)		15 times or less				
Speed/position detector	Combination with MR-JE-C/MR-JE-B	Absolute ^(Note 7) /incremental 17-bit encoder (resolution: 131072 pulses/rev)				
	Combination with MR-JE-A	Incremental 17-bit encoder (resolution: 131072 pulses/rev)				
Type		Permanent magnet synchronous motor				
Oil seal		Installed. Without oil seal is also available.				Installed
Thermistor		None				
Insulation class		130 (B)				
Structure		Totally enclosed, natural cooling (IP rating: IP65) ^(Note 2)				
Environment ^{*4}	Ambient temperature	Operation: 0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)				
	Ambient humidity	Operation: 10 %RH to 80 %RH (non-condensing), storage: 10 %RH to 90 %RH (non-condensing)				
	Ambience	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust				
	Altitude	2000 m or less above sea level ^(Note 8)				
Vibration resistance ^{*5}		X: 49 m/s ² Y: 49 m/s ²				
Vibration rank		V10 ^{*7}				
Permissible load for the shaft ^{*6}	L	[mm]	25	30	30	40
	Radial	[N]	88	245	245	392
	Thrust	[N]	59	98	98	147
Mass	Standard	[kg]	0.57	0.98	1.5	3.0
	With electromagnetic brake	[kg]	0.77	1.4	1.9	4.0

- 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 8 of "Annotations for Servo Motor Specifications" on p. 2-6 in this catalog for the shaft-through portion.
3. When unbalanced torque is generated, such as in a vertical lift machine, keep the unbalanced torque of the machine 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. When the servo motor decelerates to a stop from the maximum speed, the regenerative frequency will not be limited if the load to motor inertia ratio is 11 times or less.
5. When the servo motor decelerates to a stop from the rated speed, the regenerative frequency will not be limited if the load to motor inertia ratio is 9 times or less. When the servo motor decelerates to a stop from the maximum speed, the regenerative frequency will not be limited if the load to motor inertia ratio is 3 times or less.
6. The values in brackets are applicable with parameter setting. Refer to relevant Servo Amplifier Instruction Manual for details.
7. When absolute position detection system is used with MR-JE-C, absolute position data is read with the Ethernet communication. Refer to "MR-JE-C Servo Amplifier Instruction Manual" for details.
8. Refer to "HG-KN HG-SN Servo Motor Instruction Manual" for the restrictions when using the servo motors at altitude exceeding 1000 m and up to 2000 m above sea level.
9. The continuous running duty and the speed are not guaranteed when the power supply voltage is dropped.

Refer to "Annotations for Servo Motor Specifications" on p. 2-6 in this catalog for details about asterisks 1 to 7.