

HONEYBEE ROBOTICS

ACTUATORS & DAMPERS



BRUSHLESS DC MOTORS

Honeybee Robotics offers precision Brushless DC (BLDC) motors for applications that require high output power and smooth motion. These motors use a commutation sensor, typically resolvers or hall sensors, to drive the load more efficiently at higher torques and speeds. Honeybee has the capability to incorporate motors with low-backlash planetary gearing and output position sensors to result in a high-performance integrated actuator solution. These components are designed to be integrated together with standard interfaces to provide a cost-effective solution. A limited set of qualified actuator configurations are available as turnkey products to minimize cost and lead time, while a wider range of performance requirements can be met with custom configurations.



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RELEASE DATE: 2024-04-10

MOTOR TYPE		C-SIZE BLDC (RESOLVER), 3-PHASE, 60:1	F-SIZE BLDC (RESOLVER), 3-PHASE, 10.67:1	F-SIZE BLDC (HALL), 3-PHASE REDUNDANT, 10.67:1	F-SIZE BLDC (HALL), 3-PHASE REDUNDANT, 85.3:1
PART NUMBER		560-101-0049	560-131-0029	560-131-0028	560-151-0026
MECHANICAL PARAMETERS		UNITS			
Frame Size	-	C	F	F	F
Axial Length	inches [mm]	3.8 [97.53]	3.8 [98.01]	3.9 [99.92]	5.3 [135.45]
Maximum OD ⁷	inches [mm]	1.0 [25.4]	1.5 [38.1]	1.5 [38.1]	1.5 [38.1]
Mass	lbm [kg]	.55 [.25]	1.1 [.5]	1.1 [.5]	1.6 [.73]
Rotor Inertia	oz-in-sec ² x10 ⁻³ [g-cm ²]	0.044 [3.11]	0.249 [17.6]	0.317 [22.4]	0.317 [22.4]
Operating Temperature Range	°C	-60 - 200	-60 - 200	-60 - 200	-60 - 200
MOTOR PARAMETERS		UNITS			
Drive Type	-	Trapezoidal/Sinusoidal	Trapezoidal/Sinusoidal	Trapezoidal (6-Step)	Trapezoidal (6-Step)
Number of Phases	-	3	3	3	3
Number of Pole Pairs	-	2	2	2	2
Redundancy	-	Simplex	Simplex	Redundant	Redundant
No Load Speed ¹	RPM	79.5	449.3	625.0	78.0
Stall Torque ²	lbf-in [N-m]	14.9 [1.7] ²	29 [3.3]	7.3 [0.8]	35 [4] ²
Steady State Current Limit ²	A	0.652	6.5	2.5	1.62
Back EMF Constant ⁵	VPeak/rad/s	0.0522	0.054	0.038	0.038
Torque Constant ^{5,6}	lbf-in/Apeak [N-m/Apeak]	0.46 [0.052]	0.48 [0.054]	0.34 [0.038]	0.34 [0.038]
Motor Constant ⁵	lbf-in/sqrt(W) [N-m/sqrt(W)]	0.12 [0.014]	0.35 [0.039]	0.23 [0.026]	0.23 [0.026]
Resistance ³	Ohms	12.0 - 16.0	1.7 - 2.1	1.6 - 2.7	1.6 - 2.7
Inductance ³	mH	3.0 - 5.0	0.4 - 0.6	0.5 - 0.8	0.5 - 0.8
Maximum Allowable Winding Temperature	°C	200	200	200	200
COMMUTATION SENSOR PARAMETERS		UNITS			
Sensor Type	-	Variable Reluctance Resolver	Variable Reluctance Resolver	Hall Effect Sensor	Hall Effect Sensor
Redundancy	-	Simplex	Simplex	Redundant	Redundant
Excitation Frequency	kHz	20	20	N/A	N/A
Excitation Voltage	Vrms	5.1	2.2	4.5-24 (Supply Voltage)	4.5-24 (Supply Voltage)
Sine and Cosine Output Voltage	Vrms	1.8	0.7	N/A	N/A
Transformation Ratio	-	0.4	0.3	N/A	N/A
Electrical Cycles per Mechanical Cycle	-	2	2	N/A	N/A
GEARBOX PARAMETERS		UNITS			
Gearbox Type	-	Planetary	Planetary	Planetary	Planetary
Gear Reduction	-	60:1	10.67:1	10.67:1	85.3:1
Number of Stages	-	2	1	1	2
Typical Mechanical Efficiency	%	81%	90%	90%	81%
Typical Backlash ⁴	°	1°	1.25°	1.25°	1.5°

1 - Assuming 28 VDC bus voltage at 22°C. Contact HBR for performance at other voltages and temperatures.

2 - Current limit and stall torque derated to gearbox load capacity limits, EEE-INST-0002 or electromagnetic saturation. Actual RMS current limit and stall torque will vary based on duty cycle and interface temperatures. Contact Honeybee Robotics for more information.

3 - Line to Line for 3-phase

4 - Total efficiency of both stages.

5 - At motor level

6 - Derived from Back EMF constant

7 - Mounting flange not included. See ICD for details.