

Electric Lifting Columns

EL Series

Operating Manual

WM-0007-2E



Thank you for purchasing an Oriental Motor product. This manual describes product handling procedures and safety precautions. Please read the manual thoroughly to ensure safe operation.

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

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Safety precautions

The precautions described below are intended to ensure the safe and proper use of the product and to prevent the user and other personnel from exposure to the risk of injury. Use the product only after carefully reading and fully understanding these instructions.

In regard to a Electric Lifting Columns, it is prohibited to start operating the Electric Lifting Columns (i.e., to operate the device in accordance with the specified purpose) when the machine in which the Electric Lifting Columns is incorporated does not meet the relevant safety standards. The factory safety manager or safety personnel in charge of the applicable machine must ensure that the machine is operated only by qualified personnel who are familiar with the operation of electronic equipment, and thereby prevent injury or damage to the equipment.

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

WARNING

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 injury or property damage.

Note

The items under this heading contain important handling instructions that the user should observe to ensure safe use of the product.

Tip

The items under this heading contain related information and contents to gain a further understanding of the text in this manual.

WARNING

General

- Never use the product for equipment in connection with the maintenance or management of human life or health.

- Do not use the product in explosive or corrosive environments, in the presence of flammable gases, in areas subjected to splashing water, or near combustible materials. Doing so may result in fire or injury.
- Assign qualified personnel having expert knowledge on electrical and mechanical engineering as well as safety to the task of installing, wiring, operating/controlling, inspecting and troubleshooting the product. Handling by unqualified personnel may result in fire, injury, or damage to equipment.
- Conduct a risk assessment in a state where all parts and components including the product have been installed in the equipment. Failure to do so may result in injury or damage to equipment.
- Provide an interlocking guard at a position that meets the safety distance specified in EN ISO 13857 so that an operator or other personnel does not enter the movable range of the product while the equipment is operating. Failure to do so may result in injury.
- When teaching, adjusting, or inspecting the product inside the cage with interlock, take appropriate safety measures according to the results of the risk assessment of the entire equipment. Failure to do so may result in injury.
- Provide appropriate safety measures 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.
- Provide an emergency stop function for the equipment. Failure to do so may result in injury.
- The function and performance of the safety-related control system are appropriately determined according to the results of the risk assessment of the entire equipment. This may result in injury.
- Do not allow your hands to be caught in moving parts of the product. Doing so may result in injury or damage to equipment.
- Do not disassemble or modify the product. Doing so may result in injury or damage to equipment.
- Do not transport, install, connect, or inspect the product while the power is supplied. Doing so may result in electric shock.
- Do not use the electromagnetic brake for braking or as a safety brake. Doing so may result in injury or damage to equipment.
- When using the data setter, do so outside the safety cage. Failure to do so may result in injury.

Installation and wiring

- When transporting or installing the product, wear a helmet, safety shoes, gloves, or other protective equipment to hold the specified places. Failure to do so may result in injury.
- Be sure to secure the product itself according to the instructions. Failure to do so may result in injury or damage to equipment.
- Be sure to wire and connect according to the instructions. Failure to do so may result in fire or damage to equipment.
- Do not pull the cable and connector, apply excessive force to them, or step on them. Also, do not excessively bend the cable. Doing so may result in injury or damage to equipment.
- Depending on the operating environment, the cable between the product and the controller may be damaged or deteriorated. Therefore, protect the cable with a protective tube or cover as necessary. Failure to do so may result in injury or damage to equipment.

- Since the product is very heavy, make sure that two or more people work together to perform the necessary tasks when transporting or installing it. Also, when working with two or more people, clarify the relationship and roles of the primary worker and assistant worker, while communicating with each other to ensure safety. Failure to do so may result in injury.

Operation

- Take appropriate safety measures when placing the motor in a non-excitation state. Failure to do so may result in injury or damage to equipment.
- Check the condition of the surrounding area to ensure safety. This may cause injury or damage to equipment.
- When turning on the driver power, make sure there is no signal input from the host controller. The product may start operating unintentionally, causing injury or damage to equipment.
- Turn off the power supply of the driver in the event of a power failure. Otherwise, the product may start suddenly when the power is restored, causing injury or damage to equipment.
- If any abnormality is observed, immediately stop operation and turn off the power to the motor that drives the product. Failure to do so may result in injury or damage to equipment.
- Do not allow the moving part to hit the mechanical stoppers when operating other than push-motion return-to-home or push-motion operation. Doing so may result in injury or damage to equipment.
- When having replaced the driver, set parameters such as the resolution, the moving direction or others before operating the product. If the product is operated without setting parameters, the moving part may move to unexpected directions or run at unexpected speeds, resulting in injury or damage to equipment.
- Do not turn off the power or input a signal to place the motor in a non-excitation state during operation. The motor will lose its holding force and the moving parts or load may fall, resulting in injury or damage to equipment.
- Set parameters such as the resolution, the moving direction or others before operating the product. If the product is operated without setting parameters, the moving part may move to unexpected directions or run at unexpected speeds, resulting in injury or damage to equipment. (The parameters are set at the time of shipment.)

Maintenance and inspection

- Perform the pre-work (daily) inspection and periodic inspection according to the instructions in this manual, and check that there are no abnormalities in the product and related equipment before working. Failure to do so may result in injury or damage to equipment.
- Do not replace the motorized cylinder or the motor that is equipped with the product. Doing so may result in injury or damage to equipment. If replacement is required, contact the sales office from which you purchased the product.

CAUTION

- Do not use the product beyond its specifications. Doing so may result in injury or damage to equipment.
- Keep the area around the product free of combustible materials. Failure to do so may result in fire or a skin burn(s).
- Do not leave anything around the product that would obstruct ventilation. Doing so may result in damage to equipment.
- When conducting the insulation resistance measurement or the dielectric strength test, be sure to separate the connection between the product and the driver. Failure to do so may result in damage to equipment.
- Take measures against static electricity when handling. Static electricity may cause the encoder (ABZO sensor) of the motor that drives the product or the driver to malfunction or be damaged. This may result in injury or damage to equipment.
- Stop operation if abnormal noise or vibration occurs during operation. Failure to do so may result in injury or damage to equipment.
- When installing and wiring, take measures against EMC. Without effective measures to suppress Electromagnetic Interference (EMI) caused by the product or driver to the surrounding control system equipment and Electromagnetic Susceptibility (EMS) generated by the product or driver, the function of your equipment may be seriously affected. Verify EMC compliance with the completed equipment. This may result in injury or damage to equipment.
- Since the motor surface temperature may exceed 70 °C (158 °F) even under normal operating conditions, if the operator is allowed to approach the motor, affix a warning label shown in the figure on a conspicuous place. The surface is hot, and this may cause a skin burn(s).



- Keep fingers and objects out of the openings in the product. Failure to do so may result in fire or injury.
- Do not touch the product while operating or immediately after stopping. The surface is hot, and this may cause a skin burn(s).
- Use a product and driver only in the specified combination. Failure to do so may result in fire.
- Do not touch the moving part during operation. Doing so may result in injury.
- Be careful not to make any mistakes in the combinations when connecting the product and the driver. Wiring in the wrong combination may cause unexpected movement. This may result in injury or damage to equipment.

Precautions for use

General

Always use Oriental Motor cables to connect a product and a driver.

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

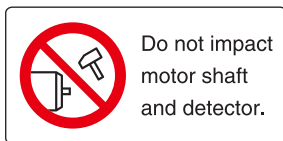
Conducting the insulation resistance measurement or the dielectric strength test with the product and driver connected may result in damage to the product.

Do not make a strong impact on the product.

Do not drop the product. Also, do not hit or strike the product. Making an impact on the product may cause the positioning accuracy to decrease, the product to damage, or the product life to shorten.

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

Applying a strong impact to the encoder (ABZO sensor) may damage to the encoder (ABZO sensor) or cause the product to malfunction. When transporting the product or installing a load, do not apply a strong impact to the moving part. The label shown in the figure is affixed on the motor.



Keep the encoder (ABZO sensor) away from a strong magnetic field.

A magnetic sensor is built into the encoder (ABZO sensor). If the product is installed near equipment that generates a strong magnetic field, the encoder (ABZO sensor) may break or malfunction. Make sure that the magnetic flux density on the surface of the encoder (ABZO sensor) does not exceed 10 mT.

Meshing noise of mechanical sensor

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

Temperature

Use the product in conditions where the motor surface temperature does not exceed 80 °C (176 °F)

The surface temperature of the motor may exceed 80 °C (176 °F) depending on operating conditions such as ambient temperature, operating speed, operating duty, and others. In order to protect the encoder (ABZO sensor), use the motor in conditions where the surface temperature on the motor case does not exceed 80 °C (176 °F). If the encoder (ABZO sensor) temperature reaches the upper limit, an alarm of Motor overheat protection will be generated.

Operation

The operating speed may not reach the maximum speed depending on the operating conditions, the ambient temperature, or the length of the motor cable.

Holding force at standstill

The holding force of the product is reduced by the current cutback function of the driver while the product is stopped. When selecting the product, check the product holding force.

Do not use the electromagnetic brake for braking the product or as a safety brake.

Do not use the electromagnetic brake as a means to brake and stop the product. 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 to maintain the position of the load when the power is cut off, but this brake is not a mechanism that will hold the load securely. Accordingly, do not use the electromagnetic brake as a safety brake. To use the electromagnetic brake to hold the load in position, do so after the product has stopped.

Notes when the connection cable is used

Note the following points when an Oriental Motor cable is used.

When connecting the connector

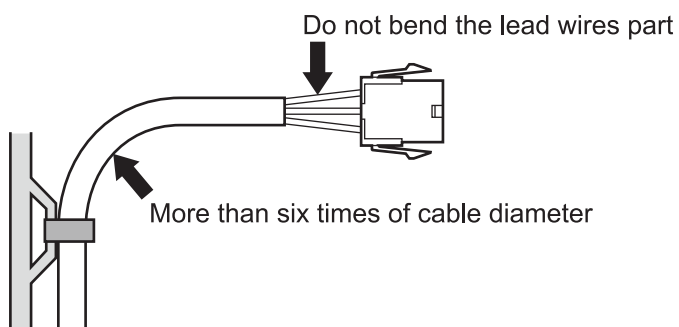
Hold the connector body, and insert it straight and securely. Inserting the connector in an inclined state may result in damage to terminals or a connection failure.

When disconnecting the connector

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

Bending radius of cable

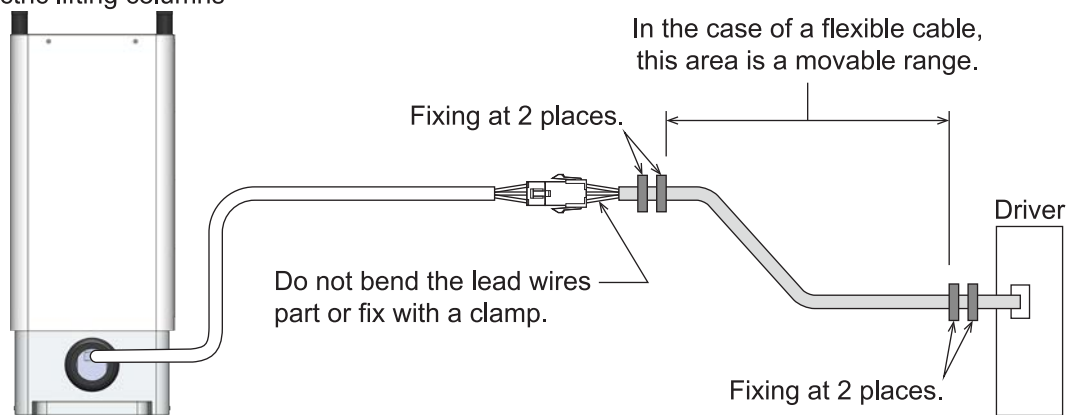
Use the cable in a state where the bending radius of the cable is more than six times the cable diameter. Do not bend the lead wires part or secure with a clamp, etc. Doing so may result in damage to the connector.



How to fix the cable

Fix the cable at two places near the connectors as shown in the figure, or fix it with a wide clamp in order to take measures to prevent the connectors from being stressed.

Electric lifting columns



Preparation

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.

- Electric lifting column... 1 unit
- Unpacking procedure... 1 copy

How to identify the product model

Verify the model name of the purchased product against the model shown on the nameplate of the product.

<u>EL</u>	<u>12</u>	<u>30</u>	<u>AZ</u>	<u>M</u>	<u>K</u>
1	2	3	4	5	6

1	Series name	EL: EL Series
2	Lead	6: 6 mm 12: 12 mm
3	Stroke	05: 50 mm 10: 100 mm 20: 200 mm 30: 300 mm
4	Equipped motor	AZ: AZ Series motor
5	Motor type	M: With electromagnetic brake
6	Power supply input	K: DC power input

Driver and controller that can be combined

Product	Series	Type	Model *
Driver	AZ Series	Pulse input type	AZD-K
		Pulse input type with RS-485 communication	AZD-KX
		Built-in controller type	AZD-KD
		Network compatible	AZD-K■
	AZ Series mini Driver	Pulse input type with RS-485 communication	AZD-KRX
		Network compatible	AZD-KR■
	AZ Series multi-axis driver	Network compatible	AZD●A-K■ AZD2B-K■
Controller	MRCU Series	—	MRCU3AK MRCU4AK MRCU5AK MRCU6AK MRCU7AK MRCU8AK

* The box (■) in the model name indicates a alphanumeric representing the network type. The box (●) in the model name indicates a number representing the number of axes.

Information about nameplate

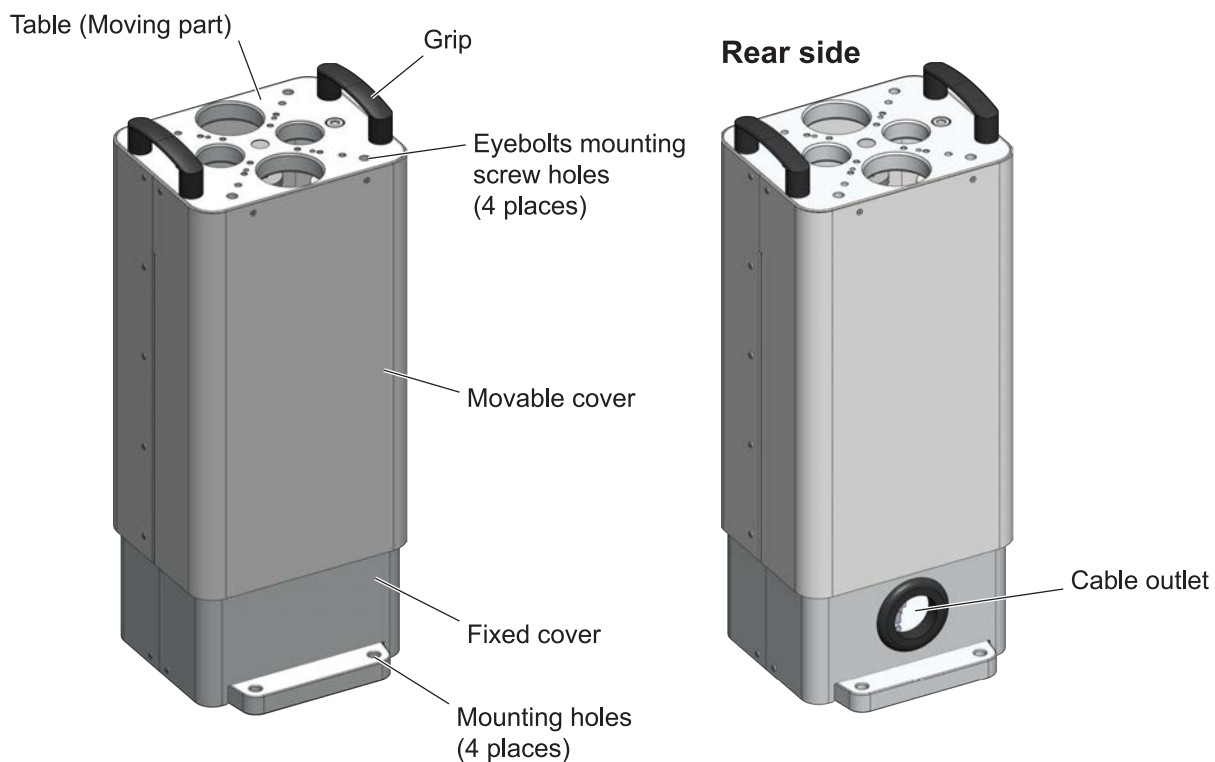
The figure shows an example.

Tip

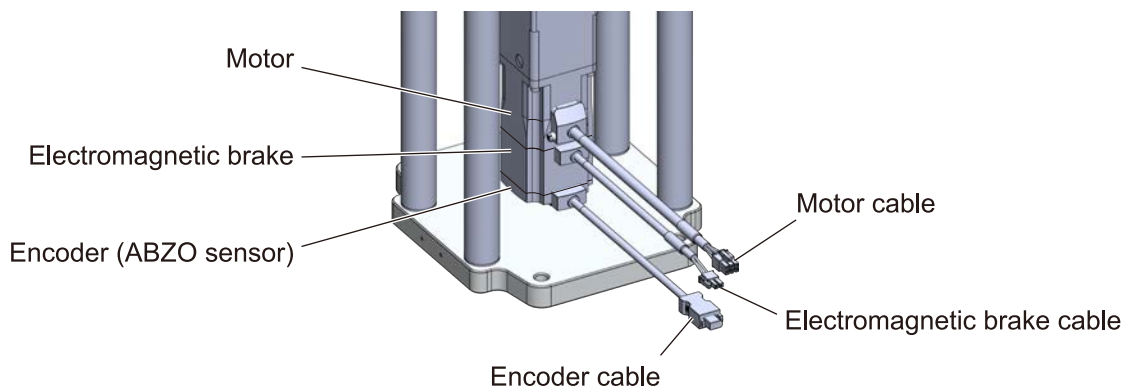
The position describing the information may vary depending on the product.



Names of parts



Inside the cover



About the products equipped with the electric lifting column

The list below shows the motorized cylinder and the motor, which are equipped with the electric lifting column.

Electric lifting column model	Motorized cylinder model	Motor model
EL605AZMK	EACM6E05AZMK	AZM66MK
EL1205AZMK	EACM6D05AZMK	
EL610AZMK	EACM6E10AZMK	
EL1210AZMK	EACM6D10AZMK	
EL620AZMK	EACM6E20AZMK	
EL1220AZMK	EACM6D20AZMK	
EL630AZMK	EACM6E30AZMK	
EL1230AZMK	EACM6D30AZMK	

- The power supply current capacity for the driver when combined with the electric lifting column is described in the operating manual of the driver.
The operating manual of the driver describes the motor by its models, refer to the motor models in the table.
- Select “EAC (0.01mm/step)” when using the MEXE02 support software.

▼ Product list		
Series	Product	Motor/Actuator
AZ	AZ Pulse Input/Built-in Control	Standard/Geared Motor
AZ mini	AZ EtherCAT compatible	DG2 Motor vertical mounting
AZ multi-axis	AZ EtherNet/IP compatible	DG2 Motor horizontal mounting
AZX	AZ PROFINET compatible	DR/DRS2 (0.001mm/step)
CVD	AZ MECHATROLINK-III compatible	EAC (0.01mm/step)
BLE2	AZ SSCNETIII/H compatible	EAS (0.01mm/step)
BLH	AZ Compact Driver(AZD-KRD)	EZS (0.01mm/step)
BLV		EZSH (0.01mm/step)
		L High-speed type (0.01mm/step)
		L High-transportable mass type (0.01mm/step)
		EH (0.01mm/step)
		EH series 3-finger type

Installation

Installation location

The product described in this manual is designed and manufactured to be incorporated into 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 installed indoors (provide ventilation holes)
- Operating ambient temperature: 0 to +40 °C [+32 to 104 °F] (non-freezing)
- Operating ambient humidity: 85 % or less (non-condensing)
- Area free of explosive atmosphere, 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 equipment, etc.)
- Area free of radioactive materials, magnetic fields, or vacuum
- Up to 1,000 m (3,300 ft.) above sea level

When a product is installed in an environment where a magnetic field is generated

A magnetic sensor is built into the encoder (ABZO sensor). If the product is installed near equipment that generates a strong magnetic field, the encoder (ABZO sensor) may break or malfunction. Make sure that the magnetic flux density on the surface of the encoder (ABZO sensor) does not exceed 10 mT.

Note

Do not install the product near equipment that generates a strong magnetic field.

How to unpack

1. Place the package on a horizontal, flat surface to unpack.
The product is not in a fixed state in the package. Be careful when handling the product as it may tilt.
2. Remove the surrounding packing.
3. Take out the product by holding the grip.

Be sure to hold the specified positions when taking out. Improper holding, such as holding the product with one grip or in a position other than that specified, resulting in the product falling and causing injury.



Installation method

The product can be installed either frame mounted or ceiling mounted. Hold the grips when transporting or installing the product.

Screws, spring washers, flat washer, are to be provided by the customer.

The values of the tightening torque are recommended. Tighten the screws to an appropriate torque according to the design conditions.

Note

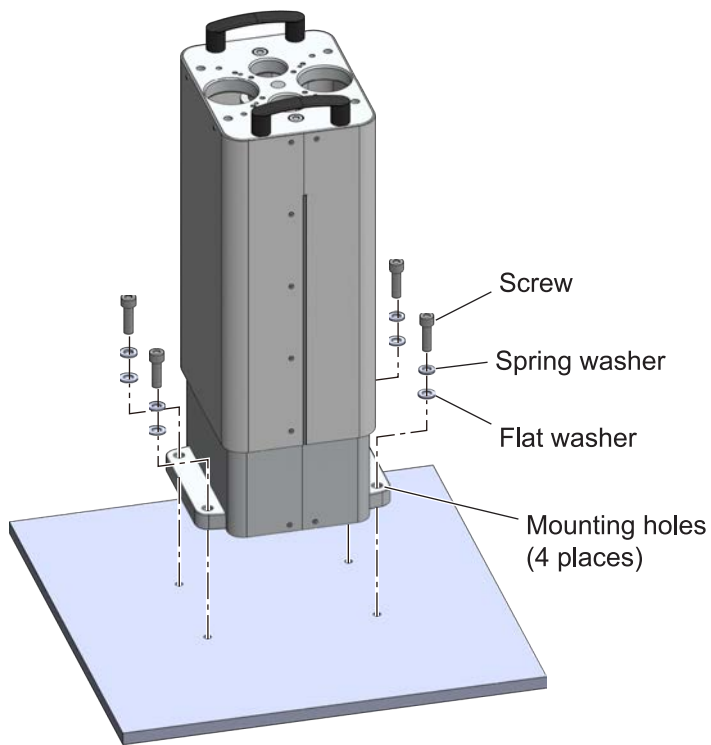
- Work in a stable condition so that the product does not tilt.
- Install the product on a metal surface of sufficient strength to prevent vibration or twisting of an enclosure in which the product is installed.

Frame mounting

Secure the product to the mounting plate using the mounting holes (4 places).

Provide screw holes in the mounting plate.

Mounting plate	Thickness	10 mm or more
	Material	Steel
Mounting hole	Hole diameter	φ11 mm
	Nominal size	M10
	Tightening torque	25 N·m (220 lb-in)



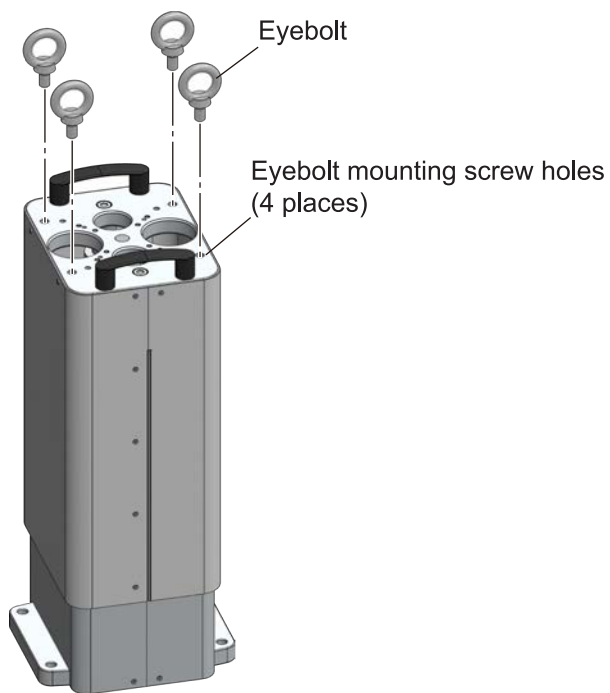
When transporting by crane

WARNING

A crane must be operated by qualified personnel. Failure to do so may result in injury or damage to equipment.

Install the eyebolts to the eyebolt mounting screw holes (4 places) and suspends the product with a crane.

Eyebolts are not included with the product. Provide eyebolts that are suitable for lifting the product mass.



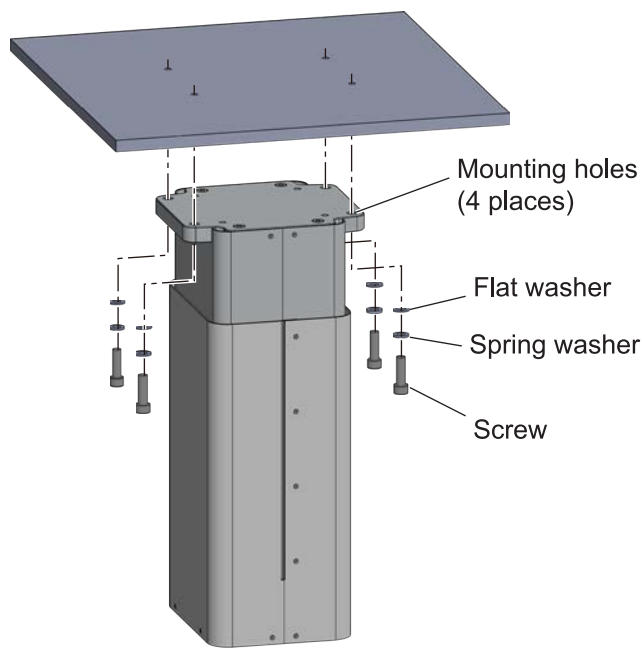
Ceiling mounting

WARNING

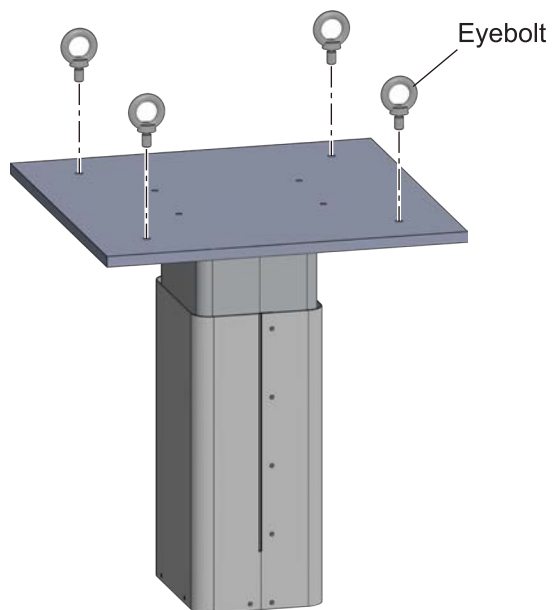
A crane must be operated by qualified personnel. Failure to do so may result in injury or damage to equipment.

1. [Remove the grip.](#)
2. Secure the product to the mounting plate using the mounting holes (4 places) .
Provide screw holes in the mounting plate.

Mounting plate	Thickness	10 mm or more
	Material	Steel
Mounting hole	Hole diameter	φ11 mm
	Nominal size	M10
	Tightening torque	25 N·m (220 lb-in)



3. Install the eyebolts to the mounting plate and suspend the product with a crane. Eyebolts are not included with the product. Provide eyebolts that are suitable for lifting the product mass.

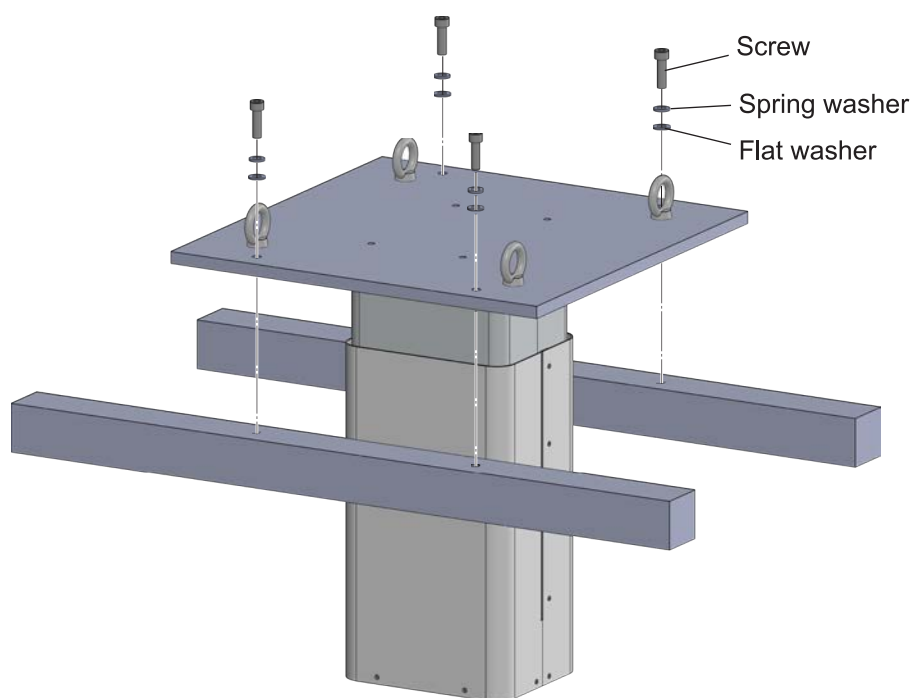


Note

Securely tighten the eyebolts with the appropriate torque so that they do not loosen according to the product's own weight and the eyebolt specifications.

4. Use a crane to lift the product.
5. Secure the mounting plate to the Installation place.

Nominal size	M8
Tightening torque	13 N·m (115 lb-in)
Number of screws	4 pieces or more



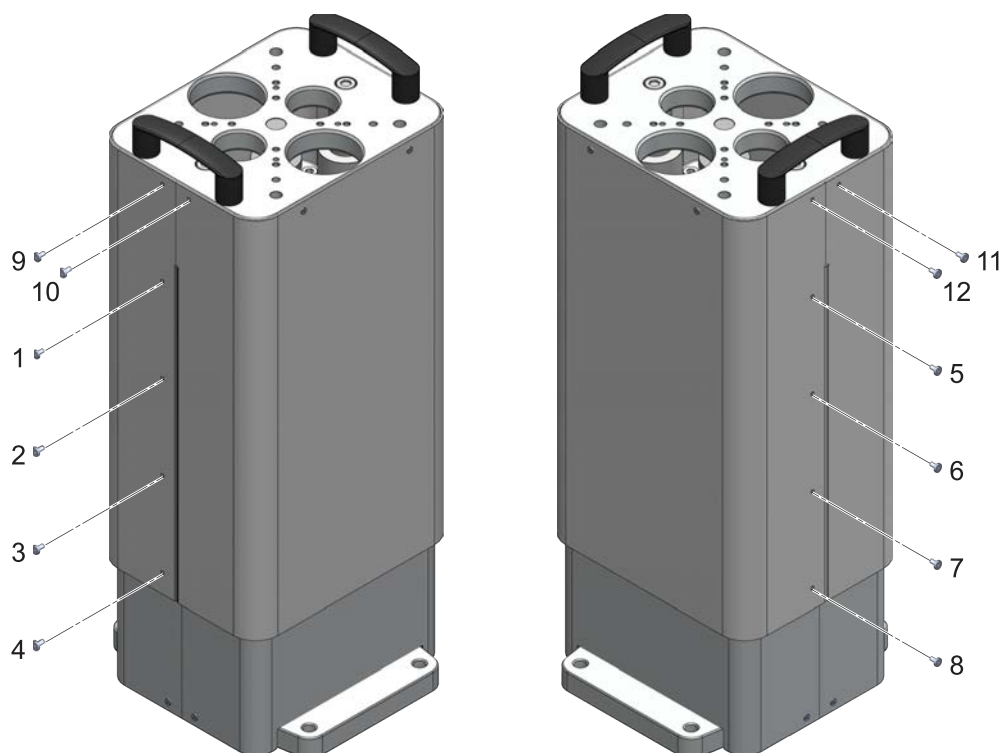
Removing the cover

Required tools: Hexagonal wrench (width across flats 1.5 mm)

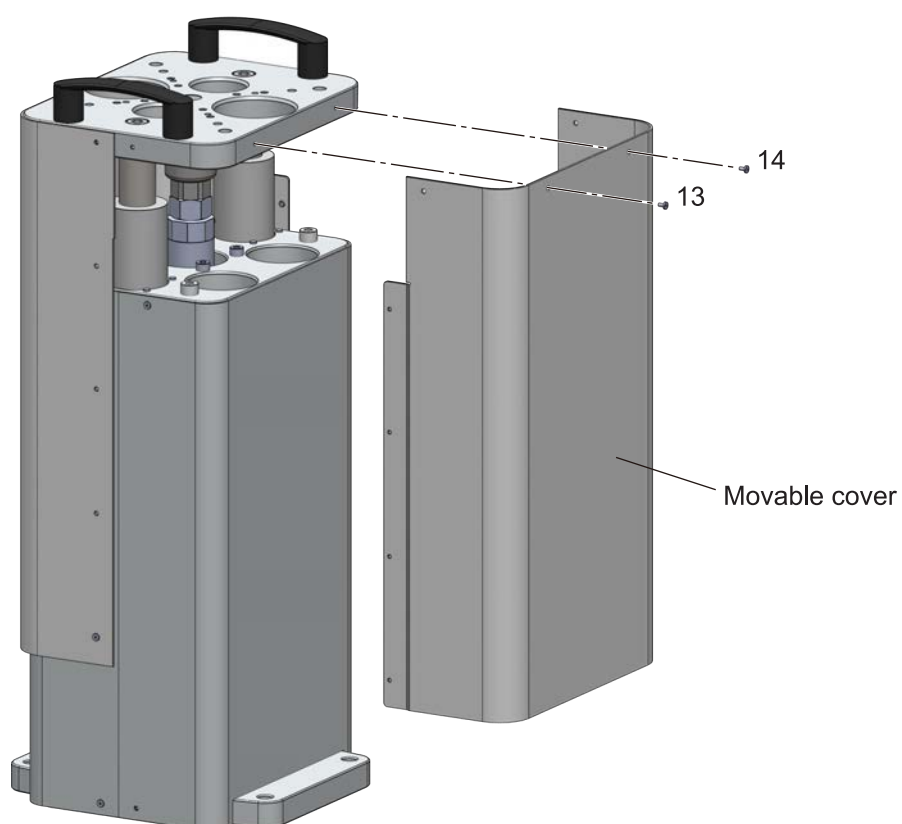
Note

- Wear protective equipment (gloves) when working. Failure to do so may result in injury due to the edges of the cover.
- Be sure to observe the specified screw tightening torque. Also, do not insert tools at an angle. Doing so may result in damage to the screws.

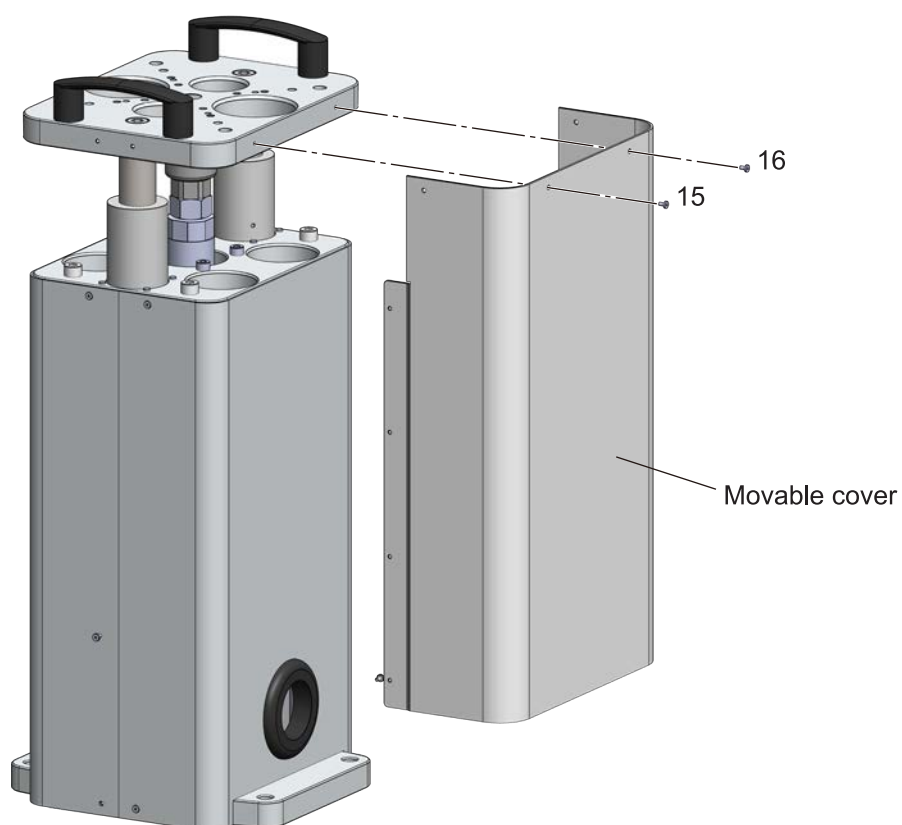
1. Remove the screws 1 through 12 in order.



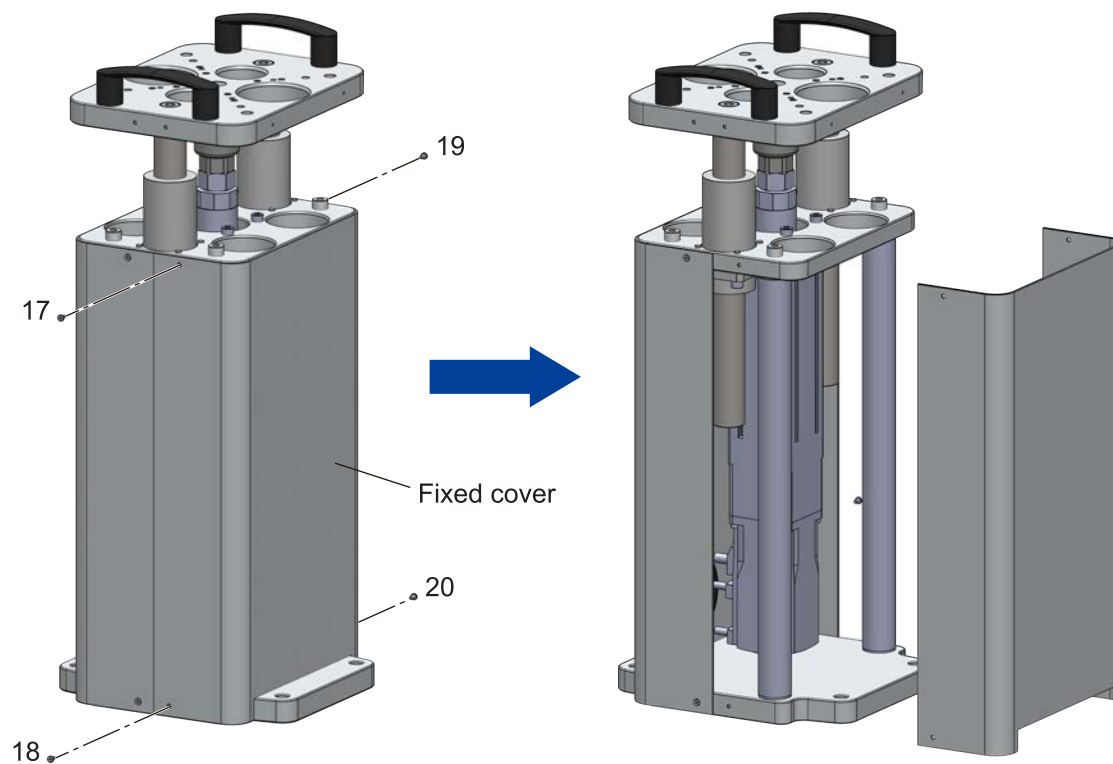
2. Remove the screws 13 and 14, then remove the movable cover on the front side. Remove the screws while holding the cover so that the cover does not fall.



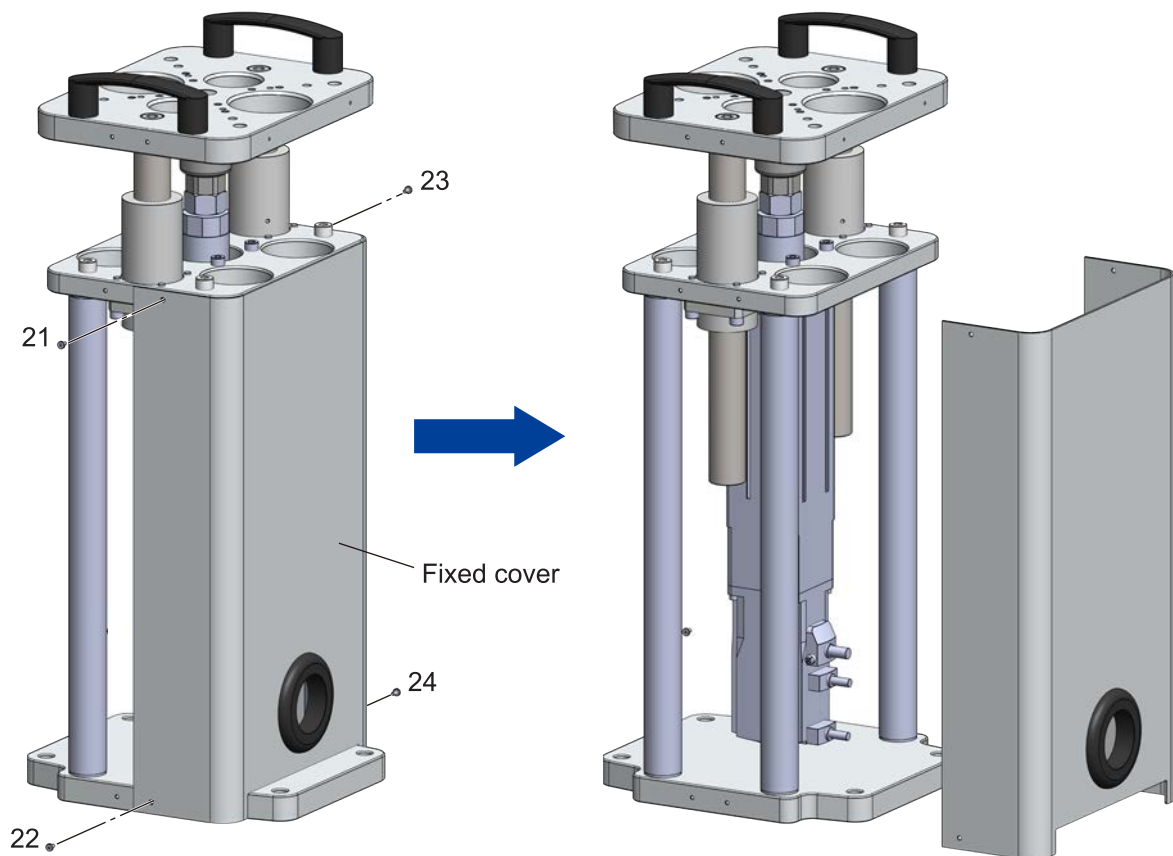
3. Remove the screws 15 and 16, then remove the movable cover on the rear side.
Remove the screws while holding the cover so that the cover does not fall.



4. Remove the screws 17 and 20, then remove the movable cover on the front side.
Remove the screws while holding the cover so that the cover does not tip over.



5. Remove the screws 21 and 24, then remove the movable cover on the rear side. Remove the screws while holding the cover so that the cover does not tip over. Remove the cover so that the cable does not get caught in the cable outlet.



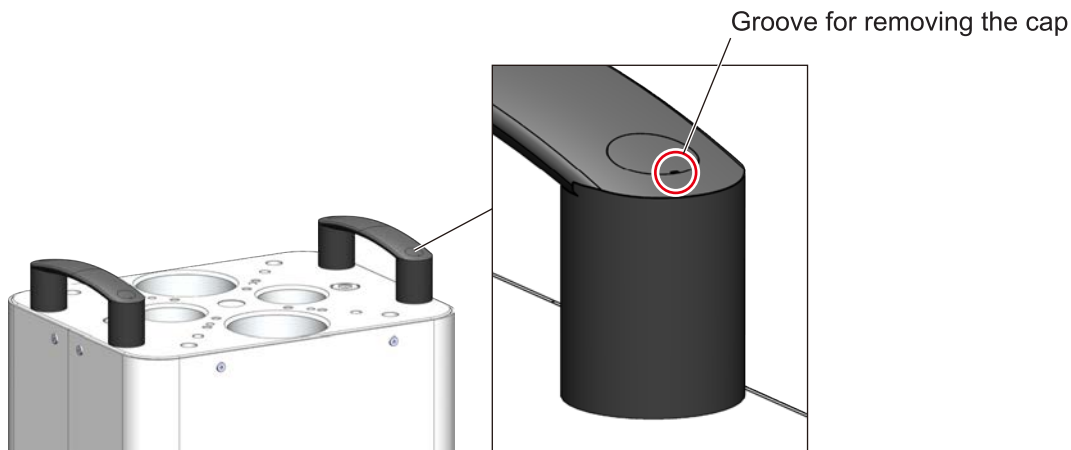
6. When installing the cover, follow the reverse procedure of removal.
Tightening torque: 0.6 N·m (85 oz-in)

Removing the grip

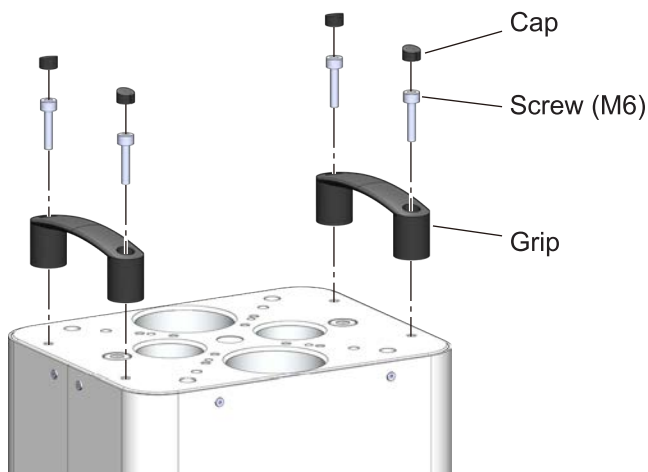
WARNING

Be sure to observe the specified screw tightening torque. Failure to do so may result in injury or damage to equipment.

1. Insert a flat blade screwdriver into the groove for removing the cap, and remove the cap.



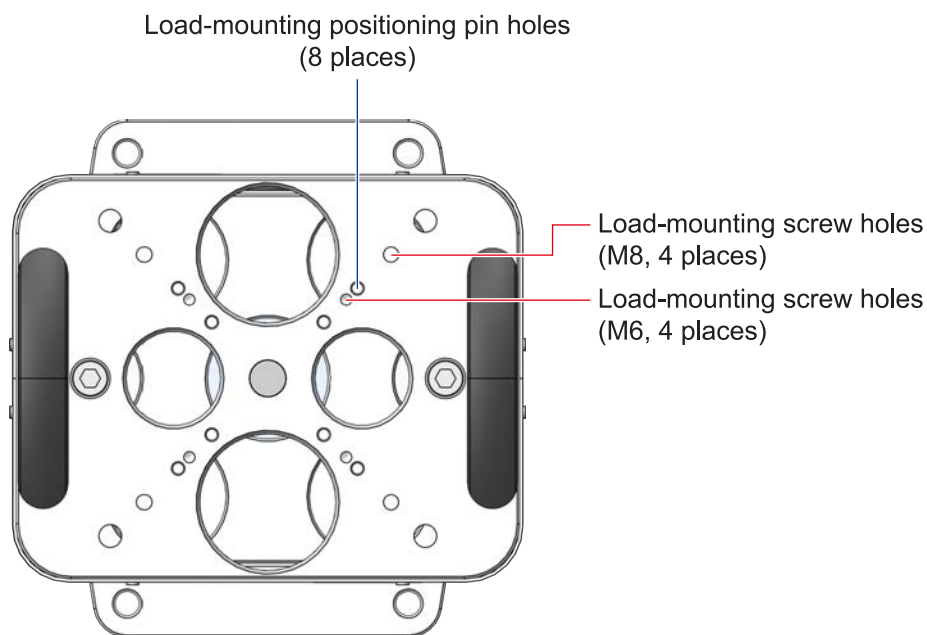
2. Remove the screw and remove the grip.



3. When installing the grip, follow the reverse procedure of removal.
Tightening torque: 3 N·m (420 oz-in)

Installing a load

Install a load using the screw on the load-mounting screw holes (eight places) of the table.
Use the load-mounting positioning pin holes (eight places) of the table when positioning a load.
The values of the tightening torque are recommended. Tighten the screws to an appropriate torque according to the design conditions.



Material of load

Steel or aluminum

Mounting screws

Nominal size	Tightening torque	Effective depth of screw
M6	6 N·m (850 oz-in)	10 mm
M8	12 N·m (106 lb-in)	20 mm

Positioning pin hole

Pin hole diameter: $\varnothing 5_0^{+0.012}$ mm

Pin hole depth: 5 mm

Positioning pin

Recommended size: $\varnothing 5_0^{+0.012}$ mm

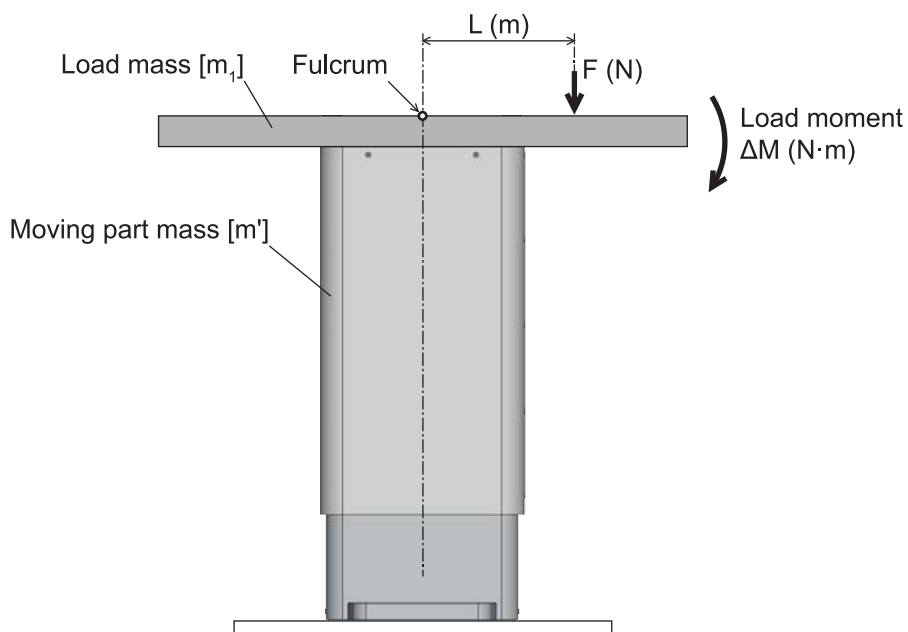
Note

Do not drive the positioning pin into the table. Driving the positioning pins into the table may cause damage to the product due to impact or excessive moment.

Permissible moment

Use the product so as not to exceed the load moment and the load mass shown in the table.

Model	Lead	Permissible moment	Transportable mass vertical [m]	Moving part mass [m']	Load mass [m ₁]
EL605	6 mm	80 N·m (700 lb-in)	30 kg (66 lb.)	5.5 kg (12.1 lb.)	24.5 kg (53.9 lb.)
EL1205	12 mm		15 kg (33 lb.)		9.5 kg (20.9 lb.)
EL610	6 mm		30 kg (66 lb.)	5.7 kg (12.5 lb.)	24.3 kg (53.5 lb.)
EL1210	12 mm		15 kg (33 lb.)		9.3 kg (20.5 lb.)
EL620	6 mm		30 kg (66 lb.)	6.9 kg (15.2 lb.)	23.1 kg (50.8 lb.)
EL1220	12 mm		15 kg (33 lb.)		8.1 kg (17.8 lb.)
EL630	6 mm		30 kg (66 lb.)	8.1 kg (17.8 lb.)	21.9 kg (48.2 lb.)
EL1230	12 mm		15 kg (33 lb.)		6.9 kg (15.2 lb.)

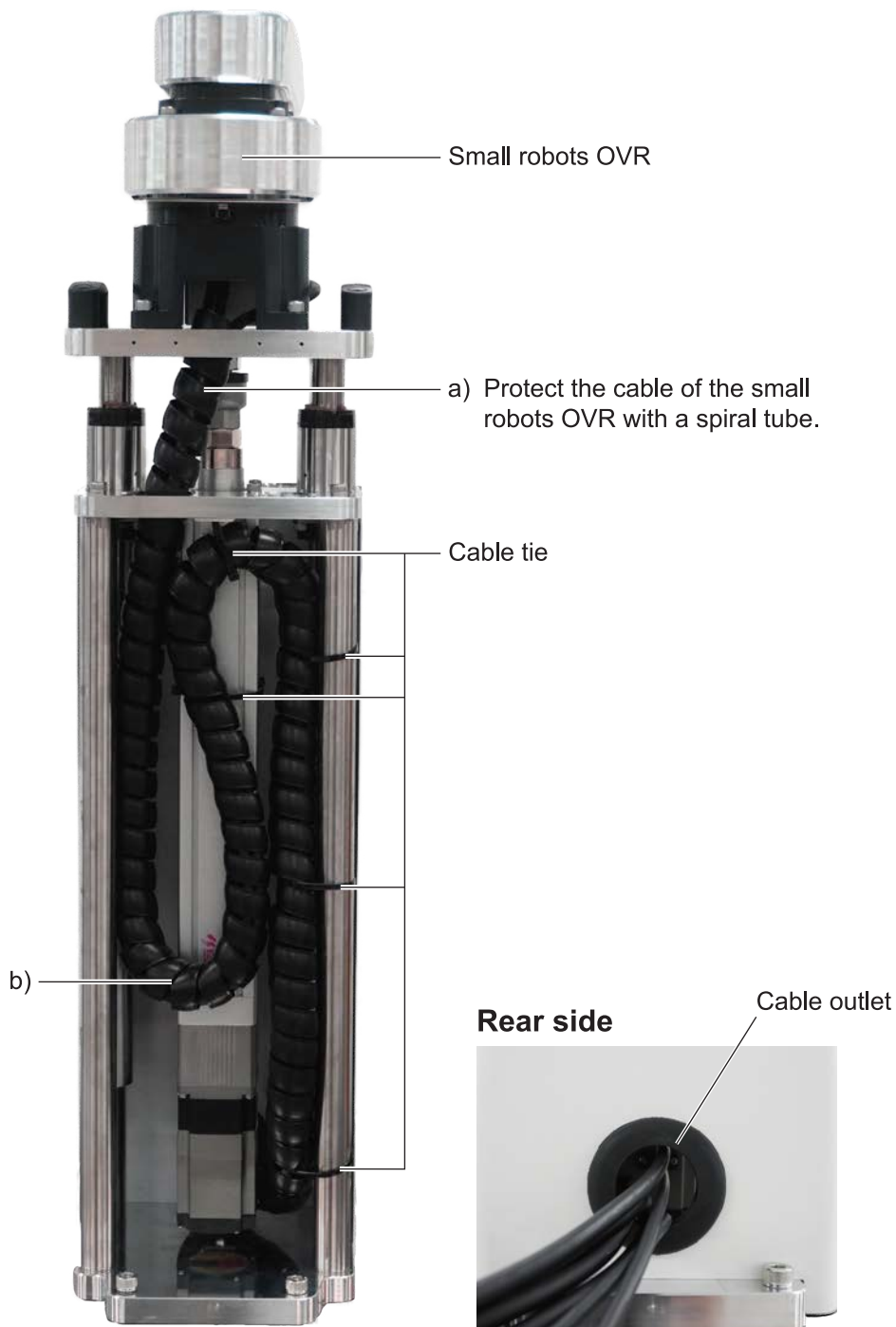


Load moment [N·m] : $\Delta M = F \times L$

Wiring example

The cable of the load (example: small robots OVR) can be taken into the electric lifting column and wired.

- a. Protect the cable with a spiral tube that has low sliding and high wear resistance or the like.
- b. Provide a margin for the movable stroke when wiring.

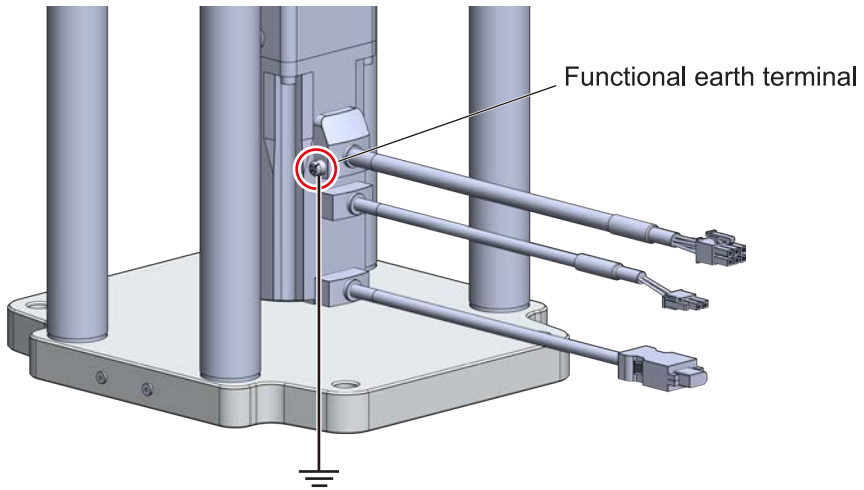


Grounding

Ground the functional earth terminal if necessary.

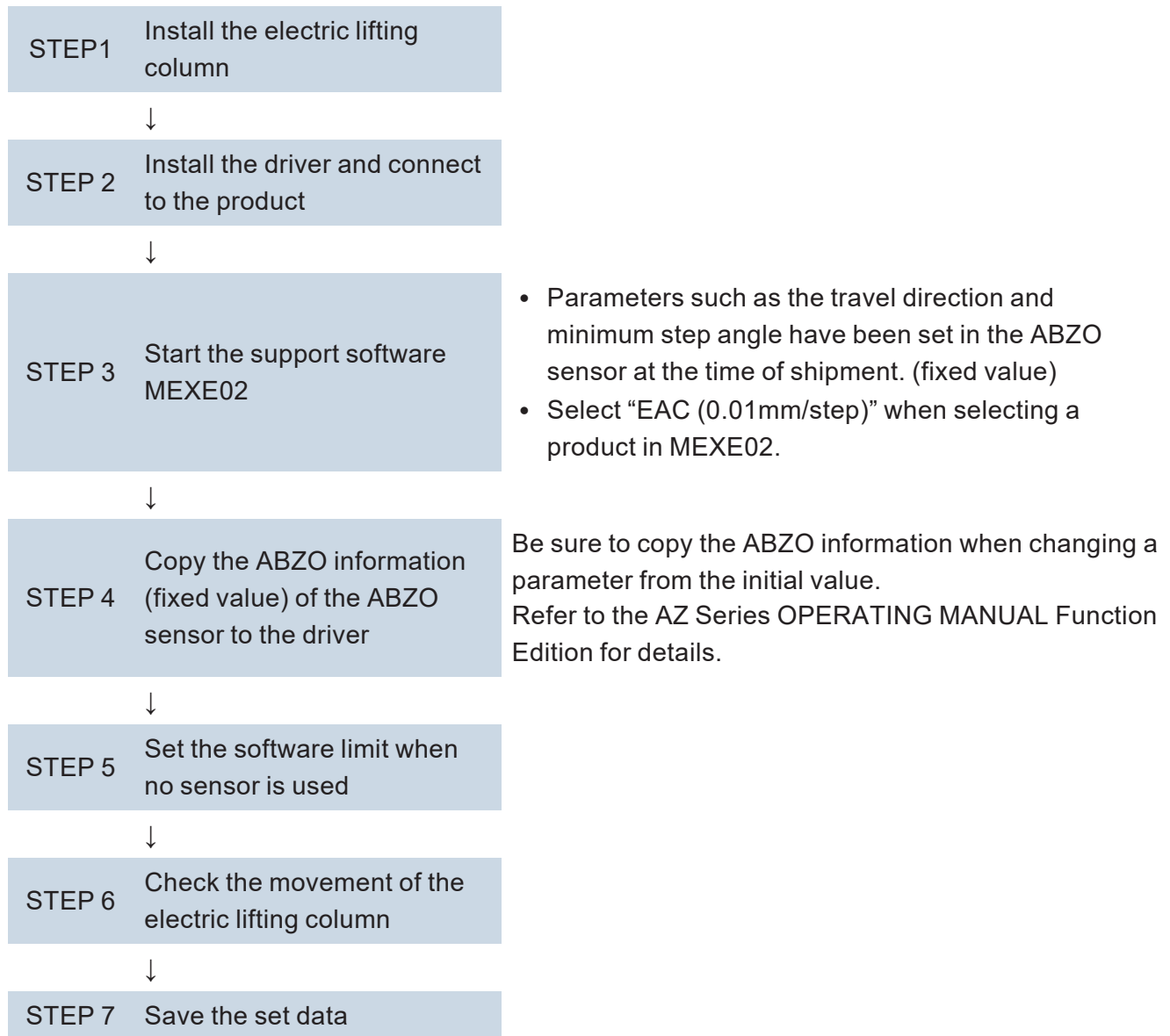
Use a round terminal when grounding, and be sure to secure it with a screw and washer. A grounding wire and a crimp terminal are not included.

- Conductor size: AWG18 (0.75 mm²) or thicker wire
- Screw size of functional earth terminal: M4
- Tightening torque: 1.2 N·m (170 oz-in)



Setting of parameters

Guidance



Parameter setting list

Parameters of the electric lifting column are set as shown below at the time of shipment.

Tip

- The operating speed may not reach the maximum speed depending on the operating conditions, the ambient temperature, or the length of the motor cable.
- For the pulse input type, use the function setting switches as they are in the factory settings. If they are changed, the ABZO information does not apply and the actuator will operate at a certain resolution.

Product specifications

Item	Factory setting
Lead	EL6: 6 EL12: 12
Minimum travel amount (resolution)	EL6: 0.01 mm (600) EL12: 0.01 mm (1,200)

Mechanism protection parameter

For the items in the table below, upper limit values are set at the time of shipment. These upper limit values cannot be changed.

Item	Factory setting	
	EL6	EL12
Maximum starting speed	100 mm/s	200 mm/s
Maximum operating speed	Preset for each model	Preset for each model
Maximum pushing speed	25 mm/s	25 mm/s
Maximum pushing return-to-home speed	50 mm/s	100 mm/s
Maximum push current*	Preset for each model	Preset for each model

* The actual usable push current is different from the push current having set. Refer to [this chapter](#).

Base setting parameters

Item	Factory setting
Electronic damper	Enable

Motor & mechanism parameter

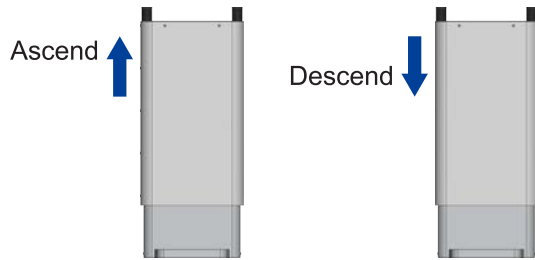
Item	Factory setting	
	EL6	EL12
Mechanism settings*	Prioritize ABZO setting	Prioritize ABZO setting

Item	Factory setting	
	EL6	EL12
Electronic gear A	5	5
Electronic gear B	3	6
Motor rotation direction	Positive direction=CW	Positive direction=CW
Mechanism type	mm	mm
Mechanism lead	6	12
Mechanism lead decimal digit setting	x 1 mm	x 1 mm
JOG/HOME/ZHOME operation setting	Prioritize ABZO setting	Prioritize ABZO setting
(JOG) Operating speed	10 mm/s	10 mm/s
(JOG) Acceleration/deceleration	0.5 m/s ²	0.5 m/s ²
(JOG) Starting speed	5 mm/s	5 mm/s
(JOG) Operating speed (high)	50 mm/s	50 mm/s
(ZHOME) Operating speed	50 mm/s	100 mm/s
(ZHOME) Acceleration/deceleration rate	0.5 m/s ²	0.5 m/s ²
(ZHOME) Starting speed	5 mm/s	5 mm/s
(HOME) Return-to-home mode	Push-motion	Push-motion
(HOME) Return-to-home starting direction	Negative direction	Negative direction
(HOME) Return-to-home acceleration/deceleration	0.5 m/s ²	0.5 m/s ²
(HOME) Return-to-home starting speed	5 mm/s	5 mm/s
(HOME) Return-to-home operating speed	50 mm/s	100 mm/s
(HOME) Return-to-home last speed	5 mm/s	5 mm/s
(HOME) Backward steps in 2 sensor return-to-home	5 mm	5 mm
(HOME) Operating amount in uni-directional return-to-home	5 mm	5 mm
(HOME) Operating current for push-motion return-to-home	Preset for each model	Preset for each model
(HOME) Backward steps in push-motion return-to-home	4 mm	4 mm

Change the "Mechanism settings" parameter and "JOG/HOME/ZHOME operation setting" parameter to "Manual setting", when each parameter of the motor or mechanism are set.

Travel direction of the moving part

The travel direction of the moving part varies depending on the setting of the travel amount or the input method of pulse signals.



The moving part moves upward

- When setting parameters to operate Set the travel amount to the positive (+) side.
- When operating using pulse signals 2-pulse input mode: Input the pulse signal to the CW input 1-pulse input mode: Input the pulse signal to the PLS input when the DIR input is ON

The moving part moves downward

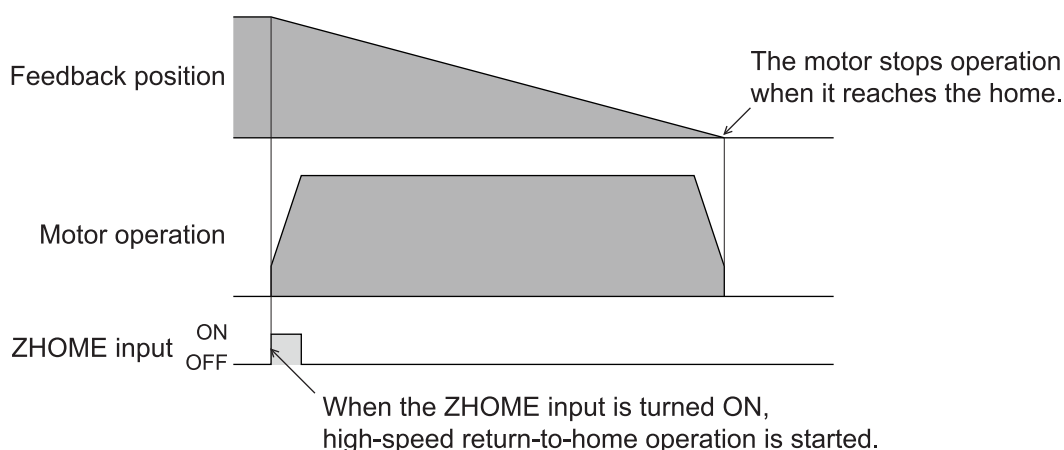
- When setting parameters to operate Set the travel amount to the negative (-) side.
- When operating using pulse signals 2-pulse input mode: Input the pulse signal to the CCW input 1-pulse input mode: Input the pulse signal to the PLS input when the DIR input is OFF

Operation

High-speed return-to-home operation

High-speed return-to-home operation is the operation that returns to the mechanical home on the absolute coordinates set in advance. Since the home is recognized by the ABZO sensor, return-to-home operation can be executed at the same speed as that of the normal positioning operation without using an external sensor.

When the ZHOME input is turned ON, high-speed return-to-home operation is started. If the operation stop signal is turned ON on the way of operation, the motor will stop.



Return-to-home operation

Return-to-home operation is operation that detects the home using external sensors. It is executed to return from the present position to the home when the power supply is turned on or positioning operation is completed. Sensor sets are provided in Oriental Motor products.

There are four types of homing operation shown below.

Item	Description	Features
2-sensor mode	When the limit sensor is detected, the motor rotates in the reverse direction and pull out of the limit sensor. After pulling out of the limit sensor, the motor rotates according to the value set in the "(HOME) Backward steps in 2 sensor return-to-home" parameter and stops. The stop position is set as the home.	• Two sensors are required externally. • The operating speed is at a low rate. (return-to-home starting speed).

Item	Description	Features
3-sensor mode	When the limit sensor is detected, the motor rotates in the reverse direction and pull out of the limit sensor. After that, it stops when the ON edge of the HOME sensor is detected. The stop position is set as the home.	• Three sensors are required externally.* • The operating speed is at a high rate. (return-to-home operating speed)
One-way rotation mode	The motor stops when the ON edge of the HOME sensor is detected. After that, until the OFF edge of the HOME sensor is detected, it pulls out of the sensor according to the speed set in the "(HOME) Return-to-home last speed" parameter. After pulling out of the HOME sensor, the motor rotates according to the value set in the "(HOME) Operating amount in uni-directional return-to-home" parameter and stops. The stop position is set as the home.	• One external sensor is required. • The operating speed is at a high rate. (return-to-home operating speed) • Not reversed.
Push-motion mode	The motor rotates in the reverse direction when a mechanism installed to the motor presses against a mechanical stopper, etc. After that, it rotates according to the value set in the "(HOME) Backward steps after first entry in push-homing" parameter and reverses, and then operates at the "(HOME) Last velocity." When a mechanism installed to the motor presses against a mechanical stopper or others, it rotates in the reverse direction and stops after rotating according to the value set in the "(HOME) Backward steps in push-homing" parameter. The stop position is set as the home.	• An external sensor is not required. • The operating speed is at a high rate. (return-to-home operating speed)

* The home can be detected even using one external sensor, when several external sensors are not installed.

Push-motion return-to-home operation

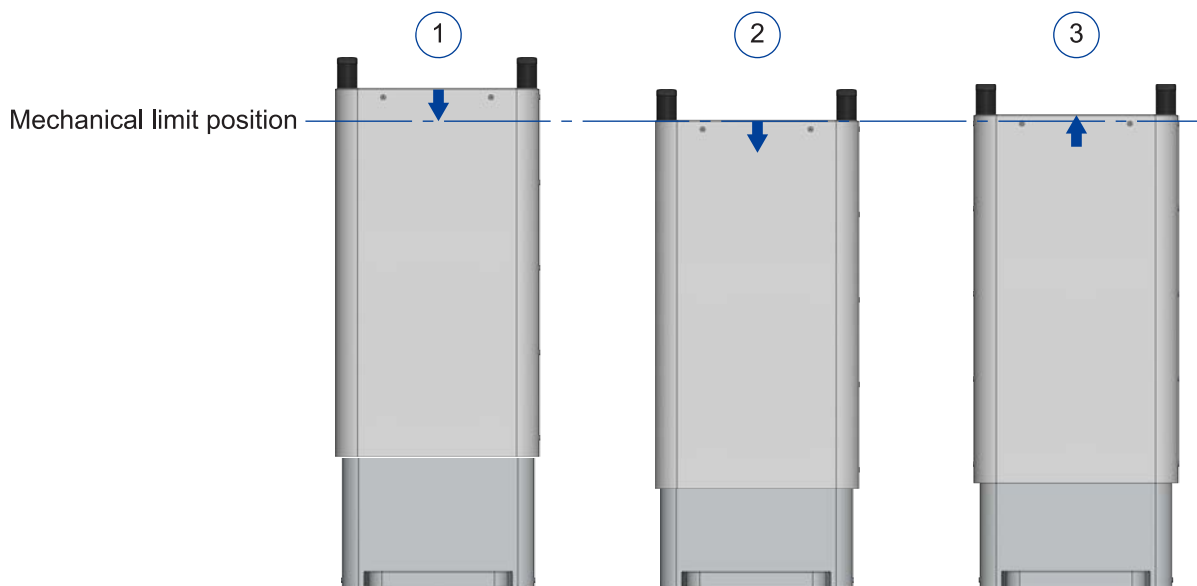
CAUTION

- Perform push-motion return-to-home operation within the specifications of the permissible moment. Failure to do so may result in damage to equipment.
- When push-motion return-to-home operation is performed to the table side, provide an external mechanism that the table presses against within the range of the effective stroke. Pressing against exceeding the range of the effective stroke may result in damage to equipment.

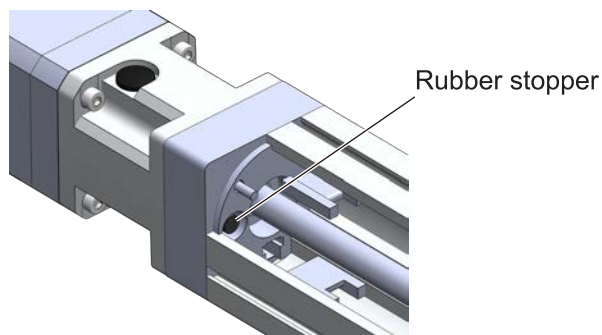
Push-motion return-to-home operation

If the "(HOME) Return-to-home position offset" parameter is still set to the initial value (0) and the push-motion return-to-home operation is performed, the moving part will return to and stop at the origin after pressing the mechanical limit position. The distance from the mechanical limit position to the origin is 4 mm.

1. When the push-motion return-to-home operation is performed, the moving part starts to move to the mechanical limit position.
2. The moving part reaches to press to the mechanical limit position.
3. The moving part returns to the set origin and stops.



Structure of the equipped motorized cylinder



Push-motion return-to-home operation current

The push force of the push-motion return-to-home operation is set for each actuator at the time of shipment.

Push-motion return-to-home speed

The upper limit value of the push-motion return-to-home speed is as follows.

Lead	Upper limit value of push-motion return-to-home
6 mm	50 mm/s
12 mm	100 mm/s

Push-motion operation

The push force of push-motion operation can be set in the Operating current of the operation data. The maximum push forces are as shown in the table.

Lead	Push force
6 mm	500 N
12 mm	400 N

Note

Set the operating current in order not to exceed the maximum push force. Performing push-motion operation with the current exceeding the maximum push force may cause damage to equipment or deterioration of specifications.

Current setting of push-motion operation

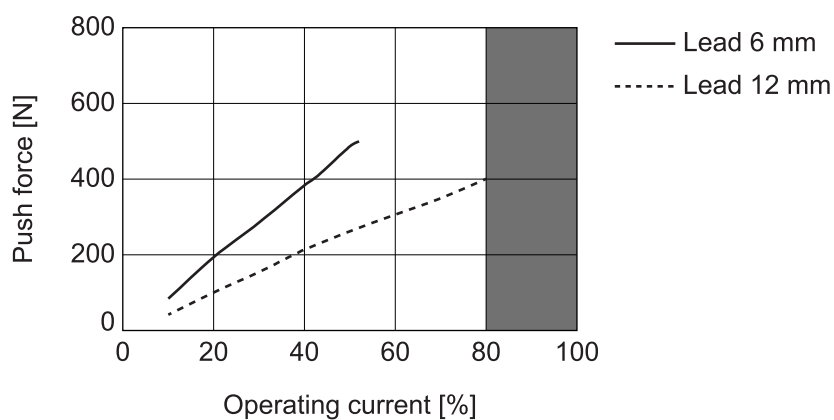
The reference value of the push current is shown below. Check the actual push force using the equipment.

Tip

The relationship between push force and operating current varies depending on the following conditions.

- Load condition such as jigs
- The moving part payload of electric lifting column (depends on the stroke)
- Cable length
- Ambient temperature

Measurement result of push force when the product equipped with the motorized cylinder is operated in the horizontal direction (average value)



Push speed

The upper limit value of push speed is 25 mm/s.

Maintenance

Assign qualified personnel with sufficient knowledge and experience to perform daily and periodic inspections in accordance with the “Safety precautions” section.

Be sure to perform these inspections in order to prevent malfunctions in advance and to ensure safety, and check that there are no abnormalities in the product and related equipment before operation. If any abnormality is found, discontinue use immediately and take necessary action, such as repair.

Inspection

Inspection interval

Perform maintenance for each time period shown in the table when operating eight hours per day. Shorten the maintenance cycle depending on the situation when the product is operated continuously day and night or when the operating rate is high.

Maintenance timing	Inspection	Cleaning
When operated for the first time	✓	–
Six months after initial operation	✓	–
Every six months thereafter	✓	–
As needed	–	✓

Inspection items

- Check if any of the screws that installed the product is loose.
- Check if any of the screws that installed the load is loose.
- Check to see if the cable is damaged, scraped or stressed.
- Check to see if the connection between the motor and driver is loose.
- Check that the operation does not produce abnormal noise or vibration.
- Check to see the amount of the grease is low or the gloss of the grease is lost. Even if the color of the grease is discolored, the lubrication is considered good if the running surface appears still glossy.

Refer to [this chapter](#) when applying grease.

Tip

Replace the cable or the spiral tube if they have been abraded as a result of the inspection.

Cleaning

- Wipe off dirt with a soft cloth. If it is very dirty, wipe with a soft cloth with neutral detergent.
- Do not blow with compressed air. Dust may enter through the gap.
- Do not use petroleum-based solvents as they may damage the painted surface.

Applying grease

Greasing interval

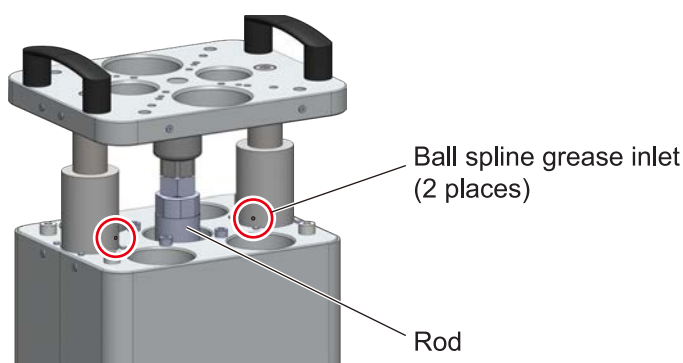
Applies grease in the following cases.

- Every 500 km (310 mi.)
- When the amount of grease is low.
- When the color of the grease is changed to brown or the gloss of the grease is lost.

How to apply grease

1. [Remove the movable cover.](#)
2. Apply grease to the rod and ball splines. Wipe off excess grease.

Lubrication part	Grease types	Lubrication method
Rod	Maltemp SRL (Kyodo Yushi Co., Ltd.)	Wipe off the old grease with a soft cloth. Then, apply new grease.
Ball spline	Albania EP Grease 2 (Shell Lubricants Japan K.K.)	Apply grease with a grease gun through the grease inlet port (ø3 mm). Apply new grease until old grease is discharged from both ends of the outer cylinder.



3. Attach the movable cover.

CAUTION

Wear safety glasses when applying grease. When handling grease, follow the instructions of the grease manufacturer and exercise caution. If grease gets into eyes or comes in contact with the skin, immediately flush the area thoroughly with water.

Warranty

Check on the Oriental Motor Website for the product warranty.

Disposal

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

When removing the motor or actuator for disposal, remove the screws carefully to prevent injury from falling parts.

Specifications

Product specifications

Check on the Oriental Motor Website for the product specifications.

General specifications

Noise level

70 dB or less

Installation conditions

The product described in this document is designed and manufactured to be incorporated into general industrial equipment.

Overvoltage category	II
Protection against electric shock	Class III
Pollution degree	2

Operating environment

Ambient temperature: 0 to +40 °C (+32 to +104 °F) (non-freezing)

Humidity: 85 % or less (non-condensing)

Altitude: Up to 1,000 m (3,300 ft.) above sea level

Atmosphere: No corrosive gas or dust. No exposure to water or oil.

Storage environment and shipping environment

Ambient temperature: -20 to +60 °C (-4 to +140 °F) (non-freezing)

Humidity: 85 % or less (non-condensing)

Altitude: Up to 3,000 m (10,000 ft.) above sea level

Atmosphere: No corrosive gas or dust. No exposure to water or oil.

Regulations and standards

EU Machinery Directive

The lifting Column and controller have been designed and manufactured to be incorporated into general industrial equipment, and a Declaration of Incorporation of Partly Completed Machinery is issued with them according to the EU Machinery Directive .

Applicable Standards: EN ISO 12100

Hazardous substances

This product does not contain substances that exceed the restriction values of the RoHS Directive.

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