

Before Using a Standard AC Motor

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■ Installation Conditions

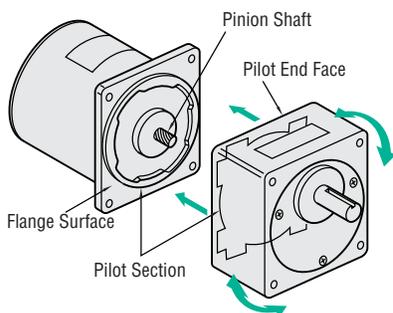
Install the motor, gearhead, control circuit (speed control pack, control unit and brake pack) in a location that meets the following conditions. Using them in a location that does not satisfy these conditions could damage the products.

- Indoors (this product is designed and manufactured to be installed within another device.)
- Ambient temperature
14°F~104°F [-10°C~+40°C (nonfreezing)], [for some motors, 14°F~122°F (-10°C~+50°C) or 32°F~122°F (0°C~+50°C)]
For control circuits, the ambient temperature range varies with each product. Refer to the pages where each product is listed.
- Ambient humidity 85% max. (avoid condensation)
- Not exposed to explosive, flammable or corrosive gas
- Not exposed to direct sunlight
- Not exposed to dust
- Not exposed to water or oil
- Place where heat can escape easily
- Not exposed to continuous vibration or excessive impact
- Installation Category II , Pollution Degree 2, Class I Equipment
* Only for the products that are certified by EN/IEC standards and conform to EN/IEC standards.
Installation Category III , Pollution Degree 3 for some products

■ Connecting Gearheads to Motors

● Method of Connecting Gearheads to Motors

As the figure below shows, a gearhead is combined with a motor using the pilots on each unit as guides. The gearhead should be moved gently from side to side without forcing the pinion shaft against the plate on the gearhead (metal plate) or against the gear itself.



Note:

- Attempting to put a motor and gearhead together by force can result in damage to the gearheads.

● Mounting Motor/Gearhead to Machinery

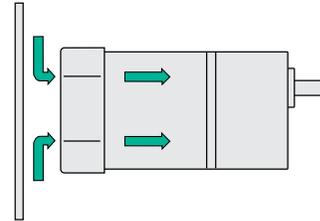
The motor flange is provided with a pilot section that serves as a guide not only when assembling the motor and gearhead as shown in the previous figure, but also when installing the motor/gearhead unit onto the machinery.



In this example, the motor/gearhead unit is mounted to a dedicated mounting brackets.

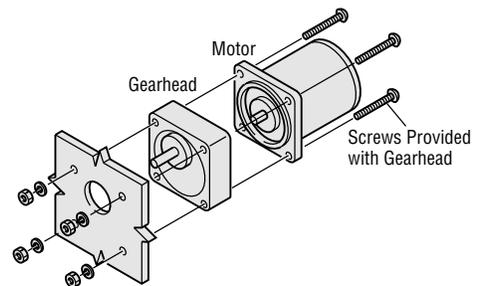
Refer to page A-204 for details.

Dedicated Mounting Bracket When mounting motors that have a built-in cooling fan at the rear, leave a space of 0.4 inch (10 mm) or more behind the fan cover or make ventilation holes so as not to block the cooling intake.



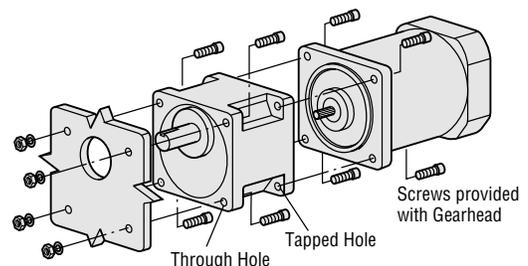
◆ For GN Type and 5GU□KA Type Gearheads

Use the screws provided with the gearhead and secure all the parts so that there are no gaps between the motor flange face and the pilot end face of the gearhead.



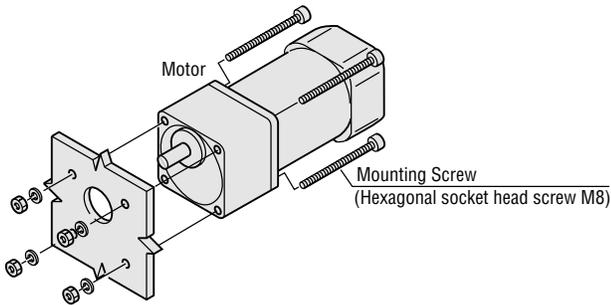
◆ For 5GU□KHA Type Gearheads

Before mounting to machinery, assemble the motor and the gearhead using the screws provided with the gearhead. Screws for mounting to machinery are not provided. M8 screws must be provided separately.



◆ For FPW Series, V Series, BH Series and BHF Series Parallel Shaft Type Gearheads

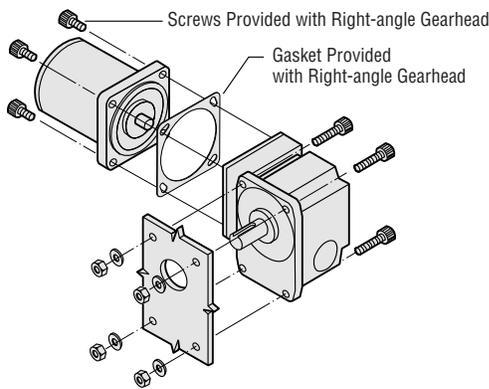
The V Series, BH Series and BHF Series parallel shaft gearmotors come with the motor and its dedicated gearhead pre-assembled. Mount to machinery using the “mounting screws” provided. FPW Series should also be mounted using the stainless steel mounting screws provided.



◆ For Right-Angle Gearheads

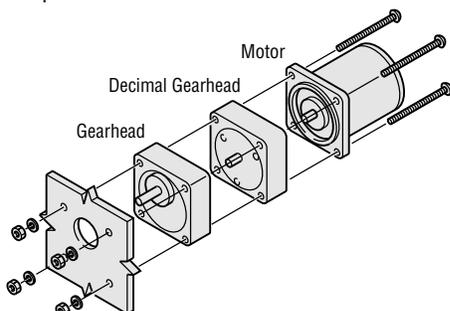
Attach the provided gasket between the motor flange face and the pilot end face. Do not bent or scratch the gasket. Before mounting the right-angle gearhead to machinery, assemble the motor and the gearhead using the screws provided.

(BH Series and BHF Series right-angle come pre-assembled with the motor and its dedicated gearhead.) Screws for mounting to machinery are not provided. M6 screws (for GN type) or M8 (for GU type, BH Series and BHF Series right-angle) must be provided separately.



◆ For Mounting a Decimal Gearhead to GN Type and 5GU□KA Type Gearheads

Use the screws provided with the decimal gearhead and secure all the parts so that there are no gaps between the motor flange face and the pilot end face of the decimal gearhead, or between the decimal gearhead and the gearhead’s pilot end face.



● Dimensions of Mounting Holes

The dimension of the 4 motor mounting holes are shown as the pitch diameter in the dimensions of each product.

The distance between mounting holes is shown in the table.

Unit = inch (mm)

Motor Frame Size	A	B	C
□1.65 (□42)	1.89 (48)	1.336 (33.94)	1.4803 (37.6)
□2.36 (□60)	2.76 (70)	1.949 (49.50)	2.1260 (54)
□2.76 (□70)	3.23 (82)	2.283 (57.98)	2.5197 (64)
□3.15 (□80)	3.70 (94)	2.617 (66.47)	2.8740 (73)
□3.54 (□90)	4.09 (104)	2.895 (73.54)	3.2677 (83)
□4.09 (□104)	4.72 (120)	3.341 (84.85)	3.7008 (94)

● Mounting Method for Hollow Shaft Type Gearheads Example of Attaching the Load

Attach the load according to load shaft conditions as shown in the figure below. The hollow shaft inside dimension is machined to a tolerance of H8, and incorporates a key slot for load shaft attachment. A load shaft tolerance of h7 is recommended. The key provided with the product should be secured on the shaft. Also, apply a lubricant such as molybdenum disulphide grease to the load shaft and the inner circumference of the hollow shaft. The recommended dimensions of load shaft are shown in the table below.

Unit = inch (mm)

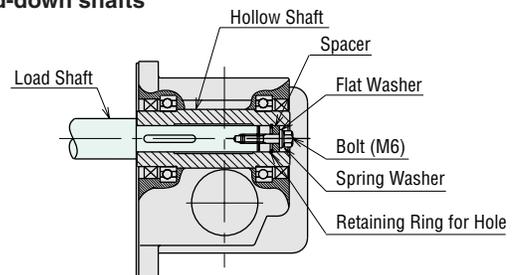
Model	Inner Diameter of Hollow-shaft	Recommended Load Shaft diameter
4GN□RH	$\phi 0.5906^{+0.0011}_0 (\phi 15^{+0.027}_0)$	$\phi 0.5906^{+0.0007}_0 (\phi 15^{+0.018}_0)$
5GN□RH	$\phi 0.5906^{+0.0011}_0 (\phi 15^{+0.027}_0)$	$\phi 0.5906^{+0.0007}_0 (\phi 15^{+0.018}_0)$
5GU□RH	$\phi 0.6693^{+0.0011}_0 (\phi 17^{+0.027}_0)$	$\phi 0.6693^{+0.0007}_0 (\phi 17^{+0.018}_0)$
BHI62□-□RH	$\phi 0.9843^{+0.0013}_0 (\phi 25^{+0.033}_0)$	$\phi 0.9843^{+0.0008}_0 (\phi 25^{+0.021}_0)$
BHI62□T-□RH		
BHF62□T-□RH		
BHF62□MT-□RH		

* Enter the gear ratio in the box (□) and “F”, “E” or “S” which indicates the power supply voltage in the box (□) within the model name.

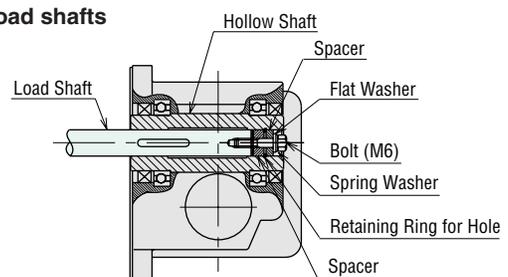
◆ 4GN□RH, 5GN□RH, 5GU□RH

See Page (A-222) for BH Series, BHF Series Right-Angle Hollow Shaft Types

Stepped-down shafts

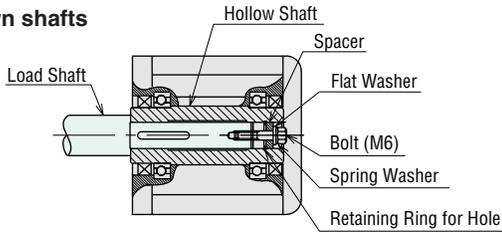


Straight load shafts

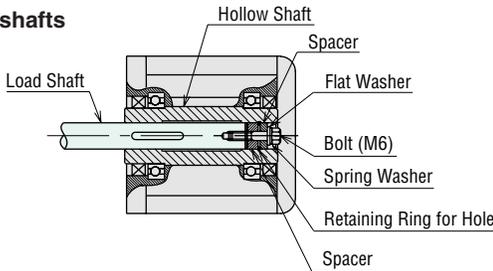


◆ **BH Series, BHF Series Right-Angle Hollow Shaft Type**

Stepped-down shafts



Straight load shafts



After securing a load, attach the safety cover provided.

Note:

- Do not apply excessive force when inserting the load shaft into the hollow shaft of the gearhead. Excessive force may damage the gearheads internal bearings. When the bolt is sticking out 0.16 inch (4 mm) or longer from the hollow shaft end, the safety cover cannot be attached.

● **Method of Securing the Load to an Output Shaft**

The output shafts of high-power gearheads are provided with a key slot to secure the load, while the shafts of gearheads with comparatively low power have been given a shaft flat. Round shaft motors come in two types, those with and without a shaft flat on the motor output shaft.



Shaft Flat

0GN, 2GN, 3GN, 4GN, 5GN, 4GN□RAA, 5GN□RAA gearhead **AXH015** and round shaft type motors with a motor frame size of □3.15 inch (80 mm) or larger



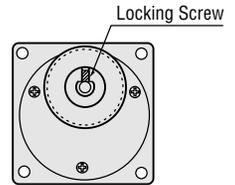
Key Slot

5GU, 5GC, 5GCH, 5GU□RAA, RH Gearheads, **5GU□KHA, V Series, BH Series, FBLII Series, AXH Series** (except 15 W)

On round shaft types, the output shaft is machined to the accuracy of h7 in dimension and 0.0008 inch or less in eccentricity. Therefore, when connecting a load to the shaft of the device, take measurements using a dial gauge or similar instrument so that there is no eccentricity. When the shaft center of two shafts does not fit, use a flexible coupling (MCL coupling) etc. to avoid unnecessary strain on the shaft. The same procedure should be applied when securing a load to gearheads.

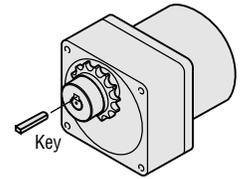
Securing the Load to a Shaft Flat

With a shaft flat, use a locking screw to ensure that the load does not slip. We recommend using double point screws or other screws with strong locking power.



Securing the Load Using a Key Slot

Secure loads using the key provided with the gearhead after machining the key slot on the equipment to be connected (sprocket etc.).

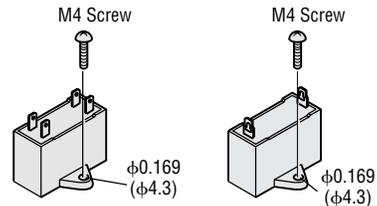


Note:

- Ensure that the gearhead shaft is not subjected to shock in the axial direction, since this will have an adverse effect on the bearings. Be especially careful not to use a hammer when inserting the key.

● **Capacitor Attachment Method**

Unit = inch (mm)

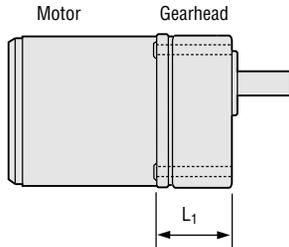
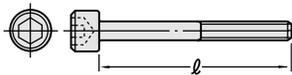


Attach a capacitor securely, using an M4 screw. (The M4 screw is not provided.)

● Dimensions of Screws Provided

V Series

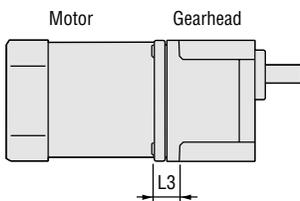
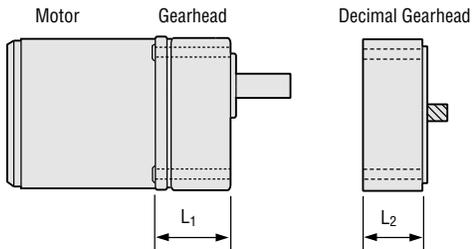
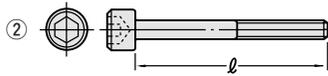
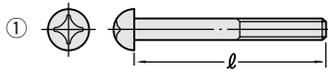
The following screws are provided with the gearhead.



Combination Type Model	Gear Ratio	Gearhead L ₁ inch (mm)	Screws (included) (4 washers and hexagonal nuts are included)	
			ℓ [inch (mm)]	Size
VHI206, VHR206 Type	5~18	1.61 (41)	1.97 (50)	
	30~120	1.77 (45)	2.17 (55)	
	180~360	1.97 (50)	2.36 (60)	
VHI315, VHR315 Type	5~18	1.77 (45)	2.56 (65)	
	30~120	1.97 (50)	2.76 (70)	
	180~360	2.17 (55)	2.95 (75)	
VHI425, VHR425 Type	5~18	1.89 (48)	2.56 (65)	
	30~120	2.09 (53)	2.76 (70)	
	180~360	2.28 (58)	2.95 (75)	
VHI540, VHR540 Type	5~18	2.07 (52.5)	2.95 (75)	
VHI560, VHR560 Type	30~90	2.58 (65.5)	3.54 (90)	
	120~300	2.81 (71.5)	3.74 (95)	
VHI590, VHR590 Type	5~15	2.07 (52.5)	2.95 (75)	
	18~36	2.58 (65.5)	3.54 (90)	
	60~180	3.05 (77.5)	3.94 (100)	

GN Type, GU Type, GC Type, GCH Type, BH Series, BHF Series, FPW Series

The following screws are provided with the gearhead and decimal gearhead.

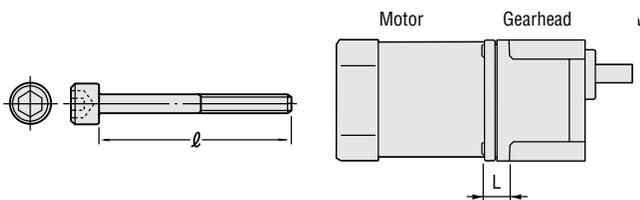


Gearhead or Combination Type Model	Screws (included) (4 washers and 4 hexagonal nuts are provided)			
	L ₁ inch (mm)	L ₁ (L ₃)+L ₂ inch (mm)	ℓ inch (mm)	Size
0GN3KA~180KA	1.22 (31)	—	1.57 (40)	No.4~40UNC
2GN3KA~18KA	1.46 (37)	—	1.97 (50)	No.8~32UNC
2GN25KA~180KA	1.85 (47)	—	2.36 (60)	
3GN3KA~18KA	1.54 (39)	—	1.97 (50)	
3GN25KA~180KA	1.93 (49)	—	2.56 (65)	No.10~24UNC
4GN3KA~18KA	1.54 (39)	—	1.97 (50)	
4GN25KA~180KA	1.95 (49.5)	—	2.56 (65)	
5GN3KA~18KA	1.95 (49.5)	—	2.76 (70)	1/4~20UNC
5GN25KA~180KA	2.66 (67.5)	—	3.27 (83)	
5GC3.6KA~18KA	1.95 (49.5)	—	2.56 (65)	M6 P1.0
5GC30KA~180KA	2.66 (67.5)	—	3.15 (80)	
5GU3KA~180KA	2.85 (72.5)	—	3.74 (95)	1/4~20UNC
5GCH3.6KA~180KA	2.85 (72.5)	—	3.74 (95)	M6 P1.0
BHI62□-□, BHI62□T-□, BHI62□MT-□	3.27 (83)	—	3.94 (100)	M8 P1.25
BHF62□T-□, BHF62□MT-□	3.27 (83)	—	3.94 (100)	
2GN10XK (Decimal Gearhead)	—	2.87 (73)	3.35 (85)	M4 P0.7
3GN10XK (Decimal Gearhead)	—	3.11 (79)	3.54 (90)	M5 P0.8
4GN10XK (Decimal Gearhead)	—	3.21 (81.5)	3.74 (95)	
5GN10XK (Decimal Gearhead)	—	4.11 (104.5)	4.72 (120)	
5GU10XKB (Decimal Gearhead)	—	4.43 (112.5)	5.51 (140)	M6 P1.0
5GU10XK (Decimal Gearhead)	—	L ₃ +L ₂ : 2.26 (57.5)	2.56 (65)	
FPW425□-□	2.32 (59)	—	3.15 (80)	M5 P0.8
FPW540□-□	2.85 (72.5)	—	3.54 (90)	M6 P1.0
FPW560□-□	2.93 (74.5)	—	3.54 (90)	
FPW690□-□	3.25 (82.5)	—	3.94 (100)	M8 P1.25

- The figures of L₁+L₂ refer to sizes when a decimal gearhead and a gearhead with gear reduction ratio of 25:1 or greater are connected.
- 4 washers and 4 hexagonal nuts are provided with the screws.
- Stainless steel screws are provided with the **FPW** Series watertight motors.
- Since **GC** and **GCH** type gearhead is attached from the gearhead side, L₁ shows the length of the gearhead only.
- Screws are not included with **BH** Series, **BHF** Series and right-angle type.
- * Enter "A", "C", "F", "E" or "S" which indicates the power supply voltage in the first box (□) within the model name. Enter the gear ratio in the second box (□) within the model name.

5GU□KHA, RH, RAA Gearheads

To assemble the motor and gearhead, use the screws provided with the gearhead. To attach the gearhead to other devices, obtain M8 screws separately.



Gearhead Model	Screws (4 washers and 4 hexagonal nuts are provided)		
	L inch (mm)	ℓ (mm)	Size
5GU□KHA	0.69 (17.5)	0.79 (20)	M6 P1.0
4GN□RH, 4GN□RAA	—	0.59 (15)	M5 P0.8
5GN□RH, 5GN□RAA	—	0.79 (20)	M6 P1.0
5GU□RH, 5GU□RAA	—	0.79 (20)	M6 P1.0

- Hexagonal nuts are not provided with 5GU□KHA and right-angle gearheads (RH and RAA types).
- * Enter the gear ratio in the box (□) within the model name.

Motor Connection

Lead Wire for Power Supply

For power supply, use a thicker lead wire than for the motor lead wire.

Motor frame size: □1.64 inch (□42 mm): AWG 24

Motor frame size: □2.36 inch (□60 mm) or larger: AWG 20

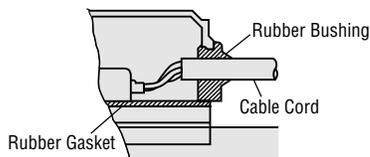
Motors with Terminal Boxes

See page A-170 for **BH** Series with electromagnetic brake and **BHF** Series with electromagnetic brake.

World K Series 6W Type

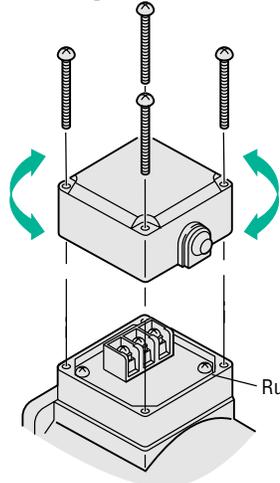
Compact, light weight and in-line arrangement of terminal blocks for ease of connection

Material of Terminal Box: Plastic



Inner Diameter of Plastic Grommet: $\phi 0.26 \sim \phi 0.33$ inch ($\phi 6.5 \sim \phi 8.5$ mm)
 Diameter of applicable cable cord: $\phi 0.27 \sim \phi 0.33$ inch ($\phi 6.8 \sim \phi 8.6$ mm)

Installing Terminal Box



- When installing the terminal box, be sure to use the rubber gasket in order to maintain a tight seal.
- Cable entry is possible at any of the four sides of the terminal box. Undo the screws which fixed the terminal box to the motor case, position the terminal box so that the outlet faces in the desired direction and refasten the screws.

Control Circuit Installation

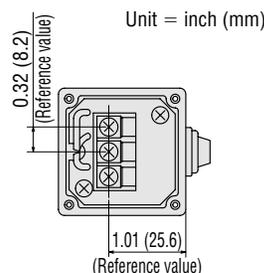
Control Circuit Installation Method

When installing a brake pack, use the flush connection socket provided.

When mounting two or more brake pack, separate them by a space of at least 0.79 inch (20 mm) because the ambient temperature rises due to the temperature rise of the brake pack itself.

Also, leave at least 0.98 inch (25 mm) of space between the brake pack and other devices or structures.

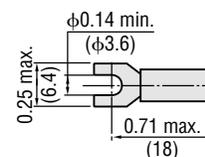
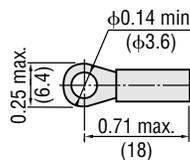
Inside Terminal Box



Recommended crimp terminals

Unit = inch (mm)

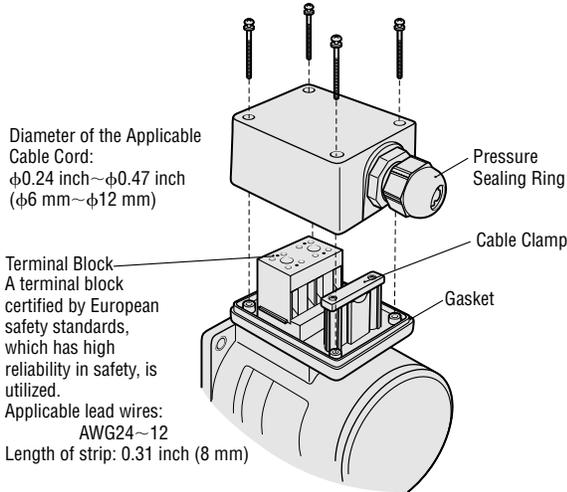
- Round Terminal with Insulation
- U-Shape Terminal with Insulation



◆ **World K Series 25W~90W Type, V Series, BH Series and BHF 200W**

The material of the terminal box is a PBT resin with excellent insulation performance. Also, the terminal block which is certified by European safety standards are utilized.

- When connecting cables to the terminal block, loosen the screw on the insertion port for the lead wire and insert the lead wire with a screw driver. Then tighten the screw securely.

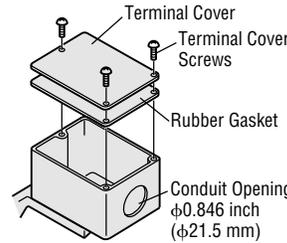


◆ **Conduit Box Type**

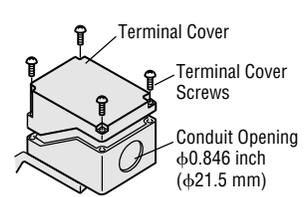
Conduit Type Box is available for induction motors.

- Open the terminal box and connect wires.
- Use applicable cable ground and conduit for conduit opening.
- After connecting, close the terminal box with the terminal cover.

Single-Phase 25W (1/30 HP), 40W (1/19 HP) / Three-Phase



Single-Phase 60W (1/12 HP), 90W (1/8 HP)

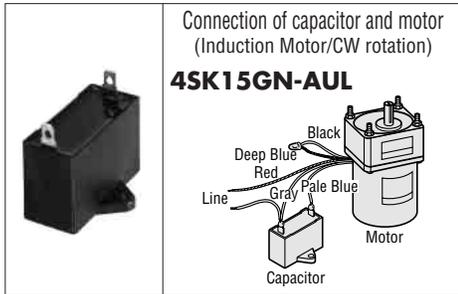


● **How to Connect a Capacitor**

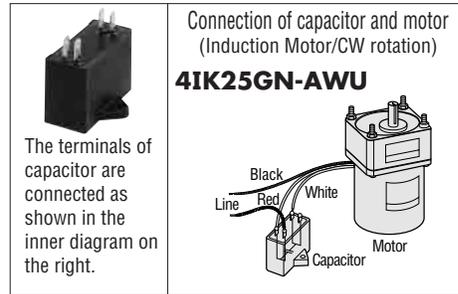
Note:

- When motors are running, a voltage of almost twice the motor power supply voltage is applied across the terminals of the capacitor. The terminals must therefore be insulated to ensure safety. Use the capacitor cap provided to insulate the terminals.

2-terminal type



4-terminal type



For lead wire connection with 4-terminal capacitor, use one lead wire per terminal.

● **Grounding**

◆ **Lead Wire Type and Terminal Box for 6W Type**

Any one of the four mounting bolts may be used to attach the ground wire to the motor case when installing into the unit. If necessary, remove all paint that may impede conductivity around the bolt mounting hole.



◆ **World K Series, V Series and BH Series**

Connect the ground wire to the ground terminal inside the terminal box.



◆ **Conduit Box Type**

Conduit box mounted motors have a ground lead wire (green wire). Connect the ground wire to this green lead wire.

Single-Phase Motors
Conduit Box

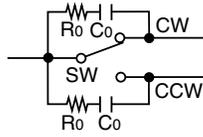


Three-Phase Motors
Conduit Box



● Contact capacity

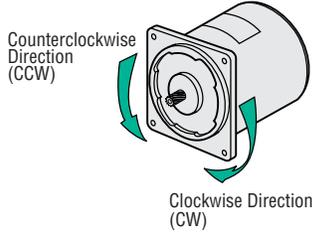
Connect a CR circuit (surge suppressor) like that in the drawing in order to protect the contacts.



Code	Contact Capacity, Others	Remarks
SW	125 VAC 5 A min.or 250 VAC 5 A min.(Induction load)	—
R ₀ , C ₀	R ₀ =5~200 Ω C ₀ =0.1~0.2 μF 200 WV (400 WV)	Accessories EPCR1201-2 A-218

■ Motor Operation

Oriental Motor's small standard motors are operated by AC input power. Connect provided capacitor to single-phase motors.



● Direction of Rotation

Clockwise (CW) direction of rotation, as referred to in the motor wiring diagrams of this catalog, is defined as the direction of rotation when viewing the mounting face end of the motor. When a motor is used with a gearhead connected, the direction of rotation of the gearhead output shaft may be the same or the opposite of the direction of rotation of the motor, depending on the gear ratio. To set the rotation direction of the gearhead output shaft required, or to change the rotation direction of the motor, do as shown below.

◆ Induction Motors

Change the direction of rotation of single-phase motors only after the motor comes to a complete stop. If an attempt is made to change the direction of rotation while the motor is rotating, the motor may ignore the reversing command or change its direction of rotation after some delay.

The connection diagrams below are general. For details, refer the pages where individual products are listed.

Clockwise Direction	Counterclockwise Direction
<p>Single-Phase 110/115 VAC Single-Phase 220/230 VAC</p>	<p>Single-Phase 110/115 VAC Single-Phase 220/230 VAC</p>
<p>Three-Phase 200/220/230 VAC</p>	<p>Three-Phase 200/220/230 VAC</p>

◆ Reversible Motors

The direction of rotation can be reversed during motor rotation using a switch. Moving the switch to CW causes the motor to rotate clockwise; moving the switch to CCW causes the motor to rotate counterclockwise.

Clockwise Direction	Counterclockwise Direction
<p>Single-Phase 110/115 VAC Single-Phase 220/230 VAC</p>	<p>Single-Phase 110/115 VAC Single-Phase 220/230 VAC</p>

Ambient Temperature and Temperature Rise in a Motor

The ambient temperature and the rise of the motor temperature are limiting parameters for the suitability of a motor in a given application.

Ambient Temperature

Use motors at ambient temperatures between 14°F (−10°C) and 104°F (+40°C) [14°F~122°F (−10°C~+50°C) or 32°F~122°F (0°C~+50°C) for some motors]. When used at temperatures outside of this range, an additional rise in temperature caused by motor operation may lead to deterioration of the wiring insulation of the motor or may drastically shorten the operating life of the ball bearings. Also, low ambient temperatures result in problems primarily with starting characteristics. The friction torque of the motor increases with the decrease in viscosity of gearhead and ball bearing lubricants resulting in a slower ramp up of the motor or failure of the motor to start.

Temperature Rise in Motor

When a motor is operating, all energy losses of the motor (losses from copper or iron etc.) are transformed into heat, causing the motor temperature to rise.

The point of the highest motor temperature rise is in the windings. For this reason, the maximum permissible temperature of the windings is stated in the EN/IEC, UL, CSA standards for the given type of insulation materials. Many of Oriental Motor motors employ Class B insulation*, whose maximum permissible temperature of the windings is 266°F (130°C). The difference in temperature between the motor case and the windings is about 50°F~68°F (10°C~20°C), but actually, taking the effect of heat radiation when they are attached to a device into consideration, you should think that the difference is about 86°F (30°C). Therefore, when the temperature of the windings is 266°F (130°C), the temperature of the motor case is about 212°F (100°C). However, when actually using a motor, keep the temperature of the motor case below 194°F (90°C), considering the motor's service life.

* In addition to Class B insulation, some of the motors have Class E insulation 248°F (120°C).

Although the motor case may become very hot while the motor is in operation, in some case as high as 194°F (90°C), this does not indicate a malfunction.

Take precautions against heat before touching the motor, and avoid accidents by keeping flammable materials away from the motor.

How to Use Gearheads

For Oriental Motor's pinion type AC motors, the dedicated gearhead, which can be coupled to the AC motors easily, is available (sold separately).

With the reduction of the motor speed through the gearhead, an increase of torque is achieved. A large number of gear ratios are available that you can select, depending on your application.

Gearheads are all low noise types. The change in the mating section, the primary source of noise in a gearhead, from a spur gear to a helical gear along with a thoroughly redesigned gearcase and ball bearings has realized a reduction in noise by −10 dB~15 dB, compared to the conventional products.

For **GN** and **GU** types, gearheads with inch-size output shafts are also available.

GC and **GCH** types are designed to be used with **C-B** motor.

V Series gearheads are using high strength gears and highly rigid ball bearing mechanism in order to achieve long life with heavy loads.

Gearheads for **BX**, **FBLII**, and **AXH** are designed to be used with high-speed motors.

List of Gearheads

Separate Type Gearheads

Application	Gearheads	Decimal Gearheads
Normal Load	0GN□KA	—
	2GN□KA	2GN10XK
	3GN□KA	3GN10XK
	4GN□KA	4GN10XK
	5GN□KA	5GN10XK
Heavy Load	5GU□KA	5GU10XKB
	5GU□KHA	5GU10XK
Impact Load	5GC□KA	—
	5GCH□KA	—

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

Combination Type

Application	Combination Type
Heavy Load	BH Series
	BHF Series
Heavy Load	V Series
Long Life	
Low Noise	
Heavy Load	BX Series
	FBLII Series
	AXH Series

* Decimal Gearheads are not included.

● Motor and Gearhead Combinations

When connecting gearheads, be sure to match the pinion shafts and frame size. For details refer the pages where the products are listed. For products with a geared motor, a gearhead is already coupled directly onto the motor.

4IK25GN-AWU **4GN25KA**



● Motor and Decimal Gearhead Combinations

The **GN** and **GU** type gearheads are available with decimal gearheads (sold separately) with a gear ratio of 10:1. They should be used in applications in which large enough gear ratios cannot be attained with a single gearhead unit (except for **OGN** type).

Note:

- Although the gear ratio of 10:1 of the decimal gearhead theoretically translates into a 10 time increase of torque available on the output shaft, it is not possible to make full use of this torque. The torque permissible in actual use is limited by the physical construction of the gearhead and is expressed as its rated maximum torque. (See the torque table of each product)

● Motor and Right-Angle Gearhead Combinations

The **4GN**, **5GN** and **5GU** pinion type gearheads are available as right-angle gearheads. Refer to Page A-189 for details.

Type	Model	Applicable Motor Output Power
Hollow Shaft	4GN□RH	25 W
	5GN□RH	40 W
	5GU□RH	60, 90 W
Solid Shaft	4GN□RAA	25 W
	5GN□RAA	40 W
	5GU□RAA	60, 90 W

Motor with motor frame size
of 3.54 in. (90mm)

Right-Angle Gearhead

5IK60GU-AWU

5 GU□RAA



Right-Angle gearheads are also available for the **BH** Series and **BHF** Series. These gearmotors come pre-assembled. Refer to Page A-54 and B-70 for details.

● Permissible Overhung Load and Permissible Thrust Load

When a chain, gear, belt, etc. is used as the transmission mechanism, the overhung load (a load applied in the right-angle direction of the output shaft) is always applied on the output shaft.

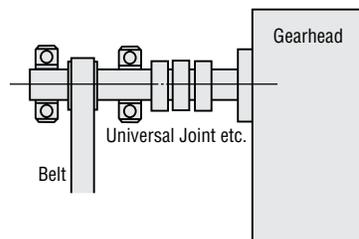
Since the overhung load acts on the output shaft and its bearing directly, it has a great influence on the life of gearhead. Be careful not to exceed the permissible value (specifications value).

If the overhung load greatly exceeds the permissible value, it will lead to the shortening of bearing life or damage to the bearing, as well as warping or fatigue loss of the output shaft after repeated load. In such situations, a support such as the one shown below must be designed to take up the overhung load.

Since connecting a transmission mechanism directly to the output shaft exerts an unbalanced load on the shaft, connect mechanisms as close to the gearhead as possible.

When using transmission mechanisms involving helical gears or worm gears, they are subject not only to overhung load but to thrust load (a load applied in the axial direction of the output shaft) as well. Ensure that the thrust load does not exceed the permissible value in the table.

Refer to Page A-10 for the calculation formula of overhung load, and Page A-11 for the permissible value (specifications value) of overhung/thrust load.



■ Brake Pack

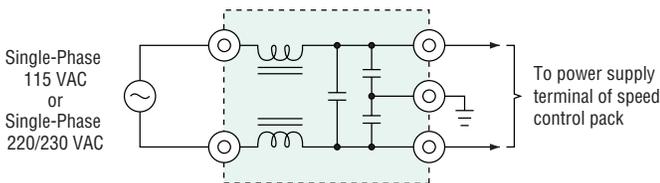
● Protection Against Noise

◆ Protection Against External Noise

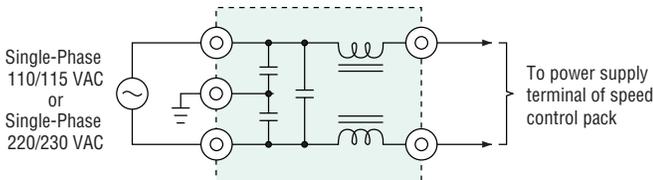
The brake pack has a built-in filter for protection against noise at power supply line, so that the external noise does not cause the motor any malfunction under normal use conditions. However, when used in a place where a large noise is generated by control, open/close of a large electric circuit, the noise ignites a thyristor etc. by mistake, and may lead to motor vibration. (The source of noise like this is a high power motor, solenoid, high-frequency quenching machine or electric welding machine etc.)

For protection against external noise, as shown in the figure below, it is very effective to connect a noise filter to the power supply line of speed control pack.

The brake pack motor employs a phase control system by a thyristor. When the thyristor is turned on/off, a rapid change in current may lead to radio noise trouble. For countermeasures in such a case, as shown in the figure below, it is the most effective to connect a noise filter to the power supply line of the brake pack.



The brake pack employs a phase control system by a thyristor. When the thyristor is turned on/off, a rapid change in current may lead to the radio noise trouble. For countermeasures in such a case, as shown in the figure below, it is the most effective to connect a noise filter to the power supply line of brake pack.

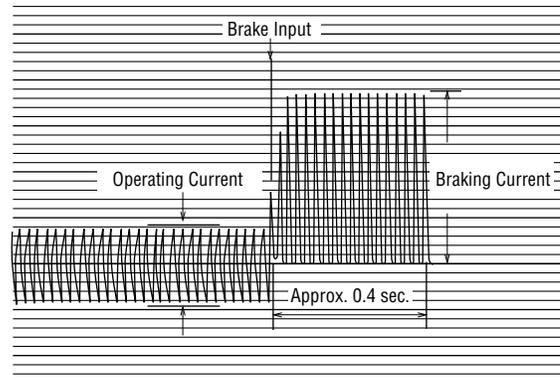


Note:

- When connecting a noise filter, install it as close to the brake pack as possible, and be sure to ground the ground terminal into housing.

● Fuse Capacity

When a brake pack is used to stop the motor instantaneously, a large amount of braking current will flow into the motor for approximately 0.4 seconds. Therefore, when connecting a fuse to the power line, select one with an appropriate capacity by referring to the braking current (listed in "Applicable Motor Specifications," as provided with a brake pack) for the motor being used.



■ Handling of a Motor

● Handling

It is ideal to carry the product in the original packaging. When handling the motor during test or installation, hold the body of the motor so that the output shaft points upward. Also, when the product is removed from the package for installation and placed in shelves or something, it is safer to place the motor upright with the shaft pointing upwards so that it cannot strike other motors.

The lead wires are insulated and securely fixed to the stator and the case mechanically. They can, therefore, withstand a certain degree of tension applied to them. However, lifting the product by the lead wires may cause them to break, or may damage the insulation or result in some other potentially hazardous situation. Be sure to hold the motor body.

● Storage

Temperature and humidity are important considerations if the motor is to be stored for an extended period of time between the purchase and assembly.

Storage in places where there are large temperature and humidity variations will reduce the stator's insulation performance.

Moreover, leaving the motor for extended periods in places with high temperature and humidity is likely to lead to the grease deterioration and corrosion inside the ball bearing.

When storing for long periods, it is therefore recommended to coat the output shaft with an anti-corrosion agent, seal the motor in a polyethylene bag and store in a place with normal temperature and humidity.