

General-Purpose AC Servo

MITSUBISHI SERVO AMPLIFIERS & MOTORS
MELSERVo-J4

SSCNETIII/H Interface for Pressure Control Servo Amplifier Instruction Manual

-MR-J4-_B_-LL
-MR-J4-DU_B_-LL

● Safety Instructions ●

Please read the instructions carefully before using the equipment.

To use the equipment correctly, do not attempt to install, operate, maintain, or inspect the equipment until you have read through this Instruction Manual, Installation guide, and appended documents carefully. Do not use the equipment until you have a full knowledge of the equipment, safety information and instructions. In this Instruction Manual, the safety instruction levels are classified into "WARNING" and "CAUTION".



Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.



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 depending on 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 what must not be done. For example, "No Fire" is indicated by .



Indicates what must be done. For example, grounding is indicated by .

In this Instruction Manual, instructions at a lower level than the above, instructions for other functions, and so on are classified into "POINT".

After reading this Instruction Manual, keep it accessible to the operator.

1. To prevent electric shock, note the following

WARNING

- Before wiring, turn off the power and wait for 15 minutes or more (20 minutes or more for converter unit) until the charge lamp turns off. Then, confirm that the voltage between P+ and N- (between L+ and L- for converter unit) 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. Otherwise, it 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 an electric shock, be sure to connect the protective earth (PE) terminal (marked $\oplus$) 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 smoke or a fire.
- Be sure to connect a magnetic contactor between the power supply and the main circuit power supply (L1, L2, and L3) of the servo amplifier, in order to configure a circuit that shuts off the power supply by the magnetic contactor. If a magnetic contactor is not connected, continuous flow of a large current may cause smoke or a fire when the servo amplifier malfunctions.
- Be sure to connect a molded-case circuit breaker or a fuse to each servo amplifier between the main circuit power supply and the power supply (L1, L2, and L3) of the servo amplifier, in order to configure a circuit that shuts off the power supply by the molded-case circuit breaker or the fuse. If a molded-case circuit breaker or fuse is not connected, a continuous flow of a large current may cause smoke or a fire when the servo amplifier malfunctions.
- When using a regenerative resistor, shut the power off with the alarm signal. Otherwise, a regenerative transistor malfunction or the like may overheat the regenerative resistor, causing smoke or a fire.
- Provide adequate protection to prevent screws and other conductive matter, oil and other combustible matter from entering the servo amplifier and servo motor.

3. To prevent injury, note the following

CAUTION

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

4. Additional instructions

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

(1) Transportation and 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.
- Leave specified clearances between the servo amplifier and cabinet walls or other equipment.
- 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.
- As the servo amplifiers and the servo motors are delicate products, avoid dropping or heavy impact.
- When you keep or use the equipment, please fulfill the following environment.

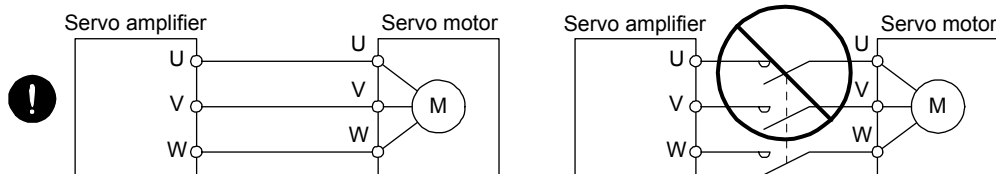
Item		Environment
Ambient temperature	Operation	0 °C to 55 °C (non-freezing)
	Storage	-20 °C to 65 °C (non-freezing)
Ambient humidity	Operation	5 %RH to 90 %RH (non-condensing)
	Storage	
Ambience		Indoors (no direct sunlight), free from corrosive gas, flammable gas, oil mist, dust, and dirt
Altitude		2000 m or less above sea level (Contact your local sales office for the altitude for options.)
Vibration resistance		5.9 m/s ² , at 10 Hz to 55 Hz (directions of X, Y and Z axes)

- When the equipment has been stored for an extended period of time, contact your local sales office.
- 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 a 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, such as heat treatment. Additionally, disinfect and protect wood from insects before packing the products.

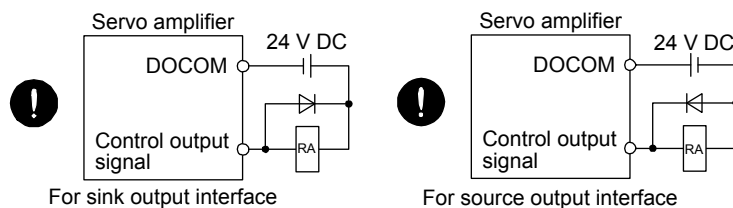
(2) Wiring

⚠ 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(-H)) on the servo amplifier output side.
- To avoid a malfunction, connect the wires to the correct phase terminals (U, V, and W) of the servo amplifier and servo motor.
- Connect the servo amplifier power outputs (U, V, and W) to the servo motor power inputs (U, V, and W) directly. Do not connect a magnetic contactor and others between them. 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 servo amplifier will malfunction and will not output signals, disabling the emergency stop and other protective circuits.



- When the wires are not tightened enough to the terminal block, the wires or terminal block may generate heat because of the poor contact. Be sure to tighten the wires with specified torque.
- Connecting a servo motor of the wrong axis to U, V, W, or CN2 of the servo amplifier may cause a malfunction.
- 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) Test run and adjustment

⚠ CAUTION

- Before operation, check and adjust the parameter settings. Improper settings may cause some machines to operate unexpectedly.
- Never make a drastic adjustment or change to the parameter values as doing so will make the operation unstable.
- Do not get close to moving parts during the servo-on status.

(4) Usage

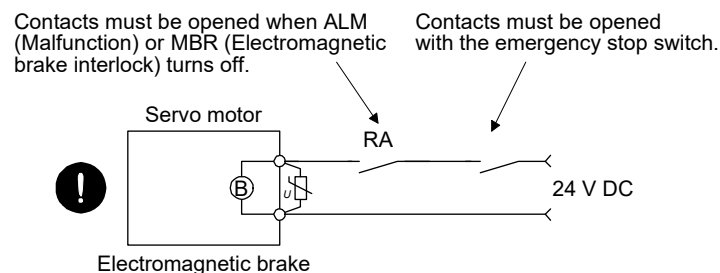
CAUTION

- Provide an external emergency stop circuit to stop the operation and shut the power off immediately.
- Do not disassemble, repair, or modify the equipment.
- 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.
- Use a noise filter, etc. to minimize the influence of electromagnetic interference. Electromagnetic interference may affect the electronic equipment used near the servo amplifier.
- Do not burn or destroy the servo amplifier. Doing so may generate a toxic gas.
- 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.
- If it is assumed that a power failure or product malfunction may result in a hazardous situation, use a servo motor with an electromagnetic brake or provide an external brake system for holding purpose to prevent such hazard.
- Configure an electromagnetic brake circuit, which is activated by an external emergency stop switch.



- Failure of MBR (Electromagnetic brake interlock) or ALM (Malfunction) may cause brake malfunction.
- When an alarm occurs, eliminate its cause, ensure safety, and deactivate the alarm to restart 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 the servo amplifier that has not been energized for an extended period of time, contact your local sales office.

(7) General instruction

- To illustrate details, the equipment in the diagrams of this Instruction 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 this Instruction Manual.

● DISPOSAL OF WASTE ●

Please dispose a servo amplifier, battery (primary battery) and other options according to your local laws and regulations.



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

The servo amplifier complies with safety integrity level 3 (SIL 3) of the IEC 61508:2010 functional safety standard.

Refer to Appendix 14 for schedule.

When using the STO function of the servo amplifier, refer to chapter 13.

For the MR-J3-D05 safety logic unit, refer to appendix 5.

Compliance with global standards

For the compliance with global standards, refer to appendix 4.

«About the manual»

You must have this Instruction Manual and the following manuals to use this servo. Be sure to prepare all the instruction manuals necessary to use the servo safely.

Servo amplifiers and drive units are written as servo amplifiers in this manual under certain circumstances, unless otherwise stated.

Relevant manuals

Manual name	Manual No.
MR-J4-_B(-RJ) Servo Amplifier Instruction Manual	SH(NA)030106
MELSERVO-J4 Servo Amplifier Instruction Manual (Troubleshooting)	SH(NA)030109
MELSERVO MR-J4-DU_(-RJ)/MR-CR55K_ Instruction Manual (Note 2)	SH(NA)030153
MELSERVO Servo Motor Instruction Manual (Vol. 3) (Note 1)	SH(NA)030113
EMC Installation Guidelines	IB(NA)67310

Note 1. It is necessary for using a rotary servo motor.

2. It is necessary for using an MR-J4-DU-_B_(-RJ) drive unit and MR-CR55K_ converter unit.

This Instruction Manual does not describe the following items. The following are the same as those for MR-J4-_B Servo amplifiers. For the details of the items, refer to each chapter/section indicated in the detailed explanation field. "MR-J4-_B_" means "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual". "MR-J4-_DU_" means "MR-J4-DU_(-RJ)/MR-CR55K_ Instruction Manual".

Item	Detailed explanation
INSTALLATION	MR-J4-_B_ chapter 2 MR-J4-_DU_ chapter 2
STARTUP	MR-J4-_B_ chapter 4 MR-J4-_DU_ chapter 4
NORMAL GAIN ADJUSTMENT (Note)	MR-J4-_B_ chapter 6
SPECIAL ADJUSTMENT FUNCTIONS (Note)	MR-J4-_B_ chapter 7
DIMENSIONS	MR-J4-_B_ chapter 9 MR-J4-_DU_ chapter 7
CHARACTERISTICS	MR-J4-_B_ chapter 10 MR-J4-_DU_ chapter 8
ABSOLUTE POSITION DETECTION SYSTEM	MR-J4-_B_ chapter 12
USING STO FUNCTION	MR-J4-_B_ chapter 13

Note. Refer to chapter 4 for adjustment of pressure control.

«Cables used for wiring»

Wires mentioned in this Instruction Manual are selected based on an ambient temperature of 40 °C.

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1. FUNCTIONS AND CONFIGURATION

1. FUNCTIONS AND CONFIGURATION

The following items are the same as those for MR-J4-_B_. Refer to the section of the detailed explanation field for details.

"MR-J4-_B_" means "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual".

"MR-J4-_DU_" means "MR-J4-DU_(-RJ)/MR-CR55K_ Instruction Manual".

Item	Detailed explanation
Structure	MR-J4-_B_ section 1.7 MR-J4-_DU_ section 1.5
Configuration including peripheral equipment	MR-J4-_B_ section 1.8 MR-J4-_DU_ section 1.6

1.1 Summary

MR-J4-_B_-LL (SSCNET III/H interface pressure control compatible servo amplifier) enables pressure control using a pressure sensor (load cell).

The servo amplifier receives analog signals from the pressure sensor (load cell), and a servo system controller gives a pressure command to the servo amplifier to control and maintain the actual pressure to constant even if the load changes. This function is suitable for machines such as molding machines and bonders which require pressure control.

Position control, speed control, and pressure control modes are available, and the mode can be changed from the servo system controller.

Items not mentioned in this manual are the same as those for MR-J4-_B_ servo amplifier. Refer to "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual" and "MR-J4-DU_(-RJ)/MR-CR55K_ Instruction Manual".

(1) Main difference from the MR-J4-_B_ servo amplifier

(a) Functions added to or changed from the MR-J4-_B_ servo amplifier

- Pressure control mode
- Analog input added (three points)

(b) Functions deleted or reduced from the MR-J4-_B_ servo amplifier

- Torque control mode
- Continuous operation to torque control mode
- Encoder output pulse (A/B/Z-phase)
- Digital input (reduced from four points to one point)
- Digital output (reduced from three points to two points)
- Fully closed loop system
- Linear servo motor system
- Direct drive servo system
- Master-slave operation function
- Scale measurement function
- J3 compatibility mode
- Super trace control

(c) Functions added by a software upgrade

Functions available with the MR-J4-_B_ servo amplifier with software version C0 or later are not available with the MR-J4-_B_-LL.

1. FUNCTIONS AND CONFIGURATION

(2) Compatible controller

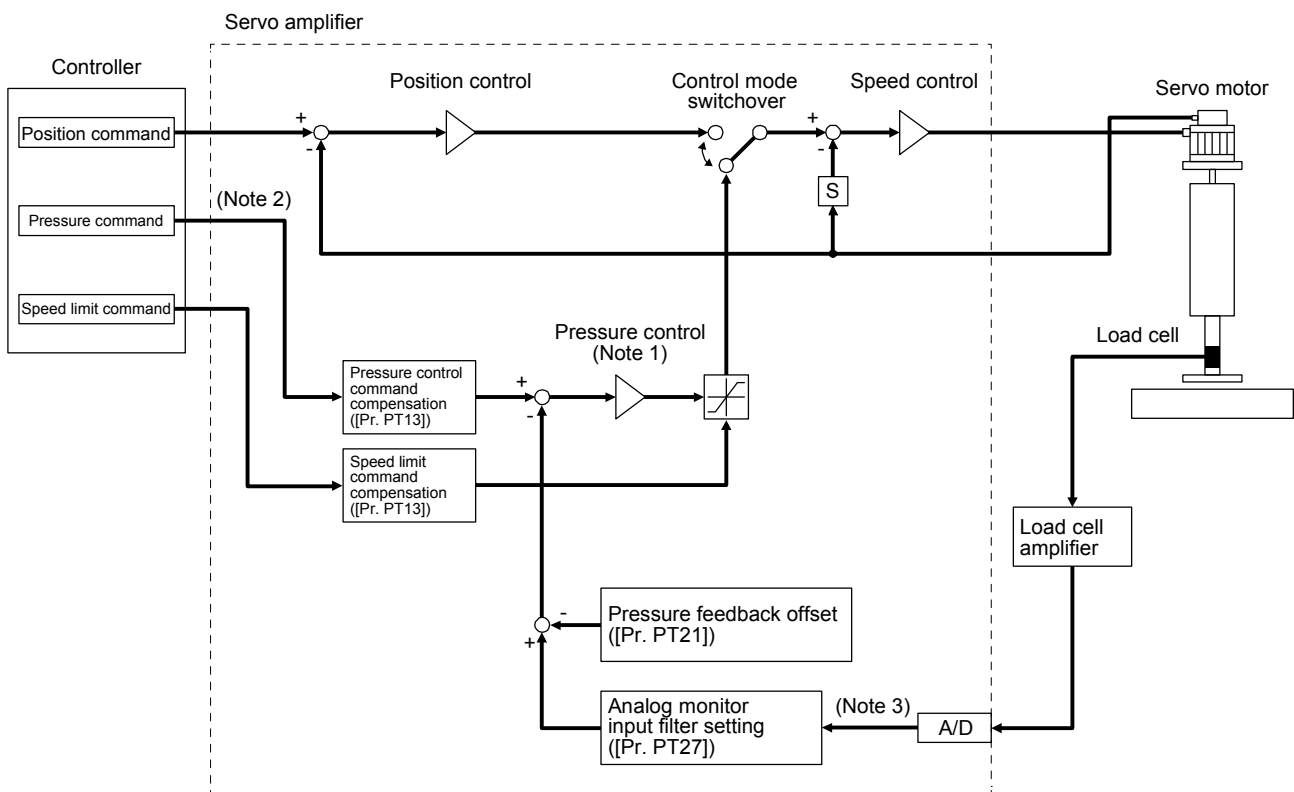
Use the MR-J4-_B_-LL with the pressure control compatible servo system controller and operation system listed in the following table. Never connect with other controllers.

Motion controller model	Operation system
R64MTCPU/R32MTCPU/R16MTCPU	SW10DNC-RMTFW version 03 or later (Note)

Note. The operation system is installed before shipment. Refer to the controller instruction manual.

1.2 Function block diagram

The function block diagram of the pressure control is shown below.



- Note
1. Set the pressure loop gain with [Pr. PT01], [Pr. PT02], and [Pr. PT03].
 2. Set the increasing direction of the pressure command with [Pr. PT12].
 3. Set the conversion coefficient of the pressure feedback voltage with [Pr. PT22].

1. FUNCTIONS AND CONFIGURATION

1.3 Standard specifications

(1) Servo amplifier

(a) 200 V class

Model MR-J4-_-LL		10B	20B	40B	60B	70B	100B	200B	350B	500B	700B	11KB	15KB	22KB
Output	Rated voltage	3-phase 170 V AC												
	Rated current [A]	1.1	1.5	2.8	3.2	5.8	6.0	11.0	17.0	28.0	37.0	68.0	87.0	126.0
Main circuit power supply input	Voltage/Frequency	3-phase or 1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz					3-phase or 1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz (Note 10)		3-phase 200 V AC to 240 V AC, 50 Hz/60 Hz					
	Rated current (Note 8) [A]	0.9	1.5	2.6	3.2 (Note 5)	3.8	5.0	10.5	16.0	21.7	28.9	46.0	64.0	95.0
	Permissible voltage fluctuation	3-phase or 1-phase 170 V AC to 264 V AC					3-phase or 1-phase 170 V AC to 264 V AC (Note 10)		3-phase 170 V AC to 264 V AC					
	Permissible frequency fluctuation	Within ±5%												
	Power supply capacity [kVA]	Refer to section 10.2 of "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual".												
	Inrush current [A]	Refer to section 10.5 of "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual".												
	Control circuit power supply input	Voltage/Frequency	1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz											
Rated current [A]		0.2									0.3			
Permissible voltage fluctuation		1-phase 170 V AC to 264 V AC												
Permissible frequency fluctuation		Within ±5%												
Power consumption [W]		30									45			
Inrush current [A]		Refer to section 10.5 of "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual".												
Interface power supply	Voltage	DC 24 V ± 10%												
	Current capacity [A]	(Note 1) 0.3 (including CN8 connector signals)												
Control method		Sine-wave PWM control, current control method												
Dynamic brake		Built-in										External option (Note 7, 9)		
SSCNET III/H communication cycle (Note 6)		0.222 ms, 0.444 ms, 0.888 ms												
Fully closed loop control		Not available												
Scale measurement function		Not available												
Load-side encoder interface		Not available												
Communication function		USB: connection to a personal computer or others (MR Configurator2-compatible)												
Encoder output pulses		Not available												
Analog monitor		Two channels												
Analog input		Three points (±10 V)												
Digital I/O		DI 1 point, DO 2 points												
Protective functions		Overcurrent shut-off, regenerative overvoltage shut-off, overload shut-off (electronic thermal), servo motor overheat protection, encoder error protection, regenerative error protection, undervoltage protection, instantaneous power failure protection, overspeed protection, and error excessive protection												
Functional safety		STO (IEC/EN 61800-5-2)												
Safety performance	Standards certified by CB	EN ISO 13849-1 category 3 PL d, IEC 61508 SIL 2, EN 62061 SIL CL2, EN 61800-5-2												
	Response performance	8 ms or less (STO input off → energy shut off)												
	(Note 3)	Test pulse interval: 1 Hz to 25 Hz												
	Test pulse input (STO)	Test pulse off time: Up to 1 ms												
	Mean time to dangerous failure (MTTFd)	MTTFd ≥ 100 [years] (314a)												
	Diagnostic coverage (DC)	DC = Medium, 97.6 [%]												
Average probability of dangerous failures per hour (PFH)		PFH = 6.4 × 10 ⁻⁹ [1/h]												

1. FUNCTIONS AND CONFIGURATION

Model MR-J4-_-LL			10B	20B	40B	60B	70B	100B	200B	350B	500B	700B	11KB	15KB	22KB
Compliance to global standards	CE marking		LVD: EN 61800-5-1 EMC: EN 61800-3 MD: EN ISO 13849-1, EN 61800-5-2, EN 62061												
	UL standard		UL 508C												
Structure (IP rating)			Natural cooling, open (IP20)				Force cooling, open (IP20)				Force cooling, open (IP20) (Note 4)				
Close mounting (Note 2)	3-phase power supply input		Possible								Impossible				
	1-phase power supply input		Possible				Impossible								
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), free from corrosive gas, flammable gas, oil mist, dust, and dirt												
	Altitude		2000 m or less above sea level (Note 11)												
	Vibration resistance		5.9 m/s ² , at 10 Hz to 55 Hz (directions of X, Y and Z axes)												
Mass [kg]			0.8		1.0		1.4		2.1	2.3	4.0	6.2	13.4		18.2

- Note
- 0.3 A is the value applicable when all I/O signals are used. The current capacity can be decreased by reducing the number of I/O points.
 - When closely mounting the servo amplifiers, operate them at the ambient temperatures of 0 °C to 45 °C or at 75% or smaller effective load ratio.
 - Test pulse is a signal which instantaneously turns off a signal to the servo amplifier at a constant period for external circuit to self-diagnose.
 - Except for the terminal block.
 - The rated current is 2.9 A when the servo amplifier is used with a UL or CSA compliant servo motor.
 - The communication cycle depends on the controller specifications and the number of axes connected.
 - Use an external dynamic brake for this servo amplifier. Failure to do so will cause an accident because the servo motor does not stop immediately but coasts at emergency stop. Ensure the safety in the entire equipment. For wiring of the external dynamic brake, refer to section 11.17 of "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual".
 - This value is applicable when a 3-phase power supply is used.
 - The external dynamic brake cannot be used for compliance with SEMI-F47 standard. Do not assign DB (Dynamic brake interlock) in [Pr. PD07] and [Pr. PD08]. Doing so will cause the servo amplifier to become servo-off when an instantaneous power failure occurs.
 - When using 1-phase 200 V AC to 240 V AC power supply, operate the servo amplifier at 75% or smaller effective load ratio.
 - Follow the restrictions in section 2.7 of "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual" when using the servo amplifiers at altitude exceeding 1000 m and up to 2000 m above sea level.

1. FUNCTIONS AND CONFIGURATION

(b) 400 V class

Model MR-J4-_-LL			60B4	100B4	200B4	350B4	500B4	700B4	11KB4	15KB4	22KB4
Output	Rated voltage		3-phase 323 V AC								
	Rated current [A]		1.5	2.8	5.4	8.6	14.0	17.0	32.0	41.0	63.0
Main circuit power supply input	Voltage/Frequency		3-phase 380 V AC to 480 V AC, 50 Hz/60 Hz								
	Rated current [A]		1.4	2.5	5.1	7.9	10.8	14.4	23.1	31.8	47.6
	Permissible voltage fluctuation		3-phase 323 V AC to 528 V AC								
	Permissible frequency fluctuation		Within ±5%								
	Power supply capacity [kVA]		Refer to section 10.2 of "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual".								
	Inrush current [A]		Refer to section 10.5 of "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual".								
	Control circuit power supply input	Voltage/Frequency		1-phase 380 V AC to 480 V AC, 50 Hz/60 Hz							
Rated current [A]		0.1			0.2						
Permissible voltage fluctuation		1-phase 323 V AC to 528 V AC									
Permissible frequency fluctuation		Within ±5%									
Power consumption [W]		30			45						
Inrush current [A]		Refer to section 10.5 of "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual".									
Interface power supply		Voltage		24 V DC ± 10%							
	Current capacity [A]		(Note 1) 0.3 (including CN8 connector signals)								
Control method			Sine-wave PWM control, current control method								
Dynamic brake			Built-in						External option (Note 5, 6)		
SSCNET III/H communication cycle (Note 4)			0.222 ms, 0.444 ms, 0.888 ms								
Fully closed loop control			Not available								
Scale measurement function			Not available								
Load-side encoder interface			Not available								
Communication function			USB: connection to a personal computer or others (MR Configurator2-compatible)								
Encoder output pulses			Not available								
Analog monitor			Two channels								
Analog input			Three points (±10 V)								
Digital I/O			DI 1 point, DO 2 points								
Protective functions			Overcurrent shut-off, regenerative overvoltage shut-off, overload shut-off (electronic thermal), servo motor overheat protection, encoder error protection, regenerative error protection, undervoltage protection, instantaneous power failure protection, overspeed protection, and error excessive protection								
Functional safety			STO (IEC/EN 61800-5-2)								
Safety performance	Standards certified by CB		EN ISO 13849-1 category 3 PL d, IEC 61508 SIL 2, EN 62061 SIL CL2, EN 61800-5-2								
	Response performance		8 ms or less (STO input off → energy shut off)								
	(Note 2)		Test pulse interval: 1 Hz to 25 Hz								
	Test pulse input (STO)		Test pulse off time: Up to 1 ms								
	Mean time to dangerous failure (MTTFd)		MTTFd ≥ 100 [years] (314a)								
	Diagnostic coverage (DC)		DC = Medium, 97.6 [%]								
	Average probability of dangerous failures per hour (PFH)		PFH = 6.4 × 10 ⁻⁹ [1/h]								
Compliance to global standards	CE marking		LVD: EN 61800-5-1 EMC: EN 61800-3 MD: EN ISO 13849-1, EN 61800-5-2, EN 62061								
	UL standard		UL 508C								
Close mounting			Impossible								
Structure (IP rating)			Natural cooling, open (IP20)		Force cooling, open (IP20)		Force cooling, open (IP20) (Note 3)				
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), free from corrosive gas, flammable gas, oil mist, dust, and dirt								
	Altitude		2000 m or less above sea level								
	Vibration		5.9 m/s ² , at 10 Hz to 55 Hz (directions of X, Y and Z axes)								
Mass [kg]			1.7		2.1	3.6	4.3	6.5	13.4	18.2	

1. FUNCTIONS AND CONFIGURATION

- Note
1. 0.3 A is the value applicable when all I/O signals are used. The current capacity can be decreased by reducing the number of I/O points.
 2. Test pulse is a signal which instantaneously turns off a signal to the servo amplifier at a constant period for external circuit to self-diagnose.
 3. Except for the terminal block.
 4. The communication cycle depends on the controller specifications and the number of axes connected.
 5. Use an external dynamic brake for this servo amplifier. Failure to do so will cause an accident because the servo motor does not stop immediately but coasts at emergency stop. Ensure the safety in the entire equipment. For wiring of the external dynamic brake, refer to section 11.17 of "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual".
 6. The external dynamic brake cannot be used for compliance with SEMI-F47 standard. Do not assign DB (Dynamic brake interlock) in [Pr. PD07] and [Pr. PD08]. Doing so will cause the servo amplifier to become servo-off when an instantaneous power failure occurs.
 7. Follow the restrictions in section 2.7 of "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual" when using the servo amplifiers at altitude exceeding 1000 m and up to 2000 m above sea level.

1. FUNCTIONS AND CONFIGURATION

(c) 100 V class

Model MR-J4-_-LL		10B1	20B1	40B1
Output	Rated voltage	3-phase 170 V AC		
	Rated current [A]	1.1	1.5	2.8
Main circuit power supply input	Voltage/Frequency	1-phase 100 V AC to 120 V AC, 50 Hz/60 Hz		
	Rated current [A]	3.0	5.0	9.0
	Permissible voltage fluctuation	1-phase 85 V AC to 132 V AC		
	Permissible frequency fluctuation	Within ±5%		
	Power supply capacity [kVA]	Refer to section 10.2 of "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual".		
	Inrush current [A]	Refer to section 10.5 of "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual".		
Control circuit power supply input	Voltage/Frequency	1-phase 100 V AC to 120 V AC, 50 Hz/60 Hz		
	Rated current [A]	0.4		
	Permissible voltage fluctuation	1-phase 85 V AC to 132 V AC		
	Permissible frequency fluctuation	Within ±5%		
	Power consumption [W]	30		
	Inrush current [A]	Refer to section 10.5 of "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual".		
Interface power supply	Voltage	24 V DC ± 10%		
	Current capacity [A]	(Note 1) 0.3 (including CN8 connector signals)		
Control method		Sine-wave PWM control, current control method		
Dynamic brake		Built-in		
SSCNET III/H communication cycle (Note 4)		0.222 ms, 0.444 ms, 0.888 ms		
Fully closed loop control		Not available		
Scale measurement function		Not available		
Load-side encoder interface		Not available		
Communication function		USB: connection to a personal computer or others (MR Configurator2-compatible)		
Encoder output pulses		Not available		
Analog monitor		Two channels		
Analog input		Three points (±10 V)		
Digital I/O		DI 1 point, DO 2 points		
Protective functions		Overcurrent shut-off, regenerative overvoltage shut-off, overload shut-off (electronic thermal), servo motor overheat protection, encoder error protection, regenerative error protection, undervoltage protection, instantaneous power failure protection, overspeed protection, and error excessive protection		
Functional safety		STO (IEC/EN 61800-5-2)		
Safety performance	Standards certified by CB	EN ISO 13849-1 category 3 PL d, IEC 61508 SIL 2, EN 62061 SIL CL2, EN 61800-5-2		
	Response performance	8 ms or less (STO input off → energy shut off)		
	(Note 3)	Test pulse interval: 1 Hz to 25 Hz		
	Test pulse input (STO)	Test pulse off time: Up to 1 ms		
	Mean time to dangerous failure (MTTFd)	MTTFd ≥ 100 [years] (314a)		
	Diagnostic coverage (DC)	DC = Medium, 97.6 [%]		
Compliance to global standards	Average probability of dangerous failures per hour (PFH)	PFH = 6.4×10^{-9} [1/h]		
	CE marking	LVD: EN 61800-5-1 EMC: EN 61800-3 MD: EN ISO 13849-1, EN 61800-5-2, EN 62061		
	UL standard	UL 508C		
Structure (IP rating)		Natural cooling, open (IP20)		
Close mounting (Note 2)		Possible		

1. FUNCTIONS AND CONFIGURATION

Model MR-J4-_-LL			10B1	20B1	40B1
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), free from corrosive gas, flammable gas, oil mist, dust, and dirt		
	Altitude		2000 m or less above sea level (Note 5)		
	Vibration resistance		5.9 m/s ² , at 10 Hz to 55 Hz (directions of X, Y and Z axes)		
Mass [kg]		0.8		1.0	

- Note
- 0.3 A is the value applicable when all I/O signals are used. The current capacity can be decreased by reducing the number of I/O points.
 - When closely mounting the servo amplifiers, operate them at the ambient temperatures of 0 °C to 45 °C or at 75% or smaller effective load ratio.
 - Test pulse is a signal which instantaneously turns off a signal to the servo amplifier at a constant period for external circuit to self-diagnose.
 - The communication cycle depends on the controller specifications and the number of axes connected.
 - Follow the restrictions in section 2.7 of "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual" when using the servo amplifiers at altitude exceeding 1000 m and up to 2000 m above sea level.

1. FUNCTIONS AND CONFIGURATION

(2) Drive unit (a) 200 V class

Model MR-J4-DU_-LL			30KB	37KB
Output	Rated voltage		3-phase 170 V AC	
	Rated current [A]		174	204
Main circuit power supply input			The main circuit power of the drive unit is supplied by the converter unit.	
Control circuit power supply input	Voltage/Frequency		1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz	
	Rated current [A]		0.3	
	Permissible voltage fluctuation		1-phase 170 V AC to 264 V AC	
	Permissible frequency fluctuation		Within ±5%	
	Power consumption [W]		45	
	Inrush current [A]		Refer to section 8.4 of "MR-J4-DU_(-RJ)/MR-CR55K_ Instruction Manual".	
Interface power supply	Voltage		24 V DC ± 10%	
	Current capacity [A]		(Note 1) 0.3 (including CN8 connector signals)	
Control method			Sine-wave PWM control, current control method	
Dynamic brake			External option (Note 5, 6)	
SSCNET III/H communication cycle (Note 4)			0.222 ms, 0.444 ms, 0.888 ms	
Fully closed loop control			Not available	
Scale measurement function			Not available	
Load-side encoder interface			Not available	
Communication function			USB: connection to a personal computer or others (MR Configurator2-compatible)	
Encoder output pulses			Not available	
Analog monitor			Two channels	
Analog input			Three points (±10 V)	
Digital I/O			DI 1 point, DO 2 points	
Protective functions			Overcurrent shut-off, overload shut-off (electronic thermal), servo motor overheat protection, encoder error protection, undervoltage protection, instantaneous power failure protection, overspeed protection, and error excessive protection	
Functional safety			STO (IEC/EN 61800-5-2)	
Safety performance	Standards certified by CB		EN ISO 13849-1 category 3 PL d, IEC 61508 SIL 2, EN 62061 SIL CL2, EN 61800-5-2	
	Response performance		8 ms or less (STO input off → energy shut off)	
	(Note 2) Test pulse input (STO)		Test pulse interval: 1 Hz to 25 Hz Test pulse off time: Up to 1 ms	
	Mean time to dangerous failure (MTTFd)		MTTFd ≥ 100 [years] (314a)	
	Diagnostic coverage (DC)		DC = Medium, 97.6 [%]	
	Average probability of dangerous failures per hour (PFH)		PFH = 6.4 × 10 ⁻⁹ [1/h]	
Compliance to global standards	CE marking		LVD: EN 61800-5-1 EMC: EN 61800-3 MD: EN ISO 13849-1, EN 61800-5-2, EN 62061	
	UL standard		UL 508C	
Structure (IP rating)			Force cooling, open (IP20) (Note 3)	
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), free from corrosive gas, flammable gas, oil mist, dust, and dirt	
	Altitude		2000 m or less above sea level (Note 7)	
	Vibration resistance		5.9 m/s ² , at 10 Hz to 55 Hz (directions of X, Y and Z axes)	
Mass [kg]			21	

1. FUNCTIONS AND CONFIGURATION

- Note
1. 0.3 A is the value applicable when all I/O signals are used. The current capacity can be decreased by reducing the number of I/O points.
 2. Test pulse is a signal which instantaneously turns off a signal to the drive unit at a constant period for external circuit to self-diagnose.
 3. Except for the terminal block.
 4. The communication cycle depends on the controller specifications and the number of axes connected.
 5. Use an external dynamic brake for this drive unit. Failure to do so will cause an accident because the servo motor does not stop immediately but coasts at emergency stop. Ensure the safety in the entire equipment. For wiring of the external dynamic brake, refer to section 9.3 of "MR-J4-DU_(-RJ)/MR-CR55K_ Instruction Manual".
 6. The external dynamic brake cannot be used for compliance with SEMI-F47 standard. Do not assign DB (Dynamic brake interlock) in [Pr. PD07] and [Pr. PD08]. Doing so will cause the drive unit to become servo-off when an instantaneous power failure occurs.
 7. Follow the restrictions in section 2.5 of "MR-J4-DU_(-RJ)/MR-CR55K_ Instruction Manual" when using the drive units at altitude exceeding 1000 m and up to 2000 m above sea level.

1. FUNCTIONS AND CONFIGURATION

(b) 400 V class

Model MR-J4-DU_LL			30KB4	37KB4	45KB4	55KB4
Output	Rated voltage		3-phase 323 V AC			
	Rated current [A]		87	102	131	143
Main circuit power supply input			The main circuit power of the drive unit is supplied by the converter unit.			
Control circuit power supply input	Voltage/Frequency		1-phase 380 V AC to 480 V AC, 50 Hz/60 Hz			
	Rated current [A]		0.2			
	Permissible voltage fluctuation		1-phase 323 V AC to 528 V AC			
	Permissible frequency fluctuation		Within ±5%			
	Power consumption [W]		45			
	Inrush current [A]		Refer to section 8.4 of "MR-J4-DU_(-RJ)/MR-CR55K_ Instruction Manual".			
Interface power supply	Voltage		24 V DC ± 10%			
	Current capacity [A]		(Note 1) 0.3 (including CN8 connector signals)			
Control method			Sine-wave PWM control, current control method			
Dynamic brake			External option (Note 5, 6)			
SSCNET III/H communication cycle (Note 4)			0.222 ms, 0.444 ms, 0.888 ms			
Fully closed loop control			Not available			
Scale measurement function			Not available			
Load-side encoder interface			Not available			
Communication function			USB: connection to a personal computer or others (MR Configurator2-compatible)			
Encoder output pulses			Not available			
Analog monitor			Two channels			
Analog input			Three points (±10 V)			
Digital I/O			DI 1 point, DO 2 points			
Protective functions			Overcurrent shut-off, overload shut-off (electronic thermal), servo motor overheat protection, encoder error protection, undervoltage protection, instantaneous power failure protection, overspeed protection, and error excessive protection			
Functional safety			STO (IEC/EN 61800-5-2)			
Safety performance	Standards certified by CB		EN ISO 13849-1 category 3 PL d, IEC 61508 SIL 2, EN 62061 SIL CL2, EN 61800-5-2			
	Response performance		8 ms or less (STO input off → energy shut off)			
	(Note 2) Test pulse input (STO)		Test pulse interval: 1 Hz to 25 Hz Test pulse off time: Up to 1 ms			
	Mean time to dangerous failure (MTTFd)		MTTFd ≥ 100 [years] (314a)			
	Diagnostic coverage (DC)		DC = Medium, 97.6 [%]			
	Average probability of dangerous failures per hour (PFH)		PFH = 6.4 × 10 ⁻⁹ [1/h]			
Compliance to global standards	CE marking		LVD: EN 61800-5-1 EMC: EN 61800-3 MD: EN ISO 13849-1, EN 61800-5-2, EN 62061			
	UL standard		UL 508C			
Structure (IP rating)			Force cooling, open (IP20) (Note 3)			
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), free from corrosive gas, flammable gas, oil mist, dust, and dirt			
	Altitude		2000 m or less above sea level (Note 7)			
Vibration resistance		5.9 m/s ² , at 10 Hz to 55 Hz (directions of X, Y and Z axes)				
Mass [kg]			16		21	

1. FUNCTIONS AND CONFIGURATION

- Note
1. 0.3 A is the value applicable when all I/O signals are used. The current capacity can be decreased by reducing the number of I/O points.
 2. Test pulse is a signal which instantaneously turns off a signal to the drive unit at a constant period for external circuit to self-diagnose.
 3. Except for the terminal block.
 4. The communication cycle depends on the controller specifications and the number of axes connected.
 5. Use an external dynamic brake for this drive unit. Failure to do so will cause an accident because the servo motor does not stop immediately but coasts at emergency stop. Ensure the safety in the entire equipment. For wiring of the external dynamic brake, refer to section 9.3 of "MR-J4-DU_(-RJ)/MR-CR55K_ Instruction Manual".
 6. The external dynamic brake cannot be used for compliance with SEMI-F47 standard. Do not assign DB (Dynamic brake interlock) in [Pr. PD07] and [Pr. PD08]. Doing so will cause the drive unit to become servo-off when an instantaneous power failure occurs.
 7. Follow the restrictions in section 2.5 of "MR-J4-DU_(-RJ)/MR-CR55K_ Instruction Manual" when using the drive units at altitude exceeding 1000 m and up to 2000 m above sea level.

(3) Converter unit

For standard specifications of MR-CR55K and MR-CR55K4, refer to section 1.2 of "MR-J4-DU_(-RJ)/MR-CR55K_ Instruction Manual".

1. FUNCTIONS AND CONFIGURATION

1.4 Combinations of servo amplifiers and servo motors

POINT
<ul style="list-style-type: none"> ● When a 1-phase 200 V AC input is used, the maximum torque of 400% cannot be achieved with HG-JR series servo motor. ● When you use the MR-J4-100B-LL or MR-J4-200B-LL with the 1-phase 200 V AC input, contact your local sales office for the torque characteristics of the HG-UR series and HG-RR series servo motors.

(1) 200 V class

Servo amplifier	Servo motor						
	HG-KR	HG-MR	HG-SR	HG-UR	HG-RR	HG-JR	HG-JR (When the maximum torque is 400%)
MR-J4-10B-LL	053 13	053 13					
MR-J4-20B-LL	23	23					
MR-J4-40B-LL	43	43					
MR-J4-60B-LL			51 52			53	
MR-J4-70B-LL	73	73		72		73	
MR-J4-100B-LL			81 102			103	53
MR-J4-200B-LL			121 201 152 202	152	103 153	153 203	73 103
MR-J4-350B-LL			301 352	202	203	353	153 203
MR-J4-500B-LL			421 502	352 502	353 503	503	353
MR-J4-700B-LL			702			601 701M 703	503
MR-J4-11KB-LL						801 12K1 11K1M 903	
MR-J4-15KB-LL						15K1 15K1M	
MR-J4-22KB-LL						20K1 25K1 22K1M	

1. FUNCTIONS AND CONFIGURATION

(2) 400 V class

Servo amplifier	Servo motor		
	HG-SR	HG-JR	HG-JR (When the maximum torque is 400%)
MR-J4-60B4-LL	524	534	534
MR-J4-100B4-LL	1024	734 1034	
MR-J4-200B4-LL	1524 2024	1534 2034	734 1034
MR-J4-350B4-LL	3524	3534	1534 2034
MR-J4-500B4-LL	5024	5034	3534
MR-J4-700B4-LL	7024	6014 701M4 7034	5034
MR-J4-11KB4-LL		8014 12K14 11K1M4 9034	
MR-J4-15KB4-LL		15K14 15K1M4	
MR-J4-22KB4-LL		20K14 25K14 22K1M4	

(3) 100 V class

Servo amplifier	Servo motor	
	HG-KR	HG-MR
MR-J4-10B1-LL	053 13	053 13
MR-J4-20B1-LL	23	23
MR-J4-40B1-LL	43	43

1.5 Combinations of converter units, drive units and servo motors

(1) 200 V class

Converter unit	Drive unit	Servo motor	
		HG-JR	
		1000 r/min series	1500 r/min series
MR-CR55K	MR-J4-DU30KB-LL	30K1	30K1M
	MR-J4-DU37KB-LL	37K1	37K1M

(2) 400 V class

Converter unit	Drive unit	Servo motor	
		HG-JR	
		1000 r/min series	1500 r/min series
MR-CR55K4	MR-J4-DU30KB4-LL	30K14	30K1M4
	MR-J4-DU37KB4-LL	37K14	37K1M4
	MR-J4-DU45KB4-LL		45K1M4
	MR-J4-DU55KB4-LL		55K1M4

1. FUNCTIONS AND CONFIGURATION

1.6 Function list

The following table lists the functions of this servo. For details of the functions, refer to each section indicated in the detailed explanation field.

"MR-J4-_B_" means "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual".

"MR-J4-_DU_" means "MR-J4-DU_(-RJ)/MR-CR55K_ Instruction Manual".

Function	Description	Detailed explanation
Model adaptive control	This function achieves a high response and stable control following the ideal model. The two-degrees-of-freedom model adaptive control enables you to set a response to the command and a response to the disturbance separately. This function can also be disabled. To disable this function, refer to section 7.5 of "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual". This is available with servo amplifiers with software version B4 or later. Check the software version with MR Configurator2. The model adaptive control is not used in the pressure control mode.	
Position control mode	This servo amplifier is used as a position control servo.	
Speed control mode	This servo amplifier is used as a speed control servo.	
Torque control mode	This is not available with the MR-J4-(DU)_B_-LL servo amplifier.	
Pressure control mode	This servo amplifier is used as a pressure control servo. Use a pressure control compatible controller.	
High-resolution encoder	High-resolution encoder of 4194304 pulses/rev is used for the encoder of the rotary servo motor compatible with the MELSERVO-J4 series.	
Absolute position detection system	Setting a home position once makes home position return unnecessary at every power-on.	MR-J4-_B_ Chapter 12
Gain switching function	You can switch gains during rotation/stop, and can use input devices to switch gains during operation.	MR-J4-_B_ Section 7.2
Advanced vibration suppression control II	This function suppresses vibration and residual vibration at an arm end. This cannot be used in the pressure control mode. When using the pressure control mode, do not set the vibration suppression control tuning mode to automatic setting with [Pr. PB02].	MR-J4-_B_ Section 7.1.5
Machine resonance suppression filter	This filter function (notch filter) decreases the gain of the specific frequency to suppress the resonance of the mechanical system.	MR-J4-_B_ Section 7.1.1
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.	MR-J4-_B_ Section 7.1.3
Adaptive filter II	The servo amplifier detects mechanical resonance and sets filter characteristics automatically to suppress mechanical vibration. This cannot be used in the pressure control mode. When using the pressure control mode, do not set the filter tuning mode selection to automatic setting with [Pr. PB01].	MR-J4-_B_ Section 7.1.2
Low-pass filter	Suppresses high-frequency resonance which occurs as the servo system response is increased.	MR-J4-_B_ Section 7.1.4
Machine analyzer function	Analyzes the frequency characteristic of the mechanical system by simply connecting an MR Configurator2 installed personal computer and the servo amplifier. MR Configurator2 is necessary for this function. This cannot be used in the pressure control mode.	
Robust filter	Improves a disturbance response when a response performance cannot be increased because of a large load to motor inertia ratio, such as a roll feed axis.	[Pr. PE41]
Slight vibration suppression control	Suppresses vibration of ± 1 pulse generated at a servo motor stop. This cannot be used in the pressure control mode.	[Pr. PB24]
Auto tuning	Automatically adjusts the gain to optimum value if load applied to the servo motor shaft varies. This cannot be used in the pressure control mode.	MR-J4-_B_ Section 6.3
Brake unit	Used when the regenerative option cannot provide enough regenerative power.	MR-J4-_B_ Section 11.3 MR-J4-_DU_ Section 9.10
Power regeneration converter	Used when the regenerative option cannot provide enough regenerative power.	MR-J4-_B_ Section 11.4

1. FUNCTIONS AND CONFIGURATION

Function	Description	Detailed explanation
Regenerative option	Use a regenerative option when the built-in regenerative resistor of the servo amplifier does not have sufficient regenerative capacity for a large regenerative power generated.	MR-J4-_B_ Section 11.2 MR-J4-_DU_ Section 9.2
Alarm history clear	Clears alarm histories.	[Pr. PC21]
Output signal selection (device settings)	The output devices including ALM (Malfunction) and DB (Dynamic brake interlock) can be assigned to certain pins of the CN3 connector.	[Pr. PD07] [Pr. PD08]
Output signal (DO) forced output	Turns on/off the output signals forcibly independently of the servo status. Use this function for checking output signal wiring, etc.	MR-J4-_B_ Section 4.5.1 (1) (d)
Test operation mode	Jog operation, positioning operation, motor-less operation, DO forced output, and program operation can be used. MR Configurator2 is necessary for this function. Refer to section 6.1 for restrictions when using in the pressure control mode.	MR-J4-_B_ Section 4.5
Analog monitor output	Outputs servo status with voltage in real time.	[Pr. PC09], [Pr. PC10]
MR Configurator2	Using a personal computer, you can perform the parameter setting, test operation, monitoring, and others. Refer to section 6.1 for restrictions when using in the pressure control mode.	Section 6.1
Linear servo system	This is not available with the MR-J4-(DU)_B_-LL servo amplifier.	
Direct drive servo system	This is not available with the MR-J4-(DU)_B_-LL servo amplifier.	
Fully closed loop system	This is not available with the MR-J4-(DU)_B_-LL servo amplifier.	
One-touch tuning	Gain adjustment is performed just by one click on MR Configurator2. MR Configurator2 is necessary for this function. This cannot be used in the pressure control mode.	MR-J4-_B_ Section 6.2
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 100 V AC/200 V AC for the input power supply will not comply with SEMI-F47 standard.	[Pr. PA20] [Pr. PF25] MR-J4-_B_ Section 7.4
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. The vibration tough drive cannot be used in the pressure control mode.	MR-J4-_B_ Section 7.3
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 by clicking "Display" under the Waveform column on the drive recorder window on MR Configurator2. However, the drive recorder is not available when: 1. You are using the graph function of MR Configurator2. 2. You are using the machine analyzer function. 3. [Pr. PF21] 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. PA23]
STO function	This function is a functional safety that complies with IEC/EN 61800-5-2. You can create a safety system for the equipment easily.	
Servo amplifier life diagnosis function	You can check the cumulative energization time and the number of on/off times of the inrush relay. This function gives an indication of the replacement time for parts of the servo amplifier including a capacitor and a relay before they malfunction. MR Configurator2 is necessary for this function.	
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 SSCNET III/H system, the data are sent to a servo system controller for analyzing and displaying the power consumption 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. This cannot be used in the pressure control mode.	

1. FUNCTIONS AND CONFIGURATION

Function	Description	Detailed explanation
Master-slave operation function	This is not available with the MR-J4-(DU)_B_-LL servo amplifier.	
Scale measurement function	This is not available with the MR-J4-(DU)_B_-LL servo amplifier.	
J3 compatibility mode	This is not available with the MR-J4-(DU)_B_-LL servo amplifier. Do not change the mode by using the application software "MR-J4(W)-B mode selection". An error appears when the mode is changed to other than the J4 mode (standard control (rotary servo motor)).	
Continuous operation to torque control mode	This is not available with the MR-J4-(DU)_B_-LL servo amplifier.	
Lost motion compensation function	This function improves the response delay occurred when the machine moving direction is reversed. This is available with servo amplifiers with software version B4 or later. Check the software version with MR Configurator2. This cannot be used in the pressure control mode.	MR-J4-_B_ Section 7.6
Super trace control	This is not available with the MR-J4-(DU)_B_-LL servo amplifier.	

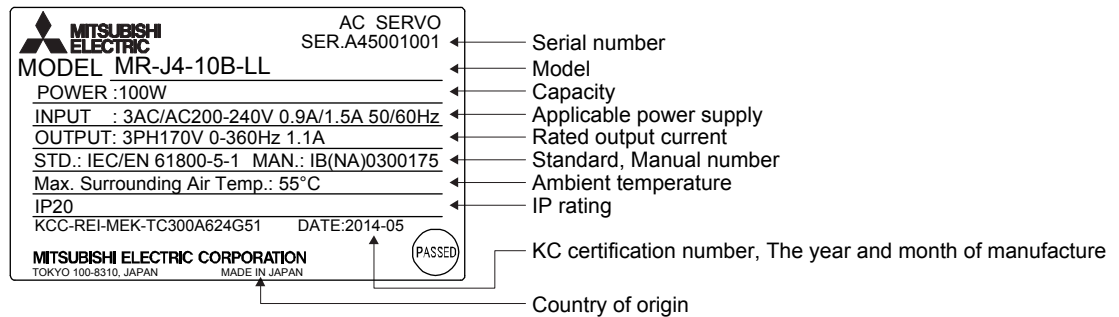
Note. For servo system controllers which are available with this, contact your local sales office.

1. FUNCTIONS AND CONFIGURATION

1.7 Model designation

(1) Rating plate

The following shows an example of rating plate for explanation of each item.



(2) Model

The following describes what each block of a model name indicates. Not all combinations of the symbols are available.

(a) Servo amplifier

MR-J4-60B4-LL

Series

Rated output

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

Special specifications

Symbol	Special specifications
-LL	Pressure control type
-RN	MR-J4- B -LL without regenerative resistor (Note)

Power supply

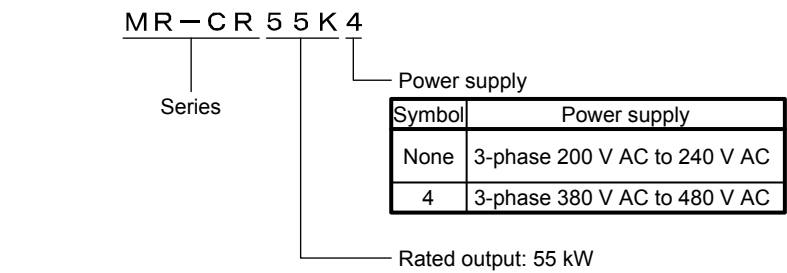
Symbol	Power supply
None	3-phase or 1-phase 200 V AC to 240 V AC
1	1-phase 100 V AC to 120 V AC
4	3-phase 380 V AC to 480 V AC

SSCNET III/H interface

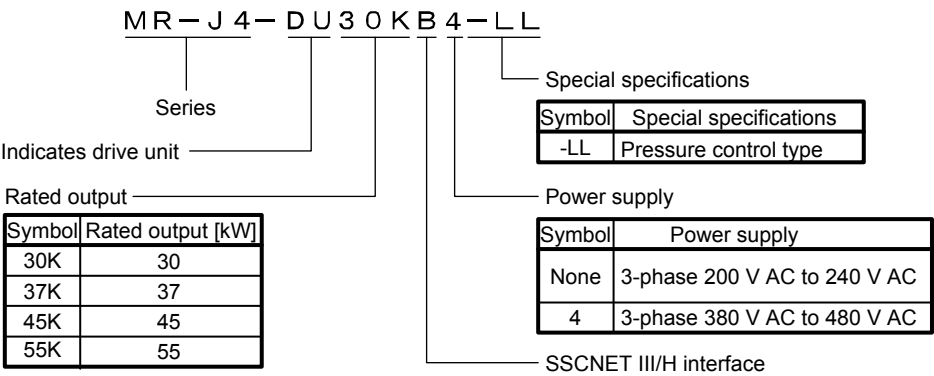
Note. Indicates a servo amplifier of 11 kW to 22 kW that does not use a regenerative resistor as standard accessory.
When using any of these servo amplifiers, always use the MR-RB5R, MR-RB9F, MR-RB9T, MR-RB5K-4, or MR-RB6K-4 regenerative option.

1. FUNCTIONS AND CONFIGURATION

(b) Converter unit



(c) Drive unit



MEMO

[illegible]

2. SIGNALS AND WIRING

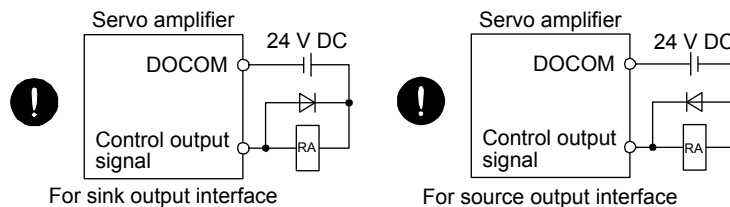
2. SIGNALS AND WIRING

⚠ WARNING

- Any person who is involved in wiring should be fully competent to do the work.
- Before wiring, turn off the power and wait for 15 minutes or more (20 minutes or more for converter unit) until the charge lamp turns off. Then, confirm that the voltage between P+ and N- (between L+ and L- for converter unit) 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, be sure to look at the lamp from the front of the servo amplifier.
- Ground the servo amplifier and servo motor securely.
- Do not attempt to wire the servo amplifier and servo motor until they have been installed. Otherwise, it may cause an electric shock.
- The cables should not be damaged, stressed, loaded, or pinched. Otherwise, it may cause an electric shock.
- To avoid an electric shock, insulate the connections of the power supply terminals.

⚠ CAUTION

- Wire the equipment correctly and securely. Otherwise, the servo motor may operate unexpectedly, resulting in injury.
- Connect cables to the correct terminals. Otherwise, a burst, damage, etc. may occur.
- Ensure that polarity (+/-) is correct. Otherwise, a burst, damage, etc. may occur.
- 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.

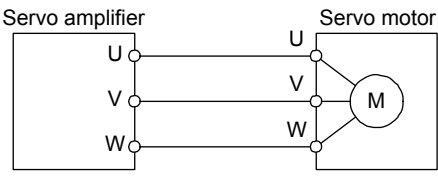
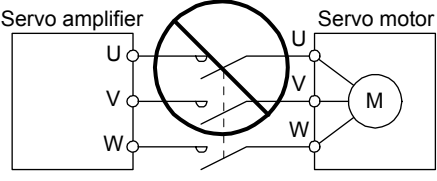


- Use a noise filter, etc. to minimize the influence of electromagnetic interference. Electromagnetic interference may affect the electronic equipment used near the servo amplifier.
- Do not install a power capacitor, surge killer or radio noise filter (optional FR-BIF(-H)) with the power line of the servo motor.
- When using a regenerative resistor, shut the power off with the alarm signal. Otherwise, a transistor fault or the like may overheat the regenerative resistor, causing a fire.
- Do not modify the equipment.
- Connecting a servo motor of the wrong axis to U, V, W, or CN2 of the servo amplifier may cause a malfunction.

2. SIGNALS AND WIRING

**CAUTION**

● Connect the servo amplifier power outputs (U, V, and W) to the servo motor power inputs (U, V, and W) directly. Do not connect a magnetic contactor and others between them.



The following items are the same as those for MR-J4-_B_. Refer to the section of the detailed explanation field for details.

"MR-J4-_B_" means "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual".

"MR-J4-_DU_" means "MR-J4-DU_(-RJ)/MR-CR55K_ Servo Amplifier Instruction Manual".

Item	Detailed explanation
Explanation of power supply system	MR-J4-_B_ section 3.3 MR-J4-_DU_ section 3.2
Forced stop deceleration function	MR-J4-_B_ section 3.6
Alarm occurrence timing chart	MR-J4-_B_ section 3.7 MR-J4-_DU_ section 3.5
SSCNET III cable connection	MR-J4-_B_ section 3.9
Servo motor with an electromagnetic brake	MR-J4-_B_ section 3.10
Grounding	MR-J4-_B_ section 3.11 MR-J4-_DU_ section 3.7

2.1 Input power supply circuit

**CAUTION**

● ALM (Malfunction) is not assigned by default. Create a circuit that shuts off the main circuit by being interlocked with an alarm detected by the controller.

POINT
<p>● When assigning ALM (Malfunction) to the CN3-9 pin, set [Pr. PD08] to "0003".</p> <p>● Items not mentioned in this section are the same as those for MR-J4-_B_ servo amplifier. Refer to section 3.1 of "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual" and "MR-J4-DU_(-RJ)/MR-CR55K_ Instruction Manual".</p>

Configure the wiring so that the main circuit power supply is shut off and the servo-on command is turned off after deceleration to a stop due to an alarm occurrence, an enabled servo forced stop, or an enabled controller forced stop. A molded-case circuit breaker (MCCB) must be used with the input cables of the main circuit power supply.

ALM (Malfunction) is not assigned by default. Create a circuit that shuts off the main circuit by being interlocked with an alarm detected by the controller. When assigning ALM (Malfunction) to the CN3-9 pin, set [Pr. PD08] to "0003".

2. SIGNALS AND WIRING

2.2 I/O signal connection example



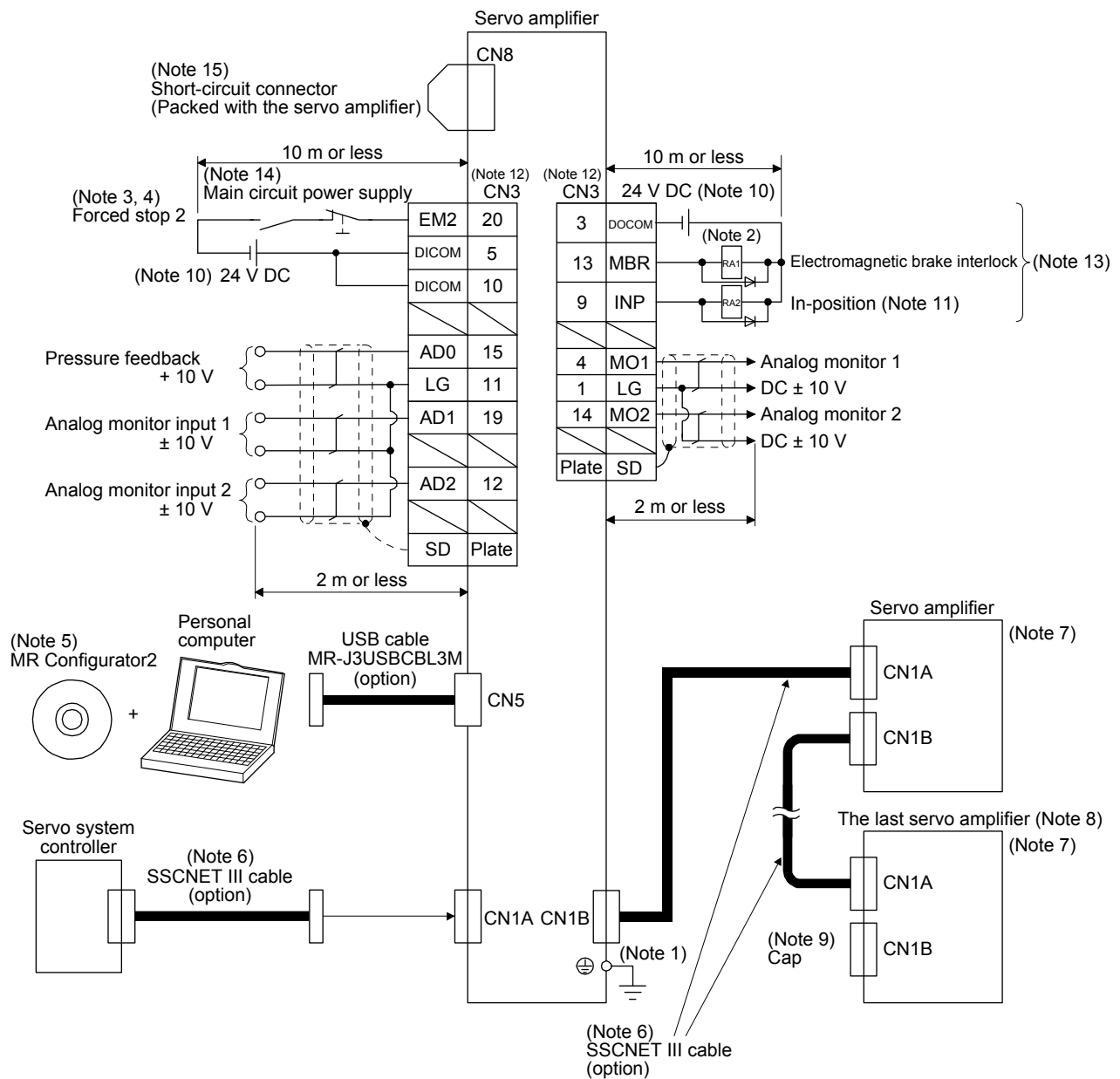
CAUTION

- ALM (Malfunction) is not assigned by default. Create a circuit that shuts off the main circuit by being interlocked with an alarm detected by the controller.

POINT

- When assigning ALM (Malfunction) to the CN3-9 pin, set [Pr. PD08] to "0003".
- In the pressure control mode, EM2 functions the same as EM1.

2.2.1 For sink I/O interface



2. SIGNALS AND WIRING

- Note
1. To prevent an electric shock, always connect the protective earth (PE) terminal (marked $\oplus$) of the servo amplifier to the protective earth (PE) of the cabinet.
 2. Connect the diode in the correct direction. If it is connected reversely, the servo amplifier will malfunction and will not output signals, disabling EM2 (Forced stop 2) and other protective circuits.
 3. If the controller does not have forced stop function, always install the forced stop 2 switch (normally closed contact).
 4. When starting operation, always turn on EM2 (Forced stop 2). (Normally closed contact)
 5. Use SW1DNC MRC2-_. (Refer to section 6.1.)
 6. Use SSCNET III cables listed in the following table.

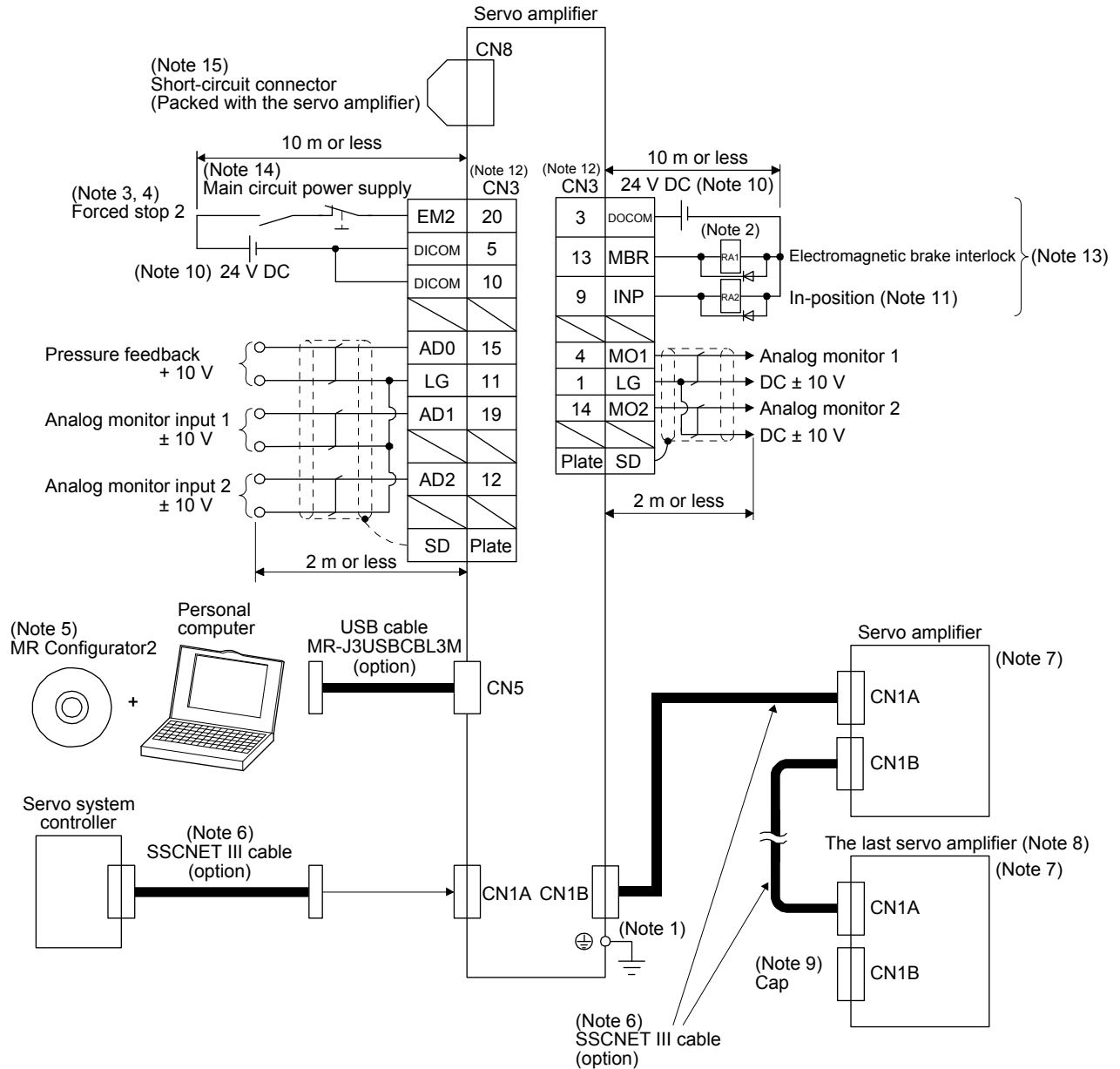
Cable	Cable model	Cable length
Standard cord inside cabinet	MR-J3BUS_M	0.15 m to 3 m
Standard cable outside cabinet	MR-J3BUS_M-A	5 m to 20 m
Long-distance cable	MR-J3BUS_M-B	30 m to 50 m

7. The wiring after the second servo amplifier is omitted.
8. Up to 64 axes of servo amplifiers can be connected. The number of connectable axes depends on the controller you use. Refer to section 4.3.1 of "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual" for setting of axis selection.
9. Make sure to cap the unused CN1B connector.
10. Supply 24 V DC $\pm$ 10% to interfaces from outside. The total current capacity of these power supplies must be 300 mA or lower. 300 mA is the value applicable when all I/O signals are used. The current capacity can be decreased by reducing the number of I/O points. Refer to section 3.8.2 (1) of "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual" that gives the current value necessary for the interface. The illustration of the 24 V DC power supply is divided between input signal and output signal for convenience. However, they can be configured by one.
11. ALM (Malfunction) is not assigned by default. Create a circuit that shuts off the main circuit by being interlocked with an alarm detected by the controller. When assigning ALM (Malfunction) to the CN3-9 pin, set [Pr. PD08] to "0003". ALM (Malfunction) turns on in normal alarm-free condition. (Normally closed contact)
12. The pins with the same signal name are connected in the servo amplifier.
13. You can change devices of these pins with [Pr. PD07] and [Pr. PD08].
14. Configure a circuit to turn off EM2 when the main circuit power is turned off to prevent an unexpected restart of the servo amplifier.
15. When not using the STO function, attach the short-circuit connector came with a servo amplifier.

2. SIGNALS AND WIRING

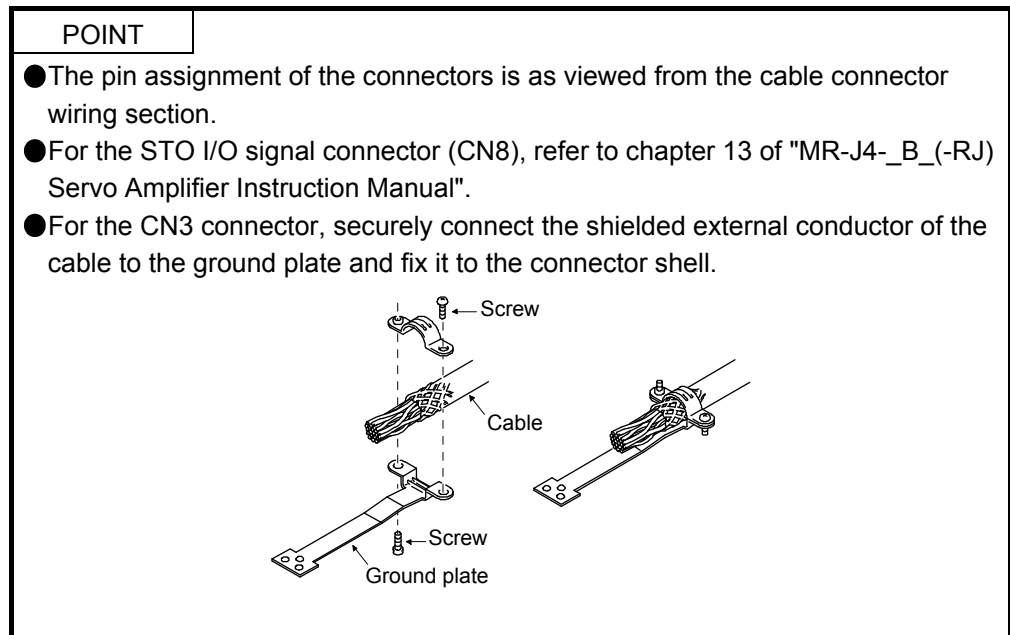
2.2.2 For source I/O interface

POINT
● For notes, refer to section 2.2.1.

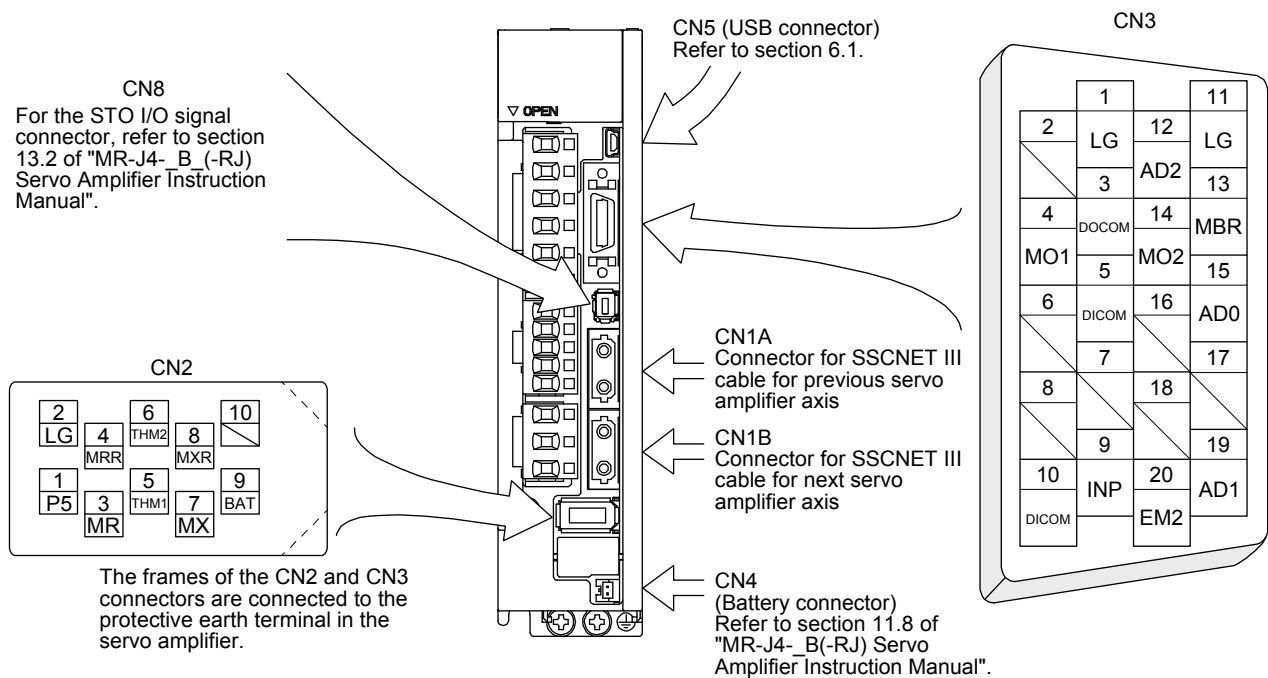


2. SIGNALS AND WIRING

2.3 Connectors and pin assignment



The servo amplifier front view shown is that of the MR-J4-20B-LL or less. For external appearance and connector arrangements of other servo amplifiers, refer to chapter 9 of "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual" and chapter 7 of "MR-J4-DU_(-RJ)/MR-CR55K_ Instruction Manual".



2. SIGNALS AND WIRING

2.4 Signal (device) explanations

For the I/O interfaces (symbols in I/O division column in the table), refer to section 2.5.2.

The pin Nos. in the connector pin No. column are assigned by default.

2.4.1 Input device

POINT	
● In the pressure control mode, EM2 functions the same as EM1.	

Device	Symbol	Connector pin No.	Function and application	I/O division																						
Forced stop 2	EM2	CN3-20	<p>Turn off EM2 (open between commons) to decelerate the servo motor to a stop with commands.</p> <p>Turn EM2 on (short between commons) in the forced stop state to reset that state.</p> <p>Set [Pr. PA04] to "2 1 _ _" to disable EM2.</p> <p>The following shows the setting of [Pr. PA04].</p> <table><tr><th rowspan="2">[Pr. PA04] setting</th><th rowspan="2">EM2/EM1</th><th colspan="2">Deceleration method</th></tr><tr><th>EM2 or EM1 is off</th><th>Alarm occurred</th></tr><tr><td>0 0 _ _</td><td>EM1</td><td>MBR (Electromagnetic brake interlock) turns off without the forced stop deceleration.</td><td>MBR (Electromagnetic brake interlock) turns off without the forced stop deceleration.</td></tr><tr><td>2 0 _ _</td><td>EM2</td><td>MBR (Electromagnetic brake interlock) turns off after the forced stop deceleration.</td><td>MBR (Electromagnetic brake interlock) turns off after the forced stop deceleration.</td></tr><tr><td>0 1 _ _</td><td>Not using EM2 or EM1</td><td></td><td>MBR (Electromagnetic brake interlock) turns off without the forced stop deceleration.</td></tr><tr><td>2 1 _ _</td><td>Not using EM2 or EM1</td><td></td><td>MBR (Electromagnetic brake interlock) turns off after the forced stop deceleration.</td></tr></table> <p>EM2 and EM1 are mutually exclusive.</p> <p>In the pressure control mode, EM2 functions the same as EM1, and thus the forced stop deceleration is not executed.</p>	[Pr. PA04] setting	EM2/EM1	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.	DI-1
[Pr. PA04] setting	EM2/EM1	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.																							
Forced stop 1	EM1	(CN3-20)	<p>When using EM1, set [Pr. PA04] to "0 0 _ _" to enable EM1.</p> <p>When EM1 is turned off (open between commons), the base circuit shuts off, and the dynamic brake operates to decelerate the servo motor to a stop.</p> <p>The forced stop will be reset when EM1 is turned on (short between commons).</p> <p>Set [Pr. PA04] to "0 1 _ _" to disable EM1.</p>	DI-1																						

2. SIGNALS AND WIRING

2.4.2 Output device

(1) Output device pin

The following shows the output device pins and parameters for assigning devices.

Connector pin No.	Parameter	Initial device	I/O division
CN3-13	[Pr. PD07]	MBR	DO-1
CN3-9	[Pr. PD08]	INP	

(2) Output device explanations

Device	Symbol	Function and application
Electromagnetic brake interlock	MBR	When using the device, set operation delay time of the electromagnetic brake in [Pr. PC02]. When a servo-off status or alarm occurs, MBR will turn off.
Malfunction	ALM	When using the signal, enable it by setting [Pr. PD07] and [Pr. PD08]. When the protective circuit is activated to shut off the base circuit, ALM will turn off. When an alarm does not occur, ALM will turn on in 2.5 s to 3.5 s after power-on.
In-position	INP	When the number of droop pulses is in the in-position range, INP will turn on. The in-position range can be changed with [Pr. PA10]. When the in-position range is increased, INP may be always on during low-speed rotation. The device cannot be used in the speed control mode and the pressure control mode.
Dynamic brake interlock	DB	When using the signal, enable it by setting [Pr. PD07] and [Pr. PD08]. When the dynamic brake needs to operate, DB will turn off. When using the external dynamic brake with the servo amplifier of 11 kW or more, this device is required. (Refer to section 11.17 of "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual" and section 9.3 of "MR-J4-DU_(-RJ)/MR-CR55K_ Instruction Manual".) For the servo amplifier of 7 kW or less, it is not necessary to use this device. The external dynamic brake cannot be used with 11 kW or more servo amplifier for compliance with SEMI-F47 standard. Do not assign DB (Dynamic brake interlock) in [Pr. PD07] to [Pr. PD08]. Doing so will cause the servo amplifier to become servo-off when an instantaneous power failure occurs.
Ready	RD	When using the signal, enable it by setting [Pr. PD07] and [Pr. PD08]. When the servo-on is enabled and the servo amplifier is ready to operate, RD will turn on.
Speed reached	SA	When using the signal, enable it by setting [Pr. PD07] and [Pr. PD08]. SA will turn off during servo-off. When the servo motor speed reaches the following range, SA will turn on. Set speed $\pm ((\text{Set speed} \times 0.05) + 20)$ r/min When the preset speed is 20 r/min or less, SA always turns on. The device cannot be used in the position control mode and the pressure control mode.

2. SIGNALS AND WIRING

Device	Symbol	Function and application
Zero speed detection	ZSP	<p>ZSP turns on when the servo motor speed is zero speed or less. Zero speed can be changed with [Pr. PC07].</p> <p>The graph illustrates the Zero Speed Detection (ZSP) signal's behavior based on servo motor speed. The speed curve oscillates between 70 r/min and -70 r/min. The ZSP signal is ON when the speed is at or below 50 r/min and OFF when the speed is at or above 70 r/min. The hysteresis width is 20 r/min. Key points on the speed curve are labeled: 1) deceleration to 50 r/min (ZSP turns ON), 2) acceleration to 70 r/min (ZSP turns OFF), 3) deceleration to 50 r/min (ZSP turns ON), and 4) acceleration to -70 r/min (ZSP turns OFF).</p> <p>Forward rotation direction: OFF level 70 r/min, ON level 50 r/min</p> <p>Servo motor speed: 0 r/min</p> <p>Reverse rotation direction: ON level -50 r/min, OFF level -70 r/min</p> <p>ZSP (Zero speed detection): ON, OFF</p> <p>20 r/min (Hysteresis width) [Pr. PC07]</p> <p>20 r/min (Hysteresis width)</p> <p>ZSP will turn on when the servo motor is decelerated to 50 r/min (at 1)), and will turn off when the servo motor is accelerated to 70 r/min again (at 2)).</p> <p>ZSP will turn on when the servo motor is decelerated again to 50 r/min (at 3)), and will turn off when the servo motor speed has reached -70 r/min (at 4)).</p> <p>The range from the point when the servo motor speed has reached the on-level, and ZSP turns on, to the point when it is accelerated again and has reached the off-level is called hysteresis width. Hysteresis width is 20 r/min for this servo amplifier.</p>
Limiting torque	TLC	When the torque reaches the torque limit value during torque generation, TLC will turn on. When the servo is off, TLC will turn off.
Warning	WNG	When a warning occurs, WNG will turn on. When a warning is not occurring, turning on the power will turn off WNG after 2.5 s to 3.5 s.
Battery warning	BWNG	BWNG turns on when [AL. 92 Battery cable disconnection warning] or [AL. 9F Battery warning] has occurred. When the battery warning is not occurring, turning on the power will turn off BWNG after 2.5 s to 3.5 s.
Variable gain selection	CDPS	CDPS will turn on during variable gain.
Absolute position undetermined	ABSV	ABSV turns on when the absolute position is undetermined. This device cannot be used in the speed control mode.
During tough drive	MTTR	When a tough drive is enabled in [Pr. PA20], activating the instantaneous power failure tough drive will turn on MTTR.

2. SIGNALS AND WIRING

2.4.3 Input signal

Signal name	Symbol	Connector pin No.	Function and application	I/O division
Pressure feedback	AD0	CN3-15	Input pressure feedback of the load cell for pressure control. Apply 0 V DC to +10 V DC between AD0 and LG. The pressure feedback value set in [Pr. PT22] will be applied at +10 V. Resolution: 16 bits/±11 V	Analog input
Analog monitor input 1	AD1	CN3-19	Input the analog input signal for monitoring. Data is sent to the servo system controller and checked. Apply 0 V DC to ±10 V DC between AD1 and LG. The monitor value set in [Pr. PT24] will be applied at +10 V. Resolution: 16 bits/±11 V	Analog input
Analog monitor input 2	AD2	CN3-12	Input the analog input signal for monitoring. Data is sent to the servo system controller and checked. Apply 0 V DC to ±10 V DC between AD2 and LG. The monitor value set in [Pr. PT26] will be applied at +10 V. Resolution: 16 bits/±11 V	Analog input

2.4.4 Output signal

Signal name	Symbol	Connector pin No.	Function and application	I/O division
Analog monitor 1	MO1	CN3-4	This signal outputs the data set in [Pr. PC09] to between MO1 and LG in terms of voltage. Resolution: 10 bits or equivalent	Analog output
Analog monitor 2	MO2	CN3-14	This signal outputs the data set in [Pr. PC10] to between MO2 and LG in terms of voltage. Resolution: 10 bits or equivalent	Analog output

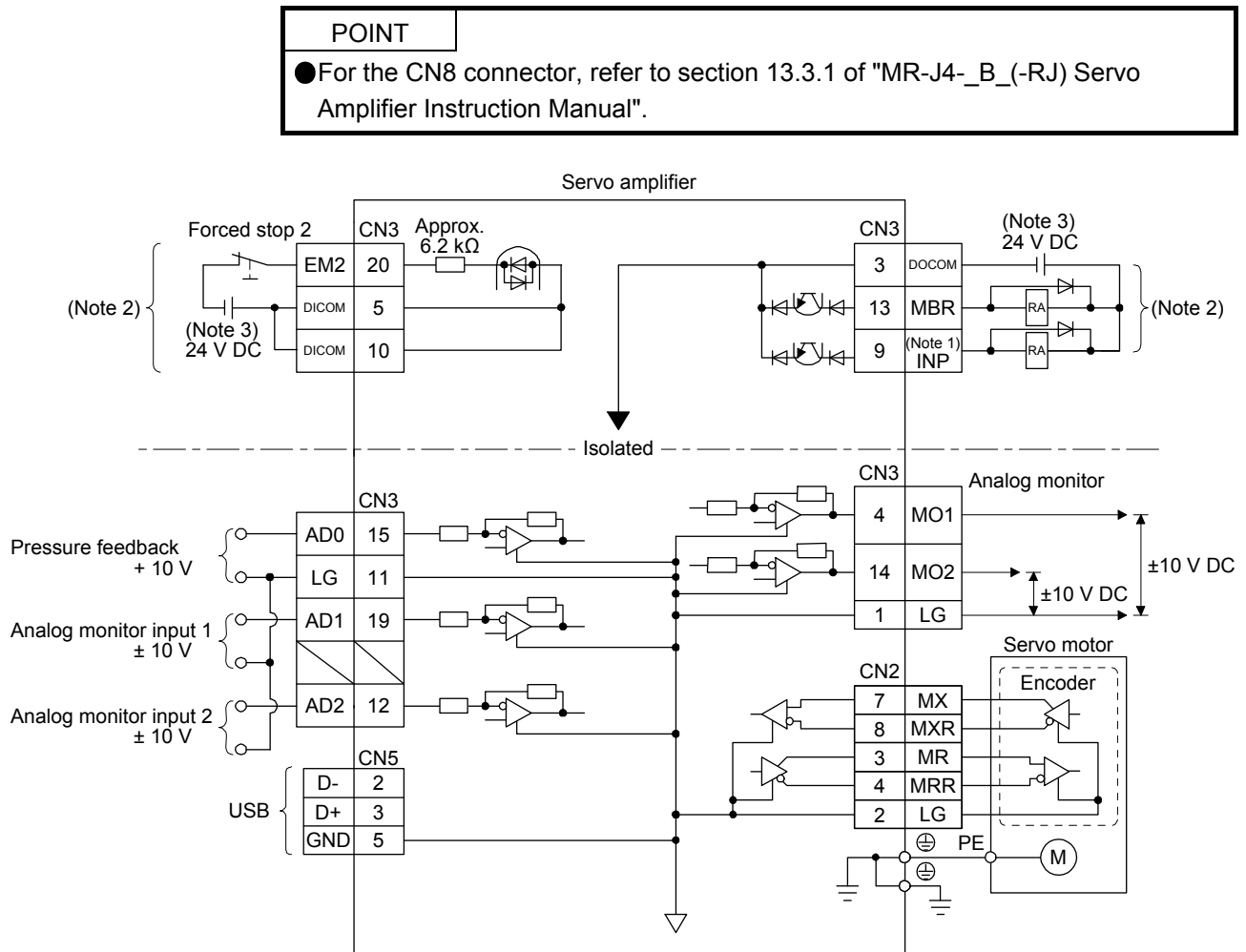
2.4.5 Power supply

Signal name	Symbol	Connector pin No.	Function and application
Digital I/F power supply input	DICOM	CN3-5 CN3-10	Input 24 V DC (24 V DC ± 10% 300 mA) for I/O interface. The power supply capacity changes depending on the number of I/O interface points to be used. For sink interface, connect + of the 24 V DC external power supply. For source interface, connect - of the 24 V DC external power supply.
Digital I/F common	DOCOM	CN3-3	Common terminal of input signal such as EM2 of the servo amplifier. This is separated from LG. For sink interface, connect - of the 24 V DC external power supply. For source interface, connect + of the 24 V DC external power supply.
Monitor common	LG	CN3-1 CN3-11	Common terminal of AD0, AD1, AD2, MO1, and MO2. Pins are connected internally.
Shield	SD	Plate	Connect the external conductor of the shielded wire.

2. SIGNALS AND WIRING

2.5 Interfaces

2.5.1 Internal connection diagram



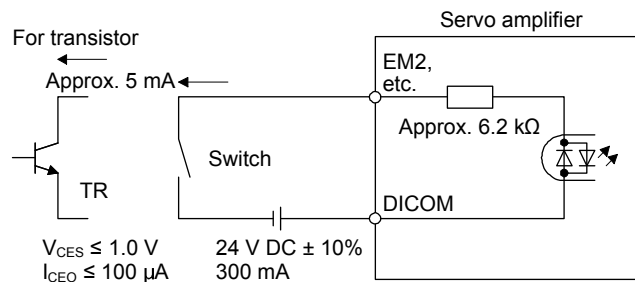
2. SIGNALS AND WIRING

2.5.2 Detailed explanation of interfaces

This section provides the details of the I/O signal interfaces (refer to the I/O division in the table) given in section 2.4. Refer to this section and make connection with the external device.

(1) Digital input interface DI-1

This is an input circuit whose photocoupler cathode side is input terminal. Transmit signals from sink (open-collector) type transistor output, relay switch, etc. The following is a connection diagram for sink input. Refer to section 2.5.3 for source input.



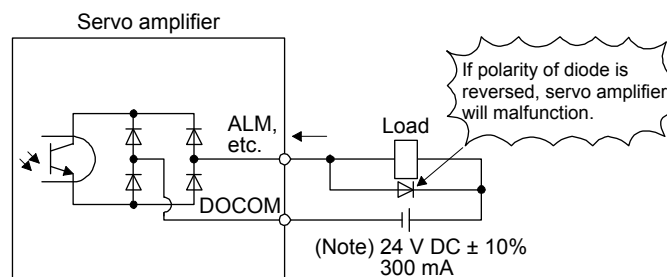
(2) Digital output interface DO-1

This is a circuit in which the collector of the output transistor is the output terminal. When the output transistor is turned on, the current will flow to the collector terminal.

A lamp, relay, or photocoupler can be driven. Install a diode (D) for an inductive load, or install an inrush current suppressing resistor (R) for a lamp load.

(Rated current: 40 mA or less, maximum current: 50 mA or less, inrush current: 100 mA or less) A maximum of 2.6 V voltage drop occurs in the servo amplifier.

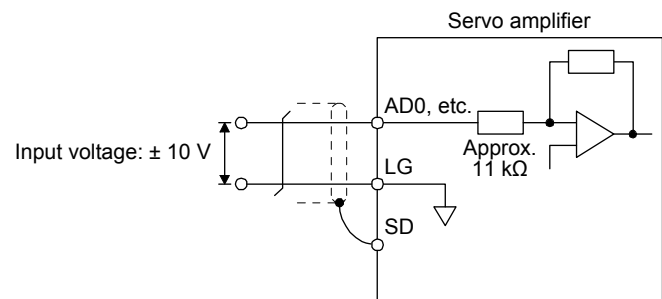
The following shows a connection diagram for sink output. Refer to section 2.5.3 for source output.



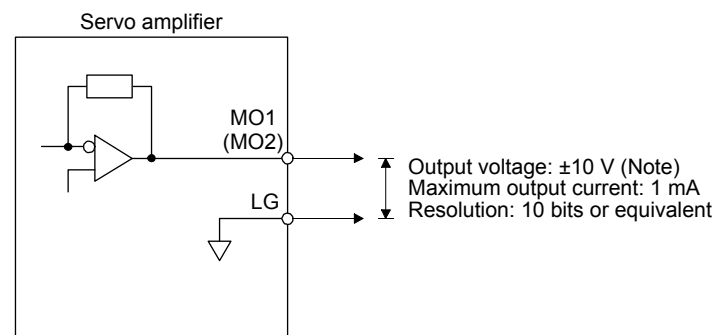
Note. If the voltage drop (maximum of 2.6 V) interferes with the relay operation, apply high voltage (maximum of 26.4 V) from external source.

2. SIGNALS AND WIRING

(3) Analog input



(4) Analog output



Note. Output voltage range varies depending on the output contents.

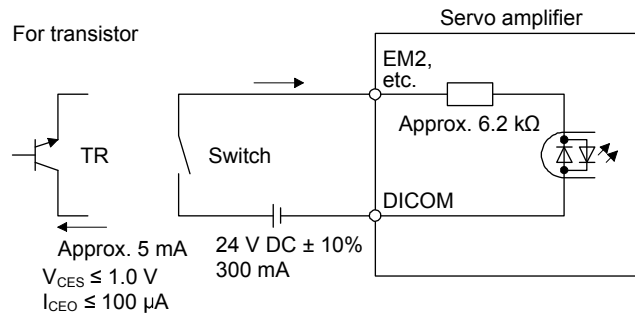
2. SIGNALS AND WIRING

2.5.3 Source I/O interfaces

In this servo amplifier, source type I/O interfaces can be used.

(1) Digital input interface DI-1

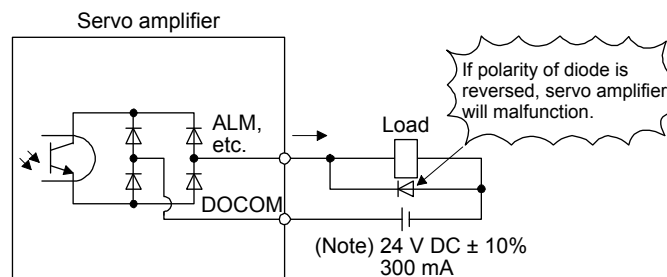
This is an input circuit in which the anode of the photocoupler is the input terminal. Transmit signals from source (open-collector) type transistor output, relay switch, etc.



(2) Digital output interface DO-1

This is a circuit in which the emitter of the output transistor is the output terminal. When the output transistor is turned on, the current will flow from the output terminal to a load.

A maximum of 2.6 V voltage drop occurs in the servo amplifier.



Note. If the voltage drop (maximum of 2.6 V) interferes with the relay operation, apply high voltage (maximum of 26.4 V) from external source.

3. PARAMETERS

3. PARAMETERS



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 any values other than the described setting values to each parameter.

POINT

- When you connect the servo amplifier to a servo system controller, servo parameter values of the servo system controller will be written to each parameter.
- Setting may not be made to some parameters and their ranges depending on the servo system controller model, servo amplifier software version, and MR Configurator2 software version. For details, refer to the servo system controller user's manual. Check the software version of the servo amplifier with MR Configurator2.

3.1 Parameter list

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.
- For servo amplifier with software version B3 or later, the parameter initial values for the manufacturer setting are partially changed.

3. PARAMETERS

3.1.1 Basic setting parameters ([Pr. PA_ _])

No.	Symbol	Name	Initial value	Unit	Control mode		
					Position	Speed	Pressure
PA01		For manufacturer setting	1000h				
PA02	**REG	Regenerative option	0000h		○	○	○
PA03	*ABS	Absolute position detection system	0000h		○	○	○
PA04	*AOP1	Function selection A-1	2000h		○	○	○
PA05		For manufacturer setting	10000				
PA06			1				
PA07			1				
PA08	ATU	Auto tuning mode	0001h		○	○	
PA09	RSP	Auto tuning response	16		○	○	
PA10	INP	In-position range	1600	[pulse]	○		
PA11		For manufacturer setting	1000.0				
PA12			1000.0				
PA13			0000h				
PA14	*POL	Rotation direction selection	0		○	○	○
PA15		For manufacturer setting	4000				
PA16			1				
PA17			0000h				
PA18			0000h				
PA19	*BLK	Parameter writing inhibit	00ABh		○	○	○
PA20	*TDS	Tough drive setting	0000h		○	○	
PA21	*AOP3	Function selection A-3	0001h		○	○	
PA22		For manufacturer setting	0000h				
PA23	DRAT	Drive recorder arbitrary alarm trigger setting	0000h		○	○	○
PA24	AOP4	Function selection A-4	0000h		○	○	
PA25	OTHOV	One-touch tuning - Overshoot permissible level	0	[%]	○	○	
PA26	*AOP5	Function selection A-5	0000h		○	○	○
PA27		For manufacturer setting	0000h				
PA28			0000h				
PA29			0000h				
PA30			0000h				
PA31			0000h				
PA32			0000h				

3. PARAMETERS

3.1.2 Gain/filter setting parameters ([Pr. PB_ _])

No.	Symbol	Name	Initial value	Unit	Control mode		
					Position	Speed	Pressure
PB01	FILT	Adaptive tuning mode (adaptive filter II)	0000h		☐	☐	☐
PB02	VRFT	Vibration suppression control tuning mode (advanced vibration suppression control II)	0000h		☐	☐	☐
PB03		For manufacturer setting	18000		☐	☐	☐
PB04	FFC	Feed forward gain	0	[%]	☐	☐	☐
PB05		For manufacturer setting	500		☐	☐	☐
PB06	GD2	Load to motor inertia ratio	7.00	[Multiplier]	☐	☐	☐
PB07	PG1	Model loop gain	15.0	[rad/s]	☐	☐	☐
PB08	PG2	Position loop gain	37.0	[rad/s]	☐	☐	☐
PB09	VG2	Speed loop gain	823	[rad/s]	☐	☐	☐
PB10	VIC	Speed integral compensation	33.7	[ms]	☐	☐	☐
PB11	VDC	Speed differential compensation	980		☐	☐	☐
PB12	OVA	Overshoot amount compensation	0	[%]	☐	☐	☐
PB13	NH1	Machine resonance suppression filter 1	4500	[Hz]	☐	☐	☐
PB14	NHQ1	Notch shape selection 1	0000h		☐	☐	☐
PB15	NH2	Machine resonance suppression filter 2	4500	[Hz]	☐	☐	☐
PB16	NHQ2	Notch shape selection 2	0000h		☐	☐	☐
PB17	NHF	Shaft resonance suppression filter	0000h		☐	☐	☐
PB18	LPF	Low-pass filter setting	3141	[rad/s]	☐	☐	☐
PB19	VRF11	Vibration suppression control 1 - Vibration frequency	100.0	[Hz]	☐	☐	☐
PB20	VRF12	Vibration suppression control 1 - Resonance frequency	100.0	[Hz]	☐	☐	☐
PB21	VRF13	Vibration suppression control 1 - Vibration frequency damping	0.00		☐	☐	☐
PB22	VRF14	Vibration suppression control 1 - Resonance frequency damping	0.00		☐	☐	☐
PB23	VFBF	Low-pass filter selection	0000h		☐	☐	☐
PB24	*MVS	Slight vibration suppression control	0000h		☐	☐	☐
PB25	*BOP1	Function selection B-1	0000h		☐	☐	☐
PB26	*CDP	Gain switching function	0000h		☐	☐	☐
PB27	CDL	Gain switching condition	10	[kpulse/s]/ [pulse]/ [r/min]	☐	☐	☐
PB28	CDT	Gain switching time constant	1	[ms]	☐	☐	☐
PB29	GD2B	Load to motor inertia ratio after gain switching	7.00	[Multiplier]	☐	☐	☐
PB30	PG2B	Position loop gain after gain switching	0.0	[rad/s]	☐	☐	☐
PB31	VG2B	Speed loop gain after gain switching	0	[rad/s]	☐	☐	☐
PB32	VICB	Speed integral compensation after gain switching	0.0	[ms]	☐	☐	☐
PB33	VRF11B	Vibration suppression control 1 - Vibration frequency after gain switching	0.0	[Hz]	☐	☐	☐
PB34	VRF12B	Vibration suppression control 1 - Resonance frequency after gain switching	0.0	[Hz]	☐	☐	☐
PB35	VRF13B	Vibration suppression control 1 - Vibration frequency damping after gain switching	0.00		☐	☐	☐
PB36	VRF14B	Vibration suppression control 1 - Resonance frequency damping after gain switching	0.00		☐	☐	☐
PB37		For manufacturer setting	1600		☐	☐	☐
PB38			0.00		☐	☐	☐
PB39			0.00		☐	☐	☐
PB40			0.00		☐	☐	☐
PB41			0		☐	☐	☐
PB42			0		☐	☐	☐
PB43			0000h		☐	☐	☐
PB44			0.00		☐	☐	☐
PB45	CNHF	Command notch filter	0000h		☐	☐	☐

3. PARAMETERS

No.	Symbol	Name	Initial value	Unit	Control mode		
					Position	Speed	Pressure
PB46	NH3	Machine resonance suppression filter 3	4500	[Hz]	☐	☐	☐
PB47	NHQ3	Notch shape selection 3	0000h		☐	☐	☐
PB48	NH4	Machine resonance suppression filter 4	4500	[Hz]	☐	☐	☐
PB49	NHQ4	Notch shape selection 4	0000h		☐	☐	☐
PB50	NH5	Machine resonance suppression filter 5	4500	[Hz]	☐	☐	☐
PB51	NHQ5	Notch shape selection 5	0000h		☐	☐	☐
PB52	VRF21	Vibration suppression control 2 - Vibration frequency	100.0	[Hz]	☐	☐	☐
PB53	VRF22	Vibration suppression control 2 - Resonance frequency	100.0	[Hz]	☐	☐	☐
PB54	VRF23	Vibration suppression control 2 - Vibration frequency damping	0.00		☐	☐	☐
PB55	VRF24	Vibration suppression control 2 - Resonance frequency damping	0.00		☐	☐	☐
PB56	VRF21B	Vibration suppression control 2 - Vibration frequency after gain switching	0.0	[Hz]	☐	☐	☐
PB57	VRF22B	Vibration suppression control 2 - Resonance frequency after gain switching	0.0	[Hz]	☐	☐	☐
PB58	VRF23B	Vibration suppression control 2 - Vibration frequency damping after gain switching	0.00		☐	☐	☐
PB59	VRF24B	Vibration suppression control 2 - Resonance frequency damping after gain switching	0.00		☐	☐	☐
PB60	PG1B	Model loop gain after gain switching	0.0	[rad/s]	☐	☐	☐
PB61		For manufacturer setting	0.0		☐	☐	☐
PB62			0000h				
PB63			0000h				
PB64			0000h				

3.1.3 Extension setting parameters ([Pr. PC_ _])

No.	Symbol	Name	Initial value	Unit	Control mode		
					Position	Speed	Pressure
PC01	ERZ	Error excessive alarm level	0	[rev]	☐	☐	☐
PC02	MBR	Electromagnetic brake sequence output	0	[ms]	☐	☐	☐
PC03		For manufacturer setting	0000h		☐	☐	☐
PC04			0000h				
PC05			0000h				
PC06			0000h				
PC07	ZSP	Zero speed	50	[r/min]	☐	☐	☐
PC08	OSL	Overspeed alarm detection level	0	[r/min]	☐	☐	☐
PC09	MOD1	Analog monitor 1 output	0000h		☐	☐	☐
PC10	MOD2	Analog monitor 2 output	0001h		☐	☐	☐
PC11	MO1	Analog monitor 1 offset	0	[mV]	☐	☐	☐
PC12	MO2	Analog monitor 2 offset	0	[mV]	☐	☐	☐
PC13		For manufacturer setting	0		☐	☐	☐
PC14			0				
PC15			0				
PC16			0000h				
PC17	**COP4	Function selection C-4	0000h		☐	☐	☐
PC18	*COP5	Function selection C-5	0000h		☐	☐	☐
PC19		For manufacturer setting	0000h		☐	☐	☐
PC20			0000h				
PC21	*BPS	Alarm history clear	0000h		☐	☐	☐
PC22		For manufacturer setting	0		☐	☐	☐
PC23			0000h				
PC24	RSBR	Forced stop deceleration time constant	100	[ms]	☐	☐	☐

3. PARAMETERS

No.	Symbol	Name	Initial value	Unit	Control mode		
					Position	Speed	Pressure
PC25		For manufacturer setting	0				
PC26			0000h				
PC27			0000h				
PC28			0000h				
PC29			0000h				
PC30		For manufacturer setting	0				
PC31	RSUP1	Vertical axis freefall prevention compensation amount	0	[0.0001rev]	○		
PC32		For manufacturer setting	0000h				
PC33			0				
PC34			100				
PC35			0000h				
PC36			0000h				
PC37			0000h				
PC38	ERW	Error excessive warning level	0	[rev]	○		
PC39		For manufacturer setting	0000h				
PC40			0000h				
PC41			0000h				
PC42			0000h				
PC43			0000h				
PC44			0000h				
PC45			0000h				
PC46			0000h				
PC47			0000h				
PC48			0000h				
PC49			0000h				
PC50			0000h				
PC51			0000h				
PC52			0000h				
PC53			0000h				
PC54			0000h				
PC55			0000h				
PC56			0000h				
PC57			0000h				
PC58			0000h				
PC59			0000h				
PC60			0000h				
PC61			0000h				
PC62			0000h				
PC63			0000h				
PC64			0000h				

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3.1.4 I/O setting parameters ([Pr. PD_ _])

No.	Symbol	Name	Initial value	Unit	Control mode		
					Position	Speed	Pressure
PD01		For manufacturer setting	0000h				
PD02	*DIA2	Input signal automatic on selection 2	0000h		○	○	○
PD03		For manufacturer setting	0020h				
PD04			0021h				
PD05			0022h				
PD06			0000h				
PD07	*DO1	Output device selection 1	0005h		○	○	○
PD08	*DO2	Output device selection 2	0004h		○	○	○
PD09		For manufacturer setting	0003h				
PD10			0000h				
PD11			0004h				
PD12			0000h				
PD13			0000h				
PD14	*DOP3	Function selection D-3	0000h		○	○	○
PD15		For manufacturer setting	0000h				
PD16			0000h				
PD17			0000h				
PD18			0000h				
PD19			0000h				
PD20			0				
PD21			0				
PD22			0				
PD23			0				
PD24			0000h				
PD25			0000h				
PD26			0000h				
PD27			0000h				
PD28			0000h				
PD29			0000h				
PD30			0				
PD31			0				
PD32			0				
PD33			0000h				
PD34			0000h				
PD35			0000h				
PD36			0000h				
PD37			0000h				
PD38			0000h				
PD39			0000h				
PD40			0000h				
PD41			0000h				
PD42			0000h				
PD43			0000h				
PD44			0000h				
PD45			0000h				
PD46			0000h				
PD47			0000h				
PD48			0000h				

3. PARAMETERS

3.1.5 Extension setting 2 parameters ([Pr. PE_ _])

No.	Symbol	Name	Initial value	Unit	Control mode		
					Position	Speed	Pressure
PE01		For manufacturer setting	0000h				
PE02			0000h				
PE03			0003h				
PE04			1				
PE05			1				
PE06			400				
PE07			100				
PE08			10				
PE09			0000h				
PE10			0000h				
PE11			0000h				
PE12			0000h				
PE13			0000h				
PE14			0111h				
PE15			20				
PE16			0000h				
PE17			0000h				
PE18			0000h				
PE19			0000h				
PE20			0000h				
PE21			0000h				
PE22			0000h				
PE23			0000h				
PE24			0000h				
PE25			0000h				
PE26			0000h				
PE27			0000h				
PE28			0000h				
PE29			0000h				
PE30			0000h				
PE31			0000h				
PE32			0000h				
PE33			0000h				
PE34			1				
PE35			1				
PE36			0.0				
PE37			0.00				
PE38			0.00				
PE39			20				
PE40			0000h				
PE41	EOP3	Function selection E-3	0000h		☐	☐	☐
PE42		For manufacturer setting	0		☐	☐	☐
PE43			0.0				
PE44	LMCP	Lost motion compensation positive-side compensation value selection	0	[0.01%]	☐	☐	☐
PE45	LMCN	Lost motion compensation negative-side compensation value selection	0	[0.01%]	☐	☐	☐
PE46	LMFLT	Lost motion filter setting	0	[0.1 ms]	☐	☐	☐
PE47	TOF	Torque offset	0	[0.01%]	☐	☐	☐
PE48	*LMOP	Lost motion compensation function selection	0000h		☐	☐	☐
PE49	LMCD	Lost motion compensation timing	0	[0.1 ms]	☐	☐	☐
PE50	LMCT	Lost motion compensation non-sensitive band	0	[pulse]/ [kpulse]	☐	☐	☐

3. PARAMETERS

No.	Symbol	Name	Initial value	Unit	Control mode		
					Position	Speed	Pressure
PE51		For manufacturer setting	0000h				
PE52			0000h				
PE53			0000h				
PE54			0000h				
PE55			0000h				
PE56			0000h				
PE57			0000h				
PE58			0000h				
PE59			0000h				
PE60			0000h				
PE61			0.00				
PE62			0.00				
PE63			0.00				
PE64			0.00				

3.1.6 Extension setting 3 parameters ([Pr. PF_ _])

No.	Symbol	Name	Initial value	Unit	Control mode		
					Position	Speed	Pressure
PF01		For manufacturer setting	0000h				
PF02			0000h				
PF03			0000h				
PF04			0				
PF05			0000h				
PF06	*FOP5	Function selection F-5	0000h		○	○	○
PF07		For manufacturer setting	0000h				
PF08			0000h				
PF09			0				
PF10			0				
PF11			0				
PF12	DBT	Electronic dynamic brake operating time	2000	[ms]	○	○	○
PF13		For manufacturer setting	0000h				
PF14			10				
PF15			0000h				
PF16			0000h				
PF17			0000h				
PF18			0000h				
PF19			0000h				
PF20			0000h				
PF21	DRT	Drive recorder switching time setting	0	[s]	○	○	○
PF22		For manufacturer setting	200				
PF23	OSCL1	Vibration tough drive - Oscillation detection level	50	[%]	○	○	
PF24	*OSCL2	Vibration tough drive function selection	0000h		○	○	
PF25	CVAT	SEMI-F47 function - Instantaneous power failure detection time	200	[ms]	○	○	○
PF26		For manufacturer setting	0				
PF27			0				
PF28			0				
PF29			0000h				
PF30			0				
PF31	FRIC	Machine diagnosis function - Friction judgment speed	0	[r/min]	○	○	

3. PARAMETERS

No.	Symbol	Name	Initial value	Unit	Control mode		
					Position	Speed	Pressure
PF32		For manufacturer setting	50				
PF33			0000h				
PF34			0000h				
PF35			0000h				
PF36			0000h				
PF37			0000h				
PF38			0000h				
PF39			0000h				
PF40			0000h				
PF41			0000h				
PF42			0000h				
PF43			0000h				
PF44			0				
PF45			0000h				
PF46			0000h				
PF47			0000h				
PF48			0021h				

3.1.7 Linear servo motor/DD motor setting parameters ([Pr. PL_ _])

Linear servo motor/DD motor setting parameters ([Pr. PL_ _]) are not used with MR-J4-(DU)_B_-LL servo amplifiers. Do not change from the default.

The default values are the same as those for MR-J4-_B_ servo amplifiers. To check the default values, refer to section 5.1.7 of "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual".

3. PARAMETERS

3.1.8 Pressure control parameters ([Pr. PT_ _])

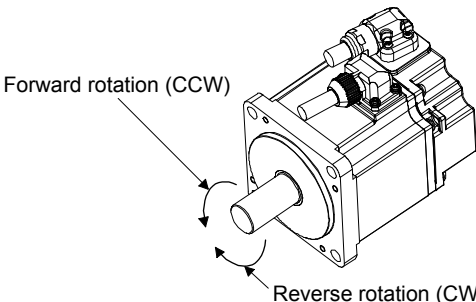
No.	Symbol	Name	Initial value	Unit	Control mode		
					Position	Speed	Pressure
PT01	APA	Pressure loop gain	800	[ms]			○
PT02	AIA	Pressure integral compensation	75				○
PT03	ADA	Pressure incomplete integral coefficient	10000				○
PT04		For manufacturer setting	0				
PT05			0.0				
PT06			800				
PT07			75				
PT08			10000				
PT09			800				
PT10			75				
PT11			10000				
PT12	*TOP1	Function selection T-1	0000h				○
PT13	*TOP2	Function selection T-2	0000h				○
PT14	*TOP3	Function selection T-3	0000h				○
PT15		For manufacturer setting	0000h				
PT16			0000h				
PT17			0				
PT18			0				
PT19			0				
PT20			0000h				
PT21	AFBO	Pressure feedback offset	0	[mV]			○
PT22	AFBD	Pressure feedback unit constant	20000	[Command unit]			○
PT23	AO1	Analog monitor input 1 offset	0	[mV]			○
PT24	AD1	Analog monitor input 1 unit constant	20000	[Command unit]			○
PT25	AO2	Analog monitor input 2 offset	0	[mV]			○
PT26	AD2	Analog monitor input 2 unit constant	20000	[Command unit]			○
PT27	ADF	Analog monitor input filter setting	0000h				○
PT28		For manufacturer setting	0				
PT29			24.0				
PT30			0				
PT31			0000h				
PT32			0000h				
PT33			0000h				
PT34			0000h				
PT35			0000h				
PT36			0000h				
PT37			0000h				
PT38			0000h				
PT39			0000h				
PT40			0000h				
PT41			0000h				
PT42			0000h				
PT43			0000h				
PT44			0000h				
PT45			0000h				
PT46			0000h				
PT47			0000h				
PT48			0000h				

3. PARAMETERS

3.2 Detailed list of parameters

POINT
<ul style="list-style-type: none"> ● Items not mentioned in this section are the same as those for MR-J4-_B_ servo amplifier. Refer to section 5.2 of "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual" and section 5.2.2 of "MR-J4-DU_(-RJ)/MR-CR55K_ Instruction Manual". However, functions available with the MR-J4-_B_ servo amplifiers with software version C0 or later are not supported by the MR-J4-(DU)_B_-LL servo amplifiers. ● Refer to "3.1 Parameter list" for the compatible control modes. ● Parameters described as "For manufacturer setting" in "3.1 Parameter list" cannot be used. ● Set a value to each "x" in the "Setting digit" columns.

3.2.1 Basic setting parameters ([Pr. PA__])

No.	Symbol	Name and function	Initial value [unit]	Setting range																																									
PA14	*POL	<div>Rotation direction selection</div> <div>Select the rotation direction of command input pulse.</div> <table border="1"><thead><tr><th rowspan="2">Setting value</th><th colspan="2">Servo motor rotation direction</th></tr><tr><th>Positioning address increase</th><th>Positioning address decrease</th></tr></thead><tbody><tr><td>0</td><td>CCW</td><td>CW</td></tr><tr><td>1</td><td>CW</td><td>CCW</td></tr></tbody></table> <div>For the pressure control mode, the servo motor rotation direction and the pressure increasing direction are as follows with a combination of "Selection of pressure increasing direction for positioning address (_ _ x _)" in [Pr. PT12].</div> <table border="1"><thead><tr><th colspan="2">Parameter setting value</th><th colspan="2">Positioning address increase</th><th colspan="2">Positioning address decrease</th></tr><tr><th>PT12 " _ _ x _ "</th><th>PA14</th><th>Pressure</th><th>Servo motor rotation direction</th><th>Pressure</th><th>Servo motor rotation direction</th></tr></thead><tbody><tr><td rowspan="2">0</td><td>0</td><td rowspan="2">Decrease</td><td>CCW</td><td rowspan="2">Increase</td><td>CW</td></tr><tr><td>1</td><td>CW</td><td>CCW</td></tr><tr><td rowspan="2">1</td><td>0</td><td rowspan="2">Increase</td><td>CCW</td><td rowspan="2">Decrease</td><td>CW</td></tr><tr><td>1</td><td>CW</td><td>CCW</td></tr></tbody></table> <div>The following shows the servo motor rotation directions.</div> <div></div> <td>0</td> <td>0 to 1</td>	Setting value	Servo motor rotation direction		Positioning address increase	Positioning address decrease	0	CCW	CW	1	CW	CCW	Parameter setting value		Positioning address increase		Positioning address decrease		PT12 " _ _ x _ "	PA14	Pressure	Servo motor rotation direction	Pressure	Servo motor rotation direction	0	0	Decrease	CCW	Increase	CW	1	CW	CCW	1	0	Increase	CCW	Decrease	CW	1	CW	CCW	0	0 to 1
Setting value	Servo motor rotation direction																																												
	Positioning address increase	Positioning address decrease																																											
0	CCW	CW																																											
1	CW	CCW																																											
Parameter setting value		Positioning address increase		Positioning address decrease																																									
PT12 " _ _ x _ "	PA14	Pressure	Servo motor rotation direction	Pressure	Servo motor rotation direction																																								
0	0	Decrease	CCW	Increase	CW																																								
	1		CW		CCW																																								
1	0	Increase	CCW	Decrease	CW																																								
	1		CW		CCW																																								

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No.	Symbol	Name and function	Initial value [unit]	Setting range														
PA20	*TDS	<p>Tough drive setting</p> <p>Alarms may not be avoided with the tough drive function depending on the situations of the power supply and load fluctuation.</p> <p>You can assign MTTR (During tough drive) to pins CN3-9 and CN3-13 with [Pr. PD07] and [Pr. PD08].</p> <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 the 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. PF23]. For details, refer to section 7.3 of "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual". This cannot be used in the pressure control mode.</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. The time until [AL. 10.1 Voltage drop in the control circuit power] occurs can be set with [Pr. PF25 SEMI-F47 function - Instantaneous power failure detection time].</td><td>0h</td></tr><tr><td>x___</td><td>For manufacturer setting</td><td>0h</td></tr></table>	Setting digit	Explanation	Initial value	___x	For manufacturer setting	0h	__x_	Vibration tough drive selection 0: Disabled 1: Enabled Selecting "1" enables to suppress vibrations by automatically changing the 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. PF23]. For details, refer to section 7.3 of "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual". This cannot be used in the pressure control mode.	0h	_x__	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. The time until [AL. 10.1 Voltage drop in the control circuit power] occurs can be set with [Pr. PF25 SEMI-F47 function - Instantaneous power failure detection time].	0h	x___	For manufacturer setting	0h	Refer to the Name and function column.
Setting digit	Explanation	Initial value																
___x	For manufacturer setting	0h																
__x_	Vibration tough drive selection 0: Disabled 1: Enabled Selecting "1" enables to suppress vibrations by automatically changing the 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. PF23]. For details, refer to section 7.3 of "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual". This cannot be used in the pressure control mode.	0h																
_x__	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. The time until [AL. 10.1 Voltage drop in the control circuit power] occurs can be set with [Pr. PF25 SEMI-F47 function - Instantaneous power failure detection time].	0h																
x___	For manufacturer setting	0h																

3.2.2 Gain/filter setting parameters ([Pr. PB_ _])

Details of Gain/filter setting parameters ([Pr. PB_ _]) are the same as those for MR-J4-_B_ servo amplifier. Refer to section 5.2.2 of "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual".

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3.2.3 Extension setting parameters ([Pr. PC__])

No.	Symbol	Name and function	Initial value [unit]	Setting range																																																																																																													
PC09	MOD1	Analog monitor 1 output Select a signal to output to MO1 (Analog monitor 1).	Refer to the Name and function column.																																																																																																														
		<table><tr><th>Setting digit</th><th>Explanation</th><th>Initial value</th></tr><tr><td>__ x x</td><td>Analog monitor 1 output selection Refer to table 3.1 for settings.</td><td>00h</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>			Setting digit	Explanation	Initial value	__ x x	Analog monitor 1 output selection Refer to table 3.1 for settings.	00h	_ x _ _	For manufacturer setting	0h	x _ _ _	0h																																																																																																		
		Setting digit			Explanation	Initial value																																																																																																											
		__ x x			Analog monitor 1 output selection Refer to table 3.1 for settings.	00h																																																																																																											
		_ x _ _			For manufacturer setting	0h																																																																																																											
		x _ _ _				0h																																																																																																											
		Table 3.1 Analog monitor setting value																																																																																																															
		<table><tr><th rowspan="2">Setting value</th><th rowspan="2">Item</th><th colspan="3">Control mode</th></tr><tr><th>Position</th><th>Speed</th><th>Pressure</th></tr><tr><td>__ 00</td><td>Servo motor speed (±8 V/max. speed)</td><td>○</td><td>○</td><td>○</td></tr><tr><td>__ 01</td><td>Torque (±8 V/max. torque)</td><td>○</td><td>○</td><td>○</td></tr><tr><td>__ 02</td><td>Servo motor speed (+8 V/max. speed)</td><td>○</td><td>○</td><td>○</td></tr><tr><td>__ 03</td><td>Torque (+8 V/max. torque)</td><td>○</td><td>○</td><td>○</td></tr><tr><td>__ 04</td><td>Current command (±8 V/max. current command)</td><td>○</td><td>○</td><td>○</td></tr><tr><td>__ 05</td><td>Speed command (±8 V/max. speed)</td><td>○</td><td>○</td><td>○</td></tr><tr><td>__ 06</td><td>Servo motor-side droop pulses (±10 V/100 pulses) (Note 1)</td><td>○</td><td>△</td><td>○</td></tr><tr><td>__ 07</td><td>Servo motor-side droop pulses (±10 V/1000 pulses) (Note 1)</td><td>○</td><td>△</td><td>○</td></tr><tr><td>__ 08</td><td>Servo motor-side droop pulses (±10 V/10000 pulses) (Note 1)</td><td>○</td><td>△</td><td>○</td></tr><tr><td>__ 09</td><td>Servo motor-side droop pulses (±10 V/100000 pulses) (Note 1)</td><td>○</td><td>△</td><td>○</td></tr><tr><td>__ 0A</td><td>Feedback position (±10 V/1 Mpulse) (Note 1)</td><td>○</td><td>△</td><td>○</td></tr><tr><td>__ 0B</td><td>Feedback position (±10 V/10 Mpulses) (Note 1)</td><td>○</td><td>△</td><td>○</td></tr><tr><td>__ 0C</td><td>Feedback position (±10 V/100 Mpulses) (Note 1)</td><td>○</td><td>△</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><td>○</td><td>○</td></tr><tr><td>__ 0E</td><td>Speed command 2 (±8 V/max. speed)</td><td>○</td><td>○</td><td>○</td></tr><tr><td>__ 17</td><td>Internal temperature of encoder (±10 V/±128 °C)</td><td>○</td><td>○</td><td>○</td></tr><tr><td>__ 1C</td><td>Pressure command (±10 V/ [Pr. PT22] setting value)</td><td>○</td><td>○</td><td>○</td></tr><tr><td>__ 1D</td><td>Pressure feedback (AD0 input voltage ±10 V) (Note 2)</td><td>○</td><td>○</td><td>○</td></tr><tr><td>__ 1E</td><td>Analog monitor input 1 (AD1 input voltage ±10 V) (Note 2)</td><td>○</td><td>○</td><td>○</td></tr><tr><td>__ 1F</td><td>Analog monitor input 2 (AD2 input voltage ±10 V) (Note 2)</td><td>○</td><td>○</td><td>○</td></tr></table>			Setting value	Item	Control mode			Position	Speed	Pressure	__ 00	Servo motor speed (±8 V/max. speed)	○	○	○	__ 01	Torque (±8 V/max. torque)	○	○	○	__ 02	Servo motor speed (+8 V/max. speed)	○	○	○	__ 03	Torque (+8 V/max. torque)	○	○	○	__ 04	Current command (±8 V/max. current command)	○	○	○	__ 05	Speed command (±8 V/max. speed)	○	○	○	__ 06	Servo motor-side droop pulses (±10 V/100 pulses) (Note 1)	○	△	○	__ 07	Servo motor-side droop pulses (±10 V/1000 pulses) (Note 1)	○	△	○	__ 08	Servo motor-side droop pulses (±10 V/10000 pulses) (Note 1)	○	△	○	__ 09	Servo motor-side droop pulses (±10 V/100000 pulses) (Note 1)	○	△	○	__ 0A	Feedback position (±10 V/1 Mpulse) (Note 1)	○	△	○	__ 0B	Feedback position (±10 V/10 Mpulses) (Note 1)	○	△	○	__ 0C	Feedback position (±10 V/100 Mpulses) (Note 1)	○	△	○	__ 0D	Bus voltage (200 V class and 100 V class: +8 V/400 V, 400 V class: +8 V/800 V)	○	○	○	__ 0E	Speed command 2 (±8 V/max. speed)	○	○	○	__ 17	Internal temperature of encoder (±10 V/±128 °C)	○	○	○	__ 1C	Pressure command (±10 V/ [Pr. PT22] setting value)	○	○	○	__ 1D	Pressure feedback (AD0 input voltage ±10 V) (Note 2)	○	○	○	__ 1E	Analog monitor input 1 (AD1 input voltage ±10 V) (Note 2)	○	○	○	__ 1F	Analog monitor input 2 (AD2 input voltage ±10 V) (Note 2)	○	○	○	
		Setting value					Item	Control mode																																																																																																									
					Position	Speed		Pressure																																																																																																									
__ 00	Servo motor speed (±8 V/max. speed)	○	○	○																																																																																																													
__ 01	Torque (±8 V/max. torque)	○	○	○																																																																																																													
__ 02	Servo motor speed (+8 V/max. speed)	○	○	○																																																																																																													
__ 03	Torque (+8 V/max. torque)	○	○	○																																																																																																													
__ 04	Current command (±8 V/max. current command)	○	○	○																																																																																																													
__ 05	Speed command (±8 V/max. speed)	○	○	○																																																																																																													
__ 06	Servo motor-side droop pulses (±10 V/100 pulses) (Note 1)	○	△	○																																																																																																													
__ 07	Servo motor-side droop pulses (±10 V/1000 pulses) (Note 1)	○	△	○																																																																																																													
__ 08	Servo motor-side droop pulses (±10 V/10000 pulses) (Note 1)	○	△	○																																																																																																													
__ 09	Servo motor-side droop pulses (±10 V/100000 pulses) (Note 1)	○	△	○																																																																																																													
__ 0A	Feedback position (±10 V/1 Mpulse) (Note 1)	○	△	○																																																																																																													
__ 0B	Feedback position (±10 V/10 Mpulses) (Note 1)	○	△	○																																																																																																													
__ 0C	Feedback position (±10 V/100 Mpulses) (Note 1)	○	△	○																																																																																																													
__ 0D	Bus voltage (200 V class and 100 V class: +8 V/400 V, 400 V class: +8 V/800 V)	○	○	○																																																																																																													
__ 0E	Speed command 2 (±8 V/max. speed)	○	○	○																																																																																																													
__ 17	Internal temperature of encoder (±10 V/±128 °C)	○	○	○																																																																																																													
__ 1C	Pressure command (±10 V/ [Pr. PT22] setting value)	○	○	○																																																																																																													
__ 1D	Pressure feedback (AD0 input voltage ±10 V) (Note 2)	○	○	○																																																																																																													
__ 1E	Analog monitor input 1 (AD1 input voltage ±10 V) (Note 2)	○	○	○																																																																																																													
__ 1F	Analog monitor input 2 (AD2 input voltage ±10 V) (Note 2)	○	○	○																																																																																																													
Note 1. Encoder pulse unit																																																																																																																	
2. Offset-adjusted values with [Pr. PT21], [Pr. PT23], and [Pr. PT25] are outputted.																																																																																																																	
PC10	MOD2	Analog monitor 2 output Select a signal to output to MO2 (Analog monitor 2).	Refer to the Name and function column.																																																																																																														
		<table><tr><th>Setting digit</th><th>Explanation</th><th>Initial value</th></tr><tr><td>__ x x</td><td>Analog monitor 2 output selection Refer to [Pr. PC09] for settings.</td><td>01h</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>			Setting digit	Explanation	Initial value	__ x x	Analog monitor 2 output selection Refer to [Pr. PC09] for settings.	01h	_ x _ _	For manufacturer setting	0h	x _ _ _	0h																																																																																																		
		Setting digit			Explanation	Initial value																																																																																																											
		__ x x			Analog monitor 2 output selection Refer to [Pr. PC09] for settings.	01h																																																																																																											
		_ x _ _			For manufacturer setting	0h																																																																																																											
x _ _ _	0h																																																																																																																

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3.2.4 I/O setting parameters ([Pr. PD_ _])

Details of I/O setting parameters ([Pr. PD_ _]) are the same as those for MR-J4-_B_ servo amplifier. Refer to section 5.2.4 of "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual".

3.2.5 Extension setting 2 parameters ([Pr. PE_ _])

Details of Extension setting 2 parameters ([Pr. PE_ _]) are the same as those for MR-J4-_B_ servo amplifier. Refer to section 5.2.5 of "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual".

3.2.6 Extension setting 3 parameters ([Pr. PF_ _])

Details of Extension setting 3 parameters ([Pr. PF_ _]) are the same as those for MR-J4-_B_ servo amplifier. Refer to section 5.2.6 of "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual" and section 5.2.2 of "MR-J4-DU_(-RJ)/MR-CR55K_ Instruction Manual".

3.2.7 Linear servo motor/DD motor setting parameters ([Pr. PL_ _])

Linear servo motor/DD motor setting parameters ([Pr. PL_ _]) are not used with MR-J4-(DU)_B_-LL servo amplifiers. Do not change from the default.

The default values are the same as those for MR-J4-_B_ servo amplifiers. To check the default values, refer to section 5.1.7 of "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual".

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3.2.8 Pressure control parameters ([Pr. PT_ _])

No.	Symbol	Name and function	Initial value [unit]	Setting range																																																									
PT01	APA	Pressure loop gain Set the proportional gain of the pressure loop. When "0" is set, the pressure command will be 0.	800	0 to 6000																																																									
PT02	AIA	Pressure integral compensation Set the integral time constant of the pressure loop.	75 [ms]	1 to 1000																																																									
PT03	ADA	Pressure incomplete integral coefficient Set the incomplete integral factor of the pressure loop. When "10000" is set, the proportional integral control will be set. When "0" is set, the proportional control will be set.	10000	0 to 10000																																																									
PT12	*TOP1	<div>Function selection T-1</div> <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><div>Selection of pressure increasing direction for positioning address Select a pressure increasing direction for the positioning address. 0: Pressure increases as the positioning address decreases 1: Pressure increases as the positioning address increases</div><div>For the pressure control mode, the servo motor rotation direction and the pressure increasing direction are as follows with a combination of "Rotation direction selection" in [Pr. PT14].</div><table><tr><th colspan="2">Parameter setting value</th><th colspan="2">Positioning address increase</th><th colspan="2">Positioning address decrease</th></tr><tr><th>PT12 " __ x _ "</th><th>PA14</th><th>Pressure</th><th>Servo motor rotation direction</th><th>Pressure</th><th>Servo motor rotation direction</th></tr><tr><td rowspan="2">0</td><td>0</td><td rowspan="2">Decrease</td><td>CCW</td><td rowspan="2">Increase</td><td>CW</td></tr><tr><td>1</td><td>CW</td><td>CCW</td></tr><tr><td rowspan="2">1</td><td>0</td><td rowspan="2">Increase</td><td>CCW</td><td rowspan="2">Decrease</td><td>CW</td></tr><tr><td>1</td><td>CW</td><td>CCW</td></tr></table><div>This is available with servo amplifiers with software version B7 or later. In addition, a controller compatible with this function is required.</div></td><td>0h</td></tr><tr><td>_ x _ _</td><td><div>Forward/reverse-side stop function Enable/disable the forward/reverse-side stop function.</div><table><tr><th>Setting value</th><th>Forward-side stop function</th><th>Reverse-side stop function</th></tr><tr><td>0</td><td>Enabled</td><td>Enabled</td></tr><tr><td>1</td><td>Enabled</td><td>Disabled</td></tr><tr><td>2</td><td>Disabled</td><td>Disabled</td></tr></table><div>To use the forward/reverse-side stop function, a controller compatible with this function is required. When using the Motion controller of R64MTCPU/R32MTCPU/R16MTCPU, set the forward/reverse-side stop function to "_ 1 _ _" in [Pr. PT12]. For the mode in which the pressure control axis keeps reversing with an error of the pressure sensor (load cell) during the pressure control, set software stroke limit with the servo system controller. For details, refer to the manuals for servo system controllers.</div></td><td>0h</td></tr><tr><td>x _ _ _</td><td>For manufacturer setting</td><td>0h</td></tr></table> <div>Refer to the Name and function column.</div>	Setting digit	Explanation	Initial value	___ x	For manufacturer setting	0h	__ x _	<div>Selection of pressure increasing direction for positioning address Select a pressure increasing direction for the positioning address. 0: Pressure increases as the positioning address decreases 1: Pressure increases as the positioning address increases</div> <div>For the pressure control mode, the servo motor rotation direction and the pressure increasing direction are as follows with a combination of "Rotation direction selection" in [Pr. PT14].</div> <table><tr><th colspan="2">Parameter setting value</th><th colspan="2">Positioning address increase</th><th colspan="2">Positioning address decrease</th></tr><tr><th>PT12 " __ x _ "</th><th>PA14</th><th>Pressure</th><th>Servo motor rotation direction</th><th>Pressure</th><th>Servo motor rotation direction</th></tr><tr><td rowspan="2">0</td><td>0</td><td rowspan="2">Decrease</td><td>CCW</td><td rowspan="2">Increase</td><td>CW</td></tr><tr><td>1</td><td>CW</td><td>CCW</td></tr><tr><td rowspan="2">1</td><td>0</td><td rowspan="2">Increase</td><td>CCW</td><td rowspan="2">Decrease</td><td>CW</td></tr><tr><td>1</td><td>CW</td><td>CCW</td></tr></table> <div>This is available with servo amplifiers with software version B7 or later. In addition, a controller compatible with this function is required.</div>	Parameter setting value		Positioning address increase		Positioning address decrease		PT12 " __ x _ "	PA14	Pressure	Servo motor rotation direction	Pressure	Servo motor rotation direction	0	0	Decrease	CCW	Increase	CW	1	CW	CCW	1	0	Increase	CCW	Decrease	CW	1	CW	CCW	0h	_ x _ _	<div>Forward/reverse-side stop function Enable/disable the forward/reverse-side stop function.</div> <table><tr><th>Setting value</th><th>Forward-side stop function</th><th>Reverse-side stop function</th></tr><tr><td>0</td><td>Enabled</td><td>Enabled</td></tr><tr><td>1</td><td>Enabled</td><td>Disabled</td></tr><tr><td>2</td><td>Disabled</td><td>Disabled</td></tr></table> <div>To use the forward/reverse-side stop function, a controller compatible with this function is required. When using the Motion controller of R64MTCPU/R32MTCPU/R16MTCPU, set the forward/reverse-side stop function to "_ 1 _ _" in [Pr. PT12]. For the mode in which the pressure control axis keeps reversing with an error of the pressure sensor (load cell) during the pressure control, set software stroke limit with the servo system controller. For details, refer to the manuals for servo system controllers.</div>	Setting value	Forward-side stop function	Reverse-side stop function	0	Enabled	Enabled	1	Enabled	Disabled	2	Disabled	Disabled	0h	x _ _ _	For manufacturer setting	0h		
Setting digit	Explanation	Initial value																																																											
___ x	For manufacturer setting	0h																																																											
__ x _	<div>Selection of pressure increasing direction for positioning address Select a pressure increasing direction for the positioning address. 0: Pressure increases as the positioning address decreases 1: Pressure increases as the positioning address increases</div> <div>For the pressure control mode, the servo motor rotation direction and the pressure increasing direction are as follows with a combination of "Rotation direction selection" in [Pr. PT14].</div> <table><tr><th colspan="2">Parameter setting value</th><th colspan="2">Positioning address increase</th><th colspan="2">Positioning address decrease</th></tr><tr><th>PT12 " __ x _ "</th><th>PA14</th><th>Pressure</th><th>Servo motor rotation direction</th><th>Pressure</th><th>Servo motor rotation direction</th></tr><tr><td rowspan="2">0</td><td>0</td><td rowspan="2">Decrease</td><td>CCW</td><td rowspan="2">Increase</td><td>CW</td></tr><tr><td>1</td><td>CW</td><td>CCW</td></tr><tr><td rowspan="2">1</td><td>0</td><td rowspan="2">Increase</td><td>CCW</td><td rowspan="2">Decrease</td><td>CW</td></tr><tr><td>1</td><td>CW</td><td>CCW</td></tr></table> <div>This is available with servo amplifiers with software version B7 or later. In addition, a controller compatible with this function is required.</div>	Parameter setting value		Positioning address increase		Positioning address decrease		PT12 " __ x _ "	PA14	Pressure	Servo motor rotation direction	Pressure	Servo motor rotation direction	0	0	Decrease	CCW	Increase	CW	1	CW	CCW	1	0	Increase	CCW	Decrease	CW	1	CW	CCW	0h																													
Parameter setting value		Positioning address increase		Positioning address decrease																																																									
PT12 " __ x _ "	PA14	Pressure	Servo motor rotation direction	Pressure	Servo motor rotation direction																																																								
0	0	Decrease	CCW	Increase	CW																																																								
	1		CW		CCW																																																								
1	0	Increase	CCW	Decrease	CW																																																								
	1		CW		CCW																																																								
_ x _ _	<div>Forward/reverse-side stop function Enable/disable the forward/reverse-side stop function.</div> <table><tr><th>Setting value</th><th>Forward-side stop function</th><th>Reverse-side stop function</th></tr><tr><td>0</td><td>Enabled</td><td>Enabled</td></tr><tr><td>1</td><td>Enabled</td><td>Disabled</td></tr><tr><td>2</td><td>Disabled</td><td>Disabled</td></tr></table> <div>To use the forward/reverse-side stop function, a controller compatible with this function is required. When using the Motion controller of R64MTCPU/R32MTCPU/R16MTCPU, set the forward/reverse-side stop function to "_ 1 _ _" in [Pr. PT12]. For the mode in which the pressure control axis keeps reversing with an error of the pressure sensor (load cell) during the pressure control, set software stroke limit with the servo system controller. For details, refer to the manuals for servo system controllers.</div>	Setting value	Forward-side stop function	Reverse-side stop function	0	Enabled	Enabled	1	Enabled	Disabled	2	Disabled	Disabled	0h																																															
Setting value	Forward-side stop function	Reverse-side stop function																																																											
0	Enabled	Enabled																																																											
1	Enabled	Disabled																																																											
2	Disabled	Disabled																																																											
x _ _ _	For manufacturer setting	0h																																																											

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No.	Symbol	Name and function	Initial value [unit]	Setting range														
PT13	*TOP2	Function selection T-2	Refer to the Name and function column.															
		<table><tr><th>Setting digit</th><th>Explanation</th><th>Initial value</th></tr><tr><td>___ x</td><td>Pressure control command compensation Enable/disable the pressure control command compensation. 0: Disabled (A command from the controller will be immediately reflected.) 1: Enabled (A command from the controller will be compensated and then reflected.)</td><td>0h</td></tr><tr><td>__ x _</td><td>Speed limit command compensation Enable/disable the speed control command compensation in the pressure control. 0: Disabled (A command from the controller will be immediately reflected.) 1: Enabled (A command from the controller will be compensated and then reflected.)</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>			Setting digit	Explanation	Initial value	___ x	Pressure control command compensation Enable/disable the pressure control command compensation. 0: Disabled (A command from the controller will be immediately reflected.) 1: Enabled (A command from the controller will be compensated and then reflected.)	0h	__ x _	Speed limit command compensation Enable/disable the speed control command compensation in the pressure control. 0: Disabled (A command from the controller will be immediately reflected.) 1: Enabled (A command from the controller will be compensated and then reflected.)	0h	_ x _ _	For manufacturer setting	0h	x _ _ _	0h
		Setting digit			Explanation	Initial value												
		___ x			Pressure control command compensation Enable/disable the pressure control command compensation. 0: Disabled (A command from the controller will be immediately reflected.) 1: Enabled (A command from the controller will be compensated and then reflected.)	0h												
		__ x _			Speed limit command compensation Enable/disable the speed control command compensation in the pressure control. 0: Disabled (A command from the controller will be immediately reflected.) 1: Enabled (A command from the controller will be compensated and then reflected.)	0h												
		_ x _ _			For manufacturer setting	0h												
x _ _ _	0h																	
PT14	*TOP3	Function selection T-3	Refer to the Name and function column.															
		<table><tr><th>Setting digit</th><th>Explanation</th><th>Initial value</th></tr><tr><td>___ x</td><td>A function that clears the integration when the pressure control command is "0" 0: Disabled 1: Enabled</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>			Setting digit	Explanation	Initial value	___ x	A function that clears the integration when the pressure control command is "0" 0: Disabled 1: Enabled	0h	__ x _	For manufacturer setting	0h	_ x _ _	0h	x _ _ _	0h	
		Setting digit			Explanation	Initial value												
		___ x			A function that clears the integration when the pressure control command is "0" 0: Disabled 1: Enabled	0h												
		__ x _			For manufacturer setting	0h												
		_ x _ _				0h												
x _ _ _	0h																	
PT21	AFBO	Pressure feedback offset Set the pressure feedback offset voltage. When "100" is set, the voltage is compensated by -100 mV. When "-100" is set, the voltage is compensated by +100 mV.	0 [mV]	-9999 to 9999														
PT22	AFBD	Pressure feedback unit constant Set the conversion coefficient of the pressure feedback voltage to be returned to the controller. Set a pressure feedback value to be returned to the controller at the maximum input voltage (10 V) of AD0 (Pressure feedback).	20000 [Command unit]	500 to 30000														
PT23	AO1	Analog monitor input 1 offset Set the offset voltage of the analog monitor input 1. When "100" is set, the voltage is compensated by -100 mV. When "-100" is set, the voltage is compensated by +100 mV.	0 [mV]	-9999 to 9999														
PT24	AD1	Analog monitor input 1 unit constant Set the conversion coefficient of the analog monitor input 1 voltage returned to the controller. Set the value of the analog monitor 1 to be returned to the controller at the maximum input voltage (10 V) of AD1 (Analog monitor input 1 voltage).	20000 [Command unit]	500 to 30000														
PT25	AO2	Analog monitor input 2 offset Set the offset voltage of the analog monitor input 2. When "100" is set, the voltage is compensated by -100 mV. When "-100" is set, the voltage is compensated by +100 mV.	0 [mV]	-9999 to 9999														
PT26	AD2	Analog monitor input 2 unit constant Set the conversion coefficient of the analog monitor input 2 voltage returned to the controller. Set the value of the analog monitor 2 to be returned to the controller at the maximum input voltage (10 V) of AD2 (Analog monitor input 2 voltage).	20000 [Command unit]	500 to 30000														

3. PARAMETERS

No.	Symbol	Name and function	Initial value [unit]	Setting range																			
PT27	ADF	Analog monitor input filter setting Set the low-pass filter for AD0 (Pressure feedback), AD1 (Analog monitor input 1), and AD2 (Analog monitor input 2).	Refer to the Name and function column.																				
Table 3.2 Filter time constant																							
<table><tr><th>Setting value</th><th>Time constant [ms]</th></tr><tr><td>0</td><td>Non-filter</td></tr><tr><td>1</td><td>0.5</td></tr><tr><td>2</td><td>1</td></tr><tr><td>3</td><td>2</td></tr><tr><td>4</td><td>4</td></tr><tr><td>5</td><td>8</td></tr><tr><td>6</td><td>16</td></tr><tr><td>7</td><td>32</td></tr><tr><td>8</td><td>64</td></tr><tr><td>9</td><td>128</td></tr></table>		Setting value	Time constant [ms]	0	Non-filter	1	0.5	2	1	3	2	4	4	5	8	6	16	7	32	8	64	9	128
Setting value	Time constant [ms]																						
0	Non-filter																						
1	0.5																						
2	1																						
3	2																						
4	4																						
5	8																						
6	16																						
7	32																						
8	64																						
9	128																						

3. PARAMETERS

MEMO

[illegible]

4. PRESSURE LOOP GAIN ADJUSTMENT

4. PRESSURE LOOP GAIN ADJUSTMENT

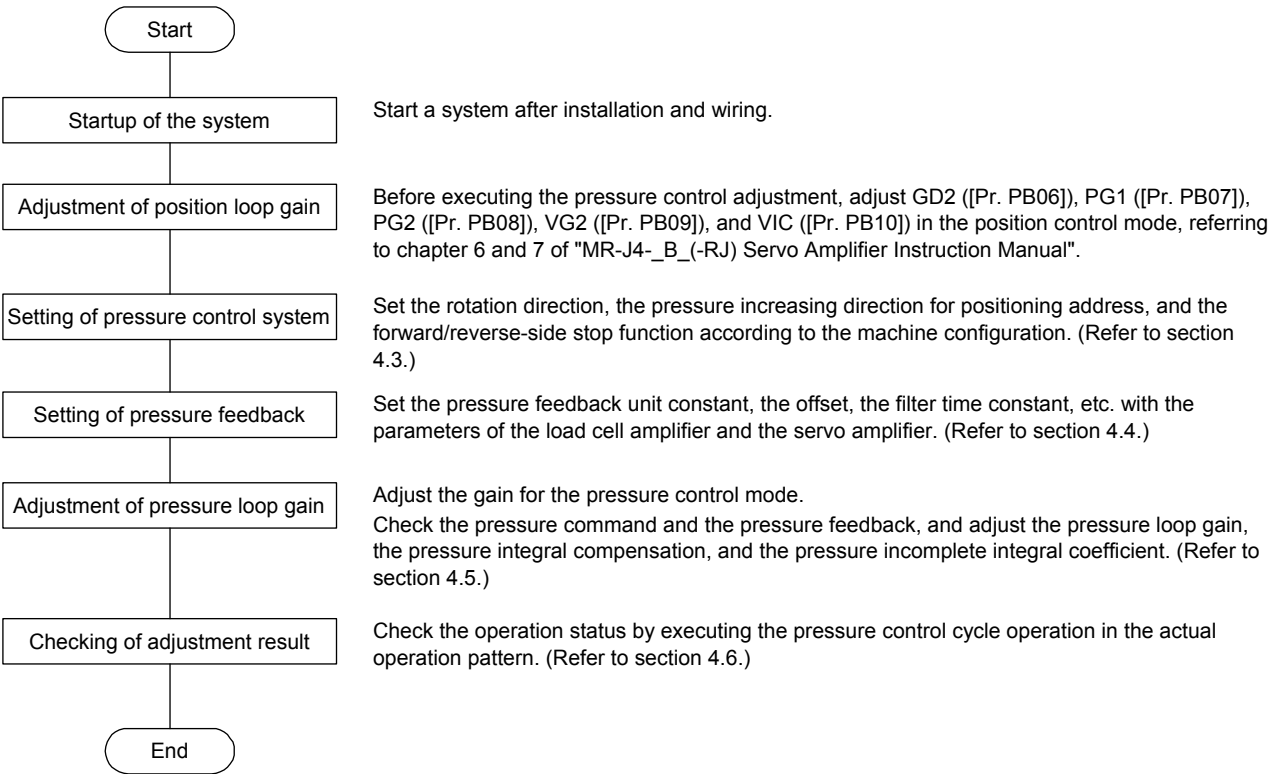
POINT	
●	Before making gain adjustment, check that neither speed nor torque is limited.

4.1 Summary

Adjust pressure control in order to increase the response performance to the pressure command from the controller. Check the pressure command and the pressure feedback, and then execute the gain adjustment of the pressure control in accordance with the machine configuration and the required performance.

4.2 Pressure control adjustment flowchart

The following shows the flowchart of the pressure control adjustment. In this section, "Setting pressure control system" and the subsequent procedures are explained.



4. PRESSURE LOOP GAIN ADJUSTMENT

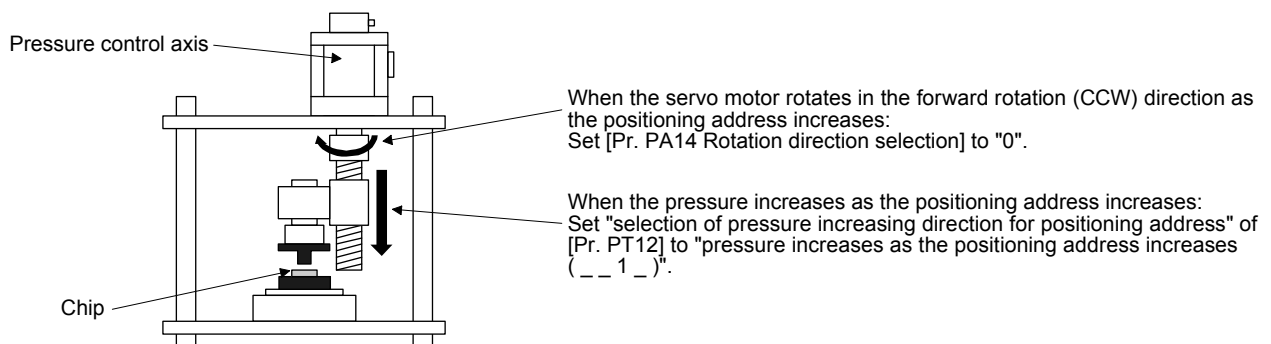
4.3 Setting of pressure control system

Set the parameters as follows according to the machine configuration and the controller to be used.

- (1) Setting of the rotation direction and the pressure increasing direction for the positioning address
Set [Pr. PA14 Rotation direction selection] and "selection of pressure increasing direction for positioning address (_ _ x _)" of [Pr. PT12] according to the machine configuration. The following shows the servo motor rotation direction and the pressure increasing direction for the positioning address.

Parameter setting value		Positioning address increase		Positioning address decrease	
PT12 "_ _ x _"	PA14	Pressure	Servo motor rotation direction	Pressure	Servo motor rotation direction
0	0	Decrease	CCW	Increase	CW
	1		CW		CCW
1	0	Increase	CCW	Decrease	CW
	1		CW		CCW

The following is an example of a machine in which a chip is pressure-bonded with a pressure control axis rotating in the forward rotation (CCW) direction as the positioning address is increased.



When the setting of [Pr. PA14] or [Pr. PT12] is incorrect, the machine may not operate properly such that the servo motor continues rotating even when the pressure feedback exceeds the pressure command, or the servo motor stops before the pressure feedback reaches the value of the pressure command. In such case, stop the operation immediately, and check the servo motor rotation direction and the pressure increasing direction. Reset [Pr. PA14] and [Pr. PT12] correctly.

- (2) Setting of the forward/reverse-side stop function

When the forward/reverse-side stop function is selected with "_ x _" of [Pr. PT12], a controller compatible with each function is required.

When using the Motion controller of R64MTCPU/R32MTCPU/R16MTCPU, set the forward/reverse-side stop function to "_ 1 _" in [Pr. PT12]. For the mode in which the pressure control axis keeps reversing with an error of the pressure sensor (load cell) during the pressure control, set software stroke limit with the servo system controller. For details, refer to the manuals for servo system controllers.

4. PRESSURE LOOP GAIN ADJUSTMENT

4.4 Setting of pressure feedback

Execute setting related to the pressure feedback. Set the parameters of the load cell amplifier and the servo amplifier.

(1) Setting of the pressure feedback unit constant

(a) Setting of the load cell amplifier

Adjust the voltage range of the load cell amplifier between 0 and +10 V according to the voltage input range of the pressure feedback.

(b) Setting of [Pr. PT 22 Pressure feedback unit constant]

Set the conversion coefficient of the pressure feedback voltage to be returned to the controller in [Pr. PT 22 Pressure feedback unit constant].

Set a pressure feedback value to be returned to the controller at the maximum input voltage (10 V) of AD0 (Pressure feedback). For example, if [Pr. PT22] is set to "2000", the pressure is controlled in a way the load cell voltage is 10 V when the controller gives the pressure command of 2000.

(2) Setting of the pressure feedback offset

(a) Setting of the load cell amplifier

When the load cell amplifier has an offset adjustment function, set the offset adjustment with the load cell amplifier.

(b) Setting of [Pr. PT 21 Pressure feedback offset]

When the load cell amplifier does not have an offset adjustment function, set the pressure feedback offset voltage with [Pr. PT 21 Pressure feedback offset].

When "100" is set, the voltage is compensated by -100 mV. When "-100" is set, the voltage is compensated by +100 mV.

(3) Setting of the pressure feedback input filter

Set the low-pass filter for removing noise from the pressure feedback input. When the low-pass filter is used, the filter response frequency affects the response performance of the pressure control. The higher the filter response frequency, the more stable the pressure control with better response. The following gives an indication of the filter response frequency.

Indication of filter response frequency	Explanation
Recommended: 500 Hz or higher (2 ms or less)	Response performance of the pressure control is high, and the operation is stable.
Lowest: 100 Hz or higher (10 ms or less)	When less than 100 Hz is set to increase the effect of noise removal, the pressure control is still possible; however, the pressure control response will be low.

(a) Setting of the load cell amplifier

If it is possible to set the low-pass filter as a noise removal function of the analog signal with the load cell amplifier, set the filter with the load cell amplifier.

(b) Setting of [Pr. PT27 Analog monitor input filter setting]

If it is not possible to set the low-pass filter with the load cell amplifier, set the low-pass filter of the pressure feedback by setting "AD0 (Pressure feedback) filter time constant" of [Pr. PT27] to "_ _ _ x".

4. PRESSURE LOOP GAIN ADJUSTMENT

4.5 Adjustment of pressure loop gain

POINT	
●	Changing [Pr. PT22 Pressure feedback unit constant] also changes the response performance of the pressure control. In this case, readjust the pressure loop gain.

To adjust the pressure control, adjust the following in order of the proportional control gain (pressure loop gain) and the integral control gain (pressure integral compensation and pressure incomplete integral coefficient). If the result of the proportional control gain adjustment does not satisfy the required performance, adjust the integral control gain.

(1) Parameters

The following parameters are used for the gain adjustment of the pressure control.

Parameter	Symbol	Name
PT01	APA	Pressure loop gain
PT02	AIA	Pressure integral compensation
PT03	ADA	Pressure incomplete integral coefficient

4. PRESSURE LOOP GAIN ADJUSTMENT

(2) Adjustment of the proportional control gain (pressure loop gain)

First, set [Pr. PT01], [Pr. PT02], and [Pr. PT03] as follows in order to enable only the proportional control gain.

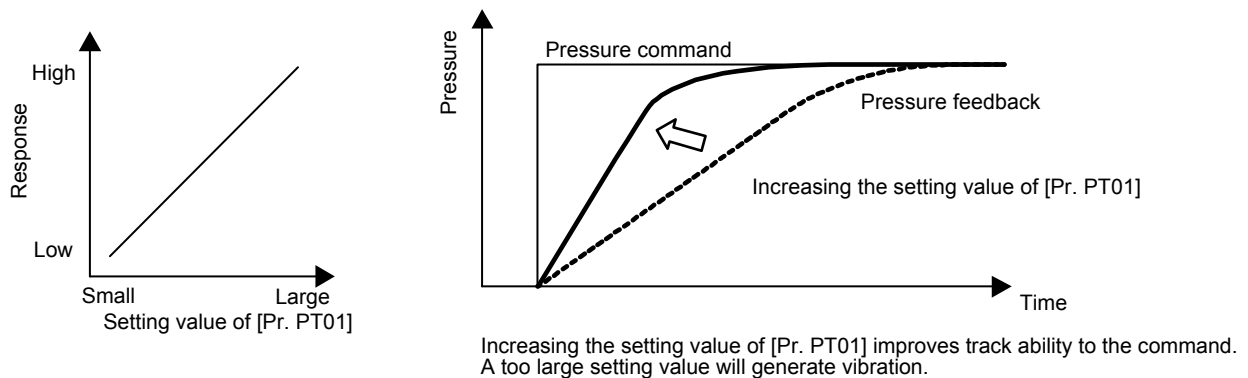
Parameter	Symbol	Setting
PT01	APA	Set "10".
PT02	AIA	Set "1000".
PT03	ADA	Set "0".

Next, increase the value of [Pr. PT01] gradually with a constant value of the pressure command is being input from the controller. If a vibration occurs, decrease the value slightly. As a rough guide, set [Pr. PT01] to 70% to 80% of the value generated the vibration.

If this satisfies the required performance, setting the integral control gain is not necessary.

The following shows the relation between the setting value of the proportional control gain (pressure loop gain) and the response performance.

[Pr. PT01 Pressure control gain]



Changing [Pr. PT22 Pressure feedback unit constant] also changes the response performance of the pressure control. In this case, readjust the pressure loop gain.

For example, if the value of [Pr. PT22] is doubled, it works the same as the pressure control proportional gain of [Pr. PT01 Pressure loop gain] is doubled. When the response performance of the pressure control needs to be unchanged, change the setting value of [Pr. PT01] to "(the value of [Pr. PT22] before change)/(the value of [Pr. PT22] after change)", and check the operation.

(3) Adjustment of the integral control gain (pressure integral compensation and pressure incomplete integral coefficient)

If the result of the proportional control gain adjustment does not satisfy the required performance, adjust the integral control gain.

The integral control gain adjustment differs depending on the machine configuration. Adjust the gain by following (a) or (b) which suits your machine.

"A machine providing a constant pressure when the servo motor stops" refers to a machine pressing together with a constant pressure by using the pressure control. "A machine providing a constant pressure when the servo motor rotates" refers to a machine pushing out with a constant pressure by using the pressure control.

4. PRESSURE LOOP GAIN ADJUSTMENT

- (a) For a machine providing a constant pressure when the servo motor stops
First, set [Pr. PT01], [Pr. PT02], and [Pr. PT03] as follows.

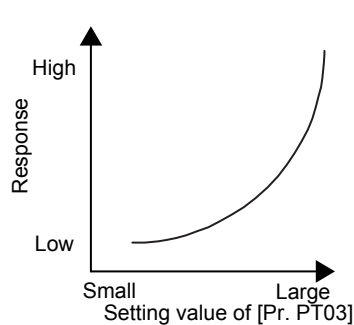
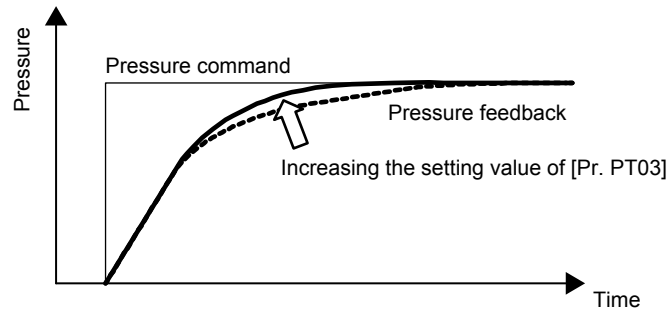
Parameter	Symbol	Setting
PT01	APA	Set the result of (2) adjustment of the proportional control gain (pressure loop gain)
PT02	AIA	Set "500".
PT03	ADA	Set "5000".

Next, increase the value of [Pr. PT03] gradually. If an overshoot or a vibration occurs, decrease the value slightly. It is not necessary to set too large value in [Pr. PT03].

Then, decrease the value of [Pr. PT02] gradually. If an overshoot or a vibration occurs, increase the value slightly.

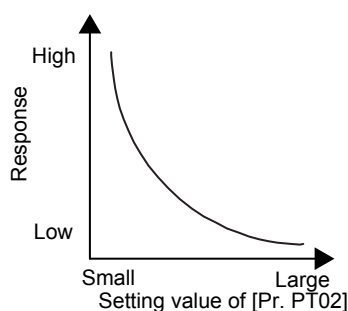
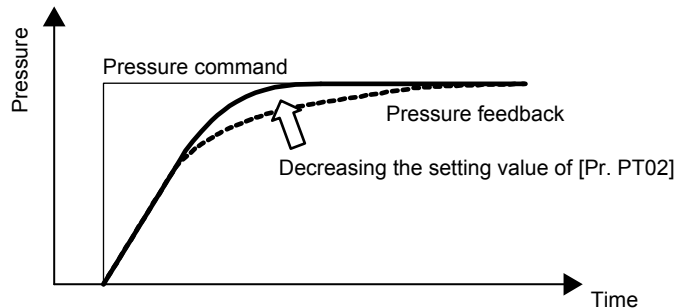
The following shows the relation between the setting value of the integral control gain (pressure integral compensation and pressure incomplete integral coefficient) and the response performance.

[Pr. PT03 Pressure incomplete integral coefficient]



Increasing the setting value of [Pr. PT03] improves track ability to the command. A too large setting value will generate overshoot or vibration.

[Pr. PT02 Pressure integral compensation]



Decreasing the setting value of [Pr. PT02] improves track ability to the command. A too small setting value will generate overshoot or vibration.

4. PRESSURE LOOP GAIN ADJUSTMENT

- (b) For a machine providing a constant pressure when the servo motor rotates
First, set [Pr. PT01], [Pr. PT02], and [Pr. PT03] as follows.

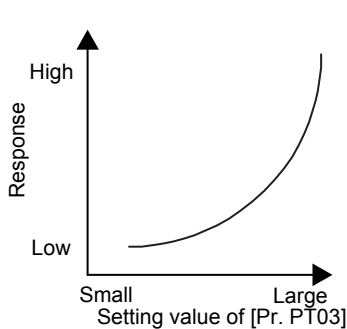
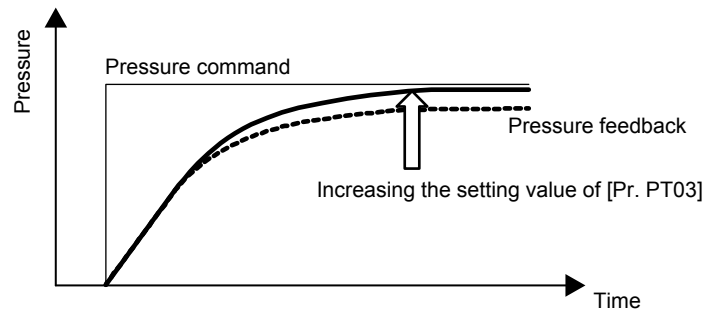
Parameter	Symbol	Setting
PT01	APA	Set the result of (2) adjustment of the proportional control gain (pressure loop gain)
PT02	AIA	Set "500".
PT03	ADA	Set "10000".

Next, if an overshoot or a vibration occurs when [Pr. PT03] is set to "10000", decrease the value of [Pr. PT03] until the overshoot or the vibration stops.

Then, decrease the value of [Pr. PT02] gradually. If an overshoot or a vibration occurs, increase the value slightly.

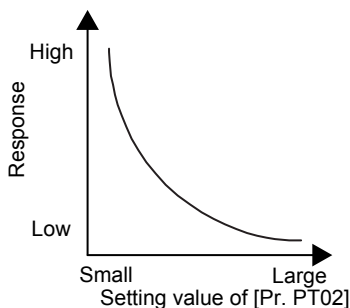
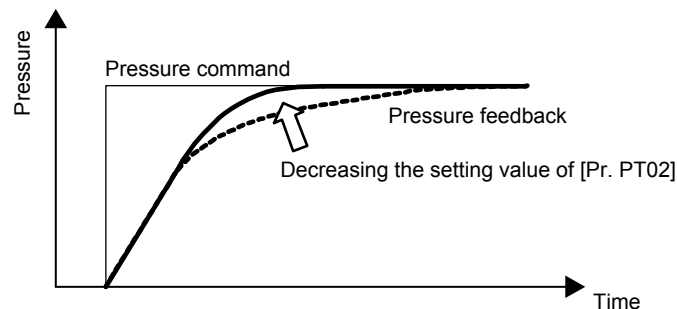
The following shows the relation between the setting value of the integral control gain (pressure integral compensation and pressure incomplete integral coefficient) and the response performance.

[Pr. PT03 Pressure incomplete integral coefficient]



If the setting value of [Pr. PT03] is small, the pressure does not reach to the command. A too large setting value will generate overshoot.

[Pr. PT02 Pressure integral compensation]



Decreasing the setting value of [Pr. PT02] improves track ability to the command. A too small setting value will generate overshoot or vibration.

4.6 Checking of adjustment result

After adjusting the pressure loop gain, check the operation by executing the pressure control cycle operation with the actual operation patterns. When there is no problem, the pressure control adjustment is complete. If a vibration occurs, execute "4.5 Adjustment of pressure loop gain" again.

[illegible]

5. TROUBLESHOOTING

5. TROUBLESHOOTING

POINT	
●	This chapter explains the details of alarms and warnings exclusively for the MR-J4-(DU)_B_-LL. Refer to "MELSERVO-J4 Servo Amplifier Instruction Manual (Troubleshooting)" for other alarms and warnings.
●	As soon as an alarm occurs, make the Servo-off status and interrupt the main circuit power.
●	[AL. 37 Parameter error] and warnings (except [AL. F0 Tough drive warning]) are not recorded in the alarm history.

When an error occurs during operation, the corresponding alarm or warning is displayed. If any alarm or warning occurs, refer to section 5.4 and 5.5 in this manual, and "MR-J4 Servo Amplifier Instruction Manual (Troubleshooting)" to take appropriate action.

When an alarm occurs, ALM (Malfunction) will turn off.

5.1 Explanations of the lists

(1) No./Name/Detail No./Detail name

Indicates the alarm or warning No., name, detail No., and detail name.

(2) Stop method

For the alarms and warnings in which "SD" is written in the stop method column, the servo motor stops with the dynamic brake after forced stop deceleration. For the alarms and warnings in which "DB" or "EDB" is written in the stop method column, the servo motor stops with the dynamic brake without forced stop deceleration.

(3) Alarm deactivation

After the alarm cause has been removed, the alarm can be deactivated in any of the methods marked ○ in the alarm deactivation column. Warnings are automatically canceled after the cause of occurrence is removed. Alarms are deactivated by alarm reset, CPU reset, or power cycling.

Alarm deactivation	Explanation
Alarm reset	1. Error reset command from the controller 2. Click the "Occurred Alarm Reset" in the "Alarm Display" window of MR Configurator2.
CPU reset	Reset the controller itself.
Cycling the power	Turn the power off and on again.

5. TROUBLESHOOTING

5.2 Alarm list

	No.	Name	Detail No.	Detail name	Stop method (Note 3, 4)	Alarm deactivation		
						Alarm reset	CPU reset	Cycling the power
Alarm	10	Undervoltage	10.1	Voltage drop in the control circuit power	EDB	○	○	○
			10.2	Voltage drop in the main circuit power	SD	○	○	○
	12	Memory error 1 (RAM)	12.1	RAM error 1	DB			○
			12.2	RAM error 2	DB			○
			12.3	RAM error 3	DB			○
			12.4	RAM error 4	DB			○
			12.5	RAM error 5	DB			○
	13	Clock error	13.1	Clock error 1	DB			○
			13.2	Clock error 2	DB			○
	14	Control process error	14.1	Control process error 1	DB			○
			14.2	Control process error 2	DB			○
			14.3	Control process error 3	DB			○
			14.4	Control process error 4	DB			○
			14.5	Control process error 5	DB			○
			14.6	Control process error 6	DB			○
			14.7	Control process error 7	DB			○
			14.8	Control process error 8	DB			○
			14.9	Control process error 9	DB			○
			14.A	Control process error 10	DB			○
	15	Memory error 2 (EEP-ROM)	15.1	EEP-ROM error at power on	DB			○
			15.2	EEP-ROM error during operation	DB			○
	16	Encoder initial communication error 1	16.1	Encoder initial communication - Receive data error 1	DB			○
			16.2	Encoder initial communication - Receive data error 2	DB			○
			16.3	Encoder initial communication - Receive data error 3	DB			○
			16.5	Encoder initial communication - Transmission data error 1	DB			○
			16.6	Encoder initial communication - Transmission data error 2	DB			○
			16.7	Encoder initial communication - Transmission data error 3	DB			○
			16.A	Encoder initial communication - Process error 1	DB			○
			16.B	Encoder initial communication - Process error 2	DB			○
			16.C	Encoder initial communication - Process error 3	DB			○
			16.D	Encoder initial communication - Process error 4	DB			○
			16.E	Encoder initial communication - Process error 5	DB			○
			16.F	Encoder initial communication - Process error 6	DB			○
	17	Board error	17.1	Board error 1	DB			○
			17.3	Board error 2	DB			○
			17.4	Board error 3	DB			○
			17.5	Board error 4	DB			○
			17.6	Board error 5	DB			○
	19	Memory error 3 (Flash-ROM)	19.1	Flash-ROM error 1	DB			○
			19.2	Flash-ROM error 2	DB			○
	1A	Servo motor combination error	1A.1	Servo motor combination error	DB			○
			1A.4	Servo motor combination error 2	DB			○
	1E	Encoder initial communication error 2	1E.1	Encoder malfunction	DB			○
	1F	Encoder initial communication error 3	1F.1	Incompatible encoder	DB			○

5. TROUBLESHOOTING

	No.	Name	Detail No.	Detail name	Stop method (Note 3, 4)	Alarm deactivation		
						Alarm reset	CPU reset	Cycling the power
Alarm	20	Encoder normal communication error 1	20.1	Encoder normal communication - Receive data error 1	EDB			○
			20.2	Encoder normal communication - Receive data error 2	EDB			○
			20.3	Encoder normal communication - Receive data error 3	EDB			○
			20.5	Encoder normal communication - Transmission data error 1	EDB			○
			20.6	Encoder normal communication - Transmission data error 2	EDB			○
			20.7	Encoder normal communication - Transmission data error 3	EDB			○
			20.9	Encoder normal communication - Receive data error 4	EDB			○
			20.A	Encoder normal communication - Receive data error 5	EDB			○
	21	Encoder normal communication error 2	21.1	Encoder data error 1	EDB			○
			21.2	Encoder data update error	EDB			○
			21.3	Encoder data waveform error	EDB			○
			21.4	Encoder non-signal error	EDB			○
			21.5	Encoder hardware error 1	EDB			○
			21.6	Encoder hardware error 2	EDB			○
			21.9	Encoder data error 2	EDB			○
	24	Main circuit error	24.1	Ground fault detected at hardware detection circuit	DB			○
			24.2	Ground fault detected by software detection function	DB	○	○	○
	25	Absolute position erased	25.1	Servo motor encoder - Absolute position erased	DB			○
	2B	Encoder counter error	2B.1	Encoder counter error 1	EDB			○
	30	Regenerative error	30.1	Regeneration heat error	DB	○ (Note 1)	○ (Note 1)	○ (Note 1)
			30.2	Regeneration signal error	DB	○ (Note 1)	○ (Note 1)	○ (Note 1)
			30.3	Regeneration feedback signal error	DB	○ (Note 1)	○ (Note 1)	○ (Note 1)
	31	Overspeed	31.1	Abnormal motor speed	SD	○	○	○
	32	Overcurrent	32.1	Overcurrent detected at hardware detection circuit (during operation)	DB			○
			32.2	Overcurrent detected at software detection function (during operation)	DB	○	○	○
			32.3	Overcurrent detected at hardware detection circuit (during a stop)	DB			○
			32.4	Overcurrent detected at software detection function (during a stop)	DB	○	○	○
	33	Overvoltage	33.1	Main circuit voltage error	EDB	○	○	○
	34	SSCNET receive error 1	34.1	SSCNET receive data error	SD	○	○ (Note 2)	○
			34.2	SSCNET connector connection error	SD	○	○	○
			34.3	SSCNET communication data error	SD	○	○	○
			34.4	Hardware error signal detection	SD	○	○	○
	35	Command frequency error	35.1	Command frequency error	SD	○	○	○
	36	SSCNET receive error 2	36.1	Continuous communication data error	SD	○	○	○
	37	Parameter error	37.1	Parameter setting range error	DB		○	○
			37.2	Parameter combination error	DB		○	○
	3A	Inrush current suppression circuit error	3A.1	Inrush current suppression circuit error	EDB			○
	3E	Operation mode error	3E.1	Operation mode error	DB		○	○
			3E.4	Control command inconsistency 1	DB		○	○
			3E.5	Control command inconsistency 2	DB		○	○
	45	Main circuit device overheat	45.1	Main circuit device overheat error 1	SD	○ (Note 1)	○ (Note 1)	○ (Note 1)
			45.2	Main circuit device overheat error 2	SD	○ (Note 1)	○ (Note 1)	○ (Note 1)

5. TROUBLESHOOTING

	No.	Name	Detail No.	Detail name	Stop method (Note 3, 4)	Alarm deactivation		
						Alarm reset	CPU reset	Cycling the power
Alarm	46	Servo motor overheat	46.1	Abnormal temperature of servo motor 1	SD	○ (Note 1)	○ (Note 1)	○ (Note 1)
			46.2	Abnormal temperature of servo motor 2	SD	○ (Note 1)	○ (Note 1)	○ (Note 1)
			46.3	Thermistor disconnected error	SD	○ (Note 1)	○ (Note 1)	○ (Note 1)
			46.4	Thermistor circuit error	SD	○ (Note 1)	○ (Note 1)	○ (Note 1)
			46.5	Abnormal temperature of servo motor 3	DB	○ (Note 1)	○ (Note 1)	○ (Note 1)
			46.6	Abnormal temperature of servo motor 4	DB	○ (Note 1)	○ (Note 1)	○ (Note 1)
	47	Cooling fan error	47.1	Cooling fan stop error	SD	○ (Note 1)	○ (Note 1)	○ (Note 1)
			47.2	Cooling fan speed reduction error	SD	○ (Note 1)	○ (Note 1)	○ (Note 1)
	50	Overload 1	50.1	Thermal overload error 1 during operation	SD	○ (Note 1)	○ (Note 1)	○ (Note 1)
			50.2	Thermal overload error 2 during operation	SD	○ (Note 1)	○ (Note 1)	○ (Note 1)
			50.3	Thermal overload error 4 during operation	SD	○ (Note 1)	○ (Note 1)	○ (Note 1)
			50.4	Thermal overload error 1 during a stop	SD	○ (Note 1)	○ (Note 1)	○ (Note 1)
			50.5	Thermal overload error 2 during a stop	SD	○ (Note 1)	○ (Note 1)	○ (Note 1)
			50.6	Thermal overload error 4 during a stop	SD	○ (Note 1)	○ (Note 1)	○ (Note 1)
	51	Overload 2	51.1	Thermal overload error 3 during operation	DB	○ (Note 1)	○ (Note 1)	○ (Note 1)
			51.2	Thermal overload error 3 during a stop	DB	○ (Note 1)	○ (Note 1)	○ (Note 1)
	52	Error excessive	52.1	Excess droop pulse 1	SD	○	○	○
			52.3	Excess droop pulse 2	SD	○	○	○
			52.4	Error excessive during 0 torque limit	SD	○	○	○
			52.5	Excess droop pulse 3	EDB	○	○	○
	54	Oscillation detection	54.1	Oscillation detection error	EDB	○	○	○
	56	Forced stop error	56.2	Over speed during forced stop	EDB	○	○	○
			56.3	Estimated distance over during forced stop	EDB	○	○	○
	63	STO timing error	63.1	STO1 off	DB	○	○	○
			63.2	STO2 off	DB	○	○	○
	8A	USB communication time-out error	8A.1	USB communication time-out error	SD	○	○	○
	8E	USB communication error	8E.1	USB communication receive error	SD	○	○	○
			8E.2	USB communication checksum error	SD	○	○	○
			8E.3	USB communication character error	SD	○	○	○
			8E.4	USB communication command error	SD	○	○	○
			8E.5	USB communication data number error	SD	○	○	○
	888	Watchdog	88_	Watchdog	DB	○	○	○

Note 1. Leave for about 30 minutes of cooling time after removing the cause of occurrence.

2. In some controller communication status, the alarm factor may not be removed.

3. The following shows three stop methods of DB, EDB, and SD.

DB: Dynamic brake stop (For a servo amplifier without the dynamic brake, the servo motor coasts.)

EDB: Electronic dynamic brake stop (available with specified servo motors)

Refer to the following table for the specified servo motors. For other than the specified servo motors, the stop method of DB is applied.

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

SD: Forced stop deceleration

4. This is applicable when [Pr. PA04] is set to the initial value. The stop method of SD can be changed to DB using [Pr. PA04].

5. TROUBLESHOOTING

5.3 Warning list

	No.	Name	Detail No.	Detail name	Stop method (Note 2, 3)
Warning	91	Servo amplifier overheat warning (Note 1)	91.1	Main circuit device overheat warning	
	92	Battery cable disconnection warning	92.1	Encoder battery cable disconnection warning	
			92.3	Battery degradation	
	95	STO warning	95.1	STO1 off detection	DB
			95.2	STO2 off detection	DB
	96	Home position setting warning	96.1	In-position warning at home positioning	
			96.2	Command input warning at home positioning	
	9B	Error excessive warning	9B.1	Excess droop pulse 1 warning	
			9B.3	Excess droop pulse 2 warning	
			9B.4	Error excessive warning during 0 torque limit	
	9F	Battery warning	9F.1	Low battery	
			9F.2	Battery degradation warning	
	E0	Excessive regeneration warning (Note 1)	E0.1	Excessive regeneration warning	
	E1	Overload warning 1 (Note 1)	E1.1	Thermal overload warning 1 during operation	
			E1.2	Thermal overload warning 2 during operation	
			E1.3	Thermal overload warning 3 during operation	
			E1.4	Thermal overload warning 4 during operation	
			E1.5	Thermal overload warning 1 during a stop	
			E1.6	Thermal overload warning 2 during a stop	
			E1.7	Thermal overload warning 3 during a stop	
			E1.8	Thermal overload warning 4 during a stop	
	E2	Servo motor overheat warning (Note 1)	E2.1	Servo motor temperature warning	
	E3	Absolute position counter warning	E3.2	Absolute position counter warning	
			E3.5	Encoder absolute positioning counter warning	
	E4	Parameter warning	E4.1	Parameter setting range error warning	
	E6	Servo forced stop warning	E6.1	Forced stop warning	SD
	E7	Controller forced stop warning	E7.1	Controller forced stop input warning	SD
	E8	Cooling fan speed reduction warning	E8.1	Decreased cooling fan speed warning	
			E8.2	Cooling fan stop	
	E9	Main circuit off warning	E9.1	Servo-on signal on during main circuit off	DB
			E9.2	Bus voltage drop during low speed operation	DB
			E9.3	Ready-on signal on during main circuit off	DB
	EC	Overload warning 2 (Note 1)	EC.1	Overload warning 2	
	ED	Output watt excess warning	ED.1	Output watt excess warning	
	EF	Reverse-side stop warning	EF.1	Reverse-side stop warning	
	F0	Tough drive warning	F0.1	Instantaneous power failure tough drive warning	
			F0.3	Vibration tough drive warning	
	F2	Drive recorder - Miswriting warning	F2.1	Drive recorder - Area writing time-out warning	
			F2.2	Drive recorder - Data miswriting warning	
	F3	Oscillation detection warning	F3.1	Oscillation detection warning	

Note 1. Leave for about 30 minutes of cooling time after removing the cause of occurrence.

2. The following shows two stop methods of DB and SD.

DB: Dynamic brake stop (For a servo amplifier without the dynamic brake, the servo motor coasts.)

SD: Forced stop deceleration

3. This is applicable when [Pr. PA04] is set to the initial value. The stop system of SD can be changed to DB using [Pr. PA04].

5. TROUBLESHOOTING

5.4 Remedies for alarms

CAUTION

- When an alarm occurs, eliminate its cause, ensure safety, and deactivate the alarm to restart operation. Otherwise, it may cause injury.
- If [AL. 25 Absolute position erased] occurs, always make home position setting again. Otherwise, it may cause an unexpected operation.
- As soon as an alarm occurs, make the Servo-off status and interrupt the main circuit power.

POINT

- This section explains the details of alarms exclusively for the MR-J4-(DU)_B_-LL. Refer to "MELSERVO-J4 Servo Amplifier Instruction Manual (Troubleshooting)" for other alarms.
- When any of the following alarms occurs, do not deactivate the alarm repeatedly to restart. Doing so will cause a malfunction of the servo amplifier and servo motor. Remove its cause and allow 30 minutes or more for cooling, and then resume the operation.
 - [AL. 30 Regenerative error] ▪ [AL. 45 Main circuit device overheat]
 - [AL. 46 Servo motor overheat] ▪ [AL. 50 Overload 1]
 - [AL. 51 Overload 2]
- [AL. 37 Parameter error] is not recorded in the alarm history.

Refer to this section and "MELSERVO-J4 Servo Amplifier Instruction Manual (Troubleshooting)" to remove the cause of the alarm. Use MR Configurator2 to refer to the cause of alarm occurrence.

Alarm No.: 3E		Name: Operation mode error				
Alarm content		<ul style="list-style-type: none"> ▪ The operation mode setting was changed. ▪ The control mode was mistakenly switched. 				
Detail No.	Detail name	Cause	Check method	Check result	Action	Target
3E.1	Operation mode error	(1) The MR-J4-_B_-LL servo amplifier was connected to an SSCNET III controller.	Check if the servo amplifier was connected to an SSCNET III controller.	Connected.	Connect the servo amplifier to an SSCNET III/H controller.	[B]
3E.4	Control command inconsistency 1	(1) The control mode of the MR-J4-_B_-LL servo amplifier was switched to the torque control mode.	Check if the control mode was switched to the torque control mode.	Executed.	Review the controller setting.	
3E.5	Control command inconsistency 2	(1) The control mode of the MR-J4-_B_-LL servo amplifier was switched to the continuous operation to torque control mode.	Check if the control mode was switched to the continuous operation to torque control mode.	Executed.	Review the controller setting.	

5. TROUBLESHOOTING

5.5 Remedies for warnings



CAUTION

- If [AL. E3 Absolute position counter warning] occurs, always make home position setting again. Otherwise, it may cause an unexpected operation.

POINT

- This section explains the details of warnings exclusively for the MR-J4-(DU)_B_-LL. Refer to "MELSERVO-J4 Servo Amplifier Instruction Manual (Troubleshooting)" for other warnings.
- When any of the following warnings occurs, do not cycle the power of the servo amplifier repeatedly to restart. Doing so will cause a malfunction of the servo amplifier and servo motor. If the power of the servo amplifier is switched off/on during the warnings, allow more than 30 minutes for cooling before resuming operation.
 - [AL. 91 Servo amplifier overheat warning] ▪ [AL. E0 Excessive regeneration warning]
 - [AL. E1 Overload warning 1] ▪ [AL. E2 Servo motor overheat warning]
 - [AL. EC Overload warning 2]
- Warnings (except [AL. F0 Tough drive warning]) are not recorded in the alarm history.

If [AL. E6], [AL. E7], [AL. E9], [AL. EA], or [AL. EB] occurs, the servo amplifier will be the servo-off status. If any other warning occurs, operation can be continued but an alarm may occur and proper operation may not be performed.

Refer to this section and "MELSERVO-J4 Servo Amplifier Instruction Manual (Troubleshooting)" to remove the cause of the warning. Use MR Configurator2 to refer to the cause of warning occurrence.

Alarm No.: EF		Name: Reverse-side stop warning					
Alarm content		▪ During the pressure control mode, the set reverse-side stop position was exceeded.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
EF.1	Reverse-side stop warning	(1)	Setting of the "forward/reverse-side stop function" in [Pr. PT12] is incorrect.	Check if [Pr. PT12] is set to " _ 1 _ _".	[Pr. PT12] is not set to " _ 1 _ _".	Set [Pr. PT12] to " _ 1 _ _".	[B]

MEMO

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6. OPTIONS AND PERIPHERAL EQUIPMENT

6. OPTIONS AND PERIPHERAL EQUIPMENT



WARNING

- Before connecting any option or peripheral equipment, turn off the power and wait for 15 minutes or more (20 minutes or more for converter unit) until the charge lamp turns off. Then, confirm that the voltage between P+ and N- (between L+ and L- for converter unit) 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, be sure to look at the lamp from the front of the servo amplifier.



CAUTION

- Use the specified peripheral equipment and options to prevent a malfunction or a fire.

POINT

- We recommend using HIV wires to wire the servo amplifiers, options, and peripheral equipment. Therefore, the recommended wire sizes may differ from those used for the previous servo amplifiers.

The following items are the same as those for MR-J4-_B_. For the details of the items, refer to each chapter/section indicated in the detailed explanation field.

"MR-J4-_B_" means "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual".

"MR-J4-_DU_" means "MR-J4-DU_(-RJ)/MR-CR55K_ Instruction Manual".

Item	Detailed explanation
Cable/connector sets	MR-J4-_B_ section 11.1 MR-J4-_DU_ section 9.1
Regenerative option	MR-J4-_B_ section 11.2 MR-J4-_DU_ section 9.2
FR-BU2-(H) brake unit	MR-J4-_B_ section 11.3 MR-J4-_DU_ section 9.10
FR-RC-(H) power regeneration converter	MR-J4-_B_ section 11.4
FR-CV-(H) power regeneration common converter	MR-J4-_B_ section 11.5
Junction terminal block PS7DW-20V14B-F (recommended)	MR-J4-_B_ section 11.6
Battery	MR-J4-_B_ section 11.8
Selection example of wires	MR-J4-_B_ section 11.9 MR-J4-_DU_ section 9.4
Molded-case circuit breakers, fuses, magnetic contactors	MR-J4-_B_ section 11.10 MR-J4-_DU_ section 9.5
Power factor improving DC reactor	MR-J4-_B_ section 11.11 MR-J4-_DU_ section 9.6
Power factor improving AC reactor	MR-J4-_B_ section 11.12
Relay (recommended)	MR-J4-_B_ section 11.13
Noise reduction techniques	MR-J4-_B_ section 11.14 MR-J4-_DU_ section 9.7
Earth-leakage current breaker	MR-J4-_B_ section 11.15 MR-J4-_DU_ section 9.8
EMC filter (recommended)	MR-J4-_B_ section 11.16 MR-J4-_DU_ section 9.9
External dynamic brake	MR-J4-_B_ section 11.17 MR-J4-_DU_ section 9.3
Panel through attachment (MR-J4ACN15K/MR-J3ACN)	MR-J4-_B_ section 11.18

6. OPTIONS AND PERIPHERAL EQUIPMENT

6.1 MR Configurator2

POINT	
●	MR Configurator2 with software version 1.37P or later is supported by the MR-J4-(DU)_B_-LL servo amplifiers.
●	Items not mentioned in this section are the same as those for MR-J4-_B_ servo amplifier. Refer to section 11.7 of "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual".

MR Configurator2 (SW1DNC-MRC2-_) uses the communication function of the servo amplifier to perform parameter setting changes, graph display, test operation, etc. on a personal computer.

6.1.1 Specifications

Item	Description
Project	Create/read/save/delete project, system setting, and print
Parameter	Parameter setting
Monitor	Display all, I/O monitor, graph, and ABS data display
Diagnosis	Alarm display, alarm onset data, drive recorder, no motor rotation (Note), system configuration, life diagnosis, machine diagnosis (Note)
Test operation	Jog operation, positioning operation, motor-less operation (Note), DO forced output, program operation, and test mode information
Adjustment	One-touch tuning, tuning, and machine analyzer
Others	Servo assistant, update parameter setting range, machine unit conversion setting, help display

Note. Do not use it in the pressure control mode.

APPENDIX

APPENDIX

App. 1 Optional data monitor function

The optional data monitor function is used to monitor data in the servo amplifier with the servo system controller. In the optional data monitor function, data types of registered monitor and transient command can be set.

For details of usage and others, refer to the manuals for servo system controllers.

App. 1.1 Registered monitor

The following explains data types exclusively for the MR-J4-(DU)_B_-LL. Items not mentioned are the same as those for MR-J4-_B_ servo amplifier. Refer to app. 13.1 of "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual".

Data type	Description
Pressure command	The pressure command from the controller is displayed.
Load cell pressure	A pressure feedback value of the load cell for pressure control is displayed.
Monitor input signal ch1	A value of the analog monitor input 1 is displayed.
Monitor input signal ch2	A value of the analog monitor input 2 is displayed.

App. 1.2 Transient command

Transient commands are the same as those for MR-J4-_B_ servo amplifiers. Refer to app. 13.2 of "MR-J4-_B_(-RJ) Servo Amplifier Instruction Manual".

REVISIONS

*The manual number is given on the bottom left of the back cover.

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Warranty

1. Warranty period and coverage

We will repair any failure or defect hereinafter referred to as "failure" in our FA equipment hereinafter referred to as the "Product" arisen during warranty period at no charge due to causes for which we are responsible through the distributor from which you purchased the Product or our service provider. However, we will charge the actual cost of dispatching our engineer for an on-site repair work on request by customer in Japan or overseas countries. We are not responsible for any on-site readjustment and/or trial run that may be required after a defective unit are repaired or replaced.

[Term]

For terms of warranty, please contact your original place of purchase.

[Limitations]

- (1) You are requested to conduct an initial failure diagnosis by yourself, as a general rule.
It can also be carried out by us or our service company upon your request and the actual cost will be charged. However, it will not be charged if we are responsible for the cause of the failure.
- (2) This limited warranty applies only when the condition, method, environment, etc. of use are in compliance with the terms and conditions and instructions that are set forth in the instruction manual and user manual for the Product and the caution label affixed to the Product.
- (3) Even during the term of warranty, the repair cost will be charged on you in the following cases;
 - (1) a failure caused by your improper storing or handling, carelessness or negligence, etc., and a failure caused by your hardware or software problem
 - (2) a failure caused by any alteration, etc. to the Product made on your side without our approval
 - (3) a failure which may be regarded as avoidable, if your equipment in which the Product is incorporated is equipped with a safety device required by applicable laws and has any function or structure considered to be indispensable according to a common sense in the industry
 - (4) a failure which may be regarded as avoidable if consumable parts designated in the instruction manual, etc. are duly maintained and replaced
 - (5) any replacement of consumable parts (battery, fan, smoothing capacitor, etc.)
 - (6) a failure caused by external factors such as inevitable accidents, including without limitation fire and abnormal fluctuation of voltage, and acts of God, including without limitation earthquake, lightning and natural disasters
 - (7) a failure generated by an unforeseeable cause with a scientific technology that was not available at the time of the shipment of the Product from our company
 - (8) any other failures which we are not responsible for or which you acknowledge we are not responsible for

2. Term of warranty after the stop of production

- (1) We may accept the repair at charge for another seven (7) years after the production of the product is discontinued. The announcement of the stop of production for each model can be seen in our Sales and Service, etc.
- (2) Please note that the Product (including its spare parts) cannot be ordered after its stop of production.

3. Service in overseas countries

Our regional FA Center in overseas countries will accept the repair work of the Product. However, the terms and conditions of the repair work may differ depending on each FA Center. Please ask your local FA center for details.

4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to:

- (1) Damages caused by any cause found not to be the responsibility of Mitsubishi.
- (2) Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.
- (3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.
- (4) Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

5. Change of Product specifications

Specifications listed in our catalogs, manuals or technical documents may be changed without notice.

6. Application and use of the Product

- (1) For the use of our General-Purpose AC Servo, its applications should be those that may not result in a serious damage even if any failure or malfunction occurs in General-Purpose AC Servo, and a backup or fail-safe function should operate on an external system to General-Purpose AC Servo when any failure or malfunction occurs.
- (2) Our General-Purpose AC Servo is designed and manufactured as a general purpose product for use at general industries. Therefore, applications substantially influential on the public interest for such as atomic power plants and other power plants of electric power companies, and also which require a special quality assurance system, including applications for railway companies and government or public offices are not recommended, and we assume no responsibility for any failure caused by these applications when used.
In addition, applications which may be substantially influential to human lives or properties for such as airlines, medical treatments, railway service, incineration and fuel systems, man-operated material handling equipment, entertainment machines, safety machines, etc. are not recommended, and we assume no responsibility for any failure caused by these applications when used. We will review the acceptability of the abovementioned applications, if you agree not to require a specific quality for a specific application. Please contact us for consultation.
- (3) Mitsubishi Electric shall have no responsibility or liability for any problems involving programmable controller trouble and system trouble caused by DoS attacks, unauthorized access, computer viruses, and other cyberattacks.

SH(NA)030241-B(2511)MEE

MODEL:

MODEL CODE:

mitsubishi electric corporation

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