



MR-J5 Servo amplifier
Model
MR-J5-10, to MR-J5-700
MR-J5-60\_4, to MR-J5-700\_4
MR-J5W2-22, to MR-J5W2-1010
MR-J5W3-222, to MR-J5W3-444.

Safety Instructions and Precautions for AC Servos

Table with 3 columns: Country/Region, Sales office, and Tel. Lists contact information for USA, Germany, China, Korea, and Japan.

- 2.1 Professional engineer
Only professional engineers should mount MR-J5 servo amplifiers.
2.2 Applications of the devices
MR-J5 servo amplifiers are used to drive servo motors, and comply with the standards shown below.
2.3 Correct use
Use the MR-J5 servo amplifiers within specifications. Refer to MR-J5 User's Manual for specifications such as voltage, temperature, etc.

WARNING Risk of electrical shock. Do not touch drive unit and terminals immediately after power-off. Allow approx. 15 minutes for capacitor to discharge.

- 2.3.1 Peripheral device and power wiring
The following are selected based on IEC/EN/UL 61800-5-1, and CSA C22.2 No. 274.
(1) 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.

Table 1. Recommended wires. Table 2. Recommended crimp terminals. Table 3. Selection example of MCCB and semiconductor fuse.

- \*1 The wire sizes can be selected based on the rated current of the servo motors.
\*2 For 1-phase 200 V AC servo amplifiers, connect the lines to L1 and L3.
\*3 For 400 V class, a step-down transformer is not required.
Connectable motors are limited as follows:
(1) Servo motors manufactured by Mitsubishi Electric (HK/LM/TM series)
(2) Other servo motors complying with IEC 60034-1 which are used with a Mitsubishi Electric serial interface-compatible encoder or with an A/B/Z-phase differential output type encoder

Table 4. Servo amplifier (200 V class). Table 5. Servo amplifier (400 V class).

- \*1 For the use under the conditions of UL Listed, select a semiconductor fuse.
\*2 For the use under the conditions of UL Listed, select a semiconductor fuse.

Table 6. Servo amplifier (200 V class). Table 7. Servo amplifier (400 V class).

- (3) Power supply
This servo amplifier can be supplied from star-connected supply with grounded neutral point of overvoltage category III.
(4) 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.

- (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.
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, and this marking also applies to machines and equipment incorporating servos.

- (1) EMC requirement
MR-J5 servo amplifiers comply with EN/BS EN IEC 61800-3. As for I/O wires (max. length 10 m), motor cables and encoder cables (max. length 50 m), use shielded wires and ground the shields.
(2) For Declaration of Conformity (DoC)
We declare that our servo amplifiers are in compliance with EC directives (Machinery directive (2006/42/EC), EMC directive (2014/30/EU), Low-voltage directive (2011/65/EU), and RoHS directive (2002/95/EC), (EU) 2015/863) and applicable regulations of the UK.

- 2.3.3 USA/Canada compliance
This servo amplifier is designed in compliance with UL 61800-5-1 and CSA C22.2 No. 274.
(1) Installation
The minimum cabinet size is 150 % of each MR-J5 servo amplifier's volume.

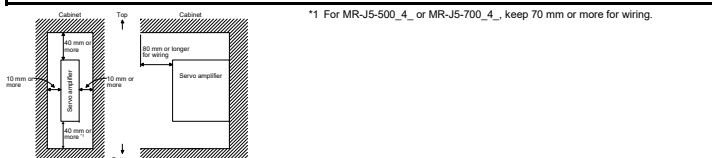
- (2) Short-circuit current rating (SCCR)
Suitable For Use On A Circuit Capable Of Delivering Not More Than 100 kA rms Symmetrical Amperes, 240 Volts Maximum for 200 V AC servo amplifiers, or Not More Than 100 kA rms Symmetrical Amperes, 480 Volts Maximum for 400 V AC servo amplifiers.
(3) Branch circuit protection
For installation in United States, branch circuit protection must be provided, in accordance with the National Electrical Code and any applicable local code.

- 2.3.4 South Korea compliance
Products that bear the KC mark comply with the Radio Wave Law.
2.4 General cautions for safety protection and protective measures
Observe the following items to ensure proper use of the MR-J5 servo amplifiers.
(1) Only qualified personnel and professional engineers should perform the installation of safety components and systems.
(2) When mounting, installing, and using the MR-J5 servo amplifier, always observe the standards and directives applicable in the respective countries.

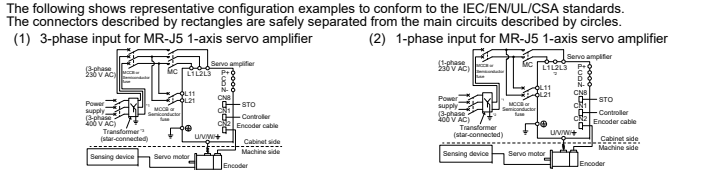
- 2.5 Residual risk
(1) Be sure that all safety related switches, relays, sensors, etc., meet the required safety standards.
(2) Perform all risk assessments and safety level certification to the machine or the system as a whole.
(3) If the upper and lower power module in the servo amplifier are shorted and damaged simultaneously, the servo motor may make a half revolution 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 sub-function from other signal wirings.
(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).

- 4. Electrical Installation and configuration diagram
POINT
To prevent malfunction, install the servo amplifier in the specified direction.
Mount the servo amplifier on a cabinet which meets IP54 in the correct vertical direction to maintain pollution degree 2.



- The following shows representative configuration examples to conform to the IEC/EN/UL/CSA standards.
(1) 3-phase input for MR-J5 1-axis servo amplifier
(2) 1-phase input for MR-J5 1-axis servo amplifier



- 5.1 Signal
The following shows MR-J5-10G signals as a typical example.
5.2 I/O device
Input device
Output device

- 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 8. Signals and STO state. Table 9. Input device. Table 10. Output device.

- 6. Maintenance, service and trouble shooting
Only qualified personnel should attempt inspections.
6.1 Inspection items
It is recommended that the following points periodically be checked.
(1) Check for loose terminal block screws.
(2) Servo motor bearings, brake section, etc. for unusual noise.

Table 11. Servo amplifier. Table 12. Tightening torque [N·m].

Table 13. Parts having service life. Table 14. Part name. Table 15. Life guideline.

- 6.2 Parts having service life
Service life of the following parts is listed below.
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\_068 STO diagnosis error] is displayed on the LED of the servo amplifier.
7. Environment
Transport the products correctly according to their mass.
When you keep or use it, please fulfill the following environment.

Table 16. Environment. Table 17. Operation. Table 18. Transportation. Table 19. Storage.

Table 20. Specifications. Table 21. Safety sub-function. Table 22. Safety performance.

Table 23. Servo amplifier dimensions. Table 24. Servo amplifier variable dimensions.

- \*1 A 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.
\*2 The performance of special proof tests within the mission time of the product is regarded as not necessary, however, the diagnostic inspection is suggested as at least one test per three months for Category 3 PL e, SIL 3 on IEC 61800-5-2:2016.

Table 25. Servo amplifier variable dimensions. Table 26. Servo amplifier variable dimensions.

Table 27. Servo amplifier variable dimensions. Table 28. Servo amplifier variable dimensions.

- 9. Check list for user documentation
Mitsubishi Electric
MR-J5 installation checklist for manufacturer/installer
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.

- 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" arising 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.

- 2. Term of warranty after the stop of production
(1) You may accept the repair at charge for another seven (7) years after the production of the product is discontinued.
3. Service in overseas countries
Our regional FA Center in overseas countries will accept the repair work of the Product.
4. Exclusion of loss in opportunity and secondary loss from warranty liability

- 6. Application and use of the Product
(1) For the use of our AC Servo, its applications should be those that should not result in a serious damage even if any failure or malfunction occurs.
(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.