



OPERATING MANUAL

Brushless Motor

BX II Series Motor Edition



Introduction

■ Before using the product

Only qualified personnel of electrical and mechanical engineering should work with the product.

Use the product correctly after thoroughly reading the section "Safety precautions." In addition, be sure to observe the contents described in warning, caution, and note in this manual.

The product described in this document 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.

- **BX II Series OPERATING MANUAL Motor Edition** (this document)

This manual explains installation methods of the motor and load, and others.

- **BX II Series OPERATING MANUAL Driver Edition**

This manual explains the functions as well as the installation/connection methods and others for the driver.

- **BX II Series USER MANUAL**

This manual explains the functions, installation/connection methods, operating methods of the motor and driver as well as detailed information for using the product.

This manual does not come with the product. For details, contact your nearest Oriental Motor sales office or download from Oriental Motor Website Download Page.

Safety precautions

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

	WARNING	Handling the product without observing the instructions that accompany a "WARNING" symbol may result in serious injury or death.
	CAUTION	Handling the product without observing the instructions that accompany a "CAUTION" symbol may result in injury or property damage.
	Note	The items under this heading contain important handling instructions that the user should observe to ensure safe use of the product.

[Description of graphic symbols]

: Indicates "prohibited" actions that must not be performed.

: Indicates "compulsory" actions that must be performed.

Thank you for purchasing an Oriental Motor product.

This Operating Manual describes product handling procedures and safety precautions.

- Please read it thoroughly to ensure safe operation.
- Always keep the manual where it is readily available.

WARNING

	<ul style="list-style-type: none"> • 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, gearhead and driver. 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.
	<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 damage to equipment. • The motor and driver are Class I equipment. When installing the motor and driver, ground their Protective Earth Terminals. Failure to do so may result in electric shock. • Install the motor and driver inside an enclosure. Failure to do so may result in electric shock or injury. • Securely connect the cables in accordance with the connection examples. Failure to do so may result in fire or electric shock. • Be sure to observe the specified cable sizes. Use of unspecified cable sizes may result in fire. • Use a motor, gearhead, driver, and regeneration resistor 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/inspection. Failure to do so may result in electric shock.

CAUTION

	<ul style="list-style-type: none"> • Do not use the motor, gearhead, driver, or regeneration resistor in a state where the specification value is exceeded. Doing so may result in fire, electric shock, injury, or damage to equipment. • Do not leave anything around the motor and driver that would obstruct ventilation. Doing so may result in damage to equipment. • Do not move the product by holding the output shaft of the motor or the gearhead, or the motor cable. Doing so may result in injury. • Do not touch the motor output shaft (key slot 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. • Do not touch the rotating part (output shaft) while operating the motor. Doing so may result in injury.
	<ul style="list-style-type: none"> • Securely install the motor, gearhead and driver to their respective mounting plates. Inappropriate installation may cause the motor, gearhead or driver to detach and fall, resulting in injury or damage to equipment. • Provide a cover over the rotating part (output shaft) of the motor or gearhead. Failure to do so may result in injury. • When installing the motor or gearhead in equipment, exercise caution not to pinch your fingers or other parts of your body between the equipment and motor or gearhead. Injury may result. • Securely install a load on the output shaft of the motor or gearhead. Inappropriate installation may result in injury. • 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

WARNING

	<ul style="list-style-type: none"> • Do not use the product in explosive or corrosive environments, in the presence of flammable gases, locations subjected to splashing water, or near combustibles. Doing so may result in fire, electrical 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. This may result in electric shock or malfunction. • Do not use the standard type (without electromagnetic brake) in a vertical application. If the driver protective function is activated, the motor will stop and the moving part will drop, thereby causing injury or damage to equipment. • Do not use the brake mechanism of the electromagnetic brake motor as a safety brake. It is intended to hold the moving part and motor positions. Using it as a safety brake may result in injury or damage to equipment. • Do not forcibly bend, pull or pinch the cable. Doing so may result in fire or electric shock. • Do not machine or modify the motor cable or connection cable. Doing so may result in electric shock or fire.
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Precautions for use

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

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

Wiring

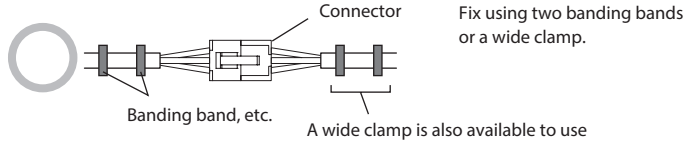
● Connecting the motor and driver

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

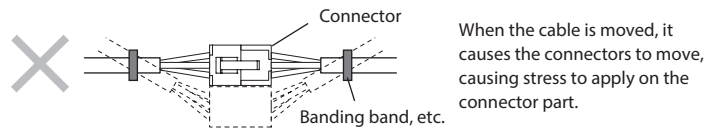
● How to fix the cable

Fix the cable at the positions near the connector so that no stress is applied on the connector part.

● Fixing at two places on each side



● Fixing at one place on each side



When installing the motor on a moving part, use a flexible cable offering excellent flexibility.

Installation

● Make sure not to hit or apply a strong impact on the motor output shaft or the encoder.

Applying a strong impact on the motor output shaft or the encoder may cause encoder damage or motor malfunction.



● 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 damage resulting from contamination. Grease leakage may lead to problems in the user's equipment or products.

● When using in low temperature environment

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

● Apply grease to the hollow output shaft of a hollow shaft flat gearhead. When using a hollow shaft flat gearhead, apply grease (molybdenum disulfide grease, etc.) on the surface of the load shaft and inner walls of the hollow output shaft to prevent seizure.

Insulation resistance measurement and dielectric strength test

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

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

● Do not conduct the insulation resistance measurement or dielectric strength test on an encoder.

Doing so may damage the product.

Operations

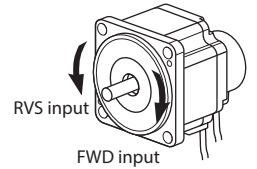
● Use an electromagnetic brake motor in an application of vertical drive such as elevating equipment.

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

● Rotation direction

The rotation direction of the motor output shaft can be changed by setting of the "Motor rotation direction" parameter.

The figure shows an example when the parameter is the initial value.



● Combination type-parallel shaft gearhead

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

Model	Gear Ratio	Rotation direction of the gearhead output shaft
BXM230	5, 10, 15, 20, 200	Same direction as the motor
BXM460		
BXM5120	30, 50, 100	Opposite direction to the motor
BXM6200	5, 10, 15, 20, 100, 200	Same direction as the motor
BXM6400		

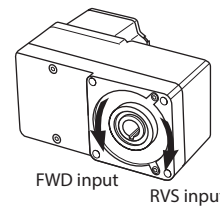
● Combination type-hollow shaft flat gearhead

At all gear ratios, the output shaft rotates in the opposite direction to the motor as viewed from the gearhead front side.

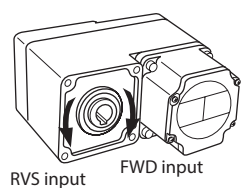
The rotation direction is different depending on whether the pre-assembled motor/gearhead is viewed from the front side or rear side.

Check with the figure below.

Viewed from front side



Viewed from rear side



Checking the product

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

● Combination type-parallel shaft gearhead

- Motor 1 unit (a gearhead is pre-assembled)
- Mounting screw 1 set
(hexagonal socket head screw, plain washer, spring washer, nut each 4 pcs, parallel key 1 pc*)
- Operating manual (this document) 1 copy
- * For the 200 W and 400 W types, the parallel key is fixed to the gearhead output shaft.

● Combination type-hollow shaft flat gearhead

- Motor 1 unit (a gearhead is pre-assembled)
- Mounting screw 1 set
(hexagonal socket head screw, plain washer, spring washer, nut* each 4 pcs, parallel key 1 pc)
- Safety cover 1 set
(safety cover 1 pc, mounting screw for safety cover 2 pcs)
- Operating manual (this document) 1 copy
- * For the 200 W and 400 W types, nuts are not included.

● Round shaft type

- Motor 1 unit
- Operating manual (this document) 1 copy

Model

Verify the model name of the purchased product against the model shown on the package label. Check the motor model and the gearhead model against the model name shown on their nameplates, respectively.

The box (□) in the model name indicates the number representing the gear ratio.

Standard type

Combination type-parallel shaft gearhead

Output power	Model	Motor model	Gearhead model
30 W	BXM230-□	BXM230-GFS	GFS2G□
60 W	BXM460-□	BXM460-GFS	GFS4G□
120 W	BXM5120-□	BXM5120-GFS	GFS5G□
200 W	BXM6200-□	BXM6200-GFS	GFS6G□
400 W	BXM6400-□	BXM6400-GFS	

Combination type-hollow shaft flat gearhead

Output power	Model	Motor model	Gearhead model
30 W	BXM230-□FR	BXM230-GFS	GFS2G□FR
60 W	BXM460-□FR	BXM460-GFS	GFS4G□FR
120 W	BXM5120-□FR	BXM5120-GFS	GFS5G□FR
200 W	BXM6200-□FR	BXM6200-GFS	GFS6G□FR
400 W	BXM6400-□FR	BXM6400-GFS	

Round shaft type

Output power	Model	Output power	Model
30 W	BXM230-A2	200 W	BXM6200-A
60 W	BXM460-A2	400 W	BXM6400-A
120 W	BXM5120-A2		

Electromagnetic brake type

Combination type-parallel shaft gearhead

Output power	Model	Motor model	Gearhead model
30 W	BXM230M-□	BXM230M-GFS	GFS2G□
60 W	BXM460M-□	BXM460M-GFS	GFS4G□
120 W	BXM5120M-□	BXM5120M-GFS	GFS5G□
200 W	BXM6200M-□	BXM6200M-GFS	GFS6G□
400 W	BXM6400M-□	BXM6400M-GFS	

Combination type-hollow shaft flat gearhead

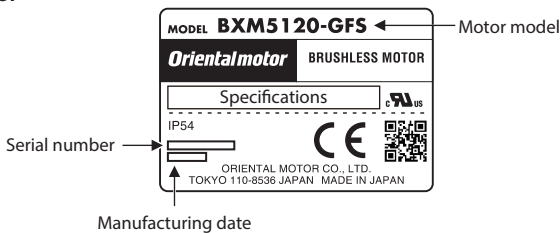
Output power	Model	Motor model	Gearhead model
30 W	BXM230M-□FR	BXM230M-GFS	GFS2G□FR
60 W	BXM460M-□FR	BXM460M-GFS	GFS4G□FR
120 W	BXM5120M-□FR	BXM5120M-GFS	GFS5G□FR
200 W	BXM6200M-□FR	BXM6200M-GFS	GFS6G□FR
400 W	BXM6400M-□FR	BXM6400M-GFS	

Round shaft type

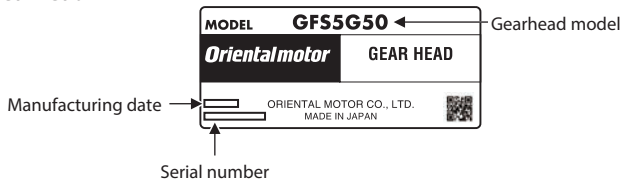
Output power	Model	Output power	Model
30 W	BXM230M-A2	200 W	BXM6200M-A
60 W	BXM460M-A2	400 W	BXM6400M-A
120 W	BXM5120M-A2		

Information about nameplate

Motor



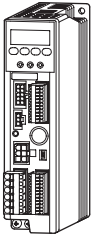
Gearhead



Drivers possible to combine

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

Output power	Motor model	Driver model	
		Single-phase 100-120 VAC	Single-phase 200-240 VAC Three-phase 200-240 VAC
30 W	BXM230	BXSD30-A2	BXSD30-C2
60 W	BXM460	BXSD60-A2	BXSD60-C2
120 W	BXM5120	BXSD120-A2	BXSD120-C2
200 W	BXM6200	BXSD200-A2	BXSD200-C2
400 W	BXM6400	-	BXSD400-C2



Connection cable (sold separately)

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

The connection cables are provided up to 30.3 m (99.4 ft.).

It is a set of two cables consisting a cable for motor and a cable for encoder.

Connection cable

Length	Model
0.3 m (1.0 ft.)	CC003SBF2
1.3 m (4.3 ft.)	CC013SBF2
2.3 m (7.5 ft.)	CC023SBF2
3.3 m (10.8 ft.)	CC033SBF2
5.3 m (17.4 ft.)	CC053SBF2
7.3 m (24.0 ft.)	CC073SBF2
10.3 m (33.8 ft.)	CC103SBF2
15.3 m (50.2 ft.)	CC153SBF2
20.3 m (66.6 ft.)	CC203SBF2
30.3 m (99.4 ft.)	CC303SBF2

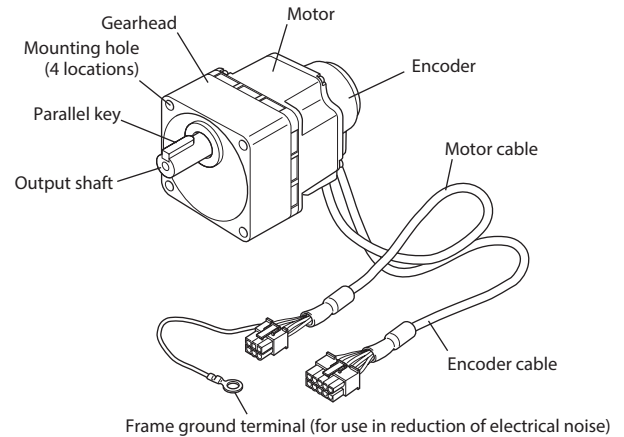
Flexible connection cables

Length	Model
1.3 m (4.3 ft.)	CC013SBR2
2.3 m (7.5 ft.)	CC023SBR2
3.3 m (10.8 ft.)	CC033SBR2
5.3 m (17.4 ft.)	CC053SBR2
7.3 m (24.0 ft.)	CC073SBR2
10.3 m (33.8 ft.)	CC103SBR2
15.3 m (50.2 ft.)	CC153SBR2
20.3 m (66.6 ft.)	CC203SBR2
30.3 m (99.4 ft.)	CC303SBR2

Names of parts

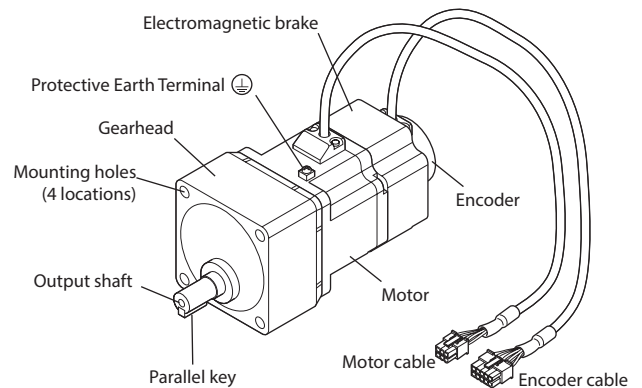
Combination type-parallel shaft gearhead Standard type

The figure shows a motor of 30 W, 60 W, or 120 W.



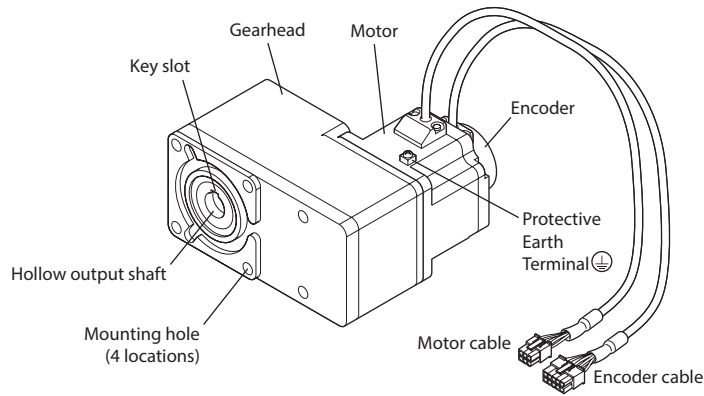
Combination type-parallel shaft gearhead Electromagnetic brake type

The figure shows a motor of 200 W or 400 W.



● Combination type-hollow shaft flat gearhead Standard type

The figure shows a motor of 200 W or 400 W.



Installation

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

■ Installation location

Install the product in a well-ventilated location that provides easy access for inspection. The location must also satisfy the following conditions:

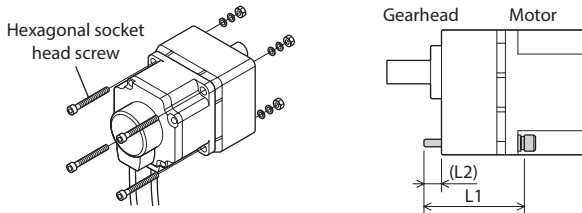
- Install it onto an appropriate flat plate having excellent vibration resistance and heat conductivity.
- Inside an enclosure installed indoors (provide a ventilation hole)
- Operating ambient temperature 0 to +50 °C [+32 to 122 °F] (non-freezing)
- Operating ambient humidity 85% or less (non-condensing)
- 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

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.

● Combination type-parallel shaft gearhead

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



Mounting screw (included)

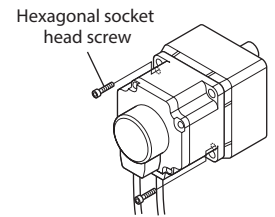
Model	Gear Ratio	Hexagonal socket head screw		L2 [mm (in.)]	Tightening torque [N·m (lb-in)]
		Screw size	L1 [mm (in.)]		
BXM230	5 to 20	M4	50 (1.97)	6 (0.24)	1.8 (15.9)
	30 to 100		55 (2.17)	7 (0.28)	
	200		60 (2.36)	7 (0.28)	
BXM460	5 to 20	M6	65 (2.56)	13 (0.51)	6.4 (56)
	30 to 100		70 (2.76)	13 (0.51)	
	200		75 (2.95)	13 (0.51)	
BXM5120	5 to 20	M8	75 (2.95)	16.5 (0.65)	15.5 (137)
	30 to 100		90 (3.54)	18.5 (0.73)	
	200		95 (3.74)	17.5 (0.69)	
BXM6200 BXM6400	5 to 20	M8	95 (3.74)	21 (0.83)	15.5 (137)
	30, 50		110 (4.33)	24 (0.94)	
	100, 200		120 (4.72)	20 (0.79)	

Removing/Installing the gearhead

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

Removing the gearhead from the motor

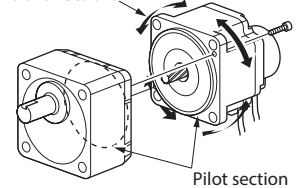
Remove the hexagonal socket head screws (2 places) assembling the motor and gearhead, and detach the gearhead from the motor.



Assembling the gearhead to the motor

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

Change the cable position to a desired 90° direction.



2. Check no gaps remain between the motor and gearhead, and tighten them with hexagonal socket head screws (2 places).

Model	Screw size	Tightening torque [N·m (lb-in)]
BXM230 BXM460	M2.6	0.4 (3.5)
BXM5120 BXM6200 BXM6400	M3	0.6 (5.3)

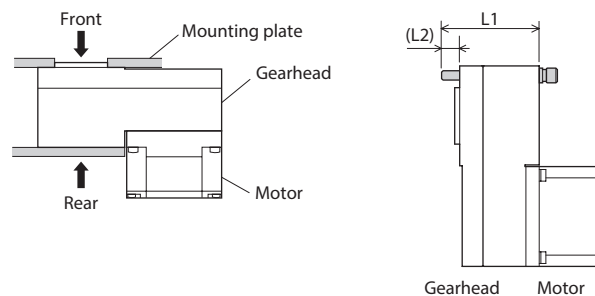
Note

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

● Combination type-hollow shaft flat gearhead

A combination type-hollow shaft flat gearhead can be installed by using either its front or rear side as the mounting surface.

Secure the motor and gearhead through four mounting holes using the included mounting screw set. Do not leave a gap between the product and mounting plate. Nuts are not included with the 200 W and 400 W types. Provide nuts separately or drill tapped holes in the mounting plate. Attach the included safety cover to the hollow output shaft on the end opposite from the one where the load shaft is installed.

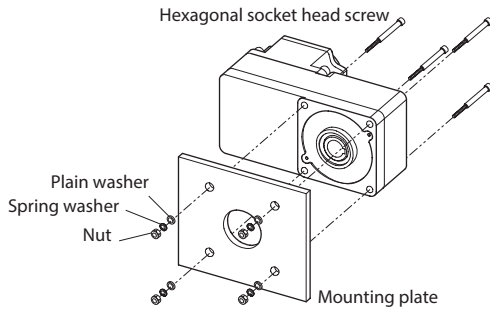


Mounting screw (included)

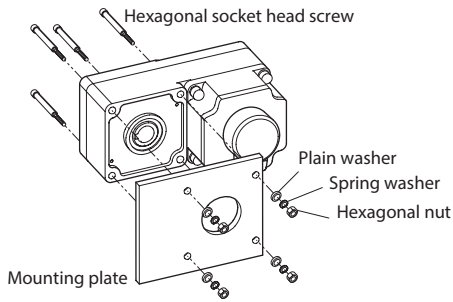
Model	Hexagonal socket head screw		L2 [mm (in.)]	Tightening torque [N·m (lb-in)]
	Screw size	L1 [mm (in.)]		
BXM230	M5	65 (2.56)	15 (0.59)	3.8 (33)
BXM460	M6	70 (2.76)	14 (0.55)	6.4 (56)
BXM5120	M8	90 (3.54)	21 (0.83)	15.5 (137)
BXM6200		100 (3.94)	13 (0.51)	
BXM6400		100 (3.94)	13 (0.51)	

● Using the front side as the mounting surface

When the gearhead is installed by using its front side as the mounting surface, use the boss section of the output shaft to align the center.

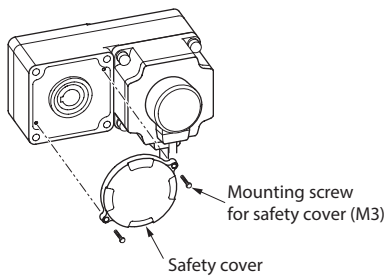


● Using the rear side as the mounting surface



● Installing the safety cover

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

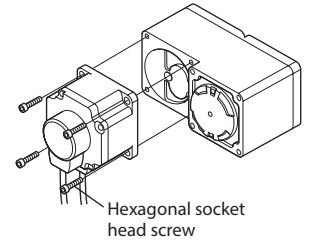


Removing/Installing the gearhead

See the following steps to replace the gearhead or to change the cable outlet position. Note that the motor cable cannot be positioned in the direction where it faces to the gearhead output shaft side.

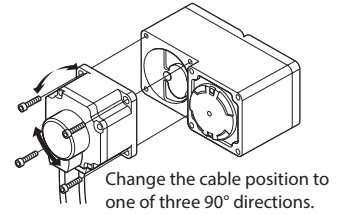
Removing the gearhead from the motor

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



Assembling the gearhead to the motor

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



2. Check no gaps remain between the motor and gearhead, and tighten them with hexagonal socket head screws (4 places).

Model	Screw size	Tightening torque [N·m (lb-in)]
BXM230	M4	1.8 (15.9)
BXM460	M6	6.4 (56)
BXM5120 BXM6200 BXM6400	M8	15.5 (137)

Note

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

● Round shaft type

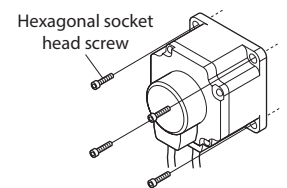
Install the motor to a mounting plate of the following size or larger, so that the motor case temperature will not exceed 90 °C (194 °F).

Model	Size of mounting plate [mm (in.)]	Thickness [mm (in.)]	Material
BXM230	115×115 (4.53×4.53)	5 (0.20)	Aluminum alloy
BXM460	135×135 (5.31×5.31)		
BXM5120	165×165 (6.50×6.50)		
BXM6200	200×200 (7.87×7.87)		
BXM6400	250×250 (9.84×9.84)	6 (0.24)	

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

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

Model	Screw size	Tightening torque [N·m (lb-in)]
BXM230	M4	1.8 (15.9)
BXM460	M6	6.4 (56)
BXM5120 BXM6200 BXM6400	M8	15.5 (137)



■ Installing a load

● Combination type-parallel shaft gearhead, round shaft type

When installing a load on the motor or gearhead, align the center of the motor output shaft (gearhead output shaft) with the center of the load shaft.

- Note**
- When coupling the motor or 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 motor output shaft (gearhead output shaft) or bearings. 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 output shaft of the motor or gearhead. This may damage the bearing, resulting in damage to the motor and gearhead.

● Output shaft shape

Combination type-parallel shaft gearhead

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

Round shaft type

A flat section is provided on the motor output shaft of each round shaft type. Apply a double-point screw, etc., at the flat section to firmly secure the load and prevent it from spinning.

● How to install a load

Using a coupling

Align the centerline of the motor or gearhead output shaft with the centerline of the load shaft.

Using a belt

Adjust the motor or gearhead output shaft to lie parallel with the load shaft, and form right angles between the output shaft/load shaft and the line connecting the centers of both pulleys.

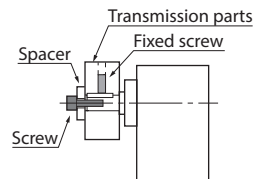
Using a gear

Adjust the motor or gearhead output shaft to lie parallel with the gear shaft, and allow the output shaft to mesh correctly with the centers of the gear teeth.

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

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

Gearhead model	Output shaft end tapped hole
GFS4G	M5, Effective depth 10 mm (0.39 in)
GFS5G GFS6G	M6, Effective depth 12 mm (0.47 in)



Example of use for output shaft end tapped hole

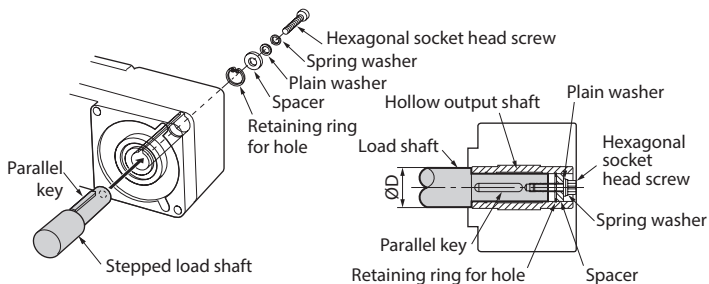
● Combination type-hollow shaft flat gearhead

If the motor is subject to a strong impact upon instantaneous stop or receives a large overhung load, use a stepped load shaft.

- Note**
- Apply grease (molybdenum disulfide grease, etc.) on the surface of the load shaft and inner walls of the hollow output shaft to prevent seizure.
 - When installing a load, do not damage the motor output shaft (gearhead output shaft) or bearings. 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 output shaft of the motor or gearhead. This may damage the bearing, resulting in damage to the motor and gearhead.

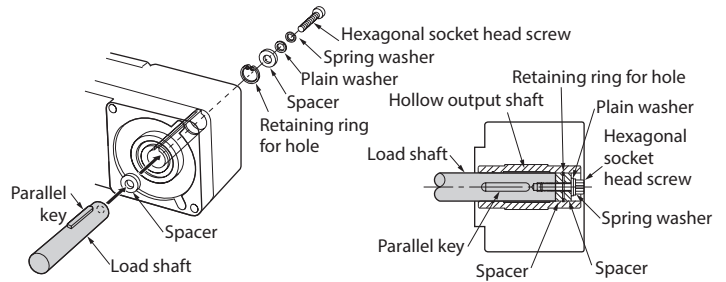
● Stepped load shaft

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



● Non-stepped load shaft

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



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

Model	Inner diameter of hollow shaft (H8)	Recommended diameter of load shaft (h7)	Nominal diameter of retaining ring for hole
BXM230	$\varnothing 12^{+0.027}_0$ ($\varnothing 0.4724^{+0.0011}_0$)	$\varnothing 12^{+0.018}_0$ ($\varnothing 0.4724^{+0.0007}_0$)	$\varnothing 12(\varnothing 0.47)$
BXM460	$\varnothing 15^{+0.027}_0$ ($\varnothing 0.5906^{+0.0011}_0$)	$\varnothing 15^{+0.018}_0$ ($\varnothing 0.5906^{+0.0007}_0$)	$\varnothing 15(\varnothing 0.59)$
BXM5120	$\varnothing 20^{+0.033}_0$ ($\varnothing 0.7874^{+0.0013}_0$)	$\varnothing 20^{+0.021}_0$ ($\varnothing 0.7874^{+0.0008}_0$)	$\varnothing 20(\varnothing 0.79)$
BXM6200 BXM6400	$\varnothing 25^{+0.033}_0$ ($\varnothing 0.9843^{+0.0013}_0$)	$\varnothing 25^{+0.021}_0$ ($\varnothing 0.9843^{+0.0008}_0$)	$\varnothing 25(\varnothing 0.98)$

Model	Applicable screw	Spacer thickness	Outer diameter of stepped shaft (ØD)
BXM230	M4	3 (0.12)	20 (0.79)
BXM460	M5	4 (0.16)	25 (0.98)
BXM5120	M6	5 (0.20)	30 (1.18)
BXM6200 BXM6400	M8	6 (0.24) [3 (0.12)]*	40 (1.57)

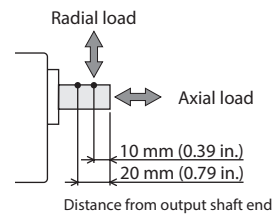
* The value in the brackets [] assumes when using the rear side as the mounting surface.

■ Permissible radial load and permissible axial load

Make sure a radial load and axial load applied to the output shaft of the motor and gearhead will not exceed the permissible values shown in the table below.

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

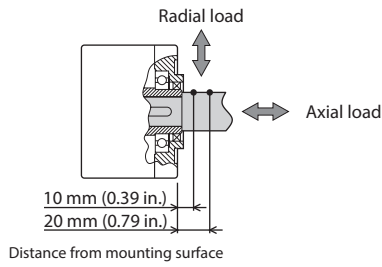
● Combination type-parallel shaft gearhead



Model	Gear ratio	Permissible radial load [N (lb.)]*		Permissible axial load [N (lb.)]
		Distance from output shaft end of the gearhead		
		10 mm (0.39 in.)	20 mm (0.79 in.)	
BXM230	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)]	
BXM460	5	200 (45) [180 (40)]	250 (56) [220 (49)]	100 (22)
	10 to 20 30 to 200	300 (67) [270 (60)] 450 (101) [420 (94)]	350 (78) [330 (74)] 550 (123) [500 (112)]	
BXM5120	5	300 (67) [230 (51)]	400 (90) [300 (67)]	150 (33)
	10 to 20 30 to 200	400 (90) [370 (83)] 500 (112) [450 (101)]	500 (112) [430 (96)] 650 (146) [550 (123)]	
BXM6200 BXM6400	5 to 20	550 (123) [500 (112)]	800 (180) [700 (157)]	200 (45) 300 (67) 400 (90)
	30, 50	1000 (220) [900 (200)]	1250 (280) [1100 (240)]	
	100, 200	1400 (310) [1200 (270)]	1700 (380) [1400 (310)]	

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

● Combination type-hollow shaft flat gearhead



Model	Gear ratio	Permissible radial load [N (lb.)]*1		Permissible axial load [N (lb.)]
		Distance from gearhead mounting surface		
		10 mm (0.39 in.)	20 mm (0.79 in.)	
BXM230	5, 10	450 (101) [410 (92)]	370 (83) [330 (74)]	200 (45)
	15 to 200	500 (112) [460 (103)]	400 (90) [370 (83)]	
BXM460	5, 10	800 (180) [730 (164)]	660 (148) [600 (135)]	400 (90)
	15 to 200	1200 (270) [1100 (240)]	1000 (220) [910 (200)]	
BXM5120	5, 10	900 (200) [820 (184)]	770 (173) [700 (157)]	500 (112)
	15, 20	1300 (290) [1200 (270)]	1110 (240) [1020 (220)]	
	30 to 200	1500 (330) [1400 (310)]	1280 (280) [1200 (270)]	
BXM6200	5 *2	1230 (270) [1130 (250)]	1070 (240) [990 (220)]	800 (180)
	10			
BXM6400	15, 20	1680 (370) [1550 (340)]	1470 (330) [1360 (300)]	
	30 to 100	2040 (450) [1900 (420)]	1780 (400) [1660 (370)]	

*1 The values assume a rated speed of 3000 r/min or below. The values in brackets [] are based on a speed of 4000 r/min.

*2 **BXM6400** only

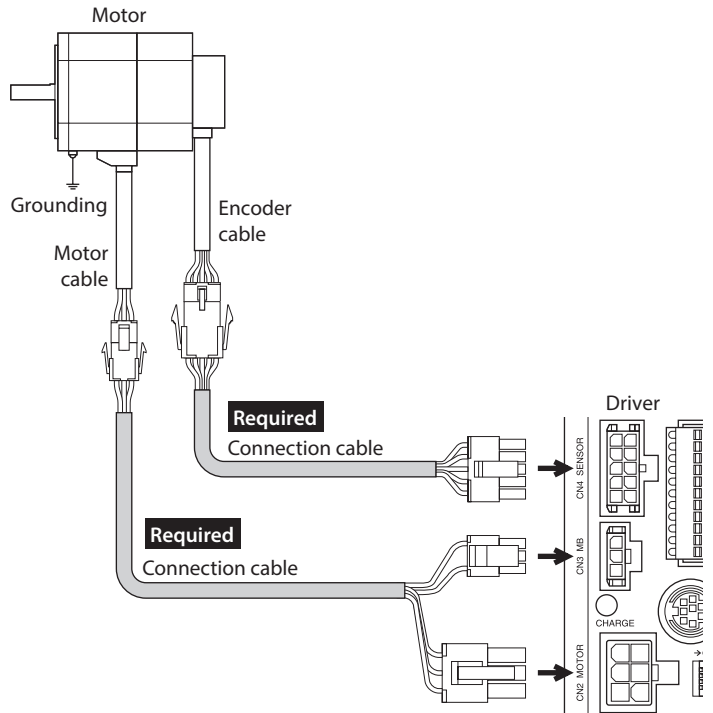
● Round shaft type

Model	Permissible radial load [N (lb.)]		Permissible axial load [N (lb.)]
	Distance from motor output shaft end		
	10 mm (0.39 in.)	20 mm (0.79 in.)	
BXM230	87.2 (19.6)	107 (24)	10 (2.2)
BXM460	117 (26)	137 (30)	20 (4.5)
BXM5120	156 (35)	176 (39)	25 (5.6)
BXM6200	197 (44)	221 (49)	
BXM6400			

Connection

■ Connecting the motor and driver

Connect the motor and the driver using the dedicated connection cable (sold separately). The figure shows a product of 200 W or 400 W.

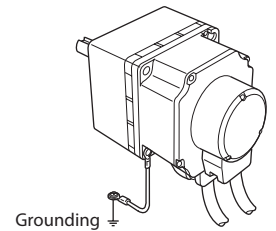


■ Grounding

The grounding method varies depending on the motor output power.

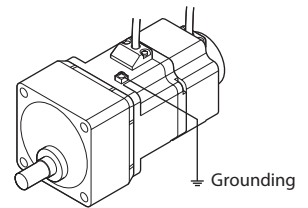
● 30 W, 60 W, 120 W

Ground the motor using one of the four mounting holes on the motor frame. At this time, insulate the frame ground terminal that come out of the motor cable without grounding it.



● 200 W, 400 W

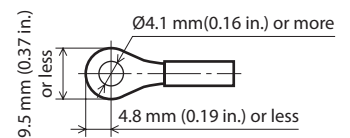
Be sure to ground the Protective Earth Terminal of the motor (screw size: M4).



● Protective Earth Terminal of the motor

Use a round terminal which is larger than the following size, and secure it with a mounting screw over a shakeproof washer.

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



● Lead wire for Protective Earth Terminal of the motor

Use a lead wire of AWG18 (0.75 mm²) or thicker for grounding.

Inspection and maintenance

■ Inspection

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



- Do not conduct the insulation resistance measurement or dielectric strength test with the motor and driver connected. Doing so may cause damage to the product.
- Do not conduct the insulation resistance measurement or dielectric strength test on an encoder. Doing so may damage the encoder.

● 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 output shaft of the motor and gearhead 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.

Specifications

Check on the Oriental Motor Website for the product specifications.

General specifications

Operating environment	Ambient temperature	0 to +50 °C [+32 to +122 °F] (non-freezing)
	Ambient humidity	85% or less (non-condensing)
	Altitude	Up to 1000 m (3300 ft.) above sea level
	Surrounding atmosphere	No corrosive gas, dust. Cannot be used in radioactive materials, magnetic field, vacuum or other special environment (For details about installation locations, refer to p.4.)
	Vibration	Not subject to continuous vibrations or excessive impact. In conformance with JIS C 60068-2-6 "Sine-wave vibration test method" Frequency range: 10 to 55 Hz Pulsating amplitude: 0.15 mm Sweep direction: 3 directions (X, Y, Z) Number of sweeps: 20 times
Storage environment Shipping environment	Ambient temperature	-20 to +60 °C [-4 to +140 °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	IP54 (Excluding the mounting surface of the round shaft type and the connector part)	

Regulations and standards

■ UL Standards, CSA Standards

This product is recognized by UL under the UL and CSA Standards. The motor model name represents the model that conforms to the standards.

Output power	Applicable Standards	Certification body	Standards File No.
30 W 60 W 120 W	UL 60950-1 CSA C22.2 No.60950-1	UL	E208200
200 W 400 W	UL 1004-1 CSA C22.2 No.100		E335369

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

■ CE Marking

This product is affixed the CE Marking under the Low Voltage Directive. The motor model name represents the model that is affixed CE Marking.

● 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 inside an enclosure in order to avoid contact with hands.
- When installing the motor and driver, securely connect their Protective Earth Terminals.
- Isolate the motor cable, power supply cable and other drive cables from the encoder cable and signal cables (CN5 to CN7) by means of double insulation.

● Applicable standards

Motor: EN 60034-1, EN 60034-5, EN 60664-1

Installation conditions (EN Standards)

- To be incorporated in equipment.
- Overvoltage category: III
- Pollution degree: 3
- Protection against electric shock: Class I

* Thermal class EN Standards: 120 (E)

■ RoHS Directive

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

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