42STH38 NEMA-17 Bipolar Precision Gearless Stepper

This NEMA-17 motor generates 3.6 Kg-cm of holding torque at 1.7 Amps. It comes with the rear shaft exposed, so you can mount an encoder or shaft coupler. See the hardware section for a list of compatible accessories.

This motor is particulary suited for precision applications due to its 0.9?° step angle.

When connected to a 1067 – PhidgetStepper Bipolar HC, the 3340 has a maximum speed of 2344 RPM.

Connection

The following table shows how to connect the motor wires to the board connectors 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.

Wire Color	Black	Green	Red	Blue
Board Connector	A	B	C	D

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

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. See the hardware section for a list of compatible devices.

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	42STH38-1684MB-12
Step Angle	0.9?°
Step Accuracy	?± 5 %
Holding Torque	3.6 kg?·cm
Rated Torque	3.3 kg?·cm
Maximum Speed (w/1067 Motor Controller)	2344 RPM
Acceleration at Max Speed (w/1067 Motor Controller)	1E+06 1/16 steps/sec?²
Electrical Properties	
Recommended Voltage	12 V DC
Rated Current	1.7 A
Coil Resistance	1.7 ?©
Phase Inductance	4.1 mH
Physical Properties	
Shaft Diameter	5 mm
Rear Shaft Diameter	3.9 mm
Mounting Plate Size	NEMA – 17
Weight	288 g
Number of Leads	4
Wire Length	300 mm

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)

- Steppers with Encoders: When Open-loop Control Is Not Enough (May 13, 2014)

This stepper motor can be used with the following motor controllers:

Product	Controller Properties			Electrical Properties
Part Number	Motor Position Resolution	Stepper Velocity Resolution	Stepper Velocity Max	Available Current per Coil Max
1067_0B	$^{1}/_{16}$ Step (40-Bit Signed)	1 1/16 steps/sec	250000 1/16 steps/sec	4 A
STC1000_0	$^{1}/_{16}$ 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	Torsional Stiffness
3421_0	5 mm	Aluminium	4.1 kg?·cm	10000 RPM	100 N?·m/rad
3425_0	5 mm	Aluminium	60.7 kg?·cm	16000 RPM	63 N?·m/rad

Product	Physical Properties				
Part Number	Inner Diameter	Material	Coupling Rated Torque	Coupling Rated Speed	Torsional Stiffness
TRM4311_0	5 mm	Aluminum	35.7 kg?·cm	12000 RPM	?€”
TRM4333_0	5 mm	Aluminium	10 kg?·cm	8000 RPM	110 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 Rotary Motion Primer. Here is a list of our 5mm bore pulleys and sprockets:

Product	Physical Properties	
Part Number	Inner Diameter	Number of Teeth
TRM4100_0	5 mm	16