

Servo Amplifier Model Designation

B A

M R - J E - 1 0 B

Mitsubishi general-purpose AC servo amplifier MELSERVO-JE Series

Symbol	Rated output [kW]
10	0.1
20	0.2
40	0.4
70	0.75
100	1
200	2
300	3

Symbol	Interface
B	SSCNET III/H
A	General-purpose

Combinations of Servo Amplifier and Servo Motor

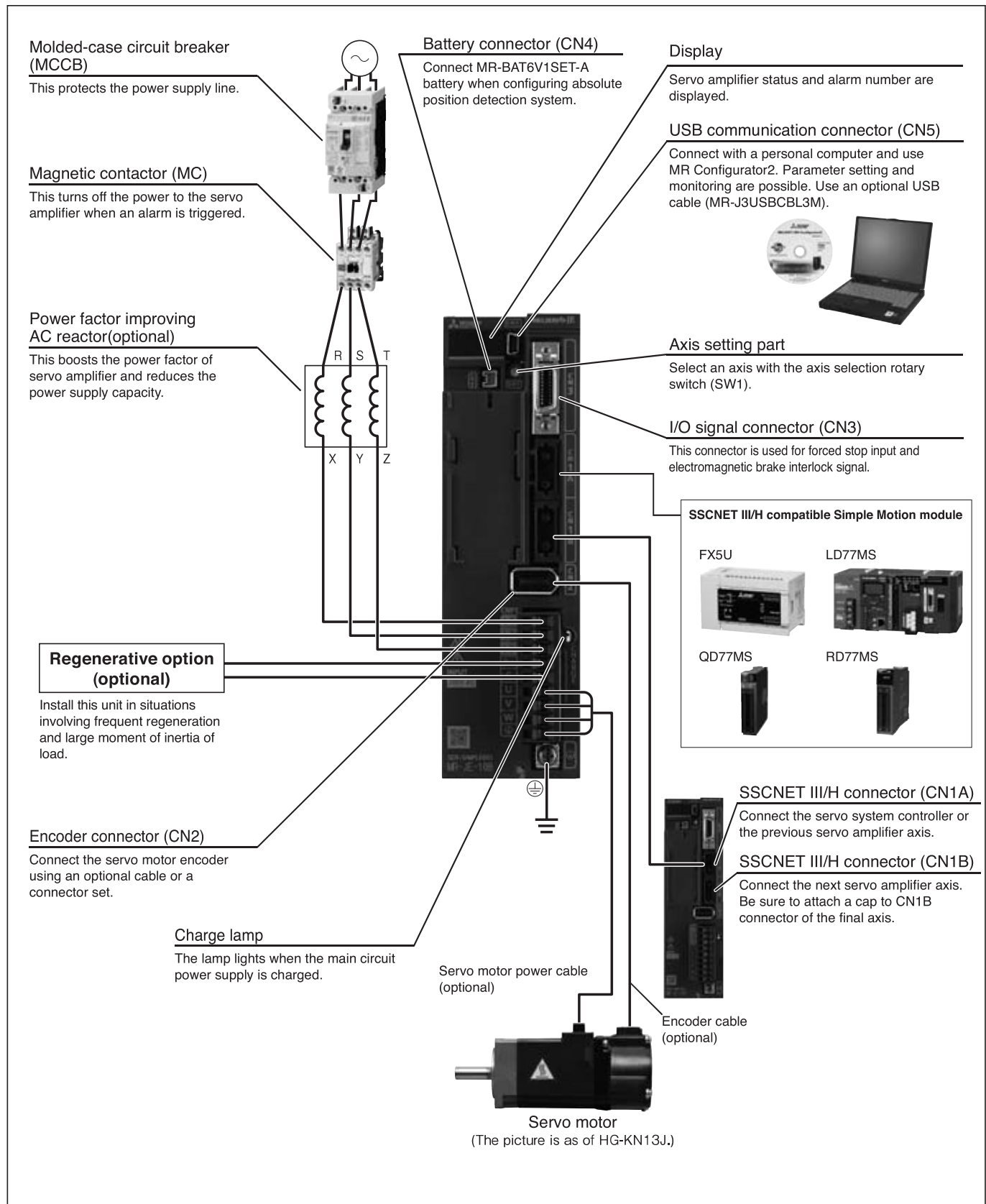
B A

Servo amplifier	Servo motor	
	HG-KN series	HG-SN series
MR-JE-10B/MR-JE-10A	HG-KN13J	-
MR-JE-20B/MR-JE-20A	HG-KN23J	-
MR-JE-40B/MR-JE-40A	HG-KN43J	-
MR-JE-70B/MR-JE-70A	HG-KN73J	HG-SN52J
MR-JE-100B/MR-JE-100A	-	HG-SN102J
MR-JE-200B/MR-JE-200A	-	HG-SN152J, HG-SN202J
MR-JE-300B/MR-JE-300A	-	HG-SN302J

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

B

Peripheral equipment is connected to MR-JE-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-JE-100B or smaller servo amplifiers. Refer to "MR-JE-_B Servo Amplifier Instruction Manual" for the actual connections.

Servo Amplifiers

Servo Motors

Options/Peripheral Equipment

I/S/Wires

Product List

Cautions

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

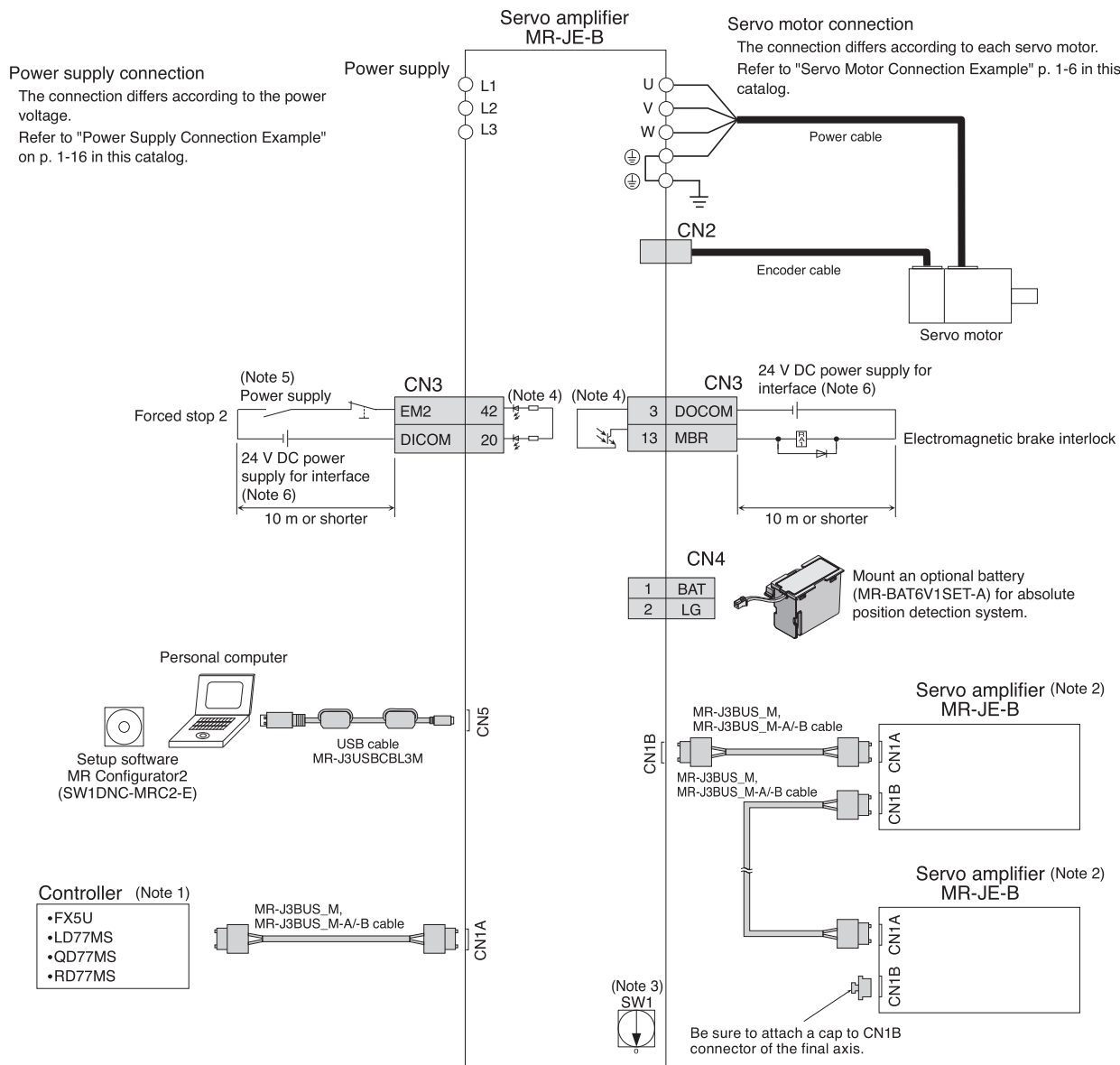
B

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	2.6	3.8	5.0	10.5	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: 0.1 A)						
Control method		Sine-wave PWM control/current control method						
Tolerable regenerative power of the built-in regenerative resistor ^(Note 2, 3) [W]		-	-	10	20	20	100	100
Dynamic brake		Built-in ^(Note 4)						
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 function, 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)						
Compliance to global standards		Refer to "Conformity with global standards and regulations" on p. 19 in this catalog.						
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: 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]		0.8	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, 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-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 them with 75% or less of the effective load ratio.
6. The command communication cycle depends on the controller specifications and the number of axes connected.
7. This value is applicable when a 3-phase power supply is used.
8. When a 1-phase 200 V AC to 240 V AC power supply is used, use the servo amplifiers with 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 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.

MR-JE-B Standard Wiring Diagram Example

B



- 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 16 axes are set by using an axis selection rotary switch (SW1). Note that the number of the connectable axes depends on the controller specifications.
4. This is for sink wiring. Source wiring is also possible.
5. Create a circuit to turn off EM2 (Forced stop 2) when the power is turned off to prevent an unexpected restart of the servo amplifier.
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.



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

Servo Motors

Options/Peripheral Equipment

LVS/Wires

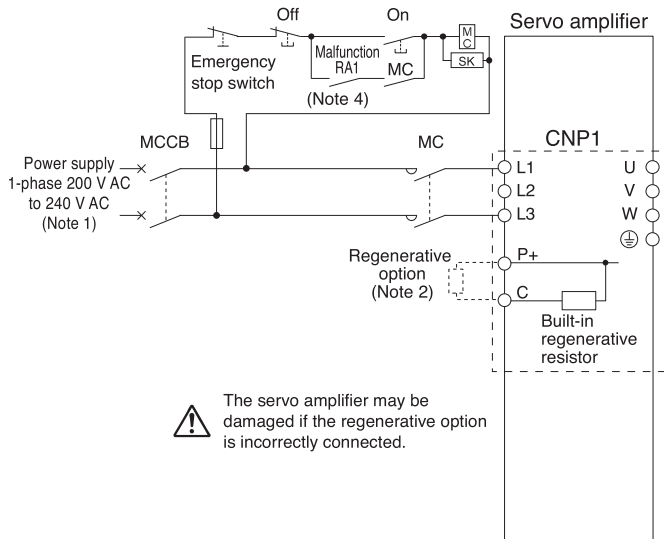
Product List

Cautions

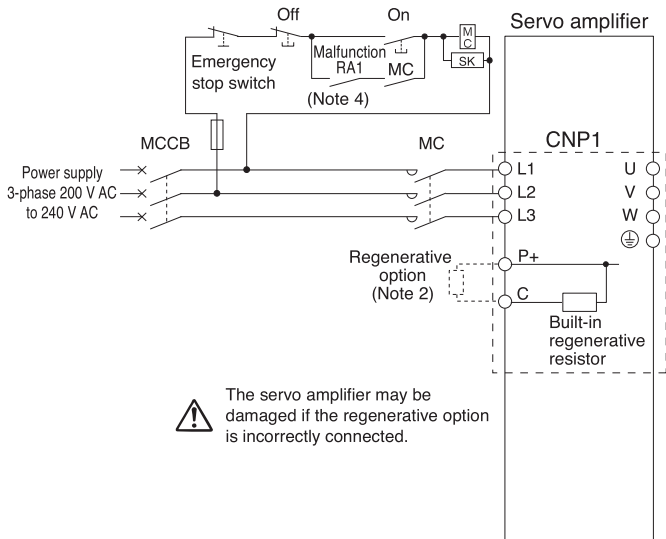
Power Supply Connection Example (MR-JE-B)

B

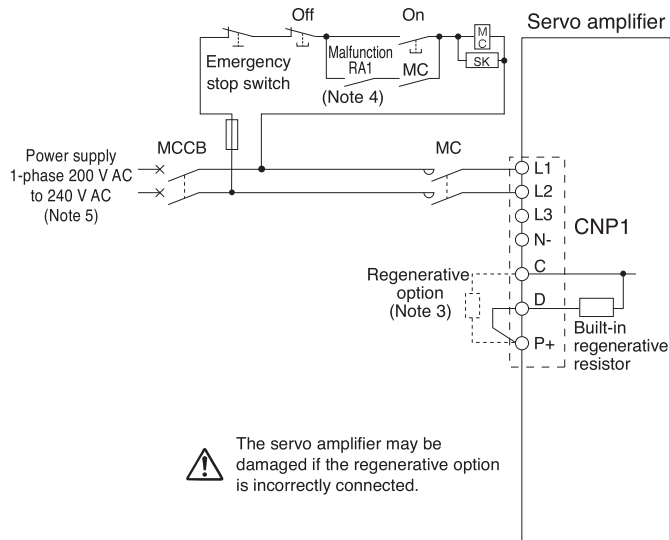
●For 1-phase 200 V AC, 1 kW or smaller



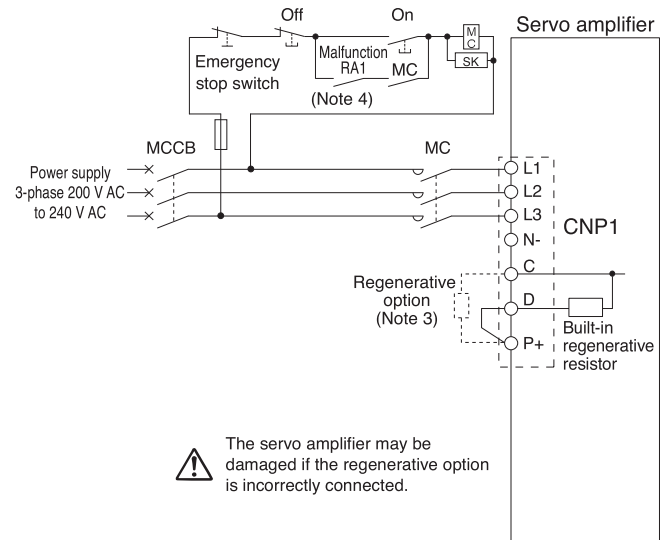
●For 3-phase 200 V AC, 1 kW or smaller



●For 1-phase 200 V AC, 2 kW



●For 3-phase 200 V AC, 2 kW and 3 kW



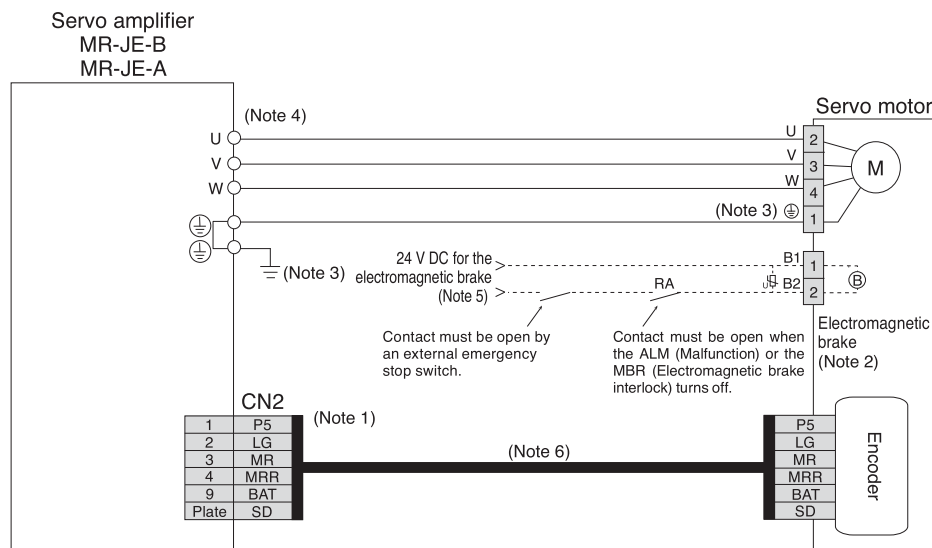
- Notes:
- For 1-phase 200 V AC to 240 V AC, connect the power supply to L1 and L3 terminals. Do not connect anything to L2.
 - Disconnect the wires for the built-in regenerative resistor (P+ and C), and remove the resistor when connecting the regenerative option externally.
 - Disconnect a short-circuit bar between P+ and D when connecting the regenerative option externally.
 - Create a power circuit to turn off the magnetic contactors of all the servo amplifiers after an alarm is detected on controller side.
 - 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.



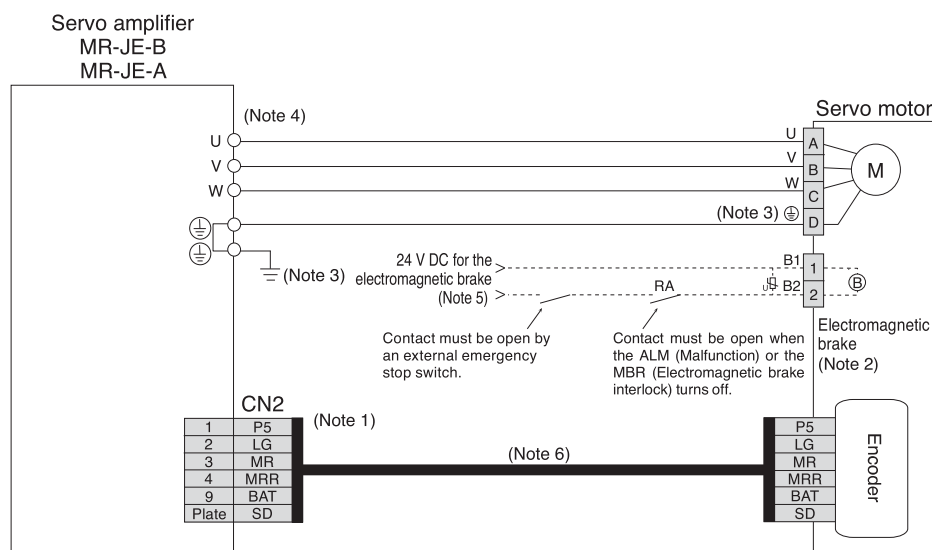
Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

Servo Motor Connection Example

● For HG-KN series



● For HG-SN 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. For 1 kW or smaller servo amplifiers, connect the grounding terminal of the servo motor to the protective earth (PE) terminal (⊕) located on the lower front of the servo amplifier to the cabinet protective earth (PE).
For 2 kW or larger servo amplifiers, connect the grounding terminal of the servo motor to the protective earth (PE) terminal (⊕) located on the lower front of the servo amplifier, and connect the other protective earth (PE) terminal (⊕) to the cabinet protective earth (PE).
4. The connector 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 "HG-KN HG-SN Servo Motor Instruction Manual" when fabricating the cables.



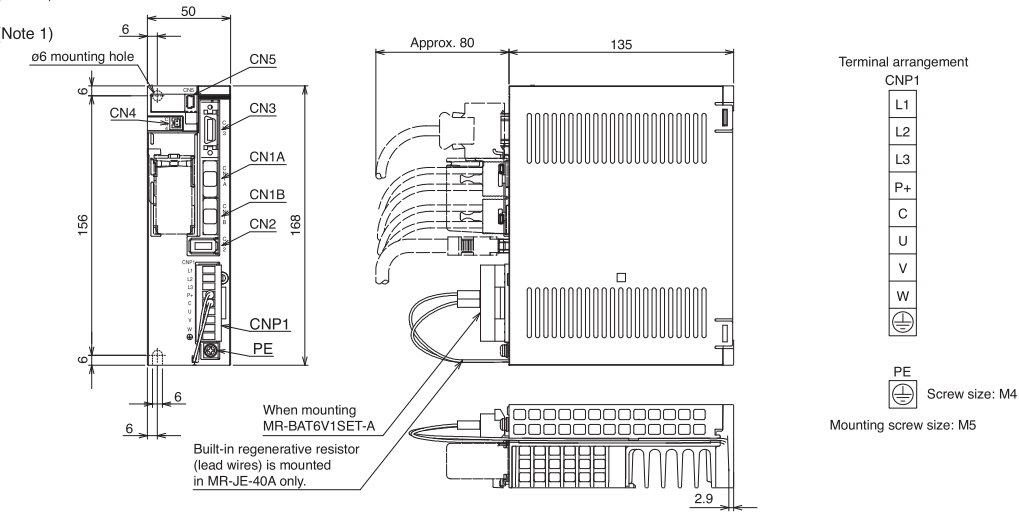
Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

MR-JE-B Dimensions

●MR-JE-10B (Note 1)

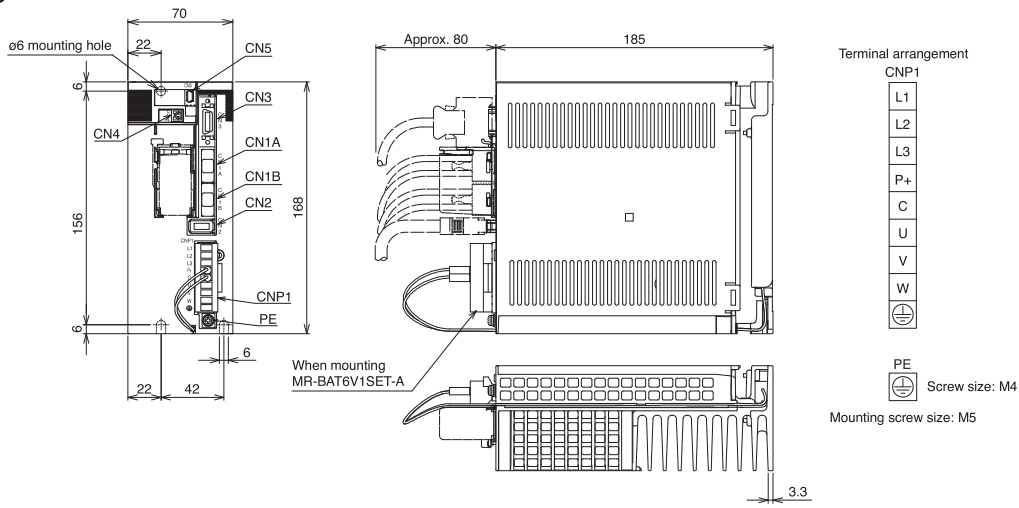
●MR-JE-20B (Note 1)

●MR-JE-40B (Note 1)



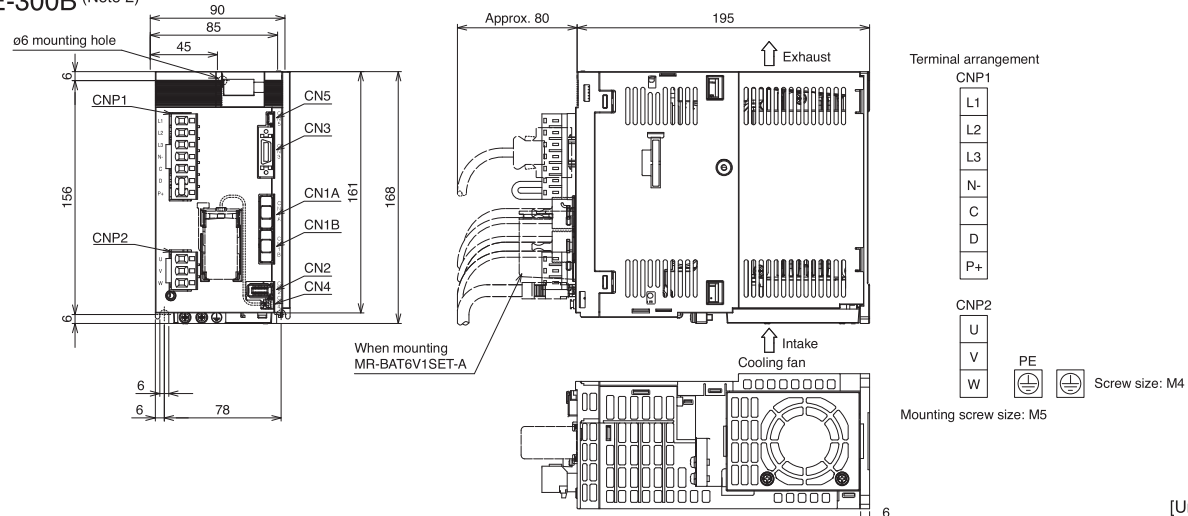
●MR-JE-70B (Note 1)

●MR-JE-100B (Note 1)



●MR-JE-200B (Note 2)

●MR-JE-300B (Note 2)

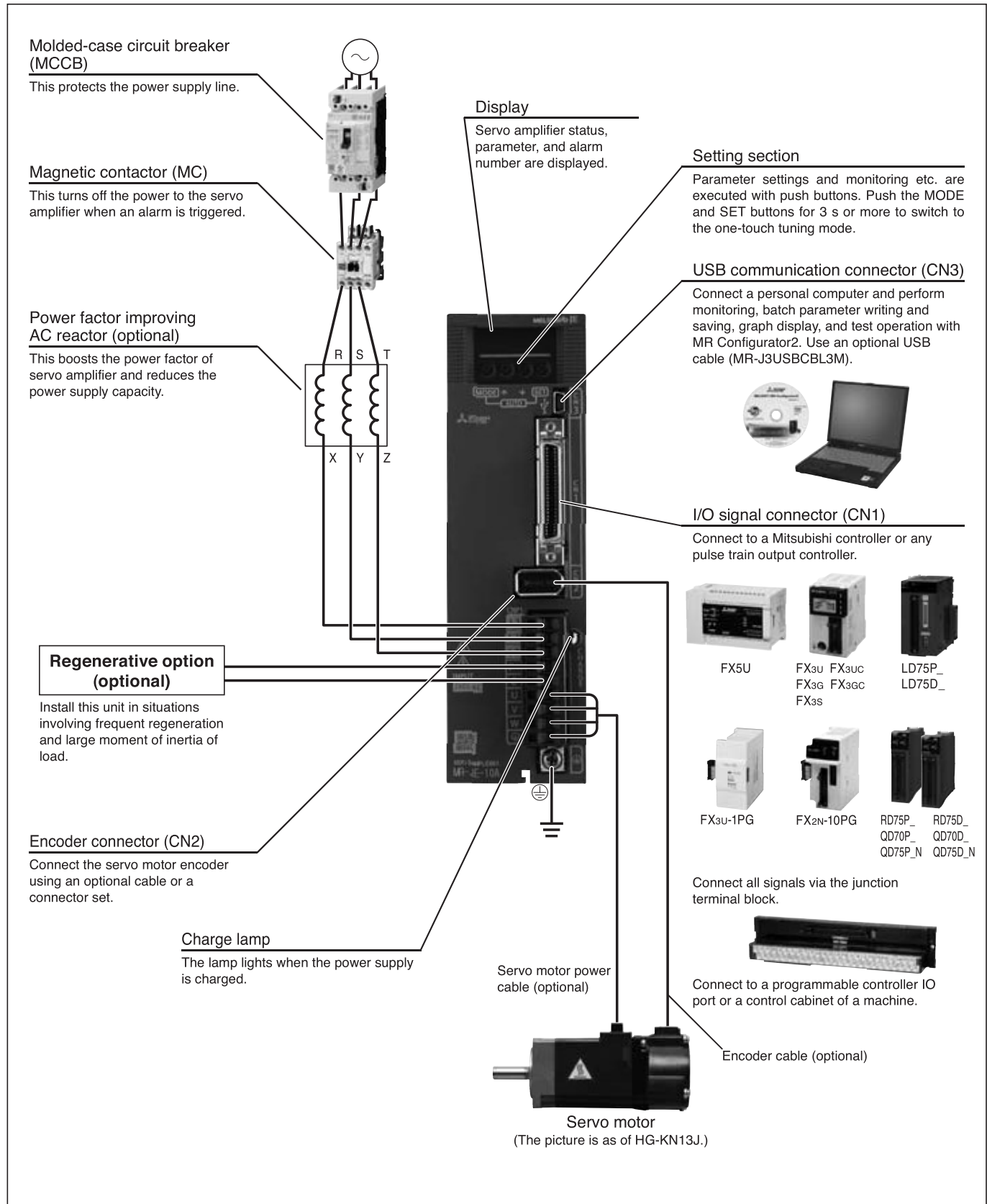


Notes: 1. CNP1 connector (insertion type) is supplied with the servo amplifier.
2. CNP1 and CNP2 connectors (insertion type) are supplied with the servo amplifier.

MR-JE-A Connections with Peripheral Equipment (Note 1)

A

Peripheral equipment is connected to MR-JE-A 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-JE-100A or smaller servo amplifiers. Refer to "MR-JE_A Servo Amplifier Instruction Manual" for the actual connections.

Servo Amplifiers

Servo Motors

Options/Peripheral Equipment

I/S/Wires

Product List

Cautions

MR-JE-A (General-purpose Interface) Specifications

A

Servo amplifier model MR-JE-		10A	20A	40A	70A	100A	200A	300A
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 9)		3-phase 200 V AC to 240 V AC, 50 Hz/60 Hz
	Rated current ^(Note 7) [A]	0.9	1.5	2.6	3.8	5.0	10.5	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 9)		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)						
Control method		Sine-wave PWM control/current control method						
Tolerable regenerative power of the built-in regenerative resistor ^(Note 2, 3) [W]		-	-	10	20	20	100	100
Dynamic brake		Built-in ^(Note 4, 8)						
Communication function		USB: Connect a personal computer (MR Configurator2 compatible) RS-422/RS-485 ^(Note 10) : Connect a controller (1 : n communication up to 32 axes) ^(Note 6)						
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: 131072 pulses/rev						
	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)						
Positioning mode		Point table method, program 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						
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						
Compliance to global standards		Refer to "Conformity with global standards and regulations" on p. 19 in this catalog.						
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: 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	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, 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-JE- A 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 them with 75% or less of the effective load ratio.

6. RS-422 communication function is available with the servo amplifiers manufactured on December 2013 or later. RS-485 communication function is available with the servo amplifiers manufactured on May 2015 or later. Refer to "MR-JE- A Servo Amplifier Instruction Manual" for how to verify the manufacturing date of the products.

7. This value is applicable when a 3-phase power supply is used.

8. The coast distance by dynamic brake of HG-KN/HG-SN servo motor series may be different from prior HF-KN/HF-SN. Contact your local sales office for more details.

9. When 1-phase 200 V AC to 240 V AC power supply is used, use them with 75% or less of the effective load ratio.

10. Compatible with Mitsubishi general-purpose AC servo protocol (RS-422/RS-485 communication) and MODBUS® RTU protocol (RS-485 communication).

A

Servo Amplifiers

Options/Peripheral
Equipment

LVSWires

Product List

Cautions

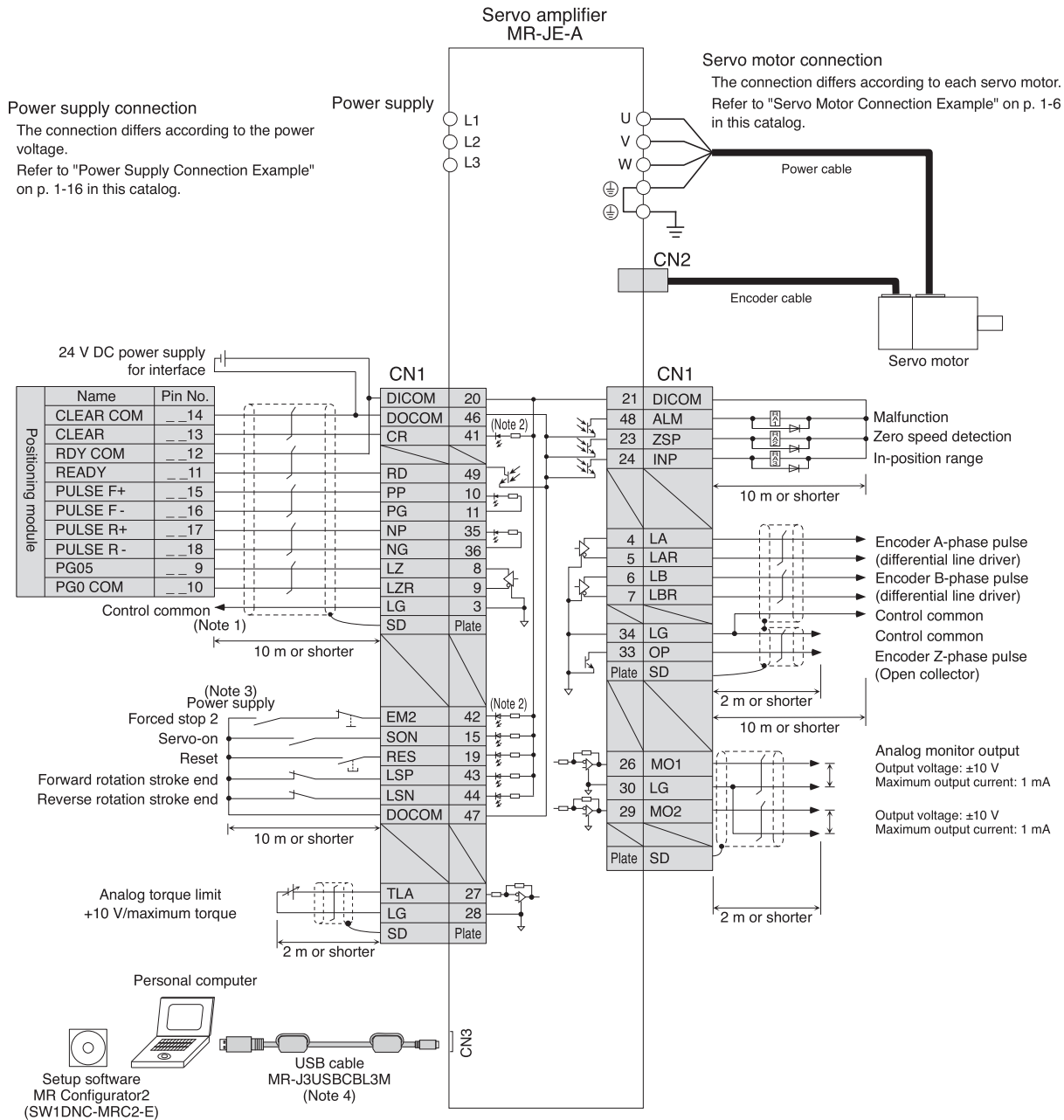
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Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

MR-JE-A Standard Wiring Diagram Example: Position Control Operation

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Connecting to QD75D/LD75D/RD75D (position servo, incremental)



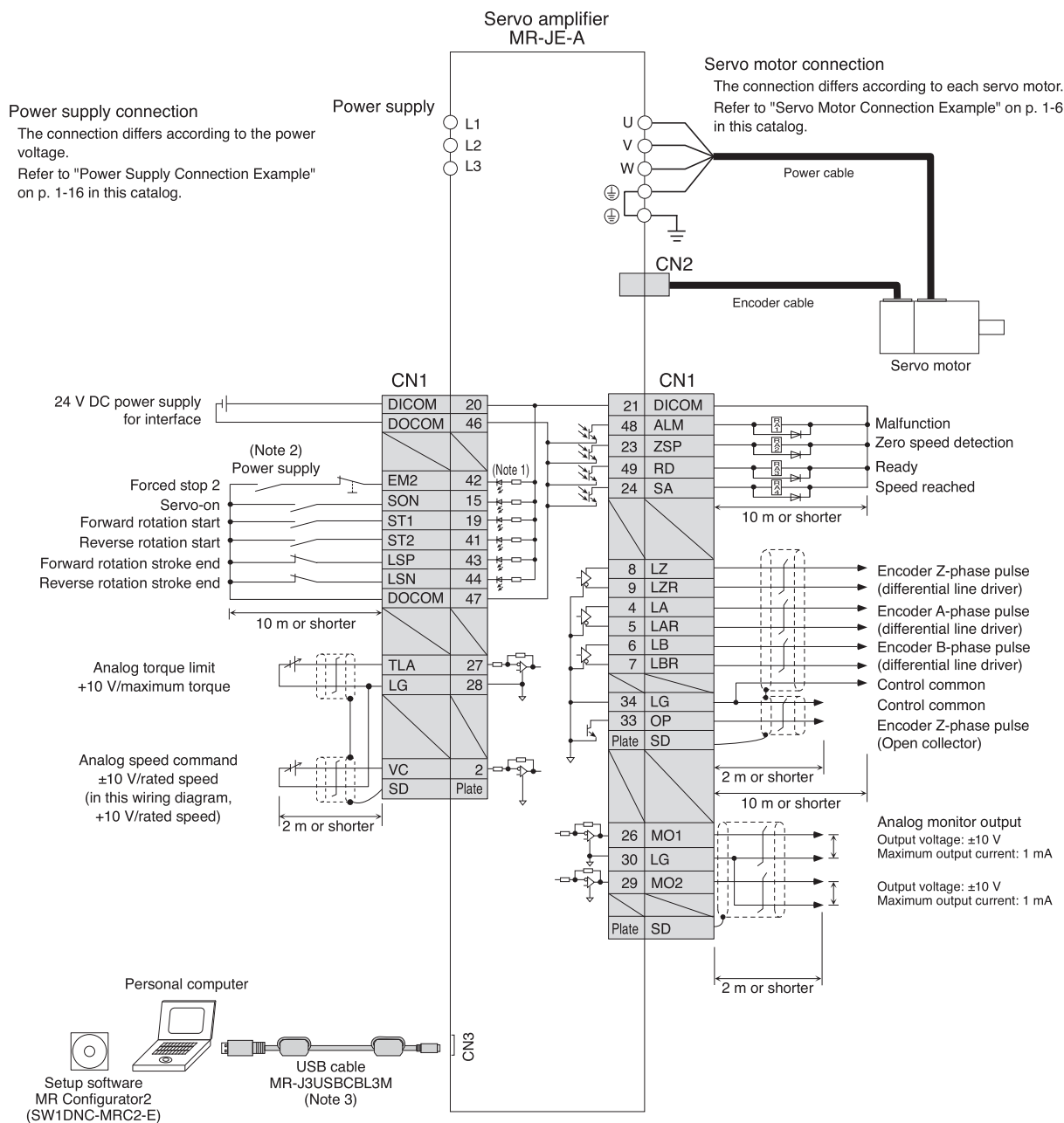
- Notes: 1. This connection is not necessary for QD75D/LD75D/RD75D Positioning module. Note that the connection between LG and control common terminal is recommended for some Positioning modules to improve noise tolerance.
2. This is for sink wiring. Source wiring is also possible.
3. Create a circuit to turn off EM2 (Forced stop 2) when the power is turned off to prevent an unexpected restart of the servo amplifier.
4. USB interface, RS-422 interface, and RS-485 interface are mutually exclusive. Do not use them at the same time.



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-A Standard Wiring Diagram Example: Speed Control Operation

A



- Notes: 1. This is for sink wiring. Source wiring is also possible.
2. Create a circuit to turn off EM2 (Forced stop 2) when the power is turned off to prevent an unexpected restart of the servo amplifier.
3. USB interface, RS-422 interface, and RS-485 interface are mutually exclusive. Do not use them at the same time.



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

Servo Motors

Options/Peripheral Equipment

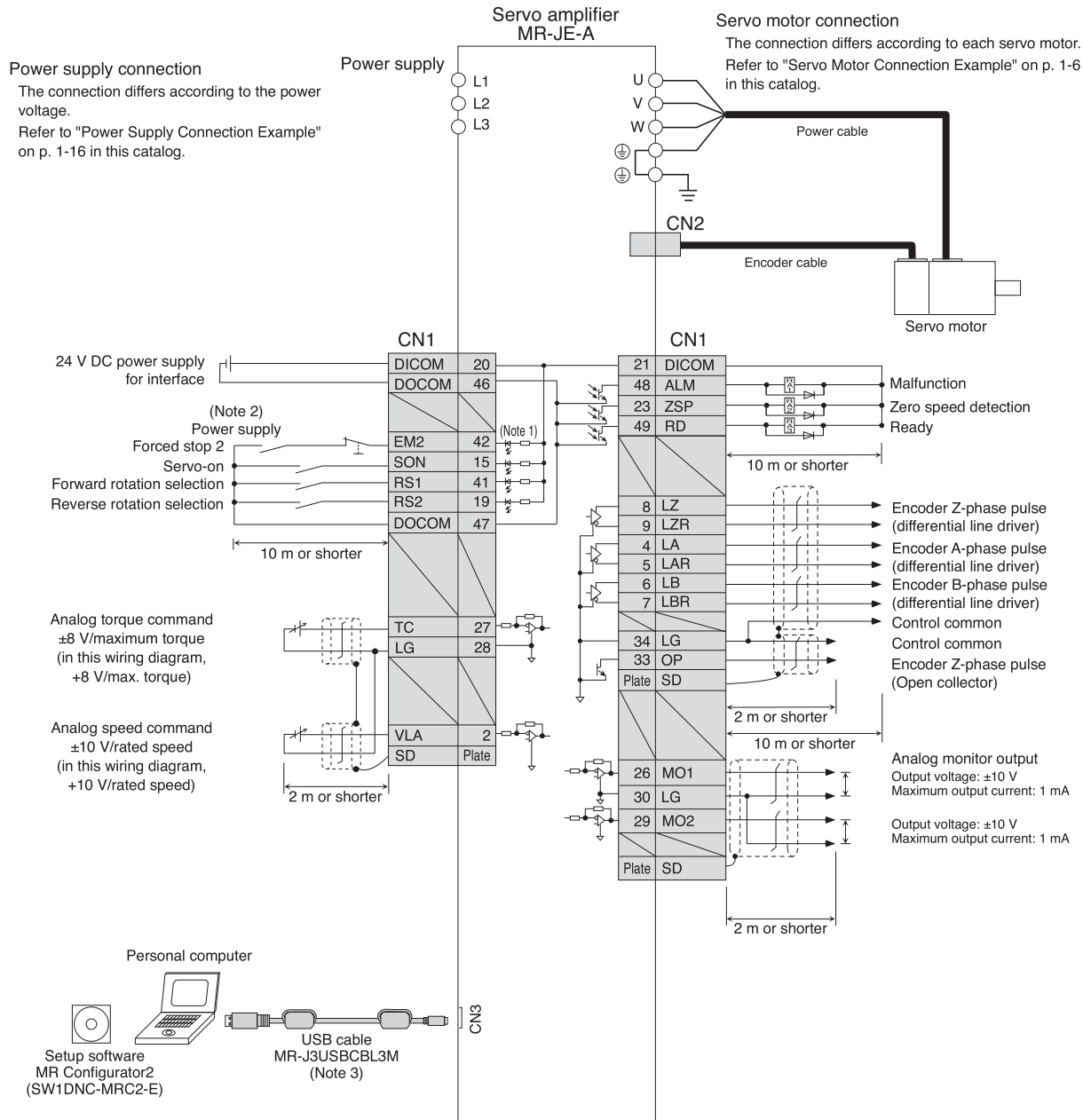
LVS/Wires

Product List

Cautions

MR-JE-A Standard Wiring Diagram Example: Torque Control Operation

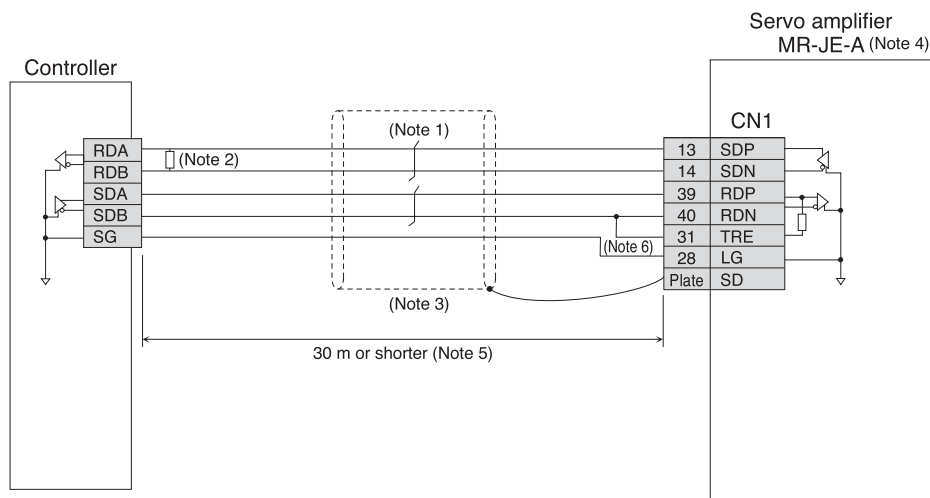
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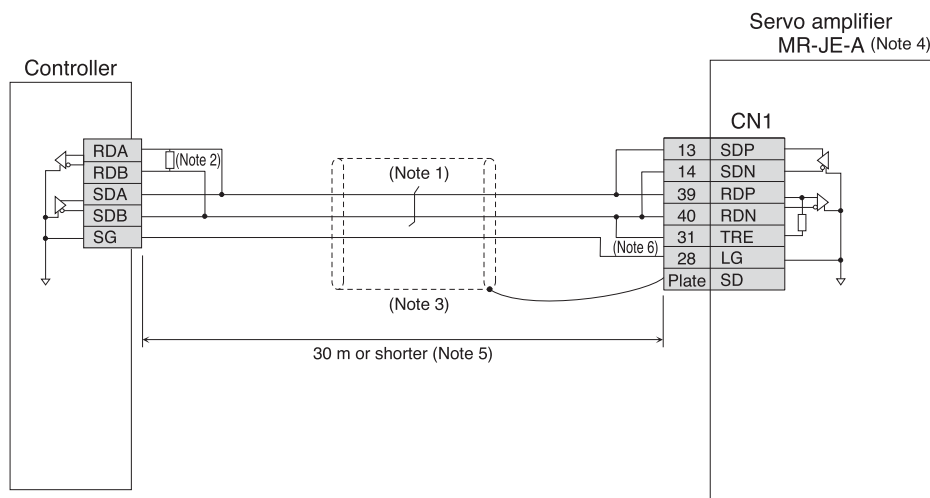
Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

RS-422 Serial Communication Connection Example

A



RS-485 Serial Communication Connection Example



- Notes: 1. Twist the wires from SDP and SDN together, and RDP and PDN together.
 2. Refer to the controller manual to connect a termination resistor. If a termination resistor is not specified, terminate with a 150 Ω resistor.
 3. It is recommended that the cable be shielded.
 4. RS-422 communication function is available with the servo amplifiers manufactured on December 2013 or later. RS-485 communication function is available with the servo amplifiers manufactured on May 2015 or later. Refer to "MR-JE-A Servo Amplifier Instruction Manual" for how to identify the manufacturing date of the products.
 5. The cable length must be 30 m or shorter in a low-noise environment. When connecting multiple axes, also keep the overall length within 30 m.
 6. Connect TRE and RDN for the servo amplifier of the final axis.



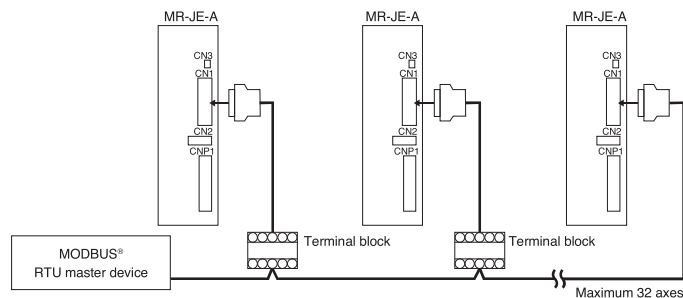
Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

MODBUS® RTU Specifications

Item		Specifications
Communication protocol		MODBUS® RTU protocol
Compliance to standards		EIA-485 (RS-485)
Numbers connected		1: n (Maximum 32) Set stations 1 to 247 by a parameter. (Station 0 is for broadcast communication)
Communication baud rate	[bps]	4800/9600/19200/38400/57600/115200 (set by a parameter)
Control process		Asynchronous system
Communication method		Half-duplex method
Maximum overall extension distance	[m]	30
Communication specifications	Character method	Binary (8-bit fixed)
	Start bit	1-bit
	Stop bit length	Select from the following by a parameter. • Even parity, stop bit length 1-bit (initial value) • Odd parity, stop bit length 1-bit • No parity, stop bit length 2-bit
	Parity check	
	Error check	CRC-16 method
Terminator		None
Waiting time setting		None
Master/Slave classification		Slave

MODBUS® RTU Wiring (For Multi-drop)

Up to 32 servo amplifier axes can be operated on the same bus.



MODBUS® RTU Compatible Function Codes

MR-JE-A servo amplifier is compatible with following function code.

Code	Function name	Description
03h	Read holding registers	Reading holding registers Reads data stored in holding registers from a master.
08h	Diagnostics	Functional diagnostics When this function code is sent from a master to slaves, the slaves return the data as it is. This function can be used for checking the communication status.
10h	Preset multiple registers	Writing to multiple registers Writes a series of data to multiple holding registers from a master.

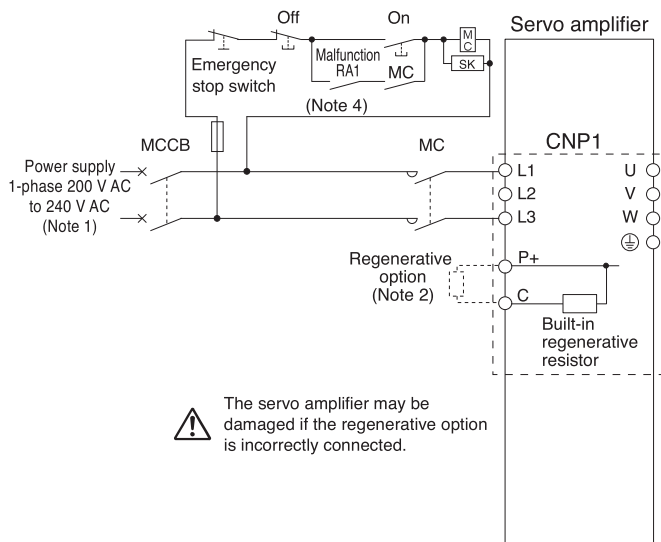
MODBUS® RTU Functions

The functions of MODBUS® RTU are as follows. MODBUS® RTU can operate and maintain the servo amplifier by remote control.

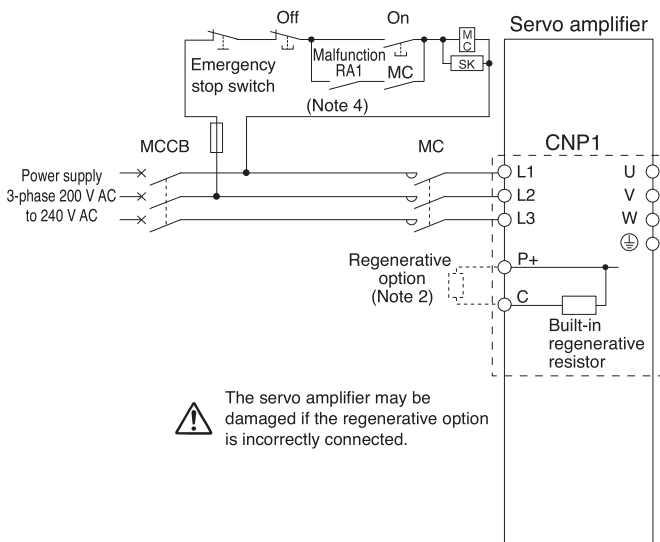
Function	Description
Status monitor	Reads the items of "Display All" in monitor function of MR Configurator 2 such as servo motor speed and droop pulse.
Parameter setting	Reads and writes parameters.
Point table setting	Reads and writes point table data.
Current alarm reading	Reads an alarm No. currently generated.
Alarm history reading	Reads all 16 alarm histories.
Parameter error No. reading/point table error No. reading	Reads corresponding parameter No. for parameter error and corresponding point table No. for point table error.
Input/output monitor	Reads on/off status of I/O signal and monitor situation of I/O device.
Motor driving	Drives servo motors.
Servo amplifier information reading	Reads servo amplifier model, software version, and cumulative power time.

Power Supply Connection Example (MR-JE-A)

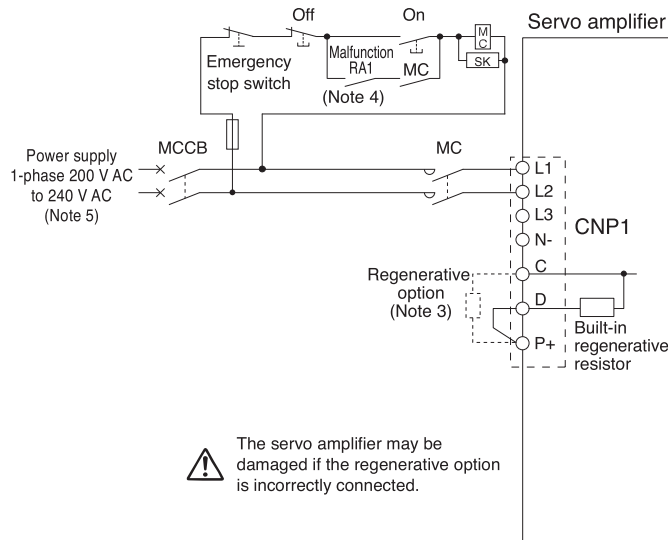
● For 1-phase 200 V AC, 1 kW or smaller



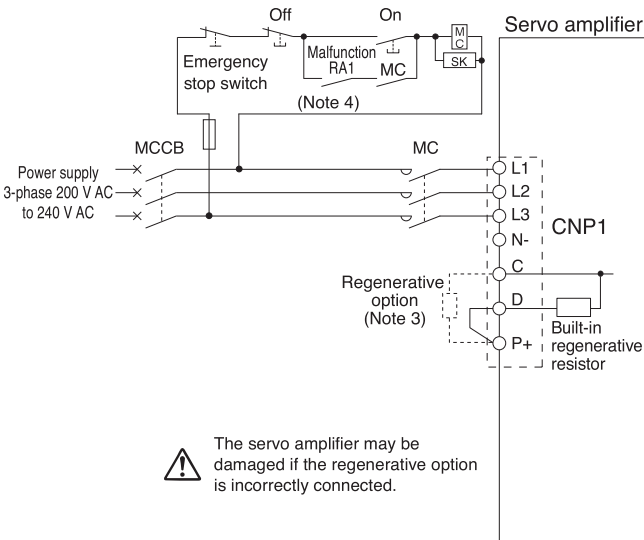
● For 3-phase 200 V AC, 1 kW or smaller



● 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. The connections are different from MR-E Super series servo amplifiers. Be careful not to make a connection error when replacing MR-E Super with MR-JE.
 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 contactor when ALM (malfunction) is off (alarm occurrence).
 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.



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-A Positioning Function: Point Table Method

A

Positioning operation is executed by selecting the point table No. with a command interface signal according to the position and speed data set in the point table.

Item			Description
Command method	Command interface		Input: 7 points excluding EM2 (Forced stop 2), output: 3 points excluding ALM (Malfunction), RS-422 communication/RS-485 communication ^(Note 2)
	Operating specification		Positioning by specifying the point table No. (31 points when communication is specified, 15 points when DI is used)
	Position command input ^(Note 1)	Absolute value command method	Set in the point table. Setting range of feed length per point: -999999 to 999999 [$\times 10^{\text{STM}}$ μm], -99.9999 to 99.9999 [$\times 10^{\text{STM}}$ inch], -999999 to 999999 [pulse], Setting range of rotation angle: -360.000 to 360.000 [degree]
		Incremental value command method	Set in the point table. Setting range of feed length per point: 0 to 999999 [$\times 10^{\text{STM}}$ μm], 0 to 99.9999 [$\times 10^{\text{STM}}$ inch], 0 to 999999 [pulse], Setting range of rotation angle: 0 to 999.999 [degree]
	Speed command input		Set the acceleration/deceleration time constants in the point table. Set the S-pattern acceleration/deceleration time constants with [Pr. PC03].
	System		Signed absolute value command method, incremental value command method
	Analog override		0 V DC to ± 10 V DC/0% to 200%
	Torque limit		Set by parameters or external analog input (0 V DC to +10 V DC/maximum torque)
	Operation mode	Automatic operation mode	Each positioning operation
Automatic continuous positioning operation			Varying-speed operation (2 to 31 speeds), automatic continuous positioning operation (2 to 31 points)
Manual operation mode		JOG operation	Inching operation is executed with DI or serial communication function ^(Note 2) according to the speed command set with a parameter.
		Manual pulse generator operation	Manual feeding is executed with a manual pulse generator. Command pulse multiplication: select from $\times 1$, $\times 10$, and $\times 100$ with a parameter.
Home position return mode		Dog type	Returns to home position upon Z-phase pulse after passing through proximity dog. Home position return direction selectable, home position shift distance settable, home position address settable, automatic retract on dog back to home position, automatic stroke retract function
		Count type	Returns to home position upon the encoder pulse count after touching proximity dog. Home position return direction selectable, home position shift distance settable, home position address settable, automatic retract on dog back to home position, automatic stroke retract function
		Data set type	Returns to home position without dog. Any position settable as a home position using manual operation, etc. Home position address settable
		Stopper type	Returns to home position upon hitting the stroke end. Home position return direction selectable, home position address settable
		Home position ignorance (servo-on position as home position)	Sets a home position where SON (Servo-on) signal turns on. Home position address settable
		Dog type rear end reference	Returns to home position with reference to the rear end of proximity dog. Home position return direction selectable, home position shift distance settable, home position address settable, automatic retract on dog back to home position, automatic stroke retract function
		Count type front end reference	Returns to home position with reference to the front end of proximity dog. Home position return direction selectable, home position shift distance settable, home position address settable, automatic retract on dog back to home position, automatic stroke retract function
		Dog cradle type	Returns to home position upon the first Z-phase pulse with reference to the front end of proximity dog. Home position return direction selectable, home position shift distance settable, home position address settable, automatic retract on dog back to home position, automatic stroke retract function
		Dog type adjacent Z-phase reference	Returns to home position upon the last Z-phase pulse with reference to the front end of proximity dog. Home position return direction selectable, home position shift distance settable, home position address settable, automatic retract on dog back to home position, automatic stroke retract function
		Dog type front end reference	Returns to home position to the front end of dog with reference to the front end of proximity dog. Home position return direction selectable, home position shift distance settable, home position address settable, automatic retract on dog back to home position, automatic stroke retract function
Dogless Z-phase reference		Returns to home position to Z-phase pulse with reference to the first Z-phase pulse. Home position return direction settable, home position shift distance settable, home position address settable	
Automatic positioning to home position function		High-speed automatic positioning to a defined home position	
Other functions			Backlash compensation, overtravel prevention with external limit switches (LSP/LSN), teaching function, roll feed display function, software stroke limit, mark detection (current position latch/interrupt positioning/mark sensor input compensation), simple cam function, encoder following function, command pulse input through function, analog override function

Notes: 1. STM is the ratio to the setting value of the position data. STM can be changed with [Pr. PT03].

2. Compatible with Mitsubishi general-purpose AC servo protocol (RS-422/RS-485 communication) and MODBUS® RTU protocol (RS-485 communication).

MR-JE-A Positioning Function: Point Table Method

A

Absolute value command method: travels to a specified address (absolute value) with reference to the home position

Item	Setting range	Description
Point table No.	1 to 31 (when communication is specified) 1 to 15 (when DI is used)	Specify a point table in which a target position, servo motor speed, acceleration/deceleration time constants, dwell, and sub function will be set.
Target position (Note 1, 2) (position data)	-999999 to 999999 [$\times 10^{\text{STM}}$ μm] -99.9999 to 99.9999 [$\times 10^{\text{STM}}$ inch] -360.000 to 360.000 [degree] -999999 to 999999 [pulse]	Set a travel distance. (1) When using as absolute value command method Set a target address (absolute value). (2) When using as incremental value command method Set a travel distance. Reverse rotation command is applied with a minus sign.
Servo motor speed	0 to permissible speed [r/min]	Set a command speed for the servo motor in positioning.
Acceleration time constant	0 to 20000 [ms]	Set a time period for the servo motor to reach the rated speed.
Deceleration time constant	0 to 20000 [ms]	Set a time period for the servo motor to decelerate from the rated speed to a stop.
Dwell	0 to 20000 [ms]	Set dwell. When the dwell is set, the position command for the next point table will be started after the position command for the selected point table is completed and the set dwell is passed. The dwell is disabled when 0 or 2 is set for the sub function. Varying-speed operation is enabled when 1, 3, 8, 9, 10, or 11 is set for the sub function and when 0 is set for the dwell.
Sub function	0 to 3, and 8 to 11	Set sub function. (1) When using as absolute value command method 0: Executes automatic operation for a selected point table. 1: Executes automatic continuous operation without stopping for the next point table. 8: Executes automatic continuous operation without stopping for the point table selected at the start. 9: Executes automatic continuous operation without stopping for the point table No. 1. (2) When using as incremental value command method 2: Executes automatic operation for a selected point table. 3: Executes automatic continuous operation without stopping for the next point table. 10: Executes automatic continuous operation without stopping for the point table selected at the start. 11: Executes automatic continuous operation without stopping for the point table No. 1.
M code	0 to 99	Set a code to be outputted when the positioning completes.

Notes: 1. Change the unit to μm /inch/degree/pulse with [Pr. PT01].

2. STM is the ratio to the setting value of the position data. STM can be changed with [Pr. PT03].

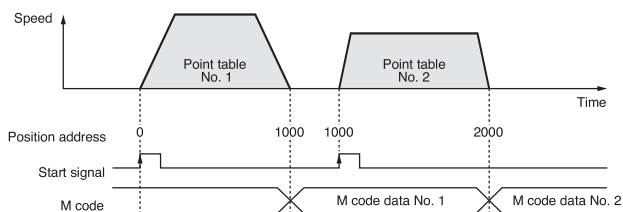
Example of setting point table data

Point table No.	Target position (position data) [$\times 10^{\text{STM}}$ μm] (Note 1)	Servo motor speed [r/min]	Acceleration time constant [ms]	Deceleration time constant [ms]	Dwell [ms]	Sub function	M code
1	1000	2000	200	200	0	*	1
2	2000	1600	100	100	0	0	2
:	:	:	:	:	:	:	:
31	3000	3000	100	100	0	2	99

* The operation of the next point table is set with the sub function.

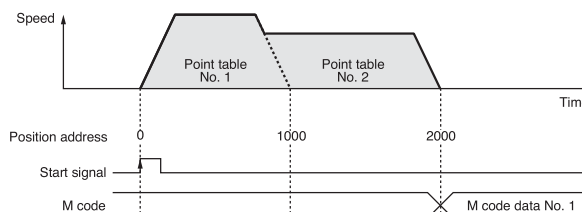
● When the sub function is set to 0:

Start signal is required for each point table.



● When the sub function is set to 1:

Automatic continuous operation is executed based on the point table.



Notes: 1. STM is the ratio to the setting value of the position data. STM can be changed with [Pr. PT03].

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MR-JE-A Positioning Function: Point Table Method

A

Incremental value command method: travels from a current position according to the set position data

Item	Setting range	Description
Point table No.	1 to 31 (when communication is specified) 1 to 15 (when DI is used)	Specify a point table in which a target position, servo motor speed, acceleration/deceleration time constants, dwell, and sub function will be set.
Target position (Note 1, 2) (position data)	0 to 999999 [$\times 10^{\text{STM}}$ μm] 0 to 99.9999 [$\times 10^{\text{STM}}$ inch] 0 to 999.999 [degree] 0 to 999999 [pulse]	Set a travel distance. Operation starts with ST1 (Forward rotation start) or ST2 (Reverse rotation start).
Servo motor speed	0 to permissible speed [r/min]	Set a command speed for the servo motor in positioning.
Acceleration time constant	0 to 20000 [ms]	Set a time period for the servo motor to reach the rated speed.
Deceleration time constant	0 to 20000 [ms]	Set a time period for the servo motor to decelerate from the rated speed to a stop.
Dwell	0 to 20000 [ms]	Set a dwell. When the dwell is set, the position command for the next point table will be started after the position command for the selected point table is completed and the set dwell is passed. The dwell is disabled when 0 is set for the sub function. Varying-speed operation is enabled when 1, 8, or 9 is set for the sub function and when 0 is set for the dwell.
Sub function	0, 1, 8, and 9	Set sub function. 0: Executes automatic operation for the selected point table. 1: Executes automatic continuous operation without stopping for the next point table. 8: Executes automatic continuous operation without stopping for the point table selected at the start. 9: Executes automatic continuous operation without stopping for the point table No. 1.
M code	0 to 99	Set a code to be outputted when the positioning completes.

Notes: 1. Change the unit to μm /inch/degree/pulse with [Pr. PT01].

2. STM is the ratio to the setting value of the position data. STM can be changed with [Pr. PT03].

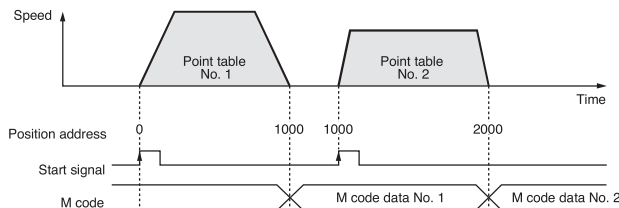
Example of setting point table data

Point table No.	Target position (position data) [$\times 10^{\text{STM}}$ μm] (Note 1)	Servo motor speed [r/min]	Acceleration time constant [ms]	Deceleration time constant [ms]	Dwell [ms]	Sub function	M code
1	1000	2000	200	200	0	*	1
2	1000	1600	100	100	0	0	2
:	:	:	:	:	:	:	:
31	3000	3000	100	100	0	0	99

* The operation of the next point table is set with the sub function.

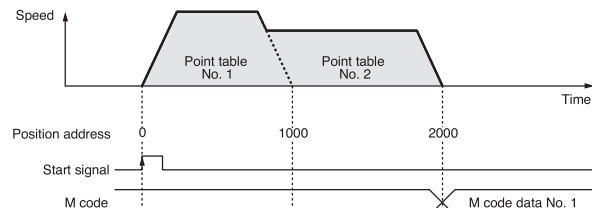
● When the sub function is set to 0:

Start signal is required for each point table.



● When the sub function is set to 1:

Automatic continuous operation is executed based on the point table.

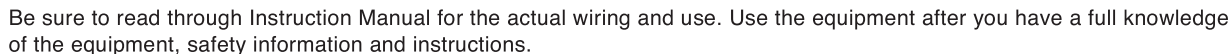


Notes: 1. STM is the ratio to the setting value of the position data. STM can be changed with [Pr. PT03].

A



4. 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.



MR-JE-A Positioning Function: Program Method

Positioning operation is executed by selecting programs with command signals. The programs including position data, servo motor speed, acceleration/deceleration time constants and others need to be created beforehand. The program method enables more complex positioning operation than the point table method. MR Configurator2 is required to create programs.

Item			Description
Command method	Command interface		Input: 7 points excluding EM2 (Forced stop 2), output: 3 points excluding ALM (Malfunction), RS-422 communication/RS-485 communication ^(Note 2)
	Operating specification		Program language (program with MR Configurator2) Program capacity: 480 steps Program points: 16
	Position command input ^(Note 1)	Absolute value command method	Set with program language. Setting range of feed length: -999999 to 999999 [$\times 10^{\text{STM}}$ μm], -99.9999 to 99.9999 [$\times 10^{\text{STM}}$ inch], -999999 to 999999 [pulse], Setting range of rotation angle: -360.000 to 360.000 [degree]
		Incremental value command method	Set with program language. Setting range of feed length: -999999 to 999999 [$\times 10^{\text{STM}}$ μm], -99.9999 to 99.9999 [$\times 10^{\text{STM}}$ inch], -999999 to 999999 [pulse], Setting range of rotation angle: -999.999 to 999.999 [degree]
	Speed command input		Set servo motor speed, acceleration/deceleration time constants, S-pattern acceleration/deceleration time constants with program language. S-pattern acceleration/deceleration time constants are also settable with [Pr. PC03].
	System		Signed absolute value command method/signed incremental value command method
	Analog override		0 V DC to ± 10 V DC/0% to 200%
	Torque limit		Set by parameters or external analog input (0 V DC to +10 V DC/maximum torque)
Operation mode	Automatic operation mode	Program	Depends on the setting of the program language
	Manual operation mode	JOG operation	Inching operation is executed with DI or serial communication function ^(Note 2) according to the speed command set with a parameter.
		Manual pulse generator operation	Manual feeding is executed with a manual pulse generator. Command pulse multiplication: select from $\times 1$, $\times 10$, and $\times 100$ with a parameter.
	Home position return mode	Dog type	Returns to home position upon Z-phase pulse after passing through proximity dog. Home position return direction selectable, home position shift distance settable, home position address settable, automatic retract on dog back to home position, automatic stroke retract function
		Count type	Returns to home position upon the encoder pulse count after touching proximity dog. Home position return direction selectable, home position shift distance settable, home position address settable, automatic retract on dog back to home position, automatic stroke retract function
		Data set type	Returns to home position without dog. Any position settable as a home position using manual operation, etc. Home position address settable
		Stopper type	Returns to home position upon hitting the stroke end. Home position return direction selectable, home position address settable
		Home position ignorance (servo-on position as home position)	Sets a home position where SON (Servo-on) signal turns on. Home position address settable
		Dog type rear end reference	Returns to home position with reference to the rear end of proximity dog. Home position return direction selectable, home position shift distance settable, home position address settable, automatic retract on dog back to home position, automatic stroke retract function
		Count type front end reference	Returns to home position with reference to the front end of proximity dog. Home position return direction selectable, home position shift distance settable, home position address settable, automatic retract on dog back to home position, automatic stroke retract function
		Dog cradle type	Returns to home position upon the first Z-phase pulse with reference to the front end of proximity dog. Home position return direction selectable, home position shift distance settable, home position address settable, automatic retract on dog back to home position, automatic stroke retract function
		Dog type adjacent Z-phase reference	Returns to home position upon the last Z-phase pulse with reference to the front end of proximity dog. Home position return direction selectable, home position shift distance settable, home position address settable, automatic retract on dog back to home position, automatic stroke retract function
		Dog type front end reference	Returns to home position to the front end of dog with reference to the front end of proximity dog. Home position return direction selectable, home position shift distance settable, home position address settable, automatic retract on dog back to home position, automatic stroke retract function
		Dogless Z-phase reference	Returns to home position to Z-phase pulse with reference to the first Z-phase pulse. Home position return direction selectable, home position shift distance settable, home position address settable
	Automatic positioning to home position function		High-speed automatic positioning to a defined home position
	Other functions		Backlash compensation, overtravel prevention with external limit switches (LSP/LSN), roll feed display function, software stroke limit, mark detection (current position latch/interrupt positioning/mark sensor input compensation), simple cam function, encoder following function, command pulse input through function, analog override function

Notes: 1. STM is the ratio to the setting value of the position data. STM can be changed with [Pr. PT03].

2. Compatible with Mitsubishi general-purpose AC servo protocol (RS-422/RS-485 communication) and MODBUS® RTU protocol (RS-485 communication).

MR-JE-A Positioning Function: Program Method

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Command List

Command	Name	Setting range	Description
SPN(setting value) (Note 2)	Servo motor speed	0 to instantaneous permissible speed [r/min]	Set a command speed for the servo motor in positioning. Do not set a value exceeding the instantaneous permissible speed of the servo motor.
STA(setting value) (Note 2)	Acceleration time constant	0 to 20000 [ms]	Set acceleration time constant. The setting value is a time period that the servo motor reaches the rated speed from a stop.
STB(setting value) (Note 2)	Deceleration time constant	0 to 20000 [ms]	Set deceleration time constant. The setting value is a time period that the servo motor stops from the rated speed.
STC(setting value) (Note 2)	Acceleration/ deceleration time constants	0 to 20000 [ms]	Set acceleration and deceleration time constants. The setting value is a time period that the servo motor reaches the rated speed from a stop and stops from the rated speed.
STD(setting value) (Note 2)	S-pattern acceleration/ deceleration time constants	0 to 1000 [ms]	Set S-pattern acceleration/deceleration time constants.
MOV(setting value) (Note 4, 5)	Absolute value travel command	-999999 to 999999 [$\times 10^{\text{STM}}$ μm] -99.9999 to 99.9999 [$\times 10^{\text{STM}}$ inch]	Travels according to the value set as an absolute value.
MOVA(setting value) (Note 4, 5)	Absolute value continuous travel command	-360.000 to 360.000 [degree] -999999 to 999999 [pulse]	Travels continuously according to the value set as an absolute value. Be sure to write this command after [MOV] command.
MOVI(setting value) (Note 4, 5)	Incremental value travel command	-999999 to 999999 [$\times 10^{\text{STM}}$ μm] -99.9999 to 99.9999 [$\times 10^{\text{STM}}$ inch]	Travels according to the value set as an incremental value.
MOVIA(setting value) (Note 4, 5)	Incremental value continuous travel command	-999.999 to 999.999 [degree] -999999 to 999999 [pulse]	Travels continuously according to the value set as an incremental value. Be sure to write this command after [MOVI] command.
SYNC(setting value) (Note 1)	Waiting for external signal to switch on	1 to 3	Stops the next step until PI1 (Program input 1) to PI3 (Program input 3) turn on after SOUT (SYNC synchronous output) is outputted.
OUTON(setting value) (Note 1)	External signal on output	1 to 3	Turns on OUT1 (Program output 1) to OUT3 (Program output 3).
OUTOF(setting value) (Note 1)	External signal off output	1 to 3	Turns off OUT1 (Program output 1) to OUT3 (Program output 3) which were turned on with [OUTON] command.
TRIP(setting value) (Note 1, 4, 5)	Absolute value trip point specification	-999999 to 999999 [$\times 10^{\text{STM}}$ μm] -99.9999 to 99.9999 [$\times 10^{\text{STM}}$ inch] -360.000 to 360.000 [degree] -999999 to 999999 [pulse]	Executes the next step after [MOV] or [MOVA] commands are started and then the servo motor moves for the travel amount set in [TRIP] command. Be sure to write this command after [MOV] or [MOVA] command.
TRIPi(setting value) (Note 1, 4, 5)	Incremental value trip point specification	-999999 to 999999 [$\times 10^{\text{STM}}$ μm] -99.9999 to 99.9999 [$\times 10^{\text{STM}}$ inch] -999.999 to 999.999 [degree] -999999 to 999999 [pulse]	Executes the next step after [MOVI] or [MOVIA] commands are started and then the servo motor moves for the travel amount set in [TRIPi] command. Be sure to write this command after [MOVI] or [MOVIA] command.
ITP(setting value) (Note 1, 3, 4, 5)	Interrupt positioning		Stops the operation after the servo motor moves for the travel amount set when the interrupt signal is inputted. Be sure to write this command after [SYNC] command.
COUNT(setting value) (Note 1)	External pulse count	-999999 to 999999 [pulse]	Executes the next step when the value of the pulse counter exceeds the count value set in [COUNT] command. [COUNT (0)] clears the pulse counter to zero.
FOR(setting value) NEXT	Step repeat command	0, and 1 to 10000 [number of times]	Repeats the steps between [FOR (setting value)] and [NEXT] commands for the number of times set. Repeats endlessly with [FOR (0) NEXT].
LPOS (Note 1)	Current position latch	-	Latches the current position with the rising edge of the LPS signal. The latched current position data can be read with the communication command.
TIM(setting value)	Dwell	1 to 20000 [ms]	Waits for the next step until the set time passes.
ZRT	Home position return	-	Executes a manual home position return.
TIMES(setting value)	Program count command	0, and 1 to 10000 [number of times]	Set the number of program execution by writing [TIMES (setting value)] command in the first line of the program. The setting is not required for executing once. Repeats endlessly with [TIMES (0)].
STOP	Program stop	-	Stops the program in execution. Be sure to write this command in the final line.

- Notes: 1. [SYNC], [OUTON], [OUTOF], [TRIP], [TRIPi], [ITP], [COUNT], and [LPOS] commands are valid while the commands are outputted.
2. [SPN] command is valid while [MOV], [MOVA], [MOVI], or [MOVIA] command is in execution. [STA], [STB], [STC], and [STD] commands are valid while [MOV] or [MOVI] command is in execution.
3. [ITP] command will be skipped to the next step when the remaining distance equals to or less than the setting value, when the servo motor is not running, or when the servo motor is decelerating.
4. Change the unit to $\mu\text{m}/\text{inch}/\text{degree}/\text{pulse}$ with [Pr. PT01].
5. STM is the ratio to the setting value of the position data. STM can be changed with [Pr. PT03].

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MR-JE-A Positioning Function: Program Method

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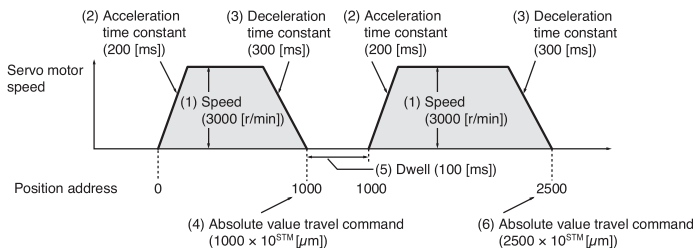
Command list

Command	Name	Setting range	Description
TLP(setting value)	Forward rotation torque limit	0, and 1 to 1000 [0.1%]	Limits the torque generated by the servo motor driving in CCW and regenerating in CW, as the maximum torque is 100%. The setting remains valid until the program is stopped. [TLP (0)] enables the setting of [Pr. PA11].
TLN(setting value)	Reverse rotation torque limit	0, and 1 to 1000 [0.1%]	Limits the torque generated by the servo motor driving in CW and regenerating in CCW, as the maximum torque is 100%. The setting remains valid until the program is stopped. [TLN (0)] enables the setting of [Pr. PA12].
TQL(setting value)	Torque limit	0, and 1 to 1000 [0.1%]	Limits the torque generated by the servo motor, as the maximum torque is 100%. The setting remains valid until the program is stopped. [TQL (0)] enables the settings of [Pr. PA11] and [Pr. PA12].

Program example 1

The following is an example of executing two types of operations with the same servo motor speed and acceleration/deceleration time constants but the different travel commands.

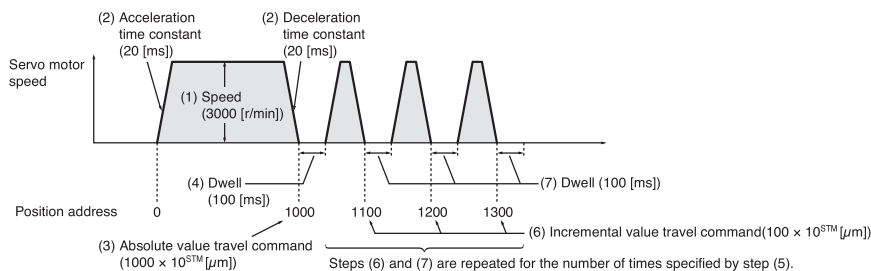
Step	Program (Note 1)	Description
(1)	SPN(3000)	Servo motor speed: 3000 [r/min]
(2)	STA(200)	Acceleration time constant: 200 [ms]
(3)	STB(300)	Deceleration time constant: 300 [ms]
(4)	MOV(1000)	Absolute value travel command: 1000 [$\times 10^{STM} \mu m$]
(5)	TIM(100)	Dwell: 100 [ms]
(6)	MOV(2500)	Absolute value travel command: 2500 [$\times 10^{STM} \mu m$]
(7)	STOP	Program stop



Program example 2

The following is an example of repeating the steps between [FOR (setting value)] and [NEXT] commands for the number of times set.

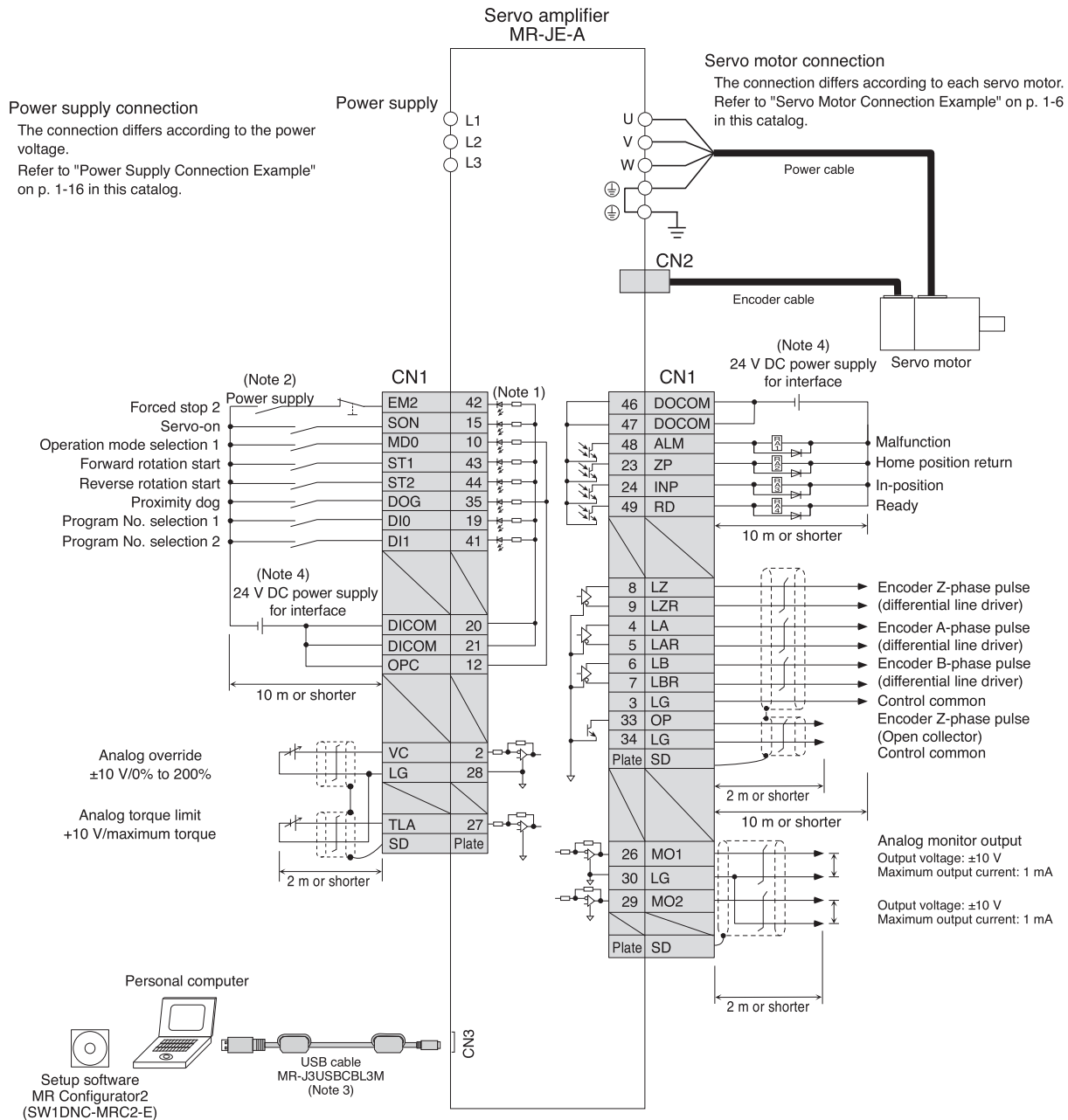
Step	Program (Note 1)	Description
(1)	SPN(3000)	Servo motor speed: 3000 [r/min]
(2)	STC(20)	Acceleration/deceleration time constants: 20 [ms]
(3)	MOV(1000)	Absolute value travel command: 1000 [$\times 10^{STM} \mu m$]
(4)	TIM(100)	Dwell: 100 [ms]
(5)	FOR(3)	Starting the step repeat command: 3 [number of times]
(6)	MOVI(100)	Incremental value travel command: 100 [$\times 10^{STM} \mu m$]
(7)	TIM(100)	Dwell: 100 [ms]
(8)	NEXT	Ending the step repeat command
(9)	STOP	Program stop



Notes: 1. The values in [SPN], [STA], [STB], and [STC] commands remains valid until they are reset. The values will not be initialized at the start of the program. The settings are also valid in other programs.

MR-JE-A Standard Wiring Diagram Example: Program Methods

A



- Notes: 1. This is for sink wiring. Source wiring is also possible. However, when input devices are assigned to CN1-10 pin and CN1-35 pin, be sure to use sink wiring. Source wiring is not possible in this case. In the positioning mode, input devices are assigned in the initial setting. Refer to "MR-JE-A Servo Amplifier Instruction Manual (Positioning Mode)" for details.
2. Create a circuit to turn off EM2 (Forced stop 2) when the power is turned off to prevent an unexpected restart of the servo amplifier.
3. USB interface, RS-422 interface, and RS-485 interface are mutually exclusive. Do not use them at the same time.
4. 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.



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

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Simple Cam Specifications

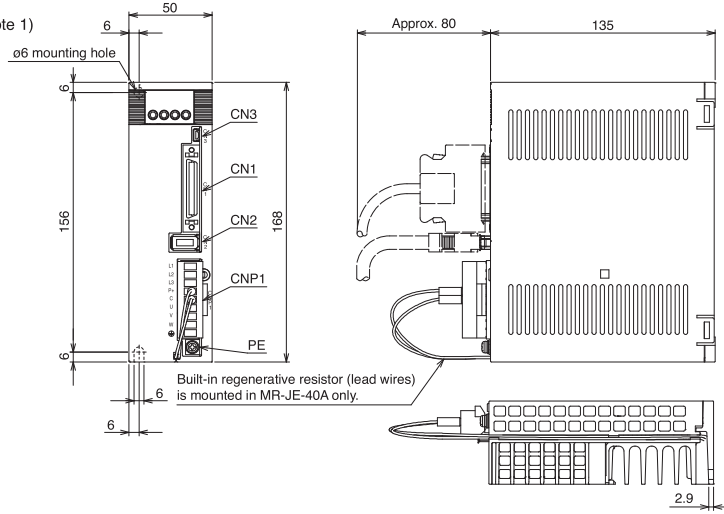
Items			Specifications
Memory capacity	Storage area for cam data		8 Kbytes (FLASH-ROM)
	Working area for cam data		8 Kbytes (RAM)
Number of registration			Maximum 8 (depending on cam resolution and coordinate number)
Comment			Maximum 32 single-byte characters for each cam data
Cam data	Stroke ratio data type	Cam resolution (Maximum number of registration)	256 (8), 512 (4), 1024 (2), 2048 (1)
		Stroke ratio	-100.000% to 100.000%
	Coordinate data type	Coordinate number (Maximum number of registration)	2 to 1024 Example: 128 (8), 256 (4), 512 (2), 1024 (1)
		Coordinate data	Input value: 0 to 999999 Output value: -999999 to 999999
Cam curve			12 types (constant speed/constant acceleration/5th curve/single hypotenuse/cycloid/distorted trapezoid/distorted sine/distorted constant speed/trapezoid/reverse trapezoid/double hypotenuse/reverse double hypotenuse)

MR-JE-A Dimensions

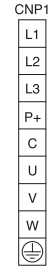
●MR-JE-10A (Note 1)

●MR-JE-20A (Note 1)

●MR-JE-40A (Note 1)



Terminal arrangement

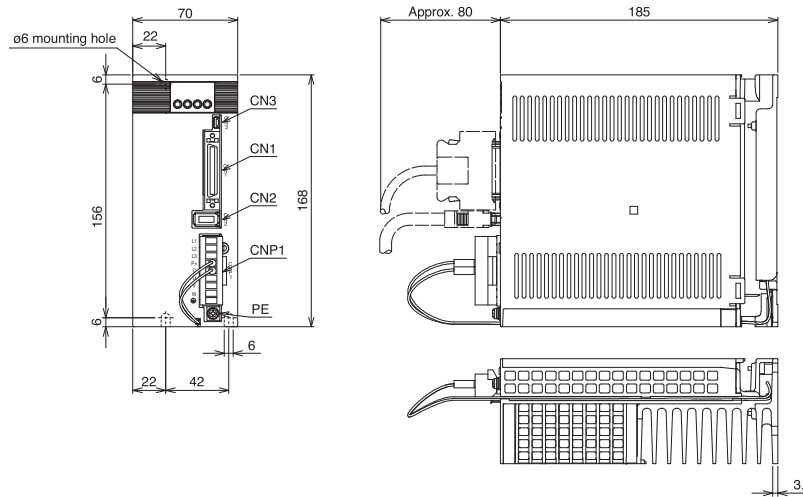


Screw size: M4
Mounting screw size: M5

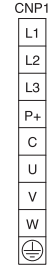
[Unit: mm]

●MR-JE-70A (Note 1)

●MR-JE-100A (Note 1)



Terminal arrangement

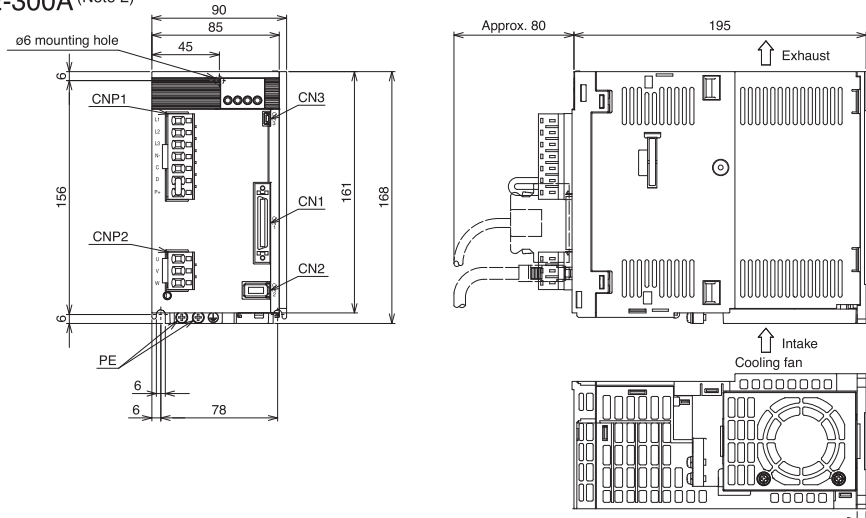


Screw size: M4
Mounting screw size: M5

[Unit: mm]

●MR-JE-200A (Note 2)

●MR-JE-300A (Note 2)



Terminal arrangement



Screw size: M4
Mounting screw size: M5

[Unit: mm]

Notes: 1. CNP1 connector (insertion type) is supplied with the servo amplifier.
2. CNP1 and CNP2 connectors (insertion type) are supplied with the servo amplifier.