



EC057B Series

The EC057B Series Brushless DC Motor is a high torque density model brushless motor in a NEMA 23 configuration. It is offered in 4 motor lengths with continuous torque from 0.078 – 0.28 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, Q Type
- Gearbox: PLG52
- Programmable Drives: BGE6015A, BGE6060A

Motor Characteristics

Motor Data	Units	Part No.				
		EC057B-1	EC057B-2	EC057B-3	EC057B-4	
Max DC Terminal Voltage	V_T	170				
Max Speed (Mechanical)	ω_{MAX}	6000				
Continuous Stall Torque ¹	T_{CS}	Nm	0.15	0.32	0.40	0.59
		oz-in	21	45	56	83
Peak Torque (Maximum) ¹	T_{pk}	Nm	0.46	0.98	1.3	1.8
		oz-in	65	140	180	260
Coulomb Friction Torque	T_f	Nm	0.0049	0.0084	0.011	0.015
		oz-in	0.69	1.2	1.6	2.1
Viscous Damping Factor	D	Nm/(rad/s)	6.7E-06	1.3E-05	1.3E-05	2.0E-05
		oz-in/krpm	0.10	0.20	0.20	0.30
Thermal Time Constant	τ_{th}	min	10	10	15	15
Thermal Resistance	R_{th}	°C/W	4.8	3.1	2.8	2.1
Max. Winding Temperature	Θ_{MAX}	°C	125	125	125	125
Rotor Inertia	J_r	kg-m ²	7.1E-06	1.2E-05	1.8E-05	2.3E-05
		oz-in-s ²	0.0010	0.0017	0.0025	0.0032
Motor Weight	W_m	g	540	740	1000	1300
		oz	19	26	36	45

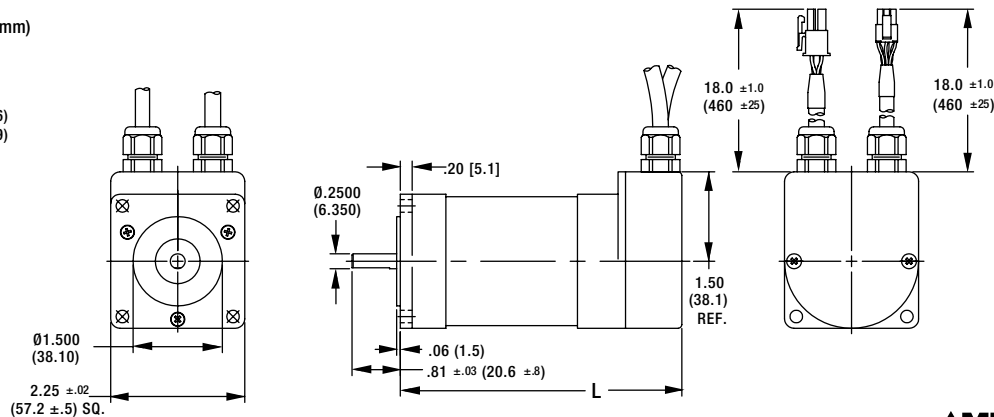
¹Recorded at maximum winding temperature at 25°C ambient and without heatsink.

Dimensional Drawings: EC057B-1 • EC057B-2 • EC057B-3 • EC057B-4

Dimensions = inches (mm)

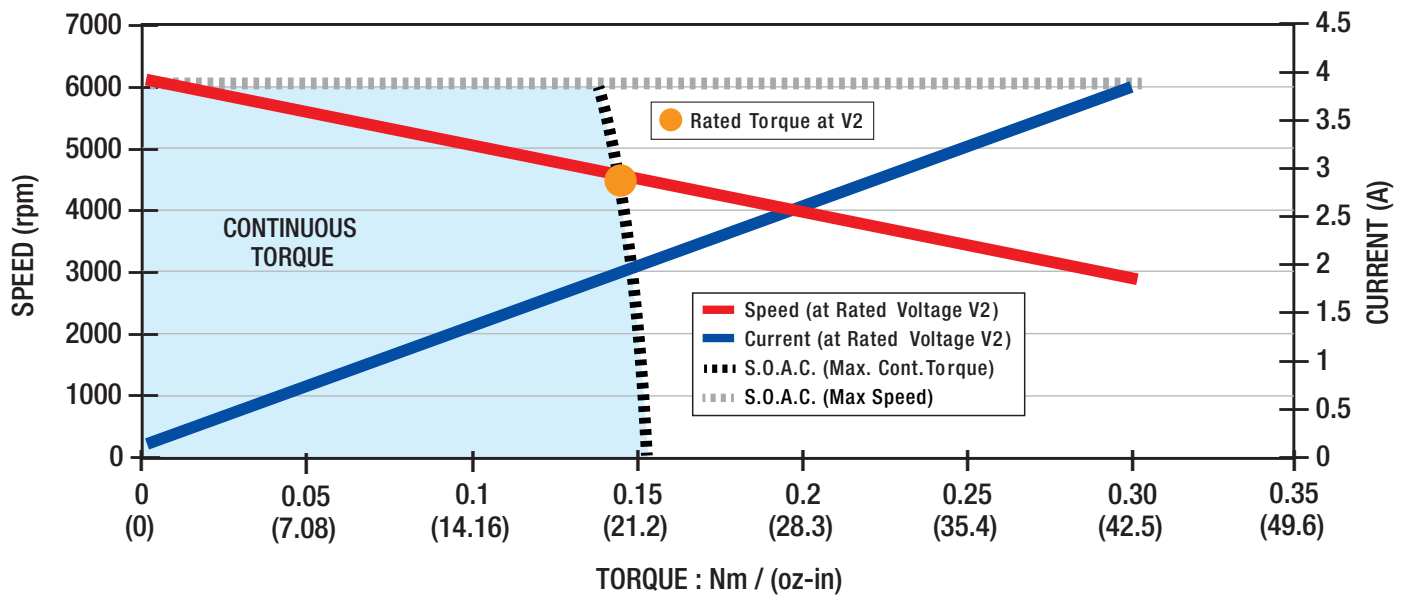
L = Lengths Available

- EC057B-1 = 3.15 (80)
- EC057B-2 = 3.94 (75.06)
- EC057B-3 = 4.72 (119.9)
- EC057B-4 = 5.51 (140)



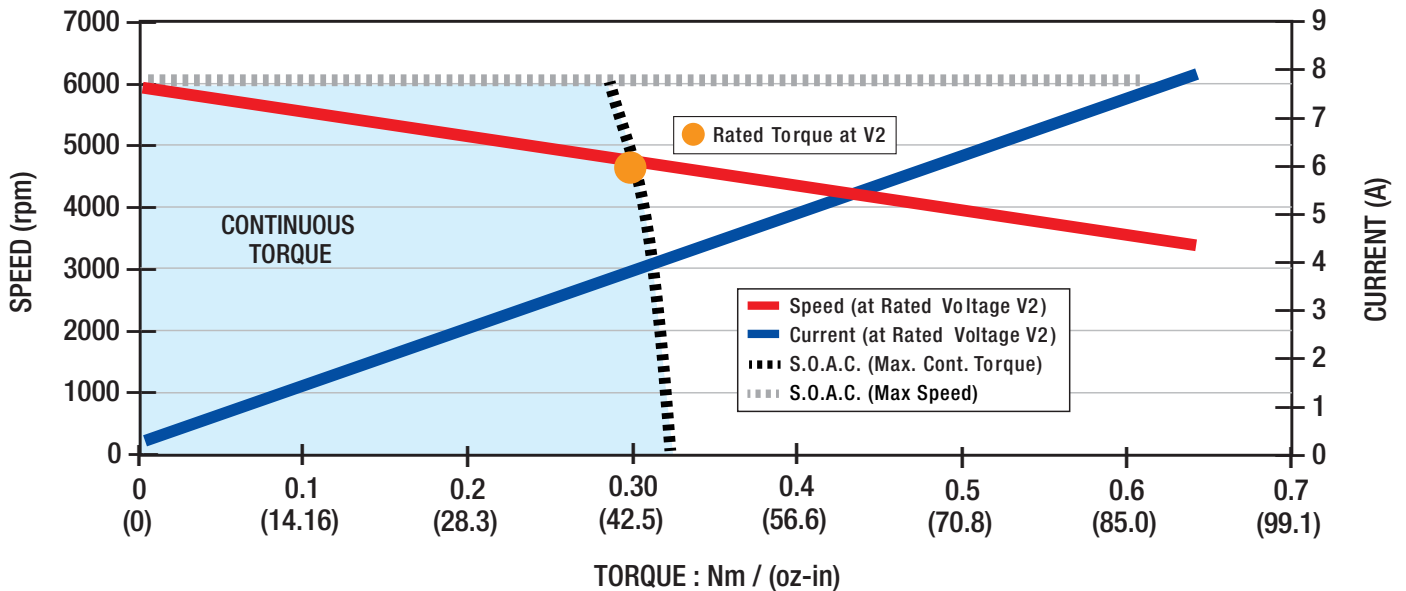
Motor Data		Units						
Rated Voltage V1	V_r	V	30.0	38.0	48.0	60.0	76.0	76.0
Rated Torque ¹ •	T_r	Nm	0.13	0.13	0.13	0.13	0.13	0.13
		oz-in	19	19	19	19	19	19
Rated Speed ¹	ω_r	rpm	6000	6000	6000	6000	6000	6000
Rated Current ¹	I_r	A	5.8	4.6	3.6	2.9	2.4	1.8
Rated Power ¹	P_r	W	83	83	83	83	84	84
No Load Speed	ω_{nl}	rpm	6000	6000	6000	6000	6000	6000
No Load Current	I_{nl}	A	0.34	0.28	0.22	0.18	0.14	0.11
Rated Voltage V2	V_r	V	19.1	24.0	30.0	38.0	48.0	48.0
Rated Torque ¹ •	T_r	Nm	0.14	0.14	0.14	0.14	0.14	0.14
		oz-in	19	19	19	19	19	20
Rated Speed ¹	ω_r	rpm	5890	5930	5720	5950	6000	4390
Rated Current ¹	I_r	A	5.8	4.6	3.6	2.9	2.4	1.9
Rated Power ¹	P_r	W	84	84	82	84	86	66
No Load Speed	ω_{nl}	rpm	6000	6000	6000	6000	6000	5390
No Load Current	I_{nl}	A	0.34	0.28	0.22	0.18	0.14	0.11
Motor Constant	K_M	Nm/ \sqrt{W}	0.041	0.041	0.041	0.041	0.042	0.042
		oz-in/ \sqrt{W}	5.8	5.8	5.9	5.8	5.9	5.9
Torque Constant	K_T	Nm/A	0.0267	0.0334	0.0430	0.0528	0.0658	0.0840
		oz-in/A	3.79	4.73	6.09	7.48	9.32	11.9
Voltage Constant	K_E	V/(rad/s)	0.0267	0.0334	0.0430	0.0528	0.0658	0.0840
		V/krpm	2.80	3.50	4.50	5.53	6.89	8.80
Terminal Resistance	R_{mt}	Ω	0.420	0.660	1.08	1.65	2.51	4.10
Inductance	L	mH	0.69	1.1	1.8	2.7	4.2	6.8
Peak Current	I_{pk}	A	20	16	12	9.9	8.1	6.3
Electrical Time Constant	τ_e	ms	1.6	1.7	1.7	1.6	1.7	1.7
Mechanical Time Constant	τ_m	ms	4.2	4.2	4.1	4.2	4.1	4.1

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



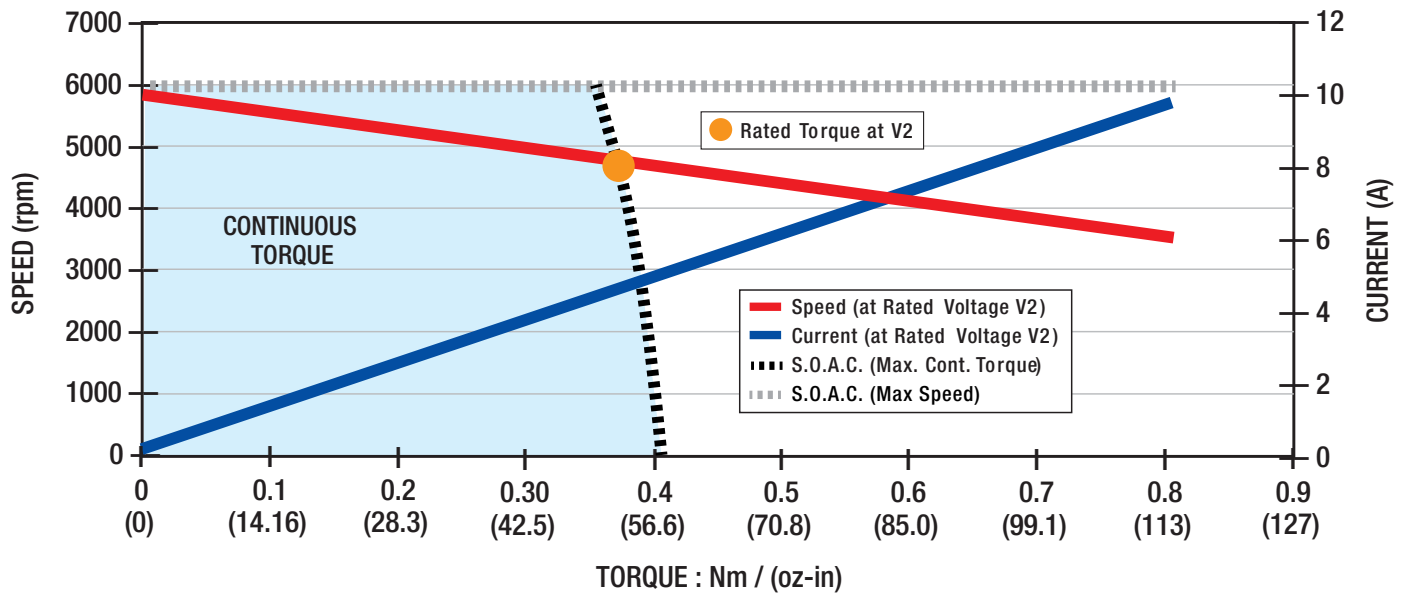
Motor Data		Units						
Rated Voltage V1	V_r	V	38.0	48.0	60.0	76.0	76.0	152
Rated Torque ¹ •	T_r	Nm	0.27	0.27	0.28	0.27	0.28	0.28
		oz-in	39	39	39	39	39	39
Rated Speed ¹	ω_r	rpm	6000	6000	6000	6000	6000	6000
Rated Current ¹	I_r	A	8.5	7.2	5.7	4.6	3.7	2.3
Rated Power ¹	P_r	W	170	170	170	170	170	170
No Load Speed	ω_{nl}	rpm	6000	6000	6000	6000	6000	6000
No Load Current	I_{nl}	A	0.46	0.39	0.31	0.25	0.20	0.12
Rated Voltage V2	V_r	V	24.0	30.0	38.0	48.0	48.0	76.0
Rated Torque ¹ •	T_r	Nm	0.29	0.28	0.28	0.28	0.30	0.31
		oz-in	40	40	40	40	42	43
Rated Speed ¹	ω_r	rpm	5600	5950	5930	6000	4600	4390
Rated Current ¹	I_r	A	8.7	7.2	5.7	4.6	3.9	2.4
Rated Power ¹	P_r	W	170	170	180	180	140	140
No Load Speed	ω_{nl}	rpm	6000	6000	6000	6000	5220	5030
No Load Current	I_{nl}	A	0.46	0.39	0.31	0.25	0.19	0.11
Motor Constant	K_M	Nm/ \sqrt{W}	0.070	0.070	0.070	0.070	0.070	0.071
		oz-in/ \sqrt{W}	10	9.9	9.9	9.9	9.9	10
Torque Constant	K_T	Nm/A	0.0372	0.0442	0.0561	0.0698	0.0870	0.143
		oz-in/A	5.27	6.26	7.95	9.89	12.3	20.3
Voltage Constant	K_E	V/(rad/s)	0.0372	0.0442	0.0561	0.0698	0.0870	0.143
		V/krpm	3.90	4.63	5.88	7.31	9.11	15.0
Terminal Resistance	R_{mt}	Ω	0.280	0.400	0.640	1.00	1.55	4.08
Inductance	L	mH	0.57	0.80	1.3	2.0	3.1	8.4
Peak Current	I_{pk}	A	30	25	20	16	13	7.8
Electrical Time Constant	τ_e	ms	2.0	2.0	2.0	2.0	2.0	2.1
Mechanical Time Constant	τ_m	ms	2.4	2.5	2.4	2.5	2.5	2.4

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



Motor Data		Units							
Rated Voltage V1	V_r	V	38.0	48.0	60.0	76.0	76.0	152	170
Rated Torque ¹ •	T_r	Nm	0.33	0.34	0.34	0.34	0.34	0.34	0.33
		oz-in	47	48	48	48	49	49	47
Rated Speed ¹	ω_r	rpm	6000	6000	6000	6000	6000	6000	6000
Rated Current ¹	I_r	A	11	8.9	7.1	5.6	4.5	2.8	1.9
Rated Power ¹	P_r	W	210	210	210	210	220	220	210
No Load Speed	ω_{nl}	rpm	6000	6000	6000	6000	6000	6000	6000
No Load Current	I_{nl}	A	0.55	0.46	0.36	0.29	0.23	0.14	0.098
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	0.34	0.35	0.35	0.37	0.38	0.38
		oz-in	48	49	49	49	53	53	54
Rated Speed ¹	ω_r	rpm	5910	6000	6000	6000	4690	4520	2850
Rated Current ¹	I_r	A	11	8.9	7.1	5.6	4.8	3.0	2.1
Rated Power ¹	P_r	W	210	220	220	220	180	180	110
No Load Speed	ω_{nl}	rpm	6000	6000	6000	6000	5170	5010	3520
No Load Current	I_{nl}	A	0.55	0.46	0.36	0.29	0.22	0.13	0.081
Motor Constant	K_M	Nm/ \sqrt{W}	0.084	0.083	0.084	0.084	0.083	0.085	0.081
		oz-in/ \sqrt{W}	12	12	12	12	12	12	11
Torque Constant	K_T	Nm/A	0.0366	0.0439	0.0561	0.0708	0.0879	0.144	0.204
		oz-in/A	5.18	6.22	7.95	10.0	12.5	20.4	28.9
Voltage Constant	K_E	V/(rad/s)	0.0366	0.0439	0.0561	0.0708	0.0879	0.144	0.204
		V/krpm	3.83	4.60	5.88	7.41	9.21	15.1	21.4
Terminal Resistance	R_{mt}	Ω	0.190	0.280	0.450	0.710	1.12	2.88	6.42
Inductance	L	mH	0.39	0.57	0.93	1.5	2.3	6.2	13
Peak Current	I_{pk}	A	39	33	25	20	16	9.9	6.6
Electrical Time Constant	τ_e	ms	2.1	2.0	2.1	2.1	2.1	2.1	2.0
Mechanical Time Constant	τ_m	ms	2.5	2.6	2.5	2.5	2.5	2.5	2.7

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	0.50	0.50	0.50	0.52	0.51	0.52
		oz-in	70	70	71	74	72	74
Rated Speed ¹	ω_r	rpm	6000	6000	6000	5770	6000	5840
Rated Current ¹	I_r	A	13	10	8.1	4.9	3.8	2.5
Rated Power ¹	P_r	W	310	310	310	310	320	320
No Load Speed	ω_{nl}	rpm	6000	6000	6000	6000	6000	6000
No Load Current	I_{nl}	A	0.64	0.50	0.40	0.24	0.19	0.12
Rated Voltage V2	V_r	V	30.0	38.0	48.0	48.0	76.0	76.0
Rated Torque ¹ •	T_r	Nm	0.51	0.51	0.51	0.58	0.57	0.60
		oz-in	72	72	72	82	81	85
Rated Speed ¹	ω_r	rpm	6000	6000	6000	3290	4260	2460
Rated Current ¹	I_r	A	13	10	8.1	5.5	4.2	2.8
Rated Power ¹	P_r	W	320	320	320	200	250	150
No Load Speed	ω_{nl}	rpm	6000	6000	6000	3840	4720	3060
No Load Current	I_{nl}	A	0.64	0.50	0.40	0.20	0.17	0.092
Motor Constant	K_M	Nm/ \sqrt{W}	0.11	0.11	0.11	0.11	0.11	0.11
		oz-in/ \sqrt{W}	15	15	15	15	16	15
Torque Constant	K_T	Nm/A	0.0439	0.0561	0.0708	0.118	0.153	0.235
		oz-in/A	6.22	7.94	10.0	16.8	21.6	33.3
Voltage Constant	K_E	V/(rad/s)	0.0439	0.0561	0.0708	0.118	0.153	0.235
		V/krpm	4.60	5.87	7.41	12.4	16.0	24.6
Terminal Resistance	R_{mt}	Ω	0.170	0.270	0.440	1.20	1.94	4.63
Inductance	L	mH	0.44	0.74	1.2	3.3	5.5	13
Peak Current	I_{pk}	A	48	36	29	18	14	9.0
Electrical Time Constant	τ_e	ms	2.6	2.7	2.7	2.8	2.8	2.8
Mechanical Time Constant	τ_m	ms	2.0	1.9	2.0	1.9	1.9	1.9

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