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Gearheads

■ Role of the Gearhead

The role of a gearhead is closely related to motor development. Originally, when the AC motor was a simple rotating device, the gearhead was mainly used to change the motor speed and as a torque amplifier. With the introduction of motors incorporating speed control functions, the primary role of the gearhead was to amplify torque. But with the wide acceptance of stepping motors and brushless DC motors to meet the requirements for control of speed and position, gearheads found new purposes, including the amplification of torque, improvement in permissible inertia and reduction of motor vibration.

Furthermore, the accurate positioning capability of motors has created a demand for high-precision, backlash-free gearheads, unlike the conventional gearheads for AC motors. Oriental Motor, keeping up with these trends, has been developing specific gearheads having optimal characteristics needed to preserve the characteristics of the motor with which it is used. Gearheads for AC motors, are designed with emphasis on high permissible torque, long life, low noise and a wide range of gear ratios. By contrast, gearheads for stepping motors are designed for highly accurate positioning, where a high degree of precision, high permissible torque and high speed operation are important. The following sections describe these gearheads in detail.

■ Gearheads for AC Motors

Standard AC motors have a long history, as do the gearheads used with these motors. During the course of that history, AC motors and gearheads have found a wide spectrum of applications and user needs including low noise level, high power, long life, wide range of gear ratios and resistance to environmental conditions. Oriental Motor has therefore been developing products in order to accommodate various needs.

● Parallel Shaft Gearheads

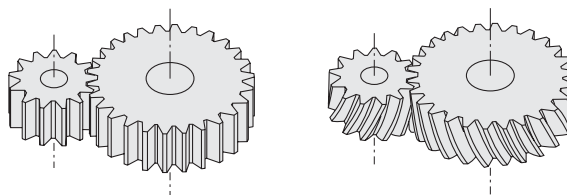
Parallel shaft gearheads are the most commonly used gear systems today. Our parallel shaft gearheads employ spur gears and helical gears. Helical gears are used for low-noise, high-strength performance.

● Spur Gear

The spur gear is a cylindrical gear on which the teeth are cut parallel to the shaft.

● Helical Gear

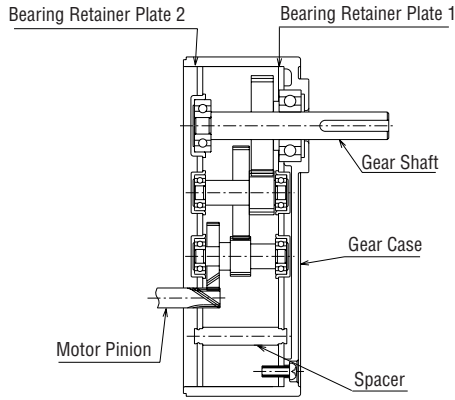
The helical gear is a cylindrical gear having teeth cut in a helical curve. Its high rate of contact, as compared to the spur gear, has the advantages of low noise and higher strength, but its axial thrust calls for careful consideration in design.



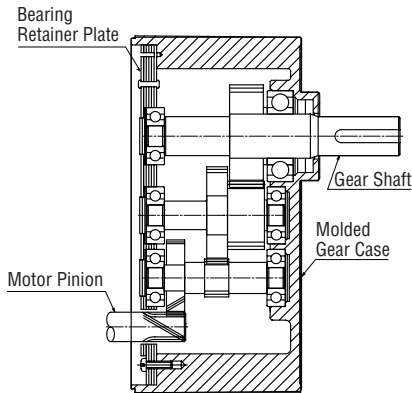
In both types of gearheads, the helical configuration is employed for the motor pinion and its mating gear. This contributes significantly to noise because of their high contact speeds, thereby achieving lower noise output.

The high-strength **GV** gearhead achieves total noise reduction by increasing the rigidity of the gear case while limiting the effect of alignment error at each shaft. The **GV** gearhead motors, with their hardened gears and larger bearings, also generate high torque, being equivalent to two to three times the level produced by the general purpose **GN** and **GU** Series motors. Moreover, the rated service life of the **GV** Series is twice that of its counterparts, meaning the **GV** gearhead will survive 20,000 hours of operation if used under the same torque commonly expected of conventional models (**GN/GU** Series). Indeed, the **GV** Series provides a great way to extend maintenance intervals and save energy and resources.

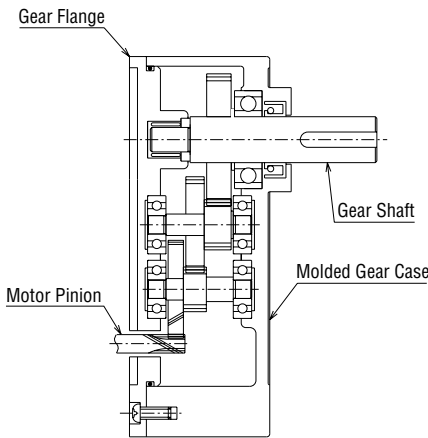
GN Gearhead



GU Gearhead



GV Gearhead



For use with general AC motors, many of which are fixed speed motors, the availability of various gear ratios suits a wide range of desired speeds. We support these motors with as many as 20 different gear ratios, ranging from 3:1 to 180:1.

● **Right-Angle Gearheads (solid and hollow shafts)**

The right-angle gearhead is designed to facilitate the efficient use of limited mounting space and the elimination of couplings and other power-transmission components (in the case of the hollow-shaft type). **RA** and **RH** right-angle shaft-type gearheads have worm gears, screw gears or hypoid gears.

Both right-angle gearheads incorporate right-angle gearing at the final stage, leaving the input end identical to that of the parallel shaft types. This facilitates the conversion from the parallel shaft to a right angle shaft gearhead without changing the motor.



Hollow Shaft



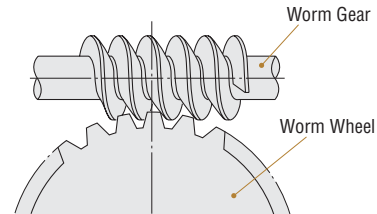
Solid Shaft

◆ **Worm Gears**

The worm gear transmits power from a single or multiple threaded worm to a mating worm wheel. The worm gear's application has been limited due to its relatively low efficiency and difficulty of manufacturing. Oriental Motor has successfully incorporated the worm gear based on its right-angle property and capacity for large gear ratios, and has improved its efficiency over conventional types by increasing the lead.

● **Worm Gears**

The worm gear transmits power from a single or multiple threaded worm to a mating worm wheel.

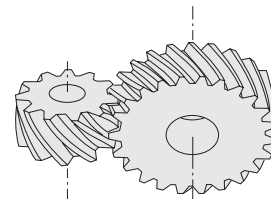


◆ **Screw Gears**

A single screw gear appears to be another regular helical gear. While the mating helical gears in the parallel shaft configuration have equal helix angles and contact with the helixes running in opposite directions, the screw gears are designed to contact their shafts crossing at right angles. Due to their point-to-point contact configuration, they're mainly used under relatively small loads, such as at low gear ratios with our right-angle gearheads.

● **Screw Gears**

These are helical gears used on offset shafts (neither perpendicular nor parallel to each other)





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