

MR-JE Servo amplifier MR-JE-10 to MR-JE-300

Instructions and Cautions for Safe Use of AC Servos

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MITSUBISHI ELECTRIC CORPORATION

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Contents of the package I Innack the product and check the rating plate to see if the servo motor is as you or

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





Model The following describes what each block of a model name indicates. Not all combinations of the symbols are available MR-JE-10A Hardware special specification
 Blank or 2 to 5 digit alphanumeric
 (RJ, ED, PX, RU, RZ, etc.)

1. About the manuals

1.1 MELSERVO JE relevant manuals
This installation guide explains how to mount MR-JE servo amplifiers.
If you have any questions about the operation or programming of the equipment described in this guide, contact your local sales office. In addition, when you mount a protective device, specific technical skills which are not detailed in the guide will be

1.2 Purpose of this guide This installation guide explains the safe operation of MR-JE servo amplifiers for engineers of machinery manufacturers and machine operators. For detailed information of the products, refer to each servo amplifier instruction manual.

2. About safety

This chapter explains safety of users and machine operators. Please read the chapter carefully before mounting the equipment. In this installation guide, the specific warnings and cautions levels are classified as follows.

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

2.1 Professional engineer

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2.1 Frunessional engineers should mount MR-JE servo amplifiers.
Here, professional engineers should mount MR-JE servo amplifiers.
Here, professional engineers are persons who took a proper engineering training or qualified persons who are engaged in electrical equipment.
Check if applicable technical training is available at your local Mitsubishi Electric office. Contact your local sales office for schedules and locations.

2.2 Applications of the devices MR-JE servo amplifiers comply with the following standards. IEC/EN 61800-5-1, IEC/EN 61800-3

Always use the MR-JE servo amplifiers within specifications (voltage, temperature, etc. Refer to each servo amplifier instruction manual for details.). Misubishi Electric Co. accepts no daims for liability if the equipment is used in any other way or if modifications are made to the device, even in the context of mounting and installation.

WARNING •It takes 15 minutes for capacitor discharging. Do not touch the unit and terminals immediately after power off

2.3.1 Peripheral device and power wiring The followings are selected based on IEC/EN 61800-5-1, UL 508C, and CSA C22.2 No.14.

Local wiring The following table shows the stranded wire sizes [AWG] symbols rated at 75 °C/60 °C.

	75 °C/6	0 °C stranded wire	[AWG]
Servo amplifier (Note 3)	L1/L2/L3/(=) (Note 2)	P+/C	U/V/W/(1) (Note 1,2)
MR-JE-10 /MR-JE-20 /MR-JE-40 /MR-JE-70 /MR-JE-100 (T)/ MR-JE-200 /MR-JE-300 _	14/14	14/14	14/14
MR-JE-200_ (S)	12/12		
Note 1. Select wire sizes depending on the rated output of the servo motors. The vi	alues in the table ar	e sizes based on ra	ted output of the sen

amplifiers.
The following shows the PE terminal specifications of the servo amplifier.
Screw size: M4 Screw size: M4
Tightening forque: 1.2 [N+m]
Recommended crimp terminals: R2.4 (Manufactured by JST)
Crimping too! YPT-60.2 I (Manufactured by JST)
3. "(S)" means 1-phase 200 V AC power input and "(T)" means 3-phase 200 V AC power input in the table.

(2) Selection example of MCCB and fuse

Selection example of MCLB and use Use T class fuses or molded-case circuit breaker (UL489 Listed MCCB) as the following table. The T class fuses and molded-case circuit breakers in the table are selected examples based on rated I/O of the servo amplifiers. When you select a smaller capacity servo motor to connect it to the servo amplifier, you can also use smaller capacity T class fuses or molded-case circuit breaker than ones in the table. For selecting ones other than Class T fuses and molded-case circuit breakers below, refer to each servo amplifier instruction manual.

Servo amplifier (Note)	Molded-case circuit breaker (240 V AC)	Fuse (300 V)
MR-JE-10_/MR-JE-20_/MR-JE-40_/MR-JE-70_ (T)	NF50-SWU-5A (50 A frame 5 A)	10 A
MR-JE-70_ (S)/MR-JE-100_ (T)	NF50-SWU-10A (50 A frame 10 A)	15 A
MR-JE-200_ (T)/MR-JE-300_	NF50-SWU-15A (50 A frame 15 A)	30 A
MR-JE-100_(S)	NF50-SVFU-15A (50 A frame 15 A)	30 A
MR-JE-200_(S)	NF50-SVFU-20A (50 A frame 20 A)	40 A
Note. "(S)" means 1-phase 200 V AC power input and "(T)" means 3-phase 20	0 V AC power input in the table.	

(3) Power supply This servo amplifier can be supplied from star-connected supply with grounded neutral point of overvoltage category III set forth in IEC/EN 60664-1. However, when you use the neutral point for single phase supply, a reinforced insulating transformer is required in the power input section. For the interface power supply, use an external 24 V DC power supply with reinforced insulation on I/O terminals.

(4) Grounding
To prevent an electric shock, always connect the protective earth (PE) of the cabinet. Do not connect two grounding cables to the same protective earth (PE) of the cabinet. Do not connect two grounding cables to the same protective earth (PE) terminal. Always connect cables to the terminals on-to-one. If using a leakage circuit breaker, always ground the protective earth (PE) terminal of the servo amplifier to prevent an electric shock. This product can cause a d.c. current in the protective earthing conductor. Where a residual current-operated protective (RCD: earth-leakage current breaker) device is used for protection in case of direct or indirect contact, only an RCD of Type B is allowed on the supply side of this product.

EMC requirement
MR_JE servo amplifiers comply with category C3 in accordance with IEC/EN 61800-3. Install an EMC filter and
surge protector on the primary side of the servo amplifier. As for I/O signal wires (max. length 10 m) and encoder
cables (max. length 50 m), use shielded wires and ground the shields. However, when the encoder cable length is
longer than 30 m for MR_JE-70_ and MR_JE-100_, set a radio noise filter (FR-BIF) to the input power supply side
of the servo amplifier. The following shows recommended products.
EMC filter: Soshin Electric HF3000A-UN series
Surge protector: Okaya Electric Industries MS-PD-250-U4 series
Radio noise filter. Missubish Electric FR-BIF

Radio noise filter: Mitsubishi Electric FR-BIF MR_JE Series are not intended to be used on a low-voltage public network which supplies domestic premises; radio frequency interference is expected if used on such a network. The installer shall provide a guide for Installation and use, including recommended mitigation devices.

(2) For Declaration of Conformity (DoC) Hereby, MITSUBISHI ELECTRIC EUROPE B.V., declares that the servo amplifiers are in compliance with the necessary requirements and standards (2004/108/EC and 2006/95/EC). For the copy of Declaration of Conformity, contact your local sales office.

2.3.3 USA/Canada compliance
This servo amplifier is designed in compliance with UL 508C and CSA C22.2 No.14.

(1) Installation
The minimum cabinet size is 150% of MR-JE servo amplifier's volume. Also, design the cabinet so that the ambient temperature in the cabinet is 55 °C or less. The servo amplifier must be installed in the metal cabinet. Additionally, mount the servo amplifier on a cabinet that the protective earth based on the standard of IEC/EN 60204-1 is correctly connected. For environment, the units should be used in open type (UC) and overvoltage category shown in table in section 8.1. The servo amplifier needs to be installed at or below of pollution degree 2.

(2) Short-circuit current rating (SCCR) Suitable For Use On A Circuit Capable Of Delivering Not More Than 100 kA rms Symmetrical Amperes, 500 Volts Maximum.

(3) Overload protection characteristics The MR-JE servo amplifiers have solid-state servo motor overload protection. (It is set on the basis (full load current) of 120% rated current of the servo amplifier.)

(4) Over-temperature protection for motor Motor Over temperature sensing is not provided by the drive. Integral thermal protection(s) is necessary for motor and refer to chapter 4 for the proper connection

(5) Branch circuit protection For installation in United States, branch circuit protection must be provided, in accordance with the National Full liberation in Uniness dates a public mount of the liberation of the liberation

2.3.4 South Korea compliance
This product complies with the Radio Wave Law (KC mark). Please note the following to use the product.
이 기기는 업무용 (A급) 전자파직합기기로서 판 매자 또는 사용자는 이 점을 주의하시기 바라며, 가정의의
지역에서 사용하는 것을 목적으로 합니다. (The product is for business use (Class A) and meets the electromagnetic compatibility requirements. The seller and the user must note the above point, and use the product in a place except for home.)

2.4 General cautions for safety protection and protective measures
Observe the following items to ensure proper use of the MELSERVO MR-JE servo amplifiers.

(1) For installing systems, only qualified personnel and professional engineers should perform.

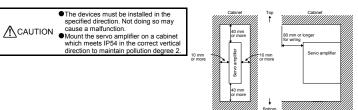
(2) When mounting, installing, and using the MR-JE servo amplifier, always observe standards and directives applicable in the country.

ssal of unusable or irreparable devices should always occur in accordance with the applicable country-specific e disposal regulations. (Example: European Waste 16 02 14)

2.6 Lithium battery transportation
To transport lithium batteries, take actions to comply with the instructions and regulations such as the United Nations
(ION), the International Civil Aviation Organization (ICAO), and the International Maritime Organization (IMO).
The batteries (MR-BAT6V1SET-A and MR-BAT6V1) are assembled batteries from two batteries (Iithium metal battery
CR17335A) which are not subject to the dangerous goods (Class 9) of the UN Recommendations.

3. Mounting/dismounting

Installation direction and clearances

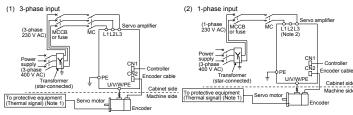


4. Electrical Installation and configuration diagram





The following shows representative configuration examples to conform to the IEC/EN/UL/CSA standards



Note 1. Please use a thermal sensor, etc. for thermal protection of the servo motor.
2. For the MR-JE-200 servo amplifiers, connect the power supply to L1 and L2. Leave L3 open.

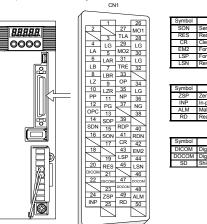
The control circuit connectors described by rectangles are safely separated from the main circuits described by circles The connected motors will be limited as follows.

HG-KN/HG-SN series servo motors (Mfg.: Mitsubishi Electric)

5. Signals

5.1 Signal
The following shows CN1 connector signals of MR-JE10A as a typical example. For the other connector
details, refer to each servo amplifier instruction manual.

5.2 I/O device
The following shows typical I/O devices of MR-JE- A. For the other devices, refer to each servo amplifier instruction



6. Maintenance and service

WARNING To avoid an electric shock, only qualified personnel should attempt inspections. For repair and parts replacement, contact your local sales office.

It is recommended that the following points periodically be checked. (1) Check for loose screws on the protective earth (PE) terminal. Retighten any loose screws. (tightening torque: 1.2

(2) Servo motor bearings, brake section, etc. for unusual noise.

(3) Check the cables and the like for scratches or cracks. Perform periodic inspection according to operating

(4) Check that the connectors are securely connected to the servo motor

(5) Check that the wires are not coming out from the connector

(6) Check for dust accumulation on the servo amplifier. (7) Check for unusual noise generated from the servo amplifier

(8) Check the servo motor shaft and coupling for connection.

6.2 Parts having service lives Service lives of the following parts are listed below. However, the service lives vary depending on operation and environment. If any fault is found in the parts, they must be replaced immediately regardless of their service lives. For parts replacement, please contact your local sales office.

Part name	Life guideline
Smoothing capacitor	(Note 3) 10 years
Relay	Number of power-on, forced stop, and controller forced stop times: 100 000 times
Cooling fan	50,000 hours to 70,000 hours (7 years to 8 years)
(Note 1) Battery backup time	Approximately 20,000 hours (equipment power supply: off, ambient temperature: 20 °C)
(Note 2) Battery life	5 years from date of manufacture

[.] The time is for using MR-BAT6V1SET-A. For details and other battery backup time, refer to each servo amplifier instruction manual.

Quality of the batteries degrades by the storage condition. The battery life is 5 years from the production date regardless of the connection

7. Transportation and storage

Transport the products correctly according to their mass.

Stacking in excess of the limited number of product packages is not allowed. • For detailed information on the battery's transportation and handing refer to each servo amplifie



↑ CAUTION instruction manual. Install the product in a load-bearing place of servo amplifier and servo motor in accordance with

each servo amplifier instruction manual.
 Do not get on or put heavy load on the equipment.
 Do not hold the lead of the built-in regenerative resistor when carrying the servo amplifier.

When you keep or use it, please fulfill the following environment.

	Item	Environment
Ambient	Operation [°C]	0 to 55 Class 3K3 (IEC/EN 60721-3-3)
temperature	Transportation (Note) [°C]	
	Storage (Note) [°C]	
Ambient humidity	Operation, transportation, storage	
		10 Hz to 57 Hz with constant amplitude of 0.075 mm
Vibration	Test condition	57 Hz to 150 Hz with constant acceleration of 9.8 m/s ² to IEC/EN 61800-5-1 (Test Fc of IEC 60068-2-6)
resistance	Operation	5.9 m/s ²
	Transportation (Note)	Class 2M3 (IEC/EN 60721-3-2)
	Storage	Class 1M2 (IEC/EN 60721-3-2)
Pollution degree		2
IP rating		IP20 (IEC/EN 60529)
ir raung		Open type (UL 50)
Altitude	Operation, storage	Max. 1000 m above sea level
Allitude	Transportation	Max. 10000 m above sea level

8.Technical data

	Item	MR-JE-10_/MR-JE-20_/MR-JE-40_/MR-JE-70_/ MR-JE-100_/MR-JE-200_	MR-JE-300_
Power supply	Line voltage	3-phase or 1-phase 200 V AC to 240 V AC, 50 Hz /60 Hz	3-phase 200 V AC to 240 V AC, 50 Hz/60 Hz
	Interface (SELV)	24 V DC, (required current capacity: M	
Control me			, current control method
Pollution de		2 (IEC/EN	
Overvoltage		1-phase 200 V AC: II (IEC/EN 60664-1),	3-phase 200 V AC: III (IEC/EN 60664-1)
Protection (riace	L/JEC/EN	61800-5-1)

8.2 Servo amplifier dimensions

Ŧ		Servo amplifier	Variabl	e dimension tab	le [mm]	Mass [kg]
		Gervo ampliner	W	Н	D	widoo [kg]
	I I	MR-JE-10_/MR-JE-20_/MR-JE-40_	50	168	135	0.8
H Front	Side	MR-JE-70_/MR-JE-100_	70	168	185	1.5
		MR-JE-200_/MR-JE-300_	90	168	195	2.1
↓l l						
W	D					

Servo amplifier 3 1 5 6 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 156 ± 0.5 6 15	e . M5
	M5
MR-JE-70_/MR-JE-100_ 22 22 156 ± 0.5 6 42 ± 0.3	
	3 M5
MR-JE-200_MR-JE-300_ 6 45 156 ± 0.5 6 78 ± 0.3	3 M5

Warranty period and coverage

warramy 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 warramty 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 oustomer in Japan or overseas countries. We are not responsible for any on-site readjustement and/or trail run that may be required after a defective unit are repaired or replaced.

IIII]
The term of warranty for Product is twelve (12) months after your purchase or delivery of the Product to a place designated by you or eighteen (18) months from the date of manufacture whichever comes first ("Warranty Period"). Warranty period for repaired Product cannot exceed beyond the original warranty period before any repair work. [Limitations]

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.

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

CONDITIONS and insulations with the control of a different to the following cases.

Even during the term of warranty, the repair cost will be charged on you in the following cases.

(i) a failure caused by your improper storing or handling, carelessness or negligence, etc., and a failure caused by your hardware or soft

(i) a tailuré caused by your miproper storing or nanoing, cardessness or negligence, etc., and a tailure caused by your hardware or source of the product made on your side without our approval (iii) at failure which may be regarded as avoidable, if your equipment in which the Product is incorporated is equipped with a safety swith required by applicable laws and has any function or structure considered to be indispensable according to a common sense in the indu (iv) a failure which may be regarded as avoidable if consumable parts designated in the instruction manual, etc. are duly maintained and replaced

replaced (v) any replacement of consumable parts (battery, fan, smoothing capacitor, etc.) (vi) a failure caused by external factors such as inevitable accidents, including without limitation fire and abnormal fluctuation of voltage, and acts of God, including without limitation earthquake, lightning and natural disasters (vii) a failure generated by an unforeseeable cause with a scientific technology that was not available at the time of the shipment of the Production of the

2. Term of warranty after the stop of production

Ne 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.

Please note that the Product (including its spare parts) cannot be ordered after its stop of production. 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.

Exclusion of responsibility for compensation against loss of opportunity, secondary loss, etc.

Exclusion of responsibility for compensation against loss of opportunity, secondary loss, etc.

Whether under or after the term of warranty, we assume no responsibility for any damages arisen from causes for which we are not responsible, any losses of opportunity and/or profit incurred by you due to a failure of the Product, any damages, secondary damages or compensation for accidents arisen under a specific circumstance that are foreseen or unforeseen by our company, any damages to products other than the Product, and also compensation for any replacement work, readjustment, start-up test run of local machines and the Product and any other operations conducted by you. Change of Product specifications

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

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.

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

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.

status.

3. The characteristic of smoothing capacitor is deteriorated due to ripple currents, etc. The life of the capacitor greatly depends on ambient temperature and operating conditions. The capacitor will reach the end of its life in 10 years of continuous operation in normal air-conditioned environment (40° Cs urrounding air temperature or less).