



OPERATING MANUAL

Brushless Motor

BLM Motor Connector type

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.

Operating manuals for the product

Operating manuals for this product are listed below. Refer to the operating manuals supplied with the driver for details about connections and operations.

- **BLM Motor Connector type OPERATING MANUAL (this document)**
- **OPERATING MANUAL for each Series (supplied with the driver)**
- **QUICK START GUIDE for each Series (supplied with the driver)**

Hazardous substances

The products do not contain the substances exceeding the restriction values of RoHS Directive (2011/65/EU).

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.

Description of graphic symbols

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

Warning	
	<ul style="list-style-type: none"> • Do not use the product in explosive or corrosive environments, in the presence of flammable gases or near combustibles. Doing so may result in fire, electric shock or injury. • Do not transport, install the product, perform connections or inspections when the power is on. Always turn the power off before carrying out these operations. Failure to do so may result in electric shock or equipment damage. • 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 connection cable. Doing so may result in electric shock or fire. • Do not apply any excessive force to the motor connector. Doing so may result in fire, electric shock or damage to equipment. • Do not forcibly bend, pull or pinch the cables. Doing so may result in fire or electric shock.

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	
	<ul style="list-style-type: none"> • Do not remove the connector cap until the connection cable is connected so that the O-ring of the connector connection on the motor is not damaged. Doing so may result in fire, electric shock or damage to equipment. • Do not touch the motor or driver when conducting insulation resistance measurement or dielectric strength test. Accidental contact may result in electric shock. • Do not disassemble or modify the motor (gearhead). Doing so may result in electric shock, injury or equipment damage. Should you require inspection or repair of internal parts, please contact the Oriental Motor branch or sales office from which you purchased the product.
	<ul style="list-style-type: none"> • Only qualified and educated personnel should be allowed to perform installation, connection, operation and inspection/troubleshooting of the product. Handling by unqualified and uneducated personnel may result in fire, electric shock, injury or equipment damage. • The motor and driver are Class I equipment. When installing the motor and driver, connect their Protective Earth Terminals. Failure to do so may result in electric shock. • Use a motor (gearhead) and driver only in the specified combination. An incorrect combination may cause in fire, electric shock or equipment damage. • Always turn off the power before performing maintenance/inspection. Failure to do so may result in electric shock.

Caution	
	<ul style="list-style-type: none"> • Do not use the motor (gearhead) beyond the specifications. Doing so may result in fire, electric shock, injury or damage to equipment. • Do not touch the motor (gearhead) while operating or immediately after stopping. The surface of the motor (gearhead) is hot and it may cause a skin burn(s). • Do not leave anything around the motor and driver that would obstruct ventilation. Doing so may result in damage to equipment. • Do not carry the product by holding the motor (gearhead) output shaft or any of the cables. Doing so may result in injury. • Do not touch the motor output shaft (tip or pinion) with bare hands. Doing so may result in injury. • When assembling the motor (pinion shaft) 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 (gearhead) in the equipment, exercise caution not to pinch your fingers or other parts of your body between the equipment and motor or gearhead. Injury may result. • Do not touch the rotating part (output shaft) when operating the motor. Doing so may result in injury.
	<ul style="list-style-type: none"> • Securely install the motor (gearhead) to their respective mounting plates. Inappropriate installation may cause the motor (gearhead) to detach and fall, resulting in injury or equipment damage. • Provide a cover on the rotating part (output shaft) of the motor (gearhead). Failure to do so may result in injury. • Securely install the load on the motor (gearhead) 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 a running motor, attach a warning label as shown in the figure in a conspicuous position. Failure to do so may result in skin burn(s). <div style="text-align: right;"> Warning label </div> <ul style="list-style-type: none"> • To dispose of the motor (gearhead), disassemble it into parts and components as much as possible and dispose of individual parts/components as industrial waste.

Precautions for use

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

● Connecting the motor and driver

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

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

● Grease measures

On rare occasions, a small amount of 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 and 300 W types

Checking the product

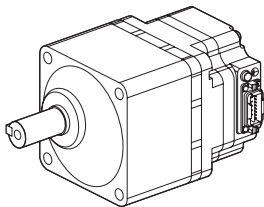
This chapter explains the items you should check, as well as the names and functions of each part.

■ Package contents

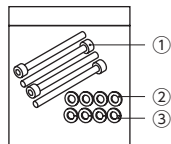
Verify that the items listed below are included.

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

- Motor 1 unit Hexagonal socket head screw set 1



The figure shows an example of the combination type.
Combination type:
With a gearhead, fixing the parallel key to the output shaft



- ① Hexagonal socket head screw: 4 pieces
② Plain washer: 4 pieces
③ Spring washer: 4 pieces

Supplied with the combination type.

- OPERATING MANUAL (this document) 1 copy

■ Model

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

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.

◆ in the model name indicates **A** (no machining) or **AC** (shaft flat) for the round shaft type.

● Combination type - parallel shaft gearhead

Output power	Combination motor model	Motor model	Gearhead model
30 W	BLM230HP-□S	BLM230HP-GFV	GFV2G□S
60 W	BLM460SHP-□S	BLM460SHP-GFV	GFV4G□S
120 W	BLM5120HP-□S	BLM5120HP-GFV	GFV5G□S
200 W	BLM6200SHP-□S	BLM6200SHP-GFV	GFV6G□S
300 W	BLM6300SHP-□S	BLM6300SHP-GFV	
400 W	BLM6400SHP-□S	BLM6400SHP-GFV	

● Round shaft type

Output power	Motor model
30 W	BLM230HP-◆S
60 W	BLM260HP-◆S
120 W	BLM5120HP-◆S
200 W	BLM5200HP-◆S
300 W	BLM5300HP-◆S
400 W	BLM5400HP-◆S

■ Connection cable (sold separately)

To connect the motor and driver, the dedicated connection cable (sold separately) is needed.

The distance between the motor and driver is up to 20 m (65.6 ft.).

The cable length that can be connected vary depending on the driver used. Check the operating manual supplied with the driver.

Cable model and type

CC 005 HBL F

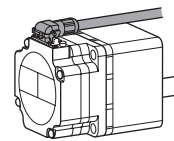
Cable length

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

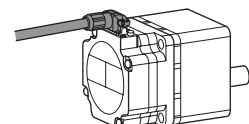
Cable leading direction

- F : In direction of output shaft
- B : In opposite direction of output shaft

In direction of output shaft :
CC_HBLF



In opposite direction of output shaft :
CC_HBLB

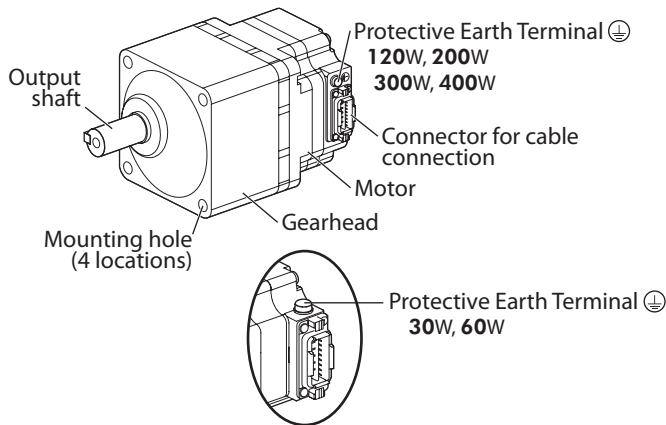


You can also use the connection cable which model name representing the length is 2-digit number (former model name).

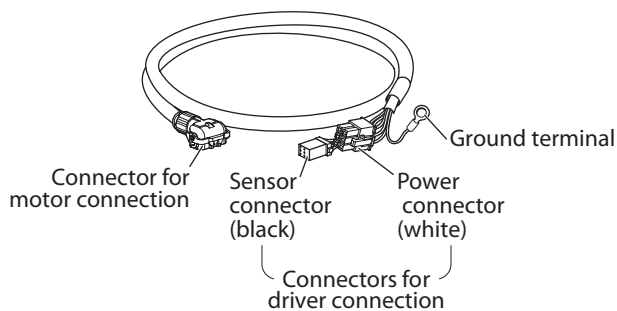
For the round shaft type, only the cable for leading in opposite direction of output shaft can be used.

Names and functions of parts

Motor



Connection cable (sold separately)



Installation

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

Installation location

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

- Indoors
- Operating ambient temperature: 0 to +40 °C (+32 to +104 °F) (non-freezing)
- Operating ambient humidity: 85% or less (non-condensing)
- Area that is free of explosive atmosphere or toxic gas (such as sulfuric gas) or liquid
- Area not exposed to direct sun
- Area free of excessive amount of dust, iron particles or the like
- Area free of excessive salt
- Area not subject to continuous vibration or excessive shocks
- Area free of excessive electromagnetic noise (from welders, power machinery, etc.)
- Area free of radioactive materials, magnetic fields or vacuum
- Altitude: Up to 1000 m (3300 ft.) above sea level

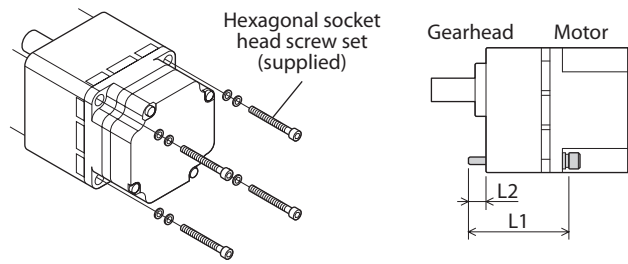
* Conditions for when the motor is installed:

Not exposed to oil (oil droplets) or chemicals. The motor can be used in an environment that is splashed with water (excluding the part of the connectors for driver connection and the mounting surface of the round shaft type). Not available for use under high pressure jets of water or immersion in water.

Installing the combination type • parallel shaft gearhead

Secure the motor with hexagonal socket head screws (supplied) through the four mounting holes provided.

Do not leave a gap between the motor and mounting plate.



Model	Gear ratio	Hexagonal socket head screw (Material: Stainless steel)			Tightening torque
		Screw size	L1 [mm (in.)]	L2 [mm (in.)]	
BLM230	5 to 20	M4	50 (1.97)	6 (0.24)	1.4 N·m (12 lb·in)
	30 to 100		55 (2.17)	7 (0.28)	
	200		60 (2.36)	7 (0.28)	
BLM460S	5 to 20	M6	60 (2.36)	8 (0.31)	5.0 N·m (44 lb·in)
	30 to 100		65 (2.56)	8 (0.31)	
	200		70 (2.76)	8 (0.31)	
BLM5120	5 to 20	M8	70 (2.76)	11.5 (0.45)	12.0 N·m (106 lb·in)
	30 to 100		85 (3.35)	13.5 (0.53)	
	200		90 (3.54)	12.5 (0.49)	
BLM6200S	5 to 20	M8	85 (3.35)	11 (0.43)	12.0 N·m (106 lb·in)
BLM6300S*1	30, 50		100 (3.94)	14 (0.55)	
BLM6400S*2	100, 200		110 (4.33)	10 (0.39)	

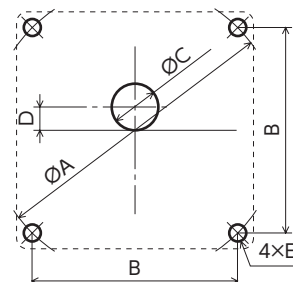
*1 The gear ratio of the **BLM6300S** is 5:1 to 100:1.

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

Recommended mounting hole dimensions

[mm (in.)]

Model	ØA	B	ØC	D	E
BLM230	70 (2.76)	49.50 (1.949)	$23^{+0.021}_0$ (0.9055 $^{+0.0008}_0$)	10 (0.39)	M4
BLM460S	94 (3.70)	66.47 (2.617)	$33^{+0.025}_0$ (1.2992 $^{+0.0010}_0$)	13 (0.51)	M6
BLM5120	104 (4.09)	73.54 (2.895)	$39^{+0.025}_0$ (1.5354 $^{+0.0010}_0$)	18 (0.71)	M8
BLM6200S BLM6300S BLM6400S	120 (4.72)	84.86 (3.341)	$41^{+0.025}_0$ (1.6142 $^{+0.0010}_0$)	20 (0.79)	M8



■ Removing/Installing the gearhead

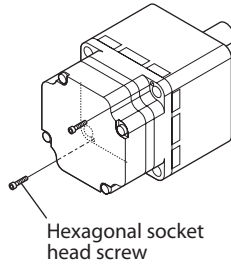
See the following steps to replace the gearhead or to change the cable position.

1. Removing the gearhead

Remove the hexagonal socket head screws assembling the motor and gearhead and detach the motor from the gearhead.

- Assembly hexagonal socket head screw

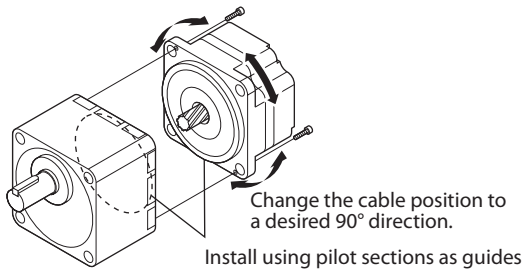
Model	Screw size	Tightening torque
BLM230 BLM460S	M2.6	0.4 N·m (3.5 lb-in)
BLM5120 BLM6200S BLM6300S BLM6400S	M3	0.6 N·m (5.3 lb-in)



2. Installing the gearhead

Using the pilot sections of the motor and gearhead as guides, install the gearhead to the motor and tighten the hexagonal socket head screws. Confirm that no gaps remain between the motor flange surface and the end face of the gearhead pilot section.

At this time, the motor cable position can be changed to a desired 90° direction. When installing the gearhead, slowly rotate it clockwise/ counterclockwise to prevent the pinion of the motor output shaft from contacting the side panel or gear of the gearhead.



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. When installing the motor/gearhead assembly, be sure to use the supplied hexagonal socket head screws.

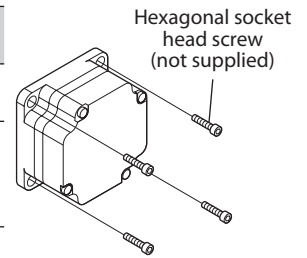
■ Installing the round shaft type

Secure the motor with hexagonal socket head screws (not supplied) through the four mounting holes provided.

Do not leave a gap between the motor and mounting plate.

Applicable mounting screw

Model	Screw size	Tightening torque*
BLM230 BLM260	M4	1.8 N·m (15.9 lb-in) [1.4 N·m (12 lb-in)]
BLM5120 BLM5200 BLM5300 BLM5400	M8	15.5 N·m (137 lb-in) [12.0 N·m (106 lb-in)]



* The brackets [] indicate the value for stainless steel.

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).

[mm (in.)]

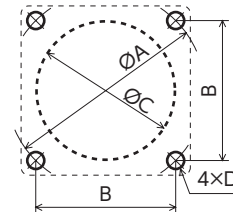
Model	Size of mounting plate	Thickness	Material
BLM230	115×115 (4.53×4.53)	5 (0.20)	Aluminum alloy
BLM260	135×135 (5.31×5.31)		
BLM5120	165×165 (6.50×6.50)		
BLM5200	200×200 (7.87×7.87)	6 (0.24)	
BLM5300 BLM5400	250×250 (9.84×9.84)		

■ Recommended mounting hole dimensions

[mm (in.)]

Model	ØA	B	ØC*	D
BLM230 BLM260	70 (2.76)	49.50 (1.949)	54 ^{+0.030} ₀ (2.2160 ^{+0.0012} ₀)	M4 or Ø4.5 (0.177)
BLM5120 BLM5200 BLM5300 BLM5400	104 (4.09)	73.54 (2.895)	83 ^{+0.035} ₀ (3.2677 ^{+0.0014} ₀)	M8 or Ø8.5 (0.335)

* ØC indicates the pilot diameter on the flange.



Note

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.

■ Installing a load

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

- Align the centerline of the motor output shaft (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.

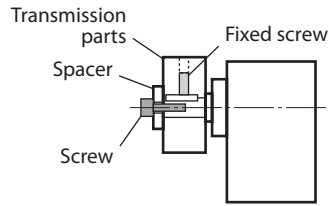
Note

- When coupling the motor (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 motor output shaft (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 motor (gearhead) output shaft. The bearing may be damaged or motor (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	M5	10 mm (0.39 in.)
GFV5G GFV6G	M6	12 mm (0.47 in.)

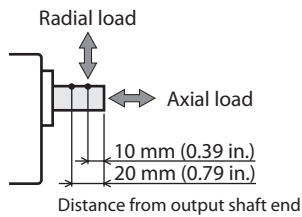


Permissible radial load and permissible axial load

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



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.



Combination type • parallel shaft gearhead

Model	Gear ratio	Permissible radial load [N (lb.)]*1 Distance from tip of gearhead output shaft		Permissible axial load [N (lb.)]
		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 BLM6300S*2 BLM6400S*3	5 to 20	550 (123) [500 (112)]	800 (180) [700 (157)]	200 (45)
	30, 50	1000 (220) [900 (200)]	1250 (280) [1100 (240)]	
	100, 200	1400 (310) [1200 (270)]	1700 (380) [1400 (310)]	

*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 BLM6300S is 5:1 to 100:1.

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

Round shaft type

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.)	
BLM230 BLM260	80 (18)	100 (22)	Not to exceed one-half the motor's mass*
BLM5120 BLM5200 BLM5300 BLM5400	150 (33)	170 (38)	

* Minimize the axial load. If an axial load must be applied, do not let it exceed one-half the motor's mass.

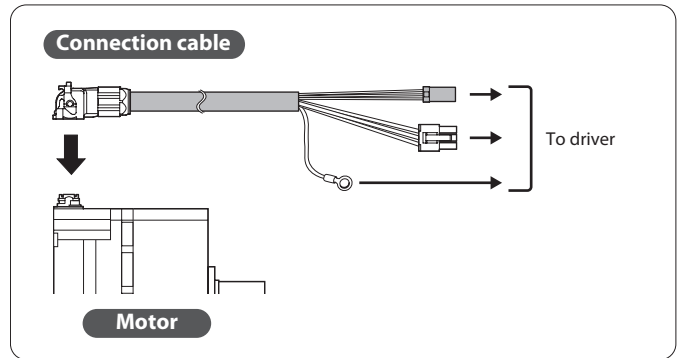
Connection

Connecting the motor and driver

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

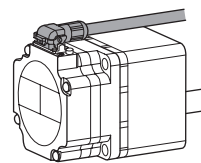
There are two types of connection cables which cable leading directions are different.

The following explains as an example of "leading in direction of output shaft"



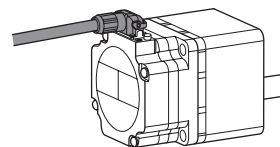
[Cable leading direction]

Leading in direction of output shaft



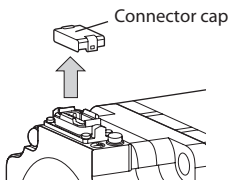
← The connection procedures are explained as an example of this cable leading direction.

Leading in opposite direction of output shaft

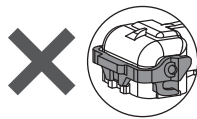
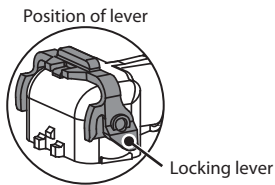
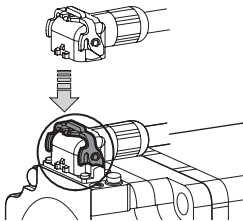


■ Connection procedures of the motor and connection cable

1 Remove

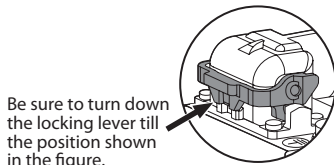
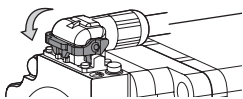


2 Attach



The connector cannot be inserted if the locking lever is turned down.

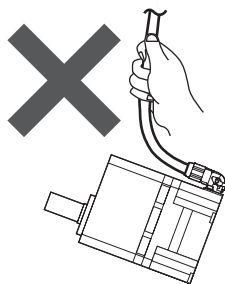
3 Secure



The connector cannot be secured unless the locking lever is turned down.

Note

Do not carry the motor by holding the cable. Doing so may cause damage to the product.



■ Detaching the connection cable

If the locking lever is turned up, the cable can be detached.

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

Grounding

Ground using the Protective Earth Terminals (⊕) of the motor and driver, as well as the ground terminal of the connection cable.

Note

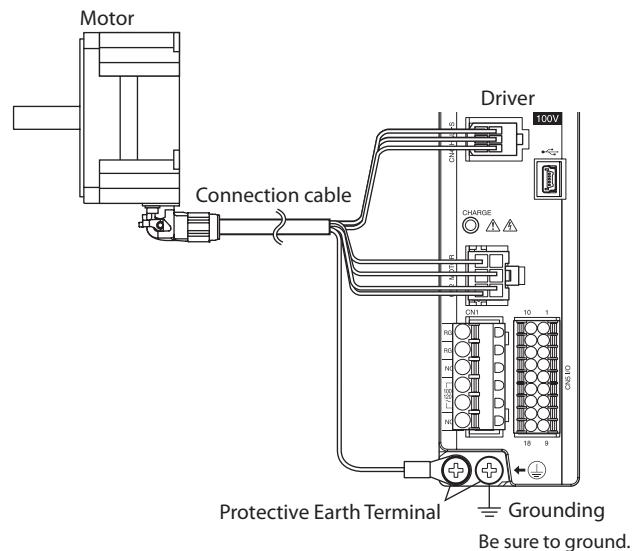
Be sure to ground the motor and driver. Failure to do so may result in electric shock or damage to the product. Static electricity may cause damage to the product if the protective earth terminals are not grounded.

Two Protective Earth Terminals (⊕) are provided on the driver. Be sure to ground one of the Protective Earth Terminals. Do not share the Protective Earth Terminal with a welder or any other power equipment. Connect the ground terminal of the connection cable to the other terminal. If the ground terminal of the connection cable is used for grounding, do not connect anything to the Protective Earth Terminal of the motor. However, the grounding resistance value provided in the standards that is applied to the equipment may not be satisfied depending on the type or length of the connection cable. In this case, ground near the motor using the Protective Earth Terminal (⊕) on the motor. If the ground terminal of the connection cable is not used, be sure to insulate.

Reference

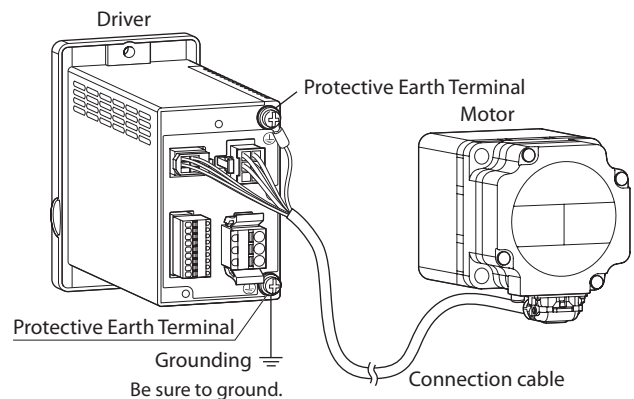
Protective earth wire of the connection cable
 Conductor size: AWG18 (0.75 mm²)
 Maximum conductor resistance: 25.0 Ω/km

■ BLE2 Series



■ BMU Series

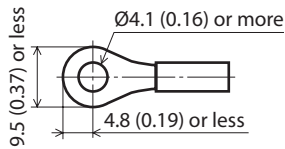
The figure shows an example of the 120 W type.



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 mm²)

[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

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.



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.

During inspection

- Are any of the motor (gearhead) mounting screws loose?
- Are there any abnormal noises in the motor bearings (ball bearings) or other moving parts?
- Are there any abnormal noises in the bearing (ball bearing) and gear meshing parts of the gearhead?
- Are the motor output shaft and load shaft out of alignment?
- Are there any scratches, signs of stress or loose driver connections in the cable?

Accessories

About motor mounting brackets (SOL)

When the mounting bracket and motor are secured, use so that the direction of the connector for cable connection is installed upward or sideways against the installation surface. Installing the motor connector to the downward direction is not recommended since the motor connector is come into contact with the mounting bracket or installation surface.

Regulations and standards

Standard and CE Marking

This product is recognized by UL under the UL and CSA standards, and it is also affixed the CE Marking under the Low Voltage Directive. The motor model name represents the model that conforms to the standards.

UL Standards and CSA Standards

Applicable Standards

Applicable Standards	Certification Body	Standards File No.
UL 1004-1 CSA C22.2 No.100	UL	E335369

* Thermal class UL/CSA Standards: 105(A)

Low Voltage Directive

- This product is designed and manufactured to be incorporated in equipment.
- This product cannot be used in IT power distribution systems.
- Install the product within the enclosure in order to avoid contact with hands.
- Ground the Protective Earth Terminals for the motor (or connection cable) and driver securely.
- Isolate the connection cable, power-supply cable and other drive cables from the signal cables by means of double insulation.

Applicable Standards

EN 60034-1, EN 60034-5, EN 60664-1

Installation conditions (EN Standard)

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

* Thermal class EN Standards: 120(E)

The motor temperature rise tests

A temperature test has been conducted with a heatsink plate. The size, thickness and material of the heatsink plates are as table.

[mm (in.)]

Motor model	Size	Thickness	Material
BLM230	115×115 (4.53×4.53)	5 (0.20)	Aluminum alloy
BLM260 BLM460S	135×135 (5.31×5.31)		
BLM5120	165×165 (6.50×6.50)		
BLM5200 BLM6200S	200×200 (7.87×7.87)		
BLM5300 BLM5400 BLM6300S BLM6400S	250×250 (9.84×9.84)	6 (0.24)	

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	Ambient temperature	-20 to +70 °C [-4 to +158 °F] (non-freezing)
	Ambient Humidity	85% or less (non-condensing)
Shipping environment	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		IP66 (IP66 for when the connection cable is attached to the motor. Excluding the mounting surface of the round shaft type and the part of the connectors for driver connection.)

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