

RB-Pol-193

Pololu 6VDC, 1010 RPM 17 oz-in Gearmotor w/ Encoder



Description

This cylindrical, 2.38" x 0.98" x 0.98" gearmotor uses a brushed DC motor with extra-strong magnets and a 9.68:1 metal gearbox to deliver a lot of power in a relatively small package. It has an integrated 48 CPR quadrature encoder on the motor shaft, which provides 465 counts per revolution of the gearbox's output shaft. These units have a 0.315"-long, 4 mm-diameter D-shaped output shaft.

Gearmotor Options

These motors are intended for use at 6 V. In general, these kinds of motors can run at voltages above and below this nominal voltage, so they should comfortably operate in the 3 – 9 V range, though they can begin rotating at voltages as low as 1 V. Higher voltages could start negatively affecting the life of the motor.

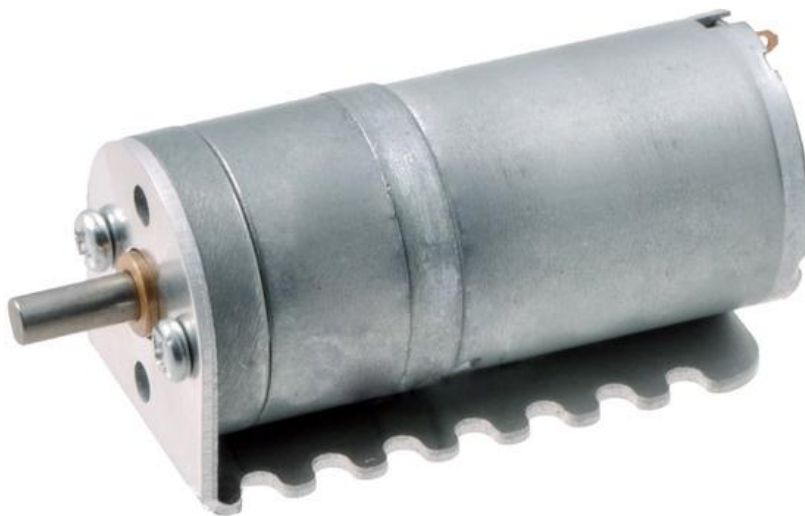
Gearmotor Dimensions

These gearmotors have output shafts with a diameter of 4 mm. The Pololu universal aluminum mounting hub for 4mm shafts can be used to mount our larger Pololu wheels (60mm-, 70mm-, 80mm-, and 90mm-diameter) or custom wheels and mechanisms to the gearmotor's output shaft (see the left

picture below). These are the same type of motors used in the Wild Thumper all-terrain chassis, and the gearbox's output shaft works directly with the 120mm-diameter Wild Thumper wheels.



The face plate has two mounting holes threaded for M3 screws. You can use our custom-designed 25D mm metal gearmotor bracket (shown in the picture below) to mount the gearmotor to your project via these mounting holes and the screws that come with the bracket.



Using the Encoder



A two-channel Hall effect encoder is used to sense the rotation of a magnetic disk on a rear protrusion of the motor shaft. The quadrature encoder provides a resolution of 48 counts per revolution of the motor shaft. To compute the counts per revolution of the gearbox output, multiply the gear ratio by 48. The motor/encoder has six color-coded, 11" (28 cm) leads:

Color	Function
Black	motor power
Red	motor power
Blue	Hall sensor Vcc (3.5 – 20 V)
Green	Hall sensor GND
Yellow	Hall sensor A output
White	Hall sensor B output

These leads have stripped, unterminated ends that can be soldered or crimped to make solder free connectors. The Hall sensor requires an input voltage, V_{cc} , between 3.5 and 20 V and draws a maximum of 10 mA. The A and B outputs are square waves from 0 V to V_{cc} approximately 90° out of phase. The frequency of the transitions tells you the speed of the motor, and the order of the transitions tells you the direction. The following oscilloscope capture shows the A and B (yellow and white) encoder outputs using a motor voltage of 6 V and a Hall sensor V_{cc} of 5 V:



By counting both the rising and falling edges of both the A and B outputs, it is possible to get 48 counts per revolution of the motor shaft. Using just a single edge of one channel results in 12 counts per revolution of the motor shaft, so the frequency of the A output in the above oscilloscope capture is 12 times the motor rotation frequency.