Oriental motor

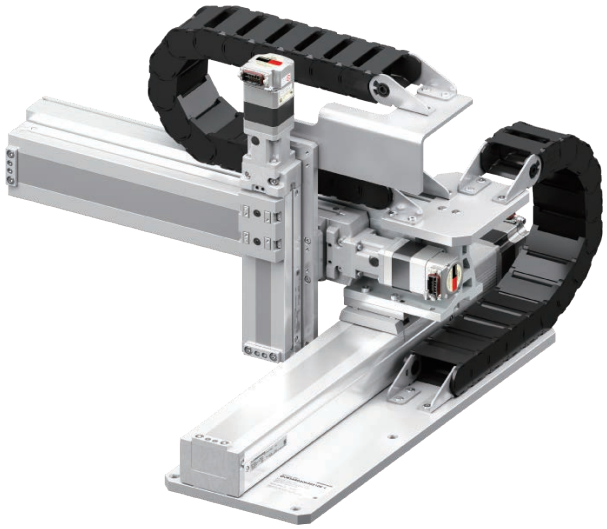
TN-OVR5E

Small Robots OVR

3-axis Cartesian

OVR3AL030030Z10K-C
OVR3AR030030Z10K-C

Technical Reference



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Thank you for purchasing an Oriental Motor product.
This document describes product handling procedures and safety precautions.

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

1 Introduction

1-1 Before use

Only qualified personnel of electrical and mechanical engineering should work with the product.
Use the product correctly after thoroughly reading the "2 Safety precautions" on p.3. In addition, be sure to observe the contents described in warning, caution, and note in this document.
The product described in this document is 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 compensation for damage caused through failure to observe this warning.

1-2 Related operating manuals

For operating manuals and technical reference, contact your nearest Oriental Motor sales office.

- Small Robots **OVR** 3-axis Cartesian **OVR3AL030030Z10K-C**/**OVR3AR030030Z10K-C** technical reference (this document)
- **AZ** Series/Motorized actuator equipped with **AZ** Series OPERATING MANUAL Function Edition

1-3 Overview of the product

This product is a 3-axis cartesian robot consisting of the **AZ** series equipped with a motorized actuator and a battery-free absolute sensor. Automation can be achieved without the hassle of design, component selection, and processing.
When using it, please pay attention to safety aspects as an industrial robot. It cannot be used as a collaborative robot.
The product target is the robot (including the motor). Host controllers, drivers, cables, end effectors, etc. are sold separately. Please contact us for control aspects.

2 Safety precautions

The precautions described below are intended to ensure the safe and correct use of the product, and to prevent the customer and others from exposure to the risk of injury. Use the product only after carefully reading and fully understanding these instructions.
In regard to a robot, it is prohibited to start operating the robot (i.e., to operate the device in accordance with the specified purpose) when the machine in which the robot is incorporated does not satisfy any relevant safety standards.
The factory safety manager or safety personnel in charge of the applicable machine must ensure that the machine is operated only by qualified personnel who are familiar with the operation of electronic equipment, and thereby prevent injury or damage to the equipment.
The term "qualified personnel" refers to persons who have received the necessary training or education and have pertinent experience; who are familiar with the relevant standards, regulations, accident-prevention rules and inspection conditions; who are authorized by the factory safety manager to engage in the necessary activities; and who have the ability to discern and prevent potential dangers.

⚠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	The items under this heading contain important handling instructions that the user should observe to ensure the safe use of the product.
memo	The items under this heading contain related information and contents to gain a further understanding of the text in this document.

⚠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 places subjected to splashing water, or near combustibles. 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.
- Do not install, wire, inspect and troubleshoot the product while the power is on. When working while the power is on, take appropriate safety measures. Failure to do so may result in fire, injury, or damage to equipment.
- Be careful not to get your hands caught in the 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.
- Conduct a risk assessment in a state where all parts and components including the robot have been installed in the equipment. Failure to do so may result in injury or damage to equipment.
- Use the product in a condition where the entire equipment complies with relevant international standards such as ISO 12100, ISO 10218-1, ISO 10218-2, national standards, and legal regulations such as occupational health and safety required in each country. Failure to do so may result in injury or damage to equipment.
- Provide a safety cage that satisfies the safety distance specified in ISO 13857 so that an operator or other personnel does not enter the movable range of the robot during operation of the equipment. Failure to do so may result in injury.
- Provide appropriate safety measures in accordance with the results of the risk assessment of entire equipment when adjusting or inspecting the robot inside the safety cage. 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.
- The functions and performance of safety-related control systems shall be determined appropriately according to the results of risk assessment of entire equipment. Failure to do so may result in injury.

Installation and wiring

- The product is heavy. Two or more people are required to transport and install the product. Failure to do so may result in injury.
- Wear protective equipment such as helmets, safety shoes, and gloves when transporting and installing. Failure to

do so may result in injury.
- Do not pull or forcibly bend the motorized linear slide or cable, or lift the product body by holding the motorized linear slide or cable part. Doing so may result in injury or damage to equipment.
- The product body should be securely fixed according to the instructions. Failure to do so may result in injury or damage to equipment.
- Wiring and connection are done reliably according to the instructions. Failure to do so may result in fire or damage to equipment.
- To prevent fire caused by large current from the power supply side, install an external fuse as necessary.

Operation

- When powering on the driver, make sure that no signal is input from the host controller. The product may start to move unintentionally, which may cause injury or damage to the equipment.
- When turning on the power to the driver for the first time, be sure to copy the fixed parameter values of the ABZO sensor to the combined driver. Otherwise, there is a risk of unexpected behavior due to parameter mismatch. Failure to do so may result in injury or damage to the equipment.
- If any abnormality occurs with the product, immediately stop operation and cut off the power to the motor that drives the product. Failure to do so may result in injury or damage to the equipment.
- Do not input the driver's STOP-COFF (current off) signal while the product is in operation. When input, the motor stops and becomes unexcited, which may cause the holding force to disappear and cause unexpected movements. Doing so may cause injury or damage to the equipment.
- Do not input the driver's FREE (non-excitation) signal when the product is stopped or running. When this signal is input, the drive motor's current is cut off and it becomes non-excitation, losing its holding force. At the same time, the power off activated type electromagnetic brakes is released, so the workpiece may fall. Doing so may cause injury or damage to the equipment.
- When cutting off motor power using an external cutoff device or the driver's STOP-COFF (current off) signal, take appropriate safety measures. The motor may lose torque and the product may move unexpectedly. Failure to do so may result in injury or damage to the equipment.
- During the first operation after turning on the power to the driver and cutting off power to the motor, adjust the position at low speed and confirm safety. Failure to do so may result in injury or damage to the equipment.
- In the event of a power outage, turn off the power to the driver. The product may suddenly start up when the power is restored, resulting in injury or equipment damage to equipment.

Maintenance and inspection

- Perform pre-work (daily) inspections and periodic inspections in accordance with the instructions in the instruction manual and technical materials, and confirm that there are no abnormalities in the product and related equipment before starting work. Failure to do so may result in injury or damage to the equipment.

⚠CAUTION

General

- Do not use the product beyond its specifications. Doing so may result in injury or damage to equipment.
- Use the driver and cable connected to the motor in the specified combination. Failure to do so may cause fire, injury, or equipment damage.
- When connecting the motor and driver, be careful not to mix them up incorrectly. Incorrect wiring may result in unexpected operation. This may cause injury or damage to the 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. Failure to do 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 the equipment.
- When installing and wiring, take measures against EMC. Failure to take effective measures against EMI from the product and driver to the surrounding control system equipment, as well as the EMS of the product and driver, can cause serious damage to the functioning of the equipment.
- When handling, take measures such as static electricity. The encoder (ABZO sensor) or driver of the motor that drives the product may malfunction or be damaged due to static electricity, etc. Failure to do so may result in injury or damage to the equipment.
- The robot's X-axis and Y-axis are not equipped with electromagnetic brakes and will lose their holding force in the event of a power outage, emergency stop, or when the safety fence is opened, appropriate measures shall be taken. Failure to do so may result in damage to the equipment.
- Do not move the encoder (ABZO sensor) toward a strong magnetic field. Doing so may cause damage to the encoder (ABZO sensor) or malfunction of the product. Doing so may cause injury or damage to the equipment.
- If abnormal sound or vibration occurs during operation, stop operation. Failure to do so may result in injury or damage to the equipment.

- The status of the operation control device should be clearly displayed, for example, “power on”, “malfunction (failure) detected,” or “automatic operation.” If an indicator light is used, it should be installed in a suitable position and the color should conform to IEC 60204-1.
- The motor surface temperature may exceed 70 °C (158 °F) even under normal operating conditions. If the operator is allowed to approach the motor in operation, affix a warning label shown in the figure on a conspicuous position. Failure to do so may result in a skin burn(s).

Warning label

- To protect the encoder (ABZO sensor), use the motor at the case surface temperature of 80 °C (176 °F) or less. Failure to do so may result in damage to the equipment.
- Do not subject the encoder (ABZO sensor) of the motor to strong impact. Damage to the encoder (ABZO sensor) may cause the product to malfunction, resulting in injury or damage to equipment. The label shown in the diagram is attached to the motor.

Warning label

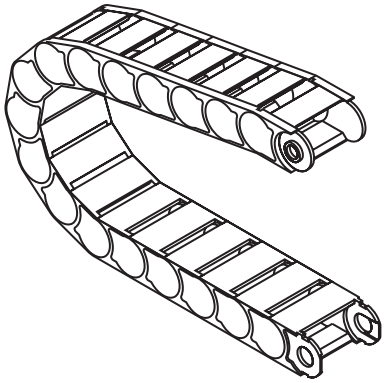
3 Preparation

3-1 Checking the product

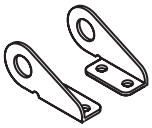
Verify that the items listed below are included. Report any missing or damaged items to the Oriental Motor sales office from which you purchased the product.

- Robot ..... 1 unit
- Unpacking instructions ..... 1 copy

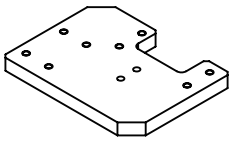
- Cable holder
  (For Y-axis: Link count15,
  For Z-axis: Link count17)



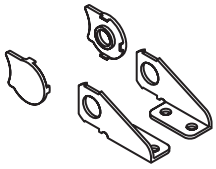
- Brackets for moving end
  (2 sets)



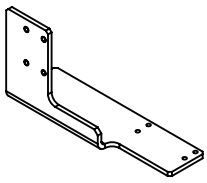
- YZ-axis cable holder mounting plate
  (1 pc.)



- Brackets for fixed end
  (2 sets)



- Z-axis cable holder mounting plate
  (1 pc.)



- Square nuts
  (M5, 2pc.)

- Hexagonal socket-head screws
  [M4×20 mm(0.79 in.), 4 pc.]

- Low head hexagonal socket-head screws
  [M5×20 mm (0.79 in.), 2 pc.)]

- Low head hexagonal socket-head screws
  [M6×10 mm(0.39 in.), 16 pc.]

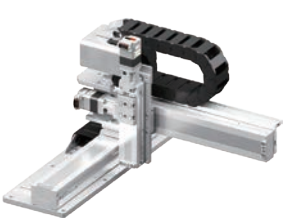
3-2 How to identify the product model

Check the model against the model shown on the nameplate.

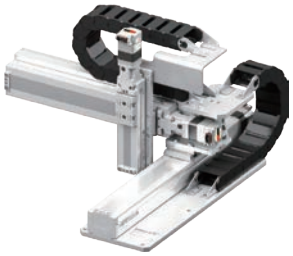
OVR	3	A	L	030	030	Z	10	K	-	C
	1	2	3	4	5	6	7	8		9

1	Number of axes	**3**: 3-axis
2	Combination type	**A**: XYZ
3	Working direction*	**L**: L type **R**: R type
4	X-axis stroke	**030**: 300 mm (11.81 in.)
5	Y-axis stroke	**030**: 300 mm (11.81 in.)
6	Z-axis	**Z**: **EZS** series
7	Z-axis stroke	**10**: 100 mm (3.94 in.)
8	Power supply input	**K**: 24 VDC
9	Robot type	**C**: Cartesian

* Working direction



L type



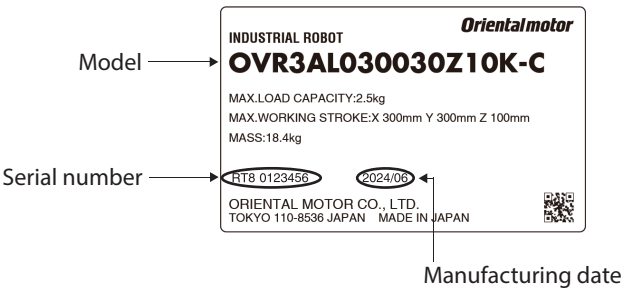
R type

3-3 Drivers possible to combine

Series	Driver type	Model
AZ Series	Built-in controller type	**AZD-KD**
	mini Driver RS-485 communication type	**AZD-KR2D**

3-4 Information about nameplate

The figure shows an example.

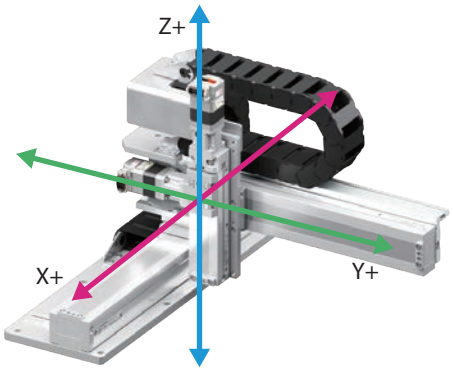


3-5 Names and functions of parts

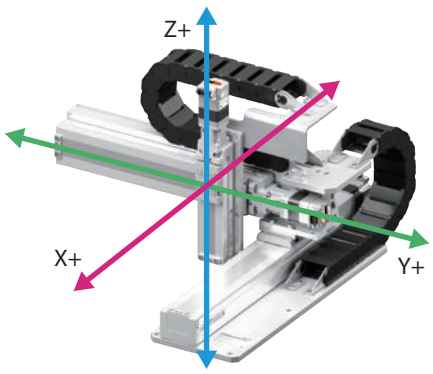
The robot consists of 3 axes: X-axis, Y-axis and Z-axis.

- All drive motors are **AZ** series equipped with battery-free absolute sensors.
- The motors on the Z-axis are equipped with the power off activated electromagnetic brake type.

• L type



• R type



Axis	Axis name	Motor models
X-axis	M1	**AZM66AKH**
Y-axis	M2	**AZM46AKH**
Z-axis	M3	**AZM46MKH**

Relationship between coordinates and rotation direction

Axis	Coordinate	Rotation direction	
		L type	R type
X-axis (M1)	+X	CW	CW
	–X	CCW	CCW
Y-axis (M2)	+Y	CW	CCW
	–Y	CCW	CW
Z-axis (M3)	+Z	CCW	CCW
	–Z	CW	CW

4 Installation

4-1 Installation location

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

- Inside an enclosure that is installed indoors (provide vent holes)
- Operating ambient temperature: 0 to +40 °C [+32 to +104 °F] (non-freezing)
- Operating ambient humidity: 85 % or less (non-condensing)
- Area 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 machinery, etc.)
- Area free of radioactive materials, magnetic fields or vacuum
- Up to 1,000 m (3,300 ft.) above sea level

4-2 How to unpack

Note

- Wear protective equipment (helmet, safety shoes, safety glasses, gloves) when working.
- The product is heavy [approximately 18.4 kg (40.5 lb.)], so two or more people are required to transport and install it.

1. Place the box on a horizontal, flat surface and unpack it. Take out the accessories and remove the reinforcement plates in order.

2. Take out the product. When removing it, be sure to hold the X-axis base plate and the Y-axis bracket with both hands. Holding the product incorrectly, such as with one hand or holding only the slider part, may cause the axis to move in an unexpected direction, resulting in the product falling and causing injury. While supporting the Y-axis with a spacer or similar, place the product in the installation location and remove the packaging material.

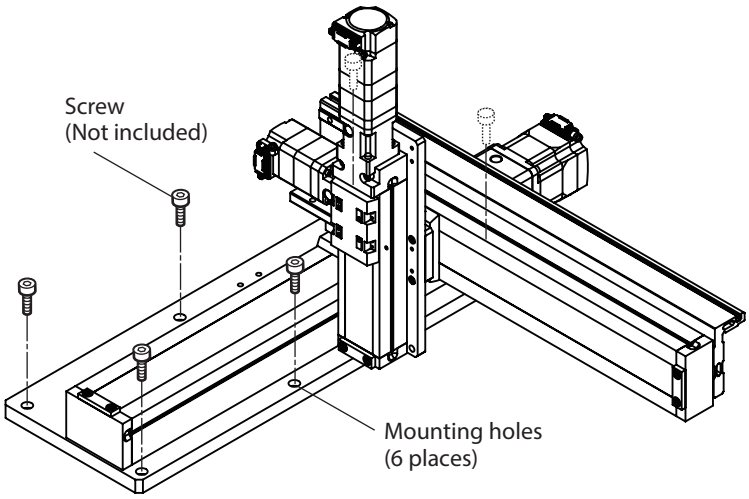
Note If the Y-axis is not supported by a spacer or similar, the robot may fall over.

4-3 Installation method

Note

- Ensure that the installation location has enough work space to safely perform teaching and maintenance inspections.
- When installing the product, install a safety cage to prevent it from entering the product's movable range.
- Perform a risk assessment of the entire equipment before use to ensure that there is no contact with the product within the cage and that it is safe please.

1. Fix the robot using the mounting holes on the base plate. Ensure it is fixed firmly according to the installation specifications.



Note

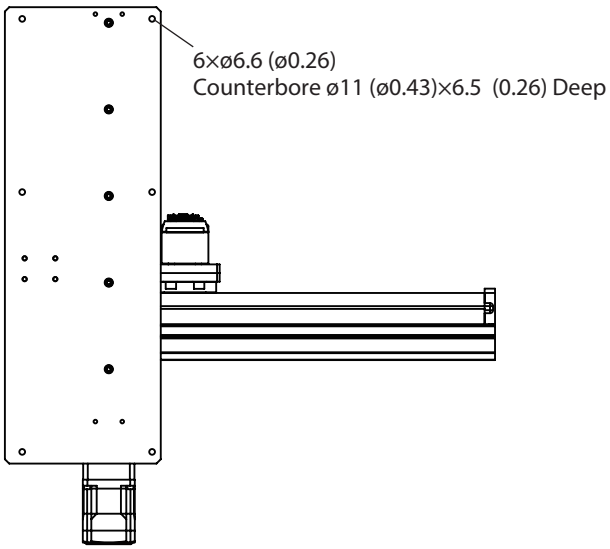
- To prevent vibration, install the product on a metal surface of sufficient strength.
- Be sure to install the robot from the upper side of the mounting plate. It cannot be installed from below the mounting plate.
- When installing the product, do so in a stable condition so that the product does not tilt.
- Please periodically check that the screws are not loose.

Mounting holes specifications

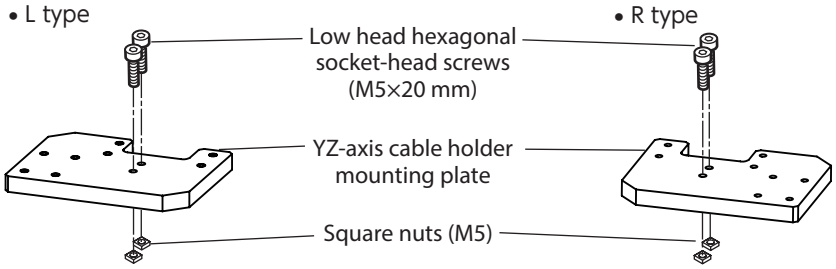
Use the mounting holes on the mounting plate to secure the robot with screws. Values of the tightening torque are recommended. Tighten the screws with a suitable torque according to the design conditions of the mounting plate.

Mounting holes	Hole diameter	ø6.6 mm (ø0.26 in.)
	Nominal size	M6
	Tightening torque	5 N•m (710 oz-in)

Viewing from the bottom of the robot [Unit: mm (in.)]

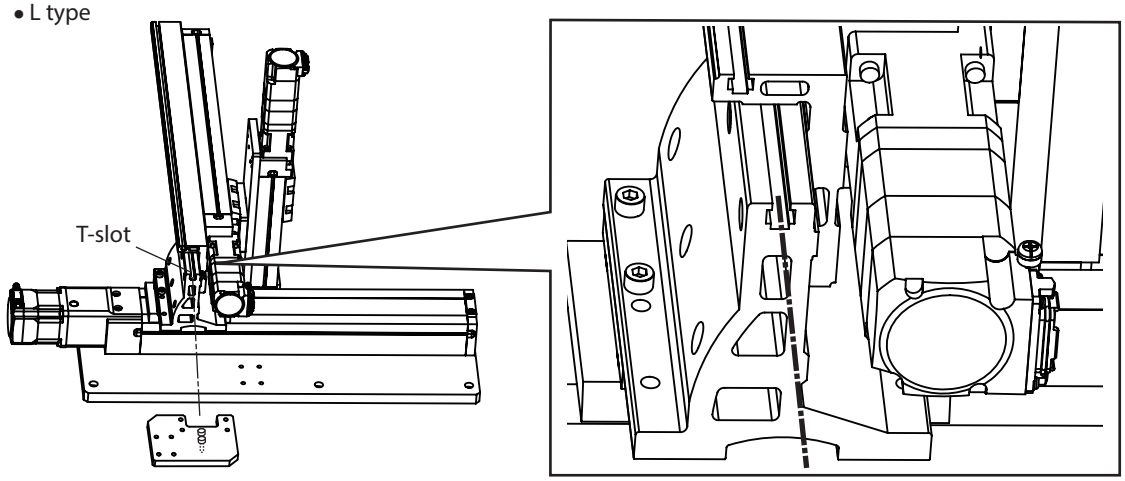


2. Temporarily fasten the included low head hexagonal socket-head screws and two square nuts to the YZ-axis cable holder mounting plate.

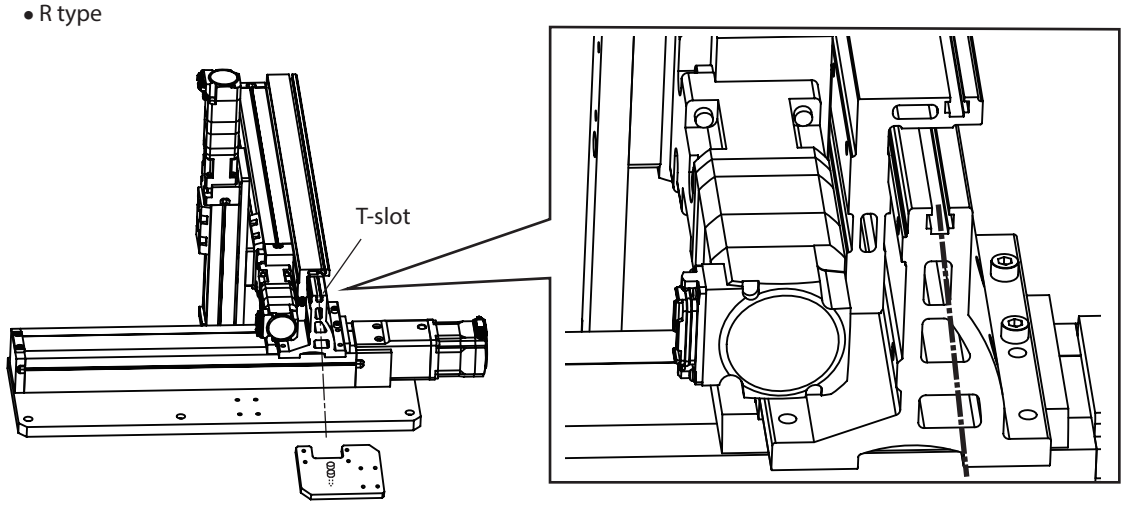


3. Insert the square nut that was temporarily attached to the YZ-axis cable holder mounting plate into the T-slot and secure it in place.
Tightening torque: 2.4 N•m (340 oz-in)

• L type

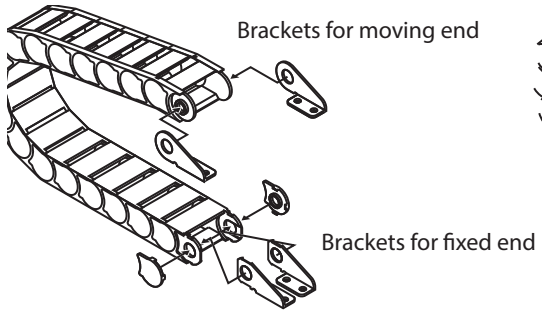


• R type

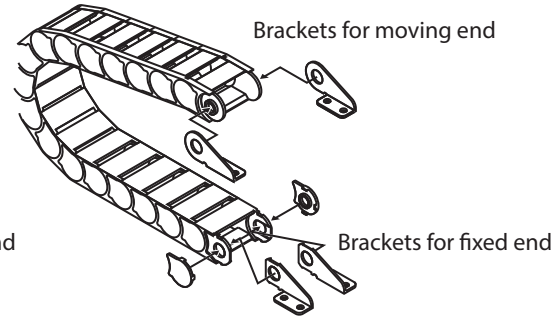


4. Attach the included brackets for fixed end and brackets for moving end to the cable holder. Please note that the number of links on the cable holder and the installation direction of the brackets for fixed end differ between the Y-axis and Z-axis.

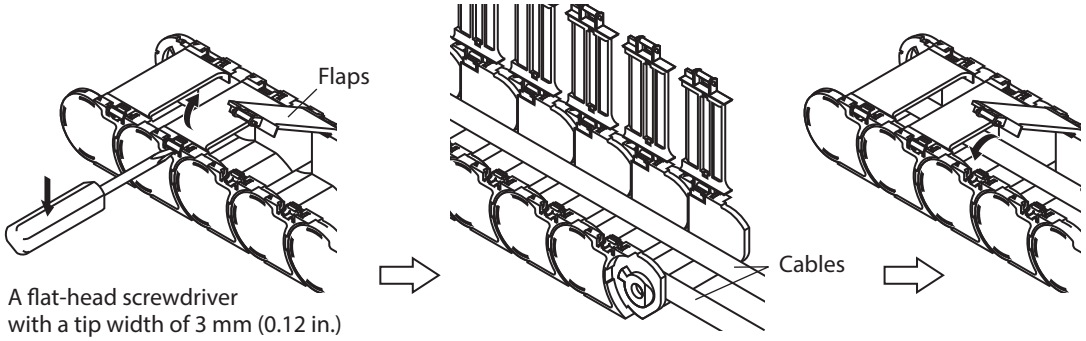
• For Y-axis: Link count15



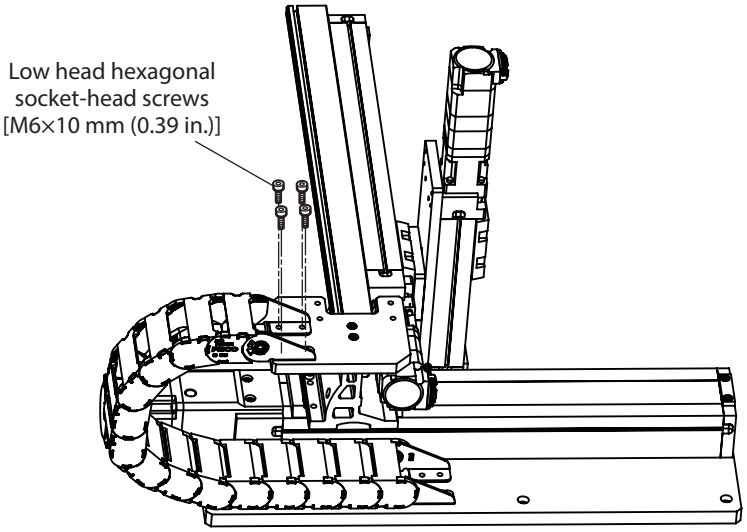
• For Y-axis: Link count17



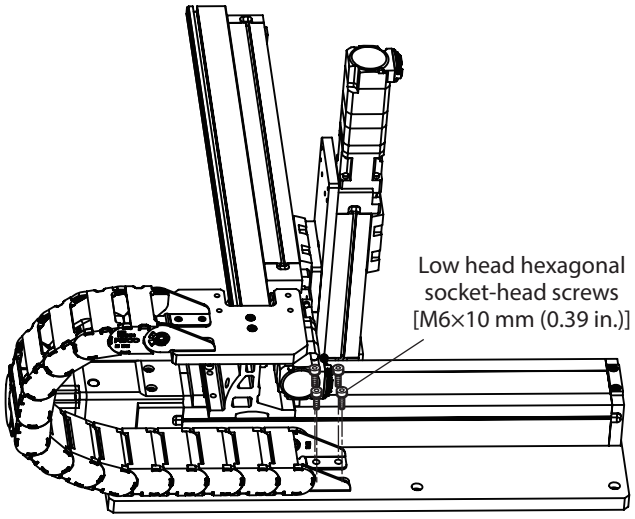
5. Pass the flexible connection cable through the cable holder.



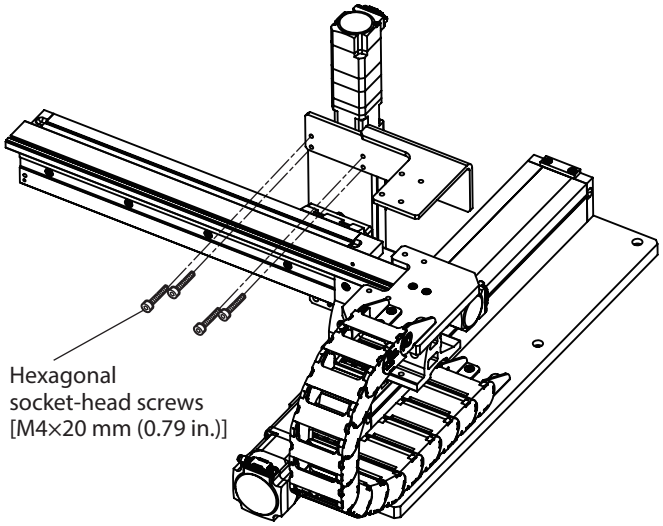
6. Fix the brackets for moving end of the cable holder to the YZ-axis cable holder mounting plate with the four included low head hexagonal socket-head screws.
Tightening torque: 2.4 N•m (340 oz-in)



7. Fix the brackets for fixed end of the cable holder to the base plate with the four included low head hexagonal socket-head screws.
   Tightening torque: 2.4 N•m (340 oz-in)

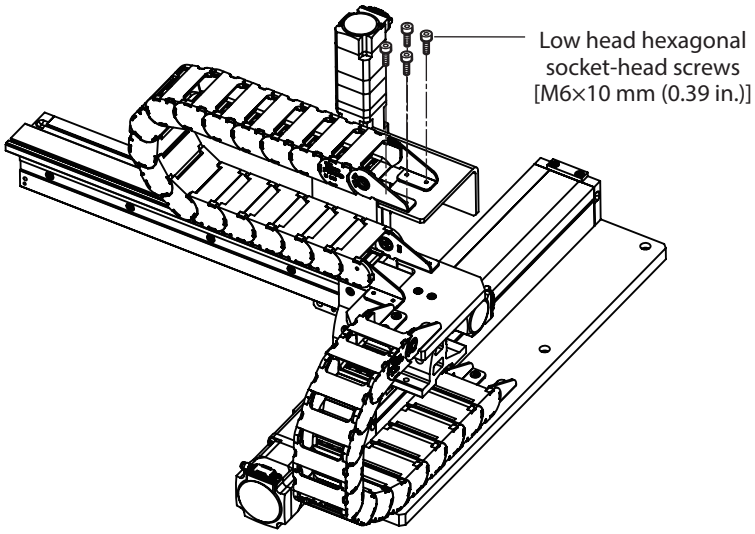


8. Fix the Z-axis cable holder mounting plate to the metal plate with the four included low head hexagonal socket-head screws.
   Tightening torque: 2.4 N•m (340 oz-in)

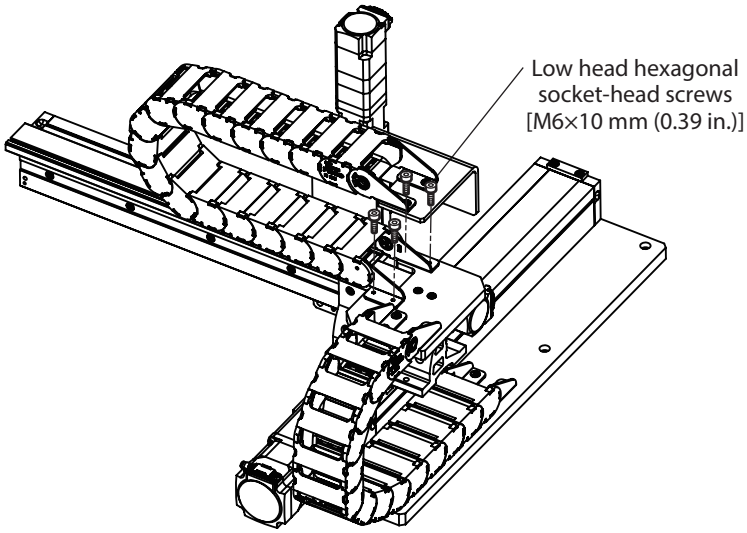


9. Refer to steps 4 and 5 to prepare the Z-axis cable holder.

10. Fix the brackets for moving end of the cable holder to the Z-axis cable holder mounting plate with the four included low head hexagonal socket-head screws.
    Tightening torque: 2.4 N•m (340 oz-in)



11. Fix the brackets for fixed end of the cable holder to the YZ-axis cable holder mounting plate with the four included low head hexagonal socket-head screws.
    Tightening torque: 2.4 N•m (340 oz-in)



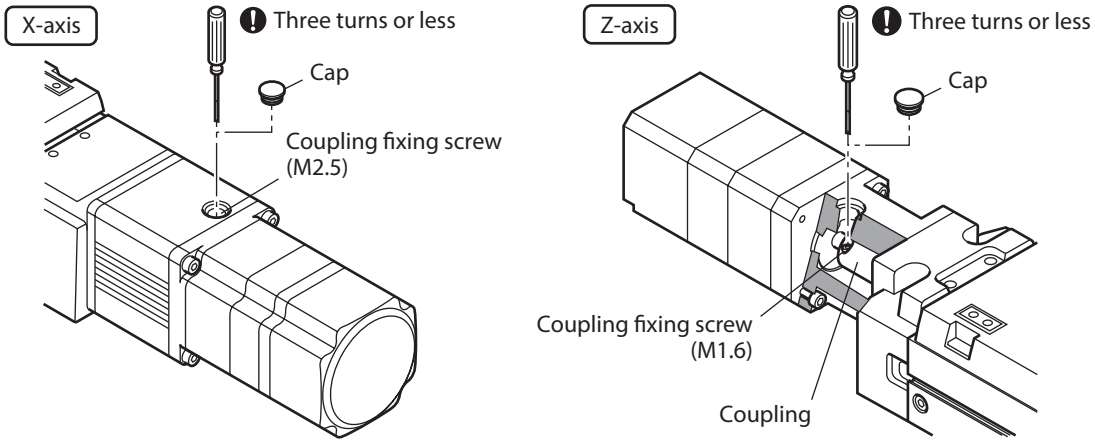
4-4 Changing the motor connector direction

The connector direction of the motors on the X-axis (M1) and Z-axis (M3) can be changed to fit the space of the equipment.
Do not change the connector direction of the motor on the Y-axis (M2) as the connector will interfere with the metal plate.

⚠WARNING

- When changing the motor connector direction, remove the load and cables and ensure that the Z-axis table is at the lowest position. The moving part may fall, leading to injury or mechanical damage. Also, if you remove the motor fixing screws while the table is in the upper position, the motor may rotate rapidly, which may cause fingers to become caught.
- Set the home again after mounting a motor. If the motorized linear slide is operated without setting the home, the moving part may move to unexpected directions or run at unexpected speeds, leading to injury or mechanical damage.
  - The moving part of the motorized linear slide may collide with the mechanical stopper.
  - The load may collide with other equipment.
- Be sure to secure the coupling with the specified tightening torque. Unless it is secured with the specified torque, the ball screw may rotate idly, leading to injury or mechanical damage.
  - The Z-axis may cause the load to fall.
  - The moving part of X-axis may collide with the mechanical stopper. Also, the load may collide with other equipment.
- Do not loosen or remove any screws not specified in the procedure. Doing so may cause the positioning accuracy to drop or damage to the robot.

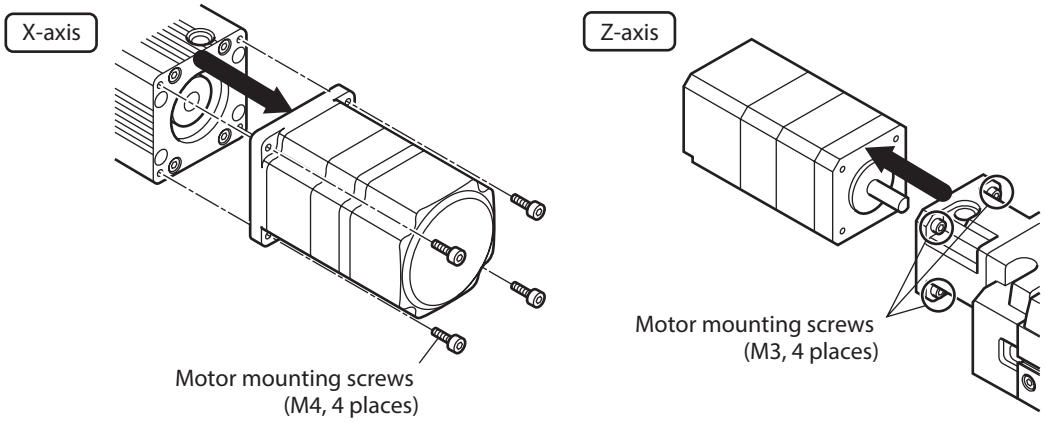
1. Remove the cap, and loosen the coupling fixing screw.



memo

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

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



Note Be sure to remove the motor when changing the motor connector direction. If the motor is rotated for direction change while the mounting surfaces of the motor and actuator are in contact, the motor may stop turning midway, the motor may not be removed.

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

Axis	Coupling fixing screw		Motor mounting screw	
	Screw size	Tightening torque	Screw size	Tightening torque
X-axis	M2.5	1 N•m (142 oz-in)	M4	2.4 N•m (340 oz-in)
Z-axis	M1.6	0.25 N•m (35 oz-in)	M3	1 N•m (142 oz-in)

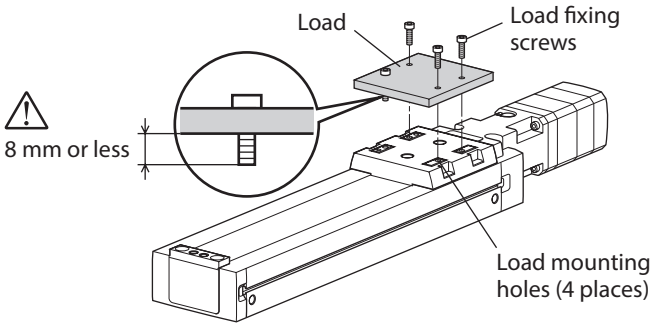
memo Use a tool capable of controlling the torque when tightening the coupling fixing screw.

4. After mounting the motor, set the home again.

4-5 How to install a load

Using the load-installation screw holes on the Z-axis table, install a load with screws.
Values of the tightening torque are recommended.
Tighten with an appropriate torque according to the design conditions of the load.

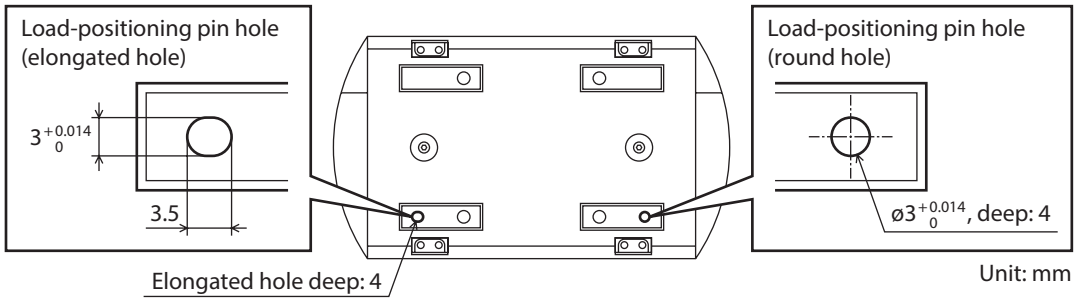
⚠WARNING For the load fixing screws, be sure not to screw deeper than the length of 8 mm in the table. Exceeding 8 mm may cause the table to break, leading to injury or mechanical damage.



Screw size	Tightening torque
M4	2.4 N•m (340 oz-in)

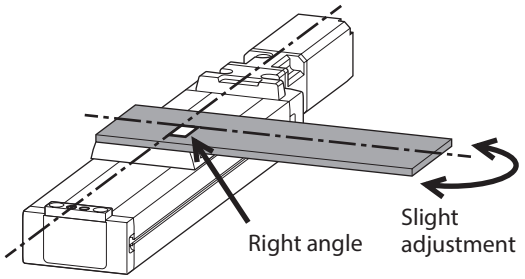
■ Load-positioning pin holes of table

Two types of load-positioning pin holes, which are an elongated hole and a round hole, are provided one place each on the table.
If installation repeatability is required when installing a load, use the load-positioning pin holes.



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

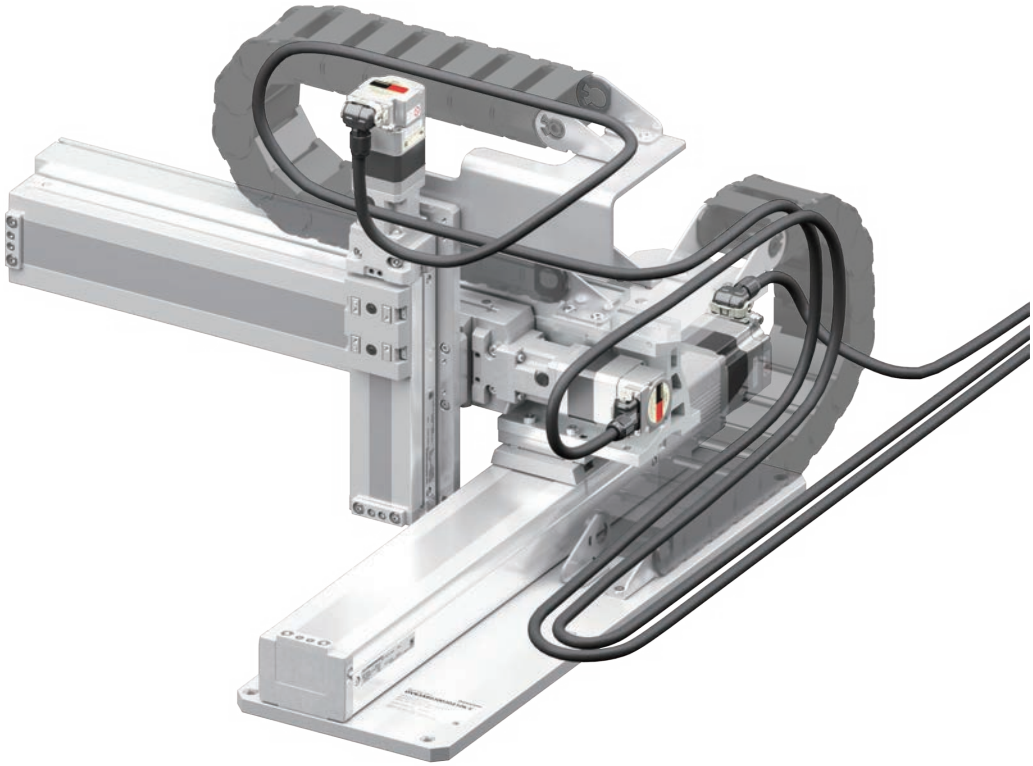
When installing a load being required the perpendicularity against the moving direction of the table, adjust the perpendicularity of the load using the round load-positioning pin hole.



5 Connection

- Fix the area near the connector so that it does not move.
- Keep 10 m (32.8 ft.) or less for the wiring distance between a motor and a driver.

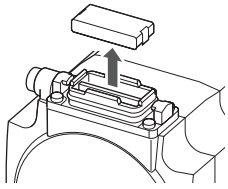
■ Wiring example



■ Connecting the cable

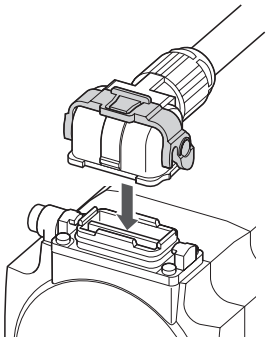
Motors are connector type motors. Please check the connection method below.

1. Remove the connector cap.

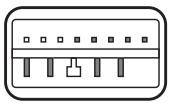


Note Do not damage the O-ring of the connector when removing the connector cap.

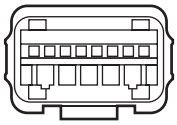
2. Connect the connector of the connection cable. The figure shows an example using the connection cable of cable outlet in output shaft direction. Check the terminal position of the connector before connecting.



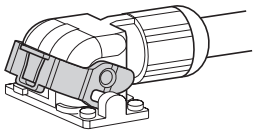
Connector on motor



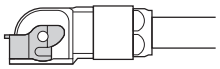
Connector of cable

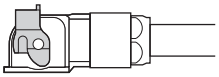


- Position of locking lever when the connector is inserted
  Avoid positions of 90 degrees and 0 degree.

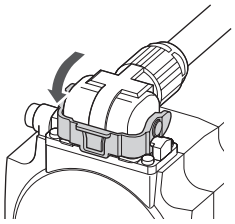


Note If the locking lever is in a state of being turned up to the 90-degree position or down to the 0-degree position, parts around the locking lever and the connector contact with each other, and the connector cannot be connected.

0 degree 

90 degrees 

3. Turn down the locking lever to the 0-degree position to fix the connector.



Handling of locking lever

- Do not apply a strong force to the locking lever. If the locking lever is damaged, the connector may not be fixed securely.
- After connecting the connector, securely turn down the locking lever to the 0-degree position to fix the connector.

⚠WARNING Be sure to turn down the locking lever. If the connector is not fixed, the cable may come off, resulting in fire, electrical shock, or damage to equipment.

Detaching the cable

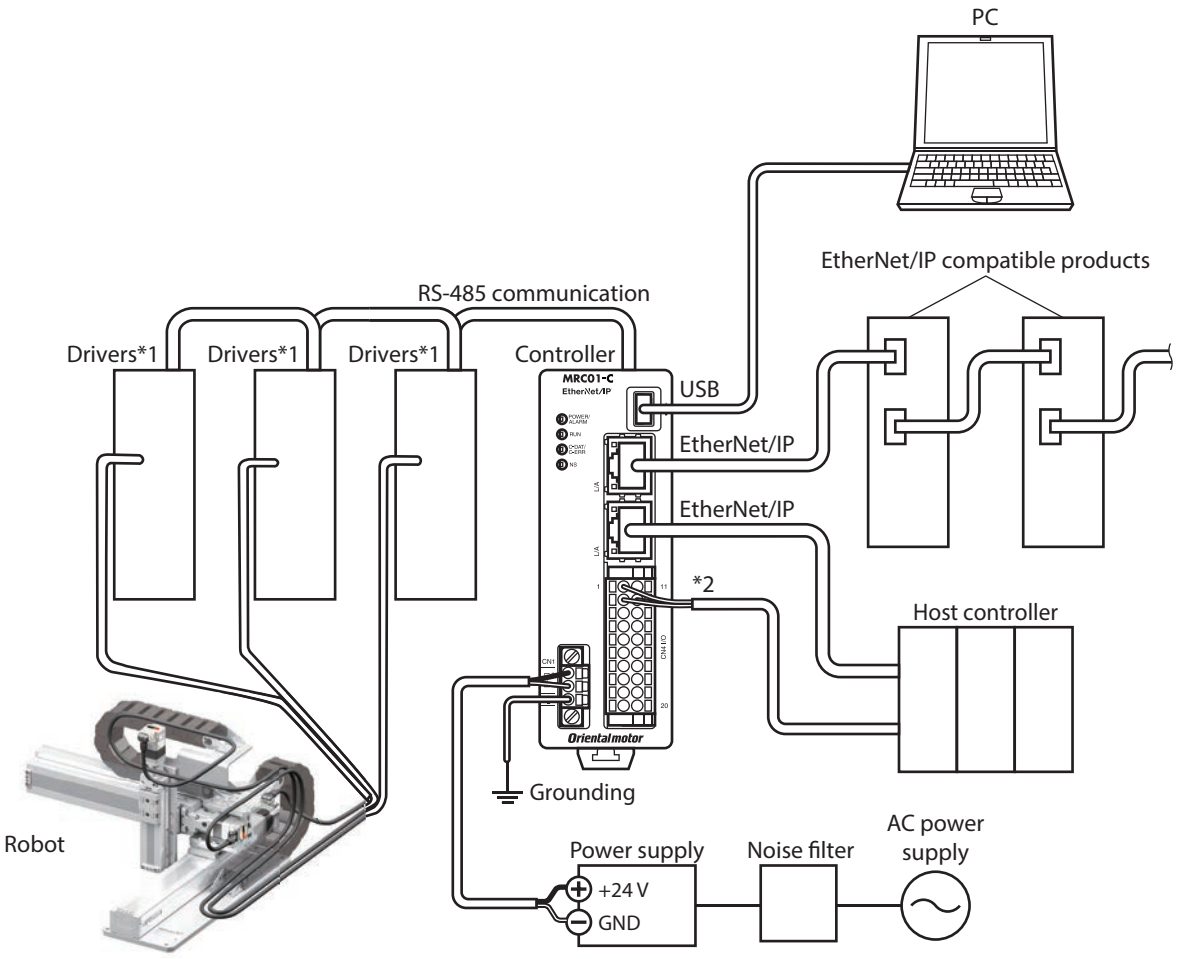
Turn up the locking lever and pull out the connector.

memo Turning up the locking lever to the 90-degree position will detach the connector at the same.

6 Before starting operation

- This product drives the robot (3-axis) with **AZ** series DC power input type drivers (3 units).
- Host controller equipment, drivers, cables, end effectors, etc. are sold separately.
- Connect between drivers using RS-485 communication. You can set operating data and parameters, and input operating commands using RS-485 communication. The protocol supports Modbus (RTU) and can be connected to touch panels, PCs, etc. For operating manual of the driver, download from Oriental Motor Website Download Page or contact your nearest Oriental Motor sales office.

6-1 System configuration



*1 Connect a power supply to each driver.

*2 Connect when using direct I/O or sensors.

Note If the motor cable or the power supply cable generates an undesirable amount of noise depending on the wiring or configuration, shield the cable or install a ferrite core.

6-2 Copying the fixed value (parameter) of the ABZO sensor to a driver

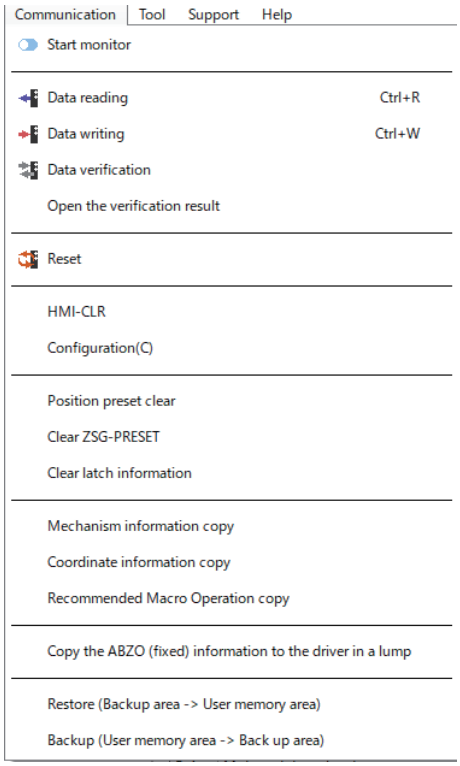
- For parameters of the **AZ** Series, the different values are stored in the ABZO sensor and driver. When turning on the driver for the first time, copy the ABZO information (fixed value) parameter to the driver using support software **MEXE02**.
- The motorized linear slide has parameters unique to the ABZO sensor stored.
  If you change the **AZ** series parameters with **MEXE02** without copying the fixed values (parameter) of the ABZO sensor to the driver, depending on the parameters, electronic gear settings etc. may be changed and unexpected movements may occur. In order to prevent such problems, copy the ABZO information (fixed value) to the driver, and match the data in the driver parameter with the fixed value in the ABZO sensor.
- Be sure to create a recovery data file before installing the product. The recovery data file is a file that information of the factory setting is stored. At the beginning, create the recovery data file for when the product is replaced with maintenance or the product is malfunctioned. Save the recovery data file in a PC as a data file.
- For details on how to copy the fixed values (parameters) of the ABZO sensor to the driver and how to create a recovery data file, please refer to the "**AZ** Series OPERATING MANUAL Function Edition".

Note

- After writing the parameter (example: electronic gear, etc.), which was changed to [Manual setting] and set, from the **MEXE02** to the driver, even if the ABZO information (fixed value) is copied, the parameter that was changed with the manual setting does not return to the fixed value.
- The work in "6-2 Copying the fixed value (parameter) of the ABZO sensor to a driver" is not necessary when using the robot controller **MRC01**. After completing setup with **MRC Studio**, we recommend backing up your data in case you need to replace the motor during maintenance. You can save data by selecting [Save As] from the **MRC Studio** [File] menu.

■ Procedure

1. Click the **MEXE02** [Communication] menu, and click the [Copy the ABZO (fixed) information to the driver in a lump.]



2. Click [Yes]. All ABZO information (fixed value) is copied in the driver.
3. After it is completed, click [OK].
4. Cycle the driver power.
5. Check whether the copied data is updated on the unit information monitor window.

6-3 Home position setting

Home position setting is an operation to set the home position of each axis in order to use the product with high precision. When using the robot controller **MRC01** or **MRC01-C**, it is not necessary to set the origin initially after unpacking. After changing the motor, make sure to set the origin of the user coordinate system before using it.

■ Procedure

Note Do not input the driver's FREE (non-excitation) signal when the product is stopped or running. When this signal is input, the drive motor's current is cut off and it becomes non-excitation, losing its holding force. At the same time, the power off activated type electromagnetic brakes is released, so the robot's own weight will cause it to lose its posture and the workpiece may fall.

● When used in combination with MRC01, MRC01-C

Set the information of the robot with the **MRC Studio** software. Once setup is complete, the origin of the base coordinate system is applied.

1. Start the **MRC Studio** software.
2. Click [COM port] to select "**MRC01**" or "**MRC01-C.**"
3. Click [Setup] on the start screen.
4. Set the robot type and the mechanism information according to the instructions on the screen.

● When determining the origin for each axis

Determine the origin using support software **MEXE02**. For details on the setting method, please refer to "**AZ** Series OPERATING MANUAL Function Edition".

1. Start the **MEXE02** software.
2. Click [Teaching, remote operation].
3. Click the [Teaching, remote operation] checkbox.
4. Operate the motor till the home position using the JOG operation buttons. Adjust the position while checking the "Command position (CPOS)" in the "Driver status" field.
5. Click [Position preset]. The home position is set.

Note
- The **AZ** series returns to origin using high-speed return-to-home operation. High-speed return-to-home operation is an operation to return to the mechanical home position on the absolute position coordinate set in advance. Since the home position 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 performing high-speed return-to-home operation, be sure to follow "2 Safety precautions" on p.3, check the surrounding conditions, and ensure safety before performing the operation.
- When the ZHOME input is turned ON, high-speed return-to-home operation is started. The motor stops when the operation stop signal is turned ON while the motor is operating.
- The home position is not set at the time of factory shipment and immediately after the resolution is changed. If high-speed return-to-home operation is started under the status, information of ZHOME start error is generated, and operation is not performed. Be sure to set the home position before starting high-speed return-to-home operation.

7 Maintenance

Daily and periodic inspections should be carried out by workers with sufficient knowledge and experience in accordance with "2 Safety precautions" on p.3. Be sure to perform these inspections to prevent malfunctions and ensure safety, and confirm that there are no abnormalities in the product and related equipment before starting work. If you find any abnormality, please stop using it immediately and take any necessary repairs or other measures.

7-1 Inspection

■ Inspection interval

If the robot is operated eight hours a day, perform maintenance according to the applicable period specified in the table. Reduce maintenance intervals accordingly if the operating rate is high such as continuous operation for twenty-four hours.

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

■ Inspection item

Note

- When carrying out each inspection, please record the inspection results and special notes on the daily inspection sheet.
- Perform inspections outside the moving range as much as possible.
- When repairs are performed during inspection, please record the details and save it for at least 3 years.

● External inspection

- Check if any of the screws having installed the product is loose.
- Check if any of the screws having installed a load is loose.
- Check if any cracks or slacks is applied in the stainless steel sheet.
- Check if a damage or stress is applied on the cable.
- Check if the connection part between the motor and driver is loose.
- Check if an unusual noise or vibration is generated from a bearing part (ball bearings) when before and after turning on the power.
- Check if the operating position does not shift during return-to-home operation and during operation (original program operation).

● Internal inspection

Visually check the internal condition of the motorized linear slide. Check the items specified in table below. Even if the grease has turned brown, lubrication condition is deemed appropriate if the running surface still appears glossy. Refer to p.24 for how to apply grease.

- Are there any deposits of foreign matter such as dust on the ball screw or guide rail?
- Has the grease on the ball screw or guide rail lost its gloss or been consumed?

■ External cleaning

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

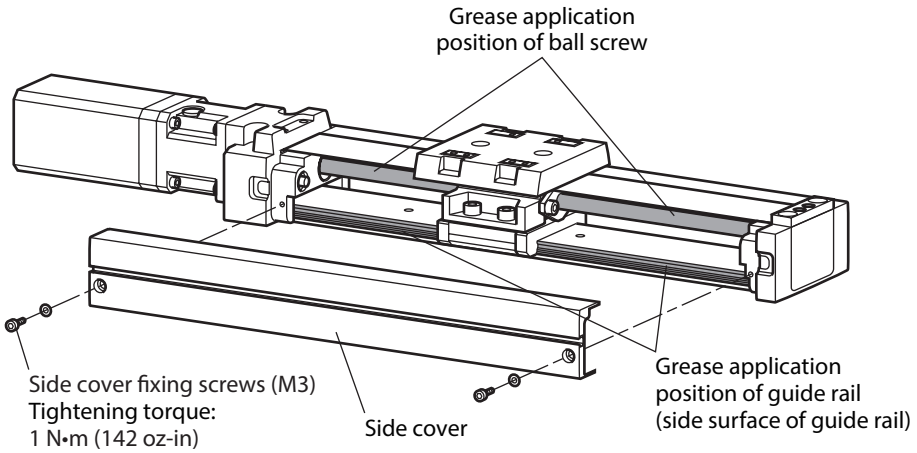
7-2 Applying grease

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

Re-greasing interval	Type of grease	Grease amount
• Every six months • Every 100 km (62 mi.) in mileage • When grease becomes extremely dirty	AFF Grease (THK CO., LTD.)	Apply grease so as to spread it over the traveling surface. Wipe off excess grease.

⚠CAUTION

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



7-3 Replacing the motor

Refer to p.14, for instructions to replace the motor. All axis motors can be replaced. If you are replacing the Y-axis motor, please refer to the Z-axis procedure.

⚠WARNING

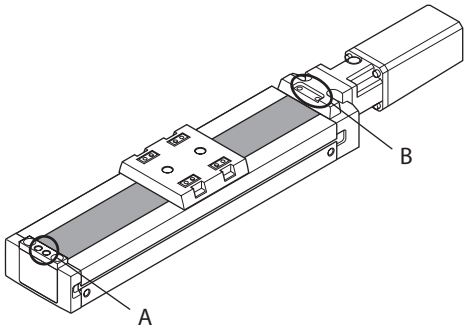
If the motor is replaced, restore using the recovery data file. Replacing the motor only will not set the optimal parameters to the driver, so the motorized linear slide may move to unexpected directions or run at unexpected speeds, leading to injury or damage to equipment. For details, refer to the **AZ** Series OPERATING MANUAL Function Edition.

7-4 Adjusting the tension of the stainless steel sheet

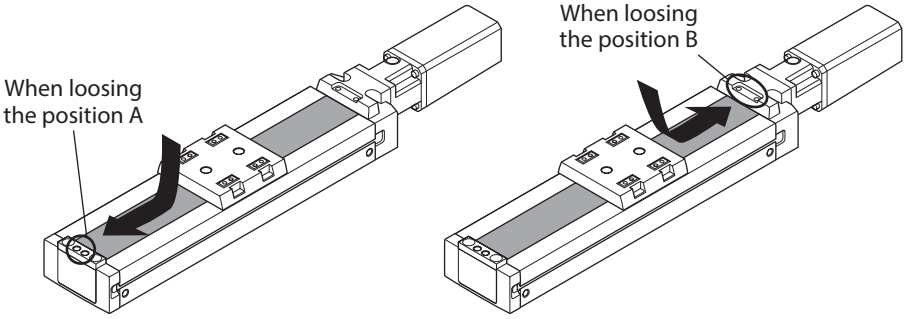
If the stainless steel sheet is slacked, tighten and take up the slack of the stainless steel sheet.

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

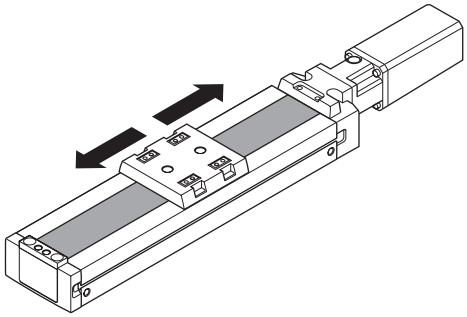
1. Loosen the screw A or B.
   Screw A: M3 Hexagonal socket head screw (2 pieces)
   Screw B: M5 Hexagonal socket set screw (2 pieces)



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



3. Tighten the screws.
   Tightening torque: 1 N•m (142 oz-in)
4. Move the table manually and check that there is no slack in the stainless steel sheet.



7-5 Warranty

Check on the Oriental Motor Website for the product warranty.

7-6 Disposal

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

8 Specifications

8-1 Product specifications

Number of axes		3-axis
Input voltage		24 VDC
Payload *1		2.5 kg (5.5 lb.)
Range of movement	X-axis	300 mm (11.81 in.)
	Y-axis	300 mm (11.81 in.)
	Z-axis	300 mm (11.81 in.)
Maximum speed *2	X-axis	600 mm/s
	Y-axis	600 mm/s
	Z-axis	600 mm/s
Repetitive positioning accuracy		±0.02 mm
Mass		18.4 kg (40.5 lb.)
Installation		Frame mounting

Recommended power capacity: 24 VDC, 300 W

*1 This is the value when the acceleration is 1 m/s^2.

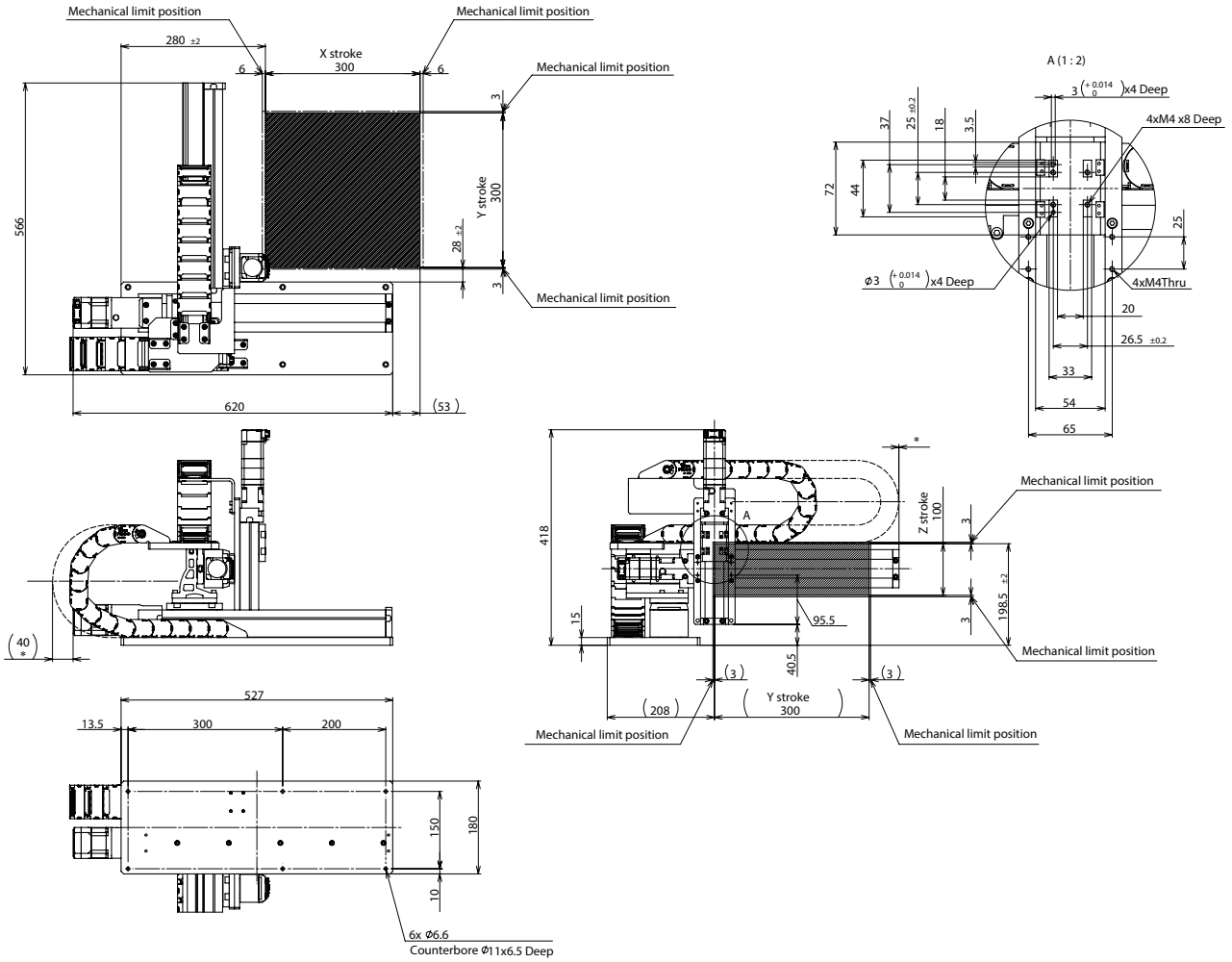
*2 Varies depending on payload and acceleration.

8-2 General specifications

Degree of protection		IP20 (Excluding connector part)
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
Storage environment 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

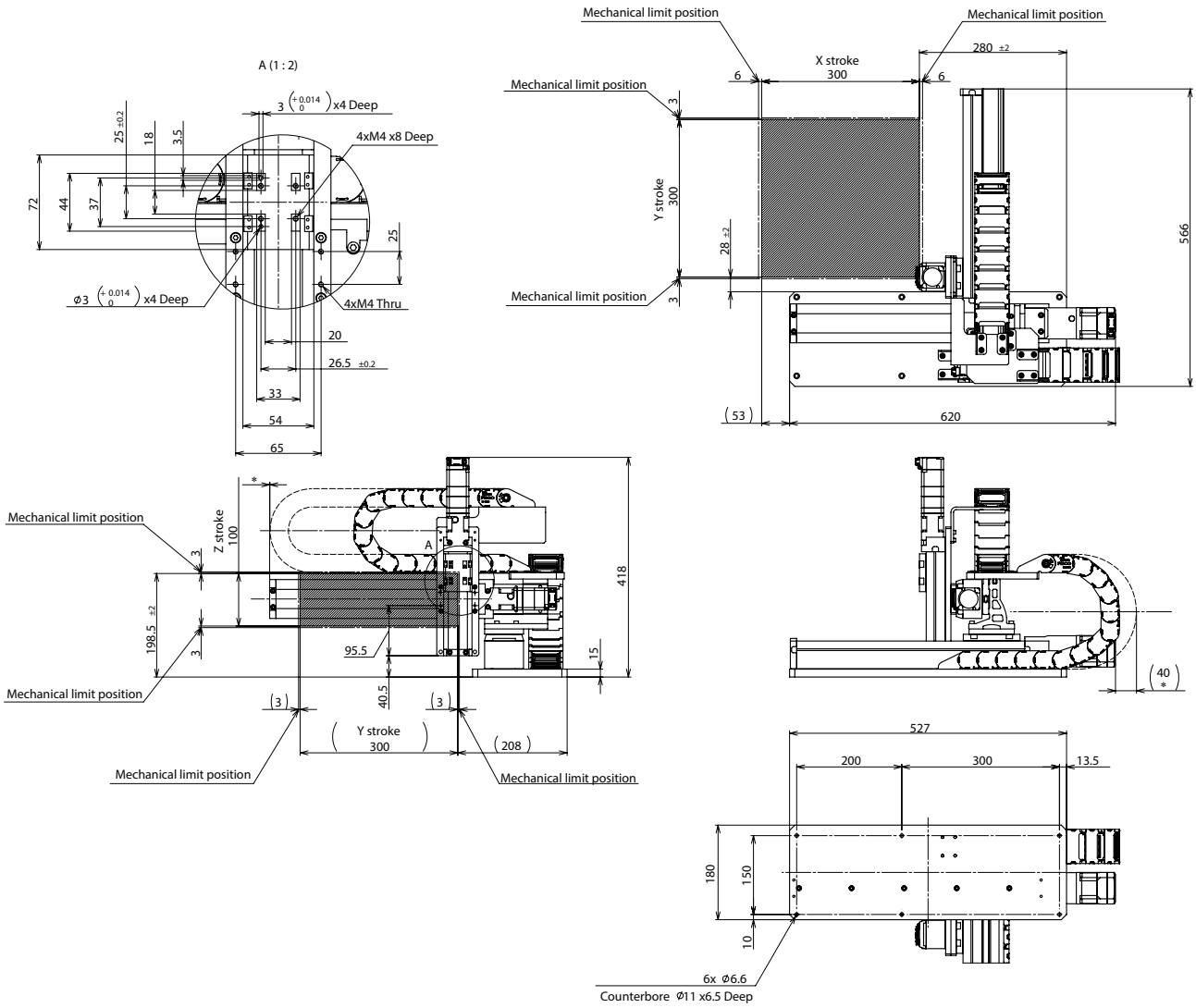
8-3 Dimensions (Unit: mm)

■ L type



* We cannot guarantee the amount of protrusion of the cable holder, so please ensure sufficient space around it.

■ R type



* We cannot guarantee the amount of protrusion of the cable holder, so please ensure sufficient space around it.

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