MITSUBISHI ELECTRIC

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Transition from MELSERVO-J3 Series to J4 Series Handbook

Existing manufacturing assets are completely utilizable.

MELSERVO-J3 to MELSERVO-J4

● SAFETY INSTRUCTIONS ●

Please read the instructions carefully before using the equipment.

To ensure correct usage of the equipment, make sure to read through this Replacement Manual, the Instruction Manual, the Installation Guide, and the Appended Documents carefully before attempting to install, operate, maintain, or inspect the equipment. Do not use the equipment until you have a full knowledge of the equipment, safety information and instructions.
In this Replacement Manual, the safety instruction levels are classified under "WARNING" and "CAUTION".

⚠ WARNING	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
⚠ CAUTION	Indicates that incorrect handling may cause hazardous conditions, resulting in medium or slight injury to personnel or may cause physical damage.

Note that the ⚠ CAUTION level may lead to a serious consequence according to conditions.
Please follow the instructions of both levels because they are important to personnel safety.
What must not be done and what must be done are indicated by the following diagrammatic symbols.

⃠	Indicates prohibition (what must not be done). For example, "No Fire" is indicated by ⃠.
●	Indicates obligation (what must be done). For example, grounding is indicated by ⏚.

In this Replacement Manual, instructions of a lower level than the above, such as those that do not cause physical damage or instructions for other functions, are classified under "POINT".
After reading this Instruction Manual, keep it accessible to the operator.

1. To prevent electric shock, note the following

⚠ WARNING

- Before wiring or inspection, turn off the power and wait for 15 minutes or more until the charge lamp turns off. Then, confirm that the voltage between P+ and N- is safe with a voltage tester and others. Otherwise, an electric shock may occur. In addition, when confirming whether the charge lamp is off or not, always confirm it from the front of the servo amplifier.
- Ground the servo amplifier and servo motor securely.
- Any person who is involved in wiring and inspection should be fully competent to do the work.
- Do not attempt to wire the servo amplifier and servo motor until they have been installed. Doing so may cause an electric shock.
- Do not operate switches with wet hands. Otherwise, it may cause an electric shock.
- The cables should not be damaged, stressed, loaded, or pinched. Otherwise, it may cause an electric shock.
- During power-on or operation, do not open the front cover of the servo amplifier. Otherwise, it may cause an electric shock.
- Do not operate the servo amplifier with the front cover removed. High-voltage terminals and charging area are exposed and you may get an electric shock.
- Except for wiring and periodic inspection, do not remove the front cover of the servo amplifier even if the power is off. The servo amplifier is charged and you may get an electric shock.
- To prevent electric shock, always connect the protective earth (PE) terminal (⏚ marked) of the servo amplifier to the protective earth (PE) of the cabinet.
- To avoid an electric shock, insulate the connections of the power supply terminals.

2. To prevent fire, note the following

⚠ CAUTION

- Install the servo amplifier, servo motor, and regenerative resistor on incombustible material. Installing them directly or close to combustibles will lead to a fire.
- Always connect a magnetic contactor between the main circuit power supply and the converter unit and L1/L2/L3 of the servo amplifier in order to configure a power supply shut-off on the side of the servo amplifier's power supply. If a magnetic contactor is not connected, continuous flow of a large current may cause smoke and fire when the converter unit or the servo amplifier (drive unit) malfunctions.
- When using the regenerative resistor, switch power off with the alarm signal. Not doing so may cause smoke and fire when a regenerative transistor malfunctions or the like may overheat the regenerative resistor.
- Provide adequate protection to prevent screws and other conductive matter, oil and other combustible matter from entering the servo amplifier and servo motor.
- Always connect one no-fuse breaker or one fuse for each servo amplifier between the power supply and the main circuit power supply (L1/L2/L3) of the servo amplifier (including the converter unit) in order to configure a power supply shut-off on the side of the servo amplifier's power supply. If a no-fuse breaker or fuse is not connected, continuous flow of a large current may cause smoke and fire when the servo amplifier malfunctions.

3. Injury prevention

⚠ CAUTION

- Only the voltage specified in the Instruction Manual should be applied to each terminal. Otherwise, a burst, damage, etc. may occur.
- The cables must be connected to the correct terminals. Otherwise, a burst, damage, etc. may occur.
- Ensure that the polarity (+/-) is correct. Otherwise, a burst, damage, etc. may occur.
- The servo amplifier heat sink, regenerative resistor, servo motor, etc. may be hot while power is on or for some time after power-off. Take safety measures, e.g. provide covers, to avoid accidentally touching the parts (cables, etc.) by hand.

4. Additional instructions

The following instructions should also be fully noted. Incorrect handling may cause a malfunction, injury, electric shock, fire, etc.

(1) Transportation/installation

⚠ CAUTION

- Transport the products correctly according to their mass.
- Stacking in excess of the specified number of product packages is not allowed.
- Do not hold the front cover when transporting the servo amplifier. Otherwise, it may drop.
- Install the servo amplifier and the servo motor in a load-bearing place in accordance with the Instruction Manual.
- Do not get on or put heavy load on the equipment.
- The equipment must be installed in the specified direction.
- Secure the prescribed distance between the servo amplifier and the inner surface of the cabinet or other devices.
- Do not install or operate the servo amplifier and servo motor which have been damaged or have any parts missing.
- Do not block the intake and exhaust areas of the servo amplifier. Otherwise, it may cause a malfunction.
- Do not drop or strike the servo amplifier and servo motor. Isolate them from all impact loads.
- When you keep or use the equipment, please fulfill the following environment.

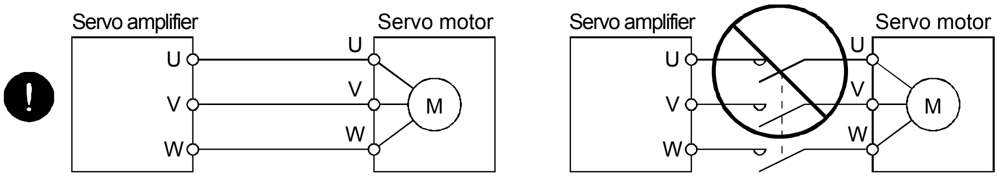
Item		Environment
Ambient temperature	Operation	0 ˚C to 55 ˚C (non-freezing)
	Storage	-20 ˚C to 65 ˚C (non-freezing)
Ambient humidity	Operation	90 %RH or less (non-condensing)
	Storage	
Ambience		Indoors (no direct sunlight) and free from corrosive gas, flammable gas, oil mist, dust, and dirt
Altitude		2000 m or less above sea level (Contact your local sales office when an option is used at an altitude of more than 1000 m.)
Vibration resistance		5.9 m/s^2 or less at 10 to 55 Hz (directions of X, Y, Z axes)

- Contact your local sales if the product has been stored for an extended period of time.
- When handling the servo amplifier, be careful about the edged parts such as corners of the servo amplifier.
- The servo amplifier must be installed in a metal cabinet.
- 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.

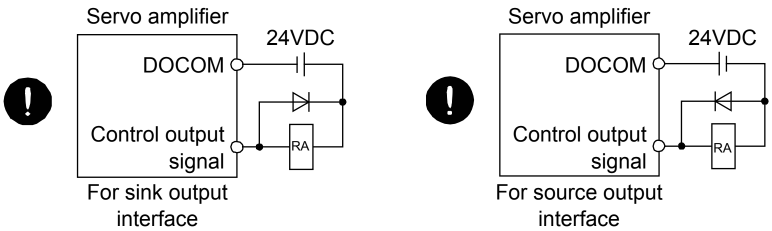
(2) Wiring

⚠ CAUTION

- Wire the equipment correctly and securely. Otherwise, the servo motor may operate unexpectedly.
- Do not install a power capacitor, surge killer, or radio noise filter (optional FR-BIF) on the output side of the servo amplifier.
- Because installation of these items may cause the servo motor to malfunction, connect the wires to the correct phase terminals (U/V/W) of the servo amplifier and servo motor power supply.
- Directly connect the servo amplifier power output (U/V/W) to the servo motor power input (U/V/W). Do not let a magnetic contactor, etc. intervene. Otherwise, it may cause a malfunction.



- The connection diagrams in this instruction manual are shown for sink interfaces, unless stated otherwise.
- The surge absorbing diode installed to the DC relay for control output should be fitted in the specified direction. Otherwise, the emergency stop and other protective circuits may not operate.



- When the cable is not tightened enough to the terminal block, the cable or terminal block may generate heat because of the poor contact. Be sure to tighten the cable with specified torque.
- To avoid a malfunction, do not connect the U, V, W, and CN2 phase terminals of the servo amplifier to the servo motor of an incorrect axis.
- Configure a circuit to turn off EM2 or EM1 when the main circuit power is turned off to prevent an unexpected restart of the servo amplifier.

(3) Trial run/adjustment

⚠ CAUTION

- Before operation, check the parameter settings. Improper settings may cause some machines to operate unexpectedly.
- Never perform extreme adjustment or changes to the parameters; otherwise, the operation may become unstable.
- Keep away from moving parts in a servo-on state.

(4) Usage

⚠ CAUTION

- Provide an external emergency stop circuit to ensure that operation can be stopped and power switched off immediately.
- Do not disassemble, repair, or modify the equipment.

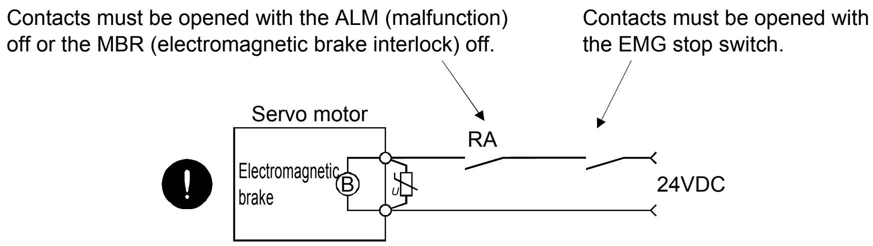
⚠ CAUTION

- Before resetting an alarm, make sure that the run signal of the servo amplifier is off in order to prevent a sudden restart. Otherwise, it may cause an accident.
- The effect of electromagnetic interference must be reduced by using a noise filter or by other means. Electromagnetic interference may be given to the electronic equipment used near the servo amplifier.
- Burning or disassembling a servo amplifier may generate toxic gases. Do not burn or break it.
- Use the servo amplifier with the specified servo motor.
- The electromagnetic brake on the servo motor is designed to hold the motor shaft and should not be used for ordinary braking.
- For such reasons as service life and mechanical structure (e.g. where a ball screw and the servo motor are coupled via a timing belt), the electromagnetic brake may not hold the motor shaft. To ensure safety, install a stopper on the machine side.

(5) Corrective actions

⚠ CAUTION

- Ensure safety by confirming the power off, etc. before performing corrective actions. Otherwise, it may cause an accident.
- When it is assumed that a hazardous condition may occur due to a power failure or product malfunction, use a servo motor with an electromagnetic brake or external brake to prevent the condition.
- Configure an electromagnetic brake circuit so that it is activated by an external EMG stop switch.



- When any alarm has occurred, eliminate its cause, ensure safety, and deactivate the alarm before restarting operation.
- Provide an adequate protection to prevent unexpected restart after an instantaneous power failure.

(6) Maintenance, inspection and parts replacement

⚠ CAUTION

- Make sure that the emergency stop circuit operates properly such that an operation can be stopped immediately and a power is shut off by the emergency stop switch.
- It is recommended that the servo amplifier be replaced every 10 years when it is used in general environment.
- When using a servo amplifier whose power has not been turned on for a long time, contact your local sales office.

(7) General precautions

- To illustrate details, the equipment in the diagrams of this Replacement Manual may have been drawn without covers and safety guards. When the equipment is operated, the covers and safety guards must be installed as specified. Operation must be performed in accordance with Instruction Manual.

● Disposal of Waste ●

When disposing of this product, the following two laws are applicable, and it is necessary to consider each law. In addition, because the following laws are effective only in Japan, local laws have priority outside Japan (overseas). We ask that the local laws be displayed on the final products or that a notice be issued as necessary.

1. Requirements of the Act on the Promotion of Effective Utilization of Resources (Commonly known as: the Law for Promotion of Effective Utilization of Resources Promotion Law)
   (1) Please recycle this product whenever possible when it becomes unnecessary.

   (2) It is recommended that this product be divided as necessary and sold to appropriate purchasers, as recycled resources are usually divided into iron, electrical parts, and so on, which are then sold to scrap processors.

2. Requirements of the Act on Waste Disposal & Cleaning (Commonly known as: The Waste Disposal Treatment Cleaning Act)
   (1) It is recommended to decrease waste through the sale of recyclables or through any other means as shown in the preceding Paragraph 1.

   (2) In case the unnecessary products cannot be sold and require disposal, such item falls under Industrial waste in the above act.

   (3) It is required that industrial waste be properly dealt with, including manifest management, by commissioning the disposal to an industrial waste disposal contractor licensed under the act.

   (4) Please dispose of batteries (primary batteries) used in servo amplifiers according to local regulations.

Measures against servo amplifier harmonics

This servo amplifier applies to "Harmonics control guidelines for customers receiving high voltage or special high voltage power" (published by current Ministry of Economy, Trade and Industry). Consumers subject to this guideline must check if a harmonic suppression measure is necessary, and measures must be enforced when the limit level is exceeded.

⚠ EEP-ROM life

The number of write times to the EEP-ROM, which stores parameter settings, etc., is limited to 100,000. If the total number of the following operations exceeds 100,000, the servo amplifier may malfunction when the EEP-ROM reaches the end of its useful life.

- Write to the EEP-ROM due to parameter setting changes
- Write to the EEP-ROM due to device changes

STO function of the servo amplifier

See the applicable "Servo Amplifier Instruction Manual" when using the STO function of the servo amplifier.

Dealing with overseas standards

See the following relevant manuals concerning dealing with overseas standards.

«About the manual»

This Replacement Manual and the following Instruction Manuals are necessary when using this servo for the first time. Ensure to prepare them to use the servo safely.

Relevant manuals

Manual name	Manual number
MELSERVO-J4 Series Instructions and Cautions for Safe Use of AC Servos (Packed with the servo amplifier)	IB(NA)0300175
MELSERVO-J4 Servo Amplifier Instruction Manual (Troubleshooting Edition)	SH(NA)030109
MELSERVO Servo Motor Instruction Manual (Vol. 3) (Note 1)	SH(NA)030113
MELSERVO Linear Servo Motor Instruction Manual (Note 2)	SH(NA)030110
MELSERVO Direct Drive Motor Instruction Manual (Note 3)	SH(NA)030112
MELSERVO Linear Encoder Instruction Manual (Note 2, 4)	SH(NA)030111
EMC Installation Guidelines	IB(NA)67310

Note 1. It is necessary for using a rotary servo motor.
2. It is necessary for using a linear servo motor.
3. It is necessary for using a direct drive motor.
4. It is necessary for using a fully closed loop system.

«Cables used for wiring»

The wiring cables mentioned in this Replacement Manual are selected based on an ambient temperature of 40°C.

«U.S. customary units»

U.S. customary units are not shown in this manual. Convert the values if necessary according to the following table.

Quantity	SI (metric) unit	U.S. customary unit
Mass	1 [kg]	2.2046 [lb]
Length	1 [mm]	0.03937 [inch]
Torque	1 [N•m]	141.6 [oz•inch]
Moment of inertia	1 [(× 10^{-4} kg•m^2)]	5.4675 [oz•$inch^2$]
Load (thrust load/axial load)	1 [N]	0.2248 [lbf]
Temperature	N [°C] × 9/5 + 32	N [°F]

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MEMO

Part 1
Summary of MR-J3 Replacement

This document describes the review items for replacing MR-J3 with MR-J4. Some equipment may require review on items not described in this document. Please review those items after viewing the Instruction Manual and the catalogs.

Part 1: Summary of MR-J3 Replacement

1. SUMMARY OF MR-J3 REPLACEMENT

In this document, the flow when replacing a system using the MELSERVO "MR-J3" with the "MR-J4 series" is explained.
After deciding the replacement strategy (batch update or partial update of the servo amplifier, servo motor, and controller), please proceed with replacement by referring to the corresponding parts of this manual and the manual for each model.

2. MAJOR REPLACEMENT TARGET MODEL

2.1 Servo Amplifier Replacement Target Model

Series	Servo amplifier model		Series	Servo amplifier Model
MR-J3 series	MR-J3-_A_	→	MR-J4 series	MR-J4-_A_
	MR-J3-_B_			MR-J4-_B_

2.2 Servo Motor Replacement Target Model

		Servo motor model		Servo motor model
Small capacity	Low inertia	HF-KP_	→	HG-KR_
	Ultra-low inertia	HF-MP_		HG-MR_
		HF-MP_ (with reducer)		HG-KR_ (with reducer)
Medium capacity	medium inertia	HF-SP_		HG-SR_
	Low inertia	HC-LP_		HG-JR_
		HF-JP_		
	Ultra-low inertia	HC-RP_		HG-RR_
		HC-RP_ (with reducer)		HG-SR_ (with reducer)
	Flat	HC-UP_		HG-UR_
Large capacity	Low inertia	HA-LP_		HG-SR_
				HG-JR_

Note For details, see "Part 5: Review on Replacement of Motor".

3. FLOW OF REPLACEMENT

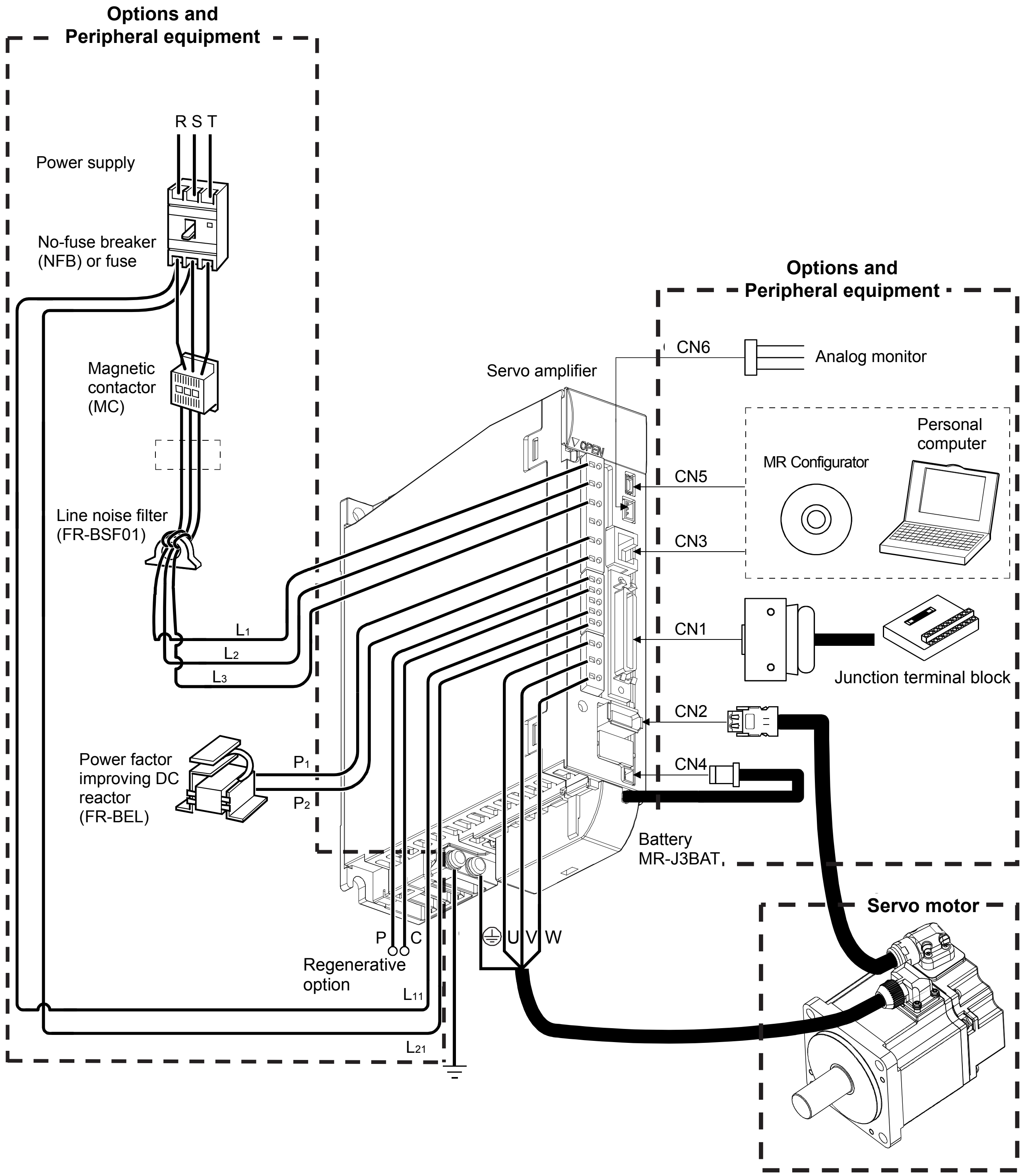
3.1 Summary

This section describes the flow of replacement when replacing a system using the MR-J3 series with a system using the MR-J4 series.

3.2 Flow of Review on Replacement

Step	Description
Checking the system prior to replacement	・・・Check the components of the system prior to replacement. : See "3.3.1 Checking the system prior to replacement" in this document.
↓	
Determination of base replacement model	・・・Determine the base replacement model for the servo amplifier/servo motor model used for the system prior to replacement. : See "3.3.2 Determination of base replacement model" in this document.
↓	
Detailed specifications/ functions difference check	・・・Determine the base replacement model and check the impact according to the "specification/function" of the replacement model. : Check "Part 4: Common Reference Material" in this document.
↓	
Attachment compatibility check	・・・Check the compatibility and the attachment differences in the "Attachment compatibility" items in the list of base replacement models. : Check "Part 4: Common Reference Material, 2. SERVO AMPLIFIER DIMENSIONS / INSTALLATION DIFFERENCES", and "Part 5: Replacement of Motor" in this document.
↓	
Detailed review on replacement model	・・・Determine the replacement strategy and perform detailed designing. : Check "Part 2: Review on Replacement of MR-J3-_A_ with MR-J4-_A_", "Part 3: Review on Replacement of MR-J3-_B_ with MR-J4-_B_" "Part 5: Review on Replacement of Motor" in this document.
↓	
Peripheral equipment check	・・・Check the peripheral equipment that comes with the replacement. : Check "Part 6: Review on Replacement of Optional Peripheral Equipment" in this document.
↓	
Startup procedure check	・・・Check the startup procedure. : Check "Part 7: Startup Procedure Manual" in this document.

The following displays the review items when replacing MR-J3 series with MR-J4 series using MR-J3-100A or less as an example case.



Changes from MR-J3 series to MR-J4 series

POINT
●The following table summarizes the changes from MR-J3 series to MR-J4 series. For details, refer to the reference document/items.

Changes	Check items	Impact	Reference document/items
Servo amplifier	Connector	Connector shape, pin arrangement, signal abbreviation, and location are different.	Part 2, Section 3.3 Part 3, Section 3.4 Part 4, Section 1.2.2
	Terminal block	Terminal block shape, location, and method of drawing out wires are different.	Part 4, Section 1.2.1
	P3, P4 terminals	MR-J4 servo amplifier has P3 and P4 in the upstream of the inrush current suppression circuit. Note that the locations of the P1 and P terminals of MR-J3-11K_ to MR-J3-22K_ are different.	Part 4, Section 1.2.1
	Z-phase	There is no difference caused by the replacement from the MR-J3 servo amplifier to the MR-J4 servo amplifier.	Part 4, Section 1.2.7
	Parameter	A-Type (general-purpose interface) is upward compatible, but the parameter needs to be changed. The parameter converter function of MR Configurator2 can transfer the parameter setting for MR-J3 to the setting for MR-J4. For B-Type (SSCNET III), the MR-J3 compatibility mode is available with the MR-J4 series and the parameter does not need to be changed.	Part 2, Section 3.5 Part 3, Section 3.6 Part 4, Chapter 2.2
	Dimensions	MR-J3 and MR-J4 have compatibility in mounting. Note that the positions (clearances) of mounting screws for the 5 kW (200 V), 3.5 kW (400 V), 11 kW, and 15 kW have been changed to reduce the size of external dimensions.	Part 4, Chapter 2
	Dynamic brake coasting distance	The servo motor has a different dynamic brake coasting distance.	Part 4, Section 1.2.3
	Forced stop deceleration	For MR-J4, in the shipping status, the servo motor decelerates to stop during a forced stop or when an alarm has occurred. The stop method for MR-J4 is different from the method of when an emergency stop or a forced stop of MR-J3 is enabled.	Part 4, Section 1.2.4 MR-J4-_A_Servo Amplifier Instruction Manual MR-J4-_B_Servo Amplifier Instruction Manual
	Initializing time	The time it takes to reach servo-on from power-on is different.	Part 4, Section 1.2.6
Options and peripheral equipment	Molded-case circuit breaker Fuse	Those for MR-J3 may not be usable. Select those for MR-J4.	Part 6, Section 4.3
	Magnetic contactor	Those for MR-J3 may not be usable. Select those for MR-J4.	Part 6, Section 4.3
	Power factor improving AC reactor	Those for MR-J3 may not be usable. FR-HAL is recommended.	Part 6, Section 7.2 Part 6, Section 7.5 Part 6, Section 7.6
	Power factor improving DC reactor	Those for MR-J3 may not be usable. FR-HEL is recommended.	Part 6, Section 7.1 Part 6, Section 7.3 Part 6, Section 7.4
	Regenerative option	Some regenerative options cannot be used for MR-J4.	Part 6, Chapter 1
	MR Configurator	MR Configurator cannot be used for MR-J4. Use MR Configurator2.	Part 6, Chapter 8
	Battery	Use MR-BAT6V1SET for MR-J4.	Part 6, Chapter 5
	Encoder cable	For MR-J4-22K_, the encoder cable needs to be changed with the following. MR-ENECBL _ M-H-MTH	Part 4, Section 1.2.2 Part 6, Chapter 3
	Wire	An HIV wire is recommended for MR-J4.	Part 6, Chapter 4
	Dynamic brakes	Some dynamic brakes cannot be used for MR-J4.	Part 6, Chapter 2
	EMC filter	There is no change in recommended products.	Part 6, Chapter 6
	Panel through attachment	MR-J3ACN cannot be used for MR-J4-11K_(4) or MR-J4-15K_(4).	Part 6, Chapter 9

Changes	Check items	Impact	Reference document/items
Servo motor	Mounting compatibility	Some models have no mounting compatibility.	Part 5, Section 1.1
	Dimensions	The total length may differ depending on models.	Part 5, Section 2.1 Part 5, Section 2.2 Part 5, Section 2.3
	Reducer	The actual reduction ratio of HF-KP and HF-MP series G1 types may differ from that of HG-KR series G1 types depending on models.	Part 5, Section 2.3 Part 5, Section 2.4
	Moment of inertia	The moment of inertia of the HF-_P/HC-_P/HA-_P motor may differ from that of the HG motor depending on models. (Note 2)	Part 5, Section 2.5
	Load to motor inertia ratio	The range of the load to motor inertia ratio for the servo motor may differ between the HF-_P/HC-_P/HA-_P motor and the HG motor depending on models.	Part 5, Section 2.5
	Connector	The power connector, encoder connector, and electromagnetic brake connector may differ from one another in shape.	Part 5, Section 2.6
	Torque characteristics	The torque characteristics of the HF-_P/HC-_P/HA-_P motor may differ from those of the HG motor.	Part 5, Section 2.7
	Rated speed/maximum speed	The Rated speed/maximum speed of the HF-_P/HC-_P/HA-_P motor may differ from those of the HG motor.	Servo Motor Instruction Manual (Vol. 3)
	Thermal sensor (Note 1)	For HG-JR 1000 r/min series of 15 kW or more and HG-JR 1500 r/min series of 22 kW or more, the thermal sensor is replaced with a thermistor. For HG-JR 1000 r/min series of 12 kW or less and HG-JR 1500 r/min series of 15 kW or less, the thermal sensor is removed.	Servo Motor Instruction Manual (Vol. 3)
	Encoder resolution	The encoder resolution differs as follows. HF-_P/HC-_P/HA-_P motor: 18bit ABS HG motor: 22 bit ABS	Servo Motor Instruction Manual (Vol. 3)
Controller (B type only)		MR-J4-_B servo amplifiers have two operation modes. "J4 mode" is for using all functions with full performance and "J3 compatibility mode" is compatible with MR-J3-B series for using the amplifiers as the conventional series. When you connect an amplifier with SSCNET III/H communication for the first controller communication with the factory setting, the operation mode will be fixed to "J4 mode". For SSCNET III communication, the operation mode will be fixed to "J3 compatibility mode".	

Note 1. For HG-JR 1000 r/min series of 15 kW or more and HG-JR 1500 r/min series of 22 kW or more, the thermal sensor is replaced with a thermistor. For HG-JR 1000 r/min series of 12 kW or less and HG-JR 1500 r/min series of 15 kW or less, the thermal sensor is removed. A new encoder cable laying is required because the motor thermal wiring differs.
2. This may change the motor inertia, making it necessary to adjust the servo gain.

3.3 Review on replacement

3.3.1 Checking the system prior to replacement

Check the components of the system prior to replacement.

Category	Controller model	Amplifier model		"Reference items" in this document	Remarks
Positioning module	QD75P(D)	MR-J3_A_	⇒	1) MR-J3 series "Part 2: Review on Replacement of MR-J3-_A_ with MR-J4-_A_"	Positioning control
	A1SD75P(D)				
Controller from another company	Controller from another company	MR-J3_A_	⇒		
No controller connected	No controller	MR-J3-_A_	⇒		Speed, torque limit
SSCNET III Positioning module	QD75MH	MR-J3-_B_	⇒	1) MR-J3 series "Part 3: Review on Replacement of MR-J3-_B_ with MR-J4-_B_"	Positioning control
SSCNET III Motion controller	Q17_HCPU	MR-J3-_B_	⇒		Positioning control
	Q170MCPU				
	Q17_DCPU				

3.3.2 Determination of base replacement model

(1) Models for replacement between MR-J3 series and MR-J4 series
Shown below are the base replacement models with the assumption that both the amplifier and motor will be replaced as a set.

■Servo amplifier

Series	Model	Replacement model (example)	Attachment compatibility (O: Compatible)	Note
200 V AC General-purpose interface	MR-J3-10A	MR-J4-10A	O	See "Part 4: Common Reference Material".
	MR-J3-20A	MR-J4-20A	O	
	MR-J3-40A	MR-J4-40A	O	
	MR-J3-60A	MR-J4-60A	O	
	MR-J3-70A	MR-J4-70A	O	
	MR-J3-100A	MR-J4-100A	O	
	MR-J3-200A(N)(-RT)	MR-J4-200A	O	
	MR-J3-350A	MR-J4-350A	O	
	MR-J3-500A	MR-J4-500A	(Note 1)	
	MR-J3-700A	MR-J4-700A	O	
	MR-J3-11KA	MR-J4-11KA	(Note 1)	
	MR-J3-11KA-LR			
	MR-J3-15KA	MR-J4-15KA	(Note 1)	
	MR-J3-15KA-LR			
	MR-J3-22KA	MR-J4-22KA	O	

Note 1: Refer to Comparison of servo amplifier dimensions (Part 4 Common Reference Material) for dimensions of mounting holes.

Series	Model	Replacement model (example)	Attachment compatibility (O: Compatible)	Note
200 V AC SSCNET Interface	MR-J3-10B	MR-J4-10B	O	See "Part 4: Common Reference Material".
	MR-J3-20B	MR-J4-20B	O	
	MR-J3-40B	MR-J4-40B	O	
	MR-J3-60B	MR-J4-60B	O	
	MR-J3-70B	MR-J4-70B	O	
	MR-J3-100B	MR-J4-100B	O	
	MR-J3-200B(N)(-RT)	MR-J4-200B	O	
	MR-J3-350B	MR-J4-350B	O	
	MR-J3-500B	MR-J4-500B	(Note 1)	
	MR-J3-700B	MR-J4-700B	O	
	MR-J3-11KB	MR-J4-11KB	(Note 1)	
	MR-J3-11KB-LR			
	MR-J3-15KB	MR-J4-15KB	(Note 1)	
	MR-J3-15KB-LR			
	MR-J3-22KB	MR-J4-22KB	O	

Note 1: Refer to Comparison of servo amplifier dimensions (Part 4 Common Reference Material) for dimensions of mounting holes.

Series	Model	Replacement model (example)	Attachment compatibility (O: Compatible)	Note
400 V AC General-purpose interface	MR-J3-60A4	MR-J4-60A4	O	See "Part 4: Common Reference Material".
	MR-J3-100A4	MR-J4-100A4	O	
	MR-J3-200A4	MR-J4-200A4	O	
	MR-J3-350A4	MR-J4-350A4	(Note 1)	
	MR-J3-500A4	MR-J4-500A4	O	
	MR-J3-700A4	MR-J4-700A4	O	
	MR-J3-11KA4	MR-J4-11KA4	(Note 1)	
	MR-J3-11KA4-LR			
	MR-J3-15KA4	MR-J4-15KA4	(Note 1)	
	MR-J3-15KA4-LR			
	MR-J3-22KA4	MR-J4-22KA4	O	

Note 1: Refer to Comparison of servo amplifier dimensions (Part 4 Common Reference Material) for dimensions of mounting holes.

Series	Model	Replacement model (example)	Attachment compatibility (O: Compatible)	Note
400 V AC SSCNET Interface	MR-J3-60B4	MR-J4-60B4	O	See "Part 4: Common Reference Material".
	MR-J3-100B4	MR-J4-100B4	O	
	MR-J3-200B4	MR-J4-200B4	O	
	MR-J3-350B4	MR-J4-350B4	(Note 1)	
	MR-J3-500B4	MR-J4-500B4	O	
	MR-J3-700B4	MR-J4-700B4	O	
	MR-J3-11KB4	MR-J4-11KB4	(Note 1)	
	MR-J3-11KB4-LR			
	MR-J3-15KB4	MR-J4-15KB4	(Note 1)	
	MR-J3-15KB4-LR			
	MR-J3-22KB4	MR-J4-22KB4	O	

Note 1: Refer to Comparison of servo amplifier dimensions (Part 4 Common Reference Material) for dimensions of mounting holes.

Series	Model	Replacement model (example)	Attachment compatibility (O: Compatible)	Note
100 V AC General-purpose interface	MR-J3-10A1	MR-J4-10A1	O	See "Part 4: Common Reference Material".
	MR-J3-20A1	MR-J4-20A1	O	
	MR-J3-40A1	MR-J4-40A1	O	
100 V AC SSCNET Interface	MR-J3-10B1	MR-J4-10B1	O	
	MR-J3-20B1	MR-J4-20B1	O	
	MR-J3-40B1	MR-J4-40B1	O	

(3) Servo amplifier and servo motor combination for the MR-J4 series

For a review on the replacement of an existing motor with a new one, see "Part 5: Review on Replacement of Motor".

(a) 100 V/200 V class

Servo amplifier	Rotary servo motor					
	HG-KR	HG-MR	HG-SR	HG-UR	HG-RR	HG-JR
MR-J4-10_	053 13	053 13				
MR-J4-20_	23	23				
MR-J4-40_	43	43				
MR-J4-60_			51 52			53
MR-J4-70_	73	73		72		73
MR-J4-100_			81 102			103
MR-J4-200_			121, 201 152, 202	152	103 153	153 203
MR-J4-350_			301 352	202	203	353
MR-J4-500_			421 502	352 502	353 503	503
MR-J4-700_			702			703
MR-J4-11K_						903 11K1M
MR-J4-15K_						15K1M
MR-J4-22K_						22K1M

(b) 400 V class

Servo amplifier	Rotary servo motor	
	HG-SR	HG-JR
MR-J4-60_4	524	534
MR-J4-100_4	1024	734, 1034
MR-J4-200_4	1524, 2024	1534, 2034
MR-J4-350_4	3524	3534
MR-J4-500_4	5024	5034
MR-J4-700_4	7024	7034
MR-J4-11K_4		9034, 11K1M4
MR-J4-15K_4		15K1M4
MR-J4-22K_4		22K1M4

3.3.3 Attachment compatibility check

Check "Part 4: Common Reference Material" and "Part 5: Review on Replacement of Motor".

3.3.4 Detailed review on replacement model

Check "Part 2: Review on Replacement of MR-J3-_A_ with MR-J4-_A_", "Part 3: Review on Replacement of MR-J3-_B_ with MR-J4-_B_".

3.3.5 Peripheral equipment check

See "Part 6: Review on Replacement of Optional Peripheral Equipment" in this document.

3.3.6 Startup procedure check

See "Part 7: Startup Procedure Manual" in this document.

4. RELATED MATERIALS

4.1 Catalog

(1) Mitsubishi General-Purpose AC Servo MELSERVO-J4

(2) Motion Controller Q17nDSCPU/Q170MSCPU

4.2 Instruction Manual

(1) MELSERVO-J4 Series MR-J4-_A(-RJ)/MR-J4-_A4(-RJ)/MR-J4-_A1(-RJ) Servo Amplifier Instruction Manual

(2) MELSERVO-J4 Series MR-J4-_B(-RJ)/MR-J4-_B4(-RJ)/MR-J4-_B1(-RJ) Servo Amplifier Instruction Manual

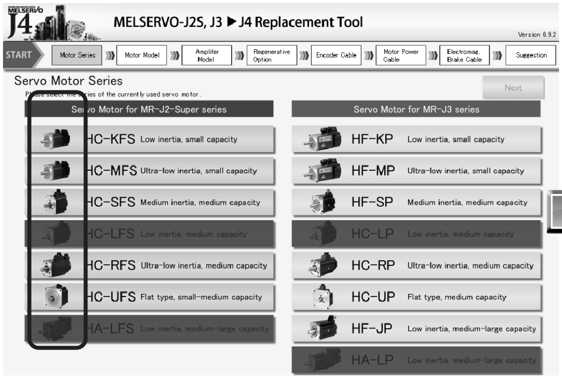
(3) HG-MR/HG-KR/HG-SR/HG-JR/HG-RR/HG-UR/HG-AK Servo Motor Instruction Manual (Vol.3)

(4) MELSERVO-J4 Servo Amplifier Instruction Manual (Troubleshooting Edition)

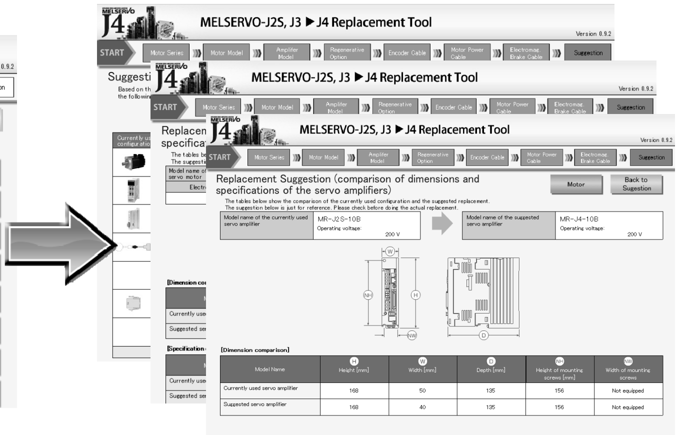
4.3 Replacement Tool for Replacing MR-J3 with MR-J4

This tool is a reference for replacing the in-use MR-J3 series with the MR-J4 series.
The replacement tool is available on the Mitsubishi Electric FA site.
When an in-use rotary servo motor or servo amplifier is selected, a corresponding MR-J4 series product can be selected.

Note: Use the results as just a reference. Refer to catalogs or instruction manuals. For details, contact your local sales office.



Servo motor series model, servo amplifier model, regenerative option, encoder motor power supply, and electromagnetic brake selection



Selection result configuration, servo motor dimensions/specification comparison, servo amplifier dimensions/specification comparison

4.4 MITSUBISHI ELECTRIC FA Global Website

http://www.mitsubishielectric.com/fa/

Part 2
Review on Replacement of MR-J3-_A_ with MR-J4-_A_

Part 2: Review on Replacement of MR-J3-_A_ with MR-J4-_A_

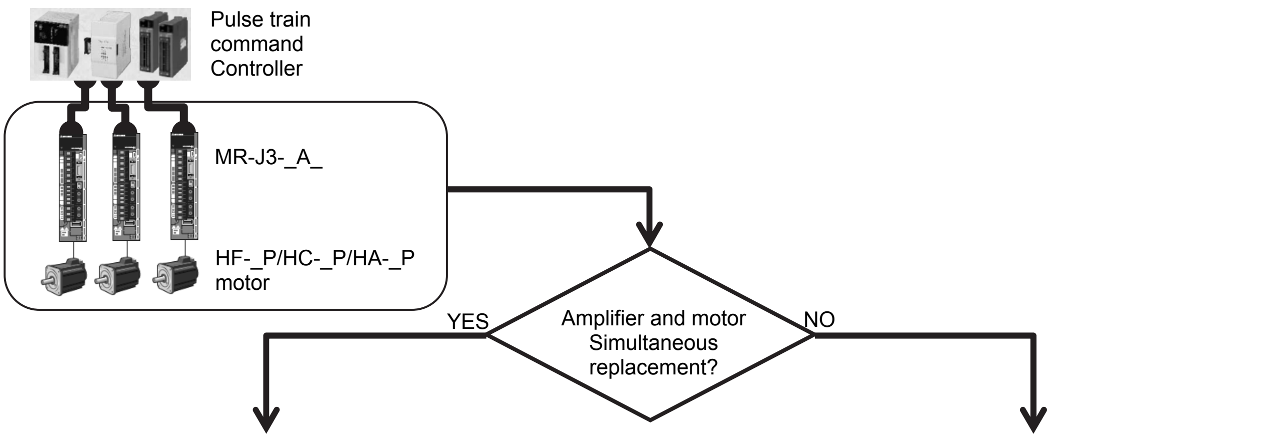
1 SUMMARY

This section describes the changes to be made when a system using MR-J3-_A_ is replaced with a system using MR-J4-_A_.

2 CASE STUDY ON REPLACEMENT OF MR-J3-_A_

2.1 Review on Replacement Method

POINT
●An HG motor cannot be driven by MR-J3-_A_. When a servo motor is replaced with an HG motor, servo amplifier also needs to be replaced with MR-J4-_A_ simultaneously.



(1) Simultaneous replacement with MR-J4-_A_ and an HG motor
Although heavier burdens including a longer construction period need to be borne, once replaced the system can be operated for a long period of time. (See Section 2.2 (1).)

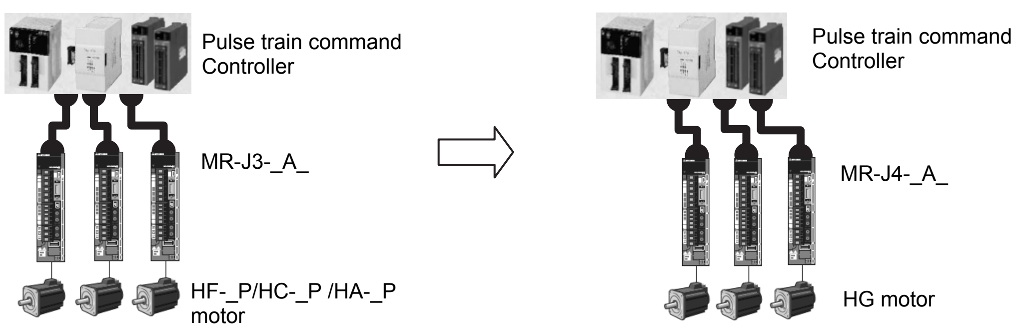
(2) Separate repair of a servo amplifier is available. (Note)
For the available motors, refer to the following. (See Section 2.2 (2).)

Note Separate repair means replacement.

2.2 Replacement Method

(1) Simultaneous replacement with MR-J4-_A_ and an HG motor
The currently used connectors or cables need to be replaced. The parameters of the existing system can be transferred with the parameter converter function of MR Configurator2. (See "Part 4: Common Reference Material".)

[Existing system] [System after simultaneous replacement]



(2) Separate repair of servo amplifiers and servo motors

POINT

- An HG motor cannot be driven by MR-J3-_A_. When a servo motor is replaced with an HG motor, servo amplifier also needs to be replaced with MR-J4-_A_ simultaneously.
- When an "HC-_P motor" shown below is used, "simultaneous replacement with MR-J4-_A_ and an HG motor" is recommended. When an HG motor is adopted, the capacity of the servo amplifier needs to be changed. (Consider replacement, referring to "torque characteristics" described in "Part 5: Replacement of Motor".)
- The low inertia "HG-JR motor" is recommended for the replacement of "HC-LP motor".
  To use a servo motor other than the motors listed in following table, check the compatibility with the equipment because the motor inertia, etc. is different.

Existing device models		Replacement models for simultaneous replacement (example)	
Servo motor	Servo amplifier	Servo motor	Servo amplifier
HC-RP103(B)G5 1/_	MR-J3-200A(N)(-RT)	HG-SR102(B)G5 1/_	MR-J4-100A
HC-RP203(B)G5 1/_	MR-J3-350A	HG-SR202(B)G5 1/_	MR-J4-200A
HC-RP353(B)G5 1/_	MR-J3-500A	HG-SR352(B)G5 1/_	MR-J4-350A
HC-RP103(B)G7 1/_	MR-J3-200A(N)(-RT)	HG-SR102(B)G7 1/_	MR-J4-100A
HC-RP203(B)G7 1/_	MR-J3-350A	HG-SR202(B)G7 1/_	MR-J4-200A
HC-RP353(B)G7 1/_	MR-J3-500A	HG-SR352(B)G7 1/_	MR-J4-350A
HC-LP52(B)	MR-J3-60A	HG-JR73(B)	MR-J4-70A
HC-LP102(B)	MR-J3-100A	HG-JR153(B)	MR-J4-200A
HC-LP152(B)	MR-J3-200A(N)(-RT)	HG-JR353(B)	MR-J4-350A

3. DIFFERENCES BETWEEN MR-J3-_A_ AND MR-J4-_A_

3.1 Function Comparison Table

<Comparison of 200 V Class>

	Item	MR-J3-_A_	MR-J4-_A_
1	Capacity range	0.1 kW to 22 kW/200 V	0.1 kW to 22 kW/200 V
2	Internal regenerative resistor	Built-in (0.2 kW to 7 kW) External (11kW to 22 kW)	Built-in (0.2 kW to 7 kW) External (11kW to 22 kW)
3	Dynamic brake	Built-in (0.1kW to 7kW) External (11kW to 22 kW)	Built-in (0.1 kW to 7 kW) External (11kW to 22 kW) **Coasting distance may differ. (Note 1)**
4	Control circuit power	1-phase 200 V AC to 230 V AC	1-phase 200 V AC to **240** V AC
5	Main circuit power	1-phase 200 V AC to 230 V AC (0.1 kW to 0.75 kW) 3-phase 200 V AC to 230 V AC (0.1 kW to 22 kW)	1-phase 200 V AC to **240** V AC (0.1 kW **to 2 kW**) 3-phase 200 V AC to **240** V AC (0.1 kW to 22 kW)
6	24 V DC power	External supply required	External supply required
7	Auto Tuning	Real-time auto tuning: 32 steps Advanced gain search	Real-time auto tuning: **40 steps** **One-touch tuning**
8	Control mode	General-Purpose Interface ・Position control mode (pulse command) ・Speed control mode (analog command) ・Torque control mode (analog command)	General-Purpose Interface ・Position control mode (pulse command) ・Speed control mode (analog command) ・Torque control mode (analog command)
9	Maximum input pulses	Differential pulse: 1 Mpps Open-collector pulse: 200 kpps Command pulse: Sink	Differential pulse: **4** Mpps Open-collector pulse: 200 kpps Command pulse: Sink
10	The number of DIO points (excluding EM1)	General-Purpose Interface DI: 9 points, DO: 6 points	General-Purpose Interface DI: 9 points, DO: 6 points
11	Encoder pulse output	ABZ-phase (differential) General-Purpose Interface Z-phase (open collector)	ABZ-phase (differential) General-Purpose Interface Z-phase (open collector)
12	DIO interface	input/output: sink/source	input/output: sink/source
13	Analog input/output	General-Purpose Interface (Input) 2ch 10-bit torque, 14-bit speed or equivalent (Output) 10-bit or equivalent × 2ch	General-Purpose Interface (Input) 2ch 10-bit torque, 14-bit speed or equivalent (Output) 10-bit or equivalent × 2ch
14	Number of internal speed commands	7 points	7 points
15	Parameter setting method	MR Configurator (SETUP221) MR Configurator2 Push button	MR Configurator2 Push button
16	Setup software communication function	USB	USB
17	Servo motor (Encoder resolution)	HF-_P series (18-bit ABS) HA-_P series (18-bit ABS)	HG series (**22**-bit ABS)
18	Motor maximum torque	HF-KP 350%	HG-KR 350%
		HF-MP 300%	HG-MR 300%
		HF-SP 300%	HG-SR 300%
		HF-JP 300%	HG-JR 300%
		HA-LP 250%	**HG-JR 300%**
19	Button	4 buttons	4 buttons
20	LED display	7-segment 5-digit	7-segment 5-digit
21	Advanced vibration suppression control	Provided	Provided **(II 3 inertia vibration suppression)**
22	Adaptive filter II	Provided	Provided
23	Notch filter	Provided (2 pcs)	Provided (5 pcs)
24	Tough drive	Unprovided	**Provided**
25	Drive recorder	Unprovided	**Provided**
26	Forced stop	EM1 (DB stop)	**EM1 (DB stop)/ EM2 (deceleration to a stop)**
Note		Functions with difference are **shown with shading**.	

Note 1. For the coasting distance, refer to "1.2.3 Dynamic brake: coasting distance" in "Part 4 Common Reference Material".

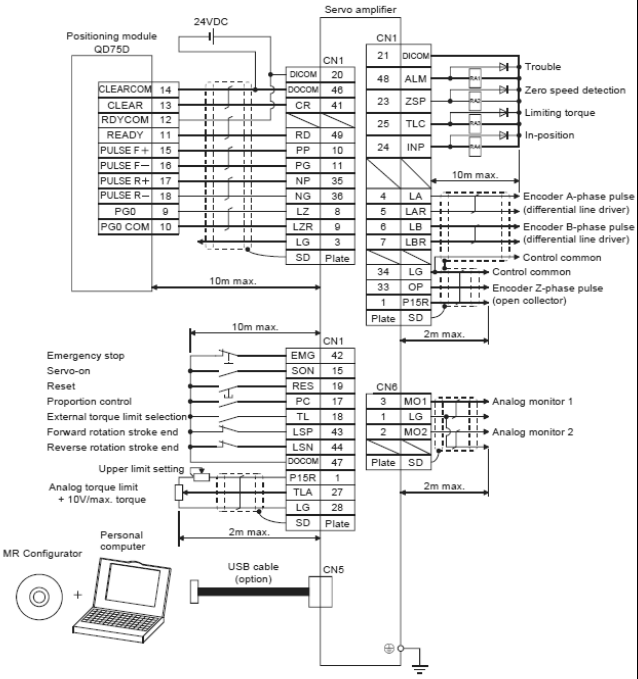
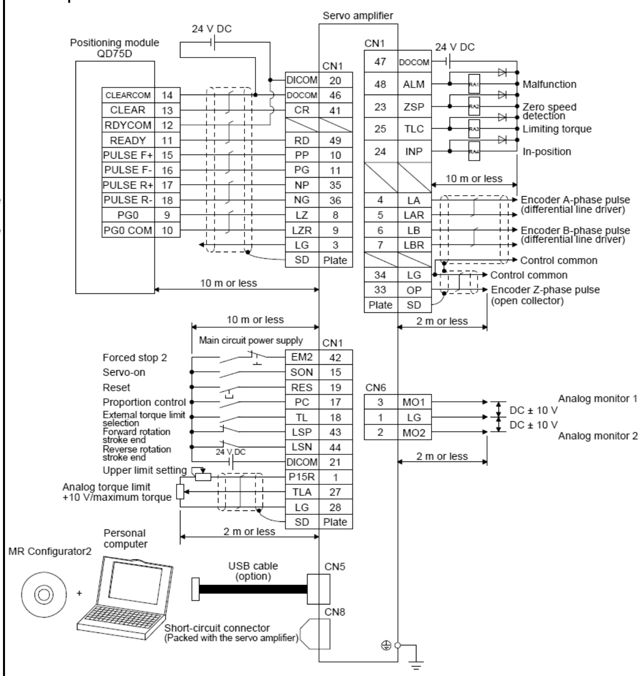
<Comparison of 400 V Class>

	Item	MR-J3-_A_	MR-J4-_A_
1	Capacity range	0.6 kW to 22 kW/400 V	0.6 to 22 kW/400 V
2	Internal regenerative resistor	Built-in (0.6 kW to 7 kW) External (11kW to 22 kW)	Built-in (0.6 kW to 7 kW) External (11kW to 22 kW)
3	Dynamic brake	Built-in (0.6 kW to 7 kW) External (11kW to 22 kW)	Built-in (0.6 kW to 7 kW) External (11kW to 22 kW) **Coasting distance may differ. (Note 1)**
4	Control circuit power	1-phase 380 V AC to 480 V AC	1-phase 380 V AC to 480 V AC
5	Main circuit power	3-phase 380 V AC to 480 V AC	3-phase 380 V AC to 480 V AC
6	24 V DC power	External supply required	External supply required
7	Auto Tuning	Real-time auto tuning: 32 steps Advanced gain search	Real-time auto tuning: **40 steps** **One-touch tuning**
8	Control mode	General-Purpose Interface ・Position control mode (pulse command) ・Speed control mode (analog command) ・Torque control mode (analog command)	General-Purpose Interface ・Position control mode (pulse command) ・Speed control mode (analog command) ・Torque control mode (analog command)
9	Maximum input pulses	Differential pulse: 1 Mpps Command pulse: Sink	Differential pulse: **4** Mpps Command pulse: Sink
10	The number of DIO points (excluding EM1)	General-Purpose Interface DI: 9 points, DO: 6 points	General-Purpose Interface DI: 9 points, DO: 6 points
11	Encoder pulse output	ABZ-phase (differential)	ABZ-phase (differential)
12	DIO interface	input/output: sink/source	input/output: sink/source
13	Analog input/output	General-Purpose Interface (Input) 2ch 10-bit torque, 14-bit speed or equivalent (Output) 10-bit or equivalent × 2ch	General-Purpose Interface (Input) 2ch 10-bit torque, 14-bit speed or equivalent (Output) 10-bit or equivalent × 2ch
14	Number of internal speed commands	7 points	7 points
15	Parameter setting method	MR Configurator (SETUP221) MR Configurator2 Push button	MR Configurator2 Push button
16	Setup software communication function	USB	USB
17	Servo motor (Encoder resolution)	HF-_P series (18-bit ABS) HA-_P series (18-bit ABS)	HG series (**22**-bit ABS)
18	Motor maximum torque	HF-SP 300%	HG-SR 300%
		HF-JP 300%	HG-JR 300%
		HA-LP 250%	**HG-JR 300%**
19	Button	4 buttons	4 buttons
20	LED display	7-segment 5-digit	7-segment 5-digit
21	Advanced vibration suppression control	Provided	Provided **(II 3 inertia vibration suppression)**
22	Adaptive filter II	Provided	Provided
23	Notch filter	Provided (2 pcs)	Provided (**5** pcs)
24	Tough drive	Unprovided	**Provided**
25	Drive recorder	Unprovided	**Provided**
26	Forced stop	EM1 (DB stop)	**EM1 (DB stop)/ EM2 (deceleration to a stop)**
Note		Functions with difference are **shown with shading**.	

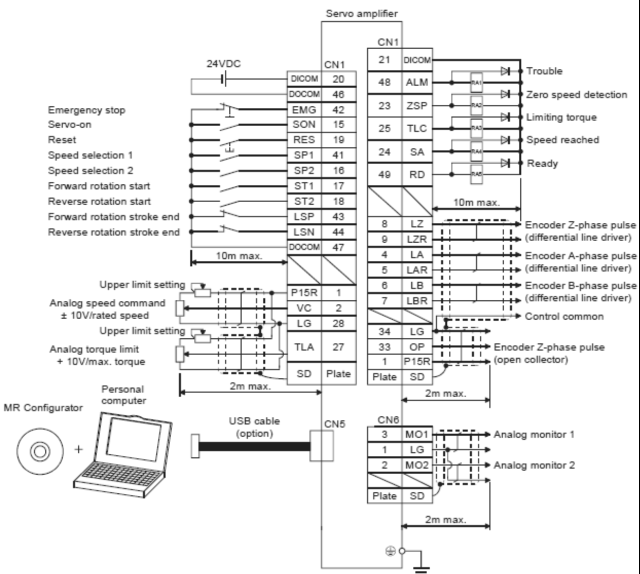
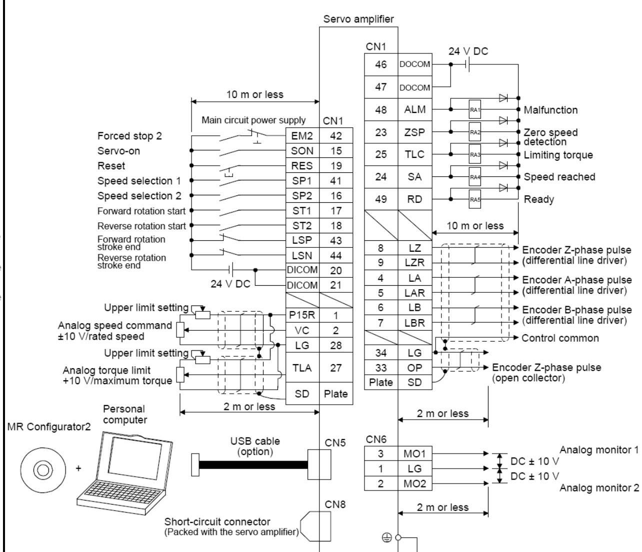
Note 1. For the coasting distance, refer to "1.2.3 Dynamic brake: coasting distance" in "Part 4 Common Reference Material".

3.2 Comparison of Standard Connection Diagrams

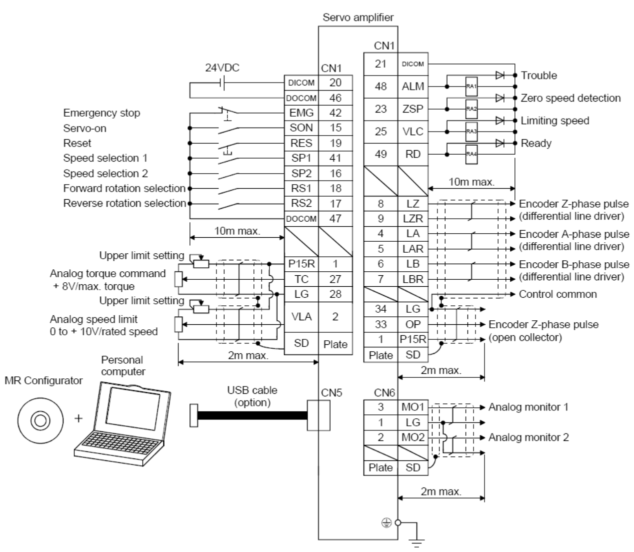
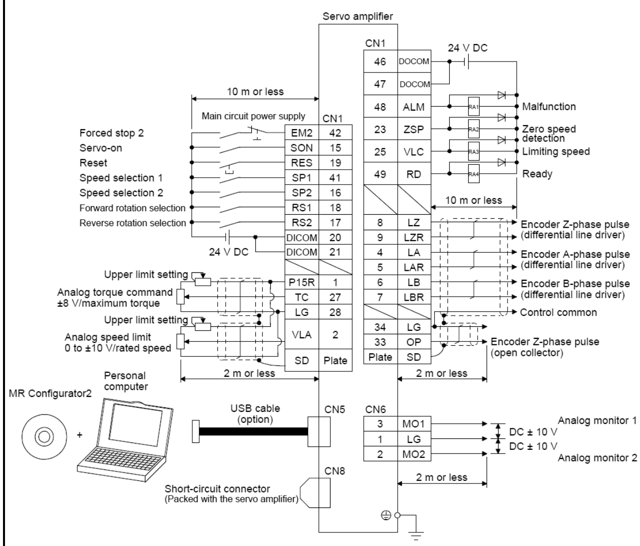
(1) Position control mode

MR-J3-_A_	MR-J4-_A_
Example of connection to QD75D 	Example of connection to QD75D 

(2) Speed control mode

MR-J3-_A_	MR-J4-_A_
	

(3) Torque control mode

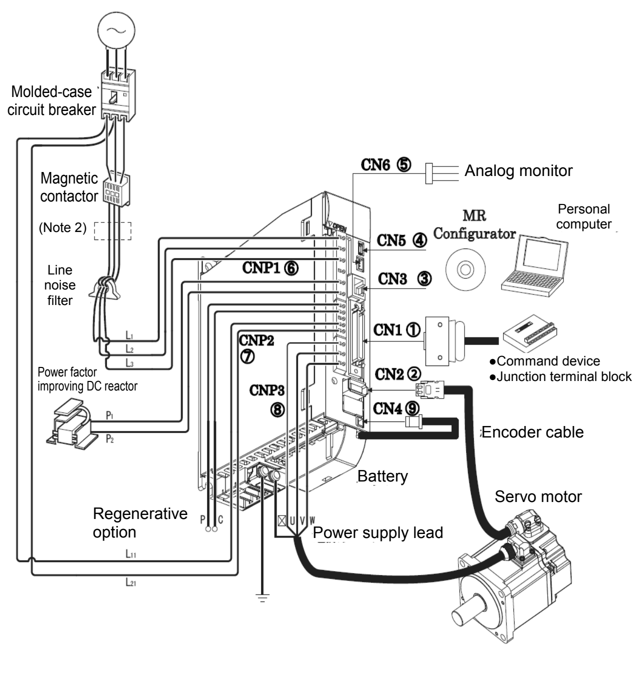
MR-J3-_A_	MR-J4-_A_
	

3.3 List of Corresponding Connectors and Terminal Blocks

(1) Position control mode

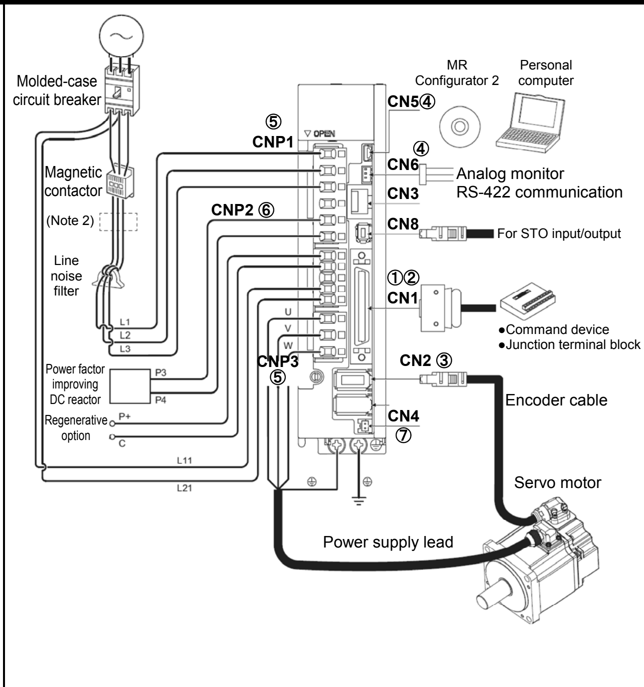
The following shows examples of connections with the peripheral equipment. For details of signals, refer to each servo amplifier instruction manual.

MR-J3-_A_



Note 1. The above configuration example is applied to MR-J3-200A or a system with less capacity.
2. The power factor improving AC reactor can also be used. In this case, the power factor improving DC reactor cannot be used.

MR-J4-_A_



Note 1. The above configuration example is applied to MR-J4-200A or a system with less capacity.
2. The power factor improving AC reactor can also be used. In this case, the power factor improving DC reactor cannot be used.

(2) List of connector and terminal block correspondence

No.	MR-J3-_A_		MR-J4-_A_	Note
①	I/O signal connector [CN1]	→	I/O signal connector [CN1]	
②	Encoder connector [CN2]		Encoder connector [CN2]	
③	RS-422 communication connector [CN3]		RS-422 communication connector [CN3]	
④	USB communication connector [CN5]		USB communication connector [CN5]	
⑤	Analog monitor connector [CN6]		Analog monitor connector [CN6]	
⑥	Main circuit power connector [CNP1]		Main circuit power connector [CNP1]	Switch to the power connector (enclosed with the amplifier).
⑦	Control circuit power connector [CNP2]		Control circuit power connector [CNP2]	
⑧	Servo motor power connector [CNP3]		Servo motor power connector [CNP3]	
⑨	Battery connector [CN4]		Battery connector [CN4]	Prepare a new battery.

Note When not using the STO function in MR-J4-_A_, attach the short-circuit connector supplied with the servo amplifier to CN8 (STO input signal connector).
The configuration of the main circuit terminal block differs depending on the capacity. See "Part 4: Common Reference Material".

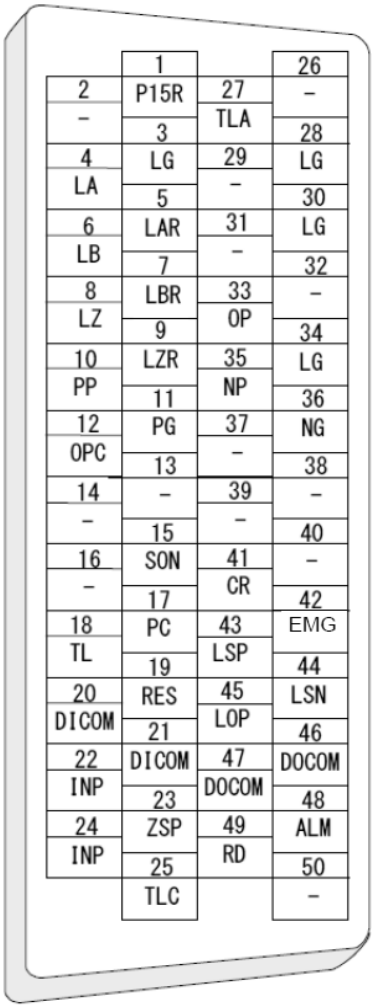
(3) Comparison of signals

(a) CN1

1) Position control mode

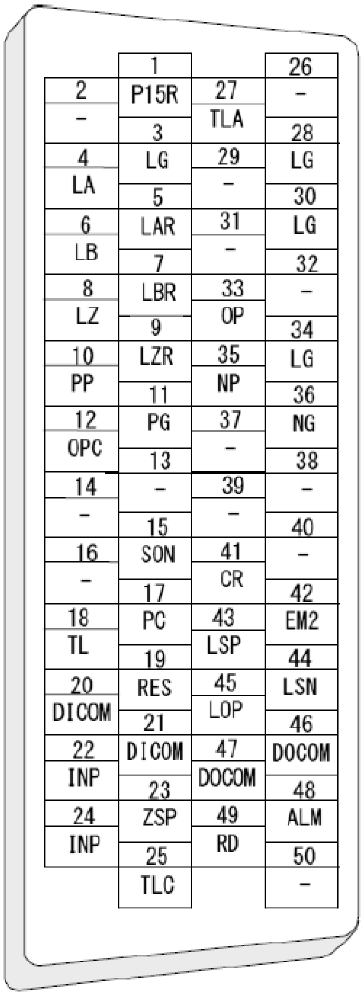
MR-J3-_A_ connector pin assignment

CN1



MR-J4-_A_ connector pin assignment

CN1



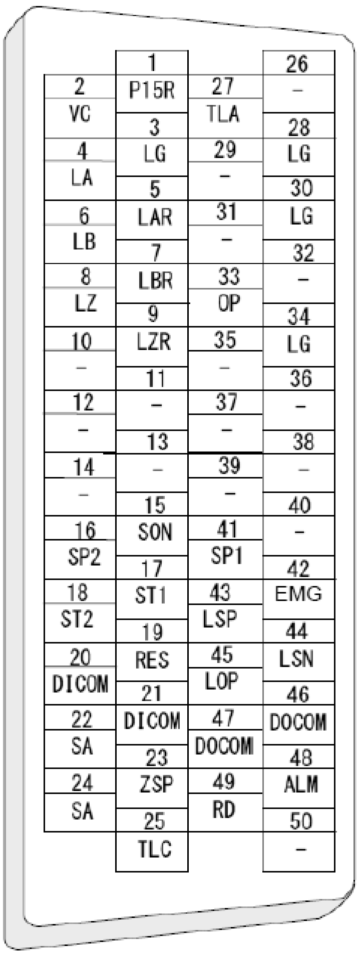
MR-J3-_A_ Connector pin No.	Signal abbreviation (Note)	MR-J4-_A_ Connector pin No.
CN1-1	P15R	CN1-1
CN1-2		CN1-2
CN1-3	LG	CN1-3
CN1-4	LA	CN1-4
CN1-5	LAR	CN1-5
CN1-6	LB	CN1-6
CN1-7	LBR	CN1-7
CN1-8	LZ	CN1-8
CN1-9	LZR	CN1-9
CN1-10	PP	CN1-10
CN1-11	PG	CN1-11
CN1-12	OPC	CN1-12
CN1-13		CN1-13
CN1-14		CN1-14
CN1-15	SON	CN1-15
CN1-16		CN1-16
CN1-17	PC	CN1-17
CN1-18	TL	CN1-18
CN1-19	RES	CN1-19
CN1-20	DICOM	CN1-20
CN1-21	DICOM	CN1-21
CN1-22	INP	CN1-22
CN1-23	ZSP	CN1-23
CN1-24	INP	CN1-24
CN1-25	TLC	CN1-25
CN1-26		CN1-26
CN1-27	TLA	CN1-27
CN1-28	LG	CN1-28
CN1-29		CN1-29
CN1-30	LG	CN1-30
CN1-31		CN1-31
CN1-32		CN1-32
CN1-33	OP	CN1-33
CN1-34	LG	CN1-34
CN1-35	NP	CN1-35
CN1-36	NG	CN1-36
CN1-37		CN1-37
CN1-38		CN1-38
CN1-39		CN1-39
CN1-40		CN1-40
CN1-41	CR	CN1-41
CN1-42	EMG (EM2)	CN1-42
CN1-43	LSP	CN1-43
CN1-44	LSN	CN1-44
CN1-45	LOP	CN1-45
CN1-46	DOCOM	CN1-46
CN1-47	DOCOM	CN1-47
CN1-48	ALM	CN1-48
CN1-49	RD	CN1-49
CN1-50		CN1-50

Note Signal abbreviations in parentheses are for MR-J4-_A_.

2) Speed control mode

MR-J3-_A_ connector pin assignment:

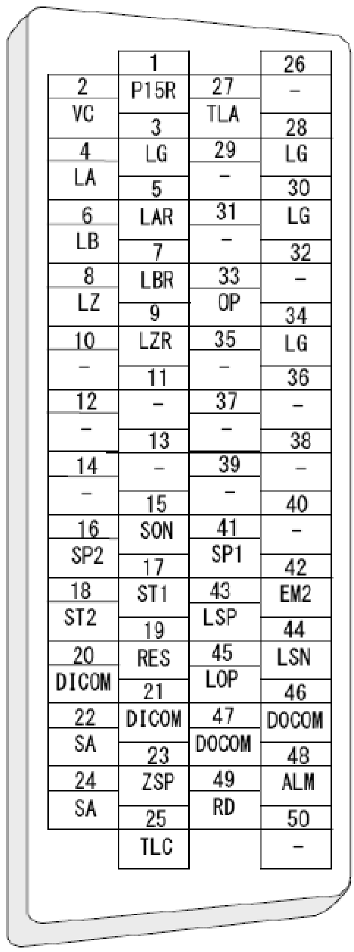
CN1



MR-J3-_A_ Connector pin No.	Signal abbreviation (Note)	MR-J4-_A_ Connector pin No.
CN1-1	P15R	CN1-1
CN1-2	VC	CN1-2
CN1-3	LG	CN1-3
CN1-4	LA	CN1-4
CN1-5	LAR	CN1-5
CN1-6	LB	CN1-6
CN1-7	LBR	CN1-7
CN1-8	LZ	CN1-8
CN1-9	LZR	CN1-9
CN1-10		CN1-10
CN1-11		CN1-11
CN1-12		CN1-12
CN1-13		CN1-13
CN1-14		CN1-14
CN1-15	SON	CN1-15
CN1-16	SP2	CN1-16
CN1-17	ST1	CN1-17
CN1-18	ST2	CN1-18
CN1-19	RES	CN1-19
CN1-20	DICOM	CN1-20
CN1-21	DICOM	CN1-21
CN1-22	SA	CN1-22
CN1-23	ZSP	CN1-23
CN1-24	SA	CN1-24
CN1-25	TLC	CN1-25
CN1-26		CN1-26
CN1-27	TLA	CN1-27
CN1-28	LG	CN1-28
CN1-29		CN1-29
CN1-30	LG	CN1-30
CN1-31		CN1-31
CN1-32		CN1-32
CN1-33	OP	CN1-33
CN1-34	LG	CN1-34
CN1-35		CN1-35
CN1-36		CN1-36
CN1-37		CN1-37
CN1-38		CN1-38
CN1-39		CN1-39
CN1-40		CN1-40
CN1-41	SP1	CN1-41
CN1-42	EMG (EM2)	CN1-42
CN1-43	LSP	CN1-43
CN1-44	LSN	CN1-44
CN1-45	LOP	CN1-45
CN1-46	DOCOM	CN1-46
CN1-47	DOCOM	CN1-47
CN1-48	ALM	CN1-48
CN1-49	RD	CN1-49
CN1-50		CN1-50

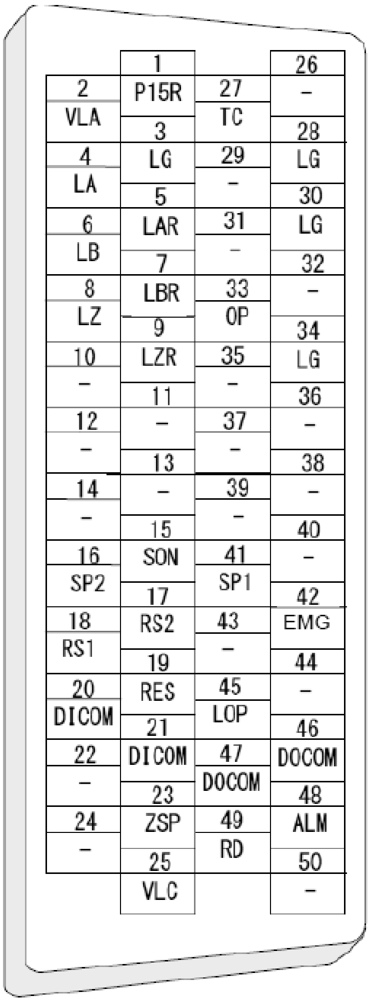
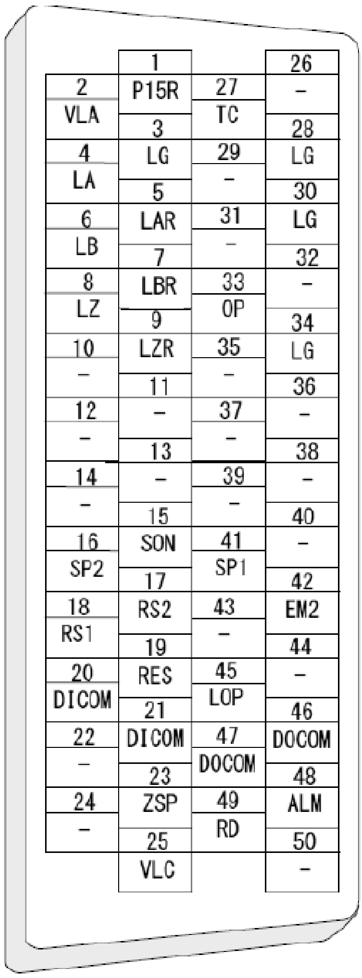
MR-J4-_A_ connector pin assignment:

CN1



Note Signal abbreviations in parentheses are for MR-J4-_A_.

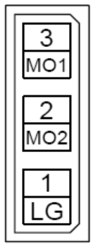
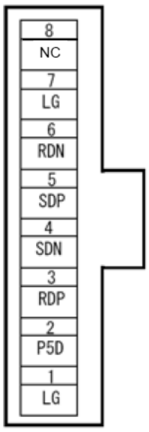
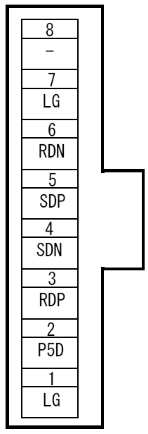
3) Torque control mode

MR-J3-_A_		Signal abbreviation (Note)	MR-J4-_A_	
Connector pin assignment	Connector pin No.		Connector pin No.	Connector pin assignment
CN1 	CN1-1	P15R	CN1-1	CN1 
	CN1-2	VLA	CN1-2	
	CN1-3	LG	CN1-3	
	CN1-4	LA	CN1-4	
	CN1-5	LAR	CN1-5	
	CN1-6	LB	CN1-6	
	CN1-7	LBR	CN1-7	
	CN1-8	LZ	CN1-8	
	CN1-9	LZR	CN1-9	
	CN1-10		CN1-10	
	CN1-11		CN1-11	
	CN1-12		CN1-12	
	CN1-13		CN1-13	
	CN1-14		CN1-14	
	CN1-15	SON	CN1-15	
	CN1-16	SP2	CN1-16	
	CN1-17	RS2	CN1-17	
	CN1-18	RS1	CN1-18	
	CN1-19	RES	CN1-19	
	CN1-20	DICOM	CN1-20	
	CN1-21	DICOM	CN1-21	
	CN1-22		CN1-22	
	CN1-23	ZSP	CN1-23	
	CN1-24		CN1-24	
	CN1-25	VLC	CN1-25	
	CN1-26		CN1-26	
	CN1-27	TC	CN1-27	
	CN1-28	LG	CN1-28	
	CN1-29		CN1-29	
	CN1-30	LG	CN1-30	
	CN1-31		CN1-31	
	CN1-32		CN1-32	
	CN1-33	OP	CN1-33	
	CN1-34	LG	CN1-34	
	CN1-35		CN1-35	
	CN1-36		CN1-36	
	CN1-37		CN1-37	
	CN1-38		CN1-38	
	CN1-39		CN1-39	
	CN1-40		CN1-40	
	CN1-41	SP1	CN1-41	
	CN1-42	EMG (EM2)	CN1-42	
	CN1-43		CN1-43	
	CN1-44		CN1-44	
	CN1-45	LOP	CN1-45	
	CN1-46	DOCOM	CN1-46	
	CN1-47	DOCOM	CN1-47	
	CN1-48	ALM	CN1-48	
	CN1-49	RD	CN1-49	
	CN1-50		CN1-50	

Note Signal abbreviations in parentheses are for MR-J4-_A_.

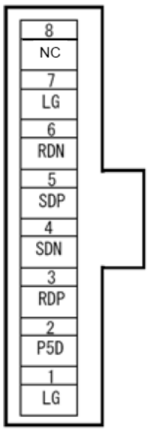
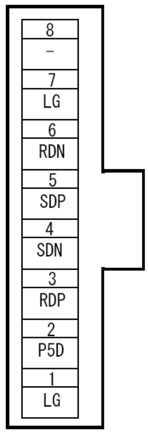
(b) CN3

1) For 7 kW or less

MR-J3-_A_		Signal abbreviation (Note)	MR-J4-_A_	
Connector pin assignment	Connector pin No.		Connector pin No.	Connector pin assignment
CN6 	CN6-1	LG	CN6-1	CN6 
	CN6-2	MO1	CN6-2	
	CN6-3	MO2	CN6-3	
CN3 	CN3-1	LG	CN3-1	CN3 
	CN3-2	P5D	CN3-2	
	CN3-3	RDP	CN3-3	
	CN3-4	SDN	CN3-4	
	CN3-5	SDP	CN3-5	
	CN3-6	RDN	CN3-6	
	CN3-7	LG	CN3-7	
	CN3-8	NC (-)	CN3-8	

Note Signal abbreviations in parentheses are for MR-J4-_A_.

2) For 11 kW to 22 kW

MR-J3-_A_		Signal abbreviation (Note)	MR-J4-_A_	
Connector pin assignment	Connector pin No.		Connector pin No.	Connector pin assignment
CN3 	CN3-1	LG	CN3-1	CN3 
	CN3-2	P5D	CN3-2	
	CN3-3	RDP	CN3-3	
	CN3-4	SDN	CN3-4	
	CN3-5	SDP	CN3-5	
	CN3-6	RDN	CN3-6	
	CN3-7	LG	CN3-7	
	CN3-8	NC (-)	CN3-8	

Note Signal abbreviations in parentheses are for MR-J4-_A_.

3.4 Comparison of Peripheral Equipment

POINT
● See "Part 6: Replacement of Optional Peripheral Equipment".

3.5 Comparison of Parameters

> ⚠ CAUTION
> - Never perform extreme adjustments and changes to the parameters, otherwise the operation may become unstable.
> - If fixed values are written in the digits of a parameter, do not change these values.
> - Do not change parameters for manufacturer setting.
> - Do not enter any setting value other than those specified for each parameter.

> POINT
> - For the parameter converter function, see "Part 4: Common Reference Material".
> - To enable a parameter whose abbreviation is preceded by *, turn the power OFF and then ON after setting the parameter.
> - For details about parameter settings for replacement, see the MR-J4-_A_ Servo Amplifier Instruction Manual.
> - With MR-J4-_A_, the deceleration to a stop function is enabled by factory settings. To disable the deceleration to a stop function, set PA04 to "0 _ _ _".

3.5.1 Setting requisite parameters upon replacement

The parameters shown in this section are a minimum number of parameters that need to be set for simultaneous replacement. Depending on the settings of the currently used amplifier, parameters other than these may need to be set.

(1) Parameters common to position control mode, speed control mode, and torque control mode

MR-J3-_A_		MR-J4-_A_		Precautions
No.	Name	No.	Name	
PA02	Regenerative option	PA02	Regenerative option	The setting value must be changed to use the regenerative option added for J4-A.
PA04	CN1-23 pin function selection			No corresponding parameter (Can substitute with PD23 to PD26, PD28.)
PA05	Number of command input pulses per revolution	PA05	Number of command input pulses per revolution	The setting value must be changed according to the encoder resolution.
PA06	Electronic gear numerator	PA06	Electronic gear numerator	The setting value must be changed according to PA21 (Electronic gear selection). When J3-A: PA05 = 0 → J4-A: PA21 = 2_ _ _ (Set the values of PA06 and PA07 for J3.) When J3-A: PA05 = other than 0 → J4-A: PA21 = 1_ _ _
PA07	Electronic gear denominator	PA07	Electronic gear denominator	
PA09	Auto tuning response	PA09	Auto tuning response	The setting value must be changed based on machine resonance frequency.
PB06	Load to motor inertia ratio	PB06	Load to motor inertia ratio	The unit system is different. (0.1 times → 0.01 times) Check the setting value.
PB07	Model loop gain	PB07	Model loop gain	The unit system is different. (rad/s → 0.1 rad/s)
PB08	Position loop gain	PB08	Position loop gain	The unit system is different. (rad/s → 0.1 rad/s)
PB29	Load to motor inertia ratio after gain switching	PB29	Load to motor inertia ratio after gain switching	The unit system is different. (0.1 times → 0.01 times) Check the setting value.
PB30	Position loop gain after gain switching	PB30	Position loop gain after gain switching	The unit system is different. (rad/s → 0.1 rad/s)

MR-J3-A		MR-J4-A		Precautions
No.	Name	No.	Name	
PC14	Analog monitor 1 output	PC14	Analog monitor 1 output	When the command pulse frequency is selected (±10 V/1 Mpps → ±10 V/4 Mpps)
PC15	Analog monitor 2 output	PC15	Analog monitor 2 output	When the command pulse frequency is selected (±10 V/1 Mpps → ±10 V/4 Mpps)
PC22	Restart after instantaneous power failure selection Encoder cable communication method selection	PC22	Encoder cable communication method selection	"Restart after instantaneous power failure selection" is not supported.
PC37	Analog speed command offset/ Analog speed limit offset	PC37	Analog speed command offset/ Analog speed limit offset	Depends on hardware. The setting values must be changed.
PC38	Analog torque command offset/ Analog torque limit offset	PC38	Analog torque command offset/ Analog torque limit offset	Depends on hardware. The setting values must be changed.
PC39	Analog monitor 1 offset	PC39	Analog monitor 1 offset	Depends on hardware. The setting values must be changed.
PC40	Analog monitor 2 offset	PC40	Analog monitor 2 offset	Depends on hardware. The setting values must be changed.
PD03	Input signal device selection 1 (CN1-15)	PD03	Input device selection 1L	
		PD04	Input device selection 1H	
PD04	Input signal device selection 2 (CN1-16)	PD05	Input device selection 2L	
		PD06	Input device selection 2H	
PD05	Input signal device selection 3 (CN1-17)	PD07	Input device selection 3L	
		PD08	Input device selection 3H	
PD06	Input signal device selection 4 (CN1-18)	PD09	Input device selection 4L	
		PD10	Input device selection 4H	
PD07	Input signal device selection 5 (CN1-19)	PD11	Input device selection 5L	
		PD12	Input device selection 5H	
PD08	Input signal device selection 6 (CN1-41)	PD13	Input device selection 6L	
		PD14	Input device selection 6H	
PD10	Input signal device selection 8 (CN1-43)	PD17	Input device selection 8L	
		PD18	Input device selection 8H	
PD11	Input signal device selection 9 (CN1-44)	PD19	Input device selection 9L	
		PD20	Input device selection 9H	
PD12	Input signal device selection 10 (CN1-45)	PD21	Input device selection 10L	
		PD22	Input device selection 10H	
PD13	Output signal device selection 1 (CN1-22)	PD23	Output device selection 1	The setting value 06 (DB) is added.
PD14	Output signal device selection 2 (CN1-23)	PD24	Output device selection 2	The setting value 06 (DB) is added.
PD15	Output signal device selection 3 (CN1-24)	PD25	Output device selection 3	The setting value 06 (DB) is added.
PD16	Output signal device selection 4 (CN1-25)	PD26	Output device selection 4	The setting value 06 (DB) is added.
PD18	Output signal device selection 6 (CN1-49)	PD28	Output device selection 6	The setting value 06 (DB) is added.
PD19	Input filter setting	PD29	Input filter setting	The filter setting value differs.
PD20	Function selection D-1	PD30	Function selection D-1	
PD22	Function selection D-3	PD32	Function selection D-3	
PD24	Function selection D-5	PD34	Function selection D-5	

3.5.2 Parameter comparison list

MR-J3-_A_ parameters					MR-J4-_A_ parameters				
No.	Abbreviation	Parameter name	Initial value	Customer setting value	No.	Abbreviation	Parameter name	Initial value	Customer setting value
PA01	*STY	Control mode	0000h		PA01	*STY	Operation mode	1000h	
PA02	*REG	Regenerative option	0000h		PA02	*REG	Regenerative option	0000h	
PA03	*ABS	Absolute position detection system	0000h		PA03	*ABS	Absolute position detection system	0000h	
PA04	*AOP1	Function selection A-1	0000h		PD23	*DO1	Output device selection 1	0004h	
					PD24	*DO2	Output device selection 2	000Ch	
					PD25	*DO3	Output device selection 3	0004h	
					PD26	*DO4	Output device selection 4	0007h	
					PD28	*DO6	Output device selection 6	0002h	
PA05	*FBP	Number of command input pulses per revolution	0		PA05	*FBP	Number of command input pulses per revolution	10000	
PA06	CMX	Electronic gear numerator (Command pulse multiplying factor numerator)	1		PA06	CMX	Electronic gear numerator (command pulse multiplication numerator)	1	
PA07	CDV	Electronic gear denominator (Command pulse multiplying factor denominator)	1		PA07	CDV	Electronic gear denominator (command pulse multiplication denominator)	1	
PA08	ATU	Auto tuning mode	0001h		PA08	ATU	Auto tuning mode	0001h	
PA09	RSP	Auto tuning response	12		PA09	RSP	Auto tuning response	16	
PA10	INP	In-position range	100		PA10	INP	In-position range	100	
PA11	TLP	Forward rotation torque limit	100.0		PA11	TLP	Forward rotation torque limit	100.0	
PA12	TLN	Reverse rotation torque limit	100.0		PA12	TLN	Reverse rotation torque limit	100.0	
PA13	*PLSS	Command pulse input form	0000h		PA13	*PLSS	Command pulse input form	0100h	
PA14	*POL	Rotation direction selection	0		PA14	*POL	Rotation direction selection	0	
PA15	*ENR	Encoder output pulses	4000		PA15	*ENR	Encoder output pulses	4000	
PA16		For manufacturer setting	0000h		PA16	*ENR2	Encoder output pulses 2	1	
PA17			0000h		PA17	*MSR	Servo motor series setting	0000h	
PA18			0000h		PA18	*MTY	Servo motor type setting	0000h	
PA19	*BLK	Parameter write inhibit	000Bh		PA19	*BLK	Parameter writing inhibit	00AAh	
PB01	FILT	Adaptive tuning mode (Adaptive filter Ⅱ)	0000h		PB01	FILT	Adaptive tuning mode (adaptive filter II)	0000h	
PB02	VRFT	Vibration suppression control tuning mode (Advanced vibration suppression control)	0000h		PB02	VRFT	Vibration suppression control tuning mode (advanced vibration suppression control II)	0000h	
PB03	PST	Position command acceleration/deceleration time constant (Position smoothing)	0		PB03	PST	Position command acceleration/deceleration time constant (position smoothing)	0	
PB04	FFC	Feed forward gain	0		PB04	FFC	Feed forward gain	0	
PB05		For manufacturer setting	500		PB05		For manufacturer setting	500	
PB06	GD2	Ratio of load inertia moment to servo motor inertia moment	7.0		PB06	GD2	Load to motor inertia ratio/load to motor mass ratio	7.00	
PB07	PG1	Model loop gain	24		PB07	PG1	Model loop gain	15.0	
PB08	PG2	Position loop gain	37		PB08	PG2	Position loop gain	37.0	
PB09	VG2	Speed loop gain	823		PB09	VG2	Speed loop gain	823	
PB10	VIC	Speed integral compensation	33.7		PB10	VIC	Speed integral compensation	33.7	
PB11	VDC	Speed differential compensation	980		PB11	VDC	Speed differential compensation	980	
PB12		For manufacturer setting	0		PB12	OVA	Overshoot amount compensation	0	
PB13	NH1	Machine resonance suppression filter 1	4500		PB13	NH1	Machine resonance suppression filter 1	4500	
PB14	NHQ1	Notch shape selection 1	0000h		PB14	NHQ1	Notch shape selection 1	0000h	
PB15	NH2	Machine resonance suppression filter 2	4500		PB15	NH2	Machine resonance suppression filter 2	4500	
PB16	NHQ2	Notch shape selection 2	0000h		PB16	NHQ2	Notch shape selection 2	0000h	

Note Parameters related to gain adjustment are different from those for the MR-J3_ servo amplifier. For gain adjustment, see MR-J4_A_ Servo Amplifier Instruction Manual.

MR-J3-_A_ parameters					MR-J4-_A_ parameters				
No.	Abbreviation	Parameter name	Initial value	Customer setting value	No.	Abbreviation	Parameter name	Initial value	Customer setting value
PB17		Automatic setting parameter			PB17	NHF	Shaft resonance suppression filter	0000h	
PB18	LPF	Low-pass filter setting	3141		PB18	LPF	Low-pass filter setting	3141	
PB19	VRF1	Vibration suppression control vibration frequency setting	100.0		PB19	VRF11	Vibration suppression control 1 - Vibration frequency	100.0	
PB20	VRF2	Vibration suppression control resonance frequency setting	100.0		PB20	VRF12	Vibration suppression control 1 - Resonance frequency	100.0	
PB21		For manufacturer setting	0.00		PB21	VRF13	Vibration suppression control 1 - Vibration frequency damping	0.00	
PB22			0.00		PB22	VRF14	Vibration suppression control 1 - Resonance frequency damping	0.00	
PB23	VFBF	Low-pass filter selection	0000h		PB23	VFBF	Low-pass filter selection	0000h	
PB24	*MVS	Slight vibration suppression control selection	0000h		PB24	*MVS	Slight vibration suppression control	0000h	
PB25	*BOP1	Function selection B-1	0000h		PB25	*BOP1	Function selection B-1	0000h	
PB26	*CDP	Gain changing selection	0000h		PB26	*CDP	Gain switching function	0000h	
PB27	CDL	Gain changing condition	10		PB27	CDL	Gain switching condition	10	
PB28	CDT	Gain changing time constant	1		PB28	CDT	Gain switching time constant	1	
PB29	GD2B	Gain changing ratio of load inertia moment to servo motor inertia moment	7.0		PB29	GD2B	Load to motor inertia ratio/load to motor mass ratio after gain switching	7.00	
PB30	PG2B	Gain changing position loop gain	37		PB30	PG2B	Position loop gain after gain switching	0.0	
PB31	VG2B	Gain changing speed loop gain	823		PB31	VG2B	Speed loop gain after gain switching	0	
PB32	VICB	Gain changing speed integral compensation	33.7		PB32	VICB	Speed integral compensation after gain switching	0.0	
PB33	VRF1B	Gain changing vibration suppression control vibration frequency setting	100.0		PB33	VRF1B	Vibration suppression control 1 - Vibration frequency after gain switching	0.0	
PB34	VRF2B	Gain changing vibration suppression control resonance frequency setting	100.0		PB34	VRF2B	Vibration suppression control 1 - Resonance frequency after gain switching	0.0	
PB35		For manufacturer setting	0.00		PB35	VRF3B	Vibration suppression control 1 - Vibration frequency damping after gain switching	0.00	
PB36			0.00		PB36	VRF4B	Vibration suppression control 1 - Resonance frequency damping after gain switching	0.00	
PB37			100		PB37		For manufacturer setting	1600	
PB38			0.0		PB38			0.00	
PB39			0.0		PB39			0.00	
PB40			0.0		PB40			0.00	
PB41			1125		PB41			0000h	
PB42			1125		PB42			0000h	
PB43			0004h		PB43			0000h	
PB44			0000h		PB44			0.00	
PB45			0000h		PB45	CNHF	Command notch filter	0000h	
PC01	STA	Acceleration time constant	0		PC01	STA	Acceleration time constant	0	
PC02	STB	Deceleration time constant	0		PC02	STB	Deceleration time constant	0	
PC03	STC	S-pattern acceleration/ deceleration time constant	0		PC03	STC	S-pattern acceleration/ deceleration time constant	0	
PC04	TQC	Torque command time constant	0		PC04	TQC	Torque command time constant/ thrust command time constant	0	
PC05	SC1	Internal speed command 1	100		PC05	SC1	Internal speed command 1	100	
		Internal speed limit 1					Internal speed limit 1		
PC06	SC2	Internal speed command 2	500		PC06	SC2	Internal speed command 2	500	
		Internal speed limit 2					Internal speed limit 2		
PC07	SC3	Internal speed command 3	1000		PC07	SC3	Internal speed command 3	1000	
		Internal speed limit 3					Internal speed limit 3		
PC08	SC4	Internal speed command 4	200		PC08	SC4	Internal speed command 4	200	
		Internal speed limit 4					Internal speed limit 4		
PC09	SC5	Internal speed command 5	300		PC09	SC5	Internal speed command 5	300	
		Internal speed limit 5					Internal speed limit 5		

MR-J3-_A_ parameters					MR-J4-_A_ parameters				
No.	Abbreviation	Parameter name	Initial value	Customer setting value	No.	Abbreviation	Parameter name	Initial value	Customer setting value
PC10	SC6	Internal speed command 6	500		PC10	SC6	Internal speed command 6	500	
		Internal speed limit 6					Internal speed limit 6		
PC11	SC7	Internal speed command 7	800		PC11	SC7	Internal speed command 7	800	
		Internal speed limit 7					Internal speed limit 7		
PC12	VCM	Analog speed command maximum speed	0		PC12	VCM	Analog speed command - Maximum speed	0	
		Analog speed limit maximum speed					Analog speed limit - Maximum speed		
PC13	TLC	Analog torque command maximum output	100.0		PC13	TLC	Analog torque command maximum output	100.0	
PC14	MOD1	Analog monitor 1 output	0000h		PC14	MOD1	Analog monitor 1 output	0000h	
PC15	MOD2	Analog monitor 2 output	0001h		PC15	MOD2	Analog monitor 2 output	0001h	
PC16	MBR	Electromagnetic brake sequence output	100		PC16	MBR	Electromagnetic brake sequence output	0	
PC17	ZSP	Zero speed	50		PC17	ZSP	Zero speed	50	
PC18	*BPS	Alarm history clear	0000h		PC18	*BPS	Alarm history clear	0000h	
PC19	*ENRS	Encoder output pulses selection	0000h		PC19	*ENRS	Encoder output pulse selection	0000h	
PC20	*SNO	Station number setting	0		PC20	*SNO	Station No. setting	0	
PC21	*SOP	Absolute position detection system	0000h		PC21	*SOP	RS-422 communication function selection (RS232C communication is not available.)	0000h	
PC22	*COP1	Function selection C-1	0000h		PC22	*COP1	Function selection C-1	0000h	
PC23	*COP2	Function selection C-2	0000h		PC23	*COP2	Function selection C-2	0000h	
PC24	*COP3	Function selection C-3	0000h		PC24	*COP3	Function selection C-3	0000h	
PC25		For manufacturer setting	0000h		PC25		For manufacturer setting	0000h	
PC26	*COP5	Function selection C-5	0000h		PC26	*COP5	Function selection C-5	0000h	
PC27	*COP6	Function selection C-6	0000h		PC27	*COP6	Function selection C-6	0000h	
PC28		For manufacturer setting	0000h		PC28	*COP7	Function selection C-7	0000h	
PC29			0000h		PC29		For manufacturer setting	0000h	
PC30	STA2	Acceleration time constant 2	0		PC30	STA2	Acceleration time constant 2	0	
PC31	STB2	Deceleration time constant 2	0		PC31	STB2	Deceleration time constant 2	0	
PC32	CMX2	Command pulse multiplying factor numerator 2	1		PC32	CMX2	Command input pulse multiplication numerator 2	1	
PC33	CMX3	Command pulse multiplying factor numerator 3	1		PC33	CMX3	Command input pulse multiplication numerator 3	1	
PC34	CMX4	Command pulse multiplying factor numerator 4	1		PC34	CMX4	Command input pulse multiplication numerator 4	1	
PC35	TL2	Internal torque limit 2	100.0		PC35	TL2	Internal torque limit 2/internal thrust limit 2	100.0	
PC36	*DMD	Status display selection	0000h		PC36	*DMD	Status display selection	0000h	
PC37	VCO	Absolute position detection system	0		PC37	VCO	Analog speed command offset	The value differs depending on the servo amplifiers	
		Analog speed limit offset					Analog speed limit offset		
PC38	TPO	Analog torque command offset	0		PC38	TPO	Analog torque command offset	0	
		Analog torque limit offset					Analog torque limit offset		
PC39	MO1	Analog monitor 1 offset	0		PC39	MO1	Analog monitor 1 offset	0	
PC40	MO2	Analog monitor 2 offset	0		PC40	MO2	Analog monitor 2 offset	0	
PC41		For manufacturer setting	0		PC41		For manufacturer setting	0	
PC42			0		PC42			0	
PC43			0000h		PC43	ERZ	Error excessive alarm detection level	0000h	
PC44			0000h		PC44	*COP9	Function selection C-9	0000h	
PC45			0000h		PC45	*COPA	Function selection C-A	0000h	
PC46			0000h		PC46		For manufacturer setting	0	
PC47			0000h		PC47			0	
PC48			0000h		PC48			0	
PC49			0000h		PC49			0	
PC50			0000h		PC50			0000h	

MR-J3-_A_ parameters					MR-J4-_A_ parameters				
No.	Abbreviation	Parameter name	Initial value	Customer setting value	No.	Abbreviation	Parameter name	Initial value	Customer setting value
PD01	*DIA1	Input signal automatic ON selection 1	0000h		PD01	*DIA1	Input signal automatic on selection 1	0000h	
PD02		For manufacturer setting	0000h		PD02		For manufacturer setting	0000h	
PD03	*DI1	Input signal device selection 1 (CN1-15)	00020202h		PD03	*DI1L	Input device selection 1L	0202h	
					PD04	*DI1H	Input device selection 1H	0002h	
PD04	*DI2	Input signal device selection 2 (CN1-16)	00212100h		PD05	*DI2L	Input device selection 2L	2100h	
					PD06	*DI2H	Input device selection 2H	2021h	
PD05	*DI3	Input signal device selection 3 (CN1-17)	00070704h		PD07	*DI3L	Input device selection 3L	0704h	
					PD08	*DI3H	Input device selection 3H	0707h	
PD06	*DI4	Input signal device selection 4 (CN1-18)	00080805h		PD09	*DI4L	Input device selection 4L	0805h	
					PD10	*DI4H	Input device selection 4H	0808h	
PD07	*DI5	Input signal device selection 5 (CN1-19)	00030303h		PD11	*DI5L	Input device selection 5L	0303h	
					PD12	*DI5H	Input device selection 5H	3803h	
PD08	*DI6	Input signal device selection 6 (CN1-41)	00202006h		PD13	*DI6L	Input device selection 6L	2006h	
					PD14	*DI6H	Input device selection 6H	3920h	
PD09		For manufacturer setting	00000000h		PD15		For manufacturer setting	0000h	
					PD16			0000h	
PD10	*DI8	Input signal device selection 8 (CN1-43)	00000A0Ah		PD17	*DI8L	Input device selection 8L	0A0Ah	
					PD18	*DI8H	Input device selection 8H	0A00h	
PD11	*DI9	Input signal device selection 9 (CN1-44)	00000B0Bh		PD19	*DI9L	Input device selection 9L	0B0Bh	
					PD20	*DI9H	Input device selection 9H	0B00h	
PD12	*DI10	Input signal device selection 10 (CN1-45)	00232323h		PD21	*DI10L	Input device selection 10L	2323h	
					PD22	*DI10H	Input device selection 10H	2B23h	
PD13	*DO1	Output signal device selection 1 (CN1-22)	0004h		PD23	*DO1	Output device selection 1	0004h	
PD14	*DO2	Output signal device selection 2 (CN1-23)	000Ch		PD24	*DO2	Output device selection 2	000Ch	
PD15	*DO3	Output signal device selection 3 (CN1-24)	0004h		PD25	*DO3	Output device selection 3	0004h	
PD16	*DO4	Output signal device selection 4 (CN1-25)	0007h		PD26	*DO4	Output device selection 4	0007h	
PD17		For manufacturer setting	0003h		PD27		For manufacturer setting	0003h	
PD18	*DO6	Output signal device selection 6 (CN1-49)	0002h		PD28	*DO6	Output device selection 6	0002h	
PD19	*DIF	Input filter setting	0002h		PD29	*DIF	Input filter setting	0004h	
PD20	*DOP1	Function selection D-1	0000h		PD30	*DOP1	Function selection D-1	0000h	
PD21		For manufacturer setting	0000h		PD31	*DOP2	Function selection D-2	0000h	
PD22	*DOP3	Function selection D-3	0000h		PD32	*DOP3	Function selection D-3	0000h	
PD23		For manufacturer setting	0000h		PD33	*DOP4	Function selection D-4	0000h	
PD24	*DOP5	Function selection D-5	0000h		PD34	*DOP5	Function selection D-5	0000h	
PD25		For manufacturer setting	0000h		PD35		For manufacturer setting	0000h	
PD26			0000h		PD36			0000h	
PD27			0000h		PD37			0000h	
PD28			0000h		PD38			0	
PD29			0000h		PD39			0	
PD30			0000h		PD40			0	

3.5.3 Comparison of parameter details

POINT

- The symbols in the control mode column mean the following control modes.
  P: Position control mode
  S: Speed control mode
  T: Torque control mode
- Differences between the MR-J3 servo amplifier and the MR-J4 servo amplifier are described in "Name and function".
  "Same setting as MR-J3": The same setting as that for MR-J3 can be used.
  (Some functions and models are added for MR-J4.)
  "Same as MR-J3": The same setting as that for MR-J3 can be used.

MR-J3-_A_			MR-J4-_A_			Control mode
No.	Name and function	Initial value	No.	Name and function	Initial value	
PA01	Control mode Turn off the power and then on again after setting the parameter to validate the parameter value. Set the control mode and control loop composition of the servo amplifier. 0 0 0 x: Selection of control mode 0: Position control mode 1: Position control mode and speed control mode 2: Speed control mode 3: Speed control mode and torque control mode 4: Torque control mode 5: Torque control mode and position control mode	0000h	PA01	Operation mode _ _ _ x: Control mode selection Select a control mode. 0: Position control mode 1: Position control mode and speed control mode 2: Speed control mode 3: Speed control mode and torque control mode 4: Torque control mode 5: Torque control mode and position control mode	0h	P S T
				_ _ x _: Operation mode selection 0: Standard control mode Setting other than above will trigger [AL. 37 Parameter error].	0h	P S T
				_ x _ _: For manufacturer setting	0h	
				x _ _ _: For manufacturer setting	1h	

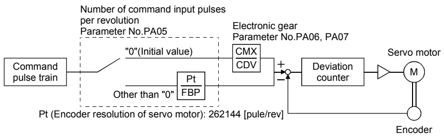
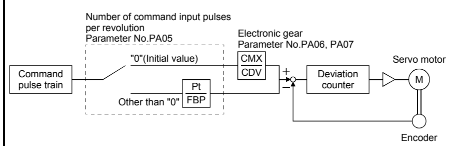
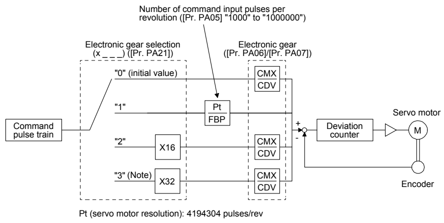
MR-J3-_A_			MR-J4-_A_			Control mode
No.	Name and function	Initial value	No.	Name and function	Initial value	
PA02	Regenerative option Turn off the power and then on again after setting the parameter to validate the parameter value. Incorrect setting may cause the regenerative option to burn. If the regenerative option selected is not for use with the servo amplifier, parameter error (AL.37) occurs. Set this parameter when using the regenerative option, brake unit, power regenerative converter, or power regenerative common converter. 0 0 x x: Selection of regenerative option 00: Regenerative option is not used ▪ For servo amplifier of 100 W, regenerative resistor is not used. ▪ For servo amplifier of 0.2 kW to 7 kW, built-in regenerative resistor is used. ▪ Supplied regenerative resistors or regenerative option is used with the servo amplifier of 11 kW to 22 kW. 01: FR-BU2-(H)/FR-RC-(H)/FR-CV-(H) 02: MR-RB032 03: MR-RB12 04: MR-RB32 05: MR-RB30 06: MR-RB50 (Cooling fanis required) 08: MR-RB31 09: MR-RB51 (Cooling fanis required) 80: MR-RB1H-4 81: MR-RB3M-4 (Cooling fanis required) 82: MR-RB3G-4 (Cooling fanis required) 83: MR-RB5G-4 (Cooling fanis required) 84: MR-RB34-4 (Cooling fanis required) 85: MR-RB54-4 (Cooling fanis required) FA: When the supplied regenerative resistor is cooled by the cooling fan to increase the ability with the servo amplifier of 11 kW to 22 kW.	0000h	PA02	Same setting as MR-J3 Regenerative option _ _ x x: Select the regenerative option. Incorrect setting may cause the regenerative option to burn. If a selected regenerative option is not for use with the servo amplifier, [AL. 37 Parameter error] occurs. 00: Regenerative option is not used. ▪ For the servo amplifier of 100 W, a regenerative resistor is not used. ▪ For the servo amplifier of 0.2 kW to 7 kW, the built-in regenerative resistor is used. ▪ The supplied regenerative resistor or a regenerative option is used with the servo amplifier of 11 kW to 22 kW. 01: FR-RC-(H)/FR-CV-(H)/FR-BU2-(H) When you use FR-RC-(H) or FR-CV-(H), select "Mode 2 (_ _ _ 1)" of "Undervoltage alarm detection mode selection" in [Pr. PC27]. 02: MR-RB032 03: MR-RB12 04: MR-RB32 05: MR-RB30 06: MR-RB50 (Cooling fan is required.) 08: MR-RB31 09: MR-RB51 (Cooling fan is required.) 0B: MR-RB3N 0C: MR-RB5N (Cooling fan is required.) 80: MR-RB1H-4 81: MR-RB3M-4 (Cooling fan is required.) 82: MR-RB3G-4 (Cooling fan is required.) 83: MR-RB5G-4 (Cooling fan is required.) 84: MR-RB34-4 (Cooling fan is required.) 85: MR-RB54-4 (Cooling fan is required.) 91: MR-RB3U-4 (Cooling fan is required.) 92: MR-RB5U-4 (Cooling fan is required.) FA: When the supplied regenerative resistor or a regenerative option used with the servo amplifier of 11 kW to 22 kW is cooled by a cooling fan to increase regenerative ability.	00h	P S T
				_ x _ _: For manufacturer setting	0h	
				x _ _ _: For manufacturer setting	0h	

MR-J3-_A_ No.	MR-J3-_A_ Name and function	MR-J3-_A_ Initial value	MR-J4-_A_ No.	MR-J4-_A_ Name and function	MR-J4-_A_ Initial value	Control mode
PA03	Absolute position detection system Turn off the power and then on again after setting the parameter to validate the parameter value. Set this parameter when using the absolute position detection system in the position control mode. 0 0 0 x: Selection of absolute position detection system 0: Used in incremental system 1: Used in absolute position detection system ABS transfer by DI0 2: Used in absolute position detection system ABS transfer by communication	0000h	PA03	Same setting as MR-J3 Absolute position detection system _ _ _ x: Absolute position detection system selection Set this digit when using the absolute position detection system in the position control mode. 0: Disabled (incremental system) 1: Enabled (absolute position detection system by DIO) 2: Enabled (absolute position detection system by communication) (available for the software version A3 or later)	0h	P
				_ _ x _: For manufacturer setting	0h	
				_ x _ _: For manufacturer setting	0h	
				x _ _ _: For manufacturer setting	0h	
PA04	Function selection A-1 Turn off the power and then on again after setting the parameter to validate the parameter value. Set this parameter when assigning the electromagnetic brake to the CN1-23 pin. 0 0 0 x: CN1-23 pin function selection 0: Output device assigned with parameter No.PD14 1: Electromagnetic brake interlock (MBR)	0000h	PD24	Output device selection 2 _ _ x x: Device selection Any output device can be assigned to the CN1-23 pin. When "Enabled (absolute position detection system by DIO) (_ _ _ 1)" is selected in [Pr. PA03], the CN1-23 pin will become ABSB1 (ABS send data bit 1) only during ABS transfer mode. Refer to table 2.1 in [Pr. PD23] for settings.	0Ch	P S T
				_ x _ _: For manufacturer setting	0h	
				x _ _ _: For manufacturer setting	0h	

Table 2.1 Selectable output devices

Setting value	Output device (Note 1)		
	P	S	T
_ _ 00	Always off	Always off	Always off
_ _ 02	RD	RD	RD
_ _ 03	ALM	ALM	ALM
_ _ 04	INP	SA	Always off
_ _ 05	MBR	MBR	MBR
_ _ 06	DB	DB	DB
_ _ 07	TLC	TLC	VLC
_ _ 08	WNG	WNG	WNG
_ _ 09	BWNG	BWNG	BWNG
_ _ 0A	Always off	SA	Always off
_ _ 0B	Always off	Always off	VLC
_ _ 0C	ZSP	ZSP	ZSP
_ _ 0D	MTTR	MTTR	MTTR
_ _ 0F	CDPS	Always off	Always off
_ _ 10	CLDS	Always off	Always off
_ _ 11	ABSV	Always off	Always off

Note1. P: Position control mode
S: Speed control mode
T: Torque control mode

MR-J3-_A_			MR-J4-_A_			Control mode
No.	Name and function	Initial value	No.	Name and function	Initial value	
PA05	Number of command input pulses per revolution Turn off the power and then on again after setting the parameter to validate the parameter value. When "0" (initial value) is set in parameter No.PA05, the electronic gear (parameter No.PA06, PA07) is made valid. When the setting is other than "0", that value is used as the command input pulses necessary to rotate the servo motor one turn. At this time, the electronic gear is made invalid.  Parameter No.PA05 setting / Description: 0: Electronic gear (parameter No.PA06, PA07) is made valid. 1000 to 50000: Number of command input pulses necessary to rotate the servo motor one turn [pulse]	0	PA05	Number of command input pulses per revolution The servo motor rotates based on set command input pulses. To enable the parameter value, set "Electronic gear selection" to "Number of command input pulses per revolution (1 _ _ _)" of in [Pr. PA21]. Setting range: 1000 to 1000000	10000	P
PA06 PA07	Electronic gear numerator (command pulse multiplying factor numerator) Electronic gear denominator (command pulse multiplying factor denominator) Incorrect setting can lead to unexpected fast rotation, causing injury. The electronic gear setting range is $\frac{1}{10} < \frac{CMX}{CDV} < 2000$ If the set value is outside this range, noise may be generated during acceleration/ deceleration or operation may not be performed at the preset speed and/or acceleration/deceleration time constants. Always set the electronic gear with servo off state to prevent unexpected operation due to improper setting. Concept of electronic gear The machine can be moved at any multiplication factor to input pulses.  $\frac{CMX}{CDV} = \frac{\text{Parameter No.PA06}}{\text{Parameter No.PA07}}$	1 1	PA06	Electronic gear numerator (command pulse multiplication numerator) Set the numerator of the electronic gear. To enable the parameter, select "Electronic gear (0 _ _ _)" or "J3 electronic gear setting value compatibility mode (2 _ _ _)" of "Electronic gear selection" in [Pr. PA21]. The following shows a standard of the setting range of the electronic gear. $\frac{1}{10} < \frac{CMX}{CDV} < 4000$ If the set value is outside this range, noise may be generated during acceleration/deceleration or operation may not be performed at the preset speed and/or acceleration/deceleration time constants.  Note This parameter is supported with software version B4 or later. Always set the electronic gear with servo-off state to prevent unexpected operation due to improper setting. Setting range: 1 to 16777215	1	P
			PA07	Electronic gear denominator (command pulse multiplication denominator) Set the denominator of the electronic gear. To enable the parameter, select "Electronic gear (0 _ _ _)" or "J3 electronic gear setting value compatibility mode (2 _ _ _)" of "Electronic gear selection" in [Pr. PA21]. Setting range: 1 to 16777215	1	P

MR-J3-_A_ No.	MR-J3-_A_ Name and function	MR-J3-_A_ Initial value	MR-J4-_A_ No.	MR-J4-_A_ Name and function	MR-J4-_A_ Initial value	Control mode
PA08	Auto tuning mode	0001h	PA08	Same setting as MR-J3 Auto tuning mode _ _ _ x: Gain adjustment mode selection	1h	P
PA09	Auto tuning response	12				S
				_ _ x _: For manufacturer setting	0h	
				_ x _ _: For manufacturer setting	0h	
				x _ _ _: For manufacturer setting	0h	
			PA09	Auto tuning response	16	P S

MR-J3-_A_ PA08 / PA09

Auto tuning mode

Auto tuning response

Make gain adjustment using auto tuning.

Auto tuning mode [Pr. PA08]

Select the gain adjustment mode.

0 0 0 x:

Gain adjustment mode setting

Setting	Gain adjustment mode	Automatically set parameter No. (Note)
0	Interpolation mode	PB06 · PB08 · PB09 · PB10
1	Auto tuning mode 1	PB06 · PB07 · PB08 · PB09 · PB10
2	Auto tuning mode 2	PB07 · PB08 · PB09 · PB10
3	Manual mode	

Note The parameters have the following names.

Parameter No.	Name
PB06	Ratio of load inertia moment to servo motor inertia moment
PB07	Model loop gain
PB08	Position loop gain
PB09	Speed loop gain
PB10	Speed integral compensation

Auto tuning response [Pr. PA09]

If the machine hunts or generates large gear sound, decrease the set value. To improve performance, e.g. shorten the settling time, increase the set value.

Setting	Response	Guideline for machine resonance frequency [Hz]
1	Low response	10.0
2		11.3
3		12.7
4		14.3
5		16.1
6		18.1
7		20.4
8		23.0
9		25.9
10		29.2
11		32.9
12		37.0
13		41.7
14		47.0
15		52.9
16	Middle response	59.6

Setting	Response	Guideline for machine resonance frequency [Hz]
17	Middle response	67.1
18		75.6
19		85.2
20		95.9
21		108.0
22		121.7
23		137.1
24		154.4
25		173.9
26		195.9
27		220.6
28		248.5
29		279.9
30		315.3
31		355.1
32	High response	400.0

MR-J4-_A_ PA08

Same setting as MR-J3

Auto tuning mode

_ _ _ x:

Gain adjustment mode selection

Select the gain adjustment mode.

0: 2 gain adjustment mode 1 (interpolation mode)

1: Auto tuning mode 1

2: Auto tuning mode 2

3: Manual mode

4: 2 gain adjustment mode 2

Refer to table 2.2 for details.

Table2.2 Gain adjustment mode selection

Setting value	Gain adjustment mode	Automatically adjusted parameter
_ _ _ 0	2 gain adjustment mode 1 (interpolation mode)	[Pr. PB06 Load to motor inertia ratio] [Pr. PB08 Position loop gain] [Pr. PB09 Speed loop gain] [Pr. PB10 Speed integral compensation]
_ _ _ 1	Auto tuning mode 1	[Pr. PB06 Load to motor inertia ratio] [Pr. PB07 Model loop gain] [Pr. PB08 Position loop gain] [Pr. PB09 Speed loop gain] [Pr. PB10 Speed integral compensation]
_ _ _ 2	Auto tuning mode 2	[Pr. PB07 Model loop gain] [Pr. PB08 Position loop gain] [Pr. PB09 Speed loop gain] [Pr. PB10 Speed integral compensation]
_ _ _ 3	Manual mode	
_ _ _ 4	2 gain adjustment mode 2	[Pr. PB08 Position loop gain] [Pr. PB09 Speed loop gain] [Pr. PB10 Speed integral compensation]

_ _ x _:
For manufacturer setting (Initial value 0h)

_ x _ _:
For manufacturer setting (Initial value 0h)

x _ _ _:
For manufacturer setting (Initial value 0h)

MR-J4-_A_ PA09

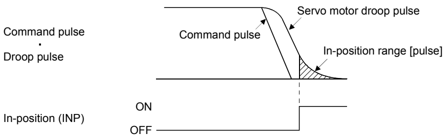
Auto tuning response

Set a response of the auto tuning.

Setting value	Response	Machine characteristic: Guideline for machine resonance frequency [Hz]
1	Low response	2.7
2		3.6
3		4.9
4		6.6
5		10.0
6		11.3
7		12.7
8		14.3
9		16.1
10		18.1
11		20.4
12		23.0
13		25.9
14		29.2
15		32.9
16		37.0
17		41.7
18		47.0
19	Middle response	52.9
20		59.6

Setting value	Response	Machine characteristic: Guideline for machine resonance frequency [Hz]
21	Middle response	67.1
22		75.6
23		85.2
24		95.9
25		108.0
26		121.7
27		137.1
28		154.4
29		173.9
30		195.9
31		220.6
32		248.5
33		279.9
34		315.3
35		355.1
36		400.0
37		446.6
38		501.2
39	High response	571.5
40		642.7

Setting range: 1 to 40

MR-J3-_A_			MR-J4-_A_			Control mode
No.	Name and function	Initial value	No.	Name and function	Initial value	
PA10	In-position range Set the range, where In-position (INP) is output, in the command pulse unit before calculation of the electronic gear. With the setting of [Pr. PC24], the range can be changed to the encoder output pulse unit.  	100	PA10	In-position range Set an in-position range per command pulse. To change it to the servo motor encoder pulse unit, set [Pr. PC24]. Setting range: 0 to 65535	100	P
PA11 PA12	Forward rotation torque limit Reverse rotation torque limit The torque generated by the servo motor can be limited. When torque is output with the analog monitor output, the smaller torque of the values in the [Pr. PA11] (forward rotation torque limit) and [Pr. PA12] (reverse rotation torque limit) is the maximum output voltage (8V). (1) Forward rotation torque limit [Pr. PA11] Set this parameter on the assumption that the maximum torque is 100 [%]. Set this parameter when limiting the torque of the servo motor in the CCW driving mode or CW regeneration mode. Set this parameter to "0.0" to generate no torque. (2) Reverse rotation torque limit [Pr. PA12] Set this parameter on the assumption that the maximum torque is 100 [%]. Set this parameter when limiting the torque of the servo motor in the CW driving mode or CCW regeneration mode. Set this parameter to "0.0" to generate no torque.	100.0 100.0	PA11	Same as MR-J3 Forward rotation torque limit You can limit the torque generated by the servo motor. When the torque is outputted with the analog monitor output, the setting of [Pr. PA11 Forward rotation torque limit] or [Pr. PA12 Reverse rotation torque limit], whichever is larger, will be the maximum output voltage (8 V). Set the parameter on the assumption that the maximum torque is 100.0 [%]. The parameter is for limiting the torque of the servo motor in the CCW power running or CW regeneration. No torque is generated when this parameter is set to "0.0". Setting range: 0.0 to 100.0	100.0	P S T
			PA12	Reverse rotation torque limit You can limit the torque generated by the servo motor. When the torque is outputted with the analog monitor output, the setting of [Pr. PA11 Forward rotation torque limit] or [Pr. PA12 Reverse rotation torque limit], whichever is larger, will be the maximum output voltage (8 V). Set the parameter on the assumption that the maximum torque is 100.0 [%]. The parameter is for limiting the torque of the servo motor in the CW power running or CCW regeneration. No torque is generated when this parameter is set to "0.0". Setting range: 0.0 to 100.0	100.0	P S T

MR-J3-_A_			MR-J4-_A_			Control mode
No.	Name and function	Initial value	No.	Name and function	Initial value	
PA13	Command pulse input form Turn off the power and then on again after setting the parameter to validate the parameter value. Select the input form of the pulse train input signal. Command pulses may be input in any of three different forms, for which positive or negative logic can be chosen. Arrow ↑ or ↓ in the table indicates the timing of importing a pulse train. A- and B-phase pulse trains are imported after they have been multiplied by 4. Selection of command pulse input form (see table below)	0000h	PA13	Command pulse input form _ _ _ x: Command input pulse train form selection 0: Forward/reverse rotation pulse train 1: Signed pulse train 2: A-phase/B-phase pulse train (The servo amplifier imports input pulses after multiplying by four.) Refer to table 2.3 for settings.	0h	P
				_ _ x _: 0: Positive logic 1: Negative logic Choose the right parameter to match the logic of the command pulse train received from a connected controller. Refer to Servo Amplifier Instruction Manual of MELSEC iQ-R series/MELSEC-Q series/MELSEC-L series/MELSEC-F series. Refer to table 2.3 for settings.	0h	P
				_ x _ _: Command input pulse train filter selection Selecting proper filter enables to enhance noise tolerance. 0: Command input pulse train is 4 Mpulses/s or less. 1: Command input pulse train is 1 Mpulse/s or less. 2: Command input pulse train is 500 kpulses/s or less. 3: Command input pulse train is 200 kpulses/s or less (available for the software version A5 or later) 1 Mpulse/s or lower commands are supported by "1". When inputting commands over 1 Mpulse/s and 4 Mpulses/s or lower, set "0". Incorrect setting may cause the following malfunctions. ・Setting a value higher than actual command will lower noise tolerance. ・Setting a value lower than actual command will cause a position mismatch.	1h	P
				x _ _ _: For manufacturer setting	0h	
				Table 2.3 Command input pulse train form selection (see table below) Arrows in the table indicate the timing of importing pulse trains. A-phase and B-phase pulse trains are imported after they have been multiplied by 4.		

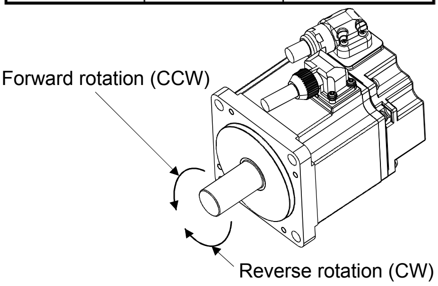
MR-J3-_A_: Selection of command pulse input form

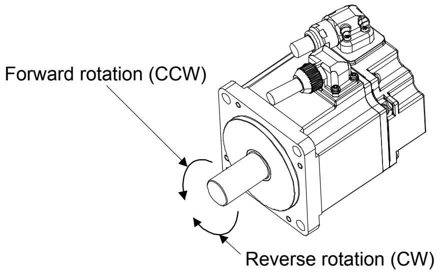
Setting		Pulse train form	Forward rotation command	Reverse rotation command
0010h	Negative logic	Forward rotation pulse train Reverse rotation pulse train	PP NP	
0011h	Negative logic	Signed pulse train	PP NP L	H
0012h	Negative logic	A-phase pulse train B-phase pulse train	PP NP	
0000h	Positive logic	Forward rotation pulse train Reverse rotation pulse train	PP NP	
0001h	Positive logic	Signed pulse train	PP NP H	L
0002h	Positive logic	A-phase pulse train B-phase pulse train	PP NP	

MR-J4-_A_: Table 2.3 Command input pulse train form selection

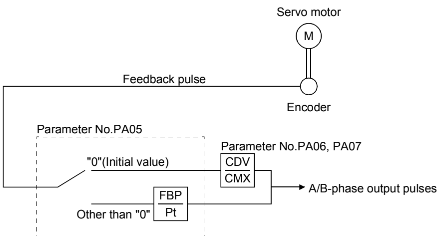
Setting value		Pulse train form	Forward rotation (positive direction) command	Reverse rotation (negative direction) command
_ _ 10h	Negative logic	Forward rotation pulse train (positive direction pulse train) Reverse rotation pulse train (negative direction pulse train)	PP NP	
_ _ 11h	Negative logic	Signed pulse train	PP NP L	H
_ _ 12h	Negative logic	A-phase pulse train B-phase pulse train	PP NP	
_ _ 00h	Positive logic	Forward rotation pulse train (positive direction pulse train) Reverse rotation pulse train (negative direction pulse train)	PP NP	
_ _ 01h	Positive logic	Signed pulse train	PP NP H	L
_ _ 02h	Positive logic	A-phase pulse train B-phase pulse train	PP NP	

<table>
<tr><th colspan="3">MR-J3-_A_</th><th colspan="3">MR-J4-_A_</th><th rowspan="2">Control mode</th></tr>
<tr><th>No.</th><th>Name and function</th><th>Initial value</th><th>No.</th><th>Name and function</th><th>Initial value</th></tr>
<tr>
<td>PA14</td>
<td>Rotation direction selection
Turn off the power and then on again after setting the parameter to validate the parameter value.

Select servo motor rotation direction relative to the input pulse train.
<table>
<tr><th rowspan="2">Parameter No.PA14 setting</th><th colspan="2">Servo motor rotation direction</th></tr>
<tr><th>When forward rotation pulse is input</th><th>When reverse rotation pulse is input</th></tr>
<tr><td>0</td><td>CCW</td><td>CW</td></tr>
<tr><td>1</td><td>CW</td><td>CCW</td></tr>
</table>


</td>
<td>0</td>
<td>PA14</td>
<td>Same as MR-J3
Rotation direction selection/travel direction selection
Select a servo motor rotation direction relative to the input pulse train.
<table>
<tr><th rowspan="2">Setting value</th><th colspan="2">Servo motor rotation direction/ linear servo motor travel direction</th></tr>
<tr><th>When forward rotation pulse is input</th><th>When reverse rotation pulse is input</th></tr>
<tr><td>0</td><td>CCW or positive direction</td><td>CW or negative direction</td></tr>
<tr><td>1</td><td>CW or negative direction</td><td>CCW or positive direction</td></tr>
</table>
The following shows the servo motor rotation directions.


Setting range: 0, 1</td>
<td>0</td>
<td>P</td>
</tr>
</table>

MR-J3-_A_			MR-J4-_A_			Control mode
No.	Name and function	Initial value	No.	Name and function	Initial value	
PA15	Encoder output pulse Turn off the power and then on again after setting the parameter to validate the parameter value. Used to set the encoder pulses (A-phase, B-phase) output by the servo amplifier. You can use parameter [Pr. PC19] to choose the output pulse setting or output division ratio setting. The number of A/B-phase pulses actually output is 1/4 times greater than the preset number of pulses. The maximum output frequency is 4.6Mpps (after multiplication by 4). Use this parameter within this range. (1) For output pulse designation Set "_ _ 0 _" (initial value) in parameter [Pr. PC19]. Set the number of pulses per servo motor revolution. Output pulse = set value [pulses/rev] For instance, set "5600" to parameter No.PA15, the actually output A/B-phase pulses are as indicated below. A/B-phase output pulses $= \frac{5600}{4} = 1400$ [pulse] (2) For output division ratio setting Set "0 0 1 0" in parameter [Pr. PC19] The number of pulses per servo motor revolution is divided by the set value. Output pulse $= \frac{\text{Resolution per servo motor revolution}}{\text{Set value}}$ [pulses/rev] For instance, set "8" to [Pr. PA15], the actually A/B-phase pulses output are as indicated below. A/B-phase output pulses $= \frac{262144}{8} \cdot \frac{1}{4} = 8192$ [pulse] (3) When outputting pulse train similar to command pulses Set [Pr. PC19] to "_ _ 2 _". The feedback pulses from the servo motor encoder are processed and output as shown below. The feedback pulses can be output in the same pulse unit as the command pulses. 	4000	PA15	Set the encoder output pulses from the servo amplifier by using the number of output pulses per revolution, dividing ratio, or electronic gear ratio. (after multiplication by 4) To set a numerator of the electronic gear, select "A-phase/B-phase pulse electronic gear setting (_ _ 3 _)" of "Encoder output pulse setting selection" in [Pr. PC19]. The maximum output frequency is 4.6 Mpps (after multiplication by 4). Use this parameter within this range. Setting range: 1 to 4194304	4000	P S T
			PA16	Set a denominator of the electronic gear for the A/B-phase pulse output. To set a denominator of the electronic gear, select "A-phase/B-phase pulse electronic gear setting (_ _ 3 _)" of "Encoder output pulse setting selection" in [Pr. PC19]. Setting range: 1 to 4194304	1	P S T

MR-J3-_A_ No.	MR-J3-_A_ Name and function	MR-J3-_A_ Initial value	MR-J4-_A_ No.	MR-J4-_A_ Name and function	MR-J4-_A_ Initial value	Control mode
PA19	Parameter write inhibit (see table below)	000Bh	PA19	Parameter writing inhibit Select a reference range and writing range of the parameter. Refer to table 2.4 for settings.	00AAh	P S T
PB01	Adaptive tuning mode (adaptive filter Ⅱ) (see below)	0000h	PB01	Same as MR-J3 (see below)	0000h	P S T

MR-J3-_A_ PA19: Parameter write inhibit

Parameter No.PA19 setting	Setting operation	Basic setting parameters No.PA_ _	Gain/Filter parameters No.PB_ _	Extension setting parameters No.PC_ _	I/O setting parameters No.PD_ _
0000h	Reference	○			
	Writing	○			
000Bh (initial value)	Reference	○	○	○	
	Writing	○	○	○	
000Ch	Reference	○	○	○	○
	Writing	○	○	○	○
100Bh	Reference	○			
	Writing	Parameter No. PA19 only			
100Ch	Reference	○	○	○	○
	Writing	Parameter No. PA19 only			

○: Enabled

MR-J4-_A_ PA19: Parameter writing inhibit

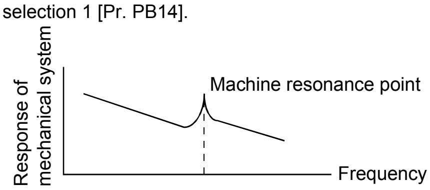
Table 2.4 [Pr. PA19] setting value and reading/writing range

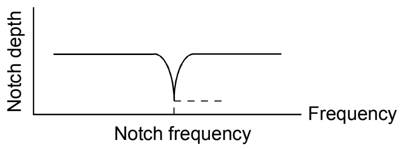
PA19	Setting operation	PA	PB	PC	PD	PE	PF	PL
Other than below	Reading	○						
	Writing	○						
000Ah	Reading	Only 19						
	Writing	Only 19						
000Bh	Reading	○	○	○				
	Writing	○	○	○				
000Ch	Reading	○	○	○	○			
	Writing	○	○	○	○			
00AAh (initial value)	Reading	○	○	○	○	○	○	
	Writing	○	○	○	○	○	○	
00ABh	Reading	○	○	○	○	○	○	○
	Writing	○	○	○	○	○	○	○
100Bh	Reading	○						
	Writing	Only 19						
100Ch	Reading	○	○	○	○			
	Writing	Only 19						
10AAh	Reading	○	○	○	○	○	○	
	Writing	Only 19						
10ABh	Reading	○	○	○	○	○	○	○
	Writing	Only 19						

○: Enabled

MR-J3-_A_ PB01: Adaptive tuning mode (adaptive filter Ⅱ)

Select the setting method for filter tuning. Setting this parameter to "_ _ _ 1" (filter tuning mode) automatically changes the machine resonance suppression filter 1 [Pr. PB13], and notch shape selection 1 [Pr. PB14].





0 0 0 x:

Adaptive tuning mode selection

Setting	Adaptive tuning mode	Automatically set parameter
0	Filter OFF	(Note)
1	Filter tuning mode	Parameter No.PB13 Parameter No.PB14
2	Manual mode	

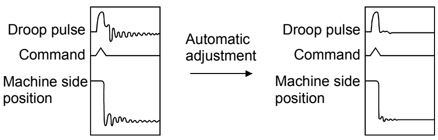
Note Parameter No.PB13 and PB14 are fixed to the initial values.

When this parameter is set to "_ _ _ 1" , the tuning is completed after positioning operation is done the predetermined number or times for the predetermined period of time, and the setting changes to "_ _ _ 2" . When the adaptive tuning is not necessary, the setting changes to "_ _ _ 0". When this parameter is set to "_ _ _ 0", the initial values are set to the machine resonance suppression filter 1 and notch shape selection 1. However, this does not occur when the servo off.

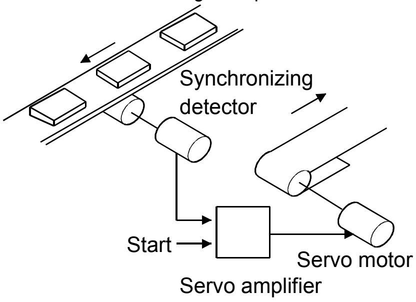
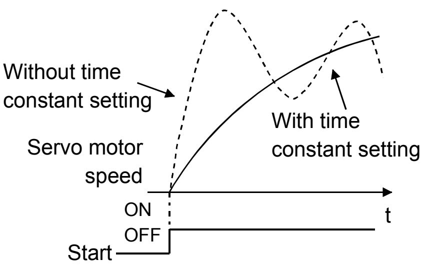
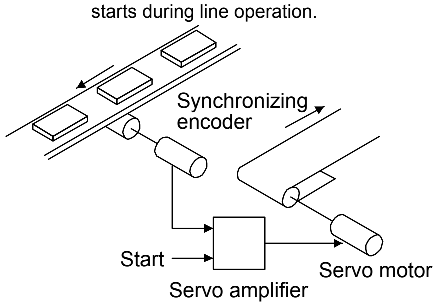
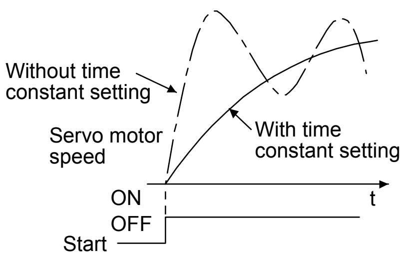
MR-J4-_A_ PB01: Same as MR-J3

Adaptive tuning mode (adaptive filter II)

Digit	Name and function	Initial value	Control mode
_ _ _ x:	Filter tuning mode selection Set the adaptive tuning. Select the adjustment mode of the machine resonance suppression filter 1. 0: Disabled 1: Automatic setting (Do not use this in the torque control mode.) 2: Manual setting		
_ _ x _:	For manufacturer setting	0h	
_ x _ _:	For manufacturer setting	0h	
x _ _ _:	For manufacturer setting	0h	

<table>
<tr><th colspan="3">MR-J3-_A_</th><th colspan="3">MR-J4-_A_</th><th rowspan="2">Control mode</th></tr>
<tr><th>No.</th><th>Name and function</th><th>Initial value</th><th>No.</th><th>Name and function</th><th>Initial value</th></tr>
<tr>
<td rowspan="4">PB02</td>
<td rowspan="4">Vibration suppression control tuning mode (advanced vibration suppression control)
The vibration suppression is valid when the [Pr. PA08] (auto tuning mode) setting is "_ _ _ 2" or "_ _ _ 3".
When [Pr. PA08] is "_ _ _ 1", vibration suppression is always invalid.
Select the setting method for vibration suppression control tuning. Setting this parameter to "_ _ _ 1" vibration suppression control tuning mode) automatically changes the vibration suppression control - vibration frequency([Pr. PB19]) and vibration suppression control - resonance frequency([Pr. PB20]) after positioning is done the predetermined number of times.


0 0 0 x:
Vibration suppression control tuning mode
<table>
<tr><th>Setting</th><th>Vibration suppression control tuning mode</th><th>Automatically set parameter</th></tr>
<tr><td>0</td><td>Vibration suppression control OFF</td><td>(Note)</td></tr>
<tr><td>1</td><td>Vibration suppression control tuning mode (Advanced vibration suppression control)</td><td>Parameter No.PB19
Parameter No.PB20</td></tr>
<tr><td>2</td><td>Manual mode</td><td></td></tr>
</table>
Note [Pr. PB19] and [Pr. PB20] are fixed to the initial values.
When this parameter is set to "_ _ _1", the tuning is completed after positioning operation is done the predetermined number or times for the predetermined period of time, and the setting changes to "_ _ _2". When the vibration suppression control tuning is not necessary, the setting changes to "_ _ _0". When this parameter is set to "_ _ _0", the initial values are set to the vibration suppression control - vibration frequency and vibration suppression control - resonance frequency. However, this does not occur when the servo off.</td>
<td rowspan="4">0000h</td>
<td rowspan="4">PB02</td>
<td>Vibration suppression control tuning mode (advanced vibration suppression control II)
_ _ _ x:
Vibration suppression control 1 tuning mode selection
Select the tuning mode of the vibration suppression control 1.
0: Disabled
1: Automatic setting
2: Manual setting</td>
<td rowspan="2">0000h</td>
<td rowspan="2">P</td>
</tr>
<tr><td>_ _ x _:
Vibration suppression control 2 tuning mode selection
Select the tuning mode of the vibration suppression control 2. To enable the setting of this digit, set "Vibration suppression mode selection" to "3 inertia mode (_ _ _ 1)" in [Pr. PA24].
0: Disabled
1: Automatic setting
2: Manual setting</td></tr>
<tr><td>_ x _ _:
For manufacturer setting</td><td>0h</td><td></td></tr>
<tr><td>x _ _ _:
For manufacturer setting</td><td>0h</td><td></td></tr>
</table>

MR-J3-_A_			MR-J4-_A_			Control mode
No.	Name and function	Initial value	No.	Name and function	Initial value	
PB03	Position command acceleration/deceleration time constant (position smoothing) Used to set the time constant of a low-pass filter in response to the position command. You can use [Pr. PB25] to choose the primary delay or linear acceleration/deceleration control system. When you choose linear acceleration/deceleration, the setting range is 0 to 10ms. Setting of longer than 10ms is recognized as 10ms. POINT ・When you have chosen linear acceleration/deceleration, do not select control selection (parameter No.PA01) and restart after instantaneous power failure (parameter No.PC22). Doing so will cause the servo motor to make a sudden stop at the time of position control switching or restart. (Example) When a command is given from a synchronizing detector, synchronous operation can be started smoothly if started during line operation.  	0	PB03	Same as MR-J3 Position command acceleration/ deceleration time constant (position smoothing) Set the constant of a primary delay to the position command. You can select a control method from "Primary delay" or "Linear acceleration/deceleration" in [Pr. PB25 Function selection B-1]. When the linear acceleration/deceleration is selected, the setting range is 0 ms to 10 ms. Setting of longer than 10 ms will be recognized as 10 ms. When the linear acceleration/deceleration is selected, do not set the "Control mode selection" ([Pr. PA01]) to the setting other than "_ _ _ 0". Doing so will cause the servo motor to make a sudden stop at the time of position control mode switching. (Example) When a command is given from a synchronizing encoder, synchronous operation will start smoothly even if it starts during line operation.   Setting range: 0 to 65535	0	P
PB04	Feed forward gain Set the feed forward gain. When the setting is 100%, the droop pulses during operation at constant speed are nearly zero. However, sudden acceleration/deceleration will increase the overshoot. As a guideline, when the feed forward gain setting is 100%, set 1s or longer as the acceleration time constant up to the rated speed.	0	PB04	Same setting as MR-J3 Feed forward gain Set the feed forward gain. When the setting is 100%, the droop pulses during operation at constant speed are nearly zero. When the super trace control is enabled, constant speed and uniform acceleration/deceleration droop pulses will be almost 0. However, sudden acceleration/deceleration will increase the overshoot. As a guideline, when the feed forward gain setting is 100%, set 1 s or more as the acceleration time constant up to the rated speed. Setting range: 0 to 100	0	P

<table>
<tr><th colspan="3">MR-J3-_A_</th><th colspan="3">MR-J4-_A_</th><th rowspan="2">Control mode</th></tr>
<tr><th>No.</th><th>Name and function</th><th>Initial value</th><th>No.</th><th>Name and function</th><th>Initial value</th></tr>
<tr><td>PB06</td><td>Ratio of load inertia moment to servo motor inertia moment
Used to set the ratio of the load inertia moment to the servo motor shaft inertia moment. When auto tuning mode 1 and interpolation mode is selected, the result of auto tuning is automatically used.
(Refer to section 7.1.1)
In this case, it varies between 0 and 100.0.</td><td>7.0</td><td>PB06</td><td>Load to motor inertia ratio/load to motor mass ratio
Set the load to motor inertia ratio or load to motor mass ratio.
The setting of the parameter will be the automatic setting or manual setting depending on the [Pr. PA08] setting. Refer to the following table for details.
When the parameter is automatic setting, the value will vary between 0.00 and 100.00.
<table>
<tr><th>Pr. PA08</th><th>This parameter</th></tr>
<tr><td>_ _ _ 0 (2 gain adjustment mode 1 (interpolation mode))</td><td rowspan="2">Automatic setting</td></tr>
<tr><td>_ _ _ 1: (Auto tuning mode 1)</td></tr>
<tr><td>_ _ _ 2: (Auto tuning mode 2)</td><td rowspan="3">Manual setting</td></tr>
<tr><td>_ _ _ 3 (Manual mode)</td></tr>
<tr><td>_ _ _ 4: (2 gain adjustment mode 2)</td></tr>
</table>
Setting range: 0.00 to 300.00</td><td>7.00</td><td>P
S</td></tr>
<tr><td>PB07</td><td>Model loop gain
Set the response gain up to the target position.
Increase the gain to improve track ability in response to the command.
When auto turning mode 1 ・ 2 is selected, the result of auto turning is automatically used.</td><td>24</td><td>PB07</td><td>Same setting as MR-J3
Model loop gain
Set the response gain up to the target position.
Increasing the setting value will also increase the response level to the position command but will be liable to generate vibration and noise.
The setting of the parameter will be the automatic setting or manual setting depending on the [Pr. PA08] setting.
<table>
<tr><th>Pr. PA08</th><th>This parameter</th></tr>
<tr><td>_ _ _ 0 (2 gain adjustment mode 1 (interpolation mode))</td><td>Manual setting</td></tr>
<tr><td>_ _ _ 1: (Auto tuning mode 1)</td><td rowspan="2">Automatic setting</td></tr>
<tr><td>_ _ _ 2: (Auto tuning mode 2)</td></tr>
<tr><td>_ _ _ 3 (Manual mode)</td><td rowspan="2">Manual setting</td></tr>
<tr><td>_ _ _ 4: (2 gain adjustment mode 2)</td></tr>
</table>
Setting range: 1.0 to 2000.0</td><td>15.0</td><td>P</td></tr>
<tr><td>PB08</td><td>Position loop gain
Used to set the gain of the position loop.
Set this parameter to increase the position response to level load disturbance. Higher setting increases the response level but is liable to generate vibration and/or noise.
When auto tuning mode 1 ・ 2 and interpolation mode is selected, the result of auto tuning is automatically used.</td><td>37</td><td>PB08</td><td>Same setting as MR-J3
Position loop gain
Set the gain of the position loop.
Set this parameter to increase the position response to level load disturbance.
Increasing the setting value will also increase the response level to the load disturbance but will be liable to generate vibration and noise.
The setting of the parameter will be the automatic setting or manual setting depending on the [Pr. PA08] setting. Refer to the following table for details.
<table>
<tr><th>Pr. PA08</th><th>This parameter</th></tr>
<tr><td>_ _ _ 0 (2 gain adjustment mode 1 (interpolation mode))</td><td rowspan="3">Automatic setting</td></tr>
<tr><td>_ _ _ 1: (Auto tuning mode 1)</td></tr>
<tr><td>_ _ _ 2: (Auto tuning mode 2)</td></tr>
<tr><td>_ _ _ 3 (Manual mode)</td><td>Manual setting</td></tr>
<tr><td>_ _ _ 4: (2 gain adjustment mode 2)</td><td>Automatic setting</td></tr>
</table>
Setting range: 1.0 to 2000.0</td><td>37.0</td><td>P</td></tr>
<tr><td>PB09</td><td>Speed loop gain
Used to set the gain of the speed loop.
Set this parameter when vibration occurs on machines of low rigidity or large backlash.
Higher setting increases the response level but is liable to generate vibration and/or noise.
When auto tuning mode 1 ・ 2, manual mode and interpolation mode is selected, the result of auto tuning is automatically used.
Note The setting range of 50000 applies to the servo amplifier whose software version is A3 or later. The setting range of the servo amplifier whose software version is older than A3 is 20 to 20000. When the software version of MR Configurator is A3 or earlier, 20001 or more cannot be set. Use the display/operation section of the servo amplifier to set 20001 or more.</td><td>823</td><td>PB09</td><td>Same setting as MR-J3
Speed loop gain
Set the gain of the speed loop.
Set this parameter when vibration occurs on machines of low rigidity or large backlash.
Increasing the setting value will also increase the response level but will be liable to generate vibration and noise.
The setting of the parameter will be the automatic setting or manual setting depending on the [Pr. PA08] setting. Refer to the table of [Pr. PB08] for details.

Setting range: 20 to 65535</td><td>823</td><td>P
S</td></tr>
</table>

MR-J3-_A_			MR-J4-_A_			Control mode
No.	Name and function	Initial value	No.	Name and function	Initial value	
PB10	Speed integral compensation Used to set the integral time constant of the speed loop. Lower setting increases the response level but is liable to generate vibration and/or noise. When auto tuning mode 1 ・ 2 and interpolation mode is selected, the result of auto tuning is automatically used.	33.7	PB10	Same setting as MR-J3 Speed integral compensation Set the integral time constant of the speed loop. Decreasing the setting value will increase the response level but will be liable to generate vibration and noise. The setting of the parameter will be the automatic setting or manual setting depending on the [Pr. PA08] setting. Refer to the table of [Pr. PB08] for details. Setting range: 0.1 to 1000.0	33.7	P S
PB11	Speed differential compensation Used to set the differential compensation. Made valid when the proportion control (PC) is switched on.	980	PB11	Speed differential compensation Set the differential compensation. To enable the setting value, turn on PC (proportional control). Setting range: 0 to 1000	980	P S
PB12	For manufacturer setting	0	PB12	Overshoot amount compensation Set a viscous friction torque in percentage to the servo motor rated speed. When the response level is low or when the torque/thrust is limited, the efficiency of the parameter may be lower. Setting range: 0 to 100	0	P
PB13	Machine resonance suppression filter 1 Set the notch frequency of the machine resonance suppression filter 1. Setting [Pr. PB01] (Adaptive tuning mode (Adaptive filter Ⅱ)) to "_ _ _1" automatically changes this parameter. When the [Pr. PB01] setting is "_ _ _0", the setting of this parameter is ignored.	4500	PB13	Machine resonance suppression filter 1 Machine resonance suppression filter 1 Set the notch frequency of the machine resonance suppression filter 1. When "Filter tuning mode selection" is set to "Automatic setting (_ _ _ 1)" in [Pr. PB01], this parameter will be adjusted automatically by adaptive tuning. When "Filter tuning mode selection" is set to "Manual setting (_ _ _ 2)" in [Pr. PB01], the setting value will be enabled. Setting range: 10 to 4500	4500	P S T

MR-J3-_A_			MR-J4-_A_			Control mode
No.	Name and function	Initial value	No.	Name and function	Initial value	
PB14	Notch shape selection 1 Used to selection the machine resonance suppression filter 1. Setting [Pr. PB01] (Adaptive tuning mode (Adaptive filter Ⅱ)) to "_ _ _1" automatically changes this parameter. When the [Pr. PB01] setting is "_ _ _0", the setting of this parameter is ignored.	0000h	PB14	Notch shape selection 1 Set the shape of the machine resonance suppression filter 1. When "Filter tuning mode selection" is set to "Automatic setting (_ _ _ 1)" in [Pr. PB01], this parameter will be adjusted automatically by adaptive tuning. Set manually for the manual setting.		
				_ _ _ x: For manufacturer setting	0h	
	0 0 x 0: Notch depth selection 0: -40 dB 1: -14 dB 2: -8 dB 3: -4 dB			_ _ x _: Notch depth selection 0: -40 dB 1: -14 dB 2: -8 dB 3: -4 dB	0h	P S T
	0 x 0 0: Notch width selection 0: α = 2 1: α = 3 2: α = 4 3: α = 5			_ x _ _: Notch width selection 0: α = 2 1: α = 3 2: α = 4 3: α = 5	0h	P S T
				x _ _ _: For manufacturer setting	0h	
PB15	Machine resonance suppression filter 2 Set the notch frequency of the machine resonance suppression filter 2. Set [Pr. PB16] (notch shape selection 2) to "_ _ _ 1" to make this parameter valid.	4500	PB15	Same as MR-J3 Machine resonance suppression filter 2 Set the notch frequency of the machine resonance suppression filter 2. To enable the setting value, set "Machine resonance suppression filter 2 selection" to "Enabled (_ _ _ 1)" in [Pr. PB16]. Setting range: 10 to 4500	4500	P S T
PB16	Notch shape selection 2 Select the shape of the machine resonance suppression filter 2.	0000h	PB16	Same as MR-J3 Notch shape selection 2 Set the shape of the machine resonance suppression filter 2.		
	0 0 0 x: Machine resonance suppression filter 2 selection 0: Invalid 1: Valid			_ _ _ x: Machine resonance suppression filter 2 selection 0: Disabled 1: Enabled	0h	P S T
	0 0 x 0: Notch depth selection 0: -40 dB 1: -14 dB 2: -8 dB 3: -4 dB			_ _ x _: Notch depth selection 0: -40 dB 1: -14 dB 2: -8 dB 3: -4 dB	0h	P S T
	0 x 0 0: Notch width selection 0: α = 2 1: α = 3 2: α = 4 3: α = 5			_ x _ _: Notch width selection 0: α = 2 1: α = 3 2: α = 4 3: α = 5	0h	P S T
				x _ _ _: For manufacturer setting	0h	

MR-J3-_A_			MR-J4-_A_			Control mode
No.	Name and function	Initial value	No.	Name and function	Initial value	
PB17	Automatic setting parameter The value of this parameter is set according to a set value of [Pr. PB06] (Ratio of load inertia moment to servo motor inertia moment).		PB17	Shaft resonance suppression filter Set the shaft resonance suppression filter. This is used to suppress a low-frequency machine vibration. When "Shaft resonance suppression filter selection" is "Automatic setting (_ _ _ 0)" in [Pr. PB23], the value will be calculated automatically from the servo motor you use and load to motor inertia ratio. Set manually for "Manual setting (_ _ _ 1)". When "Shaft resonance suppression filter selection" is "Disabled (_ _ _ 2)" in [Pr. PB23], the setting value of this parameter is disabled. When "Machine resonance suppression filter 4 selection" is "Enabled (_ _ _ 1)" in [Pr. PB49], the shaft resonance suppression filter is not available.		P S T
				_ _ x x: Shaft resonance suppression filter setting frequency selection Refer to table 2.5 for settings. Set the value closest to the frequency you need.	00h	P S T
				_ x _ _: Notch depth selection 0: -40 dB 1: -14 dB 2: -8 dB 3: -4 dB	0h	P S T
				x _ _ _: For manufacturer setting	0h	
				Table 2.5 Shaft resonance suppression filter setting frequency selection (see below)		

Table 2.5 Shaft resonance suppression filter setting frequency selection

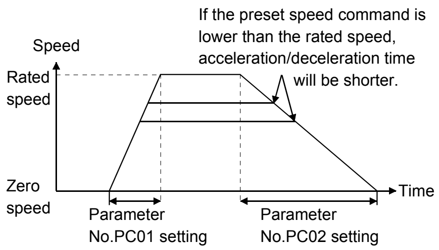
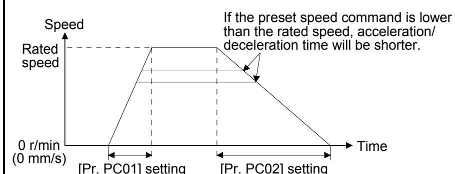
Setting value	Frequency [Hz]	Setting value	Frequency [Hz]
_ _ 00	Disabled	_ _ 10	562
_ _ 01	Disabled	_ _ 11	529
_ _ 02	4500	_ _ 12	500
_ _ 03	3000	_ _ 13	473
_ _ 04	2250	_ _ 14	450
_ _ 05	1800	_ _ 15	428
_ _ 06	1500	_ _ 16	409
_ _ 07	1285	_ _ 17	391
_ _ 08	1125	_ _ 18	375
_ _ 09	1000	_ _ 19	360
_ _ 0A	900	_ _ 1A	346
_ _ 0B	818	_ _ 1B	333
_ _ 0C	750	_ _ 1C	321
_ _ 0D	692	_ _ 1D	310
_ _ 0E	642	_ _ 1E	300
_ _ 0F	600	_ _ 1F	290

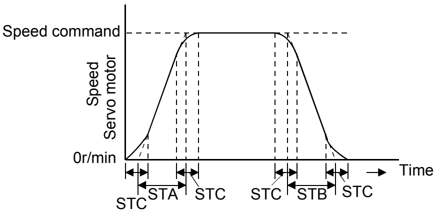
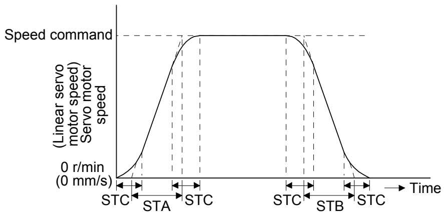
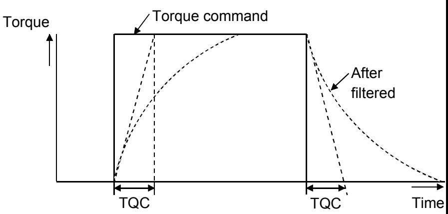
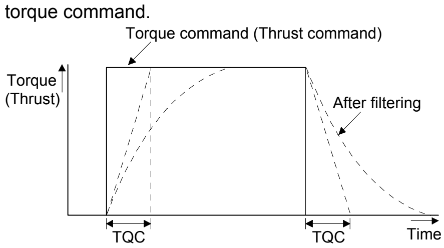
MR-J3-_A_			MR-J4-_A_			Control mode
No.	Name and function	Initial value	No.	Name and function	Initial value	
PB18	Low-pass filter setting Set the low-pass filter. Setting [Pr. PB23] (low-pass filter selection) to "_ _ 0 _" automatically changes this parameter. When [Pr. PB23] is set to "_ _ 1 _ ", this parameter can be set manually.	3141	PB18	Same as MR-J3 Low-pass filter setting Set the low-pass filter. The following shows a relation of a required parameter to this parameter. [Pr. PB23] → [Pr. PB18]: _ _ 0_ (Initial value) → Automatic setting _ _ 1 _ → Setting value enabled _ _ 2 _ → Setting value disabled Setting is not necessary because this parameter is automatically set.	3141	P S
PB19	Vibration suppression control vibration frequency setting Set the vibration frequency for vibration suppression control to suppress low-frequency machine vibration, such as enclosure vibration. Setting [Pr. PB02] (vibration suppression control tuning mode) to "_ _ _ 1" automatically changes this parameter. When [Pr. PB02] is set to "_ _ _ 2", this parameter can be set manually.	100.0	PB19	Same as MR-J3 Vibration suppression control 1 - Vibration frequency Set the vibration frequency for vibration suppression control 1 to suppress low-frequency machine vibration. When "Vibration suppression control 1 tuning mode selection" is set to "Automatic setting (_ _ _ 1)" in [Pr. PB02], this parameter will be set automatically. Set manually for "Manual setting (_ _ _ 2)". Setting range: 0.1 to 300.0	100.0	P
PB20	Vibration suppression control resonance frequency setting Set the resonance frequency for vibration suppression control to suppress low-frequency machine vibration, such as enclosure vibration. Setting [Pr. PB02] (vibration suppression control tuning mode) to "_ _ _ 1" automatically changes this parameter. When [Pr. PB02] is set to "_ _ _ 2", this parameter can be set manually.	PB20	PB20	Same as MR-J3 Vibration suppression control 1 - Resonance frequency Set the resonance frequency for vibration suppression control 1 to suppress low-frequency machine vibration. [When "Vibration suppression control 1 tuning mode selection" is set to "Automatic setting (_ _ _ 1)" in [Pr. PB02], this parameter will be set automatically. Set manually for "Manual setting (_ _ _ 2)". Setting range: 0.1 to 300.0	100.0	P
PB21	For manufacturer setting Do not change this value by any means.	0.00	PB21	Vibration suppression control 1 - Vibration frequency damping Set a damping of the vibration frequency for vibration suppression control 1 to suppress low-frequency machine vibration. When "Vibration suppression control 1 tuning mode selection" is set to "Automatic setting (_ _ _ 1)" in [Pr. PB02], this parameter will be set automatically. Set manually for "Manual setting (_ _ _ 2)". Setting range: 0.00 to 0.30	0.00	P
PB22	For manufacturer setting Do not change this value by any means.	0.00	PB22	Vibration suppression control 1 - Resonance frequency damping Set a damping of the resonance frequency for vibration suppression control 1 to suppress low-frequency machine vibration. When "Vibration suppression control 1 tuning mode selection" is set to "Automatic setting (_ _ _ 1)" in [Pr. PB02], this parameter will be set automatically. Set manually for "Manual setting (_ _ _ 2)". Setting range: 0.00 to 0.30	0.00	P

MR-J3-_A_			MR-J4-_A_			Control mode
No.	Name and function	Initial value	No.	Name and function	Initial value	
PB23	Low-pass filter selection Select the low-pass filter. 0 0 x 0: Low-pass filter selection 0: Automatic setting 1: Manual setting ([Pr. PB18] setting) When automatic setting has been selected, select the filter that has the band width close to the one calculated with $\frac{VG2 \cdot 10}{1 + GD2}$ [rad/s]	0000h	PB23	Same setting as MR-J3 Low-pass filter selection Shaft resonance suppression filter selection _ _ _ x: Select the shaft resonance suppression filter. 0: Automatic setting 1: Manual setting 2: Disabled When "Machine resonance suppression filter 4 selection" is set to "Enabled (_ _ _ 1)" in [Pr. PB49], the shaft resonance suppression filter is not available.	0h	P S T
				_ _ x _: Low-pass filter selection Select the low-pass filter. 0: Automatic setting 1: Manual setting 2: Disabled	0h	P S T
				_ x _ _: For manufacturer setting	0h	
				x _ _ _: For manufacturer setting	0h	
PB24	Slight vibration suppression control selection Select the slight vibration suppression control. When [Pr. PA08] (auto tuning mode) is set to "_ _ _ 3", the slight vibration suppression control is made valid. 0 0 0 x: Slight vibration suppression control selection 0: Invalid 1: Valid	0000h	PB24	Same as MR-J3 Slight vibration suppression control Slight vibration suppression control selection _ _ _ x: Select the slight vibration suppression control. 0: Disabled 1: Enabled To enable the slight vibration suppression control, set "Gain adjustment mode selection" to "Manual mode (_ _ _ 3)" in [Pr. PA08]. Slight vibration suppression control cannot be used in the speed control mode.	0h	P
				_ _ x _: For manufacturer setting	0h	
				_ x _ _: For manufacturer setting	0h	
				x _ _ _: For manufacturer setting	0h	
PB25	Function selection B-1 Select the control systems for position command acceleration/deceleration time constant ([Pr. PB03]). 0 0 x 0: Control of position command acceleration/ deceleration time constant 0: Primary delay 1: When linear acceleration/deceleration is selected, do not execute control switching after instantaneous power failure. The servo motor will make a sudden stop during the control switching or automatic restart.	0000h	PB25	Function selection B-1 _ _ _ x: Model adaptive control selection 0: Enabled (model adaptive control) 2: Disabled (PID control) This parameter is supported with software version B4 or later.	0h	P
				_ _ x _: Position acceleration/deceleration filter type selection Select the position acceleration/deceleration filter type. 0: Primary delay 1: Linear acceleration/deceleration When you select "Linear acceleration/deceleration", do not switch the control mode. Doing so will cause the servo motor to make a sudden stop at the time of control mode switching.	0h	P
				_ x _ _: For manufacturer setting	0h	
				x _ _ _: For manufacturer setting	0h	

MR-J3-_A_ No.	MR-J3-_A_ Name and function	MR-J3-_A_ Initial value	MR-J4-_A_ No.	MR-J4-_A_ Name and function	MR-J4-_A_ Initial value	Control mode
PB26	Gain changing selection Select the gain changing condition.		PB26	Gain switching function Select the gain switching condition. Set conditions to enable the gain switching values set in [Pr. PB29] to [Pr. PB36] and [Pr. PB56] to [Pr. PB60].		
	0 0 0 x: Gain changing selection Under any of the following conditions, the gains change on the basis of the [Pr. PB29] to [Pr. PB34] settings 0: Invalid 1: Input device (Gain changing (CDP)) 2: Command frequency ([Pr. PB27] setting) 3: Droop pulse ([Pr. PB27] setting) 4: Servo motor speed ([Pr. PB27] setting)	0h		_ _ _ x: Gain switching selection 0: Disabled 1: Input device (gain switching (CDP)) 2: Command frequency 3: Droop pulses 4: Servo motor speed	0h	P S
	_ _ x _: Gain changing condition 0: Valid when the input device (gain changing (CDP)) is ON, or valid when the value is equal to or larger than the value set in [Pr. PB27] 1: Valid when the input device (gain changing (CDP)) is OFF, or valid when the value is equal to or smaller than the value set in [Pr. PB27]	0h		_ _ x _: Gain switching condition selection 0: Gain after switching is enabled with gain switching condition or more 1: Gain after switching is enabled with gain switching condition or less	0h	P S
	_ x _ _: For manufacturer setting Do not change this value by any means.	0h		_ x _ _: Gain switching time constant disabling condition selection 0: Switching time constant enabled 1: Switching time constant disabled 2: Return time constant disabled This parameter is used by servo amplifier with software version B4 or later.	0h	P S
	x _ _ _: For manufacturer setting Do not change this value by any means.	0h		x _ _ _: For manufacturer setting	0h	
PB27	Gain changing condition Used to set the value of gain changing condition (command frequency, droop pulses, servo motor speed) selected in [Pr. PB26].The set value unit changes with the changing condition item.	10	PB27	Same as MR-J3 Gain switching condition This is used to set the value of gain switching (command frequency, droop pulses, and servo motor speed) selected in [Pr. PB26]. The set value unit differs depending on the switching condition item. Setting range: 0 to 9999	10	P S
PB28	Gain changing time constant Used to set the time constant at which the gains will change in response to the conditions set in [Pr. PB26] and [Pr. PB27].	1	PB28	Same as MR-J3 Gain switching time constant This is used to set the time constant at which the gains will change in response to the conditions set in [Pr. PB26] and [Pr. PB27]. Setting range: 0 to 100	1	P S
PB29	Gain changing ratio of load inertia moment to servo motor inertia moment Used to set the ratio of load inertia moment to servo motor inertia moment when gain changing is valid. This parameter is made valid when the auto tuning is invalid ([Pr. PA08]: _ _ _ 3).	7.0	PB29	Same as MR-J3 load to motor mass ratio after gain switching This is used to set the load to motor inertia ratio/load to motor mass ratio when gain switching is enabled. This parameter is enabled only when "Gain adjustment mode selection" is "Manual mode (_ _ _ 3)" in [Pr. PA08]. Setting range: 0.00 to 300.00 Unit: 1.0 time	7.00	P S
PB30	Gain changing position loop gain Set the position loop gain when the gain changing is valid. This parameter is made valid when the auto tuning is invalid ([Pr. PA08]: _ _ _ 3).	37	PB30	Position loop gain after gain switching Set the position loop gain when the gain switching is enabled. When you set a value less than 1.0 rad/s, the value will be the same as [Pr. PB08]. This parameter is enabled only when "Gain adjustment mode selection" is "Manual mode (_ _ _ 3)" in [Pr. PA08]. Setting range: 0.0 to 2000.0	0.0	P

MR-J3-_A_			MR-J4-_A_			Control mode
No.	Name and function	Initial value	No.	Name and function	Initial value	
PB31	Gain changing speed loop gain Set the speed loop gain when the gain changing is valid. This parameter is made valid when the auto tuning is invalid ([Pr. PA08]: _ _ _ 3). The setting range of 50000 applies to the servo amplifier whose software version is A3 or later. The setting range of the servo amplifier whose software version is older than A3 is 20 to 20000. When the software version of MR Configurator is A3 or earlier, 20001 or more cannot be set. Use the display/operation section of the servo amplifier to set 20001 or more.	823	PB31	Speed loop gain after gain switching Set the speed loop gain when the gain switching is enabled. When you set a value less than 20 rad/s, the value will be the same as [Pr. PB09]. This parameter is enabled only when "Gain adjustment mode selection" is "Manual mode (_ _ _ 3)" in [Pr. PA08]. Setting range: 0 to 65535	0	P S
PB32	Gain changing speed integral compensation Set the speed integral compensation when the gain changing is valid. This parameter is made valid when the auto tuning is invalid ([Pr. PA08]: _ _ _ 3).	33.7	PB32	Speed integral compensation after gain switching Set the speed integral compensation when the gain changing is enabled. When you set a value less than 0.1 ms, the value will be the same as [Pr. PB10]. This parameter is enabled only when "Gain adjustment mode selection" is "Manual mode (_ _ _ 3)" in [Pr. PA08]. Setting range: 0.0 to 5000.0	0.0	P S
PB33	Gain changing vibration suppression control - vibration frequency setting Set the vibration frequency for vibration suppression control when the gain changing is valid. This parameter is made valid when the [Pr. PB02] setting is "_ _ _ 2" and the [Pr. PB26] setting is "_ _ _ 1". When using the vibration suppression control gain changing, always execute the changing after the servo motor has stopped.	100.0	PB33	Vibration suppression control 1 - Vibration frequency after gain switching Set the vibration frequency for vibration suppression control 1 when the gain switching is enabled. When you set a value less than 0.1 Hz, the value will be the same as [Pr. PB19]. This parameter will be enabled only when the following conditions are fulfilled. "Gain adjustment mode selection" in [Pr. PA08] is "Manual mode (_ _ _ 3)". "Vibration suppression control 1 tuning mode selection" in [Pr. PB02] is "Manual setting (_ _ _ 2)". "Gain switching selection" in [Pr. PB26] is "Input device (gain switching (CDP)) (_ _ _ 1)". Switching during driving may cause a shock. Be sure to switch them after the servo motor stops. Setting range: 0.0 to 300.0	0.0	P
PB34	Gain changing vibration suppression control - resonance frequency setting Set the resonance frequency for vibration suppression control when the gain changing is valid. This parameter is made valid when the [Pr. PB02] setting is "_ _ _ 2" and the [Pr. PB26] setting is "_ _ _ 1". When using the vibration suppression control gain changing, always execute the changing after the servo motor has stopped.	100.0	PB34	Vibration suppression control 1 - Resonance frequency after gain switching Set the resonance frequency for vibration suppression control 1 when the gain switching is enabled. When you set a value less than 0.1 Hz, the value will be the same as [Pr. PB20]. This parameter will be enabled only when the following conditions are fulfilled. "Gain adjustment mode selection" in [Pr. PA08] is "Manual mode (_ _ _ 3)". "Vibration suppression control 1 tuning mode selection" in [Pr. PB02] is "Manual setting (_ _ _ 2)". "Gain switching selection" in [Pr. PB26] is "Input device (gain switching (CDP)) (_ _ _ 1)". Switching during driving may cause a shock. Be sure to switch them after the servo motor stops. Setting range: 0.0 to 300.0	0.0	P

MR-J3-_A_			MR-J4-_A_			Control mode
No.	Name and function	Initial value	No.	Name and function	Initial value	
PB35	For manufacturer setting Do not change this value by any means.	0.00	PB35	Vibration suppression control 1 - Vibration frequency damping after gain switching Set a damping of the vibration frequency for vibration suppression control 1 when the gain switching is enabled. This parameter will be enabled only when the following conditions are fulfilled. "Gain adjustment mode selection" in [Pr. PA08] is "Manual mode (_ _ _ 3)". "Vibration suppression control 1 tuning mode selection" in [Pr. PB02] is "Manual setting (_ _ _ 2)". "Gain switching selection" in [Pr. PB26] is "Input device (gain switching (CDP)) (_ _ _ 1)". Switching during driving may cause a shock. Be sure to switch them after the servo motor stops. Setting range: 0.00 to 0.30	0.00	P
PB36	For manufacturer setting Do not change this value by any means.	0.00	PB36	Vibration suppression control 1 - Resonance frequency damping after gain switching Set a damping of the resonance frequency for vibration suppression control 1 when the gain switching is enabled. This parameter will be enabled only when the following conditions are fulfilled. "Gain adjustment mode selection" in [Pr. PA08] is "Manual mode (_ _ _ 3)". "Vibration suppression control 1 tuning mode selection" in [Pr. PB02] is "Manual setting (_ _ _ 2)". "Gain switching selection" in [Pr. PB26] is "Input device (gain switching (CDP)) (_ _ _ 1)". Switching during driving may cause a shock. Be sure to switch them after the servo motor stops. Setting range: 0.00 to 0.30	0.00	P
PC01	Acceleration time constant Used to set the acceleration time required to reach the rated speed from 0r/min in response to the analog speed command and internal speed commands 1 to 7.  For example for the servo motor of 3000r/min rated speed, set 3000 (3s) to increase speed from 0r/min to 1000r/min in 1 second.	0	PC01	Same as MR-J3 Acceleration time constant Set the acceleration time required to reach the rated speed from 0 r/min or 0 mm/s for VC (Analog speed command) and [Pr. PC05 Internal speed command 1] to [Pr. PC11 Internal speed command 7].  For example for the servo motor of 3000 r/min rated speed, set 3000 (3 s) to increase the speed from 0 r/min to 1000 r/min in 1 second. Setting range: 0 to 50000	0	S T
PC02	Deceleration time constant Used to set the deceleration time required to reach 0r/min from the rated speed in response to the analog speed command and internal speed commands 1 to 7.	0	PC02	Same as MR-J3 Deceleration time constant Set the deceleration time required to reach 0 r/min or 0 mm/s from the rated speed for VC (Analog speed command) and [Pr. PC05 Internal speed command 1] to [Pr. PC11 Internal speed command 7]. Setting range: 0 to 50000	0	S T

MR-J3-_A_			MR-J4-_A_			Control mode
No.	Name and function	Initial value	No.	Name and function	Initial value	
PC03	S-pattern acceleration/deceleration time constant Used to smooth start/stop of the servo motor. Set the time of the arc part for S-pattern acceleration/deceleration.  STA: Acceleration time constant (parameter No.PC01) STB: Deceleration time constant (parameter No.PC02) STC: S-pattern acceleration/deceleration time constant (parameter No.PC03) Long setting of STA (acceleration time constant) or STB (deceleration time constant) may produce an error in the time of the arc part for the setting of the S-pattern acceleration/deceleration time constant. The upper limit value of the actual arc part time is limited by $\frac{2000000}{STA}$ for acceleration or by $\frac{2000000}{STB}$ for deceleration. (Example) At the setting of STA=20000, STB=5000 and STC=200, the actual arc part times are as follows. During acceleration: 100[ms] (Limited to 100[ms] since $\frac{2000000}{20000}$ = 100[ms]<200[ms].) During deceleration: 200[ms] (200[ms] as set since $\frac{2000000}{5000}$ = 400[ms]>200[ms].)	0	PC03	Same as MR-J3 S-pattern acceleration/deceleration time constant Start/stop the servo motor or linear servo motor smoothly. Set the time of the arc part for S-pattern acceleration/deceleration.  STA: Acceleration time constant ([Pr. PC01]) STB: Deceleration time constant ([Pr. PC02]) STC: S-pattern acceleration/deceleration time constant ([Pr. PC03]) Long setting of STA (acceleration time constant) or STB (deceleration time constant) may produce an error in the time of the arc part for the setting of the S-pattern acceleration/deceleration time constant. The upper limit value of the actual arc part time is limited by $\frac{2000000}{STA}$ for acceleration or by $\frac{2000000}{STB}$ for deceleration. (Example) At the setting of STA 20000, STB 5000 and STC 200, the actual arc part times are as follows. Acceleration: 100 ms $\frac{2000000}{20000}$ = 100 [ms] < 200 [ms] Therefore, it will be limited to 100 ms. Deceleration: 200 ms $\frac{2000000}{5000}$ = 400 [ms] > 200 [ms] Therefore, it will be 200 ms as you set. Setting range: 0 to 5000	0	S T
PC04	Torque command time constant Used to set the constant of a low-pass filter in response to the torque command.  TQC: Torque command time constant	0	PC04	Same as MR-J3 Torque command time constant Set the constant of a primary delay filter to the torque command.  TQC: Torque Setting range: 0 to 50000	0	T

MR-J3-_A_			MR-J4-_A_			Control mode
No.	Name and function	Initial value	No.	Name and function	Initial value	
PC05	Internal speed command 1 Used to set speed 1 of internal speed commands.	100	PC05	Same as MR-J3 Internal speed command 1 Set the speed 1 of internal speed commands. Setting range: 0 to permissible instantaneous speed	100	S
	Internal speed limit 1 Used to set speed 1 of internal speed limits.			Internal speed limit 1 Set the speed 1 of internal speed limits. Setting range: 0 to permissible instantaneous speed		T
PC06	Internal speed command 2 Used to set speed 2 of internal speed commands.	500	PC06	Same as MR-J3 Internal speed command 2 Set the speed 2 of internal speed commands. Setting range: 0 to permissible instantaneous speed	500	S
	Internal speed limit 2 Used to set speed 2 of internal speed limits.			Internal speed limit 2 Set the speed 2 of internal speed limits. Setting range: 0 to permissible instantaneous speed		T
PC07	Internal speed command 3 Used to set speed 3 of internal speed commands.	1000	PC07	Same as MR-J3 Internal speed command 3 Set the speed 3 of internal speed commands. Setting range: 0 to permissible instantaneous speed	1000	S
	Internal speed limit 3 Used to set speed 3 of internal speed limits.			Internal speed limit 3 Set speed 3 of internal speed limits. Setting range: 0 to permissible instantaneous speed		T
PC08	Internal speed command 4 Used to set speed 4 of internal speed commands.	200	PC08	Same as MR-J3 Internal speed command 4 Set the speed 4 of internal speed commands. Setting range: 0 to permissible instantaneous speed	200	S
	Internal speed limit 4 Used to set speed 4 of internal speed limits.			Internal speed limit 4 Set the speed 4 of internal speed limits. Setting range: 0 to permissible instantaneous speed		T
PC09	Internal speed command 5 Used to set speed 5 of internal speed commands.	300	PC09	Same as MR-J3 Internal speed command 5 Set the speed 5 of internal speed commands. Setting range: 0 to permissible instantaneous speed	300	S
	Internal speed limit 5 Used to set speed 5 of internal speed limits.			Internal speed limit 5 Set the speed 5 of internal speed limits. Setting range: 0 to permissible instantaneous speed		T
PC10	Internal speed command 6 Used to set speed 6 of internal speed commands.	500	PC10	Same as MR-J3 Internal speed command 6 Set the speed 6 of internal speed commands. Setting range: 0 to permissible instantaneous speed	500	S
	Internal speed limit 6 Used to set speed 6 of internal speed limits.			Internal speed limit 6 Set the speed 6 of internal speed limits. Setting range: 0 to permissible instantaneous speed		T

<table>
<tr><th colspan="3">MR-J3-_A_</th><th colspan="3">MR-J4-_A_</th><th rowspan="2">Control mode</th></tr>
<tr><th>No.</th><th>Name and function</th><th>Initial value</th><th>No.</th><th>Name and function</th><th>Initial value</th></tr>
<tr><td rowspan="2">PC11</td><td>Internal speed command 7
Used to set speed 7 of internal speed commands.</td><td rowspan="2">800</td><td rowspan="2">PC11</td><td>Same as MR-J3
Internal speed command 7
Set the speed 7 of internal speed commands.
Setting range: 0 to permissible instantaneous speed</td><td rowspan="2">800</td><td>S</td></tr>
<tr><td>Internal speed limit 7
Used to set speed 7 of internal speed limits.</td><td>Internal speed limit 7
Set the speed 7 of internal speed limits.
Setting range: 0 to permissible instantaneous speed</td><td>T</td></tr>
<tr><td rowspan="2">PC12</td><td>Analog speed command maximum speed
Used to set the speed at the maximum input voltage (10 V) of the analog speed command (VC).
When "0" is set, the analog speed command maximum speed would be the rated speed of the servo motor connected.
The speed is as indicated below for motorless operation of test operation.
<table><tr><th colspan="2">Servo amplifier capacity [W]</th><th>Servo motor speed [r/min]</th></tr><tr><td>100V class</td><td>100 to 400</td><td rowspan="2">3000</td></tr><tr><td rowspan="2">200V class</td><td>100 to 750</td></tr><tr><td>1k to 37k</td><td rowspan="2">2000</td></tr><tr><td>400V class</td><td>600 to 55k</td></tr></table></td><td rowspan="2">0</td><td rowspan="2">PC12</td><td>Same setting as MR-J3
Analog speed command - Maximum speed
Set the speed of servo motor at the maximum voltage (10 V) input to VC (Analog speed command).
When "0" is set, the rated speed of the connected servo motor is used.
When you input a command value of the permissible speed or more to VC, the value is clamped at the permissible speed.
Setting range: 0 to 50000</td><td rowspan="2">0</td><td>S</td></tr>
<tr><td>Analog speed limit maximum speed
Used to set the speed at the maximum input voltage (10 V) of the analog speed limit (VLA).
Set "0" to select the rated speed of the servo motor connected.</td><td>Analog speed limit - Maximum speed
Set the speed of servo motor at the maximum voltage (10 V) input to VLA (Analog speed limit).
When "0" is set, the rated speed of the connected servo motor is used.
When you input a limit value of the permissible speed or more to VLA, the value is clamped at the permissible speed.
Setting range: 0 to 50000</td><td>T</td></tr>
<tr><td>PC13</td><td>Analog torque command maximum output
Used to set the output torque at the analog torque command voltage (TC = ±8 V) of +8 V on the assumption that the maximum torque is 100 [%]. For example, set 50 to output (maximum torque × 50/100) at the TC of +8 V.</td><td>100.0</td><td>PC13</td><td>Same as MR-J3
Analog torque command maximum output
This is used to set the output torque at the analog torque (TC = ±8 V) of +8 V on the assumption that the maximum torque is 100.0%.
For example, set 50.0.
The maximum torque × $\frac{50.0}{100.0}$ is outputted.
If a value equal to or larger than the maximum torque is inputted to TC, the value will be clamped at the maximum torque.
Setting range: 0.0 to 1000.0</td><td>100.0</td><td>T</td></tr>
</table>

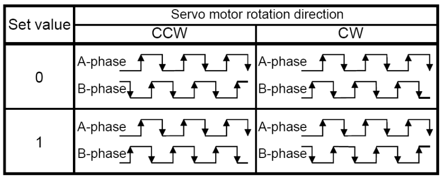
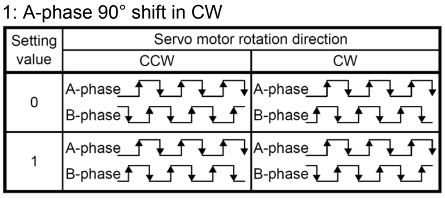
<table>
<tr><th colspan="3">MR-J3-_A_</th><th colspan="3">MR-J4-_A_</th><th rowspan="2">Control mode</th></tr>
<tr><th>No.</th><th>Name and function</th><th>Initial value</th><th>No.</th><th>Name and function</th><th>Initial value</th></tr>
<tr><td rowspan="4">PC14</td><td rowspan="4">Analog monitor 1 output
Used to selection the signal provided to the analog monitor 1 (MO1) output.

0 0 0 x:
Analog monitor 1 (MO1) output selection
<table>
<tr><th>Setting</th><th>Item</th></tr>
<tr><td>0</td><td>Servo motor speed (±8V/max. speed)</td></tr>
<tr><td>1</td><td>Torque (±8V/max. torque) (Note 2)</td></tr>
<tr><td>2</td><td>Servo motor speed (+8V/max. speed)</td></tr>
<tr><td>3</td><td>Torque (+8V/max. torque) (Note 2)</td></tr>
<tr><td>4</td><td>Current command (±8V/max. current command)</td></tr>
<tr><td>5</td><td>Command pulse frequency (±10V/1Mpps)</td></tr>
<tr><td>6</td><td>Droop pulses (±10V/100 pulses) (Note 1)</td></tr>
<tr><td>7</td><td>Droop pulses (±10V/1000 pulses) (Note 1)</td></tr>
<tr><td>8</td><td>Droop pulses (±10V/10000 pulses) (Note 1)</td></tr>
<tr><td>9</td><td>Droop pulses (±10V/100000 pulses) (Note 1)</td></tr>
<tr><td>A</td><td>Feedback position (±10V/1 Mpulses) (Note 1)</td></tr>
<tr><td>B</td><td>Feedback position (±10V/10 Mpulses) (Note 1)</td></tr>
<tr><td>C</td><td>Feedback position (±10V/100 Mpulses) (Note 1)</td></tr>
<tr><td>D</td><td>Bus voltage (±8V/400V) (Note 3)</td></tr>
</table>
Note 1. Encoder pulse unit.
2. 8 V is outputted at the maximum torque. However, when [Pr. PA11] [Pr. PA12] are set to limit torque, 8 V is outputted at the torque highly limited.
3. For 400 V class servo amplifier, the bus voltage becomes +8 V/800 V.</td><td rowspan="4">0000h</td><td rowspan="4">PC14</td><td>Analog monitor 1 output
_ _ x x:
Analog monitor 1 output selection
Select a signal to output to MO1 (Analog monitor 1).
Refer to table 2.6 for settings.</td><td>00h</td><td>P
S
T</td></tr>
<tr><td>_ x _ _:
For manufacturer setting</td><td>0h</td><td></td></tr>
<tr><td>x _ _ _:
For manufacturer setting</td><td>0h</td><td></td></tr>
<tr><td>Table 2.6 Analog monitor setting value
(MR-J4-_A_(-RJ) 100 W or more)
<table>
<tr><th rowspan="2">Setting value</th><th rowspan="2">Item</th><th>Operation mode (Note 1)</th></tr>
<tr><th>Standard</th></tr>
<tr><td>_ _ 00</td><td>(Linear) servo motor speed (±8 V/max. speed)</td><td>○</td></tr>
<tr><td>_ _ 01</td><td>Torque or thrust (±8 V/max. torque or max. thrust) (Note 3)</td><td>○</td></tr>
<tr><td>_ _ 02</td><td>(Linear) servo motor speed (+8 V/max. speed)</td><td>○</td></tr>
<tr><td>_ _ 03</td><td>Torque or thrust (+8 V/max. torque or max. thrust) (Note 3)</td><td>○</td></tr>
<tr><td>_ _ 04</td><td>Current command (±8 V/max. current command)</td><td>○</td></tr>
<tr><td>_ _ 05</td><td>Command pulse frequency (±10 V/±4 Mpulses/s)</td><td>○</td></tr>
<tr><td>_ _ 06</td><td>Servo motor-side droop pulses (±10 V/100 pulses) (Note 2)</td><td>○</td></tr>
<tr><td>_ _ 07</td><td>Servo motor-side droop pulses (±10 V/1000 pulses) (Note 2)</td><td>○</td></tr>
<tr><td>_ _ 08</td><td>Servo motor-side droop pulses (±10 V/10000 pulses) (Note 2)</td><td>○</td></tr>
<tr><td>_ _ 09</td><td>Servo motor-side droop pulses (±10 V/100000 pulses) (Note 2)</td><td>○</td></tr>
<tr><td>_ _ 0A</td><td>Feedback position (±10 V/1 Mpulse) (Note 2)</td><td>○</td></tr>
<tr><td>_ _ 0B</td><td>Feedback position (±10 V/10 Mpulses) (Note 2)</td><td>○</td></tr>
<tr><td>_ _ 0C</td><td>Feedback position (±10 V/100 Mpulses) (Note 2)</td><td>○</td></tr>
<tr><td>_ _ 0D</td><td>Bus voltage (200 V class and 100 V class: +8 V/400 V, 400 V class: +8 V/800 V)</td><td>○</td></tr>
<tr><td>_ _ 0E</td><td>Speed command 2 (±8 V/max. speed)</td><td>○</td></tr>
<tr><td>_ _ 10</td><td>Load-side droop pulses (±10 V/100 pulses) (Note 2)</td><td></td></tr>
<tr><td>_ _ 11</td><td>Load-side droop pulses (±10 V/1000 pulses) (Note 2)</td><td></td></tr>
<tr><td>_ _ 12</td><td>Load-side droop pulses (±10 V/10000 pulses) (Note 2)</td><td></td></tr>
<tr><td>_ _ 13</td><td>Load-side droop pulses (±10 V/100000 pulses) (Note 2)</td><td></td></tr>
<tr><td>_ _ 14</td><td>Load-side droop pulses (±10 V/1 Mpulse) (Note 2)</td><td></td></tr>
<tr><td>_ _ 15</td><td>Servo motor-side/load-side position deviation (±10 V/100000 pulses)</td><td></td></tr>
<tr><td>_ _ 16</td><td>Servo motor-side/load-side speed deviation (±8 V/max. speed)</td><td></td></tr>
<tr><td>_ _ 17</td><td>Internal temperature of encoder (±10 V/±128 °C)</td><td>○</td></tr>
</table>
Note 1. Items with ○ are available for each operation mode.
Standard: Standard (semi closed loop system) use of the rotary servo motor
2. Encoder pulse unit
3. The larger value of [Pr. PA11] or [Pr. PA12] will be the maximum torque.</td><td></td><td></td></tr>
<tr><td rowspan="3">PC15</td><td rowspan="3">Analog monitor 2 output
Used to selection the signal provided to the analog monitor 2 (MO2) output.

0 0 0 x:
Select the analog monitor 2 (MO2) output
The settings are the same as those of [Pr. PC14]</td><td rowspan="3">0001h</td><td rowspan="3">PC15</td><td>Analog monitor 2 output
Analog monitor 2 output selection
_ _ x x:
Select a signal to output to MO2 (Analog monitor 2).
Refer to [Pr. PC14] for settings.</td><td>01h</td><td>P
S
T</td></tr>
<tr><td>_ x _ _:
For manufacturer setting</td><td>0h</td><td></td></tr>
<tr><td>x _ _ _:
For manufacturer setting</td><td>0h</td><td></td></tr>
<tr><td>PC16</td><td>Electromagnetic brake sequence output
Used to set the delay time (Tb) between electronic brake interlock (MBR) and the base drive circuit is shut-off.</td><td>100</td><td>PC16</td><td>Same as MR-J3

Analog monitor 2 output
Set the delay time between MBR (Electromagnetic brake interlock) and the base drive circuit is shut-off.

Setting range: 0 to 1000</td><td>0</td><td>P
S
T</td></tr>
</table>

MR-J3-_A_			MR-J4-_A_			Control mode
No.	Name and function	Initial value	No.	Name and function	Initial value	
PC17	Zero speed Used to set the output range of the zero speed detection (ZSP). Zero speed detection (ZSP) has hysteresis width of 20r/min	50	PC17	Same as MR-J3 Zero speed Set the output range of ZSP (Zero speed detection). ZSP (Zero speed detection) has hysteresis of 20 r/min or 20 mm/s. Setting range: 0 to 10000	50	P S T
PC18	Alarm history clear Used to clear the alarm history. 0 0 0 x: Alarm history clear 0: Invalid 1: Valid When alarm history clear is made valid, the alarm history is cleared at next power-on. After the alarm history is cleared, the setting is automatically made invalid (reset to 0).	0000h	PC18	Same as MR-J3 Alarm history clear Alarm history clear selection _ _ _ x: Clear the alarm history. 0: Disabled 1: Enabled When "Enabled" is set, the alarm history will be cleared at the next power-on. After the alarm history is cleared, the setting is automatically disabled.	0h	P S T
				_ _ x _: For manufacturer setting	0h	
				_ x _ _: For manufacturer setting	0h	
				x _ _ _: For manufacturer setting	0h	
PC19	Encoder output pulses selection Use to select the, encoder output pulses direction and encoder output pulses setting. 0 0 0 x: Encoder output pulses phase changing Changes the phases of A/B-phase encoder output pulses. 	0000h	PC19	Same setting as MR-J3 Encoder output pulse selection Encoder output pulse phase selection _ _ _ x: Select the encoder pulse direction. 0: A-phase 90° shift in CCW 1: A-phase 90° shift in CW 	0h	P S T
	0 0 x 0: Encoder output pulses setting selection (refer to [Pr. PA15]) 0: Output pulses setting 1: Division ratio setting 2: Ratio is automatically set to command pulse unit Setting "2" makes the [Pr. PA15] (encoder output pulses) setting invalid.			Encoder output pulse setting selection _ _ x _: 0: Output pulse setting When "_ 1 0 _" is set to this parameter, [AL. 37 Parameter error] will occur. 1: Dividing ratio setting 2: The same output pulse setting as the command pulse 3: A-phase/B-phase pulse electronic gear setting When you select "1", the setting of [Pr. PA16 Encoder output pulses 2] will be disabled. When you select "2", the settings of [Pr. PA15 Encoder output pulses] and [Pr. PA16 Encoder output pulses 2] will be disabled. When you select the setting, do not change the settings in [Pr. PA06] and [Pr. PA07] after the power-on.	0h	P S T
				Selection of the encoders for encoder output pulse _ x _ _: Select an encoder for servo amplifier output. 0: Servo motor encoder 1: Load-side encoder When "_ 1 0 _" is set to this parameter, [AL. 37 Parameter error] will occur. This is only for the fully closed loop system.	0h	P
				x _ _ _: For manufacturer setting	0h	

MR-J3-_A_			MR-J4-_A_			Control mode
No.	Name and function	Initial value	No.	Name and function	Initial value	
PC20	Station number setting Used to specify the station number for serial communication. Always set one station to one axis of servo amplifier. If one station number is set to two or more stations, normal communication cannot be made.	0	PC20	Same setting as MR-J3 Station No. setting Specify a station number of the servo amplifier for RS-422/RS-485 and USB communications. Always set one station to one axis of the servo amplifier. Setting one station number to two or more stations will disable a normal communication. Setting range: 0 to 31	0	P S T
PC21	Communication function selection Select the communication I/F and select the RS-422 communication conditions. 0 0 x 0: RS-422 communication baud rate selection 0: 9600 [bps] 1: 19200 [bps] 2: 38400 [bps] 3: 57600 [bps] 4: 115200 [bps]	0000h	PC21	RS-422 communication function selection Select the communication I/F and select the RS-422 communication conditions.		
				_ _ _ x: For manufacturer setting	0h	
				_ _ x _: RS-422 communication baud rate selection When using the parameter unit, set "1 _ _ _" in [Pr. PF34]. 0: 9600 [bps] 1: 19200 [bps] 2: 38400 [bps] 3: 57600 [bps] 4: 115200 [bps]	0h	P S T
	0 x 0 0: RS-422 communication response delay time 0: Invalid 1: Valid, reply sent after delay time of 800 μs or longer			_ x _ _: RS-422/RS-485 communication response delay time selection 0: Disabled 1: Enabled (responding after 800 μs or longer delay time)	0h	P S T
				x _ _ _: For manufacturer setting	0h	
PC22	Function selection C-1 Select the execution of automatic restart after instantaneous power failure selection, and encoder cable communication system selection. 0 0 0 x: Restart after instantaneous power failure selection If the power supply voltage has returned to normal after an undervoltage status caused by the reduction of the input power supply voltage in the speed control mode, the servo motor can be restarted by merely turning on the start signal without resetting the alarm. 0: Invalid (Undervoltage alarm (AL.10) occurs.) 1: Valid	0000h	PC22	_ _ _ x: For manufacturer setting	0h	
				_ _ x _: For manufacturer setting	0h	
				_ x _ _: For manufacturer setting	0h	
	x 0 0 0: Encoder cable communication system selection 0: Two-wire type 1: Four-wire type The following encoder cables are four-wire type. MR-EKCBL30M-L MR-EKCBL30M-H MR-EKCBL40M-H MR-EKCBL50M-H Other encoder cables are two-wire type. Incorrect setting will result in an encoder error 1 (At power ON) (AL.16).			Function selection C-1 x _ _ _: Encoder cable communication method selection Select how to execute the encoder cable communication method. 0: Two-wire type 1: Four-wire type When using an encoder of A/B/Z-phase differential output method, set "0". If the setting is incorrect, [AL. 16 Encoder initial communication error 1] or [AL. 20 Encoder normal communication error 1] occurs.	0h	P S T

<table>
<tr><th colspan="3">MR-J3-_A_</th><th colspan="3">MR-J4-_A_</th><th rowspan="2">Control mode</th></tr>
<tr><th>No.</th><th>Name and function</th><th>Initial value</th><th>No.</th><th>Name and function</th><th>Initial value</th></tr>
<tr><td rowspan="4">PC23</td><td>Function selection C-2
Select the servo lock at speed control mode stop, the VC-VLA voltage averaging, and the speed limit in torque control mode.
0 0 0 x:
Selection of servo lock at stop In the speed control mode, the servo motor shaft can be locked to prevent the shaft from being moved by the external force.
0: Valid (Servo-locked)
The operation to maintain the stop position is performed.
1: Invalid (Not servo-locked)
The stop position is not maintained.
The control to make the speed 0r/min is performed.</td><td rowspan="4">0000h</td><td rowspan="4">PC23</td><td>Same as MR-J3
Function selection C-2
_ _ _ x:
Servo-lock selection at speed control stop
Select the servo-lock selection at speed control stop.
In the speed control mode, the servo motor shaft can be locked to prevent the shaft from being moved by an external force.
0: Enabled (servo-lock)
The operation to maintain the stop position is performed.
1: Disabled (no servo-lock)
The stop position is not maintained.
The control to make the speed 0 r/min or 0 mm/s is performed.</td><td>0h</td><td>S</td></tr>
<tr><td rowspan="2">0 x 0 0:
VC/VLA voltage averaging
Used to set the filtering time when the analog speed command (VC) voltage or analog speed limit (VLA) is imported.
Set 0 to vary the speed to voltage fluctuation in real time. Increase the set value to vary the speed slower to voltage fluctuation.
<table><tr><th>Set value</th><th>Filtering time [ms]</th></tr><tr><td>0</td><td>0</td></tr><tr><td>1</td><td>0.444</td></tr><tr><td>2</td><td>0.888</td></tr><tr><td>3</td><td>1.777</td></tr><tr><td>4</td><td>3.555</td></tr><tr><td>5</td><td>7.111</td></tr></table></td><td>_ _ x _ :
For manufacturer setting</td><td>0h</td><td></td></tr>
<tr><td>_ x _ _:
VC/VLA voltage averaging selection
Select the VC/VLA voltage average.
Set the filtering time when VC (Analog speed command) or VLA (Analog speed limit) is imported.
Set 0 to vary the speed to voltage fluctuation in real time. Increase the set value to vary the speed slower to voltage fluctuation.
<table><tr><th>Setting value</th><th>Filtering time [ms]</th></tr><tr><td>0</td><td>0</td></tr><tr><td>1</td><td>0.444</td></tr><tr><td>2</td><td>0.888</td></tr><tr><td>3</td><td>1.777</td></tr><tr><td>4</td><td>3.555</td></tr><tr><td>5</td><td>7.111</td></tr></table></td><td>0h</td><td>S
T</td></tr>
<tr><td>x 0 0 0:
Selection of speed limit for torque control
0: Valid
1: Invalid
Do not use this function except when configuring a speed loop externally.
If the speed limit is invalid, the following parameters can be used.
[Pr. PB01] (Adaptive tuning mode (Adaptive filter))
[Pr. PB13] (machine resonance suppression filter 1)
[Pr. PB14] (notch shape selection 1)
[Pr. PB15] (machine resonance suppression filter 2)
[Pr. PB16] (notch shape selection 2)</td><td>x _ _ _:
Speed limit selection at torque control
Select the speed limit selection at torque control.
0: Enabled
1: Disabled
Do not use this function except when configuring an external speed loop.</td><td>0h</td><td>T</td></tr>
<tr><td rowspan="4">PC24</td><td rowspan="4">Function selection C-3
Select the unit of the in-position range
0 0 0 x:
In-position range unit selection
0: Command input pulse unit
1: Servo motor encoder pulse unit</td><td rowspan="4">0000h</td><td rowspan="4">PC24</td><td>Function selection C-3
In-position range unit selection
_ _ _ x:
Select a unit of in-position range.
0: Command input pulse unit
1: Servo motor encoder pulse unit</td><td>0h</td><td>P</td></tr>
<tr><td>_ _ x _:
For manufacturer setting</td><td>0h</td><td></td></tr>
<tr><td>_ x _ _:
For manufacturer setting</td><td>0h</td><td></td></tr>
<tr><td>x _ _ _:
Error excessive alarm/error excessive warning level unit selection
Select units for error excessive alarm level setting with [Pr. PC43] and for error excessive warning level setting with [Pr. PC73].
0: Per 1 rev or 1 mm
1: Per 0.1 rev or 0.1 mm
2: Per 0.01 rev or 0.01 mm
3: Per 0.001 rev or 0.001 mm</td><td>0h</td><td>P</td></tr>
</table>

MR-J3-_A_			MR-J4-_A_			Control mode
No.	Name and function	Initial value	No.	Name and function	Initial value	
PC26	Function selection C-5 Select the stroke limit warning (AL. 99). 0 0 0 x: Stroke limit warning (AL. 99) selection 0: Valid 1: Invalid When this parameter is set to "1", AL. 99 will not occur if the forward rotation stroke end (LSP) or reverse rotation stroke end (LSN) turns OFF.	0000h	PC26	Same as MR-J3 Function selection C-5 _ _ _ x: [AL. 99 Stroke limit warning] selection Enable or disable [AL. 99 Stroke limit warning]. 0: Enabled 1: Disabled	0h	P S
				_ _ x _: For manufacturer setting	0h	
				_ x _ _: For manufacturer setting	0h	
				x _ _ _: For manufacturer setting	0h	
PC27	Function selection C-6 Set this function if undervoltage alarm occurs because of distorted power supply voltage waveform when using power regenerative converter or power regenerative common converter. 0 0 0 x: Setting when undervoltage alarm occurs 0: Initial value (Waveform of power supply voltage is not distorted) 1: Set "1" if undervoltage alarm occurs because of distorted power supply voltage waveform when using power regenerative converter or power regenerative common converter.	0000h	PC27	Function selection C-6 _ _ _ x: [AL. 10 Undervoltage] detection method selection Set this parameter when [AL. 10 undervoltage] occurs due to power supply voltage distortion while using FR-RC-(H) or FR-CV-(H). 0: When [AL. 10] does not occur 1: When [AL. 10] occurs	0h	P S T
				_ _ x _: Main circuit power supply selection This digit is not available with MR-J4-_A_(-RJ) 100 W or more servo amplifiers.	0h	P S T
				_ x _ _: Undervoltage alarm selection Select the alarm and warning for when the bus voltage drops to the undervoltage alarm level. 0: [AL. 10] regardless of servo motor speed 1: [AL. E9] at servo motor speed 50 r/min (50 mm/s) or less, [AL. 10] at over 50 r/min (50 mm/s)	0h	P S T
				x _ _ _: For manufacturer setting	0h	
PC30	Acceleration time constant 2 This parameter is made valid when the acceleration/deceleration selection (STAB2) is turned ON. Used to set the acceleration time required to reach the rated speed from Or/min in response to the analog speed command and internal speed commands 1 to 7.	0	PC30	Same as MR-J3 Acceleration time constant 2 To enable the parameter, turn on STAB2 (Speed acceleration/deceleration selection). Set the acceleration time required to reach the rated speed from 0 r/min or 0 mm/s for VC (Analog speed command) and [Pr. PC05 Internal speed command 1] to [Pr. PC11 Internal speed command 7]. Setting range: 0 to 50000	0	S T
PC31	Deceleration time constant 2 This parameter is made valid when the acceleration/deceleration selection (STAB2) is turned ON. Used to set the deceleration time required to reach Or/min from the rated speed in response to the analog speed command and internal speed commands 1 to 7.	0	PC31	Same as MR-J3 Deceleration time constant 2 To enable the parameter, turn on STAB2 (Speed acceleration/deceleration selection). Set the deceleration time required to reach 0 r/min or 0 mm/s from the rated speed for VC (Analog speed command) and [Pr. PC05 Internal speed command 1] to [Pr. PC11 Internal speed command 7]. Setting range: 0 to 50000	0	S T

MR-J3-_A_			MR-J4-_A_			Control mode
No.	Name and function	Initial value	No.	Name and function	Initial value	
PC32	Command pulse multiplying factor numerator 2 Available when the [Pr. PA05] is set to "0".	1	PC32	Commanded pulse multiplication numerator 2 To enable the parameter, select "Electronic gear (0 _ _ _)" or "J3 electronic gear setting value compatibility mode (2 _ _ _)" of "Electronic gear selection" in [Pr. PA21]. Setting range: 1 to 16777215	1	P
PC33	Command pulse multiplying factor numerator 3 Available when the [Pr. PA05] is set to "0".	1	PC33	Commanded pulse multiplication numerator 3 To enable the parameter, select "Electronic gear (0 _ _ _)" or "J3 electronic gear setting value compatibility mode (2 _ _ _)" of "Electronic gear selection" in [Pr. PA21]. Setting range: 1 to 16777215	1	P
PC34	Command pulse multiplying factor numerator 4 Available when the [Pr. PA05] is set to "0".	1	PC34	Commanded pulse multiplication numerator 4 To enable the parameter, select "Electronic gear (0 _ _ _)" or "J3 electronic gear setting value compatibility mode (2 _ _ _)" of "Electronic gear selection" in [Pr. PA21]. Setting range: 1 to 16777215	1	P
PC35	Internal torque limit 2 Set this parameter to limit servo motor torque on the assumption that the maximum torque is 100 [%]. When 0 is set, torque is not produced. When torque is output in analog monitor output, this set value is the maximum output voltage (8 V).	100.0	PC35	Internal torque limit 2 Set the parameter on the assumption that the maximum torque is 100.0%. The parameter is for limiting the torque of the servo motor. No torque is generated when this parameter is set to "0.0". When TL1 (Internal torque limit selection) is turned on, Internal torque limits 1 and 2 are compared and the lower value will be enabled. Setting range: 0.0 to 100.0	100.0	P S T

<table>
<tr><th colspan="3">MR-J3-_A_</th><th colspan="3">MR-J4-_A_</th><th rowspan="2">Control mode</th></tr>
<tr><th>No.</th><th>Name and function</th><th>Initial value</th><th>No.</th><th>Name and function</th><th>Initial value</th></tr>
<tr>
<td rowspan="3">PC36</td>
<td rowspan="3">Status display selection
Select the status display to be provided at power-on.
0 0 0 x:
Selection of status display at power-on
0: Cumulative feedback pulse
1: Servo motor speed
2: Droop pulse
3: Cumulative command pulses
4: Command pulse frequency
5: Analog speed command voltage (Note 1)
6: Analog torque command voltage (Note 2)
7: Regenerative load ratio
8: Effective load ratio
9: Peak load ratio
A: Instantaneous torque
B: Within one-revolution position (1 pulse unit)
C: Within one-revolution position (100 pulse unit)
D: ABS counter
E: Load inertia moment ratio
F: Bus voltage
Note 1. In speed control mode. Analog speed limit voltage in torque control mode.
2. In torque control mode. Analog torque limit voltage in speed or position control mode.

0 x 0 0:
Status display at power-on in corresponding control mode
<table>
<tr><th>Control mode</th><th>Status display at power-on</th></tr>
<tr><td>Position</td><td>Cumulative feedback pulses</td></tr>
<tr><td>Position/speed</td><td>Cumulative feedback pulses/servo motor speed</td></tr>
<tr><td>Speed</td><td>Servo motor speed</td></tr>
<tr><td>Speed/torque</td><td>Servo motor speed/analog torque command voltage</td></tr>
<tr><td>Torque</td><td>Analog torque command voltage</td></tr>
<tr><td>Torque/position</td><td>Analog torque command voltage/cumulative feedback pulses</td></tr>
</table>
0: Depends on the control mode.
1: Depends on the first digit setting of this parameter.</td>
<td rowspan="3">0000h</td>
<td rowspan="3">PC36</td>
<td>Status display selection
_ _ x x:
Status display selection at power-on
Select a status display shown at power-on. Setting "21" to "27" will trigger [AL. 37] in the mode other than the positioning mode.
00: Cumulative feedback pulses
01: Servo motor speed
02: Droop pulses
03: Cumulative command pulses
04: Command pulse frequency
05: Analog speed command voltage (Note 1)
06: Analog torque command voltage (Note 2)
07: Regenerative load ratio
08: Effective load ratio
09: Peak load ratio
0A: Instantaneous torque
0B: Within one-revolution position/within virtual one-revolution position (1 pulse unit)
0C: Within one-revolution position/within virtual one-revolution position (1000 pulses unit)
0D: ABS counter/virtual ABS counter
0E: Load to motor inertia ratio/load to motor mass ratio
0F: Bus voltage
10: Internal temperature of encoder
11: Settling time
12: Oscillation detection frequency
13: Number of tough operations
14: Unit power consumption (increment of 1 W)
15: Unit power consumption (increment of 1 kW)
16: Unit total power consumption (increment of 1 Wh)
17: Unit total power consumption (increment of 100 kWh)
18: Load-side cumulative feedback pulses
19: Load-side droop pulses
1A: Load-side encoder information 1 (1 pulse unit)
1B: Load-side encoder information 1 (100000 pulses unit)
1C: Load-side encoder ABS counter
1D: Z-phase counter (1 pulse unit)
1E: Z-phase counter (100000 pulses unit)
1F: Electrical angle (1 pulse unit)
20: Electrical angle (100000 pulses unit)
Note 1. It is for the speed control mode. It will be the analog speed limit voltage in the torque control mode.
2. It is for the torque control mode. It will be the analog torque limit voltage in the speed control mode and position control mode.</td>
<td>00h</td>
<td>P
S
T</td>
</tr>
<tr>
<td>_ x _ _:
Status display at power-on in corresponding control mode
0: Depends on the control mode
1: Depends on the last 2 digits settings of the parameter
<table>
<tr><th>Control mode</th><th>Status display at power-on</th></tr>
<tr><td>Position</td><td>Cumulative feedback pulses</td></tr>
<tr><td>Position/speed</td><td>Cumulative feedback pulses/servo motor speed</td></tr>
<tr><td>Speed</td><td>Servo motor speed</td></tr>
<tr><td>Speed/torque</td><td>Servo motor speed /analog torque command voltage</td></tr>
<tr><td>Torque</td><td>Analog torque command voltage</td></tr>
<tr><td>Torque/position</td><td>Analog torque command voltage/cumulative feedback pulses</td></tr>
</table></td>
<td>0h</td>
<td>P
S
T</td>
</tr>
<tr>
<td>x _ _ _:
For manufacturer setting</td>
<td>0h</td>
<td></td>
</tr>
</table>

MR-J3-_A_ No.	MR-J3-_A_ Name and function	MR-J3-_A_ Initial value	MR-J4-_A_ No.	MR-J4-_A_ Name and function	MR-J4-_A_ Initial value	Control mode
PC37	Analog speed command offset Used to set the offset voltage of the analog speed command (VC). For example, if CCW rotation is provided by switching on forward rotation start (ST1) with 0 V applied to VC, set a negative value. When automatic VC offset is used, the automatically offset value is set to this parameter. The initial value is the value provided by the automatic VC offset function before shipment at the VC-LG voltage of 0 V.	Depen-ding on servo amplifier	PC37	Same as MR-J3 Analog speed command offset Set the offset voltage of VC (Analog speed command). For example, if CCW rotation or positive direction travel is provided by switching on ST1 (Forward rotation start) while applying 0 V to VC, set a negative value. When automatic VC offset is used, the automatically offset value is set to this parameter. The initial value is provided before shipment by the automatic VC offset function on condition that the voltage between VC and LG is 0 V. Setting range: -9999 to 9999	The value differs depending on the servo amplifiers.	S
	Analog speed limit offset Used to set the offset voltage of the analog speed limit (VLA). For example, if CCW rotation is provided by switching on forward rotation selection (RS1) with 0 V applied to VLA, set a negative value. When automatic VC offset is used, the automatically offset value is set to this parameter. The initial value is the value provided by the automatic VC offset function before shipment at the VLA-LG voltage of 0 V.			Analog speed limit offset Set the offset voltage of VLA (Analog speed limit). For example, if CCW rotation or positive direction travel is provided by switching on RS1 (Forward rotation selection) while applying 0 V to VLA, set a negative value. When automatic VC offset is used, the automatically offset value is set to this parameter. (Refer to section 4.5.4.) The initial value is provided before shipment by the automatic VC offset function on condition that the voltage between VLA and LG is 0 V. Setting range: -9999 to 9999		T
PC38	Analog torque command offset Used to set the offset voltage of the analog torque command (TC).	0	PC38	Analog torque command offset Set the offset voltage of TC (Analog torque command). Setting range: -9999 to 9999 mV	0	T
	Analog torque limit offset Used to set the offset voltage of the analog torque limit (TLA).			Analog torque limit offset Set the offset voltage of TLA (Analog torque limit). Setting range: -9999 to 9999 mV		S
PC39	Analog monitor 1 offset Used to set the offset voltage of the analog monitor (MO1).	0	PC39	Same as MR-J3 Analog monitor 1 offset Set the offset voltage of MO1 (Analog monitor 1). Setting range: -9999 to 9999 mV	0	P S T
PC40	Analog monitor 2 offset Used to set the offset voltage of the analog monitor (MO2).	0	PC40	Same as MR-J3 Analog monitor 2 offset Set the offset voltage of MO2 (Analog monitor 2). Setting range: -9999 to 9999 mV	0	P S T
PC43	For manufacturer setting Do not change this value by any means.	0000h	PC43	Error excessive alarm level Set an error excessive alarm level. You can change the setting unit with "Error excessive alarm/error excessive warning level unit selection" in [Pr. PC24]. Set this per rev. for rotary servo motors. Setting "0" will be "3 rev", and setting over 200 rev will be clamped with 200 rev. Setting range: 0 to 1000	0	P

MR-J3-_A_ No.	MR-J3-_A_ Name and function		MR-J3-_A_ Initial value	MR-J4-_A_ No.	MR-J4-_A_ Name and function		MR-J4-_A_ Initial value	Control mode
PD01	Input signal automatic ON selection 1 Select the input devices to be automatically turned ON.		0000h	PD01	Same as MR-J3 Input signal automatic on selection 1 Select input devices to turn on them automatically.			
	_ _ _ x (HEX)	_ x _ _ (BIN): SON (Servo-on) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)			_ _ _ x (HEX)	_ _ _ x (BIN): For manufacturer setting	0h	
						_ _ x _ (BIN): For manufacturer setting		
						_ x _ _ (BIN): SON (Servo-on) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)		P S T
						x _ _ _ (BIN): For manufacturer setting		
	_ _ x _ (HEX)	_ _ _ x (BIN): PC (Proportional control) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)			_ _ x _ (HEX)	_ _ _ x (BIN): PC (Proportional control) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)	0h	P S
		_ _ x _ (BIN): TL (External torque) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)				_ _ x _ (BIN): TL (External torque) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)		P S
						_ x _ _ (BIN): For manufacturer setting		
						x _ _ _ (BIN): For manufacturer setting		
	_ x _ _ (HEX)	_ x _ _ (BIN): LSP (Forward rotation stroke end) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)			_ x _ _ (HEX)	_ _ _ x (BIN): For manufacturer setting	0h	
						_ _ x _ (BIN): For manufacturer setting		
						_ x _ _ (BIN): LSP (Forward rotation stroke end) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)		P S
		x _ _ _ (BIN): LSN (Reverse rotation stroke end) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)				x _ _ _ (BIN): LSN (Reverse rotation stroke end) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)		P S
					x _ _ _	For manufacturer setting		

MR-J3-_A_:

0 □ □ □

Signal name	Initial value BIN	Initial value HEX
	0	0
	0	
Servo-on (SON)	0	
	0	

Signal name	Initial value BIN	Initial value HEX
Proportion control (PC)	0	0
External torque limit selection (TL)	0	
	0	
	0	

Signal name	Initial value BIN	Initial value HEX
	0	0
	0	
Forward rotation stroke end (LSP)	0	
Reverse rotation stroke end (LSN)	0	

BIN 0: Used as external input signal
BIN 1: Automatic ON

For example, to turn ON SON, the setting is "0 0 0 4".

MR-J4-_A_:

Convert the setting value into hexadecimal as follows.

0 □ □ □

Signal name	Initial value BIN	Initial value HEX
	0	0
	0	
SON (Servo-on)	0	
	0	

Signal name	Initial value BIN	Initial value HEX
PC (Proportional control)	0	0
TL (External torque/external thrust limit selection)	0	
	0	
	0	

Signal name	Initial value BIN	Initial value HEX
	0	0
	0	
LSP (Forward rotation stroke end)	0	
LSN (Reverse rotation stroke end)	0	

BIN 0: Use for an external input signal.
BIN 1: Automatic on

<table>
<tr><th colspan="3">MR-J3-_A_</th><th colspan="3">MR-J4-_A_</th><th rowspan="2">Control mode</th></tr>
<tr><th>No.</th><th>Name and function</th><th>Initial value</th><th>No.</th><th>Name and function</th><th>Initial value</th></tr>
<tr>
<td rowspan="4">PD03</td>
<td rowspan="4">Input signal device selection 1 (CN1-15)
Any input signal can be assigned to the CN1-15 pin. Note that the setting digits and the signal that can be assigned change depending on the control mode.

Select the input device of the CN1-15 pin.

0 0 _ _ _ _ x x — Position control
0 0 _ _ x x _ _ — Speed control mode
0 0 x x _ _ _ _ — Torque control mode

The devices that can be assigned in each control mode are those that have the symbols indicated in the following table. If any other device is set, it is invalid.
<table>
<tr><th rowspan="2">Setting</th><th colspan="3">Control modes (Note 1)</th></tr>
<tr><th>P</th><th>S</th><th>T</th></tr>
<tr><td>00</td><td></td><td></td><td></td></tr>
<tr><td>01</td><td colspan="3">For manufacturer setting (Note 2)</td></tr>
<tr><td>02</td><td>SON</td><td>SON</td><td>SON</td></tr>
<tr><td>03</td><td>RES</td><td>RES</td><td>RES</td></tr>
<tr><td>04</td><td>PC</td><td>PC</td><td></td></tr>
<tr><td>05</td><td>TL</td><td>TL</td><td></td></tr>
<tr><td>06</td><td>CR</td><td></td><td></td></tr>
<tr><td>07</td><td></td><td>ST1</td><td>RS2</td></tr>
<tr><td>08</td><td></td><td>ST2</td><td>RS1</td></tr>
<tr><td>09</td><td>TL1</td><td>TL1</td><td></td></tr>
<tr><td>0A</td><td>LSP</td><td>LSP</td><td></td></tr>
<tr><td>0B</td><td>LSN</td><td>LSN</td><td></td></tr>
<tr><td>0C</td><td colspan="3">For manufacturer setting (Note 2)</td></tr>
<tr><td>0D</td><td>CDP</td><td>CDP</td><td></td></tr>
<tr><td>0E to 1F</td><td colspan="3">For manufacturer setting (Note 2)</td></tr>
<tr><td>20</td><td></td><td>SP1</td><td>SP1</td></tr>
<tr><td>21</td><td></td><td>SP2</td><td>SP2</td></tr>
<tr><td>22</td><td></td><td>SP3</td><td>SP3</td></tr>
<tr><td>23</td><td>LOP</td><td>LOP</td><td>LOP</td></tr>
<tr><td>24</td><td>CM1</td><td></td><td></td></tr>
<tr><td>25</td><td>CM2</td><td></td><td></td></tr>
<tr><td>26</td><td></td><td>STAB2</td><td>STAB2</td></tr>
<tr><td>27 to 3F</td><td colspan="3">For manufacturer setting (Note 2)</td></tr>
</table>
Note 1. P: Position control mode
S: Speed control mode
T: Torque control mode
2. For manufacturer setting. Never set this value.</td>
<td rowspan="4">0002
0202h</td>
<td rowspan="3">PD03</td>
<td>Input device selection 1L
Any input device can be assigned to the CN1-15 pin.
_ _ x x:
Position control mode - Device selection
Refer to table 2.7.</td>
<td>02h</td><td>P</td>
</tr>
<tr><td>x x _ _:
Speed control mode - Device selection
Refer to table 2.7.</td><td rowspan="2">02h</td><td rowspan="2">S</td></tr>
<tr><td>Table 2.7 Selectable input devices
<table>
<tr><th rowspan="2">Setting value</th><th colspan="3">Input device (Note 1)</th></tr>
<tr><th>P</th><th>S</th><th>T</th></tr>
<tr><td>02</td><td>SON</td><td>SON</td><td>SON</td></tr>
<tr><td>03</td><td>RES</td><td>RES</td><td>RES</td></tr>
<tr><td>04</td><td>PC</td><td>PC</td><td></td></tr>
<tr><td>05</td><td>TL</td><td>TL</td><td></td></tr>
<tr><td>06</td><td>CR</td><td></td><td></td></tr>
<tr><td>07</td><td></td><td>ST1</td><td>RS2</td></tr>
<tr><td>08</td><td></td><td>ST2</td><td>RS1</td></tr>
<tr><td>09</td><td>TL1</td><td>TL1</td><td></td></tr>
<tr><td>0A</td><td>LSP</td><td>LSP</td><td>LSP (Note 3)</td></tr>
<tr><td>0B</td><td>LSN</td><td>LSN</td><td>LSN (Note 3)</td></tr>
<tr><td>0D</td><td>CDP</td><td>CDP</td><td></td></tr>
<tr><td>0E</td><td>CLD</td><td></td><td></td></tr>
<tr><td>0F</td><td>MECR</td><td></td><td></td></tr>
<tr><td>20</td><td></td><td>SP1</td><td>SP1</td></tr>
<tr><td>21</td><td></td><td>SP2</td><td>SP2</td></tr>
<tr><td>22</td><td></td><td>SP3</td><td>SP3</td></tr>
<tr><td>23</td><td>LOP (Note 2)</td><td>LOP (Note 2)</td><td>LOP (Note 2)</td></tr>
<tr><td>24</td><td>CM1</td><td></td><td></td></tr>
<tr><td>25</td><td>CM2</td><td></td><td></td></tr>
<tr><td>26</td><td></td><td>STAB2</td><td>STAB2</td></tr>
</table>
Note 1. P: Position control mode
S: Speed control mode
T: Torque control mode
The diagonal lines indicate manufacturer settings. Never change the setting.
2. When assigning LOP (Control switching), assign it to the same pin in all control modes.
3. In the torque control mode, this device cannot be used during normal operation. Also, when the magnetic pole detection in the torque control mode is completed, this signal will be disabled.</td></tr>
<tr><td rowspan="2">PD04</td><td>Input device selection 1H
Any input device can be assigned to the CN1-15 pin.
_ _ x x:
Torque control mode - Device selection
Refer to table 2.7 in [Pr. PD03] for settings.</td><td>02h</td><td>T</td></tr>
<tr><td></td><td></td><td></td><td>x x _ _:
For manufacturer setting</td><td>02h</td><td></td></tr>
</table>

MR-J3-_A_			MR-J4-_A_			Control mode
No.	Name and function	Initial value	No.	Name and function	Initial value	
PD04	Input signal device selection 2 (CN1-16) Any input signal can be assigned to the CN1-16 pin. The devices that can be assigned and the setting method are the same as in [Pr. PD03]. Select the input device of the CN1-16 pin. 0 0 _ _ _ _ x x — Position control 0 0 _ _ x x _ _ — Speed control mode 0 0 x x _ _ _ _ — Torque control mode	0021 2100h	PD05	Input device selection 2L Any input device can be assigned to the CN1-16 pin.		
				_ _ x x: Position control mode - Device selection Refer to table 2.7 in [Pr. PD03] for settings.	00h	P
				x x _ _: Speed control mode - Device selection Refer to table 2.7 for settings.	21h	
			PD06	Input device selection 2H Any input device can be assigned to the CN1-16 pin.		
				_ _ x x: Torque control mode - Device selection Refer to table 2.7 in [Pr. PD03] for settings.	21h	T
				x x _ _: For manufacturer setting	20h	
PD05	Input signal device selection 3 (CN1-17) Any input signal can be assigned to the CN1-17 pin. The devices that can be assigned and the setting method are the same as in [Pr. PD03]. Select the input device of the CN1-17 pin. 0 0 _ _ _ _ x x — Position control 0 0 _ _ x x _ _ — Speed control mode 0 0 x x _ _ _ _ — Torque control mode When "Valid (ABS transfer by DI0)" has been selected for the absolute position detection system in [Pr. PA03], the CN1-17 pin is set to the ABS transfer mode (ABSM).	0007 0704h	PD07	Input device selection 3L Any input device can be assigned to the CN1-17 pin. When "_ _ _ 1" is set in [Pr. PA03] and absolute position detection system by DIO is selected, the CN1-17 pin will become ABSM (ABS transfer mode).		
				_ _ x x: Position control mode - Device selection Refer to table 2.7 in [Pr. PD03] for settings.	04h	P
				x x _ _: Speed control mode - Device selection Refer to table 2.7 in [Pr. PD03] for settings.	07h	S
			PD08	Input device selection 3H Any input device can be assigned to the CN1-17 pin.		
				_ _ x x: Torque control mode - Device selection Refer to table 2.7 in [Pr. PD03] for settings.	07h	T
				x x _ _: For manufacturer setting	07h	

MR-J3-_A_			MR-J4-_A_			Control mode
No.	Name and function	Initial value	No.	Name and function	Initial value	
PD06	Input signal device selection 4 (CN1-18) Any input signal can be assigned to the CN1-18 pin. The devices that can be assigned and the setting method are the same as in [Pr. PD03]. Select the input device of the CN1-18 pin. 0 0 _ _ _ _ x x Position control 0 0 _ _ x x _ _ Speed control mode 0 0 x x _ _ _ _ Torque control mode When "Valid (ABS transfer by DI0)" has been selected for the absolute position detection system in [Pr. PA03], the CN1-18 pin is set to the ABS transfer request (ABSR).	0008 0805h	PD09	Input device selection 4L When "_ _ _ 1" is set in [Pr. PA03] and absolute position detection system by DIO is selected, the CN1-18 pin will become ABSR (ABS transfer request).		
				_ _ x x: Position control mode - Device selection Refer to table 2.7 in [Pr. PD03] for settings.	05h	P
				x x _ _: Speed control mode - Device selection Refer to table 2.7 in [Pr. PD03] for settings.	08h	S
			PD10	Input device selection 4H Any input device can be assigned to the CN1-18 pin.		
				_ _ x x: Torque control mode - Device selection Refer to table 2.7 in [Pr. PD03] for settings.	08h	T
				x x _ _: For manufacturer setting	08h	
PD07	Input signal device selection 5 (CN1-19) Any input signal can be assigned to the CN1-19 pin. The devices that can be assigned and the setting method are the same as in [Pr. PD03]. Select the input device of the CN1-19 pin. 0 0 _ _ _ _ x x Position control 0 0 _ _ x x _ _ Speed control mode 0 0 x x _ _ _ _ Torque control mode	0003 0303h	PD11	Input device selection 5L Any input device can be assigned to the CN1-19 pin.		
				_ _ x x: Position control mode - Device selection Refer to table 2.7 in [Pr. PD03] for settings.	03h	P
				x x _ _: Speed control mode - Device selection Refer to table 2.7 in [Pr. PD03] for settings.	03h	S
			PD12	Input device selection 5H Any input device can be assigned to the CN1-19 pin.		
				_ _ x x: Torque control mode - Device selection Refer to table 2.7 in [Pr. PD03] for settings.	03h	T
				x x _ _: For manufacturer setting	03h	

MR-J3-_A_			MR-J4-_A_			Control mode
No.	Name and function	Initial value	No.	Name and function	Initial value	
PD08	Input signal device selection 6 (CN1-41) Any input signal can be assigned to the CN1-41 pin. The devices that can be assigned and the setting method are the same as in [Pr. PD03]. Select the input device of the CN1-41 pin. 0 0 _ _ _ _ x x — Position control 0 0 _ _ x x _ _ — Speed control mode 0 0 x x _ _ _ _ — Torque control mode	0020 2006h	PD13	Input device selection 6L Any input device can be assigned to the CN1-41 pin.		
				_ _ x x: Position control mode - Device selection Refer to table 2.7 in [Pr. PD03] for settings.	06h	P
				x x _ _: Speed control mode - Device selection Refer to table 2.7 in [Pr. PD03] for settings.	20h	S
			PD14	Input device selection 6H Any input device can be assigned to the CN1-41 pin.		
				_ _ x x: Torque control mode - Device selection Refer to table 2.7 in [Pr. PD03] for settings.	20h	T
				x x _ _: For manufacturer setting	39h	
PD10	Input signal device selection 8 (CN1-43) Any input signal can be assigned to the CN1-43 pin. The devices that can be assigned and the setting method are the same as in [Pr. PD03] Select the input device of the CN1-43 pin. 0 0 _ _ _ _ x x — Position control 0 0 _ _ x x _ _ — Speed control mode 0 0 x x _ _ _ _ — Torque control mode	0000 0A0Ah	PD17	Input device selection 8L Any input device can be assigned to the CN1-43 pin.		
				_ _ x x: Position control mode - Device selection Refer to table 2.7 in [Pr. PD03] for settings.	0Ah	P
				x x _ _: Speed control mode - Device selection Refer to table 2.7 in [Pr. PD03] for settings.	0Ah	S
			PD18	Input device selection 8H Any input device can be assigned to the CN1-43 pin.		
				_ _ x x: Torque control mode - Device selection Refer to table 5.10 in [Pr. PD03] for settings.	00h	T
				x x _ _: For manufacturer setting	0Ah	

MR-J3-_A_			MR-J4-_A_			Control mode
No.	Name and function	Initial value	No.	Name and function	Initial value	
PD11	Input signal device selection 9 (CN1-44) Any input signal can be assigned to the CN1-44 pin. The devices that can be assigned and the setting method are the same as in [Pr. PD03]. Select the input device of the CN1-44 pin. 0 0 _ _ _ _ x x — Position control 0 0 _ _ x x _ _ — Speed control mode 0 0 x x _ _ _ _ — Torque control mode	0000 0B0Bh	PD19	Input device selection 9L Any input device can be assigned to the CN1-44 pin.		
				_ _ x x: Position control mode - Device selection Refer to table 2.7 in [Pr. PD03] for settings.	0Bh	P
				x x _ _: Speed control mode - Device selection Refer to table 2.7 in [Pr. PD03] for settings.	0Bh	S
			PD20	Input device selection 9H Any input device can be assigned to the CN1-44 pin.		
				_ _ x x: Torque control mode - Device selection Refer to table 2.7 in [Pr. PD03] for settings.	00h	T
				x x _ _: For manufacturer setting	0Bh	
PD12	Input signal device selection 10 (CN1-45) Any input signal can be assigned to the CN1-45 pin. The devices that can be assigned and the setting method are the same as in [Pr. PD03]. Select the input device of the CN1-45 pin. 0 0 _ _ _ _ x x — Position control 0 0 _ _ x x _ _ — Speed control mode 0 0 x x _ _ _ _ — Torque control mode	0023 2323h	PD21	Input device selection 10L Any input device can be assigned to the CN1-45 pin.		
				_ _ x x: Position control mode - Device selection Refer to table 2.7 in [Pr. PD03] for settings.	23h	P
				x x _ _: Speed control mode - Device selection Refer to table 2.7 in [Pr. PD03] for settings.	23h	S
			PD22	Input device selection 10H Any input device can be assigned to the CN1-45 pin.		
				_ _ x x: Torque control mode - Device selection Refer to table 2.7 in [Pr. PD03] for settings.	23h	T
				x x _ _: For manufacturer setting	2Ah	

MR-J3-_A_ No.	MR-J3-_A_ Name and function	MR-J3-_A_ Initial value	MR-J4-_A_ No.	MR-J4-_A_ Name and function	MR-J4-_A_ Initial value	Control mode
PD13	Output signal device selection 1 (CN1-22) Any output signal can be assigned to the CN1-22 pin. In the initial setting, INP is assigned in the position control mode, and SA is assigned in the speed control mode. Note that the device that can be assigned changes depending on the control mode. 0 0 x x: Select the output device of the CN1-22 pin. The devices that can be assigned in each control mode are those that have the symbols indicated in the following table. If any other device is set, it is invalid. (See table A below.) When "Valid (ABS transfer by DI0)" has been selected for the absolute position detection system in [Pr. PA03], the CN1-22 pin is set to the ABS transmission data bit 0 (ABSB0) in the ABS transfer mode only.	0004h	PD23	Output device selection 1 _ _ x x: Device selection Any output device can be assigned to the CN1-22 pin. When "Enabled (absolute position detection system by DIO) (_ _ _ 1)" is selected in [Pr. PA03], the CN1-22 pin will become ABSB0 (ABS send data bit 0) only during ABS transfer mode. Refer to table 2.8 for settings.	04h	P S T
				_ x _ _: For manufacturer setting	0h	
				x _ _ _: For manufacturer setting	0h	

Table A (MR-J3-_A_):

Setting	Control modes (Note 1)		
	P	S	T
00	Always OFF	Always OFF	Always OFF
01	For manufacturer setting (Note 2)		
02	RD	RD	RD
03	ALM	ALM	ALM
04	INP	SA	Always OFF
05	MBR	MBR	MBR
06	DB	DB	DB
07	TLC	TLC	VLC
08	WNG	WNG	WNG
09	BWNG	BWNG	BWNG
0A	Always OFF	SA	SA
0B	Always OFF	Always OFF	VLC
0C	ZSP	ZSP	ZSP
0D	For manufacturer setting (Note 2)		
0E	For manufacturer setting (Note 2)		
0F	CDPS	Always OFF	Always OFF
10	For manufacturer setting (Note 2)		
11	ABSV	Always OFF	Always OFF
12 to 3F	For manufacturer setting (Note 2)		

Note 1. P: Position control mode
S: Speed control mode
T: Torque control mode
2. For manufacturer setting. Never set this value.

Table 2.8 Selectable output devices

Setting value	Output device (Note 1)		
	P	S	T
_ _ 00	Always off	Always off	Always off
_ _ 02	RD	RD	RD
_ _ 03	ALM	ALM	ALM
_ _ 04	INP	SA	Always off
_ _ 05	MBR	MBR	MBR
_ _ 06	DB	DB	DB
_ _ 07	TLC	TLC	VLC
_ _ 08	WNG	WNG	WNG
_ _ 09	BWNG	BWNG	BWNG
_ _ 0A	Always off	SA	Always off
_ _ 0B	Always off	Always off	VLC
_ _ 0C	ZSP	ZSP	ZSP
_ _ 0D	MTTR	MTTR	MTTR
_ _ 0F	CDPS	Always off	Always off
_ _ 10	CLDS	Always off	Always off
_ _ 11	ABSV	Always off	Always off

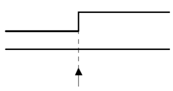
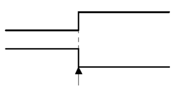
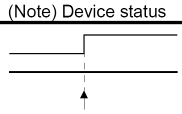
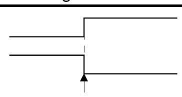
Note 1. P: Position control mode
S: Speed control mode
T: Torque control mode

MR-J3-_A_			MR-J4-_A_			Control mode
No.	Name and function	Initial value	No.	Name and function	Initial value	
PD14	Output signal device selection 2 (CN1-23) Any output signal can be assigned to the CN1-23 pin. In the initial setting, ZSP is assigned to the pin. The devices that can be assigned and the setting method are the same as in [Pr. PD13]. 0 0 x x: Select the output device of the CN1-23 pin. When "Valid (ABS transfer by DI0)" has been selected for the absolute position detection system in [Pr. PA13], the CN1-23 pin is set to the ABS transmission data bit 1 (ABSB1) in the ABS transfer mode only.	000Ch	PD24	Same as MR-J3 Output device selection 2 _ _ x x: Device selection Any output device can be assigned to the CN1-23 pin. When "Enabled (absolute position detection system by DIO) (_ _ _ 1)" is selected in [Pr. PA03], the CN1-23 pin will become ABSB1 (ABS send data bit 1) only during ABS transfer mode. Refer to table 2.8 in [Pr. PD23] for settings.	0Ch	P S T
				_ x _ _: For manufacturer setting	0h	
				x _ _ _: For manufacturer setting	0h	
PD15	Output signal device selection 3 (CN1-24) Any output signal can be assigned to the CN1-24 pin. In the initial setting, INP is assigned in the position control mode, and SA is assigned in the speed control mode. The devices that can be assigned and the setting method are the same as in [Pr. PD13]. 0 0 x x: Select the output device of the CN1-24 pin.	0004h	PD25	Same setting as MR-J3 Output device selection 3 _ _ x x: Device selection Any output device can be assigned to the CN1-24 pin. Refer to table 2.8 in [Pr. PD23] for settings.	04h	P S T
				_ x _ _: For manufacturer setting	0h	
				x _ _ _: For manufacturer setting	0h	
PD16	Output signal device selection 4 (CN1-25) Any output signal can be assigned to the CN1-25 pin. In the initial setting, TLC is assigned in the position control and speed control modes, and VLC is assigned in the torque control mode. The devices that can be assigned and the setting method are the same as in [Pr. PD13]. 0 0 x x: Select the output device of the CN1-25 pin. When "Valid (ABS transfer by DI0)" has been selected for the absolute position detection system in parameter No.PA03, the CN1-25 pin is set to the ABS transmission data ready (ABST) in the ABS transfer mode only.	0007h	PD26	Same setting as MR-J3 Output device selection 4 _ _ x x: Device selection Any output device can be assigned to the CN1-25 pin. When "Enabled (absolute position detection system by DIO) (_ _ _ 1)" is selected in [Pr. PA03], the CN1-25 pin will become ABST (ABS send data ready) only during ABS transfer mode. Refer to table 2.8 in [Pr. PD23] for settings.	07h	P S T
				_ x _ _: For manufacturer setting	0h	
				x _ _ _: For manufacturer setting	0h	
PD18	Output signal device selection 6 (CN1-49) Any output signal can be assigned to the CN1-49 pin. In the initial setting, RD is assigned to the pin. The devices that can be assigned and the setting method are the same as in [Pr. PD13]. 0 0 x x: Select the output device of the CN1-49 pin.	0002h	PD28	Same setting as MR-J3 Output device selection 6 _ _ x x: Device selection Any output device can be assigned to the CN1-49 pin. Refer to table 2.8 in [Pr. PD23] for settings.	02h	P S T
				_ x _ _: For manufacturer setting	0h	
				x _ _ _: For manufacturer setting	0h	

MR-J3-_A_			MR-J4-_A_			Control mode
No.	Name and function	Initial value	No.	Name and function	Initial value	
PD19	Input filter setting Select the input filter. 0 0 0 x: Input signal filter If external input signal causes chattering due to noise, etc., input filter is used to suppress it. 0: None 1: 1.777 [ms] 2: 3.555 [ms] 3: 5.333 [ms]	0002h	PD29	Input filter setting Select a filter for the input signal. _ _ _ x: Input signal filter selection If external input signal causes chattering due to noise, etc., input filter is used to suppress it. 0: None 1: 0.888 [ms] 2: 1.777 [ms] 3: 2.666 [ms] 4: 3.555 [ms] 5: 4.444 [ms] (available for the software version B3 or later) 6: 5.333 [ms] (available for the software version B3 or later)	4h	P S T
				_ _ x _: RES (Reset) dedicated filter selection 0: Disabled 1: Enabled (50 [ms])	0h	P S T
				_ x _ _: CR (Clear) dedicated filter selection 0: Disabled 1: Enabled (50 [ms])	0h	P S T
				x _ _ _: For manufacturer setting	0h	
PD20	Function selection D-1 Select the stop processing at forward rotation stroke end (LSP)/reverse rotation stroke end (LSN) OFF and the base circuit status at reset (RES) ON. 0 0 _ x: How to make a stop when forward rotation stroke end (LSP) reverse rotation stroke end (LSN) is valid. 0: Sudden stop 1: Slow stop	0000h	PD30	Function selection D-1 _ _ _ x: Stop method selection for LSP (Forward rotation stroke end) off and LSN (Reverse rotation stroke end) off Select a stop method for LSP (Forward rotation stroke end) off and LSN (Reverse rotation stroke end) off. Setting "2" or "3" will trigger [AL. 37] in the mode other than the positioning mode. 0: Quick stop 1: Slow stop	0h	P S
	0 0 x _ : Selection of base circuit status at reset (RES) ON 0: Base circuit switched off 1: Base circuit not switched off			_ _ x _: Base circuit status selection for RES (Reset) on 0: Base circuit shut-off 1: No base circuit shut-off	0h	P S T
				_ x _ _: For manufacturer setting	0h	
				x _ _ _: Enabled/disabled selection for a thermistor of servo motor 0: Enabled 1: Disabled The setting in this digit will be disabled when using a servo motor without thermistor. This parameter is used by servo amplifier with software version A5 or later.	0h	P S T

MR-J3-_A_			MR-J4-_A_			Control mode
No.	Name and function	Initial value	No.	Name and function	Initial value	
PD21	For manufacturer setting Do not change this value by any means.	0000h	PD31	Function selection D-2 _ _ _ x: For manufacturer setting	0h	
				_ _ x _: For manufacturer setting	0h	
				_ x _ _: INP (In-position) on condition selection Select a condition that INP (In-position) is turned on. 0: Droop pulses are within the in-position range. 1: The command pulse frequency is 0, and droop pulses are within the in-position range. When the position command is not inputted for about 1 ms, the command pulse frequency is decided as 0. This parameter is used by servo amplifier with software version B4 or later.	0h	P
				x _ _ _: For manufacturer setting	0h	
PD22	Function selection D-3 Set the clear (CR). 0 0 0 x: Clear (CR) selection 0: Droop pulses are cleared on the leading edge. 1: While on, droop pulses are always cleared.	0000h	PD32	Same setting as MR-J3 Function selection D-3 _ _ _ x: CR (Clear) selection Set CR (Clear). 0: Deleting droop pulses at the leading edge of turning on of CR 1: Continuous deleting of droop pulses while CR is on 2: Disabled (available for the software version B3 or later)	0h	P
				_ _ x _: For manufacturer setting	0h	
				_ x _ _: For manufacturer setting	0h	
				x _ _ _: For manufacturer setting	0h	
PD23	For manufacturer setting Do not change this value by any means.	0000h	PD33	_ _ _ x: For manufacturer setting	0h	
				_ _ x _: For manufacturer setting	0h	
				Function selection D-4 _ x _ _: Rotation direction selection for enabling torque limit Select a direction which enables internal torque limit 2 or external torque limit. 0: Both of "CCW or positive direction" and "CW or negative direction" are enabled. 1: Enabled with "CCW or positive direction" 2: Enabled with "CW or negative direction" This parameter setting is used with servo amplifier with software version B3 or later.	0h	P S T
				x _ _ _: For manufacturer setting	0h	

<table>
<tr><th colspan="3">MR-J3-_A_</th><th colspan="3">MR-J4-_A_</th><th rowspan="2">Control mode</th></tr>
<tr><th>No.</th><th>Name and function</th><th>Initial value</th><th>No.</th><th>Name and function</th><th>Initial value</th></tr>
<tr>
<td rowspan="4">PD24</td>
<td rowspan="3">Function selection D-5
Select the alarm code and warning (WNG) outputs.

0 0 _ x:
Setting of alarm code output
<table>
<tr><th rowspan="2">Set value</th><th colspan="3">Connector pins of CN1</th></tr>
<tr><th>22</th><th>23</th><th>24</th></tr>
<tr><td>0</td><td colspan="3">Alarm code is not output.</td></tr>
<tr><td>1</td><td colspan="3">Alarm code is output at alarm occurrence.</td></tr>
</table>
<table>
<tr><th colspan="3">(Note) Alarm code</th><th rowspan="2">Alarm display</th><th rowspan="2">Name</th></tr>
<tr><th>CN1 pin 22</th><th>CN1 pin 23</th><th>CN1 pin 24</th></tr>
<tr><td rowspan="9">0</td><td rowspan="9">0</td><td rowspan="9">0</td><td>88888</td><td>Watchdog</td></tr>
<tr><td>AL.12</td><td>Memory error 1</td></tr>
<tr><td>AL.13</td><td>Clock error</td></tr>
<tr><td>AL.15</td><td>Memory error 2</td></tr>
<tr><td>AL.17</td><td>Board error 2</td></tr>
<tr><td>AL.19</td><td>Memory error 3</td></tr>
<tr><td>AL.37</td><td>Parameter error</td></tr>
<tr><td>AL.8A</td><td>Serial communication time-out error</td></tr>
<tr><td>AL.8E</td><td>Serial communication error</td></tr>
<tr><td rowspan="2">0</td><td rowspan="2">0</td><td rowspan="2">1</td><td>AL.30</td><td>Regenerative error</td></tr>
<tr><td>AL.33</td><td>Overvoltage</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>AL.10</td><td>Undervoltage</td></tr>
<tr><td rowspan="5">0</td><td rowspan="5">1</td><td rowspan="5">1</td><td>AL.45</td><td>Main circuit device overheat</td></tr>
<tr><td>AL.46</td><td>Servo motor overheat</td></tr>
<tr><td>AL.47</td><td>Cooling fan alarm</td></tr>
<tr><td>AL.50</td><td>Overload 1</td></tr>
<tr><td>AL.51</td><td>Overload 2</td></tr>
<tr><td rowspan="2">1</td><td rowspan="2">0</td><td rowspan="2">0</td><td>AL.24</td><td>Main circuit</td></tr>
<tr><td>AL.32</td><td>Overcurrent</td></tr>
<tr><td rowspan="3">1</td><td rowspan="3">0</td><td rowspan="3">1</td><td>AL.31</td><td>Overspeed</td></tr>
<tr><td>AL.35</td><td>Command pulse frequency error</td></tr>
<tr><td>AL.52</td><td>Error excessive</td></tr>
<tr><td rowspan="4">1</td><td rowspan="4">1</td><td rowspan="4">0</td><td>AL.16</td><td>Encoder error 1</td></tr>
<tr><td>AL.1A</td><td>Motor combination error</td></tr>
<tr><td>AL.20</td><td>Encoder error 2</td></tr>
<tr><td>AL.25</td><td>Absolute position erase</td></tr>
</table>
Note 0: off
1: on
A parameter alarm (AL. 37) occurs if the alarm code output is selected with [Pr. PA03] set to "_ _ _ 1" and the DI0-based absolute position detection system selected.</td>
<td rowspan="4">0000h</td>
<td rowspan="4">PD34</td>
<td>Alarm code output
Select output status of alarm codes.
Alarm codes are outputted to the pins CN1-22, CN1-23, and CN1-24.
0: Disabled
1: Enabled
When "Enabled (absolute position detection system by DIO) (_ _ _ 1)" is selected in [Pr. PA03] and when MBR (Electromagnetic brake interlock) or ALM (Malfunction) is assigned to the CN1-22 pin, CN1-23 pin, or CN1-24 pin, selecting alarm code output will generate [AL. Parameter error].
(The alarm code output is different from that for MR-J3. Check the MR-J4-_A_ Servo Amplifier Instruction Manual.)</td>
<td>0h</td>
<td>P
S
T</td>
</tr>
<tr>
<td>_ _ x _ :
Selection of output device at warning occurrence
Select ALM (Malfunction) output status at warning occurrence.
<table>
<tr><th>Setting value</th><th>Device status</th></tr>
<tr><td>0</td><td>WNG ON OFF
ALM ON OFF

Warning occurrence</td></tr>
<tr><td>1</td><td>WNG ON OFF
ALM ON OFF

Warning occurrence</td></tr>
</table></td>
<td>0h</td>
<td>P
S
T</td>
</tr>
<tr>
<td>_ x _ _:
For manufacturer setting</td>
<td>0h</td>
<td></td>
</tr>
<tr>
<td>0 0 x _:
Selection of output device at warning occurrence
Select the warning (WNG) and trouble (ALM) output status at warning occurrence.
<table>
<tr><th>Setting</th><th>(Note) Device status</th></tr>
<tr><td>0</td><td>WNG 1 0
ALM 1 0

Warning occurrence</td></tr>
<tr><td>1</td><td>WNG 1 0
ALM 1 0

Warning occurrence</td></tr>
</table>
Note 0: off
1: on</td>
<td>x _ _ _:
For manufacturer setting</td>
<td>0h</td>
<td></td>
</tr>
</table>

3.6 Important Points for Replacement

1. SUMMARY

This section describes the precautions for setting parameters for the replacement of MR-J3-_A_ with MR-J4-_A_

2. Precautions

We recommend that you use the parameter converter function (supported from version 1.12N or later) of MR Configurator2 for the replacement of MR-J3-_A_ with MR-J4-_A_. The following describes the parameters that are easily missed when the parameter setting is manually changed. For the changed parameter list, refer to (1) to (3) below.

(1) Command input pulse train filter selection (_ x _ _) of [Pr. PA13 Command pulse input form]
As compared to MR-J3-_A_, the command input pulse train filter selection is added in PA13 of MR-J4-_A_. Do not set "0h" for the command input pulse train filter selection when changing the command input pulse train form selection and pulse train logic selection. Setting "0h" for the command input pulse train filter selection enables the command input of up to 4 Mpps but reduces the noise filter ability.

No./symbol/ name	Setting digit	Function	Initial value [unit]	Control mode (O:Enabled)		
				P	S	T
PA13 *PLSS Command pulse input form	_ _ _ x	Command input pulse train form selection 0: Forward/reverse rotation pulse train 1: Signed pulse train 2: A-phase/B-phase pulse train	0h	○		
	_ _ x _	Pulse train logic selection 0: Positive logic 1: Negative logic	0h	○		
	_ x _ _	Command input pulse train filter selection Selecting proper filter enables to enhance noise tolerance. 0: Command input pulse train is 4 Mpulses/s or less. 1: Command input pulse train is 1 Mpulse/s or less. 2: Command input pulse train is 500 kpulses/s or less. 3: Command input pulse train is 200 kpulses/s or less (available for the software version A5 or later) 1 Mpulse/s or lower commands are supported by "1". When inputting commands over 1 Mpulse/s and 4 Mpulses/s or lower, set "0".	1h	○		
	x _ _ _	For manufacturer setting	0h			

(2) [Pr. PC16 Electromagnetic brake sequence output]
MR-J3-_A_ and MR-J4-_A_ have different initial values for PC16 (MR-J3-_A_: 100 ms, MR-J4-_A_: 0 ms). When MBR (Electromagnetic brake interlock) is assigned for PD23 to PD26 and PD28, refer to the MR-J4-_A_ Servo Amplifier Instruction Manual and then set PC16.

No./symbol/ name	Setting digit	Function	Initial value [unit]	Control mode (○: Enabled) P	S	T
PC16 MBR Electromagnetic brake sequence output		Set the delay time between MBR (Electromagnetic brake interlock) and the base drive circuit is shut-off. Setting range: 0 to 1000	0 [ms]	○	○	○

(3) Input signal filter selection (_ _ _ x) of [Pr. PD29 Input filter setting]
MR-J3-_A_ and MR-J4-_A_ have different initial values for the input signal filter selection.

<table>
<tr><th rowspan="2">No./symbol/ name</th><th rowspan="2">Setting digit</th><th rowspan="2">Function</th><th rowspan="2">Initial value [unit]</th><th colspan="3">Control mode (○:Enabled)</th></tr>
<tr><th>P</th><th>S</th><th>T</th></tr>
<tr><td rowspan="5">PD29
*DIF
Input filter setting</td><td colspan="6">Select a filter for the input signal.</td></tr>
<tr><td>_ _ _ x</td><td>Input signal filter selection
If external input signal causes chattering due to noise, etc., input filter is used to suppress it.
<table>
<tr><th>Setting value</th><th>MR-J4-_A_</th><th>MR-J3-_A_</th></tr>
<tr><td>0</td><td>None</td><td>None</td></tr>
<tr><td>1</td><td>0.888 [ms]</td><td>1.777 [ms]</td></tr>
<tr><td>2</td><td>1.777 [ms]</td><td>3.555 [ms] (Initial value)</td></tr>
<tr><td>3</td><td>2.666 [ms]</td><td>5.333 [ms]</td></tr>
<tr><td>4</td><td>3.555 [ms] (Initial value)</td><td></td></tr>
</table></td><td>4h</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td>_ _ x _</td><td>RES (Reset) dedicated filter selection
0: Disabled
1: Enabled (50 [ms])</td><td>0h</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td>_ x _ _</td><td>CR (Clear) dedicated filter selection
0: Disabled
1: Enabled (50 [ms])</td><td>0h</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td>x _ _ _</td><td>For manufacturer setting</td><td>0h</td><td></td><td></td><td></td></tr>
</table>

Part 3
Review on Replacement of MR-J3-_B_ with MR-J4-_B_

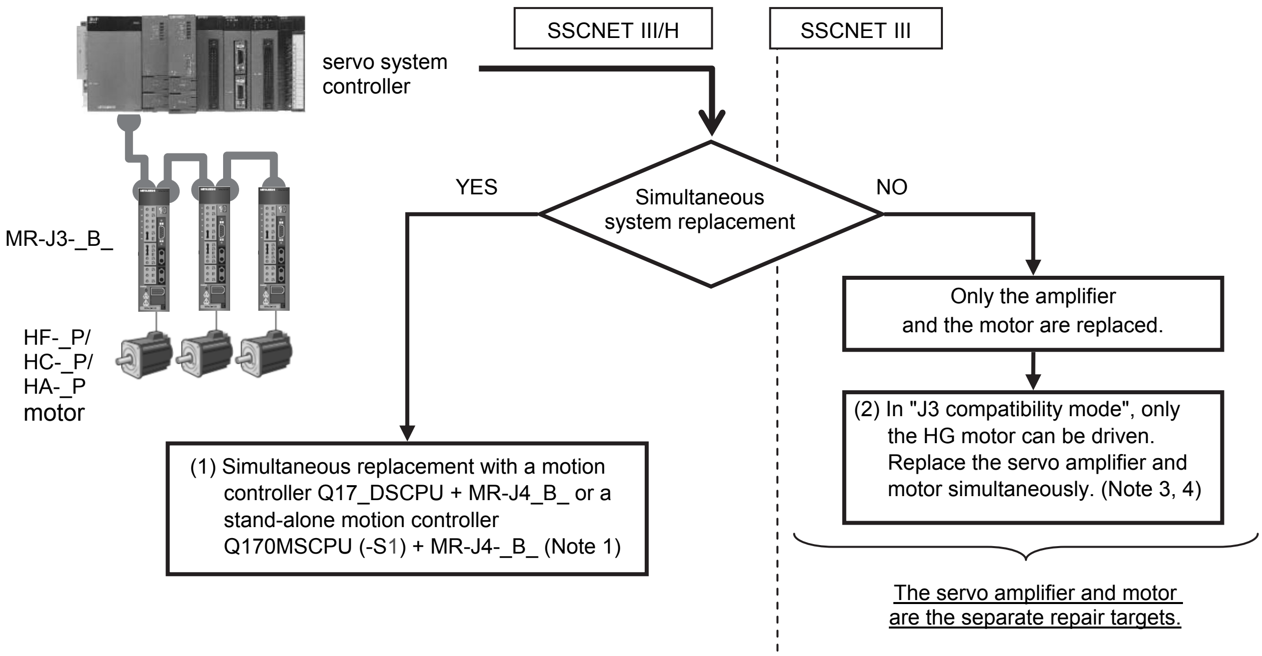
Part 3: Review on Replacement of MR-J3-_B_ with MR-J4-_B_

1. SUMMARY

This document describes the changes that are applied to when replacing a system using the MR-J3-_B_ with a system using the MR-J4-_B_.

2. CASE STUDY ON REPLACEMENT OF MR-J3-_B_

2.1 Review on Replacement Method



Note 1. Although heavier burdens including a longer construction period need to be borne, once replaced the system can be operated for a long period of time.
2. When designing a new system, apply simultaneous replacement at (1).
3. Separate repair means replacement.
4. When the servo motor is replaced with an HG motor, simultaneous replacement with MR-J4-_B_ and an HG motor is necessary. (When the servo amplifier is used in "J3 compatibility mode" for MR-J4 with SSCNET III, simultaneous replacement to MR-J4-_B_ + HG motor is necessary.)

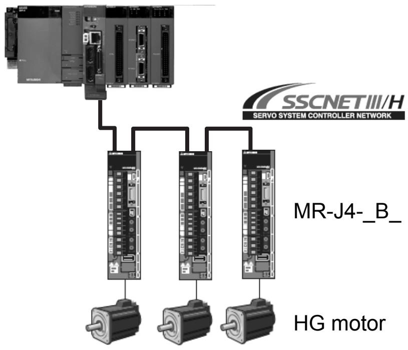
2.2 Replacement Method

This section shows replacements using a QDS motion controller and an SSCNETIII/H-compatible stand-alone motion controller as examples.

(1) For simultaneous replacement

QDS motion controller + MR-J4-_B_ + HG motor

QnUD programmable controller +
QDS motion controller + Q3_DB

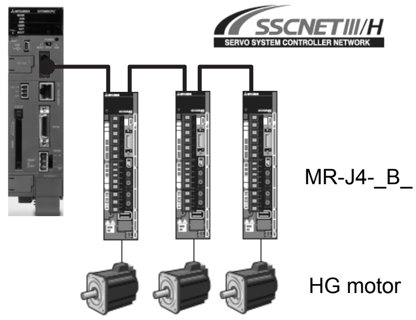


High-speed motion control and excellent extensibility can reduce cycle time.

"QDS motion controller" refers to the following model.
Q172DSCPU/Q173DSCPU

Stand-alone motion controller + MR-J4-_B_ + HG motor

SSCNET III/H-compatible stand-alone motion controller:
Q170MSCPU (-S1)



High performance equivalent to that of a QDS motion controller can be achieved at a lower cost.

"Stand-alone motion controller" refers to the following model.
Q170MSCPU (-S1)

(2) Gradual replacement/separate repair of MR-J3-_B_ with MR-J4-_B_

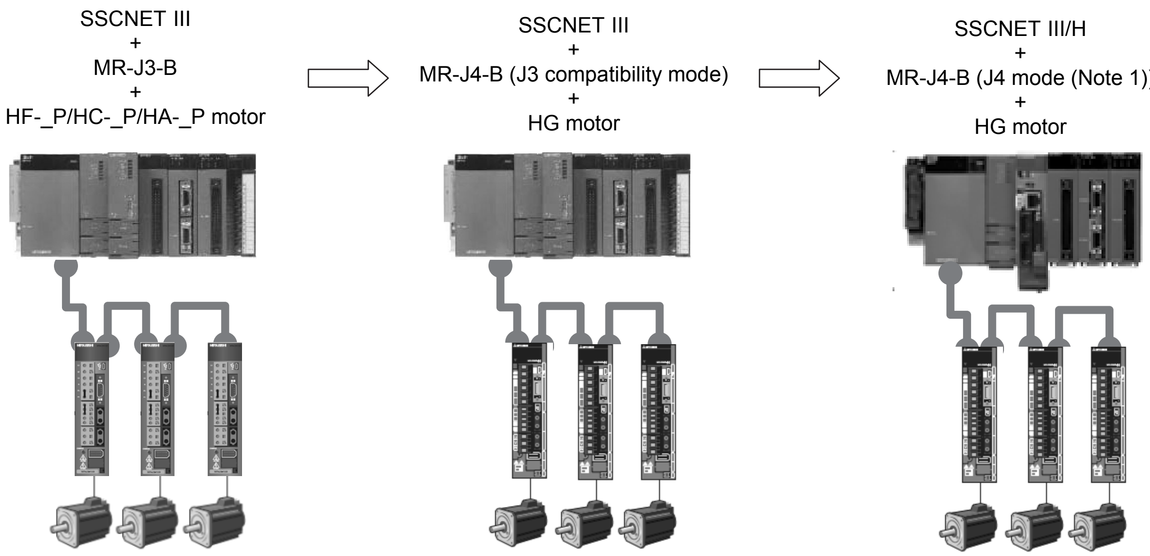
POINT

- MR-J3-_B_ cannot drive an HG motor. When the servo motor is replaced with an HG motor, simultaneous replacement with MR-J4-_B_ and an HG motor is necessary.
- When the servo amplifier is used in "J3 compatibility mode" for MR-J4 with SSCNET III, simultaneous replacement to MR-J4-_B_ + HG motor is necessary.
- When an "HC-_P motor" shown below is used, "simultaneous replacement with MR-J4-_B_ and an HG motor" is recommended. When an HG motor is adopted, the capacity of the servo amplifier needs to be changed. (Consider replacement, referring to "torque characteristics" described in "Part 5: Replacement of Motor".)
- The low inertia "HG-JR motor" is recommended for the replacement of "HC-LP motor".

  To use a servo motor other than the motors listed in following table, check the compatibility with the equipment because the motor inertia, etc. is different.

Existing device models		Replacement models for simultaneous replacement (example)	
Servo motor	Servo amplifier	Servo motor	Servo amplifier
HC-RP103(B)G5 1/_	MR-J3-200B(N)(-RT)	HG-SR102(B)G5 1/_	MR-J4-100B
HC-RP203(B)G5 1/_	MR-J3-350B	HG-SR202(B)G5 1/_	MR-J4-200B
HC-RP353(B)G5 1/_	MR-J3-500B	HG-SR352(B)G5 1/_	MR-J4-350B
HC-RP103(B)G7 1/_	MR-J3-200B(N)(-RT)	HG-SR102(B)G7 1/_	MR-J4-100B
HC-RP203(B)G7 1/_	MR-J3-350B	HG-SR202(B)G7 1/_	MR-J4-200B
HC-RP353(B)G7 1/_	MR-J3-500B	HG-SR352(B)G7 1/_	MR-J4-350B
HC-LP52(B)	MR-J3-60B	HG-JR73(B)	MR-J4-70B
HC-LP102(B)	MR-J3-100B	HG-JR153(B)	MR-J4-200B
HC-LP152(B)	MR-J3-200B(N)(-RT)	HG-JR353(B)	MR-J4-350B

(Current configuration)



Note 1. For "J3 compatibility mode" and "J4 mode", refer to "Part 3 Section 4.1 J3 compatibility mode".

3. DIFFERENCES BETWEEN MR-J3-_B_ AND MR-J4-_B_

3.1 Function Comparison Table

< Comparison of 200 V Class >

Item		MR-J3-_B_	MR-J4-_B_
1	Capacity range	0.1 kW to 22 kW/200 V	0.1 kW to 22 kW/200 V
2	Internal regenerative resistor	Built-in (0.2 kW to 7 kW) External (11kW to 22 kW)	Built-in (0.2 kW to 7 kW) External (11kW to 22 kW)
3	Dynamic brake	Built-in (0.1kW to 7kW) External (11kW to 22 kW)	Built-in (0.1kW to 7kW) External (11kW to 22 kW) **Coasting distance may differ. (Note 1)**
4	Control circuit power	1-phase 200 V AC to 230 V AC	1-phase 200 V AC to **240** V AC
5	Main circuit power	1-phase 200 V AC to 230 V AC (0.1 kW to 0.75 kW) 3-phase 200 V AC to 230 V AC (0.1 kW to 22 kW)	1-phase 200 V AC to **240** V AC (0.1 kW to **2 kW**) 3-phase 200 V AC to **240** V AC (0.1 kW to 22 kW)
6	24 V DC power	External supply required	External supply required
7	Auto Tuning	Real-time auto tuning: 32 steps Advanced gain search	Real-time auto tuning: **40 steps** **One-touch tuning**
8	Control mode	SSCNET III Interface (50 Mbps) ・Position control mode ・Speed control mode	**SSCNET III/H Interface (150 Mbps)** ・Position control mode ・Speed control mode ・**Torque control mode** **< J3 compatibility mode >** SSCNET III Interface (50 Mbps) ・Position control mode ・Speed control mode
9	The number of DIO points (excluding EM1)	SSCNET III Interface DI: 3 points, DO: 3 points	SSCNET III/H Interface DI: 3 points, DO: 3 points
10	Encoder pulse output	ABZ-phase (differential)	ABZ-phase (differential)
11	DIO interface	input/output: sink/source	input/output: sink/source
12	Analog input/output	SSCNET III Interface (Output) 10-bit or equivalent × 2ch	SSCNET III/H Interface (Output) 10-bit or equivalent × 2ch
13	Parameter setting method	MR Configurator (SETUP221) MR Configurator2	MR Configurator2
14	Setup software communication function	USB	USB
15	Servo motor (Encoder resolution)	HF-_P series (18-bit ABS) HA-_P series (18-bit ABS)	HG series (**22**-bit ABS)
16	Motor maximum torque	HF-KP 350%	HG-KR 350%
		HF-MP 300%	HG-MR 300%
		HF-SP 300%	HG-SR 300%
		HF-JP 300%	HG-JR 300%
		HA-LP 250%	**HG-JR 300%**
17	LED display	7-segment 3-digit	7-segment 3-digit
18	Advanced vibration suppression control	Provided	Provided **(II 3 inertia vibration suppression)**
19	Adaptive filter II	Provided	Provided
20	Notch filter	Provided (2 pcs)	Provided (**5** pcs)
21	Tough drive	Unprovided	**Provided**
22	Drive recorder	Unprovided	**Provided**
23	Forced stop	EM1 (DB stop)	**EM1 (DB stop)/ EM2 (deceleration to a stop)**
Note		Functions with difference are **shown with shading**.	

Note 1. For the coasting distance, refer to "1.2.3 Dynamic brake: coasting distance" in "Part 4 Common Reference Material".

< Comparison of 400 V Class >

Item		MR-J3-_B_	MR-J4-_B_
1	Capacity range	0.6 kW to 22 kW/400 V	0.6 kW to 22 kW/400 V
2	Internal regenerative resistor	Built-in (0.6 kW to 7 kW) External (11kW to 22 kW)	Built-in (0.6 kW to 7 kW) External (11kW to 22 kW)
3	Dynamic brake	Built-in (0.6 kW to 7 kW) External (11kW to 22 kW)	Built-in (0.6 kW to 7 kW) External (11kW to 22 kW) **Coasting distance may differ. (Note 1)**
4	Control circuit power	1-phase 380 V AC to 480 V AC	1-phase 380 V AC to 480 V AC
5	Main circuit power	3-phase 380 V AC to 480 V AC	3-phase 380 V AC to 480 V AC
6	24 V DC power	External supply required	External supply required
7	Auto Tuning	Real-time auto tuning: 32 steps Advanced gain search	Real-time auto tuning: **40 steps** **One-touch tuning**
8	Control mode	SSCNET III Interface (50 Mbps) ・Position control mode ・Speed control mode	**SSCNET III/H Interface (150 Mbps)** ・Position control mode ・Speed control mode ・**Torque control mode** **< J3 compatibility mode >** SSCNET III Interface (50 Mbps) ・Position control mode ・Speed control mode
9	The number of DIO points (excluding EM1)	SSCNET III Interface DI: 3 points, DO: 3 points	SSCNET III /H Interface DI: 3 points, DO: 3 points
10	Encoder pulse output	ABZ-phase (differential) (A) General-Purpose Interface Z-phase (open collector)	ABZ-phase (differential) General-Purpose Interface Z-phase (open collector)
11	DIO interface	input/output: sink/source	input/output: sink/source
12	Analog input/output	SSCNET III Interface (Output) 10-bit or equivalent × 2ch	SSCNET III/H Interface (Output) 10-bit or equivalent × 2ch
13	Parameter setting method	MR Configurator (SETUP221) MR Configurator2	MR Configurator2
14	Setup software communication function	USB	USB
15	Servo motor (Encoder resolution)	HF-_P series (18-bit ABS) HA-_P series (18-bit ABS)	HG series (**22**-bit ABS)
16	Motor maximum torque	HF-SP 300%	HG-SR 300%
		HF-JP 300%	HG-JR 300%
		HA-LP 250%	**HG-JR 300%**
17	LED display	7-segment 3-digit	7-segment 3-digit
18	Advanced vibration suppression control	Provided	Provided **(II 3 inertia vibration suppression)**
19	Adaptive filter II	Provided	Provided
Note		Functions with difference are **shown with shading**.	

Note 1. For the coasting distance, refer to "1.2.3 Dynamic brake: coasting distance" in "Part 4 Common Reference Material".

3.2 Comparison of Networks

MR-J4-_B_ servo amplifier is connected to controllers, including a servo system controller, on the high-speed synchronous network SSCNET III/H. The servo amplifier directly receives a command from a controller to drive a servo motor.
SSCNET III/H allows higher-speed communication of 150 Mbps for both upstream and downstream traffic to be achieved with high noise resistance enabled by adoption of the SSCNET III optical cables. Large amounts of data are exchanged in real-time between the controller and the servo amplifier. Servo monitor information is stored in the upper information system and is used for control.

3.2.1 Comparison of servo system network specifications

Item	MR-J3 series		MR-J4 series (Note 1)	
	SSCNET III		SSCNET III	SSCNET III/H
Communication media	Optical fiber cable	→	Optical fiber cable	
Communication speed	50 Mbps		50 Mbps	150 Mbps
Transmission distance	[Standard cord inside cabinet/ standard cable outside cabinet] Maximum distance between stations: 20 m		[Standard cord inside cabinet/ standard cable outside cabinet] Maximum distance between stations: 20 m	
	[Long distance cable] Maximum distance between stations: 50 m		[Long distance cable] Maximum distance between stations: 50 m	[Long distance cable] Maximum distance between stations: 100 m

Note 1. When you connect an amplifier with SSCNET III/H communication for the first controller communication with the factory setting, the operation mode will be fixed to "J4 mode". For SSCNET III communication, the operation mode will be fixed to "J3 compatibility mode". To return to the factory setting or to select an arbitrary mode, change the setting with the application "MR-J4 (W)-B mode selection".
The application "MR-J4 (W)-B mode selection" is available with MR Configurator2 Version 1.12N and later. When a version older than 1.12N is used, download an update version from the MITSUBISHI ELECTRIC FA Global Website.

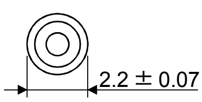
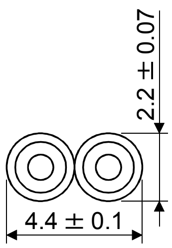
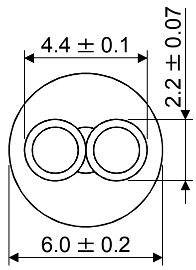
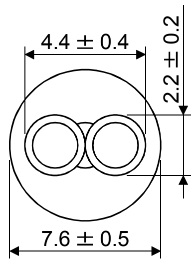
(1) Explanation of SSCNET III/H cable models

Function	Name	J4 series		MR-J3/MR-J3W series
		J4 mode	J3 compatibility mode	
SSCNET III/H communication or SSCNET III communication	Communication baud rate	150 Mbps	50 Mbps	50 Mbps
	Maximum distance between stations	100 m	50 m	50 m

Note For cable of 30 m or shorter, contact your local sales office.
Contact Mitsubishi Electric System & Service about ultra-high flex-life cables and long distance cables longer than 50 m.

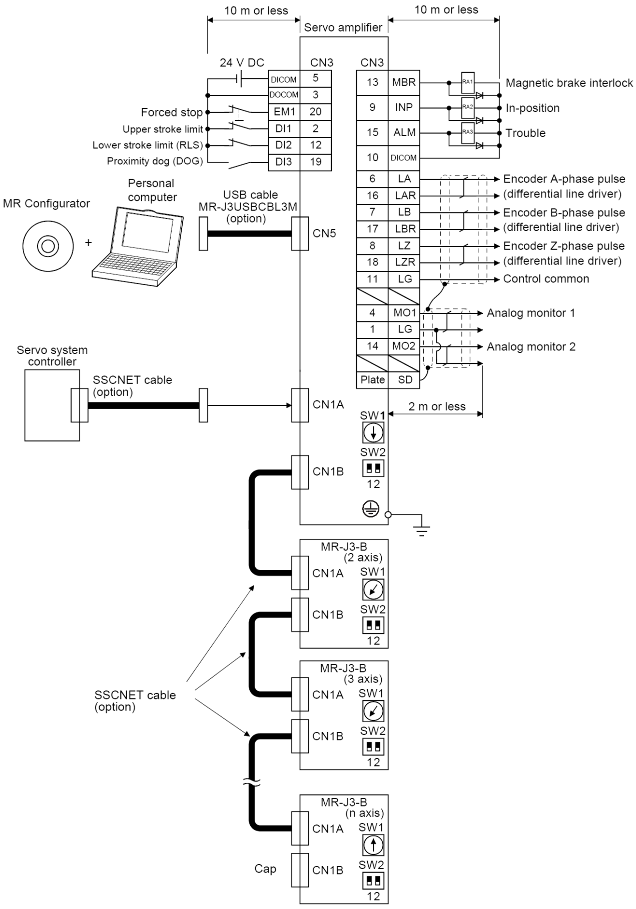
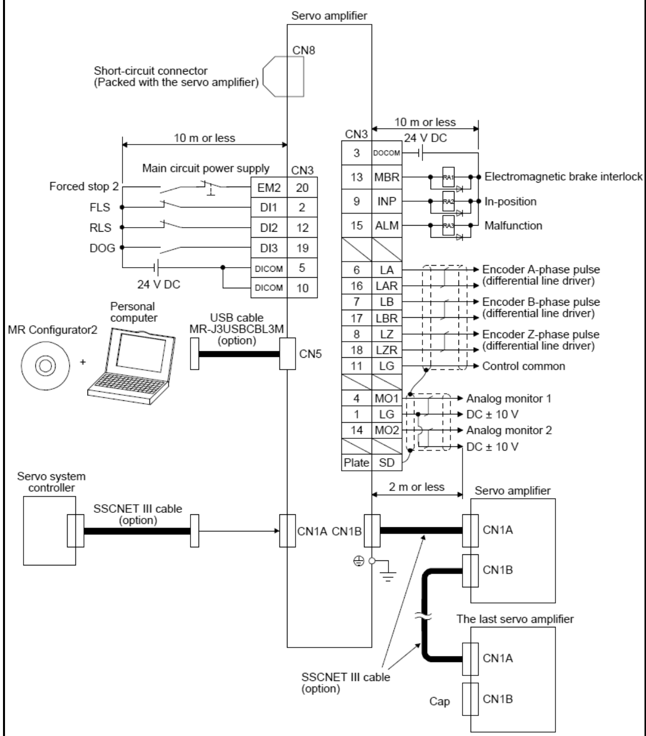
(2) SSCNET III/H cable specifications

POINT
●SSCNET III cables can be used as they are.

		Description			
SSCNET III/H cable model		MR-J3BUS_M		MR-J3BUS_M-A	MR-J3BUS_M-B
SSCNET III/H cable length		0.15 m	0.3 m to 3 m	5 m to 20 m	30 m to 50 m
Optical cable (cord)	Minimum bend radius	25 mm		Enforced covering cable: 50 mm Cord: 25 mm	Enforced covering cable: 50 mm Cord: 30 mm
	Tension strength	70 N	140 N	420 N (Enforced covering cable)	980 N (Enforced covering cable)
	Temperature range for use (Note)	-40 °C to 85 °C			-20 °C to 70 °C
	Atmosphere	Indoors (not exposed to direct sunlight), no solvent or oil.			
	Appearance [mm]				

Note This temperature range for use is the value for optical cable (cord) only. Temperature condition for the connector is the same as that for servo amplifier.

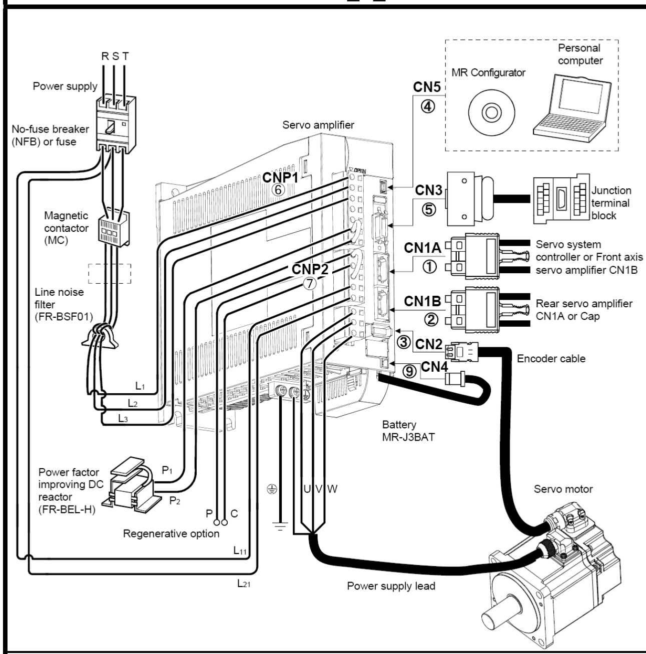
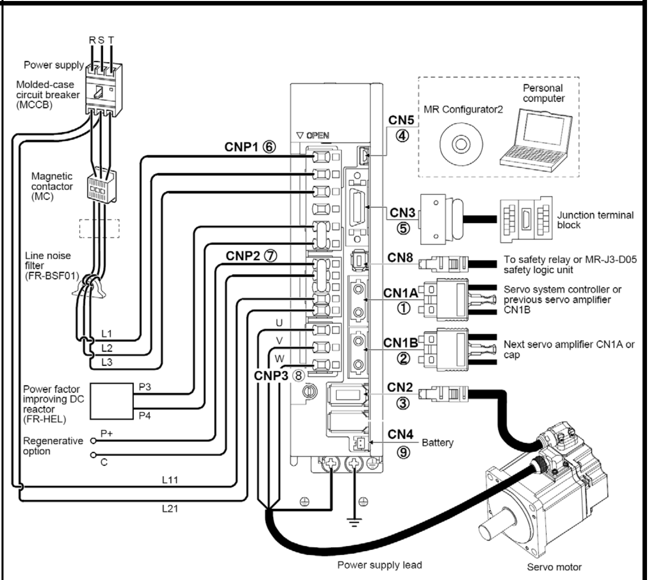
3.3 Comparison of Standard Connection Diagrams

MR-J3-_B_	MR-J4-_B_
MR-J3-700B or less 	

3.4 List of Corresponding Connectors and Terminal Blocks

An example of connections with the peripheral equipment is shown below. Refer to the respective Instruction Manuals for details on the signals.

(1) Comparison of connectors (7 kW or less)

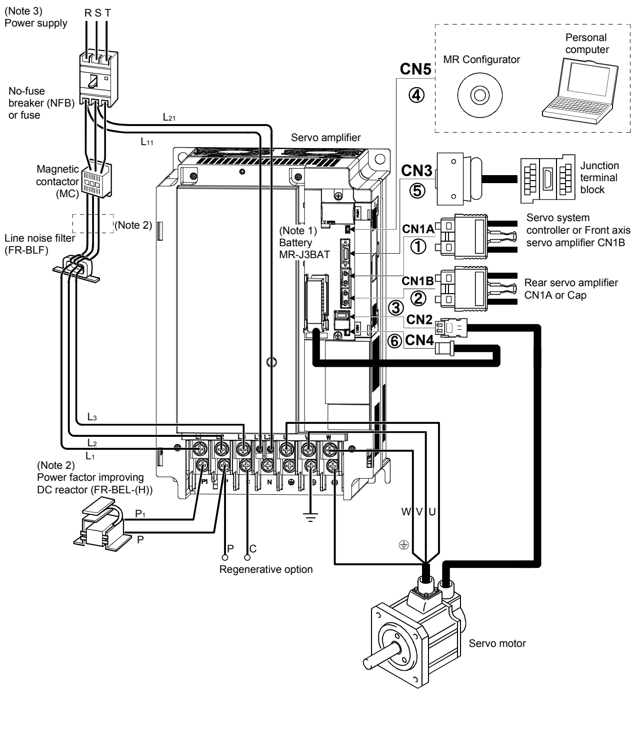
<table>
<tr><th>MR-J3-_B_</th><th>MR-J4-_B_</th></tr>
<tr><td>
</td><td>
</td></tr>
<tr><td>Note 1. The above configuration example is applied to the MR-J3-200B or less capacities.
2. The power factor improving AC reactor can also be used. In this case, the power factor improving DC reactor cannot be used.</td><td>Note 1. The above configuration example is applied to the MR-J4-200B or less capacities.
2. The power factor improving AC reactor can also be used. In this case, the power factor improving DC reactor cannot be used.</td></tr>
</table>

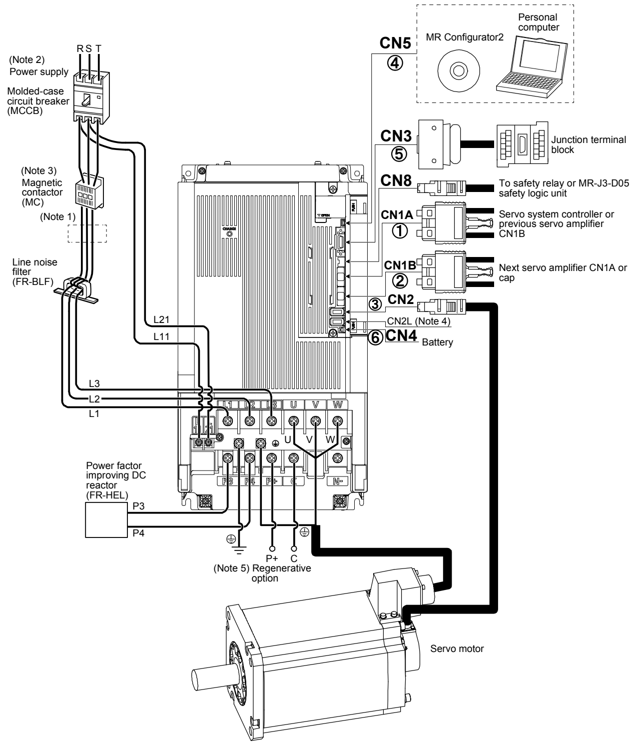
(2) List of connector and terminal block correspondence (7 kW or less)

	MR-J3-_B_		MR-J4-_B_	Precautions
①	SSCNET III cable connector [CN1A]		SSCNET III cable connector [CN1A]	
②	SSCNET III cable connector [CN1B]		SSCNET III cable connector [CN1B]	
③	Encoder connector [CN2]		Encoder connector [CN2]	
④	USB communication connector [CN5]	→	USB communication connector [CN5]	
⑤	I/O signal connector [CN3]		I/O signal connector [CN3]	
⑥	Main circuit power connector [CNP1]		Main circuit power connector [CNP1]	Must switch to the power connector (enclosed with the amplifier).
⑦	Control circuit power connector [CNP2]		Control circuit power connector [CNP2]	
⑧	Servo motor power connector [CNP3]		Servo motor power connector [CNP3]	
⑨	Battery connector [CN4]		Battery connector [CN4]	Prepare a new battery.

Note When not using the STO function in MR-J4-_B_, attach a short-circuit connector supplied with a servo amplifier onto CN8 (STO input signal connector).
The configuration of the main circuit terminal block differs depending on capacity. See "Part 4: Common Reference Material".

(3) Comparison of connectors (11 kW or less)

<table>
<tr><th>MR-J3-_B_</th><th>MR-J4-_B_</th></tr>
<tr><td>


The above configuration example is for MR-J3-11KB or models with more capacity.
</td><td>


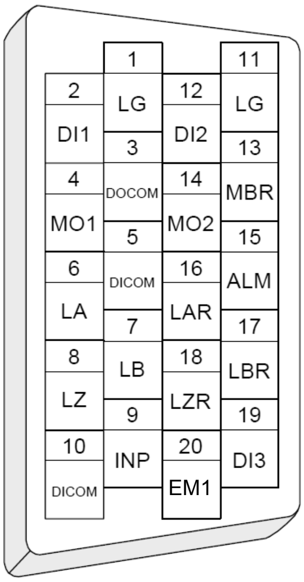
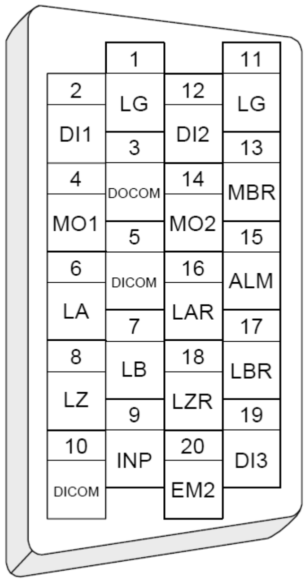
The above configuration example is for MR-J4-11KB or models with more capacity.
</td></tr>
<tr><td>
Note 1. The battery (option) is used for the absolute position detection system in the position control mode.
2. The power factor improving AC reactor can also be used. In this case, the power factor improving DC reactor cannot be used.
When not using the power factor improving DC reactor, short P3 and P4.
3. Refer to the respective Instruction Manuals for the power supply specification.
</td><td>
Note 1. The power factor improving AC reactor can also be used. In this case, the power factor improving DC reactor cannot be used.
When not using the power factor improving DC reactor, short P3 and P4.
2. For power supply specifications, refer to "MR-J4-_B_ Servo Amplifier Instruction Manual".
3. Depending on the main circuit voltage and operation pattern, bus voltage decreases, and that may cause the forced stop deceleration to shift to the dynamic brake deceleration. When dynamic brake deceleration is not required, slow the time to turn off the magnetic contactor.
4. This is for MR-J4-_B-RJ servo amplifier. MR-J4-_B servo amplifier does not have CN2L connector.
5. When using the regenerative option, refer to Part 6 section 1.1 and 1.2.
</td></tr>
</table>

(4) List of connector and terminal block correspondence (11 kW or less)

	MR-J3-_B_		MR-J4-_B_	Precautions
①	SSCNET III cable connector [CN1A]	→	SSCNET III cable connector [CN1A]	
②	SSCNET III cable connector [CN1B]	→	SSCNET III cable connector [CN1B]	
③	Encoder connector [CN2]	→	Encoder connector [CN2]	
④	USB communication connector [CN5]	→	USB communication connector [CN5]	
⑤	I/O signal connector [CN3]	→	I/O signal connector [CN3]	
⑥	Battery connector [CN4]	→	Battery connector [CN4]	Prepare a new battery.

Note 1. When not using the STO function in MR-J4-_B_, attach a short-circuit connector supplied with a servo amplifier onto CN8 (STO input signal connector).
2. The configuration of the main circuit terminal block differs depending on capacity. See "Part 4: Common Reference Material".

(5) Comparison of signals

MR-J3-_B_ < 7 kW or less >		Abbreviation (Note 1)	MR-J4-_B_	
Connector pin assignment	Connector pin No.		Connector pin No.	Connector pin assignment
	CN3-1	LG	CN3-1	
	CN3-2	DI1	CN3-2	
	CN3-3	DOCOM	CN3-3	
	CN3-4	MO1	CN3-4	
	CN3-5	DICOM	CN3-5	
	CN3-6	LA	CN3-6	
	CN3-7	LB	CN3-7	
	CN3-8	LZ	CN3-8	
	CN3-9	INP	CN3-9	
	CN3-10	DICOM	CN3-10	
	CN3-11	LG	CN3-11	
	CN3-12	DI2	CN3-12	
	CN3-13	MBR	CN3-13	
	CN3-14	MO2	CN3-14	
	CN3-15	ALM	CN3-15	
	CN3-16	LAR	CN3-16	
	CN3-17	LBR	CN3-17	
	CN3-18	LZR	CN3-18	
	CN3-19	DI3	CN3-19	
	CN3-20 (Note 2)	EM1	CN3-20	
		(EM2)		
	Plate	SD	Plate	

Note 1. Signals unique to MR-J4-_B_ are in parentheses.
2. The factory setting for MR-J4-_B_ is EM2.

3.5 Comparison of Peripheral Equipment

POINT
● See "Part 6: Review on Replacement of Optional Peripheral Equipment".

3.6 Comparison of Parameters

CAUTION	
⚠ CAUTION	●Never perform extreme adjustments and changes to the parameters, otherwise the operation may become unstable. ●If fixed values are written in the digits of a parameter, do not change these values. ●Do not change parameters for manufacturer setting. ●Do not enter any setting value other than those specified for each parameter.

POINT

- ●For the parameter converter function, see "Part 4: Common Reference Material".
- ●The parameter whose symbol is preceded by * is enabled with the following conditions:
  - *: After setting the parameter, cycle the power or reset the controller.
  - **: After setting the parameter, cycle the power.
- ●For details about parameter settings for replacement, see the MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual to set parameters.
- ●Do not enter any setting value other than those specified for each parameter.

POINT

- ●With MR-J4-B, the deceleration to a stop function is enabled in the factory setting. To disable the deceleration to a stop function, set PA04 to "0 _ _ _".
- ●In cases of 11 kW or more, the dynamic brake (DB) needs to be assigned to a device in Pr.PD07 to PD09.

3.6.1 Setting requisite parameters upon replacement

The parameters shown in this section are a minimum number of parameters that need to be set for simultaneous replacement. Depending on the settings of the currently used amplifier, parameters other than these may need to be set.

Parameter number	Name	Precautions
PA01	Control type selection	MR-J4 has servo motors whose initial settings are 350%. Refer to Part 5 "Review on Replacement of Motor" and check the operation.
PA02	Regenerative option selection	The setting value must be changed according to the option model.
PA04	Function selection A-1 Servo forced stop selection	Forced stop deceleration function selection To configure the same settings as for MR-J3-_B_, select "Forced stop deceleration function disabled (with EM1 used)".
PA08	Gain adjustment mode selection	The setting value needs to be changed according to the auto tuning mode.
PA09	Auto tuning response	Auto tuning response setting Enter this setting value for replacement, referring to "3.6.3 Comparison of parameter details". It is necessary to make gain adjustment again when replacing. For details on how to make gain adjustments, refer to Chapter 6 of the MRJ4-_B_ Servo Amplifier Instruction Manual. The setting value needs be changed based on the standard machine resonance frequency.
PA10	In-position range	The setting needs to be changed depending on the motor.
PA15	Encoder output pulse	Used to set the encoder pulses (A-phase and B-phase) output by the servo amplifier.
PA19	Parameter writing inhibit	Change the setting value as necessary. PB06 Load to motor inertia ratio The unit system is different. (0.1-fold→0.01
PB06	Load to motor inertia ratio	The unit system is different. (0.1-fold→0.01-fold) Pay attention to setting value.
PB07	Model loop gain	The unit system is different. (rad/s→0.1 rad/s)
PB08	Position loop gain	The unit system is different. (rad/s→0.1 rad/s)
PB13	Machine resonance suppression filter 1	Change the setting value according to the frequency and depth.
PB14	Notch shape selection 1	
PB15	Machine resonance suppression filter 2	Change the setting value according to the frequency and depth.
PB16	Notch shape selection 2	
PB29	Load to motor inertia ratio after gain switching	The unit system is different. (0.1-fold→0.01-fold) Pay attention to setting value.
PB30	Position loop gain after gain switching	It is necessary to convert the ratio to a value to change the setting value.
PB31	Speed loop gain after gain switching	It is necessary to convert the ratio to a value to change the setting value.
PB32	Speed integral compensation after gain switching	It is necessary to convert the ratio to a value to change the setting value.
PC09	Analog monitor 1 output	The setting value must be changed according to monitor output data. "Maximum speed" and "Maximum torque" differ depending on the motor. Set according to the motor.
PC10	Analog monitor 2 output	
PC11	Analog monitor 1 offset	Depends on hardware. It is necessary to change the setting value.
PC12	Analog monitor 2 offset	Depends on hardware. It is necessary to change the setting value.

3.6.2 Parameter comparison list

MR-J3-_B_ parameters					MR-J4-_B_ parameters				
No.	Abbreviation	Parameter name	Initial value	Customer setting value	No.	Abbreviation	Parameter name	Initial value	Customer setting value
PA01	**STY	For manufacturer setting	0000h		PA01	**STY	Operation mode	1000h	
PA02	**REG	Regenerative option	0000h		PA02	**REG	Regenerative option	0000h	
PA03	*ABS	Absolute position detection system	0000h		PA03	*ABS	Absolute position detection system	0000h	
PA04	*AOP1	Function selection A-1	0000h		PA04	*AOP1	Function selection A-1	2000h	
PA05		For manufacturer setting	0		PA05		For manufacturer setting	10000	
PA06			1		PA06			1	
PA07			1		PA07			1	
PA08	ATU	Auto tuning mode	0001h		PA08	ATU	Auto tuning mode	0001h	
PA09	RSP	Auto tuning response	12		PA09	RSP	Auto tuning response	16	
PA10	INP	In-position range	100		PA10	INP	In-position range	1600	
PA11		For manufacturer setting	1000.0		PA11		For manufacturer setting	1000.0	
PA12			1000.0		PA12			1000.0	
PA13			0000h		PA13			0000h	
PA14	*POL	Rotation direction selection	0		PA14	*POL	Rotation direction selection/travel direction selection	0	
PA15	*ENR	Encoder output pulses	4000		PA15	*ENR	Encoder output pulses	4000	
PA16		For manufacturer setting	0		PA16	*ENR2	Encoder output pulses 2	1	
PA17			0000h		PA17	**MSR	Servo motor series setting	0000h	
PA18			0000h		PA18	**MTY	Servo motor type setting	0000h	
PA19	*BLK	Parameter write inhibit	000Bh		PA19	*BLK	Parameter writing inhibit	00ABh	
PB01	FILT	Adaptive tuning mode (adaptive filter II)	0000h		PB01	FILT	Adaptive tuning mode (adaptive filter II)	0000h	
PB02	VRFT	Vibration suppression control tuning mode (advanced vibration suppression control)	0000h		PB02	VRFT	Vibration suppression control tuning mode (advanced vibration suppression control II)	0000h	
PB03		For manufacturer setting	0		PB03	TFBGN	Torque feedback loop gain	18000	
PB04	FFC	Feed forward gain	0		PB04	FFC	Feed forward gain	0	
PB05		For manufacturer setting	500		PB05		For manufacturer setting	500	
PB06	GD2	Ratio of load inertia moment to servo motor inertia moment	7.0		PB06	GD2	Load to motor inertia ratio/load to motor mass ratio	7.00	
PB07	PG1	Model loop gain	24		PB07	PG1	Model loop gain	15.0	
PB08	PG2	Position loop gain	37		PB08	PG2	Position loop gain	37.0	
PB09	VG2	Speed loop gain	823		PB09	VG2	Speed loop gain	823	
PB10	VIC	Speed integral compensation	33.7		PB10	VIC	Speed integral compensation	33.7	
PB11	VDC	Speed differential compensation	980		PB11	VDC	Speed differential compensation	980	
PB12	OVA	Overshoot amount compensation	0		PB12	OVA	Overshoot amount compensation	0	
PB13	NH1	Machine resonance suppression filter 1	4500		PB13	NH1	Machine resonance suppression filter 1	4500	
PB14	NHQ1	Notch shape selection 1	0000h		PB14	NHQ1	Notch shape selection 1	0000h	
PB15	NH2	Machine resonance suppression filter 2	4500		PB15	NH2	Machine resonance suppression filter 2	4500	
PB16	NHQ2	Notch shape selection 2	0000h		PB16	NHQ2	Notch shape selection 2	0000h	
PB17		Automatic setting parameter			PB17	NHF	Shaft resonance suppression filter	0000h	
PB18	LPF	Low-pass filter setting	3141		PB18	LPF	Low-pass filter setting	3141	
PB19	VRF1	Vibration suppression control vibration frequency setting	100.0		PB19	VRF11	Vibration suppression control 1 - Vibration frequency	100.0	
PB20	VRF2	Vibration suppression control resonance frequency setting	100.0		PB20	VRF12	Vibration suppression control 1 - Resonance frequency	100.0	
PB21		For manufacturer setting	0.00		PB21	VRF13	Vibration suppression control 1 - Vibration frequency damping	0.00	
PB22			0.00		PB22	VRF14	Vibration suppression control 1 - Resonance frequency damping	0.00	
PB23	VFBF	Low-pass filter selection	0000h		PB23	VFBF	Low-pass filter selection	0000h	

MR-J3-_B_ parameters					MR-J4-_B_ parameters				
No.	Abbreviation	Parameter name	Initial value	Customer setting value	No.	Abbreviation	Parameter name	Initial value	Customer setting value
PB24	*MVS	Slight vibration suppression control selection	0000h		PB24	*MVS	Slight vibration suppression control	0000h	
PB25		For manufacturer setting	0000h		PB25	*BOP1	Function selection B-1	0000h	
PB26	*CDP	Gain changing selection	0000h		PB26	*CDP	Gain switching function	0000h	
PB27	CDL	Gain changing condition	10		PB27	CDL	Gain switching condition	10	
PB28	CDT	Gain changing time constant	1		PB28	CDT	Gain switching time constant	1	
PB29	GD2B	Gain changing ratio of load inertia moment to servo motor inertia moment	7.0		PB29	GD2B	Load to motor inertia ratio/load to motor mass ratio after gain switching	7.00	
PB30	PG2B	Gain changing position loop gain	37		PB30	PG2B	Position loop gain after gain switching	0.0	
PB31	VG2B	Gain changing speed loop gain	823		PB31	VG2B	Speed loop gain after gain switching	0	
PB32	VICB	Gain changing speed integral compensation	33.7		PB32	VICB	Speed integral compensation after gain switching	0.0	
PB33	VRF1B	Gain changing vibration suppression control vibration frequency setting	100.0		PB33	VRF11B	Vibration suppression control 1 - Vibration frequency after gain switching	0.0	
PB34	VRF2B	Gain changing vibration suppression control resonance frequency setting	100.0		PB34	VRF12B	Vibration suppression control 1 - Resonance frequency after gain switching	0.0	
PB35		For manufacturer setting	0.00		PB35	VRF13B	Vibration suppression control 1 - Vibration frequency damping after gain switching	0.00	
PB36			0.00		PB36	VRF14B	Vibration suppression control 1 - Resonance frequency damping after gain switching	0.00	
PB37			100		PB37		For manufacturer setting	1600	
PB38			0.0		PB38			0.00	
PB39			0.0		PB39			0.00	
PB40			0.0		PB40			0.00	
PB41			1125		PB41			0	
PB42			1125		PB42			0	
PB43			0004h		PB43			0000h	
PB44			0.0		PB44			0.00	
PB45	CNHF	Vibration suppression control filter 2	0000h		PB45	CNHF	Command notch filter	0000h	
PC01	ERZ	Error excessive alarm level	3		PC01	ERZ	Error excessive alarm level	0	
PC02	MBR	Electromagnetic brake sequence output	0		PC02	MBR	Electromagnetic brake sequence output	0	
PC03	*ENRS	Encoder output pulses selection	0000h		PC03	*ENRS	Encoder output pulse selection	0000h	
PC04	**COP1	Function selection C-1	0000h		PC04	**COP1	Function selection C-1	0000h	
PC05	**COP2	Function selection C-2	0000h		PC05	**COP2	Function selection C-2 Motor-less operation selection	0000h	
PC06	*COP3	Function selection C-3	0000h		PC06	*COP3	Function selection C-3 error excessive warning level unit selection	0000h	
PC07	ZSP	Zero speed	50		PC07	ZSP	Zero speed	50	
PC08		For manufacturer setting	0		PC08	OSL	Overspeed alarm detection level	0	
PC09	MOD1	Analog monitor 1 output	0000h		PC09	MOD1	Analog monitor 1 output	0000h	
PC10	MOD2	Analog monitor 2 output	0001h		PC10	MOD2	Analog monitor 2 output	0000h	
PC11	MO1	Analog monitor 1 offset	0		PC11	MO1	Analog monitor 1 offset	0	
PC12	MO2	Analog monitor 2 offset	0		PC12	MO2	Analog monitor 2 offset	0	
PC13	MOSDL	Analog monitor feedback position output standard data Low	0		PC13	MOSDL	Analog monitor - Feedback position output standard data - Low	0	
PC14	MOSDH	Analog monitor feedback position output standard data High	0		PC14	MOSDH	Analog monitor - Feedback position output standard data - High	0	
PC15		For manufacturer setting	0		PC15		For manufacturer setting	0	
PC16			0000h		PC16			0000h	
PC17	**COP4	Function selection C-4	0000h		PC17	**COP4	Function selection C-4	0000h	
PC18		For manufacturer setting	0000h		PC18	*COP5	Function selection C-5	0000h	
PC19			0000h		PC19		Zero speed	0000h	
PC20	*COP7	Function selection C-7	0000h		PC20	*COP7	Overspeed alarm detection level	0000h	

MR-J3-_B_ parameters					MR-J4-_B_ parameters				
No.	Abbreviation	Parameter name	Initial value	Customer setting value	No.	Abbreviation	Parameter name	Initial value	Customer setting value
PC21	*BPS	Alarm history clear	0000h		PC21	*BPS	Alarm history clear	0000h	
PC22		For manufacturer setting	0000h		PC22		For manufacturer setting	0	
PC23			0000h		PC23			0000h	
PC24			0000h		PC24	RSBR	Forced stop deceleration time constant	100	
PC25			0000h		PC25		For manufacturer setting	0	
PC26			0000h		PC26	**COP8	Function selection C-8	0000h	
PC27			0000h		PC27	**COP9	Function selection C-9	0000h	
PC28			0000h		PC28		For manufacturer setting	0000h	
PC29			0000h		PC29	**COP8	Function selection C-B	0000h	
PC30			0000h		PC30		For manufacturer setting	0	
PC31			0000h		PC31	RSUP1	Vertical axis freefall prevention compensation amount	0	
PC32			0000h		PC32		For manufacturer setting	0000h	
PD01		For manufacturer setting	0000h		PD01		For manufacturer setting	0000h	
PD02			0000h		PD02	*DIA2	Input signal automatic on selection 2	0000h	
PD03			0000h		PD03		For manufacturer setting	0020h	
PD04			0000h		PD04			0021h	
PD05			0000h		PD05			0022h	
PD06			0000h		PD06			0000h	
PD07	*DO1	Output signal device selection 1 (CN3-13)	0005h		PD07	*DO1	Output device selection 1	0005h	
PD08	*DO2	Output signal device selection 2 (CN3-9)	0004h		PD08	*DO2	Output device selection 2	0004h	
PD09	*DO3	Output signal device selection 3 (CN3-15)	0003h		PD09	*DO3	Output device selection 3	0003h	
PD10		For manufacturer setting	0000h		PD10		For manufacturer setting	0000h	
PD11			0004h		PD11	*DIF	Input filter setting (Note)	0004h	
PD12			0000h		PD12	*DOP1	Function selection D-1	0000h	
PD13			0000h		PD13	*DOP2	Function selection D-2	0000h	
PD14	*DOP3	Function selection D-3	0000h		PD14	*DOP3	Function selection D-3	0000h	
PD15	*IDCS	For manufacturer setting	0000h		PD15	*IDCS	Driver communication setting	0000h	
PD16	*MD1	Driver communication setting - Master - Transmit data selection 1	0000h		PD16	*MD1	Driver communication setting - Master - Transmit data selection 1	0000h	
PD17	*MD2	Driver communication setting - Master - Transmit data selection 2	0000h		PD17	*MD2	Driver communication setting - Master - Transmit data selection 2	0000h	
PD18		For manufacturer setting	0000h		PD18		For manufacturer setting	0000h	
PD19			0000h		PD19			0000h	
PD20	*SLA1	Driver communication setting - Slave - Master axis No. selection 1	0		PD20	*SLA1	Driver communication setting - Slave - Master axis No. selection 1	0	
PD21		For manufacturer setting	0		PD21		For manufacturer setting	0	
PD22			0		PD22			0	
PD23			0		PD23			0	
PD24			0000h		PD24			0000h	
PD25			0000h		PD25			0000h	
PD26			0000h		PD26			0000h	
PD27			0000h		PD27			0000h	
PD28			0000h		PD28			0000h	
PD29			0000h		PD29			0000h	
PD30	TLC	Master-slave operation - Torque command coefficient on slave	0000h		PD30	TLC	Master-slave operation - Torque command coefficient on slave	0	
PD31	VLC	Master-slave operation - Speed limit coefficient on slave	0000h		PD31	VLC	Master-slave operation - Speed limit coefficient on slave	0	
PD32	VLL	Master-slave operation - Speed limit adjusted value on slave	0000h		PD32	VLL	Master-slave operation - Speed limit adjusted value on slave	0	

Note Refer to the servo system controller instruction manual for the setting.

3.6.3 Comparison of parameter details

MR-J3-_B_			MR-J4-_B_		
No.	Name and function	Initial value	No.	Name and function	Initial value
PA01	Control mode Turn off the power and then on again after setting the parameter to validate the parameter value. This parameter is supported by a combination of a servo amplifier, whose software version is C4 or later (manufactured in January 2010 or later), and a HF-KP servo motor (manufactured in August 2009 or later). Check the software version using status display or MR Configurator. When the 350% maximum torque setting of the HF-KP servo motor is enabled, set the torque limit value in the controller at 1000%. A HF-KP servo motor with a decelerator and servo motors except the HF-KP series do not support the 350 maximum torque setting. Making the 350 maximum torque setting valid when using these servo motors causes the parameter error (37). Set the control loop composition of the servo amplifier, and the maximum torque of the HFKP series servo motor. By making the high-response control valid in the control loop composition, response of the servo can be increased compared to the response under the standard control (factory setting).Moreover, the track ability for a command and the settling time in machines with high rigidity can be decreased. To further shorten the settling time using the auto tuning results of the high-response control, increase the setting of model loop gain ([Pr. PB07]) in the manual mode. By making the 350 maximum torque setting valid, the maximum torque of the HF-KP servo motor can be increased from 300 to 350. To operate at the maximum torque of 350, operate within the range of overload protection characteristic. If operated beyond the overload protection characteristic range, servo motor overheat (46), overload 1 (50), and overload 2 (51) may occur. 0 x 0 0: Control type selection 0: Standard control (350 maximum torque setting of HF-KP servo motor Invalid) 3: Standard control (350 maximum torque setting of HF-KP servo motor Valid) 4: High-response control valid (350 maximum torque setting of HF-KP servo motor Invalid) 5: High-response control valid (350 maximum torque setting of HF-KP servo motor Valid)	0000h	PA01	Operation mode Select an operation mode. _ _ _ x: For manufacturer setting	0h
				_ _ x _ : Operation mode selection 0: Standard control mode Setting other than above will result in [AL. 37 Parameter error].	0h
				_ x _ _ : For manufacturer setting	0h
				x _ _ _ : Operation mode selection To change this digit, use an application software "MR-J4(W)-B mode selection". When you change it without the application, [AL. 3E Operation mode error] will occur. 0: J3 compatibility mode 1: J4 mode	1h

MR-J3-_B_			MR-J4-_B_		
No.	Name and function	Initial value	No.	Name and function	Initial value
PA02	Regenerative option This parameter value and switch power off once, then switch it on again to make that parameter setting valid. Wrong setting may cause the regenerative option to burn. If the regenerative option selected is not for use with the servo amplifier, parameter error (37) occurs. _ _ x x: Selection of regenerative option 00: Regenerative option is not used ・For servo amplifier of 100 W, regenerative resistor is not used. ・For servo amplifier of 0.2 kW to 7 kW, built-in regenerative resistor is used. ・Supplied regenerative resistors or regenerative option is used with the servo amplifier of 11 kW to 22 kW. 01: FR-BU2-(H)・FR-RC-(H)・FR-CV-(H) 02: MR-RB032 03: MR-RB12 04: MR-RB32 05: MR-RB30 06: MR-RB50 (Cooling fan is required) 08: MR-RB31 09: MR-RB51 (Cooling fan is required) 80: MR-RB1H-4 81: MR-RB3M-4 (Cooling fan is required) 82: MR-RB3G-4 (Cooling fan is required) 83: MR-RB5G-4 (Cooling fan is required) 84: MR-RB34-4 (Cooling fan is required) 85: MR-RB54-4 (Cooling fan is required) FA: When the supplied regenerative resistor is cooled by the cooling fan to increase the ability with the servo amplifier of 11kW to 22kW. Note The setting is for the servo amplifier of 22 kW or less.	0000h	PA02	Same as MR-J3 Regenerative option Used to select the regenerative option. Incorrect setting may cause the regenerative option to burn. If a selected regenerative option is not for use with the servo amplifier, [AL. 37 Parameter error] occurs. _ _ x x: Regenerative option selection 00: Regenerative option is not used. ・For servo amplifier of 100 W, regenerative resistor is not used. ・For servo amplifier of 0.2 kW to 7 kW, built-in regenerative resistor is used. ・Supplied regenerative resistors or regenerative option is used with the servo amplifier of 11 kW to 22 kW. 01: FR-RC-(H)/FR-CV-(H)/FR-BU2-(H) When you use FR-RC-(H) or FR-CV-(H), "Mode 2 (_ _ _ 1)" of "Undervoltage alarm detection mode selection" in [Pr. PC20]. 02: MR-RB032 03: MR-RB12 04: MR-RB32 05: MR-RB30 06: MR-RB50 (Cooling fan is required.) 08: MR-RB31 09: MR-RB51 (Cooling fan is required.) 0B: MR-RB3N 0C: MR-RB5N (Cooling fan is required.) 80: MR-RB1H-4 81: MR-RB3M-4 (Cooling fan is required.) 82: MR-RB3G-4 (Cooling fan is required.) 83: MR-RB5G-4 (Cooling fan is required.) 84: MR-RB34-4 (Cooling fan is required.) 85: MR-RB54-4 (Cooling fan is required.) 91: MR-RB3U-4 (Cooling fan is required.) 92: MR-RB5U-4 (Cooling fan is required.) FA: When the supplied regenerative resistors or the regenerative option is cooled by the cooling fan to increase the ability with the servo amplifier of 11 kW to 22 kW.	00h
				_ x _ _ : For manufacturer setting	0h
				x _ _ _ : For manufacturer setting	0h

MR-J3-_B_			MR-J4-_B_		
No.	Name and function	Initial value	No.	Name and function	Initial value
PA03	Absolute position detection system This parameter is made valid when power is switched off, then on after setting, or when the controller reset has been performed. This parameter cannot be used in the speed control mode. Set this parameter when using the absolute position detection system in the position control mode. 0 0 0 x: Selection of absolute position detection system 0: Used in incremental system 1: Used in absolute position detection system	0000h	PA03	Same as MR-J3 Absolute position detection system Set this parameter when using the absolute position detection system. The parameter is not available in the speed control mode and torque control mode.	
				_ _ _ x: Absolute position detection system selection 0: Disabled (used in incremental system) 1: Enabled (used in absolute position detection system)	0h
				_ _ x _ : For manufacturer setting	0h
				_ x _ _ : For manufacturer setting	0h
				x _ _ _ : For manufacturer setting	0h
PA04	Function selection A-1 This parameter is made valid when power is switched off, then on after setting, or when the controller reset has been performed. The servo forced stop function is avoidable. 0 x 0 0: Selection of servo forced stop 0: Valid (Forced stop (EM1) is used 1: Invalid (Forced stop (EM1) is not used.) When not using the forced stop (EM1) of servo amplifier, set the selection of servo forced stop to Invalid (_ _1_). At this time, the forced stop (EM1) automatically turns on inside the servo amplifier.	0000h	PA04	Same setting as MR-J3 Function selection A-1 This is used to select the forced stop input and forced stop deceleration function.	
				_ _ _ x: For manufacturer setting	0h
				_ _ x _ : For manufacturer setting	0h
				_ x _ _ : Servo forced stop selection 0: Enabled (The forced stop input EM2 or EM1 is used.) 1: Disabled (The forced stop input EM2 and EM1 are not used.) Refer to table 3.1 for details.	0h
				x _ _ _ : Forced stop deceleration function selection 0: Forced stop deceleration function disabled (EM1) 2: Forced stop deceleration function enabled (EM2) Refer to table 3.1 for details.	2h

Table 3.1 Deceleration method

Setting value	EM2/EM1	Deceleration method	
		EM2 or EM1 is off	Controller forced stop is enabled/Alarm occurred
0 0 _ _	EM1	MBR (Electromagnetic brake interlock) turns off without the forced stop deceleration.	MBR (Electromagnetic brake interlock) turns off without the forced stop deceleration.
2 0 _ _	EM2	MBR (Electromagnetic brake interlock) turns off after the forced stop deceleration.	MBR (Electromagnetic brake interlock) turns off after the forced stop deceleration.
0 1 _ _	Not using EM2 or EM1		MBR (Electromagnetic brake interlock) turns off without the forced stop deceleration.
2 1 _ _	Not using EM2 or EM1		MBR (Electromagnetic brake interlock) turns off after the forced stop deceleration.

MR-J3-_B_ No.	MR-J3-_B_ Name and function	MR-J3-_B_ Initial value	MR-J4-_B_ No.	MR-J4-_B_ Name and function	MR-J4-_B_ Initial value
PA08	Auto tuning mode (see below)	0001h	PA08	Same setting as MR-J3 (see below)	
PA09	Auto tuning response (see below)	12	PA09	Auto tuning response (see below)	16
PA10	In-position range (see below)	100	PA10	In-position range (see below)	1600

PA08

MR-J3-_B_ (Initial value: 0001h)

Auto tuning mode

This parameter cannot be used in the torque control mode.

Make gain adjustment using auto tuning.

Auto tuning mode [Pr. PA08]

Select the gain adjustment mode.

0 0 0 x:

Gain adjustment mode setting

0: Interpolation mode (Automatically set parameter No. (Note) [Pr. PB06･ PB08･ PB09･ PB10])

1: Auto tuning mode 1 (Automatically set parameter No. (Note) [Pr. PB06･ PB07･ PB08･ PB09･ PB10])

2: Auto tuning mode 2 (Automatically set parameter No. [Pr. PB07･ PB08･ PB09･ PB10])

3: Manual mode

Note The parameters have the following names.

Parameter No.	Name
PB06	Ratio of load inertia moment to servo motor inertia moment
PB07	Model loop gain
PB08	Position loop gain
PB09	Speed loop gain
PB10	Speed integral compensation

MR-J4-_B_

Same setting as MR-J3

Auto tuning response

Set a response of the auto tuning.

Setting	Name and function	Initial value
_ _ _ x:	Gain adjustment mode selection 0: 2 gain adjustment mode 1 (interpolation mode) 1: Auto tuning mode 1 2: Auto tuning mode 2 3: Manual mode 4: 2 gain adjustment mode 2	1h
_ _ x _ :	For manufacturer setting	0h
_ x _ _ :	For manufacturer setting	0h
x _ _ _ :	For manufacturer setting	0h

PA09

MR-J3-_B_ (Initial value: 12)

Auto tuning response

If the machine hunts or generates large gear sound, decrease the set value. To improve performance, e.g. shorten the settling time, increase the set value.

Setting	Response	Guideline for machine resonance frequency [Hz]
1	Low response	10.0
2	↑	11.3
3		12.7
4		14.3
5		16.1
6		18.1
7		20.4
8		23.0
9		25.9
10		29.2
11		32.9
12		37.0
13		41.7
14		47.0
15	↓	52.9
16	Middle response	59.6

Setting	Response	Guideline for machine resonance frequency [Hz]
17	Low response	67.1
18	↑	75.6
19		85.2
20		95.9
21		108.0
22		121.7
23		137.1
24		154.4
25		173.9
26		195.9
27		220.6
28		248.5
29		279.9
30		315.3
31	↓	355.1
32	Middle response	400.0

MR-J4-_B_ (Initial value: 16)

Auto tuning response

Set a response of the auto tuning.

Setting value	Machine characteristic: Response	Machine characteristic: Guideline for machine resonance frequency [Hz]
1	Low response	2.7
2	↑	3.6
3		4.9
4		6.6
5		10.0
6		11.3
7		12.7
8		14.3
9		16.1
10		18.1
11		20.4
12		23.0
13		25.9
14		29.2
15		32.9
16		37.0
17		41.7
18	↓	47.0
19	Middle response	52.9
20		59.6

Setting value	Machine characteristic: Response	Machine characteristic: Guideline for machine resonance frequency [Hz]
21	Middle response	67.1
22	↑	75.6
23		85.2
24		95.9
25		108.0
26		121.7
27		137.1
28		154.4
29		173.9
30		195.9
31		220.6
32		248.5
33		279.9
34		315.3
35		355.1
36		400.0
37		446.6
38	↓	501.2
39	High response	571.5
40		642.7

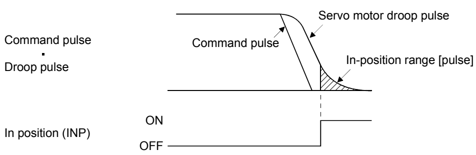
PA10

MR-J3-_B_ (Initial value: 100)

In-position range

This parameter cannot be used in the speed control mode.

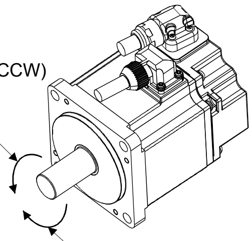
Set the range, where in position (INP) is output, in the command pulse unit.

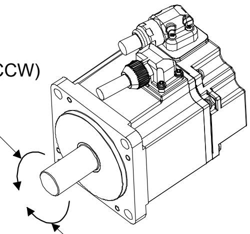


MR-J4-_B_ (Initial value: 1600)

In-position range

Set an in-position range per command pulse.

<table>
<tr><th colspan="3">MR-J3-_B_</th><th colspan="3">MR-J4-_B_</th></tr>
<tr><th>No.</th><th>Name and function</th><th>Initial value</th><th>No.</th><th>Name and function</th><th>Initial value</th></tr>
<tr>
<td>PA14</td>
<td>Rotation direction selection
This parameter is made valid when power is switched off, then on after setting, or when the controller reset has been performed.
Select servo motor rotation direction relative.
<table>
<tr><th>Parameter No.PA14 setting</th><th colspan="2">(Note 1) Servo motor rotation direction</th></tr>
<tr><th></th><th>When positioning address increase</th><th>When positioning address decrease</th></tr>
<tr><td>0</td><td>CCW</td><td>CW</td></tr>
<tr><td>1</td><td>CW</td><td>CCW</td></tr>
</table>
Note 1. The torque generation direction for the torque control.
2. The torque generation direction can be set for the slave axis with this parameter by using the master-slave operation function.


</td>
<td>0</td>
<td>PA14</td>
<td>Rotation direction selection/travel direction selection
This is used to select a rotation direction or travel direction.
For the setting for the master-slave operation function, refer to section 4.2.
<table>
<tr><th>Setting value</th><th colspan="2">Servo motor rotation direction</th></tr>
<tr><th></th><th>Positioning address increase</th><th>Positioning address decrease</th></tr>
<tr><td>0</td><td>CCW or positive direction</td><td>CW or negative direction</td></tr>
<tr><td>1</td><td>CW or negative direction</td><td>CCW or positive direction</td></tr>
</table>
The following shows the servo motor rotation directions.


</td>
<td>0</td>
</tr>
<tr>
<td>PA15</td>
<td>Encoder output pulse
This parameter is made valid when power is switched off, then on after setting, or when the controller reset has been performed.
Used to set the encoder pulses (A-phase, B-phase) output by the servo amplifier. Set the value 4 times greater than the A-phase or B-phase pulses.
You can use [Pr. PC03] to choose the output pulse setting or output division ratio setting.
The number of A/B-phase pulses actually output is 1/4 times greater than the preset number of pulses.
The maximum output frequency is 4.6Mpps (after multiplication by 4). Use this parameter within this range.

For output pulse designation
Set "_ _ 0 _" (initial value) in [Pr. PC03]
Set the number of pulses per servo motor revolution.
Output pulse set value [pulses/rev]
For instance, set "5600" to [Pr. PA15], the actually output A/B-phase pulses are as indicated below.
$A \cdot B\text{-phase output pulses} = \frac{5600}{4} = 1400\text{[pulse]}$

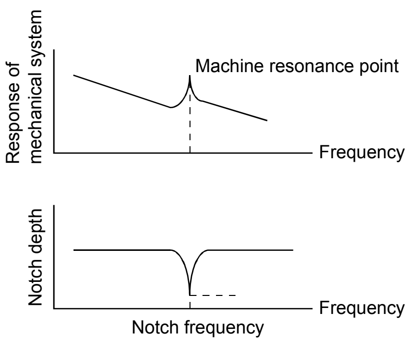
For output division ratio setting
Set "_ _ 1 _" in [Pr. PC03]
The number of pulses per servo motor revolution is divided by the set value.
$\text{Output pulse} = \frac{\text{Resolution per servo motor revolution}}{\text{Set value}}\ \text{[pulses/rev]}$
For instance, set "8" to [Pr. PA15], the actually output A/B-phase pulses are as indicated below.
$A \cdot B\text{-phase output pulses} = \frac{262144}{8} \cdot \frac{1}{4} = 8192\text{[pulse]}$</td>
<td>4000</td>
<td>PA15

PA16</td>
<td>Encoder output pulses
Set the encoder output pulses from the servo amplifier by using the number of output pulses per revolution, dividing ratio, or electronic gear ratio. (after multiplication by 4)
To set a numerator of the electronic gear, select "A-phase/B-phase pulse electronic gear setting (_ _ 3 _)" of "Encoder output pulse setting selection" in [Pr. PC03].
The maximum output frequency is 4.6 Mpulses/s. Set the parameter within this range.

Encoder output pulses 2
Set a denominator of the electronic gear for the A/B-phase pulse output. To set a denominator of the electronic gear, select "A-phase/B-phase pulse electronic gear setting (_ _ 3 _)" of "Encoder output pulse setting selection" in [Pr. PC03].</td>
<td>4000

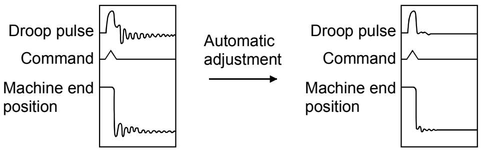
1</td>
</tr>
</table>

<table>
<tr><th colspan="3">MR-J3-_B_</th><th colspan="3">MR-J4-_B_</th></tr>
<tr><th>No.</th><th>Name and function</th><th>Initial value</th><th>No.</th><th>Name and function</th><th>Initial value</th></tr>
<tr>
<td>PA19</td>
<td>Parameter write inhibit
<table>
<tr><th>Parameter No.PA19 setting</th><th>Setting operation</th><th>Basic setting parameters No.PA _ _</th><th>Gain/filter parameters No.PB _ _</th><th>Extension setting parameters No.PC _ _</th><th>I/O setting parameters No.PD _ _</th></tr>
<tr><td rowspan="2">0000h</td><td>Reference</td><td>○</td><td></td><td></td><td></td></tr>
<tr><td>Write</td><td>○</td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">000Bh (initial value)</td><td>Reference</td><td>○</td><td>○</td><td>○</td><td></td></tr>
<tr><td>Write</td><td>○</td><td>○</td><td>○</td><td></td></tr>
<tr><td rowspan="2">000Ch</td><td>Reference</td><td>○</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td>Write</td><td>○</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td rowspan="2">100Bh</td><td>Reference</td><td>○</td><td></td><td></td><td></td></tr>
<tr><td>Write</td><td>Parameter No.PA19 only</td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">100Ch</td><td>Reference</td><td>○</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td>Write</td><td>Parameter No.PA19 only</td><td></td><td></td><td></td></tr>
</table>
○: Enabled</td>
<td>000Bh</td>
<td>PA19</td>
<td>Parameter writing inhibit
Select a reference range and writing range of the parameter.
See the table below for the setting value.

Table 5.3 [Pr. PA19] setting value and reading/writing range
<table>
<tr><th>PA19</th><th>Setting operation</th><th>PA</th><th>PB</th><th>PC</th><th>PD</th><th>PE</th><th>PF</th><th>PL</th></tr>
<tr><td rowspan="2">Other than below</td><td>Reading</td><td>○</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Writing</td><td>○</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">000Ah</td><td>Reading</td><td>Only 19</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Writing</td><td>Only 19</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">000Bh</td><td>Reading</td><td>○</td><td>○</td><td>○</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Writing</td><td>○</td><td>○</td><td>○</td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">000Ch</td><td>Reading</td><td>○</td><td>○</td><td>○</td><td>○</td><td></td><td></td><td></td></tr>
<tr><td>Writing</td><td>○</td><td>○</td><td>○</td><td>○</td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">000Fh</td><td>Reading</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td></td><td>○</td></tr>
<tr><td>Writing</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td></td><td>○</td></tr>
<tr><td rowspan="2">00AAh</td><td>Reading</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td></td></tr>
<tr><td>Writing</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td></td></tr>
<tr><td rowspan="2">00ABh (initial value)</td><td>Reading</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td>Writing</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td rowspan="2">100Bh</td><td>Reading</td><td>○</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Writing</td><td>Only 19</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">100Ch</td><td>Reading</td><td>○</td><td>○</td><td>○</td><td>○</td><td></td><td></td><td></td></tr>
<tr><td>Writing</td><td>Only 19</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">100Fh</td><td>Reading</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td></td><td>○</td></tr>
<tr><td>Writing</td><td>Only 19</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">10AAh</td><td>Reading</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td></td></tr>
<tr><td>Writing</td><td>Only 19</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">10ABh</td><td>Reading</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td>Writing</td><td>Only 19</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
○: Enabled</td>
<td>00ABh</td>
</tr>
<tr>
<td rowspan="5">PB01</td>
<td rowspan="5">Adaptive tuning mode (adaptive filter II)
Select the setting method for filter tuning. Setting this parameter to " _ _ _ 1" (filter tuning mode 1) automatically changes the machine resonance suppression filter 1 [Pr. PB13] and notch shape selection [Pr. PB14].


0 0 0 x:
Filter tuning mode selection
0: Filter OFF ([Pr. PB13・PB14] are fixed to the initial values.)
1: Filter tuning mode (Automatically set parameter: [Pr. PB13･PB14])
2: Manual mode

When this parameter is set to "_ _ _ 1", the tuning is completed after positioning is done the predetermined number or times for the predetermined period of time, and the setting changes to " _ _ 2 _". When the filter tuning is not necessary, the setting changes to "_ _ _ 0". When this parameter is set to "_ _ _ 0", the initial values are set to the machine resonance suppression filter 1 and notch shape selection. However, this does not occur when the servo off.</td>
<td rowspan="5">0000h</td>
<td rowspan="5">PB01</td>
<td>Adaptive tuning mode (adaptive filter II)
Set the adaptive tuning.</td>
<td></td>
</tr>
<tr><td>_ _ _ x:
Filter tuning mode selection
Select the adjustment mode of the machine resonance suppression filter 1.
0: Disabled
1: Automatic setting
2: Manual setting</td><td>0h</td></tr>
<tr><td>_ _ x _ :
For manufacturer setting</td><td>0h</td></tr>
<tr><td>_ x _ _ :
For manufacturer setting</td><td>0h</td></tr>
<tr><td>x _ _ _ :
For manufacturer setting</td><td>0h</td></tr>
</table>

MR-J3-_B_			MR-J4-_B_		
No.	Name and function	Initial value	No.	Name and function	Initial value
PB02	Vibration suppression control tuning mode (advanced vibration suppression control) This parameter cannot be used in the speed control mode. The vibration suppression is valid when the [Pr. PA08] (auto tuning) setting is "_ _ _ 2" or "_ _ _ 3". When PA08 is [Pr. PA08] is "_ _ _ 1", vibration suppression is always invalid. Select the setting method for vibration suppression control tuning. Setting this parameter to "_ _ _ 1" (vibration suppression control tuning mode) automatically changes the vibration suppression control vibration frequency ([Pr. PB19]) and vibration suppression control resonance frequency ([Pr. PB20]) after positioning is done the predetermined number of times.  0 0 0 x: Vibration suppression control tuning mode 0: Vibration suppression control OFF (Automatically set parameter (Note)) 1: Vibration suppression control tuning mode (Advanced vibration suppression control) (Automatically set parameter: [Pr.PB19・PB20]) 2: Manual mode Note [Pr. PB19・PB20] are fixed to the initial values. When this parameter is set to "_ _ _ 1", the tuning is completed after positioning is done the predetermined number or times for the predetermined period of time, and the setting changes to "_ _ _ 2". When the vibration suppression control tuning is not necessary, the setting changes to "_ _ _ 0". When this parameter is set to "_ _ _ 0", the initial values are set to the vibration suppression control vibration frequency and vibration suppression control resonance frequency. However, this does not occur when the servo off.	0000h	PB02	Vibration suppression control tuning mode (advanced vibration suppression control II) This is used to set the vibration suppression control tuning.	
				_ _ _ x: Vibration suppression control 1 tuning mode selection Select the tuning mode of the vibration suppression control 1. 0: Disabled 1: Automatic setting 2: Manual setting	0h
				_ _ x _ : Vibration suppression control 2 tuning mode selection Select the tuning mode of the vibration suppression control 2. To enable the digit, select "3 inertia mode (_ _ _ 1)" of "Vibration suppression mode selection" in [Pr. PA24 Function selection A-4]. 0: Disabled 1: Automatic setting 2: Manual setting	0h
				_ x _ _ : For manufacturer setting	0h
				x _ _ _ : For manufacturer setting	0h
PB03	For manufacturer setting Do not change this value by any means.	0	PB03	Torque feedback loop gain This is used to set a torque feedback loop gain in the continuous operation to torque control mode. Decreasing the setting value will also decrease a collision load during continuous operation to torque control mode. Setting a value less than 6 rad/s will be 6 rad/s.	18000
PB04	Feed forward gain This parameter cannot be used in the speed control mode. Set the feed forward gain. When the setting is 100%, the droop pulses during operation at constant speed are nearly zero. However, sudden acceleration/deceleration will increase the overshoot. As a guideline, when the feed forward gain setting is 100%, set 1s or more as the acceleration/deceleration time constant up to the rated speed.	0	PB04	Same as MR-J3 Feed forward gain Set the feed forward gain. When the setting is 100%, the droop pulses during operation at constant speed are nearly zero. When the super trace control is enabled, constant speed and uniform acceleration/deceleration droop pulses will be almost 0. However, sudden acceleration/deceleration will increase the overshoot. As a guideline, when the feed forward gain setting is 100%, set 1 s or more as the acceleration time constant up to the rated speed.	0

<table>
<tr><th colspan="3">MR-J3-_B_</th><th colspan="3">MR-J4-_B_</th></tr>
<tr><th>No.</th><th>Name and function</th><th>Initial value</th><th>No.</th><th>Name and function</th><th>Initial value</th></tr>
<tr><td>PB06</td><td>Load to motor inertia ratio
Used to set the ratio of the load inertia moment to the servo motor shaft inertia moment. When auto tuning mode 1 and interpolation mode is selected, the result of auto tuning is automatically used.
When [Pr. PA08] is set to "_ _ _ 2" or "_ _ _ 3", this parameter can be set manually.</td><td>7.0</td><td>PB06</td><td>Same setting as MR-J3
Load to motor inertia ratio/load to motor mass ratio
This is used to set the load to motor inertia ratio or load to motor mass ratio. Setting a value considerably different from the actual load moment of inertia or load mass may cause an unexpected operation such as an overshoot.
The setting of the parameter will be the automatic setting or manual setting depending on the [Pr. PA08] setting. Refer to the following table for details. When the parameter is automatic setting, the value will vary between 0.00 and 100.00.
<table>
<tr><th>Pr. PA08</th><th>This parameter</th></tr>
<tr><td>_ _ _ 0 (2 gain adjustment mode 1 (interpolation mode))</td><td rowspan="2">Automatic setting</td></tr>
<tr><td>_ _ _ 1 (Auto tuning mode 1)</td></tr>
<tr><td>_ _ _ 2 (Auto tuning mode 2)</td><td rowspan="3">Manual setting</td></tr>
<tr><td>_ _ _ 3 (Manual mode)</td></tr>
<tr><td>_ _ _ 4 (2 gain adjustment mode 2)</td></tr>
</table></td><td>7.00</td></tr>
<tr><td>PB07</td><td>Model loop gain
Set the response gain up to the target position.
Increase the gain to improve track ability in response to the command.
When auto turning mode 1・2 is selected, the result of auto turning is automatically used.
When [Pr. PA08] is set to "_ _ _ 0" or "_ _ _ 3", this parameter can be set manually.</td><td>24</td><td>PB07</td><td>Same setting as MR-J3
Model loop gain
Set the response gain up to the target position.
Increasing the setting value will also increase the response level to the position command but will be liable to generate vibration and noise.
The setting of the parameter will be the automatic setting or manual setting depending on the [Pr. PA08] setting. Refer to the following table for details.
<table>
<tr><th>Pr. PA08</th><th>This parameter</th></tr>
<tr><td>_ _ _ 0 (2 gain adjustment mode 1 (interpolation mode))</td><td>Manual setting</td></tr>
<tr><td>_ _ _ 1 (Auto tuning mode 1)</td><td rowspan="2">Automatic setting</td></tr>
<tr><td>_ _ _ 2 (Auto tuning mode 2)</td></tr>
<tr><td>_ _ _ 3 (Manual mode)</td><td rowspan="2">Manual setting</td></tr>
<tr><td>_ _ _ 4 (2 gain adjustment mode 2)</td></tr>
</table></td><td>15.0</td></tr>
<tr><td>PB08</td><td>Position loop gain
This parameter cannot be used in the speed control mode.
Used to set the gain of the position loop.
Set this parameter to increase the position response to level load disturbance. Higher setting increases the response level but is liable to generate vibration and/or noise.
When auto tuning mode 1・2 and interpolation mode is selected, the result of auto tuning is automatically used.
When [Pr. PA08] is set to " _ _ _ 3", this parameter can be set manually.</td><td>37</td><td>PB08</td><td>Same as MR-J3
Position loop gain
This is used to set the gain of the position loop.
Set this parameter to increase the position response to level load disturbance.
Increasing the setting value will also increase the response level to the load disturbance but will be liable to generate vibration and noise.
The setting of the parameter will be the automatic setting or manual setting depending on the [Pr. PA08] setting. Refer to the following table for details.
<table>
<tr><th>Pr. PA08</th><th>This parameter</th></tr>
<tr><td>_ _ _ 0 (2 gain adjustment mode 1 (interpolation mode))</td><td rowspan="3">Automatic setting</td></tr>
<tr><td>_ _ _ 1 (Auto tuning mode 1)</td></tr>
<tr><td>_ _ _ 2 (Auto tuning mode 2)</td></tr>
<tr><td>_ _ _ 3 (Manual mode)</td><td>Manual setting</td></tr>
<tr><td>_ _ _ 4 (2 gain adjustment mode 2)</td><td>Automatic setting</td></tr>
</table></td><td>37.0</td></tr>
<tr><td>PB09</td><td>Speed loop gain
Used to set the gain of the speed loop.
Set this parameter when vibration occurs on machines of low rigidity or large backlash.
Higher setting increases the response level but is liable to generate vibration and/or noise.
When auto tuning mode 1・2, and interpolation mode is selected, the result of auto tuning is automatically used.
When [Pr. PA08] is set to " _ _ _ 3", this parameter can be set manually.</td><td>823</td><td>PB09</td><td>Same as MR-J3
Speed loop gain
This is used to set the gain of the speed loop.
Set this parameter when vibration occurs on machines of low rigidity or large backlash. Increasing the setting value will also increase the response level but will be liable to generate vibration and noise.
The setting of the parameter will be the automatic setting or manual setting depending on the [Pr. PA08] setting. Refer to the table of [Pr. PB08] for details.</td><td>823</td></tr>
</table>

MR-J3-_B_			MR-J4-_B_		
No.	Name and function	Initial value	No.	Name and function	Initial value
PB10	Speed integral compensation Used to set the integral time constant of the speed loop. Lower setting increases the response level but is liable to generate vibration and/or noise. When auto tuning mode 1・2 and interpolation mode is selected, the result of auto tuning is automatically used. When [Pr. PA08] is set to " _ _ _ 3", this parameter can be set manually.	33.7	PB10	Same as MR-J3 Speed integral compensation This is used to set the integral time constant of the speed loop. Decreasing the setting value will increase the response level but will be liable to generate vibration and noise. The setting of the parameter will be the automatic setting or manual setting depending on the [Pr. PA08] setting. Refer to the table of [Pr. PB08] for details.	33.7
PB11	Speed differential compensation Used to set the differential compensation. When [Pr. PB24] is set to "_ _ 3 _", this parameter is made valid. When [Pr. PB24] is set to " _ _ 0 _", this parameter is made valid by instructions of controller.	980	PB11	Same as MR-J3 Speed differential compensation This is used to set the differential compensation. To enable the parameter, select "Continuous PID control enabled (_ _ 3 _)" of "PI-PID switching control selection" in [Pr. PB24].	980
PB12	Overshoot amount compensation This parameter is supported by the servo amplifiers whose software versions are C4 or later. Check the software version using MR Configurator. Used to suppress overshoot during position control. Overshoot can be suppressed in machines with high friction. Set a control ratio against the friction torque in percentage unit. When [Pr. PA01] is set to "_ 4 _ _" or "_ 5 _ _" and [Pr. PB12] is set to "0", the control ratio against the friction torque is fixed at 5% in the servo amplifier.	0	PB12	Same as MR-J3 Overshoot amount compensation This is used to set a viscous friction torque or thrust to rated torque in percentage unit at servo motor rated speed rated speed. When the response level is low or when the torque/thrust is limited, the efficiency of the parameter may be lower.	0
PB13	Machine resonance suppression filter 1 Set the notch frequency of the machine resonance suppression filter 1. Setting [Pr. PB01] (adaptive tuning mode (adaptive filter II)) to "_ _ _ 1" automatically changes this parameter. When the [Pr. PB01] setting is " _ _ _ 0", the setting of this parameter is ignored.	4500	PB13	Same as MR-J3 Machine resonance suppression filter 1 Set the notch frequency of the machine resonance suppression filter 1. When "Filter tuning mode selection" is set to "Automatic setting (_ _ _ 1)" in [Pr. PB01], this parameter will be adjusted automatically. When "Filter tuning mode selection" is set to "Manual setting (_ _ _ 2)" in [Pr. PB01], the setting value will be enabled.	4500

MR-J3-_B_			MR-J4-_B_		
No.	Name and function	Initial value	No.	Name and function	Initial value
PB14	Notch shape selection 1 Used to selection the machine resonance suppression filter 1. 0 0 x 0: Notch depth selection 0: -40 dB 1: -14 dB 2: -8 dB 3: -4 dB	0000h	PB14	Same as MR-J3 Notch shape selection 1 Set the shape of the machine resonance suppression filter 1. When "Filter tuning mode selection" is set to "Automatic setting (_ _ _ 1)" in [Pr. PB01], this parameter will be adjusted automatically. Set manually for the manual setting.	
				_ _ _ x: For manufacturer setting	0h
				_ _ x _ : Notch depth selection 0: -40 dB 1: -14 dB 2: -8 dB 3: -4 dB	0h
	0 x 0 0: Notch width selection 0: α = 2 1: α = 3 2: α = 4 3: α = 5 Setting [Pr. PB01] (adaptive tuning mode (adaptive filter II)) to "_ _ _ 1" automatically changes this parameter. When the [Pr. PB01] setting is "_ _ _ 0", the setting of this parameter is ignored.			_ x _ _ : Notch width selection 0: α = 2 1: α = 3 2: α = 4 3: α = 5	0h
				x _ _ _ : For manufacturer setting	0h
PB15	Machine resonance suppression filter 2 Set the notch frequency of the machine resonance suppression filter 2. Set [Pr. PB16] (notch shape selection 2) to "_ _ _ 1" to make this parameter valid.	4500	PB15	Same as MR-J3 Machine resonance suppression filter 2 Set the notch frequency of the machine resonance suppression filter 2. To enable the setting value, select "Enabled (_ _ _ 1)" of "Machine resonance suppression filter 2 selection" in [Pr. PB16].	4500
PB16	Notch shape selection 2 Select the shape of the machine resonance suppression filter 2. 0 _ _ x: Machine resonance suppression filter 2 selection 0: Invalid 1: Valid	0000h	PB16	Same as MR-J3 Notch shape selection 2 Set the shape of the machine resonance suppression filter 2.	
				_ _ _ x: Machine resonance suppression filter 2 selection 0: Disabled 1: Enabled	0h
	0 _ x _ : Notch depth selection 0: -40 dB 1: -14 dB 2: -8 dB 3: -4 dB			_ _ x _ : Notch depth selection 0: -40 dB 1: -14 dB 2: -8 dB 3: -4 dB	0h
	0 x _ _ : Notch width 0: α = 2 1: α = 3 2: α = 4 3: α = 5			_ x _ _ : Notch width selection 0: α = 2 1: α = 3 2: α = 4 3: α = 5	0h
				x _ _ _ : For manufacturer setting	0h

MR-J3-_B_			MR-J4-_B_		
No.	Name and function	Initial value	No.	Name and function	Initial value
PB17	Automatic setting parameter The value of this parameter is set according to a set value of [Pr. PB06] (Load to motor inertia ratio)		PB17	Shaft resonance suppression filter This is used for setting the shaft resonance suppression filter. This is used to suppress a low-frequency machine vibration. When you select "Automatic setting (_ _ _ 0)" of "Shaft resonance suppression filter selection" in [Pr. PB23], the value will be calculated automatically from the servo motor you use and load to motor inertia ratio. When "Manual setting (_ _ _ 1)" is selected, the setting written to the parameter is used. When "Shaft resonance suppression filter selection" is "Disabled (_ _ _ 2)" in [Pr. PB23], the setting value of this parameter will be disabled. When you select "Enabled (_ _ _ 1)" of "Machine resonance suppression filter 4 selection" in [Pr. PB49], the shaft resonance suppression filter is not available.	
				_ _ x x: Shaft resonance suppression filter setting frequency selection This is used for setting the shaft resonance suppression filter. Refer to table 3.2 for settings. Set the value closest to the frequency you need.	00h
				_ x _ _ : Notch depth selection 0: -40 dB 1: -14 dB 2: -8 dB 3: -4 dB	0h
				x _ _ _ : For manufacturer setting	0h
				Table 3.2 Shaft resonance suppression filter setting frequency selection	

Table 3.2 Shaft resonance suppression filter setting frequency selection

Setting value	Frequency [Hz]	Setting value	Frequency [Hz]
_ _ 0 0	Disabled	_ _ 1 0	562
_ _ 0 1	Disabled	_ _ 1 1	529
_ _ 0 2	4500	_ _ 1 2	500
_ _ 0 3	3000	_ _ 1 3	473
_ _ 0 4	2250	_ _ 1 4	450
_ _ 0 5	1800	_ _ 1 5	428
_ _ 0 6	1500	_ _ 1 6	409
_ _ 0 7	1285	_ _ 1 7	391
_ _ 0 8	1125	_ _ 1 8	375
_ _ 0 9	1000	_ _ 1 9	360
_ _ 0 A	900	_ _ 1 A	346
_ _ 0 B	818	_ _ 1 B	333
_ _ 0 C	750	_ _ 1 C	321
_ _ 0 D	692	_ _ 1 D	310
_ _ 0 E	642	_ _ 1 E	300
_ _ 0 F	600	_ _ 1 F	290

MR-J3-_B_			MR-J4-_B_		
No.	Name and function	Initial value	No.	Name and function	Initial value
PB18	Low-pass filter setting Set the low-pass filter. Setting [Pr. PB023] (low-pass filter selection) to "_ _ 0 _" automatically changes this parameter. When [Pr. PB023] is set to "_ _ 1 _", this parameter can be set manually.	3141	PB18	Same setting as MR-J3 Low-pass filter setting Set the low-pass filter. The following shows a relation of a required parameter to this parameter. [Pr. PB23] / [Pr. PB18] _ _ 0 _ (Initial value): Automatic setting _ _ 1 _: Setting value enabled _ _ 2 _: Setting value disabled	3141
PB19	Vibration suppression control vibration frequency setting This parameter cannot be used in the speed control mode. Set the vibration frequency for vibration suppression control to suppress low-frequency machine vibration, such as enclosure vibration. Setting [Pr. PB02] (vibration suppression control tuning mode) to "_ _ _ 1"automatically changes this parameter. When [Pr. PB02] is set to "_ _ _ 2", this parameter can be set manually.	100.0	PB19	Same as MR-J3 Vibration suppression control 1 - Vibration frequency Set the vibration frequency for vibration suppression control 1 to suppress low-frequency machine vibration. When "Vibration suppression control 1 tuning mode selection" is set to "Automatic setting (_ _ _ 1)" in [Pr. PB02], this parameter will be set automatically. Set manually for "Manual setting (_ _ _ 2)".	100.0
PB20	Vibration suppression control resonance frequency setting This parameter cannot be used in the speed control mode. Set the resonance frequency for vibration suppression control to suppress low frequency machine vibration, such as enclosure vibration. Setting [Pr. PB02] (vibration suppression control tuning mode) to "_ _ _ 1" automatically changes this parameter. When parameter No.PB02 is set to "_ _ _ 2", this parameter can be set manually.	100.0	PB20	Same as MR-J3 Vibration suppression control 1 - Resonance frequency Set the resonance frequency for vibration suppression control 1 to suppress low-frequency machine vibration. When "Vibration suppression control 1 tuning mode selection" is set to "Automatic setting (_ _ _ 1)" in [Pr. PB02], this parameter will be set automatically. Set manually for "Manual setting (_ _ _ 2)".	100.0
PB21	For manufacturer setting Do not change this value by any means.	0.00	PB21	Vibration suppression control 1 - Vibration frequency damping Set a damping of the vibration frequency for vibration suppression control 1 to suppress low-frequency machine vibration. When "Vibration suppression control 1 tuning mode selection" is set to "Automatic setting (_ _ _ 1)" in [Pr. PB02], this parameter will be set automatically. Set manually for "Manual setting (_ _ _ 2)".	0.00
PB22	For manufacturer setting Do not change this value by any means.	0.00	PB22	Vibration suppression control 1 - Resonance frequency damping Set a damping of the resonance frequency for vibration suppression control 1 to suppress low-frequency machine vibration. When "Vibration suppression control 1 tuning mode selection" is set to "Automatic setting (_ _ _ 1)" in [Pr. PB02], this parameter will be set automatically. Set manually for "Manual setting (_ _ _ 2)".	0.00

MR-J3-_B_			MR-J4-_B_		
No.	Name and function	Initial value	No.	Name and function	Initial value
PB23	Low-pass filter selection Select the low-pass filter. 0 0 x 0: Low-pass filter selection 0: Automatic setting 1: Manual setting ([Pr. PB18] setting) When automatic setting has been selected, select the filter that has the band width close to the one calculated with $\frac{VG2 \cdot 10}{1 + GD2}$ [rad/s]	0000h	PB23	Same setting as MR-J3 Low-pass filter selection Select the shaft resonance suppression filter and low-pass filter.	
				_ _ _ x: Shaft resonance suppression filter selection 0: Automatic setting 1: Manual setting 2: Disabled When you select "Enabled (_ _ _ 1)" of "Machine resonance suppression filter 4 selection" in [Pr. PB49], the shaft resonance suppression filter is not available.	0h
				_ _ x _ : Low-pass filter selection 0: Automatic setting 1: Manual setting 2: Disabled	0h
				_ x _ _ : For manufacturer setting	0h
				x _ _ _ : For manufacturer setting	0h
PB24	Slight vibration suppression control selection Select the slight vibration suppression control and PI-PID change. When [Pr. PA08] (auto tuning mode) is set to "_ _ _ 3", the slight vibration suppression control is made valid. (Slight vibration suppression control cannot be used in the speed control mode.) 0 0 _ x: Slight vibration suppression control selection 0: Invalid 1: Valid 0 0 x _ : PI-PID control switch over selection 0: PI control is valid. (Switching to PID control is possible with instructions of controller.) 3: PID control is always valid.	0000h	PB24	Same as MR-J3 Slight vibration suppression control Select the slight vibration suppression control and PI-PID switching control.	
				_ _ _ x: Slight vibration suppression control selection 0: Disabled 1: Enabled To enable the slight vibration suppression control, select "Manual mode (_ _ _ 3)" of "Gain adjustment mode selection" in [Pr. PA08]. Slight vibration suppression control cannot be used in the speed control mode.	0h
				_ _ x _ : PI-PID switching control selection 0: PI control enabled (Switching to PID control is possible with commands of servo system controller.) 3: Continuous PID control enabled If the servo motor at a stop is rotated even one pulse due to any external factor, it generates torque to compensate for a position shift. When the servo motor shaft is to be locked mechanically after positioning completion (stop), enabling PID control and completing positioning simultaneously will suppress the unnecessary torque generated to compensate for a position shift.	0h
				_ x _ _ : For manufacturer setting	0h
				x _ _ _ : For manufacturer setting	0h

MR-J3-_B_			MR-J4-_B_		
No.	Name and function	Initial value	No.	Name and function	Initial value
PB25	For manufacturer setting Do not change this value by any means.	0000h	PB25	Function selection B-1 Select enabled/disabled of model adaptive control. This parameter is supported with software version B4 or later.	
				_ _ _ x: Model adaptive control selection 0: Enabled (model adaptive control) 2: Disabled (PID control)	0h
				_ _ x _ : For manufacturer setting	0h
				_ x _ _ : For manufacturer setting	0h
				x _ _ _ : For manufacturer setting	0h
PB26	Gain changing selection Select the gain changing condition.	0000h	PB26	Same setting as MR-J3 Gain switching function Select the gain switching condition. Set conditions to enable the gain switching values set in [Pr. PB29] to [Pr. PB36] and [Pr. PB56] to [Pr. PB60].	
	0 0 _ x: Gain changing selection Under any of the following conditions, the gains change on the basis of the [Pr. PB29 to PB34] settings. 0: Invalid 1: Control instructions from a controller. 2: Command frequency ([Pr. PB27] setting) 3: Droop pulse value ([Pr. PB27] setting) 4: Servo motor speed ([Pr. PB27] setting)			_ _ _ x: Gain switching selection 0: Disabled 1: Control command from controller is enabled 2: Command frequency 3: Droop pulses 4: Servo motor speed	0h
	0 0 x _ : Gain changing condition 0: Valid when the control instruction from a controller is ON Valid at equal to or more than the value set in [Pr. PB27] 1: Valid when the control instruction from a controller is OFF Valid at equal to or less than the value set in [Pr. PB27]			_ _ x _ : Gain switching condition selection 0: Gain after switching is enabled with gain switching condition or more 1: Gain after switching is enabled with gain switching condition or less	0h
				_ x _ _ : Gain switching time constant disabling condition selection 0: Switching time constant enabled 1: Switching time constant disabled 2: Return time constant disabled This parameter is used by servo amplifier with software version B4 or later.	0h
				x _ _ _ : For manufacturer setting	0h
PB27	Gain changing condition Used to set the value of gain changing condition (command frequency, droop pulses, servo motor speed) selected in [Pr. PB26]. The set value unit changes with the changing condition item.	10	PB27	Same setting as MR-J3 Gain switching condition This is used to set the value of gain switching (command frequency, droop pulses, and servo motor speed) selected in [Pr. PB26]. The set value unit differs depending on the switching condition item.	10
PB28	Gain changing time constant Used to set the time constant at which the gains will change in response to the conditions set in [Pr. PB26 and PB27].	1	PB28	Same setting as MR-J3 Gain switching time constant This is used to set the time constant at which the gains will change in response to the conditions set in [Pr. PB26] and [Pr. PB27].	1

MR-J3-_B_			MR-J4-_B_		
No.	Name and function	Initial value	No.	Name and function	Initial value
PB29	Gain changing load to motor inertia ratio Used to set the load to motor inertia ratio when gain changing is valid. This parameter is made valid when the auto tuning is invalid ([Pr. PA08]: _ _ _ 3).	7.0	PB29	Same as MR-J3 Load to motor inertia ratio/load to motor mass ratio after gain switching This is used to set the load to motor inertia ratio/load to motor mass ratio when gain switching is enabled. This parameter is enabled only when you select "Manual mode (_ _ _ 3)" of "Gain adjustment mode selection" in [Pr. PA08].	7.00
PB30	Gain changing position loop gain This parameter cannot be used in the speed control mode. Set the position loop gain when the gain changing is valid. This parameter is made valid when the auto tuning is invalid ([Pr. PA08]: _ _ _ 3).	37	PB30	Position loop gain after gain switching Set the position loop gain when the gain switching is enabled. When you set a value less than 1.0 rad/s, the value will be the same as [Pr. PB08]. This parameter is enabled only when you select "Manual mode (_ _ _ 3)" of "Gain adjustment mode selection" in [Pr. PA08].	0.0
PB31	Gain changing speed loop gain Set the speed loop gain when the gain changing is valid. This parameter is made valid when the auto tuning is invalid ([Pr. PA08]: _ _ _ 3).	823	PB31	Speed loop gain after gain switching Set the speed loop gain when the gain switching is enabled. When you set a value less than 20 rad/s, the value will be the same as [Pr. PB09]. This parameter is enabled only when you select "Manual mode (_ _ _ 3)" of "Gain adjustment mode selection" in [Pr. PA08].	0
PB32	Gain changing speed integral compensation Set the speed integral compensation when the gain changing is valid. This parameter is made valid when the auto tuning is invalid ([Pr. PA08]: _ _ _ 3)	33.7	PB32	Speed integral compensation after gain switching Set the speed integral compensation when the gain changing is enabled. When you set a value less than 0.1 ms, the value will be the same as [Pr. PB10]. This parameter is enabled only when you select "Manual mode (_ _ _ 3)" of "Gain adjustment mode selection" in [Pr. PA08].	0.0
PB33	Gain changing vibration suppression control vibration frequency setting This parameter cannot be used in the speed control mode. Set the vibration frequency for vibration suppression control when the gain changing is valid. This parameter is made valid when the [Pr. PB02] setting is "_ _ _ 2"and the [Pr. PB26] setting is " _ _ _ 1". When using the vibration suppression control gain changing, always execute the changing after the servo motor has stopped.	100.0	PB33	Vibration suppression control 1 - Vibration frequency after gain switching Set the vibration frequency for vibration suppression control 1 when the gain switching is enabled. When you set a value less than 0.1 Hz, the value will be the same as [Pr. PB19]. This parameter will be enabled only when the following conditions are fulfilled. ▪ "Gain adjustment mode selection" in [Pr. PA08] is "Manual mode (_ _ _ 3)". ▪ "Vibration suppression control 1 tuning mode selection" in [Pr. PB02] is "Manual setting (_ _ _ 2)". ▪ "Gain switching selection" in [Pr. PB26] is "Control command from controller is enabled (_ _ _ 1)". Switching during driving may cause a shock. Be sure to switch them after the servo motor stops.	0.0

MR-J3-_B_			MR-J4-_B_		
No.	Name and function	Initial value	No.	Name and function	Initial value
PB34	Gain changing vibration suppression control resonance frequency setting This parameter cannot be used in the speed control mode. Set the resonance frequency for vibration suppression control when the gain changing is valid. This parameter is made valid when the [Pr. PB02] setting is "_ _ _ 2" and the [Pr. PB26] setting is "_ _ _ 1". When using the vibration suppression control gain changing, always execute the changing after the servo motor has stopped.	100.0	PB34	Vibration suppression control 1 - Resonance frequency after gain switching Set the resonance frequency for vibration suppression control 1 when the gain switching is enabled. When you set a value less than 0.1 Hz, the value will be the same as [Pr. PB20]. This parameter will be enabled only when the following conditions are fulfilled. ▪ "Gain adjustment mode selection" in [Pr. PA08] is "Manual mode (_ _ _ 3)". ▪ "Vibration suppression control 1 tuning mode selection" in [Pr. PB02] is "Manual setting (_ _ _ 2)". ▪ "Gain switching selection" in [Pr. PB26] is "Control command from controller is enabled (_ _ _ 1)". Switching during driving may cause a shock. Be sure to switch them after the servo motor stops.	0.0
PB35	For manufacturer setting Do not change this value by any means.	0.00	PB35	Vibration suppression control 1 - Vibration frequency damping after gain switching Set a damping of the vibration frequency for vibration suppression control 1 when the gain switching is enabled. This parameter will be enabled only when the following conditions are fulfilled. ▪ "Gain adjustment mode selection" in [Pr. PA08] is "Manual mode (_ _ _ 3)". ▪ "Vibration suppression control 1 tuning mode selection" in [Pr. PB02] is "Manual setting (_ _ _ 2)". ▪ "Gain switching selection" in [Pr. PB26] is "Control command from controller is enabled (_ _ _ 1)". Switching during driving may cause a shock. Be sure to switch them after the servo motor stops.	0.00
PB36	For manufacturer setting Do not change this value by any means.	0.00	PB36	Vibration suppression control 1 - Resonance frequency damping after gain switching Set a damping of the resonance frequency for vibration suppression control 1 when the gain switching is enabled. This parameter will be enabled only when the following conditions are fulfilled. ▪ "Gain adjustment mode selection" in [Pr. PA08] is "Manual mode (_ _ _ 3)". ▪ "Vibration suppression control 1 tuning mode selection" in [Pr. PB02] is "Manual setting (_ _ _ 2)". ▪ "Gain switching selection" in [Pr. PB26] is "Control command from controller is enabled (_ _ _ 1)". Switching during driving may cause a shock. Be sure to switch them after the servo motor stops.	0.00

MR-J3-_B_			MR-J4-_B_		
No.	Name and function	Initial value	No.	Name and function	Initial value
PB45	Vibration suppression control filter 2 Used to set the vibration suppression control filter 2. By setting this parameter, machine end vibration, such as workpiece end vibration and base shake, can be suppressed.	0000h	PB45	Same as MR-J3 Command notch filter Set the command notch filter.	
	0 0 x x: Vibration suppression control filter 2 setting frequency selection			_ _ x x: Command notch filter setting frequency selection Refer to table 3.3 for the relation of setting values to frequency.	00h
	0 x 0 0: Notch depth selection			_ x _ _ : Notch depth selection Refer to table 3.4 for details.	0h
				x _ _ _ : For manufacturer setting	0h

MR-J3 (0 0 x x):

Setting value	Frequency [Hz]
0	Invalid
1 to 5F	2250 to 4.5

MR-J3 (0 x 0 0):

Setting value	Depth
0 to F	-40dB to -0.6dB

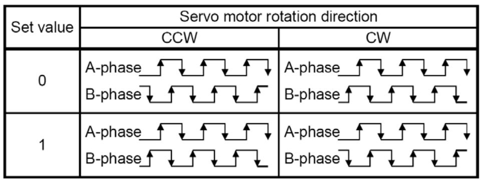
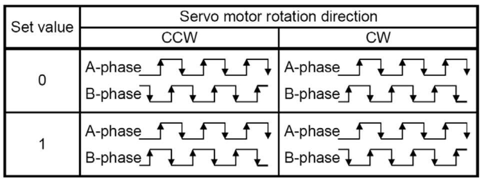
Note 1. This parameter is supported by the servo amplifiers whose software versions are C4 or later.
Check the software version using MR Configurator.

Table 3.3 Command notch filter setting frequency selection

Setting value	Frequency [Hz]	Setting value	Frequency [Hz]	Setting value	Frequency [Hz]
_ _ 0 0	Disabled	_ _ 2 0	70	_ _ 4 0	17.6
_ _ 0 1	2250	_ _ 2 1	66	_ _ 4 1	16.5
_ _ 0 2	1125	_ _ 2 2	62	_ _ 4 2	15.6
_ _ 0 3	750	_ _ 2 3	59	_ _ 4 3	14.8
_ _ 0 4	562	_ _ 2 4	56	_ _ 4 4	14.1
_ _ 0 5	450	_ _ 2 5	53	_ _ 4 5	13.4
_ _ 0 6	375	_ _ 2 6	51	_ _ 4 6	12.8
_ _ 0 7	321	_ _ 2 7	48	_ _ 4 7	12.2
_ _ 0 8	281	_ _ 2 8	46	_ _ 4 8	11.7
_ _ 0 9	250	_ _ 2 9	45	_ _ 4 9	11.3
_ _ 0 A	225	_ _ 2 A	43	_ _ 4 A	10.8
_ _ 0 B	204	_ _ 2 B	41	_ _ 4 B	10.4
_ _ 0 C	187	_ _ 2 C	40	_ _ 4 C	10
_ _ 0 D	173	_ _ 2 D	38	_ _ 4 D	9.7
_ _ 0 E	160	_ _ 2 E	37	_ _ 4 E	9.4
_ _ 0 F	150	_ _ 2 F	36	_ _ 4 F	9.1
_ _ 1 0	140	_ _ 3 0	35.2	_ _ 5 0	8.8
_ _ 1 1	132	_ _ 3 1	33.1	_ _ 5 1	8.3
_ _ 1 2	125	_ _ 3 2	31.3	_ _ 5 2	7.8
_ _ 1 3	118	_ _ 3 3	29.6	_ _ 5 3	7.4
_ _ 1 4	112	_ _ 3 4	28.1	_ _ 5 4	7.0
_ _ 1 5	107	_ _ 3 5	26.8	_ _ 5 5	6.7
_ _ 1 6	102	_ _ 3 6	25.6	_ _ 5 6	6.4
_ _ 1 7	97	_ _ 3 7	24.5	_ _ 5 7	6.1
_ _ 1 8	93	_ _ 3 8	23.4	_ _ 5 8	5.9
_ _ 1 9	90	_ _ 3 9	22.5	_ _ 5 9	5.6
_ _ 1 A	86	_ _ 3 A	21.6	_ _ 5 A	5.4
_ _ 1 B	83	_ _ 3 B	20.8	_ _ 5 B	5.2
_ _ 1 C	80	_ _ 3 C	20.1	_ _ 5 C	5.0
_ _ 1 D	77	_ _ 3 D	19.4	_ _ 5 D	4.9
_ _ 1 E	75	_ _ 3 E	18.8	_ _ 5 E	4.7
_ _ 1 F	72	_ _ 3 F	18.2	_ _ 5 F	4.5

Table 3.4 Notch depth selection

Setting value	Depth [dB]
_ 0 _ _	-40.0
_ 1 _ _	-24.1
_ 2 _ _	-18.1
_ 3 _ _	-14.5
_ 4 _ _	-12.0
_ 5 _ _	-10.1
_ 6 _ _	-8.5
_ 7 _ _	-7.2

MR-J3-_B_			MR-J4-_B_		
No.	Name and function	Initial value	No.	Name and function	Initial value
PC01	Error excessive alarm level This parameter cannot be used in the speed control mode or in the torque control mode. Set error excessive alarm level with rotation amount of servo motor. Note 1. Setting can be changed in parameter No.PC06. 2. For a servo amplifier with software version of B2 or later, reactivating the power supply to enable the setting value is not necessary. For a servo amplifier with software version of earlier than B2, reactivating the power supply is required to enable the setting value. Check the software version using MR Configurator.	3	PC01	Error excessive alarm level Set an error excessive alarm level. Set this per rev. for rotary servo motors and direct drive motors. Setting "0" will be 3 rev. Setting over 200 rev will be clamped with 200 rev.	0
PC02	Electromagnetic brake sequence output Used to set the delay time (Tb) between electronic brake interlock (MBR) and the base drive circuit is shut-off.	0	PC02	Same as MR-J3 Electromagnetic brake sequence output This is used to set the delay time between MBR (Electromagnetic brake interlock) and the base drive circuit is shut-off.	0
PC03	Encoder output pulse selection Use to select the, encoder output pulse direction and encoder output pulse setting.	0000h	PC03	Same setting as MR-J3 Encoder output pulse selection This is used to select the encoder pulse direction and encoder output pulse setting.	
	0 0 0 x: Encoder output pulse phase changing Changes the phases of A, B-phase encoder pulses output. 			_ _ _ x: Encoder output pulse phase selection 0: Increasing A-phase 90° in CCW or positive direction 1: Increasing A-phase 90° in CW or negative direction 	0h
	0 0 x 0: Encoder output pulse setting selection 0: Output pulse designation 1: Division ratio setting			_ _ x _ : Encoder output pulse setting selection 0: Output pulse setting When "_ 1 0 _" is set to this parameter, [AL. 37 Parameter error] will occur. 1: Division ratio setting 3: A-phase/B-phase pulse electronic gear setting 4: A/B-phase pulse through output setting	0h
				_ x _ _ : Selection of the encoders for encoder output pulse This is used for selecting an encoder for servo amplifier output. 0: Servo motor encoder 1: Load-side encoder When "_ 1 0 _" is set to this parameter, [AL. 37 Parameter error] will occur.	0h
				x _ _ _ : For manufacturer setting	0h

MR-J3-_B_			MR-J4-_B_		
No.	Name and function	Initial value	No.	Name and function	Initial value
PC04	Function selection C-1 Select the encoder cable communication system selection. x 0 0 0: Encoder cable communication system selection 0: Two-wire type 1: Four-wire type Incorrect setting will result in an encoder alarm 1 (16).	0000h	PC04	Same as MR-J3 Function selection C-1 Select the encoder cable communication method selection.	
				_ _ _ x: For manufacturer setting	0h
				_ _ x _ : For manufacturer setting	0h
				_ x _ _ : For manufacturer setting	0h
				x _ _ _ : Encoder cable communication method selection 0: Two-wire type 1: Four-wire type When using an encoder of A/B/Z-phase differential output method, set "0". Incorrect setting will result in [AL. 16 Encoder initial communication error 1]. Or [AL. 20 Encoder initial communication error 1] will occur.	0h
PC05	Function selection C-2 Motor-less operation select. 0 0 0 x: Motor-less operation select. 0: Valid 1: Invalid	0000h	PC05	Same setting as MR-J3 Function selection C-2 Set the motor-less operation.	
				_ _ _ x: Motor-less operation selection 0: Disabled 1: Enabled	0h
				_ _ x _ : For manufacturer setting	0h
				_ x _ _ : For manufacturer setting	0h
				x _ _ _ : [AL. 9B Error excessive warning] selection 0: [AL. 9B Error excessive warning] disabled 1: [AL. 9B Error excessive warning] enabled The setting of this digit is used by servo amplifier with software version B4 or later.	0h
PC06	Function selection C-3 This parameter cannot be used in the speed control mode or in the torque control mode. Select the error excessive alarm level setting for [Pr. PC01] x 0 0 0: Error excessive alarm level setting selection 0: 1 [rev]unit 1: 0.1 [rev]unit 2: 0.01 [rev]unit 3: 0.001[rev]unit	0000h	PC06	Same as MR-J3 Function selection C-3 Select units for error excessive alarm level setting with [Pr. PC01]. The parameter is not available in the speed control mode and torque control mode.	
				_ _ _ x: For manufacturer setting	0h
				_ _ x _ : For manufacturer setting	0h
				_ x _ _ : For manufacturer setting	0h
				x _ _ _ : Error excessive alarm/error excessive warning level unit selection 0: Per 1 rev or 1 mm 1: Per 0.1 rev or 0.1 mm 2: Per 0.01 rev or 0.01 mm 3: Per 0.001 rev or 0.001 mm	0h

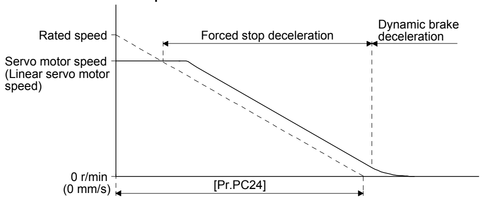
MR-J3-_B_			MR-J4-_B_		
No.	Name and function	Initial value	No.	Name and function	Initial value
PC07	Zero speed Used to set the output range of the zero speed detection (ZSP). Zero speed detection (ZSP) has hysteresis width of 20r/min	50	PC07	Same as MR-J3 Zero speed Used to set the output range of ZSP (Zero speed detection). ZSP (Zero speed detection) has hysteresis of 20 r/min or 20 mm/s.	50
PC08	For manufacturer setting Do not change this value by any means.	0	PC08	Overspeed alarm detection level This is used to set an overspeed alarm detection level. When you set a value more than "servo motor maximum speed × 120%" the set value will be clamped. When you set "0", the value of "servo motor maximum speed × 120%" will be set.	0
PC09	Analog monitor 1 output Used to selection the signal provided to the analog monitor 1 (MO1) output. 0 0 0 x: Analog monitor 1 (MO1) output selection 0: Servo motor speed (± 8 V/max. speed) 1: Torque (±8 V/max. torque) 2: Servo motor speed (+8 V/max. speed) 3: Torque (+8 V/max. torque) 4: Current command (±8 V/max. current command) 5: Speed command (±8 V/max. current command) 6: Droop pulses (±10 V/100 pulses) 7: Droop pulses (±10 V/1000 pulses) 8: Droop pulses (±10 V/10000 pulses) 9: Droop pulses (±10 V/100000 pulses) A: Feedback position (±10 V/1 Mpulses) B: Feedback position (±10 V/10 Mpulses) C: Feedback position (±10 V/100 Mpulses) D: Bus voltage (+8 V/400 V) E: Speed command 2 (±8 V/max. current command)	0000h	PC09	Analog monitor 1 output Select a signal to output to MO1 (Analog monitor 1).	
				_ _ x x: Analog monitor 1 output selection 0 0: servo motor speed (±8 V/max. speed) 0 1: Torque (±8 V/max. torque) 0 2: servo motor speed (+8 V/max. speed) 0 3: Torque (+8 V/max. torque) 0 4: Current command (±8 V/max. current command) 0 5: Speed command (±8 V/max. speed) 0 6: Servo motor-side droop pulses (±10 V/100 pulses) (Note) 0 7: Servo motor-side droop pulses (±10 V/1000 pulses) (Note) 0 8: Servo motor-side droop pulses (±10 V/10000 pulses) (Note) 0 9: Servo motor-side droop pulses (±10 V/100000 pulses) (Note) 0 A: Feedback position (±10 V/1 Mpulse) (Note) 0 B: Feedback position (±10 V/10 Mpulses) (Note) 0 C: Feedback position (±10 V/100 Mpulses) (Note) 0 D: Bus voltage (200 V class and 100 V class: +8 V/400 V, 400 V class: +8 V/800 V) 0 E: Speed command 2 (±8 V/max. speed) 1 0: Load-side droop pulses (±10 V/100 pulses) (Note) 1 1: Load-side droop pulses (±10 V/1000 pulses) (Note) 1 2: Load-side droop pulses (±10 V/10000 pulses) (Note) 1 3: Load-side droop pulses (±10 V/100000 pulses) (Note) 1 4: Load-side droop pulses (±10 V/1 Mpulse) (Note) 1 5: Servo motor-side/load-side position deviation (±10 V/100000 pulses) 1 6: Servo motor-side/load-side speed deviation (±8 V/max. speed) 1 7: Internal temperature of encoder (±10 V/±128 ˚C) Note. Encoder pulse unit	00h
				_ x _ _ : For manufacturer setting	0h
				x _ _ _ : For manufacturer setting	0h
PC10	Analog monitor 2 output Used to selection the signal provided to the analog monitor 2 (MO2) output. 0 0 0 x: Select the analog monitor 2 (MO2) output The settings are the same as those of [Pr. PC09].	0001h	PC10	Analog monitor 2 output Select a signal to output to Analog monitor 2 (MO2).	
				_ _ x x: Analog monitor 2 output selection Refer to [Pr. PC09] for settings.	01h
				_ x _ _ : For manufacturer setting	0h
				x _ _ _ : For manufacturer setting	0h

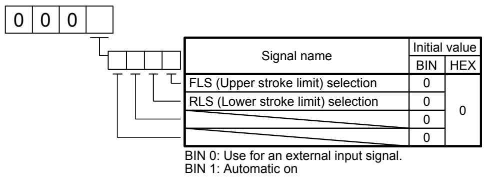
MR-J3-_B_			MR-J4-_B_		
No.	Name and function	Initial value	No.	Name and function	Initial value
PC11	Analog monitor 1 offset Used to set the offset voltage of the analog monitor 1 (MO1) output.	0	PC11	Same as MR-J3 Analog monitor 1 offset This is used to set the offset voltage of Analog monitor 1 (MO1).	0
PC12	Analog monitor 2 offset Used to set the offset voltage of the analog monitor 2 (MO2) output.	0	PC12	Same as MR-J3 Analog monitor 2 offset This is used to set the offset voltage of Analog monitor 2 (MO2).	0
PC13	Analog monitor feedback position output standard data Low Used to set the standard position of feedback output with analog monitor 1 (M01) or 2 (M02). For this parameter, the lower-order four digits of standard position in decimal numbers are set.	0	PC13	Same as MR-J3 Analog monitor - Feedback position output standard data - Low Set a monitor output standard position (lower 4 digits) for the feedback position for when selecting "Feedback position" for Analog monitor 1 (MO1) and Analog monitor 2 (MO2). Monitor output standard position = [Pr. PC14] setting × 10000 + [Pr. PC13] setting	0
PC14	Analog monitor feedback position output standard data High Used to set the standard position of feedback output with analog monitor 1 (M01) or 2 (M02). For this parameter, the higher-order four digits of standard position in decimal numbers are set.	0	PC14	Same as MR-J3 Analog monitor - Feedback position output standard data - High Set a monitor output standard position (higher 4 digits) for the feedback position for when selecting "Feedback position" for Analog monitor 1 (MO1) and Analog monitor 2 (MO2). Monitor output standard position = [Pr. PC14] setting × 10000 + [Pr. PC13] setting	0
PC17	Function Selection C-4 This parameter cannot be used in the speed control mode or in the torque control mode. Home position setting condition in the absolute position detection system can be selected. 0 0 0 x: Selection of home position setting condition 0: Need to pass motor Z-phase after the power supply is switched on. 1: Not need to pass motor Z-phase after the power supply is switched on.	0000h	PC17	Same setting as MR-J3 Function selection C-4 This is used to select a home position setting condition.	
				_ _ _ x: Selection of home position setting condition 0: Need to pass servo motor Z-phase after power on 1: Not need to pass servo motor Z-phase after power on	0h
				_ _ x _ : When the rotary motor is used, the setting need not be changed.	0h
				_ x _ _ : For manufacturer setting	0h
				x _ _ _ : For manufacturer setting	0h
PC18	For manufacturer setting Do not change this value by any means.	0000h	PC18	Function selection C-5 This is used to select an occurring condition of [AL. E9 Main circuit off warning].	
				_ _ _ x: For manufacturer setting	0h
				_ _ x _ : For manufacturer setting	0h
				_ x _ _ : For manufacturer setting	0h
				x _ _ _ : [AL. E9 Main circuit off warning] selection 0: Detection with ready-on and servo-on command 1: Detection with servo-on command	0h

<table>
<tr><th colspan="3">MR-J3-_B_</th><th colspan="3">MR-J4-_B_</th></tr>
<tr><th>No.</th><th>Name and function</th><th>Initial value</th><th>No.</th><th>Name and function</th><th>Initial value</th></tr>
<tr><td rowspan="5">PC20</td><td rowspan="5">Function Selection C-7
Set this function if undervoltage alarm occurs because of distorted power supply voltage waveform when using power regenerative converter or power regeneration common converter.

0 0 0 x:
Setting when undervoltage alarm occurs
0: Initial value (Waveform of power supply voltage is not distorted)
1: Set "1" if undervoltage alarm occurs because of distorted power supply voltage waveform when using power regenerative converter or power regeneration common converter.</td><td rowspan="5">0000h</td><td rowspan="5">PC20</td><td>Function selection C-7
This is used to select an undervoltage alarm detection method.</td><td></td></tr>
<tr><td>_ _ _ x:
[AL. 10 Undervoltage] detection method selection
This is set when FR-RC-(H) or FR-CV-(H) is used and if [AL. 10 undervoltage] occurs due to distorted power supply voltage waveform.
0: [AL. 10] not occurrence
1: [AL. 10] occurrence</td><td>0h</td></tr>
<tr><td>_ _ x _ :
For manufacturer setting</td><td>0h</td></tr>
<tr><td>_ x _ _ :
Undervoltage alarm selection
Select the alarm and warning for when the bus voltage drops to the undervoltage alarm level.
0: [AL. 10] regardless of servo motor speed
1: [AL. E9] at servo motor speed 50 r/min (50 mm/s) or less, [AL. 10] at over 50 r/min (50 mm/s)</td><td>0h</td></tr>
<tr><td>x _ _ _ :
For manufacturer setting</td><td>0h</td></tr>
<tr><td rowspan="5">PC21</td><td rowspan="5">Alarm history clear
Used to clear the alarm history.

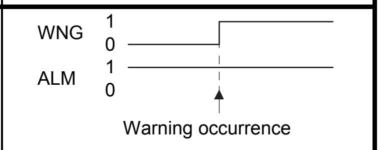
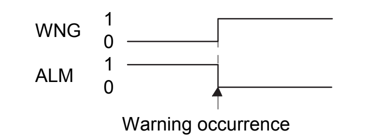
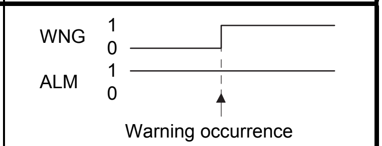
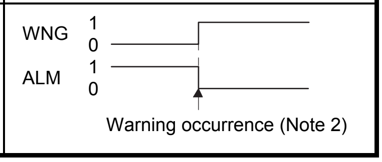
0 0 0 x:
Alarm history clear
0: Invalid
1: Valid
When alarm history clear is made valid, the alarm history is cleared at next power-on.
After the alarm history is cleared, the setting is automatically made invalid (reset to 0).</td><td rowspan="5">0000h</td><td rowspan="5">PC21</td><td>Same as MR-J3
Alarm history clear
Used to clear the alarm history.</td><td></td></tr>
<tr><td>_ _ _ x:
Alarm history clear selection
0: Disabled
1: Enabled
When "Enabled" is set, the alarm history will be cleared at the next power-on. After the alarm history is cleared, the setting is automatically disabled.</td><td>0h</td></tr>
<tr><td>_ _ x _ :
For manufacturer setting</td><td>0h</td></tr>
<tr><td>_ x _ _ :
For manufacturer setting</td><td>0h</td></tr>
<tr><td>x _ _ _ :
For manufacturer setting</td><td>0h</td></tr>
</table>

MR-J3-_B_			MR-J4-_B_		
No.	Name and function	Initial value	No.	Name and function	Initial value
PC24	For manufacturer setting Do not change this value by any means.	0000h	PC24	Forced stop deceleration time constant This is used to set deceleration time constant when you use the forced stop deceleration function.  [Precautions] ▪ If the servo motor torque thrust is saturated at the maximum torque during forced stop deceleration because the set time is too short, the time to stop will be longer than the set time constant. ▪ [AL. 50 Overload alarm 1] or [AL. 51 Overload alarm 2] may occur during forced stop deceleration, depending on the set value. ▪ After an alarm that leads to a forced stop deceleration, if an alarm that does not lead to a forced stop deceleration occurs or if the control circuit power supply is cut, dynamic braking will start regardless of the deceleration time constant setting. ▪ Set a longer time than deceleration time at quick stop of the controller. If a shorter time is set, [AL. 52 Error excessive] may occur.	100
PC29	For manufacturer setting Do not change this value by any means.	0000h	PC29	Function selection C-B This is used to select the POL reflection at torque control.	
				_ _ _ x: For manufacturer setting	0h
				_ _ x _ : For manufacturer setting	0h
				_ x _ _ : For manufacturer setting	0h
				x _ _ _ : POL reflection selection at torque control 0: Enabled 1: Disabled	0h
PC31	For manufacturer setting Do not change this value by any means.	0000h	PC31	Vertical axis freefall prevention compensation amount Set the compensation amount of the vertical axis freefall prevention function. Set it per servo motor rotation amount travel distance. When a positive value is set, compensation is performed to the address increasing direction. When a negative value is set, compensation is performed to the address decreasing direction. The vertical axis freefall prevention function is performed when all of the following conditions are met. 1)Position control mode 2)The value of the parameter is other than "0". 3)The forced stop deceleration function is enabled. 4)Alarm occurs or EM2 turns off when the servo motor speed is zero speed or less. 5)MBR (Electromagnetic brake interlock) was enabled in [Pr. PD07] to [Pr. PD09], and the base circuit shut-off delay time was set in [Pr. PC02].	0

MR-J3-_B_			MR-J4-_B_			
No.	Name and function	Initial value	No.	Name and function		Initial value
PD02	For manufacturer setting Do not change this value by any means.	0000h	PD02	Input signal automatic on selection 2		
				_ _ _ x (HEX)	_ _ _ x: FLS (Upper stroke limit) selection 0: Disabled 1: Enabled _ _ x _ : RLS (Lower stroke limit) selection 0: Disabled 1: Enabled _ x _ _ : For manufacturer setting x _ _ _ : For manufacturer setting	0h
				_ _ x _ (HEX)	For manufacturer setting	0h
				_ x _ _ (HEX)	For manufacturer setting	0h
				_ x _ _ (HEX)	For manufacturer setting	0h
				Convert the setting value into hexadecimal as follows. 		

MR-J3-_B_			MR-J4-_B_		
No.	Name and function	Initial value	No.	Name and function	Initial value
PD07	Output signal device selection 1 (CN3-13) Any input signal can be assigned to the CN3-13 pin. As the initial value, MBR is assigned to the pin. _ _ x x: Select the output device of the CN3-13 pin. 00: Always OFF 01: For manufacturer setting (Note 3) 02: RD 03: ALM 04: INP (Note1, 4) 05: MBR 06: DB 07: TLC (Note 4) 08: WNG 09: BWNG 0A: SA (Note 2) 0B: VLC (Note 5) 0C: ZSP 0D: For manufacturer setting (Note 3) 0E: For manufacturer setting (Note 3) 0F: CDPS 10: For manufacturer setting (Note 3) 11: ABSV (Note 1) 12 to1F: For manufacturer setting (Note 3) 20 to 3F: For manufacturer setting (Note 3) Note 1. It becomes always OFF in the speed control mode. 2. It becomes always OFF in the position control mode or in the torque control mode. 3. For manufacturer setting Never change this setting. 4. It becomes always OFF in the torque control mode. 5. It becomes always OFF in the position control mode or in the speed control mode.	0005h	PD07	Same setting as MR-J3 Output device selection 1 You can assign any output device to the CN3-13 pin.	
				_ _ x x: Device selection 0 0: Always off 0 2: RD (Ready) 0 3: ALM (Malfunction) 0 4: INP (In-position) 0 5: MBR (Electromagnetic brake interlock) 0 6: DB (Dynamic brake interlock) 0 7: TLC (Limiting torque) 0 8: WNG (Warning) 0 9: BWNG (Battery warning) 0 A: SA (Speed reached) 0 C: ZSP (Zero speed detection) 0 F: CDPS (Variable gain selection) 1 1: ABSV (Absolute position undetermined) 1 7: MTTR (During tough drive)	05h
				_ x _ _ : For manufacturer setting	0h
				x _ _ _ : For manufacturer setting	0h
PD08	Output signal device selection 2 (CN3-9) Any input signal can be assigned to the CN3-9 pin. As the initial value, INP is assigned to the pin. The devices that can be assigned and the setting method are the same as in [Pr. PD07]. 0 0 x x: Select the output device of the CN3-9 pin.	0004h	PD08	Same setting as MR-J3 Output device selection 2 You can assign any output device to the CN3-9 pin. INP (In-position) is assigned as the initial value. The devices that can be assigned and the setting method are the same as in [Pr. PD07].	
				_ _ x x: Device selection Refer to [Pr. PD07] for settings.	04h
				_ x _ _ : For manufacturer setting	0h
				x _ _ _ : For manufacturer setting	0h

MR-J3-_B_			MR-J4-_B_		
No.	Name and function	Initial value	No.	Name and function	Initial value
PD09	Output signal device selection 3 (CN3-15) Any input signal can be assigned to the CN3-15 pin. As the initial value, ALM is assigned to the pin. The devices that can be assigned and the setting method are the same as in [Pr. PD07]. 0 0 x x: Select the output device of the CN3-15 pin.	0003h	PD09	Same setting as MR-J3 Output device selection 3 You can assign any output device to the CN3-15 pin. ALM (Malfunction) is assigned as the initial value. The devices that can be assigned and the setting method are the same as in [Pr. PD07].	
				_ _ x x: Device selection Refer to [Pr. PD07] for settings.	03h
				_ x _ _ : For manufacturer setting	0h
				x _ _ _ : For manufacturer setting	0h
PD11	For manufacturer setting Do not change this value by any means.	0004h	PD11	Input filter setting Select the input filter.	
				_ _ _ x: Input signal filter selection Refer to the servo system controller instruction manual for the setting. If external input signal causes chattering due to noise, etc., input filter is used to suppress it. 0: None 1: 0.888 [ms] 2: 1.777 [ms] 3: 2.666 [ms] 4: 3.555 [ms]	4h
				_ _ x _ : For manufacturer setting	0h
				_ x _ _ : For manufacturer setting	0h
				x _ _ _ : For manufacturer setting	0h
PD12	For manufacturer setting Do not change this value by any means.	0000h	PD12	Function selection D-1	
				_ _ _ x : For manufacturer setting	0h
				_ _ x _ : For manufacturer setting	0h
				_ x _ _ : For manufacturer setting	0h
				x _ _ _ : Servo motor thermistor enabled/disabled selection 0: Enabled 1: Disabled For servo motors without thermistor, the setting will be disabled. This parameter setting is used with servo amplifier with software version A5 or later.	0h

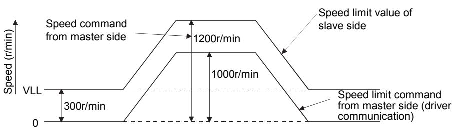
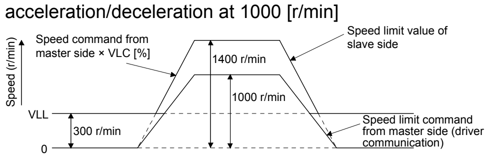
MR-J3-_B_			MR-J4-_B_		
No.	Name and function	Initial value	No.	Name and function	Initial value
PD13	For manufacturer setting Do not change this value by any means.	0000h	PD13	Function selection D-2 Select the INP (In-position) on condition. This parameter is supported with software version B4 or later.	
				_ _ _ x: For manufacturer setting	0h
				_ _ x _ : For manufacturer setting	0h
				_ x _ _ : INP (In-position) on condition selection Select a condition that INP (In-position) is turned on. 0: Droop pulses are within the in-position range. 1: The command pulse frequency is 0, and droop pulses are within the in-position range. When the position command is not inputted for about 1 ms, the command pulse frequency is decided as 0.	0h
				x _ _ _ : For manufacturer setting	0h
PD14	Function selection D-3 Set the ALM output signal at warning occurrence. 0 0 x 0: Selection of output device at warning occurrence Select the warning (WNG) and trouble (ALM) output status at warning occurrence. Output of Servo amplifier Setting: 0 — Device status (Note)  Setting: 1 — Device status (Note)  Note 0: off 1: on	0000h	PD14	Same setting as MR-J3 Function selection D-3	0000h
				_ _ _ x: For manufacturer setting	
				_ _ x _ : Selection of output device at warning occurrence Select WNG (Warning) and ALM (Malfunction) output status at warning occurrence. Servo amplifier output Setting: 0 — Device status (Note1)  Setting: 1 — Device status (Note1)  Note1. 0: Off 1: On 2. Although ALM is turned off upon occurrence of the warning, the forced stop deceleration is performed.	
				_ x _ _ : For manufacturer setting	
				x _ _ _ : For manufacturer setting	

MR-J3-_B_			MR-J4-_B_		
No.	Name and function	Initial value	No.	Name and function	Initial value
PD15	Driver communication setting This parameter setting is used with servo amplifier with software version C1 or later. Check the software version using MR Configurator. This parameter is used to select master/slave axis for the driver communication.	0000h	PD15	Same setting as MR-J3 Driver communication setting This parameter is used to select master/slave axis for the driver communication. This is available only when the forced stop deceleration function is disabled. When the forced stop deceleration function is enabled, [AL. 37] will occur. This parameter setting is used with servo amplifier with software version A8 or later.	
	0 0 _ x: Master axis operation selection 0: Disabled (not using master-slave operation function) 1: Enabled (this servo amplifier: master axis)			_ _ _ x: Master axis operation selection Setting "1" other than in standard control mode will trigger [AL. 37]. 0: Disabled (not using master-slave operation function) 1: Enabled (this servo amplifier: master axis)	0h
	0 0 x _ : Slave axis operation selection 0: Disabled (not using master-slave operation function) 1: Enabled (this servo amplifier: slave axis)			_ _ x _ : Slave axis operation selection Setting "1" other than in standard control mode will trigger [AL. 37]. 0: Disabled (not using master-slave operation function) 1: Enabled (this servo amplifier: slave axis)	0h
				_ x _ _ : For manufacturer setting	0h
				x _ _ _ : For manufacturer setting	0h
PD16	Driver communication setting - Master - Transmit data selection 1 This parameter setting is used with servo amplifier with software version C1 or later. Check the software version using MR Configurator. This parameter is used to select transmit data from master axis to slave axis. When setting this amplifier as master axis ([Pr. PD15] = "0001"), select "0038 (torque command)" with this parameter.	0000h	PD16	Same setting as MR-J3 Driver communication setting - Master - Transmit data selection 1 This parameter is used to select transmit data from master axis to slave axis. When setting this amplifier as master axis ([Pr. PD15] is "_ _ 0 1".), select "_ _ 3 8 (torque command)" with this parameter. This parameter setting is used with servo amplifier with software version A8 or later.	
	0 0 x x: Transmission data selection 00: Disabled 38: Torque command			_ _ x x: Transmission data selection 00: Disabled 38: Torque command	00h
				_ x _ _ : For manufacturer setting	0h
				x _ _ _ : For manufacturer setting	0h

PD15 (MR-J3-_B_ and MR-J4-_B_):

Master-slave operation function		Setting value
Not used		0000
Used	Master	0001
	Slave	0010

MR-J3-_B_			MR-J4-_B_		
No.	Name and function	Initial value	No.	Name and function	Initial value
PD17	Driver communication setting - Master - Transmit data selection 2 This parameter setting is used with servo amplifier with software version C1 or later. Check the software version using MR Configurator. This parameter is used to select transmit data from master axis to slave axis. When setting this amplifier as master axis ([Pr. PD15] = "0001"), select "003A (speed limit command)" with this parameter. 0 0 x x: Transmission data selection 00: Disabled 3A: speed limit command	0000h	PD17	Driver communication setting - Master - Transmit data selection 2 This parameter is used to select transmit data from master axis to slave axis. When setting this amplifier as master axis ([Pr. PD15] is "_ _ 0 1".), select "_ _ 3 A (speed limit command)" with this parameter. This parameter setting is used with servo amplifier with software version A8 or later.	
				_ _ x x: Transmission data selection 00: Disabled 3A: speed limit command	00h
				_ x _ _ : For manufacturer setting	0h
				x _ _ _ : For manufacturer setting	0h
PD20	Driver communication setting - Slave - Master axis No. selection 1 This parameter setting is used with servo amplifier with software version C1 or later. Check the software version using MR Configurator. Select a master axis when this amplifier is slave axis. When setting this amplifier as slave axis ([Pr. PD15] = "0010"), set the axis No. of the servo amplifier of master. Refer to MR-J4-_B_ Servo Amplifier Instruction Manual for details of axis Nos.	0	PD20	Driver communication setting - Slave - Master axis No. selection 1 Select a master axis when this amplifier is slave axis. When setting this amplifier as slave axis ([Pr. PD15] is "_ _ 1 0".), set the axis No. of the servo amplifier of master. Setting "0" disables this parameter. This parameter setting is used with servo amplifier with software version A8 or later.	0
PD30	Master-slave operation - Torque command coefficient on slave This parameter setting is used with servo amplifier with software version C1 or later. Check the software version using MR Configurator. This parameter is used to set an internal torque command coefficient to torque command value received from master axis. This parameter is enabled when this amplifier is set as slave axis ([Pr. PD15] = "0010"). Convert a decimal value to a hexadecimal value for input. The maximum value is 500. Setting over 500 will be 500. Setting 100 [%] (0064h in hexadecimal) means multiplication of one. The torque ratio will be 100 (master) to 100 (slave). Setting 90 [%] (005Ah in hexadecimal) means multiplication of 0.9. The torque ratio will be 100 (master) to 90 (slave).	0000h	PD30	Master-slave operation - Torque command coefficient on slave This parameter is used to set an internal torque command coefficient to torque command value received from master axis. This parameter is enabled when this amplifier is set as slave axis ([Pr. PD15] is "_ _ 1 0".). The maximum value is 500. Setting over 500 will be 500. Setting 100 [%] means multiplication of one. The torque ratio will be 100 (master) to 100 (slave). Setting 90 [%] means multiplication of 0.9. The torque ratio will be 100 (master) to 90 (slave). This parameter setting is used with servo amplifier with software version A8 or later.	0

MR-J3-_B_			MR-J4-_B_		
No.	Name and function	Initial value	No.	Name and function	Initial value
PD31	Master-slave operation - Speed limit coefficient on slave This parameter setting is used with servo amplifier with software version C1 or later. Check the software version using MR Configurator. This parameter is used to set an internal speed limit value coefficient to speed limit command value received from master axis. This parameter is enabled when this amplifier is set as slave axis ([Pr. PD15] = "0010"). Convert a decimal value to a hexadecimal value for input. The maximum value is 500. Setting over 500 will be 500. Setting 100 [%] (0064h in hexadecimal) means multiplication of one. Setting example: [Pr. PD31 (VLC)] = 0078h (120%), [Pr. PD32 (VLL)] = 012Ch (300 r/min), and master side acceleration/deceleration at 1000 [r/min] 	0000h	PD31	Master-slave operation - Speed limit coefficient on slave This parameter is used to set an internal speed limit value coefficient to speed limit command value received from master axis. This parameter is enabled when this amplifier is set as slave axis ([Pr. PD15] is "_ _ 1 0".). The maximum value is 500. Setting over 500 will be 500. Setting 100 [%] means multiplication of one. Setting example: [Pr. PD31 (VLC)] = 140 [%], [Pr. PD32 (VLL)] = 300 [r/min], and master side acceleration/deceleration at 1000 [r/min]  This parameter setting is used with servo amplifier with software version A8 or later.	0
PD32	Master-slave operation - Speed limit adjusted value on slave This parameter setting is used with servo amplifier with software version C1 or later. Check the software version using MR Configurator. This parameter is used to set a minimum value for internal speed limit value. This parameter is enabled when this amplifier is set as slave axis ([Pr. PD15] = "0010"). Convert a decimal value to a hexadecimal value for input. The speed limit value will not be this setting value or lower. This parameter ensures torque control range at low speed driving (avoid area likely to reach speed limit). Set 100 to 500 [r/min] normally as a reference. Refer to [Pr. PD31] for the setting example.	0000h	PD32	Master-slave operation - Speed limit adjusted value on slave This parameter is used to set a minimum value for internal speed limit value. This parameter is enabled when this amplifier is set as slave axis ([Pr. PD15] is "_ _ 1 0".). The speed limit value will not be this setting value or lower. This parameter ensures torque control range at low speed driving (avoid area likely to reach speed limit). Set 100 to 500 [r/min] normally as a reference. Refer to [Pr. PD31] for the setting example. This parameter setting is used with servo amplifier with software version A8 or later.	0

4. APPLICATION OF FUNCTIONS

This chapter explains application of using servo amplifier functions.

4.1 J3 compatibility mode

POINT
●The J3 compatibility mode is compatible only with HG series servo motors. ●Specifications of the J3 compatibility mode of the servo amplifier with software version A4 or earlier differ from those with software version A5 or later. ●The J3 compatibility mode is not compatible with the master-slave operation function.

4.1.1 J3 Outline of J3 compatibility mode

MR-J4-_B_(-RJ) servo amplifiers and MR-J4-_B_(-RJ) servo amplifiers have two operation modes. "J4 mode" is for using all functions with full performance and "J3 compatibility mode" is compatible with MR-J3-B series for using the amplifiers as the conventional series.
When you connect an amplifier with SSCNET III/H communication for the first controller communication by factory setting, the operation mode will be fixed to "J4 mode". For SSCNET communication, it will be fixed to "J3 compatibility mode". When you set the mode back to the factory setting, use the application "MR-J4(W)-B mode selection".
The application "MR-J4(W)-B mode selection" is packed with MR Configurator2 of software version 1.12N or later.
For the operating conditions of the application "MR-J4(W)-B mode selection", use MR Configurator2.

4.1.2 Operation modes supported by J3 compatibility mode

The J3 compatibility mode supports the following operation modes.

Operation mode in J3 compatibility mode	Model of MR-J3-_B
MR-J3-B standard control mode (rotary servo motor)	MR-J3-_B

Each operation mode has the same ordering as conventional MR-J3-B series servo amplifiers and is compatible with their settings.
In addition, the control response characteristic in the J3 compatibility mode will be the same as that of MR-J3 series. By enabling the J3 extension function, control response will be equal to MR-J4 series using a controller compatible with SSCNET III.

4.1.3 J3 compatibility mode supported function list

The following shows functions which compatible with J4 mode and J3 compatibility mode. The letters such as "A0" described after ◎ and ○ mean servo amplifier software versions which compatible with each function. Each function is used with servo amplifiers with these software versions or later.

Function	Name	Compatible (◎: J4 new, ○: Equivalent to J3, ×: Not available)		
		MR-J4 series		MR-J3/MR-J3W series (Note 8)
		J4 mode	J3 compatibility mode	
Basic specification	Speed frequency response	2.5 kHz	2.1 kHz	2.1 kHz
	Encoder resolution	22 bits (Note 1)	18 bits (Note 1)	18 bits
SSCNET III/H communication or SSCNET III communication	Communication baud rate	150 Mbps	50 Mbps	50 Mbps
	Maximum distance between stations	100 m	50 m	50 m
Basic function	Absolute position detection system	○A0	○A0	○
	Motor-less operation	○A0	○A0	○
	Rotation direction selection/travel direction selection	○A0	○A0	○
Encoder output pulses	A/B-phase pulse output	○A0	○A0	○
	Z-phase pulse output	○A0	○A0	○
Input/output	Analog monitor output	○A0	○A0	○
	Motor thermistor	○A0	○A0	MR-J3-_B-RJ004 MR-J3-_B-RJ080W
Control mode	Position control mode	○A0	○A0	○
	Speed control mode	○A0	○A0	○
	Torque control mode	○A0	○A0	○
	Continuous operation to torque control mode	○A0	○A0	○
Auto tuning	Auto tuning mode 1	○A0	○A0	○
	Auto tuning mode 2	○A0	○A0	○
	2 gain adjustment mode 1 (interpolation mode)	○A0	○A0	○
	2 gain adjustment mode 2	◎A0	×	×
	Manual mode	○A0	○A0	○
Filter function	Machine resonance suppression filter 1	○A0	○A0	○
	Machine resonance suppression filter 2	○A0	○A0	○
	Machine resonance suppression filter 3	◎A0	◎B0 (Note 6)	×
	Machine resonance suppression filter 4	◎A0	◎B0 (Note 6)	×
	Machine resonance suppression filter 5	◎A0	◎B0 (Note 6)	×
	Shaft resonance suppression filter	○A0	◎B0 (Note 6)	×
	Low-pass filter	○A0	○A0	○
	Robust disturbance compensation (Note 3)	×	○A0	○
	Robust filter	◎A0	◎B0 (Note 6)	×
Vibration suppression control	Standard mode/3 inertia mode	◎A0	◎B0 (Note 6)	×
	Vibration suppression control 1	○A0	○A0	○
	Vibration suppression control 2	◎A0	◎B0 (Note 6)	×
	Command notch filter	○A0	○A0	○

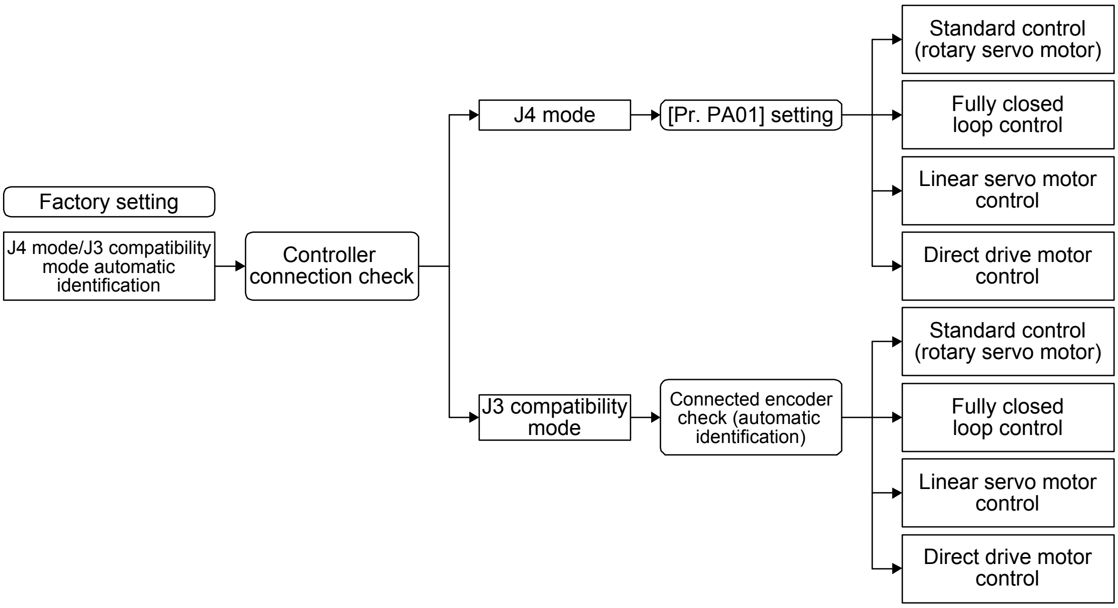
Function	Name	Compatible (◎: J4 new, ○: Equivalent to J3, ×: Not available)		
		MR-J4 series		MR-J3/MR-J3W series (Note 8)
		J4 mode	J3 compatibility mode	
Applied control	Gain switching	○A0	○A0	○
	Slight vibration suppression control	○A0	○A0	○
	Overshoot amount compensation	○A0	○A0	○
	PI-PID switching control	○A0	○A0	○
	Feed forward	○A0	○A0	○
	Torque limit	○A0	○A0	○
	Master-slave operation function	○A8	×	○
	Scale measurement function	◎A8	×	×
	Model adaptive control disabled	○B4	○B4	×
	Lost motion compensation function	◎B4	◎B4 (Note 6)	×
	Super trace control	◎B4	×	×
Adjustment function	One-touch tuning	◎A0	◎B0 (Note 6)	×
	Adaptive tuning	○A0	○A0	○
	Vibration suppression control 1 tuning	○A0	○A0	○
	Vibration suppression control 2 tuning	◎A0	◎B0 (Note 6)	×
Encoder	Semi closed loop control two-wire type/four-wire type selection	○A0	○A0	○
Functional safety	STO function	○A0	○A0	MR-J3-_BS
	Forced stop deceleration function at alarm occurrence	○A0	○A0 (Note 5)	MR-J3-_BS
	Vertical axis freefall prevention function	○A0	○A0	MR-J3-_BS
Tough drive function	SEMI-F47 function	◎A0	◎B0 (Note6, 7)	×
	Vibration tough drive	◎A0	◎B0 (Note 6)	×
	Instantaneous power failure tough drive	◎A0	◎B0 (Note 6)	×
Diagnosis function	3-digit alarm display	◎A0	◎A0	×
	16 alarm histories supported	◎A0	× (Note 2)	× (Note 2)
	Drive recorder function	◎A0	◎B0 (Note 6)	×
	Machine diagnosis function	◎A0	◎B0 (Note 6)	×
Controller	SSCNET III	×	○A0	○
	SSCNET III/H	◎A0	×	×
	Home position return function	○A0	○A0	○
Others	J4 mode/J3 compatibility mode automatic identification (Note 4)	○A0	○A0	×
	Power monitoring function	◎A0	◎B0 (Note 6)	×

Note 1. The value is at the HG series servo motor driving.
2. Alarm history will be saved up to six times.
3. For MR-J4 series, the robust filter and vibration tough drive are available instead.
4. The operation mode will be identified automatically at the first controller communication. You can change the operation mode with the application "MR-J4(W)-B mode selection".
5. When MR-J4 is used as a replacement of MR-J3-_S, "Servo forced stop selection" in [Pr. PA04] will be "Disabled (_ 1 _ _)" in the initial setting. Change the setting as necessary.
6. This is available when the J3 extension function is enabled. Refer to section 4.1.9 for details.
7. For servo system controllers which are available with this, contact your local sales office.

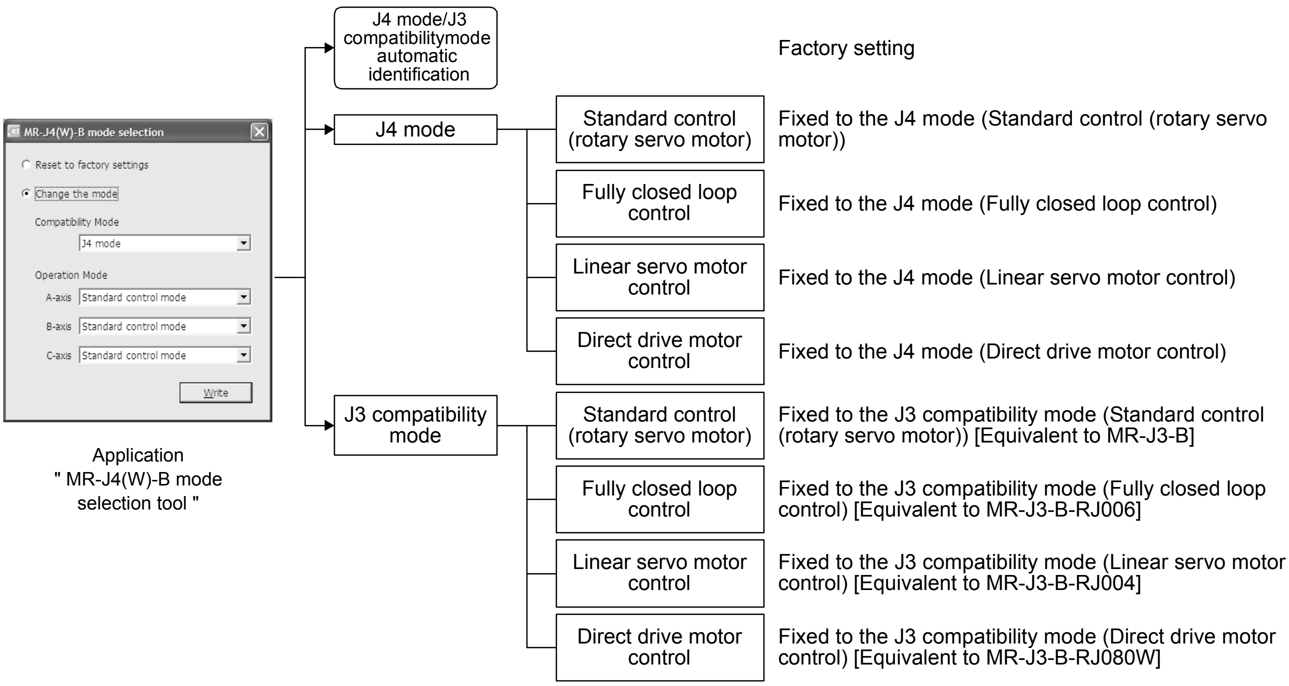
4.1.4 How to switch J4 mode/J3 compatibility mode

There are two ways to switch the J4 mode/J3 compatibility mode with the MR-J4-_B_(-RJ) servo amplifier.

(1) Mode selection by the automatic identification of the servo amplifier
J4 mode/J3 compatibility mode is identified automatically depending on the connected controller. When the controller makes a connection request with SSCNET III/H communication, the mode will be "J4 mode". For SSCNET communication, it will be "J3 compatibility mode".
For the J3 compatibility mode, standard control will be identified automatically with a motor (encoder) connected to the servo amplifier. For the J4 mode, the operation mode will be the setting of [Pr. PA01].



(2) Mode selection using the application software "MR-J4(W)-B mode selection"
You can set the factory setting, J4 mode/J3 compatibility mode, and operation mode with the dedicated application.



4.1.5 How to use the J3 compatibility mode

(1) Setting of the controller
To use in the J3 compatibility mode, select MR-J3 series in the system setting window.

Operation mode in J3 compatibility mode	System setting
MR-J3-B standard control mode (rotary servo motor)	Select MR-J3-_B.

(2) Setting of MR Configurator
To use in the J3 compatibility mode, make the system setting as follows.

Operation mode in J3 compatibility mode	System setting
MR-J3-B standard control mode (rotary servo motor)	Select MR-J3-_B.

Cautions for using MR Configurator
・The gain search cannot be used. You can use the advanced gain search.

(3) Setting of MR Configurator2
To use in the J3 compatibility mode, make the system setting as follows.

Operation mode in J3 compatibility mode	System setting
MR-J3-B standard control mode (rotary servo motor)	Select MR-J3-_B.

Cautions for using MR Configurator2
・Use MR Configurator2 with software version 1.12N or later. Older version than 1.12N cannot be used.
・Information about existing models (MR-J3) cannot be updated with the parameter setting range update function. Register a new model to use.
・The alarm will be displayed by 3 digits.
・The robust disturbance compensation cannot be used.

4.1.6 Cautions for switching J4 mode/J3 compatibility mode

The J3 compatibility mode of the operation mode is automatically identified by factory setting depending on a connected encoder. If a proper encoder is not connected at the first connection, the system will not start normally due to a mismatch with a set mode with the controller. (For the J4 mode, you can set the operation mode with [Pr. PA01].) When the operation mode mismatches, the servo amplifier will display [AL. 3E.1 Operation mode error]. Set the mode back to the factory setting or set correctly (J4 mode/J3 compatibility mode and operation mode) using the application "MR-J4(W)-B mode selection".

4.1.7 Cautions for the J3 compatibility mode

The J3 compatibility mode is partly changed and has restrictions compared with MR-J3 series.

(1) The alarm display was changed from 2 digits (_ _) to 3 digits (_ _. _). The alarm detail number (._) is displayed in addition to the alarm No (_ _). The alarm No. (_ _) is not changed.

(2) When the power of the servo amplifier is cut or fiber-optic cable is disconnected, the same type communication can be cut regardless of connection order. When you power on/off the servo amplifier during operation, use the connect/disconnect function of the controller. Refer to the following manuals for detail.
- MELSEC iQ-R Motion Controller Programming Manual (Common) (R16MTCPU/R32MTCPU) (IB-0300237) "5.3.1 Connect/disconnect function of SSCNET communication"
- Motion controller Q series Programming Manual (COMMON) (Q173D(S)CPU/Q172D(S)CPU) (IB-0300134) "4.11.1 Connect/disconnect function of SSCNET communication"
- MELSEC iQ-R Simple Motion Module User's Manual (Application) (RD77MS2/RD77MS4/RD77MS8/RD77MS16) (IB-0300247) "8.12 Connect/Disconnect Function of SSCNET Communication"
- MELSEC-Q QD77MS Simple Motion Module User's Manual (IB-0300185) "14.12 Connect/disconnect function of SSCNET communication"
- MELSEC-L LD77MH Simple Motion Module User's Manual (IB-0300172) "14.13 Connect/disconnect function of SSCNET communication"
- MELSEC-L LD77MS Simple Motion Module User's Manual (Positioning Control) (IB-0300211) "14.13 Connect/disconnect function of SSCNET communication"

(3) The J3 compatibility mode has a functional compatibility. However, the operation timing may differ. Check the operation timing on customer side to use.

(4) The J3 compatibility mode is not compatible with high-response control set by [Pr. PA01 Operation mode].

4.1.8 Change of specifications of "J3 compatibility mode" switching process

(1) Detailed explanation of "J3 compatibility mode" switching

(a) Operation when using a servo amplifier before change of specifications

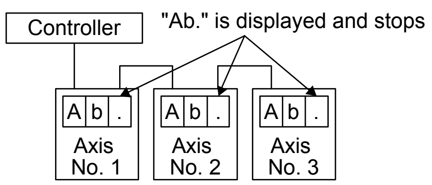
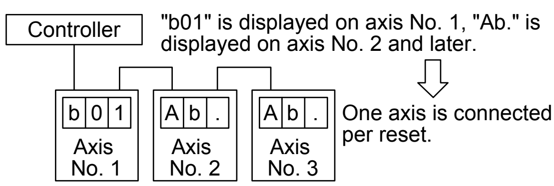
For the controllers in which "Not required" is described to controller reset in table 3.5, the mode will be switched to "J3 compatibility mode" for all axes at the first connection. However, it takes about 10 s per axis for completing the connection.

For the controllers in which "Reset required" is described in table 3.5, the operation at the first connection is shown in table 3.6. The LED displays will be "Ab." for all axes at the first connection to the controller as shown in table 3.6. After that, resetting controller will change the 1-axis to "b01". The 2-axis and later will not change from "Ab.". After that, one axis will be connected per two times of controller reset.

Table 3.5 Controller reset required/not required list (before change of specifications)

Controller	Model	Controller reset required/not required	
		Single-axis connection	Multi-axis connection
Motion controller	R_MTCPU	Not required	Not required
	Q17_DSCPU	Not required	Not required
	Q17_DCPU	Not required	Not required
	Q17_HCPU	Not required	Not required
	Q170MCPU	Not required	Not required
Simple motion module Positioning module	RD77MS_	Not required	Not required
	QD77MS_	Not required	Not required
	LD77MS_	Not required	Not required
	QD75MH_	Not required	Not required
	QD74MH_	Reset required	Reset required
	LD77MH_	Not required	Not required
	FX3U-20SSC-H	Not required	Reset required

Table 3.6 Controller connection operation before change of specifications

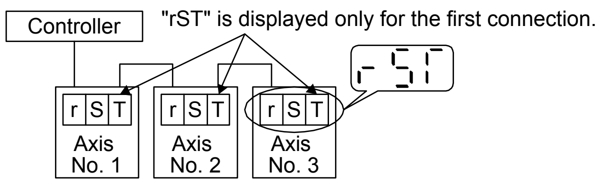
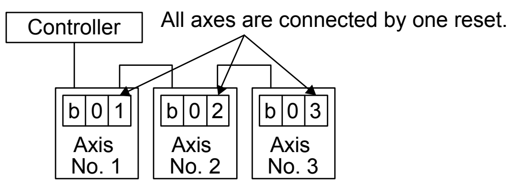
	Before change of specifications (software version A4 or earlier)
First connection of controller	
After controller reset	

(b) Operation when using a servo amplifier after change of specifications
For the controllers in which "Not required" is described to controller reset in table 3.7, the mode will be switched to "J3 compatibility mode" for all axes at the first connection. It takes about 10 s for completing the connection not depending on the number of axes.
For the controllers in which "Reset required" is described in table 3.7, the operation at the first connection is shown in table 3.8. The servo amplifier's mode will be "J3 compatibility mode" and the LED displays will be "rST" for all axes at the first connection to the controller as shown in table 3.8. At the status, resetting controller once will change the display to "b##" (## means axis No.) for all axes and all axes will be ready to connect.
(One controller reset enables to all-axis connection.)

Table 3.7 Controller reset required/not required list (after change of specifications)

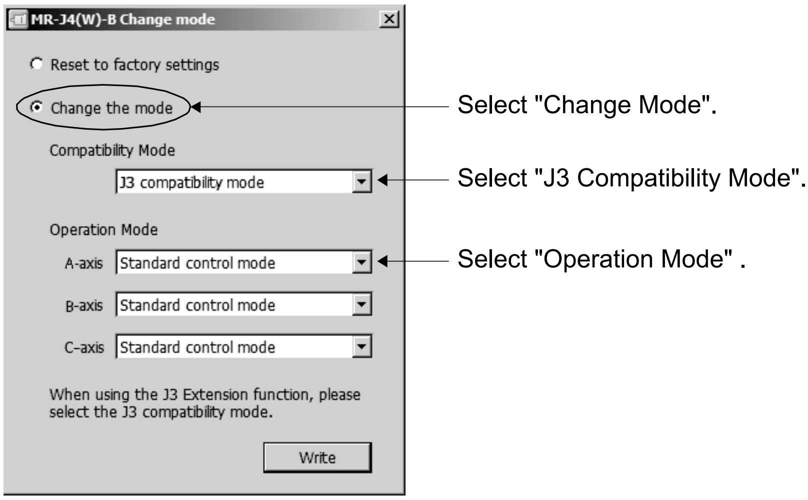
Controller	Model	Controller reset required/not required	
		Single-axis connection	Multi-axis connection
Motion controller	R_MTCPU	Not required	Not required
	Q17_DSCPU	Not required	Not required
	Q17_DCPU	Not required	Not required
	Q17_HCPU	Not required	Not required
	Q170MCPU	Not required	Not required
Simple motion module Positioning module	RD77MS_	Not required	Not required
	QD77MS_	Not required	Not required
	LD77MS_	Not required	Not required
	QD75MH_	Not required	Not required
	QD74MH_	Reset required	Reset required
	LD77MH_	Not required	Not required
	FX3U-20SSC-H	Reset required	Reset required

Table 3.8 Controller connection operation after change of specifications

	After change of specifications (software version A4 or above)
First connection of controller	
After controller reset	

(c) Using servo amplifiers before and after change of specifications simultaneously
When using servo amplifiers before change of specifications and after change of specifications simultaneously, controller reset is necessary for number of connecting axes of servo amplifiers.

(2) Changing the mode to "J3 compatibility mode" by using the application "MR-J4(W)-B mode selection".
You can switch the servo amplifier's mode to "J3 compatibility mode" beforehand with the built-in application software "MR-J4(W)-B mode selection" of MR Configurator2. Use it for a solution when it is difficult to reset many times with your "Reset required" controller such as "QD74MH_".
The application "MR-J4(W)-B mode selection" has no expiration date.



4.1.9 Extension function

POINT
●The J3 extension function is used with servo amplifiers with software version B0 or later. ●To enable the J3 extension function, MR Configurator2 with software version 1.25B or later is necessary. ●The J3 extension function of the amplifier differs from MR-J3-B in motion.

The J3 extension function is for using functions of J4 mode with J3 compatibility mode.
By enabling the J3 extension function, control response will be equal to MR-J4 series using a controller compatible with SSCNET III.

J4 mode	J3 compatibility mode	
	J3 extension function enabled: [Pr. PX01] = "_ _ _ 1"	J3 extension function disabled: [Pr. PX01] = "_ _ _ 0"
・SSCNET III/H communication ・MR-J4-B function	・SSCNET III communication ・The same parameter ordering as MR-J3-B ・MR-J4-B control function ・Parameter added	・SSCNET III communication ・The same parameter ordering as MR-J3-B

The following shows functions used with the J3 extension function.

Function	Description	Detailed explanation
Gain switching function (Vibration suppression control 2 and model loop gain)	You can switch gains during rotation/stop, and can use input devices to switch gains during operation.	Section 4.1.9 (6)
Advanced vibration suppression control II	This function suppresses vibration at the arm end or residual vibration.	Section 4.1.9 (5) (c)
Machine resonance suppression filter 3 Machine resonance suppression filter 4 Machine resonance suppression filter 5	This is a filter function (notch filter) which decreases the gain of the specific frequency to suppress the resonance of the mechanical system.	Section 4.1.9 (5) (a)
Shaft resonance suppression filter	When a load is mounted to the servo motor shaft, resonance by shaft torsion during driving may generate a mechanical vibration at high frequency. The shaft resonance suppression filter suppresses the vibration.	Section 4.1.9 (5) (b)
Robust filter	This function provides better disturbance response in case low response level that load to motor inertia ratio is high for such as roll send axes.	[Pr. PX31]
One-touch tuning	Gain adjustment is performed just by one click on a certain button on MR Configurator2. MR Configurator2 is necessary for this function.	Section 4.1.9 (4)
Tough drive function	This function makes the equipment continue operating even under the condition that an alarm occurs. The tough drive function includes two types: the vibration tough drive and the instantaneous power failure tough drive.	Section 4.1.9 (7)
SEMI-F47 function (Note)	Enables to avoid triggering [AL. 10 Undervoltage] using the electrical energy charged in the capacitor in case that an instantaneous power failure occurs during operation. Use a 3-phase for the input power supply of the servo amplifier. Using a 1-phase 200 V AC for the input power supply will not comply with SEMI-F47 standard.	[Pr. PX25] [Pr. PX28] Section 4.1.9 (8)
Drive recorder function	This function continuously monitors the servo status and records the status transition before and after an alarm for a fixed period of time. You can check the recorded data on the drive recorder window on MR Configurator2 by clicking the "Graph" button. However, the drive recorder will not operate on the following conditions. 1. You are using the graph function of MR Configurator2. 2. You are using the machine analyzer function. 3. [Pr. PX30] is set to "-1". 4. The controller is not connected (except the test operation mode). 5. An alarm related to the controller is occurring.	[Pr. PX29]
Power monitoring function	This function calculates the power running energy and the regenerative power from the data in the servo amplifier such as speed and current. Power consumption and others are displayed on MR Configurator2 in the system of SSCNET III/H. Since the servo amplifier sends data to a servo system controller, you can analyze the data and display the data on a display.	
Machine diagnosis function	From the data in the servo amplifier, this function estimates the friction and vibrational component of the drive system in the equipment and recognizes an error in the machine parts, including a ball screw and bearing. MR Configurator2 is necessary for this function.	
Lost motion compensation function	This function improves the response delay occurred when the machine moving direction is reversed. This is used with servo amplifiers with software version B4 or later. Check the software version of the servo amplifier using MR Configurator2.	Section 4.1.9 (9)

Note For servo system controllers which are available with this, contact your local sales office.

The following shows how to use the J3 extension function.

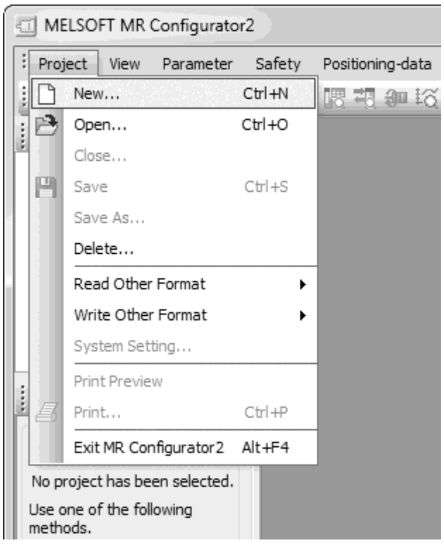
(1) Settings of J3 extension function

POINT
●To set the J3 extension function, connect a personal computer with MR Configurator2 of software version 1.25B or later to the servo amplifier with USB cable. ●The extension control 2 parameters ([Pr. PX_ _]) cannot be set from a controller.

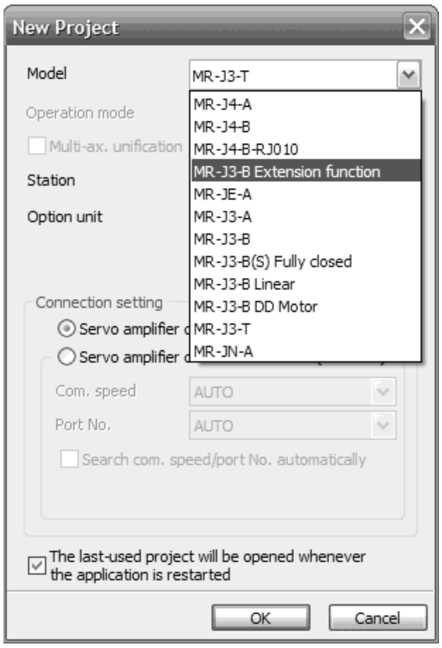
To use the J3 the extension function, enable the setting of the extension control 2 parameters ([Pr. PX_ _]). Set as follows using MR Configurator2.

(a) Setting to enable the extension control 2 parameters ([Pr. PX_ _])

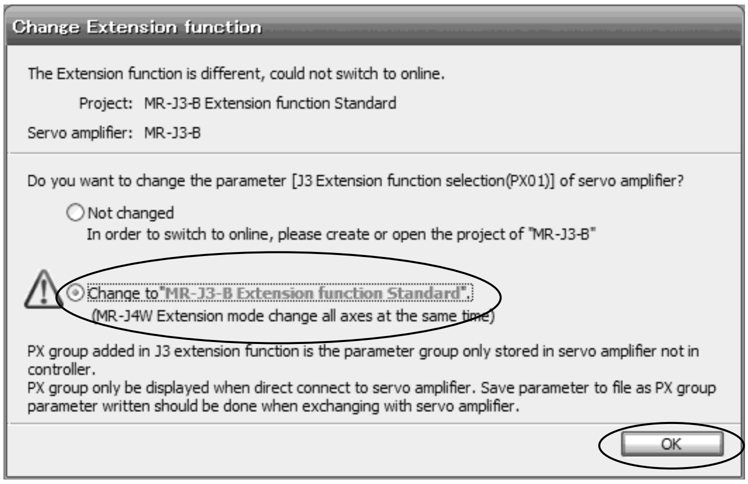
1) Open the "Project" menu and click "New" in MR Configurator2. The "New" window will be displayed.



2) Select "MR-J3-B extension function" of model selection in the "New" window and click "OK". The "Extension function change" window will be displayed.

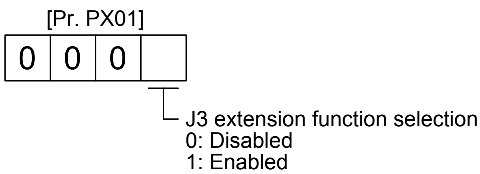


3) Click "Change to MR-J3-B extension function" in the "Extension function change" window and click "OK". Now, you can set the extension control 2 parameters ([Pr. PX_ _]).



(b) Setting to enable the J3 extension function

To enable the J3 extension function, set [Pr. PX01] to "_ _ _ 1".



(2) Extension control 2 parameters ([Pr. PX_ _])

⚠CAUTION
- Never make a drastic adjustment or change to the parameter values as doing so will make the operation unstable.
- If fixed values are written in the digits of a parameter, do not change these values.
- Do not change parameters for manufacturer setting.
- Do not set a value other than the described values to each parameter.

POINT
- The parameter whose symbol is preceded by * is enabled with the following conditions:
  *: After setting the parameter, cycle the power or reset the controller.
  **: After setting the parameter, cycle the power.
- Abbreviations of J3 compatibility mode indicate the followings.
  Standard: Standard (semi closed loop system) use of the rotary servo motor

No.	Symbol	Name	Initial value	Unit	J3 compatibility mode (O: Enabled)
					Standard
PX01	**J3EX	J3 extension function	0000h		○
PX02	XOP1	Function selection X-1	0000h		○
PX03	VRFTX	Vibration suppression control tuning mode (advanced vibration suppression control II)	0000h		○
PX04	VRF21	Vibration suppression control 2 - Vibration frequency	100.0	[Hz]	○
PX05	VRF22	Vibration suppression control 2 - Resonance frequency	100.0	[Hz]	○
PX06	VRF23	Vibration suppression control 2 - Vibration frequency damping	0.00		○
PX07	VRF24	Vibration suppression control 2 - Resonance frequency damping	0.00		○
PX08	VRF21B	Vibration suppression control 2 - Vibration frequency after gain switching	0.0	[Hz]	○
PX09	VRF22B	Vibration suppression control 2 - Resonance frequency after gain switching	0.0	[Hz]	○
PX10	VRF23B	Vibration suppression control 2 - Vibration frequency damping after gain switching	0.00		○
PX11	VRF24B	Vibration suppression control 2 - Resonance frequency damping after gain switching	0.00		○
PX12	PG1B	Model loop gain after gain switching	0.0	[rad/s]	○
PX13	*XOP2	Function selection X-2	0001h		○
PX14	OTHOV	One-touch tuning - Overshoot permissible level	0	[%]	○
PX15		For manufacturer setting	0000h		
PX16			0000h		
PX17	NH3	Machine resonance suppression filter 3	4500	[Hz]	○
PX18	NHQ3	Notch shape selection 3	0000h		○
PX19	NH4	Machine resonance suppression filter 4	4500	[Hz]	○
PX20	NHQ4	Notch shape selection 4	0000h		○
PX21	NH5	Machine resonance suppression filter 5	4500	[Hz]	○

No.	Symbol	Name	Initial value	Unit	J3 compatibility mode (O: Enabled) Standard
PX22	NHQ5	Notch shape selection 5	0000h		○
PX23	XOP3	Function selection X-3	0000h		○
PX24	FRIC	Machine diagnosis function - Friction judgement speed	0	[r/min]/[mm/s]	○
PX25	*TDS	Tough drive setting	0000h		○
PX26	OSCL1	Vibration tough drive - Oscillation detection level	50	[%]	○
PX27	*OSCL2	Vibration tough drive function selection	0000h		○
PX28	CVAT	SEMI-F47 function - Instantaneous power failure detection time	200	[ms]	○
PX29	DRAT	Drive recorder arbitrary alarm trigger setting	0000h		○
PX30	DRT	Drive recorder switching time setting	0	[s]	○
PX31	XOP4	Function selection X-4	0000h		○
PX32		For manufacturer setting	0		
PX33			0.0		
PX34			0.0		
PX35			50		
PX36	LMCP	Lost motion compensation positive-side compensation value selection	0	[0.01%]	○
PX37	LMCN	Lost motion compensation negative-side compensation value selection	0	[0.01%]	○
PX38	LMFLT	Lost motion filter setting	0	[0.1 ms]	○
PX39	TOF	Torque offset	0	[0.01%]	○
PX40	*LMOP	Lost motion compensation function selection	0000h		○
PX41	LMCD	Lost motion compensation timing	0	[0.1 ms]	○
PX42	LMCT	Lost motion compensation non-sensitive band	0	[pulse]/[kpulse]	○
PX43		For manufacturer setting	0000h		
PX44			0000h		
PX45			0000h		
PX46			0000h		
PX47			0000h		
PX48			0000h		
PX49			0000h		
PX50			0000h		
PX51			0000h		
PX52			0000h		
PX53			0000h		
PX54			0000h		
PX55			0000h		
PX56			0000h		
PX57			0000h		
PX58			0000h		
PX59			0000h		
PX60			0000h		
PX61			0000h		
PX62			0000h		
PX63			0000h		
PX64			0000h		

(3) Extension control 2 parameters ([Pr. PX_ _]) detailed list

<table>
<tr><th>No.</th><th>Symbol</th><th>Name and function</th><th>Initial value [unit]</th><th>Setting range</th></tr>
<tr><td>PX01</td><td>**J3EX</td><td>J3 extension function
Select enabled or disabled of the J3 extension function.
<table>
<tr><th>Setting digit</th><th>Explanation</th><th>Initial value</th></tr>
<tr><td>_ _ _ x</td><td>J3 extension function selection
0: Disabled
1: Enabled

When you enable the J3 extension function selection, setting of [Pr. PX01] to [Pr. PX35] will be enabled and you will be able to also use functions in J4 mode with J3 compatibility mode. Additionally, the J3 extension function of the amplifier differs from MR-J3-B in motion.</td><td>0h</td></tr>
<tr><td>_ _ x _</td><td rowspan="3">For manufacturer setting</td><td>0h</td></tr>
<tr><td>_ x _ _</td><td>0h</td></tr>
<tr><td>x _ _ _</td><td>0h</td></tr>
</table></td><td colspan="2">Refer to the "Name and function" column.</td></tr>
<tr><td>PX02</td><td>XOP1</td><td>Function selection X-1
<table>
<tr><th>Setting digit</th><th>Explanation</th><th>Initial value</th></tr>
<tr><td>_ _ _ x</td><td>Vibration suppression mode selection
0: Standard mode
1: 3 inertia mode
2: Low response mode
When two low resonance frequencies are generated, select "3 inertia mode (_ _ _ 1)". When the load to motor inertia ratio exceeds the recommended load to motor inertia ratio, select "Low response mode (_ _ _ 2)".
When you select the standard mode or low response mode, "Vibration suppression control 2" is not available.
When you select the 3 inertia mode, the feed forward gain is not available.
Before changing the control mode with the controller during the 3 inertia mode or low response mode, stop the motor.</td><td>0h</td></tr>
<tr><td>_ _ x _</td><td rowspan="3">For manufacturer setting</td><td>0h</td></tr>
<tr><td>_ x _ _</td><td>0h</td></tr>
<tr><td>x _ _ _</td><td>0h</td></tr>
</table></td><td colspan="2">Refer to the "Name and function" column.</td></tr>
<tr><td>PX03</td><td>VRFTX</td><td>Vibration suppression control tuning mode (advanced vibration suppression control II)
This is used to set the vibration suppression control tuning. Refer to MR-J4-_B_ Servo Amplifier Instruction Manual for details.
<table>
<tr><th>Setting digit</th><th>Explanation</th><th>Initial value</th></tr>
<tr><td>_ _ _ x</td><td>For manufacturer setting</td><td>0h</td></tr>
<tr><td>_ _ x _</td><td>Vibration suppression control 2 tuning mode selection
Select the tuning mode of the vibration suppression control 2. To enable the digit, select "3 inertia mode (_ _ _ 1)" of "Vibration suppression mode selection" in [Pr. PX02 Function selection X-1].
0: Disabled
1: Automatic setting
2: Manual setting</td><td>0h</td></tr>
<tr><td>_ x _ _</td><td rowspan="2">For manufacturer setting</td><td>0h</td></tr>
<tr><td>x _ _ _</td><td>0h</td></tr>
</table></td><td colspan="2">Refer to the "Name and function" column.</td></tr>
</table>

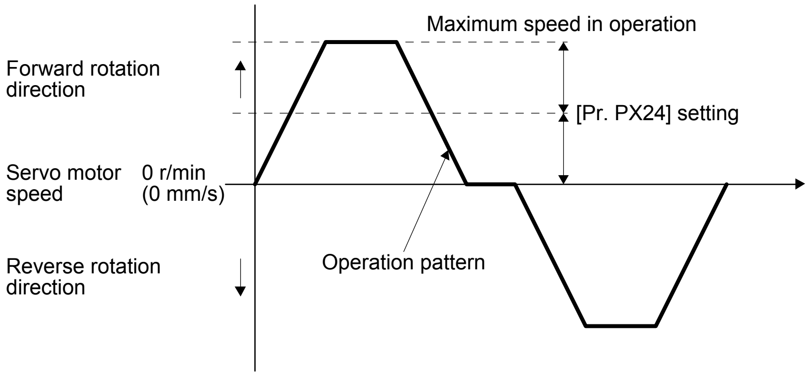
No.	Symbol	Name and function	Initial value [unit]	Setting range
PX04	VRF21	Vibration suppression control 2 - Vibration frequency Set the vibration frequency for vibration suppression control 2 to suppress low-frequency machine vibration. To enable the setting value, set "Vibration suppression mode selection" to "3 inertia mode (_ _ _ 1)" in [Pr. PX02]. When "Vibration suppression control 2 tuning mode selection" is set to "Automatic setting (_ _ 1 _)" in [Pr. PX03], this parameter will be set automatically. Set manually for "Manual setting (_ _ 2 _)".	100.0 [Hz]	0.1 to 300.0
PX05	VRF22	Vibration suppression control 2 - Resonance frequency Set the resonance frequency for vibration suppression control 2 to suppress low-frequency machine vibration. To enable the setting value, set "Vibration suppression mode selection" to "3 inertia mode (_ _ _ 1)" in [Pr. PX02]. When "Vibration suppression control 2 tuning mode selection" is set to "Automatic setting (_ _ 1 _)" in [Pr. PX03], this parameter will be set automatically. Set manually for "Manual setting (_ _ 2 _)".	100.0 [Hz]	0.1 to 300.0
PX06	VRF23	Vibration suppression control 2 - Vibration frequency damping Set a damping of the vibration frequency for vibration suppression control 2 to suppress low-frequency machine vibration. To enable the setting value, set "Vibration suppression mode selection" to "3 inertia mode (_ _ _ 1)" in [Pr. PX02]. When "Vibration suppression control 2 tuning mode selection" is set to "Automatic setting (_ _ 1 _)" in [Pr. PX03], this parameter will be set automatically. Set manually for "Manual setting (_ _ 2 _)".	0.00	0.00 to 0.30
PX07	VRF24	Vibration suppression control 2 - Resonance frequency damping Set a damping of the resonance frequency for vibration suppression control 2 to suppress low-frequency machine vibration. To enable the setting value, set "Vibration suppression mode selection" to "3 inertia mode (_ _ _ 1)" in [Pr. PX02]. When "Vibration suppression control 2 tuning mode selection" is set to "Automatic setting (_ _ 1 _)" in [Pr. PX03], this parameter will be set automatically. Set manually for "Manual setting (_ _ 2 _)".	0.00	0.00 to 0.30
PX08	VRF21B	Vibration suppression control 2 - Vibration frequency after gain switching Set the vibration frequency for vibration suppression control 2 when the gain switching is enabled. When you set a value less than 0.1 Hz, the value will be the same as [Pr. PX04]. To enable this, select "3 inertia mode (_ _ _ 1)" of "Vibration suppression mode selection" in [Pr. PX02]. This parameter will be enabled only when the following conditions are fulfilled. ・"Gain adjustment mode selection" in [Pr. PA08] is "Manual mode (_ _ _ 3)". ・"Vibration suppression control 2 tuning mode selection" in [Pr. PX03] is "Manual setting (_ _ 2 _)". ・"Gain switching selection" in [Pr. PB26] is "Control command from controller is enabled (_ _ _ 1)". When you set "0.0", the value will be the same as [Pr. PX04]. Switching during driving may cause a shock. Be sure to switch them after the servo motor or linear servo motor stops.	0.0 [Hz]	0.0 to 300.0
PX09	VRF22B	Vibration suppression control 2 - Resonance frequency after gain switching Set the resonance frequency for vibration suppression control 2 when the gain switching is enabled. When you set a value less than 0.1 Hz, the value will be the same as [Pr. PX05]. To enable this, select "3 inertia mode (_ _ _ 1)" of "Vibration suppression mode selection" in [Pr. PX02]. This parameter will be enabled only when the following conditions are fulfilled. ・"Gain adjustment mode selection" in [Pr. PA08] is "Manual mode (_ _ _ 3)". ・"Vibration suppression control 2 tuning mode selection" in [Pr. PX03] is "Manual setting (_ _ 2 _)". ・"Gain switching selection" in [Pr. PB26] is "Control command from controller is enabled (_ _ _ 1)". When you set "0.0", the value will be the same as [Pr. PX05]. Switching during driving may cause a shock. Be sure to switch them after the servo motor stops.	0.0 [Hz]	0.0 to 300.0

<table>
<tr><th>No.</th><th>Symbol</th><th>Name and function</th><th>Initial value [unit]</th><th>Setting range</th></tr>
<tr><td>PX10</td><td>VRF23B</td><td>Vibration suppression control 2 - Vibration frequency damping after gain switching
Set a damping of the vibration frequency for vibration suppression control 2 when the gain switching is enabled.
To enable this, select "3 inertia mode (_ _ _ 1)" of "Vibration suppression mode selection" in [Pr. PX02].
This parameter will be enabled only when the following conditions are fulfilled.
・"Gain adjustment mode selection" in [Pr. PA08] is "Manual mode (_ _ _ 3)".
・"Vibration suppression control 2 tuning mode selection" in [Pr. PX03] is "Manual setting (_ _ 2 _)".
・"Gain switching selection" in [Pr. PB26] is "Control command from controller is enabled (_ _ _ 1)".
Switching during driving may cause a shock. Be sure to switch them after the servo motor stops.</td><td>0.00</td><td>0.00
to
0.30</td></tr>
<tr><td>PX11</td><td>VRF24B</td><td>Vibration suppression control 2 - Resonance frequency damping after gain switching
Set a damping of the resonance frequency for vibration suppression control 2 when the gain switching is enabled.
To enable this, select "3 inertia mode (_ _ _ 1)" of "Vibration suppression mode selection" in [Pr. PX02].
This parameter will be enabled only when the following conditions are fulfilled.
・"Gain adjustment mode selection" in [Pr. PA08] is "Manual mode (_ _ _ 3)".
・"Vibration suppression control 2 tuning mode selection" in [Pr. PX03] is "Manual setting (_ _ 2 _)".
・"Gain switching selection" in [Pr. PB26] is "Control command from controller is enabled (_ _ _ 1)".
Switching during driving may cause a shock. Be sure to switch them after the servo motor stops.</td><td>0.00</td><td>0.00
to
0.30</td></tr>
<tr><td>PX12</td><td>PG1B</td><td>Model loop gain after gain switching
Set the model loop gain when the gain switching is enabled.
When you set a value less than 1.0 rad/s, the value will be the same as [Pr. PB07].
This parameter will be enabled only when the following conditions are fulfilled.
・"Gain adjustment mode selection" in [Pr. PA08] is "Manual mode (_ _ _ 3)".
・"Gain switching selection" in [Pr. PB26] is "Control command from controller is enabled (_ _ _ 1)".
Switching during driving may cause a shock. Be sure to switch them after the servo motor stops.</td><td>0.0
[rad/s]</td><td>0.0
to
2000.0</td></tr>
<tr><td>PX13</td><td>*XOP2</td><td>Function selection X-2
<table>
<tr><th>Setting digit</th><th>Explanation</th><th>Initial value</th></tr>
<tr><td>_ _ _ x</td><td>One-touch tuning function selection
0: Disabled
1: Enabled

When the digit is "0", the one-touch tuning with MR Configurator2 will be disabled.</td><td>1h</td></tr>
<tr><td>_ _ x _</td><td rowspan="3">For manufacturer setting</td><td>0h</td></tr>
<tr><td>_ x _ _</td><td>0h</td></tr>
<tr><td>x _ _ _</td><td>0h</td></tr>
</table></td><td colspan="2">Refer to the "Name and function" column.</td></tr>
<tr><td>PX14</td><td>OTHOV</td><td>One-touch tuning - Overshoot permissible level
Set a permissible value of overshoot amount for one-touch tuning as a percentage of the in-position range.
However, setting "0" will be 50%.</td><td>0
[%]</td><td>0
to
100</td></tr>
<tr><td>PX17</td><td>NH3</td><td>Machine resonance suppression filter 3
Set the notch frequency of the machine resonance suppression filter 3.
To enable the setting value, select "Enabled (_ _ _ 1)" of "Machine resonance suppression filter 3 selection" in [Pr. PX18].</td><td>4500
[Hz]</td><td>10
to
4500</td></tr>
</table>

<table>
<tr><th>No.</th><th>Symbol</th><th>Name and function</th><th>Initial value [unit]</th><th>Setting range</th></tr>
<tr><td>PX18</td><td>NHQ3</td><td>Notch shape selection 3
Set the shape of the machine resonance suppression filter 3.
<table>
<tr><th>Setting digit</th><th>Explanation</th><th>Initial value</th></tr>
<tr><td>_ _ _ x</td><td>Machine resonance suppression filter 3 selection
0: Disabled
1: Enabled</td><td>0h</td></tr>
<tr><td>_ _ x _</td><td>Notch depth selection
0: -40 dB
1: -14 dB
2: -8 dB
3: -4 dB</td><td>0h</td></tr>
<tr><td>_ x _ _</td><td>Notch width selection
0: α = 2
1: α = 3
2: α = 4
3: α = 5</td><td>0h</td></tr>
<tr><td>x _ _ _</td><td>For manufacturer setting</td><td>0h</td></tr>
</table></td><td colspan="2">Refer to the "Name and function" column.</td></tr>
<tr><td>PX19</td><td>NH4</td><td>Machine resonance suppression filter 4
Set the notch frequency of the machine resonance suppression filter 4.
To enable the setting value, select "Enabled (_ _ _ 1)" of "Machine resonance suppression filter 4 selection" in [Pr. PX20].</td><td>4500
[Hz]</td><td>10
to
4500</td></tr>
<tr><td>PX20</td><td>NHQ4</td><td>Notch shape selection 4
Set the shape of the machine resonance suppression filter 4.
<table>
<tr><th>Setting digit</th><th>Explanation</th><th>Initial value</th></tr>
<tr><td>_ _ _ x</td><td>Machine resonance suppression filter 4 selection
0: Disabled
1: Enabled
When you select "Enabled" of this digit, [Pr. PB17 Shaft resonance suppression filter] is not available.</td><td>0h</td></tr>
<tr><td>_ _ x _</td><td>Notch depth selection
0: -40 dB
1: -14 dB
2: -8 dB
3: -4 dB</td><td>0h</td></tr>
<tr><td>_ x _ _</td><td>Notch width selection
0: α = 2
1: α = 3
2: α = 4
3: α = 5</td><td>0h</td></tr>
<tr><td>x _ _ _</td><td>For manufacturer setting</td><td>0h</td></tr>
</table></td><td colspan="2">Refer to the "Name and function" column.</td></tr>
<tr><td>PX21</td><td>NH5</td><td>Machine resonance suppression filter 5
Set the notch frequency of the machine resonance suppression filter 5.
To enable the setting value, select "Enabled (_ _ _ 1)" of "Machine resonance suppression filter 5 selection" in [Pr. PX22].</td><td>4500
[Hz]</td><td>10
to
4500</td></tr>
</table>

No.	Symbol	Name and function	Initial value [unit]	Setting range
PX22	NHQ5	Notch shape selection 5 Set the shape of the machine resonance suppression filter 5. When you select "Enabled (_ _ _ 1)" of "Robust filter selection" in [Pr. PX31], the machine resonance suppression filter 5 is not available. Setting digit / Explanation / Initial value: _ _ _ x: Machine resonance suppression filter 5 selection 0: Disabled 1: Enabled (Initial value: 0h) _ _ x _: Notch depth selection 0: -40 dB 1: -14 dB 2: -8 dB 3: -4 dB (Initial value: 0h) _ x _ _: Notch width selection 0: α = 2 1: α = 3 2: α = 4 3: α = 5 (Initial value: 0h) x _ _ _: For manufacturer setting (Initial value: 0h)	Refer to the "Name and function" column.	
PX23	*XOP3	Function selection X-3 Setting digit / Explanation / Initial value: _ _ _ x: Torque limit function selection at instantaneous power failure (instantaneous power failure tough drive selection) 0: Disabled 1: Enabled When an instantaneous power failure occurs during operation, you can save electric energy charged in the capacitor in the servo amplifier by limiting torque at acceleration. You can also delay the time until [AL. 10.2 Voltage drop in the main circuit power] occurs with instantaneous power failure tough drive function. Doing this will enable you to set a longer time in [Pr. PX28 SEMI-F47 function - Instantaneous power failure detection time]. To enable the torque limit function at instantaneous power failure, select "Enabled (_ 1 _ _)" of "SEMI-F47 function selection" in [Pr. PX25]. This parameter setting is used with servo amplifier with software version B0 or later. (Initial value: 0h) _ _ x _: For manufacturer setting (Initial value: 0h) _ x _ _: For manufacturer setting (Initial value: 0h) x _ _ _: For manufacturer setting (Initial value: 0h)	Refer to the "Name and function" column.	

<table>
<tr><th>No.</th><th>Symbol</th><th>Name and function</th><th>Initial value [unit]</th><th>Setting range</th></tr>
<tr><td>PX24</td><td>FRIC</td><td>Machine diagnosis function - Friction judgement speed
Set a (linear) servo motor speed that divides a friction estimation area into high and low during the friction estimation process of the machine diagnosis.
Setting "0" will set a value half of the rated speed.
When your operation pattern is under the rated speed, we recommend that you set a half value of the maximum speed.

</td><td>0
[r/min]/
[mm/s]</td><td>0 to permis-sible speed</td></tr>
<tr><td>PX25</td><td>*TDS</td><td>Tough drive setting
Alarms may not be avoided with the tough drive function depending on the situations of the power supply and load fluctuation.
You can assign MTTR (During tough drive) to pins CN3-9, CN3-13, and CN3-15 with [Pr. PD07] to [Pr. PD09].
<table>
<tr><th>Setting digit</th><th>Explanation</th><th>Initial value</th></tr>
<tr><td>_ _ _ x</td><td>For manufacturer setting</td><td>0h</td></tr>
<tr><td>_ _ x _</td><td>Vibration tough drive selection
0: Disabled
1: Enabled

Selecting "1" enables to suppress vibrations by automatically changing setting values of [Pr. PB13 Machine resonance suppression filter 1] and [Pr. PB15 Machine resonance suppression filter 2] in case that the vibration exceeds the value of the oscillation level set in [Pr. PX26].
Refer to (8) of this section for details.</td><td>0h</td></tr>
<tr><td>_ x _ _</td><td>SEMI-F47 function selection
0: Disabled
1: Enabled

Selecting "1" enables to avoid triggering [AL. 10 Undervoltage] using the electrical energy charged in the capacitor in case that an instantaneous power failure occurs during operation. In [Pr. PX28 SEMI-F47 function - Instantaneous power failure detection time], set the time until the occurrence of [AL. 10.1 Voltage drop in the control circuit power].</td><td>0h</td></tr>
<tr><td>x _ _ _</td><td>For manufacturer setting</td><td>0h</td></tr>
</table></td><td colspan="2">Refer to the "Name and function" column.</td></tr>
<tr><td>PX26</td><td>OSCL1</td><td>Vibration tough drive - Oscillation detection level
Set a filter readjustment sensitivity of [Pr. PB13 Machine resonance suppression filter 1] and [Pr. PB15 Machine resonance suppression filter 2] while the vibration tough drive is enabled.
However, setting "0" will be 50%.
Example: When you set "50" to the parameter, the filter will be readjusted at the time of 50% or more oscillation level.</td><td>50
[%]</td><td>0
to
100</td></tr>
</table>

<table>
<tr><th>No.</th><th>Symbol</th><th>Name and function</th><th>Initial value [unit]</th><th>Setting range</th></tr>
<tr><td>PX27</td><td>*OSCL2</td><td>Vibration tough drive function selection
<table>
<tr><th>Setting digit</th><th>Explanation</th><th>Initial value</th></tr>
<tr><td>_ _ _ x</td><td>Oscillation detection alarm selection
0: [AL. 54 Oscillation detection] will occur at oscillation detection.
1: [AL. F3.1 Oscillation detection warning] will occur at oscillation detection.
2: Oscillation detection function disabled
Select alarm or warning when an oscillation continues at a filter readjustment sensitivity level of [Pr. PX26].
The digit is continuously enabled regardless of the vibration tough drive in [Pr. PX25].</td><td>0h</td></tr>
<tr><td>_ _ x _</td><td rowspan="3">For manufacturer setting</td><td>0h</td></tr>
<tr><td>_ x _ _</td><td>0h</td></tr>
<tr><td>x _ _ _</td><td>0h</td></tr>
</table>
</td><td colspan="2">Refer to the "Name and function" column.</td></tr>
<tr><td>PX28</td><td>CVAT</td><td>SEMI-F47 function - Instantaneous power failure detection time
Set the time until the occurrence of [AL. 10.1 Voltage drop in the control circuit power].
This parameter setting range differs depending on the software version of the servo amplifier as follows.
・Software version C0 or later: Setting range 30 ms to 200 ms
・Software version C1 or earlier: Setting range 30 ms to 500 ms
To comply with SEMI-F47 standard, it is unnecessary to change the initial value (200 ms).
However, when the instantaneous power failure time exceeds 200 ms, and the instantaneous power failure voltage is less than 70% of the rated input voltage, the power may be normally turned off even if a value larger than 200 ms is set in the parameter.
To disable the parameter, set "Disabled (_ 0 _ _)" of "SEMI-F47 function selection" in [Pr. PX25].</td><td>200
[ms]</td><td>30
to
500</td></tr>
<tr><td>PX29</td><td>DRAT</td><td>Drive recorder arbitrary alarm trigger setting
<table>
<tr><th>Setting digit</th><th>Explanation</th><th>Initial value</th></tr>
<tr><td>_ _ x x</td><td>Alarm detail No. setting
Set the digits when you execute the trigger with arbitrary alarm detail No. for the drive recorder function.
When these digits are "0 0", only the arbitrary alarm No. setting will be enabled.</td><td>00h</td></tr>
<tr><td>x x _ _</td><td>Alarm No. setting
Set the digits when you execute the trigger with arbitrary alarm No. for the drive recorder function.
When "0 0" are set, arbitrary alarm trigger of the drive recorder will be disabled.</td><td>00h</td></tr>
</table>
Setting example:
To activate the drive recorder when [AL. 50 Overload 1] occurs, set "5 0 0 0".
To activate the drive recorder when [AL. 50.3 Thermal overload error 4 during operation] occurs, set "5 0 0 3".</td><td colspan="2">Refer to the "Name and function" column.</td></tr>
<tr><td>PX30</td><td>DRT</td><td>Drive recorder switching time setting
Set the drive recorder switching time.
When a USB communication is cut during using a graph function, the function will be changed to the drive recorder function after the setting time of this parameter.
When a value from "1" to "32767" is set, it will switch after the setting value.
However, when "0" is set, it will switch after 600 s.
When "-1" is set, the drive recorder function is disabled.</td><td>0
[s]</td><td>-1
to
32767</td></tr>
</table>

<table>
<tr><th>No.</th><th>Symbol</th><th>Name and function</th><th>Initial value [unit]</th><th>Setting range</th></tr>
<tr><td>PX31</td><td>XOP4</td><td>Function selection X-4
<table>
<tr><th>Setting digit</th><th>Explanation</th><th>Initial value</th></tr>
<tr><td>_ _ _ x</td><td>Robust filter selection
0: Disabled
1: Enabled
When you select "Enabled" of this digit, the machine resonance suppression filter 5 set in [Pr. PX22] is not available.</td><td>0h</td></tr>
<tr><td>_ _ x _</td><td>For manufacturer setting</td><td>0h</td></tr>
<tr><td>_ x _ _</td><td></td><td>0h</td></tr>
<tr><td>x _ _ _</td><td></td><td>0h</td></tr>
</table></td><td colspan="2">Refer to the "Name and function" column.</td></tr>
<tr><td>PX36</td><td>LMCP</td><td>Lost motion compensation positive-side compensation value selection
Set the lost motion compensation for when reverse rotation (CW) switches to forward rotation (CCW) in increments of 0.01% assuming the rated torque as 100%.
This parameter is supported with software version B4 or later.</td><td>0
[0.01%]</td><td>0
to
30000</td></tr>
<tr><td>PX37</td><td>LMCN</td><td>Lost motion compensation negative-side compensation value selection
Set the lost motion compensation for when forward rotation (CCW) switches to reverse rotation (CW) in increments of 0.01% assuming the rated torque as 100%.
This parameter is supported with software version B4 or later.</td><td>0
[0.01%]</td><td>0
to
30000</td></tr>
<tr><td>PX38</td><td>LMFLT</td><td>Lost motion filter setting
Set the time constant of the lost motion compensation filter in increments of 0.1 ms.
If the time constant is "0", the torque is compensated with the value set in [Pr. PX36] and [Pr. PX37]. If the time constant is other than "0", the torque is compensated with the high-pass filter output value of the set time constant, and the lost motion compensation will continue.
This parameter is supported with software version B4 or later.</td><td>0
[0.1 ms]</td><td>0
to
30000</td></tr>
<tr><td>PX39</td><td>TOF</td><td>Torque offset
Set this when canceling unbalanced torque of vertical axis. Set this assuming the rated torque of the servo motor as 100%.
The torque offset does not need to be set for a machine not generating unbalanced torque.
The torque offset set with this parameter will be enabled in the position control mode, speed control mode, and torque control mode. Input commands assuming torque offset for the torque control mode.
This parameter is supported with software version B4 or later.</td><td>0
[0.01%]</td><td>-10000
to
10000</td></tr>
<tr><td>PX40</td><td>*LMOP</td><td>Lost motion compensation function selection
Select the lost motion compensation function.
This parameter is supported with software version B4 or later.
<table>
<tr><th>Setting value</th><th>Explanation</th><th>Initial value</th></tr>
<tr><td>_ _ _ x</td><td>Lost motion compensation selection
0: Disabled
1: Enabled</td><td>0h</td></tr>
<tr><td>_ _ x _</td><td>Unit setting of lost motion compensation non-sensitive band
0: 1 pulse unit
1: 1 kpulse unit</td><td>0h</td></tr>
<tr><td>_ x _ _</td><td>For manufacturer setting</td><td>0h</td></tr>
<tr><td>x _ _ _</td><td></td><td>0h</td></tr>
</table></td><td colspan="2">Refer to the "Name and function" column.</td></tr>
<tr><td>PX41</td><td>LMCD</td><td>Lost motion compensation timing
Set the lost motion compensation timing in increments of 0.1 ms.
You can delay the timing to perform the lost motion compensation for the set time.
This parameter is supported with software version B4 or later.</td><td>0
[0.1 ms]</td><td>0
to
30000</td></tr>
<tr><td>PX42</td><td>LMCT</td><td>Lost motion compensation non-sensitive band
Set the lost motion compensation non-sensitive band. When the fluctuation of the droop pulse is the setting value or less, the speed will be 0. Setting can be changed in [Pr. PX40]. Set the parameter per encoder unit.
This parameter is supported with software version B4 or later.</td><td>0
[pulse]/
[kpulse]</td><td>0
to
65535</td></tr>
</table>

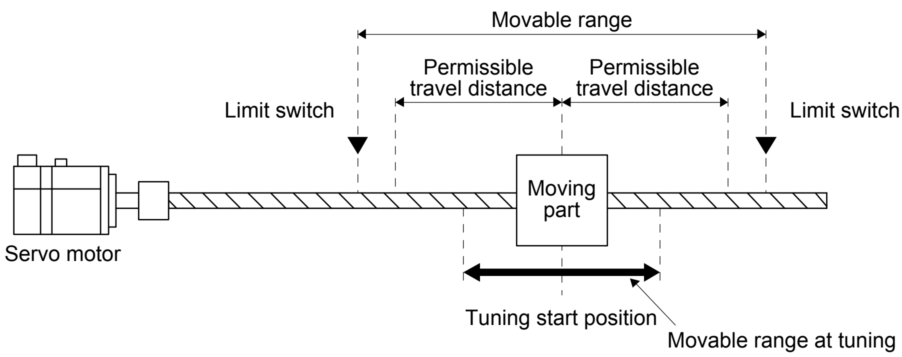
(4) One-touch tuning

POINT
●When executing the one-touch tuning, check the [Pr. PX13 One-touch tuning function selection] is "_ _ _ 1" (initial value). ●At start of the one-touch tuning, only when "Auto tuning mode 1 (_ _ _ 1)" or "2 gain adjustment mode 1 (interpolation mode) (_ _ _ 0)" of "Gain adjustment mode selection" is selected in [Pr. PA08], [Pr. PB06 Load to motor inertia ratio/load to motor mass ratio] will be estimated. ●Execute the one-touch tuning while the servo system controller and the servo amplifier are connected. ●When executing the one-touch tuning in the test operation mode (SW2-1 is on), write the tuning result to servo parameters of the servo system controller, and then connect the servo system controller and the servo amplifier. ●The amplifier command method can be used with the servo amplifier with software version C1 or later and MR Configurator2 with software version 1.45X or later. ●When the one-touch tuning is executed, MR Configurator2 is required.

The one-touch tuning includes two methods: the user command method and the amplifier command method.

1) User command method
The user command method performs one-touch tuning by inputting commands from outside the servo amplifier.

2) Amplifier command method
In the amplifier command method, when you simply input a travel distance (permissible travel distance) that collision against the equipment does not occur during servo motor driving, a command for the optimum tuning will be generated inside the servo amplifier to perform one-touch tuning.



The following parameters are set automatically with one-touch tuning. Also, "Gain adjustment mode selection" in [Pr. PA08] will be "2 gain adjustment mode 2 (_ _ _ 4)" automatically. Other parameters will be set to an optimum value depending on the setting of [Pr. PA09 Auto tuning response].

Table 3.9 List of parameters automatically set with one-touch tuning

Parameter	Symbol	Name
PA08	ATU	Auto tuning mode
PA09	RSP	Auto tuning response
PB01	FILT	Adaptive tuning mode (adaptive filter II)
PB02	VRFT	Vibration suppression control tuning mode (advanced vibration suppression control II)
PB06	GD2	Load to motor inertia ratio
PB07	PG1	Model loop gain
PB08	PG2	Position loop gain
PB09	VG2	Speed loop gain
PB10	VIC	Speed integral compensation
PB12	OVA	Overshoot amount compensation
PB13	NH1	Machine resonance suppression filter 1
PB14	NHQ1	Notch shape selection 1
PB15	NH2	Machine resonance suppression filter 2
PB16	NHQ2	Notch shape selection 2
PB17	NHF	Shaft resonance suppression filter
PB18	LPF	Low-pass filter setting
PB19	VRF11	Vibration suppression control 1 - Vibration frequency
PB20	VRF12	Vibration suppression control 1 - Resonance frequency
PB21	VRF13	Vibration suppression control 1 - Vibration frequency damping
PB22	VRF14	Vibration suppression control 1 - Resonance frequency damping
PB23	VFBF	Low-pass filter selection
PX17	NH3	Machine resonance suppression filter 3
PX18	NHQ3	Notch shape selection 3
PX19	NH4	Machine resonance suppression filter 4
PX20	NHQ4	Notch shape selection 4
PX22	NHQ5	Notch shape selection 5
PX31	XOP4	Function selection X-4

(a) One-touch tuning flowchart

1) User command method

Make one-touch tuning as follows.

Start	
Startup of the system	Start a system referring to MR-J4-_B_ Servo Amplifier Instruction Manual.
Operation	Rotate the servo motor by a servo system controller. (In the user command method, the one-touch tuning cannot be executed if the servo motor is not operating.)
One-touch tuning start, mode selection	Start one-touch tuning of MR Configurator2, and select "User command method".
Response mode selection	Select a response mode (High mode, Basic mode, and Low mode) in the one-touch tuning window of MR Configurator2.
One-touch tuning execution	Press the start button during servo motor driving to execute one-touch tuning.
One-touch tuning in progress	Gains and filters will be adjusted automatically. During processing of tuning, the tuning progress will be displayed in % in MR Configurator2.
One-touch tuning completion	When one-touch tuning is completed normally, the parameters described in table 3.9 will be set automatically. When the tuning is not completed normally, the tuning error will be displayed. (Refer to (4) (b) 5) of this section.))
Tuning result check	Check the tuning result. When the tuning result is not satisfactory, you can return the parameter to the value before the one-touch tuning or the initial value. (Refer to (4) (b) 8) of this section.))
End	

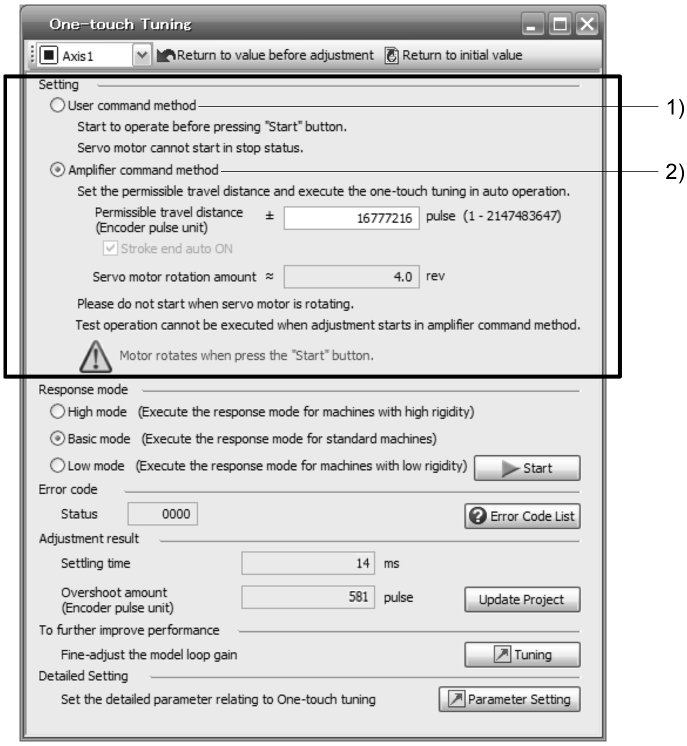
2) Amplifier command method
   Make one-touch tuning as follows.

Start	
Startup of the system	Start a system referring to MR-J4-_B_ Servo Amplifier Instruction Manual.
Movement to tuning start position	Move the moving part to the center of a movable range.
One-touch tuning start, mode selection	Start one-touch tuning of MR Configurator2, and select "Amplifier command method".
Input of permissible travel distance	In the one-touch tuning window of MR Configurator2, input a maximum travel distance to move the moving part at one-touch tuning.
Response mode selection	Select a response mode (High mode, Basic mode, and Low mode) in the one-touch tuning window of MR Configurator2.
One-touch tuning execution	While the servo motor is stopped, press the start button to start one-touch tuning. After the tuning is started, the servo motor will reciprocate automatically. Executing one-touch tuning during servo motor rotation will cause an error. After one-touch tuning is executed using the amplifier command method, control will not be performed by commands from the controller.
One-touch tuning in progress	Gains and filters will be adjusted automatically. During processing of tuning, the tuning progress will be displayed in % in MR Configurator2.
One-touch tuning completion	One-touch tuning will be completed automatically after the tuning. When one-touch tuning is completed normally, the parameters described in table 3.9 will be updated automatically. When the tuning is not completed normally, the tuning error will be displayed. (Refer to (4) (b) 5) of this section.))
Tuning result check	Check the tuning result. When the tuning result is not satisfactory, you can return the parameter to the value before the one-touch tuning or the initial value. (Refer to (4) (b) 8) of this section.))
Controller reset Servo amplifier power cycling	After executing the one-touch tuning, resetting the controller or cycling the power of the servo amplifier returns to the state in which control is performed from the controller.
End	

(b) Display transition and operation procedure of one-touch tuning

1) Command method selection

Select a command method from two methods in the one-touch tuning window of MR Configurator2.



a) User command method
It is recommended to input commands meeting the following conditions to the servo amplifier. If one-touch tuning is executed while commands which do not meet the conditions are inputted to the servo amplifier, the one-touch tuning error may occur.

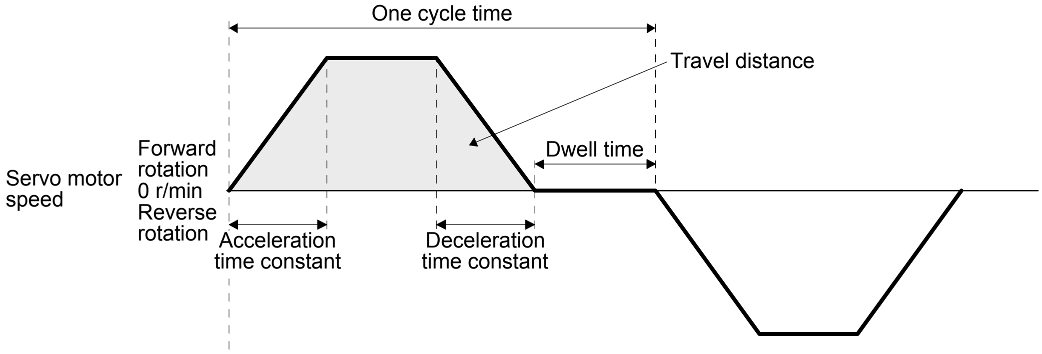
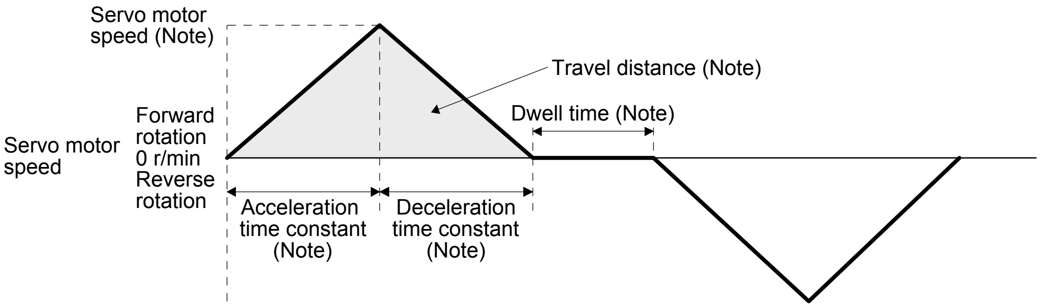


Fig. 3.1 Recommended command for one-touch tuning in the user command method

Item	Description
Travel distance	Set 100 pulses or more in encoder unit. Setting less than 100 pulses will cause the one-touch tuning error "C004".
Servo motor speed	Set 150 r/min (mm/s) or higher. Setting less than150 r/min (mm/s) may cause the one-touch tuning error "C005".
Acceleration time constant Deceleration time constant	Set the time to reach 2000 r/min (mm/s) to 5 s or less. Set an acceleration time constant/deceleration time constant so that the acceleration/deceleration torque is 10% or more of the rated torque. The estimation accuracy of the load to motor inertia ratio is more improved as the acceleration/deceleration torque is larger, and the one-touch tuning result will be closer to the optimum value.
Dwell time	Set 200 ms or more. Setting a smaller value may cause the one-touch tuning error "C004".
One cycle time	Set 30 s or less. Setting over 30 s will cause the one-touch tuning error "C004".

b) Amplifier command method

Input a permissible travel distance. In the amplifier command method, the servo motor will be operated in a range between "current value ± permissible travel distance". Input the permissible travel distance as large as possible within a range that the movable part does not collide against the machine. Inputting a small permissible travel distance decreases the possibility that the moving part will collide against the machine. However, the estimation accuracy of the load to motor inertia ratio may be lower, resulting in improper tuning.
Also, executing the one-touch tuning in the amplifier command method will generate a command for the following optimum tuning inside the servo amplifier to start the tuning.



Note It will be automatically generated in the servo amplifier.

Fig. 3.2 Command generated by one-touch tuning in the amplifier command method

Item	Description
Travel distance	An optimum travel distance will be automatically set in the range not exceeding the user-inputted permissible travel distance with MR Configurator2.
Servo motor speed	A speed not exceeding 1/2 of the rated speed and overspeed alarm detection level ([Pr. PC08]) will be automatically set.
Acceleration time constant Deceleration time constant	An acceleration time constant/deceleration time constant will be automatically set so as not to exceed 60% of the rated torque and the torque limit value set at the start of one-touch tuning in the amplifier command method.
Dwell time	A dwell time in which the one-touch tuning error "C004" does not occur will be automatically set.

2) Response mode selection
Select a response mode from 3 modes in the one-touch tuning window of MR Configurator2.

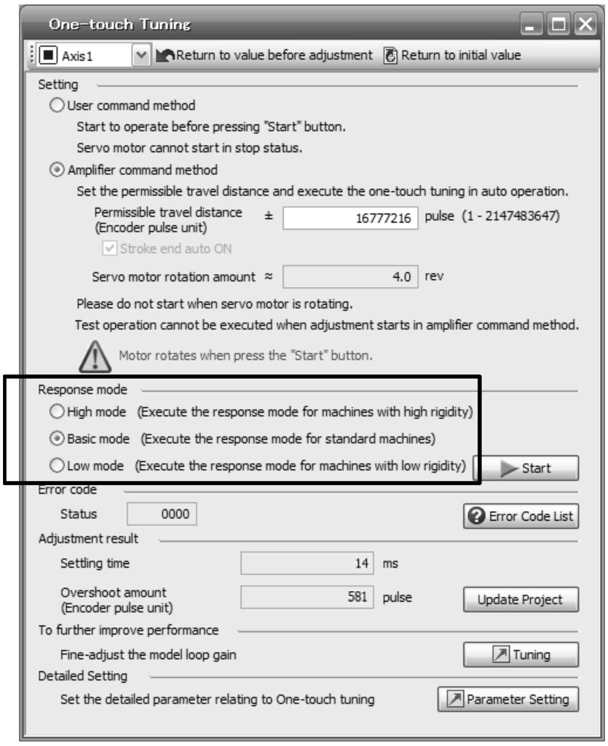


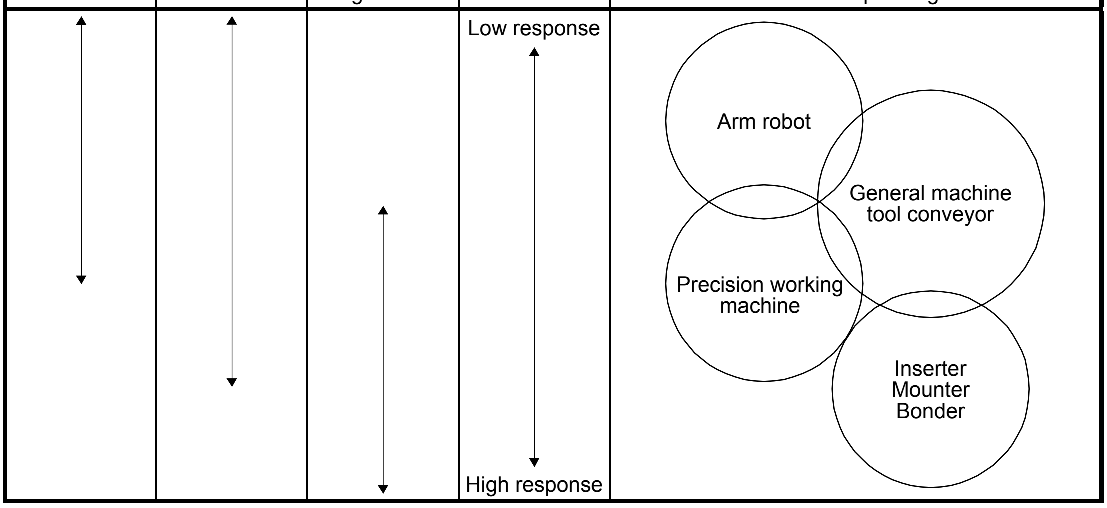
Table 3.10 Response mode explanations

Response mode	Explanation
High mode	This mode is for high rigid system.
Basic mode	This mode is for standard system.
Low mode	This mode is for low rigid system.

Refer to the following table for selecting a response mode.

Table 3.11 Guideline for response mode

Response mode			Response	Machine characteristic
Low mode	Basic mode	High mode		Guideline of corresponding machine



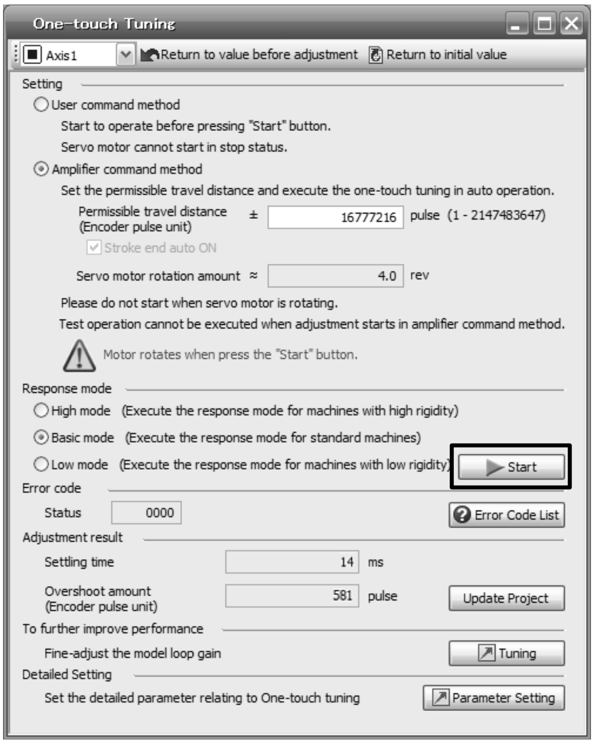
3) One-touch tuning execution

POINT
●For equipment in which overshoot during one-touch tuning is in the permissible level of the in-position range, changing the value of [Pr. PX14 One-touch tuning overshoot permissible level] will shorten the settling time and improve the response. ●When executing one-touch tuning in the amplifier command method, turn on EM2. When you turn off EM2 during one-touch tuning, "C008" will be displayed at status in error code, and the one-touch tuning will be canceled. ●When executing the one-touch tuning in the amplifier command method, FLS (Upper stroke limit) and RLS (Lower stroke limit) will be disabled. Thus, set a permissible travel distance within a range where moving part collision never occurs, or execute the one-touch tuning in a state in which the servo motor can immediately stop in emergency. ●When one-touch tuning is executed in the amplifier command method while magnetic pole detection is not being performed, magnetic pole detection will be performed, and then one-touch tuning will start after the magnetic pole detection is completed.

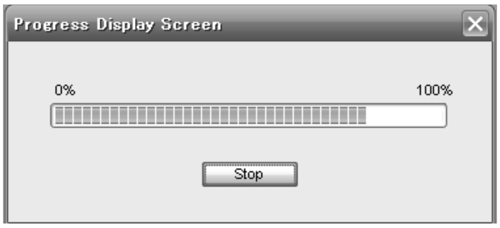
After the response mode is selected in (4) (b) 2) in this section, clicking the start button will start one-touch tuning. If the start button is clicked while the servo motor stops, "C002" or "C004" will be displayed at status in error code. (Refer to (4) (b) 5) in this section for error codes.)

Click the start button to start the one-touch tuning in the amplifier command method with the servo-off, the servo-on will be automatically enabled, and the one-touch tuning will start. In the one-touch tuning by the amplifier command method, an optimum tuning command will be generated in the servo amplifier after servo-on. Then, the servo motor will reciprocate, and the one-touch tuning will be executed. After the tuning is completed or canceled, the servo amplifier will be the servo-off status. When the servo-on command is inputted from outside, the amplifier will be the servo-on status.

After one-touch tuning is executed using the amplifier command method, control will not be performed by commands from the controller. To return to the state in which control is performed by commands from the controller, reset the controller or cycle the power.

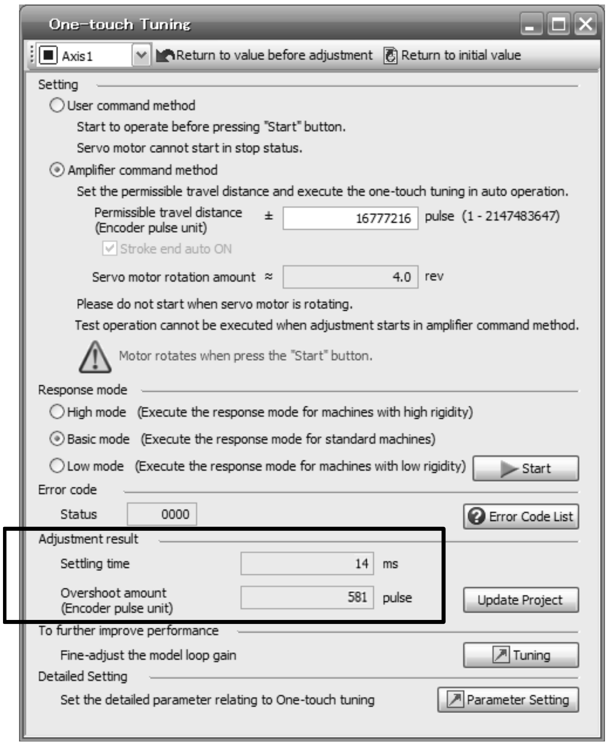


During processing of one-touch tuning, the progress will be displayed as follows. Tuning will be completed at 100%.



Completing the one-touch tuning will start writing tuning parameters to the servo amplifier, and the following window will be displayed. Select whether or not to reflect the tuning result in the project.

After the one-touch tuning is completed, "0000" will be displayed at status in error code. In addition, settling time and overshoot amount will be displayed in "Adjustment result".



4) Stop of one-touch tuning
During one-touch tuning, clicking the stop button stops one-touch tuning. If the one-touch tuning is stopped, "C000" will be displayed at status in error code. After the one-touch tuning is stopped, parameters will return to the values at the start of the one-touch tuning. To stop one-touch tuning, and execute it again, stop the servo motor once. In addition, after returning the moving part to the tuning start position, execute it.

5) If an error occurs
If a tuning error occurs during tuning, one-touch tuning will be stopped. With that, the following error code will be displayed in status. Check the cause of tuning error. When executing one-touch tuning again, stop the servo motor once. In addition, after returning the moving part to the tuning start position, execute it.

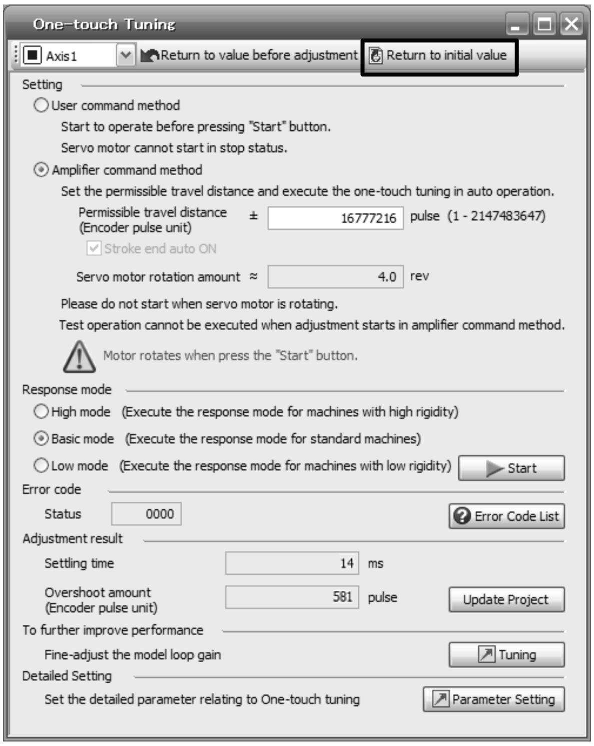
Display	Name	Error detail	Corrective action example
C000	Tuning canceled	The stop button was clicked during one-touch tuning.	
C001	Overshoot exceeded	Overshoot amount is a value larger than the one set in [Pr. PA10 In-position range] and [Pr. PX14 One-touch tuning - Overshoot permissible level].	Increase the in-position range or overshoot permissible level.
C002	Servo-off during tuning	The one-touch tuning was attempted in the user command method during servo-off. The servo amplifier will be servo-off status during one-touch tuning.	When executing one-touch tuning in the user command method, turn to servo-on, and then execute it. Prevent the servo amplifier from being the servo-off status during one-touch tuning.
C003	Control mode error	1. The one-touch tuning was attempted while the torque control mode was selected in the control modes.	Select the position control mode or speed control mode for the control mode from the controller, and then execute one-touch tuning. Do not change the control mode during the one-touch tuning.
		2. During one-touch tuning, the control mode was attempted to change from the position control mode to the speed control mode.	
C004	Time-out	1. One cycle time during the operation has been over 30 s.	Set one cycle time during the operation (time from the command start to the next command start) to 30 s or less.
		2. The command speed is slow.	Set the servo motor speed to100 r/min or higher. Error is less likely to occur as the setting speed is higher. When one-touch tuning by the amplifier command is used, set a permissible travel distance so that the servo motor speed is 100 r/min or higher. Set a permissible travel distance to two or more revolutions as a guide value to set the servo motor speed to 100 r/min.
		3. The operation interval of the continuous operation is short.	Set the stop interval during operation to 200 ms or more. Error is less likely to occur as the setting time is longer.
C005	Load to motor inertia ratio misestimated	1. The estimation of the load to motor inertia ratio at one-touch tuning was a failure.	Drive the motor with meeting conditions as follows. ・The acceleration time constant/deceleration time constant to reach 2000 r/min (mm/s) is 5 s or less. ・Speed is 150 r/min (mm/s) or higher. ・The load to servo motor inertia ratio is 100 times or less. ・The acceleration/deceleration torque is 10% or more of the rated torque.
		2. The load to motor inertia ratio was not estimated due to an oscillation or other influences.	Set to the auto tuning mode that does not estimate the load to motor inertia ratio as follows, and then execute the one-touch tuning. ・Select "Auto tuning mode 2 (_ _ _ 2)", "Manual mode (_ _ _ 3)", or "2 gain adjustment mode 2 (_ _ _ 4)" of "Gain adjustment mode selection" in [Pr. PA08]. ・Manually set [Pr. PB06 Load to motor inertia ratio/load to motor mass ratio] properly.

Display	Name	Error detail	Corrective action example
C006	Amplifier command start error	One-touch tuning was attempted to start in the amplifier command method under the following speed condition. Servo motor speed: 20 r/min or higher	Execute the one-touch tuning in the amplifier command method while the servo motor is stopped.
C007	Amplifier command generation error	1. One-touch tuning was executed in the amplifier command method when the permissible travel distance is set to 100 pulses or less in the encoder pulse unit, or the distance is set not to increase the servo motor speed to 150 r/min (mm/s) or higher at the time of load to motor inertia ratio estimation.	Set a permissible travel distance to 100 pulses or more in the encoder pulse unit, or a distance so as to increase the servo motor speed to 150 r/min (mm/s) or higher at the time of load to motor inertia ratio estimation, and then execute the one-touch tuning. Set a permissible travel distance to four or more revolutions as a guide value. Load to motor inertia ratio will be estimated when "0000" or "0001" is set in [Pr. PA08 Auto tuning mode] at the start of one-touch tuning. If the permissible travel distance is short and the servo motor speed cannot be increased to 150 r/min (mm/s) or higher, select "Auto tuning mode 2 (_ _ _ 2)", "Manual mode (_ _ _ 3)", or "2 gain adjustment mode 2 (_ _ _ 4)" of "Gain adjustment mode selection" in [Pr. PA08].
		2. An overspeed alarm detection level is set so that the servo motor speed becomes 150 r/min (mm/s) or less at the time of load to motor inertia ratio estimation.	When estimating the load to motor inertia ratio, set the overspeed alarm detection level so that the speed becomes 150 r/min or more.
		3. The torque limit has been set to 0.	Set the torque limit value to greater than 0.
C008	Stop signal	EM2 was turned off during one-touch tuning in the amplifier command method.	Review the one-touch tuning start position and permissible travel distance for the amplifier command method. After ensuring safety, turn on EM2.
C009	Parameter	Parameters for manufacturer setting have been changed.	Return the parameters for manufacturer setting to the initial values.
C00A	Alarm	One-touch tuning was attempted to start in the amplifier command method during alarm or warning. Alarm or warning occurred during one-touch tuning by the amplifier command method.	Start one-touch tuning when no alarm or warning occurs. Prevent alarm or warning from occurring during one-touch tuning.
C00F	One-touch tuning disabled	"One-touch tuning function selection" in [Pr. PX13] is "Disabled (_ _ _ 0)".	Select "Enabled (_ _ _ 1)".

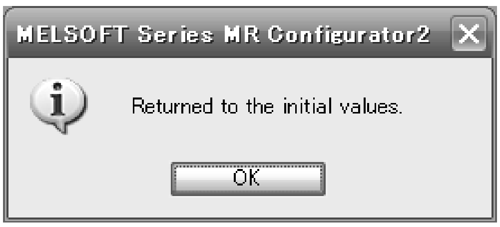
6) If an alarm occurs
   If an alarm occurs during tuning, one-touch tuning will be forcibly terminated. Remove the cause of the alarm and execute one-touch tuning again. When executing one-touch tuning in the amplifier command method again, return the moving part to the tuning start position.

7) If a warning occurs
   If a warning which continues the motor driving occurs during one-touch tuning by the user command method, the tuning will be continued. If a warning which does not continue the motor driving occurs during the tuning, one-touch tuning will be stopped.
   One-touch tuning will be stopped when warning occurs during one-touch tuning by the amplifier command method regardless of the warning type. Remove the cause of the warning, and return the moving part to the tuning start position. Then, execute the tuning again.

8) Initializing one-touch tuning
   Clicking "Return to initial value" in the one-touch tuning window of MR Configurator2 enables to return the parameter to the initial value. Refer to table 3.9 for the parameters which you can initialize.
   Clicking "Return to value before adjustment" in the one-touch tuning window of MR Configurator2 enables to return the parameter to the value before clicking the start button.



When the initialization of one-touch tuning is completed, the following window will be displayed. (returning to initial value)



(c) Caution for one-touch tuning

1) Caution common for user command method and amplifier command method

a) The tuning is not available in the torque control mode.

b) The one-touch tuning cannot be executed while an alarm or warning which does not continue the motor driving is occurring.

2) Caution for amplifier command method

a) Starting one-touch tuning while the servo motor is rotating displays "C006" at status in error code, and the one-touch tuning cannot be executed.

b) One-touch tuning is not available during the test operation mode. The following test operation modes cannot be executed during one-touch tuning.
- Positioning operation
- JOG operation
- Program operation
- Machine analyzer operation

c) After one-touch tuning is executed, control will not be performed by commands from the servo system controller. To return to the state in which control is performed from the servo system controller, reset the controller or cycle the power of the servo amplifier.

d) During one-touch tuning, the permissible travel distance may be exceeded due to overshoot, set a value sufficient to prevent machine collision.

e) When Auto tuning mode 2, Manual mode, or 2 gain adjustment mode 2 is selected in [Pr. PA08 Auto tuning mode], the load to motor inertia ratio will not be estimated. An optimum acceleration/deceleration command will be generated by [Pr. PB06 Load to motor inertia ratio/load to motor mass ratio] at the start of one-touch tuning. When the load to motor inertia ratio is incorrect, the optimum acceleration/deceleration command may not be generated, causing the tuning to fail.

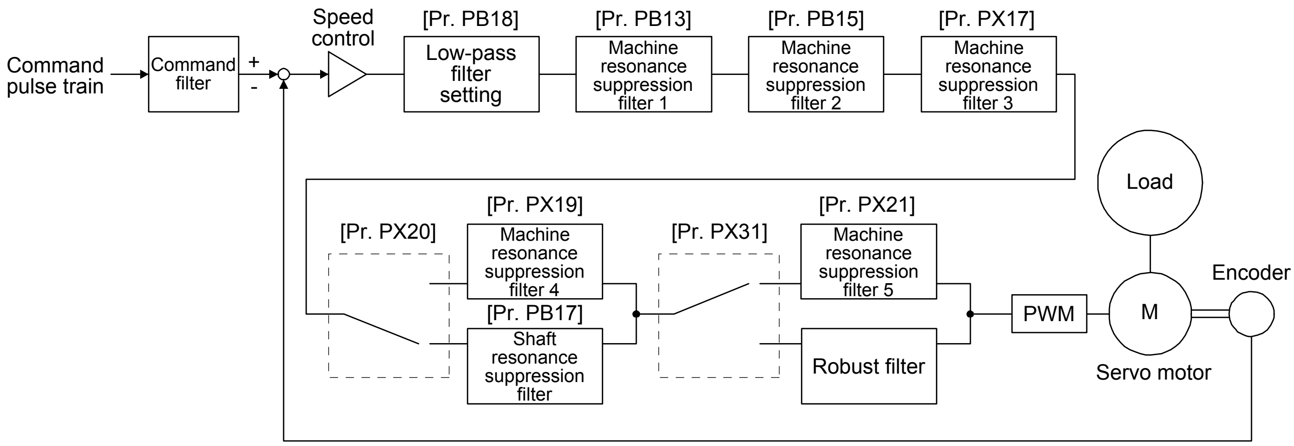
f) When one-touch tuning is started by using USB communication, if the USB communication is interrupted during the tuning, the servo motor will stop, and the tuning will also stop. The parameter will return to the one at the start of the one-touch tuning.

g) When one-touch tuning is started via the controller, if communication between the controller and the servo amplifier or personal computer is shut-off during the tuning, the servo motor will stop, and the tuning will also stop. The parameter will return to the one at the start of the one-touch tuning.

h) When one-touch tuning is started during the speed control mode, the mode will be switched to the position control mode automatically. The tuning result may differ from the one obtained by executing tuning by using the speed command.

(5) Filter setting

The following filters are available with the J3 extension function.



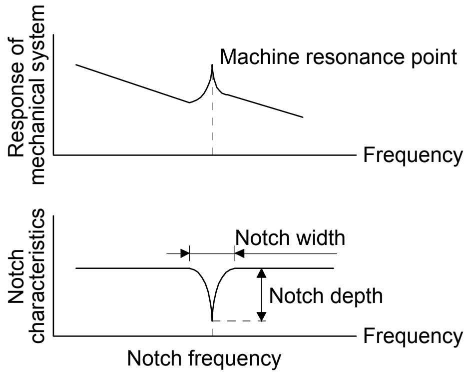
(a) Machine resonance suppression filter

POINT
●The machine resonance suppression filter is a delay factor for the servo system. Therefore, vibration may increase if you set an incorrect resonance frequency or set notch characteristics too deep or too wide. ●If the frequency of machine resonance is unknown, decrease the notch frequency from higher to lower ones in order. The optimum notch frequency is set at the point where vibration is minimal. ●A deeper notch has a higher effect on machine resonance suppression but increases a phase delay and may increase vibration. ●A deeper notch has a higher effect on machine resonance suppression but increases a phase delay and may increase vibration. ●The machine characteristic can be grasped beforehand by the machine analyzer on MR Configurator2. This allows the required notch frequency and notch characteristics to be determined.

If a mechanical system has a natural resonance point, increasing the servo system response level may cause the mechanical system to produce resonance (vibration or unusual noise) at that resonance frequency. Using the machine resonance suppression filter and adaptive tuning can suppress the resonance of the mechanical system. The setting range is 10 Hz to 4500 Hz.

1) Function

The machine resonance suppression filter is a filter function (notch filter) which decreases the gain of the specific frequency to suppress the resonance of the mechanical system. You can set the gain decreasing frequency (notch frequency), gain decreasing depth and width.



You can set five machine resonance suppression filters at most.

Filter	Setting parameter	Precaution	Parameter that is reset with vibration tough drive function	Parameter automatically adjusted with one-touch tuning
Machine resonance suppression filter 1	PB01/PB13/PB14	The filter can be set automatically with "Filter tuning mode selection" in [Pr. PB01].	PB13	PB01/PB13/PB14
Machine resonance suppression filter 2	PB15/PB16		PB15	PB15/PB16
Machine resonance suppression filter 3	PX17/PX18			PX17/PX18
Machine resonance suppression filter 4	PX19/PX20	Enabling the machine resonance suppression filter 4 disables the shaft resonance suppression filter. Using the shaft resonance suppression filter is recommended because it is adjusted properly depending on the usage situation. The shaft resonance suppression filter is enabled for the initial setting.		PX19/PX20
Machine resonance suppression filter 5	PX21/PX22	Enabling the robust filter disables the machine resonance suppression filter 5. The robust filter is disabled for the initial setting.		PX22

2) Parameter
   a) Machine resonance suppression filter 1 ([Pr. PB13] and [Pr. PB14])
      Set the notch frequency, notch depth and notch width of the machine resonance suppression filter 1 ([Pr. PB13] and [Pr. PB14])
      When you select "Manual setting (_ _ _ 2)" of "Filter tuning mode selection" in [Pr. PB01], the setting of the machine resonance suppression filter 1 is enabled.

   b) Machine resonance suppression filter 2 ([Pr. PB15] and [Pr. PB16])
      To use this filter, select "Enabled (_ _ _ 1)" of "Machine resonance suppression filter 2 selection" in [Pr. PB16].
      How to set the machine resonance suppression filter 2 ([Pr. PB15] and [Pr. PB16]) is the same as for the machine resonance suppression filter 1 ([Pr. PB13] and [Pr. PB14]).

   c) Machine resonance suppression filter 3 ([Pr. PX17] and [Pr. PX18])
      To use this filter, select "Enabled (_ _ _ 1)" of "Machine resonance suppression filter 3 selection" in [Pr. PX18].
      How to set the machine resonance suppression filter 3 ([Pr. PX17] and [Pr. PX18]) is the same as for the machine resonance suppression filter 1 ([Pr. PB13] and [Pr. PB14]).

   d) Machine resonance suppression filter 4 ([Pr. PX19] and [Pr. PX20])
      To use this filter, select "Enabled (_ _ _ 1)" of "Machine resonance suppression filter 4 selection" in [Pr. PX20]. However, enabling the machine resonance suppression filter 4 disables the shaft resonance suppression filter.
      How to set the machine resonance suppression filter 4 ([Pr. PX19] and [Pr. PX20]) is the same as for the machine resonance suppression filter 1 ([Pr. PB13] and [Pr. PB14]).

   e) Machine resonance suppression filter 5 ([Pr. PX21] and [Pr. PX22])
      To use this filter, select "Enabled (_ _ _ 1)" of "Machine resonance suppression filter 5 selection" in [Pr. PX22]. However, enabling the robust filter ([Pr. PX31]: _ _ _ 1) disables the machine resonance suppression filter 5.
      How to set the machine resonance suppression filter 5 ([Pr. PX21] and [Pr. PX22]) is the same as for the machine resonance suppression filter 1 ([Pr. PB13] and [Pr. PB14]).

(b) Shaft resonance suppression filter

POINT
●This filter is set properly by default according to servo motor you use and load moment of inertia. For [Pr. PB23], "_ _ _ 0" (automatic setting) is recommended because setting "Shaft resonance suppression filter selection" in [Pr. PB23] or setting [Pr. PB17 Shaft resonance suppression filter] can degrades in performance.

1) Function

When a load is mounted to the servo motor shaft, resonance by shaft torsion during driving may generate a mechanical vibration at high frequency. The shaft resonance suppression filter suppresses the vibration.

When you select "Automatic setting", the filter will be set automatically on the basis of the servo motor you use and the load to motor inertia ratio. The disabled setting increases the response of the servo amplifier for high resonance frequency.

2) Parameter

Set "Shaft resonance suppression filter selection" in [Pr. PB23].

[Pr. PB23]

0	0	0	

Shaft resonance suppression filter selection
0: Automatic setting
1: Manual setting
2: Disabled

To set [Pr. PB17 Shaft resonance suppression filter] automatically, select "Automatic setting".
To set [Pr. PB17 Shaft resonance suppression filter] manually, select "Manual setting". The setting values are as follows.

Shaft resonance suppression filter setting frequency selection

Setting value	Frequency [Hz]	Setting value	Frequency [Hz]
_ _ 0 0	Disabled	_ _ 1 0	562
_ _ 0 1	Disabled	_ _ 1 1	529
_ _ 0 2	4500	_ _ 1 2	500
_ _ 0 3	3000	_ _ 1 3	473
_ _ 0 4	2250	_ _ 1 4	450
_ _ 0 5	1800	_ _ 1 5	428
_ _ 0 6	1500	_ _ 1 6	409
_ _ 0 7	1285	_ _ 1 7	391
_ _ 0 8	1125	_ _ 1 8	375
_ _ 0 9	1000	_ _ 1 9	360
_ _ 0 A	900	_ _ 1 A	346
_ _ 0 B	818	_ _ 1 B	333
_ _ 0 C	750	_ _ 1 C	321
_ _ 0 D	692	_ _ 1 D	310
_ _ 0 E	642	_ _ 1 E	300
_ _ 0 F	600	_ _ 1 F	290

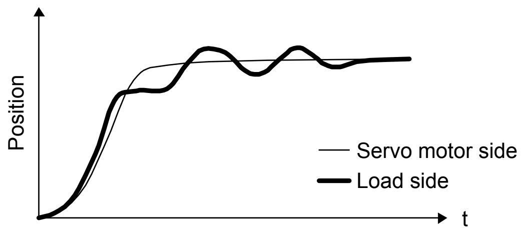
(c) Advanced vibration suppression control II

POINT

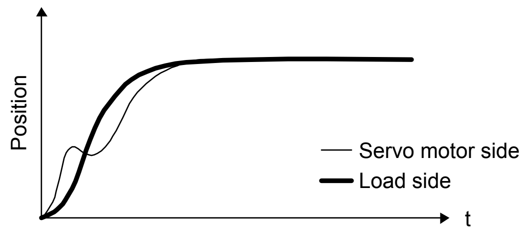
- This is enabled when "Gain adjustment mode selection" is "Auto tuning mode 2 (_ _ _ 2)" or "Manual mode (_ _ _ 3)" in [Pr. PA08].
- The machine resonance frequency supported in the vibration suppression control tuning mode is 1.0 Hz to 100.0 Hz. As for the vibration out of the range, set manually.
- Stop the servo motor before changing the vibration suppression control-related parameters. Otherwise, it may cause an unexpected operation.
- For positioning operation during execution of vibration suppression control tuning, provide a stop time to ensure a stop after vibration damping.
- Vibration suppression control tuning may not make normal estimation if the residual vibration at the servo motor side is small.
- Vibration suppression control tuning sets the optimum parameter with the currently set control gains. When the response setting is increased, set vibration suppression control tuning again.
- When using the vibration suppression control 2, set "_ _ _ 1" in [Pr. PX02].

1) Function

Vibration suppression control is used to further suppress load-side vibration, such as work-side vibration and base shake. The servo motor-side operation is adjusted for positioning so that the machine does not vibrate.



Vibration suppression: off (normal)



Vibration suppression control: on

When the advanced vibration suppression control II ([Pr. PB02] and [Pr. PX03]) is executed, the vibration frequency at load side is automatically estimated to suppress machine side vibration two times at most.

In the vibration suppression control tuning mode, this mode shifts to the manual setting after the positioning operation is performed the predetermined number of times. For manual setting, adjust the vibration suppression control 1 with [Pr. PB19] to [Pr. PB22] and vibration suppression control 2 with [Pr. PX04] to [Pr. PX07].

2) Parameter

Set the advanced vibration suppression control II ([Pr. PB02] and [Pr. PX03]).

When you use a vibration suppression control, set "Vibration suppression control 1 tuning mode selection" in [Pr. PB02]. When you use two vibration suppression controls, set "Vibration suppression control 2 tuning mode selection" in [Pr. PX03] in addition.

[Pr. PB02]

0	0	0	

Vibration suppression control 1 tuning mode

Setting value	Vibration suppression control 1 tuning mode selection	Automatically set parameter
_ _ _ 0	Disabled	
_ _ _ 1	Automatic setting	PB19/PB20/PB21/PB22
_ _ _ 2	Manual setting	

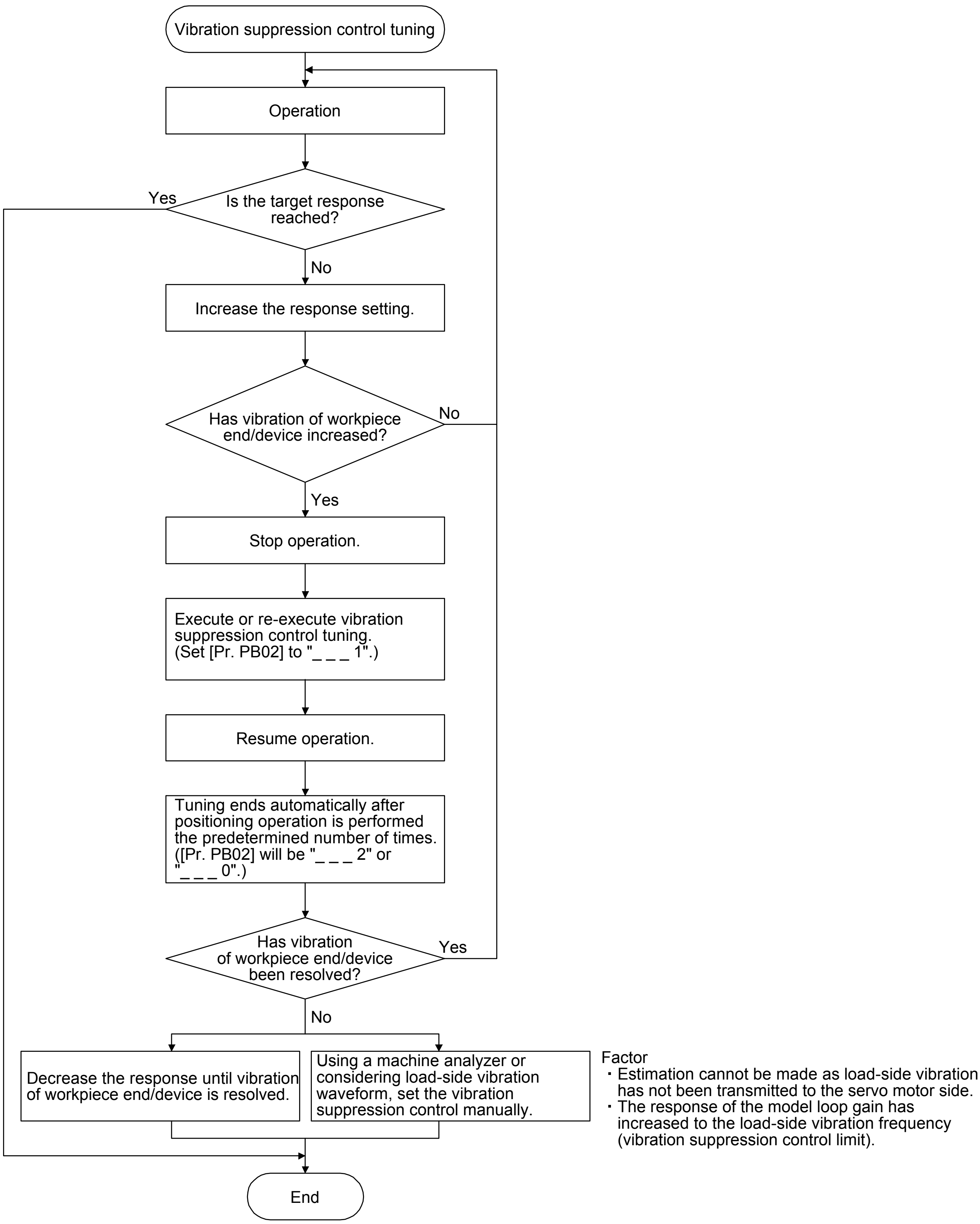
[Pr. PX03]

0	0		0

Vibration suppression control 2 tuning mode

Setting value	Vibration suppression control 2 tuning mode selection	Automatically set parameter
_ _ 0 _	Disabled	
_ _ 1 _	Automatic setting	PX04/PX05/PX06/PX07
_ _ 2 _	Manual setting	

3) Vibration suppression control tuning procedure
The following flow chart is for the vibration suppression control 1. For the vibration suppression control 2, set "_ _ 1 _" in [Pr. PX03] to execute the vibration suppression control tuning.



4) Vibration suppression control manual mode

POINT
●When load-side vibration does not show up in servo motor-side vibration, the setting of the servo motor-side vibration frequency does not produce an effect. ●When the anti-resonance frequency and resonance frequency can be confirmed using the machine analyzer or external equipment, do not set the same value but set different values to improve the vibration suppression performance.

Measure work-side vibration and device shake with the machine analyzer or external measuring instrument, and set the following parameters to adjust vibration suppression control manually.

Setting item	Vibration suppression control 1	Vibration suppression control 2
Vibration suppression control - Vibration frequency	[Pr. PB19]	[Pr. PX04]
Vibration suppression control - Resonance frequency	[Pr. PB20]	[Pr. PX05]
Vibration suppression control - Vibration frequency damping	[Pr. PB21]	[Pr. PX06]
Vibration suppression control - Resonance frequency damping	[Pr. PB22]	[Pr. PX07]

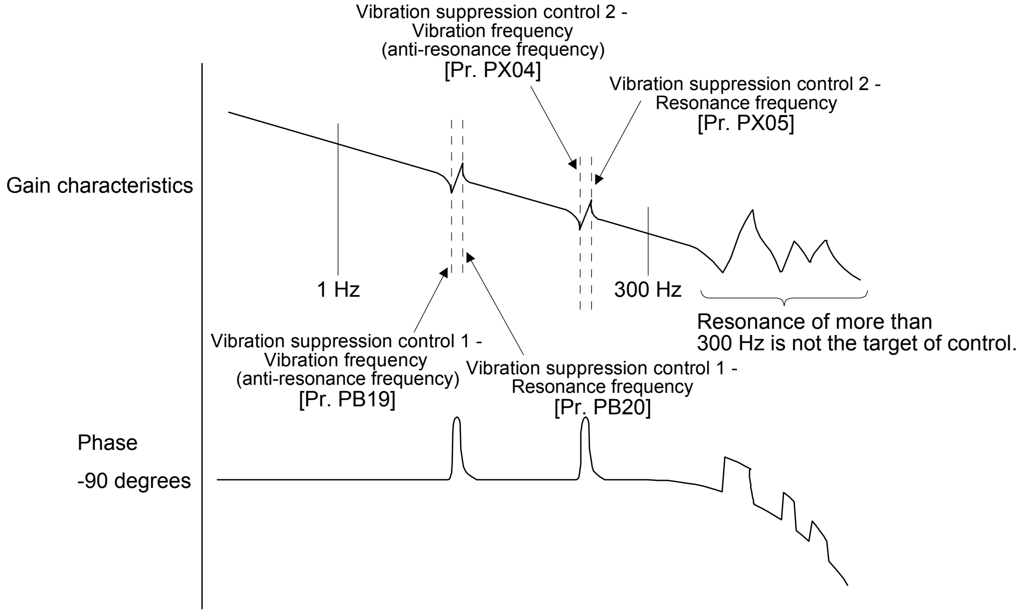
Step 1. Select "Manual setting (_ _ _ 2)" of "Vibration suppression control 1 tuning mode selection" in [Pr. PB02] or "Manual setting (_ _ 2 _)" of "Vibration suppression control 2 tuning mode selection" in [Pr. PX03].

Step 2. Set "Vibration suppression control - Vibration frequency" and "Vibration suppression control - Resonance frequency" as follows.

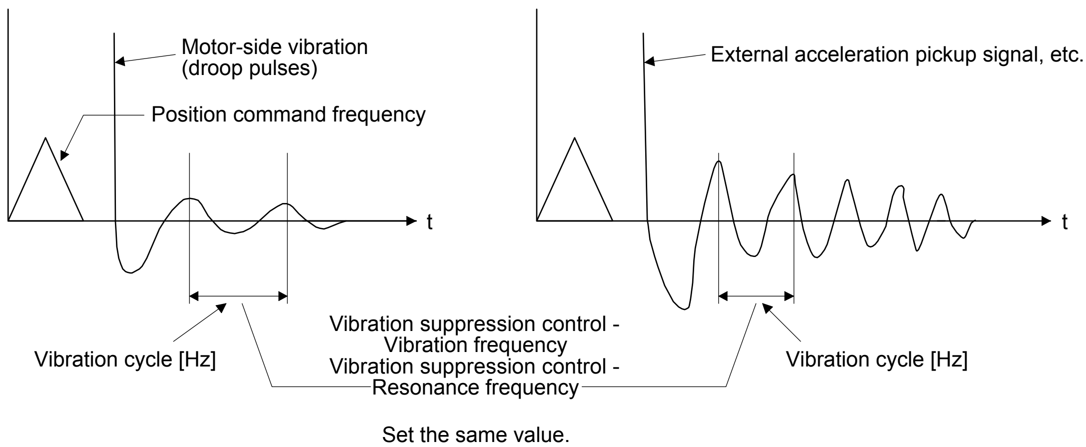
However, the value of [Pr. PB07 Model loop gain], vibration frequency, and resonance frequency have the following usable range and recommended range.

Vibration suppression control	Usable range	Recommended setting range
Vibration suppression control 1	[Pr. PB19] > 1/2π × (0.9 × [Pr. PB07]) [Pr. PB20] > 1/2π × (0.9 × [Pr. PB07])	[Pr. PB19] > 1/2π × (1.5 × [Pr. PB07]) [Pr. PB20] > 1/2π × (1.5 × [Pr. PB07])
Vibration suppression control 2	When [Pr. PB19] < [Pr. PX04], [Pr. PX04] > (5.0 + 0.1 × [Pr. PB07]) [Pr. PX05] > (5.0 + 0.1 × [Pr. PB07]) 1.1 < [Pr. PX04]/[Pr. PB19] < 5.5 [Pr. PB07] < 2π (0.3 × [Pr. PB19] + 1/8 × [Pr. PX04])	When [Pr. PB19] < [Pr. PX04], [Pr. PX04], [Pr. PX05] > 6.25 Hz 1.1 < [Pr. PX04]/[Pr. PB19] < 4 [Pr. PB07] < 1/3 × (4 × [Pr. PB19] + 2 × [Pr. PX04])

a) When a vibration peak can be confirmed with machine analyzer using MR Configurator2, or external equipment.



b) When vibration can be confirmed using monitor signal or external sensor



Step 3. Fine-adjust "Vibration suppression control - Vibration frequency damping" and "Vibration suppression control - Resonance frequency damping".

(6) Gain switching function

You can switch gains with the function. You can switch gains during rotation and during stop, and can use a control command from a controller to switch gains during operation.

(a) Use

The following shows when you use the function.

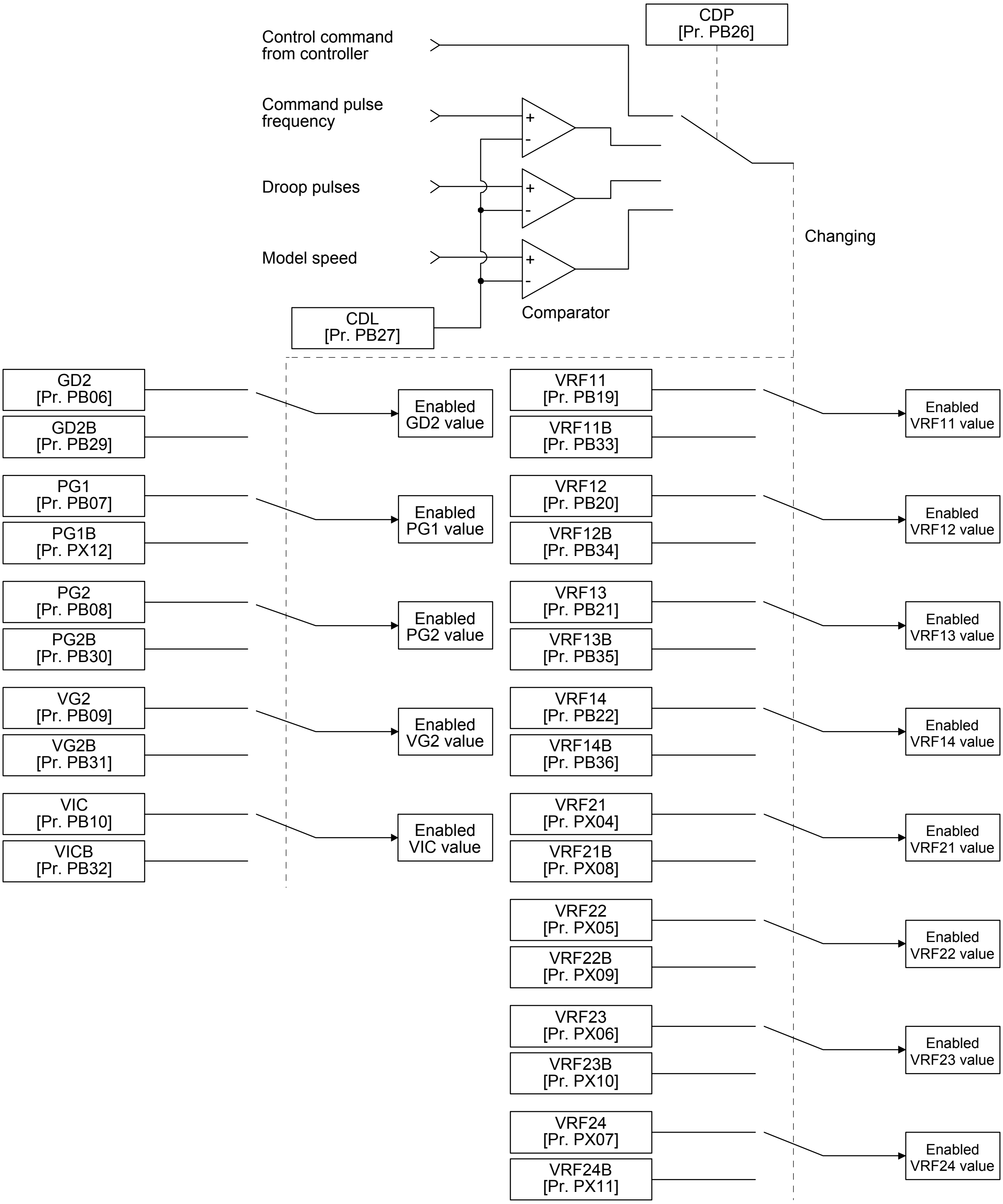
1) You want to increase the gains during servo-lock but decrease the gains to reduce noise during rotation.

2) You want to increase the gains during settling to shorten the stop settling time.

3) You want to change the gains using a control command from a controller to ensure stability of the servo system since the load to motor inertia ratio varies greatly during a stop (e.g. a large load is mounted on a carrier).

(b) Function block diagram

The control gains, load to motor inertia ratio, and vibration suppression control settings are changed according to the conditions selected by [Pr. PB26 Gain switching function] and [Pr. PB27 Gain switching condition].



(c) Parameter

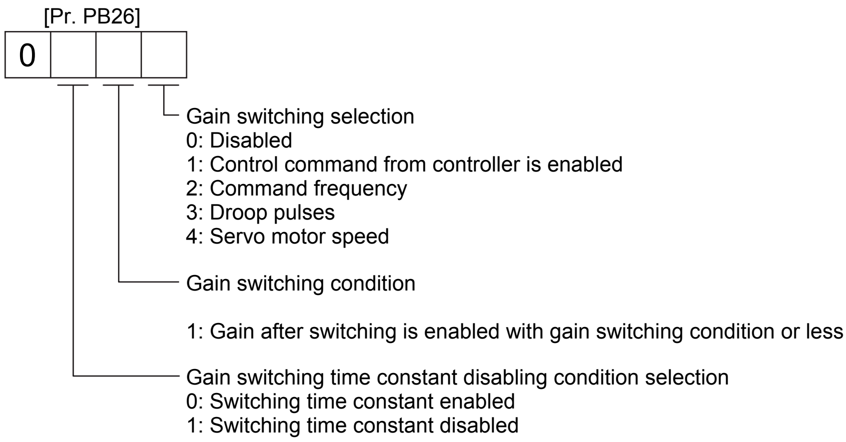
When using the gain switching function, always select "Manual mode (_ _ _ 3)" of "Gain adjustment mode selection" in [Pr. PA08 Auto tuning mode]. The gain switching function cannot be used in the auto tuning mode.

1) Parameter for setting gain switching condition

Parameter	Symbol	Name	Unit	Description
PB26	CDP	Gain switching selection		Select a switching condition.
PB27	CDL	Gain switching condition	[kpulse/s] /[pulse] /[r/min]	Set a switching condition values.
PB28	CDT	Gain switching time constant	[ms]	Set the filter time constant for a gain change at switching.

a) [Pr. PB26 Gain switching function]

Used to set the gain switching condition. Select the switching condition in the first to third digits.



b) [Pr. PB27 Gain switching condition]

Set a level to switch gains with [Pr. PB27] after you select "Command frequency", "Droop pulses", or "Servo motor speed" with the gain switching selection in [Pr. PB26 Gain switching function].

The setting unit is as follows.

Gain switching condition	Unit
Command frequency	[kpulse/s]
Droop pulses	[pulse]
Servo motor speed/linear servo motor speed	[r/min]/[mm/s]

c) [Pr. PB28 Gain switching time constant]

You can set the primary delay filter to each gain at gain switching. This parameter is used to suppress shock given to the machine if the gain difference is large at gain switching, for example.

2) Switchable gain parameter

Loop gain	Before switching			After switching		
	Parameter	Symbol	Name	Parameter	Symbol	Name
Load to motor inertia ratio/load to motor mass ratio	PB06	GD2	Load to motor inertia ratio/load to motor mass ratio	PB29	GD2B	Load to motor inertia ratio/load to motor mass ratio after gain switching
Model loop gain	PB07	PG1	Model loop gain	PX12	PG1B	Model loop gain after gain switching
Position loop gain	PB08	PG2	Position loop gain	PB30	PG2B	Position loop gain after gain switching
Speed loop gain	PB09	VG2	Speed loop gain	PB31	VG2B	Speed loop gain after gain switching
Speed integral compensation	PB10	VIC	Speed integral compensation	PB32	VICB	Speed integral compensation after gain switching
Vibration suppression control 1 - Vibration frequency	PB19	VRF11	Vibration suppression control 1 - Vibration frequency	PB33	VRF11B	Vibration suppression control 1 - Vibration frequency after gain switching
Vibration suppression control 1 - Resonance frequency	PB20	VRF12	Vibration suppression control 1 - Resonance frequency	PB34	VRF12B	Vibration suppression control 1 - Resonance frequency after gain switching
Vibration suppression control 1 - Vibration frequency damping	PB21	VRF13	Vibration suppression control 1 - Vibration frequency damping	PB35	VRF13B	Vibration suppression control 1 - Vibration frequency damping after gain switching
Vibration suppression control 1 - Resonance frequency damping	PB22	VRF14	Vibration suppression control 1 - Resonance frequency damping	PB36	VRF14B	Vibration suppression control 1 - Resonance frequency damping after gain switching
Vibration suppression control 2 - Vibration frequency	PX04	VRF21	Vibration suppression control 2 - Vibration frequency	PX08	VRF21B	Vibration suppression control 2 - Vibration frequency after gain switching
Vibration suppression control 2 - Resonance frequency	PX05	VRF22	Vibration suppression control 2 - Resonance frequency	PX09	VRF22B	Vibration suppression control 2 - Resonance frequency after gain switching
Vibration suppression control 2 - Vibration frequency damping	PX06	VRF23	Vibration suppression control 2 - Vibration frequency damping	PX10	VRF23B	Vibration suppression control 2 - Vibration frequency damping after gain switching
Vibration suppression control 2 - Resonance frequency damping	PX07	VRF24	Vibration suppression control 2 - Resonance frequency damping	PX11	VRF24B	Vibration suppression control 2 - Resonance frequency damping after gain switching

a) [Pr. PB06] to [Pr. PB10]
   These parameters are the same as in ordinary manual adjustment. Gain switching allows the values of load to motor inertia ratio/load to motor mass ratio, model loop gain, position loop gain, speed loop gain, and speed integral compensation to be switched.

b) [Pr. PB19] to [Pr. PB22]/[Pr. PX04] to [Pr. PX07]
   These parameters are the same as in ordinary manual adjustment. You can switch the vibration frequency, resonance frequency, vibration frequency damping, and resonance frequency damping by switching gain during motor stop.

c) [Pr. PB29 Load to motor inertia ratio/load to motor mass ratio after gain switching]
   Set the load to motor inertia ratio or load to motor mass ratio after gain switching. If the load to motor inertia ratio does not change, set it to the same value as [Pr. PB06 Load to motor inertia ratio/load to motor mass ratio].

d) [Pr. PB30 Position loop gain after gain switching], [Pr. PB31 Speed loop gain after gain switching], and [Pr. PB32 Speed integral compensation after gain switching]
   Set the values of after switching position loop gain, speed loop gain and speed integral compensation.

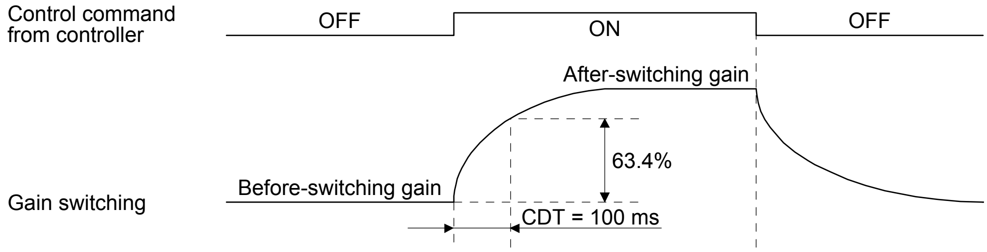
e) Vibration suppression control after gain switching ([Pr. PB33] to [Pr. PB36]/[Pr. PX08] to [Pr. PX11]), and [Pr. PX12 Model loop gain after gain switching]
   The gain switching vibration suppression control and gain switching model loop gain are used only with control command from the controller.
   You can switch the vibration frequency, resonance frequency, vibration frequency damping, resonance frequency damping, and model loop gain of the vibration suppression control 1 and vibration suppression control 2.

(d) Gain switching procedure
This operation will be described by way of setting examples.

1) When you choose switching by control command from the controller
a) Setting example

Parameter	Symbol	Name	Setting value	Unit
PB06	GD2	Load to motor inertia ratio/load to motor mass ratio	4.00	[Multiplier]
PB07	PG1	Model loop gain	100	[rad/s]
PB08	PG2	Position loop gain	120	[rad/s]
PB09	VG2	Speed loop gain	3000	[rad/s]
PB10	VIC	Speed integral compensation	20	[ms]
PB19	VRF11	Vibration suppression control 1 - Vibration frequency	50	[Hz]
PB20	VRF12	Vibration suppression control 1 - Resonance frequency	50	[Hz]
PB21	VRF13	Vibration suppression control 1 - Vibration frequency damping	0.20	
PB22	VRF14	Vibration suppression control 1 - Resonance frequency damping	0.20	
PX04	VRF21	Vibration suppression control 2 - Vibration frequency	20	[Hz]
PX05	VRF22	Vibration suppression control 2 - Resonance frequency	20	[Hz]
PX06	VRF23	Vibration suppression control 2 - Vibration frequency damping	0.10	
PX07	VRF24	Vibration suppression control 2 - Resonance frequency damping	0.10	
PB29	GD2B	Load to motor inertia ratio/load to motor mass ratio after gain switching	10.00	[Multiplier]
PX12	PG1B	Model loop gain after gain switching	50	[rad/s]
PB30	PG2B	Position loop gain after gain switching	84	[rad/s]
PB31	VG2B	Speed loop gain after gain switching	4000	[rad/s]
PB32	VICB	Speed integral compensation after gain switching	50	[ms]
PB26	CDP	Gain switching function	0001 (Switch by control command from the controller.)	
PB28	CDT	Gain switching time constant	100	[ms]
PB33	VRF11B	Vibration suppression control 1 - Vibration frequency after gain switching	60	[Hz]
PB34	VRF12B	Vibration suppression control 1 - Resonance frequency after gain switching	60	[Hz]
PB35	VRF13B	Vibration suppression control 1 - Vibration frequency damping after gain switching	0.15	
PB36	VRF14B	Vibration suppression control 1 - Resonance frequency damping after gain switching	0.15	
PX08	VRF21B	Vibration suppression control 2 - Vibration frequency after gain switching	30	[Hz]
PX09	VRF22B	Vibration suppression control 2 - Resonance frequency after gain switching	30	[Hz]
PX10	VRF23B	Vibration suppression control 2 - Vibration frequency damping after gain switching	0.05	
PX11	VRF24B	Vibration suppression control 2 - Resonance frequency damping after gain switching	0.05	

b) Switching timing chart



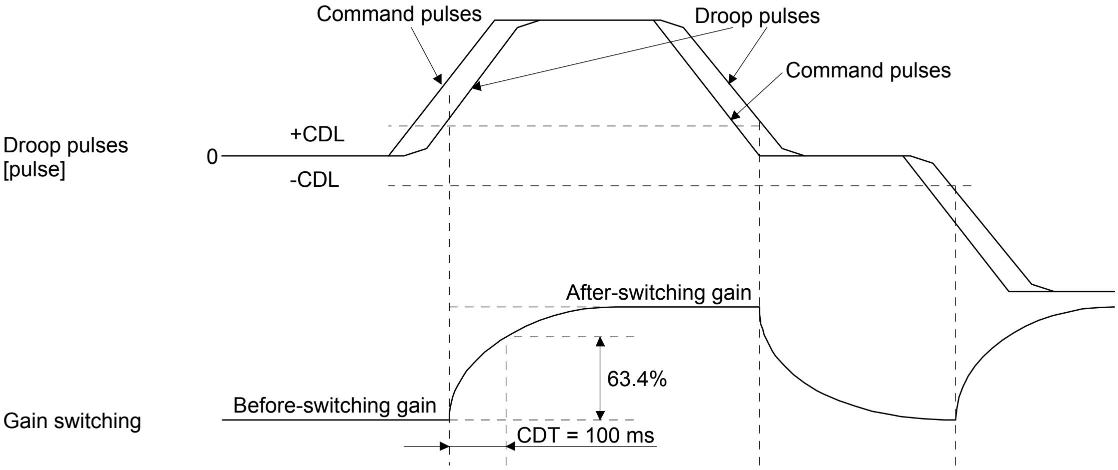
Model loop gain	100	→	50	→	100
Load to motor inertia ratio/load to motor mass ratio	4.00	→	10.00	→	4.00
Position loop gain	120	→	84	→	120
Speed loop gain	3000	→	4000	→	3000
Speed integral compensation	20	→	50	→	20
Vibration suppression control 1 - Vibration frequency	50	→	60	→	50
Vibration suppression control 1 - Resonance frequency	50	→	60	→	50
Vibration suppression control 1 - Vibration frequency damping	0.20	→	0.15	→	0.20
Vibration suppression control 1 - Resonance frequency damping	0.20	→	0.15	→	0.20
Vibration suppression control 2 - Vibration frequency	20	→	30	→	20
Vibration suppression control 2 - Resonance frequency	20	→	30	→	20
Vibration suppression control 2 - Vibration frequency damping	0.10	→	0.05	→	0.10
Vibration suppression control 2 - Resonance frequency damping	0.10	→	0.05	→	0.10

2) When you choose switching by droop pulses
The vibration suppression control after gain switching and model loop gain after gain switching cannot be used.

a) Setting example

Parameter	Symbol	Name	Setting value	Unit
PB06	GD2	Load to motor inertia ratio/load to motor mass ratio	4.00	[Multiplier]
PB08	PG2	Position loop gain	120	[rad/s]
PB09	VG2	Speed loop gain	3000	[rad/s]
PB10	VIC	Speed integral compensation	20	[ms]
PB29	GD2B	Load to motor inertia ratio/load to motor mass ratio after gain switching	10.00	[Multiplier]
PB30	PG2B	Position loop gain after gain switching	84	[rad/s]
PB31	VG2B	Speed loop gain after gain switching	4000	[rad/s]
PB32	VICB	Speed integral compensation after gain switching	50	[ms]
PB26	CDP	Gain switching selection	0003 (switching by droop pulses)	
PB27	CDL	Gain switching condition	50	[pulse]
PB28	CDT	Gain switching time constant	100	[ms]

b) Switching timing chart



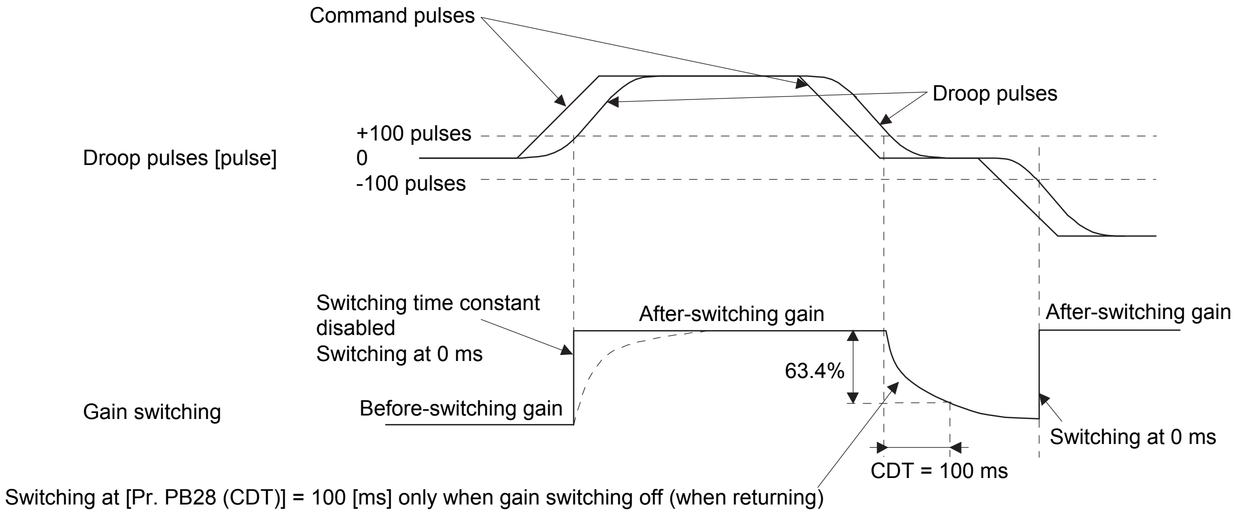
Load to motor inertia ratio/load to motor mass ratio	4.00	→	10.00	→	4.00	→	10.00
Position loop gain	120	→	84	→	120	→	84
Speed loop gain	3000	→	4000	→	3000	→	4000
Speed integral compensation	20	→	50	→	20	→	50

3) When the gain switching time constant is disabled

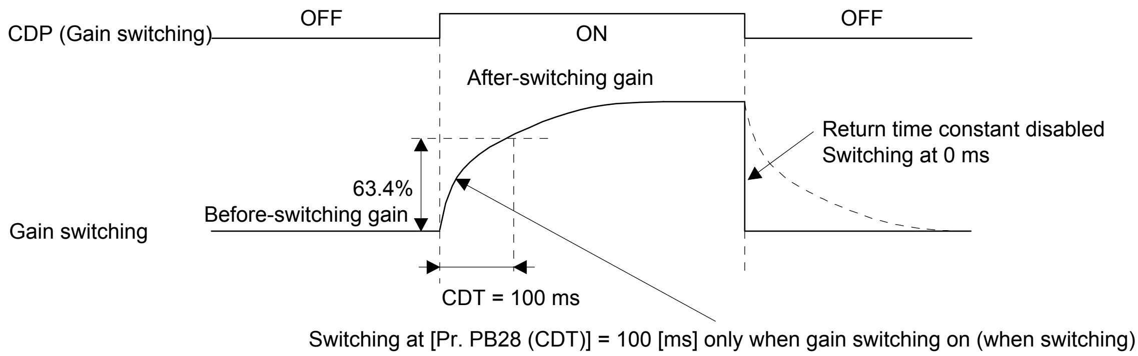
a) Gain switching time constant disabled was selected.

The gain switching time constant is disabled. The time constant is enabled at gain return.

The following example shows for [Pr. PB26 (CDP)] = 0103, [Pr. PB27 (CDL)] = 100 [pulse], and [Pr. PB28 (CDT)] = 100 [ms].



b) Gain return time constant disabled was selected.
The gain switching time constant is enabled. The time constant is disabled at gain return.
The following example shows for [Pr. PB26 (CDP)] = 0201, [Pr. PB27 (CDL)] = 0, and [Pr. PB28 (CDT)] = 100 [ms].



(7) Tough drive function

POINT
●Set enable/disable of the tough drive function with [Pr. PX25 Tough drive setting]. (Refer to (2) of this section.)

This function makes the equipment continue operating even under the condition that an alarm occurs. The vibration tough drive function and instantaneous power failure tough drive function are available with the J3 extension function.

(a) Vibration tough drive function
This function prevents vibration by resetting a filter instantaneously when machine resonance occurs due to varied vibration frequency caused by machine aging.
To reset the machine resonance suppression filters with the function, [Pr. PB13 Machine resonance suppression filter 1] and [Pr. PB15 Machine resonance suppression filter 2] should be set in advance.
Set [Pr. PB13] and [Pr. PB15] as follows.

1) One-touch tuning execution (Refer to (4) of this section.)

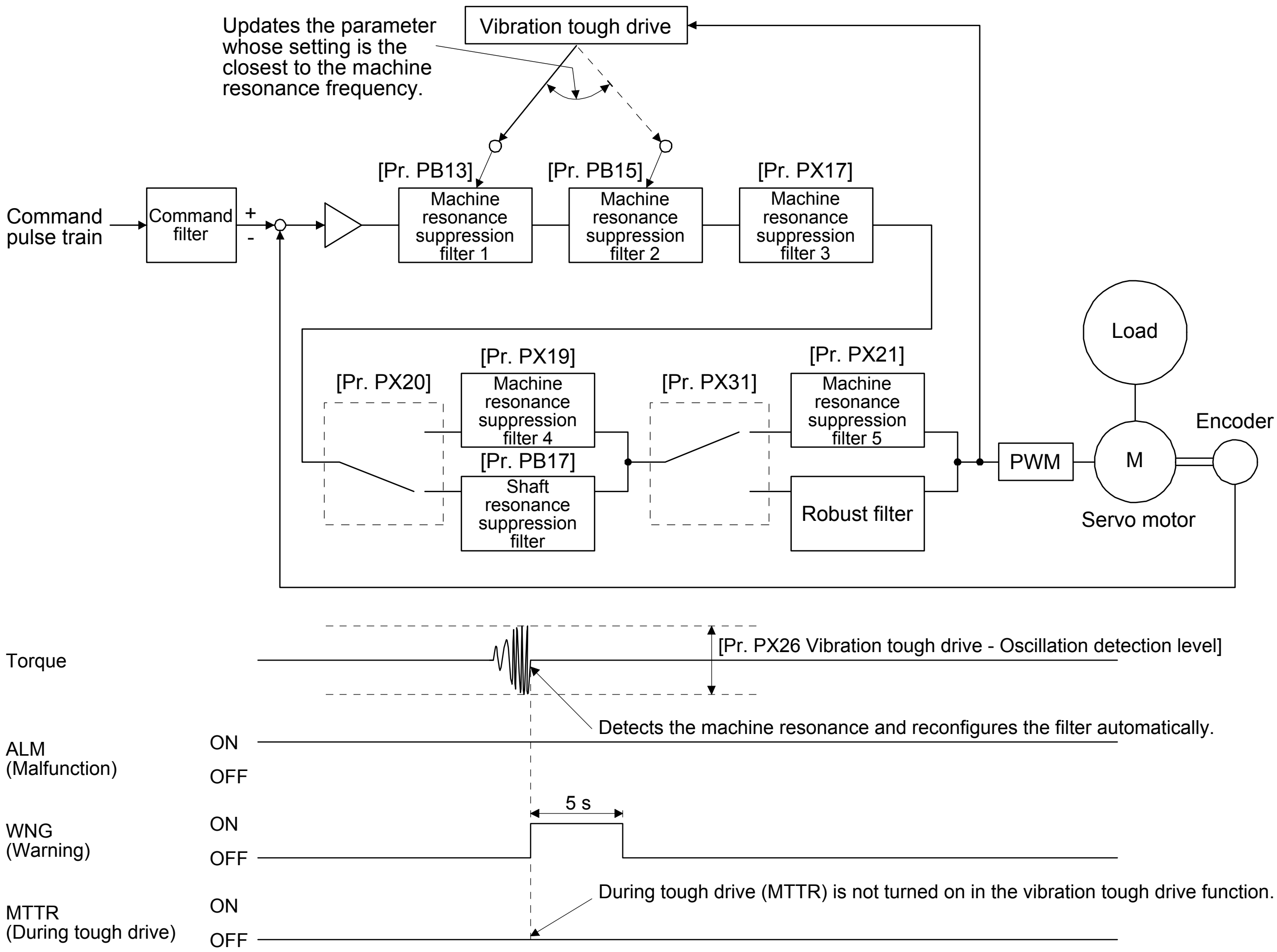
2) Manual setting (Refer to (2) of this section.)

The vibration tough drive function operates when a detected machine resonance frequency is within ±30% for a value set in [Pr. PB13 Machine resonance suppression filter 1] or [Pr. PB15 Machine resonance suppression filter 2].
To set a detection level of the function, set sensitivity in [Pr. PX26 Vibration tough drive - Oscillation detection level].

POINT
●Resetting [Pr. PB13] and [Pr. PB15] by the vibration tough drive function is performed constantly. However, the number of write times to the EEPROM is limited to once per hour. ●The vibration tough drive function does not reset [Pr. PX17 Machine resonance suppression filter 3], [Pr. PX19 Machine resonance suppression filter 4], and [Pr. PX21 Machine resonance suppression filter 5]. ●The vibration tough drive function does not detect a vibration of 100 Hz or less.

The following shows the function block diagram of the vibration tough drive function.
The function detects machine resonance frequency and compares it with [Pr. PB13] and [Pr. PB15], and reset a machine resonance frequency of a parameter whose set value is closer.

Filter	Setting parameter	Precaution	Parameter that is reset with vibration tough drive function
Machine resonance suppression filter 1	PB01/PB13/PB14	The filter can be set automatically with "Filter tuning mode selection" in [Pr. PB01].	PB13
Machine resonance suppression filter 2	PB15/PB16		PB15
Machine resonance suppression filter 3	PX17/PX18		
Machine resonance suppression filter 4	PX19/PX20	Enabling the machine resonance suppression filter 4 disables the shaft resonance suppression filter. Using the shaft resonance suppression filter is recommended because it is adjusted properly depending on the usage situation. The shaft resonance suppression filter is enabled for the initial setting.	
Machine resonance suppression filter 5	PX21/PX22	Enabling the robust filter disables the machine resonance suppression filter 5. The robust filter is disabled for the initial setting.	



(b) Instantaneous power failure tough drive function

The instantaneous power failure tough drive function avoids [AL. 10 Undervoltage] even when an instantaneous power failure occurs during operation. When the instantaneous power failure tough drive activates, the function will increase the tolerance against instantaneous power failure using the electrical energy charged in the capacitor in the servo amplifier and will change an alarm level of [AL. 10 Undervoltage] simultaneously. The [AL. 10.1 Voltage drop in the control circuit power] detection time for the control circuit power supply can be changed by [Pr. PX28 SEMI-F47 function - Instantaneous power failure detection time]. In addition, [AL.10.2 Voltage drop in the main circuit power] detection level for the bus voltage is changed automatically.

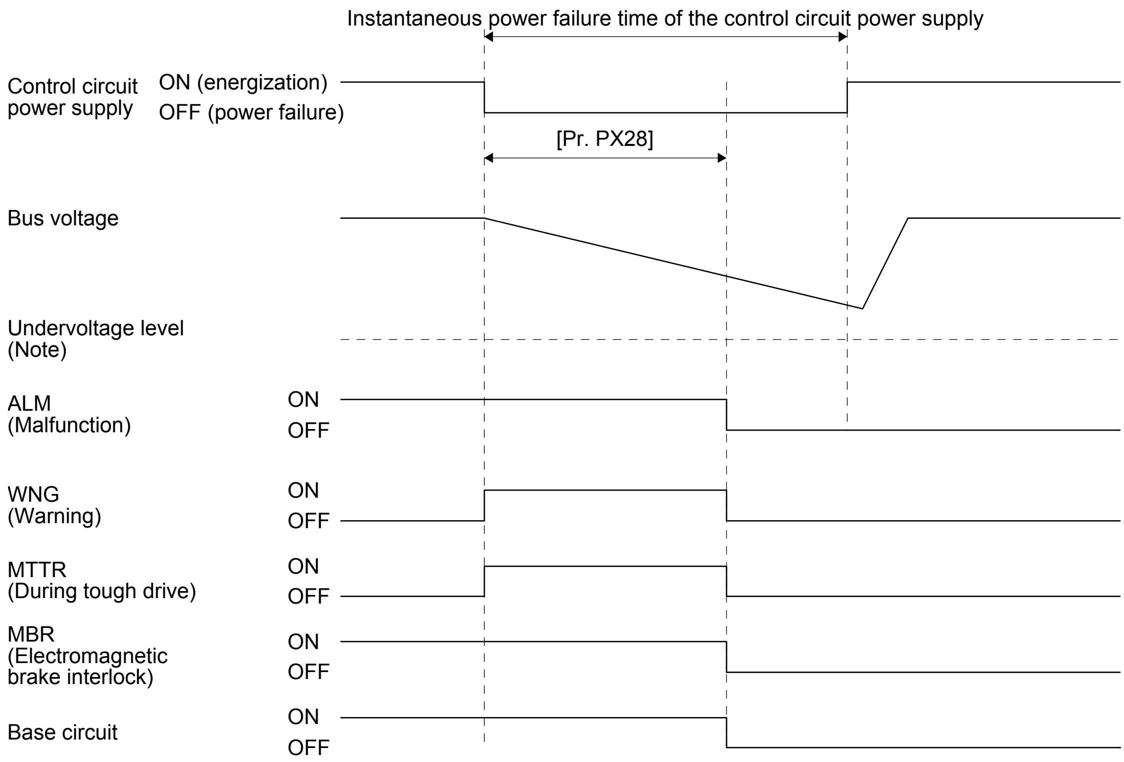
POINT

- MBR (Electromagnetic brake interlock) will not turn off during the instantaneous power failure tough drive.
- When selecting "Enabled (_ _ _ 1)" for "Torque limit function selection at instantaneous power failure" in [Pr. PX23], if an instantaneous power failure occurs during operation, you can save electric energy charged in the capacitor in the servo amplifier by limiting torque at acceleration. You can also delay the time until the occurrence of [AL. 10.2 Voltage drop in the main circuit power]. Doing this will enable you to set a longer time in [Pr. PX28 SEMI-F47 function - Instantaneous power failure detection time].
- When the load of instantaneous power failure is large, [AL. 10.2] caused by the bus voltage drop may occur regardless of the set value of [Pr. PX28 SEMI-F47 function - Instantaneous power failure detection time].
- The external dynamic brake cannot be used for compliance with SEMI-F47 standard. Do not assign DB (Dynamic brake interlock) in [Pr. PD07] to [Pr. PD09]. Failure to do so will cause the servo amplifier to become servo-off when an instantaneous power failure occurs.
- The setting range of [Pr. PX28 SEMI-F47 function - Instantaneous power failure detection time] differs depending on the software version of the servo amplifier as follows.
  - Software version C0 or later: Setting range 30 ms to 200 ms
  - Software version C1 or earlier: Setting range 30 ms to 500 ms

  To comply with SEMI-F47 standard, it is unnecessary to change the initial value (200 ms).

  However, when the instantaneous power failure time exceeds 200 ms, and the instantaneous power failure voltage is less than 70% of the rated input voltage, the power may be normally turned off even if a value larger than 200 ms is set in the parameter.

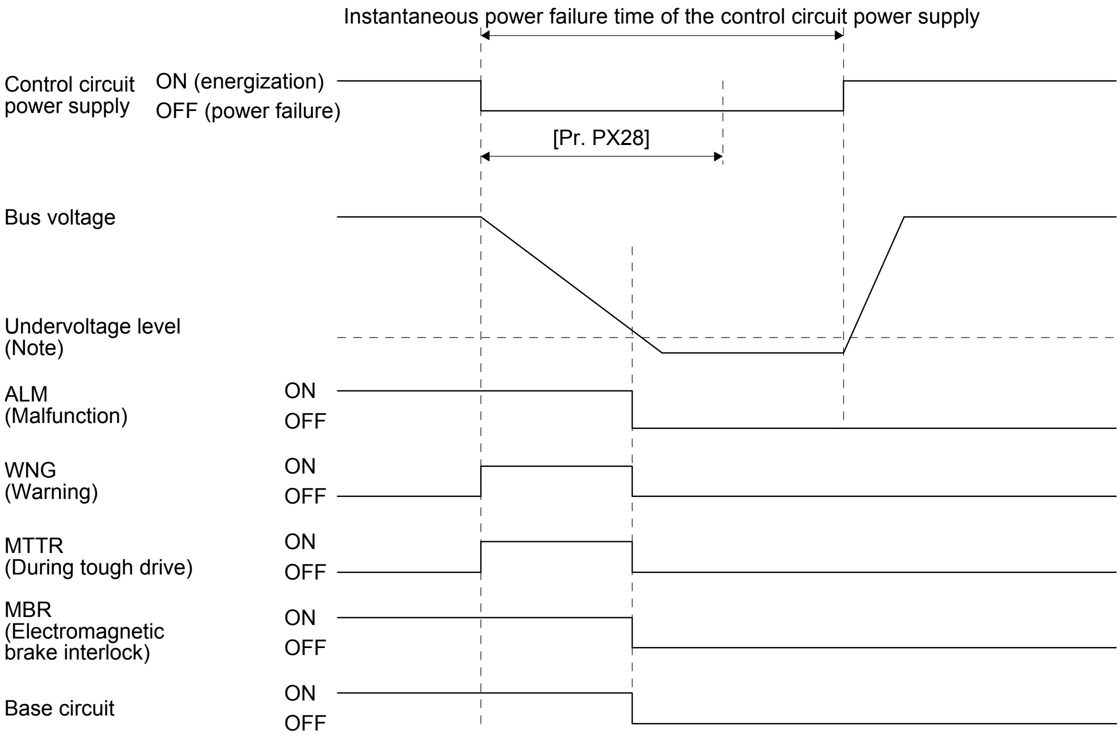
1) Instantaneous power failure time of control circuit power supply > [Pr. PX28 SEMI-F47 function - Instantaneous power failure detection time]
   The alarm occurs when the instantaneous power failure time of the control circuit power supply exceeds [Pr. PX28 SEMI-F47 function - Instantaneous power failure detection time].
   MTTR (During tough drive) turns on after the instantaneous power failure is detected.
   MBR (Electromagnetic brake interlock) turns off when the alarm occurs.



Note Refer to table 3.12 for the undervoltage level.

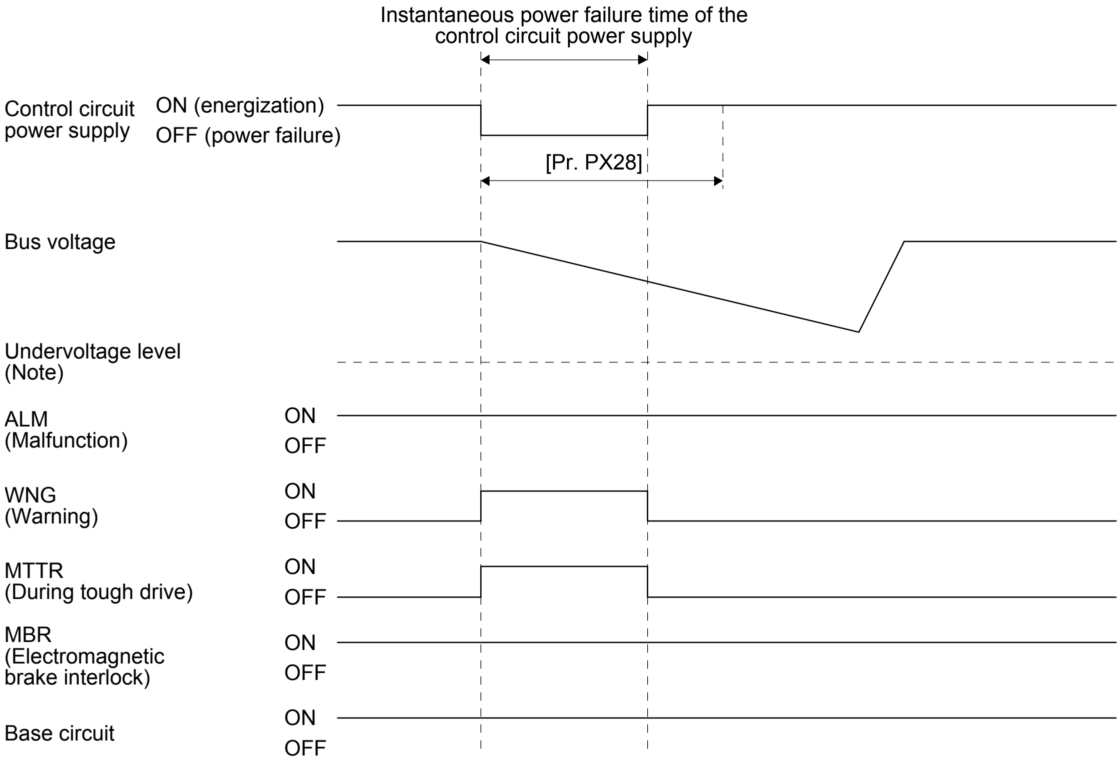
2) Instantaneous power failure time of control circuit power supply < [Pr. PX28 SEMI-F47 function - Instantaneous power failure detection time]
Operation status differs depending on how bus voltage decrease.

a) When the bus voltage decreases lower than Undervoltage level within the instantaneous power failure time of the control circuit power supply
[AL. 10 Undervoltage] occurs when the bus voltage decrease lower than Undervoltage level regardless of the enabled instantaneous power failure tough drive.



Note Refer to table 3.12 for the undervoltage level.

b) When the bus voltage does not decrease lower than Undervoltage level within the instantaneous power failure time of the control circuit power supply
The operation continues without alarming.



Note Refer to table 3.12 for the undervoltage level.

(8) Compliance with SEMI-F47 standard

POINT
●The control circuit power supply of the servo amplifier can be possible to comply with SEMI-F47 standard. However, a back-up capacitor may be necessary for instantaneous power failure in the main circuit power supply depending on the power supply impedance and operating situation. ●Use a 3-phase for the input power supply of the servo amplifier. Using a 1-phase 100 V AC/200 V AC for the input power supply will not comply with SEMI-F47 standard. ●The external dynamic brake cannot be used for compliance with SEMI-F47 standard. Do not assign DB (Dynamic brake interlock) in [Pr. PD07] to [Pr. PD09]. Failure to do so will cause the servo amplifier to become servo-off when an instantaneous power failure occurs. ●Be sure to perform actual machine tests and detail checks for power supply instantaneous power failure of SEMI-F47 standard with your equipment.

The following explains the compliance with "SEMI-F47 semiconductor process equipment voltage sag immunity test" of MR-J4 series.
This function enables to avoid triggering [AL. 10 Undervoltage] using the electrical energy charged in the capacitor in case that an instantaneous power failure occurs during operation.

(a) Parameter setting

Setting [Pr. PX25] and [Pr. PX28] as follows will enable SEMI-F47 function.

Parameter	Setting value	Description
PX25	_ 1 _ _	Enable SEMI-F47 function selection.
PX28	200	Set the time [ms] of the [AL. 10.1 Voltage drop in the control circuit power] occurrence.

Enabling SEMI-F47 function will change operation as follows.

1) The voltage will drop in the control circuit power with "Rated voltage × 50% or less". 200 ms later, [AL. 10.1 Voltage drop in the control circuit power] will occur.

2) [AL. 10.2 Voltage drop in the main circuit power] will occur when bus voltage is as follows.

Table 3.12 Voltages which trigger [AL. 10.2 Voltage drop in the main circuit power]

Servo amplifier	Bus voltage which triggers alarm
MR-J4-10B(-RJ) to MR-J4-700B(-RJ)	158 V DC
MR-J4-11KB(-RJ) to MR-J4-22KB(-RJ)	200 V DC
MR-J4-60B4(-RJ) to MR-J4-22KB4(-RJ)	380 V DC

3) MBR (Electromagnetic brake interlock) will turn off when [AL. 10.1 Voltage drop in the control circuit power] occurs.

(b) Requirements conditions of SEMI-F47 standard

Table 3.13 shows the permissible time of instantaneous power failure for instantaneous power failure of SEMI-F47 standard.

Table 3.13 Requirements conditions of SEMI-F47 standard

Instantaneous power failure voltage	Permissible time of instantaneous power failure [s]
Rated voltage × 80%	1
Rated voltage × 70%	0.5
Rated voltage × 50%	0.2

(c) Calculation of tolerance against instantaneous power failure

Table 3.14 shows tolerance against instantaneous power failure when instantaneous power failure voltage is "rated voltage × 50%" and instantaneous power failure time is 200 ms.

Table 3.14 Tolerance against instantaneous power failure (instantaneous power failure voltage = rated voltage × 50%, instantaneous power failure time = 200 ms)

Servo amplifier	Instantaneous maximum output [W]	Tolerance against instantaneous power failure [W] (voltage drop between lines)
MR-J4-10B(-RJ)	350	250
MR-J4-20B(-RJ)	700	420
MR-J4-40B(-RJ)	1400	630
MR-J4-60B(-RJ)	2100	410
MR-J4-70B(-RJ)	2625	1150
MR-J4-100B(-RJ)	3000	1190
MR-J4-200B(-RJ)	5400	2040
MR-J4-350B(-RJ)	10500	2600
MR-J4-500B(-RJ)	15000	4100
MR-J4-700B(-RJ)	21000	5900
MR-J4-11KB(-RJ)	40000	2600
MR-J4-15KB(-RJ)	50000	3500
MR-J4-22KB(-RJ)	56000	4300
MR-J4-60B4(-RJ)	1900	190
MR-J4-100B4(-RJ)	3500	200
MR-J4-200B4(-RJ)	5400	350
MR-J4-350B4(-RJ)	10500	730
MR-J4-500B4(-RJ)	15000	890
MR-J4-700B4(-RJ)	21000	1500
MR-J4-11KB4(-RJ)	40000	2400
MR-J4-15KB4(-RJ)	50000	3200
MR-J4-22KB4(-RJ)	56000	4200

Instantaneous maximum output means power which servo amplifier can output in maximum torque at rated speed. You can examine margins to compare the values of following conditions and instantaneous maximum output.

Even if driving at maximum torque with low speed in actual operation, the motor will not drive with the maximum output. This can be handled as a margin.

The following shows the conditions of tolerance against instantaneous power failure.

1) Delta connection

For the 3-phase (L1/L2/L3) delta connection, an instantaneous power failure occurs in the voltage between a pair of lines (e.g. between L1 and L2) among voltages between three pairs of lines (between L1 and L2, L2 and L3, or L3 and L1).

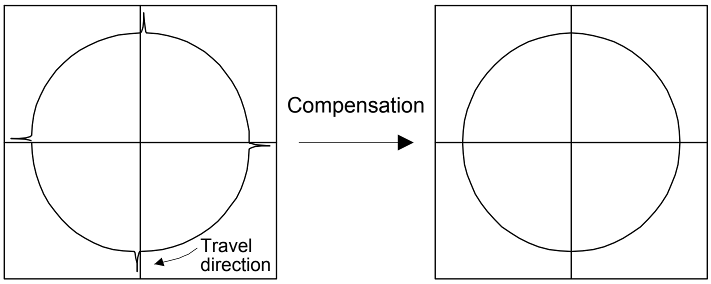
2) Star connection

For the 3-phase (L1/L2/L3/neutral point N) star connection, an instantaneous power failure occurs in the voltage between a pair of lines (e.g. between L1 and N) among voltages at six locations, between three pairs of lines (between L1 and L2, L2 and L3, or L3 and L1) and between one of the lines and the neutral point (between L1 and N, L2 and N, or L3 and N).

(9) Lost motion compensation function

POINT
●The lost motion compensation function is enabled only in the position control mode.

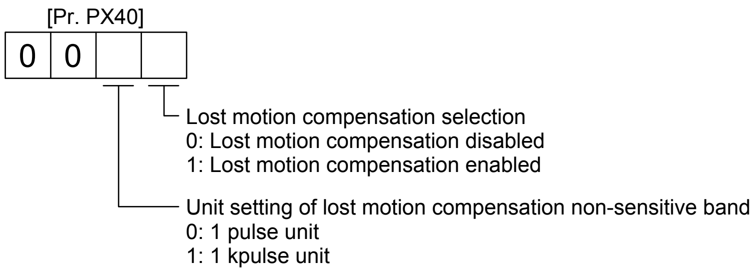
The lost motion compensation function corrects response delays (caused by a non-sensitive band due to friction, twist, expansion, and backlash) caused when the machine travel direction is reversed. This function contributes to improvement for protrusions that occur at a quadrant change and streaks that occur at a quadrant change during circular cutting.
This function is effective when a high follow-up performance is required such as drawing an arc with an X-Y table.



The locus before compensation The locus after compensation

(a) Parameter setting
Setting [Pr. PX36] to [Pr. PX42] enables the lost motion compensation function.

1) Lost motion compensation function selection ([Pr. PX40])
Select the lost motion compensation function.



2) Lost motion compensation ([Pr. PX36]/[Pr. PX37])
Set the same value for the lost motion compensation for each of when the forward rotation switches to the reverse rotation and when the reverse rotation switches to the forward rotation. When the heights of protrusions differ depending on the travel direction, set the different compensation for each travel direction. Set a value twice the usual friction torque and adjust the value while checking protrusions.

3) Torque offset ([Pr. PX39])
For a vertical axis, unbalanced torque occurs due to the gravity. Although setting the torque offset is usually unnecessary, setting unbalanced torque of a machine as a torque offset cancels the unbalanced torque. The torque offset does not need to be set for a machine not generating unbalanced torque.

4) Lost motion compensation timing ([Pr. PX41])
You can set the delay time of the lost motion compensation start timing with this parameter. When a protrusion occurs belatedly, set the lost motion compensation timing corresponding to the protrusion occurrence timing.

5) Lost motion compensation non-sensitive band ([Pr. PX42])
When the travel direction reverses frequently around the zero speed, unnecessary lost motion compensation is triggered by the travel direction switching. By setting the lost motion compensation non-sensitive band, the speed is recognized as 0 when the fluctuation of the droop pulse is the setting value or less.
When the value of this parameter is changed, the compensation timing is changed. Adjust the value of Lost motion compensation timing ([Pr. PX41]).

6) Lost motion filter setting ([Pr. PX38])
Changing the value of this parameter is usually unnecessary. When a value other than 0.0 ms is set in this parameter, the high-pass filter output value of the set time constant is applied to the compensation and lost motion compensation continues.

(b) Adjustment procedure of the lost motion compensation function

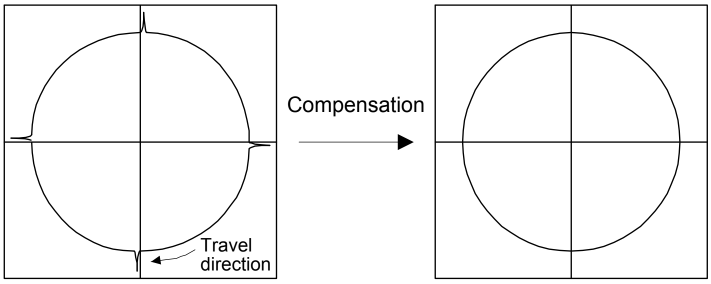
1) Measuring the load current
Measure the load currents during the forward direction feed and reverse direction feed with MR Configurator2.

2) Setting the lost motion compensation
Calculate the friction torque from the measurement result of (9) (b) 1) of this section and set a value twice the friction torque in [Pr. PX36] and [Pr. PX37] as lost motion compensation.

$$\text{Friction torque [\%]} = \frac{|(\text{load current during feed in the forward rotation direction [\%]}) - (\text{load current during feed in the reverse rotation direction [\%]})|}{2}$$

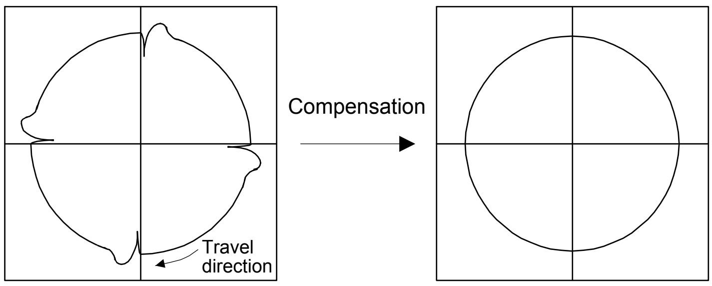
3) Checking protrusions
Drive the servo motor and check that the protrusions are corrected.

4) Adjusting the lost motion compensation
When protrusions still occur, the compensation is insufficient. Increase the lost motion compensation by approximately 0.5% until the protrusions are eliminated. When notches occur, the compensation is excessive. Decrease the lost motion compensation by approximately 0.5% until the notches are eliminated. Different values can be set as the compensation for each of when the forward rotation (CCW) switches to the reverse rotation (CW) and when the reverse rotation (CW) switches to the forward rotation (CCW).



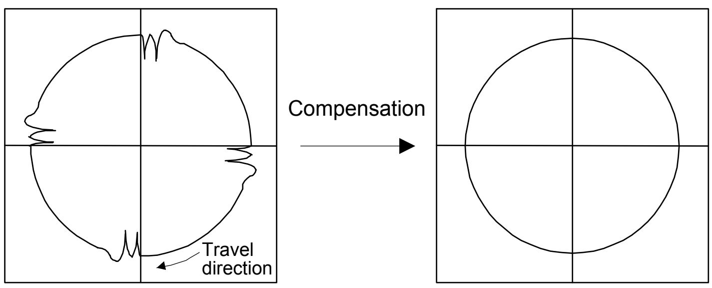
The locus before compensation
The locus after compensation

5) Adjusting the lost motion compensation timing
When the machine has low rigidity, the speed loop gain is set lower than the standard setting value, or the servo motor is rotating at high speed, quadrant projections may occur behind the quadrant change points. In this case, you can suppress the quadrant projections by delaying the lost motion compensation timing with [Pr. PX41 Lost motion compensation timing]. Increase the setting value of [Pr. PX41] from 0 ms (Initial value) by approximately 0.5 ms to adjust the compensation timing.



Before timing delay compensation
After timing delay compensation

6) Adjusting the lost motion compensation non-sensitive band
When the lost motion is compensated twice around a quadrant change point, set [Pr. PX42 Lost motion compensation non-sensitive band]. Increase the setting value so that the lost motion is not compensated twice. Setting [Pr. PX42] may change the compensation timing. Adjust the lost motion compensation timing of (9) (b) 5) of this section.



Before timing delay compensation
After timing delay compensation

4.2 Master-slave operation function

WARNING	●Configure the circuit so that all the master and slave axes for the same machine are stopped by the controller forced stop at the moment of a stop of a master or slave axis due to such as a servo alarm. When they are not stopped simultaneously by the controller forced stop, the servo motor may operate unexpectedly and the machine can be damaged. ●All the master and slave axes for the same machine should turn on/off EM1 (Forced stop 1) simultaneously. When EM1 (Forced stop 1) is not turned on/off simultaneously, the servo motor may operate unexpectedly and the machine can be damaged.

POINT

- ●The master-slave operation function works only when the forced stop deceleration function is disabled. When the forced stop deceleration function is enabled, [AL. 37] will occur.
- ●The master-slave operation function cannot be used with the continuous operation to torque control.
- ●Use the master-slave operation function with the following controllers. Refer to the manuals for each servo system controller for compatible software versions, and other details.
  RD77MS/QD77MS_/LD77MS_
  R_MTCPU/Q17_DSCPU
  Q170MSCPU
- ●When the function is used in vertical axis system, set the same value to the parameters regarding the dynamic brake and electromagnetic brake to prevent a drop of axes.
- ●The servo-on command of the master axis and slave axis should be turned on/off simultaneously. If the servo-on command is turned on only for a slave axis, torque will not be generated. Therefore, an extreme load will be applied to the electromagnetic brake of the master axis for using in vertical axis system.
- ●The master-slave operation function is available for servo amplifier with software version A8 or later. All servo amplifiers used in the same system connected to a controller should be software version A8 or later.

(1) Summary

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.
Transmission of torque data from the master axis to slave axes is via SSCNET III/H. Additional wiring is not required.

(2) System configuration

POINT

- The control modes compatible with the master-slave operation function are as follows.

Master-slave operation function compatibility table

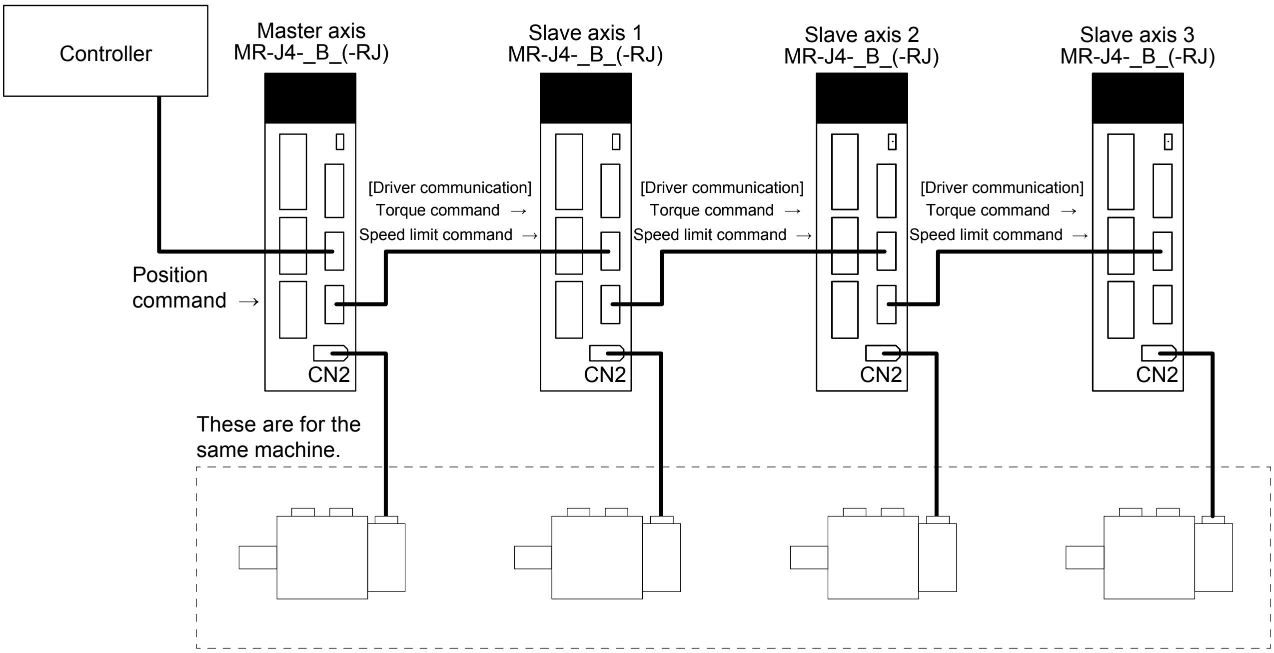
Control mode	Forced stop deceleration function	Master axis (Note)	Slave axis (Note)
Standard control mode	Enabled		
	Disabled	○	○

○: Available

Note When a setting for the master-slave operation is set to an axis which is not compatible with the master-slave operation function, [AL. 37] will occur.

- The master axis and slave axis are recommended to use for a linked condition on a mechanical constitution. When they are not linked, they can reach a speed limit level. Doing so may cause [AL. 31 Overspeed].
- The slave axes use the control command from the master axis. Therefore, the controller mainly controls parameter settings, servo-on command, acquisition of monitor information from a servo amplifier, etc. The commands regarding absolute positioning such as setting absolute position detection and requiring home position setting from the controller to slave axes must not be made.
- Configure the circuit so that all the master and slave axes are stopped at the moment of a stop of a master or slave axis due to such as a servo alarm.
- When the STO signal of a servo amplifier is used, the master axis and slave axis should be turned off simultaneously.

Eight master axes can be set at most per one system of SSCNET III/H. The maximum number of slave axes to each master axis is not limited. However, the total number of the master and slave axes should be the maximum number of the servo amplifiers at most. In addition, when an SSCNET III/H communication shut-off occurs due to malfunction of a servo amplifier, the malfunctioning axis and later axis cannot be communicated. Therefore, the first amplifier from the controller via SSCNET III/H cable should be master axis.



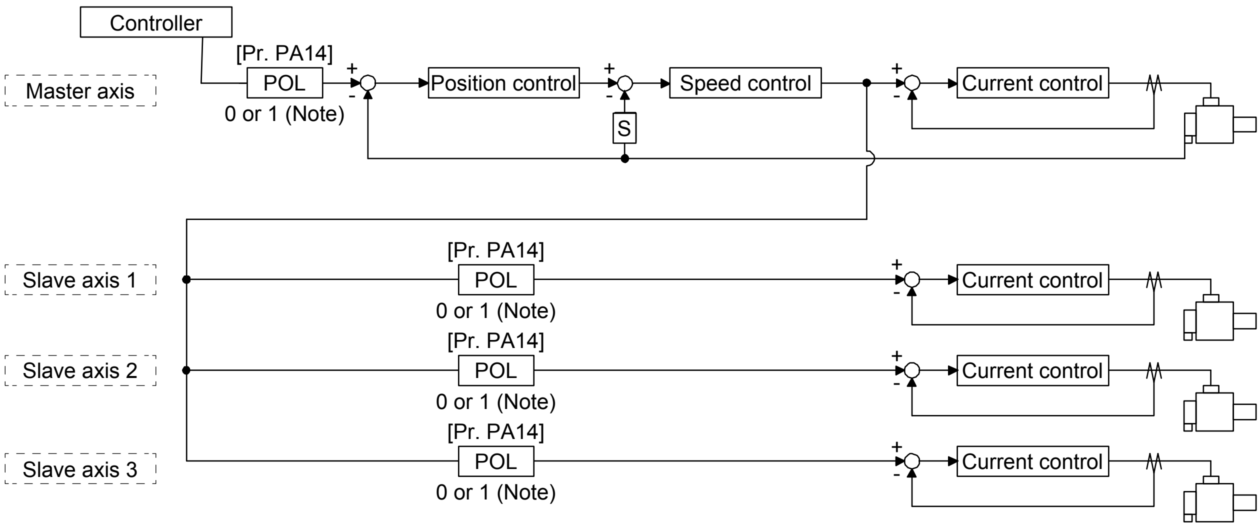
(3) Parameter setting for the master-slave operation function
To use the master-slave operation function, the following parameter settings are necessary. For details of the parameters, refer to section 3.6.3.

No.	Name	Initial value	Setting value		Setting
			Master axis	Slave axis	
PA04	Forced stop deceleration function selection	2000	0 _ _ _	0 _ _ _	Used to disable the forced stop deceleration function.
PA14	Rotation direction selection/travel direction selection	0	Refer to section 3.6.3.		Used to set a torque generation direction.
PD15 (Note)	Driver communication setting	0000	0001	0010	Master and slave setting
PD16 (Note)	Driver communication setting - Master - Transmit data selection 1	0000	0038	0000	Communication data from master to slave ・Torque command ・Speed limit value
PD17 (Note)	Driver communication setting - Master - Transmit data selection 2	0000	003A	0000	
PD20 (Note)	Master axis No. selection 1 for slave	0	0	Master axis No.	Master axis No. of transmitting data
PD30	Master-slave operation - Torque command coefficient on slave	0	0	Refer to section 3.6.3.	Ratio of torque command of slave axis, ratio of speed limit value, and setting of speed limit minimum value
PD31	Master-slave operation - Speed limit coefficient on slave	0	0		
PD32	Master-slave operation - Speed limit adjusted value on slave	0	0		

Note Always set this with servo parameters of the controller. Incorrect setting will prevent a normal SSCNET III/H communication.

(4) Rotation direction setting

Rotation directions can be different among a controller command, master axis, and slave axes. To align the directions, set [Pr. PA14] referring to (4) of this section. Not doing so can cause such as an overload due to a reverse direction torque against machine system rotation direction.



Note Setting "1" will reverse the polarity.

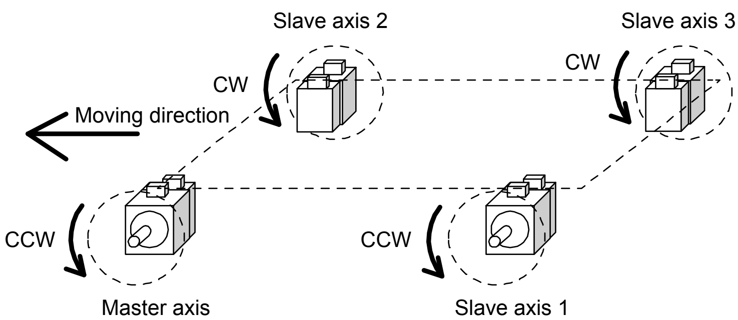
Fig. 3.3 Rotation direction setting of master and slave axes with torque command method for an example of one master axis and three slave axes

Table 3.15 Rotation direction setting parameter

No.	Symbol	Name and function
PA14	*POL	Rotation direction selection 1. For master axis Select a servo motor rotation direction of master axis to SSCNET controller command. 0: Servo motor CCW rotation in positioning address increase direction 1: Servo motor CW rotation in positioning address increase direction 2. For slave axis Select servo motor rotation direction to a command from master axis. 0: Torque command polarity from master axis 1: Reverse of torque command polarity from master axis

The following shows a setting example of rotation direction for a platform truck with one master axis and three slave axes.

To set a rotation direction of the servo motor according to the moving direction, set the torque command polarity to the slave axis 1 the same as that to the master axis, and set the opposite polarity to the slave axis 2 and slave axis 3 from the master axis.



[Pr. PA14] setting

Axis	[Pr. PA14]
Master axis	0
Slave axis 1	0
Slave axis 2	1
Slave axis 3	1

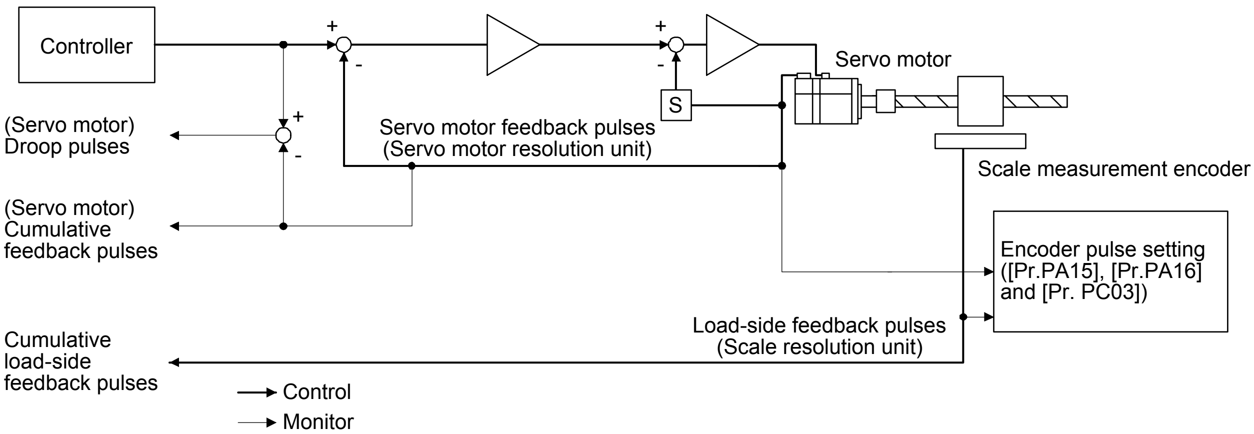
4.3 Scale measurement function

The scale measurement function transmits position information of a scale measurement encoder to the controller by connecting the scale measurement encoder in semi closed loop control.

> **POINT**
>
> ● The scale measurement function is available for the servo amplifiers of software version A8 or later.
>
> ● When the scale measurement function is used for MR-J4-_B_ servo amplifiers, the following restrictions apply. However, these restrictions will not be applied for MR-J4-_B_-RJ servo amplifiers.
> - A/B/Z-phase differential output type encoder cannot be used.
> - The scale measurement encoder and servo motor encoder are compatible with only the two-wire type. The four-wire type scale measurement encoder and servo motor encoder cannot be used.
> - When you use the HG-KR and HG-MR series for driving and scale measurement encoder, the optional four-wire type encoder cables (MR-EKCBL30M-L, MR-EKCBL30M-H, MR-EKCBL40M-H, and MR-EKCBL50M-H) cannot be used. When an encoder cable of 30 m to 50 m is needed, fabricate a two-wire type encoder cable according to MR-J4-_B_ Servo Amplifier Instruction Manual.
>
> ● The scale measurement function compatible servo amplifier can be used with any of the following controllers.
> - Motion controller R_MTCPU/Q17_DSCPU
> - Simple motion module RD77MS/QD77MS_/LD77MS_
>
> For settings and restrictions of controllers compatible with the scale measurement function, refer to user's manuals for each controller.

4.3.1 Functions and configuration

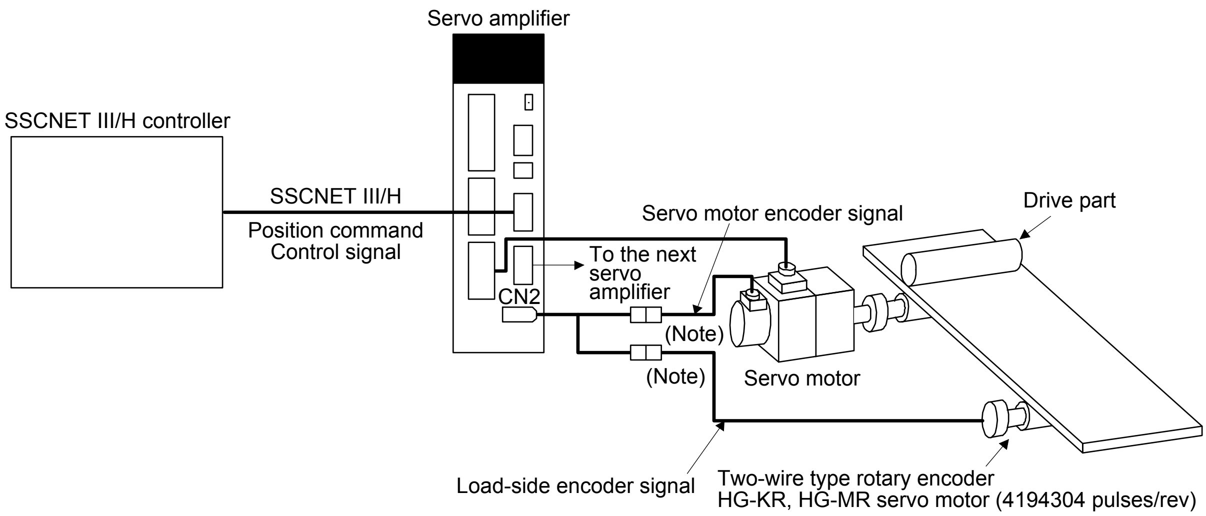
(1) Function block diagram
The following shows a block diagram of the scale measurement function. The control will be performed per servo motor encoder unit for the scale measurement function.



(2) System configuration

(a) For a rotary encoder

1) MR-J4-_B_ servo amplifier



Note Use a two-wire type encoder cable. A four-wire type linear encoder cable cannot be used.

4.3.2 Scale measurement encoder

POINT
●Always use the scale measurement encoder cable introduced in this section. Using other products may cause a malfunction. ●For details of the scale measurement encoder specifications, performance and assurance, contact each encoder manufacturer.

When a rotary encoder is used, an absolute position detection system can be configured by installing the encoder battery to the servo amplifier. In this case, the battery life will be shorter because the power consumption is increased as the power is supplied to the two encoders of motor side and load side.

(1) Rotary encoder
When a rotary encoder is used as a scale measurement encoder, use the following servo motor or synchronous encoder as the encoder.

Servo motor and synchronous encoder that can be used as encoder

	HG-KR	HG-MR	Synchronous encoder Q171ENC-W8
MR-J4-_B_	○	○	
MR-J4-_B_-RJ	○	○	○

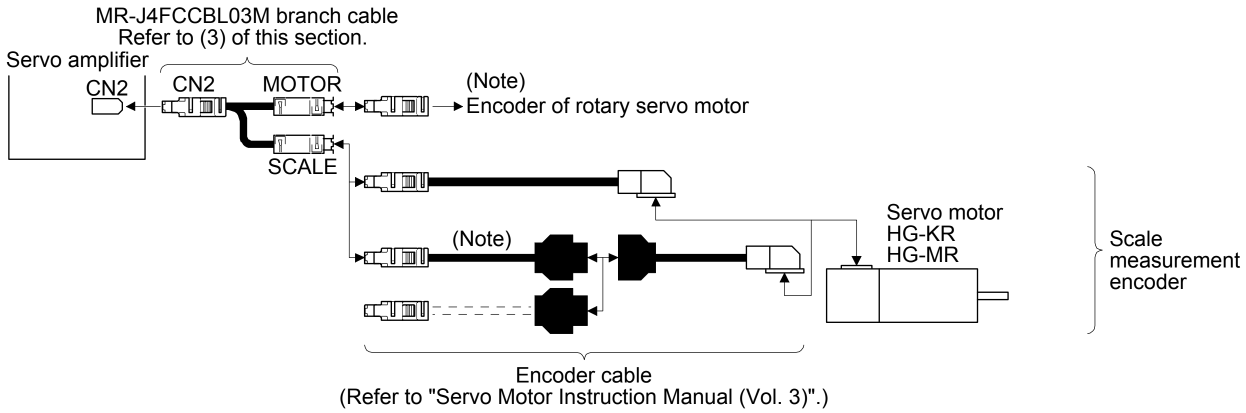
○: Available

Use a two-wire type encoder cable for MR-J4-_B_ servo amplifiers. Do not use MR-EKCBL30M-L, MR-EKCBL30M-H, MR-EKCBL40M-H, or MR-EKCBL50M-H as they are four-wire type.
When an encoder cable of 30 m to 50 m is needed, fabricate a two-wire type encoder cable according to MR-J4-_B_ Servo Amplifier Instruction Manual.

(2) Configuration diagram of encoder cable
Configuration diagram for servo amplifier and scale measurement encoder is shown below. Cables vary depending on the scale measurement encoder.

(a) Rotary encoder
Refer to "Servo Motor Instruction Manual (Vol. 3)" for encoder cables for rotary encoders.

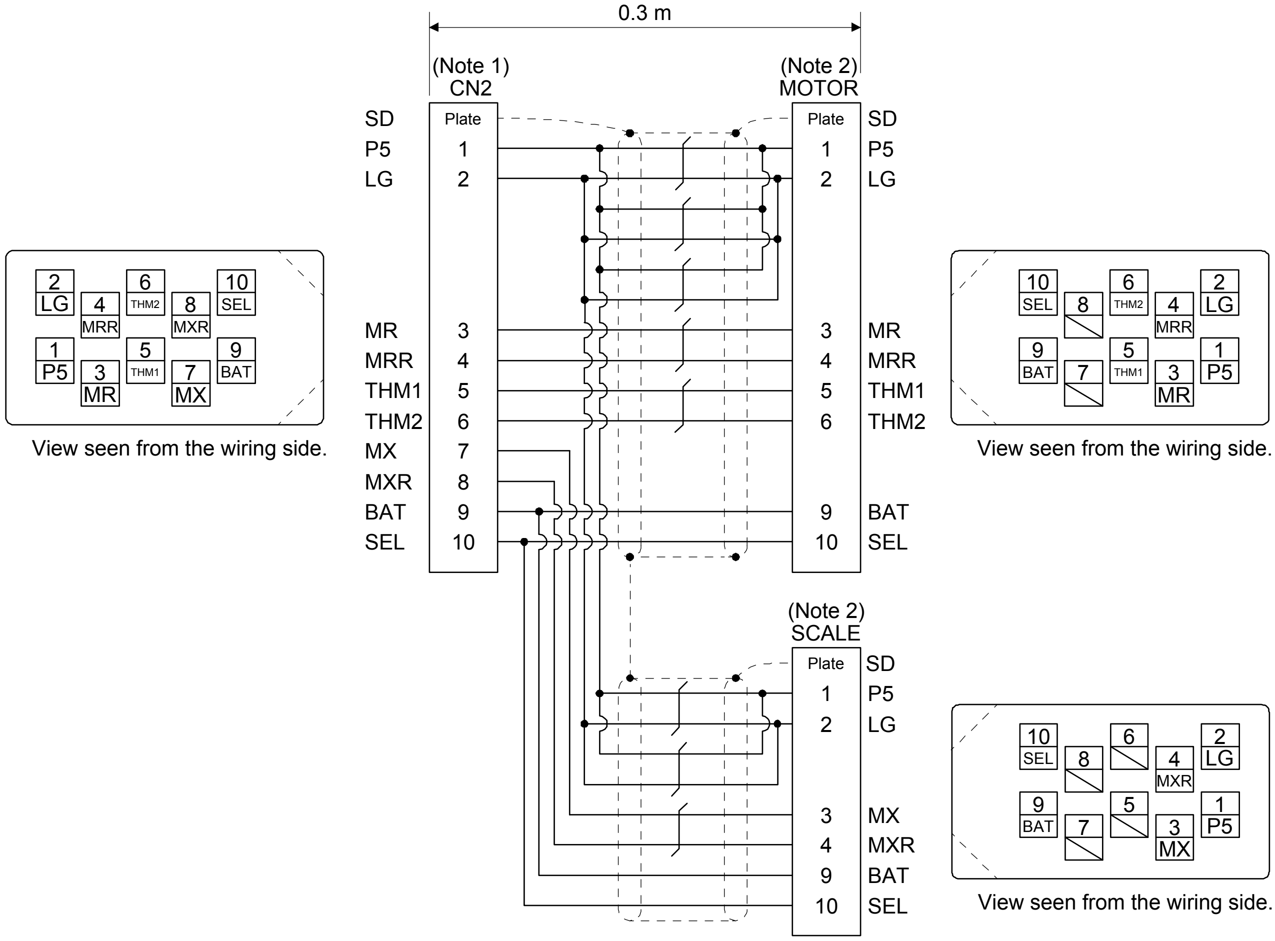
1) MR-J4-_B_ servo amplifier



Note Use a two-wire type encoder cable. A four-wire type linear encoder cable cannot be used.

(3) MR-J4FCCBL03M branch cable

Use MR-J4FCCBL03M branch cable to connect the scale measurement encoder to CN2 connector. When fabricating the branch cable using MR-J3THMCN2 connector set, refer to "Linear Encoder Instruction Manual".



Note 1. Receptacle: 36210-0100PL, shell kit: 36310-3200-008 (3M)

2. Plug: 36110-3000FD, shell kit: 36310-F200-008 (3M)

4.3.3 How to use scale measurement function

(1) Selection of scale measurement function
The scale measurement function is set with the combination of basic setting parameters [Pr. PA01] and [Pr. PA22].

(a) Operation mode selection
The scale measurement function can be used during semi closed loop system (standard control mode). Set [Pr. PA01] to "_ _ 0 _".

[Pr. PA01]

1	0		0

Operation mode selection

Setting value	Operation mode	Control unit
0	Semi closed loop system (Standard control mode)	Servo motor-side resolution unit

(b) Scale measurement function selection
Select the scale measurement function. Select "1 _ _ _" (Used in absolute position detection system) or "2 _ _ _" (Used in incremental system) according to the encoder you use.

[Pr. PA22]

	0	0	0

Scale measurement function selection
0: Disabled
1: Used in absolute position detection system
2: Used in incremental system

(2) Selection of scale measurement encoder communication method and polarity.
For MR-J4-_B_-RJ servo amplifiers, set the following "Load-side encoder communication method selection" of [Pr. PC26] as necessary.
The communication method differs depending on the scale measurement encoder type. Select "Four-wire type" because there is only four-wire type for synchronous encoder.
Select the cable to be connected to CN2L connector in [Pr. PC26].

[Pr. PC26]

	0	0	0

Load-side encoder cable communication method selection
0: Two-wire type
1: Four-wire type
When using a load-side encoder of A/B/Z-phase differential output method, set "0".
Incorrect setting will trigger [AL. 70] and [AL. 71].
Setting "1" while using an MR-J4-_B_ servo amplifier will trigger [AL. 37].

Select a polarity of the scale measurement encoder with the following "Encoder pulse count polarity selection" and "Selection of A/B/Z-phase input interface encoder Z-phase connection judgement function" of [Pr. PC27] as necessary.

POINT
●"Encoder pulse count polarity selection" in [Pr. PC27] is not related to [Pr. PA14 Rotation direction selection]. Make sure to set the parameter according to the relationships between servo motor and linear encoder/rotary encoder.

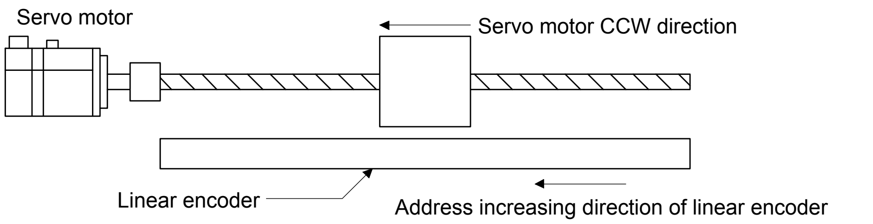
(a) Parameter setting method

1) Select an encoder pulse count polarity.
This parameter is used to set the load-side encoder polarity to be connected to CN2L connector in order to match the CCW direction of servo motor and the increasing direction of load-side encoder feedback. Set this as necessary.

[Pr. PC27]

0	0	0	

Encoder pulse count polarity selection
0: Load-side encoder pulse increasing direction in the servo motor CCW
1: Load-side encoder pulse decreasing direction in the servo motor CCW



2) A/B/Z-phase input interface encoder Z-phase connection judgement function
This function can trigger an alarm by detecting non-signal for Z phase.
The Z-phase connection judgement function is enabled by default. To disable the Z-phase connection judgement function, set [Pr. PC27].

[Pr. PC27]

0		0	0

Selection of A/B/Z-phase input interface encoder Z-phase connection judgement function
0: Enabled
1: Disabled

(b) How to confirm the scale measurement encoder feedback direction
You can confirm the directions of the cumulative feedback pulses of servo motor encoder and the load-side cumulative feedback pulses are matched by moving the device (scale measurement encoder) manually in the servo-off status. If mismatched, reverse the polarity.

(3) Confirmation of scale measurement encoder position data
Check the scale measurement encoder mounting and parameter settings for any problems.
Operate the device (scale measurement encoder) to check the data of the scale measurement encoder is renewed correctly. If the data is not renewed correctly, check the wiring and parameter settings.
Change the scale polarity as necessary.

Part 4
Common Reference Material

Part 4: Common Reference Material

1. SPECIFICATION DIFFERENCES

1.1 Detailed Specification/Function Differences

(1) Comparison of MR-J3 series and MR-J4 series (A/B-Type)

Item		MR-J3 series	MR-J4 series
1	Capacity range	(100 V class) 0.1 kW to 0.4 kW (200 V class) 0.1 kW to 22 kW (400 V class) 0.6 kW to 22 kW	(100 V class) 0.1 kW to 0.4 kW (200 V class) 0.1 kW to 22 kW (400 V class) 0.6 kW to 22 kW
2	Regenerative resistor	Built-in (0.2 kW to 7 kW) External (11 kW to 22 kW)	Built-in (0.2 kW to 7 kW) External (11 kW to 22 kW)
3	Dynamic brake	Built-in (0.1 kW to 7 kW) External (11 kW to 22 kW)	Built-in (0.1 kW to 7 kW) External (11 kW to 22 kW) **Coasting distance is different. (Note1)**
4	Control circuit power	(100 V class) 1-phase 100V AC to 120V AC (200 V class) 1-phase 200V AC to 230V AC (400 V class) 24VDC (up to 7 kW) 1-phase 380V AC to 480V AC (11 kW to 55 kW)	(100 V class) 1-phase 100V AC to 120V AC (200 V class) 1-phase 200V AC to **240V AC** (400 V class) 1-phase 380V AC to 480V AC
5	Main circuit power	(100 V class) 1-phase 100V AC to 120V AC (200 V class) 1-phase 230V AC 3-phase 200V AC to 230V AC (0.1 kW to 750 W) 3-phase 200V AC to 230V AC (0.1 kW to 37 kW) (400 V class) 3-phase 380V AC to 480V AC	(100 V class) 1-phase 100V AC to 120V AC (200 V class) 1-phase 200V AC to **240V AC** (0.1 kW to **2 kW**) 3-phase 200V AC to **240V AC** (0.1 kW to 22 kW) (400 V class) 3-phase 380V AC to 480V AC
6	24 V DC power	External supply required	External supply required
7	Auto tuning	Real-time auto tuning: 32 steps Advanced gain search	Real-time auto tuning: **40 steps** **One-touch tuning**
8	Control mode	(A) General-Purpose Interface ・Position control mode (pulse command) ・Speed control mode (analog command) ・Torque control mode (analog command) (B) SSCNET III Interface (50 Mbps) ・Position control mode ・Speed control mode	(A) General-Purpose Interface ・Position control mode (pulse command) ・Speed control mode (analog command) ・Torque control mode (analog command) (B) **SSCNET III**/H Interface **(150 Mbps)** ・Position control mode ・Speed control mode **・Torque control mode** **< J3 compatibility mode >** (B) SSCNET III Interface (50 Mbps) ・Position control mode ・Speed control mode
9	Maximum input pulses (A-Type)	Differential pulse: 1 Mpps Command pulse: Sink	Differential pulse: **4** Mpps Command pulse: Sink
10	The number of DIO points (excluding EM1)	(A) General-Purpose Interface DI: 9 points, DO: 6 points (B) SSCNET III Interface DI: 3 points, DO: 3 points	(A) General-Purpose Interface DI: 9 points, DO: 6 points (B) SSCNET III Interface DI: 3 points, DO: 3 points
11	Encoder pulse output	ABZ-phase (differential) (A) General-Purpose Interface Z-phase (open collector)	ABZ-phase (differential) (A) General-Purpose Interface Z-phase (open collector)
12	DIO interface	input/output: sink/source	input/output: sink/source
13	Analog input/output	(A) General-Purpose Interface (Input) 2ch 10-bit torque, 14-bit speed or equivalent (Output) 10-bit or equivalent × 2ch (B) SSCNET III Interface (Output) 10-bit or equivalent × 2ch	(A) General-Purpose Interface (Input) 2ch 10-bit torque, 14-bit speed or equivalent (Output) 10-bit or equivalent × 2ch (B) SSCNET III Interface (Output) 10-bit or equivalent × 2ch

Note 1. For the coasting distance, refer to "1.2.3 Dynamic brake: coasting distance" in "Part 4 Common Reference Material".

Item		MR-J3 series	MR-J4 series
14	Number of internal speed commands (A-Type)	7 points	7 points
15	Parameter setting method	MR Configurator (SETUP221) MR Configurator2 Push button (A-Type)	MR Configurator2 Push button (A-Type)
16	Setup software communication function	USB	USB
17	Servo motor (Encoder resolution)	HF-_P series (18-bit ABS) HA-_P series (18-bit ABS)	HG series (**22**-bit ABS)
18	Motor maximum torque	HF-KP 350%	HG-KR 350%
		HF-MP 300%	HG-MR 300%
		HF-SP 300%	HG-SR 300%
		HF-JP 300%	HG-JR 300%
		HA-LP 250%	**HG-JR 300%**
19	Button (A-Type)	4 buttons	4 buttons
20	LED display	(A-Type) 7-segment 5-digit (B-Type) 7-segment 3-digit	(A-Type) 7-segment 5-digit (B-Type) 7-segment 3-digit
21	Advanced vibration suppression control	Provided	Provided **(II 3 inertia vibration suppression)**
22	Adaptive filter II	Provided	Provided

1.2 Servo amplifier

1.2.1 Main circuit terminal block

Series	Main circuit terminal block	Series	Main circuit terminal block
MR-J3-10_ to MR-J3-60_	CNP1: L_1, —, L_2, N, P_1, P_2 / CNP1: L_1, L_2, L_3, N, P_1, P_2 CNP2: P, C, D, L_{11}, L_{21} / CNP2: P, C, D, L_{11}, L_{21} CNP3: U, V, W / CNP3: U, V, W PE terminal Screw size: M4 Tightening torque: 1.2 [N•m] (10.6 [lb•in])	MR-J4-10_ to MR-J4-60_	CNP1: L1, L2, L3, N-, P, P CNP2: P+, C, D, L11, L21 CNP3: U, V, W PE Screw size: M4 Tightening torque: 1.2 [N•m]
MR-J3-70_, MR-J3-100_	CNP1: L_1, L_2, L_3, N, P_1, P_2 CNP2: P, C, D, L_{11}, L_{21} CNP3: U, V, W PE terminal Screw size: M4 Tightening torque: 1.2 [N•m] (10.6 [lb•in])	MR-J4-70_, MR-J4-100_	CNP1: L1, L2, L3, N-, P, P CNP2: P+, C, D, L11, L21 CNP3: U, V, W PE Screw size: M4 Tightening torque: 1.2 [N•m]
MR-J3-200_N, /-200_(-RT)	CNP: L_1, L_2, L_3, N-, —, P_1, P_2 / CNP: L_1, L_2, L_3, N, P_1, P_2 CNP: P+, C, D, L_{11}, L_{21} / CNP: U, V, W CNP: U, V, W / CNP: P, C, D, L_{11}, L_{21} PE terminal Screw size: M4 Tightening torque: 1.2 [N•m] (10.6 [lb•in])	MR-J4-200_	CNP1: L1, L2, L3, N-, P, P CNP2: P+, C, D, L11, L21 CNP3: U, V, W PE Screw size: M4 Tightening torque: 1.2 [N•m]
MR-J3-350_	CNP1: L_1, L_2, L_3, N, P_1, P_2 CNP3: U, V, W CNP2: P, C, D, L_{11}, L_{21} PE terminal Screw size: M4 Tightening torque: 1.2 [N•m] (10.6 [lb•in])	MR-J4-350_	CNP1: L1, L2, L3, N-, P, P CNP2: P+, C, D, L11, L21 CNP3: U, V, W PE Screw size: M4 Tightening torque: 1.2 [N•m]

<table>
<tr><th>Series</th><th>Main circuit terminal block</th><th>Series</th><th>Main circuit terminal block</th></tr>
<tr>
<td>MR-J3-500_</td>
<td>TE1
L_1 L_2 L_3 P C U V W
Terminal screw: M4
Tightening torque: 1.2[N•m]
(10.6 [lb•in])
TE2
L_{11} L_{21}
Terminal screw: M3.5(Note)
Tightening torque: 0.8[N•m]
(7.08 [lb•in])
TE3
N P_1 P_2
Terminal screw: M4
Tightening torque: 1.2[N•m]
(10.6 [lb•in])
PE terminal
Terminal screw: M4
Tightening torque: 1.2[N•m]
(10.6 [lb•in])
Built-in regenerative resistor lead terminal fixing screw</td>
<td>MR-J4-500_</td>
<td>TE2: L11 L21
TE1: L1 L2 L3 N-
TE3: P3 P4 P+ C
TE4: D U V W
PE
TE Screw size: M3.5
Tightening torque: 0.8 [N•m]
TE Screw size: M4
Tightening torque: 1.2 [N•m]
TE Screw size: M4
Tightening torque: 1.2 [N•m]
TE Screw size: M4
Tightening torque: 1.2 [N•m]
PE Screw size: M4
Tightening torque: 1.2 [N•m]</td>
</tr>
<tr>
<td>MR-J3-700_</td>
<td>TE1
L_1 L_2 L_3 P C U V W
Terminal screw: M4
Tightening torque: 1.2 [N•m]
(10.6 [lb•in])
TE2
L_{11} L_{21}
Terminal screw: M3.5 (Note)
Tightening torque: 0.8 [N•m]
(7.08 [lb•in])
TE3
N P_1 P_2
Terminal screw: M4
Tightening torque: 1.2 [N•m]
(10.6 [lb•in])
PE terminal
Terminal screw: M4
Tightening torque: 1.2 [N•m]
(10.6 [lb•in])
Built-in regenerative resistor lead terminal fixing screw</td>
<td>MR-J4-700_</td>
<td>TE3: N- P3 P4
TE1: L1 L2 L3 P+ C U V W
TE2: L11 L21
PE
TE Screw size: M4
Tightening torque: 1.2 [N•m]
TE Screw size: M4
Tightening torque: 1.2 [N•m]
TE Screw size: M3.5
Tightening torque: 0.8 [N•m]
PE Screw size: M4
Tightening torque: 1.2 [N•m]</td>
</tr>
<tr>
<td>MR-J3-11K_
(-LR)
MR-J3-15K_
(-LR)</td>
<td>TE
L_1 L_2 L_3 L_{11} L_{21} U V W
P_1 P C N ⏚ ⏚ ⏚
<table>
<tr><th></th><th></th><th>L_1・L_2・L_3・U・V・W
P_1・P・C・N・⏚</th><th>L_{11}・L_{21}</th></tr>
<tr><td>MR-J3-11KA(4)
MR-J3-15KA(4)</td><td>Screw size</td><td>M6</td><td>M4</td></tr>
<tr><td></td><td>Tightening torque [(lb:in)][N•m]</td><td>3.0</td><td>1.2</td></tr>
<tr><td>MR-J3-22KA(4)</td><td>Screw size</td><td>M8</td><td>M4</td></tr>
<tr><td></td><td>Tightening torque [(lb:in)][N•m]</td><td>6.0</td><td>1.2</td></tr>
</table></td>
<td>MR-J4-11K_
MR-J4-15K_</td>
<td>TE1-1: L1 L2 L3 U V W
TE1-2: P3 P4 P+ C N-
TE2: L11 L21
PE
TE1-1 Screw size: M6
Tightening torque: 3.0 [N•m]
TE1-2 Screw size: M6
Tightening torque: 3.0 [N•m]
TE Screw size: M4
Tightening torque: 1.2 [N•m]
PE Screw size: M6
Tightening torque: 3.0 [N•m]</td>
</tr>
<tr>
<td>MR-J3-22K_</td>
<td>TE
L_1 L_2 L_3 L_{11} L_{21} U V W
P_1 P C N ⏚ ⏚ ⏚
<table>
<tr><th></th><th></th><th>L_1・L_2・L_3・U・V・W
P_1・P・C・N・⏚</th><th>L_{11}・L_{21}</th></tr>
<tr><td>MR-J3-11KA(4)
MR-J3-15KA(4)</td><td>Screw size</td><td>M6</td><td>M4</td></tr>
<tr><td></td><td>Tightening torque [(lb:in)][N•m]</td><td>3.0</td><td>1.2</td></tr>
<tr><td>MR-J3-22KA(4)</td><td>Screw size</td><td>M8</td><td>M4</td></tr>
<tr><td></td><td>Tightening torque [(lb:in)][N•m]</td><td>6.0</td><td>1.2</td></tr>
</table></td>
<td>MR-J4-22K_</td>
<td>TE1-1: L1 L2 L3 U V W
TE1-2: P3 P4 P+ C N-
PE
TE2: L11 L21
TE1-1 Screw size: M8
Tightening torque: 6.0 [N•m]
TE1-2 Screw size: M8
Tightening torque: 6.0 [N•m]
TE Screw size: M4
Tightening torque: 1.2 [N•m]
PE Screw size: M8
Tightening torque: 6.0 [N•m]</td>
</tr>
</table>

Note Screw size is M3.5 for the control circuit terminal block (TE2) of the servo amplifier manufactured in April 2007 or later. Screw size is M3 for the control terminal block (TE2) of the servo amplifier manufactured in March 2007 or earlier.

Series	Main circuit terminal block	Series	Main circuit terminal block
MR-J3-60_4 to MR-J3-200_4	CNP1: L_1 / L_2 / L_3 / N− / (blank) / P_1 / P_2 CNP2: P+ / C / D / L_{11} / L_{21} CNP3: U / V / W PE terminal Screw size: M4 Tightening torque: 1.2 [N•m] (10.6 [lb•in])	MR-J4-60_4 to MR-J4-200_4	CNP1: N- / L1 / L2 / L3 / P3 / P4 CNP2: P+ / C / D / L_{11} / L_{21} CNP3: U / V / W PE Screw size: M4 Tightening torque: 1.2 [N•m]
MR-J3-350_4	TE1: L_1 / L_2 / L_3 / P / C / U / V / W — Terminal screw: M4, Tightening torque: 1.2 [N•m] (10.6 [lb•in]) TE2: L_{11} / L_{21} — Terminal screw: M3.5 (Note), Tightening torque: 0.8 [N•m] (7.08 [lb•in]) TE3: N / P_1 / P_2 — Terminal screw: M4, Tightening torque: 1.2 [N•m] (10.6 [lb•in]) PE terminal — Terminal screw: M4, Tightening torque: 1.2 [N•m] (10.6 [lb•in]) Built-in regenerative resistor lead terminal fixing screw	MR-J4-350_4	CNP1: N- / L1 / L2 / L3 / P3 / P4 CNP2: P+ / C / D / L_{11} / L_{21} CNP3: U / V / W PE Screw size: M4 Tightening torque: 1.2 [N•m]
MR-J3-500_4	TE1: L_1 / L_2 / L_3 / P / C / U / V / W — Terminal screw: M4, Tightening torque: 1.2 [N•m] (10.6 [lb•in]) TE2: L_{11} / L_{21} — Terminal screw: M3.5 (Note), Tightening torque: 0.8 [N•m] (7.08 [lb•in]) TE3: N / P_1 / P_2 — Terminal screw: M4, Tightening torque: 1.2 [N•m] (10.6 [lb•in]) PE terminal — Terminal screw: M4, Tightening torque: 1.2 [N•m] (10.6 [lb•in]) Built-in regenerative resistor lead terminal fixing screw	MR-J4-500_4	TE2: L_{11} / L_{21} TE3: N- / P3 / P4 TE1: L1 / L2 / L3 / P+ / C / U / V / W PE TE Screw size: M3.5, Tightening torque: 0.8 [N•m] TE Screw size: M4, Tightening torque: 1.2 [N•m] TE Screw size: M4, Tightening torque: 1.2 [N•m] PE Screw size: M4, Tightening torque: 1.2 [N•m]
MR-J3-700_4	TE1: L_1 / L_2 / L_3 / P / C / U / V / W — Terminal screw: M4, Tightening torque: 1.2 [N•m] (10.6 [lb•in]) TE2: L_{11} / L_{21} — Terminal screw: M3.5 (Note), Tightening torque: 0.8 [N•m] (7.08 [lb•in]) TE3: N / P_1 / P_2 — Terminal screw: M4, Tightening torque: 1.2 [N•m] (10.6 [lb•in]) PE terminal — Terminal screw: M4, Tightening torque: 1.2 [N•m] (10.6 [lb•in]) Built-in regenerative resistor lead terminal fixing screw	MR-J4-700_4	TE3: N- / P3 / P4 TE1: L1 / L2 / L3 / P+ / C / U / V / W TE2: L_{11} / L_{21} PE TE Screw size: M4, Tightening torque: 1.2 [N•m] TE Screw size: M4, Tightening torque: 1.2 [N•m] TE Screw size: M3.5, Tightening torque: 0.8 [N•m] PE Screw size: M4, Tightening torque: 0.8 [N•m]

Note Screw size is M3.5 for the control circuit terminal block (TE2) of the servo amplifier manufactured in April 2007 or later. Screw size is M3 for the control terminal block (TE2) of the servo amplifier manufactured in March 2007 or earlier.

<table>
<tr><th>Series</th><th>Main circuit terminal block</th><th>Series</th><th>Main circuit terminal block</th></tr>
<tr>
<td>MR-J3-11K_4 (-LR),
MR-J3-15K_4 (-LR)</td>
<td>TE
<table>
<tr><td>L_1</td><td>L_2</td><td>L_3</td><td>L_{11} L_{21}</td><td>U</td><td>V</td><td>W</td></tr>
<tr><td>P_1</td><td>P</td><td>C</td><td>N</td><td>⏚</td><td>⏚</td><td>⏚</td></tr>
</table>
<table>
<tr><td colspan="2"></td><td>L_1 • L_2 • L_3 • U • V • W
P_1 • P • C • N • ⏚</td><td>L_{11} • L_{21}</td></tr>
<tr><td rowspan="2">MR-J3-11KA(4)
MR-J3-15KA(4)</td><td>Screw size</td><td>M6</td><td>M4</td></tr>
<tr><td>Tightening torque [(lb:in)][N• m]</td><td>3.0</td><td>1.2</td></tr>
<tr><td rowspan="2">MR-J3-22KA(4)</td><td>Screw size</td><td>M8</td><td>M4</td></tr>
<tr><td>Tightening torque [(lb:in)][N• m]</td><td>6.0</td><td>1.2</td></tr>
</table>
</td>
<td>MR-J4-11K_4,
MR-J4-15K_4</td>
<td>TE1-1
L1 L2 L3 U V W

TE1-2
P3 P4 P+ C N-

TE2
L11 L21

PE
⏚ ⏚

TE1-1 Screw size: M6
Tightening torque: 3.0 [N•m]
TE1-2 Screw size: M6
Tightening torque: 3.0 [N•m]
TE Screw size: M4
Tightening torque: 1.2 [N•m]
PE Screw size: M6
Tightening torque: 3.0 [N•m]</td>
</tr>
<tr>
<td>MR-J3-22K_4</td>
<td>TE
<table>
<tr><td>L_1</td><td>L_2</td><td>L_3</td><td>L_{11} L_{21}</td><td>U</td><td>V</td><td>W</td></tr>
<tr><td>P_1</td><td>P</td><td>C</td><td>N</td><td>⏚</td><td>⏚</td><td>⏚</td></tr>
</table>
<table>
<tr><td colspan="2"></td><td>L_1 • L_2 • L_3 • U • V • W
P_1 • P • C • N • ⏚</td><td>L_{11} • L_{21}</td></tr>
<tr><td rowspan="2">MR-J3-11KA(4)
MR-J3-15KA(4)</td><td>Screw size</td><td>M6</td><td>M4</td></tr>
<tr><td>Tightening torque [(lb:in)][N• m]</td><td>3.0</td><td>1.2</td></tr>
<tr><td rowspan="2">MR-J3-22KA(4)</td><td>Screw size</td><td>M8</td><td>M4</td></tr>
<tr><td>Tightening torque [(lb:in)][N• m]</td><td>6.0</td><td>1.2</td></tr>
</table>
</td>
<td>MR-J4-22K_4</td>
<td>TE1-1
L1 L2 L3 U V W

TE1-2
P3 P4 P+ C N

PE
⏚ ⏚

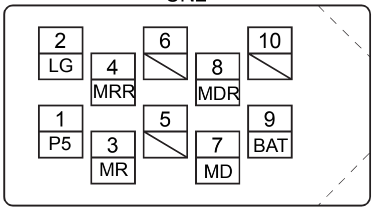
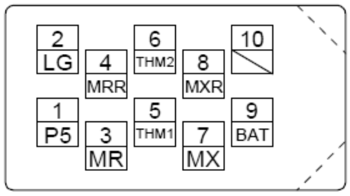
TE2
L11 L21

TE1-1 Screw size: M8
Tightening torque: 6.0 [N•m]
TE1-2 Screw size: M8
Tightening torque: 6.0 [N•m]
TE Screw size: M4
Tightening torque: 1.2 [N•m]
PE Screw size: M8
Tightening torque: 6.0 [N•m]</td>
</tr>
<tr>
<td>MR-J3-10_1
to
MR-J3-40_1</td>
<td>CNP1: L_1, (blank), L_2, N, P_1, P_2 / CNP1: L_1, L_2, L_3, N, P_1, P_2
CNP2: P, C, D, L_{11}, L_{21} / CNP2: P, C, D, L_{11}, L_{21}
CNP3: U, V, W / CNP3: U, V, W

PE terminal
⏚
Screw size: M4
Tightening torque: 1.2 [N •m] (10.6 [lb• in])</td>
<td>MR-J4-10_1
to
MR-J4-40_1</td>
<td>CNP1: L1, (blank), L2, N-, (blank), (blank)
CNP2: P+, C, D, L11, L21
CNP3: U, V, W

PE
⏚ ⏚
Screw size: M4
Tightening torque: 1.2 [N•m]</td>
</tr>
</table>

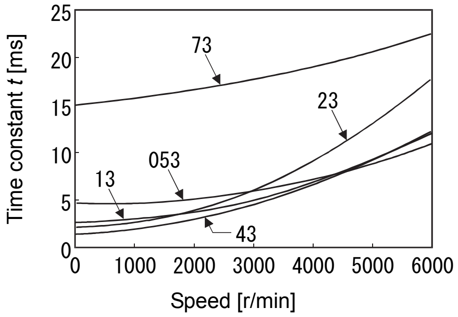
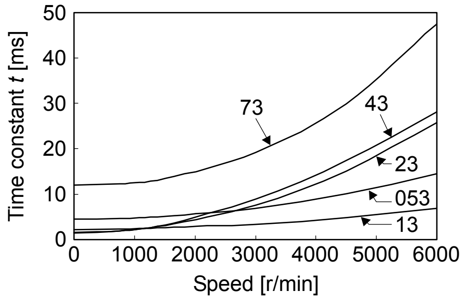
1.2.2 Comparison of encoder signals (CN2)

<table>
<tr><th colspan="2">MR-J3 series</th><th rowspan="2">Signal symbol (Note 1)</th><th colspan="2">MR-J4 series</th></tr>
<tr><th>Connector pin assignment</th><th>Connector pin No.</th><th>Connector pin No.</th><th>Connector pin assignment</th></tr>
<tr><td rowspan="7">CN2
</td><td>CN2-2</td><td>LG</td><td>CN2-2</td><td rowspan="7">CN2 (Note 2)
</td></tr>
<tr><td>CN2-7</td><td>MD
(MX)</td><td>CN2-7</td></tr>
<tr><td>CN2-3</td><td>MR</td><td>CN2-3</td></tr>
<tr><td>CN2-9</td><td>BAT</td><td>CN2-9</td></tr>
<tr><td>CN2-8</td><td>MDR
(MXR)</td><td>CN2-8</td></tr>
<tr><td>CN2-4</td><td>MRR</td><td>CN2-4</td></tr>
<tr><td>CN2-1</td><td>P5</td><td>CN2-1</td></tr>
</table>

Note 1. Signal abbreviations in parentheses are for MR-J4 series.
2. THM1 and THM2 depend on the motor used. Refer to "Part 5 Review on Replacement of Motor".

1.2.3 Dynamic brake: coasting distance

(1) Dynamic brake time constant

<table>
<tr><th>Series</th><th>Dynamic brake time constant</th><th>Series</th><th>Dynamic brake time constant</th></tr>
<tr><td>HF-KP</td><td>
</td><td>HG-KR</td><td>
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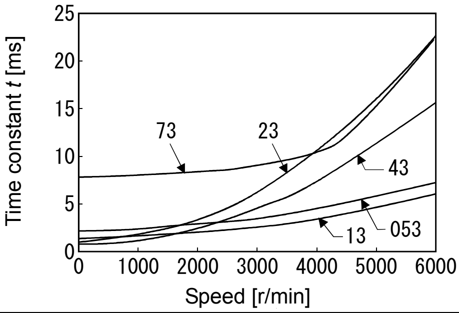
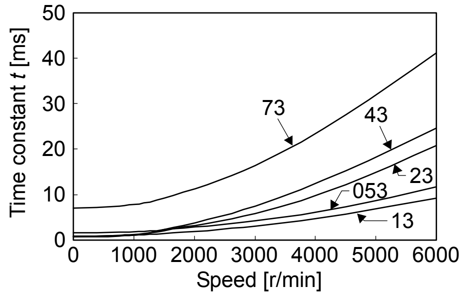
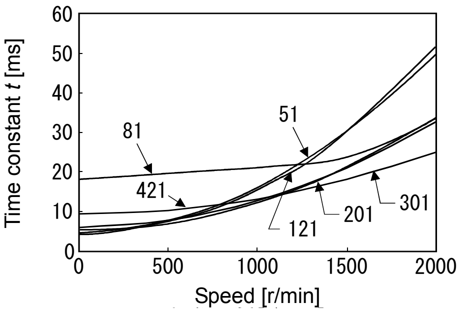
<tr><td>HF-MP</td><td>
</td><td>HG-MR</td><td>
</td></tr>
<tr><td>HF-SP
1000
r/min</td><td>
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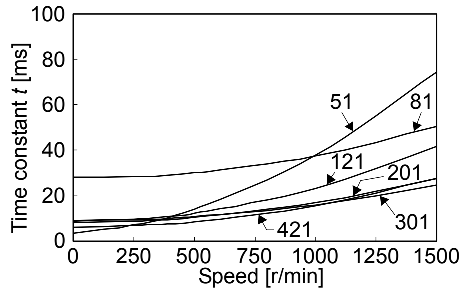
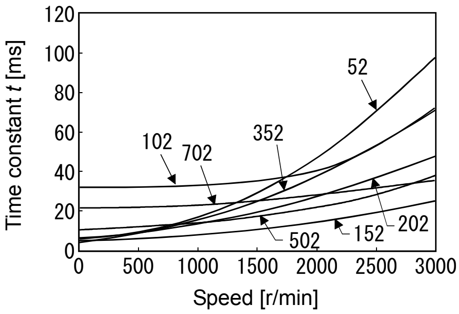
1000
r/min</td><td>
</td></tr>
<tr><td>HF-SP
2000
r/min</td><td>
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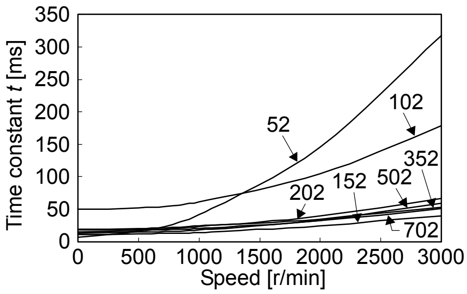
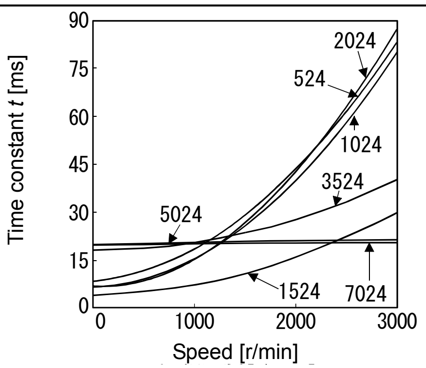
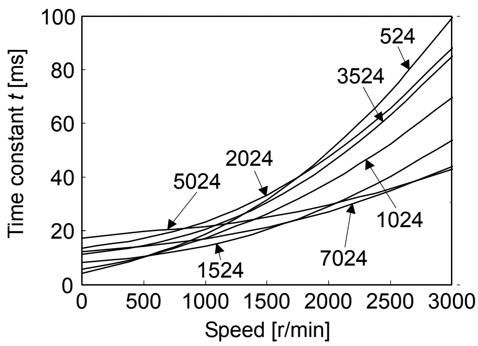
2000
r/min</td><td>
</td></tr>
<tr><td>HF-SP
400V
2000
r/min</td><td>
</td><td>HG-SR
400V
2000
r/min</td><td>
</td></tr>
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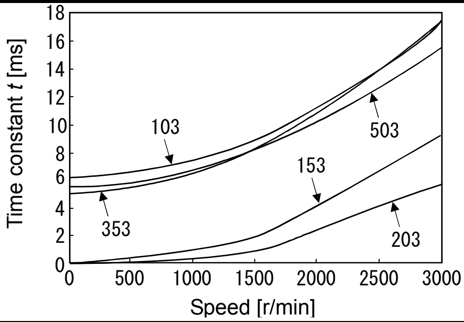
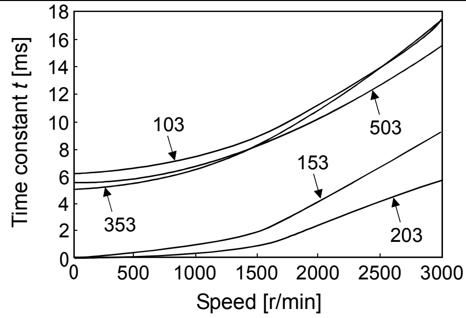
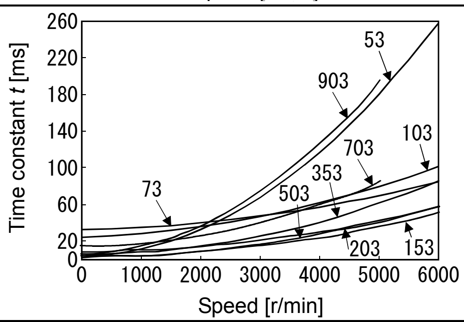
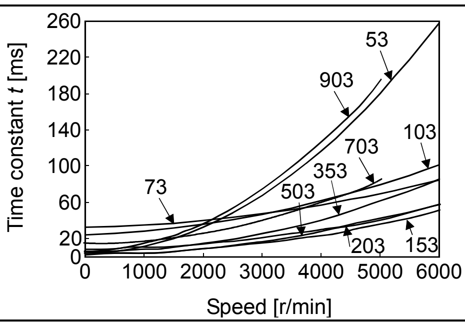
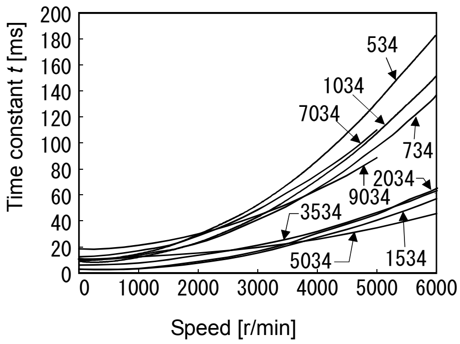
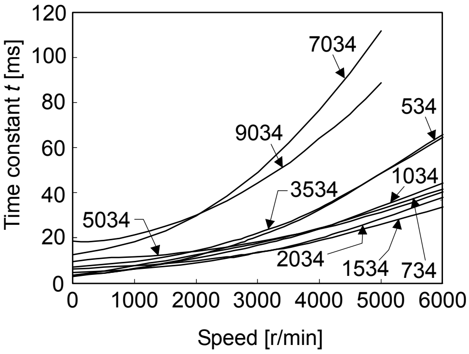
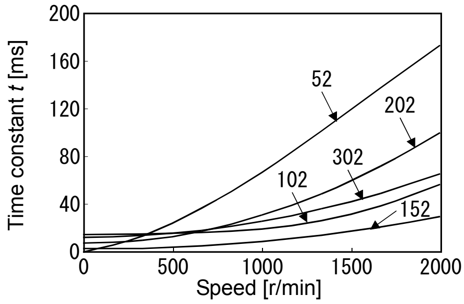
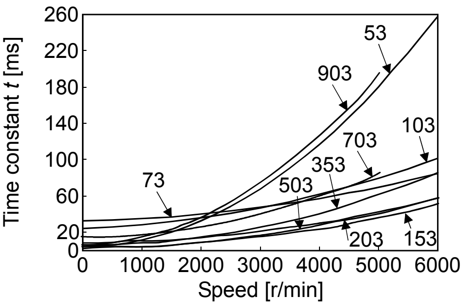
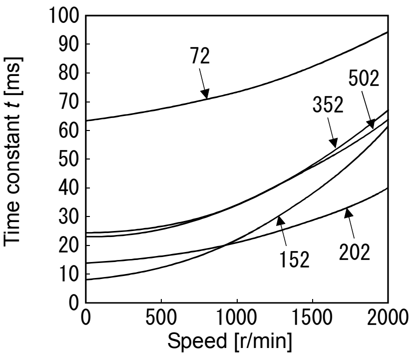
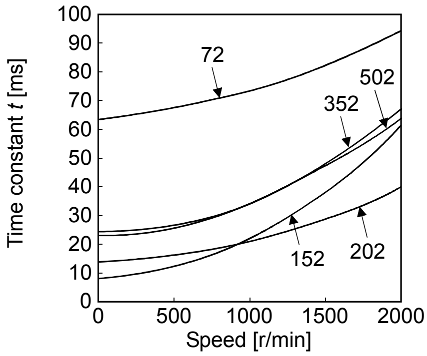
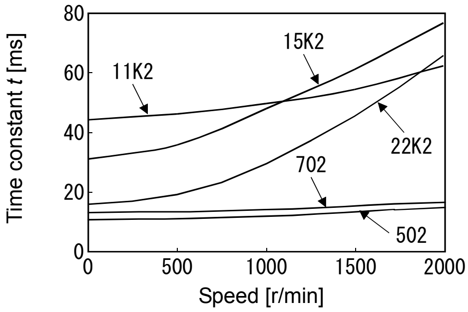
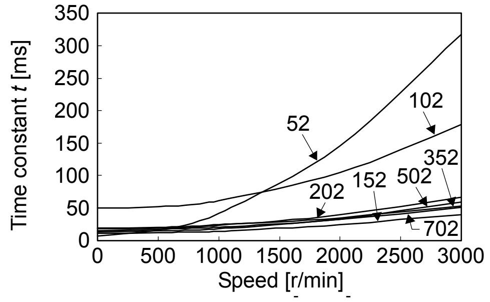
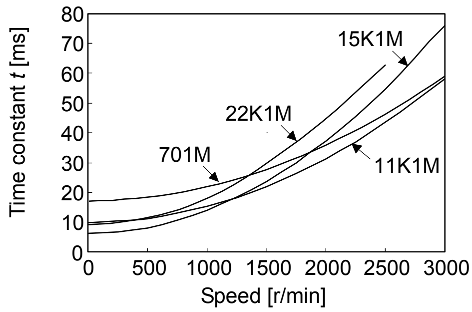
Series	Dynamic brake time constant	Series	Dynamic brake time constant
HC-RP		HG-RR	
HF-JP 200V		HG-JR 200V	
HF-JP 400V		HG-JR 400V	
HC-LP 2000 r/min		HG-JR 3000 r/min	
HC-UP		HG-UR	

<table>
<tr><th>Series</th><th>Dynamic brake time constant</th><th>Series</th><th>Dynamic brake time constant</th></tr>
<tr><td rowspan="2">HA-LP
200V</td><td rowspan="2">
</td><td>HG-SR
200V</td><td>
</td></tr>
<tr><td>HG-JR
200V
1500
r/min</td><td>
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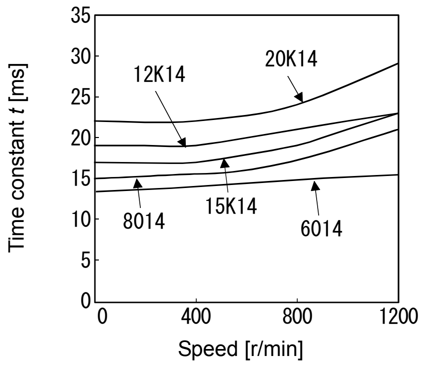
400V
1500
r/min</td><td>
</td><td rowspan="2">HG-JR
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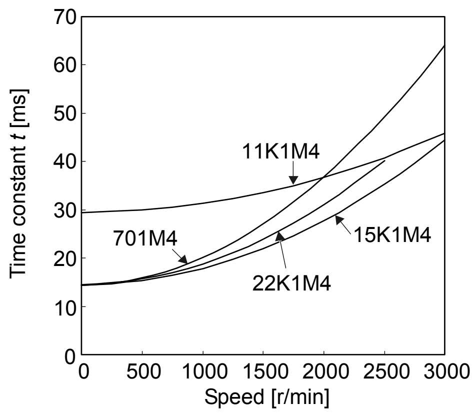
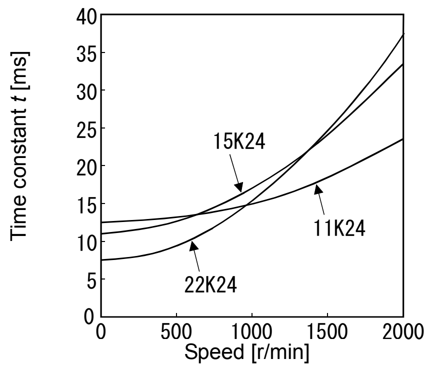
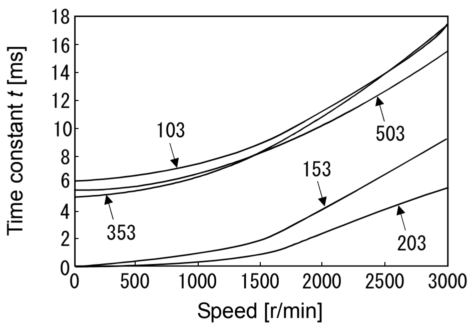
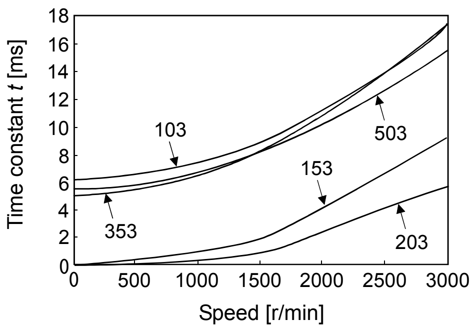
1500
r/min</td><td rowspan="2">
</td></tr>
<tr><td>HA-LP
400V
2000
r/min</td><td>
</td></tr>
<tr><td>HC-RP</td><td>
</td><td>HG-RR</td><td>
</td></tr>
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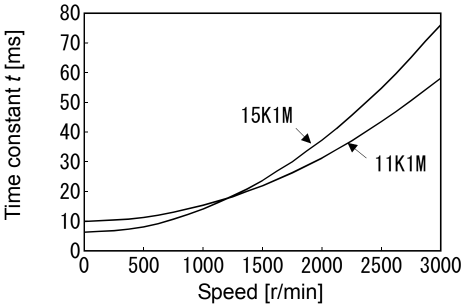
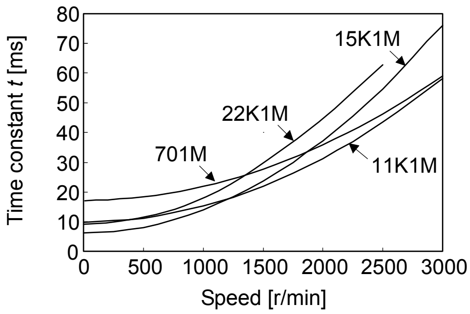
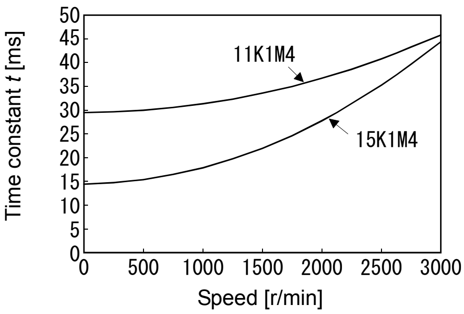
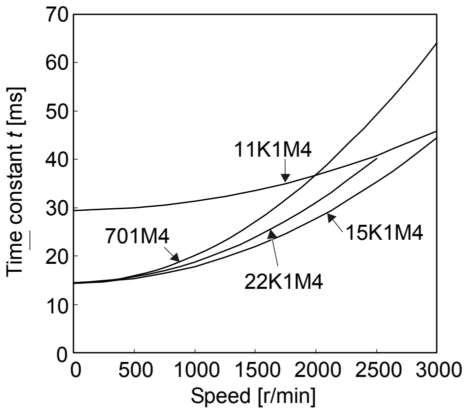
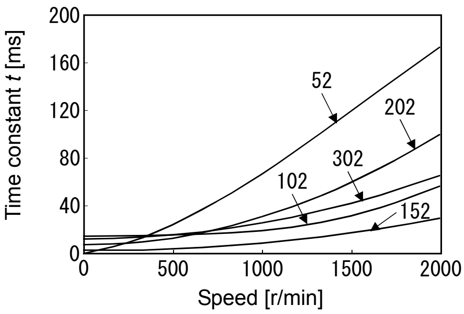
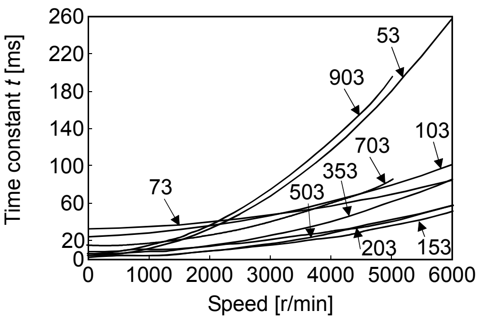
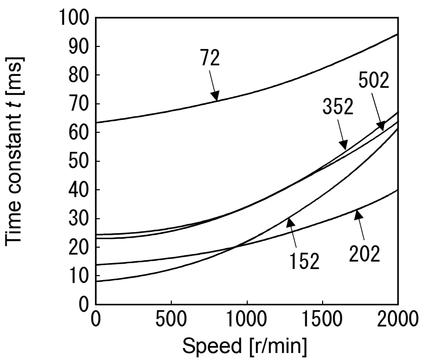
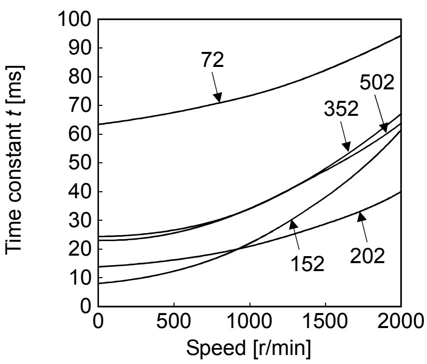
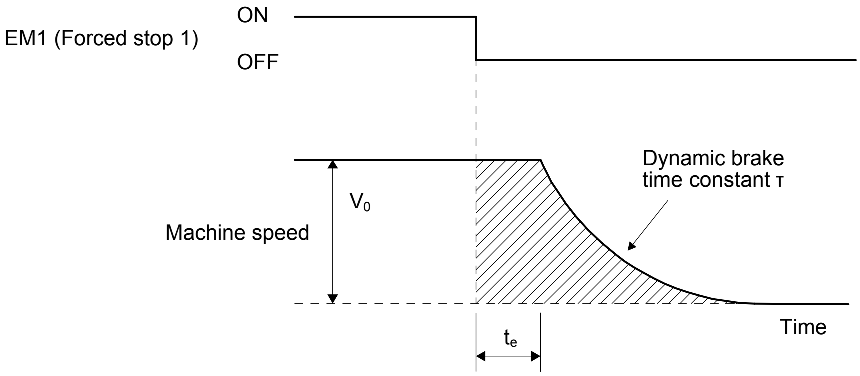
Series	Dynamic brake time constant	Series	Dynamic brake time constant
HF-JP 200V		HG-JR 200V	
HF-JP 400V		HG-JR 400V	
HC-LP 2000 r/min		HG-JR 3000 r/min	
HC-UP		HG-UR	

(2) Calculation of coasting distance

The figure shows the pattern in which the servo motor comes to a stop when the dynamic brake is operated. Use equation 4.1 to calculate an approximate coasting distance to a stop. The dynamic brake time constant τ varies with the servo motor and machine operation speeds. (Refer to (1) of this section.) A working part generally has a friction force. Therefore, actual coasting distance will be shorter than a maximum coasting distance calculated with the following equation.



Dynamic Brake Operation Diagram

$$L_{max} = \frac{V_0}{60} \cdot \left\{ t_e + \tau \left(1 + \frac{J_L}{J_M} \right) \right\} \cdots\cdots (4.1)$$

L_{max} : Maximum coasting distance ········· [mm]

V_0 : Machine's fast feed speed ········· [mm/min]

J_M : Moment of inertia of the servo motor ········· [$\times 10^{-4}$ kg • m^2]

J_L : Load moment of inertia converted into equivalent value on servo motor shaft ········· [$\times 10^{-4}$ kg • m^2]

τ : Dynamic brake time constant ········· [s]

t_e : Delay time of control section ········· [s]

For 7 kW or lower servo, there is internal relay delay time of about 10 ms. For 11 kW to 55 kW servo, there is delay caused by magnetic contactor built into the external dynamic brake (about 50 ms) and delay caused by the external relay.

(3) Electronic dynamic brake

The electronic dynamic brake operates in the initial state for HG series servo motors with a 600 W or smaller capacity.

The time constant "τ" for the electronic dynamic brake will be shorter than that for normal dynamic brake. Therefore, coasting distance will be shorter than in normal dynamic brake.

Series	Servo motor
HG-KR	HG-KR053, HG-KR13, HG-KR23, HG-KR43
HG-MR	HG-MR053, HG-MR13, HG-MR23, HG-MR43
HG-SR	HG-SR51, HG-SR52

Parameter settings (for MR-J4-_A_series)

<table>
<tr><th>No.</th><th>Abbrevia-tion</th><th>Name and function</th><th>Initial value [unit]</th><th>Setting range</th></tr>
<tr><td>PF09</td><td>*FOP5</td><td>Function selection F-5
<table>
<tr><th>Setting digit</th><th>Explanation</th><th>Initial value</th></tr>
<tr><td>_ _ _ x</td><td>Electronic dynamic brake selection.
0: Automatic (effective only for specific servo motors)
2: Disabled
Refer to the following table for the specified servo motors.
<table>
<tr><th>Series</th><th>Servo motor</th></tr>
<tr><td>HG-KR</td><td>HG-KR053, HG-KR13, HG-KR23, HG-KR43</td></tr>
<tr><td>HG-MR</td><td>HG-MR053, HG-MR13, HG-MR23, HG-MR43</td></tr>
<tr><td>HG-SR</td><td>HG-SR51, HG-SR52</td></tr>
</table></td><td>0h</td></tr>
</table></td><td colspan="2">Refer to the "Name and function" column.</td></tr>
<tr><td>PF15</td><td>DBT</td><td>Electronic Dynamic Brake Operating Time
Set an operating time for the electronic dynamic brake. (Note 1)</td><td>2000 [ms]</td><td>0 to 10000</td></tr>
</table>

Parameter settings (for MR-J4-_B_series)

<table>
<tr><th>No.</th><th>Abbrevia-tion</th><th>Name and function</th><th>Initial value [unit]</th><th>Setting range</th></tr>
<tr><td>PF06</td><td>*FOP5</td><td>Function selection F-5
<table>
<tr><th>Setting digit</th><th>Explanation</th><th>Initial value</th></tr>
<tr><td>_ _ _ x</td><td>Electronic dynamic brake selection.
0: Automatic (effective only for specific servo motors)
2: Disabled
Refer to the following table for the specified servo motors.
<table>
<tr><th>Series</th><th>Servo motor</th></tr>
<tr><td>HG-KR</td><td>HG-KR053, HG-KR13, HG-KR23, HG-KR43</td></tr>
<tr><td>HG-MR</td><td>HG-MR053, HG-MR13, HG-MR23, HG-MR43</td></tr>
<tr><td>HG-SR</td><td>HG-SR51, HG-SR52</td></tr>
</table></td><td>0h</td></tr>
</table></td><td colspan="2">Refer to the "Name and function" column.</td></tr>
<tr><td>PF12</td><td>DBT</td><td>Electronic Dynamic Brake Operating Time
Set an operating time for the electronic dynamic brake. (Note 1)</td><td>2000 [ms]</td><td>0 to 10000</td></tr>
</table>

Note 1. When the electronic dynamic brake is released during operation, the servo system cannot be switched on until the PF12 operating time is over.

1.2.4 Forced stop deceleration function selection

(1) Parameter setting (for MR-J4-_A_series)

POINT
●With MR-J4-A_, the deceleration to a stop function is enabled by the factory setting. To disable the deceleration to a stop function, set PA04 to "0 _ _ _".

No.	Abbre-viation	Name and function	Initial value [unit]	Setting range
PA04	*AOP1	Function selection A-1 This is used to select the forced stop input and forced stop deceleration function.	Refer to the "Name and function" column.	

Setting digit	Explanation	Initial value
_ _ _ x	For manufacturer setting	0h
_ _ x _		0h
_ x _ _		0h
x _ _ _	Forced stop deceleration function selection 0: Forced stop deceleration function disabled (EM1) 2: Forced stop deceleration function enabled (EM2) See the following table for details.	2h

Setting value	EM2/EM1 selection	Deceleration method	
		EM2 or EM1 is off	Alarm occurred
0 _ _ _	EM1	MBR (Electromagnetic brake interlock) turns off without the forced stop deceleration.	MBR (Electromagnetic brake interlock) turns off without the forced stop deceleration.
2 _ _ _	EM2	MBR (Electromagnetic brake interlock) turns off after the forced stop deceleration.	MBR (Electromagnetic brake interlock) turns off after the forced stop deceleration.

(2) Parameter setting (for MR-J4-_B_series)

> POINT
>
> ●With MR-J4-B, the deceleration to a stop function is enabled in the factory setting. To disable the deceleration to a stop function, set PA04 to "0 _ _ _".

No.	Abbre-viation	Name and function	Initial value [unit]	Setting range
PA04	*AOP1	Function selection A-1 This is used to select the forced stop input and forced stop deceleration function.	Refer to the "Name and function" column	

Setting digit	Explanation	Initial value
_ _ _ x	For manufacturer setting	0h
_ _ x _		0h
_ x _ _	Servo forced stop selection 0: Enabled (The forced stop input EM2 or EM1 is used.) 1: Disabled (The forced stop input EM2 and EM1 are not used.) See the following table for details.	0h
x _ _ _	Forced stop deceleration function selection 0: Forced stop deceleration function disabled (EM1) 2: Forced stop deceleration function enabled (EM2) See the following table for details.	2h

Setting value	EM2/EM1 selection	Deceleration method	
		EM2 or EM1 is off	Alarm occurred
0 0 _ _	EM1	MBR (Electromagnetic brake interlock) turns off without the forced stop deceleration.	MBR (Electromagnetic brake interlock) turns off without the forced stop deceleration.
2 0 _ _	EM2	MBR (Electromagnetic brake interlock) turns off after the forced stop deceleration.	MBR (Electromagnetic brake interlock) turns off after the forced stop deceleration.
0 1 _ _	Not using EM2 or EM1		MBR (Electromagnetic brake interlock) turns off without the forced stop deceleration.
2 1 _ _	Not using EM2 or EM1		MBR (Electromagnetic brake interlock) turns off after the forced stop deceleration.

1.2.5 Servo setup software: MR Configurator ⇒MR Configurator2

Item	MR-J3 series		MR-J4 series
Servo setup software	MR Configurator Model: MRZJW3-SETUP221	→	MR Configurator2 Model: SW1DNC-MRC2-E

(1) MR Configurator2 (SW1DNC-MRC2-E) specification

Item	Description
Project	Create/read/save/delete project, system setting, and print
Parameter	Parameter setting, amplifier axis name setting, parameter converter (Note 1)
Positioning data	Point table, program, indirect addressing
Monitor	Display all, I/O monitor, graph, and ABS data display
Diagnostics	Alarm display, alarm onset data display, drive recorder, display of the reason for no rotation, system configuration, life diagnosis, machine diagnosis
Test operation	Jog operation (Note 1), positioning operation, motor-less operation, DO forced output, and program operation, test operation event information, single-step feed (Note 2)
Adjustment	One-touch tuning, tuning, and machine analyzer
Others	Servo assistant, parameter setting range update, help display, connection to MITSUBISHI ELECTRIC FA Global Website

Note 1. This function is available only in standard control mode.
2. SW1DNC-MRC2-E supports only MR-J4A-RJ.

(2) System configuration

For servo setup software components, see the MR-J4-_A_ Servo Amplifier Instruction Manual or MR-J4-_B_ Servo Amplifier Instruction Manual.

1.2.6 Servo amplifier initializing time

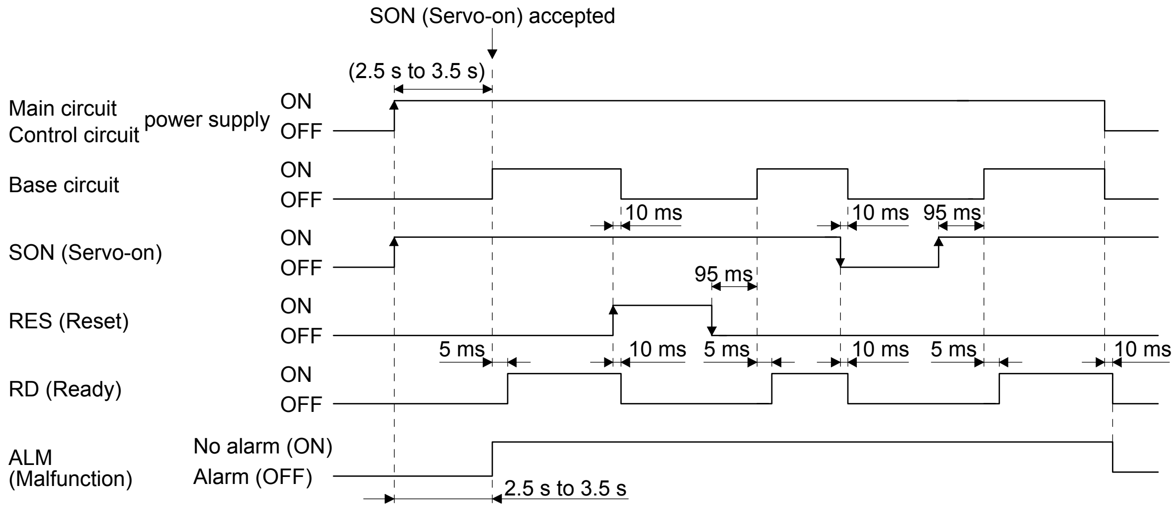
This section explains the initializing time of the servo amplifier (the time taken between power-on and servo-on reception). The initializing time is 2 s at maximum for the MR-J2S-_A_servo amplifier, but 3.5 s at maximum for the MR-J4-_A_servo amplifier. Note the initializing time difference upon replacement.

<Points to note upon replacement>

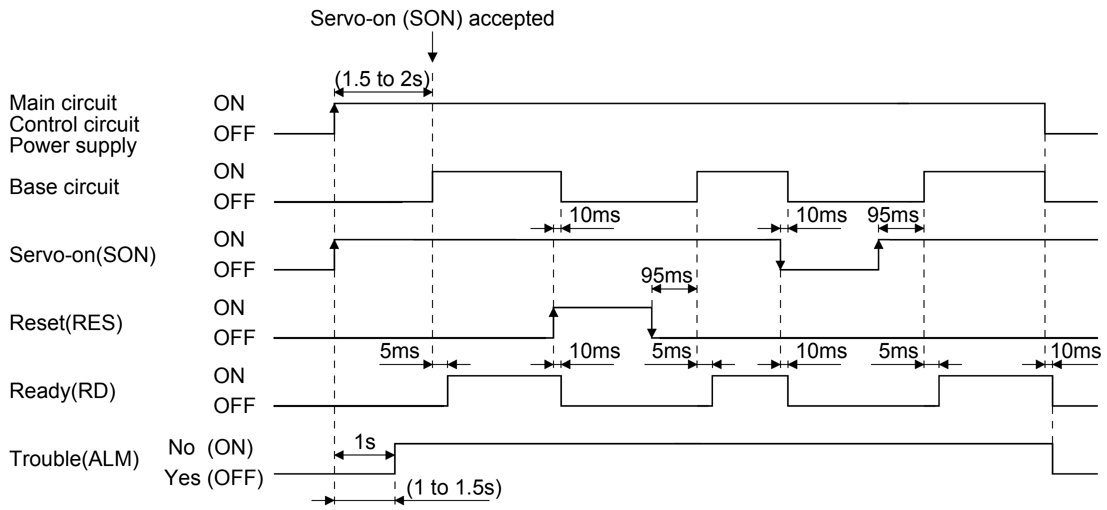
(1) When using the electromagnetic brake to prevent a drop in a vertical lift application or the like with an external timer to adjust the brake release time, the lift may drop due to a longer servo-lock time. Adjust the brake release time as necessary or use MBR (electromagnetic brake interlock signal).

(2) A longer servo-on time at power-on may cause a delay in the motor starting time after power-up. Please take note.

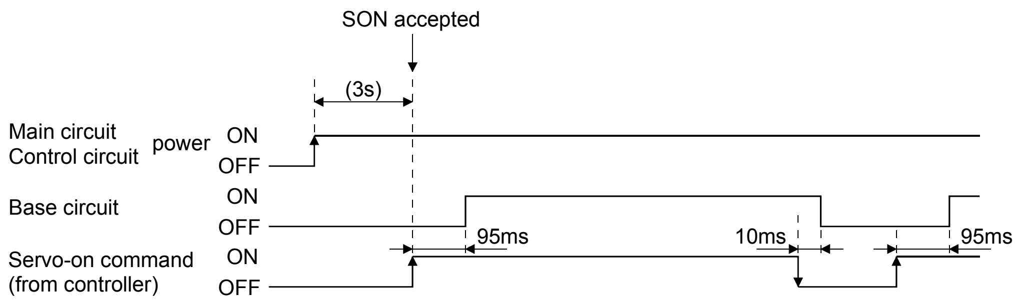
(1) MR-J4-_A_ / MR-J4-_B_ series servo amplifier
The initializing time is 2.5 to 3.5 s.



(2) MR-J3-_A_ series servo amplifier
The initializing time is 1.5 to 2 s.



(3) MR-J3-_B_ series servo amplifier
The initializing time is 3 s.

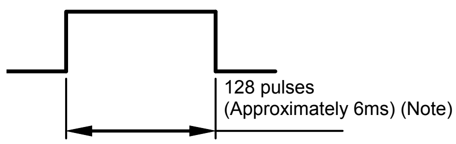


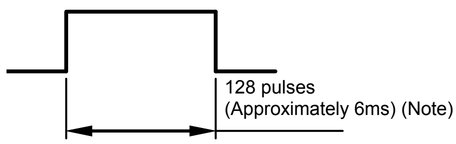
1.2.7 The pulse width of the encoder Z-Phase pulse

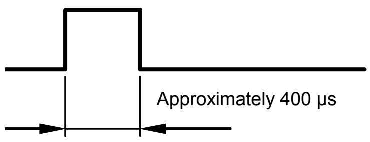
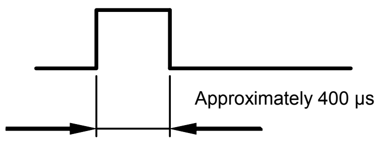
< Precautions >

Always reset the home position upon replacement.

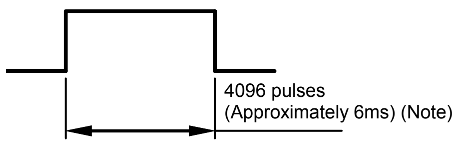
< Amplifier replacement >

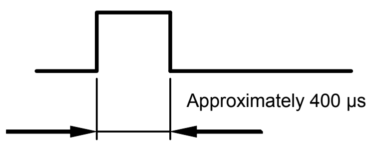
<table>
<tr><th></th><th>MR-J3 series</th><th>MR-J4 series</th></tr>
<tr><td>At low speed</td><td>256/262144 pulses
(Example: At 10 r/min)


* This is the pulse width when the motor rotates at 10 r/min.
The pulse width changes depending on rotational frequency.</td><td>256/262144 pulses
(Example: At 10 r/min)


* This is the pulse width when the motor rotates at 10 r/min.
The pulse width changes depending on rotational frequency.</td></tr>
<tr><td>At high speed</td><td>Approximately 400 μs fixed

</td><td>Approximately 400 μs fixed

</td></tr>
</table>

< Simultaneous replacement >

<table>
<tr><th></th><th>HG-KR, MR, SR motor</th></tr>
<tr><td>At low speed</td><td>4096/4194304 pulses
(Example: At 10 r/min)


* This is the pulse width when the motor rotates at 10 r/min.
The pulse width changes depending on rotational frequency.</td></tr>
<tr><td>At high speed</td><td>Approximately 400 μs fixed

</td></tr>
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2. SERVO AMPLIFIER DIMENSIONS/ATTACHMENT DIFFERENCES

2.1 MR-J3 series ⇒ MR-J4 series Comparison Table of Servo Amplifier Dimensions/Installation Differences

2.1.1 200 V/100 V class (22 kW or less A/B-Type)

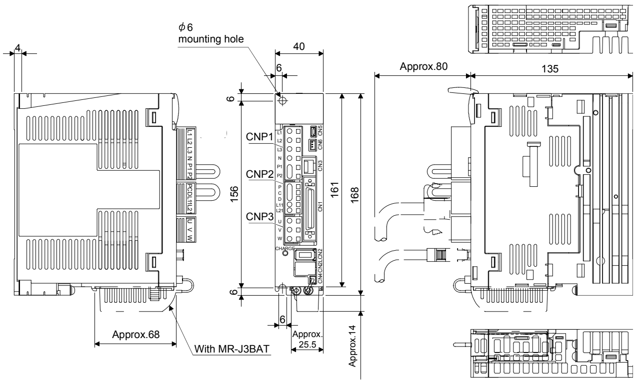
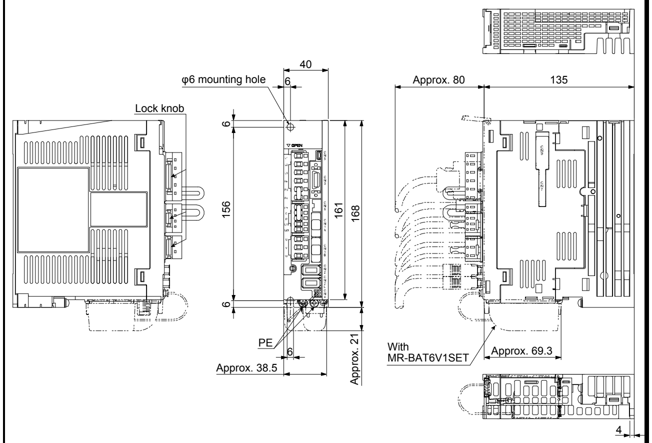
The following table shows comparison of the MR-J3 series and MR-J4 series dimensions. Dimensions of servo amplifiers of 3.5 kW or less, 7 kW, and 22 kW are the same and have compatibility in mounting. Note that the width and horizontal mounting screw pitch have been changed for servo amplifiers of 5 kW. For servo amplifiers of 11 kW and 15 kW, note that the width, vertical/horizontal mounting screw pitch, and screw size have been changed.

Comparison of dimensions (comparison between the same capacity types) [Unit: mm]

Model MR-J3 series	Model MR-J4 series	Height		Width		Depth		Mounting screw pitch	
		MR-J3	MR-J4	MR-J3	MR-J4	MR-J3	MR-J4	MR-J3	MR-J4
MR-J3-10_(1)	MR-J4-10_(1)	168	168	40	40	135	135	156 (Vertical) (2 screws)	156 (Vertical) (2 screws)
MR-J3-20_(1)	MR-J4-20_(1)								
MR-J3-40_(1)	MR-J4-40_(1)					170	170		
MR-J3-60 _	MR-J4-60_								
MR-J3-70_	MR-J4-70_			60	60	185	185	156 (Vertical)/ 42 (Horizontal) (3 screws)	156 (Vertical)/ 42 (Horizontal) (3 screws)
MR-J3-100_	MR-J4-100_								
MR-J3-200_(N) (-RT)	MR-J4-200_			90	90	195	195	156 (Vertical)/ 78 (Horizontal) (3 screws)	156 (Vertical)/ 78 (Horizontal) (3 screws)
MR-J3-350_	MR-J4-350_								
MR-J3-500_	MR-J4-500_	250	250	130	**105**	200	200	235 (Vertical)/ 118 (Horizontal) (4 screws)	235 (Vertical)/ **93 (Horizontal)** (4 screws)
MR-J3-700_	MR-J4-700_	300	300	172	172			285 (Vertical)/ 160 (Horizontal) (4 screws)	285 (Vertical)/ 160 (Horizontal) (4 screws)
MR-J3-11K_(-LR)	MR-J4-11K_	400	400	260	**220**	260	260	376 (Vertical)/ 236 (Horizontal) (4 screws)	**380 (Vertical)**/ **196 (Horizontal)** (4 screws)
MR-J3-15K_(-LR)	MR-J4-15K_								
MR-J3-22K_	MR-J4-22K_				260				376 (Vertical)/ 236 (Horizontal) (4 screws)

• Dimensions with differences are **shown with shading**.

Comparison of 200 V/100 V class dimensions

<table>
<tr><th>MR-J3 series dimensions</th><th>MR-J4 series dimensions</th></tr>
<tr><td>MR-J3-10_, MR-J3-20_

</td><td>MR-J4-10_, MR-J4-20_

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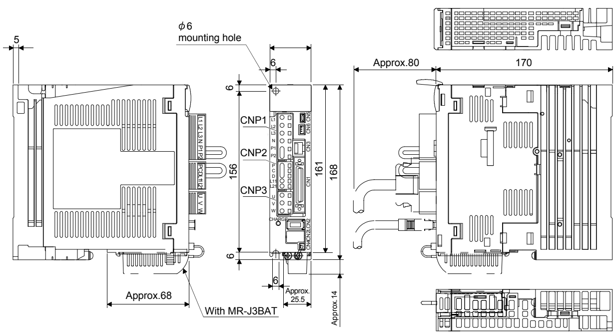
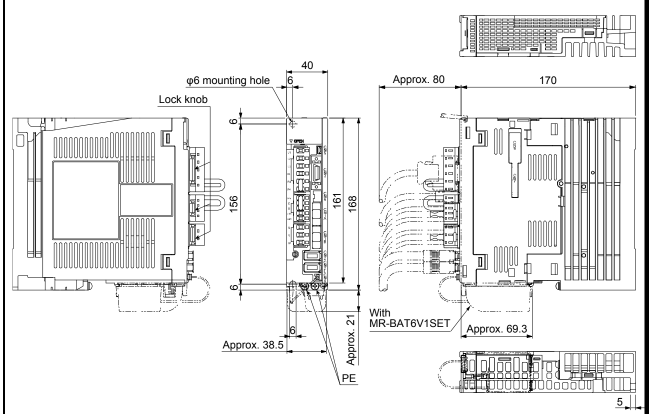
<tr><td>MR-J3-40_, MR-J3-60_

</td><td>MR-J4-40_, MR-J4-60_

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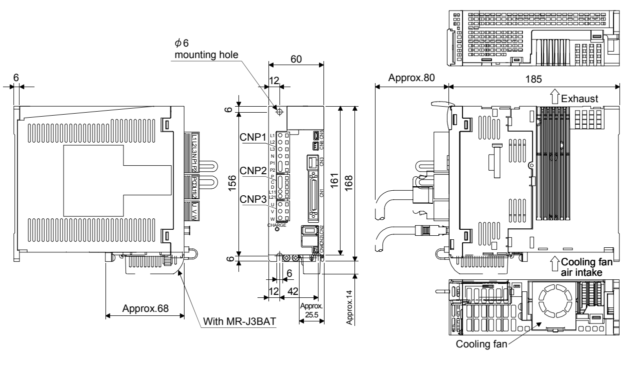
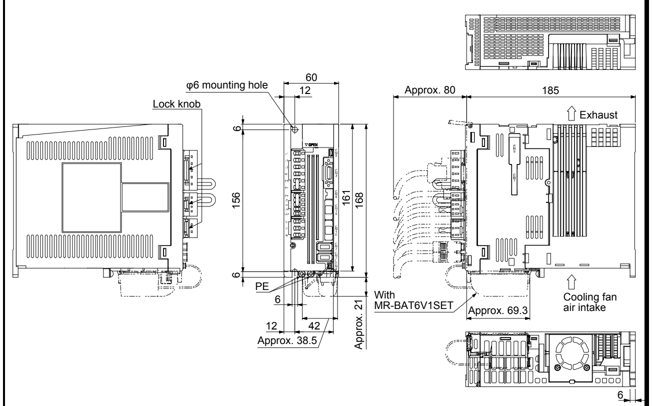
<tr><td>MR-J3-70_, MR-J3-100_

</td><td>MR-J4-70_, MR-J4-100_

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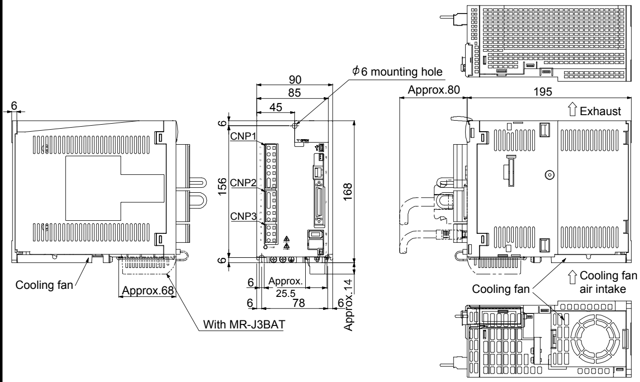
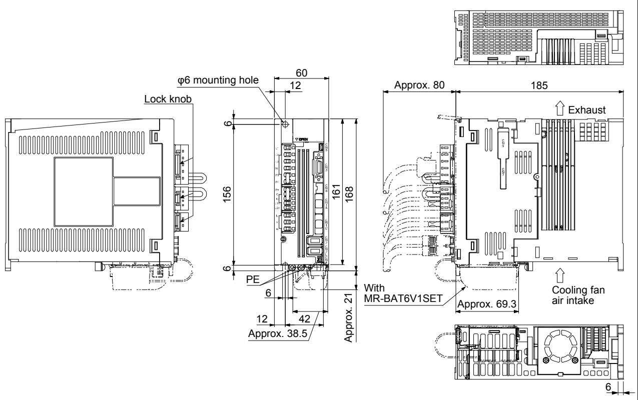
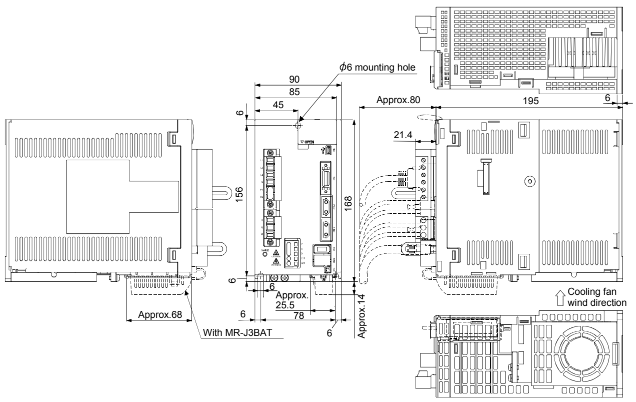
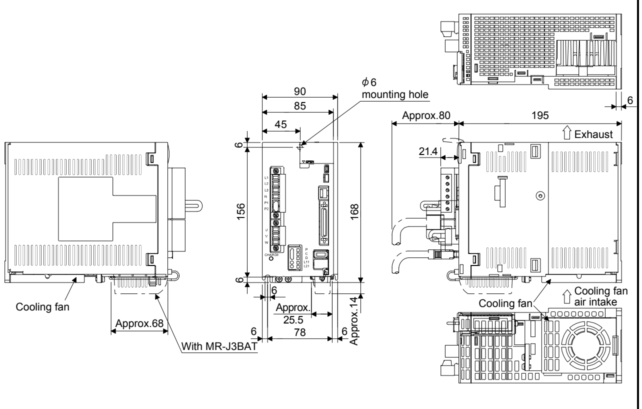
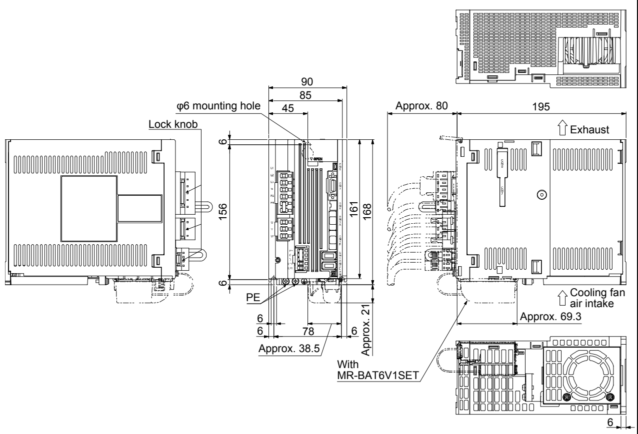
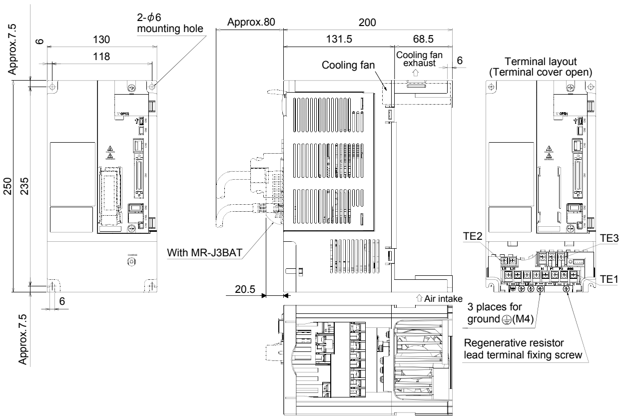
MR-J3 series dimensions	MR-J4 series dimensions
MR-J3-200_N 	MR-J4-200_ 
MR-J3-200_(-RT) 	
MR-J3-350_ 	MR-J4-350_ 

<table>
<tr><th>MR-J3 series dimensions</th><th>MR-J4 series dimensions</th></tr>
<tr>
<td>MR-J3-500_



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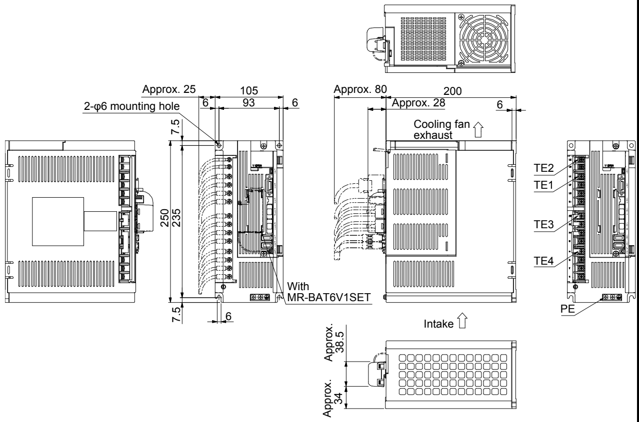
<td>MR-J4-500_



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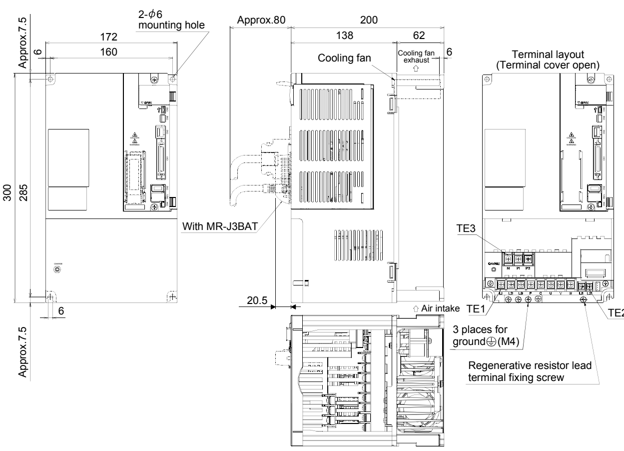
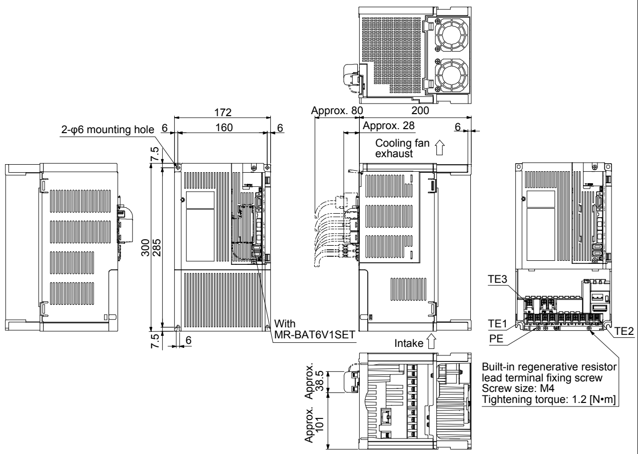
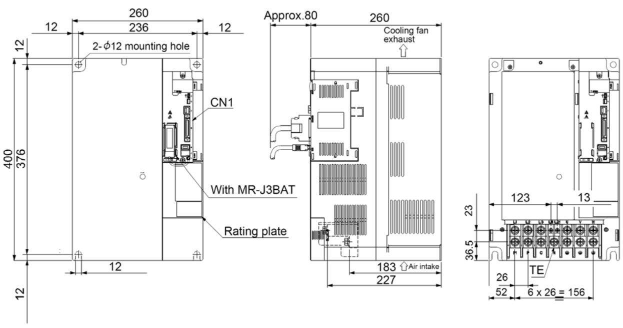
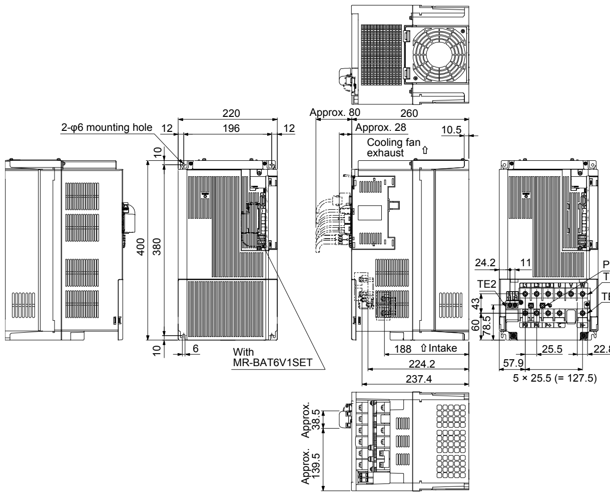
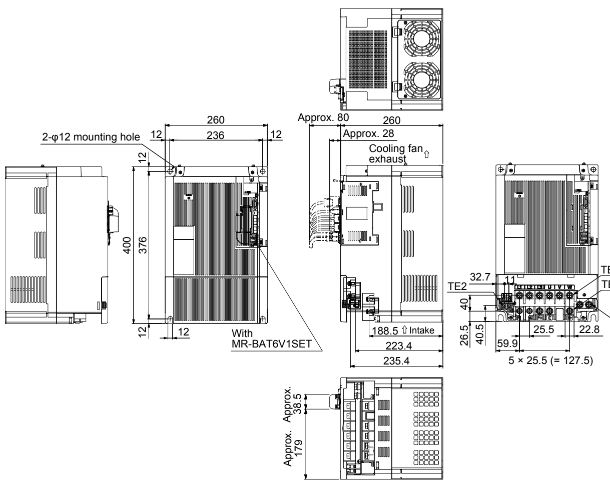
</tr>
<tr>
<td>MR-J3-700_



</td>
<td>MR-J4-700_



</td>
</tr>
</table>

MR-J3 series dimensions	MR-J4 series dimensions
MR-J3-11K_(-LR), MR-J3-15K_(-LR), MR-J3-22K_ 	MR-J4-11K_, MR-J4-15K_ 
	MR-J4-22K_ 

2.1.2 400 V class (22 kW or less A/B-Type)

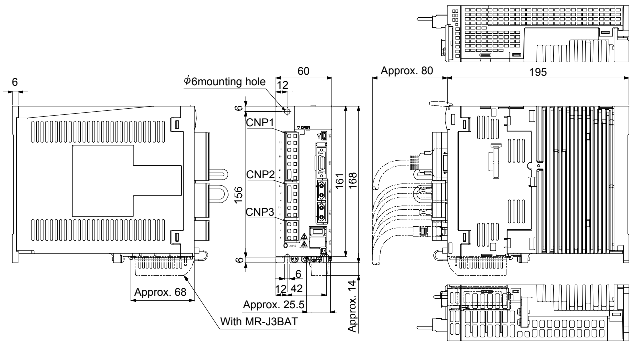
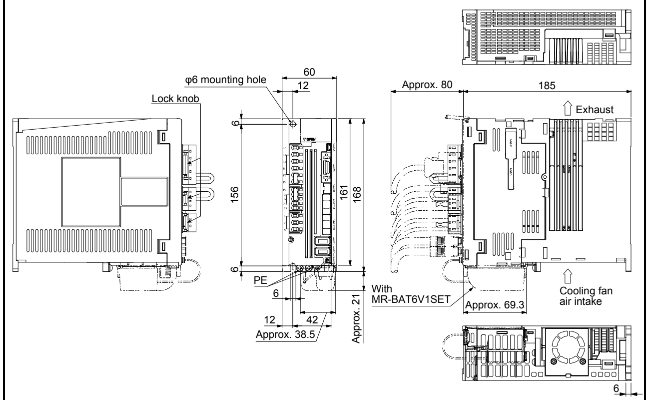
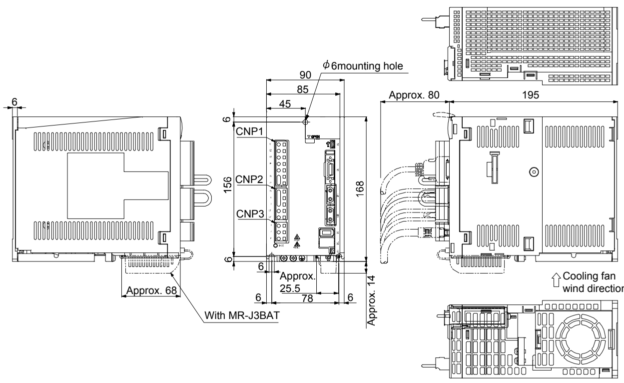
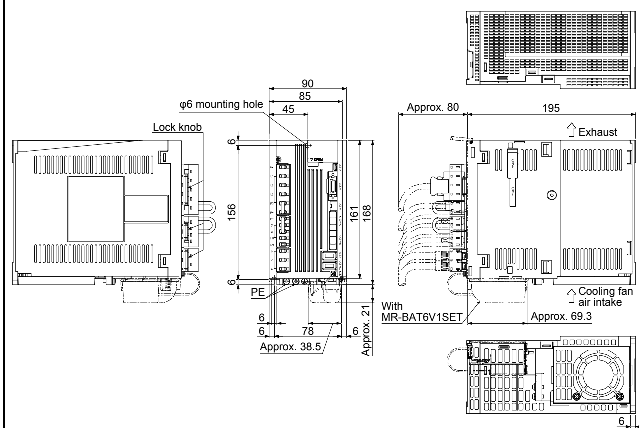
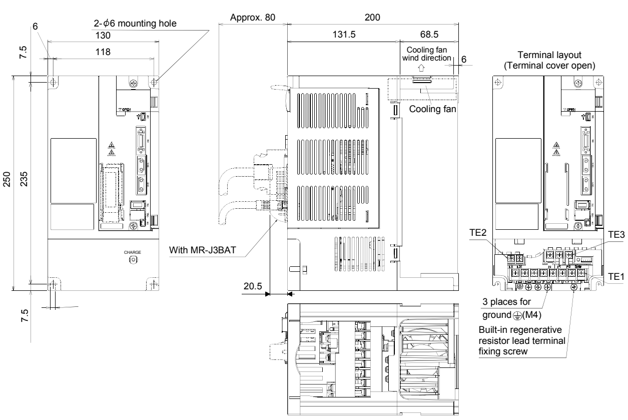
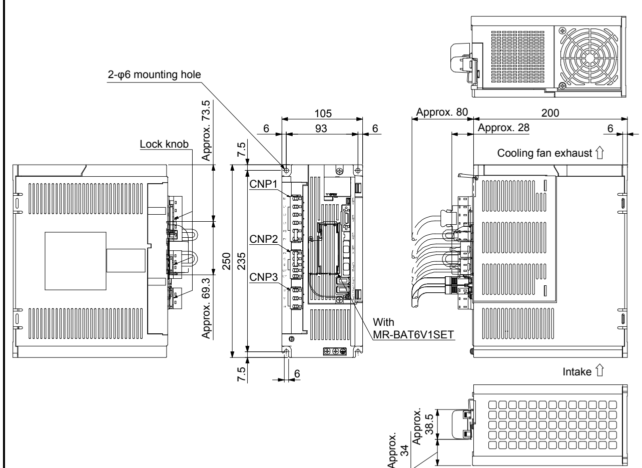
The following table shows comparison of the MR-J3 series and MR-J4 series dimensions. Dimensions of servo amplifiers of 2 kW or less, 5 kW, 7 kW, and 22 kW are the same and have compatibility in mounting. Note that the width and horizontal mounting screw pitch have been changed for servo amplifiers of 3.5 kW. For servo amplifiers of 11 kW and 15 kW, note that the width, vertical/horizontal mounting screw pitch, and screw size have been changed.

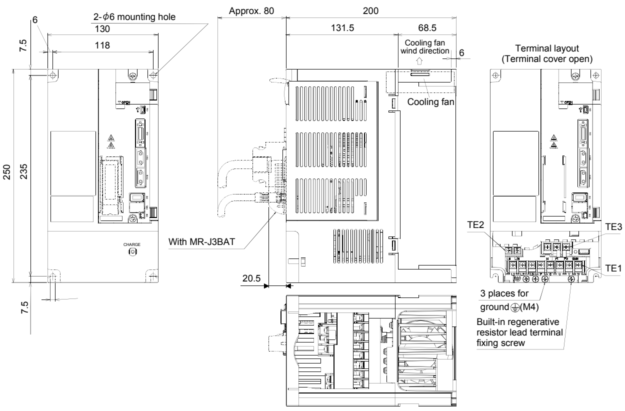
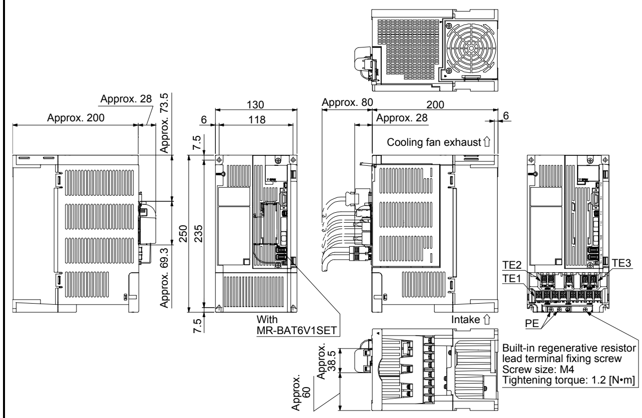
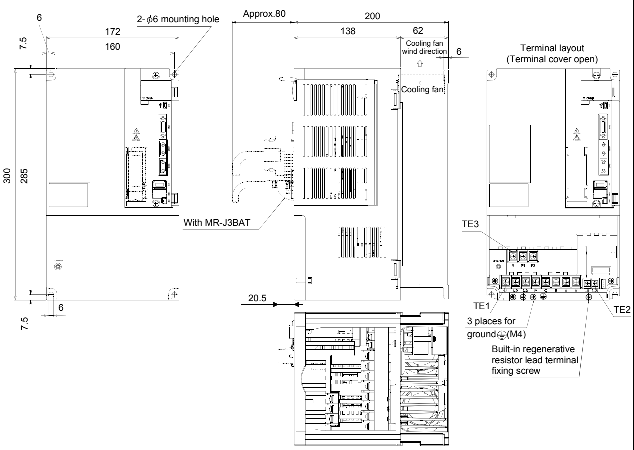
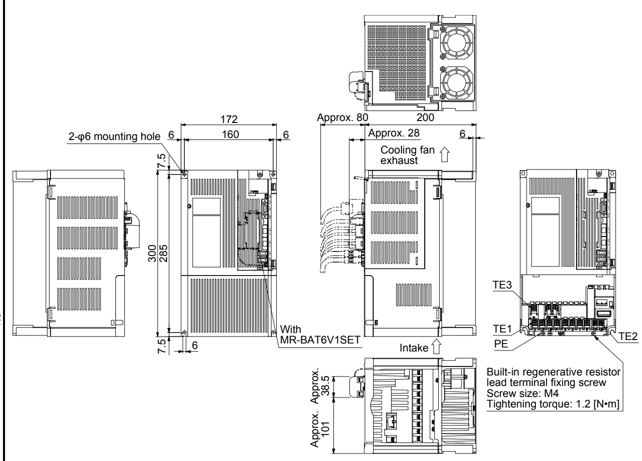
Comparison of dimensions (comparison between the same capacity types) [Unit: mm]

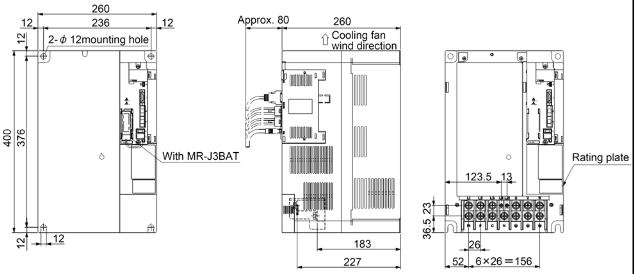
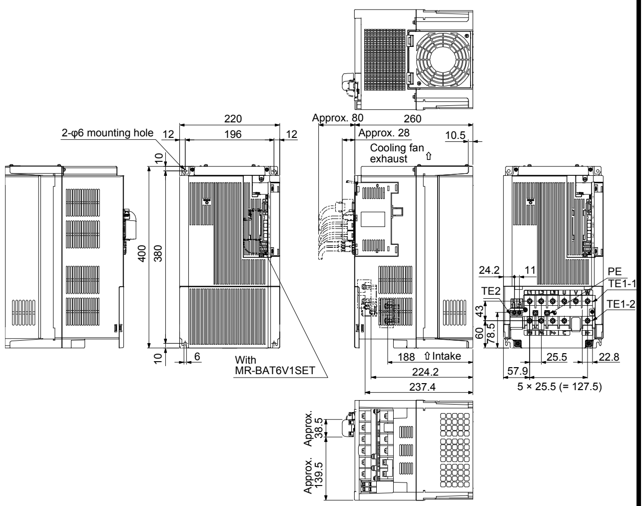
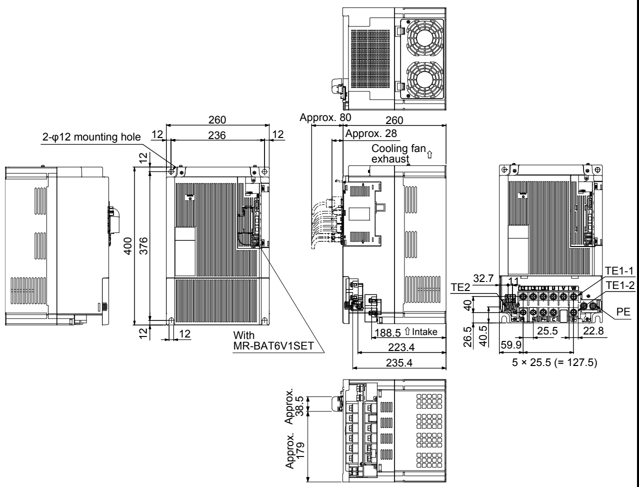
<table>
<tr><th rowspan="2">Model
MR-J3 series</th><th rowspan="2">Model
MR-J4 series</th><th colspan="2">Height</th><th colspan="2">Width</th><th colspan="2">Depth</th><th colspan="2">Mounting screw pitch</th></tr>
<tr><th>MR-J3</th><th>MR-J4</th><th>MR-J3</th><th>MR-J4</th><th>MR-J3</th><th>MR-J4</th><th>MR-J3</th><th>MR-J4</th></tr>
<tr><td>MR-J3-60_4</td><td>MR-J4-60_4</td><td rowspan="3">168</td><td rowspan="3">168</td><td rowspan="2">60</td><td rowspan="2">60</td><td rowspan="3">195</td><td rowspan="2">185</td><td rowspan="2">156 (Vertical)/
42 (Horizontal)
(3 screws)</td><td rowspan="2">156 (Vertical)/
42 (Horizontal)
(3 screws)</td></tr>
<tr><td>MR-J3-100_4</td><td>MR-J4-100_4</td></tr>
<tr><td>MR-J3-200_4</td><td>MR-J4-200_4</td><td>90</td><td>90</td><td>195</td><td>156 (Vertical)/
78 (Horizontal)
(3 screws)</td><td>156 (Vertical)/
78 (Horizontal)
(3 screws)</td></tr>
<tr><td>MR-J3-350_4</td><td>MR-J4-350_4</td><td rowspan="2">250</td><td rowspan="2">250</td><td rowspan="2">130</td><td>105</td><td rowspan="3">200</td><td rowspan="3">200</td><td rowspan="2">235 (Vertical)/
118 (Horizontal)
(4 screws)</td><td>235 (Vertical)/
93 (Horizontal)
(4 screws)</td></tr>
<tr><td>MR-J3-500_4</td><td>MR-J4-500_4</td><td>130</td><td>235 (Vertical)/
118 (Horizontal)
(4 screws)</td></tr>
<tr><td>MR-J3-700_4</td><td>MR-J4-700_4</td><td>300</td><td>300</td><td>172</td><td>172</td><td>285 (Vertical)/
160 (Horizontal)
(4 screws)</td><td>285 (Vertical)/
160 (Horizontal)
(4 screws)</td></tr>
<tr><td>MR-J3-11K_4(-LR)</td><td>MR-J4-11K_4</td><td rowspan="3">400</td><td rowspan="3">400</td><td rowspan="3">260</td><td rowspan="2">220</td><td rowspan="3">260</td><td rowspan="3">260</td><td rowspan="3">376 (Vertical)/
236 (Horizontal)
(4 screws)</td><td rowspan="2">380 (Vertical)/
196 (Horizontal)
(4 screws)</td></tr>
<tr><td>MR-J3-15K_4(-LR)</td><td>MR-J4-15K_4</td></tr>
<tr><td>MR-J3-22K_4</td><td>MR-J4-22K_4</td><td>260</td><td>376 (Vertical)/
236 (Horizontal)
(4 screws)</td></tr>
</table>

• Dimensions with differences are **shown with shading**.

Comparison of 400 V class dimensions

<table>
<tr><th>MR-J3 series dimensions</th><th>MR-J4 series dimensions</th></tr>
<tr><td>MR-J3-60_4, MR-J3-100_4
</td>
<td>MR-J4-60_4, MR-J4-100_4
</td></tr>
<tr><td>MR-J3-200_4
</td>
<td>MR-J4-200_4
</td></tr>
<tr><td>MR-J3-350_4
</td>
<td>MR-J4-350_4
</td></tr>
</table>

<table>
<tr><th>MR-J3 series dimensions</th><th>MR-J4 series dimensions</th></tr>
<tr><td>MR-J3-500_4

</td>
<td>MR-J4-500_4

</td></tr>
<tr><td>MR-J3-700_4

</td>
<td>MR-J4-700_4

</td></tr>
</table>

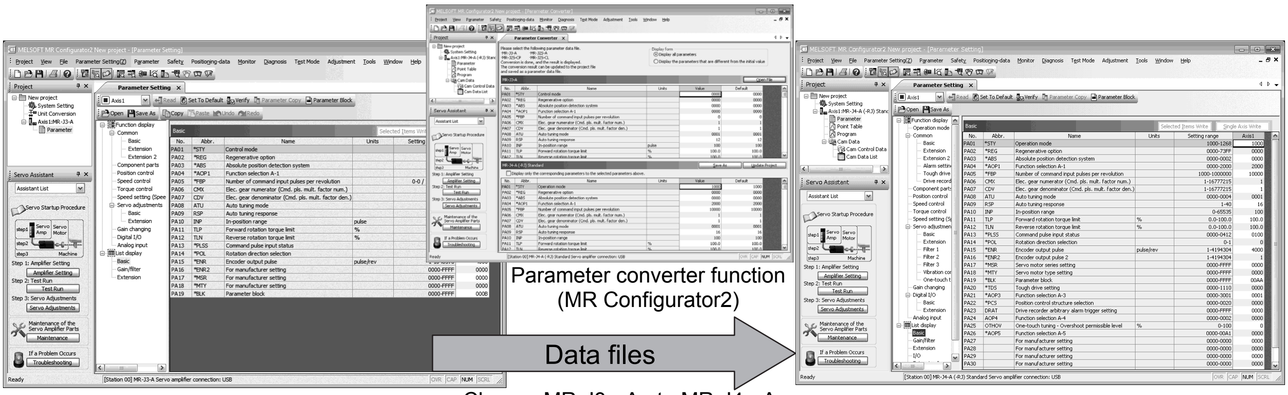
<table>
<tr><th>MR-J3 series dimensions</th><th>MR-J4 series dimensions</th></tr>
<tr><td rowspan="2">MR-J3-11K_4(-LR), MR-J3-15K_4(-LR), MR-J3-22K_4

</td>
<td>MR-J4-11K_4, MR-J4-15K_4

</td></tr>
<tr><td>MR-J4-22K_4

</td></tr>
</table>

2.2 Parameter conversion

2.2.1 Operation procedure of parameter conversion

The parameter converter function of MR Configurator2 allows the servo parameters of MR-J3-_A_ to be changed to the servo parameters of MR-J4-_A_. (version 1.12N or later)

POINT
●Parameters common to MR-J3-_A_ and MR-J4-_A_ are the conversion targets. The initial value of MR-J4-_A_ is set for additional parameters of MR-J4-_A_.



MR Configurator2 Change MR-J3-_A_ to MR-J4-_A_ MR Configurator2

2.2.2 MR-J3-_A_ parameter diversion procedure

POINT
●Parameter conversion: Set the parameter block within the readable range to read changes from the initial value.

• Parameter reading from the servo amplifier MR- J3-_A_

Start MR Configurator2(SW1DNC-MRC2-E) • • • A connection with a PC-AT compatible personal computer is required.

USB communication (MR-J3USBCBL3M)

↓

Create a new project.

↓

Read the servo parameters.

↓

Save the parameter file.

↓

• Converting the parameters of MR-J3-_A_ and writing them to the MR-J4-_A_ servo amplifier

↓

Create a new project.

↓

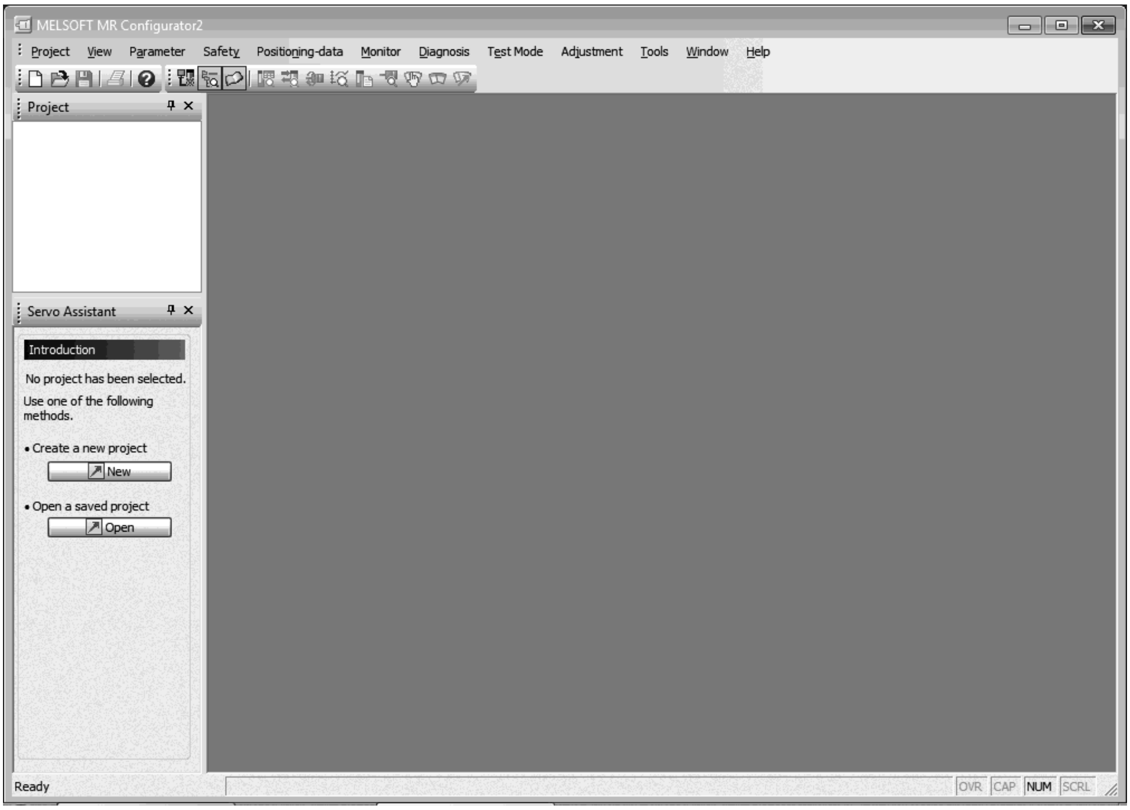
Change MR- J3-_A_ parameters to MR-J4-_A_ parameters.

↓

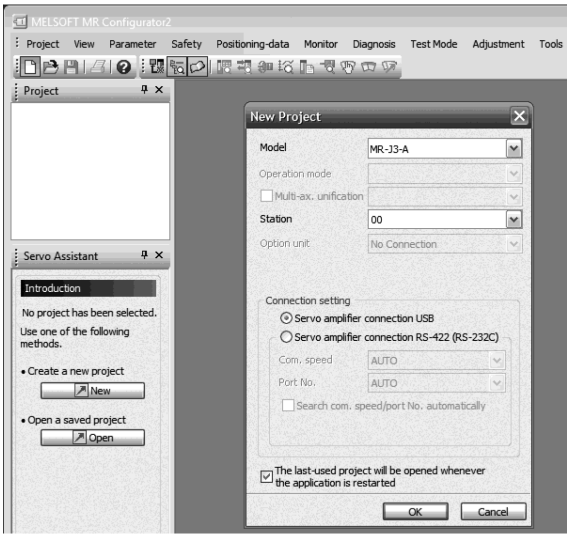
Write the changed parameters to the MR-J4-_A_ servo amplifier.

2.2.3 Parameter reading from the servo amplifier MR- J3-_A_

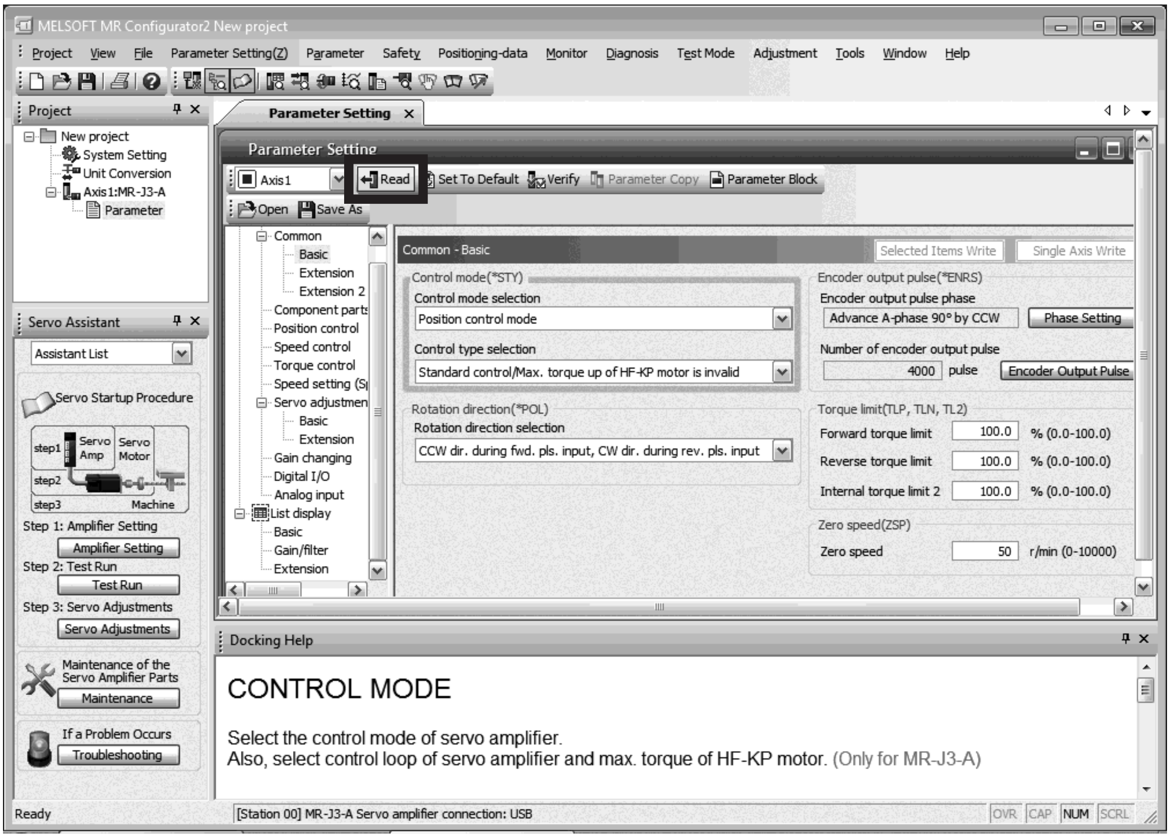
(1) Start MR Configurator2 (SW1DNC-MRC2-E).
For MR Configurator2 (SW1DNC-MRC2-E) of version 1.09K or later, the "MR-J4-A(-RJ) standard" project is created at the first startup after installation.



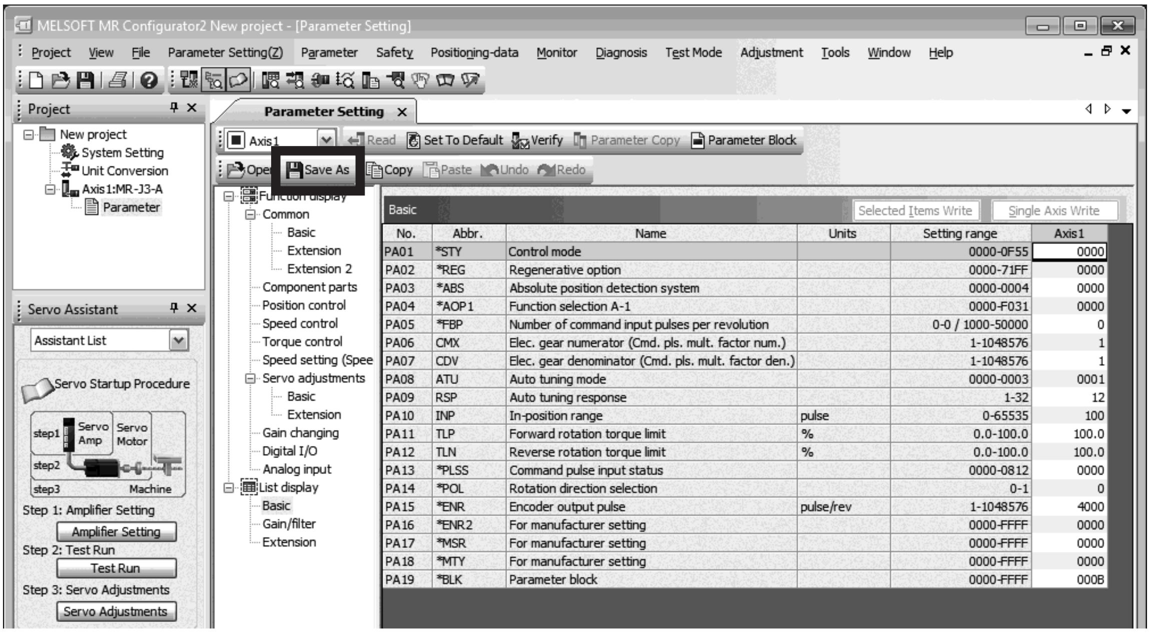
(2) Create a new project.
Select [Project] - [New] from the menu to display the New Project dialog box. Select "MR-J3-A" for Model.
The setting of "Station" must be the same as that of the servo amplifier. Set the same value as that of the parameter: PC20.



(3) Read the servo parameters.
Click [Parameters] in the menu to display the parameter list screen.
Connect the MR- J3-_A_ amplifier to a personal computer and click the [Read] button.

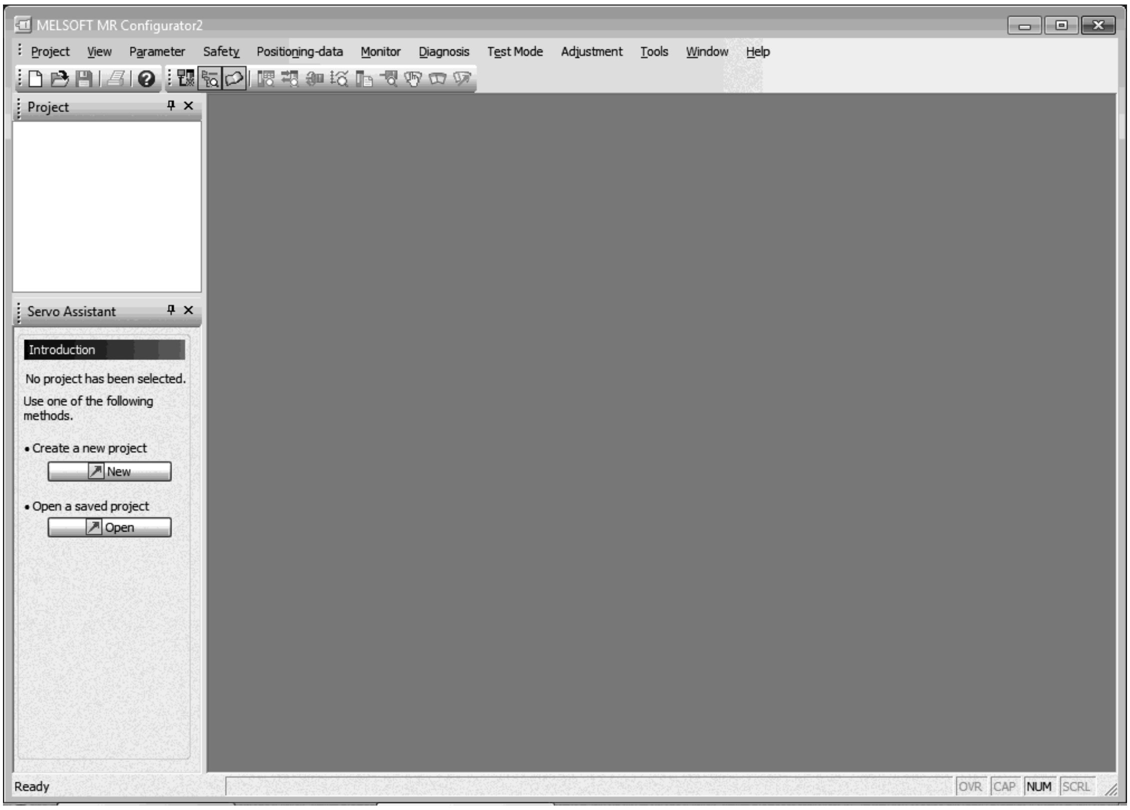


After reading the parameters is completed, select [Save As] to save the parameter file.

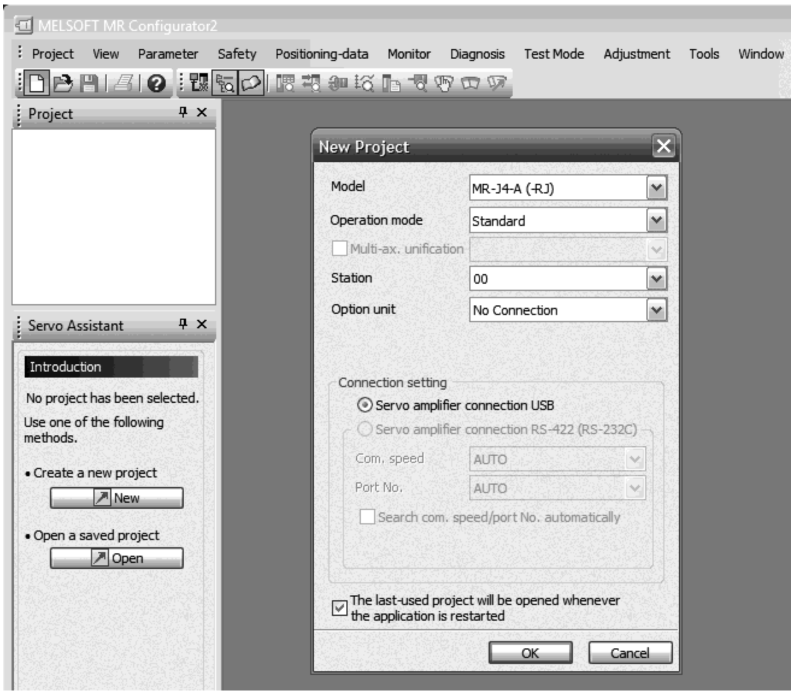


2.2.4 Converting the parameters of MR-J3-_A_ and writing them to the MR-J4-_A_ servo amplifier

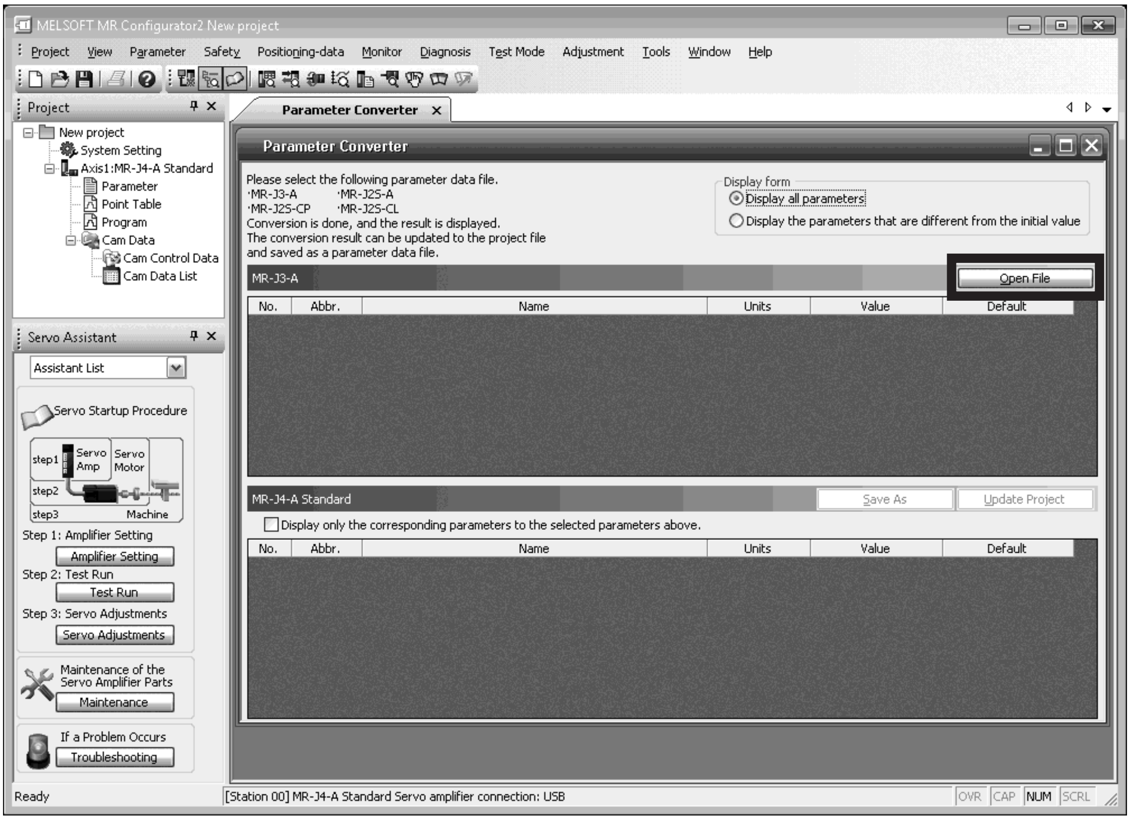
(1) Start MR Configurator2 (SW1DNC-MRC2-E).



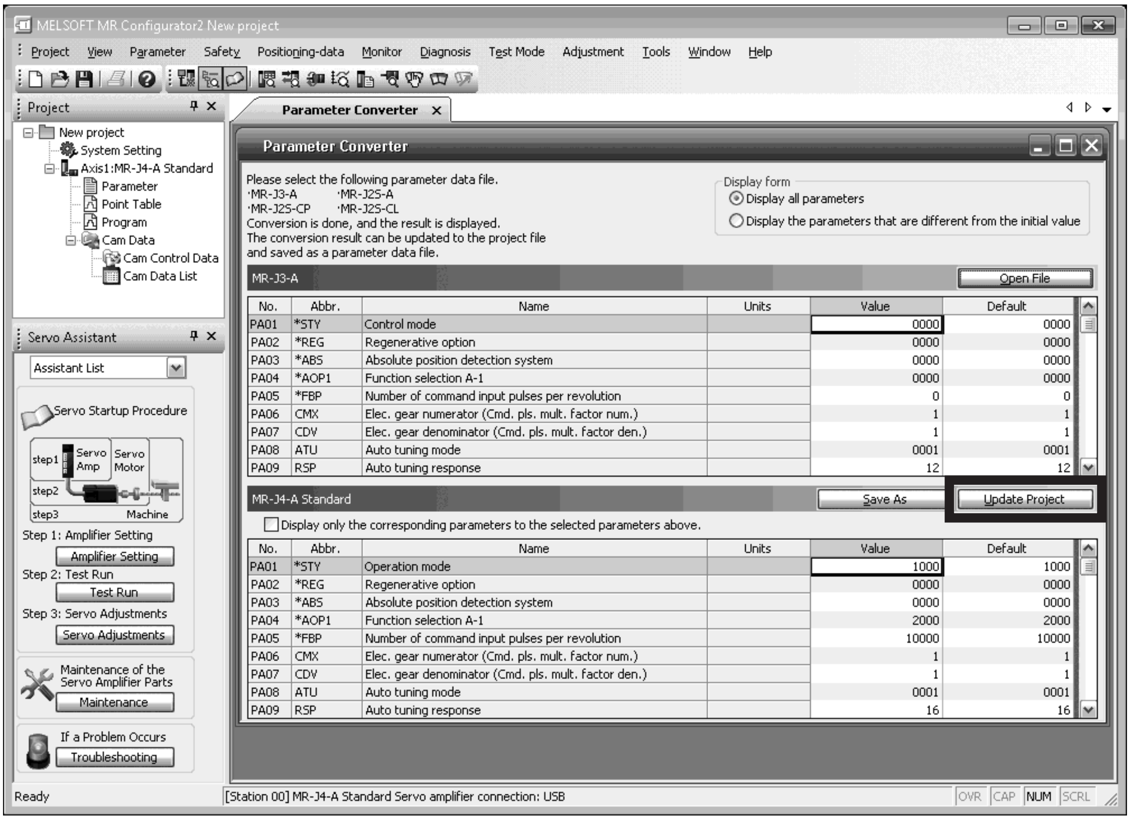
(2) Create a new project.
Select [Project] - [New] from the menu to display the New Project dialog box. Select "MR-J4-A" for Model.



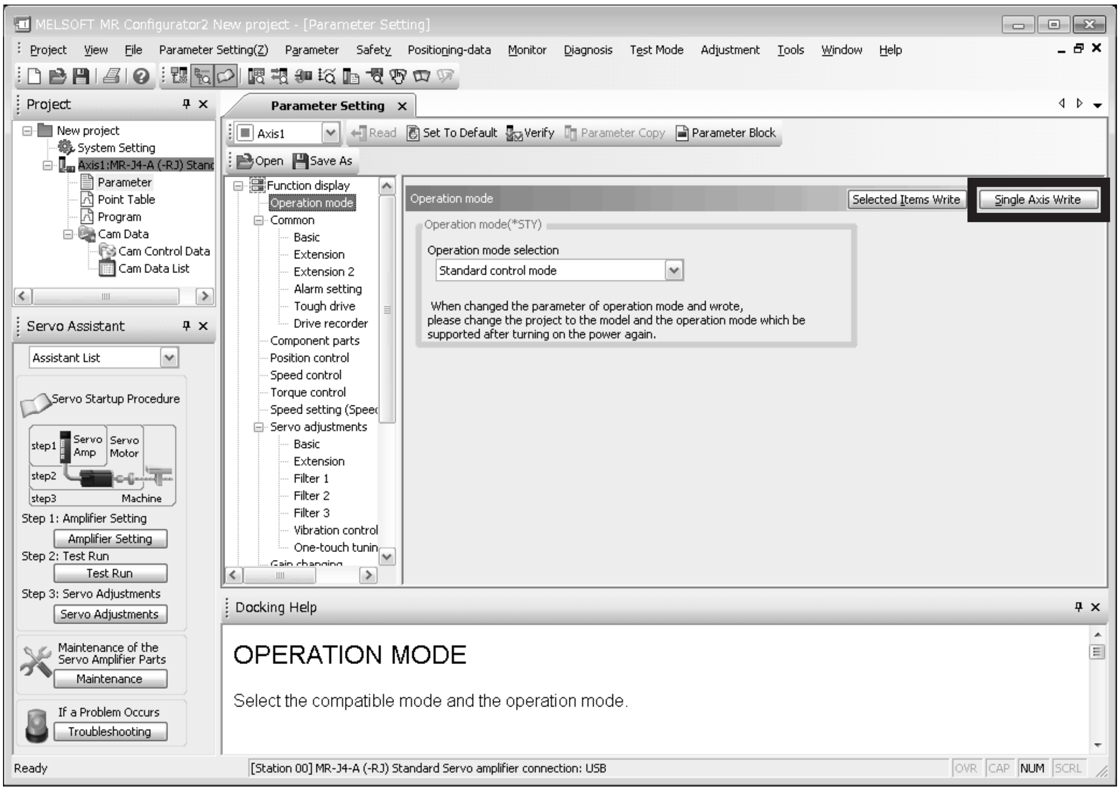
(3) Change MR- J3-_A_ parameters to MR-J4-_A_ parameters.
Select [Parameter] - [Parameter Converter] from the menu to display the parameter converter screen.
Then click the [Open file] button and specify the user file that was saved with the operation in (3) of Section 2.2.3.



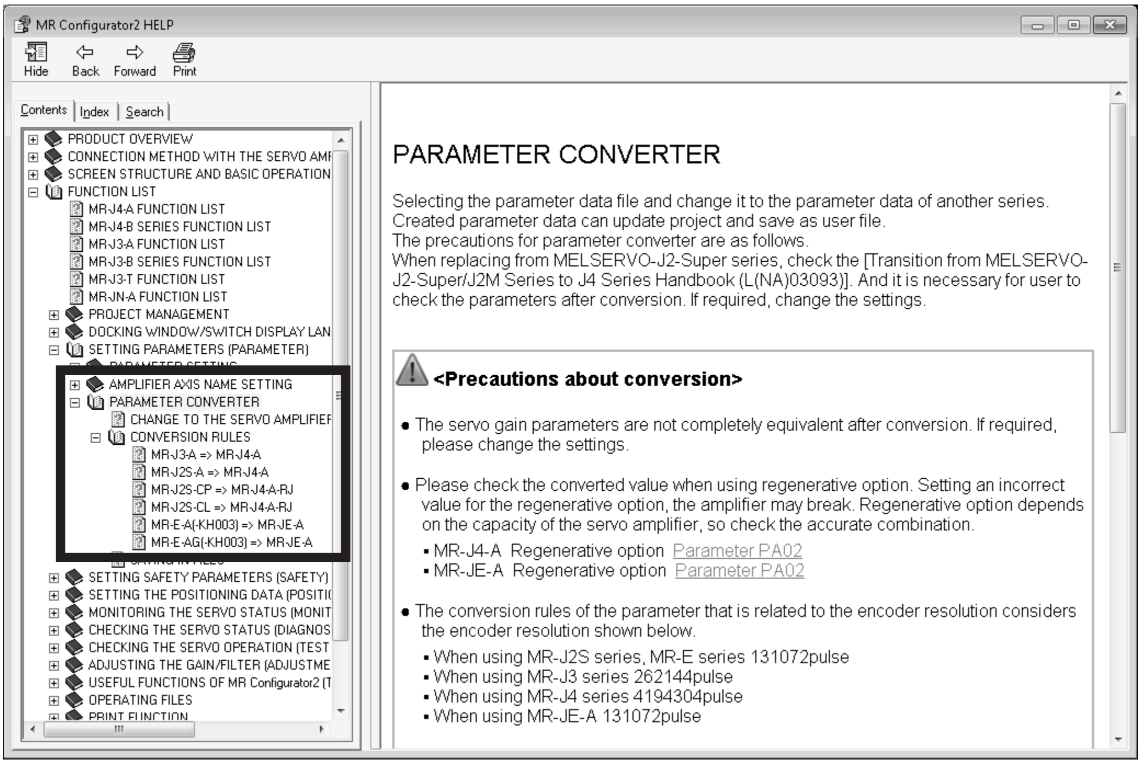
Click [Update Project].



(4) Write the changed parameters to the MR-J4-_A_ servo amplifier.
Select [Parameter] - [Parameter Setting] from the menu to display the parameter setting screen.
Connect the MR-J4-_A_ servo amplifier to a personal computer and click the [Single Axis Write] button.
The parameter values will be written to the MR-J4-_A_ servo amplifier.



Note: The servo gain is not perfectly equal.
Refer to the MR Configurator2 (SW1DNC-MRC2-E) help for details.



2.2.5 Conversion rules (MR-J3-_A_ => MR-J4-_A_)

The following table shows the servo parameter conversion rules from MR-J3-_A_ to MR-J4- _B_.
Servo parameters not specified in the following table will be set to the initial values.

POINT

- Because the servo parameters of MR-J3-_A _ and those of MR-J4-_A_ are not completely interchangeable, the conversion rules may not be applied. Check the operations and review the settings as necessary.
- The value of the parameter writing after parameter conversion is the initial value.
  - MR-J4-_A_ parameter writing inhibit, parameter PA19: 00AA h
- Various offset parameters cannot be converted. Change the settings as necessary.
  - MR-J4-_A_ parameter PC37 to parameter PC40
- The following parameters of MR-J4-_A_ are compatible with the servo amplifier's software version A3 or later. The software version can be checked in the system configuration.
  - MR-J4-_A_ Absolute position detection system parameter PA03 _ _ _2h (Absolute position detection system by communication)
  - MR-J4-_A_ RS422 communication function selection parameter PC21
- When the geared servo motor is replaced, the reduction ratio may differ before and after the replacement. Check the specifications of the servo motor and review the electronic gear settings as necessary.
  - MR-J4-_A_ [Pr. PA05] to [Pr. PA07]

MR-J3-_A_				MR-J4-_A_			Conversion rule
No.	Name	Type	Target	No.	Type	Target	
PA01	Control mode	Hex	_ _ _ X	PA01	Hex	_ _ _ X	The setting value will be maintained.
PA02	regenerative option	Hex	_ _ XX	PA02	Hex	_ _ XX	The setting value will be maintained.
PA03	Absolute position detection system	Hex	_ _ _ X	PA03	Hex	_ _ _ X	01_ _ will be changed to _ _ 01. 02_ _ will be changed to _ _ 02. Otherwise, _ _ 00 will be set.
PA04	Function selection A-1	Hex	_ _ _ X	PD24	Hex	_ _ XX	01_ _ will be changed to _ _ 05. (MBR) The setting value other than above will not be maintained.
PA05	Number of command input pulses per revolution	Dec	-	PA05	Dec	-	0 will be changed to 10000. Otherwise, the setting value will be maintained.
				PA21	Hex	X_ _ _	0 will be changed to 2_ _ _. Otherwise, 1_ _ _ will be set.
PA06	Electronic gear numerator (Command pulse multiplying factor numerator)	Dec	-	PA06	Dec	-	The setting value will be maintained.
PA07	Electronic gear denominator (Command pulse multiplying factor denominator)	Dec	-	PA07	Dec	-	The setting value will be maintained.
PA08	Auto tuning mode	Hex	_ _ _ X	PA08	Hex	_ _ _ X	The setting value will be maintained.
PA09	Auto tuning response	Dec	-	PA09	Dec	-	The value 4 is added to the setting value.
PA10	In-position range	Dec	-	PA10	Dec	-	The setting value will be maintained.
PA11	Forward rotation torque limit	Dec	-	PA11	Dec	-	The setting value will be maintained.
PA12	Reverse rotation torque limit	Dec	-	PA12	Dec	-	The setting value will be maintained.
PA13	Command pulse input form	Hex	_ _ XX	PA13	Hex	_ _ XX	The setting value will be maintained.

Hex: hexadecimal parameter; Dec: decimal parameter

MR-J3-_A_				MR-J4-_A_			Conversion rule
No.	Name	Type	Target	No.	Type	Target	
PA14	Rotation direction selection	Dec	-	PA14	Dec	-	The setting value will be maintained.
PA15	Encoder output pulse	Dec	-	PA15	Dec	-	(1) When the setting value of PC19 is _ _ 1 _, the value increases by 16 times. (2) When the setting value of PC19 is other than _ _ 1 _, the setting value will be maintained.
PB01	Adaptive tuning mode (Adaptive filter Ⅱ)	Hex	_ _ _ X	PB01	Hex	_ _ _ X	The setting value will be maintained.
PB02	Vibration suppression control tuning mode (Advanced vibration suppression control)	Hex	_ _ _ X	PB02	Hex	_ _ _ X	The setting value will be maintained.
PB03	Feed forward gain	Dec	-	PB03	Dec	-	The setting value will be maintained.
PB04	For manufacturer setting	Dec	-	PB04	Dec	-	The setting value will be maintained.
PB06	Ratio of load inertia moment to servo motor inertia moment	Dec	-	PB06	Dec	-	One decimal place will be added.
PB07	Model loop gain	Dec	-	PB07	Dec	-	One decimal place will be added.
PB08	Position loop gain	Dec	-	PB08	Dec	-	One decimal place will be added.
PB09	Speed loop gain	Dec	-	PB09	Dec	-	The setting value will be maintained.
PB10	Speed integral compensation	Dec	-	PB10	Dec	-	The setting value will be maintained.
PB11	Speed differential compensation	Dec	-	PB11	Dec	-	The setting value will be maintained.
PB13	Machine resonance suppression filter 1	Dec	-	PB13	Dec	-	The setting value will be maintained.
PB14	Notch shape selection 1	Hex	_ XX_	PB14	Hex	_ XX_	The setting value will be maintained.
PB15	Machine resonance suppression filter 2	Dec	-	PB15	Dec	-	The setting value will be maintained.
PB16	Notch shape selection 2	Hex	_ XXX	PB16	Hex	_ XXX	The setting value will be maintained.
PB17	Automatic setting parameter	Hex	_ _ XX	PB17	Hex	_ _ XX	_ _ 01 will be changed to _ _ 00. Otherwise, the setting value will be maintained.
			_ X_ _			_ X_ _	The setting value will be maintained.
PB18	Low-pass filter setting	Dec	-	PB18	Dec	-	The setting value will be maintained.
PB19	Vibration suppression control vibration frequency setting	Dec	-	PB19	Dec	-	The setting value will be maintained.
PB20	Vibration suppression control resonance frequency setting	Dec	-	PB20	Dec	-	The setting value will be maintained.
PB23	Low-pass filter selection	Hex	_ _ X_	PB23	Hex	_ _ X_	The setting value will be maintained.
PB24	Slight vibration suppression control selection	Hex	_ _ _ X	PB24	Hex	_ _ _ X	The setting value will be maintained.
PB25	Function selection B-1	Hex	_ _ X_	PB25	Hex	_ _ X_	The setting value will be maintained.
PB26	Gain changing selection	Hex	_ _ XX	PB26	Hex	_ _ XX	The setting value will be maintained.
PB27	Gain changing condition	Dec	-	PB27	Dec	-	The setting value will be maintained.
PB28	Gain changing time constant	Dec	-	PB28	Dec	-	The setting value will be maintained.
PB29	Gain changing ratio of load inertia moment to servo motor inertia moment	Dec	-	PB29	Dec	-	One decimal place will be added.
PB30	Gain changing position loop gain	Dec	-	PB30	Dec	-	One decimal place will be added.
PB31	Gain changing speed loop gain	Dec	-	PB31	Dec	-	The setting value will be maintained.
PB32	Gain changing speed integral compensation	Dec	-	PB32	Dec	-	The setting value will be maintained.
PB33	Gain changing vibration suppression control vibration frequency setting	Dec	-	PB33	Dec	-	The setting value will be maintained.
PB34	Gain changing vibration suppression control resonance frequency setting	Dec	-	PB34	Dec	-	The setting value will be maintained.
PC01	Acceleration time constant	Dec	-	PC01	Dec	-	The setting value will be maintained.
PC02	Deceleration time constant	Dec	-	PC02	Dec	-	The setting value will be maintained.
PC03	S-pattern acceleration/deceleration time constant	Dec	-	PC03	Dec	-	The setting value will be maintained.
PC04	Torque command time constant	Dec	-	PC04	Dec	-	The setting value will be maintained.

Hex: hexadecimal parameter; Dec: decimal parameter

MR-J3-_A_				MR-J4-_A_			Conversion rule
No.	Name	Type	Target	No.	Type	Target	
PC05	Internal speed command 1 Internal speed limit 1	Dec	-	PC05	Dec	-	The setting value will be maintained.
PC06	Internal speed command 2 Internal speed limit 2	Dec	-	PC06	Dec	-	The setting value will be maintained.
PC07	Internal speed command 3 Internal speed limit 3	Dec	-	PC07	Dec	-	The setting value will be maintained.
PC08	Internal speed command 4 Internal speed limit 4	Dec	-	PC08	Dec	-	The setting value will be maintained.
PC09	Internal speed command 5 Internal speed limit 5	Dec	-	PC09	Dec	-	The setting value will be maintained.
PC10	Internal speed command 6 Internal speed limit 6	Dec	-	PC10	Dec	-	The setting value will be maintained.
PC11	Internal speed command 7 Internal speed limit 7	Dec	-	PC11	Dec	-	The setting value will be maintained.
PC12	Analog speed command maximum speed Analog speed limit maximum speed	Dec	-	PC12	Dec	-	The setting value will be maintained.
PC13	Analog torque command maximum output	Dec	-	PC13	Dec	-	The setting value will be maintained.
PC14	Analog monitor 1 output	Hex	_ _ XX	PC14	Hex	_ _ XX	The setting value will be maintained.
PC15	Analog monitor 2 output	Hex	_ _ XX	PC15	Hex	_ _ XX	The setting value will be maintained.
PC16	Electromagnetic brake sequence output	Dec	-	PC16	Dec	-	The setting value will be maintained.
PC17	Zero speed	Dec	-	PC17	Dec	-	The setting value will be maintained.
PC18	Alarm history clear	Hex	_ _ _ X	PC18	Hex	_ _ _ X	The setting value will be maintained.
PC19	Encoder output pulses selection	Hex	_ _ XX	PC19	Hex	_ _ XX	The setting value will be maintained.
PC20	Station number setting	Dec	-	PC20	Dec	-	The setting value will be maintained.
PC21	Communication function selection	Hex	_ XX_	PC21	Hex	_ XX_	The setting value will be maintained.
PC22	Function selection C-1	Hex	X_ _ _	PC22	Hex	X_ _ _	The setting value will be maintained.
PC23	Function selection C-2	Hex	_ _ _ X	PC23	Hex	_ _ _ X	The setting value will be maintained.
			XX_ _			XX_ _	The setting value will be maintained.
PC24	Function selection C-1	Hex	_ _ _ X	PC24	Hex	_ _ _ X	The setting value will be maintained.
PC26	Function selection C-5	Hex	_ _ _ X	PC26	Hex	_ _ _ X	The setting value will be maintained.
PC27	Function selection C-6	Hex	_ _ _ X	PC27	Hex	_ _ _ X	The setting value will be maintained.
PC30	Acceleration time constant 2	Dec	-	PC30	Dec	-	The setting value will be maintained.
PC31	Deceleration time constant 2	Dec	-	PC31	Dec	-	The setting value will be maintained.
PC32	Command pulse multiplying factor numerator 2	Dec	-	PC32	Dec	-	The setting value will be maintained.
PC33	Command pulse multiplying factor numerator 3	Dec	-	PC33	Dec	-	The setting value will be maintained.
PC34	Command pulse multiplying factor numerator 4	Dec	-	PC34	Dec	-	The setting value will be maintained.
PC35	Internal torque limit 2	Dec	-	PC35	Dec	-	The setting value will be maintained.
PC36	Status display selection	Hex	_ _ XX	PC36	Hex	_ _ XX	_ _1_ will be changed to _ _ 00. Otherwise, the setting value will be maintained.
			_ X_ _			_ X_ _	The setting value will be maintained.

Hex: hexadecimal parameter; Dec: decimal parameter

MR-J3-_A_				MR-J4-_A_			Conversion rule
No.	Name	Type	Target	No.	Type	Target	
PD01	Input signal automatic ON selection 1	Hex	_ XXX	PD01	Hex	_ XXX	The setting value will be maintained.
PD03	Input signal device selection 1 (CN1-15)	Hex	_ _ _ _ XXXX	PD03	Hex	XXXX	The setting value will be maintained.
			_ _ XX_ _ _ _	PD04	Hex	_ _ XX	The setting value will be maintained.
PD04	Input signal device selection 2 (CN1-16)	Hex	_ _ _ _ XXXX	PD05	Hex	XXXX	The setting value will be maintained.
			_ _ XX_ _ _ _	PD06	Hex	_ _ XX	The setting value will be maintained.
PD05	Input signal device selection 3 (CN1-17)	Hex	_ _ _ _ XXXX	PD07	Hex	XXXX	The setting value will be maintained.
			_ _ XX_ _ _ _	PD08	Hex	_ _ XX	The setting value will be maintained.
PD06	Input signal device selection 4 (CN1-18)	Hex	_ _ _ _ XXXX	PD09	Hex	XXXX	The setting value will be maintained.
			_ _ XX_ _ _ _	PD10	Hex	_ _ XX	The setting value will be maintained.
PD07	Input signal device selection 5 (CN1-19)	Hex	_ _ _ _ XXXX	PD11	Hex	XXXX	The setting value will be maintained.
			_ _ XX_ _ _ _	PD12	Hex	_ _ XX	The setting value will be maintained.
PD08	Input signal device selection 6 (CN1-41)	Hex	_ _ _ _ XXXX	PD13	Hex	XXXX	The setting value will be maintained.
			_ _ XX_ _ _ _	PD14	Hex	_ _ XX	The setting value will be maintained.
PD10	Input signal device selection 8 (CN1-43)	Hex	_ _ _ _ XXXX	PD17	Hex	XXXX	The setting value will be maintained.
			_ _ XX_ _ _ _	PD18	Hex	_ _ XX	The setting value will be maintained.
PD11	Input signal device selection 9 (CN1-44)	Hex	_ _ _ _ XXXX	PD19	Hex	XXXX	The setting value will be maintained.
			_ _ XX_ _ _ _	PD20	Hex	_ _ XX	The setting value will be maintained.
PD12	Input signal device selection 10 (CN1-45)	Hex	_ _ _ _ XXXX	PD21	Hex	XXXX	The setting value will be maintained.
			_ _ XX_ _ _ _	PD22	Hex	_ _ XX	The setting value will be maintained.
PD13	Output signal device selection 1 (CN1-22)	Hex	_ _ XX	PD23	Hex	_ _ XX	The setting value will be maintained.
PD14	Output signal device selection 2 (CN1-23)	Hex	_ _ XX	PD24	Hex	_ _ XX	PA04 =_ _ _1 will be changed to _ _ 05. (MBR) Otherwise, the setting value will be maintained.
PD15	Output signal device selection 3 (CN1-24)	Hex	_ _ XX	PD25	Hex	_ _ XX	The setting value will be maintained.
PD16	Output signal device selection 4 (CN1-25)	Hex	_ _ XX	PD26	Hex	_ _ XX	The setting value will be maintained.
PD18	Output signal device selection 6 (CN1-49)	Hex	_ _ XX	PD28	Hex	_ _ XX	The setting value will be maintained.
PD19	Input filter setting	Hex	_ _ _ X	PD29	Hex	_ _ _ X	_ _ _ 1 will be changed to _ _ _ 2. _ _ _ 2 will be changed to _ _ _ 4. _ _ _ 3 will be changed to _ _ _ 4. Otherwise, the setting value will be maintained.
PD20	Function selection D-1	Hex	_ _ XX	PD30	Hex	_ _ XX	The setting value will be maintained.
PD22	Function selection D-3	Hex	_ _ _ X	PD32	Hex	_ _ _ X	The setting value will be maintained.
PD24	Function selection D-5	Hex	_ _ XX	PD34	Hex	_ _ XX	The setting value will be maintained.

Hex: hexadecimal parameter; Dec: decimal parameter

2.2.6 Parameters that need to be checked after parameter conversion

Parameter No.	Name	Initial value	Setting value	Description
PA03	Absolute position detection system	-	-	Absolute position detection system selection When the setting before conversion is "_ _ _2: Enabled (absolute position detection system by communication)", this parameter can be set for MR-J4-A with software version A3 or later. A parameter error will occur when the software version A2 or earlier is used.
PA04	Function selection A-1	2000h	0_ _ _h	Forced stop deceleration function selection To configure the same settings as those for MR-J3-_A_, select "Forced stop deceleration function disabled (EM1)"
PA09	Auto tuning response	-	-	Auto tuning response setting Adjust the gain value again after the replacement.
PC21	RS-422 Absolute position detection system	-	-	• RS-422 communication baud rate selection This parameter can be set when MR-J4-_A_ with software version A3 or later is used for the conversion from MR-J3-_A_. A parameter error will occur when the software version A2 or earlier is used. • RS-422 communication response delay time (supported by software version A3 or later)
PC37	Absolute position detection system/ Analog speed limit offset	-	-	Not converted by the parameter converter function. Set the value as required.
PC38	Analog torque command offset/ Analog torque limit offset			Set the value as required.
PC39	Analog monitor 1 offset			Set the value as required.
PC40	Analog monitor 2 offset			Set the value as required.
PD29	Input signal filter setting	-	-	When the setting before conversion has exceeded 3.55 [ms], the setting will be converted to "4: 3.555 [ms]". When MR-J4-_A_ with the software version B3 or later is used, "6: 5.333 [ms]" can be set.

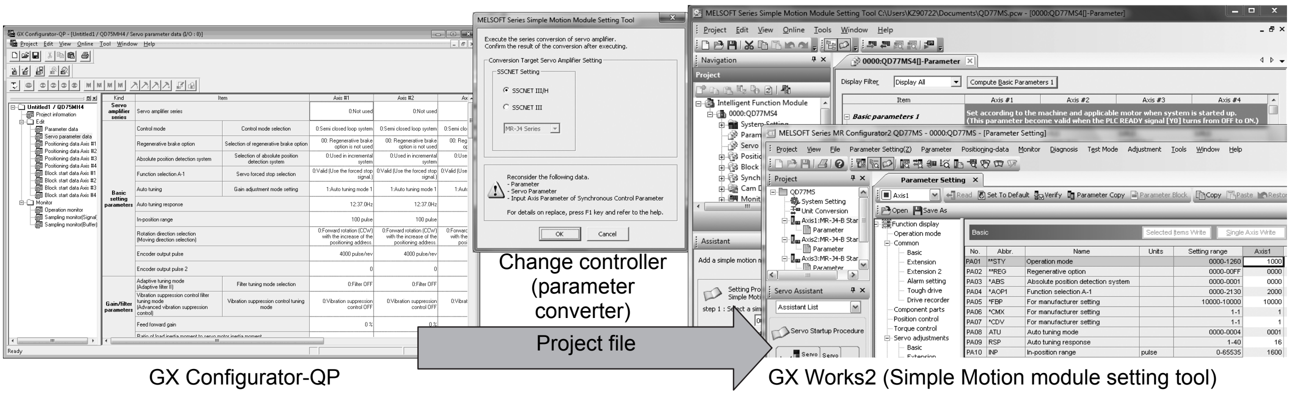
Note 1. For items that have no setting values listed in the table, refer to "Part 2: Review on Replacement of MR-J3-_A_ with MR-J4-_A_".

2.3 MR-J3-_B_ Parameter Diversion Procedure

The parameter converter functions of GX Works2 and MT Developer2 convert the servo parameters of MR-J3-_B_ to those of MR-J4-_B_ when the controller is changed.
(GX Works2: 1.84N or later, MT Developer2: 1.41T or later)

POINT
●Parameters common to MR-J3-_B_ and MR-J4-_B_ are the conversion targets. The initial value of MR-J4-_B_ is set for additional parameters of MR-J4-_B_.

(Target model)
• Positioning module QD75MH to Simple Motion module QD77MS/LD77MS
• Motion controller Q17nHCPU/Q17nDCPU/Q170MCPU to Q17nDSCPU/Q170MSCPU(-S1)



GX Configurator-QP
SW3RNC-GSVE
SW6RNC-GSVE

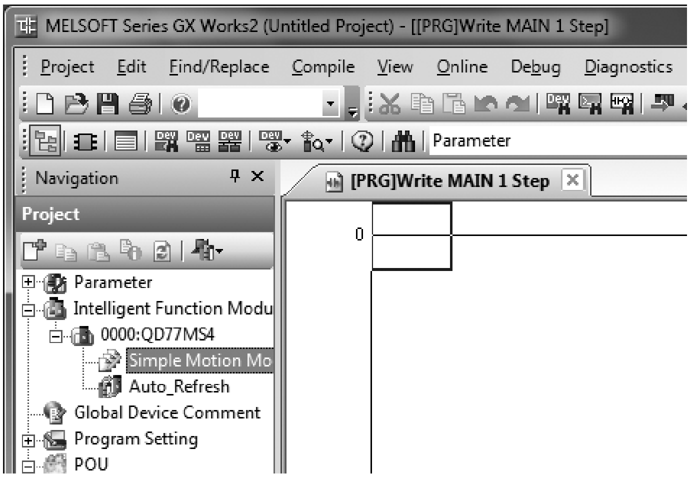
GX Works2 (Simple Motion module setting tool)
MT Developer2

Change MR-J3-_B_ to MR-J4-_B_

2.3.1 Changing QD75MH to QD77MS/LD77MS

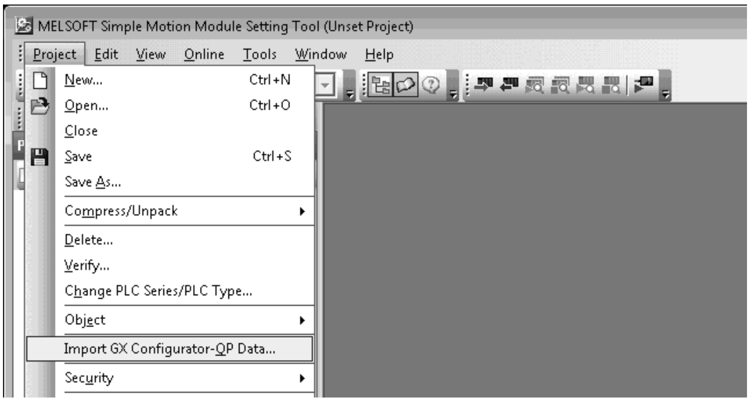
(1) Start GX Works2 and create a project.

(2) Right-click [Intelligent Function Module] in the Navigation window and select [New Module] to add the simple motion module QD77MS/LD77MS.

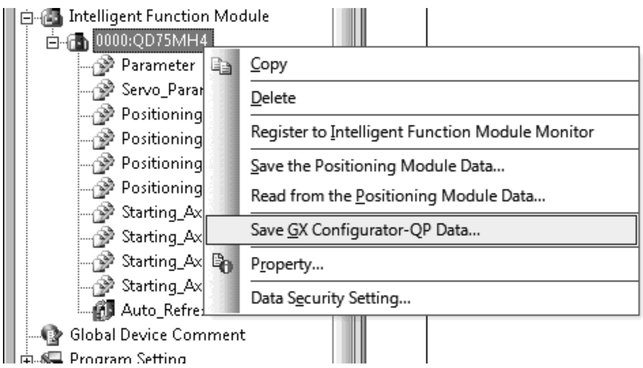


(3) Double-click [Simple Motion Module Setting] of the added simple motion module to start the simple motion module setting tool.

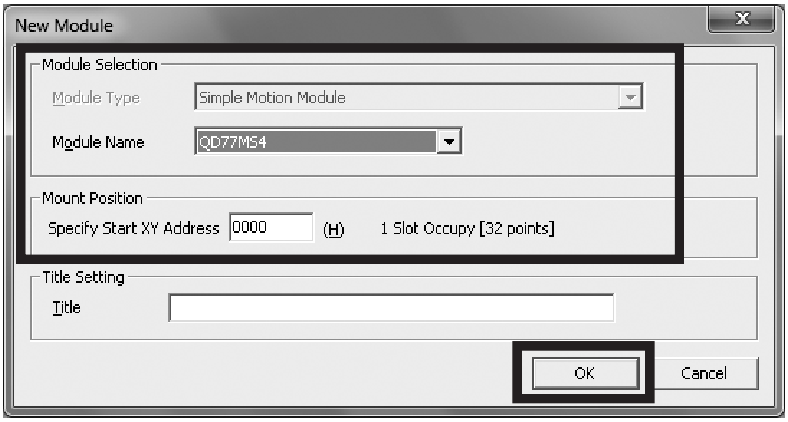
(4) Read the GX Configurator-QP data.
Click [Project] - [Import GX Configurator-QP Data] from the menu to display the screen for reading GX Configurator-QP data. Specify and read QD75MH data.



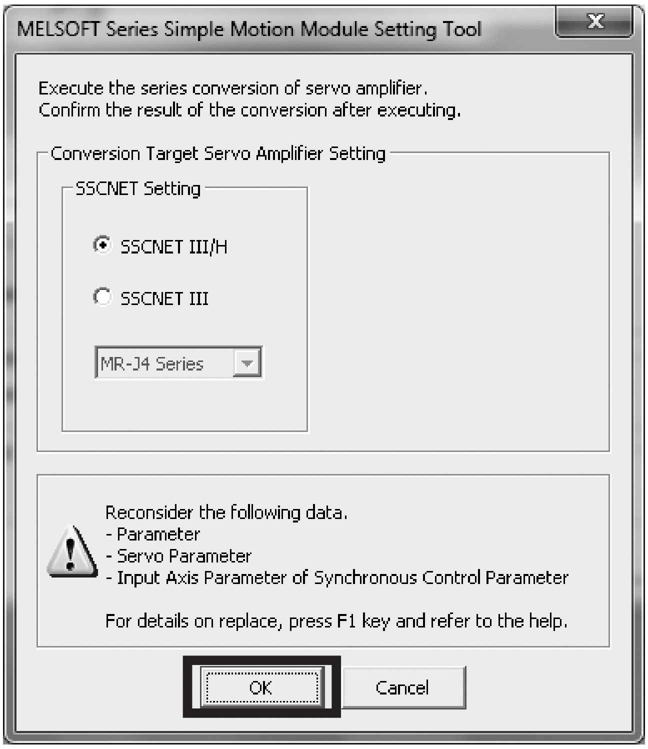
When using QD75 data made on GX Works2, save the QD75 data as GX Configurator-QP data on GX Works2 and perform the above operation.



(5) Specify the target module.
Specify the model and the head XY address of the target module and then click the [OK] button.

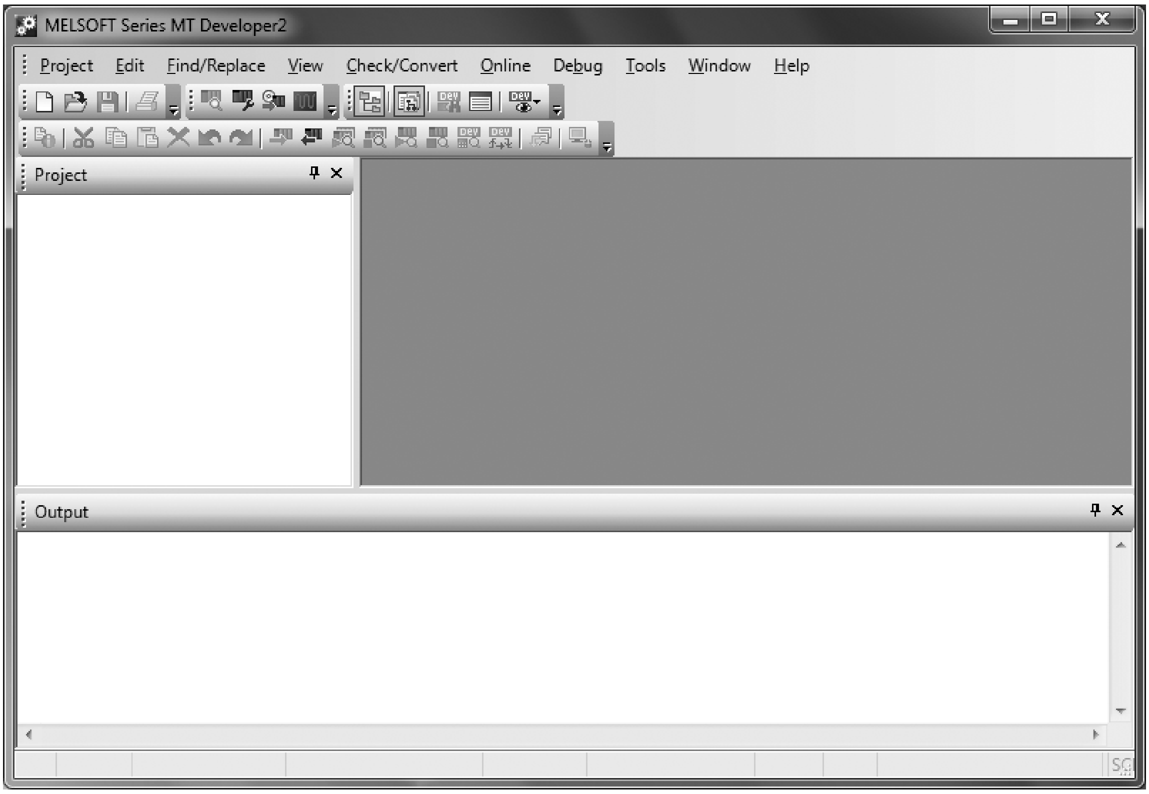


(6) Execute servo parameter conversion.
Select the target servo amplifier setting and click the [OK] button.
The servo parameters are converted as follows depending on the target servo amplifier setting.
When "SSCNET III / H" is selected, MR-J3-_B_ is converted to MR-J4-_B_.
When "SSCNET III" is selected: Utilize the MR-J3-_B_ data without conversion.

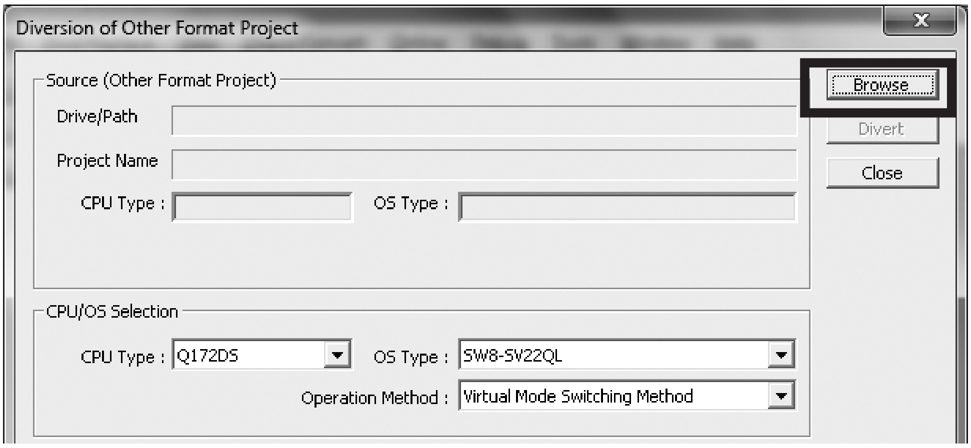


2.3.2 Changing Q17nHCPU/Q17nDCPU/Q170MCPU to Q17nDSCPU/Q170MSCPU(-S1)

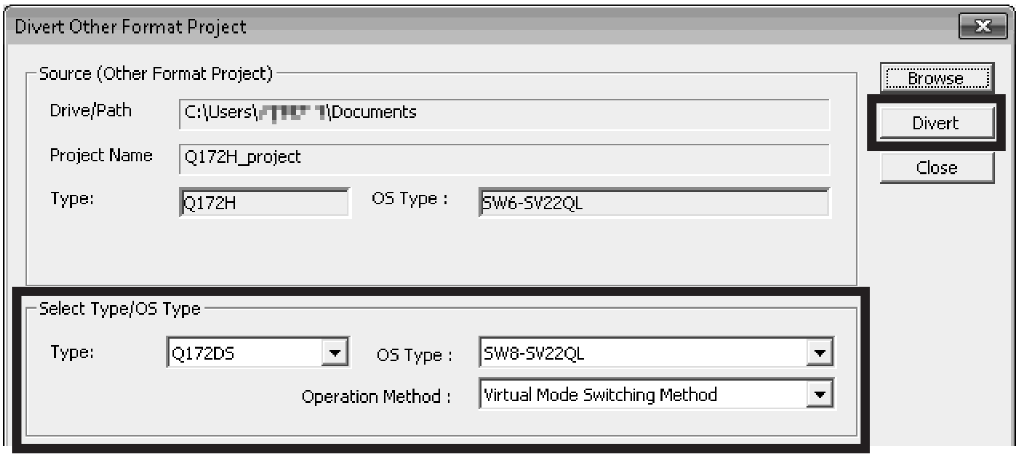
(1) Start MT Developer2.



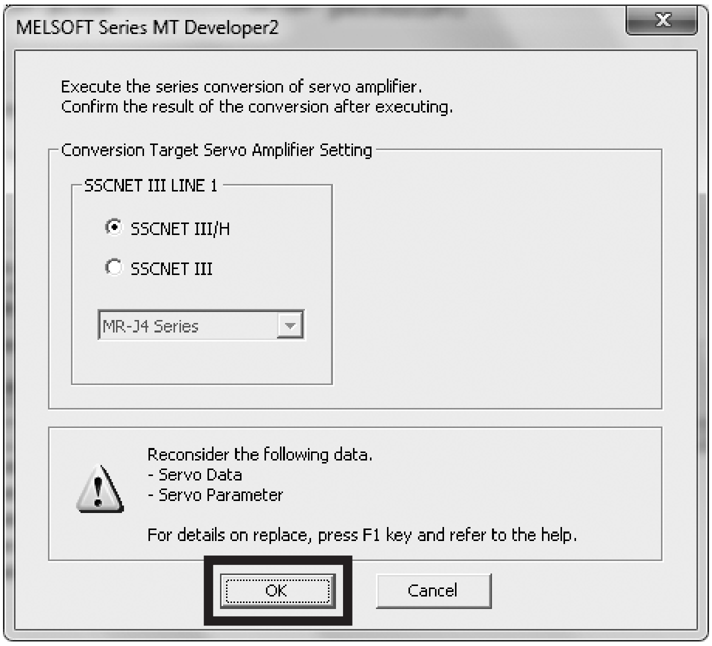
(2) Select the source project.
Click [Project] - [Divert File] - [Diversion of Other Format Project] from the menu to display the Diversion of Other Format Project window. Click the [Browse] button and select a source project.
To divert an MT Developer2 project, click [Project] - [Divert File] - [Utilize MT Developer file format Project] from the menu.



(3) Execute file diversion.
Select the CPU type, OS type, and Operation method in the CPU/OS selection, and click the [Diversion] button.



(4) Execute servo parameter conversion.
Select the target servo amplifier setting and click the [OK] button.
The servo parameters are converted as follows depending on the target servo amplifier setting.
When "SSCNET III / H" is selected, MR-J3-_B_ is converted to MR-J4-_B_.
When "SSCNET III" is selected: Utilize the MR-J3-_B_ data without conversion.



2.3.3 Conversion rules (MR-J3-_B_ => MR-J4-_B_)

The following table shows the servo parameter conversion rules from MR-J3-_B_ (standard) to MR-J4- _B_ standard.
Servo parameters not specified in the following table will be set to the initial values.

POINT

- Because the servo parameters of MR-J3-_B_ and those of MR-J4-_B_ are not completely interchangeable, the conversion rules may not be applied. Check the operations and review the settings as necessary.
- The parameter writing inhibit after parameter conversion is the initial value (the following setting value).
  • MR-J4-_B_ parameter writing inhibit, parameter PA19: 00ABh
- Various offset parameters cannot be converted. Change the settings as necessary.
  • MR-J4-_B_ parameter PC11, parameter PC12
- When the geared servo motor is replaced, the reduction ratio may differ before and after the replacement. Check the specifications of the servo motor and review the electronic gear settings as necessary. For the electronic gear settings, refer to the controller instruction manual.
- Some parameters are not supported depending on the software version of the servo amplifier. Refer to section 2.3.4 for details.

MR-J3-_B_				MR-J4-_B_			Conversion rules
No.	Name	Type	Target	No.	Type	Target	
PA02	Regenerative option	Hex	_ _ XX	PA02	Hex	_ _ XX	The setting value will be maintained.
PA03	Absolute position detection system	Hex	_ _ _ X	PA03	Hex	_ _ _ X	The setting value will be maintained.
PA04	Function selection A-1	Hex	_ X_ _	PA04	Hex	_ X_ _	The setting value will be maintained.
PA08	Auto tuning mode	Hex	_ _ _ X	PA08	Hex	_ _ _ X	The setting value will be maintained.
PA09	Auto tuning response	Dec	-	PA09	Dec	-	The value 4 is added to the setting value.
PA10	In-position range	Dec	-	PA10	Dec	-	The setting value will increase by 16 times when it is 4095 or smaller. The setting value other than the above will be 65535.
PA14	Rotation direction selection	Dec	-	PA14	Dec	-	The setting value will be maintained.
PA15	Encoder output pulses	Dec	-	PA15	Dec	-	When the setting value of PC03 is _ _ 1_, the setting value of PA15 is increased by 16 times. However, when the value is 65535 or larger, the setting value will be 65535. When the setting value of PC03 is other than _ _1_, it will be maintained.
PB01	Adaptive tuning mode (Adaptive filter II)	Hex	_ _ _ X	PB01	Hex	_ _ _ X	The setting value will be maintained.
PB02	Vibration suppression control tuning mode (advanced vibration suppression control)	Hex	_ _ _ X	PB02	Hex	_ _ _ X	The setting value will be maintained.
PB04	Feed forward gain	Dec	-	PB04	Dec	-	The setting value will be maintained.
PB06	Ratio of load inertia moment to servo motor inertia moment	Dec	-	PB06	Dec	-	One decimal place will be added.
PB07	Model loop gain	Dec	-	PB07	Dec	-	One decimal place will be added.
PB08	Position loop gain	Dec	-	PB08	Dec	-	One decimal place will be added.
PB09	Speed loop gain	Dec	-	PB09	Dec	-	The setting value will be maintained.
PB10	Speed integral compensation	Dec	-	PB10	Dec	-	The setting value will be maintained.
PB11	Speed differential compensation	Dec	-	PB11	Dec	-	The setting value will be maintained.

Hex: hexadecimal parameter; Dec: decimal parameter

MR-J3-_B_				MR-J4-_B_			Conversion rules
No.	Name	Type	Target	No.	Type	Target	
PB12	Overshoot amount compensation	Dec	-	PB12	Dec	-	The setting value will be maintained.
PB13	Machine resonance suppression filter 1	Dec	-	PB13	Dec	-	The setting value will be maintained.
PB14	Notch shape selection 1	Hex	_ XX_	PB14	Hex	_ XX_	The setting value will be maintained.
PB15	Machine resonance suppression filter 2	Dec	-	PB15	Dec	-	The setting value will be maintained.
PB16	Notch shape selection 2	Hex	_ XXX	PB16	Hex	_ XXX	The setting value will be maintained.
PB17	Automatic setting parameter Low-pass filter setting	Hex	_ _ XX _ X_ _	PB17	Hex	_ _ XX _ X_ _	_ _ 01 will be changed to _ _ 00. Otherwise, the setting value will be maintained.
PB18	Vibration suppression control vibration frequency setting	Dec	-	PB18	Dec	-	The setting value will be maintained.
PB19	Vibration suppression control resonance frequency setting	Dec	-	PB19	Dec	-	The setting value will be maintained.
PB20	Automatic setting parameter	Dec	-	PB20	Dec	-	The setting value will be maintained.
PB23	Low-pass filter selection	Hex	_ _ X_	PB23	Hex	_ _ X_	The setting value will be maintained.
PB24	Slight vibration suppression control selection	Hex	_ _ XX	PB24	Hex	_ _ XX	The setting value will be maintained.
PB26	Gain changing selection	Hex	_ _ XX	PB26	Hex	_ _ XX	The setting value will be maintained.
PB27	Gain changing condition	Dec	-	PB27	Dec	-	The setting value will be maintained.
PB28	Gain changing time constant	Dec	-	PB28	Dec	-	The setting value will be maintained.
PB29	Gain changing ratio of load inertia moment to servo motor inertia moment	Dec	-	PB29	Dec	-	One decimal place will be added.
PB30	Gain changing position loop gain	Dec	-	PB30	Dec	-	One decimal place will be added.
PB31	Gain changing speed loop gain	Dec	-	PB31	Dec	-	The setting value will be maintained.
PB32	Gain changing speed integral compensation	Dec	-	PB32	Dec	-	The setting value will be maintained.
PB33	Gain changing vibration suppression control vibration frequency setting	Dec	-	PB33	Dec	-	The setting value will be maintained.
PB34	Gain changing vibration suppression control resonance frequency setting	Dec	-	PB34	Dec	-	The setting value will be maintained.
PB45	Vibration suppression control filter 2	Hex	_ XXX	PB45	Hex	_ XXX	The setting value will be maintained.
PC01	Error excessive alarm level	Dec	-	PC01	Dec	-	The setting value will be maintained.
PC02	Electromagnetic brake sequence output	Dec	-	PC02	Dec	-	The setting value will be maintained.
PC03	Encoder output pulses selection	Hex	_ _ XX	PC03	Hex	_ _ XX	The setting value will be maintained.
PC04	Function selection C-1	Hex	X_ _ _	PC04	Hex	X_ _ _	The setting value will be maintained.
PC05	Function selection C-2	Hex	_ _ _ X	PC05	Hex	_ _ _ X	The setting value will be maintained.
PC06	Function selection C-3	Hex	X_ _ _	PC06	Hex	X_ _ _	The setting value will be maintained.
PC07	Zero speed	Dec	-	PC07	Dec	-	The setting value will be maintained.
PC09	Analog monitor 1 output	Hex	_ _ _ X	PC09	Hex	_ _ _ X	The setting value will be maintained.
PC10	Analog monitor 2 output	Hex	_ _ _ X	PC10	Hex	_ _ _ X	The setting value will be maintained.
PC13	Analog monitor feedback position output standard data Low	Dec	-	PC13	Dec	-	The lower four digits of the calculation result of PC14 × 160000 + PC13 × 16 will be set. However, when the calculation result is -99999999 or smaller, -9999 will be set. When the calculation result is 99999999 or larger, 9999 will be set.
PC14	Analog monitor feedback position output standard data High	Dec	-	PC14	Dec	-	The integral value of the calculation result of (PC14 × 160000 + PC13 × 16) ÷ 10000 will be set. However, when the calculation result is -9999 or smaller, -9999 will be set. When the calculation result is 9999 or larger, 9999 will be set.

Hex: hexadecimal parameter; Dec: decimal parameter

MR-J3-_B_				MR-J4-_B_			Conversion rule
No.	Name	Type	Target	No.	Type	Target	
PC17	Function selection C-4	Hex	_ _ _ X	PC17	Hex	_ _ _ X	The setting value will be maintained.
PC20	Function selection C-7	Hex	_ _ _ X	PC20	Hex	_ _ _ X	The setting value will be maintained.
PC21	Alarm history clear	Hex	_ _ _ X	PC21	Hex	_ _ _ X	The setting value will be maintained.
PD07	Output signal device selection 1 (CN3-13)	Hex	_ _ XX	PD07	Hex	_ _ XX	_ _ 0B will be changed to _ _ 05. Otherwise, the setting value will be maintained.
PD08	Output signal device selection 2 (CN3-9)	Hex	_ _ XX	PD08	Hex	_ _ XX	_ _ 0B will be changed to _ _ 04. Otherwise, the setting value will be maintained.
PD09	Output signal device selection 3 (CN3-15)	Hex	_ _ XX	PD09	Hex	_ _ XX	_ _ 0B will be changed to _ _ 03. Otherwise, the setting value will be maintained.
PD14	Function selection D-3	Hex	_ _ X_	PD14	Hex	_ _ X_	The setting value will be maintained.
PD15	Driver communication setting	Hex	_ _ XX	PD15	Hex	_ _ XX	The setting value will be maintained.
PD16	Driver communication setting - Master - Transmit data selection 1	Hex	_ _ XX	PD16	Hex	_ _ XX	The setting value will be maintained.
PD17	Driver communication setting - Master - Transmit data selection 2	Hex	_ _ XX	PD17	Hex	_ _ XX	The setting value will be maintained.
PD20	Driver communication setting - Slave - Master axis No. selection 1	Dec	-	PD20	Dec	-	The setting value will be maintained.
PD30	Master-slave operation - Torque command coefficient on slave	Hex	XXXX	PD30	Dec	-	A hexadecimal value without sign will be converted into a decimal value. When the setting value is larger than 500, it will be 500.
PD31	Master-slave operation - Speed limit coefficient on slave	Hex	XXXX	PD31	Dec	-	A hexadecimal value without sign will be converted into a decimal value. When the setting value is larger than 500, it will be 500.
PD32	Master-slave operation - Speed limit adjusted value on slave	Hex	XXXX	PD32	Dec	-	A hexadecimal value without sign will be converted into a decimal value.

Hex: hexadecimal parameter; Dec: decimal parameter

2.3.4 Parameters that need to be checked after parameter conversion

Parameter No.	Name	Initial value	Setting value	Description
PA04	Function selection A-1	2000h	0_ _ _h	Forced stop deceleration function selection To configure the same settings as those for MR-J3-_B_, select "Forced stop deceleration function disabled (EM1)".
PA09	Auto tuning response	-	-	Auto tuning response setting Adjust the gain value again after the replacement.
PA10	In-position range	-	-	In-position range When the setting of MR-J3-_B_ is larger than 4095 [pulse], it will be converted into 65535 [pulse]. Check for any problems of the equipment.
PA15	Encoder output pulses	-	-	Encoder output pulses When the setting of MR-J3-_B_ is larger than 4095 [pulse] and the output dividing ratio setting is selected, 65535 [pulse] will be set. Check for any problems of the equipment.
PC03	Encoder output pulse selection	-	-	Encoder output pulse setting selection To use "_ _4_: Encoder pulse through output setting", use MR-J4-_B_ with the software version A5 or later. A parameter error will occur when the software version A4 or earlier is used.
PC11	Analog monitor 1 offset	-	-	Set the value as required.
PC12	Analog monitor 2 offset	-	-	Set the value as required.
PC13	Analog monitor feedback position output standard data Low	-	-	Set the value as required.
PC14	Analog monitor feedback position output standard data High	-	-	Set the value as required.
PD15	Driver communication setting	-	-	• Master axis operation selection • Slave axis operation selection Use MR-J4-_B_ with the software version A8 or later to use this function. A parameter error will occur when MR-J4-_B_ with the software version A7 or earlier is used.
PD16	Driver communication setting - Master - Transmit data selection 1	-	-	Driver communication setting - Master - Transmit data selection 1 Use MR-J4-_B_ with the software version A8 or later to use this function. A parameter error will occur when MR-J4-_B_ with the software version A7 or earlier is used.
PD17	Driver communication setting - Master - Transmit data selection 2	-	-	Driver communication setting - Master - Transmit data selection 2 Use MR-J4-_B_ with the software version A8 or later to use this function. A parameter error will occur when MR-J4-_B_ with the software version A7 or earlier is used.
PD20	Driver communication setting - Slave - Master axis No. selection 1	-	-	Driver communication setting - Slave - Master axis No. selection 1 Use MR-J4-_B_ with the software version A8 or later to use this function. A parameter error will occur when MR-J4-_B_ with the software version A7 or earlier is used.
PD30	Master-slave operation - Torque command coefficient on slave	-	-	Master-slave operation - Torque command coefficient on slave Use MR-J4-_B_ with the software version A8 or later to use this function. A parameter error will occur when MR-J4-_B_ with the software version A7 or earlier is used.
PD31	Master-slave operation - Speed limit coefficient on slave	-	-	Master-slave operation - Speed limit coefficient on slave Use MR-J4-_B_ with the software version A8 or later to use this function. A parameter error will occur when MR-J4-_B_ with the software version A7 or earlier is used.

Note 1. For items that have no setting value listed in the table, see "Part 3: Review on Replacement of MR-J3-_B_ with MR-J4-_B_".

Parameter No.	Name	Initial value	Setting value	Description
PD32	Master-slave operation - Speed limit adjusted value on slave	-	-	Master-slave operation - Speed limit adjusted value on slave Use MR-J4-_B_ with the software version A8 or later to use this function. A parameter error will occur when MR-J4-_B_ with the software version A7 or earlier is used.
PE05	Fully closed loop control - Feedback pulse electronic gear 1 - Denominator	-	-	Fully closed loop control - Feedback pulse electronic gear 1 - Denominator The parameter conversion will convert the value of (PE05 × PE35) to be increased by 16 times. When the value is out of the range in the parameter of MR-J4-_B_, the value before conversion will be maintained. Set a value as necessary.
PE35	Fully closed loop control - Feedback pulse electronic gear 2 - Denominator	-	-	Fully closed loop control - Feedback pulse electronic gear 2 - Denominator The parameter conversion will convert the value of (PE05 × PE35) to be increased by 16 times. When the value is out of the range in the parameter of MR-J4-_B_, the value before conversion will be maintained. Set a value as necessary.

Note 1. For items that have no setting value listed in the table, see "Part 3: Review on Replacement of MR-J3-_B_ with MR-J4-_B_".

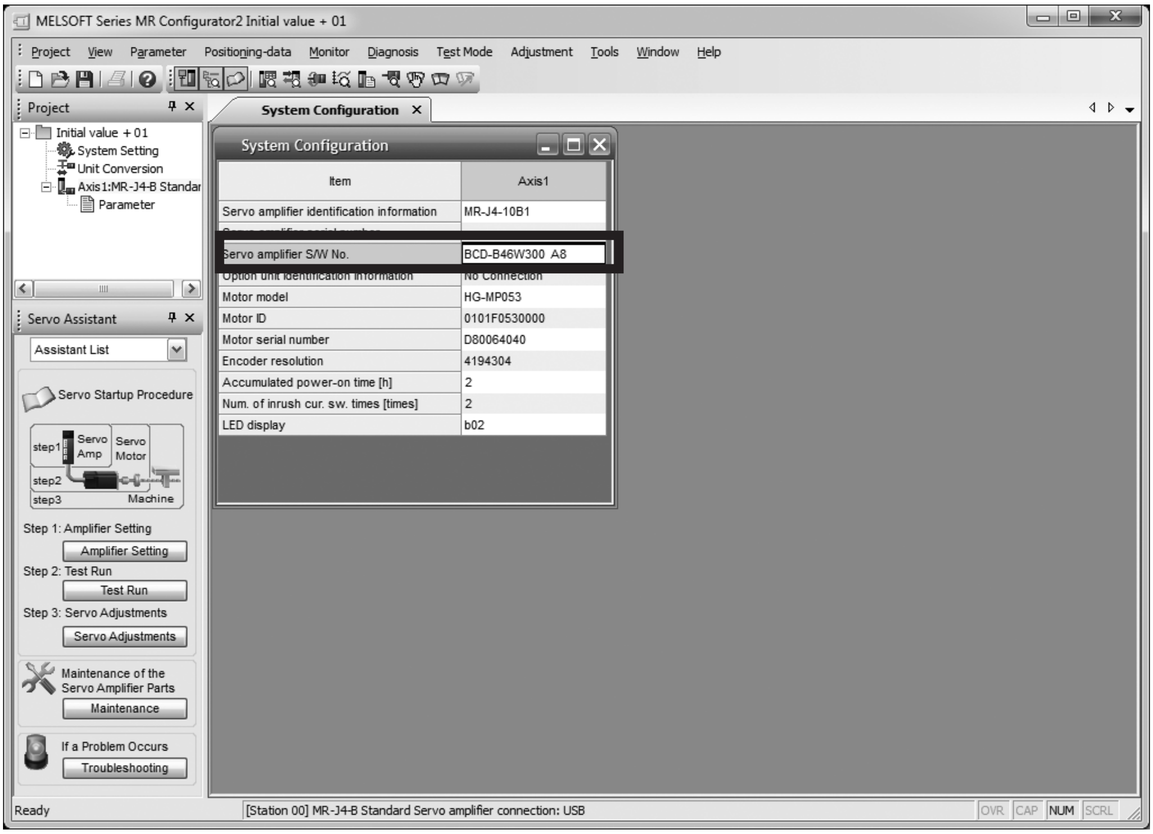
3. COMMON POINTS TO NOTE

3.1 Method for checking the software version

3.1.1 Checking with MR Configurator2 (SW1DNC-MRC2-E)

Check the software version of the servo amplifier with MR Configurator2 (SW1DNC-MRC2-E).
Start MR Configurator2. Select [Diagnosis] - [System Configuration] from the menu to display the servo amplifier software No.

Servo amplifier software No.: BCD-○○○○○○○ ○○
↓ software No. ↓ software version



Checking with MR Configurator2

4. COMMUNICATION FUNCTION (MITSUBISHI GENERAL-PURPOSE AC SERVO PROTOCOL)

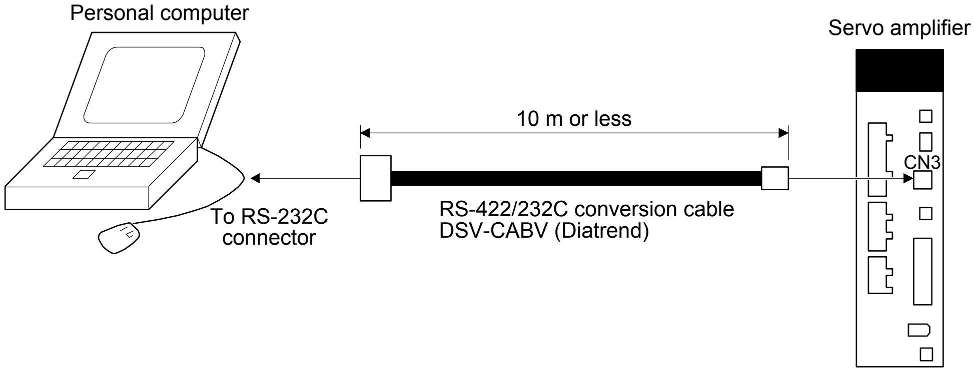
POINT
●RS-422 serial communication function is supported by servo amplifier with software version A3 or later. ●The USB communication function (CN5 connector) and the RS-422 communication function (CN3 connector) are mutually exclusive functions. They cannot be used together.

You can operate servo driving, parameter change, monitor function, etc. using RS-422 communication (Mitsubishi general-purpose AC servo protocol) with the servo amplifier.

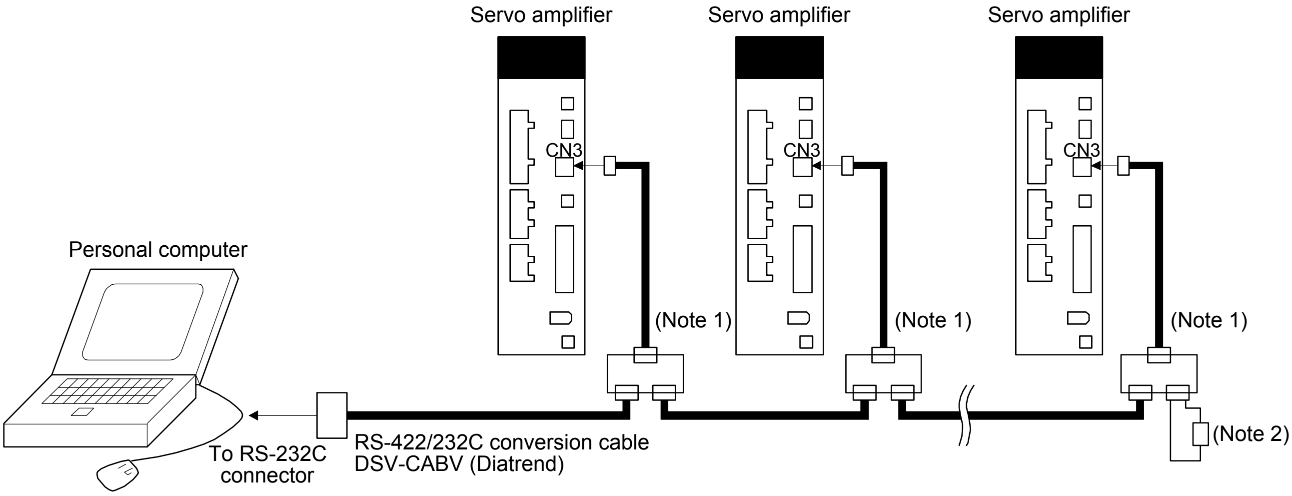
4.1 Structure

4.1.1 Configuration diagram

(1) Single axis
Operate the single-axis servo amplifier. It is recommended to use the following cable.



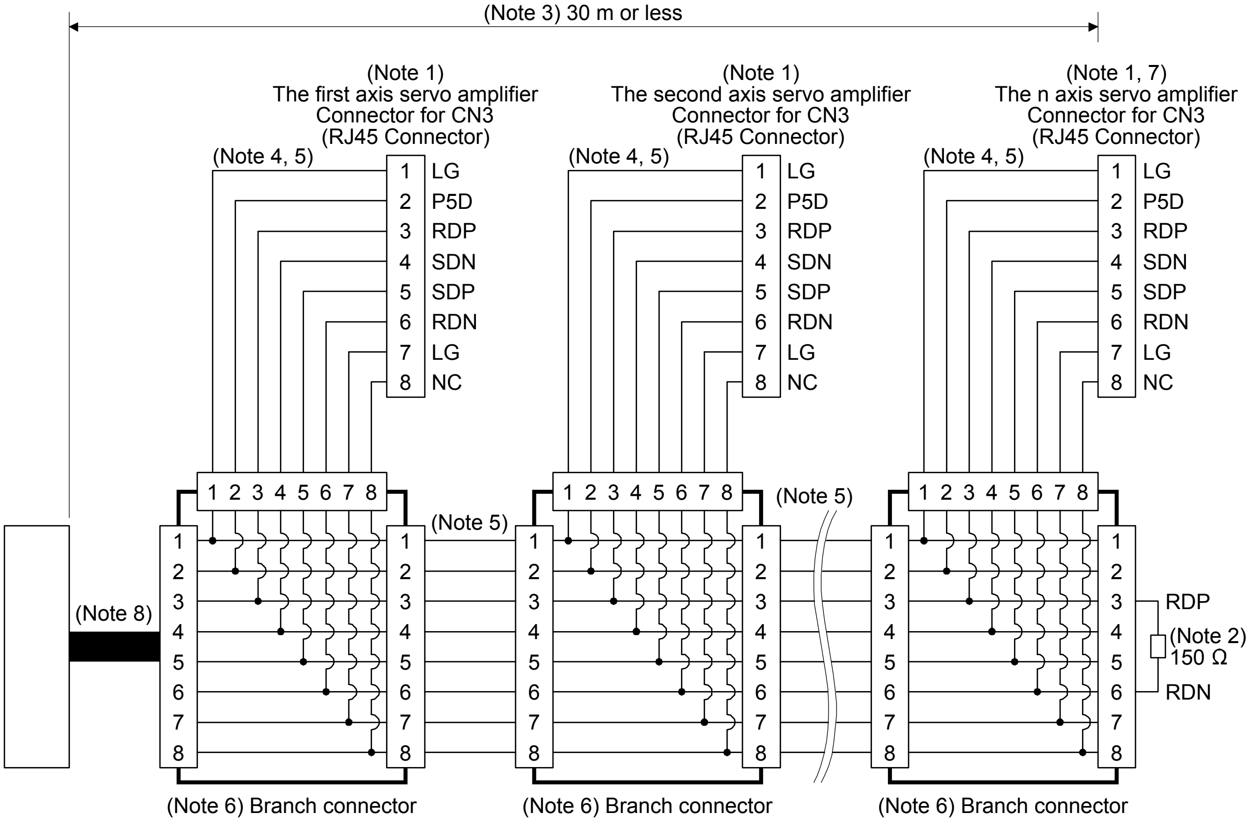
(2) Multi-drop connection
(a) Diagrammatic sketch
Up to 32 axes of servo amplifiers from stations 0 to 31 can be operated on the same bus.



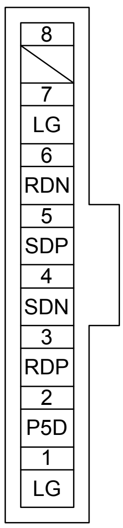
Note 1. The BMJ-8 (Hachiko Electric) is recommended as the branch connector.
2. The final axis must be terminated between RDP (pin No.3) and RDN (pin No.6) on the receiving side (servo amplifier) with a 150 Ω resistor.

(b) Cable connection diagram

Wire the cables as follows.



Note 1. Recommended connector (Hirose Electric)
Plug: TM10P-88P
Connection tool: CL250-0228-1
The following shows pin assignment viewed from connector wiring section.



2. The final axis must be terminated between RDP (pin No.3) and RDN (pin No.6) on the receiving side (servo amplifier) with a 150 Ω resistor.
3. The overall length is 30 m or less in low-noise environment.
4. The wiring between the branch connector and servo amplifier should be as short as possible.
5. Use the EIA568-compliant cable (10BASE-T cable, etc.).
6. Recommended branch connector: BMJ-8 (Hachiko Electric)
7. n ≤ 32 (Up to 32 axes can be connected.)
8. RS-422/232C conversion cable DSV-CABV (Diatrend)

4.1.2 Precautions for using RS-422/RS-232C/USB communication function

Note the following to prevent an electric shock and malfunction of the servo amplifier.

(1) Power connection of personal computers
Connect your personal computer with the following procedures.

(a) When you use a personal computer with AC power supply

1) When using a personal computer with a three-core power plug or power plug with grounding wire, use a three-pin socket or ground the grounding wire.

2) When your personal computer has two-core plug and has no grounding wire, connect the personal computer to the servo amplifier with the following procedures.

a) Disconnect the power plug of the personal computer from an AC power socket.

b) Check that the power plug was disconnected and connect the device to the servo amplifier.

c) Connect the power plug of the personal computer to the AC power socket.

(b) When you use a personal computer with battery
You can use as it is.

(2) Connection with other devices using servo amplifier communication function
When the servo amplifier is charged with electricity due to connection with a personal computer and the charged servo amplifier is connected with other devices, the servo amplifier or the connected devices may malfunction. Connect the servo amplifier and other devices with the following procedures.

(a) Shut off the power of the device for connecting with the servo amplifier.

(b) Shut off the power of the servo amplifier which was connected with the personal computer and check the charge lamp is off.

(c) Connect the device with the servo amplifier.

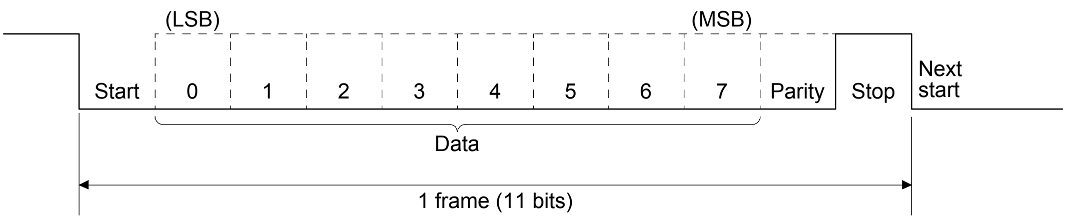
(d) Turn on the power of the servo amplifier and the device.

4.2 Communication specifications

4.2.1 Outline of communication

Receiving a command, this servo amplifier returns data. The device which gives the command (e.g. personal computer) is called a master station and the device (servo amplifier) which returns data in response to the command is called a slave station. When fetching data successively, the master station repeatedly commands the slave station to send data.

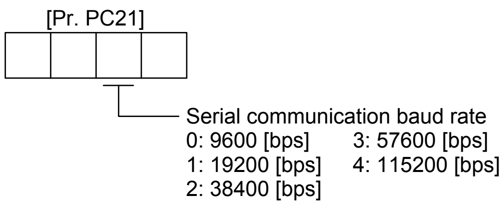
Item	Definition	
Baud rate [bps]	9600/19200/38400/57600/115200 asynchronous system	
Transfer code	Start bit	1 bit
	Data bit	8 bits
	Parity bit	1 bit (even)
	Stop bit	1 bit
Transfer method	Character method	Half-duplex communication method



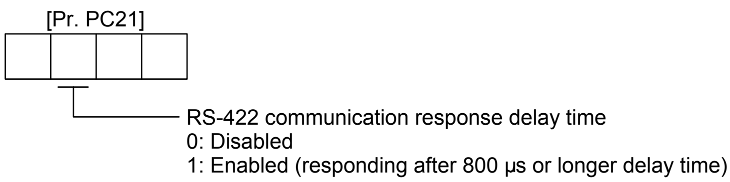
4.2.2 Parameter setting

When the RS-422 communication function is used to operate the servo, set the communication specifications of the servo amplifier with the parameters.
To enable the parameter values, cycle the power after setting.

(1) Serial communication baud rate
Select the communication speed. Match this value to the communication speed of the sending end (master station).



(2) RS-422 communication response delay time
Set the time from when the servo amplifier (slave station) receives communication data to when it returns data. Set "0" to return data in less than 800 μs or "1" to return data in 800 μs or longer.



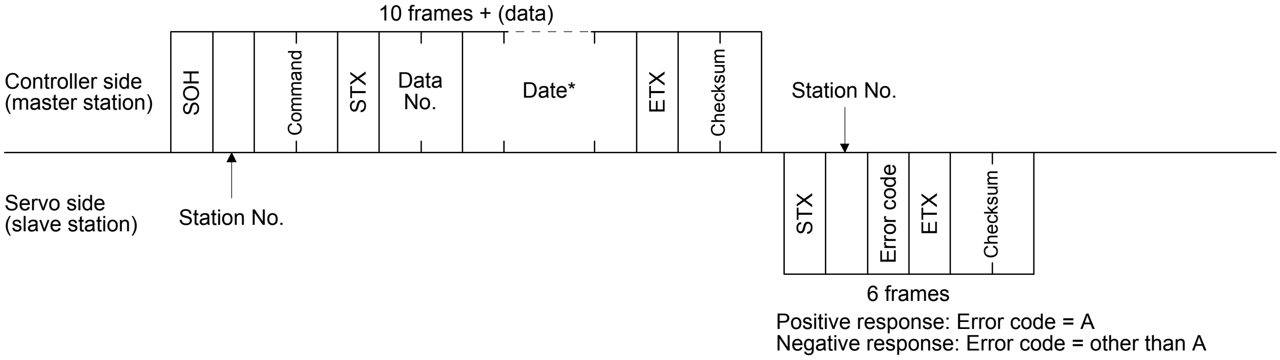
(3) Station No. setting
Set the station No. of the servo amplifier to [Pr. PC20]. The setting range is station No. 0 to 31.

4.3 Protocol

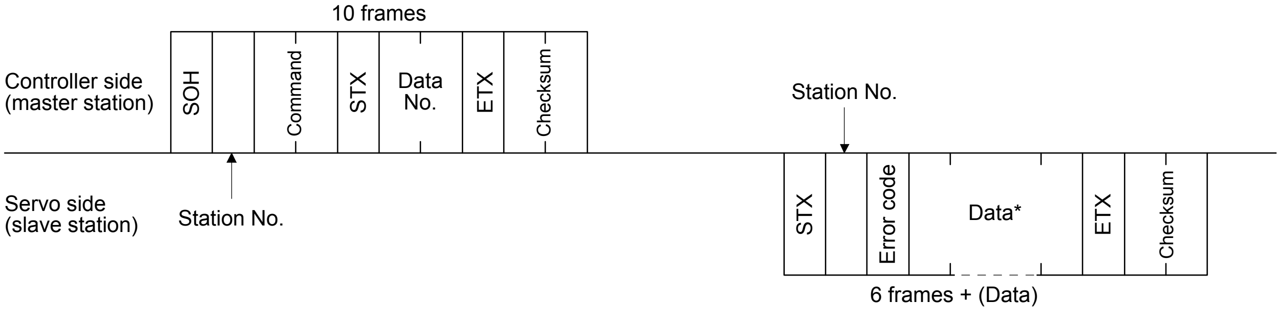
4.3.1 Transmission data configuration

Since up to 32 axes may be connected to the bus, add a station No. to the command, data No., etc. to determine the destination servo amplifier of data communication. Set the station No. to each servo amplifier using the parameters. Transmission data is enabled for the servo amplifier of the specified station No. When "*" is set as the station No. added to the transmission data, the transmission data is enabled for all servo amplifiers connected. However, when return data is required from the servo amplifier in response to the transmission data, set "0" to the station No. of the servo amplifier which must provide the return data.

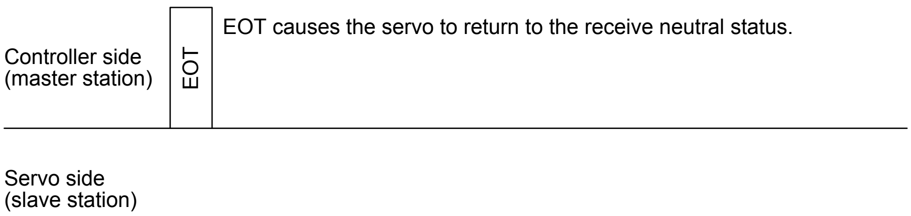
(1) Transmission of data from the controller to the servo



(2) Transmission of data request from the controller to the servo

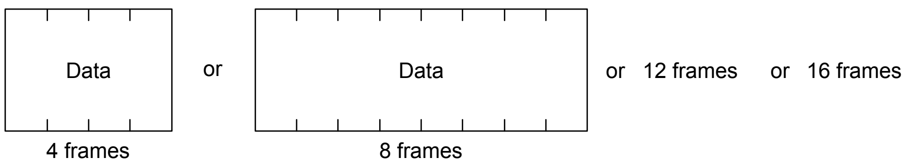


(3) Recovery of communication status by time-out



(4) Data frames

The data length depends on the command.



4.3.2 Character codes

(1) Control codes

Code name	Hexadecimal (ASCII code)	Description	Personal computer terminal key operation (general)
SOH	01H	start of head	ctrl + A
STX	02H	start of text	ctrl + B
ETX	03H	end of text	ctrl + C
EOT	04H	end of transmission	ctrl + D

(2) Codes for data
ASCII unit codes are used.

b8	0	0	0	0	0	0	0	0
b7	0	0	0	0	1	1	1	1
b6	0	0	1	1	0	0	1	1
b5	0	1	0	1	0	1	0	1

b8 to b5	b4	b3	b2	b1	R \ C	0	1	2	3	4	5	6	7
	0	0	0	0	0	NUL	DLE	Space	0	@	P	`	p
	0	0	0	1	1	SOH	DC1	!	1	A	Q	a	q
	0	0	1	0	2	STX	DC2	“	2	B	R	b	r
	0	0	1	1	3	ETX	DC3	#	3	C	S	c	s
	0	1	0	0	4			$	4	D	T	d	t
	0	1	0	1	5			%	5	E	U	e	u
	0	1	1	0	6			&	6	F	V	f	v
	0	1	1	1	7			‘	7	G	W	g	w
	1	0	0	0	8			(	8	H	X	h	x
	1	0	0	1	9			)	9	I	Y	i	y
	1	0	1	0	10			∗	:	J	Z	j	z
	1	0	1	1	11			+	;	K	[	k	{
	1	1	0	0	12			,	<	L	¥	l	|
	1	1	0	1	13			-	=	M	]	m	}
	1	1	1	0	14			.	>	N	^	n	‾
	1	1	1	1	15			/	?	O	_	o	DEL

(3) Station numbers
You may set 32 station Nos. from station 0 to station 31 and the ASCII unit codes are used to specify the stations.

Station No.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
ASCII code	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F

Station No.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ASCII code	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V

For example, "30H" is transmitted in hexadecimal for the station No. "0" (axis 1).

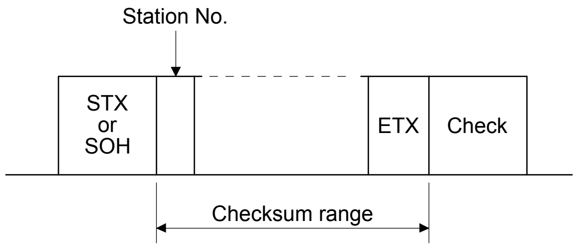
4.3.3 Error codes

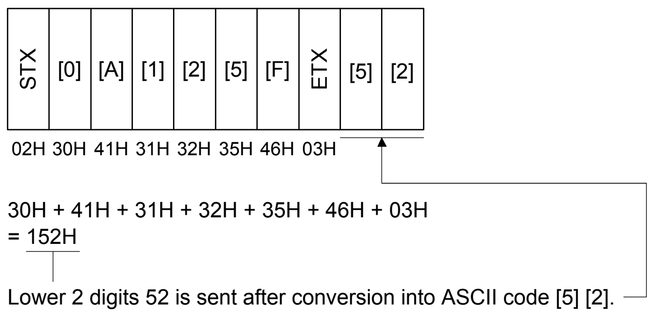
Error codes are used in the following cases and an error code of single-code length is transmitted.
Receiving data from the master station, the slave station sends the error code corresponding to that data to the master station. The error code sent in upper case indicates that the servo is normal and the one in lower case indicates that an alarm occurred.

Error code		Error name	Explanation	Remark
Servo: normal	Servo: alarm			
[A]	[a]	Normal	Data transmitted was processed normally.	Positive response
[B]	[b]	Parity error	Parity error occurred in the transmitted data.	Negative response
[C]	[c]	Checksum error	Checksum error occurred in the transmitted data.	
[D]	[d]	Character error	The transmitted character is out of specifications.	
[E]	[e]	Command error	The transmitted command is out of specifications.	
[F]	[f]	Data No. error	The transmitted data No. is out of specifications.	

4.3.4 Checksum

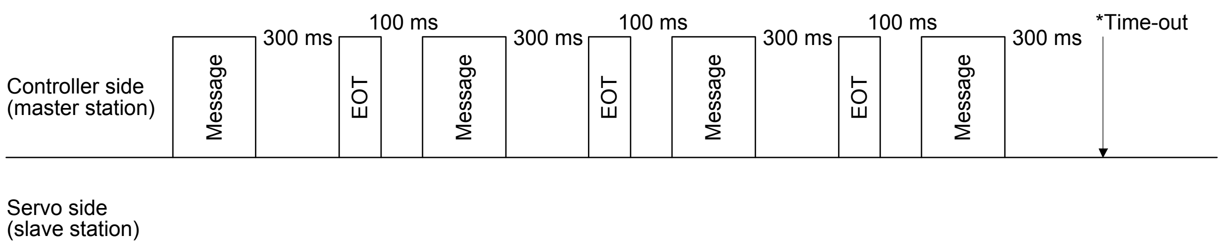
The checksum is an ASCII-coded hexadecimal representing the lower two digits of the sum of ASCII-coded hexadecimal numbers up to ETX, with the exception of the first control code (STX or SOH).





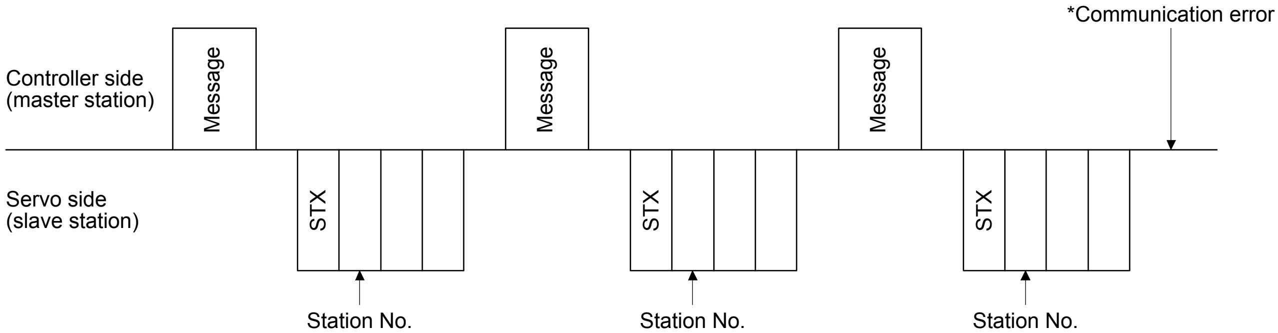
4.3.5 Time-out processing

The master station transmits EOT when the slave station does not start return processing (STX is not received) 300 [ms] after the master station has ended communication processing. 100 ms after that, the master station retransmits the message. Time-out occurs if the slave station does not answer after the master station has performed the above communication processing three times. (communication error)



4.3.6 Retry processing

When a fault occurs in communication between the master and slave stations, the error code in the response data from the slave station is a negative response code ([B] to [F], [b] to [f]). In this case, the master station retransmits the message which was sent at the occurrence of the fault (retry processing). A communication error occurs if the above processing is repeated and results in the error three or more consecutive times.



Similarly, when the master station detects a fault (e.g. checksum, parity) in the response data from the slave station, the master station retransmits the message which was sent at the occurrence of the fault. A communication error occurs if the retry processing is performed three times.

4.3.7 Initialization

After the slave station is switched on, it cannot return to communication until the internal initialization processing terminates. Hence, at power-on, ordinary communication should be started after.

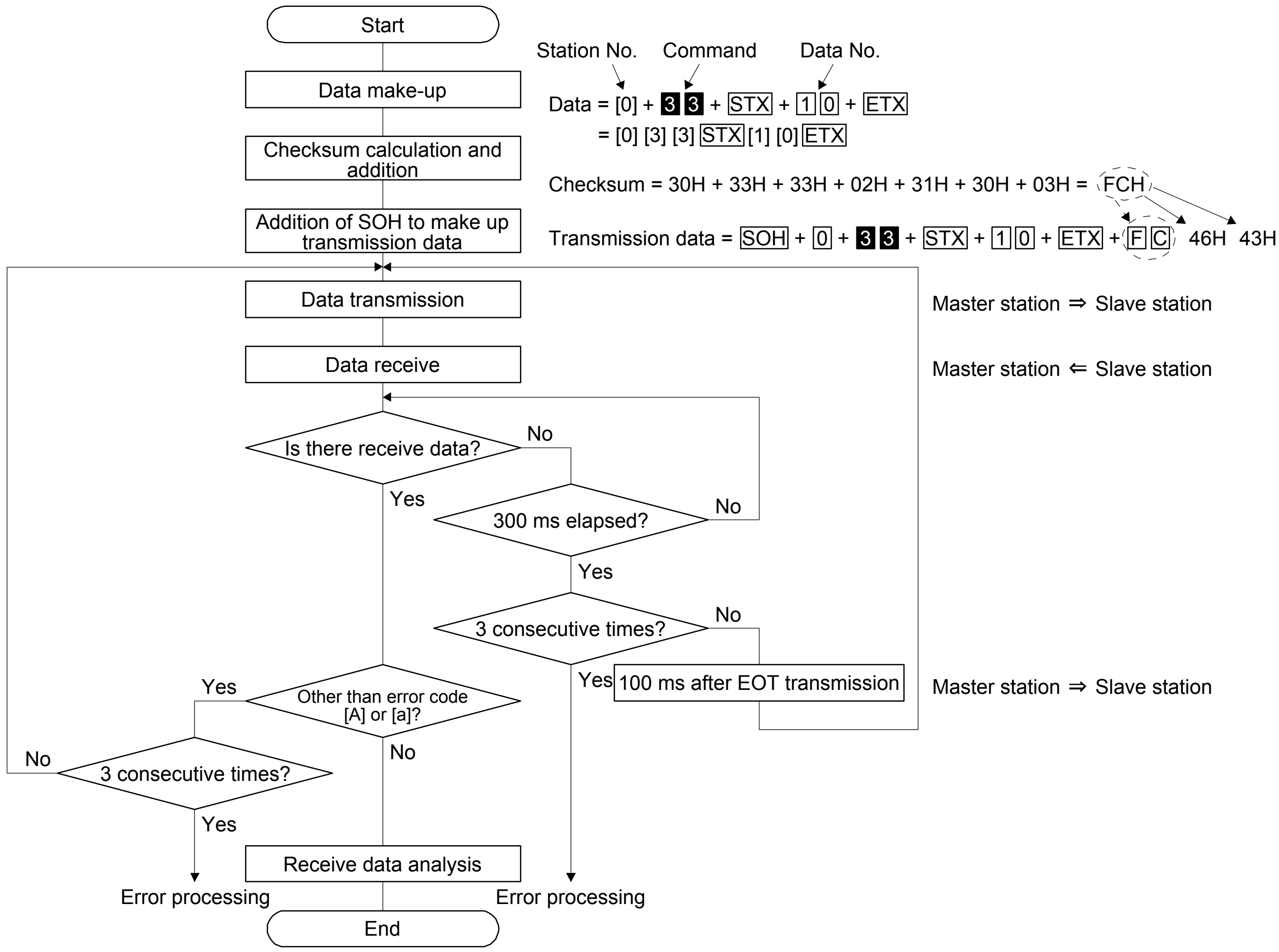
(1) Wait for 3.5 s or longer after the slave station is switched on.

(2) Check that normal communication can be made by reading the parameter or other data which does not pose any safety problems.

4.3.8 Communication procedure example

The following example reads the set value of alarm history (last alarm) from the servo amplifier of station 0.

Data item	Value	Description
Station No.	0	Servo amplifier station 0
Command	3 3	Reading command
Data No.	1 0	Alarm history (last alarm)



4.4 Command and data No. list

POINT

- Even if a command or data No. is the same between different model servo amplifiers, its description may differ.
- Commands of MR-J3-_A_ are available.
  The following commands are also available.

Description	MR-J3/-J4	Only MR-J4
Current value of each parameter	[0] [5]	[1] [5]
Upper limit value of each parameter setting range	[0] [6]	[1] [6]
Lower limit value of each parameter setting range	[0] [7]	[1] [7]
Writing each parameter	[8] [4]	[9] [4]

4.4.1 Reading command

(1) Status display (command [0] [1])

Command	Data No.	Description	MR-J3-_A_		MR-J4-_A_	
			Status display	Frame length	Status display	Frame length
[0] [1]	[0] [0]	Status display symbol and unit	Cumulative feedback pulses	16	Cumulative feedback pulses Motor-side cumu. feedback pulses (after gear)	16
	[0] [1]		Servo motor speed		Servo motor speed Servo motor speed	
	[0] [2]		Droop pulses		Droop pulses Motor-side droop pulses	
	[0] [3]		Cumulative command pulses		Cumulative command pulses	
	[0] [4]		Command pulse frequency		Command pulse frequency	
	[0] [5]		Analog speed command voltage Analog speed limit voltage		Analog speed command voltage Analog speed limit voltage	
	[0] [6]		Analog torque limit voltage Analog torque command voltage		Analog torque limit voltage Analog torque command voltage	
	[0] [7]		Regenerative load ratio		Regenerative load ratio	
	[0] [8]		Effective load ratio		Effective load ratio	
	[0] [9]		Peak load ratio		Peak load ratio	
	[0] [A]		Instantaneous torque		Instantaneous torque Instantaneous thrust	
	[0] [B]		Position within one-revolution		Position within one-revolution Motor encoder position within one-revolution Virtual position within one-revolution	
	[0] [C]		ABS counter		ABS counter Motor encoder ABS counter Virtual ABS counter	
	[0] [D]		Load to motor inertia ratio		Load to motor inertia ratio Load to motor mass ratio	
	[0] [E]		Bus voltage		Bus voltage	
	[0] [F]				Load-side cumulative feedback pulses	
	[1] [0]				Load-side droop pulses	
	[1] [1]				Load-side encoder information 1 Z-phase counter	
	[1] [2]				Load-side encoder information 2	
	[1] [6]				Temperature of motor thermistor	
	[1] [7]				Motor-side cumu. feedback pulses (before gear)	
	[1] [8]				Electrical angle	
	[1] [E]				Motor-side/load-side position deviation	

Command	Data No.	Description	MR-J3-_A_		MR-J4-_A_	
			Status display	Frame length	Status display	Frame length
[0] [1]	[1] [F]	Status display symbol and unit		16	Motor-side/load-side speed deviation	16
	[2] [0]				Internal temperature of encoder	
	[2] [1]				Settling time	
	[2] [2]				Oscillation detection frequency	
	[2] [3]				Number of tough operations	
	[2] [8]				Unit power consumption	
	[2] [9]				Unit total power consumption	
[0] [1]	[8] [0]	Status display data value and processing information	Cumulative feedback pulses	12	Cumulative feedback pulses Motor-side cumu. feedback pulses (after gear)	12
	[8] [1]		Servo motor speed		Servo motor speed Servo motor speed	
	[8] [2]		Droop pulses		Droop pulses Motor-side droop pulses	
	[8] [3]		Cumulative command pulses		Cumulative command pulses	
	[8] [4]		Command pulse frequency		Command pulse frequency	
	[8] [5]		Analog speed command voltage Analog speed limit voltage		Analog speed command voltage Analog speed limit voltage	
	[8] [6]		Analog torque limit voltage Analog torque command voltage		Analog torque limit voltage Analog torque command voltage	
	[8] [7]		Regenerative load ratio		Regenerative load ratio	
	[8] [8]		Effective load ratio		Effective load ratio	
	[8] [9]		Peak load ratio		Peak load ratio	
	[8] [A]		Peak load ratio		Instantaneous torque Instantaneous thrust	
	[8] [B]		Position within one-revolution		Position within one-revolution Motor encoder position within one-revolution Virtual position within one-revolution	
	[8] [C]		ABS counter		ABS counter Motor encoder ABS counter Virtual ABS counter	
	[8] [D]		Load to motor inertia ratio		Load to motor inertia ratio Load to motor mass ratio	
	[8] [E]		Bus voltage		Bus voltage	
	[8] [F]				Load-side cumulative feedback pulses	
	[9] [0]				Load-side droop pulses	
	[9] [1]				Load-side encoder information 1 Z-phase counter	
	[9] [2]				Load-side encoder information 2	
	[9] [6]				Temperature of motor thermistor	
	[9] [7]				Motor-side cumu. feedback pulses (before gear)	
	[9] [8]				Electrical angle	
	[9] [E]				Motor-side/load-side position deviation	
	[9] [F]				Motor-side/load-side speed deviation	
	[A] [0]				Internal temperature of encoder	
	[A] [1]				Settling time	
	[A] [2]				Oscillation detection frequency	
	[A] [3]				Number of tough operations	
	[A] [8]				Unit power consumption	
	[A] [9]				Unit total power consumption	

(2) Parameters (command [0] [4]/[0] [5]/[1] [5]/[0] [6]/[1] [6]/[0] [7]/[1] [7]/[0] [8]/[0] [9])

Command	Data No.	MR-J3-_A_ Description	MR-J3-_A_ Frame length	MR-J4-_A_ Description	MR-J4-_A_ Frame length
[0] [4]	[0] [1]	Parameter group read 0000: Basic setting parameter (No.PA_ _) 0001: Gain filter parameter (No.PB_ _) 0002: Extension setting parameter (No.PC_ _) 0003: I/O setting parameter (No.PD_ _)	4	Parameter group reading 0000: Basic setting parameters ([Pr. PA_ _]) 0001: Gain/filter parameters ([Pr. PB_ _]) 0002: Extension setting parameters ([Pr. PC_ _]) 0003: I/O setting parameters ([Pr. PD_ _]) 0004: Extension setting 2 parameters ([Pr. PE_ _]) 0005: Extension setting 3 parameters ([Pr. PF_ _])	4
[0] [5]	[0] [1] to [F] [F]	Current values of parameters Reads the current values of the parameters in the parameter group specified with the command [8] [5]＋data No. [0] [0]. Before reading the current values, therefore, always specify the parameter group with the command [8] [5]＋data No. [0] [0]. The decimal equivalent of the data No. value (hexadecimal) corresponds to the parameter number.	8	Current values of parameters Reads the current values of the parameters in the parameter group specified with the command [8] [5] + data No. [0] [0]. Before reading the current values, therefore, always specify the parameter group with the command [8] [5] + data No. [0] [0]. The decimal equivalent of the data No. value (hexadecimal) corresponds to the parameter No. Command [1] [5]: Frame length 12 is available.	8
[0] [6]	[0] [1] to [F] [F]	Upper limit values of parameter setting ranges Reads the permissible upper limit values of the parameters in the parameter group specified with the command [8] [5]＋data No. [0] [0]. Before reading the upper limit values, therefore, always specify the parameter group with the command [8] [5]＋data No. [0] [0]. The decimal equivalent of the data No. value (hexadecimal) corresponds to the parameter number.	8	Upper limit values of parameter setting ranges Reads the permissible upper limit values of the parameters in the parameter group specified with the command [8] [5] + data No. [0] [0]. Before reading the upper limit values, therefore, always specify the parameter group with the command [8] [5] + data No. [0] [0]. The decimal equivalent of the data No. value (hexadecimal) corresponds to the parameter No. Command [1] [6]: Frame length 12 is available.	8
[0] [7]	[0] [1] to [F] [F]	Lower limit values of parameter setting ranges Reads the permissible lower limit values of the parameters in the parameter group specified with the command [8] [5] data No. [0] [0]. Before reading the lower limit values, therefore, always specify the parameter group with the command [8] [5] data No. [0] [0]. The decimal equivalent of the data No. value (hexadecimal) corresponds to the parameter number.	8	Lower limit values of parameter setting ranges Reads the permissible lower limit values of the parameters in the parameter group specified with the command [8] [5] + data No. [0] [0]. Before reading the lower limit values, therefore, always specify the parameter group with the command [8] [5] + data No. [0] [0]. The decimal equivalent of the data No. value (hexadecimal) corresponds to the parameter No. Command [1] [7]: Frame length 12 is available.	8
[0] [8]	[0] [1] to [F] [F]	Abbreviations of parameters Reads the abbreviations of the parameters in the parameter group specified with the command [8] [5] data No. [0] [0]. Before reading the abbreviations, therefore, always specify the parameter group with the command [8] [5] data No. [0] [0]. The decimal equivalent of the data No. value (hexadecimal) corresponds to the parameter number.	12	Parameter symbols Reads the symbols of the parameters in the parameter group specified with the command [8] [5] + data No. [0] [0]. Before reading the symbols, therefore, always specify the parameter group with the command [8] [5] + data No. [0] [0]. The decimal equivalent of the data No. value (hexadecimal) corresponds to the parameter No.	12
[0] [9]	[0] [1] to [F] [F]	Write enable/disable of parameters Reads write enable/disable of the parameters in the parameter group specified with the command [8] [5] data No. [0] [0]. Before reading write enable/disable, therefore, always specify the parameter group with the command [8] [5] data No. [0] [0]. 0000: Write enabled 0001: Write disabled	4	Writing enable/disable of parameters Reads writing enable/disable of the parameters in the parameter group specified with the command [8] [5] + data No. [0] [0]. Before reading the lower limit values, therefore, always specify the parameter group with the command [8] [5] + data No. [0] [0]. 0000: Writing enabled 0001: Writing disabled	4

(3) External I/O signals (command [1] [2])

Command	Data No.	MR-J3-_A_ / MR-J4-_A_ Description	Frame length
[1] [2]	[0] [0]	Input device status	8
	[4] [0]	External input pin status	
	[6] [0]	Status of input device turned on by communication	
	[8] [0]	Output device status	
	[C] [0]	External output pin status	

(4) Alarm history (command [3] [3])

Command	Data No.	Description	MR-J3-_A_		MR-J4-_A_	
			Alarm occurrence sequence	Frame length	Alarm occurrence sequence	Frame length
[3] [3]	[1] [0]	Alarm No. in alarm history	most recent alarm	4	Most recent alarm	4
	[1] [1]		first alarm in past		First alarm in past	
	[1] [2]		second alarm in past		Second alarm in past	
	[1] [3]		third alarm in past		Third alarm in past	
	[1] [4]		fourth alarm in past		Fourth alarm in past	
	[1] [5]		fifth alarm in past		Fifth alarm in past	
	[1] [6]				Sixth alarm in past	
	[1] [7]				Seventh alarm in past	
	[1] [8]				Eighth alarm in past	
	[1] [9]				Ninth alarm in past	
	[1] [A]				Tenth alarm in past	
	[1] [B]				Eleventh alarm in past	
	[1] [C]				Twelfth alarm in past	
	[1] [D]				Thirteenth alarm in past	
	[1] [E]				Fourteenth alarm in past	
	[1] [F]				Fifteenth alarm in past	
	[2] [0]	Alarm occurrence time in alarm history	most recent alarm	8	Most recent alarm	8
	[2] [1]		first alarm in past		First alarm in past	
	[2] [2]		second alarm in past		Second alarm in past	
	[2] [3]		third alarm in past		Third alarm in past	
	[2] [4]		fourth alarm in past		Fourth alarm in past	
	[2] [5]		fifth alarm in past		Fifth alarm in past	
	[2] [6]				Sixth alarm in past	
	[2] [7]				Seventh alarm in past	
	[2] [8]				Eighth alarm in past	
	[2] [9]				Ninth alarm in past	
	[2] [A]				Tenth alarm in past	
	[2] [B]				Eleventh alarm in past	
	[2] [C]				Twelfth alarm in past	
	[2] [D]				Thirteenth alarm in past	
	[2] [E]				Fourteenth alarm in past	
	[2] [F]				Fifteenth alarm in past	

(5) Current alarm (Command [0][2])

Command	Data No.	MR-J3-_A_ / MR-J4-_A_ Description	Frame length
[0] [2]	[0] [0]	Current alarm No.	4

(6) Status display at alarm occurrence (command [3] [5])

Command	Data No.	Description	MR-J3-_A_ Status display	MR-J3-_A_ Frame length	MR-J4-_A_ Status display	MR-J4-_A_ Frame length
[3] [5]	[8] [0]	Status display data value and processing information	Cumulative feedback pulses	12	Cumulative feedback pulses Motor-side cumu. feedback pulses (after gear)	12
	[8] [1]		Servo motor speed		Servo motor speed Servo motor speed	
	[8] [2]		Droop pulses		Droop pulses Motor-side droop pulses	
	[8] [3]		Cumulative command pulses		Cumulative command pulses	
	[8] [4]		Command pulse frequency		Command pulse frequency	
	[8] [5]		Analog speed command voltage Analog speed limit voltage		Analog speed command voltage Analog speed limit voltage	
	[8] [6]		Analog torque command voltage Analog torque limit voltage		Analog torque command voltage Analog torque limit voltage	
	[8] [7]		Regenerative load ratio		Regenerative load ratio	
	[8] [8]		Effective load ratio		Effective load ratio	
	[8] [9]		Peak load ratio		Peak load ratio	
	[8] [A]		Instantaneous torque		Instantaneous torque Instantaneous thrust	
	[8] [B]		Position within one-revolution		Position within one-revolution Motor encoder position within one-revolution Virtual position within one-revolution	
	[8] [C]		ABS counter		ABS counter Motor encoder ABS counter Virtual ABS counter	
	[8] [D]		Load to motor inertia ratio		Load to motor inertia ratio Load to motor mass ratio	
	[8] [E]		Bus voltage		Bus voltage	
	[8] [F]				Load-side cumulative feedback pulses	
	[9] [0]				Load-side droop pulses	
	[9] [1]				Load-side encoder information 1 Z-phase counter	
	[9] [2]				Load-side encoder information 2	
	[9] [6]				Temperature of motor thermistor	
	[9] [7]				Motor-side cumu. feedback pulses (before gear)	
	[9] [8]				Electrical angle	
	[9] [E]				Motor-side/load-side position deviation	
	[9] [F]				Motor-side/load-side speed deviation	
	[A] [0]				Internal temperature of encoder	
	[A] [1]				Settling time	
	[A] [2]				Oscillation detection frequency	
	[A] [3]				Number of tough operations	
	[A] [8]				Unit power consumption	
	[A] [9]				Unit total power consumption	

(7) Test operation mode (command [0] [0])

Command	Data No.	MR-J3-_A_/MR-J4-_A_ Description	Frame length
[0] [0]	[1] [2]	Test operation mode reading 0000: Normal mode (not test operation mode) 0001: JOG operation 0002: Positioning operation 0003: Motor-less operation 0004: Output signal (DO) forced output	4

(8) Software version (command [0] [2])

Command	Data No.	MR-J3-_A_/MR-J4-_A_ Description	Frame length
[0] [2]	[9] [0]	Servo motor-side pulse unit absolute position	8
	[9] [1]	Command unit absolute position	8
	[7] [0]	Software version	16

4.4.2 Writing commands

(1) Status display (command [8] [1])

Command	Data No.	MR-J3-_A_/MR-J4-_A_		
		Description	Setting range	Frame length
[8] [1]	[0] [0]	Status display data deletion	1EA5	4

(2) Parameters (command [8] [4]/ [9] [4]/[8] [5])

Command	Data No.	MR-J3-_A_			MR-J4-_A_		
		Description	Setting range	Frame length	Description	Setting range	Frame length
[8] [4]	[0] [1] to [F] [F]	Write of parameters Writes the values of the parameters in the parameter group specified with the command [8] [5] data No. [0] [0]. Before writing the values, therefore, always specify the parameter group with the command [8] [5] data No. [0] [0]. The decimal equivalent of the data No. value (hexadecimal) corresponds to the parameter number.	Depending on the parameter	8	Writing each parameter Writes the values of the parameters in the parameter group specified with the command [8] [5] + data No. [0] [0]. Before writing the values, therefore, always specify the parameter group with the command [8] [5] + data No. [0] [0]. The decimal equivalent of the data No. value (hexadecimal) corresponds to the parameter No. Command [9] [4]: Frame length 12 is available.	Depending on the parameter	8
[8] [5]	[0] [0]	Parameter group write 0000: Basic setting parameter (No.PA_ _) 0001: Gain filter parameter (No.PB_ _) 0002: Extension setting parameter (No.PC_ _) 0003: I/O setting parameter (No.PD_ _)	0000 to 0003	4	Parameter group writing 0000: Basic setting parameters ([Pr. PA_ _]) 0001: Gain/filter parameters ([Pr. PB_ _]) 0002: Extension setting parameters ([Pr. PC_ _]) 0003: I/O setting parameters ([Pr. PD_ _]) 0004: Extension setting 2 parameters ([Pr. PE_ _]) 0005: Extension setting 3 parameters ([Pr. PF_ _])	0000 to 0005	4

(3) External I/O signals (command [9] [2])

Command	Data No.	MR-J3-_A_/MR-J4-_A_		
		Description	Setting range	Frame length
[9] [2]	[6] [0]	Communication input device signal	Refer to section 4.5.5.	8

(4) Alarm history (command [8] [2])

Command	Data No.	MR-J3-_A_/MR-J4-_A_		
		Description	Setting range	Frame length
[8] [2]	[2] [0]	Alarm history clear	1EA5	4

(5) Current alarm (command [8] [2])

Command	Data No.	MR-J3-_A_/MR-J4-_A_		
		Description	Setting range	Frame length
[8] [2]	[0] [0]	Alarm clear	1EA5	4

(6) I/O device prohibition (command [9] [0])

Command	Data No.	MR-J3-_A_/MR-J4-_A_		
		Description	Setting range	Frame length
[9] [0]	[0] [0]	Turns off the input device, external analog input signal or pulse train input, except EMG, LSP and LSN, independently of the external on/off status.	1EA5	4
	[0] [3]	Disables all output devices (DO).		
	[1] [0]	Cancels the prohibition of the input device, external analog input signal or pulse train input, except EMG, LSP and LSN.		
	[1] [3]	Cancels the prohibition of the output device.		

(7) Operation mode selection (command [8] [B])

Command	Data No.	MR-J3-_A_			MR-J4-_A_		
		Description	Setting range	Frame length	Description	Setting range	Frame length
[8] [B]	[0] [0]	Operation mode switching 0000: Test operation mode cancel 0001: JOG operation 0002: Positioning operation 0003: Motorless operation 0004: Output signal (DO) forced output	0000 to 0004	4	Selection of test operation mode 0000: Test operation mode cancel 0001: JOG operation 0002: Positioning operation 0004: Output signal (DO) forced output	0000 to 0002, 0004	4

(8) Test operation mode data (command [9] [2], [A] [0])

Command	Data No.	MR-J3-_A_/MR-J4-_A_		
		Description	Setting range	Frame length
[9] [2]	[0] [0]	Input signal for test operation	Refer to section 4.5.7.	8
	[A] [0]	Forced output of signal pin	Refer to section 4.5.9.	8
[A] [0]	[1] [0]	Writes the servo motor speed in the test operation mode (JOG operation and positioning operation).	0000 to 7FFF	4
	[1] [1]	Writes the acceleration/deceleration time constant in the test operation mode (JOG operation and positioning operation).	00000000 to 7FFFFFFF	8
	[2] [0]	Sets the travel distance in the test operation mode (Positioning operation).	00000000 to 7FFFFFFF	8
	[2] [1]	Selects the positioning direction of test operation (positioning operation). 0 □ 0 □ 0: Forward rotation direction 1: Reverse rotation direction 0: Command pulse unit 1: Encoder pulse unit	0000 to 0101	4
	[4] [0]	This is a start command for test operation (positioning operation).	1EA5	4
	[4] [1]	This is used to make a temporary stop during test operation (positioning operation). "_" in the data indicates a blank. STOP: Temporary stop GO_ _: Restart for remaining distance CLR _: Remaining distance clear	STOP GO _ _ CLR _	4

4.5 Detailed explanations of commands

4.5.1 Data processing

When the master station transmits a command data No. or a command + data No. + data to a slave station, the servo amplifier returns a response or data in accordance with the purpose.
When numerical values are represented in these send data and receive data, they are represented in decimal, hexadecimal, etc.
Therefore, data must be processed in accordance with the application.
Since whether data must be processed or not and how to process data depend on the monitoring, parameters, etc., follow the detailed explanation of the corresponding command.
The following methods are how to process send and receive data when reading and writing data.

(1) Processing a read data
When the display type is 0, the eight-character data is converted from hexadecimal to decimal and a decimal point is placed according to the decimal point position information.
When the display type is 1, the eight-character data is used unchanged.

The following example indicates how to process the receive data "003000000929" given to show.
The receive data is as follows.

0	0	3	0	0	0	0	0	0	9	2	9

Data 32-bit length (hexadecimal representation)
(Data conversion is required as indicated in the display type.)

Display type
0: Data must be converted into decimal.
1: Data is used unchanged in hexadecimal.

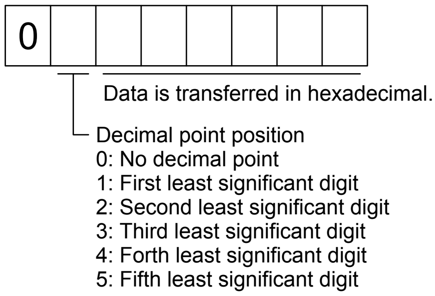
Decimal point position
0: No decimal point
1: First least significant digit (normally not used)
2: Second least significant digit
3: Third least significant digit
4: Forth least significant digit
5: Fifth least significant digit
6: Sixth least significant digit

Since the display type is "0" in this case, the hexadecimal data is converted into decimal.
00000929H → 2345
As the decimal point position is "3", a decimal point is placed in the third least significant digit.
Hence, "23.45" is displayed.

(2) Writing processed data

When the data to be written is handled as decimal, the decimal point position must be specified. If it is not specified, the data cannot be written. When the data is handled as hexadecimal, specify "0" as the decimal point position.

The data to be sent is the following value.



For example, here is described how to process the set data when a value of "15.5" is sent.

Since the decimal point position is the second least significant digit, the decimal point position data is "2".

As the data to be sent is hexadecimal, the decimal data is converted into hexadecimal.

155 → 9B

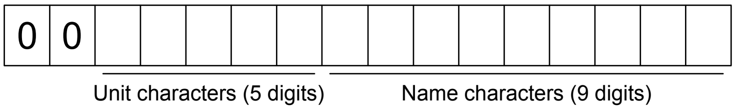
Hence, "0200009B" is transmitted.

4.5.2 Status display mode

(1) Reading the status display name and unit
The following shows how to read the status display name and unit.

(a) Transmission
Transmit the command [0] [1] and the data No. corresponding to the status display item to be read, [0] [0] to [0] [E] and [2] [0] to [2] [9]. (Refer to (1) of section 4.4.1.)

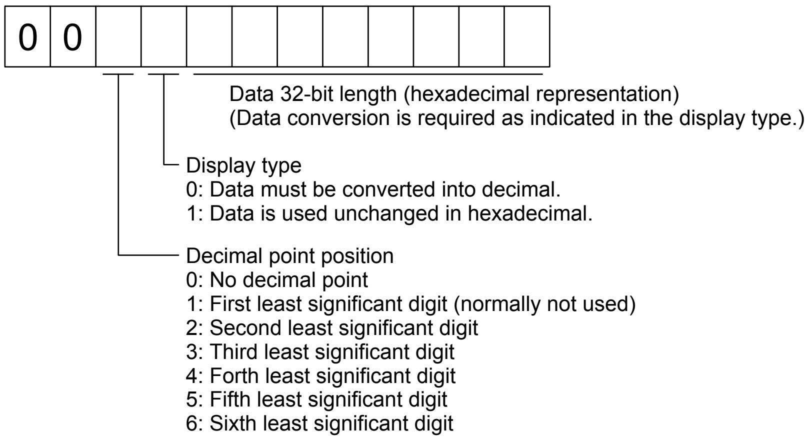
(b) Return
The slave station returns the status display name and unit requested.



(2) Status display data reading
The following shows how to read the status display data and processing information.

(a) Transmission
Transmit the command [0] [1] and the data No. corresponding to the status display item to be read, [8] [0] to [8] [E] and [A] [0] to [A] [9]. (Refer to (1) of section 4.4.1.)

(b) Return
The slave station returns the status display data requested.



(3) Status display data clear
To clear the cumulative feedback pulse data of the status display, send this command immediately after reading each status display item. The data of the status display item transmitted is cleared to "0".

Command	Data No.	Data
[8] [1]	[0] [0]	1EA5

For example, after sending command [0] [1] and data No. [8] [0] and receiving the status display data, send command [8] [1], data No. [0] [0] and data [1EA5] to clear the cumulative feedback pulse value to "0".

4.5.3 Parameter

(1) Specification of the parameter group

To read or write the parameter settings, etc., the group of the parameters to be operated must be specified in advance. Write data to the servo amplifier as follows to specify the parameter group.

Command	Data No.	Transmission data	Parameter group
[8] [5]	[0] [0]	0000	Basic setting parameters ([Pr. PA_ _])
		0001	Gain/filter parameters ([Pr. PB_ _])
		0002	Extension setting parameters ([Pr. PC_ _])
		0003	I/O setting parameters ([Pr. PD_ _])
		0004	Extension setting 2 parameters ([Pr. PE_ _])
		0005	Extension setting 3 parameters ([Pr. PF_ _])

(2) Parameter group reading

The following shows how to read the parameter group set with slave station.

(a) Transmission

Transmit command [0] [4] and data No. [0] [1].

Command	Data No.
[0] [4]	[0] [1]

(b) Return

The slave station returns the preset parameter group.

0	0	0	

Parameter group
0: Basic setting parameters ([Pr. PA_ _])
1: Gain/filter parameters ([Pr. PB_ _])
2: Extension setting parameters ([Pr. PC_ _])
3: I/O setting parameters ([Pr. PD_ _])
4: Extension setting 2 parameters ([Pr. PE_ _])
5: Extension setting 3 parameters ([Pr. PF_ _])

(3) Reading symbols

The following shows how to read symbols of parameters. Specify a parameter group in advance. (Refer to (1) of this section.)

(a) Transmission

Transmit the command [0] [8] and the data No. [0] [1] to [F] [F] corresponding to the parameter No. (Refer to (1) of section 4.4.1.)

The data No. is expressed in hexadecimal. The decimal equivalent of the data No. value corresponds to the parameter No.

(b) Return

The slave station returns the symbol of the parameter requested.

0	0	0									

Symbol characters (9 digits)

(4) Reading the setting

The following shows how to read the parameter setting. Specify a parameter group in advance. (Refer to (1) of this section.)

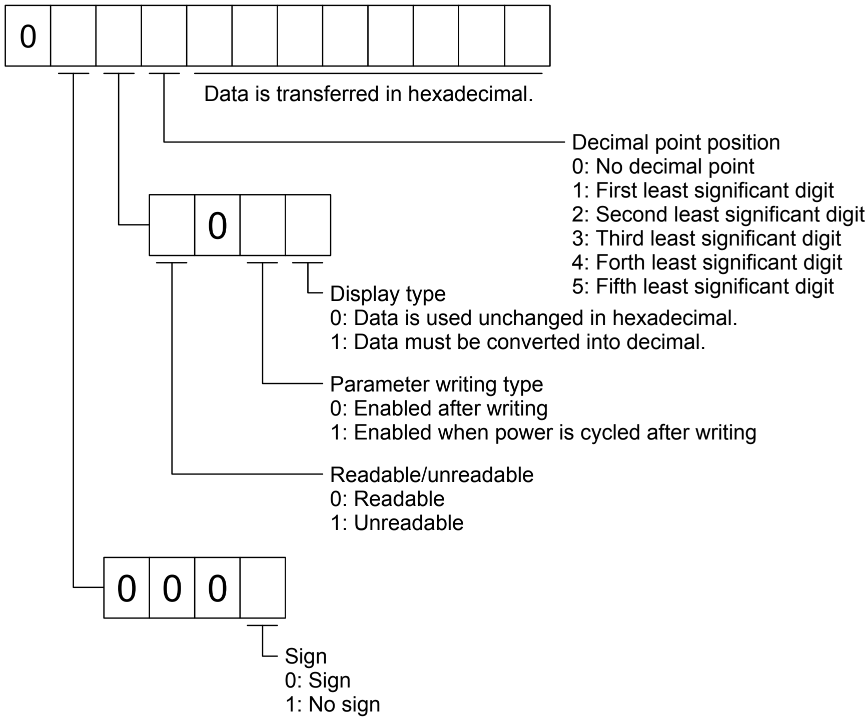
(a) Transmission

Transmit the command [1] [5] and the data No. corresponding to the parameter No [0] [1] to [F] [F]. (Refer to (1) of section 4.4.1.)

The data No. is expressed in hexadecimal. The decimal equivalent of the data No. value corresponds to the parameter No.

(b) Return

The slave station returns the data and processing information of the parameter No. requested.



For example, data "00120000270F" means 999.9 (decimal display format) and data "000000003ABC" means 3ABC (hexadecimal display format).

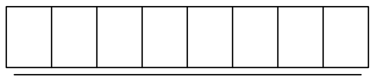
When the display type is "0" (hexadecimal) and the decimal point position is other than 0, the display type is a special hexadecimal display format and "F" of the data value is handled as a blank. Data "0001FFFFF053" means 053 (special hexadecimal display format).

"000000000000" is transferred when the parameter that was read is the one inaccessible for reference in the parameter writing inhibit setting of [Pr. PA19].

(5) Reading the setting range
The following shows how to read the parameter setting range. Specify a parameter group in advance. (Refer to (1) of this section.)

(a) Transmission
When reading an upper limit value, transmit the command [1] [6] and the data No. [0] [1] to [F] [F] corresponding to the parameter No. When reading a lower limit value, transmit the command [1] [7] and the data No. [0] [1] to [F] [F] corresponding to the parameter No. (Refer to (1) of section 4.4.1.)
The data No. is expressed in hexadecimal. The decimal equivalent of the data No. value corresponds to the parameter No.

(b) Return
The slave station returns the data and processing information of the parameter No. requested.



Data is transferred in hexadecimal.

For example, data "FFFFFFEC" means "-20".

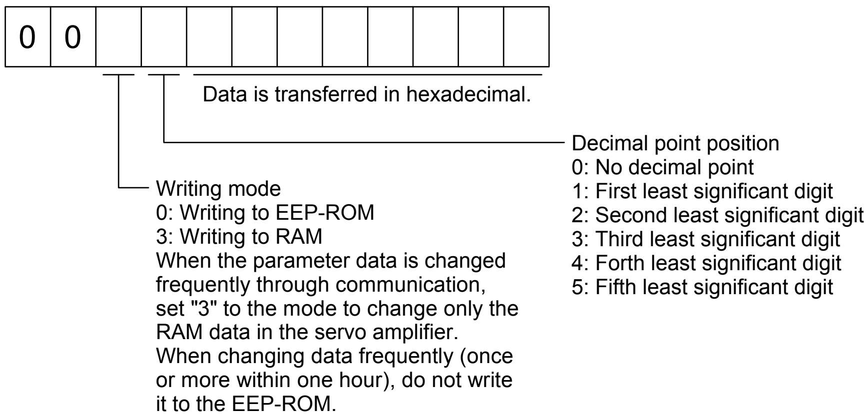
(6) Writing setting values

POINT

- If setting values need to be changed with a high frequency (i.e. one time or more per one hour), write the setting values to the RAM, not the EEP-ROM. The EEPROM has a limitation in the number of write times and exceeding this limitation causes the servo amplifier to malfunction. Note that the number of write times to the EEP-ROM is limited to approximately 100, 000.

Write the parameter setting into EEP-ROM of the servo amplifier. Specify a parameter group in advance. (Refer to (1) of this section.)
Write any value within the setting enabled range. For the setting enabled range, refer to Part2/Part3 or read the setting range by performing operation in (4) of this section.
Transmit command [9] [4], the data No., and the set data.
The data No. is expressed in hexadecimal. The decimal equivalent of the data No. value corresponds to the parameter No.
When the data to be written is handled as decimal, the decimal point position must be specified. If it is not specified, the data cannot be written. When the data is handled as hexadecimal, specify "0" as the decimal point position.
Check the writing data is within the upper/lower limit value before writing. To prevent an error, read the parameter data to be written, confirm the decimal point position, and create transmission data.
On completion of writing, read the same parameter data to verify that data has been written correctly.

Command	Data No.	Data
[9] [4]	[0] [1] to [F] [F]	See below.



4.5.4 External I/O signal status (DIO diagnosis)

(1) Reading input device status

The following shows how to read the status of the input devices.

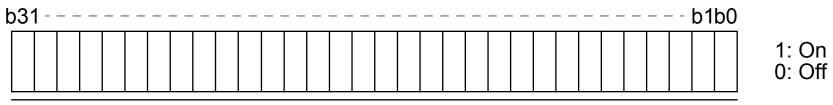
(a) Transmission

Transmit command [1] [2] and data No. [0] [0].

Command	Data No.
[1] [2]	[0] [0]

(b) Return

The slave station returns the status of the input devices.



Command of each bit is transmitted to the master station as hexadecimal data.

Bit	Symbol	Bit	Symbol	Bit	Symbol	Bit	Symbol
0	SON	8	SP1	16		24	
1	LSP	9	SP2	17		25	
2	LSN	10	SP3	18		26	
3	TL	11	ST1/RS2	19		27	CDP
4	TL1	12	ST2/RS1	20	STAB2	28	CLD
5	PC	13	CM1	21		29	MECR
6	RES	14	CM2	22		30	
7	CR	15	LOP	23		31	

(2) Reading external input pin status

The following shows how to read the on/off status of the external input pins.

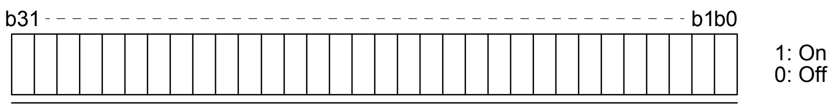
(a) Transmission

Transmit command [1] [2] and data No. [4] [0].

Command	Data No.
[1] [2]	[4] [0]

(b) Return

The on/off status of the input pins are returned.



Command of each bit is transmitted to the master station as hexadecimal data.

Bit	CN1 connector pin	Bit	CN1 connector pin	Bit	CN1 connector pin	Bit	CN1 connector pin
0	43	8	18	16		24	
1	44	9	45	17		25	
2	42	10		18		26	
3	15	11		19		27	
4	19	12		20		28	
5	41	13		21		29	
6	16	14		22		30	
7	17	15		23		31	

(3) Reading the status of input devices switched on with communication

The following shows how to read the on/off status of the input devices switched on with communication.

(a) Transmission

Transmit command [1] [2] and data No. [6] [0].

Command	Data No.
[1] [2]	[6] [0]

(b) Return

The slave station returns the status of the input devices.

b31 - - - - - - - - b1b0

1: On
0: Off

Command of each bit is transmitted to the master station as hexadecimal data.

Bit	Symbol	Bit	Symbol	Bit	Symbol	Bit	Symbol
0	SON	8	SP1	16		24	
1	LSP	9	SP2	17		25	
2	LSN	10	SP3	18		26	
3	TL	11	ST1/RS2	19		27	CDP
4	TL1	12	ST2/RS1	20	STAB2	28	CLD
5	PC	13	CM1	21		29	MECR
6	RES	14	CM2	22		30	
7	CR	15	LOP	23		31	

(4) Reading external output pin status

The following shows how to read the on/off status of the external output pins.

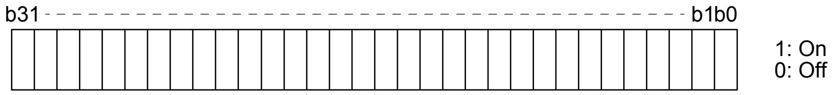
(a) Transmission

Transmit command [1] [2] and data No. [C] [0].

Command	Data No.
[1] [2]	[C] [0]

(b) Return

The slave station returns the status of the output devices.



Command of each bit is transmitted to the master station as hexadecimal data.

Bit	CN1 connector pin	Bit	CN1 connector pin	Bit	CN1 connector pin	Bit	CN1 connector pin
0	49	8	14 (Note)	16		24	
1	24	9		17		25	
2	23	10		18		26	
3	25	11		19		27	
4	22	12		20		28	
5	48	13		21		29	
6	33	14		22		30	
7	13 (Note)	15		23		31	

Note This is available when devices are assigned to the CN1-13 pin and CN1-14 pin with MR-J4-_A_-RJ 100 W or more servo amplifiers with software version B3 or later.

(5) Reading output device status

The following shows how to read the on/off status of the output devices.

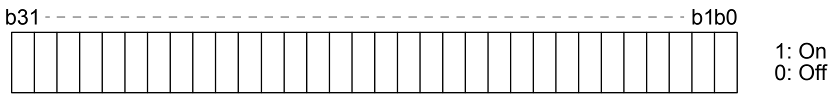
(a) Transmission

Transmit command [1] [2] and data No. [8] [0].

Command	Data No.
[1] [2]	[8] [0]

(b) Return

The slave station returns the status of the input/output devices.



Command of each bit is transmitted to the master station as hexadecimal data.

Bit	Symbol	Bit	Symbol	Bit	Symbol	Bit	Symbol
0	RD	8	ALM	16		24	
1	SA	9	OP	17		25	CDPS
2	ZSP	10	MBR	18		26	CLDS
3	TLC	11	DB	19		27	ABSV
4	VLC	12	ACD0	20		28	
5	INP	13	ACD1	21		29	
6		14	ACD2	22		30	
7	WNG	15	BWNG	23		31	MTTR

4.5.5 Input device on/off

POINT
●The on/off status of all devices in the servo amplifier are the status of the data received at last. Therefore, when there is a device which must be kept on, transmit data which turns the device on every time.

Each input device can be switched on/off. However, when the device to be switched off is in the external input signal, also switch off the input signal.

Transmit command [9] [2], data No. [6] [0], and data.

Command	Data No.	Set data
[9] [2]	[6] [0]	See below.

b31 - - - - - - - - - - - - - - - - b1b0

1: On
0: Off

Command of each bit is transmitted to the master station as hexadecimal data.

Bit	Symbol
0	SON
1	LSP
2	LSN
3	TL
4	TL1
5	PC
6	RES
7	CR

Bit	Symbol
8	SP1
9	SP2
10	SP3
11	ST1/RS2
12	ST2/RS1
13	CM1
14	CM2
15	LOP

Bit	Symbol
16	
17	
18	
19	
20	STAB2
21	
22	
23	

Bit	Symbol
24	
25	
26	
27	CDP
28	CLD
29	MECR
30	
31	

4.5.6 Disabling/enabling I/O devices (DIO)

You can disable inputs regardless of the I/O device status. When inputs are disabled, the input signals (devices) are recognized as follows. However, EM2 (Forced stop 2), LSP (Forward rotation stroke end), and LSN (Reverse rotation stroke end) cannot be disabled.

Signal	Status
Input device (DI)	Off
External analog input signal	0 V
Pulse train input	None

(1) Disabling/enabling the input devices (DI), external analog input signals and pulse train inputs except EM2 (Forced stop 2), LSP (Forward rotation stroke end), and LSN (Reverse rotation stroke end). Transmit the following communication commands.

(a) Disabling

Command	Data No.	Data
[9] [0]	[0] [0]	1EA5

(b) Enabling

Command	Data No.	Data
[9] [0]	[1] [0]	1EA5

(2) Disabling/enabling the output devices (DO)
Transmit the following communication commands.

(a) Disabling

Command	Data No.	Data
[9] [0]	[0] [3]	1EA5

(b) Enabling

Command	Data No.	Data
[9] [0]	[1] [3]	1EA5

4.5.7 Input devices on/off (test operation)

Each input devices can be turned on/off for test operation. However, when the device to be switched off is in the external input signal, also switch off the input signal.

Transmit command [9] [2], data No. [0] [0], and data.

Command	Data No.	Set data
[9] [2]	[0] [0]	See below.

b31 - - - - - - - - - - b1b0

1: On
0: Off

Command of each bit is transmitted to the master station as hexadecimal data.

Bit	Symbol	Bit	Symbol	Bit	Symbol	Bit	Symbol
0	SON	8	SP1	16		24	
1	LSP	9	SP2	17		25	
2	LSN	10	SP3	18		26	
3	TL	11	ST1	19		27	CDP
4	TL1	12	ST2	20	STAB2	28	CLD
5	PC	13	CM1	21		29	MECR
6	RES	14	CM2	22		30	
7	CR	15	LOP	23		31	

4.5.8 Test operation mode

POINT
●The test operation mode is used to check operation. Do not use it for actual operation. ●If communication stops for longer than 0.5 s during test operation, the servo amplifier decelerates to a stop, resulting in servo-lock. To prevent this, continue communication all the time by monitoring the status display, etc. ●Even during operation, you can switch the servo amplifier to the test operation mode. In this case, switching to the test operation mode will shut off the base circuit to coast the motor.

(1) How to prepare and cancel the test operation mode

(a) Preparing the test operation mode

Set the test operation mode type with the following procedure.

1) Selection of test operation mode

Send the command [8] [B] + data No. [0] [0] + data to select the test operation mode.

Command	Data No.	Transmission data	Selection of test operation mode
[8] [B]	[0] [0]	0001	JOG operation
		0002	Positioning operation
		0004	Output signal (DO) forced output (Note)

Note Refer to section 4.5.9 for output signal (DO) forced output.

2) Check of test operation mode

Read the test operation mode set for the slave station, and check that it is set correctly.

a) Transmission

Transmit command [0] [0] and data No. [1] [2].

Command	Data No.
[0] [0]	[1] [2]

b) Reply

The slave station returns the preset operation mode.

0	0	0	

Test operation mode reading
0: Normal mode (not test operation mode)
1: JOG operation
2: Positioning operation
3: Motor-less operation
4: Output signal (DO) forced output

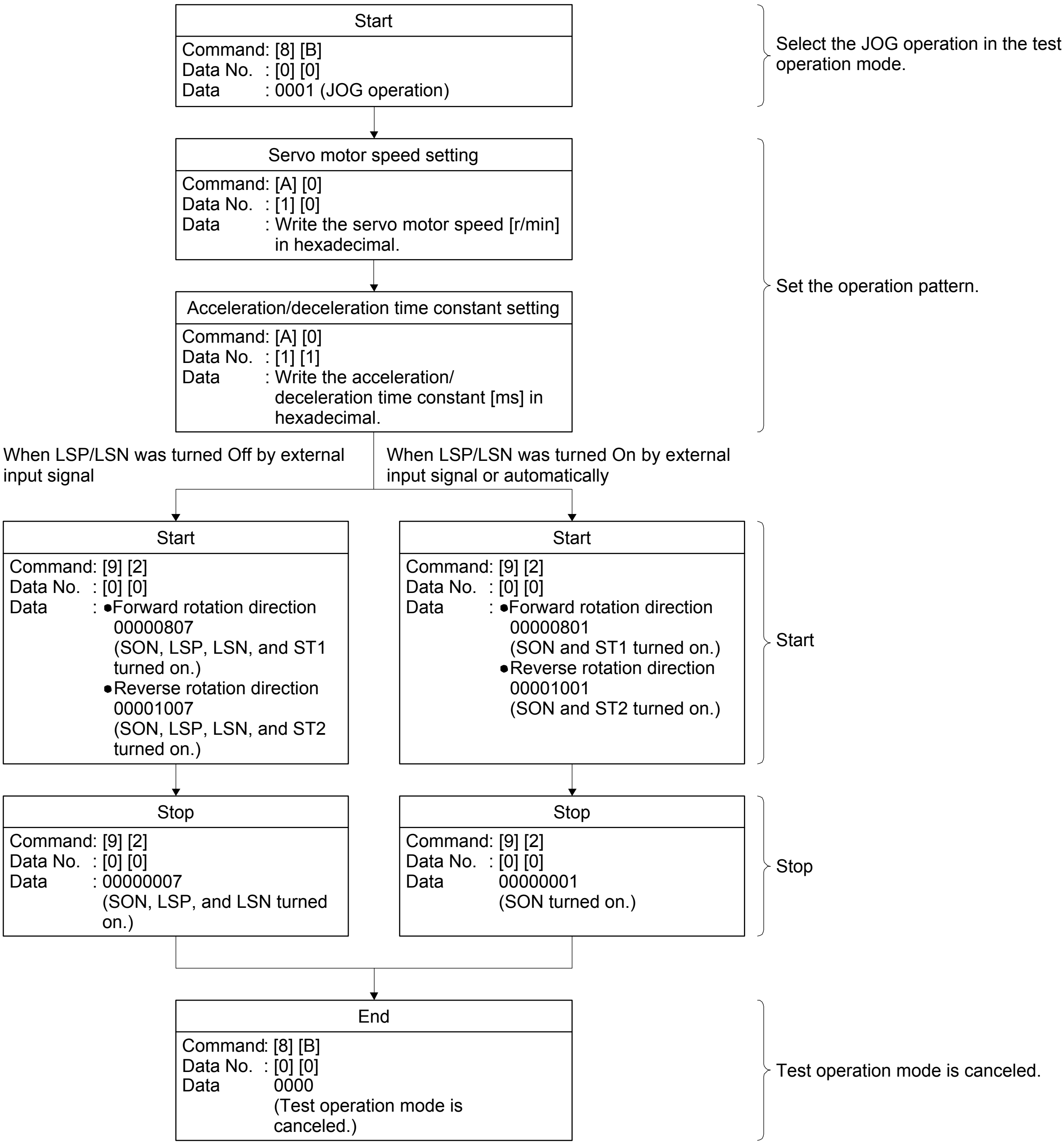
(b) Cancel of test operation mode

To terminate the test operation mode, send the command [8] [B] + data No. [0] [0] + data.

Command	Data No.	Transmission data	Selection of test operation mode
[8] [B]	[0] [0]	0000	Test operation mode cancel

(2) JOG operation

Transmit the command, data No., and data as follows to execute JOG operation.



(3) Positioning operation

(a) Operation procedure

Transmit the command, data No., and data as follows to execute positioning operation.

Start
Command: [8] [B]
Data No. : [0] [0]
Data : 0002 (Positioning operation)

Select the JOG operation in the test operation mode.

Servo motor speed setting
Command: [A] [0]
Data No. : [1] [0]
Data : Write the speed [r/min] in hexadecimal.

Acceleration/deceleration time constant setting
Command: [A] [0]
Data No. : [1] [1]
Data : Write the acceleration/ deceleration time constant [ms] in hexadecimal.

Travel distance setting
Command: [A] [0]
Data No. : [2] [0]
Data : Write the travel distance [pulse] in hexadecimal.

Rotation direction selection
Command: [A] [0]
Data No. : [2] [1]
Data : 0000 (Forward rotation direction)
0001 (Reverse rotation direction)

Set the operation pattern.

When LSP/LSN was turned Off by external input signal

Enable input device.
Command: [9] [2]
Data No. : [0] [0]
Data : 00000007
(SON, LSP, and LSN turned on.)

When LSP/LSN was turned On by external input signal or automatically

Enable input device.
Command: [9] [2]
Data No. : [0] [0]
Data : 00000001
(SON turned on.)

Turn on SON (Servo-on) to make the servo amplifier ready.

(Note)

Start positioning operation
Command: [A] [0]
Data No. : [4] [0]
Data : 1EA5

Start

End
Command: [8] [B]
Data No. : [0] [0]
Data : 0000
(Test operation mode is canceled.)

Test operation mode is canceled.

Note It has 100 ms delay.

(b) Temporary stop/restart/remaining distance clear

Transmit the following command, data No., and data during positioning operation to make deceleration to a stop.

Command	Data No.	Data
[A] [0]	[4] [1]	STOP

Transmit the following command, data No., and data during a temporary stop to restart.

Command	Data No.	(Note) Data
[A] [0]	[4] [1]	GO_ _

Note "_" indicates a blank.

Transmit the following command, data No., and data during a temporary stop to stop positioning operation and erase the remaining travel distance.

Command	Data No.	(Note) Data
[A] [0]	[4] [1]	CLR_

Note "_" indicates a blank.

4.5.9 Output signal pin on/off (output signal (DO) forced output)

In the test operation mode, the output signal pins can be turned on/off regardless of the servo status. Using command [9] [0], disable the external output signals in advance.

(1) Selecting output signal (DO) forced output in the test operation mode
Transmit command + [8] [B] + data No. [0] [0] + data "0004" to select output signal (DO) forced output.

0	0	0	4

Selection of test operation mode
4: Output signal (DO) forced output

(2) External output signal on/off
Transmit the following communication commands.

Command	Data No.	Set data
[9] [2]	[A] [0]	See below.

b31 - - - - b1b0

1: On
0: Off

Command of each bit is transmitted to the master station as hexadecimal data.

Bit	CN1 connector pin	Bit	CN1 connector pin	Bit	CN1 connector pin	Bit	CN1 connector pin
0	49	8	14 (Note)	16		24	
1	24	9		17		25	
2	23	10		18		26	
3	25	11		19		27	
4	22	12		20		28	
5	48	13		21		29	
6	33	14		22		30	
7	13 (Note)	15		23		31	

Note The MR-J4-_A_-RJ 100 W or more servo amplifier is available with software version B3 or later.

(3) Output signal (DO) forced output
Transmit command [8] [B] + data No. [0] [0] + data to stop output signal (DO) forced output.

Command	Data No.	Transmission data	Selection of test operation mode
[8] [B]	[0] [0]	0000	Test operation mode cancel

4.5.10 Alarm history

(1) Alarm No. reading

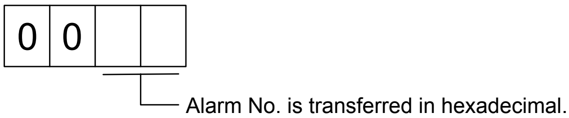
The following shows how to read alarm Nos. which occurred in the past. Alarm Nos. and occurrence times of No. 0 (last alarm) to No. 15 (sixteenth alarm in the past) are read.

(a) Transmission

Transmit command [3] [3] + data No. [1] [0] to [1] [F]. Refer to (1) of section 4.4.1.

(b) Return

Alarm Nos. corresponding to the data No. is provided.



For example, "0032" means [AL. 32] and "00FF" means [AL. _ _] (no alarm).

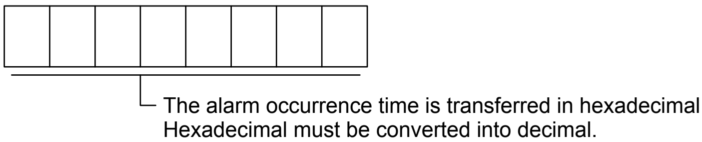
(2) Alarm occurrence time reading

The following shows how to read alarm occurrence times which occurred in the past.
Alarm occurrence time corresponding to the data No. is provided in terms of the total time beginning with operation start, with the minute unit omitted.

(a) Transmission

Transmit command [3] [3] + data No. [2] [0] to [2] [F].
Refer to (1) of section 4.4.1.

(b) Return



For example, data "01F5" means that the alarm occurred in 501 hours after starting operation.

(3) Clearing the alarm history

Alarm history is cleared.
Transmit command [8] [2] and data No. [2] [0].

Command	Data No.	Data
[8] [2]	[2] [0]	1EA5

4.5.11 Current alarm

(1) Current alarm reading

The following shows how to read the alarm No. which is occurring currently.

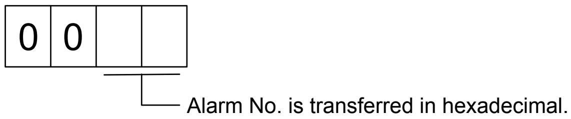
(a) Transmission

Transmit command [0] [2] and data No. [0] [0].

Command	Data No.
[0] [2]	[0] [0]

(b) Return

The slave station returns the alarm currently occurring.



For example, "0032" means [AL. 32] and "00FF" means [AL. _ _] (no alarm).

(2) Reading status display at alarm occurrence

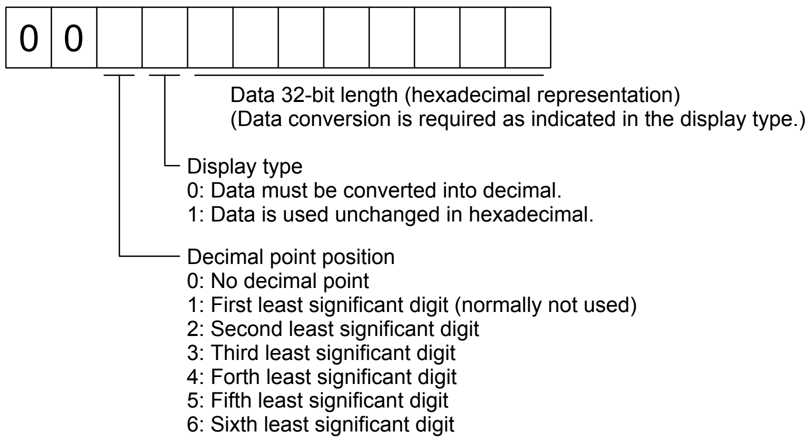
The following shows how to read the status display data at alarm occurrence. When the data No. corresponding to the status display item is transmitted, the data value and data processing information will be returned.

(a) Transmission

Transmit the command [3] [5] + the data No. corresponding to the status display item to read, [8] [0] to [8] [E] and [A] [0] to [A] [9]. Refer to (1) of section 4.4.1.

(b) Return

The slave station returns the status display data of requested alarm at occurrence.



(3) Current alarm reset

As by the reset (RES) on, reset the servo amplifier alarm to make the servo amplifier ready to operate. After removing the cause of the alarm, reset the alarm with no command entered.

Command	Data No.	Data
[8] [2]	[0] [0]	1EA5

4.5.12 Other commands

(1) Servo motor-side pulse unit absolute position
The following shows how to read the absolute position in the servo motor-side pulse unit. Note that overflow will occur in the position of 8192 or more revolutions from the home position.

(a) Transmission
Transmit command [0] [2] and data No. [9] [0].

Command	Data No.
[0] [2]	[9] [0]

(b) Return
The slave station returns the requested servo motor-side pulses.

Absolute position is sent back in hexadecimal in the servo motor-side pulse unit
(Data must be converted into decimal.)

For example, data "000186A0" is 100000 pulses in the motor-side pulse unit.

(2) Command unit absolute position
The following shows how to read the absolute position in the command unit.

(a) Transmission
Transmit command [0] [2] and data No. [9] [1].

Command	Data No.
[0] [2]	[9] [1]

(b) Return
The slave station returns the requested command pulses.

Absolute position is sent back in hexadecimal in the command unit.
(Data must be converted into decimal.)

For example, data "000186A0" is 100000 pulses in the command unit.

(3) Software version

The following shows how to read the software version of the servo amplifier.

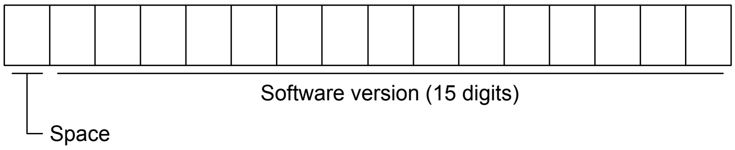
(a) Transmission

Transmit command [0] [2] and data No. [7] [0].

Command	Data No.
[0] [2]	[7] [0]

(b) Return

The slave station returns the requested software version.



Part 5
Review on Replacement of Motor

Part 5: Review on Replacement of Motor

1. SERVO MOTOR REPLACEMENT

1.1 Servo Motor Substitute Model and Compatibility

POINT

- Compatibility here means the attachment compatibility.
  For details about the compatibility of servo motor dimensions, reducer specifications, moment of inertia, connector specifications, and torque characteristics, see "2 COMPARISON OF SERVO MOTOR SPECIFICATIONS".

(1) HF-KP motor

Series	Model	Example of replacement model	Compatibility (○: Compatible)	Note
Small capacity, low inertia HF-KP series Standard/With brake (B): With brake	HF-KP053(B)	HG-KR053(B)	○	
	HF-KP13(B)	HG-KR13(B)		
	HF-KP23(B)	HG-KR23(B)		
	HF-KP43(B)	HG-KR43(B)		
	HF-KP73(B)	HG-KR73(B)		
Small capacity, low inertia HF-KP series with high precision reducer (G1) (B): With brake	HF-KP053(B)G1 1/5	HG-KR053(B)G1 1/5	○	• Because the reduction gears of models marked with ◆ are different from the actual reduction ratio, it is required that an electronic gear be set up. Refer to "2.4 Comparison of actual reduction ratios for geared servo motors" for the details.
	HF-KP053(B)G1 1/12	HG-KR053(B)G1 1/12		
	HF-KP053(B)G1 1/20	HG-KR053(B)G1 1/20		
	HF-KP13(B)G1 1/5	HG-KR13(B)G1 1/5		
	HF-KP13(B)G1 1/12	HG-KR13(B)G1 1/12		
	HF-KP13(B)G1 1/20	HG-KR13(B)G1 1/20		
	HF-KP23(B)G1 1/5	HG-KR23(B)G1 1/5		
	HF-KP23(B)G1 1/12	HG-KR23(B)G1 1/12 ◆		
	HF-KP23(B)G1 1/20	HG-KR23(B)G1 1/20 ◆		
	HF-KP43(B)G1 1/5	HG-KR43(B)G1 1/5		
	HF-KP43(B)G1 1/12	HG-KR43(B)G1 1/12 ◆		
	HF-KP43(B)G1 1/20	HG-KR43(B)G1 1/20 ◆		
	HF-KP73(B)G1 1/5	HG-KR73(B)G1 1/5		
	HF-KP73(B)G1 1/12	HG-KR73(B)G1 1/12 ◆		
	HF-KP73(B)G1 1/20	HG-KR73(B)G1 1/20		

Series	Model	Example of replacement model	Compatibility (○: Compatible)	Note
Small capacity, low inertia HF-KP series with high precision reducer Flange output type (G5) (B): With brake	HF-KP053(B)G5 1/5	HG-KR053(B)G5 1/5	○	
	HF-KP053(B)G5 1/11	HG-KR053(B)G5 1/11		
	HF-KP053(B)G5 1/21	HG-KR053(B)G5 1/21		
	HF-KP053(B)G5 1/33	HG-KR053(B)G5 1/33		
	HF-KP053(B)G5 1/45	HG-KR053(B)G5 1/45		
	HF-KP13(B)G5 1/5	HG-KR13(B)G5 1/5		
	HF-KP13(B)G5 1/11	HG-KR13(B)G5 1/11		
	HF-KP13(B)G5 1/21	HG-KR13(B)G5 1/21		
	HF-KP13(B)G5 1/33	HG-KR13(B)G5 1/33		
	HF-KP13(B)G5 1/45	HG-KR13(B)G5 1/45		
	HF-KP23(B)G5 1/5	HG-KR23(B)G5 1/5		
	HF-KP23(B)G5 1/11	HG-KR23(B)G5 1/11		
	HF-KP23(B)G5 1/21	HG-KR23(B)G5 1/21		
	HF-KP23(B)G5 1/33	HG-KR23(B)G5 1/33		
	HF-KP23(B)G5 1/45	HG-KR23(B)G5 1/45		
	HF-KP43(B)G5 1/5	HG-KR43(B)G5 1/5		
	HF-KP43(B)G5 1/11	HG-KR43(B)G5 1/11		
	HF-KP43(B)G5 1/21	HG-KR43(B)G5 1/21		
	HF-KP43(B)G5 1/33	HG-KR43(B)G5 1/33		
	HF-KP43(B)G5 1/45	HG-KR43(B)G5 1/45		
	HF-KP73(B)G5 1/5	HG-KR73(B)G5 1/5		
	HF-KP73(B)G5 1/11	HG-KR73(B)G5 1/11		
	HF-KP73(B)G5 1/21	HG-KR73(B)G5 1/21		
	HF-KP73(B)G5 1/33	HG-KR73(B)G5 1/33		
	HF-KP73(B)G5 1/45	HG-KR73(B)G5 1/45		
Small capacity, low inertia HF-KP series with high precision reducer Shaft output type (G7) (B): With brake	HF-KP053(B)G7 1/5	HG-KR053(B)G7 1/5	○	
	HF-KP053(B)G7 1/11	HG-KR053(B)G7 1/11		
	HF-KP053(B)G7 1/21	HG-KR053(B)G7 1/21		
	HF-KP053(B)G7 1/33	HG-KR053(B)G7 1/33		
	HF-KP053(B)G7 1/45	HG-KR053(B)G7 1/45		
	HF-KP13(B)G7 1/5	HG-KR13(B)G7 1/5		
	HF-KP13(B)G7 1/11	HG-KR13(B)G7 1/11		
	HF-KP13(B)G7 1/21	HG-KR13(B)G7 1/21		
	HF-KP13(B)G7 1/33	HG-KR13(B)G7 1/33		
	HF-KP13(B)G7 1/45	HG-KR13(B)G7 1/45		
	HF-KP23(B)G7 1/5	HG-KR23(B)G7 1/5		
	HF-KP23(B)G7 1/11	HG-KR23(B)G7 1/11		
	HF-KP23(B)G7 1/21	HG-KR23(B)G7 1/21		
	HF-KP23(B)G7 1/33	HG-KR23(B)G7 1/33		
	HF-KP23(B)G7 1/45	HG-KR23(B)G7 1/45		
	HF-KP43(B)G7 1/5	HG-KR43(B)G7 1/5		
	HF-KP43(B)G7 1/11	HG-KR43(B)G7 1/11		
	HF-KP43(B)G7 1/21	HG-KR43(B)G7 1/21		
	HF-KP43(B)G7 1/33	HG-KR43(B)G7 1/33		
	HF-KP43(B)G7 1/45	HG-KR43(B)G7 1/45		
	HF-KP73(B)G7 1/5	HG-KR73(B)G7 1/5		
	HF-KP73(B)G7 1/11	HG-KR73(B)G7 1/11		
	HF-KP73(B)G7 1/21	HG-KR73(B)G7 1/21		
	HF-KP73(B)G7 1/33	HG-KR73(B)G7 1/33		
	HF-KP73(B)G7 1/45	HG-KR73(B)G7 1/45		

(2) HF-MP motor

Series	Model	Example of replacement model	Compatibility (O: Compatible)	Note
Small capacity, ultralow inertia HF-MP series Standard/With brake (B): With brake	HF-MP053(B)	HG-MR053(B)	O	
	HF-MP13(B)	HG-MR13(B)		
	HF-MP23(B)	HG-MR23(B)		
	HF-MP43(B)	HG-MR43(B)		
	HF-MP73(B)	HG-MR73(B)		
Small capacity, ultralow inertia HF-MP series with general reducer (G1) (B): With brake	HF-MP053(B)G1 1/5	HG-KR053(B)G1 1/5	O	• The HG-MR series does not support the geared model. The geared model is supported with the HG-KR series. • Because the reduction gears of models marked with ◆are different from the actual reduction ratio, it is required that an electronic gear be set up. Refer to "2.4 Comparison of actual reduction ratios for geared servo motors" for the details.
	HF-MP053(B)G1 1/12	HG-KR053(B)G1 1/12		
	HF-MP053(B)G1 1/20	HG-KR053(B)G1 1/20		
	HF-MP13(B)G1 1/5	HG-KR13(B)G1 1/5		
	HF-MP13(B)G1 1/12	HG-KR13(B)G1 1/12		
	HF-MP13(B)G1 1/20	HG-KR13(B)G1 1/20		
	HF-MP23(B)G1 1/5	HG-KR23(B)G1 1/5		
	HF-MP23(B)G1 1/12	HG-KR23(B)G1 1/12 ◆		
	HF-MP23(B)G1 1/20	HG-KR23(B)G1 1/20 ◆		
	HF-MP43(B)G1 1/5	HG-KR43(B)G1 1/5		
	HF-MP43(B)G1 1/12	HG-KR43(B)G1 1/12 ◆		
	HF-MP43(B)G1 1/20	HG-KR43(B)G1 1/20 ◆		
	HF-MP73(B)G1 1/5	HG-KR73(B)G1 1/5		
	HF-MP73(B)G1 1/12	HG-KR73(B)G1 1/12 ◆		
	HF-MP73(B)G1 1/20	HG-KR73(B)G1 1/20		

Series	Model	Example of replacement model	Compatibility (○: Compatible)	Note
Small capacity, ultralow inertia HF-MP series with high precision reducer Flange output type (G5) (B): With brake	HF-MP053(B)G5 1/5	HG-KR053(B)G5 1/5	○	• The HG-MR series does not support the geared model. The geared model is supported with the HG-KR series.
	HF-MP053(B)G5 1/11	HG-KR053(B)G5 1/11		
	HF-MP053(B)G5 1/21	HG-KR053(B)G5 1/21		
	HF-MP053(B)G5 1/33	HG-KR053(B)G5 1/33		
	HF-MP053(B)G5 1/45	HG-KR053(B)G5 1/45		
	HF-MP13(B)G5 1/5	HG-KR13(B)G5 1/5		
	HF-MP13(B)G5 1/11	HG-KR13(B)G5 1/11		
	HF-MP13(B)G5 1/21	HG-KR13(B)G5 1/21		
	HF-MP13(B)G5 1/33	HG-KR13(B)G5 1/33		
	HF-MP13(B)G5 1/45	HG-KR13(B)G5 1/45		
	HF-MP23(B)G5 1/5	HG-KR23(B)G5 1/5		
	HF-MP23(B)G5 1/11	HG-KR23(B)G5 1/11		
	HF-MP23(B)G5 1/21	HG-KR23(B)G5 1/21		
	HF-MP23(B)G5 1/33	HG-KR23(B)G5 1/33		
	HF-MP23(B)G5 1/45	HG-KR23(B)G5 1/45		
	HF-MP43(B)G5 1/5	HG-KR43(B)G5 1/5		
	HF-MP43(B)G5 1/11	HG-KR43(B)G5 1/11		
	HF-MP43(B)G5 1/21	HG-KR43(B)G5 1/21		
	HF-MP43(B)G5 1/33	HG-KR43(B)G5 1/33		
	HF-MP43(B)G5 1/45	HG-KR43(B)G5 1/45		
	HF-MP73(B)G5 1/5	HG-KR73(B)G5 1/5		
	HF-MP73(B)G5 1/11	HG-KR73(B)G5 1/11		
	HF-MP73(B)G5 1/21	HG-KR73(B)G5 1/21		
	HF-MP73(B)G5 1/33	HG-KR73(B)G5 1/33		
	HF-MP73(B)G5 1/45	HG-KR73(B)G5 1/45		
Small capacity, ultralow inertia HF-MP series with high precision reducer Shaft output type (G7) (B): With brake	HF-MP053(B)G7 1/5	HG-KR053(B)G7 1/5	○	• The HG-MR series does not support the geared model. The geared model is supported with the HG-KR series.
	HF-MP053(B)G7 1/11	HG-KR053(B)G7 1/11		
	HF-MP053(B)G7 1/21	HG-KR053(B)G7 1/21		
	HF-MP053(B)G7 1/33	HG-KR053(B)G7 1/33		
	HF-MP053(B)G7 1/45	HG-KR053(B)G7 1/45		
	HF-MP13(B)G7 1/5	HG-KR13(B)G7 1/5		
	HF-MP13(B)G7 1/11	HG-KR13(B)G7 1/11		
	HF-MP13(B)G7 1/21	HG-KR13(B)G7 1/21		
	HF-MP13(B)G7 1/33	HG-KR13(B)G7 1/33		
	HF-MP13(B)G7 1/45	HG-KR13(B)G7 1/45		
	HF-MP23(B)G7 1/5	HG-KR23(B)G7 1/5		
	HF-MP23(B)G7 1/11	HG-KR23(B)G7 1/11		
	HF-MP23(B)G7 1/21	HG-KR23(B)G7 1/21		
	HF-MP23(B)G7 1/33	HG-KR23(B)G7 1/33		
	HF-MP23(B)G7 1/45	HG-KR23(B)G7 1/45		
	HF-MP43(B)G7 1/5	HG-KR43(B)G7 1/5		
	HF-MP43(B)G7 1/11	HG-KR43(B)G7 1/11		
	HF-MP43(B)G7 1/21	HG-KR43(B)G7 1/21		
	HF-MP43(B)G7 1/33	HG-KR43(B)G7 1/33		
	HF-MP43(B)G7 1/45	HG-KR43(B)G7 1/45		
	HF-MP73(B)G7 1/5	HG-KR73(B)G7 1/5		
	HF-MP73(B)G7 1/11	HG-KR73(B)G7 1/11		
	HF-MP73(B)G7 1/21	HG-KR73(B)G7 1/21		
	HF-MP73(B)G7 1/33	HG-KR73(B)G7 1/33		
	HF-MP73(B)G7 1/45	HG-KR73(B)G7 1/45		

(3) HF-SP motor

Series	Model	Example of replacement model	Compatibility (○: Compatible)	Note
Medium capacity, medium inertia HF-SP series Standard/With brake (4): 400 V specifications (B): With brake	HF-SP51(B)	HG-SR51(B)	○	• The total length of the motor will be shorter, so confirm that the motor connector does not interfere with the device side.
	HF-SP81(B)	HG-SR81(B)		
	HF-SP121(B)	HG-SR121(B)		
	HF-SP201(B)	HG-SR201(B)		
	HF-SP301(B)	HG-SR301(B)		
	HF-SP421(B)	HG-SR421(B)		
	HF-SP52(4)(B)	HG-SR52(4)(B)		
	HF-SP102(4)(B)	HG-SR102(4)(B)		
	HF-SP152(4)(B)	HG-SR152(4)(B)		
	HF-SP202(4)(B)	HG-SR202(4)(B)		
	HF-SP352(4)(B)	HG-SR352(4)(B)		
	HF-SP502(4)(B)	HG-SR502(4)(B)		
	HF-SP702(4)(B)	HG-SR702(4)(B)		
Medium capacity, medium inertia HF-SP series with general reducer (4): 400 V specifications (B): With brake G1: Flange-mounting G1H: Foot-mounting	HF-SP52(4)(B)G1(H) 1/6	HG-SR52(4)(B)G1(H) 1/6	○	• The total length of the motor will be shorter, so confirm that the motor connector does not interfere with the device side.
	HF-SP52(4)(B)G1(H) 1/11	HG-SR52(4)(B)G1(H) 1/11		
	HF-SP52(4)(B)G1(H) 1/17	HG-SR52(4)(B)G1(H) 1/17		
	HF-SP52(4)(B)G1(H) 1/29	HG-SR52(4)(B)G1(H) 1/29		
	HF-SP52(4)(B)G1(H) 1/35	HG-SR52(4)(B)G1(H) 1/35		
	HF-SP52(4)(B)G1(H) 1/43	HG-SR52(4)(B)G1(H) 1/43		
	HF-SP52(4)(B)G1(H) 1/59	HG-SR52(4)(B)G1(H) 1/59		
	HF-SP102(4)(B)G1(H) 1/6	HG-SR102(4)(B)G1(H) 1/6		
	HF-SP102(4)(B)G1(H) 1/11	HG-SR102(4)(B)G1(H) 1/11		
	HF-SP102(4)(B)G1(H) 1/17	HG-SR102(4)(B)G1(H) 1/17		
	HF-SP102(4)(B)G1(H) 1/29	HG-SR102(4)(B)G1(H) 1/29		
	HF-SP102(4)(B)G1(H) 1/35	HG-SR102(4)(B)G1(H) 1/35		
	HF-SP102(4)(B)G1(H) 1/43	HG-SR102(4)(B)G1(H) 1/43		
	HF-SP102(4)(B)G1(H) 1/59	HG-SR102(4)(B)G1(H) 1/59		
	HF-SP152(4)(B)G1(H) 1/6	HG-SR152(4)(B)G1(H) 1/6		
	HF-SP152(4)(B)G1(H) 1/11	HG-SR152(4)(B)G1(H) 1/11		
	HF-SP152(4)(B)G1(H) 1/17	HG-SR152(4)(B)G1(H) 1/17		
	HF-SP152(4)(B)G1(H) 1/29	HG-SR152(4)(B)G1(H) 1/29		
	HF-SP152(4)(B)G1(H) 1/35	HG-SR152(4)(B)G1(H) 1/35		
	HF-SP152(4)(B)G1(H) 1/43	HG-SR152(4)(B)G1(H) 1/43		
	HF-SP152(4)(B)G1(H) 1/59	HG-SR152(4)(B)G1(H) 1/59		
	HF-SP202(4)(B)G1(H) 1/6	HG-SR202(4)(B)G1(H) 1/6		
	HF-SP202(4)(B)G1(H) 1/11	HG-SR202(4)(B)G1(H) 1/11		
	HF-SP202(4)(B)G1(H) 1/17	HG-SR202(4)(B)G1(H) 1/17		
	HF-SP202(4)(B)G1(H) 1/29	HG-SR202(4)(B)G1(H) 1/29		
	HF-SP202(4)(B)G1(H) 1/35	HG-SR202(4)(B)G1(H) 1/35		
	HF-SP202(4)(B)G1(H) 1/43	HG-SR202(4)(B)G1(H) 1/43		
	HF-SP202(4)(B)G1(H) 1/59	HG-SR202(4)(B)G1(H) 1/59		
	HF-SP352(4)(B)G1(H) 1/6	HG-SR352(4)(B)G1(H) 1/6		
	HF-SP352(4)(B)G1(H) 1/11	HG-SR352(4)(B)G1(H) 1/11		
	HF-SP352(4)(B)G1(H) 1/17	HG-SR352(4)(B)G1(H) 1/17		
	HF-SP352(4)(B)G1(H) 1/29	HG-SR352(4)(B)G1(H) 1/29		
	HF-SP352(4)(B)G1(H) 1/35	HG-SR352(4)(B)G1(H) 1/35		
	HF-SP352(4)(B)G1(H) 1/43	HG-SR352(4)(B)G1(H) 1/43		
	HF-SP352(4)(B)G1(H) 1/59	HG-SR352(4)(B)G1(H) 1/59		

Series	Model	Example of replacement model	Compatibility (O: Compatible)	Note
Medium capacity, medium inertia HF-SP series with general reducer (4): 400 V specifications (B): With brake G1: Flange-mounting G1H: Foot-mounting	HF-SP502(4)(B)G1(H) 1/6	HG-SR502(4)(B)G1(H) 1/6	O	• The total length of the motor will be shorter, so confirm that the motor connector does not interfere with the device side.
	HF-SP502(4)(B)G1(H) 1/11	HG-SR502(4)(B)G1(H) 1/11		
	HF-SP502(4)(B)G1(H) 1/17	HG-SR502(4)(B)G1(H) 1/17		
	HF-SP502(4)(B)G1(H) 1/29	HG-SR502(4)(B)G1(H) 1/29		
	HF-SP502(4)(B)G1(H) 1/35	HG-SR502(4)(B)G1(H) 1/35		
	HF-SP502(4)(B)G1(H) 1/43	HG-SR502(4)(B)G1(H) 1/43		
	HF-SP502(4)(B)G1(H) 1/59	HG-SR502(4)(B)G1(H) 1/59		
	HF-SP702(4)(B)G1(H) 1/6	HG-SR702(4)(B)G1(H) 1/6		
	HF-SP702(4)(B)G1(H) 1/11	HG-SR702(4)(B)G1(H) 1/11		
	HF-SP702(4)(B)G1(H) 1/17	HG-SR702(4)(B)G1(H) 1/17		
	HF-SP702(4)(B)G1(H) 1/29	HG-SR702(4)(B)G1(H) 1/29		
	HF-SP702(4)(B)G1(H) 1/35	HG-SR702(4)(B)G1(H) 1/35		
	HF-SP702(4)(B)G1(H) 1/43	HG-SR702(4)(B)G1(H) 1/43		
	HF-SP702(4)(B)G1(H) 1/59	HG-SR702(4)(B)G1(H) 1/59		
Medium capacity, medium inertia HF-SP series with high precision reducer Flange output type (G5) (4): 400 V specifications (B): With brake	HF-SP52(4)(B)G5 1/5	HG-SR52(4)(B)G5 1/5	O	• The total length of the motor will be shorter, so confirm that the motor connector does not interfere with the device side.
	HF-SP52(4)(B)G5 1/11	HG-SR52(4)(B)G5 1/11		
	HF-SP52(4)(B)G5 1/21	HG-SR52(4)(B)G5 1/21		
	HF-SP52(4)(B)G5 1/33	HG-SR52(4)(B)G5 1/33		
	HF-SP52(4)(B)G5 1/45	HG-SR52(4)(B)G5 1/45		
	HF-SP102(4)(B)G5 1/5	HG-SR102(4)(B)G5 1/5		
	HF-SP102(4)(B)G5 1/11	HG-SR102(4)(B)G5 1/11		
	HF-SP102(4)(B)G5 1/21	HG-SR102(4)(B)G5 1/21		
	HF-SP102(4)(B)G5 1/33	HG-SR102(4)(B)G5 1/33		
	HF-SP102(4)(B)G5 1/45	HG-SR102(4)(B)G5 1/45		
	HF-SP152(4)(B)G5 1/5	HG-SR152(4)(B)G5 1/5		
	HF-SP152(4)(B)G5 1/11	HG-SR152(4)(B)G5 1/11		
	HF-SP152(4)(B)G5 1/21	HG-SR152(4)(B)G5 1/21		
	HF-SP152(4)(B)G5 1/33	HG-SR152(4)(B)G5 1/33		
	HF-SP152(4)(B)G5 1/45	HG-SR152(4)(B)G5 1/45		
	HF-SP202(4)(B)G5 1/5	HG-SR202(4)(B)G5 1/5		
	HF-SP202(4)(B)G5 1/11	HG-SR202(4)(B)G5 1/11		
	HF-SP202(4)(B)G5 1/21	HG-SR202(4)(B)G5 1/21		
	HF-SP202(4)(B)G5 1/33	HG-SR202(4)(B)G5 1/33		
	HF-SP202(4)(B)G5 1/45	HG-SR202(4)(B)G5 1/45		
	HF-SP352(4)(B)G5 1/5	HG-SR352(4)(B)G5 1/5		
	HF-SP352(4)(B)G5 1/11	HG-SR352(4)(B)G5 1/11		
	HF-SP352(4)(B)G5 1/21	HG-SR352(4)(B)G5 1/21		
	HF-SP502(4)(B)G5 1/5	HG-SR502(4)(B)G5 1/5		
	HF-SP502(4)(B)G5 1/11	HG-SR502(4)(B)G5 1/11		
	HF-SP702(4)(B)G5 1/5	HG-SR702(4)(B)G5 1/5		

Series	Model	Example of replacement model	Compatibility (O: Compatible)	Note
Medium capacity, medium inertia HF-SP series with high precision reducer Shaft output type (G7) (4): 400 V specifications (B): With brake	HF-SP52(4)(B)G7 1/5	HG-SR52(4)(B)G7 1/5	O	• The total length of the motor will be shorter, so confirm that the motor connector does not interfere with the device side.
	HF-SP52(4)(B)G7 1/11	HG-SR52(4)(B)G7 1/11		
	HF-SP52(4)(B)G7 1/21	HG-SR52(4)(B)G7 1/21		
	HF-SP52(4)(B)G7 1/33	HG-SR52(4)(B)G7 1/33		
	HF-SP52(4)(B)G7 1/45	HG-SR52(4)(B)G7 1/45		
	HF-SP102(4)(B)G7 1/5	HG-SR102(4)(B)G7 1/5		
	HF-SP102(4)(B)G7 1/11	HG-SR102(4)(B)G7 1/11		
	HF-SP102(4)(B)G7 1/21	HG-SR102(4)(B)G7 1/21		
	HF-SP102(4)(B)G7 1/33	HG-SR102(4)(B)G7 1/33		
	HF-SP102(4)(B)G7 1/45	HG-SR102(4)(B)G7 1/45		
	HF-SP152(4)(B)G7 1/5	HG-SR152(4)(B)G7 1/5		
	HF-SP152(4)(B)G7 1/11	HG-SR152(4)(B)G7 1/11		
	HF-SP152(4)(B)G7 1/21	HG-SR152(4)(B)G7 1/21		
	HF-SP152(4)(B)G7 1/33	HG-SR152(4)(B)G7 1/33		
	HF-SP152(4)(B)G7 1/45	HG-SR152(4)(B)G7 1/45		
	HF-SP202(4)(B)G7 1/5	HG-SR202(4)(B)G7 1/5		
	HF-SP202(4)(B)G7 1/11	HG-SR202(4)(B)G7 1/11		
	HF-SP202(4)(B)G7 1/21	HG-SR202(4)(B)G7 1/21		
	HF-SP202(4)(B)G7 1/33	HG-SR202(4)(B)G7 1/33		
	HF-SP202(4)(B)G7 1/45	HG-SR202(4)(B)G7 1/45		
	HF-SP352(4)(B)G7 1/5	HG-SR352(4)(B)G7 1/5		
	HF-SP352(4)(B)G7 1/11	HG-SR352(4)(B)G7 1/11		
	HF-SP352(4)(B)G7 1/21	HG-SR352(4)(B)G7 1/21		
	HF-SP502(4)(B)G7 1/5	HG-SR502(4)(B)G7 1/5		
	HF-SP502(4)(B)G7 1/11	HG-SR502(4)(B)G7 1/11		
	HF-SP702(4)(B)G7 1/5	HG-SR702(4)(B)G7 1/5		

(4) HC-RP motor

Series	model	Example of replacement model	Compatibility (O: Compatible)	Note
Medium capacity, ultra-low inertia HC-RP series (B): With brake	HC-RP103(B)	HG-RR103(B)	O	
	HC-RP153(B)	HG-RR153(B)		
	HC-RP203(B)	HG-RR203(B)		
	HC-RP353(B)	HG-RR353(B)		
	HC-RP503(B)	HG-RR503(B)		
Medium capacity, ultra-low inertia HC-RP series with high precision reducer Flange output type (G5) (B): With brake	HC-RP103(B)G5 1/5◇	HG-SR102(B)G5 1/5	(Note 1)	• The HG-RR series does not support the geared model. The geared model is supported with the HG-SR series. • Check the output torque because the reduction ratio of models marked with ◆is greatly different. • The capacity of the corresponding servo amplifier will be different if a model marked with ◇is replaced. The corresponding servo amplifier for HG-SR102 is MR-J4-100_, for HG-SR202 is MR-J4-200_, and for HG-SR352 is MR-J4-350_.
	HC-RP103(B)G5 1/11◇	HG-SR102(B)G5 1/11		
	HC-RP103(B)G5 1/21◇	HG-SR102(B)G5 1/21		
	HC-RP103(B)G5 1/33◇	HG-SR102(B)G5 1/33		
	HC-RP103(B)G5 1/45◇	HG-SR102(B)G5 1/45		
	HC-RP153(B)G5 1/5	HG-SR152(B)G5 1/5		
	HC-RP153(B)G5 1/11	HG-SR152(B)G5 1/11		
	HC-RP153(B)G5 1/21	HG-SR152(B)G5 1/21		
	HC-RP153(B)G5 1/33	HG-SR152(B)G5 1/33		
	HC-RP153(B)G5 1/45	HG-SR152(B)G5 1/45		
	HC-RP203(B)G5 1/5◇	HG-SR202(B)G5 1/5		
	HC-RP203(B)G5 1/11◇	HG-SR202(B)G5 1/11		
	HC-RP203(B)G5 1/21◇	HG-SR202(B)G5 1/21		
	HC-RP203(B)G5 1/33◇	HG-SR202(B)G5 1/33		
	HC-RP203(B)G5 1/45◇	HG-SR202(B)G5 1/45		
	HC-RP353(B)G5 1/5◇	HG-SR352(B)G5 1/5		
	HC-RP353(B)G5 1/11◇	HG-SR352(B)G5 1/11		
	HC-RP353(B)G5 1/21◇	HG-SR352(B)G5 1/21		
	HC-RP353(B)G5 1/33◇	HG-SR352(B)G5 1/21 ◆		
	HC-RP503(B)G5 1/5	HG-SR502(B)G5 1/5		
	HC-RP503(B)G5 1/11	HG-SR502(B)G5 1/11		
	HC-RP503(B)G5 1/21	HG-SR502(B)G5 1/11 ◆		
Medium capacity, ultra-low inertia HC-RP series with high precision reducer Shaft output type (G7) (B): With brake	HC-RP103(B)G7 1/5◇	HG-SR102(B)G7 1/5	(Note 1)	• The HG-RR series does not support the geared model. The geared model is supported with the HG-SR series. • Check the output torque because the reduction ratio of models marked with ◆is greatly different. • The capacity of the corresponding servo amplifier will be different if a model marked with ◇is replaced. The corresponding servo amplifier for HG-SR102 is MR-J4-100_, for HG-SR202 is MR-J4-200_, and for HG-SR352 is MR-J4-350_.
	HC-RP103(B)G7 1/11◇	HG-SR102(B)G7 1/11		
	HC-RP103(B)G7 1/21◇	HG-SR102(B)G7 1/21		
	HC-RP103(B)G7 1/33◇	HG-SR102(B)G7 1/33		
	HC-RP103(B)G7 1/45◇	HG-SR102(B)G7 1/45		
	HC-RP153(B)G7 1/5	HG-SR152(B)G7 1/5		
	HC-RP153(B)G7 1/11	HG-SR152(B)G7 1/11		
	HC-RP153(B)G7 1/21	HG-SR152(B)G7 1/21		
	HC-RP153(B)G7 1/33	HG-SR152(B)G7 1/33		
	HC-RP153(B)G7 1/45	HG-SR152(B)G7 1/45		
	HC-RP203(B)G7 1/5◇	HG-SR202(B)G7 1/5		
	HC-RP203(B)G7 1/11◇	HG-SR202(B)G7 1/11		
	HC-RP203(B)G7 1/21◇	HG-SR202(B)G7 1/21		
	HC-RP203(B)G7 1/33◇	HG-SR202(B)G7 1/33		
	HC-RP203(B)G7 1/45◇	HG-SR202(B)G7 1/45		
	HC-RP353(B)G7 1/5◇	HG-SR352(B)G7 1/5		
	HC-RP353(B)G7 1/11◇	HG-SR352(B)G7 1/11		
	HC-RP353(B)G7 1/21◇	HG-SR352(B)G7 1/21		
	HC-RP353(B)G7 1/33◇	HG-SR352(B)G7 1/21 ◆		
	HC-RP503(B)G7 1/5	HG-SR502(B)G7 1/5		
	HC-RP503(B)G7 1/11	HG-SR502(B)G7 1/11		
	HC-RP503(B)G7 1/21	HG-SR502(B)G7 1/11 ◆		

Note 1. For mounting dimensions, see "2.3 Comparison of Mounting Dimensions for Geared Servo Motors".

(5) HC-LP/UP, HF-JP motor

Series	model	Example of replacement model	Compatibility (○: Compatible)	Note
Medium capacity, low inertia HC-LP series (B): With brake	HC-LP52(B) ◇	HG-JR73(B)	(Note 1)	• The capacity of the corresponding servo amplifier will be different if a model marked with ◇is replaced. The correspondence servo amplifier for HG-JR73 is MR-J4-70_, for HG-JR153 is MR-J4-200_, and for HG-JR353 is MR-J4-350_. • The power supply and electromagnetic brake connector differ. For further details, see "2.6 Comparison of Servo Motor Connector Specifications".
	HC-LP102(B) ◇	HG-JR153(B)		
	HC-LP152(B) ◇	HG-JR353(B)		
	HC-LP202(B)	HG-JR353(B)		
	HC-LP302(B)	HG-JR503(B)		
Medium capacity, flat type HC-UP series (B): With brake	HC-UP72(B)	HG-UR72(B)	○	
	HC-UP152(B)	HG-UR152(B)		
	HC-UP202(B)	HG-UR202(B)		
	HC-UP352(B)	HG-UR352(B)		
	HC-UP502(B)	HG-UR502(B)		
Large capacity, low inertia HF-JP 1000 r/min series (4): 400 V specifications (B): With brake	HF-JP53(4)(B)	HG-JR53(4)(B)	○	
	HF-JP73(4)(B)	HG-JR73(4)(B)		
	HF-JP103(4)(B)	HG-JR103(4)(B)		
	HF-JP153(4)(B)	HG-JR153(4)(B)		
	HF-JP203(4)(B)	HG-JR203(4)(B)		
	HF-JP353(4)(B)	HG-JR353(4)(B)		
	HF-JP503(4)(B)	HG-JR503(4)(B)		
	HF-JP703(4)(B)	HG-JR703(4)(B)		
	HF-JP903(4)(B)	HG-JR903(4)(B)		
	HF-JP11K1M(4)(B)	HG-JR11K1M(4)(B)		
	HF-JP15K1M(4)(B)	HG-JR15K1M(4)(B)		

Note 1. Refer to "2.2 Detailed comparison of servo motor mounting dimensions" for mounting dimensions.

(6) HA-LP motor

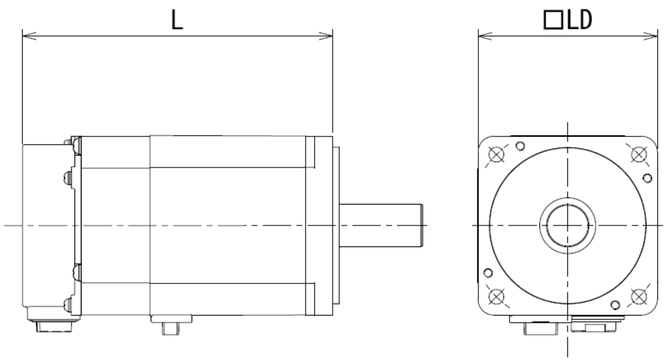
Series	Model	Example of replacement model	Compatibility (○: Compatible)	Note
Large capacity, low inertia HA-LP 1000 r/min series (4): 400 V specifications (B): With brake	HA-LP601(4)(B)	HG-JR601(4)(B)	(Note 1)	• Replacement from a model marked with ◇ requires a new encoder cable wiring because the motor thermal wiring differs.
	HA-LP801(4)(B)	HG-JR801(4)(B)		
	HA-LP12K1(4)(B)	HG-JR12K1(4)(B)		
	HA-LP15K1(4) ◇	HG-JR15K1(4)		
	HA-LP20K1(4) ◇	HG-JR20K1(4)		
	HA-LP25K1(4) ◇	HG-JR25K1(4)		
	HA-LP601(4)(B)	HG-JR601(4)R(B)-S_	○ (Note 2)	
	HA-LP801(4)(B)	HG-JR801(4)R(B)-S_		
	HA-LP12K1(4)(B)	HG-JR12K1(4)R(B)-S_		
	HA-LP15K1(4) ◇	HG-JR15K1(4)R-S_		
	HA-LP20K1(4) ◇	HG-JR20K1(4)R-S_		
	HA-LP25K1(4) ◇	HG-JR25K1(4)R-S_		
Large capacity, low inertia HA-LP 1500 r/min series (4): 400 V specifications (B): With brake	HA-LP701M(4)(B)	HG-JR701M(4)(B)	(Note 1)	
	HA-LP11K1M(4)(B)	HG-JR11K1M(4)(B)		
	HA-LP15K1M(4)(B)	HG-JR15K1M(4)(B)		
	HA-LP22K1M(4)	HG-JR22K1M(4)		
	HA-LP701M(4)(B)	HG-JR701M(4)R(B)-S_	○ (Note 2)	
	HA-LP11K1M(4)(B)	HG-JR11K1M(4)R(B)-S_(□250)		
	HA-LP15K1M(4)(B)	HG-JR15K1M(4)R(B)-S_		
	HA-LP22K1M(4) ◇	HG-JR22K1M(4)R-S_		
Large capacity, low inertia HA-LP 2000 r/min series (4): 400 V specifications (B): With brake	HA-LP502	HG-SR502	(Note 1)	
	HA-LP702	HG-SR702		
	HA-LP11K2(4)(B)	HG-JR11K1M(4)(B)		
	HA-LP15K2(4)(B)			
	HA-LP22K2(4)(B)	HG-JR15K1M(4)(B)		
	HA-LP30K2(4) ◇	HG-JR22K1M(4)		
	HA-LP502	HG-SR502R-S_	○ (Note 2)	
	HA-LP702	HG-SR702R-S_		
	HA-LP11K2(4)(B)	HG-JR11K1M(4)R(B)-S_(□200)		
	HA-LP15K2(4)(B)	HG-JR11K1M(4)R(B)-S_(□250)		
	HA-LP22K2(4)(B)	HG-JR15K1M(4)R(B)-S_		
	HA-LP30K2(4) ◇	HG-JR22K1M(4)R-S_		

Note 1. Refer to "2.2 Detailed comparison of servo motor mounting dimensions" for mounting dimensions.
2. Only flanges and shaft ends have compatibility in mounting.
Please contact your local sales office regarding the motor model and its delivery, since it is developed upon receipt of order.

2. COMPARISON OF SERVO MOTOR SPECIFICATIONS

2.1 Comparison of Servo Motor Mounting Dimensions

[Unit: mm]

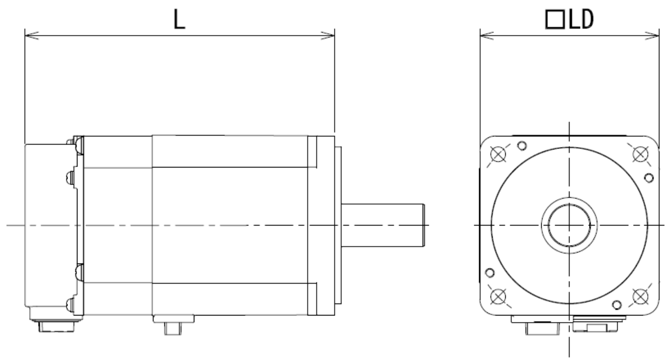


Target product			Replacement product			Note
Model	L	LD	Model	L	LD	
HF-KP053(B)	66.4 (107.5)	40	HG-KR053(B)	66.4 (107)	40	
HF-MP053(B)			HG-MR053(B)			
HF-KP13(B)	82.4 (123.5)		HG-KR13(B)	82.4 (123)		
HF-MP13(B)			HG-MR13(B)			
HF-KP23(B) HF-MP23(B)	76.6 (116.1)	60	HG-KR23(B) HG-MR23(B)	76.6 (113.4)	60	(Note 2)
HF-KP43(B) HF-MP43(B)	98.5 (138)		HG-KR43(B) HG-MR43(B)	98.3 (135.1)		
HF-KP73(B) HF-MP73(B)	113.8 (157)	80	HG-KR73(B) HG-MR73(B)	112 (152.3)	80	
HF-SP51(B)	140.5 (175)	130	HG-SR51(B)	132.5 (167)	130	
HF-SP81(B)	162.5 (197)		HG-SR81(B)	146.5 (181)		
HF-SP121(B)	143.5 (193)	176	HG-SR121(B)	138.5 (188)	176	
HF-SP201(B)	183.5 (233)		HG-SR201(B)	162.5 (212)		
HF-SP301(B)	203.5 (253)		HG-SR301(B)	178.5 (228)		
HF-SP421(B)	263.5 (313)		HG-SR421(B)	218.5 (268)		
HF-SP52(B) HF-SP524(B)	118.5 (153)	130	HG-SR52(B) HG-SR524(B)	118.5 (153)	130	
HF-SP102(B) HF-SP1024(B)	140.5 (175)		HG-SR102(B) HG-SR1024(B)	132.5 (167)		
HF-SP152(B) HF-SP1524(B)	162.5 (197)		HG-SR152(B) HG-SR1524(B)	146.5 (181)		
HF-SP202(B) HF-SP2024(B)	143.5 (193)	176	HG-SR202(B) HG-SR2024(B)	138.5 (188)	176	
HF-SP352(B) HF-SP3524(B)	183.5 (233)		HG-SR352(B) HG-SR3524(B)	162.5 (212)		
HF-SP502(B) HF-SP5024(B)	203.5 (253)		HG-SR502(B) HG-SR5024(B)	178.5 (228)		
HF-SP702(B) HF-SP7024(B)	263.5 (313)		HG-SR702(B) HG-SR7024(B)	218.5 (268)		
HC-RP103(B)	145.5 (183.5)	100	HG-RR103(B)	145.5 (183)	100	
HC-RP153(B)	170.5 (208.5)		HG-RR153(B)	170.5 (208)		
HC-RP203(B)	195.5 (233.5)		HG-RR203(B)	195.5 (233)		
HC-RP353(B)	215.5 (252.5)	130	HG-RR353(B)	215.5 (252)	130	
HC-RP503(B)	272.5 (309.5)		HG-RR503(B)	272.5 (309)		

Note 1. As for the dimensions not listed here, refer to the catalog or Instruction Manual. ( ): With brake

2. Some mounting dimensions have differences. Refer to "2.2 Detailed Comparison of Servo Motor Mounting Dimensions" for detailed dimensions.

[Unit: mm]

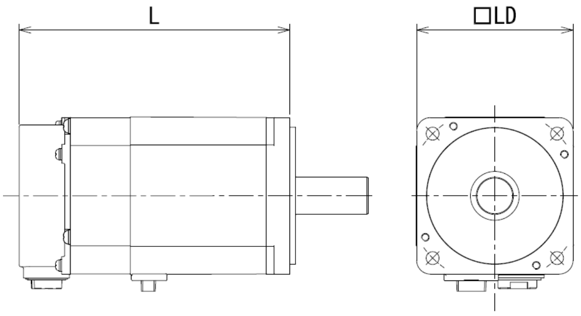


Target product			Replacement product			Note
Model	L	LD	Model	L	LD	
HC-LP52(B)	144 (177)	130	HG-JR73(B)	145.5 (191)	90	(Note 2)
HC-LP102(B)	164 (197)		HG-JR153(B)	199.5 (245)		
HC-LP152(B)	191.5 (224.5)		HG-JR353(B)	213 (251.5)	130	
HC-LP202(B)	198.5 (246.5)	176	HG-JR353(B)	213 (251.5)		
HC-LP302(B)	248.5 (296.5)		HG-JR503(B)	267 (305.5)		
HC-UP72(B)	109 (142.5)	176	HG-UR72(B)	109 (142.5)	176	
HC-UP152(B)	118.5 (152)		HG-UR152(B)	118.5 (152)		
HC-UP202(B)	116.5 (159.5)	220	HG-UR202(B)	116.5 (159.5)	220	
HC-UP352(B)	140.5 (183.5)		HG-UR352(B)	140.5 (183.5)		
HC-UP502(B)	164.5 (207.5)		HG-UR502(B)	164.5 (207.5)		
HF-JP53(B) HF-JP534(B)	127.5 (173)	90	HG-JR53(B) HG-JR534(B)	127.5 (173)	90	
HF-JP73(B) HF-JP734(B)	145.5 (191)		HG-JR73(B) HG-JR734(B)	145.5 (191)		
HF-JP103(B) HF-JP1034(B)	163.5 (209)		HG-JR103(B) HG-JR1034(B)	163.5 (209)		
HF-JP153(B) HF-JP1534(B)	199.5 (245)		HG-JR153(B) HG-JR1534(B)	199.5 (245)		
HF-JP203(B) HF-JP2034(B)	235.5 (281)		HG-JR203(B) HG-JR2034(B)	235.5 (281)		
HF-JP353(B) HF-JP3534(B)	213 (251.5)	130	HG-JR353(B) HG-JR3534(B)	213 (251.5)	130	
HF-JP503(B) HF-JP5034(B)	267 (305.5)		HG-JR503(B) HG-JR5034(B)	267 (305.5)		
HF-JP703(B) HF-JP7034(B)	263.5 (313)	176	HG-JR703(B) HG-JR7034(B)	263.5 (313)	176	
HF-JP903 HF-JP9034(B)	303.5 (353)		HG-JR903 HG-JR9034(B)	303.5 (353)		
HF-JP11K1M(B) HF-JP11K1M4(B)	339.5 (412)	220	HG-JR11K1M(B) HG-JR11K1M4(B)	339.5 (412)	220	
HF-JP15K1M(B) HF-JP15K1M4(B)	439.5 (512)		HG-JR15K1M(B) HG-JR15K1M4(B)	439.5 (512)		

Note 1. As for the dimensions not listed here, refer to the catalog or Instruction Manual. ( ): With brake

2. Without attachment compatibility. Refer to "2.2 Detailed Comparison of Servo Motor Mounting Dimensions" for detailed dimensions.

[Unit: mm]

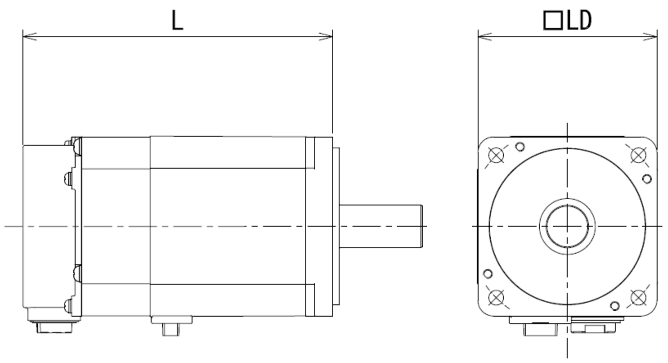


Target product			Replacement product			Note
Model	L	LD	Model	L	LD	
HA-LP601(B) HA-LP6014(B)	480 (550)	200	HG-JR601(B) HG-JR6014(B)	299.5 (372)	220	(Note 2)
			HG-JR601R(B)-S_ HG-JR6014R(B)-S_	399 (472)	200	
HA-LP801(B) HA-LP8014(B)	495 (610)	250	HG-JR801(B) HG-JR8014(B)	339.5 (412)	220	(Note 2)
			HG-JR801R(B)-S_ HG-JR8014R(B)-S_	354 (427)	250	
HA-LP12K1(B) HA-LP12K14(B)	555 (670)		HG-JR12K1(B) HG-JR12K14(B)	439.5 (512)	220	(Note 2)
			HG-JR12K1R(B)-S_ HG-JR12K14R(B)-S_	454 (527)	250	
HA-LP15K1 HA-LP15K14	605	280	HG-JR15K1 HG-JR15K14	476	250	(Note 2)
			HG-JR15K1R-S_ HG-JR15K14R-S_	493	280	
HA-LP20K1 HA-LP20K14	650		HG-JR20K1 HG-JR20K14	538	250	(Note 2)
			HG-JR20K1R-S_ HG-JR20K14R-S_	555	280	
HA-LP25K1 HA-LP25K14	640	350	HG-JR25K1 HG-JR25K14	600	250	(Note 2)
			HG-JR25K1R-S_ HG-JR25K14R-S_	617	350	

Note 1. As for the dimensions not listed here, refer to the catalog or Instruction Manual. ( ): With brake

2. Without attachment compatibility. Refer to "2.2 Detailed Comparison of Servo Motor Mounting Dimensions" for detailed dimensions.

[Unit: mm]

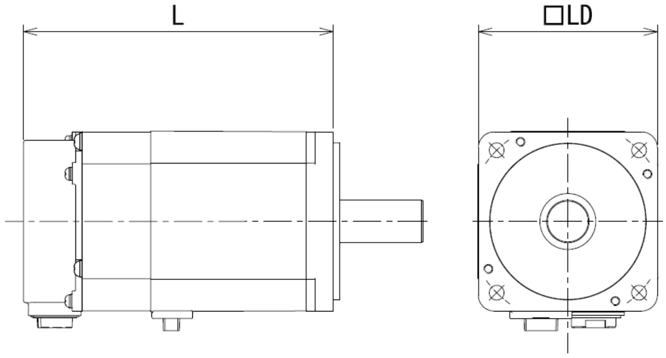


Target product			Replacement product			Note
Model	L	LD	Model	L	LD	
HA-LP701M(B) HA-LP701M4(B)	480 (550)	200	HG-JR701M(B) HG-JR701M4(B)	299.5 (372)	220	(Note 2)
			HG-JR701MR(B)-S_ HG-JR701M4R(B)-S_	399 (472)	200	
HA-LP11K1M(B) HA-LP11K1M4(B)	495 (610)	250	HG-JR11K1M(B) HG-JR11K1M4(B)	339.5 (412)	220	(Note 2)
			HG-JR11K1MR(B)-S_(□250) HG-JR11K1M4R(B)-S_(□250)	354 (427)	250	
HA-LP15K1M(B) HA-LP15K1M4(B)	555 (670)		HG-JR15K1M(B) HG-JR15K1M4(B)	439.5 (512)	220	(Note 2)
			HG-JR15K1MR(B)-S_ HG-JR15K1M4R(B)-S_	454 (526.5)	250	
HA-LP22K1M HA-LP22K1M4	605	280	HG-JR22K1M HG-JR22K1M4	476	250	(Note 2)
			HG-JR22K1MR-S_ HG-JR22K1M4R-S_	488	280	

Note 1. As for the dimensions not listed here, refer to the catalog or Instruction Manual. ( ): With brake

2. Without attachment compatibility. Refer to "2.2 Detailed Comparison of Servo Motor Mounting Dimensions" for detailed dimensions.

[Unit: mm]

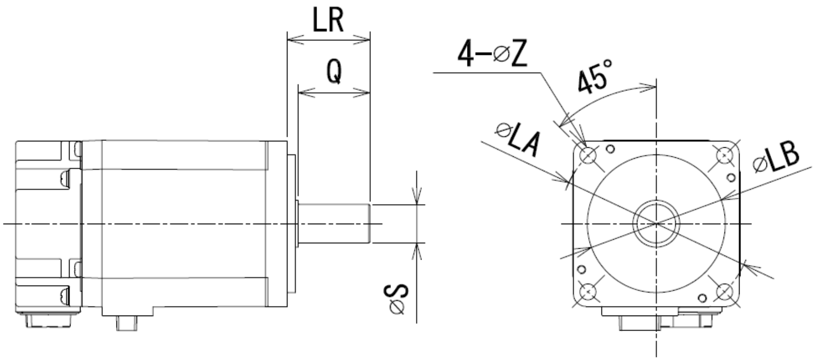


Target product			Replacement product			Note
Model	L	LD	Model	L	LD	
HA-LP502	298	200	HG-SR502	178.5	176	(Note 2)
			HG-SR502R-S_	207	200	
HA-LP702	340		HG-SR702	218.5	176	(Note 2)
			HG-SR702R-S_	247	200	
HA-LP11K2(B) HA-LP11K24(B)	480 (550)		HG-JR11K1M(B) HG-JR11K1M4(B)	339.5 (412)	220	(Note 2)
			HG-JR11K1MR(B)-S_(□200) HG-JR11K1M4R(B)-S_(□200)	439 (512)	200	
HA-LP15K2(B) HA-LP15K24(B)	495 (610)	250	HG-JR11K1M(B) HG-JR11K1M4(B)	339.5 (412)	220	(Note 2)
			HG-JR11K1MR(B)-S_(□250) HG-JR11K1M4R(B)-S_(□250)	354 (427)	250	
HA-LP22K2(B) HA-LP22K24(B)	555 (670)		HG-JR15K1M(B) HG-JR15K1M4(B)	439.5 (512)	220	(Note 2)
			HG-JR15K1MR(B)-S_ HG-JR15K1M4R(B)-S_	454 (526.5)	250	
HA-LP30K2	615	280	HG-JR22K1M	476	250	(Note 2)
			HG-JR22K1MR-S_	493	280	
HA-LP30K24	605		HG-JR22K1M4	476	250	(Note 2)
			HG-JR22K1M4R-S_	493	280	

Note 1. As for the dimensions not listed here, refer to the catalog or Instruction Manual. ( ): With brake
2. Without attachment compatibility. Refer to "2.2 Detailed Comparison of Servo Motor Mounting Dimensions" for detailed dimensions.

2.2 Detailed Comparison of Servo Motor Mounting Dimensions

[Unit: mm]

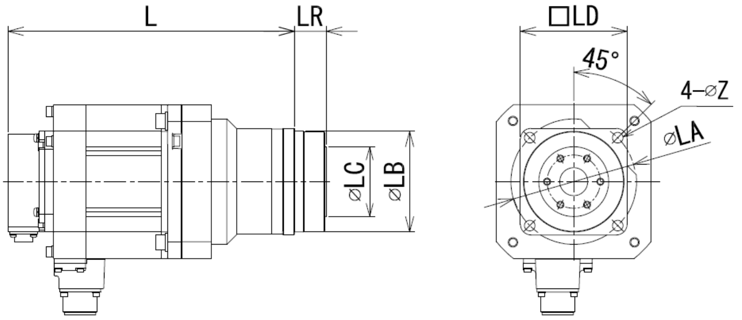


Target product							Replacement product						
Model	LA	LB	LR	Q	S	Z	Model	LA	LB	LR	Q	S	Z
HF-KP23(B) HF-MP23(B)	70	50	30	27	14	5.8	HG-KR23(B) HG-MR23(B)	70	50	30	26	14	5.8
HF-KP43(B) HF-MP43(B)	70	50	30	27	14	5.8	HG-KR43(B) HG-MR43(B)	70	50	30	26	14	5.8
HF-KP73(B) HF-MP73(B)	90	70	40	37	19	6.6	HG-KR73(B) HG-MR73(B)	90	70	40	36	19	6.6
HC-LP52(B)	145	110	55	50	24	9	HG-JR73(B)	100	80	40	30	16	6.6
HC-LP102(B)	145	110	55	50	24	9	HG-JR153(B)	100	80	40	30	16	6.6
HC-LP152(B)	145	110	55	50	24	9	HG-JR353(B)	145	110	55	50	28	9
HC-LP202(B)	200	114.3	79	75	35	13.5	HG-JR353(B)	145	110	55	50	28	9
HC-LP302(B)	200	114.3	79	75	35	13.5	HG-JR503(B)	145	110	55	50	28	9
HA-LP601(B) HA-LP6014(B)	215	180	85	80	42	14.5	HG-JR601(B) HG-JR6014(B)	235	200	85	79	42	13.5
HA-LP801(B) HA-LP8014(B)	265	230	110	100	55	14.5	HG-JR801(B) HG-JR8014(B)	235	200	116	110	55	13.5
HA-LP12K1(B) HA-LP12K14(B)	265	230	110	100	55	14.5	HG-JR12K1(B) HG-JR12K14(B)	235	200	116	110	55	13.5
HA-LP15K1 HA-LP15K14	300	250	140	140	60	19	HG-JR15K1 HG-JR15K14	265	230	140	130	65	24
HA-LP20K1 HA-LP20K14	300	250	140	140	60	19	HG-JR20K1 HG-JR20K14	265	230	140	130	65	24
HA-LP25K1 HA-LP25K14	350	300	140	140	65	19	HG-JR25K1 HG-JR25K14	265	230	140	130	65	24
HA-LP701M(B) HA-LP701M4(B)	215	180	85	80	42	14.5	HG-JR701M(B) HG-JR701M4(B)	235	200	85	79	42	13.5
HA-LP11K1M(B) HA-LP11K1M4(B)	265	230	110	100	55	14.5	HG-JR11K1M(B) HG-JR11K1M4(B)	235	200	116	110	55	13.5
HA-LP15K1M(B) HA-LP15K1M4(B)	265	230	110	100	55	14.5	HG-JR15K1M(B) HG-JR15K1M4(B)	235	200	116	110	55	13.5
HA-LP22K1M HA-LP22K1M4	300	250	140	140	60	19	HG-JR22K1M HG-JR22K1M4	265	230	140	130	65	24
HA-LP502	215	180	85	80	42	14.5	HG-SR502	200	114.3	79	75	35	13.5
HA-LP702	215	180	85	80	42	14.5	HG-SR702	200	114.3	79	75	35	13.5
HA-LP11K2(B) HA-LP11K24(B)	215	180	85	80	42	14.5	HG-JR11K1M(B) HG-JR11K1M4(B)	235	200	116	110	55	13.5
HA-LP15K2(B) HA-LP15K24(B)	265	230	110	100	55	14.5	HG-JR11K1M(B) HG-JR11K1M4(B)	235	200	116	110	55	13.5
HA-LP22K2(B) HA-LP22K24(B)	265	230	110	100	55	14.5	HG-JR15K1M(B) HG-JR15K1M4(B)	235	200	116	110	55	13.5
HA-LP30K2 HA-LP30K24	300	250	140	140	60	19	HG-JR22K1M HG-JR22K1M4	265	230	140	130	65	24

Note 1. As for the dimensions not listed here, refer to the catalog or Instruction Manual. ( ): With brake
2. Dimensions with differences are shown with shading.

2.3 Comparison of Mounting Dimensions for Geared Servo Motors
(For high precision applications: HC-RP_G5 → HG-SR_G5)

[Unit: mm]



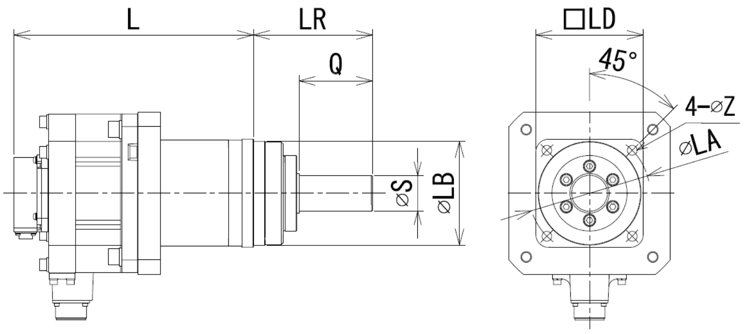
Output (kW)	HC-RP series (G5)								HG-SR series (G5)							
	Reduction ratio	L	LR	LA	LB	LC	LD	Z	Reduction ratio	L	LR	LA	LB	LC	LD	Z
1.0	1/5	227.5 (265.5)	27	105	85	59	90	9	1/5	227.5 (262)	27	105	85	59	90	9
	1/11	227.5 (265.5)	27	105	85	59	90	9	1/11	239.5 (274)	35	135	115	84	120	11
	1/21	255.5 (293.5)	35	135	115	84	120	11	1/21	239.5 (274)	35	135	115	84	120	11
	1/33	255.5 (293.5)	35	135	115	84	120	11	1/33	255.5 (290)	53	190	165	122	170	14
	1/45	268.5 (306.5)	53	190	165	122	170	14	1/45	255.5 (290)	53	190	165	122	170	14
1.5	1/5	252.5 (290)	27	105	85	59	90	9	1/5	241.5 (276)	27	105	85	59	90	9
	1/11	280.5 (318.5)	35	135	115	84	120	11	1/11	253.5 (288)	35	135	115	84	120	11
	1/21	280.5 (318.5)	35	135	115	84	120	11	1/21	269.5 (304)	53	190	165	122	170	14
	1/33	293.5 (331.5)	53	190	165	122	170	14	1/33	269.5 (304)	53	190	165	122	170	14
	1/45	293.5 (331.5)	53	190	165	122	170	14	1/45	269.5 (304)	53	190	165	122	170	14
2.0	1/5	277.5 (315.5)	27	105	85	59	90	9	1/5	267.5 (317)	35	135	115	84	120	11
	1/11	305.5 (343.5)	35	135	115	84	120	11	1/11	267.5 (317)	35	135	115	84	120	11
	1/21	318.5 (365.5)	53	190	165	122	170	14	1/21	287.5 (337)	53	190	165	122	170	14
	1/33	318.5 (365.5)	53	190	165	122	170	14	1/33	287.5 (337)	53	190	165	122	170	14
	1/45	318.5 (365.5)	53	190	165	122	170	14	1/45	287.5 (337)	53	190	165	122	170	14
3.5	1/5	344.5 (381.5)	35	135	115	84	120	11	1/5	291.5 (341)	35	135	115	84	120	11
	1/11	344.5 (381.5)	35	135	115	84	120	11	1/11	311.5 (361)	53	190	165	122	170	14
	1/21	364.5 (401.5)	53	190	165	122	170	14	1/21	311.5 (361)	53	190	165	122	170	14
	1/33	364.5 (401.5)	53	190	165	122	170	14	1/21	311.5 (361)	53	190	165	122	170	14
5.0	1/5	401.5 (438.5)	35	135	115	84	120	11	1/5	327.5 (377)	53	190	165	122	170	14
	1/11	421.5 (458.5)	53	190	165	122	170	14	1/11	327.5 (377)	53	190	165	122	170	14
	1/21	421.5 (458.5)	53	190	165	122	170	14	1/11	327.5 (377)	53	190	165	122	170	14

Note 1. As for the dimensions not listed here, refer to the catalog or Instruction Manual. ( ): With brake

2. Dimensions with differences are shown with shading.

(For high precision applications: HC-RP_G7 → HG-SR_G7)

[Unit: mm]



Output (kW)	HC-RP series (G7)								HG-SR series (G7)							
	Reduction ratio	L	LR	Q	S	LA	LB	LD	Z	Reduction ratio	L	LR	Q	S	LA	LB	LD	Z
1.0	1/5	227.5 (265.5)	80	42	25	105	85	90	9	1/5	227.5 (262)	80	42	25	105	85	90	9
	1/11	227.5 (265.5)	80	42	25	105	85	90	9	1/11	239.5 (274)	133	82	40	135	115	120	11
	1/21	255.5 (293.5)	133	82	40	135	115	120	11	1/21	239.5 (274)	133	82	40	135	115	120	11
	1/33	255.5 (293.5)	133	82	40	135	115	120	11	1/33	255.5 (290)	156	82	50	190	165	170	14
	1/45	268.5 (306.5)	156	82	50	190	165	170	14	1/45	255.5 (290)	156	82	50	190	165	170	14
1.5	1/5	252.5 (290.5)	80	42	25	105	85	90	9	1/5	241.5 (276)	80	42	25	105	85	90	9
	1/11	280.5 (318.5)	133	82	40	135	115	120	11	1/11	253.5 (288)	133	82	40	135	115	120	11
	1/21	280.5 (318.5)	133	82	40	135	115	120	11	1/21	269.5 (304)	156	82	50	190	165	170	14
	1/33	293.5 (331.5)	156	82	50	190	165	170	14	1/33	269.5 (304)	156	82	50	190	165	170	14
	1/45	293.5 (331.5)	156	82	50	190	165	170	14	1/45	269.5 (304)	156	82	50	190	165	170	14
2.0	1/5	277.5 (315.5)	80	42	25	105	85	90	9	1/5	267.5 (317)	133	82	40	135	115	120	11
	1/11	305.5 (343.5)	133	82	40	135	115	120	11	1/11	267.5 (317)	133	82	40	135	115	120	11
	1/21	318.5 (356.5)	156	82	50	190	165	170	14	1/21	287.5 (337)	156	82	50	190	165	170	14
	1/33	318.5 (356.5)	156	82	50	190	165	170	14	1/33	287.5 (337)	156	82	50	190	165	170	14
	1/45	318.5 (356.5)	156	82	50	190	165	170	14	1/45	287.5 (337)	156	82	50	190	165	170	14
3.5	1/5	344.5 (381.5)	133	82	40	135	115	120	11	1/5	291.5 (341)	133	82	40	135	115	120	11
	1/11	344.5 (381.5)	133	82	40	135	115	120	11	1/11	311.5 (361)	156	82	50	190	165	170	14
	1/21	364.5 (401.5)	156	82	50	190	165	170	14	1/21	311.5 (361)	156	82	50	190	165	170	14
	1/33	364.5 (401.5)	156	82	50	190	165	170	14	1/21	311.5 (361)	156	82	50	190	165	170	14
5.0	1/5	401.5 (438.5)	133	82	40	135	115	120	11	1/5	327.5 (377)	156	82	50	190	165	170	14
	1/11	421.5 (458.5)	156	82	50	190	165	170	14	1/11	327.5 (377)	156	82	50	190	165	170	14
	1/21	421.5 (458.5)	156	82	50	190	165	170	14	1/11	327.5 (377)	156	82	50	190	165	170	14

Note 1. As for the dimensions not listed here, refer to the catalog or Instruction Manual. ( ): With brake
2. Dimensions with differences are shown with shading.

2.4 Comparison of Actual Reduction Ratios for Geared Servo Motors

Because the actual reduction ratio for some models is different when replacing HF-KP or HF-MP_G1 with HG-KR_G1, it is required that an electronic gear be set up.

POINT
●The HG-MR series does not support the geared model. ●The geared model is supported with the HG-KR series.

(For general industrial machines: HF-KP, HF-MP_G1 → HG-KR_G1)

Output (W)	Reduction ratio	Actual reduction ratio	
		HF-KP, HF-MP series (G1)	HG-KR series (G1)
50	1/5	9/44	9/44
	1/12	49/576	49/576
	1/20	25/484	25/484
100	1/5	9/44	9/44
	1/12	49/576	49/576
	1/20	25/484	25/484
200	1/5	19/96	19/96
	1/12	25/288	961/11664
	1/20	253/5000	513/9984
400	1/5	19/96	19/96
	1/12	25/288	961/11664
	1/20	253/5000	7/135
750	1/5	1/5	1/5
	1/12	525/6048	7/87
	1/20	625/12544	625/12544

Note 1. Actual reduction ratios with differences are shown with shading.

2.5 Comparison of Moment of Inertia

(1) HF-KP motor

Series	Target product			Replacement product		
	Model	Moment of inertia J × 10^{-4} kg•m^2	Load inertia moment ratio	Model	Moment of inertia J × 10^{-4} kg•m^2	Load inertia moment ratio
Small capacity, low inertia HF-KP series (B): With brake	HF-KP053(B)	0.052 (0.054)	15 times or less	HG-KR053(B)	0.0450 (0.0472)	17 times or less
	HF-KP13(B)	0.088 (0.090)		HG-KR13(B)	0.0777 (0.0837)	
	HF-KP23(B)	0.24 (0.31)	24 times or less	HG-KR23(B)	0.221 (0.243)	26 times or less
	HF-KP43(B)	0.42 (0.50)	22 times or less	HG-KR43(B)	0.371 (0.393)	25 times or less
	HF-KP73(B)	1.43 (1.63)	15 times or less	HG-KR73(B)	1.26 (1.37)	17 times or less
Small capacity, low inertia HF-KP series with general reducer (G1) (B): With brake	HF-KP053(B)G1 1/5	0.089 (0.091)	5 times or less	HG-KR053(B)G1 1/5	0.0820 (0.0840)	5 times or less
	HF-KP053(B)G1 1/12	0.111 (0.113)		HG-KR053(B)G1 1/12	0.104 (0.106)	
	HF-KP053(B)G1 1/20	0.093 (0.095)		HG-KR053(B)G1 1/20	0.0860 (0.0880)	
	HF-KP13(B)G1 1/5	0.125 (0.127)		HG-KR13(B)G1 1/5	0.115 (0.121)	
	HF-KP13(B)G1 1/12	0.147 (0.149)		HG-KR13(B)G1 1/12	0.137 (0.143)	
	HF-KP13(B)G1 1/20	0.129 (0.131)		HG-KR13(B)G1 1/20	0.119 (0.125)	
	HF-KP23(B)G1 1/5	0.400 (0.470)	7 times or less	HG-KR23(B)G1 1/5	0.375 (0.397)	7 times or less
	HF-KP23(B)G1 1/12	0.450 (0.520)		HG-KR23(B)G1 1/12	0.418 (0.440)	
	HF-KP23(B)G1 1/20	0.420 (0.490)		HG-KR23(B)G1 1/20	0.391 (0.413)	
	HF-KP43(B)G1 1/5	0.570 (0.650)		HG-KR43(B)G1 1/5	0.525 (0.547)	
	HF-KP43(B)G1 1/12	0.620 (0.700)		HG-KR43(B)G1 1/12	0.568 (0.590)	
	HF-KP43(B)G1 1/20	0.930 (1.01)		HG-KR43(B)G1 1/20	0.881 (0.903)	
	HF-KP73(B)G1 1/5	1.85 (2.05)	5 times or less	HG-KR73(B)G1 1/5	1.68 (1.79)	5 times or less
	HF-KP73(B)G1 1/12	2.52 (2.72)		HG-KR73(B)G1 1/12	2.35 (2.46)	
	HF-KP73(B)G1 1/20	2.58 (2.78)		HG-KR73(B)G1 1/20	2.41 (2.52)	

Note 1. As for the motor specifications not listed here, refer to the catalog or Instruction Manual. ( ): With brake
If the load inertia moment ratio is exceeded, please ask the sales contact.

Series	Target product			Replacement product		
	Model	Moment of inertia J × 10^{-4} kg•m^2	Load inertia moment ratio	Model	Moment of inertia J × 10^{-4} kg•m^2	Load inertia moment ratio
Small capacity, low inertia HF-KP series with high precision reducer Flange output type (G5) (B): With brake	HF-KP053(B)G5 1/5	0.120 (0.122)	10 times or less	HG-KR053(B)G5 1/5	0.113 (0.115)	10 times or less
	HF-KP053(B)G5 1/11	0.112 (0.114)		HG-KR053(B)G5 1/11	0.105 (0.107)	
	HF-KP053(B)G5 1/21	0.103 (0.105)		HG-KR053(B)G5 1/21	0.0960 (0.0980)	
	HF-KP053(B)G5 1/33	0.097 (0.099)		HG-KR053(B)G5 1/33	0.0900 (0.0920)	
	HF-KP053(B)G5 1/45	0.097 (0.099)		HG-KR053(B)G5 1/45	0.0900 (0.0920)	
	HF-KP13(B)G5 1/5	0.156 (0.158)		HG-KR13(B)G5 1/5	0.146 (0.152)	
	HF-KP13(B)G5 1/11	0.148 (0.150)		HG-KR13(B)G5 1/11	0.138 (0.144)	
	HF-KP13(B)G5 1/21	0.139 (0.141)		HG-KR13(B)G5 1/21	0.129 (0.135)	
	HF-KP13(B)G5 1/33	0.150 (0.152)		HG-KR13(B)G5 1/33	0.140 (0.146)	
	HF-KP13(B)G5 1/45	0.149 (0.151)		HG-KR13(B)G5 1/45	0.139 (0.145)	
	HF-KP23(B)G5 1/5	0.441 (0.511)	14 times or less	HG-KR23(B)G5 1/5	0.422 (0.444)	14 times or less
	HF-KP23(B)G5 1/11	0.443 (0.513)		HG-KR23(B)G5 1/11	0.424 (0.446)	
	HF-KP23(B)G5 1/21	0.738 (0.808)		HG-KR23(B)G5 1/21	0.719 (0.741)	
	HF-KP23(B)G5 1/33	0.692 (0.762)		HG-KR23(B)G5 1/33	0.673 (0.695)	
	HF-KP23(B)G5 1/45	0.691 (0.761)		HG-KR23(B)G5 1/45	0.672 (0.694)	
	HF-KP43(B)G5 1/5	0.621 (0.701)		HG-KR43(B)G5 1/5	0.572 (0.594)	
	HF-KP43(B)G5 1/11	0.996 (1.08)		HG-KR43(B)G5 1/11	0.947 (0.969)	
	HF-KP43(B)G5 1/21	0.918 (0.998)		HG-KR43(B)G5 1/21	0.869 (0.891)	
	HF-KP43(B)G5 1/33	0.970 (1.05)		HG-KR43(B)G5 1/33	0.921 (0.943)	
	HF-KP43(B)G5 1/45	0.964 (1.04)		HG-KR43(B)G5 1/45	0.915 (0.937)	
	HF-KP73(B)G5 1/5	2.08 (2.28)	10 times or less	HG-KR73(B)G5 1/5	1.91 (2.02)	10 times or less
	HF-KP73(B)G5 1/11	1.99 (2.19)		HG-KR73(B)G5 1/11	1.82 (1.93)	
	HF-KP73(B)G5 1/21	2.18 (2.38)		HG-KR73(B)G5 1/21	2.01 (2.12)	
	HF-KP73(B)G5 1/33	1.96 (2.16)		HG-KR73(B)G5 1/33	1.79 (1.90)	
	HF-KP73(B)G5 1/45	1.96 (2.16)		HG-KR73(B)G5 1/45	1.79 (1.90)	
Small capacity, low inertia HF-KP series with high precision reducer Shaft output type (G7) (B): With brake	HF-KP053(B)G7 1/5	0.126 (0.128)	10 times or less	HG-KR053(B)G7 1/5	0.119 (0.121)	10 times or less
	HF-KP053(B)G7 1/11	0.113 (0.115)		HG-KR053(B)G7 1/11	0.106 (0.108)	
	HF-KP053(B)G7 1/21	0.103 (0.105)		HG-KR053(B)G7 1/21	0.0960 (0.0980)	
	HF-KP053(B)G7 1/33	0.097 (0.099)		HG-KR053(B)G7 1/33	0.0900 (0.0920)	
	HF-KP053(B)G7 1/45	0.097 (0.099)		HG-KR053(B)G7 1/45	0.0900 (0.0920)	
	HF-KP13(B)G7 1/5	0.162 (0.164)		HG-KR13(B)G7 1/5	0.152 (0.158)	
	HF-KP13(B)G7 1/11	0.149 (0.151)		HG-KR13(B)G7 1/11	0.139 (0.145)	
	HF-KP13(B)G7 1/21	0.139 (0.141)		HG-KR13(B)G7 1/21	0.129 (0.135)	
	HF-KP13(B)G7 1/33	0.151 (0.153)		HG-KR13(B)G7 1/33	0.141 (0.147)	
	HF-KP13(B)G7 1/45	0.149 (0.151)		HG-KR13(B)G7 1/45	0.139 (0.145)	
	HF-KP23(B)G7 1/5	0.447 (0.517)	14 times or less	HG-KR23(B)G7 1/5	0.428 (0.450)	14 times or less
	HF-KP23(B)G7 1/11	0.443 (0.513)		HG-KR23(B)G7 1/11	0.424 (0.446)	
	HF-KP23(B)G7 1/21	0.740 (0.810)		HG-KR23(B)G7 1/21	0.721 (0.743)	
	HF-KP23(B)G7 1/33	0.693 (0.763)		HG-KR23(B)G7 1/33	0.674 (0.696)	
	HF-KP23(B)G7 1/45	0.691 (0.761)		HG-KR23(B)G7 1/45	0.672 (0.694)	
	HF-KP43(B)G7 1/5	0.627 (0.707)		HG-KR43(B)G7 1/5	0.578 (0.600)	
	HF-KP43(B)G7 1/11	1.00 (1.08)		HG-KR43(B)G7 1/11	0.955 (0.977)	
	HF-KP43(B)G7 1/21	0.920 (1.00)		HG-KR43(B)G7 1/21	0.871 (0.893)	
	HF-KP43(B)G7 1/33	0.976 (1.06)		HG-KR43(B)G7 1/33	0.927 (0.949)	
	HF-KP43(B)G7 1/45	0.967 (1.05)		HG-KR43(B)G7 1/45	0.918 (0.940)	
	HF-KP73(B)G7 1/5	2.12 (2.32)	10 times or less	HG-KR73(B)G7 1/5	1.95 (2.06)	10 times or less
	HF-KP73(B)G7 1/11	2.00 (2.20)		HG-KR73(B)G7 1/11	1.83 (1.94)	
	HF-KP73(B)G7 1/21	2.20 (2.40)		HG-KR73(B)G7 1/21	2.03 (2.14)	
	HF-KP73(B)G7 1/33	1.97 (2.17)		HG-KR73(B)G7 1/33	1.80 (1.91)	
	HF-KP73(B)G7 1/45	1.96 (2.16)		HG-KR73(B)G7 1/45	1.79 (1.90)	

Note 1. As for the motor specifications not listed here, refer to the catalog or Instruction Manual. ( ): With brake
If the load inertia moment ratio with brake is exceeded, please ask the sales contact.

(2) HF-MP motor

Series	Target product			Replacement product		
	Model	Moment of inertia J × 10^{-4} kg•m^2	Load inertia moment ratio	Model	Moment of inertia J × 10^{-4} kg•m^2	Load inertia moment ratio
Small capacity, ultra-low inertia HF-MP series (B): With brake	HF-MP053(B)	0.019 (0.025)	30 times or less	HG-MR053(B)	0.0162 (0.0224)	35 times or less
	HF-MP13(B)	0.032 (0.039)		HG-MR13(B)	0.0300 (0.0362)	32 times or less
	HF-MP23(B)	0.088 (0.12)		HG-MR23(B)	0.0865 (0.109)	
	HF-MP43(B)	0.15 (0.18)		HG-MR43(B)	0.142 (0.164)	
	HF-MP73(B)	0.60 (0.70)		HG-MR73(B)	0.586 (0.694)	
Small capacity, ultra-low inertia HF-MP series with general reducer (G1) (B): With brake	HF-MP053(B)G1 1/5	0.056 (0.062)	25 times or less	HG-KR053(B)G1 1/5	0.0820 (0.0840)	5 times or less
	HF-MP053(B)G1 1/12	0.078 (0.084)		HG-KR053(B)G1 1/12	0.104 (0.106)	
	HF-MP053(B)G1 1/20	0.060 (0.066)		HG-KR053(B)G1 1/20	0.0860 (0.0880)	
	HF-MP13(B)G1 1/5	0.069 (0.076)		HG-KR13(B)G1 1/5	0.115 (0.121)	
	HF-MP13(B)G1 1/12	0.091 (0.089)		HG-KR13(B)G1 1/12	0.137 (0.143)	
	HF-MP13(B)G1 1/20	0.073 (0.080)		HG-KR13(B)G1 1/20	0.119 (0.125)	
	HF-MP23(B)G1 1/5	0.248 (0.280)		HG-KR23(B)G1 1/5	0.375 (0.397)	7 times or less
	HF-MP23(B)G1 1/12	0.298 (0.330)		HG-KR23(B)G1 1/12	0.418 (0.440)	
	HF-MP23(B)G1 1/20	0.268 (0.300)		HG-KR23(B)G1 1/20	0.391 (0.413)	
	HF-MP43(B)G1 1/5	0.300 (0.330)		HG-KR43(B)G1 1/5	0.525 (0.547)	
	HF-MP43(B)G1 1/12	0.350 (0.380)		HG-KR43(B)G1 1/12	0.568 (0.590)	
	HF-MP43(B)G1 1/20	0.660 (0.690)		HG-KR43(B)G1 1/20	0.881 (0.903)	
	HF-MP73(B)G1 1/5	1.02 (1.12)		HG-KR73(B)G1 1/5	1.68 (1.79)	5 times or less
	HF-MP73(B)G1 1/12	1.69 (1.79)		HG-KR73(B)G1 1/12	2.35 (2.46)	
	HF-MP73(B)G1 1/20	1.75 (1.85)		HG-KR73(B)G1 1/20	2.41 (2.52)	

Note 1. As for the motor specifications not listed here, refer to the catalog or Instruction Manual. ( ): With brake
If the load inertia moment ratio with brake is exceeded, please ask the sales contact.

Series	Target product			Replacement product		
	Model	Moment of inertia J × 10^{-4} kg•m^2	Load inertia moment ratio	Model	Moment of inertia J × 10^{-4} kg•m^2	Load inertia moment ratio
Small capacity, ultra-low inertia HF-MP series with high precision reducer Flange output type (G5) (B): With brake	HF-MP053(B)G5 1/5	0.087 (0.093)	25 times or less	HG-KR053(B)G5 1/5	0.113 (0.115)	10 times or less
	HF-MP053(B)G5 1/11	0.079 (0.085)		HG-KR053(B)G5 1/11	0.105 (0.107)	
	HF-MP053(B)G5 1/21	0.070 (0.076)		HG-KR053(B)G5 1/21	0.0960 (0.0980)	
	HF-MP053(B)G5 1/33	0.064 (0.070)		HG-KR053(B)G5 1/33	0.0900 (0.0920)	
	HF-MP053(B)G5 1/45	0.064 (0.070)		HG-KR053(B)G5 1/45	0.0900 (0.0920)	
	HF-MP13(B)G5 1/5	0.100 (0.107)		HG-KR13(B)G5 1/5	0.146 (0.152)	
	HF-MP13(B)G5 1/11	0.092 (0.099)		HG-KR13(B)G5 1/11	0.138 (0.144)	
	HF-MP13(B)G5 1/21	0.083 (0.090)		HG-KR13(B)G5 1/21	0.129 (0.135)	
	HF-MP13(B)G5 1/33	0.094 (0.101)		HG-KR13(B)G5 1/33	0.140 (0.146)	
	HF-MP13(B)G5 1/45	0.093 (0.100)		HG-KR13(B)G5 1/45	0.139 (0.145)	
	HF-MP23(B)G5 1/5	0.289 (0.321)		HG-KR23(B)G5 1/5	0.422 (0.444)	14 times or less
	HF-MP23(B)G5 1/11	0.291 (0.323)		HG-KR23(B)G5 1/11	0.424 (0.446)	
	HF-MP23(B)G5 1/21	0.586 (0.618)		HG-KR23(B)G5 1/21	0.719 (0.741)	
	HF-MP23(B)G5 1/33	0.540 (0.572)		HG-KR23(B)G5 1/33	0.673 (0.695)	
	HF-MP23(B)G5 1/45	0.539 (0.571)		HG-KR23(B)G5 1/45	0.672 (0.694)	
	HF-MP43(B)G5 1/5	0.351 (0.381)		HG-KR43(B)G5 1/5	0.572 (0.594)	
	HF-MP43(B)G5 1/11	0.726 (0.756)		HG-KR43(B)G5 1/11	0.947 (0.969)	
	HF-MP43(B)G5 1/21	0.648 (0.678)		HG-KR43(B)G5 1/21	0.869 (0.891)	
	HF-MP43(B)G5 1/33	0.700 (0.730)		HG-KR43(B)G5 1/33	0.921 (0.943)	
	HF-MP43(B)G5 1/45	0.694 (0.724)		HG-KR43(B)G5 1/45	0.915 (0.937)	
	HF-MP73(B)G5 1/5	1.25 (1.35)		HG-KR73(B)G5 1/5	1.91 (2.02)	10 times or less
	HF-MP73(B)G5 1/11	1.16 (1.26)		HG-KR73(B)G5 1/11	1.82 (1.93)	
	HF-MP73(B)G5 1/21	1.35 (1.45)		HG-KR73(B)G5 1/21	2.01 (2.12)	
	HF-MP73(B)G5 1/33	1.13 (1.23)		HG-KR73(B)G5 1/33	1.79 (1.90)	
	HF-MP73(B)G5 1/45	1.13 (1.23)		HG-KR73(B)G5 1/45	1.79 (1.90)	
Small capacity, ultra-low inertia HF-MP series with high precision reducer Shaft output type (G7) (B): With brake	HF-MP053(B)G7 1/5	0.093 (0.099)	25 times or less	HG-KR053(B)G7 1/5	0.119 (0.121)	10 times or less
	HF-MP053(B)G7 1/11	0.080 (0.086)		HG-KR053(B)G7 1/11	0.106 (0.108)	
	HF-MP053(B)G7 1/21	0.070 (0.076)		HG-KR053(B)G7 1/21	0.0960 (0.0980)	
	HF-MP053(B)G7 1/33	0.064 (0.070)		HG-KR053(B)G7 1/33	0.0900 (0.0920)	
	HF-MP053(B)G7 1/45	0.064 (0.070)		HG-KR053(B)G7 1/45	0.0900 (0.0920)	
	HF-MP13(B)G7 1/5	0.106 (0.113)		HG-KR13(B)G7 1/5	0.152 (0.158)	
	HF-MP13(B)G7 1/11	0.093 (0.100)		HG-KR13(B)G7 1/11	0.139 (0.145)	
	HF-MP13(B)G7 1/21	0.083 (0.090)		HG-KR13(B)G7 1/21	0.129 (0.135)	
	HF-MP13(B)G7 1/33	0.095 (0.102)		HG-KR13(B)G7 1/33	0.141 (0.147)	
	HF-MP13(B)G7 1/45	0.093 (0.100)		HG-KR13(B)G7 1/45	0.139 (0.145)	
	HF-MP23(B)G7 1/5	0.295 (0.327)		HG-KR23(B)G7 1/5	0.428 (0.450)	14 times or less
	HF-MP23(B)G7 1/11	0.291 (0.323)		HG-KR23(B)G7 1/11	0.424 (0.446)	
	HF-MP23(B)G7 1/21	0.588 (0.620)		HG-KR23(B)G7 1/21	0.721 (0.743)	
	HF-MP23(B)G7 1/33	0.541 (0.573)		HG-KR23(B)G7 1/33	0.674 (0.696)	
	HF-MP23(B)G7 1/45	0.539 (0.571)		HG-KR23(B)G7 1/45	0.672 (0.694)	
	HF-MP43(B)G7 1/5	0.357 (0.387)		HG-KR43(B)G7 1/5	0.578 (0.600)	
	HF-MP43(B)G7 1/11	0.734 (0.764)		HG-KR43(B)G7 1/11	0.955 (0.977)	
	HF-MP43(B)G7 1/21	0.650 (0.680)		HG-KR43(B)G7 1/21	0.871 (0.893)	
	HF-MP43(B)G7 1/33	0.706 (0.736)		HG-KR43(B)G7 1/33	0.927 (0.949)	
	HF-MP43(B)G7 1/45	0.697 (0.727)		HG-KR43(B)G7 1/45	0.918 (0.940)	
	HF-MP73(B)G7 1/5	1.29 (1.39)		HG-KR73(B)G7 1/5	1.95 (2.06)	10 times or less
	HF-MP73(B)G7 1/11	1.17 (1.27)		HG-KR73(B)G7 1/11	1.83 (1.94)	
	HF-MP73(B)G7 1/21	1.37 (1.47)		HG-KR73(B)G7 1/21	2.03 (2.14)	
	HF-MP73(B)G7 1/33	1.14 (1.24)		HG-KR73(B)G7 1/33	1.80 (1.91)	
	HF-MP73(B)G7 1/45	1.13 (1.23)		HG-KR73(B)G7 1/45	1.79 (1.90)	

Note 1. As for the motor specifications not listed here, refer to the catalog or Instruction Manual. ( ): With brake
If the load inertia moment ratio with brake is exceeded, please ask the sales contact.

(3) HF-SP motor

Series	Target product			Replacement product		
	Model	Moment of inertia J $\times 10^{-4}$ kg•m^2	Load inertia moment ratio	Model	Moment of inertia J $\times 10^{-4}$ kg•m^2	Load inertia moment ratio
Medium capacity, medium inertia HF-SP series (B): With brake	HF-SP51(B)	11.9 (14.0)	15 times or less	HG-SR51(B)	11.6 (13.8)	17 times or less
	HF-SP81(B)	17.8 (20.0)		HG-SR81(B)	16.0 (18.2)	
	HF-SP121(B)	38.3 (47.9)		HG-SR121(B)	46.8 (56.5)	15 times or less
	HF-SP201(B)	75.0 (84.7)		HG-SR201(B)	78.6 (88.2)	
	HF-SP301(B)	97.0 (107)		HG-SR301(B)	99.7 (109)	
	HF-SP421(B)	154 (164)		HG-SR421(B)	151 (161)	
	HF-SP52(B) HF-SP524(B)	6.1 (8.3)		HG-SR52(B) HG-SR524(B)	7.26 (9.48)	
	HF-SP102(B) HF-SP1024(B)	11.9 (14.0)		HG-SR102(B) HG-SR1024(B)	11.6 (13.8)	17 times or less
	HF-SP152(B) HF-SP1524(B)	17.8 (20.0)		HG-SR152(B) HG-SR1524(B)	16.0 (18.2)	
	HF-SP202(B) HF-SP2024(B)	38.3 (47.9)		HG-SR202(B) HG-SR2024(B)	46.8 (56.5)	15 times or less
	HF-SP352(B) HF-SP3524(B)	75.0 (84.7)		HG-SR352(B) HG-SR3524(B)	78.6 (88.2)	
	HF-SP502(B) HF-SP5024(B)	97.0 (107)		HG-SR502(B) HG-SR5024(B)	99.7 (109)	
	HF-SP702(B) HF-SP7024(B)	154 (164)		HG-SR702(B) HG-SR7024(B)	151 (161)	

Note 1. As for the motor specifications not listed here, refer to the catalog or Instruction Manual. ( ): With brake
If the load inertia moment ratio with brake is exceeded, please ask the sales contact.

Series	Target product			Replacement product		
	Model	Moment of inertia J × 10^{-4} kg•m^2	Load inertia moment ratio	Model	Moment of inertia J × 10^{-4} kg•m^2	Load inertia moment ratio
Medium capacity, medium inertia HF-SP series with general reducer (4): 400 V specifications (B): With brake G1: Flange-mounting G1H: Foot-mounting	HF-SP52(4)(B)G1(H) 1/6	7.10 (9.30)	4 times or less	HG-SR52(4)(B)G1(H) 1/6	8.08 (10.3)	4 times or less
	HF-SP52(4)(B)G1(H) 1/11	6.70 (8.80)		HG-SR52(4)(B)G1(H) 1/11	7.65 (9.85)	
	HF-SP52(4)(B)G1(H) 1/17	6.60 (8.70)		HG-SR52(4)(B)G1(H) 1/17	7.53 (9.73)	
	HF-SP52(4)(B)G1(H) 1/29	6.50 (8.70)		HG-SR52(4)(B)G1(H) 1/29	7.47 (9.67)	
	HF-SP52(4)(B)G1(H) 1/35	7.30 (9.40)		HG-SR52(4)(B)G1(H) 1/35	8.26 (10.5)	
	HF-SP52(4)(B)G1(H) 1/43	7.30 (9.40)		HG-SR52(4)(B)G1(H) 1/43	8.22 (10.4)	
	HF-SP52(4)(B)G1(H) 1/59	7.20 (9.40)		HG-SR52(4)(B)G1(H) 1/59	8.18 (10.4)	
	HF-SP102(4)(B)G1(H) 1/6	15.4 (17.5)		HG-SR102(4)(B)G1(H) 1/6	14.8 (17.0)	
	HF-SP102(4)(B)G1(H) 1/11	13.9 (16.0)		HG-SR102(4)(B)G1(H) 1/11	13.3 (15.5)	
	HF-SP102(4)(B)G1(H) 1/17	13.5 (15.6)		HG-SR102(4)(B)G1(H) 1/17	12.9 (15.1)	
	HF-SP102(4)(B)G1(H) 1/29	13.2 (15.3)		HG-SR102(4)(B)G1(H) 1/29	12.6 (14.8)	
	HF-SP102(4)(B)G1(H) 1/35	13.2 (15.3)		HG-SR102(4)(B)G1(H) 1/35	12.6 (14.8)	
	HF-SP102(4)(B)G1(H) 1/43	14.3 (16.5)		HG-SR102(4)(B)G1(H) 1/43	13.8 (16.0)	
	HF-SP102(4)(B)G1(H) 1/59	20.3 (22.4)		HG-SR102(4)(B)G1(H) 1/59	19.1 (21.3)	
	HF-SP152(4)(B)G1(H) 1/6	21.3 (23.4)		HG-SR152(4)(B)G1(H) 1/6	19.2 (21.4)	
	HF-SP152(4)(B)G1(H) 1/11	19.8 (21.9)		HG-SR152(4)(B)G1(H) 1/11	17.7 (19.9)	
	HF-SP152(4)(B)G1(H) 1/17	19.4 (21.6)		HG-SR152(4)(B)G1(H) 1/17	17.3 (19.5)	
	HF-SP152(4)(B)G1(H) 1/29	20.4 (22.6)		HG-SR152(4)(B)G1(H) 1/29	18.4 (20.6)	
	HF-SP152(4)(B)G1(H) 1/35	20.4 (22.5)		HG-SR152(4)(B)G1(H) 1/35	18.3 (20.5)	
	HF-SP152(4)(B)G1(H) 1/43	26.3 (28.4)		HG-SR152(4)(B)G1(H) 1/43	23.6 (25.8)	
	HF-SP152(4)(B)G1(H) 1/59	26.2 (28.3)		HG-SR152(4)(B)G1(H) 1/59	23.5 (25.7)	
	HF-SP202(4)(B)G1(H) 1/6	42.1 (51.7)		HG-SR202(4)(B)G1(H) 1/6	50.0 (59.4)	
	HF-SP202(4)(B)G1(H) 1/11	40.5 (50.2)		HG-SR202(4)(B)G1(H) 1/11	48.4 (57.8)	
	HF-SP202(4)(B)G1(H) 1/17	40.2 (49.8)		HG-SR202(4)(B)G1(H) 1/17	48.1 (57.5)	
	HF-SP202(4)(B)G1(H) 1/29	46.9 (56.6)		HG-SR202(4)(B)G1(H) 1/29	54.8 (64.2)	
	HF-SP202(4)(B)G1(H) 1/35	46.7 (56.4)		HG-SR202(4)(B)G1(H) 1/35	54.5 (63.9)	
	HF-SP202(4)(B)G1(H) 1/43	46.4 (56.1)		HG-SR202(4)(B)G1(H) 1/43	54.3 (63.7)	
	HF-SP202(4)(B)G1(H) 1/59	46.4 (56.0)		HG-SR202(4)(B)G1(H) 1/59	54.2 (63.6)	
	HF-SP352(4)(B)G1(H) 1/6	84.4 (94.0)		HG-SR352(4)(B)G1(H) 1/6	87.1 (96.5)	
	HF-SP352(4)(B)G1(H) 1/11	80.1 (89.8)		HG-SR352(4)(B)G1(H) 1/11	82.8 (92.2)	
	HF-SP352(4)(B)G1(H) 1/17	78.8 (88.5)		HG-SR352(4)(B)G1(H) 1/17	81.5 (90.9)	
	HF-SP352(4)(B)G1(H) 1/29	83.9 (93.6)		HG-SR352(4)(B)G1(H) 1/29	86.6 (96.0)	
	HF-SP352(4)(B)G1(H) 1/35	83.7 (93.3)		HG-SR352(4)(B)G1(H) 1/35	86.3 (95.7)	
	HF-SP352(4)(B)G1(H) 1/43	101.9 (111.5)		HG-SR352(4)(B)G1(H) 1/43	105 (114)	
	HF-SP352(4)(B)G1(H) 1/59	101.3 (110.9)		HG-SR352(4)(B)G1(H) 1/59	104 (113)	
	HF-SP502(4)(B)G1(H) 1/6	121.2 (130.8)		HG-SR502(4)(B)G1(H) 1/6	126 (135)	
	HF-SP502(4)(B)G1(H) 1/11	108.9 (118.5)		HG-SR502(4)(B)G1(H) 1/11	114 (123)	
	HF-SP502(4)(B)G1(H) 1/17	104.8 (114.5)		HG-SR502(4)(B)G1(H) 1/17	110 (119)	
	HF-SP502(4)(B)G1(H) 1/29	135.6 (145.3)		HG-SR502(4)(B)G1(H) 1/29	141 (150)	
	HF-SP502(4)(B)G1(H) 1/35	135.1 (144.8)		HG-SR502(4)(B)G1(H) 1/35	140 (150)	
	HF-SP502(4)(B)G1(H) 1/43	134.1 (143.8)		HG-SR502(4)(B)G1(H) 1/43	139 (149)	
	HF-SP502(4)(B)G1(H) 1/59	132.9 (142.6)		HG-SR502(4)(B)G1(H) 1/59	138 (147)	
	HF-SP702(4)(B)G1(H) 1/6	177.4 (187.0)		HG-SR702(4)(B)G1(H) 1/6	177 (187)	
	HF-SP702(4)(B)G1(H) 1/11	190.2 (199.9)		HG-SR702(4)(B)G1(H) 1/11	190 (199)	
	HF-SP702(4)(B)G1(H) 1/17	182.7 (192.4)		HG-SR702(4)(B)G1(H) 1/17	182 (192)	
	HF-SP702(4)(B)G1(H) 1/29	192.3 (202.0)		HG-SR702(4)(B)G1(H) 1/29	192 (202)	
	HF-SP702(4)(B)G1(H) 1/35	191.8 (201.5)		HG-SR702(4)(B)G1(H) 1/35	192 (201)	
	HF-SP702(4)(B)G1(H) 1/43	269.8 (278.3)		HG-SR702(4)(B)G1(H) 1/43	267 (277)	
	HF-SP702(4)(B)G1(H) 1/59	268.0 (276.5)		HG-SR702(4)(B)G1(H) 1/59	266 (275)	

Note 1. As for the motor specifications not listed here, refer to the catalog or Instruction Manual. ( ): With brake
If the load inertia moment ratio with brake is exceeded, please ask the sales contact.

Series	Target product			Replacement product		
	Model	Moment of inertia J × 10^{-4} kg•m^2	Load inertia moment ratio	Model	Moment of inertia J × 10^{-4} kg•m^2	Load inertia moment ratio
Medium capacity, medium inertia HF-SP series with high precision reducer Flange output type (G5) (4): 400 V specifications (B): With brake	HF-SP52(4)(B)G5 1/5	6.75 (8.95)	10 times or less	HG-SR52(4)(B)G5 1/5	7.91 (10.1)	10 times or less
	HF-SP52(4)(B)G5 1/11	6.66 (8.86)		HG-SR52(4)(B)G5 1/11	7.82 (10.0)	
	HF-SP52(4)(B)G5 1/21	9.00 (11.2)		HG-SR52(4)(B)G5 1/21	10.2 (12.4)	
	HF-SP52(4)(B)G5 1/33	8.80 (11.0)		HG-SR52(4)(B)G5 1/33	9.96 (12.2)	
	HF-SP52(4)(B)G5 1/45	8.80 (11.0)		HG-SR52(4)(B)G5 1/45	9.96 (12.2)	
	HF-SP102(4)(B)G5 1/5	12.6 (14.7)		HG-SR102(4)(B)G5 1/5	12.3 (14.5)	
	HF-SP102(4)(B)G5 1/11	15.2 (17.3)		HG-SR102(4)(B)G5 1/11	14.9 (17.1)	
	HF-SP102(4)(B)G5 1/21	14.8 (16.9)		HG-SR102(4)(B)G5 1/21	14.5 (16.7)	
	HF-SP102(4)(B)G5 1/33	16.6 (18.7)		HG-SR102(4)(B)G5 1/33	16.3 (18.5)	
	HF-SP102(4)(B)G5 1/45	16.5 (18.6)		HG-SR102(4)(B)G5 1/45	16.2 (18.4)	
	HF-SP152(4)(B)G5 1/5	18.5 (20.7)		HG-SR152(4)(B)G5 1/5	16.7 (18.9)	
	HF-SP152(4)(B)G5 1/11	21.1 (23.3)		HG-SR152(4)(B)G5 1/11	19.3 (21.5)	
	HF-SP152(4)(B)G5 1/21	23.5 (25.7)		HG-SR152(4)(B)G5 1/21	21.7 (23.9)	
	HF-SP152(4)(B)G5 1/33	22.5 (24.7)		HG-SR152(4)(B)G5 1/33	20.7 (22.9)	
	HF-SP152(4)(B)G5 1/45	22.4 (24.6)		HG-SR152(4)(B)G5 1/45	20.6 (22.8)	
	HF-SP202(4)(B)G5 1/5	42.9 (52.5)		HG-SR202(4)(B)G5 1/5	51.4 (61.1)	
	HF-SP202(4)(B)G5 1/11	42.7 (52.3)		HG-SR202(4)(B)G5 1/11	51.2 (60.9)	
	HF-SP202(4)(B)G5 1/21	44.7 (54.3)		HG-SR202(4)(B)G5 1/21	53.2 (62.9)	
	HF-SP202(4)(B)G5 1/33	43.7 (53.3)		HG-SR202(4)(B)G5 1/33	52.2 (61.9)	
	HF-SP202(4)(B)G5 1/45	43.7 (53.3)		HG-SR202(4)(B)G5 1/45	52.2 (61.9)	
	HF-SP352(4)(B)G5 1/5	79.6 (89.3)		HG-SR352(4)(B)G5 1/5	83.2 (92.8)	
	HF-SP352(4)(B)G5 1/11	83.1 (92.8)		HG-SR352(4)(B)G5 1/11	86.7 (96.3)	
	HF-SP352(4)(B)G5 1/21	81.4 (91.1)		HG-SR352(4)(B)G5 1/21	85.0 (94.6)	
	HF-SP502(4)(B)G5 1/5	107.1 (117.1)		HG-SR502(4)(B)G5 1/5	110 (119)	
	HF-SP502(4)(B)G5 1/11	105.1 (115.1)		HG-SR502(4)(B)G5 1/11	108 (117)	
	HF-SP702(4)(B)G5 1/5	164.1 (174.1)		HG-SR702(4)(B)G5 1/5	161 (171)	
Medium capacity, medium inertia HF-SP series with high precision reducer Shaft output type (G7) (4): 400 V specifications (B): With brake	HF-SP52(4)(B)G7 1/5	6.79 (8.99)	10 times or less	HG-SR52(4)(B)G7 1/5	7.95 (10.2)	10 times or less
	HF-SP52(4)(B)G7 1/11	6.66 (8.86)		HG-SR52(4)(B)G7 1/11	7.82 (10.0)	
	HF-SP52(4)(B)G7 1/21	9.00 (11.2)		HG-SR52(4)(B)G7 1/21	10.2 (12.4)	
	HF-SP52(4)(B)G7 1/33	8.80 (11.0)		HG-SR52(4)(B)G7 1/33	9.96 (12.2)	
	HF-SP52(4)(B)G7 1/45	8.80 (11.0)		HG-SR52(4)(B)G7 1/45	9.96 (12.2)	
	HF-SP102(4)(B)G7 1/5	12.6 (14.7)		HG-SR102(4)(B)G7 1/5	12.3 (14.5)	
	HF-SP102(4)(B)G7 1/11	15.3 (17.4)		HG-SR102(4)(B)G7 1/11	15.0 (17.2)	
	HF-SP102(4)(B)G7 1/21	14.8 (16.9)		HG-SR102(4)(B)G7 1/21	14.5 (16.7)	
	HF-SP102(4)(B)G7 1/33	16.6 (18.7)		HG-SR102(4)(B)G7 1/33	16.3 (18.5)	
	HF-SP102(4)(B)G7 1/45	16.6 (18.7)		HG-SR102(4)(B)G7 1/45	16.3 (18.5)	
	HF-SP152(4)(B)G7 1/5	18.5 (20.7)		HG-SR152(4)(B)G7 1/5	16.7 (18.9)	
	HF-SP152(4)(B)G7 1/11	21.2 (23.4)		HG-SR152(4)(B)G7 1/11	19.4 (21.6)	
	HF-SP152(4)(B)G7 1/21	23.5 (25.7)		HG-SR152(4)(B)G7 1/21	21.7 (23.9)	
	HF-SP152(4)(B)G7 1/33	22.5 (24.7)		HG-SR152(4)(B)G7 1/33	20.7 (22.9)	
	HF-SP152(4)(B)G7 1/45	22.5 (24.7)		HG-SR152(4)(B)G7 1/45	20.7 (22.9)	
	HF-SP202(4)(B)G7 1/5	43.2 (52.8)		HG-SR202(4)(B)G7 1/5	51.7 (61.4)	
	HF-SP202(4)(B)G7 1/11	42.8 (52.4)		HG-SR202(4)(B)G7 1/11	51.3 (61.0)	
	HF-SP202(4)(B)G7 1/21	44.8 (54.4)		HG-SR202(4)(B)G7 1/21	53.3 (63.0)	
	HF-SP202(4)(B)G7 1/33	43.7 (53.3)		HG-SR202(4)(B)G7 1/33	52.2 (61.9)	
	HF-SP202(4)(B)G7 1/45	43.7 (53.3)		HG-SR202(4)(B)G7 1/45	52.2 (61.9)	
	HF-SP352(4)(B)G7 1/5	79.9 (89.6)		HG-SR352(4)(B)G7 1/5	83.5 (93.1)	
	HF-SP352(4)(B)G7 1/11	83.4 (93.1)		HG-SR352(4)(B)G7 1/11	87.0 (96.6)	
	HF-SP352(4)(B)G7 1/21	81.5 (91.2)		HG-SR352(4)(B)G7 1/21	85.1 (94.7)	
	HF-SP502(4)(B)G7 1/5	108.5 (118.5)		HG-SR502(4)(B)G7 1/5	111 (121)	
	HF-SP502(4)(B)G7 1/11	105.4 (115.4)		HG-SR502(4)(B)G7 1/11	108 (117)	
	HF-SP702(4)(B)G7 1/5	165.5 (175.5)		HG-SR702(4)(B)G7 1/5	163 (173)	

Note 1. As for the motor specifications not listed here, refer to the catalog or Instruction Manual. ( ): With brake
If the load inertia moment ratio with brake is exceeded, please ask the sales contact.

(4) HC-RP motor

Series	Target product Model	Target product Moment of inertia J × 10^{-4} kg•m²	Target product Load inertia moment ratio	Replacement product Model	Replacement product Moment of inertia J × 10^{-4} kg•m²	Replacement product Load inertia moment ratio
Medium capacity, ultra-low inertia HC-RP series (B): With brake	HC-RP103(B)	1.50 (1.85)	5 times or less	HG-RR103(B)	1.50 (1.85)	5 times or less
	HC-RP153(B)	1.90 (2.25)		HG-RR153(B)	1.90 (2.25)	
	HC-RP203(B)	2.30 (2.65)		HG-RR203(B)	2.30 (2.65)	
	HC-RP353(B)	8.30 (11.8)		HG-RR353(B)	8.30 (11.8)	
	HC-RP503(B)	12.0 (15.5)		HG-RR503(B)	12.0 (15.5)	
Medium capacity, ultra-low inertia HC-RP series with high precision reducer Flange output type (G5) (B): With brake	HC-RP103(B)G5 1/5	2.33 (2.68)	5 times or less	HG-SR102(B)G5 1/5	12.3 (14.5)	10 times or less
	HC-RP103(B)G5 1/11	2.25 (2.60)		HG-SR102(B)G5 1/11	14.9 (17.1)	
	HC-RP103(B)G5 1/21	4.40 (4.75)		HG-SR102(B)G5 1/21	14.5 (16.7)	
	HC-RP103(B)G5 1/33	4.20 (4.55)		HG-SR102(B)G5 1/33	16.3 (18.5)	
	HC-RP103(B)G5 1/45	6.10 (6.45)		HG-SR102(B)G5 1/45	16.2 (18.4)	
	HC-RP153(B)G5 1/5	2.73 (3.08)		HG-SR152(B)G5 1/5	16.7 (18.9)	
	HC-RP153(B)G5 1/11	5.20 (5.55)		HG-SR152(B)G5 1/11	19.3 (21.5)	
	HC-RP153(B)G5 1/21	4.80 (5.15)		HG-SR152(B)G5 1/21	21.7 (23.9)	
	HC-RP153(B)G5 1/33	6.60 (6.95)		HG-SR152(B)G5 1/33	20.7 (22.9)	
	HC-RP153(B)G5 1/45	6.50 (6.85)		HG-SR152(B)G5 1/45	20.6 (22.8)	
	HC-RP203(B)G5 1/5	3.13 (3.48)		HG-SR202(B)G5 1/5	51.4 (61.1)	
	HC-RP203(B)G5 1/11	5.60 (5.95)		HG-SR202(B)G5 1/11	51.2 (60.9)	
	HC-RP203(B)G5 1/21	8.00 (8.35)		HG-SR202(B)G5 1/21	53.2 (62.9)	
	HC-RP203(B)G5 1/33	7.00 (7.35)		HG-SR202(B)G5 1/33	52.2 (61.9)	
	HC-RP203(B)G5 1/45	6.90 (7.25)		HG-SR202(B)G5 1/45	52.2 (61.9)	
	HC-RP353(B)G5 1/5	13.2 (16.7)		HG-SR352(B)G5 1/5	83.2 (92.8)	
	HC-RP353(B)G5 1/11	13.0 (16.5)		HG-SR352(B)G5 1/11	86.7 (96.3)	
	HC-RP353(B)G5 1/21	15.0 (18.5)		HG-SR352(B)G5 1/21	85.0 (94.6)	
	HC-RP353(B)G5 1/33	14.1 (17.6)				
	HC-RP503(B)G5 1/5	16.9 (20.4)		HG-SR502(B)G5 1/5	110 (119)	
	HC-RP503(B)G5 1/11	20.5 (24.0)		HG-SR502(B)G5 1/11	108 (117)	
	HC-RP503(B)G5 1/21	18.7 (22.2)				
Medium capacity, ultra-low inertia HC-RP series with high precision reducer Shaft output type (G7) (B): With brake	HC-RP103(B)G7 1/5	2.37 (2.72)	5 times or less	HG-SR102(B)G7 1/5	12.3 (14.5)	10 times or less
	HC-RP103(B)G7 1/11	2.25 (2.60)		HG-SR102(B)G7 1/11	15.0 (17.2)	
	HC-RP103(B)G7 1/21	4.40 (4.75)		HG-SR102(B)G7 1/21	14.5 (16.7)	
	HC-RP103(B)G7 1/33	4.20 (4.55)		HG-SR102(B)G7 1/33	16.3 (18.5)	
	HC-RP103(B)G7 1/45	6.20 (6.55)		HG-SR102(B)G7 1/45	16.3 (18.5)	
	HC-RP153(B)G7 1/5	2.77 (3.12)		HG-SR152(B)G7 1/5	16.7 (18.9)	
	HC-RP153(B)G7 1/11	5.30 (5.65)		HG-SR152(B)G7 1/11	19.4 (21.6)	
	HC-RP153(B)G7 1/21	4.80 (5.15)		HG-SR152(B)G7 1/21	21.7 (23.9)	
	HC-RP153(B)G7 1/33	6.60 (6.95)		HG-SR152(B)G7 1/33	20.7 (22.9)	
	HC-RP153(B)G7 1/45	6.60 (6.95)		HG-SR152(B)G7 1/45	20.7 (22.9)	
	HC-RP203(B)G7 1/5	3.17 (3.52)		HG-SR202(B)G7 1/5	51.7 (61.4)	
	HC-RP203(B)G7 1/11	5.70 (6.05)		HG-SR202(B)G7 1/11	51.3 (61.0)	
	HC-RP203(B)G7 1/21	8.00 (8.35)		HG-SR202(B)G7 1/21	53.3 (63.0)	
	HC-RP203(B)G7 1/33	7.00 (7.35)		HG-SR202(B)G7 1/33	52.2 (61.9)	
	HC-RP203(B)G7 1/45	7.00 (7.35)		HG-SR202(B)G7 1/45	52.2 (61.9)	
	HC-RP353(B)G7 1/5	13.5 (17.0)		HG-SR352(B)G7 1/5	83.5 (93.1)	
	HC-RP353(B)G7 1/11	13.1 (16.6)		HG-SR352(B)G7 1/11	87.0 (96.6)	
	HC-RP353(B)G7 1/21	15.1 (18.6)		HG-SR352(B)G7 1/21	85.1 (94.7)	
	HC-RP353(B)G7 1/33	14.1 (17.6)				
	HC-RP503(B)G7 1/5	17.2 (20.7)		HG-SR502(B)G7 1/5	111 (121)	
	HC-RP503(B)G7 1/11	20.7 (24.2)		HG-SR502(B)G7 1/11	108 (117)	
	HC-RP503(B)G7 1/21	18.8 (22.3)				

Note 1. As for the motor specifications not listed here, refer to the catalog or Instruction Manual. ( ): With brake
If the load inertia moment ratio with brake is exceeded, please ask the sales contact.

(5) HC-LP/-UP, HF-JP motor

Series	Target product			Replacement product		
	Model	Moment of inertia J × 10^{-4} kg•m^2	Load inertia moment ratio	Model	Moment of inertia J × 10^{-4} kg•m^2	Load inertia moment ratio
Medium capacity, low inertia HC-LP series (B): With brake	HC-LP52(B)	3.10 (5.20)	10 times or less	HG-JR73(B)	2.09 (2.59)	10 times or less
	HC-LP102(B)	4.62 (6.72)		HG-JR153(B)	3.79 (4.29)	
	HC-LP152(B)	6.42 (8.52)		HG-JR353(B)	13.2 (15.4)	
	HC-LP202(B)	22.0 (32.0)				
	HC-LP302(B)	36.0 (46.0)		HG-JR503(B)	19.0 (21.2)	
Medium capacity, flat type HC-UP series (B): With brake	HC-UP72(B)	10.4 (12.5)	15 times or less	HG-UR72(B)	10.4 (12.5)	15 times or less
	HC-UP152(B)	22.1 (24.2)		HG-UR152(B)	22.1 (24.2)	
	HC-UP202(B)	38.2 (46.8)		HG-UR202(B)	38.2 (46.8)	
	HC-UP352(B)	76.5 (85.1)		HG-UR352(B)	76.5 (85.1)	
	HC-UP502(B)	115 (124)		HG-UR502(B)	115 (124)	
Large capacity, low inertia HF-JP series (B): With brake	HF-JP53(B) HF-JP534(B)	1.52 (2.02)	10 times or less	HG-JR53(B) HG-JR534(B)	1.52 (2.02)	10 times or less
	HF-JP73(B) HF-JP734(B)	2.09 (2.59)		HG-JR73(B) HG-JR734(B)	2.09 (2.59)	
	HF-JP103(B) HF-JP1034(B)	2.65 (3.15)		HG-JR103(B) HG-JR1034(B)	2.65 (3.15)	
	HF-JP153(B) HF-JP1534(B)	3.79 (4.29)		HG-JR153(B) HG-JR1534(B)	3.79 (4.29)	
	HF-JP203(B) HF-JP2034(B)	4.92 (5.42)		HG-JR203(B) HG-JR2034(B)	4.92 (5.42)	
	HF-JP353(B) HF-JP3534(B)	13.2 (15.4)		HG-JR353(B) HG-JR3534(B)	13.2 (15.4)	
	HF-JP503(B) HF-JP5034(B)	19.0 (21.2)		HG-JR503(B) HG-JR5034(B)	19.0 (21.2)	
	HF-JP703(B) HF-JP7034(B)	43.3 (52.9)		HG-JR703(B) HG-JR7034(B)	43.3 (52.9)	
	HF-JP903(B) HF-JP9034(B)	55.8 (65.4)		HG-JR903(B) HG-JR9034(B)	55.8 (65.4)	
	HF-JP11K1M(B) HF-JP11K1M4(B)	220 (240)		HG-JR11K1M(B) HG-JR11K1M4(B)	220 (240)	
	HF-JP15K1M(B) HF-JP15K1M4(B)	315 (336)		HG-JR15K1M(B) HG-JR15K1M4(B)	315 (336)	

Note 1. As for the motor specifications not listed here, refer to the catalog or Instruction Manual. ( ): With brake
If the load inertia moment ratio with brake is exceeded, please ask the sales contact.

(6) HA-LP motor

Series	Target product			Replacement product		
	Model	Moment of inertia J × 10^{-4} kg•m^2	Load inertia moment ratio	Model	Moment of inertia J × 10^{-4} kg•m^2	Load inertia moment ratio
Large capacity, low inertia HA-LP 1000 r/min series (B): With brake	HA-LP601(B) HA-LP6014(B)	105 (113)	10 times or less	HG-JR601(B) HG-JR6014(B)	176 (196)	10 times or less
	HA-LP801(B) HA-LP8014(B)	220 (293)		HG-JR801(B) HG-JR8014(B)	220 (240)	
	HA-LP12K1(B) HA-LP12K14(B)	295 (369)		HG-JR12K1(B) HG-JR12K14(B)	315 (336)	
	HA-LP15K1 HA-LP15K14	550		HG-JR15K1 HG-JR15K14	489	
	HA-LP20K1 HA-LP20K14	650		HG-JR20K1 HG-JR20K14	627	
	HA-LP25K1 HA-LP25K14	1080		HG-JR25K1 HG-JR25K14	764	
Large capacity, low inertia HA-LP 1500 r/min series (B): With brake	HA-LP701M(B) HA-LP701M4(B)	105 (113)		HG-JR701M(B) HG-JR701M4(B)	176 (196)	
	HA-LP11K1M(B) HA-LP11K1M4(B)	220 (293)		HG-JR11K1M(B) HG-JR11K1M4(B)	220 (240)	
	HA-LP15K1M(B) HA-LP15K1M4(B)	295 (369)		HG-JR15K1M(B) HG-JR15K1M4(B)	315 (336)	
	HA-LP22K1M HA-LP22K1M4	550		HG-JR22K1M HG-JR22K1M4	489	
Large capacity, low inertia HA-LP 2000 r/min series (B): With brake	HA-LP502	74.0		HG-SR502	99.7	15 times or less
	HA-LP702	94.2		HG-SR702	151	
	HA-LP11K2(B) HA-LP11K24(B)	105 (113)		HG-JR11K1M(B) HG-JR11K1M4(B)	220 (240)	10 times or less
	HA-LP15K2(B) HA-LP15K24(B)	220 (293)				
	HA-LP22K2(B) HA-LP22K24(B)	295 (369)		HG-JR15K1M(B) HG-JR15K1M4(B)	315 (336)	
	HA-LP30K2 HA-LP30K24	550		HG-JR22K1M HG-JR22K1M4	489	

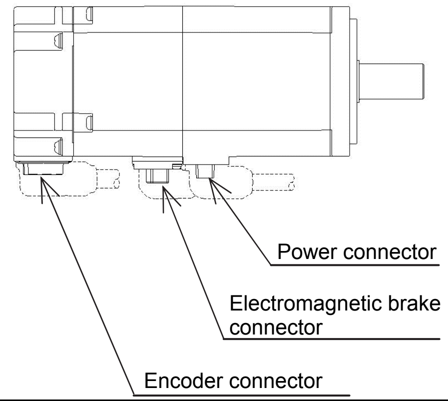
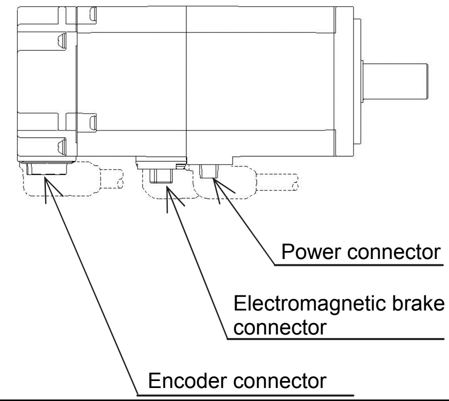
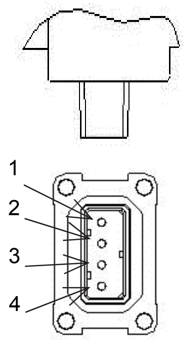
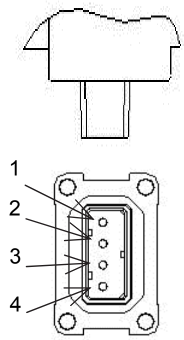
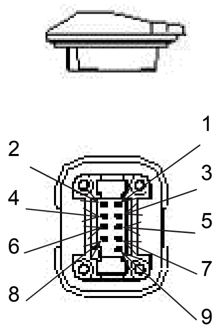
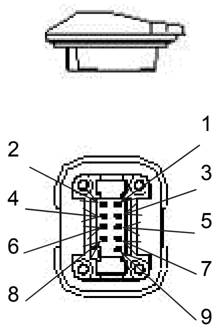
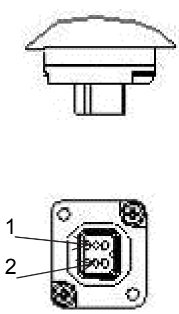
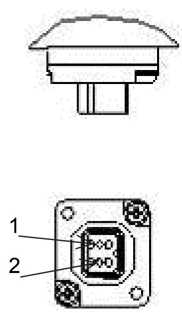
Note 1. As for the motor specifications not listed here, refer to the catalog or Instruction Manual. ( ): With brake
If the load inertia moment ratio with brake is exceeded, please ask the sales contact.

Series	Target product			Replacement product		
	Model	Moment of inertia J × 10^{-4} kg•m^2	Load moment inertia ratio	Model	Moment of inertia J × 10^{-4} kg•m^2	Load moment inertia ratio
Large capacity, low inertia HA-LP 1000 r/min series (B): With brake	HA-LP601(B) HA-LP6014(B)	105 (113)	10 times or less	HG-JR601R(B)-S_ HG-JR6014R(B) -S_	198 (218)	10 times or less
	HA-LP801(B) HA-LP8014(B)	220 (293)		HG-JR801R(B)-S_ HG-JR8014R(B)-S_	228 (248)	
	HA-LP12K1(B) HA-LP12K14(B)	295 (369)		HG-JR12K1R(B)-S_ HG-JR12K14R(B)-S_	323 (344)	
	HA-LP15K1 HA-LP15K14	550		HG-JR15K1R-S_ HG-JR15K14R-S_	487	
	HA-LP20K1 HA-LP20K14	650		HG-JR20K1R-S_ HG-JR20K14R-S_	625	
	HA-LP25K1 HA-LP25K14	1080		HG-JR25K1R-S_ HG-JR25K14R-S_	767	
Large capacity, low inertia HA-LP 1500 r/min series (B): With brake	HA-LP701M(B) HA-LP701M4(B)	105 (113)		HG-JR701MR(B)-S_ HG-JR701M4R(B)-S_	198 (218)	
	HA-LP11K1M(B) HA-LP11K1M4(B)	220 (293)		HG-JR11K1MR(B)-S_(□250) HG-JR11K1M4R(B)-S_(□250)	228 (248)	
	HA-LP15K1M(B) HA-LP15K1M4(B)	295 (369)		HG-JR15K1MR(B)-S_ HG-JR15K1M4R(B)-S_	323 (344)	
	HA-LP22K1M HA-LP22K1M4	550		HG-JR22K1MR-S_ HG-JR22K1M4R-S_	487	
Large capacity, low inertia HA-LP 2000r/min series (B): With brake	HA-LP502	74.0		HG-SR502R-S_	104	15 times or less
	HA-LP702	94.2		HG-SR702R-S_	155	
	HA-LP11K2(B) HA-LP11K24(B)	105 (113)		HG-JR11K1MR(B)-S_(□200) HG-JR11K1M4R(B)-S_(□200)	236 (256)	10 times or less
	HA-LP15K2(B) HA-LP15K24(B)	220 (293)		HG-JR11K1MR(B)-S_(□250) HG-JR11K1M4R(B)-S_(□250)	228 (248)	
	HA-LP22K2(B) HA-LP22K24(B)	295 (369)		HG-JR15K1MR(B)-S_ HG-JR15K1M4R(B)-S_	323 (344)	
	HA-LP30K2 HA-LP30K24	550		HG-JR22K1MR-S_ HG-JR22K1M4R-S_	487	

Note 1. As for the motor specifications not listed here, refer to the catalog or Instruction Manual. ( ): With brake
If the load moment inertia ratio with brake is exceeded, please ask the sales contact.

2.6 Comparison of Servo Motor Connector Specifications

(1) HF-KP/-MP motor

	MR-J3 series (HF-KP/MP)	MR-J4 series (HG-KR/MR)
Motor appearance		
Power connector	 (see Power connector Pin assignment below)	 (see Power connector Pin assignment below)
Encoder connector	 (see Encoder connector Pin assignment below)	 (see Encoder connector Pin assignment below)
Electromagnetic brake connector (Power connector)	 (see Electromagnetic brake connector Pin assignment below)	 (see Electromagnetic brake connector Pin assignment below)

MR-J3 series (HF-KP/MP) / MR-J4 series (HG-KR/MR) (identical for both series)

Power connector Pin assignment

Pin No.	Signal name
1	Earth
2	U
3	V
4	W

Encoder connector Pin assignment

Pin No.	Signal name
1	
2	BAT
3	P5
4	MRR
5	MR
6	LG
7	
8	
9	SHD

Electromagnetic brake connector Pin assignment

Pin No.	Signal name
1	B1
2	B2

(2) HF-SP motor

<table>
<tr><th></th><th>MR-J3 series (HF-SP)
Target models: HF-SP51(B), HF-SP81(B),
HF-SP52(4)(B) to HF-SP152(4)(B)</th><th>MR-J4 series (HG-SR)
Target models: HG-SR51(B), HG-SR81(B),
HG-SR52(4)(B) to HG-SR152(4)(B)</th></tr>
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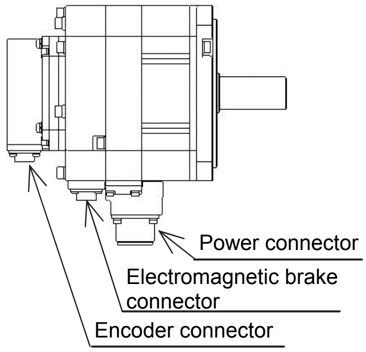

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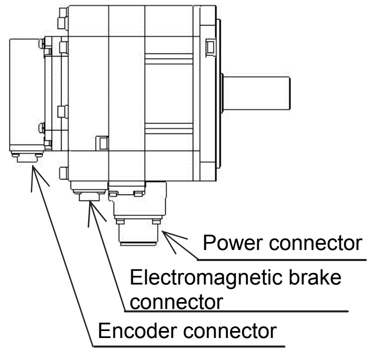

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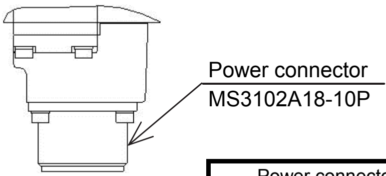
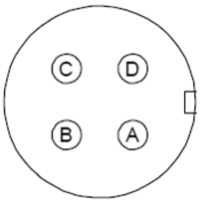
<tr><td>Power connector</td><td>





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<tr><th colspan="2">Power connector Pin assignment</th></tr>
<tr><th>Pin No.</th><th>Signal name</th></tr>
<tr><td>A</td><td>U</td></tr>
<tr><td>B</td><td>V</td></tr>
<tr><td>C</td><td>W</td></tr>
<tr><td>D</td><td>Earth</td></tr>
</table>

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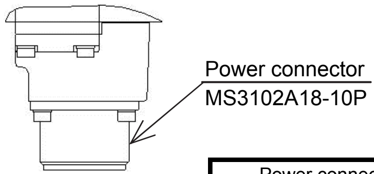
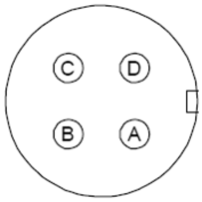
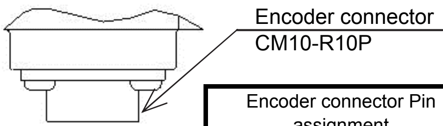
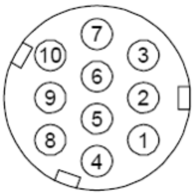




<table>
<tr><th colspan="2">Power connector Pin assignment</th></tr>
<tr><th>Pin No.</th><th>Signal name</th></tr>
<tr><td>A</td><td>U</td></tr>
<tr><td>B</td><td>V</td></tr>
<tr><td>C</td><td>W</td></tr>
<tr><td>D</td><td>Earth</td></tr>
</table>

</td></tr>
<tr><td>Encoder connector
(Note 1)</td><td>





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<tr><th>Pin No.</th><th>Signal name</th></tr>
<tr><td>1</td><td>MR</td></tr>
<tr><td>2</td><td>MRR</td></tr>
<tr><td>3</td><td></td></tr>
<tr><td>4</td><td>BAT</td></tr>
<tr><td>5</td><td>LG</td></tr>
<tr><td>6</td><td></td></tr>
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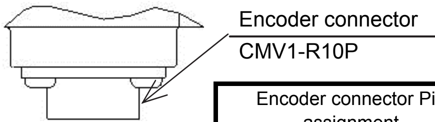

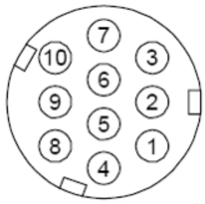

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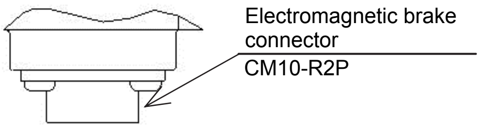
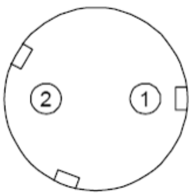
<tr><td>Electromagnetic brake connector
(Note 1)</td><td>





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<tr><th>Pin No.</th><th>Signal name</th></tr>
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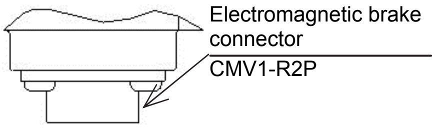

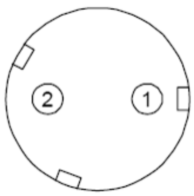

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Note 1. Although the types of encoder and electromagnetic brake connector differ, they can be wired with the existing cables because the connector specifications have compatibility in wiring.

<table>
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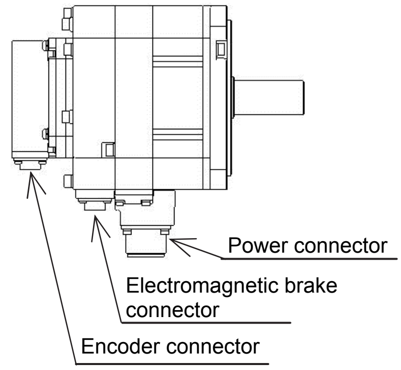
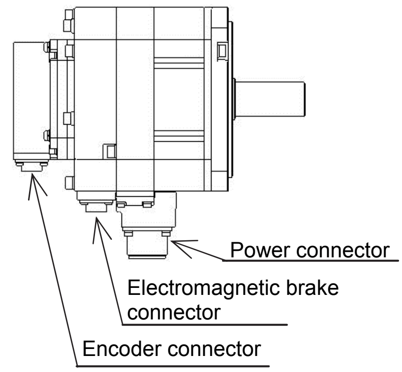
Target models: HF-SP121(B) to HF-SP421(B)
HF-SP202(4)(B) to HF-SP702(4)(B)</td><td>MR-J4 series (HG-SR)
Target models: HG-SR121(B) to HG-SR421(B)
HG-SR202(4)(B) to HG-SR702(4)(B)</td></tr>
<tr><td>Motor appearance</td><td>
</td><td>
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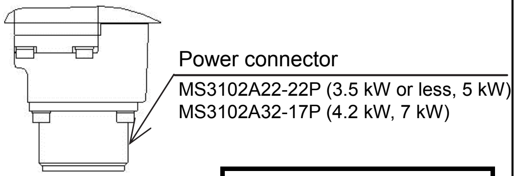
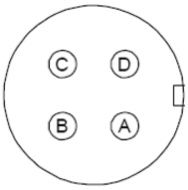
<tr><td>Power connector</td><td>



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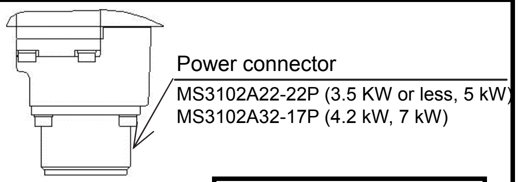
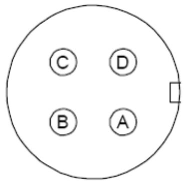
</table></td><td>



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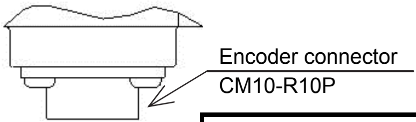
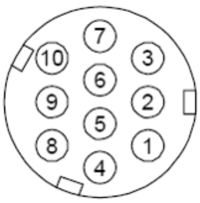
(Note 1)</td><td>



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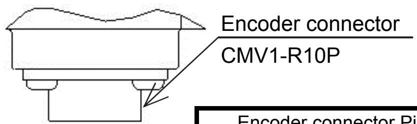
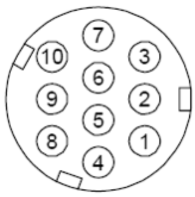
</table></td><td>



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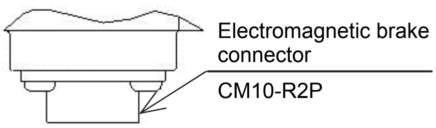
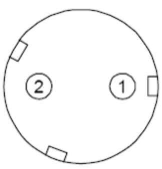
<tr><td>Electromagnetic brake connector
(Note 1)</td><td>



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<tr><th>Pin No.</th><th>Signal name</th></tr>
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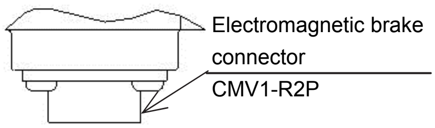
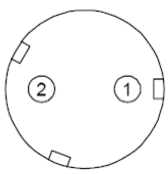
</table></td><td>



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<tr><th>Pin No.</th><th>Signal name</th></tr>
<tr><td>1</td><td>B1</td></tr>
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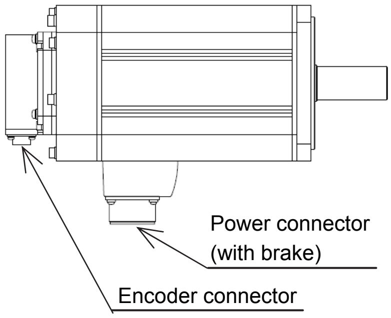
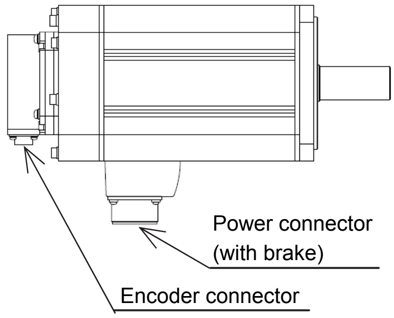
Note 1. Although the types of encoder and electromagnetic brake connector differ, they can be wired with the existing cables because the connector specifications have compatibility in wiring.

(3) HC-RP motor

<table>
<tr><th></th><th>MR-J3 series (HC-RP)
Target models: HC-RP103(B) to HC-RP203(B)</th><th>MR-J4 series (HG-RR)
Target models: HG-RR103(B) to HG-RR203(B)</th></tr>
<tr><td>Motor appearance</td><td>
</td><td>
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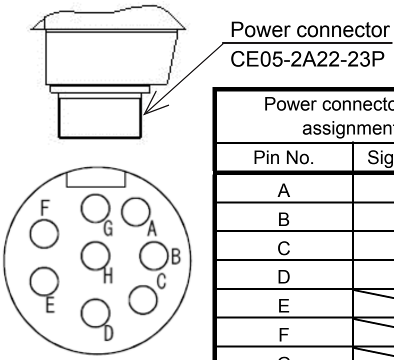
<tr><td>Power connector</td><td>

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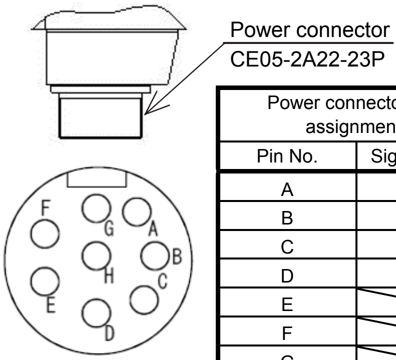
</table></td><td>

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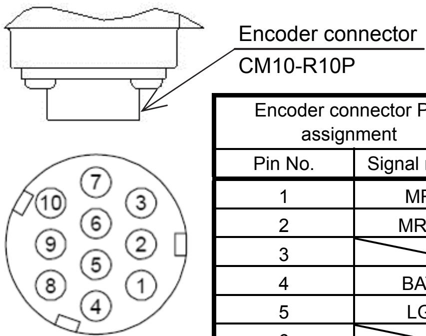
(Note 1)</td><td>

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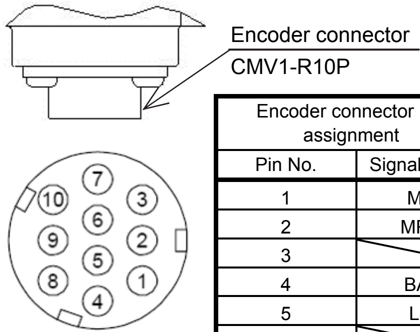
</table></td><td>

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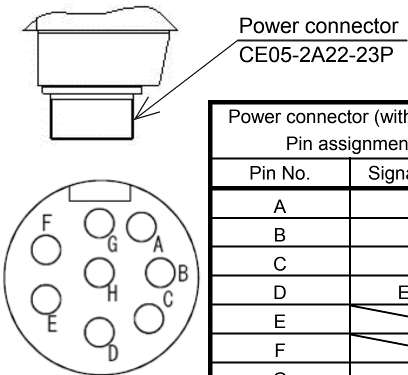
(Power connector)</td><td>

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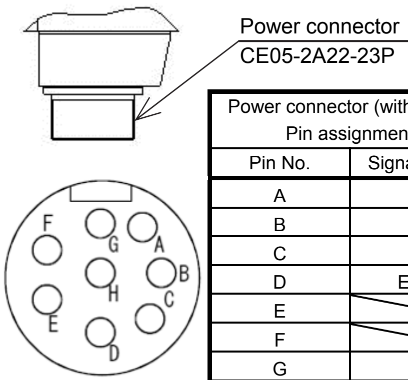
</table></td><td>

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Note 1. Although the encoder connector type differs, it can be wired with the existing cables because the connector specifications have compatibility in wiring.

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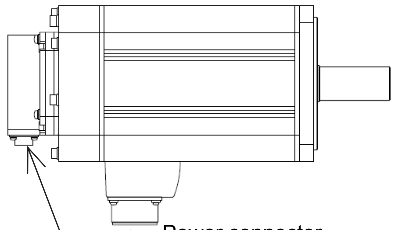
Target models: HC-RP353(B), HC-RP503(B)</th><th>MR-J4 series (HG-RR)
Target models: HG-RR353(B), HG-RR503(B)</th></tr>
<tr><td>Motor appearance</td><td>
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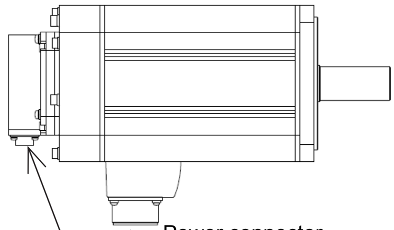
(With electromagnetic brake)
Encoder connector</td><td>
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(With electromagnetic Brake)
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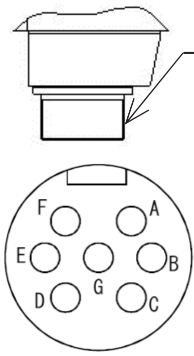
<tr><td>Power connector</td><td>
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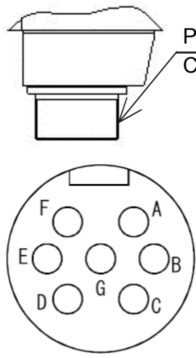
</table></td><td>
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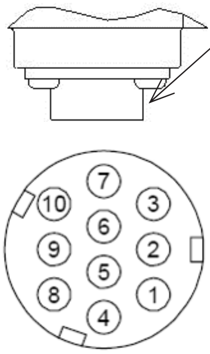
(Note 1)</td><td>
Encoder connector
CMV1-R10P
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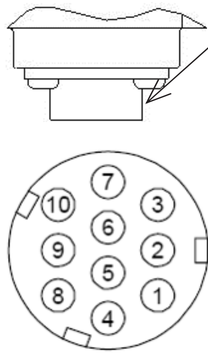
</table></td><td>
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CMV1-R10P
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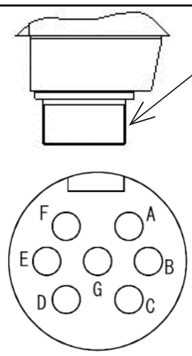
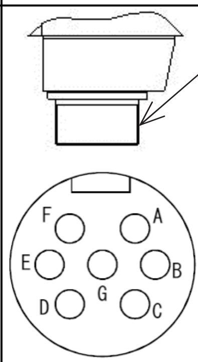
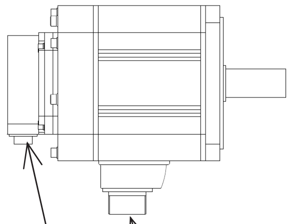
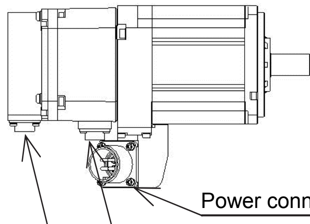
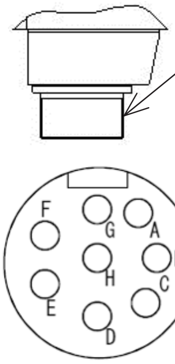
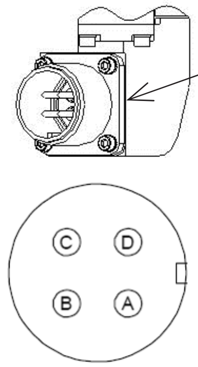
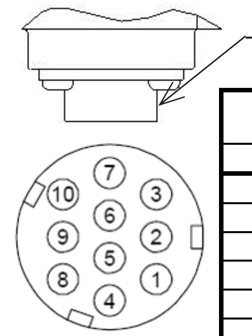
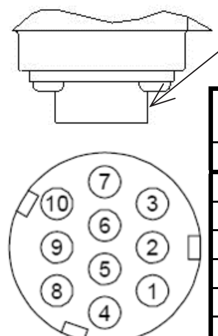
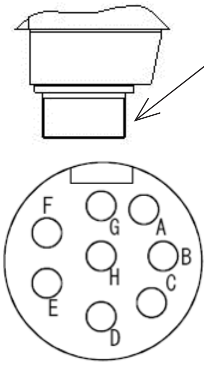
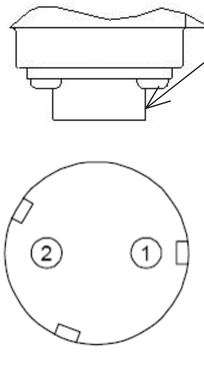
<tr><td>Electromagnetic brake connector
(Power connector)</td><td>
Power connector
CE05-2A24-10P
<table>
<tr><th colspan="2">Power connector (with brake) Pin assignment</th></tr>
<tr><th>Pin No.</th><th>Signal name</th></tr>
<tr><td>A</td><td>U</td></tr>
<tr><td>B</td><td>V</td></tr>
<tr><td>C</td><td>W</td></tr>
<tr><td>D</td><td>Earth</td></tr>
<tr><td>E</td><td>B1</td></tr>
<tr><td>F</td><td>B2</td></tr>
<tr><td>G</td><td></td></tr>
</table></td><td>
Power connector
CE05-2A24-10P
<table>
<tr><th colspan="2">Power connector (with brake) Pin assignment</th></tr>
<tr><th>Pin No.</th><th>Signal name</th></tr>
<tr><td>A</td><td>U</td></tr>
<tr><td>B</td><td>V</td></tr>
<tr><td>C</td><td>W</td></tr>
<tr><td>D</td><td>Earth</td></tr>
<tr><td>E</td><td>B1</td></tr>
<tr><td>F</td><td>B2</td></tr>
<tr><td>G</td><td></td></tr>
</table></td></tr>
</table>

Note 1. Although the encoder connector type differs, it can be wired with the existing cables because the connector specifications have compatibility in wiring.

(4) HC-LP motor

	MR-J3 series (HC-LP) Target models: HC-LP52(B), LP102(B)	MR-J4 series (HG-JR) Target models: HG-JR73(B), JR153(B)
Motor appearance	 Power connector (With electromagnetic brake) Encoder connector	 Power connector Electromagnetic brake connector Encoder connector
Power connector	 Power connector CE05-2A22-23P	 Power connector MS3102A18-10P
Encoder connector (Note 1)	 Encoder connector CM10-R10P	 Encoder connector CMV1-R10P
Electromagnetic brake connector (Power connector)	 Power connector CE05-2A22-23P	 Electromagnetic brake connector CMV1-R2P

MR-J3 series (HC-LP) — Power connector Pin assignment

Pin No.	Signal name
A	U
B	V
C	W
D	Earth
E	
F	
G	
H	

MR-J4 series (HG-JR) — Power connector Pin assignment

Pin No.	Signal name
A	U
B	V
C	W
D	Earth

MR-J3 series (HC-LP) — Encoder connector Pin assignment

Pin No.	Signal name
1	MR
2	MRR
3	
4	BAT
5	LG
6	
7	
8	P5
9	
10	SHD

MR-J4 series (HG-JR) — Encoder connector Pin assignment

Pin No.	Signal name
1	MR
2	MRR
3	
4	BAT
5	LG
6	
7	
8	P5
9	
10	SHD

MR-J3 series (HC-LP) — Power connector (with brake) Pin assignment

Pin No.	Signal name
A	U
B	V
C	W
D	Earth
E	
F	
G	B1
H	B2

MR-J4 series (HG-JR) — Electromagnetic brake connector Pin assignment

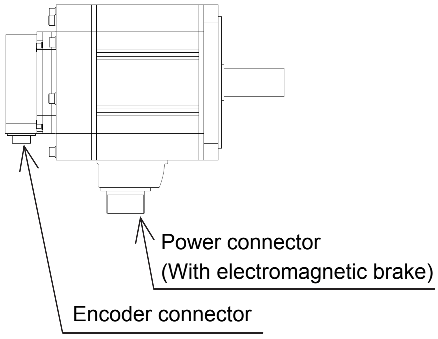
Pin No.	Signal name
1	B1
2	B2

Note 1. Although the encoder connector type differs, it can be wired with the existing cables because the connector specifications have compatibility in wiring.

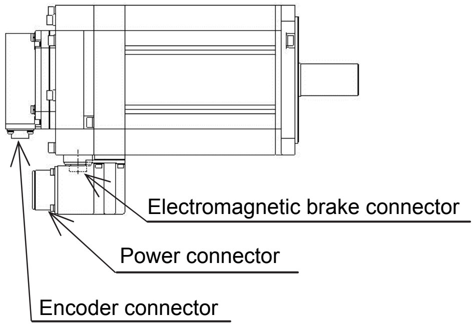
	MR-J3 series (HC-LP) Target models: HC-LP152(B)	MR-J4 series (HG-JR) Target models: HG-JR353(B)
Motor appearance	see below	see below
Power connector	see below	see below
Encoder connector (Note 1)	see below	see below
Electromagnetic brake connector (Power connector)	see below	see below

Motor appearance

MR-J3 series (HC-LP)
Target models: HC-LP152(B)

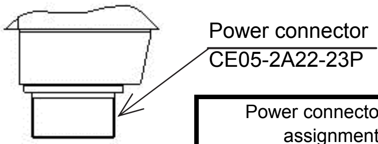


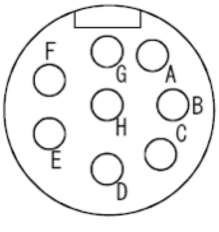
MR-J4 series (HG-JR)
Target models: HG-JR353(B)



Power connector

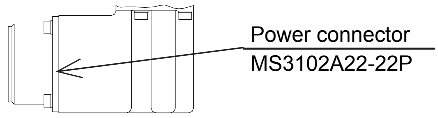
MR-J3 series (HC-LP)

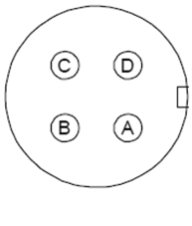




Power connector Pin assignment	
Pin No.	Signal name
A	U
B	V
C	W
D	Earth
E	
F	
G	
H	

MR-J4 series (HG-JR)

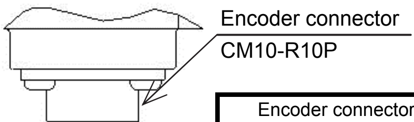




Power connector Pin assignment	
Pin No.	Signal name
A	U
B	V
C	W
D	Earth

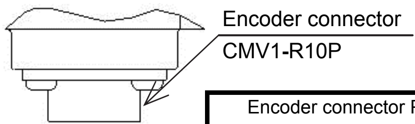
Encoder connector (Note 1)

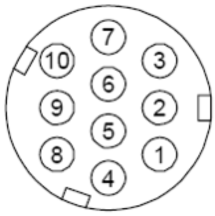
MR-J3 series (HC-LP)



Encoder connector Pin assignment	
Pin No.	Signal name
1	MR
2	MRR
3	
4	BAT
5	LG
6	
7	
8	P5
9	
10	SHD

MR-J4 series (HG-JR)

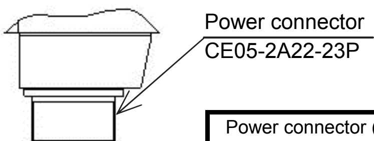


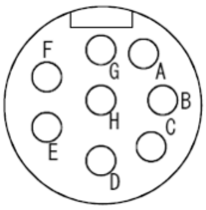


Encoder connector Pin assignment	
Pin No.	Signal name
1	MR
2	MRR
3	
4	BAT
5	LG
6	
7	
8	P5
9	
10	SHD

Electromagnetic brake connector (Power connector)

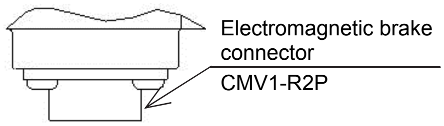
MR-J3 series (HC-LP)

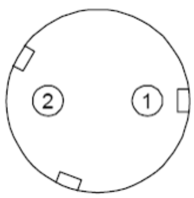




Power connector (with brake) Pin assignment	
Pin No.	Signal name
A	U
B	V
C	W
D	Earth
E	
F	
G	B1
H	B2

MR-J4 series (HG-JR)





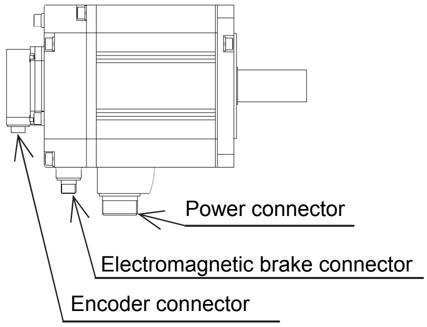
Electromagnetic brake connector Pin assignment	
Pin No.	Signal name
1	B1
2	B2

Note 1. Although the encoder connector type differs, it can be wired with the existing cables because the connector specifications have compatibility in wiring.

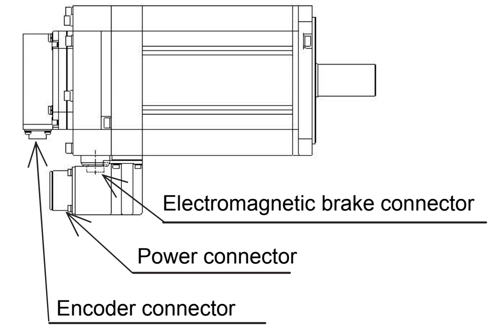
	MR-J3 series (HC-LP) Target models: HC-LP202(B), LP302(B)	MR-J4 series (HG-JR) Target models: HG-JR353(B), JR503(B)

Motor appearance

MR-J3 series (HC-LP):

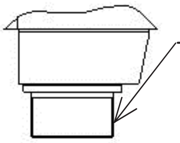


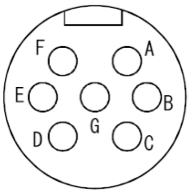
MR-J4 series (HG-JR):



Power connector

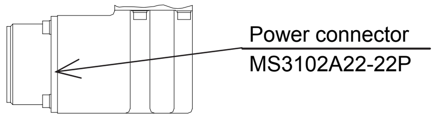
MR-J3 series (HC-LP):

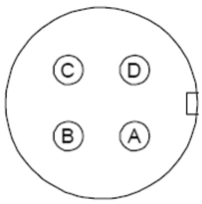




Power connector Pin assignment	
Pin No.	Signal name
A	U
B	V
C	W
D	Earth
E	
F	
G	
H	

MR-J4 series (HG-JR):

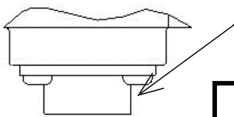


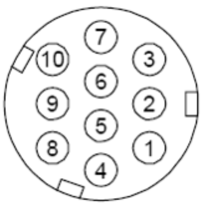


Power connector Pin assignment	
Pin No.	Signal name
A	U
B	V
C	W
D	Earth

Encoder connector (Note 1)

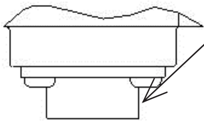
MR-J3 series (HC-LP):

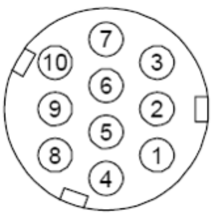




Encoder connector Pin assignment	
Pin No.	Signal name
1	MR
2	MRR
3	
4	BAT
5	LG
6	
7	
8	P5
9	
10	SHD

MR-J4 series (HG-JR):

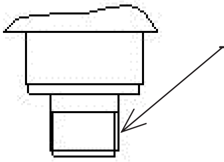


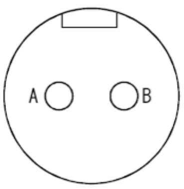


Encoder connector Pin assignment	
Pin No.	Signal name
1	MR
2	MRR
3	
4	BAT
5	LG
6	
7	
8	P5
9	
10	SHD

Electromagnetic brake connector (Power connector)

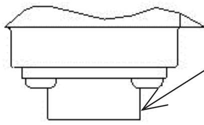
MR-J3 series (HC-LP):

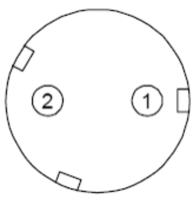




Electromagnetic brake connector Pin assignment	
Pin No.	Signal name
A	B1
B	B2

MR-J4 series (HG-JR):





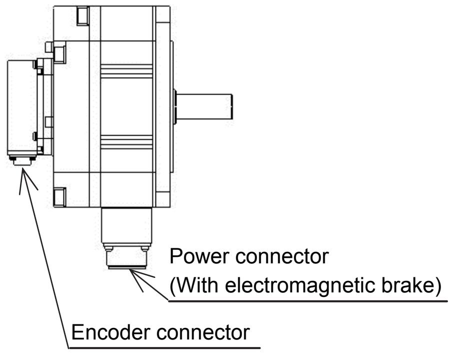
Electromagnetic brake connector Pin assignment	
Pin No.	Signal name
1	B1
2	B2

Note 1. Although the encoder connector type differs, it can be wired with the existing cables because the connector specifications have compatibility in wiring.

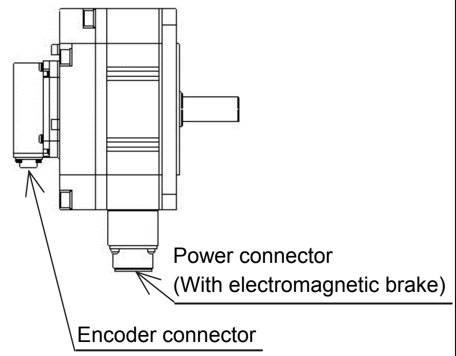
(5)HC-UP motor

Motor appearance

MR-J3 series (HC-UP)
Target models: HC-UP72(B), HC-UP152(B)

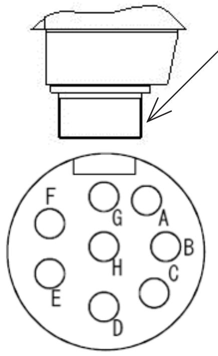


MR-J4 series (HG-UR)
Target models: HG-UR72(B), HG-UR152(B)



Power connector

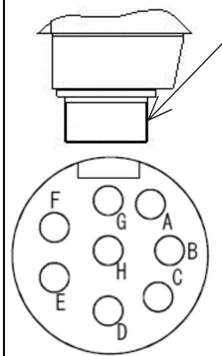
MR-J3 series (HC-UP)



Power connector
CE05-2A22-23P

Power connector Pin assignment	
Pin No.	Signal name
A	U
B	V
C	W
D	Earth
E	
F	
G	
H	

MR-J4 series (HG-UR)

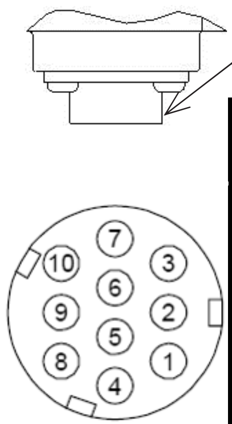


Power connector
CE05-2A22-23P

Power connector Pin assignment	
Pin No.	Signal name
A	U
B	V
C	W
D	Earth
E	
F	
G	
H	

Encoder connector (Note 1)

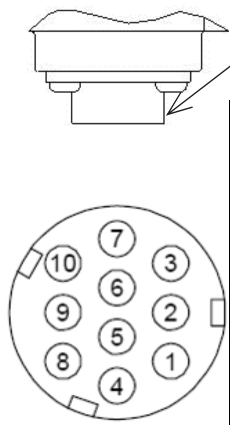
MR-J3 series (HC-UP)



Encoder connector
CM10-R10P

Encoder connector Pin assignment	
Pin No.	Signal name
1	MR
2	MRR
3	
4	BAT
5	LG
6	
7	
8	P5
9	
10	SHD

MR-J4 series (HG-UR)

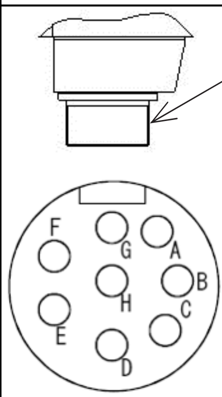


Encoder connector
CMV1-R10P

Encoder connector Pin assignment	
Pin No.	Signal name
1	MR
2	MRR
3	
4	BAT
5	LG
6	
7	
8	P5
9	
10	SHD

Electromagnetic brake connector (Power connector)

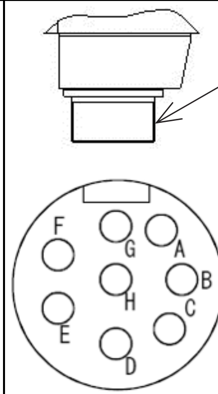
MR-J3 series (HC-UP)



Power connector
CE05-2A22-23P

Power connector (with brake) Pin assignment	
Pin No.	Signal name
A	U
B	V
C	W
D	Earth
E	
F	
G	B1
H	B2

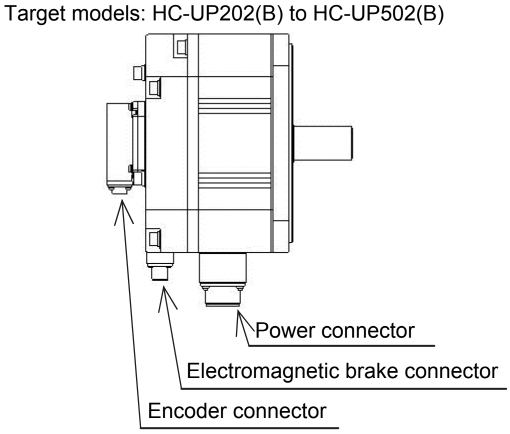
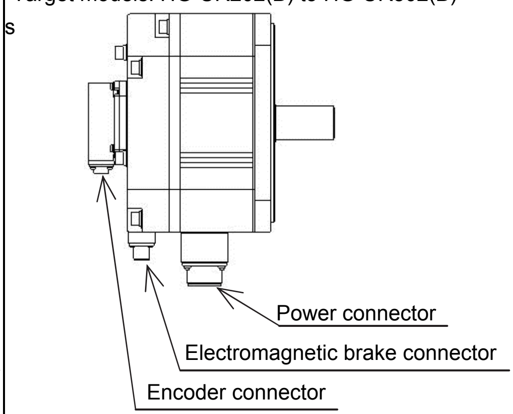
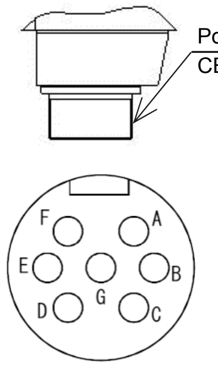
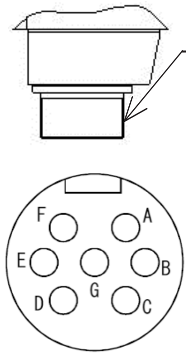
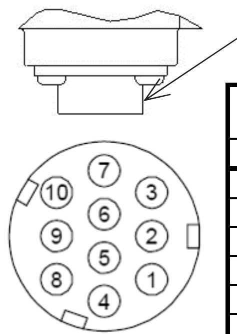
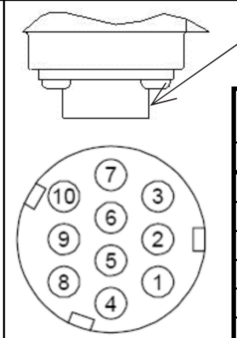
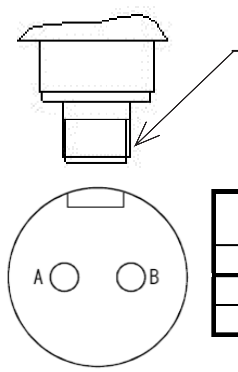
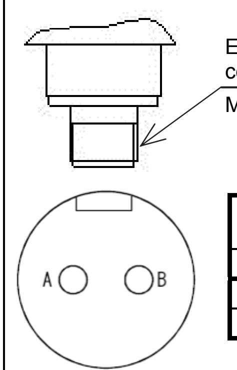
MR-J4 series (HG-UR)



Power connector
CE05-2A22-23P

Power connector (with brake) Pin assignment	
Pin No.	Signal name
A	U
B	V
C	W
D	Earth
E	
F	
G	B1
H	B2

Note 1. Although the encoder connector type differs, it can be wired with the existing cables because the connector specifications have compatibility in wiring.

	MR-J3 series (HC-UP) Target models: HC-UP202(B) to HC-UP502(B)	MR-J4 series (HG-UR) Target models: HG-UR202(B) to HG-UR502(B) s
Motor appearance		
Power connector		
Encoder connector (Note 1)		
Electromagnetic brake connector		

Motor appearance

MR-J3 series (HC-UP):

MR-J4 series (HG-UR):

Power connector

MR-J3 series (HC-UP): Power connector CE05-2A24-10P

Power connector Pin assignment	
Pin No.	Signal name
A	U
B	V
C	W
D	Earth
E	
F	
G	

MR-J4 series (HG-UR): Power connector CE05-2A24-10P

Power connector Pin assignment	
Pin No.	Signal name
A	U
B	V
C	W
D	Earth
E	
F	
G	

Encoder connector (Note 1)

MR-J3 series (HC-UP): Encoder connector CM10-R10P

Encoder connector Pin assignment	
Pin No.	Signal name
1	MR
2	MRR
3	
4	BAT
5	LG
6	
7	
8	P5
9	
10	SHD

MR-J4 series (HG-UR): Encoder connector CMV1-R10P

Encoder connector Pin assignment	
Pin No.	Signal name
1	MR
2	MRR
3	
4	BAT
5	LG
6	
7	
8	P5
9	
10	SHD

Electromagnetic brake connector

MR-J3 series (HC-UP): Electromagnetic brake connector MS3102A10SL-4P

Electromagnetic brake connector Pin assignment	
Pin No.	Signal name
A	B1
B	B2

MR-J4 series (HG-UR): Electromagnetic brake connector MS3102A10SL-4P

Electromagnetic brake connector Pin assignment	
Pin No.	Signal name
A	B1
B	B2

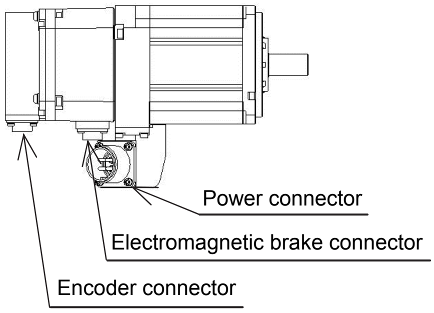
Note 1. Although the encoder connector type differs, it can be wired with the existing cables because the connector specifications have compatibility in wiring.

(6) HF-JP motor

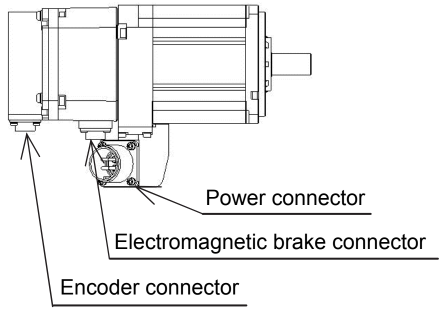
	MR-J3 series (HF-JP) Target models: HF-JP53(4)(B) to HF-JP203(4)(B)	MR-J4 series (HG-JR) Target models: HG-JR53(4)(B) to HG-JR203(4)(B)

Motor appearance

MR-J3 series (HF-JP)
Target models: HF-JP53(4)(B) to HF-JP203(4)(B)

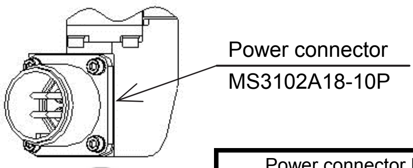


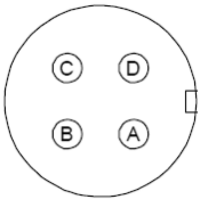
MR-J4 series (HG-JR)
Target models: HG-JR53(4)(B) to HG-JR203(4)(B)



Power connector

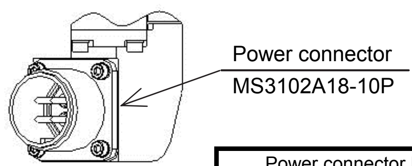
MR-J3 series (HF-JP):

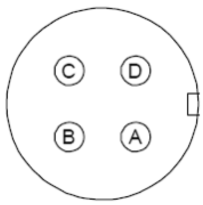




Power connector Pin assignment	
Pin No.	Signal name
A	U
B	V
C	W
D	Earth

MR-J4 series (HG-JR):

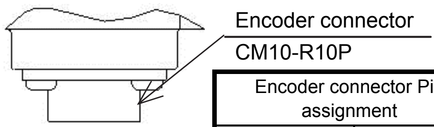


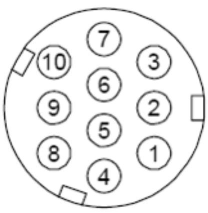


Power connector Pin assignment	
Pin No.	Signal name
A	U
B	V
C	W
D	Earth

Encoder connector (Note 1)

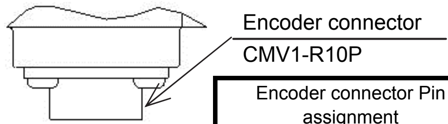
MR-J3 series (HF-JP):

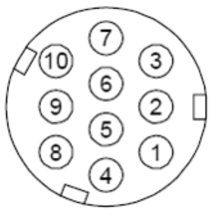




Encoder connector Pin assignment	
Pin No.	Signal name
1	MR
2	MRR
3	
4	BAT
5	LG
6	
7	
8	P5
9	
10	SHD

MR-J4 series (HG-JR):

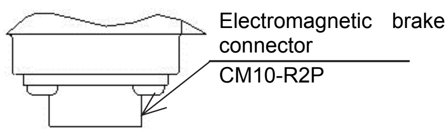


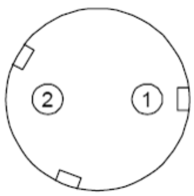


Encoder connector Pin assignment	
Pin No.	Signal name
1	MR
2	MRR
3	
4	BAT
5	LG
6	
7	
8	P5
9	
10	SHD

Electromagnetic brake connector (Note 1)

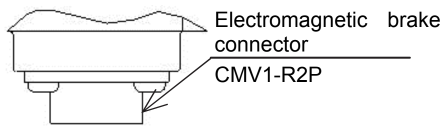
MR-J3 series (HF-JP):

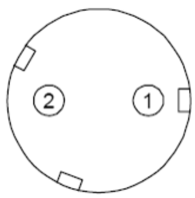




Electromagnetic brake connector Pin assignment	
Pin No.	Signal name
A	B1
B	B2

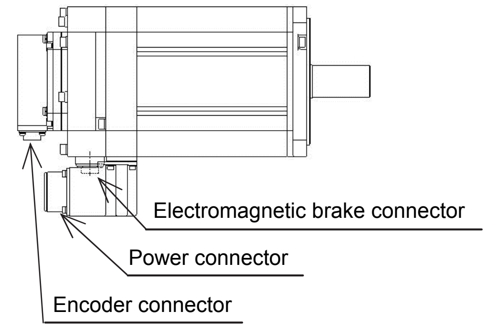
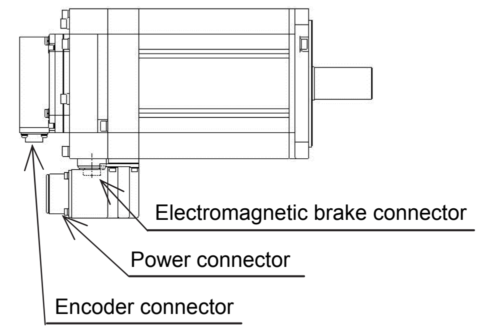
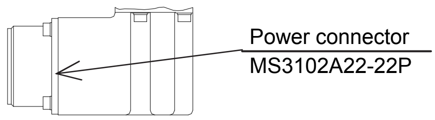
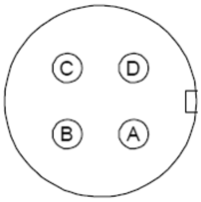
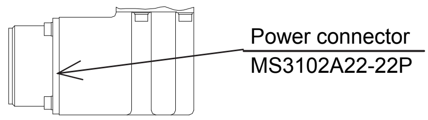
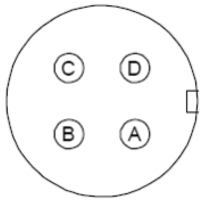
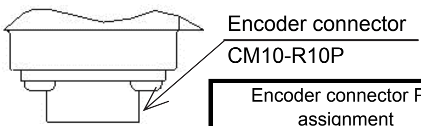
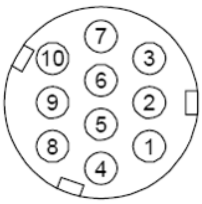
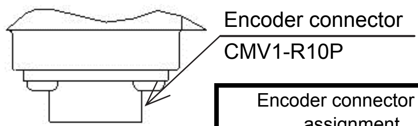
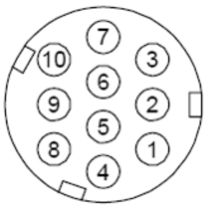
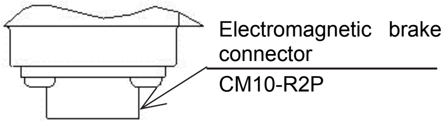
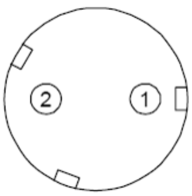
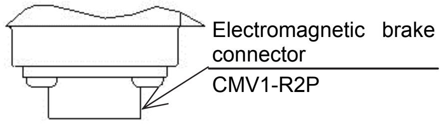
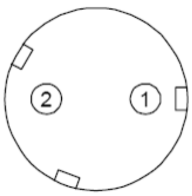
MR-J4 series (HG-JR):





Electromagnetic brake connector Pin assignment	
Pin No.	Signal name
A	B1
B	B2

Note 1. Although the types of encoder and electromagnetic brake connector differ, they can be wired with the existing cables because the connector specifications have compatibility in wiring.

	MR-J3 series (HF-JP) Target models: HF-JP353(B), HF-JP503(B)	MR-J4 series (HG-JR) Target models: HG-JR353(B), HG-JR503(B)
Motor appearance		
Power connector	 	 
Encoder connector (Note 1)	 	 
Electromagnetic brake connector (Note 1)	 	 

MR-J3 series (HF-JP) — Power connector Pin assignment

Pin No.	Signal name
A	U
B	V
C	W
D	Earth

MR-J4 series (HG-JR) — Power connector Pin assignment

Pin No.	Signal name
A	U
B	V
C	W
D	Earth

MR-J3 series (HF-JP) — Encoder connector Pin assignment

Pin No.	Signal name
1	MR
2	MRR
3	
4	BAT
5	LG
6	
7	
8	P5
9	
10	SHD

MR-J4 series (HG-JR) — Encoder connector Pin assignment

Pin No.	Signal name
1	MR
2	MRR
3	
4	BAT
5	LG
6	
7	
8	P5
9	
10	SHD

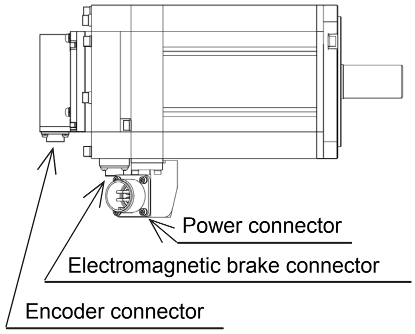
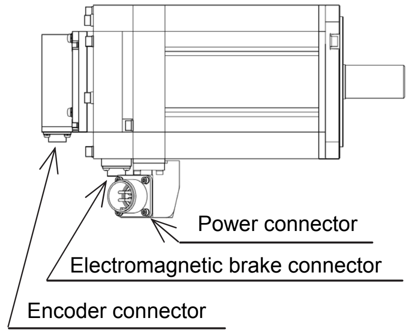
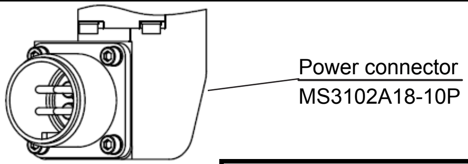
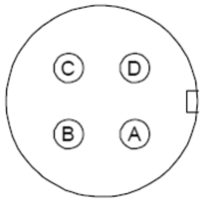
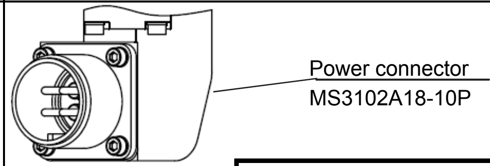
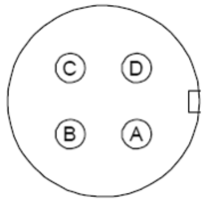
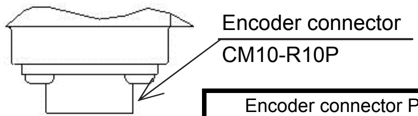
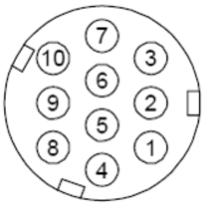
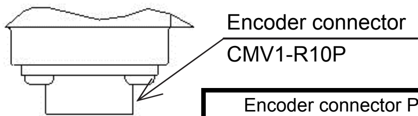
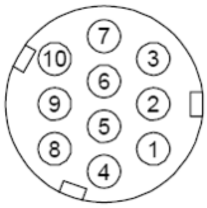
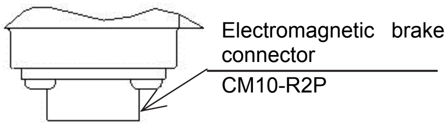
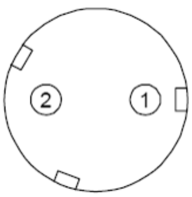
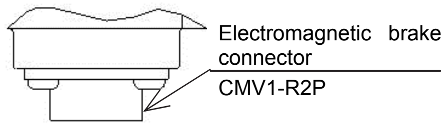
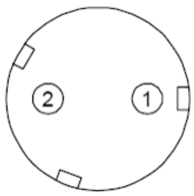
MR-J3 series (HF-JP) — Electromagnetic brake connector Pin assignment

Pin No.	Signal name
1	B1
2	B2

MR-J4 series (HG-JR) — Electromagnetic brake connector Pin assignment

Pin No.	Signal name
1	B1
2	B2

Note 1. Although the types of encoder and electromagnetic brake connector differ, they can be wired with the existing cables because the connector specifications have compatibility in wiring.

	MR-J3 series (HF-JP) Target models: HF-JP3534(B), HF-JP5034(B)	MR-J4 series (HG-JR) Target models: HG-JR3534(B), HG-JR5034(B)
Motor appearance		
Power connector	 (see Power connector Pin assignment below)	 (see Power connector Pin assignment below)
Encoder connector (Note 1)		
Electromagnetic brake connector (Note 1)		

MR-J3 series (HF-JP) — Power connector Pin assignment

Pin No.	Signal name
A	U
B	V
C	W
D	Earth

MR-J4 series (HG-JR) — Power connector Pin assignment

Pin No.	Signal name
A	U
B	V
C	W
D	Earth

MR-J3 series (HF-JP) — Encoder connector Pin assignment

Pin No.	Signal name
1	MR
2	MRR
3	
4	BAT
5	LG
6	
7	
8	P5
9	
10	SHD

MR-J4 series (HG-JR) — Encoder connector Pin assignment

Pin No.	Signal name
1	MR
2	MRR
3	
4	BAT
5	LG
6	
7	
8	P5
9	
10	SHD

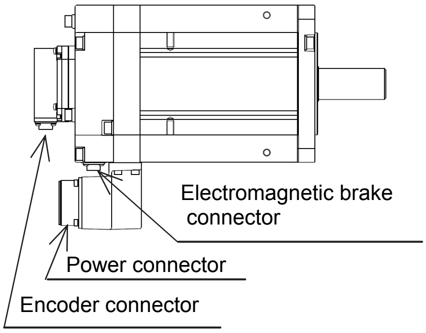
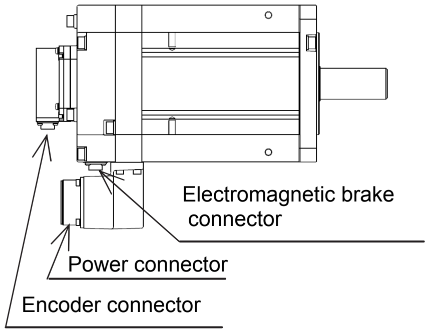
MR-J3 series (HF-JP) — Electromagnetic brake connector Pin assignment

Pin No.	Signal name
1	B1
2	B2

MR-J4 series (HG-JR) — Electromagnetic brake connector Pin assignment

Pin No.	Signal name
1	B1
2	B2

Note 1. Although the types of encoder and electromagnetic brake connector differ, they can be wired with the existing cables because the connector specifications have compatibility in wiring.

<table>
<tr><td></td><td>MR-J3 series (HF-JP)
Target models: HF-JP703(4)(B), HF-JP903(4)(B)</td><td>MR-J4 series (HG-JR)
Target models: HG-JR703(4)(B), HG-JR903(4)(B)</td></tr>
<tr><td>Motor appearance</td><td>
</td><td>
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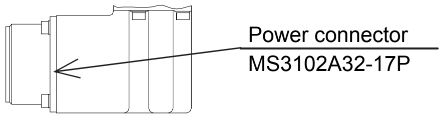
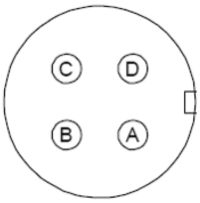
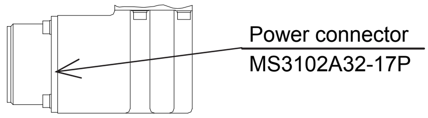
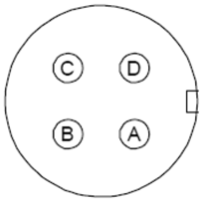
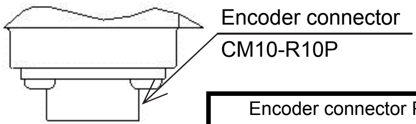
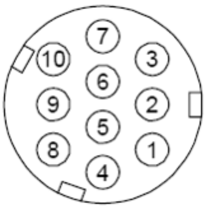
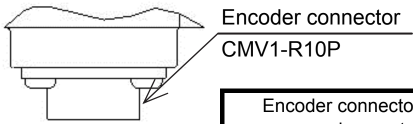
<tr><td>Power connector</td><td>

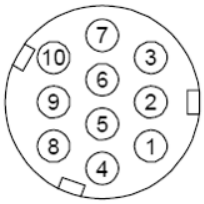


<table>
<tr><th colspan="2">Power connector Pin assignment</th></tr>
<tr><th>Pin No.</th><th>Signal name</th></tr>
<tr><td>A</td><td>U</td></tr>
<tr><td>B</td><td>V</td></tr>
<tr><td>C</td><td>W</td></tr>
<tr><td>D</td><td>Earth</td></tr>
</table></td><td>



<table>
<tr><th colspan="2">Power connector Pin assignment</th></tr>
<tr><th>Pin No.</th><th>Signal name</th></tr>
<tr><td>A</td><td>U</td></tr>
<tr><td>B</td><td>V</td></tr>
<tr><td>C</td><td>W</td></tr>
<tr><td>D</td><td>Earth</td></tr>
</table></td></tr>
<tr><td>Encoder connector
(Note 1)</td><td>


<table>
<tr><th colspan="2">Encoder connector Pin assignment</th></tr>
<tr><th>Pin No.</th><th>Signal name</th></tr>
<tr><td>1</td><td>MR</td></tr>
<tr><td>2</td><td>MRR</td></tr>
<tr><td>3</td><td></td></tr>
<tr><td>4</td><td>BAT</td></tr>
<tr><td>5</td><td>LG</td></tr>
<tr><td>6</td><td></td></tr>
<tr><td>7</td><td></td></tr>
<tr><td>8</td><td>P5</td></tr>
<tr><td>9</td><td></td></tr>
<tr><td>10</td><td>SHD</td></tr>
</table></td><td>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<tr><th>Pin No.</th><th>Signal name</th></tr>
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<tr><td>2</td><td>MRR</td></tr>
<tr><td>3</td><td></td></tr>
<tr><td>4</td><td>BAT</td></tr>
<tr><td>5</td><td>LG</td></tr>
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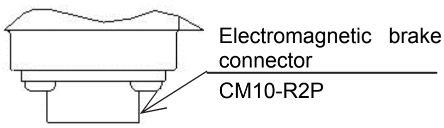
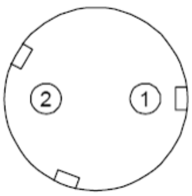
<tr><td>7</td><td></td></tr>
<tr><td>8</td><td>P5</td></tr>
<tr><td>9</td><td></td></tr>
<tr><td>10</td><td>SHD</td></tr>
</table></td></tr>
<tr><td>Electromagnetic brake connector
(Note 1)</td><td>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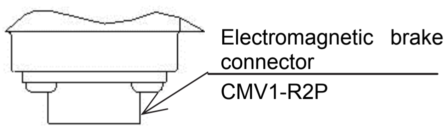
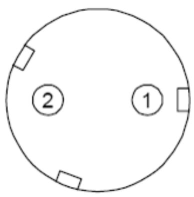
<tr><th colspan="2">Electromagnetic brake connector Pin assignment</th></tr>
<tr><th>Pin No.</th><th>Signal name</th></tr>
<tr><td>1</td><td>B1</td></tr>
<tr><td>2</td><td>B2</td></tr>
</table></td><td>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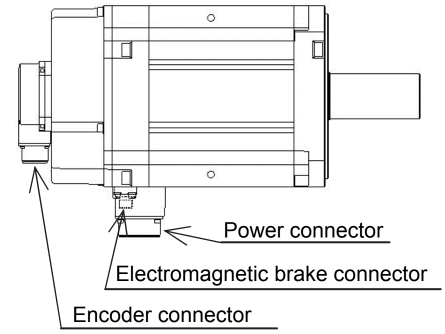
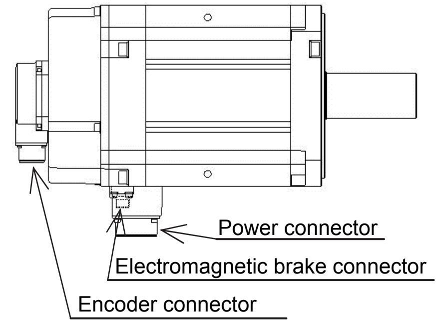
<tr><th colspan="2">Electromagnetic brake connector Pin assignment</th></tr>
<tr><th>Pin No.</th><th>Signal name</th></tr>
<tr><td>1</td><td>B1</td></tr>
<tr><td>2</td><td>B2</td></tr>
</table></td></tr>
</table>

Note 1. Although the types of encoder and electromagnetic brake connector differ, they can be wired with the existing cables because the connector specifications have compatibility in wiring.

<table>
<tr><td></td><td>MR-J3 series (HF-JP)
Target models: HF-JP11K1M(4)(B),
HF-JP15K1M(4)(B)</td><td>MR-J4 series (HG-JR)
Target models: HG-JR11K1M(4)(B),
HG-JR15K1M(4)(B)</td></tr>
<tr><td>Motor appearance</td><td>
</td><td>
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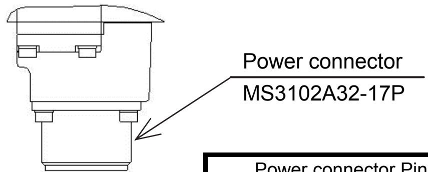
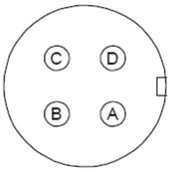
<tr><td>Power connector</td><td>



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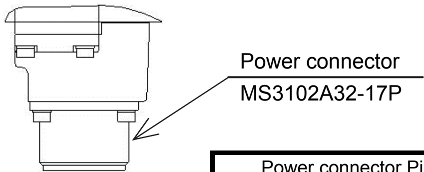
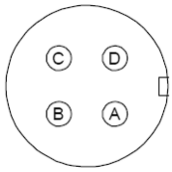
<tr><th>Pin No.</th><th>Signal name</th></tr>
<tr><td>A</td><td>U</td></tr>
<tr><td>B</td><td>V</td></tr>
<tr><td>C</td><td>W</td></tr>
<tr><td>D</td><td>Earth</td></tr>
</table></td><td>



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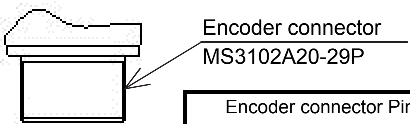
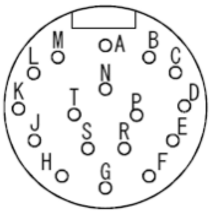
<tr><th>Pin No.</th><th>Signal name</th></tr>
<tr><td>A</td><td>U</td></tr>
<tr><td>B</td><td>V</td></tr>
<tr><td>C</td><td>W</td></tr>
<tr><td>D</td><td>Earth</td></tr>
</table></td></tr>
<tr><td>Encoder connector
(Note 1)</td><td>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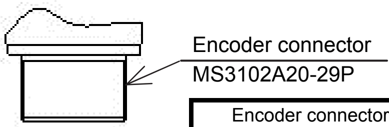
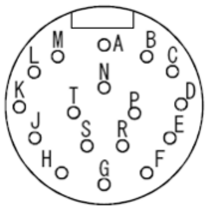
<tr><th colspan="2">Encoder connector Pin assignment</th></tr>
<tr><th>Pin No.</th><th>Signal name</th></tr>
<tr><td>A</td><td></td></tr>
<tr><td>B</td><td></td></tr>
<tr><td>C</td><td>MR</td></tr>
<tr><td>D</td><td>MRR</td></tr>
<tr><td>E</td><td></td></tr>
<tr><td>F</td><td>BAT</td></tr>
<tr><td>G</td><td>LG</td></tr>
<tr><td>H</td><td></td></tr>
<tr><td>J</td><td></td></tr>
<tr><td>K</td><td></td></tr>
<tr><td>L</td><td></td></tr>
<tr><td>M</td><td></td></tr>
<tr><td>N</td><td>SHD</td></tr>
<tr><td>P</td><td></td></tr>
<tr><td>R</td><td>LG</td></tr>
<tr><td>S</td><td>P5</td></tr>
<tr><td>T</td><td></td></tr>
</table></td><td>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<tr><th colspan="2">Encoder connector Pin assignment</th></tr>
<tr><th>Pin No.</th><th>Signal name</th></tr>
<tr><td>A</td><td></td></tr>
<tr><td>B</td><td></td></tr>
<tr><td>C</td><td>MR</td></tr>
<tr><td>D</td><td>MRR</td></tr>
<tr><td>E</td><td></td></tr>
<tr><td>F</td><td>BAT</td></tr>
<tr><td>G</td><td>LG</td></tr>
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<tr><td>M</td><td></td></tr>
<tr><td>N</td><td>SHD</td></tr>
<tr><td>P</td><td></td></tr>
<tr><td>R</td><td>LG</td></tr>
<tr><td>S</td><td>P5</td></tr>
<tr><td>T</td><td></td></tr>
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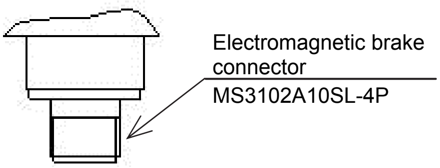
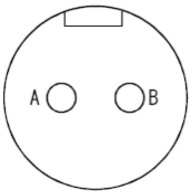
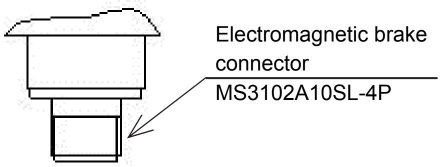
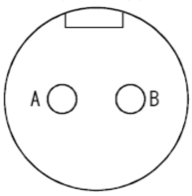
<tr><td>Electromagnetic brake connector</td><td>

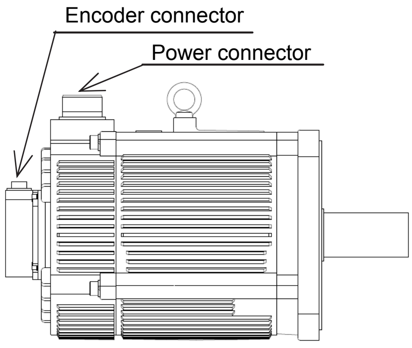
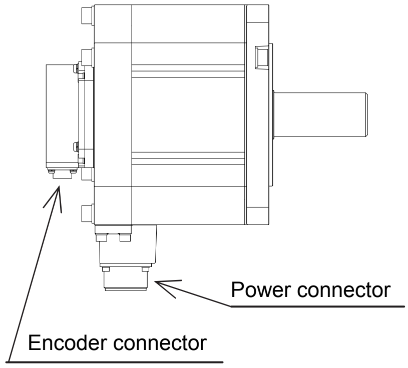
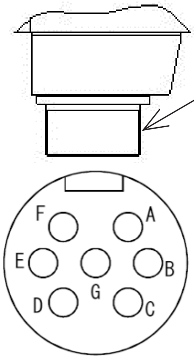
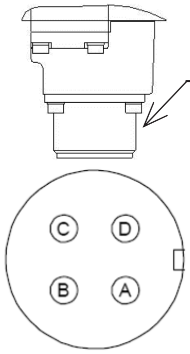
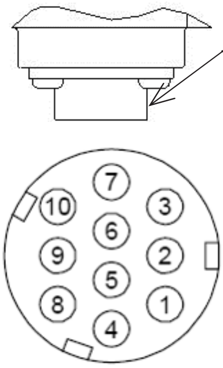
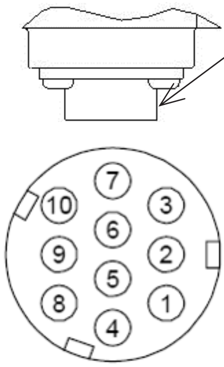


<table>
<tr><th colspan="2">Electromagnetic brake connector Pin assignment</th></tr>
<tr><th>Pin No.</th><th>Signal name</th></tr>
<tr><td>A</td><td>B1</td></tr>
<tr><td>B</td><td>B2</td></tr>
</table></td><td>



<table>
<tr><th colspan="2">Electromagnetic brake connector Pin assignment</th></tr>
<tr><th>Pin No.</th><th>Signal name</th></tr>
<tr><td>A</td><td>B1</td></tr>
<tr><td>B</td><td>B2</td></tr>
</table></td></tr>
</table>

(7) HA-LP motor

	MR-J3 series (HA-LP) Target models: HA-LP502	MR-J4 series (HG-SR) Target models: HG-SR502
Motor appearance		
Power connector	 Power connector CE05-2A24-10P (Power connector Pin assignment: see table below)	 Power connector MS3102A22-22P (Power connector Pin assignment: see table below)
Encoder connector (Note 1)	 Encoder connector CM10-R10P (Encoder connector Pin assignment: see table below)	 Encoder connector CMV1-R10P (Encoder connector Pin assignment: see table below)

MR-J3 series (HA-LP) – Power connector Pin assignment

Pin No.	Signal name
A	U
B	V
C	W
D	Earth
E	
F	
G	

MR-J4 series (HG-SR) – Power connector Pin assignment

Pin No.	Signal name
A	U
B	V
C	W
D	Earth

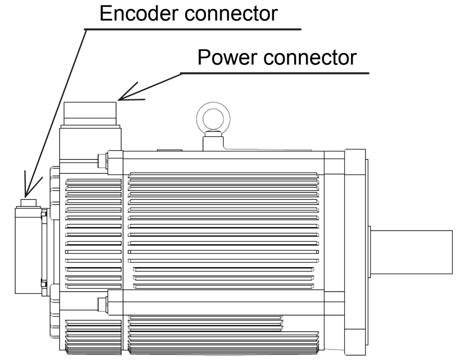
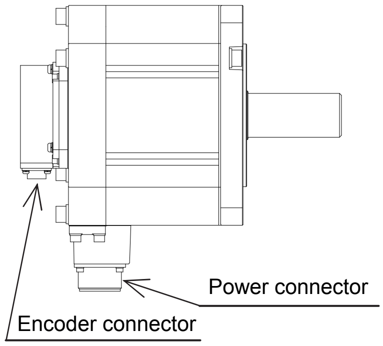
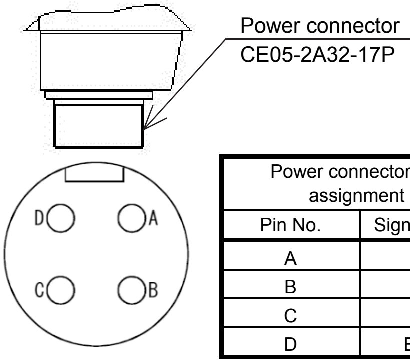
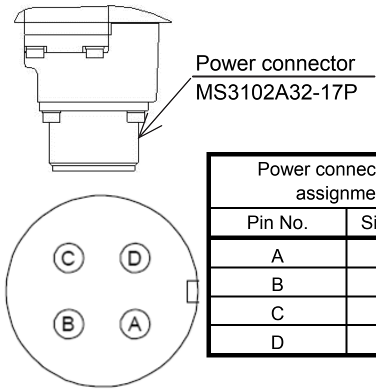
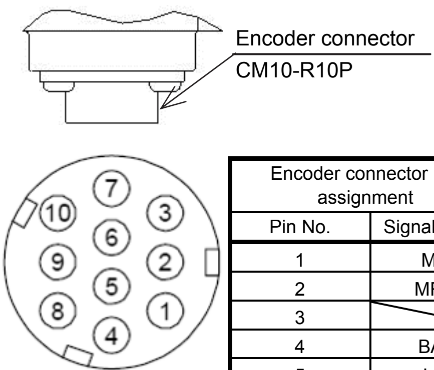
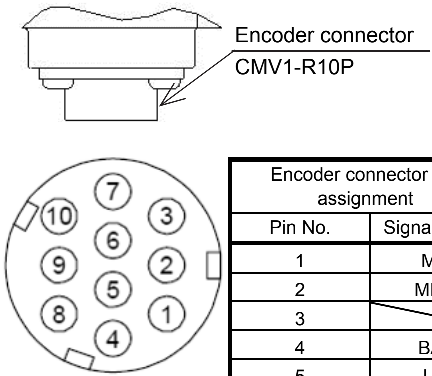
MR-J3 series (HA-LP) – Encoder connector Pin assignment

Pin No.	Signal name
1	MR
2	MRR
3	
4	BAT
5	LG
6	
7	
8	P5
9	
10	SHD

MR-J4 series (HG-SR) – Encoder connector Pin assignment

Pin No.	Signal name
1	MR
2	MRR
3	
4	BAT
5	LG
6	
7	
8	P5
9	
10	SHD

Note 1. Although the encoder connector type differs, it can be wired with the existing cables because the connector specifications have compatibility in wiring.

	MR-J3 series (HA-LP) Target models: HA-LP702	MR-J4 series (HG-SR) Target models: HG-SR702
Motor appearance		
Power connector		
Encoder connector (Note 1)		

Power connector – MR-J3 series (HA-LP): Power connector CE05-2A32-17P

Power connector Pin assignment	
Pin No.	Signal name
A	U
B	V
C	W
D	Earth

Power connector – MR-J4 series (HG-SR): Power connector MS3102A32-17P

Power connector Pin assignment	
Pin No.	Signal name
A	U
B	V
C	W
D	Earth

Encoder connector – MR-J3 series (HA-LP): Encoder connector CM10-R10P

Encoder connector Pin assignment	
Pin No.	Signal name
1	MR
2	MRR
3	
4	BAT
5	LG
6	
7	
8	P5
9	
10	SHD

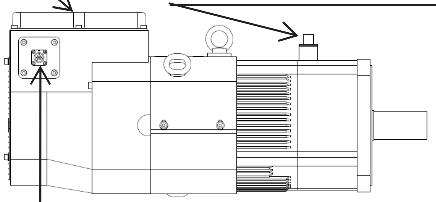
Encoder connector – MR-J4 series (HG-SR): Encoder connector CMV1-R10P

Encoder connector Pin assignment	
Pin No.	Signal name
1	MR
2	MRR
3	
4	BAT
5	LG
6	
7	
8	P5
9	
10	SHD

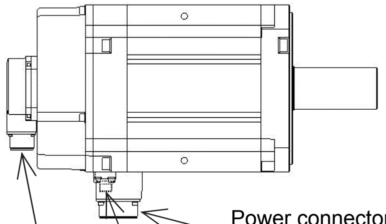
Note 1. Although the encoder connector type differs, it can be wired with the existing cables because the connector specifications have compatibility in wiring.

	MR-J3 series (HA-LP) Target models: HA-LP601(4)(B), LP701M(4)(B) HA-LP11K2(4)(B)	MR-J4 series (HG-JR) Target models: HG-JR601(4)(B), JR701M(4)(B) HG-JR11K1M(4)(B)
Motor appearance		
Power connector (Enlarged view of terminal box)		
Encoder connector		
Electromagnetic brake connector		

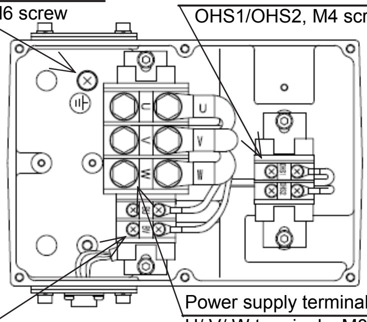
Motor appearance — MR-J3 series (HA-LP)



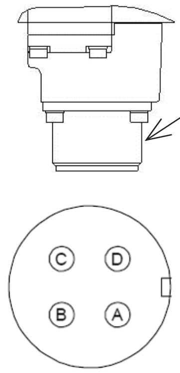
Motor appearance — MR-J4 series (HG-JR)



Power connector (Enlarged view of terminal box) — MR-J3 series (HA-LP)



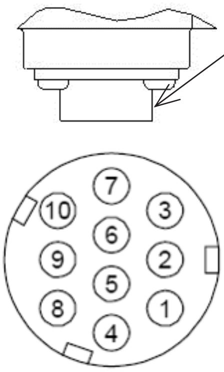
Power connector — MR-J4 series (HG-JR)



Power connector Pin assignment

Pin No.	Signal name
A	U
B	V
C	W
D	Earth

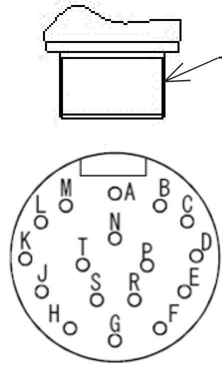
Encoder connector — MR-J3 series (HA-LP)



Encoder connector Pin assignment

Pin No.	Signal name
1	MR
2	MRR
3	
4	BAT
5	LG
6	
7	
8	P5
9	
10	SHD

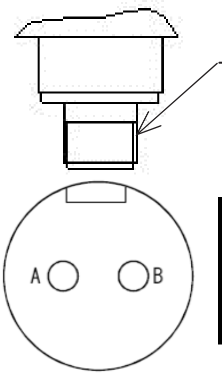
Encoder connector — MR-J4 series (HG-JR)



Encoder connector Pin assignment

Pin No.	Signal name
A	
B	
C	MR
D	MRR
E	
F	BAT
G	LG
H	
J	
K	
L	
M	
N	SHD
P	
R	LG
S	P5
T	

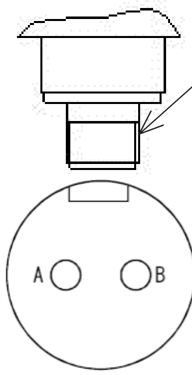
Electromagnetic brake connector — MR-J3 series (HA-LP)



Electromagnetic brake connector Pin assignment

Pin No.	Signal name
A	B1
B	B2

Electromagnetic brake connector — MR-J4 series (HG-JR)



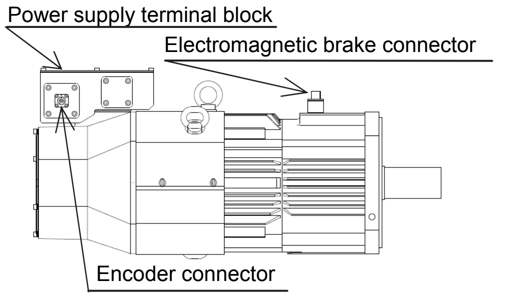
Electromagnetic brake connector Pin assignment

Pin No.	Signal name
A	B1
B	B2

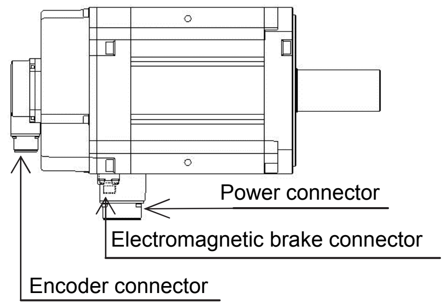
	MR-J3 series (HA-LP)	MR-J4 series (HG-JR)
Target models	HA-LP801(4)(B), LP12K1(4)(B) HA-LP11K1M(4)(B), LP15K1M(4)(B) HA-LP15K2(4)(B), LP22K2(4)(B)	HG-JR801(4)(B), JR12K1(4)(B) HG-JR11K1M(4)(B), R15K1M(4)(B)

Motor appearance

MR-J3 series (HA-LP):

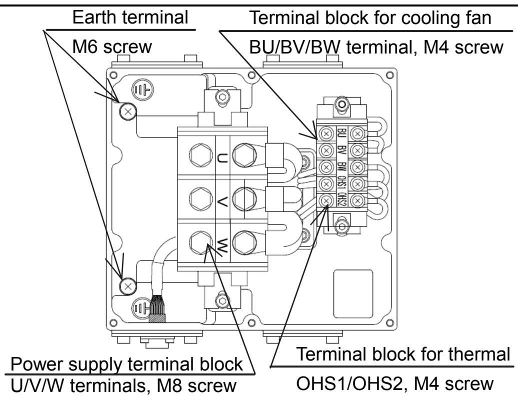


MR-J4 series (HG-JR):

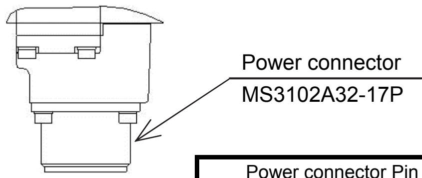


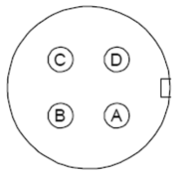
Power connector (Enlarged view of terminal box)

MR-J3 series (HA-LP):



MR-J4 series (HG-JR):

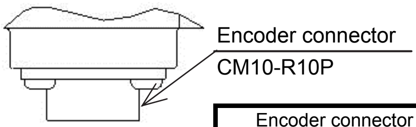


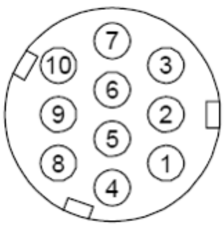


Power connector Pin assignment	
Pin No.	Signal name
A	U
B	V
C	W
D	Earth

Encoder connector

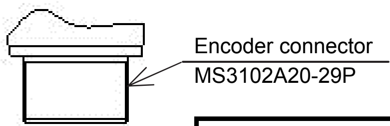
MR-J3 series (HA-LP):

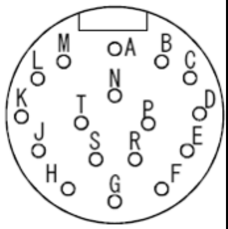




Encoder connector Pin assignment	
Pin No.	Signal name
1	MR
2	MRR
3	
4	BAT
5	LG
6	
7	
8	P5
9	
10	SHD

MR-J4 series (HG-JR):

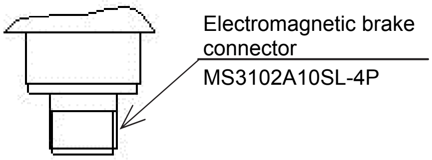


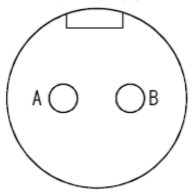


Encoder connector Pin assignment	
Pin No.	Signal name
A	
B	
C	MR
D	MRR
E	
F	BAT
G	LG
H	
J	
K	
L	
M	
N	SHD
P	
R	LG
S	P5
T	

Electromagnetic brake connector

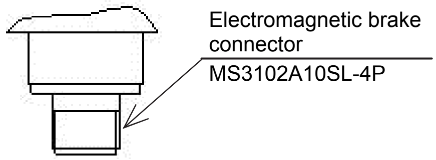
MR-J3 series (HA-LP):

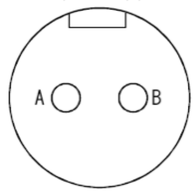




Electromagnetic brake connector Pin assignment	
Pin No.	Signal name
A	B1
B	B2

MR-J4 series (HG-JR):



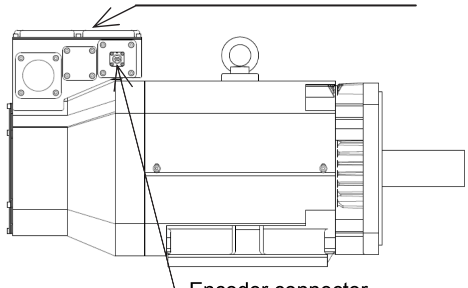


Electromagnetic brake connector Pin assignment	
Pin No.	Signal name
A	B1
B	B2

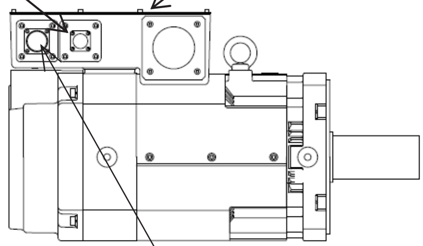
	MR-J3 series (HA-LP)	MR-J4 series (HG-JR)
Target models	HA-LP15K1(4), LP20K1(4) HA-LP22K1M(4), LP30K24	HG-JR15K1(4), JR20K1(4) HG-JR22K1M(4)

Motor appearance

MR-J3 series (HA-LP):

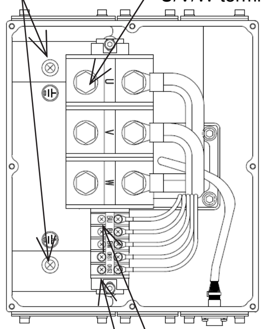


MR-J4 series (HG-JR):

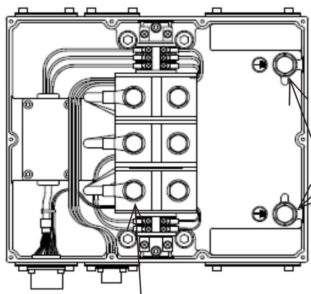


Power connector (Enlarged view of terminal box)

MR-J3 series (HA-LP):

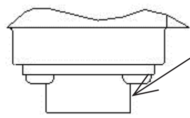


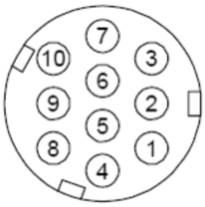
MR-J4 series (HG-JR):



Encoder connector

MR-J3 series (HA-LP):

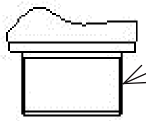


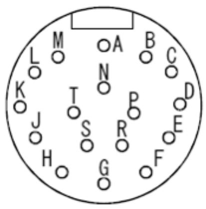


Encoder connector Pin assignment

Pin No.	Signal name
1	MR
2	MRR
3	
4	BAT
5	LG
6	
7	
8	P5
9	
10	SHD

MR-J4 series (HG-JR):



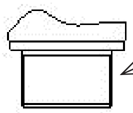


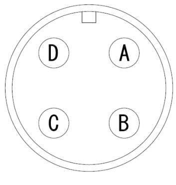
Encoder connector Pin assignment

Pin No.	Signal name
A	
B	
C	MR
D	MRR
E	
F	BAT
G	LG
H	
J	
K	THM1
L	THM1
M	
N	SHD
P	
R	LG
S	P5
T	

Cooling fan connector

MR-J4 series (HG-JR):





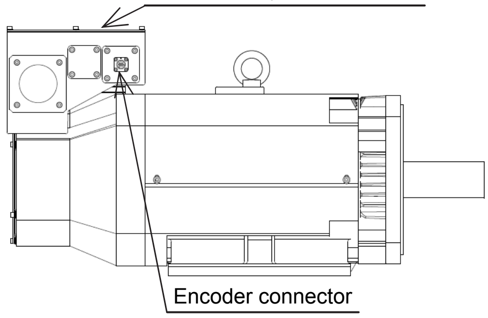
Cooling fan connector Pin assignment

Pin No.	Signal name
A	BU
B	BV
C	BW
D	

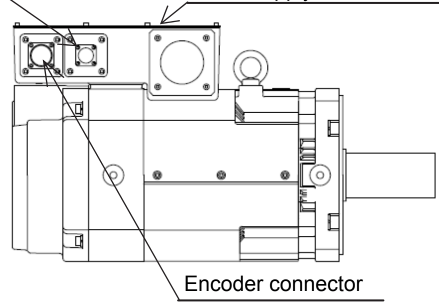
	MR-J3 series (HA-LP)	MR-J4 series (HG-JR)
Target models	HA-LP30K2	HG-JR22K1M

Motor appearance

MR-J3 series (HA-LP), Target models: HA-LP30K2

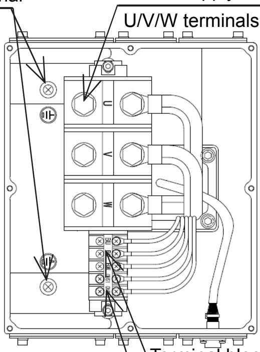


MR-J4 series (HG-JR), Target models: HG-JR22K1M

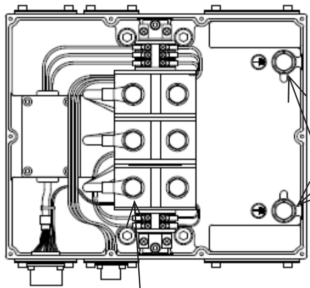


Power connector (Enlarged view of terminal box)

MR-J3 series (HA-LP)

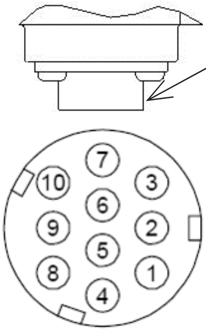


MR-J4 series (HG-JR)



Encoder connector

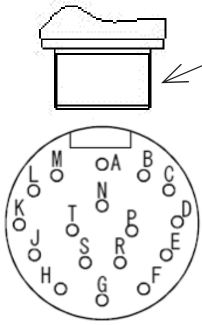
MR-J3 series (HA-LP)



Encoder connector Pin assignment

Pin No.	Signal name
1	MR
2	MRR
3	
4	BAT
5	LG
6	
7	
8	P5
9	
10	SHD

MR-J4 series (HG-JR)



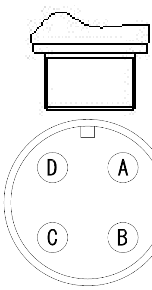
Encoder connector Pin assignment

Pin No.	Signal name
A	
B	
C	MR
D	MRR
E	
F	BAT
G	LG
H	
J	
K	THM1
L	THM1
M	
N	SHD
P	
R	LG
S	P5
T	

Cooling fan connector

MR-J3 series (HA-LP): —

MR-J4 series (HG-JR)



Cooling fan connector Pin assignment

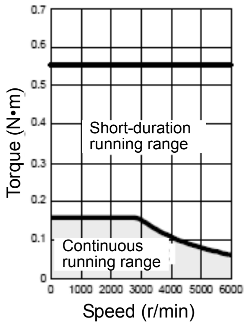
Pin No.	Signal name
A	BU
B	BV
C	BW
D	

2.7 Comparison of Servo Motor Torque Characteristics

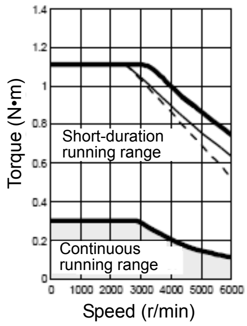
◆Comparison of torque characteristics between the HG-KR and HF-KP series

Same torque characteristics

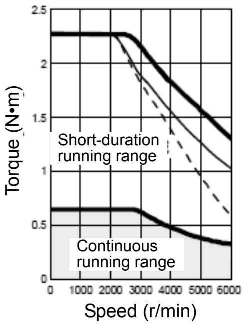
HF-KP053 → HG-KR053



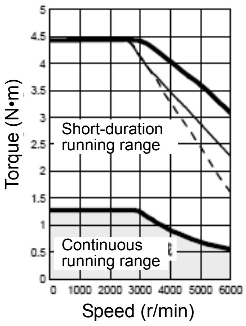
HF-KP13 → HG-KR13



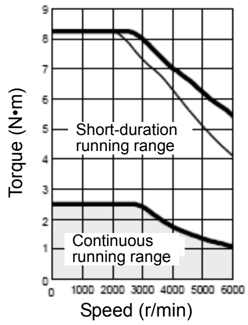
HF-KP23 → HG-KR23



HF-KP43 → HG-KR43



HF-KP73 → HG-KR73

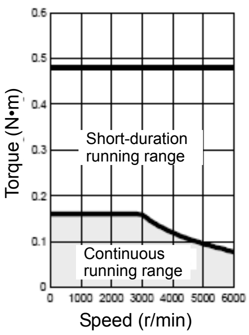


Note 1. For the 3-phase 200 V AC and 1-phase 230 V AC power supplies, the torque characteristic is indicated by the heavy lines.
2. For the 1-phase 200 V AC power supply, part of the torque characteristic is indicated by the thin line.
3. For the 1-phase 100 V AC power supply, part of the torque characteristic is indicated by the broken line.
4. The torque characteristics of the HF-KP series are the value of the maximally increased torque.

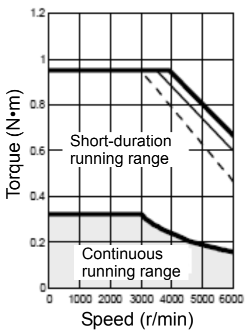
◆Comparison of torque characteristics between the HG-MR and HF-MP series

Same torque characteristics

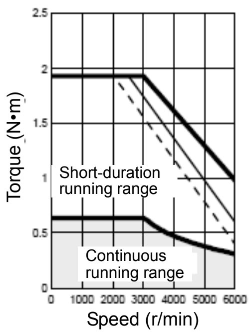
HF-MP053 → HG-MR053



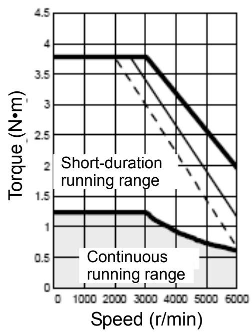
HF-MP13 → HG-MR13



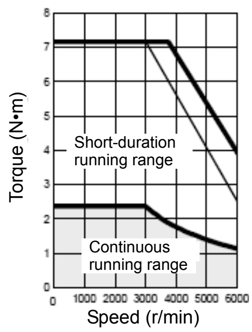
HF-MP23 → HG-MR23



HF-MP43 → HG-MR43



HF-MP73 → HG-MR73



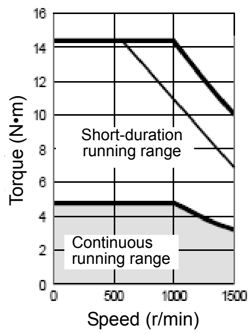
Note 1. For the 3-phase 200 V AC and 1-phase 230 V AC power supplies, the torque characteristic is indicated by the heavy lines.
2. For the 1-phase 200 V AC power supply, part of the torque characteristic is indicated by the thin line.
3. For the 1-phase 100 V AC power supply, part of the torque characteristic is indicated by the broken line.

◆Comparison of torque characteristics between the HG-SR and HF-SP series

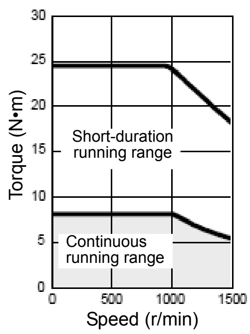
Same torque characteristics

200 V class

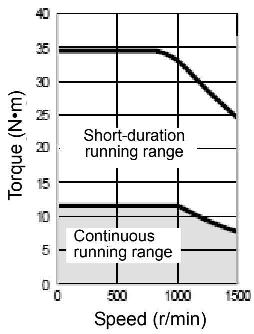
HF-SP51 → HG-SR51



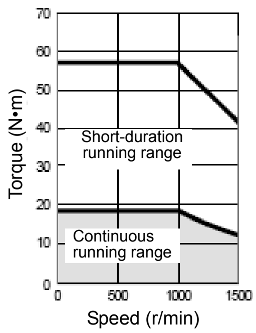
HF-SP81 → HG-SR81



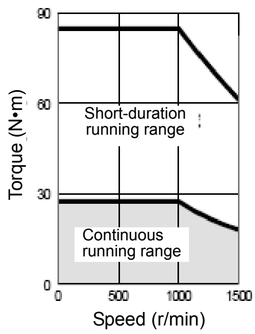
HF-SP121 → HG-SR121



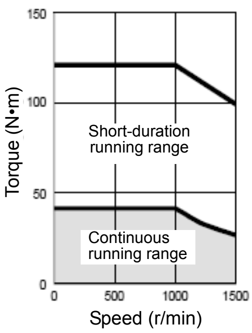
HF-SP201 → HG-SR201



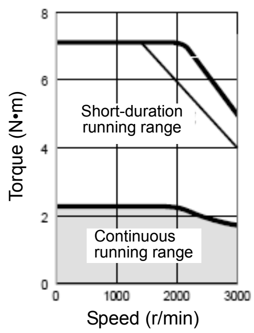
HF-SP301 → HG-SR301



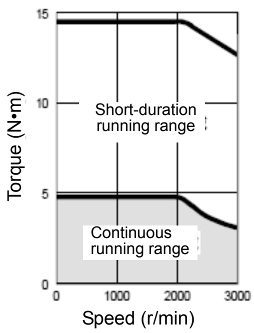
HF-SP421 → HG-SR421



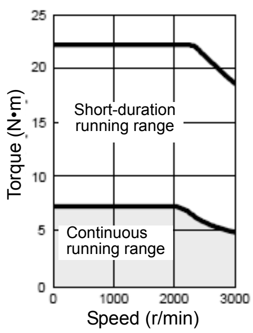
HF-SP52 → HG-SR52



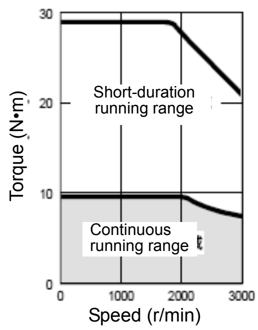
HF-SP102 → HG-SR102



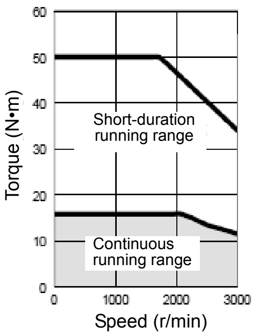
HF-SP152 → HG-SR152



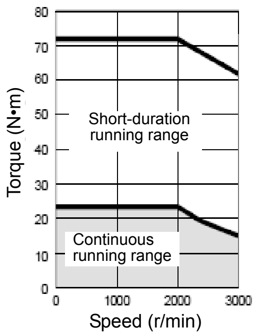
HF-SP202 → HG-SR202



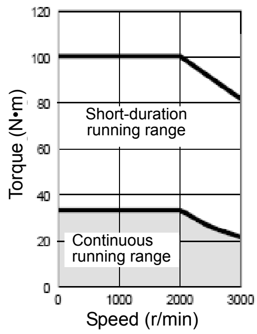
HF-SP352 → HG-SR352



HF-SP502 → HG-SR502



HF-SP702 → HG-SR702



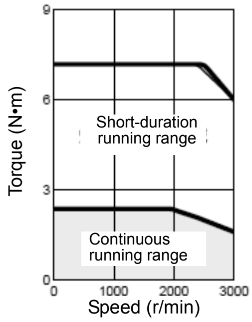
Note 1. For the 3-phase 200 V AC and 1-phase 230 V AC power supplies, the torque characteristic is indicated by the heavy lines.
2. For the 1-phase 200 V AC power supply, part of the torque characteristic is indicated by the thin line.

◆Comparison of torque characteristics between the HG-SR and HF-SP series

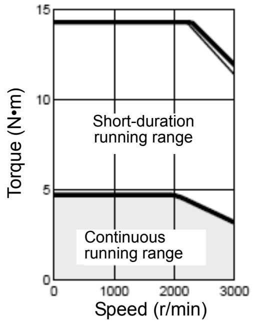
Same torque characteristics

400 V class

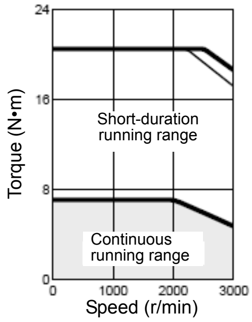
HF-SP524 → HG-SR524



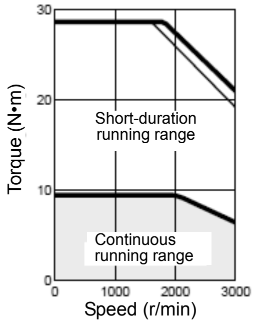
HF-SP1024 → HG-SR1024



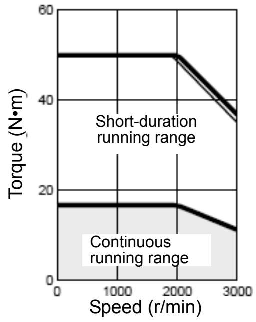
HF-SP1524 → HG-SR1524



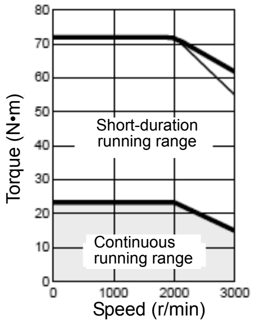
HF-SP2024 → HG-SR2024



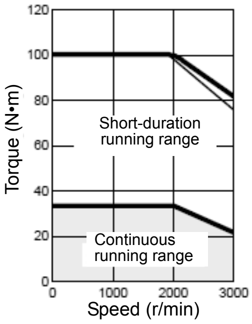
HF-SP3524 → HG-SR3524



HF-SP5024 → HG-SR5024



HF-SP7024 → HG-SR7024

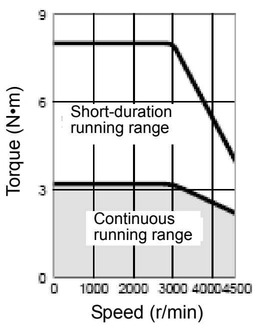


Note 1. For the 3-phase 400 V AC power supply, the torque characteristic is indicated by the heavy line.
2. For the 1-phase 380 V AC power supply, part of the torque characteristic is indicated by the thin line.

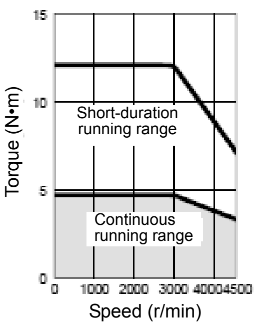
◆Comparison of torque characteristics between the HG-RR and HC-RP series

Same torque characteristics

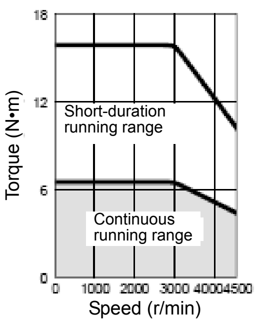
HC-RP103 → HG-RR103



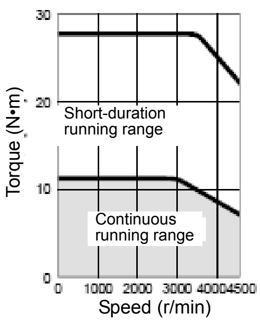
HC-RP153 → HG-RR153



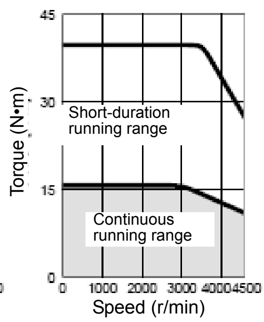
HC-RP203 → HG-RR203



HC-RP353 → HG-RR353

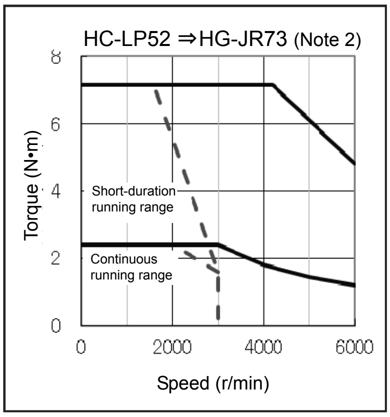


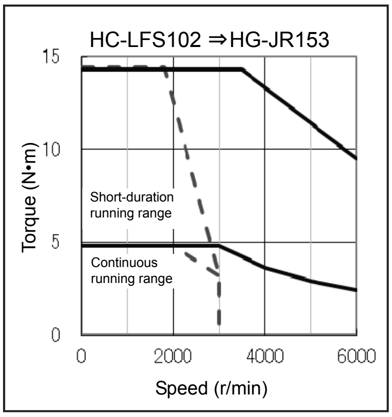
HC-RP503 → HG-RR503

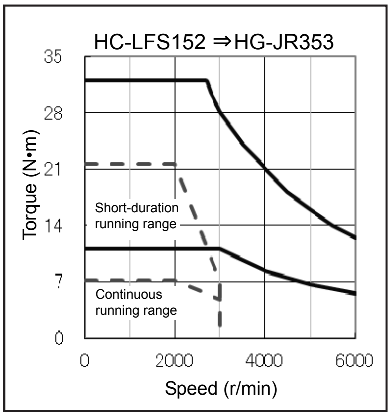


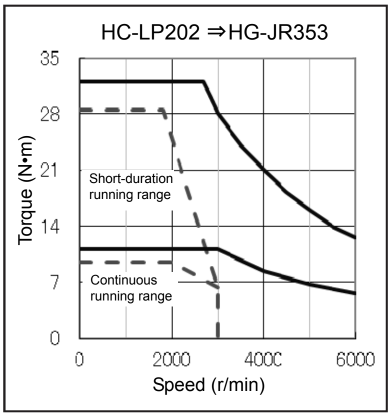
Note 1. The above torque characteristics are for 3-phase 200 V AC.

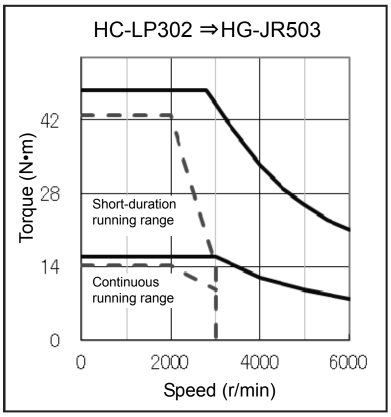
◆Comparison of torque characteristics between the HG-JR and HC-LP series (── : HG-JR, - - - : HC-LP)









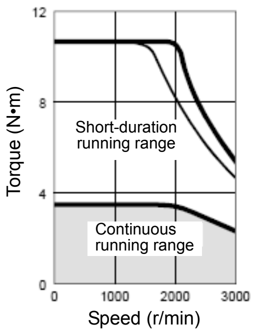


Note 1. The above torque characteristics are for 3-phase 200V AC.
2. For the 1-phase 230 V AC power supply, please contact your local sales office.

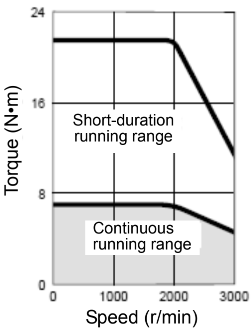
◆Comparison of torque characteristics between the HG-UR and HC-UP series

Same torque characteristics

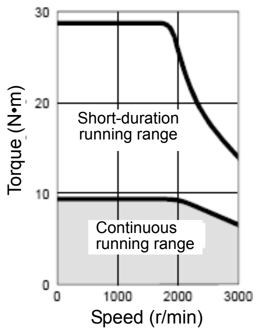
HC-UP72 → HG-UR72



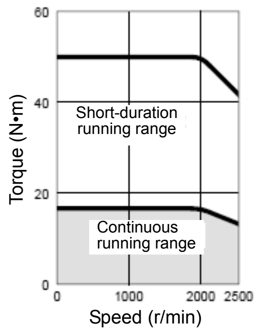
HC-UP152 → HG-UR152



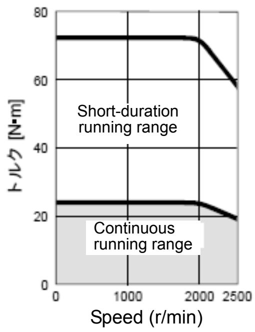
HC-UP202 → HG-UR202



HC-UP352 → HG-UR352



HC-UP502 → HG-UR502

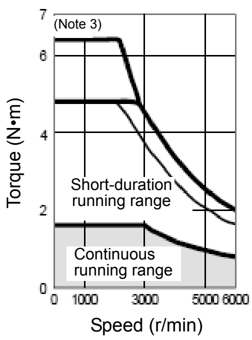


Note 1. The above torque characteristics are for 3-phase 200V AC.

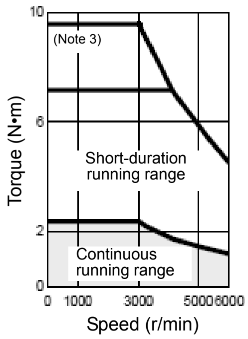
◆Comparison of torque characteristics between the HG-JR and HF-JP series

Same torque characteristics

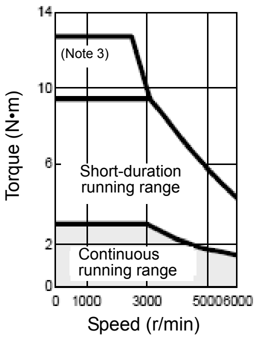
HF-JP53 → HG-JR53



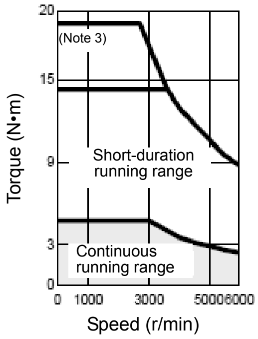
HF-JP73 → HG-JR73



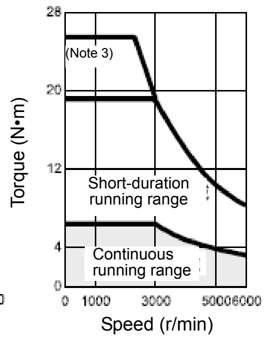
HF-JP103 → HG-JR103



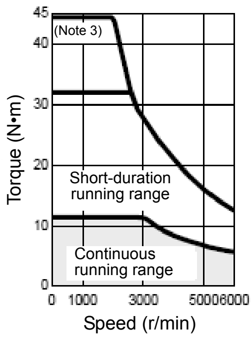
HF-JP153 → HG-JR153



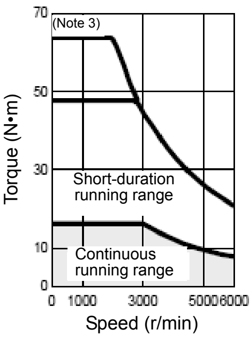
HF-JP203 → HG-JR203



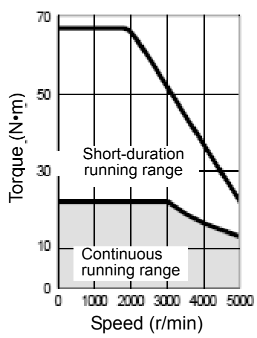
HF-JP353 → HG-JR353



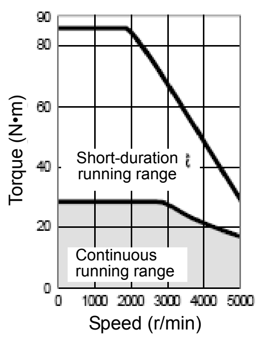
HF-JP503 → HG-JR503



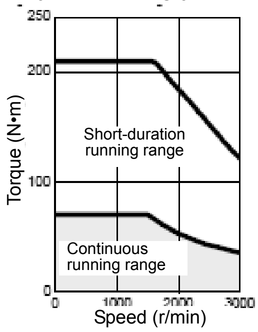
HF-JP703 → HG-JR703



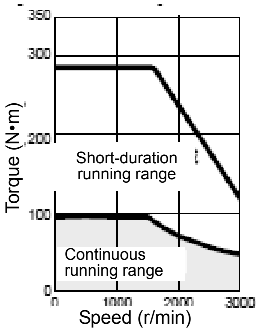
HF-JP903 → HG-JR903



HF-JP11K1M → HG-JR11K1M



HF-JP15K1M → HG-JR15K1M



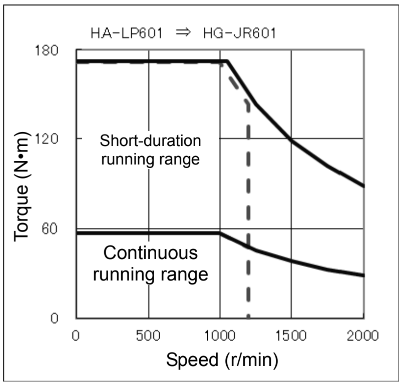
Note 1. For the 3-phase 200 V AC and 1-phase 230 V AC power supplies, the torque characteristic is indicated by the heavy lines.
2. For the 1-phase 200 V AC power supply, part of the torque characteristic is indicated by the thin line.
3. Value at the maximum torque 400%.

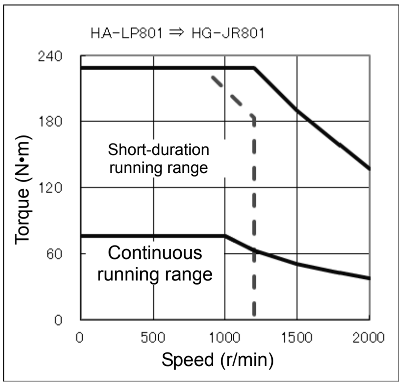
POINT

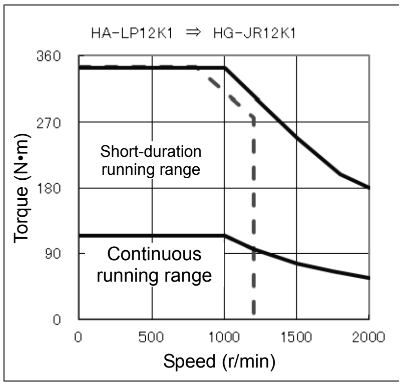
●When servo motors are replaced with HG-JR_R_-S_ motors (compatible product), the torque characteristics differ.
Please contact your local sales office.

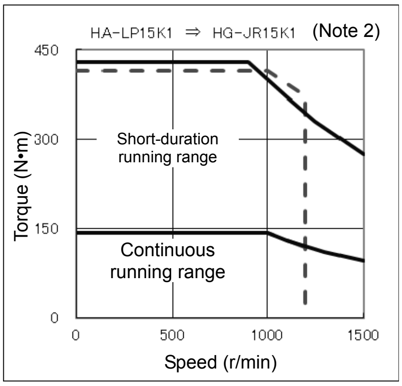
◆Comparison of torque characteristics between the HG-JR and HA-LP series (── : HG-JR, - - - : HA-LP)

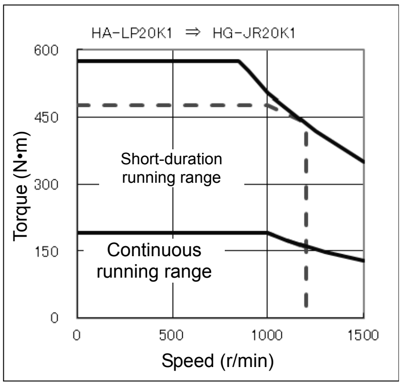
•HA-LP 1000 r/min series, 200 V class

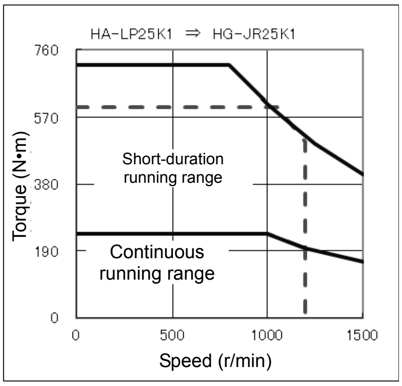








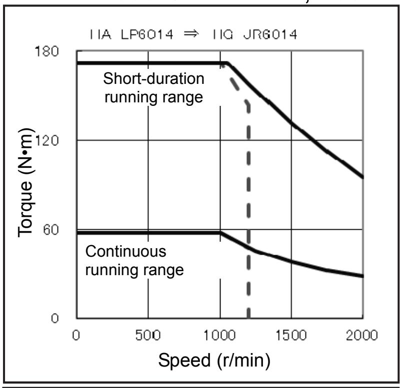


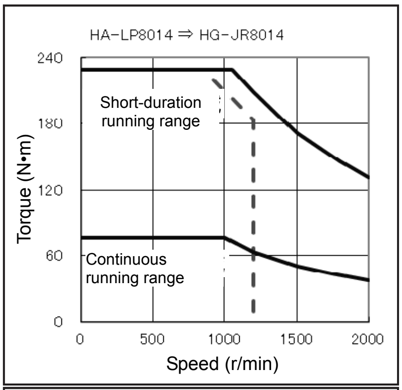


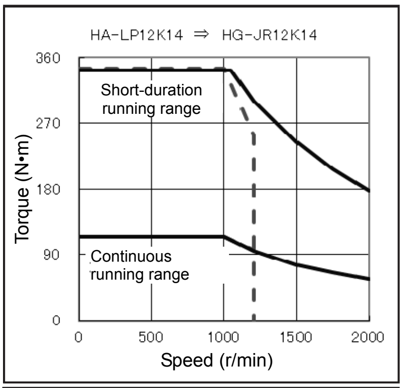
Note 1. The above torque characteristics are for 3-phase 200V AC.
2. Please contact your local sales office if the compatibility of torque characteristics is required.

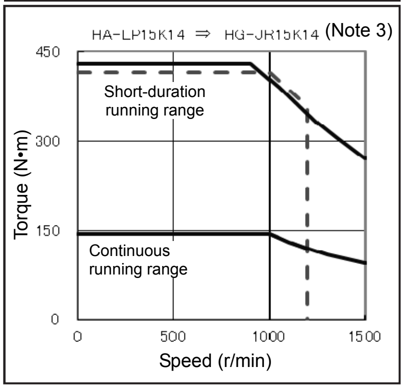
◆Comparison of torque characteristics between the HG-JR and HA-LP series (—— : HG-JR, - - - : HA-LP)

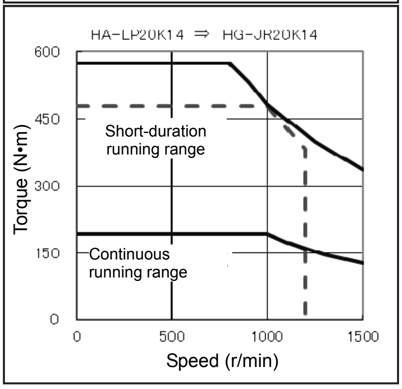
•HA-LP 1000 r/min series, 400V class

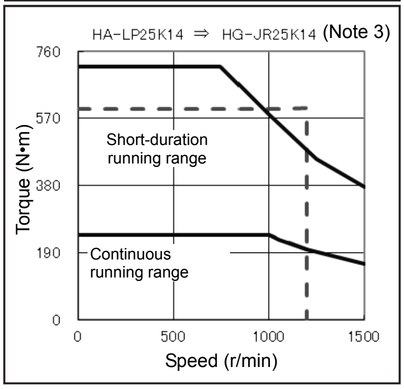








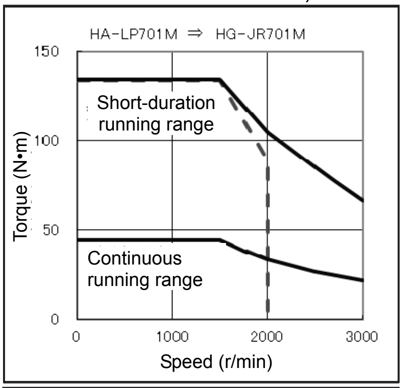


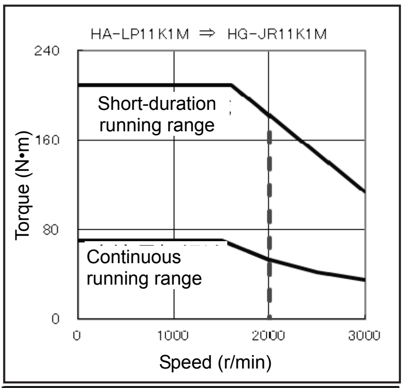


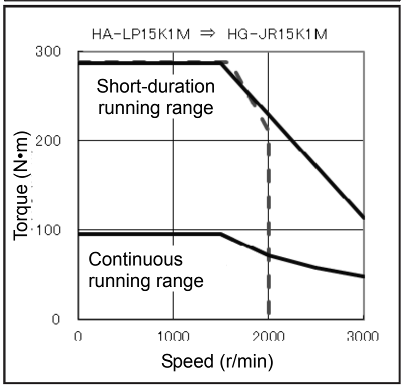
Note 1. The above torque characteristics are for 3-phase 400V AC.
2. As for 3-phase 380V AC, refer to the catalog or Instruction Manual.
3. Please contact your local sales office if the compatibility of torque characteristics is required.

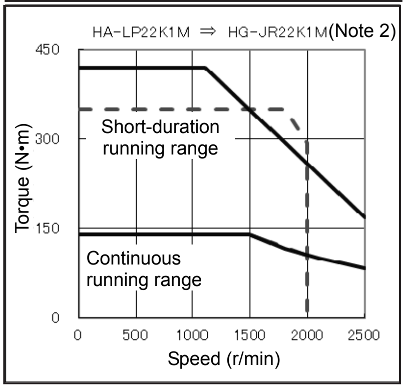
◆Comparison of torque characteristics between the HG-JR and HA-LP series (—— : HG-JR, - - - : HA-LP)

•HA-LP 1500 r/min series, 200 V class



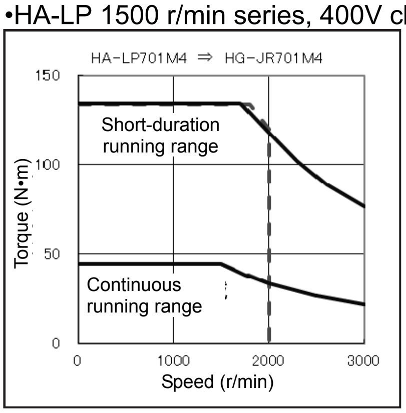


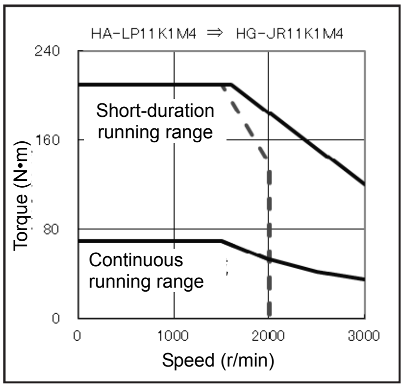


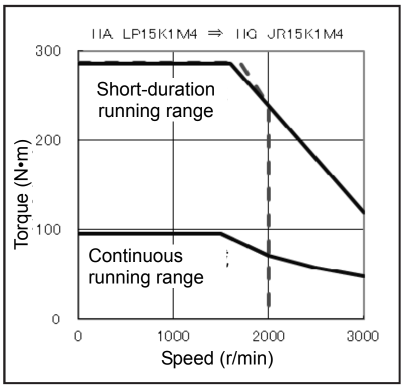


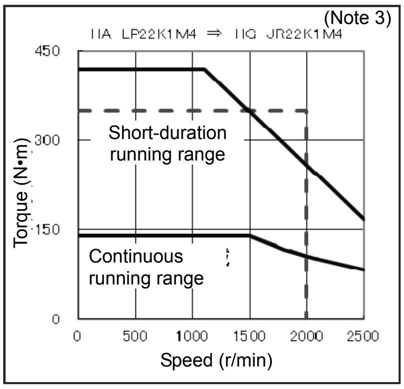
Note 1. The above torque characteristics are for 3-phase 200V AC.
2. Please contact your local sales office if the compatibility of torque characteristics is required.

•HA-LP 1500 r/min series, 400V class





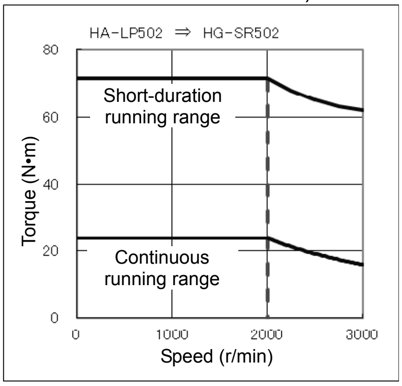


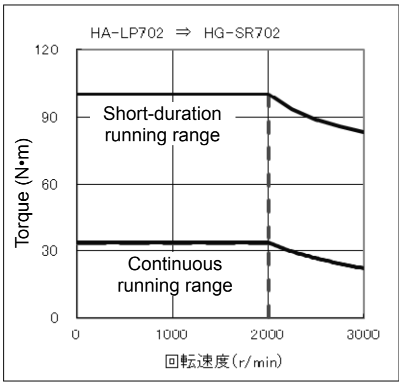


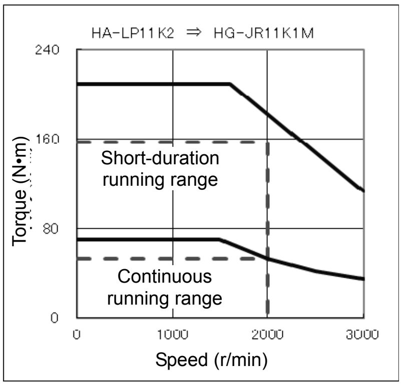
Note 1. The above torque characteristics are for 3-phase 400 V AC.
2. As for 3-phase 380V AC, refer to the catalog or Instruction Manual.
3. Please contact your local sales office if the compatibility of torque characteristics is required.

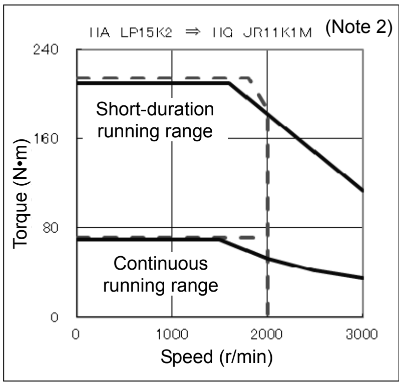
◆Comparison of torque characteristics between the HG-JR, SR and HA-LP series
(—— : HG-JR, SR - - - : HA-LP)

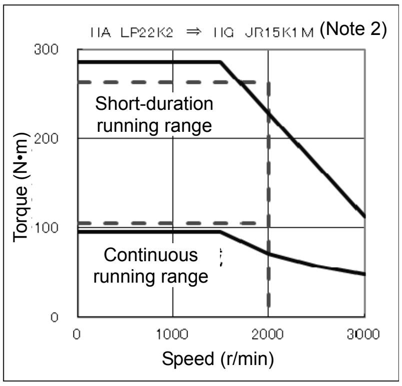
•HA-LP 2000 r/min series, 200 V class

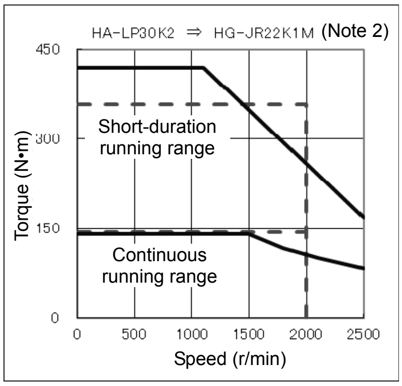






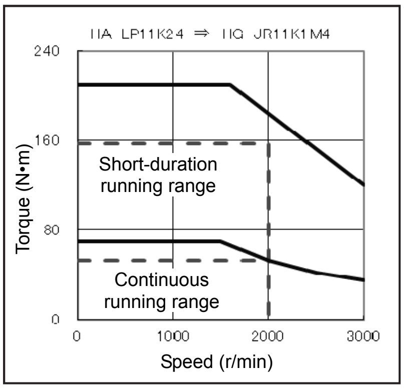


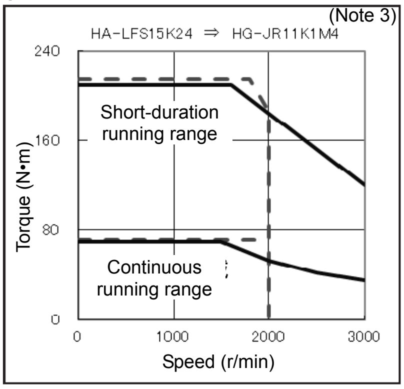


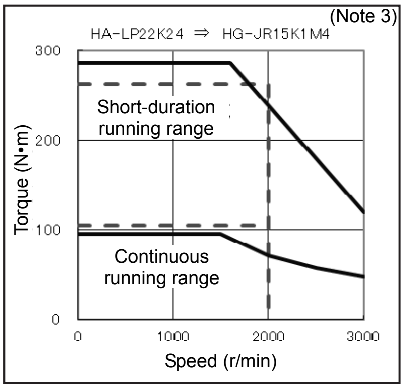


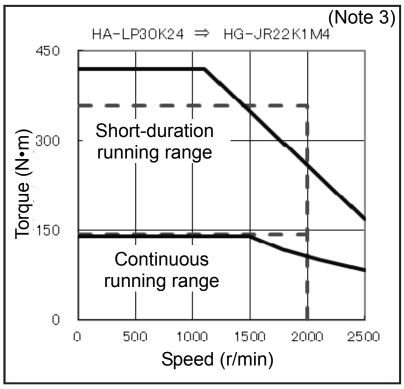
Note 1. The above torque characteristics are for 3-phase 200 V AC.
2. Please contact your local sales office if the compatibility of torque characteristics is required.

•HA-LP 2000 r/min series, 400V class









Note 1. The above torque characteristics are for 3-phase 400V AC.
2. As for 3-phase 380V AC, refer to the catalog or Instruction Manual.
3. Please contact your local sales office if the compatibility of torque characteristics is required.

MEMO

Part 6
Review on Replacement of Optional Peripheral Equipment

Part 6: Review on Replacement of Optional Peripheral Equipment

1. COMPARISON TABLE OF REGENERATIVE OPTION COMBINATIONS

POINT

- The MR-J4 series provides the new regenerative options shown in the table below.
- When an MR-J3 series regenerative resistor is used as it is with a motor combined, an alarm may occur.
  Use the MR-J4 series in combination with the regenerative resistor for MR-J4 series.
- Do not use regenerative options newly provided by the MR-J4 series with the MR-J3 series because use of them causes an amplifier malfunction.

List of new regenerative options

Servo amplifier model	Regenerative option MR-RB		Accessory regenerative resistor
MR-J4-350_	3N	5N	
MR-J4-11K_	5R		GRZG400-0.8Ω × 4
MR-J4-15K_	9F		GRZG400-0.6Ω × 5
MR-J4-22K_	9T		GRZG400-0.5Ω × 5
MR-J4-700_4	3U-4	5U-4	
MR-J4-11K_4	5K-4		GRZG400-2.5Ω × 4
MR-J4-15K_4	6K-4		GRZG400-2Ω × 5

1.1 Regenerative Options (200 V class /100 V class)

1.1.1 Combination and regenerative power for the MR-J3 series

List of regenerative options

Servo amplifier model	Built-in regenerative resistor [W]	Permissible regenerative power of regenerative option [W] MR-RB								
		032 [40Ω]	12 [40Ω]	30 [13Ω]	3N [9Ω]	31 [6.7Ω]	32 [40Ω]	(Note 1) 50 [13Ω]	(Note 1) 5N [9Ω]	(Note 1) 51 [6.7Ω]
MR-J3-10A/B		30								
MR-J3-20A/B	10	30	100							
MR-J3-40A/B	10	30	100							
MR-J3-60A/B	10	30	100							
MR-J3-70A/B	20	30	100				300			
MR-J3-100A/B	20	30	100				300			
MR-J3-200A/B(N)(-RT)	100			300				500		
MR-J3-350A/B	100			300				500		
MR-J3-500A/B	130					300				500
MR-J3-700A/B	170					300				500
MR-J3-11KA/B										
MR-J3-11KA/B-LR										
MR-J3-15KA/B										
MR-J3-15KA/B-LR										
MR-J3-22KA/B										

Servo amplifier model	Built-in regenerative resistor [W]	(Note 2) Standard accessories [External]	Permissible regenerative power of regenerative option [W] MR-RB				
			(Note 2) 5E [6Ω]	(Note 2) 5R [3.2Ω]	(Note 2) 9P [4.5Ω]	(Note 2) 9F [3Ω]	(Note 2) 9T [2.5Ω]
MR-J3-10A/B							
MR-J3-20A/B	10						
MR-J3-40A/B	10						
MR-J3-60A/B	10						
MR-J3-70A/B	20						
MR-J3-100A/B	20						
MR-J3-200A/B(N)(-RT)	100						
MR-J3-350A/B	100						
MR-J3-500A/B	130						
MR-J3-700A/B	170						
MR-J3-11KA/B		GRZG400-1.5Ω × 4 500 (800)	500 (800)				
MR-J3-11KA/B-LR		GRZG400-0.8Ω × 4 500 (800)		500 (800)			
MR-J3-15KA/B		GRZG400-0.9Ω × 5 850 (1300)			850 (1300)		
MR-J3-15KA/B-LR		GRZG400-0.6Ω × 5 850 (1300)				850 (1300)	
MR-J3-22KA/B						850 (1300)	

Note 1. Always install a cooling fan.

2. The values in the parentheses are applied to when a cooling fan is installed.

1.1.2 Combination and regenerative power for MR-J4 series (replacement model)

List of regenerative options

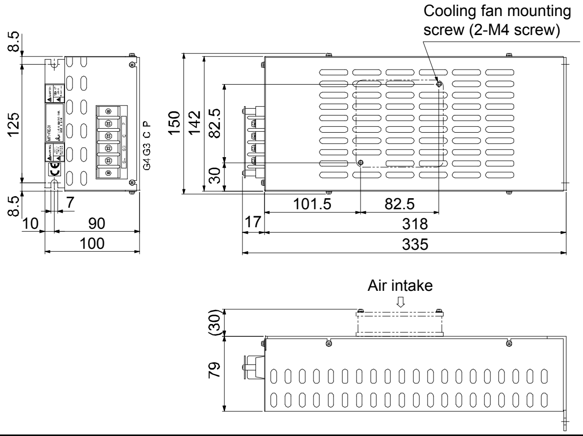
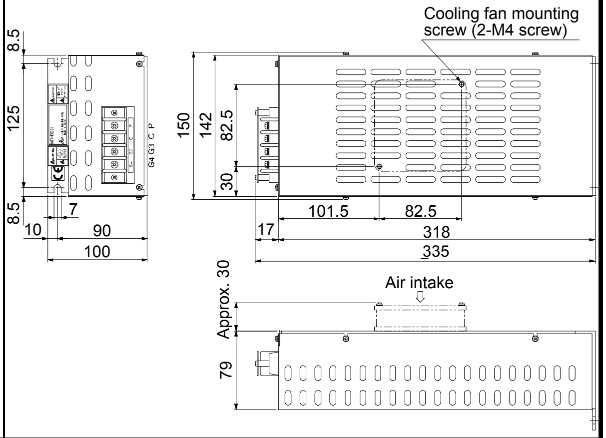
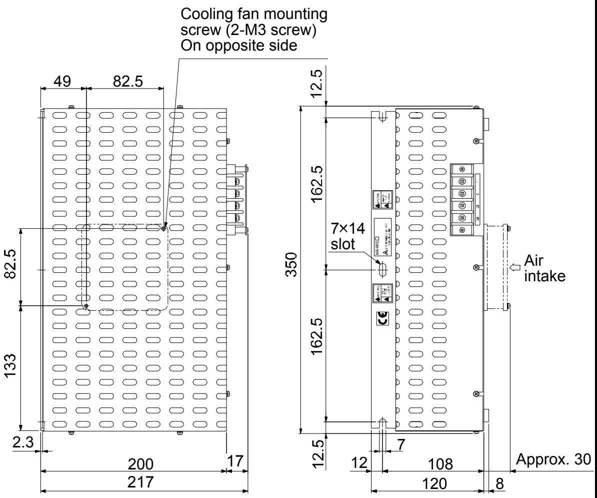
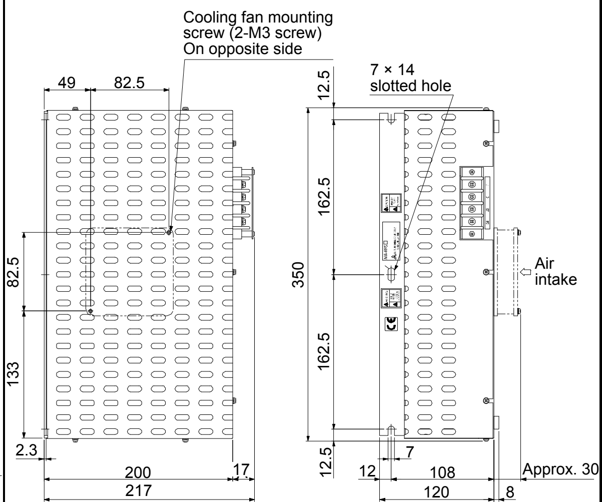
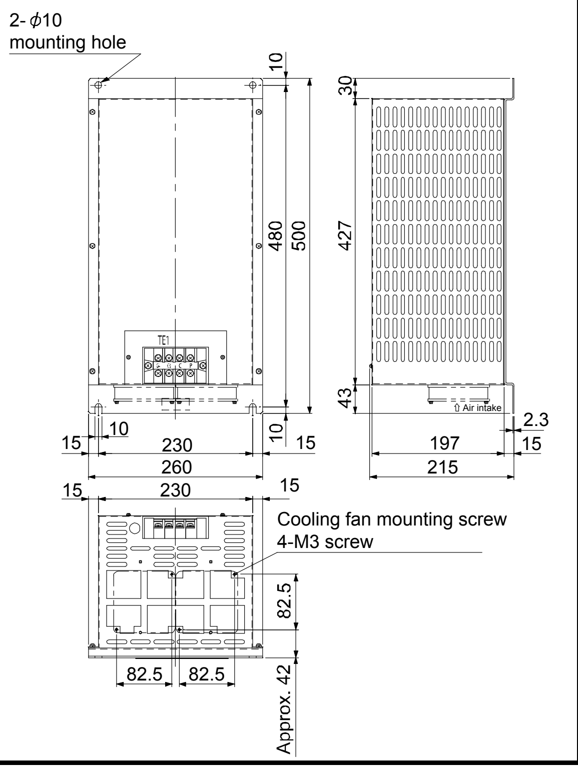
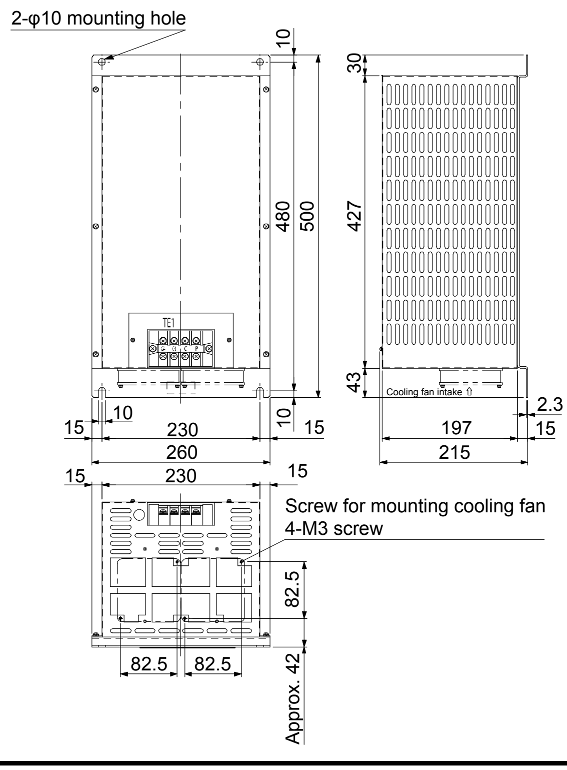
Servo amplifier model	Built-in regenerative resistor [W]	Permissible regenerative power of regenerative option [W] MR-RB								
		032 [40Ω]	12 [40Ω]	30 [13Ω]	3N [9Ω]	31 [6.7Ω]	32 [40Ω]	(Note 1) 50 [13Ω]	(Note 1) 5N [9Ω]	(Note 1) 51 [6.7Ω]
MR-J4-10A/B		30								
MR-J4-20A/B	10	30	100							
MR-J4-40A/B	10	30	100							
MR-J4-60A/B	10	30	100							
MR-J4-70A/B	20	30	100				300			
MR-J4-100A/B	20	30	100				300			
MR-J4-200A/B	100			300				500		
MR-J4-350A/B	100				**300**				**500**	
MR-J4-500A/B	130					300				500
MR-J4-700A/B	170					300				500
MR-J4-11KA/B										
MR-J4-15KA/B										
MR-J4-22KA/B										

Servo amplifier model	Built-in regenerative resistor [W]	(Note 2) Standard accessories [External]	Permissible regenerative power of regenerative option [W] MR-RB				
			(Note 2) 5E [6Ω]	(Note 2) 5R [3.2Ω]	(Note 2) 9P [4.5Ω]	(Note 2) 9F [3Ω]	(Note 2) 9T [2.5Ω]
MR-J4-10A/B							
MR-J4-20A/B	10						
MR-J4-40A/B	10						
MR-J4-60A/B	10						
MR-J4-70A/B	20						
MR-J4-100A/B	20						
MR-J4-200A/B	100						
MR-J4-350A/B	100						
MR-J4-500A/B	130						
MR-J4-700A/B	170						
MR-J4-11KA/B		GRZG400-0.8Ω × 4 500 (800)		**500 (800)**			
MR-J4-15KA/B		GRZG400-0.6Ω × 5 850 (1300)				**850 (1300)**	
MR-J4-22KA/B		GRZG400-0.5Ω × 5 850 (1300)					**850 (1300)**

Note 1. Always install a cooling fan.
2. The values in the parentheses are applied to when a cooling fan is installed.

- Changed items are **shown with shading**.
- Parameter settings (PA02 for MR-J4) may be required depending on the regenerative option model. Refer to the Instruction Manual for details.

1.1.3 External Form Comparison

	MR-J3 series	MR-J4 series
350_	MR-RB30  	MR-RB3N 
350_	MR-RB50  	MR-RB5N 
11K_ 15K_ 22K_	MR-RB5E • MR-RB9P • MR-RB9F  	MR-RB5R • MR-RB9F • MR-RB9T 

1.2 Regenerative Options (400 V class)

1.2.1 Combination and regenerative power for the MR-J3 series

List of regenerative options

Servo amplifier model	Built-in regenerative resistor [W]	Permissible regenerative power of regenerative option [W] MR-RB							
		1H-4 [82Ω]	(Note 1) 3M-4 [120Ω]	(Note 1) 3G-4 [47Ω]	(Note 1) 34-4 [26Ω]	(Note 1) 3U-4 [22Ω]	(Note 1) 5G-4 [47Ω]	(Note 1) 54-4 [26Ω]	(Note 1) 5U-4 [22Ω]
MR-J3-60A4/B4	15	100	300						
MR-J3-100A4/B4	15	100	300						
MR-J3-200A4/B4	100			300			500		
MR-J3-350A4/B4	100			300			500		
MR-J3-500A4/B4	130				300			500	
MR-J3-700A4/B4	170				300			500	
MR-J3-11KA4/B4									
MR-J3-11KA4/B4-LR									
MR-J3-15KA4/B4									
MR-J3-15KA4/B4-LR									
MR-J3-22KA4/B4									

Servo amplifier model	Built-in regenerative resistor [W]	(Note 2) Standard accessories [External]	Permissible regenerative power of regenerative option [W] MR-RB			
			(Note 2) 5K-4 [10Ω]	(Note 2) 6B-4 [20Ω]	(Note 2) 60-4 [12.5Ω]	(Note 2) 6K-4 [10Ω]
MR-J3-60A4/B4	15					
MR-J3-100A4/B4	15					
MR-J3-200A4/B4	100					
MR-J3-350A4/B4	100					
MR-J3-500A4/B4	130					
MR-J3-700A4/B4	170					
MR-J3-11KA4/B4		GRZG400-5Ω × 4 500(800)		500 (800)		
MR-J3-11KA4/B4-LR		GRZG400-2.5Ω × 4 500 (800)	500 (800)			
MR-J3-15KA4/B4		GRZG400-2.5Ω × 5 850 (1300)			850 (1300)	
MR-J3-15KA4/B4-LR		GRZG400-2Ω × 5 850 (1300)				850 (1300)
MR-J3-22KA4/B4						850 (1300)

Note 1. Always install a cooling fan.
2. The values in the parentheses are applied to when a cooling fan is installed.

1.2.2 Combination and regenerative power for MR-J4 series (replacement model)

List of regenerative options

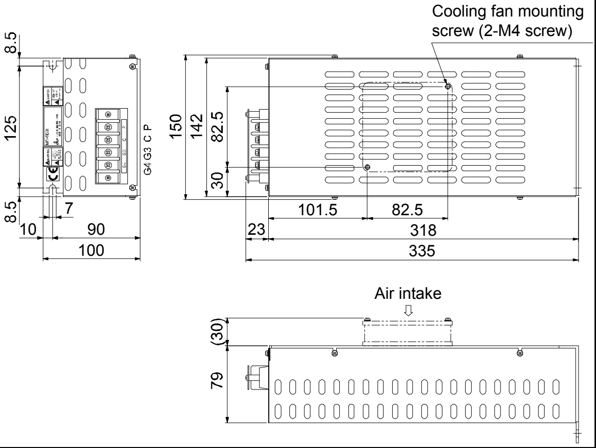
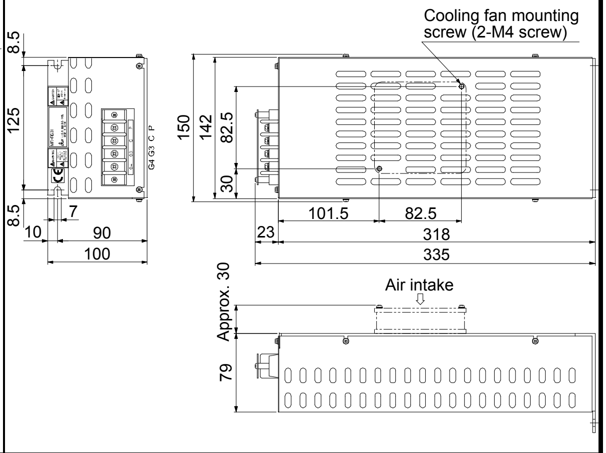
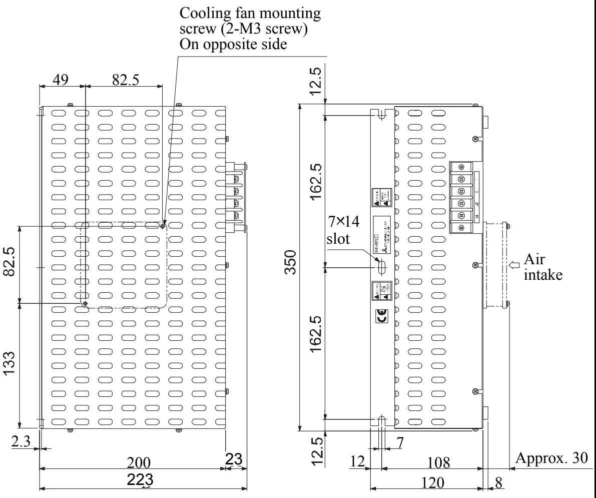
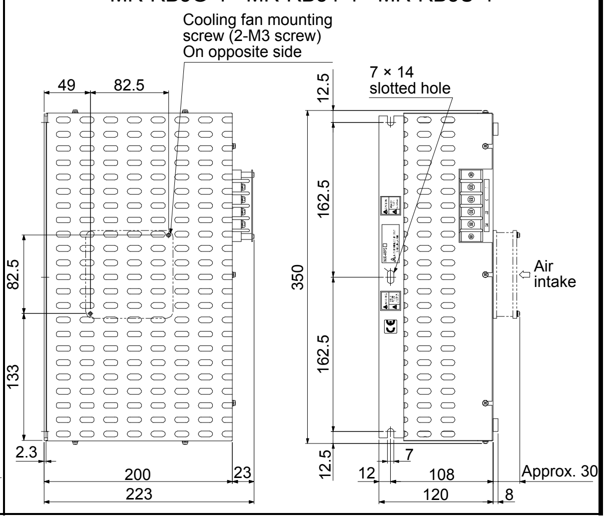
Servo amplifier model	Built-in regenerative resistor [W]	Permissible regenerative power of regenerative option [W] MR-RB							
		1H-4 [82Ω]	(Note 1) 3M-4 [120Ω]	(Note 1) 3G-4 [47Ω]	(Note 1) 34-4 [26Ω]	(Note 1) 3U-4 [22Ω]	(Note 1) 5G-4 [47Ω]	(Note 1) 54-4 [26Ω]	(Note 1) 5U-4 [22Ω]
MR-J4-60A4/B4	15	100	300						
MR-J4-100A4/B4	15	100	300						
MR-J4-200A4/B4	100			300			500		
MR-J4-350A4/B4	100			300			500		
MR-J4-500A4/B4	130				300			500	
MR-J4-700A4/B4	170					**300**			**500**
MR-J4-11KA4/B4									
MR-J4-15KA4/B4									
MR-J4-22KA4/B4									

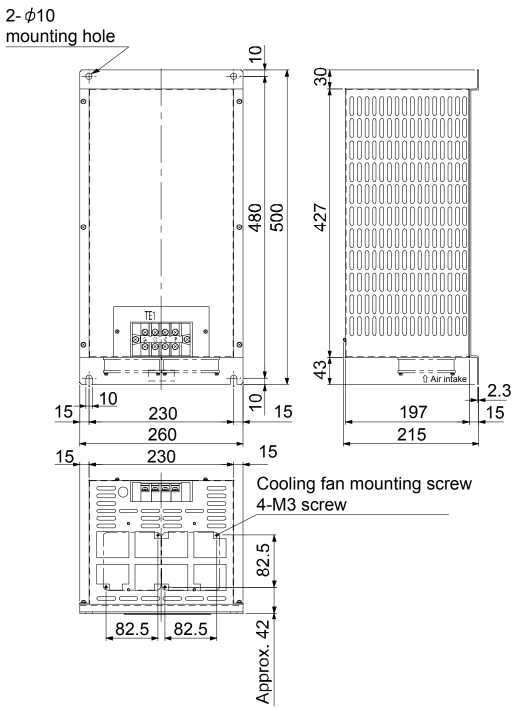
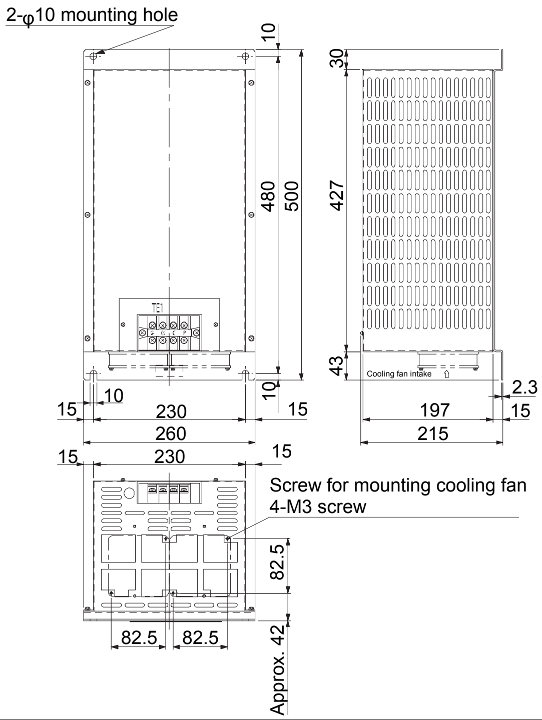
Servo amplifier model	Built-in regenerative resistor [W]	(Note 2) Standard accessories [External]	Permissible regenerative power of regenerative option [W] MR-RB			
			(Note 2) 5K-4 [10Ω]	(Note 2) 6B-4 [20Ω]	(Note 2) 60-4 [12.5Ω]	(Note 2) 6K-4 [10Ω]
MR-J4-60A4/B4	15					
MR-J4-100A4/B4	15					
MR-J4-200A4/B4	100					
MR-J4-350A4/B4	100					
MR-J4-500A4/B4	130					
MR-J4-700A4/B4	170					
MR-J4-11KA4/B4		**GRZG400-2.5Ω × 4 500 (800)**	**500 (800)**			
MR-J4-15KA4/B4		**GRZG400-2.0Ω × 5 850 (1300)**				**850 (1300)**
MR-J4-22KA4/B4		GRZG400-2.0Ω × 5 850 (1300)				850 (1300)

Note 1. Always install a cooling fan.
2. The values in the parentheses are applied to when a cooling fan is installed.

- Changed items are **shown with shading**.
- Parameter settings (PA02 for MR-J4) may be required depending on the regenerative option model. Refer to the Instruction Manual for details.

1.2.3 External Form Comparison

<table>
<tr><th></th><th>MR-J3 series</th><th>MR-J4 series</th></tr>
<tr><td>700_4</td><td>MR-RB34-4

</td><td>MR-RB3U-4

</td></tr>
<tr><td>200_4
500_4
700_4</td><td>MR-RB5G-4 • MR-RB54-4

</td><td>MR-RB5G-4 • MR-RB54-4 • MR-RB5U-4

</td></tr>
</table>

<table>
<tr><th></th><th>MR-J3 series</th><th>MR-J4 series</th></tr>
<tr><td>11K_4
15K_4</td><td>MR-RB6B-4/MR-RB60-4/MR-RB6K-4

</td><td>MR-RB5K-4/MR-RB6K-4
MR-RB137-4/MR-RB13V-4

</td></tr>
</table>

2. COMPARISON TABLE OF DYNAMIC BRAKE OPTION COMBINATIONS

POINT

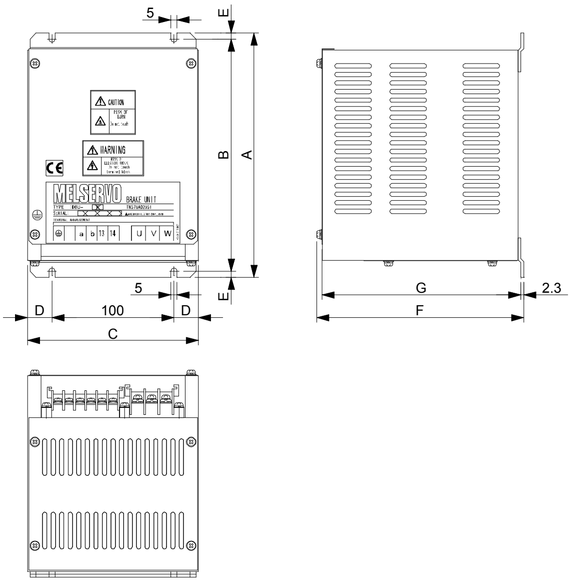
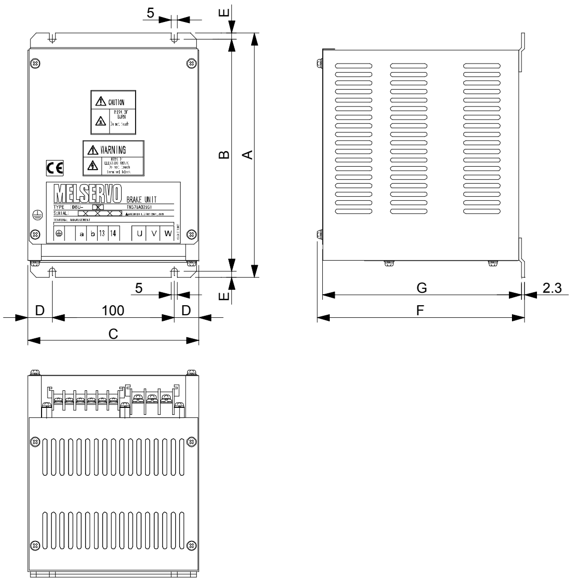
- When an MR-J4-22K servo amplifier and an HG-JR22K1M servo motor are combined, the coasting distance will be longer. Therefore, use a dynamic brake option, DBU-22K-R1.

Dynamic brake option combination

Model	Applicable servo amplifier	
DBU-11K	MR-J3-11KA/B	MR-J4-11KA/B
DBU-15K	MR-J3-15KA/B	MR-J4-15KA/B
DBU-22K	MR-J3-22KA/B	-
DBU-22K-R1	-	**MR-J4-22KA/B**
DBU-11K-4	MR-J3-11KA4/B4	MR-J4-11KA4/B4
DBU-22K-4	MR-J3-15KA4/B4 MR-J3-22KA4/B4	MR-J4-15KA4/B4 MR-J4-22KA4/B4

Note Changed items are shown with shading.

2.1 External Form Comparison

<table>
<tr><th></th><th>MR-J3 series</th><th>MR-J4 series</th></tr>
<tr><td>22K_</td><td>DBU-22K

</td><td>DBU-22K-R1

</td></tr>
</table>

External dynamic brake	A	B	C	D	E	F	G	Mass [kg]
DBU-22K	250	238	150	25	6	235	228	6
DBU-22K-R1	250	238	150	25	6	235	228	6

3. COMPARISON TABLE OF CABLE OPTION COMBINATIONS

Cable option combinations

Application		MR-J3 series	MR-J4 series	Compatibility (O: Compatible)	Note
Encoder cable		MR-J3ENCBL_M-A_-_	←	-	Use the same combination. _M: Cable length A_: Leading direction -_: Bending life
		MR-J3JCBL03M-A_-L	←	-	
		MR-EKCBL_M-_	←	-	
		MR-J3JSCBL03M-A_-L	←	-	
		MR-J3ENSCBL_M-_	←	-	
		MR-ENECBL_M-H	MR-ENECBL_M-H(-MTH)	-	(-MTH) is required for MR-J4-22K_. _: Cable length
Encoder connector set		MR-ECNM	←	-	Use the same combination.
		MR-J3SCNS	←	-	Use the same combination.
			MR-ENCNS2	O	The screw-type is added.
		MR-J3SCNSA	←	-	Use the same combination.
			MR-ENCNS2A	O	The screw-type is added.
		MR-ENECNS	←	-	Use the same combination.
SSCNET optical communication cable		MR-J3BUS_M	←	-	Use the same combination. _M: Cable length -_: Bending life
		MR-J3BUS_M-_	←	-	
Connector set for SSCNET optical communication		MR-J3BCN1	←	-	Use the same combination.
Junction terminal block cable	A type CN1	MR-J2M-CN1TBL_M	←	-	Use the same combination. _: Cable length
connector set		MR-J3CN1	←	-	Use the same combination.
Junction terminal block		MR-TB50	←	-	Use the same combination.
Junction terminal block cable	B type CN3	MR-J2HBUS_M	←	-	Use the same combination. _: Cable length
connector set		MR-CCN1	←	-	Use the same combination.
Servo motor power supply cable		MR-PWS1CBL_M-A_-_	←	-	Use the same combination. _M: Cable length A_: Leading direction -_: Bending life
		MR-PWS2CBL03M-A_-L	←	-	
Power connector set (Servo motor side power connector)		MR-PWCNS4	←	-	Use the same combination.
		MR-PWCNS5	←	-	
		MR-PWCNS3	←	-	
Electromagnetic brake cable		MR-BKS1CBL_M-A_-_	←	-	Use the same combination. _M: Cable length A_: Leading direction -_: Bending life
		MR-BKS2CBL03M-A_-L	←	-	
Electromagnetic brake connector set		MR-BKCNS1	←	-	Use the same combination.
			MR-BKCNS2	O	The screw-type is added.
		MR-BKCNS1A	←	-	Use the same combination.
			MR-BKCNS2A	O	The screw-type is added.
		MR-BKCN	←	-	Use the same combination.
Servo amplifier power connector (1 kW or less)	CNP1	54928-0670	06JFAT-SAXGDK-H7.5	Note 1	Connector shape is changed because the manufacturer is changed. ( ) is for MR-J3-200_(-RT).
	CNP2	54927-0520	05JFAT-SAXGDK-H5.0	Note 1	
	CNP3	54928-0370	03JFAT-SAXGDK-H7.5	Note 1	
Servo amplifier power connector (2 kW)	CNP1	721-207/026-000 (PC4/6-STF-7.62-CRWH)	06JFAT-SAXGFK-XL	Note 1	
	CNP2	721-205/026-000 (54927-0520)	05JFAT-SAXGDK-H5.0	Note 1	
	CNP3	721-203/026-000 (PC4/3-STF-7.62-CRWH)	03JFAT-SAXGFK-XL	Note 1	
Servo amplifier power connector (3.5 kW)	CNP1	PC4/6-STF-7.62-CRWH	06JFAT-SAXGFK-XL	Note 1	
	CNP2	54927-0520	05JFAT-SAXGDK-H5.0	Note 1	
	CNP3	PC4/3-STF-7.62-CRWH	03JFAT-SAXGFK-XL	Note 1	
CN5 communication cable		MR-J3USBCBL3M	←	-	Use the same combination.

Note 1. These replacement models do not have compatibility in mounting. The power connector is supplied with a servo amplifier for MR-J4 series.

4. POWER SUPPLY WIRE SIZE

4.1 Selection of Power Supply Wire Size (Example)

4.1.1 MR-J3 series power supply wire size

POINT

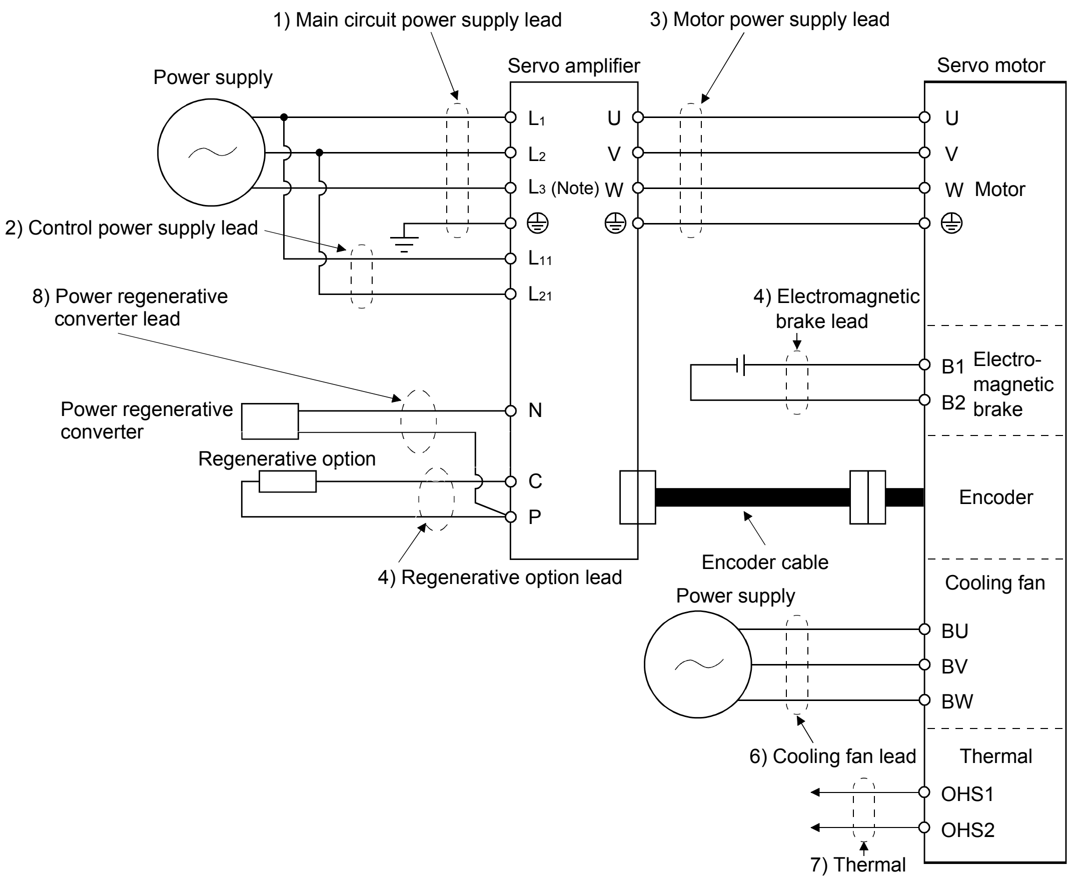
- Wires indicated in this section are separated wires. When using a cable for power line (U/V//W) between the servo amplifier and servo motor, use a 600V grade EP rubber insulated chloroprene sheath cab-tire cable (2PNCT). For selection of cables, refer to Servo Amplifier Instruction Manual.
- To comply with the UL/CSA Standard, use the wires shown in appendix 10 for wiring. To comply with other standards, use a wire that is complied with each standard.
- Selection condition of wire size is as follows.
  Construction condition: One wire is constructed in the air
  Wire length: 30m or less

(1) Wires for power supply wiring

POINT
●Use 600 V Grade heat-resistant polyvinyl chloride insulated wires (HIV wires) for HF-JP series servo motor.

The following diagram shows the wires used for wiring. Use the wires given in this section or equivalent.

In this case, the power supply wire used is a 600 V plastic one and the wiring distance is 30 m or less.
When the wiring distance exceeds 30 m, select another wire size in consideration of the voltage drop.
The alphabet letters (a/b/c) on the table correspond to crimp terminals used when wiring a servo amplifier.
The method of wiring a servo motor differs depending on the type and capacity of the servo motor.
To comply with the UL/cUL (CSA) standard, use UL-approved copper wires rated at 60˚C or higher for wiring.



Note There is no L_3 for 1-phase 100 to 120 V AC power supply.

Wire size selection example 1 (IV wire)
Recommended wire

<table>
<tr><th rowspan="2">Servo amplifier</th><th colspan="7">Power supply wire [mm^2] (Note 1, 4)</th></tr>
<tr><th>(1) L1/L2/L3/⏚</th><th>(2) L11/L21</th><th>(3) U/V/W/⏚</th><th>(4) P/C</th><th>(5) B1/B2</th><th>(6) BU/BV/BW</th><th>(7)OHS1/OHS2</th></tr>
<tr><td>MR-J3-10_(1)</td><td rowspan="7">2 (AWG14)</td><td rowspan="8">1.25 (AWG16)</td><td rowspan="5">1.25 (AWG16)</td><td rowspan="8">2 (AWG14)</td><td rowspan="22">1.25 (AWG16)</td><td rowspan="9"></td><td rowspan="9"></td></tr>
<tr><td>MR-J3-20_(1)</td></tr>
<tr><td>MR-J3-40_(1)</td></tr>
<tr><td>MR-J3-60_</td></tr>
<tr><td>MR-J3-70_</td></tr>
<tr><td>MR-J3-100_</td><td rowspan="2">2 (AWG14)</td></tr>
<tr><td>MR-J3-200_</td></tr>
<tr><td>MR-J3-350_</td><td>3.5 (AWG12)</td><td>3.5 (AWG12)</td></tr>
<tr><td>MR-J3-500_
(Note 2)</td><td>5.5 (AWG10): a</td><td rowspan="2">1.25 (AWG16): h</td><td>5.5 (AWG10): a</td><td>2 (AWG14): g</td></tr>
<tr><td>MR-J3-700_
(Note 2)</td><td>8 (AWG8): b</td><td>8 (AWG8): b</td><td>3.5 (AWG12): a</td><td>2 (AWG14)
(Note 3)</td><td>1.25 (AWG16)
(Note 3)</td></tr>
<tr><td>MR-J3-11K_
(Note 2)</td><td>14 (AWG6): c</td><td rowspan="3">1.25(AWG16): g</td><td>22 (AWG4): d</td><td rowspan="2">5.5 (AWG10): j</td><td rowspan="3">2 (AWG14)</td><td rowspan="3">1.25 (AWG16)</td></tr>
<tr><td>MR-J3-15K_
(Note 2)</td><td>22 (AWG4): d</td><td>30 (AWG2): e</td></tr>
<tr><td>MR-J3-22K_
(Note 2)</td><td>50 (AWG1/0): f</td><td>60 (AWG2/0): f</td><td>5.5 (AWG10): k</td></tr>
<tr><td>MR-J3-60_4</td><td rowspan="3">2 (AWG14)</td><td rowspan="3">1.25 (AWG16)</td><td rowspan="2">1.25 (AWG16)</td><td rowspan="3">2 (AWG14)</td><td rowspan="5"></td><td rowspan="5"></td></tr>
<tr><td>MR-J3-100_4</td></tr>
<tr><td>MR-J3-200_4</td><td>2 (AWG14)</td></tr>
<tr><td>MR-J3-350_4</td><td>2 (AWG14): g</td><td rowspan="3">1.25 (AWG16): h</td><td>2 (AWG14): g</td><td rowspan="3">2 (AWG14): g</td></tr>
<tr><td>MR-J3-500_4
(Note 2)</td><td rowspan="2">5.5 (AWG10): a</td><td rowspan="2">5.5 (AWG10): a</td></tr>
<tr><td>MR-J3-700_4
(Note 2)</td><td>2 (AWG14)
(Note 3)</td><td>1.25 (AWG16)
(Note 3)</td></tr>
<tr><td>MR-J3-11K_4
(Note 2)</td><td>8 (AWG8): l</td><td rowspan="3">1.25 (AWG16): g</td><td>8 (AWG8): l</td><td>3.5 (AWG12): j</td><td rowspan="3">2 (AWG14)</td><td rowspan="3">1.25 (AWG16)</td></tr>
<tr><td>MR-J3-15K_4
(Note 2)</td><td>14 (AWG6): c</td><td>22 (AWG4):d</td><td>5.5 (AWG10): j</td></tr>
<tr><td>MR-J3-22K_4
(Note 2)</td><td>14 (AWG6): m</td><td>22 (AWG4):n</td><td>5.5 (AWG10): k</td></tr>
</table>

Note 1. Alphabets in the table indicate crimping tools. For crimping terminals and applicable tools, refer to Section 4.2.1 of this document.
2. When connecting to the terminal block, be sure to use the screws which are provided with the terminal block.
3. For the servo motor with a cooling fan.
4. Wires are selected based on the highest rated current among combining servo motors.

Wire size selection example (HIV wire)

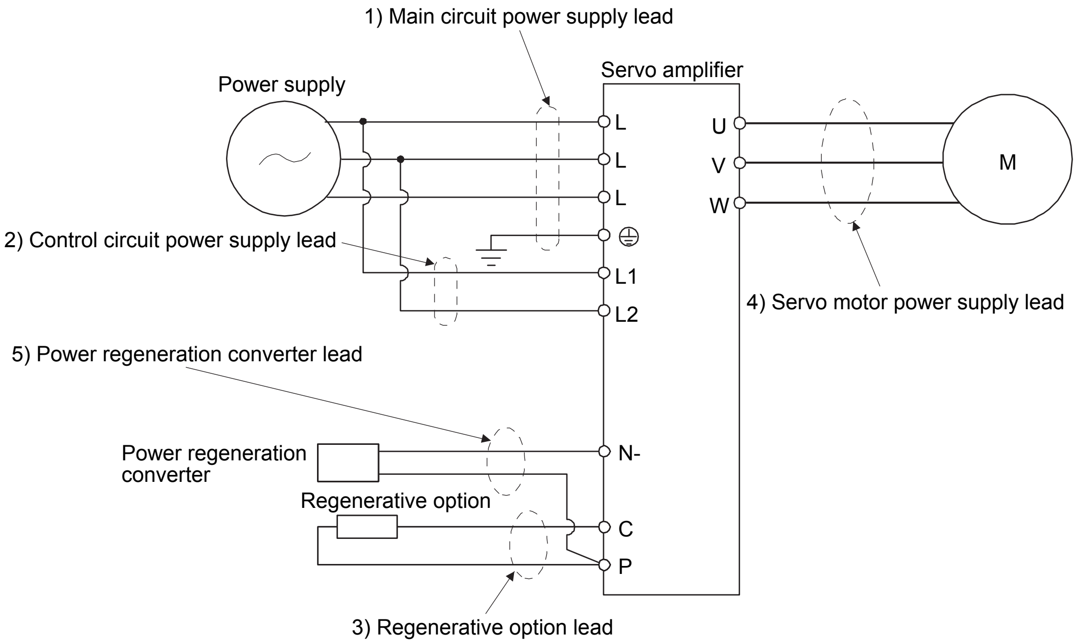
Servo amplifier	Power supply wire [mm^2] (Note 1, 4)						
	(1) L1/L2/L3/⏚	(2) L11/L21	(3) U/V/W/⏚	(4) P/C	(5) B1/B2	(6) BU/BV/BW	□OHS1/OHS2
MR-J3-10_(1)	2 (AWG14)	1.25 (AWG16)	1.25 (AWG16)	2 (AWG14)	1.25 (AWG16)		
MR-J3-20_(1)							
MR-J3-40_(1)							
MR-J3-60_							
MR-J3-70_							
MR-J3-100_			1.25 (AWG16)				
MR-J3-200_			2 (AWG14)				
MR-J3-350_	3.5 (AWG12)		3.5 (AWG12)				
MR-J3-500_ (Note 2)	5.5 (AWG10): a	1.25 (AWG16): h	5.5 (AWG10): a	2 (AWG14): g			
MR-J3-700_ (Note 2)	8 (AWG8): b		8 (AWG8): b	2 (AWG14): g		1.25 (AWG16) (Note 3)	1.25 (AWG16) (Note 3)
MR-J3-11K_ (Note 2)	14 (AWG6): c	1.25 (AWG16): g	14 (AWG6): c	3.5 (AWG12): j		1.25 (AWG16)	1.25 (AWG16)
MR-J3-15K_ (Note 2)	22 (AWG4): d		22 (AWG4): d				
MR-J3-22K_ (Note 2)	38 (AWG1): p		38 (AWG1): p	5.5 (AWG10): k			
MR-J3-60_4	2 (AWG14)	1.25 (AWG16)	1.25 (AWG16)	2 (AWG14)			
MR-J3-100_4							
MR-J3-200_4			2 (AWG14)				
MR-J3-350_4	2 (AWG14): g	1.25 (AWG16): h	2 (AWG14): g	2 (AWG14): g			
MR-J3-500_4 (Note 2)	3.5 (AWG12): a		3.5 (AWG12): a				
MR-J3-700_4 (Note 2)			5.5 (AWG10): a			1.25 (AWG16) (Note 3)	1.25 (AWG16) (Note 3)
MR-J3-11K_4 (Note 2)	5.5 (AWG10): j	1.25 (AWG16): g	8 (AWG8): l	2 (AWG14): q		1.25 (AWG16)	1.25 (AWG16)
MR-J3-15K_4 (Note 2)	8 (AWG8): l		14 (AWG6): c	3.5 (AWG12): j			
MR-J3-22K_4 (Note 2)	14 (AWG6): m		14 (AWG6): m	3.5 (AWG12): k			

Note 1. Alphabets in the table indicate crimping tools. For crimping terminals and applicable tools, refer to Section 4.2.1 of this document.
2. To connect these models to a terminal block, make sure to use the screws that come with the terminal block.
3. For the servo motor with a cooling fan.
4. Wires are selected based on the highest rated current among combining servo motors.

4.1.2 MR-J4-series power supply wire size

POINT
●To comply with the IEC/EN/UL/CSA standard, use the wires shown in the instruction manuals of the servo amplifier in use for wiring. To comply with other standards, use a wire that is complied with each standard. ●Selection conditions of wire size are as follows. Construction condition: Single wire set in midair Wire length: 30 m or less

The following diagram shows the wires used for wiring. Use the wires given in this section or equivalent.



(1) Example of selecting the wire sizes

POINT
●Use the HIV wire for the replacement with MR-J4.

For the power supply wire, use a 600 V grade heat-resistant polyvinyl chloride insulated wire (HIV wire). The table below shows selection examples of power supply wire sizes.

Wire size selection example (HIV wire)
Recommended wire

Servo amplifier	Power supply wire [mm^2] (Note 1)			
	1) L1/L2/L3/⏚	2) L11/L21	3) P+/C	4) U/V/W/⏚ (Note 3)
MR-J4-10_(1) (-RJ)	2 (AWG 14)	1.25 to 2 (AWG 16 to 14) (Note 4)	2 (AWG 14)	AWG 18 to 14 (Note 4)
MR-J4-20_(1) (-RJ)				
MR-J4-40_(1) (-RJ)				
MR-J4-60_(-RJ)				
MR-J4-70_(-RJ)				
MR-J4-100_(-RJ)				
MR-J4-200_(-RJ)				AWG 16 to 10
MR-J4-350_(-RJ)	3.5 (AWG 12)			
MR-J4-500_(-RJ) (Note 2)	5.5 (AWG 10): a	1.25 (AWG 16): a 2 (AWG 14): d (Note 4)	2 (AWG 14): c	2 (AWG 14): c 3.5 (AWG 12): a 5.5 (AWG 10): a
MR-J4-700_(-RJ) (Note 2)	8 (AWG 8): b			2 (AWG 14): c 3.5 (AWG 12): a 5.5 (AWG 10): a 8 (AWG 8): b
MR-J4-11K_(-RJ) (Note 2)	14 (AWG 6): f	1.25 (AWG 16): c 2 (AWG 14): c	3.5 (AWG 12): g	14 (AWG 6): f 5.5 (AWG 10): g 8 (AWG 8): k
MR-J4-15K_(-RJ) (Note 2)	22 (AWG 4): h		5.5 (AWG 10): g	22 (AWG 4): h 8 (AWG 8): k
MR-J4-22K_(-RJ) (Note 2)	38 (AWG 2): i		5.5 (AWG 10): j	38 (AWG 2): i
MR-J4-60_4(-RJ) • MR-J4-100_4(-RJ)	2 (AWG 14)	1.25 to 2 (AWG 16 to 14) (Note 4)	2 (AWG 14)	AWG 16 to 14
MR-J4-200_4(-RJ)				
MR-J4-350_4(-RJ)				
MR-J4-500_4(-RJ) (Note 2)	2 (AWG 14): b	1.25 (AWG 16): a 2 (AWG 14): c (Note 4)	2 (AWG 14): b	3.5 (AWG 12): a
MR-J4-700_4(-RJ) (Note 2)	3.5 (AWG 12): a			5.5 (AWG 10): a
MR-J4-11K_4(-RJ) (Note 2)	5.5 (AWG 10): d	1.25 (AWG 16): b 2 (AWG 14): b (Note 4)	2 (AWG 14): f	8 (AWG 8): g
MR-J4-15K_4(-RJ) (Note 2)	8 (AWG 8): g		3.5 (AWG 12): d	
MR-J4-22K_4(-RJ) (Note 2)	14 (AWG 6): i		3.5 (AWG 12): e	5.5 (AWG 10): e 8 (AWG 8):h 14 (AWG 6): i

Note 1. Alphabets in the table indicate crimping tools. For crimp terminals and applicable tools, see 4.2.2 (1), (2) of this document.
2. To connect these models to a terminal block, make sure to use the screws that come with the terminal block.
3. This wire size is applicable to the servo amplifier connector and terminal block. For wires connecting to the servo motor, refer to each servo amplifier instruction manual.
4. To comply with the UL/CSA standard, use a wire of 2 mm^2.

4.2 Selection Example of Crimp Terminals

4.2.1 MR-J3 series crimp terminal

Recommended crimp terminals

Symbol	Servo amplifier-side crimp terminals				
	Crimp terminal (Note 2)	Applicable tool			Manufacturer
		Body	Head	Dice	
a	FVD5.5-4	YNT-1210S			J.S.T. Mfg. Co., Ltd.
b (Note 1)	8-4NS	YHT-8S			
c	FVD14-6	YF-1 E-4	YNE-38	DH-122 DH-112	
d	FVD22-6			DH-123 DH-113	
e (Note 1)	38-6	YPT-60-21		TD-124 TD-112	
		YF-1 E-4	YET-60-1		
f (Note 1)	R60-8	YPT-60-21		TD-125 TD-113	
		YF-1 E-4	YET-60-1		
g	FVD2-4	YNT-1614			
h	FVD2-M3				
j	FVD5.5-6	YNT-1210S			
k	FVD5.5-8				
l	FVD8-6	YF-1 E-4	YNE-38	DH-121 DH-111	
m	FVD14-8			DH-122 DH-112	
n	FVD22-8			DH-123 DH-113	
p (Note 1)	R38-8	YPT-60-21		TD-124 TD-112	
		YF-1 E-4	YET-60-1		
q	FVD2-6	YNT-1614			

Note 1. Coat the crimping part with an insulation tube.
2. Some crimp terminals may not be mounted depending on the size. Make sure to use the recommended ones or equivalent ones.

4.2.2 MR-J4-series crimp terminal

(1) Selection example of crimp terminals (200 V/100 V class)
The table below shows selection examples of a crimp terminal for a servo amplifier terminal block.

Recommended crimp terminals

Symbol	Servo amplifier-side crimp terminals				
	Crimp terminal (Note 2)	Applicable tool			Manufacturer
		Body	Head	Dice	
a	FVD5.5-4	YNT-1210S			J.S.T. Mfg. Co., Ltd.
b (Note 1)	8-4NS	YHT-8S			
c	FVD2-4	YNT-1614			
d	FVD2-M3				
e	FVD1.25-M3	YNT-2216			
f	FVD14-6	YF-1	YNE-38	DH-122 DH-112	
g	FVD5.5-6	YNT-1210S			
h	FVD22-6	YF-1	YNE-38	DH-123 DH-113	
i	FVD38-8	YF-1	YNE-38	DH-124 DH-114	
j	FVD5.5-8	YNT-1210S			
k	FVD8-6	YF-1 E-4	YNE-38	DH-121 DH-111	

Note 1. Cover the crimped portion with an insulating tape.
2. Installation of a crimp terminal may be impossible depending on the size, so make sure to use the recommended crimp terminal or one equivalent to it.

(2) Selection example of crimp terminals (400 V class)
The table below shows selection examples of a crimp terminal for a servo amplifier terminal block.

Recommended crimp terminals

Symbol	Servo amplifier-side crimp terminals				Manufacturer
	Crimp terminal (Note)	Applicable tool			
		Body	Head	Dice	
a	FVD5.5-4	YNT-1210S			J.S.T. Mfg. Co., Ltd
b	FVD2-4	YNT-1614			
c	FVD2-M3				
d	FVD5.5-6	YNT-1210S			
e	FVD5.5-8	YNT-1210S			
f	FVD2-6	YNT-1614			
g	FVD8-6	YF-1	YNE-38	DH-121 DH-111	
h	FVD8-8				
i	FVD14-8			DH-122 DH-112	

Note Installation of a crimp terminal may be impossible depending on the size, so make sure to use the recommended crimp terminal or one equivalent to it.

4.3 Selection of Molded-Case Circuit Breaker, Fuse, and Magnetic Contactor (Example)

4.3.1 MR-J3 series, molded-case circuit breakers, fuses, and magnetic contactors

⚠ CAUTION	● Select a molded-case circuit breaker with a short shut-off time to prevent smoking and fire from the servo amplifier. ● Always use one molded-case circuit breaker and one magnetic contactor with one servo amplifier.

When using a fuse instead of the molded-case circuit breaker, use the one having the specifications given in this section.

Molded-case circuit breakers, fuses, and magnetic contactors

Servo amplifier	Molded-case circuit breaker (Note 3)			Fuse			Magnetic contactor (Note 2)
	Current		Voltage AC	Class (Note 1)	Current	Voltage AC	
	Not using power factor improving reactor	Using power factor improving reactor					
MR-J3-10_(1)	30 A frame 5 A	30 A frame 5 A	240 V	T	10 A	300 V	S-N10
MR-J3-20_	30 A frame 5 A	30 A frame 5 A			10 A		
MR-J3-20_1	30 A frame 10 A	30 A frame 10 A			15 A		
MR-J3-40_	30 A frame 10 A	30 A frame 5 A			15 A		
MR-J3-60_/70_/100_/40_1	30 A frame 15 A	30 A frame 10 A			20 A		
MR-J3-200_	30 A frame 20 A	30 A frame 15 A			40 A		S-N18
MR-J3-350_	30 A frame 30 A	30 A frame 30 A			70 A		S-N20
MR-J3-500_	50 A frame 50 A	50 A frame 40 A			125 A		S-N35
MR-J3-700_	100 A frame 75 A	50 A frame 50 A			150 A		S-N50
MR-J3-11K_	100 A frame 100 A	100 A frame 75 A			200 A		S-N65
MR-J3-15K_	225 A frame 125 A	100 A frame 100 A			250 A		S-N95
MR-J3-22K_	225 A frame 175 A	225 A frame 150 A			350 A		S-N125
MR-J3-60_4	30 A frame 5 A	30 A frame 5 A	600 Y/347 V		10 A	600 V	S-N10
MR-J3-100_4	30 A frame 10 A	30 A frame 10 A			15 A		
MR-J3-200_4	30 A frame 15 A	30 A frame 15 A			25 A		
MR-J3-350_4	30 A frame 20 A	30 A frame 20 A			35 A		S-N18
MR-J3-500_4	30 A frame 30 A	30 A frame 30 A			50 A		
MR-J3-700_4	50 A frame 40 A	50 A frame 30 A			65 A		S-N20
MR-J3-11K_4	60 A frame 60 A	50 A frame 50 A			100 A		S-N25
MR-J3-15K_4	100 A frame 75 A	60 A frame 60 A			150 A		S-N35
MR-J3-22K_4	225 A frame 125 A	100 A frame 100 A			175 A		S-N65

Note 1. When not using the servo amplifier as a UL/CSA Standard compliant product, K5 class fuse can be used.
2. Be sure to use a magnetic contactor with an operation delay time of 80ms or less.
3. Use a molded-case circuit breaker which has the same or more operation characteristics than our lineup.

4.3.2 MR-J4 series, molded-case circuit breakers, fuses, and magnetic contactors (recommended)

(1) For main circuit power supply

⚠ CAUTION	●Select a molded-case circuit breaker with a short shut-off time to prevent smoking and fire from the servo amplifier. ●Always use one molded-case circuit breaker and one magnetic contactor with one servo amplifier.

When using a fuse instead of the molded-case circuit breaker, use the one having the specifications given in this section.

Molded-case circuit breakers, fuses, and magnetic contactors

Servo amplifier	Molded-case circuit breaker (Note 1)			Fuse			Magnetic contactor (Note 2)
	Frame, rated current		Voltage AC [V]	Class	Current [A]	Voltage AC [V]	
	Power factor improving reactor is not used	Power factor improving reactor is used					
MR-J4-10_(1)	30 A frame 5 A	30 A frame 5 A	240	T	10	300	S-N10 S-T10
MR-J4-20_							
MR-J4-20_1	30 A frame 10 A	30 A frame 10 A			15		
MR-J4-40_	30 A frame 10 A	30 A frame 5 A			15		
MR-J4-60_/70_/40_1	30 A frame 15 A	30 A frame 10 A			20		
MR-J4-70_							
MR-J4-100_ (3-phase power supply input)							
MR-J4-100_ (1-phase power supply input)	30 A frame 15 A	30 A frame 15 A			30		
MR-J4-200_	30 A frame 20 A	30 A frame 20 A			40		S-N20 (Note 3) S-T21
MR-J4-350_	30 A frame 30 A	30 A frame 30 A			70		S-N20 S-T21
MR-J4-500_	50 A frame 50 A	50 A frame 50 A			125		S-N35
MR-J4-700_	100 A frame 75 A	100 A frame 60 A			150		S-N50
MR-J4-11K_	100 A frame 100 A	100 A frame 100 A			200		
MR-J4-15K_	125 A frame 125 A	125 A frame 125 A			250		S-N65
MR-J4-22K_	225 A frame 175 A	225 A frame 175 A			350		S-N95
MR-J4-60_4	30 A frame 5 A	30 A frame 5 A	480	T	10	600	S-N10 S-T10
MR-J4-100_4	30 A frame 10 A	30 A frame 5 A			15		
MR-J4-200_4	30 A frame 15 A	30 A frame 10 A			25		
MR-J4-350_4	30 A frame 20 A	30 A frame 15 A			35		S-N20 (Note 3) S-T21
MR-J4-500_4	30 A frame 20 A	30 A frame 20 A			50		
MR-J4-700_4	30 A frame 30 A	30 A frame 30 A			65		S-N20 S-T21
MR-J4-11K_4	50 A frame 50 A	50 A frame 50 A			100		S-N25
MR-J4-15K_4	60 A frame 60 A	60 A frame 60 A			150		S-N35
MR-J4-22K_4	100 A frame 100 A	100 A frame 100 A			175		S-N50

Note 1. In order for the servo amplifier to comply with the UL/CSA standard, see the applicable "Servo Amplifier Instruction Manual".
2. Use a magnetic contactor with an operation delay time (interval between current being applied to the coil until closure of contacts) of 80 ms or less.
3. S-N18 can be used when auxiliary contact is not required.

(2) For control circuit power supply
When the wiring for the control circuit power supply (L11, L21) is thinner than that for the main circuit power supply (L1, L2, L3), install an overcurrent protection device (molded-case circuit breaker or fuse) to protect the branch circuit.

Molded-case circuit breaker, fuse

Servo amplifier	Molded-case circuit breaker (Note)		Fuse (Class T)		Fuse (Class K5)	
	Frame, rated current	Voltage AC [V]	Current [A]	Voltage AC [V]	Current [A]	Voltage AC [V]
MR-J4-10_ MR-J4-20_ MR-J4-40_ MR-J4-60_ MR-J4-70_ MR-J4-100_ MR-J4-200_ MR-J4-350_ MR-J4-500_ MR-J4-700_ MR-J4-11K_ MR-J4-15K_ MR-J4-22K_	30 A frame 5 A	240	1	300	1	250
MR-J4-60_4 MR-J4-100_4 MR-J4-200_4 MR-J4-350_4 MR-J4-500_4 MR-J4-700_4 MR-J4-11K_4 MR-J4-15K_4 MR-J4-22K_4	30 A frame 5 A	480	1	600	1	600
MR-J4-10_1 MR-J4-20_1 MR-J4-40_1	30 A frame 5 A	240	1	300	1	250

Note In order for the servo amplifier to comply with the UL/CSA standard, see the Servo Amplifier Instruction Manual.

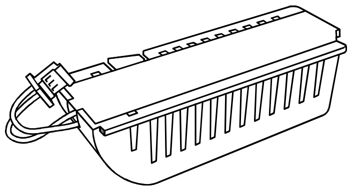
5. BATTERY

POINT
●The battery MR-J3BAT for MR-J3 series is unavailable because the voltage specification of the battery differs from that for MR-J4 series.

5.1 MR-J3-Series Battery

(1) Purpose of use for MR-J3BAT

This battery is used to construct an absolute position detection system. Refer to Servo Amplifier Instruction Manual for the fitting method, etc..

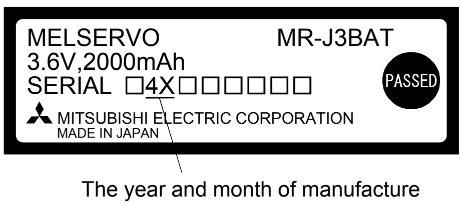


(2) Year and month when MR-J3BAT is manufactured

Production year and month of the MR-J3BAT are indicated in a serial number on the rating plate of the battery back face.

The year and month of manufacture are indicated by the last one digit of the year and 1 to 9, X (10), Y (11), Z (12).

For October 2004, the Serial No. is like, "SERIAL_4X_ _ _ _ _ _ ".



5.2 MR-J4-Series Battery

5.2.1 Battery replacement procedure

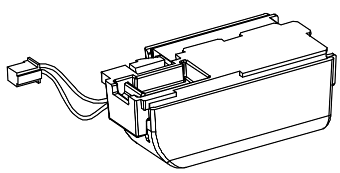
Model: MR-BAT6V1SET, MR-BAT6V1BJ, MR-BT6VCASE

⚠ WARNING	●Before replacing a battery, turn off the main circuit power and wait for 15 minutes or longer until the charge lamp turns off. Then, check the voltage between P+ and N- with a voltage tester or others. Otherwise, an electric shock may occur. In addition, when confirming whether the charge lamp is off or not, always confirm it from the front of the servo amplifier.

⚠ CAUTION	●The internal circuits of the servo amplifier may be damaged by static electricity. Always take the following precautions. • Ground your body and the work bench. • Do not touch the conductive areas, such as connector pins and electrical parts, directly by hand. ●The built-in battery for the MR-BAT6V1BJ battery for junction battery cable cannot be replaced. Therefore, do not disassemble the MR-BAT6V1BJ battery for junction battery cable. Doing so may cause a malfunction.

POINT
● When using the BAT6V1SET battery and the MR-BT6VCASE battery case are used Replacing a battery with the control circuit power supply turned off will erase the absolute position data. When using the MR-BAT6V1BJ battery for junction battery cable In order to prevent the absolute position data from being erased, replace the MR-BAT6V1BJ battery for junction battery cable according to the procedure described in the Instruction Manual. ● Verify that the battery for replacement is within its service life. ●Refer to the Instruction Manual for battery transportation and the new EU Battery Directive.

Replace the old battery with only the control circuit power supply turned on. Replacing a battery with the control circuit power supply turned on will cause [AL.9F.1 low battery] but will not erase the absolute position data.
See the Instruction Manual for the procedure for mounting the battery on the servo amplifier.

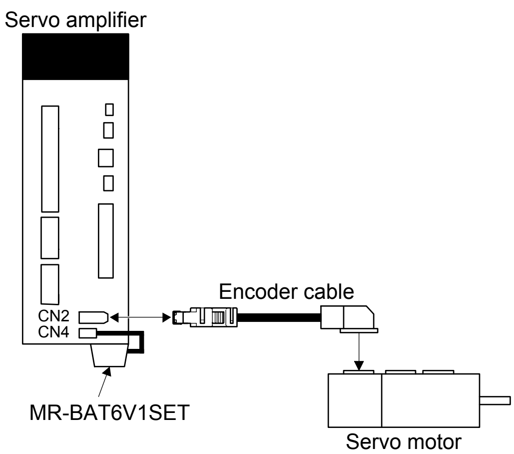


POINT
●Three types of batteries are used to construct the absolute position detection system: MR-BAT6V1SET battery, MR-BAT6V1BJ battery for junction battery cable, and MR-BT6VCASE battery case. The use of the MR-BAT6V1BJ battery for junction battery cable has the following characteristics distinctive from other batteries. • The encoder cable can be removed from the servo amplifier. • A battery can be replaced with the control circuit power supply turned off. ●If the encoder lost the absolute position data, always perform home position setting before operation. The encoder will lose the absolute position data in the following cases. In addition, the absolute position data may be erased if the battery is used outside of the specification. When using the MR-BAT6V1SET battery and the MR-BT6VCASE battery case • Encoder cable is removed. • A battery is replaced with the control circuit power supply turned off. When using the MR-BAT6V1BJ battery for junction battery cable • The connector and the cable are removed between the servo motor and the battery. • A battery is replaced in a procedure different from the procedure described in the Instruction Manual. ●The MR-BAT6V1BJ battery for junction battery cable is compatible only with the HG series servo motor. ●A single MR-BT6VCASE battery case can retain the absolute position data of up to eight axes of servo motors.

5.2.2 When using the MR-BAT6V1SET battery

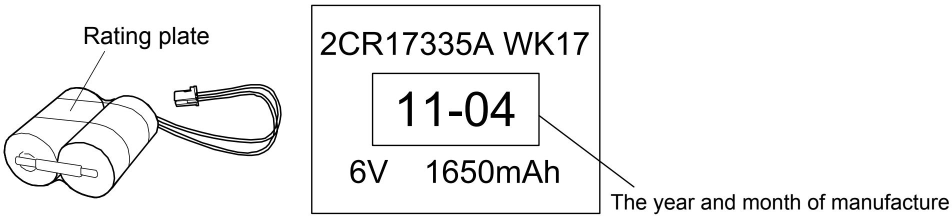
(a) Battery connection

Connect according to the following figure.



(b) Year and month of manufacture of battery

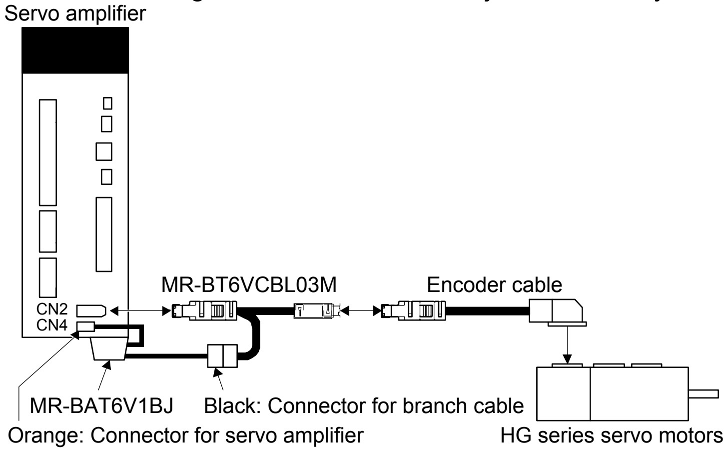
The manufacture date of an MR-BAT6V1 battery installed in MR-BAT6V1SET is written on the name plate attached to the MR-BAT6V1 battery.



5.2.3 When using MR-BAT6V1BJ battery for junction battery cable

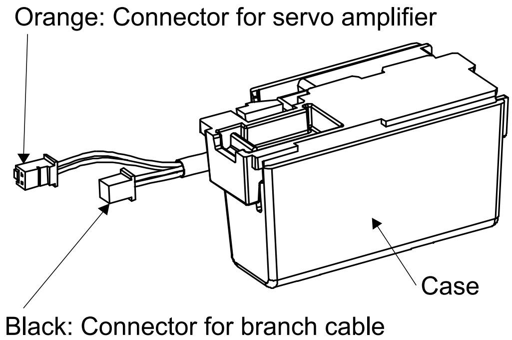
(a) Battery mounting

Connect the MR-BAT6V1BJ using the MR-BT6VCBL03M junction battery cable as follows.



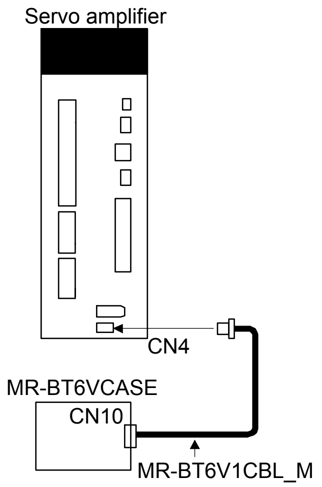
(b) Battery manufacture year and month

The manufacture year and month are described in the manufacturer's (SERIAL) number marked on the rating name plate. The second digit of the manufacturer's number indicates the first digit of the Christian Era and the third digit indicates the manufacture month (X for October, Y for November, and Z for December). For example, November 2013 is indicated as "SERIAL:_3Y_ _ _ _ _ _".

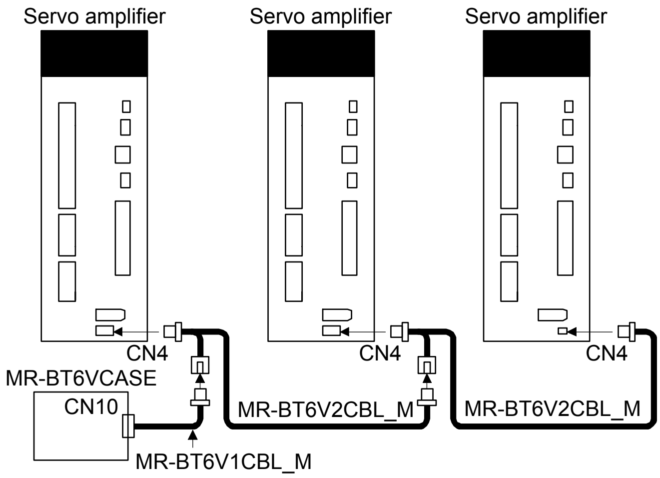


5.2.4 When using MR-BT6VCASE battery case

(a) Battery connection



Connection to a single unit of servo amplifier



Connection to eight axes of servo amplifiers

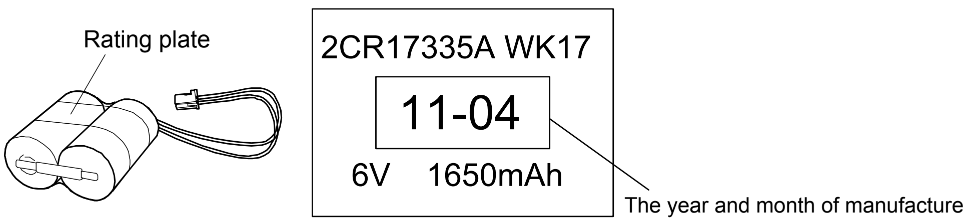
A single MR-BT6VCASE battery case can retain the absolute position data of up to eight axes of servo motors. Servo motors in the incremental system are included in the number of axes. Refer to the following table for the number of connectable axes of each servo motor.

Servo motor	Number of axes								
Rotary servo motor	0	1	2	3	4	5	6	7	8

The battery case accommodates five connected batteries. The battery case contains no batteries. Batteries need to be prepared separately.

(b) Battery manufacture year and month

The manufacture year and month of a MR-BAT6V1 to be housed in the MR-BT6VCASE battery case is written on the name plate attached to the MR-BAT6V1 battery.



6 EMC FILTER (RECOMMENDED)

6.1 MR-J3/MR-J4-series EMC Filter (recommended) (100 V/200 V/400 V class)

It is recommended that one of the following filters be used to comply with EN EMC directive. Some EMC filters have large in leakage current.
When using an EMC filter, always use one for each servo amplifier.

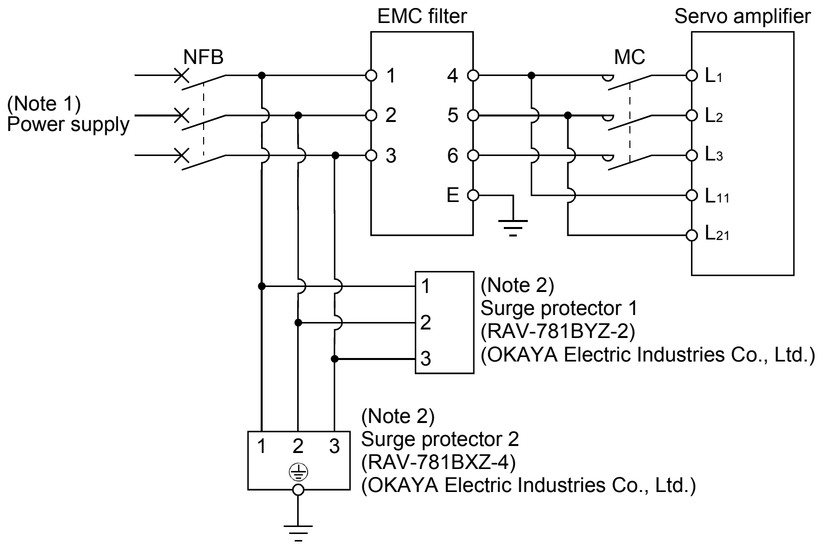
Combination with the servo amplifier

Servo amplifier	Recommended filter (Soshin Electric)				Mass [kg]
	Model	Rated current [A]	Rated voltage [V AC]	Leakage current [mA]	
MR-J3-10_ to MR-J3-100_ MR-J3-10_1 to MR-J3-40_1 MR-J4-10_ to MR-J4-100_ MR-J4-10_1 to MR-J4-40_1	HF3010A-UN (Note)	10	Max. 250	5	3.5
MR-J3-200_N/MR-J3-350_ MR-J4-200_/MR-J4-350_	HF3030A-UN (Note)	30			5.5
MR-J3-500_/MR-J3-700_ MR-J4-500_/MR-J4-700_	HF3040A-UN (Note)	40		6.5	6
MR-J3-11K_ to MR-J3-22K_ MR-J4-11K_ to MR-J4-22K_	HF3100A-UN (Note)	100			12
MR-J3-60_4/MR-J3-100_4 MR-J4-60_4/MR-J4-100_4	TF3005C-TX	5	Max. 500	5.5	6
MR-J3-200_4 to MR-J3-700_4 MR-J4-200_4 to MR-J4-700_4	TF3020C-TX	20			
MR-J3-11K_4 MR-J4-11K_4	TF3030C-TX	30			7.5
MR-J3-15K_4 MR-J4-15K_4	TF3040C-TX	40			12.5
MR-J3-22K_4 MR-J4-22K_4	TF3060C-TX	60			

Note This surge protector is separately required to use any of these EMC filters.

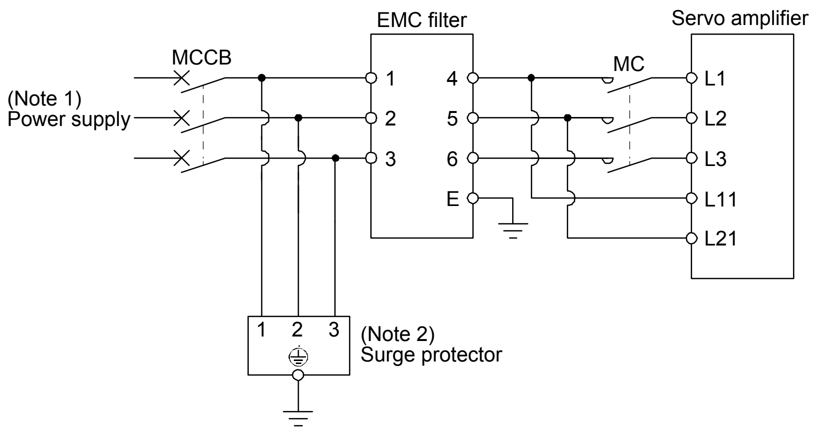
6.1.1 Connection example

(1) MR-J3 series



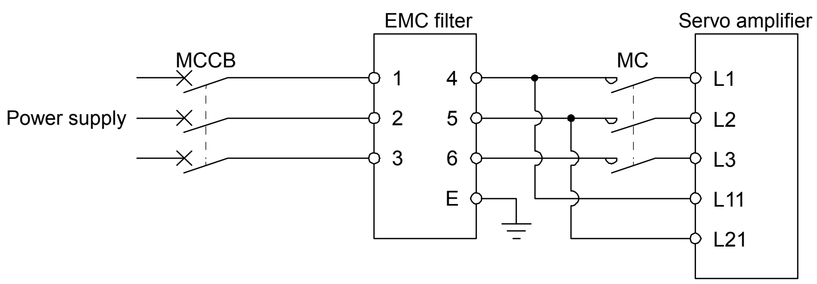
Note 1. For 1-phase 200 to 230V AC power supply, connect the power supply to L_1, L_2 and leave L_3 open.
There is no L_3 for 1-phase 100 to 120 V AC power supply. Refer to section 1.3 for the power supply specification.
2. The example is when a surge protector is connected.

(2) MR-J4 series (100 V/200 V class)



Note 1. For 1-phase 200 to 230V AC power supply, connect the power supply to L_1, L_2 and leave L_3 open.
There is no L_3 for 1-phase 100 to 120 V AC power supply. Refer to section 1.3 for the power supply specification.
2. The example is when a surge protector is connected.

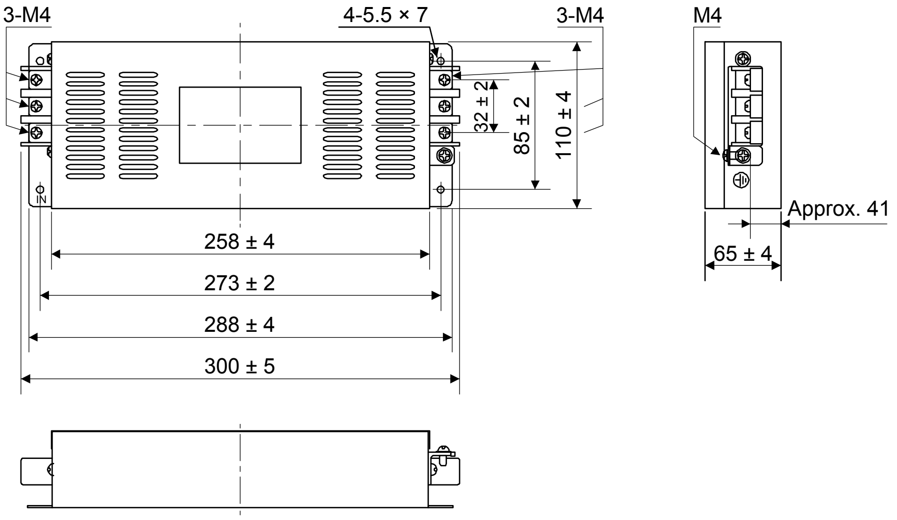
(3) MR-J4 series (400 V class)



6.1.2 Dimensions

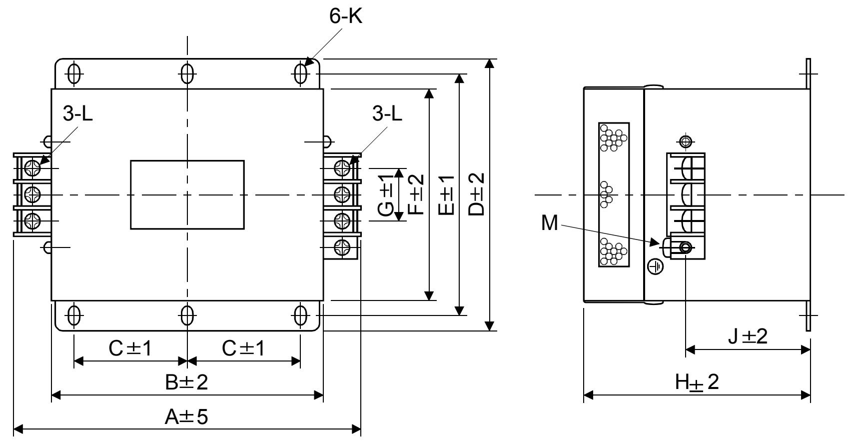
HF3010A-UN

[Unit: mm]



HF3030A-UN/HF3040A-UN

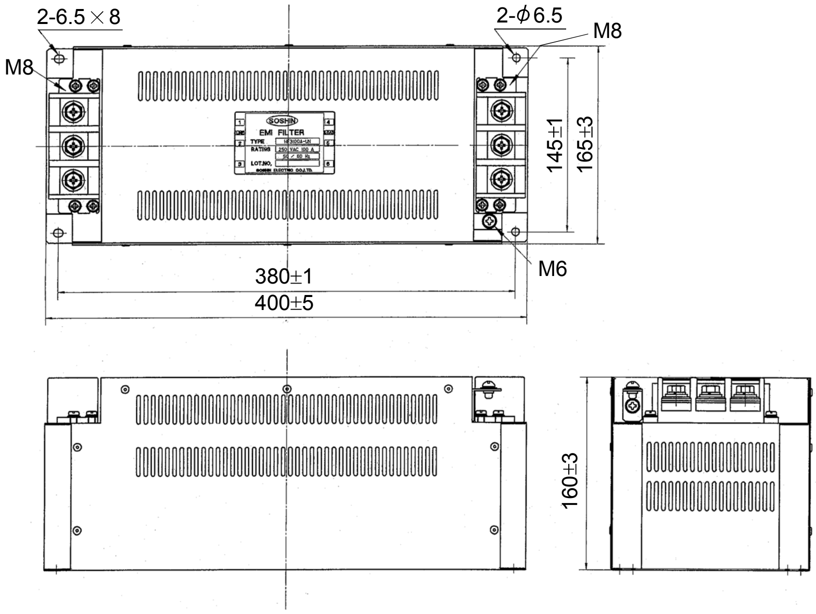
[Unit: mm]



Model	Dimensions [mm]											
	A	B	C	D	E	F	G	H	J	K	L	M
HF3030A-UN HF3040A-UN	260	210	85	155	140	125	44	140	70	R3.25 length: 8	M5	M4

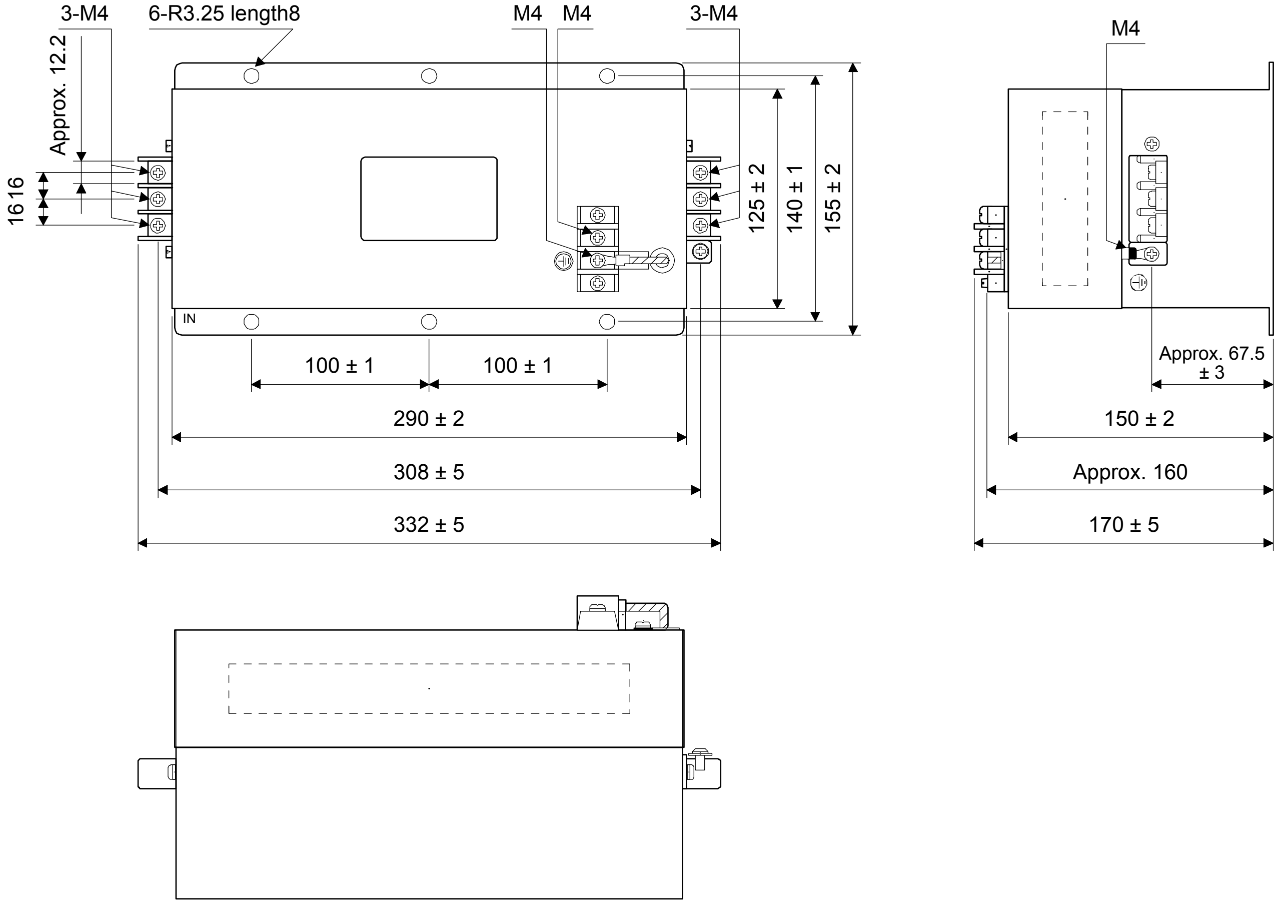
HF3100A-UN

[Unit: mm]



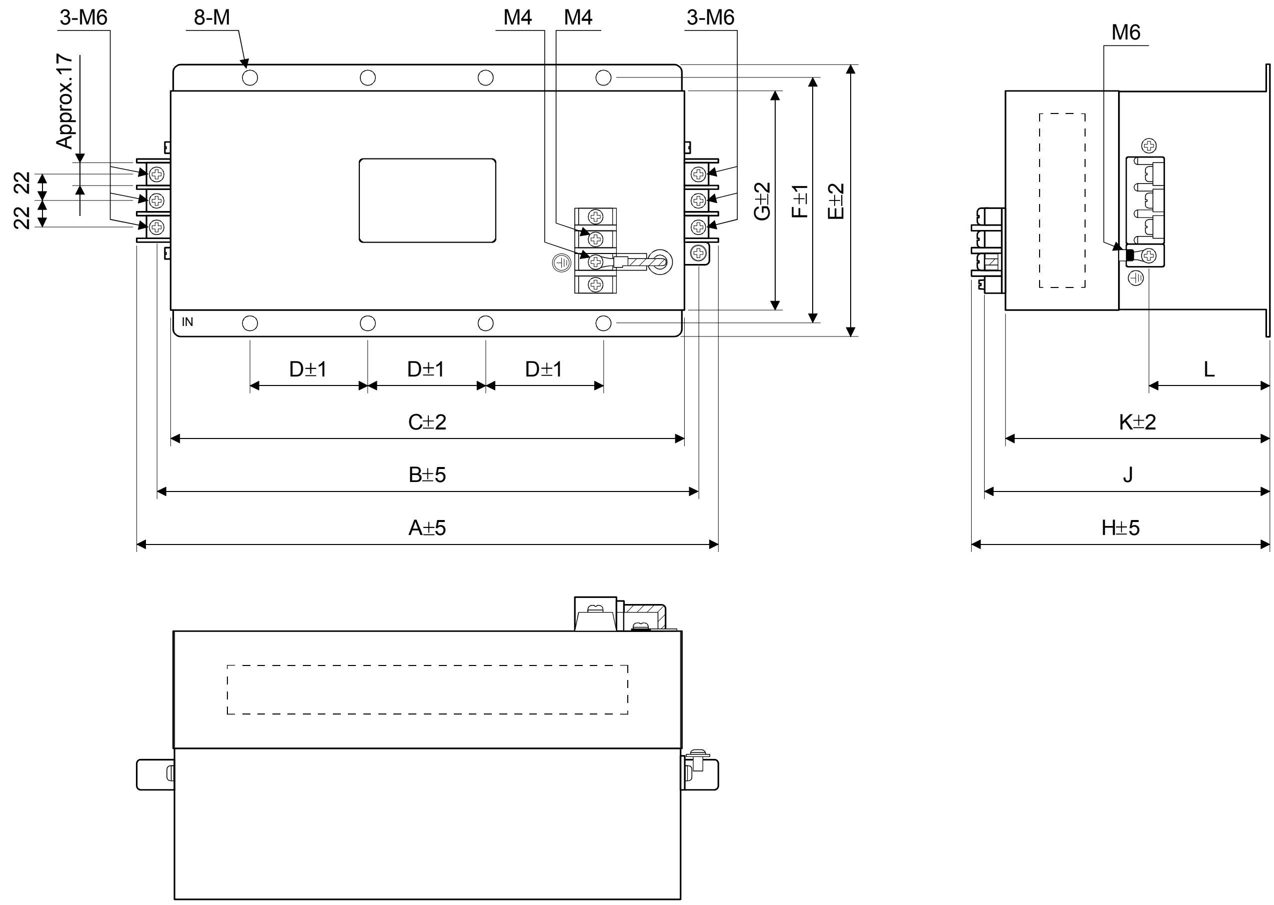
TF3005C-TX/TF3020C-TX/TF3030C-TX

[Unit: mm]



TF3040C-TX • F3060C-TX

[Unit: mm]

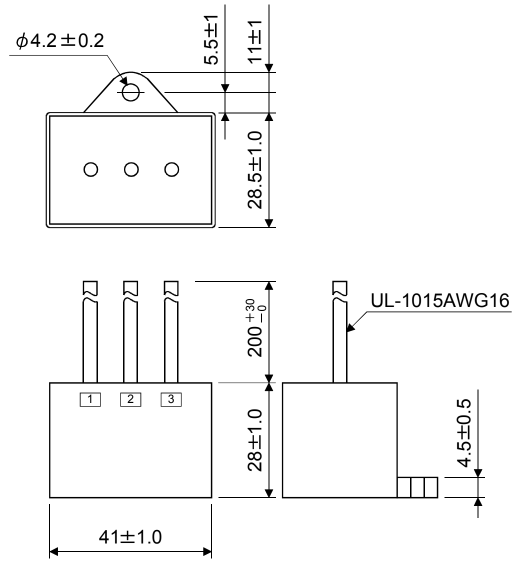


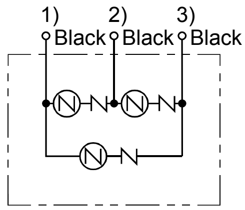
Model	Dimensions [mm]											
	A	B	C	D	E	F	G	H	J	K	L	M
TF3040C-TX TF3060C-TX	438	412	390	100	175	160	145	200	(190)	180	(91.5)	R3.25 length 8 (M6)

Surge protector

RAV-781BYZ-2

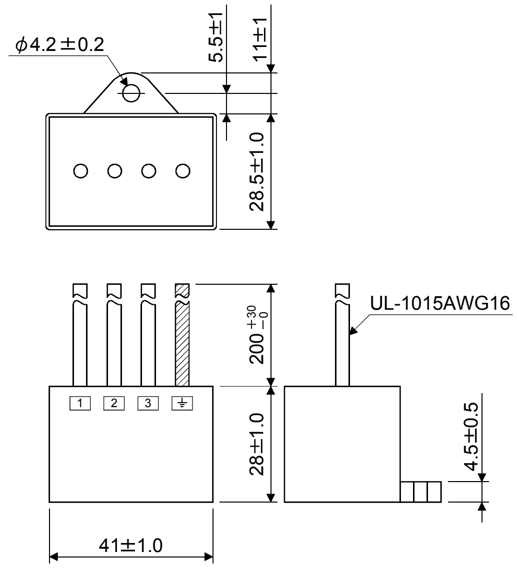
[Unit: mm]

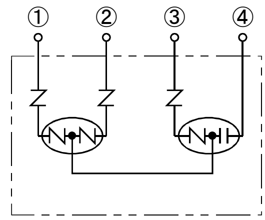




RAV-781BXZ-4

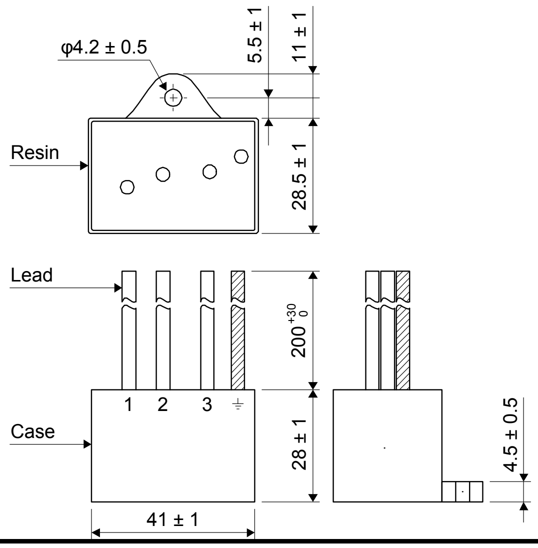
[Unit: mm]

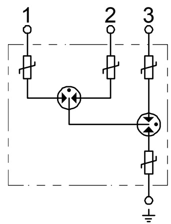




RSPD-250-U4

[Unit: mm]





7. POWER FACTOR IMPROVING AC REACTOR/POWER FACTOR IMPROVING DC REACTOR

7.1 MR-J3-Series Power Factor Improving DC Reactor

POINT
●For the 100V AC power supply type (MR-J3-_A1), the power factor improving DC reactor cannot be used.

The power factor improving DC reactor increases the form factor of the servo amplifier's input current to improve the power factor. It can decrease the power supply capacity. As compared to the power factor improving AC reactor (FR-BAL-(H)), it can decrease the loss. The input power factor is improved to about 95%. It is also effective to reduce the input side harmonics.
When connecting the power factor improving DC reactor to the servo amplifier, always disconnect P_1 and P_2 (For 11k to 22kW, disconnect P_1 and P). If it remains connected, the effect of the power factor improving DC reactor is not produced.
When used, the power factor improving DC reactor generates heat. To release heat, therefore, leave a 10cm or more clearance at each of the top and bottom, and a 5cm or more clearance on each side.

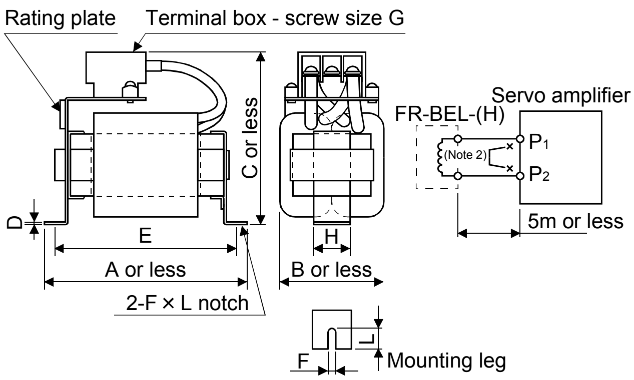


Fig.6.1

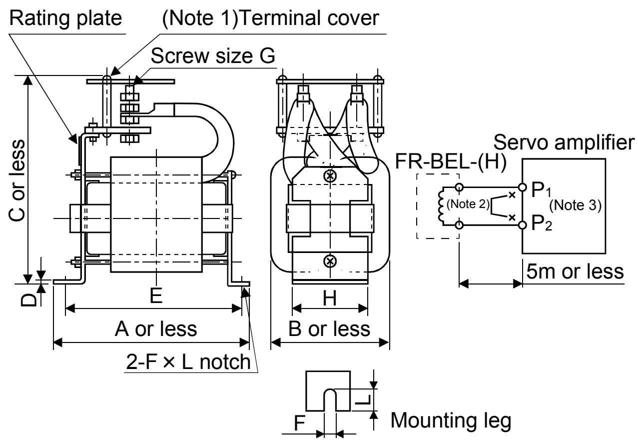


Fig.6.2

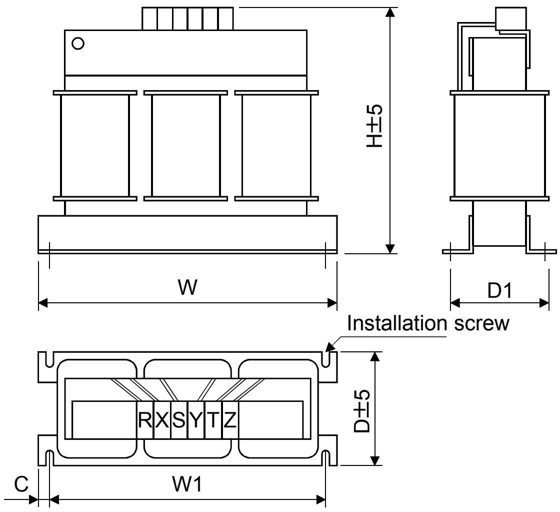
Note 1.Since the terminal cover is supplied, attach it after connecting a wire.
2.When using power factor improving DC reactor, disconnect P_1 and P_2.
3.When 11k to 22kW, "P_2" becomes "P", respectively.

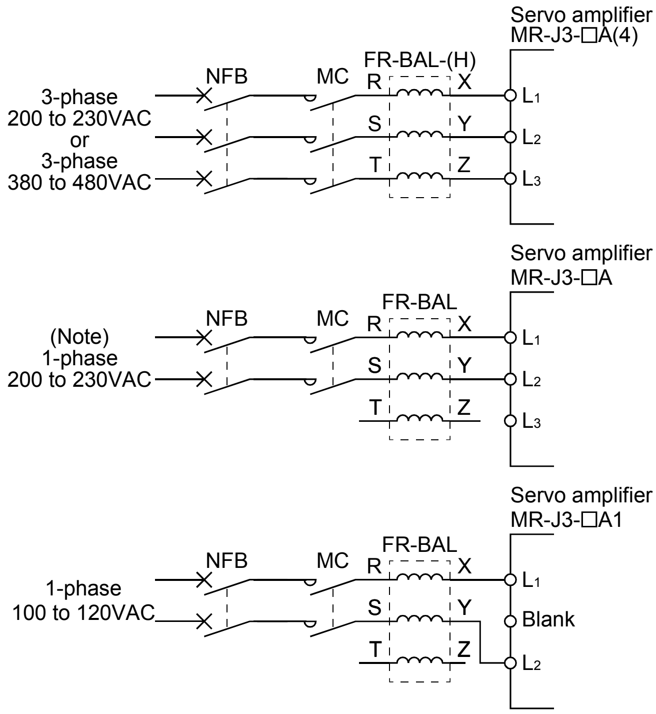
Servo amplifier	Power factor improving DC reactor	Outline drawing	Dimensions [mm]									Mounting screw size	Mass [kg (lb)]	Wire [mm^2] (Note)
			A	B	C	D	E	F	L	G	H			
MR-J3-10A/20A	FR-BEL-0.4K		110	50	94	1.6	95	6	12	M3.5	25	M5	0.5	
MR-J3-40A	FR-BEL-0.75K		120	53	102	1.6	105	6	12	M4	25	M5	0.7	
MR-J3-60A/70A	FR-BEL-1.5K		130	65	110	1.6	115	6	12	M4	30	M5	1.1	2 (AWG14)
MR-J3-100A	FR-BEL-2.2K	Fug. 6.1	130	65	110	1.6	115	6	12	M4	30	M5	1.2	
MR-J3-200A	FR-BEL-3.7K		150	75	102	2.0	135	6	12	M4	40	M5	1.7	
MR-J3-350A	FR-BEL-7.5K		150	75	126	2.0	135	6	12	M5	40	M5	2.3	3.5 (AWG12)
MR-J3-500A	FR-BEL-11K		170	93	132	2.3	155	6	14	M5	50	M5	3.1	5.5 (AWG10)
MR-J3-700A	FR-BEL-15K		170	93	170	2.3	155	6	14	M8	56	M5	3.8	8 (AWG8)
MR-J3-11KA														22 (AWG4)
MR-J3-15KA	FR-BEL-22K	Fug. 6.2	185	119	182	2.6	165	7	15	M8	70	M6	5.4	30 (AWG2)
MR-J3-22KA	FR-BEL-30K		185	119	201	2.6	165	7	15	M8	70	M6	6.7	60 (AWG2/0)
MR-J3-60A4	FR-BEL-H1.5K		130	63	89	1.6	115	6	12	M3.5	32	M5	0.9	
MR-J3-100A4	FR-BEL-H2.2K		130	63	101	1.6	115	6	12	M3.5	32	M5	1.1	2 (AWG14)
MR-J3-200A4	FR-BEL-H3.7K	Fug. 6.1	150	75	102	2	135	6	12	M4	40	M5	1.7	
MR-J3-350A4	FR-BEL-H7.5K		150	75	124	2	135	6	12	M4	40	M5	2.3	
MR-J3-500A4	FR-BEL-H11K		170	93	132	2.3	155	6	14	M5	50	M5	3.1	5.5 (AWG10)
MR-J3-700A4	FR-BEL-H15K		170	93	160	2.3	155	6	14	M6	56	M5	3.7	8 (AWG8)
MR-J3-11KA4		Fug. 6.2												
MR-J3-15KA4	FR-BEL-H22K		185	119	171	2.6	165	7	15	M6	70	M6	5.0	22 (AWG4)
MR-J3-22KA4	FR-BEL-H30K		185	119	189	2.6	165	7	15	M6	70	M6	6.7	

Note Selection condition of wire size is as follows.
Wire type: 600 V Polyvinyl chloride insulated wire (IV wire)
Construction condition: One wire is constructed in the air

7.2 MR-J3-Series Power Factor Improving AC Reactor

The power factor improving reactors improve the phase factor by increasing the form factor of servo amplifier's input current.
It can reduce the power capacity.
The input power factor is improved to be about 90%. For use with a 1-phase power supply, it may be slightly lower than 90%.
In addition, it reduces the higher harmonic of input side.
When using power factor improving AC reactors for two or more servo amplifiers, be sure to connect a power factor improving AC reactor to each servo amplifier.
If using only one power factor improving AC reactor, enough improvement effect of phase factor cannot be obtained unless all servo amplifiers are operated.





Note For the 1-phase 200 to 230 V AC power supply, Connect the power supply to L_1, L_2 and leave L_3 open.

Servo amplifier	Power factor improving AC reactor	Dimensions [mm]						Mounting screw size	Terminal screw size	Mass [kg (lb)]
		W	W1	H	D	D1	C			
MR-J3-10A/20A/10A1	FR-BAL-0.4K	135	120	115	59	$45^{0}_{-2.5}$	7.5	M4	M3.5	2.0
MR-J3-40A/20A1	FR-BAL-0.75K	135	120	115	69	$57^{0}_{-2.5}$	7.5	M4	M3.5	2.8
MR-J3-60A/70A/40A1	FR-BAL-1.5K	160	145	140	71	$55^{0}_{-2.5}$	7.5	M4	M3.5	3.7
MR-J3-100A	FR-BAL-2.2K	160	145	140	91	$75^{0}_{-2.5}$	7.5	M4	M3.5	5.6
MR-J3-200A	FR-BAL-3.7K	220	200	192	90	$70^{0}_{-2.5}$	10	M5	M4	8.5
MR-J3-350A	FR-BAL-7.5K	220	200	194	120	$100^{0}_{-2.5}$	10	M5	M5	14.5
MR-J3-500A	FR-BAL-11K	280	255	220	135	$100^{0}_{-2.5}$	12.5	M6	M6	19
MR-J3-700A	FR-BAL-15K	295	270	275	133	$110^{0}_{-2.5}$	12.5	M6	M6	27
MR-J3-11KA										
MR-J3-15KA	FR-BAL-22K	290	240	301	199	170±5	25	M8	M8	35
MR-J3-22KA	FR-BAL-30K	290	240	301	219	190±5	25	M8	M8	43
MR-J3-60A4	FR-BAL-H1.5K	160	145	140	87	$70^{0}_{-2.5}$	7.5	M4	M3.5	5.3
MR-J3-100A4	FR-BAL-H2.2K	160	145	140	91	$75^{0}_{-2.5}$	7.5	M4	M3.5	5.9
MR-J3-200A4	FR-BAL-H3.7K	220	200	190	90	$70^{0}_{-2.5}$	10	M5	M3.5	8.5
MR-J3-350A4	FR-BAL-H7.5K	220	200	192	120	100±5	10	M5	M4	14
MR-J3-500A4	FR-BAL-H11K	280	255	226	130	100±5	12.5	M6	M5	18.5
MR-J3-700A4	FR-BAL-H15K	295	270	244	130	110±5	12.5	M6	M5	27
MR-J3-11KA4										
MR-J3-15KA4	FR-BAL-H22K	290	240	269	199	170±5	25	M8	M8	Approx. 35
MR-J3-22KA4	FR-BAL-H30K	290	240	290	219	190±5	25	M8	M8	Approx. 43

7.3 MR-J4-Series Power factor improving DC reactors (200 V class)

The following shows the advantages of using power factor improving DC reactor.
- It improves the power factor by increasing the form factor of the servo amplifier's input current.
- It decreases the power supply capacity.
- The input power factor is improved to be about 85%.
- As compared to the power factor improving AC reactor (FR-HAL-(H)), it decreases the loss.

When connecting the power factor improving DC reactor to the servo amplifier, always disconnect P3 and P4. If it remains connected, the effect of the power factor improving DC reactor is not produced.
When used, the power factor improving DC reactor generates heat. To release heat, therefore, leave a 10 cm or more clearance at each of the top and bottom, and a 5 cm or more clearance on each side.

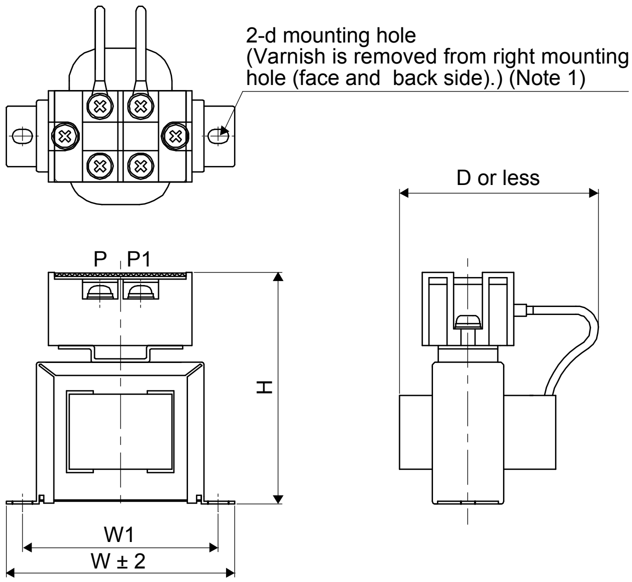


Fig. 6.3

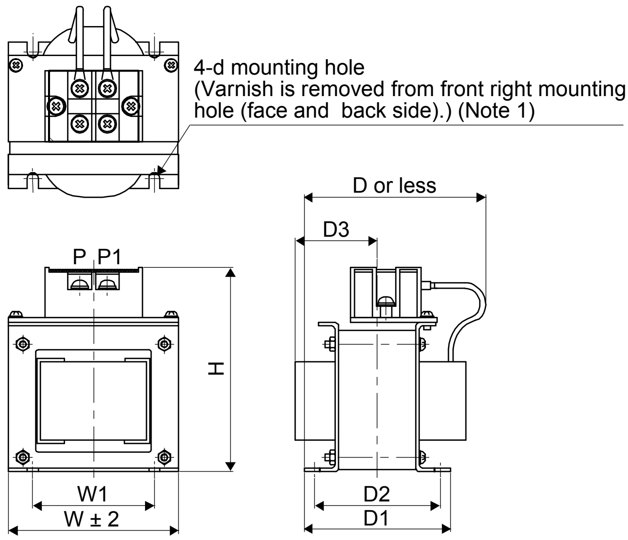


Fig. 6.4

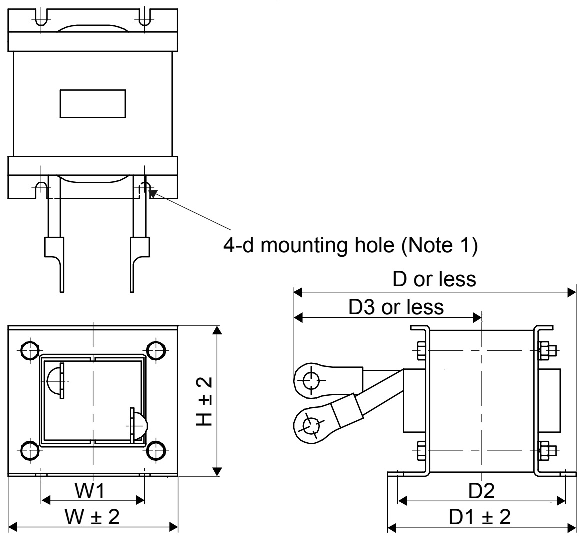
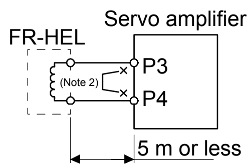


Fig. 6.5



Note 1. Use this for grounding.
2. When using the Power factor improving DC reactor, remove the short bar across P3-P4.

<table>
<tr><th rowspan="2">Servo amplifier</th><th rowspan="2">Power factor improving DC reactor</th><th rowspan="2">Outline drawing</th><th colspan="8">Dimensions [mm]</th><th rowspan="2">Terminal size</th><th rowspan="2">Mass [kg]</th><th rowspan="2">Wire [mm²] (Note 2)</th></tr>
<tr><th>W</th><th>W1</th><th>H</th><th>D (Note 1)</th><th>D1</th><th>D2</th><th>D3</th><th>d</th></tr>
<tr><td>MR-J4-10_,
MR-J4-20_</td><td>FR-HEL-0.4K</td><td rowspan="4">Fig. 6.3</td><td>70</td><td>60</td><td>71</td><td>61</td><td rowspan="4"></td><td>21</td><td rowspan="4"></td><td>M4</td><td>M4</td><td>0.4</td><td rowspan="5">2 (AWG 14)</td></tr>
<tr><td>MR-J4-40_</td><td>FR-HEL-0.75K</td><td>85</td><td>74</td><td>81</td><td>61</td><td>21</td><td>M4</td><td>M4</td><td>0.5</td></tr>
<tr><td>MR-J4-60_,
MR-J4-70_</td><td>FR-HEL-1.5K</td><td>85</td><td>74</td><td>81</td><td>70</td><td>30</td><td>M4</td><td>M4</td><td>0.8</td></tr>
<tr><td>MR-J4-100_</td><td>FR-HEL-2.2K</td><td>85</td><td>74</td><td>81</td><td>70</td><td>30</td><td>M4</td><td>M4</td><td>0.9</td></tr>
<tr><td>MR-J4-200_</td><td>FR-HEL-3.7K</td><td rowspan="6">Fig. 6.4</td><td>77</td><td>55</td><td>92</td><td>82</td><td>66</td><td>57</td><td>37</td><td>M4</td><td>M4</td><td>1.5</td></tr>
<tr><td>MR-J4-350_</td><td>FR-HEL-7.5K</td><td>86</td><td>60</td><td>113</td><td>98</td><td>81</td><td>72</td><td>43</td><td>M4</td><td>M5</td><td>2.5</td><td>3.5 (AWG 12)</td></tr>
<tr><td>MR-J4-500_</td><td>FR-HEL-11K</td><td>105</td><td>64</td><td>133</td><td>112</td><td>92</td><td>79</td><td>47</td><td>M6</td><td>M6</td><td>3.3</td><td>5.5 (AWG 10)</td></tr>
<tr><td>MR-J4-700_</td><td>FR-HEL-15K</td><td>105</td><td>64</td><td>133</td><td>115</td><td>97</td><td>84</td><td>48.5</td><td>M6</td><td>M6</td><td>4.1</td><td>8 (AWG 8)</td></tr>
<tr><td>MR-J4-11K_</td><td>FR-HEL-15K</td><td>105</td><td>64</td><td>133</td><td>115</td><td>97</td><td>84</td><td>48.5</td><td>M6</td><td>M6</td><td>4.1</td><td>14 (AWG 6)</td></tr>
<tr><td>MR-J4-15K_</td><td>FR-HEL-22K</td><td>105</td><td>64</td><td>93</td><td>175</td><td>117</td><td>104</td><td>115 (Note 1)</td><td>M6</td><td>M10</td><td>5.6</td><td>22 (AWG 4)</td></tr>
<tr><td>MR-J4-22K_</td><td>FR-HEL-30K</td><td>Fig. 6.5</td><td>114</td><td>72</td><td>100</td><td>200</td><td>125</td><td>101</td><td>135 (Note 1)</td><td>M6</td><td>M10</td><td>7.8</td><td>38 (AWG 2)</td></tr>
</table>

Note 1. Maximum dimensions. The dimension varies depending on the input/output lines.

2. Selection conditions of wire size are as follows.
Wire type: 600 V grade heat-resistant polyvinyl chloride insulated wire (HIV wire)
Construction condition: Single wire set in midair

7.4 MR-J4-Series Power factor improving DC reactors (400 V class)

The following shows the advantages of using power factor improving DC reactor.

- It improves the power factor by increasing the form factor of the servo amplifier's input current.
- It decreases the power supply capacity.
- The input power factor is improved to be about 85%.
- As compared to the power factor improving AC reactor (FR-HAL-(H)), it decreases the loss.

When connecting the power factor improving DC reactor to the servo amplifier, always disconnect P3 and P4. If it remains connected, the effect of the power factor improving DC reactor is not produced.
When used, the power factor improving DC reactor generates heat. To release heat, therefore, leave a 10 cm or more clearance at each of the top and bottom, and a 5 cm or more clearance on each side.

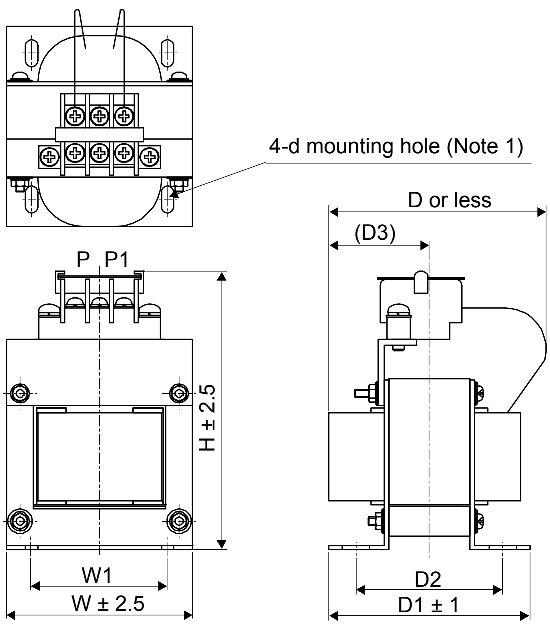


Fig. 6.6

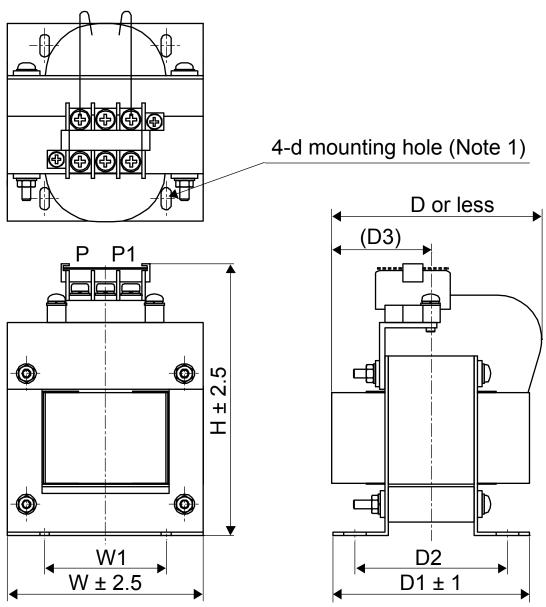


Fig. 6.7

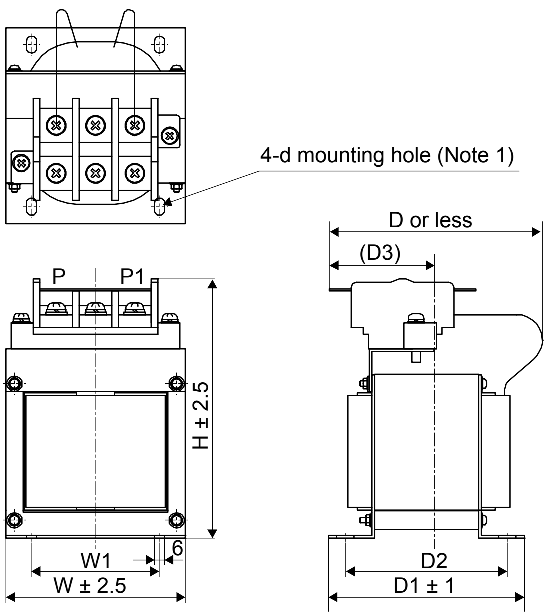
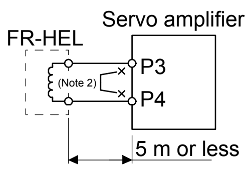


Fig. 6.8



Note 1. Use this for grounding.
2. When using the power factor improving DC reactor, remove the short bar across P3 and P4.

Servo amplifier	Power factor improving DC reactor	Outline drawing	Dimensions [mm]								Terminal size	Mass [kg]	Wire [mm^2] (Note)
			W	W1	H	D	D1	D2	D3	d			
MR-J4-60_4	FR-HEL-H1.5K	Fig. 6.6	66	50	100	80	74	54	37	M4	M3.5	1.0	2 (AWG 14)
MR-J4-100_4	FR-HEL-H2.2K		76	50	110	80	74	54	37	M4	M3.5	1.3	2 (AWG 14)
MR-J4-200_4	FR-HEL-H3.7K	Fig. 6.7	86	55	120	95	89	69	45	M4	M4	2.3	2 (AWG 14)
MR-J4-350_4	FR-HEL-H7.5K		96	60	128	105	100	80	50	M5	M4	3.5	2 (AWG 14)
MR-J4-500_4	FR-HEL-H11K		105	75	137	110	105	85	53	M5	M5	4.5	3.5 (AWG 12)
MR-J4-700_4	FR-HEL-H15K	Fig. 6.8	105	75	152	125	115	95	62	M5	M6	5.0	5.5 (AWG 10)
MR-J4-11K_4													8 (AWG 8)
MR-J4-15K_4	FR-HEL-H22K		133	90	178	120	95	75	53	M5	M6	6.0	8 (AWG 8)
MR-J4-22K_4	FR-HEL-H30K		133	90	178	120	100	80	56	M5	M6	6.5	14 (AWG 6)

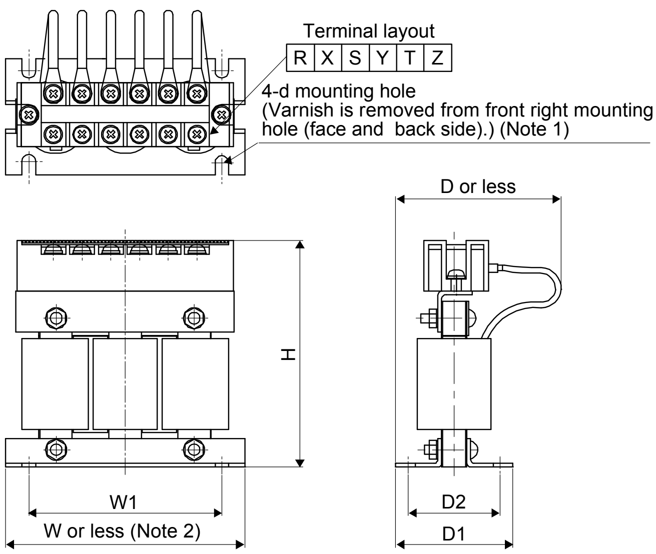
Note Selection conditions of wire size are as follows.
Wire type: 600 V grade heat-resistant polyvinyl chloride insulated wire (HIV wire)
Construction condition: Single wire set in midair

7.5 MR-J4-Series Power factor improving AC reactors (200 V/100 V class)

The following shows the advantages of using power factor improving AC reactor.

- It improves the power factor by increasing the form factor of the servo amplifier's input current.
- It decreases the power supply capacity.
- The input power factor is improved to be about 80%.

When using power factor improving reactors for two servo amplifiers or more, be sure to connect a power factor improving reactor to each servo amplifier. If using only one power factor improving reactor, enough improvement effect of phase factor cannot be obtained unless all servo amplifiers are operated.



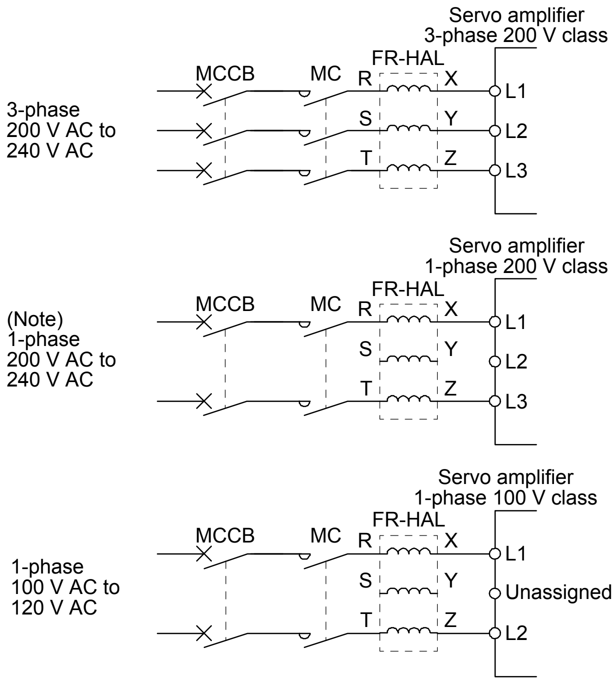


Fig. 6.9

Note 1. Use this hole for grounding.
2. W ± 2 is applicable for FR-HAL-0.4K to FR-HAL-1.5K.

Note For 1-phase 200 V AC to 240 V AC, connect the power supply to L1 and L3. Leave L2 open.

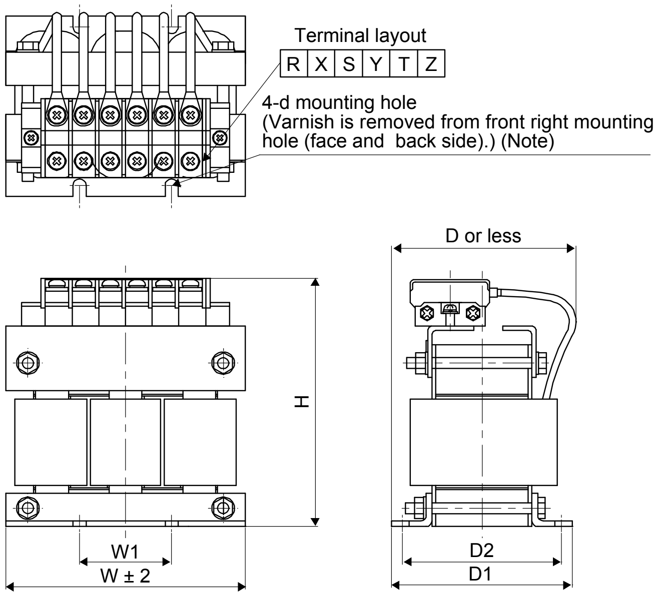


Fig. 6.10

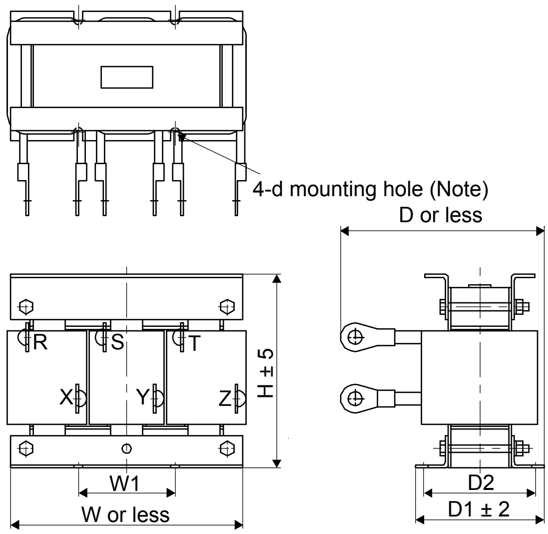


Fig. 6.11

Note Use this hole for grounding.

Note Use this for grounding.

Servo amplifier	Power factor improving AC reactor	Outline drawing	Dimensions [mm]							Terminal size	Mass [kg]
			W	W1	H	D (Note)	D1	D2	d		
MR-J4-10_, MR-J4-20_	FR-HAL-0.4K	Fig. 6.9	104	84	99	72	51	40	M5	M4	0.6
MR-J4-40_	FR-HAL-0.75K		104	84	99	74	56	44	M5	M4	0.8
MR-J4-60_, MR-J4-70_	FR-HAL-1.5K		104	84	99	77	61	50	M5	M4	1.1
MR-J4-100_	FR-HAL-2.2K		115 (Note)	40	115	77	71	57	M6	M4	1.5
MR-J4-200_	FR-HAL-3.7K		115 (Note)	40	115	83	81	67	M6	M4	2.2
MR-J4-350_	FR-HAL-7.5K	Fig. 6.10	130	50	135	100	98	86	M6	M5	4.2
MR-J4-500_	FR-HAL-11K		160	75	164	111	109	92	M6	M6	5.2
MR-J4-700_	FR-HAL-15K		160	75	167	126	124	107	M6	M6	7.0
MR-J4-11K_	FR-HAL-15K		160	75	167	126	124	107	M6	M6	7.0
MR-J4-15K_	FR-HAL-22K		185 (Note)	75	150	158	100	87	M6	M8	9.0
MR-J4-22K_	FR-HAL-30K	Fig. 6.11	185 (Note)	75	150	168	100	87	M6	M10	9.7

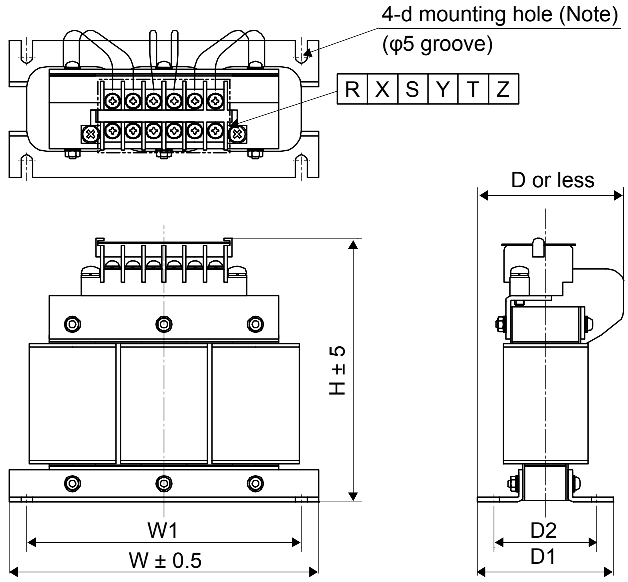
Note Maximum dimensions. The dimension varies depending on the input/output lines.

7.6 MR-J4-Series Power factor improving AC reactors (400 V class)

The following shows the advantages of using power factor improving AC reactor.

- It improves the power factor by increasing the form factor of the servo amplifier's input current.
- It decreases the power supply capacity.
- The input power factor is improved to be about 80%.

When using power factor improving reactors for two servo amplifiers or more, be sure to connect a power factor improving reactor to each servo amplifier. If using only one power factor improving reactor, enough improvement effect of phase factor cannot be obtained unless all servo amplifiers are operated.



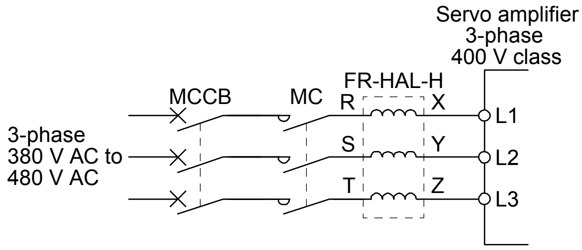


Fig. 6.15

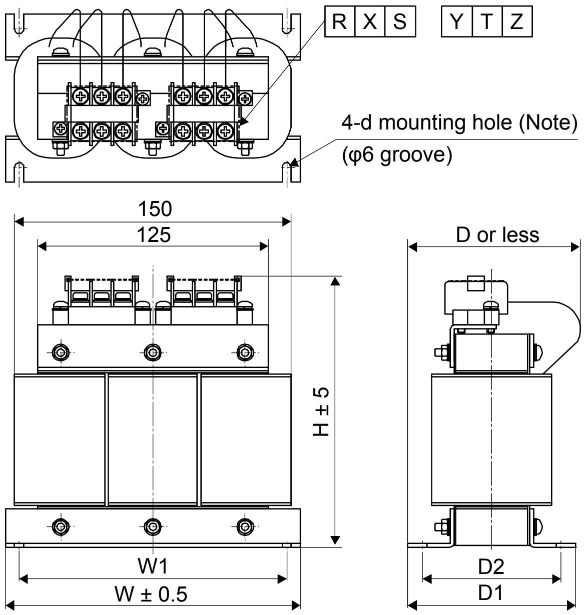


Fig. 6.16

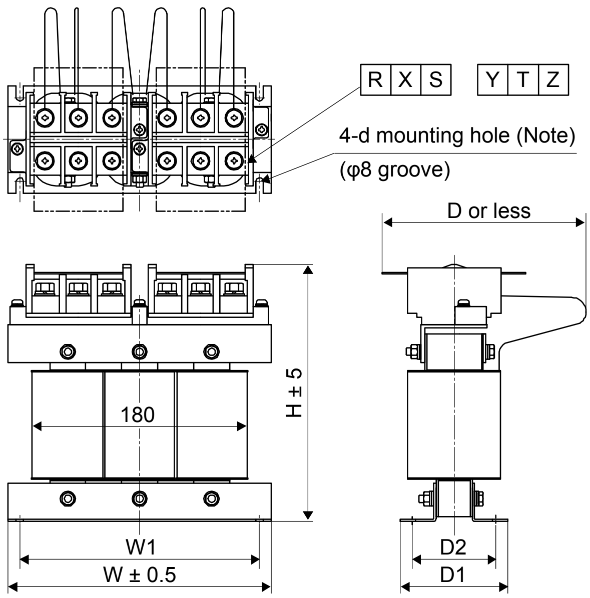


Fig. 6.17

Note Use this for grounding.

Servo amplifier	Power factor improving AC reactor	Outline drawing	Dimensions [mm]							Terminal size	Mass [kg]
			W	W1	H	D (Note)	D1	D2	d		
MR-J4-60_4	FR-HAL-H1.5K	Fig. 6.15	135	120	115	59	59.6	45	M4	M3.5	1.5
MR-J4-100_4	FR-HAL-H2.2K		135	120	115	59	59.6	45	M4	M3.5	1.5
MR-J4-200_4	FR-HAL-H3.7K		135	120	115	69	70.6	57	M4	M3.5	2.5
MR-J4-350_4	FR-HAL-H7.5K	Fig. 6.16	160	145	142	91	91	75	M4	M4	5.0
MR-J4-500_4	FR-HAL-H11K		160	145	146	91	91	75	M4	M5	6.0
MR-J4-700_4 MR-J4-11K_4	FR-HAL-H15K		220	200	195	105	90	70	M5	M5	9.0
MR-J4-15K_4	FR-HAL-H22K	Fig. 6.17	220	200	215	170	90	70	M5	M8	9.5
MR-J4-22K_4	FR-HAL-H30K		220	200	215	170	96	75	M5	M8	11

Note Maximum dimensions. The dimension varies depending on the input/output lines.

8. MR CONFIGURATOR

8.1 MR-J3-Series MR Configurator (Setup Software)

The MR Configurator (MRZJW3-SETUP221E) uses the communication function of the servo amplifier to perform parameter setting changes, graph display, test operation, etc. on a personal computer.

* MR Configurator2 (SW1DNC-MRC2-_E) is available for the MR-J3 series.

8.1.1 Specifications

<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>Compatibility with a servo amplifier</td><td>The following table shows MR Configurator software version for each servo amplifier.
<table>
<tr><th rowspan="3">Version</th><th colspan="5">Compatible servo amplifier (Drive unit)</th></tr>
<tr><th colspan="3">200 V class</th><th colspan="2">400 V class</th></tr>
<tr><th>7 kW or less</th><th>11 to 22 kW</th><th>30 to 37 kW</th><th>7 kW or less</th><th>11 to 22 kW</th></tr>
<tr><td>B0toB2</td><td>O</td><td></td><td></td><td></td><td></td></tr>
<tr><td>B3</td><td>O</td><td></td><td></td><td></td><td></td></tr>
<tr><td>B4</td><td>O</td><td>O</td><td></td><td></td><td>O</td></tr>
<tr><td>B5</td><td>O</td><td>O</td><td>O</td><td></td><td>O</td></tr>
<tr><td>B8 or later</td><td>O</td><td>O</td><td>O</td><td>O</td><td>O</td></tr>
</table>
O: Enabled</td></tr>
<tr><td>Baud rate [bps]</td><td>115200/57600/38400/19200/9600</td></tr>
<tr><td>Monitor</td><td>Display all, high-speed display, graph display
(Minimum resolution changes with the processing speed of the personal computer.)</td></tr>
<tr><td>Alarm</td><td>Display, history, amplifier data</td></tr>
<tr><td>Diagnosis</td><td>DI/DO display, display of the reason for no rotation, power ON cumulative display, software No. display, motor information display, tuning data display, ABS data display, VC automatic offset display,
axis name setting</td></tr>
<tr><td>Parameter</td><td>Parameter list, turning, change list, detailed information</td></tr>
<tr><td>Test operation</td><td>JOG operation, positioning operation, motor-less operation, DO forced output, and program operation</td></tr>
<tr><td>Advanced function</td><td>Machine analyzer, gain search, machine simulation, robust disturbance compensation, advanced Gain search</td></tr>
<tr><td>File operation</td><td>Data read, save, delete, print</td></tr>
<tr><td>Others</td><td>Automatic demo, help display</td></tr>
</table>

8.2 MR-J4-Series MR Configurator2

MR Configurator2 (SW1DNC-MRC2-_E) uses the communication function of the servo amplifier to perform parameter setting changes, graph display, test operation, etc. on a personal computer.

8.2.1 Specifications

Item	Description
Project	Create/read/save/delete project, system setting, and print
Parameter	Parameter setting, axis name setting, parameter converter (Note 1)
Monitor	Display all, I/O monitor, graph, and ABS data display
Diagnosis	Alarm display, alarm onset data, drive recorder, no motor rotation, system configuration, life diagnosis, machine diagnosis
Test operation	Positioning operation, motor-less operation (Note 1), DO forced output, and program operation, test mode information
Adjustment	One-touch tuning, tuning, and machine analyzer
Others	Servo assistant, parameter setting range update, help display

Note 1. This is available only in the standard control mode.

8.3 System configuration

8.3.1 Components

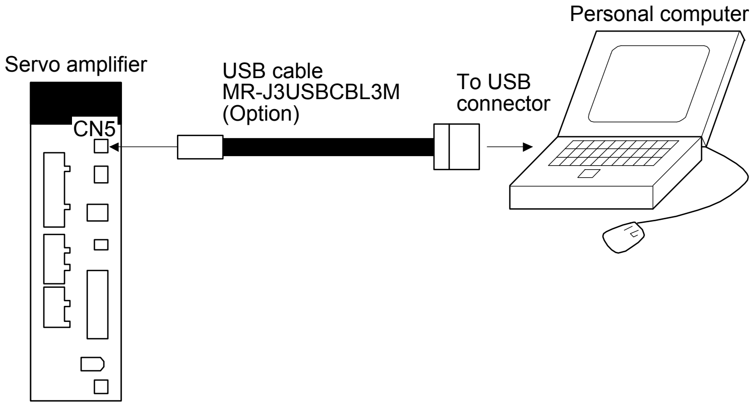
To use this software, the following components are required in addition to the servo amplifier and servo motor.

Equipment		Description
(Note 1, 2, 3, 4, 5) Personal computer	OS	Microsoft® Windows® 10 Enterprise, Microsoft® Windows® 10 Pro Microsoft® Windows® 10 Home Microsoft® Windows® 8.1 Enterprise Operating System Microsoft® Windows® 8.1 Pro, Operating System Microsoft® Windows® 8.1 Operating System 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
	CPU (Recommended)	Desktop personal computer: Intel® Celeron® processor, 2.8 GHz or more Notebook personal computer: Intel® Pentium® M processor, 1.7 GHz or more
	Memory (Recommended)	512 MB or more (for 32-bit OS), 1 GB or more (for 64-bit OS)
	Free space on the hard disk	1 GB or more
	Communication Interface	USB port
Browser	Windows® Internet Explorer® 4.0 or later	
Display	One whose resolution is 1024 × 768 or more and that can provide a high color (16 bit) display. Connectable with the above personal computer.	
Keyboard	Connectable with the above personal computer.	
Mouse	Connectable with the above personal computer.	
Printer	Connectable with the above personal computer.	
USB cable	MR-J3USBCBL3M	

Note 1. On some personal computers, MR Configurator2 may not run properly.
2. When Windows® XP or later is used, the following functions cannot be used.
   - Windows Program Compatibility mode
   - Fast User Switching
   - Remote Desktop
   - Large Fonts Mode (Display property)
   - DPI settings other than 96DPI (Display property)

   For 64-bit operating system, this software is compatible with Windows® 7 and Windows® 8.
3. When Windows® 7 or later is used, the following functions cannot be used.
   - Windows XP Mode
   - Windows touch
4. When using this software with Windows Vista® or later, log in as a user having USER authority or higher.
5. When Windows® 8 or later is used, the following functions cannot be used.
   - Hyper-V
   - Modern UI style

8.3.2 Connection with servo amplifier



8.3.3 Precautions for using USB communication function

Note the following to prevent an electric shock and malfunction of the servo amplifier.

(1) Power connection of personal computers
Connect your personal computer with the following procedures.

(a) When you use a personal computer with AC power supply

1) When using a personal computer with a three-core power plug or power plug with grounding wire, use a three-pin socket or ground the grounding wire.

2) When your personal computer has two-core plug and has no grounding wire, connect the personal computer to the servo amplifier with the following procedures.

a) Disconnect the power plug of the personal computer from an AC power socket.

b) Check that the power plug was disconnected and connect the device to the servo amplifier.

c) Connect the power plug of the personal computer to the AC power socket.

(b) When you use a personal computer with battery
You can use as it is.

(2) Connection with other devices using servo amplifier communication function
When the servo amplifier is charged with electricity due to connection with a personal computer and the charged servo amplifier is connected with other devices, the servo amplifier or the connected devices may malfunction. Connect the servo amplifier and other devices with the following procedures.

(a) Shut off the power of the device for connecting with the servo amplifier.

(b) Shut off the power of the servo amplifier which was connected with the personal computer and check the charge lamp is off.

(c) Connect the device with the servo amplifier.

(d) Turn on the power of the servo amplifier and the device.

9 PANEL THROUGH ATTACHMENT

POINT

- MR-J3ACN can be used only for MR-J4-22K_(4).

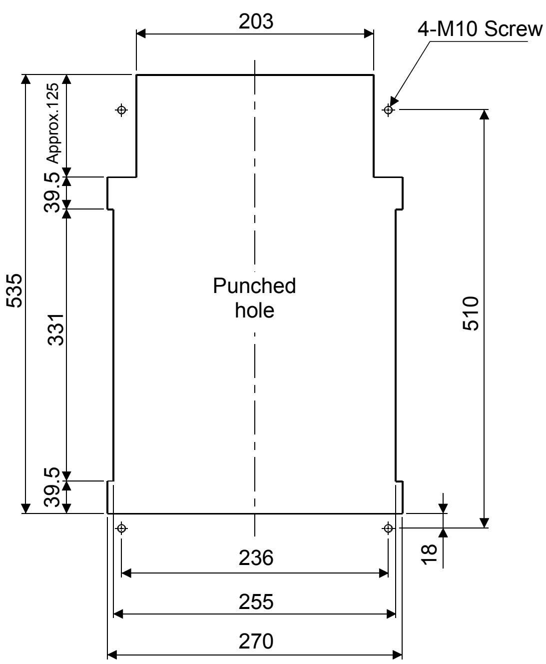
Panel through attachment	MR-J3-Series	MR-J4-Series
MR-J4ACN15K		MR-J4-11K_(4)(-RJ) MR-J4-15K_(4)(-RJ)
MR-J3ACN	MR-J3-11K_(4) to MR-J3-22K_(4)	MR-J4-22KA(4)(-RJ)

9.1 MR-J3-Series (MR-J3ACN)

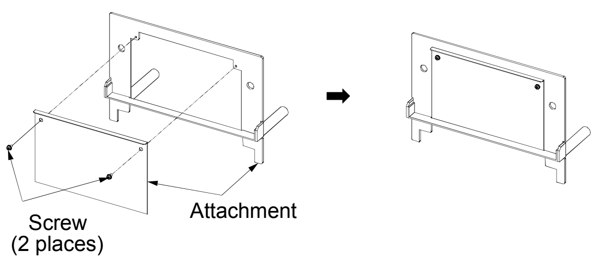
Use the Panel through attachment to mount the heat generation area of the servo amplifier in the outside of the control box to dissipate servo amplifier-generated heat to the outside of the box and reduce the amount of heat generated in the box, thereby allowing a compact control box to be designed.
In the control box, machine a hole having the panel cut dimensions, fit the panel through attachment to the servo amplifier with the fitting screws (4 screws supplied), and install the servo amplifier to the control box.
The environment outside the control box when using the panel through attachment should be within the range of the servo amplifier operating environment conditions.

(1) Panel cut dimensions

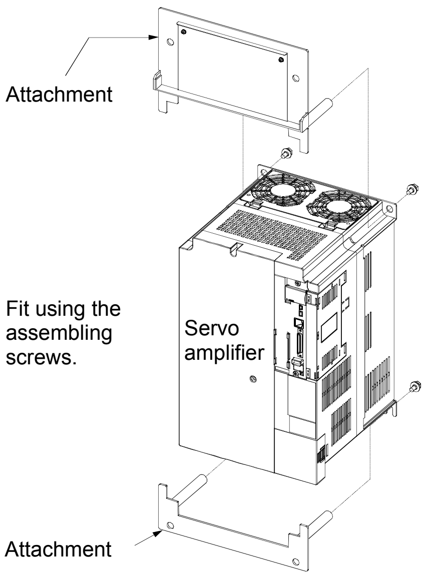
[Unit : mm]



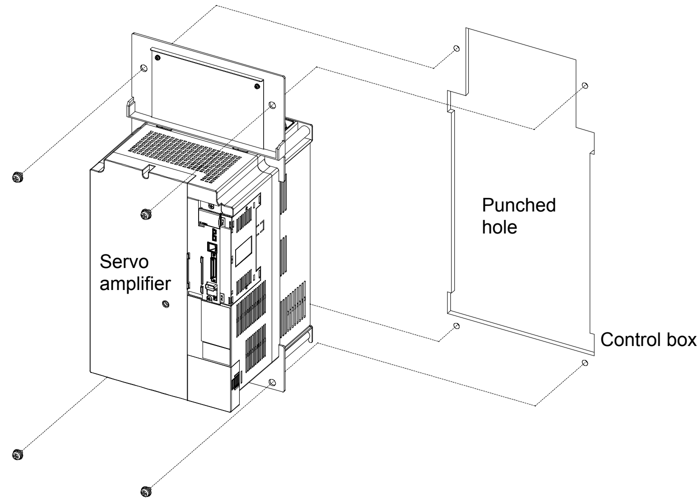
(2) How to assemble the attachment for a panel through attachment



(3) Fitting method



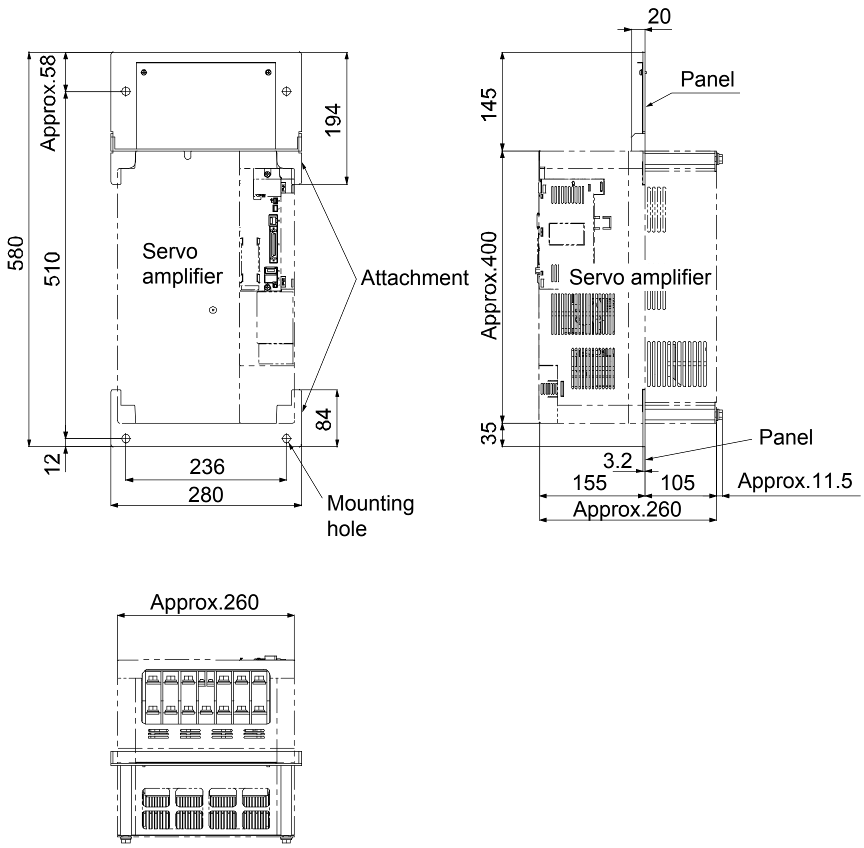
a. Assembling the panel through attachment



b. Installation to the control box

(4) Outline dimension drawing

[Unit: mm]

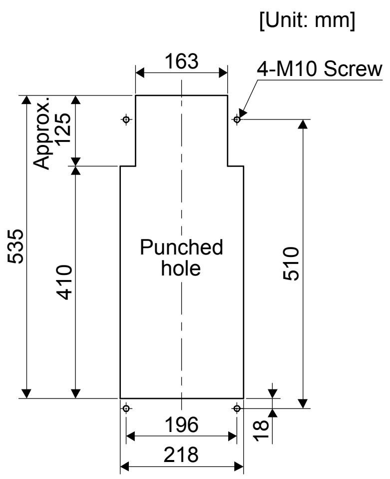


9.2 MR-J4-Series (MR-J4ACN15K • MR-J3ACN)

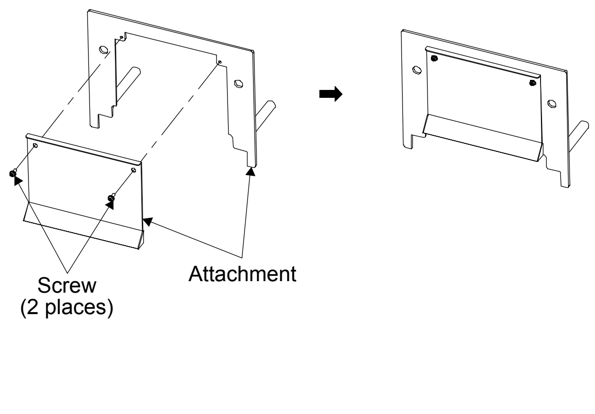
Use the panel through attachment to mount the heat generation area of the servo amplifier in the outside of the cabinet to dissipate servo amplifier-generated heat to the outside of the cabinet and reduce the amount of heat generated in the cabinet. In addition, designing a compact cabinet is allowed.
In the cabinet, machine a hole having the panel cut dimensions, fit the panel through attachment to the servo amplifier with the fitting screws (4 screws supplied), and install the servo amplifier to the cabinet.
Please prepare screws for mounting. They do not come with.
The environment outside the cabinet when using the panel through attachment should be within the range of the servo amplifier operating environment.
The panel through attachments are used for MR-J4-11KA(-RJ) to MR-J4-22KA(-RJ) and MR-J4-11KA4(-RJ) to MR-J4-22KA4(-RJ).
The following shows the combinations.

Servo amplifier	Panel through attachment
MR-J4-11KA(-RJ) MR-J4-15KA(-RJ)	MR-J4ACN15K
MR-J4-22KA(-RJ)	MR-J3ACN
MR-J4-11KA4(-RJ) MR-J4-15KA4(-RJ)	MR-J4ACN15K
MR-J4-22KA4(-RJ)	MR-J3ACN

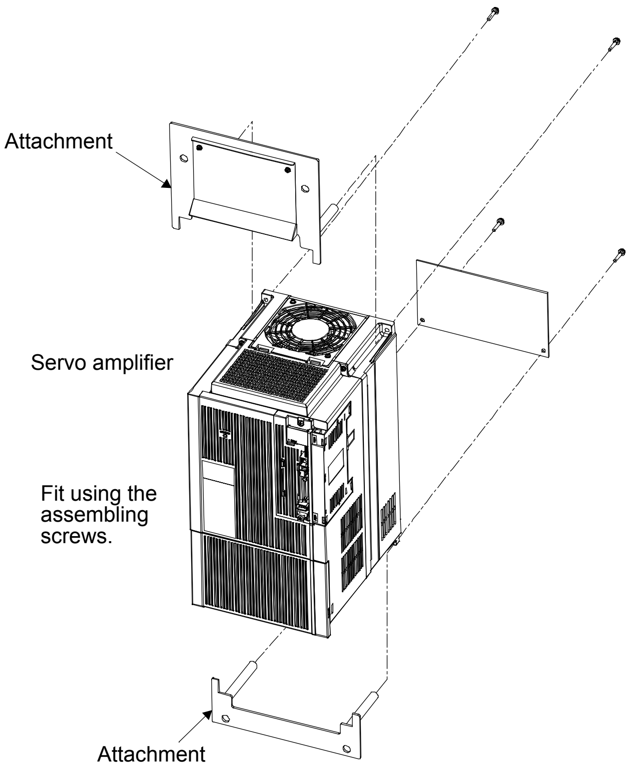
(1) MR-J4ACN15K
(a) Panel cut dimensions



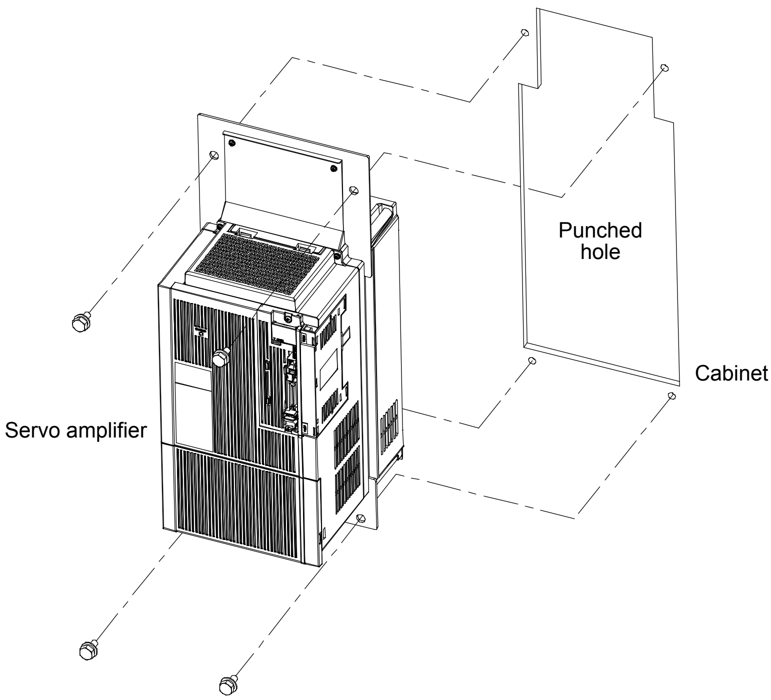
(b) How to assemble the attachment for panel through attachments



(c) Mounting method



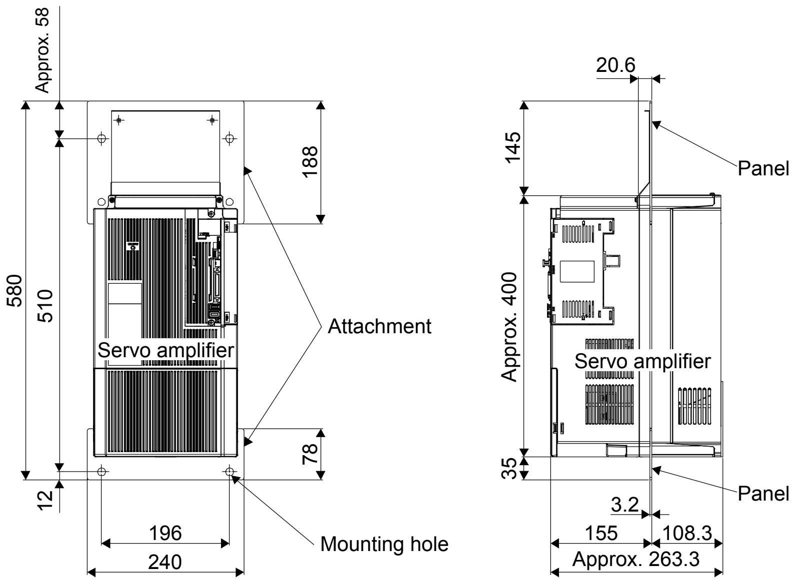
a. Assembling the panel through attachment



b. Mounting it to inside cabinet

(d) Mounting dimensional diagram

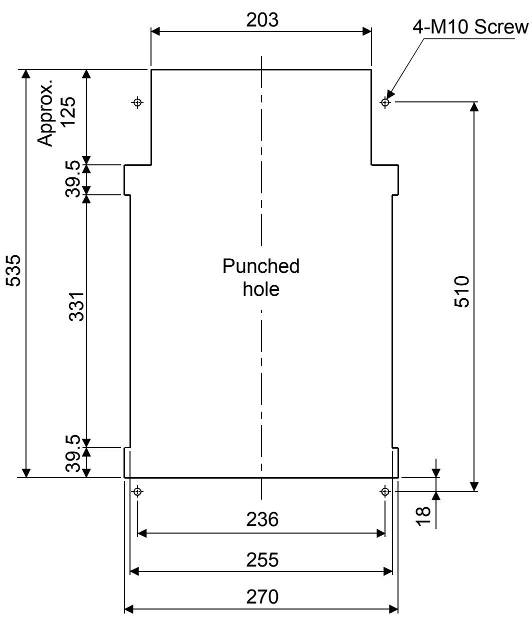
[Unit: mm]



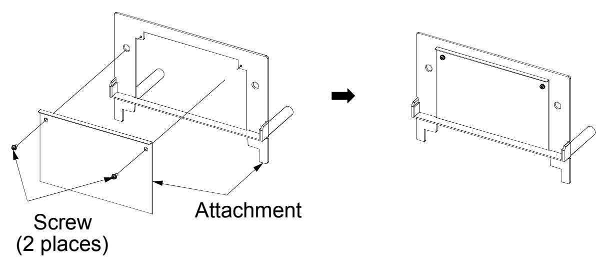
(2) MR-J3ACN

(a) Panel cut dimensions

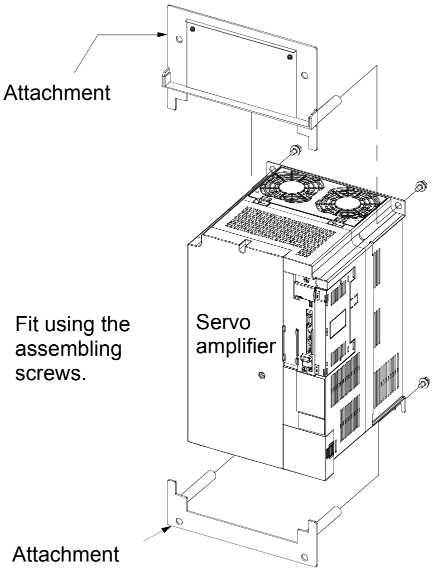
[Unit : mm]



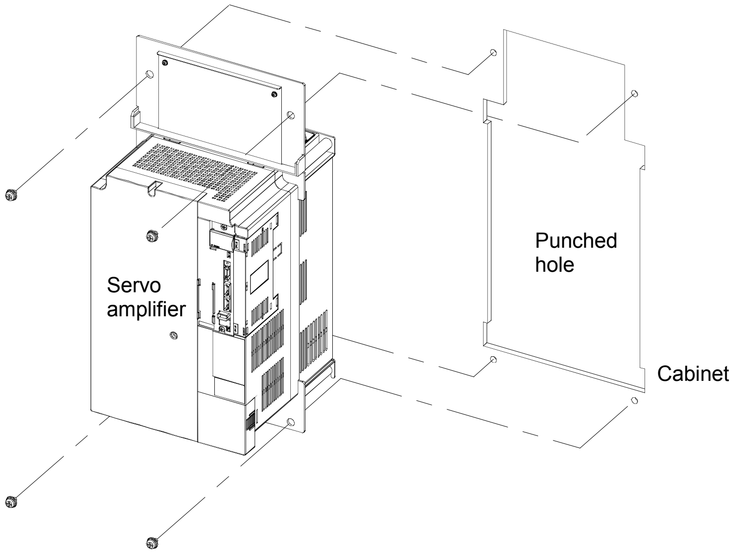
(b) How to assemble the attachment for panel through attachment



(c) Mounting method



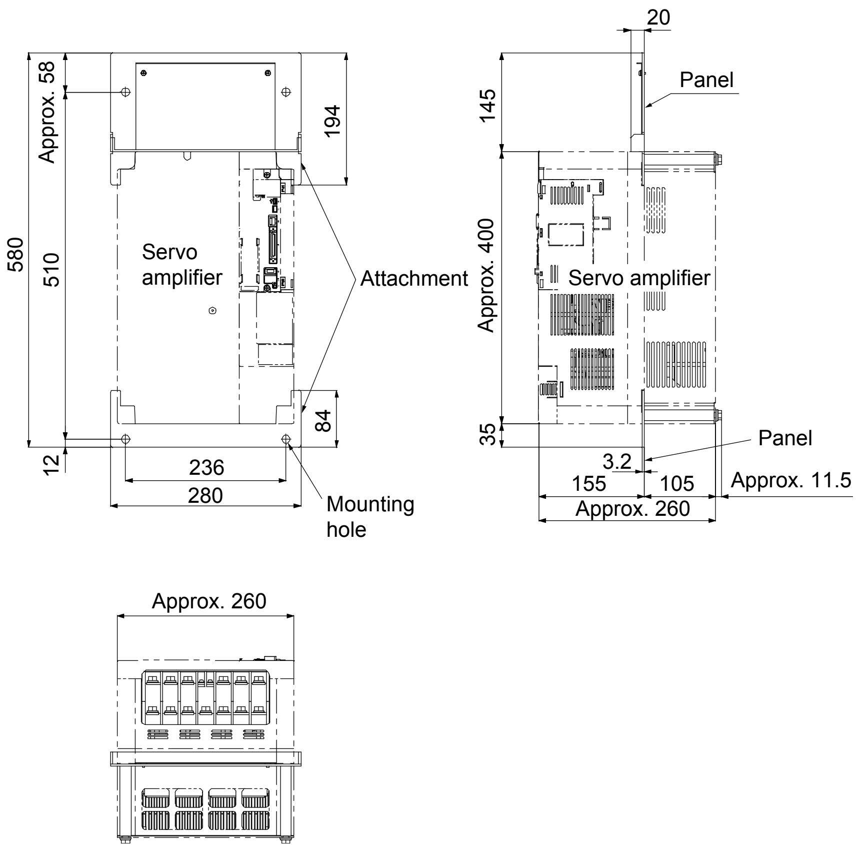
a. Assembling the panel through attachment



b. Mounting it to inside cabinet

(d) Mounting dimensional diagram

[Unit: mm]



Part 7

Startup Procedure Manual

Part 7: Startup Procedure Manual

1. STARTUP

WARNING	●Do not operate the switches with wet hands. Otherwise, it may cause an electric shock.

CAUTION	●Before starting operation, check the parameters. Improper settings may cause some machines to operate unexpectedly. ●The servo amplifier heat sink, regenerative resistor, servo motor, etc., may be hot while power is on or for some time after power-off. Take safety measures, example, provide covers to avoid accidentally touching the parts (cables, etc.) by hand. Otherwise, it may cause a burn injury and parts damaged. ●During operation, never touch the rotor of the servo motor. Otherwise, it may cause injury.

1.1 Switching power on for the first time

When switching power on for the first time, follow this section to make a startup.

1.1.1 Startup procedure

Parameter settings check for the currently used model	・・・ Confirm the parameter settings of the currently used MR-J3 amplifier with the display or with the setup software and record them.
↓	
Wiring check	・・・ Visually verify that the wires are correctly connected to the servo amplifier and the servo motor.
↓	
Surrounding environment check	・・・ Check the surrounding environment of the servo amplifier and servo motor.
↓	
Parameter setting (Note 1)	・・・ Set the parameters as necessary, such as the used control mode and regenerative option selection. (See to this Replacement Manual.)
↓	
Test operation of the servo motor alone in the test operation mode (Note 1, 2)	・・・ For the test operation, with the servo motor disconnected from the machine and operated at the speed as low as possible, check whether the servo motor rotates correctly.
↓	
Test operation with the servo motor and machine connected	・・・ After connecting the servo motor to the machine, check the motions of the machine by sending operation commands from a higher-level command-issuing device.
↓	
Gain adjustment (Note 1)	・・・ Make gain adjustment to optimize the machine motions.
↓	
Actual operation (Note 2)	・・・ Perform a home position return as necessary when in position control mode.
↓	
Stop	・・・ Stop giving commands and stop operation. In addition, check the conditions when the servo motor operation stops.

Note 1. For details about the settings for each servo amplifier and its test operation, see the applicable Servo Amplifier Instruction Manual. If the gain of the existing servo amplifier is extremely high, there may be slight differences in characteristics upon primary replacement. Make sure to set the gain again.
2. When turning on the power supply, also turn on the 24V DC power supply for the external interface. Otherwise, AL. E6.1 occurs.

REVISIONS

*The installation guide number is given on the bottom left of the back cover.

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MEMO

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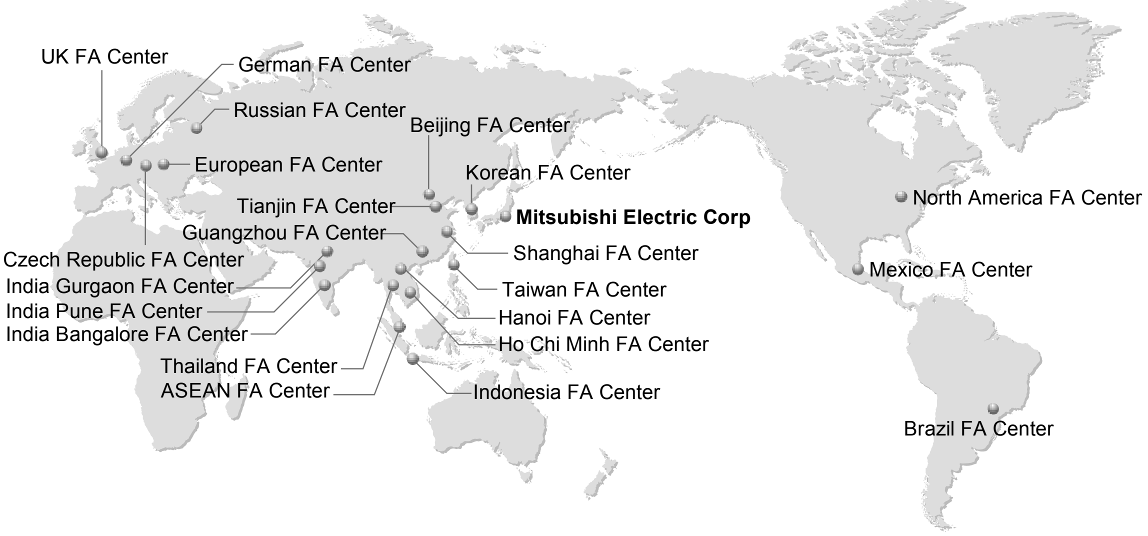

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⚠ Safety Warning
To ensure proper use of the products listed in this catalog, please be sure to read the instruction manual prior to use.

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