

OPERATING MANUAL

Brushless Motor for DC Power Input Drivers

BLM Motor Connector Type

Introduction

Before using the product

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 in general industrial equipment.

Do not use for any other purpose. For the 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 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 them from Oriental Motor Website Download Page or contact your nearest Oriental Motor sales office.

	Operating manual name
Motor	For DC power input driver BLM Motor Connector Type OPERATING MANUAL (this document)
Driver	BLH Series Analog Setting Type OPERATING MANUAL Digital Setting Type OPERATING MANUAL RS-485 Communication Type OPERATING MANUAL

Safety precautions

The precautions described below are intended to ensure the safe and correct 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.

 WARNING	Handling the product without observing the instructions that accompany a "WARNING" symbol may result in serious injury or death.
 CAUTION	Handling the product without observing the instructions that accompany a "CAUTION" symbol may result in injury or property damage.
 Note	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.

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 disassemble or modify the motor. Doing so may result in 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, injury, or damage to equipment. • Use a motor and a driver only in the specified combination. An incorrect combination may cause fire or damage to equipment. • Install the motor inside 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 its specifications. Doing so may result in fire, 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 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) with bare hands. Doing so may result in 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 product and equipment. Injury may result. • Do not touch the rotating part (output shaft) while operating the motor. Doing so may result in injury.
	• 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. • 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. • Be sure to ground the motor to prevent it from being damaged by 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 operating motor, attach a warning label as shown in the figure in a conspicuous position. Failure to do so may result in a skin burn(s).



Warning label

WARNING

	• Do not use the product in explosive or corrosive environments, in the presence of flammable gases, locations subjected to splashing water, or near combustibles. Doing so may result in fire 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. This may result in damage to equipment. • Do not use a motor in vertical drive such as elevating equipment. If the driver protective function is activated, the motor will stop and the moving part will fall, thereby causing injury or damage to equipment. • Do not machine or modify the cable. Doing so may result in fire or damage to equipment. • Do not apply any excessive force to the motor connector. Doing so may result in fire or damage to equipment. • Do not forcibly bend, pull or pinch the cable. Doing so may result in fire or damage to equipment. • Do not touch the motor when conducting the insulation resistance measurement or dielectric strength test. Accidental contact may result in electric shock.
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Precautions for use

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

Use a motor and a driver only in the specified combination.

Wiring

● Connecting a motor and a driver

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

The maximum extension distance between a motor and a driver is 5 m (16.4 ft.). Limit the number of times so that attaching/detaching between the connection cable and the motor or driver will not exceed 30 times.

Repeatedly attaching and detaching the connection cable may cause malfunction or damage to the motor or driver.

Installation circumstances

● Grease measures

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

● When using in low temperature environment

When an ambient temperature is low, a load torque may increase due to the oil seal or viscosity increment of 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.

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 dielectric strength test with the motor and driver connected may result in damage to the product.

Operations

● Do not perform gravitational operation (vertical drive)

If this product is performed operation (i.e. gravitational operation) in which the motor output shaft is turned from the load side, the motor speed cannot be controlled. Also, if gravitational operation is performed, since the internal voltage of the driver may exceed the permissible value, the protective function may be activated. As a result, the motor may coast to a stop, causing the load to fall.

● Rotation direction of the gearhead output shaft

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

● BLM015HK-□

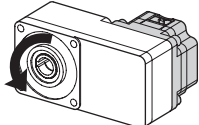
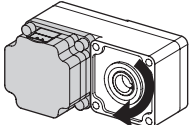
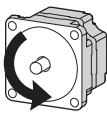
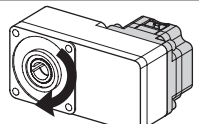
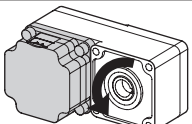
Gear ratio	Rotation direction of the gearhead output shaft
5, 10, 15, 50, 100	Same direction as the motor output shaft
20, 30	Opposite direction to the motor output shaft

● Geared motor, parallel shaft **GFS** gearhead (Except for **BLM015HK-□**)

Gear ratio	Rotation direction of the gearhead output shaft
5, 10, 15, 20	Same direction as the motor output shaft
30, 50, 100	Opposite direction to the motor output shaft

● Hollow shaft flat **FR** gearhead

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

Motor output shaft	Gearhead output shaft	
	Front	Rear
		
		

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

Checking the product

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

■ How to identify the product model

BLM **2** **50** **D** **H** **K** - **5** **CS**
 1 2 3 4 5 6 7 8

1	Motor type	BLM : Brushless motor
2	Frame size	0 : 42 mm (1.65 in.), 2 : 60 mm (2.36 in.), 4 : 80 mm (3.15 in.)
3	Output power	15 : 15 W 30 : 30 W 50 : 50 W
4	Motor classification	D
5	Motor connection method	H : Connector type
6	Power supply voltage	K : 24 VDC
7	Gear ratio, Motor shaft type	Number: Gear ratio of gearhead A : Round shaft type, AC : Round shaft type (shaft flat)
8	Gearhead type	Blank: Parallel shaft GFS gearhead CS : CS geared FR : Hollow shaft flat FR gearhead

■ Package contents, model

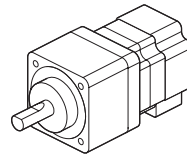
Verify that the items listed below are included.

Report any missing or damaged items to the branch or sales office from which you purchased the product. Verify the model 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 the number representing the gear ratio.
- The box (◇) in the model name of the round shaft type indicates **A** (no machining) or **AC** (shaft flat).

● Geared motor

The geared motor represents a single component that integrates a motor and a gearhead. Do not disassemble the gearhead from the motor.



Frame size 42 mm (1.65 in.)

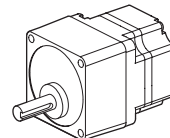
- ☐ Motor 1 unit
- ☐ Instructions and Precautions for Safe Use 1 copy

[Frame size 60 mm (2.36 in.)]

- ☐ Motor 1 unit
- ☐ Instructions and Precautions for Safe Use 1 copy
- ☐ Mounting screw 1 set
(Hexagonal socket head screw, plain washer, spring washer, 4 pieces each)
- ☐ Parallel key 1 piece
(Fixed to the output shaft)

Frame size	Output power	Model
42 mm (1.65 in.)	15 W	BLM015HK-□ BLM015HK-□CS
	30 W	BLM030DHK-□CS
60 mm (2.36 in.)	30 W	BLM230HK-□CS
	50 W	BLM250DHK-□CS

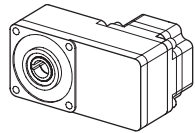
● Motor with parallel shaft **GFS** gearhead



- ☐ Motor 1 unit
- ☐ Instructions and Precautions for Safe Use 1 copy
- ☐ Mounting screw 1 set
(Hexagonal socket head screw, plain washer, spring washer, 4 pieces each)
- ☐ Parallel key 1 piece

Frame size	Output power	Model	Motor model	Gearhead model
60 mm (2.36 in.)	30 W	BLM230HK-□	BLM230HK-GFS	GFS2G□
80 mm (3.15 in.)	50 W	BLM450HK-□	BLM450HK-GFS	GFS4G□

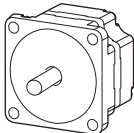
● Motor with hollow shaft flat FR gearhead



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

Frame size	Output power	Model	Motor model	Gearhead model
60 mm (2.36 in.)	30 W	BLM230HK-□FR	BLM230HK-GFS	GFS2G□FR
80 mm (3.15 in.)	50 W	BLM450HK-□FR	BLM450HK-GFS	GFS4G□FR

● Round shaft type motor

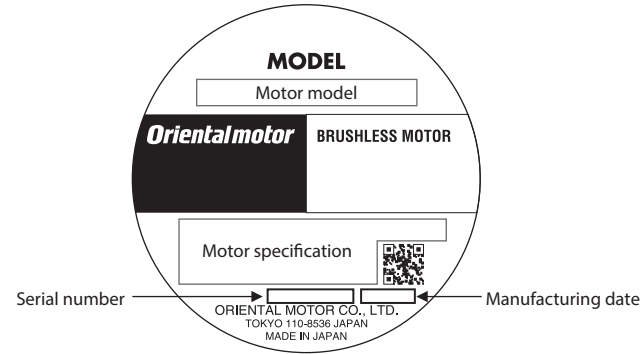


- ☐ Motor 1 unit
- ☐ Instructions and Precautions for Safe Use 1 copy

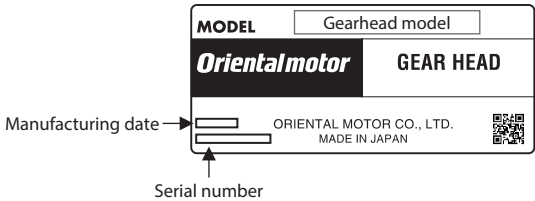
Frame size	Output power	Model
42 mm (1.65 in.)	15 W	BLM015HK-◇
	30 W	BLM030DHK-◇
60 mm (2.36 in.)	30 W	BLM230HK-◇
	50 W	BLM250DHK-◇
80 mm (3.15 in.)	50 W	BLM450HK-◇

■ Information about nameplate

● Motor, geared motor



● Gearhead

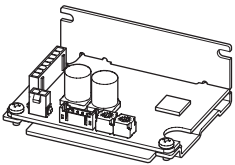


■ Drivers possible to combine

Products with which the motors can be combined are listed below.
The box (■) in the driver model indicates a code (blank, **D**, **R**) representing the driver type.
Blank: Analog setting type, **D**: Digital setting type, **R**: RS-485 communication type

● BLH Series

Output power	Motor model	Driver model
15 W	BLM015HK	BLH2D15H-K■
30 W	BLM030DHK	BLH2D30DH-K■
	BLM230HK	BLH2D30H-K■
50 W	BLM250DHK	BLH2D50DH-K■
	BLM450HK	BLH2D50H-K■



■ Connection cable (sold separately)

To connect a motor and a driver, the dedicated connection cable (sold separately) is required.
The maximum extension distance is 5 m (16.4 ft.).

● Connection cable

Length	Model
0.5 m (1.6 ft.)	LCM005LAAF
1 m (3.3 ft.)	CCM010LAAF
1.5 m (4.9 ft.)	CCM015LAAF
2 m (6.6 ft.)	CCM020LAAF
3 m (9.8 ft.)	CCM030LAAF
5 m (16.4 ft.)	CCM050LAAF

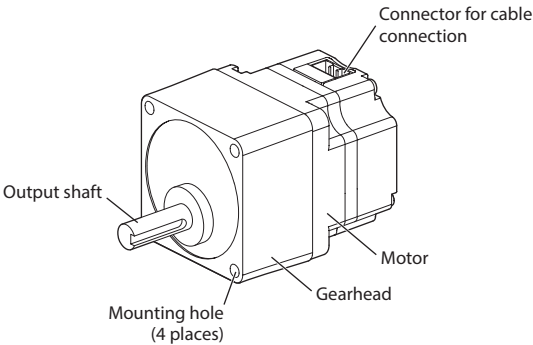
● Flexible connection cables

Length	Model
1 m (3.3 ft.)	CCM010LAAR
1.5 m (4.9 ft.)	CCM015LAAR
2 m (6.6 ft.)	CCM020LAAR
3 m (9.8 ft.)	CCM030LAAR
5 m (16.4 ft.)	CCM050LAAR

■ Names of parts

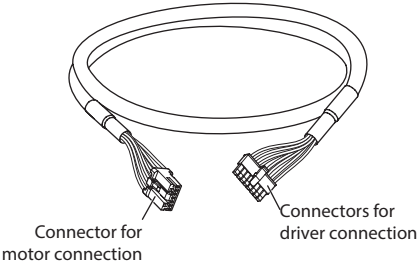
Motor

The figure shows the motor with parallel shaft **GFS** gearhead.



Connection cable (sold separately)

The figure shows a connection cable of 1 m (3.3 ft.) to 5 m (16.4 ft.) length.
The connection cable of 0.5 m (1.6 ft.) length is the lead wire type.



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. The location must also satisfy the following conditions:

- Inside an enclosure that is installed indoors (provide vent holes)
- Operating ambient temperature: 0 to +50 °C (+32 to +122 °F) (non-freezing)
- Operating ambient humidity 85% or less (non-condensing)
- Area 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 not subject to splashing water (rain, water droplets), oil (oil droplets) or other liquids
- Area free of excessive salt
- Area not subject to continuous vibrations or excessive shocks
- Area free of excessive electromagnetic noise (from welders, power machinery, etc.)
- Area free of radioactive materials, magnetic fields or vacuum
- Altitude Up to 1000 m (3300 ft.) above sea level

Installation method

Note Do not install the motor to the mounting hole diagonally or assemble the motor forcibly. Doing so may damage the motor.

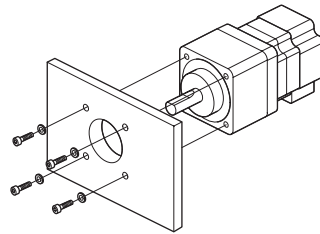
Geared motor [frame size 42 mm (1.65 in.)]

Secure the four mounting holes of the product using hexagonal socket head screws (not included).

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

Model	Screw size	Tightening torque [N·m (lb-in)]
BLM015 BLM030	M4	2.0 (17.7)

The effective depth of screw is 8 mm (0.31 in.).

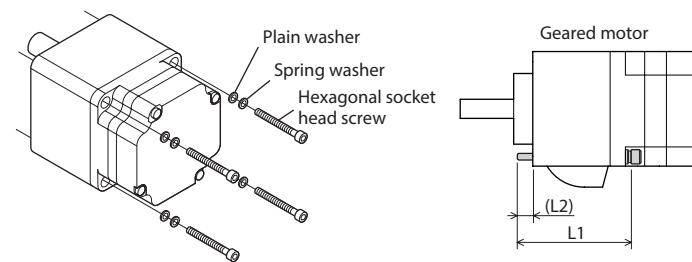


Note Fit the mounting boss on the gearhead mounting surface into a counterbore or through-hole machined flange pilot.

Geared motor [frame size 60 mm (2.36 in.)]

Secure the product using the included hexagonal socket head screws through the four mounting holes.

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

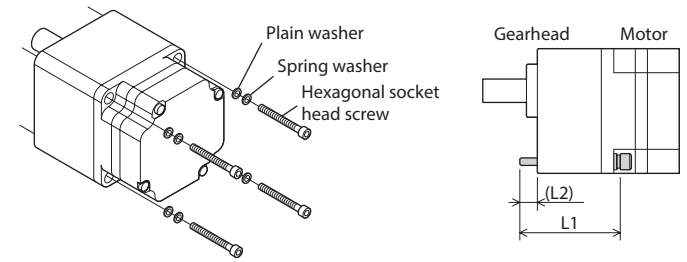


Model	Gear ratio	Hexagonal socket head screw (included)		L2 [mm (in.)]	Tightening torque [N·m (lb-in)]
		Screw size	L1 [mm (in.)]		
BLM230HK-□CS BLM250DHK-□CS	5 to 20	M4	60 (2.36)	10 (0.39)	2.0 (17.7)

Motor with parallel shaft GFS gearhead

Secure the product using the included hexagonal socket head screws through the four mounting holes.

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



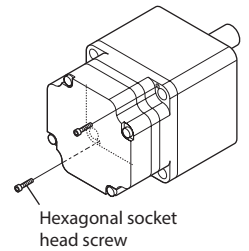
Model	Gear Ratio	Hexagonal socket head screw (included)		L2 [mm (in.)]	Tightening torque [N·m (lb-in)]
		Screw size	L1 [mm (in.)]		
BLM230HK-□	5 to 20	M4	50 (1.97)	6 (0.24)	2.0 (17.7)
	30 to 100		55 (2.17)	7 (0.28)	
BLM450HK-□	5 to 20	M6	60 (2.36)	8 (0.31)	5.0 (44)
	30 to 100		65 (2.56)	8 (0.31)	

Removing and assembling the gearhead (Except for geared motors)

This is the procedure to replace the gearhead or to change the connector position for cable connection.

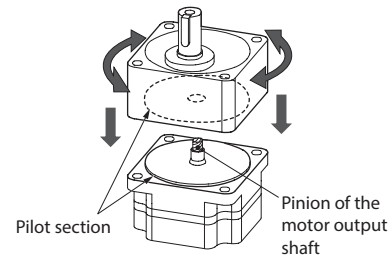
Removing the gearhead from the motor

Remove the hexagonal socket head screws (2 places) assembling the motor and gearhead, and detach the gearhead from the motor.



Assembling the gearhead to the motor

1. Keep the pilot sections of the motor and gearhead in parallel, and assemble the gearhead with the motor while slowly rotating it clockwise/counterclockwise. At this time, note so that the pinion of the motor output shaft does not hit the gearhead or gears strongly.



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

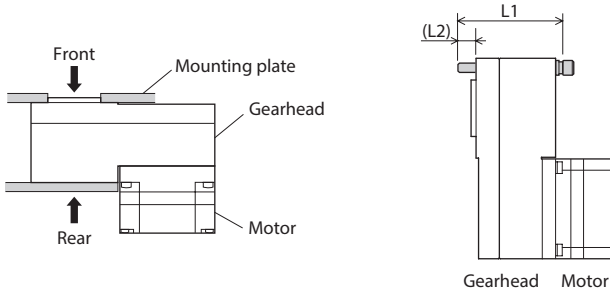
2. Check that there is no gap between the motor and the gearhead, and tighten them with hexagonal socket head screws (2 places).

Model	Screw size	Tightening torque [N·m (lb-in)]
BLM230 BLM450	M2.6	0.4 (3.5)

- Note**
- Do not forcibly assemble the motor and gearhead. Also, prevent metal objects or foreign substances from entering in the gearhead. The pinion of the motor output shaft or gear 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. If the O-ring is crushed or severed, grease may leak from the gearhead.

● Motor with hollow shaft flat FR gearhead

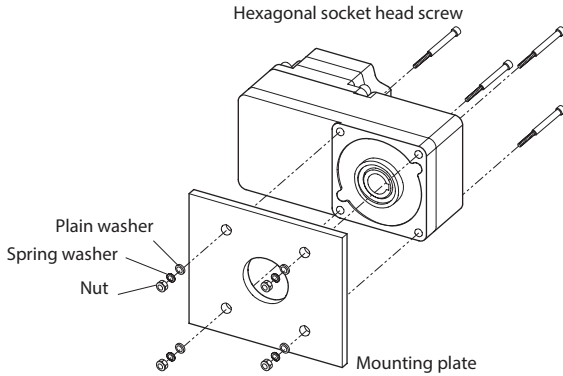
A hollow shaft flat gearhead can be installed by using either its front or rear side as the mounting surface.
Secure with the included hexagonal socket head screws through the four mounting holes so as not to leave a gap between the motor and mounting plate.
Attach the included safety cover to the hollow output shaft on the end opposite from the one where the load shaft is installed.



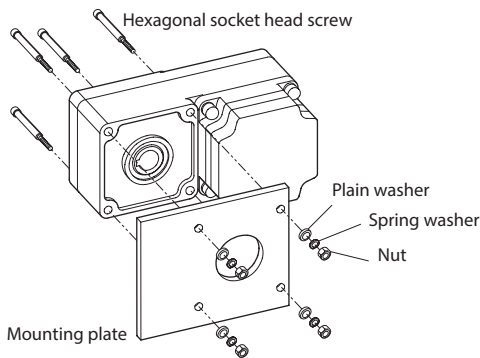
Model	Hexagonal socket head screw (supplied)		L2 [mm (in.)]	Tightening torque [N·m (lb-in)]
	Screw size	L1 [mm]		
BLM230	M5	65 (2.56)	15 (0.59)	3.0 (26)
BLM450	M6	70 (2.76)	14 (0.55)	5.0 (44)

Using the front side as the mounting surface

When the gearhead is installed using its front side as the mounting surface, use the mounting boss of the output shaft to align the center axes of the hollow shaft and the load shaft.

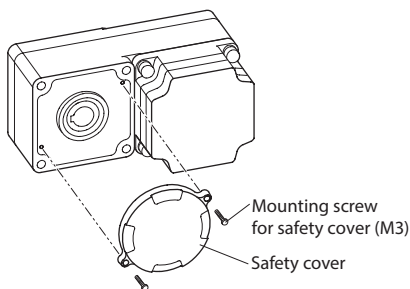


Using the rear side as the mounting surface



Installing the safety cover

After installing a load, attach the included safety cover.
The safety cover can be attached to either side.
Tightening torque: 0.45 N·m (3.9 lb-in)

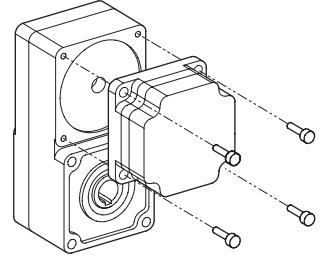


Removing and assembling the gearhead

This is the procedure to replace the gearhead or to change the connector position for cable connection. Note that the motor cable cannot be positioned in the direction where it faces to the gearhead output shaft side.

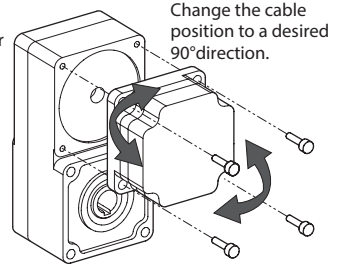
Removing the gearhead from the motor

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



Assembling the motor with the gearhead

1. Keep the pilot sections of the motor and gearhead in parallel, and assemble the motor with the gearhead while slowly rotating it clockwise/counterclockwise.
At this time, note so that the pinion of the motor output shaft does not hit the gearhead strongly.



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

Model	Screw size	Tightening torque [N·m (lb-in)]
BLM230	M4	2.0 (17.7)
BLM450	M6	5.0 (44)

Note

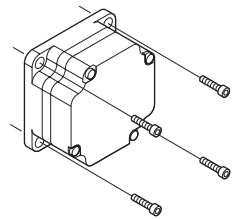
- Do not forcibly assemble the motor and gearhead. Also, prevent metal objects or foreign substances from entering in the gearhead. The pinion of the motor output shaft or gear may be damaged, resulting in noise or shorter service life.
- Do not allow dust to attach to the pilot sections of the motor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

● Round shaft type motor

Secure the product using hexagonal socket head screws (not included) through the four mounting holes.
Install so that there is no gap between the product and the mounting plate.

Applicable mounting screws

Model	Screw size	Tightening torque [N·m (lb-in)]
BLM015	M3	1.0 (8.8)
BLM030		
BLM230	M4	2.0 (17.7)
BLM250		
BLM450	M6	5.0 (44)



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

Model	Size of heat sink [mm (in.)]	Thickness [mm (in.)]	Material
BLM015	115×115 (4.53×4.53)	5 (0.20)	Aluminum alloy
BLM030			
BLM230			
BLM250	135×135 (5.31×5.31)		
BLM450			

■ Installing a 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. Forcibly inserting the load by driving it with a hammer may damage the bearing. 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.

● Geared motor, motor with parallel shaft GFS gearhead, round shaft type motor

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

● Output shaft shape

Geared motor [frame size 60 mm (2.36 in.)], motor with parallel shaft **GFS** gearhead
A key slot is provided on the output shaft. Form a key slot on the load side and secure the load using the included parallel key.

Model	Parallel key dimension
BLM230HK-□	4 mm (0.16 in.)
BLM230HK-□CS	3 mm (0.12 in.)
BLM250DHK-□CS	
BLM450HK-□	5 mm (0.20 in.)

Geared motor [frame size 42 mm (1.65 in.)], round shaft type motor
A flat section is provided on the output shaft. Apply a double-point screw, etc., at the flat section to firmly secure the load and prevent it from spinning.

● 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 with each other, and position both pulleys so that the line connecting their centers is at a right angle to the shafts.

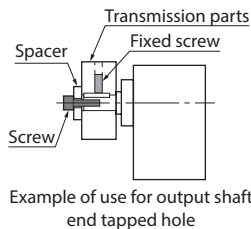
Using a gear drive

Align the output shaft and gear shaft in parallel with each other, and let the gears mesh at the center of the tooth widths.

When using the output shaft end tapped hole of a gearhead (except for GFS2G)

Use a tapped hole provided at the end of the output shaft as an auxiliary means for preventing the transfer mechanism from disengaging.

Gearhead model	Output shaft end tapped hole
GFS4G□	M5, Effective depth 10 mm (0.39 in)



● Motor with hollow shaft flat FR gearhead

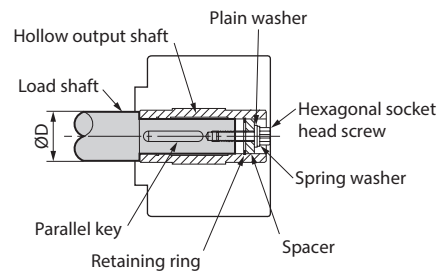
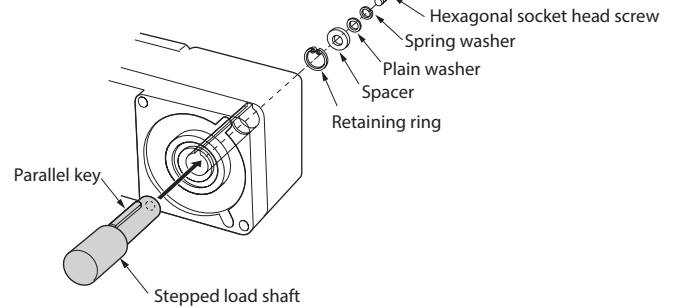
If a large impact occurs at instantaneous stop or a large radial load is applied, use a stepped load shaft.

Note

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

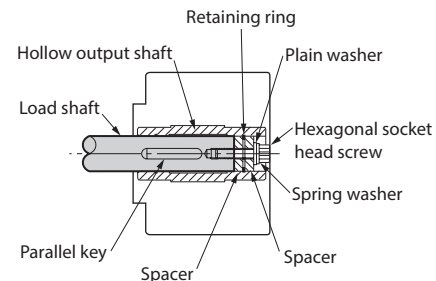
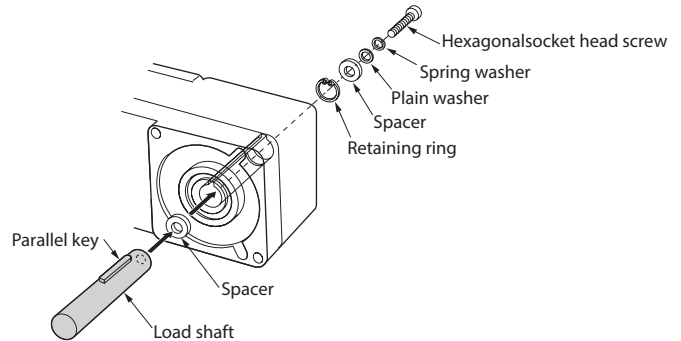
● Stepped load shaft

Secure the retaining ring for hole to the load shaft by tightening the hexagonal socket head screw over a spacer, plain washer and spring washer.



● Non-stepped load shaft

Install a spacer on the load shaft side and secure the retaining ring for hole to the load shaft by tightening the hexagonal socket head screw over a spacer, flat washer and spring washer.



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

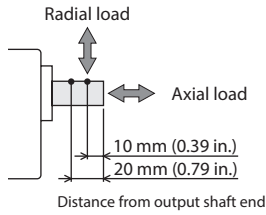
Model	Inner diameter of hollow shaft (H8)	Recommended diameter of load shaft (h7)	Nominal diameter of retaining ring
BLM230	$\varnothing 12^{+0.027}_{-0} (\varnothing 0.4724^{+0.0011}_{-0})$	$\varnothing 12^{0}_{-0.018} (\varnothing 0.4724^{0}_{-0.0007})$	$\varnothing 12 (\varnothing 0.47)$
BLM450	$\varnothing 15^{+0.027}_{-0} (\varnothing 0.5906^{+0.0011}_{-0})$	$\varnothing 15^{0}_{-0.018} (\varnothing 0.5906^{0}_{-0.0007})$	$\varnothing 15 (\varnothing 0.59)$
Model	Applicable screw	Spacer thickness	Outer diameter of stepped shaft (ØD)
BLM230	M4	3 (0.12)	20 (0.79)
BLM450	M5	4 (0.16)	25 (0.98)

■ Permissible radial load and permissible axial load

Make sure a radial load and axial load applied to the output shaft will 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 subject to repeated loading by a radial or axial load that is in excess of the permissible limit.

● Geared motor, motor with parallel shaft GFS gearhead

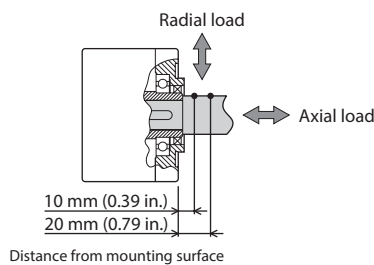


Model	Gear ratio	Permissible radial load [N (lb.)] Distance from output shaft end of the gearhead		Permissible load Axial load [N (lb.)]
		10 mm (0.39 in.)	20 mm (0.79 in.)	
BLM015HK-□	5 to 100	50 (11.2)	–	30 (6.7)
BLM015HK-□CS	5	50 (11.2)	–	40 (9.0)
BLM030DHK-□CS	10 to 20	80 (18)		
BLM230HK-□	5	100 (22)	150 (33)	40 (9.0)
	10 to 20	150 (33)	200 (45)	
	30 to 100	200 (45)	300 (67)	
BLM230HK-□CS	5	150 (33)	190 (42)	70 (15.7)
BLM250DHK-□CS	10 to 20	200 (45)	260 (58)	
BLM450HK-□	5	200 (45)	250 (56)	100 (22)
	10 to 20	300 (67)	350 (78)	
	30 to 100	450 (101)	550 (123)	

● Round shaft type motor

Model	Permissible radial load [N (lb.)] Distance from output shaft end of the motor		Permissible axial load [N (lb.)]
	10 mm (0.39 in.)	20 mm (0.79 in.)	
BLM015	50 (11.2)	–	5 (1.12)
BLM030	50 (11.2)	–	5 (1.12)
BLM230	70 (15.7)	100 (22)	15 (3.3)
BLM250	70 (15.7)	100 (22)	15 (3.3)
BLM450	120 (27)	140 (31)	20 (4.5)

● Motor with hollow shaft flat FR gearhead



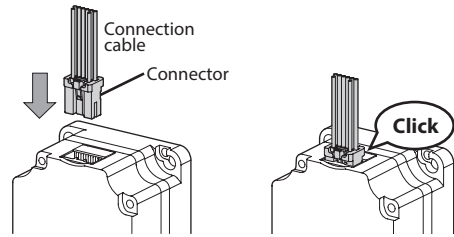
Model	Gear ratio	Permissible radial load [N (lb.)] Distance from gearhead mounting surface		Permissible axial load [N (lb.)]
		10 mm (0.39 in.)	20 mm (0.79 in.)	
BLM230	5, 10	450 (101)	370 (83)	200 (45)
	15 to 200	500 (112)	400 (90)	
BLM450	5, 10	800 (180)	660 (148)	400 (90)
	15 to 200	1200 (270)	1000 (220)	

Connection

■ Connecting the motor and the connection cable

● Connecting the connection cable to the motor.

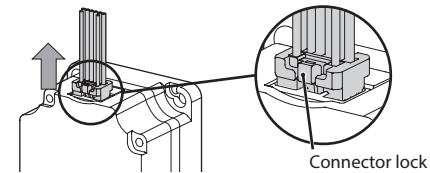
Hold the connector main body of the connection cable, and insert the connector until making a clicking noise.



Note Make sure to insert the connector securely. Insecure connector connection may cause malfunction.

● Removing the connection cable from the motor

Hold the connector main body and pull out the connector while pressing the connector lock. Do not apply stress on the connection part of the lead wires and connector.

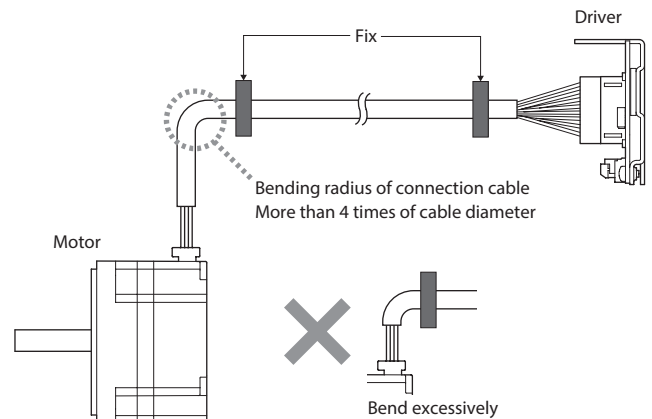


Note

- Be sure to insert and pull out the connector while holding the connector part. Failure to do so may result in damage to the connector and the motor.
- Do not lift up the product by holding the connection cable. Doing so may result in damage to the product.

■ Notes about wiring

Fix the connection cable near each connection part of the connectors on the motor and driver sides to prevent from applying stress on the connection parts.

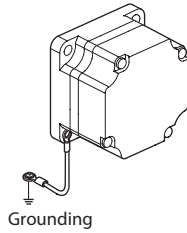


Note When fixing the connection cable, do not excessively bend it near the connection part of the connector. Applying stress on the connector or terminals due to self-weight or bending of the connection cable may cause poor contact or disconnection.

Grounding

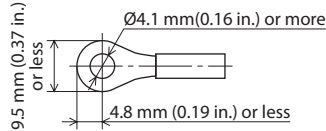
Ground the motor using one of the four mounting holes on the motor frame shown in the figure. If the mounting surface of the gearhead is coated with paint, remove the paint and install to a metal surface that has grounded.

The wire used to ground the motor and driver must be as thick and short to the grounding point as possible so that no potential difference is generated. Choose a large, thick and uniformly conductive surface for the grounding point.



Ground terminal

- Applicable crimp terminal:
Insulated round crimp terminal
- Applicable lead wire:
AWG18 to 14 (0.75 to 2.0 mm²)
- Terminal screw size: M4
- Tightening torque: 1.2 N·m (10.6 lb·in)



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 would be conducted for the items listed below after each operation of the motor.

If an abnormal condition is noted, discontinue any use and contact your nearest Oriental Motor sales office.

Note

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.

Inspection item

- Check if any of the motor mounting screws come loose.
- Check if the bearing part (ball bearings) of the motor generates unusual noises.
- Check if the bearing part (ball bearings) or gear meshing part of the gearhead generates unusual noises.
- Check if the output shaft and the load shaft are out of alignment.
- Check if a damage or stress is applied on the cable or lead wires. Also, check if the connection part with the motor or the driver is loose.

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)

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

Specifications

Check on the Oriental Motor Website for the product specifications.

General specifications

Operating environment	Ambient temperature	0 to +50 °C [+32 to +122 °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, dust, water or oil. Cannot be used in radioactive materials, magnetic field, vacuum or other special environments.
Vibration	Not subject to continuous vibrations or excessive impact. In conformance with JIS C 60068-2-6 "Sine-wave vibration test method"	
	Frequency range: 10 to 55 Hz, Pulsating amplitude: 0.15 mm Sweep direction: 3 directions (X, Y, Z) Number of sweeps: 20 times	
Storage environment	Ambient temperature	-25 to +70 °C [-13 to +158 °F] (non-freezing)
	Ambient humidity	85% or less (non-condensing)
	Altitude	Up to 3000 m (10000 ft.) above sea level
Shipping environment	No corrosive gas, dust, water or oil. Cannot be used in radioactive materials, magnetic field, vacuum or other special environment.	
	Surrounding atmosphere	
Degree of protection		IP40 (when connecting the connector)

Regulations and standards

UL Standards, CSA Standards

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

EU RoHS Directive/UK RoHS Regulation

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

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