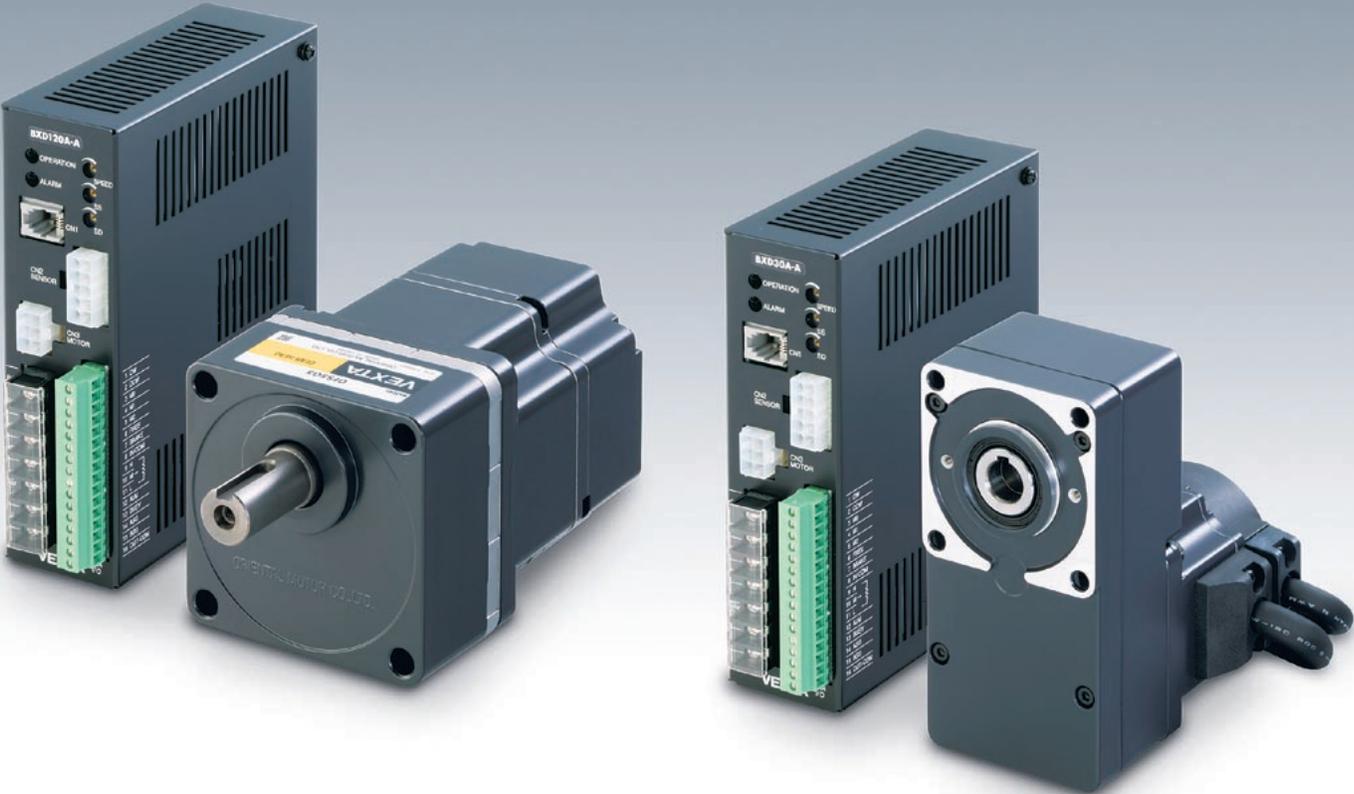


**(RoHS)** RoHS-Compliant  
Brushless DC Motor and Driver Package

# **BX Series**



**RoHS** RoHS-Compliant  
 Brushless DC Motor and Driver Package  
**BX Series**



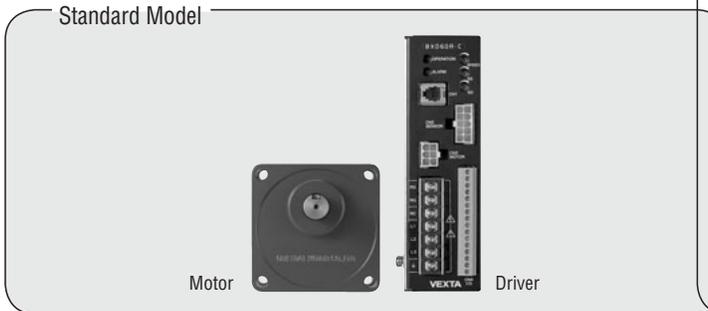
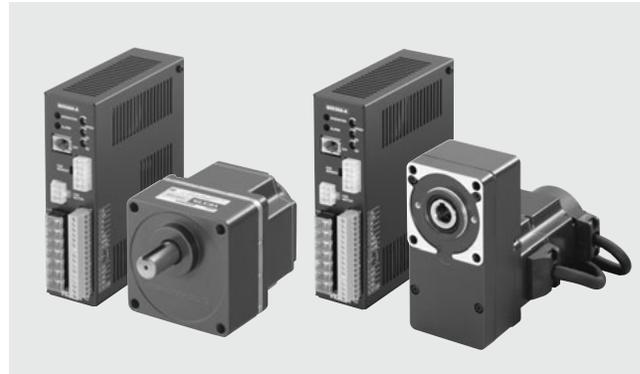
The **BX** Series brushless DC motor and driver packages offer high performance and high function. The full lineup covers a wide output range from 30 W (1/25 HP) up to 400 W (1/2 HP). When using with a control module, the **BX** Series provides the torque limiting, position control and other extended functions, in addition to the high-performance speed control function offered by the standard model.

**Features**

**Functional Extension to Meet Various Application Needs**

In addition to the speed control function offered by the standard model, you can implement various other functions using a control module.

- Speed Control — Standard Model
- Speed Control Mode (when a control module is used)
- Position Control — Position Control Mode (when a control module is used)
- Torque Limiting (when a control module is used)



**Control Module (Sold separately)**

You can extend the functions of the **BX** Series using an optional control module. The following functions are available on the extended system:

- Speed setting (up to 8 speeds)
- Setting of positioning operation data (up to 6 data settings)
- Torque limit setting
- Various displays

**OPX-1A:** Speed (r/min), position counter (STEP), load factor (%), alarm codes, alarm history

**Control Module**

**OPX-1A**

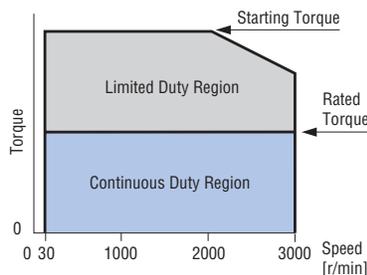
For additional function settings using a dedicated setting unit



**Standard Model**

**Wide Speed Control Range and Flat Torque**

The **BX** Series offers a wide speed range of 30 to 3000 r/min and provides flat torque at all speeds from high to low. The high starting torque characteristics ensure ample torque at start and stop.



**Excellent Speed Stability**

The **BX** Series offers highly accurate speed control, achieving an excellent speed regulation with respect to load.

- Speed regulation:  $\pm 0.05\%$  with respect to load
- $\pm 0.05\%$  with respect to voltage
- $\pm 0.5\%$  with respect to temperature

With the **BX** Series, rotational irregularity (flutter\*) at medium and high speeds is also reduced substantially.

\* "Flutter" refers to rotational irregularity caused by the motor structure, drive method used by the driver, and so on.

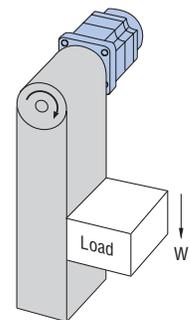
You can control the motor speed using the driver's internal speed potentiometer or supplied external speed potentiometer.

**Speed Control during Vertical Drive**

The motor with an electromagnetic brake enables stable speed control even during vertical drive (gravitational operation). When the power is turned off, the motor stops instantly to hold the load in place. The electromagnetic brake is automatically controlled via the driver in accordance with ON/OFF of the operation command signal.

**Note:**

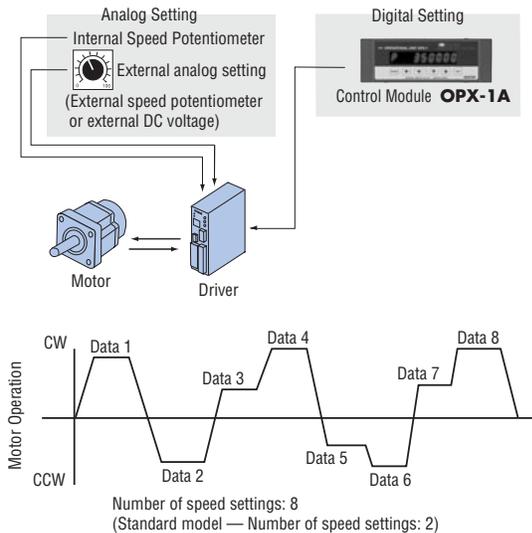
- Regeneration energy generates during vertical drive. If the **BX** Series will be used in applications that require vertical drive, be sure to use a regeneration unit (sold separately).



## Speed Control (Extended function when using a control module)

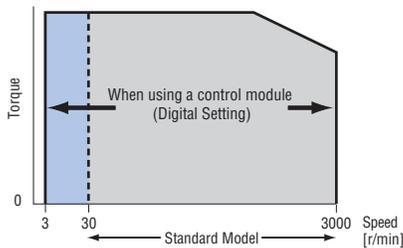
### ● Digital Speed Setting (Up to eight speeds)

Speed can be set digitally using an optional control module. You can set up to eight different speed.



### ● Speed Control Range of 3 to 3000 r/min

The digital speed setting function expands the speed control range to cover 3 to 3000 r/min.



### ● Improved Speed Control Accuracy

**Standard model**  
 $\pm 0.05\%$  with respect to load  
 $\pm 0.05\%$  with respect to voltage  
 $\pm 0.5\%$  with respect to temperature

**When using a control module (Digital setting)**  
 $\pm 0.05\%$  with respect to load  
 $\pm 0.05\%$  with respect to voltage  
 $\pm 0.05\%$  with respect to temperature

### ● High-Strength, Long-Life Gearhead

The high-strength gearheads used by the **BX** Series support high speeds. The gearheads of the 200 W (1/4 HP) and 400 W (1/2 HP) models are designed with a maximum permissible torque of 70 N·m (610 lb-in).

All gearheads have a rated life of 10000 hours, which corresponds to twice the service life of our conventional gearhead.

The parallel shaft gearheads for 120 W (1/6 HP), 200 W (1/4 HP) and 400 W (1/2 HP) have a tapped hole at the shaft tip.

### ● (RoHS) RoHS-Compliant

The **BX** Series conforms to the RoHS Directive that prohibits the use of six chemical substances including lead and cadmium.

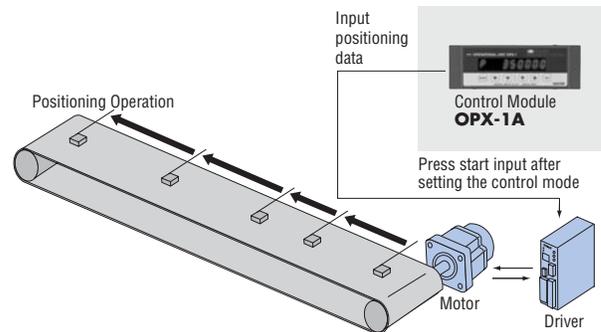
#### RoHS (Restriction of Hazardous Substances) Directive:

Directive on restriction of the use of certain hazardous substances in electrical and electronic equipment (2002/95/EC).

The RoHS Directive prohibits the use of six chemical substances in electrical and electronic products sold in the EU member states. The six controlled substances are: lead, hexavalent chromium, cadmium, mercury and two specific brominated flame-retardants (PBB and PBDE).

## Position Control (Extended function when using a control module)

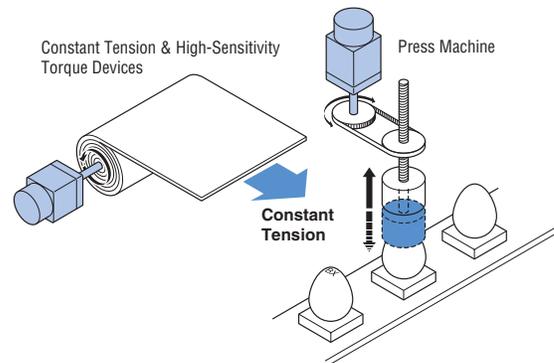
Position control can be performed with the **BX** Series simply by setting data using an optional control module. The resolution is  $0.72^\circ$  (500 pulses per rotation) and a maximum of six points of positioning data can be set, of which two can be set for continuous operation. Return to mechanical/electrical home operation can also be performed.



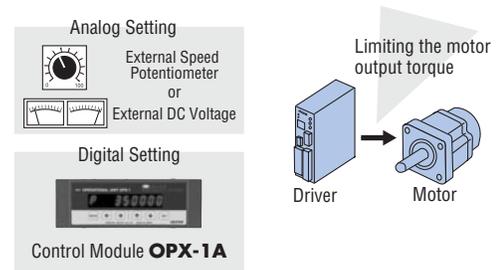
## Torque Limiting (Extended function when using a control module)

### ● Limiting the Motor Output Torque

Use of an optional control module enables torque limiting. The torque limiting function suppresses the motor output torque in accordance with the application and use condition.



### ● Analog Setting/Digital Setting



# System Configuration

## Combination Type – Parallel Shaft Gearhead, Round Shaft Type



**Mounting Brackets (Accessories)**  
 (→ Page 44)



**Flexible Couplings (Accessories)**  
 (→ Page 47)



**DIN Rail Mounting Plate (Accessories)**  
 Driver can be snapped into DIN rails. (→ Page 46)

**Extension Cables (Accessories)**  
 Extension cables used between motors and drivers.\*  
 (→ Page 43)



These tools are needed to enable the extended functions of the **BX** Series.

**Control Module OPX-1A (Accessories)**  
 (→ Page 43)  
 With dedicated cable (2 m [6.6 ft])



**Combination Type (Motor/Gearhead)**



**External Speed Potentiometer (Included)**



**Driver**



**AC Power Supply**

**Programmable Controller**

**BX Series**

**Regeneration Unit (Accessories)**

Regenerated energy is discharged during a vertical (gravitational) operation or upon an abrupt start/stop involving a large inertial load. Use this unit if your application involves vertical movement or generation of a large inertial load.  
 (→ Page 44)



**Example of System Configuration**

\*A flexible extension cable is available for **BX** Series. It is most suitable for uses where the cable is bent or twisted. (→ Page 43)

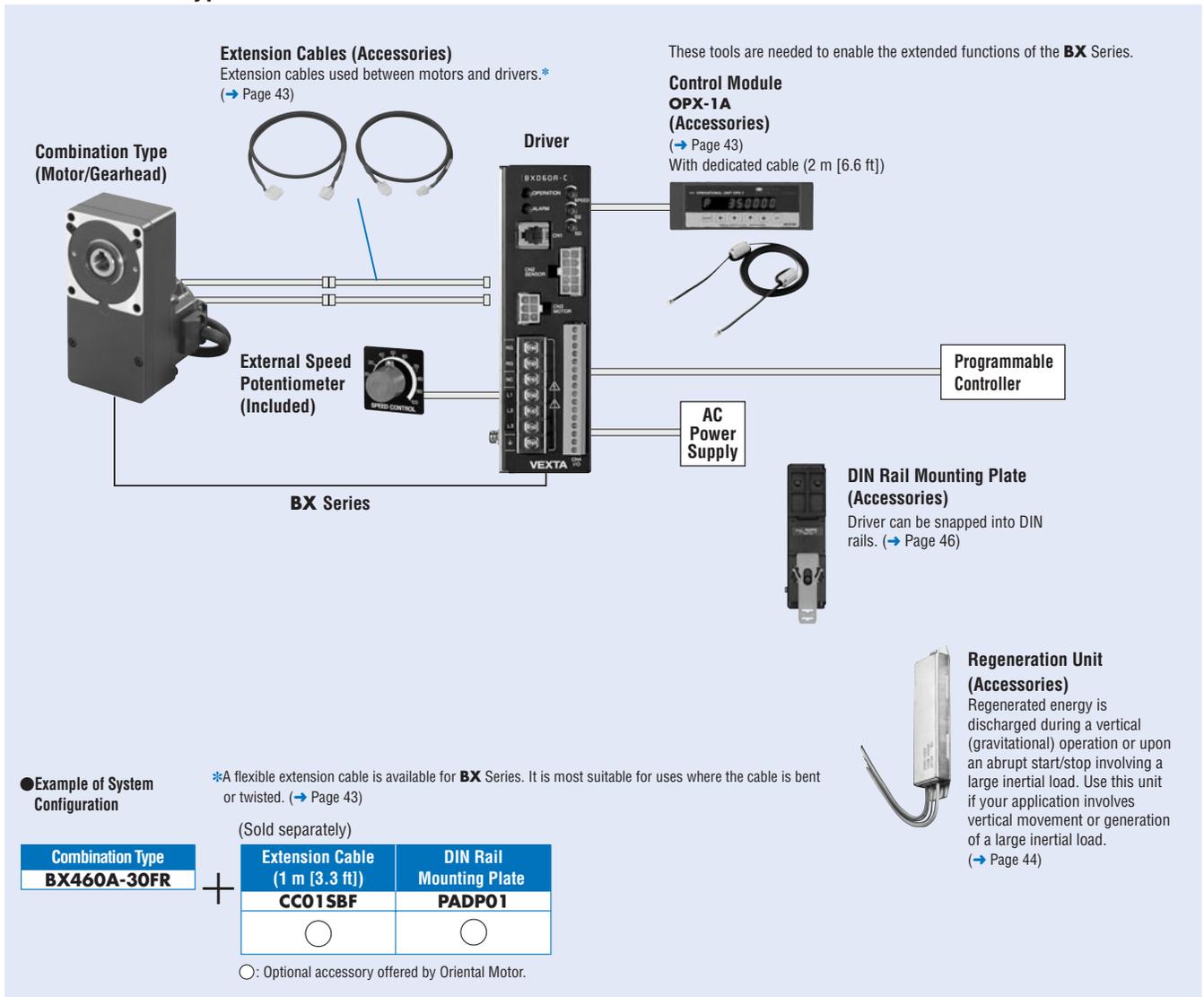
(Sold separately)

Combination Type	Extension Cable (1 m [3.3 ft])	Mounting Bracket	Flexible Coupling	DIN Rail Mounting Plate
<b>BX460A-30S</b>	<b>CCO1SBF</b>	<b>SOL4M6</b>	<b>MCL5515F10</b>	<b>PADP01</b>
	○	○	○	○

○: Optional accessory offered by Oriental Motor.

The system configuration shown above is an example. Other combinations are available.

## ● Combination Type–Hollow Shaft Flat Gearhead



● The system configuration shown above is an example. Other combinations are available.

## ■ Safety Standards and CE Marking

Model	Standards	Certification Body	Standards File No.	CE Marking	
Motor	BXM230	UL	E208200	Low Voltage Directives	
	BXM460				
	BXM5120		CSA C22.2 No.60950-1		
	BXM6200		UL 1004		E62327
BXM6400	CSA C22.2 No.100				
Driver	EN 60034-1	UL	E171462	EMC Directives	
	EN 60034-5				
	IEC 60664-1				Conform to EN/IEC Standards
	UL 508C				
Driver	CSA C22.2 No.14	UL	E171462	EMC Directives	
	EN 50178				
	Conform to EN/IEC Standards				

● When the system is approved under various safety standards, the model names on the motor and driver nameplates are the approved model names.

**List of Motor and Driver Combinations** → Page 42

● The EMC value changes according to the wiring and layout. Therefore, the final EMC level must be checked with the motor/driver incorporated in the equipment.

## Product Number Code

**BX 2 30 A M - 5 FR**

①      ②      ③      ④      ⑤      ⑥      ⑦

①	Series	<b>BX: BX Series</b>
②	Motor Frame Size	<b>2:</b> 60 mm (2.36 in.) <b>4:</b> 80 mm (3.15 in.) <b>5:</b> 90 mm (3.54 in.) <b>6:</b> 104 mm (4.09 in.) [Gearhead Frame Size: 110 mm (4.33 in.)]
③	Output Power (W)	(Example) <b>30:</b> 30 W (1/25 HP)
④	Power Supply Voltage	<b>A:</b> Single-Phase 100–115 VAC <b>C:</b> Single-Phase, Three-Phase 200–230 VAC <b>S:</b> Three-Phase 200–230 VAC
⑤	Type of Motor	<b>M:</b> Electromagnetic Brake Type Blank: Standard
⑥	Gear Ratio/Shaft Type	Number: Gear ratio for combination types: 8 types from <b>5</b> to <b>200</b> <b>A:</b> Round Shaft Type <b>GFS:</b> Pinion Shaft Type
⑦		<b>S:</b> Combination Type–Parallel Shaft Gearhead <b>FR:</b> Combination Type–Hollow Shaft Flat Gearhead

## Product Line

<b>Combination Type</b>	The combination type comes with the motor and its dedicated gearhead pre-assembled. This simplifies installation in equipment. Motors and gearheads are also available separately to facilitate changes or repairs.
-------------------------	---

### Standard

#### ◇ Combination Type–Parallel Shaft Gearhead

Output Power	Power Supply Voltage	Model	Gear Ratio
30 W (1/25 HP)	Single-Phase 100–115 VAC	<b>BX230A-□S</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
	Single-Phase, Three-Phase 200–230 VAC	<b>BX230C-□S</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
60 W (1/12 HP)	Single-Phase 100–115 VAC	<b>BX460A-□S</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
	Single-Phase, Three-Phase 200–230 VAC	<b>BX460C-□S</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
120 W (1/6 HP)	Single-Phase 100–115 VAC	<b>BX5120A-□S</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
	Single-Phase, Three-Phase 200–230 VAC	<b>BX5120C-□S</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
200 W (1/4 HP)	Single-Phase 100–115 VAC	<b>BX6200A-□S</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
	Single-Phase, Three-Phase 200–230 VAC	<b>BX6200C-□S</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
400 W (1/2 HP)	Three-Phase 200–230 VAC	<b>BX6400S-□S</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>

● Enter the gear ratio in the box (□) within the model name.

#### ◇ Round Shaft Type

Output Power	Power Supply Voltage	Model
30 W (1/25 HP)	Single-Phase 100–115 VAC	<b>BX230A-A</b>
	Single-Phase, Three-Phase 200–230 VAC	<b>BX230C-A</b>
60 W (1/12 HP)	Single-Phase 100–115 VAC	<b>BX460A-A</b>
	Single-Phase, Three-Phase 200–230 VAC	<b>BX460C-A</b>
120 W (1/6 HP)	Single-Phase 100–115 VAC	<b>BX5120A-A</b>
	Single-Phase, Three-Phase 200–230 VAC	<b>BX5120C-A</b>
200 W (1/4 HP)	Single-Phase 100–115 VAC	<b>BX6200A-A</b>
	Single-Phase, Three-Phase 200–230 VAC	<b>BX6200C-A</b>
400 W (1/2 HP)	Three-Phase 200–230 VAC	<b>BX6400S-A</b>

#### ◇ Combination Type–Hollow Shaft Flat Gearhead

Output Power	Power Supply Voltage	Model	Gear Ratio
30 W (1/25 HP)	Single-Phase 100–115 VAC	<b>BX230A-□FR</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
	Single-Phase, Three-Phase 200–230 VAC	<b>BX230C-□FR</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
60 W (1/12 HP)	Single-Phase 100–115 VAC	<b>BX460A-□FR</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
	Single-Phase, Three-Phase 200–230 VAC	<b>BX460C-□FR</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
120 W (1/6 HP)	Single-Phase 100–115 VAC	<b>BX5120A-□FR</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
	Single-Phase, Three-Phase 200–230 VAC	<b>BX5120C-□FR</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>

● Enter the gear ratio in the box (□) within the model name.

#### ◇ Pinion Shaft Type

Output Power	Power Supply Voltage	Model
30 W (1/25 HP)	Single-Phase 100–115 VAC	<b>BX230A-GFS</b>
	Single-Phase, Three-Phase 200–230 VAC	<b>BX230C-GFS</b>
60 W (1/12 HP)	Single-Phase 100–115 VAC	<b>BX460A-GFS</b>
	Single-Phase, Three-Phase 200–230 VAC	<b>BX460C-GFS</b>
120 W (1/6 HP)	Single-Phase 100–115 VAC	<b>BX5120A-GFS</b>
	Single-Phase, Three-Phase 200–230 VAC	<b>BX5120C-GFS</b>
200 W (1/4 HP)	Single-Phase 100–115 VAC	<b>BX6200A-GFS</b>
	Single-Phase, Three-Phase 200–230 VAC	<b>BX6200C-GFS</b>
400 W (1/2 HP)	Three-Phase 200–230 VAC	<b>BX6400S-GFS</b>

● **With Electromagnetic Brake**

◇ **Combination Type – Parallel Shaft Gearhead**

Output Power	Power Supply Voltage	Model	Gear Ratio
30 W (1/25 HP)	Single-Phase 100–115 VAC	<b>BX230AM-□S</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
	Single-Phase, Three-Phase 200–230 VAC	<b>BX230CM-□S</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
60 W (1/12 HP)	Single-Phase 100–115 VAC	<b>BX460AM-□S</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
	Single-Phase, Three-Phase 200–230 VAC	<b>BX460CM-□S</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
120 W (1/6 HP)	Single-Phase 100–115 VAC	<b>BX5120AM-□S</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
	Single-Phase, Three-Phase 200–230 VAC	<b>BX5120CM-□S</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
200 W (1/4 HP)	Single-Phase 100–115 VAC	<b>BX6200AM-□S</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
	Single-Phase, Three-Phase 200–230 VAC	<b>BX6200CM-□S</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
400 W (1/2 HP)	Three-Phase 200–230 VAC	<b>BX6400SM-□S</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>

● Enter the gear ratio in the box (□) within the model name.

◇ **Round Shaft Type**

Output Power	Power Supply Voltage	Model
30 W (1/25 HP)	Single-Phase 100–115 VAC	<b>BX230AM-A</b>
	Single-Phase, Three-Phase 200–230 VAC	<b>BX230CM-A</b>
60 W (1/12 HP)	Single-Phase 100–115 VAC	<b>BX460AM-A</b>
	Single-Phase, Three-Phase 200–230 VAC	<b>BX460CM-A</b>
120 W (1/6 HP)	Single-Phase 100–115 VAC	<b>BX5120AM-A</b>
	Single-Phase, Three-Phase 200–230 VAC	<b>BX5120CM-A</b>
200 W (1/4 HP)	Single-Phase 100–115 VAC	<b>BX6200AM-A</b>
	Single-Phase, Three-Phase 200–230 VAC	<b>BX6200CM-A</b>
400 W (1/2 HP)	Three-Phase 200–230 VAC	<b>BX6400SM-A</b>

● **Gearhead**

◇ **Parallel Shaft Gearhead**

Output Power of Applicable Motor	Gearhead Model	Gear Ratio
30 W (1/25 HP)	<b>GFS2G□</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
60 W (1/12 HP)	<b>GFS4G□</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
120 W (1/6 HP)	<b>GFS5G□</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
200 W (1/4 HP) 400 W (1/2 HP)	<b>GFS6G□</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>

● Enter the gear ratio in the box (□) within the gearhead model name.

● **Control Module**

Model
<b>OPX-1A</b>

● With dedicated cable (2 m [6.6 ft])

◇ **Combination Type – Hollow Shaft Flat Gearhead**

Output Power	Power Supply Voltage	Model	Gear Ratio
30 W (1/25 HP)	Single-Phase 100–115 VAC	<b>BX230AM-□FR</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
	Single-Phase, Three-Phase 200–230 VAC	<b>BX230CM-□FR</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
60 W (1/12 HP)	Single-Phase 100–115 VAC	<b>BX460AM-□FR</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
	Single-Phase, Three-Phase 200–230 VAC	<b>BX460CM-□FR</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
120 W (1/6 HP)	Single-Phase 100–115 VAC	<b>BX5120AM-□FR</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
	Single-Phase, Three-Phase 200–230 VAC	<b>BX5120CM-□FR</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>

● Enter the gear ratio in the box (□) within the model name.

◇ **Pinion Shaft Type**

Output Power	Power Supply Voltage	Model
30 W (1/25 HP)	Single-Phase 100–115 VAC	<b>BX230AM-GFS</b>
	Single-Phase, Three-Phase 200–230 VAC	<b>BX230CM-GFS</b>
60 W (1/12 HP)	Single-Phase 100–115 VAC	<b>BX460AM-GFS</b>
	Single-Phase, Three-Phase 200–230 VAC	<b>BX460CM-GFS</b>
120 W (1/6 HP)	Single-Phase 100–115 VAC	<b>BX5120AM-GFS</b>
	Single-Phase, Three-Phase 200–230 VAC	<b>BX5120CM-GFS</b>
200 W (1/4 HP)	Single-Phase 100–115 VAC	<b>BX6200AM-GFS</b>
	Single-Phase, Three-Phase 200–230 VAC	<b>BX6200CM-GFS</b>
400 W (1/2 HP)	Three-Phase 200–230 VAC	<b>BX6400SM-GFS</b>

◇ **Hollow Shaft Flat Gearhead**

Output Power of Applicable Motor	Gearhead Model	Gear Ratio
30 W (1/25 HP)	<b>GFS2G□FR</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
60 W (1/12 HP)	<b>GFS4G□FR</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>
120 W (1/6 HP)	<b>GFS5G□FR</b>	<b>5, 10, 15, 20, 30, 50, 100, 200</b>

● Enter the gear ratio in the box (□) within the gearhead model name.

# Specifications

## Standard

### 30 W (1/25 HP), 60 W (1/12 HP) (RoHS)



Model	Combination Type – Parallel Shaft Gearhead		BX230A-□S	BX230C-□S	BX460A-□S	BX460C-□S
	Combination Type – Hollow Shaft Flat Gearhead		BX230A-□FR	BX230C-□FR	BX460A-□FR	BX460C-□FR
	Round Shaft Type		BX230A-A	BX230C-A	BX460A-A	BX460C-A
Rated Output Power (Continuous)		W (HP)	30 (1/25)		60 (1/12)	
Power Source	Rated Voltage	VAC	Single-Phase 100–115 –15~+10%	Single-Phase, Three-Phase 200–230 –15~+10%	Single-Phase 100–115 –15~+10%	Single-Phase, Three-Phase 200–230 –15~+10%
	Rated Frequency	Hz	50/60±5%			
	Rated Input Current	A	1.4	Single-Phase 0.8, Three-Phase 0.5	2.2	Single-Phase 1.4, Three-Phase 0.7
	Maximum Input Current	A	2.4	Single-Phase 1.6, Three-Phase 0.8	3.5	Single-Phase 2.2, Three-Phase 1.2
Rated Torque		N-m (oz-in)	0.1 (14.2)		0.2 (28)	
Starting Torque*1		N-m (oz-in)	0.2 (28)		0.4 (56)	
Rated Speed		r/min	3000			
Speed Control Range		r/min	30~3000 (Analog setting) 3~3000 (Digital setting: can be set in 1 r/min increments)*2			
Permissible Load Inertia for Round Shaft Type		J×10 <sup>-4</sup> kg·m <sup>2</sup> (oz-in <sup>2</sup> )	1.5 (8.2)		3 (16.4)	
Rotor Inertia		J×10 <sup>-4</sup> kg·m <sup>2</sup> (oz-in <sup>2</sup> )	0.088 (0.48)		0.194 (1.06)	
Speed Regulation	Load	±0.05% max. (0~Rated torque, at rated speed, at rated voltage, at normal ambient temperature)				
	Voltage	±0.05% max. (Rated voltage –15~+10%, at rated speed, with no load, at normal ambient temperature)				
	Temperature	±0.5% (±0.05%)*2 max. (0~+50°C [+32~+122°F], at rated speed, with no load, at rated voltage)				

\*1 The starting torque can be used for a maximum duration of approximately 5 seconds at 2000 r/min or less.

\*2 This specification applies when a control module **OPX-1A** is used (the figure applies to both the speed control mode and position control mode).

● Enter the gear ratio in the box (□) within the model name.

● The values for each specification apply to the motor only.

### 120 W (1/6 HP), 200 W (1/4 HP), 400 W (1/2 HP) (RoHS)



Model	Combination Type – Parallel Shaft Gearhead		BX5120A-□S	BX5120C-□S	BX6200A-□S	BX6200C-□S	BX6400S-□S
	Combination Type – Hollow Shaft Flat Gearhead		BX5120A-□FR	BX5120C-□FR	—	—	—
	Round Shaft Type		BX5120A-A	BX5120C-A	BX6200A-A	BX6200C-A	BX6400S-A
Rated Output Power (Continuous)		W (HP)	120 (1/6)		200 (1/4)		400 (1/2)
Power Source	Rated Voltage	VAC	Single-Phase 100–115 –15~+10%	Single-Phase, Three-Phase 200–230 –15~+10%	Single-Phase 100–115 –15~+10%	Single-Phase, Three-Phase 200–230 –15~+10%	Three-Phase 200–230 –15~+10%
	Rated Frequency	Hz	50/60±5%				
	Rated Input Current	A	3.7	Single-Phase 2.3, Three-Phase 1.1	4.7	Single-Phase 2.8, Three-Phase 1.7	2.8
	Maximum Input Current	A	6.7	Single-Phase 4.1, Three-Phase 2.0	9.0	Single-Phase 5.3, Three-Phase 3.2	4.4
Rated Torque		N-m (oz-in)	0.4 (56)		0.65 (92)		1.3 (184)
Starting Torque*1		N-m (oz-in)	0.8 (113)		1.3 (184)		2.6 (360)
Rated Speed		r/min	3000				
Speed Control Range		r/min	30~3000 (Analog setting) 3~3000 (Digital setting: can be set in 1 r/min increments)*2				
Permissible Load Inertia for Round Shaft Type		J×10 <sup>-4</sup> kg·m <sup>2</sup> (oz-in <sup>2</sup> )	6 (33)		10 (55)		17.5 (96)
Rotor Inertia		J×10 <sup>-4</sup> kg·m <sup>2</sup> (oz-in <sup>2</sup> )	0.625 (3.4)		0.66 (3.6)		0.66 (3.6)
Speed Regulation	Load	±0.05% max. (0~Rated torque, at rated speed, at rated voltage, at normal ambient temperature)					
	Voltage	±0.05% max. (Rated voltage –15~+10%, at rated speed, with no load, at normal ambient temperature)					
	Temperature	±0.5% (±0.05%)*2 max. (0~+50°C [+32~+122°F], at rated speed, with no load, at rated voltage)					

\*1 The starting torque can be used for a maximum duration of approximately 5 seconds at 2000 r/min or less.

\*2 This specification applies when a control module **OPX-1A** is used (the figure applies to both the speed control mode and position control mode).

● Enter the gear ratio in the box (□) within the model name.

● The values for each specification apply to the motor only.

● With Electromagnetic Brake

◇ 30 W (1/25 HP), 60 W (1/12 HP) (RoHS)



Model	Combination Type – Parallel Shaft Gearhead		BX230AM-□S	BX230CM-□S	BX460AM-□S	BX460CM-□S
	Combination Type – Hollow Shaft Flat Gearhead		BX230AM-□FR	BX230CM-□FR	BX460AM-□FR	BX460CM-□FR
	Round Shaft Type		BX230AM-A	BX230CM-A	BX460AM-A	BX460CM-A
Rated Output Power (Continuous)		W (HP)	30 (1/25)		60 (1/12)	
Power Source	Rated Voltage	VAC	Single-Phase 100–115 –15~+10%	Single-Phase, Three-Phase 200–230 –15~+10%	Single-Phase 100–115 –15~+10%	Single-Phase, Three-Phase 200–230 –15~+10%
	Rated Frequency	Hz	50/60±5%			
	Rated Input Current	A	1.4	Single-Phase 0.8, Three-Phase 0.5	2.2	Single-Phase 1.4, Three-Phase 0.7
	Maximum Input Current	A	2.4	Single-Phase 1.6, Three-Phase 0.8	3.5	Single-Phase 2.2, Three-Phase 1.2
Rated Torque		N-m (oz-in)	0.1 (14.2)		0.2 (28)	
Starting Torque*1		N-m (oz-in)	0.2 (28)		0.4 (56)	
Rated Speed		r/min	3000			
Speed Control Range		r/min	30~3000 (Analog setting) 3~3000 (Digital setting: can be set in 1 r/min increments)*2			
Permissible Load Inertia for Round Shaft Type		J×10 <sup>-4</sup> kg·m <sup>2</sup> (oz-in <sup>2</sup> )	1.5 (8.2)		3 (16.4)	
Rotor Inertia		J×10 <sup>-4</sup> kg·m <sup>2</sup> (oz-in <sup>2</sup> )	0.088 (0.48)		0.194 (1.06)	
Speed Regulation	Load	±0.05% max. (0~Rated torque, at rated speed, at rated voltage, at normal ambient temperature)				
	Voltage	±0.05% max. (Rated voltage –15~+10%, at rated speed, with no load, at normal ambient temperature)				
	Temperature	±0.5%(±0.05%)*2 max. (0~+50°C [+32~+122°F], at rated speed, with no load, at rated voltage)				
Gravitational Operation Ability	Continuous Regenerative Power	W (HP)	100 (1/8)			
	Instantaneous Regenerative Power	W (HP)	240 (1/3)			
	Applicable Regeneration Unit*3		<b>EPRC-400P</b>			
Electromagnetic Brake*4	Brake Type	Active when the power is off, automatically controlled by the driver				
	Static Friction Torque	N-m (oz-in)	0.1 (14.2)		0.2 (28)	

\*1 The starting torque can be used for a maximum duration of approximately 5 seconds at 2000 r/min or less.

\*2 This specification applies when a control module **OPX-1A** is used (the figure applies to both the speed control mode and position control mode).

\*3 Install the regeneration unit in the place which has the same heat radiation capability as heat radiation plate (Material: Aluminum 350 mm×350 mm [13.8 in.×13.8 in.], 3 mm [0.12 in.] thick).

\*4 Do not start or stop the motor by turning on/off the power supply, as it will cause the electromagnetic brake to wear abnormally.

● Enter the gear ratio in the box (□) within the model name.

● The values for each specification apply to the motor only.

◇ 120 W (1/6 HP), 200 W (1/4 HP), 400 W (1/2 HP) (RoHS)



Model	Combination Type – Parallel Shaft Gearhead		BX5120AM-□S	BX5120CM-□S	BX6200AM-□S	BX6200CM-□S	BX6400SM-□S
	Combination Type – Hollow Shaft Flat Gearhead		BX5120AM-□FR	BX5120CM-□FR	—	—	—
	Round Shaft Type		BX5120AM-A	BX5120CM-A	BX6200AM-A	BX6200CM-A	BX6400SM-A
Rated Output Power (Continuous)		W (HP)	120 (1/6)		200 (1/4)		400 (1/2)
Power Source	Rated Voltage	VAC	Single-Phase 100–115 –15~+10%	Single-Phase, Three-Phase 200–230 –15~+10%	Single-Phase 100–115 –15~+10%	Single-Phase, Three-Phase 200–230 –15~+10%	Three-Phase 200–230 –15~+10%
	Rated Frequency	Hz	50/60±5%				
	Rated Input Current	A	3.7	Single-Phase 2.3, Three-Phase 1.1	4.7	Single-Phase 2.8, Three-Phase 1.7	2.8
	Maximum Input Current	A	6.7	Single-Phase 4.1, Three-Phase 2.0	9.0	Single-Phase 5.3, Three-Phase 3.2	4.4
Rated Torque		N-m (oz-in)	0.4 (56)		0.65 (92)		1.3 (184)
Starting Torque*1		N-m (oz-in)	0.8 (113)		1.3 (184)		2.6 (360)
Rated Speed		r/min	3000				
Speed Control Range		r/min	30~3000 (Analog setting) 3~3000 (Digital setting: can be set in 1 r/min increments)*2				
Permissible Load Inertia for Round Shaft Type		J×10 <sup>-4</sup> kg·m <sup>2</sup> (oz-in <sup>2</sup> )	6 (33)		10 (55)		17.5 (96)
Rotor Inertia		J×10 <sup>-4</sup> kg·m <sup>2</sup> (oz-in <sup>2</sup> )	0.625 (3.4)		0.66 (3.6)		0.66 (3.6)
Speed Regulation	Load	±0.05% max. (0~Rated torque, at rated speed, at rated voltage, at normal ambient temperature)					
	Voltage	±0.05% max. (Rated voltage –15~+10%, at rated speed, with no load, at normal ambient temperature)					
	Temperature	±0.5%(±0.05%)*2 max. (0~+50°C [+32~+122°F], at rated speed, with no load, at rated voltage)					
Gravitational Operation Ability	Continuous Regenerative Power	W (HP)	100 (1/8)			100 (1/8)	
	Instantaneous Regenerative Power	W (HP)	240 (1/3)			800 (1)	
	Applicable Regeneration Unit*3		<b>EPRC-400P</b>			<b>RGB100</b>	
Electromagnetic Brake*4	Brake Type	Active when the power is off, automatically controlled by the driver					
	Static Friction Torque	N-m (oz-in)	0.4 (56)		0.65 (92)		1.3 (184)

\*1 The starting torque can be used for a maximum duration of approximately 5 seconds at 2000 r/min or less.

\*2 This specification applies when a control module **OPX-1A** is used (the figure applies to both the speed control mode and position control mode).

\*3 Install the regeneration unit in the place which has the same heat radiation capability as heat radiation plate (Material: Aluminum 350 mm×350 mm [13.8 in.×13.8 in.], 3 mm [0.12 in.] thick).

\*4 Do not start or stop the motor by turning on/off the power supply, as it will cause the electromagnetic brake to wear abnormally.

● Enter the gear ratio in the box (□) within the model name.

● The values for each specification apply to the motor only.

## Common Specifications

Item	Specifications
Input Signal*	Photocoupler input Input resistance: 2.3 kΩ, internal power supply voltage: +15 V CW input, CCW input, Speed data selection input, Motor control release (FREE) input, Brake input (during Alarm output: Alarm reset input)
Output Signal*	Open-collector output, 4.5~26.4 VDC Alarm output, Busy output (Alarm output: Alarm pulse output): 40 mA max. Speed output (ASG, BSG): 20 mA max.
Protective Function	If any of the following protective functions is activated, the motor will naturally decelerate to a stop (braking force will be applied if the motor is equipped with an electromagnetic brake) and the alarm output will be turned off. The driver's alarm LED will blink (alarm pulse will output) for the number of times shown in parentheses: <ul style="list-style-type: none"> <li>· Overload protection (2): The motor received a load exceeding the rated torque for approximately 5 seconds or more.</li> <li>· Overvoltage protection (3): The power supply voltage applied to the driver exceeded 115 or 230 VAC by 20% or more. Or, a load exceeding the permissible load inertia or gravitational capacity was driven.</li> <li>· Excessive position deviation protection (4): The motor does not follow commands when being operated in the position control mode.</li> <li>· Overcurrent protection (5): Excessive current flowed through the driver due to ground fault, etc. (alarm reset input is disabled).</li> <li>· Overspeed protection (6): The rotating speed of the motor shaft exceeded approximately 4000 r/min.</li> <li>· EEPROM error (7): Data could not be written to the EEPROM or data set in the EEPROM could not be read (alarm reset input is disabled).</li> <li>· Encoder error (8): An encoder signal error occurred due to poor connection of the signal cable, open circuit, etc. (alarm reset input is disabled).</li> <li>· Undervoltage protection (9): The power supply voltage applied to the driver dropped below 100 or 200 VAC by 40% or more.</li> </ul>
Maximum Extended Length	20.4 m (67.3 ft) between the motor and driver (when an accessory extension cable is used)
Time Rating	Continuous

\* The input signals and output signals may function differently when the control module is used.  
 Details of connection and operation → Page 30

## General Specifications

Item	Motor	Driver
Insulation Resistance	100 MΩ or more when 500 VDC megger is applied between the windings and the case after continuous operation under normal ambient temperature and humidity (except for encoder).	100 MΩ or more when 500 VDC megger is applied between the power supply input terminal and the case, and between the power supply input terminal and the I/O terminal after continuous operation under normal ambient temperature and humidity.
Dielectric Strength	Sufficient to withstand 1.5 kVAC at 50 Hz applied between the windings and the case for 1 minute after continuous operation under normal ambient temperature and humidity (except for encoder).	Sufficient to withstand 1.5 kVAC at 50 Hz applied between the case and the power supply input terminal for 1 minute, and 1.8 kVAC at 50 Hz applied between power supply input and the I/O terminal for 1 minute after continuous operation under normal ambient temperature and humidity.
Temperature Rise	Temperature rise of the windings and the case are 50°C (90°F) or less, and 40°C (72°F) or less*1 respectively measured by the thermocouple method after rated continuous operation under normal ambient temperature and humidity.	Temperature rise of the heat sink are 50°C (90°F) or less measured by the thermocouple method after rated continuous operation under normal ambient temperature and humidity.
Operating Environment Condition	Ambient Temperature	0~+50°C [+32~+122°F] (non-freezing)
	Ambient Humidity	85% max. (non-condensing)
	Altitude	Up to 1000 m (3300 ft) above sea level
	Atmosphere	No corrosive gases or dust. Use in a radioactive or magnetic field, vacuum or any other special environment is prohibited.
Vibration	Not to be exposed to continuous vibration or excessive impact. In conformance with JIS C 60068-2-6, "Sine-Wave Vibration Test Method" Frequency range: 10~55 Hz, pulsating amplitude: 0.15 mm (0.006 in.), sweep direction: 3 directions (X, Y, Z), number of sweeps: 20 times	
Storage Condition*2	Ambient Temperature	-20~+60°C [-4~+140°F] (non-freezing)
	Ambient Humidity	85% max. (non-condensing)
	Altitude	Up to 3000 m (10000 ft) above sea level
Insulation Class	UL, CSA standards: class A (105°C [221°F]), EN standards: class E (120°C [248°F])	—
Degree of Protection	IP54 (Excluding the mounting surface of the round shaft type and the connector)	IP10

\*1 For round shaft types, please attach to the heat radiation plate (material: aluminum) of the following sizes to maintain a maximum motor case temperature of 90°C (194°F).

**BX230□-A**: 115 mm × 115 mm (4.53 in. × 4.53 in.), 5 mm (0.20 in.) thick    **BX460□-A**: 135 mm × 135 mm (5.31 in. × 5.31 in.), 5 mm (0.20 in.) thick  
**BX5120□-A**: 165 mm × 165 mm (6.50 in. × 6.50 in.), 5 mm (0.20 in.) thick    **BX6200□-A**: 200 mm × 200 mm (7.87 in. × 7.87 in.), 5 mm (0.20 in.) thick  
**BX6400□-A**: 250 mm × 250 mm (9.84 in. × 9.84 in.), 6 mm (0.24 in.) thick

● Enter the power supply voltage **A**, **C** or **S (AM, CM, or SM)**: Electromagnetic brake in the box (□) within the applicable product.

\*2 The storage condition applies to a short period such as a period during transportation.

### Note:

● Do not measure insulation resistance or perform the dielectric strength test while the motor and driver are connected.

## Speed Control Mode Specifications

● Standard Model: These specifications apply when the basic motor/driver package is used.

● Extended Function: These specifications apply when an optional control module **OPX-1A** is used.

Item	Standard Model	Extended Function
Speed Control Range	30~3000 r/min (Analog setting)	30~3000 r/min (Analog setting) 3~3000 r/min (Digital setting; can be set in 1 r/min increments)
Speed Setting Method	Select one of the following methods: · Internal speed potentiometer · External speed potentiometer (included): <b>PAVR-20KZ</b> (20 kΩ, 1/4 W) · External DC voltage: 0~5 VDC, 1 mA min. (input impedance: 15 kΩ)	Select one of the following methods: · Digital setting (with <b>OPX-1A</b> ) · Internal speed potentiometer · External speed potentiometer (included): <b>PAVR-20KZ</b> (20 kΩ, 1/4 W) · External DC voltage: 0~5 VDC, 1 mA min. (input impedance: 15 kΩ)
Acceleration/Deceleration Time	0.1~15 seconds (3000 r/min with no load) Once set, the specified acceleration/deceleration time applies to all speed data.	Select one of the following methods (3000 r/min with no load): · Digital setting (with <b>OPX-1A</b> ): 0~30 seconds (set in 1-ms steps) · Acceleration/deceleration time potentiometer: 0.1~15 seconds Once set, the specified acceleration/deceleration time applies to all speed data.
Number of Speed Settings	2 speeds 1 speed set by the internal speed potentiometer, and 1 speed set by the external speed potentiometer (20 kΩ, 1/4 W) or external DC voltage (0~5 VDC)	Select one of the following methods: 8 speeds: Digital setting (with <b>OPX-1A</b> ) 8 speeds: 6 speeds set by digital setting (with <b>OPX-1A</b> ), 1 speed set by the internal speed potentiometer, and 1 speed set by the external speed potentiometer (20 kΩ, 1/4 W) or external DC voltage (0~5 VDC)

## Position Control Mode Specifications (with an optional control module **OPX-1A**)

The following specifications apply when the **BX** Series is combined with an optional control module **OPX-1A** and used in the position control mode.

### Positioning Operation

Item	Specifications
Position Setting Method	Incremental (from the current position to relative position)
Resolution	1 step 0.72°, 500 (P/R)
Number of Travel Amount Settings	6 (Data No.0~5)
Travel Amount Setting Range	-8 388 608~+8 388 607 steps (Data No.0~5)
Speed Control Range	30~3000 r/min (Analog setting) 3~3000 r/min (Digital setting; can be set in 1 r/min increments)
Speed Setting Method	Select one of the following methods: · Digital setting (Data No.0~5) with optional control module <b>OPX-1A</b> · Internal speed potentiometer · External speed potentiometer (included): <b>PAVR-20KZ</b> (20 kΩ, 1/4 W) · External DC voltage 0~5 VDC, 1 mA minimum, (input impedance : 15 kΩ)
Acceleration/Deceleration Time	Preset Acceleration/Deceleration time is shared by all data index operations by one of the following (at 3000 r/min with no load): · Digital setting (with <b>OPX-1A</b> ): 0~30 s (can be set in 1 ms increments) · Acceleration/Deceleration time potentiometer with analog setting : 0.1~15 s
Number of Speed Settings	Can be set using one of the following methods: 6 speeds: Digital setting (with <b>OPX-1A</b> ) 6 speeds: 4 speeds set by digital setting (with <b>OPX-1A</b> ), 1 speed set by the internal speed potentiometer, and 1 speed set by the external speed potentiometer (20 kΩ, 1/4 W) or external DC voltage (0~5 VDC)

### Continuous Operation

Item	Specifications
Speed Control Range	30~3000 r/min (Analog setting) 3~3000 r/min (Digital setting; can be set in 1 r/min increments)
Number of Speed Settings	Can be set using one of the following methods: 6 speeds: Digital setting (with <b>OPX-1A</b> ) 6 speeds: 4 speeds set by digital setting (with <b>OPX-1A</b> ), 1 speed set by the internal speed potentiometer, and 1 speed set by the external speed potentiometer (20 kΩ, 1/4 W) or external DC voltage (0~5 VDC)
Rotation Direction	CW when the position in Data No.0 or 1 is set to a value of zero or greater; CCW when the position in Data No.0 or 1 is set to a value of -1 or less.
Initial Value	0 (CW)

● When using the continuous operation, the number of position settings is reduced from 6 (Data No.0~5) to 4 (Data No.2~5).

### Return to Mechanical Home Operation

Item	Specifications
Mechanical Home Position Detection	1-sensor mode: NC (Normally closed)
Direction of Home Detection Start	Set to CW or CCW
Speed Control Range	3~3000 r/min (Digital setting; can be set in 1 r/min increments; Data No.7)

## Return to Electrical Home Operation

Item	Specifications
Travel Amount	From the current motor position to the electrical home position
Positional Offset Range	-8 388 608~+8 388 607 steps
Initial Offset Value	0
Speed Control Range	3~3000 r/min (Digital setting; can be set in 1 r/min increments; Data No.6)
Acceleration/Deceleration Time	Preset Acceleration/Deceleration time is shared by all data index operations by one of the following (at 3000 r/min with no load): · Digital setting (with <b>OPX-1A</b> ): 0~30 s (can be set in 1 ms increments) · Acceleration/Deceleration time potentiometer with analog setting: 0.1~15 s

## Torque Limiting Function Specifications (with an optional control module **OPX-1A**)

You can set the motor output torque limiting value similarly for both the speed control and position control modes with an optional control module **OPX-1A**.

Item	Specifications
Torque Limiting Setting Method	By one of the following: · Digital common torque setting: A torque limiting value can be set for all data sets (No.0~7) in one operation. · Digital independent torque setting: A torque limiting value can be set independently for each data set (No.0~7). · Analog common torque setting: A torque limiting value can be set for all data sets (No.0~7) in one operation via external speed potentiometer (20 kΩ, 1/4 W) or external DC voltage (0~5 VDC) This torque limiting value applies to all operation data.
Torque Limiting Setting Range	Assuming that starting torque is 100%, torque limiting values can be selected by one of the following: · Digital setting: 1~100% (can be set in 1% increments) · External analog setting: 1~100% by external speed potentiometer (20 kΩ, 1/4 W) or external DC voltage (0~5 VDC)

### Note:

- An error of up to approximately 20% (starting torque: 100%) may occur between the set value and generated torque due to the speed setting, power supply voltage and distance of motor cable extension. Repeatability under the same condition is approximately 10%. We recommend that the torque limit be set to approximately 20% or more.

## Gearmotor – Torque Table of Combination Type

### Combination Type – Parallel Shaft Gearhead

Unit = N·m (lb-in)

Model	Gear Ratio	5	10	15	20	30	50	100	200
	Speed Range* r/min	6~600 (0.6~600)	3~300 (0.3~300)	2~200 (0.2~200)	1.5~150 (0.15~150)	1~100 (0.1~100)	0.6~60 (0.06~60)	0.3~30 (0.03~30)	0.15~15 (0.015~15)
<b>BX230</b> <input type="checkbox"/> <b>S</b>		0.45	0.9	1.4	1.8	2.6	4.3	6	6
<b>BX230</b> <input type="checkbox"/> <b>M</b> <input type="checkbox"/> <b>S</b>		(3.9)	(7.9)	(12.3)	(15.9)	(23)	(38)	(53)	(53)
<b>BX460</b> <input type="checkbox"/> <b>S</b>		0.9	1.8	2.7	3.6	5.2	8.6	16	16
<b>BX460</b> <input type="checkbox"/> <b>M</b> <input type="checkbox"/> <b>S</b>		(7.9)	(15.9)	(23)	(31)	(46)	(76)	(141)	(141)
<b>BX5120</b> <input type="checkbox"/> <b>S</b>		1.8	3.6	5.4	7.2	10.3	17.2	30	30
<b>BX5120</b> <input type="checkbox"/> <b>M</b> <input type="checkbox"/> <b>S</b>		(15.9)	(31)	(47)	(63)	(91)	(152)	(260)	(260)
<b>BX6200</b> <input type="checkbox"/> <b>S</b>		2.9	5.9	8.8	11.7	16.8	28	52.7	70
<b>BX6200</b> <input type="checkbox"/> <b>M</b> <input type="checkbox"/> <b>S</b>		(25)	(52)	(77)	(103)	(148)	(240)	(460)	(610)
<b>BX6400S</b> <input type="checkbox"/> <b>S</b>		5.9	11.7	17.6	23.4	33.5	55.9	70	70
<b>BX6400SM</b> <input type="checkbox"/> <b>S</b>		(52)	(103)	(155)	(207)	(290)	(490)	(610)	(610)

\*Values in parentheses only apply when a control module **OPX-1A** is used.

- Enter the power supply voltage (**A** or **C**) in the box (  ) within the model name. Enter the gear ratio in the box (  ) within the model name.
- A colored background indicates gear shaft rotation in the same direction as the motor shaft; a white background indicates rotation in the opposite direction.

### Combination Type – Hollow Shaft Flat Gearhead

Unit = N·m (lb-in)

Model	Gear Ratio	5	10	15	20	30	50	100	200
	Speed Range* r/min	6~600 (0.6~600)	3~300 (0.3~300)	2~200 (0.2~200)	1.5~150 (0.15~150)	1~100 (0.1~100)	0.6~60 (0.06~60)	0.3~30 (0.03~30)	0.15~15 (0.015~15)
<b>BX230</b> <input type="checkbox"/> <b>FR</b>		0.4	0.85	1.3	1.7	2.6	4.3	8.5	1.7
<b>BX230</b> <input type="checkbox"/> <b>M</b> <input type="checkbox"/> <b>FR</b>		(3.5)	(7.5)	(11.5)	(15.0)	(23)	(38)	(75)	(150)
<b>BX460</b> <input type="checkbox"/> <b>FR</b>		0.85	1.7	2.6	3.4	5.1	8.5	17	3.4
<b>BX460</b> <input type="checkbox"/> <b>M</b> <input type="checkbox"/> <b>FR</b>		(7.5)	(15.0)	(23)	(30)	(45)	(75)	(150)	(300)
<b>BX5120</b> <input type="checkbox"/> <b>FR</b>		1.7	3.4	5.1	6.8	10.2	17	34	6.8
<b>BX5120</b> <input type="checkbox"/> <b>M</b> <input type="checkbox"/> <b>FR</b>		(15.0)	(30)	(45)	(6.0)	(90)	(150)	(300)	(600)

\*Values in parentheses only apply when a control module **OPX-1A** is used.

- Enter the power supply voltage (**A** or **C**) in the box (  ) within the model name. Enter the gear ratio in the box (  ) within the model name.
- The flat gearhead rotates in the opposite direction to the motor when viewed from the front of the gearhead. It rotates in the same direction as the motor when viewed from the rear (motor mounting surface) of the gearhead.

Rotation direction of the hollow shaft flat gearhead → Page 14

## ■ Permissible Overhung Load and Permissible Thrust Load

### ● Combination Type – Parallel Shaft Gearhead

Model	Gear Ratio	Permissible Overhung Load		Permissible Thrust Load N (lb)
		10 mm (0.39 in.) from Shaft End N (lb)	20 mm (0.79 in.) from Shaft End N (lb)	
<b>BX230</b> <input type="checkbox"/> - <input type="checkbox"/> S <b>BX230</b> <input type="checkbox"/> M- <input type="checkbox"/> S	<b>5</b>	100 (22)	150 (33)	40 (9)
	<b>10, 15, 20</b>	150 (33)	200 (45)	
	<b>30, 50, 100, 200</b>	200 (45)	300 (67)	
<b>BX460</b> <input type="checkbox"/> - <input type="checkbox"/> S <b>BX460</b> <input type="checkbox"/> M- <input type="checkbox"/> S	<b>5</b>	200 (45)	250 (56)	100 (22)
	<b>10, 15, 20</b>	300 (67)	350 (78)	
	<b>30, 50, 100, 200</b>	450 (101)	550 (123)	
<b>BX5120</b> <input type="checkbox"/> - <input type="checkbox"/> S <b>BX5120</b> <input type="checkbox"/> M- <input type="checkbox"/> S	<b>5</b>	300 (67)	400 (90)	150 (33)
	<b>10, 15, 20</b>	400 (90)	500 (112)	
	<b>30, 50, 100, 200</b>	500 (123)	650 (146)	
<b>BX6200</b> <input type="checkbox"/> - <input type="checkbox"/> S <b>BX6200</b> <input type="checkbox"/> M- <input type="checkbox"/> S	<b>5, 10, 15, 20</b>	550 (123)	800 (180)	200 (45)
	<b>30, 50</b>	1000 (220)	1250 (280)	300 (67)
	<b>100, 200</b>	1400 (310)	1700 (380)	400 (90)
<b>BX6400S</b> - <input type="checkbox"/> S <b>BX6400SM</b> - <input type="checkbox"/> S	<b>5, 10, 15, 20</b>	550 (123)	800 (180)	200 (45)
	<b>30, 50</b>	1000 (220)	1250 (280)	300 (67)
	<b>100, 200</b>	1400 (310)	1700 (380)	400 (90)

● Enter the power supply voltage (**A** or **C**) in the box () within the model name.  
Enter the gear ratio in the box () within the model name.

### ● Combination Type – Hollow Shaft Flat Gearhead

Model	Gear Ratio	Permissible Overhung Load		Permissible Thrust Load N (lb)
		10 mm (0.39 in.) from Mounting Surface of Gearhead N (lb)	20 mm (0.79 in.) from Mounting Surface of Gearhead N (lb)	
<b>BX230</b> <input type="checkbox"/> - <input type="checkbox"/> FR <b>BX230</b> <input type="checkbox"/> M- <input type="checkbox"/> FR	<b>5, 10</b>	450 (101)	370 (83)	200 (45)
	<b>15, 20, 30, 50, 100, 200</b>	500 (112)	400 (90)	
<b>BX460</b> <input type="checkbox"/> - <input type="checkbox"/> FR <b>BX460</b> <input type="checkbox"/> M- <input type="checkbox"/> FR	<b>5, 10</b>	800 (180)	660 (148)	400 (90)
	<b>15, 20, 30, 50, 100, 200</b>	1200 (270)	1000 (220)	
<b>BX5120</b> <input type="checkbox"/> - <input type="checkbox"/> FR <b>BX5120</b> <input type="checkbox"/> M- <input type="checkbox"/> FR	<b>5, 10</b>	900 (200)	770 (173)	500 (112)
	<b>15, 20</b>	1300 (290)	1110 (240)	
	<b>30, 50, 100, 200</b>	1500 (330)	1280 (280)	

● Enter the power supply voltage (**A** or **C**) in the box () within the model name.  
Enter the gear ratio in the box () within the model name.

### ● Round Shaft Type

Model	Permissible Overhung Load		Permissible Thrust Load
	10 mm (0.39 in.) from Shaft End N (lb)	20 mm (0.79 in.) from Shaft End N (lb)	
<b>BX230</b> <input type="checkbox"/> - <b>A</b> <b>BX230</b> <input type="checkbox"/> M- <b>A</b>	87.2 (19.6)	107 (24)	The permissible thrust load shall be no greater than half the motor mass.
<b>BX460</b> <input type="checkbox"/> - <b>A</b> <b>BX460</b> <input type="checkbox"/> M- <b>A</b>	117 (26)	137 (30)	
<b>BX5120</b> <input type="checkbox"/> - <b>A</b> <b>BX5120</b> <input type="checkbox"/> M- <b>A</b>	156 (35)	176 (39)	
<b>BX6200</b> <input type="checkbox"/> - <b>A</b> <b>BX6200</b> <input type="checkbox"/> M- <b>A</b>	197 (44)	221 (49)	
<b>BX6400S</b> - <b>A</b> <b>BX6400SM</b> - <b>A</b>	197 (44)	221 (49)	

● Enter the power supply voltage (**A** or **C**) in the box () within the model name.

## Permissible Load Inertia (J) of Combination Type

### Combination Type–Parallel Shaft Gearhead

Unit = kg·m<sup>2</sup> (oz·in<sup>2</sup>)

Model	Gear Ratio	5	10	15	20	30	50	100	200
<b>BX230</b> □-□S		1.2×10 <sup>-3</sup> (66)	5×10 <sup>-3</sup> (270)	1.1×10 <sup>-2</sup> (600)	2×10 <sup>-2</sup> (1090)	3.7×10 <sup>-2</sup> (2000)	9.2×10 <sup>-2</sup> (5000)	2.5×10 <sup>-1</sup> (13700)	5×10 <sup>-1</sup> (27000)
<b>BX230</b> ■M-□S	When quick stop or instantaneous bi-directional motion is used*	1.55×10 <sup>-4</sup> (8.5)	6.2×10 <sup>-4</sup> (34)	14×10 <sup>-4</sup> (77)	24.8×10 <sup>-4</sup> (136)	55.8×10 <sup>-4</sup> (310)	155×10 <sup>-4</sup> (850)	155×10 <sup>-4</sup> (850)	155×10 <sup>-4</sup> (850)
<b>BX460</b> □-□S		2.2×10 <sup>-3</sup> (120)	9.5×10 <sup>-3</sup> (520)	2.2×10 <sup>-2</sup> (1200)	3.5×10 <sup>-2</sup> (1910)	8×10 <sup>-2</sup> (4400)	2.2×10 <sup>-1</sup> (12000)	6.2×10 <sup>-1</sup> (34000)	1.2 (66000)
<b>BX460</b> ■M-□S	When quick stop or instantaneous bi-directional motion is used*	5.5×10 <sup>-4</sup> (30)	22×10 <sup>-4</sup> (120)	49.5×10 <sup>-4</sup> (270)	88×10 <sup>-4</sup> (480)	198×10 <sup>-4</sup> (1080)	550×10 <sup>-4</sup> (3000)	550×10 <sup>-4</sup> (3000)	550×10 <sup>-4</sup> (3000)
<b>BX5120</b> □-□S		4.5×10 <sup>-3</sup> (250)	1.9×10 <sup>-2</sup> (1040)	4.2×10 <sup>-2</sup> (2300)	7×10 <sup>-2</sup> (3800)	1.6×10 <sup>-1</sup> (8800)	4.5×10 <sup>-1</sup> (25000)	1.2 (66000)	2.5 (137000)
<b>BX5120</b> ■M-□S	When quick stop or instantaneous bi-directional motion is used*	25×10 <sup>-4</sup> (137)	100×10 <sup>-4</sup> (550)	225×10 <sup>-4</sup> (1230)	400×10 <sup>-4</sup> (2200)	900×10 <sup>-4</sup> (4900)	2500×10 <sup>-4</sup> (13700)	2500×10 <sup>-4</sup> (13700)	2500×10 <sup>-4</sup> (13700)
<b>BX6200</b> □-□S		1×10 <sup>-2</sup> (550)	4.6×10 <sup>-2</sup> (2500)	1×10 <sup>-1</sup> (5500)	1.7×10 <sup>-1</sup> (9300)	3.9×10 <sup>-1</sup> (21000)	9.3×10 <sup>-1</sup> (51000)	1.8 (98000)	3.7 (200000)
<b>BX6200</b> ■M-□S	When quick stop or instantaneous bi-directional motion is used*	37.5×10 <sup>-4</sup> (210)	150×10 <sup>-4</sup> (820)	338×10 <sup>-4</sup> (1840)	600×10 <sup>-4</sup> (3300)	1350×10 <sup>-4</sup> (7400)	3750×10 <sup>-4</sup> (21000)	3750×10 <sup>-4</sup> (21000)	3750×10 <sup>-4</sup> (21000)
<b>BX6400S</b> □-□S		1×10 <sup>-2</sup> (550)	4.6×10 <sup>-2</sup> (2500)	1×10 <sup>-1</sup> (5500)	1.7×10 <sup>-1</sup> (9300)	3.9×10 <sup>-1</sup> (21000)	9.3×10 <sup>-1</sup> (51000)	1.8 (98000)	3.7 (200000)
<b>BX6400SM</b> □-□S	When quick stop or instantaneous bi-directional motion is used*	37.5×10 <sup>-4</sup> (210)	150×10 <sup>-4</sup> (820)	338×10 <sup>-4</sup> (1840)	600×10 <sup>-4</sup> (3300)	1350×10 <sup>-4</sup> (7400)	3750×10 <sup>-4</sup> (21000)	3750×10 <sup>-4</sup> (21000)	3750×10 <sup>-4</sup> (21000)

\*Values only apply when a control module **OPX-1A** is used.

●Enter the power supply voltage (**A** or **C**) in the box (■) within the model name. Enter the gear ratio in the box (□) within the model name.

### Combination Type–Hollow Shaft Flat Gearhead

Unit = kg·m<sup>2</sup> (oz·in<sup>2</sup>)

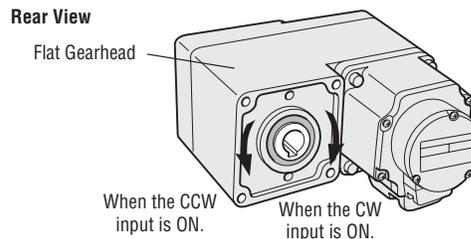
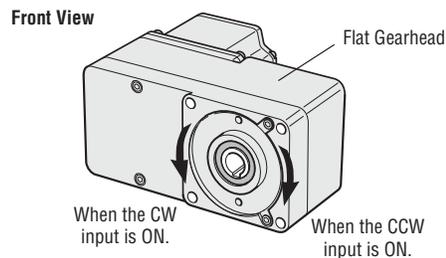
Model	Gear Ratio	5	10	15	20	30	50	100	200
<b>BX230</b> □-□FR		1.2×10 <sup>-3</sup> (66)	5×10 <sup>-3</sup> (270)	1.1×10 <sup>-2</sup> (600)	2×10 <sup>-2</sup> (1090)	3.7×10 <sup>-2</sup> (2000)	9.2×10 <sup>-2</sup> (5000)	2.5×10 <sup>-1</sup> (13700)	5×10 <sup>-1</sup> (27000)
<b>BX230</b> ■M-□FR	When quick stop or instantaneous bi-directional motion is used*	1.55×10 <sup>-4</sup> (8.5)	6.2×10 <sup>-4</sup> (34)	14×10 <sup>-4</sup> (77)	24.8×10 <sup>-4</sup> (136)	55.8×10 <sup>-4</sup> (310)	155×10 <sup>-4</sup> (850)	155×10 <sup>-4</sup> (850)	155×10 <sup>-4</sup> (850)
<b>BX460</b> □-□FR		2.2×10 <sup>-3</sup> (120)	9.5×10 <sup>-3</sup> (520)	2.2×10 <sup>-2</sup> (1200)	3.5×10 <sup>-2</sup> (1910)	8×10 <sup>-2</sup> (4400)	2.2×10 <sup>-1</sup> (12000)	6.2×10 <sup>-1</sup> (34000)	1.2 (66000)
<b>BX460</b> ■M-□FR	When quick stop or instantaneous bi-directional motion is used*	5.5×10 <sup>-4</sup> (30)	22×10 <sup>-4</sup> (120)	49.5×10 <sup>-4</sup> (270)	88×10 <sup>-4</sup> (480)	198×10 <sup>-4</sup> (1080)	550×10 <sup>-4</sup> (3000)	550×10 <sup>-4</sup> (3000)	550×10 <sup>-4</sup> (3000)
<b>BX5120</b> □-□FR		4.5×10 <sup>-3</sup> (250)	1.9×10 <sup>-2</sup> (1040)	4.2×10 <sup>-2</sup> (2300)	7×10 <sup>-2</sup> (3800)	1.6×10 <sup>-1</sup> (8800)	4.5×10 <sup>-1</sup> (25000)	1.2 (66000)	2.5 (137000)
<b>BX5120</b> ■M-□FR	When quick stop or instantaneous bi-directional motion is used*	25×10 <sup>-4</sup> (137)	100×10 <sup>-4</sup> (550)	225×10 <sup>-4</sup> (1230)	400×10 <sup>-4</sup> (2200)	900×10 <sup>-4</sup> (4900)	2500×10 <sup>-4</sup> (13700)	2500×10 <sup>-4</sup> (13700)	2500×10 <sup>-4</sup> (13700)

\*Values only apply when a control module **OPX-1A** is used.

●Enter the power supply voltage (**A** or **C**) in the box (■) within the model name. Enter the gear ratio in the box (□) within the model name.

## Rotation Direction of the Hollow Shaft Flat Gearhead

The hollow shaft flat gearhead of the combination type rotates in the direction as shown below, with respect to the direction input from the driver.



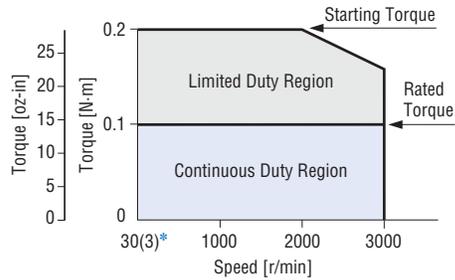
## Speed–Torque Characteristics

Continuous Duty Region: Continuous operation is possible in this region.

Limited Duty Region: This region is used primarily when accelerating. When a load that exceeds the rated torque is applied continuously for approximately five seconds, overload protection is activated and the motor coasts to a stop.

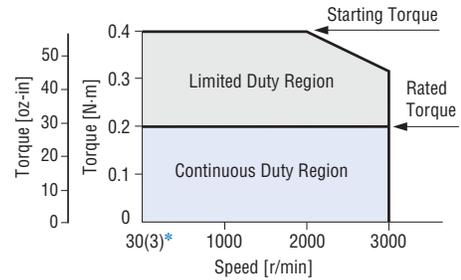
**BX230** -**A**/**BX230** -**S**/**BX230** -**FR**

**BX230** -**M**-**A**/**BX230** -**M**-**S**/**BX230** -**M**-**FR**



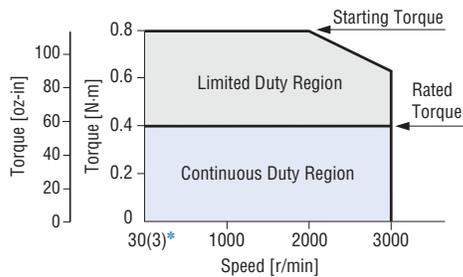
**BX460** -**A**/**BX460** -**S**/**BX460** -**FR**

**BX460** -**M**-**A**/**BX460** -**M**-**S**/**BX460** -**M**-**FR**



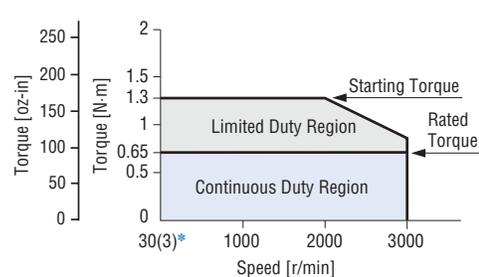
**BX5120** -**A**/**BX5120** -**S**/**BX5120** -**FR**

**BX5120** -**M**-**A**/**BX5120** -**M**-**S**/**BX5120** -**M**-**FR**



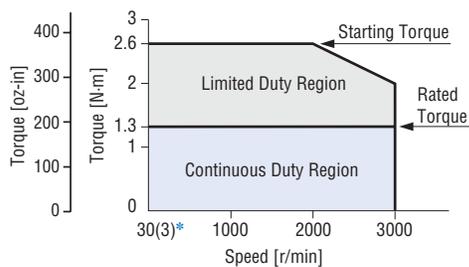
**BX6200** -**A**/**BX6200** -**S**

**BX6200** -**M**-**A**/**BX6200** -**M**-**S**



**BX6400S**-**A**/**BX6400S**-**S**

**BX6400SM**-**A**/**BX6400SM**-**S**



\*Values in parentheses only apply when a control module **OPX-1A** is used.

● The characteristics shown above apply to the motor only.

● Enter the power supply voltage (**A** or **C**) in the box (■) within the model name.

Enter the gear ratio in the box (□) within the model name.

## Vertical Drive (Gravitational) Operation

The **BX** Series provides stable speed control during gravitational operation. When a motor is rotated by external power, it works as a generator. The driver may be damaged if the energy that is regenerated during a vertical (gravitational) operation or due to an abrupt start/stop involving a large inertial load exceeds the maximum level that can be absorbed by driver. The optional regeneration unit (sold separately) is designed to discharge the regenerated energy, thereby protecting the driver.

Regeneration unit → Page 44

Regeneration Unit Model	BX Model	Rated Output Power W (HP)	Continuous Regeneration Capability W (HP)	Instantaneous Regeneration Capability W (HP)
<b>EPRC-400P</b>	<b>BX230</b>	30 (1/25)	100 (1/8)	240 (1/3)
	<b>BX460</b>	60 (1/12)		
	<b>BX5120</b>	120 (1/6)		
<b>RGB100</b>	<b>BX6200</b>	200 (1/4)	100 (1/8)	800 (1)
	<b>BX6400</b>	400 (1/2)		

● Install the regeneration unit in the place which has the same heat radiation capability as heat radiation plate (Material: Aluminum 350 mm×350 mm [13.8 in.×13.8 in.], 3 mm [0.12 in.] thick).

### Regenerative Power

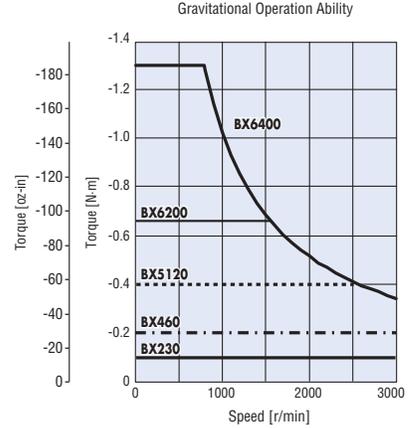
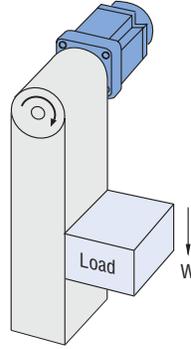
The regenerative power can be estimated using the formula below. Use the calculated value as a guideline.

$$\text{Regenerative Power (W)} = 0.1047 \times T_L \text{ [N} \cdot \text{m]} \times N \text{ [r/min]}$$

$T_L$ : Load torque  $N$ : Speed

● Use the electromagnetic brake type for gravitational operation.

## Gravitational Operation Ability



● Gravitational operation exceeding the range of continuous regeneration capability will trigger the internal thermal protector (150°C [302°F]).

## Dimensions Unit = mm (in.)

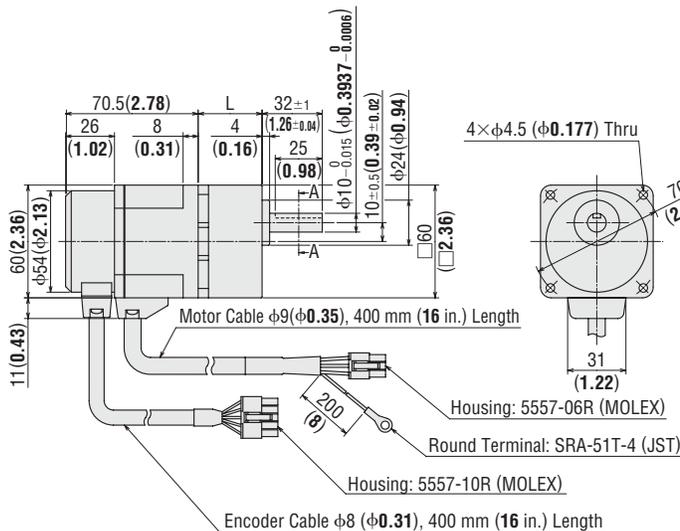
● Mounting screws are included with the combination type.

### Standard Type 30 W (1/25 HP)

#### Motor/Parallel Shaft Gearhead

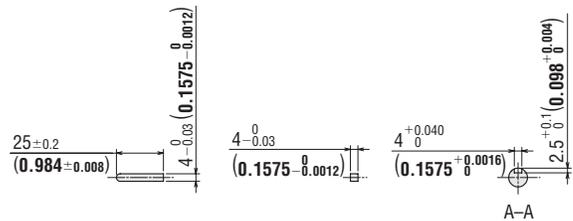
Model	Motor Model	Gearhead Model	Gear Ratio	L	CAD
<b>BX230A-□S</b> <b>BX230C-□S</b>	BXM230-GFS	GFS2G□	<b>5~20</b>	34 (1.34)	C147A
<b>30~100</b>			38 (1.50)	C147B	
<b>200</b>			43 (1.69)	C147C	

Mass: 1.2 kg (2.6 lb) Including gearhead



### Key and Key Slot

(The key is included with the gearhead)



● Enter the gear ratio in the box (□) within the model name.



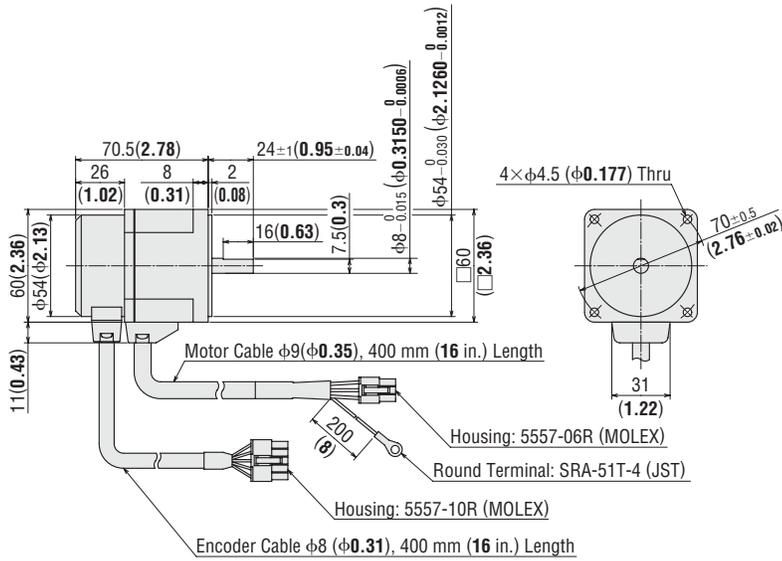
## ◇ Round Shaft Type

### BX230A-A, BX230C-A

Motor: BXM230-A2

Mass: 0.7 kg (1.5 lb)

CAD C150

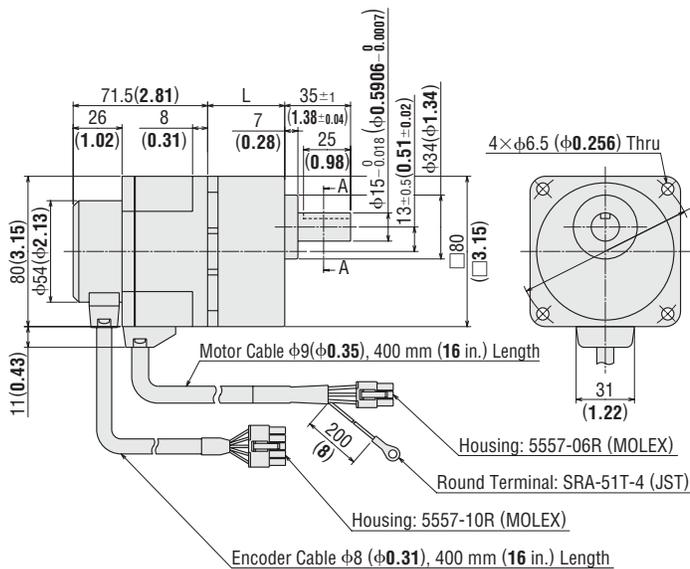


## ● Standard Type 60 W (1/12 HP)

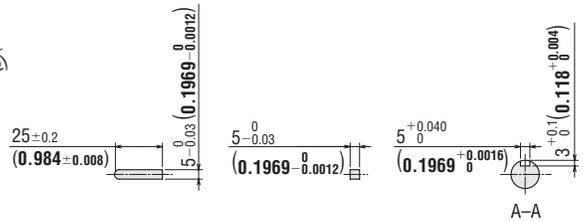
### ◇ Motor/Parallel Shaft Gearhead

Model	Motor Model	Gearhead Model	Gear Ratio	L	CAD
BX460A-□S BX460C-□S	BXM460-GFS	GFS4G□	5~20	41 (1.61)	C148A
			30~100	46 (1.81)	C148B
			200	51 (2.0)	C148C

Mass: 2.0 kg (4.4 lb) Including gearhead



### ◇ Key (Included)



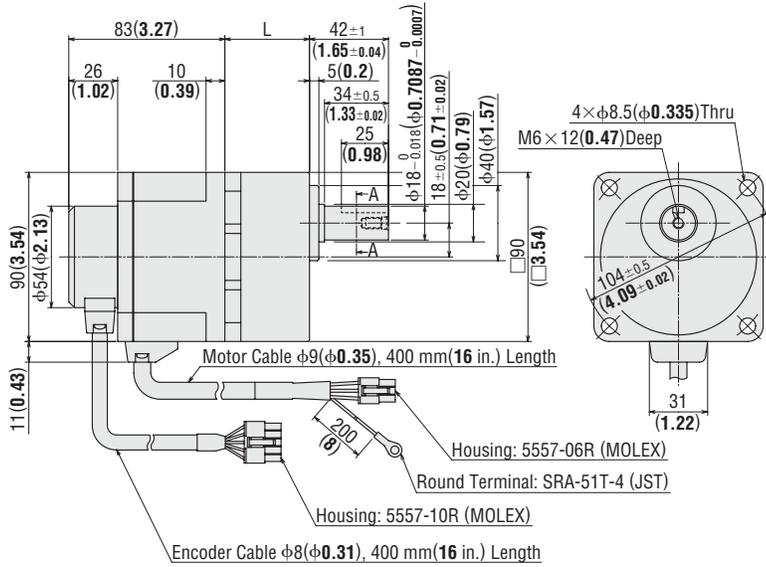
● Enter the gear ratio in the box (□) within the model name.



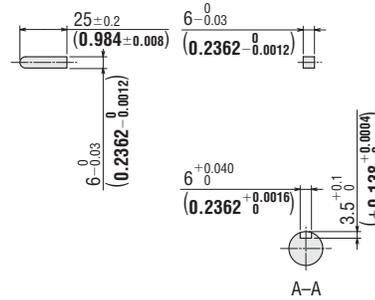
● **Standard Type 120 W (1/6 HP)**  
 ◇ **Motor/Parallel Shaft Gearhead**

Model	Motor Model	Gearhead Model	Gear Ratio	L	CAD
<b>BX5120A-□S</b> <b>BX5120C-□S</b>	BXM5120-GFS	GFS5G□	5~20	45 (1.77)	C149A
			30~100	58 (2.28)	C149B
			200	64 (2.52)	C149C

Mass: 3.1 kg (6.8 lb) Including gearhead

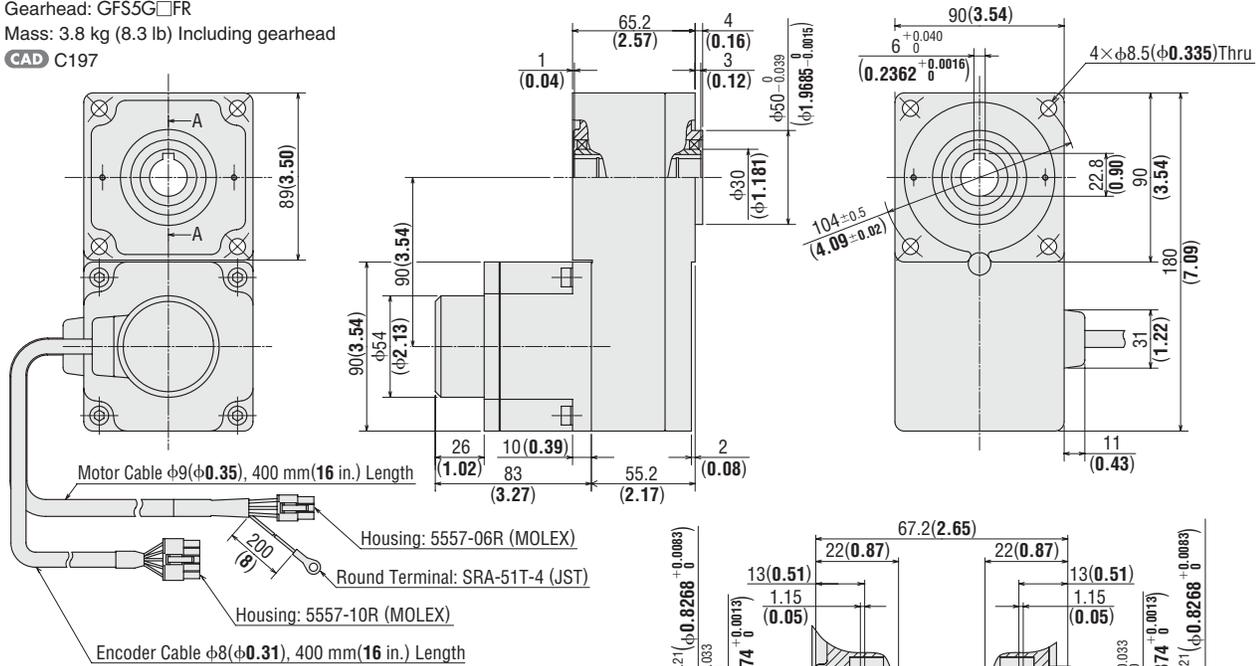


◇ **Key and Key Slot**  
 (The key is included with the gearhead)

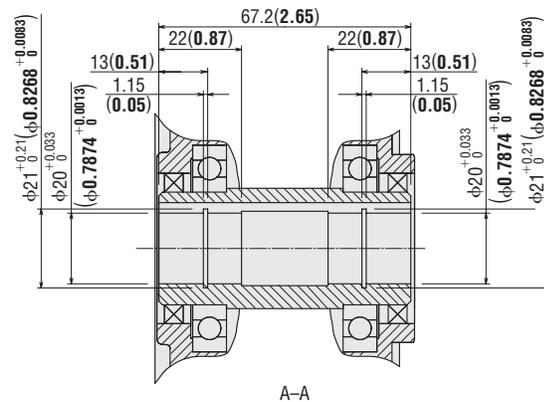
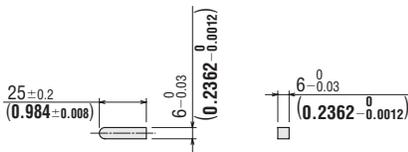


◇ **Motor/Hollow Shaft Flat Gearhead**  
**BX5120A-□FR, BX5120C-□FR**

Motor: BXM5120-GFS  
 Gearhead: GFS5G□FR  
 Mass: 3.8 kg (8.3 lb) Including gearhead  
 CAD C197



◇ **Key (Included)**



● Enter the gear ratio in the box (□) within the model name.

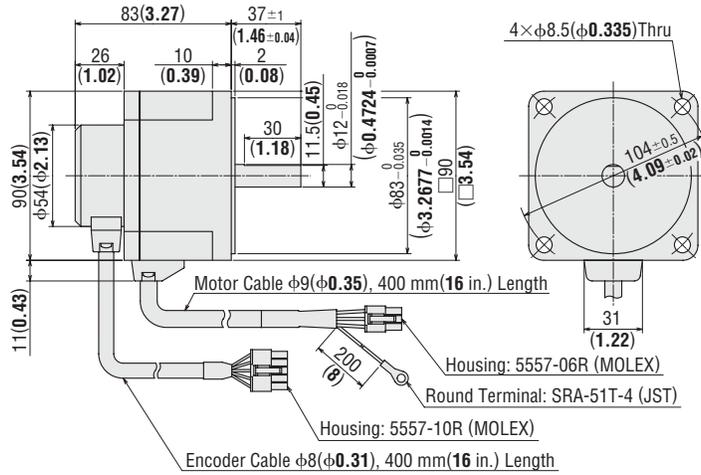
### ◇ Round Shaft Type

#### BX5120A-A, BX5120C-A

Motor: BXM5120-A2

Mass: 1.6 kg (3.5 lb)

CAD C152

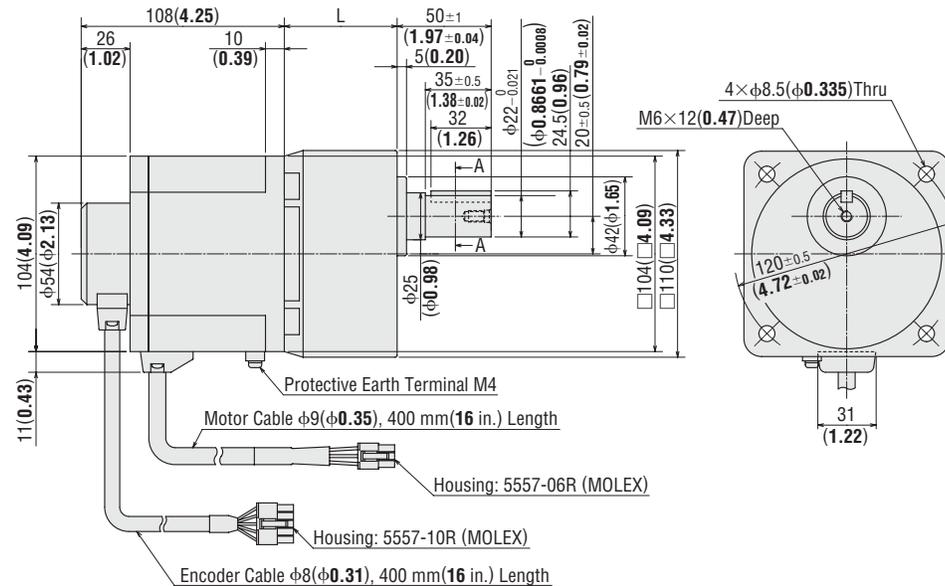


### ● Standard Type 200 W (1/4 HP), 400 W (1/2 HP)

#### ◇ Motor/Parallel Shaft Gearhead

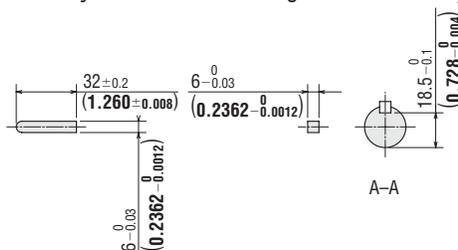
Model	Motor Model	Gearhead Model	Gear Ratio	L	CAD
<b>BX6200A-□S</b>	BXM6200-GFS	GFS6G□	<b>5~20</b>	60 (2.36)	C198A
<b>BX6200C-□S</b>			<b>30, 50</b>	72 (2.83)	C198B
<b>BX6400S-□S</b>	BXM6400-GFS		<b>100, 200</b>	86 (3.39)	C198C

Mass: 5.5 kg (12.1 lb) Including gearhead



### ◇ Key and Key Slot

(The key is included with the gearhead. At the time of shipment, a key is inserted on the gearhead's shaft.)



● Enter the gear ratio in the box (□) within the model name.

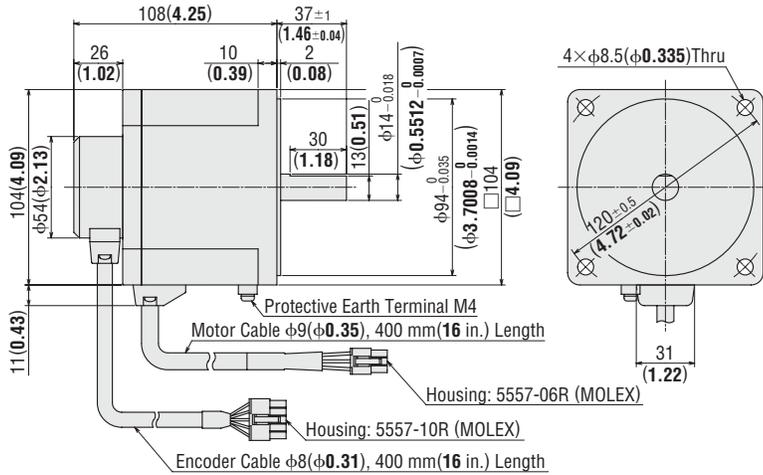
## ◇ Round Shaft Type

### BX6200A-A, BX6200C-A, BX6400S-A

Motor: BXM6200-A, BXM6400-A

Mass: 2.5 kg (5.5 lb)

CAD C182

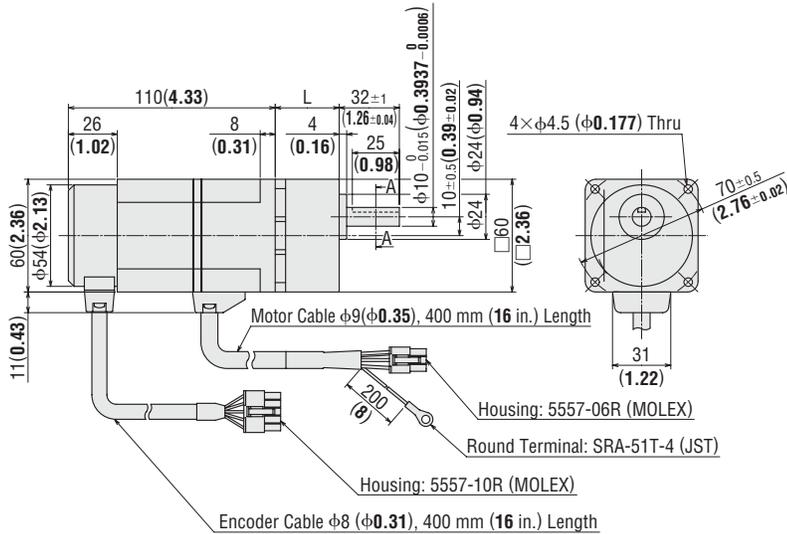


## ● Electromagnetic Brake 30 W (1/25 HP)

### ◇ Motor/Parallel Shaft Gearhead

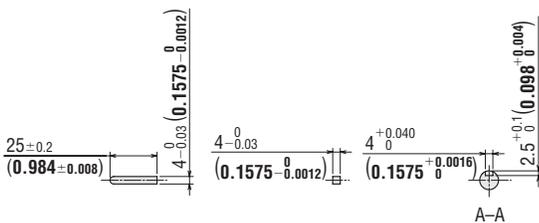
Model	Motor Model	Gearhead Model	Gear Ratio	L	CAD
BX230AM-□S BX230CM-□S	BXM230M-GFS	GFS2G□	5~20	34 (1.34)	C153A
			30~100	38 (1.50)	C153B
			200	43 (1.69)	C153C

Mass: 1.5 kg (3.3 lb) Including gearhead



## ◇ Key and Key Slot

(The key is included with the gearhead)



● Enter the gear ratio in the box (□) within the model name.

### ◇ Motor/Hollow Shaft Flat Gearhead

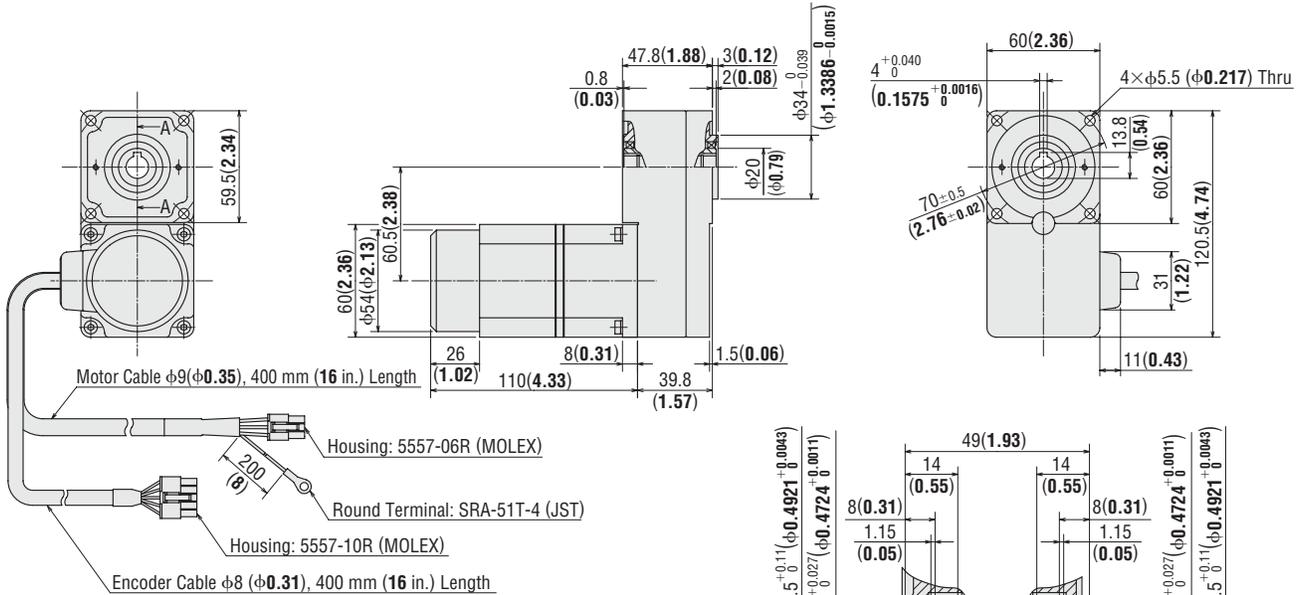
**BX230AM-□FR, BX230CM-□FR**

Motor: BXM230M-GFS

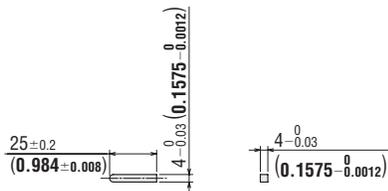
Gearhead: GFS2G□FR

Mass: 1.8 kg (4.0 lb) Including gearhead

**CAD** C199



### ◇ Key (Included)



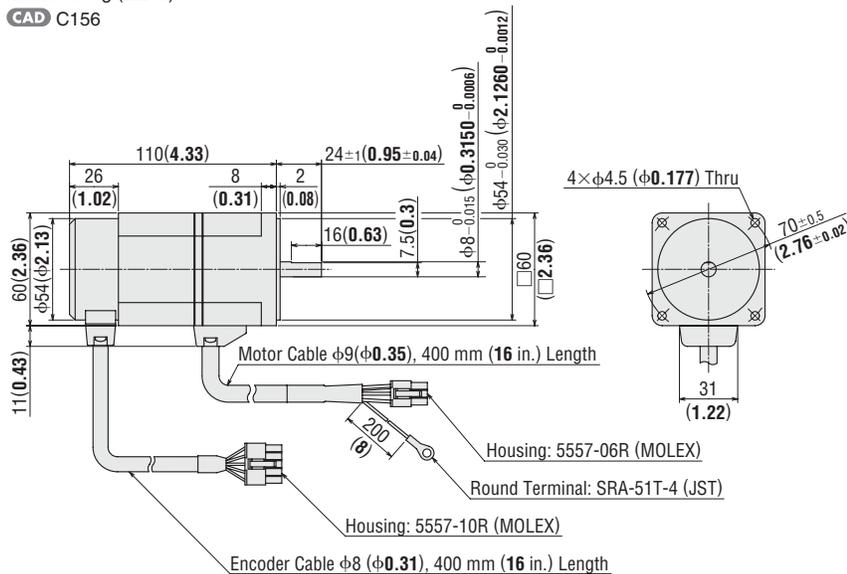
### ◇ Round Shaft Type

**BX230AM-A, BX230CM-A**

Motor: BXM230M-A2

Mass: 1.0 kg (2.2 lb)

**CAD** C156



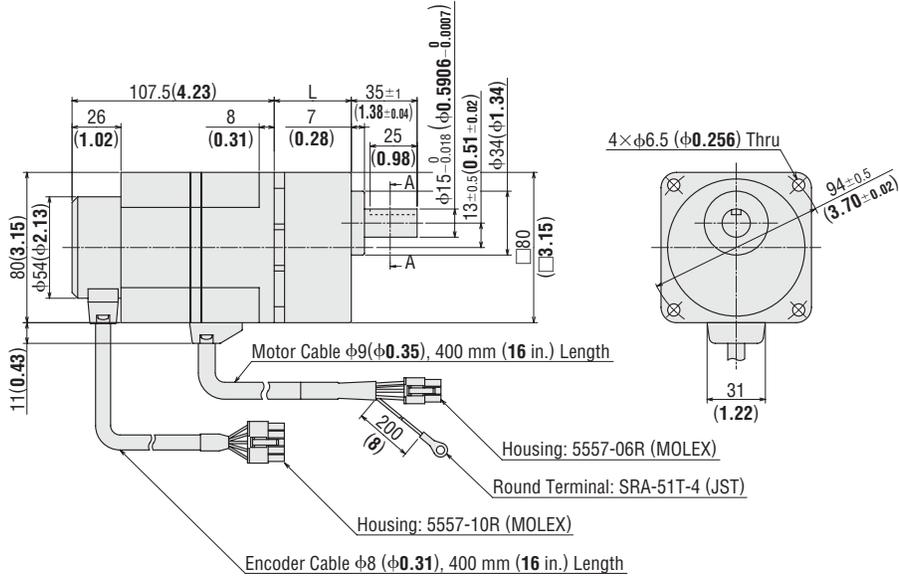
● Enter the gear ratio in the box (□) within the model name.

## ● Electromagnetic Brake 60 W (1/12 HP)

### ◇ Motor/Parallel Shaft Gearhead

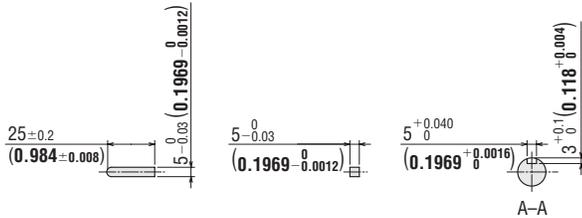
Model	Motor Model	Gearhead Model	Gear Ratio	L	CAD
<b>BX460AM</b> -□S	BXM460M-GFS	GFS4G□	<b>5~20</b>	41 (1.61)	C154A
<b>BX460CM</b> -□S			<b>30~100</b>	46 (1.81)	C154B
			<b>200</b>	51 (2.0)	C154C

Mass: 2.5 kg (5.5 lb) Including gearhead



### ◇ Key and Key Slot

(The key is included with the gearhead)



● Enter the gear ratio in the box (□) within the model name.





### ◇ Motor/Hollow Shaft Flat Gearhead

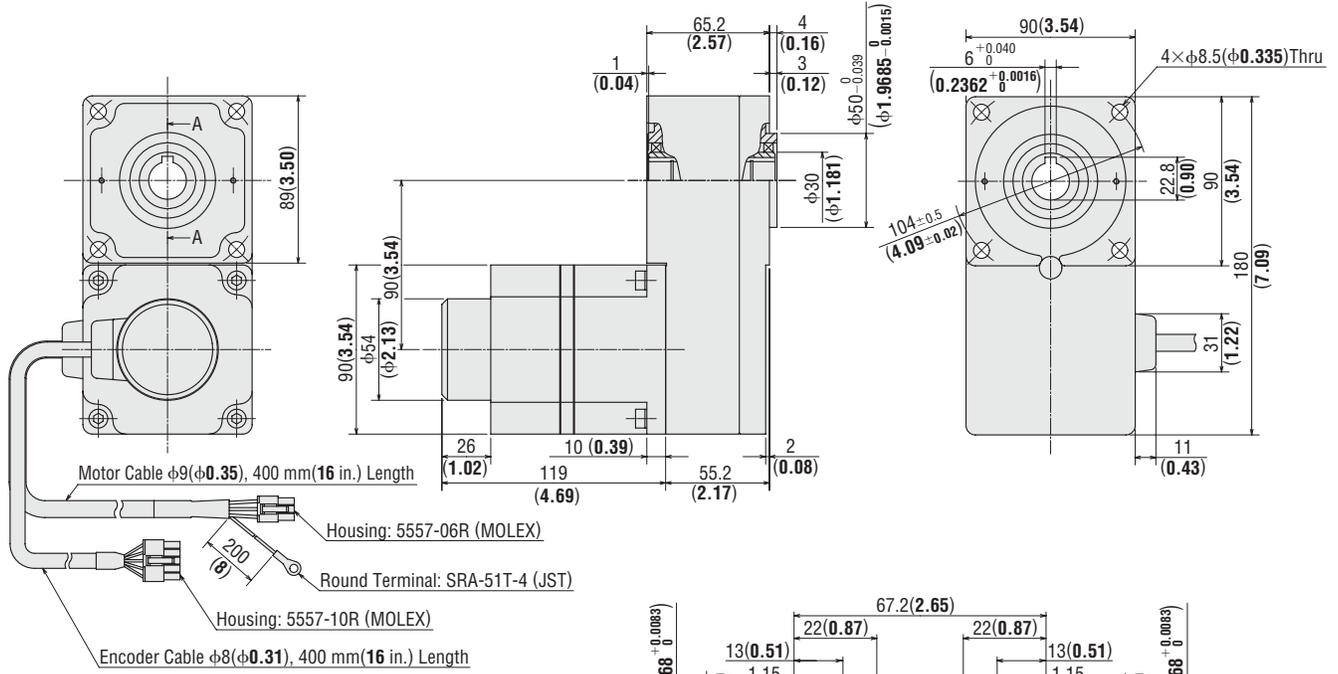
**BX5120AM-□FR, BX5120CM-□FR**

Motor: BXM5120M-GFS

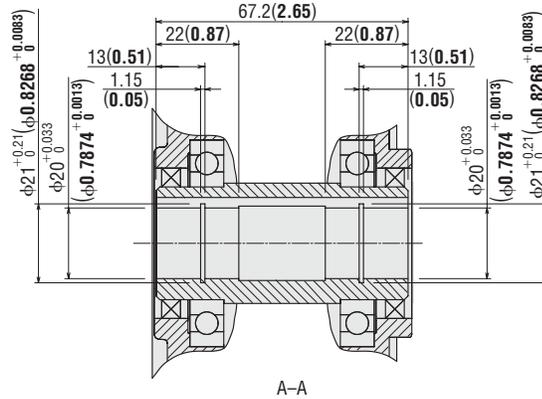
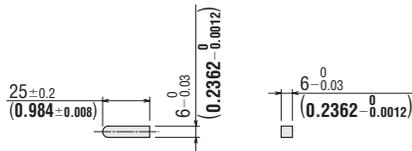
Gearhead: GFS5G□FR

Mass: 4.4 kg (9.7 lb) Including gearhead

CAD C201



### ◇ Key (Included)



● Enter the gear ratio in the box (□) within the model name.

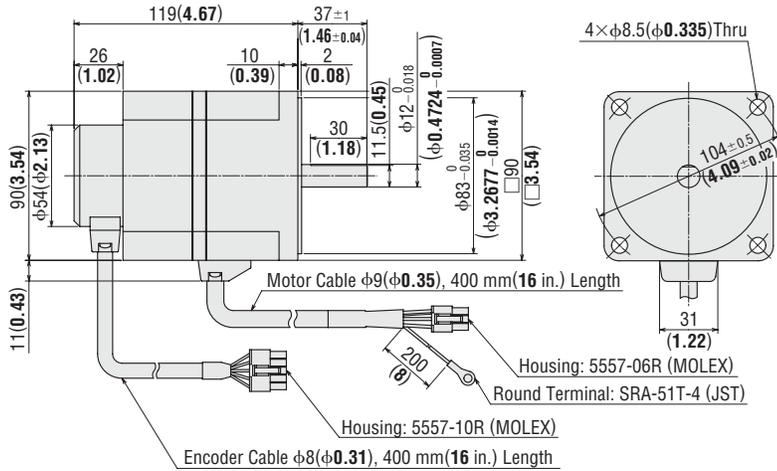
### ◇ Round Shaft Type

#### BX5120AM-A, BX5120CM-A

Motor: BXM5120M-A2

Mass: 2.2 kg (4.8 lb)

CAD C158

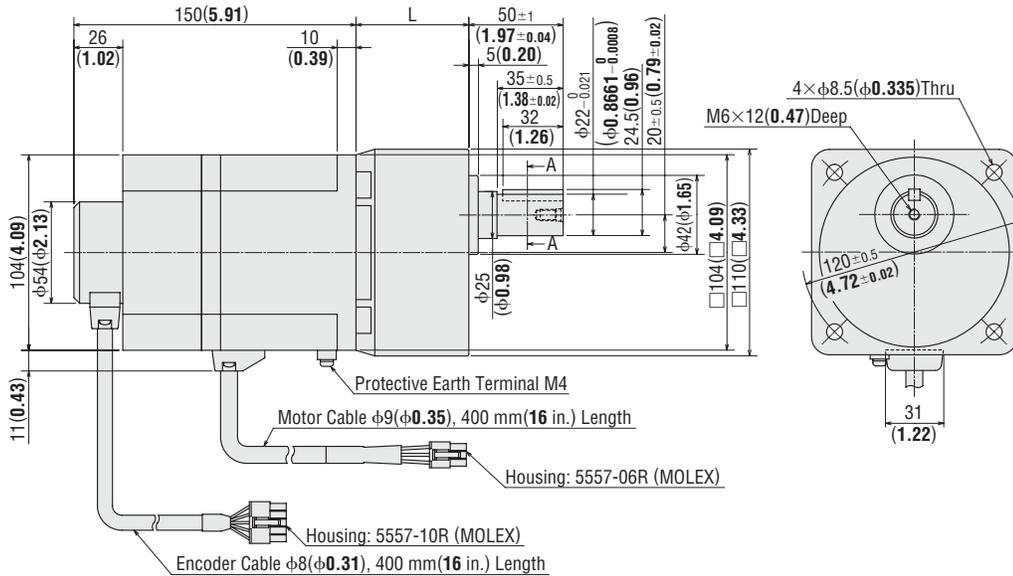


### ● Electromagnetic Brake 200 W (1/4 HP), 400 W (1/2 HP)

#### ◇ Motor/Parallel Shaft Gearhead

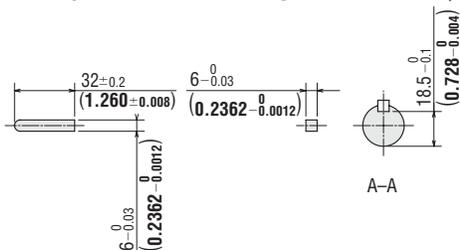
Model	Motor Model	Gearhead Model	Gear Ratio	L	CAD
BX6200AM-□S	BXM6200M-GFS	GFS6G□	5~20	60 (2.36)	C202A
BX6200CM-□S			30, 50	72 (2.83)	C202B
BX6400SM-□S	BXM6400M-GFS		100, 200	86 (3.39)	C202C

Mass: 6.5 kg (14 lb) Including gearhead



### ◇ Key and Key Slot

(The key is included with the gearhead. At the time of shipment, a key is inserted on the gearhead's shaft.)



● Enter the gear ratio in the box (□) within the model name.

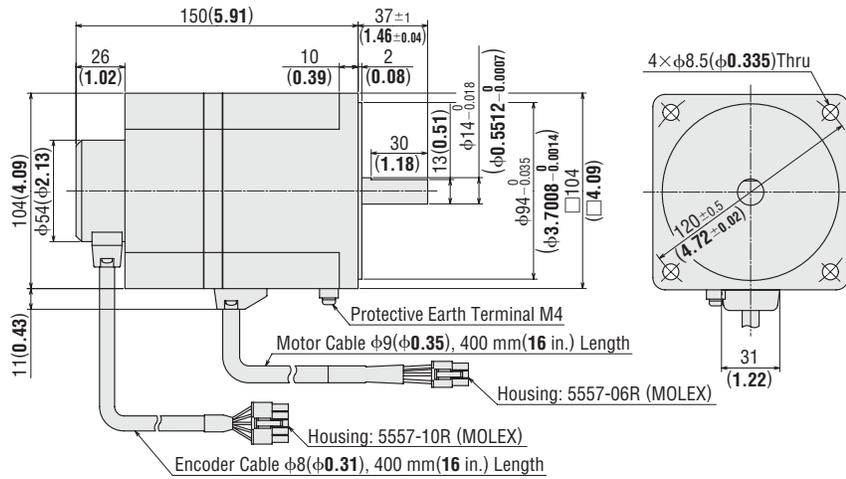
### ◆ Round Shaft Type

**BX6200AM-A, BX6200CM-A, BX6400SM-A**

Motor: BXM6200M-A, BXM6400M-A

Mass: 3.5 kg (7.7 lb)

**CAD** C184



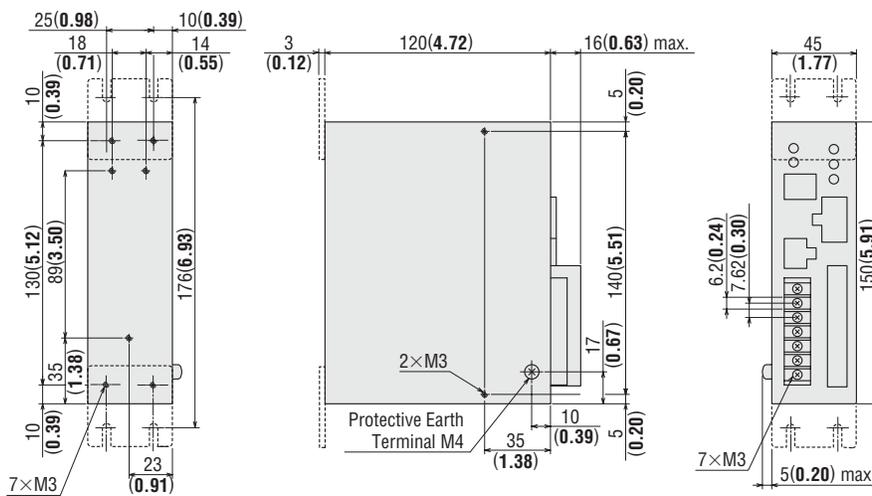
### ◆ Driver (Common to all models)

BXD30A-A, BXD30A-C, BXD60A-A, BXD60A-C

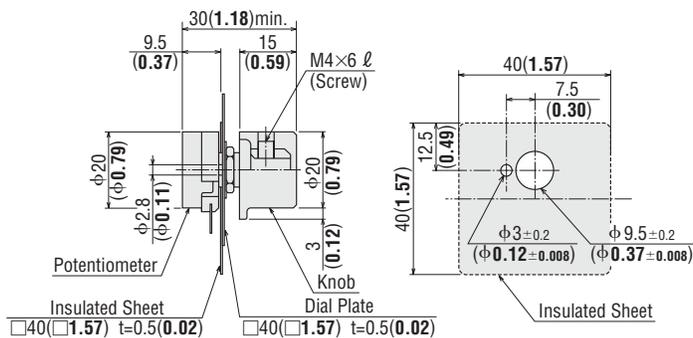
BXD120A-A, BXD120A-C, BXD200A-A, BXD200A-C, BXD400A-S

Mass: 0.8 kg (1.8 lb)

**CAD** C141



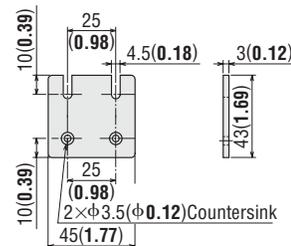
### ◆ External Speed Potentiometer (Included)



Recommended thickness of a mounting plate is a maximum 4.5 mm (0.177 in.)

● Enter the gear ratio in the box (□) within the model name.

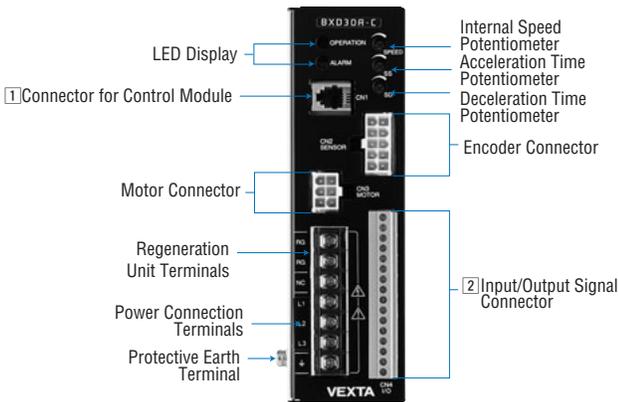
### ◆ Mounting Bracket (2 pieces included)



## Connection and Operation (Speed Control)

Speed control can be implemented on the standard model, but extended function is available only when a control module **OPX-1A** is used.

### Names and Functions of Driver Parts



### 1 Connector for Control Module

You can extend the speed control performance by using an optional control module **OPX-1A**.



### ◇ Main Function

OPX-1A	
Setting Function	<ul style="list-style-type: none"> <li>Speed (8 Speed settings max.)</li> <li>Torque Limiting Values</li> </ul>
Displaying Function	<ul style="list-style-type: none"> <li>Speed (r/min)</li> <li>Load Factor (%)</li> <li>Alarm Cord</li> <li>Alarm History</li> </ul>

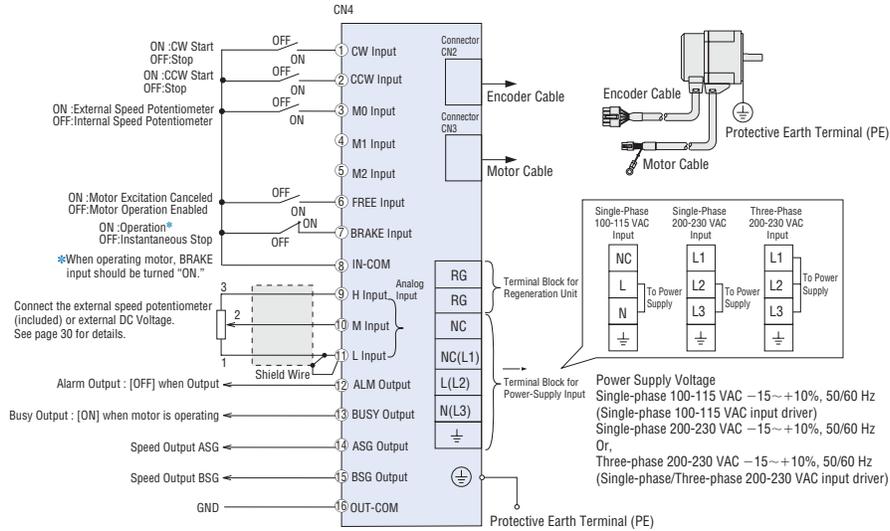
● Dimensions → Page 43

### 2 Input and Output Signals

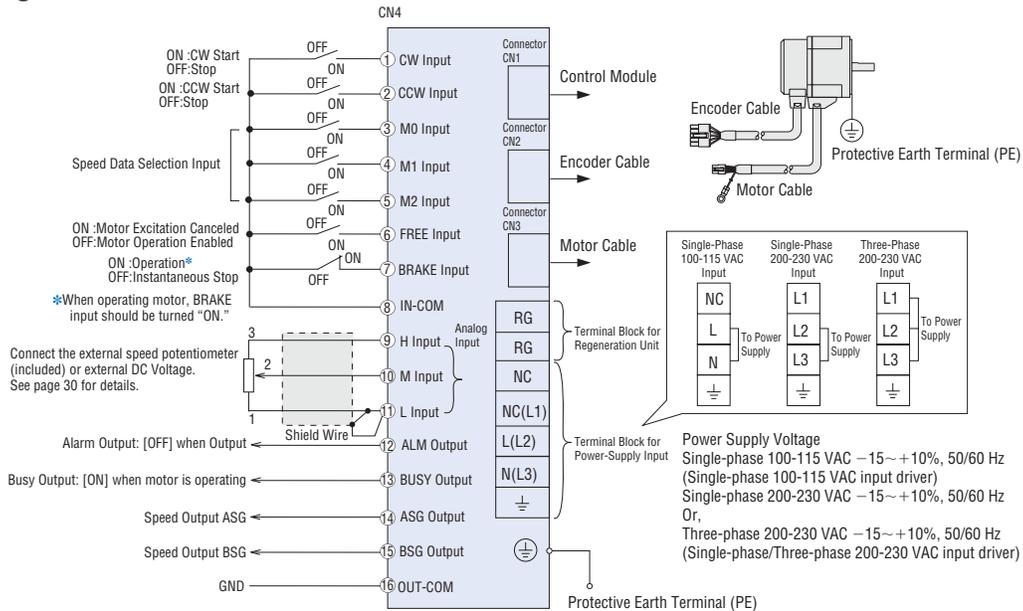
CN4 Terminal Number	I/O	Signal		Function/Application
		Standard Model	Extended Function	
1	Input	CW	CW	CW rotation/stop switching input
2		CCW	CCW	CCW rotation/stop switching input
3		M0	M0	Internal speed setting/external analog setting
4		NC	M1	Standard model: Nothing is connected.
5		NC	M2	Extended system: Operation data selection
6		FREE	FREE	Motor excitation cancellation, electromagnetic brake release
7	Analog Input	BRAKE/ ALARM-RESET	BRAKE/ ALARM-RESET	Normal: Instantaneous stop switching input Protective function has been activated: Alarm reset input
8		IN-COM	IN-COM	Input signal common
9	Analog Input	H	H	Speed setting via the external speed potentiometer or external DC voltage
10		M	M	
11		L	L	
12	Output	ALARM	ALARM	This signal is output when a protective function has been activated (normally closed).
13		BUSY/ ALARM-PULSE	BUSY(TLM)*/ ALARM-PULSE	Normal: Busy output Protective function has been activated: Alarm pulse input
14		ASG	ASG	500 pulses are output per motor rotation (phase difference output)
15		BSG	BSG	
16		OUT-COM	OUT-COM	

\*The BUSY output can be changed to the torque limiting (TLM) output only when a torque limit is set.

● Connection Diagrams  
◇ Standard Model

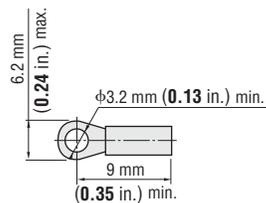


◇ When Using a Control Module



◇ Applicable Crimp Terminals

- Power Supply Terminals
- Round Terminal with Insulation (M3)



● I/O Terminals (CN4)

When using a crimp terminal for connection, use one of the terminals listed below. The applicable crimp terminal varies, depending on the wire size.

When the following terminals are used, the applicable wire size will be between AWG26 and 18 (0.14 to 0.75 mm<sup>2</sup>).

Manufacturer: Phoenix Contact

- Al 0.25-6 Applicable wire size: AWG26 to 24 (0.14 to 0.2 mm<sup>2</sup>)
- Al 0.5-6 Applicable wire size: AWG20 (0.5 mm<sup>2</sup>)
- Al 0.34-6 Applicable wire size: AWG22 (0.3 mm<sup>2</sup>)
- Al 0.75-6 Applicable wire size: AWG18 (0.75 mm<sup>2</sup>)

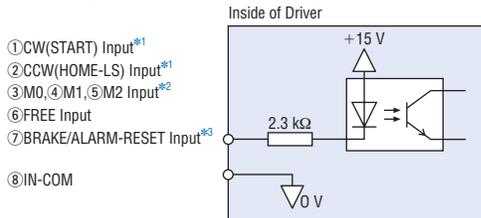
Notes:

- When it is necessary to have a connection more than 0.4 m between motor and driver, the accessory extension cable or flexible extension cable must be used.
- Use one of the following cables for the power supply line:  
 Single-Phase 100-115 VAC, 3-core cable [AWG18 (0.75 mm<sup>2</sup>) or thicker]  
 Single-Phase 200-230 VAC, 3-core cable [AWG18 (0.75 mm<sup>2</sup>) or thicker]  
 Three-Phase 200-230 VAC, 4-core cable [AWG18 (0.75 mm<sup>2</sup>) or thicker]
- When wiring the control I/O signal lines, keep a minimum distance of 300 mm from power lines (AC line, motor line and other largecurrent circuits). Also, do not route the control I/O signal lines in the same duct or piping as that is used for power lines.
- Cables for the power supply lines and control I/O signal lines are not supplied with the product. Provide appropriate cables separately.
- When grounding the driver, connect the ground wire to the protective earth terminal (M4) and connect the other end to a single point using a cable with a size of AWG18 (0.75 mm<sup>2</sup>) or thicker.

## Input/Output Signal Circuits (Common to standard model and using a control module)

### Input Circuit

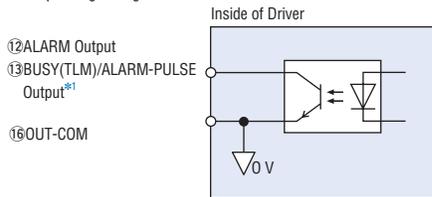
The circled number located in front of each signal represents the number of the corresponding I/O signal terminal.



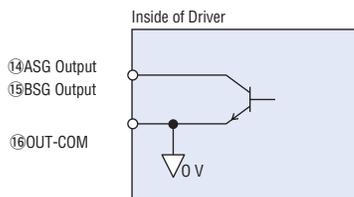
- \*1 The CW and CCW inputs function in the speed control mode on the standard model and when the control module **OPX-1A** is used. The START and HOME-LS inputs function in the position control mode when the control module **OPX-1A** is used.
- \*2 The M0 input is the only operation data selection input available on the standard model. The M0, M1 and M2 inputs function when the control module **OPX-1A** is used.
- \*3 This input functions as the BRAKE input during normal operation, and as the ALARM-RESET input when a driver protection is active.

### Output Circuit

The circled number located in front of each signal represents the number of the corresponding I/O signal terminal.



- \*1 This output functions as the BUSY output during normal operation, and as the ALARM-PULSE output when a driver protection is active. When the control module **OPX-1A** is used, the BUSY output can be changed to the TLM output.



### When a Controller with a Built-In Clamp Diode is Used

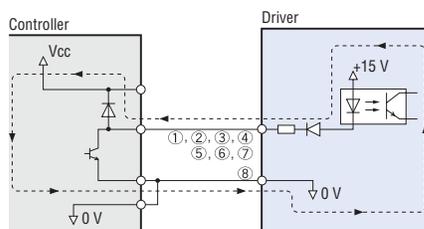
When you want to use the controller with a built-in clamp diode, pay attention to the sequence of turning on or off the power.

Power ON: Controller ON → Driver ON

Power OFF: Driver OFF → Controller OFF

If the driver power is turned on first when connected as shown in the figure to the right, or the controller power is turned off with the driver power turned on, current will be applied, as indicated by the arrows in the diagram. This may cause the motor to run.

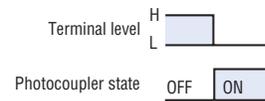
When the power is turned on or off simultaneously, the motor may run temporarily due to differences in power capacity. The controller power must be turned on first, and driver power must be turned off first.



## Description of Input/Output Signals

### Indication of Input/Output Signal "ON" "OFF"

Input (Output) "ON" indicates that the current is sent into the photocoupler (transistor) inside the driver. Input (Output) "OFF" indicates that the current is not sent into the photocoupler (transistor) inside the driver. The input/output remains "OFF" if nothing is connected.



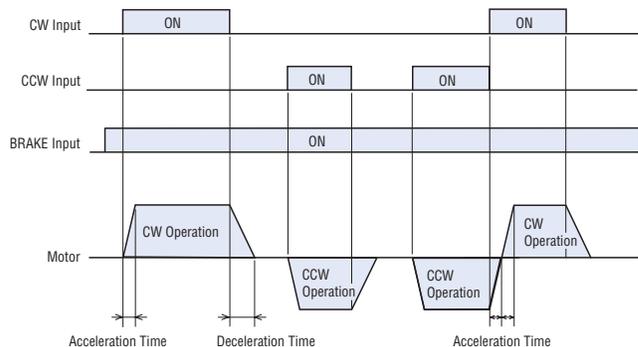
## Input Signals (Standard model)

### Clockwise Rotation (CW) Input

When the BRAKE input is ON, motor operation is enabled. If the CW input is turned ON, acceleration and operation are performed in the clockwise direction at the rate set by the acceleration time potentiometer. If it is turned OFF, the motor decelerates and the operation stops at the rate set by the deceleration time potentiometer.

### Counterclockwise Rotation (CCW) Input

When the BRAKE input is ON, motor operation is enabled. If the CCW input is turned ON, acceleration and operation are performed in the counterclockwise direction at the rate set by the acceleration time potentiometer. If it is turned OFF, the motor decelerates and the operation stops at the rate set by the deceleration time potentiometer.



- If the direction of rotation has been changed during motor operation, acceleration and deceleration will be performed at the rate set by the acceleration time potentiometer.

#### Note:

- The direction of rotation indicates the direction as viewed from the motor's output shaft. With the combination type, the direction of rotation varies in according to the gearhead ratio.

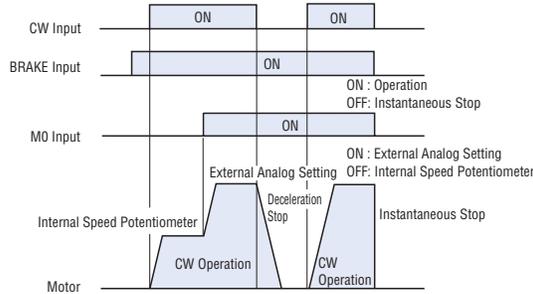
Gearmotor—torque table of combination type → Page 12

Rotation direction of the hollow shaft flat gearhead → Page 14

◆ **Speed Control Data Selection (M0) Input**

With the M0 input, the speed can be controlled by either the internal speed potentiometer or an external analog setting.

M0	Speed Data
OFF	Internal Speed Potentiometer
ON	External Analog Setting



● Switching to a lower speed using the M0 input while the motor is operating will cause the motor to decelerate over the time set by the acceleration time potentiometer, not the time set by the deceleration time potentiometer.

◆ **Motor Control Release (FREE) Input**

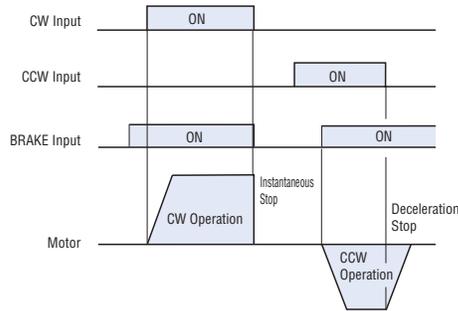
When the photocoupler is turned ON, the motor excitation is cancelled and the electromagnetic brake is released. The FREE input is given the highest priority regardless of the condition of other inputs. The FREE input functions even when a protective function is activated.

◆ **Brake (BRAKE)/Alarm Reset (ALARM-RESET) Input**

This input functions as the BRAKE input during normal operation, and as the ALARM-RESET input when a driver protective function is active.

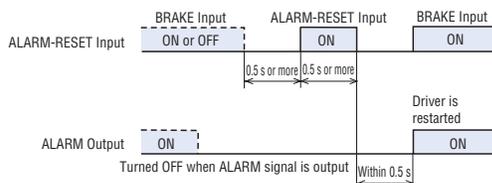
● **During Normal Operation (BRAKE Input)**

When the BRAKE input is turned ON, motor operation is enabled. If it is turned OFF, the motor is stopped instantaneously. To start motor operation, be sure to set the BRAKE input to ON.



● **Upon Activation of a Protective Function (ALARM-RESET)**

The activated protective function is reset and the driver is restarted. This input is used to reset protective functions while power is supplied. Note, however, that if the protective function for overcurrent, EEPROM error or encoder error have been activated, they cannot be reset. If any of these protective functions have been activated, contact the nearest Oriental Motor sales office.



● **Input Signals (When using a control module)**

- ◆ **Clockwise Rotation (CW) Input**
- ◆ **Counterclockwise Rotation (CCW) Input**
- ◆ **Motor Control Release (FREE) Input**
- ◆ **Brake (BRAKE)/Alarm Reset (ALARM-RESET) Input**

same as Input Signals (Standard model)

◆ **Speed Control Data Selection (M0, M1, M2) Input**

The particular combination of the M0, M1 and M2 inputs selects a maximum of eight sets of speed data. (Common to speed control mode and position control mode)

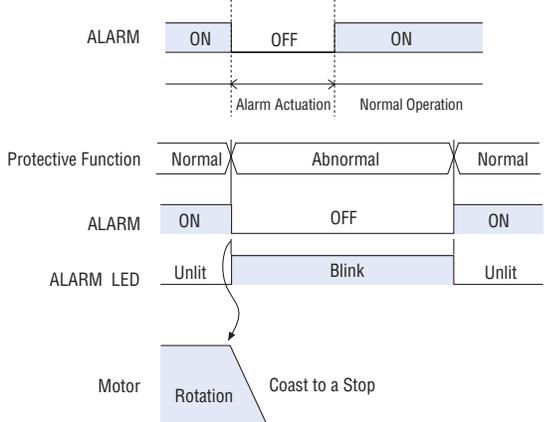
Speed Control Data	Speed Control Data Selection			Method of Speed Setting
	M0	M1	M2	
No.0	OFF	OFF	OFF	Internal speed potentiometer/ Digital setting
No.1	ON	OFF	OFF	External analog/ Digital setting
No.2	OFF	ON	OFF	Digital setting
No.3	ON	ON	OFF	Digital setting
No.4	OFF	OFF	ON	Digital setting
No.5	ON	OFF	ON	Digital setting
No.6	OFF	ON	ON	Digital setting
No.7	ON	ON	ON	Digital setting

## Speed Control

### ● Output Signals (Standard model)

#### ◇ Alarm (ALARM) Output

The photocoupler turns OFF when a driver protective function is active. When overload, overcurrent or other abnormality is detected, the alarm signal is output and the ALARM LED on the driver is blinked and the motor stops naturally. The electromagnetic brake will be activated. To reset the alarm signal output, remove the cause of the problem and ensure the safety of the equipment and load. Then turn on the ALARM-RESET input or reconnect the power. When reconnecting the power, turn off the power and then wait for at least 30 seconds before turning it back on.

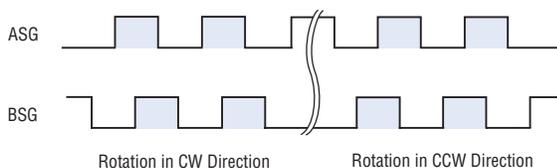


#### Note:

- The alarm output logic is opposite that of other signal outputs (positive logic output).

#### ◇ Phase Difference (ASG/BSG) Output

Feedback pulses are output from the encoder (500 p/r). This output is used when monitoring the motor speed and position by connecting a counter, etc.



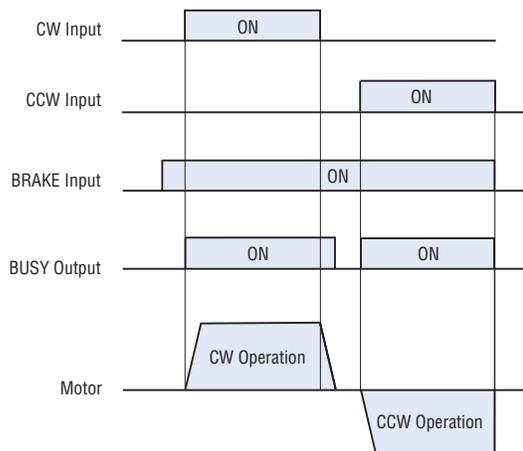
#### ◇ Busy (BUSY) [Torque Limiting (TLM)]/Alarm Pulse (ALARM-PULSE) Output

This output functions as the BUSY output during normal operation, and as the ALARM-PULSE output when a driver protection function is active.

When the torque limiting function is set when a control module or a data setting software is used. This output can be changed to the TLM output, which indicates that the torque limit has been reached.

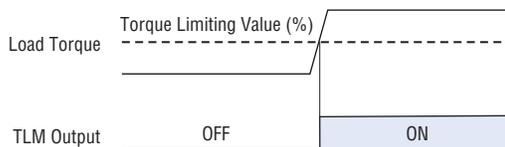
### ● During Normal Operation (Busy Output)

Speed control mode: The photocoupler turns ON during motor operation.  
Position control mode: The photocoupler turns ON during rotation, and turns OFF upon stopping at the set stop position.



### ● When a Torque Limiting Value is Set [This signal can be used as the torque limiting (TLM) output.]

In speed control mode/position control mode: The transistor will turn "ON" when the specified torque limit is reached.

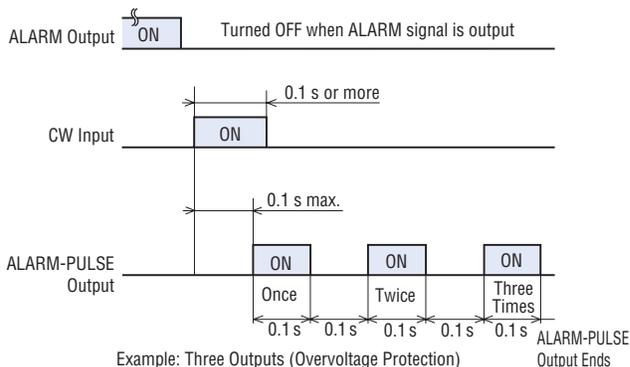


#### Notes:

- An optional control module **OPX-1A** is required to implement torque limiting.
  - Switch the busy (BUSY) output to the torque limiting (TLM) output.
  - The maximum error between the torque limiting and actual generated torque is approximately 20% (starting torque: 100%).
- Torque limiting function when using a control module → Page 40

### ● Upon Activation of a Protection Function (ALARM-PULSE Output)

If a one shot input (0.1 s or more) is given to the rotational direction or START input, a pulse (5 Hz) will be output for the number of times equivalent to the number of times the ALARM LED blinks upon activation of a protective function. It is possible for a controller to determine the type of protective function that has been activated by counting the number of pulses thus output.



● **Output Signals (When using a control module)**

- ◇ Alarm (ALARM) Output
- ◇ Phase Difference (ASG/BSG) Output
- ◇ Busy (BUSY) [Torque Limiting (TLM)]/ALARM-PULSE Output

same as Output Signals (Standard model)

● **Speed Setting Method (Common to standard model and using a control module)**

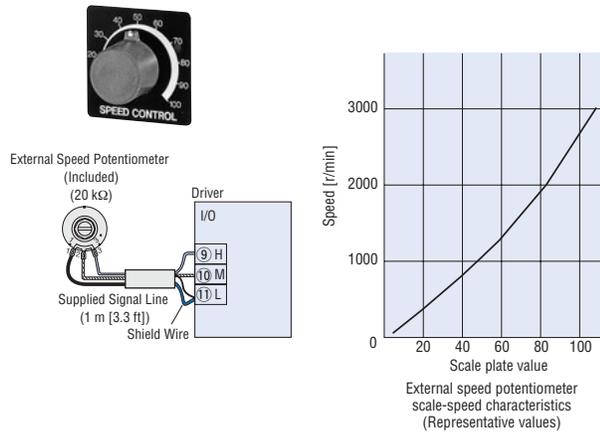
◇ **Using the Internal Speed Potentiometer**

Set a desired speed using the potentiometer provided on the driver's front panel.

To use the internal speed potentiometer, turn "OFF" the photocoupler for M0 terminal.

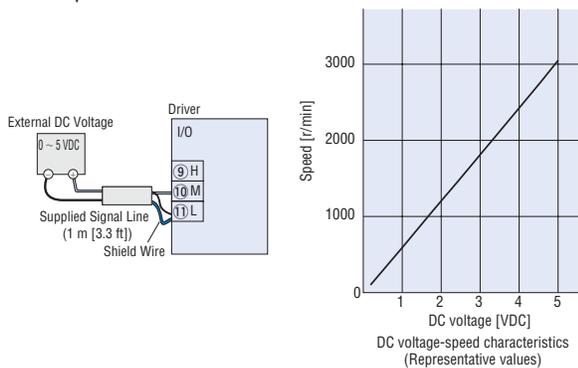
◇ **Using the External Speed Potentiometer (Included)**

When the motor speed is to be set remotely, connect the supplied external speed potentiometer as shown below. When the external speed potentiometer is used, set the M0 terminal to "Photocoupler ON."



◇ **Speed Setting via External DC Voltage**

When the motor speed needs to be set using external DC voltage, connect as follows. In this case, set the M0 terminal to "Photocoupler ON."



**Note:**

- When setting speeds using the external speed potentiometer or via external DC voltage, be sure to use the supplied signal line (φ3.3 mm×1 m [φ0.130 in.×3.3 ft]). Connect the shield wire for the signal line to terminal L. Ensure proper connection on the external speed potentiometer or external DC voltage side so that the shield wire will not contact with another terminal. The input impedance between terminals M and L is approximately 15 kΩ.

◇ **Digital Setting (Only when a control module is used.)**

The particular combination of the M0, M1 and M2 inputs selects a maximum of eight sets of speed data. (Common to speed control mode and position control mode)

Speed Control Data	Speed Control Data Selection			Method of Speed Setting
	M0	M1	M2	
No.0	OFF	OFF	OFF	Internal speed potentiometer/Digital setting
No.1	ON	OFF	OFF	External analog/Digital setting
No.2	OFF	ON	OFF	Digital setting
No.3	ON	ON	OFF	Digital setting
No.4	OFF	OFF	ON	Digital setting
No.5	ON	OFF	ON	Digital setting
No.6	OFF	ON	ON	Digital setting
No.7	ON	ON	ON	Digital setting

### ● Multi-Motor Control (Applicable to both standard model and using a control module)

Two or more motors can be operated at the same speed using a single external speed potentiometer or external DC voltage.

The figure below shows an example of the single-phase power supply specification. For the three-phase power supply specification, change the power supply line to one for a three-phase power supply. The motor and operation control unit are not illustrated in the figure.

#### ◇ Using an External Speed Potentiometer

Connect all drivers using a common power supply line and common speed control line, as shown in the figure, and set a desired speed using the external speed potentiometer VRx. The resistance of the external speed potentiometer is determined as follows:

Resistance when the number of drivers is n:  $VRx=20/n$  (k $\Omega$ ),  $n/4$  (W)

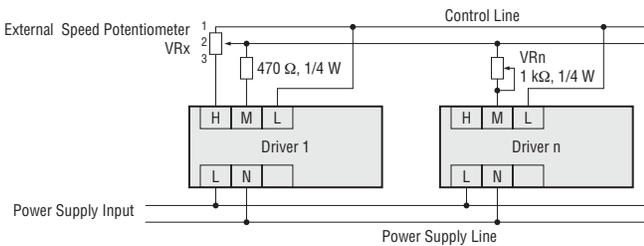
Example: When two drivers are connected

$$VRx=20/2=10 \text{ (k}\Omega\text{)}, 2/4=1/2 \text{ (W)}$$

Based on the calculation, the resistance should be 10 k $\Omega$ , 1/2 W.

To adjust the speed difference among the motors, connect a resistor of 470  $\Omega$ , 1/4 W to the M terminal on the first driver, and connect a variable resistor (VRn) of 1 k $\Omega$ , 1/4 W to the M terminal on each of the remaining drivers.

The number of motors operated in parallel via the external speed potentiometer should be limited to five or less.



#### ◇ Using External DC Voltage

Connect all drivers using a common power supply line and common speed control line, as shown in the figure, and connect a 5-V DC power supply.

The resistance of the external DC power supply is determined as follows:

Power supply capacity when the number of drivers is n:

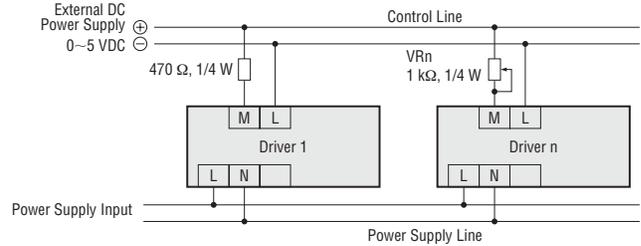
$$I = 1 \times n \text{ (mA)}$$

Example: When two drivers are connected

$$I=1 \times 2=2 \text{ (mA)}$$

Based on the calculation, the resistance should be at least 2 mA.

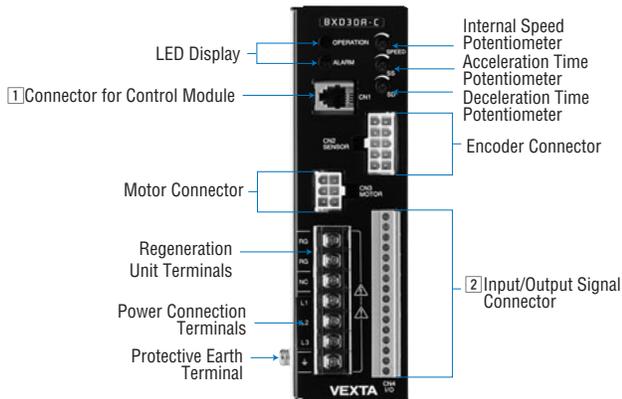
To adjust the speed difference among the motors, connect a resistor of 470  $\Omega$ , 1/4 W to the M terminal on the first driver, and connect a variable resistor (VRn) of 1 k $\Omega$ , 1/4 W to the M terminal on each of the remaining drivers.



## ■ Connection and Operation (Position Control)

When performing a position control motion an optional control module **OPX-1A** is required.

### ● Names and Functions of Driver Parts



### 1 Connector for Control Module

You can extend the position control performance by using an optional control module **OPX-1A**.



### ◇ Main Function

	<b>OPX-1A</b>
Setting Function	<ul style="list-style-type: none"> <li>· Travel Amount (6 Points max.)</li> <li>· Speed (8 Speeds max.)</li> <li>· Torque Limiting Values</li> </ul>
Displaying Function	<ul style="list-style-type: none"> <li>· Positioning Counter (STEP)</li> <li>· Speed (r/min)</li> <li>· Load Factor (%)</li> <li>· Alarm Cord</li> <li>· Alarm History</li> </ul>

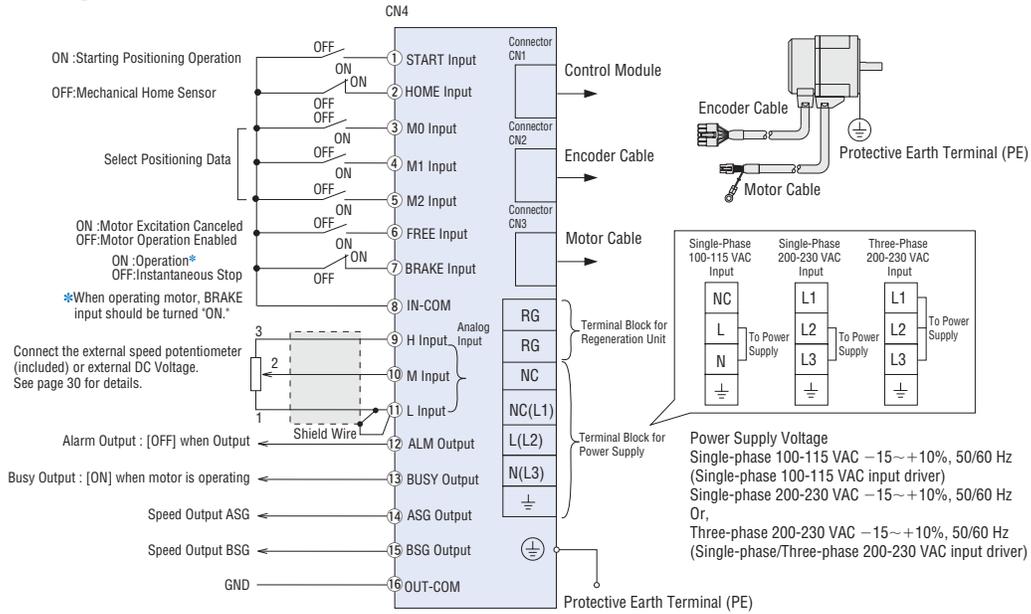
● Dimensions → Page 43

### 2 Input and Output Signals

CN4 Terminal Number	I/O	Signal	Function/Application
1	Input	START	Starting positioning operation (one-shot)
2		HOME-LS	Mechanical home sensor (normally closed)
3		M0	Select positioning data
4		M1	
5		M2	
6		FREE	Motor excitation cancellation, electromagnetic brake release
7		BRAKE/ ALARM-RESET	Normal: Instantaneous stop switching input Protective function has been activated: Alarm reset input
8		IN-COM	Input signal common
9	Analog Input	H	Speed setting via the external speed potentiometer or external DC voltage
10		M	
11		L	
12	Output	ALARM	This signal is output when a protective function has been activated (normally closed).
13		BUSY(TLM)*/ ALARM-PULSE	Normal: Busy output Protective function has been activated: Alarm pulse input
14		ASG	500 pulses are output per motor rotation (phase difference output)
15		BSG	
16		OUT-COM	Output signal common

\*The BUSY output can be changed to the torque limiting (TLM) output only when a torque limit is set.

● Connection Diagram



● Refer to the connection diagrams for applicable crimp terminal and notes on connection. → Pages 31

● Input/Output Signal Circuits

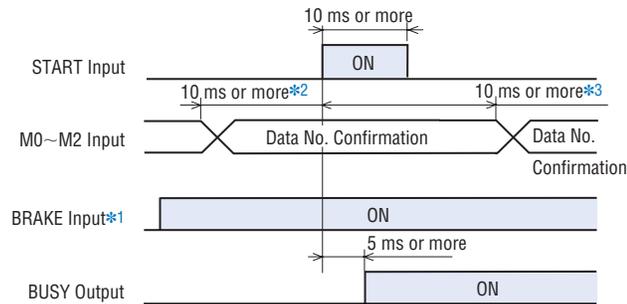
same as Speed Control → Page 32

● Input Signals

◇ Start (START) Input

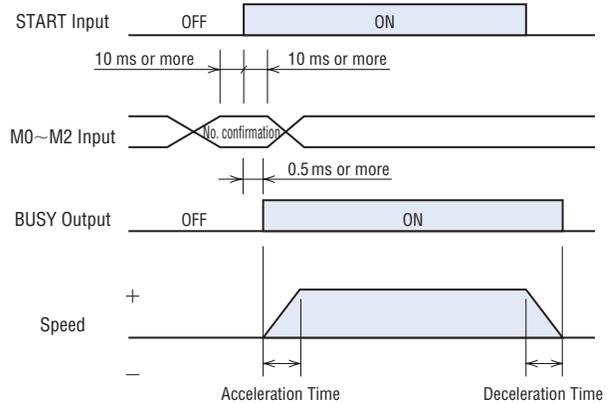
This signal starts the positioning, continuous, return to mechanical home or return to electrical home operations. Operation will start when the START input is turned ON after selecting the operation data via the combination of M0, M1 and M2 inputs.

● Positioning Operation



- \*1 The motor stops when the BRAKE input is turned OFF. Before starting motor operation, be sure to turn the BRAKE input to ON.
- \*2 Input the operation data confirmation signal at least 10 ms before the input of START signal.
- \*3 When confirming the data number for the next travel amount following input of the START signal, input the confirmation signal at least 10 ms after the input of that signal.

● Continuous Operation



- When the digital independent torque limiting function is set, the data numbers will be reflected as necessary even during an index operation.

◇ **Mechanical Home Sensor (HOME-LS) Input**

This signal is used during the return to mechanical home operation.

● **Return to Mechanical Home Operation**

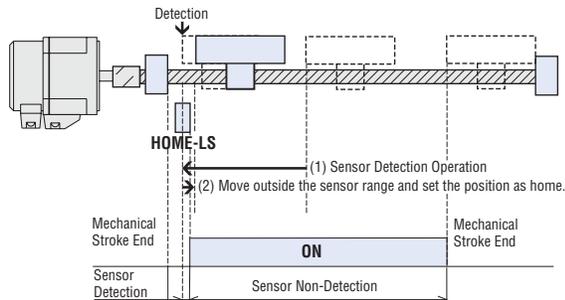
The mechanical home sensor (HOME-LS input) installed on the equipment is detected with the motor operated in the set detection start direction. Upon detection of the home sensor, the motor reverses its direction and stops at a position just outside the range of the home sensor.

Mechanical home detection method: 1-sensor mode (normally closed input)

Starting direction of home detection: May be set as CW or CCW (in uni-direction)

Speed input in data: No. 7

No acceleration/deceleration time is set.



**Note:**

- Install the home sensor (HOME-LS) before the stroke-end sensor on the detection starting side.

◇ **Operation Data Selection (M0, M1, M2) Input**

The particular combination of the M0, M1 and M2 inputs selects a maximum of six sets of positioning data as well as the return to home operation.

Operation Data	Operation Data Selection			Position Control Mode	Method of Speed Setting
	M0	M1	M2		
No.0	OFF	OFF	OFF	Positioning operation 0/ Continuous operation 0	Internal speed potentiometer/ Digital setting
No.1	ON	OFF	OFF	Positioning operation 1/ Continuous operation 1	External analog/ Digital setting
No.2	OFF	ON	OFF	Positioning operation 2	Digital setting
No.3	ON	ON	OFF	Positioning operation 3	Digital setting
No.4	OFF	OFF	ON	Positioning operation 4	Digital setting
No.5	ON	OFF	ON	Positioning operation 5	Digital setting
No.6	OFF	ON	ON	Return to electrical home operation	Digital setting
No.7	ON	ON	ON	Return to mechanical home operation	Digital setting

- Speed can be set for each data.

Speed data is set in the same manner as in the speed control mode.

- No. 0 and No. 1 allow the switching of positioning operation and continuous operation.

◇ **Motor Control Release (FREE) Input**

same as Input Signals (Standard model) → Page 33

◇ **Brake (BRAKE)/Alarm Reset (ALARM-RESET) Input**

same as Input Signals (Standard model) → Page 33

● **Output Signals**

◇ **Alarm (ALARM) Output**

◇ **Phase Difference (ASG/BSG) Output**

◇ **Busy (BUSY) [Torque Limiting (TLM)]/Alarm Pulse (ALARM-PULSE) Output**

same as Output Signals (Standard model) → Page 34

## Torque Limiting Function When Using a Control Module

The **BX** Series permits the setting of a motor output torque limit in both the speed control mode of extended system and position control mode. The torque limiting is set relative to the starting torque being 100%. When torque needs to be limited continuously during push-motion operation or gravitational operation, set the limit to rated torque or less.

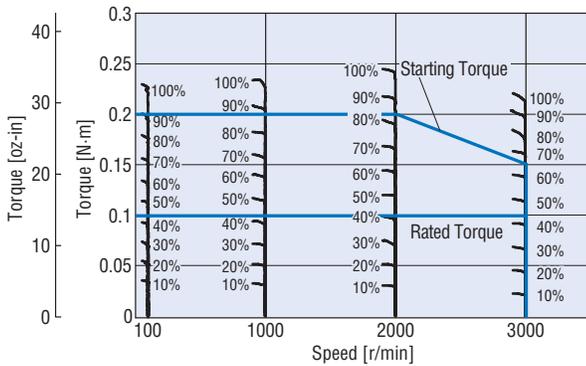
Calculate the output torque for the combination type based on the applicable speed and torque, using the "Speed–Torque Limit Characteristics" graphs and formulas shown below.

Gearhead output shaft speed  $N_G = \text{Motor speed} \times 1 / \text{Gearhead ratio}$

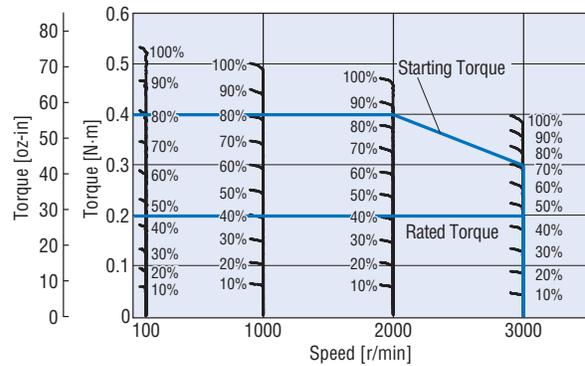
Gearhead output shaft torque  $T_G = \text{Motor torque} \times \text{Gearhead ratio} \times 0.9$  (coefficient)

## Speed–Torque Limit Characteristics (Reference values)

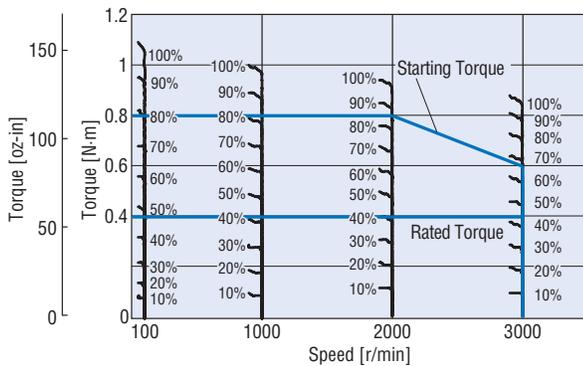
**BX230-A/BX230-S/BX230-FR**  
**BX230M-A/BX230M-S/BX230M-FR**



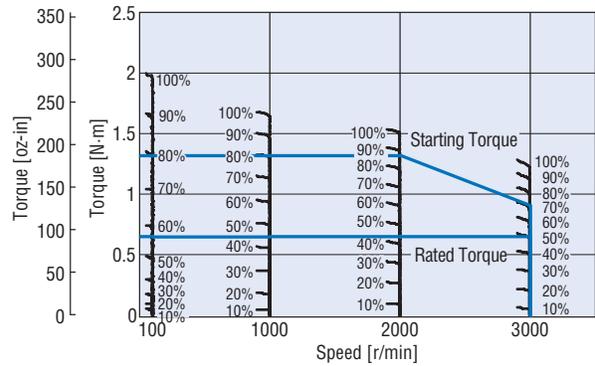
**BX460-A/BX460-S/BX460-FR**  
**BX460M-A/BX460M-S/BX460M-FR**



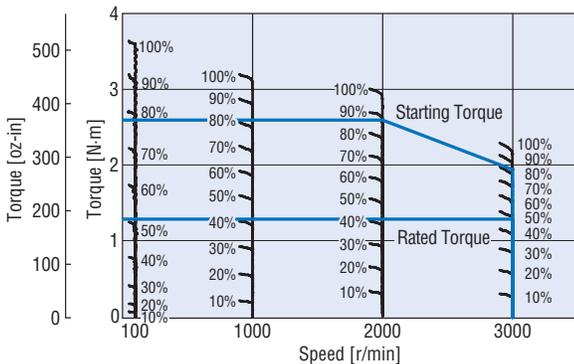
**BX5120-A/BX5120-S/BX5120-FR**  
**BX5120M-A/BX5120M-S/BX5120M-FR**



**BX6200-A/BX6200-S/BX6200-FR**  
**BX6200M-A/BX6200M-S/BX6200M-FR**



**BX6400S-A/BX6400S-S**  
**BX6400SM-A/BX6400SM-S**



**Notes:**

● An error of up to approximately 20% (starting torque: 100 percent) may occur between the set value and generated torque due to the speed setting, power supply voltage and distance of motor cable extension.

● Repeatability under the same condition is approximately 10%. We recommend that the torque limit be set to approximately 20% or more.

● Enter the power supply voltage (**A** or **C**) in the box (■) within the model name. Enter the gear ratio in the box (□) within the model name.

## Installation of the Hollow Shaft Flat Gearhead

### Installing the Load Shaft

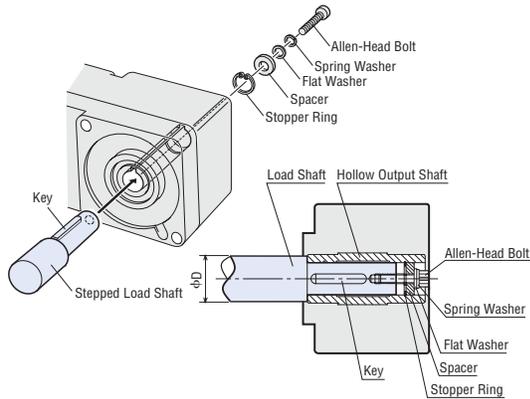
- Install the load shaft to the hollow output shaft by aligning the center of the hollow shaft with that of the load shaft.
- The hollow output shaft has a key slot. Machine a matching key slot on the load shaft side and use the supplied key to affix the two shafts across the slots.
- A recommended tolerance of the load shaft is h7.
- If the motor will receive large impacts due to frequent instantaneous stops or carry a large overhung load, use a stepped load shaft.

#### Notes:

- When installing the load shaft to the hollow output shaft, be careful not to damage the hollow output shaft or bearing.
- To prevent seizure, apply a coat of molybdenum disulfide grease on the exterior surface of the load shaft and interior surface of the hollow output shaft.
- Do not attempt to modify or machine the hollow output shaft. Doing so may damage the bearing and cause the hollow shaft flat gearhead to break.

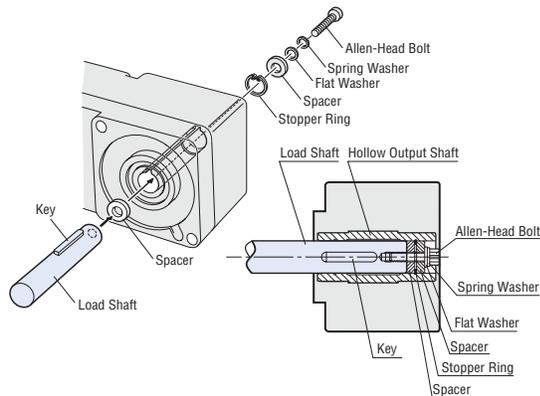
### Stepped Load Shaft

Install an allen-head bolt over a stopper ring, spacer, flat washer and spring washer, and tighten the bolt to affix the load shaft.



### Straight Load Shaft

Install an allen-head bolt over a stopper ring, spacer, flat washer and spring washer, with a spacer also inserted underneath the load shaft, and tighten the bolt to affix the load shaft.



## Recommended Load Shaft Installation Dimensions

Unit = mm (in.)

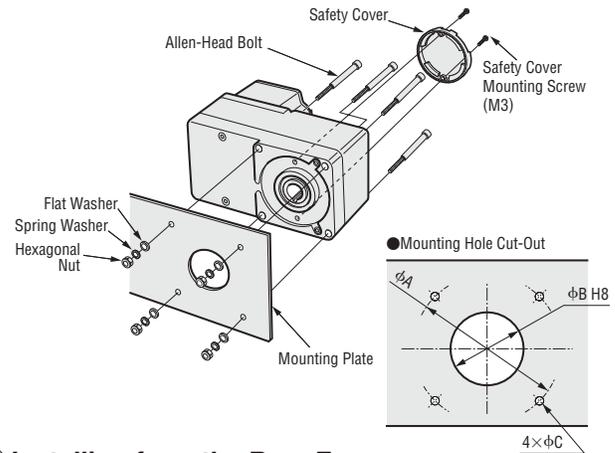
Model	BX230	BX460	BX5120
Inner Diameter of Hollow Shaft (H8)	$\phi 12^{+0.027}$ ( $\phi 0.4724^{+0.0011}$ )	$\phi 15^{+0.027}$ ( $\phi 0.5906^{+0.0011}$ )	$\phi 20^{+0.033}$ ( $\phi 0.7874^{+0.0013}$ )
Recommended Tolerance of Load Shaft (h7)	$\phi 12^{-0.018}$ ( $\phi 0.4724^{-0.0007}$ )	$\phi 15^{-0.018}$ ( $\phi 0.5906^{-0.0007}$ )	$\phi 20^{-0.021}$ ( $\phi 0.7874^{-0.0008}$ )
Nominal Diameter of Stopper Ring	$\phi 12$ ( $\phi 0.47$ ), C-shaped	$\phi 15$ ( $\phi 0.59$ ), C-shaped	$\phi 20$ ( $\phi 0.79$ ), C-shaped
Applicable Bolt	M4	M5	M6
Spacer Thickness*	3 (0.12)	4 (0.16)	5 (0.20)
Outer Diameter of Step Part $\phi D$	20 (0.79)	25 (0.98)	30 (1.18)

\*Determine the spacer thickness in conformance with the table. If the spacer is thicker than the specified dimension, the bolt will project from the surface and interfere with the safety cover.

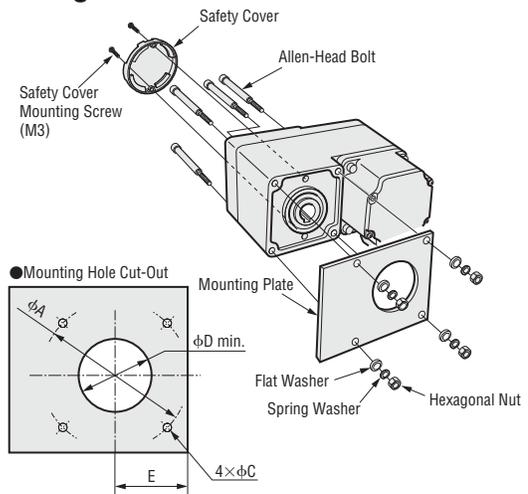
### Installing the Hollow Shaft

#### Installing from the Front Face

The output shaft boss (h8) can be used to align the shaft.



#### Installing from the Rear Face



### Mounting Hole Dimensions

Unit = mm (in.)

Model	BX230	BX460	BX5120
Nominal Bolt Size	M5	M6	M8
$\phi A$	70 (2.76)	94 (3.70)	104 (4.09)
$\phi B H8$	$34^{+0.039}$ ( $1.34^{+0.0015}$ )	$38^{+0.039}$ ( $1.50^{+0.0015}$ )	$50^{+0.039}$ ( $1.97^{+0.0015}$ )
$\phi C$	5.5 (0.217)	6.5 (0.256)	8.5 (0.335)
$\phi D$	25 (0.98)	30 (1.18)	35 (1.38)
E	29 (1.14)	39 (1.54)	44 (1.73)

#### Note:

- When installing the hollow shaft flat gearhead from the rear face, provide dimension "E" to prevent the mounting plate from contacting the motor.

## List of Motor and Driver Combinations

### Standard

#### ◇ Combination Type – Parallel Shaft Gearhead

The combination type comes with the motor and the parallel shaft gearhead pre-assembled.

Output Power	Model	Motor Model	Gearhead Model	Driver Model
30 W	<b>BX230A-□S</b>	BXM230-GFS	GFS2G□	BXD30A-A
	<b>BX230C-□S</b>			BXD30A-C
60 W	<b>BX460A-□S</b>	BXM460-GFS	GFS4G□	BXD60A-A
	<b>BX460C-□S</b>			BXD60A-C
120 W	<b>BX5120A-□S</b>	BXM5120-GFS	GFS5G□	BXD120A-A
	<b>BX5120C-□S</b>			BXD120A-C
200 W	<b>BX6200A-□S</b>	BXM6200-GFS	GFS6G□	BXD200A-A
	<b>BX6200C-□S</b>			BXD200A-C
400 W	<b>BX6400S-□S</b>	BXM6400-GFS	GFS6G□	BXD400A-S

● Enter the gear ratio in the box (□) within the model name.

#### ◇ Combination Type – Hollow Shaft Flat Gearhead

The combination type comes with the motor and hollow shaft flat gearhead pre-assembled.

Output Power	Model	Motor Model	Gearhead Model	Driver Model
30 W	<b>BX230A-□FR</b>	BXM230-GFS	GFS2G□FR	BXD30A-A
	<b>BX230C-□FR</b>			BXD30A-C
60 W	<b>BX460A-□FR</b>	BXM460-GFS	GFS4G□FR	BXD60A-A
	<b>BX460C-□FR</b>			BXD60A-C
120 W	<b>BX5120A-□FR</b>	BXM5120-GFS	GFS5G□FR	BXD120A-A
	<b>BX5120C-□FR</b>			BXD120A-C

● Enter the gear ratio in the box (□) within the model name.

### With Electromagnetic Brake

#### ◇ Combination Type – Parallel Shaft Gearhead

The combination type comes with the motor and the parallel shaft gearhead pre-assembled.

Output Power	Model	Motor Model	Gearhead Model	Driver Model
30 W	<b>BX230AM-□S</b>	BXM230M-GFS	GFS2G□	BXD30A-A
	<b>BX230CM-□S</b>			BXD30A-C
60 W	<b>BX460AM-□S</b>	BXM460M-GFS	GFS4G□	BXD60A-A
	<b>BX460CM-□S</b>			BXD60A-C
120 W	<b>BX5120AM-□S</b>	BXM5120M-GFS	GFS5G□	BXD120A-A
	<b>BX5120CM-□S</b>			BXD120A-C
200 W	<b>BX6200AM-□S</b>	BXM6200M-GFS	GFS6G□	BXD200A-A
	<b>BX6200CM-□S</b>			BXD200A-C
400 W	<b>BX6400SM-□S</b>	BXM6400M-GFS	GFS6G□	BXD400A-S

● Enter the gear ratio in the box (□) within the model name.

#### ◇ Combination Type – Hollow Shaft Flat Gearhead

The combination type comes with the motor and hollow shaft flat gearhead pre-assembled.

Output Power	Model	Motor Model	Gearhead Model	Driver Model
30 W	<b>BX230AM-□FR</b>	BXM230M-GFS	GFS2G□FR	BXD30A-A
	<b>BX230CM-□FR</b>			BXD30A-C
60 W	<b>BX460AM-□FR</b>	BXM460M-GFS	GFS4G□FR	BXD60A-A
	<b>BX460CM-□FR</b>			BXD60A-C
120 W	<b>BX5120AM-□FR</b>	BXM5120M-GFS	GFS5G□FR	BXD120A-A
	<b>BX5120CM-□FR</b>			BXD120A-C

● Enter the gear ratio in the box (□) within the model name.

#### ◇ Round Shaft Type

Output Power	Model	Motor Model	Driver Model
30 W	<b>BX230A-A</b>	BXM230-A2	BXD30A-A
	<b>BX230C-A</b>		BXD30A-C
60 W	<b>BX460A-A</b>	BXM460-A2	BXD60A-A
	<b>BX460C-A</b>		BXD60A-C
120 W	<b>BX5120A-A</b>	BXM5120-A2	BXD120A-A
	<b>BX5120C-A</b>		BXD120A-C
200 W	<b>BX6200A-A</b>	BXM6200-A	BXD200A-A
	<b>BX6200C-A</b>		BXD200A-C
400 W	<b>BX6400S-A</b>	BXM6400-A	BXD400A-S

#### ◇ Pinion Shaft Type

Output Power	Model	Motor Model	Driver Model
30 W	<b>BX230A-GFS</b>	BXM230-GFS	BXD30A-A
	<b>BX230C-GFS</b>		BXD30A-C
60 W	<b>BX460A-GFS</b>	BXM460-GFS	BXD60A-A
	<b>BX460C-GFS</b>		BXD60A-C
120 W	<b>BX5120A-GFS</b>	BXM5120-GFS	BXD120A-A
	<b>BX5120C-GFS</b>		BXD120A-C
200 W	<b>BX6200A-GFS</b>	BXM6200-GFS	BXD200A-A
	<b>BX6200C-GFS</b>		BXD200A-C
400 W	<b>BX6400S-GFS</b>	BXM6400-GFS	BXD400A-S

#### ◇ Round Shaft Type

Output Power	Model	Motor Model	Driver Model
30 W	<b>BX230AM-A</b>	BXM230M-A2	BXD30A-A
	<b>BX230CM-A</b>		BXD30A-C
60 W	<b>BX460AM-A</b>	BXM460M-A2	BXD60A-A
	<b>BX460CM-A</b>		BXD60A-C
120 W	<b>BX5120AM-A</b>	BXM5120M-A2	BXD120A-A
	<b>BX5120CM-A</b>		BXD120A-C
200 W	<b>BX6200AM-A</b>	BXM6200M-A	BXD200A-A
	<b>BX6200CM-A</b>		BXD200A-C
400 W	<b>BX6400SM-A</b>	BXM6400M-A	BXD400A-S

#### ◇ Pinion Shaft Type

Output Power	Model	Motor Model	Driver Model
30 W	<b>BX230AM-GFS</b>	BXM230M-GFS	BXD30A-A
	<b>BX230CM-GFS</b>		BXD30A-C
60 W	<b>BX460AM-GFS</b>	BXM460M-GFS	BXD60A-A
	<b>BX460CM-GFS</b>		BXD60A-C
120 W	<b>BX5120AM-GFS</b>	BXM5120M-GFS	BXD120A-A
	<b>BX5120CM-GFS</b>		BXD120A-C
200 W	<b>BX6200AM-GFS</b>	BXM6200M-GFS	BXD200A-A
	<b>BX6200CM-GFS</b>		BXD200A-C
400 W	<b>BX6400SM-GFS</b>	BXM6400M-GFS	BXD400A-S

## ■ Accessories (Sold separately)

### ● Control Module (RoHS)

This data setting unit lets you monitor various data effortlessly.

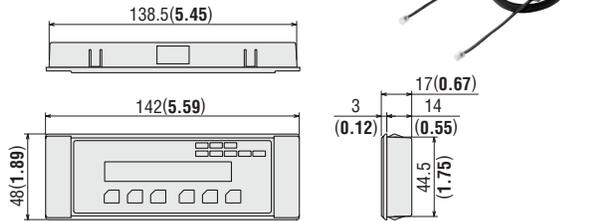
#### ◇ Model: OPX-1A

With dedicated cable (2 m [6.6 ft])

#### ◇ Dimensions Unit = mm (in.)

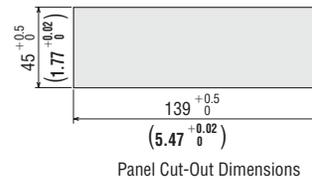
Mass: 0.07 kg (0.154 lb)

CAD C142



### ● Panel Cut-Out for Control Module

(Thickness of the mounting plate: 1~3 mm [0.04~0.12 in.])



Panel Cut-Out Dimensions

### ● Extension Cable, Flexible Extension Cable (RoHS)

These cables are used to extend the wiring distance between the motor and driver. Use of flexible extension cables is recommended in applications where the cable will be flexed repeatedly. All extension cables and flexible extension cables come as a set of motor and encoder cables.

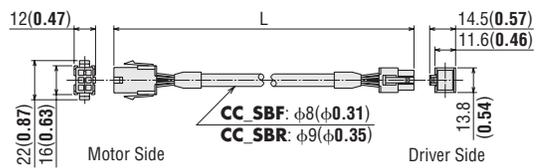
#### ◇ Extension Cable

Model	Length (L)
<b>CC01SBF</b>	1 m (3.3 ft)
<b>CC02SBF</b>	2 m (6.6 ft)
<b>CC03SBF</b>	3 m (9.8 ft)
<b>CC05SBF</b>	5 m (16.4 ft)
<b>CC07SBF</b>	7 m (23.0 ft)
<b>CC10SBF</b>	10 m (32.8 ft)
<b>CC15SBF</b>	15 m (49.2 ft)
<b>CC20SBF</b>	20 m (65.6 ft)

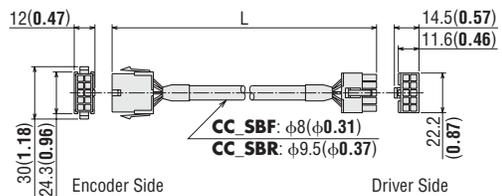
#### ◇ Flexible Extension Cable

Model	Length (L)
<b>CC01SBR</b>	1 m (3.3 ft)
<b>CC02SBR</b>	2 m (6.6 ft)
<b>CC03SBR</b>	3 m (9.8 ft)
<b>CC05SBR</b>	5 m (16.4 ft)
<b>CC07SBR</b>	7 m (23.0 ft)
<b>CC10SBR</b>	10 m (32.8 ft)
<b>CC15SBR</b>	15 m (49.2 ft)
<b>CC20SBR</b>	20 m (65.6 ft)

#### ◇ For Motor



#### ◇ For Encoder



## ● Regeneration Unit (RoHS)

Use this unit if your application involves vertical movement or generation of a large inertial load using electromagnetic brake type.

◇ Model: **EPRC-400P**  
**RGB100**



## ◇ Specifications

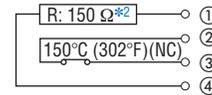
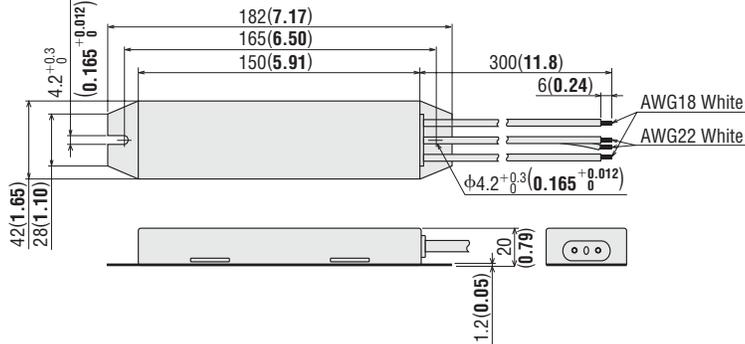
Model	EPRC-400P	RGB100
Applicable Product	<b>BX230, BX460, BX5120</b>	<b>BX6200, BX6400</b>
Continuous Regeneration Capability*1	100 W	100 W
Resistance Value	400 Ω	150 Ω
Thermostat Operating Temperature	Operation: 150±7°C (302±12.6°F) Return: 145±12°C (293±21.6°F) (Normally closed)	Operation: 150±7°C (302±12.6°F) Return: 145±12°C (293±21.6°F) (Normally closed)
Thermostat Electrical Rating	120 VAC 4 A 30 VDC 4 A (Minimum current 5 mA)	120 VAC 4 A 30 VDC 4 A (Minimum current 5 mA)

\*1 Install the regeneration unit in the place which has the same heat radiation capability as heat radiation plate (Material: Aluminum 350 mm×350 mm [13.8 in.×13.8 in.], 3 mm [0.12 in.] thick).

## ◇ Dimensions Unit = mm (in.)

Mass: 250 g (8.8 oz)

CAD C194



①-④ : AWG18×2  
For regeneration current  
Connect to RG Terminal  
②-③ : AWG22×2  
Thermostat for signal

\*2 EPRC-400P = 400 Ω

## ● Motor/Gearhead Mounting Brackets (RoHS)

Four kinds of mounting brackets for motors and gearheads are available. They are high-strength type, which can be used with high power motors/gearheads. These brackets come with tapped holes. To mount the motor and gearhead, simply fasten with the screws provided to the gearhead. To mount the motor alone, mounting screws must be provided separately.



◇ For Motor Frame Size: □60 mm (□2.36 in.)

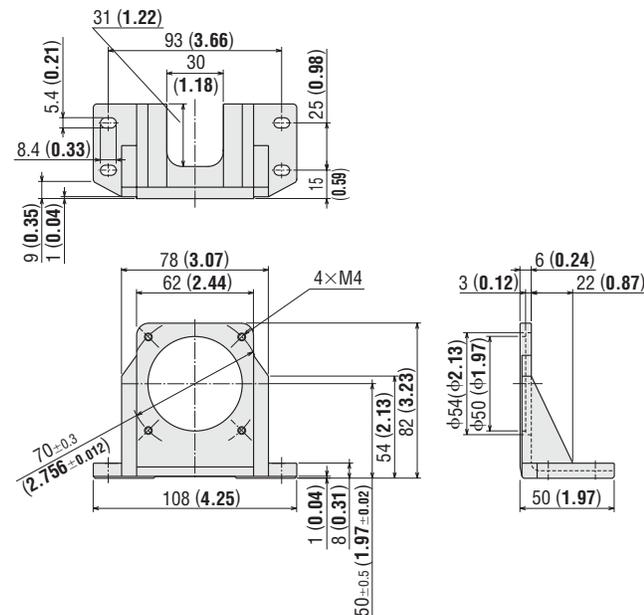
● Model: **SOL2M4**

Mass: 135 g (4.8 oz)

Material: Aluminum alloy

CAD A321

● Dimensions Unit = mm (in.)



◇ For Motor Frame Size: □80 mm (□3.15 in.)

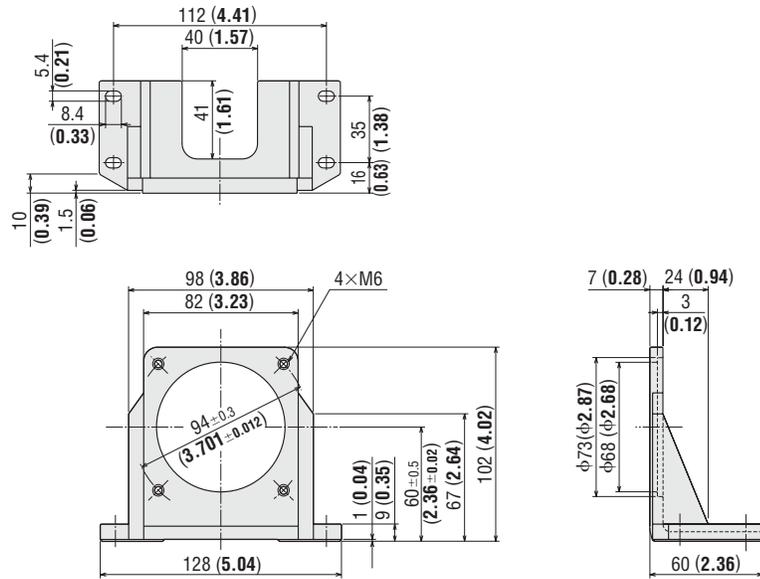
● Model: **SOL4M6**

Mass: 210 g (7.4 oz)

Material: Aluminum alloy

CAD A237

● Dimensions Unit = mm (in.)



◇ For Motor Frame Size: □90 mm (□3.54 in.)

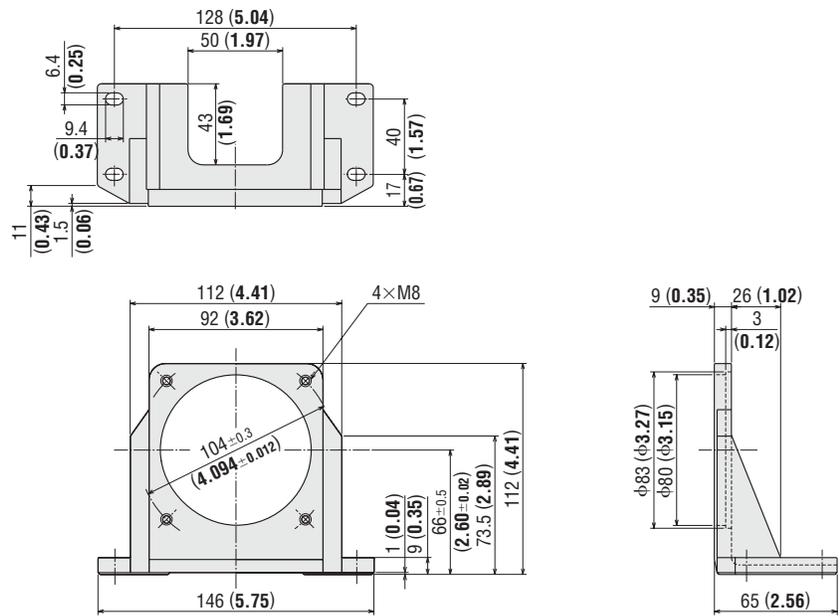
● Model: **SOL5M8**

Mass: 270 g (9.5 oz)

Material: Aluminum alloy

CAD A239

● Dimensions Unit = mm (in.)



◇ For Motor Frame Size: □104 mm (□4.09 in.)

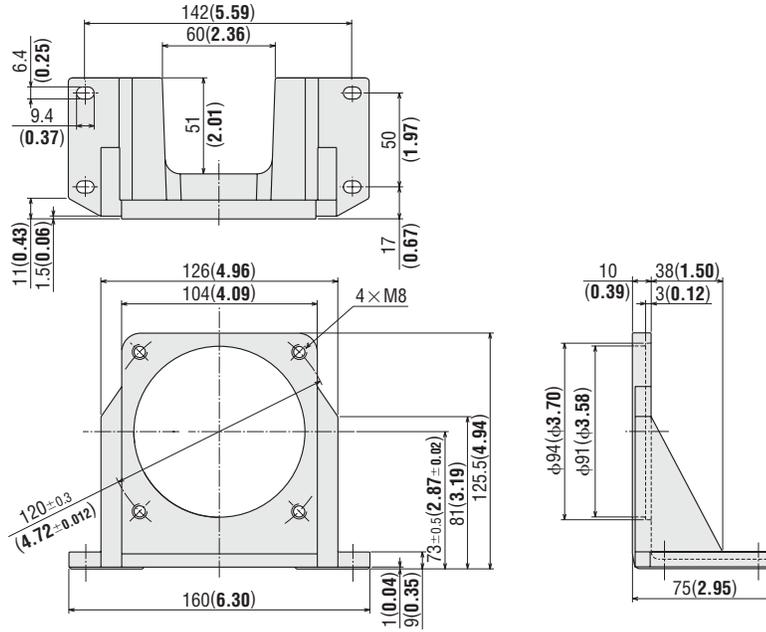
● Model: **SOL6M8**

Mass: 380 g (13.4 oz)  
 Material: Aluminum alloy  
 CAD A240

● Applicable Products

**BX** Series Round shaft type

● Dimensions Unit = mm (in.)



● DIN Rail Mounting Plate (RoHS)

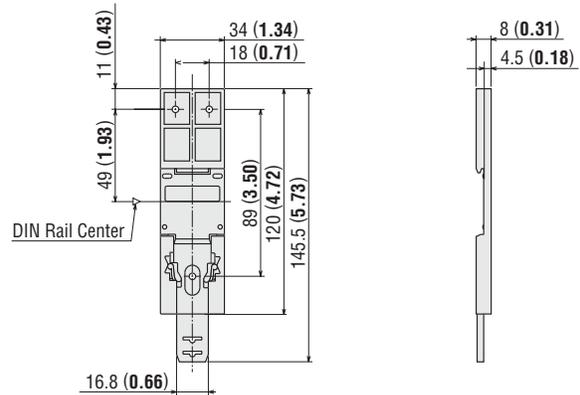
This installation plate is convenient for installing the driver of **BX** Series on DIN rails with ease.

◇ Model: **PADP01**



◇ Dimensions Unit = mm (in.)

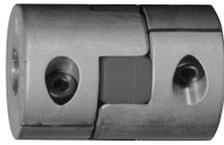
Mass: 20 g (0.71 oz)  
 Screws (Included)  
 M3 Length 8 mm (0.31 in.) ... 3 pieces



## ● Flexible Couplings (RoHS)

These products are the clamp type couplings to connect between the shaft of motor/gearhead and the shaft of the equipment to be connected. Couplings come with shaft holes and have standardized combinations for different diameter shaft holes.

Always use **MCL** couplings for the combination types and **MCS** couplings for the round shaft types.



### ◇ MCL Couplings (RoHS)

Applicable Product	Shaft Diameter mm (in.)	Type of Load	Coupling Type
<b>BX230</b> ■-□	φ10 (φ0.3937)	Regular Load	<b>MCL30</b>
		Shock Load	
<b>BX460</b> ■-□	φ15 (φ0.5906)	Regular Load	<b>MCL40</b>
		Shock Load	<b>MCL55</b>
<b>BX5120</b> ■-□	φ18 (φ0.7087)	Regular Load	<b>MCL55</b>
		Shock Load	
<b>BX6200</b> ■-□	φ22 (φ0.8661)	Regular Load	<b>MCL65</b>
<b>BX6400</b> ■-□		Shock Load	

### ◇ MCS Couplings (RoHS)

Applicable Product	Shaft Diameter mm (in.)	Coupling Type
<b>BX230</b> ■-A	φ8 (φ0.3150)	<b>MCS20</b>
<b>BX460</b> ■-A	φ10 (φ0.3937)	<b>MCS20</b>
<b>BX5120</b> ■-A	φ12 (φ0.4724)	<b>MCS30</b>
<b>BX6200</b> ■-A	φ14 (φ0.5512)	<b>MCS30</b>
<b>BX6400</b> ■-A		

● Enter the power supply voltage **A**, **C** or **S** (**AM**, **CM**, or **SM**: Electromagnetic brake) in the box (■) within the applicable product.

Enter the gear ratio in the box (□) within the applicable product.

● Choose from a range of flexible couplings with various shaft hole diameters.

This product is manufactured at a plant certified with the international standards **ISO 9001** (for quality assurance) and **ISO 14001** (for systems of environmental management).

Specifications are subject to change without notice.  
This catalog was published in October, 2007.

---

# ORIENTAL MOTOR U.S.A. CORP.

## Western Sales and Customer Service Center

Tel: (310) 715-3301 Fax: (310) 225-2594

Los Angeles

Tel: (310) 715-3301

San Jose

Tel: (408) 392-9735

## Midwest Sales and Customer Service Center

Tel: (847) 285-5100 Fax: (847) 843-4121

Chicago

Tel: (847) 285-5100

Dallas

Tel: (214) 432-3386

Toronto

Tel: (905) 502-5333

## Eastern Sales and Customer Service Center

Tel: (781) 848-2426 Fax: (781) 848-2617

Boston

Tel: (781) 848-2426

Charlotte

Tel: (704) 696-1036

New York

Tel: (973) 359-1100

### Technical Support

Tel: (800) 468-3982 / 8:30 a.m. to 5:00 p.m., P.S.T. (M-F)  
/ 7:30 a.m. to 5:00 p.m., C.S.T. (M-F)

E-mail: [techsupport@orientalmotor.com](mailto:techsupport@orientalmotor.com)

### Obtain Specifications, Online Training and Purchase Products at:

[www.orientalmotor.com](http://www.orientalmotor.com)

