



EC057A Series

The EC057A Series Brushless DC Motor is a high torque model brushless motor designed in a NEMA 23 package. It is offered in 3 motor lengths with continuous torque from 0.38 – 0.93 Nm.

EC Instrument Grade Motors

For applications that require uniform motion control at all speeds. Capable of high acceleration.

Benefits

- Speeds up to 6,000 RPM possible
- DC bus voltage up to 170 VDC
- NEMA 23 configuration
- Six standard windings
- 4 Pole rare earth design

Optional Assemblies

- Encoders: E30C/D, H Type, Q Type, C Type
- Programmable Drives: BGE6015A, BGE6060A

Motor Characteristics

Motor Data	Units	Part No.		
		EC057A-1	EC057A-2	EC057A-3
Max DC Terminal Voltage	V_T	170		
Max Speed (Mechanical)	ω_{MAX}	6000		
Continuous Stall Torque ¹	T_{CS}	Nm	0.38	0.71
		oz-in	54	100
Peak Torque (Maximum) ¹	T_{PK}	Nm	1.2	2.2
		oz-in	170	310
Coulomb Friction Torque	T_f	Nm	0.0075	0.013
		oz-in	1.1	1.8
Viscous Damping Factor	D	Nm/(rad/s)	2.0E-05	4.0E-05
		oz-in/krpm	0.30	0.60
Thermal Time Constant	τ_{th}	min	20	15
Thermal Resistance	R_{th}	°C/W	1.5	1.3
Max. Winding Temperature	Θ_{MAX}	°C	125	125
Rotor Inertia	J_r	kg-m ²	1.3E-05	2.6E-05
		oz-in-s ²	0.0019	0.0037
Motor Weight	W_m	g	660	1000
		oz	23	36

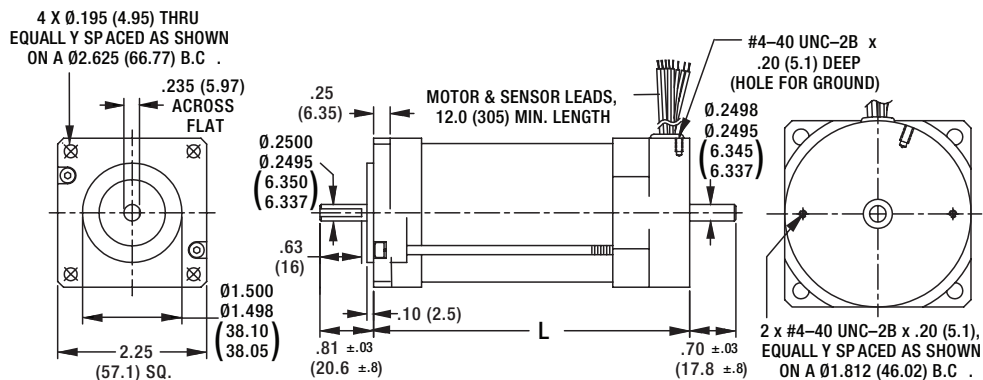
¹Recorded at maximum winding temperature at 25°C ambient and without heatsink.

Dimensional Drawings: EC057A-1 • EC057A-2 • EC057A-3

Dimensions = inches (mm)

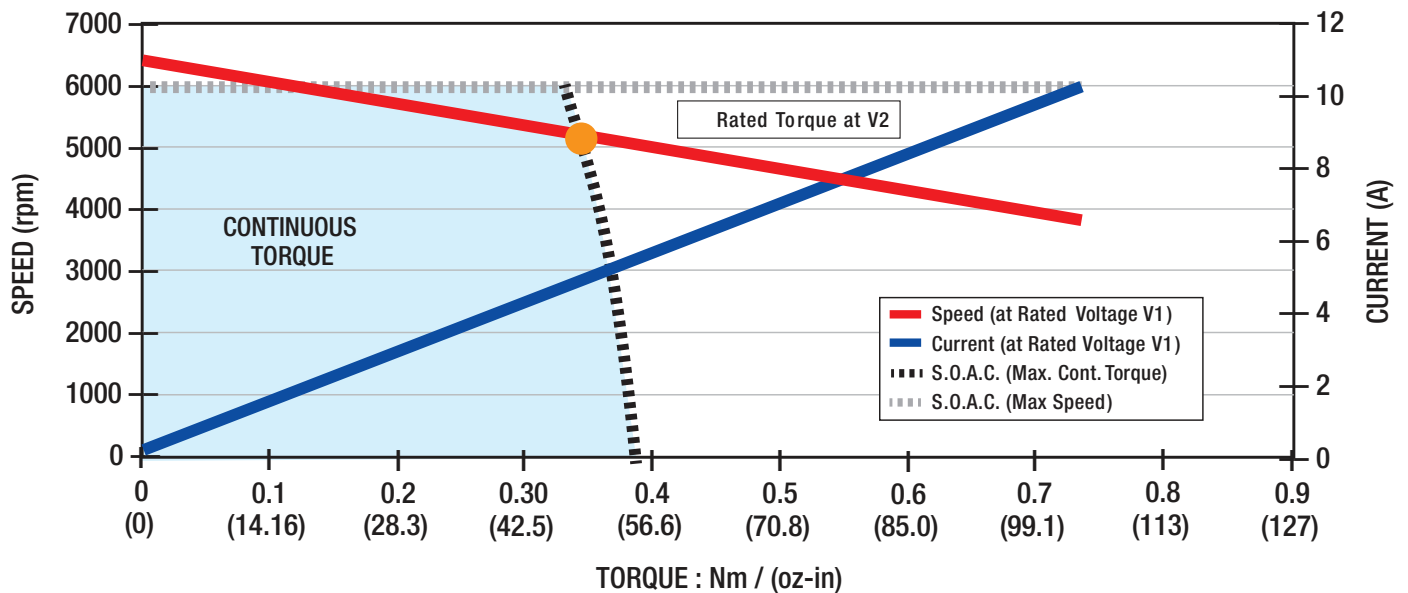
L = Lengths Available

- EC057A-1 = 2.8 (71.1)
- EC057A-2 = 3.8 (96.5)
- EC057A-3 = 4.8 (121.9)



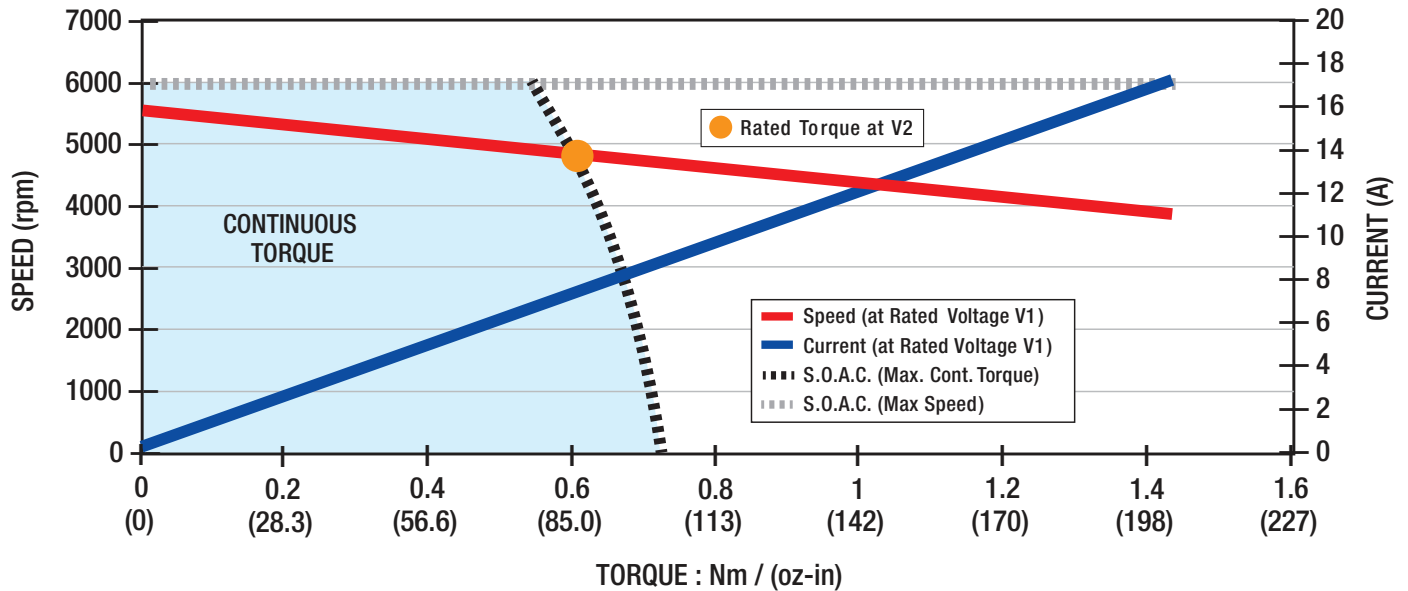
Motor Data		Units							
Rated Voltage V1	V_r	V	38.0	48.0	60.0	76.0	76.0	152	152
Rated Torque ¹ •	T_r	Nm	0.32	0.34	0.34	0.33	0.34	0.33	0.34
		oz-in	46	48	48	46	48	46	48
Rated Speed ¹	ω_r	rpm	6000	6000	6000	6000	6000	6000	6000
Rated Current ¹	I_r	A	9.6	7.4	5.9	4.8	3.7	2.4	2.4
Rated Power ¹	P_r	W	200	210	210	210	210	210	210
No Load Speed	ω_{nl}	rpm	6000	6000	6000	6000	6000	6000	6000
No Load Current	I_{nl}	A	0.51	0.38	0.31	0.26	0.19	0.13	0.13
Rated Voltage V2	V_r	V	24.0	30.0	38.0	48.0	48.0	76.0	76.0
Rated Torque ¹ •	T_r	Nm	0.34	0.36	0.36	0.34	0.37	0.36	0.37
		oz-in	48	51	50	49	53	51	53
Rated Speed ¹	ω_r	rpm	5180	4790	4870	5180	3560	3810	3620
Rated Current ¹	I_r	A	9.9	7.8	6.2	5.0	4.0	2.6	2.6
Rated Power ¹	P_r	W	180	180	180	190	140	140	140
No Load Speed	ω_{nl}	rpm	5670	5320	5390	5670	4250	4490	4310
No Load Current	I_{nl}	A	0.49	0.36	0.29	0.25	0.16	0.11	0.10
Motor Constant	K_M	Nm/ \sqrt{W}	0.072	0.074	0.074	0.073	0.074	0.072	0.074
		oz-in/ \sqrt{W}	10	10	10	10	10	10	10
Torque Constant	K_T	Nm/A	0.0401	0.0535	0.0668	0.0802	0.107	0.160	0.167
		oz-in/A	5.68	7.57	9.47	11.4	15.1	22.7	23.7
Voltage Constant	K_E	V/(rad/s)	0.0401	0.0535	0.0668	0.0802	0.107	0.160	0.167
		V/krpm	4.20	5.60	7.00	8.40	11.2	16.8	17.5
Terminal Resistance	R_{mt}	Ω	0.310	0.520	0.820	1.23	2.09	4.91	5.12
Inductance	L	mH	0.22	0.40	0.62	0.90	1.6	3.6	3.9
Peak Current	I_{pk}	A	33	26	20	17	13	8.4	8.1
Electrical Time Constant	τ_e	ms	0.71	0.77	0.76	0.73	0.77	0.73	0.76
Mechanical Time Constant	τ_m	ms	2.6	2.4	2.5	2.6	2.5	2.6	2.5

¹Recorded at maximum winding temperature at 25°C ambient and without heatsink.



Motor Data		Units							
Rated Voltage V1	V_r	V	48.0	60.0	76.0	121	152	152	170
Rated Torque ¹ •	T_r	Nm	0.53	0.52	0.54	0.53	0.53	0.53	0.53
		oz-in	75	73	77	75	74	75	75
Rated Speed ¹	ω_r	rpm	6000	6000	6000	6000	6000	6000	6000
Rated Current ¹	I_r	A	12	9.3	6.9	4.7	3.6	3.0	2.4
Rated Power ¹	P_r	W	330	330	340	330	330	330	330
No Load Speed	ω_{nl}	rpm	6000	6000	6000	6000	6000	6000	6000
No Load Current	I_{nl}	A	0.72	0.58	0.41	0.29	0.23	0.18	0.15
Rated Voltage V2	V_r	V	30.0	38.0	48.0	48.0	76.0	76.0	76.0
Rated Torque ¹ •	T_r	Nm	0.57	0.55	0.61	0.66	0.62	0.66	0.68
		oz-in	81	78	86	93	88	93	96
Rated Speed ¹	ω_r	rpm	5290	5410	4790	3080	3940	3040	2260
Rated Current ¹	I_r	A	13	9.8	7.6	5.7	4.2	3.6	2.9
Rated Power ¹	P_r	W	320	310	300	210	260	210	160
No Load Speed	ω_{nl}	rpm	5330	5400	4870	3410	4150	3370	2700
No Load Current	I_{nl}	A	0.67	0.54	0.36	0.21	0.18	0.13	0.092
Motor Constant	K_M	Nm/ \sqrt{W}	0.12	0.12	0.13	0.12	0.12	0.12	0.12
		oz-in/ \sqrt{W}	17	18	18	18	18	18	18
Torque Constant	K_T	Nm/A	0.0535	0.0668	0.0936	0.134	0.174	0.214	0.267
		oz-in/A	7.57	9.47	13.3	18.9	24.6	30.3	37.9
Voltage Constant	K_E	V/(rad/s)	0.0535	0.0668	0.0936	0.134	0.174	0.214	0.267
		V/krpm	5.60	7.00	9.80	14.0	18.2	22.4	28.0
Terminal Resistance	R_{mt}	Ω	0.190	0.290	0.540	1.16	1.96	2.96	4.64
Inductance	L	mH	0.17	0.26	0.52	1.1	1.8	2.7	4.3
Peak Current	I_{pk}	A	45	36	27	18	14	11	9.3
Electrical Time Constant	τ_e	ms	0.89	0.90	0.96	0.92	0.92	0.92	0.92
Mechanical Time Constant	τ_m	ms	1.7	1.7	1.6	1.7	1.7	1.7	1.7

¹Recorded at maximum winding temperature at 25°C ambient and without heatsink.



Motor Data		Units						
Rated Voltage V1	V _r	V	48.0	60.0	76.0	76.0	152	152
Rated Torque ¹ •	T _r	Nm	0.51	0.50	0.50	0.50	0.51	0.71
		oz-in	72	70	71	71	72	100
Rated Speed ¹	ω _r	rpm	6000	6000	6000	6000	6000	4570
Rated Current ¹	I _r	A	11	7.9	6.4	5.3	3.2	2.7
Rated Power ¹	P _r	W	320	310	310	320	320	340
No Load Speed	ω _{nl}	rpm	6000	6000	6000	6000	6000	4500
No Load Current	I _{nl}	A	1.2	0.84	0.67	0.56	0.34	0.17
Rated Voltage V2	V _r	V	30.0	38.0	48.0	48.0	76.0	76.0
Rated Torque ¹ •	T _r	Nm	0.66	0.68	0.68	0.76	0.80	0.91
		oz-in	94	97	96	110	110	130
Rated Speed ¹	ω _r	rpm	4830	4560	4610	3700	3490	1930
Rated Current ¹	I _r	A	13	10	8.2	7.6	4.7	3.3
Rated Power ¹	P _r	W	340	330	330	300	290	180
No Load Speed	ω _{nl}	rpm	4740	4500	4550	3790	3600	2250
No Load Current	I _{nl}	A	0.94	0.68	0.55	0.41	0.24	0.11
Motor Constant	K _M	Nm/√W	0.16	0.16	0.16	0.16	0.16	0.16
		oz-in/√W	22	22	22	22	23	23
Torque Constant	K _T	Nm/A	0.0602	0.0802	0.100	0.120	0.201	0.321
		oz-in/A	8.52	11.4	14.2	17.0	28.4	45.4
Voltage Constant	K _E	V/(rad/s)	0.0602	0.0802	0.100	0.120	0.201	0.321
		V/krpm	6.30	8.40	10.5	12.6	21.0	33.6
Terminal Resistance	R _{mt}	Ω	0.150	0.260	0.410	0.590	1.56	3.92
Inductance	L	mH	0.13	0.24	0.37	0.54	1.5	3.8
Peak Current	I _{pk}	A	54	39	33	27	17	11
Electrical Time Constant	τ _e	ms	0.87	0.92	0.90	0.92	0.96	0.98
Mechanical Time Constant	τ _m	ms	1.6	1.6	1.6	1.6	1.5	1.5

¹Recorded at maximum winding temperature at 25°C ambient and without heatsink.

