Motor with 64 CPR Encoder for 37D mm Metal Gearmotors (No Gearbox)

Pololu item #: 2821 **30** in stock
Brand: Pololu
Status: Active and Preferred
Free shipping in USA

Price break	Unit price (US$)
1	24.95
10	22.46

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This is the motor and encoder portion of our 37D mm metal gearmotors with 64 CPR encoders. It does not include a gearbox, but the pinion gear on the output shaft works with all of our 37D mm gearmotor gearboxes, so this can be used as a replacement motor or encoder for those gearboxes. It is intended for use at 12 V, though the motor can begin rotating at voltages as low as 1 V.

Key specs at **12 V**: 11,000 RPM and 300 mA free-run, 5 oz-in (0.3 kg-cm) and 5 A stall.

Alternatives available with variations in these parameter(s): **gear ratio**. Select variant

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Overview

This motor with integrated 64 CPR (counts per revolution) quadrature encoder is intended as a replacement motor and encoder for our **37D mm metal gearmotors**. The 2mm output shaft has a non-removable pinion gear that works with all of our 37D mm gearmotor gearboxes. Note that we do not sell the 37D mm gearboxes separately, but if you have a gearmotor with a damaged motor or encoder (or if you want to effectively add an encoder to a version without an encoder), you can transfer the gearbox to this replacement motor.

The motor has a diameter of 34.5 mm (1.36 in) and a length of approximately 44 mm (1.7 in) from the top of the motor can to the bottom of the encoder. The top of the motor has six mounting holes evenly spaced around the outer edge threaded for M2.5 screws. These mounting holes form a regular hexagon, with the center of each hole located 13 mm from the center of the output shaft.. The mounting holes have a depth of approximately 3.5 mm.

Pinion Gear Specs

- Metric with module m = 0.5
- Number of teeth: 10
- Face thickness: 4 mm
- Pressure angle: 20°
- Gear position: 9 mm from top of motor to top of gear

Gearmotor Options

You will typically want to combine this motor with a gearbox to give it a more appropriate combination of torque and speed (without a gearbox, it offers very high speed with very low torque). Our 37D mm line of metal gearmotors consist of this motor combined with different gearboxes. We do not carry the gearboxes by themselves, so unless you are looking at this as a replacement motor for a compatible gearbox you already have, we strongly recommend you consider getting a preassembled gearmotor with the gear ratio that best suits your project requirements.

Gear Ratio	No-Load Speed @ 12 V	Stall Torque @ 12 V	Stall Current @ 12 V		

				 With Encoder	 Without Encoder
1:1	11,000 RPM	5 oz-in	5 A	**motor without gearbox**	
19:1	500 RPM	84 oz-in	5 A	**37Dx68L mm**	**37Dx52L mm**
30:1	350 RPM	110 oz-in	5 A	**37Dx68L mm**	**37Dx52L mm**
50:1	200 RPM	170 oz-in	5 A	**37Dx70L mm**	**37Dx54L mm**
70:1	150 RPM	200 oz-in	5 A	**37Dx70L mm**	**37Dx54L mm**
100:1	100 RPM	220 oz-in	5 A	**37Dx73L mm**	**37Dx57L mm**
131:1	80 RPM	250 oz-in	5 A	**37Dx73L mm**	**37Dx57L mm**

Note: Stalling or overloading gearmotors can greatly decrease their lifetimes and even result in immediate damage. Stalls can also result in rapid (potentially on the order of seconds) thermal damage to the motor windings and brushes; a general recommendation for brushed DC motor operation is 25% or less of the stall current.

This motor is intended for use at 12 V, though in general, these kinds of motors can run at voltages above and below the nominal voltage (this motor can begin rotating at voltages as low as 1 V). Lower voltages might not be practical, and higher voltages could start negatively affecting the life of the motor.

This motor is functionally identical to the previous version we carried **without end caps** (it is the same motor and encoder). The black plastic end cap is easily removable if you need to access the encoder or want to slightly reduce the overall motor size, but there is a little bit of base plastic that will remain, as can be seen in the pictures below that show this motor combined with a gearbox:

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 64 counts per revolution of the motor shaft when counting both edges of both channels. To compute the counts per revolution of the gearbox output, multiply the gear ratio by 64. The motor/encoder has six color-coded, 11" (28 cm) leads terminated by a 1×6 female header with a 0.1″ pitch, as shown in the main product picture. This header works with standard **0.1″ male headers** and our male **jumper** and **precrimped wires**. If this header is not convenient for your application, you can pull the crimped wires out of the header or cut the header off. The following table describes the wire functions:

37D mm metal gearmotor with 64 CPR encoder (with end cap removed).

Color	Function
Red	motor power (connects to one motor terminal)
Black	motor power (connects to the other motor terminal)
Green	encoder GND
Blue	encoder Vcc (3.5 – 20 V)
Yellow	encoder A output

White	encoder B output

The Hall sensor requires an input voltage, Vcc, 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 Vcc 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 12 V and a Hall sensor Vcc of 5 V:

Encoder A and B outputs for 37D mm metal gearmotor with 64 CPR encoder (motor running at 12 V).

By counting both the rising and falling edges of both the A and B outputs, it is possible to get 64 counts per revolution of the motor shaft. Using just a single edge of one channel results in 16 counts per revolution of the motor shaft, so the frequency of the A output