Safety Precautions

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

- Read the included Instruction Manual carefully before installing, assembling, and using the product for proper use.
- Do not modify or alter the product in any way.
- Contact us or your point of sale for installation or maintenance services of the product.
- Consult us when using the product for the following uses, as these require special considerations for operations, maintenance, and management such as redundancy and emergency power generators.

  ❶ Use in medical equipment that may have an effect on human life or the human body
  ❷ 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
  ❸ Use in computer systems that may have an impact on society or on the public
  ❹ 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.
- For use in space, aviation, or nuclear power-related applications, contact us or your point of sale.
- The products listed in this catalog fall into the category 16 of Appended Table 1 of the Export Trade Control Order. To export these products as an individual part or to export a device into which they are assembled, the "Inform Requirements" and "Objective Requirements"—established by the Ministry of Economy, Trade and Industry of Japan based on the "Catch-all Controls"—must be studied for applicability. Accordingly, appropriate export formalities must be performed.

Safety Precautions

Warning Labels on Products

Either or all of the following symbols are labeled on products depending on the model of driver or stepping motor.

This label is attached in the vicinity of high-voltage portions such as charging or cover-protected parts, to indicate locations with risk of electric shock.

This label is attached in the vicinity of the grounding terminals of drivers to indicate that grounding is required.

This label is attached to the portion of drivers where a voltage of 42.4 VAC or 60 VDC or more is applied, drawing attention to the risk of electric shock.

Indicates that the stepping motor may get hot, resulting in burns.

Indicates that the stepping motor should be grounded.

Safety Alert Symbols

The following safety symbols are used in the manual to indicate different hazardous situations and prohibited/required actions.

⚠ DANGER — Indicates hazards that could cause severe bodily injury or death as a result of failure to follow the instructions.

⚠ CAUTION — Indicates possible hazards that could cause moderate bodily injury or only property damage as a result of failure to follow the instructions.

> Note that even items with a ⚠ CAUTION symbol could potentially lead to serious outcomes, depending on the situation. They all indicate important situations, so be sure to observe them.

⃠ PROHIBITED — Indicates actions that must not be taken.

❗ COMPULSORY — Indicates actions that must be taken.

⚠ DANGER

General

1. Do not use the product in an explosive, flammable or corrosive atmosphere, watery place or near a combustible material. Failure to follow this may cause injury or fire.
2. Only technically qualified personnel should transport, install, wire, operate, or perform maintenance and inspection on the product. Failure to follow this may cause electric shock, injury, or fire.
3. Do not work on wiring, maintenance servicing, or inspection with power on. Perform either of those five minutes after turning the power off. Failure to follow this may cause electrical shock.
4. When the protective functions of the product is activated, turn the power off immediately and eliminate the cause. If continuing the operation without eliminating the cause, the product may operate improperly and cause injury or a breakdown of the system devices.
5. Stepping motor may run out of order when operating and stopping depending on the magnitude of the load. Put the product into use after sufficient trial test operation in the maximum planned load conditions to check that the product can handle the load. Doing otherwise may cause a breakdown of the system. (Should the product run out of order in the use to drive upward/downward, it may cause a fall of the load.)
6. Do not touch the internal parts of the driver. Failure to follow this may cause electrical shock.

Wiring

7. Do not connect the stepping motor directly to a mains outlet. Failure to follow this may cause electric shock, injury, or fire. Stepping motors should be powered by stepping drivers (except for synchronous motors).
8. Use an input voltage within the rated voltage range. Using otherwise may cause fire or an electric shock.
9. Connect the driver and stepping motor to the ground. Failure to follow this may cause electrical shock.
10. Do not damage, apply excessive stresses, put heavy things on, or tuck down cables. Failure to follow this may cause electrical shock.
11. Perform wiring with the power cable as instructed by the wiring diagram or the Instruction Manual. Failure to follow this may cause electric shock or fire.
12. Our stepping motor cables are for fixed-wiring use, so do not use products in applications where flex cables are required. Failure to follow this may cause electric shock, injury, or fire.

Operation

13. Be sure not to touch the rotating part of the stepping motor during its operation. Failure to do so may cause injury.
14. Do not reach or touch the electric terminals while electric power is on. Failure to follow this may cause electrical shock.
15. Never disconnect any of the connectors while electric power is on. Failure to follow this may cause electric shock or product damage.
16. Do not operate products with live parts exposed. Failure to follow this may cause electrical shock.
17. If smoke, fire, unusual smells, or unusual sounds are produced from the driver or stepping motor, turn off the power and stop using them immediately. Failure to follow this may cause electric shock, injury, or fire.

⚠ CAUTION

General

1. Prior to installation, operation, maintenance servicing or inspection, be sure to read the Instruction Manual and follow the instructions. Failure to follow this may cause electric shock, injury, or fire.
2. Do not use the driver or the stepping motor in conditions that exceed the specification values. Failure to follow this may cause electric shock, injury, or fire.
3. Do not insert a finger or an object into the opening of products. Failure to follow this may cause electric shock, injury, or fire.
4. Do not use a damaged driver or stepping motor. Doing so may cause injury or fire.
5. Use the driver and stepping motor in the designated combination. Failure to follow this may cause fire or product failures.
6. The driver, motor, and peripheral devices become hot during operation, so use them carefully. Otherwise it may result in a burn.
7. Never disassemble, repair, modify, or alter products. Failure to follow this may cause electric shock, injury, or fire.
8. Do not remove the product name plate. Using products with incorrect ratings may result in fire.
9. Be careful that this product does not fall or tip over when handling, as this can be dangerous.

Unpacking

10. Unpack the box right side up. Failure to do so may result in injury.
11. Confirm that the product you received is the one that you have ordered. Installing an incorrect product may cause a breakdown.

Wiring

12. Do not perform measurements of insulation resistance or dielectric strength. Failure to follow this may cause product damage. Contact us or your point of sale instead, if such a measurement is required.
13. Perform wiring work according to local standards of electrical installations. Failure to follow this may cause motor burnout or fire.
14. Perform wiring correctly and securely. Incorrect wiring may cause the stepping motor to run out of control, resulting in injury.
15. Insulate the attached condenser and external resistance connection terminals. Failure to follow this may cause electrical shock.

Installation

16. Do not climb or attach a heavy article on the product. Failure to do so may cause injury.
17. Do not obstruct the air intake and exhaust vents. Failure to follow this may cause fire.
18. Make sure to use the specified driver mounting direction. Failure to follow this may cause product failures.
19. Keep a distance as instructed by the Instruction Manual for the driver from the inner surface of the control console or other devices. Failure to follow this may cause product failures.
20. Place the product with great care so as to prevent from danger such as a tumble or a turnover.
21. Install the product to incombustible materials such as metals. Failure to do so may cause fire, injury, or device breakdown.
22. Do not place combustible material around this product. Failure to do so may result in fire or burns.
23. Be sure to provide an adequate ventilation path when installing this product, and do not block the intake and exhaust ports. Failure to do so may result in electric shock, fire, or device breakdown.
24. Confirm the rotating direction before connecting with the mechanical device. Failure to follow this may cause injury or product damage.
25. Do not touch the motor output spindle (including the key slot and gears) with your bare hand. Failure to do so may cause injury.
26. Do not to apply force that exceeds the specified allowable loads to the motor output shaft.

Operation

27. The stepping motor is not equipped with any protective device. Prepare an overvoltage protection device, earth leakage breaker, overheat protection device, and emergency stop device to ensure safe operation. Failure to follow this may cause injury or fire.
28. Do not touch the product for a period after the power is on or has been turned off, since the driver and stepping motor remain at a high temperature. Failure to do so may cause burns. In particular, the temperature rises considerably of the stepping motor depending on the operating conditions. Do not allow the motor surface to exceed the following temperatures:

    Thermal class F (+155°C) stepping motors: 125°C
    Thermal class B (+130°C) stepping motors: 100°C
    Regardless of thermal class, encoder equipped steeping motors: 85°C, in-vacuum stepping motors: 150°C
29. Immediately stop operation in case of anomaly. Failure to do so may cause an electric shock, injury or fire.
30. Do not perform drastic setting changes as such changes may cause unstable operation. Failure to do so may cause injury.

31. During trial operations, firmly stabilize the stepping motor, and confirm operations by disconnecting from the mechanical system before connecting with it. Failure to do so may cause injury.
32. When the alarm has been activated, eliminate the cause and ensure safety before resuming operations. Failure to do so may cause injury.
33. When the electric power recovers after a momentary interruption, do not approach the devices because the system may restart operation by itself. (Set the system so as to secure the safety even when it restarts on such occasions.) Failure to do so may cause injury.
34. Confirm that the electric power supply properly conforms to the product specifications. Failure to follow this may cause product failures.
35. The electromagnetic brake is designed to hold the motor position in place. Do not use it as dynamic braking. Doing so may cause the breakdown of the system.
36. Secure the key when operating the motor with a key. Failure to do so may cause injury.
37. For use in applications where varying loads are applied to the shaft, contact us in advance. Use in environments with varying loads might result in equipment failure.

Maintenance

38. Be careful when performing maintenance services or inspection as the driver and stepping motor frames get hot. Failure to do so may cause burns.
39. It is recommended that the electrolytic condenser of the driver is replaced with a new one as preventive maintenance after using for 5 years (the expected life in an average operating environment of 40°C). The expected life of the fuse is 10 years in an average operating environment of 40°C. Thus, periodical replacement is recommended.
40. Contact us or your point of sale for repair. If the product is disassembled by the user, it may become inoperable.

Transportation

41. Handle the product with care during transportation so as to prevent from dangers such as tumbling or overturning.
42. Do not hold with the cable or the motor shaft when transporting. Failure to follow this may cause product damage or injury.

Disposal

43. Dispose of stepping drivers and motors as industrial waste.

PROHIBITED

Storage

1. Avoid storing products in locations exposed to rain or water drops, or in an environment with hazardous gas or liquid. Failure to follow this may cause failures.

Maintenance

2. Do not disassemble or repair products by yourself. Failure to follow this may cause fire or electric shock.

General

3. Do not remove the product name plate. Using products with incorrect ratings may result in fire.

COMPULSORY

Storage

1. Store the product in a location that is not exposed to sunlight, at a temperature and humidity within the product specifications.
2. If the driver has been stored for a long period (3 years or longer), contact us. The capacitance of electrolytic capacitors can decrease through long-term storage, which may cause malfunctions.

Operation

3. Install an external emergency stop circuit to turn the power off if needed.
4. Operate this product within the specified ambient temperature and humidity.

Transportation

5. Follow the instructions displayed on the package box and avoid excessively stacking boxes.