

# ACTUATORS & DAMPERS

## Geared Stepper Motors

Stepper motors are a popular choice for applications that require high torque density, simple control, and unpowered holding torque. Low-backlash planetary gearing and output position sensors can be added to offer an integrated actuator solution. The actuator design incorporates standard interfaces to provide a cost-effective and flexible architecture. A limited set of configurations are available as standard products to minimize cost and lead time, while a wider range of performance requirements can be met with custom configurations.



# HONEYBEE ROBOTICS

A BLUE ORIGIN COMPANY

Part Number		560-101-0050	560-101-0051	560-101-0052
<b>Mechanical Parameters</b>				
	<b>Units</b>			
Frame Size	-	C	C	C
Overall Length	in [mm]	3.15 [80.1]	3.15 [80.1]	3.15 [80.1]
Nominal OD	in [mm]	1.00 [25.4]	1.00 [25.4]	1.00 [25.4]
Mass	lbm [kg]	0.45 [0.2]	0.45 [0.2]	0.45 [0.2]
<b>Operational Parameters</b>				
	<b>Units</b>			
Drive Type	-	6 Step or 2 Legs Tied	Bipolar	Bipolar
Phases	#	3	2	2
Number of Pole Pairs	-	4	3	3
Full Step Size	deg [rad]	0.42 [0.0073]	0.83 [0.014]	0.83 [0.014]
No Load Response Rate	pulses/sec	559	299	326
	degrees/sec [rad/s]	233 [4.06]	250 [4.36]	271 [4.72]
Torque at Low Pulse Rate	lbf-in [N·m]	8.96 [1.01]	2.38 [0.27]	4.05 [0.45]
Powered Holding Torque	lbf-in [N·m]	12.67 [1.43]	4.75 [0.71]	5.73 [0.65]
Unpowered Holding Torque	lbf-in [N·m]	1.0 [0.113]	1.2 [0.135]	1.2 [0.135]
Operating Temperature Range	°C	-60 to +100	-60 to +100	-60 to +100
Survival Temperature Range	°C	-80 to +200	-80 to +200	-80 to +200
<b>Motor Parameters</b>				
	<b>Units</b>			
Rotor Inertia	Oz-in-s <sup>2</sup> x10 <sup>-3</sup> [g·cm <sup>2</sup> ]	0.04 [2.7]	0.038 [2.71]	0.038 [2.71]
Phase Resistance	Ω	94 – 116	207 – 253	144 – 176
Phase Inductance	mH	14	30	42
<b>Gearbox Parameters</b>				
	<b>Units</b>			
Gearbox Type	-	Planetary	Planetary	Planetary
Redundancy	-	No	Yes	No
Gear Reduction	-	36:1	36:1	36:1
Typical Backlash	°	1.25°	1.25°	1.25°

Release Date: 2026-04-13



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