

## OPERATING MANUAL

### Brushless Motor

### BLM Motor Connector Type

### JH Gearhead/ JB Gearhead/ JV Gearhead

## Introduction

### ■ Before using the motor

Only qualified personnel of electrical and mechanical engineering 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 for this product are listed below.

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 <b>JH</b> Gearhead/ <b>JB</b> Gearhead/ <b>JV</b> Gearhead<br>OPERATING MANUAL (this document) |
| Driver | <b>BMU</b> Series OPERATING MANUAL<br><b>BLE2</b> Series OPERATING MANUAL                                                      |

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

## 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.   |
|  <b>Note</b>   | The items under this heading contain important handling instructions that the user should observe to ensure 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 product while the power is supplied. Always turn off the power before carrying out these operations. Electric shock or damage to equipment may result.
- Do not use a motor in a vertical application. If the driver's protection function is activated, the motor will stop and the moving part of the equipment will drop, thereby causing injury or equipment damage.
- Do not machine or modify the cable. Doing so may result in fire, electric shock, or damage to equipment.
- Do not apply any excessive force to the motor connector. Doing so may result in fire, electric shock, or damage to equipment.

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.

## WARNING

- Do not forcibly bend, pull or pinch the cable. Doing so may result in fire, electric shock, or damage to equipment.
- 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.
- Do not touch the motor or driver when conducting the insulation resistance measurement or dielectric strength test. Accidental contact may result in electric shock.
- Do not disassemble or modify the motor. This 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.
- 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 damage to equipment.
- 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.
- The motor is Class I equipment. Install the motor so as to avoid contact with hands, or ground it to prevent the risk of electric shock.
- Use a motor and driver only in the specified combination. Failure to do so may result in fire, electric shock, or damage to equipment.
- Always turn off the power before performing maintenance or inspection. Failure to do so may result in electric shock.

## CAUTION

- Do not use the motor beyond the specifications. Doing so may result in fire, electric shock, injury or damage to equipment.
- Do not touch the motor while operating or immediately after stopping. The surface of the motor is hot and it may cause a skin burn(s).
- Do not leave anything around the motor that would obstruct ventilation. Doing so may result in damage to equipment.
- Do not lift up the product by holding the output shaft or the cable. Doing so may result in injury.
- Do not touch the motor output shaft (end or pinion) with bare hands. Doing so may cause injury.
- 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.
- When installing the motor in equipment, exercise caution not to pinch your fingers or other parts of your body between the equipment and motor. Injury may result.
- Do not touch the rotating part (output shaft) while operating the motor. Doing so may cause injury.
- Do not step on the motor and gearhead or hang from them. Doing so may result in injury or damage to equipment.
- Installation may cause the motor to detach and fall, resulting in injury or damage to equipment.
- Provide a cover over the rotating part (output shaft). Failure to do so may result in injury.
- Securely install a load on the output shaft. Inappropriate installation may result in injury.
- 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.
- Securely install the motor to the mounting plate. Inappropriate installation may cause the motor to detach and fall, resulting in injury or damage to equipment.

## CAUTION

- 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, attach a warning label in a conspicuous position as shown in the figure. Failure to do so may result in a skin burn(s).



Warning label

## Precautions for use

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.7 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

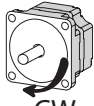
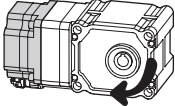
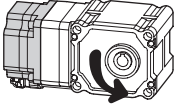
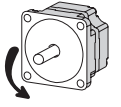
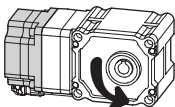
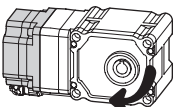
Do not perform instantaneous bidirectional operation when a **BLM** motor of 400 W is operated using the **BLE2** Series driver. Doing so may cause damage to the product.

#### ● Rotation direction of the gearhead output shaft

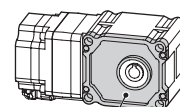
The rotation direction of the gearhead output shaft with respect to the motor output shaft is shown in the figure below. Check the operating manual of the driver for the rotation direction of the motor output shaft and the setting method.

#### Right Angle Hollow Shaft Hypoid Gear 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  |

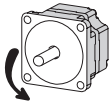
When viewing from the opposite side of the gearhead flange side, the gearhead output shaft rotates in the opposite direction to the above figure.



Gearhead flange

#### 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 Gear 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   |
|------------------------|------|-------|-------|-------|-------|-------|-------|
| Actual reduction ratio | 4.97 | 10.12 | 20.08 | 30.86 | 49.09 | 104.1 | 196.4 |

| Gear ratio             | 300   | 450   | 600   | 1200 |
|------------------------|-------|-------|-------|------|
| Actual reduction ratio | 300.5 | 450.8 | 588.9 | 1178 |

## Checking the product

This section explains the items you should check, as well as the names of each part.

### ■ Package contents

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.

The Combined motor has a gearhead assembled. Screw for motor assembly are not included with the gearhead.

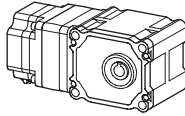
#### ● Motor

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

#### ● Gearhead(sold separately)

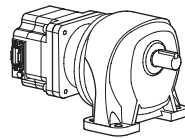
##### Right Angle Hollow Shaft Hypoid Gear JH Gearhead

- ☐ 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



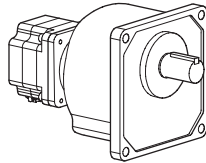
##### Foot Mount Gearhead JB Gearhead

- ☐ 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



### ■ How to identify the product model

**BLM 5 200 H P K**  
1 2 3 4 5 6

|   |                                 |                                                          |
|---|---------------------------------|----------------------------------------------------------|
| 1 | Motor type                      | <b>BLM:</b> Brushless Motor                              |
| 2 | Frame size                      | <b>5:</b> 90 mm (3.54 in.)                               |
| 3 | Output power                    | <b>120:</b> 120 W <b>200:</b> 200 W<br><b>400:</b> 400 W |
| 4 | Motor connection method         | <b>H:</b> Connector type                                 |
| 5 | Degree of protection for motor* | <b>P:</b> IP66                                           |
| 6 | Motor shaft                     | <b>K:</b> Round shaft type (with key)                    |

\* For the degree of protection for when the motor and the gearhead are assembled, refer to the "General specifications" on p.8.

### ■ Model

Check the model number of the motor and gearhead against the number shown on their nameplates, respectively.

Enter the gear ratio in the box (□) within the model name.

Enter the code (X, Y, A, C, E, D, K, S) representing the gearhead size in the box (■) within the model name.

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

| Output power | Motor model       | Gearhead model |
|--------------|-------------------|----------------|
| 120 W        | <b>BLM5120HPK</b> | <b>5H□C</b>    |
| 200 W        | <b>BLM5200HPK</b> | <b>5■H□C</b>   |
| 400 W        | <b>BLM5400HPK</b> |                |

#### ● Foot Mount Gearhead JB Gearhead

| Output power | Motor model       | Gearhead model |
|--------------|-------------------|----------------|
| 200 W        | <b>BLM5200HPK</b> | <b>5■B□A</b>   |
| 400 W        | <b>BLM5400HPK</b> |                |

#### ● Parallel Shaft Gearhead JV Gearhead

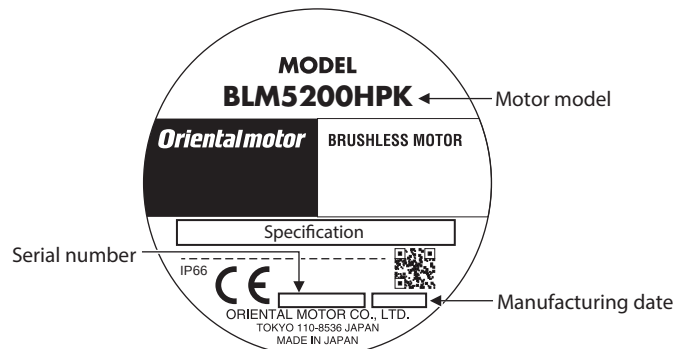
| Output power | Motor model       | Gearhead model |
|--------------|-------------------|----------------|
| 200 W        | <b>BLM5200HPK</b> | <b>5KV□C</b>   |
| 400 W        | <b>BLM5400HPK</b> | <b>5■V□C</b>   |

### Type of gear ratio

| Gearhead                 | Gear ratio*                                             |
|--------------------------|---------------------------------------------------------|
| Right Angle Hollow Shaft | <b>5, 10, 15, 20, 30, 50, 100, 200</b>                  |
| Foot mount               | <b>5, 10, 20, 30, 50, 100, 200, 300, 450, 600, 1200</b> |
| Parallel shaft           | <b>100, 200, 300, 450</b>                               |

\* The lineup of the gear ratio varies depending on the motor output power.

### ■ Information about nameplate



### ■ Drivers possible to combine

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

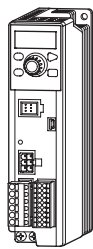
#### ● BMU Series



| Output power | Motor model    | Driver model             |                                                     |
|--------------|----------------|--------------------------|-----------------------------------------------------|
|              |                | Single-phase 100-120 VAC | Single-phase 200-240 VAC<br>Three-phase 200-240 VAC |
| 120 W        | <b>BLM5120</b> | <b>BMUD120-A2</b>        | <b>BMUD120-C2</b>                                   |
| 200 W        | <b>BLM5200</b> | <b>BMUD200-A</b>         | <b>BMUD200-C</b>                                    |
| 400 W        | <b>BLM5400</b> | —                        | <b>BMUD400-S*</b>                                   |

\* The power supply voltage is three-phase 200-240 VAC only.

● BLE2 Series



| Output power | Motor model | Driver model             |                                                     |
|--------------|-------------|--------------------------|-----------------------------------------------------|
|              |             | Single-phase 100-120 VAC | Single-phase 200-240 VAC<br>Three-phase 200-240 VAC |
| 120 W        | BLM5120     | BLE2D120-A               | BLE2D120-C                                          |
| 200 W        | BLM5200     | —                        | BLE2D200-C                                          |
| 400 W        | BLM5400     | —                        | BLE2D400-S*                                         |

\* The power supply voltage is three-phase 200-240 VAC only.

■ 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.

Model name and type

CC 005 ☐ HBL F

Cable length

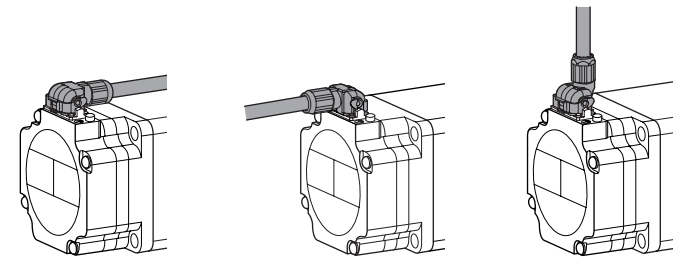
|                       |                       |
|-----------------------|-----------------------|
| 005 : 0.5 m (1.6 ft.) | 040 : 4 m (13.1 ft.)  |
| 010 : 1 m (3.3 ft.)   | 050 : 5 m (16.4 ft.)  |
| 015 : 1.5 m (4.9 ft.) | 070 : 7 m (23.0 ft.)  |
| 020 : 2 m (6.6 ft.)   | 100 : 10 m (32.8 ft.) |
| 025 : 2.5 m (8.2 ft.) | 150 : 15 m (49.2 ft.) |
| 030 : 3 m (9.8 ft.)   | 200 : 20 m (65.6 ft.) |

Cable outlet direction

F : Output shaft direction  
B : Opposite to output shaft direction  
V : Vertical direction

☐ : Cable classification

Output shaft direction: CC\_\_F      Opposite to output shaft direction: CC\_\_B      Vertical direction: CC\_\_V

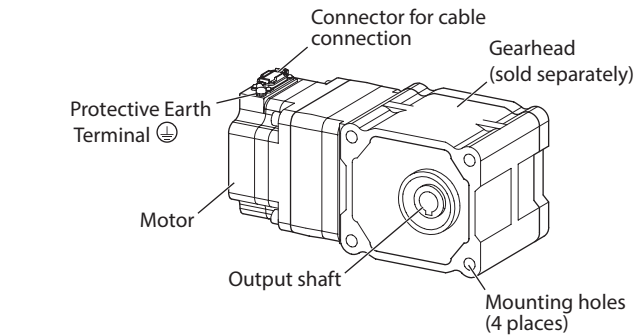


■ Names of parts

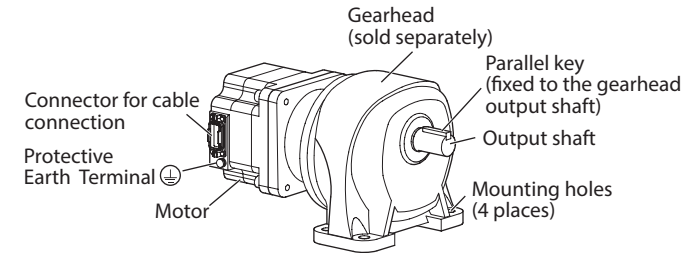
Motor

The figure shows the gearhead assembled.

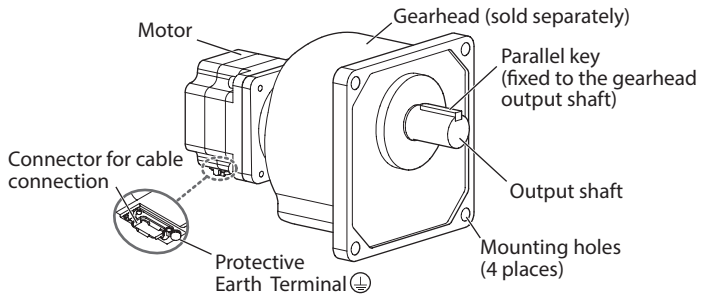
● Right Angle Hollow Shaft Hypoid Gear JH Gearhead



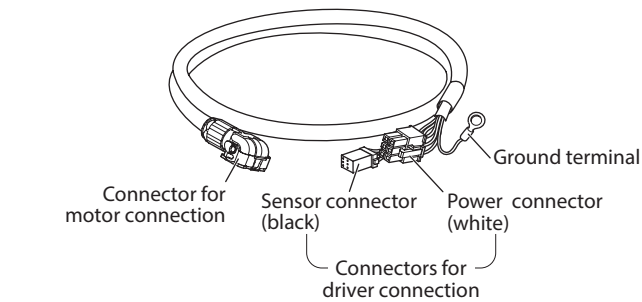
● Foot Mount Gearhead JB Gearhead



● Parallel Shaft Gearhead JV Gearhead



Connection cable (sold separately)



Installation

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

■ 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 Gear 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 ]

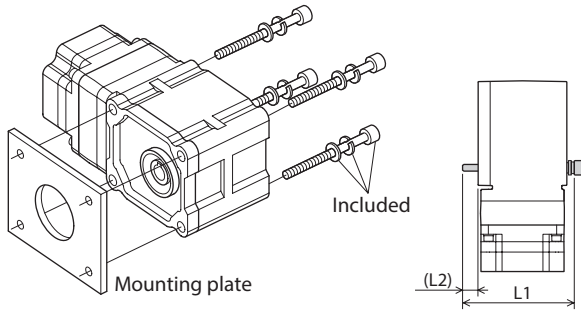
- Area not subject to splashing water (rain, water droplets), oil (oil droplets) or other liquids



## ■ Installation method

### Right Angle Hollow Shaft Hypoid Gear JH Gearhead

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



| Output power    | Gear ratio       | Hexagonal socket head screw |                 | L1<br>[mm (in.)] | L2<br>[mm (in.)] | Tightening torque<br>[lb-in] |
|-----------------|------------------|-----------------------------|-----------------|------------------|------------------|------------------------------|
|                 |                  | Screw size                  | Material        |                  |                  |                              |
| 120 W           | <b>10 to 200</b> | 5/16-18UNC                  | Stainless steel | 114<br>(4.5)     | 16<br>(0.63)     | 106                          |
| 200 W or higher | <b>5 to 50</b>   | 5/16-18UNC                  |                 | 127<br>(5)       | 24<br>(0.94)     | 106                          |
|                 | <b>100, 200</b>  | 3/8-16UNC                   |                 | 127<br>(5)       | 17<br>(0.67)     | 210                          |

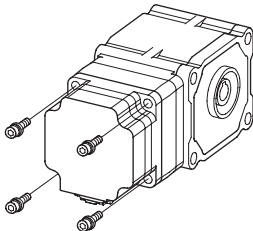
**Note** When the motor is installed to equipment using the mounting surface of the gearhead, proper alignment between the hollow shaft inside dimension and the load shaft is necessary. Keep the alignment tolerance within 0.02 mm (0.0008 in.). Insufficient alignment may result in damage to the gearhead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

### ● Removing/assembling the gearhead

See the following steps to replace the gearhead or to change the position of the connector for cable connection.

#### Removing the gearhead from the motor

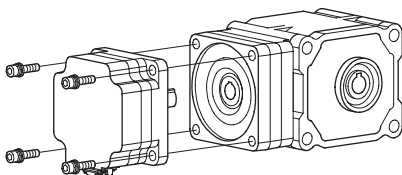
Remove the hexagonal socket head screws (4 places) assembling the motor and gearhead, and detach the gearhead from the motor.



#### Assembling the gearhead to the motor

- 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.
- 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<br>[N·m (lb-in)] |
|------------|-----------------|------------------------------------|
| M6         | Stainless steel | 5 (44)                             |



**Note**

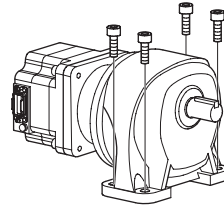
- Do not forcibly assemble the motor and gearhead. The motor output shaft or the gearhead input part may be damaged, resulting in noise or shorter service life.
- Do not allow dust to attach to the pilot sections of the motor and gearhead. Also, assemble the motor and gearhead carefully by not pinching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

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

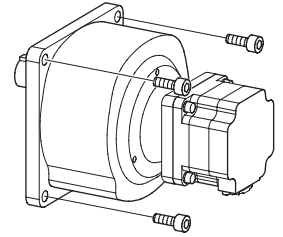
Secure the motor onto a flat and smooth mounting plate having excellent vibration resistance with 4 bolts. Do not leave a gap between the motor and mounting plate.

Bolts for mounting the product are not included. Provide them separately.

#### Foot mount



#### Parallel shaft



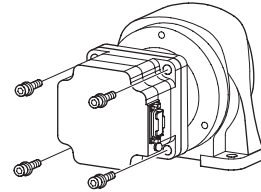
| Gearhead       | Gear ratio              | Screw size | Tightening torque<br>[lb-in] |
|----------------|-------------------------|------------|------------------------------|
| Foot mount     | <b>5, 10, 20</b>        | 5/16-18UNC | 115                          |
|                | <b>30, 50, 100, 200</b> | 3/8-16UNC  | 220                          |
|                | <b>300, 450</b>         | 7/16-14UNC | 380                          |
| Parallel shaft | <b>600, 1200</b>        | 9/16-12UNC | 610                          |
|                | <b>100, 200</b>         | 3/8-16UNC  | 220                          |
|                | <b>300, 450</b>         | 7/16-14UNC | 380                          |

### ● Removing/assembling the gearhead

See the following steps to replace the gearhead or to change the position of the connector for cable connection.

#### Removing the gearhead from the motor

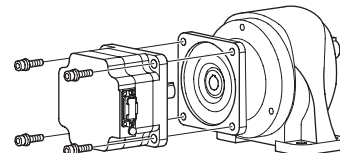
Remove the hexagonal socket head screws (4 places) assembling the motor and gearhead, and detach the gearhead from the motor.



#### Assembling the gearhead to the motor

- 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.
- 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<br>[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 a load

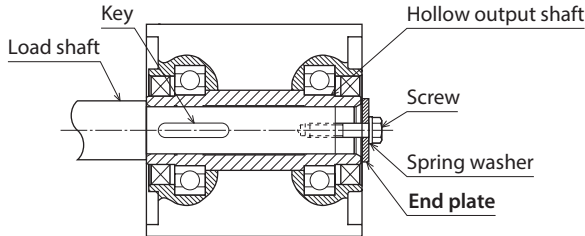
### Right Angle Hollow Shaft Hypoid Gear JH Gearhead

Mounting method of the load varies depending on the load shaft conditions. See the following figures.

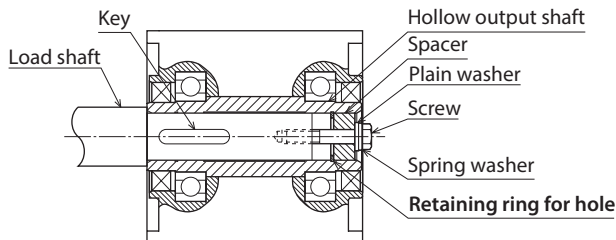
The hollow output shaft inside dimension is processed to a tolerance of H8, and incorporates a key slot for load shaft attachment. A load shaft tolerance of h7 is recommended. Also, apply anti-seizing agent such as molybdenum disulfide grease on the surface of the load shaft and the bore of the hollow 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

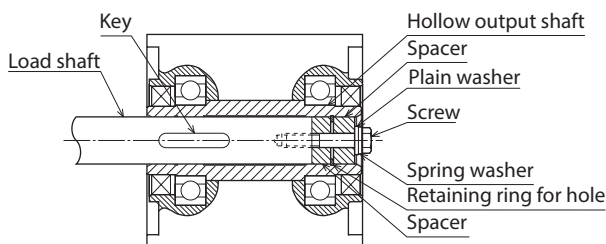
##### Mounting method using end plate



##### 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.

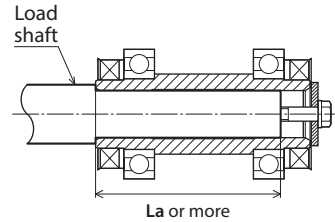
#### ● Recommended load shaft installation dimensions

[Unit : mm (in.)]

| Output power                                               |                | 120 W                                          | 200 W or higher                            |                                               |
|------------------------------------------------------------|----------------|------------------------------------------------|--------------------------------------------|-----------------------------------------------|
| Gear ratio                                                 |                | 10 to 200                                      | 5 to 50                                    | 100, 200                                      |
| Inner diameter of hollow shaft                             |                | $\varnothing 15.875^{+0.027}_{-0.0011}$ (5/8") | $\varnothing 25.4^{+0.033}_{-0.0013}$ (1") | $\varnothing 31.75^{+0.039}_{-0.0015}$ (5/4") |
| Recommended load shaft dimensions                          |                | $\varnothing 15.875^{+0.018}_{-0.0007}$ (5/8") | $\varnothing 25.4^{+0.021}_{-0.0008}$ (1") | $\varnothing 31.75^{+0.025}_{-0.001}$ (5/4")  |
| Length of stepped shaft La                                 |                | 72 (2.83)                                      | 96 (3.78)                                  | 96 (3.78)                                     |
| Screw size                                                 |                | M6                                             | M6                                         | M8                                            |
| Spacer dimension                                           | Outer diameter | $\varnothing 14.5$ (Ø0.57)                     | $\varnothing 24.5$ (Ø0.96)                 | $\varnothing 29.5$ (Ø1.16)                    |
|                                                            | Inner diameter | $\varnothing 7$ (Ø0.28)                        | $\varnothing 7$ (Ø0.28)                    | $\varnothing 9$ (Ø0.35)                       |
|                                                            | Width          | 3 (0.12)                                       | 4 (0.16)                                   | 5 (0.20)                                      |
| Nominal diameter of retaining ring (C-type retaining ring) |                | $\varnothing 15$ (Ø0.59)                       | $\varnothing 25$ (Ø0.98)                   | $\varnothing 30$ (Ø1.18)                      |
| End plate thickness                                        |                | 3 (0.12)                                       | 4 (0.16)                                   | 5 (0.20)                                      |

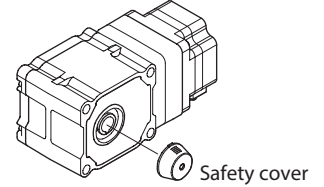
● Parts for installing a load shaft including a retaining ring for hole, a spacer, a screw, are not included. They are to be supplied by the customer.

#### 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.



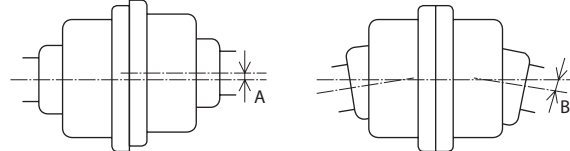
### Foot Mount Gearhead JB Gearhead, Parallel Shaft Gearhead JV Gearhead

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

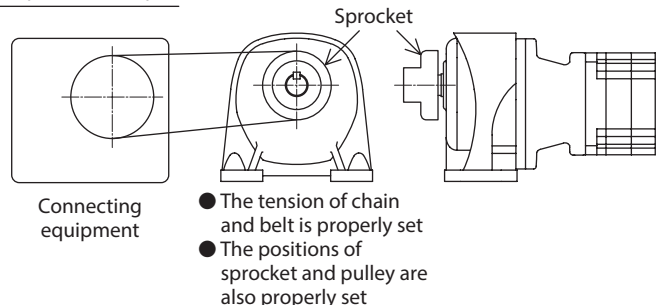
② Tension of chains and V-belts } Arrange at right angle with the shaft center.  
Coupling of gears

③ Tension of V-belt — Excessive tensioning may result in damage to the bearings.

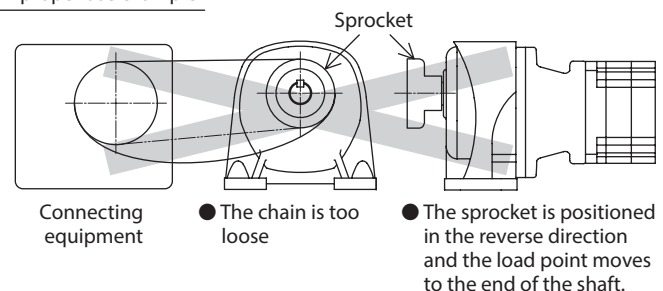
Tension of chain — Excessive tensioning may result in damage to the bearings.

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

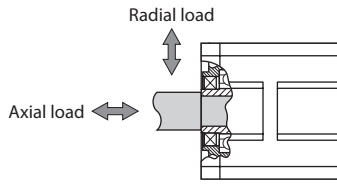


#### Improper use example



## ■ 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.



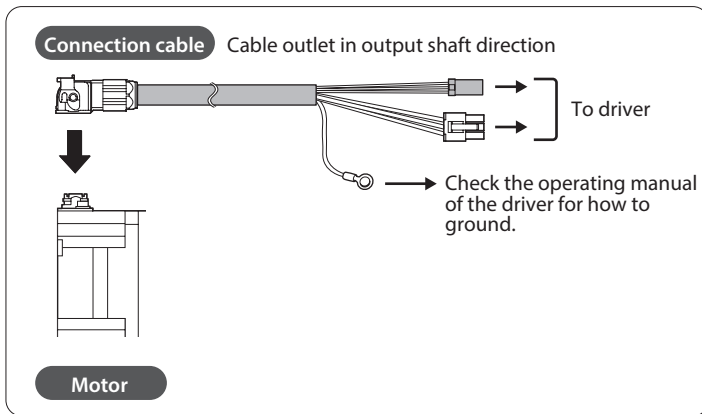
**Note** Failure due to fatigue may occur when the gearhead bearings and output shaft are subject to repeated loading by a radial or axial load that is in excess of the permissible limit.

## Connection

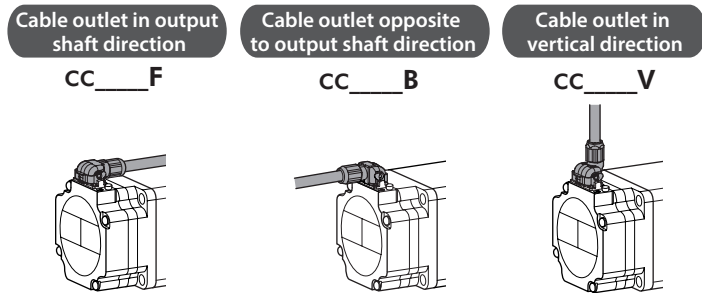
### ■ Connecting the motor and driver

Connect the motor and driver using the connection cable (sold separately).

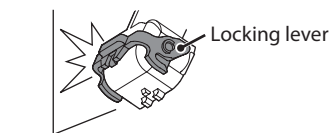
There are three types of connection cables which cable outlet directions are different.



#### [ Cable outlet direction ]



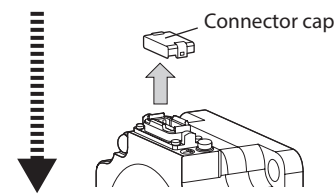
**Note** Do not apply a strong force on the locking lever of the connector for motor connection. Applying a strong force on the locking lever may cause damage.



## ■ Connection procedures of the motor and connection cable

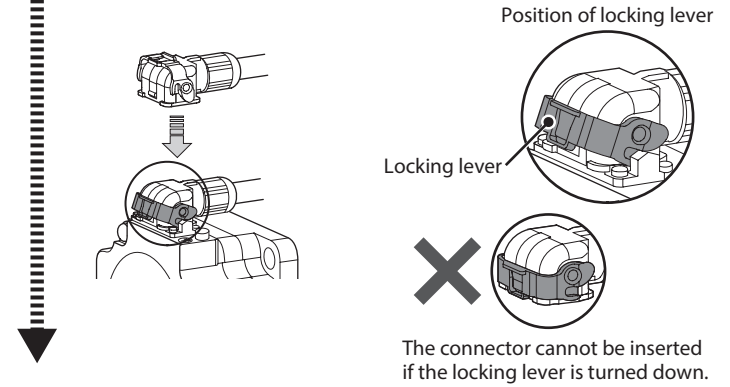
The following example explains using the connection cable of "cable outlet in output shaft direction."

### 1 Remove



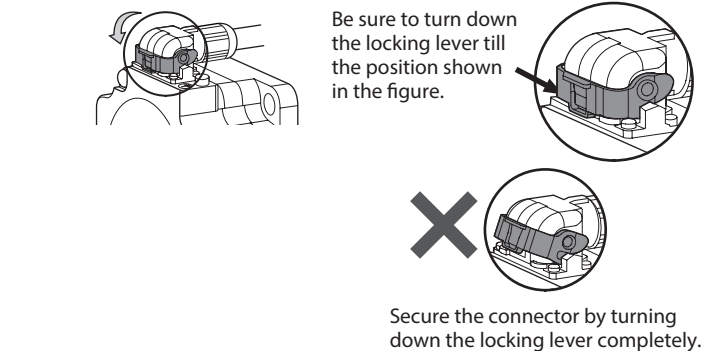
### 2 Attach

Check the cable outlet direction and insert the connector securely.

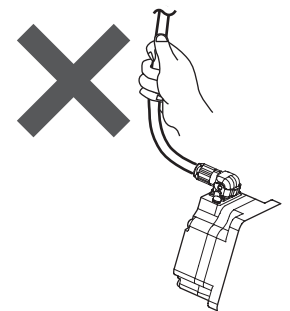


### 3 Secure

Secure the cable with the locking lever so that the cable does not come off.



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



### ■ 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.

## Grounding

Ground using the Protective Earth Terminals (⏏) 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.

## Inspection and maintenance

### Inspection

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

### Note

Do not conduct the insulation resistance measurement or dielectric strength test with the motor and driver connected. Doing so may result in damage to the product.

### Inspection item

- Are any of the mounting screws of the motor and gearhead loose?
- Are there any abnormal noises from inside of the motor or gearhead?
- Are the gearhead output shaft and load shaft out of alignment?
- Are there any scratches, signs of stress or loose driver connections in the cable?

### Warranty

Check on the Oriental Motor Website for the product warranty.

### Disposal

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

## Peripheral equipment (sold separately)

Peripheral equipment such as couplings and torque arms can be checked on the Oriental Motor Website.

## 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.4.                                                                                            |
|                       | 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)                                                                                                                                                                                                                                                           |
|                       | Altitude               | Up to 1000 m (3300 ft.) above sea level                                                                                                                                                                                                                                                |
| Shipping environment  | 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  |                        | Foot mount: IP44<br>Right angle hollow shaft, parallel shaft: IP66 (IP66 for when the connection cable is attached to the motor. Excluding the connectors for driver connection of the connection cable.)                                                                              |

## Regulations and standards

### UL Standards and CSA Standards

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

### CE Marking

This product is affixed the CE Marking under the Low Voltage Directive.

### Low Voltage Directive

#### Installation conditions (EN Standard)

- For incorporating in equipment
- Overvoltage category: II
- Pollution degree: 3
- Protection against electric shock: Class I

### 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       |
|-------------|---------------------|----------------------|----------------|
| BLM5120     | 165×165 (6.50×6.50) | 5 (0.20)             | Aluminum alloy |
| BLM5200     | 200×200 (7.87×7.87) |                      |                |
| BLM5400     | 250×250 (9.84×9.84) | 6 (0.24)             |                |

### RoHS Directive

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

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