



Motorized Linear Slide

EZS Series Actuator

OPERATING MANUAL

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Thank you for purchasing an Oriental Motor product.

This Operating Manual describes product handling procedures and safety precautions.

- Please read it thoroughly to ensure safe operation.
- Always keep the manual where it is readily available.

1 Introduction

1-1 Before use

Only qualified personnel of electrical and mechanical engineering should work with the product. Use the product correctly after thoroughly reading the "2 Safety precautions" on p.4. In addition, be sure to observe the contents described in warning, caution, and note in this manual. The product described in this manual has been designed and manufactured to be incorporated in general industrial equipment. Do not use for any other purpose. Oriental Motor Co., Ltd. is not responsible for any damage caused through failure to observe this warning.

1-2 How to use operating manuals

Operating manuals for the **EZS** Series are listed below. Operating manuals supplied with the product vary depending on the type of the product. After reading the manuals, keep them in a convenient place where they are readily available.

EZS Series equipped with the AZ Series	
• EZS Series Actuator (this document)	This manual explains the functions as well as the installation method and others for the motorized linear slide.
• AZ Series Driver (supplied with driver)	This manual explains items from preparation to basic operations, etc.
• AZ Series Function Edition *	This manual explains more detailed operations, functions, etc. that are not described in <u>OPERATING MANUAL</u> supplied with the product.
• Motorized actuator Function Setting Edition *	This manual explains settings of parameters required for when a motorized linear slide is combined with a driver.
• Recovery Guide (supplied with motorized linear slide)	This manual explains how to create the recovery data file that has stored the factory setting of the motorized linear slide.
• APPENDIX UL Standards for AZ Series (Supplied with products conform to the UL Standards)	This appendix describes the information of the equipped motor required for recognition of UL Standards.

* This manual does not come with the product. For details, contact your nearest Oriental Motor sales office or download from Oriental Motor Website Download Page.

EZS Series equipped with the AR Series	
• EZS Series Actuator (this document)	These manuals explain the functions as well as the installation method and others.
• AR Series Driver (supplied with driver)	
• AR Series USER MANUAL *	This manual explains the equipped motor and driver functions, the installation and connection method, the data setting method, the operating method, as well as the troubleshooting and others.
• Motorized actuator Function Setting Edition *	This manual explains settings of parameters required for when a motorized linear slide is combined with a driver.
• APPENDIX UL Standards for AR Series (Supplied with products conform to the UL Standards)	This appendix describes the information of the equipped motor required for recognition of UL Standards.

* This manual does not come with the product. For details, contact your nearest Oriental Motor sales office or download from Oriental Motor Website Download Page.

1-3 Equipped motor list

These are the lists of the motor model names that are equipped in the **EZS** Series.

The power supply current capacity, accessories and others of the drivers to be combined with the motorized linear slide are described in the OPERATING MANUAL Driver.

Since the motor model names are described in the OPERATING MANUAL Driver, check by reference to those described in the tables.

■ EZS Series equipped with the AZ Series

● AC power input type

Motorized linear slide model name	Motor model name
EZSM3000000AZAC	AZM46AC
EZSM3000000AZMC	AZM46MC
EZSM4000000AZAC	AZM46AC
EZSM4000000AZMC	AZM46MC
EZSM6000000AZAC	AZM66AC
EZSM6000000AZMC	AZM66MC

● DC power input type

Motorized linear slide model name	Motor model name
EZSM3000000AZAK	AZM46AK
EZSM3000000AZMK	AZM46MK
EZSM4000000AZAK	AZM46AK
EZSM4000000AZMK	AZM46MK
EZSM6000000AZAK	AZM66AK
EZSM6000000AZMK	AZM66MK

■ EZS Series equipped with the AR Series

● AC power input type

Motorized linear slide model name	Motor model name
EZSM3000000ARAC	ARM46AC
EZSM3000000ARMC	ARM46MC
EZSM4000000ARAC	ARM46AC
EZSM4000000ARMC	ARM46MC
EZSM6000000ARAC	ARM66AC
EZSM6000000ARMC	ARM66MC

● DC power input type

Motorized linear slide model name	Motor model name
EZSM3000000ARAK	ARM46SAK
EZSM3000000ARMK	ARM46SMK
EZSM4000000ARAK	ARM46SAK
EZSM4000000ARMK	ARM46SMK
EZSM6000000ARAK	ARM66SAK
EZSM6000000ARMK	ARM66SMK

2 Safety precautions

The precautions described below are intended to prevent danger or injury to the user and other personnel through safe, correct use of the product. Use the product only after carefully reading and fully understanding these instructions.

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

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

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

Description of signs

 Warning	Handling the product without observing the instructions that accompany a "Warning" symbol may result in serious injury or death.
 Caution	Handling the product without observing the instructions that accompany a "Caution" symbol may result in bodily injury or property damage.
 Note	The items under this heading contain important handling instructions that the user should observe to ensure the safe use of the product.

Description of graphic symbols

	Indicates "prohibited" actions that must not be performed.
	Indicates "compulsory" actions that must be performed.

 Warning	
	<ul style="list-style-type: none"> • Do not use the motorized linear slide in explosive or corrosive environments, in the presence of flammable gases, locations subjected to splashing water, or near combustibles. Doing so may result in fire, electrical shock, or injury. • Do not transport, install, connect, or inspect the motorized linear slide while the power is supplied. Doing so may result in electric shock. • Do not forcibly bend, pull, or pinch the cable. Doing so may result in fire or electric shock. • Do not disassemble or modify the motorized linear slide. Doing so may result in injury or damage to equipment. • Never use the motorized linear slide in a medical device used in connection with the maintenance or management of human life or health, or in a transportation system whose purpose is to move or carry people. • Do not use the brake mechanism of the electromagnetic brake motor as a deceleration/safety brake. Doing so may result in injury or damage to equipment. • Do not collide the table with the mechanical stopper in operations other than push-motion return-to-home operation or push-motion operation. Doing so may result in injury or damage to equipment.

 **Warning**


- Assign qualified personnel the task of installing, wiring, operating, inspecting and troubleshooting the motorized linear slide.
Failure to do so may result in fire, electric shock, injury or damage to equipment.
- Take measures to keep the moving parts in position for vertical operations such as elevator applications.
Failure to do so may result in injury or damage to equipment.
- Operate the data setter outside the safety cage.
Failure to do so may result in injury.
- Be sure to provide a safety cage conforming to EN ISO 13857 to prevent persons from entering the moving range of the motorized linear slide while power is supplied to the motorized linear slide. Turn off the main power to the driver before performing adjustment or inspection in which the table is moved manually.
Accidental contact may result in serious injury.
- When the driver generates an alarm (any of the driver's protective functions is triggered), take measures to hold the moving part in place since the motor stops and loses its holding torque. Failure to do so may result in injury or damage to equipment.
- Install the motorized linear slide in an enclosure.
Failure to do so may result in electric shock or injury.
- The motorized linear slide is Class I equipment, and therefore install so as to prevent from directly touching the motorized linear slide, or make sure to ground it.
Failure to do so may result in electric shock.
- Provide an emergency stop device or emergency stop circuit external to the equipment so that the entire equipment will operate safely in the event of a system failure or malfunction.
Failure to do so may result in injury.
- Perform the return-to-home operation after the power is restored. When the absolute-position backup system is used, positioning operation of the absolute mode is executed.
Failure to do so may result in injury or damage to equipment.
- Operate the motorized linear slide after setting the resolution, moving direction or other parameters. If the motorized linear slide is operated without setting parameters, the table may move to unexpected directions or run at unexpected speeds, causing injury or damage to equipment. (A variety of parameters have been set to the motorized linear slide equipped with the **AZ** Series at the time of shipment.)
- When the motor of the motorized linear slide equipped with the **AZ** Series is replaced, be sure to create the recovery data file in accordance with the procedures of the **AZ** Series Function Edition. If the replacement is not performed in accordance with the procedures, the table may move to unexpected directions or run at unexpected speeds, leading to injury or damage to equipment.
- After replacing the driver, set the resolution, moving direction or other parameters before operating the motorized linear slide.
If the motorized linear slide is operated without setting parameters, the table may move to unexpected directions or run at unexpected speeds, causing injury or damage to equipment.

 Caution	
	<ul style="list-style-type: none"> • Do not use the motorized linear slide beyond its specifications. Doing so may result in electric shock, injury or damage to equipment. • Keep your fingers and objects out of the openings in the motorized linear slide. Failure to do so may result in fire, electric shock or injury. • Do not touch the motorized linear slide while operating or immediately after stopping. Doing so may result in a skin burn(s). • Do not carry the motorized linear slide by holding its cables or its moving part. Doing so may cause injury. • Keep the area around the motorized linear slide free of combustible materials. Failure to do so may result in fire or a skin burn(s). • Do not leave anything around the motorized linear slide that would obstruct ventilation. Doing so may result in damage to equipment. • Do not touch the moving part during operation. Doing so may result in injury. • Do not touch the terminals while conducting the insulation resistance measurement or the dielectric strength test. Accidental contact may result in electric shock. • Do not use the sensor set (accessory) as safety components. Doing so may result in injury or damage to equipment.
	<ul style="list-style-type: none"> • Use a motorized linear slide and driver only in the specified combination. An incorrect combination may cause a fire. • The motorized linear slide is very heavy. When transporting or installing the motorized linear slide, make sure two persons work together to carry out the necessary tasks. Failure to do so may result in injury. • Wear a helmet, safety shoes, gloves or other protective gear when transporting or installing the motorized linear slide. Failure to do so may result in injury. • When replacing a motor, use the motor whose model number is the same as the one mounted at the time of shipment. If a motor being different from the one at the time of shipment is mounted, the specifications cannot be satisfied, and, in addition, damage to the equipment or injury may result. • The motor surface temperature may exceed 70 °C (158 °F) even under normal operating conditions. If the operator is allowed to approach the running motor, attach a warning label as shown below in a conspicuous position. Failure to do so may result in a skin burn(s) <div style="text-align: right; margin-top: 20px;">  Warning label </div>

3 Precautions for use

This chapter covers limitations and requirements the user should consider when using the product.

■ General

● Always use the supplied cable or accessory cable to connect the motorized linear slide and driver.

In the following condition, an appropriate accessory cable must be purchased separately.

- If a flexible cable is to be used.
- If a cable of 3 m (9.8 ft.) or longer is to be used.
- If a motorized linear slide and driver package without a cable was purchased.

● When conducting the insulation resistance measurement and the dielectric strength test, be sure to separate the connection between the motor and the driver.

Conducting the insulation resistance measurement or dielectric strength test with the motor and driver connected may result in damage to equipment.

● Do not make an impact on the motorized linear slide.

Do not drop the motorized linear slide. Also, do not hit the motorized linear slide on something hard. Doing so may cause the positioning accuracy decrease, the motor damage or the product service life reduction.

● Make sure not to hit or apply a strong impact on the encoder (ABZO sensor).

- Making a strong impact on an encoder (ABZO sensor) may cause the motor malfunction or damage to the encoder (ABZO sensor). When transporting the motorized linear slide or installing a load, handle the motorized linear slide carefully not to make a strong impact on the moving part.
- The warning label shown in the right is indicated on the motor of the motorized linear slide equipped with the **AZ** Series.



Warning label

● Do not move the encoder (ABZO sensor) toward a strong magnetic field.

A magnetic sensor is built into the encoder (ABZO sensor). If the motor is installed close to equipment which generates a strong magnetic field, the encoder (ABZO sensor) may break or malfunction. Keep the magnetic flux density on the surface of the encoder (ABZO sensor) so as not to exceed the values in the table.

	Magnetic flux density
When operating	10 mT
When transporting and storing	10 mT

● Meshing noise of mechanical sensor

A gear type mechanical sensor is built into the encoder (ABZO sensor). Although the meshing noise of gears may generate, it is not malfunction.

■ Temperature

● Use the motorized linear slide equipped with the **AZ** Series in conditions where the motor surface temperature will not exceed 80 °C (176 °F).

The motor surface temperature may exceed 80 °C (176 °F) under certain conditions (ambient temperature, operating speed, duty cycle, etc.). In order to protect the encoder (ABZO sensor), use the motor in conditions where the surface temperature does not exceed 80 °C (176 °F). If the encoder (ABZO sensor) temperature reaches the upper limit, the motor overheat alarm will generate.

● Use the motorized linear slide equipped with the **AR** Series in conditions where the motor surface temperature will not exceed 100 °C (212 °F).

The motor does not have a function to protect from overheating. The motor surface temperature may exceed 100 °C (212 °F) under certain conditions (ambient temperature, operating speed, duty cycle, etc.). To prevent the motor bearings (ball bearings) from reaching its usable life quickly, use the motor in conditions where the surface temperature does not exceed 100 °C (212 °F).

■ Operation

- In the case of the DC power input type products, the maximum speed may not be reached depending on the ambient temperature or the length of the motor cable.

- **Holding torque at standstill**

When the motorized linear slide stops, the holding torque will be reduced by the current cutback function of the driver. When selecting the motorized linear slide, check the holding torque at standstill in the specifications on the catalog.

- **Do not use the electromagnetic brake to reduce speed or as a safety brake.**

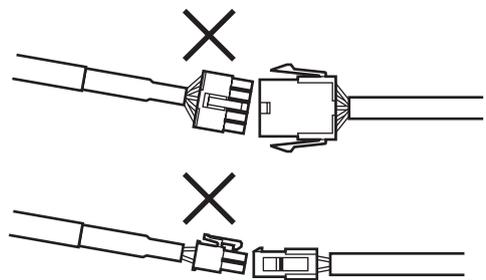
Do not use the electromagnetic brake as means to decelerate and stop the motorized linear slide. The brake hub of the electromagnetic brake will wear significantly and the braking force will drop. Since the power off activated type electromagnetic brake is equipped, it helps maintain the position of the load when the power is cut off, but this brake cannot securely hold the load in place. Accordingly, do not use the electromagnetic brake as a safety brake. To use the electromagnetic brake to hold the load in place, do so after the motorized linear slide has stopped.

■ Notes for when the connection cable is used

Note the following points when a supplied cable or accessory cable is used.

- **When inserting the connector**

Hold the connector main body, and insert it in straight securely. Inserting the connector in an inclined state may result in damage to terminals or a connection failure.



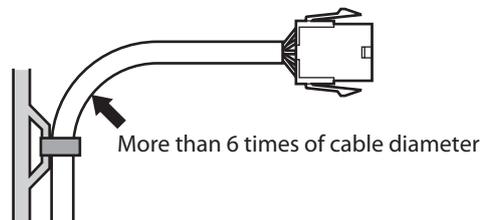
- **When pulling out the connector**

Pull out the connector in straight while releasing the lock part of the connector. Pulling out the connector with holding the cable (lead wire) may result in damage to the connector.

- **Bending radius of cable**

Use the cable in a state where the bending radius of the cable is more than 6 times of the cable diameter.

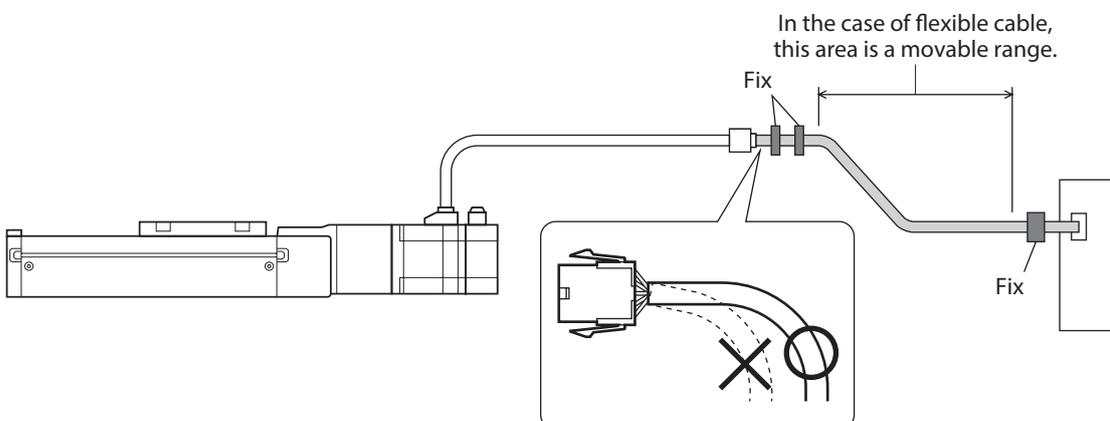
In the case of the lead wire type, use in a state where the bending radius is more than 4 times of the diameter of the lead wires.



- **How to fix the cable**

Fix the cable at the positions near the connector so as to apply no stress on the connector part.

Take measures so as to apply no stress on the connector by using wide clamps or by fixing at two places.



4 Preparation

This chapter explains the items you should check, as well as the name of each part.

4-1 Checking the product

Verify that the items listed below are included. Report any missing or damaged items to the Oriental Motor sales office from which you purchased the product.

When purchasing a motorized linear slide and driver package	When purchasing a motorized linear slide only
<ul style="list-style-type: none"> • Motorized linear slide • Driver • OPERATING MANUAL Actuator (this document) • OPERATING MANUAL Driver • Recovery Guide (Supplied with the models equipped with the AZ Series) • APPENDIX UL Standards *1 • Bolts for mounting the motorized linear slide (4 pcs.) • Connectors bag • Cable for motor *2 • Cable for electromagnetic brake *2 (Supplied with electromagnetic brake types) • Cable for encoder *2 (Supplied with the models equipped with the AZ Series) • Varistor *3 (Supplied with the models equipped with the AR Series) 	<ul style="list-style-type: none"> • Motorized linear slide • OPERATING MANUAL Actuator (this document) • Recovery Guide (Supplied with the models equipped with the AZ Series) • APPENDIX UL Standards *1 • Bolts for mounting the motorized linear slide (4 pcs.) • Varistor *4 (Supplied with the models equipped with the AR Series)

*1 Supplied with products conform to the UL Standards.

*2 When the product is supplied with a connection cable.

*3 Supplied with the motorized linear slides equipped with the DC power input type motor with electromagnetic brake which are combined with the pulse input type driver.

*4 Supplied with the motorized linear slides equipped with the DC power input type motor with electromagnetic brake.

4-2 How to identify the product model

Verify the model number of the purchased product against the number shown on the package label. Check the model number of the motorized linear slide against the number shown on the nameplate.

■ Motorized linear slide and driver package model

E Z S 4 R - E 0 5 0 - A Z M K D - 1

1 2 3 5 6 7 8 9 10 11

Models for clean room use

E Z S 4 CL - E 0 5 0 - A Z M K D - 1

1 2 4 5 6 7 8 9 10 11

1	Series name	EZS : EZS Series
2	Linear slide size	3 : Width 54 mm, Height 50 mm 4 : Width 74 mm, Height 50 mm 6 : Width 74 mm, Height 66.5 mm

3	Motor mounting direction	R : Parallel motor mounting type (Right side) L : Parallel motor mounting type (Left side) Blank : In-line motor mounting type
4	Direction of air coupler for suction	CR : Right CL : Left
5	Ball screw lead	D : 12 mm E : 6 mm
6	Stroke	005 to 085 : 50 to 850 mm (50 mm unit)
7	Motor	AZ : AZ Series AR : AR Series
8	Motor type	A : Single shaft M : With electromagnetic brake
9	Power supply input	<ul style="list-style-type: none"> Motorized linear slide equipped with the AZ Series A : Single-phase 100-120 VAC C : Single-phase/Three-phase 200-240 VAC K : 24/48 VDC Motorized linear slide equipped with the AR Series A : Single-phase 100-120 VAC (Single-phase 100-115 VAC for the pulse input type) C : Single-phase 200-240 VAC (Single-phase 200-230 VAC for the pulse input type) S : Three-phase 200-230 VAC (For the pulse input type only) K : 24/48 VDC
10	Driver type	D : Built-in controller type Blank: Pulse input type
11	Connection cable	Number : Length of supplied cable (m) Blank : Without connection cable

■ Motorized linear slide model

E Z S M 4 R E 050 AZ M K
1 2 3 5 6 7 8 9

Models for clean room use

E Z S M 4 CL E 050 AZ M K
1 2 4 5 6 7 8 9

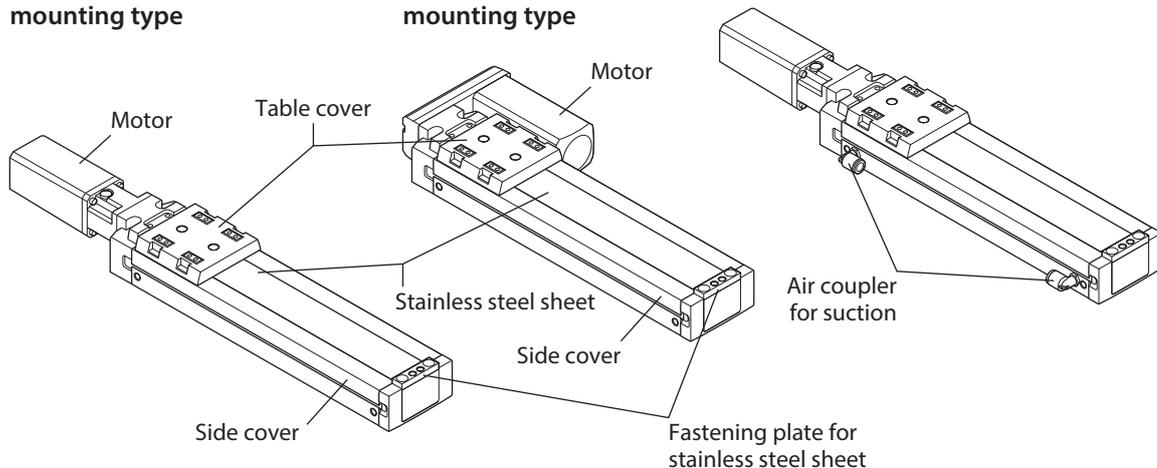
1	Series name	EZSM : EZS Series
2	Linear slide size	3 : Width 54 mm, Height 50 mm 4 : Width 74 mm, Height 50 mm 6 : Width 74 mm, Height 66.5 mm
3	Motor mounting direction	R : Parallel motor mounting type (Right side) L : Parallel motor mounting type (Left side) Blank : In-line motor mounting type
4	Direction of air coupler for suction	CR : Right CL : Left
5	Ball screw lead	D : 12 mm E : 6 mm
6	Stroke	005 to 085 : 50 to 850 mm (50 mm unit)
7	Motor	AZ : AZ Series AR : AR Series
8	Motor type	A : Single shaft M : With electromagnetic brake
9	Motor power supply type	C : AC power supply input K : DC power supply input

4-3 Names of parts

• In-line motor mounting type

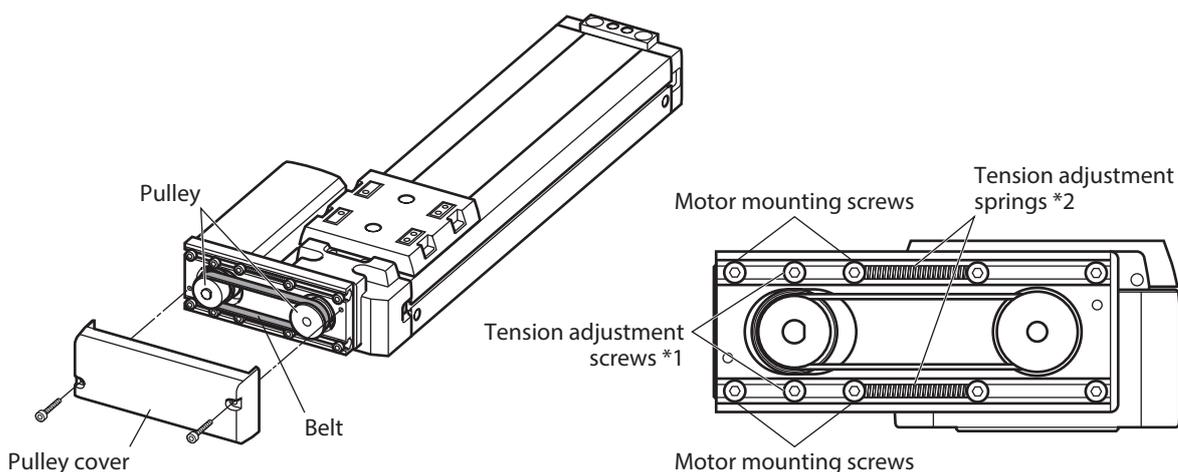
• Parallel motor mounting type

• Models for clean room use



* Only the in-line motor mounting type is available for the models for clean room use.

■ Mechanism of the parallel motor mounting type



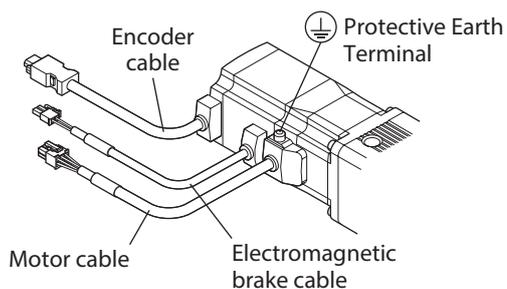
*1 The motor is fixed in the position where the belt tension becomes optimum.

*2 Springs for belt tension adjustment are installed.

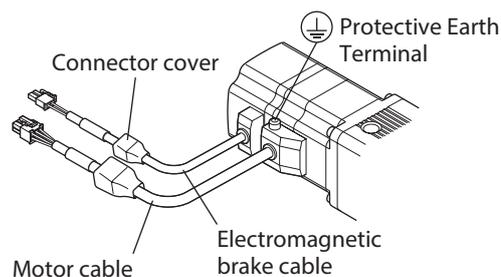
■ Motor

The following figures show models for the electromagnetic brake type and AC power input.

• Motorized linear slide equipped with the AZ Series



• Motorized linear slide equipped with the AR Series



5 Installation

5-1 Location for installation

The motorized linear slide has been designed and manufactured to be incorporated in general industrial equipment. Install it in a well-ventilated location that provides easy access for inspection. The location must also satisfy the following conditions:

- Inside an enclosure that is installed indoors (provide vent holes)
- Operating ambient temperature: 0 to +40 °C [+32 to 104 °F] (non-freezing)
- Operating ambient humidity: 85% or less (non-condensing)
- Area that is free of explosive atmosphere or toxic gas (such as sulfuric gas) or liquid
- Area not exposed to direct sun
- Area free of excessive amount of dust, iron particles or the like
- Area not subject to splashing water (rain, water droplets), oil (oil droplets) or other liquids
- Area free of excessive salt
- Area not subject to continuous vibration or excessive shocks
- Area free of excessive electromagnetic noise (from welders, power machinery, etc.)
- Area free of radioactive materials, magnetic fields or vacuum
- Up to 1000 m (3300 ft.) above sea level

■ If a motor is installed in an environment where a magnetic field is generated

A magnetic sensor is built into the encoder (ABZO sensor). If the motor is installed close to equipment which generates a strong magnetic field, the encoder (ABZO sensor) may break or malfunction. Make sure to prevent the magnetic flux density on the surface of the encoder (ABZO sensor) from exceeding 10 mT.

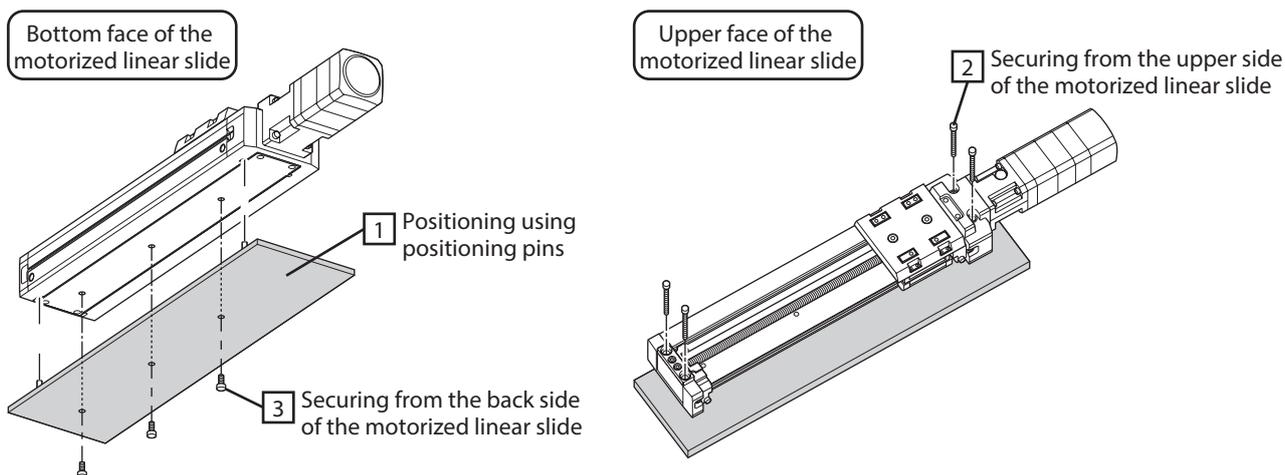
Note Do not install the motor close to equipment which generates a strong magnetic field.

5-2 Installing the motorized linear slide

The **EZS** Series is available for horizontal installation, vertical installation, and wall-mount installation. Taking account of vibration prevention as well as deflection of the motorized linear slide, install it on a metal surface of sufficient strength (thickness 10 mm or more). Secure so that the entire area of the bottom face of the motorized linear slide contacts the mounting plate.

■ Installation procedure

- 1 Use the positioning pin holes and the positioning pins to position the motorized linear slide. (⇒ p.15)
Use the guide rail reference surfaces and the mounting reference surfaces of the motorized linear slide to position.
- 2 Secure the motorized linear slide from the upper side with the supplied bolts for mounting. (⇒ p.16)
- 3 Secure the motorized linear slide from the back side of the mounting plate with screws (not supplied). (⇒ p.16)



■ Mounting plate

The thickness of the mounting plate described in the table is the minimum requirements for installation. If the accuracy is required, design the thickness of the mounting plate in consideration of the installation conditions such as load condition, rigidity, vibration and others.

Model	Material	Thickness	Flatness against the mounting reference surface
EZS3	Aluminum	10 mm or more	0.05 mm or less
EZS4, EZS6			0.06 mm or less

■ Mounting screw, positioning pin

Model	Bolt for mounting (Supplied with the product.)	Guide rail fixing screw	Positioning pin
EZS3, EZS4	M5×45 mm Length from the bottom face of the motorized linear slide : 8 mm	M5 Length from the mounting plate : 6 mm or less	ø3 mm Length from the mounting plate : 4 mm or less
EZS6	M5×65 mm Length from the bottom face of the motorized linear slide : 12 mm		

Note About the length of mounting screws and positioning pins, be sure to observe the specified value. Exceeding the specified value may cause the motorized linear slide to break, leading to injury or mechanical damage.

■ Release the electromagnetic brake

When moving the table of the motorized linear slide with an electromagnetic brake for adjusting the position or others, connect the 24 VDC power supply for electromagnetic brake to release the electromagnetic brake.

● Specifications of a power supply for electromagnetic brake

Model	Voltage	Current capacity
EZS3, EZS4	24 VDC±5% *	0.08 A or more
EZS6		0.25 A or more

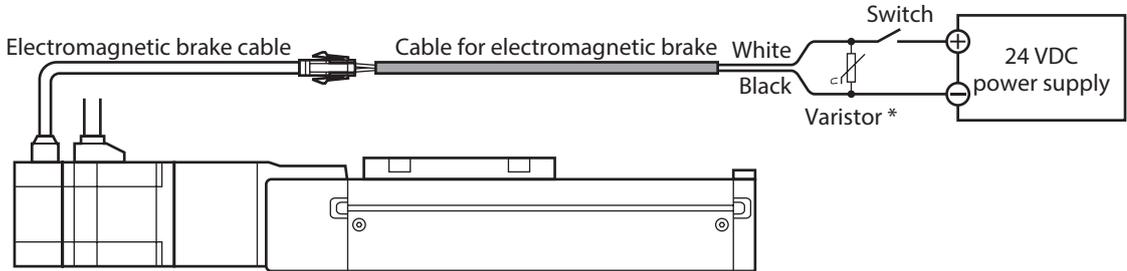
* If the distance between the motorized linear slide with an electromagnetic brake and the driver is extended to the following length, use a power supply of 24±4% VDC.

Motorized linear slide equipped with the **AZ** Series : 20 m (65.6 ft.)

Motorized linear slide equipped with the **AR** Series : 20 to 30 m (65.6 to 98.4 ft.)

● **Releasing procedure**

1. Connect the “electromagnetic brake cable” and “cable for electromagnetic brake.”
2. Connect the lead wires of the “cable for electromagnetic brake” to the 24 VDC power supply. Connect the white lead wire to the +24 VDC terminal, and the black lead wire to the GND terminal.
3. Turn on the 24 VDC power supply. The electromagnetic brake will be released and the table will be able to move by hand.

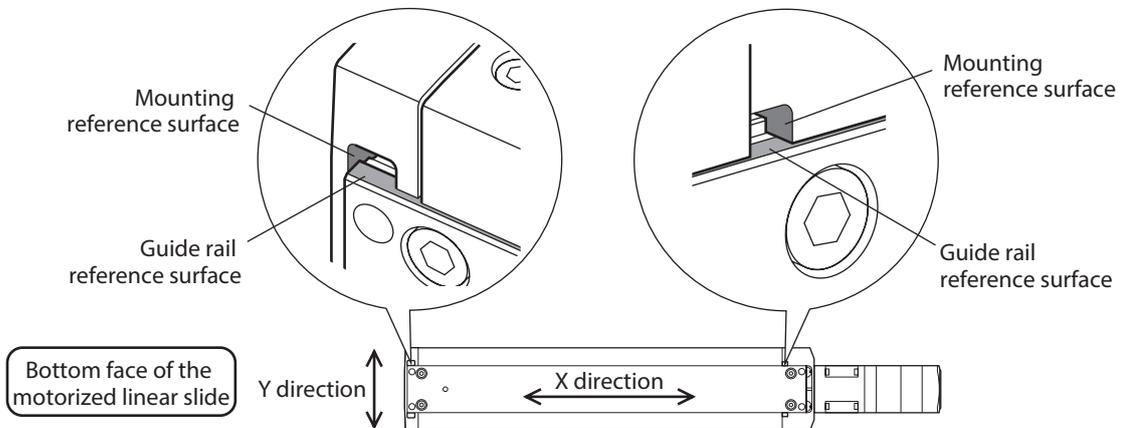


* Be sure to connect the varistor to protect the contact of the switch or to prevent electrical noise.
 Motorized linear slide equipped with the **AZ** Series : Recommended varistor: Z15D121 (SEMITEC Corporation)
 Motorized linear slide equipped with the **AR** Series : Use the supplied varistor.

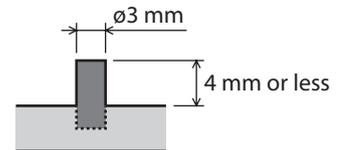
Note Connect the lead wires of the electromagnetic brake in the correct polarities since they have polarities. Connecting the lead wires in wrong polarities will not properly operate the electromagnetic brake.

■ **Positioning the motorized linear slide**

There are two types of reference surfaces for the positioning pin holes. One is the reference surface used the side of the guide rail, and the other is the mounting reference surface of the motorized linear slide. Use the guide rail reference surfaces in the Y direction and the mounting reference surfaces in the X direction to position the motorized linear slide.

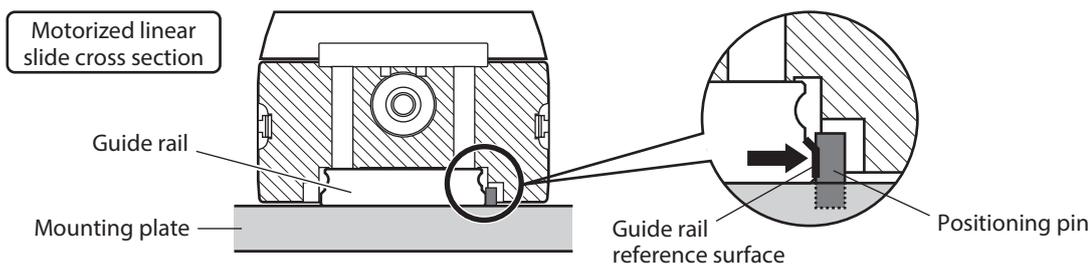


Provide positioning pins (2 pieces) on the mounting plate first, and position the motorized linear slide. Use the positioning pins of diameter $\varnothing 3$ mm, and keep the height from the mounting plate to be 4 mm or less.



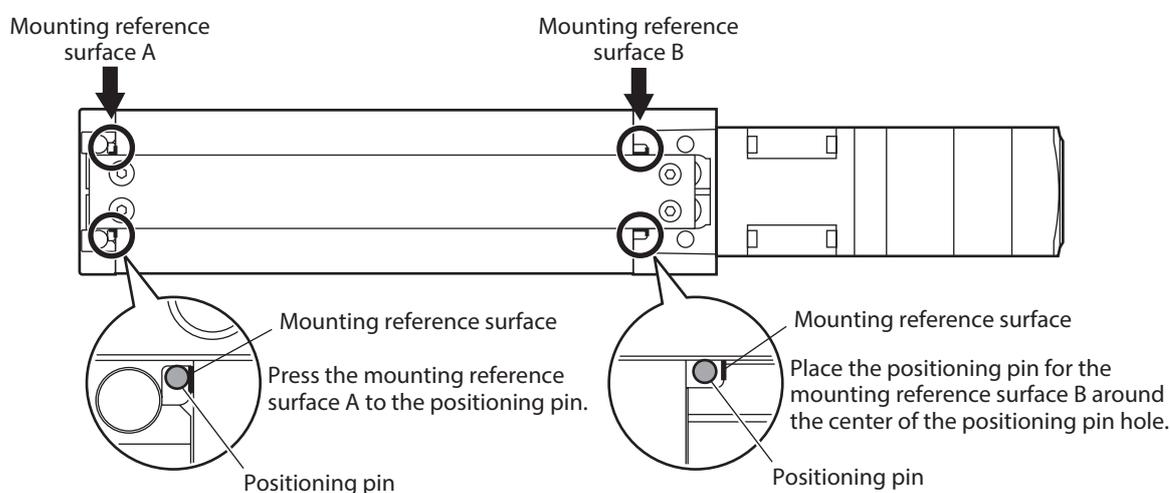
● Working procedure

1. Use the guide rail reference surfaces to position the Y direction.
Position while pressing the guide rail reference surfaces to positioning pins.

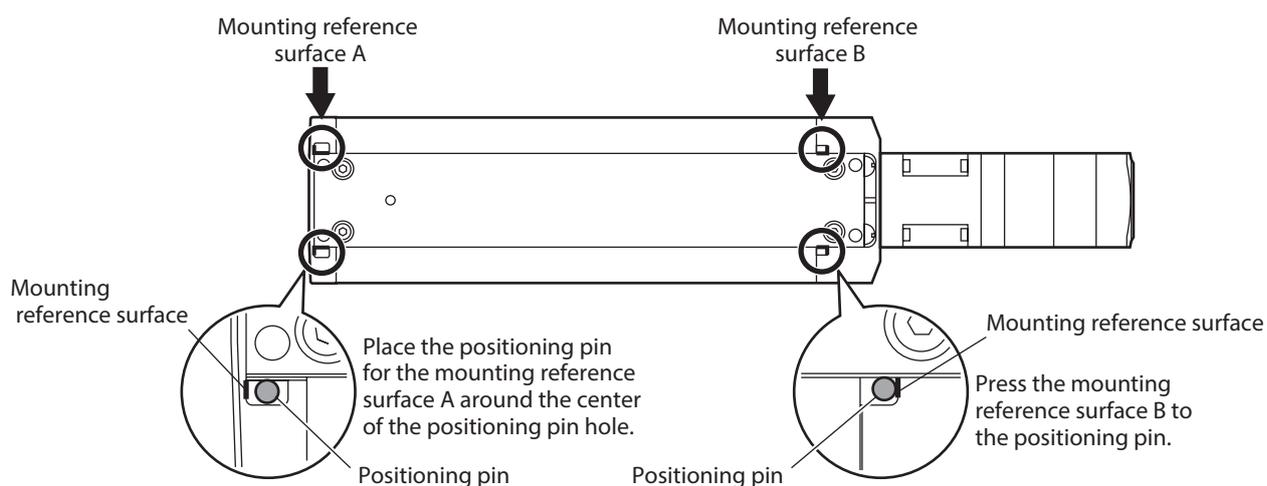


2. Use the mounting reference surface to position the X direction.
There are two types of mounting reference surfaces, A and B. Position the mounting reference surface A or B by pressing to either of the positioning pins which have been positioned in the procedure 1.

EZS3 Example) When pressing the mounting reference surface A to the positioning pin



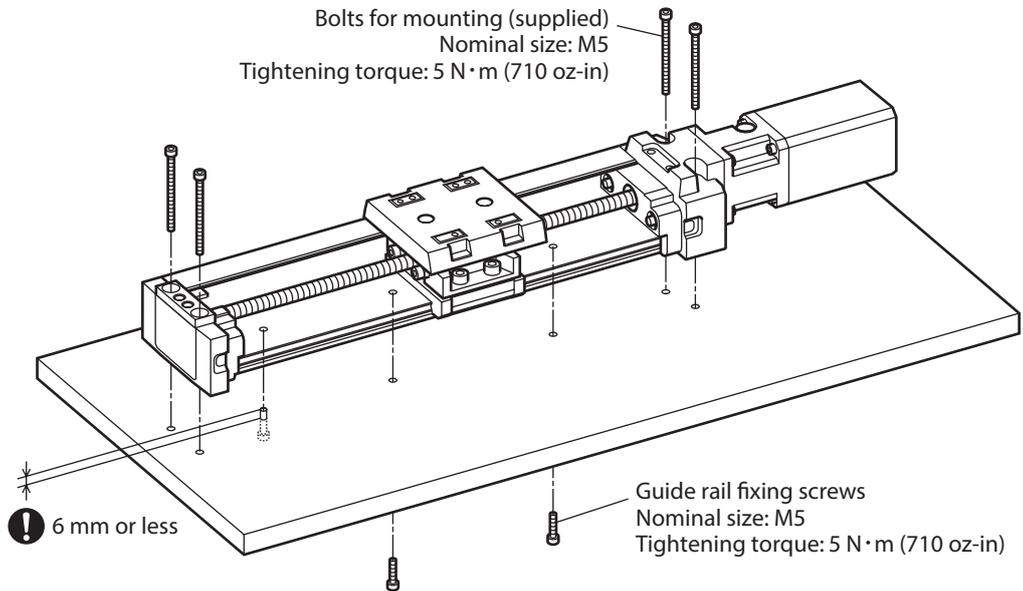
EZS4, EZS6 Example) When pressing the mounting reference surface B to the positioning pin



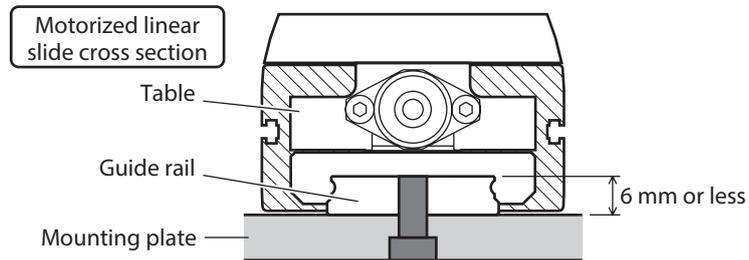
■ How to install the motorized linear slide

Install so that the entire area of the bottom face of the motorized linear slide contacts the mounting plate.

1. Secure the motorized linear slide from the upper face using the supplied bolts for mounting.
2. Secure the guide rail from the back side of the mounting plate with screws (not supplied).



⚠ Warning The thickness of the guide rail is 6 mm. Make sure the screw length to secure the guide rail is 6 mm or less from the mounting plate. Exceeding 6 mm may cause the table to break, leading to injury or mechanical damage.



5-3 Changing the motor cable leading direction

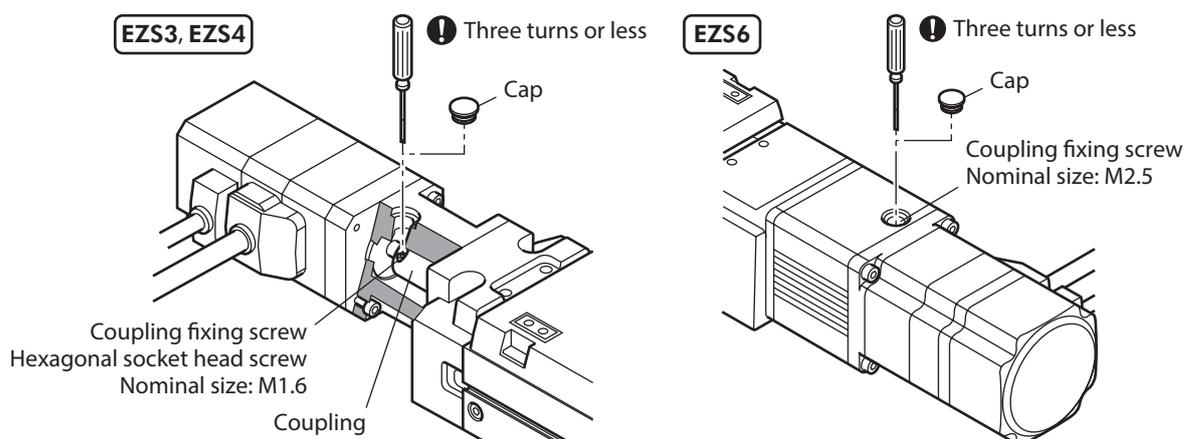
The motor cable leading direction can be changed according to the space of equipment.

Warning

- When changing the motor cable leading direction, remove the load, and perform in a state where the motorized linear slide is placed in a horizontal position. Doing the operation in a vertical condition may allow the moving part to fall, leading to injury or mechanical damage.
 - If the motor mounting screws are removed in a state where the motorized linear slide is installed vertically, the motor may rotate rapidly. Thereby, fingers may be caught in the product or the cable may be disconnected.
- Set the home position again after mounting a motor. If the motorized linear slide is operated without setting the home position, the moving part may move to unexpected directions or run at unexpected speeds, leading to injury or mechanical damage.
 - The moving part of the motorized linear slide may collide with the mechanical stopper.
 - The load may collide with other equipment.
- Be sure to secure the coupling with the specified tightening torque. Unless it is secured with the specified torque, the ball screw may rotate idly, leading to injury or mechanical damage.
 - When the motorized linear slide is used in a vertical condition, the load may fall.
 - When the motorized linear slide is used in a horizontal condition, the moving part of the motorized linear slide may collide with the mechanical stopper. Also, the load may collide with other equipment.

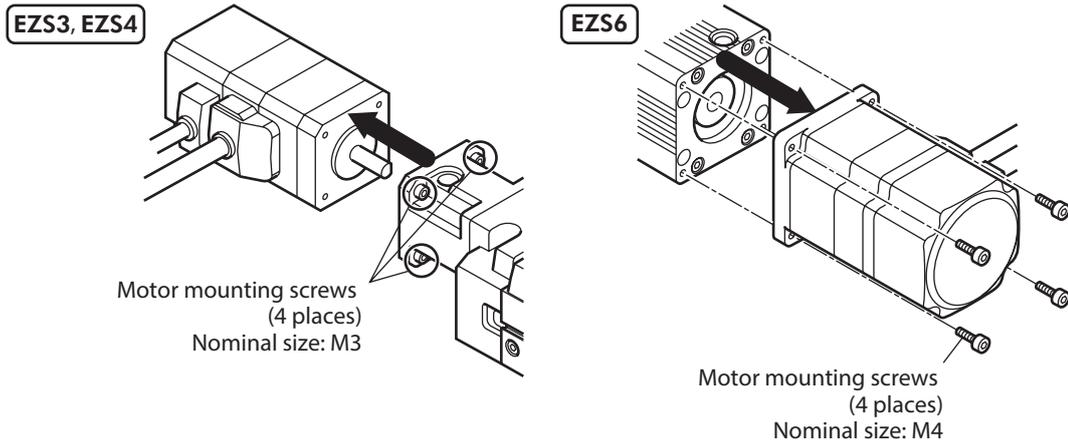
■ In-line motor mounting type

1. Remove the cap, and loosen the coupling fixing screw.



- When removing the coupling fixing screw, do not insert the tool diagonally.
- Do not use the ball-end hex key.
- To prevent the coupling fixing screw from falling off, keep three turns or less when turning the screw.

- Remove the motor mounting screws, and dismount the motor.



- Change the cable leading direction, and mount the motor.
Mount the motor according to the procedure opposite of dismounting it.
Refer to the table below for the tightening torque of the coupling fixing screw and motor mounting screw.

Model	Tightening torque	
	Coupling fixing screw	Motor mounting screw
EZS3, EZS4	M1.6, 0.25 N·m (35 oz-in)	M3, 1 N·m (142 oz-in)
EZS6	M2.5, 1 N·m (142 oz-in)	M4, 2.4 N·m (340 oz-in)

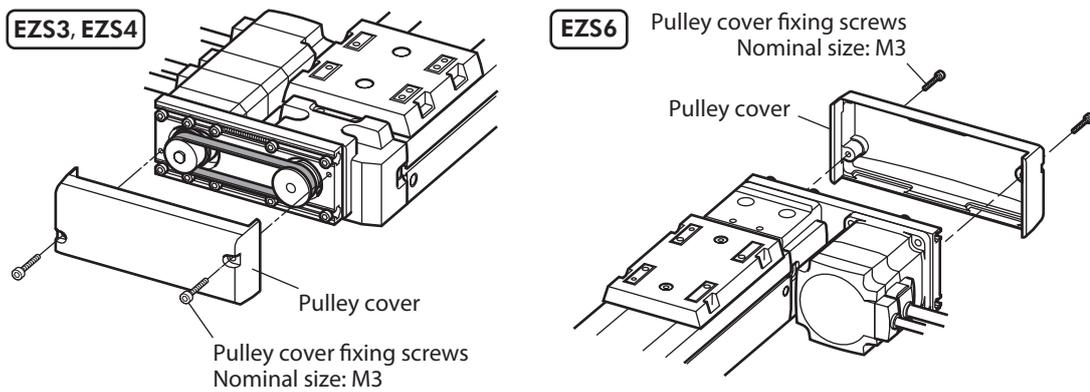
memo Use a tool capable of controlling the torque when tightening the coupling fixing screw.

- After mounting the motor, set the home position again.

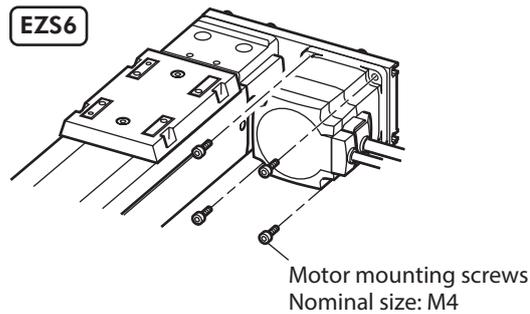
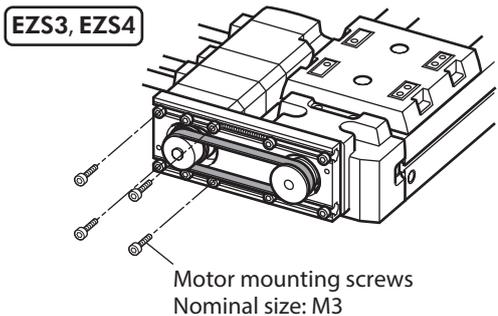
■ Parallel motor mounting type

The cable leading direction can be changed to one of three directions.

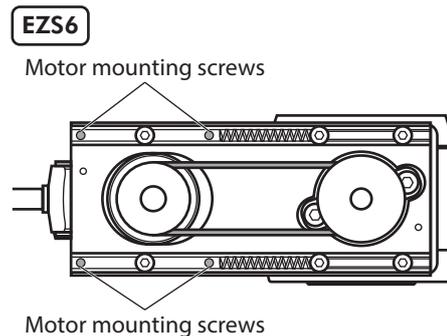
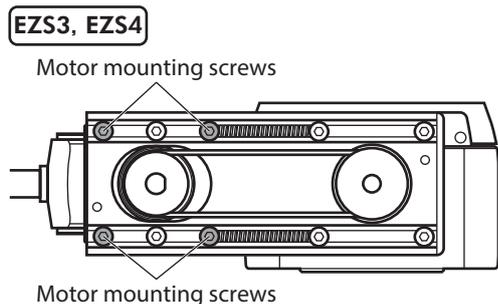
- Remove the pulley cover fixing screws, and detach the pulley cover.



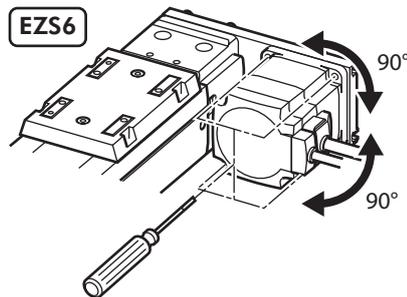
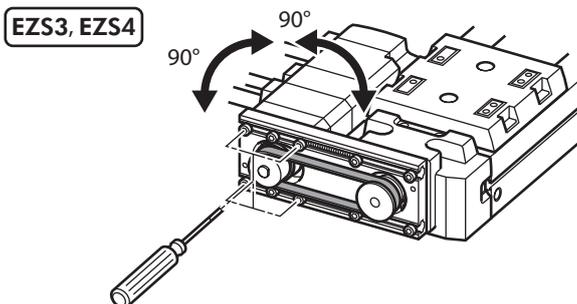
2. Remove the motor mounting screws, and dismount the motor.



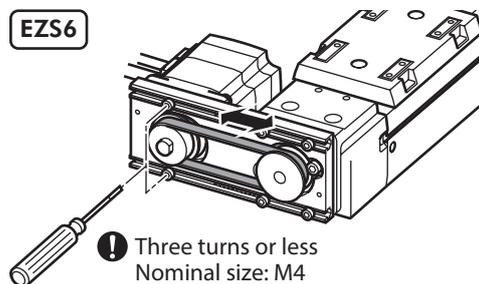
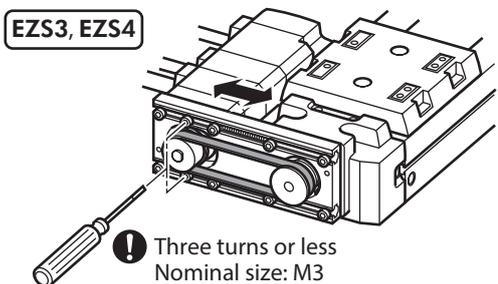
Note Do not loosen or remove the screws other than the motor mounting screws.



3. Change the cable leading direction, and mount the motor to tentatively fix the motor mounting screws. Tentatively fix the screws in a degree to be able to move the motor when touching it.



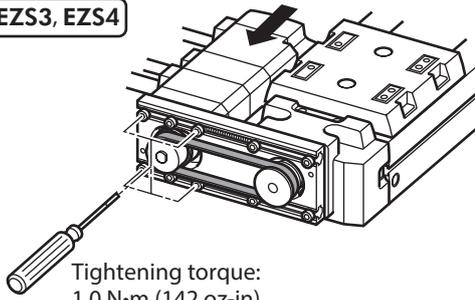
4. Loosen the tension adjustment screws. When loosening the screws, tension of the belt will be adjusted properly by the strength of springs.



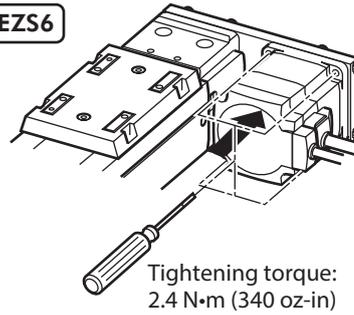
memo To prevent the tension adjusting screws from falling off, keep three turns or less when turning the screw.

5. Tighten the motor mounting screws with pressing the motor in the direction of arrow so that the motor does not tilt.

EZS3, EZS4

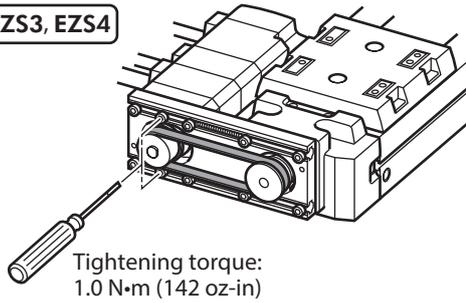


EZS6

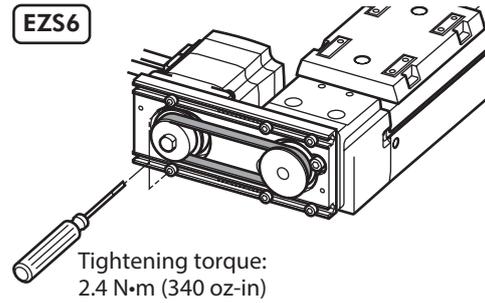


6. Tighten the tension adjustment screws.

EZS3, EZS4



EZS6

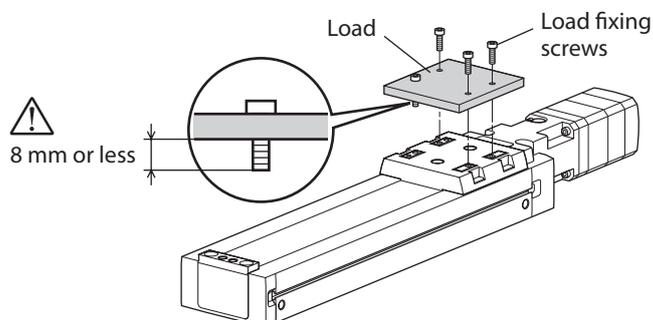


7. Attach the pulley cover, and tighten the screws.
Tightening torque: 1.0 N·m (142 oz-in)
8. After mounting the motor, set the home position again.

5-4 How to install a load

Using the load-installation screw holes on the table, install a load with screws.

Warning For the load fixing screws, be sure not to screw deeper than the length of 8 mm in the table. Exceeding 8 mm may cause the table to break, leading to injury or mechanical damage.

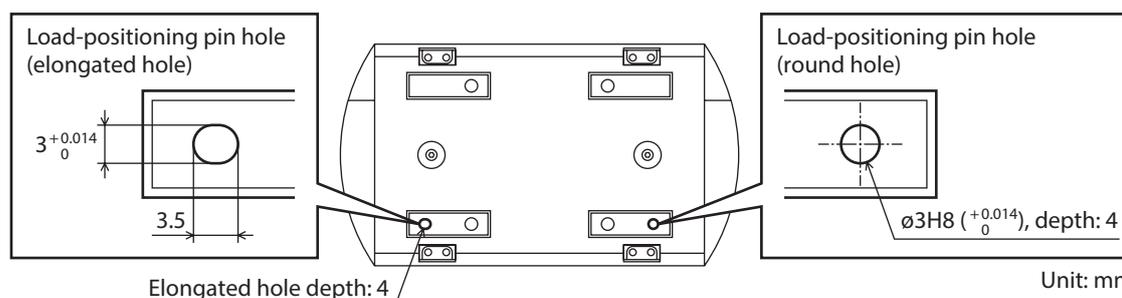


Model	Load fixing screw Tightening torque
EZS3, EZS4	M4, 2.4 N·m (340 oz-in)
EZS6	M5, 5 N·m (710 oz-in)

Load-positioning pin holes of table

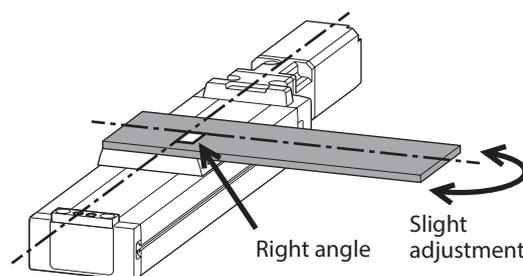
Two types of load-positioning pin holes, which are an elongated hole and a round hole, are provided one place each on the table.

If installation repeatability is required when installing a load, use the load-positioning pin holes.



Note Be sure to secure positioning pins to a load side. Securing the positioning pins to the table may damage the mechanism due to impact or an excessive moment of inertia.

When installing a load being required the perpendicularity against the moving direction of the table, adjust the perpendicularity of the load using the round load-positioning pin hole.



6 Connection

6-1 Connecting the driver

For details about the connection method of the driver, refer to the [OPERATING MANUAL Driver](#).

6-2 Grounding the motorized linear slide

Use a round terminal when grounding, and make sure to ground with a screw and washer. Ground wires and crimp terminals are not supplied.

- memo**
- When multiple motorized linear slides are used in combination, ground each motorized linear slide.
 - Do not share the grounding wire with a welder or any other power equipment.

Motorized linear slide equipped with the AZ Series

The grounding method of the motor varies depending on the driver input power. Check the table and ground using a suitable method. Be sure to ground the driver.

Driver input voltage	100-120 VAC 200-240 VAC	24 VDC	48 VDC
Grounding method			
1) Protective Earth Terminal of the driver	Required to ground	Required to ground	Required to ground
2) Grounding wire of the motor	Required to ground	Not required	Not required
3) Protective Earth Terminal of the motor	*	Not required	*

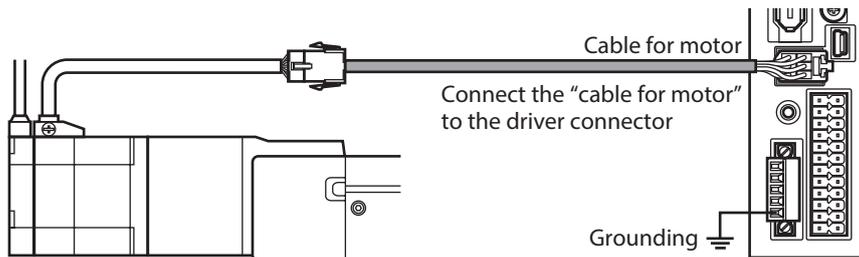
* Ground if the grounding resistance of the standards that applies to the equipment is not satisfied.

Reference: Grounding wire of the "cable for motor"

- Conductor size: AWG18 (0.75 mm²)
- Maximum conductor resistance: 21.8 Ω/km (25.6 Ω/km for flexible cable)

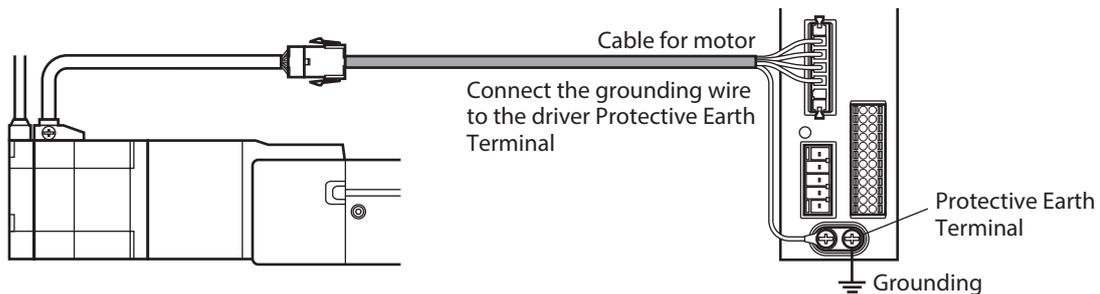
1) Grounding the Protective Earth Terminal of the driver

Connect the motor to the driver, and surely ground the Protective Earth Terminal of the driver. Refer to the [OPERATING MANUAL Driver](#) for how to ground. The figure shows the DC power input type.



2) Grounding the grounding wire of the motor [AC power input type only]

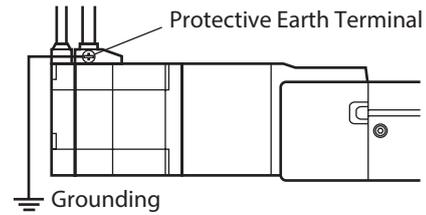
Connect the grounding wire of the "cable for motor" to the Protective Earth Terminal of the driver.



● **3) Grounding the Protective Earth Terminal of the motor**

Be sure to ground the Protective Earth Terminal of the motor.

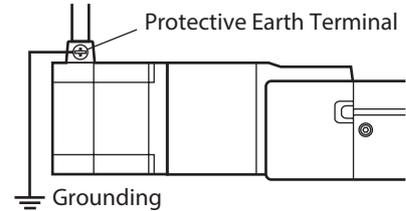
- Grounding wire: AWG18 (0.75 mm²) or more
- Screw size of Protective Earth Terminal: M4
- Tightening torque: 1.2 N·m (170 oz-in)



■ **Motorized linear slide equipped with the AR Series**

If the DC power input type product is used at 48 VDC or the AC power input type is used, be sure to ground the Protective Earth Terminal of the motor.

- Grounding wire: AWG18 (0.75 mm²) or more
- Screw size of Protective Earth Terminal: M4
- Tightening torque: 1.2 N·m (170 oz-in)



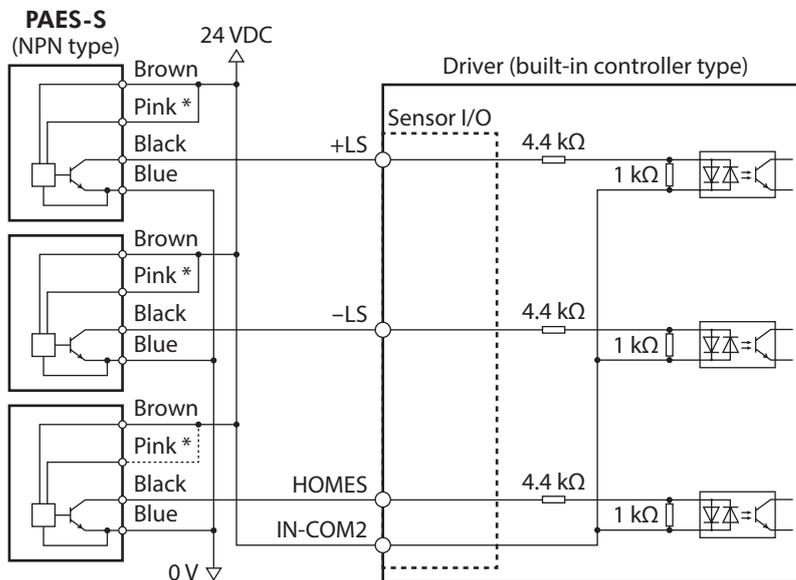
6-3 Connect the sensor (Motorized linear slide equipped with the AR Series)

External sensors are required when the motorized linear slide equipped with the **AR Series** is used. This section explains examples for how to connect the driver and accessory sensor set. For details, refer to the OPERATING MANUAL of the sensor set or OPERATING MANUAL Driver.

■ **Connection example for the sensor set PAES-S (NPN type)**

The connection example is shown based on the following conditions.

- Home-seeking mode: 3 sensor mode
- Logic of +LS output and -LS output: Normally closed
- Logic of HOMES output: Normally open

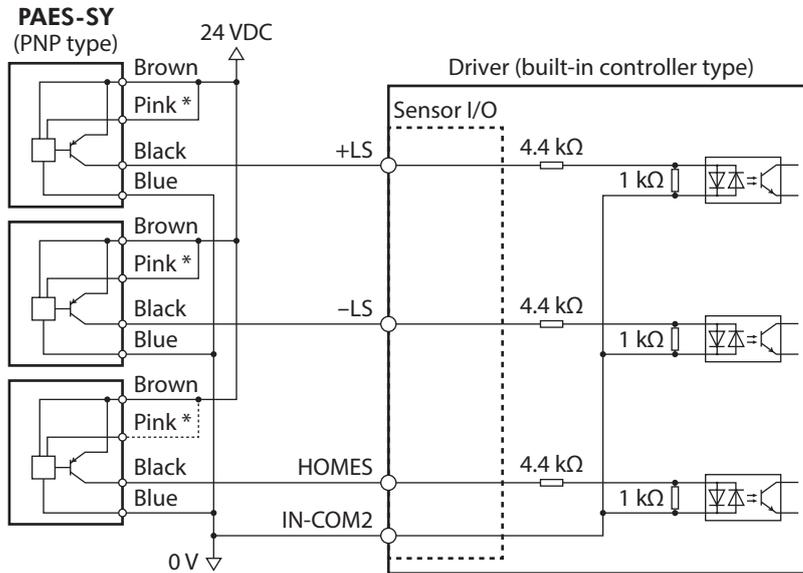


* The logic of the sensor varies depending on the connection method. When the pink color lead is connected to the brown color lead, the sensor logic will be "normally closed."

■ Connection example for the sensor set PAES-SY (PNP type)

The connection example is shown based on the following conditions.

- Home-seeking mode: 3 sensor mode
- Logic of +LS output and -LS output: Normally closed
- Logic of HOMES output: Normally open



* The logic of the sensor varies depending on the connection method. When the pink color lead is connected to the brown color lead, the sensor logic will be "normally closed."

7 Maintenance

This chapter explains the maintenance items in order to operate motorized linear slide safely and efficiently. If an abnormal condition is noted on the motorized linear slide, discontinue any use and contact your nearest Oriental Motor sales office.

7-1 Inspection item and timing

If the motorized linear slide is operated eight hours a day, perform maintenance according to the applicable period specified in the table below. Reduce maintenance intervals accordingly if the operating rate is high such as continuous operation for 24 hours.

Maintenance timing	External inspection	External cleaning	Internal inspection
When operated for the first time	○	–	–
Six months after initial operation	○	–	○
Every six months thereafter	○	–	○
As needed	–	○	–

■ External inspection

Check the items specified in table below.

Item	Description	Remedial action
Motorized linear slide	<ul style="list-style-type: none"> • Are there any loose screws which have installed the motorized linear slide? • Are there any loose screws which have installed the load? • Are there any loose motor mounting screws? 	Tighten the screws securely.
	Are there any cracks or slacks in the stainless steel sheet?	<ul style="list-style-type: none"> • Replace the stainless steel sheet. For the stainless steel sheet for maintenance, contact your nearest Oriental Motor sales office. • Refer to p.33, and adjust the tension of the stainless steel sheet.
Connector, cable	<ul style="list-style-type: none"> • Are there any scratches or receive a stress on the cable? • Are there any loose connections on the motor or driver? 	<ul style="list-style-type: none"> • Replace the cable. • Connect the connector again.
Operation	Are there any abnormal noise or vibration from the bearings, etc.?	Check the load mounting condition and operating speed.

■ External cleaning

- Wipe off any dirt and stains using a soft cloth. To remove stubborn stains, wipe the area using a soft cloth moistened with neutral detergent.
- Do not apply compressed air. Dust may enter through gaps.
- Do not use petroleum solvents, since they will damage the coated surface.

Internal inspection

Visually check the internal condition of the motorized linear slide. Check the items specified in table below. Even if the grease has turned brown, lubrication condition is deemed appropriate if the running surface still appears glossy. Refer to "7-2 Grease lubrication" for how to apply grease.

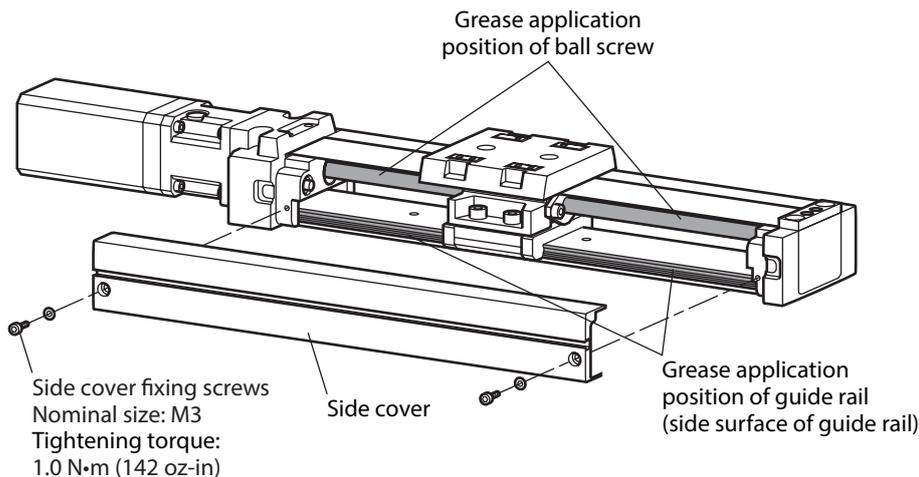
Item	Description	Remedial action
Ball screw	Are there any deposits of foreign matter such as dust?	Remove the foreign matter.
	Has the grease lost its gloss or been consumed?	Clean the ball screw with a soft cloth and apply grease to the nut running groove.
Guide rail	Are there any deposits of foreign matter such as dust?	Remove the foreign matter.
	Has the grease lost its gloss or been consumed?	Clean the ball rolling grooves on both sides of the guide rail with a soft cloth and apply grease to the ball rolling grooves.

7-2 Grease lubrication

Detach the side cover, and apply grease referencing the re-greasing interval in the table below.

Grease application position	Re-greasing interval	Type of grease	Grease amount
Ball screw	<ul style="list-style-type: none"> • Every six months • Every 100 km (62 mi) in mileage 	• AFF Grease (THK Co., Ltd.)	Apply grease so as to spread it over the traveling surface. Wipe off excess grease.
		• Models for clean room use • AFE-CA Grease (THK Co., Ltd.)	
Guide rail	• When grease becomes extremely dirty	• AFF Grease (THK Co., Ltd.)	

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



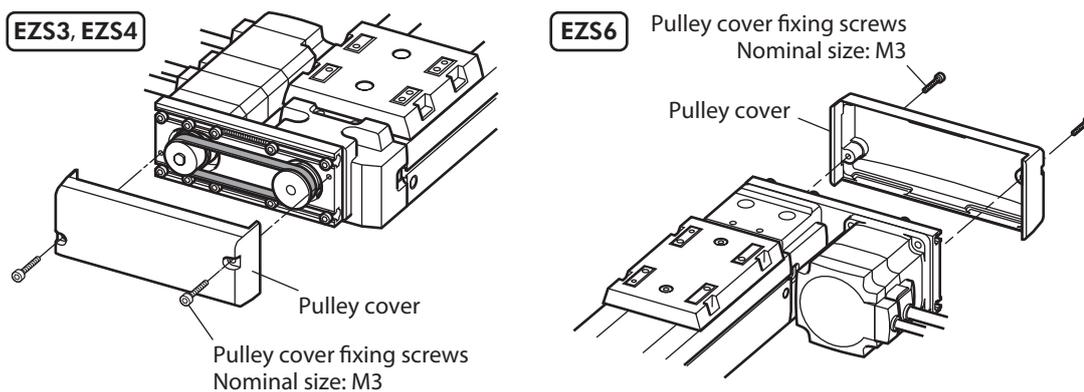
7-3 Checking the belt (Parallel motor mounting type)

Detach the pulley cover, and check the belt condition according to the items in the table below. As the result of checking, replace the belt if abnormality is detected. Refer to p.28 for how to replace the belt.

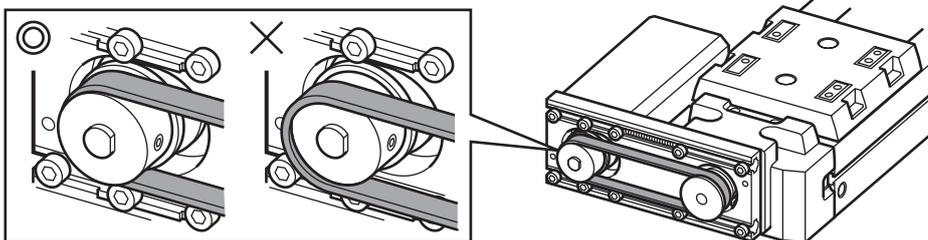
Inspection interval	Every 500 km (310 mi) in mileage
Inspection item	<ul style="list-style-type: none"> • No crack on the belt rubber • No tooth chip on the belt • No abnormal wear on the tooth cloth of the belt

■ Checking method

1. Remove the pulley cover fixing screws, and detach the pulley cover.



2. Check the the belt condition. And check the belt does not detach or protrude from the pulley.



3. Attach the pulley cover, and tighten the screws.
Tightening torque: 1.0 N·m (142 oz-in)

7-4 Adjusting the belt tension and replacing the belt

Adjust the belt tension of the parallel motor mounting type, or replace the belt.

Warning

- When adjusting the belt tension or replacing the belt, remove the load, and perform in a state where the motorized linear slide is placed in a horizontal position. Doing the operation in a vertical condition may allow the moving part to fall, leading to injury or mechanical damage.
- Set the home position again after mounting a motor. If the motorized linear slide is operated without setting the home position, the moving part may move to unexpected directions or run at unexpected speeds, leading to injury or mechanical damage.
 - The moving part of the motorized linear slide may collide with the mechanical stopper.
 - The load may collide with other equipment.

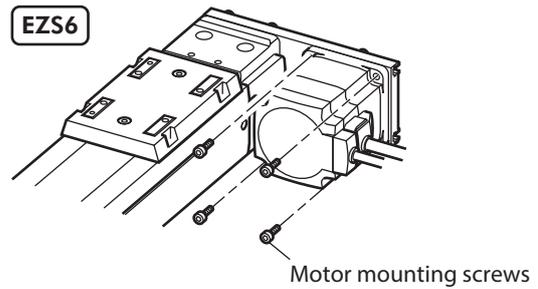
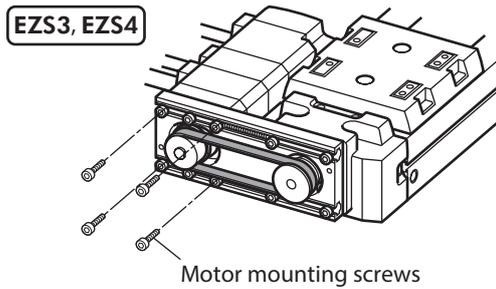
■ Belt for maintenance

For the belt for maintenance, contact your nearest Oriental Motor sales office.

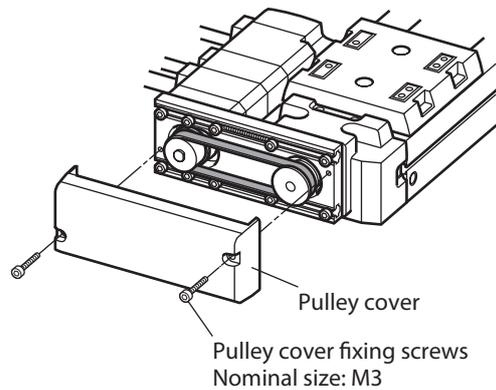
Model	Belt model
EZS3, EZS4	LS-LVCS2M060186
EZS6	LS-LVCS3M080252

■ Working procedure

This section explains about the **EZS4** type as an example. With the **EZS6** type, the motor mounting screws are located in the rear side of the motor.

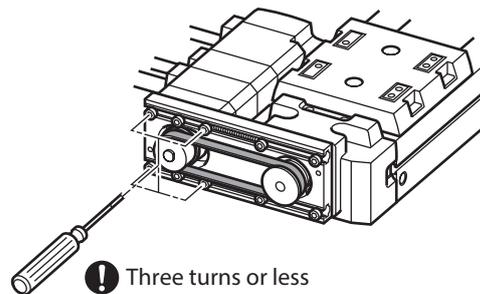


1. Remove the pulley cover fixing screws, and detach the pulley cover.



2. Loosen the motor mounting screws.

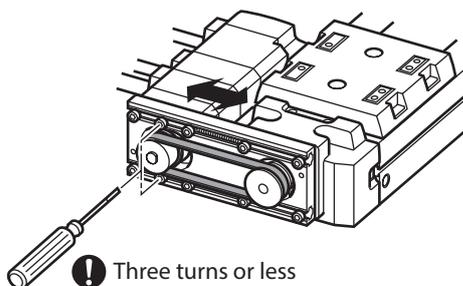
Model	Nominal size
EZS3, EZS4	M3
EZS6	M4



To prevent the motor mounting screw from falling off, keep three turns or less when turning the screw.

- Loosen the tension adjustment screws.
When loosening the screws, tension of the belt will be adjusted properly by the strength of springs.

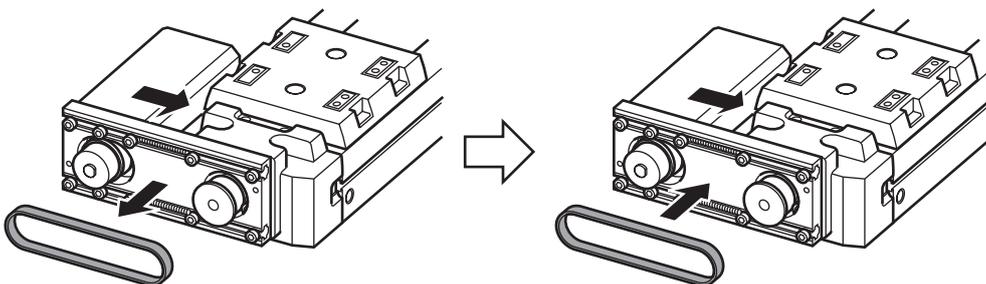
Model	Nominal size
EZS3, EZS4	M3
EZS6	M4



! Three turns or less

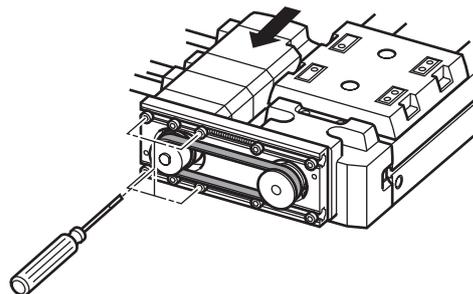
memo To prevent the tension adjustment screw from falling off, keep three turns or less when turning the screw.

- When replacing the belt, remove it while pressing the motor to the linear slide side. In addition, even when installing a new belt, do so while pressing the motor.



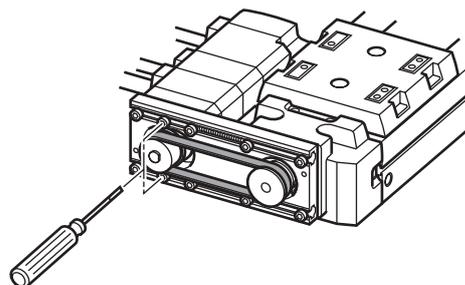
- Tighten the motor mounting screws with pressing the motor in the direction of arrow so that the motor does not tilt.

Model	Tightening torque
EZS3, EZS4	1.0 N·m (142 oz-in)
EZS6	2.4 N·m (340 oz-in)



- Tighten the tension adjustment screws.

Model	Tightening torque
EZS3, EZS4	1.0 N·m (142 oz-in)
EZS6	2.4 N·m (340 oz-in)



- Attach the pulley cover, and tighten the screws.
Tightening torque: 1.0 N·m (142 oz-in)
- After mounting the motor, set the home position again.
If the motor for the motorized linear slide equipped with the **AZ** Series was replaced, set the home position again after restoring with the recovery data file.

7-5 Replacing the motor

Warning

- When replacing the motor, remove the load, and perform in a state where the motorized linear slide is placed in a horizontal position. Doing the operation in a vertical condition may allow the moving part to fall, leading to injury or mechanical damage.
 - If the motor mounting screws are removed in a state where the motorized linear slide is installed vertically, the motor may rotate rapidly. Thereby, fingers may be caught in the product or the cable may be disconnected.
- Set the home position again after mounting a motor. If the motorized linear slide is operated without setting the home position, the moving part may move to unexpected directions or run at unexpected speeds, leading to injury or mechanical damage.
 - The moving part of the motorized linear slide may collide with the mechanical stopper.
 - The load may collide with other equipment.
- Be sure to secure the coupling or pulley with the specified tightening torque. Unless it is secured with the specified torque, the ball screw may rotate idly, leading to injury or mechanical damage.
 - When the motorized linear slide is used in a vertical condition, the load may fall.
 - When the motorized linear slide is used in a horizontal condition, the moving part of the motorized linear slide may collide with the mechanical stopper. Also, the load may collide with other equipment.
- If the motor for the motorized linear slide equipped with the **AZ** Series is replaced, restore using the recovery data file. Replacing the motor only will not set the optimal parameters to the driver, so the motorized linear slide may move to unexpected directions or run at unexpected speeds, leading to injury or damage to equipment. For details, refer to the **AZ** Series Function Edition.

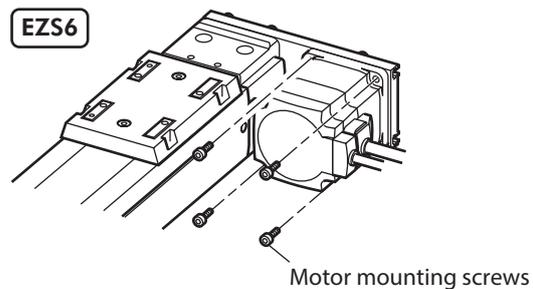
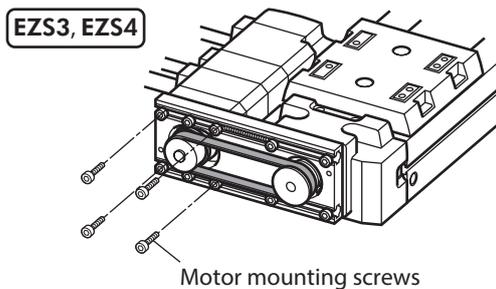
■ In-line motor mounting type

Refer to "In-line motor mounting type" on p.17, replace the motor.

If the motor for the motorized linear slide equipped with the **AZ** Series was replaced, set the home position again after restoring with the recovery data file.

■ Parallel motor mounting type

This section explains about the **EZS4** type as an example. With the **EZS6** type, the motor mounting screws are located in the rear side of the motor.



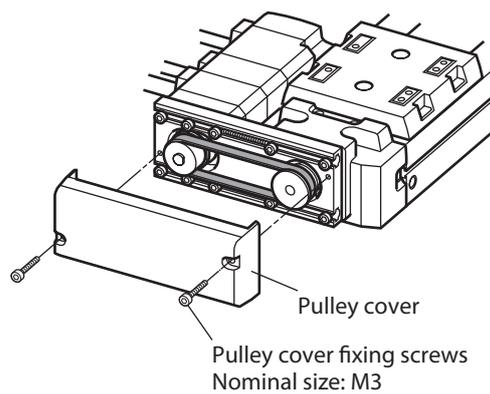
● Pulley for maintenance

If the motor of the parallel motor mounting type is replaced, purchase the pulley together with the motor. For details, contact your nearest Oriental Motor sales office.

Model	Pulley model
EZS3, EZS4	LS-LSPTP1709
EZS6	LS-LSPTP1710

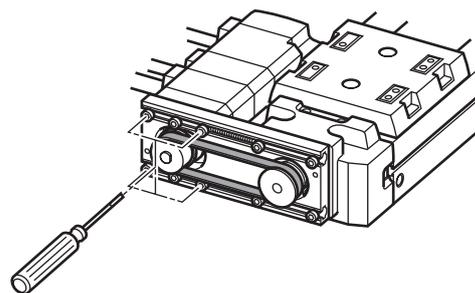
● Replacement procedure

1. Remove the pulley cover fixing screws, and detach the pulley cover.

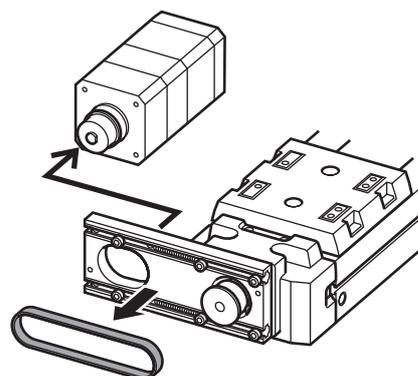


2. Remove the motor mounting screws.

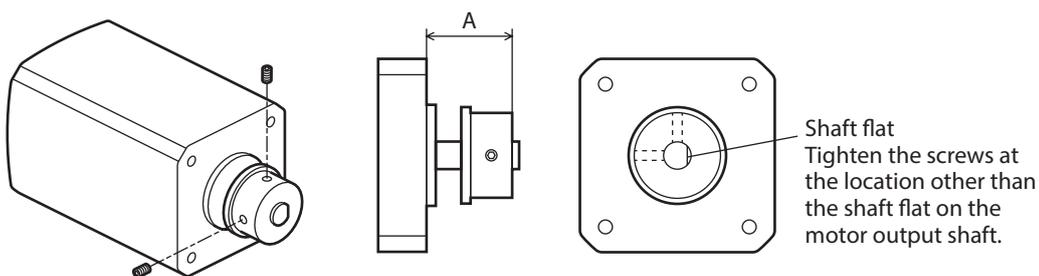
Model	Nominal size
EZS3, EZS4	M3
EZS6	M4



3. Dismount the motor and remove the belt.

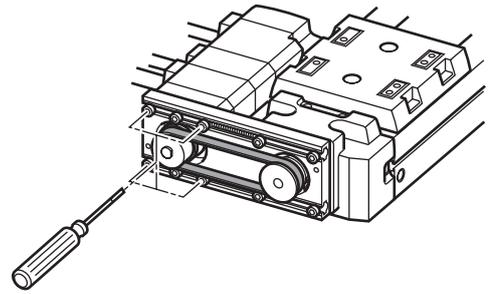


4. Install the pulley for maintenance to the new motor, and tighten the screws.

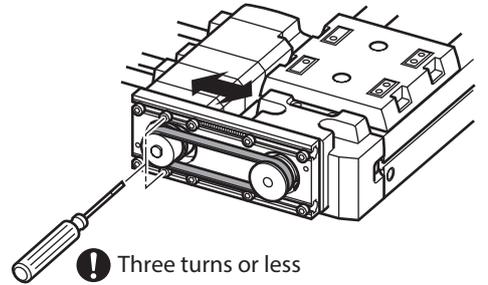


Model	A	Nominal size	Tightening torque
EZS3, EZS4	18.5 mm	M3	0.8 N·m (113 oz-in)
EZS6	20.5 mm	M4	1.7 N·m (240 oz-in)

5. Mount the motor and install the belt, and tentatively fix the motor mounting screws.
Tentatively fix the screws in a degree to be able to move the motor when touching it.



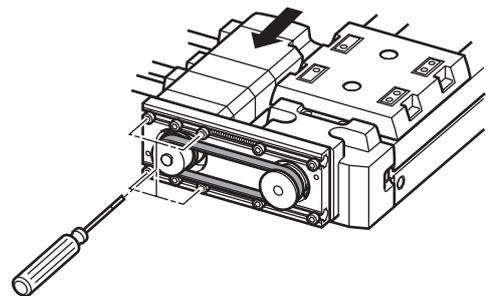
6. Loosen the tension adjustment screws.
When loosening the screws, tension of the belt will be adjusted properly by the strength of springs.



To prevent the tension adjusting screws from falling off, keep three turns or less when turning the screw.

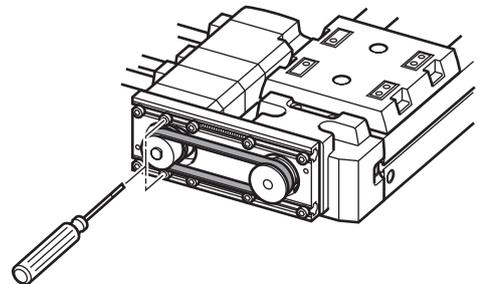
7. Tighten the motor mounting screws with pressing the motor in the direction of arrow so that the motor does not tilt.

Model	Tightening torque
EZS3, EZS4	1.0 N·m (142 oz-in)
EZS6	2.4 N·m (340 oz-in)



8. Tighten the tension adjustment screws.

Model	Tightening torque
EZS3, EZS4	1.0 N·m (142 oz-in)
EZS6	2.4 N·m (340 oz-in)



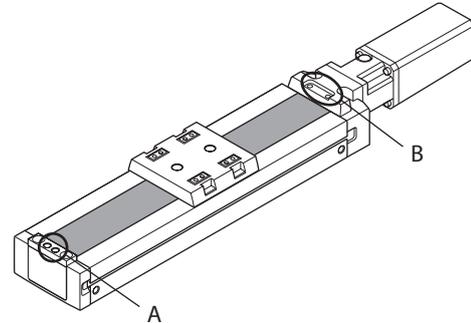
9. Attach the pulley cover, and tighten the screws.
Tightening torque: 1.0 N·m (142 oz-in)
10. After mounting the motor, set the home position again.
If the motor for the motorized linear slide equipped with the **AZ** Series was replaced, set the home position again after restoring with the recovery data file.

7-6 Adjusting the tension of the stainless steel sheet

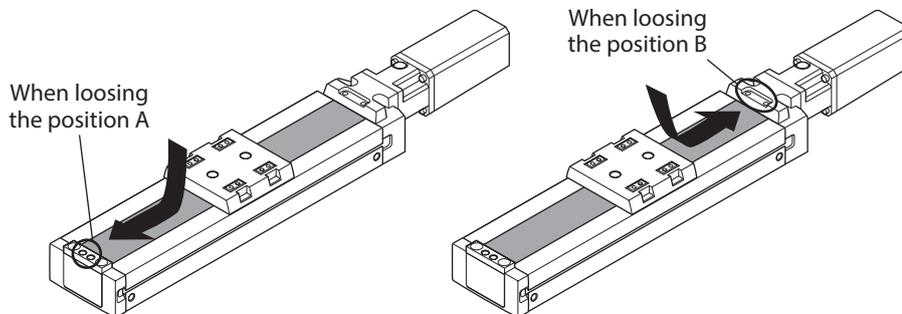
If the stainless steel sheet is slacked, tighten and take up the slack of the stainless steel sheet.

Caution Do not touch the end section of the stainless steel sheet with bare hands. Doing so may result in injury.

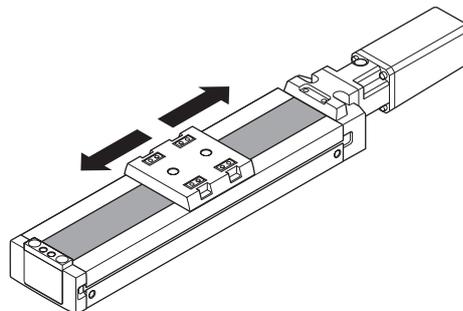
- Loosen the screw A or B.
Screw A: M3 Hexagonal socket head screw (2 pcs.)
Screw B: M5 Hexagonal socket set screw (2 pcs.)



- Pull the stainless steel sheet in the direction of the arrow while holding down it by hand to take up its slack.



- Tighten the screws.
Tightening torque: 1.0 N·m (142 oz-in)
- Move the table manually and check that there is no slack in the stainless steel sheet.



7-7 Warranty

Check on the Oriental Motor Website or General Catalog for the product warranty.

7-8 Disposal

Dispose the product correctly in accordance with laws and regulations, or instructions of local governments.

8 Standards, general specifications

8-1 Standards

■ UL Standard and CSA Standard

Check the "APPENDIX UL Standards" of each product for recognition information about UL Standards of the equipped motor.

■ EU Directives

● CE Marking

Motors for the AC power input type are affixed the CE Marking under the Low Voltage Directive and EMC Directive.

Low Voltage Directive

Applicable Standards: EN 60034-1, EN 60034-5, EN 60664-1

For the motorized linear slide equipped with the **AR** Series, they are certified by TÜV Rheinland under the EN 60034-1.

■ RoHS Directive

The products do not contain the substances exceeding the restriction values of RoHS Directive (2011/65/EU).

■ Machinery Directive

The motorized linear slide and driver have been designed and manufactured to be incorporated in general industrial equipment, and a Declaration of Incorporation of Partly Completed Machinery is issued with them according to the Machinery Directive.

- Applicable standard: EN ISO 12100

8-2 Specifications

Check on the Oriental Motor Website for the product specifications.

8-3 General specifications

■ Installation conditions

The product has been designed and manufactured to be incorporated in general industrial equipment.

Input power supply	DC power supply	AC power supply
Overvoltage category	II	
Protection against electric shock	Class I	
Pollution degree	2	3
Degree of protection	IP20	
Noise level	72 dB	

■ Environmental conditions

	Operating environment	Storage environment Shipping environment
Ambient temperature	0 to +40 °C [+32 to +104°F] (non-freezing)	-20 to +60 °C [-4 to +140 °F] (non-freezing)
Ambient humidity	85% or less (non-condensing)	
Altitude	Up to 1000 m (3300 ft.) above sea level	Up to 3000 m (10,000 ft.) above sea level

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

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

ORIENTAL MOTOR DO BRASIL LTDA.
Tel:+55-11-3266-6018
www.orientalmotor.com.br

ORIENTAL MOTOR (EUROPA) GmbH
Schiessstraße 44, 40549 Düsseldorf, Germany
Technical Support Tel:00 800/22 55 66 22
www.orientalmotor.de

ORIENTAL MOTOR (UK) LTD.
Tel:01256-347090
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ORIENTAL MOTOR (FRANCE) SARL
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Tel:080-777-2042
www.inaom.co.kr

ORIENTAL MOTOR CO., LTD.
Hong Kong Branch
Tel:+852-2427-9800

ORIENTAL MOTOR CO., LTD.
4-8-1 Higashiueno, Taito-ku, Tokyo
110-8536 Japan
Tel:03-6744-0361
www.orientalmotor.co.jp