

Notice before Using Products

The products are designed to be used with general industrial devices. When using them, pay sufficient attention to the following points.

- Read the Operation Manual thoroughly prior to placement, assembly and/or operation in order to use the product properly.
- Refrain from modifying or processing the product in any way.
- Contact us or your point of sale for placement or maintenance services of the product.
- Regarding the following uses of the product, contact us or your point of sale for the special care required for operation, maintenance and management such as multiplexing the system, installing an emergency electric generator set, and so forth.

- ① Use in medical equipment that may have an effect on human life or the human body
- ② Use in transportation systems or transport-related equipment such as trains or elevators, that may have an effect on human life or the human body
- ③ Use in computer systems that may have an impact on society or on the public
- ④ Use in other devices that have a major impact on human safety or on maintaining public operations

- In addition to the above, contact us or your point of sale for use in an environment where vibrations occur, such as in automobiles or transportation systems.
- For use in space, aviation, or nuclear power-related applications, contact us or your point of sale.
- The products shown in this catalog are subject to Japanese Export Control Law. Diversion contrary to the law of exporting country is prohibited.

Indication by (Warning Label) on the Product

The following indications are expressed by Warning labels. Indications vary depending on models.



This label is affixed near high voltage parts such as the electrically charged or cover-protected section, warning of the places where it is likely to cause an electric shock.



This label is affixed near the GND terminals where grounding is required, recommending that the terminals should be well grounded.

Safety Ranks of the Cautions

The following five ranks are provided.




DANGER Improper operations or use is most likely to result in serious injury or death.



WARNING Improper operations or use is most likely to result in serious injury or death.



CAUTION Improper operations or use is likely to result in average or minor injury, or in property damage.

In spite of the cautions with the  CAUTION label, it may cause serious results.
Either the contents or the labels is describing important cautions to be followed inevitably.



PROHIBITED Indicates what must not be done.



COMPULSORY Indicates what must be done.



WARNING

Precautions on Use

1. Do not use the product in an explosive atmosphere. Doing so may cause injury or fire.
2. Do not work on wiring, maintenance servicing or inspection with the electric power on. Always turn the power off and wait for 15 minutes or more. Confirm that the main circuit power supply charging LED is off before starting the work. Failure to do so may result in an electric shock or damage.
3. The protective ground terminal of the servo amplifier must be grounded to the device or control panel. The servo motor ground terminal must be connected to the protective ground terminal of the servo amplifier. Failure to do so may result in an electric shock.
4. Never touch the internal parts of the servo amplifier. Doing so may cause an electric shock.

5. Do not damage, apply excessive stress, or place a heavy object on the cable or get it caught between objects. Doing so may cause an electric shock.
6. Never touch the rotating part of the servo motor during its operation. Doing so may cause injury.



CAUTION

Precautions on Use

1. Use the servo amplifier and servo motor in the designated combination. Failure to do so may result in a fire or failure.
2. Have a person with specialized knowledge perform transporting, installation, wiring, operation, maintenance or inspection of the product. Failure to do so may result in an electric shock, injury or fire.
3. Do not install the product in a damp environment, explosive, flammable or corrosive atmosphere, or near a combustible material. Doing so may cause a fire or failure.

4. Do not touch the servo amplifier, servo motor or peripheral devices as the temperature becomes very high. Doing so may cause burns.
5. Do not touch the product while the power is on or for a while after the power is turned off since the servo amplifier radiator fins, regenerative resistor, and servo motor are very hot. Doing so may cause burns.
6. Have a person with specialized knowledge of relevant safety standards read and understand the information listed in the included Instruction Manual before designing the safety system that uses the Safe Torque Off function. Failure to do so may result in injury or failure.
7. Prior to installation, operation, maintenance servicing or inspection, be sure to read the Instruction Manual and follow the instructions to perform. Failure to do so may result in an electric shock, injury or fire.
8. Use the servo amplifier and servo motor within the specified ranges. Failure to do so may result in an electric shock, injury, or damage.
9. Element wires of the regenerative resistor have an allowed instantaneous capacity. Consult us if the moment of inertia is large or rotational speed is high and the instantaneous regenerative current is large.

Transportation

10. Do not carry the product by holding the cable, motor spindle, or detector section. Doing so may cause a failure or injury.
11. Be careful when carrying the product to prevent it from falling or overturning. Failure to do so may result in injury.

Placement

12. Do not climb on or place a heavy object on the product. Doing so may cause injury.
13. Ensure that the product is installed in the correct direction. Failure to do so may result in a fire or failure.
14. Do not drop or expose the product to excessive shock. Doing so may cause a failure.
15. Ensure that the intake and exhaust ports are not blocked and take measures to prevent foreign matter from entering. Failure to do so may result in a fire.
16. Place the servo amplifier in the control panel keeping a distance from other devices as instructed in the Instruction Manual. Failure to do so may result in a fire or failure.
17. Ensure that the bottom and top of the box are facing correctly while unpacking. Failure to do so may result in injury.
18. Confirm that the product is what you ordered. Failure to do so may result in injury or damage.
19. Be careful when installing the product in order to prevent it from falling or overturning. Use eye bolts for servo motors that come with them. Failure to do so may result in injury.
20. Mount the product on an incombustible material such as metal. Failure to do so may result in a fire.
21. Setup devices such as a collision safety device so that it sufficiently withstands the maximum output of the system. Failure to do so may result in injury.

Wiring

22. Ensure that wiring has been correctly done. Failure to do so may result in injury.
23. Perform wiring as instructed in the wiring diagram or the Instruction Manual. Failure to do so may result in an electric shock or fire.
24. Perform wiring conforming to the electrical Installation standards or the internal rule. Failure to do so may result in burnout or fire.
25. Do not connect commercial power supplies to U, V, W terminals of the servo motor. Doing so may cause a fire or failure.
26. Install safety devices such as a breaker to prepare for a short circuit of external wiring. Failure to do so may result in a fire.
27. Do not bind the servo motor power cable and I/O signal cable or encoder cable together or pass them through the same duct. Doing so may cause a malfunction.
28. When connecting an inductive load such as a relay to the control output signal of the servo amplifier, always connect a diode for surge absorption. Make sure that the diode is connected in the correct polarity direction. Failure to do so may result in a failure of the servo amplifier.
29. Do not connect 90 VDC or AC power to the servo motor 24 VDC brake. Also, do not connect 400 VAC to the servo motor 200 VAC cooling fan. Doing so may cause burnout or fire.
30. Braking delay time becomes longer due to the surge absorption

element for the servo motor holding brake relay. Use a sequence that takes the holding delay time into consideration. Failure to do so may result in fall or injury.

Operations

31. Do not make drastic changes or adjustments as they may result in unstable operation. Doing so may cause injury.
32. When performing a trial operation, fasten the servo motor and disconnect it from the mechanical system. Check the operation, then connect it to the machine. Failure to do so may result in injury.
33. The holding brake is not a stopping device to ensure machine safety. Install a stopping device on the machine to ensure machine safety. Failure to do so may result in injury.
34. When an alarm has been activated, eliminate the cause, ensure safety, and reset the alarm before resuming operations. Failure to do so may result in injury.
35. Ensure that the input power supply voltage is within the specified range. Failure to do so may result in a failure.
36. When the electric power recovers after a momentary interruption, do not approach the devices because the system may restart operation by itself. (Design the system ensuring safety in case it restarts on such occasions.) Doing so may cause injury.
37. Do not use servo amplifiers and servo motors that have had a failure, damage, or burnout. Doing so may cause injury or fire.
38. Stop operations immediately when an emergency occurs. Failure to do so may result in an electric shock, injury or fire.
39. When using the servo motor with a vertical axis, install a safety device to prevent the workpiece from falling when an alarm is activated. Failure to do so may result in injury or damage.

Maintenance and Inspection

40. Parts that are used in servo amplifiers (electrolytic condenser, cooling fan, lithium batteries for the encoder, fuse, relay, etc.) deteriorate over time. As preventive maintenance, replace with new ones according to the standard replacement intervals. Contact us for details. Failure to do so may result in a failure.
41. Never touch the terminals or connectors while the power is on. Doing so may cause an electric shock.
42. Servo amplifier frames become very hot. Be careful when performing maintenance or inspection. Failure to do so may result in burns.
43. Contact us for repairs. If the product is disassembled by the user, it may become inoperable. Doing so may cause a failure.



Storage

1. Avoid storing this product in places exposed to rain or water drops, or in an environment with hazardous gas or liquid. Failure to do so may result in a failure.

Operations

2. Do not use the brake built into the servo motor for normal braking operation as it is a holding brake. Using this brake for braking damages the brake. Doing so may cause a failure.
3. Do not apply static electricity or high voltage to the encoder cable for the servo motor. Doing so may cause a failure.
4. With a servo amplifier that has a standard dynamic brake resistor, never continuously rotate the servo motor externally when the servo is off. Doing so causes the dynamic brake resistor to generate heat, which is very dangerous. Doing so may cause a fire or burns.
5. Applying excessive voltage that exceeds the input voltage range may cause a part failure. Never use the product with the voltage exceeding the specified range. Doing so may cause a failure or injury.
6. Do not turn on and off the power frequently. Turning on and off the power exceeding 30 times/day, 5 times/hour may cause premature failures of internal parts.

Maintenance and Inspection

7. Do not disassemble or repair the product. Doing so may cause fire or an electric shock.
8. Do not measure the insulation resistance or dielectric voltage of the product. Doing so may cause damage.
9. Never plug in or unplug a connector with the power ON (hot swapping) as electronic components may be damaged due to the generated surge voltage. Doing so may cause an electric shock or damage.
10. Do not remove the nameplate.

! COMPULSORY

Storage

1. Avoid direct sunlight and store the product within the specified ambient temperature and humidity range “-20°C to +65°C, 90% RH or less” (non-condensing). Failure to do so may cause a failure.
2. If the servo amplifier has been stored for a long period (3 years or longer as a general guide), contact us. The capacitance may have decreased with the electrolytic condenser due to the long period storage, which may cause a failure.
3. If the servo motor has been stored for a long period (3 years or longer as a general guide), contact us. Bearings and brakes must be checked.

Transportation

4. Excess loading of products on the carrier may cause the load to collapse. Follow the instructions given on the outside of the package. Failure to do so may result in injury.
5. Use eye bolts that come with servo motors to transport servo motors. Do not use them to transport devices. Doing so may cause injury or failure.

Wiring

6. Install an external emergency stop circuit to turn the power off in the event that operation must be instantly halted. Also, build a safety circuit outside of the servo amplifier so that the main

circuit power supply is turned off when an alarm is activated. Failure to do so may result in uncontrollable operation, injury, fire, or secondary damage.

Operations

7. Install an external emergency stop circuit to turn the power off in the event that operation must be instantly halted. Also, build a safety circuit outside of the servo amplifier so that the main circuit power supply is turned off when an alarm is activated. Failure to do so may result in uncontrollable operation, injury, fire, or secondary damage.
8. Servo motors are not equipped with any protective devices. Take protective measures using an over-current protective relay, a ground fault interrupter, a protective device from excess temperature, and an emergency stopping device. Failure to do so may result in injury or fire.
9. Operate this product within the specified ambient temperature and humidity range.
 Servo amplifier (temperature 0°C to 55°C/Humidity 90%RH or less (non-condensing))
 Servo motor (temperature 0°C to 40°C/Humidity 90%RH or less (non-condensing))
 Failure to do so may result in a failure.

Retirement

10. When disposing of a servo amplifier or servo motor, handle it as general industrial waste.

Guideline for Suppressing Harmonics

Harmonic current generated from devices such as a servo amplifier may affect other customers if emitted. Therefore, “Guideline for Suppressing Harmonics by Customers Receiving High Voltage or Special High Voltage” is established by the Ministry of International Trade and Industry (currently Ministry of Economy).

Servo amplifiers used by specific customers are the target devices (harmonics generator) of this guideline. Consumers to whom the guideline is applied must determine if harmonic suppression measures are necessary based on the guideline and take measures for keeping harmonic emission within the limit specified by the contracted power. Even for consumers to whom the guideline is not applied, it is recommended to take harmonic suppression measures in order to avoid troubles due to the harmonics.

Our servo amplifiers fall under the circuit type in the table 1 shown in the “Guideline for Suppressing Harmonics”.

Refer to the following materials for information on how to calculate harmonic current.

“Harmonic current calculation method for specific customers” (JEM-TR225) General Incorporated Association The Japan Electrical Manufacturers’ Association (JEMA)

For servo amplifiers that have DC type input power supply, determine if harmonic suppression measures are necessary on the converter (AC-DC converter) side.

When harmonic suppression measures are necessary for the servo amplifier, connect a harmonic suppression reactor. For harmonic suppression reactors, contact us for details.

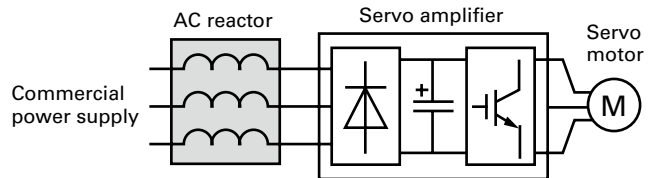


Table 1

Servo amplifier model no.	Power supply	Circuit classification	Circuit type	Conversion factor Ki
RS3□01□□ RS3□02□□ RS3□03□□ RS3□05□□	3-Phase	3	3-Phase bridge (Condenser smooth)	3-1 6-pulse converter without reactor K31=3.4
				3-2 6-pulse converter with reactor (AC side) K32=1.8
	Single-phase	4	Single-phase bridge (Condenser smooth, full-wave rectification)	4-3 Without reactor K43=2.9
				4-4 With reactor (AC side) K44=1.3
RS3A10□□ RS3A15□□ RS3A30□□ RS3PAA27000 (Power supply unit for RS3W60□□)	3-Phase	3	3-Phase bridge (Condenser smooth)	3-1 6-pulse converter without reactor K31=3.4
				3-2 6-pulse converter with reactor (AC side) K32=1.8

Reference materials
“Guideline for Suppressing Harmonics by Customers Receiving High Voltage or Special High Voltage” (September, 1994) Ministry of International Trade and Industry (currently Ministry of Economy) “Guideline for Suppressing Harmonics” (JEAG 9702-2013) General Incorporated Association The Japan Electric Association “Guideline for Suppressing Servo Amplifier Harmonics” (February, 2015) General Incorporated Association The Japan Electrical Manufacturers’ Association (JEMA) “Harmonic current calculation method for specific customers” (JEM-TR225) General Incorporated Association The Japan Electrical Manufacturers’ Association (JEMA) “Guideline for Suppressing Servo Amplifier (input current 20 A or less) Harmonics” (JEM-TR227) General Incorporated Association The Japan Electrical Manufacturers’ Association (JEMA)