

ACTUATORS & DAMPERS

Brushless Direct Current (BLDC) Motors

Honeybee Robotics' precision BLDC motors are designed for applications that require high output power and smooth motion. Low-backlash planetary gearing and commutation sensors are typically added to offer an integrated actuator solution. The actuator design incorporates standard interfaces to provide the most 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.



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HONEYBEE ROBOTICS

A BLUE ORIGIN COMPANY

Part Number		560-101-0049	560-131-0029	560-131-0028	560-151-0026
Mechanical Parameters		Units			
Frame Size	-	C	F	F	F
Overall Length	in [mm]	3.80 [96.5]	3.74 [94.9]	3.69 [93.7]	5.00 [127]
Nominal OD	in [mm]	1.00 [25.4]	1.50 [38.1]	1.50 [38.1]	1.50 [38.1]
Mass	lbm [kg]	0.55 [0.3]	1.10 [0.5]	1.10 [0.5]	1.60 [0.7]
Rotor Inertia	Oz-in-s ² x10 ⁻³ [g-cm ²]	0.044 [3.1]	0.249 [17.6]	0.317 [22.4]	0.317 [22.4]
Operational Parameters		Units			
Nominal Operational Voltage	V _{DC}	28	28	28	28
Maximum Allowable Current Limit	A _{DC}	1.6	6.5	4.5	4.5
No Load Speed	RPM	85	450	625	75
Stall Torque	lbf-in [N·m]	36 [4.0]	29.0 [3.3]	13.7 [1.5]	110 [12.4]
Torque Limit [10,000 cycle fatigue life]	lbf-in [N·m]	36 [4.0]	24 [2.7]	13.7 [1.5]	110 [12.4]
Torque Limit [1,000,000 cycle fatigue life]	lbf-in [N·m]	11.2 [1.3]	4.7 [0.5]	4.7 [0.5]	31 [3.5]
Operational Temperature Range	°C	-60 to +100	-60 to +100	-55 to +90	-55 to +90
Survival Temperature Range	°C	-80 to +200	-80 to +200	-65 to +150	-65 to +150
Motor Parameters		Units			
Number of Phases	-	3	3	3	3
Number of Pole Pairs	-	2	2	2	2
Back EMF Constant	V _{PEAK} /rad/s	0.052	0.054	0.038	0.038
Torque Constant	lbf-in/A _{PEAK} [N·m/A _{PEAK}]	0.46 [0.052]	0.48 [0.054]	0.34 [0.038]	0.34 [0.038]
Motor Constant	lbf-in/√W [N·m/√W]	0.12 [0.014]	0.35 [0.039]	0.23 [0.026]	0.23 [0.026]
Resistance (Line-Line)	Ω	12 - 16	1.7 - 2.1	1.6 - 2.7	1.6 - 2.7
Inductance (Line-Line)	mH	3.0 - 5.0	0.4 - 0.6	0.5 - 0.8	0.5 - 0.8
Commutation Sensor Parameters		Units			
Sensor Type	-	Variable Reluctance Resolver	Variable Reluctance Resolver	Bi-Polar Latching Hall Effect Sensor	Bi-Polar Latching Hall Effect Sensor
Redundancy	-	No	No	Yes	Yes
Supply Voltage	V _{DC}	N/A	N/A	4.5 - 24	4.5 - 24
Excitation Frequency	kHz	20	20	N/A	N/A
Excitation Voltage	V _{RMS}	5.1	2.2	N/A	N/A
Transformation Ratio (Output/Input)	-	0.4	0.3	N/A	N/A
Resolver Speed	-	2X	2X	N/A	N/A
Gearbox Parameters		Units			
Gearbox Type	-	Planetary	Planetary	Planetary	Planetary
Gear Reduction	-	60:1	10.7:1 (32:3)	10.7:1 (32.3)	85.3:1 (256:3)
Typical Backlash	°	1	1.25	1.25	1.50