Oriental motor

HM-5197-3

OPERATING MANUAL

Brushless Motor

BLM Motor Connector Type

Right Angle Hollow Shaft
Hypoid Gear JH Gearhead

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.

■ 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 Right Angle Hollow Shaft 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.

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 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 protective function is activated, the motor will stop and the moving part of the equipment may drop. This may cause injury or damage to equipment.
- Do not machine or modify the connection cable. Doing so may result in fire, electric shock or damage to equipment.
- Do not apply any excessive force to the motor connector. Doing so may result in fire, electric shock or damage to equipment.
- Do not forcibly bend, pull or pinch the cables. Doing so may result in fire, electric shock or damage to equipment.

⚠Warning

- 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 and gearhead. Doing so may result in electric shock, injury or damage to equipment. Refer all such internal inspections and repairs to the branch or sales office from which you purchased the product.

- 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 is Class Ⅰ equipment. When installing the motor and driver, ground 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 result in fire, electric shock or damage to equipment.
- Always turn off the power before performing maintenance/inspection. Failure to do so may result in electric shock.

⚠Caution

- Do not use the motor and gearhead beyond the specifications. Doing so may result in fire, electric shock, injury or damage to equipment.
- Do not touch the motor and gearhead while operating or immediately after stopping. The surfaces of the motor and gearhead are 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 carry the product by holding the motor output shaft or any of the cables. Doing so may result in injury.
- Do not touch the motor output shaft (end of shaft) 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 and gearhead 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) when operating the motor. Doing so may result in injury.

- Securely install the motor and gearhead to the mounting plate. Inappropriate installation may cause the motor and gearhead to detach and fall, resulting in injury or equipment damage.
- Provide a cover over the rotating part (output shaft). Failure to do so may cause injury.
- Securely install a load on the output shaft. Failure to do so may cause 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).


Warning label

- To dispose of the motor and gearhead, disassemble them 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.

● Connection cable

Do not apply a strong force on the locking lever of the connector for motor connection. Applying a strong force on the locking lever may cause damage. Refer to p.6 for details.

● Grease measures

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

● Caution when using under low temperature environment

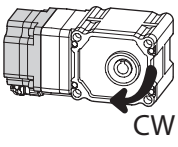
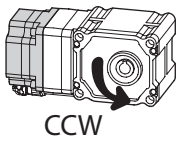
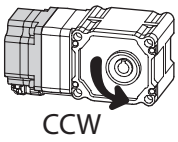
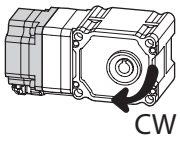
When an ambient temperature is low, since the load torque may increase by the oil seal or viscosity increment of grease used in the gearhead, the output torque may decrease or an overload alarm may generate. However, as time passes, the oil seal or grease is warmed up, and the motor can be driven without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

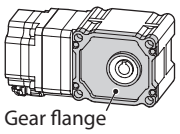
● Rotation direction of the output shaft

The rotation direction of the gearhead output shaft with respect to the motor output shaft is shown in the figure below. (As viewed from the gear flange side)

Motor output shaft ∗	Gearhead output shaft	
	Gear ratio: 5 to 50	Gear ratio: 100, 200
 CW	 CW	 CCW
 CCW	 CCW	 CW

∗ Check the operating manual supplied with the driver for the rotation direction of the motor output shaft and the setting method.

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


Gear flange

About rotation speed and gear ratio

● Maximum rotation speed 3600 r/min

Use the motor in conditions where the motor rotation speed is 3600 r/min or lower.

● Gear ratio and actual reduction ratio

The gear ratio in the model name differs from the actual reduction ratio of the gearhead.
Check the actual reduction ratio in the table below.

For 60 W, 120 W

Gear ratio	10	15	20	30	50	100	200
Actual reduction ratio	10.25	15.38	20.50	30.75	51.25	102.5	205.0

For 200 W or higher

Gear ratio	5	10	15	20	30	50	100	200
Actual reduction ratio	5	10	15	20	30	50	98.95	200

Checking the product

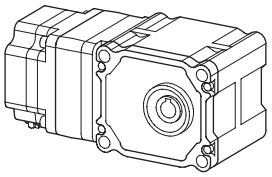
This section explains the items you should check, as well as the names and functions of each part.

■ Package contents

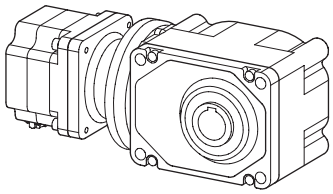
Verify that the items listed below are included.
Report any missing or damaged items to the branch or sales office from which you purchased the product.

☐ Motor.....1 unit
(Pre-assembled with a gearhead)

[60 W, 120 W]



[200 W or higher]



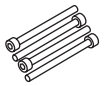
☐ Safety cover.....1 piece

[60 W, 120 W]

[200 W or higher]

☐ Mounting screw set

- Hexagonal socket head screw: 4 pieces



- Plain washer: 4 pieces

- Spring washer: 4 pieces

☐ Parallel key .....1 piece

☐ OPERATING MANUAL .....1 copy
(this document)

■ 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.
A code is added to the end of the model name for the product which motor connector position has been changed.

● 60 W, 120 W

Output power	Model	Motor model	Gearhead model
60 W	**BLM460SHPK-4H☐S**	BLM460SHPK	4H☐S
120 W	**BLM5120HPK-5H☐S**	BLM5120HPK	5H☐S

☐: Gear ratio (10, 15, 20, 30, 50, 100, 200)

● 200 W or higher

Output power	Model	Motor model	Gearhead model
200 W	**BLM5200HPK-5■H☐S**	BLM5200HPK	5■H☐S
300 W	**BLM5300HPK-5■H☐S**	BLM5300HPK	
400 W	**BLM5400HPK-5■H☐S**	BLM5400HPK	

■: Code (X, Y)
☐: Gear ratio (5, 10, 15, 20, 30, 50, 100, 200)

■ Connection cable (sold separately)

To connect the motor and driver, the dedicated connection cable (sold separately) is needed. The connection cables are provided up to 20 m (65.6 ft.). The cable length that can be connected varies depending on the driver used. Check the operating manual supplied with the driver.

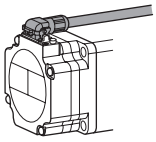
Cable model and type

CC 005 HBL F

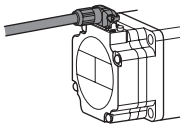
Cable length
005 : 0.5 m (1.6 ft.)
010 : 1 m (3.3 ft.)
015 : 1.5 m (4.9 ft.)
020 : 2 m (6.6 ft.)
025 : 2.5 m (8.2 ft.)
030 : 3 m (9.8 ft.)
040 : 4 m (13.1 ft.)
050 : 5 m (16.4 ft.)
070 : 7 m (23.0 ft.)
100 : 10 m (32.8 ft.)
150 : 15 m (49.2 ft.)
200 : 20 m (65.6 ft.)

Cable leading direction
F : In direction of output shaft
B : In opposite direction of output shaft

In direction of output shaft :
CC__HBLF



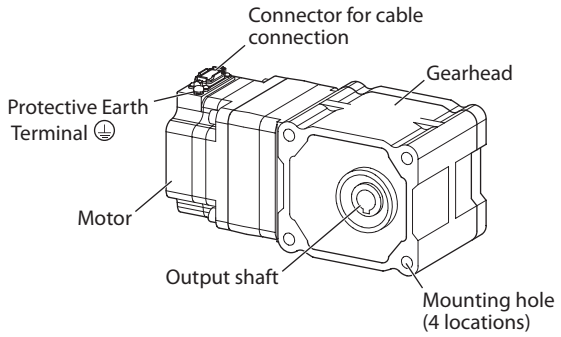
In opposite direction of output shaft :
CC__HBLB



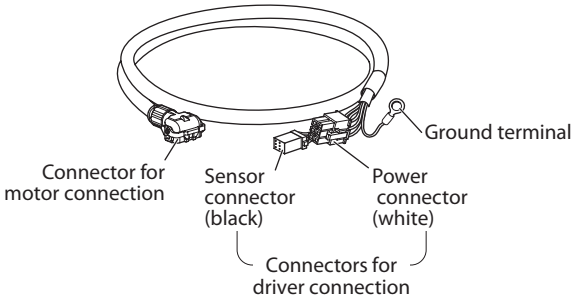
You can also use the connection cable which model name representing the length is 2-digit number (former model name).

■ 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.

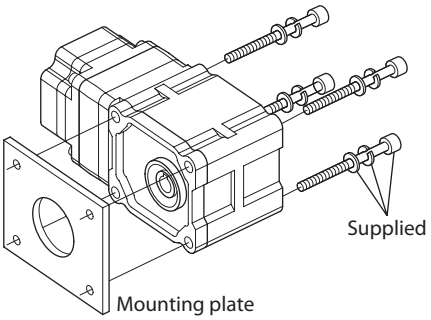
■ Installation location

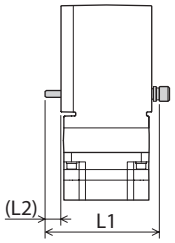
Install the product in a well-ventilated location that provides easy access for inspection.

- 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
- Area not subject to oil (oil droplets) or chemicals
  The motor can be used in an environment that is splashed with water (excluding the part of the connector for driver connection).
  However, do not use it underwater or under high water-pressure.

■ 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.





Output power	Gear ratio	Hexagonal socket head screw			L2 [mm (in.)]	Tightening torque [N·m (lb-in)]
		Screw size	Material	L1 [mm (in.)]		
60 W	10 to 200	M6	Stainless steel	95 (3.74)	11 (0.43)	5 (44)
120 W	10 to 200	M8		110 (4.33)	10 (0.39)	12 (106)
200 W or higher	5 to 50	M8		120 (4.72)	16 (0.63)	12 (106)
	100, 200	M10		130 (5.12)	19.5 (0.77)	24 (212)

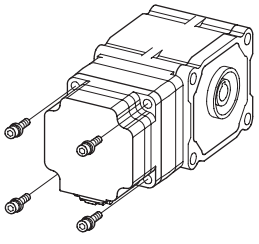
Note

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

● Removing/assembling the gearhead

This is the procedure for when the gearhead is removed and replaced.

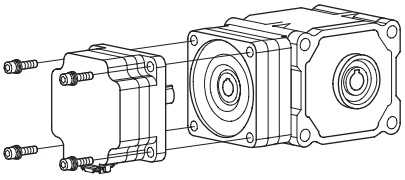
1. **Removing the gearhead from the motor**
   Remove the hexagonal socket head screws (4 pieces) assembling the motor and gearhead, and detach the gearhead from the motor.



2. **Assembling the gearhead to the motor**

Combine the gearhead with the motor and tighten the hexagonal socket head screws. Check the key is fitted to the motor output shaft before assembling them.
When assembling, apply anti-seizing agent such as molybdenum disulfide grease on the surface of the motor shaft and on the bore of the motor shaft input part in the gearhead. Also, confirm that no gaps remain on the mating face of the motor and gearhead.

Output power	Screw size	Material	Tightening torque [N·m (lb-in)]
60 W	M5	Stainless steel	3 (27)
For 120 W or higher	M6		5 (44)



Note

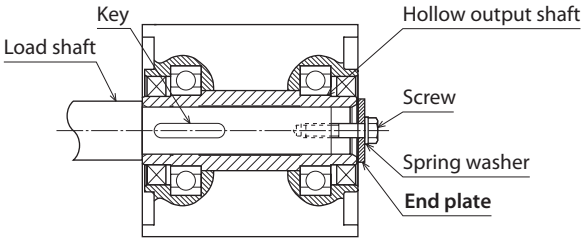
- Do not forcibly assemble the motor and gearhead. The motor output shaft or the gearhead input part may be damaged, resulting in noise or shorter service life.
- Do not allow dust to attach to the pilot sections of the motor and gearhead. Also, assemble the motor and gearhead carefully by not pinching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

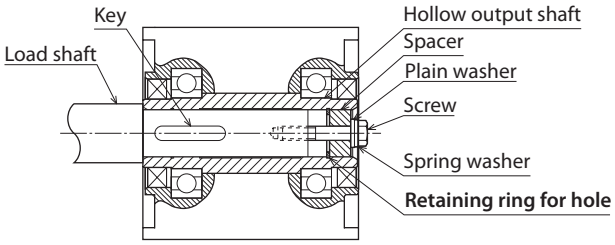
Mounting method of the load varies depending on the load shaft conditions. See the following figures.
The hollow output shaft inside dimension is processed to a tolerance of H8, and incorporates a key slot for load shaft attachment. A load shaft tolerance of h7 is recommended.
Also, apply anti-seizing agent such as molybdenum disulfide grease on the surface of the load shaft and the bore of the hollow output shaft.
A load can be installed to the hollow output shaft from either right face or left face in the following figure.

● Stepped load shaft

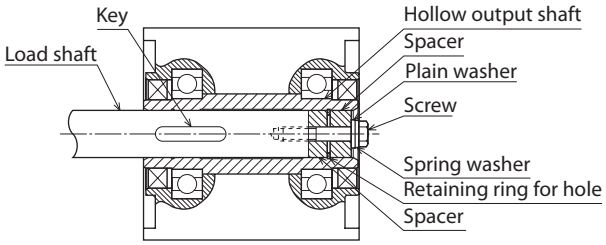
Mounting method using end plate



Mounting method using retaining ring



● Non-stepped load shaft



Note

Do not apply excessive or abrupt force to the hollow output shaft when inserting a load shaft into the hollow output shaft. Excessive or abrupt force may cause damage to the gearhead internal bearings.

● Recommended load shaft installation dimensions

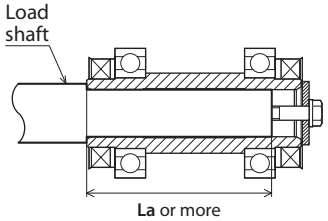
[Unit : mm (in.)]

Output power		60 W	120 W
Gear ratio		10 to 200	10 to 200
Inner diameter of hollow shaft (H8)		$Ø12^{+0.027}_{0}$ ($Ø0.4724^{+0.0011}_{0}$)	$Ø15^{+0.027}_{0}$ ($Ø0.5906^{+0.0011}_{0}$)
Recommended load shaft dimensions (h7)		$Ø12^{0}_{-0.018}$ ($Ø0.4724^{0}_{-0.0007}$)	$Ø15^{0}_{-0.018}$ ($Ø0.5906^{0}_{-0.0007}$)
Length of stepped shaft **La**		55 (2.17)	72 (2.83)
Screw size		M5	M6
Spacer dimension	Outer diameter	Ø11.5 (Ø0.45)	Ø14.5 (Ø0.57)
	Inner diameter	Ø6 (Ø0.24)	Ø7 (Ø0.28)
	Width	3 (0.12)	3 (0.12)
Nominal diameter of retaining ring (C-type retaining ring)		Ø12 (Ø0.47)	Ø15 (Ø0.59)
End plate thickness		3 (0.12)	3 (0.12)

Output power		200 W or higher	
Gear ratio		5 to 50	100, 200
Inner diameter of hollow shaft (H8)		$Ø25^{+0.033}_{0}$ ($Ø0.9843^{+0.0013}_{0}$)	$Ø30^{+0.033}_{0}$ ($Ø1.811^{+0.0013}_{0}$)
Recommended load shaft dimensions (h7)		$Ø25^{0}_{-0.021}$ ($Ø0.9843^{0}_{-0.0008}$)	$Ø30^{0}_{-0.021}$ ($Ø1.811^{0}_{-0.0008}$)
Length of stepped shaft **La**		96 (3.78)	96 (3.78)
Screw size		M6	M8
Spacer dimension	Outer diameter	Ø24.5 (Ø0.96)	Ø29.5 (Ø1.16)
	Inner diameter	Ø7 (Ø0.28)	Ø9 (Ø0.35)
	Width	4 (0.16)	5 (0.20)
Nominal diameter of retaining ring (C-type retaining ring)		Ø25 (Ø0.98)	Ø30 (Ø1.18)
End plate thickness		4 (0.16)	5 (0.20)

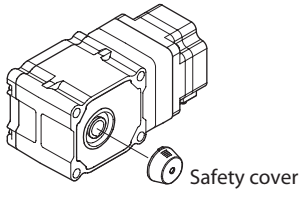
- Parts for installing a load shaft including a retaining ring for hole, a spacer, a screw, are not supplied.

Recommended load shaft length



● Installing the safety cover

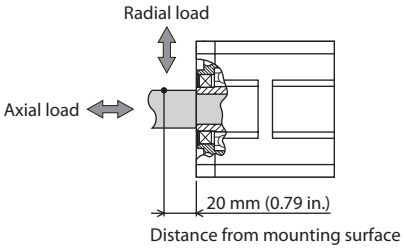
After installing the load, attach the supplied safety cover.
The safety cover can be attached to either face.



■ Permissible radial load and permissible axial load

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

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



Gear ratio	Motor shaft rotation speed* (r/min)	60 W		120 W		200 W or higher	
		Permissible radial load [N (lb.)] 20 mm (0.79 in.) from mounting surface	Permissible axial load [N (lb.)]	Permissible radial load [N (lb.)] 20 mm (0.79 in.) from mounting surface	Permissible axial load [N (lb.)]	Permissible radial load [N (lb.)] 20 mm (0.79 in.) from mounting surface	Permissible axial load [N (lb.)]
5	1500	–	–	–	–	1346 (303)	307 (69)
	3000	–	–	–	–	942 (212)	215 (48)
	3600	–	–	–	–	673 (151)	154 (35)
10	1500	265 (60)	88 (20)	363 (82)	108 (24)	1663 (374)	380 (86)
	3000	201 (45)	67 (15)	276 (62)	82 (18)	1164 (262)	266 (60)
	3600	148 (33)	49 (11)	203 (46)	60 (14)	832 (187)	190 (43)
15	1500	341 (77)	108 (24)	484 (109)	147 (33)	1882 (423)	429 (97)
	3000	259 (58)	82 (18)	368 (83)	112 (25)	1317 (296)	300 (68)
	3600	191 (43)	60 (14)	271 (61)	82 (18)	941 (212)	215 (48)
20	1500	417 (94)	137 (31)	605 (136)	186 (42)	2035 (458)	466 (105)
	3000	317 (71)	104 (23)	460 (104)	141 (32)	1425 (321)	326 (73)
	3600	234 (53)	77 (17)	339 (76)	104 (23)	1018 (229)	233 (52)
30	1500	531 (119)	177 (40)	806 (181)	245 (55)	2309 (520)	527 (119)
	3000	404 (91)	135 (30)	613 (138)	186 (42)	1616 (364)	369 (83)
	3600	297 (67)	99 (22)	451 (101)	137 (31)	1155 (260)	264 (59)
50	1500	682 (153)	226 (51)	971 (218)	294 (66)	2681 (603)	613 (138)
	3000	518 (117)	172 (39)	738 (166)	223 (50)	1877 (422)	429 (97)
	3600	382 (86)	127 (29)	544 (122)	165 (37)	1341 (302)	307 (69)
100	1500	758 (171)	245 (55)	1045 (235)	324 (73)	3436 (773)	785 (177)
	3000	576 (130)	186 (42)	794 (179)	246 (55)	2405 (541)	550 (124)
	3600	424 (95)	137 (31)	585 (132)	181 (41)	1718 (387)	393 (88)
200	1500	836 (188)	275 (62)	1127 (254)	343 (77)	3436 (773)	785 (177)
	3000	635 (143)	209 (47)	857 (193)	261 (59)	2405 (541)	550 (124)
	3600	468 (105)	154 (35)	631 (142)	192 (43)	1718 (387)	393 (88)

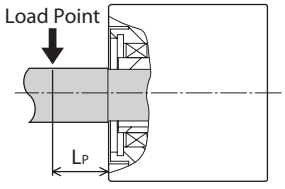
* The speed control range is 80 to 3600 r/min.

● Permissible radial load calculation

The calculation formula of the permissible radial load varies depending on the mechanism.

F_0 (N) : Permissible radial load in the case of distance 20 mm from mounting surface
L_P (mm) : Distance from mounting surface to load point
S (mm) : Distance from mounting surface to bearing

When end of shaft being driven is not supported by a bearing



• 60 W

$$\text{Permissible radial load (N)} = \frac{68.5}{48.5+L_P} \times F_0$$

• 120 W

$$\text{Permissible radial load (N)} = \frac{79}{59+L_P} \times F_0$$

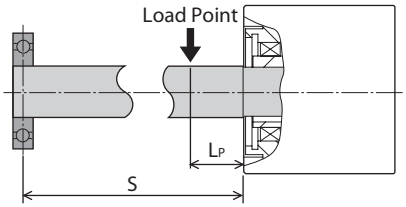
• 200 W or higher (Gear ratio 5 to 50)

$$\text{Permissible radial load (N)} = \frac{95.5}{75.5+L_P} \times F_0$$

• 200 W or higher (Gear ratio 100, 200)

$$\text{Permissible radial load (N)} = \frac{102}{82+L_P} \times F_0$$

When end of shaft being driven is supported by a bearing



• 60 W

$$\text{Permissible radial load (N)} = \frac{68.5(S+5.5)}{53(S-L_P)} \times F_0$$

• 120 W

$$\text{Permissible radial load (N)} = \frac{79(S+4)}{65(S-L_P)} \times F_0$$

• 200 W or higher (Gear ratio 5 to 50)

$$\text{Permissible radial load (N)} = \frac{95.5(S-9)}{104.5(S-L_P)} \times F_0$$

• 200 W or higher (Gear ratio 100, 200)

$$\text{Permissible radial load (N)} = \frac{102(S-9)}{111(S-L_P)} \times F_0$$

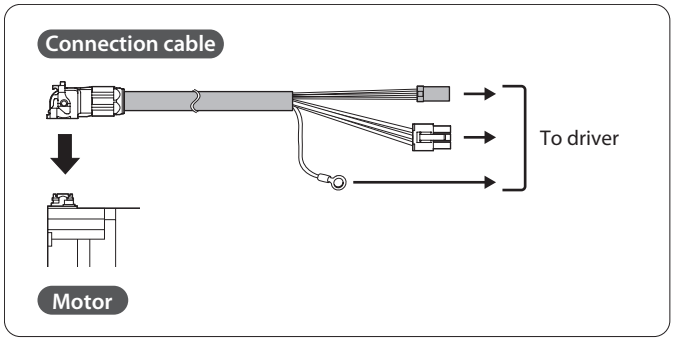
Connection

■ Connecting the motor and driver

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

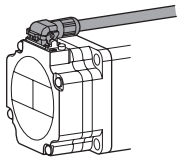
There are two types of connection cables which cable leading directions are different.

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



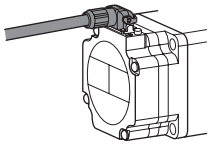
[Cable leading direction]

Leading in direction of output shaft

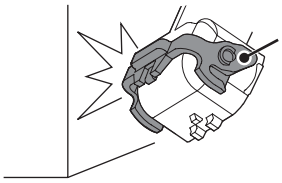


The connection procedures are explained as an example of this cable leading direction.

Leading in opposite direction of output shaft

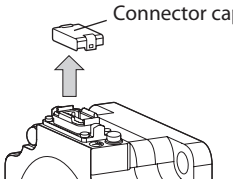


Note Do not apply a strong force on the locking lever of the connector for motor connection. Applying a strong force on the locking lever may cause damage.

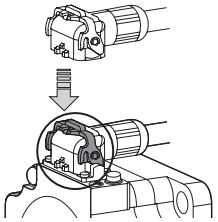


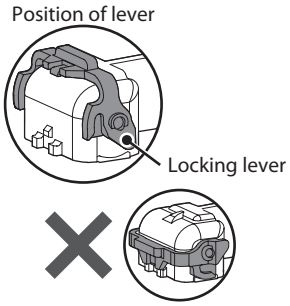
■ Connection procedures of the motor and connection cable

1 Remove



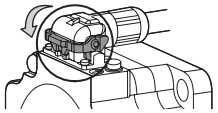
2 Attach

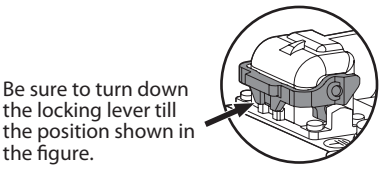


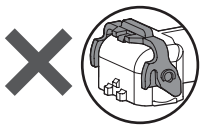


The connector cannot be inserted if the locking lever is turned down.

3 Secure

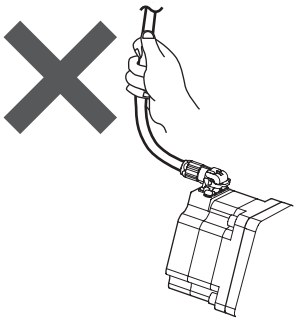






The connector cannot be secured unless the locking lever is turned down.

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



■ Detaching the connection cable

Turn up the locking lever to detach the cable.

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

Grounding

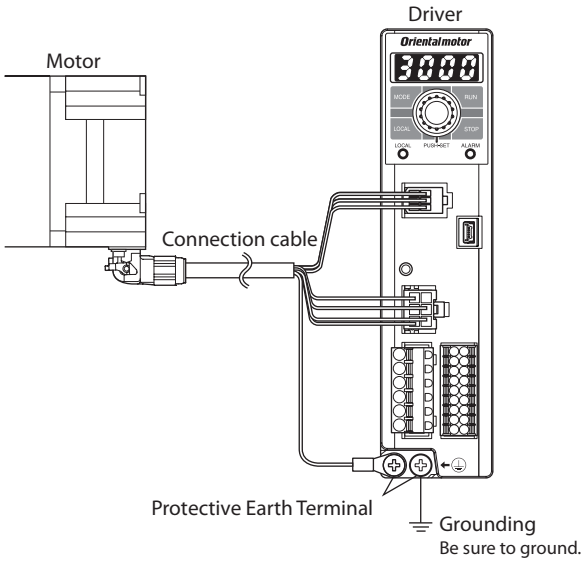
Ground using the Protective Earth Terminals ⏚ of the motor and driver, as well as the ground terminal of the connection cable.

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. 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.

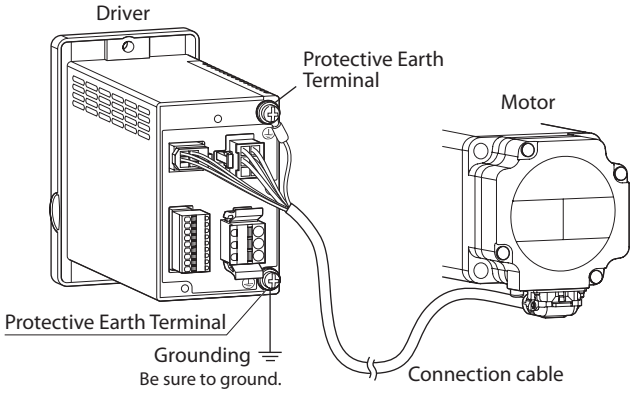
Reference
Protective earth wire of the connection cable
Conductor size: AWG18 (0.75 mm^2)
Maximum conductor resistance: 25.0 Ω/km

■ BLE2 Series



■ BMU Series

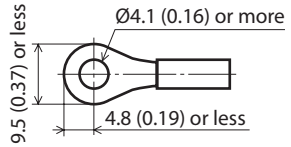
The figure shows an example of the 120 W type.



■ 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 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

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

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

■ During inspection

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

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

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

Model	Size [mm (in.)]	Thickness [mm (in.)]	Material
BLM460	135×135 (5.31×5.31)	5 (0.20)	Aluminum alloy
BLM5120	165×165 (6.50×6.50)		
BLM5200	200×200 (7.87×7.87)		
BLM5300 **BLM5400**	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 "Sinewave 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	−10 to +60 °C [+14 to +140 °F] (non-freezing)
	Ambient Humidity	85% or less (non-condensing)
	Altitude	Up to 1000 m (3300 ft.) above sea level
	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 connectors for driver connection of the connection cable.)

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

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