



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
		oz-in	4.1
Peak Torque (Maximum) ¹	T _{PK}	Nm	0.085
		oz-in	12
Coulomb Friction Torque	T _f	Nm	9.9E-04
		oz-in	0.14
Viscous Damping Factor	D	Nm/(rad/s)	1.1E-06
		oz-in/krpm	0.016
Thermal Time Constant	τ _{th}	min	14
Thermal Resistance	R _{th}	°C/W	8.1
Max. Winding Temperature	Θ _{MAX}	°C	130
Rotor Inertia	J _r	kg-m ²	9.9E-07
		oz-in-s ²	1.4E-04
Motor Weight	W _m	g	170
		oz	6.0
			210
			7.4

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

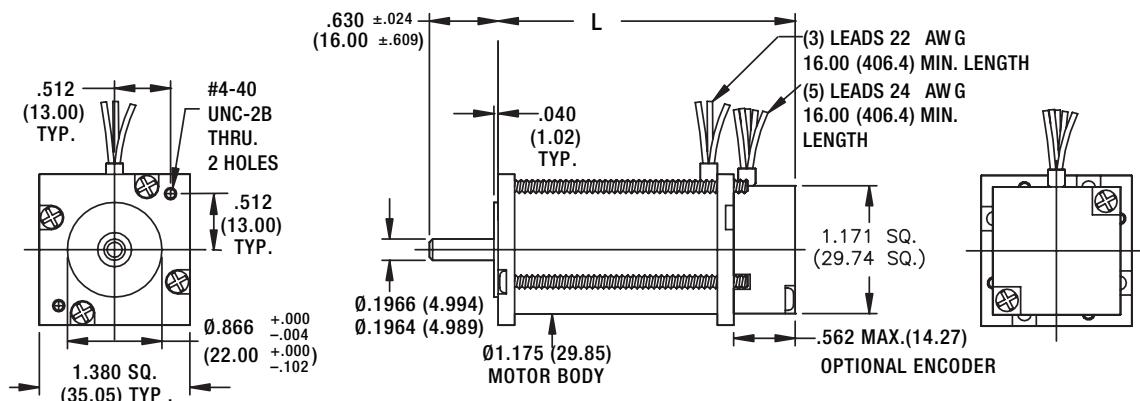
Dimensional Drawings: ES030A-1 • ES030A-2

Dimensions = inches (mm)

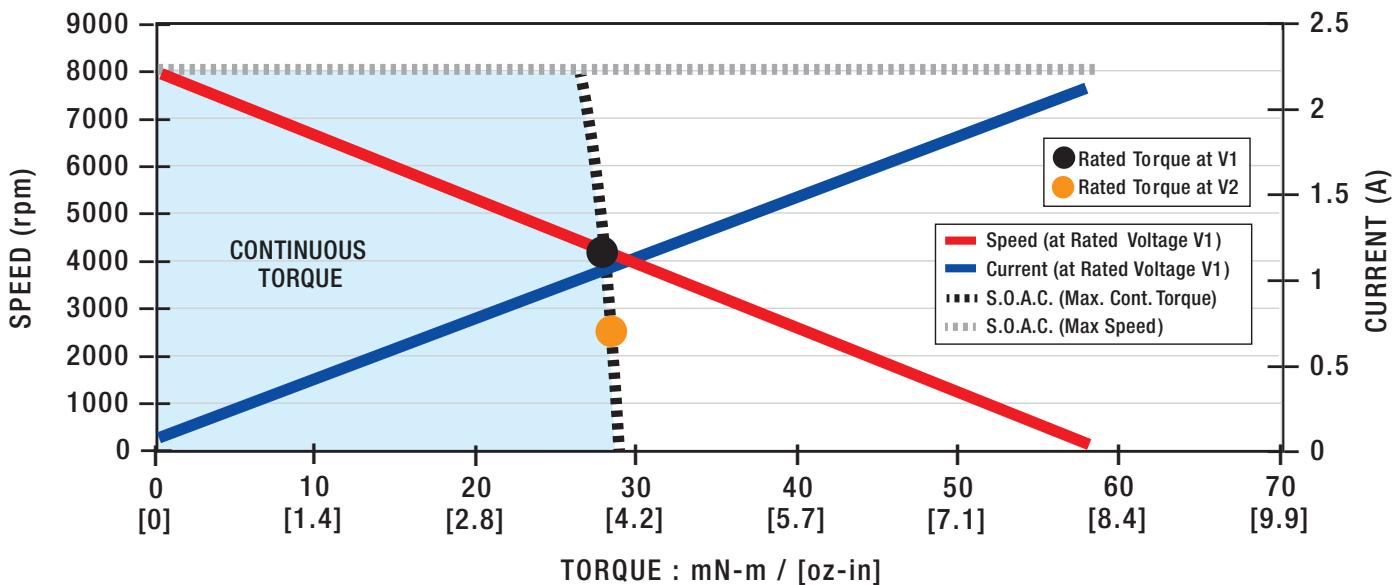
L = Lengths Available

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	0.038
		oz-in	5.4	5.3	5.3	5.2	5.3	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
		oz-in	5.7	5.6	5.7	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/√W	0.015	0.016	0.015	0.016	0.016	0.016	0.016	0.016
		oz-in/√W	2.1	2.2	2.1	2.3	2.2	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

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