



BEFORE USING THE PRODUCT

Thank you for purchasing an Oriental Motor product.

- Please read this BEFORE USING THE PRODUCT and the separate manual entitled OPERATING MANUAL thoroughly to ensure safe operation.
- Always keep the manual where it is readily available.



This product must be handled by qualified personnel. Before using the product, please read this manual carefully to ensure correct use.

Applicable product

EZS II Series SPF II Series SPV Series SPR II Series ESR Series PWA II Series
EZA Series EZC II Series

Safety precautions

This product is designed and manufactured for use as an internal component for general industrial equipment. Do not use the product for any other purpose. Oriental Motor shall not be liable whatsoever for any damage arising from failure to observe this warning.

 Warning	Handling the product without observing the instructions that accompany a “Warning” symbol may result in death or serious bodily injury.
 Caution	Handling the product without observing the instructions that accompany a “Caution” symbol may result in bodily injury or property damage.
Note	These notes appear throughout the manual and describe items that must be observed by the user to ensure correct use of the product.

You must not operate the motorized actuator (operate the equipment for the specified purpose) if the machine in which the motorized actuator is installed does not satisfy the related safety standards.


The factory safety manager or safety personnel in charge of the applicable machine must ensure that the machine is operated only by qualified personnel who are familiar with the operation of electronic equipment, and thereby prevent injury or damage to the equipment.

The term “qualified personnel” refers to persons who have received the necessary training or education and have pertinent experience; who are familiar with the relevant standards, regulations, accident-prevention rules and inspection conditions; who are authorized by the factory safety manager to engage in the necessary activities; and who have the ability to discern and prevent potential dangers.

Warning

General

- Provide an emergency-stop device or emergency-stop circuit external to the equipment so that the entire equipment will operate safely in the event of a system failure or malfunction. Failure to do so may result in injury.
- Immediately when trouble has occurred, stop running and turn off the controller power. Failure to do so may result in fire, electric shock or injury.
- Be sure to provide a safety cage conforming to EN 294 to prevent persons from entering the moving range of the motorized actuator while power is supplied to the motorized actuator. Turn off the main power to the controller before performing adjustment or inspection in which the motorized actuator is moved manually. Accidental contact may result in serious injury.
- Never use a motorized actuator in a medical device used in connection with the maintenance or management of human life or health, or in a transportation system whose purpose is to move or carry people.
- Be sure that personnel with expert knowledge of electrical and mechanical engineering perform the installation, connection, operation, maintenance and troubleshooting. Failure to do so may result in fire, electric shock or injury.
- Do not transport, install the product, and perform connections or inspections when the power is on. Always turn the power off before carrying out these operations. Failure to do so may result in electric shock.
- If the controller’s protective function has been actuated, remove the cause and then reconnect the power source. If the motorized actuator operation is continued without removing the cause, the controller may malfunction and cause injury or equipment damage.
- Do not disassemble or modify the parts other than those specified in this manual. Doing so may result in electric shock or injury.

- When the product is used in a lifting application, choose a motorized actuator equipped with an electromagnetic brake. Without an electromagnetic brake the motorized actuator will lose its holding brake force when the power is cut off or upon actuation of the controller's protective function or emergency stop function. When this happens, the moving part may drop, causing injury or equipment damage.
- Do not use the electromagnetic brake to decelerate, nor use it as a safety brake. The electromagnetic brake is designed to hold the motorized actuator position. Doing so may result in injury or equipment damage.
- Be careful not to let the hand get caught in the moving parts of the motorized actuator. Keep your fingers and objects out of the openings in the motorized actuator. Doing so may result in injury or equipment damage.
- Do not forcibly pull or bend the cable or lift the motorized actuator by holding the cable. Doing so may result in electric shock or injury.
- Do not touch the controller immediately after the power is cut off, or until the CHARGE LED (lit in red) turns off. Doing so may result in electric shock due to residual voltage (ESMC-A2, ESMC-C2 only).
- Configure an emergency stop circuit that will cut off the motor's output power and stop the motorized actuator upon the detection of an EMG (emergency stop) input. For details on the circuit configuration, refer to 3.6 "Emergency stop circuit" in the Linear Motion Controller OPERATING MANUAL.
- Do not use the product in an atmosphere containing explosive, flammable or corrosive gases, in a place exposed to water, or near flammable objects. Doing so may result in fire, electric shock or injury.
- The terminals on the controller's front panel marked with  symbol indicate the presence of high voltage. Do not touch the battery while the power is on. Doing so may result in fire or electric shock (ESMC-A2, ESMC-C2 only).
- Handle the air coupler for suction and sensors by following the instructions provided with that product. Failure to do so may result in injury or equipment damage.

Installing and wiring

- When transporting the motorized actuator, do not hold the motorized actuator by its cables, moving part, air coupler for suction and air tube for suction. Doing so may result in injury or equipment damage.
- Affix the motorized actuator securely by following the specified installation method. Failure to do so may result in injury or equipment damage.
- Be sure to install the product in an enclosure to prevent contact with any hands. If the product is likely to come in contact with any hands, be sure to provide a protective earth. Securely ground the protective earth terminal. Electric shock may result (only when the motorized actuator is combined with the controller ESMC-A2 or ESMC-C2).
- Do not touch the moving part while the power is supplied. The moving part is cut off from the protective grounding circuit, so electric shock may result (only when the motorized actuator is combined with the controller ESMC-A2 or ESMC-C2).
- The DC power supply to be connected to the controller should have reinforced insulation on the primary and secondary sides. Failure to do so may result in electric shock.
- Do not touch the battery while the power is supplied. The battery is connected to the primary circuit, so touching the battery may result in electric shock (ESMC-A2, ESMC-C2 only).
- When measuring insulation resistance or conducting withstand voltage test, never touch the terminals. Electric shock may result.
- Keep the controller's input-power voltage within the specified range to avoid fire and electric shock.
- Connect the product correctly and securely according to the wiring diagram. Failure to do so may result in fire, electric shock, and equipment damage.
- The motorized actuator to be connected to the controller must always match the motorized actuator model printed on the controller key name plate.

Operation

- Confirm that all of the controller's input signals are set to the OFF state before turning on the power. Also, confirm the emergency stop method of the machine beforehand and operate the motorized actuator in a condition where an emergency stop can be executed at any moment if necessary. Doing so may result in injury or equipment damage.
- Perform return-to-home operation or absolute positioning operation immediately after the power is restored. Failure to do so may result in injury or equipment damage.
- Turn off the power to the controller in case of a power failure. Failure to do so may result in injury or equipment damage when the motorized actuator starts suddenly upon power recovery.
- Do not ON the C.OFF input or FREE input while the motorized actuator is operating. If the C.OFF input switches to the active state during operation, the motorized actuator will stop and lose its holding brake force. Doing so may result in injury or equipment damage.

- Never ON the C.OFF input when the motorized actuator is installed vertically, whether the motorized actuator is operating or stopped. The holding brake force will be lost, and the load may drop. Doing so may result in injury or equipment damage.
- Do not allow any moving part to collide with the stroke end of the motorized actuator in any operation other than push-motion return-to-home operation or push-motion operation.

Inspection

- Remove the load from the moving parts before checking the internal parts. Failure to do so may result in injury or equipment damage.



General

- Do not use the motorized actuator and controller beyond their specified values. Doing so may result in injury or equipment damage.
- No one should come close to the motorized actuator beyond the safety distance, except for qualified personnel. Doing so may result in injury.
- Do not use the sensors supplied with your motorized actuator or the sensor set for **EZS II** Series as safety components. Doing so may result in injury or equipment damage.
- Do not touch the motorized actuator, controller or regenerative unit during operation or immediately after stopping. The surface is hot and may cause a skin burn(s).
- Measuring insulation resistance or conducting withstand voltage test without shorting all terminals will damage the controller.
- Conduct the insulation resistance measurement or withstand voltage test separately on the motorized actuator and the controller. Conducting the insulation resistance measurement or withstand voltage test with the motorized actuator and controller connected may result in injury or damage to equipment.
- Do not use any battery other than the dedicated battery supplied with the product. Use of any other battery may result in injury or damage to the equipment, controller or battery.
- Do not perform direct teaching unless the motorized actuator is installed in the horizontal direction. When performing direct teaching, the motor will lose its holding brake force and the load may drop. The motor's output current will be cut off, and the electromagnetic brake will be released as well. Doing so may result in injury or equipment damage.
- If the emergency stop button on the teaching pendant is pressed or any of the controller's protective functions is actuated, the controller will cut off the motor output current and stop the motor. If the motorized actuator is equipped with an electromagnetic brake, the brake is actuated and the position is held. However, if there is no electromagnetic brake, the holding brake force is lost and it may take longer to stop. If the load installed on the moving parts is likely to contact other equipment during this period, provide a safety mechanism on the machine side. Doing so may result in injury or equipment damage.
- Static electricity may cause the controller or controller key to malfunction or sustain damage. Do not touch the controller while the power is being supplied. When adjusting the DIP switches while the power supply is active, always use an insulated screwdriver.

Installing

- The motorized actuator is very heavy. When transporting or installing the motorized actuator, make sure two persons work together to carry out the necessary tasks. Failure to do so may result in injury.
- Wear a helmet, safety shoes, gloves or other protective gear when transporting or installing the motorized actuator. Failure to do so may result in injury.
- Be sure to install the frame cover before operating the motorized actuator (**SPF II** Series, **SPV** Series, **SPR II** Series and **ESR** Series only). Doing so may result in injury.
- Lay the suction tubes specified for the **EZS II** Series (clean room specification) by preventing sharp bends. In addition, keep the tube length to a minimum, since a longer tube will make it difficult to obtain the specified flow rate.
- To ensure the specified cleanliness of the **EZS II** Series (clean room specification), suction air from the slide at the specified flow rate. Dust may enter due to a residual pressure if the suction vacuum pump or blower stops. Provide the necessary devices to prevent this problem. Failure to do so may generate dust.

Operation

- The motor temperature may rise significantly depending on the operating condition. With the **EZS II** Series, **EZA** Series and **EZC II** Series, the surface temperature of the motor cover should not exceed 65 °C (149 °F) during operation. With the **SPF II** Series, **SPV** Series, **SPR II** Series, **ESR** Series and **PWA II** Series, the surface temperature of the motor case should not exceed 100 °C (212 °F) during operation. Failure to do so may damage the motor.
- The motor surface temperature may exceed 70 °C (158 °F) even in a normal operating condition. If the operator is allowed to approach the running motor, attach a warning label as shown below in a conspicuous position. Failure to do so may result in skin burn(s). (**SPF II** Series, **SPV** Series, **SPR II** Series, **ESR** Series and **PWA II** Series only).



Warning label

Inspection

- Wear protective goggles when applying grease. Pay attention to safety and handle the grease carefully by following the instructions provided with that product. If grease gets into the eyes or comes in contact with the skin, immediately flush the area thoroughly with water.
- Do not touch the end faces of the stainless sheet used in the **EZS II** Series with bare hands. Doing so may result in injury.

Disposing

- To dispose of the motorized actuator and controller, disassemble it into parts and components as much as possible and dispose of individual parts/components as industrial waste. If your local government enforces specific rules under an ordinance, etc., dispose of the motorized actuator, controller and battery in accordance with the applicable ordinance, etc.
- The product uses nickel-cadmium batteries. Dispose of used batteries in accordance with local laws and regulations. If you have any questions regarding disposal of the product, please contact any Oriental Motor branch or sales office.

Warning label

Words of warning on handling, such as those shown below, are displayed on the controller and battery.

- Controller warning label (Material: PET)

	WARNING—Risk of electric shock.
	• Read manual before installing.
	• Do not touch the controller immediately after the power is cut off, or until the CHARGE LED (lit in red) turns off. Doing so may result in electric shock due to residual voltage.
	警告 — 電気が感電のおそれがあります。
	• 据え付け、運転の前には必ず取扱説明書をお読み下さい。
	• 電源を切った直後、CHARGE LED (赤色点灯) が消灯するまでコントローラに触れないで下さい。残留電圧により感電の原因になります。

- Battery warning label (Material: Polypropylene)

	警告 — 感電のおそれがあります。	
	バッテリーは一次回路に接続されています。通電中は触れないでください。	
	WARNING — Risk of electric shock.	
	The battery is connected to the primary AC power circuit. Do not touch the battery while the power is on.	

- Battery name plate (Material: PET)

	Ni-Cd BATTERY TYPE PAEZ-BT2 2.4V DC 2000mAh 製造年月 2002. 10
	△危険 △シールド、分解、火中に投じないで下さい
	• 使用後はリサイクルへ
	• DO NOT DISPOSE OF IN FIRE OR SHORT CIRCUIT.
	* BATTERY MUST BE RECYCLED OR DISPOSED OF PROPERLY.
	DATE OF MFG. OCT. 2002
	THE FURUKAWA BATTERY CO., LTD. MADE IN JAPAN

Safety precautions for cable holder (Optional)



General

- Do not step onto the cable holder. The cable holder may break and drop.
- Pay attention to the flexing part of the cable holder. You may suffer injury to your hand or finger by accidentally pinching it in the flexing part.
- Do not apply excessive load on the mounting bracket of the cable holder. The cable holder may come off due to the load, causing injury or damage to the entire system.

Installation

- When connecting, disconnecting, opening/closing or maintaining/inspecting the cable holder, take an appropriate measure to keep the cable holder from moving. If not secured, the cable holder may suddenly move or fall down due to its dead weight, thereby causing injury.
- Firmly tighten the mounting bracket of the cable holder to prevent loosening. If the mounting bracket becomes loose, the entire system may be damaged.

Inspection

- Before commencing any maintenance or inspection work on the cable holder, be sure to turn off the power to the equipment and apply safety measures.



General

- For the cables and hoses to be stored in the cable holder, select those having excellent flexibility and wear resistance that will withstand friction and load from movement. Do not use cables and hoses with wire braid sheath, as they can get damaged easily.

© Copyright ORIENTAL MOTOR CO., LTD. 2009

• Please contact your nearest Oriental Motor office for further information.

ORIENTAL MOTOR U.S.A. CORP.
Technical Support Tel: (800) 468-3982
8:30 A.M. to 5:00 P.M., P.S.T. (M-F)
7:30 A.M. to 5:00 P.M., C.S.T. (M-F)
E-mail: techsupport@orientalmotor.com
www.orientalmotor.com

ORIENTAL MOTOR (EUROPA) GmbH
Headquarters and Düsseldorf Office
Tel: 0211-52067-00 Fax: 0211-52067-099
Munich Office
Tel: 089-3181225-00 Fax: 089-3181225-25
Hamburg Office
Tel: 040-76910443 Fax: 040-76910445

ORIENTAL MOTOR (UK) LTD.
Tel: 01256-347090 Fax: 01256-347099

ORIENTAL MOTOR (FRANCE) SARL
Tel: 01 47 86 97 50 Fax: 01 47 82 45 16

ORIENTAL MOTOR ITALIA s.r.l.
Tel: 02-93906346 Fax: 02-93906348

TAIWAN ORIENTAL MOTOR CO., LTD.
Tel: (02) 8228-0707 Fax: (02) 8228-0708

SINGAPORE ORIENTAL MOTOR PTE LTD
Tel: (6745) 7344 Fax: (6745) 9405

ORIENTAL MOTOR (MALAYSIA) SDN. BHD.
Tel: (03) 22875778 Fax: (03) 22875528

ORIENTAL MOTOR (THAILAND) CO., LTD.
Tel: 66-2-254-6113 Fax: 66-2-254-6114

INA ORIENTAL MOTOR CO., LTD.
KOREA
Tel: (032) 822-2042~3 Fax: (032) 819-8745

ORIENTAL MOTOR CO., LTD.
Headquarters Tokyo, Japan
Tel: (03) 3835-0684 Fax: (03) 3835-1890