



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

Instructions and Cautions for Safe Use of AC Servos

Table with columns: Country/Region, Sales office, Tel/Fax. Lists contact information for USA, Germany, China, and Korea.

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.

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 and CAUTION symbols with explanatory text: 'Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.' and '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

Only 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

2.3 Correct use

Always use the MR-JE servo amplifiers within specifications (voltage, temperature, etc). Refer to each servo amplifier instruction manual for details. Mitsubishi Electric Co. accepts no claims 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 symbol with text: '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 following are selected based on IEC/EN 61800-5-1, UL 508C, and CSA C22.2 No.14.

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

Table: Recommended wires. Columns: Servo amplifier (Note 3), 75 °C/60 °C stranded wire [AWG], L1/L2/L3 (Note 2), P+I/C, U/V/W/PE (Note 1,2).

- Note 1. Select wire sizes depending on the rated output of the servo motors.
2. The following shows the PE terminal specifications of the servo amplifier.
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
Use T class fuses or molded-case circuit breaker (UL489 Listed MCCB) as the following table. The T class fuses and molded-case circuit breaker in the table are selected examples based on rated I/O of the servo amplifiers.

Table: Selection example of MCCB and fuse. Columns: Servo amplifier (Note), Molded-case circuit breaker (240 V AC), Fuse (300 V).

- (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.

- (4) Grounding
To prevent an electric shock, always connect the protective earth (PE) of terminal (marked with a symbol) of the servo amplifier to the protective earth (PE) of the cabinet. Do not connect two grounding cables to the same protective earth (PE) terminal.

2.3.2 EU compliance

The MR-JE servo amplifiers are designed to comply with the following directions to meet requirements for mounting, using, and periodic technical inspections: EMC directive (2004/108/EC), and Low-voltage directive (2006/95/EC).

- (1) 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.

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.
(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 Electrical Code and any applicable local codes.

2.3.4 South Korea compliance
This product complies with the Radio Wave Law (KC mark). Please note the following to use the product.
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.

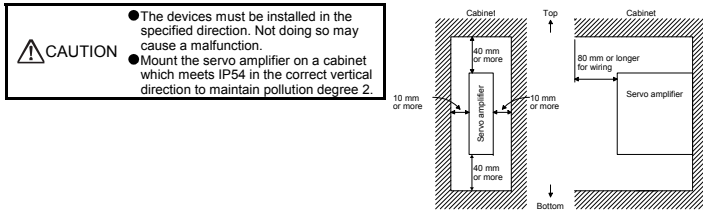
- (1) For installing systems, only qualified personnel and professional engineers should perform.
(2) When mounting, installing, and using the MR-JE servo amplifier, always observe standards and directives applicable in the country.

2.5 Disposal
Disposal of unusable or irreparable devices should always occur in accordance with the applicable country-specific waste 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 (UN), 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 (lithium metal battery CR17335A) which are not subject to the dangerous goods (Class 9) of the UN Recommendations.

3. Mounting/dismounting

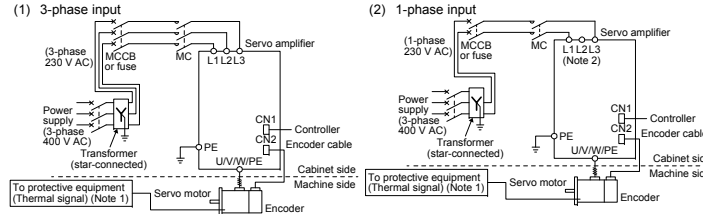
Installation direction and clearances



CAUTION symbol with text: 'The devices must be installed in the specified direction. Not doing so may cause a malfunction. Mount the servo amplifier on a cabinet which meets IP54 in the correct vertical direction to maintain pollution degree 2.'

CAUTION symbol with text: 'Connecting a servo motor for different axis to U, V, W, or CN2 of the servo amplifier may cause a malfunction.'

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



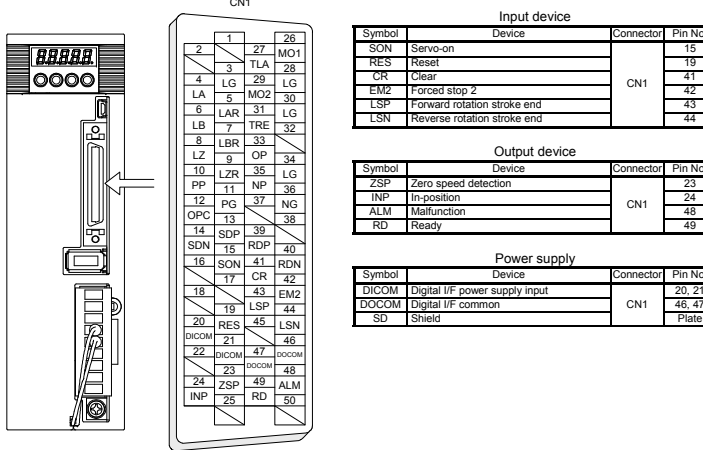
- Note 1. Please use a thermal sensor, etc. for thermal protection of the servo motor.
2. For the MR-JE-200\_ servo amplifiers, connect the power supply to L1 and L2. Leave L3 open.

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-JE-10A as a typical example. For the other connector details, refer to each servo amplifier instruction manual.



6. Maintenance and service

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

6.1 Inspection items
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 N·m)
(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 conditions.
(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.

Table: Part name vs Life guideline. Rows: Smoothing capacitor, Relay, Cooling fan, (Note 1) Battery backup time, (Note 2) Battery life.

- Note 1. The time is for using MR-BAT6V1SET-A. For details and other battery backup time, refer to each servo amplifier instruction manual.
2. Quality of the batteries degrades by the storage condition. The battery life is 5 years from the production date regardless of the connection 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 °C surrounding air temperature or less).

7. Transportation and storage

CAUTION symbol with text: '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 handling refer to each servo amplifier 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.

Table: Environment specifications. Columns: Item, Environment. Rows: Ambient temperature, Ambient humidity, Vibration resistance, Pollution degree, IP rating, Altitude.

Note: In regular transportation packaging

8. Technical data

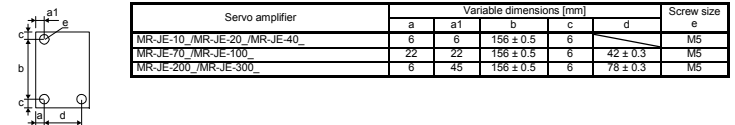
8.1 MR-JE servo amplifier

Table: Technical data for MR-JE servo amplifier. Columns: Item, MR-JE-10\_/MR-JE-20\_/MR-JE-40\_/MR-JE-70\_/MR-JE-100\_/MR-JE-200, MR-JE-300. Rows: Power supply, Control method, Pollution degree, Overvoltage category, Protection class, Short-circuit current rating (SCCR).

8.2 Servo amplifier dimensions

Table: Servo amplifier dimensions. Columns: Servo amplifier, Variable dimension table (mm), Mass [kg]. Rows: MR-JE-10\_/MR-JE-20\_/MR-JE-40\_, MR-JE-70\_/MR-JE-100, MR-JE-200\_/MR-JE-300\_.

8.3 Mounting hole



[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 if 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]

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]

- (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:
(i) a failure caused by your improper storing or handling, carelessness or negligence, etc. and a failure caused by your hardware or software problem
(ii) a failure caused by any alteration, etc. to the Product made on your side without our approval
(iii) 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
(iv) a failure which may be regarded as avoidable if consumable parts designated in the instruction manual, etc. are duly maintained and 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 Product from our company
(viii) 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 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.

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.