PITTMAN®

AMETEK®

Full Line Catalog

Brushless DC Motors

Brushed DC Motors

Gearboxes

Encoders

Drives

Brakes

www.haydonkerkpittman.com

AMETEK®

www.motiontech.com.au

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Custom motors also available.
Contact our Application Engineers for assistance.
e: info.pittman-motors@ametek.com

DC Brush and Brushless Motors

With various power ratings, sizes, lengths and options to meet most motion applications.

To streamline and simplify your product design and manufacturing, Pittman Motors can be configured with standard components such as encoders, brakes and gearboxes, and customized with unique motor windings, wire harnesses, EMI/RFI suppression, shaft modifications, custom output devices (pinions, gears, etc.), or any other value-added features.

EC Instrument Grade Motors

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

Pittman Instrument Grade Brushless DC Motors are used in a wide variety of OEM applications including business machines, light industrial equipment, robots, pumps, traction drives and medical equipment.

- Motors are available in diameters from 33 to 121mm with rated torques up to 6 N-m
- Choice of sizes, power densities, speed capabilities, windings and connection options
- Further customization and adaptation to your equipment can offer design solutions not previously envisioned
- Complementary ranges of gears, brakes and encoders available to optimize performance

EC Instrument Grade Motors with IDEA® Drive

- All inclusive, high-torque, precision servo motor and IDEA® Drive
- Suitable for distributed or autonomous control
- Available in 3 motor lengths with continuous torque up to 0.15 Nm

EA Automation Grade Motors

For applications that require feedback connectivity to other machinery components. IP-65 Rated.

Pittman Automation Grade Brushless DC Motors are IP65 rated construction packaged in a rugged and compact enclosure. Integrated encoders provide high resolution and frequency response.

- Quick disconnect connectors, heavy duty shafts and bearings
- Extreme power densities
- NEMA mounts
- Specialty windings, encoders, resolvers and connection options available

ES Slotless, Brushless Motors

For applications that require high acceleration and precision control at all speeds. Torque production is predictable and very controllable.

Pittman Slotless Brushless DC Motors offer many advantages over conventional slotted stator construction. Negligible magnetic cogging provides improved servo efficiency and enables extremely smooth, quiet motion.

Low inductance and high current bandwidth provides precise control. Slotless construction also provides excellent winding heat transfer for high thermal efficiency and transient load capacity.

- Internal Hall Effect feedback sensors for linear speed-torque characteristics, high starting torque and variable speed control with appropriate drive electronics
- Modifications to the shaft, winding and mechanical mounting are available for OEM applications

DC Brush Commutated Motors

For applications that require reliability and performance with basic control. Yields high efficiencies by consuming less electricity.

Pittman Brush Commutated DC Motors have a wide range of frame sizes and magnetic technologies from 22 to 83mm in diameter. Motors are designed to offer smooth low speed performance, quiet operation and long life. Armatures are skewed to minimize magnetic cogging, while brush and commutator designs minimize noise.

- Available options: brush materials, EMI/RFI suppression networks, shaft modifications, special windings, lead wire assemblies, spur and planetary gearing
- Holding brakes, and customer specified pulleys and gears
- Multiple encoder platforms with a wide range of resolutions available

Information needed to properly select a DC Motor

1. What type of control is required?

   Open loop speed control

   Closed loop torque control

   Closed loop speed control

   Closed loop position control

   Other _____

2. What are the application requirements?

   Speed _____ Torque _____

   Other _____

3. Duty Cycle, continuous or intermittent (specify interval on time, off time, repeat duration).

   _____

Helpful Hint: Continuous torque value will determine the frame size. Required speed will determine if frame size will meet needed parameters.

4. What motor technology is required? Brushed DC Brushless DC (BLDC)

   Helpful Hint: Performance requirements define which type of motor is best suited for the application. See following page for selection criteria.

5. What are the size constraints? _____

6. What voltage and power input is available? _____

7. Do you need an encoder? YES NO

8. Do you need a brake? YES NO

9. Are there any environmental considerations? YES NO If yes, specify: _____

Basic Rotary Power Output Equations

Speed (rad/sec) x Torque (Nm) = Watts

or

Speed (RPM) x Torque (oz-in) x 7.4 x 10^{-4} = Watts

Name _____ **Company** _____

Address _____ **City** _____ **State** _____ **Zip** _____

Country _____ **Phone** _____ **Email** _____

1. Application Description _____
2. Initial Quantity and Delivery _____ /_____, Annual Quantity and Delivery _____ /_____
3. Target Price Range _____

4. Mechanical					
Load Speed	rpm	Load Inertia	oz-in-sec^2	Diameter	in max
Continuous Load Torque	oz-in rms	Acceleration Time	sec	Length (w/o Shaft)	in max
Peak Load Torque	oz-in pk	Duty Cycle		Weight	oz max

5. Electrical					
Applied Voltage	VDC	Continuous Current	A	Peak Current	A

6. Environmental			
Ambient Temperature Range	°C	Ambient Humidity Range	°C

7. Unusual Conditions _____
8. Additional Requirements _____

   _____

   _____
9. Physical Characteristics and Velocity Profiles _____

   _____

   _____
10. Other important information _____

    _____

Upon completion, email to: info.pittman-motors@ametek.com

Model	Shop Online eCommerce Part No.	Integrated Drive	Rated Voltage	Gear Series	Gear Ratio	Gear Type	Continuous Output Torque	
							(Nm)	(oz-in)
DC026C-3	8693S037-SP		12				0.022	3.2
DC030A-1	GM8212-11-SP		19.1	G35A	6.3	standard spur	0.045	6.4
DC030A-1	GM8212-21-SP		19.1	G35A	19.5	standard spur	0.13	18
DC030A-1	GM8212-31-SP		19.1	G35A	60.5	standard spur	0.36	50
DC030A-1	GM8212-41-SP		19.1	G35A	187	standard spur	0.71	100
DC030B-3	8224S004-SP		12				0.018	2.6
DC030B-3	8224S006-SP		24				0.018	2.6
DC030B-3	GM8224S010-SP		24	G35A	6.3	standard spur	0.11	16
DC030B-3	GM8224S012-SP		12	G35A-WF	9.9	wide face spur	0.16	23
DC030B-3	GM8224S016-SP		24	G35A-WF	19.5	wide face spur	0.31	44
DC030B-3	GM8224S020-SP		12	G35A-WF	60.5	wide face spur	0.86	120
DC030B-3	GM8224S024-SP		12	G35A-WF	95.9	wide face spur	1.2	175
DC030B-3	GM8224S028-SP		24	G35A-WF	187	wide face spur	1.2	175
DC030C-1	8541A001-R1-SP		12				0.018	2.5
DC030C-1	8541A002-R1-SP		24				0.018	2.5
DC030C-1	8541S040-SP		24				0.018	2.5
DC030C-2	8542A003-R1-SP		12				0.04	5.6
DC030C-2	8542S041-SP		24				0.04	5.6
DC030C-2	GM8542S049-SP		12	G30A	216	planetary	6.2	880
DC030C-2	GM8542S056-SP		24	G30A	216	planetary	6.2	880
DC030C-3	8543A005-R1-SP		12				0.059	8.3
DC030C-3	8543A006-R1-SP		24				0.059	8.3
DC030C-3	8543S042-SP		24				0.059	8.3
DC030C-3	GM8543S044-SP		12	G35A-WF	9.9	wide face spur	0.51	72
DC030C-3	GM8543S045-SP		12	G35A-WF	19.5	wide face spur	0.99	140
DC030C-3	GM8543S046-SP		12	G35A-WF	30.9	wide face spur	1.2	175
DC030C-3	GM8543S047-SP		12	G30A	36	planetary	1.7	240
DC030C-3	GM8543S048-SP		12	G30A	96	planetary	4.1	580
DC030C-3	GM8543S050-SP		24	G35A	6.3	standard spur	0.35	50
DC030C-3	GM8543S051-SP		24	G35A-WF	9.9	wide face spur	0.51	72
DC030C-3	GM8543S052-SP		24	G35A-WF	19.5	wide face spur	0.99	140
DC030C-3	GM8543S053-SP		24	G35A-WF	30.9	wide face spur	1.2	175
DC030C-3	GM8543S054-SP		24	G30A	36	planetary	1.7	240
DC030C-3	GM8543S057-SP		24	G35A	6.3	standard spur	0.35	50
DC030C-3	GM8543S058-SP		24	G35A-WF	19.5	wide face spur	0.99	140
DC030C-3	GM8543S059-SP		24	G30A	36	planetary	1.7	240

SHOP ONLINE: Part Number Cross-Reference

Output Speed @ Cont. Torque (RPM)	Motor Voltage Constant		Motor Torque Constant		Encoder Series	Encoder Resolution	Encoder Output Channels
	V/(rad/s)	(V/krpm)	Nm/A	(oz-in)/A			
740	0.0122	1.28	0.0122	1.73			
65.4	0.0216	2.26	0.0216	3.06			
21.1	0.0216	2.26	0.0216	3.06			
6.81	0.0216	2.26	0.0216	3.06			
2.2	0.0216	2.26	0.0216	3.06			
816	0.0109	1.14	0.0109	1.54			
845	0.0218	2.29	0.0218	3.09			
33.4	0.0436	4.57	0.0436	6.18			
20.3	0.0218	2.29	0.0218	3.09			
10.8	0.0436	4.57	0.0436	6.18			
3.35	0.0218	2.29	0.0218	3.09			
2.12	0.0218	2.29	0.0218	3.09			
1.12	0.0436	4.57	0.0436	6.18			
439	0.0158	1.66	0.0158	2.24			
438	0.0316	3.31	0.0316	4.48			
438	0.0316	3.31	0.0316	4.48	E35A	500	A + B
405	0.0157	1.65	0.0157	2.23			
556	0.0315	3.30	0.0315	4.46	E35A	500	A + B
0.933	0.0248	2.60	0.0248	3.51			
1.16	0.0496	5.19	0.0496	7.02			
400	0.0184	1.92	0.0184	2.60			
472	0.0374	3.91	0.0374	5.29			
472	0.0374	3.91	0.0374	5.29	E35A	500	A + B
29.6	0.0236	2.47	0.0236	3.34			
15.1	0.0236	2.47	0.0236	3.34			
9.56	0.0236	2.47	0.0236	3.34			
8.22	0.0236	2.47	0.0236	3.34			
3.08	0.0236	2.47	0.0236	3.34			
52.7	0.0474	4.96	0.0474	6.71			
33.3	0.0474	4.96	0.0474	6.71			
17	0.0474	4.96	0.0474	6.71			
10.7	0.0474	4.96	0.0474	6.71			
9.23	0.0474	4.96	0.0474	6.71			
52.7	0.0474	4.96	0.0474	6.71	E35A	500	A + B
17	0.0474	4.96	0.0474	6.71	E35A	500	A + B
9.23	0.0474	4.96	0.0474	6.71	E35A	500	A + B

Model	Shop Online eCommerce Part No.	Integrated Drive	Rated Voltage	Gear Series	Gear Ratio	Gear Type	Continuous Output Torque	
							(Nm)	(oz-in)
DC040A-2	GM9213-1-SP		12	G51A	5.9	standard spur	0.11	16
DC040A-2	GM9213-2-SP		12	G51A	19.7	standard spur	0.33	47
DC040A-2	GM9213-3-SP		12	G51A	65.5	standard spur	0.99	140
DC040A-2	GM9213-4-SP		12	G51A	218	standard spur	1.2	175
DC040A-2	GM9213-5-SP		12	G51A	728	standard spur	1.2	175
DC040B-3	9234S006-R1-SP		24				0.043	6.1
DC040B-3	9234S007-R1-SP		24				0.043	6.1
DC040B-3	GM9234S017-R1-SP		24	G51A-HT	11.5	high torque spur	0.45	63
DC040B-3	GM9234S023-R1-SP		24	G51A-WF	38.3	wide face spur	1.4	200
DC040B-3	GM9234S029-R1-SP		24	G51A-WF	127	wide face spur	3.5	500
DC040B-3	GM9234S032-R1-SP		24	G51A-WF	218	wide face spur	3.5	500
DC040B-5	9236S008-R1-SP		24				0.067	9.5
DC040B-5	9236S009-R1-SP		24				0.067	9.5
DC040B-5	GM9236S014-R1-SP		24	G51A-HT	5.9	high torque spur	0.36	50
DC040B-5	GM9236S015-R1-SP		24	G51A-HT	5.9	high torque spur	0.36	50
DC040B-5	GM9236S020-R1-SP		24	G51A-WF	19.7	wide face spur	1.1	160
DC040B-5	GM9236S026-R1-SP		24	G51A-WF	65.5	wide face spur	3.5	490
DC040B-5	GM9236S027-R1-SP		24	G51A-WF	65.5	wide face spur	3.5	490
DC040B-6	9237S010-R1-SP		24				0.081	12
DC040B-6	9237S011-R1-SP		24				0.081	12
DC054B-3	14203S009-SP		24				0.15	21
DC054B-4	14204S005-SP		24				0.18	26
DC054B-4	14204S006-SP		24				0.18	26
DC054B-4	GM14904S011-R1-SP		24	G51A-HT	5.9	high torque spur	0.97	140
DC054B-4	GM14904S012-R1-SP		24	G51A-HT	5.9	high torque spur	0.97	140
DC054B-4	GM14904S015-R1-SP		24	G51A-WF	19.7	wide face spur	3	430
DC054B-4	GM14904S016-R1-SP		24	G51A-WF	19.7	wide face spur	3	430
DC054B-6	14206S011-SP		24				0.26	37
DC054B-7	14207S007-SP		24				0.35	50
DC054B-7	14207S008-SP		24				0.35	50
EC033A-2	1312S103-SP		24				0.046	6.5
EC042B-1	EC042B-10M0-805-SP		24				0.062	8.8
EC042B-1	EC042B-10MP-915	IDEA RS485	12-60				0.062	8.8
EC042B-1	EC042B-10MP-935	IDEA CANopen	12-60				0.062	8.8
EC042B-1	EC042B-1PM0-801-SP		24	PLG42S	4	planetary	0.16	22
EC042B-1	EC042B-1PM0-802-SP		24	PLG42S	16	planetary	0.56	80
EC042B-1	EC042B-1PM0-803-SP		24	PLG42S	25	planetary	0.88	125
EC042B-1	EC042B-1PM0-804-SP		24	PLG42S	100	planetary	3.18	450

SHOP ONLINE: Part Number Cross-Reference

Output Speed @ Cont. Torque (RPM)	Motor Voltage Constant		Motor Torque Constant		Encoder Series	Encoder Resolution	Encoder Output Channels
	V/(rad/s)	(V/krpm)	Nm/A	(oz-in)/A			
8.65	0.0395	4.14	0.0395	5.60			
2.6	0.0395	4.14	0.0395	5.60			
0.779	0.0395	4.14	0.0395	5.60			
0.234	0.0395	4.14	0.0395	5.60			
0.0701	0.0395	4.14	0.0395	5.60			
527	0.0365	3.82	0.0365	5.17			
527	0.0365	3.82	0.0365	5.17	E30B	500	A + B + Index
32.1	0.0459	4.81	0.0459	6.50			
9.62	0.0459	4.81	0.0459	6.50			
2.88	0.0459	4.81	0.0459	6.50			
1.69	0.0459	4.81	0.0459	6.50			
416	0.0458	4.80	0.0458	6.49			
416	0.0458	4.80	0.0458	6.49	E30B	500	A + B + Index
69.4	0.0458	4.80	0.0458	6.49			
69.4	0.0458	4.80	0.0458	6.49	E30B	500	A + B + Index
20.8	0.0458	4.80	0.0458	6.49			
6.24	0.0458	4.80	0.0458	6.49			
6.24	0.0458	4.80	0.0458	6.49	E30B	500	A + B + Index
457	0.0424	4.44	0.0424	6.00			
457	0.0424	4.44	0.0424	6.00	E30B	500	A + B + Index
309	0.0654	6.85	0.0654	9.26			
335	0.0612	6.41	0.0612	8.67			
335	0.0612	6.41	0.0612	8.67	E30B	500	A + B + Index
56.1	0.0612	6.41	0.0612	8.67			
56.1	0.0612	6.41	0.0612	8.67	E30B	500	A + B + Index
16.8	0.0612	6.41	0.0612	8.67			
16.8	0.0612	6.41	0.0612	8.67	E30B	500	A + B + Index
290	0.0706	7.39	0.0706	10.00			
294	0.0706	7.39	0.0706	10.00			
294	0.0706	7.39	0.0706	10.00	E30B	500	A + B + Index
5350	0.0311	3.25	0.0311	4.40	U	1000	A + B + Index
4090	0.0448	4.69	0.0448	6.34	E30D	1000	A + B + Index
4090	0.0448	4.69	0.0448	6.34	E30D	1000	A + B + Index
4090	0.0448	4.69	0.0448	6.34	E30D	1000	A + B + Index
1000	0.0448	4.69	0.0448	6.34	E30D	1000	A + B + Index
250	0.0448	4.69	0.0448	6.34	E30D	1000	A + B + Index
160	0.0448	4.69	0.0448	6.34	E30D	1000	A + B + Index
40	0.0448	4.69	0.0448	6.34	E30D	1000	A + B + Index

Model	Shop Online eCommerce Part No.	Integrated Drive	Rated Voltage	Gear Series	Gear Ratio	Gear Type	Continuous Output Torque	
							(Nm)	(oz-in)
EC042B-2	EC042B-20M0-804-SP		24				0.12	16.9
EC042B-2	EC042B-20MP-914	IDEA RS485	12-60				0.12	16.9
EC042B-2	EC042B-20MP-934	IDEA CANopen	12-60				0.12	16.9
EC042B-2	EC042B-2PM0-801-SP		24	PLG42S	4	planetary	0.35	50
EC042B-2	EC042B-2PM0-802-SP		24	PLG42S	16	planetary	1.26	179
EC042B-2	EC042B-2PM0-803-SP		24	PLG42S	25	planetary	1.97	279
EC042B-2	EC042B-2PM0-804-SP		24	PLG42S	100	planetary	7.11	1008
EC042B-3	EC042B-30M0-803-SP		24				0.159	22.6
EC042B-3	EC042B-30MP-913	IDEA RS485	12-60				0.159	22.6
EC042B-3	EC042B-30MP-933	IDEA CANopen	12-60				0.159	22.6
EC042B-3	EC042B-3PM0-801-SP		24	PLG42S	4	planetary	0.48	67
EC042B-3	EC042B-3PM0-802-SP		24	PLG42S	16	planetary	1.72	243
EC042B-3	EC042B-3PM0-803-SP		24	PLG52	28.12	planetary	2.9	411
EC042B-3	EC042B-3PM0-804-SP		24	PLG52	91.12	planetary	8.47	1200
EC044A-1	EC044A-10M0-806-SP		24				0.041	5.8
EC044A-1	EC044A-1PM0-801-SP		24	PLG42S	4	planetary	0.09	13.2
EC044A-1	EC044A-1PM0-802-SP		24	PLG42S	16	planetary	0.34	47.6
EC044A-1	EC044A-1PM0-803-SP		24	PLG42S	25	planetary	0.53	74
EC044A-1	EC044A-1PM0-804-SP		24	PLG42S	100	planetary	1.9	268
EC044A-2	EC044A-20M0-804-SP		24				0.061	8.6
EC044A-2	EC044A-2PM0-801-SP		24	PLG42S	4	planetary	0.17	23.4
EC044A-2	EC044A-2PM0-802-SP		24	PLG42S	16	planetary	0.59	84.1
EC044A-2	EC044A-2PM0-803-SP		24	PLG42S	25	planetary	0.93	132
EC044A-2	EC044A-2PM0-804-SP		24	PLG42S	100	planetary	3.3	474
EC044A-3	EC044A-30M0-803-SP		24				0.075	11
EC044A-3	EC044A-3PM0-801-SP		24	PLG42S	4	planetary	0.22	30.5
EC044A-3	EC044A-3PM0-802-SP		24	PLG42S	16	planetary	0.78	110
EC044A-3	EC044A-3PM0-803-SP		24	PLG42S	25	planetary	1.2	171
EC044A-3	EC044A-3PM0-804-SP		24	PLG42S	100	planetary	4.4	618
EC057C-2	N2342S104-SP		24				0.13	18
EC057C-4	N2344S105-SP		38.2				0.25	36
ES030A-2	3442S100-SP		38.2				0.037	5.2
ES040A-2	4442S101-SP		38.2				0.097	14
ES050A-3	5443S102-SP		38.2				0.27	39

SHOP ONLINE: Part Number Cross-Reference

Output Speed @ Cont. Torque (RPM)	Motor Voltage Constant		Motor Torque Constant		Encoder Series	Encoder Resolution	Encoder Output Channels
	V/(rad/s)	(V/krpm)	Nm/A	(oz-in)/A			
4400	0.0444	4.65	0.0444	6.29	E30D	1000	A + B + Index
4400	0.0444	4.65	0.0444	6.29	E30D	1000	A + B + Index
4400	0.0444	4.65	0.0444	6.29	E30D	1000	A + B + Index
1000	0.0444	4.65	0.0444	6.29	E30D	1000	A + B + Index
250	0.0444	4.65	0.0444	6.29	E30D	1000	A + B + Index
160	0.0444	4.65	0.0444	6.29	E30D	1000	A + B + Index
40	0.0444	4.65	0.0444	6.29	E30D	1000	A + B + Index
4690	0.0427	4.47	0.0427	6.04	E30D	1000	A + B + Index
4690	0.0427	4.47	0.0427	6.04	E30D	1000	A + B + Index
4690	0.0427	4.47	0.0427	6.04	E30D	1000	A + B + Index
1000	0.0427	4.47	0.0427	6.04	E30D	1000	A + B + Index
250	0.0427	4.47	0.0427	6.04	E30D	1000	A + B + Index
142	0.0427	4.47	0.0427	6.04	E30D	1000	A + B + Index
44	0.0427	4.47	0.0427	6.04	E30D	1000	A + B + Index
4246	0.0413	4.33	0.0413	5.86	E30D	1000	A + B + Index
1062	0.0413	4.33	0.0413	5.86	E30D	1000	A + B + Index
265	0.0413	4.33	0.0413	5.86	E30D	1000	A + B + Index
170	0.0413	4.33	0.0413	5.86	E30D	1000	A + B + Index
42	0.0413	4.33	0.0413	5.86	E30D	1000	A + B + Index
4438	0.0423	4.43	0.0423	5.99	E30D	1000	A + B + Index
1109	0.0423	4.43	0.0423	5.99	E30D	1000	A + B + Index
277	0.0423	4.43	0.0423	5.99	E30D	1000	A + B + Index
178	0.0423	4.43	0.0423	5.99	E30D	1000	A + B + Index
44	0.0423	4.43	0.0423	5.99	E30D	1000	A + B + Index
4110	0.0462	4.84	0.0462	6.55	E30D	1000	A + B + Index
1027	0.0462	4.84	0.0462	6.55	E30D	1000	A + B + Index
257	0.0462	4.84	0.0462	6.55	E30D	1000	A + B + Index
164	0.0462	4.84	0.0462	6.55	E30D	1000	A + B + Index
41	0.0462	4.84	0.0462	6.55	E30D	1000	A + B + Index
5980	0.0342	3.58	0.0342	4.84	U	1000	A + B + Index
6120	0.0555	5.81	0.0555	7.86	U	1000	A + B + Index
5750	0.0486	5.09	0.0486	6.88	U	1000	A + B + Index
5190	0.0612	6.41	0.0612	8.67	U	1000	A + B + Index
3950	0.0865	9.06	0.0865	12.30	U	1000	A + B + Index

EC033A Series

The EC033A Series Brushless DC Motor is a high torque density model brushless motor in a 33mm diameter housing. It is offered in 3 motor lengths with continuous torque from 0.025 – 0.060 Nm.

Benefits

- Speeds up to 12,000 RPM possible
- DC bus voltage up to 60 VDC
- 33mm diameter housing
- Eight standard windings, Special windings available
- 4 pole rare earth design

Optional Assemblies

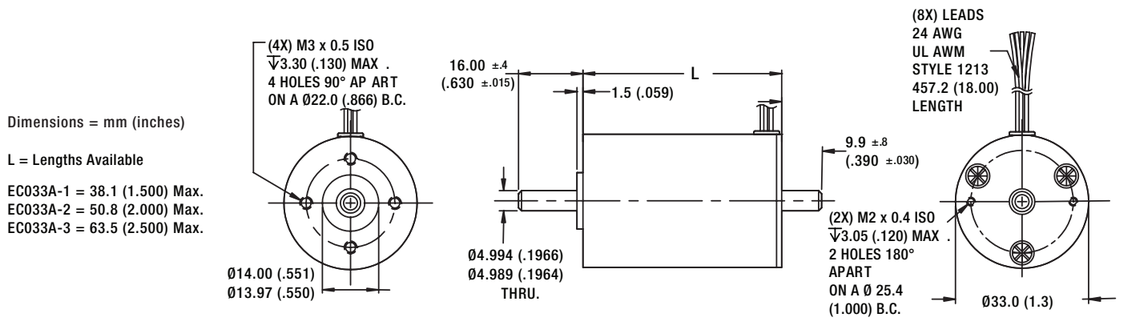
- Encoder: E30C/D
- Gearboxes: G30A, G35A
- Programmable Drives: PBL4850E, BGE3004A, BGE6015A

Motor Characteristics

Motor Data		Units	Series		
			EC033A-1	EC033A-2	EC033A-3
Max DC Terminal Voltage	V_T	V	60		
Max Speed (Mechanical)	ω_{MAX}	rpm	12000		
Continuous Stall Torque[1]	T_{CS}	Nm	0.025	0.049	0.060
		oz-in	3.5	7.0	8.5
Peak Torque (Maximum)[1]	T_{pk}	Nm	0.081	0.16	0.19
		oz-in	12	22	27
Coulomb Friction Torque	T_f	Nm	0.0028	0.0042	0.0056
		oz-in	0.40	0.60	0.80
Viscous Damping Factor	D	Nm/(rad/s)	9.4E-07	1.6E-06	2.2E-06
		oz-in/krpm	0.014	0.023	0.032
Thermal Time Constant	τ_{th}	min	7.8	9.0	11
Thermal Resistance	R_{th}	°C/W	15	13	11
Max. Winding Temperature	Θ_{MAX}	°C	130	130	130
Rotor Inertia	J_r	kg-m^2	1.2E-06	1.9E-06	2.7E-06
		oz-in-s^2	1.7E-04	2.8E-04	3.9E-04
Motor Weight	W_m	g	130	180	240
		oz	4.5	6.5	8.5

[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink. **For PBL4850E to operate a brush motor, an encoder is required.

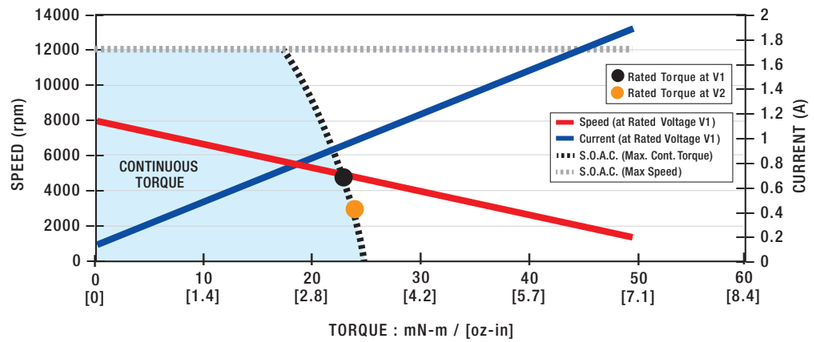
Dimensional Drawings: EC033A-1 • EC033A-2 • EC033A-3



Performance Data & Graph: EC033A–1

Motor Data		Units								
Rated Voltage **V1**	V_r	V	4.78	6.00	7.58	9.55	12.0	15.2	19.1	24.0
Rated Torque[1] •	T_r	Nm	0.024	0.024	0.023	0.023	0.023	0.023	0.023	0.023
		oz-in	3.4	3.4	3.3	3.3	3.3	3.3	3.3	3.2
Rated Speed[1]	ω_r	rpm	3430	3850	4090	4340	4540	4490	4620	4750
Rated Current[1]	I_r	A	4.9	3.9	2.9	2.4	1.9	1.4	1.2	0.93
Rated Power[1]	P_r	W	8.6	9.5	10	11	11	11	11	11
No Load Speed	ω_{nl}	rpm	6960	7020	6830	7020	7050	6900	7040	7080
No Load Current	I_{nl}	A	0.57	0.46	0.35	0.29	0.23	0.18	0.15	0.12
Rated Voltage **V2**	V_r	V	3.79	4.78	6.00	7.58	9.55	12.0	15.2	19.1
Rated Torque[1] •	T_r	Nm	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024
		oz-in	3.5	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Rated Speed[1]	ω_r	rpm	1680	2120	2370	2590	2800	2730	2890	3000
Rated Current[1]	I_r	A	5.0	4.0	3.0	2.4	1.9	1.5	1.2	0.97
Rated Power[1]	P_r	W	4.3	5.4	6.0	6.5	7.0	6.9	7.2	7.5
No Load Speed	ω_{nl}	rpm	5460	5540	5360	5530	5570	5410	5560	5600
No Load Current	I_{nl}	A	0.55	0.44	0.34	0.28	0.22	0.17	0.14	0.11
Motor Constant	K_M	Nm/√W	0.0099	0.010	0.011	0.011	0.011	0.011	0.011	0.011
		oz-in/√W	1.4	1.5	1.5	1.5	1.6	1.6	1.6	1.6
Torque Constant	K_T	Nm/A	0.00622	0.00776	0.0101	0.0124	0.0156	0.0201	0.0248	0.0310
		oz-in/A	0.880	1.10	1.43	1.76	2.20	2.85	3.52	4.39
Voltage Constant	K_E	V/(rad/s)	0.00622	0.00776	0.0101	0.0124	0.0156	0.0201	0.0248	0.0310
		V/krpm	0.651	0.813	1.06	1.30	1.63	2.11	2.60	3.25
Terminal Resistance	R_{mt}	Ω	0.395	0.569	0.863	1.29	1.94	3.14	4.81	7.36
Inductance	L	mH	0.14	0.22	0.38	0.57	0.90	1.5	2.3	3.6
Peak Current	I_{pk}	A	12	11	8.8	7.4	6.0	4.8	3.9	3.0
Electrical Time Constant	τ_e	ms	0.36	0.39	0.44	0.44	0.46	0.48	0.48	0.49
Mechanical Time Constant	τ_m	ms	12	11	9.9	9.8	9.3	9.0	9.1	8.9

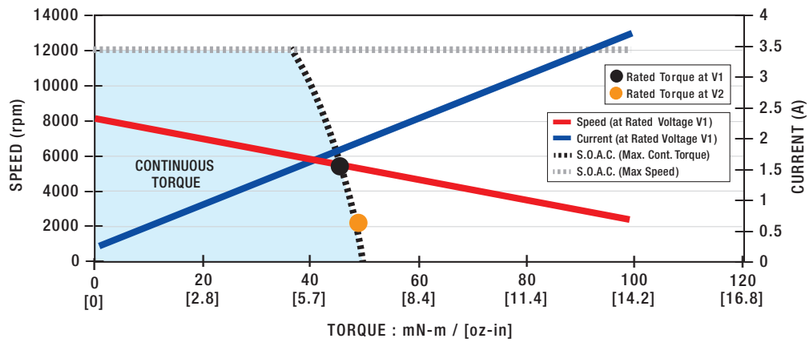
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



■ Performance Data & Graph: **EC033A–2**

Motor Data		Units								
Rated Voltage **V1**	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	0.047	0.046	0.046	0.046	0.046	0.046	0.045	0.045
		oz-in	6.6	6.6	6.5	6.5	6.5	6.5	6.4	6.4
Rated Speed[1]	ω_r	rpm	4780	4990	5060	5220	5350	5200	5350	5450
Rated Current[1]	I_r	A	4.6	3.7	2.8	2.3	1.8	1.4	1.1	0.90
Rated Power[1]	P_r	W	23	24	24	25	26	25	25	26
No Load Speed	ω_{nl}	rpm	7120	7140	7000	7140	7180	6970	7140	7180
No Load Current	I_{nl}	A	0.44	0.35	0.27	0.22	0.18	0.14	0.11	0.087
Rated Voltage **V2**	V_r	V	6.00	7.58	9.55	12.0	15.2	19.1	24.0	30.3
Rated Torque[1] •	T_r	Nm	0.049	0.049	0.049	0.049	0.049	0.049	0.049	0.048
		oz-in	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9
Rated Speed[1]	ω_r	rpm	1660	1890	1990	2090	2240	2160	2220	2330
Rated Current[1]	I_r	A	4.8	3.9	3.0	2.4	1.9	1.5	1.2	0.95
Rated Power[1]	P_r	W	8.5	9.7	10	11	11	11	11	12
No Load Speed	ω_{nl}	rpm	4420	4460	4350	4440	4500	4350	4440	4490
No Load Current	I_{nl}	A	0.40	0.32	0.25	0.20	0.17	0.13	0.10	0.080
Motor Constant	K_M	Nm/√W	0.016	0.017	0.017	0.017	0.018	0.018	0.018	0.018
		oz-in/√W	2.3	2.4	2.5	2.5	2.5	2.5	2.5	2.5
Torque Constant	K_T	Nm/A	0.0124	0.0156	0.0201	0.0248	0.0310	0.0404	0.0498	0.0622
		oz-in/A	1.76	2.20	2.85	3.52	4.39	5.72	7.05	8.80
Voltage Constant	K_E	V/(rad/s)	0.0124	0.0156	0.0201	0.0248	0.0310	0.0404	0.0498	0.0622
		V/krpm	1.30	1.63	2.11	2.60	3.25	4.23	5.21	6.51
Terminal Resistance	R_{mt}	Ω	0.584	0.870	1.35	2.06	3.13	5.12	7.88	12.1
Inductance	L	mH	0.27	0.42	0.71	1.1	1.7	2.9	4.3	6.8
Peak Current	I_{pk}	A	15	12	9.0	7.5	6.0	4.5	3.6	3.0
Electrical Time Constant	τ_e	ms	0.46	0.49	0.53	0.53	0.54	0.56	0.55	0.56
Mechanical Time Constant	τ_m	ms	7.4	7.0	6.5	6.5	6.3	6.1	6.2	6.1

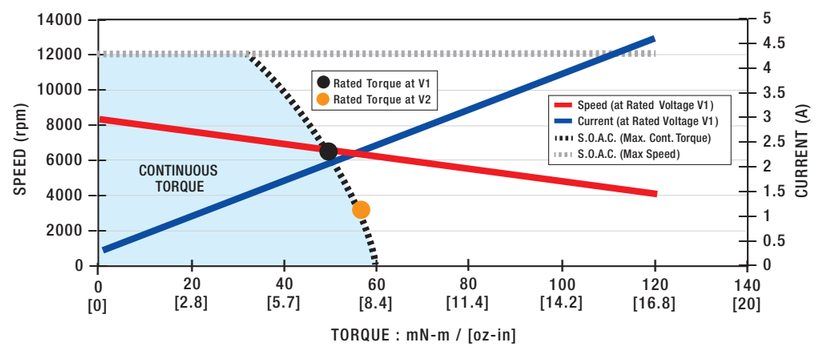
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



■ Performance Data & Graph: **EC033A–3**

Motor Data		Units								
Rated Voltage **V1**	V_r	V	12.0	15.2	19.1	24.0	30.3	38.2	48.0	60.0
Rated Torque[1] •	T_r	Nm	0.052	0.051	0.050	0.049	0.049	0.048	0.049	0.049
		oz-in	7.3	7.2	7.1	7.0	6.9	6.9	6.9	6.9
Rated Speed[1]	ω_r	rpm	6060	6450	6590	6460	6670	6790	6550	6650
Rated Current[1]	I_r	A	4.3	3.4	2.7	2.1	1.7	1.3	1.0	0.83
Rated Power[1]	P_r	W	33	34	34	33	34	34	33	34
No Load Speed	ω_{nl}	rpm	7360	7610	7650	7400	7600	7660	7410	7520
No Load Current	I_{nl}	A	0.49	0.40	0.32	0.25	0.20	0.16	0.13	0.099
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	0.057	0.057	0.057	0.056	0.056	0.056	0.056	0.056
		oz-in	8.1	8.1	8.0	8.0	8.0	7.9	7.9	7.9
Rated Speed[1]	ω_r	rpm	2790	3030	3150	3170	3270	3340	3250	3340
Rated Current[1]	I_r	A	4.7	3.8	3.0	2.3	1.9	1.5	1.2	0.93
Rated Power[1]	P_r	W	17	18	19	19	19	20	19	20
No Load Speed	ω_{nl}	rpm	4600	4740	4760	4650	4750	4770	4640	4750
No Load Current	I_{nl}	A	0.45	0.37	0.29	0.23	0.19	0.15	0.12	0.090
Motor Constant	K_M	Nm/√W	0.021	0.021	0.022	0.022	0.022	0.022	0.023	0.023
		oz-in/√W	2.9	3.0	3.1	3.2	3.1	3.2	3.2	3.2
Torque Constant	K_T	Nm/A	0.0152	0.0186	0.0233	0.0303	0.0372	0.0466	0.0605	0.0746
		oz-in/A	2.15	2.64	3.30	4.29	5.27	6.60	8.57	10.6
Voltage Constant	K_E	V/(rad/s)	0.0152	0.0186	0.0233	0.0303	0.0372	0.0466	0.0605	0.0746
		V/krpm	1.59	1.95	2.44	3.17	3.90	4.88	6.34	7.81
Terminal Resistance	R_{mt}	Ω	0.532	0.774	1.17	1.84	2.82	4.32	7.10	11.0
Inductance	L	mH	0.26	0.39	0.62	1.0	1.6	2.5	4.2	6.3
Peak Current	I_{pk}	A	15	12	9.6	7.5	6.0	4.8	3.6	3.0
Electrical Time Constant	τ_e	ms	0.49	0.51	0.53	0.56	0.56	0.57	0.59	0.58
Mechanical Time Constant	τ_m	ms	6.3	6.1	5.9	5.5	5.5	5.4	5.3	5.3

The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



Shown with optional assemblies.

Benefits

- Speeds up to 9,000 RPM possible
- DC bus voltage up to 96 VDC
- Large bearings for high side loads
- Metric mounting
- Eight standard windings per stack, special windings available

Optional Assemblies

- Encoders: E30C/D
- Gearboxes: PLG42S, PLG52
- Programmable Drives: PBL4850E, BGE3004A, BGE6015A

EC042B Series

The EC042B Series Brushless DC Motor is an excellent choice for both power transmission and precision motion control applications. It is offered in 3 motor lengths with continuous torque from 0.064 - 0.170 Nm. The EC042B is a high torque density 4 pole model designed as an economical yet higher performance general purpose servo motor. It is a great choice if more torque is needed in a 42 mm motor.

Motor Characteristics

Motor Data		Units	Series		
			EC042B-1	EC042B-2	EC042B-3
Max DC Terminal Voltage	V_T	V	96		
Max Speed (Mechanical)	ω_{MAX}	rpm	9000		
Continuous Stall Torque[1]	T_{CS}	Nm	0.064	0.120	0.170
		oz-in	9.0	17	24
Peak Torque (Maximum)[1]	T_{pk}	Nm	0.38	0.39	0.55
		oz-in	54	55	79
Coulomb Friction Torque	T_f	Nm	0.0014	0.0028	0.0042
		oz-in	0.20	0.40	0.60
Viscous Damping Factor	D	V/(rad/s)	3.4E-06	4.7E-06	6.7E-06
		oz-in/krpm	0.050	0.070	0.10
Thermal Time Constant	τ_{th}	min	5.1	11	16
Thermal Resistance	R_{th}	°C/W	9.1	5.9	4.4
Max. Winding Temperature	Θ_{MAX}	°C	105	105	105
Rotor Inertia	J_r	kg-m^2	1.4E-05	1.8E-05	2.1E-05
		oz-in-s^2	0.0021	0.0025	0.0029
Motor Weight	W_m	g	340	540	730
		oz	12	19	26

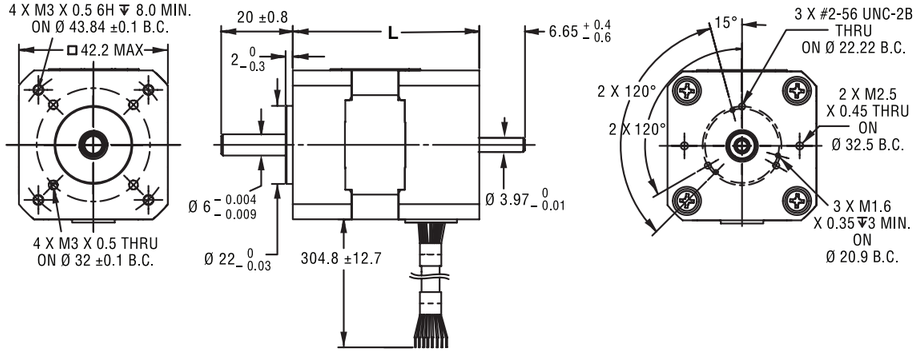
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.

Dimensional Drawings: EC042B-1 • EC042B-2 • EC042B-3

Dimensions = metric [mm]

L = Lengths Available

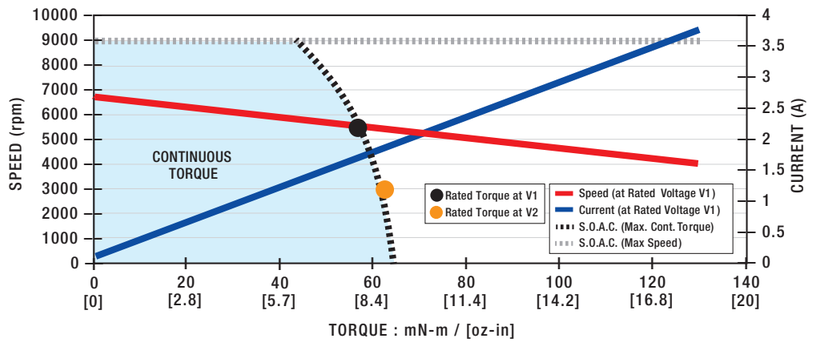
EC042B-1 = 54.5 mm
EC042B-2 = 74.5 mm
EC042B-3 = 94.5 mm



Performance Data & Graph: EC042B–1

Motor Data		Units									
Rated Voltage **V1**	V_r	V	12.0	15.2	12.0	15.2	19.1	24.0	30.3	38.2	48.0	60.6
Rated Torque[1] •	T_r	Nm	0.057	0.057	0.057	0.057	0.058	0.058	0.058	0.056	0.056	0.058
		oz-in	8.1	8.1	8.1	8.1	8.2	8.2	8.2	8.0	8.0	8.2
Rated Speed[1]	ω_r	rpm	5380	5310	5380	5310	5360	5400	5530	5160	5100	5460
Rated Current[1]	I_r	A	3.4	2.7	3.4	2.7	2.2	1.8	1.4	1.0	0.82	0.70
Rated Power[1]	P_r	W	32	32	32	32	33	33	34	31	30	33
No Load Speed	ω_{nl}	rpm	6280	6210	6280	6210	6250	6280	6400	6090	6030	6340
No Load Current	I_{nl}	A	0.21	0.16	0.21	0.16	0.13	0.11	0.082	0.061	0.048	0.041
Rated Voltage **V2**	V_r	V	7.58	9.55	7.58	9.55	12.0	15.2	19.1	24.0	30.3	38.2
Rated Torque[1] •	T_r	Nm	0.062	0.063	0.062	0.063	0.064	0.063	0.064	0.061	0.061	0.063
		oz-in	8.8	8.9	8.8	8.9	9.0	9.0	9.1	8.7	8.7	8.9
Rated Speed[1]	ω_r	rpm	2900	2840	2900	2840	2880	2930	2990	2740	2710	2950
Rated Current[1]	I_r	A	3.7	2.9	3.7	2.9	2.4	1.9	1.5	1.1	0.88	0.75
Rated Power[1]	P_r	W	19	19	19	19	19	19	20	18	17	19
No Load Speed	ω_{nl}	rpm	3960	3900	3960	3900	3920	3970	4030	3820	3800	3990
No Load Current	I_{nl}	A	0.16	0.13	0.16	0.13	0.097	0.079	0.064	0.047	0.037	0.032
Motor Constant	K_M	Nm/√W	0.027	0.027	0.027	0.027	0.028	0.027	0.028	0.027	0.026	0.027
		oz-in/√W	3.8	3.8	3.8	3.8	3.9	3.9	3.9	3.8	3.7	3.9
Torque Constant	K_T	Nm/A	0.0181	0.0231	0.0181	0.0231	0.0289	0.0361	0.0448	0.0592	0.0751	0.0903
		oz-in/A	2.56	3.27	2.56	3.27	4.09	5.11	6.34	8.39	10.6	12.8
Voltage Constant	K_E	V/(rad/s)	0.0181	0.0231	0.0181	0.0231	0.0289	0.0361	0.0448	0.0592	0.0751	0.0903
		V/krpm	1.89	2.42	1.89	2.42	3.03	3.78	4.69	6.20	7.87	9.46
Terminal Resistance	R_{mt}	Ω	0.446	0.724	0.446	0.724	1.10	1.72	2.61	4.97	8.05	10.9
Inductance	L	mH	0.57	0.94	0.57	0.94	1.5	2.3	3.5	6.2	9.9	14
Peak Current	I_{pk}	A	23	9.0	23	9.0	7.5	6.0	4.8	3.6	2.7	2.4
Electrical Time Constant	τ_e	ms	1.3	1.3	1.3	1.3	1.3	1.3	1.4	1.2	1.2	1.3
Mechanical Time Constant	τ_m	ms	20	20	20	20	19	19	19	20	21	19

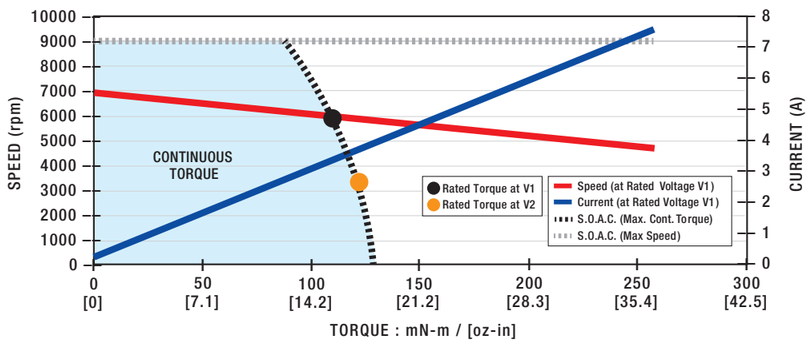
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



Performance Data & Graph: **EC042B–2**

Motor Data		Units								
Rated Voltage **V1**	V_r	V	15.2	19.1	24.0	30.3	38.2	48.0	60.6	76.4
Rated Torque[1] •	T_r	Nm	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
		oz-in	15	16	16	16	16	16	16	15
Rated Speed[1]	ω_r	rpm	5850	5810	5780	5850	5620	5620	5610	5700
Rated Current[1]	I_r	A	5.2	4.3	3.4	2.7	2.1	1.6	1.3	1.0
Rated Power[1]	P_r	W	66	67	68	69	65	65	65	65
No Load Speed	ω_{nl}	rpm	6490	6440	6410	6470	6270	6270	6260	6350
No Load Current	I_{nl}	A	0.28	0.22	0.17	0.14	0.11	0.082	0.065	0.053
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	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
		oz-in	17	17	18	18	17	17	17	17
Rated Speed[1]	ω_r	rpm	3260	3250	3270	3290	3130	3150	3140	3180
Rated Current[1]	I_r	A	5.7	4.7	3.8	3.0	2.3	1.8	1.4	1.1
Rated Power[1]	P_r	W	41	42	43	43	40	40	40	40
No Load Speed	ω_{nl}	rpm	4070	4040	4050	4080	3940	3960	3940	3990
No Load Current	I_{nl}	A	0.22	0.18	0.14	0.11	0.083	0.066	0.052	0.043
Motor Constant	K_M	Nm/√W	0.042	0.043	0.044	0.044	0.043	0.043	0.043	0.042
		oz-in/√W	5.9	6.1	6.2	6.2	6.0	6.1	6.0	6.0
Torque Constant	K_T	Nm/A	0.0222	0.0281	0.0355	0.0444	0.0577	0.0725	0.0918	0.114
		oz-in/A	3.14	3.98	5.03	6.29	8.17	10.3	13.0	16.1
Voltage Constant	K_E	V/(rad/s)	0.0222	0.0281	0.0355	0.0444	0.0577	0.0725	0.0918	0.114
		V/krpm	2.33	2.95	3.72	4.65	6.05	7.60	9.61	11.9
Terminal Resistance	R_{mt}	Ω	0.280	0.427	0.655	1.03	1.83	2.89	4.63	7.29
Inductance	L	mH	0.42	0.67	1.1	1.7	2.8	4.5	7.2	11
Peak Current	I_{pk}	A	18	15	12	9.6	7.2	5.7	4.5	3.6
Electrical Time Constant	τ_e	ms	1.5	1.6	1.6	1.6	1.5	1.5	1.5	1.5
Mechanical Time Constant	τ_m	ms	10	9.5	9.2	9.2	9.7	9.7	9.7	9.9

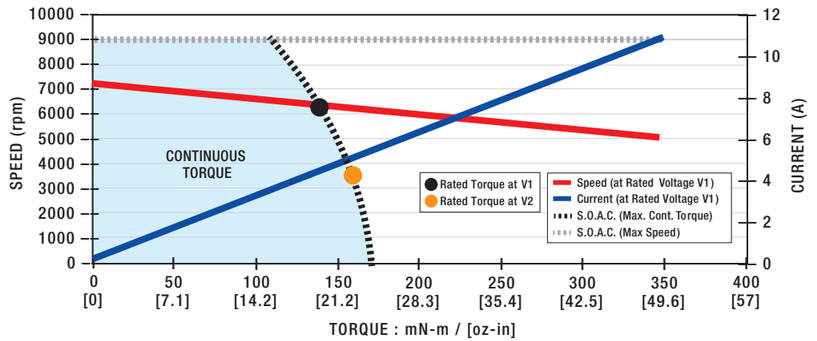
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



Performance Data & Graph: **EC042B–3**

Motor Data		Units								
Rated Voltage **V1**	V_r	V	19.1	24.0	30.3	38.2	48.0	60.6	76.4	96.0
Rated Torque[1] •	T_r	Nm	0.14	0.14	0.15	0.15	0.15	0.15	0.15	0.15
		oz-in	20	20	21	21	21	21	21	21
Rated Speed[1]	ω_r	rpm	6170	6220	6210	6190	6000	6220	6200	6240
Rated Current[1]	I_r	A	5.8	4.6	3.8	3.0	2.4	1.9	1.5	1.2
Rated Power[1]	P_r	W	91	93	95	95	95	98	97	98
No Load Speed	ω_{nl}	rpm	6710	6750	6730	6720	6540	6730	6720	6750
No Load Current	I_{nl}	A	0.34	0.27	0.22	0.17	0.13	0.11	0.084	0.067
Rated Voltage **V2**	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	0.16	0.16	0.17	0.17	0.17	0.17	0.17	0.17
		oz-in	23	23	24	24	24	24	24	24
Rated Speed[1]	ω_r	rpm	3470	3540	3520	3490	3410	3540	3510	3560
Rated Current[1]	I_r	A	6.4	5.2	4.2	3.3	2.6	2.1	1.7	1.4
Rated Power[1]	P_r	W	58	60	62	61	61	63	62	64
No Load Speed	ω_{nl}	rpm	4210	4270	4240	4220	4120	4240	4220	4260
No Load Current	I_{nl}	A	0.27	0.22	0.17	0.14	0.11	0.085	0.067	0.054
Motor Constant	K_M	Nm/√W	0.050	0.051	0.052	0.052	0.053	0.053	0.053	0.053
		oz-in/√W	7.1	7.2	7.4	7.3	7.5	7.5	7.5	7.6
Torque Constant	K_T	Nm/A	0.0270	0.0337	0.0427	0.0539	0.0696	0.0854	0.108	0.135
		oz-in/A	3.82	4.77	6.04	7.64	9.86	12.1	15.3	19.1
Voltage Constant	K_E	V/(rad/s)	0.0270	0.0337	0.0427	0.0539	0.0696	0.0854	0.108	0.135
		V/krpm	2.82	3.53	4.47	5.65	7.29	8.94	11.3	14.1
Terminal Resistance	R_{mt}	Ω	0.289	0.441	0.670	1.09	1.74	2.58	4.16	6.38
Inductance	L	mH	0.41	0.65	1.0	1.7	2.8	4.1	6.6	10
Peak Current	I_{pk}	A	21	17	14	11	8.4	6.9	5.4	4.5
Electrical Time Constant	τ_e	ms	1.4	1.5	1.5	1.5	1.6	1.6	1.6	1.6
Mechanical Time Constant	τ_m	ms	8.3	8.1	7.6	7.8	7.5	7.3	7.4	7.3

The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



Shown with optional assemblies.

Benefits

- Speeds up to 15,000 RPM possible
- DC bus voltage up to 48 VDC
- Metric mounting
- Eight standard windings per stack, special windings available

Optional Assemblies

- Encoders: E30C/D
- Gearboxes: PLG42S, G51A, PLG52
- Brake: B30A
- Programmable Drives: PBL4850E, BGE3004A, BGE6015A

EC044A Series

The EC044A Series Brushless DC Motor is a medium torque density 4 pole model designed as an economical upgrade to brushed motors. The EC044A is an excellent choice for both power transmission and precision motion control applications. It is offered in 3 motor lengths with continuous torque from 0.043 – 0.081 Nm in a 44 mm diameter.

Motor Characteristics

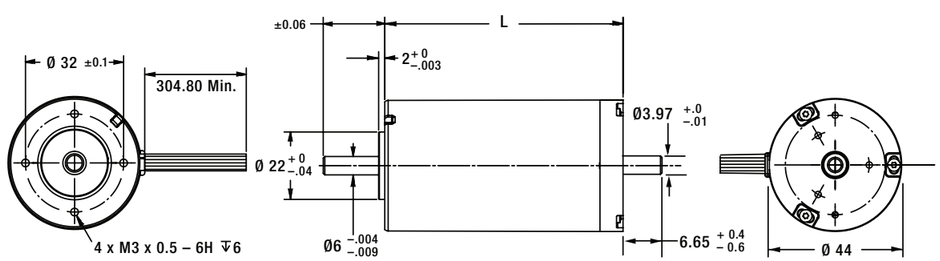
Motor Data		Units	Series		
			EC044A-1	EC044A-2	EC044A-3
Max DC Terminal Voltage	V_T	V	48		
Max Speed (Mechanical)	ω_{MAX}	rpm	15000		
Continuous Stall Torque[1]	T_{CS}	Nm	0.043	0.065	0.081
		oz-in	6.0	9.2	11
Peak Torque (Maximum)[1]	T_{pk}	Nm	0.20	0.36	0.45
		oz-in	29	51	64
Coulomb Friction Torque	T_f	Nm	0.0028	0.0028	0.0028
		oz-in	0.40	0.40	0.40
Viscous Damping Factor	D	Nm/(rad/s)	2.0E-06	4.0E-06	5.4E-06
		oz-in/krpm	0.030	0.060	0.080
Thermal Time Constant	τ_{th}	min	5.4	9.0	13
Thermal Resistance	R_{th}	°C/W	10	8.5	7.5
Max. Winding Temperature	Θ_{MAX}	°C	125	125	125
Rotor Inertia	J_r	kg-m²	2.1E-06	3.0E-06	4.0E-06
		oz-in-s²	3.0E-04	4.2E-04	5.6E-04
Motor Weight	W_m	g	260	350	430
		oz	9.2	12	15

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

Dimensional Drawings: EC044A-1 • EC044A-2 • EC044A-3

Dimensions = metric (mm)

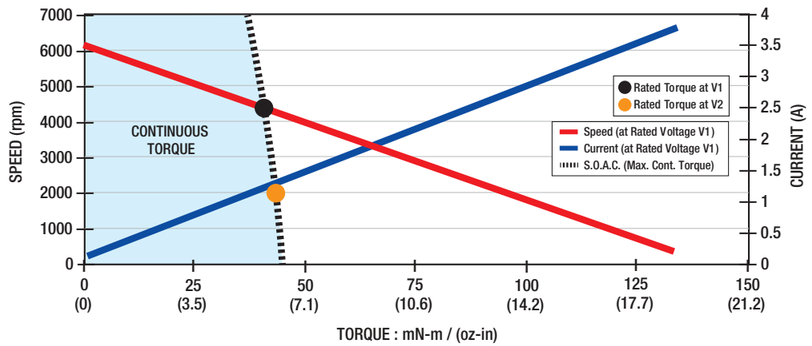
L = Lengths Available
EC044A-1 = 52.3 mm
EC044A-2 = 65.0 mm
EC044A-3 = 77.7 mm



Performance Data & Graph: EC044A–1

Motor Data		Units							
Rated Voltage **V1**	V_r	V	7.58	9.55	12.0	15.2	19.1	24.0	30.2	38.1
Rated Torque[1] •	T_r	Nm	0.039	0.041	0.041	0.041	0.041	0.041	0.041	0.041
		oz-in	5.6	5.8	5.8	5.8	5.8	5.8	5.8	5.7
Rated Speed[1]	ω_r	rpm	4240	4060	4130	4190	4190	4250	4140	4240
Rated Current[1]	I_r	A	3.7	2.9	2.3	1.9	1.5	1.2	0.93	0.74
Rated Power[1]	P_r	W	17	17	18	18	18	18	18	18
No Load Speed	ω_{nl}	rpm	5490	5280	5340	5370	5380	5430	5340	5420
No Load Current	I_{nl}	A	0.31	0.24	0.19	0.15	0.12	0.097	0.075	0.061
Rated Voltage **V2**	V_r	V	4.78	6.00	7.58	9.55	12.0	15.2	19.1	24.0
Rated Torque[1] •	T_r	Nm	0.042	0.043	0.043	0.044	0.043	0.044	0.044	0.043
		oz-in	5.9	6.2	6.1	6.2	6.1	6.2	6.2	6.1
Rated Speed[1]	ω_r	rpm	1880	1780	1850	1880	1880	1940	1870	1910
Rated Current[1]	I_r	A	3.9	3.1	2.5	2.0	1.6	1.3	0.99	0.78
Rated Power[1]	P_r	W	8.2	8.1	8.4	8.6	8.5	8.9	8.6	8.7
No Load Speed	ω_{nl}	rpm	3440	3290	3350	3350	3350	3420	3350	3390
No Load Current	I_{nl}	A	0.28	0.21	0.17	0.14	0.11	0.086	0.067	0.054
Motor Constant	K_M	Nm/√W	0.019	0.020	0.020	0.020	0.020	0.020	0.020	0.020
		oz-in/√W	2.7	2.8	2.8	2.9	2.8	2.8	2.9	2.8
Torque Constant	K_T	Nm/A	0.0129	0.0169	0.0210	0.0265	0.0332	0.0413	0.0529	0.0658
		oz-in/A	1.83	2.39	2.98	3.75	4.71	5.86	7.49	9.32
Voltage Constant	K_E	V/(rad/s)	0.0129	0.0169	0.0210	0.0265	0.0332	0.0413	0.0529	0.0658
		V/krpm	1.35	1.77	2.20	2.77	3.48	4.33	5.54	6.89
Terminal Resistance	R_{mt}	Ω	0.450	0.720	1.11	1.73	2.75	4.24	6.90	10.8
Inductance	L	mH	0.31	0.54	0.83	1.3	2.1	3.2	5.2	8.1
Peak Current	I_{pk}	A	17	13	11	8.8	6.9	5.7	4.4	3.5
Electrical Time Constant	τ_e	ms	0.69	0.75	0.75	0.76	0.75	0.76	0.76	0.75
Mechanical Time Constant	τ_m	ms	5.7	5.3	5.3	5.2	5.3	5.3	5.2	5.3

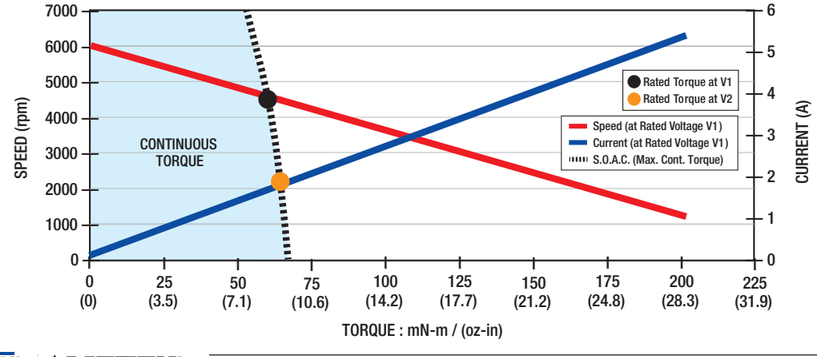
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



■ Performance Data & Graph: **EC044A–2**

Motor Data		Units							
Rated Voltage **V1**	V_r	V	12.0	15.2	19.1	24.0	30.2	38.1	48.0	48.0
Rated Torque[1] •	T_r	Nm	0.059	0.061	0.061	0.061	0.061	0.060	0.061	0.063
		oz-in	8.3	8.7	8.6	8.6	8.7	8.6	8.6	8.9
Rated Speed[1]	ω_r	rpm	4550	4360	4430	4440	4430	4530	4440	3220
Rated Current[1]	I_r	A	3.4	2.7	2.1	1.7	1.4	1.1	0.85	0.71
Rated Power[1]	P_r	W	28	28	28	28	28	29	28	21
No Load Speed	ω_{nl}	rpm	5470	5270	5340	5330	5340	5410	5340	4280
No Load Current	I_{nl}	A	0.25	0.19	0.16	0.13	0.096	0.078	0.061	0.045
Rated Voltage **V2**	V_r	V	7.58	9.55	12.0	15.2	19.1	24.0	38.1	48.0
Rated Torque[1] •	T_r	Nm	0.064	0.066	0.065	0.066	0.066	0.065	0.064	0.063
		oz-in	9.0	9.3	9.3	9.3	9.3	9.3	9.0	8.9
Rated Speed[1]	ω_r	rpm	2220	2100	2140	2180	2160	2220	3160	3220
Rated Current[1]	I_r	A	3.6	2.8	2.3	1.8	1.4	1.2	0.89	0.71
Rated Power[1]	P_r	W	15	15	15	15	15	15	21	21
No Load Speed	ω_{nl}	rpm	3440	3300	3340	3370	3360	3400	4230	4280
No Load Current	I_{nl}	A	0.21	0.16	0.13	0.11	0.080	0.065	0.055	0.045
Motor Constant	K_M	Nm/√W	0.026	0.027	0.027	0.027	0.027	0.027	0.027	0.027
		oz-in/√W	3.7	3.8	3.8	3.8	3.8	3.8	3.8	3.8
Torque Constant	K_T	Nm/A	0.0206	0.0271	0.0336	0.0423	0.0532	0.0662	0.0846	0.105
		oz-in/A	2.92	3.84	4.76	5.99	7.53	9.37	12.0	14.9
Voltage Constant	K_E	V/(rad/s)	0.0206	0.0271	0.0336	0.0423	0.0532	0.0662	0.0846	0.105
		V/krpm	2.16	2.84	3.52	4.43	5.57	6.93	8.86	11.0
Terminal Resistance	R_{mt}	Ω	0.629	1.02	1.59	2.49	3.96	6.10	9.95	15.6
Inductance	L	mH	0.50	0.86	1.3	2.1	3.3	5.1	8.4	13
Peak Current	I_{pk}	A	19	15	12	9.6	7.6	6.2	4.8	3.1
Electrical Time Constant	τ_e	ms	0.79	0.84	0.83	0.84	0.83	0.84	0.84	0.83
Mechanical Time Constant	τ_m	ms	4.4	4.1	4.2	4.1	4.2	4.1	4.1	4.2

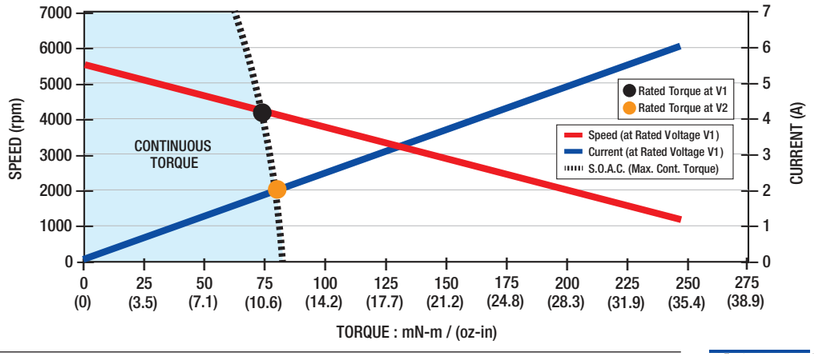
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



■ Performance Data & Graph: **EC044A–3**

Motor Data		Units							
Rated Voltage **V1**	V_r	V	15.2	19.1	24.0	30.2	38.1	48.0	48.0	48.0
Rated Torque[1] •	T_r	Nm	0.073	0.075	0.075	0.075	0.075	0.075	0.079	0.081
		oz-in	10	11	11	11	11	11	11	11
Rated Speed[1]	ω_r	rpm	4260	4040	4110	4110	4120	4200	2940	2060
Rated Current[1]	I_r	A	3.0	2.4	1.9	1.5	1.2	0.97	0.80	0.65
Rated Power[1]	P_r	W	32	32	32	32	32	33	24	17
No Load Speed	ω_{nl}	rpm	5050	4830	4890	4890	4910	4980	3880	3120
No Load Current	I_{nl}	A	0.20	0.15	0.13	0.097	0.078	0.062	0.044	0.032
Rated Voltage **V2**	V_r	V	9.52	12.0	15.2	19.1	24.0	30.2	38.1	38.1
Rated Torque[1] •	T_r	Nm	0.079	0.081	0.080	0.081	0.081	0.081	0.081	0.082
		oz-in	11	11	11	11	11	11	12	12
Rated Speed[1]	ω_r	rpm	2080	1970	2040	2040	2030	2070	2020	1320
Rated Current[1]	I_r	A	3.2	2.5	2.0	1.6	1.3	1.0	0.81	0.66
Rated Power[1]	P_r	W	17	17	17	17	17	18	17	11
No Load Speed	ω_{nl}	rpm	3150	3030	3090	3090	3090	3120	3080	2470
No Load Current	I_{nl}	A	0.17	0.13	0.099	0.079	0.063	0.051	0.040	0.030
Motor Constant	K_M	Nm/√W	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031
		oz-in/√W	4.3	4.5	4.4	4.5	4.4	4.5	4.5	4.4
Torque Constant	K_T	Nm/A	0.0284	0.0372	0.0462	0.0582	0.0731	0.0909	0.116	0.145
		oz-in/A	4.02	5.27	6.55	8.24	10.3	12.9	16.5	20.5
Voltage Constant	K_E	V/(rad/s)	0.0284	0.0372	0.0462	0.0582	0.0731	0.0909	0.116	0.145
		V/krpm	2.97	3.90	4.84	6.09	7.65	9.52	12.2	15.1
Terminal Resistance	R_{mt}	Ω	0.860	1.40	2.18	3.42	5.44	8.40	13.7	21.5
Inductance	L	mH	0.68	1.2	1.8	2.9	4.5	7.0	11	18
Peak Current	I_{pk}	A	18	14	11	8.8	7.0	5.7	3.5	2.2
Electrical Time Constant	τ_e	ms	0.79	0.84	0.83	0.84	0.83	0.83	0.83	0.82
Mechanical Time Constant	τ_m	ms	4.2	4.0	4.0	4.0	4.0	4.0	4.0	4.0

he V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



EC057C Series

The EC057C 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 – 0.280 Nm.

Benefits

- Speeds up to 12,000 RPM possible
- DC bus voltage up to 76.4 VDC
- NEMA 23 configuration
- Eight standard windings per stack, special windings available
- 4 Pole rare earth design

Optional Assemblies

- Encoder: E30C/D
- Gearboxes: G40A, PLG42S, G51A, PLG52
- Brake: B49A
- Programmable Drives: BGE3004A, BGE6015A

Motor Characteristics

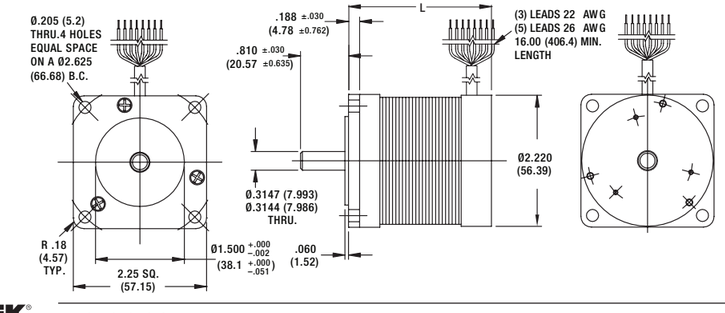
Motor Data		Units	Series			
			EC057C-1	EC057C-2	EC057C-3	EC057C-4
Max DC Terminal Voltage	V_T	V	90			
Max Speed (Mechanical)	ω_{MAX}	rpm	12000			
Continuous Stall Torque[1]	T_{CS}	Nm	0.078	0.140	0.220	0.280
		oz-in	11	20	31	40
Peak Torque (Maximum)[1]	T_{pk}	Nm	0.25	0.44	0.70	0.88
		oz-in	36	63	99	130
Coulomb Friction Torque	T_f	Nm	0.0066	0.0078	0.0092	0.011
		oz-in	0.93	1.1	1.3	1.5
Viscous Damping Factor	D	Nm/(rad/s)	8.1E-07	2.1E-06	3.5E-06	4.9E-06
		oz-in/krpm	0.012	0.031	0.052	0.072
Thermal Time Constant	τ_{th}	min	13	17	21	25
Thermal Resistance	R_{th}	°C/W	11	7.9	5.2	4.7
Max. Winding Temperature	Θ_{MAX}	°C	130	130	130	130
Rotor Inertia	J_r	kg-m^2	4.2E-06	7.8E-06	1.1E-05	1.5E-05
		oz-in-s^2	6.0E-04	0.0011	0.0016	0.0021
Motor Weight	W_m	g	370	510	670	830
		oz	13	18	24	29

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

Dimensional Drawings: EC057C-1 • EC057C-2 • EC057C-3 • EC057C-4

Dimensions = inches (mm)

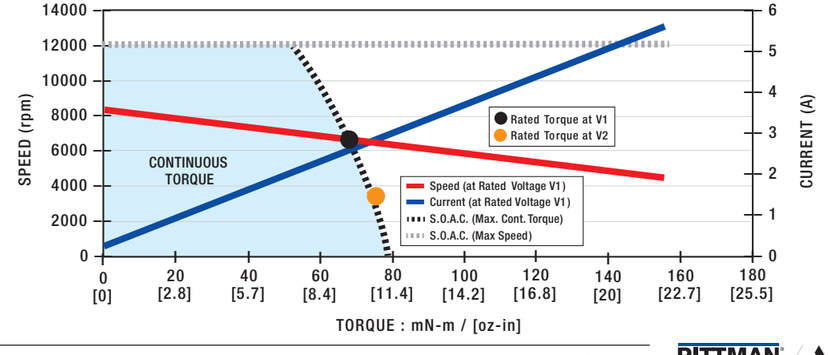
L = Lengths Available
EC057C-1 = 1.464 (37.19) Max.
EC057C-2 = 1.914 (48.62) Max.
EC057C-3 = 2.414 (61.32) Max.
EC057C-4 = 2.914 (74.02) Max.



Performance Data & Graph: EC057C–1

Motor Data		Units							
Rated Voltage **V1**	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	0.071	0.070	0.069	0.068	0.068	0.067	0.067	0.067
		oz-in	10	9.9	9.7	9.6	9.6	9.5	9.5	9.5
Rated Speed[1]	ω_r	rpm	6290	6260	6590	6700	6540	6740	6820	6590
Rated Current[1]	I_r	A	7.2	5.5	4.4	3.5	2.7	2.1	1.7	1.3
Rated Power[1]	P_r	W	47	46	47	48	46	47	48	46
No Load Speed	ω_{nl}	rpm	7610	7360	7580	7630	7390	7580	7630	7380
No Load Current	I_{nl}	A	0.62	0.48	0.39	0.31	0.24	0.20	0.16	0.12
Rated Voltage **V2**	V_r	V	6.00	7.58	9.55	12.0	15.2	19.1	24.0	30.3
Rated Torque[1] •	T_r	Nm	0.077	0.076	0.076	0.075	0.075	0.075	0.075	0.075
		oz-in	11	11	11	11	11	11	11	11
Rated Speed[1]	ω_r	rpm	3070	3180	3380	3460	3440	3540	3570	3480
Rated Current[1]	I_r	A	7.8	5.9	4.8	3.8	2.9	2.4	1.9	1.4
Rated Power[1]	P_r	W	25	25	27	27	27	28	28	27
No Load Speed	ω_{nl}	rpm	4740	4620	4730	4760	4650	4750	4770	4630
No Load Current	I_{nl}	A	0.60	0.46	0.38	0.30	0.23	0.19	0.15	0.12
Motor Constant	K_M	Nm/√W	0.025	0.027	0.027	0.028	0.028	0.028	0.028	0.029
		oz-in/√W	3.5	3.8	3.8	3.9	4.0	4.0	4.0	4.1
Torque Constant	K_T	Nm/A	0.0117	0.0153	0.0188	0.0235	0.0305	0.0375	0.0470	0.0610
		oz-in/A	1.66	2.16	2.66	3.33	4.31	5.31	6.65	8.64
Voltage Constant	K_E	V/(rad/s)	0.0117	0.0153	0.0188	0.0235	0.0305	0.0375	0.0470	0.0610
		V/krpm	1.23	1.60	1.97	2.46	3.19	3.93	4.92	6.39
Terminal Resistance	R_{mt}	Ω	0.220	0.330	0.480	0.730	1.16	1.77	2.76	4.50
Inductance	L	mH	0.24	0.41	0.62	0.97	1.6	2.5	3.9	6.5
Peak Current	I_{pk}	A	25	19	15	12	9.6	7.8	6.3	4.8
Electrical Time Constant	τ_e	ms	1.1	1.2	1.3	1.3	1.4	1.4	1.4	1.5
Mechanical Time Constant	τ_m	ms	6.8	6.0	5.8	5.6	5.3	5.3	5.3	5.1

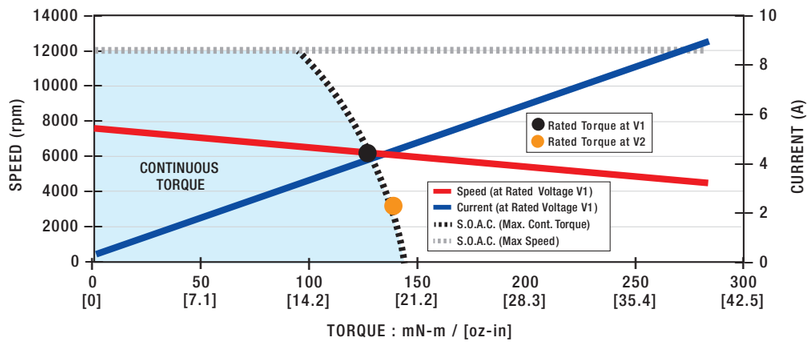
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



Performance Data & Graph: **EC057C–2**

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	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
		oz-in	19	18	18	18	18	18	18	18
Rated Speed[1]	ω_r	rpm	5690	5890	5780	5980	6090	5930	6070	6070
Rated Current[1]	I_r	A	8.9	7.1	5.4	4.3	3.4	2.6	2.1	1.7
Rated Power[1]	P_r	W	79	80	78	80	81	78	80	80
No Load Speed	ω_{nl}	rpm	6620	6730	6490	6630	6700	6500	6640	6690
No Load Current	I_{nl}	A	0.54	0.44	0.34	0.27	0.22	0.17	0.14	0.11
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	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
		oz-in	20	20	20	20	20	20	19	20
Rated Speed[1]	ω_r	rpm	2970	3100	3080	3260	3310	3220	3320	3310
Rated Current[1]	I_r	A	9.5	7.6	5.8	4.6	3.7	2.9	2.3	1.9
Rated Power[1]	P_r	W	44	45	45	47	48	46	48	48
No Load Speed	ω_{nl}	rpm	4160	4210	4060	4180	4210	4070	4180	4210
No Load Current	I_{nl}	A	0.51	0.41	0.32	0.26	0.21	0.16	0.13	0.11
Motor Constant	K_M	Nm/√W	0.039	0.040	0.042	0.043	0.043	0.044	0.044	0.044
		oz-in/√W	5.6	5.7	6.0	6.1	6.1	6.3	6.3	6.2
Torque Constant	K_T	Nm/A	0.0171	0.0213	0.0278	0.0342	0.0427	0.0555	0.0683	0.0855
		oz-in/A	2.42	3.02	3.94	4.84	6.04	7.86	9.67	12.1
Voltage Constant	K_E	V/(rad/s)	0.0171	0.0213	0.0278	0.0342	0.0427	0.0555	0.0683	0.0855
		V/krpm	1.79	2.23	2.91	3.58	4.47	5.81	7.15	8.95
Terminal Resistance	R_{mt}	Ω	0.190	0.280	0.430	0.630	0.970	1.56	2.39	3.84
Inductance	L	mH	0.28	0.44	0.74	1.1	1.8	3.0	4.5	7.4
Peak Current	I_{pk}	A	30	24	18	15	12	9.3	7.5	6.0
Electrical Time Constant	τ_e	ms	1.5	1.6	1.7	1.8	1.8	1.9	1.9	1.9
Mechanical Time Constant	τ_m	ms	5.1	4.8	4.3	4.2	4.1	3.9	4.0	4.1

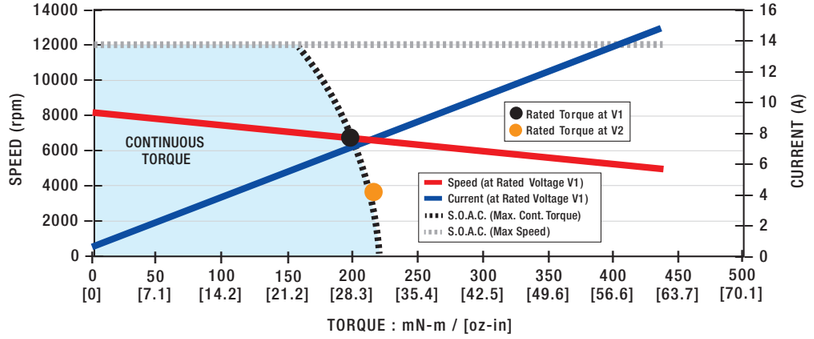
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



Performance Data & Graph: **EC057C–3**

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	0.21	0.21	0.20	0.20	0.20	0.20	0.19	0.19
		oz-in	30	29	29	28	28	28	28	27
Rated Speed[1]	ω_r	rpm	5940	6060	6340	6470	6360	6570	6630	6460
Rated Current[1]	I_r	A	15	11	9.0	7.1	5.4	4.4	3.5	2.7
Rated Power[1]	P_r	W	130	130	130	140	130	130	140	130
No Load Speed	ω_{nl}	rpm	7060	6900	7060	7100	6890	7070	7090	6880
No Load Current	I_{nl}	A	0.74	0.57	0.47	0.37	0.29	0.23	0.19	0.15
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	0.22	0.22	0.22	0.22	0.22	0.21	0.21	0.21
		oz-in	31	31	31	31	30	30	30	30
Rated Speed[1]	ω_r	rpm	3080	3220	3430	3590	3540	3650	3720	3630
Rated Current[1]	I_r	A	16	12	9.6	7.7	5.8	4.7	3.8	2.9
Rated Power[1]	P_r	W	71	74	78	81	80	82	83	81
No Load Speed	ω_{nl}	rpm	4450	4330	4430	4490	4330	4430	4470	4330
No Load Current	I_{nl}	A	0.68	0.52	0.43	0.34	0.26	0.22	0.17	0.13
Motor Constant	K_M	Nm/√W	0.046	0.051	0.052	0.054	0.057	0.057	0.058	0.059
		oz-in/√W	6.6	7.2	7.4	7.7	8.0	8.1	8.1	8.3
Torque Constant	K_T	Nm/A	0.0160	0.0208	0.0256	0.0320	0.0416	0.0512	0.0641	0.0834
		oz-in/A	2.27	2.95	3.62	4.53	5.90	7.25	9.07	11.8
Voltage Constant	K_E	V/(rad/s)	0.0160	0.0208	0.0256	0.0320	0.0416	0.0512	0.0641	0.0834
		V/krpm	1.68	2.18	2.68	3.35	4.36	5.36	6.71	8.73
Terminal Resistance	R_{mt}	Ω	0.120	0.170	0.240	0.350	0.540	0.810	1.24	2.00
Inductance	L	mH	0.17	0.28	0.42	0.66	1.1	1.7	2.6	4.5
Peak Current	I_{pk}	A	48	39	30	25	19	15	12	9.3
Electrical Time Constant	τ_e	ms	1.4	1.6	1.8	1.9	2.1	2.1	2.1	2.2
Mechanical Time Constant	τ_m	ms	5.3	4.4	4.1	3.9	3.5	3.5	3.4	3.3

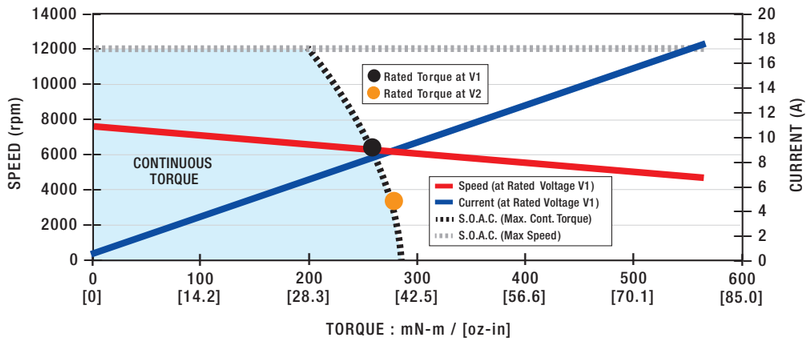
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



■ Performance Data & Graph: **EC057C–4**

Motor Data		Units								
Rated Voltage **V1**	V_r	V	15.2	19.1	24.0	30.3	38.2	48.0	60.6	76.4
Rated Torque[1] •	T_r	Nm	0.27	0.26	0.26	0.26	0.25	0.25	0.25	0.25
		oz-in	38	37	37	36	36	36	35	35
Rated Speed[1]	ω_r	rpm	5870	5850	6110	6270	6120	6280	6360	6190
Rated Current[1]	I_r	A	14	11	8.6	6.8	5.2	4.2	3.3	2.6
Rated Power[1]	P_r	W	170	160	170	170	160	170	170	160
No Load Speed	ω_{nl}	rpm	6750	6510	6650	6730	6530	6660	6720	6540
No Load Current	I_{nl}	A	0.66	0.50	0.41	0.33	0.26	0.21	0.17	0.13
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	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28
		oz-in	40	40	40	39	39	39	39	39
Rated Speed[1]	ω_r	rpm	3100	3180	3410	3510	3430	3550	3600	3490
Rated Current[1]	I_r	A	15	11	9.2	7.3	5.6	4.6	3.6	2.8
Rated Power[1]	P_r	W	92	94	100	100	99	100	100	100
No Load Speed	ω_{nl}	rpm	4230	4080	4200	4230	4090	4200	4230	4100
No Load Current	I_{nl}	A	0.60	0.46	0.38	0.30	0.23	0.19	0.15	0.12
Motor Constant	K_M	Nm/√W	0.057	0.062	0.065	0.067	0.069	0.069	0.070	0.071
		oz-in/√W	8.1	8.8	9.1	9.4	9.7	9.8	9.8	10
Torque Constant	K_T	Nm/A	0.0213	0.0278	0.0342	0.0427	0.0555	0.0683	0.0855	0.111
		oz-in/A	3.02	3.94	4.84	6.04	7.86	9.67	12.1	15.7
Voltage Constant	K_E	V/(rad/s)	0.0213	0.0278	0.0342	0.0427	0.0555	0.0683	0.0855	0.111
		V/krpm	2.23	2.91	3.58	4.47	5.81	7.15	8.95	11.6
Terminal Resistance	R_{mt}	Ω	0.140	0.200	0.280	0.410	0.650	0.980	1.51	2.45
Inductance	L	mH	0.22	0.37	0.56	0.88	1.5	2.3	3.5	6.0
Peak Current	I_{pk}	A	48	36	29	24	18	15	12	9.0
Electrical Time Constant	τ_e	ms	1.6	1.9	2.0	2.1	2.3	2.3	2.3	2.4
Mechanical Time Constant	τ_m	ms	4.6	3.8	3.6	3.3	3.1	3.1	3.1	3.0

The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



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 0.15 – 0.59 Nm.

■ **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	Series			
			EC057B-1	EC057B-2	EC057B-3	EC057B-4
Max DC Terminal Voltage	V_T	V	170			
Max Speed (Mechanical)	ω_{MAX}	rpm	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-m²	7.1E-06	1.2E-05	1.8E-05	2.3E-05
		oz-in-s²	0.0010	0.0017	0.0025	0.0032
Motor Weight	W_m	g	540	740	1000	1300
		oz	19	26	36	45

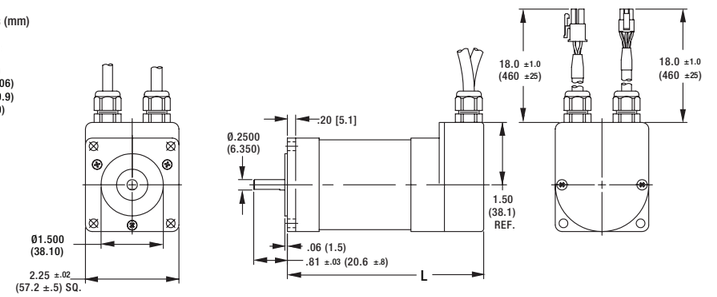
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.

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

Dimensions = inches (mm)

L = Lengths Available

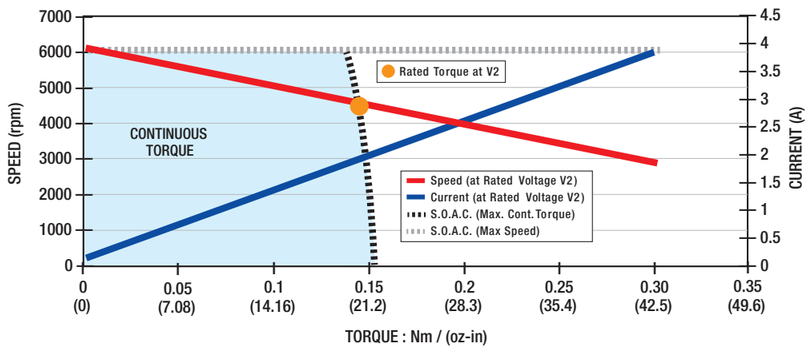
EC057B-1 = 3.15 (80)
EC057B-2 = 3.94 (75.06)
EC057B-3 = 4.72 (119.9)
EC057B-4 = 5.51 (140)



■ Performance Data & Graph: **EC057B–1**

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/√W	0.041	0.041	0.041	0.041	0.042	0.042
		oz-in/√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

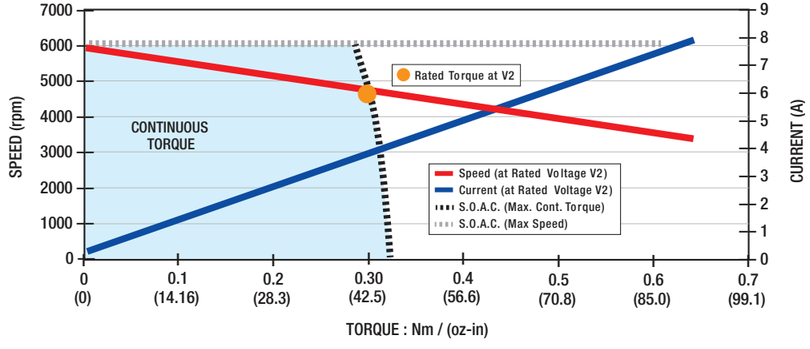
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



■ Performance Data & Graph: **EC057B–2**

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/√W	0.070	0.070	0.070	0.070	0.070	0.071
		oz-in/√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

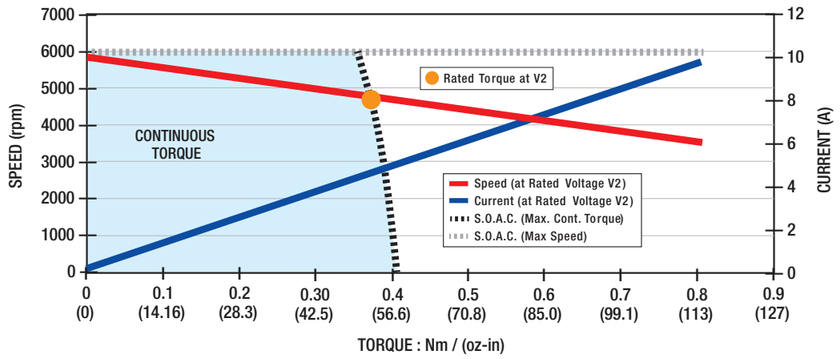
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



■ Performance Data & Graph: **EC057B–3**

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/√W	0.084	0.083	0.084	0.084	0.083	0.085	0.081
		oz-in/√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

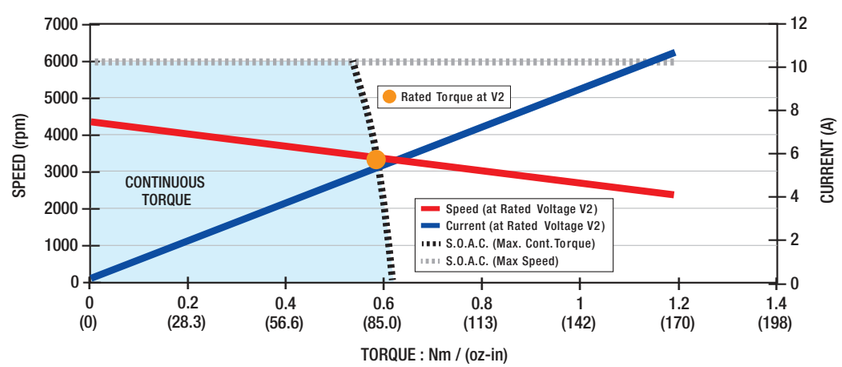
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



■ Performance Data & Graph: **EC057B–4**

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/√W	0.11	0.11	0.11	0.11	0.11	0.11
		oz-in/√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

The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



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.

Benefits

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

Optional Assemblies

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

Motor Characteristics

Motor Data		Units	Series		
			EC057A-1	EC057A-2	EC057A-3
Max DC Terminal Voltage	V_T	V	170		
Max Speed (Mechanical)	ω_{MAX}	rpm	6000		
Continuous Stall Torque[1]	T_{CS}	Nm	0.38	0.71	0.93
		oz-in	54	100	130
Peak Torque (Maximum)[1]	T_{pk}	Nm	1.2	2.2	2.9
		oz-in	170	310	410
Coulomb Friction Torque	T_f	Nm	0.0075	0.013	0.016
		oz-in	1.1	1.8	2.3
Viscous Damping Factor	D	Nm/(rad/s)	2.0E-05	4.0E-05	8.1E-05
		oz-in/krpm	0.30	0.60	1.2
Thermal Time Constant	τ_{th}	min	20	15	15
Thermal Resistance	R_{th}	°C/W	1.5	1.3	1.3
Max. Winding Temperature	Θ_{MAX}	°C	125	125	125
Rotor Inertia	J_r	kg-m^2	1.3E-05	2.6E-05	3.9E-05
		oz-in-s^2	0.0019	0.0037	0.0055
Motor Weight	W_m	g	660	1000	1400
		oz	23	36	48

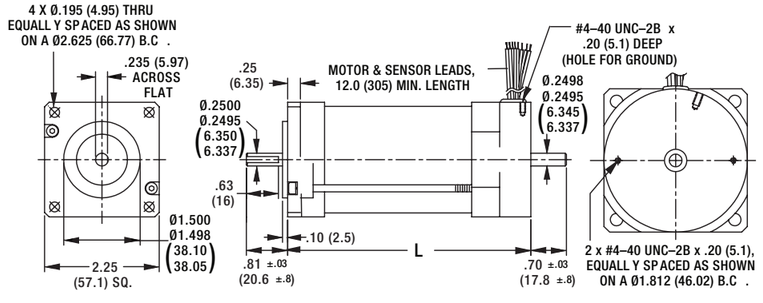
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.

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

Dimensions = inches (mm)

L = Lengths Available

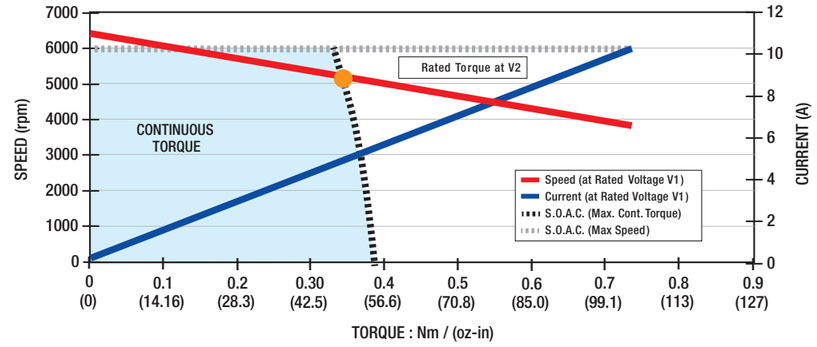
EC057A-1 = 2.8 (71.1)
EC057A-2 = 3.8 (96.5)
EC057A-3 = 4.8 (121.9)



Performance Data & Graph: EC057A–1

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/√W	0.072	0.074	0.074	0.073	0.074	0.072	0.074
		oz-in/√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

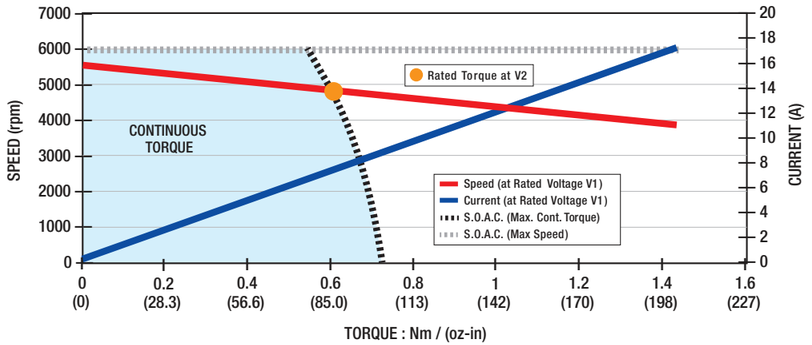
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



■ Performance Data & Graph: **EC057A–2**

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/√W	0.12	0.12	0.13	0.12	0.12	0.12	0.12
		oz-in/√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

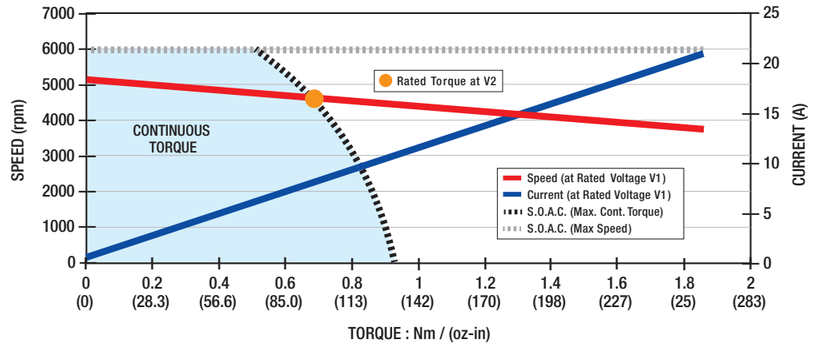
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



■ Performance Data & Graph: **EC057A–3**

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

The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



EC083A Series

The EC083A Series Brushless DC Motor is a high torque model brushless motor designed in a NEMA 34 package. It is offered in 6 motor lengths with continuous torque from 0.91 – 2.1 Nm.

Benefits

- Speeds up to 6,000 RPM possible
- DC bus voltage up to 325 VDC
- Capable of 24 VDC bus systems
- NEMA 34 package
- 8 pole rare earth design

Optional Assemblies

- Encoders: Z Type, C Type
- Programmable Drive: BGE6060A

Motor Characteristics

Motor Data		Units	Series					
			EC083A-1	EC083A-2	EC083A-3	EC083A-4	EC083A-5	EC083A-6
Max DC Terminal Voltage	V_T	V	325					
Max Speed (Mechanical)	ω_{MAX}	rpm	6000					
Continuous Stall Torque[1]	T_{CS}	Nm	0.91	1.4	1.7	1.9	2.1	2.1
		oz-in	130	200	240	260	300	300
Peak Torque (Maximum)[1]	T_{pk}	Nm	2.9	4.5	5.2	5.9	6.8	6.9
		oz-in	410	640	740	830	970	970
Coulomb Friction Torque	T_f	Nm	0.020	0.030	0.038	0.041	0.045	0.047
		oz-in	2.8	4.3	5.4	5.8	6.4	6.7
Viscous Damping Factor	D	Nm/(rad/s)	1.3E-05	1.3E-05	4.7E-05	4.7E-05	6.7E-05	6.7E-05
		oz-in/krpm	0.20	0.20	0.70	0.70	1.0	1.0
Thermal Time Constant	τ_{th}	min	15	15	15	15	15	15
Thermal Resistance	R_{th}	°C/W	1.5	1.4	1.4	1.4	1.3	1.1
Max. Winding Temperature	Θ_{MAX}	°C	125	125	125	125	125	125
Rotor Inertia	J_r	kg-m^2	6.8E-05	1.0E-04	1.2E-04	1.6E-04	2.0E-04	2.4E-04
		oz-in-s^2	0.0096	0.014	0.018	0.022	0.029	0.034
Motor Weight	W_m	g	1400	2000	2500	3000	3500	4100
		oz	50	70	88	110	120	140

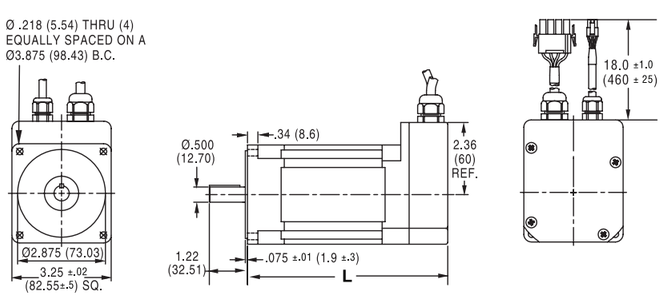
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.

Dimensional Drawings: EC083A-1 • EC083A-2 • EC083A-3 • EC083A-4 • EC083A-5 • EC083A-6

Dimensions = inches (mm)

L = Lengths Available

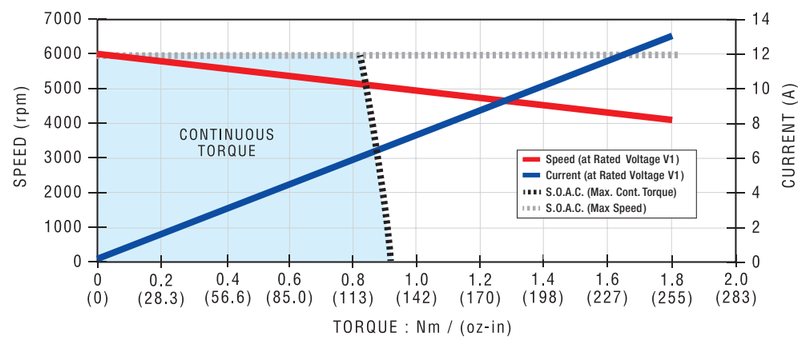
EC083A-1 = 4.05 (102.9)
EC083A-2 = 4.55 (115.6)
EC083A-3 = 5.05 (128.3)
EC083A-4 = 5.55 (141.0)
EC083A-5 = 6.05 (153.7)
EC083A-6 = 6.55 (166.4)



Performance Data & Graph: EC083A–1

Motor Data		Units						
Rated Voltage **V1**	V_r	V	60.0	76.0	96.0	152	305	305
Rated Torque[1] •	T_r	Nm	0.80	0.81	0.81	0.79	0.78	0.78
		oz-in	110	110	120	110	110	110
Rated Speed[1]	ω_r	rpm	6000	6000	6000	6000	6000	6000
Rated Current[1]	I_r	A	31	23	18	12	9.9	6.3
Rated Power[1]	P_r	W	500	510	510	500	490	490
No Load Speed	ω_{nl}	rpm	6000	6000	6000	6000	6000	6000
No Load Current	I_{nl}	A	0.97	0.71	0.55	0.39	0.31	0.20
Rated Voltage **V2**	V_r	V	38.0	38.0	76.0	76.0	152	152
Rated Torque[1] •	T_r	Nm	0.81	0.83	0.82	0.81	0.79	0.79
		oz-in	110	120	120	110	110	110
Rated Speed[1]	ω_r	rpm	6000	6000	6000	6000	6000	6000
Rated Current[1]	I_r	A	31	23	18	12	9.9	6.3
Rated Power[1]	P_r	W	510	520	510	510	500	500
No Load Speed	ω_{nl}	rpm	6000	6000	6000	6000	6000	6000
No Load Current	I_{nl}	A	0.97	0.71	0.55	0.39	0.31	0.20
Motor Constant	K_M	Nm/√W	0.15	0.15	0.16	0.15	0.15	0.15
		oz-in/√W	21	22	22	21	21	21
Torque Constant	K_T	Nm/A	0.0294	0.0405	0.0516	0.0736	0.0921	0.143
		oz-in/A	4.17	5.73	7.30	10.4	13.0	20.3
Voltage Constant	K_E	V/(rad/s)	0.0294	0.0405	0.0516	0.0736	0.0921	0.143
		V/krpm	3.08	4.24	5.40	7.71	9.64	15.0
Terminal Resistance	R_{mt}	Ω	0.0400	0.0700	0.110	0.240	0.370	0.920
Inductance	L	mH	0.14	0.26	0.43	0.88	1.4	3.3
Peak Current	I_{pk}	A	110	81	63	42	36	22
Electrical Time Constant	τ_e	ms	3.5	3.7	3.9	3.7	3.8	3.6
Mechanical Time Constant	τ_m	ms	3.1	2.9	2.8	3.0	3.0	3.0

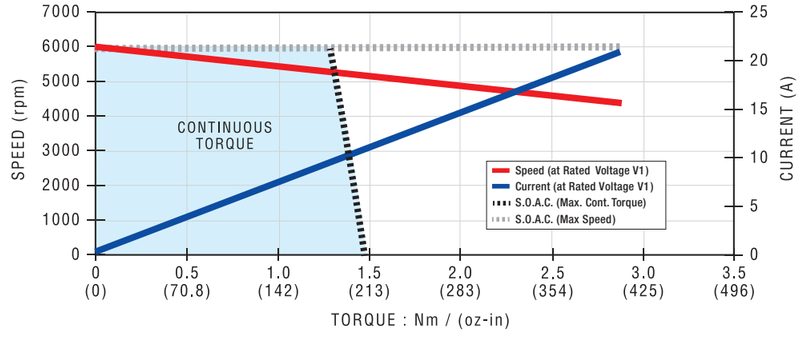
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



■ Performance Data & Graph: **EC083A–2**

Motor Data		Units						
Rated Voltage **V1**	V_r	V	76.0	76.0	152	152	305	305
Rated Torque[1] •	T_r	Nm	1.2	1.3	1.2	1.2	1.2	1.2
		oz-in	180	180	180	180	170	170
Rated Speed[1]	ω_r	rpm	6000	6000	6000	6000	6000	6000
Rated Current[1]	I_r	A	23	18	12	9.8	6.3	5.1
Rated Power[1]	P_r	W	780	790	780	780	770	760
No Load Speed	ω_{nl}	rpm	6000	6000	6000	6000	6000	6000
No Load Current	I_{nl}	A	0.65	0.51	0.33	0.28	0.18	0.15
Rated Voltage **V2**	V_r	V	38.0	48.0	76.0	76.0	152	152
Rated Torque[1] •	T_r	Nm	1.3	1.3	1.3	1.3	1.3	1.3
		oz-in	180	180	180	190	180	180
Rated Speed[1]	ω_r	rpm	5930	5860	5930	4920	6000	5270
Rated Current[1]	I_r	A	23	19	12	10	6.3	5.2
Rated Power[1]	P_r	W	800	800	800	690	790	710
No Load Speed	ω_{nl}	rpm	5970	5920	5970	5050	6000	5370
No Load Current	I_{nl}	A	0.65	0.51	0.33	0.27	0.18	0.15
Motor Constant	K_M	Nm/√W	0.21	0.21	0.22	0.22	0.21	0.21
		oz-in/√W	30	30	31	31	30	30
Torque Constant	K_T	Nm/A	0.0606	0.0772	0.121	0.143	0.222	0.269
		oz-in/A	8.59	10.9	17.2	20.3	31.4	38.1
Voltage Constant	K_E	V/(rad/s)	0.0606	0.0772	0.121	0.143	0.222	0.269
		V/krpm	6.35	8.08	12.7	15.0	23.2	28.2
Terminal Resistance	R_{mt}	Ω	0.0800	0.130	0.310	0.440	1.07	1.65
Inductance	L	mH	0.33	0.54	1.4	1.9	4.5	6.7
Peak Current	I_{pk}	A	84	66	42	36	23	18
Electrical Time Constant	τ_e	ms	4.1	4.2	4.4	4.3	4.2	4.1
Mechanical Time Constant	τ_m	ms	2.2	2.2	2.1	2.2	2.2	2.3

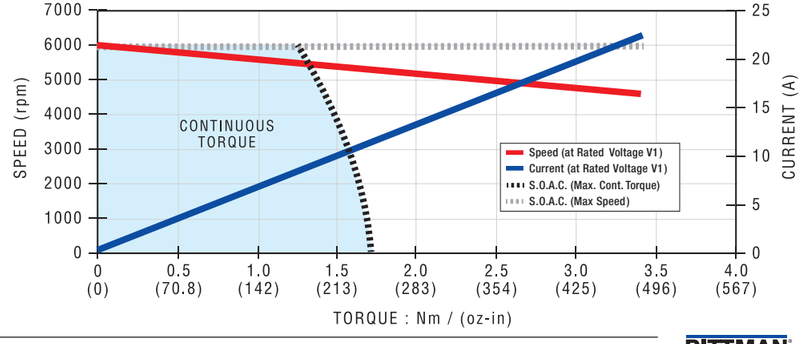
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



■ Performance Data & Graph: **EC083A–3**

Motor Data		Units					
Rated Voltage **V1**	V_r	V	76.0	96.0	152	305	305
Rated Torque[1] •	T_r	Nm	1.2	1.2	1.2	1.2	1.2
		oz-in	170	170	170	170	170
Rated Speed[1]	ω_r	rpm	6000	6000	6000	6000	6000
Rated Current[1]	I_r	A	27	18	13	11	8.9
Rated Power[1]	P_r	W	740	750	760	750	760
No Load Speed	ω_{nl}	rpm	6000	6000	6000	6000	6000
No Load Current	I_{nl}	A	1.4	0.86	0.63	0.53	0.43
Rated Voltage **V2**	V_r	V	38.0	48.0	76.0	152	152
Rated Torque[1] •	T_r	Nm	1.2	1.2	1.2	1.2	1.2
		oz-in	170	180	170	170	170
Rated Speed[1]	ω_r	rpm	6000	5890	6000	6000	6000
Rated Current[1]	I_r	A	27	18	13	11	8.9
Rated Power[1]	P_r	W	760	770	770	760	770
No Load Speed	ω_{nl}	rpm	6000	5730	6000	6000	6000
No Load Current	I_{nl}	A	1.4	0.84	0.63	0.53	0.43
Motor Constant	K_M	Nm/√W	0.25	0.25	0.26	0.26	0.25
		oz-in/√W	36	36	36	36	35
Torque Constant	K_T	Nm/A	0.0507	0.0797	0.109	0.130	0.159
		oz-in/A	7.18	11.3	15.4	18.5	22.6
Voltage Constant	K_E	V/(rad/s)	0.0507	0.0797	0.109	0.130	0.159
		V/krpm	5.31	8.35	11.4	13.7	16.7
Terminal Resistance	R_{mt}	Ω	0.0400	0.100	0.180	0.260	0.410
Inductance	L	mH	0.17	0.42	0.78	1.1	1.7
Peak Current	I_{pk}	A	120	75	54	45	36
Electrical Time Constant	τ_e	ms	4.3	4.2	4.3	4.3	4.1
Mechanical Time Constant	τ_m	ms	1.9	2.0	1.9	1.9	2.0

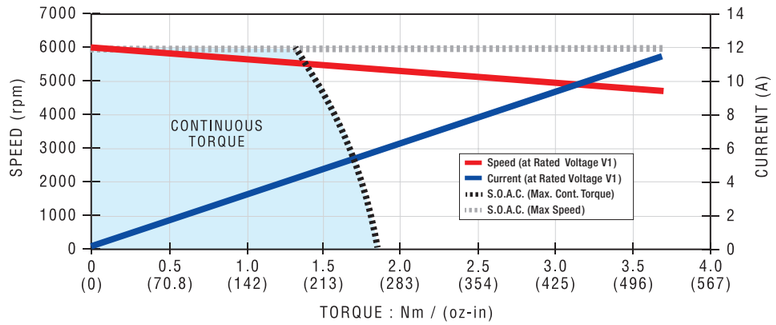
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



■ Performance Data & Graph: **EC083A–4**

Motor Data		Units						
Rated Voltage **V1**	V_r	V	76.0	76.0	152	152	305	305
Rated Torque[1] •	T_r	Nm	1.3	1.3	1.3	1.3	1.3	1.3
		oz-in	190	190	180	190	180	180
Rated Speed[1]	ω_r	rpm	6000	6000	6000	6000	6000	6000
Rated Current[1]	I_r	A	22	16	11	8.1	5.4	4.4
Rated Power[1]	P_r	W	840	830	820	840	820	810
No Load Speed	ω_{nl}	rpm	6000	6000	6000	6000	6000	6000
No Load Current	I_{nl}	A	1.1	0.73	0.51	0.37	0.26	0.21
Rated Voltage **V2**	V_r	V	38.0	48.0	76.0	76.0	152	152
Rated Torque[1] •	T_r	Nm	1.5	1.5	1.4	1.7	1.4	1.6
		oz-in	210	220	200	240	200	220
Rated Speed[1]	ω_r	rpm	5260	4820	5290	3700	5290	4250
Rated Current[1]	I_r	A	24	18	12	9.8	5.9	5.2
Rated Power[1]	P_r	W	810	770	800	660	800	700
No Load Speed	ω_{nl}	rpm	5150	4740	5150	3750	5150	4240
No Load Current	I_{nl}	A	0.95	0.67	0.48	0.31	0.24	0.19
Motor Constant	K_M	Nm/√W	0.27	0.28	0.28	0.28	0.28	0.27
		oz-in/√W	38	40	39	39	39	38
Torque Constant	K_T	Nm/A	0.0702	0.0964	0.140	0.193	0.281	0.341
		oz-in/A	9.94	13.7	19.9	27.3	39.8	48.3
Voltage Constant	K_E	V/(rad/s)	0.0702	0.0964	0.140	0.193	0.281	0.341
		V/krpm	7.35	10.1	14.7	20.2	29.4	35.7
Terminal Resistance	R_{mt}	Ω	0.0700	0.120	0.260	0.480	1.04	1.60
Inductance	L	mH	0.26	0.49	1.1	2.0	4.2	6.2
Peak Current	I_{pk}	A	93	69	48	33	23	19
Electrical Time Constant	τ_e	ms	3.7	4.1	4.0	4.1	4.0	3.9
Mechanical Time Constant	τ_m	ms	2.2	2.0	2.1	2.0	2.1	2.2

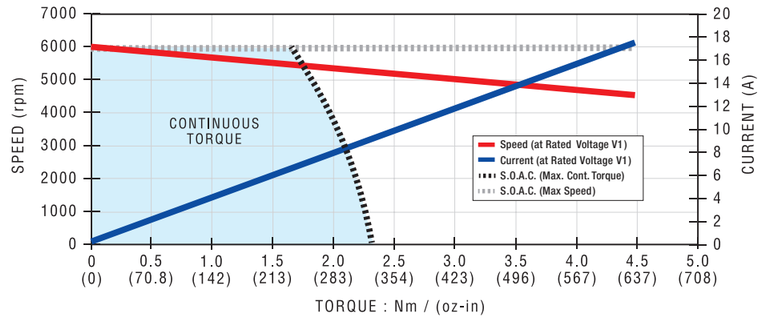
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



■ Performance Data & Graph: **EC083A–5**

Motor Data		Units						
Rated Voltage **V1**	V_r	V	76.0	96.0	121	152	305	305
Rated Torque[1] •	T_r	Nm	1.3	1.3	1.4	1.4	1.4	1.6
		oz-in	180	190	190	200	190	230
Rated Speed[1]	ω_r	rpm	6000	6000	6000	6000	6000	6000
Rated Current[1]	I_r	A	24	19	17	12	9.7	6.9
Rated Power[1]	P_r	W	790	840	860	890	860	1000
No Load Speed	ω_{nl}	rpm	6000	6000	6000	6000	6000	6000
No Load Current	I_{nl}	A	1.4	1.1	0.92	0.64	0.52	0.32
Rated Voltage **V2**	V_r	V	38.0	96.0	96.0	76.0	152	152
Rated Torque[1] •	T_r	Nm	1.3	1.3	1.4	1.6	1.4	1.8
		oz-in	180	190	190	220	200	250
Rated Speed[1]	ω_r	rpm	6000	6000	6000	5490	6000	5380
Rated Current[1]	I_r	A	24	19	17	13	9.7	7.4
Rated Power[1]	P_r	W	800	840	860	900	870	1000
No Load Speed	ω_{nl}	rpm	5700	6000	6000	5260	6000	5280
No Load Current	I_{nl}	A	1.4	1.1	0.92	0.60	0.52	0.31
Motor Constant	K_M	Nm/√W	0.32	0.32	0.30	0.32	0.31	0.28
		oz-in/√W	45	45	43	45	44	40
Torque Constant	K_T	Nm/A	0.0634	0.0845	0.0951	0.137	0.169	0.274
		oz-in/A	8.98	12.0	13.5	19.5	23.9	38.8
Voltage Constant	K_E	V/(rad/s)	0.0634	0.0845	0.0951	0.137	0.169	0.274
		V/krpm	6.64	8.85	9.96	14.4	17.7	28.7
Terminal Resistance	R_{mt}	Ω	0.0400	0.0700	0.100	0.190	0.290	0.940
Inductance	L	mH	0.17	0.30	0.38	0.81	1.2	3.2
Peak Current	I_{pk}	A	120	90	78	57	45	29
Electrical Time Constant	τ_e	ms	4.3	4.3	3.8	4.3	4.2	3.4
Mechanical Time Constant	τ_m	ms	2.0	2.0	2.2	2.0	2.1	2.5

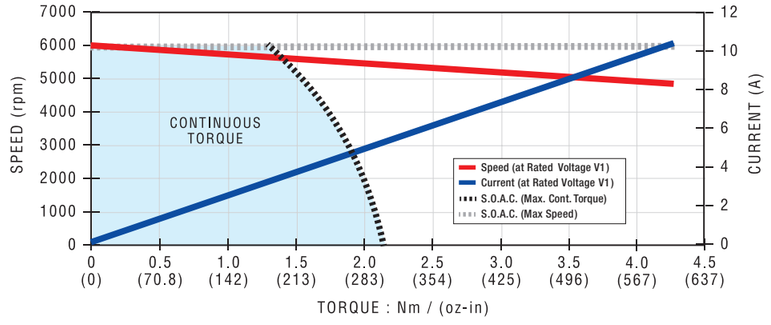
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



■ Performance Data & Graph: **EC083A–6**

Motor Data		Units							
Rated Voltage **V1**	V_r	V	76.0	76.0	152	152	305	305	305
Rated Torque[1] •	T_r	Nm	1.4	1.4	1.3	1.3	1.3	1.3	1.3
		oz-in	190	200	190	190	190	190	180
Rated Speed[1]	ω_r	rpm	6000	6000	6000	6000	6000	6000	6000
Rated Current[1]	I_r	A	28	24	10	8.5	6.8	5.2	3.4
Rated Power[1]	P_r	W	860	890	830	840	840	840	800
No Load Speed	ω_{nl}	rpm	6000	6000	6000	6000	6000	6000	6000
No Load Current	I_{nl}	A	1.6	1.3	0.59	0.48	0.39	0.30	0.21
Rated Voltage **V2**	V_r	V	38.0	48.0	76.0	76.0	152	152	152
Rated Torque[1] •	T_r	Nm	1.4	1.4	1.6	1.8	1.4	1.6	1.9
		oz-in	200	200	230	260	190	230	270
Rated Speed[1]	ω_r	rpm	6000	6000	4940	3900	6000	4920	3240
Rated Current[1]	I_r	A	28	24	12	11	6.8	6.2	4.8
Rated Power[1]	P_r	W	870	900	840	750	850	850	640
No Load Speed	ω_{nl}	rpm	6000	6000	4740	3850	6000	4740	3270
No Load Current	I_{nl}	A	1.6	1.3	0.53	0.40	0.39	0.27	0.16
Motor Constant	K_M	Nm/√W	0.29	0.32	0.33	0.32	0.32	0.32	0.31
		oz-in/√W	42	45	46	45	45	46	44
Torque Constant	K_T	Nm/A	0.0588	0.0706	0.153	0.188	0.235	0.306	0.442
		oz-in/A	8.33	9.99	21.6	26.6	33.3	43.3	62.6
Voltage Constant	K_E	V/(rad/s)	0.0588	0.0706	0.153	0.188	0.235	0.306	0.442
		V/krpm	6.16	7.39	16.0	19.7	24.6	32.0	46.3
Terminal Resistance	R_{mt}	Ω	0.0400	0.0500	0.220	0.350	0.540	0.900	2.06
Inductance	L	mH	0.13	0.19	0.91	1.4	2.2	3.6	7.8
Peak Current	I_{pk}	A	130	110	51	42	33	26	17
Electrical Time Constant	τ_e	ms	3.3	3.8	4.1	3.9	4.0	4.0	3.8
Mechanical Time Constant	τ_m	ms	2.7	2.4	2.2	2.4	2.3	2.3	2.5

The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



EC121A Series

The EC121A Series Brushless DC Motor is a high torque model brushless motor designed in a NEMA 48 package. It is offered in 4 motor lengths with continuous torque from 3.0 – 6.5 Nm.

■ **Benefits**

- Speeds up to 4,000 RPM possible
- DC bus voltage up to 325 VDC
- Capable of 48 VDC bus systems
- NEMA 48 package
- 8 pole rare earth design

■ **Optional Assemblies**

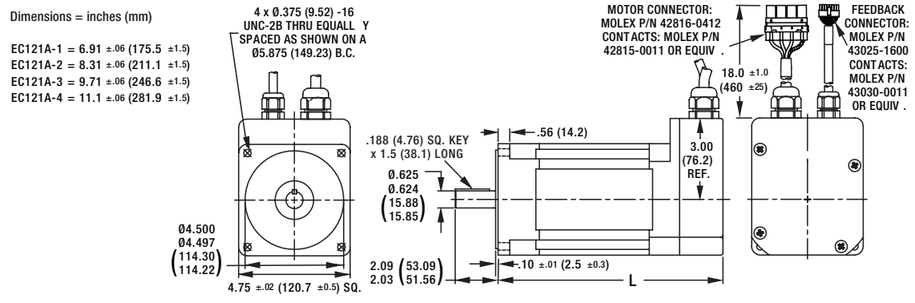
- Encoder: C Type
- Programmable Drive: BGE6060A

■ **Motor Characteristics**

Motor Data		Units	Series			
			EC121A-1	EC121A-2	EC121A-2	EC121A-4
Max DC Terminal Voltage	V_T	V	325			
Max Speed (Mechanical)	ω_{MAX}	rpm	4000			
Continuous Stall Torque[1]	T_{CS}	Nm	3.0	3.6	4.2	6.5
		oz-in	430	510	590	930
Peak Torque (Maximum)[1]	T_{pk}	Nm	9.4	12	14	20
		oz-in	1300	1700	2000	2800
Coulomb Friction Torque	T_f	Nm	0.051	0.065	0.086	0.10
		oz-in	7.3	9.3	12	14
Viscous Damping Factor	D	Nm/(rad/s)	1.3E-04	2.0E-04	1.3E-04	3.2E-04
		oz-in/krpm	1.9	3.0	2.0	4.7
Thermal Time Constant	τ_{th}	min	15	15	15	15
Thermal Resistance	R_{th}	°C/W	0.96	0.81	0.86	0.65
Max. Winding Temperature	Θ_{MAX}	°C	125	125	125	125
Rotor Inertia	J_r	kg-m²	7.9E-04	1.2E-03	1.7E-03	2.1E-03
		oz-in-s²	0.11	0.18	0.24	0.30
Motor Weight	W_m	g	7100	9900	12000	15000
		oz	250	350	440	530

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

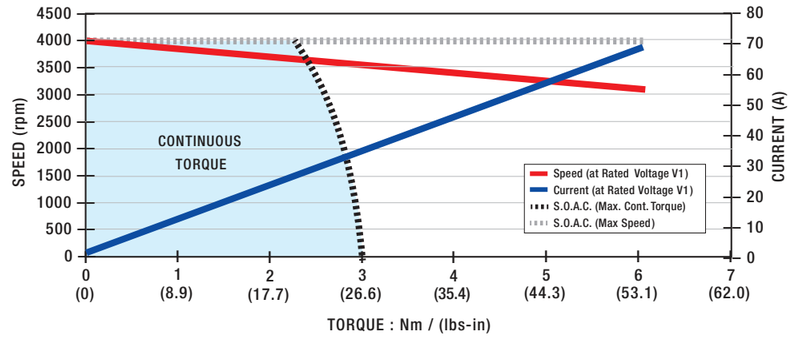
Dimensional Drawings: EC121A-1 • EC121A-2 • EC121A-3 • EC121A-4



Performance Data & Graph: **EC121A–1**

Motor Data		Units							
Rated Voltage **V1**	V_r	V	60.0	76.0	76.0	121	152	152	305
Rated Torque[1] •	T_r	Nm	2.2	2.3	2.4	2.3	2.3	2.3	2.3
		oz-in	320	320	330	330	330	330	320
Rated Speed[1]	ω_r	rpm	4000	4000	4000	4000	4000	4000	4000
Rated Current[1]	I_r	A	28	25	21	18	14	11	8.5
Rated Power[1]	P_r	W	930	950	990	960	970	960	960
No Load Speed	ω_{nl}	rpm	4000	4000	4000	4000	4000	4000	4000
No Load Current	I_{nl}	A	1.2	1.0	0.82	0.70	0.57	0.45	0.34
Rated Voltage **V2**	V_r	V	30.0	38.0	48.0	170	76.0	76.0	152
Rated Torque[1] •	T_r	Nm	2.6	2.5	2.5	2.3	2.4	2.6	2.3
		oz-in	370	350	360	320	330	370	330
Rated Speed[1]	ω_r	rpm	3080	3490	3610	4000	3970	3090	4000
Rated Current[1]	I_r	A	31	27	22	18	14	13	8.5
Rated Power[1]	P_r	W	830	910	950	960	980	850	970
No Load Speed	ω_{nl}	rpm	3050	3440	3540	4000	3870	3090	4000
No Load Current	I_{nl}	A	0.99	0.93	0.77	0.70	0.56	0.40	0.34
Motor Constant	K_M	Nm/√W	0.42	0.40	0.41	0.41	0.40	0.40	0.40
		oz-in/√W	59	56	58	57	56	57	57
Torque Constant	K_T	Nm/A	0.0936	0.105	0.129	0.152	0.187	0.234	0.315
		oz-in/A	13.3	14.9	18.3	21.5	26.5	33.1	44.6
Voltage Constant	K_E	V/(rad/s)	0.0936	0.105	0.129	0.152	0.187	0.234	0.315
		V/krpm	9.80	11.0	13.5	15.9	19.6	24.5	33.0
Terminal Resistance	R_{mt}	Ω	0.0500	0.0700	0.100	0.140	0.220	0.340	0.610
Inductance	L	mH	0.27	0.34	0.51	0.72	1.1	1.7	3.1
Peak Current	I_{pk}	A	110	99	84	69	57	45	33
Electrical Time Constant	τ_e	ms	5.4	4.9	5.1	5.1	5.0	5.0	5.1
Mechanical Time Constant	τ_m	ms	4.5	5.0	4.7	4.8	5.0	4.9	4.9

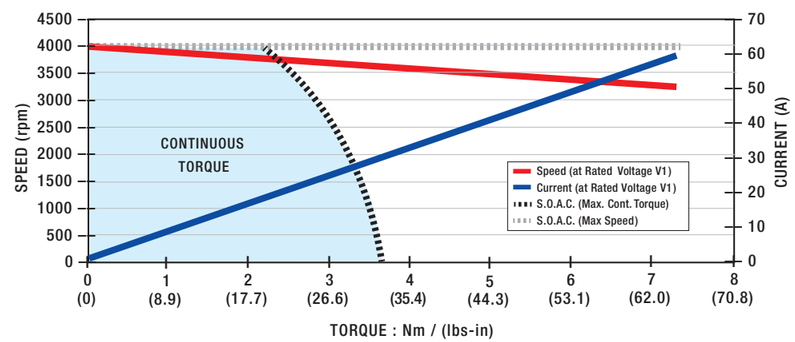
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



Performance Data & Graph: **EC121A–2**

Motor Data		Units						
Rated Voltage **V1**	V_r	V	76.0	76.0	152	152	305	305
Rated Torque[1] •	T_r	Nm	2.1	2.3	2.3	2.3	2.3	2.4
		oz-in	300	320	330	330	320	330
Rated Speed[1]	ω_r	rpm	4000	4000	4000	4000	4000	4000
Rated Current[1]	I_r	A	19	18	14	11	7.3	5.3
Rated Power[1]	P_r	W	880	950	980	970	960	990
No Load Speed	ω_{nl}	rpm	4000	4000	4000	4000	4000	4000
No Load Current	I_{nl}	A	1.2	1.1	0.73	0.62	0.41	0.29
Rated Voltage **V2**	V_r	V	38.0	48.0	76.0	76.0	152	152
Rated Torque[1] •	T_r	Nm	2.9	2.9	2.6	3.0	2.3	3.2
		oz-in	410	410	370	420	330	450
Rated Speed[1]	ω_r	rpm	2850	3190	3730	3090	4000	2850
Rated Current[1]	I_r	A	25	22	15	14	7.3	6.9
Rated Power[1]	P_r	W	850	960	1000	960	970	950
No Load Speed	ω_{nl}	rpm	2760	3050	3510	2970	3870	2760
No Load Current	I_{nl}	A	0.95	0.87	0.68	0.53	0.40	0.24
Motor Constant	K_M	Nm/√W	0.50	0.53	0.53	0.53	0.52	0.54
		oz-in/√W	70	75	75	75	74	76
Torque Constant	K_T	Nm/A	0.131	0.150	0.206	0.244	0.374	0.524
		oz-in/A	18.6	21.2	29.2	34.5	53.0	74.2
Voltage Constant	K_E	V/(rad/s)	0.131	0.150	0.206	0.244	0.374	0.524
		V/krpm	13.7	15.7	21.6	25.5	39.2	54.9
Terminal Resistance	R_{mt}	Ω	0.0700	0.0800	0.150	0.210	0.510	0.950
Inductance	L	mH	0.32	0.42	0.80	1.1	2.7	5.2
Peak Current	I_{pk}	A	96	90	66	57	36	26
Electrical Time Constant	τ_e	ms	4.6	5.3	5.3	5.4	5.2	5.5
Mechanical Time Constant	τ_m	ms	5.1	4.4	4.4	4.4	4.5	4.3

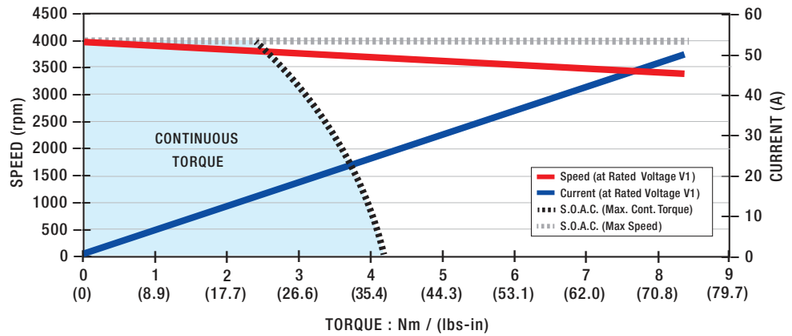
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



■ Performance Data & Graph: **EC121A–3**

Motor Data		Units						
Rated Voltage **V1**	V_r	V	76.0	152	152	305	305	305
Rated Torque[1] •	T_r	Nm	2.4	2.7	2.7	2.6	2.6	2.7
		oz-in	340	380	390	370	380	390
Rated Speed[1]	ω_r	rpm	4000	4000	4000	4000	4000	4000
Rated Current[1]	I_r	A	16	15	11	9.4	7.6	5.6
Rated Power[1]	P_r	W	1000	1100	1100	1100	1100	1100
No Load Speed	ω_{nl}	rpm	4000	4000	4000	4000	4000	4000
No Load Current	I_{nl}	A	0.79	0.69	0.51	0.44	0.35	0.25
Rated Voltage **V2**	V_r	V	48.0	76.0	76.0	170	152	152
Rated Torque[1] •	T_r	Nm	3.3	2.9	3.7	2.6	2.9	3.7
		oz-in	470	410	520	370	410	530
Rated Speed[1]	ω_r	rpm	2640	3760	2660	4000	3770	2640
Rated Current[1]	I_r	A	21	16	15	9.4	8.1	7.4
Rated Power[1]	P_r	W	920	1200	1000	1100	1100	1000
No Load Speed	ω_{nl}	rpm	2530	3500	2550	4000	3500	2530
No Load Current	I_{nl}	A	0.68	0.66	0.43	0.44	0.33	0.22
Motor Constant	K_M	Nm/√W	0.60	0.62	0.64	0.62	0.63	0.64
		oz-in/√W	85	88	90	88	89	91
Torque Constant	K_T	Nm/A	0.181	0.207	0.285	0.330	0.413	0.573
		oz-in/A	25.6	29.3	40.3	46.8	58.6	81.1
Voltage Constant	K_E	V/(rad/s)	0.181	0.207	0.285	0.330	0.413	0.573
		V/krpm	19.0	21.7	29.8	34.6	43.3	60.0
Terminal Resistance	R_{mt}	Ω	0.0900	0.110	0.200	0.280	0.430	0.790
Inductance	L	mH	0.46	0.60	1.1	1.1	2.4	4.6
Peak Current	I_{pk}	A	81	75	57	48	39	28
Electrical Time Constant	τ_e	ms	5.1	5.5	5.7	4.0	5.6	5.8
Mechanical Time Constant	τ_m	ms	4.7	4.4	4.2	4.4	4.3	4.1

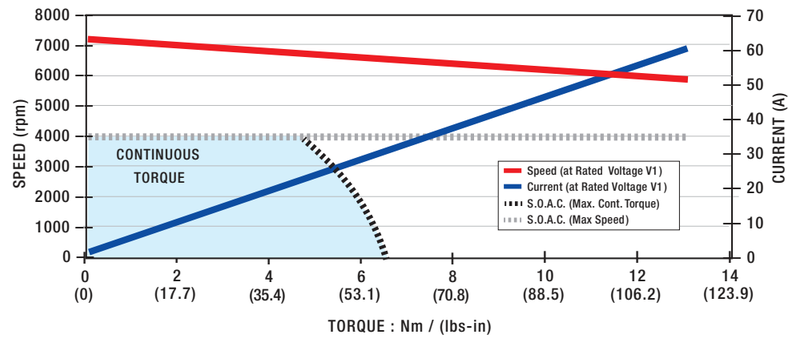
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



■ Performance Data & Graph: **EC121A–4**

Motor Data		Units			
Rated Voltage **V1**	V_r	V	152	305	305
Rated Torque[1] •	T_r	Nm	4.7	4.7	4.7
		oz-in	660	660	660
Rated Speed[1]	ω_r	rpm	4000	4000	4000
Rated Current[1]	I_r	A	24	15	12
Rated Power[1]	P_r	W	2000	2000	2000
No Load Speed	ω_{nl}	rpm	4000	4000	4000
No Load Current	I_{nl}	A	1.1	0.65	0.53
Rated Voltage **V2**	V_r	V	76.0	152	152
Rated Torque[1] •	T_r	Nm	5.4	4.8	5.4
		oz-in	770	670	770
Rated Speed[1]	ω_r	rpm	3240	4000	3240
Rated Current[1]	I_r	A	27	15	14
Rated Power[1]	P_r	W	1800	2000	1800
No Load Speed	ω_{nl}	rpm	3220	3970	3220
No Load Current	I_{nl}	A	0.93	0.64	0.47
Motor Constant	K_M	Nm/√W	0.62	0.63	0.62
		oz-in/√W	88	89	88
Torque Constant	K_T	Nm/A	0.224	0.365	0.449
		oz-in/A	31.8	51.7	63.6
Voltage Constant	K_E	V/(rad/s)	0.224	0.365	0.449
		V/krpm	23.5	38.2	47.0
Terminal Resistance	R_{mt}	Ω	0.130	0.340	0.520
Inductance	L	mH	0.93	1.6	3.7
Peak Current	I_{pk}	A	100	63	51
Electrical Time Constant	τ_e	ms	7.2	4.7	7.2
Mechanical Time Constant	τ_m	ms	5.5	5.5	5.5

The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



EC042B IDEA® Motor Series

The IDEA® Motor Series integrates a high-torque, precision servo motor and IDEA Drive as a single compact unit. The IDEA Motor enables distributed control without the use of a costly PLC or external motion controller. EC042B is offered in 3 motor lengths with continuous torque up to 0.15 Nm.

CANopen DS-301 / DS-402 communication or GUI programming interface with RS485

CANopen

- DS-301 / DS-402 communication
- Connect up to 127 drives on the same network
- Integrated inputs, outputs and encoder

RS485

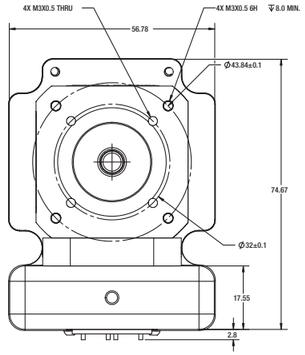
- GUI programming interface
- Integrated trapezoidal and S-curve trajectory generator with movement profile plotter
- Program execution
- I/O-driven nested prioritized vectored interrupts
- Polled I/O for autonomous real-time control
- Connect up to 256 drives on the same network
- Integrated inputs, outputs and encoder

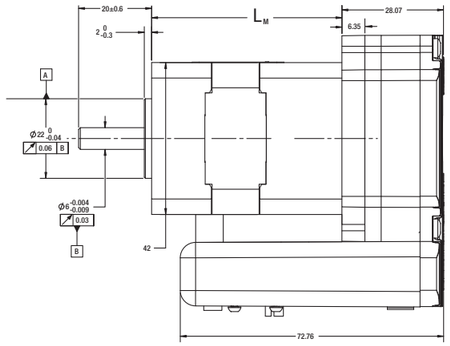
Motor Characteristics

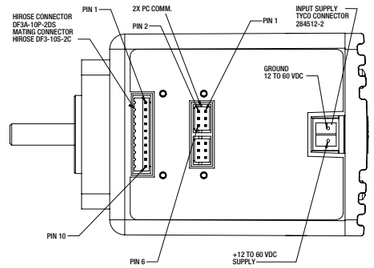
Motor Data		Units	Series		
			EC042B-1	EC042B-2	EC042B-3
Length	L_M	mm / inch	52.6mm / 2.071"	72.6mm / 2.8"	92.6mm / 3.646"
Rated Power Output[2]	Pr	W	25	54	70
Input Voltage Range	Vi	Vdc	12 - 60		
Rated Voltage[1]	V1	Vdc	24		
No Load Speed[1]	ωnl	rpm	4825	4856	5182
Rated Speed[1]	ωr	rpm	3930	4022	4460
Rated Torque[1]	Tr	Nm	0.06	0.12	0.15
		oz-in	8.2	16.0	21.0
Rated Input Current[1]	Ir	A	1.4	2.93	3.4
Continuous Input Power[1]	Pcs	W	38	70	89
Rotor Inertia	Jr	kg-m²	0.000014	0.000018	0.000021
		oz-in-sec²	0.0021	0.0025	0.0029
Motor Weight	Wm	g	423	623	815
		oz	15	22	29

[1]Values specified at Rated Voltage. [2]Values specified at Rated Voltage, Speed and Torque.
Drive input current is capable up to 8Arms continuous and 20A peak (1 sec) when within motor capabilities maximum winding temperature at 25°C ambient and without heatsink.

Instrument Grade Brushless DC Motors with IDEA® Drive







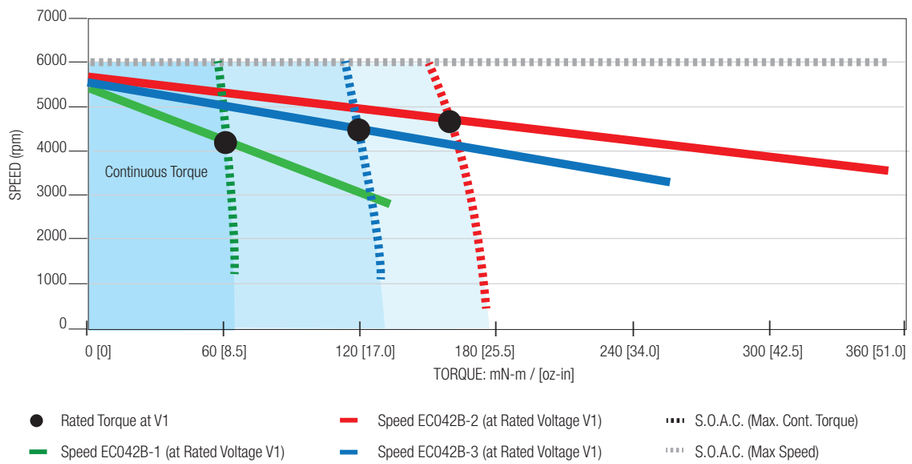
Drive Specifications

Digital I/O Voltage Range	5-24 VDC
Digital Inputs	4
Digital Outputs	4
Digital Sinking Outputs	200mA (each)
Digital Input Maximum Current	8mA (each)
Maximum Temperature	70°C (at heat sink)
Program Storage Size / Type	85 Kbytes / Flash
Max. Number of Stored Programs	85
Position Counter Range	64bit

I/O Pin Positions

PIN 1	GROUND I/O SUPPLY (5 to 24 Vdc)
PIN 2	I/O SUPPLY (5 to 24 Vdc)
PIN 3	INPUT 1
PIN 4	INPUT 2
PIN 5	INPUT 3
PIN 6	INPUT 4
PIN 7	OUTPUT 1
PIN 8	OUTPUT 2
PIN 9	OUTPUT 3
PIN 10	OUTPUT 4

Performance Graph



Optional Accessories

Part No.	Option	Description
56-1348	Cables	Power cable, 1 meter (39.37)
56-1352		I/O Cable, 1 meter (39.37)
56-1536-4		Communication Cable, 1 meter (39.37) for daisy chaining IDEA Motors
56-2322		USB to RS485/CANopen Cable, 1 meter (39.37) Use with 52-870 or 52-879
PLG42S	Gearboxes	Configured to be integrated directly with EC042B IDEA Motor
PLG52		
52-870	Converters	USB to CANopen Converter
52-879		USB to RS485 Converter

Optional PLG42S Gearbox

Optional PLG52 Gearbox

PLG42S Characteristics

See page 114 for full product description.

Specifications	Units	4:1	8:1	16:1	25:1	32:1	50:1	64:1	100:1	128:1	156:1	200:1	256:1	400:1	512:1
Maximum Load	Nm	0.7	0.7	1.3	1.3	1.3	1.3	1.3	3	3	3	3	3	3	3
	oz-in	99	99	184	184	184	184	184	425	425	425	425	425	425	425
Weight (Mass)	g	160	160	200	200	200	200	200	250	250	250	250	250	250	250
	oz	5.64	5.64	7.1	7.1	7.1	7.1	7.1	8.8	8.8	8.8	8.8	8.8	8.8	8.8
Length (Lg)	mm	48.2	48.2	60.0	60.0	60.0	60.0	60.0	71.8	71.8	71.8	71.8	71.8	71.8	71.8
	inches	1.90	1.90	2.36	2.36	2.36	2.36	2.36	2.83	2.83	2.83	2.83	2.83	2.83	2.83
Stage	–	1	1	2	2	2	2	2	3	3	3	3	3	3	3
Ratio	–	4 / 1	8 / 1	16 / 1	25 / 1	32 / 1	50 / 1	64 / 1	100 / 1	128 / 1	156.25/1	200 / 1	256 / 1	400 / 1	512 / 1
Efficiency	–	0.90	0.90	0.81	0.81	0.81	0.81	0.81	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Shaft Rotation	–	CW	CW	CW	CW	CW	CW	CW	CW	CW	CW	CW	CW	CW	CW

Notes:
1. Maximum load represents gearbox capability only. Continuous load torque capability will vary with gear ratio, motor selection, and operating conditions.
2. Shaft rotation is designated while looking at output shaft with motor operating in a clockwise direction. Gearboxes have bi-directional capability.

PLG52 Characteristics

See page 116 for full product description.

Specifications	Units	4.5:1	6.25:1	15:1	20.2:1	28.1:1	36:1	50:1	91.1:1	126.5:1	162:1	225:1	288:1	400:1
Maximum Load	Nm	1.2	1.2	8	8	8	8	8	24					
	oz-in	170	170	1133	1133	1133	1133	1133	3399					
Weight (Mass)	g	560	560	720	720	720	720	720	880					
	oz	19.8	19.8	25.4	25.4	25.4	25.4	25.4	31.0					
Length (LG)	mm	50.0	50.0	65.5	65.5	65.5	65.5	65.5	80.5					
	inches	1.97	1.97	2.58	2.58	2.58	2.58	2.58	3.17					
Stage	–	1	1	2	2	2	2	2	3					
Ratio	–	4.5/1	6.25/1	15/1	20.25/1	28.12/1	36/1	50/1	91.12/1	126.5/1	162/1	225/1	288/1	288/1
Efficiency	–	0.90	0.90	0.81	0.81	0.81	0.81	0.81	0.73					
Shaft Rotation	–	CW												

Factory Options

– Gearbox-ready for PLG42S, PLG52
– Lead screws, linear rails and slides

^ CANopen Communication

^ RS485 Communication

EC057B IDEA® Motor Series

The IDEA® Motor Series integrates a high-torque, precision servo motor and IDEA Drive as a single compact unit. The IDEA Motor enables distributed control without the use of a costly PLC or external motion controller. EC057B

CANopen

– DS-301 / DS-402 communication
– Connect up to 127 drives on the same network
– Integrated inputs, outputs and encoder

RS485

– GUI programming interface
– Integrated trapezoidal and S-curve trajectory generator with movement profile plotter
– Program execution
– I/O-driven nested prioritized vectored interrupts
– Polled I/O for autonomous real-time control

Drive Specifications

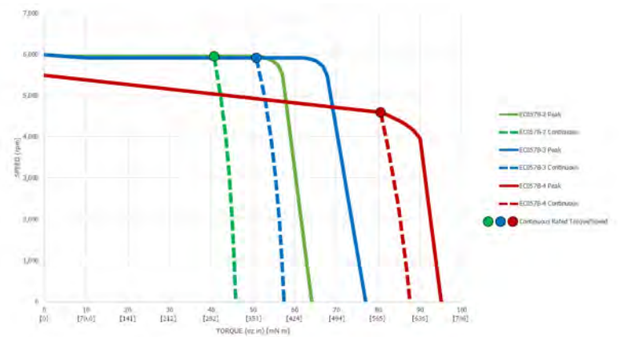
Digital I/O Voltage Range	5-24 VDC
Digital Inputs	4
Digital Outputs	4
Digital Sinking Outputs	200mA (each)
Digital Input Maximum Current	8mA (each)
Maximum Temperature	70°C (at heat sink)
Program Storage Size / Type	85 Kbytes / Flash
Max. Number of Stored Programs	85
Position Counter Range	64bit

Motor Characteristics

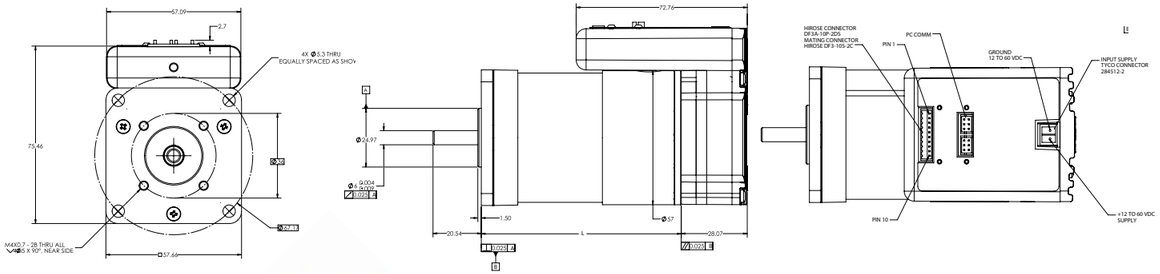
Motor Data		Units	Part No. EC057B-2	Part No. EC057B-3	Part No. EC057B-4
Length	LM	mm / inch	113mm / 4.45"	133mm / 5.24"	153mm / 6.03"
Rated Power Output[2]	Pr	W	170	195	300
Input Voltage Range	Vi	Vdc	12 - 60		
Rated Voltage[1]	V1	Vdc	48		
No Load Speed[1]	ωnl	rpm	6,000		
Rated Speed[1]	ωr	rpm	5,900		
Rated Torque[1]	Tr	Nm	0.27	0.31	0.48
		oz-in	39	44	67
Rated Input Current[1]	Ir	A	5.0	5.5	7.0
Continuous Input Power[1]	Pcs	W	240	265	370
Rotor Inertia	Jr	kg-m²	0.000012	0.000018	0.000023
		oz-in-sec²	0.0017	0.0025	0.0032
Motor Weight	Wm	g	860	1100	1380
		oz	30	39	49

[1]Values specified at Rated Voltage. [2]Values specified at Rated Voltage, Speed and Torque.
Drive input current is capable up to 8Arms continuous and 20A peak (1 sec) when within motor capabilities maximum winding temperature at 25°C ambient and without heatsink.

Performance Graph



Dimensional Drawings (mm)



Optional
PLG52 Gearbox

Factory Options

Gearbox-ready for PLG52
Lead screws, linear rails and slides

Optional Accessories

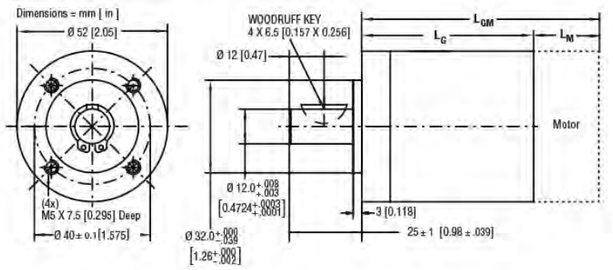
Part No.	Option	Description
PLG52	Gearbox	Configured to be integrated directly with EC057B IDEA Motor
56-1348	Cables	Power cable, 1 meter (39.37')
56-1352		I/O Cable, 1 meter (39.37")
UTR4852	Converter	USB to RS485 Converter, use with 56-1346 and 56-1536-4
56-1346	Cables	USB Cable (A to mini B), 2 meters (78.74")
56-1536-4		RS485 Cable, 1 meter (39.37")
52-870	Converters	USB to CANopen Converter, use with 56-2322
52-879		USB to RS485 Converter, use with 56-2322
56-2322	Cable	USB to CANopen/RS485 Cable, 2 meters (78.74") Use with 52-870 or 52-879

Motor Data		Units	Part No.		
			EC057B-2	EC057B-3	EC057B-4
Length	L	mm / inch	113mm / 4.45"	133mm / 5.24"	153mm / 6.03"

I/O Pin Positions

PIN 1	GROUND I/O SUPPLY (5 to 24 Vdc)	**PIN 6**	INPUT 4
PIN 2	I/O SUPPLY (5 to 24 Vdc)	**PIN 7**	OUTPUT 1
PIN 3	INPUT 1	**PIN 8**	OUTPUT 2
PIN 4	INPUT 2	**PIN 9**	OUTPUT 3
PIN 5	INPUT 3	**PIN 10**	OUTPUT 4

Dimensions: Optional Gearbox, PLG52



Add **L** from EC057B IDEA Motor Dimensional Drawing above to determine L_M and L_{GM} motor lengths

PLG52 Characteristics

Gear Data	Units	PLG52 4.5:1	PLG52 6.25:1	PLG52 15:1	PLG52 20.2:1	PLG52 28.1:1	PLG52 36:1	PLG52 50:1	PLG52 91.1:1	PLG52 126.5:1	PLG52 162:1	PLG52 225:1	PLG52 288:1	PLG52 400:1
Maximum Load	Nm	1.2		8					24					
	oz-in	170		1133					3399					
Weight (Mass)	g	560		720					880					
	oz	19.8		25.4					31.0					
Length (L)	mm	50.0		65.5					80.5					
	inches	1.97		2.58					3.17					
Stages	–	1		2					3					
Efficiency	–	0.90		0.81					0.73					
Shaft Rotation	–	CW												

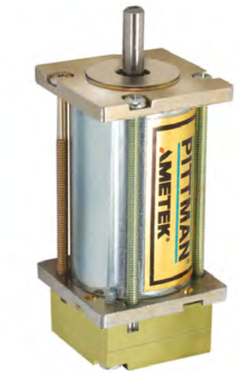
ES030A Series

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.

Motor Characteristics

Motor Data		Units	Series	
			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-m²	9.9E-07	1.4E-06
		oz-in-s²	1.4E-04	2.0E-04
Motor Weight	W_m	g	170	210
		oz	6.0	7.4

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



Shown with optional assembly.

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

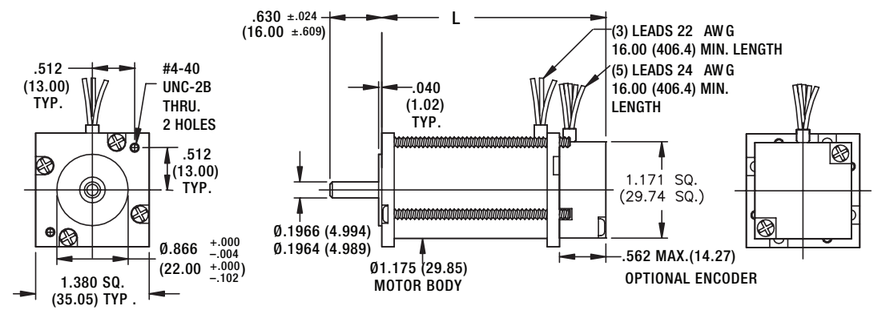
Optional Assemblies

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

Dimensional Drawings: ES030A-1 • ES030A-2

Dimensions = inches (mm)

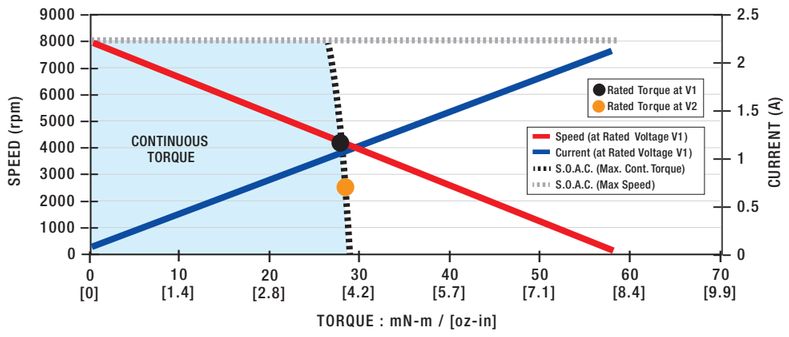
L = Lengths Available
ES030A-1 = 2.322 (58.98) Max.
ES030A-2 = 2.722 (69.14) Max.



■ Performance Data & Graph: **ES030A–1**

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

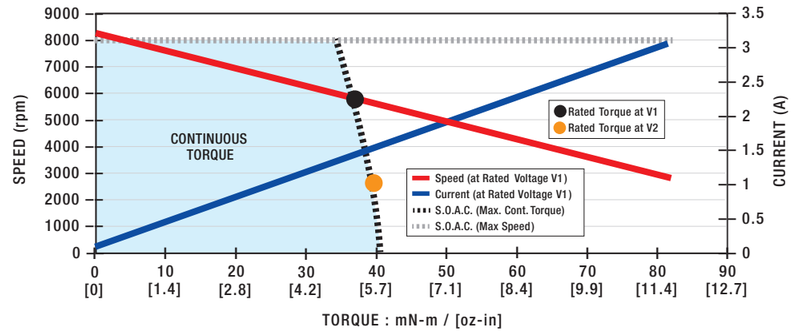
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



■ Performance Data & Graph: **ES030A–2**

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

The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



Shown with optional assembly.

ES040A Series

The ES040A Series Brushless DC Motor is a high torque density model brushless motor with a slotless design in a NEMA 17 configuration. It is offered in 3 motor lengths with continuous torque from 0.085 – 0.134 Nm.

Benefits

- Speeds up to 8,000 RPM possible
- DC bus voltage up to 120 VDC
- NEMA 17 configuration
- Eight standard windings, special windings available
- 4 pole rare earth design

Optional Assemblies

- Encoder: E30C/D
- Gearboxes: G40A, PLG42S, G51A, PLG52
- Brakes: B30A, B49A
- Programmable Drives: PBL4850E, BGE6015A

Motor Characteristics

Motor Data		Units	Series		
			ES040A-1	ES040A-2	ES040A-3
Max DC Terminal Voltage	V_T	V	120		
Max Speed (Mechanical)	ω_{MAX}	rpm	8000		
Continuous Stall Torque[1]	T_{CS}	Nm	0.085	0.100	0.134
		oz-in	12	14	19
Peak Torque (Maximum)[1]	T_{pk}	Nm	0.26	0.31	0.41
		oz-in	36	43	59
Coulomb Friction Torque	T_f	Nm	0.0011	0.0011	0.0011
		oz-in	0.15	0.15	0.15
Viscous Damping Factor	D	Nm/(rad/s)	1.6E-06	1.8E-06	2.2E-06
		oz-in/krpm	0.024	0.027	0.033
Thermal Time Constant	τ_{th}	min	23	26	27
Thermal Resistance	R_{th}	°C/W	6.7	6.4	5.4
Max. Winding Temperature	Θ_{MAX}	°C	130	130	130
Rotor Inertia	J_r	$kg\text{-}m^2$	4.5E-06	5.7E-06	6.1E-06
		$oz\text{-}in\text{-}s^2$	6.4E-04	8.0E-04	8.6E-04
Motor Weight	W_m	g	400	450	510
		oz	14	16	18

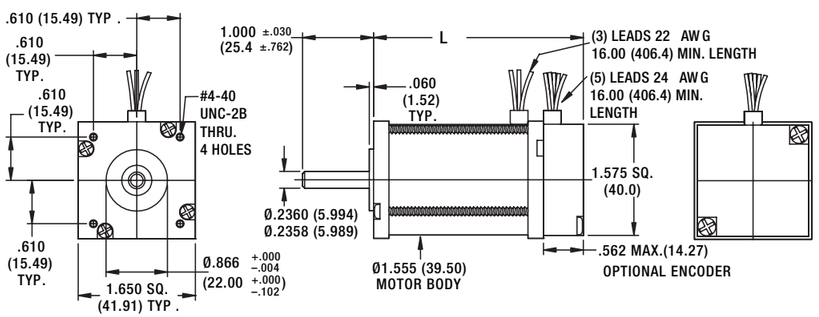
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.

Dimensional Drawings: ES040A-1 • ES040A-2 • ES040A-3

Dimensions = inches (mm)

L = Lengths Available

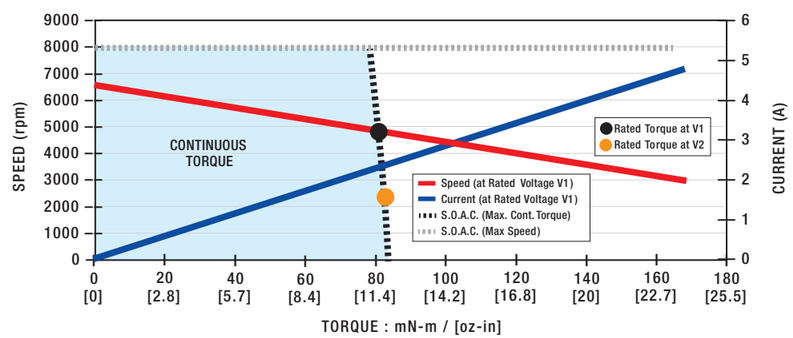
ES040A-1 = 2.655 (67.44) Max.
ES040A-2 = 2.955 (75.06) Max.
ES040A-3 = 3.255 (82.68) Max.



Performance Data & Graph: ES040A–1

Motor Data		Units								
Rated Voltage **V1**	V_r	V	15.2	19.1	24.0	30.3	38.2	48.0	60.6	76.4
Rated Torque[1] •	T_r	Nm	0.081	0.081	0.081	0.081	0.081	0.081	0.081	0.081
		oz-in	12	12	12	12	12	12	12	12
Rated Speed[1]	ω_r	rpm	4810	4790	4790	4800	4790	4790	4800	4790
Rated Current[1]	I_r	A	3.7	3.0	2.4	1.9	1.5	1.2	0.94	0.74
Rated Power[1]	P_r	W	41	41	41	41	41	41	41	41
No Load Speed	ω_{nl}	rpm	5800	5760	5790	5790	5760	5790	5800	5760
No Load Current	I_{nl}	A	0.082	0.065	0.052	0.041	0.033	0.026	0.021	0.017
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	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083
		oz-in	12	12	12	12	12	12	12	12
Rated Speed[1]	ω_r	rpm	2360	2350	2370	2360	2350	2360	2360	2350
Rated Current[1]	I_r	A	3.8	3.0	2.4	1.9	1.5	1.2	0.96	0.76
Rated Power[1]	P_r	W	21	20	21	21	20	21	21	20
No Load Speed	ω_{nl}	rpm	3640	3620	3660	3650	3620	3650	3650	3620
No Load Current	I_{nl}	A	0.068	0.054	0.043	0.034	0.027	0.022	0.017	0.014
Motor Constant	K_M	Nm/√W	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029
		oz-in/√W	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
Torque Constant	K_T	Nm/A	0.0249	0.0315	0.0394	0.0498	0.0630	0.0788	0.0993	0.126
		oz-in/A	3.53	4.46	5.58	7.05	8.93	11.2	14.1	17.9
Voltage Constant	K_E	V/(rad/s)	0.0249	0.0315	0.0394	0.0498	0.0630	0.0788	0.0993	0.126
		V/krpm	2.61	3.30	4.13	5.21	6.60	8.25	10.4	13.2
Terminal Resistance	R_{mt}	Ω	0.750	1.19	1.89	3.00	4.76	7.56	12.0	19.0
Inductance	L	mH	0.14	0.21	0.34	0.54	0.84	1.3	2.2	3.4
Peak Current	I_{pk}	A	12	9.3	7.2	5.7	4.5	3.6	2.9	2.3
Electrical Time Constant	τ_e	ms	0.19	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Mechanical Time Constant	τ_m	ms	5.5	5.5	5.5	5.5	5.4	5.5	5.5	5.4

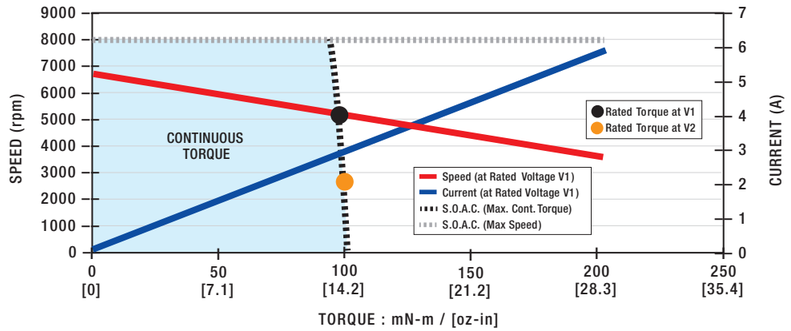
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



■ Performance Data & Graph: **ES040A–2**

Motor Data		Units								
Rated Voltage **V1**	V_r	V	19.1	24.0	30.3	38.2	48.0	60.6	76.4	96.0
Rated Torque[1] •	T_r	Nm	0.097	0.097	0.097	0.097	0.097	0.097	0.097	0.097
		oz-in	14	14	14	14	14	14	14	14
Rated Speed[1]	ω_r	rpm	5200	5160	5200	5190	5160	5210	5190	5160
Rated Current[1]	I_r	A	3.7	2.9	2.3	1.8	1.4	1.2	0.91	0.72
Rated Power[1]	P_r	W	53	53	53	53	53	53	53	53
No Load Speed	ω_{nl}	rpm	5950	5920	5970	5940	5910	5980	5950	5910
No Load Current	I_{nl}	A	0.072	0.057	0.046	0.036	0.029	0.023	0.018	0.015
Rated Voltage **V2**	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	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
		oz-in	14	14	14	14	14	14	14	14
Rated Speed[1]	ω_r	rpm	2680	2690	2690	2670	2680	2690	2680	2680
Rated Current[1]	I_r	A	3.7	3.0	2.4	1.9	1.5	1.2	0.93	0.74
Rated Power[1]	P_r	W	28	28	28	28	28	28	28	28
No Load Speed	ω_{nl}	rpm	3730	3750	3760	3730	3730	3770	3730	3730
No Load Current	I_{nl}	A	0.058	0.047	0.037	0.029	0.024	0.019	0.015	0.012
Motor Constant	K_M	Nm/√W	0.034	0.034	0.033	0.034	0.034	0.034	0.034	0.034
		oz-in/√W	4.8	4.8	4.7	4.8	4.8	4.7	4.8	4.8
Torque Constant	K_T	Nm/A	0.0306	0.0386	0.0483	0.0612	0.0773	0.0964	0.122	0.155
		oz-in/A	4.33	5.46	6.84	8.67	10.9	13.7	17.3	21.9
Voltage Constant	K_E	V/(rad/s)	0.0306	0.0386	0.0483	0.0612	0.0773	0.0964	0.122	0.155
		V/krpm	3.20	4.04	5.06	6.41	8.09	10.1	12.8	16.2
Terminal Resistance	R_{mt}	Ω	0.820	1.31	2.08	3.30	5.24	8.32	13.2	21.0
Inductance	L	mH	0.16	0.26	0.41	0.64	1.0	1.6	2.6	4.2
Peak Current	I_{pk}	A	11	9.0	7.2	5.7	4.5	3.6	2.9	2.3
Electrical Time Constant	τ_e	ms	0.20	0.20	0.20	0.19	0.20	0.19	0.20	0.20
Mechanical Time Constant	τ_m	ms	5.0	5.0	5.1	5.0	5.0	5.1	5.0	5.0

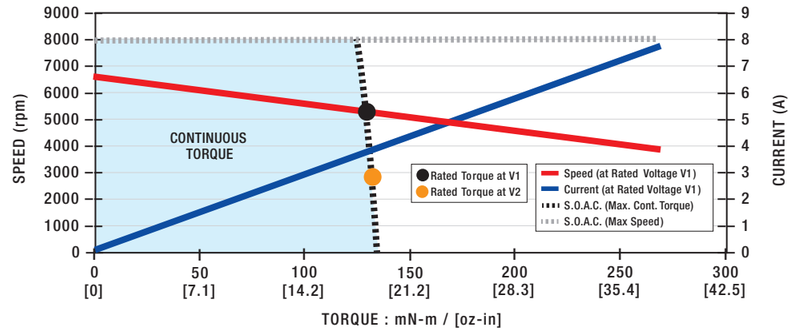
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.

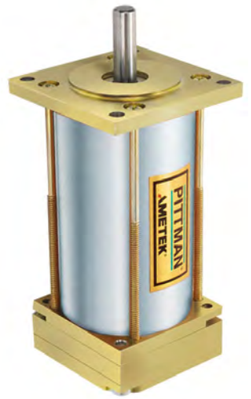


■ Performance Data & Graph: **ES040A–3**

Motor Data		Units								
Rated Voltage **V1**	V_r	V	24.0	30.3	38.2	48.0	60.6	76.4	96.0	121
Rated Torque[1] •	T_r	Nm	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
		oz-in	18	18	18	18	18	18	18	18
Rated Speed[1]	ω_r	rpm	5250	5250	5270	5240	5230	5270	5250	5240
Rated Current[1]	I_r	A	3.8	3.0	2.4	1.9	1.5	1.2	0.95	0.75
Rated Power[1]	P_r	W	71	71	72	71	71	72	71	71
No Load Speed	ω_{nl}	rpm	5840	5840	5870	5830	5810	5860	5840	5830
No Load Current	I_{nl}	A	0.062	0.049	0.040	0.031	0.025	0.020	0.016	0.013
Rated Voltage **V2**	V_r	V	15.2	19.1	24.0	30.3	38.2	48.0	60.6	76.4
Rated Torque[1] •	T_r	Nm	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
		oz-in	19	19	19	19	19	19	19	19
Rated Speed[1]	ω_r	rpm	2820	2800	2790	2800	2800	2790	2800	2800
Rated Current[1]	I_r	A	3.9	3.1	2.4	1.9	1.5	1.2	0.97	0.77
Rated Power[1]	P_r	W	39	39	39	39	39	39	39	39
No Load Speed	ω_{nl}	rpm	3700	3680	3690	3680	3660	3680	3680	3680
No Load Current	I_{nl}	A	0.050	0.039	0.031	0.025	0.020	0.016	0.013	0.0097
Motor Constant	K_M	Nm/√W	0.041	0.041	0.041	0.041	0.042	0.041	0.041	0.041
		oz-in/√W	5.9	5.9	5.8	5.9	5.9	5.9	5.9	5.9
Torque Constant	K_T	Nm/A	0.0392	0.0495	0.0620	0.0784	0.0993	0.124	0.157	0.198
		oz-in/A	5.54	7.00	8.78	11.1	14.1	17.6	22.2	28.0
Voltage Constant	K_E	V/(rad/s)	0.0392	0.0495	0.0620	0.0784	0.0993	0.124	0.157	0.198
		V/krpm	4.10	5.18	6.49	8.21	10.4	13.0	16.4	20.7
Terminal Resistance	R_{mt}	Ω	0.890	1.42	2.26	3.58	5.68	9.04	14.3	22.7
Inductance	L	mH	0.19	0.30	0.47	0.74	1.2	1.9	3.0	4.8
Peak Current	I_{pk}	A	12	9.3	7.5	6.0	4.5	3.6	2.9	2.3
Electrical Time Constant	τ_e	ms	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Mechanical Time Constant	τ_m	ms	3.5	3.5	3.6	3.5	3.5	3.5	3.5	3.5

The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.





Shown with optional assembly.

ES050A Series

The ES050A Series Brushless DC Motor is a high torque density model brushless motor with a slotless design in a NEMA 23 configuration. It is offered in 3 motor lengths with continuous torque from 0.18 – 0.30 Nm.

Benefits

- Speeds up to 5,000 RPM possible
- DC bus voltage up to 120 VDC
- NEMA 23 configuration
- Eight standard windings, special windings available
- 4 pole rare earth design

Optional Assemblies

- Encoder: E30C/D
- Gearboxes: G40A, PLG42S, PLG52
- Brake: B49A
- Programmable Drives: PBL4850E, BGE6015A

Motor Characteristics

Motor Data		Units	Series		
			ES050A-1	ES050A-2	ES050A-3
Max DC Terminal Voltage	V_T	V	120		
Max Speed (Mechanical)	ω_{MAX}	rpm	5000		
Continuous Stall Torque[1]	T_{CS}	Nm	0.18	0.25	0.30
		oz-in	25	35	43
Peak Torque (Maximum)[1]	T_{pk}	Nm	0.54	0.77	0.94
		oz-in	76	110	130
Coulomb Friction Torque	T_f	Nm	0.0030	0.0037	0.0040
		oz-in	0.42	0.52	0.57
Viscous Damping Factor	D	Nm/(rad/s)	1.3E-05	1.5E-05	1.7E-05
		oz-in/krpm	0.19	0.22	0.25
Thermal Time Constant	τ_{th}	min	14	17	22
Thermal Resistance	R_{th}	°C/W	4.8	4.5	4.4
Max. Winding Temperature	Θ_{MAX}	°C	130	130	130
Rotor Inertia	J_r	kg-m^2	1.7E-05	2.8E-05	3.4E-05
		oz-in-s^2	0.0025	0.0040	0.0048
Motor Weight	W_m	g	620	850	990
		oz	22	30	35

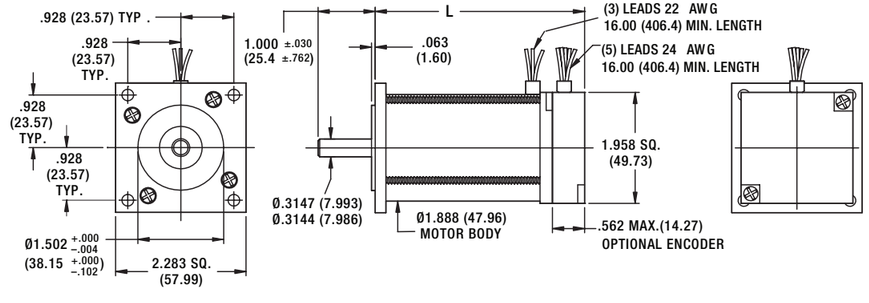
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.

Dimensional Drawings: ES050A-1 • ES050A-2 • ES050A-3

Dimensions = inches (mm)

L = Lengths Available

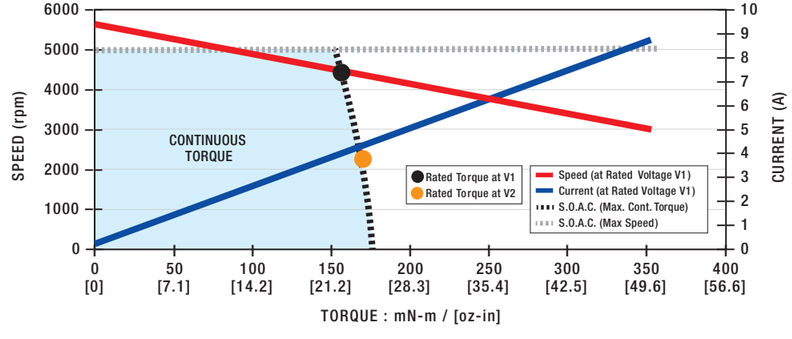
ES050A-1 = 3.165 (80.39) Max.
ES050A-2 = 3.665 (93.09) Max.
ES050A-3 = 4.165 (105.79) Max.



Performance Data & Graph: ES050A–1

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	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
		oz-in	23	23	22	22	22	22	22	22
Rated Speed[1]	ω_r	rpm	4480	4320	4460	4430	4490	4470	4430	4500
Rated Current[1]	I_r	A	9.1	6.6	5.1	4.1	3.2	2.6	2.0	1.6
Rated Power[1]	P_r	W	75	72	73	73	73	73	73	74
No Load Speed	ω_{nl}	rpm	5000	5000	5000	4980	5000	5000	4990	5000
No Load Current	I_{nl}	A	0.47	0.34	0.27	0.22	0.17	0.14	0.11	0.086
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	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
		oz-in	24	24	24	24	24	24	24	24
Rated Speed[1]	ω_r	rpm	2150	2140	2290	2300	2320	2290	2290	2320
Rated Current[1]	I_r	A	9.5	6.9	5.5	4.3	3.5	2.7	2.2	1.7
Rated Power[1]	P_r	W	39	38	41	41	41	41	41	41
No Load Speed	ω_{nl}	rpm	3420	3160	3140	3150	3170	3140	3150	3180
No Load Current	I_{nl}	A	0.37	0.26	0.20	0.16	0.13	0.10	0.079	0.064
Motor Constant	K_M	Nm/√W	0.042	0.046	0.049	0.049	0.049	0.049	0.049	0.049
		oz-in/√W	5.9	6.5	6.9	6.9	6.9	6.9	6.9	6.9
Torque Constant	K_T	Nm/A	0.0209	0.0286	0.0361	0.0456	0.0570	0.0722	0.0911	0.114
		oz-in/A	2.96	4.04	5.11	6.46	8.07	10.2	12.9	16.1
Voltage Constant	K_E	V/(rad/s)	0.0209	0.0286	0.0361	0.0456	0.0570	0.0722	0.0911	0.114
		V/krpm	2.19	2.99	3.78	4.78	5.97	7.56	9.54	11.9
Terminal Resistance	R_{mt}	Ω	0.250	0.390	0.550	0.880	1.37	2.20	3.52	5.48
Inductance	L	mH	0.060	0.10	0.17	0.27	0.41	0.66	1.1	1.7
Peak Current	I_{pk}	A	29	21	17	13	11	8.4	6.6	5.4
Electrical Time Constant	τ_e	ms	0.24	0.26	0.31	0.31	0.30	0.30	0.30	0.30
Mechanical Time Constant	τ_m	ms	10	8.3	7.4	7.4	7.4	7.4	7.4	7.4

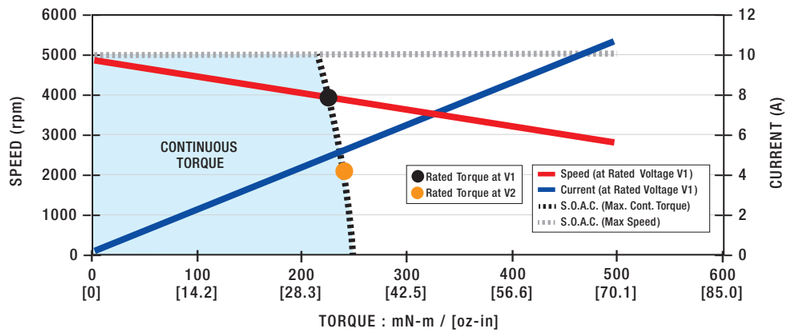
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



■ Performance Data & Graph: **ES050A–2**

Motor Data		Units								
Rated Voltage **V1**	V_r	V	15.2	19.1	24.0	30.3	38.2	48.0	60.6	76.4
Rated Torque[1] •	T_r	Nm	0.23	0.23	0.22	0.22	0.22	0.22	0.22	0.22
		oz-in	32	32	32	32	32	32	32	32
Rated Speed[1]	ω_r	rpm	4090	3860	3950	3940	3980	3930	3940	3980
Rated Current[1]	I_r	A	8.8	6.4	5.0	4.0	3.2	2.5	2.0	1.6
Rated Power[1]	P_r	W	97	92	92	92	93	92	93	93
No Load Speed	ω_{nl}	rpm	4760	4380	4350	4360	4390	4340	4370	4390
No Load Current	I_{nl}	A	0.37	0.26	0.20	0.16	0.13	0.099	0.080	0.064
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	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
		oz-in	34	34	34	34	34	34	34	34
Rated Speed[1]	ω_r	rpm	2040	1970	2100	2080	2100	2080	2080	2090
Rated Current[1]	I_r	A	9.2	6.7	5.3	4.2	3.3	2.6	2.1	1.7
Rated Power[1]	P_r	W	51	50	52	52	52	52	52	52
No Load Speed	ω_{nl}	rpm	2990	2750	2750	2740	2760	2740	2750	2760
No Load Current	I_{nl}	A	0.28	0.20	0.16	0.13	0.097	0.076	0.061	0.049
Motor Constant	K_M	Nm/√W	0.056	0.061	0.064	0.064	0.064	0.065	0.064	0.064
		oz-in/√W	8.0	8.6	9.1	9.1	9.1	9.1	9.1	9.1
Torque Constant	K_T	Nm/A	0.0303	0.0413	0.0523	0.0660	0.0826	0.105	0.132	0.165
		oz-in/A	4.29	5.86	7.41	9.34	11.7	14.9	18.7	23.4
Voltage Constant	K_E	V/(rad/s)	0.0303	0.0413	0.0523	0.0660	0.0826	0.105	0.132	0.165
		V/krpm	3.17	4.33	5.48	6.91	8.65	11.0	13.8	17.3
Terminal Resistance	R_{mt}	Ω	0.290	0.460	0.660	1.06	1.65	2.66	4.25	6.62
Inductance	L	mH	0.080	0.13	0.21	0.34	0.53	0.86	1.4	2.1
Peak Current	I_{pk}	A	28	21	16	13	10	8.1	6.6	5.1
Electrical Time Constant	τ_e	ms	0.28	0.28	0.32	0.32	0.32	0.32	0.32	0.32
Mechanical Time Constant	τ_m	ms	8.9	7.6	6.8	6.9	6.8	6.8	6.9	6.8

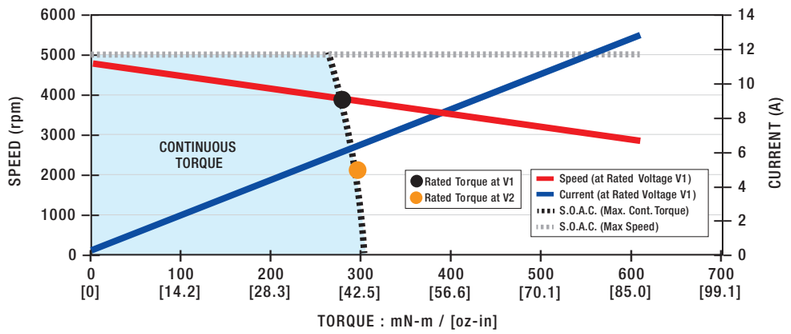
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



■ Performance Data & Graph: **ES050A–3**

Motor Data		Units								
Rated Voltage **V1**	V_r	V	19.1	24.0	30.3	38.2	48.0	60.6	76.4	96.0
Rated Torque[1] •	T_r	Nm	0.28	0.28	0.27	0.27	0.27	0.27	0.27	0.27
		oz-in	39	39	39	39	39	39	39	39
Rated Speed[1]	ω_r	rpm	4120	3870	3950	3950	3970	3970	3950	3970
Rated Current[1]	I_r	A	8.1	6.0	4.6	3.7	2.9	2.3	1.8	1.5
Rated Power[1]	P_r	W	120	110	110	110	110	110	110	110
No Load Speed	ω_{nl}	rpm	4570	4220	4210	4200	4230	4220	4200	4230
No Load Current	I_{nl}	A	0.31	0.22	0.17	0.14	0.11	0.085	0.067	0.054
Rated Voltage **V2**	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	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29
		oz-in	42	42	41	41	41	41	41	41
Rated Speed[1]	ω_r	rpm	2160	2080	2160	2140	2170	2160	2140	2170
Rated Current[1]	I_r	A	8.5	6.3	4.9	3.9	3.1	2.5	1.9	1.6
Rated Power[1]	P_r	W	66	64	66	66	66	66	66	66
No Load Speed	ω_{nl}	rpm	2870	2670	2650	2640	2670	2660	2640	2670
No Load Current	I_{nl}	A	0.23	0.17	0.13	0.10	0.081	0.064	0.051	0.041
Motor Constant	K_M	Nm/√W	0.069	0.074	0.079	0.079	0.078	0.078	0.079	0.078
		oz-in/√W	9.8	11	11	11	11	11	11	11
Torque Constant	K_T	Nm/A	0.0397	0.0540	0.0685	0.0865	0.108	0.137	0.173	0.216
		oz-in/A	5.63	7.65	9.70	12.3	15.3	19.3	24.5	30.6
Voltage Constant	K_E	V/(rad/s)	0.0397	0.0540	0.0685	0.0865	0.108	0.137	0.173	0.216
		V/krpm	4.16	5.66	7.17	9.06	11.3	14.3	18.1	22.6
Terminal Resistance	R_{mt}	Ω	0.330	0.530	0.760	1.21	1.90	3.03	4.85	7.60
Inductance	L	mH	0.090	0.16	0.26	0.41	0.65	1.0	1.7	2.6
Peak Current	I_{pk}	A	26	19	15	12	9.6	7.5	6.0	4.8
Electrical Time Constant	τ_e	ms	0.27	0.30	0.34	0.34	0.34	0.34	0.34	0.34
Mechanical Time Constant	τ_m	ms	7.1	6.2	5.5	5.5	5.6	5.5	5.5	5.6

The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



Shown with optional assembly.

Benefits

- Speeds up to 10,000 RPM possible
- DC bus voltage up to 48 VDC
- Eight standard windings, special windings available
- 2 pole stator with rare earth magnets
- 7 slot skewed armature cogging reduction
- Ball bearings
- Copper graphite brushes, RFI suppression available

Optional Assemblies

- Encoders: E21C/D, E30C/D
- Gearboxes: G30A, G35A
- Brake: B30A
- Programmable Drive: PBL4850E**

DC026C Series

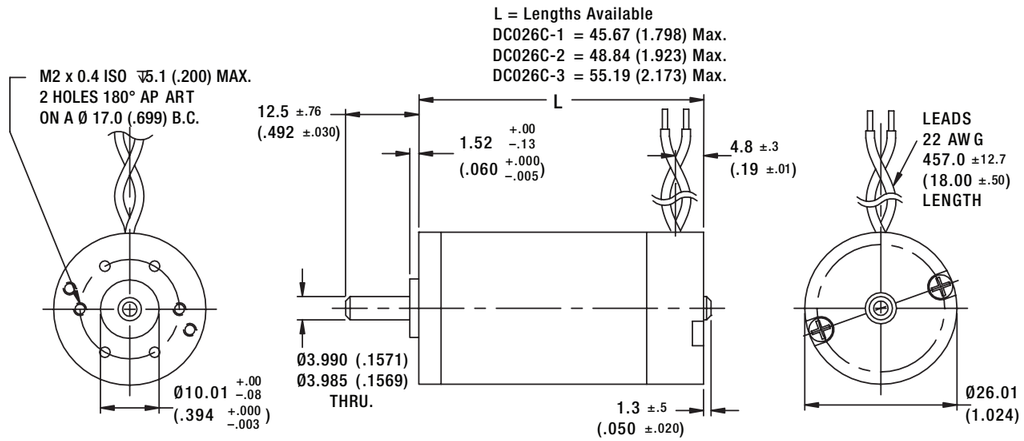
The DC026C Series Brush Commutated DC Motor is a 26 mm diameter, high performance unit offered in 3 lengths with continuous output torques of 0.0134 to 0.0226 Nm.

Motor Characteristics

Motor Data		Units	Series		
			DC026C-1	DC026C-2	DC026C-3
Max DC Terminal Voltage	V_T	V	48		
Max Speed (Mechanical)	ω_{MAX}	rpm	10000		
Continuous Stall Torque[1]	T_{CS}	Nm	0.0134	0.0170	0.0226
		oz-in	1.9	2.4	3.2
Peak Torque (Maximum)[1]	T_{pk}	Nm	0.059	0.084	0.13
		oz-in	8.3	12	19
Coulomb Friction Torque	T_f	Nm	0.0021	0.0021	0.0021
		oz-in	0.30	0.30	0.30
Viscous Damping Factor	D	Nm/(rad/s)	1.2E-06	1.3E-06	1.5E-06
		oz-in/krpm	0.018	0.020	0.022
Thermal Time Constant	τ_{th}	min	13	13	12
Thermal Resistance	R_{th}	°C/W	19	18	16
Max. Winding Temperature	Θ_{MAX}	°C	130	130	130
Rotor Inertia	J_r	kg-m²	9.9E-07	1.2E-06	1.6E-06
		oz-in-s²	1.4E-04	1.7E-04	2.3E-04
Motor Weight	W_m	g	76	86	110
		oz	2.7	3.1	3.7

[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink. **For PBL4850E to operate a brush motor, an encoder is required.

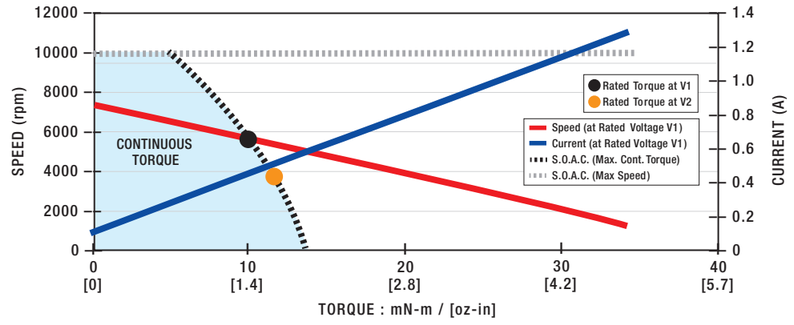
Dimensional Drawings: DC026C-1 • DC026C-2 • DC026C-3



Performance Data & Graph: DC026C–1

Motor Data		Units							
Rated Voltage **V1**	V_r	V	6.00	7.58	9.55	12.0	15.2	19.1	24.0	30.3
Rated Torque[1] •	T_r	Nm	0.011	0.011	0.010	0.010	0.010	0.010	0.010	0.010
		oz-in	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.4
Rated Speed[1]	ω_r	rpm	5080	5250	5350	5450	5610	5570	5530	5580
Rated Current[1]	I_r	A	1.9	1.5	1.1	0.92	0.73	0.57	0.45	0.36
Rated Power[1]	P_r	W	5.7	5.8	5.7	5.8	5.9	5.8	5.8	5.8
No Load Speed	ω_{nl}	rpm	6970	6990	6910	7000	7100	7030	6970	7010
No Load Current	I_{nl}	A	0.40	0.32	0.25	0.20	0.16	0.13	0.098	0.079
Rated Voltage **V2**	V_r	V	4.78	6.00	7.58	9.55	12.0	15.2	19.1	24.0
Rated Torque[1] •	T_r	Nm	0.012	0.012	0.012	0.012	0.011	0.011	0.011	0.011
		oz-in	1.7	1.7	1.6	1.6	1.6	1.6	1.6	1.6
Rated Speed[1]	ω_r	rpm	3260	3380	3520	3620	3690	3730	3700	3700
Rated Current[1]	I_r	A	2.0	1.6	1.2	1.0	0.79	0.62	0.49	0.39
Rated Power[1]	P_r	W	4.1	4.2	4.3	4.4	4.4	4.5	4.4	4.4
No Load Speed	ω_{nl}	rpm	5500	5480	5430	5520	5560	5550	5500	5510
No Load Current	I_{nl}	A	0.37	0.30	0.23	0.19	0.15	0.12	0.092	0.074
Motor Constant	K_M	Nm/√W	0.0085	0.0088	0.0090	0.0090	0.0090	0.0091	0.0092	0.0091
		oz-in/√W	1.2	1.2	1.3	1.3	1.3	1.3	1.3	1.3
Torque Constant	K_T	Nm/A	0.00763	0.00964	0.0123	0.0153	0.0191	0.0243	0.0307	0.0386
		oz-in/A	1.08	1.37	1.74	2.16	2.70	3.43	4.35	5.46
Voltage Constant	K_E	V/(rad/s)	0.00763	0.00964	0.0123	0.0153	0.0191	0.0243	0.0307	0.0386
		V/krpm	0.799	1.01	1.29	1.60	2.00	2.54	3.22	4.04
Terminal Resistance	R_{mt}	Ω	0.800	1.22	1.87	2.89	4.47	7.08	11.3	17.8
Inductance	L	mH	0.41	0.66	1.1	1.6	2.6	4.1	6.6	10
Peak Current	I_{pk}	A	7.5	6.2	5.1	4.2	3.4	2.7	2.1	1.7
Electrical Time Constant	τ_e	ms	0.51	0.54	0.56	0.56	0.57	0.58	0.58	0.58
Mechanical Time Constant	τ_m	ms	14	13	12	12	12	12	12	12

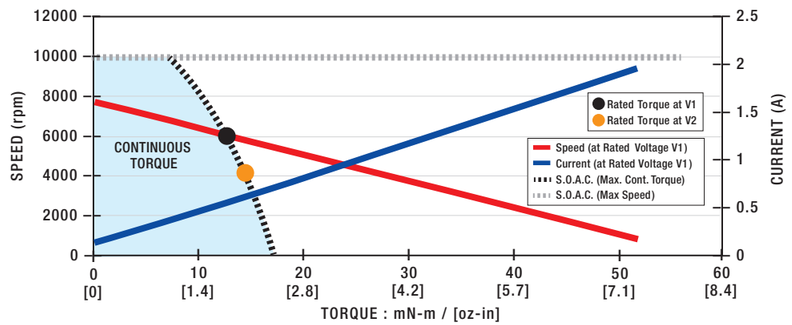
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



■ Performance Data & Graph: **DC026C–2**

Motor Data		Units								
Rated Voltage **V1**	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	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
		oz-in	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8
Rated Speed[1]	ω_r	rpm	5720	5880	5900	6080	6130	6100	6100	6140
Rated Current[1]	I_r	A	1.9	1.5	1.1	0.91	0.72	0.57	0.45	0.36
Rated Power[1]	P_r	W	8.0	8.1	8.0	8.1	8.1	8.0	8.0	8.0
No Load Speed	ω_{nl}	rpm	7320	7330	7270	7370	7410	7350	7350	7370
No Load Current	I_{nl}	A	0.34	0.27	0.22	0.17	0.14	0.11	0.085	0.068
Rated Voltage **V2**	V_r	V	6.00	7.58	9.55	12.0	15.2	19.1	24.0	30.3
Rated Torque[1] •	T_r	Nm	0.015	0.015	0.015	0.014	0.014	0.014	0.014	0.014
		oz-in	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0
Rated Speed[1]	ω_r	rpm	3820	4000	4050	4140	4240	4220	4190	4240
Rated Current[1]	I_r	A	2.0	1.6	1.2	0.99	0.79	0.62	0.49	0.39
Rated Power[1]	P_r	W	6.0	6.1	6.2	6.3	6.4	6.3	6.3	6.4
No Load Speed	ω_{nl}	rpm	5750	5780	5750	5790	5860	5820	5790	5810
No Load Current	I_{nl}	A	0.32	0.26	0.20	0.16	0.13	0.10	0.079	0.063
Motor Constant	K_M	Nm/√W	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.011
		oz-in/√W	1.4	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Torque Constant	K_T	Nm/A	0.00932	0.0117	0.0149	0.0186	0.0233	0.0295	0.0372	0.0469
		oz-in/A	1.32	1.66	2.11	2.64	3.30	4.18	5.27	6.64
Voltage Constant	K_E	V/(rad/s)	0.00932	0.0117	0.0149	0.0186	0.0233	0.0295	0.0372	0.0469
		V/krpm	0.976	1.23	1.56	1.95	2.44	3.09	3.90	4.91
Terminal Resistance	R_{mt}	Ω	0.860	1.30	2.02	3.10	4.84	7.67	12.2	19.2
Inductance	L	mH	0.47	0.76	1.2	1.9	3.0	4.8	7.6	12
Peak Current	I_{pk}	A	8.8	7.3	5.9	4.9	3.9	3.1	2.5	2.0
Electrical Time Constant	τ_e	ms	0.55	0.58	0.60	0.61	0.61	0.62	0.62	0.63
Mechanical Time Constant	τ_m	ms	12	11	11	11	11	11	11	10

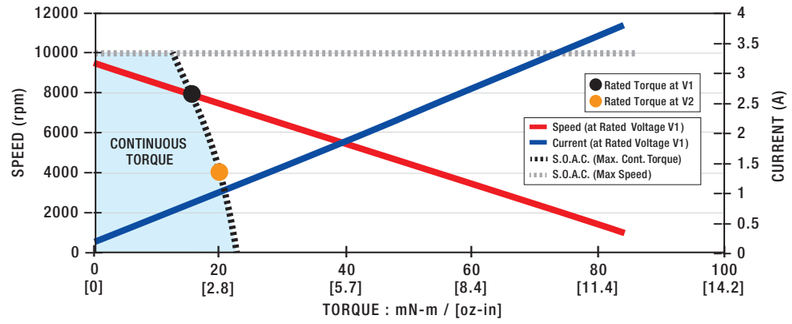
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



■ Performance Data & Graph: **DC026C–3**

Motor Data		Units								
Rated Voltage **V1**	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	0.017	0.016	0.016	0.015	0.015	0.015	0.015	0.015
		oz-in	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.1
Rated Speed[1]	ω_r	rpm	7540	7760	7880	7900	7980	8110	8090	8030
Rated Current[1]	I_r	A	2.2	1.7	1.3	1.0	0.82	0.65	0.51	0.41
Rated Power[1]	P_r	W	13	13	13	13	13	13	13	13
No Load Speed	ω_{nl}	rpm	8920	8950	8970	8910	8970	9080	9050	8970
No Load Current	I_{nl}	A	0.36	0.29	0.23	0.18	0.15	0.12	0.092	0.072
Rated Voltage **V2**	V_r	V	6.00	7.58	9.55	12.0	15.2	19.1	24.0	30.3
Rated Torque[1] •	T_r	Nm	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
		oz-in	2.9	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Rated Speed[1]	ω_r	rpm	3510	3740	3820	3860	3970	4010	3980	3990
Rated Current[1]	I_r	A	2.5	2.0	1.6	1.2	0.98	0.79	0.62	0.49
Rated Power[1]	P_r	W	7.4	7.8	7.9	7.9	8.1	8.2	8.2	8.2
No Load Speed	ω_{nl}	rpm	5550	5600	5580	5550	5630	5680	5630	5610
No Load Current	I_{nl}	A	0.31	0.25	0.20	0.16	0.13	0.099	0.078	0.062
Motor Constant	K_M	Nm/√W	0.011	0.012	0.012	0.012	0.012	0.012	0.012	0.012
		oz-in/√W	1.6	1.7	1.7	1.7	1.7	1.7	1.7	1.7
Torque Constant	K_T	Nm/A	0.00974	0.0122	0.0155	0.0196	0.0244	0.0305	0.0386	0.0489
		oz-in/A	1.38	1.73	2.19	2.77	3.46	4.31	5.46	6.92
Voltage Constant	K_E	V/(rad/s)	0.00974	0.0122	0.0155	0.0196	0.0244	0.0305	0.0386	0.0489
		V/krpm	1.02	1.28	1.62	2.05	2.56	3.19	4.04	5.12
Terminal Resistance	R_{mt}	Ω	0.730	1.08	1.67	2.59	4.02	6.28	9.96	15.8
Inductance	L	mH	0.39	0.61	0.98	1.6	2.4	3.8	6.1	9.8
Peak Current	I_{pk}	A	13	11	9.1	7.4	6.0	4.8	3.8	3.0
Electrical Time Constant	τ_e	ms	0.53	0.56	0.59	0.60	0.61	0.61	0.61	0.62
Mechanical Time Constant	τ_m	ms	12	12	11	11	11	11	11	11

The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



Shown with optional assemblies.

DC030B Series

The DC030B Series Brush Commutated DC Motor is a 30 mm diameter unit offered in 3 lengths with continuous output torques of 0.0113 to 0.0184 Nm.

Benefits

- Speeds up to 10,000 RPM possible
- DC bus voltage up to 48 VDC
- Eight standard windings, special windings available
- 2 pole stator with ceramic magnets
- 7 slot skewed armature cogging reduction
- Sintered bronze bearings, ball bearings; copper graphite brushes, RFI suppression available

Optional Assemblies

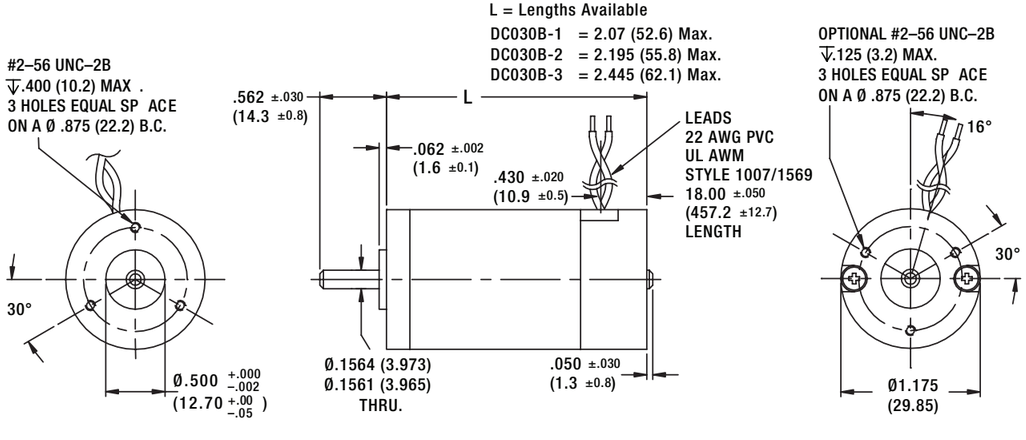
- Encoder: E30C/D
- Gearboxes: G30A, G35A
- Brake: B30A
- Programmable Drive: PBL4850E**

Motor Characteristics

Motor Data		Units	Series		
			DC030B-1	DC030B-2	DC030B-3
Max DC Terminal Voltage	V_T	V	48		
Max Speed (Mechanical)	ω_{MAX}	rpm	10000		
Continuous Stall Torque[1]	T_{CS}	Nm	0.0113	0.0140	0.0184
		oz-in	1.6	2.0	2.6
Peak Torque (Maximum)[1]	T_{pk}	Nm	0.045	0.065	0.10
		oz-in	6.4	9.2	15
Coulomb Friction Torque	T_f	Nm	0.0025	0.0025	0.0025
		oz-in	0.35	0.35	0.35
Viscous Damping Factor	D	Nm/(rad/s)	1.0E-06	1.2E-06	1.4E-06
		oz-in/krpm	0.016	0.018	0.021
Thermal Time Constant	τ_{th}	min	7.8	9.0	11
Thermal Resistance	R_{th}	°C/W	24	23	21
Max. Winding Temperature	Θ_{MAX}	°C	155	155	155
Rotor Inertia	J_r	kg-m^2	9.9E-07	1.2E-06	1.6E-06
		oz-in-s^2	1.4E-04	1.7E-04	2.3E-04
Motor Weight	W_m	g	130	140	160
		oz	4.7	5.1	5.8

[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink. **For PBL4850E to operate a brush motor, an encoder is required.

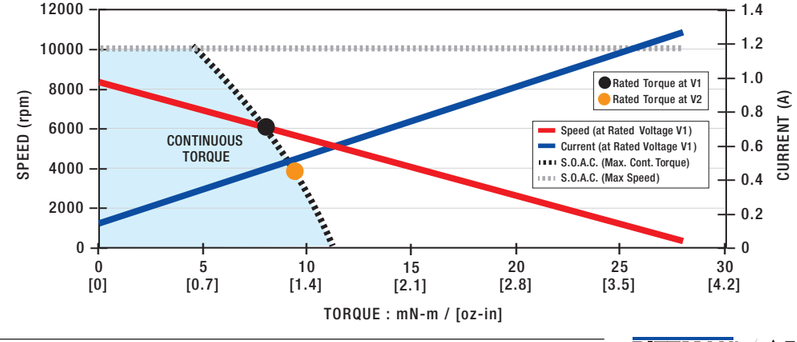
Dimensional Drawings: DC030B-1 • DC030B-2 • DC030B-3



Performance Data & Graph: DC030B–1

Motor Data		Units							
Rated Voltage **V1**	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	0.0082	0.0081	0.0080	0.0079	0.0080	0.0079	0.0079	0.0079
		oz-in	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Rated Speed[1]	ω_r	rpm	5810	5940	6120	6100	6050	6110	6110	6100
Rated Current[1]	I_r	A	1.2	0.93	0.74	0.58	0.46	0.36	0.29	0.23
Rated Power[1]	P_r	W	5.0	5.0	5.1	5.1	5.0	5.1	5.0	5.0
No Load Speed	ω_{nl}	rpm	7630	7710	7810	7740	7700	7730	7700	7700
No Load Current	I_{nl}	A	0.30	0.25	0.20	0.16	0.13	0.096	0.076	0.061
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	0.0095	0.0094	0.0094	0.0093	0.0093	0.0093	0.0093	0.0093
		oz-in	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Rated Speed[1]	ω_r	rpm	3580	3700	3780	3850	3820	3820	3850	3860
Rated Current[1]	I_r	A	1.3	1.0	0.81	0.64	0.51	0.40	0.32	0.25
Rated Power[1]	P_r	W	3.6	3.7	3.7	3.8	3.7	3.7	3.7	3.8
No Load Speed	ω_{nl}	rpm	5970	6060	6090	6090	6050	6050	6030	6050
No Load Current	I_{nl}	A	0.29	0.23	0.19	0.15	0.12	0.091	0.072	0.058
Motor Constant	K_M	Nm/√W	0.0078	0.0077	0.0078	0.0079	0.0079	0.0079	0.0079	0.0079
		oz-in/√W	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Torque Constant	K_T	Nm/A	0.0110	0.0137	0.0171	0.0217	0.0274	0.0345	0.0436	0.0548
		oz-in/A	1.56	1.93	2.42	3.07	3.88	4.88	6.18	7.76
Voltage Constant	K_E	V/(rad/s)	0.0110	0.0137	0.0171	0.0217	0.0274	0.0345	0.0436	0.0548
		V/krpm	1.15	1.43	1.79	2.27	2.87	3.61	4.57	5.74
Terminal Resistance	R_{mt}	Ω	2.01	3.10	4.81	7.61	12.1	19.1	30.3	48.0
Inductance	L	mH	1.0	1.6	2.5	3.9	6.3	9.9	16	25
Peak Current	I_{pk}	A	4.8	3.9	3.2	2.5	2.0	1.6	1.3	1.0
Electrical Time Constant	τ_e	ms	0.50	0.51	0.51	0.52	0.52	0.52	0.52	0.52
Mechanical Time Constant	τ_m	ms	16	16	16	16	16	16	16	16

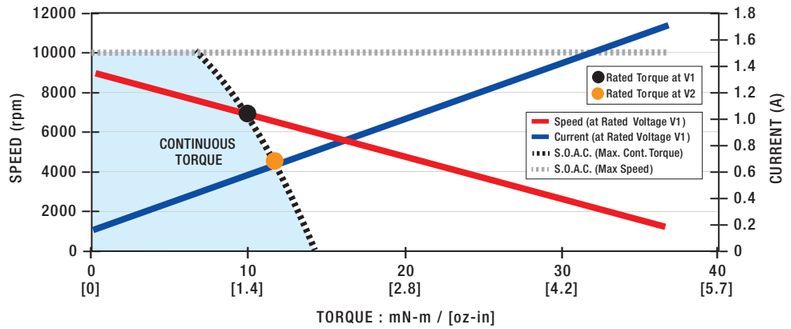
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



Performance Data & Graph: **DC030B–2**

Motor Data		Units							
Rated Voltage **V1**	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	0.010	0.010	0.0099	0.0099	0.0098	0.0098	0.0097	0.0098
		oz-in	1.5	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Rated Speed[1]	ω_r	rpm	6520	6590	6790	6890	6840	6870	6890	6840
Rated Current[1]	I_r	A	1.5	1.2	0.90	0.72	0.57	0.45	0.35	0.28
Rated Power[1]	P_r	W	7.0	7.0	7.0	7.1	7.0	7.0	7.0	7.0
No Load Speed	ω_{nl}	rpm	8100	8060	8120	8230	8130	8150	8140	8100
No Load Current	I_{nl}	A	0.34	0.27	0.21	0.17	0.14	0.11	0.084	0.066
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	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
		oz-in	1.7	1.7	1.6	1.6	1.6	1.6	1.6	1.6
Rated Speed[1]	ω_r	rpm	4220	4330	4430	4570	4550	4530	4560	4560
Rated Current[1]	I_r	A	1.6	1.3	1.0	0.80	0.63	0.50	0.39	0.31
Rated Power[1]	P_r	W	5.3	5.3	5.4	5.5	5.5	5.5	5.5	5.5
No Load Speed	ω_{nl}	rpm	6370	6360	6360	6490	6420	6400	6410	6390
No Load Current	I_{nl}	A	0.32	0.25	0.20	0.16	0.13	0.099	0.078	0.062
Motor Constant	K_M	Nm/√W	0.0089	0.0090	0.0092	0.0091	0.0092	0.0092	0.0092	0.0093
		oz-in/√W	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Torque Constant	K_T	Nm/A	0.0105	0.0133	0.0167	0.0207	0.0264	0.0332	0.0419	0.0530
		oz-in/A	1.49	1.88	2.37	2.93	3.73	4.71	5.94	7.51
Voltage Constant	K_E	V/(rad/s)	0.0105	0.0133	0.0167	0.0207	0.0264	0.0332	0.0419	0.0530
		V/krpm	1.10	1.39	1.75	2.17	2.76	3.48	4.39	5.55
Terminal Resistance	R_{mt}	Ω	1.40	2.17	3.34	5.20	8.24	13.1	20.6	32.9
Inductance	L	mH	0.73	1.2	1.8	2.9	4.6	7.3	12	18
Peak Current	I_{pk}	A	6.8	5.5	4.6	3.7	2.9	2.3	1.9	1.5
Electrical Time Constant	τ_e	ms	0.52	0.54	0.54	0.55	0.55	0.56	0.56	0.56
Mechanical Time Constant	τ_m	ms	15	15	14	15	14	14	14	14

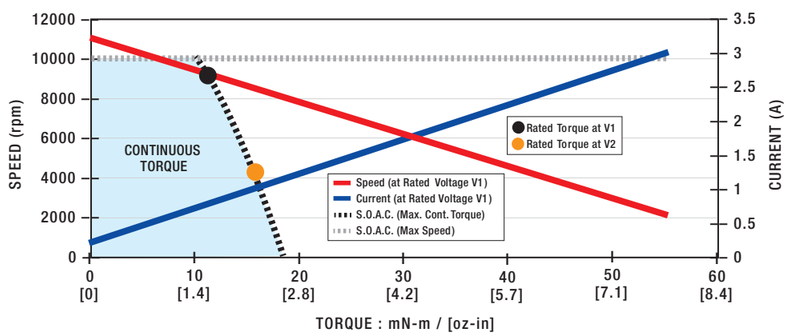
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



Performance Data & Graph: **DC030B–3**

Motor Data		Units							
Rated Voltage **V1**	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	0.013	0.012	0.012	0.012	0.011	0.011	0.011	0.011
		oz-in	1.8	1.7	1.7	1.6	1.6	1.6	1.6	1.6
Rated Speed[1]	ω_r	rpm	8500	8850	9020	9080	9170	9350	9310	9260
Rated Current[1]	I_r	A	2.1	1.7	1.3	0.99	0.79	0.63	0.49	0.39
Rated Power[1]	P_r	W	11	11	11	11	11	11	11	11
No Load Speed	ω_{nl}	rpm	9830	9960	9930	9900	9940	10000	10000	9970
No Load Current	I_{nl}	A	0.45	0.36	0.29	0.23	0.18	0.15	0.12	0.090
Rated Voltage **V2**	V_r	V	6.00	7.58	9.55	12.0	15.2	19.1	24.0	30.3
Rated Torque[1] •	T_r	Nm	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
		oz-in	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2
Rated Speed[1]	ω_r	rpm	3630	3940	4070	4140	4270	4330	4300	4320
Rated Current[1]	I_r	A	2.5	2.0	1.6	1.2	0.98	0.79	0.62	0.49
Rated Power[1]	P_r	W	6.3	6.7	6.8	6.9	7.1	7.1	7.1	7.1
No Load Speed	ω_{nl}	rpm	6090	6210	6160	6140	6220	6280	6220	6220
No Load Current	I_{nl}	A	0.39	0.31	0.25	0.20	0.16	0.13	0.098	0.077
Motor Constant	K_M	Nm/√W	0.0099	0.010	0.010	0.010	0.011	0.010	0.011	0.011
		oz-in/√W	1.4	1.4	1.5	1.5	1.5	1.5	1.5	1.5
Torque Constant	K_T	Nm/A	0.00876	0.0109	0.0138	0.0175	0.0219	0.0272	0.0346	0.0436
		oz-in/A	1.24	1.54	1.96	2.47	3.10	3.85	4.90	6.18
Voltage Constant	K_E	V/(rad/s)	0.00876	0.0109	0.0138	0.0175	0.0219	0.0272	0.0346	0.0436
		V/krpm	0.917	1.14	1.45	1.83	2.29	2.85	3.62	4.57
Terminal Resistance	R_{mt}	Ω	0.790	1.17	1.80	2.79	4.33	6.75	10.7	17.0
Inductance	L	mH	0.37	0.58	0.94	1.5	2.3	3.7	5.9	9.4
Peak Current	I_{pk}	A	12	10	8.4	6.8	5.5	4.5	3.6	2.8
Electrical Time Constant	τ_e	ms	0.47	0.50	0.52	0.54	0.54	0.54	0.55	0.55
Mechanical Time Constant	τ_m	ms	17	16	15	15	15	15	15	15

The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



Shown with optional assemblies.

Benefits

- High torque
- Speeds up to 10,000 RPM possible
- DC bus voltage up to 48 VDC
- Eight standard windings, special windings available
- 2 pole stator with magnetic cogging reduction
- Bonded rare earth magnets
- 7 slot armature
- Long life graphite brushes, RFI suppression available

Optional Assemblies

- Encoder: E30C/D
- Gearboxes: G30A, G35A, G51A
- Brake: B30A
- Programmable Drive: PBL4850E**

DC030C Series

The DC030C Series Brush Commutated DC Motor is a 30 mm diameter unit offered in 3 lengths with continuous output torques of 0.0177 to 0.0586 Nm.

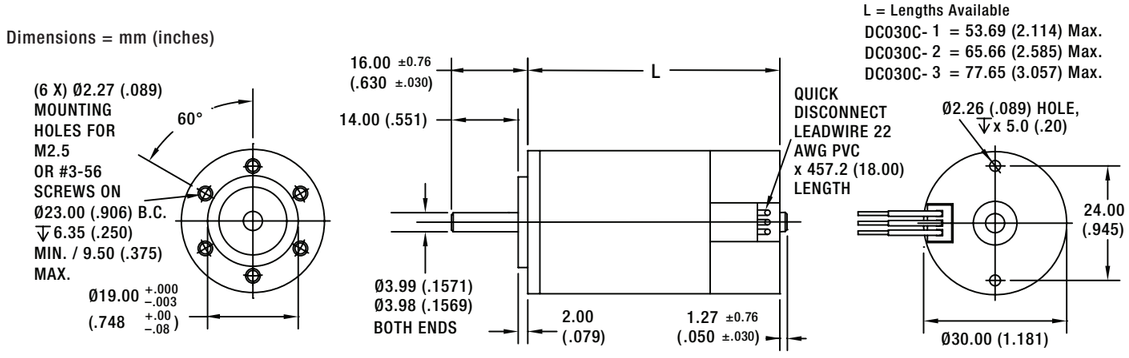
Motor Characteristics

Motor Data		Units	Series		
			DC030C-1	DC030C-2	DC030C-3
Max DC Terminal Voltage	V_T	V	48		
Max Speed (Mechanical)	ω_{MAX}	rpm	10000		
Continuous Stall Torque[1]	T_{CS}	Nm	0.0177	0.0410	0.0586
		oz-in	2.7	5.8	8.5
Peak Torque (Maximum)[1]	T_{pk}	Nm	0.068	0.22	0.36
		oz-in	9.6	31	51
Coulomb Friction Torque	T_f	Nm	0.0035	0.0042	0.0049
		oz-in	0.50	0.60	0.70
Viscous Damping Factor	D	Nm/(rad/s)	3.0E-06	3.4E-06	3.7E-06
		oz-in/krpm	0.045	0.050	0.055
Thermal Time Constant	τ_{th}	min	10	13	16
Thermal Resistance	R_{th}	°C/W	17	14	11
Max. Winding Temperature	Θ_{MAX}	°C	155	155	155
Rotor Inertia	J_r	kg-m^2	2.0E-06	3.7E-06	5.8E-06
		oz-in-s^2	2.9E-04	5.2E-04	8.2E-04
Motor Weight	W_m	g	130	170	210
		oz	4.7	6.1	7.6

[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink. **For PBL4850E to operate a brush motor, an encoder is required.

Dimensional Drawings: DC030C-1 • DC030C-2 • DC030C-3

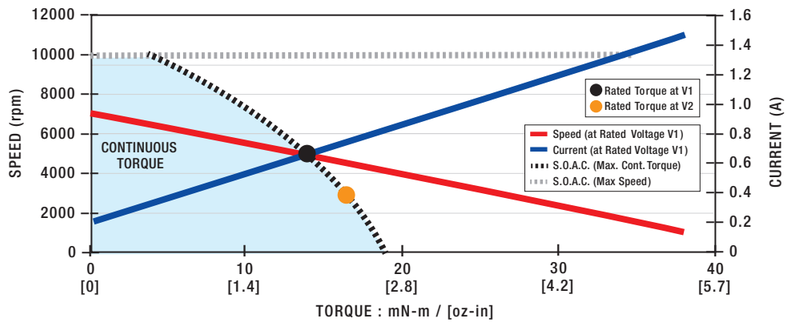
Dimensions = mm (inches)



Performance Data & Graph: DC030C–1

Motor Data		Units							
Rated Voltage **V1**	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	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014
		oz-in	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Rated Speed[1]	ω_r	rpm	4850	4840	4830	4780	4830	4840	4790	4760
Rated Current[1]	I_r	A	1.7	1.3	1.0	0.83	0.66	0.52	0.41	0.33
Rated Power[1]	P_r	W	7.1	7.0	7.0	7.0	7.0	7.0	7.0	7.0
No Load Speed	ω_{nl}	rpm	6820	6720	6750	6740	6740	6770	6730	6720
No Load Current	I_{nl}	A	0.46	0.36	0.29	0.23	0.18	0.15	0.12	0.090
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	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
		oz-in	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Rated Speed[1]	ω_r	rpm	2890	2920	2850	2870	2910	2880	2850	2850
Rated Current[1]	I_r	A	1.8	1.4	1.1	0.91	0.72	0.57	0.45	0.36
Rated Power[1]	P_r	W	4.9	5.0	4.9	4.9	5.0	4.9	4.9	4.9
No Load Speed	ω_{nl}	rpm	5350	5280	5270	5300	5300	5290	5270	5280
No Load Current	I_{nl}	A	0.43	0.33	0.27	0.21	0.17	0.14	0.11	0.083
Motor Constant	K_M	Nm/√W	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
		oz-in/√W	1.4	1.5	1.4	1.4	1.5	1.4	1.4	1.4
Torque Constant	K_T	Nm/A	0.0124	0.0159	0.0200	0.0251	0.0316	0.0397	0.0503	0.0633
		oz-in/A	1.76	2.24	2.83	3.56	4.48	5.63	7.13	8.97
Voltage Constant	K_E	V/(rad/s)	0.0124	0.0159	0.0200	0.0251	0.0316	0.0397	0.0503	0.0633
		V/krpm	1.30	1.66	2.09	2.63	3.31	4.16	5.27	6.63
Terminal Resistance	R_{mt}	Ω	1.50	2.37	3.81	6.08	9.50	15.1	24.3	38.6
Inductance	L	mH	1.1	1.8	2.9	4.6	7.3	12	18	29
Peak Current	I_{pk}	A	6.4	5.1	4.0	3.1	2.5	2.0	1.6	1.2
Electrical Time Constant	τ_e	ms	0.76	0.77	0.77	0.76	0.77	0.77	0.76	0.76
Mechanical Time Constant	τ_m	ms	20	19	20	20	19	20	20	20

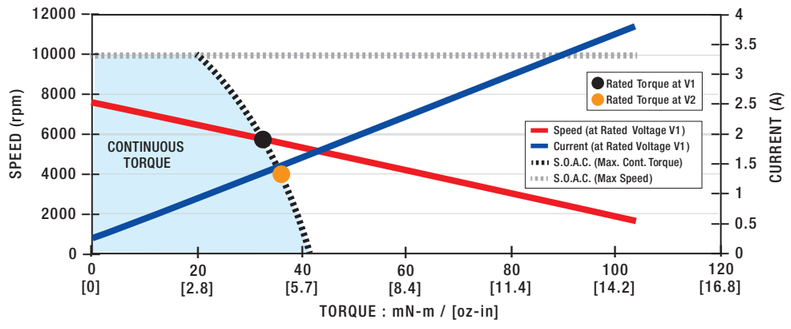
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



■ Performance Data & Graph: **DC030C–2**

Motor Data		Units							
Rated Voltage **V1**	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	0.037	0.036	0.035	0.033	0.032	0.031	0.031	0.031
		oz-in	5.3	5.2	5.0	4.7	4.5	4.4	4.4	4.4
Rated Speed[1]	ω_r	rpm	3410	4180	4960	5550	5750	6040	6010	6040
Rated Current[1]	I_r	A	3.8	2.9	2.3	1.7	1.3	1.1	0.83	0.66
Rated Power[1]	P_r	W	13	16	18	19	19	20	20	20
No Load Speed	ω_{nl}	rpm	6950	6940	7130	7110	7060	7180	7150	7150
No Load Current	I_{nl}	A	0.54	0.43	0.35	0.28	0.22	0.18	0.14	0.11
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	0.039	0.039	0.038	0.036	0.036	0.035	0.035	0.035
		oz-in	5.6	5.5	5.3	5.1	5.0	5.0	5.0	4.9
Rated Speed[1]	ω_r	rpm	1620	2410	3090	3740	3950	4160	4150	4210
Rated Current[1]	I_r	A	3.9	3.0	2.4	1.9	1.4	1.1	0.91	0.72
Rated Power[1]	P_r	W	6.7	9.7	12	14	15	15	15	15
No Load Speed	ω_{nl}	rpm	5460	5480	5590	5630	5590	5660	5650	5660
No Load Current	I_{nl}	A	0.50	0.40	0.32	0.26	0.20	0.16	0.13	0.11
Motor Constant	K_M	Nm/√W	0.013	0.014	0.015	0.016	0.017	0.018	0.018	0.018
		oz-in/√W	1.8	2.0	2.1	2.3	2.4	2.5	2.5	2.5
Torque Constant	K_T	Nm/A	0.0124	0.0158	0.0196	0.0248	0.0315	0.0392	0.0496	0.0624
		oz-in/A	1.76	2.23	2.77	3.52	4.46	5.54	7.02	8.83
Voltage Constant	K_E	V/(rad/s)	0.0124	0.0158	0.0196	0.0248	0.0315	0.0392	0.0496	0.0624
		V/krpm	1.30	1.65	2.05	2.60	3.30	4.10	5.19	6.53
Terminal Resistance	R_{mt}	Ω	0.960	1.29	1.71	2.27	3.33	4.90	7.83	12.2
Inductance	L	mH	0.49	0.79	1.2	2.0	3.2	5.0	8.0	13
Peak Current	I_{pk}	A	9.9	9.3	8.9	8.4	7.2	6.2	4.9	3.9
Electrical Time Constant	τ_e	ms	0.51	0.61	0.71	0.86	0.95	1.0	1.0	1.0
Mechanical Time Constant	τ_m	ms	23	19	16	14	12	12	12	12

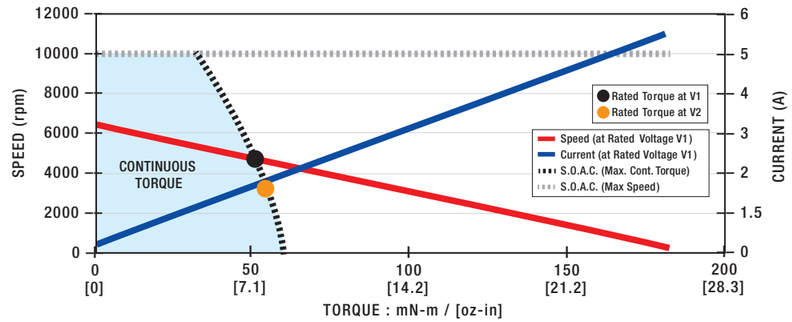
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



■ Performance Data & Graph: **DC030C–3**

Motor Data		Units							
Rated Voltage **V1**	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	0.056	0.054	0.052	0.050	0.051	0.050	0.048	0.048
		oz-in	7.9	7.7	7.3	7.1	7.2	7.0	6.8	6.7
Rated Speed[1]	ω_r	rpm	3320	4040	4620	4900	4770	4940	5140	5190
Rated Current[1]	I_r	A	4.7	3.6	2.7	2.1	1.7	1.3	1.0	0.80
Rated Power[1]	P_r	W	19	23	25	26	25	26	26	26
No Load Speed	ω_{nl}	rpm	6050	6060	6010	6070	6000	5980	6020	5980
No Load Current	I_{nl}	A	0.51	0.40	0.31	0.25	0.20	0.16	0.13	0.097
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	0.058	0.057	0.055	0.054	0.054	0.054	0.053	0.052
		oz-in	8.2	8.0	7.8	7.6	7.7	7.6	7.5	7.4
Rated Speed[1]	ω_r	rpm	1810	2550	3100	3410	3290	3440	3640	3710
Rated Current[1]	I_r	A	4.8	3.7	2.8	2.3	1.8	1.4	1.1	0.85
Rated Power[1]	P_r	W	11	15	18	19	19	19	20	20
No Load Speed	ω_{nl}	rpm	4770	4800	4720	4810	4760	4720	4760	4750
No Load Current	I_{nl}	A	0.47	0.38	0.29	0.24	0.19	0.15	0.12	0.090
Motor Constant	K_M	Nm/√W	0.017	0.019	0.022	0.023	0.023	0.024	0.025	0.025
		oz-in/√W	2.5	2.7	3.1	3.2	3.2	3.3	3.5	3.6
Torque Constant	K_T	Nm/A	0.0145	0.0183	0.0236	0.0294	0.0373	0.0474	0.0595	0.0752
		oz-in/A	2.06	2.60	3.34	4.17	5.29	6.71	8.42	10.7
Voltage Constant	K_E	V/(rad/s)	0.0145	0.0183	0.0236	0.0294	0.0373	0.0474	0.0595	0.0752
		V/krpm	1.52	1.92	2.47	3.08	3.91	4.96	6.23	7.88
Terminal Resistance	R_{mt}	Ω	0.700	0.900	1.17	1.66	2.74	4.04	5.87	8.98
Inductance	L	mH	0.42	0.64	1.0	1.6	2.6	4.1	6.6	10
Peak Current	I_{pk}	A	14	13	13	12	8.8	7.5	6.5	5.3
Electrical Time Constant	τ_e	ms	0.60	0.71	0.89	0.98	0.94	1.0	1.1	1.2
Mechanical Time Constant	τ_m	ms	19	16	12	11	11	10	9.6	9.2

The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



Shown with optional assemblies.

DC040B Series

The DC040B Series Brush Commutated DC Motor is a 40 mm diameter unit offered in 6 lengths with continuous output torques of 0.017 to 0.081 Nm.

Benefits

- Speeds up to 8,500 RPM possible
- DC bus voltage up to 48 VDC
- Eight standard windings. Special windings, sintered bronze bearings, ball bearings; copper graphite brushes, RFI suppression available
- 2 pole stator with ceramic magnets
- 7 slot skewed armature cogging reduction

Optional Assemblies

- Encoder: E21C/D, E30C/D
- Gearboxes: G30A, G40A, PLG42S, G51A
- Brakes: B30A, B49A
- Drives: BGE6060A, PBL4850E**

Motor Characteristics

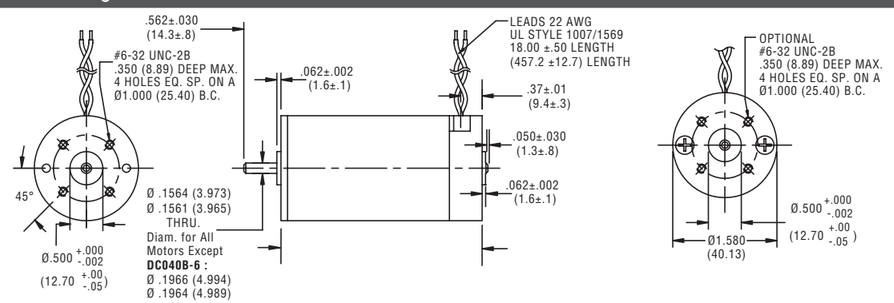
Motor Data		Units	Series					
			DC040B-1	DC040B-2	DC040B-3	DC040B-4	DC040B-5	DC040B-6
Max DC Terminal Voltage	V_T	V	48					
Max Speed (Mechanical)	ω_{MAX}	rpm	8000				7000	
Continuous Stall Torque[1]	T_{CS}	Nm	0.017	0.033	0.043	0.049	0.067	0.081
		oz-in	2.4	4.7	6.1	6.9	9.5	12
Peak Torque (Maximum)[1]	T_{pk}	Nm	0.086	0.20	0.26	0.32	0.40	0.50
		oz-in	12	28	37	45	56	71
Coulomb Friction Torque	T_f	Nm	0.0035	0.0042	0.0042	0.0046	0.0056	0.0056
		oz-in	0.50	0.60	0.60	0.65	0.80	0.80
Viscous Damping Factor	D	Nm/(rad/s)	1.8E-06	2.3E-06	2.6E-06	3.0E-06	3.5E-06	3.7E-06
		oz-in/krpm	0.028	0.034	0.039	0.045	0.053	0.055
Thermal Time Constant	τ_{th}	min	7.2	11	12	13	14	14
Thermal Resistance	R_{th}	°C/W	23	19	17	15	14	11
Max. Winding Temperature	Θ_{MAX}	°C	155	155	155	155	155	155
Rotor Inertia	J_r	kg-m^2	1.9E-06	3.2E-06	4.2E-06	5.6E-06	7.1E-06	8.5E-06
		oz-in-s^2	2.7E-04	4.6E-04	5.9E-04	7.9E-04	0.0010	0.0012
Motor Weight	W_m	g	200	250	290	340	390	440
		oz	7.0	8.9	10	12	14	16

[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink. **For PBL4850E to operate a brush motor, an encoder is required.

Dimensional Drawings: DC040B-1 • DC040B-2 • DC040B-3 • DC040B-4 • DC040B-5 • DC040B-6

L = Lengths Available

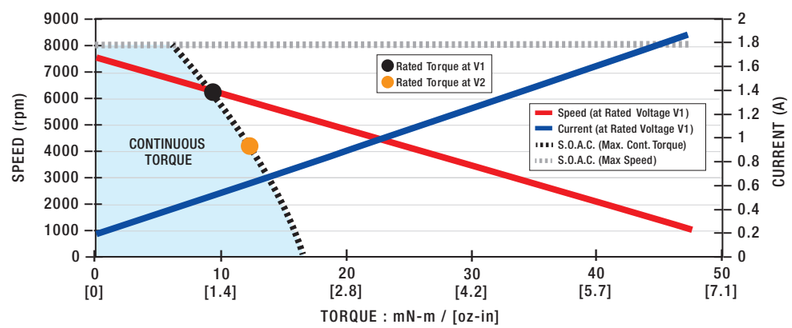
DC040B-1 = 1.828 (46.43)
DC040B-2 = 2.203 (55.96)
DC040B-3 = 2.403 (61.04)
DC040B-4 = 2.703 (68.66)
DC040B-5 = 3.053 (75.55)
DC040B-6 = 3.353 (85.17)



Performance Data & Graph: DC040B–1

Motor Data		Units							
Rated Voltage **V1**	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	0.010	0.0099	0.0095	0.0094	0.0093	0.0092	0.0092	0.0092
		oz-in	1.5	1.4	1.3	1.3	1.3	1.3	1.3	1.3
Rated Speed[1]	ω_r	rpm	6020	6080	6230	6230	6260	6320	6300	6290
Rated Current[1]	I_r	A	1.4	1.1	0.83	0.65	0.51	0.40	0.32	0.25
Rated Power[1]	P_r	W	6.5	6.3	6.2	6.1	6.1	6.1	6.0	6.0
No Load Speed	ω_{nl}	rpm	6930	6850	6910	6880	6890	6910	6880	6880
No Load Current	I_{nl}	A	0.40	0.32	0.25	0.20	0.16	0.13	0.099	0.079
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	0.013	0.013	0.012	0.012	0.012	0.012	0.012	0.012
		oz-in	1.8	1.8	1.8	1.7	1.7	1.7	1.7	1.7
Rated Speed[1]	ω_r	rpm	3970	4060	4130	4200	4220	4230	4230	4250
Rated Current[1]	I_r	A	1.6	1.2	0.98	0.77	0.61	0.48	0.38	0.30
Rated Power[1]	P_r	W	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4
No Load Speed	ω_{nl}	rpm	5440	5400	5400	5420	5430	5430	5410	5430
No Load Current	I_{nl}	A	0.38	0.30	0.24	0.19	0.15	0.12	0.093	0.074
Motor Constant	K_M	Nm/√W	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011
		oz-in/√W	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Torque Constant	K_T	Nm/A	0.0122	0.0156	0.0196	0.0247	0.0310	0.0391	0.0495	0.0622
		oz-in/A	1.73	2.20	2.77	3.50	4.39	5.53	7.00	8.80
Voltage Constant	K_E	V/(rad/s)	0.0122	0.0156	0.0196	0.0247	0.0310	0.0391	0.0495	0.0622
		V/krpm	1.28	1.63	2.05	2.59	3.25	4.09	5.18	6.51
Terminal Resistance	R_{mt}	Ω	1.25	1.93	2.99	4.70	7.38	11.6	18.5	29.2
Inductance	L	mH	0.72	1.2	1.8	2.9	4.6	7.3	12	19
Peak Current	I_{pk}	A	7.6	6.2	5.1	4.1	3.3	2.6	2.1	1.6
Electrical Time Constant	τ_e	ms	0.58	0.60	0.61	0.63	0.63	0.63	0.63	0.63
Mechanical Time Constant	τ_m	ms	16	15	15	15	15	14	14	14

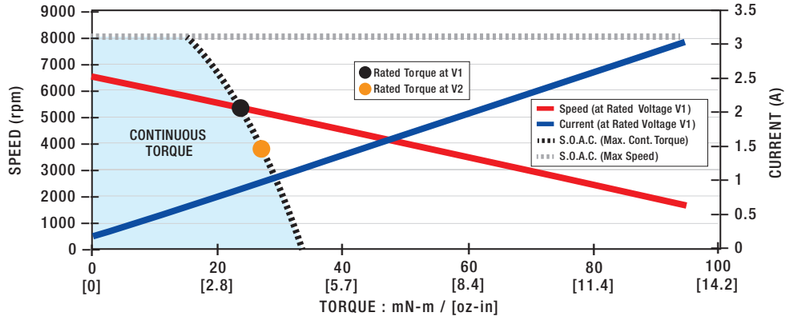
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



Performance Data & Graph: **DC040B–2**

Motor Data		Units							
Rated Voltage **V1**	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	0.026	0.025	0.024	0.024	0.024	0.023	0.023	0.023
		oz-in	3.6	3.5	3.4	3.4	3.3	3.3	3.3	3.3
Rated Speed[1]	ω_r	rpm	5000	5100	5300	5310	5350	5360	5390	5390
Rated Current[1]	I_r	A	2.4	1.8	1.4	1.1	0.89	0.70	0.55	0.44
Rated Power[1]	P_r	W	13	13	13	13	13	13	13	13
No Load Speed	ω_{nl}	rpm	5870	5810	5920	5870	5880	5860	5880	5880
No Load Current	I_{nl}	A	0.38	0.30	0.25	0.19	0.16	0.12	0.095	0.076
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	0.028	0.028	0.027	0.027	0.027	0.027	0.027	0.027
		oz-in	4.0	3.9	3.9	3.8	3.8	3.8	3.8	3.8
Rated Speed[1]	ω_r	rpm	3440	3570	3680	3750	3790	3780	3810	3830
Rated Current[1]	I_r	A	2.6	2.0	1.6	1.2	0.98	0.77	0.61	0.49
Rated Power[1]	P_r	W	10	10	11	11	11	11	11	11
No Load Speed	ω_{nl}	rpm	4630	4600	4650	4650	4660	4620	4640	4660
No Load Current	I_{nl}	A	0.36	0.29	0.23	0.18	0.15	0.12	0.090	0.072
Motor Constant	K_M	Nm/√W	0.017	0.018	0.018	0.019	0.019	0.019	0.019	0.019
		oz-in/√W	2.5	2.6	2.6	2.6	2.7	2.7	2.7	2.7
Torque Constant	K_T	Nm/A	0.0148	0.0188	0.0234	0.0297	0.0372	0.0472	0.0593	0.0746
		oz-in/A	2.10	2.66	3.31	4.21	5.27	6.68	8.40	10.6
Voltage Constant	K_E	V/(rad/s)	0.0148	0.0188	0.0234	0.0297	0.0372	0.0472	0.0593	0.0746
		V/krpm	1.55	1.97	2.45	3.11	3.90	4.94	6.21	7.81
Terminal Resistance	R_{mt}	Ω	0.720	1.08	1.63	2.53	3.94	6.21	9.78	15.4
Inductance	L	mH	0.52	0.84	1.3	2.1	3.3	5.3	8.3	13
Peak Current	I_{pk}	A	13	11	9.3	7.5	6.1	4.9	3.9	3.1
Electrical Time Constant	τ_e	ms	0.72	0.78	0.79	0.82	0.84	0.85	0.85	0.85
Mechanical Time Constant	τ_m	ms	11	9.9	9.7	9.3	9.2	9.1	9.0	9.0

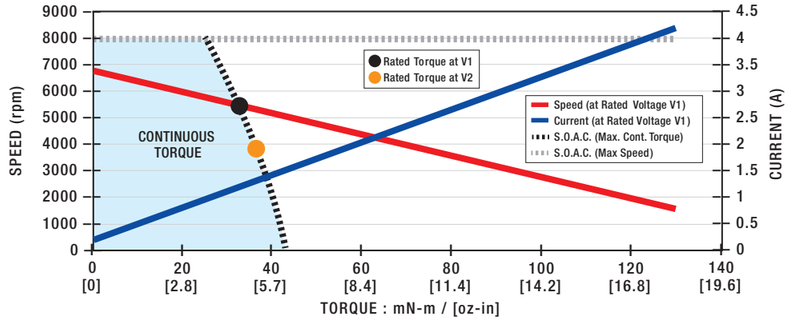
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



Performance Data & Graph: **DC040B–3**

Motor Data		Units							
Rated Voltage **V1**	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	0.035	0.034	0.034	0.033	0.033	0.033	0.032	0.032
		oz-in	5.0	4.9	4.8	4.7	4.7	4.6	4.6	4.6
Rated Speed[1]	ω_r	rpm	5030	5170	5280	5450	5430	5480	5490	5490
Rated Current[1]	I_r	A	3.2	2.5	1.9	1.5	1.2	0.95	0.75	0.59
Rated Power[1]	P_r	W	19	19	19	19	19	19	19	19
No Load Speed	ω_{nl}	rpm	6050	6020	6000	6090	6030	6050	6040	6030
No Load Current	I_{nl}	A	0.41	0.33	0.26	0.21	0.17	0.13	0.11	0.081
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	0.038	0.038	0.037	0.037	0.036	0.036	0.036	0.036
		oz-in	5.4	5.3	5.3	5.2	5.2	5.1	5.1	5.1
Rated Speed[1]	ω_r	rpm	3460	3620	3690	3870	3870	3890	3910	3930
Rated Current[1]	I_r	A	3.4	2.7	2.1	1.7	1.3	1.0	0.81	0.65
Rated Power[1]	P_r	W	14	14	14	15	15	15	15	15
No Load Speed	ω_{nl}	rpm	4780	4770	4720	4830	4780	4780	4770	4780
No Load Current	I_{nl}	A	0.39	0.31	0.24	0.20	0.16	0.13	0.096	0.077
Motor Constant	K_M	Nm/√W	0.019	0.020	0.021	0.021	0.021	0.021	0.021	0.021
		oz-in/√W	2.7	2.8	2.9	3.0	3.0	3.0	3.0	3.0
Torque Constant	K_T	Nm/A	0.0144	0.0182	0.0232	0.0287	0.0365	0.0459	0.0581	0.0731
		oz-in/A	2.04	2.58	3.29	4.07	5.17	6.50	8.22	10.3
Voltage Constant	K_E	V/(rad/s)	0.0144	0.0182	0.0232	0.0287	0.0365	0.0459	0.0581	0.0731
		V/krpm	1.51	1.91	2.43	3.01	3.82	4.81	6.08	7.65
Terminal Resistance	R_{mt}	Ω	0.560	0.830	1.26	1.89	2.96	4.62	7.30	11.5
Inductance	L	mH	0.39	0.63	1.0	1.6	2.5	4.0	6.4	10
Peak Current	I_{pk}	A	17	14	12	10	8.1	6.6	5.2	4.2
Electrical Time Constant	τ_e	ms	0.70	0.76	0.81	0.83	0.85	0.86	0.87	0.87
Mechanical Time Constant	τ_m	ms	11	10	9.7	9.5	9.3	9.1	9.0	9.0

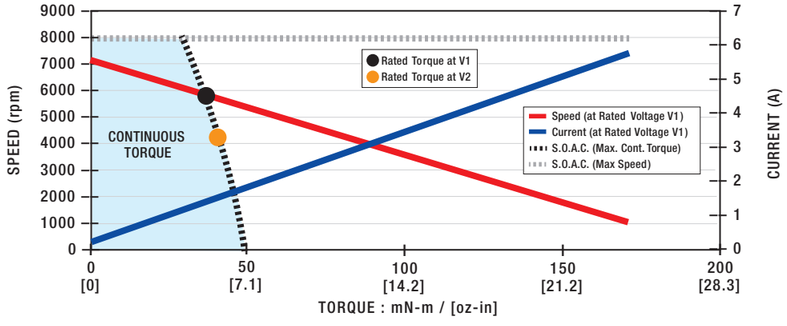
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



■ Performance Data & Graph: **DC040B–4**

Motor Data		Units							
Rated Voltage **V1**	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	0.040	0.038	0.037	0.037	0.036	0.036	0.036	0.036
		oz-in	5.6	5.4	5.3	5.2	5.1	5.1	5.0	5.0
Rated Speed[1]	ω_r	rpm	5160	5480	5640	5660	5810	5810	5850	5820
Rated Current[1]	I_r	A	3.7	2.9	2.2	1.7	1.4	1.1	0.86	0.68
Rated Power[1]	P_r	W	22	22	22	22	22	22	22	22
No Load Speed	ω_{nl}	rpm	6180	6290	6290	6220	6320	6280	6310	6260
No Load Current	I_{nl}	A	0.47	0.38	0.30	0.24	0.19	0.15	0.12	0.094
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	0.043	0.042	0.042	0.041	0.041	0.040	0.040	0.040
		oz-in	6.1	6.0	5.9	5.8	5.7	5.7	5.7	5.7
Rated Speed[1]	ω_r	rpm	3560	3860	3960	4060	4170	4160	4200	4200
Rated Current[1]	I_r	A	3.9	3.1	2.4	1.9	1.5	1.2	0.94	0.74
Rated Power[1]	P_r	W	16	17	17	17	18	18	18	18
No Load Speed	ω_{nl}	rpm	4880	4990	4950	4940	5020	4960	4980	4970
No Load Current	I_{nl}	A	0.44	0.36	0.28	0.22	0.18	0.14	0.12	0.088
Motor Constant	K_M	Nm/√W	0.020	0.021	0.022	0.023	0.023	0.023	0.023	0.023
		oz-in/√W	2.9	3.0	3.1	3.2	3.2	3.3	3.3	3.3
Torque Constant	K_T	Nm/A	0.0141	0.0175	0.0222	0.0282	0.0349	0.0443	0.0557	0.0705
		oz-in/A	2.00	2.47	3.14	3.99	4.94	6.27	7.88	9.98
Voltage Constant	K_E	V/(rad/s)	0.0141	0.0175	0.0222	0.0282	0.0349	0.0443	0.0557	0.0705
		V/krpm	1.48	1.83	2.32	2.95	3.65	4.64	5.83	7.38
Terminal Resistance	R_{mt}	Ω	0.480	0.680	1.02	1.56	2.37	3.72	5.83	9.23
Inductance	L	mH	0.33	0.51	0.82	1.3	2.1	3.3	5.2	8.4
Peak Current	I_{pk}	A	20	18	15	12	10	8.1	6.6	5.2
Electrical Time Constant	τ_e	ms	0.69	0.75	0.80	0.85	0.86	0.89	0.89	0.90
Mechanical Time Constant	τ_m	ms	13	12	12	11	11	11	10	10

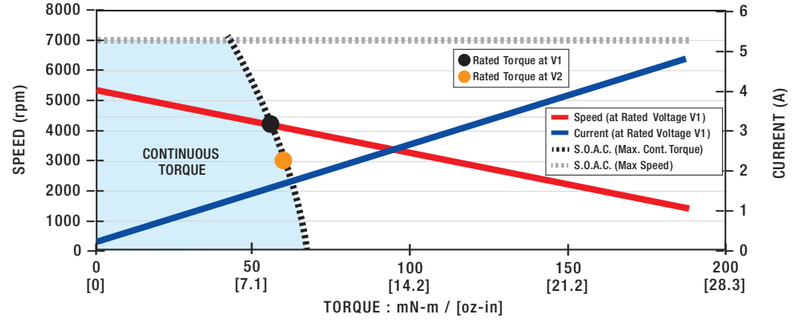
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



■ Performance Data & Graph: **DC040B–5**

Motor Data		Units							
Rated Voltage **V1**	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	0.059	0.057	0.056	0.056	0.055	0.055	0.055	0.055
		oz-in	8.3	8.1	8.0	7.9	7.8	7.8	7.8	7.8
Rated Speed[1]	ω_r	rpm	3730	3980	4090	4110	4210	4230	4250	4230
Rated Current[1]	I_r	A	4.0	3.2	2.5	1.9	1.6	1.2	0.96	0.76
Rated Power[1]	P_r	W	23	24	24	24	24	24	24	24
No Load Speed	ω_{nl}	rpm	4720	4810	4800	4750	4820	4800	4810	4780
No Load Current	I_{nl}	A	0.40	0.33	0.26	0.21	0.17	0.13	0.11	0.081
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	0.062	0.061	0.060	0.060	0.059	0.059	0.059	0.059
		oz-in	8.8	8.6	8.5	8.5	8.4	8.4	8.4	8.3
Rated Speed[1]	ω_r	rpm	2530	2770	2840	2920	3000	3000	3030	3030
Rated Current[1]	I_r	A	4.2	3.3	2.6	2.0	1.6	1.3	1.0	0.81
Rated Power[1]	P_r	W	16	18	18	18	19	19	19	19
No Load Speed	ω_{nl}	rpm	3730	3810	3770	3770	3820	3790	3800	3790
No Load Current	I_{nl}	A	0.39	0.31	0.25	0.20	0.16	0.13	0.097	0.077
Motor Constant	K_M	Nm/√W	0.026	0.027	0.028	0.029	0.029	0.029	0.030	0.030
		oz-in/√W	3.7	3.9	4.0	4.1	4.1	4.2	4.2	4.2
Torque Constant	K_T	Nm/A	0.0185	0.0229	0.0291	0.0370	0.0458	0.0582	0.0731	0.0925
		oz-in/A	2.62	3.25	4.12	5.23	6.49	8.24	10.4	13.1
Voltage Constant	K_E	V/(rad/s)	0.0185	0.0229	0.0291	0.0370	0.0458	0.0582	0.0731	0.0925
		V/krpm	1.94	2.40	3.05	3.87	4.80	6.09	7.66	9.69
Terminal Resistance	R_{mt}	Ω	0.500	0.710	1.07	1.64	2.49	3.91	6.14	9.72
Inductance	L	mH	0.43	0.66	1.1	1.7	2.6	4.2	6.7	11
Peak Current	I_{pk}	A	19	17	14	12	9.6	7.7	6.2	4.9
Electrical Time Constant	τ_e	ms	0.86	0.93	0.99	1.0	1.1	1.1	1.1	1.1
Mechanical Time Constant	τ_m	ms	10	9.5	8.9	8.5	8.4	8.2	8.1	8.0

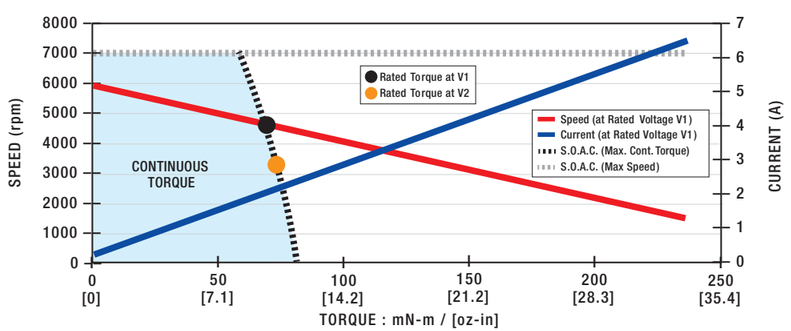
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



■ Performance Data & Graph: **DC040B–6**

Motor Data		Units							
Rated Voltage **V1**	V_r	V	12.0	15.2	19.1	24.0	30.3	38.2	48.0	48.0
Rated Torque[1] •	T_r	Nm	0.071	0.070	0.069	0.068	0.068	0.068	0.068	0.072
		oz-in	10	9.9	9.8	9.7	9.6	9.6	9.6	10
Rated Speed[1]	ω_r	rpm	4260	4540	4590	4590	4730	4730	4720	3390
Rated Current[1]	I_r	A	4.2	3.3	2.6	2.0	1.6	1.3	1.0	0.85
Rated Power[1]	P_r	W	32	33	33	33	34	34	33	26
No Load Speed	ω_{nl}	rpm	5210	5330	5290	5220	5330	5310	5270	4170
No Load Current	I_{nl}	A	0.37	0.30	0.24	0.19	0.15	0.12	0.092	0.069
Rated Voltage **V2**	V_r	V	9.55	12.0	15.2	19.1	24.0	30.3	38.2	38.2
Rated Torque[1] •	T_r	Nm	0.075	0.074	0.073	0.073	0.072	0.072	0.072	0.075
		oz-in	11	10	10	10	10	10	10	11
Rated Speed[1]	ω_r	rpm	2970	3170	3270	3290	3380	3390	3410	2360
Rated Current[1]	I_r	A	4.4	3.5	2.7	2.1	1.7	1.4	1.1	0.88
Rated Power[1]	P_r	W	23	25	25	25	26	26	26	19
No Load Speed	ω_{nl}	rpm	4130	4200	4190	4150	4210	4200	4190	3310
No Load Current	I_{nl}	A	0.35	0.28	0.22	0.18	0.14	0.11	0.087	0.066
Motor Constant	K_M	Nm/√W	0.029	0.030	0.030	0.031	0.031	0.031	0.032	0.032
		oz-in/√W	4.0	4.2	4.3	4.4	4.4	4.5	4.5	4.5
Torque Constant	K_T	Nm/A	0.0212	0.0263	0.0333	0.0424	0.0524	0.0664	0.0840	0.106
		oz-in/A	3.00	3.72	4.72	6.00	7.42	9.40	11.9	15.0
Voltage Constant	K_E	V/(rad/s)	0.0212	0.0263	0.0333	0.0424	0.0524	0.0664	0.0840	0.106
		V/krpm	2.22	2.75	3.49	4.44	5.49	6.95	8.80	11.1
Terminal Resistance	R_{mt}	Ω	0.550	0.790	1.20	1.85	2.82	4.45	6.98	11.1
Inductance	L	mH	0.49	0.75	1.2	2.0	3.0	4.9	7.7	12
Peak Current	I_{pk}	A	22	19	16	13	11	8.6	6.9	4.3
Electrical Time Constant	τ_e	ms	0.89	0.95	1.0	1.1	1.1	1.1	1.1	1.1
Mechanical Time Constant	τ_m	ms	10	9.7	9.2	8.7	8.7	8.6	8.4	8.4

The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



DC054B Series

The DC054B Series Brush Commutated DC Motor is a 54 mm diameter unit offered in 7 lengths with continuous output torques of 0.071 to 0.350 Nm.

Shown with optional assemblies.

■ **Benefits**

- Speeds up to 6,00 RPM possible
- DC bus voltage up to 80 VDC
- Eight standard windings. Special windings, sintered bronze bearings, ball bearings; copper graphite brushes, RFI suppression available
- 2 pole stator with ceramic magnets
- 7 slot skewed armature cogging reduction

■ **Optional Assemblies**

- Encoder: E30C/D, Q Type
- Gearboxes: G40A, PLG42S, G51A, PLG52
- Drives: BGE6060A, PBL4850E**

■ **Motor Characteristics**

Motor Data		Units	Series						
			DC054B-1	DC054B-2	DC054B-3	DC054B-4	DC054B-5	DC054B-6	DC054B-7
Max DC Terminal Voltage	V_T	V	48						
Max Speed (Mechanical)	ω_{MAX}	rpm	6000		5000				
Continuous Stall Torque[1]	T_{CS}	Nm	0.071	0.099	0.150	0.180	0.220	0.260	0.350
		oz-in	10	14	21	26	31	37	50
Peak Torque (Maximum)[1]	T_{pk}	Nm	0.39	0.67	1.0	1.3	1.4	1.8	2.6
		oz-in	55	95	140	180	200	260	370
Coulomb Friction Torque	T_f	Nm	0.0085	0.0085	0.011	0.011	0.014	0.014	0.016
		oz-in	1.2	1.2	1.6	1.6	2.0	2.0	2.2
Viscous Damping Factor	D	Nm/(rad/s)	1.1E-05	1.1E-05	1.2E-05	1.2E-05	1.3E-05	1.3E-05	1.7E-05
		oz-in/krpm	0.17	0.17	0.18	0.18	0.19	0.19	0.25
Thermal Time Constant	τ_{th}	min	22	24	26	29	29	34	32
Thermal Resistance	R_{th}	°C/W	9.9	9.0	8.1	7.7	7.3	6.8	5.0
Max. Winding Temperature	Θ_{MAX}	°C	155	155	155	155	155	155	155
Rotor Inertia	J_r	kg-m^2	1.1E-05	1.6E-05	2.1E-05	2.6E-05	3.1E-05	3.7E-05	4.7E-05
		oz-in-s^2	0.0016	0.0023	0.0030	0.0037	0.0044	0.0052	0.0067
Motor Weight	W_m	g	590	740	880	1000	1100	1300	1500
		oz	21	26	31	35	40	45	55

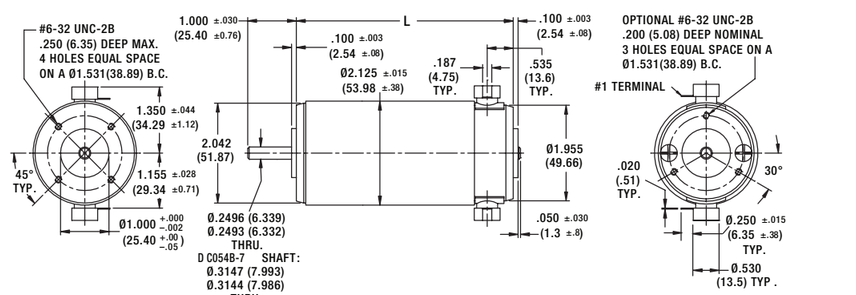
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink. **For PBL4850E to operate a brush motor, an encoder is required.

Dimensional Drawings: DC054B-1 • DC054B-2 • DC054B-3 • DC054B-4 • DC054B-5 • DC054B-6 • DC054B-7

Dimensions = Inches (mm)

L = Lengths Available

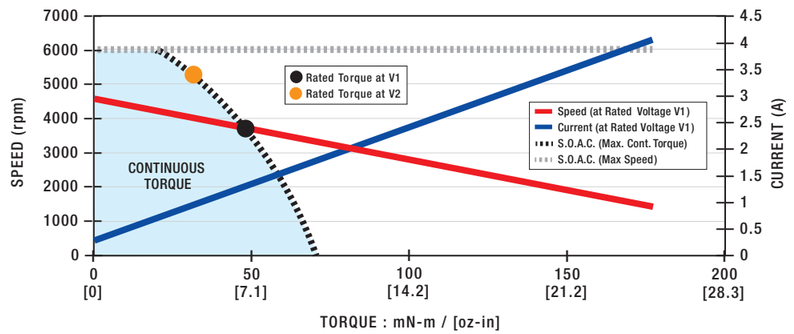
DC054B-1 = 2.953 (75.01) Max.
DC054B-2 = 3.203 (81.36) Max.
DC054B-3 = 3.703 (94.06) Max.
DC054B-4 = 4.078 (103.6) Max.
DC054B-5 = 4.453 (113.1) Max.
DC054B-6 = 4.953 (125.8) Max.
DC054B-7 = 5.703 (144.9) Max.



■ Performance Data & Graph: **DC054B–1**

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	0.049	0.048	0.048	0.048	0.048	0.047	0.048	0.048
		oz-in	6.9	6.8	6.8	6.8	6.7	6.7	6.7	6.7
Rated Speed[1]	ω_r	rpm	3680	3780	3750	3740	3720	3770	3750	3720
Rated Current[1]	I_r	A	2.7	2.1	1.7	1.3	1.0	0.83	0.65	0.51
Rated Power[1]	P_r	W	19	19	19	19	19	19	19	19
No Load Speed	ω_{nl}	rpm	4140	4200	4170	4150	4120	4170	4150	4120
No Load Current	I_{nl}	A	0.52	0.42	0.33	0.26	0.21	0.17	0.13	0.11
Rated Voltage **V2**	V_r	V	15.2	19.1	24.0	30.3	38.2	48.0	60.6	76.4
Rated Torque[1] •	T_r	Nm	0.033	0.031	0.031	0.031	0.031	0.031	0.031	0.031
		oz-in	4.7	4.4	4.4	4.4	4.4	4.3	4.3	4.3
Rated Speed[1]	ω_r	rpm	5250	5320	5280	5290	5250	5300	5300	5250
Rated Current[1]	I_r	A	2.1	1.6	1.3	0.99	0.77	0.62	0.49	0.39
Rated Power[1]	P_r	W	18	17	17	17	17	17	17	17
No Load Speed	ω_{nl}	rpm	5270	5300	5250	5260	5210	5260	5260	5210
No Load Current	I_{nl}	A	0.57	0.46	0.36	0.29	0.23	0.18	0.15	0.12
Motor Constant	K_M	Nm/√W	0.031	0.031	0.031	0.031	0.032	0.032	0.032	0.032
		oz-in/√W	4.4	4.4	4.4	4.5	4.5	4.5	4.5	4.5
Torque Constant	K_T	Nm/A	0.0263	0.0328	0.0416	0.0525	0.0668	0.0832	0.105	0.134
		oz-in/A	3.72	4.65	5.90	7.44	9.47	11.8	14.9	18.9
Voltage Constant	K_E	V/(rad/s)	0.0263	0.0328	0.0416	0.0525	0.0668	0.0832	0.105	0.134
		V/krpm	2.75	3.44	4.36	5.50	7.00	8.71	11.0	14.0
Terminal Resistance	R_{mt}	Ω	0.720	1.11	1.76	2.79	4.45	6.98	11.1	17.8
Inductance	L	mH	0.63	0.99	1.6	2.5	4.1	6.4	10	16
Peak Current	I_{pk}	A	17	14	11	8.6	6.8	5.5	4.3	3.4
Electrical Time Constant	τ_e	ms	0.88	0.89	0.90	0.91	0.92	0.91	0.92	0.92
Mechanical Time Constant	τ_m	ms	12	12	11	11	11	11	11	11

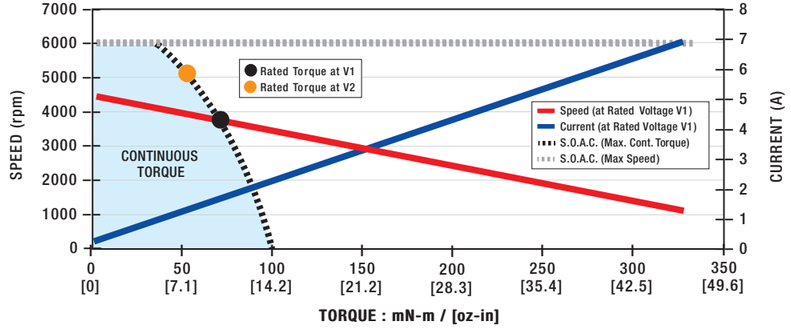
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



■ Performance Data & Graph: **DC054B–2**

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	0.072	0.071	0.070	0.070	0.070	0.070	0.070	0.070
		oz-in	10	10	9.9	9.9	9.9	9.9	9.9	9.8
Rated Speed[1]	ω_r	rpm	3720	3740	3790	3770	3780	3750	3790	3780
Rated Current[1]	I_r	A	3.5	2.7	2.2	1.7	1.4	1.1	0.86	0.67
Rated Power[1]	P_r	W	28	28	28	28	28	27	28	28
No Load Speed	ω_{nl}	rpm	4010	4010	4030	4010	4010	3970	4020	4000
No Load Current	I_{nl}	A	0.49	0.39	0.31	0.25	0.20	0.16	0.13	0.096
Rated Voltage **V2**	V_r	V	15.2	19.1	24.0	30.3	38.2	48.0	60.6	76.4
Rated Torque[1] •	T_r	Nm	0.054	0.054	0.052	0.052	0.051	0.052	0.051	0.051
		oz-in	7.7	7.6	7.4	7.3	7.3	7.3	7.2	7.2
Rated Speed[1]	ω_r	rpm	5130	5100	5160	5160	5160	5100	5190	5160
Rated Current[1]	I_r	A	2.8	2.2	1.7	1.4	1.1	0.85	0.68	0.53
Rated Power[1]	P_r	W	29	29	28	28	28	28	28	27
No Load Speed	ω_{nl}	rpm	5090	5050	5080	5070	5070	5000	5090	5050
No Load Current	I_{nl}	A	0.54	0.42	0.34	0.27	0.21	0.17	0.14	0.11
Motor Constant	K_M	Nm/√W	0.041	0.041	0.042	0.042	0.042	0.042	0.042	0.042
		oz-in/√W	5.8	5.9	5.9	5.9	5.9	6.0	6.0	6.0
Torque Constant	K_T	Nm/A	0.0275	0.0349	0.0435	0.0551	0.0695	0.0884	0.110	0.139
		oz-in/A	3.89	4.94	6.17	7.80	9.84	12.5	15.6	19.7
Voltage Constant	K_E	V/(rad/s)	0.0275	0.0349	0.0435	0.0551	0.0695	0.0884	0.110	0.139
		V/krpm	2.88	3.65	4.56	5.77	7.28	9.26	11.5	14.6
Terminal Resistance	R_{mt}	Ω	0.450	0.710	1.09	1.73	2.74	4.37	6.85	10.9
Inductance	L	mH	0.63	1.0	1.6	2.5	4.1	6.6	10	16
Peak Current	I_{pk}	A	27	21	18	14	11	8.7	7.0	5.6
Electrical Time Constant	τ_e	ms	1.4	1.4	1.4	1.5	1.5	1.5	1.5	1.5
Mechanical Time Constant	τ_m	ms	9.7	9.5	9.3	9.3	9.2	9.1	9.2	9.1

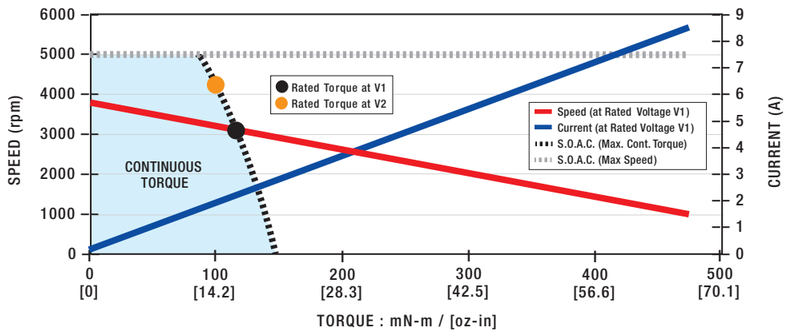
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



■ Performance Data & Graph: **DC054B–3**

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	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
		oz-in	17	17	17	17	17	16	17	17
Rated Speed[1]	ω_r	rpm	3050	3100	3090	3120	3120	3110	3090	3140
Rated Current[1]	I_r	A	4.7	3.7	2.9	2.3	1.8	1.4	1.1	0.91
Rated Power[1]	P_r	W	38	38	38	38	38	38	38	38
No Load Speed	ω_{nl}	rpm	3390	3390	3370	3390	3380	3360	3340	3390
No Load Current	I_{nl}	A	0.48	0.38	0.30	0.24	0.19	0.15	0.12	0.095
Rated Voltage **V2**	V_r	V	15.2	19.1	24.0	30.3	38.2	48.0	60.6	76.4
Rated Torque[1] •	T_r	Nm	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
		oz-in	15	15	14	14	14	14	14	14
Rated Speed[1]	ω_r	rpm	4180	4190	4170	4240	4230	4190	4190	4240
Rated Current[1]	I_r	A	4.2	3.3	2.6	2.0	1.6	1.3	1.0	0.80
Rated Power[1]	P_r	W	46	45	45	45	44	44	44	44
No Load Speed	ω_{nl}	rpm	4300	4270	4240	4280	4270	4230	4220	4280
No Load Current	I_{nl}	A	0.52	0.41	0.32	0.26	0.21	0.16	0.13	0.11
Motor Constant	K_M	Nm/√W	0.054	0.055	0.055	0.056	0.056	0.057	0.056	0.056
		oz-in/√W	7.6	7.8	7.9	7.9	7.9	8.0	8.0	7.9
Torque Constant	K_T	Nm/A	0.0327	0.0413	0.0523	0.0654	0.0828	0.105	0.133	0.165
		oz-in/A	4.62	5.86	7.41	9.26	11.7	14.9	18.8	23.4
Voltage Constant	K_E	V/(rad/s)	0.0327	0.0413	0.0523	0.0654	0.0828	0.105	0.133	0.165
		V/krpm	3.42	4.33	5.48	6.85	8.67	11.0	13.9	17.3
Terminal Resistance	R_{mt}	Ω	0.370	0.570	0.890	1.38	2.19	3.46	5.53	8.68
Inductance	L	mH	0.56	0.91	1.5	2.3	3.6	5.8	9.3	15
Peak Current	I_{pk}	A	32	27	21	17	14	11	8.7	7.0
Electrical Time Constant	τ_e	ms	1.5	1.6	1.6	1.6	1.7	1.7	1.7	1.7
Mechanical Time Constant	τ_m	ms	7.3	7.1	6.9	6.8	6.8	6.6	6.6	6.7

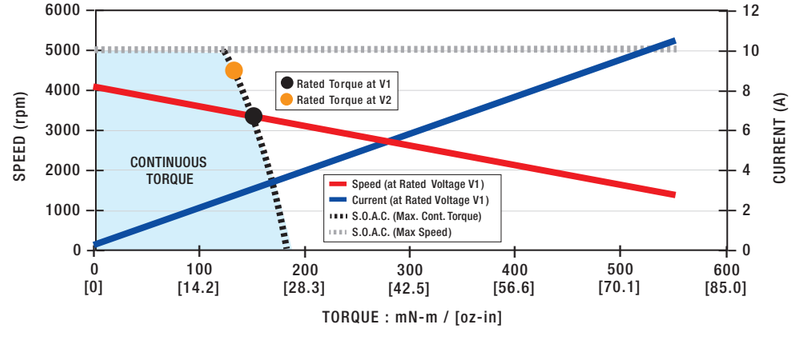
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



■ Performance Data & Graph: **DC054B–4**

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	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
		oz-in	22	22	21	21	21	21	21	21
Rated Speed[1]	ω_r	rpm	3280	3340	3350	3350	3400	3380	3380	3350
Rated Current[1]	I_r	A	6.3	5.0	3.9	3.1	2.5	1.9	1.5	1.2
Rated Power[1]	P_r	W	53	53	53	53	53	53	53	53
No Load Speed	ω_{nl}	rpm	3630	3670	3650	3630	3660	3630	3640	3600
No Load Current	I_{nl}	A	0.53	0.42	0.33	0.26	0.21	0.17	0.14	0.11
Rated Voltage **V2**	V_r	V	15.2	19.1	24.0	30.3	38.2	48.0	60.6	76.4
Rated Torque[1] •	T_r	Nm	0.14	0.14	0.14	0.13	0.13	0.13	0.13	0.13
		oz-in	19	19	19	19	19	19	19	19
Rated Speed[1]	ω_r	rpm	4470	4500	4500	4520	4570	4520	4550	4510
Rated Current[1]	I_r	A	5.7	4.6	3.6	2.8	2.2	1.7	1.4	1.1
Rated Power[1]	P_r	W	64	64	64	63	63	63	63	62
No Load Speed	ω_{nl}	rpm	4610	4620	4590	4590	4620	4570	4600	4550
No Load Current	I_{nl}	A	0.57	0.45	0.36	0.28	0.23	0.18	0.15	0.11
Motor Constant	K_M	Nm/√W	0.059	0.059	0.060	0.061	0.061	0.062	0.061	0.062
		oz-in/√W	8.3	8.4	8.5	8.6	8.6	8.7	8.7	8.7
Torque Constant	K_T	Nm/A	0.0306	0.0383	0.0484	0.0612	0.0766	0.0974	0.122	0.156
		oz-in/A	4.33	5.42	6.86	8.67	10.8	13.8	17.3	22.0
Voltage Constant	K_E	V/(rad/s)	0.0306	0.0383	0.0484	0.0612	0.0766	0.0974	0.122	0.156
		V/krpm	3.20	4.01	5.07	6.41	8.02	10.2	12.8	16.3
Terminal Resistance	R_{mt}	Ω	0.270	0.420	0.650	1.01	1.57	2.50	3.96	6.33
Inductance	L	mH	0.40	0.62	1.0	1.6	2.5	4.0	6.4	10
Peak Current	I_{pk}	A	44	36	29	24	19	15	12	9.6
Electrical Time Constant	τ_e	ms	1.5	1.5	1.5	1.6	1.6	1.6	1.6	1.6
Mechanical Time Constant	τ_m	ms	7.5	7.5	7.2	7.0	7.0	6.9	6.9	6.8

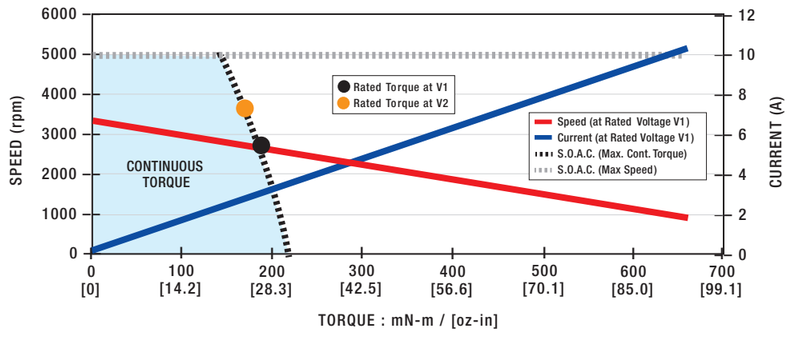
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



Performance Data & Graph: **DC054B–5**

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	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
		oz-in	27	27	26	26	26	26	26	26
Rated Speed[1]	ω_r	rpm	2620	2700	2690	2690	2730	2720	2710	2700
Rated Current[1]	I_r	A	6.4	5.0	4.0	3.1	2.5	2.0	1.6	1.2
Rated Power[1]	P_r	W	52	53	53	53	53	53	53	52
No Load Speed	ω_{nl}	rpm	2990	3040	3010	3000	3020	3010	3000	2980
No Load Current	I_{nl}	A	0.49	0.40	0.31	0.25	0.20	0.16	0.13	0.097
Rated Voltage **V2**	V_r	V	15.2	19.1	24.0	30.3	38.2	48.0	60.6	76.4
Rated Torque[1] •	T_r	Nm	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
		oz-in	25	24	24	24	24	24	24	24
Rated Speed[1]	ω_r	rpm	3590	3650	3630	3650	3690	3660	3670	3640
Rated Current[1]	I_r	A	5.9	4.7	3.7	2.9	2.3	1.8	1.4	1.1
Rated Power[1]	P_r	W	66	66	65	65	65	65	65	65
No Load Speed	ω_{nl}	rpm	3800	3820	3790	3790	3820	3790	3800	3770
No Load Current	I_{nl}	A	0.52	0.42	0.33	0.26	0.21	0.17	0.13	0.11
Motor Constant	K_M	Nm/√W	0.068	0.069	0.070	0.070	0.070	0.071	0.071	0.071
		oz-in/√W	9.6	9.8	9.9	10	10	10	10	10
Torque Constant	K_T	Nm/A	0.0371	0.0463	0.0587	0.0741	0.0927	0.117	0.148	0.188
		oz-in/A	5.25	6.56	8.32	10.5	13.1	16.6	21.0	26.6
Voltage Constant	K_E	V/(rad/s)	0.0371	0.0463	0.0587	0.0741	0.0927	0.117	0.148	0.188
		V/krpm	3.88	4.85	6.15	7.76	9.71	12.3	15.5	19.7
Terminal Resistance	R_{mt}	Ω	0.300	0.450	0.710	1.11	1.73	2.75	4.36	6.97
Inductance	L	mH	0.45	0.71	1.1	1.8	2.8	4.5	7.2	12
Peak Current	I_{pk}	A	40	34	27	22	18	14	11	8.7
Electrical Time Constant	τ_e	ms	1.5	1.6	1.6	1.6	1.6	1.7	1.7	1.7
Mechanical Time Constant	τ_m	ms	6.8	6.5	6.4	6.3	6.3	6.2	6.2	6.1

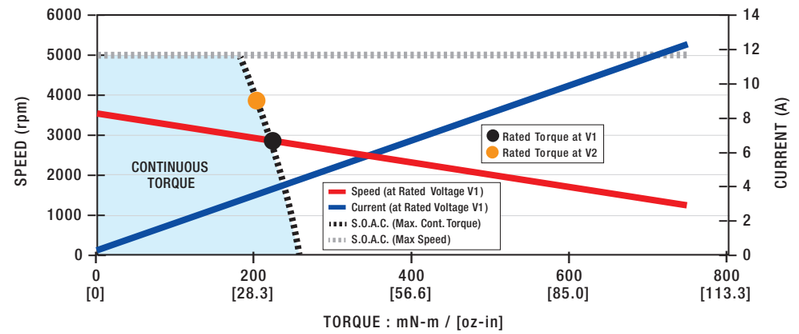
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



Performance Data & Graph: **DC054B–6**

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	0.23	0.22	0.22	0.22	0.22	0.22	0.22	0.22
		oz-in	32	32	32	31	31	31	31	31
Rated Speed[1]	ω_r	rpm	2940	2850	2880	2880	2890	2920	2900	2900
Rated Current[1]	I_r	A	8.3	6.2	4.9	3.9	3.0	2.4	1.9	1.5
Rated Power[1]	P_r	W	69	67	67	67	67	67	67	67
No Load Speed	ω_{nl}	rpm	3320	3160	3180	3150	3150	3170	3150	3150
No Load Current	I_{nl}	A	0.56	0.42	0.34	0.27	0.21	0.17	0.13	0.11
Rated Voltage **V2**	V_r	V	15.2	19.1	24.0	30.3	38.2	48.0	60.6	76.4
Rated Torque[1] •	T_r	Nm	0.21	0.21	0.21	0.20	0.20	0.20	0.20	0.20
		oz-in	30	29	29	29	29	29	29	29
Rated Speed[1]	ω_r	rpm	4000	3830	3870	3880	3880	3900	3890	3890
Rated Current[1]	I_r	A	7.8	5.8	4.6	3.6	2.8	2.3	1.8	1.4
Rated Power[1]	P_r	W	88	83	84	83	83	83	83	82
No Load Speed	ω_{nl}	rpm	4210	3980	4000	3990	3980	3990	3980	3970
No Load Current	I_{nl}	A	0.59	0.44	0.36	0.28	0.22	0.18	0.14	0.11
Motor Constant	K_M	Nm/√W	0.072	0.075	0.076	0.077	0.077	0.078	0.078	0.078
		oz-in/√W	10	11	11	11	11	11	11	11
Torque Constant	K_T	Nm/A	0.0335	0.0446	0.0557	0.0706	0.0892	0.112	0.141	0.179
		oz-in/A	4.75	6.32	7.88	9.99	12.6	15.8	20.0	25.3
Voltage Constant	K_E	V/(rad/s)	0.0335	0.0446	0.0557	0.0706	0.0892	0.112	0.141	0.179
		V/krpm	3.51	4.67	5.83	7.39	9.34	11.7	14.8	18.7
Terminal Resistance	R_{mt}	Ω	0.220	0.350	0.540	0.840	1.32	2.06	3.28	5.20
Inductance	L	mH	0.31	0.54	0.85	1.4	2.2	3.4	5.4	8.7
Peak Current	I_{pk}	A	55	43	35	29	23	19	15	12
Electrical Time Constant	τ_e	ms	1.4	1.5	1.6	1.6	1.6	1.6	1.7	1.7
Mechanical Time Constant	τ_m	ms	7.2	6.5	6.4	6.2	6.1	6.1	6.0	6.0

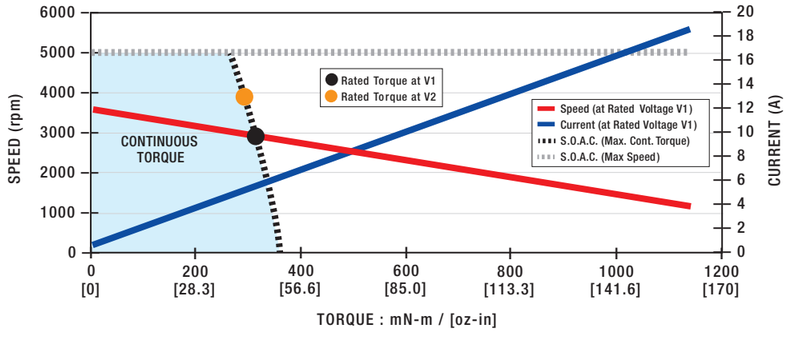
The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



■ Performance Data & Graph: **DC054B–7**

Motor Data		Units								
Rated Voltage **V1**	V_r	V	15.2	19.1	24.0	30.3	38.2	48.0	60.6	76.4
Rated Torque[1] •	T_r	Nm	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31
		oz-in	44	44	44	44	44	44	43	43
Rated Speed[1]	ω_r	rpm	3000	2850	2900	2900	2920	2930	2930	2920
Rated Current[1]	I_r	A	8.9	6.7	5.3	4.2	3.3	2.6	2.1	1.6
Rated Power[1]	P_r	W	98	93	94	94	94	94	94	94
No Load Speed	ω_{nl}	rpm	3330	3140	3160	3140	3150	3160	3150	3140
No Load Current	I_{nl}	A	0.51	0.38	0.30	0.24	0.19	0.15	0.12	0.094
Rated Voltage **V2**	V_r	V	19.1	24.0	30.3	38.2	48.0	60.6	76.4	60.6
Rated Torque[1] •	T_r	Nm	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.32
		oz-in	41	41	41	41	41	40	40	46
Rated Speed[1]	ω_r	rpm	4020	3820	3890	3880	3880	3920	3910	2150
Rated Current[1]	I_r	A	8.4	6.3	5.0	3.9	3.1	2.5	2.0	1.7
Rated Power[1]	P_r	W	120	120	120	120	120	120	120	72
No Load Speed	ω_{nl}	rpm	4190	3950	3990	3960	3960	3990	3980	2480
No Load Current	I_{nl}	A	0.55	0.40	0.33	0.26	0.20	0.16	0.13	0.089
Motor Constant	K_M	Nm/√W	0.086	0.091	0.092	0.093	0.094	0.093	0.094	0.094
		oz-in/√W	12	13	13	13	13	13	13	13
Torque Constant	K_T	Nm/A	0.0424	0.0565	0.0706	0.0897	0.113	0.141	0.179	0.226
		oz-in/A	6.00	8.01	9.99	12.7	16.0	20.0	25.3	32.0
Voltage Constant	K_E	V/(rad/s)	0.0424	0.0565	0.0706	0.0897	0.113	0.141	0.179	0.226
		V/krpm	4.44	5.92	7.39	9.39	11.8	14.8	18.7	23.7
Terminal Resistance	R_{mt}	Ω	0.240	0.390	0.590	0.930	1.46	2.29	3.64	5.78
Inductance	L	mH	0.31	0.56	0.87	1.4	2.2	3.5	5.6	8.9
Peak Current	I_{pk}	A	63	49	41	33	26	21	17	13
Electrical Time Constant	τ_e	ms	1.3	1.4	1.5	1.5	1.5	1.5	1.5	1.5
Mechanical Time Constant	τ_m	ms	6.3	5.8	5.6	5.5	5.4	5.4	5.4	5.4

The V1 and V2 ratings are intended to demonstrate the motor winding performance at different applied voltages. Use the voltage constant to specify the motor winding selection along with the motor p/n: for example, DC030C-1 (3.31 V/krpm).
[1]Recorded at maximum winding temperature at 25°C ambient and without heatsink.



Cost-Effective Spur & Planetary Gearboxes

When added to our motors, Pittman gearboxes offer greater flexibility to the designer for low duty applications. Spur gearboxes provide an offset output shaft and are offered with sleeve or ball bearings, optional lubricants for extreme temperatures, and Delrin gears for reduced noise. Shortened housings are available for select ratios.

Our planetary gearbox series provides a centered output shaft for servo and continuous duty power transmission applications. Planetary gearboxes are offered with plastic or metal gears and can be customized with sleeve or ball bearings on the input and output shafts.

NOTE: Gearboxes are configured to be integrated directly with our motors. They are not designed to be sold separately..

Gear Data	Units	G35A	G51A	G30A	G40A	PLG42S	PLG52
Diameter	mm	34.8	50.8	30.0	40.0	42.0	52.0
	in	1.37	2.00	1.18	1.57	1.65	2.05
Min Load	Nm	0.706	1.2355	2.47	24.12	3.5	1.2
	oz-in	100	175	350	2000	496	170
Max Load	Nm	1.2355	3.53	8.83	24.12	14	24
	oz-in	175	500	1250	2000	1983	3399
Min Weight (Mass)	g	66.6	167.3	110.6	255.1	270	560
	oz	2.35	5.9	3.9	9	9.52	19.8
Max Weight (Mass)	g	92.1	231.9	1559	425.2	880	880
	oz	1.2	15	5.5	15	31	31
Min Length	mm	28.4	35.6	32.64	35.6	47.6	50
	in	1.12	1.4	1.285	1.4	1.87	1.97
Max Length	mm	29.6	38.8	50.17	58.4	71.2	80.5
	in	1.164	1.528	1.975	2.3	2.8	3.17
Stages Range		1-2	1-2	1-4	1-4	1-3	1-3
Reduction Range		6.3:1-1803.6:1	5.9:1-4732.5:1	4:1-1296:1	4:1-864:1	4:1-512:1	4.5:1-400:1

G35A Series

The G35A is an economical 35 mm offset spur gearbox suitable for lower torque applications. The wide range of sintered steel gears combinations especially complement brushed motors when speed reduction in required. Also available in high torque or wide faced gears for increased output loads.

Compatible Motors: DC026C, DC030B, DC030C, EC033A

Benefits

- Maximum Load torque up to 0.7 Nm in the standard model
- Load increased to 1.13 Nm in the high torque and up to 1.24 in wide face versions
- Standard bronze bearings

Optional Assembly

- Special lubrication for extreme conditions
- Ball bearings for high radial loads
- Delrin gears for noise reduction

Characteristics

Gear Data	Units	G35A 6.3:1	G35A 9.9:1	G35A 19.5:1	G35A 30.9:1	G35A 60.5:1	G35A 95.9:1
Maximum Load	Nm	0.706					
	oz-in	100					
Weight (Mass)	g	66.6	70.6	70.6	74.3	74.3	78.2
	oz	2.4	2.5	2.5	2.6	2.6	2.76
Length (L)	mm	24.6					
	inches	0.97					
Stages	–	1					
Ratio	–	6.3:1	9.9:1	19.5:1	30.9:1	60.5:1	95.9:1
Efficiency	–	0.81	0.73	0.73	0.66	0.66	0.57
Shaft Rotation	–	CW	CCW	CCW	CW	CW	CCW

Gear Data	Units	G35A 187.7:1	G35A 297.5:1	G35A 581.8:1	G35A 922.3:1	G35A 1803.6:1
Maximum Load	Nm	0.706				
	oz-in	100				
Weight (Mass)	g	78.2	88.2	88.2	92.1	92.1
	oz	2.76	3.11	3.11	3.25	3.25
Length (L)	mm	24.6	29.6	29.6	29.6	29.6
	inches	0.968	1.164	1.164	1.164	1.164
Stages	–	1	2	2	2	2
Ratio	–	187.7:1	297.5:1	581.8:1	922.3:1	1803.6:1
Efficiency	–	0.59	0.53	0.53	0.48	0.48
Shaft Rotation	–	CCW	CW	CW	CCW	CCW

High Torque Characteristics

Gear Data	Units	G35A-HT 9.9:1	G35A-HT 19.5:1	G35A-HT 30.9:1	G35A-HT 60.5:1	G35A-HT 95.9:1
Maximum Load	Nm	1.130				
	oz-in	160				
Weight (Mass)	g	70.6	70.6	74.3	74.3	78.2
	oz	2.49	2.49	2.62	2.62	2.76
Length (L)	mm	24.6 mm / 0.968 inches				
Stages	–	1				
Ratio	–	9.9:1	19.5:1	30.9:1	60.5:1	95.9:1
Efficiency	–	0.73	0.73	0.66	0.66	0.59
Shaft Rotation	–	CCW	CCW	CW	CW	CCW

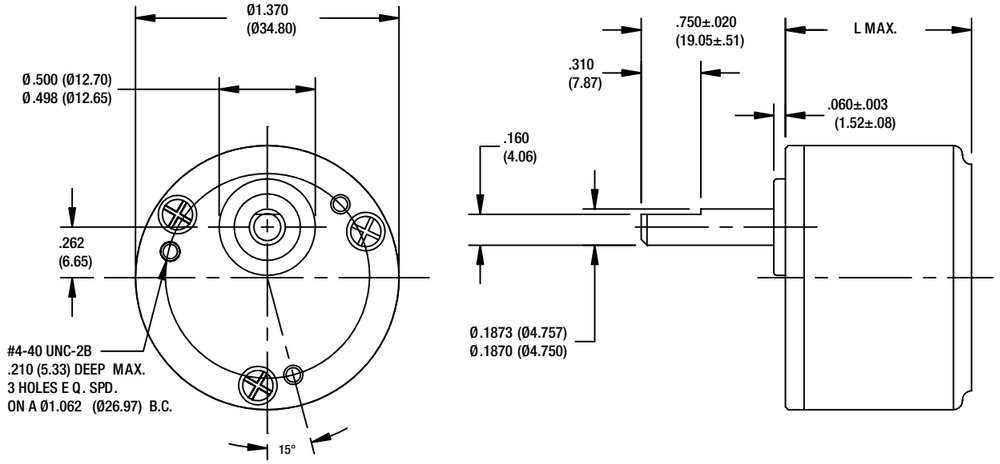
Gear Data	Units	G35A-HT 187.7:1	G35A-HT 297.5:1	G35A-HT 581.8:1	G35A-HT 922.3:1	G35A-HT 1803.6:1
Maximum Load	Nm	1.130				
	oz-in	160				
Weight (Mass)	g	78.2	88.2	88.2	92.1	92.1
	oz	2.76	3.11	3.11	3.25	3.25
Length (L)	mm	24.6	29.6	29.6	29.6	29.6
	inches	0.968	1.164	1.164	1.164	1.164
Stages	–	1	2	2	2	2
Ratio	–	187.7:1	297.5:1	581.8:1	922.3:1	1803.6:1
Efficiency	–	0.59	0.53	0.53	0.48	0.48
Shaft Rotation	–	CCW	CW	CW	CCW	CCW

Wide Face Characteristics

Gear Data	Units	G35A-WF 9.9:1	G35A-WF 19.5:1	G35A-WF 30.9:1	G35A-WF 60.5:1	G35A-WF 95.9:1
Maximum Load	Nm	1.236				
	oz-in	175				
Weight (Mass)	g	70.6	70.6	74.3	74.3	78.2
	oz	2.49	2.49	2.62	2.62	2.76
Length (L)	mm	24.6 mm / 0.968 inches				
Stages	–	1				
Ratio	–	9.9:1	19.5:1	30.9:1	60.5:1	95.9:1
Efficiency	–	0.73	0.73	0.66	0.66	0.59
Shaft Rotation	–	CCW	CCW	CW	CW	CCW

Gear Data	Units	G35A-WF 187.7:1	G35A-WF 297.5:1	G35A-WF 581.8:1	G35A-WF 922.3:1	G35A-WF 1803.6:1
Maximum Load	Nm	1.236				
	oz-in	175				
Weight (Mass)	g	78.2	88.2	88.2	92.1	92.1
	oz	2.76	3.11	3.11	3.25	3.25
Length (L)	mm	24.6	29.6	29.6	29.6	29.6
	inches	0.968	1.164	1.164	1.164	1.164
Stages	–	1	2	2	2	2
Ratio	–	187.7:1	297.5:1	581.8:1	922.3:1	1803.6:1
Efficiency	–	0.59	0.53	0.53	0.48	0.48
Shaft Rotation	–	CCW	CW	CW	CCW	CCW

Dimensional Drawings



Combined Length (L_{GM})

Compatible Motors / Length (mm) Standard, High Torque, Wide Face		
Stage	1	2
DC026C-1	74.4	79.2
DC026C-2	77.6	82.4
DC026C-3	83.9	88.7

Compatible Motors / Length (mm) Standard, High Torque, Wide Face		
Stage	1	2
DC030C-1	82.4	87.2
DC030C-2	94.4	99.2
DC030C-3	106.4	111.2

Compatible Motors / Length (mm) Standard, High Torque, Wide Face		
Stage	1	2
DC030B-1	75.6	80.4
DC030B-2	78.8	83.6
DC030B-3	85.2	90.0

Compatible Motors / Length (mm) Standard, High Torque, Wide Face		
Stage	1	2
EC033A-1	63.5	68.5
EC033A-2	75.4	80.4
EC033A-3	88.1	93.1

G51A Series

The G51A is an economical 51 mm offset spur gearbox suitable for lower torque applications. The wide range of sintered steel gears combinations especially complement brushed motors when speed reduction in required. Also available in high torque or wide faced gears for increased output loads.

Compatible Motors: DC030C, DC040B, DC054B, EC057C

Benefits

- Maximum Load torque up to 1.24 Nm in the standard model
- Load increased to 2.12 Nm in the high torque and up to 3.53 in wide face versions
- Standard bronze bearings

Optional Assembly

- Special lubrication for extreme conditior
- Ball bearings for high radial loads
- Delrin gears for noise reduction

Characteristics

Gear Data	Units	G51A 5.9:1	G51A 11.5:1	G51A 19.7:1	G51A 38.3:1	G51A 65.5:1	G51A 127.8:1
Maximum Load	Nm	1.236					
	oz-in	175					
Weight (Mass)	g	167.3	167.3	177.5	177.5	187.7	187.7
	oz	5.9	2.9	6.26	6.26	6.62	6.62
Length (L)	mm	34.9					
	inches	1.373					
Stages	–	1					
Ratio	–	5.9:1	11.5:1	19.7:1	38.3:1	65.5:1	127.8:1
Efficiency	–	0.81	0.81	0.73	0.73	0.66	0.66
Shaft Rotation	–	CW	CW	CCW	CCW	CW	CW

Gear Data	Units	G51A 218.4:1	G51A 425.9:1	G51A 728.1:1	G51A 1419.8:1	G51A 2426.9:1	G51A 4732.5:1
Maximum Load	Nm	1.236					
	oz-in	175					
Weight (Mass)	g	197.9	197.9	208.1	208.1	231.9	231.9
	oz	6.98	6.98	7.34	7.34	8.18	8.18
Length (L)	mm	34.9	34.9	34.9	34.9	38.8	38.8
	inches	1.373	1.373	1.373	1.373	1.528	1.528
Stages	–	1	1	1	1	2	2
Ratio	–	218.4:1	425.9:1	728.1:1	1419.8:1	2426.9:1	4732.5:1
Efficiency	–	0.59	0.59	0.53	0.53	0.48	0.48
Shaft Rotation	–	CCW	CCW	CW	CW	CCW	CCW

High Torque Characteristics

Gear Data	Units	G51A-HT 5.9:1	G51A-HT 11.5:1	G51A-HT 19.7:1	G51A-HT 38.3:1	G51A-HT 65.5:1	G51A-HT 127.8:1
Maximum Load	Nm	2.118					
	oz-in	300					
Weight (Mass)	g	167.30	167.3	177.5	177.5	187.7	187.7
	oz	5.90	5.9	6.26	6.26	6.62	6.62
Length (L)	mm	34.9 mm / 1.373 inches					
Stages	–	1					
Ratio	–	5.9:1	11.5:1	19.7:1	38.3:1	65.5:1	127.8:1
Efficiency	–	0.81	0.81	0.73	0.73	0.66	0.66
Shaft Rotation	–	CW	CW	CCW	CCW	CW	CW

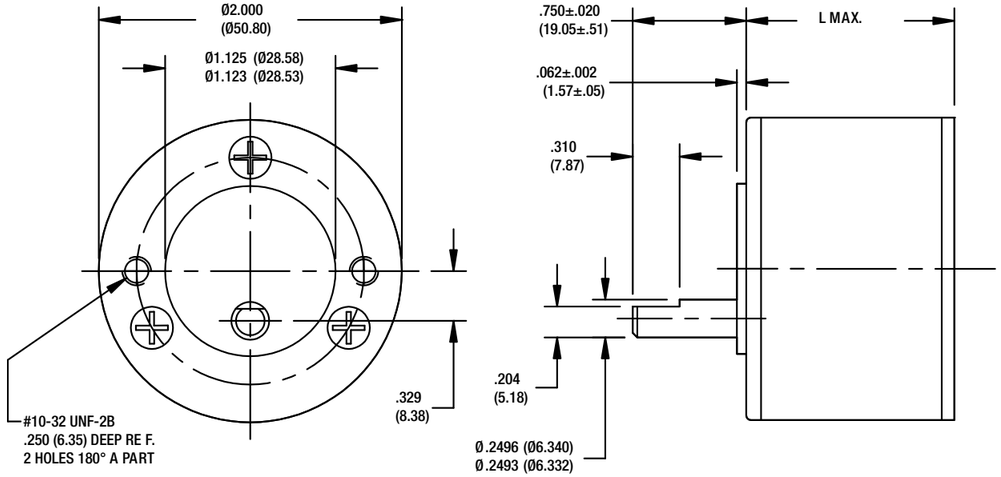
Gear Data	Units	G51A-HT 218.4:1	G51A-HT 425.9:1	G51A-HT 728.1:1	G51A-HT 1419.8:1	G51A-HT 2426.9:1	G51A-HT 4732.5:1
Maximum Load	Nm	2.118					
	oz-in	300					
Weight (Mass)	g	197.9	197.9	208.1	208.1	231.9	231.9
	oz	6.98	6.98	7.34	7.34	8.18	8.18
Length (L)	mm	34.9	34.9	34.9	34.9	38.8	38.8
	inches	1.373	1.373	1.373	1.373	1.528	1.528
Stages	–	1	1	1	1	2	2
Ratio	–	218.4:1	425.9:1	728.1:1	1419.8:1	2426.9:1	4732.5:1
Efficiency	–	0.59	0.59	0.53	0.53	0.48	0.48
Shaft Rotation	–	CCW	CCW	CW	CW	CCW	CCW

Wide Face Characteristics

Gear Data	Units	G51A-WF 19.7:1	G51A-WF 38.3:1	G51A-WF 65.5:1	G51A-WF 127.8:1
Maximum Load	Nm	3.53			
	oz-in	500			
Weight (Mass)	g	184.8	184.8	195	195
	oz	6.52	6.52	6.88	6.88
Length (L)	mm	34.9 mm / 1.373 inches			
Stages	–	1			
Ratio	–	19.7:1	38.3:1	65.5:1	127.8:1
Efficiency	–	0.73	0.73	0.66	0.66
Shaft Rotation	–	CCW	CCW	CW	CW

Gear Data	Units	G51A-WF 218.4:1	G51A-WF 425.9:1	G51A-WF 728.1:1	G51A-WF 1419.8:1
Maximum Load	Nm	3.53			
	oz-in	500			
Weight (Mass)	g	205.3	205.3	229.1	229.1
	oz	7.24	7.24	8.08	8.08
Length (L)	mm	34.9	34.9	38.8	38.8
	inches	1.373	1.373	1.53	1.53
Stages	–	1	1	2	2
Ratio	–	218.4:1	425.9:1	728.1:1	1419.8:1
Efficiency	–	0.59	0.59	0.53	0.53
Shaft Rotation	–	CCW	CCW	CW	CW

Dimensional Drawings



Combined Length (L_{GM})

Compatible Motors / Length (mm) Standard, High Torque, Wide Face		
Stage	1	2
DC030C-1	88.6	92.5
DC030C-2	100.6	104.5
DC030C-3	112.6	116.5

Compatible Motors / Length (mm) Standard, High Torque, Wide Face		
Stage	1	2
DC054B-1	109.9	113.8
DC054B-2	116.3	120.2
DC054B-3	129.0	132.9
DC054B-4	138.5	142.4
DC054B-5	148.0	151.9
DC054B-6	160.7	164.6
DC054B-7	179.8	183.7

Compatible Motors / Length (mm) Standard, High Torque, Wide Face		
Stage	1	2
DC040B-1	78.8	82.7
DC040B-2	88.3	92.2
DC040B-3	93.4	97.3
DC040B-4	101.0	104.9
DC040B-5	109.9	113.8
DC040B-6	117.5	121.4

Compatible Motors / Length (mm) Standard, High Torque, Wide Face		
Stage	1	2
EC057C-1	73.8	77.7
EC057C-2	85.2	89.1
EC057C-3	97.9	101.8
EC057C-4	110.6	114.5

G30A Series

The G30A is a 30mm planetary gearbox suitable for servo applications where DC Servo brush or BLDC motor technology is specified. The G30A provides maximum efficiency, minimum backlash, has a smaller mechanical footprint and is available with round and square mounting endbell configurations.

Compatible Motors: DC026C, DC030B, DC030C, DC040B, EC033A, EC044A, ES030A

Benefits

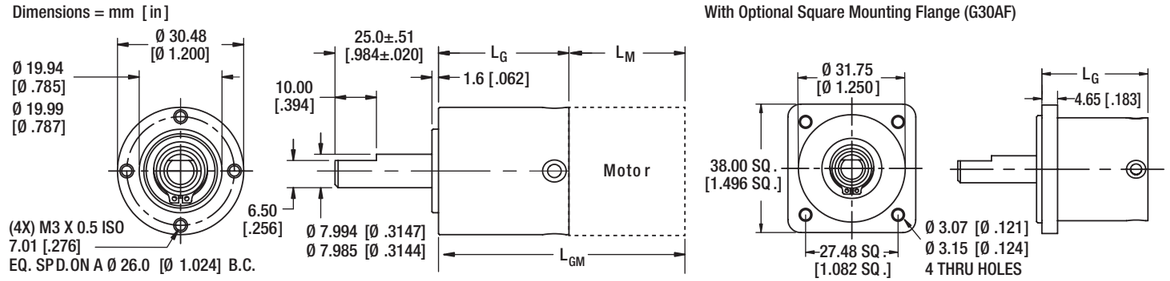
- Sintered metal gears for high torque capacity
- Sintered metal output bearing

Characteristics

Gear Data	Units	G30A 4:1	G30A 6:1	G30A 16:1	G30A 24:1	G30A 36:1	G30A 64:1	G30A 96:1
Maximum Load	Nm	2.47	2.47	3.53	3.53	3.53	6.5	6.5
	oz-in	350	350	500	500	500	920	920
Weight (Mass)	g	110.6	110.6	124.7	124.7	124.7	138.9	138.9
	oz	3.9	3.9	4.4	4.4	4.4	4.9	4.9
Length (L)	mm	32.64	32.64	38.48	38.48	38.48	44.32	44.32
	inches	1.285	1.285	1.515	1.515	1.515	1.745	1.745
Stages	–	1	1	2	2	2	3	3
Ratio	–	4/1	6/1	16/1	24/1	36/1	64/1	96/1
Efficiency	–	0.90	0.90	0.81	0.81	0.81	0.73	0.73
Shaft Rotation	–	CW						

Gear Data	Units	G30A 144:1	G30A 216:1	G30A 256:1	G30A 384:1	G30A 576:1	G30A 864:1	G30A 1296:1
Maximum Load	Nm	6.5	6.5	8.83	8.83	8.83	8.83	8.83
	oz-in	920	920	1250	1250	1250	1250	1250
Weight (Mass)	g	138.9	138.9	155.9	155.9	155.9	155.9	155.9
	oz	4.9	4.9	5.5	5.5	5.5	5.5	5.5
Length (L)	mm	44.32	44.32	50.17	50.17	50.17	50.17	50.17
	inches	1.745	1.745	1.975	1.975	1.975	1.975	1.975
Stages	–	3	3	4	4	4	4	4
Ratio	–	144/1	216/1	256/1	384/1	576/1	864/1	1296/1
Efficiency	–	0.73	0.73	0.66	0.66	0.66	0.66	0.66
Shaft Rotation	–	CW						

Dimensional Drawings



Combined Length (L_{GM})

Compatible Motors / Length (mm)				
Stage	1	2	3	4
DC026C-1	78.3	84.2	90.0	95.8
DC026C-2	81.5	87.3	93.2	99.0
DC026C-3	87.8	93.7	99.5	105.4

Compatible Motors / Length (mm)				
Stage	1	2	3	4
EC033A-1	70.7	76.6	82.4	88.3
EC033A-2	83.4	89.3	95.1	101.0
EC033A-3	96.1	102.0	107.8	113.7

Stage	1	2	3	4
DC030B-1	85.2	91.1	96.9	102.7
DC030B-2	88.4	94.2	100.1	105.9
DC030B-3	94.7	100.6	106.4	112.3

Stage	1	2	3	4
EC044A-1	84.9	90.8	96.6	102.5
EC044A-2	97.6	103.5	109.3	115.2
EC044A-3	110.3	116.2	122.0	127.9

Stage	1	2	3	4
DC030C-1	86.3	92.2	98.0	103.9
DC030C-2	98.3	104.1	110.0	115.8
DC030C-3	110.3	116.1	122.0	127.8

Stage	1	2	3	4
ES030A-1	91.6	97.5	103.3	109.2
ES030A-2	101.8	107.6	113.5	119.3

Stage	1	2	3	4
DC040B-1	79.1	84.9	90.8	96.6
DC040B-2	88.6	94.4	100.3	106.1
DC040B-3	93.7	99.5	105.4	111.2
DC040B-4	101.3	107.1	113.0	118.8
DC040B-5	110.2	116.0	121.9	127.7
DC040B-6	117.8	123.6	129.5	135.3

G40A Series

The G40A is a 40 mm planetary gearbox suitable for servo applications where DC Servo brush or BLDC motor technology is specified.

Compatible Motors: DC040B, DC054B, EC057C, ES030A, ES040A, ES050A

Benefits

- Sintered metal gears for high torque capacity
- Sintered metal output bearing

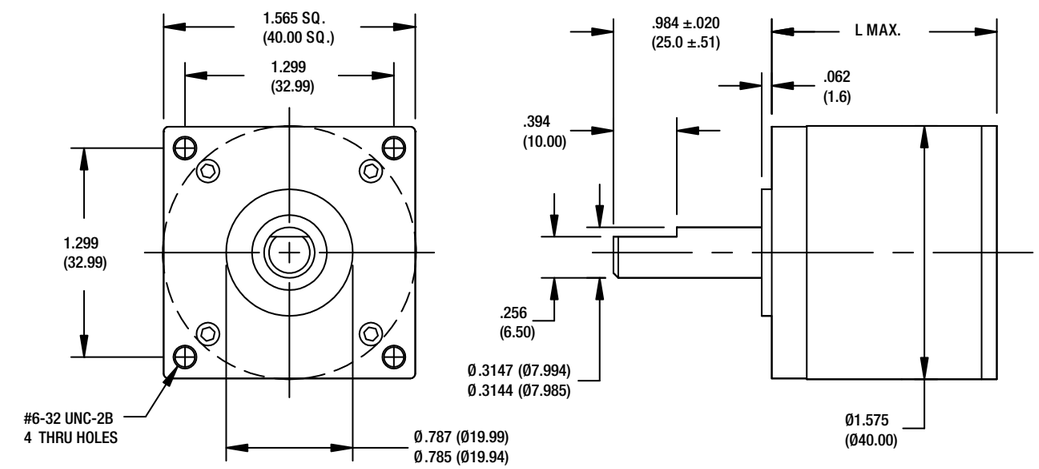
Optional Assemblies

- Alternate mounting and shaft configurations
- Output ball bearing for high radial loads
- Additional ratios

Characteristics

Gear Data	Units	G40A 4:1	G40A 17.3:1	G40A 24:1	G40A 75.1:1	G40A 144:1	G40A 325.5:1	G40A 864:1
Maximum Load	Nm	14.12						
	oz-in	2000						
Weight (Mass)	g	255.1	311.8	311.8	368.5	368.5	425.2	425.2
	oz	9	11	11	13	13	15	15
Length (L)	mm	35.6	43.2	43.2	50.8	50.8	58.4	58.4
	inches	1.400	1.700	1.700	2.000	2.000	2.300	2.300
Stages	–							
Ratio	–	4/1	52/3	24/1	676/9	144/1	8768/27	864/1
Efficiency	–	0.90	0.81	0.81	0.73	0.73	0.65	0.65
Shaft Rotation	–	CW						

Dimensional Drawings



Combined Length (L_{GM})

Compatible Motors / Length (mm)				
Stage	1	2	3	4
DC040B-1	82.03	89.63	97.23	104.83
DC040B-2	91.56	99.16	106.76	114.36
DC040B-3	96.64	104.24	111.84	119.44
DC040B-4	104.26	111.86	119.46	127.06
DC040B-5	111.15	118.75	126.35	133.95
DC040B-6	120.77	128.37	135.97	143.57

Stage	1	2	3	4
DC054B-1	110.61	118.21	125.81	133.41
DC054B-2	116.96	124.56	132.16	139.76
DC054B-3	129.66	137.26	144.86	152.46
DC054B-4	139.20	146.80	154.40	162.00
DC054B-5	148.70	156.30	163.90	171.50
DC054B-6	161.40	169.00	176.60	184.20
DC054B-7	180.50	188.10	195.70	203.30

Compatible Motors / Length (mm)				
Stage	1	2	3	4
EC057C-1	74.5	82.1	89.7	97.3
EC057C-2	85.9	93.5	101.1	108.7
EC057C-3	98.6	106.2	113.8	121.4
EC057C-4	111.3	118.9	126.5	134.1

Stage	1	2	3	4
ES030A-1	94.58	102.18	109.78	117.38
ES030A-2	104.71	112.34	119.94	127.54

Stage	1	2	3	4
ES040A-1	103.04	110.64	118.24	125.84
ES040A-2	110.66	118.26	125.86	133.46
ES040A-3	118.28	125.88	133.48	141.08

Stage	1	2	3	4
ES050A-1	115.99	123.59	131.19	138.79
ES050A-2	128.69	136.29	143.89	151.49
ES050A-3	141.39	148.99	156.59	164.19

PLG42S Series

The PLG42S is a 42 mm planetary gearbox suitable for servo applications where DC Servo brush or BLDC motor technology is specified. The PLG42S provides excellent efficiency in a compact and industry compatible output configuration.

Compatible Motors: DC040B, DC054B, EC042B, EC044A, EC057C, ES040A, ES050A

Benefits

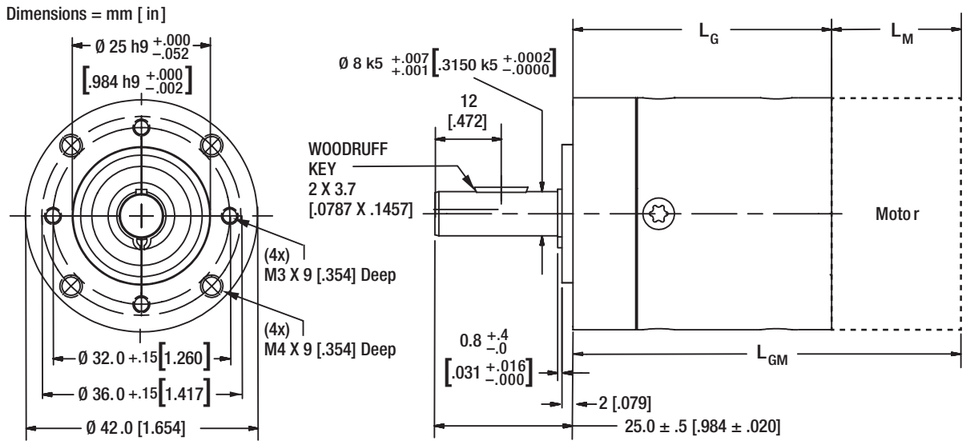
- Maximum Load torque up to 14 Nm
- All steel gearing for high torque capacity
- Dual ball bearings on output shaft
- High efficiency

Characteristics

Gear Data	Units	PLG42S 4:1	PLG42S 8:1	PLG42S 16:1	PLG42S 25:1	PLG42S 32:1	PLG42S 50:1	PLG42S 64:1
Maximum Load	Nm	3.5	3.5	6	6	6	6	6
	oz-in	496	496	850	850	850	850	850
Weight (Mass)	g	270	270	370	370	370	370	370
	oz	9.52	9.52	13.1	13.1	13.1	13.1	13.1
Length (L)	mm	47.6	47.6	59.4	59.4	59.4	59.4	59.4
	inches	1.87	1.87	2.34	2.34	2.34	2.34	2.34
Stages	–	1	1	2	2	2	2	2
Ratio	–	4/1	8/1	16/1	25/1	32/1	50/1	64/1
Efficiency	–	0.90	0.90	0.81	0.81	0.81	0.73	0.73
Shaft Rotation	–	CW						

Gear Data	Units	PLG42S 100:1	PLG42S 128:1	PLG42S 156:1	PLG42S 200:1	PLG42S 200:1	PLG42S 200:1	PLG42S 200:1
Maximum Load	Nm	14						
	oz-in	1983						
Weight (Mass)	g	880						
	oz	31.0						
Length (L)	mm	71.2						
	inches	2.80						
Stages	–	3						
Ratio	–	100/1	128/1	156.25/1	200/1	256/1	400/1	512/1
Efficiency	–	0.73						
Shaft Rotation	–	CW						

Dimensional Drawings



Combined Length (L_{GM})

Compatible Motors / Length (mm)			
Stage	1	2	3
DC040B-1	94.0	105.8	117.6
DC040B-2	103.6	115.4	127.2
DC040B-3	108.6	120.4	132.2
DC040B-4	116.3	128.1	139.9
DC040B-5	123.2	135.0	146.8
DC040B-6	132.8	144.6	156.4

Stage	1	2	3
DC054B-1	122.6	134.4	146.2
DC054B-2	129.0	140.8	152.6
DC054B-3	141.7	153.5	165.3
DC054B-4	151.2	163.0	174.8
DC054B-5	160.7	172.5	184.3
DC054B-6	173.4	185.2	197.0
DC054B-7	192.5	204.3	216.1

Stage	1	2	3
EC042B-1	99.8	111.6	123.4
EC042B-2	119.8	131.6	143.4
EC042B-3	139.8	151.6	163.4

Compatible Motors / Length (mm)			
Stage	1	2	3
EC044A-1	100.3	112.1	123.9
EC044A-2	113.0	124.8	136.6
EC044A-3	125.7	137.5	149.3

Stage	1	2	3
EC057C-1	86.5	98.3	110.1
EC057C-2	97.9	109.7	121.5
EC057C-3	110.6	122.4	134.2
EC057C-4	123.3	135.1	146.9

Stage	1	2	3
ES040A-1	115.0	126.8	138.6
ES040A-2	122.7	134.5	146.3
ES040A-3	130.3	142.1	153.9

Stage	1	2	3
ES050A-1	128.0	139.8	151.6
ES050A-2	140.7	152.5	164.3
ES050A-3	153.4	165.2	177.0

PLG52 Series

The PLG52 is a 52 mm planetary gearbox suitable for servo applications where DC Servo brush or BLDC motor technology is specified. The PLG52 provides excellent efficiency in a compact and industry compatible output configuration.

Compatible Motors: DC054B, EC042B, EC044A, EC057B, EC057C, ES040A, ES050A

Benefits

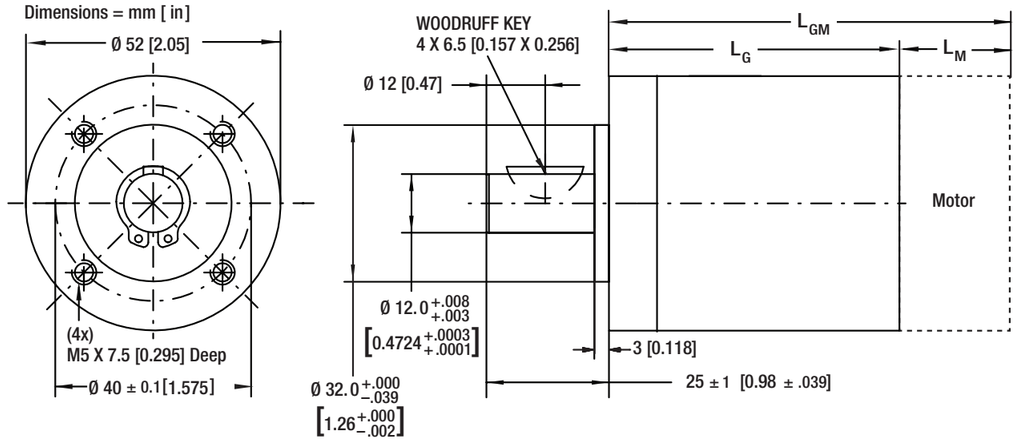
- Maximum Load torque up to 24 Nm
- All steel gearing for high torque capacity
- Dual ball bearings on output shaft to withstand high loads
- High efficiency

Characteristics

Gear Data	Units	PLG52 4.5:1	PLG52 6.25:1	PLG52 15:1	PLG52 20.2:1	PLG52 28.1:1	PLG52 36:1	PLG52 50:1
Maximum Load	Nm	1.2	1.2	8	8	8	8	8
	oz-in	170	170	1133	1133	1133	1133	1133
Weight (Mass)	g	560	560	720	720	720	720	720
	oz	19.8	19.8	25.4	25.4	25.4	25.4	25.4
Length (L)	mm	50.0	50.0	65.5	65.5	65.5	65.5	65.5
	inches	1.97	1.97	2.58	2.58	2.58	2.58	2.58
Stages	–	1	1	2	2	2	2	2
Ratio	–	4.5/1	6.25/1	15/1	20.25/1	28.12/1	36/1	50/1
Efficiency	–	0.90	0.90	0.81	0.81	0.81	0.81	0.81
Shaft Rotation	–	CW						

Gear Data	Units	PLG52 91.1:1	PLG52 126.5:1	PLG52 162:1	PLG52 225:1	PLG52 288:1	PLG52 400:1
Maximum Load	Nm	24					
	oz-in	3399					
Weight (Mass)	g	880					
	oz	31.0					
Length (L)	mm	80.5					
	inches	3.17					
Stages	–	3					
Ratio	–	91.12/1	126.5/1	162/1	225/1	288/1	400/1
Efficiency	–	0.73					
Shaft Rotation	–	CW					

Dimensional Drawings



Combined Length (L_{GM})

Compatible Motors / Length (mm)			
Stage	1	2	3
DC054B-1	127.0	142.5	157.5
DC054B-2	133.4	148.9	163.9
DC054B-3	146.1	161.6	176.6
DC054B-4	155.6	171.1	186.1
DC054B-5	165.1	180.6	195.6
DC054B-6	177.8	193.3	208.3
DC054B-7	196.9	212.4	227.4

Stage	1	2	3
EC042B-1	104.5	120.0	135.0
EC042B-2	124.5	140.0	155.0
EC042B-3	144.5	160.0	175.0

Stage	1	2	3
EC044A-1	102.3	117.8	132.8
EC044A-2	115.0	130.5	145.5
EC044A-3	127.7	143.2	158.2

Compatible Motors / Length (mm)			
Stage	1	2	3
EC057B-1	130.0	145.5	160.5
EC057B-2	125.1	140.6	155.6
EC057B-3	169.9	185.4	200.4
EC057B-4	190.0	205.5	220.5

Stage	1	2	3
EC057C-1	88.2	103.7	118.7
EC057C-2	99.6	115.1	130.1
EC057C-3	112.3	127.8	142.8
EC057C-4	125.0	140.5	155.5

Stage	1	2	3
ES040A-1	117.4	132.9	147.9
ES040A-2	125.1	140.6	155.6
ES040A-3	132.7	148.2	163.2

Stage	1	2	3
ES050A-1	131.8	147.3	162.3
ES050A-2	144.5	160.0	175.0
ES050A-3	157.2	172.7	187.7

E21 Series

Compact and low profile, E21 Series Encoders provide parameters of reflective optical technology, transmissive optical technology with and without differential line drivers, and multitude of line counts.

Modular and bearing construction options. Bearing style encoders provide significant performance upgrades in demanding applications. Factory installed and tested for quick start-up.

Benefits

- Resolutions from 120 to 8192
- TTL Quadrature output
- Frequency response to 960 kHz
- Low power consumption, 5V @ 60mA max.
- Locking connector

Optional Assemblies

- Index pulse
- Differential line driver with complementary outputs
- Detachable cable with optional axial orientation
- Through hole cover

Characteristics

Encoder Data		Units	Part No. E21C	Part No. E21D
Available Resolutions			120,125,128, 250, 256, 300, 360	500, 512, 1000, 1024, 1600, 2000, 2048, 3200, 4000, 4096, 6400, 8000, 8192
Output			2-Channel Quadrature	2-Channel Quadrature with Index
Output Interface			TTL Compatible	TTL Compatible
Supply Voltage	V_{CC}	VDC	4.5 to 5.5	4.5 to 5.5
Supply Current	I_{CC}	mA	20 max.	60 max.
High Level Output Voltage	V_{OR}	V	2.4 min.	2.4 min.
High Level Output Voltage	V_{OL}	V	0.4 max.	0.4 max.
Max. Operating Frequency	f_{MAX}	kHz	40 (120-360 CPR)	55 (500-512 CPR)
				110 (1000-1024 CPR)
				220 (2000-2048 CPR)
				240 (1600 CPR)
				480 (3200-4096 CPR)
				960 (6400-8192 CPR)
Operating Temperature	Θ_{MAX}	°C	-20 to +85	-20 to +85
Encoder Weight (Mass)	W_E	oz	0.11	0.11
		g	3.1	3.1

Connection Chart

PIN	E21C[1]	E21D[1]	Optional Cable
1	Channel A		Blue/White
2	Vcc		White
3	Encoder Ground		Black
4	Channel A		Blue
5	Channel B		Violet/White
6	Channel B		Violet
7	—	Index I	Green/White
8	—	Index I	Green

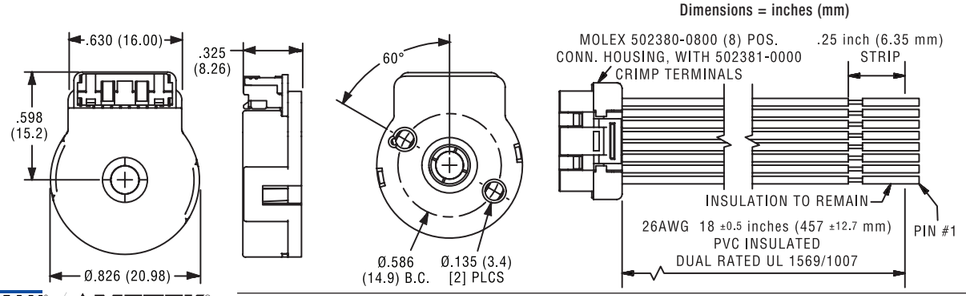
[1]Optional differential LD connections shown in gray.

Optional Cables

Cable for Encoder	Part No.	Description
E21C	84-90-3	2-Channel, Radial, Differential Outputs
E21D	84-90-1	3-Channel, Radial, Differential Outputs

Dimensional Drawings: E21C • E21D

Dimensions = inches (mm)



E30 Series

Compact and low profile, E30 Series Encoders provide parameters of reflective optical technology, transmissive optical technology with and without differential line drivers, and multitude of line counts.

Modular and bearing construction options. Bearing style encoders provide significant performance upgrades in demanding applications. Factory installed and tested for quick start-up.

Benefits

- Resolutions from 200 to 2048
- TTL Quadrature output
- Frequency response to 220 kHz
- Low power consumption, 5V @ 20mA max.
- Locking connector

Optional Assemblies

- Index pulse
- Differential line driver with complementary outputs
- Detachable cable with optional axial orientation

Characteristics

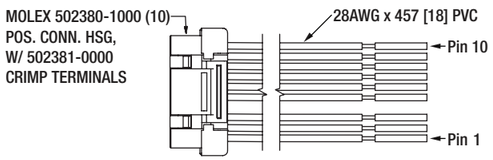
Encoder Data		Units	Part No. E30C	Part No. E30D
Available Resolutions			200, 250, 256, 400, 500	500, 512, 1000, 1024, 2000, 2048
Output			2-Channel Quadrature	3-Channel Quadrature with Index
Output Interface			TTL Compatible	TTL Compatible
Supply Voltage	V_{CC}	VDC	4.5 to 5.5	4.5 to 5.5
Supply Current	I_{CC}	mA	20 max.	20 max.
High Level Output Voltage	V_{OR}	V	2.4 min.	2.4 min.
High Level Output Voltage	V_{OL}	V	0.4 max.	0.4 max.
Max. Operating Frequency	f_{MAX}	kHz	40 (200-500 CPR)	55 (500-512 CPR)
				110 (1000-1024 CPR)
				220 (2000-2048 CPR)
Operating Temperature	Θ_{MAX}	°C	-20 to +85	-20 to +85
Encoder Weight (Mass)	W_E	oz	0.2	0.2
		g	5.6	5.6

Connection Chart / Radial Connector

PIN	COLOR	E30C	E30D	E30C[1]	E30D[1]
1	Black	Encoder Ground			
2	White	Vcc			
3	Green/White	–		–	Index I
4	–	–		–	
5	Blue/White	–		Channel A	
6	Blue	Channel A		Channel A	
7	Violet	Channel B		Channel B	
8	Violet/White	–		Channel B	
9	Green	–	Index I	–	Index I
10	Green/Yellow	Motor Ground		Motor Ground	

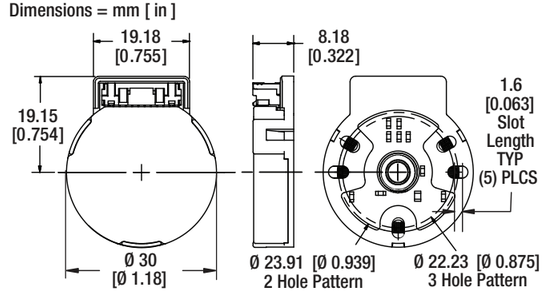
[1]Optional differential LD connections shown in gray.

Optional Cable Assembly (82-1108-1)

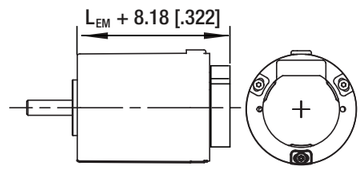


Dimensional Drawings: E30C • E30D

Dimensions = mm [in]



Typical Motor with Encoder



Scale = 50%

Q / V Series

Compact and low profile, Q / V Series Encoders provide parameters of reflective optical technology, transmissive optical technology with and without differential line drivers, and multitude of line counts.

Modular and bearing construction options. Bearing style encoders provide significant performance upgrades in demanding applications. Factory installed and tested for quick start-up.

Encoders are identical except for the mounting spring is configured for different motors.

Benefits

- Resolutions from 1000 to 5000
- Differential line driver is standard
- Frequency response to 500 kHz
- Rugged mechanical design
- Good for higher temperature
- Shielded cable

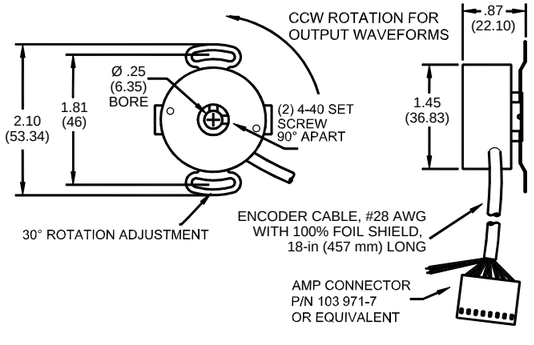
Characteristics

Encoder Data		Units	Part No. Q1 V1	Q3 V3	Q5 V5	Q8 V8
Available Resolutions			1000	2000	2500	5000
Output			2-Channel Quadrature with Index			
Output Interface			TTL Compatible			
Supply Voltage	V_{CC}	VDC	4.75 to 5.25			
Supply Current	I_{CC}	mA	125 max.			
Max. Operating Frequency	f_{MAX}	kHz	500			
Operating Temperature	Θ_{MAX}	°C	-20 to +100			

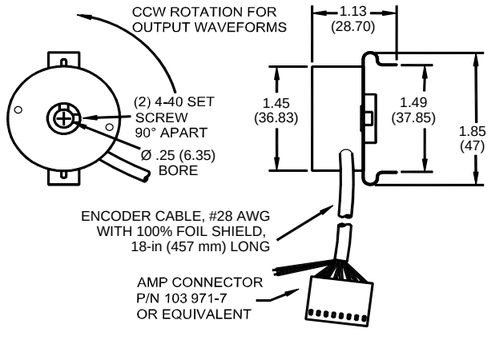
Connection Chart

PIN	Color	Q / V Series
1	Red	Vcc
2	Black	Encoder Ground
3	Brown	Channel A
4	White	Channel A
5	Blue	Channel B
6	Green	Channel B
7	Orange	Index I
8	Yellow	Index I
N/C	Black / White	Case Ground
N/C	Drain Wire	Cable Shield

Dimensional Drawings: Q Series



Dimensional Drawings: V Series



C / D Series

Compact and low profile, C / D Series Encoders provide parameters of reflective optical technology, transmissive optical technology with and without differential line drivers, and multitude of line counts.

Modular and bearing construction options. Bearing style encoders provide significant performance upgrades in demanding applications. Factory installed and tested for quick start-up.

Encoders are identical to the Q / V Series except for the additional motor commutation signals.

Benefits

- Resolutions from 1000 to 5000
- Differential line driver is standard
- Frequency response to 500 kHz
- Rugged mechanical design
- 1° (mech) accuracy of commutators
- IP 40 Rated

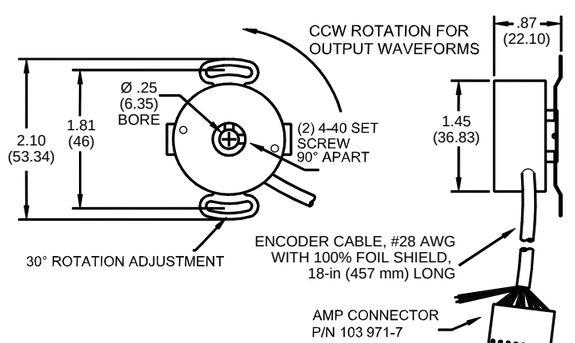
Connection Chart

COLOR	C / D Series
Red	VDC (+5V)
Black	Common
Brown	Output A
White	Output A'
Blue	Output B
Green	Output B'
Orange	Output Z
Yellow	Output Z'
Violet	Output U
Gray	Output U'
White / Brown	Output V
White / Red	Output V'
White / Orange	Output W
White / Yellow	Output W'
Back / White	Case Ground
Drain Wire	Cable Shield

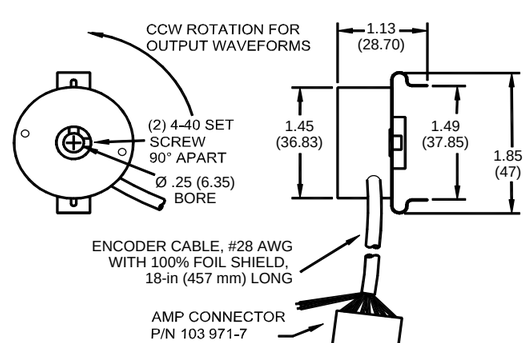
Characteristics

Encoder Data		Units	Part No. C1 D1	CA	C3 D3	CC	C5 D5	CE	C8 D8	CH
Available Resolutions			1000		2000		2500		5000	
Motor Poles			4	8	4	8	4	8	4	8
Output			2-Channel Quadrature with Index							
Output Interface			TTL Compatible							
Supply Voltage	V_{CC}	VDC	4.75 to 5.25							
Supply Current	I_{CC}	mA	200 max.							
Max. Operating Frequency	f_{MAX}	kHz	500							
Operating Temperature	Θ_{MAX}	°C	-20 to +100							

Dimensional Drawings: C Series



Dimensional Drawings: D Series



BGE3004A Non-Programmable Drive

The BGE3004A brushless motor drive is a non-programmable single-quadrant speed controller. Speeds can be controlled between 500 – 5000 rpm with a 0-10VDC reference voltage.

Benefits

- Speed control with PWM
- Integral potentiometer for speed setting
- Protection against under-voltage, reverse polarity, stall protection and over temperature
- Compact Size: 2.72 in x 1.58 in x .71 in (69 mm x 40 mm x 18 mm)

Wire Assignment

Color	Signal
Black	GND
Red	+Vc
Brown	N-analog
Yellow	cw / ccw
Green	Start / Stop

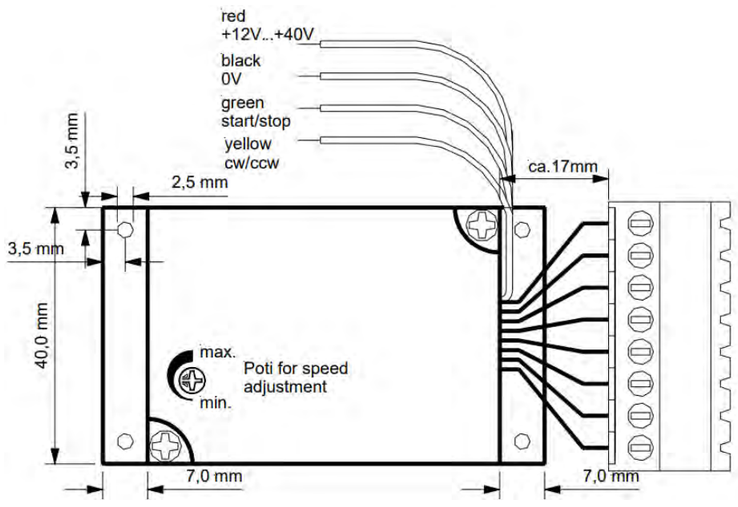
Wire Assignment

PIN	Color	BGE3004A
1	Black	Motor Phase B
2	Red	Motor Phase A
3	Brown	Motor Phase C
4	Black	GND (Hall)
5	Yellow	H1
6	Green	H2
7	Brown	H3
8	Red	+12 Vc (Hall)

Characteristics

Data	Units	Part No. BGE3004A
Voltage Range	V DC	12 to 40
Continuous Output Current	Amps	4 A rms
Communication (A)		0 to 10 V analog
Peak Output Current	Amps	34 A
Speed Range	RPM	500 - 5000
Torque Mode		No
Speed Mode		Yes
Position Mode		No
Size	mm	69 x 40 x 18

Dimensional Drawing: BGE3004A

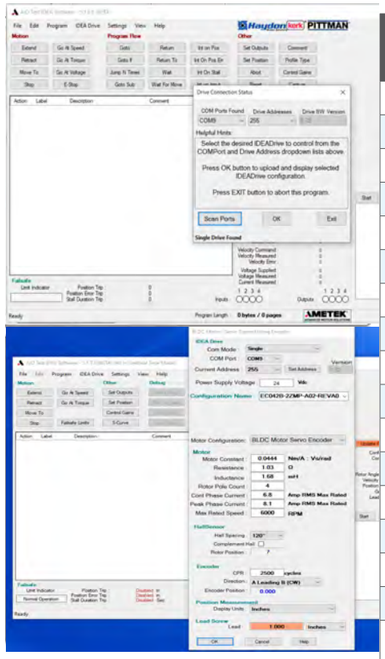


PBL/ABL/CBL 6035E & 6070E Programmable Drives

The PBL Series Drive brushless motor controller is a servo drive and fully programmable control unit which will simplify your machine building experience. An intuitive patent-pending Graphic User Interface (GUI) removes the complexity of programming while support tools simplify its quick integration.

Benefits

- RoHS Compliant
- Stand-alone drive unit
- Programming done through Graphic User Interface (GUI)
- Automatic population of motor and drive parameters
- Programmable motion program language ideal for autonomous complex precise repetitive motion sequences
- I/O control ideal for simple non repetitive motion (PDE / PWM / Joystick, etc.)
- Programmable Speed / Current / Accel-Decel / Current Boost / Interrupts / I/O
- Sinusoidal commutation
- USB, RS485, or CANopen Communications Protocol
- Movement profile plotter
- Interactive program debug feature
- Optional motor cables
- Streaming commands ideal for networked coordinated motion control



Simple to use drive software with on-screen button and easy to understand programming guides.

Characteristics

Data	Part No. P/A/CBL6035E NEW	P/A/CBL6070E
Drive Input Voltage Range	12 to 60 V DC	
Maximum Drive Current/Phase	3.5 A rms / 7 A peak	7.0 A rms / 10.0 A rms peak
Current Boost Capability	Optional 30% current boost capability during ramping	
Communications	USB / RS485 / CAN	
Commutation	Dependent on motor type	
Motor	Stepper / BLDC / BDC	
Hall Cell Spacing	60° / 120°	
Encoder (min. requirement)	5V, Incremental encoder with 128 CPR min	
Digital I/O Voltage Range	5 to 24 V DC	
Digital Inputs	4	
Digital Input Max Current	8 mA (each)	
Digital Outputs	4 at heat sink	
Digital Output Max Current	200 mA at heat sink	
Maximum Temperature	70° measured at heat sink	
Program Storage Size	85 Kbytes	
Program Storage Memory Type	Flash	
Maximum Number Stored Programs	85 - referenced by 10 character program names	
Position Counter Range	64 bit	
Ramping	Trapezoidal or S-Curve	
Interrupt Sources	4 Inputs (rising, falling or both edges). Internal Position Counter (when reaching a programmed position)	

I/O Connector TABLE "A"

PIN	Description	Note
1	GROUND I/O SUPPLY	5 - 24 VDC
2	+ I/O SUPPLY	5 - 24 VDC
3	INPUT 1	
4	INPUT 2	
5	INPUT 3	
6	INPUT 4	
7	OUTPUT 1	
8	OUTPUT 2	
9	OUTPUT 3	
10	OUTPUT 4	

I/O Connector TABLE "B"

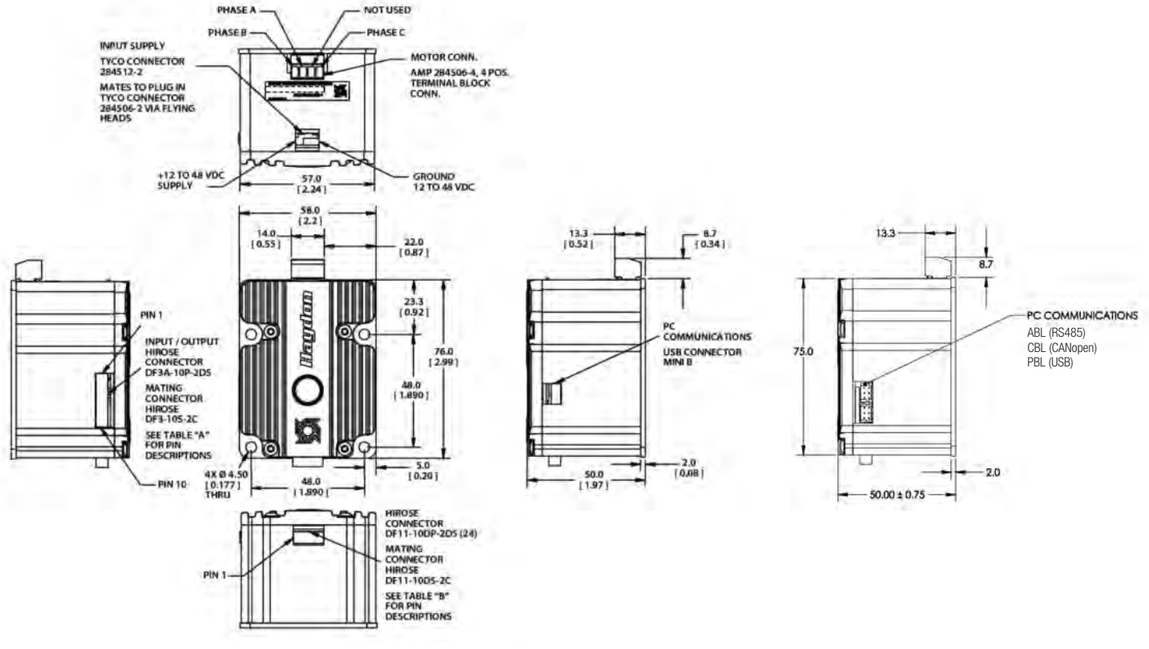
PIN	Description	Note
1	"A" CHANNEL	
2	HALL CELL A	
3	"B" CHANNEL	
4	HALL CELL B	
5	INDEX / ENCODER	
6	HALL CELL C	
7	+5 V DC	
8	+5 V DC	
9	GROUND	
10	GROUND	

Optional Accessories

Description	Part No.
USB Cable (A to Mini B), 2 meters	56-1346
Power Cable, 1 meter	56-1348
I/O Cable, 1 meter	56-1352
Motor Connector Screw Terminal	56-1570
Hall Cell & Encoder Cable	56-1856

Description	Part No.
RS485 Cable, 0.25 meter (9.84)	56-1536-1
RS485 Cable, 1 meter (39.37)	56-1536-4
USB to CANopen Cable, 2 meters (78.74) Use with 52-870 or 52-879	84-152
USB to RS485 Converter	UTR4852 52-879
USB to CANopen Converter	52-870

Dimensional Drawing



BGE6005A Programmable Drive

The compact BGE6005A brushless motor drive is 4-quadrant servo controller designed for operation in speed, torque and position modes. Drive can operate as a stand-alone motion controller or as a slave in a CANopen network.

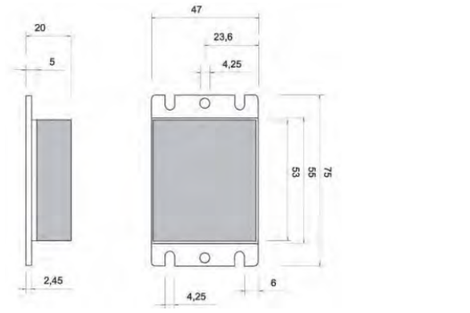
Benefits

- 4-quadrant servo controller
- Fully programmable control unit
- CANopen interface (DSP402)
- Protection against over-voltage, under-voltage and over-temperature
- Also capable of driving brushed type DC motors

Characteristics

Data	Units	Part No. BGE6005A
Voltage Range	V DC	10 to 60 V DC
Continuous Output Current	A	2 A rms
Peak Output Current	A	5.0 A rm
Digital Inputs		3
Digital Outputs		1
Analog Inputs		1 (0 to +10 V)
Communication		CANopen
Torque Mode		Yes
Speed Mode		Yes
Position Mode		Yes
Size	mm	75 x 47 x 20

Dimensional Drawing: BGE6005A



X2 Connector - Power Supply and Motor

PIN	Symbol	Description
1	+UP	Supply voltage power
2	GND	Earth for power supply
3	Ma	Motor connection A
4	Mb	Motor connection B
5	Mc	Motor connection C

X1 Connector - Sensors, Encoders and I/O

PIN	Symbol	Description
1	+UE	Supply voltage electronic
2	GND	Earth for electronic
3	AIN0	Analog input 0
4	DIN0	Digital input 0
5	DIN1	Digital input 1
6	DIN2/DOUT0	Digital input 2/ Digital output 0
7	CAN_HI	CAN high
8	CAN_LO	CAN low
9	H1	Hallsensor signal 1
10	H2	Hallsensor signal 2
11	H3/Inx	Hallsensor signal 3/Inc. Encoder Index
12	A	Inc. encoder track A
13	NB	Inc. encoder track B/
14	+UH	Power supply Hall/Enc+5V
15	GND	Earth for Hall/Encoder

BGE6015A Programmable Drive

The BGE6015A brushless motor drive is a larger 4-quadrant servo controller designed for operation in speed, torque and position modes. Drive can operate as a stand-alone motion controller or as a slave in a CANopen network.

Benefits

- 4-quadrant servo controller
- Fully programmable control unit
- CANopen interface (DSP402)
- Protection against over-voltage, under-voltage and over-temperature
- Also capable of driving brushed type DC motors

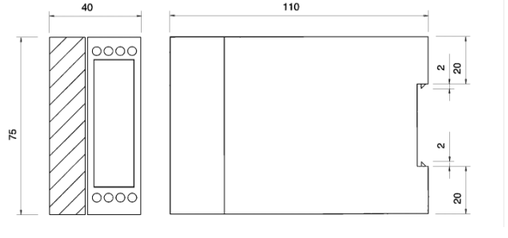
Characteristics

Data	Units	Part No.
		BGE6015A
Voltage Range	V DC	10 to 60 V DC
Continuous Output Current	A	9 A rms
Peak Output Current	A	15.0 A rm
Digital Inputs		5
Digital Outputs		1
Analog Inputs		1 (0 to +10 V)
Communication		CANopen
Torque Mode		Yes
Speed Mode		Yes
Position Mode		Yes
Size	mm	75 x 110 x 40

X1 Connector - Power Supply and Motor

PIN	Symbol	Description
1	PE	Earth
2	+UP	Power supply
3	GND	Ground 0V for power supply
4	Ma	Motor connection A
5	Mb	Motor connection B
6	Mc	Motor connection C

Dimensional Drawing: BGE6015A



X2 Connector - Hall Sensors and Encoders

PIN	Symbol	Description
1	H1	Hall sensor 1
2	H2	Hall sensor 2
3	H3	Hall sensor 3
4	A	Inc. encoder channel A
5	B	Inc. encoder channel B
6	INX	Inc. encoder index channel
7	+UH	Power supply hall/encoder +5V
8	/H1	Hall sensor 1 inverted
9	/H2	Hall sensor 2 inverted
10	/H3	Hall sensor 3 inverted
11	/A	Inc. encoder channel A inverted
12	/B	Inc. encoder channel B inverted
13	/INX	inc. encoder index channel inverted
14	GND	Ground 0V for power supply hall/encoder

X3 Connector - Analog and Digital I/O

PIN	Symbol	Description
1	+UE	Power supply electronic
2	+AIN 0/DIN4	+ Analog input/ digital input 4
3	DIN 0	Digital input 0
4	DIN 1	Digital input 1
5	DIN 2	Digital input 2
6	DIN 3	Digital input 3
7	GND	Ground 0V for power supply electronic
8	-AIN 0	Analog input
9	DOUT 0	Digital output 0
10	CAN_HI	CAN high
11	CAN_LO	CAN low
12	CAN_GND	CAN ground

BGE6050A Programmable Drive

The BGE6060A brushless motor drive is the largest Pittman 4-quadrant servo controllers designed for operation in speed, torque and position modes. Operates as a stand-alone motion controller or as a slave in a CANopen network.

Benefits

- 4-quadrant servo controller
- Fully programmable control unit
- CANopen interface (DSP402)
- Protection against over-voltage, under-voltage and over-temperature
- Also capable of driving brushed type DC motors

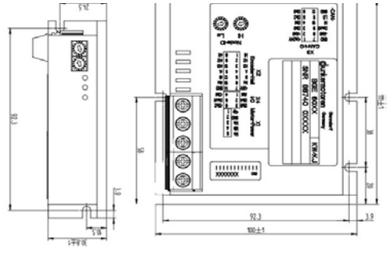
Characteristics

Data	Units	Part No.
		BGE6060A
Voltage Range	V DC	10 to 60 V DC
Continuous Output Current	A	60 A rms
Peak Output Current	A	160.0 A rm
Digital Inputs		6
Digital Outputs		2
Analog Inputs		2 (0 to +10 V)
Communication		CANopen
Torque Mode		Yes
Speed Mode		Yes
Position Mode		Yes
Size	mm	100 x 111 x 30

X1 Connector - Power Supply and Motor

PIN	Symbol	Description
1	PE	Earth
2	+UP	Power supply
3	GND	Ground 0V for power supply
4	Ma	Motor connection A
5	Mb	Motor connection B
6	Mc	Motor connection C

Dimensional Drawing: BGE6060A



X2 Connector - Hall Sensors and Encoders

PIN	Symbol	Description
1	H1	Hall sensor 1
2	H2	Hall sensor 2
3	H3	Hall sensor 3
4	A	Inc. encoder channel A
5	B	Inc. encoder channel B
6	INX	Inc. encoder index channel
7	+UH	Power supply hall/encoder +5V
8	/H1	Hall sensor 1 inverted
9	/H2	Hall sensor 2 inverted
10	/H3	Hall sensor 3 inverted
11	/A	Inc. encoder channel A inverted
12	/B	Inc. encoder channel B inverted
13	/INX	inc. encoder index channel inverted
14	GND	Ground 0V for power supply hall/encoder

X3 Connector - Analog and Digital I/O

PIN	Symbol	Description
1	+UE	"Power supply electronic "
2	+AIN 0/DIN4	+ Analog input/ digital input 4
3	DIN 0	Digital input 0
4	DIN 1	Digital input 1
5	DIN 2	Digital input 2
6	DIN 3	Digital input 3
7	res.	Reserved pin
8	-AIN 0	Analog input
9	DOUT 0	Digital output 0
10	CAN_HI	CAN high
11	CAN_LO	CAN low
12	CAN_GND	CAN ground

B30A Brake

The B30A power off, fail safe holding brake is designed to hold a load in position when power is removed from the motor and brake. This compact 30 mm brake has a holding torque of 0.113 Nm (1 lb-in). The B30A is typically mounted to the motor rear.

Benefits

- Holding torque of 0.113 Nm
- Factory-set precision air gap
- Low profile mounting plate
- Rigid molded friction disk
- High rate compression spring
- MIL-W-22759/34D lead wires
- Hexagonal drive nut with set screw

Characteristics

Data	Units	12V	19V	24V	30V
Applied Voltage	V DC	12	19	24	30
Static Holding Torque	lb-in	1			
	Nm	0.113			
Current	Amps	0.33	0.21	0.17	0.13
Resistance	Ohms	36	90	134	219
Hub and Disc Inertia	oz-in-sec^2	4.0 x 10-5			
	kg-m^2	2.82E-2			
Weight	oz	2.2			
	g	62.4			

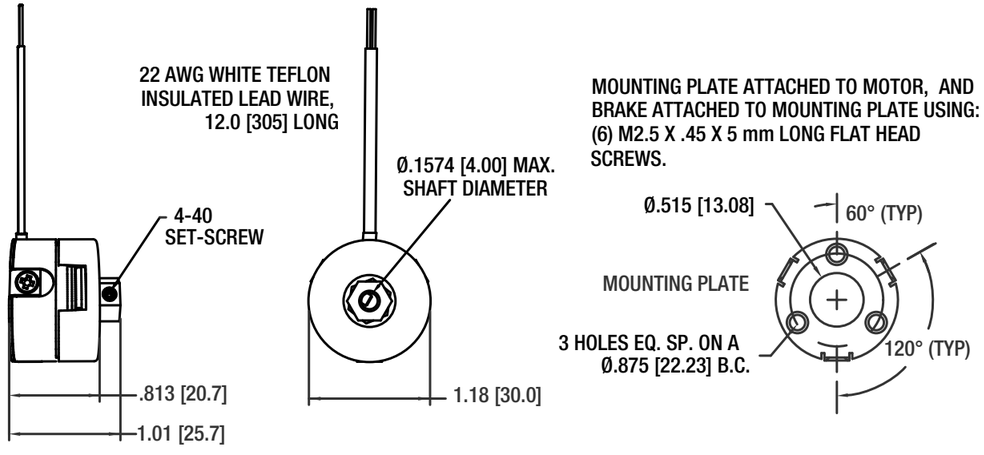
Compatible DC Motor

- DC026C
- DC030B
- DC030C
- DC040B
- ES030A
- ES040A

Mounting

- 3 holes eq. space on a 0.875 in (22.23 mm) BC

Dimensional Drawings: B30A



B49A Brake

Designed to hold a load in position when power is removed from the motor and brake, the B49A power off, fail safe holding brake is typically mounted to the motor rear. This brake has a holding torque of 3 lb-in.

Benefits

- Factory-set precision air gap
- Rigid molded friction disk
- High rate compression spring
- Square drive nut with set screw

Compatible DC Motors

- DC040B
- DC054B
- EC057C
- ES040A
- ES050A

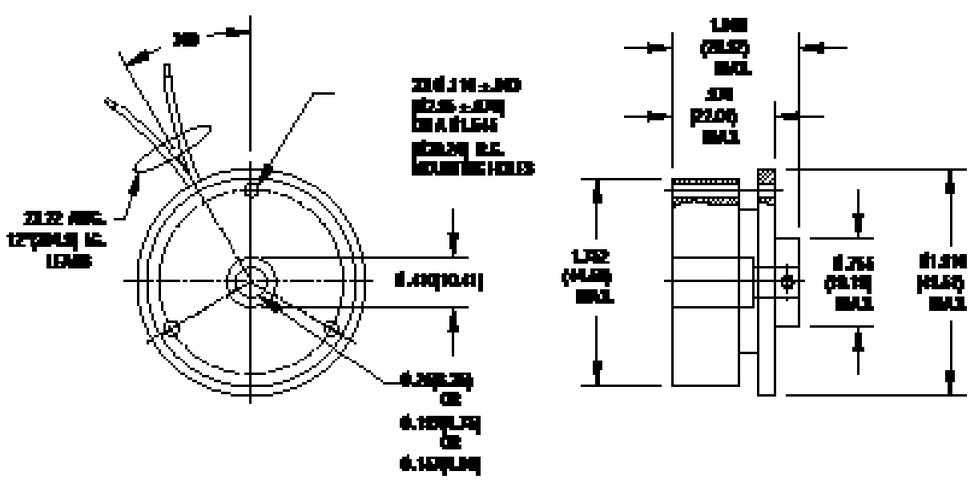
Mounting

- 3 holes eq. space on a 0.875 in (22.23 mm) BC

Characteristics

Data	Units	12V	24V
Applied Voltage	V DC	12	24
Static Holding Torque	lb-in	3	
	Nm	0.339	
Current	Amps	0.353	0.190
Resistance	Ohms	34	132
Hub and Disc Inertia	oz-in-sec^2	7.0 x 10-5	
	kg-m^2	4.94E-2	
Weight	oz	3	
	g	85	

Dimensional Drawings: B49A



Customization

Our dedicated team at Haydon Kerk Pittman takes great pride in designing and developing customized solutions for your application needs. Our design and development engineers engage with you to develop ideal solutions using the Haydon Kerk Pittman building blocks. Then, we apply our manufacturing capabilities to produce higher-level solutions that reduce your system design complexity, cost, and lead time.

Our advanced engineering and application expertise enable us to quickly design and manufacture customized motion solutions. We specialize in single- and multi-axis systems using our own, off-the-shelf or custom-designed components to your specifications. With our vertically integrated in-house manufacturing, we produce high-precision motion systems at all levels of sophistication, with integration that provides necessary mechanical, electrical and software features.

- **Motor Options**
- Encoders
- Drives
- Custom Cables
- Gearboxes
- Brakes
- Integration of Haydon Kerk rails, lead screw and nut assemblies
- Integration of customer-defined parts

No matter the complexity, our team is committed to partnering with you to help achieve your objectives. Email us today at info.pittman-motors@ametek.com to discuss your customization needs or visit www.haydonkerkpittman.com to explore the possibilities.

Distributors for Australia & New Zealand

MOTION TECHNOLOGIES PTY LIMITED

24/22-30 Northumberland Road
Caringbah NSW 2229 Australia
Phone: (02) 9524 4782

sales@motiontech.com.au
www.motiontech.com.au

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AMETEK Haydon Kerk Pittman
1500 Meriden Road
Waterbury, CT 06705 USA
www.**haydonkerkpittman**.com

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