

## **Brushless Motors**

### **BLV Series R Type Motor 750 W**

## **OPERATING MANUAL**

Before using the product

Safety precautions

Precautions for use

Checking the product

Installation

Inspection and maintenance

Cable and accessories

Specifications

Regulations and standards

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 Before using the product

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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 is designed and manufactured to be incorporated into general industrial equipment. Do not use it for any other purpose.

For the main power supply, use a DC power supply with reinforced insulation on its primary and secondary sides. Oriental Motor Co., Ltd. is not responsible for any compensation for damage caused through failure to observe this warning.

## ■ Related operating manuals

For operating manuals, download from Oriental Motor website download page or contact your nearest Oriental Motor sales office. Search for an operating manual by the model name described on the nameplate.

- **BLV Series R** Type Motor 750 W OPERATING MANUAL (This document)
- **BLV Series R** Type Driver **BLVD-KCRD** OPERATING MANUAL Installation and Connection Edition
- **BLV Series R** Type OPERATING MANUAL Function Edition
- **BLV Series R** Type Driver CANopen Communication Profile

## 2 Safety precautions

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

Description of signs

|                                                                                                  |                                                                                                                                      |
|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
|  <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, in areas subjected to splashing water, or near combustible materials. Doing so may result in fire, electric shock, or injury.</li><li>• Do not transport, install, connect, or inspect the product while the power is supplied. Always turn off the power before carrying out these operations. This may result in electric shock or damage to equipment.</li><li>• Do not use a motor without an electromagnetic brake in an application of vertical drive, such as elevating equipment. If the alarm function (protective function) of the driver is activated, the motor will stop operating. This may cause the moving part to fall, resulting in injury or damage to equipment.</li><li>• Do not use the brake mechanism of the electromagnetic brake motor as a safety brake. It is intended to hold the moving part and motor positions. This may result in injury or damage to equipment.</li><li>• When using an electromagnetic brake motor in an application of vertical drive, such as elevating equipment, be sure to sufficiently check the load condition before operating. If a load in excess of the rated torque is applied or the small torque limiting value is set, the load may fall. This may result in injury or damage to equipment.</li><li>• Do not machine or modify the cable. Doing so may result in fire, electrical shock, or damage to equipment.</li><li>• Do not forcibly bend, pull, or pinch the cable. Doing so may result in fire, electrical shock, or damage to equipment.</li><li>• Do not touch the motor or driver when conducting the insulation resistance measurement or the dielectric strength test. Accidental contact may result in electric shock.</li><li>• Do not disassemble or modify the motor. 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> |

## ! WARNING



- Assign qualified and educated personnel to the task of installing, connecting, operating, and inspecting/troubleshooting the product. Handling by unqualified and uneducated personnel may result in fire, electric shock, injury, or damage to equipment.
- Use a motor and driver only in the specified combination. Failure to do so may result in fire, electric shock, or damage to equipment.
- If the alarm function (protective function) of the driver is activated, remove the cause before resetting the alarm. Continuing the operation without removing the cause of the problem may cause the motor to malfunction, resulting in injury or damage to equipment.
- Install the motor in an enclosure. Failure to do so may result in injury.
- 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 during operation or immediately after stopping. The surface of the motor is hot and it may cause a skin burn(s).
- Keep the area around the motor free of combustible materials. Failure to do so may result in fire or 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 the motor by holding the output shaft or the cable. Doing so may result in injury.
- Do not touch the motor output shaft (shaft end or pinion section) with bare hands. Doing so may result in injury.
- When assembling the motor and gearhead, be careful not to get your fingers or any other part of your body caught between the motor and the gearhead. This may result in injury.
- When installing the motor in equipment, be careful not to get your fingers or any other part of your body caught between the product and the equipment. This may result in injury.
- Do not touch the rotating part (output shaft) during operation. Doing so may result in injury.



- Since the motor is very heavy, make sure that two or more people work together to perform the necessary tasks when transporting or installing it. Failure to do so may result in injury.
- Securely install the motor on the mounting plate. Improper installation may cause the motor to come loose 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. Failure to do so may result in injury.
- Be sure to ground the motor and the driver to prevent damage from static electricity. Failure to do so may result in fire or damage to equipment.
- The motor surface temperature may exceed 70 °C (158 °F) even under normal operating conditions. If the operator is allowed to approach the motor during operation, affix a warning label shown in the figure on a conspicuous position. Failure to do so may result in a skin burn(s).



Warning label

## 3 Precautions for use

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

### ■ Wiring

#### ● Connecting a motor and a driver

Use the dedicated connection cable (sold separately) when extending the wiring distance between the motor and the driver.

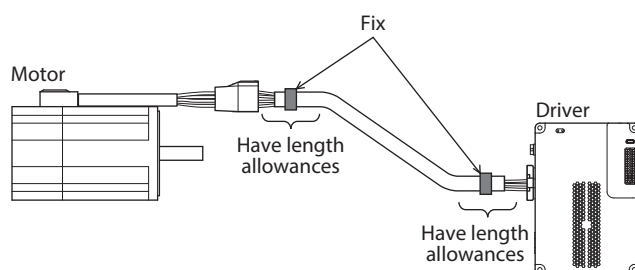
#### ● Notes when the cable is used

Note the following points when the cable is used.

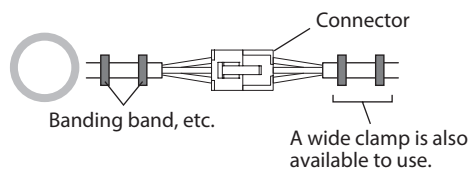
#### How to fix the cable

Fix the cable at the positions near the connector so that no stress due to the bending or self-weight of the cable is applied to the connector.

Also, do not excessively bend the cable near the connection part of the connector. Applying stress to the cable may cause poor contact or disconnection, resulting in malfunction or heat generation.

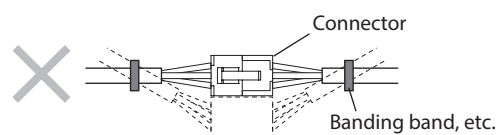


#### ● Fixing at two places on each side



Fix using two cable ties or a wide clamp.

#### ● Fixing at one place on each side

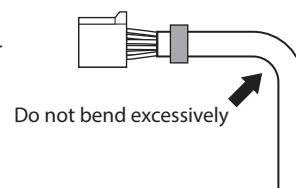


When the cable is moved, it causes stress to apply to the connector part.

#### When bending the cable

Do not excessively bend the cable.

Applying stress to the cable may cause poor contact or disconnection, resulting in malfunction or heat generation.



### ■ Installation

#### ● Grease measures

On rare occasions, grease may ooze out from the gearhead. If there is concern about potential environmental contamination from grease leakage, check for grease stains during periodic inspections. Alternatively, install an oil pan or other device to prevent damage from contamination. Grease leakage may lead to problems in the user's equipment or products.

#### ● When using in low temperature environment

When the ambient temperature is low, the load torque may increase due to the oil seal or the viscosity of the grease used in the gearhead, and the output torque may decrease or the overload alarm may be generated. However, as time passes, the oil seal or grease is warmed up, and the motor can be operated without generating the overload alarm.

- **Apply grease to the hollow output shaft of a hollow shaft flat gearhead.**

When using a hollow shaft flat gearhead, apply grease, such as molybdenum disulfide grease, to the surface of the load shaft and inner walls of the hollow output shaft to prevent seizure.

## ■ Grounding

- **Ground the motor.**

Install the motor to a grounded metal plate. Use the thickest possible wires and the shortest distance to ground the motor and driver so that there is no potential difference between the grounding points. Choose a large, thick, and uniformly conductive surface for the grounding point. Static electricity may damage the product if it is not grounded.

## ■ Insulation resistance measurement and dielectric strength test

- **Do not conduct the insulation resistance measurement or the dielectric strength test with the motor and driver connected.**

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

## ■ Operations

- **Motor with a key**

When operating the motor with key in a state where a load is not installed, make sure to provide measures so that the key is not flown off. To fly off the key may result in injury or damage to equipment.

- **Use an electromagnetic brake motor in an application of vertical drive, such as elevating equipment.**

When the motor is used in an application of vertical drive, such as elevating equipment (lifting and lowering device), use an electromagnetic brake motor so that the load can be held in position.

- **The electromagnetic brake of the brushless motor is intended for holding a load, so do not use it to brake or stop the motor.**

Using the electromagnetic brake to hold a load while the motor output shaft is rotating may result in damage to the product.

- **Rotation direction of the gearhead output shaft**

The rotation direction of the gearhead output shaft may differ from that of the motor output shaft depending on the gear ratio of the gearhead.

The rotation direction of the motor output shaft is the direction as viewed from the motor output shaft side.

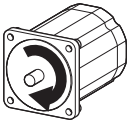
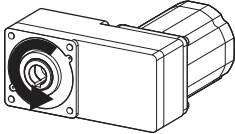
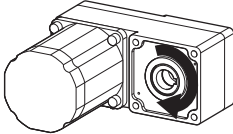
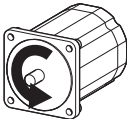
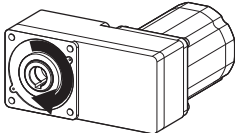
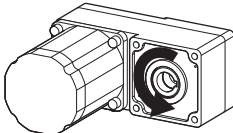
Refer to the operating manual of the driver for the rotation direction of the motor output shaft relative to the operation input signals of the driver.

### Parallel shaft gearhead

| Gear ratio        | Rotation direction of the gearhead output shaft |
|-------------------|-------------------------------------------------|
| <b>5, 10, 50</b>  | Same direction as the motor output shaft        |
| <b>15, 20, 30</b> | Opposite direction to the motor output shaft    |

**Hollow shaft flat gearhead**

The rotation directions of the gearhead output shaft relative to the motor output shaft are shown in the figures below.

| Motor output shaft                                                                | Gearhead output shaft                                                             |                                                                                    |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
|                                                                                   | Front                                                                             | Rear                                                                               |
|  |  |  |
|  |  |  |

● **Sliding noise of electromagnetic brake**

Sliding noise of the brake disk for the electromagnetic brake motor may be generated during operation.  
It is no functional problem.

# 4 Checking the product

## 4-1 Package contents

Verify that the items listed below are included.

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

### ■ Combination type-parallel shaft gearhead

- ☐ Motor ..... 1 unit
- ☐ Parallel key ..... 1 piece\*
- ☐ Mounting screw ..... 1 set  
(Hexagon socket head cap screw, flat washer, spring washer: each 4 pieces)
- ☐ Instructions and Precautions for Safe Use ..... 1 copy

\* The parallel key is fixed to the gearhead output shaft.

### ■ Combination type-hollow shaft flat gearhead

- ☐ Motor ..... 1 unit
- ☐ Parallel key ..... 1 piece
- ☐ Mounting screw ..... 1 set  
(Hexagon socket head cap screw, flat washer, spring washer: each 4 pieces)
- ☐ Safety cover ..... 1 set  
(Safety cover: 1 piece, mounting screw for safety cover: 2 pieces)
- ☐ Instructions and Precautions for Safe Use ..... 1 copy

### ■ Round shaft type

- ☐ Motor ..... 1 unit
- ☐ Parallel key ..... 1 piece\*
- ☐ Instructions and Precautions for Safe Use ..... 1 copy

\* Included with round shaft types with a key.

The parallel key is fixed to the motor output shaft.

## 4-2 How to identify the product model

### ● Combination type-hollow shaft flat gearhead

**BLMR 6 750 K M - 5 FR S - F**  
 1      2      3      4      5      6      7      8      9

|   |                          |                                                                         |
|---|--------------------------|-------------------------------------------------------------------------|
| 1 | Motor type               | <b>BLMR: BLV Series R Type</b>                                          |
| 2 | Frame size               | <b>6:</b> 104 mm (4.09 in.)                                             |
| 3 | Output power             | <b>750:</b> 750 W                                                       |
| 4 | Power supply voltage     | <b>K:</b> DC input                                                      |
| 5 | Electromagnetic brake    | <b>M:</b> With electromagnetic brake                                    |
| 6 | Gear ratio               | Number: Gear ratio of gearhead                                          |
| 7 | Gearhead type            | Blank: Parallel shaft gearhead<br><b>FR:</b> Hollow shaft flat gearhead |
| 8 | Material of output shaft | <b>S:</b> Stainless steel                                               |
| 9 | Cable outlet direction   | <b>F:</b> Output shaft side<br><b>B:</b> Opposite to output shaft side  |

### ● Round shaft type

**BLMR 6 750 K M - A - F**  
 1      2      3      4      5      6      7

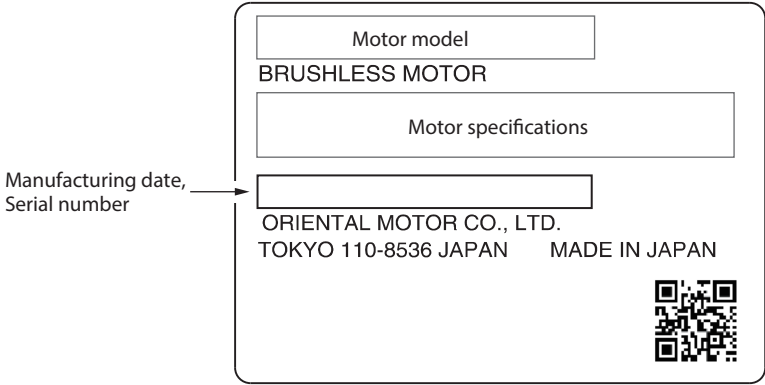
|   |                        |                                                                        |
|---|------------------------|------------------------------------------------------------------------|
| 1 | Motor type             | <b>BLMR: BLV Series R Type</b>                                         |
| 2 | Frame size             | <b>6:</b> 104 mm (4.09 in.)                                            |
| 3 | Output power           | <b>750:</b> 750 W                                                      |
| 4 | Power supply voltage   | <b>K:</b> DC input                                                     |
| 5 | Electromagnetic brake  | <b>M:</b> With electromagnetic brake                                   |
| 6 | Output shaft type      | <b>A:</b> Round shaft type<br><b>K:</b> Round shaft type with a key    |
| 7 | Cable outlet direction | <b>F:</b> Output shaft side<br><b>B:</b> Opposite to output shaft side |

4-3 Information about nameplate

Tell us the model name, product serial number, and manufacturing date when you contact us.  
The figure shows an example.

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

Motor



Gearhead



## 4-4 Products that can be combined

Verify the model name of the purchased product against the model shown on the package label.

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

- The box (□) in the model name indicates a number representing the gear ratio.
- The box (◆) in the model name indicates **F** or **B** representing the cable outlet direction.

### ■ Combination type-parallel shaft gearhead

| Combination type motor |                |                | Driver model     |
|------------------------|----------------|----------------|------------------|
| Model name             | Motor model    | Gearhead model |                  |
| <b>BLMR6750K-□S-◆</b>  | BLMR6750K-GR-◆ | 6GR□S2         | <b>BLVD-KCRD</b> |

### ■ Combination type-hollow shaft flat gearhead

| Combination type motor  |                |                | Driver model     |
|-------------------------|----------------|----------------|------------------|
| Model name              | Motor model    | Gearhead model |                  |
| <b>BLMR6750K-□FRS-◆</b> | BLMR6750K-GR-◆ | 6GR□FRS2       | <b>BLVD-KCRD</b> |

### ■ Round shaft type

| Motor model                                  | Driver model     |
|----------------------------------------------|------------------|
| <b>BLMR6750K-A-◆</b><br><b>BLMR6750K-K-◆</b> | <b>BLVD-KCRD</b> |

### ■ Combination type-parallel shaft gearhead with electromagnetic brake

| Combination type motor |                 |                | Driver model     |
|------------------------|-----------------|----------------|------------------|
| Model name             | Motor model     | Gearhead model |                  |
| <b>BLMR6750KM-□S-◆</b> | BLMR6750KM-GR-◆ | 6GR□S2         | <b>BLVD-KCRD</b> |

### ■ Combination type-hollow shaft flat gearhead with electromagnetic brake

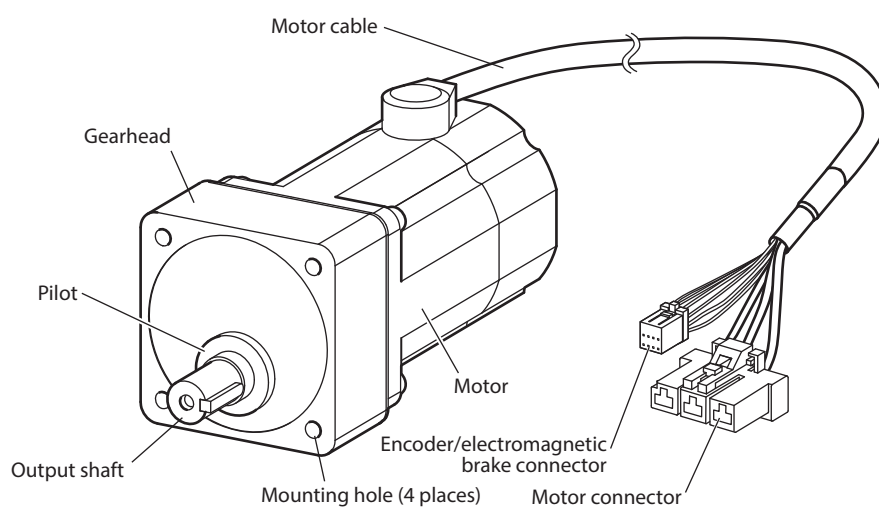
| Combination type motor   |                 |                | Driver model     |
|--------------------------|-----------------|----------------|------------------|
| Model name               | Motor model     | Gearhead model |                  |
| <b>BLMR6750KM-□FRS-◆</b> | BLMR6750KM-GR-◆ | 6GR□FRS2       | <b>BLVD-KCRD</b> |

### ■ Round shaft type electromagnetic brake motor

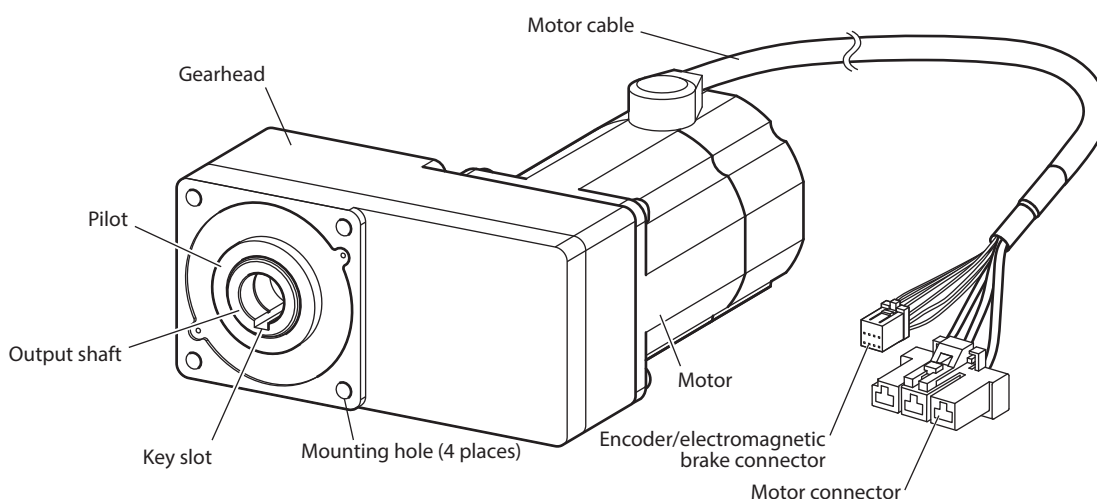
| Motor model                                    | Driver model     |
|------------------------------------------------|------------------|
| <b>BLMR6750KM-A-◆</b><br><b>BLMR6750KM-K-◆</b> | <b>BLVD-KCRD</b> |

## 4-5 Names and functions of parts

### ■ Combination type-parallel shaft gearhead (Example: BLMR6750K-10S-B)

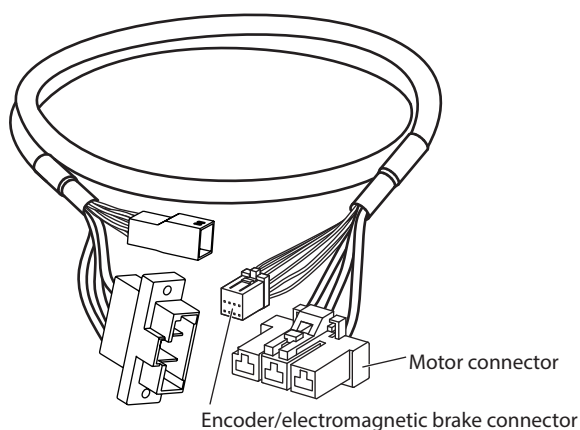


### ■ Combination type-hollow shaft flat gearhead (Example: BLMR6750K-10FRS-B)



#### Connection cable (Sold separately)

Use the dedicated connection cable (sold separately) when extending the wiring distance between the motor and the driver. Refer to "Connection cables" on p.25 for the connection cable models.



# 5 Installation

## 5-1 Installation Location

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

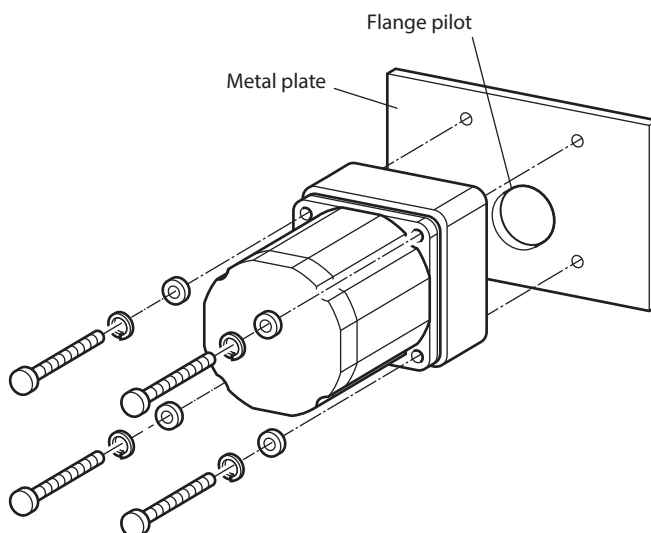
- Inside an enclosure installed indoors (provide ventilation holes)
- Operating ambient temperature: 0 to +40 °C [+32 to 104 °F] (non-freezing)
- Operating ambient humidity: 85 % or less (non-condensing)
- Area free of explosive atmosphere, toxic gas (such as sulfuric gas), or liquid
- Area not exposed to direct sun
- Area free of excessive amount of dust, iron particles, or the like
- Area not subject to splashing water (rain, water droplets), oil (oil droplets), or other liquids
- Area free of excessive salt
- Area not subject to continuous vibration or excessive shocks
- Area free of excessive electromagnetic noise (from welders, power machinery, etc.)
- Area free of radioactive materials, magnetic fields, or vacuum
- Up to 1000 m (3300 ft.) above sea level

## 5-2 Installation method

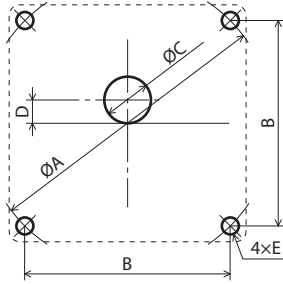
### ■ Combination type-parallel shaft gearhead

#### Installing to equipment

The motor can be installed in any direction. Install it securely to a metal surface that is as rigid as possible, taking into account heat dissipation and vibration prevention.



● **Mounting hole dimensions [Unit: mm (in.)]**



| Gearhead model | ØA         | B            | ØC        | D         | E  |
|----------------|------------|--------------|-----------|-----------|----|
| <b>6GR□S2</b>  | 120 (4.72) | 84.86 (3.34) | 42 (1.65) | 20 (0.79) | M8 |

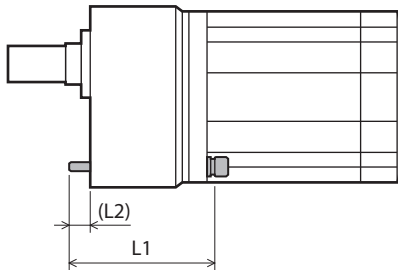
ØC indicates the external dimensions of the product.

Drill holes with a minimum diameter of ØC + 1 mm (0.04 in.).

● **Nominal designation of thread, tightening torque**

The value of the tightening torque is recommended. Tighten the screws to an appropriate torque according to the design conditions of the metal plate.

| Gear ratio            | Nominal designation of thread | L1 [mm (in.)] | L2 [mm (in.)] | Tightening torque [N·m (lb-in)] |
|-----------------------|-------------------------------|---------------|---------------|---------------------------------|
| <b>5, 10</b>          | M8                            | 85 (3.35)     | 11 (0.43)     | 12 (106)                        |
| <b>15, 20, 30, 50</b> |                               | 110 (4.33)    | 10 (0.39)     |                                 |

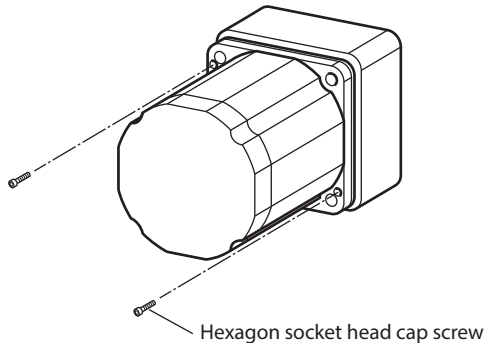


### Removing/assembling a motor and a gearhead

This is the procedure for replacing the gearhead or changing the cable outlet position.

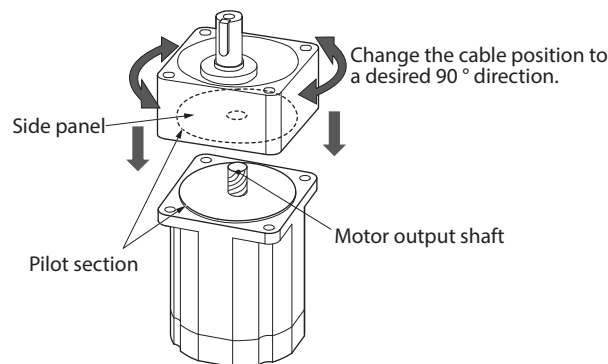
1. Removing the gearhead from the motor

Remove the hexagon socket head cap screws (2 places) securing the motor and gearhead, and remove the gearhead from the motor.



2. Assembling the gearhead to the motor

1) Keep the pilot sections of the motor and gearhead parallel, and assemble the gearhead to the motor while slowly rotating it clockwise/counterclockwise. At this time, make sure that the pinion of the motor output shaft does not hit the side panel or gears of the gearhead strongly.



Assemble the gearhead to the motor in a condition where the motor output shaft is set upward.

2) Check that there is no gap between the motor and the gearhead, and tighten them with hexagon socket head cap screws (2 places).

| Gearhead model | Nominal designation of thread | Tightening torque [N·m (lb-in)] |
|----------------|-------------------------------|---------------------------------|
| 6GR□S2         | M3                            | 0.6 (5.3)                       |

#### Note

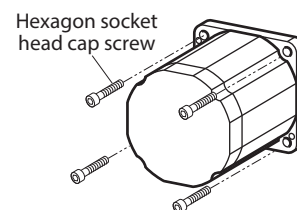
- Do not forcibly assemble the motor and the gearhead. Also, do not allow metal objects or foreign substances to enter the gearhead. The pinion of the motor output shaft or the gear may be damaged, resulting in noise or a reduction in the service life.
- Do not allow dust to attach to the pilot sections of the motor and gearhead. Also, assemble the motor and the gearhead carefully to avoid pinching the O-ring on the motor pilot section. If the O-ring is crushed or damaged, grease may leak from the gearhead.

## Motor (Round shaft type)

Secure the product using hexagon socket head cap screws (not included) through the four mounting holes.

Install so that there is no gap between the motor and the mounting plate.

| Nominal designation of thread | Tightening torque [N·m (lb-in)] |
|-------------------------------|---------------------------------|
| M8                            | 12<br>(106)                     |



Install the motor on a mounting plate of the following size or larger, so that the motor case temperature does not exceed 90 °C (194 °F).

| Size of mounting plate [mm (in.)] | Thickness [mm (in.)] | Material       |
|-----------------------------------|----------------------|----------------|
| 350 × 350<br>(13.78 × 13.78)      | 10<br>(0.39)         | Aluminum alloy |



Do not install the motor to the mounting hole diagonally or assemble the motor forcibly. Doing so may cause damage to the flange pilot section, thereby resulting in damage to the motor.

## Combination type-hollow shaft flat gearhead

### Installing to equipment

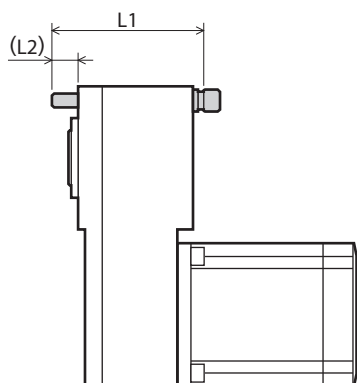
The motor can be installed in any direction. Install it securely to a metal surface that is as rigid as possible, taking into account heat dissipation and vibration prevention.

Use the included hexagon socket head cap screw set to install the product.

### ● Nominal designation of thread, tightening torque

The value of the tightening torque is recommended. Tighten the screws to an appropriate torque according to the design conditions of the metal plate.

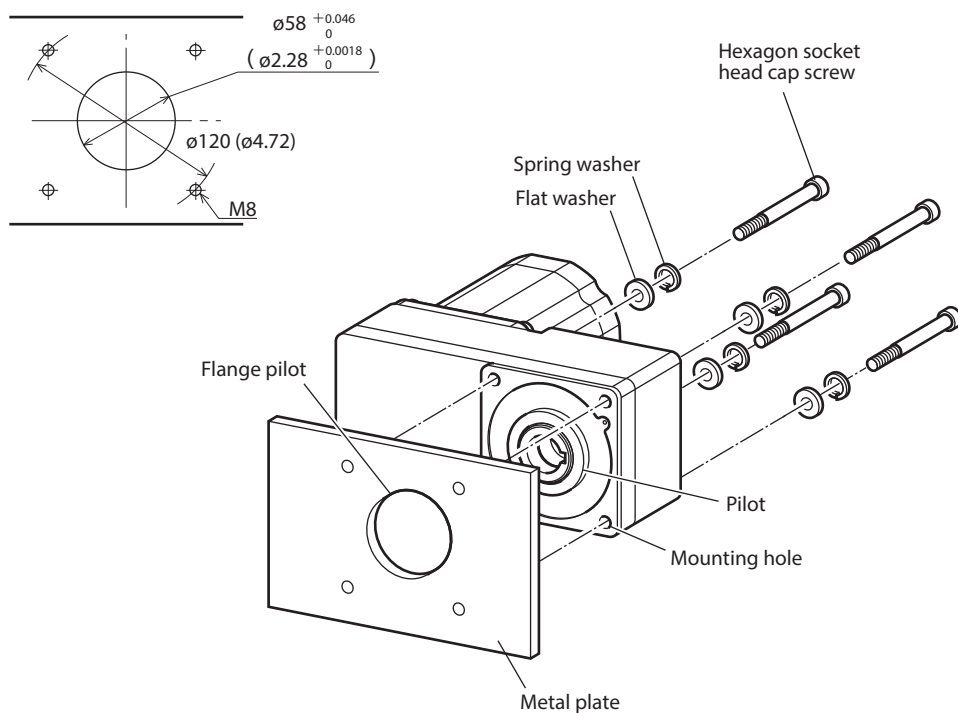
| Nominal designation of thread | L1 [mm (in.)] | L2 [mm (in.)] | Tightening torque [N·m (lb-in)] |
|-------------------------------|---------------|---------------|---------------------------------|
| M8                            | 100 (3.94)    | 13 (0.51)     | 12 (106)                        |



## ● Using the front as a mounting surface

The center axes of the motor and the metal plate can be aligned using the pilot.

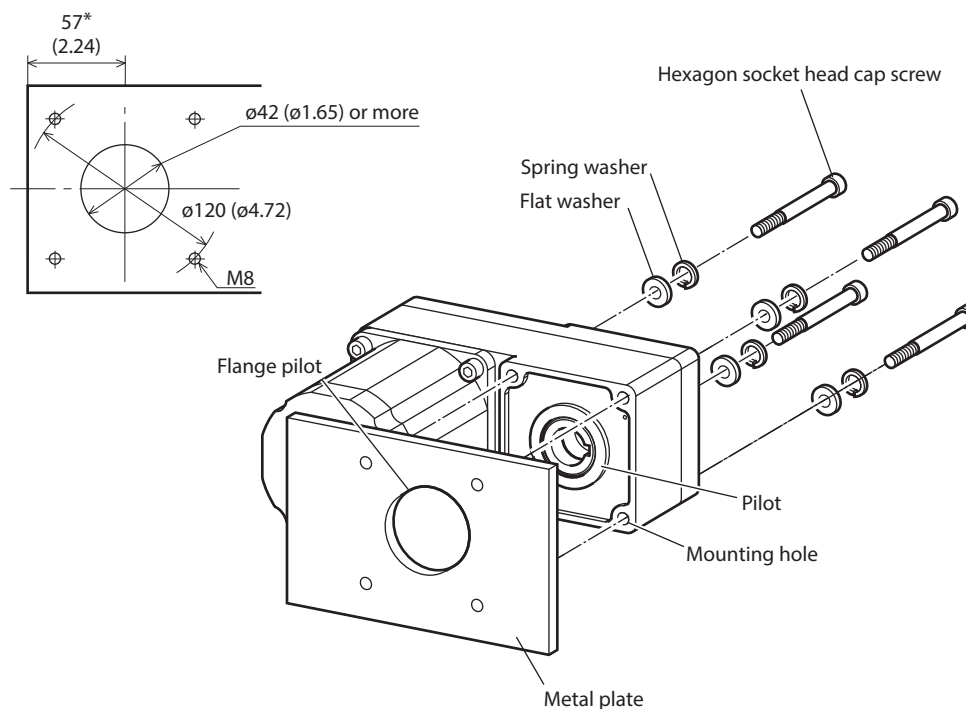
- Mounting hole dimensions [Unit: mm (in.)]



## ● Using the rear as a mounting surface

When installing using the rear, the center axes of the motor and the metal plate cannot be aligned due to no pilot. If centering is required, adjust the center axes yourself.

- Mounting hole dimensions [Unit: mm (in.)]



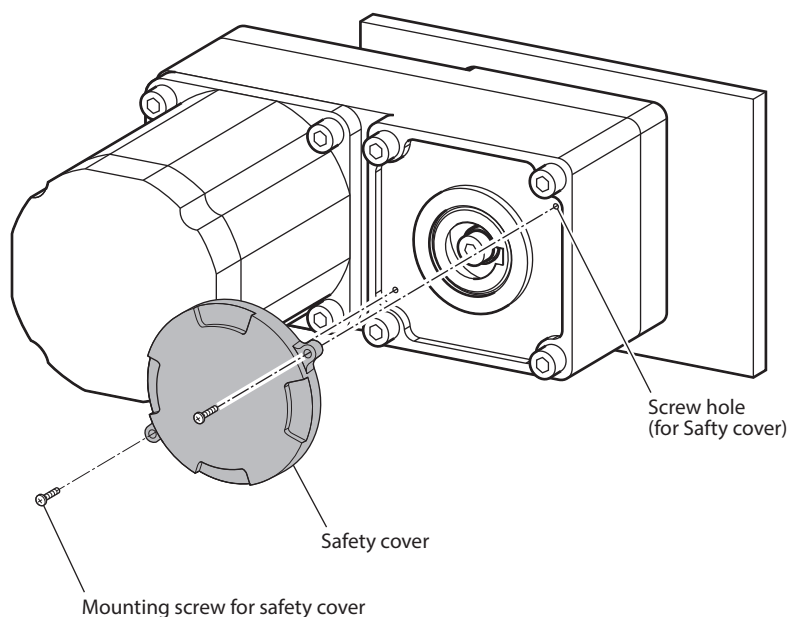
\* It is the distance from the motor to the center of the output shaft when the motor is placed on the left side.

## ● Attaching the safety cover

After installing the load shaft, install the included safety cover to prevent the output shaft from being touched.

The safety cover can be attached on either side.

Tightening torque: 0.45 N·m (3.9 lb-in)



## Removing/assembling a motor and a gearhead

This is the procedure for replacing the gearhead or changing the cable outlet position.

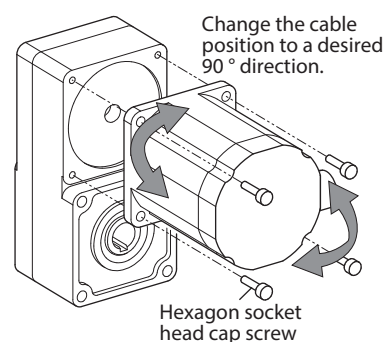
### 1. Removing the gearhead from the motor

Remove the hexagon socket head cap screws (4 places) securing the motor and gearhead, and remove the gearhead from the motor.

### 2. Assembling the gearhead to the motor

1) Keep the pilot sections of the motor and gearhead parallel, and assemble the gearhead to the motor while slowly rotating it clockwise/counterclockwise.

At this time, make sure that the pinion of the motor output shaft does not hit the side panel or gears of the gearhead strongly.



2) Check that there is no gap between the motor and the gearhead, and tighten them with hexagon socket head cap screws (4 places).

| Gearhead model  | Nominal designation of thread | Tightening torque [N·m (lb-in)] |
|-----------------|-------------------------------|---------------------------------|
| <b>6GR□FRS2</b> | M8                            | 12 (106)                        |

The box (□) in the gearhead model name indicates a gear ratio.

## Note

- Do not forcibly assemble the motor and the gearhead. Also, do not allow metal objects or foreign substances to enter the gearhead. The pinion of the motor output shaft or the gear may be damaged, resulting in noise or a reduction in the service life.
- Do not allow dust to attach to the pilot sections of the motor and gearhead. Also, assemble the motor and the gearhead carefully to avoid pinching the O-ring on the motor pilot section. If the O-ring is crushed or damaged, grease may leak from the gearhead.

## 5-3 Installing a load

When installing a load, align the centers of the output shaft and the load.

### Note

- When installing a load, pay attention to centering, belt tension, parallelism of pulleys, etc. Also, firmly secure the tightening screws of the coupling or pulleys.
- When installing a load, do not damage the output shaft or the bearings. Forcing the load in by hitting it with a hammer, etc., may cause the bearing to break. Do not apply any excessive force to the output shaft.
- Do not modify or machine the output shaft. This may damage the bearing, resulting in damage to the motor and gearhead.

## ■ Combination type-parallel shaft gearhead

### ● Output shaft shape

A key slot is provided on the output shaft of the gearhead. Machine a key slot on the load side and secure the load using the included parallel key.

### ● How to install a load

#### Using a coupling

Align the centers of the output shaft and load shaft in a straight line.

#### Using a belt

Align the output shaft and load shaft in parallel and make sure the line connecting the centers of the two pulleys is perpendicular to the shafts.

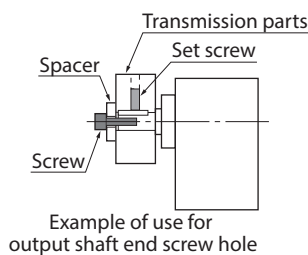
#### Using a gear drive

Align the output shaft and gear shaft in parallel and allow the gears to mesh at the center of the tooth widths.

### When using the output shaft end screw hole of a gearhead

Use a screw hole provided at the end of the output shaft as an auxiliary means to prevent the transmission parts from disengaging. The box (□) in the gearhead model name indicates a gear ratio.

| Gearhead model | Output shaft end screw hole             |
|----------------|-----------------------------------------|
| 6GR□S2         | M6, effective depth<br>12 mm (0.47 in.) |



## Combination type-hollow shaft flat gearhead

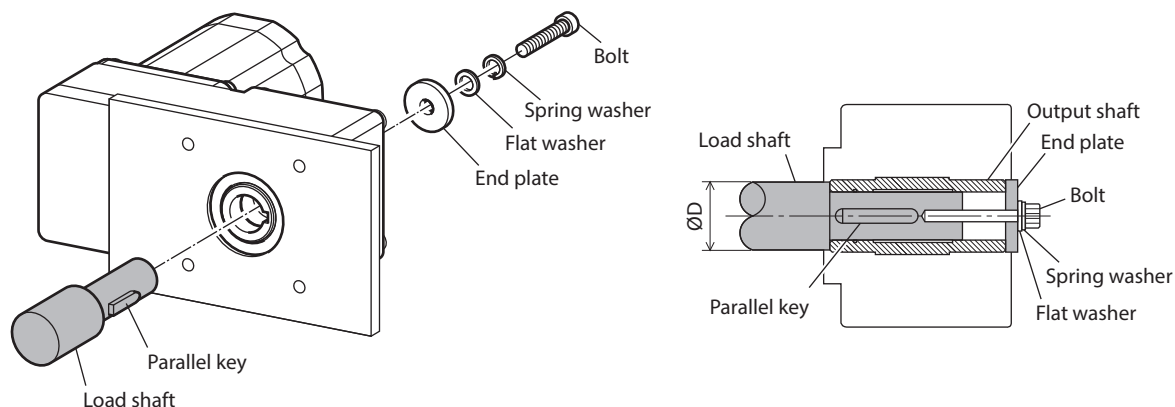
If a large impact occurs at instantaneous stop or a large radial load is applied, use a stepped load shaft.

**Note** Apply grease (molybdenum disulfide grease, etc.) to the surface of the load shaft and the inner walls of the hollow output shaft to prevent seizure.

### When the stepped load shaft is installed

#### Installation using an end plate

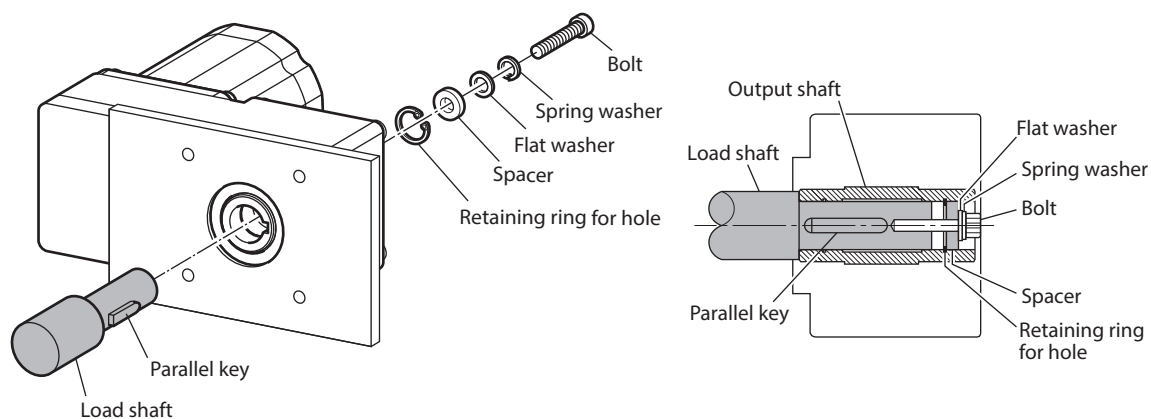
Use an end plate, flat washer, and spring washer to secure the load shaft with a screw.



**Note** When installing the load shaft using an end plate, the included safety cover cannot be installed because it is in contact with the screw. Other measures must be taken to protect the output shaft.

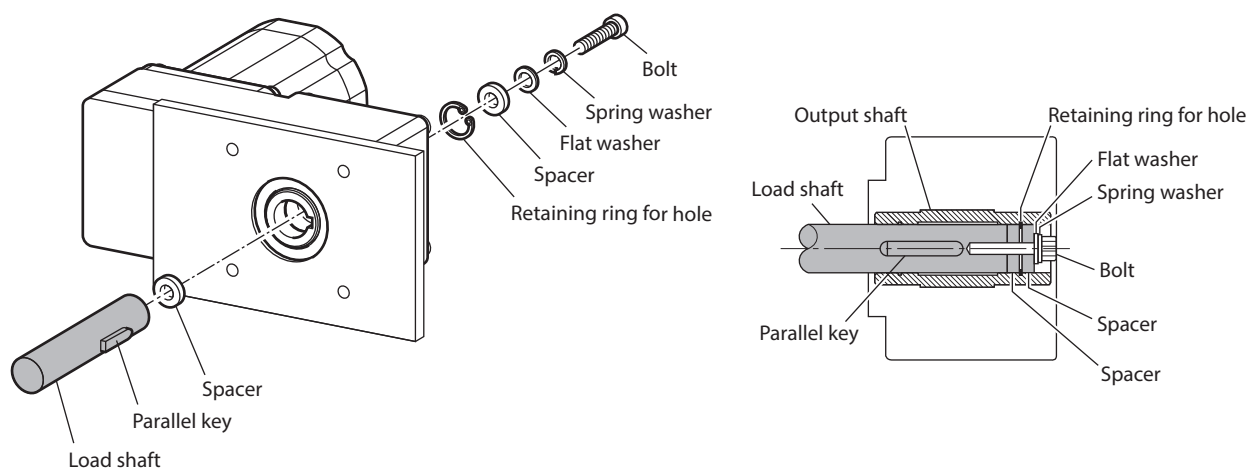
#### Installation using a retaining ring for hole

First, place a retaining ring for hole. Then, use a spacer, flat washer, and spring washer to secure the load shaft with a screw.



### ● When the non-stepped load shaft is installed

First, place a retaining ring for hole. Then, use spacers, a flat washer, and a spring washer to secure the load shaft with a screw. Also place a spacer on the load shaft side.



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

| Gearhead model  | Inner diameter of hollow shaft (H8)                                                                                           | Recommended diameter of load shaft (h7)                                                                                       | Nominal diameter of retaining ring for hole                | Applicable screw | Spacer thickness        | Outer diameter of stepped shaft (ØD) |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|------------------|-------------------------|--------------------------------------|
| <b>6GR□FRS2</b> | $\begin{matrix} \text{Ø}25 & +0.033 \\ & 0 \end{matrix}$<br>( $\begin{matrix} \text{Ø}0.9843 & +0.0013 \\ & 0 \end{matrix}$ ) | $\begin{matrix} \text{Ø}25 & 0 \\ & -0.021 \end{matrix}$<br>( $\begin{matrix} \text{Ø}0.9843 & 0 \\ & -0.0008 \end{matrix}$ ) | $\begin{matrix} \text{Ø}25 \\ (\text{Ø}0.98) \end{matrix}$ | M8               | 6 (0.24)<br>[3 (0.12)]* | 40 (1.57)                            |

\* The values in the brackets [ ] are those when using the rear as the mounting surface.

### ■ Motor (Round shaft type)

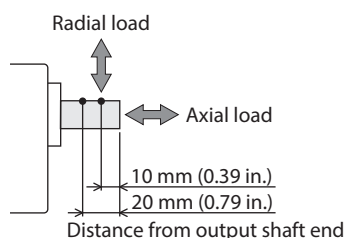
Use a hexagon socket set screw (double-point), etc., to firmly secure the load so that it does not rotate idly.

For the round shaft type motors with a key, machine a key slot on the load side and secure the load using the included parallel key.

## 5-4 Permissible radial load and permissible axial load

Make sure that the radial load and axial load applied to the output shaft do not exceed the permissible values shown in the table below.

**Note** Failure due to fatigue may occur when the motor or gearhead bearings and output shaft are repeatedly subjected to the radial or axial load that exceeds the permissible limit.

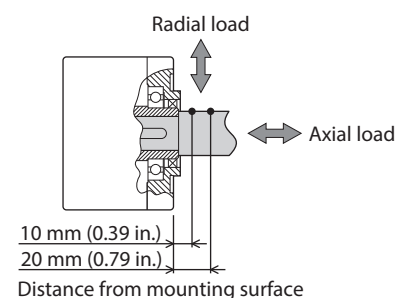


### Combination type-parallel shaft gearhead

The values are based on a rated speed of 3000 r/min or lower. The values in the brackets [ ] are based on a rated speed of 4000 r/min.

| Gearhead model | □: Gear ratio     | Permissible radial load [N (lb.)]<br>Distance from the output shaft end of the gearhead |                         | Permissible axial load<br>[N (lb.)] |
|----------------|-------------------|-----------------------------------------------------------------------------------------|-------------------------|-------------------------------------|
|                |                   | 10 mm (0.39 in.)                                                                        | 20 mm (0.79 in.)        |                                     |
| <b>6GR□S2</b>  | <b>5, 10</b>      | 550 (123) [500 (112)]                                                                   | 800 (180) [700 (157)]   | 200 (45)                            |
|                | <b>15, 20, 30</b> | 1000 (220) [900 (200)]                                                                  | 1250 (280) [1100 (240)] | 300 (67)                            |
|                | <b>50</b>         | 1300 (290) [1200 (270)]                                                                 | 1450 (320) [1300 (290)] | 400 (90)                            |

### Combination type-hollow shaft flat gearhead



The values are based on a rated speed of 3000 r/min or lower. The values in the brackets [ ] are based on a rated speed of 4000 r/min.

| Gearhead model  | □: Gear ratio | Permissible radial load [N (lb.)]<br>Distance from the gearhead mounting surface |                         | Permissible axial load<br>[N (lb.)] |
|-----------------|---------------|----------------------------------------------------------------------------------|-------------------------|-------------------------------------|
|                 |               | 10 mm (0.39 in.)                                                                 | 20 mm (0.79 in.)        |                                     |
| <b>6GR□FRS2</b> | <b>5, 10</b>  | 1230 (270) [1130 (250)]                                                          | 1070 (240) [990 (220)]  | 800 (180)                           |
|                 | <b>15, 20</b> | 1680 (370) [1550 (340)]                                                          | 1470 (330) [1360 (300)] |                                     |
|                 | <b>30, 50</b> | 2040 (450) [1900 (420)]                                                          | 1780 (400) [1660 (370)] |                                     |

### Motor (Round shaft type)

| Model           | Permissible radial load [N (lb.)]<br>Distance from the output shaft end of the motor |                  | Permissible axial load<br>[N (lb.)] |
|-----------------|--------------------------------------------------------------------------------------|------------------|-------------------------------------|
|                 | 10 mm (0.39 in.)                                                                     | 20 mm (0.79 in.) |                                     |
| <b>BLMR6750</b> | 262 (58)                                                                             | 304 (68)         | 25 (5.6)                            |

## 6 Inspection and maintenance

### 6-1 Inspection

It is recommended that the following items be checked periodically after each operation of the motor. If any abnormality occurs, discontinue use of the product and contact your nearest Oriental Motor sales office.



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

#### ■ Inspection Items

- Check to see if any of the mounting screws of the motor and gearhead are loose.
- Check to see if the bearing part (ball bearings) of the motor makes an unusual noise.
- Check to see if the bearing part (ball bearings) or the gear meshing part of the gearhead makes an unusual noise.
- Check to see if the output shaft of the motor and gearhead and a load shaft are out of alignment.
- Check to see if the cable is damaged or stressed, or if the connection between the motor/cable and the driver is loose.

### 6-2 Warranty

#### ■ Product warranty

We will repair free of charge any defect in material or workmanship found in our product during the warranty period.

The warranty repair covers only our product itself. (However, in the case of a circuit product, the warranty covers both our product and our software installed in our product only.) We shall not be liable for any loss or lost opportunity the user may experience in connection with a defect in our product.

This warranty shall not cover defects due to expiration of the product's life or replacement of consumable parts.

#### ■ Warranty period

The warranty period of our product shall be two years after delivery to a location specified by you.

#### ■ Exclusions

Defects and malfunctions of our product arising from one or more of the following causes are excluded from the scope of this warranty:

- 1) Any condition, environment, handling or use which is not appropriate or not specified in our product catalog or other product specifications and documents approved by us
- 2) Any cause or any reason not associated with our product
- 3) A modification or repair to our product not performed by us
- 4) A use other than the intended use of our product
- 5) A condition not foreseeable based on the science or technology available at the time of delivery from our premises
- 6) An act of God, natural disaster or any other cause or reason beyond our reasonable control

The above information is based on the assumption of trading and use in Japan.

### 6-3 Disposal

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

## 7 Cable and accessories

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### ■ Connection cables

Use these cables when extending the wiring distance between the motor and the driver.

The maximum extension distance including the cable length of the motor itself should be 3.5 m (11.5 ft.).

| Length        | Model              |
|---------------|--------------------|
| 1 m (3.3 ft.) | <b>CCM010B3AAF</b> |
| 2 m (6.6 ft.) | <b>CCM020B3AAF</b> |
| 3 m (9.8 ft.) | <b>CCM030B3AAF</b> |

### ■ Couplings, mounting brackets

Couplings and mounting brackets can be checked on the Oriental Motor Website.

#### About the mounting brackets (SOL) of the motor

If the motor is secured to the mounting bracket in a state where the cable outlet is set in the output shaft direction, the cable may interfere with and make contact with the mounting bracket or installation surface.

## 8 Specifications

### ■ Specifications

Check on the Oriental Motor Website for the product specifications.

### ■ General specifications

|                                             |                        |                                                                                                                                                                                                                                                                                        |
|---------------------------------------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating environment                       | Ambient temperature    | 0 to +40 °C (+32 to +104 °F) (non-freezing)                                                                                                                                                                                                                                            |
|                                             | Humidity               | 85 % or less (non-condensing)                                                                                                                                                                                                                                                          |
|                                             | Altitude               | Up to 1000 m (3300 ft.) above sea level                                                                                                                                                                                                                                                |
|                                             | Surrounding atmosphere | No corrosive gas or dust. No water or oil.<br>Cannot be used in radioactive materials, magnetic field, vacuum or other special environments.                                                                                                                                           |
|                                             | Vibration              | Not subject to continuous vibration or excessive impact. In conformance with JIS C 60068-2-6 "Sine-wave vibration test method"<br>Frequency range: 10 Hz 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<br>Shipping environment | Ambient temperature    | –20 to +70 °C (–4 to +158 °F) (non-freezing)                                                                                                                                                                                                                                           |
|                                             | Humidity               | 85 % or less (non-condensing)                                                                                                                                                                                                                                                          |
|                                             | Altitude               | Up to 3000 m (10000 ft.) above sea level                                                                                                                                                                                                                                               |
|                                             | Surrounding atmosphere | No corrosive gas or dust. No water or oil.<br>Cannot be used in radioactive materials, magnetic field, vacuum or other special environments.                                                                                                                                           |
| Degree of protection                        |                        | IP40                                                                                                                                                                                                                                                                                   |

## 9 Regulations and standards

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### ■ UL Standards

This product is recognized by UL under the UL Standards.

### ■ Hazardous substances

This product does not contain substances that exceed the regulation values in the RoHS Directive.

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