OPERATING MANUAL

Brushless Motor
BLM Motor Cable Type

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.

Introduction

■ Before using the motor

Only qualified and educated personnel should work with the product.
Use the product correctly after thoroughly reading the section "Safety precautions." Should you require the inspection or repair of internal parts, contact the Oriental Motor office where you purchased the product.
The product described in this manual has been designed and manufactured to be incorporated in general industrial equipment.
Do not use for any other purpose. Oriental Motor Co., Ltd. is not responsible for any damage caused through failure to observe this warning.

■ Related operating manuals

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

	Operating manual name
Motor	**BLM** Motor Cable Type OPERATING MANUAL (this document)
Driver	**BMU** Series OPERATING MANUAL

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

Safety precautions

The precautions described below are intended to prevent danger or injury to the user and other personnel through safe, correct use of the product. Please read and understand these precautions thoroughly before using the product.

⚠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.

⚠WARNING

- Do not use the product in explosive or corrosive environments, in the presence of flammable gases, in places subjected to splashing water, or near combustibles. Doing so may result in fire, electric shock or injury.
- Do not transport, install, connect or inspect the product while the power is supplied. Always turn off the power before carrying out these operations. Electric shock or damage to equipment may result.
- Do not use a motor in a vertical application. If the driver's protection function is activated, the motor will stop and the moving part of the equipment will drop, thereby causing injury or equipment damage.
- Do not machine or modify the cable. Doing so may result in fire, electric shock, or damage to equipment.
- Do not forcibly bend, pull or pinch the cable. Doing so may result in fire, electric shock, or damage to equipment.
- Do not touch the motor or driver when conducting the insulation resistance measurement or dielectric strength test. Accidental contact may result in electric shock.
- Do not disassemble or modify the motor. This may result in electric shock, injury or damage to equipment. Refer all such internal inspections and repairs to the branch or sales office from which you purchased the product.

⚠WARNING

- Only qualified and educated personnel should be allowed to perform installation, connection, operation and inspection/troubleshooting of the product. Handling by unqualified and uneducated personnel may result in fire, electric shock, injury, or damage to equipment.
- The motor is Class Ⅰ equipment. Install the motor so as to avoid contact with hands, or ground it to prevent the risk of electric shock.
- Use a motor and driver only in the specified combination. Failure to do so may result in fire, electric shock, or damage to equipment.
- Always turn off the power before performing maintenance or inspection. Failure to do so may result in electric shock.

⚠CAUTION

- Do not use the motor beyond the specifications. Doing so may result in fire, electric shock, injury or damage to equipment.
- Do not touch the motor while operating or immediately after stopping. The surface of the motor is hot and it may cause a skin burn(s).
- Do not leave anything around the motor that would obstruct ventilation. Doing so may result in damage to equipment.
- Do not lift up the product by holding the output shaft or the cable. Doing so may result in injury.
- Do not touch the motor output shaft (end or pinion) with bare hands. Doing so may cause injury.
- When assembling the motor with the gearhead, exercise caution not to pinch your fingers or other parts of your body between the motor and gearhead. Injury may result.
- When installing the motor in equipment, exercise caution not to pinch your fingers or other parts of your body between the equipment and motor. Injury may result.
- Do not touch the rotating part (output shaft) while operating the motor. Doing so may cause injury.

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


Warning label

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

Precautions for use

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

● **Connecting the motor and driver**

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

● **Grease measures**

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

● **Caution when using under low temperature environment**

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

● **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.

● **Rotation direction of gearhead output shaft**

In the case of the combination type-parallel shaft gearhead, 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.

Gear ratio	Rotation direction of gearhead output shaft
5, **10**, **15**, **20**, **200**	Same as the motor output shaft
30, **50**, **100**∗	Opposite to the motor output shaft

∗ Same as the motor output shaft when the gear ratio is 100:1 for the 200 W type.

Checking the product

This chapter explains the items you should check, as well as the names and functions of each part.

■ Package contents

Verify that the items listed below are included. Report any missing or damaged items to the branch or sales office from which you purchased the product.
The Combined motor has a gearhead assembled. Screw for motor assembly are not included with the gearhead.

● **Motor**

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

● **Gearhead(sold separately)**

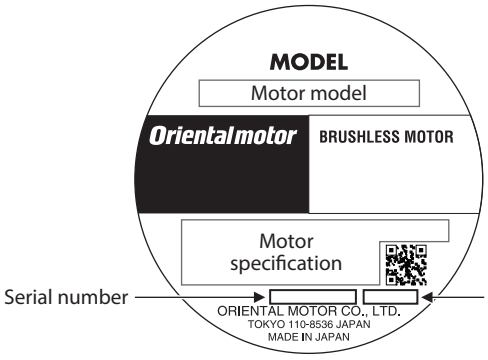
☐Gearhead.....1 unit
☐Mounting screw.....1 set
Hexagonal socket head screw, plain washer, spring washer 4 pieces each
☐Parallel key.....1 piece
(200W and 400W types are xed to the output shaft)
☐Mounting screw.....1 set
Hexagonal socket head screw: 2 picecs

■ Model

Check the model number of the motor and gearhead against the number shown on their nameplates, respectively.
☐ in the model name indicates a number representing the gear ratio.

Output power	Motor model	Gearhead model
30 W	**BLM230-GFV2**	**GFV2G☐A**
60 W	**BLM460S-GFV2**	**GFV4G☐A**
120 W	**BLM5120-GFV2**	**GFV5G☐A**
200 W	**BLM6200S-GFV**	**GFV6G☐A**
400 W	**BLM6400S-GFV**	

■ Information about nameplate



■ Drivers possible to combine

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

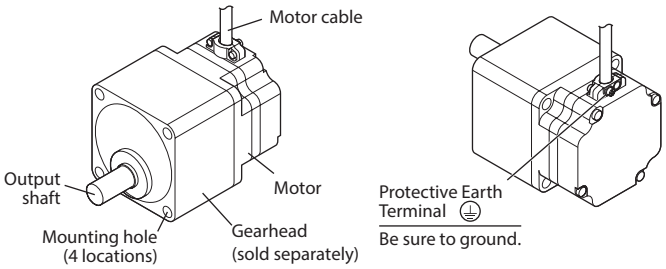
● **BMU Series**

Output power	Motor model	Driver model	
		Single-phase 100-120 VAC	Single-phase 200-240 VAC Three-phase 200-240 VAC
30 W	**BLM230**	**BMUD30-A2**	**BMUD30-C2**
60 W	**BLM460S**	**BMUD60-A2**	**BMUD60-C2**
120 W	**BLM5120**	**BMUD120-A2**	**BMUD120-C2**
200 W	**BLM6200S**	**BMUD200-A**	**BMUD200-C**
400 W	**BLM6400S**	—	**BMUD400-S**∗

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

■ Names and functions of parts

The figure shows the gearhead assembled.



Installation

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

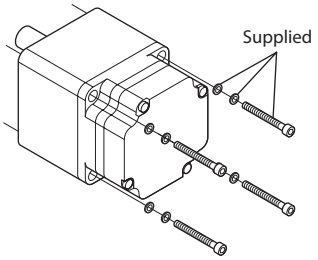
■ Installation location

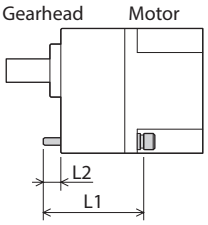
Install the product in a well-ventilated location that provides easy access for inspection.

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

■ Installation method

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



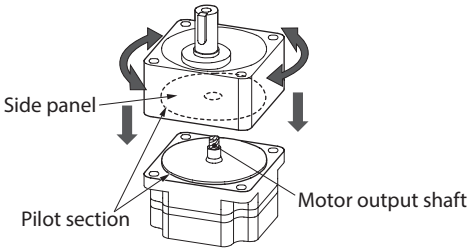


Motor model	Gear ratio	Hexagonal socket head screw (Material: Stainless steel)			Tightening torque
		Screw size	L1 [mm (in.)]	L2 [mm (in.)]	
BLM230	**5** to **20**	No.8-32UNC	50.8 (2)	7 (0.28)	1.4 N·m (12.3 lb-in)
	30 to **100**		57.2 (2.25)	9 (0.35)	
	200		63.5 (2.5)	11 (0.43)	
BLM460S	**5** to **20**	1/4-20UNC	63.5 (2.5)	12 (0.47)	5.0 N·m (44 lb-in)
	30 to **100**		69.9 (2.75)	13 (0.51)	
	200		76.2 (3)	15 (0.59)	
BLM5120	**5** to **20**	5/16-18UNC	69.9 (2.75)	12.5 (0.49)	12.0 N·m (106 lb-in)
	30 to **100**		82.6 (3.25)	11.5 (0.45)	
	200		88.9 (3.5)	12.5 (0.49)	
BLM6200S **BLM6400S** *	**5** to **20**		88.9 (3.5)	16 (0.63)	
	30, **50**		101.6 (4)	17 (0.67)	
	100, **200**		114.3 (4.5)	15 (0.59)	

* The gear ratio of the **BLM6400S** is 5:1 to 50:1.

Assembling the gearhead to the motor

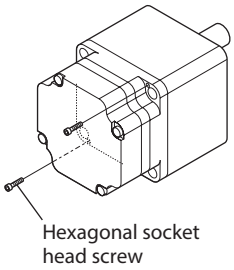
1. Keep the pilot sections of the motor and gearhead in parallel, and assemble the gearhead with the motor while slowly rotating it clockwise/counterclockwise. At this time, note so that the motor output shaft does not hit the side panel or gears of the gearhead strongly.



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

2. Check that there is no gap between the motor and gearhead, and secure them with hexagonal socket head screws for assembling (2 pieces).

Model	Screw size	Tightening torque
BLM230 **BLM460S**	M2.6	0.4 N·m (3.5 lb-in)
BLM5120 **BLM6200S** **BLM6400S**	M3	0.6 N·m (5.3 lb-in)



Note

- Do not forcibly assemble the motor and gearhead. Also, do not let metal objects or other foreign matter enter 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.
- The hexagonal socket head screws assembling the motor and gearhead are used to attach the motor and gearhead temporarily. Be sure to use the supplied mounting screw set to install the motor.

■ Installing a load

When installing a load on the gearhead, pay attention to the following points.

- Align the centerline of the gearhead output shaft with the centerline of the load.
- A key slot is provided on the output shaft of each combination type • parallel shaft gearhead. Form a key slot on the load side and secure the load using the supplied parallel key.

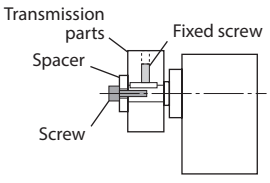
Note

- When coupling the gearhead with 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 gearhead output shaft or bearing. Forcing in the load by driving it with a hammer, etc., may break the bearing. Do not apply any excessive force to the output shaft.
- Do not modify or machine the gearhead output shaft. The bearing may be damaged or gearhead may break.

When using the output shaft end tapped hole of a gearhead (GFV4G, GFV5G, GFV6G only)

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

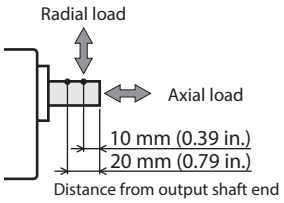
Gearhead model	Screw size	Effective depth of screw
GFV4G	No.10-24UNC	10 mm (0.39 in.)
GFV5G **GFV6G**	No.12-24UNC	12 mm (0.47 in.)



■ Permissible radial load and permissible axial load

The radial load and the axial load on the output shaft of the motor (gearhead) must be kept under the permissible values listed below.

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

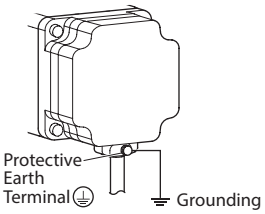


Motor model		Permissible radial load [N (lb.)]∗1 Distance from tip of gearhead output shaft		Permissible axial load [N (lb.)]
	Gear ratio	10 mm (0.39 in.)	20 mm (0.79 in.)	
BLM230	**5**	100 (22) [90 (20)]	150 (33) [110 (24)]	40 (9)
	10 to **20**	150 (33) [130 (29)]	200 (45) [170 (38)]	
	30 to **200**	200 (45) [180 (40)]	300 (67) [230 (51)]	
BLM460S	**5**	200 (45) [180 (40)]	250 (56) [220 (49)]	100 (22)
	10 to **20**	300 (67) [270 (60)]	350 (78) [330 (74)]	
	30 to **200**	450 (101) [420 (94)]	550 (123) [500 (112)]	
BLM5120	**5**	300 (67) [230 (51)]	400 (90) [300 (67)]	150 (33)
	10 to **20**	400 (90) [370 (83)]	500 (112) [430 (96)]	
	30 to **200**	500 (112) [450 (101)]	650 (146) [550 (123)]	
BLM6200S **BLM6400S**∗2	**5** to **20**	550 (123) [500 (112)]	800 (180) [700 (157)]	200 (45)
	30, **50**	1000 (220) [900 (200)]	1250 (280) [1100 (240)]	300 (67)
	100, **200**	1400 (310) [1200 (270)]	1700 (380) [1400 (310)]	400 (90)

∗1 The values assume a rated speed of 3000 r/min or below. The values in [ ] are based on a rated speed of 4000 r/min.
∗2 The gear ratio of the **BLM6400S** is 5:1 to 50:1.

Grounding

Connect the Protective Earth Terminal ⏚ on the motor to the ground near the motor. Minimize the wiring length of the ground cable.

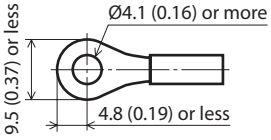


Note Be sure to ground the motor and driver. Failure to do so may result in electric shock or damage to the product.
Static electricity may cause damage to the product if the protective earth terminals are not grounded.

■ Ground terminal

- Applicable crimp terminal: Round crimp terminal with insulation cover
- Thread size of terminal: M4
- Tightening torque: 1.2 N·m (10.6 lb-in)
- Applicable lead wire: AWG18 to 14 (0.75 to 2.0 mm^2)

[mm (in.)]



■ Precautions about static electricity

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

Inspection and maintenance

■ Inspection

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

Note Do not conduct the insulation resistance measurement or dielectric strength test with the motor and driver connected. 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 mounting screws of the motor and gearhead is 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 gearhead output shaft and a load shaft are out of alignment.
- Check if a damage or stress is applied on the cable or the connection part between the cable and 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.

General specifications

Operation environment	Ambient temperature	0 to +40 °C [+32 to +104 °F] (non-freezing)
	Ambient Humidity	85% or less (non-condensing)
	Altitude	Up to 1000 m (3300 ft.) above sea level
	Surrounding atmosphere	No corrosive gas or dust. Cannot be used in radioactive materials, magnetic field, vacuum or other special environment. Details about the installation location are described on p.3.
	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 (0.006 in.) Sweep direction: 3 directions (X, Y, Z) Number of sweeps: 20 times
Storage environment Shipping environment	Ambient temperature	−20 to +70 °C [−4 to +158 °F] (non-freezing)
	Ambient Humidity	85% or less (non-condensing)
	Altitude	Up to 3000 m (10000 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 environment.
Degree of protection		IP40

Regulations and standards

■ UL Standards and CSA Standards

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

■ CE Marking

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

● Low Voltage Directive

Installation conditions (EN Standard)

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

● Motor temperature rise tests

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

Motor model	Size [mm (in.)]	Thickness [mm (in.)]	Material
BLM230	115×115 (4.53×4.53)	5 (0.20)	Aluminum alloy
BLM460S	135×135 (5.31×5.31)		
BLM5120	165×165 (6.50×6.50)		
BLM6200S	200×200 (7.87×7.87)		
BLM6400S	250×250 (9.84×9.84)	6 (0.24)	

■ RoHS Directive

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

Published in June 2025

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

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