



Motorized Cylinders

EAC Series Actuator Edition

OPERATING MANUAL

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.

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1 Introduction

1.1 Introduction

Only qualified personnel should work with the product. Use the product correctly after thoroughly reading the separate operating manual "1.6 Safety precautions."

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 the descriptions listed in the "1.6 Safety precautions" as well as the "Warning" and "Caution" of each chapter.

1.2 Type and description for operating manuals

The composition of operating manuals for this product are described as follows. Operating manuals supplied with the product vary depending on the type of the product.

< How to obtain the operating manual >		< Description >
●Installation		
Motorized cylinders OPERATING MANUAL (this document)	Supplied with the product	This manual explains safety precautions, installation methods, maintenance and others.
●Connection and setting		
Driver OPERATING MANUAL	Supplied with the product	This manual explains connections, setting methods, I/O signals and others.
●Connection and setting		
Read this manual before starting up your equipment. Recovery Guide	Supplied with the product*1	This manual is a recovery guide for when assuming to replace the motor at the time of maintenance.
USER MANUAL or OPERATING MANUAL Function Edition	Download*2	This manual explains various functions, I/O signals, operation and others.
+		
Motorized actuator Function Setting Edition	Download*2	This manual explains the driver's parameters (moving direction, minimum travel amount) and functions for when combining various actuators.

*1 This manual is supplied with products that the **AZ** Series motor is equipped.

*2 Please 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 **EAC** Series.

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

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

■ AC power input type

Motorized cylinders Cylinder name	Motor model
EACM400000ARAC-O	ARM46AC
EACM400000ARMC-O	ARM46MC
EACM600000ARAC-O	ARM66AC
EACM600000ARMC-O	ARM66MC
EACM400000AZAC-O	AZM46AC
EACM400000AZMC-O	AZM46MC
EACM600000AZAC-O	AZM66AC
EACM600000AZMC-O	AZM66MC

■ DC power input type

Motorized cylinders Cylinder name	Motor model
EACM200000ARAK-O	ARM24SAK
EACM200000ARMK-O	ARM24SMK
EACM400000ARAK-O	ARM46SAK
EACM400000ARMK-O	ARM46SMK
EACM600000ARAK-O	ARM66SAK
EACM600000ARMK-O	ARM66SMK
EACM200000AZAK-O	AZM24AK
EACM400000AZAK-O	AZM46AK
EACM400000AZMK-O	AZM46MK
EACM600000AZAK-O	AZM66AK
EACM600000AZMK-O	AZM66MK

1.4 Checking the product

Verify that the items listed below are included.

Verify the model number of the purchased product against the number shown on the package label. Check the model number of the motorized cylinder and driver against the number shown on the nameplate. Report any missing or damaged items to the branch or sales office from which you purchased the product.

■ Motorized cylinder equipped the AR Series

When purchasing a motorized cylinder and driver package	When purchasing a motorized cylinder only
<ul style="list-style-type: none"> • Motorized cylinder • Driver • Varistor *1 • Motorized cylinders OPERATING MANUAL (This document) • Driver OPERATING MANUAL • APPENDIX UL Standards *3 • A bag of connectors • Cable for motor *4 • Cable for electromagnetic brake *4 (Supplied with electromagnetic brake types) 	<ul style="list-style-type: none"> • Motorized cylinder • Varistor *2 • Motorized cylinders OPERATING MANUAL (This document) • APPENDIX UL Standards *3

*1 This comes with the products if the driver that combines the “motorized cylinder with an electromagnetic brake” is the ARD-K.

*2 This comes with the DC power input type motorized cylinder with an electromagnetic brake that equipped the **AR** Series.

*3 Supplied with products conform to the UL Standards.

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

■ Motorized cylinder equipped the AZ Series

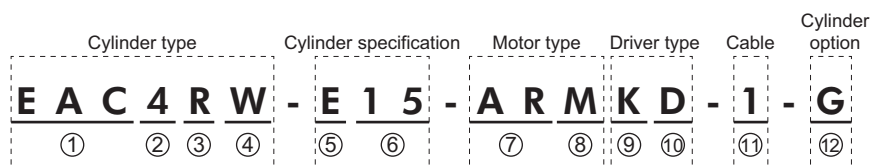
When purchasing a motorized cylinder and driver package	When purchasing a motorized cylinder only
<ul style="list-style-type: none"> • Motorized cylinder • Driver • Motorized cylinders OPERATING MANUAL (This document) • Driver OPERATING MANUAL • APPENDIX UL Standards *1 • Recovery Guide • A bag of connectors • Cable for motor *2 • Cable for electromagnetic brake *2 (Supplied with electromagnetic brake types) • Cable for encoder *2 	<ul style="list-style-type: none"> • Motorized cylinder • Motorized cylinders OPERATING MANUAL (This document) • APPENDIX UL Standards *1 • Recovery Guide

*1 Supplied with products conform to the UL Standards.

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

1.5 How to identify the product model

■ Motorized cylinder and driver package model



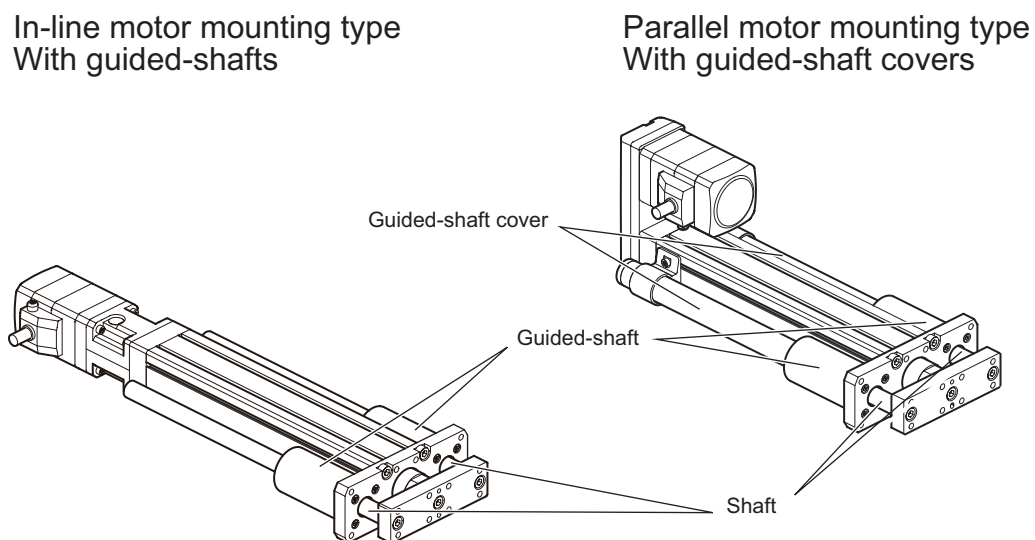
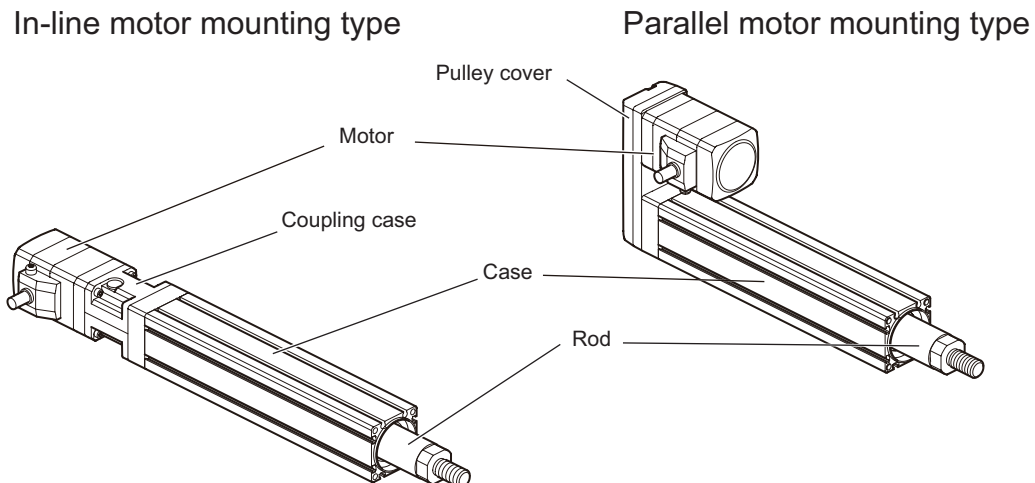
1	Series name	EAC : EAC series
2	Cylinder size	2 : 28 mm 4 : 42 mm 6 : 60 mm
3	Motor mounting direction	R : Parallel motor mounting type Blank: In-line motor mounting type
4	Guided-shaft	W : With guided-shafts Blank: Without a guided-shaft
5	Ball screw lead	D : 12 mm E : 6 mm F : 3 mm
6	Stroke	05 ~ 30 : 50 ~ 300 mm
7	Motor	AR : AR series AZ : AZ series
8	Motor type	A : Single shaft M : With electromagnetic brake
9	Power input	Motorized cylinder equipped 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 VDC/48 VDC Motorized cylinder equipped the AZ Series A : Single-phase 100-120 VAC C : Single-phase, three-phase 200-240 VAC K : 24 VDC/48 VDC
10	Driver type	D : Built-in controller type Blank: Pulse input Type
11	Length of supplied cable	Number: Length of supplied cable 1 : 1 m (3.3 ft.) 2 : 2 m (6.6 ft.) 3 : 3 m (9.8 ft.) Blank: Without connection cable
12	Guided-shaft cover	G : With guided shaft covers Blank: Without a guided shaft cover

■ Motorized cylinder model

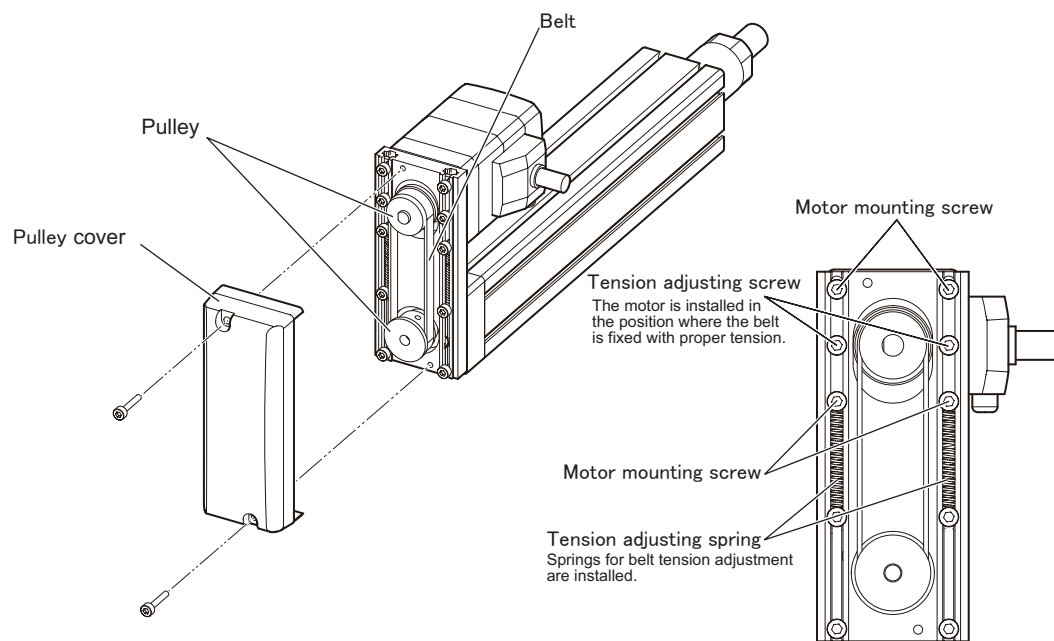


1	Series name	EACM: EAC series
2	Cylinder size	2 : 28 mm 4 : 42 mm 6 : 60 mm
3	Motor mounting direction	R : Parallel motor mounting type Blank: In-line motor mounting type
4	Guided-shaft	W : With guided-shafts Blank: Without a guided-shaft
5	Ball screw lead	D : 12 mm E : 6 mm F : 3 mm
6	Stroke	05 ~ 30 : 50 ~ 300 mm
7	Motor	AR : AR series AZ : AZ series
8	Motor type	A : Single shaft M : With electromagnetic brake
9	Motor power supply type	K : DC power input C : AC power input
10	Guided-shaft cover	G : With guided shaft covers Blank: Without a guided shaft cover

1.6 Names and functions of parts

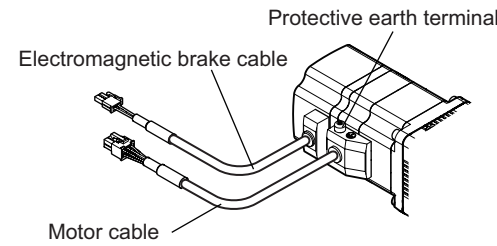


Mechanism of the parallel motor mounting type



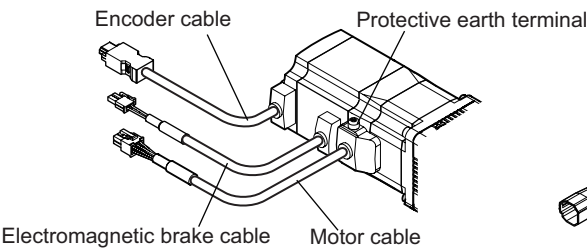
Names of cables

Cables of the motorized cylinder equipped the **AR** Series

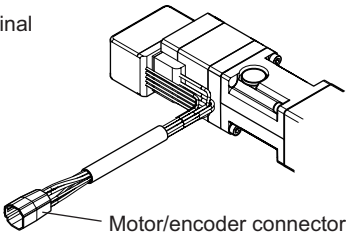


Cables of the motorized cylinder equipped the **AZ** Series

EAC4,EAC6



EAC2



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

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

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



Description of signs

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

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 product in an atmosphere containing explosive, flammable or corrosive gases, in a place exposed to water, or near flammable objects. Doing so may result in fire, electric shock or injury. Do not perform operations such as transportation, installation, connection, inspection or maintenance while the power is on. Always turn the power off before carrying out these operations. Failure to do so may result in electric shock. Do not forcibly bend, pull or pinch the cable. Doing so may result in electric shock or fire. Do not disassemble or modify the product. Doing so may result in injury or damage to equipment. Never use a motorized cylinder in a medical device used in connection with the maintenance or management of human life or health, or in a transportation system whose purpose is to move or carry people. Be sure to provide a safety cage conforming to EN ISO 13857 to prevent persons from entering the moving range of the motorized cylinder while power is supplied to the motorized cylinder. Turn off the main power to the driver before performing adjustment or inspection in which the rod is moved manually. Accidental contact may result in serious injury. Do not use the electromagnetic brake to decelerate, nor use it as a safety brake. Doing so may result in injury or equipment damage. Do not hit the rod of the motorized cylinder to the mechanical stopper other than push-motion return-to-home operation and push-motion operation. Doing so may result in injury or damage to equipment.
	<ul style="list-style-type: none"> Assign qualified personnel the task of installing, wiring, operating/controlling, inspecting and troubleshooting the product. Failure to do so may result in fire, electric shock, injury or damage to equipment. If this product is used in an vertical application, be sure to provide a measure for the position retention of moving parts. Failure to do so may result in injury or damage to equipment. Operate the data setter outside the safety fence. Failure to do so may result in 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 products in the enclosure in order to prevent electric shock or injury The motor and driver are designed with Class I equipment basic insulation. When installing the motor, do not touch the product or be sure to ground them. 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. If backing up the battery or using the motorized cylinder that equipped the AZ Series, perform the absolute positioning operation. Failure to do so may result in injury or equipment damage. Operate the motorized cylinder after setting the resolution, moving direction and other parameters. If the motorized cylinder is operated without setting parameters, the rod 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 cylinder that equipped the AZ Series at the time of shipment.) When the motor of the AZ Series is replaced at the time of maintenance, be sure to follow the procedures of the recovery guide. If the replacement is not performed in accordance with the procedures, the rod may move to unexpected directions or run at unexpected speeds, causing injury or damage to equipment. After replacing the driver, set the resolution, moving (rotating) direction or other parameters before operating the motorized cylinder. If the motorized cylinder is operated without setting parameters, the rod may move to unexpected directions or run at unexpected speeds, causing injury or damage to equipment.

⚠ Warning



- Be sure to secure the motorized cylinder according to the screw size and tightening torque which are specified in this manual.
- When the accessory mounting plate (foot type, flange type) is used, secure with the indicated tightening torque using all of the supplied screws.

⚠ Caution



- Do not use the product beyond its specifications
Doing so may cause electric shock, injury or damage to equipment.
- Keep your fingers and objects out of the openings in the product.
Failure to do so may result in fire, electric shock or injury.
- Do not touch the product while operating or immediately after stopping.
Doing so may cause a skin burn(s).
- Do not carry the motorized cylinder by holding its cables or its moving part.
Doing so may cause injury.
- Keep the area around the product free of combustible materials.
Failure to do so may result in fire or a skin burn(s).
- Leave nothing around the product that would obstruct ventilation.
Failure to do so may result in damage to equipment.
- Do not touch the moving part during operation.
Doing so may cause injury.
- Do not touch the terminals while performing the insulation resistance test or dielectric strength test.
Doing so may cause electric shock.



- Use a motorized cylinder and driver only in the specified combination.
An incorrect combination may cause a fire.
- 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).
- The motorized cylinder is very heavy. When transporting or installing the motorized cylinder, 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 cylinder. Failure to do so may result in injury.
- When replacing the motor for the motorized cylinder, use the motor of the same model name that had been combined at the time of shipment. If a motor which series and size are different from the original one is combined, the motorized cylinder will not meet specifications and also injury or equipment damage may result.

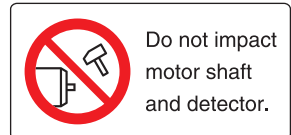


Warning label

1.8 Precautions for use

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

General	<ul style="list-style-type: none"> • Be sure to use the cable (supplied or accessory) to connect the motorized cylinder and driver. In the following condition, an appropriate accessory cable must be purchased separately. <ul style="list-style-type: none"> • 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 motor 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 withstand voltage test with the motorized actuator and driver connected may result in injury or damage to equipment. • Do not make an impact with the motorized cylinder. Do not drop the motorized cylinder. Also, do not hit the motor or gear-reduction mechanism on something hard. Doing so may cause the positioning accuracy decrease, the motor section damage or the product service life reduction. • Make sure not to hit or apply a strong impact on the encoder (ABZO sensor). <ul style="list-style-type: none"> • 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 cylinder or installing a load, handle the motorized cylinder carefully not to make a strong impact on the moving part. • The warning label shown in the right is indicated on the motor part of the motorized cylinder equipped with the AZ Series. • The EAC2 type equipped the AZ Series does not have the models with an electromagnetic brake. Take measures to keep the moving part in position for vertical operations such as elevator applications.
Temperature	<ul style="list-style-type: none"> • Use the motorized cylinder equipped the AR Series in conditions where its surface temperature will not exceed 100 ° C (212 ° F). The driver has an overheat protection function, but the motor has no such feature. 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 will not exceed 100 ° C (212 ° F). • Use the motorized cylinder equipped the AZ Series in conditions where its surface temperature will not exceed 80 ° C (176 ° F). The surface temperature on the motor case may exceed 80 ° C (176 ° F) depending on operating conditions such as ambient temperature, operating speed, duty cycle and others. In order to protect the encoder, use the motor so that the surface temperature on the motor case does not exceed 80 ° C (176 ° F). If the encoder temperature reaches the upper limit, the motor overheat protection alarm will generate.
Operation	<ul style="list-style-type: none"> • 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 cylinder stops, the holding torque of the output table will be reduced by the current cutback function of the driver. When selecting the motorized cylinder, make sure the holding torque at standstill by checking the catalog specification. • Do not use the electromagnetic brake to reduce speed or as a safety brake. Do not use the electromagnetic brake as a means to decelerate and stop the motorized cylinder. The brake hub of the electromagnetic brake will wear significantly and the braking force will drop if used to stop the motor. The electromagnetic brake is a power-off activated type. This means that although it helps maintain the position of the load in the event of power outage, etc., 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 cylinder has stopped.



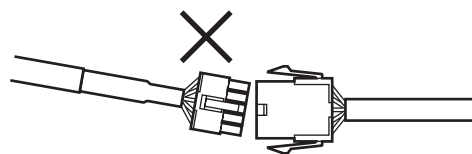
Warning label

■ Notes for when the connection cable is used

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

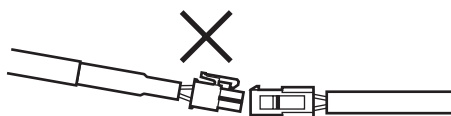
• When inserting the connector

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



• When pulling out the connector

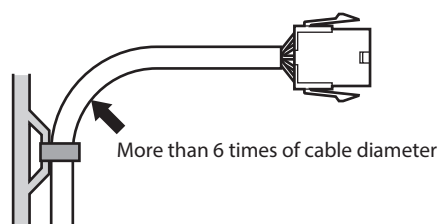
Pull out the connector in straight while releasing the lock part of the connector. Pulling out the connector with holding the cable (lead wire) may result in damage to the connector.



• 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.

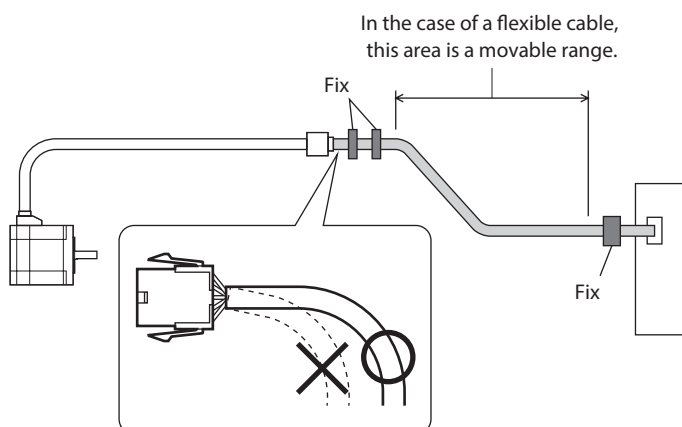
In the case of the lead wire type, use in a state where the bending radius is more than 4 times of the diameter of the lead wires.



• 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.



2 Installation

2.1 Location for installation

The motorized actuator has been designed and manufactured to be incorporated in general industrial equipment. Install them 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
- 1000 m (3300 ft.) or lower above sea level.

2.2 Installation direction

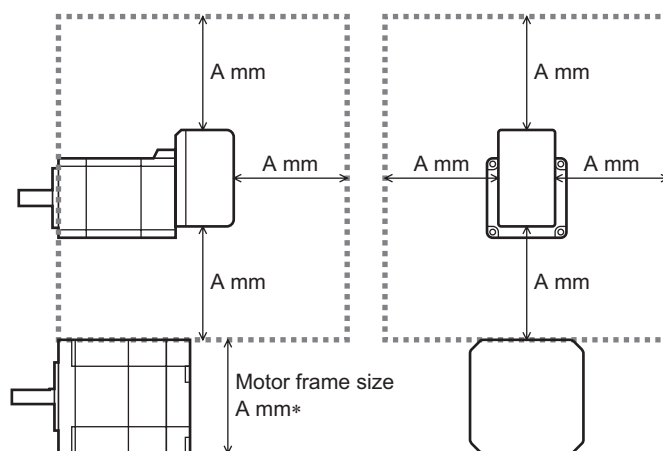
The motorized cylinder can be installed in any direction.

2.3 Installing the motorized cylinder

To prevent vibration, install the motorized cylinder on a metal surface of sufficient strength. Install it so that the cable gland and encoder of the motor will not contact the mounting plate.

- When the **EAC2** type equipped the **AZ** Series is installed in equipment

When the **EAC2** type motorized cylinders are installed, make sure the installation location since the encoder may easily be affected by a magnetic field. If motors of the actuators are installed side by side, ensure the distance among motors of more than the motor frame size which is installed near the **EAC2** type. Otherwise, provide a barrier or others to shield a magnetic field.



* Ensure the distance among motors of more than the motor frame size (A mm) of the actuator which is installed at a short distance.

• Reference

Motor of the actuator installed at a short distance	A
Motor frame size 20 mm	20 mm
Motor frame size 28 mm	28 mm
Motor frame size 42 mm	42 mm
Motor frame size 60mm	60 mm

■ When a motorized cylinder is installed using the rod side

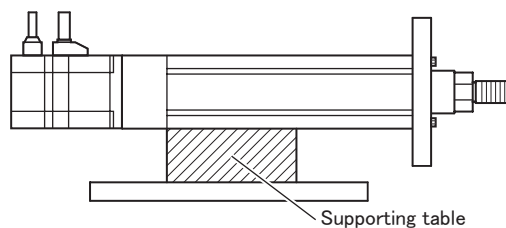


Warning

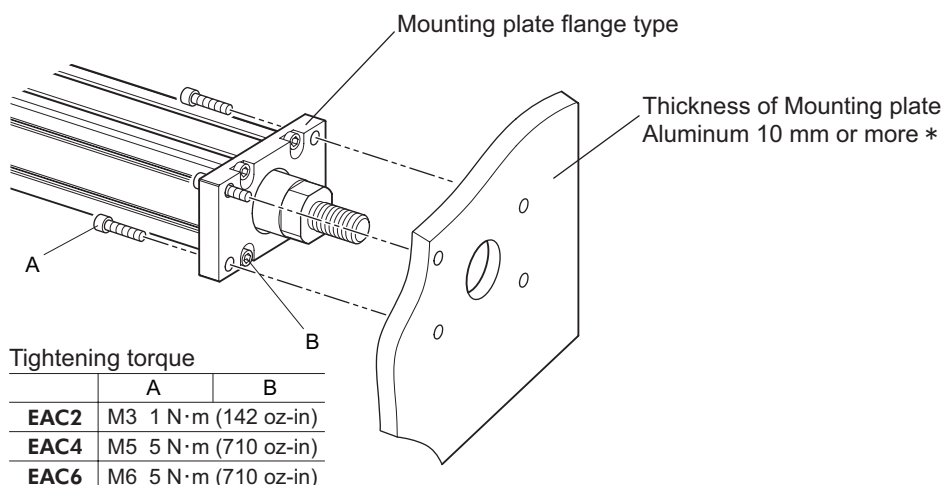
- Be sure to secure the motorized cylinder according to the screw size and tightening torque which are specified in this manual.
- When the accessory mounting plate (foot type, flange type) is used, secure with the indicated tightening torque using all of the supplied screws.

Note

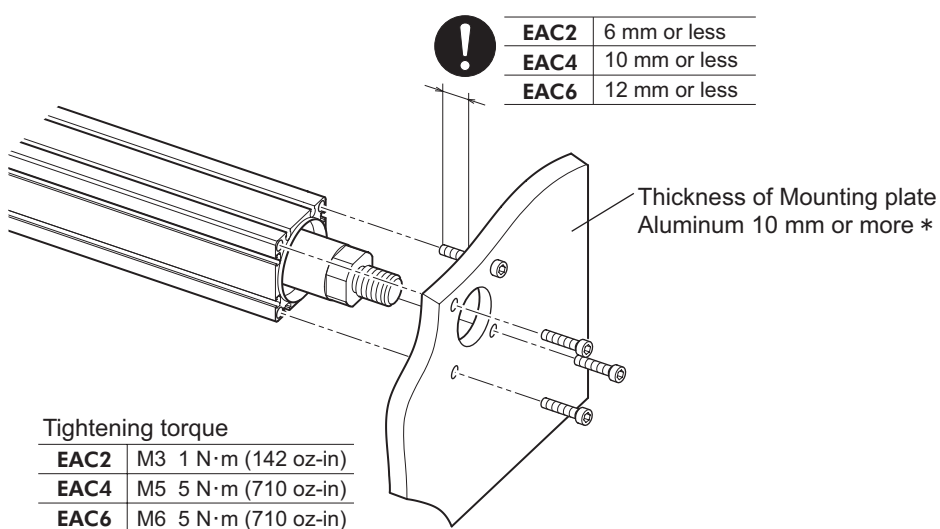
When the motorized cylinder which stroke is longer than 150 mm is installed using the rod side, place a supporting table under the actuator.



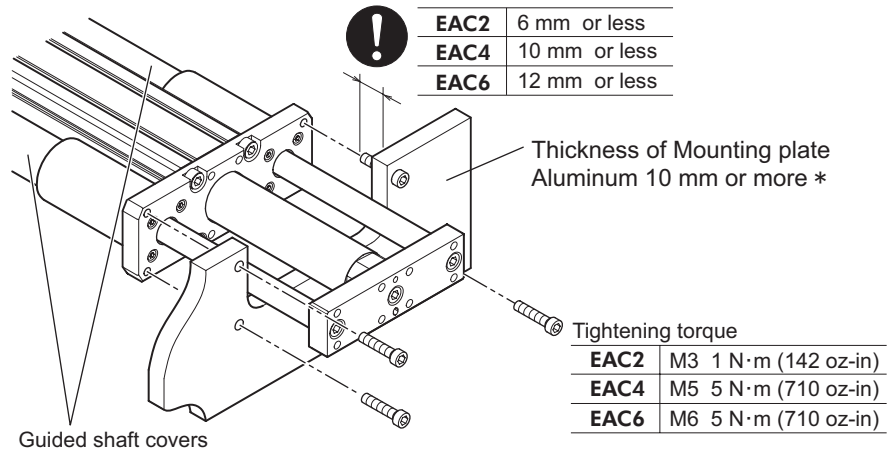
- When using an accessory mounting plate flange type (sold separately)



- When installing a motorized cylinder directly



- When installing a motorized cylinder with guided-shafts



! Do not hold the shaft covers when carrying the actuator.

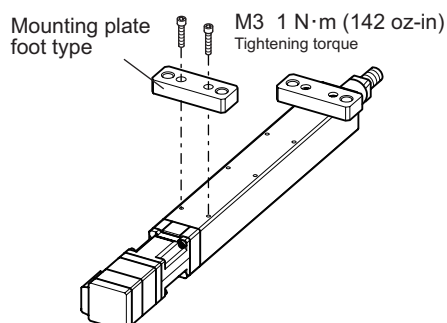
* This is the minimum value to require for installation. Determine the thickness of the mounting plate in consideration of the conditions such as load condition, rigidity, vibration and others.

■ When a motorized cylinder is installed using the side of the case

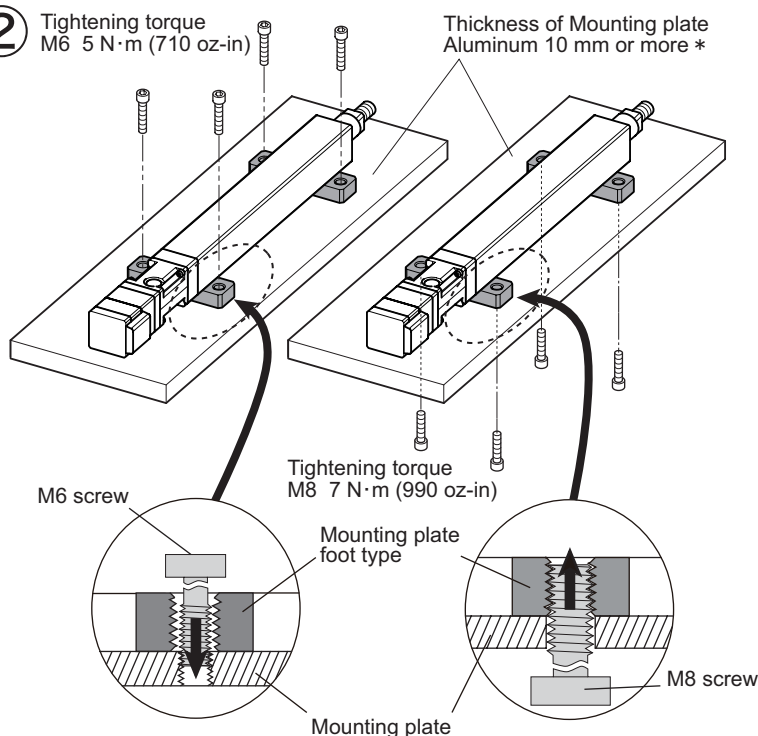
- When using an accessory mounting plate foot type (sold separately)

EAC2

- ① Secure the mounting plate using the supplied screws.

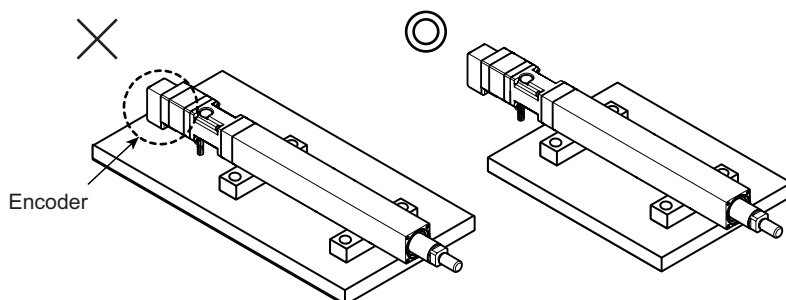


- ② Tightening torque
M6 5 N·m (710 oz-in)
M8 7 N·m (990 oz-in)



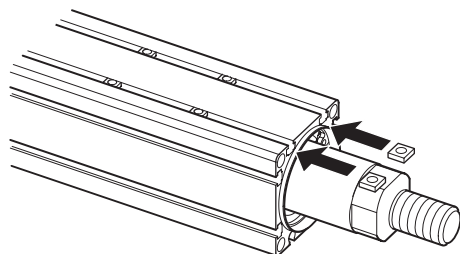
* This is the minimum value to require for installation. Determine the thickness of the mounting plate in consideration of the conditions such as load condition, rigidity, vibration and others.

When the cable leading direction of the **EAC2** Series equipped the **AZ** Series is installed downward, install it so that the encoder will not contact the mounting plate.

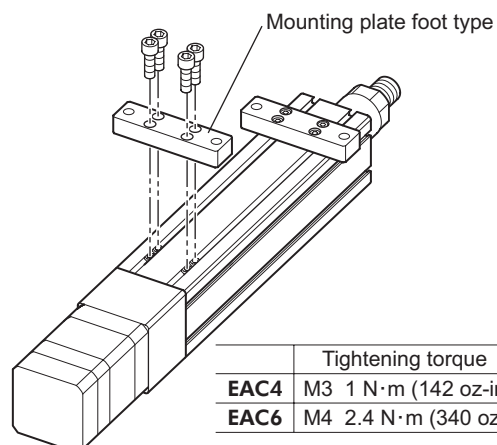


EAC4 EAC6

- 1 Insert the nuts supplied with the mounting plate foot type into the slots on the side of the case.



- 2 Secure the mounting plate using the supplied screws and nuts that have inserted by ①.

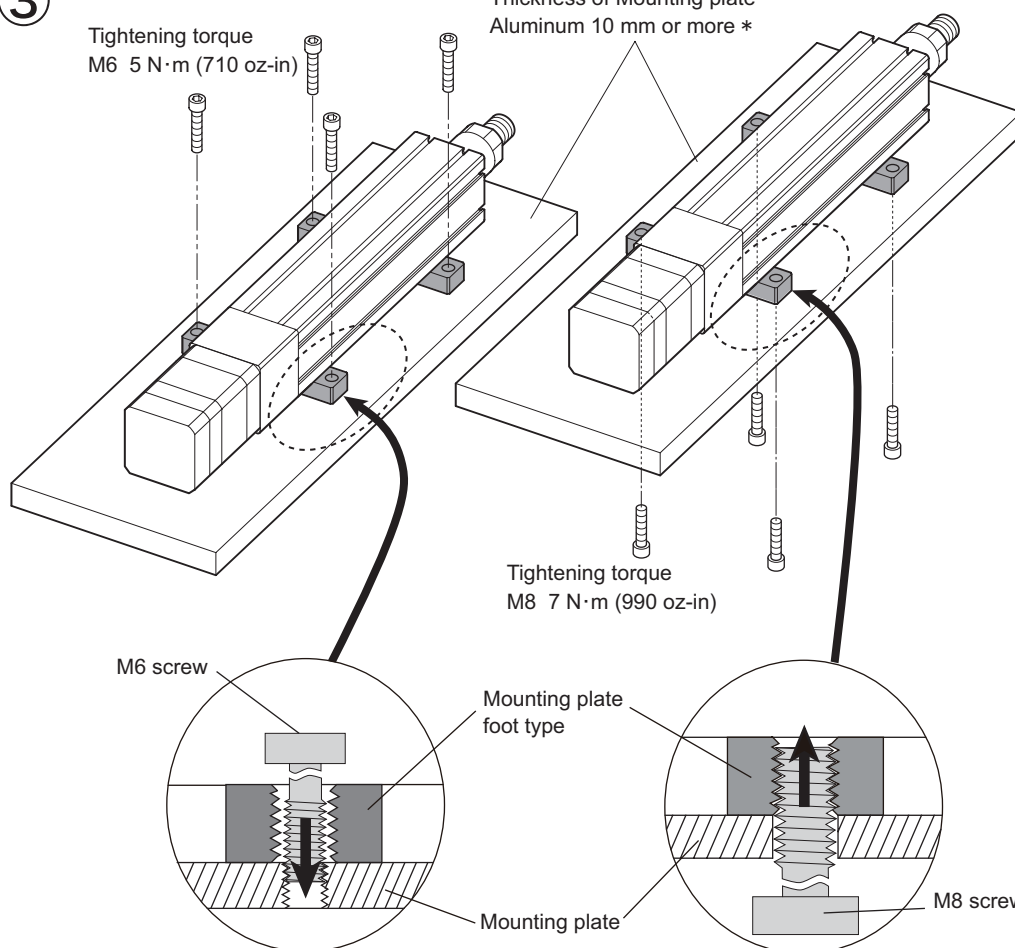


	Tightening torque
EAC4	M3 1 N·m (142 oz-in)
EAC6	M4 2.4 N·m (340 oz-in)

- 3

Tightening torque
M6 5 N·m (710 oz-in)

Thickness of Mounting plate
Aluminum 10 mm or more *



Tightening torque
M8 7 N·m (990 oz-in)

M6 screw

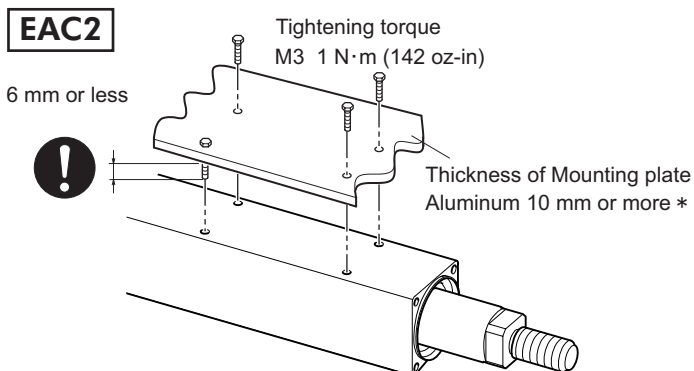
Mounting plate
foot type

Mounting plate

M8 screw

* This is the minimum value to require for installation. Determine the thickness of the mounting plate in consideration of the conditions such as load condition, rigidity, vibration and others.

● When installing a motorized cylinder directly



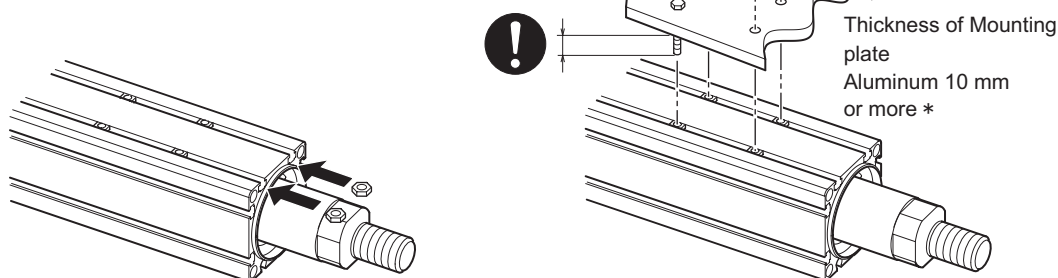
EAC4 EAC6

① Insert nuts into the slots on the side of the case

②

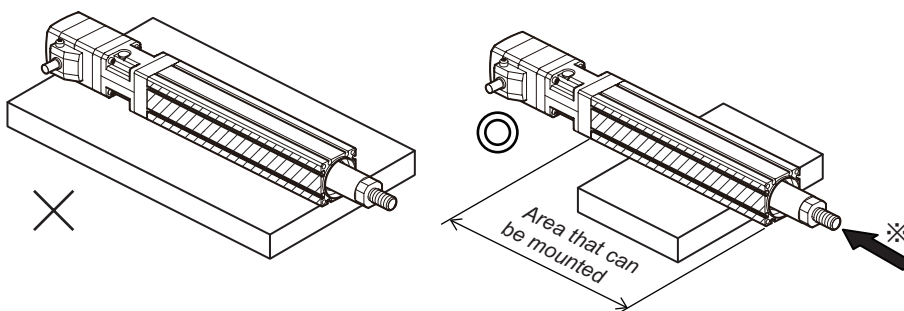
EAC4	4.2 mm or less
EAC6	5.8 mm or less

	Tightening torque
EAC4	M3 1 N·m (142 oz-in)
EAC6	M4 2.4 N·m (340 oz-in)



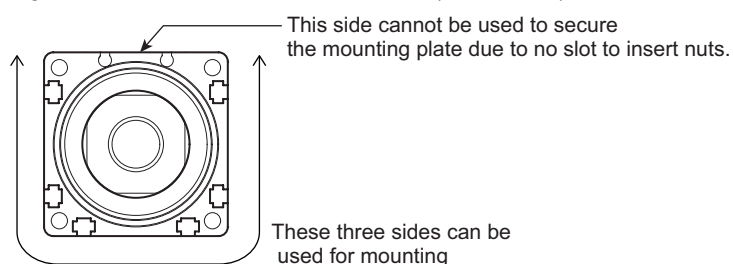
* This is the minimum value to require for installation. Determine the thickness of the mounting plate in consideration of the conditions such as load condition, rigidity, vibration and others.

Install the motorized cylinder so that the motor will not contact the mounting plate.



Since the slots to insert nuts are provided in three sides for the **EAC4** and **EAC6** types, you can install by using any of the three sides as shown in the figure. The **EAC2** types can be installed using only the side provided mounting holes.

※Figure viewed from the direction of an arrow (**EAC4,EAC6**)



2.4 Changing the motor cable outlet direction

The motor cable outlet direction can be changed according to the equipment.

Warning

- When changing the motor cable outlet direction, remove the load and keep the motorized cylinder in a horizontal position. Doing the operation in a vertical condition may cause injury or damage to equipment.
 - Doing the operation in a vertical condition may allow the moving part of the motorized cylinder to fall.
 - Removing the screws fixed the motor in a vertical condition may cause the motor itself to rotate.
- If the actuator is operated without setting the home position again, the moving part may move to unexpected directions, causing injury or damage to equipment.
 - The moving part of the motorized cylinder may collide with the mechanical stopper.
 - The load may collide with other equipment.
- Be sure to secure the coupling and pulley with the specified tightening torque. If they are not secured with the specified torque, the ball screw may rotate idly, causing injury or damage to equipment.
 - When the motorized cylinder is used in a vertical condition, the load may fall.
 - When the motorized cylinder is used in a horizontal condition, the moving part of the motorized cylinder may collide with the mechanical stopper. Also, the load may collide with other equipment.

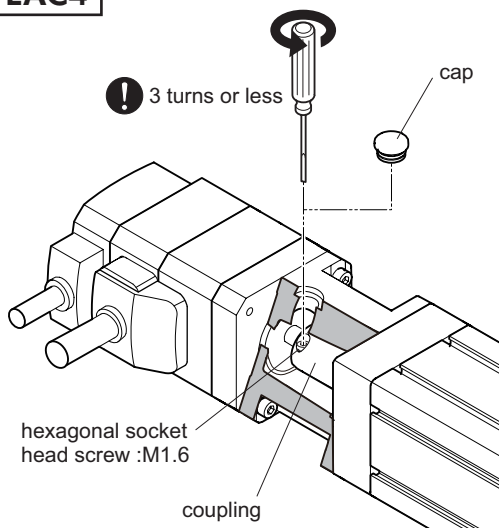
Note

- Since the coupling fixing screw is small, handle it carefully.
 - Keep the tightening torque.
 - Do not insert a hex key at a slant.
 - Do not use the ball-end hex key.
- To prevent the coupling fixing screw from falling off, keep three turns or less when loosening it.

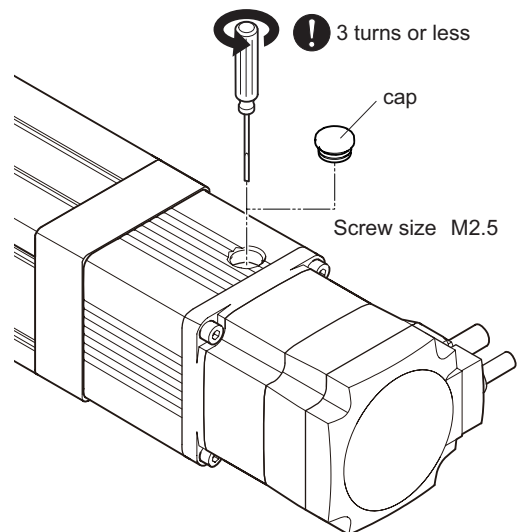
■ In-line motor mounting type

- 1 Remove the cap and loosen the screws of the coupling.

**EAC2
EAC4**

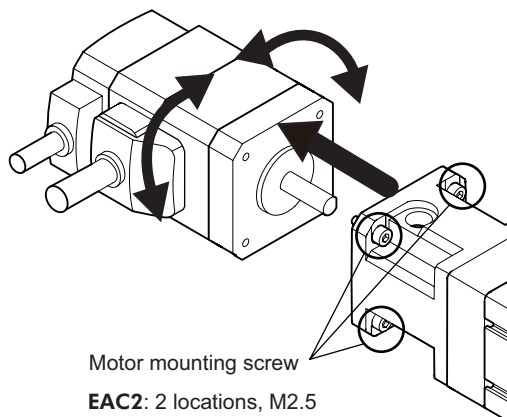


EAC6

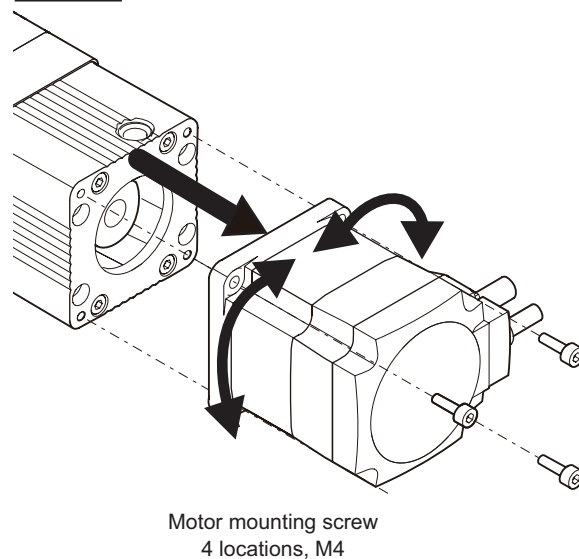


- ② Loosen the screw that is secured the motor, and change the outlet direction of the cable.

EAC2
EAC4



EAC6



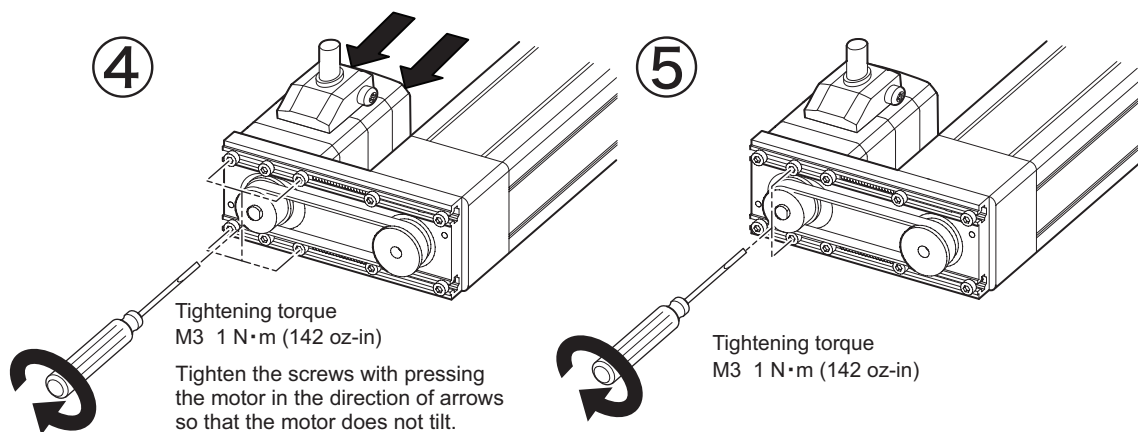
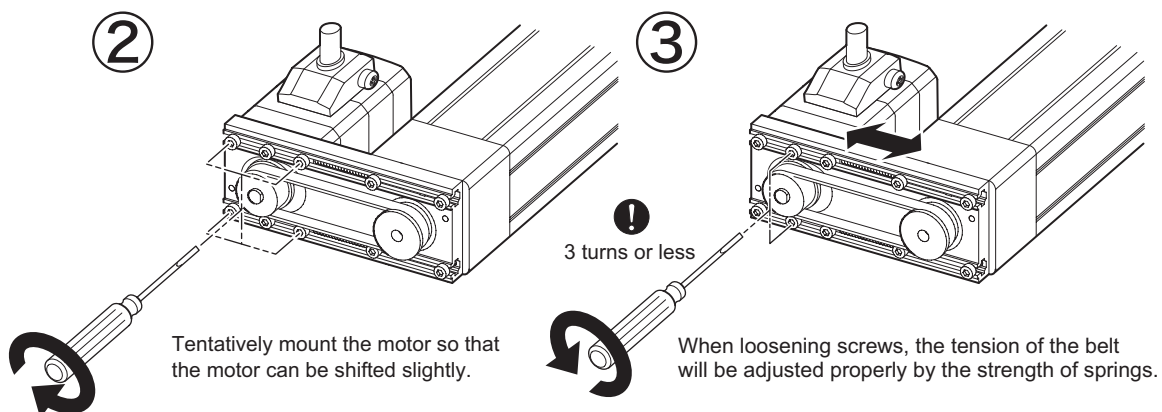
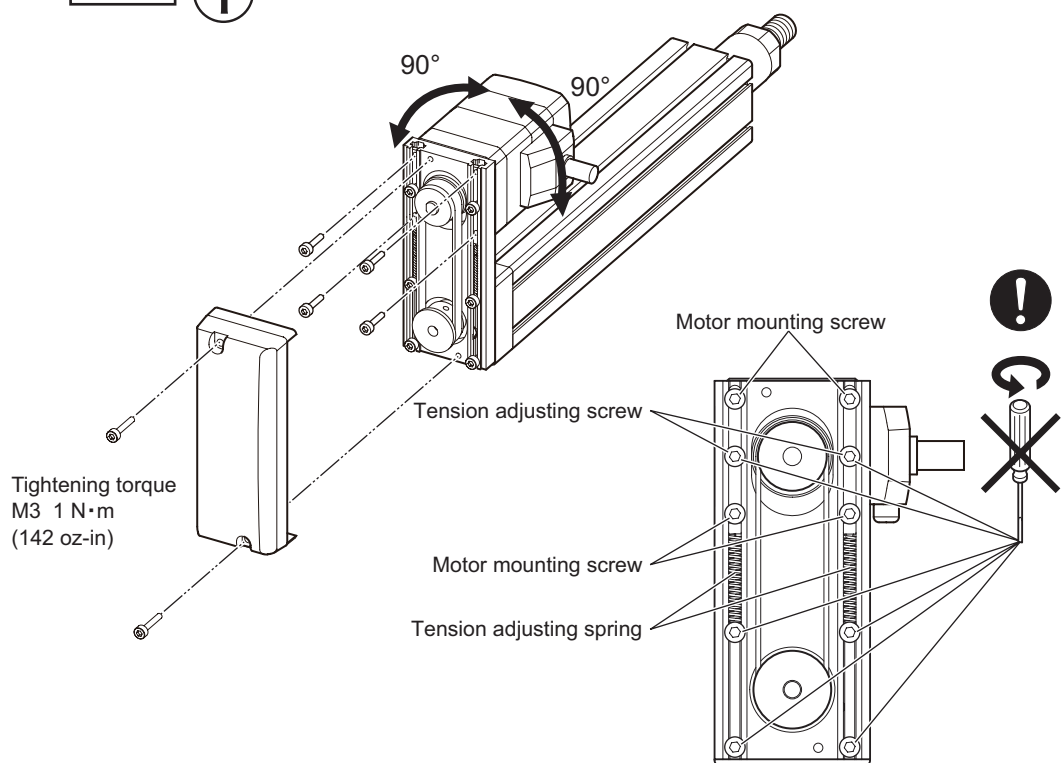
- ③ When installing the motor, perform the reverse procedure to removing the motor. (②→①)
Refer to the table below for the tightening torque of the coupling and motor mounting screw.

	Tightening torque	
	coupling mounting screw	motor mounting screw
EAC2	M1.6 0.25 N·m (35 oz-in)	M2.5 0.5 N·m (71 oz-in)
EAC4	M1.6 0.25 N·m (35 oz-in)	M3 1 N·m (142 oz-in)
EAC6	M2.5 1 N·m (142 oz-in)	M4 2.4 N·m (340 oz-in)

- ④ After the motor cable outlet direction has been changed, set the home position again.

■ Parallel motor mounting type

EAC4 **1**

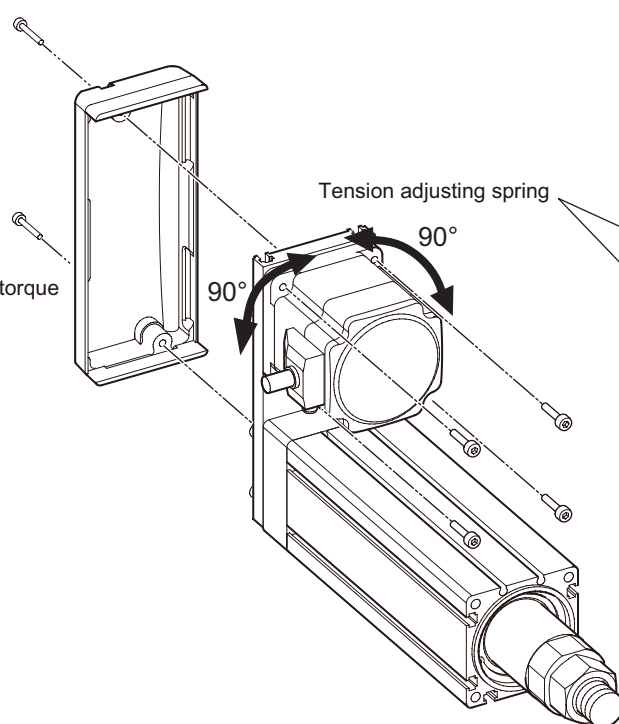


6 After the outlet direction of the motor cable has been changed, set the home position again.

EAC6

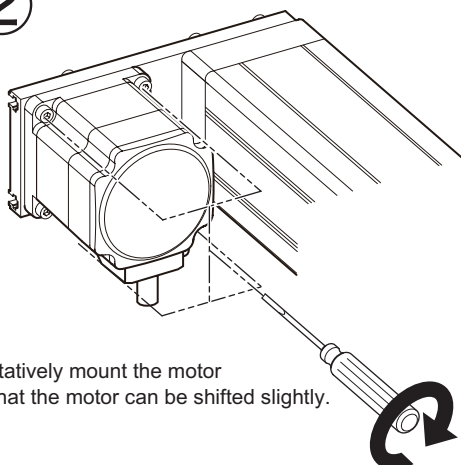
①

Tightening torque
M3 1 N·m
(142 oz-in)



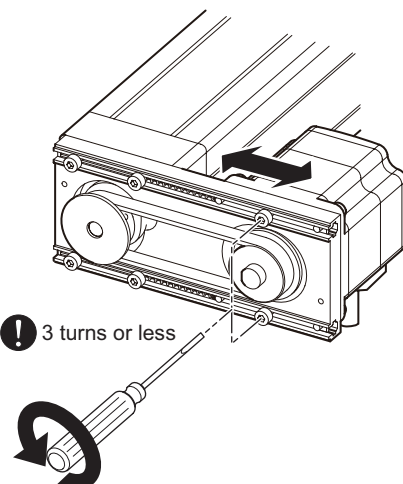
②

Tentatively mount the motor
so that the motor can be shifted slightly.



③

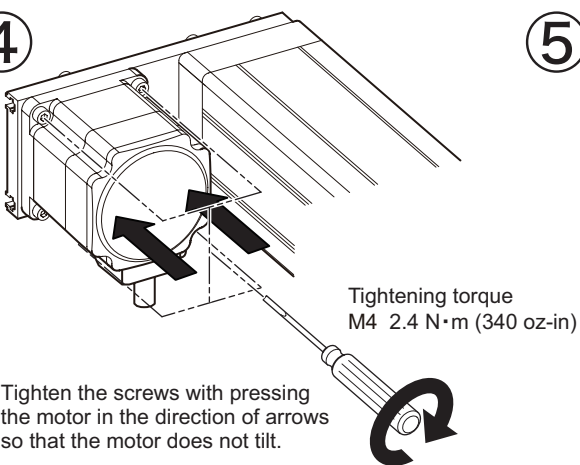
! 3 turns or less



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

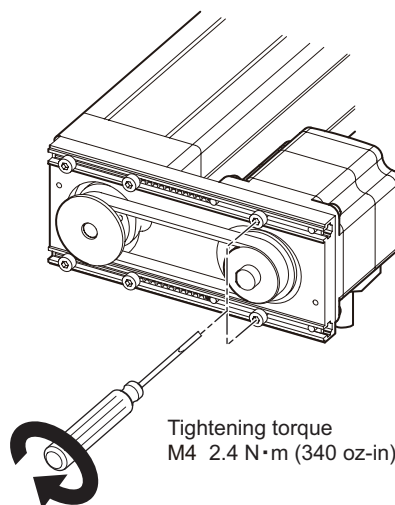
④

Tighten the screws with pressing
the motor in the direction of arrows
so that the motor does not tilt.



⑤

Tightening torque
M4 2.4 N·m (340 oz-in)



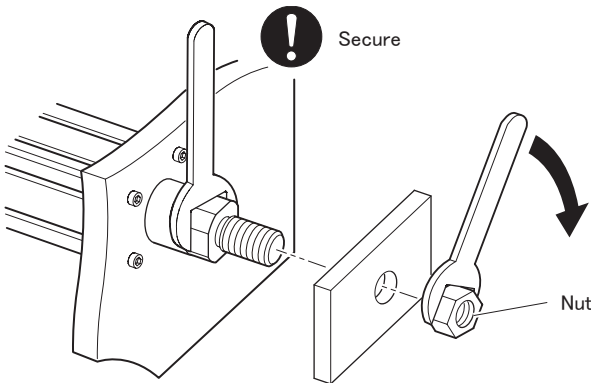
⑥

After the outlet direction of the motor cable has been changed, set the home position again.

2.5 Installing a load

■ Motorized cylinder without a guided-shaft

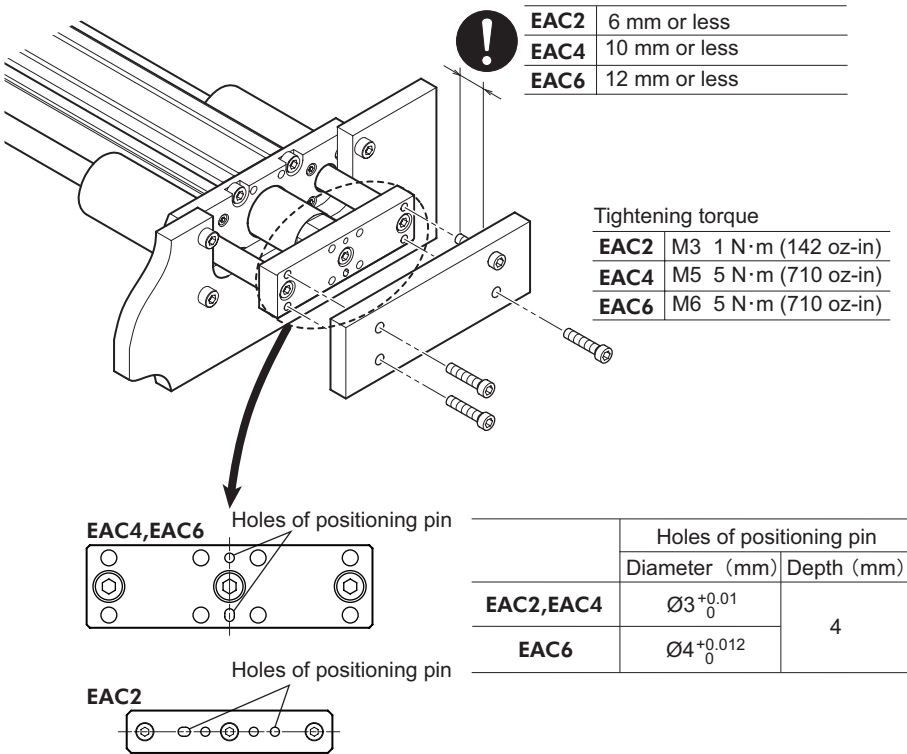
Install a load using the screw on the rod end and the nut.



■ Motorized cylinder with guided-shafts

Install a load using the load mounting holes on the rod end.

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



3 Connection

3.1 Connecting the driver

For details about the connection method of the driver as well as the wiring distance between the actuator and driver, refer to the [Driver OPERATING MANUAL](#) or [USER MANUAL](#).

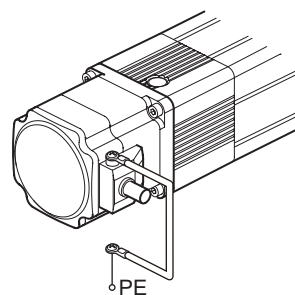
3.2 Grounding the motorized cylinder

- Note**
- When multiple motorized cylinders are used in combination, ground each motorized cylinder.
 - Do not share the grounding wire with a welder or any other power equipment.
 - When grounding, use a round terminal and secure it with a mounting screw with a washer.
 - Ground wires and crimp terminals are not supplied.

■ Motorized cylinder equipped the AR Series

If the DC power input type is used at 48 VDC or the AC power input type is used, be sure to ground the protective earth terminal of the motor.

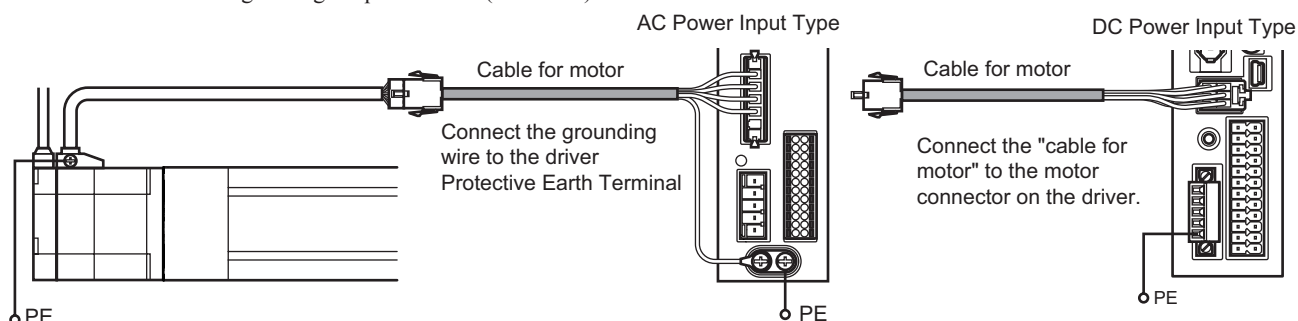
- Grounding wire: AWG18 (0.75 mm²) or more
- Screw size of the protective earth terminal: M4
- Tightening torque: 1.2 N·m (170 oz-in)



■ Motorized cylinder equipped the AZ Series

1. If the DC power input type is used at 48 VDC or the AC power input type is used, connect the grounding wire of the "cable for motor" to the driver protective earth terminal.
2. Ground the driver Protective Earth Terminal.
Refer to the [Driver OPERATING MANUAL](#) for how to ground the driver.
3. Since the **AZ** Series has a grounding lead wire in the cable, it is possible to ground through the driver. However, the grounding resistance required by the standards applied to equipment may not be satisfied depending on the type or length of the motor cable. Ground using the protective earth terminal of the motor as necessary.

- Grounding wire: AWG18 (0.75 mm²) or more
- Screw size of the protective earth terminal: M4
- Tightening torque: 1.2 N·m (170 oz-in)



Even when the protective earth terminal of the motor is grounded, be sure to ground the driver.

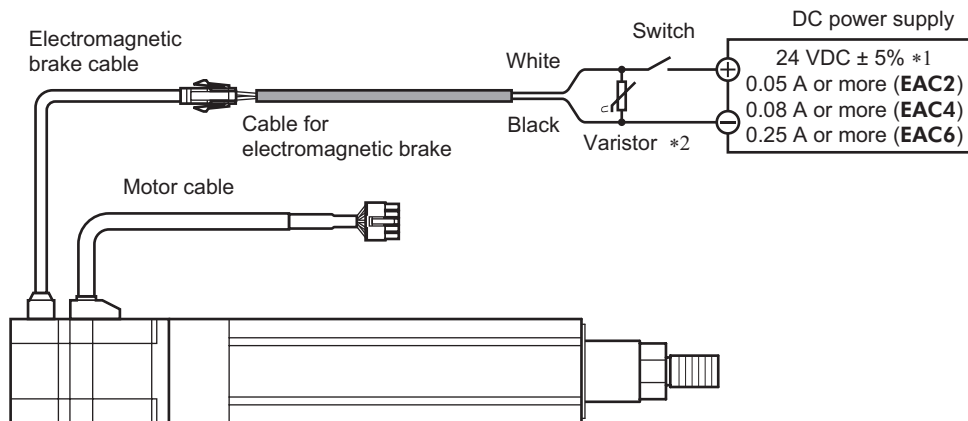
- Reference: Grounding wire of the "cable for motor"
 - Conductor size: AWG18 (0.75 mm²)
 - Maximum conductor resistance: 21.8 Ω/km (25.6 Ω/km for a flexible cable)

3.3 When the electromagnetic brake type is used

When moving the table of the motorized cylinder with an electromagnetic brake for adjusting the position or others, release the electromagnetic brake using a DC power supply for the electromagnetic brake.

How to release an electromagnetic brake

1. Connect the “electromagnetic brake cable” and supplied “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.
When turning on the power, the electromagnetic brake will be released and the table will be able to move by hand.



- *1 If the distance between the “motorized cylinder with an electromagnetic brake” and driver is extended to 20 m (65.6 ft.) or longer, use a power supply of $24 \pm 4\%$ VDC.
- *2 Connect the varistor to protect the contact of the switch or to prevent electrical noise.
[Recommended varistor: Z15D121 (SEMITEC Corporation)]

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.

4 Maintenance

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

4.1 Inspection Items and Timing

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

Maintenance time period	External check
When operated for the first time	○
Six months after initial operation	○
Every six months thereafter	○

■ External Check

Check the items specified in table below.

Item	What to check	Action if problem is found
Motorized cylinder	<ul style="list-style-type: none"> • Are there any loose screws which have mounted the motorized cylinder? • Are there any loose screws which have mounted the load? • Are there any loose screws which have mounted the motor? 	Tighten the screws securely.
Cables	<ul style="list-style-type: none"> • Are there any scratches or areas under stress on the cable? • Are there any loose connections on the motor or driver? 	Disconnect and reconnect the connector or replace the cable.
Operation	Are there any abnormal noise or vibration from the bearings, etc.?	Check the installation of the load and operating speed again.

■ External Cleaning

- Clean the exterior surface of the motorized cylinder whenever necessary.
- Wipe off any dirt and stains using a soft cloth.
- Do not apply compressed air. Dust may enter 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.
- When the grease on the cylinder rod has become dirty, wipe off the dirty grease completely with a rag and apply new grease.

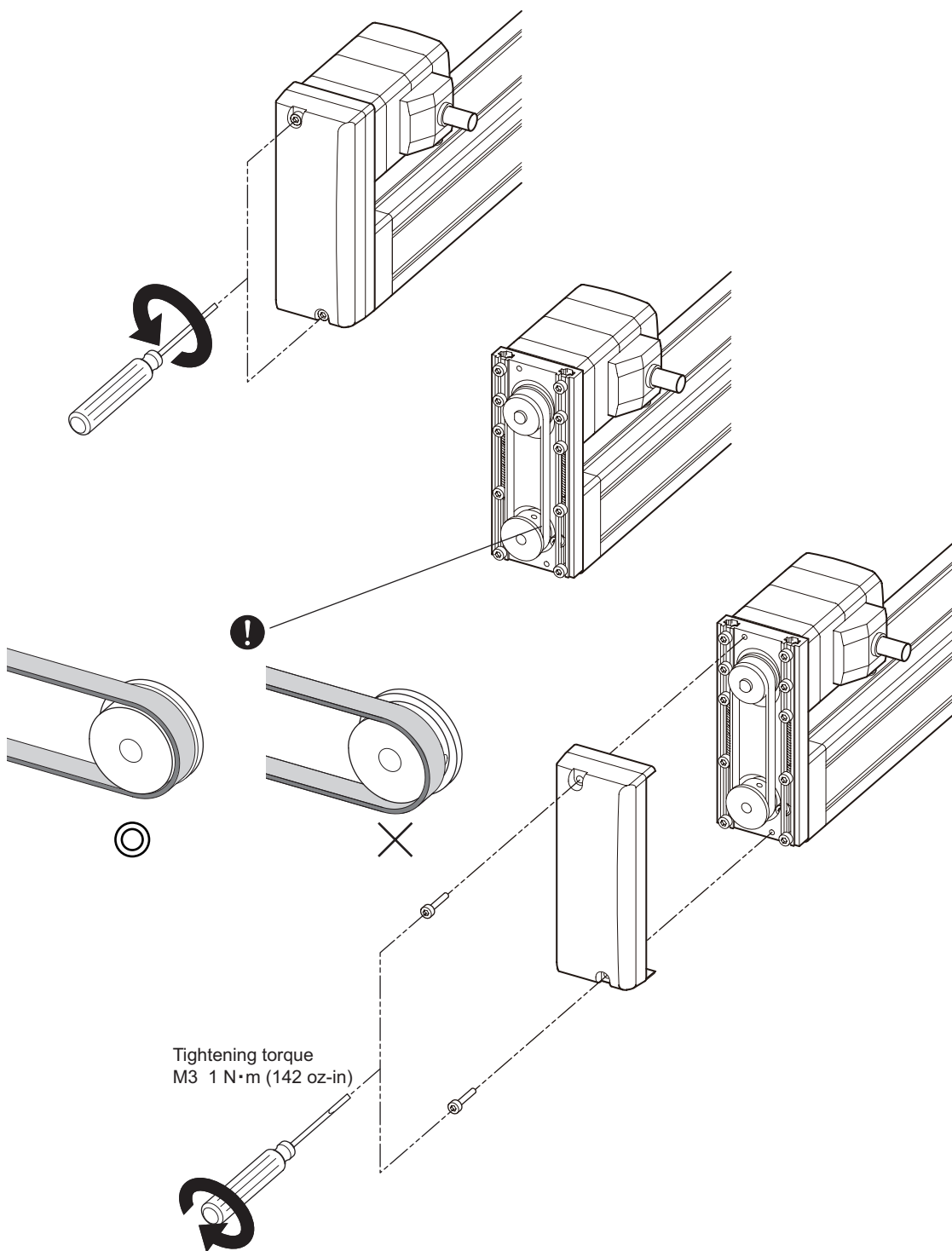
■ Checking the belt (when using the parallel motor mounting type)

Remove the pulley cover to check the belt condition.

Replace the belt if the following condition can be checked at the time of maintenance. See p.27 for how to replace the belt.

Inspection interval	Every 500 km (310 mi.) in mileage
Inspection item	<ul style="list-style-type: none"> • Is there any crack on the belt rubber? • Is there any stripped teeth on the belt? • Is there any abnormal abrasion on facing fabric of the belt?

- How to remove and install the pulley cover



4.2 Greasing

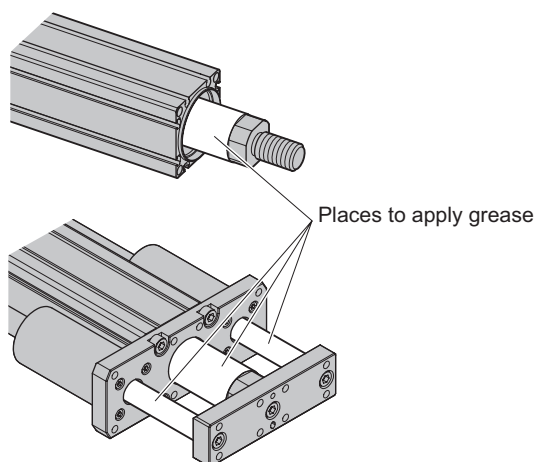
When the grease on the motorized cylinder rod has become dirty, wipe off the dirty grease completely with a rag and apply new grease {Multemp SRL (KYODO YUSHI CO., LTD)}.

⚠ 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.

Greasing timing

- Once every 500 km (310 mi) of travel.
- When the grease has deteriorated. (The color of the grease has changed to brown. There is no gloss in the grease.)



4.3 Adjusting the belt tension and replacing the belt

⚠ Warning

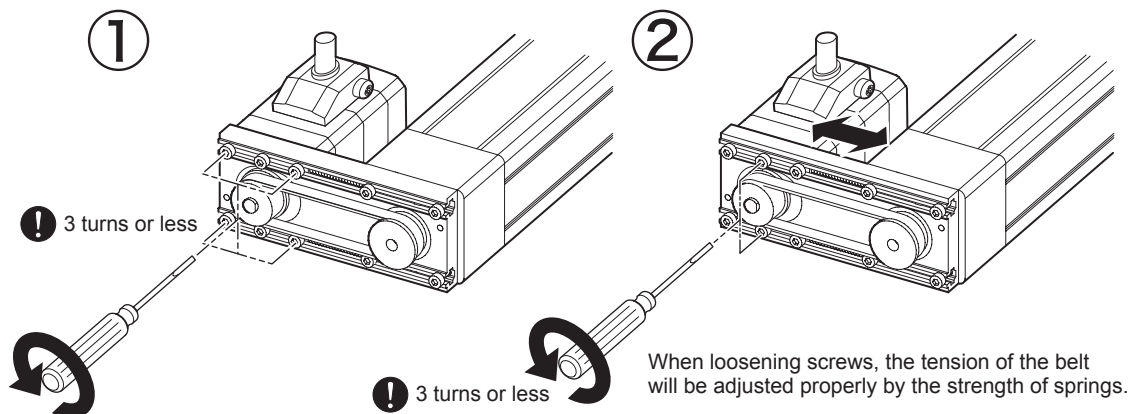
- When performing tension adjustment or replacement of the belt, remove the load and keep the motorized cylinder in a horizontal position. Doing the operation in a vertical condition may allow the moving part to fall, causing injury or damage to equipment.
- If the motorized cylinder is operated without setting the home position again, the moving part may move to unexpected directions, causing injury or damage to equipment.
 - The moving part of the motorized cylinder may collide with the mechanical stopper.
 - The load may collide with other equipment.

- Perform the belt tension adjustment in the order of ①→②→⑤→⑥
- Perform the belt replacement in the order of ①→②→③→④→⑤→⑥

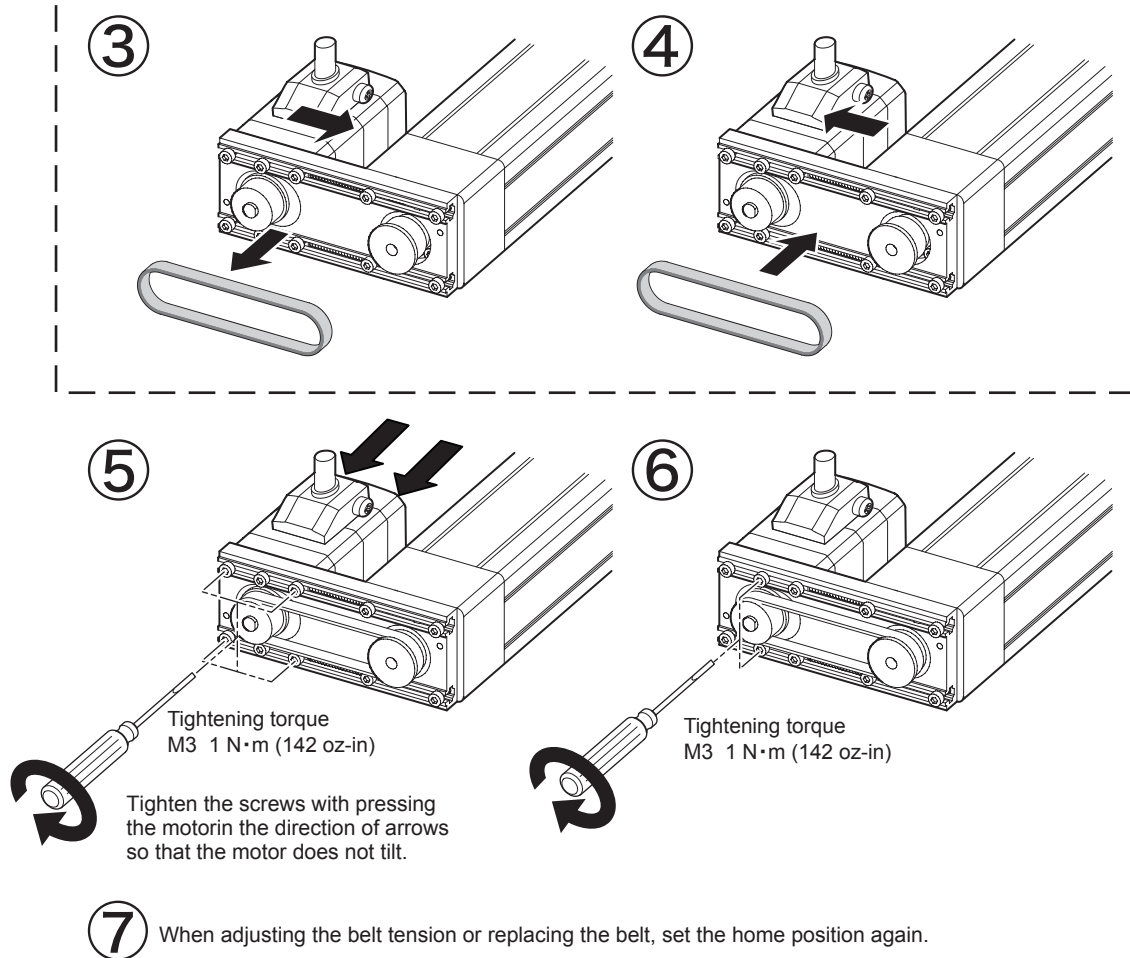
Use the following accessories (sold separately) for the belt replacement.

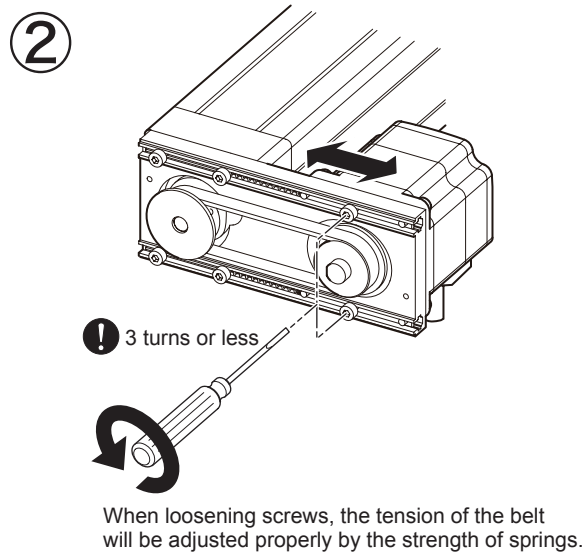
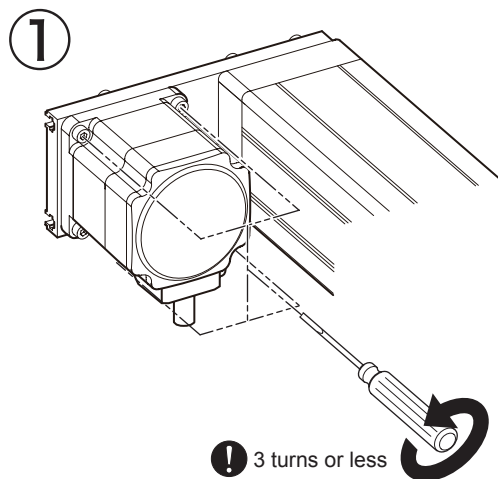
Motorized cylinder model	Belt model
EAC4	LS-LVCS2M060186
EAC6	LS-LVCS3M080252

EAC4

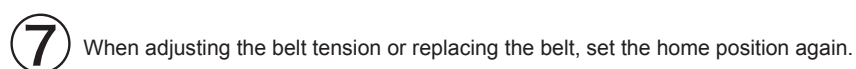
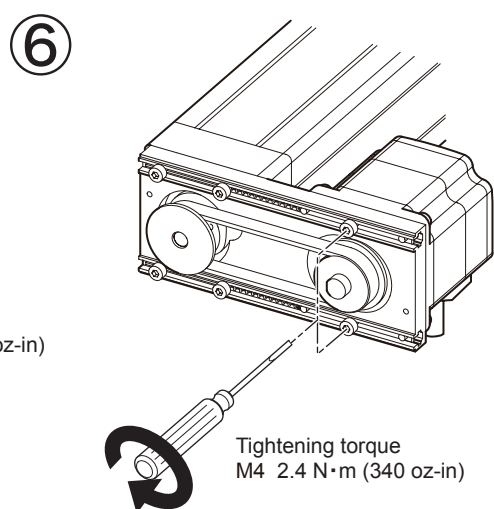
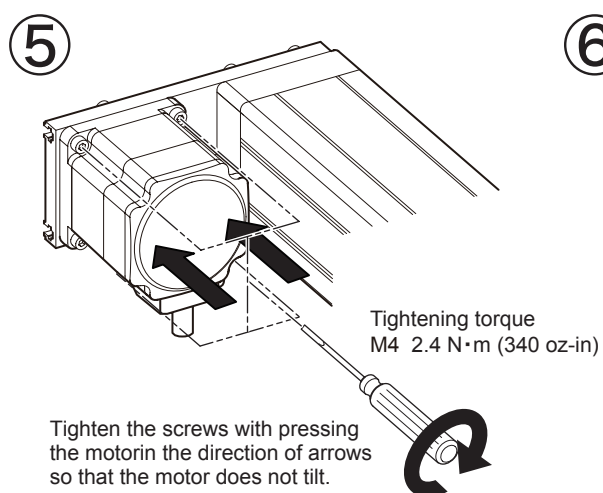
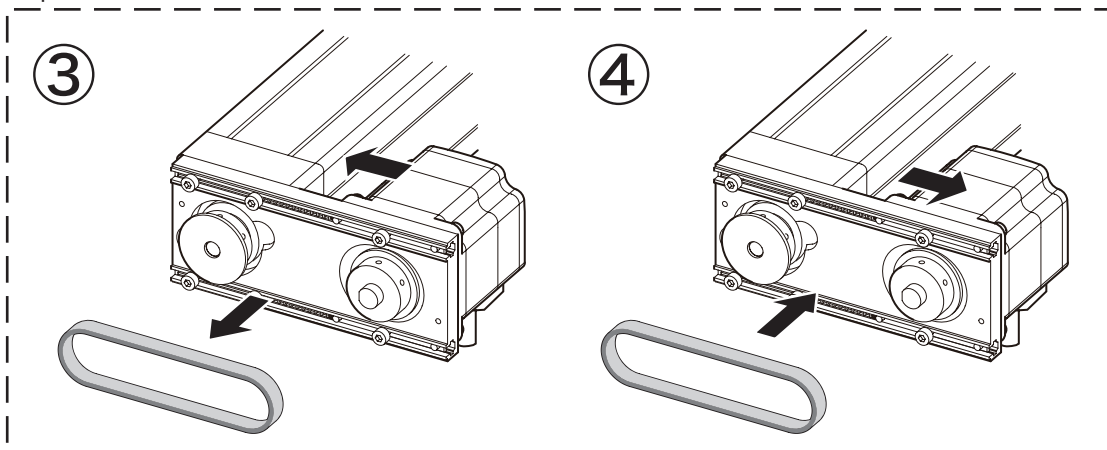


Replace the belt



EAC6

Replace the belt



4.4 Replacing the motor

Warning

- When replacing the motor, remove the load and keep the motorized cylinder in a horizontal position. Doing the operation in a vertical condition may cause injury or damage to equipment.
 - Doing the operation in a vertical condition may allow the moving part of the motorized cylinder to fall.
 - Removing the screws fixed the motor in a vertical condition may cause the motor itself to rotate.
- Be sure to secure the coupling and pulley with the specified tightening torque. If they are not secured with the specified torque, the ball screw may rotate idly, causing injury or damage to equipment.
 - When the motorized cylinder is used in a vertical condition, the load may fall.
 - When the motorized cylinder is used in a horizontal condition, the moving part of the motorized cylinder may collide with the mechanical stopper. Also, the load may collide with other equipment.
- For the motorized cylinder equipped the **AZ** Series, perform maintenance according to the separate manual "Read this manual before starting up your equipment Recovery Guide" or "Motorized actuator Function Setting Edition." If the motorized cylinder is operated immediately after replacing the motor only, since the optimal parameters have not set to the driver, it may move to unexpected directions or run at unexpected speeds, causing injury or damage to equipment.
- If the motorized cylinder is operated without setting the home position again, the moving part may move to unexpected directions, causing injury or damage to equipment.
 - The moving part of the motorized cylinder may collide with the mechanical stopper.
 - The load may collide with other equipment.

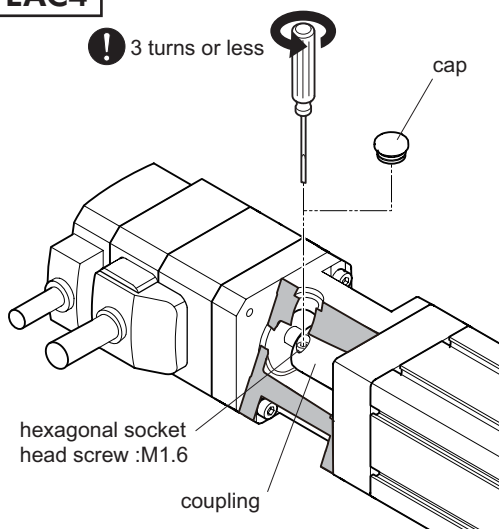
Note

- Since the coupling fixing screw is small, handle it carefully.
 - Keep the tightening torque.
 - Do not insert a hex key at a slant.
 - Do not use the ball-end hex key.
- To prevent the coupling fixing screw from falling off, keep three turns or less when loosening it.

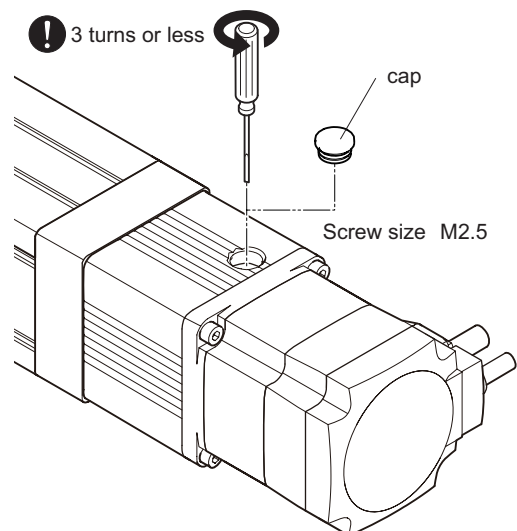
■ In-line motor mounting type

- 1 Open the cap and loosen the screws of the coupling.

**EAC2
EAC4**

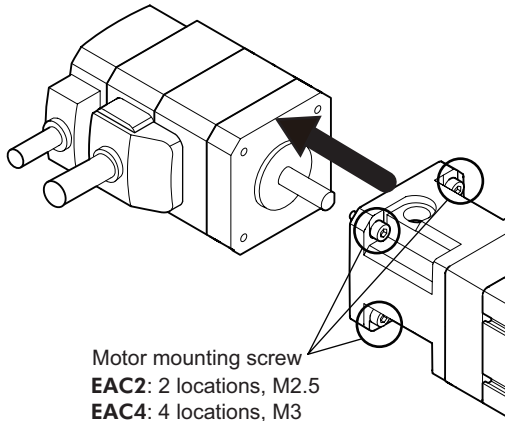


EAC6

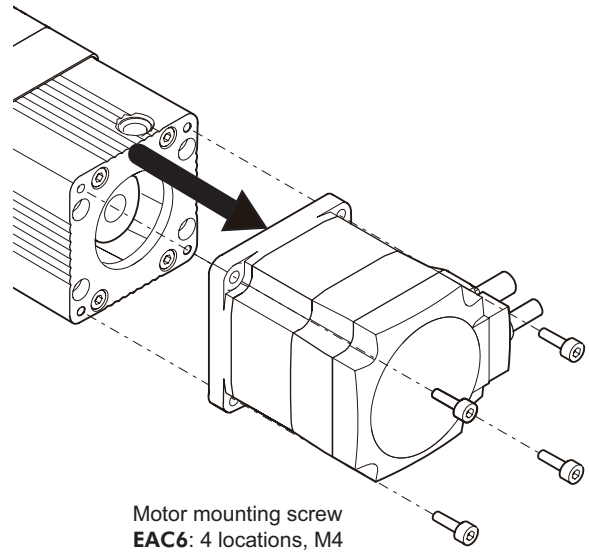


- ② Remove the motor by loosening the screws that are secured the motor.

EAC2
EAC4



EAC6



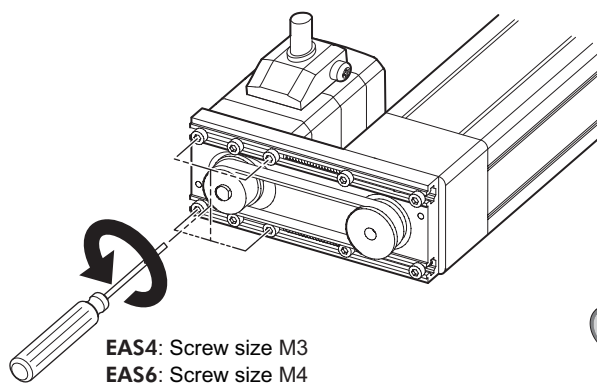
- ③ When installing the motor, perform the reverse procedure to removing the motor. (②→①)
Refer to the table below for the tightening torque of the coupling and the motor mounting screw.

	Tightening torque	
	coupling mounting screw	motor mounting screw
EAC2	M1.6 0.25 N·m (35 oz-in)	M2.5 0.5 N·m (71 oz-in)
EAC4	M1.6 0.25 N·m (35 oz-in)	M3 1 N·m (142 oz-in)
EAC6	M2.5 1 N·m (142 oz-in)	M4 2.4 N·m (340 oz-in)

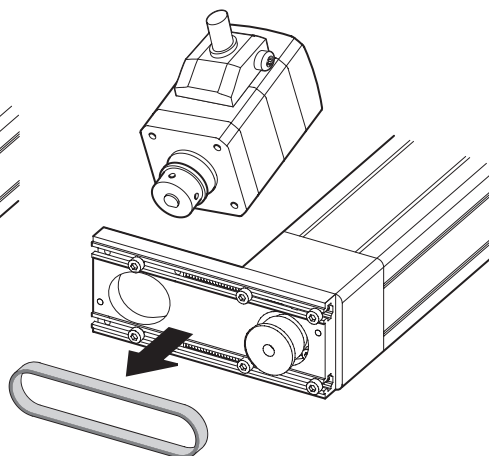
- ④ For the motorized cylinder equipped the **AZ** Series, perform maintenance according to the separate manual "Read this manual before starting up your equipment Recovery Guide" or "Motorized actuator Function Setting Edition."
- ⑤ Set the home position again after replacing the motor.

■ Parallel motor mounting type

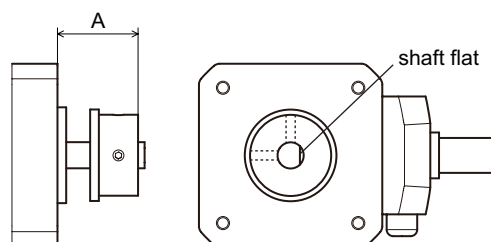
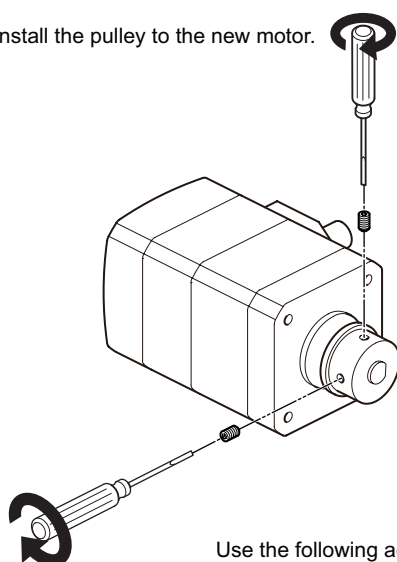
- ① Remove the motor by loosening the screws (4 locations) that are secured the motor.



- ② When the motor is removed, the belt can be removed.



- ③ Install the pulley to the new motor.

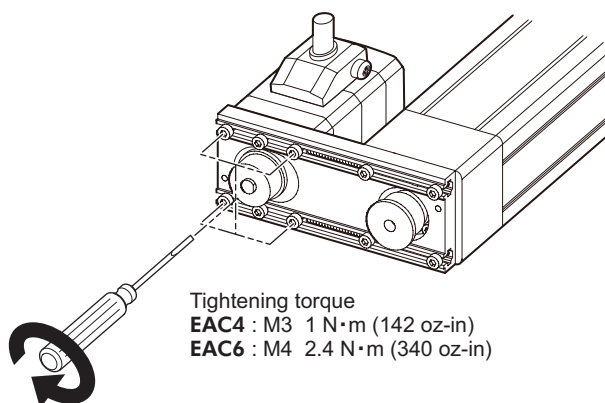


Fix the screw at the location other than the shaft flat on the motor shaft.

Use the following accessories (sold separately) for the pulley replacement.

	Model name of pulley for maintenance	Dimension A [mm]	Screw size	Tightening torque [N·m] (oz-in)
EAC4	LS-LSPTP1709	18.5	M3	0.8 (113)
EAC6	LS-LSPTP1710	20	M4	1.7 (241)

- ④ Tentatively mount the motor so that the motor can be shifted slightly. After tentatively attaching the motor, perform steps (②→④→⑤→⑥) according to p.27 "Adjusting the belt tension and replacing the belt."



- ⑤ For the motorized cylinder equipped the **AZ** Series, perform maintenance according to the separate manual "Read this manual before starting up your equipment Recovery Guide" or "Motorized actuator Function Setting Edition."
- ⑥ Set the home position again after replacing the motor.

4.5 Warranty

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

4.6 Disposal

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

5 Standard, General specifications

5.1 Standard

■ 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 **EAC** Series AC power input type are affixed the CE Marking under the Low Voltage Directive and EMC Directive.

Low Voltage Directive

Applied Standards	EN 60034-1, EN 60034-5, EN 60664-1
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For the actuators equipped with the **AR** Series, they are certified by TÜV Rheinland under the EN 60034-1 and EN 60034-5.

■ Hazardous substances

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

■ Machinery Directive

The motorized actuators and drivers 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

5.2 Specifications

Check on the Oriental Motor Website for the product specifications.

5.3 General specifications

■ Installation conditions

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

Power input	DC power supply	AC power supply
Over voltage category	II	
Protection against electric shock	Class I	
Pollution degree	2	3
Degree of protection	—	
Noise level	72 dB	

■ Environmental conditions

	Operation 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)	
Humidity	85% or less (non-condensing)		
Altitude	Up to 1000 m (3300 ft.) above sea level	Up to 3000 m (10000 ft.) above sea level	

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