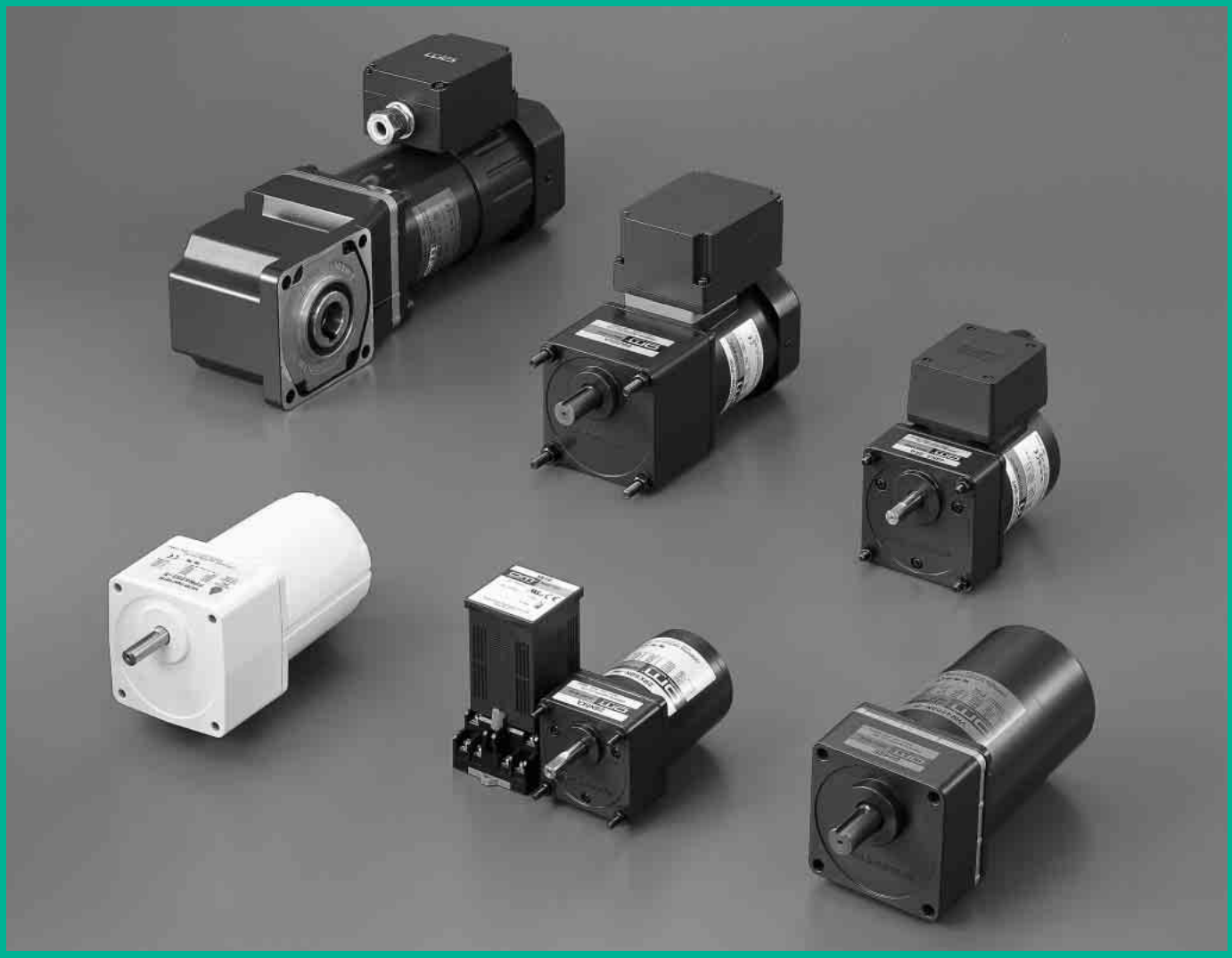
ORIENTAL MOTOR



Standard AC Motors

A

Features of Standard AC Motors

Features

Easy-to-Use and Reliable

All that is required to rotate a standard compact AC motor is a commercial power supply and a capacitor. Three-phase motors do not even require a capacitor. They are the simplest way to get rotational operation form a motor. The simplicity of AC motors improves their reliability and service life.

Conform to Safety Standards and Global Power Supply Voltages

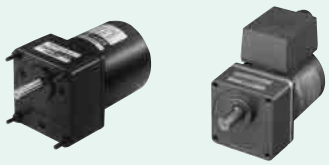
Many of Oriental Motor's AC motors conform to UL/CSA/EN standards and apply the CE Marking in accordance with the low voltage directives. AC motors are available in power supply voltages that meet the requirements of North America, Asia and Europe.

Variety of Functions

There are two basic types of AC motors: standard induction motors that run continuously and reversible motors that allow for bi-directional operation. AC motors with additional functionality are also available. These types of motors include: electromagnetic brake motors to hold loads in a power-off situation; clutch and brake motors for quick starts and stops; synchronous motors for a fixed speed in synchronization with the power frequency ; and torque motors for tension control and winding applications.

Quiet Operation

Today's applications demand lower noise levels. Oriental Motor has met these demands by developing low-noise gearheads and quiet AC motors using new and innovative technologies. In particular, the **V** Series is especially suitable for applications where noise reduction is required, producing up to 6dB less than other standard AC motors.

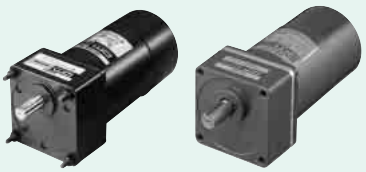
Induction Motors for continuous operation Page A-13	Capacitor-run, single-phase and three-phase motors are available. Lead wire type, terminal box type and conduit box type motors are available depending upon how the power source and the motor are connected.	
Reversible Motors for bi-directional operation Page A-67	These are capacitor-run, single-phase motors. The outward appearance is the same as that of induction motors. These motors are suited for applications where the motor must frequently switch direction.	
Synchronous Motors Page A-103	These motors provide rotation at a fixed speed in synchronization with the frequency of the power source. (60 Hz: 1800 r/min)	
Torque Motors Page A-111	This motor is suitable for controlling tension and pushing applications in winding operations. Torque can be set to any desired level by changing the input voltage.	

Watertight, Dust-Resistant Motors
Page A-119

These gear motors provide watertight and dust-resistant performance that meet IP67 grade.

Electromagnetic Brake Motors for load holding
Page A-127

This product is a load-holding brake motor with a power off activated type electromagnetic brake.



Clutch and Brake Motors for high-frequency starting and stopping
Page A-171

This motor combines a clutch and brake mechanism with an induction motor. It is ideal for high-frequency starting and stopping.

Brake Pack
Page A-179

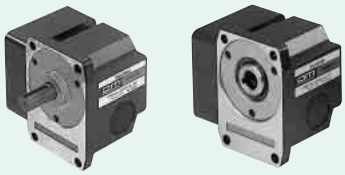
These brake circuits are used for instantaneous stopping when used with induction motors, reversible motors and electromagnetic motors.

Parallel Shaft Gearheads

Details on the possible combinations of pinion shaft motors and parallel shaft gearheads can be found in each motor section.

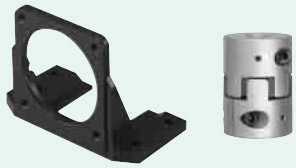
Right-Angle Gearheads
Page A-189

There are two types of right-angle gearheads; Hollow Shaft Type and Solid Shaft Type.



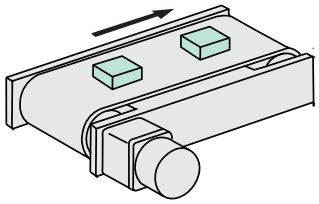
Accessories
Page A-203

Oriental Motor provides a wide variety of accessories such as Mounting Brackets, Flexible Couplings, Extension cables and more.

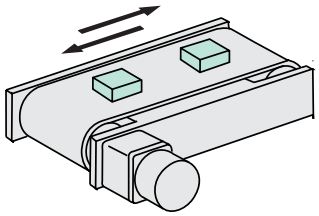


Applications for Standard AC Motors

Induction Motors
For uni-directional continuous operation

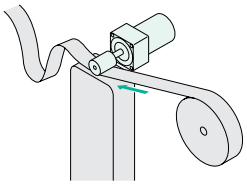


Reversible Motors
For applications where the motor must switch frequently from one direction to the next

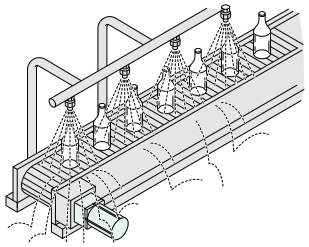


Synchronous Motors
For applications where the motor's rotation must be kept at a fixed speed, regardless of changes of the load.

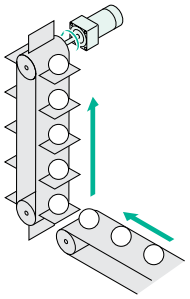
Torque Motors
For applications where a rolled object is released according to the amount of tension.



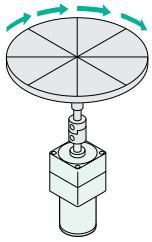
Watertight Motors
For applications where motors are splashed.



Electromagnetic Brake Motors
For applications in which loads must be held.

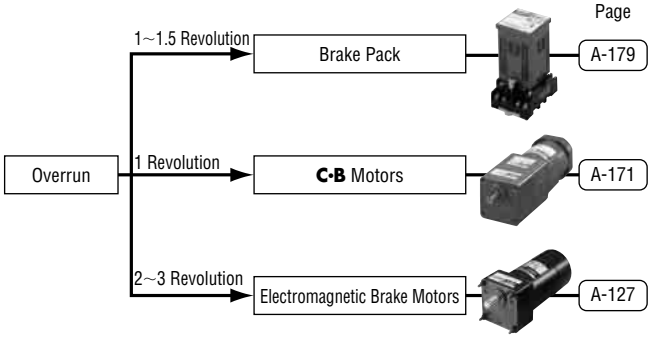


Clutch and Brake Motors (C·B Motors)
For applications where the motor must repeat frequent starting and stopping.



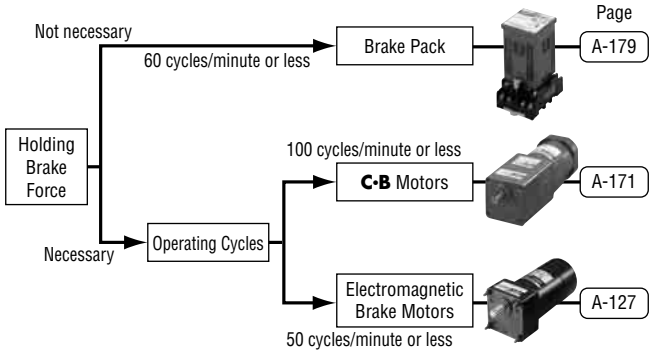
How to Select a Brake Motor

Selecting from stopping accuracy



✻ The overrun values are those of an individual motor.

Selecting based on frequency of use



Notes:
- The operating cycles are based merely on brake response. The value specified above is the maximum, so it may not be possible to repeat braking operation at this frequency.
- In an actual application, be certain the surface temperature of the motor case remains below 194°F (90˚C) by considering the rise in motor temperature.

Motor Types

Product Line

●=Available

Frame Size		□1.65 in. (□42 mm)	□2.36 in. (□60 mm)	□2.76 in. (□70 mm)	□3.15 in. (□80 mm)	□3.54 in. (□90 mm)			□4.09 in. (□104 mm)
Output Power		1 W (1/750 HP)	6 W (1/125 HP)	15 W (1/50 HP)	25 W (1/30 HP)	40 W (1/19 HP)	60 W (1/12 HP)	90 W (1/8 HP)	200 W (1/4 HP)
Induction Motors	World **K** Series		●	●	●	●	●	●	
	K Series 4-pole	●							
	K Series 2-pole				● (40 W)		●	●	
	V Series		●	●	●	●	●	●	
	BH Series								●
Reversible Motors	World **K** Series		●	●	●	●	●	●	
	K Series	●							
	V Series		●	●	●	●	●	●	
Electromagnetic Brake Motors	World **K** Series		●	●	●	●	●	●	
	V Series		●	●	●	●	●	●	
	BH Series								●
Clutch and Brake Motors						●	●	●	
Synchronous Motors			● (4 W)	● (10 W)	● (15 W)	● (25 W)			
Torque Motors				● (6 W)	● (10 W)	● (20 W)			
Watertight Motors					●	●	●		● (90 W)

● Induction, Reversible and Electromagnetic Brake Motors

◆ Global Standard World K Series

Types: Induction, Reversible and Electromagnetic Brake Motors

Output Power: 6 W (1/125 HP)～90 W (1/8 HP)

Our wide range of products includes those that meet the power supply voltages of the major countries in the world, which enables the motor to be used for various applications.

◆ V Series High-Strength, Long Life and Quiet Operation

Types: Induction, Reversible and Electromagnetic Brake Motors

Output Power: 6 W (1/125 HP)～90 W (1/8 HP)

Higher maximum permissible torque of up to three times the level of the World **K** Series gearhead, long life that last for 10,000 hours and a noise reduction of 6 dB. Available with the motor and its dedicated gearhead already assembled. Meets the power supply voltages of major countries in the world, which enables the motor to be used for various applications, same as the World **K** Series.

◆ High-output Power 200 W (1/4 HP) BH Series

Types: Induction and Electromagnetic Brake Motors

Output Power: 200 W (1/4 HP)

The **BH** Series provides 200 W (1/4 HP) output power and up to 350 lb-in (40 N·m) of torque in a compact 4.09 in. sq. (104 mm sq.) mounting configuration. Motors and gearheads come pre-assembled with both parallel shaft and right-angle type gearheads. Conforms to global power supply voltages and standards.

● Clutch and Brake Motors

Types: Induction Motors

Output Power: 40 W(1/19 HP)～90 W (1/8 HP)

This combination makes it the ideal motor for uses involving frequent starting and stopping.

● Synchronous Motors

Output Power: 4 W(1/190 HP)～25 W (1/30 HP)

This provides rotation at a fixed speed in synchronization with the frequency of the power source, regardless of fluctuation of the load or line voltage.

● Torque Motors

Output Power: 6 W(1/125 HP)～20 W (1/38 HP)

The torque can be set to any desired level by changing the input voltage.

● Watertight Motors

Output Power: 25 W (1/30 HP)～90 W (1/8 HP)

These geared motors provide watertight and dustproof performance that meet IP67 grade.

Features of the V Series

Quiet Operation

The **V** Series utilizes a comprehensive set of noise-reduction technologies: a special tooth-surface machining technology to remove cutting marks of 1 to 2 μm from the surface of the motor shaft teeth, an optimized quiet-running design that considers the circular speed of the motor while maintaining its strength, and a high-accuracy assembly-technology that ensures precision at micron levels.

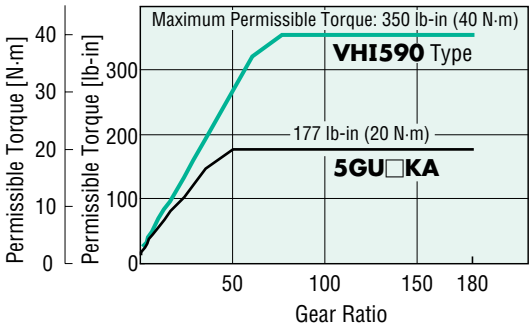
High-Strength, Long Life

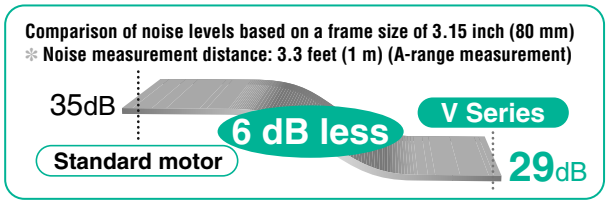
The motor's considerable strength has resulted from the use of a rigid case, a proprietary side-panel construction and an optimized gear design. Moreover, the use of a larger-diameter bearing serves to extend its useful life.

Higher Maximum Permissible Torque by Up to Three Times *

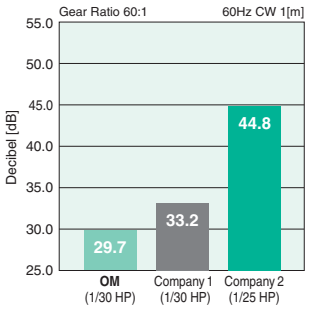
The high-strength design of the **V** Series is made evident through its maximum permissible torque, which has been increased up to three times* the level of the **GN** type gearhead, and two times the level of **GU** type gearhead. Even if the load condition is changed to a level that normally requires a higher amount of gearhead strength, the **V** Series can accommodate such a change without the need to increase the size of the motor or gearhead.

* Specific torque is dependent on frame size.

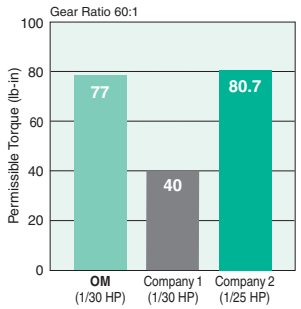




Noise Comparison



Permissible Torque Comparison



Designed for Long-Term Performance (10,000 hours)

Each model in the **V** Series is designed to last for 10,000 hours when driven at the maximum permissible torque. That's twice the design life of Oriental Motor's **GN** and **GV** type gearheads. This results in a considerable savings in time and effort with regard to maintenance.

Combination Type (Pre-Assembled Gearmotors)

As an added convenience to complement high quality and performance, each motor in the **V** Series comes pre-assembled with a gearhead to make installation easy.

Replacement Gearhead

Should you wish to change the gear ratio, easy gearhead replacement makes that possible.

Spare Parts

The **V** Series motor and gearhead can be purchased separately for use as spare components.

How to Read Specifications

When actually selecting a motor and gearhead, you should read the specifications to make sure that the motor you select meets your application needs. Shown below is an explanation of how you should read the specifications on some important items.

How to Read Specifications

Motor Specifications Table (Example)

Specifications — 30 Minutes Rating ⑥

Model Upper Model Name: Pinion Shaft Type Lower Model Name( ): Round Shaft Type		Output Power ①		Voltage	Frequency	Current ②	Starting Torque ③		Rated Torque ④		Rated Speed ⑤	Capacitor
Lead Wire Type Dimension	Terminal Box Type Dimension	HP	W	VAC	Hz	A	oz-in	mN·m	oz-in	mN·m	r/min	μF
TP **5RK90GU-AWU (5RK90A-AWU)**	**5RK90GU-AWTU (5RK90A-AWTU)**	1/8	90	110 115	60	1.81	83	590	83	585	1500	30

① Output Power: The amount of work that can be performed in a given period of time. It can be used as a criteria for motor capability.
② Current: The current value used by a motor when the motor is producing rated torque.
③ Starting Torque: This term refers to the torque generated the instant the motor starts. If the motor is subjected to a friction load smaller than this torque, it will operate.
④ Rated Torque: This is the torque created when the motor is operating most efficiently. Though the maximum torque is far greater, rated torque should, from the standpoint of utility, be the highest torque.
⑤ Rated Speed: This is the speed of the motor when the motor is producing rated torque
⑥ Rating: The time that a motor can operate continuously at rated output (torque). With a continuous rating, a motor can operate continuously.

Specifications Table for Electromagnetic Brake Section (Power Off Activated type) (Example)

Model	Voltage VAC	Frequency Hz	Current A	Input W	Holding Brake Torque ① oz-in	mN·m
4RK25GN-AWMU **4RK25A-AWMU**	Single-Phase 110 Single-Phase 115	60	0.09	6	14.2	100

① Holding brake torque: This refers to the holding brake torque of the electromagnetic brake and expresses the size of holding torque at the motor output shaft.

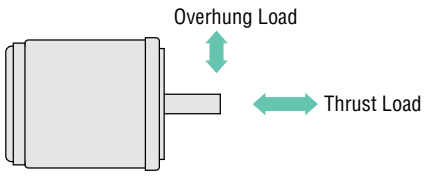
When a gearhead is combined, calculate the holding torque at the gearhead output shaft with the following formula.

Holding torque at the gearhead output shaft $T_G = T_M \times i$

T_G : Holding torque at the gearhead output shaft
T_M : Holding torque at the motor output shaft
i : Gear ratio

● Specifications Table for Permissible Overhung Load and Permissible Thrust Load (Example)

Motor			① Permissible Overhung Load lb. (N)			
Frame Size □inch (mm)	Output Shaft Diameter ϕinch (mm)	Series	Distance from shaft end inch (mm)			
			0.39 (10)		0.79 (20)	
2.36 (60)	0.2362 (6)	World **K**	11.2	50	24	110



① Permissible Overhung Load: The value ① shown in the table above is the value for the permissible overhung load. As shown in the figure above, permissible overhung load is the permissible value of the load applied in a direction perpendicular to the gearhead output shaft.

② Permissible Thrust Load: As shown in the figure above, this term refers to the permissible value of load applied in the axial direction to the gearhead output shaft. Keep the thrust load to no more than half the motor weight.

The calculating method of overhung load applied on the output shaft is the same as for a gear shaft. See the permissible overhung load and permissible thrust load for details.

Permissible overhung load and permissible thrust load for gearhead → Page A-11

How to Read Gearhead Specifications

Gearheads are shown for both AC standard motors and Speed Control Systems.

● Gearmotor – Torque Table (Example)

◆ Single-Phase115/230 VAC, 60 Hz

Unit = Upper values: lb-in/Lower values: N·m

Model \ Speed r/min	600	500	360	300	240	200	144	120	100	72	60	50	36	30	24	20	18	15	12	10
Gear Ratio	**3**	**3.6**	**5**	**6**	**7.5**	**9**	**12.5**	**15**	**18**	**25**	**30**	**36**	**50**	**60**	**75**	**90**	**100**	**120**	**150**	**180**
5RK90GU-AWU / **5GU□KA**	12.3	15	21	24	31	38	46	56	68	85	102	123	170	177	177	177	177	177	177	177
5RK90GU-AWTU / **5GU□KA**	1.4	1.7	2.4	2.8	3.6	4.3	5.3	6.4	7.7	9.7	11.6	13.9	19.3	20	20	20	20	20	20	20

① Permissible Torque: It refers to the value of load torque driven by the gearhead's output shaft.
Each value is shown for the corresponding gear ratio.

Permissible torque when a gearhead is connected can be calculated with the equation below.
Permissible torque for some products are omitted. In that case, use the equation below to calculate the permissible torque.

Permissible Torque $T_G = T_M \times i \times \eta$

T_G : Permissible Torque of Gearhead
T_M : Motor Torque
i : Gear Ratio of Gearhead
η : Gearhead Efficiency

● Gearhead Efficiency

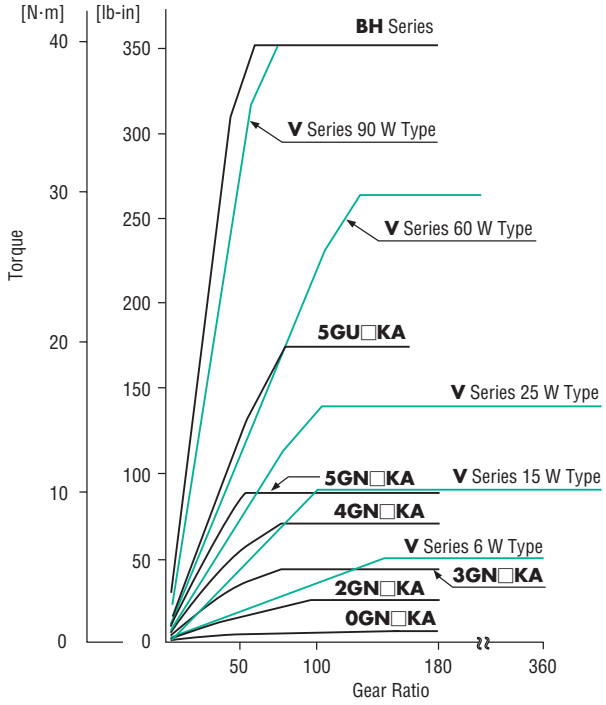
Model \ Gear Ratio	3	3.6	5	6	7.5	9	12.5	15	18	25	30	36	50	60	75	90	100	120	150	180	250	300	360
V Series 6 W, 15 W, 25 W Type			90 %								86 %								81 %				
V Series 40 W, 60 W Type			90 %							86 %								81 %					
V Series 90 W Type			90 %					86 %							81 %								
2GN□KA, 3GN□KA, 4GN□KA, 5GN□KA,			81 %						73 %				66 %										
0GN□KA, 5GU□KA,			81 %				73 %			66 %					59 %								
5GU□KHA													66 %		59 %								
BH Series		90 %		90 %		90 %		86 %			86 %			81 %		81 %		81 %		81 %			
BHF Series	90 %		90 %			90 %		86 %			86 %		81 %				81 %			81 %			

Model \ Gear Ratio	5	10	15	20	30	50	100	200
BX Series 30~120 W Type **FBL II** Series **AXH** Series 30~100 W Type	90 %				86%			81%
BX Series 200 W, 400 W Type	81 %				73%		66%	

- The efficiency of the BH6G2-□RH and BH6G2-□RA is 73% for all gear ratios, both during rated operation and at start.
- Gearhead efficiency of all the decimal gearheads is 81%.
- For the efficiency of Right-Angle Gearheads, see the page for Right-Angle Gearheads. The efficiency of Right-Angle Gearheads → Page A-191

Maximum Permissible Torque

The gearhead output torque increases proportionally as the gear ratio increases. However, factors affecting the gearhead mechanical strength such as gear construction and materials etc., limit the size of the load which can be applied to the gearhead. This torque is called the maximum permissible torque.
The maximum permissible torques of typical gearheads are shown in the figure to the right.



(Maximum Permissible Torque of Gearhead)

Speed and Direction of Rotation
Gearmotor – Torque Table (Example)

Single-Phase 115 VAC/230 VAC, 60 Hz

Unit = Upper values: lb-in/Lower values: N·m

Model	Speed ① r/min	600	500	360	300	240	200	144	120	100	72	60	50	36	30	24	20	18	15	12	10
	Gear Ratio	**3**	**3.6**	**5**	**6**	**7.5**	**9**	**12.5**	**15**	**18**	**25**	**30**	**36**	**50**	**60**	**75**	**90**	**100**	**120**	**150**	**180**
5RK90GU-AWU **5RK90GU-AWTU** / **5GU□KA**		12.3 1.4	15 1.7	21 2.4	24 2.8	31 3.6	38 4.3	46 5.3	56 6.4	68 7.7	85 9.7	102 11.6	123 13.9	170 19.3	177 20	177 20	177 20	177 20	177 20	177 20	177 20

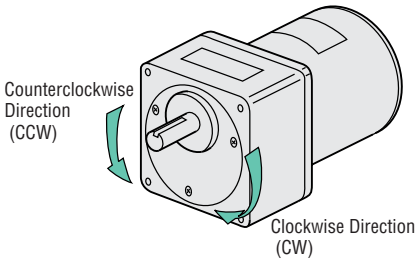
① Speed: This refers to the speed of rotation in the gearhead output shaft. The speeds, depending on gear ratio, are shown in the permissible torque table when the gearhead is attached. The speed is calculated by dividing the motor's synchronous speed by the gear ratio. The actual speed, according to the load condition, is 2～20% less than the displayed value.

The speed is calculated with the following equation.

$$\text{Speed } N_G = \frac{N_M}{i}$$

N_G : Speed of Gearhead [r/min]
N_M : Speed of Motor [r/min]
i : Gear Ratio of Gearhead

② Direction of rotation: This refers to the direction of rotation viewed from the output shaft. The shaded areas indicate rotation in the same direction as the motor shaft, while the others rotate in the opposite direction. The direction of gearhead shaft rotation may differ from motor shaft rotation depending on the gear ratio of the gearhead. The gear ratio and rotation direction of each gearhead is shown in the table below.



Gear Ratio and Rotation Direction of Gearhead (Example)

For details see the page where each product is listed.

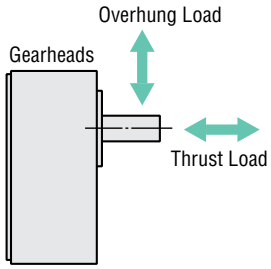
▩ ····· Same direction as the motor shaft
□ ····· Opposite direction as the motor shaft

Model \ Gear Ratio	3	3.6	5	6	7.5	9	12.5	15	18	25	30	36	50	60	75	90	100	120	150	180
2GN□KA, 3GN□KA, 4GN□KA, 5GN□KA, 5GC□KA	▩	▩	▩	▩	▩	▩	▩	▩	▩	□	□	□	▩	▩	▩	▩	▩	▩	▩	▩
0GN□KA, 5GU□KA, 5GCH□KA	▩	▩	▩	▩	▩	▩	□	□	□	▩	▩	▩	▩	▩	□	□	□	□	□	□
5GU□KHA													▩	▩	□	□	□	□	□	□

✻ Connection of a decimal gearhead reduces the speed by 10:1, but does not affect the direction of rotation.

● Specifications Table for Permissible Overhung Load and Permissible Thrust Load (Example)

Gearhead Mode	Gear Ratio	Maximum Permissible Torque lb-in (N·m)	Permissible Overhung Load lb.(N) ① 0.39 inch (10 mm) from shaft end	Permissible Overhung Load lb.(N) ① 0.79 inch (20 mm) from shaft end	Permissible Thrust Load lb.(N) ②
4GN□KA	3~18	70 (8.0)	22 (100)	33 (150)	11 (50)
	25~180		45 (200)	67 (300)	



① Permissible Overhung Load: The value ① shown in the table above is the one for the permissible overhung load. As shown in the figure above, permissible overhung load is the permissible value of the load applied in a direction perpendicular to the gearhead output shaft.

② Permissible Thrust Load: The value ② shown in the table above is the one for permissible thrust load specifications. As shown in the figure above, this term refers to the permissible value of load applied in the axial direction to the gearhead output shaft.

When a chain, gear, belt, etc. is used as the transmission mechanism, an overhung load is always applied the output shaft. The overhung load is calculated with the following equation.

$$\text{Overhung Load } W = \frac{K \times T \times f}{\gamma}$$

W: Overhung Load [lb. (N)]
K: Load Coefficient for Driving Method (See the right table)
T: Torque at Gearhead Output Shaft [lb-in (N·m)]
f: Service Factor
γ: Effective Radius of Gear or Pulleys [in. (m)]

◇Load Coefficient for Driving Method (K)

Drive System	K
Chain or Synchronous belt	1
Gear	1.25
V-belt	1.5
Flat belt	2.5

◇Service Factor (f)

Load Type	Example	Factor f
Uniform Load	· Unidirectional continuous operation · For driving belt conveyors and film rollers that are subject to minimal load fluctuation	1.0
Light Impact	· Frequent starting and stopping · Cam drive and inertial body positioning via stepping motor	1.5
Medium Impact	· Frequent instantaneous bidirectional operation, starting and stopping of reversible motors · Frequent instantaneous stopping via brake pack of AC motors · Frequent instantaneous starting and stopping of brushless motors, servo motors	2.0

● Permissible Load Inertia for Gearheads

This refers to the permissible value for load inertia (J) at the gearhead output shaft. Based on the permissible value at the motor output shaft, calculate J with the following equation and convert it into the permissible value for the gearhead output shaft.

Permissible Load Inertia

Gear ratio 3:1~50:1 $J_G = J_M \times i^2$
Gear ratio 60:1 or higher $J_G = J_M \times 2500$

J_G: Permissible Load Inertia at the gearhead output shaft J [oz-in^2 (kg·m^2)]
J_M: Permissible Load Inertia at the motor shaft J [oz-in^2 (kg·m^2)]
i: Gear ratio (Example: i = 3 means the gear ratio of 3:1)

◆ Permissible Load Inertia at the Gearhead Output Shaft (Example)

No. of Phase	Frame Size	Output Power	Permissible Load Inertia at Motor Shaft J [oz-in^2 ($\times 10^{-4}$ kg·m^2)]
Single-Phase	3.15 inch (80 mm)	25 W (1/30 HP)	1.7 (0.31)

For some products that are combination types, the permissible load inertia at the gearhead output shaft is directly shown as the specifications values, divided with each gear ratio.

Common Specifications

Permissible Overhung Load and Permissible Thrust Load of Round Shaft Motors

Permissible Overhung Load

Motor			Permissible Overhung Load lb. N			
Motor Frame Size in. (mm)	Motor Shaft Size in. (mm)	Series	0.39 in. (10 mm) from shaft end		0.79 in. (20 mm) from shaft end	
□1.64 (□42)	ϕ0.1969 (ϕ5)	**K**	9	40	—	—
□2.36 (□60)	ϕ0.2500 (ϕ6.35)	World **K**	11.2	50	24	110
□2.76 (□70)	ϕ0.2500 (ϕ6.35)	World **K**	9	40	13.5	60
□3.15 (□80)	ϕ0.3125 (ϕ7.937) ϕ0.3150 (ϕ8)	World **K** **K**	20	90	31	140
□3.54 (□90)	ϕ0.3750 (ϕ9.525) ϕ0.3937 (ϕ10)	World **K** **K**	31	140	45	200
	ϕ0.4724 (ϕ12)	World **K** **K**	54	240	60	270
□4.09 (□104)	ϕ0.5512 (ϕ14)	**BH**	72	320	78	350

Permissible Thrust Load

Avoid thrust as much as possible. If thrust load is unavoidable, keep it to no more than half the motor weight.

Permissible Overhung Load and Permissible Thrust Load of Gearheads

Model	Gear Ratio	Maximum Permissible Torque		Permissible Overhung Load lb. N				Permissible Thrust Load	
				0.39 in. (10 mm) from shaft end		0.79 in. (20 mm) from shaft end			
		lb-in	N·m					lb.	N
0GN□KA	**3~180**	8.8	1.0	4.5	20	—	—	3.3	15
2GN□KA	**3~18**	26	3.0	11.2	50	18	80	6.7	30
	25~180			27	120	40	180		
3GN□KA	**3~18**	44	5.0	18	80	27	120	9	40
	25~180			33	150	56	250		
4GN□KA	**3~18**	70	8.0	22	100	33	150	11.2	50
	25~180			45	200	67	300		
5GN□KA, 5GC□KA	**3~18**	88	10	56	250	78	350	22	100
	25~180			67	300	101	450		
5GU□KA, 5GCH□KA	**3~9**	177	20	90	400	112	500	33	150
	12.5~18			101	450	135	600		
	25~180			112	500	157	700		
5GU□KHA	**50~180**	260	30	90	400	135	600	33	150
VHI206, VHR206 Type	**5~9**	53	6	22	100	33	150	9	40
	12.5~25			33	150	45	200		
	30~360			45	200	67	300		
VHI315, VHR315 Type	**5~9**	88	10	33	150	45	200	18	80
	12.5~25			45	200	67	300		
	30~360			67	300	90	400		
VHI425, VHR425 Type	**5~9**	141	16	45	200	56	250	22	100
	12.5~25			67	300	78	350		
	30~360			101	450	123	550		
VHI540, VHR540 Type **VHI560, VHR560** Type	**5~9**	260	30	90	400	112	500	33	150
	12.5~18			101	450	135	600		
	25~300			112	500	157	700		
VHI590, VHR590 Type	**5~9**	350	40	90	400	112	500	33	150
	12.5~18			101	450	135	600		
	25~180			112	500	157	700		
BHI62, BHF62 Parallel Shaft Type	**3~36**	350	40	123	550	180	800	45	200
	50~180			146	650	220	1000		
BHI62RH Right-Angle Hollow Shaft Type **BHF62RH** Right-Angle Hollow Shaft Type	**5~36**	530	60	270*	1200*	240*	1100*	67	300
	50~180			490*	2200*	450*	2000*		
BHI62RA Right-Angle Solid Shaft Type **BHF62RA** Right-Angle Solid Shaft Type	**5~36**	530	60	200	900	220	1000	67	300
	50~180			380	1700	410	1850		
FPW425 Type	**3~18**	70	8.0	22	100	33	150	11.2	50
	25~180			45	200	67	300		
FPW540 Type	**3~18**	88	10	56	250	78	350	22	100
	25~180			67	300	101	450		
FPW560 Type	**3~9**	132	15	90	400	112	500	33	150
	12.5~18			101	450	135	600		
	25~180			112	500	157	700		
FPW690 Type	**3~9**	260	30	123	550	180	800	45	200
	12.5~180			146	650	220	1000		

● For permissible overhung load and permissible thrust load of **4GN□RH**, **5GN□RH**, **5GU□RH** (Right-Angle Gearheads Hollow Shaft Type), see the page where the products are listed. →Page A-189

✻ For **BH** and **BHF** Series Right-Angle Hollow Shaft Combination Types, the permissible overhung load values are distances from the flange mounting surface. The permissible overhung loads at each distance is calculated with the equation on the following page.

◆ Calculating the Permissible Overhung Load for BH6G2-□RH

As shown in the figure below, when the end of the shaft being driven is supported, calculate the permissible overhung load using the following equation. (This mechanism is the most demanding in terms of overhung load.)

- Gear Ratio 5:1～36:1

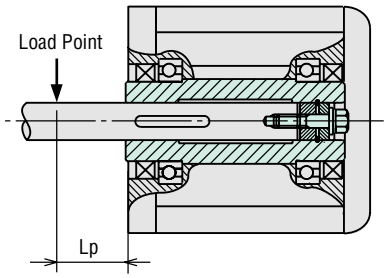
$$\text{Permissible Overhung Load } W\text{ [lb. (N)]} = \frac{3.44\text{ in. (87.5 mm)}}{3.44\text{ in. (87.5 mm)} + L_p} \times 300\text{ lb. (1350 N)}$$

300 lb. (1350 N): Permissible Overhung Load at the flange mounting surface

- Gear Ratio 50:1～180:1

$$\text{Permissible Overhung Load } W\text{ [lb. (N)]} = \frac{3.44\text{ in. (87.5 mm)}}{3.44\text{ in. (87.5 mm)} + L_p} \times 550\text{ lb. (2450 N)}$$

550 lb. (2450 N): Permissible Overhung Load at the flange mounting surface



■ Permissible Load Inertia of Gearhead

When a high load inertia (J) is connected to a gearhead, high torques are exerted instantaneously on the gearhead when starting up in frequent, discontinuous operations (or when stopped by an electromagnetic brake, or when stopped instantaneously by a speed control motor). Excessive impact loads can be the cause of gearhead or motor damage.
The table below gives values for permissible load inertia on the motor shaft. Use the motor and gearhead within these parameters. The permissible inertial load value shown for three-phase motors is the value when reversing after a stop.
The permissible load inertia (J) on the gearhead output shaft is calculated with the following equation.
The life of the gearhead when operating at the permissible inertial load with instantaneous stops of the motors with electromagnetic brakes or speed control motors is at least 2 million cycles.

● Permissible Load Inertia at Gearhead Output Shaft

Gear ratio 3:1～50:1 $J_G = J_M \times i^2$
Gear ratio 60:1 or higher $J_G = J_M \times 2500$

J_G: Permissible Load Inertia at the gearhead output shaft J [oz-in^2 (kg·m^2)]
J_M: Permissible Load Inertia at the motor shaft J [oz-in^2 (kg·m^2)]
i : Gear ratio (Example: i = 3 means the gear ratio of 3:1)

● Permissible Load Inertia at the Motor Shaft

AC Motor

No. of Phase	Frame Size inch (mm)	Output Power W	(HP)	Permissible Load Inertia at Motor Shaft J: oz-in^2 ($\times 10^{-4}$ kg·m^2)	
Single-Phase	1.64 (42) sq.	1	(1/750)	0.088	(0.016)
	2.36 (60) sq.	6	(1/125)	0.34	(0.062)
	2.76 (70) sq.	15	(1/50)	0.77	(0.14)
	3.15 (80) sq.	25	(1/30)	1.7	(0.31)
	3.54 (90) sq.	40	(1/19)	4.1	(0.75)
		60	(1/12)	6.0	(1.1)
		90	(1/8)	6.0	(1.1)
	40.9 (104) sq.	200	(1/4)	11	(2.0)
Three-Phase	3.15 (80) sq.	25	(1/30)	1.7	(0.31)
	3.54 (90) sq.	40	(1/19)	4.1	(0.75)
		60	(1/12)	6.0	(1.1)
		90	(1/8)	6.0	(1.1)
	40.9 (104) sq.	200	(1/4)	11	(2.0)