[86STH156 NEMA-34 Bipolar Gearless Large Stepper](#)

This NEMA-34 motor generates 122 kg-cm of holding torque at 4.2 Amps. 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 3336 has a maximum speed of 1500 RPM. See the "Compatible Products" tab for wiring details.

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.
This motor is large enough that the back EMF generated from stalling or changing directions could easily damage your motor controller. If you're planning on using this motor in high-speed or high-torque applications, feel free to contact us for advice.

Product Specifications

Motor Properties	
Motor Type	Bipolar Stepper
Manufacturer Part Number	86STH156-4208B
Step Angle	1.8?°

Step Accuracy	?± 5 %
Holding Torque	122 kg?·cm
Rated Torque	106 kg?·cm
Maximum Speed (w/1067 Motor Controller)	1500 RPM
Acceleration at Max Speed (w/1067 Motor Controller)	15000 1/16 steps/sec?^{2}

Electrical Properties

Recommended Voltage	30 V DC
Coil Resistance	900 m?©
Rated Current (Series Wiring)	3 A
Rated Current (Parallel Wiring)	6 A
Phase Inductance	8 mH

Physical Properties

Shaft Diameter	$\frac{5}{8}$?€^{3}
Rear Shaft Diameter	3.9 mm
Mounting Plate Size	NEMA — 34
Weight	5.2 kg
Number of Leads	8
Wire Length	400 mm

Documents

- Stepper Motor and Controller Primer

- Mechanical Drawings

- Download 3D Step File

Projects

- Motor Music: Play MIDI Files using Phidget Stepper Motors (June 1, 2015)

- How To Avoid Resonance Issues in Stepper Motors (July 28, 2014)

- Using Steppers In High-Energy Applications (June 3, 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. These diagrams show to wiring configurations: series and parallel. Series wiring will result in higher torque when the motor is stopped or at low speeds. Parallel wiring will provide better torque at higher speeds, but less torque overall. Since the current in parallel mode is split between two paths, the current rating is doubled. When connecting motor wires to one another, you must solder or screw clamp them together rather than just twisting them together.

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
TRM4321_0	$^5\Box_8$?€³	Aluminum	611.8 kg·cm	4000 RPM

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 5/8″ bore pulleys and sprockets:

Product	Physical Properties	
Part Number	Inner Diameter	Number of Teeth
TRM4127_0	$^5\Box_8$?€³	24
TRM4150_0	$^5\Box_8$?€³	9