



EZS Series **Slider**
EZC Series **Cylinder**

INSTALLATION MANUAL



Notes to the User

- This product must be handled by qualified personnel with expert knowledge of electrical and mechanical engineering. Before using the product, please read *Chapter 1, "Safety"*, carefully to ensure correct use.
- 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 a failure to observe this warning.
- Should you require the inspection or repair of internal parts, please contact the Oriental Motor branch or sales office from which you purchased the product.
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Introduction

Please read this “*Introduction*” section and familiarize yourself with the key aspects of the manual.

This section covers the following:

- Intended reader of the manual
- Purpose of the manual
- Receipt, storage and disposal of the product
- Product support by Oriental Motor
- Rules of notation used in the manual

Intended Reader of the Manual

This manual is intended for qualified personnel with expert knowledge of electrical and mechanical engineering.

Those in charge of the design, installation, wiring, maintenance and troubleshooting of EZS/EZC Series products should read this manual.

Purpose of the Manual

This manual explains the installation and maintenance procedures for EZS/EZC Series sliders and cylinders.

Receipt, Storage and Disposal of the Product

The customer should inspect the exterior of the equipment before accepting the product. Check the delivered product by verifying it against the specification on the order sheet. If the product is damaged, please contact the Oriental Motor branch or sales office from which you purchased the product.

Leave the product in the packing carton until immediately before installation. If the product is not to be used for an extended period of time, store it in a place that satisfies the following conditions:

- A clean place not subject to excessive humidity or salt
- A place away from direct sunlight
- An ambient temperature of 0°C to +50°C (+32°F to +122°F) (nonfreezing)
- A relative humidity of 85% or below (noncondensing)
- A place not exposed to corrosive gases
- A place not subject to continuous vibration

When disposing of the product, treat it as industrial waste.

Engage a certified waste-disposal service to carry out the disposal.

The product uses nickel-cadmium batteries. Dispose of the 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.

Product Support

Should you require any of the following services, please contact any Oriental Motor branch or sales office.

- Sales information and assistance for product selection
- Technical support regarding the product
- Warranty repair

Technical Assistance Regarding the Product

Should you require technical assistance from Oriental Motor, please call our Technical Support Line. So that we can promptly respond to your inquiry, please have the product model ready when you call.

Structure and Contents of This Manual

This manual serves as a user's guide for EZS/EZC Series sliders and cylinders. Operating any EZS/EZC Series slider or cylinder requires the controller supplied with the slider/cylinder, as well as the setup of an optional teaching pendant or data editing software and the programming of operating data. Please refer to the following manuals for the EZS/EZC Series, and follow the instructions:

- EZS/EZC Series Slider/Cylinder Installation Manual (this document)
- EZS/EZC Series Controller User Manual
This manual explains the installation, wiring, I/O, setting and troubleshooting of the controller.
- EZS/EZC Series Controller Data Setting Manual
This manual explains the process of creating operation data, setting parameters and performing troubleshooting using the teaching pendant.
- Teaching Pendant EZT1 User Manual
This manual explains the key layout of the teaching pendant.
- Data Editing Software EZED1
This manual explains the installation and operating method of the data editing software.

Contents of the Manual

This manual consists of chapters 1 through 6 and appendixes A and B. The table below gives a brief explanation of the content of each chapter and section. The rules of notation, as well as warnings and precautions specific to the sliders/cylinders, are also explained.

Chapter	Description
Chapter 1 Safety	Read this chapter carefully in order to understand the safety precautions. The information provided in this chapter is designed to ensure safety at the customer's site and protect the slider/cylinder against damage.
Chapter 2 Unpacking, Inspection and Storage	This chapter lists the items included in the slider/cylinder package and explains the basic inspection procedure to be performed prior to installation or storage.
Chapter 3 Slider/Cylinder Overview	This chapter explains the basic functions of the slider/cylinder and requirements regarding their use.
Chapter 4 Installation	This chapter explains how to install the slider/cylinder in the machine and affix a load and sensors to the slider/cylinder.
Chapter 5 Maintenance	This chapter explains the minimum maintenance required for the slider/cylinder.
Chapter 6 Repair	This chapter explains the warranty repair period and scope of repair for the slider/cylinder.
Appendix A Specifications	This section explains the specifications of the different sliders and cylinders.
Appendix B Optional Parts and Accessories	This section introduces the optional parts and accessories used with different sliders and cylinders.

Rules of Notation

The following symbols are used throughout this manual to indicate safety warnings, precautions, important notes and tips:



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 in certain situations to ensure correct use of the product.

Notation

The description of text in this manual follows the notation rules specified below:

- A sentence starting with a filled circle provides information, not an operating procedure.
- A sentence starting with a number indicates an operating procedure or a step in a procedure.
- Referenced titles are denoted in italics.
- Slider and cylinder models are sometimes abbreviated by using xx to represent the stroke, such as in “EVS4-xxM”.

Chapter 1 Safety

Read this manual before installing or wiring the slider/cylinder. By reading the manual you can better understand the installation methods and procedures and gain an understanding of how to operate the slider/cylinder both safely and effectively. Always observe the items listed under “*General Safety Guidelines*” on p. 1-3. Warnings and precautions specific to the slider/cylinder are explained in connection with the relevant items throughout this manual.

1.1 Safety Precautions

The EZS/EZC Series products are designed for use in an electrical system or machine as an internal component. During operation and immediately after the power supply is cut off, the parts continue to operate and remain hot, thus posing a risk of bodily injury or property damage.

It is prohibited to start the slider/cylinder (i.e., to operate the device in accordance with the specified purpose) when the machine does not satisfy any relevant 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.

1.2 Potential Dangers

Dangers that may arise in connection with the use of this product are as follows:

- Electric shock
- Electrical fire
- Danger posed by the machine
- Electromagnetic disturbance

These dangers must be controlled properly by providing safety design for the machine, adopting specific local regulations, and observing the standard safety guidelines and specific precautionary notes supplemental thereto. This product poses no danger associated with chemical products or radiation.

1.2.1 Electric Shock

To prevent electric shock, as the power supply for your EZS/EZC Series product use a DC power supply that passes the necessary tests and provides reinforced insulation on the primary and secondary sides.

1.2.2 Electrical Fire

Electrical fire can be avoided by conforming to the general procedures implemented in industrial power-equipment works. It is essential that appropriate qualified personnel conduct the electrical work. Please note that a safe distance must be ensured from the machine in which the slider/cylinder is installed, so that only appropriate qualified personnel can access the slider/cylinder.

1.2.3 Danger Posed by the Machine

Danger posed by the machine relates to unexpected movement of the slider table or cylinder rod in an uncontrolled situation. If the machine is subject to such an unexpected movement of parts, the slider/cylinder must be electrically disconnected from the controller using an appropriate preventive measure whenever the operating part of the machine is to be accessed by a person. Note that the mounting parts of the slider/cylinder must under all circumstances not be loose.

Provide a safety measure external to the controller so that the entire machine will operate safely when an abnormality occurs due to a failure in the slider/cylinder or controller, or due to any other external factor.

- The controller cuts off the motor's output current and stops the slider/cylinder when its protective function is actuated or upon the occurrence of a CPU error.
If the slider/cylinder is equipped with an electromagnetic brake, the electromagnetic brake is actuated in order to produce the necessary holding brake force. Provide a measure on the machine side so that it will operate safely if the slider/cylinder stops.

1.2.4 Electromagnetic Disturbance

Appropriate measures must be taken to suppress the EMI (Electromagnetic Interference) caused by the slider/cylinder, controller and teaching pendant in the nearby control systems equipment and to address the EMS (Electromagnetic Susceptibility) of the slider/cylinder, controller and teaching pendant. Failure to do so may result in a serious impairment of the machine's performance.

Provide EMC (Electromagnetic Compatibility) measures when installing/wiring the product.

The safety precautions described above are by no means comprehensive. Please contact Oriental Motor concerning any question or problem you might have.

1.3 General Safety Guidelines

This section explains the general safety guidelines applicable to the EZS/EZC Series. Safety information specific to the slider/cylinder is provided in connection with the relevant items throughout the manual.

To prevent bodily injury, please observe the following points.



Warning

- 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.
- Always turn off the power supply before connecting or disconnecting the product to/from the machine. 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 slider/cylinder operation is continued without removing the cause, the controller may malfunction and cause injury or equipment damage.
- Always turn off the power supply to the controller before performing maintenance or repair of the machine. Failure to do so may result in injury.
- Do not disassemble or modify the slider/cylinder. When maintaining the slider, do not disassemble parts other than those specified in this manual. Doing so may result in injury.
- When the product is used in a lifting application, choose a type equipped with an electromagnetic brake. Without an electromagnetic brake the slider/cylinder 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 slider/cylinder position. Failure to observe this precaution may result in injury or equipment damage.
- If the product is of the absolute type, perform a return-to-home operation or absolute positioning operation immediately after recovery of the power supply. Failure to do so may result in injury or equipment damage.
- If an incremental positioning operation is performed immediately after recovery of the power supply, the following accidents may occur:
 - If the moving part of the slider/cylinder has shifted during the battery backup period due to an external force, the new position of the moving part will be recognized as the origin in the positioning operation and the stopping position will deviate accordingly.



Caution

- Do not use the slider/cylinder and controller beyond their specified values. Doing so may result in injury or equipment damage.
- No one should come close to the slider/cylinder beyond the safety distance, except for qualified personnel. To do so may result in injury.
- When transporting the slider/cylinder, do so by holding the body of the slider/cylinder. Holding the slider/cylinder by the cables, table or rod may result in injury.
- Do not supply power to the machine when the slider/cylinder covers are not installed in their specified positions. Doing so may result in electric shock or injury.
- Do not touch the table or rod while the slider/cylinder is in operation. To do so may result in injury.
- Connect the slider/cylinder cables to the appropriate connectors on the controller. Failure to do so may result in equipment damage.

- **Precautionary note on emergency stop**

When the emergency stop button on the teaching pendant is pressed or an EMG input to the controller is detected, the controller cuts off the motor's output current and stops the motor. If the slider/cylinder 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 table or rod is likely to contact other equipment during this period, provide a safety mechanism on the machine side. Failure to do so may result in injury or equipment damage.

- **Precautionary note on static electricity**

Static electricity may cause the controller to malfunction or sustain damage. Do not touch the controller while the power is being supplied. When adjusting the controller's axis-number setting switch, brake-release switch, pendant switch or DIP switches while the power supply is active, always use an insulated screwdriver.

Chapter 2 Unpacking, Inspection and Storage

This chapter explains the receiving procedures that must be carried out in order to ensure that the slider/cylinder will function as specified.

These procedures include the following:

- Unpacking the EZS/EZC Series slider/cylinder
- Inspecting the slider/cylinder for damage sustained during shipment
- Checking the combination of slider/cylinder and controller
- Storage guidelines for the slider/cylinder

2.1 Unpacking the Slider/Cylinder

Each EZS/EZC Series product comes with a slider or cylinder and a controller packed in the same carton.

1. Remove the EZS/EZC Series slider/cylinder from the shipping carton and remove all packing materials from around the product. You may keep the packing materials and shipping carton for storage or shipment of the slider/cylinder at a later time.
2. Check all items in the carton against the packing list. The nameplate on the product indicates the following information:
 - Product model
 - Serial number
 - Manufacture date code

Packing list

EZS Series

- | | |
|--|---|
| ● Slider 1 unit | ● Hexagonal socket-head screw 4 pcs. (M5)* |
| ● Controller 1 unit | ● I/O connector (plug) 1 set |
| ● Installation manual 1 copy (this document) | ● Power cable 1 pc. |
| ● User manual for controller 1 copy | ● Battery 1 pc. (absolute type only) |
| ● Data setting manual for controller 1 copy | ● Battery holder 2 pc. (absolute type only) |

*EZS4 and EZS6 only

EZC Series

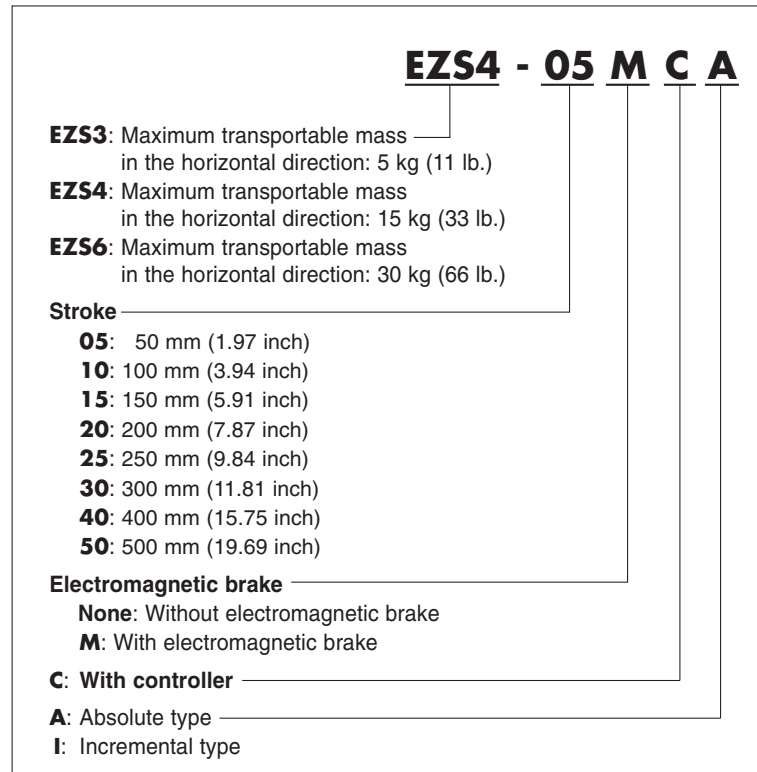
- | | |
|--|---|
| ● Cylinder 1 unit | ● Hexagonal nut 1 pc. |
| ● Controller 1 unit | ● I/O connector (plug) 1 set |
| ● Installation manual 1 copy (this document) | ● Power cable 1 pc. |
| ● User manual for controller 1 copy | ● Battery 1 pc. (absolute type only) |
| ● Data setting manual for controller 1 copy | ● Battery holder 2 pc. (absolute type only) |

2.2 Explanation of Unit Model

The unit-model codes for the EZS/EZC Series are shown in figures 2-1 and 2-2. However, a given combination of these numbers and letters does not always provide a valid unit model. Refer to “*Combination List*” on p. A-1.

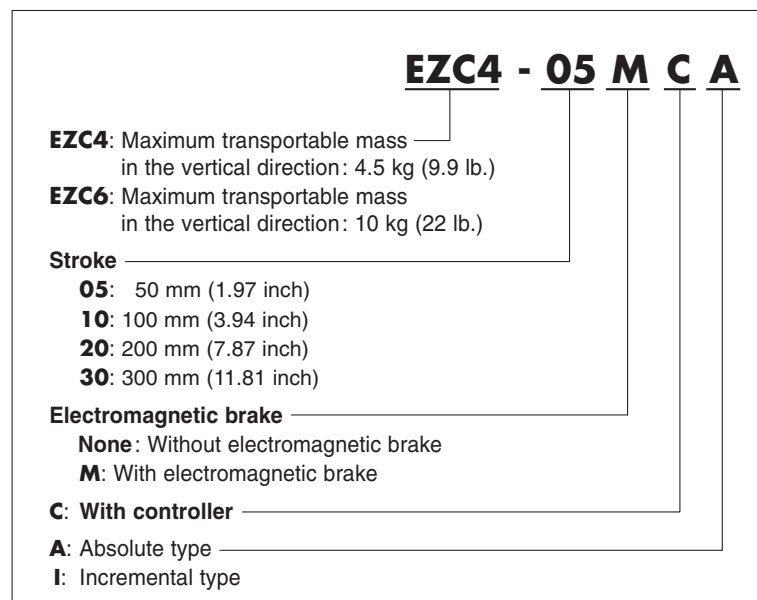
2.2.1 Slider

■ Figure 2-1 Unit Model of Slider



2.2.2 Cylinder

■ Figure 2-2 Unit Model of Cylinder



2.3 Inspection Procedure

It is recommended that you check the following points upon receipt of the product:

- Inspect the slider/cylinder for any physical damage sustained during shipment.
- Check the combination of the slider or cylinder and the controller.
- Check the slider/cylinder operation by conducting an operation test.

To check the combination, see “*Combination List*” on p. A-1 and check the unit model and corresponding models of individual slider/cylinder and controller.

If the product is found to be damaged during the unpacking process, or if the combination is wrong or the slider/cylinder does not operate properly when tested, please contact the Oriental Motor branch or sales office from which you purchased the product.

Report problems to Oriental Motor as soon as possible after your receipt of the product.

For the warranty period of the slider/cylinder and whether or not the applicable defect qualifies for a warranty repair, see “*Repair*” on p. 6-1.

2.4 Storing the Slider/Cylinder

Use the product packing materials to wrap the slider/cylinder and put it back into the shipping carton. Store the slider/cylinder in a place that satisfies the following conditions:

- A clean place not subject to excessive humidity or salt
- A place away from direct sunlight
- An ambient temperature of 0°C to +50°C (+32°F to +122°F) (nonfreezing)
- A relative humidity of 85% or below (noncondensing)
- A place not exposed to corrosive gases
- A place not subject to continuous vibration

Note

The slider and cylinder are pieces of precision equipment. The table, rod and ball screw are particularly vulnerable to damage during storage and installation, so do not subject those parts to excessive force. Further, do not hold the slider/cylinder by the cables, table or rod when transporting it. The accuracy of the product may be reduced if the slider/cylinder is not handled with care. Applying sudden impact or unnecessary force to the slider/cylinder may also result in a damaged bearing or ball screw.

Chapter 3 Slider/Cylinder Overview

This chapter explains the basic slider/cylinder functions and operating requirements that must be understood and observed in order to ensure correct use of the slider/cylinder.

3.1 Slider

The EZS Series slider is a ball-screw-drive type slider that uses a stepping motor with an encoder as its power unit. The resolution of the slider table is 0.015 mm (0.0006 inch), and the table moves 12 mm (0.47 inch) per revolution of the motor.

The encoder constantly feeds back the table position to the controller. The controller monitors the encoder signal and controls the motor so as to prevent any deviation in the table position. There are two controller types: the incremental type and absolute type. If your controller is of the incremental type, return the table to the home position after power is input.

The slider's limit stroke range is set by the controller's softlimits. The motor stops once the set softlimits are exceeded.

The encoder has a built-in temperature sensor to prevent damage to the encoder or motor due to an abnormal increase in motor temperature. Since the allowable temperature of the encoder is lower than that of the motor, the temperature inside the encoder is detected.

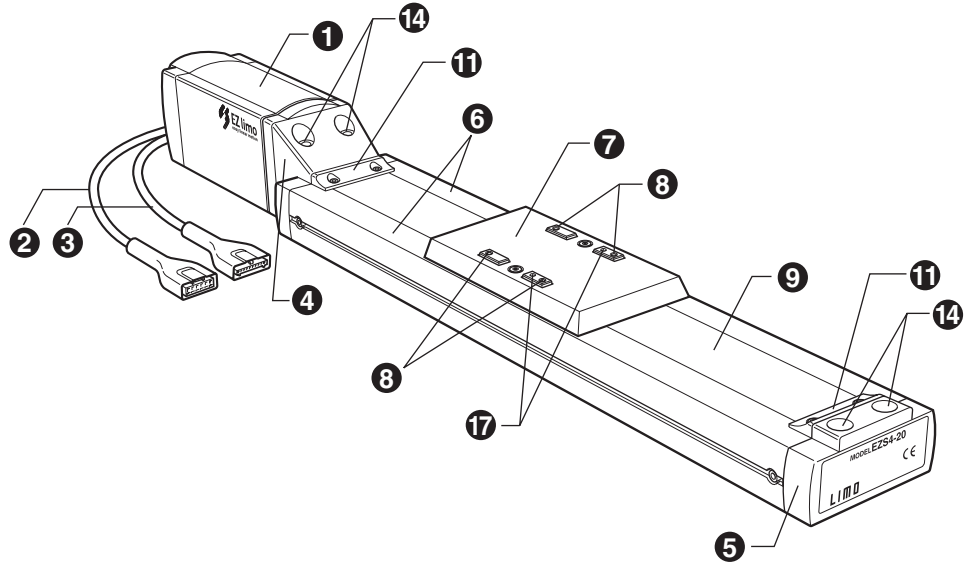
Sliders equipped with electromagnetic brakes are available to provide a holding brake function.

The electromagnetic brake is released when the power is supplied to the controller, and is actuated (producing a holding brake force) when an EMG input is detected or a protective function is actuated.

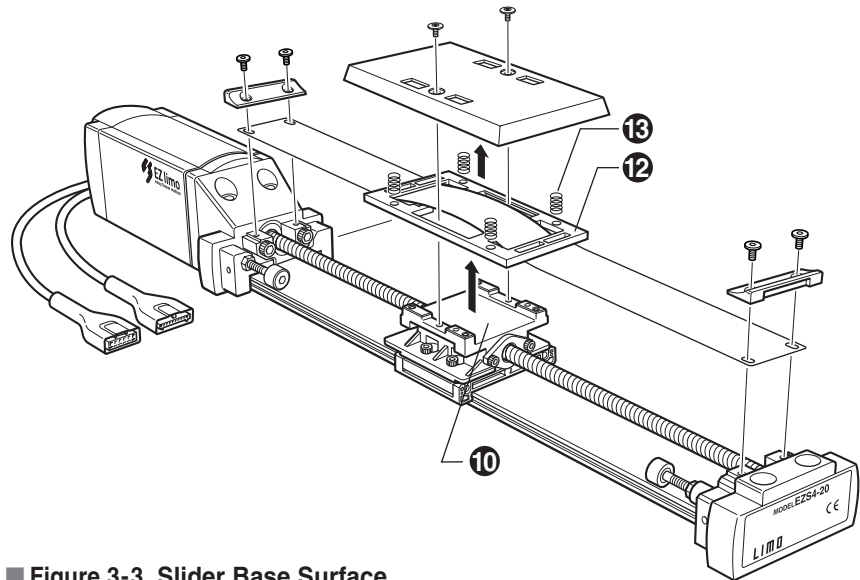
3.1.1 Slider Functions

The function of each slider part is illustrated in figures 3-1, 3-2 and 3-3 and Table 3-1. Illustration shows the EZS4.

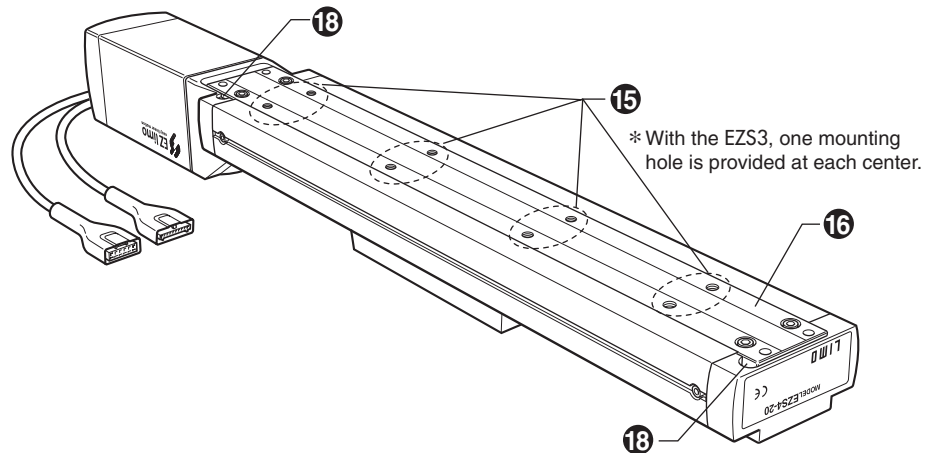
■ Figure 3-1 Slider



■ Figure 3-2 Slider (table cover and side covers removed)



■ Figure 3-3 Slider Base Surface



■ Table 3-1 Slider Functions

No.	Name	Function									
①	Power unit	Houses a stepping motor with encoder or a stepping motor with encoder and electromagnetic brake.									
②	Motor cable	A cable of 7.2 mm (0.28 inch) in outer diameter and 250 mm (9.84 inch) in length. The connector (plug) on the cable end connects to the controller.									
③	Encoder cable	A cable of 7.7 mm (0.30 inch) in outer diameter and 250 mm (9.84 inch) in length. The connector (plug) on the cable end connects to the controller.									
④	Bracket										
⑤	Flange										
⑥	Side cover	A sensor set (optional) can be installed.									
⑦	Top cover	A protective cover for the table.									
⑧	Load mounting holes	Used to install a load onto the table. The applicable thread sizes are shown in Table 3-2.									
		<table border="1"> <thead> <tr> <th colspan="2">■ Table 3-2 Thread Size</th> </tr> <tr> <th>Slider</th> <th>Thread size</th> </tr> </thead> <tbody> <tr> <td>EZS3</td> <td rowspan="2">4-M4 P0.7 tap hole</td> </tr> <tr> <td>EZS4</td> </tr> <tr> <td>EZS6</td> <td>4-M5 P0.8 tap hole</td> </tr> </tbody> </table>	■ Table 3-2 Thread Size		Slider	Thread size	EZS3	4-M4 P0.7 tap hole	EZS4	EZS6	4-M5 P0.8 tap hole
■ Table 3-2 Thread Size											
Slider	Thread size										
EZS3	4-M4 P0.7 tap hole										
EZS4											
EZS6	4-M5 P0.8 tap hole										
⑨	Stainless sheet	A protective cover for the mechanical part of the slider. Re-tension the sheet if slack is observed after operation.									
⑩	Table	Has a resolution of 0.015 mm (0.0006 inch) and moves 12 mm (0.47 inch) per revolution of the motor.									
⑪	Sheet retainer	Secures the stainless sheet.									
⑫	Sheet holder	Lifts and holds the stainless sheet in order to assist with table movement.									
⑬	Coil spring	Supports the sheet holder and assists with table movement.									
⑭*	Mounting hole [4- \varnothing 5.5 mm (\varnothing 0.22 inch)]	Through-holes used to install the slider from the table side.									
⑮	Mounting hole	Tap holes used to install the slider from the base side. The number of holes varies, depending on the stroke. The applicable thread sizes are shown in Table 3-3.									
		<table border="1"> <thead> <tr> <th colspan="2">■ Table 3-3 Thread Size</th> </tr> <tr> <th>Slider</th> <th>Thread size</th> </tr> </thead> <tbody> <tr> <td>EZS3</td> <td>M4 P0.7 tap hole</td> </tr> <tr> <td>EZS4</td> <td rowspan="2">M5 P0.8 tap hole</td> </tr> <tr> <td>EZS6</td> </tr> </tbody> </table>	■ Table 3-3 Thread Size		Slider	Thread size	EZS3	M4 P0.7 tap hole	EZS4	M5 P0.8 tap hole	EZS6
■ Table 3-3 Thread Size											
Slider	Thread size										
EZS3	M4 P0.7 tap hole										
EZS4	M5 P0.8 tap hole										
EZS6											
⑯	Base	The slider installation surface.									
⑰	Positioning pinhole	These holes help maintain positional repeatability when the work must be removed and then installed again for the purpose of maintenance, etc.									
⑱	Mounting reference surface	These surfaces help maintain positional repeatability when the slider must be removed and then installed again for the purpose of maintenance, etc.									

*EZS4 and EZS6 only

3.2 Cylinder

The EZC Series cylinder is a ball-screw-drive type cylinder that uses a stepping motor with an encoder as its power unit. The resolution of the cylinder rod is 0.015 mm (0.0006 inch), and the rod moves 12 mm (0.47 inch) per revolution of the motor.

The encoder constantly feeds back the rod position to the controller. The controller monitors the encoder signal and controls the motor so as to prevent any deviation in the rod position. There are two controller types: the incremental type and absolute type. If your controller is of the incremental type, return the rod to the home position after power is input.

The cylinder's limit stroke range is set by the controller's softlimits. The motor stops once the set softlimits are exceeded.

The encoder has a built-in temperature sensor to prevent damage to the encoder or motor due to an abnormal increase in motor temperature. Since the allowable temperature of the encoder is lower than that of the motor, the temperature inside the encoder is detected.

Cylinders equipped with electromagnetic brakes are available to provide a holding brake function.

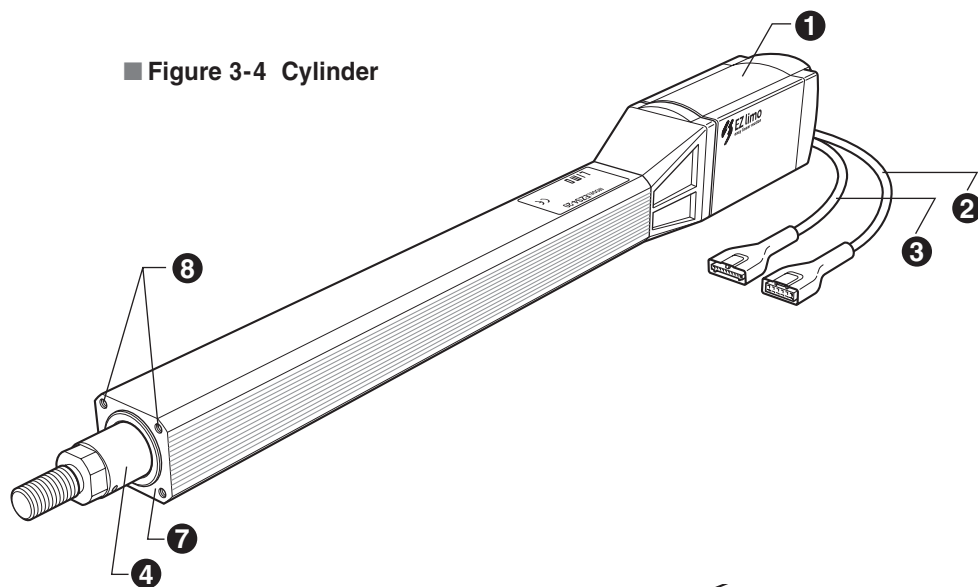
The electromagnetic brake is released when the power is supplied to the controller, and is actuated (producing a holding brake force) when an EMG input is detected or a protective function is actuated.

The cylinder can be used for a push-motion operation, in which the load is pushed with a fixed thrust force. In this mode, the load is pushed continuously for the distance set by the push distance.

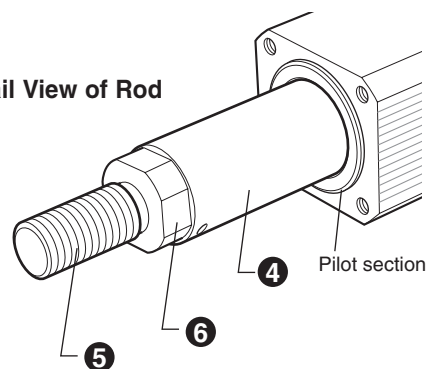
3.2.1 Cylinder Functions

The function of each cylinder part is illustrated in figures 3-4 and 3-5 and Table 3-3.

■ Figure 3-4 Cylinder



■ Figure Figure 3-5 Detail View of Rod



■ Table 3-4 Cylinder Functions

No.	Name	Function									
①	Power unit	Houses a stepping motor with encoder or a stepping motor with encoder and electromagnetic brake.									
②	Motor cable	A cabtyre cable of 7.2 mm (0.28 inch) in outer diameter and 250 mm (9.84 inch) in length. The connector (plug) on the cable end connects to the controller.									
③	Encoder cable	A cabtyre cable of 7.7 mm (0.30 inch) in outer diameter and 250 mm (9.84 inch) in length. The connector (plug) on the cable end connects to the controller.									
④	Rod	The moving part of the cylinder. The rod has a resolution of 0.015 mm (0.0006 inch) and moves 12 mm (0.47 inch) per revolution of the motor.									
⑤	Male screw	Used to install a load onto the rod. The applicable thread sizes are shown in Table 3-5. <table border="1" data-bbox="1189 1077 1476 1216"> <caption>■ Table 3-5 Thread Size</caption> <thead> <tr> <th>Cylinder</th> <th>Thread size</th> </tr> </thead> <tbody> <tr> <td>EZC4</td> <td>M14</td> </tr> <tr> <td>EZC6</td> <td>M18</td> </tr> </tbody> </table>	Cylinder	Thread size	EZC4	M14	EZC6	M18			
Cylinder	Thread size										
EZC4	M14										
EZC6	M18										
⑥	Wrench point	When affixing the load to the rod, apply a wrench to this area to prevent turning torque from being applied to the rod.									
⑦	Flange	The cylinder installation surface. Pilot sections of the dimensions shown in Table 3-6 are provided as guides for engagement. <table border="1" data-bbox="895 1458 1476 1659"> <caption>■ Table 3-6 Dimensions of Pilot Section</caption> <thead> <tr> <th>Cylinder</th> <th>Outer diameter [mm (inch)]</th> <th>Height [mm (inch)]</th> </tr> </thead> <tbody> <tr> <td>EZC4</td> <td>$35^{+0.061}_{+0.034} \left(1.378^{+0.0024}_{+0.0013} \right)$</td> <td>2 (0.08)</td> </tr> <tr> <td>EZC6</td> <td>$48^{+0.069}_{+0.034} \left(1.890^{+0.0027}_{+0.0013} \right)$</td> <td>2 (0.08)</td> </tr> </tbody> </table>	Cylinder	Outer diameter [mm (inch)]	Height [mm (inch)]	EZC4	$35^{+0.061}_{+0.034} \left(1.378^{+0.0024}_{+0.0013} \right)$	2 (0.08)	EZC6	$48^{+0.069}_{+0.034} \left(1.890^{+0.0027}_{+0.0013} \right)$	2 (0.08)
Cylinder	Outer diameter [mm (inch)]	Height [mm (inch)]									
EZC4	$35^{+0.061}_{+0.034} \left(1.378^{+0.0024}_{+0.0013} \right)$	2 (0.08)									
EZC6	$48^{+0.069}_{+0.034} \left(1.890^{+0.0027}_{+0.0013} \right)$	2 (0.08)									
⑧	Mounting hole	Tapped holes used to install the cylinder from the rod side. Install an optional cylinder flange when installing the cylinder from the side opposite the rod. The applicable thread sizes are shown in Table 3-7. <table border="1" data-bbox="1121 1854 1476 1995"> <caption>■ Table 3-7 Thread Size</caption> <thead> <tr> <th>Cylinder</th> <th>Thread size</th> </tr> </thead> <tbody> <tr> <td>EZS4</td> <td>4-M5 P0.8 tap hole</td> </tr> <tr> <td>EZS6</td> <td>4-M6 P1 tap hole</td> </tr> </tbody> </table>	Cylinder	Thread size	EZS4	4-M5 P0.8 tap hole	EZS6	4-M6 P1 tap hole			
Cylinder	Thread size										
EZS4	4-M5 P0.8 tap hole										
EZS6	4-M6 P1 tap hole										

3.3 Operating Requirements

3.3.1 Maximum Thrust Force

Operate the slider/cylinder so that the sum of the load thrust force and external force does not exceed the maximum thrust force. The slider/cylinder may be damaged if operated under a load exceeding the maximum thrust force, or when the table or rod remains locked for a prolonged period.

3.3.2 Allowable Overhang Length

Operate the slider within the allowable overhang length. The slider's service life may be reduced if the slider is operated continuously at an overhang exceeding the allowable value.

Use a linear guide or similar mechanism to prevent loads other than those in the axial direction from being applied to the cylinder rod.

3.3.3 Maximum Acceleration

Start and stop the slider/cylinder at a rate of acceleration that is within the maximum limit. The slider/cylinder may be damaged if operated at a rate exceeding the maximum limit of acceleration.

3.3.4 Temperature Range and Maximum Load Weight

The load weight of the slider/cylinder decreases as the speed increases. Operate the slider/cylinder within a maximum load weight appropriate for a given speed range.

Chapter 4 Installation

This chapter explains how to install the slider/cylinder and install a load.



Warning

- To prevent injury, turn off the power supply to the controller before installing the product to the machine or wiring the product.
- To prevent injury or equipment damage, strictly observe the following items when carrying a vertical load using the slider/cylinder:
 - Always use a slider/cylinder with an electromagnetic brake. If the slider/cylinder is not equipped with an electromagnetic brake, the load will drop when the power is cut off, upon an emergency stop or when an alarm is generated.
 - Always set the brake-release switch on the controller to “ON”. If this switch is set to “OFF”, the load cannot be held by the electromagnetic brake and will drop upon an emergency stop or when an alarm is generated.
 - Do not perform direct teaching. Doing so causes the load to drop due to a loss of holding force of the motor and electromagnetic brake.
 - Do not activate the controller’s C.OFF input. To do so will cause the load to drop.

4.1 Required Installation Conditions

- Install the slider/cylinder onto a flat metal surface satisfying the following conditions:

Vibration:	Not subject to continuous vibration or excessive shock
Altitude:	1000 m (3280 ft.) or below
Temperature:	0°C to +40°C (+32°F to +104°F) (nonfreezing)
Humidity:	85% or below (noncondensing)
Atmosphere:	Indoor Free from explosive or toxic gases (e.g., sulfuric gas) or liquids Free from contact with water or oil Away from direct sunlight Not exposed to air with high salt content
Installation condition:	Built-in component Overvoltage category: I Pollution degree: 2 Protection against electric shock: Class III equipment

4.2 Installing the Slider

Install the slider onto a flat metal plate providing excellent vibration resistance. Adjust the flatness of the metal plate to 0.06 mm (0.002 inch) or less [EVS3: 0.035 mm (0.001 inch) or less] per 200 mm (7.87 inch). If the flatness is insufficient, the slider’s mounting surface may become deformed, resulting in noise or a reduction in service life.

Slider mounting holes are provided in both the table surface and base surface. If a large inertial moment is applied to the slider body or when the slider is wall-mounted or installed vertically or upside down, we recommend that you follow the procedure specified in 4.2.2, “Installing from the Base Surface”. Select an appropriate installation method in accordance with the application.



Caution

- To prevent fire, do not place flammable objects around the slider/cylinder.
- To prevent injury or equipment damage, secure the slider/cylinder using the specified installation method.

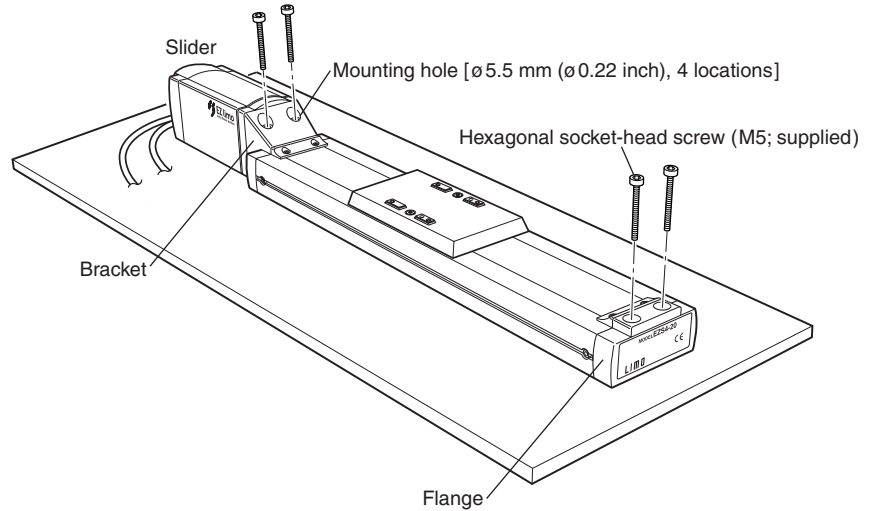
4.2.1 Installing from the Table Surface

Affix the slider to the mounting plate using the supplied hexagonal socket-head screws (M5 x 4 pcs.) and the mounting holes (through-holes) provided in the slider bracket and flange.

Figure 4-1 shows the slider installation method.

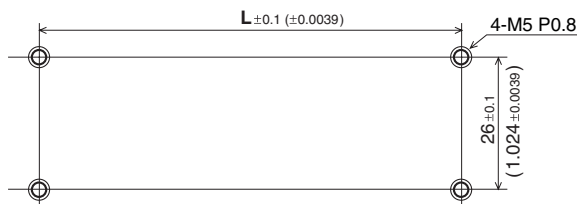
Figure 4-2 shows the slider's installation dimensions.

■ Figure 4-1 Installation Method



Slider	Thread size	Across-flats size of wrench	Tightening torque	Mounting plate thickness and material
EZS4-xxM	M5 P0.8	4 mm (0.16 inch)	5 N·m (710 oz-in)	5 mm (0.20 inch) or thicker iron plate
EZS4-xx				10 mm (0.40 inch) or thicker aluminum plate
EZS6-xxM	M5 P0.8	4 mm (0.16 inch)	5 N·m (710 oz-in)	5 mm (0.20 inch) or thicker iron plate
EZS6-xx				10 mm (0.40 inch) or thicker aluminum plate

■ Figure 4-2 Installation Dimensions Unit: mm (inch)



Slider		L	Slider		L
EZS4-05M	EZS4-05	242 (9.528)	-		-
EZS4-10M	EZS4-10	292 (11.496)	EZS6-10M	EZS6-10	342 (13.465)
EZS4-15M	EZS4-15	342 (13.465)	EZS6-15M	EZS6-15	392 (15.433)
EZS4-20M	EZS4-20	392 (15.433)	EZS6-20M	EZS6-20	442 (17.402)
EZS4-25M	EZS4-25	442 (17.402)	EZS6-25M	EZS6-25	492 (19.370)
EZS4-30M	EZS4-30	492 (19.370)	EZS6-30M	EZS6-30	542 (21.339)
EZS4-40M	EZS4-40	592 (23.307)	EZS6-40M	EZS6-40	642 (25.276)
EZS4-50M	EZS4-50	692 (27.244)	EZS6-50M	EZS6-50	742 (29.213)

4.2.2 Installing from the Base Surface

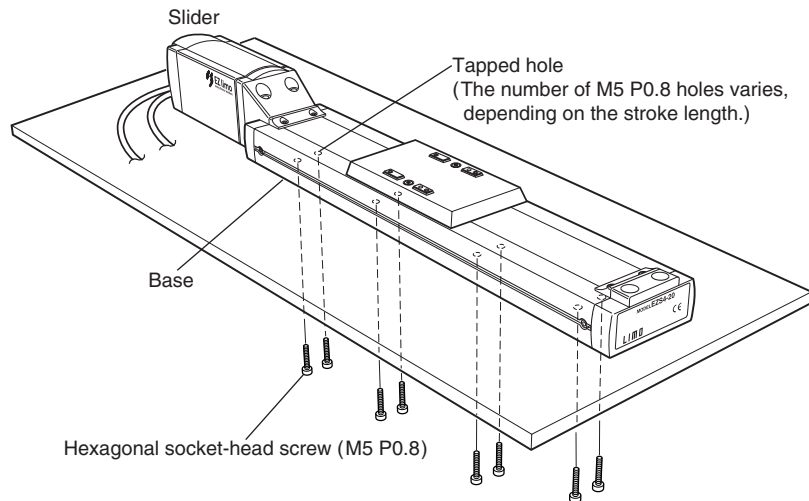
Affix the slider to the mounting plate using hexagonal socket-head screws (not supplied) and the tapped holes provided in the slider base.

Figure 4-3 shows the slider installation method.

Figure 4-4 shows the slider's installation dimensions.

■ Figure 4-3 Installation Method

Illustration shows the EZS4.



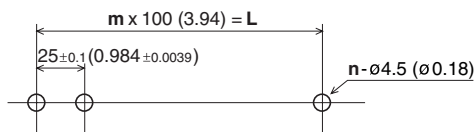
Note

The length of engagement of the slider's mounting screw with the slider tapped hole must not exceed 6 mm (0.24 inch) [EZS3: 5 mm (0.20 inch)]. Contact with the slider body may occur if the engagement length exceeds 6 mm (0.24 inch) [EZS3: 5 mm (0.20 inch)], resulting in a malfunction or damage.

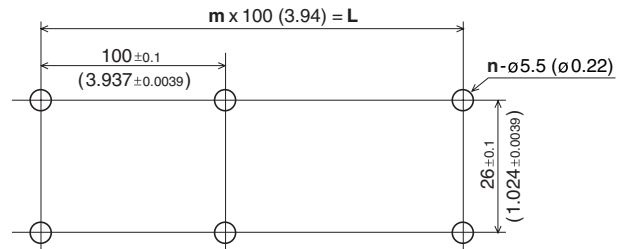
Slider	Thread size	Across-flats size of wrench	Tightening torque	Mounting plate thickness and material
EZS3-xxM	M4 P0.7	3 mm (0.12 inch)	2.4 N·m (341 oz-in)	5 mm (0.20 inch) or thicker iron plate, or 10 mm (0.40 inch) or thicker aluminum plate
EZS3-xx	Effective depth: 5 mm (0.20 inch)			
EZS4-xxM	M5 P0.8	4 mm (0.16 inch)	5 N·m (710 oz-in)	5 mm (0.20 inch) or thicker iron plate, or 10 mm (0.40 inch) or thicker aluminum plate
EZS4-xx				
EZS6-xxM				
EZS6-xx				

■ Figure 4-4 Installation Dimensions Unit: mm (inch) except for n and m

● EZS3



● EZS4, EZS6



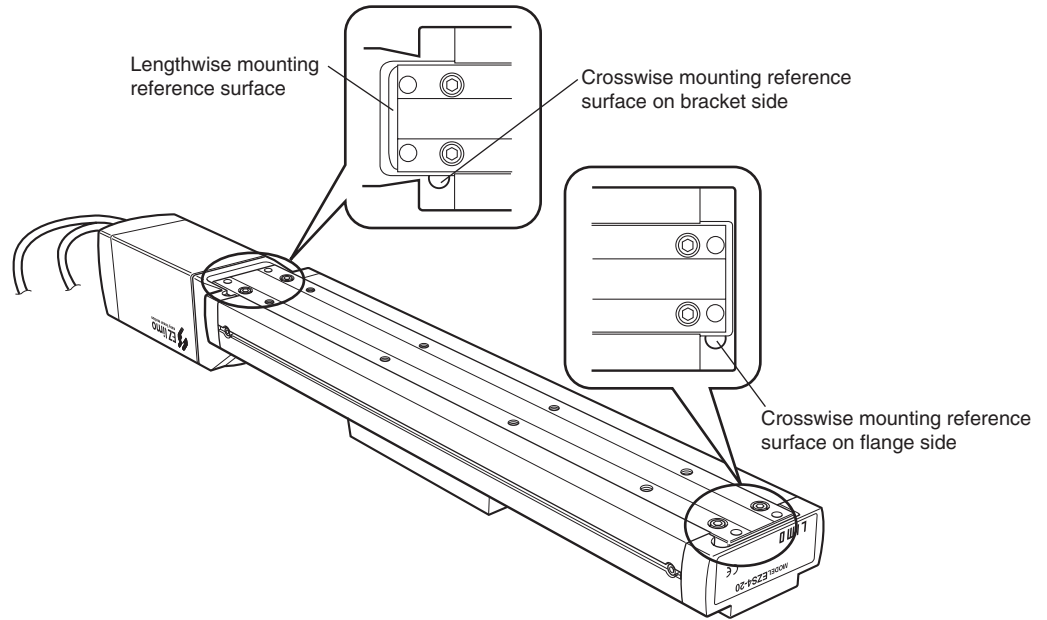
Slider	L	n	m	Slider	L	n	m	Slider	L	n	m			
EZS3-05M	EZS3-05	100 (3.94)	5	1	EZS4-05M	EZS4-05	100 (3.94)	4	1	—	—	—		
EZS3-10M	EZS3-10	150 (5.91)	7	1.5	EZS4-10M	EZS4-10	200 (7.88)	6	2	EZS6-10M	EZS6-10	200 (7.88)	6	2
EZS3-15M	EZS3-15	200 (7.88)	9	2	EZS4-15M	EZS4-15	200 (7.88)	6	2	EZS6-15M	EZS6-15	300 (11.82)	8	3
EZS3-20M	EZS3-20	250 (9.85)	11	2.5	EZS4-20M	EZS4-20	300 (11.82)	8	3	EZS6-20M	EZS6-20	300 (11.82)	8	3
EZS3-25M	EZS3-25	300 (11.82)	13	3	EZS4-25M	EZS4-25	300 (11.82)	8	3	EZS6-25M	EZS6-25	400 (15.76)	10	4
EZS3-30M	EZS3-30	350 (13.78)	15	3.5	EZS4-30M	EZS4-30	400 (15.76)	10	4	EZS6-30M	EZS6-30	400 (15.76)	10	4
EZS3-40M	EZS3-40	450 (17.72)	19	4.5	EZS4-40M	EZS4-40	500 (19.70)	12	5	EZS6-40M	EZS6-40	500 (19.70)	12	5
EZS3-50M	EZS3-50	550 (21.66)	23	5.5	EZS4-50M	EZS4-50	600 (23.64)	14	6	EZS6-50M	EZS6-50	600 (23.64)	14	6

4.2.3 How to Use the Mounting Reference Surfaces

Use the “mounting reference surfaces” provided on the slider base to ensure positional repeatability when the slider must be removed and then installed again for purposes of maintenance, etc.

Figure 4-5 shows the positions of the mounting reference surfaces.

■ **Figure 4-5 Positions of Mounting Reference Surfaces**



Crosswise Positioning

Drive positioning pins into the slider installation surface until the pins contact the notch located on the flange/bracket side.

Lengthwise Positioning

Drive positioning pins into the slider installation surface until the pins contact the notch located on the bracket side.

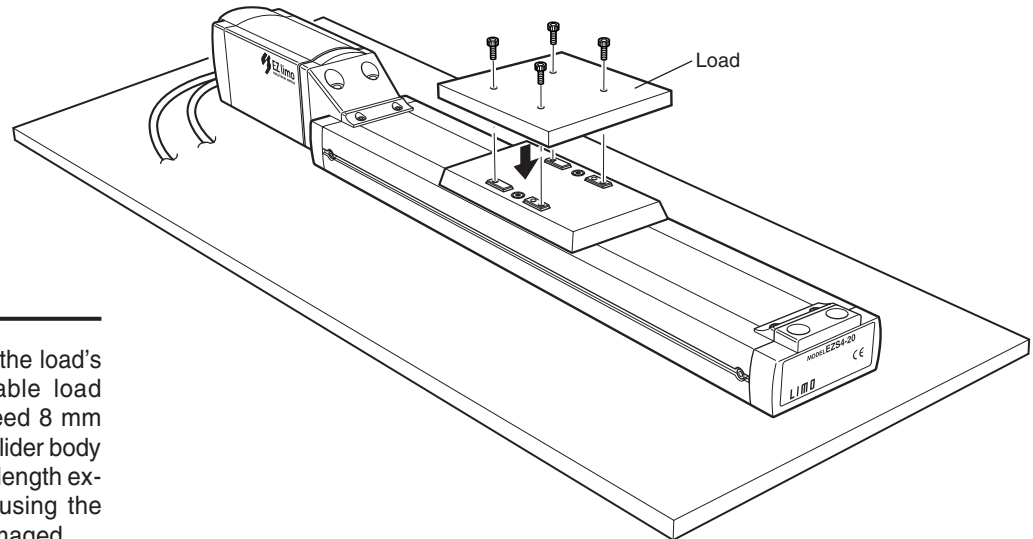
4.2.4 Affixing a Load to the Table

Install a load using the load mounting holes provided in the table (four locations) and screws (not supplied).

Figure 4-6 shows the load installation method.

Figure 4-7 shows the load's installation dimensions.

■ Figure 4-6 Installation Method

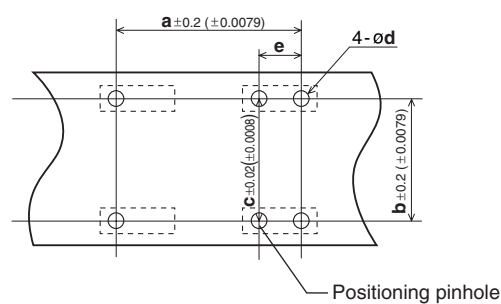


Note

The length of engagement of the load's mounting screw with the table load mounting hole must not exceed 8 mm (0.32 inch). Contact with the slider body may occur if the engagement length exceeds 8 mm (0.32 inch), causing the load mounting hole to be damaged.

Slider	Mounting screw	Tightening torque
EZS3-xxM	M4 P0.7 Effective depth: 8 mm (0.315 inch)	2.4 N·m (340.8 oz-in)
EZS3-xx		
EZS4-xxM		
EZS4-xx		
EZS6-xxM	M5 P0.8 Effective depth: 8 mm (0.315 inch)	5 N·m (710 oz-in)
EZS6-xx		

■ Figure 4-7 Installation Dimensions Unit: mm (inch)



Note

- Always fix the positioning pins to the load side. Driving the pin into the table will generate an impact or excessive moment, which may damage the ball screw.
- Use the positioning pin only when removing and reinstalling a given load to/from the same product. The positioning pinholes vary from one product to another.

Slider	a	b, c	d	e
EZS3-xxM	24	27	4.5	5
EZS3-xx	(0.945)	(1.063)	(0.18)	(0.19)
EZS4-xxM	42	46	4.5	8
EZS4-xx	(1.654)	(1.811)	(0.18)	(0.31)
EZS6-xxM	75	46	5.5	15
EZS6-xx	(2.953)	(1.811)	(0.22)	(0.59)

4.2.5 Installing the Sensors

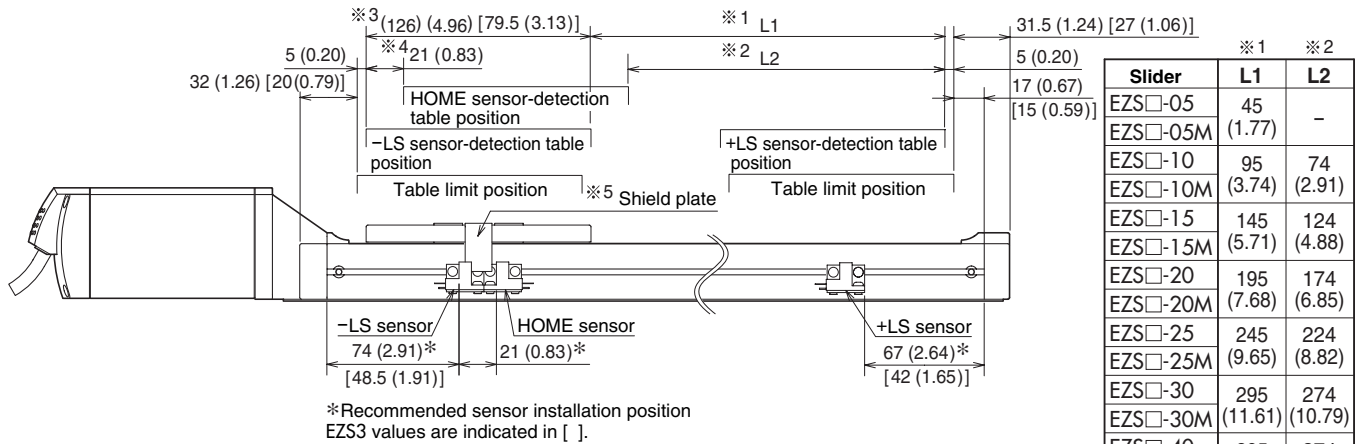
Install the sensors included in the **PAEZ-S** sensor set in the slots provided in the side cover.

The sensors can be installed on either the right or left side cover of the slider.

Figure 4-8 shows the recommended sensor installation positions.

■ **Figure 4-8 Recommended Sensor Installation Positions** Unit: mm (inch)

● **EZS3, EZS4**



Note

Only two sensors can be installed on the EZS3-05, EZS3-05M, EZS4-05 and EZS4-05M.

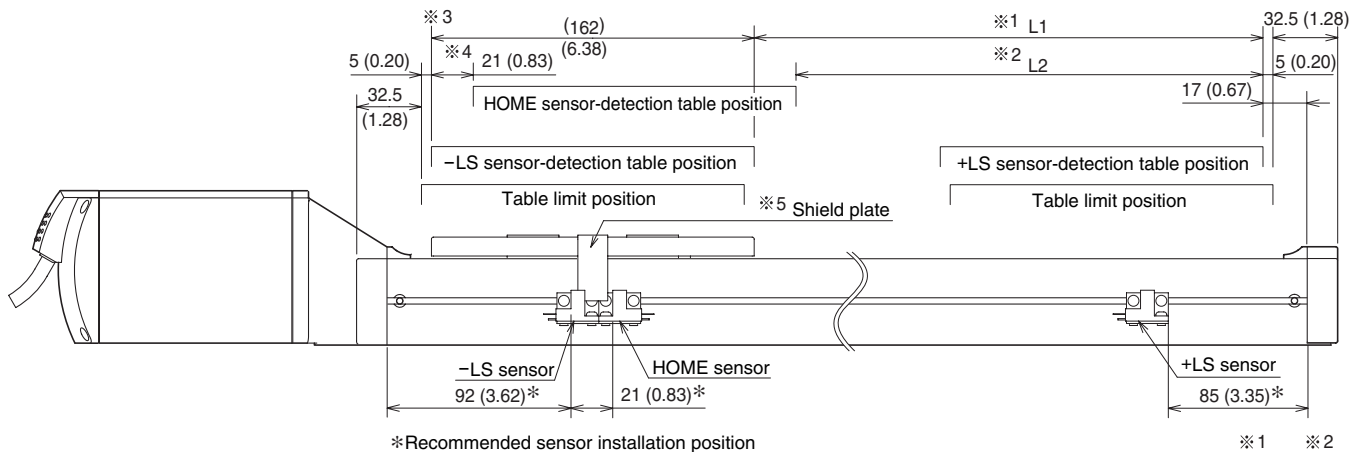
With these models, use the -LS sensor and +LS sensor.

- ※1 L1 indicates the effective stroke when two sensors are used.
- ※2 L2 indicates the effective stroke when three sensors are used.
The EZS3-05, EZS3-05M, EZS4-05 and EZS4-05M do not accommodate the use of three sensors.
- ※3 Home position when two sensors are used
- ※4 Home position when three sensors are used
- ※5 Install the shield plate onto the work.

[Use the two supplied mounting screws: M3 x 5 mm (0.20 inch)]

The square box in the slider will contain 3 or 4.

● **EZS6**



- ※1 L1 indicates the effective stroke when two sensors are used.
- ※2 L2 indicates the effective stroke when three sensors are used.
- ※3 Home position when two sensors are used
- ※4 Home position when three sensors are used
- ※5 Install the shield plate onto the work.

[Use the two supplied mounting screws: M3 x 5 mm (0.20 inch)]

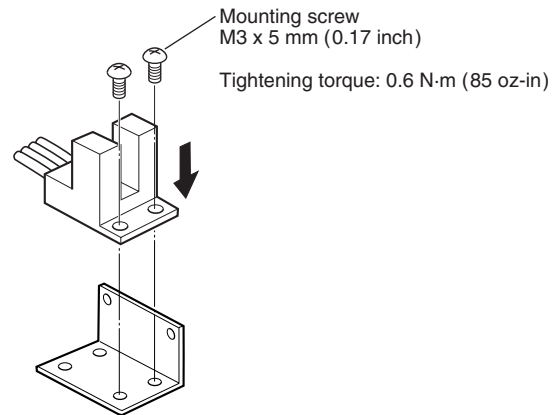


Caution

● To prevent injury or equipment damage, do not use the sensor set as a safety part.

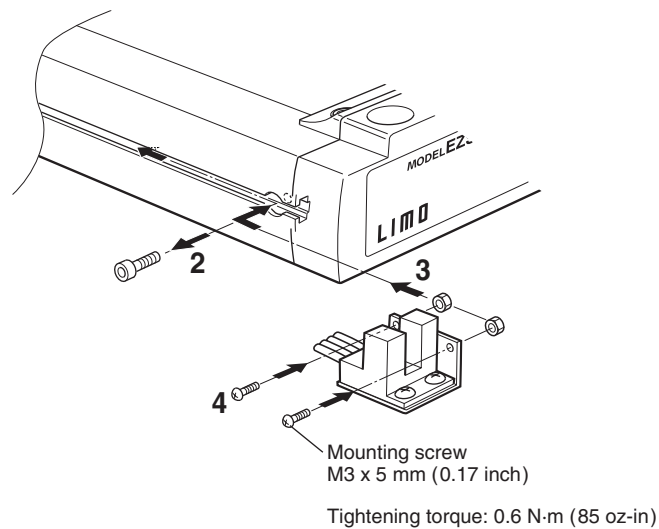
1. Install the sensor onto the sensor mounting bracket and affix it with screws.

■ Figure 4-9 Securing of Sensor to Sensor Mounting Bracket



2. Remove the mounting screw from the side cover on the flange side.
3. Install nuts in the slots located in the side cover.
4. Install screws [M3 x 5 mm (0.17 inch)] and nuts (M3) to the sensor mounting bracket.
Move the sensor to the recommended installation position and tighten the screws to secure the sensor in position.

■ Figure 4-10 Installation of Sensor

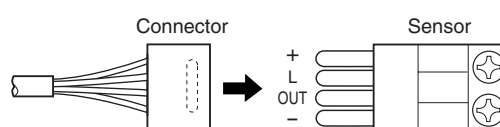


5. Tighten the mounting screw, which was earlier removed, onto the side cover.
6. Plug the connector with cable into the sensor.
Hold the connector with the tab facing down and insert it into the sensor terminal.

Note

- Do not install or remove the connector with cable while the power is being supplied. Doing so may damage the sensor.
- When removing the connector with a cable, do not pull it by the cables. Pull out the connector while pressing it firmly from the top and bottom.

■ Figure 4-11 Connection of Connector with Robot Cables

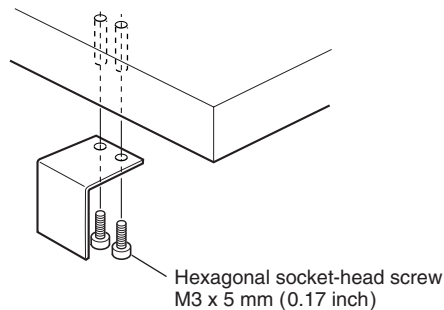


Sensor terminal	Lead color of connector with cable
+	Brown
L	Pink
OUT	Black
-	Blue

7. Install the shield plate onto the load.

Figure 4-13 shows the machining dimensions of the shield plate for installation.

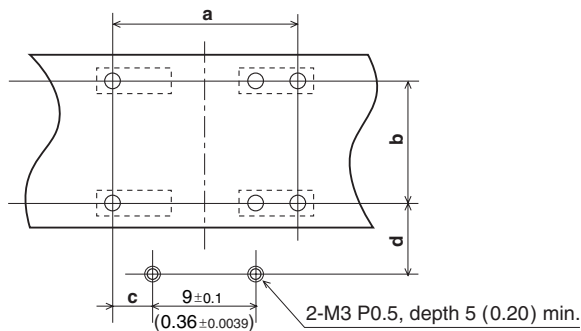
■ Figure 4-12 Installation of Shield Plate



Tightening torque: 0.8 N·m (113 oz-in)

■ Figure 4-13 Machining Dimensions of Shield Plate for Installation

Unit: mm (inch)



Note

- Always install the shield plate onto the load. The shield plate cannot be installed onto the slider.
- There are three types of shield plates: the EZS3 type, EZS4 type and EZS6 type. The two plates vary slightly in size. Always use a shield plate appropriate for the slider. Using a shield plate of an unmatched size may disable the sensor detection or damage the sensor due to contact between the shield plate and sensor.

Slider	a	b	c	d
EZS3-xxM	24	27	7.5	13.8
EZS3-xx	(0.94)	(1.06)	(0.30)	(0.54)
EZS4-xxM	42	46	16.5	18
EZS4-xx	(1.65)	(1.81)	(0.65)	(0.71)
EZS6-xxM	75	46	33	18
EZS6-xx	(2.95)	(1.81)	(1.30)	(0.71)

■ Figure 4-14 Sensor Setting Details

The **PAEZ-S** sensor set consists of the following parts:

Photomicrosensor 3 pcs.
EE-SX674A (Omron)

Connector with cables 3 pcs.
EE-1010-R (Omron)

Sensor mounting bracket 3 pcs.

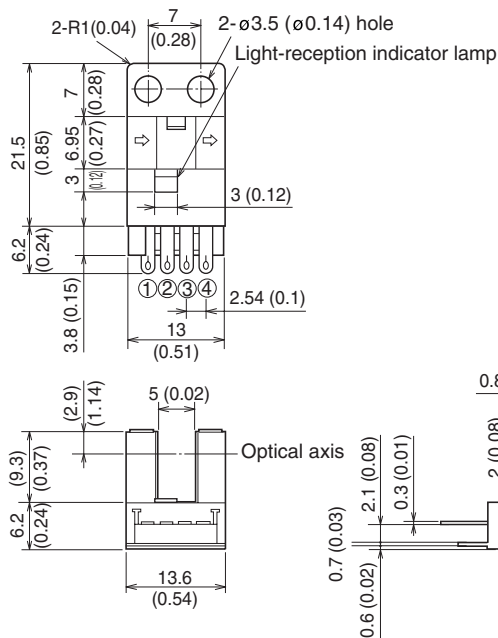
Shield plate 1 pc. each
(for EZS3, EZS4 and EZS6)

Nut (M3) 6 pcs.

Screw (M3) 12 pcs.

Hexagonal socket-head screw (M3) 2 pcs.

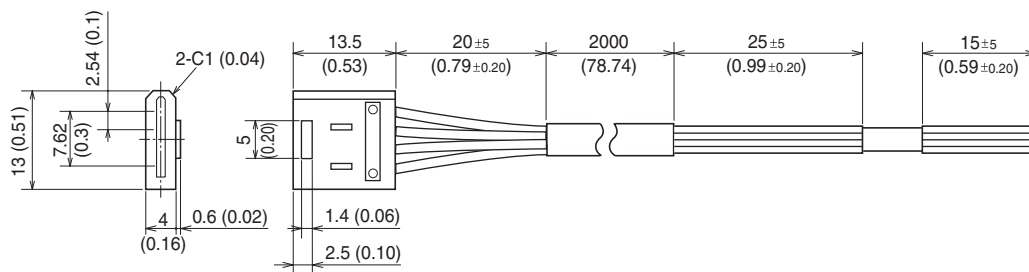
■ Figure 4-15 External View of Photomicrosensor Unit: mm (inch)



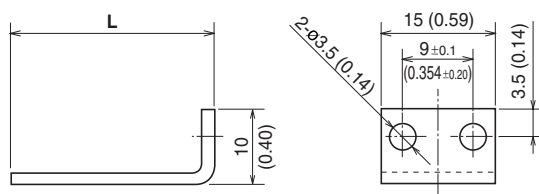
■ Terminal Arrangement

①	+	Vcc
②	L	L
③	OUT	OUTPUT
④	-	GND (0V)

■ Figure 4-16 External View of Connector with Cable Unit: mm (inch)



■ Figure 4-17 External View of Shield Plate Unit: mm (inch)



Slider	L
EZS3	29.5 (1.16)
EZS4	27 (1.06)
EZS6	33 (1.30)

4.3 Installing the Cylinder

Install the cylinder onto a flat metal plate providing excellent vibration resistance.



Warning

- When performing a push-motion operation, confirm that the thrust force achieved with the set push current is sufficient to perform the push-motion operation properly without causing the load to drop.

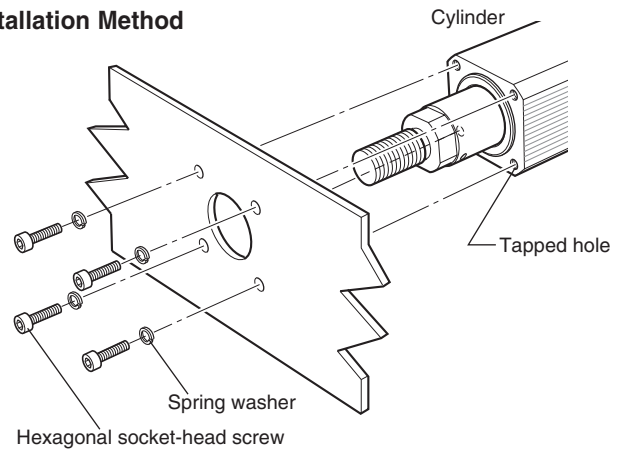
4.3.1 Installation Using Cylinder Mounting Holes

Use the mounting holes provided in the cylinder end face on the rod side to secure the cylinder to the mounting plate with four screws (not supplied).

Figure 4-18 shows the cylinder installation method.

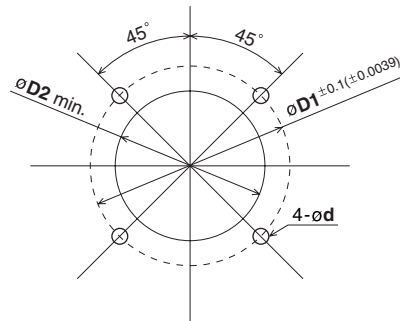
Figure 4-19 shows the cylinder's installation dimensions.

■ Figure 4-18 Installation Method



Cylinder	Thread size	Effective depth	Across-flats size of wrench	Tightening torque	Mounting plate thickness and material
EZC4-xxM	M5 P0.8	15 mm (0.60 inch)	4 mm (0.16 inch)	5 N·m (710 oz-in)	5 mm (0.20 inch) or thicker iron plate, or
EZC4-xx					10 mm (0.40 inch) or thicker aluminum plate
EZC6-xxM	M6 P1	15 mm (0.60 inch)	5 mm (0.20 inch)	5 N·m (710 oz-in)	5 mm (0.20 inch) or thicker iron plate, or
EZC6-xx					10 mm (0.40 inch) or thicker aluminum plate

■ Figure 4-19 Installation Dimensions Unit: mm (inch)

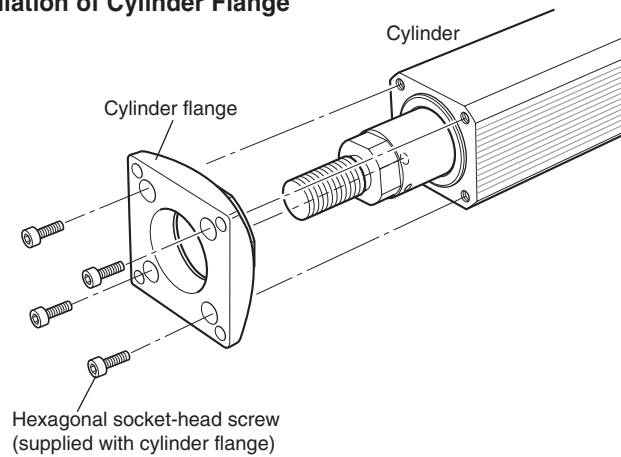


Cylinder	D1	D2	d
EZC4-xxM	43 (1.70)	36 (1.42)	5.5 (0.22)
EZC4-xx			
EZC6-xxM	57 (2.24)	49 (1.93)	6.5 (0.26)
EZC6-xx			

4.3.2 Installation Using Cylinder Flange (optional)

1. Use the four supplied screws to secure the cylinder flange to the cylinder end face on the rod side.

■ Figure 4-20 Installation of Cylinder Flange



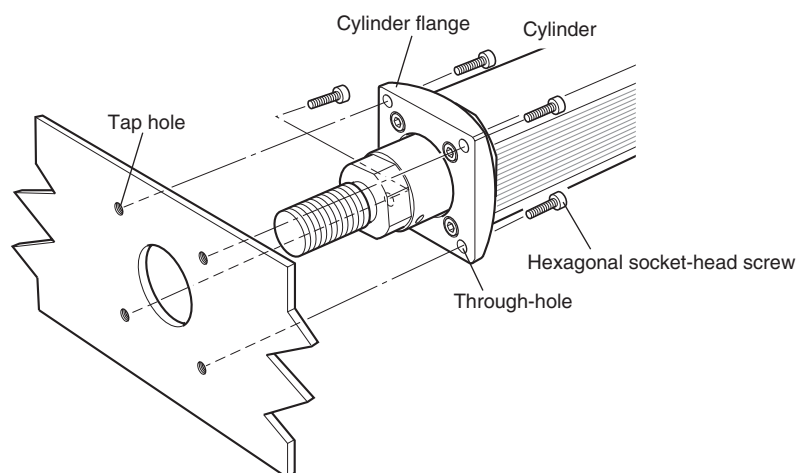
Cylinder	Cylinder flange	Thread size	Across-flats size of wrench	Tightening torque
EZC4-xxM	PAEZ4-F	M5 P0.8	4 mm (0.16 inch)	5 N·m (710 oz-in)
EZC4-xx				
EZC6-xxM	PAEZ6-F	M6 P1	5 mm (0.20 inch)	5 N·m (710 oz-in)
EZC6-xx				

2. Use the cylinder flange mounting holes and four screws (not supplied) to secure the cylinder to the mounting plate.

Figure 4-21 shows the cylinder installation method.

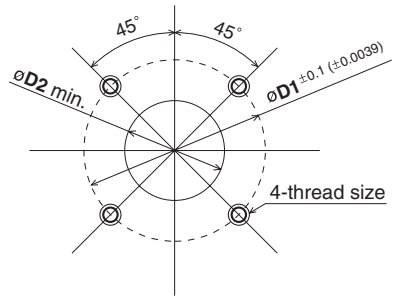
Figure 4-22 shows the cylinder's installation dimensions.

■ Figure 4-21 Installation Method



Cylinder	Thread size	Across-flats size of wrench	Tightening torque	Mounting plate thickness and material
EZC4-xxM	M5 P0.8	4 mm (0.16 inch)	5 N·m (710 oz-in)	5 mm (0.20 inch) or thicker iron plate, or 10 mm (0.40 inch) or thicker aluminum plate
EZC4-xx				
EZC6-xxM	M6 P1	5 mm (0.20 inch)	5 N·m (710 oz-in)	6 mm (0.40 inch) or thicker iron plate, or 12 mm (0.47 inch) or thicker aluminum plate
EZC6-xx				

■ Figure 4-22 Installation Dimensions Unit: mm (inch)



Cylinder	D1	D2	Thread size
EZC4-xxM	63 (2.480)	30 (1.18)	M5 P0.8
EZC4-xx			
EZC6-xxM	80 (3.150)	42 (1.65)	M6 P1
EZC6-xx			

4.3.3 Securing a Load to the Rod

Use a linear guide or similar mechanism to prevent loads other than those in the axial direction from being applied to the cylinder rod.

Note

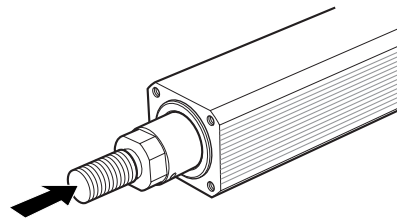
Avoid using the cylinder in such a way that the rod receives an overhang load or angular load moment. It may cause the cylinder to malfunction or shorten its service life.

Installing a Load

Install a load using the supplied nut and the male screw at the tip of the rod. Figure 4-23 shows the load installation method.

■ Figure 4-23 Installation Method

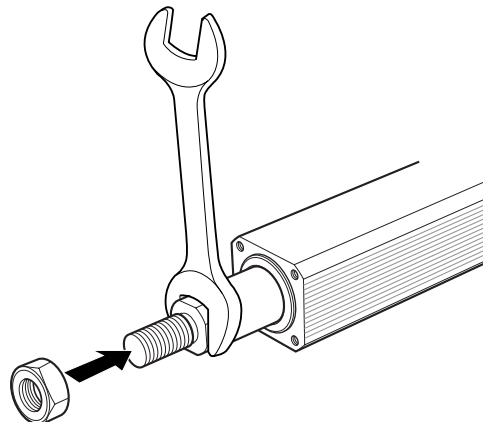
1. Cause the rod to retract to the end.



Note

When securing a load, apply a wrench to the wrench point on the rod to prevent the rod from being subjected to turning torque. If the rod is subjected to turning torque, the internal mechanism may be damaged.

2. Apply a wrench to the wrench point on the rod and secure the load with the nut. Use a wrench with a size of 32 mm (1.26 inch) (EZC6) or 22 mm (0.87 inch) (EZC4).



Note

Always remove the load from the rod when shipping the equipment with the cylinder installed.

4.4 Wiring

Follow the instructions in “EZS/EZC Series Controller User Manual” regarding the slider/cylinder wiring methods.

4.4.1 Wiring the Cables

Plug the connectors (plugs) at the ends of the motor cable and encoder cable of the slider/cylinder into the corresponding connectors (sockets) on the controller.

4.4.2 Cable Wiring Length

Note

- Do not modify the motor/encoder cables in any way. Do not extend the motor/encoder cables by connecting two or more optional cables or allowing the overall extension length to exceed 10 m (32.8 ft.). Doing so may cause a malfunction.
- Do not allow the connectors (plugs) at the ends of the cable and connectors (sockets) on the controller side to receive any mechanical stress such as bending or tensile force.
- When extending the cable, cover the connector with a tube to protect it against dust, water and oil.
- When extending the cable, fix it in place so the connector does not move.

To extend the wiring length of the slider/cylinder, always use the optional cable set or flexible cable set.

Keep the overall extension length to 10 m (32.8 ft.) or less.

● Cable set

Motor/Encoder Cables: Set of two cables

Model	Cable length
CC02EZ1	2 m (6.6 ft.)
CC05EZ1	5 m (16.4 ft.)
CC10EZ1	10 m (32.8 ft.)

● Flexible cable set

Motor/Encoder Cables: Set of two cables

Model	Cable length
CC02EZ1R	2 m (6.6 ft.)
CC05EZ1R	5 m (16.4 ft.)
CC10EZ1R	10 m (32.8 ft.)

4.4.3 Protecting the Motor

The controller provides motor protection functions that operate under the conditions specified below:

Overheat Protection

When actuated, the overheat protection function stops the motor.

- When a signal from the encoder’s built-in temperature sensor has been output to the controller.

Overload Protection

When actuated, the overload protection function stops the motor.

- When a load exceeding the maximum thrust force has been applied for five seconds or more in an operating mode other than the push-motion operation or return-to-home operation.

4.4.4 Emergency Stop

Upon detection of an EMG input to the controller, or when the emergency stop button on the teaching pendant has been pressed, the motor’s output current is cut off and the slider/cylinder is stopped (stop category 0: non-controlled stop).

If the slider/cylinder is equipped with an electromagnetic brake, the electromagnetic brake is actuated, producing a holding brake force.

The stop action is specified in 9.2.2 and 9.2.5.3 of EN60204-1.

The following three stop actions are available:

Category 0: The power supply to the drive device is stopped by direct means (e.g., non-controlled stop).

Category 1: The power supply to the drive device continues during the stopping action and stops when the stopping action is complete. Controlled stop mode.

Category 2: The power supply to the drive device continues. Controlled-stop mode.

4.5 Compliance with the EC Directives

The EZS/EZC Series sliders/cylinders and controllers bear the CE mark indicating their compliance with the following EC directives.

The installation conditions needed to satisfy the EC directives are as follows:

1. For the power supply to the controller, use an EMC-compliant DC power supply with reinforced insulation provided on the primary and secondary sides.
2. Install a mains filter on the input side of the DC power supply.
When a power transformer is used, always connect an AC line filter on the AC input side of the power transformer.
3. Use optional cables for slider/cylinder connection.
4. Install the slider/cylinder and controller in an industrial-grade enclosure so that only appropriate qualified personnel can access these parts.

The EZS/EZC Series controllers, sliders/cylinders and teaching pendants use an input power-source voltage of 24 VDC and thus are excluded from the scope of the Low-Voltage Directive. However, it is recommended that the following precautions be observed when installing and wiring the product.

- Protect the product within an enclosure during use.
- For the controller's power supply, use a DC power supply with reinforced insulation provided on the primary and secondary sides.

4.5.1 EMC Directives (89/336/EEC, 92/31/EEC)

Follow the instructions in "EZS/EZC Series Controller User Manual" regarding the installation/wiring methods.

The EZS/EZC Series controllers, sliders/cylinders and teaching pendants have been confirmed to comply with the EMC directives by conducting EMC measurements in accordance with 4.11.3, "Example of EMC-Compliant Wiring", on p. 4-35 of the above manual.

The degree of EMC compliance with respect to a given machine depends on the configuration, wiring, installation condition and hazard level of other control systems equipment and electrical parts used with the controller and slider/cylinder. Therefore, it is the customer's responsibility to perform EMC measurements and confirm EMC compliance with respect to a given machine.

Applicable Standards

EMI	Emission Tests	EN50081-2
	Radiated Emission Test	EN55011
EMS	Immunity Tests	EN61000-6-2
	Radiation Field Immunity Test	IEC61000-4-3
	Electrostatic Discharge Immunity Test	IEC61000-4-2 *1
	Fast Transient/Burst Immunity Test	IEC61000-4-4 *2
	Conductive Noise Immunity Test	IEC61000-4-6

*1 Pendant: 10 kV both in air and in the contact state

Controller: Malfunction or damage may occur due to static electricity.

When touching the controller, cut off the power supply or provide an antistatic measure. Always use an insulated screwdriver when adjusting the controller's axis-number setting switch, brake-release switch, pendant switch or DIP switches.

*2 Injection to pendant cable through clamp: 1 kV

Injection to the encoder, motor, power and I/O cables through clamp: 2 kV

Chapter 5 Maintenance

This chapter explains the maintenance items that must be performed to ensure safe, efficient operation of the slider/cylinder. Should you encounter any abnormality, immediately stop using the product and contact your nearest Customer Service Center.

5.1 Slider

5.1.1 Inspection Items and Timing



Warning

- To prevent injury, turn off the power supply to the controller before inspecting the slider.
- To prevent injury or equipment damage, remove the load from the table before checking the internal parts.

Perform maintenance after each applicable period specified in Table 5-1. The schedule assumes that the slider is operated eight hours a day. Reduce the maintenance intervals accordingly if the operation rate is high, such as when the slider is operated continuously day and night.

■ Table 5-1 Inspection Items and Timing

Maintenance intervals	External check	Internal check
When operated for the first time	○	
One month after initial operation	○	
Six months after initial operation	○	○*
One year after initial operation	○	○*
Every six months thereafter	○	○*

* Add grease if signs of degradation (change to brown color, loss of gloss) are observed during the internal inspection. See 5.1.4, “Internal Check/Cleaning and Greasing”, on p. 5-2 for the greasing method.

5.1.2 External Check

Check the items specified in Table 5-2.

■ Table 5-2 Inspection Items and Contents

Item	What to check	Action if problem is found
Slider	Are there any loose mounting screws ?	Tighten the screws securely.
	Is there any cracking or slack in the stainless sheet ?	Re-tension or replace the sheet.
Cables	Are there any scratches or areas under stress, or is the cable slack at the controller connection ?	Disconnect and reconnect the connector or replace the cable.
Operation	Is there any abnormal noise or vibration from the bearings, etc. ?	Check the installation of the load and operating speed again.

5.1.3 External Cleaning

- Clean the exterior surface of the slider whenever necessary.
- Wipe off any dirt and stains using a soft cloth.
- Do not apply compressed air to prevent dust from entering through gaps.
- Do not use petroleum solvents, since they will damage the coated surface.
- To remove stubborn stains, wipe the area using a soft cloth moistened with neutral detergent.

5.1.4 Internal Check/Cleaning and Greasing

Note

- Do not touch the encoder to prevent product breakdown. The phase output of the encoder has been precisely adjusted through detection of rotation angle and home position.
- Clean the outside first in order to prevent any dust adhering to the outside from entering when the component parts are removed. The entry of dust may result in abnormal noise or breakdown during operation.

Remove the table cover, stainless sheet and side covers to check and clean the internal parts.

Product used in the explanation: EZS4-xxM

Required tool: Hex wrench [across-flats size: 1.5 mm (0.06 inch), 2.5 mm (0.10 inch)]



Caution

- To prevent injury, do not pull the stainless sheet with unnecessary force or grab it strongly, nor touch the sheet with bare hands.

1. Removing the covers

Remove the covers in the following order:

1-1 Table cover

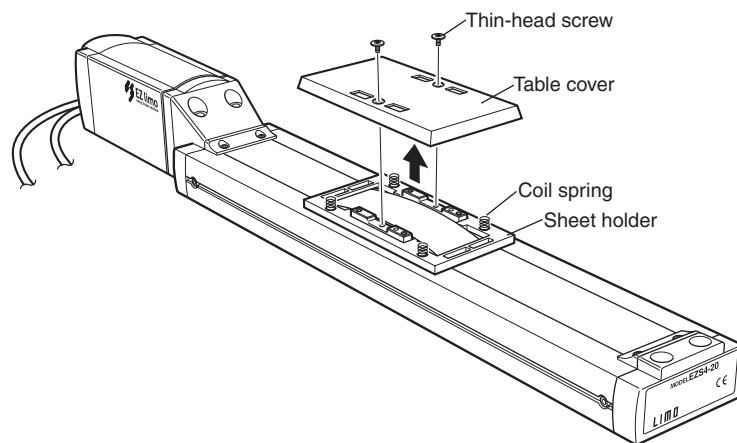
Pull out the thin-head screws from the tabletop and remove the table cover. The number of screws varies, depending on the product.

The sheet holder contains coil springs. Be careful not to lose any of the coil springs once they're removed.

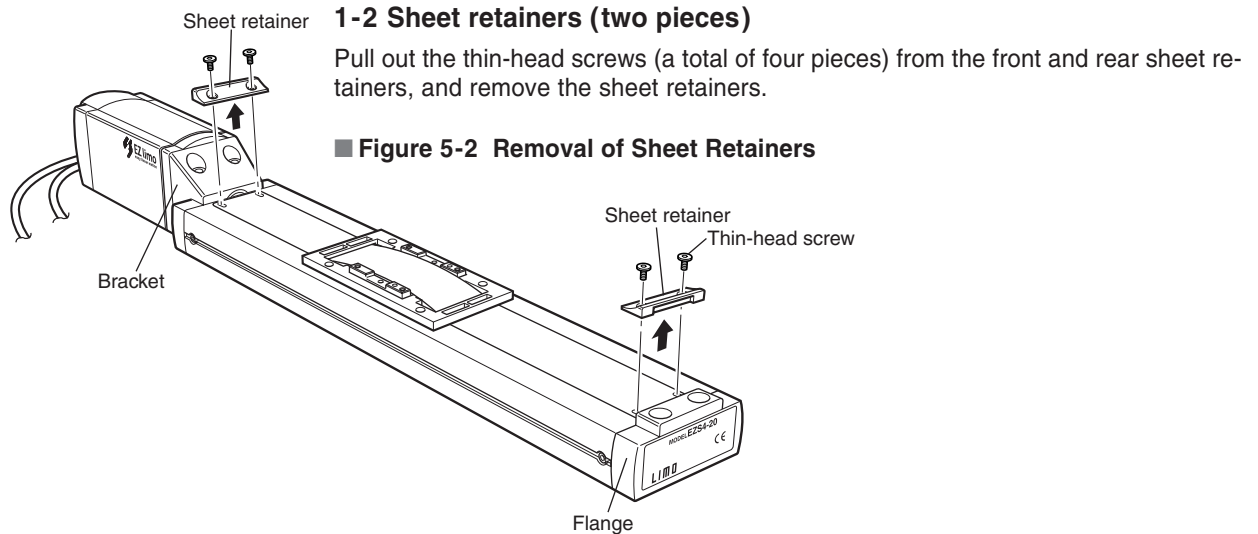
■ Table 5-3 Number of Thin-Head Screws

Model	Number of screws
EZS3-xxM, EZS3-xx	2 pcs.
EZS4-xxM, EZS4-xx	
EZS6-xxM, EZS6-xx	4 pcs.

■ Figure 5-1 Removal of Table Cover



Use a hex wrench with an across-flats size of 1.5 mm (0.06 inch) when loosening the thin-head screws.

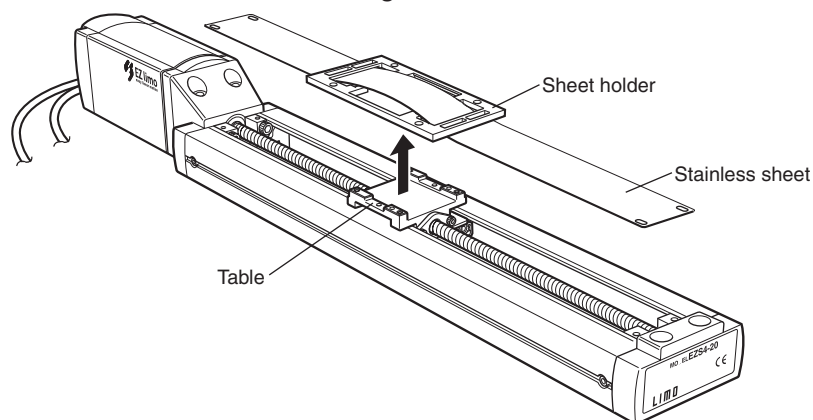


Use a hex wrench with an across-flats size of 1.5 mm (0.06 inch) when loosening the thin-head screws.

1-3 Sheet holder and stainless sheet

Lift the sheet holder and remove it together with the stainless sheet. Do not bend the stainless sheet.

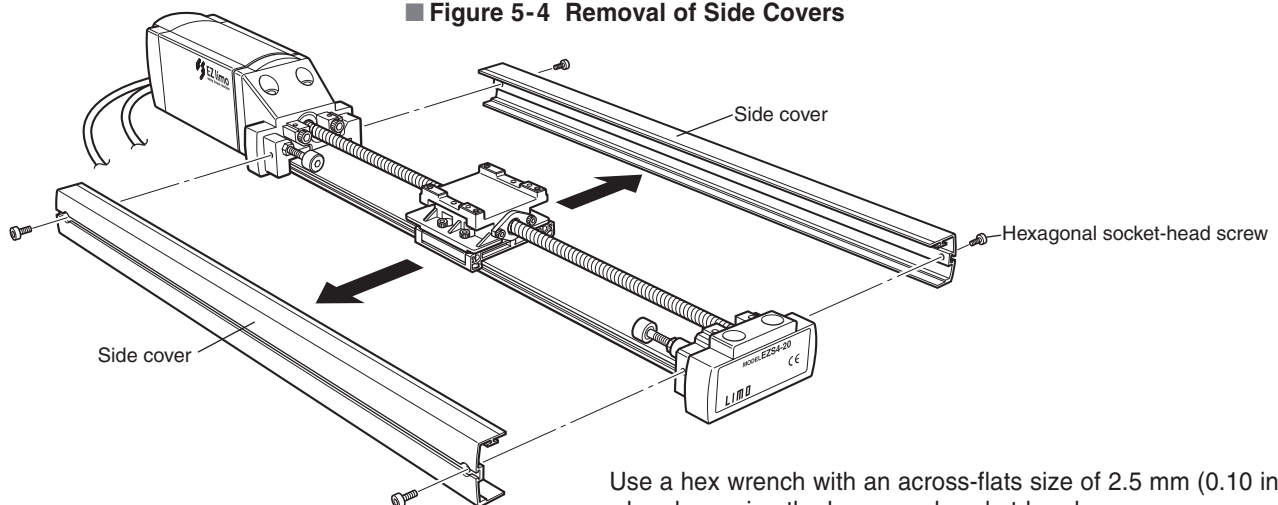
■ **Figure 5-3 Removal of Sheet Holder and Stainless Sheet**



1-4 Side covers (two pieces)

Pull out the hexagonal socket-head screws from the right and left side covers, and remove the side covers.

■ **Figure 5-4 Removal of Side Covers**



Use a hex wrench with an across-flats size of 2.5 mm (0.10 inch) when loosening the hexagonal socket-head screws.

2. Visual check of condition inside the slider

Check the items specified in Table 5-4.

■ Table 5-4 Inspection Items and Contents

Item	What to check	Action if problem is found
Ball-screw shaft	Are there any deposits of foreign matter such as dust?	Remove the foreign matter.
	Has the grease lost its gloss or been consumed?	Clean the screw shaft with a soft cloth and apply grease to the nut running groove.
Guide rail	Are there any deposits of foreign matter such as dust?	Remove the foreign matter.
	Has the grease lost its gloss or been consumed?	Use a soft cloth to clean the ball rolling grooves on both sides of the guide rail, and apply grease to the ball rolling grooves.

Even if the grease has turned brown, lubrication condition is deemed appropriate if the running surface still appears glossy.

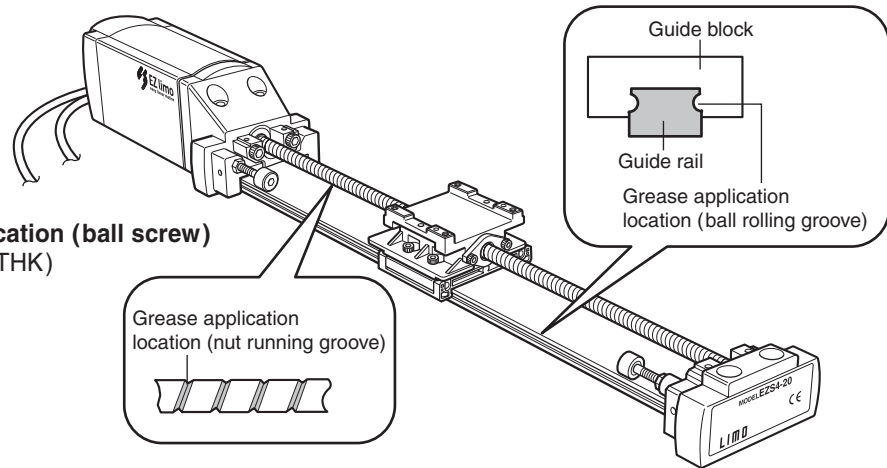
3. Greasing

If any of the following conditions applies, clean the inside using a soft cloth and add grease.

- The grease has lost its gloss.
- The amount of grease is not sufficient.


■ Figure 5-6 Greasing Location (guide rail)

Guide rail: AFF grease (THK)



■ Figure 5-5 Greasing Location (ball screw)

Ball screw: AFG grease (THK)



Caution

- Wear protective goggles when applying grease. Pay due 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.

4. Installing the covers

When the internal check and cleaning is complete, install the side covers, stainless sheet and table cover by reversing the order in which they were removed.

4-1 Side covers (two pieces)

Install the side covers to the slider and secure them by tightening the hexagonal socket-head screws.

Use a hex wrench or torque wrench with an across-flats size of 2.5 mm (0.10 inch) when tightening the hexagonal socket-head screws.

Tightening torque: 0.6 N·m (85 oz-in)

4-2 Stainless sheet and sheet holder

1. Place the stainless sheet and sheet holder on the table.

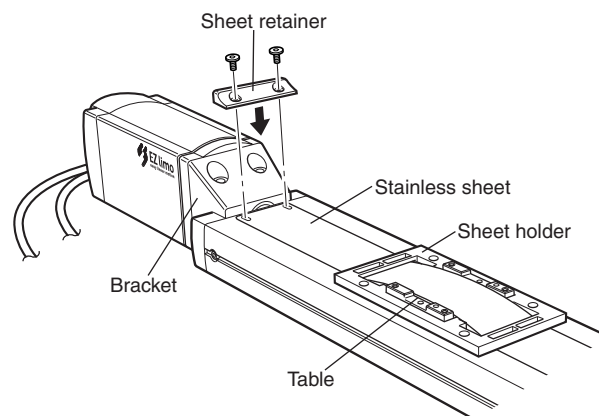
Bring the stainless sheet end face on the bracket side into contact with the bracket end face.

2. Install the sheet retainer on the bracket side and secure it by tightening the thin-head screws.

Use a hex wrench or torque wrench with an across-flats size of 1.5 mm (0.06 inch) when tightening the thin-head screws.

Tightening torque: 0.6 N·m (85 oz-in)

■ **Figure 5-7 Installation of Stainless Sheet (bracket side) and Securing of Sheet Retainer**



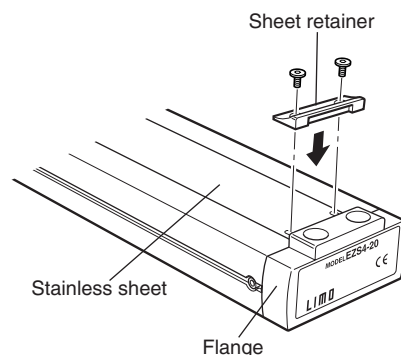
3. Press the stainless sheet against the table and apply uniform tension to the sheet.

4. Install the sheet retainer on the flange side and secure it by tightening the thin-head screws.

Use a hex wrench or torque wrench with an across-flats size of 1.5 mm (0.06 inch) when tightening the thin-head screws.

Tightening torque: 0.6 N·m (85 oz-in)

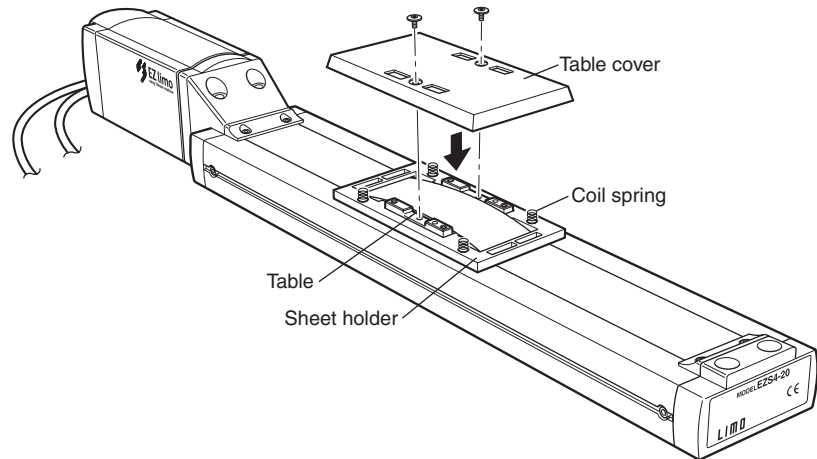
■ **Figure 5-8 Pressing of Stainless Sheet and Securing of Sheet Retainer (flange side)**



4-3 Table cover

Confirm that the coil springs (four pieces) are installed within the sheet holder. Place the table cover on the table and secure it by tightening the thin-head screws. Use a hex wrench or torque wrench with an across-flats size of 1.5 mm (0.06 inch) when tightening the thin-head screws. Tightening torque: 0.6 N·m (85 oz-in)

■ Figure 5-9 Securing of Table Cover



5. Checking the tension of the stainless sheet

Once the slider and controller are connected, perform an operation check to confirm that the stainless sheet is straight and uniformly tensioned.

5.1.5 Re-Tensioning the Stainless Sheet

The stainless sheet has been tightly installed at the factory. However, if slack has been generated due to operation or as a result of maintenance, re-tension the sheet in the following order.

Product used in the explanation: EZS4-xx

Required tool: Hex wrench [across-flats size: 1.5 mm (0.06 inch)]

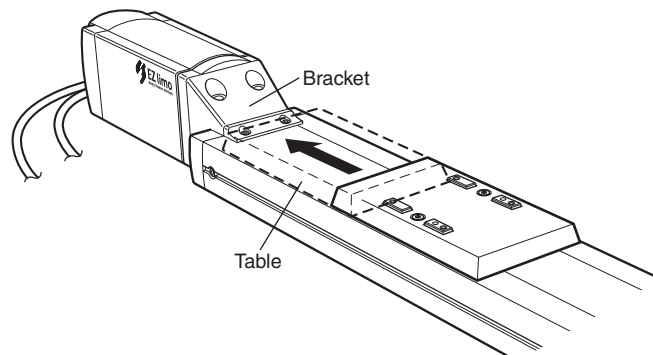


Warning

- To prevent injury, turn off the power supply to the controller before inspecting the internal parts.
- To prevent injury or equipment damage, remove the load from the table before checking the internal parts.

1. Push the table gently with a hand, and move it toward the bracket side.

■ Figure 5-10 Movement of Table

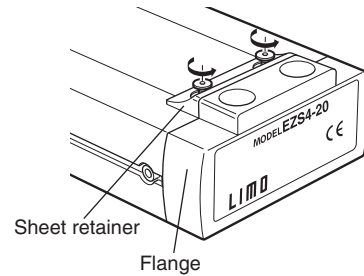


Note

- Disconnect the motor cable from the controller to prevent damage to the controller due to back EMF of the motor.
- If the slider is equipped with an electromagnetic brake, move the table toward the bracket side before commencing work.

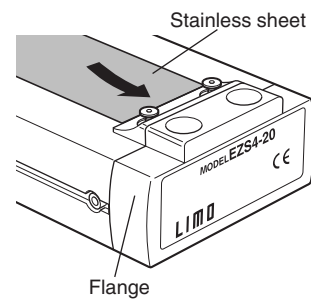
- Loosen the screws of the sheet retainer on the flange side using a hex wrench with an across-flats size of 1.5 mm (0.06 inch). Do not remove the screws.

■ **Figure 5-11 Release of Sheet Retainer**



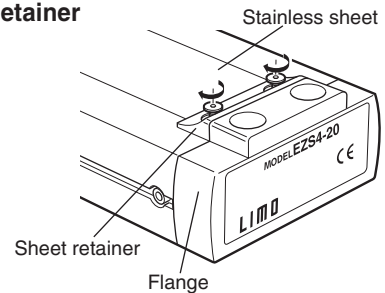
- Pull the stainless sheet toward the flange side to remove the slack in the sheet.

■ **Figure 5-12 Re-Tensioning of Stainless Sheet**



- Tighten the thin-head screws to secure the sheet retainer. Use a hex wrench or torque wrench with an across-flats size of 1.5 mm (0.06 inch) when tightening the thin-head screws. Tightening torque: 0.6 N·m (85 oz-in)


■ **Figure 5-13 Securing of Sheet Retainer**



- Check the tension of the stainless sheet. Once the slider and controller are connected, perform an operation check to confirm that the stainless sheet is straight and uniformly tensioned.

5.2 Cylinder

5.2.1 Inspection Items and Timing



Warning

- To prevent injury, turn off the power supply to the controller before inspecting the cylinder.

Perform maintenance after each applicable period specified in Table 5-5. The schedule assumes that the cylinder is operated eight hours a day. Reduce the maintenance intervals accordingly if the operation rate is high, such as when the cylinder is operated continuously day and night.

■ **Table 5-5 Inspection Items and Timing**

Maintenance intervals	External check
When operated for the first time	○
One month after initial operation	○
Two to three months after initial operation	○*
Every two to three months thereafter	○*

*Add grease if signs of degradation (change to brown color, loss of gloss) are observed during the inspection. See 5.2.4, “*Greasing*”, on p. 5-9 for the greasing method.

5.2.2 External Check

Check the items specified in Table 5-6.

■ **Table 5-6 Inspection Items and Contents**

Item	What to check	Action if problem is found
Cylinder	Are there any loose mounting screws ?	Tighten the screws securely.
	Is there any looseness in the load mounting nut ?	Tighten the nut securely.
	Is there any degradation in the greasing condition of the rod ?	Add grease.
Cables	Are there any scratches or areas under stress, or is the cable slack at the controller connection ?	Disconnect and reconnect the connector or replace the cable.
Operation	Is there any abnormal noise or vibration from the bearings, etc. ?	Check the installation of the load and operating speed again.

5.2.3 External Cleaning

- Clean the exterior surface of the cylinder whenever necessary.
- Wipe off any dirt and stains using a soft cloth.
- Do not apply compressed air to prevent dust from entering through gaps.
- Do not use petroleum solvents, since they will damage the coated surface.
- To remove stubborn stains, wipe the area using a soft cloth moistened with neutral detergent.

5.2.4 Greasing

Add grease if signs of degradation (change to brown color, loss of gloss) are observed during the inspection.

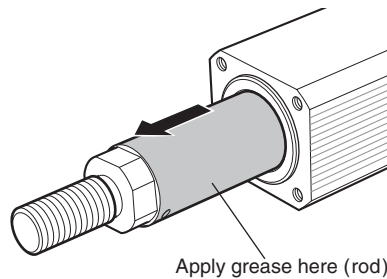
● Greasing Location

Rod: Multemp SRL (Kyodo Yushi)

Apply grease to the rod in the following order:

1. Pull out the rod.
2. Wipe off dirty grease.
3. Apply grease to the rod using a soft cloth, etc.

■ Figure 5-14 Greasing Location



Note

To prevent noise or malfunctioning during operation, do not use a brush to apply grease.



Caution

- Wear protective goggles when applying grease. Pay due attention to safety, and handle 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.

Chapter 6 Repair

Any problem with the slider/cylinder will be repaired free of charge if the following conditions are met.

6.1 Scope of Warranty Repair

If a breakdown occurs during the warranty period specified in 6.2 and Oriental Motor is clearly responsible for such a breakdown, the affected product or part will be repaired free of charge. However, this warranty does not cover any loss (including lost profit) arising indirectly or consequently from the breakdown of a delivered product.

6.2 Warranty Period

The warranty period shall be one year from the delivery of the product.

6.3 How to Receive Repair

Contact the Oriental Motor branch or sales office from which you purchased the product and arrange a return.

6.4 Repair Following Expiration of the Warranty Period

Once the warranty period has expired, Oriental Motor will perform repair for a fee only when the product function can be recovered/maintained through such a repair.

Appendix **A** Specifications

A.1 Combination List

A.1.1 Slider

Incremental Type

■ Without Electromagnetic Brake

Unit model	Slider model	Controller model	
EZS3-05CI	EZS3-05	EZMC36I	
EZS3-10CI	EZS3-10		
EZS3-15CI	EZS3-15		
EZS3-20CI	EZS3-20		
EZS3-25CI	EZS3-25		
EZS3-30CI	EZS3-30		
EZS3-40CI	EZS3-40		
EZS3-50CI	EZS3-50		
EZS4-05CI	EZS4-05		EZMC36I
EZS4-10CI	EZS4-10		
EZS4-15CI	EZS4-15		
EZS4-20CI	EZS4-20		
EZS4-25CI	EZS4-25		
EZS4-30CI	EZS4-30		
EZS4-40CI	EZS4-40		
EZS4-50CI	EZS4-50		
EZS6-10CI	EZS6-10	EZMC36I	
EZS6-15CI	EZS6-15		
EZS6-20CI	EZS6-20		
EZS6-25CI	EZS6-25		
EZS6-30CI	EZS6-30		
EZS6-40CI	EZS6-40		
EZS6-50CI	EZS6-50		

■ With Electromagnetic Brake

Unit model	Slider model	Controller model	
EZS3-05MCI	EZS3-05M	EZMC36I	
EZS3-10MCI	EZS3-10M		
EZS3-15MCI	EZS3-15M		
EZS3-20MCI	EZS3-20M		
EZS3-25MCI	EZS3-25M		
EZS3-30MCI	EZS3-30M		
EZS3-40MCI	EZS3-40M		
EZS3-50MCI	EZS3-50M		
EZS4-05MCI	EZS4-05M		EZMC36I
EZS4-10MCI	EZS4-10M		
EZS4-15MCI	EZS4-15M		
EZS4-20MCI	EZS4-20M		
EZS4-25MCI	EZS4-25M		
EZS4-30MCI	EZS4-30M		
EZS4-40MCI	EZS4-40M		
EZS4-50MCI	EZS4-50M		
EZS6-10MCI	EZS6-10M	EZMC36I	
EZS6-15MCI	EZS6-15M		
EZS6-20MCI	EZS6-20M		
EZS6-25MCI	EZS6-25M		
EZS6-30MCI	EZS6-30M		
EZS6-40MCI	EZS6-40M		
EZS6-50MCI	EZS6-50M		

Absolute Type

■ Without Electromagnetic Brake

Unit model	Slider model	Controller model
EZS3-05CA	EZS3-05	EZMC36A
EZS3-10CA	EZS3-10	
EZS3-15CA	EZS3-15	
EZS3-20CA	EZS3-20	
EZS3-25CA	EZS3-25	
EZS3-30CA	EZS3-30	
EZS3-40CA	EZS3-40	
EZS3-50CA	EZS3-50	
EZS4-05CA	EZS4-05	EZMC36A
EZS4-10CA	EZS4-10	
EZS4-15CA	EZS4-15	
EZS4-20CA	EZS4-20	
EZS4-25CA	EZS4-25	
EZS4-30CA	EZS4-30	
EZS4-40CA	EZS4-40	
EZS4-50CA	EZS4-50	
EZS6-10CA	EZS6-10	EZMC36A
EZS6-15CA	EZS6-15	
EZS6-20CA	EZS6-20	
EZS6-25CA	EZS6-25	
EZS6-30CA	EZS6-30	
EZS6-40CA	EZS6-40	
EZS6-50CA	EZS6-50	

■ With Electromagnetic Brake

Unit model	Slider model	Controller model
EZS3-05MCA	EZS3-05M	EZMC36A
EZS3-10MCA	EZS3-10M	
EZS3-15MCA	EZS3-15M	
EZS3-20MCA	EZS3-20M	
EZS3-25MCA	EZS3-25M	
EZS3-30MCA	EZS3-30M	
EZS3-40MCA	EZS3-40M	
EZS3-50MCA	EZS3-50M	
EZS4-05MCA	EZS4-05M	EZMC36A
EZS4-10MCA	EZS4-10M	
EZS4-15MCA	EZS4-15M	
EZS4-20MCA	EZS4-20M	
EZS4-25MCA	EZS4-25M	
EZS4-30MCA	EZS4-30M	
EZS4-40MCA	EZS4-40M	
EZS4-50MCA	EZS4-50M	
EZS6-10MCA	EZS6-10M	EZMC36A
EZS6-15MCA	EZS6-15M	
EZS6-20MCA	EZS6-20M	
EZS6-25MCA	EZS6-25M	
EZS6-30MCA	EZS6-30M	
EZS6-40MCA	EZS6-40M	
EZS6-50MCA	EZS6-50M	

A.1.2 Cylinder

Incremental Type

■ Without Electromagnetic Brake

Unit model	Cylinder model	Controller model	Unit model	Cylinder model	Controller model
EZC4-05CI	EZC4-05	EZMC36I	EZC6-05CI	EZC6-05	EZMC36I
EZC4-10CI	EZC4-10		EZC6-10CI	EZC6-10	
EZC4-20CI	EZC4-20		EZC6-20CI	EZC6-20	
EZC4-30CI	EZC4-30		EZC6-30CI	EZC6-30	

■ With Electromagnetic Brake

Unit model	Cylinder model	Controller model	Unit model	Cylinder model	Controller model
EZC4-05MCI	EZC4-05M	EZMC36I	EZC6-05MCI	EZC6-05M	EZMC36I
EZC4-10MCI	EZC4-10M		EZC6-10MCI	EZC6-10M	
EZC4-20MCI	EZC4-20M		EZC6-20MCI	EZC6-20M	
EZC4-30MCI	EZC4-30M		EZC6-30MCI	EZC6-30M	

Absolute Type

■ Without Electromagnetic Brake

Unit model	Cylinder model	Controller model	Unit model	Cylinder model	Controller model
EZC4-05CA	EZC4-05	EZMC36A	EZC6-05CA	EZC6-05	EZMC36A
EZC4-10CA	EZC4-10		EZC6-10CA	EZC6-10	
EZC4-20CA	EZC4-20		EZC6-20CA	EZC6-20	
EZC4-30CA	EZC4-30		EZC6-30CA	EZC6-30	

■ With Electromagnetic Brake

Unit model	Cylinder model	Controller model	Unit model	Cylinder model	Controller model
EZC4-05MCA	EZC4-05M	EZMC36A	EZC6-05MCA	EZC6-05M	EZMC36A
EZC4-10MCA	EZC4-10M		EZC6-10MCA	EZC6-10M	
EZC4-20MCA	EZC4-20M		EZC6-20MCA	EZC6-20M	
EZC4-30MCA	EZC4-30M		EZC6-30MCA	EZC6-30M	

A.2 Slider Specifications

A.2.1 Performance Specifications

The following specifications are common to all models, regardless of the stroke:

■ EZS3

Slider		With electromagnetic brake		Without electromagnetic brake						
Motor type		Stepping motor with encoder		Stepping motor with encoder						
Drive method		Ball screw		Ball screw						
Maximum speed	mm/s (in/sec)	300 (11.81)		300 (11.81)						
Maximum transportable mass	Horizontal direction	5 (11)		5 (11)						
	Vertical direction	2 (4.4)		—						
Maximum acceleration	Horizontal direction	2 (6.56)		2 (6.56)						
	Vertical direction	2 (6.56)		—						
Maximum thrust force	N (lb.)	23 (5.1)		23 (5.1)						
Maximum holding brake force	Power ON	23 (5.1)		23 (5.1)						
	Power OFF	0		0						
	Electromagnetic brake	23 (5.1)		—						
Repetitive positioning accuracy	mm (inch)	±0.02 (±0.0008)								
Resolution	mm (inch)	0.015 (0.0006)								
Lead	mm (inch)	12 (0.472)								
Stroke	mm (inch)	50 (1.97), 100 (3.94), 150 (5.91), 200 (7.87), 250 (9.84), 300 (11.81), 400 (15.75), 500 (19.69)								
Slider weight	kg (lb.)	Stroke	50 (1.97): 1.5 (3.3)[1.7 (3.74)]	100 (3.94): 1.6 (3.52)[1.8 (3.96)]	150 (5.91): 1.7 (3.74)[1.9 (4.18)]	200 (7.87): 1.8 (3.96)[2.0 (4.4)]	250 (9.84): 1.9 (4.18)[2.1 (4.62)]	300 (11.81): 2.0 (4.4)[2.2 (4.84)]	400 (15.75): 2.2 (4.84)[2.4 (5.28)]	500 (19.69): 2.4 (5.28)[2.6 (5.72)]
Numbers in [] are values for the electromagnetic brake type.										
Ambient temperature	°C (°F)	0 to +40 (+32 to +104), nonfreezing								
Noise level (reference value)*	dB (A)	58								

■ EZS4

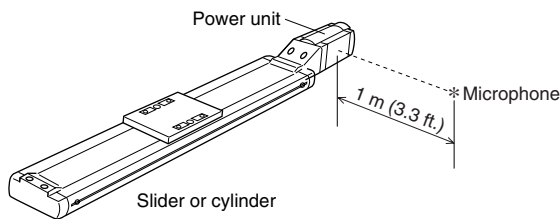
Slider		With electromagnetic brake			Without electromagnetic brake					
Motor type		Stepping motor with encoder			Stepping motor with encoder					
Drive method		Ball screw			Ball screw					
Maximum speed	mm/s (in/sec)	100 (3.94)	200 (7.87)	300 (11.81)	100 (3.94)	200 (7.87)	300 (11.81)			
Maximum transportable mass	Horizontal direction	15 (33)	10 (22)	5 (11)	15 (33)	10 (22)	5 (11)			
	Vertical direction	4.5 (9.9)	4 (8.8)	2 (4.4)	—	—	—			
Maximum acceleration	Horizontal direction	2 (6.56)			2 (6.56)					
	Vertical direction	2 (6.56)			—					
Maximum thrust force	N (lb.)	45 (10.1)	40 (9)	23 (5.1)	45 (9.9)	40 (9)	23 (5.1)			
Maximum holding brake force	Power ON	45 (10.1)			45 (10.1)					
	Power OFF	0			0					
	Electromagnetic brake	45 (10.1)			—					
Repetitive positioning accuracy	mm (inch)	±0.02 (±0.0008)								
Resolution	mm (inch)	0.015 (0.0006)								
Lead	mm (inch)	12 (0.472)								
Stroke	mm (inch)	50 (1.97), 100 (3.94), 150 (5.91), 200 (7.87), 250 (9.84), 300 (11.81), 400 (15.75), 500 (19.69)								
Slider weight	kg (lb.)	Stroke	50 (1.97): 2.3 (5.06)[2.5 (5.5)]	100 (3.94): 2.5 (5.5)[2.7 (5.94)]	150 (5.91): 2.7 (5.94)[2.9 (6.38)]	200 (7.87): 2.9 (6.38)[3.1 (6.82)]	250 (9.84): 3.1 (6.82)[3.3 (7.26)]	300 (11.81): 3.3 (7.26)[3.5 (7.7)]	400 (15.75): 3.7 (8.14)[3.9 (8.58)]	500 (19.69): 4.1 (9.02)[4.3 (9.46)]
Numbers in [] are values for the electromagnetic brake type.										
Ambient temperature	°C (°F)	0 to +40 (+32 to +104), nonfreezing								
Noise level (reference value)*	dB (A)	56								

■ EZS6

Slider		With electromagnetic brake			Without electromagnetic brake		
Motor type		Stepping motor with encoder			Stepping motor with encoder		
Drive method		Ball screw			Ball screw		
Maximum speed	mm/s (in/sec)	100 (3.94)	200 (7.87)	300 (11.81)	100 (3.94)	200 (7.87)	300 (11.81)
Maximum transportable mass	Horizontal direction	30 (66)	20 (44)	10 (22)	30 (66)	20 (44)	10 (22)
	Vertical direction	10 (22)	8 (17.6)	3 (6.6)	—	—	—
Maximum acceleration	Horizontal direction	2 (6.56)			2 (6.56)		
	Vertical direction	2 (6.56)			—		
Maximum thrust force	N (lb.)	100 (22)	94 (21.1)	35 (7.8)	100 (22)	94 (21.1)	35 (7.8)
Maximum holding brake force	Power ON	100 (22)			100 (22)		
	Power OFF	0			0		
	Electromagnetic brake	100 (22)			—		
Repetitive positioning accuracy	mm (inch)	±0.02 (±0.0008)					
Resolution	mm (inch)	0.015 (0.0006)					
Lead	mm (inch)	12 (0.472)					
Stroke	mm (inch)	100 (3.94), 150 (5.91), 200 (7.87), 250 (9.84), 300 (11.81), 400 (15.75), 500 (19.69)					
Slider weight	kg (lb.)	Stroke 100 (3.94): 4.0 (8.8)[4.4 (9.68)]		150 (5.91): 4.3 (9.46)[4.7 (10.34)]		200 (7.87): 4.5 (9.9)[4.9 (10.78)]	
Numbers in [] are values for the electromagnetic brake type.		300 (11.81): 5.0 (11.0)[5.4 (11.88)]		250 (9.84): 4.7 (10.34)[5.1 (11.22)]		400 (15.75): 5.5 (12.1)[5.9 (12.98)]	
		500 (19.69): 5.9 (12.98)[6.3 (13.86)]					
Ambient temperature	°C (°F)	0 to +40 (+32 to +104), nonfreezing					
Noise level (reference value)*	dB (A)	61					

* Noise level is indicated by a value measured in A range at 1 m (3.3 ft.) from the power unit during a reciprocating operation at the maximum speed and stroke.

■ Figure A-1 Noise Measurement Method



A.2.2 General Specifications

Insulation Resistance

An insulation resistance of 100 MΩ or more has been confirmed via a 500-VDC megger at the following locations:

- Between motor coil and case
- Between case and electromagnetic brake coil (electromagnetic brake type only)

Dielectric Strength

No abnormality was found after the applicable voltage was applied for one minute at the following locations:

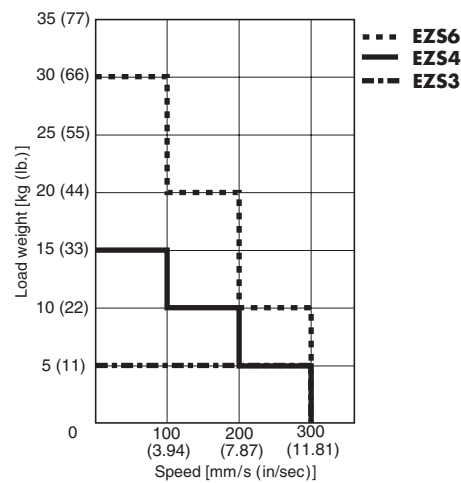
- Between motor coil and case
- Between case and electromagnetic brake coil (electromagnetic brake type only)

EZS3 AC0.5kV 50Hz
 EZS4 AC0.5kV 50Hz
 EZS6 AC1.0kV 50Hz

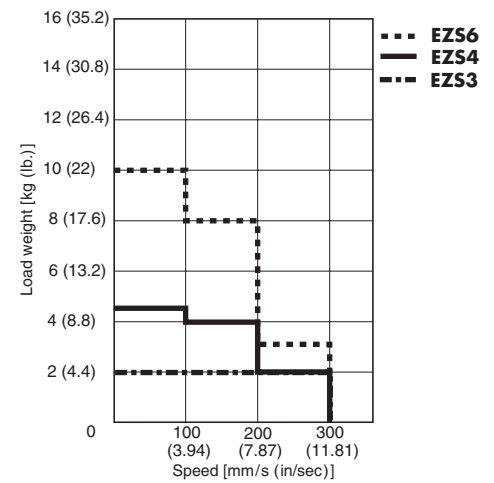
A.2.3 Speed and Load Weight

The relationships between slider speed and load weight limit are shown in the diagrams below:

■ **Figure A-2**
 Correlation Diagram of Speed and Load Weight (horizontal direction)



■ **Figure A-3**
 Correlation Diagram of Speed and Load Weight (vertical direction)



A.2.4 Allowable Overhang Length

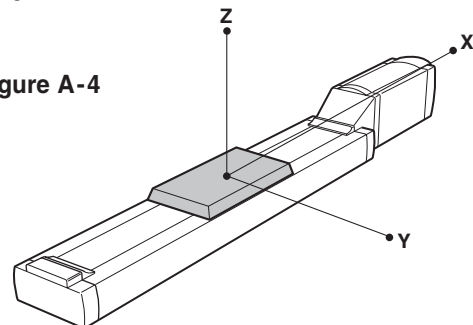
The allowable overhang lengths from the center of the load's mounting surface to the center of gravity of the object being carried are shown in the tables below:

Horizontal Installation

■ **Table A-1 Allowable Overhang Length (EZS3)**
 Unit: mm (inch)

Carried weight	X	Y	Z
1 kg (2.2 lb.)	205 (8.07)	300 (11.81)	300 (11.81)
2.5 kg (5.5 lb.)	75 (2.95)	136 (5.35)	300 (11.81)
5 kg (11 lb.)	32 (1.26)	58 (2.28)	157 (6.18)

■ **Figure A-4**



■ **Table A-2 Allowable Overhang Length (EZS4)**
 Unit: mm (inch)

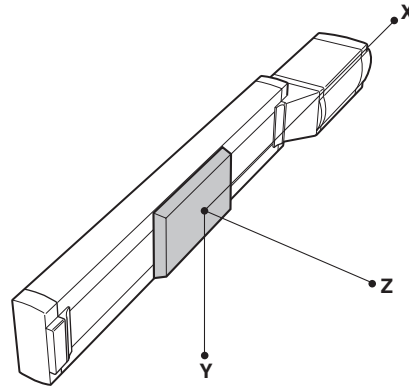
Carried weight	X	Y	Z
5 kg (11 lb.)	113 (4.45)	135 (5.34)	300 (11.81)
10 kg (22 lb.)	51 (2.01)	67 (2.64)	252 (9.92)
15 kg (33 lb.)	31 (1.22)	45 (1.77)	150 (5.91)

■ **Table A-3 Allowable Overhang Length (EZS6)**
 Unit: mm (inch)

Carried weight	X	Y	Z
10 kg (22 lb.)	500 (19.69)	414 (16.30)	500 (19.69)
20 kg (44 lb.)	386 (15.20)	207 (8.15)	500 (19.69)
30 kg (66 lb.)	257 (10.12)	137 (5.40)	500 (19.69)

Installation by Wall Mounting

■ Figure A-5



■ Table A-4 Allowable Overhang Length (EZS3)

Unit: mm (inch)

Carried weight	X	Y	Z
1 kg (2.2 lb.)	155 (6.10)	300 (11.81)	300 (11.81)
2.5 kg (5.5 lb.)	62 (2.44)	300 (11.81)	105 (4.13)
5 kg (11 lb.)	22 (0.87)	106 (4.17)	31 (1.22)

■ Table A-5 Allowable Overhang Length (EZS4)

Unit: mm (inch)

Carried weight	X	Y	Z
5 kg (11 lb.)	28 (1.10)	135 (5.34)	237 (9.33)
10 kg (22 lb.)	14 (0.55)	67 (2.64)	99 (3.90)
15 kg (33 lb.)	9 (0.35)	45 (1.77)	53 (2.09)

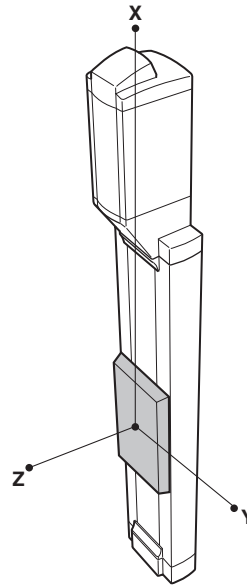
■ Table A-6 Allowable Overhang Length (EZS6)

Unit: mm (inch)

Carried weight	X	Y	Z
10 kg (22 lb.)	100 (3.94)	490 (19.30)	414 (16.30)
20 kg (44 lb.)	50 (1.97)	245 (9.65)	179 (7.05)
30 kg (66 lb.)	33 (1.30)	163 (6.42)	100 (3.94)

Vertical Installation

■ Figure A-6



■ Table A-7 Allowable Overhang Length (EZS3)

Unit: mm (inch)

Carried weight	X	Y	Z
0.5 kg (1.1 lb.)	300 (11.81)	257 (10.12)	300 (11.81)
1 kg (2.2 lb.)	142 (5.59)	129 (5.08)	142 (5.59)
2 kg (4.4 lb.)	62 (2.44)	62 (2.44)	52 (2.05)

■ Table A-8 Allowable Overhang Length (EZS4)

Unit: mm (inch)

Carried weight	X	Y	Z
2 kg (4.4 lb.)	230 (9.06)	57 (2.24)	230 (9.06)
4 kg (8.8 lb.)	102 (4.02)	29 (1.14)	102 (4.02)
4.5 kg (9.9 lb.)	87 (3.43)	25 (0.98)	87 (3.43)

■ Table A-9 Allowable Overhang Length (EZS6)

Unit: mm (inch)

Carried weight	X	Y	Z
3 kg (6.6 lb.)	500 (19.67)	277 (10.90)	500 (19.67)
8 kg (17.6 lb.)	500 (19.67)	104 (4.09)	500 (19.67)
10 kg (22 lb.)	500 (19.67)	83 (3.27)	500 (19.67)

A.3 Cylinder Specifications

A.3.1 Performance Specifications

The following specifications are common to all models, regardless of the stroke:

■ EZC4

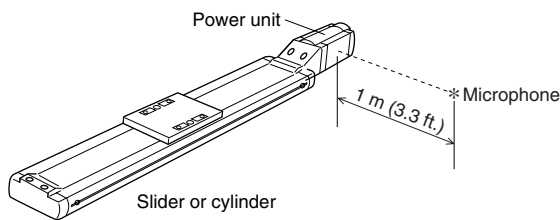
Cylinder		With electromagnetic brake			Without electromagnetic brake		
Motor type		Stepping motor with encoder			Stepping motor with encoder		
Drive method		Ball screw			Ball screw		
Maximum speed	mm/s (in/sec)	100 (3.94)	200 (7.87)	300 (11.81)	100 (3.94)	200 (7.87)	300 (11.81)
Maximum transportable mass	Horizontal direction	—	—	—	—	—	—
	Vertical direction	4.5 (9.9)	4 (8.8)	2 (4.4)	—	—	—
Maximum acceleration	Horizontal direction	—			—		
	Vertical direction	2 (6.56)			—		
Maximum thrust force	N (lb.)	45 (10.1)	40 (9)	23 (5.1)	45 (10.1)	40 (9)	23 (5.1)
Push force	N (lb.)	45 (10.1) [6 mm/s (0.24 in/sec) or less]			45 (10.1) [6 mm/s (0.24 in/sec) or less]		
Maximum holding brake force	Power ON	45 (10.1)			45 (10.1)		
	Power OFF	0			0		
	Electromagnetic brake	45 (10.1)			—		
Repetitive positioning accuracy	mm (inch)	±0.02 (±0.0008)					
Resolution	mm (inch)	0.015 (0.0006)					
Lead	mm (inch)	12 (0.472)					
Stroke	mm (inch)	50 (1.97), 100 (3.94), 200 (7.87), 300 (11.81)					
Slider weight	kg (lb.)	Stroke 50 (1.97): 1.6 (3.52)[1.8 (3.96)] 200 (7.87): 2.4 (5.28)[2.6 (5.72)]			100 (3.94): 1.9 (4.18)[2.1 (4.62)] 300 (11.81): 2.9 (6.38)[3.1 (6.82)]		
Numbers in [] are values for the electromagnetic brake type.							
Ambient temperature	°C (°F)	0 to +40 (+32 to +104), nonfreezing					
Noise level (reference value)*	dB (A)	58					

■ EZC6

Cylinder		With electromagnetic brake			Without electromagnetic brake		
Motor type		Stepping motor with encoder			Stepping motor with encoder		
Drive method		Ball screw			Ball screw		
Maximum speed	mm/s (in/sec)	100 (3.94)	200 (7.87)	300 (11.81)	100 (3.94)	200 (7.87)	300 (11.81)
Maximum transportable mass	Horizontal direction	—	—	—	—	—	—
	Vertical direction	10 (22)	8 (17.6)	3 (6.6)	—	—	—
Maximum acceleration	Horizontal direction	—			—		
	Vertical direction	2 (6.56)			—		
Maximum thrust force	N (lb.)	100 (22.5)	94 (21.1)	35 (7.8)	100 (22.5)	94 (21.1)	35 (7.8)
Push force	N (lb.)	100 (22.5) [6 mm/s (0.24 in/sec) or less]			100 (22.5) [6 mm/s (0.24 in/sec) or less]		
Maximum holding brake force	Power ON	100 (22.5)			100 (22.5)		
	Power OFF	0			0		
	Electromagnetic brake	100 (22.5)			—		
Repetitive positioning accuracy	mm (inch)	±0.02 (±0.0008)					
Resolution	mm (inch)	0.015 (0.0006)					
Lead	mm (inch)	12 (0.472)					
Stroke	mm (inch)	50 (1.97), 100 (3.94), 200 (7.87), 300 (11.81)					
Slider weight	kg (lb.)	Stroke 50 (1.97): 3.2 (7.04)[3.6 (7.92)] 100 (3.94): 3.6 (7.92)[4.0 (8.8)] 200 (7.87): 4.5 (9.9)[4.9 (10.78)] 300 (11.81): 5.5 (12.1)[5.9 (12.98)]					
Ambient temperature		°C (°F) 0 to +40 (+32 to +104), nonfreezing					
Noise level (reference value)*		dB (A) 65					

* Noise level is indicated by a value measured in A range at 1 m (3.3 ft.) from the power unit during a reciprocating operation at the maximum speed and stroke.

■ Figure A-7 Noise Measurement Method



A.3.2 General Specifications

Insulation Resistance

An insulation resistance of 100 MΩ or more has been confirmed via a 500-VDC megger at the following locations:

- Between motor coil and case
- Between case and electromagnetic brake coil (electromagnetic brake type only)

Dielectric Strength

No abnormality was found after the applicable voltage was applied for one minute at the following locations:

- Between motor coil and case
- Between case and electromagnetic brake coil (electromagnetic brake type only)

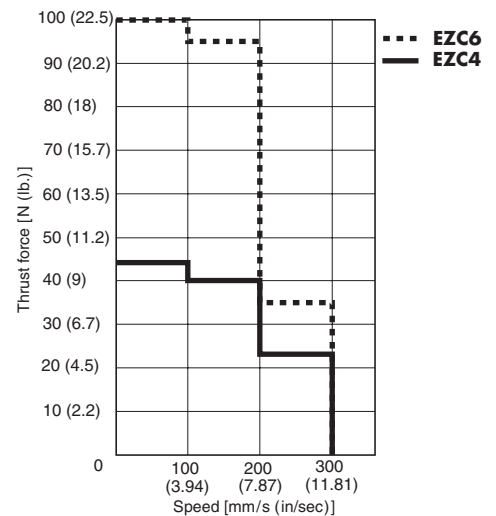
EZC4 AC 0.5kV 50Hz

EZC6 AC 1.0kV 50Hz

A.3.3 Speed and Thrust Force

The relationship between cylinder speed and thrust force limit is shown in the diagram below:

■ **Figure A-8**
Correlation Diagram of Speed and Thrust Force
(horizontal/vertical directions)

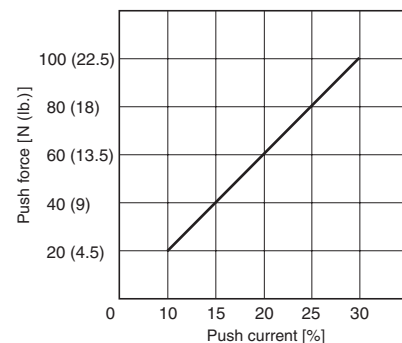
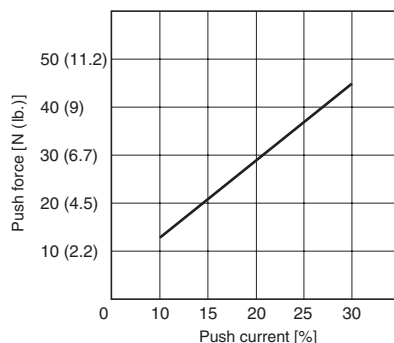


A.3.4 Push Current and Push Force

The relationships between push current during horizontal operation and push force at cylinder standstill are shown in the diagrams below:

- The accuracy of push force at standstill is not guaranteed.
- If the push force is smaller than the slide resistance of the load, a malfunction may occur when the rod is pushed against it.
- When the cylinder is used in a lift, an external force calculated by multiplying the weight of the carried object by the rate of gravitational acceleration is applied. Therefore, the cylinder push force must be set so as to accommodate this external force. Measure the push force using an actual load, and set an appropriate push current.

■ **Figure A-9 Push Force at Standstill (EZC4)** ■ **Figure A-10 Push Force at Standstill (EZC6)**



Appendix **B** Optional Parts and Accessories

B.1 Cable Set

These cables are used to extend the wiring length between the slider/cylinder and controller.

Flexible cables offering excellent elasticity are also available.

A motor cable and an encoder cable are provided as a set. Each cable can be purchased individually.

● Cable Set

Motor cable/encoder cable: Set of two cables

Model	Cable length
CC02EZ1	2 m (6.6 ft.)
CC05EZ1	5 m (16.4 ft.)
CC10EZ1	10 m (32.8 ft.)

Individual Motor Cable

Model	Cable length
CC02EZ1-M	2 m (6.6 ft.)
CC05EZ1-M	5 m (16.4 ft.)
CC10EZ1-M	10 m (32.8 ft.)

Individual Encoder Cable

Model	Cable length
CC02EZ1-E	2 m (6.6 ft.)
CC05EZ1-E	5 m (16.4 ft.)
CC10EZ1-E	10 m (32.8 ft.)

● Flexible Cable Set

Motor cable/encoder cable: Set of two cables

Model	Cable length
CC02EZ1R	2 m (6.6 ft.)
CC05EZ1R	5 m (16.4 ft.)
CC10EZ1R	10 m (32.8 ft.)

Individual Motor Cable

Model	Cable length
CC02EZ1R-M	2 m (6.6 ft.)
CC05EZ1R-M	5 m (16.4 ft.)
CC10EZ1R-M	10 m (32.8 ft.)

Individual Encoder Cable

Model	Cable length
CC02EZ1R-E	2 m (6.6 ft.)
CC05EZ1R-E	5 m (16.4 ft.)
CC10EZ1R-E	10 m (32.8 ft.)

B.2 Stainless Sheet

This sheet serves as a protective cover for the mechanical part of the slider.

EZS3-xx/EZS3-xxM Type

Model	Stroke
PAEZ3-5W	50 mm (1.97 inch)
PAEZ3-10W	100 mm (3.94 inch)
PAEZ3-15W	150 mm (5.91 inch)
PAEZ3-20W	200 mm (7.87 inch)
PAEZ3-25W	250 mm (9.84 inch)
PAEZ3-30W	300 mm (11.81 inch)
PAEZ3-40W	400 mm (15.75 inch)
PAEZ3-50W	500 mm (19.69 inch)

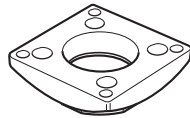
EZS4-xx/EZS4-xxM Type

Model	Stroke
PAEZ4-5W	50 mm (1.97 inch)
PAEZ4-10W	100 mm (3.94 inch)
PAEZ4-15W	150 mm (5.91 inch)
PAEZ4-20W	200 mm (7.87 inch)
PAEZ4-25W	250 mm (9.84 inch)
PAEZ4-30W	300 mm (11.81 inch)
PAEZ4-40W	400 mm (15.75 inch)
PAEZ4-50W	500 mm (19.69 inch)

EZS6-xx/EZS6-xxM Type

Model	Stroke
PAEZ6-10W	100 mm (3.94 inch)
PAEZ6-15W	150 mm (5.91 inch)
PAEZ6-20W	200 mm (7.87 inch)
PAEZ6-25W	250 mm (9.84 inch)
PAEZ6-30W	300 mm (11.81 inch)
PAEZ6-40W	400 mm (15.75 inch)
PAEZ6-50W	500 mm (19.69 inch)

B.3 Cylinder Flange



Each flange comes with hexagonal socket-head screws (four pieces).

EZS4-xx/EZS4-xxM Type

Model
PAEZ4-F

EZS6-xx/EZS6-xxM Type

Model
PAEZ6-F

B.4 Sensor Set

These sensors are used to detect the position of the slider table. They can be used when the controller is operated in the controller mode or driver mode.

- **Set of three sensors**

Model
PAEZ-S

B.5 Sensor Cable

Use this cable to connect the sensors and controller when the controller is operated in the controller mode.

Model	Cable length
CC02EZ1-S	2 m (6.6 ft.)

• Please contact your nearest ORIENTAL MOTOR office for further information.

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