

## Brushless Motor

# BLM Motor Connector Type for JH Gearhead/ JB Gearhead/ JV Gearhead

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## OPERATING MANUAL

Thank you for purchasing an Oriental Motor product.

This Operating Manual describes product handling procedures and safety precautions.

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

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# 1 Introduction

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## ■ Before using the motor

Only qualified personnel should work with the product. Use the product correctly after thoroughly reading the section "Safety precautions." In addition, be sure to observe the contents described in warning, caution, and note in this manual.

The product described in this manual has been designed and manufactured to be incorporated in general industrial equipment. Do not use for any other purpose.

Oriental Motor Co., Ltd. is not responsible for any damage caused through failure to observe this warning.

## ■ Related operating manuals

Operating manuals are not included with the product. Download from Oriental Motor Website Download Page or contact your nearest Oriental Motor sales office.

|        | Operating manual name   |
|--------|---|
| Motor  | <b>BLM</b> Motor Connector Type for <b>JH</b> Gearhead/ <b>JB</b> Gearhead/ <b>JV</b> Gearhead OPERATING MANUAL (this document) |
| Driver | <b>BMU</b> Series OPERATING MANUAL  |
|        | <b>BLE2</b> Series OPERATING MANUAL   |

Refer to the operating manuals of the speed controller for details about connections and operations.

Search for an operating manual by the model name shown on the nameplate.

## 2 Safety precautions

The precautions described below are intended to prevent danger or injury to the user and other personnel through safe, correct use of the product.

Please read and understand these precautions thoroughly before using the product.

|  |  |
|--|--|
|  <b>WARNING</b> | Handling the product without observing the instructions that accompany a "WARNING" symbol may result in serious injury or death.     |
|  <b>CAUTION</b> | Handling the product without observing the instructions that accompany a "CAUTION" symbol may result in injury or property damage.   |
|                 | The items under this heading contain important handling instructions that the user should observe to ensure safe use of the product. |
|                 | The items under this heading contain related information and contents to gain a further understanding of the text in this manual.    |

### Description of graphic symbols

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

|  <b>WARNING</b> |  |
|---|--|
|                | <ul style="list-style-type: none"> <li>• Do not use the product in explosive or corrosive environments, in the presence of flammable gases or near combustibles. Doing so may result in fire, electric shock or injury.</li> <li>• Do not transport, install the product, perform connections or inspections when the power is on. Always turn the power off before carrying out these operations. Failure to do so may result in electric shock or equipment damage.</li> <li>• Do not use a motor in a vertical application. If the driver protective function is activated, the motor will stop and the moving part of the equipment may drop. This may cause injury or damage to equipment.</li> <li>• Do not machine or modify the connection cable. Doing so may result in fire, electric shock or damage to equipment.</li> <li>• Do not apply any excessive force to the motor connector. Doing so may result in fire, electric shock or damage to equipment.</li> <li>• Do not forcibly bend, pull or pinch the cables. Doing so may result in fire, electric shock or damage to equipment.</li> <li>• Do not remove the connector cap until the connection cable is connected so that the O-ring of the connector for cable connection on the motor is not damaged. Doing so may result in fire, electric shock or damage to equipment.</li> <li>• Do not touch the motor or driver when conducting insulation resistance measurement or dielectric strength test. Accidental contact may result in electric shock.</li> <li>• Do not disassemble or modify the motor and gearhead. Doing so may result in electric shock, injury or damage to equipment. Refer all such internal inspections and repairs to the branch or sales office from which you purchased the product.</li> </ul> |
|                | <ul style="list-style-type: none"> <li>• Only qualified and educated personnel should be allowed to perform installation, connection, operation and inspection/troubleshooting of the product. Handling by unqualified and uneducated personnel may result in fire, electric shock, injury or equipment damage.</li> <li>• A motor and gearhead are heavy in weight. When transporting or installing, make sure two persons work together to carry out the necessary tasks. Failure to do so may cause injury.</li> <li>• The motor is Class I equipment. When installing the motor and driver, ground their Protective Earth Terminals. Failure to do so may result in electric shock.</li> <li>• Use a motor, gearhead, and driver only in the specified combination. An incorrect combination may result in fire, electric shock or damage to equipment.</li> <li>• Always turn off the power before performing maintenance/inspection. Failure to do so may result in electric shock.</li> </ul>   |

|  <b>CAUTION</b> |  |
|--|--|
|                 | <ul style="list-style-type: none"> <li>• Do not use the motor and gearhead beyond the specifications. Doing so may result in fire, electric shock, injury or damage to equipment.</li> <li>• Do not touch the motor and gearhead while operating or immediately after stopping. The surfaces of the motor and gearhead are hot, and it may cause a skin burn(s).</li> <li>• Do not leave anything around the motor that would obstruct ventilation. Doing so may result in damage to equipment.</li> <li>• Do not carry the product by holding the output shaft for the motor and gearhead or any of the cables. Doing so may result in injury.</li> <li>• Do not touch the output shaft (end of shaft) for the motor and gearhead with bare hands. Doing so may result in injury.</li> <li>• When assembling the motor with the gearhead, exercise caution not to pinch your fingers or other parts of your body between the motor and gearhead. Injury may result.</li> <li>• When installing the motor and gearhead in equipment, exercise caution not to pinch your fingers or other parts of your body between the product and equipment. Injury may result.</li> <li>• Do not touch the rotating part (output shaft) when operating the motor. Doing so may result in injury.</li> <li>• Do not step on the motor and gearhead or hang from them. Doing so may result in injury or damage to equipment.</li> </ul>                 |
|                 | <ul style="list-style-type: none"> <li>• Securely install the motor and gearhead to the mounting plate. Inappropriate installation may cause the motor and gearhead to detach and fall, resulting in injury or equipment damage.</li> <li>• Provide a cover over the rotating part (output shaft). Failure to do so may cause injury.</li> <li>• Securely install a load on the output shaft. Failure to do so may cause injury.</li> <li>• When installing a load on the output shaft, make sure the alignment of shafts, the tension of belts, and the parallelism of pulleys. Also, securely tighten the clamping screws for pulleys and couplings before operation. Failure to do so may cause injury or damage to equipment due to broken parts.</li> <li>• Be sure to ground the motor and driver to prevent them from being damaged by static electricity. Failure to do so may result in fire or damage to equipment.</li> <li>• The motor surface temperature may exceed 70 °C (158 °F) even under normal operating conditions. If the operator is allowed to approach a running motor, attach a warning label as shown in the figure in a conspicuous position. Failure to do so may result in skin burn(s).</li> </ul> <div style="text-align: right; margin-top: 10px;"> <br/>                     Warning label                 </div> |

# 3 Precautions for use

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

**Be sure to match the motor output power with the driver output power.**

## ■ Wiring

### ● Connecting the motor and driver

To connect the motor and driver, always use the dedicated connection cable (sold separately).

Limit the number of times so that attaching/detaching between the connection cable and the motor or driver will not exceed 100 times.

### ● Connection cable

Do not apply a strong force on the locking lever of the connector for motor connection. Applying a strong force on the locking lever may cause damage.

Refer to p.18 for details.

## ■ Installation circumstances

### ● Grease measures

On rare occasions, grease may ooze out from the gearhead. 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. Grease leakage may lead to problems in the customer's equipment or products.

### ● Note when using in low temperature environment

When an ambient temperature is low, since the load torque may increase by the oil seal or viscosity increment of grease used in the gearhead, the output torque may decrease or an overload alarm may generate. However, as time passes, the oil seal or grease is warmed up, and the motor can be driven without generating an overload alarm.

## ■ Insulation resistance measurement and dielectric strength test

### ● Do not conduct the insulation resistance measurement or dielectric strength test with the motor and driver connected

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

## ■ Operations

### ● Instantaneous bidirectional operation

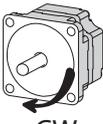
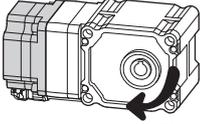
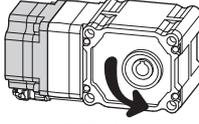
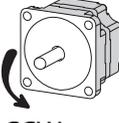
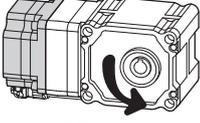
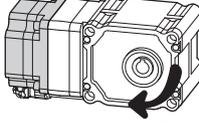
Do not perform instantaneous bidirectional operation when a **BLM** motor of 300 W or 400 W is operated using the **BLE2** Series driver. Doing so may cause damage to the product.

### ● Rotation direction of the gearhead output shaft

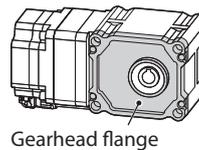
The rotation direction of the gearhead output shaft with respect to the motor output shaft is shown in the figure below. Check the operating manual of the driver for the rotation direction of the motor output shaft and the setting method.

#### Right Angle Hollow Shaft Hypoid JH Gearhead

The figure shows the rotation direction viewed from the gearhead flange surface.

| Motor output shaft   | Gearhead output shaft  |  |
|--|--|--|
|  | Gear ratio: 5 to 50  | Gear ratio: 100, 200   |
| <br>CW  | <br>CW  | <br>CCW |
| <br>CCW | <br>CCW | <br>CW  |

When viewing from the opposite side of the gearhead flange side, the gearhead output shaft rotates in the opposite direction to the above figure.



#### Foot Mount Gearhead JB Gearhead, Parallel Shaft Gearhead JV Gearhead

The figure shows the foot mount gearhead. The parallel shaft gearhead also rotates in the same direction.

| Motor output shaft   | Gearhead output shaft  |  |
|--|--|--|
|  | Gear ratio: 5 to 30<br>300 to 1200   | Gear ratio: 50 to 200  |
| <br>CW  | <br>CW  | <br>CCW |
| <br>CCW | <br>CCW | <br>CW  |

## ■ About rotation speed and gear ratio

- **Maximum rotation speed 3600 r/min**

Use the motor in conditions where the motor rotation speed is 3600 r/min or lower.

- **Gear ratio and actual reduction ratio**

The gear ratio in the model name differs from the actual reduction ratio of the gearhead. Check the actual reduction ratio in the table below.

### Right Angle Hollow Shaft Hypoid JH Gearhead

#### For 60 W, 120 W

| Gear ratio             | 10    | 15    | 20    | 30    | 50    | 100   | 200   |
|------------------------|-------|-------|-------|-------|-------|-------|-------|
| Actual reduction ratio | 10.25 | 15.38 | 20.50 | 30.75 | 51.25 | 102.5 | 205.0 |

#### For 200 W or higher

| Gear ratio             | 5 | 10 | 15 | 20 | 30 | 50 | 100   | 200 |
|------------------------|---|----|----|----|----|----|-------|-----|
| Actual reduction ratio | 5 | 10 | 15 | 20 | 30 | 50 | 98.95 | 200 |

### Foot Mount Gearhead JB Gearhead, Parallel Shaft Gearhead JV Gearhead

| Gear ratio             | 5    | 10    | 20    | 30    | 50    | 100   | 200   | 300   | 450   | 600   | 1200 |
|------------------------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| Actual reduction ratio | 4.97 | 10.12 | 20.08 | 30.86 | 49.09 | 104.1 | 196.4 | 300.5 | 450.8 | 588.9 | 1178 |

# 4 Preparation

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## 4.1 Checking the product

Verify that the items listed below are included.

Report any missing or damaged items to the branch or sales office from which you purchased the product.

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

### ■ Motor

- Motor (with key) .....1 unit
- Instructions and Precautions for Safe Use.....1 copy

| Output power | Motor model       |
|--------------|-------------------|
| 60 W         | <b>BLM460SHPK</b> |
| 120 W        | <b>BLM5120HPK</b> |
| 200 W        | <b>BLM5200HPK</b> |
| 300 W        | <b>BLM5300HPK</b> |
| 400 W        | <b>BLM5400HPK</b> |

### ■ Gearhead (sold separately)

#### ● Right Angle Hollow Shaft Hypoid JH Gearhead

- Gearhead.....1 unit
- Safety cover.....1 piece
- Mounting screw.....1 set  
Hexagonal socket head screw, plain washer, spring washer: 4 pieces each  
Parallel key: 1 piece
- Screw for motor assembly .....1 set  
Hexagonal socket head screw: 4 pieces

#### ● Foot Mount Gearhead JB Gearhead

- Gearhead.....1 unit
- Parallel key.....1 piece (fixed to the gearhead output shaft)
- Screw for motor assembly .....1 set  
Hexagonal socket head screw: 4 pieces

#### ● Parallel Shaft Gearhead JV Gearhead

- Gearhead.....1 unit
- Parallel key.....1 piece (fixed to the gearhead output shaft)
- Screw for motor assembly .....1 set  
Hexagonal socket head screw: 4 pieces

## 4.2 Combination tables

Products with which the motors can be combined are listed below.

### ■ Right Angle Hollow Shaft Hypoid JH Gearhead

| Output power | Motor model       | Applicable gearhead model |   | Applicable driver model          |                                  |                                 |
|--------------|-------------------|---------------------------|---|----------------------------------|----------------------------------|---------------------------------|
|              |                   | Model                     | □: Gear ratio                           | Single-phase<br>100-120 VAC      | Single-phase<br>200-240 VAC      | Three-phase<br>200-240 VAC      |
| 60 W         | <b>BLM460SHPK</b> | <b>4H□S</b>               | <b>10, 15, 20, 30, 50,<br/>100, 200</b> | <b>BMUD60-A2<br/>BLE2D60-A</b>   | <b>BMUD60-C2<br/>BLE2D60-C</b>   |                                 |
| 120 W        | <b>BLM5120HPK</b> | <b>5H□S</b>               | <b>10, 15, 20, 30, 50,<br/>100, 200</b> | <b>BMUD120-A2<br/>BLE2D120-A</b> | <b>BMUD120-C2<br/>BLE2D120-C</b> |                                 |
| 200 W        | <b>BLM5200HPK</b> | <b>5XH□S</b>              | <b>5, 10, 15, 20, 30, 50</b>            | <b>BMUD200-A<br/>BLE2D200-A</b>  | <b>BMUD200-C<br/>BLE2D200-C</b>  |                                 |
|              |                   | <b>5YH□S</b>              | <b>100, 200</b>                         |                                  |                                  |                                 |
| 300 W        | <b>BLM5300HPK</b> | <b>5XH□S</b>              | <b>5, 10, 15, 20, 30, 50</b>            | -                                | <b>BMUD300-C<br/>BLE2D300-C</b>  |                                 |
|              |                   | <b>5YH□S</b>              | <b>100, 200</b>                         |                                  |                                  |                                 |
| 400 W        | <b>BLM5400HPK</b> | <b>5XH□S</b>              | <b>5, 10, 15, 20, 30, 50</b>            | -                                | <b>BMUD400-C<br/>BLE2D400-C</b>  | <b>BMUD400-S<br/>BLE2D400-S</b> |
|              |                   | <b>5YH□S</b>              | <b>100, 200</b>                         |                                  |                                  |                                 |

### ■ Foot Mount Gearhead JB Gearhead

| Output power | Motor model       | Applicable gearhead model |                  | Applicable driver model         |                                 |                                 |
|--------------|-------------------|---------------------------|------------------|---------------------------------|---------------------------------|---------------------------------|
|              |                   | Model                     | □: Gear ratio    | Single-phase<br>100-120 VAC     | Single-phase<br>200-240 VAC     | Three-phase<br>200-240 VAC      |
| 200 W        | <b>BLM5200HPK</b> | <b>5AB□B</b>              | <b>5, 10, 20</b> | <b>BMUD200-A<br/>BLE2D200-A</b> | <b>BMUD200-C<br/>BLE2D200-C</b> |                                 |
|              |                   | <b>5CB□B</b>              | <b>30, 50</b>    |                                 |                                 |                                 |
|              |                   | <b>5EB□B</b>              | <b>100, 200</b>  |                                 |                                 |                                 |
|              |                   | <b>5KB□B</b>              | <b>300, 450</b>  |                                 |                                 |                                 |
|              |                   | <b>5SB□B</b>              | <b>600, 1200</b> |                                 |                                 |                                 |
| 300 W        | <b>BLM5300HPK</b> | <b>5AB□B</b>              | <b>5, 10, 20</b> | -                               | <b>BMUD300-C<br/>BLE2D300-C</b> |                                 |
|              |                   | <b>5CB□B</b>              | <b>30, 50</b>    |                                 |                                 |                                 |
|              |                   | <b>5EB□B</b>              | <b>100, 200</b>  |                                 |                                 |                                 |
|              |                   | <b>5KB□B</b>              | <b>300, 450</b>  |                                 |                                 |                                 |
|              |                   | <b>5SB□B</b>              | <b>600</b>       |                                 |                                 |                                 |
| 400 W        | <b>BLM5400HPK</b> | <b>5AB□B</b>              | <b>5, 10, 20</b> | -                               | <b>BMUD400-C<br/>BLE2D400-C</b> | <b>BMUD400-S<br/>BLE2D400-S</b> |
|              |                   | <b>5CB□B</b>              | <b>30, 50</b>    |                                 |                                 |                                 |
|              |                   | <b>5EB□B</b>              | <b>100, 200</b>  |                                 |                                 |                                 |
|              |                   | <b>5KB□B</b>              | <b>300, 450</b>  |                                 |                                 |                                 |
|              |                   | <b>5SB□B</b>              | <b>600</b>       |                                 |                                 |                                 |

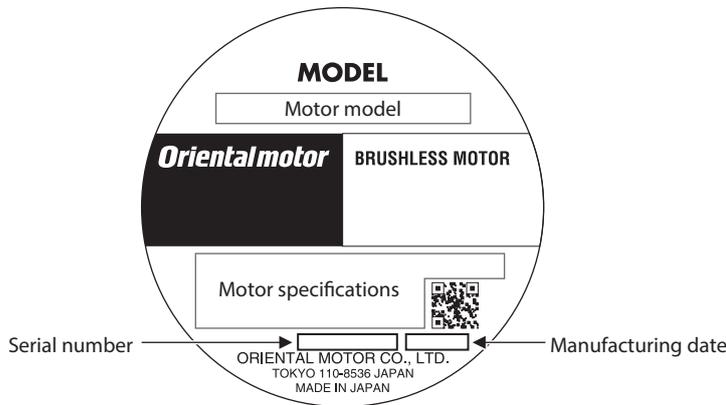
### ■ Parallel Shaft Gearhead JV Gearhead

| Output power | Motor model       | Applicable gearhead model |                 | Applicable driver model         |                                 |                                 |
|--------------|-------------------|---------------------------|-----------------|---------------------------------|---------------------------------|---------------------------------|
|              |                   | Model                     | □: Gear ratio   | Single-phase<br>100-120 VAC     | Single-phase<br>200-240 VAC     | Three-phase<br>200-240 VAC      |
| 200 W        | <b>BLM5200HPK</b> | <b>5KV□S</b>              | <b>300, 450</b> | <b>BMUD200-A<br/>BLE2D200-A</b> | <b>BMUD200-C<br/>BLE2D200-C</b> |                                 |
| 300 W        | <b>BLM5300HPK</b> | <b>5DV□S</b>              | <b>200</b>      | -                               | <b>BMUD300-C<br/>BLE2D300-C</b> |                                 |
|              |                   | <b>5KV□S</b>              | <b>300, 450</b> |                                 |                                 |                                 |
| 400 W        | <b>BLM5400HPK</b> | <b>5DV□S</b>              | <b>100, 200</b> | -                               | <b>BMUD400-C<br/>BLE2D400-C</b> | <b>BMUD400-S<br/>BLE2D400-S</b> |
|              |                   | <b>5KV□S</b>              | <b>300, 450</b> |                                 |                                 |                                 |

### 4.3 Information about nameplate

The figure shows an example.

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



### 4.4 Connection cable/flexible connection cable (sold separately)

To connect the motor and driver, the dedicated connection cable (sold separately) is needed. The connection cables are provided up to 20 m (65.6 ft.). The cable length that can be connected varies depending on the driver used. Check the operating manual of the driver.

Product number code

**CC 010 KH BL R F**  
 1      2      3      4      5      6

|   |                         |                                     |  |                             |                              |                             |                             |
|---|-------------------------|-------------------------------------|--|-----------------------------|------------------------------|-----------------------------|-----------------------------|
| 1 | Cable type              | <b>CC:</b> Connection cable         |  |                             |                              |                             |                             |
| 2 | Cable length*           | <b>005:</b> 0.5 m (1.6 ft.)         | <b>010:</b> 1 m (3.3 ft.)                    | <b>015:</b> 1.5 m (4.9 ft.) | <b>020:</b> 2 m (6.6 ft.)    | <b>025:</b> 2.5 m (8.2 ft.) | <b>030:</b> 3 m (9.8 ft.)   |
|   |                         | <b>040:</b> 4 m (13.1 ft.)          | <b>050:</b> 5 m (16.4 ft.)                   | <b>070:</b> 7 m (23.0 ft.)  | <b>100:</b> 10 m (32.8 ft.)  | <b>150:</b> 15 m (49.2 ft.) | <b>200:</b> 20 m (65.6 ft.) |
| 3 | Motor connection method | <b>KH:</b> Metal connector          |  |                             |                              |                             |                             |
| 4 | Applicable model        | <b>BL:</b> Brushless motor          |  |                             |                              |                             |                             |
| 5 | Blank: Connection cable | <b>R:</b> Flexible connection cable |  |                             |                              |                             |                             |
| 6 | Cable outlet direction  | <b>F:</b> Output shaft direction    | <b>B:</b> Opposite to output shaft direction |                             | <b>V:</b> Vertical direction |                             |                             |
|   |                         |                                     |  |                             |                              |                             |                             |

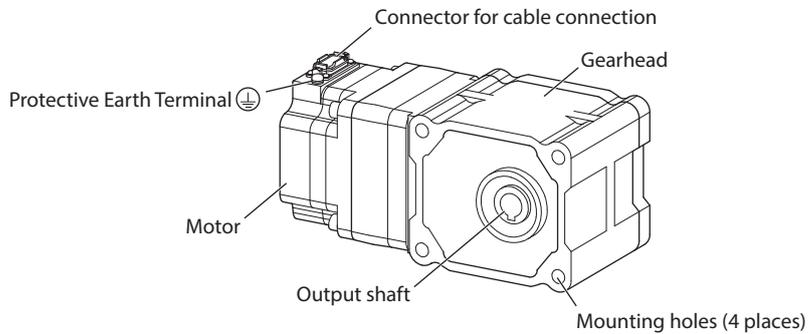
\* Cable length 0.5 m (1.6 ft.) is connection cable only

## 4.5 Names of parts

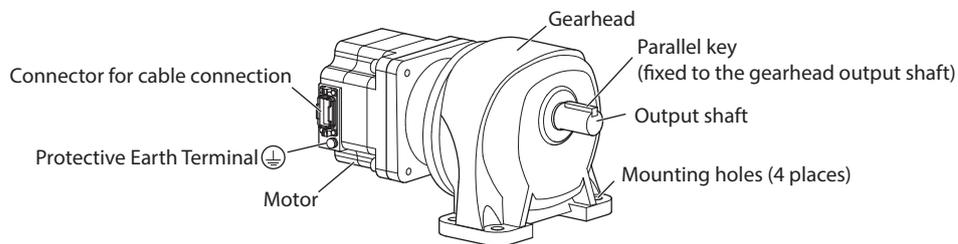
### ■ Motor

The figure shows the gearhead pre-assembled.

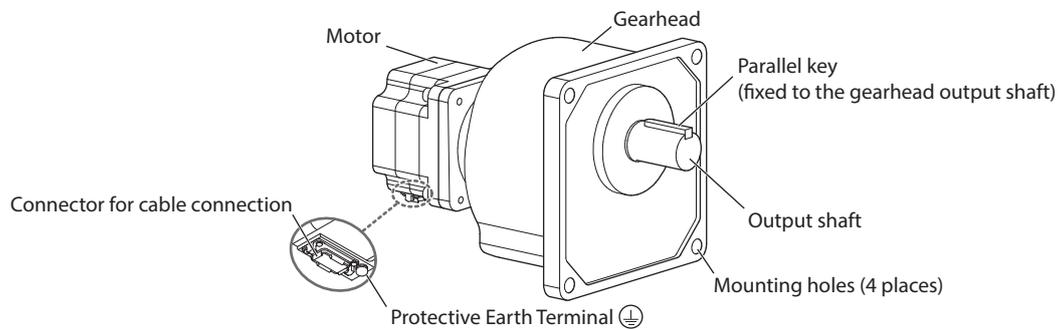
#### ● Right Angle Hollow Shaft Hypoid JH Gearhead



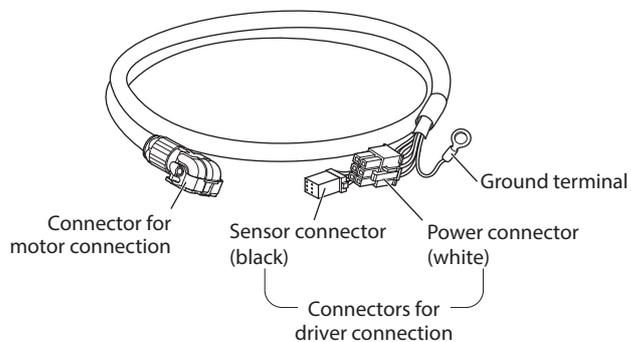
#### ● Foot Mount Gearhead JB Gearhead



#### ● Parallel Shaft Gearhead JV Gearhead



### ■ Connection cable/flexible connection cable (sold separately)



# 5 Installation

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This section explains the installation method of a load in addition to the installation location and installation method of the product.

## 5.1 Installation location

Install the product in a well-ventilated location that provides easy access for inspection.

### [Common conditions]

- Indoors
- Operating ambient temperature: 0 to +40 °C (+32 to +104 °F) (non-freezing)
- Operating ambient humidity: 85% or less (non-condensing)
- Area that is free of explosive atmosphere or toxic gas (such as sulfuric gas) or liquid
- Area not exposed to direct sun
- Area free of excessive amount of dust, iron particles or the like
- Area 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
- Altitude Up to 1000 m (3300 ft.) above sea level

### [Right Angle Hollow Shaft Hypoid JH Gearhead, Parallel Shaft Gearhead JV Gearhead]

- Area not subject to oil (oil droplets) or chemicals  
The motor can be used in an environment that is splashed with water (excluding the part of the connector for driver connection).  
However, do not use it underwater or under high water-pressure.

### [Foot Mount Gearhead JB Gearhead]

- Area not subject to splashing water (rain, water droplets), oil (oil droplets) or other liquids

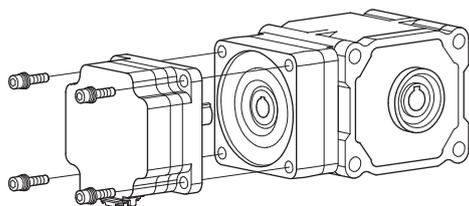
## 5.2 Installation method

The installation method varies depending on the type of gearhead.

### ■ Right Angle Hollow Shaft Hypoid JH Gearhead

#### ● Assembling the gearhead to the motor

1. Check the key is fitted to the motor output shaft before assembling the gearhead to the motor.  
When assembling, apply anti-seizing agent such as molybdenum disulfide grease on the surface of the motor shaft and on the bore of the motor shaft input part in the gearhead.
2. Check that there is no gap between the motor and gearhead, and tighten them with hexagonal socket head screws (4 pieces).



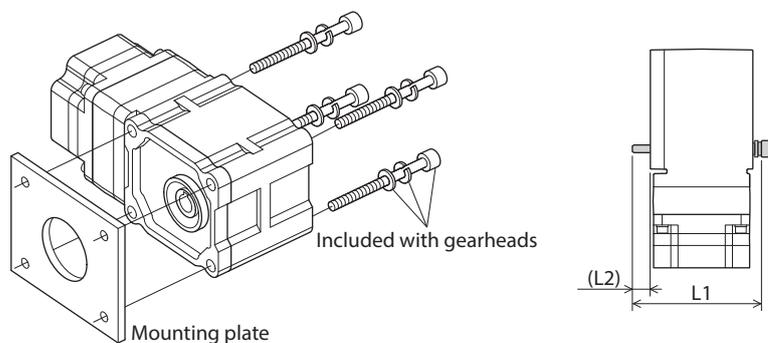
| Output power    | Screw size | Material        | Tightening torque [N-m (lb-in)] |
|-----------------|------------|-----------------|---------------------------------|
| 60 W            | M5         | Stainless steel | 3 (26)                          |
| 200 W or higher | M6         |                 | 5 (44)                          |



- Do not forcibly assemble the motor and gearhead. The motor output shaft or the gearhead input part may be damaged, resulting in noise or shorter service life.
- Do not allow dust to attach to the pilot sections of the motor and gearhead. Also, assemble the motor and gearhead carefully by not pinching the O-ring at the motor pilot section. Pinching the O-ring may cause to infiltrate foreign objects such as water into the product.

#### ● Installing to mounting plate

Secure the motor through four mounting holes using the gearhead included mounting screw set. Do not leave a gap between the motor and mounting plate.



| Output power    | Gear ratio       | Hexagonal socket head screw |                 |               | L2 [mm (in.)] | Tightening torque [N-m (lb-in)] |
|-----------------|------------------|-----------------------------|-----------------|---------------|---------------|---------------------------------|
|                 |                  | Screw size                  | Material        | L1 [mm (in.)] |               |                                 |
| 60 W            | <b>10 to 200</b> | M6                          | Stainless steel | 95 (3.74)     | 11 (0.43)     | 5 (44)                          |
| 120 W           | <b>10 to 200</b> | M8                          |                 | 110 (4.33)    | 10 (0.39)     | 12 (106)                        |
| 200 W or higher | <b>5 to 50</b>   | M8                          |                 | 120 (4.72)    | 16 (0.63)     | 12 (106)                        |
|                 | <b>100, 200</b>  | M10                         |                 | 130 (5.12)    | 19.5 (0.77)   | 24 (210)                        |



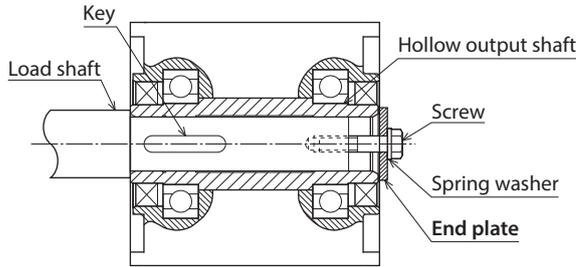
When the motor is installed to equipment using the mounting surface of the gearhead, proper alignment between the hollow shaft inside dimension and the load shaft is necessary. Keep the alignment tolerance within 0.02 mm (0.0008 in.). Insufficient alignment may result in damage to the gearhead internal bearings.

● **Installing a load**

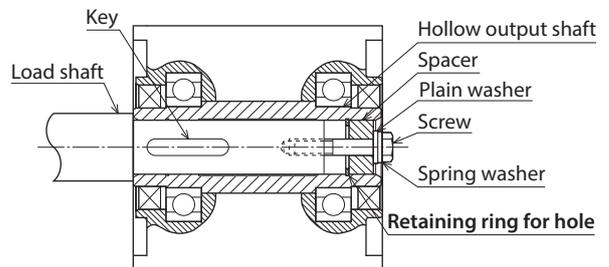
Mounting method of the load varies depending on the load shaft conditions. See the following figures. The hollow output shaft inside dimension is processed to a tolerance of H8, and incorporates a key slot for load shaft attachment. A load shaft tolerance of h7 is recommended. Also, apply anti-seizing agent such as molybdenum disulfide grease on the surface of the load shaft and the bore of the hollow output shaft. A load can be installed to the hollow output shaft from either right face or left face in the following figure.

**Stepped load shaft**

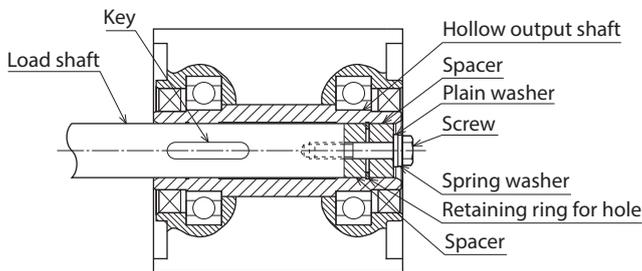
● Mounting method using end plate



● Mounting method using retaining ring



**Non-stepped load shaft**



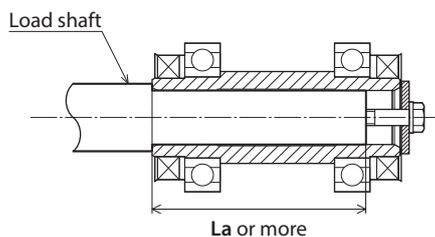
**Note** Do not apply excessive or abrupt force to the hollow output shaft when inserting a load shaft into the hollow output shaft. Excessive or abrupt force may cause damage to the gearhead internal bearings.

**Recommended load shaft installation dimensions [Unit: mm (in.)]**

Parts for installing a load shaft including a retaining ring for hole, a spacer, a screw, are not included. The are to be supplied by the customer.

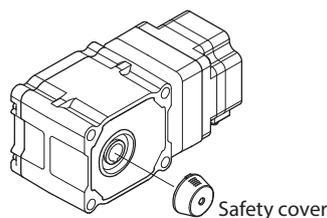
| Output power   | 60 W  | 120 W   | 200 W or higher   |  |   |
|--|---|---|---|--|---|
| Gear ratio   | <b>10 to 200</b>  | <b>10 to 200</b>  | <b>5 to 50</b>  | <b>100, 200</b>  |   |
| Inner diameter of hollow shaft (H8)                        | $\varnothing 12^{+0.027}_0$<br>( $\varnothing 0.4724^{+0.0011}$ )   | $\varnothing 15^{+0.027}_0$<br>( $\varnothing 0.5906^{+0.0011}$ )   | $\varnothing 25^{+0.033}_0$<br>( $\varnothing 0.9843^{+0.0013}$ )   | $\varnothing 30^{+0.033}_0$<br>( $\varnothing 1.811^{+0.0013}$ )   |   |
| Recommended load shaft dimensions (h7)                     | $\varnothing 12^0_{-0.018}$<br>( $\varnothing 0.4724^0_{-0.0007}$ ) | $\varnothing 15^0_{-0.018}$<br>( $\varnothing 0.5906^0_{-0.0007}$ ) | $\varnothing 25^0_{-0.021}$<br>( $\varnothing 0.9843^0_{-0.0008}$ ) | $\varnothing 30^0_{-0.021}$<br>( $\varnothing 1.811^0_{-0.0008}$ ) |   |
| Length of stepped shaft La                                 | 55 (2.17)   | 72 (2.83)   | 96 (3.78)   | 96 (3.78)  |   |
| Screw size   | M5  | M6  | M6  | M8   |   |
| Spacer dimension   | Outer diameter  | $\varnothing 11.5$ ( $\varnothing 0.45$ )                           | $\varnothing 14.5$ ( $\varnothing 0.57$ )                           | $\varnothing 24.5$ ( $\varnothing 0.96$ )                          | $\varnothing 29.5$ ( $\varnothing 1.16$ ) |
|  | Inner diameter  | $\varnothing 6$ ( $\varnothing 0.24$ )                              | $\varnothing 7$ ( $\varnothing 0.28$ )                              | $\varnothing 7$ ( $\varnothing 0.28$ )                             | $\varnothing 9$ ( $\varnothing 0.35$ )    |
|  | Width   | 3 (0.12)  | 3 (0.12)  | 4 (0.16)   | 5 (0.20)                                  |
| Nominal diameter of retaining ring (C-type retaining ring) | $\varnothing 12$ ( $\varnothing 0.47$ )                             | $\varnothing 15$ ( $\varnothing 0.59$ )                             | $\varnothing 25$ ( $\varnothing 0.98$ )                             | $\varnothing 30$ ( $\varnothing 1.18$ )                            |   |
| End plate thickness  | 3 (0.12)  | 3 (0.12)  | 4 (0.16)  | 5 (0.20)   |   |

**Recommended load shaft length**



### Installing the safety cover

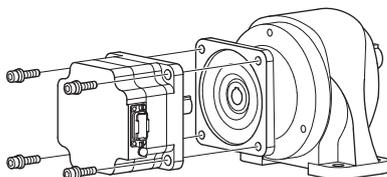
After installing the load, attach the included safety cover. The safety cover can be attached to either face.



## ■ Foot Mount Gearhead JB Gearhead, Parallel Shaft Gearhead JV Gearhead

### ● Assembling the gearhead to the motor

1. Check the key is fitted to the motor output shaft before assembling the gearhead to the motor. When assembling, apply anti-seizing agent such as molybdenum disulfide grease on the surface of the motor shaft and on the bore of the motor shaft input part in the gearhead.
2. Check that there is no gap between the motor and gearhead, and tighten them with hexagonal socket head screws (4 pieces).



| Screw size | Material        | Tightening torque [N·m (lb-in)] |
|------------|-----------------|---------------------------------|
| M6         | Stainless steel | 5 (44)                          |

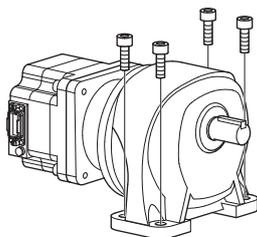
#### Note

- Do not forcibly assemble the motor and gearhead. The motor output shaft or the gearhead input part may be damaged, resulting in noise or shorter service life.
- Do not allow dust to attach to the pilot sections of the motor and gearhead. Also, assemble the motor and gearhead carefully by not pinching the O-ring at the motor pilot section. Pinching the O-ring may cause to infiltrate foreign objects such as water into the product.

### ● Installing to mounting plate

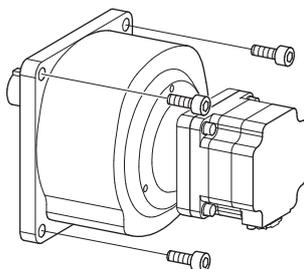
Secure the motor onto a flat and smooth mounting plate having excellent vibration resistance with 4 bolts. Do not leave a gap between the motor and mounting plate. Bolts for mounting the product are not included. Provide them separately.

#### Foot Mount Gearhead JB Gearhead



| Gear ratio              | Screw size | Tightening torque [N·m (lb-in)] |
|-------------------------|------------|---------------------------------|
| <b>5, 10, 20</b>        | M8         | 13 (115)                        |
| <b>30, 50, 100, 200</b> | M10        | 25 (220)                        |
| <b>300, 450</b>         | M12        | 44 (380)                        |
| <b>600, 1200</b>        | M14        | 69 (610)                        |

#### Parallel Shaft Gearhead JV Gearhead



| Gear ratio      | Screw size | Tightening torque [N·m (lb-in)] |
|-----------------|------------|---------------------------------|
| <b>100, 200</b> | M10        | 25 (220)                        |
| <b>300, 450</b> | M12        | 44 (380)                        |

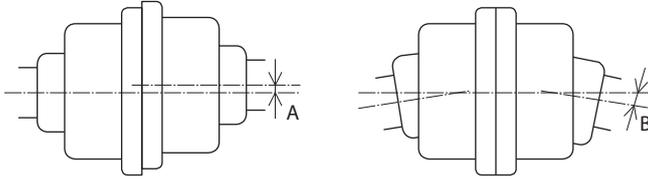
● **Installing a load**

When installing a load on the motor, make sure the following points.

**Direct connection**

Shaft center of other equipment } Align the shaft centers in a straight line.  
 Shaft center of gearhead }

Example: Coupling



The displacements A and B should be minimized as much as possible. Since the displacements A and B vary according to the type of coupling, keep within the permissible value.

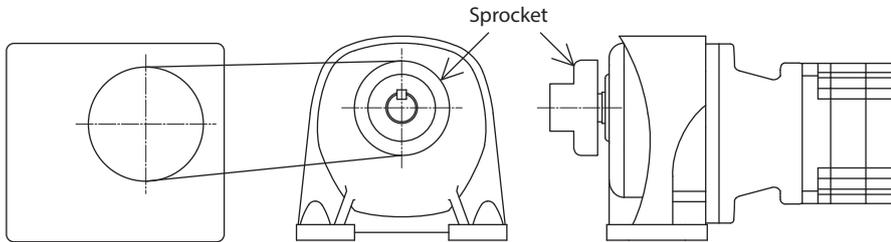
**Attaching chains, V-belts, gears, etc.**

[1] Shaft center of other equipment } Arrange the shaft centers in parallel.  
 Shaft center of gearhead }

[2] Tension of chains and V-belts } Arrange at right angle with the shaft center.  
 Coupling of gears }

- [3] Tension of V-belt — Excessive tensioning may result in damage to the bearings.
  - Tension of chain — Excessive tensioning may result in damage to the bearings.
- If the chain is installed loosely, since a large impact force may occur at the time of starting the motor and it may cause a negative effect on the gearhead or other equipment, adjust the tension of the chain properly.

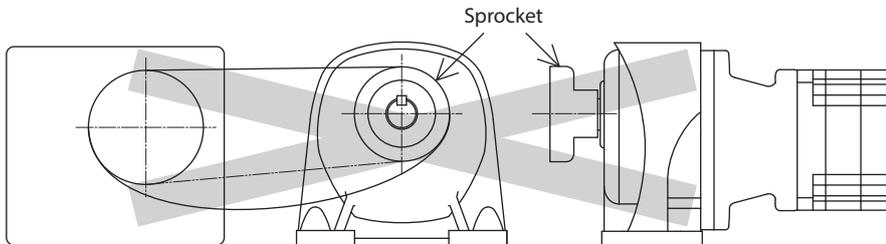
Proper use example



Connecting equipment

- The tension of chain and belt is properly set
- The positions of sprocket and pulley are also properly set

Improper use example

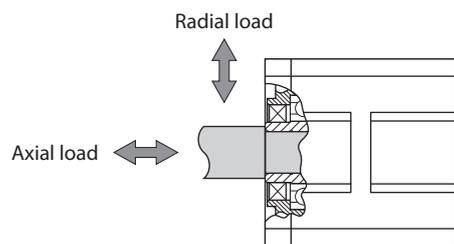


Connecting equipment

- The chain is too loose
- The sprocket is positioned in the reverse direction and the load point moves to the end of the shaft.

### 5.3 Permissible radial load and permissible axial load

The radial load and axial load have a great influence on the life of the bearings and strength of the shaft. Do not exceed the permissible radial load and permissible axial load. Check on the Oriental Motor Website for details.

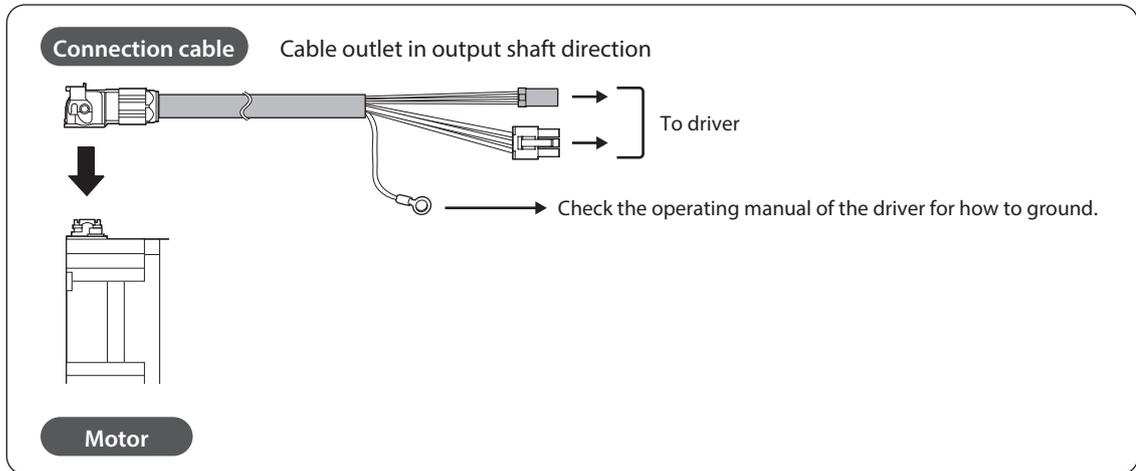


Failure due to fatigue may occur when the gearhead bearings and output shaft are subject to repeated loading by a radial or axial load that is in excess of the permissible limit.

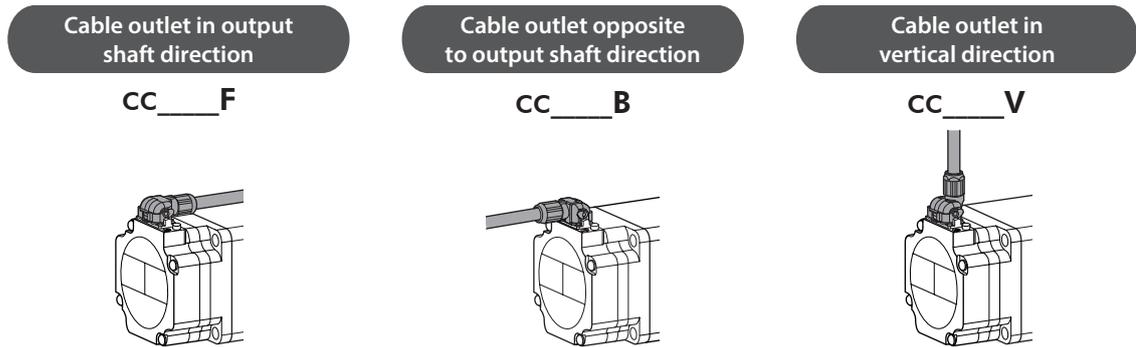
# 6 Connection

## 6.1 Connecting the motor and driver

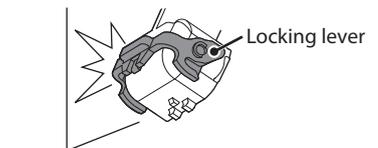
Connect the motor and driver using the connection cable (sold separately).  
There are three types of connection cables which cable outlet directions are different.



[Cable outlet direct]

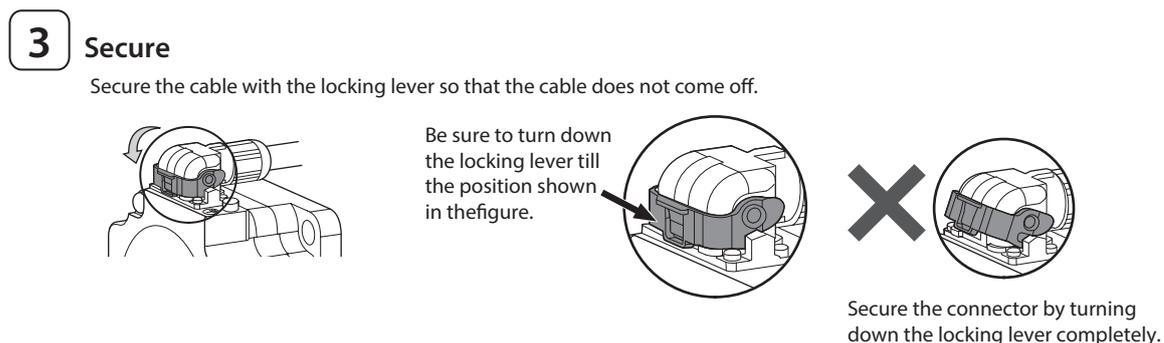
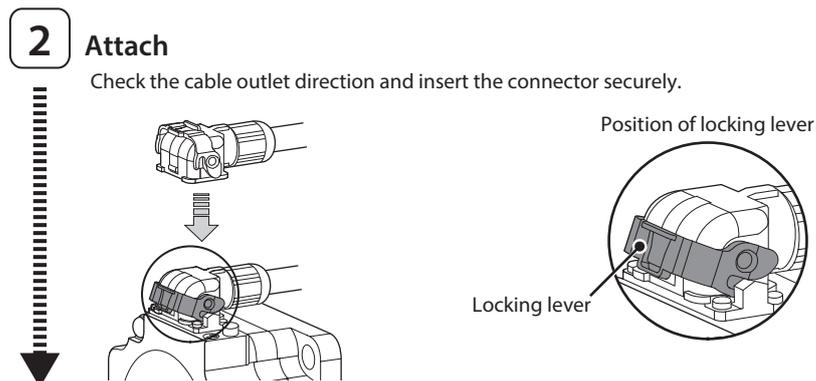
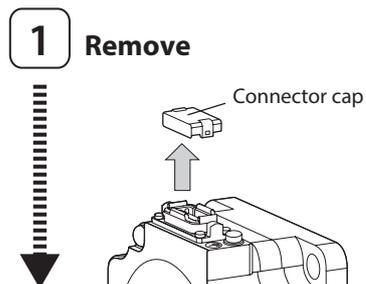


**Note** Do not apply a strong force on the locking lever of the connector for motor connection. Applying a strong force on the locking lever may cause damage.

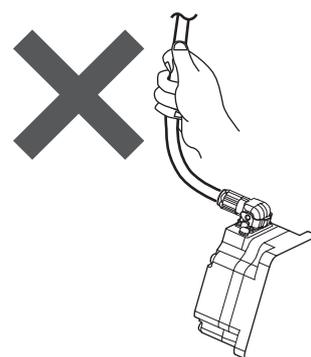


## 6.2 Connection procedures of the motor and connection cable

The following example explains using the connection cable of "cable outlet in output shaft direction."



**Note** Do not lift up the product by holding the connection cable. Doing so may cause damage to the product.



## 6.3 Detaching the connection cable

Turn up the locking lever to detach the cable.

The connection cable for relay can be used by connecting up to 2 pieces.  
Check the operating manual of the driver.

# 7 Grounding

Ground using the Protective Earth Terminals  $\oplus$  of the motor and driver, as well as the ground terminal of the connection cable. Check the operating manual of the driver for how to ground.

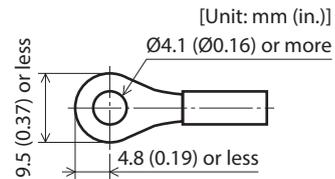
**Note** Be sure to ground the motor and driver. Failure to do so may result in electric shock or damage to the product. Static electricity may cause damage to the product if the Protective Earth Terminals are not grounded.

The grounding resistance value provided in the standards applied to the equipment may not be satisfied depending on the type or length of the connection cable.

In this case, ground near the motor using the Protective Earth Terminal  $\oplus$  on the motor. If the ground terminal of the connection cable is not used, be sure to insulate.

## ■ Ground terminal

- Applicable crimp terminal: Round crimp terminal with insulation cover
- Terminal screw size: M4
- Tightening torque: 1.2 N·m (10.6 lb-in)
- Applicable lead wire: AWG18 to 14 (0.75 to 2.0 mm<sup>2</sup>)



## ■ Precautions about static electricity

Static electricity may cause the driver to malfunction or suffer damage. Be sure to ground the motor and driver to prevent them from being damaged by static electricity.

# 8 Inspection and maintenance

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## 8.1 Inspection

It is recommended that periodic inspections would be conducted for the items listed below after each operation of the motor. If an abnormal condition is noted, discontinue any use and contact your nearest Oriental Motor sales office.



Do not conduct the insulation resistance measurement or dielectric strength test with the motor and speed controller connected. Doing so may cause damage to the product.

---

### ■ Inspection item

- Check if any of the mounting screws of the motor and gearhead are loose.
- Check if the bearing part (ball bearings) of the motor generates unusual noises.
- Check if the bearing part (ball bearings) or gear meshing part of the gearhead generates unusual noises.
- Check if the output shaft of the motor and gearhead and a load shaft are out of alignment.
- Check if a damage or stress is applied on the cable or the connection part between the cable and speed controller is loose.

## 8.2 Warranty

Check on the Oriental Motor Website for the product warranty.

## 8.3 Disposal

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

# 9 Specifications

## 9.1 Specifications

Check on the Oriental Motor Website for the product specifications.

## 9.2 General specifications

|                       |                        |  |
|-----------------------|------------------------|--|
| Operation environment | Ambient temperature    | 0 to +40 °C [+32 to +104 °F] (non-freezing)  |
|                       | Ambient Humidity       | 85% or less (non-condensing)   |
|                       | Altitude               | Up to 1000 m (3300 ft.) above sea level  |
|                       | Surrounding atmosphere | No corrosive gas or dust.<br>Cannot be used in radioactive materials, magnetic field, vacuum or other special environment.<br>Details about the installation location are described on p.12.   |
|                       | Vibration              | Not subject to continuous vibrations or excessive impact.<br>In conformance with JIS C 60068-2-6 "Sinewave vibration test method"<br>Frequency range: 10 to 55 Hz<br>Pulsating amplitude: 0.15 mm (0.006 in.)<br>Sweep direction: 3 directions (X, Y, Z)<br>Number of sweeps: 20 times |
| Storage environment   | Ambient temperature    | -10 to +60 °C [+14 to +140 °F] (non-freezing)  |
|                       | Ambient Humidity       | 85% or less (non-condensing)   |
| Shipping environment  | Altitude               | Up to 1000 m (3300 ft.) above sea level  |
|                       | Surrounding atmosphere | No corrosive gas, dust, water or oil.<br>Cannot be used in radioactive materials, magnetic field, vacuum or other special environment.   |
| Degree of protection  |                        | IP66* (IP66 for when the connection cable is attached to the motor. Excluding the connectors for driver connection of the connection cable.)   |

\* Combination is Foot Mount Gearhead **JB** Gearhead: IP44

# 10 Regulations and standards

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Check on the Oriental Motor Website for the regulations and standards.

## ■ UL Standards, CSA Standards

This product is recognized by UL under the UL and CSA Standards.

## ■ CE Marking

This product is affixed with the marks under the following directives.

### ● Low Voltage Directive

#### Installation conditions

- For incorporating in equipment
- Overvoltage category: III
- Pollution degree: 2
- Protection against electric shock: Class I

### ● RoHS Directive

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

## ■ The motor temperature rise tests

The temperature rise tests stipulated in the above standards are conducted in a state where a motor is mounted on a heat radiation plate instead of attaching a gearhead. The size, thickness and material of the heatsink plates are as follows.

| Motor model                      | Size [mm (in.)]     | Thickness [mm (in.)] | Material       |
|----------------------------------|---------------------|----------------------|----------------|
| <b>BLM460S</b>                   | 135×135 (5.31×5.31) | 5 (0.20)             | Aluminum alloy |
| <b>BLM5120</b>                   | 165×165 (6.50×6.50) |                      |                |
| <b>BLM5200</b>                   | 200×200 (7.87×7.87) |                      |                |
| <b>BLM5300</b><br><b>BLM5400</b> | 250×250 (9.84×9.84) | 6 (0.24)             |                |

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Published in December 2025

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