



MR-J4 Model
MR-J4-10 to MR-J4-22K, MR-J4-40 to MR-J4-22K-4/...

Instructions and Cautions for Safe Use of AC Servos

Table with 2 columns: Country/Region, Sales office. Lists sales offices for USA, Germany, China, Korea, and Japan.

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Specifications are subject to change without notice. Compliance with the indicated global standards and regulations is current as of the release date of this installation guide.

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Contents of the package
Unpack the product and check the rating plate to see if the servo amplifier is as you ordered.

Table with 2 columns: Contents, Quantity. Lists Servo amplifier and MELSERVO-J4 Series Instructions and Cautions for Safe Use of AC Servos.

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

Table with 2 columns: Model, Item. Lists various specifications for MR-J4-100 servo amplifier.

Warning plate
The following shows an example of warning plate.

Warning plate image with Japanese text and symbols. Includes a table of symbols and their meanings.

1. About the manuals
To use the MELSERVO-J4 series safely, read each instruction manual carefully.

1.1 MELSERVO-J4 relevant manuals
This installation guide explains how to mount MR-J4 servo amplifiers. You can also check it with our website for free.

1.2 Purpose of this guide
This installation guide explains the safe operation of MR-J4 servo amplifiers for engineers of machinery manufacturers and machine operators.

1.3 Terms related to safety
1.3.1 IEC 61800-5-2 Stop function
STO function (Refer to IEC 61800-5-2: 2007 4.2.2.2 STO.) The MR-J4 servo amplifiers have the STO function.

2. About safety
This chapter explains safety of users and machine operators. Please read the chapter carefully before mounting the equipment.

WARNING and CAUTION symbols with explanatory text. 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.

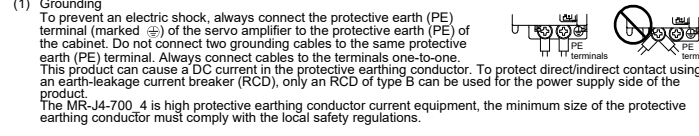
2.1 Professional engineer
Only professional engineers should mount MR-J4 servo amplifiers. Here, professional engineers should meet all the conditions below.

2.2 Applications of the devices
MR-J4 servo amplifiers are used to drive servo motors, and comply with the standards shown below.

2.3 Correct use
Use the MR-J4 servo amplifiers within specifications. Refer to each instruction manual for specifications such as voltage, temperature, etc.

WARNING symbol with text: If you need to get close to the moving parts of the machine for inspection or other causes, ensure safety by confirming the power off, etc. Otherwise, it may cause an accident. It takes 15 minutes maximum 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 61800-5-1, UL 508C, and CSA C22.2 No. 274.



(1) Grounding
To prevent an electric shock, always connect the protective earth (PE) terminal (marked with the symbol) of the servo amplifier to the protective earth (PE) of the cabinet.

(2) Power Wiring (local wiring and crimping tool)
The following table shows the stranded wire sizes [AWG] and the crimp terminal symbols rated at 75 °C/160 °F.

Table 1-1. Recommended wires and Table 1-2. Recommended wires. Tables showing wire specifications for servo amplifiers.

Note 1. To connect these models to a terminal block, be sure to use the screws that come with the terminal block. Note 2. The alphabetical letters in the table indicate the symbols of the recommended crimp terminals.

(3) Selection example of MCCB and fuse
The fuses (Class T, J, CC) and molded-case circuit breakers in the table are selected examples based on rated I/O of the servo amplifiers.

Table showing MCCB and fuse selection examples for various servo amplifier models.

Note 1. 'IS' means 1-phase 200 V AC power input and 'IT' means 3-phase 200 V AC power input in the table. Note 2. For products having '5A' or '10A' in the recommended model, products up to '15A' can be used.

(4) Power supply
This servo amplifier can be supplied from star-connected supply with grounded neutral point of overvoltage category II (overvoltage category II) for 1-phase servo amplifiers, MR-J4-03A6, and MR-J4W2-0303B6 set forth in IEC/EN 60684-1.

(5) Motor overload and Over temperature protection
The overload protection of the servo motor does not include a thermal memory function, and is not speed sensitive. The servo amplifier cannot detect the heating of the servo motor.

2.3.2 Europe/UK compliance
The CE/UKCA marking proves the compliance of the servo product with the essential requirements specified in the relevant EU Directives and UK Regulations.

(1) EMC requirement
MR-J4 servo amplifiers comply with EN/BS EN IEC 61800-3. As for I/O wires (max. length 10 m. However, 3 m for STO cable for CN8) and encoder cables (max. length 50 m), use shielded wires and ground the shields.

(2) For Declaration of Conformity (DoC)
We declare that the servo amplifiers are in compliance with EC directives (Machinery directive (2006/42/EC), EMC directive (2014/30/EU), Low voltage directive (2014/35/EU), and RoHS directive (2011/65/EU, (EU) 2015/863)) and applicable regulations of the UK.

2.3.3 USA/Canada compliance
This servo amplifier is designed in compliance with UL 508C or UL 61800-5-1 for the use in the United States. For the use in Canada, the servo amplifier is designed in compliance with CSA C22.2 No. 274.

(1) Installation
The minimum cabinet size is 150% of each MR-J4 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 (Not More Than 5 kA rms Symmetrical Amperes, 48 Volts Maximum for MR-J4-03A6 and MR-J4W2-0303B6).

(3) 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
Products that bear the KC mark comply with the Radio Wave Law. Please note the following to use the product. 이 기기는 전파의 방해 (AG) 전자파 적합하기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 원하지 않습니다.

(1) For safety components and installing systems, only qualified personnel and professional engineers should perform. (2) When mounting, installing, and using the MR-J4 servo amplifier, always observe standards and directives applicable in the country.

2.5 Residual risk
(1) Be sure that all safety related switches, relays, sensors, etc., meet the required safety standards. (2) Perform all risk assessments and safety level certification to the machine or the system as a whole.

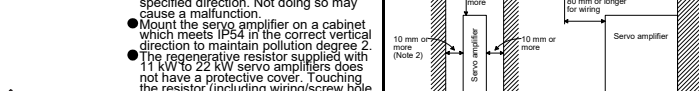
(3) If the upper and lower power module in the servo amplifier are shorted and damaged simultaneously, the servo motor may make a half rotation at a maximum. (4) Only qualified personnel are authorized to install, start-up, repair or service the machines in which these components are installed.

(5) Separate the wiring for safety observation function from other signal wirings. (ISO 13849-1:2015 Table F.1 No. 5) (6) Protect the cables with appropriate ways (routing them in a cabinet, using a cable guard, etc.). (7) Keep the required clearance/creepage distance depending on voltage you use.

2.6 Disposal
Disposal of unusable or irreparable devices should always occur in accordance with the applicable country-specific waste disposal regulations.

2.7 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).

3. Mounting/dismounting
Installation direction and clearances
The devices must be installed in the specified direction. Not doing so may cause a malfunction.



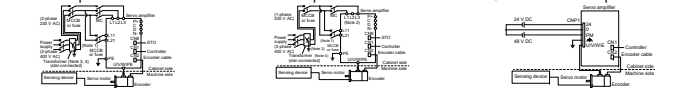
CAUTION symbol with text: Turn off the molded-case circuit breaker (MCCB) to avoid electrical shocks or damages to the product before starting the installation or wiring. The installation complies with IEC/EN 60204-1. The voltage supply to machines must be 20 ms or more of tolerance against instantaneous power surges as specified in IEC/EN 60204-1.

To adapt your machine using MR-J4-03A6 or MR-J4W2-0303B6 to IEC/EN 60950-1, either supply the amplifier with a power supply complying with the requirement of 2.5 stated in IEC/EN 60950-1 (Limited Power Source), or cover the amplifier and motors connected to the outputs with a fire enclosure.

4. Electrical Installation and configuration diagram
WARNING: Turn off the molded-case circuit breaker (MCCB) to avoid electrical shocks or damages to the product before starting the installation or wiring.

CAUTION symbol with text: The installation complies with IEC/EN 60204-1. The voltage supply to machines must be 20 ms or more of tolerance against instantaneous power surges as specified in IEC/EN 60204-1.

The following shows representative configuration examples to conform to the IEC/EN/UL/CSA standards. (1) 3-phase input for MR-J4 1-axis (2) 1-phase input for MR-J4 1-axis (3) Main circuit 48 V DC input for MR-J4 1-axis servo amplifier

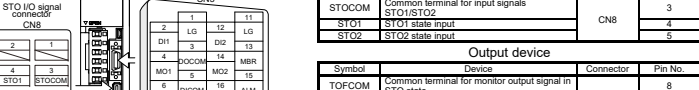


Note 1. When the wire sizes of L1 and L2 are the same, MCCB or fuse is not required. Note 2. When using a 100 V class servo amplifier, step down the power supply voltage to 100 V and connect the main circuit power supply lines to L1 and L2.

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

(1) HG/HF/HGA series servo motors (Mitsubishi Electric) (2) Using a servo motor complied with IEC 60034-1 and Mitsubishi Electric encoder (OBA, OSA)

5. Signals
5.1 Signal
The following shows MR-J4-10B signals as a typical example. For other servo amplifiers, refer to each servo amplifier instruction manual.



5.2 I/O device
Input device
Symbol Device Connector Pin No. EMZ Forward stop 2 CN8 20

5.3 Signals and STO state
The following table shows the STO1 and STO2 states when the power is on in normal state and STO1 and STO2 are on (closed) or off (opened).

Table showing STO1 and STO2 states for ON/OFF and monitoring conditions.

6. Maintenance, service and trouble shooting
WARNING: 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 terminal block screws. Retighten any loose screws.

Table showing tightening torque (Nm) for various servo amplifier components.

(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. (9) 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.

6.2 Parts having service life
The life of the following parts is listed below. However, the service life varies depending on operation and environment. If any fault is found in the parts, they must be replaced immediately regardless of their service life.

Table showing service life for Smoothing capacitor, Relay, Cooling fan, Battery backup time, and Battery life.

Note 1. The life is for using MR-J4 1-axis servo amplifier with an rotary servo motor using MR-BATV1SET, MR-BATV1BU, or MR-BATV1BU. Note 2. Check the following conditions for the storage condition.

6.3 Trouble shooting for STO
When the input signals status (STO1 / STO2) do not same, and the fault detected by the diagnostic function, the alarm number [AL 68 STO diagnosis status] is displayed on the LED of the servo amplifier.

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.

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 transportation and handling of the battery, refer to the servo amplifier instruction manual.

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

Table showing environmental requirements for Operation, Storage, and Transportation across various parameters like temperature, humidity, vibration, and pollution.

Note: In regular transport packaging.

8. Technical data
8.1 MR-J4 servo amplifier

Table showing technical data for MR-J4 servo amplifiers, including power supply, control circuit, interface, and protection specifications.

Note 1. For the use in USA/Canada, constitute a branch circuit including the power supply which ensures SCRR of 5A minimum in the industrial cabinet. Note 2. MR-J4-...RU also supports a power supply of 240 V DC to 340 V DC.

8.2 Dimensions/mounting hole process drawing
The following table shows the dimensions and mounting hole process drawing for MR-J4 servo amplifiers.

Table showing dimensions and mounting hole process drawing for MR-J4 servo amplifiers.

Note: The value in the parenthesis shows the value of MR-J4-...GF.

Table showing variable dimensions (mm) for MR-J4 servo amplifiers.

9. Check list for user documentation
The following items must be satisfied by the initial test operation at least. The manufacturer/installer must be responsible for checking the standards in the items.

MITSUBISHI ELECTRIC MR-J4 installation checklist for manufacturer/installer. Includes sections for Warranty, Term of warranty after the stop of production, and Service in overseas countries.

1. Warranty period and coverage
We warrant any failure or defect hereinafter referred to as 'failure' in our FA equipment hereinafter referred to as the 'Product' arisen during warranty period not charge due to causes for which we are responsible through the distributor from which you purchased the Product.

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

5. Change of Product specifications
Specifications listed in our catalogs, manuals and technical documents may be changed without notice. (1) For the use of our AC Servo, its applications should be those that may not result in a serious damage even if AC Servo or malfunction occurs in AC Servo, and a backup or fail-safe function should operate on an external system to AC Servo when any failure or malfunction occurs.

6. Application and use of the Product
(1) For the use of our AC Servo, its applications should be those that may not result in a serious damage even if AC Servo or malfunction occurs. (2) Our AC Servo is designed and manufactured as a general purpose product for use as general industries.

7. Disclaimer
We will review the acceptability of the above-mentioned 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 governmental controller trouble and system trouble caused by DoS attacks, unauthorized access, computer viruses, and other cyberattacks.