



Shown with optional assembly.

ES030A Series

The ES030A Series Brushless DC Motor is a high torque density model brushless motor with a slotless design in a NEMA 14 configuration. It is offered in 2 motor lengths with continuous torque from 0.029 – 0.041 Nm.

ES Slotless, Brushless Motors For applications that require high acceleration and precision control at all speeds. Torque production is predictable and very controllable.

Motor Characteristics

Motor Data	Units	Part No.	
		ES030A-1	ES030A-2
Max DC Terminal Voltage V_T	V	60	
Max Speed (Mechanical) ω_{MAX}	rpm	8000	
Continuous Stall Torque ¹ T_{CS}	Nm	0.029	0.041
	oz-in	4.1	5.8
Peak Torque (Maximum) ¹ T_{pk}	Nm	0.085	0.13
	oz-in	12	18
Coulomb Friction Torque T_f	Nm	9.9E-04	9.9E-04
	oz-in	0.14	0.14
Viscous Damping Factor D	Nm/(rad/s)	1.1E-06	2.5E-06
	oz-in/krpm	0.016	0.037
Thermal Time Constant τ_{th}	min	14	15
Thermal Resistance R_{th}	°C/W	8.1	7.9
Max. Winding Temperature Θ_{MAX}	°C	130	130
Rotor Inertia J_r	kg-m ²	9.9E-07	1.4E-06
	oz-in-s ²	1.4E-04	2.0E-04
Motor Weight W_m	g	170	210
	oz	6.0	7.4

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

Benefits

- Speeds up to 8,000 RPM possible
- DC bus voltage up to 60 VDC
- NEMA 14 configuration
- Eight standard windings, special windings available
- 4 pole rare earth design

Optional Assemblies

- Encoder: E30C/D
- Gearboxes: G30A, G35A, G40A
- Brake: B30A
- Programmable Drives: PBL4850E, BGE6015A

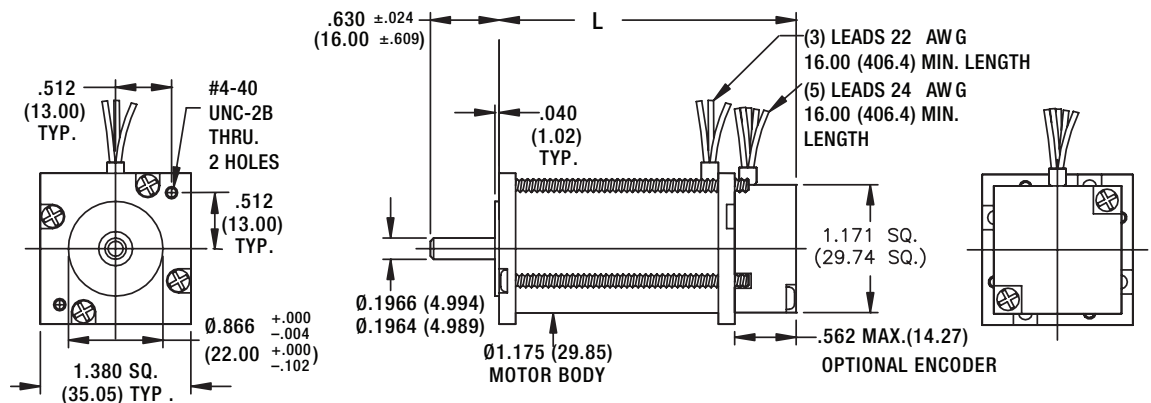
Dimensional Drawings: ES030A-1 • ES030A-2

Dimensions = inches (mm)

L = Lengths Available

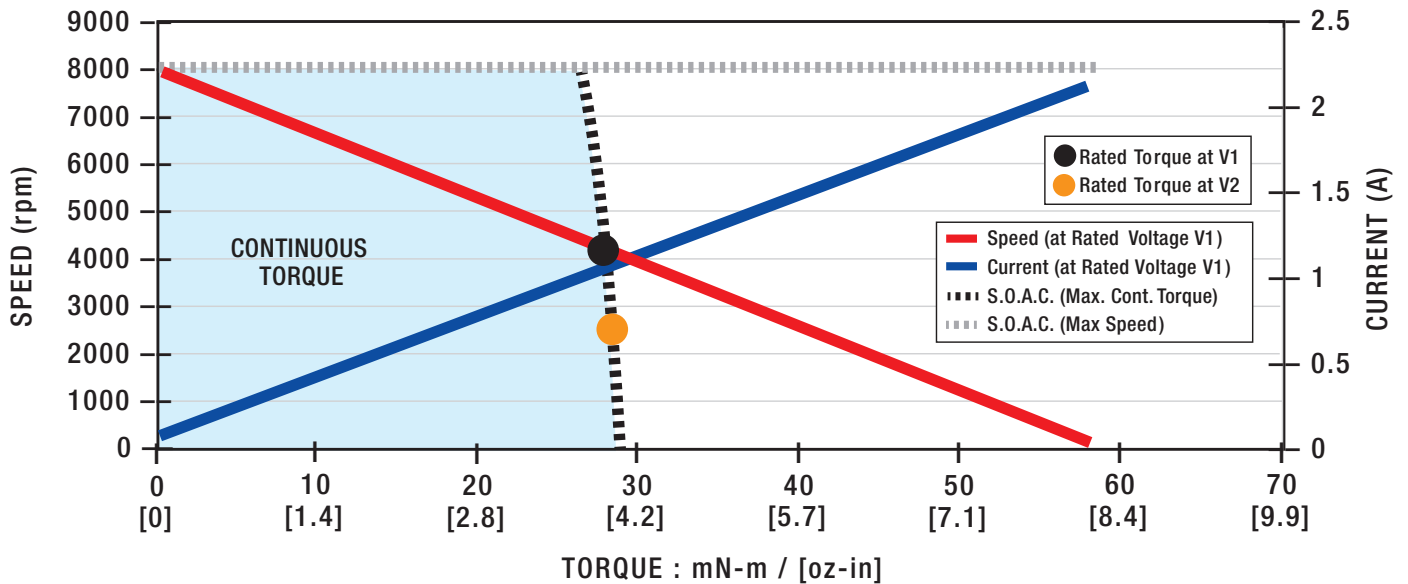
ES030A-1 = 2.322 (58.98) Max.

ES030A-2 = 2.722 (69.14) Max.



Motor Data		Units								
Rated Voltage V1	V _r	V	12.0	15.2	19.1	24.0	30.3	38.2	48.0	60.6
Rated Torque ¹ •	T _r	Nm	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028
		oz-in	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Rated Speed ¹	ω _r	rpm	4140	3630	3950	4160	3600	4240	4160	3600
Rated Current ¹	I _r	A	2.1	1.7	1.3	1.0	0.84	0.66	0.52	0.42
Rated Power ¹	P _r	W	12	11	12	12	11	12	12	11
No Load Speed	ω _{nl}	rpm	7090	7180	7140	7110	7160	7150	7120	7160
No Load Current	I _{nl}	A	0.12	0.092	0.072	0.057	0.046	0.036	0.029	0.023
Rated Voltage V2	V _r	V	9.55	12.0	15.2	19.1	24.0	30.3	38.2	48.0
Rated Torque ¹ •	T _r	Nm	0.029	0.029	0.029	0.029	0.029	0.028	0.029	0.029
		oz-in	4.0	4.1	4.0	4.0	4.1	4.0	4.0	4.1
Rated Speed ¹	ω _r	rpm	2450	1860	2240	2450	1860	2510	2450	1860
Rated Current ¹	I _r	A	2.1	1.7	1.3	1.1	0.85	0.67	0.53	0.43
Rated Power ¹	P _r	W	7.3	5.6	6.7	7.3	5.6	7.5	7.3	5.6
No Load Speed	ω _{nl}	rpm	5630	5650	5670	5640	5650	5660	5650	5650
No Load Current	I _{nl}	A	0.11	0.083	0.066	0.052	0.042	0.033	0.026	0.021
Motor Constant	K _M	Nm/√W	0.011	0.010	0.011	0.011	0.010	0.011	0.011	0.010
		oz-in/√W	1.6	1.5	1.5	1.6	1.5	1.6	1.6	1.5
Torque Constant	K _T	Nm/A	0.0159	0.0198	0.0250	0.0316	0.0395	0.0500	0.0631	0.0791
		oz-in/A	2.24	2.80	3.54	4.48	5.60	7.09	8.94	11.2
Voltage Constant	K _E	V/(rad/s)	0.0159	0.0198	0.0250	0.0316	0.0395	0.0500	0.0631	0.0791
		V/krpm	1.66	2.07	2.62	3.31	4.14	5.24	6.61	8.28
Terminal Resistance	R _{mt}	Ω	1.98	3.55	5.25	7.90	14.2	19.6	31.6	56.8
Inductance	L	mH	0.18	0.32	0.46	0.70	1.3	1.8	2.8	5.1
Peak Current	I _{pk}	A	6.1	4.3	3.6	3.0	2.1	1.9	1.5	1.1
Electrical Time Constant	τ _e	ms	0.091	0.090	0.088	0.089	0.090	0.093	0.089	0.090
Mechanical Time Constant	τ _m	ms	7.8	9.0	8.3	7.8	9.0	7.7	7.8	9.0

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



Motor Data		Units									
Rated Voltage V1	V_r	V	12.0	15.2	19.1	24.0	30.3	38.2	48.0	60.6	
Rated Torque ¹ •	T_r	Nm	0.038	0.037	0.038	0.037	0.038	0.037	0.037	0.037	0.038
		oz-in	5.4	5.3	5.3	5.2	5.3	5.2	5.2	5.2	5.3
Rated Speed ¹	ω_r	rpm	5170	5380	5320	5800	5350	5750	5800	5360	
Rated Current ¹	I_r	A	3.0	2.3	1.9	1.5	1.1	0.91	0.73	0.56	
Rated Power ¹	P_r	W	21	21	21	22	21	22	22	21	
No Load Speed	ω_{nl}	rpm	7360	7190	7390	7410	7170	7390	7400	7170	
No Load Current	I_{nl}	A	0.20	0.15	0.13	0.097	0.072	0.061	0.048	0.037	
Rated Voltage V2	V_r	V	7.58	9.55	12.0	15.2	19.1	24.0	30.3	38.2	
Rated Torque ¹ •	T_r	Nm	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040
		oz-in	5.7	5.6	5.7	5.6	5.6	5.6	5.6	5.6	5.6
Rated Speed ¹	ω_r	rpm	1970	2230	2080	2590	2230	2510	2580	2240	
Rated Current ¹	I_r	A	3.1	2.3	1.9	1.5	1.2	0.96	0.76	0.59	
Rated Power ¹	P_r	W	8.3	9.3	8.7	11	9.3	10	11	9.3	
No Load Speed	ω_{nl}	rpm	4640	4500	4630	4680	4500	4630	4660	4510	
No Load Current	I_{nl}	A	0.15	0.11	0.091	0.073	0.055	0.046	0.037	0.028	
Motor Constant	K_M	Nm/ \sqrt{W}	0.015	0.016	0.015	0.016	0.016	0.016	0.016	0.016	0.016
		oz-in/ \sqrt{W}	2.1	2.2	2.1	2.3	2.2	2.3	2.3	2.3	2.2
Torque Constant	K_T	Nm/A	0.0153	0.0199	0.0243	0.0305	0.0397	0.0486	0.0610	0.0794	
		oz-in/A	2.16	2.81	3.43	4.31	5.63	6.88	8.64	11.2	
Voltage Constant	K_E	V/(rad/s)	0.0153	0.0199	0.0243	0.0305	0.0397	0.0486	0.0610	0.0794	
		V/krpm	1.60	2.08	2.54	3.19	4.16	5.09	6.39	8.31	
Terminal Resistance	R_{mt}	Ω	1.10	1.63	2.67	3.62	6.52	9.32	14.5	26.0	
Inductance	L	mH	0.12	0.19	0.29	0.48	0.76	1.2	1.9	3.0	
Peak Current	I_{pk}	A	9.3	7.2	5.7	4.8	3.6	2.9	2.3	1.8	
Electrical Time Constant	τ_e	ms	0.11	0.12	0.11	0.13	0.12	0.12	0.13	0.12	
Mechanical Time Constant	τ_m	ms	6.8	5.9	6.5	5.6	6.0	5.7	5.6	6.0	

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