Oriental motor

HL-80002-12

Hollow Rotary Actuator

DGII Series Actuator Edition

OPERATING MANUAL

Table of contents

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

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

1 Introduction

1-1 Before use

Only qualified personnel of electrical and mechanical engineering should work with the product.
Use the product correctly after thoroughly reading the "3 Safety precautions" on p.13. In addition, be sure to observe the contents described in warning, caution, and note in this manual.
The product described in this manual 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, download from Oriental Motor Website Download Page or contact your nearest Oriental Motor sales office.

Common	• **DGII** Series OPERATING MANUAL Actuator Edition (this document) • Motorized Actuator Hollow Rotary Actuator OPERATING MANUAL Function Setting Edition

Actuators equipped with the **AZ** Series	• **AZ** Series/Motorized actuator equipped with **AZ** Series OPERATING MANUAL Function Edition • OPERATING MANUAL or USER MANUAL of combined driver
Actuators equipped with the **AZX** Series	• **AZX** Series/Motorized actuator equipped with **AZX** Series OPERATING MANUAL Hardware Edition • **AZX** Series/Motorized actuator equipped with **AZX** Series OPERATING MANUAL Software Edition
Actuators equipped with the **AR** Series	• **AR** Series/Motorized actuator equipped with **AR** Series USER MANUAL
Actuators equipped with the **RKII** Series	• **RKII** Series/Motorized actuator equipped with **RKII** Series USER MANUAL

2 Preparation

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

2-1 Checking the product

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

When purchasing a hollow rotary actuator only	When purchasing a hollow rotary actuator and driver package
• Hollow rotary actuator • Instructions and Precautions for Safe Use • APPENDIX UL Standards (included with products conform to the UL Standards)	• Hollow rotary actuator • Driver • A bag of connectors • Cable for motor* • Cable for electromagnetic brake (included with an electromagnetic brake motor and driver package)* • Cable for encoder (included with products equipped with the **AZ** Series)* • Instructions and Precautions for Safe Use • APPENDIX UL Standards (included with products conform to the UL Standards)

* This does not come with the "products without cables."

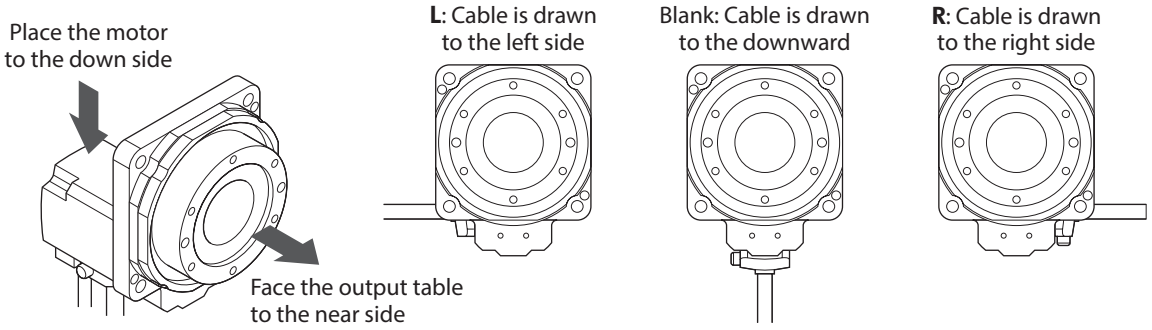
2-2 How to identify the product model (actuator model)

■ Actuators equipped with the AZ Series Motor vertical mounting

DGM 130 R - AZ A C R
1 2 3 4 5 6 7

1	Series name	**DGM**: **DGII** Series
2	Frame size	**60**: 60 mm (2.36 in.) **85**: 85 mm (3.35 in.) **130**: 130 mm (5.12 in.) **200**: 200 mm (7.87 in.)
3	Output table supporting bearing type	**R**: Cross-roller bearing Blank: Deep-groove ball bearing
4	Equipped motor	**AZ**: **AZ** Series
5	Motor type	**A**: Standard **M**: With electromagnetic brake
6	Motor power supply type	**C**: AC power input **K**: DC power input
7	Cable outlet direction*	Blank: Downward **R**: Right side (For **DGM130**, **DGM200** type only) **L**: Left side (For **DGM130**, **DGM200** type only)

* The cable outlet direction represents the cable direction when the output table is faced to the near side and the motor is placed to the down side.

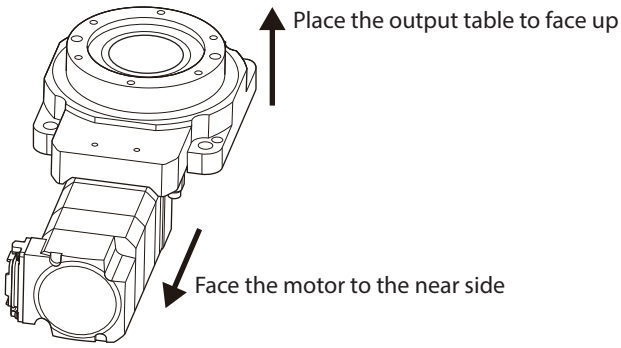


■ Actuators equipped with the AZ Series Motor horizontal mounting

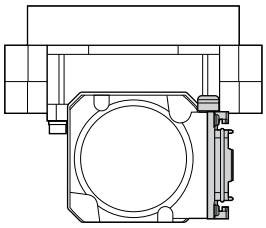
DGR	85	R	36	-	AZ	A	C	H	R
1	2	3	4		5	6	7	8	9

1	Series name	**DGR**: **DGII** Series
2	Frame size	**60**: 60 mm **85**: 85 mm **130**: 130 mm
3	Output table support bearing type	**R**: Cross-roller bearing
4	Gear ratio	**30**, **36**
5	Equipped motor	**AZ**: **AZ** Series
6	Motor type	**A**: Standard **M**: With electromagnetic brake
7	Motor power supply type	**C**: AC power input **K**: DC power input
8	Motor connection method	**H**: Connector type Blank: Cable type
9	Connector direction / cable outlet direction*	**U**: Upper side **D**: Down side **R**: Right side **L**: Left side

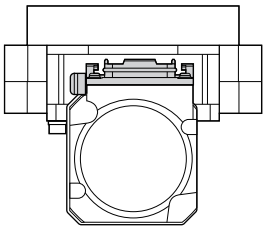
* The connector direction and cable outlet direction represent the cable direction when the motor is on the near side with the output table up.
The figure shows a connector type actuator.



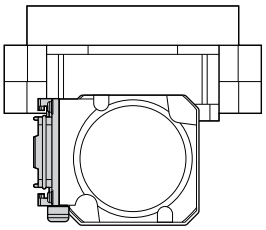
R: Right side



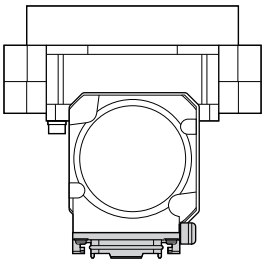
U: Upper side



L: Left side



D: Down side

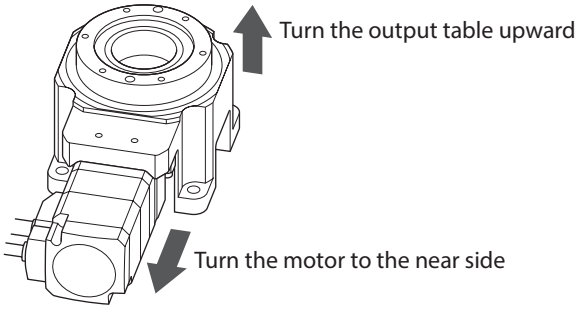


■ Actuators equipped with the AZ Series Motor horizontal mounting (Foot mount)

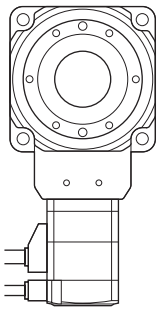
DGB 85 R 18 - AZ A C R
1 2 3 4 5 6 7 8

1	Series name	**DGB**: **DGII** Series
2	Frame size	**85**: 85 mm (3.35 in.) **130**: 130 mm (5.12 in.)
3	Output table supporting bearing type	**R**: Cross-roller bearing
4	Gear ratio	**12**, **18**, **36**
5	Equipped motor	**AZ**: **AZ** Series
6	Motor type	**A**: Standard **M**: With electromagnetic brake
7	Motor power supply type	**C**: AC power input **K**: DC power input
8	Cable outlet direction*	**R**: Right side **L**: Left side

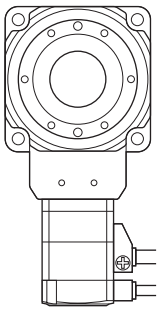
* The cable outlet direction represents the cable direction when the motor is on the near side with the output table up.



L: Cable is drawn to the left side



R: Cable is drawn to the right side



■ Actuators equipped with the AZX Series

DGM 200 R 18 - AZX A C
1 2 3 4 5 6 7

1	Series name	**DGM**: **DGII** Series
2	Frame size	**200**:200 mm (7.87 in.)
3	Output table supporting bearing type	**R**: Cross-roller bearing
4	Gear ratio	**18**
5	Equipped motor	**AZX**: **AZX** Series
6	Motor type	**A**: Standard **M**: With electromagnetic brake
7	Motor power supply type	**C**: AC power input

■ Actuators equipped with the AR Series

DGM 130 R - AR A C
1 2 3 4 5 6

1	Series name	DGM: **DGII** Series
2	Frame size	60: 60 mm (2.36 in.) 85: 85 mm (3.35 in.) 130: 130 mm (5.12 in.) 200: 200 mm (7.87 in.)
3	Output table supporting bearing type	R: Cross-roller bearing Blank: Deep-groove ball bearing
4	Equipped motor	AR: **AR** Series
5	Motor type	A: Standard B: Standard (double shaft) M: With electromagnetic brake
6	Motor power supply type	C: AC power input K: DC power input (For DGM60 type only)

■ Actuators equipped with the RKII Series

DGM 130 - 5PKE A C
1 2 3 4 5

1	Series name	DGM: **DGII** Series
2	Frame size	85: 85 mm (3.35 in.) 130: 130 mm (5.12 in.)
3	Equipped motor	5PKE: 5-phase PKE motor
4	Motor type	A: Standard
5	Motor power supply type	C: AC power input

2-3 How to identify the product model (actuator and driver package model)

■ Actuators equipped with the AZ Series

DG 130 R - AZ A C D -3
1 2 3 4 5 6 7 8

1	Series name	**DG**: **DGII** Series
2	Frame size	**85**: 85 mm (3.35 in.) **130**: 130 mm (5.12 in.) **200**: 200 mm (7.87 in.)
3	Output table supporting bearing type	**R**: Cross-roller bearing
4	Equipped motor	**AZ**: **AZ** Series
5	Motor type	**A**: Standard **M**: With electromagnetic brake
6	Power supply input	**A**: Single-phase 100-120 VAC **C**: Single-phase, Three-phase 200-240 VAC
7	Driver type	**D**: Built-in controller type Blank: Pulse input type
8	Connection cable	Number: Length of included connection cable (m) Blank: Without cable

■ Actuators equipped with the AR Series

DG 130 R - AR A C D 2 -3
1 2 3 4 5 6 7 8 9

1	Series name	**DG**: **DGII** Series
2	Frame size	**60**: 60 mm (2.36 in.) **85**: 85 mm (3.35 in.) **130**: 130 mm (5.12 in.) **200**: 200 mm (7.87 in.)
3	Output table supporting bearing type	**R**: Cross-roller bearing Blank: Deep-groove ball bearing
4	Equipped motor	**AR**: **AR** Series
5	Motor type	**A**: Standard **B**: Standard (double shaft) **M**: With electromagnetic brake
6	Power supply input	• Built-in controller type **A**: Single-phase 100-120 VAC **C**: Single-phase 200-240 VAC **K**: 24 VDC (For **DG60** type only) • Pulse input type **A**: Single-phase 100-115 VAC **C**: Single-phase 200-230 VAC **S**: Three-phase 200-230 VAC **K**: 24 VDC (For **DG60** type only)
7	Driver type	**D**: Built-in controller type Blank: Pulse input type
8	Reference number	**2**: Combination with the ARD driver Blank: Combination with the LSD driver
9	Connection cable	Number: Length of included connection cable (m) Blank: Without cable

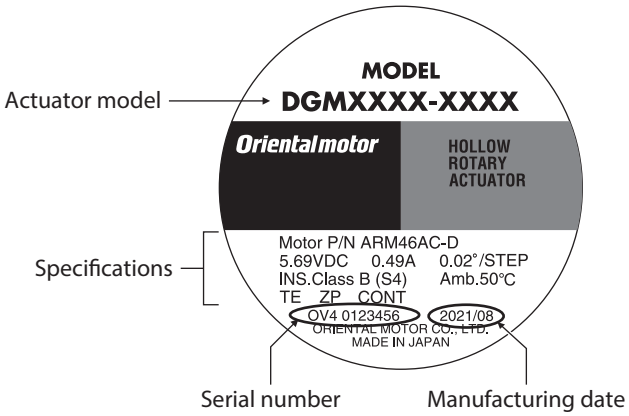
■ Actuators equipped with the RKII Series

DG	130	-	RKS	A	C	D	-3
1	2		3	4	5	6	7

1	Series name	**DG**: **DGII** Series
2	Frame size	**85**: 85 mm (3.35 in.) **130**: 130 mm (5.12 in.)
3	Equipped motor	**RKS**: **RKII** Series
4	Motor type	**A**: Standard
5	Power supply input	**A**: Single-phase 100-120 VAC **C**: Single-phase 200-240 VAC
6	Driver type	**D**: Built-in controller type Blank: Pulse input type
7	Connection cable	Number: Length of included connection cable (m) Blank: Without cable

2-4 Information about nameplate

The figure shows an example.

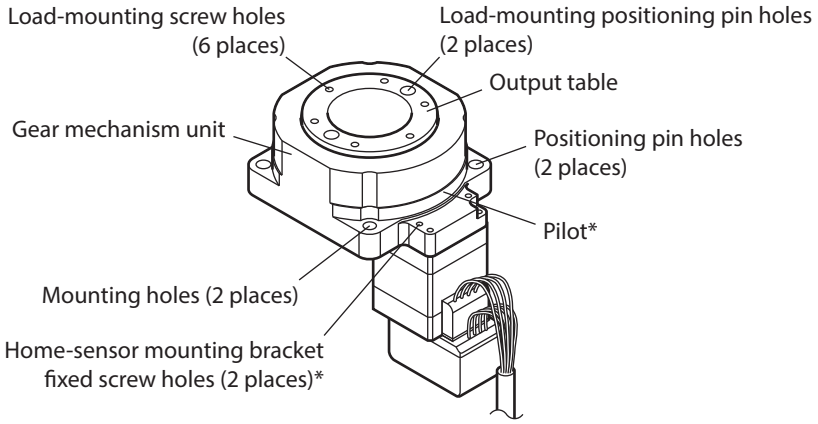


memo The position describing the information may vary depending on the product.

2-5 Names of parts

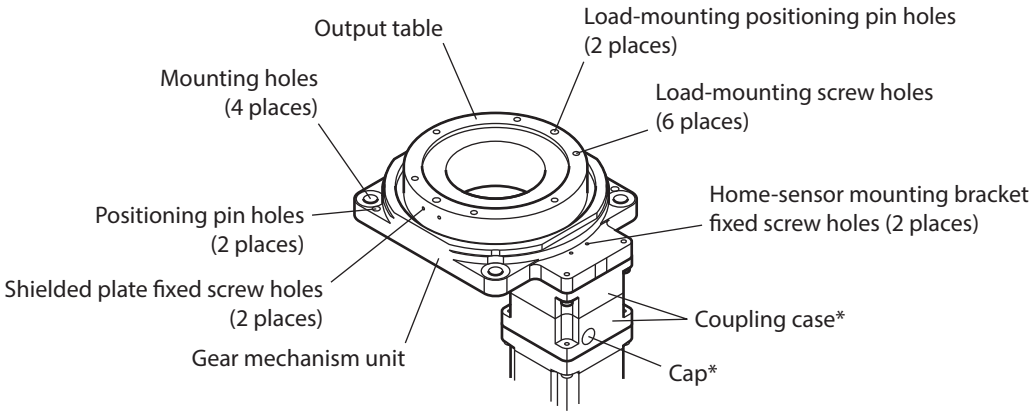
■ Mechanism section

- **DGM60**



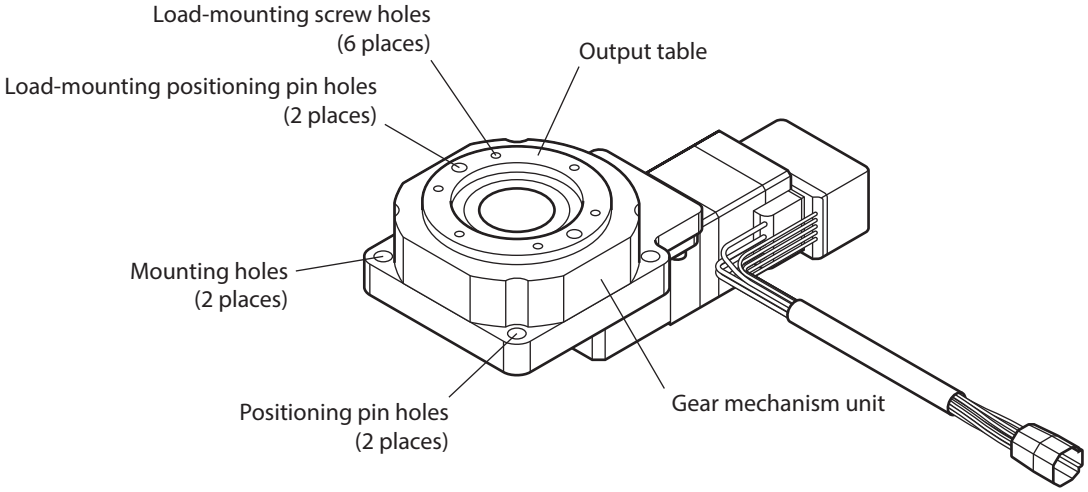
* **DGM60R** does not have it.

- **DGM85, DGM130, DGM200**

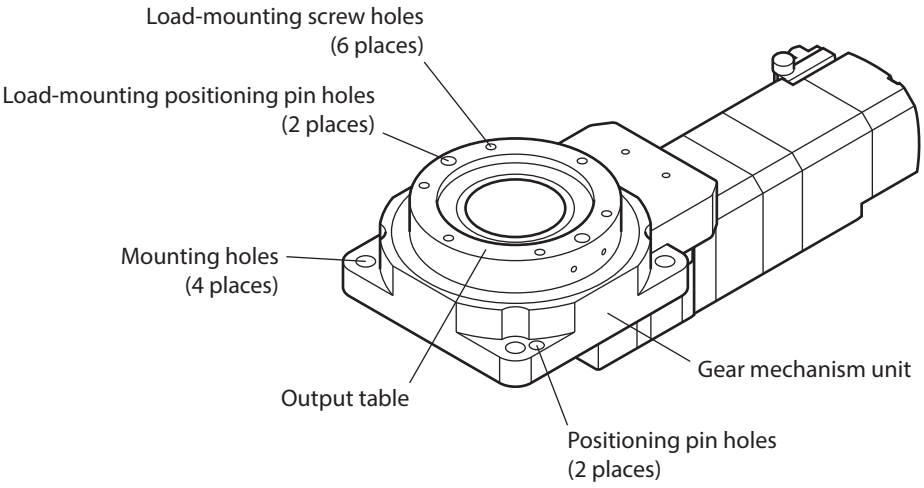


* Actuators equipped with the **AZX** Series only

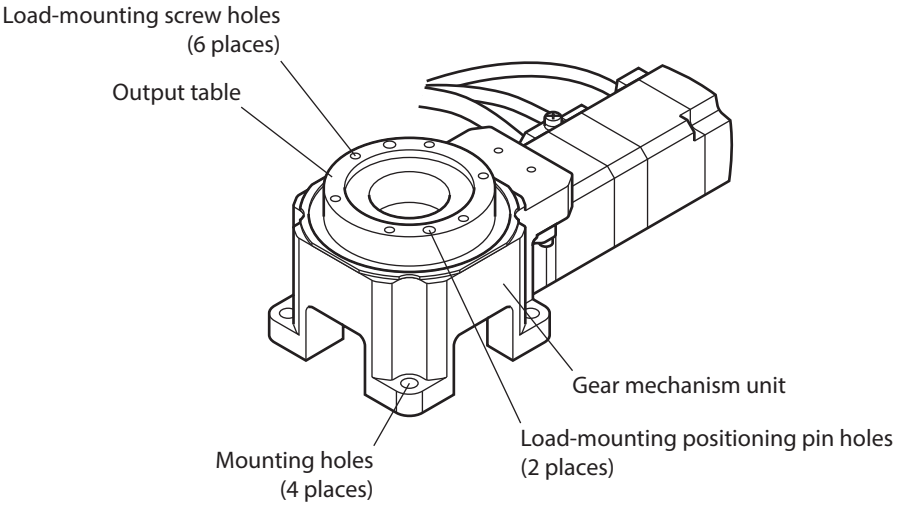
- **DGR60**



- **DGR85, 130**



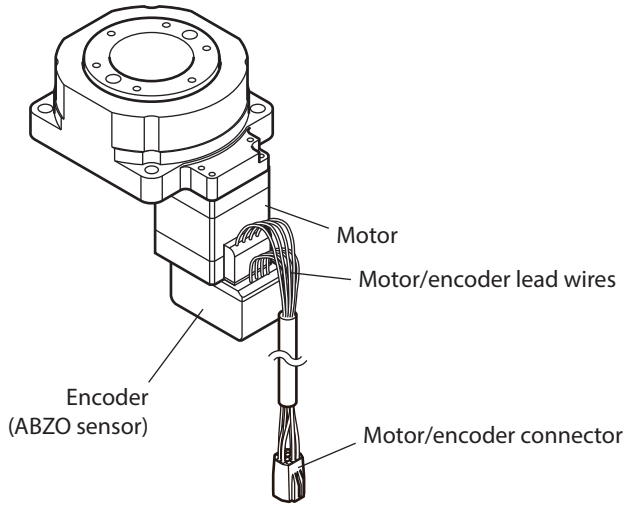
- **DGB**



■ Motor section

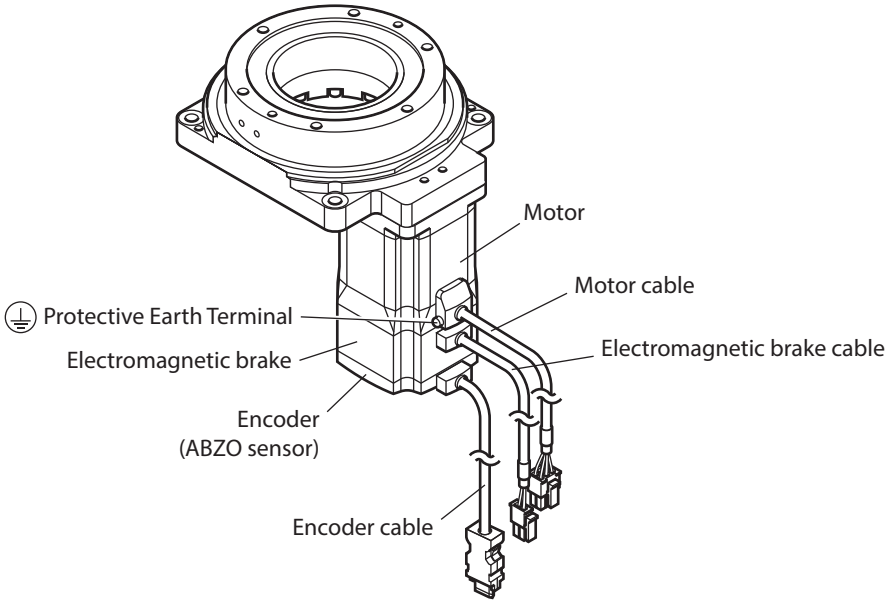
- **Actuators equipped with the AZ Series, AZX Series**

Frame size 60



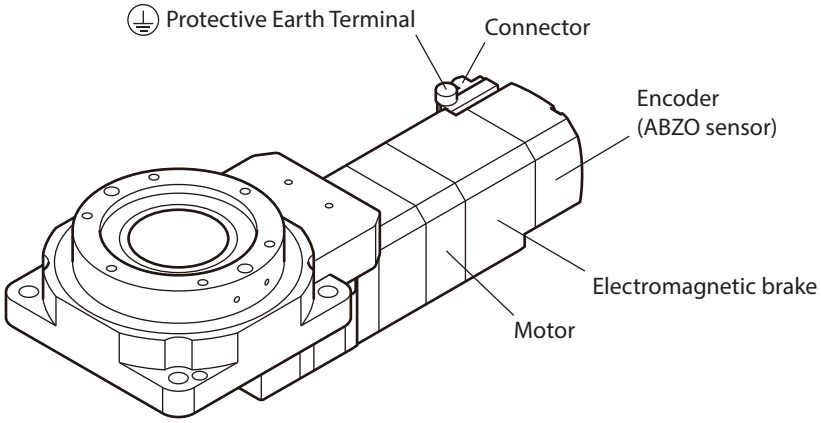
Frame sizes 85, 130, 200 (Cable type)

The figure shows an actuator equipped with the **AZ** Series, AC power input electromagnetic brake motor.



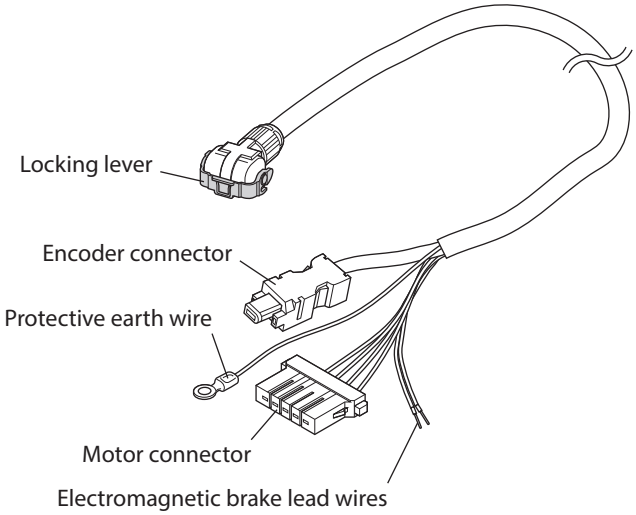
Frame sizes 85, 130 (Connector type)

The figure shows an actuator equipped with the **AZ** Series, AC power input electromagnetic brake motor.

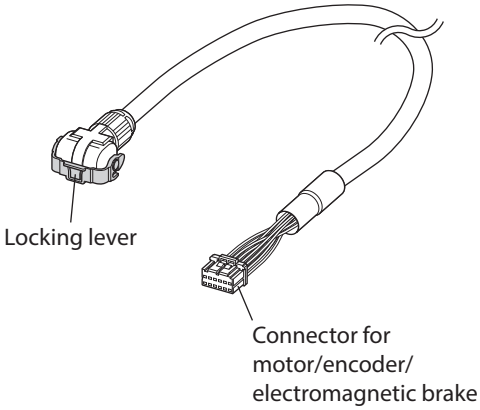


- **Connection cable**

For AC power input

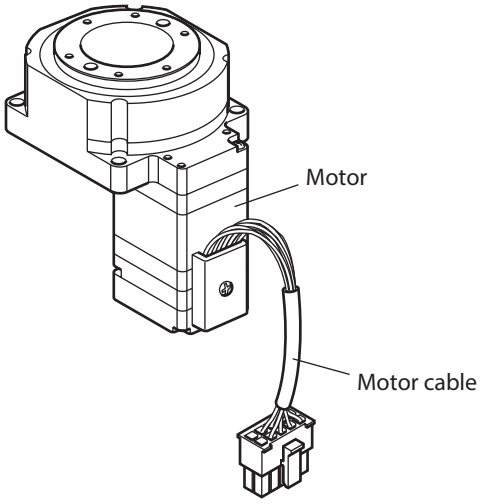


For mini Driver



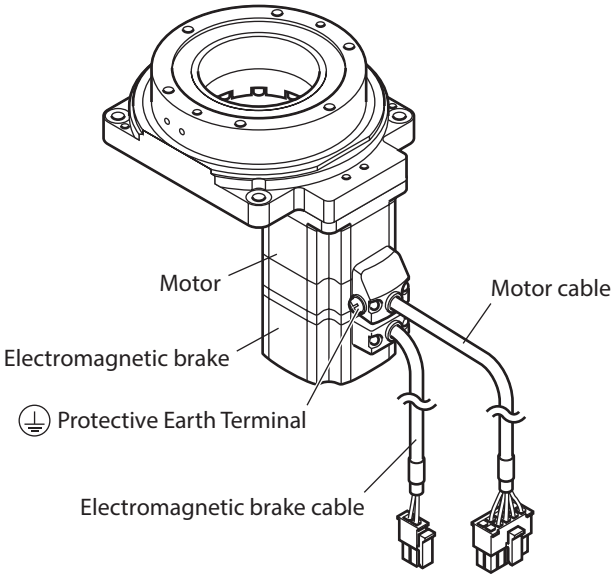
- **Actuators equipped with the AR Series**

Frame size 60



Frame size 85, 130, 200

The figure shows an actuator with an AC power input electromagnetic brake motor.



3 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 hollow rotary actuator (hereinafter referred to as actuator), it is prohibited to start operating the actuator (i.e., to operate the device in accordance with the specified purpose) when the machine in which the actuator 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.

Description of signs

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

Description of graphic symbols

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

⚠WARNING	
⃠	• 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, electric shock, or injury. • Do not transport, install, connect or inspect the actuator while the power is supplied. Doing so may result in electric shock. • Do not forcibly bend, pull or pinch the cable. Doing so may result in fire and electric shock. • Do not disassemble or modify the product. Doing so may result in injury or damage to equipment. • Do not machine or modify the connection cable. Doing so may result in fire, electrical shock, or damage to equipment. • Do not apply a strong force to the connector or the terminal. Doing so may damage the connector or terminal, resulting in fire, electric shock, or damage to equipment. • Never use an actuator in a medical device used in connection with the maintenance or management of human life or health, or in a transportation system whose purpose is to move or carry people. • Be sure to provide a safety cage conforming to EN ISO 13857 to prevent persons from entering the moving range of the actuator while power is supplied to the actuator. Turn off the main power to the driver before performing adjustment or inspection in which the output table is moved manually. Accidental contact may result in serious injury. • Do not use the electromagnetic brake for braking or as a safety brake. Doing so may result in injury or equipment damage.

⚠WARNING

- Assign qualified personnel to the task of installing, wiring, operating/controlling, inspecting and troubleshooting the product. Handling by unqualified personnel may result in fire, electric shock, injury, or damage to equipment.
- Take measures to keep the moving part in position if the product is used in vertical operations such as elevating equipment. Failure to do so may result in injury or damage to equipment.
- Operate the data setter outside the safety fence. Failure to do so may result in injury.
- When an alarm is generated in the driver (any of the driver's protective functions is triggered), take measures to hold the moving part in a specific position since the actuator stops and loses its holding torque. Failure to do so may result in injury or damage to equipment.
- Install the products inside an enclosure in order to prevent electric shock or injury.

- Be sure to ground the product when installing a Class I product. Failure to do so may result in electric shock.
- Provide an emergency stop device or emergency stop circuit external to the equipment so that the entire equipment will operate safely in the event of a system failure or malfunction. Failure to do so may result in injury.
- Perform the return-to-home operation after the power is restored. When an actuator equipped with the **AZ** Series or **AZX** Series is used, or when the absolute-position backup system is used in the built-in controller type driver with an actuator equipped with the **AR** Series, execute positioning operation of the absolute mode. Failure to do so may result in injury or equipment damage.
- Operate the actuator after setting the resolution, traveling direction and other parameters. If the actuator is operated without setting parameters, the output table may move to unexpected directions or run at unexpected speeds, causing injury or damage to equipment. (A variety of parameters have been set to the actuator equipped with the **AZ** Series or **AZX** Series at the time of shipment.)
- After replacing the driver, set the resolution, moving (rotating) direction or other parameters before operating the actuator. If the actuator is operated without setting parameters, the output table may move to unexpected directions or run at unexpected speeds, causing injury or damage to equipment.

⚠CAUTION

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

- Use an actuator and driver only in the specified combination. An incorrect combination may cause a fire.
- Wear a helmet, safety shoes, gloves or other protective gear when transporting or installing the actuator. Failure to do so may result in injury.
- The actuator is very heavy. When transporting or installing the actuator, make sure two persons work together to carry out the necessary tasks. Failure to do so may result in injury.
- 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

4 Precautions for use

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

■ General

- **Be sure to use our cable to connect the actuator and the driver.**

  Check on the Oriental Motor Website for the cable model.

- **Do not apply excessive force to the locking lever.**

  If the locking lever is damaged, the connector may not be fixed securely.

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

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

- **Do not make an impact on the actuator.**

  Do not drop the actuator. Also, do not hit the motor or gear-reduction mechanism on something hard. Doing so may cause the positioning accuracy decrease, the actuator damage or the product service life reduction.

■ Temperature

- **Use the actuator equipped with the AZ Series or AZX Series in conditions where the motor surface temperature does not exceed 80 °C (176 °F).**

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

- **Use the actuator equipped with the AR Series or RKII Series in conditions where the motor surface temperature does not exceed 100 °C (212 °F).**

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

■ Operation

- **Do not apply a moment load or axial load in excess of the specified permissible limit.**

  Continuing to operate the actuator under an excessive moment load or axial load may damage the bearings of the actuator. Be sure to operate the actuator below the specified permissible limits of the moment load and axial load.

- **When the motor is the double shaft**

  With these models, do not apply load torque, radial load or axial load to the back shaft of the motor.

- **Hollow hole section**

  If the pipe or cable installed in the hollow hole section is rotated together with the output table, take measures not to rub or disconnect in contact with the inner wall of the hollow hole section.

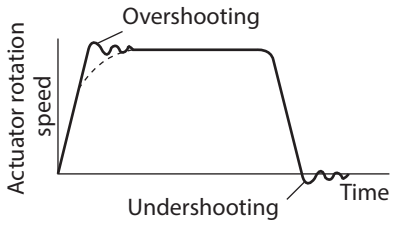
- **Holding torque at standstill (Excluding AZX Series)**

  When the actuator stops, the holding torque of the output table will be reduced by the current cutback function of the driver. When selecting a actuator, check the holding torque at motor standstill in the specifications on the catalog.

- **Do not use the electromagnetic brake to reduce speed or as a safety brake.**
  - The electromagnetic brake is a power-off activated type. This means that although it helps maintain the position of the load in the event of power outage, etc., this brake cannot securely hold the load in place. Accordingly, do not use the electromagnetic brake as a safety brake.
  - Do not use the electromagnetic brake as a means to decelerate and stop the actuator. The brake hub of the electromagnetic brake will wear significantly and the braking force will drop if used to stop the motor.
  - To use the electromagnetic brake to hold the load in place, do so after the actuator has stopped.

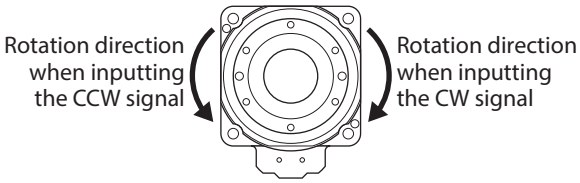
- **Do not perform an operation to cause overshooting or undershooting.**

Operating the actuator under the condition that overshooting or undershooting occurs may cause damage to the gear-reduction mechanism. Review the operating condition or adjust the speed filter. Since the product equipped with the **RKII** Series pulse input type does not have the function of the speed filter, adjust to revise the operating condition.

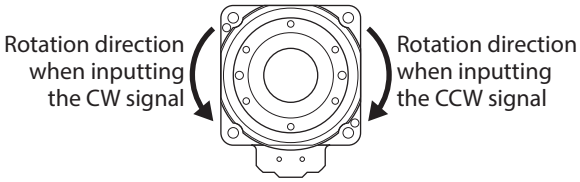


- **Rotation direction of output table**

The output table of the actuator equipped with the **AZ** Series or **AZX** Series rotates in the same direction as the driver input signal (CW input, CCW input). CW and CCW indicate the rotation direction when viewed from the output table side.



The output table of the actuator equipped with the **AR** Series and the **RKII** Series rotates in the opposite direction as the driver input signal (CW input, CCW input). CW and CCW indicate the rotation direction when viewed from the output table side.



4-1 Notes when using the actuator equipped with the AZ Series or AZX Series

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

- Making a strong impact on an encoder (ABZO sensor) may cause the actuator malfunction or damage to the encoder (ABZO sensor).
- When transporting the actuator or installing a load, handle the actuator carefully not to make a strong impact on the moving part.
- The warning label shown in the figure is indicated on the motor.

Warning label

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

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

Actuator manufacturing date	Model name	Magnetic flux density	
		When transporting and storing	When operating
After October 2023	All	10 mT	10 mT
Before September 2023	**DGM60**	5 mT	2 mT*
	DGM85, **DGM130**, **DGM200** **DGB85**, **DGB130**	10 mT	10 mT

* When the magnetic flux density is exceeding 1 mT and 2 mT or less, use in an environment where the operating ambient temperature is exceeding 20 °C (68 °F) and 40 °C (104 °F) or less.

- **Meshing noise of mechanical sensor**

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

4-2 Notes when the connection cable is used

Note the following points when our cable is used.

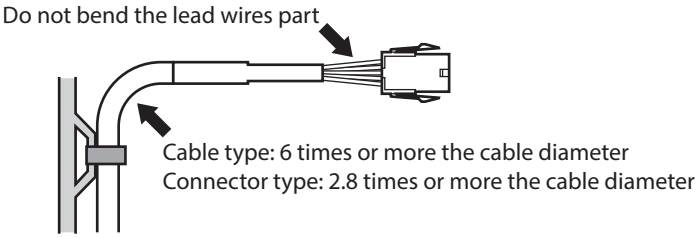
- **When inserting the connector**

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

- **When pulling out the connector**

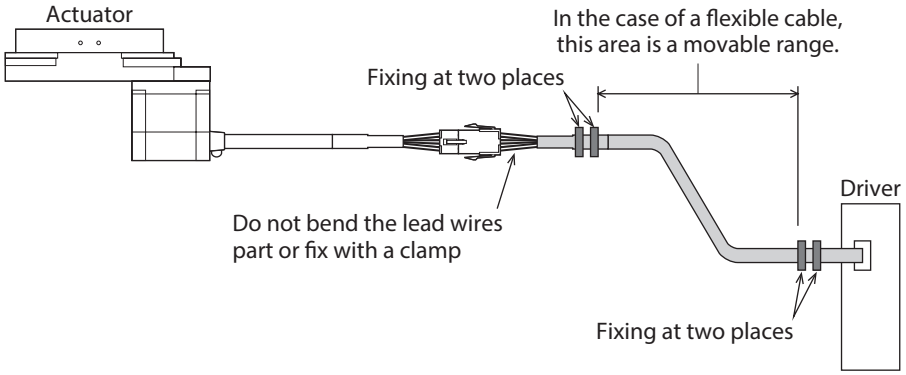
  For the connection cable with the connector lock, pull out the connector in a straight line while releasing the lock part of the connector.
  Pulling out the connector with holding the cable may result in damage to the connector.

- **Bending radius of cable**
  - Use the cable in a condition where the bending radius of the cable is as follows.
    Cable type: More than 6 times the cable diameter
    Connector type: More than 2.8 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 near the connectors at two places as shown in the figure or fix it with a wide clamp to take measures to prevent stress from being applied to the connectors.
  The figure shows a cable type actuator.



5 Check before installation

5-1 Location for installation

The actuator 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
  Actuator equipped with the **AZ** Series or **AZX** Series
  0 to +40 °C (+32 to +104 °F) (Non-freezing)
  Actuator equipped with the **AR** Series or **RKII** Series
  When the home sensor is not used: 0 to +50 °C (+32 to +122 °F) (Non-freezing)
  When the home sensor is use: 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 vibrations 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

■ Installation direction

The actuator can be installed in any direction.
To prevent vibration, install the actuator on a metal surface of sufficient strength.

Note

- On rare occasions, a small amount of grease may ooze out from the actuator. If there is concern over possible environmental damage resulting from the leakage of grease, check for grease stains during regular inspections. Alternatively, install an oil pan or other device to prevent leakage from causing further damage. Oil leakage may lead to problems in the user's equipment or products.
- Be sure the positioning pins are secured to the mounting plate. Driving the pins into the actuator may damage the actuator due to impact.
- Do not drop the actuator. Also, do not hit the motor or gear-reduction mechanism on something hard. Doing so may cause the positioning accuracy decrease, the actuator damage or the product service life reduction.
- Do not loosen or remove the screws of the actuator. Doing so may cause the positioning accuracy to drop or damage to the actuator.

■ If an actuator equipped with the AZ Series or AZX Series is installed

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

Actuator manufacturing date	Model name	Magnetic flux density
After October 2023	All	10 mT
Before September 2023	**DGM60**	2 mT*
	DGM85, **DGM130**, **DGM200** **DGB85**, **DGB130**	10 mT

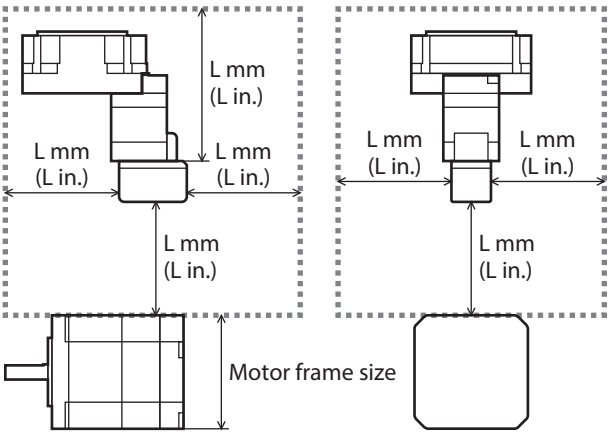
* When the magnetic flux density is exceeding 1 mT and 2 mT or less, use in an environment where the operating ambient temperature is exceeding 20 °C (68 °F) and 40 °C (104 °F) or less.

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

The encoder (ABZO sensor) of the **DGM60**, **DGR60** equipped with the **AZ** Series is easily affected by a magnetic field, so make sure the installation location.
Allow more clearance around the encoder (ABZO sensor) than specified in the table. Check the manufacturing date of an actuator with the nameplate.

Actuator manufacturing date	Distance from ABZO sensor (L)
After October 2023	2 mm (0.08 in.)
Before September 2023	Motor frame size

The figure shows a **DGM60** actuator.



6 Installing the DGM60

Perform cutout machining or through-hole machining on a mounting plate when installing the actuator.

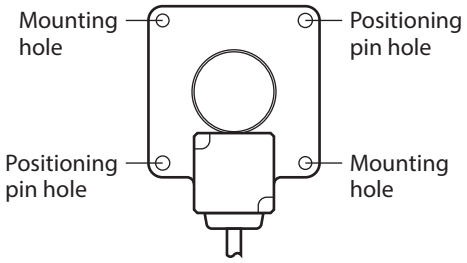
Thickness of mounting plate	5 mm (0.20 in.) or more
Material	Steel or aluminum

6-1 Specifications for mounting holes and positioning pin holes

The mounting holes and positioning pin holes are through holes. The positioning pin holes can be used as mounting holes when they are not used. As with the above case, provide screw hole machining in the mounting plate.
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	ø4.5 mm (ø0.18 in.)
	Nominal size	M4
	Tightening torque	2 N·m (284 oz-in)
Positioning pin holes	Pin hole diameter	ø5 $^{+0.012}_{0}$ mm (ø0.1969 $^{+0.0005}_{0}$ in.)
	Pin hole depth	10 mm (0.39 in.), Through hole

Viewing from the motor side



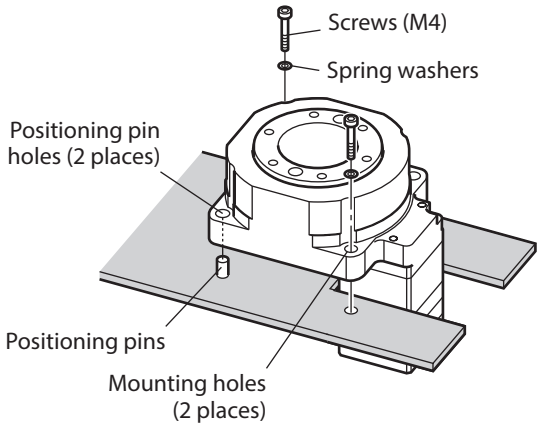
6-2 Installation method

Note Installation of the actuator must be in a stable condition so that the actuator is not in a tilted position.

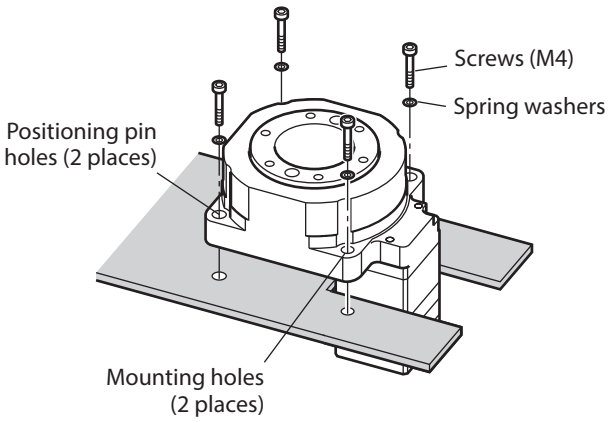
■ When a mounting plate with cutout is used

Secure the actuator with screws.

- **When using the positioning pins**

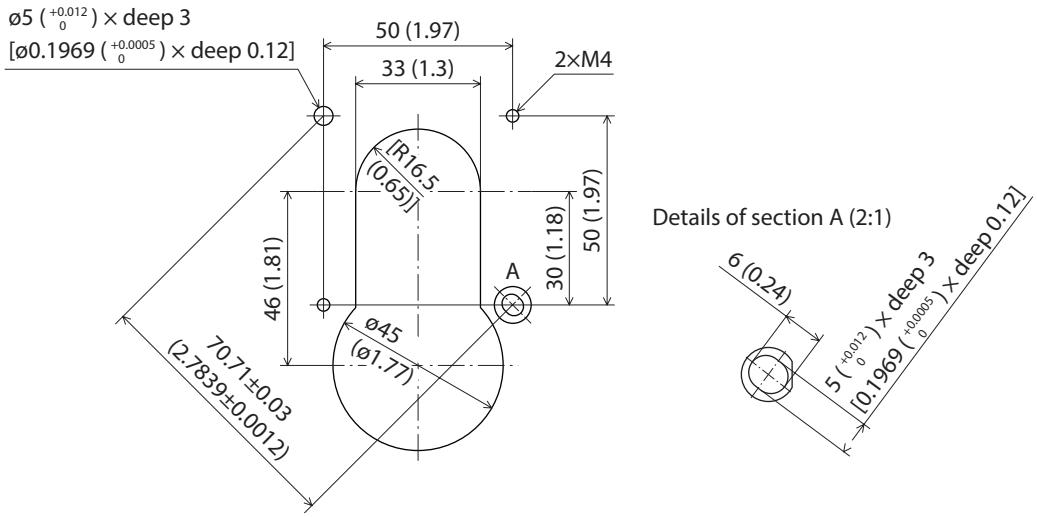


- **When the positioning pin holes are used as mounting holes**



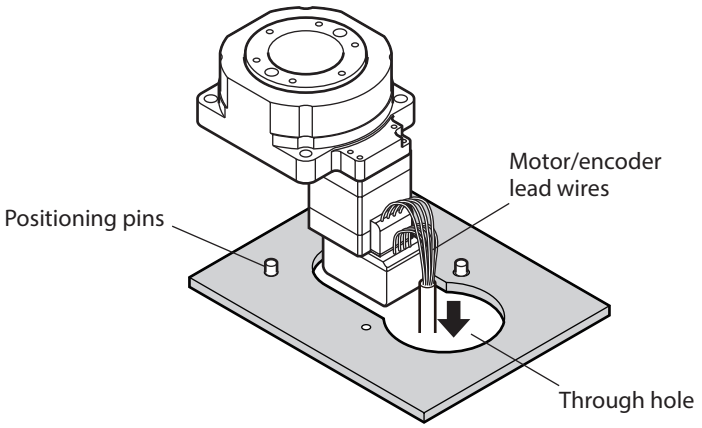
■ When a mounting plate with through-hole is used

- **Design for mounting plate [reference] [unit: mm (in.)]**



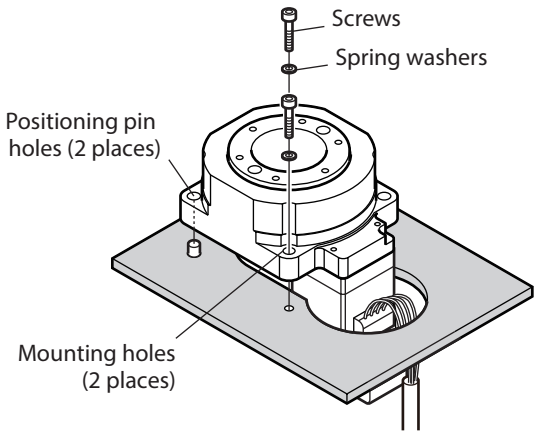
- **Installation method**

1. Pass the motor/encoder lead wires through the through hole of the mounting plate.

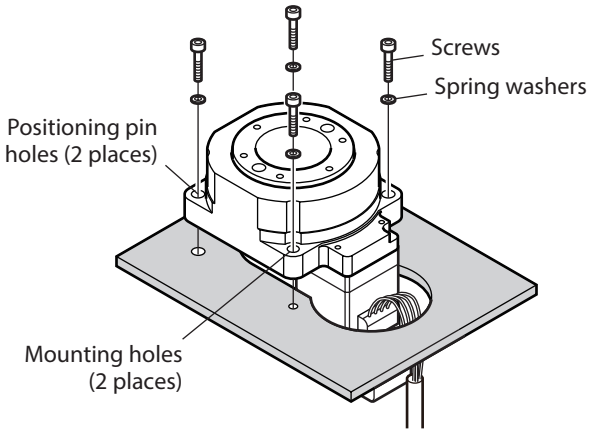


2. Move the actuator to the through hole which diameter is larger, and secure the actuator with screws.

- **When using the positioning pins**

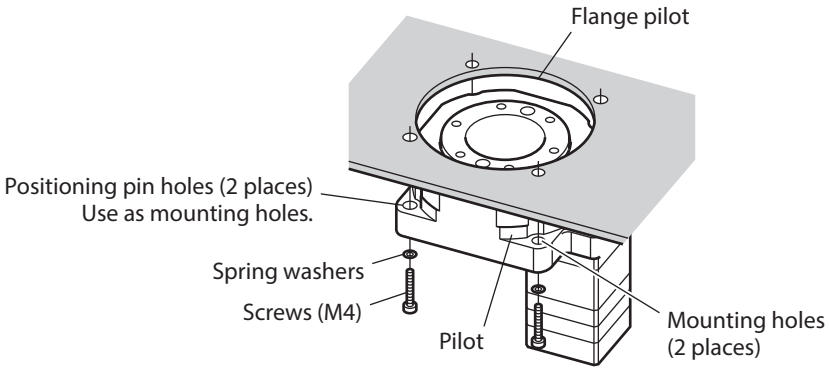


- **When the positioning pin holes are used as mounting holes**



■ When installing from below the mounting plate

Use the positioning pin holes as mounting holes.
Fit the pilot of the actuator into the flange pilot having performed through-hole machining, and secure the mounting holes with screws (four pieces).



Note The **DGM60R** actuator cannot be installed from the bottom of the mounting plate.

7 Installing the DGM85/DGM130/ DGM200

Perform cutout machining or through-hole machining on a mounting plate when installing the actuator.
When designing a mounting plate, take into account the shape of the motor.

Model	Thickness of mounting plate	Material
DGM85	8 mm (0.31 in.) or more	Steel or aluminum
DGM130	10 mm (0.39 in.) or more	
DGM200	15 mm (0.59 in.) or more	

memo For actuators equipped with the **AZX** Series, remove the motor from the gear-reduction mechanism, and the cable outlet direction can be changed. However, since it is necessary to turn the actuator downward to remove the motor, change the cable outlet direction before installing the actuator.
Refer to p.31 for details.

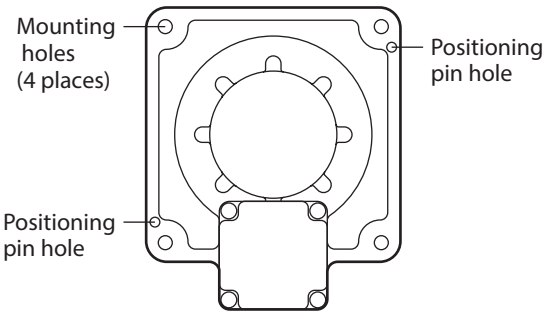
7-1 Specifications for mounting holes and positioning pin holes

The mounting holes are through holes. Provide screw hole machining in the mounting plate.
Values of the tightening torque are recommended. Tighten the screws with a suitable torque according to the design conditions of the mounting plate.

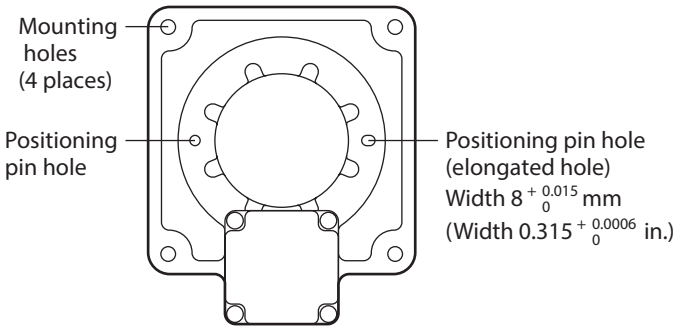
Model	Mounting hole			Positioning pin hole	
	Pin hole diameter	Nominal size	Tightening torque	Pin hole diameter	Pin hole depth
DGM85	ø6.5 mm (ø0.26 in.)	M6	6 N·m (53 lb-in)	ø5 $^{+0.012}_{0}$ mm (ø0.1969 $^{+0.0005}_{0}$ in.)	10.5 mm (0.41 in.), Through hole
DGM130	ø9 mm (ø0.35 in.)	M8	13 N·m (115 lb-in)		12 mm (0.47 in.), Through hole
DGM200	ø11 mm (ø0.43 in.)	M10	25 N·m (220 lb-in)	ø8 $^{+0.015}_{0}$ mm (ø0.3150 $^{+0.0006}_{0}$ in.)	8 mm (0.31 in.), Blind hole

Viewing from the motor side

DGM85, DGM130



DGM200

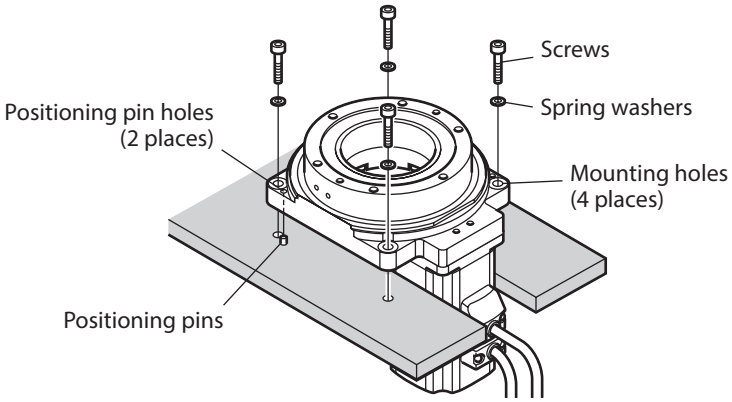


7-2 Installation method

When moving the output table of the electromagnetic brake type manually, refer to "12-3 Connecting a power supply for electromagnetic brake" on p.37 and release the electromagnetic brake.

■ When a mounting plate with cutout is used

Use two positioning pin holes to position the actuator, and secure the mounting holes with screws (four pieces).



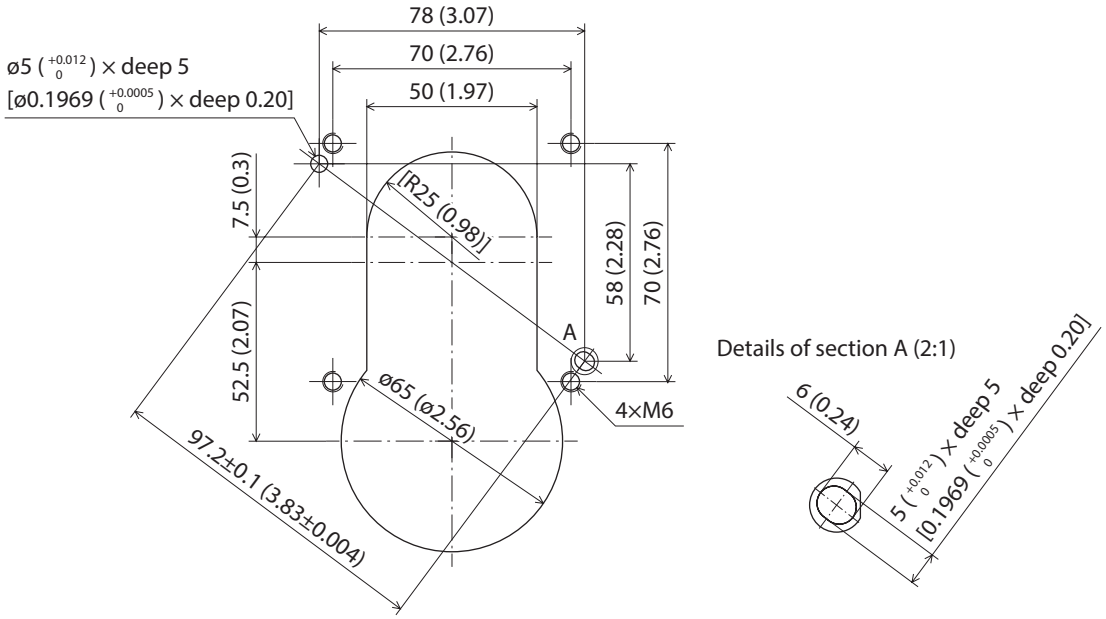
Note

- Be sure to install the actuator from the upper side of the mounting plate. It cannot be installed from below the mounting plate.
- Installation of the actuator must be in a stable condition so that the actuator is not in a tilted position.

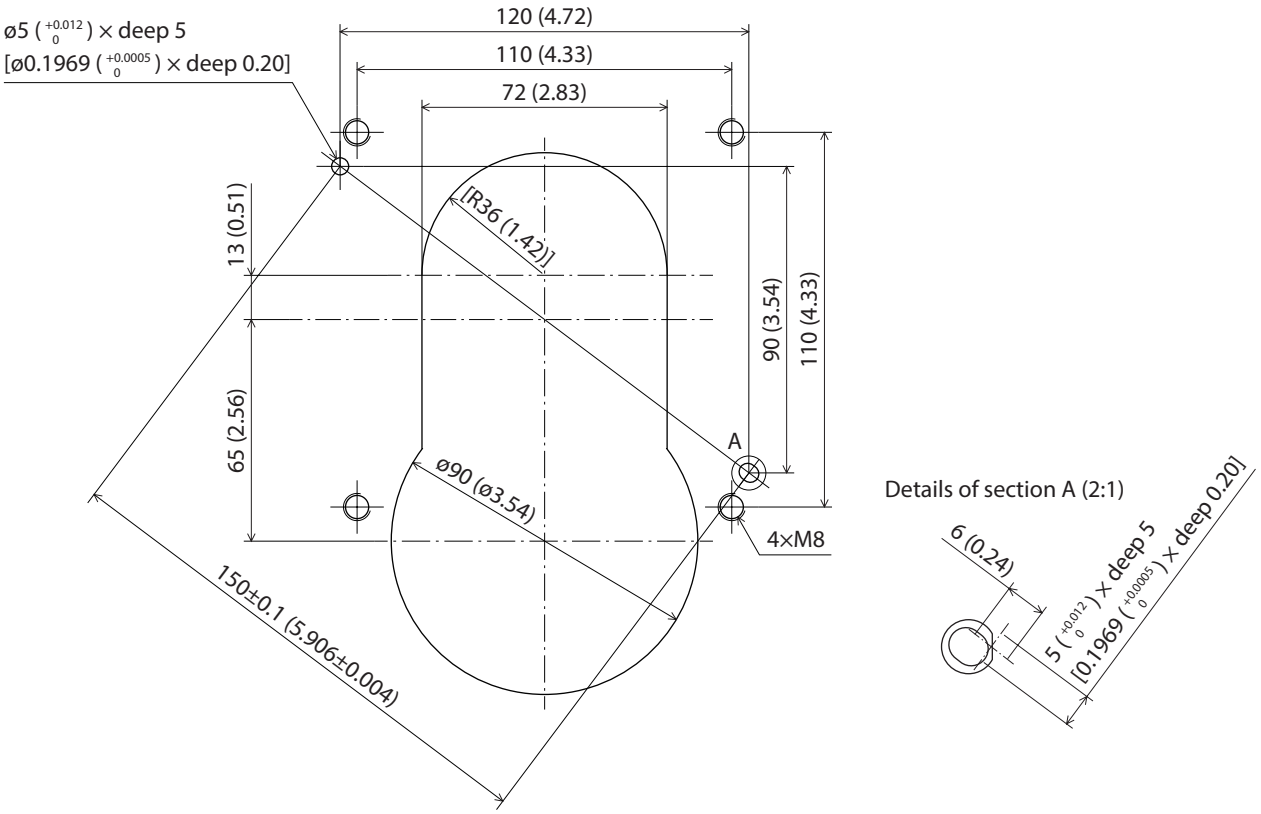
■ When a mounting plate with through-hole is used

- **Design for mounting plate [reference] [unit: mm (in.)]**

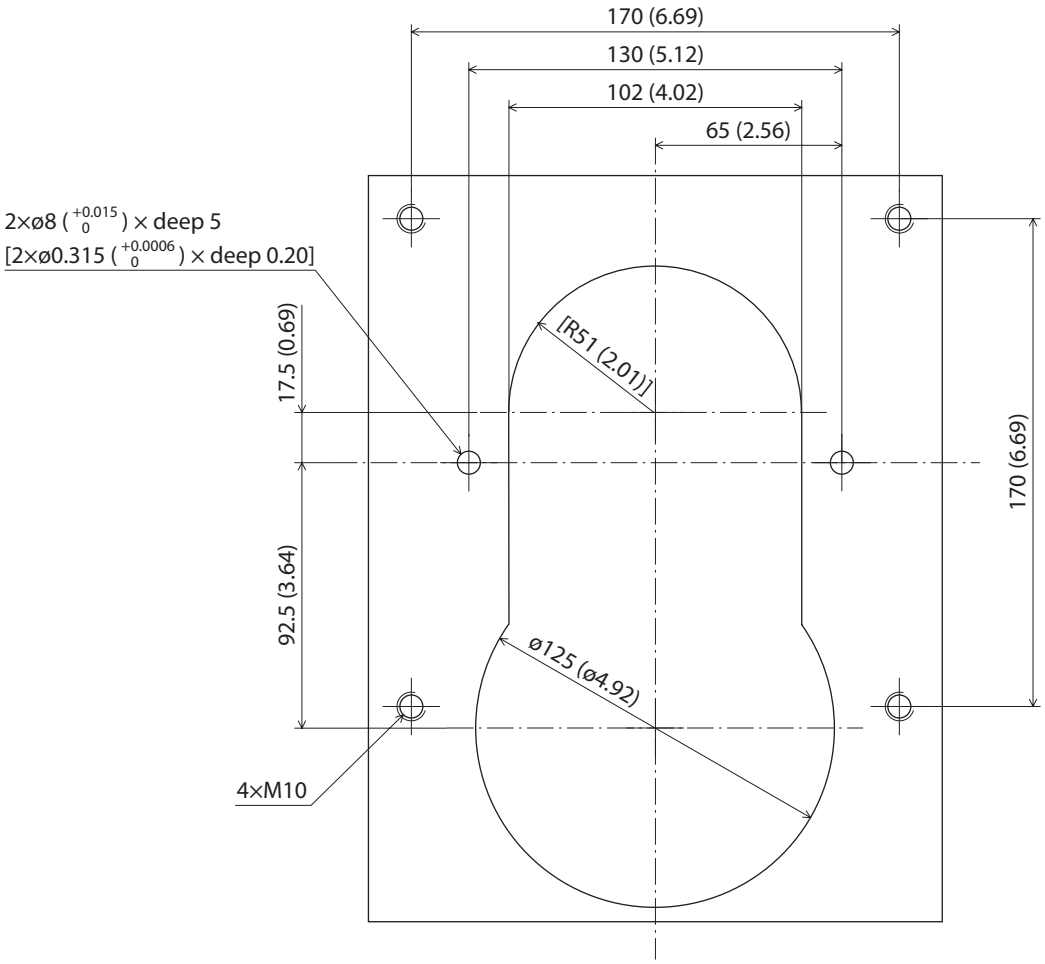
DGM85



DGM130



DGM200

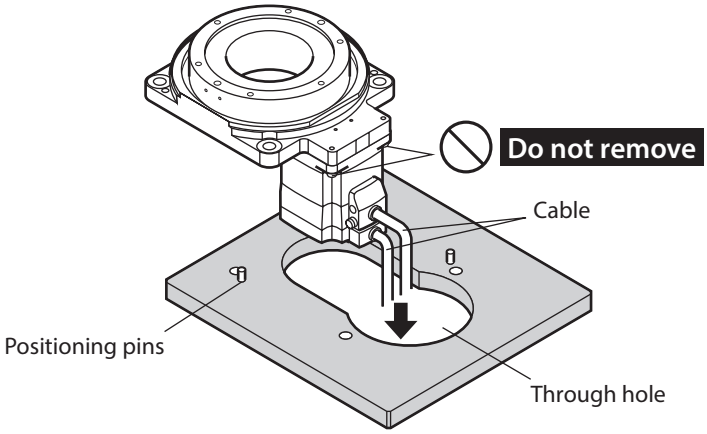


- **Installation procedure: When installing an actuator which cable outlet direction is downward**

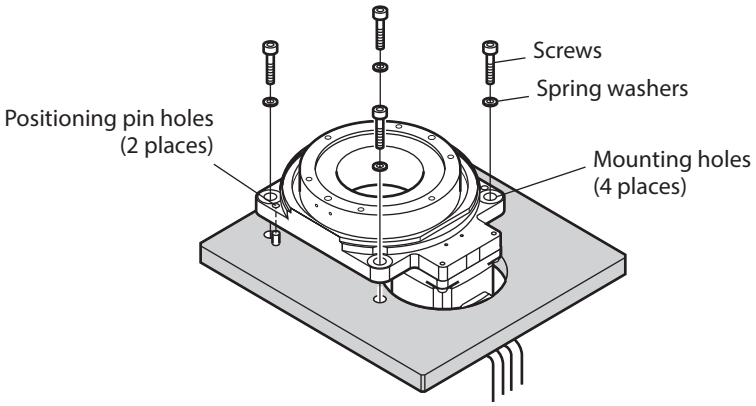
Note

- Be sure to install the actuator from the upper side of the mounting plate. It cannot be installed from below the mounting plate.
- Installation of the actuator must be in a stable condition so that the actuator is not in a tilted position.

1. Pass the motor cable through the through hole of the mounting plate.



2. Move the actuator to the through hole which diameter is larger, and secure the mounting holes with screws (four pieces).



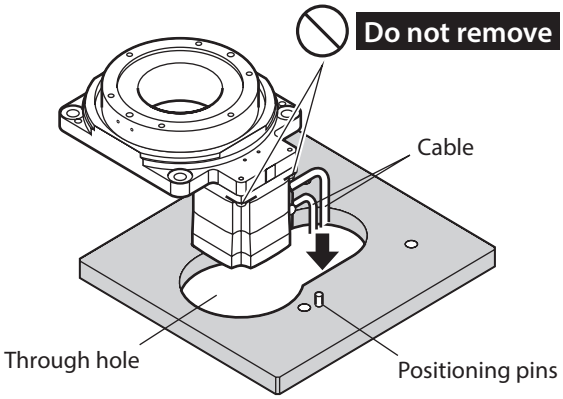
- **Installation procedure: When installing an actuator which cable outlet direction is rightward or leftward**

  This section explains based on an example when the cable outlet direction is rightward.

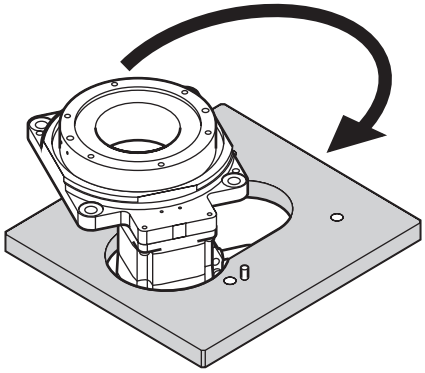
Note

- Be sure to install the actuator from the upper side of the mounting plate. It cannot be installed from below the mounting plate.
- Installation of the actuator must be in a stable condition so that the actuator is not in a tilted position.

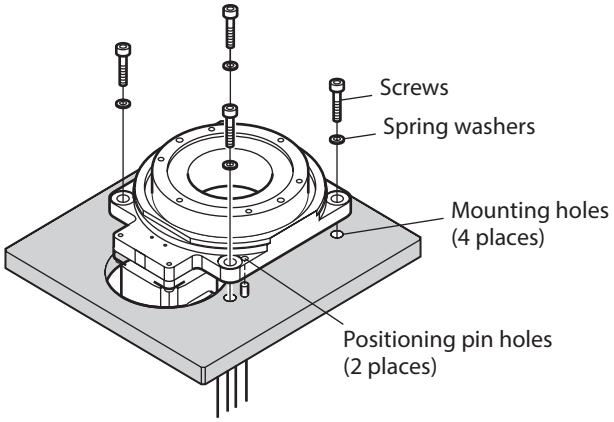
1. Pass the motor cable through the through hole of the mounting plate.



2. Rotate the actuator by 90 degrees.



3. Secure the mounting holes with screws (four pieces).



8 Installing the DGR

Install the actuator on the mounting plate with a through hole.

Model name	Mounting plate thickness	Material
DGR60	5 mm (0.20 in.) or more	Steel or aluminum
DGR85	8 mm (0.31 in.) or more	
DGR130	10 mm (0.39 in.) or more	

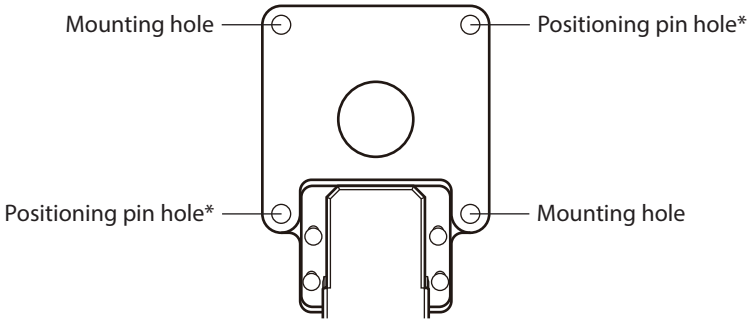
8-1 Specifications of mounting holes and positioning pin holes

The mounting holes are through holes. Provide screw holes in the mounting plate.
The value of the tightening torque is recommended. Tighten the screws to an appropriate torque according to the design conditions of the mounting plate.

Model name	Mounting hole			Positioning pin hole	
	Hole diameter	Nominal designation of thread	Tightening torque	Pin hole diameter	Pin hole depth
DGR60	ø5 mm (ø0.20 in.)	M4	2 N·m (17.7 lb-in)	ø5 $^{+0.012}_{0}$ mm (ø0.1969 $^{+0.0005}_{0}$ in.)	10 mm (0.39 in.), Through hole
DGR85	ø6.5 mm (ø0.26 in.)	M6	6 N·m (53 lb-in)		10.5 mm (0.41 in.), Through hole
DGR130	ø9 mm (ø0.35 in.)	M8	13 N·m (115 lb-in)		12 mm (0.47 in.), Through hole

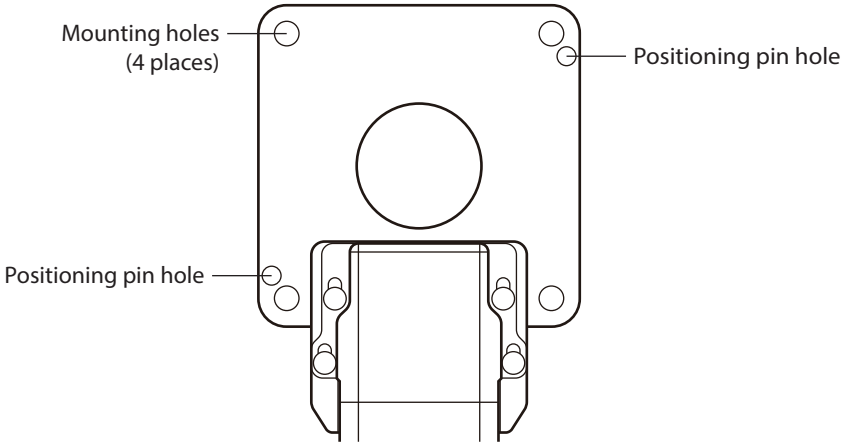
■ Figures viewed from the opposite side of the output table

DGR60



* When the positioning pin is not used, the positioning pin hole can be used as a mounting hole.

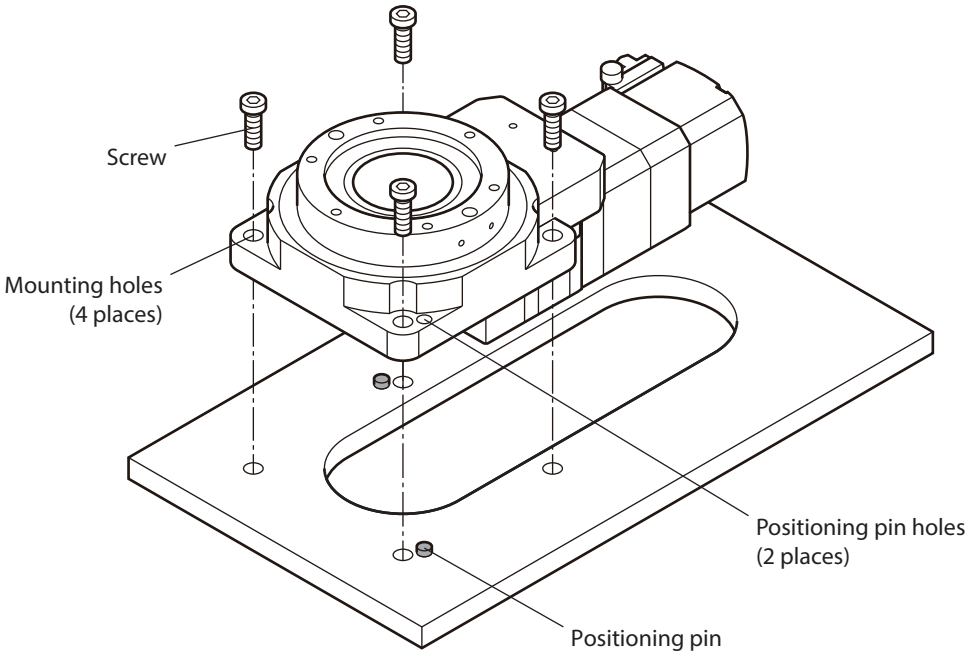
DGR85, DGR130



8-2 Installation method

⚠CAUTION Do not remove the motor or loosen the screws of the motor. The accuracy of the actuator may be reduced, resulting in malfunction or shortened service life.

Use two positioning pin holes to position the actuator and secure the mounting holes with screws.
To move the output table manually when installing the actuator, refer to "12-3 Connecting a power supply for electromagnetic brake" on p.37 to release the electromagnetic brake.
The figure shows a **DGR85** actuator.



Note
- Be sure to install the actuator from the upper side of the mounting plate. It cannot be installed from the bottom side.
- Installation of the actuator must be in a stable condition so that the actuator is not in a tilted position.
- Install it so that the cable and encoder are not in contact with the mounting plate.

9 Installing the DGB

Install the actuator on the mounting plate.

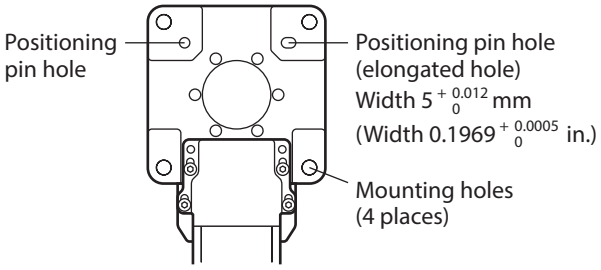
Model	Thickness of mounting plate	Material
DGB85	8 mm (0.31 in.) or more	Steel or aluminum
DGB130	10 mm (0.39 in.) or more	

9-1 Specifications for mounting holes and positioning pin holes

The mounting holes are through holes. Provide screw hole machining in the mounting plate.
Values of the tightening torque are recommended. Tighten the screws with a suitable torque according to the design conditions of the mounting plate.

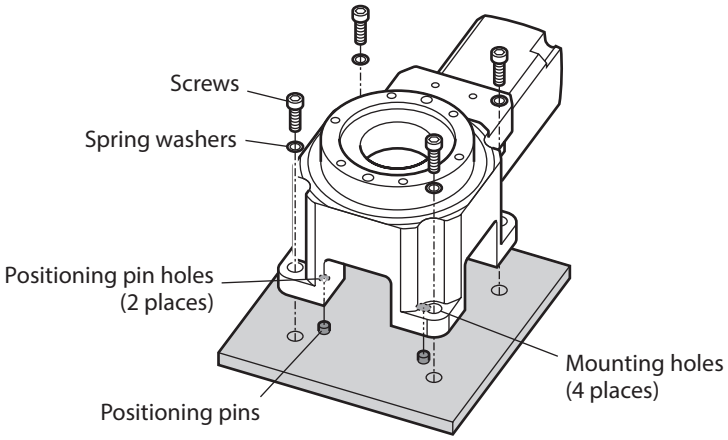
Model	Mounting holes			Positioning pin holes	
	Hole diameter	Nominal size	Tightening torque	Pin hole diameter	Pin hole depth
DGB85	ø6.5 mm (ø0.26 in.)	M6	6 N·m (53 lb-in)	ø5 $^{+0.012}_{0}$ mm (ø0.1969 $^{+0.0005}_{0}$ in.)	5 mm (0.20 in.), Blind hole
DGB130	ø9 mm (ø0.35 in.)	M8	13 N·m (115 lb-in)		

Viewed from the opposite side to the output table



9-2 Installation method

Use two positioning pin holes to position the actuator, and secure the mounting holes with screws (4 pieces).
When moving the output table of the electromagnetic brake type manually, refer to "12-3 Connecting a power supply for electromagnetic brake" on p.37 and release the electromagnetic brake.



Note

- Be sure to install the actuator from the upper side of the mounting plate. It cannot be installed from below the mounting plate.
- When installing the actuator, do so in a stable condition so that the actuator does not tilt.

10 Changing the motor cable outlet direction (Actuator equipped with the AZX Series)

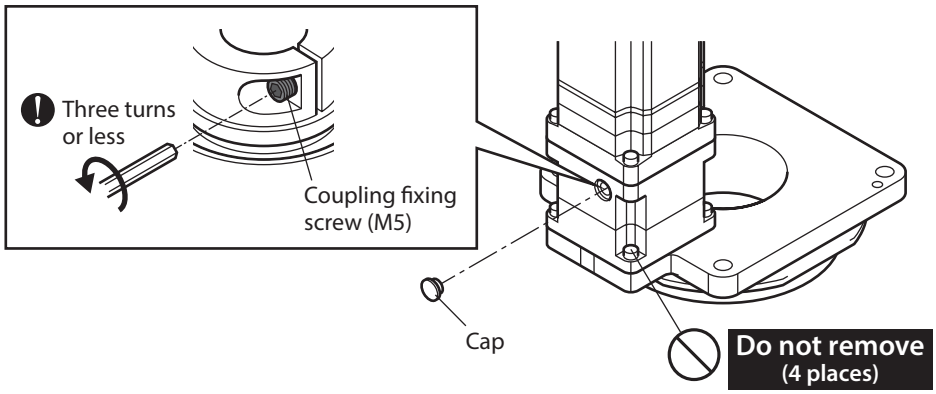
The motor cable outlet direction can be changed according to the space of equipment.

⚠WARNING

- When changing the motor cable outlet direction, remove the load. Doing so in a condition where a load is installed may result in injury or damage to equipment.
- Set the home again after mounting a motor. If the actuator 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 load may collide with other equipment.
- Be sure to secure the coupling with the specified tightening torque. If the coupling is not secured with the specified tightening torque, it may slip, causing the moving part to rotate in an unexpected direction or at an unexpected speed, resulting in injury or damage to equipment.
- Be sure to secure the motor mounting screws with the specified tightening torque. Unless it is secured with the specified torque, the moving part may move to unexpected directions or run at unexpected speeds, leading to injury or mechanical damage.

Note When mounting or dismounting the motor, do so with the gear-reduction mechanism facing down. Since the weight of the motor is applied to the coupling case, the gap can be eliminated. If there is a gap between the motor and the coupling case, it may cause abnormal noise or reduce the product life.

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

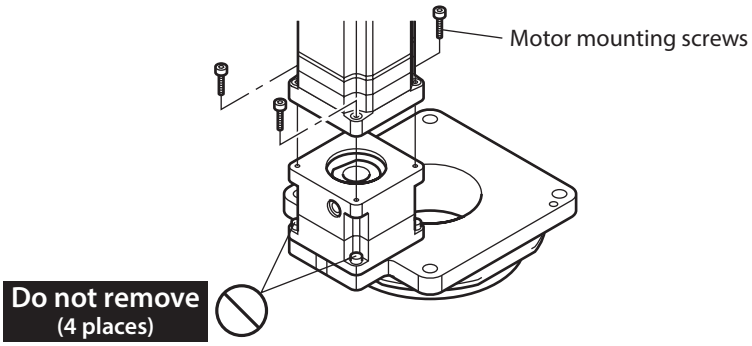


Note

- Do not touch the coupling with bare hands. Doing so may cause rust.
- To prevent the coupling fixing screw from falling off, keep three turns or less when turning the screw.
- When loosening the coupling fixing screw, do not insert the tool diagonally.
- Do not use the ball-end hex key.

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

Screw size	Screw length	Number of screws
M6	20 mm (0.79 in.)	4 pcs.



3. Change the cable outlet direction, and mount the motor to the coupling case.

Note Be sure to remove the motor when changing the cable outlet direction. If the motor is rotated to change direction while the mounting surface of the motor and actuator are in contact, it will not be possible to remove the motor.

4. Tighten the coupling fixing screw.
   Tightening torque: 6 N·m (850 oz-in)
5. Tighten the motor mounting screws.
   Tightening torque: 3 N·m (420 oz-in)

Note If an object is caught between the motor and the coupling case, or if the motor output shaft and the coupling are not aligned, there may be a gap. To prevent damage to the equipment, fix securely so that there is no gap between them.

6. Attach the cap.
7. After mounting the motor, set the home again.

11 Installing a load

11-1 Specifications about installation

Install a load with screws using the load-mounting screw holes (six places) onto the output table.
Use the load-mounting pin holes (two places) of the output table when positioning a load.
Values of the tightening torque are recommended. Tighten the screws with a suitable torque according to the design conditions of the load.

Model	Nominal size	Tightening torque [N·m (oz-in)]	Effective depth of screw thread [mm (in.)]	Material of load	Pin hole diameter [mm (in.)]	Pin hole depth [mm (in.)]
DGM60	M3	1 (142)	8 (0.31)	Steel or aluminum	$ø5\ ^{+0.012}_{0}$ ($ø0.1969\ ^{+0.0005}_{0}$)	6 (0.24)
DGM60R DGR60R		1.4 (198)	6 (0.24)		$ø4\ ^{+0.012}_{0}$ ($ø0.1575\ ^{+0.0005}_{0}$)	
DGM85	M4	2 (280)	6 (0.24)		$ø5\ ^{+0.012}_{0}$ ($ø0.1969\ ^{+0.0005}_{0}$)	
DGM85R DGR85R DGB85R			8 (0.31)			
DGM130	M5	3.5 (490)	8 (0.31)			
DGM130R DGR130R DGB130R						
DGM200R	M6	6 (850)	10 (0.39)		$ø8\ ^{+0.015}_{0}$ ($ø0.3150\ ^{+0.0006}_{0}$)	8 (0.31)

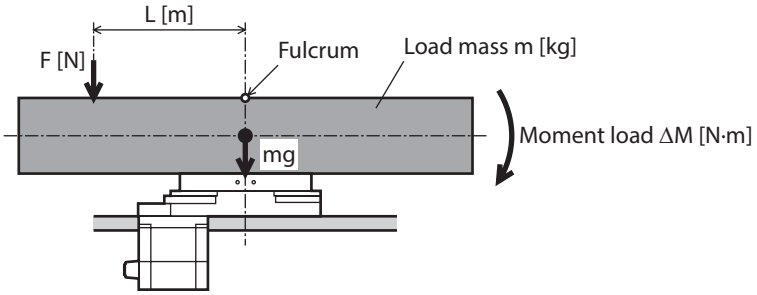
Note Be sure the positioning pins are secured to the load. Driving the pins into the output table may damage the bearing due to impact or an excessive moment of inertia.

11-2 Permissible moment, permissible axial load

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

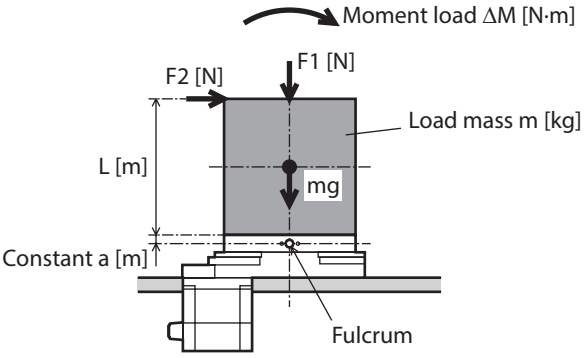
Model	Output table supporting bearing	Permissible moment (N·m)	Permissible axial load (N)
DGM60	Deep-groove ball bearing	2	100
DGM60R DGR60R	Cross-roller bearing	7	350
DGM85	Deep-groove ball bearing	6	200
DGM85R DGR85R DGB85R	Cross-roller bearing	10	500
DGM130	Deep-groove ball bearing	20	300
DGM130R DGR130R DGB130R	Cross-roller bearing	50	2,000
DGM200R	Cross-roller bearing	100	4,000

■ When external force F is applied at distance L from the center of the output table



Moment load [N·m] : $\Delta M = F \times L$
Axial load [N] : Fs = F + m (load mass) × g (gravitational acceleration)

■ When external forces F1 and F2 are applied at distance L from the mounting face of the output table



Moment load [N·m] : $\Delta M = F2 \times (L + \text{constant a})$
Axial load [N] : Fs = F1 + m (load mass) × g (gravitational acceleration)

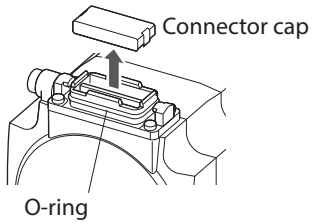
Model	Constant a (m)
DGM60 DGM60R DGR60R	0.01
DGM85	0.015
DGM85R DGR85R DGB85R	0.02
DGM130	0.016
DGM130R DGR130R DGB130R	0.03
DGM200R	0.04

12 Connection

12-1 Connecting the connector type motor and the cable

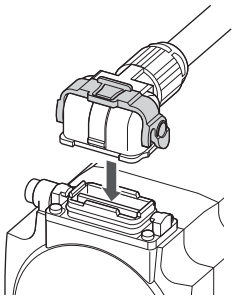
■ Connecting the cable

1. Remove the connector cap.

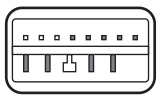


Note Do not damage the O-ring of the connector when removing the connector cap.

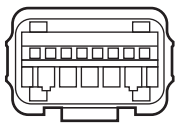
2. Connect the connector of the connection cable.
   The figure shows an example where the cable outlet direction is the output shaft direction. Check the position of the connector terminals before connecting.



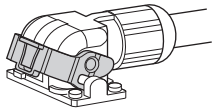
Connector of motor



Connector of cable

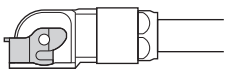


- Position of locking lever when connecting the connector
  Avoid 90-degree and 0-degree positions.

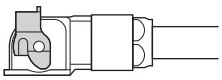


Note If the locking lever is in a state of being turned up to the 90-degree position or down to the 0-degree position, parts around the locking lever and the connector are in contact with each other, and the connectors cannot be connected.

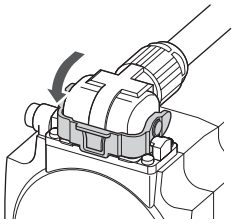
0-degree position



90-degree position



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



Handling of locking lever

- Do not apply excessive force to the locking lever. If the locking lever is damaged, the connector may not be fixed securely.
- After connecting the connector, turn the locking lever down securely 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, electric shock, or damage to equipment.

■ Removing the cable

Turn up the locking lever and pull out the connector.

memo Turning up the locking lever to the 90-degree position simultaneously disconnects the connector.

12-2 Protective Earth

memo
- When multiple actuators of AC power input type are used in combination, provide Protective Earth for each actuator.
- Do not share the grounding wire with a welder or power equipment.

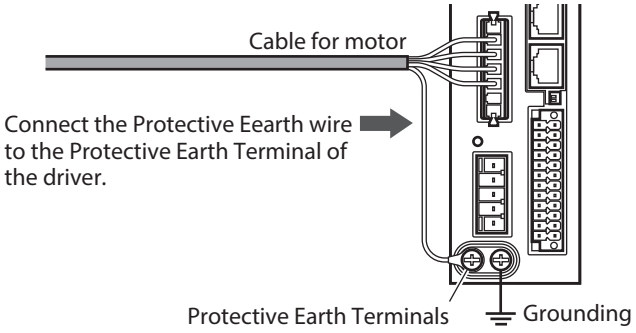
■ Actuator equipped with the AZ Series, AZX Series

Protective Earth is not required for DC power input type actuators. Ground the functional earth terminal (M4) if necessary.
AC power input type actuators can be grounded by connecting the Protective Earth wire of the cable for motor to the Protective Earth Terminal of the driver. However, if grounding the Protective Earth wire of the cable for motor does not satisfy the grounding resistance required by the applicable standard of the equipment, the Protective Earth Terminal of the motor must also be grounded.

1) Grounding the Protective Earth wire of the motor

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

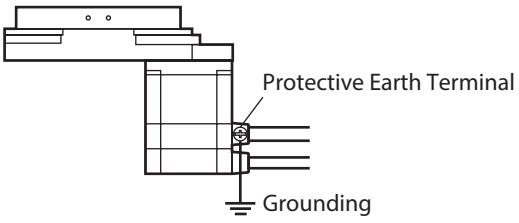
Equipped motor	**AZ** Series		**AZX** Series	
Cable type	Connection cable	Flexible connection cable	Connection cable	Flexible connection cable
Conductor wire size	AWG18 (0.75 mm^2)	AWG18 (0.75 mm^2)	AWG16 (1.25 mm^2)	AWG17 (1.25 mm^2)
Maximum conductor resistance	21.8 Ω/km	25.6 Ω/km	15.1 Ω/km	18.6 Ω/km
Tightening torque	1.2 N·m (170 oz-in)		1.2 N·m (170 oz-in)	



memo Ground the Protective Earth Terminal of the motor if the grounding resistance required by the applicable standard of the equipment is not satisfied.

2) Grounding the Protective Earth Terminal of the motor

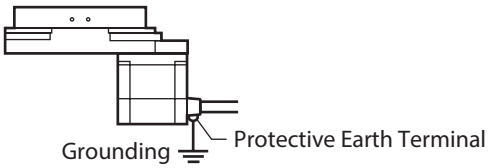
Ground the Protective Earth Terminal of the motor.
Use a round terminal when grounding, and make sure to secure with a screw and washer.
A grounding wire and a crimp terminal are not included.
- Grounding wire: AWG18 (0.75 mm^2) or thicker
- Screw size of Protective Earth Terminal: M4
- Tightening torque: 1.2 N·m (170 oz-in)



■ Actuator equipped with the AR Series, RKII Series

Protective Earth is not required for DC power input type actuators. Ground the functional earth terminal (M4) if necessary.
Ground the Protective Earth Terminal of the motor for AC power input type actuators.
Use a round terminal when grounding, and make sure to secure with a screw and washer.
A grounding wire and a crimp terminal are not included.

- Grounding wire: AWG 18 (0.75 mm^2) or thicker
- Screw size of Protective Earth Terminal: M4
- Tightening torque: 1.2 N·m (170 oz-in)



12-3 Connecting a power supply for electromagnetic brake

When moving the output table of the electromagnetic brake type manually, connect the 24 VDC power supply for electromagnetic brake to release the electromagnetic brake.

memo If a cable for mini Driver is used, the electromagnetic brake cannot be released using a 24 VDC power supply. Refer to the operating manual of the driver for how to release the electromagnetic brake.

■ Specifications of a power supply for electromagnetic brake

Equipped motor	Model	Voltage	Current capacity
AZ Series **AR** Series	**DGM85**, **DGR85**, **DGB85**	24 VDC±5 %*	0.08 A or more
	DGM130, **DGM200**, **DGR130**, **DGB130**		0.25 A or more
AZX Series	**DGM200**	24 VDC±10 %	0.35 A or more

* If the distance between an actuator with an electromagnetic brake and driver is extended to the following length, use a power supply of 24±4 % VDC.
Actuator equipped with the **AZ** Series cable type: 20 m (65.6 ft.)
Actuator equipped with the **AZ** Series connector type: 10 m (32.8 ft.)
Actuator equipped with the **AR** Series: 20 to 30 m (65.6 to 98.4 ft.)

■ Connection method

Note The lead wires of the "cable for electromagnetic brake" have polarities, so connect them in the correct polarities. If the lead wires are connected with their polarities reversed, the electromagnetic brake will not operate properly.

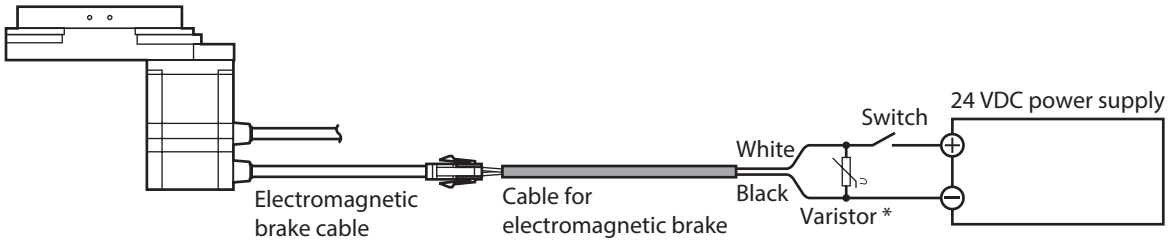
● **Cable type actuator**

1. Connect the electromagnetic brake cable and the cable for electromagnetic brake.
2. Connect the lead wires of the cable for electromagnetic brake to a 24 VDC power supply.
   Connect the white lead wire to the 24 VDC terminal (positive side) and the black lead wire to the ground (GND) terminal (negative side).
3. Turn on the 24 VDC power supply.
   The electromagnetic brake will be released and the output table will be able to move by hand.

● **Connector type actuator**

1. Connect the electromagnetic brake lead wires of the connection cable to a 24 VDC power supply.
   Connect the pink lead wire to the 24 VDC terminal (positive side) and the yellow lead wire to the ground (GND) terminal (negative side).
2. Turn on the 24 VDC power supply.
   The electromagnetic brake will be released and the output table will be able to move by hand.

The figure shows a cable type actuator.



* Be sure to connect the varistor to protect the contact of the switch or to prevent electrical noise.
[Recommended varistor: Z15D121 (SEMITEC Corporation)]

12-4 Connecting a home sensor

Installation method of our home-sensor set and connection example of the driver are explained here.

Note The home-sensor set cannot be used with a **DGM60R** actuator and an actuator equipped with the **AZ** Series motor horizontal mounting.

■ Home-sensor set description

The following parts are used for the home-sensor set.

Model	Home-sensor set model	Sensor output	Photomicrosensor model
DGM60	**PADG-SA**	NPN	EE-SX672A (OMRON Corporation)
DGM85, **DGM130**, **DGM200**	**PADG-SB**		EE-SX673A (OMRON Corporation)
DGM60	**PADG-SAY**	PNP	EE-SX672R (OMRON Corporation)
DGM85, **DGM130**, **DGM200**	**PADG-SBY**		EE-SX673R (OMRON Corporation)

- Photomicrosensor.....1 pc.
- Flexible cable with connector.....1 pc. EE-1010-R (OMRON Corporation) length 2 m (6.6 ft.)
- Sensor mounting bracket.....1 pc.
- Shielded plate.....1 pc.
- Screw (M3, spring washer, plain washer).....2 pcs.
- Hexagonal socket head screw (M2.5).....4 pcs.

■ Installation method

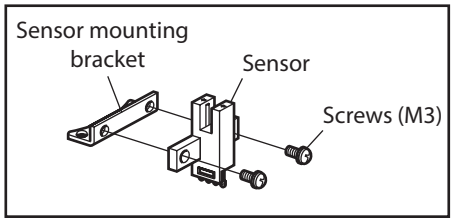
⚠CAUTION Do not install the home-sensor set while the power is being supplied. Doing so may result in injury or damage to equipment.

Note
- Be sure to install the sensor and shielded plate in the direction shown in the figure. Installing them in the wrong direction may disable sensor detection or cause the shielded plate to contact the sensor, resulting in sensor damage.
- When installing the sensor bracket and shielded plate to the actuator, be sure to use the included screws.

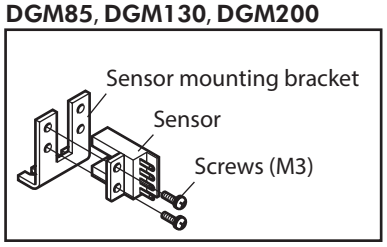
1. Secure the sensor to the sensor bracket using the included screws (M3×2).
   Tightening torque: 0.6 N·m (85 oz-in)

   For the **DGM85**, **DGM130** and **DGM200** types, the screw holes are provided on two places (right and left) of the sensor bracket. The sensor can be installed to either of the screw holes (right or left).
   Install it to the position in which an indicating light can be seen.

DGM60

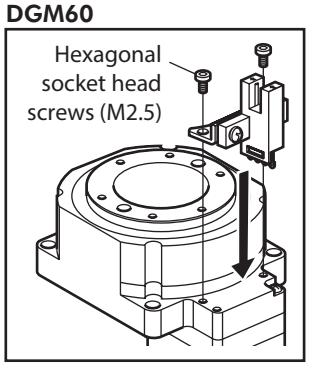


DGM85, **DGM130**, **DGM200**

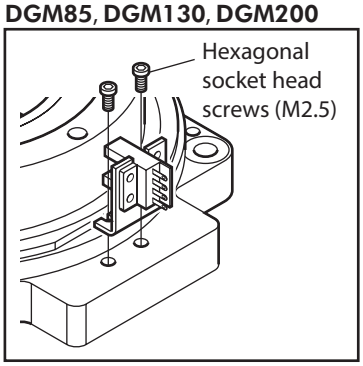


2. Secure the bracket and sensor assembly to the gear-reduction mechanism of the actuator using the included hexagonal socket head screws (M2.5×2).
   Tightening torque: 0.5 N·m (71 oz-in)

DGM60



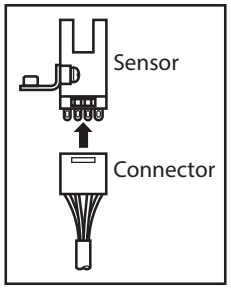
DGM85, **DGM130**, **DGM200**



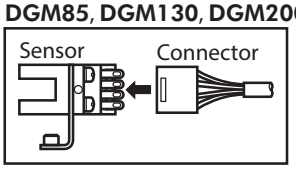
Note Do not use the screw holes (M2.5) for the home sensor of the actuator for any other purpose.

3. Connect the flexible cable with connector to the sensor.

DGM60



DGM85, **DGM130**, **DGM200**



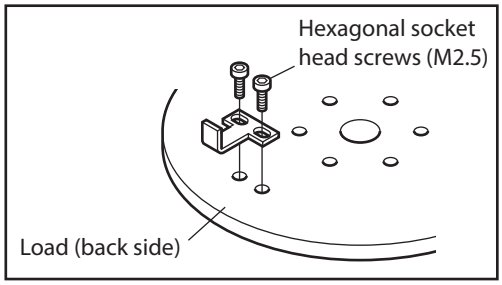
Note
- Do not connect or remove the flexible cable with connector while the power is being supplied. Doing so may cause damage to the sensor.
- Wire the flexible cable in such a way that it will not contact the actuator.

memo When removing the flexible cable with connector, pull out the connector while pressing it firmly from the top and bottom.

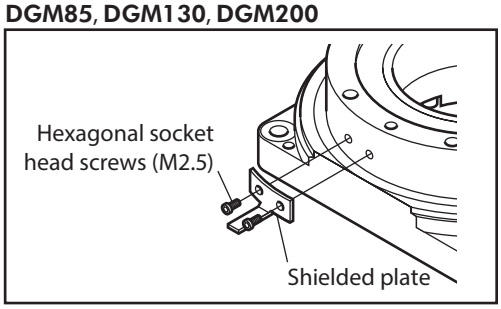
4. Secure the shielded plate using the included hexagonal socket head screws (M2.5×2).
   Tightening torque: 0.5 N·m (71 oz-in)

   For the **DGM60** type, secure the shielded plate to the back side of the load.
   For the **DGM85**, **DGM130** and **DGM200** types, secure the shielded plate to the output table.

DGM60

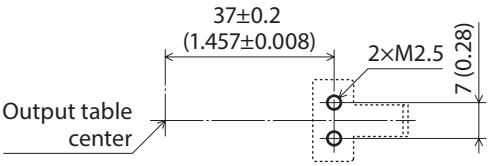


DGM85, **DGM130**, **DGM200**

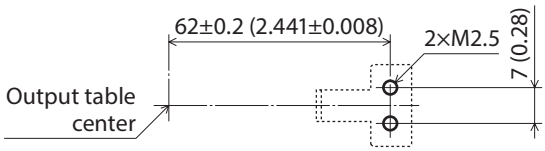


5. In the case of the **DGM60** type, secure the load being attached the shielded plate onto the output table. Machining dimensions of shielded plate for installation (for the **DGM60** type only)

- When providing mounting holes on the table center side [mm (in.)]



- When providing mounting holes on the opposite side of the table center [mm (in.)]



memo

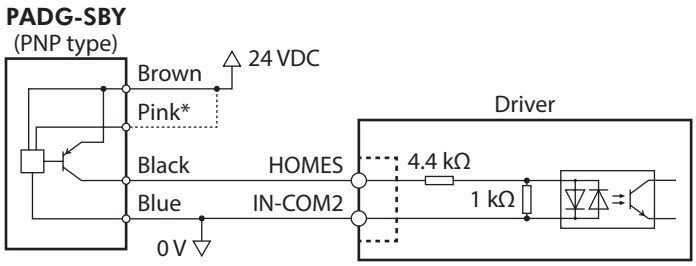
- The photomicrosensor is designed for use inside equipment and therefore has no special means of protection against disturbance light. If the actuator is to be used under an incandescent lamp or in conditions that are subject to disturbances from external light, provide the means to prevent such interference.
- Use the product after checking the sensor is installed securely.
- Place the power cables such as the motor cable or power supply cable as far apart as possible from the sensor cable. If the power cables and sensor cable have to cross, cross them at a right angle.
- To prevent sensor deterioration due to temperature, operate the actuator under the following conditions.
  · Actuators equipped with the **AZ** Series or **AZX** Series:
  Ambient operating temperature 0 to +40 °C (+32 to +104 °F), motor surface temperature 80 °C (176 °F) or lower
  · Actuators equipped with the **AR** Series or **RKII** Series:
  Ambient operating temperature 0 to +40 °C (+32 to +104 °F), motor surface temperature 90 °C (194 °F) or lower
- Adhesion of dust on the sensor may cause actuator malfunction. Clean and/or replace the sensor regularly.
- Use a common GND for the sensor power and user's controller power. Any difference in GND potential will result in a sensor malfunction.

■ Connection example

The connection example is shown based on the following conditions.

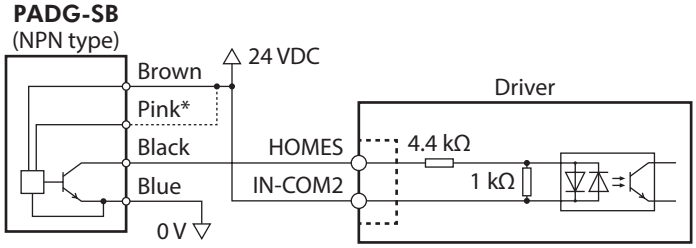
- Return-to-home mode: 3-sensor mode
- HOMES output logic: Normally open
- Driver: **AR** Series Built-in Controller Type

● **Home-sensor set PADG-SBY (PNP type)**



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

● **Home-sensor set PADG-SB (NPN type)**



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

13 Maintenance

13-1 Inspection

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

■ Inspection interval

If the actuator 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	Inspection	Cleaning
When operated for the first time	○	–
Six months after initial operation	○	–
Every six months thereafter	○	–
As needed	–	○

■ Inspection item

- Check if any of the screws having installed the actuator is loose.
- Check if any of the screws having installed a load is loose.
- Check if a damage or stress is applied on the cable.
- Check if the connection part between the actuator and driver is loose.
- Check if an unusual noise or vibration is generated from a bearing part (ball bearings).
- For the connector type actuator, check to see if the locking lever of the connection cable is damaged.
- For the connector type actuator, check to see if the locking lever of the connection cable is come off.

■ 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.

13-2 Warranty

Check on the Oriental Motor Website for the product warranty.

13-3 Disposal

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

14 Regulations and standards

14-1 Actuators equipped with the AZ Series

■ Motor models that comply with regulations and standards

For the actuators, the motor models shown in the table below comply with regulations and standards. The motor model can be checked by the "Motor P/N" on the nameplate.

- The box (●) in the actuator model indicates the gear ratio.
- The box (■) in the actuator model indicates an alphabet representing the cable outlet direction or the connector direction.

● **AC power input type**

Actuator model	Motor model that comply with regulations and standards (Motor P/N)
DGM85R-AZAC	AZM46AC-D
DGM85R-AZMC	AZM46MC-D
DGM130R-AZAC■	AZM66AC-D
DGM130R-AZMC■	AZM66MC-D
DGM200R-AZAC■	AZM911AC-D
DGM200R-AZMC■	AZM911MC-D
DGR85R●-AZACH■	AZM46ACH-DB
DGR85R●-AZMCH■	AZM46MCH-DB
DGR130R●-AZACH■	AZM66ACH-DB
DGR130R●-AZMCH■	AZM66MCH-DB
DGB85R●-AZAC■	AZM46AC-DB
DGB85R●-AZMC■	AZM46MC-DB
DGB130R●-AZAC■	AZM66AC-DB
DGB130R●-AZMC■	AZM66MC-DB

● **DC power input type**

Actuator model	Motor model that comply with regulations and standards (Motor P/N)
DGM60-AZAK DGM60R-AZAK	AZM24AK-D
DGM85R-AZAK	AZM46AK-D
DGM85R-AZMK	AZM46MK-D
DGM130R-AZAK■	AZM66AK-D
DGM130R-AZMK■	AZM66MK-D
DGR60R30-AZAK■	AZM24AK-D
DGR85R●-AZAKH■	AZM46AKH-DB
DGR130R●-AZAKH■	AZM66AKH-DB
DGB85R●-AZAK■	AZM46AK-DB
DGB130R●-AZAK■	AZM66AK-DB

■ UL Standards, CSA Standards

For recognition information about standards, refer to the "APPENDIX UL Standards."

■ CE Marking / UKCA Marking

● **EU Low Voltage Directive / UK Electrical Equipment (Safety) Regulation**

The AC input type motor is affixed with the marks under the EU Low Voltage Directive / UK Electrical Equipment (Safety) Regulations.

● **EU EMC Directive / UK EMC Regulation**

The EMC test is conducted in a state where the actuator is connected to the driver.
The driver that is combined with the actuator complies with the EMC Directive/Regulations. Refer to the operating manual of the driver for details.

● **EU RoHS Directive / UK RoHS Regulation**

This product does not contain the substances exceeding the restriction values.

14-2 Actuators equipped with the AZX Series

■ Motor models that comply with regulations and standards

For the actuators, the motor models shown in the table below comply with regulations and standards. The motor model can be checked by the "Motor P/N" on the nameplate.

Actuator model	Motor model that comply with regulations and standards (Motor P/N)
DGM200R18-AZXAC	**AZXM960AC-D**
DGM200R18-AZXMC	**AZXM960MC-D**

■ UL Standards, CSA Standards

For recognition information about standards, refer to the "APPENDIX UL Standards."

■ CE Marking / UKCA Marking

- **EU Low Voltage Directive / UK Electrical Equipment (Safety) Regulation**

  The AC input type motor is affixed with the marks under the EU Low Voltage Directive / UK Electrical Equipment (Safety) Regulations.

- **EU EMC Directive / UK EMC Regulation**

  The EMC test is conducted in a state where the actuator is connected to the driver.
  The driver that is combined with the actuator complies with the EMC Directive/Regulations.Refer to the OPERATING MANUAL Hardware Edition for details.

- **EU RoHS Directive / UK RoHS Regulation**

  This product does not contain the substances exceeding the restriction values.

14-3 Actuators equipped with the AR Series, RKII Series

■ Motor models that comply with regulations and standards(Equipped with the AR Series)

For the actuators, the motor models shown in the table below comply with regulations and standards. The motor model can be checked by the "Motor P/N" on the nameplate.

- **AC power input type**

Actuator model	Motor model that comply with regulations and standards (Motor P/N)
DGM85R-ARAC	**ARM46AC-D**
DGM85R-ARBC	**ARM46BC-D**
DGM130R-ARAC	**ARM66AC-D**
DGM130R-ARBC	**ARM66BC-D**
DGM130R-ARMC	**ARM66MC-D**
DGM200R-ARAC	**ARM911AC-D**
DGM200R-ARBC	**ARM911BC-D**
DGM200R-ARMC	**ARM911MC-D**

- **DC power input type**

Actuator model	Motor model that comply with regulations and standards (Motor P/N)
DGM60-ARAK	**ARM24SAK-D**
DGM60-ARBK	**ARM24SBK-D**

■ UL Standards, CSA Standards

For recognition information about standards, refer to the "APPENDIX UL Standards."

■ CE Marking

- **Low Voltage Directive**

  The AC input type motor is affixed with the CE Marking under the Low Voltage Directive.

- **EMC Directive**

  The EMC test is conducted in a state where the actuator is connected to the driver.
  The driver that is combined with the actuator complies with the EMC Directive. Refer to the operating manual of the driver for details.

- **RoHS Directive**

  This product does not contain the substances exceeding the restriction values.

15 Specifications

15-1 General specifications

Check on the Oriental Motor Website for the product specifications.

■ Installation conditions

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

Item	Type of equipped motor				
	AZ Series, **RKII** Series		**AZX** Series	**AR** Series	
Input power supply	DC	AC	AC	DC	AC
Overvoltage category	I	II	II	I	II
Protection against electric shock	Class III equipment	Class I equipment	Class I equipment	Class III equipment	Class I equipment
Pollution degree	2				
Degree of protection	IP40 (IP20 for the motor connector of the cable type actuator)			IP40 [IP20 for the standard (double shaft) and motor connector]	

■ Environmental conditions

	Operating environment	Storage environment Shipping environment
Ambient temperature	• Actuators equipped with the **AZ** Series, **AZX** Series 0 to +40 °C (+32 to +104 °F) (Non-freezing) • Actuators equipped with the **AR** Series, **RKII** Series When the home sensor is not used: 0 to +50 °C (+32 to 122 °F) (Non-freezing) When the home sensor is used: 0 to +40 °C (+32 to +104 °F) (Non-freezing)	–20 to +60 °C (–4 to +140 °F) (Non-freezing)
Ambient humidity	85 % or less (Non-condensing)	
Altitude	Up to 1,000 m (3,300 ft.) above sea level	Up to 3,000 m (10,000 ft.) above sea level

16 Accessories

■ Home-sensor set

Home-sensor set model	Applicable product	Sensor output
PADG-SA	**DGM60**	NPN
PADG-SB	**DGM85**, **DGM130**, **DGM200**	
PADG-SAY	**DGM60**	PNP
PADG-SBY	**DGM85**, **DGM130**, **DGM200**	

Note The home-sensor set cannot be used with a **DGM60R** actuator and an actuator equipped with the **AZ** Series motor horizontal mounting.

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

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