42STH38 NEMA-17 Bipolar Stepper with 51:1 Gearbox

This NEMA-17 motor has an integrated Planetary gearbox with a $50^{4397}/_{4913}$: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 1067 – PhidgetStepper Bipolar HC, the 3328 has a maximum speed of 63 RPM. At the output of the gearbox, the step angle is approximately 0.035?°. 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 1.7 Amps, this stepper motor can produce a maximum torque of 180 kg-cm. However, the gearbox is only rated for 48 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 Properties	
Motor Type	Bipolar Stepper
Manufacturer Part Number	42STH38-1684B / 36JXS60K51
Step Angle	0.035?°
Step Accuracy	?± 5 %
Holding Torque	48 kg?·cm
Rated Torque	48 kg?·cm
Maximum Speed (w/1067 Motor Controller)	63 RPM
Acceleration at Max Speed (w/1067 Motor Controller)	1.35E+06 1/16 steps/sec?²
Electrical Properties	
Recommended Voltage	12 V DC
Rated Current	1.7 A
Coil Resistance	1.7 ?©
Phase Inductance	3.2 mH
Physical Properties	
Shaft Diameter	8 mm
Rear Shaft Diameter	3.9 mm
Mounting Plate Size	NEMA – 17
Weight	564 g
Number of Leads	4
Wire Length	300 mm
Gearbox Properties	
Gearbox Type	Planetary
Gear Ratio	50 $^{4397}\square_{4913}$: 1
Backlash Error	1 $^{1}\square_{2}$?°
Maximum Strength of Gears	48 kg?·cm
Shaft Maximum Axial Load	49.1 N
Shaft Maximum Radial Load	98.1 N

Documents

- Mechanical Drawings
- Stepper Motor and Controller Primer

Projects

- Motor Music: Play MIDI Files using Phidget Stepper Motors (June 1, 2015)
- How To Avoid Resonance Issues in Stepper Motors (July 28, 2014)
- Steppers with Encoders: When Open-loop Control Is Not Enough (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 counter-clockwise 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 Number	**Motor Position Resolution**	**Stepper Velocity Resolution**	**Stepper Velocity Max**	**Available Current per Coil Max**
1067_0B	$\frac{1}{16}$ Step (40-Bit Signed)	1 1/16 steps/sec	250000 1/16 steps/sec	4 A
STC1000_0	$\frac{1}{16}$ 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:

Product	Encoder Properties		
Part Number	Output Circuit Type	Encoder Resolution	Encoder Speed Max
3531_0	Push-Pull (Single-Ended)	300 CPR	6000 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
3423_0	8 mm	Aluminium	4.1 kg?·cm	10000 RPM
3427_0	8 mm	Aluminium	60.7 kg?·cm	16000 RPM
TRM4313_0	8 mm	Aluminum	35.7 kg?·cm	12000 RPM