<u>28STH32 NEMA-11 Bipolar Stepper with</u> <u>100:1 Gearbox</u>



This NEMA-11 motor has a Planetary gearbox with a $99^{1044}/_{2057}$:1 ratio. It comes with the rear shaft exposed, so you can mount an encoder or shaft coupler. See the "Compatible Products" tab for a complete list of attachments.

When connected to a <u>1067 – PhidgetStepper Bipolar HC</u>, the 3322 has a maximum speed 35 RPM. At the output of the gearbox, the step angle is approximately 0.018?°. When using the step angle in calculations, you should derive the exact step angle by dividing 1.8?° by the gearbox reduction ratio. See the "Compatible Products" tab for wiring details.

At 0.67 Amps, this stepper motor can produce a maximum torque of 60 kg-cm. However, the gearbox is only rated for 32 kg-cm of continuous torque. Loading this gearbox stepper beyond the torque rating of the gearbox will shorten its useful life.

Connection

This motor must be controlled by a constant current or chopper drive controller. You can find a list of suitable controllers on the **Compatible Products**tab. There you will also find compatible attachments such as encoders, mounting hardware, and transmission hardware.

Warning

Connecting the motor directly to a power supply will destroy the motor and void the warranty. If you want to check your motor make sure it is connected to a constant current / chopper drive controller.

Product Specifications

Motor Type Bipolar Stepper Manufacturer Part Number 28STH32-0674B / 28JXS40K100 Step Angle 0.018° ± 5 % Step Accuracy Holding Torque 32 kg·cm Rated Torque 32 kg·cm Maximum Speed (w/1067 Motor Controller) 35 RPM Acceleration at Max Speed 1.5E+06 1/16 steps/sec² (w/1067 Motor Controller) **Electrical Properties** Recommended Voltage 12 V DC 670 mA Rated Current Coil Resistance 5.6 Phase Inductance 3.4 mH **Physical Properties** Shaft Diameter 6 mm Rear Shaft Diameter 3.9 mm Mounting Plate Size NEMA - 11Weight 243.6 g Number of Leads 4 300 mm Wire Length **Gearbox Properties** Gearbox Type Planetary **99** 1044 Gear Ratio Backlash Error $1 \operatorname{^{1}\Pi_{2}^{\circ}}$ Maximum Strength of Gears 32 kg·cm Shaft Maximum Axial Load 25 N Shaft Maximum Radial Load 35 N

Documents

- Stepper Motor and Controller Primer
- Mechanical Drawings

Projects

- Motor Music: Play MIDI Files using Phidget Stepper Motors (June 1, 2015)
- How To Avoid Resonance Issues in Stepper Motors (July 28, 2014)
- <u>Steppers with Encoders: When Open-loop Control Is Not Enough</u> (May 13, 2014)

Motor Controllers

This motor must be controlled by a stepper motor controller. This diagram shows how to connect the motor wires to the controller to produce a clockwise rotation in the stepper motor when increasing position. To wire for counterclockwise rotation when increasing position, reverse the red and blue wires.

Note: Make sure to unplug the power cord from the motor controller before switching wires around.

The following stepper controllers can be used to drive this motor:

Product		Controller Properties				Electrical Properties
Part N	lumber	Motor Position Stepper Stepper Resolution Resolution Resolution				Available Current per Coil Max
<u>1067_0</u>	<u>)B</u>	¹ □ ₁₆ Step (40-Bit Signed)	1 1/16 steps/sec	250000 1/16 steps/sec	4	A
<u>STC100</u>	<u>00_0</u>	¹ □ ₁₆ Step (40-Bit Signed)	1 1/16 steps/sec	115000 1/16 steps/sec	4	A

Encoders

The rear shaft of this motor can be equipped with an encoder for applications

where you need to keep track of the exact position, velocity, or acceleration of the motor. The mounting holes on the back of this motor are compatible with the following encoders:

ProductEncoder PropertiesPart NumberOutput Circuit TypeEncoder Resolution Encoder Speed Max3531_0Push-Pull (Single-Ended) 300 CPR6000 RPM

Shaft Couplers

If you need to connect the main shaft of this motor to the shaft of another device, you can use a shaft coupler:

Product		Physical Properties			
Part Number	Inner Diameter	Material	Coupling Rated Torque	Coupling Rated Speed	Torsional Stiffness
<u>3422_0</u>	6 mm	Aluminium	4.1 kg?∙cm	10000 RPM	100 N?∙m/rad
<u>3426_0</u>	6 mm	Aluminium	60.7 kg?·cm	16000 RPM	63 N?∙m⁄rad

Pulleys and Sprockets

If you're using this motor to drive a rotary system that requires a lot of torque, you may be interested in pulleys and sprockets. By using a two pulleys or sprockets of different sizes, you can increase the gear ratio of the motor. Pulleys and sprockets can also be used to transmit the motor's rotation over a long distance. For more guidance on building a transmission system, visit our <u>Rotary Motion Primer</u>. Here is a list of our 6mm bore pulleys and sprockets:

Product					Physical	Propert	ies	
Part	Nun	nber	Ir	nner	Diameter	Number	of	Teeth
TRM41	L <mark>62</mark>	<u>0</u>	6	mm		22		