

Brushless Motors

p. 3 - 12

LE Series Instrument Grade Brushless Motors



IP 42 Rated Construction

Applications: Medical Equipment, Business Machines, Packaging, Textile, Semiconductor, Pumps, Vending

	Torque	Speed	Diameter	
LE39222	10 - 30 oz-in	0 - 9000 rpm	1.75 in	p. 3
LE45022	20 - 70 oz-in	0 - 6000 rpm	2.25 in	p. 4
LE45222	50 - 110 oz-in	0 - 6000 rpm	2.25 in	p. 5
LE54222	7 - 16 lb-in	0 - 6000 rpm	3.25 in	p. 6
LE56222	5 - 18 lb-in	0 - 6000 rpm	3.25 in	p. 7
LE68222	18 - 54 lb-in	0 - 6000 rpm	4.75 in	p. 8

DE Series Automation Duty Brushless Motors



IP 65 Rated with Heavy Duty Construction

Applications: Metal Working, Packaging, Woodworking, Textile, Converting, Assembly Automation

	Torque	Speed	Diameter	
DE45222	3 - 15.6 lb-in	0 - 6000 rpm	2.25 in	p. 10
DE56222	17 - 44 lb-in	0 - 6000 rpm	3.25 in	p. 11
DE60222	44 - 114 lb-in	0 - 3000 rpm	4.75 in	p. 12

Stepping Motors

p. 13 - 18

LV / LK Series Stepper Motors



High Performance, 1.8 Degree, Encoder Ready

Applications: Medical Equipment, Business Machines, Packaging, Textile, Semiconductor, Labeling, Vending Equipment, Gaming, Engraving

	Holding Torque	Current	Diameter	
LV39	20 - 78 oz-in	0.3 - 1.5 a	1.66 in	p. 13 & 14
LK45	54 - 258 oz-in	0.7 - 4.2 a	2.20 in	p. 15 & 16
LK56	326 - 1300 oz-in	1.0 - 9 a	3.38 in	p. 17 & 18

DC Brush Motors

p. 19 - 22





LG Series Brush Motors



High Performance, 1.8 Degree, Encoder Ready

Applications: Medical Equipment, Business Machines, Semiconductor, Labeling, Vending Equipment

	Holding Torque	Speed	Diameter	
LG37222	8 oz-in	0 - 6000 rpm	1.5 in	p. 19
LG45222	30 - 57 oz-in	0 - 6000 rpm	2.25 in	p. 20
LG45122	35 - 60 oz-in	0 - 6000 rpm	2.25 in	p. 21
LG55222	4 - 14 lb-in	0 - 6000 rpm	3.25 in	p. 22

Drives		p. 23 - 36
	EPF Brushless Drives 20 - 325 Vdc, 6 - 12.5 amp Rated	p. 23 - 28
	PVG Micro Stepping Motor Drivers 12 - 75 Vdc, 0.35 - 5 amp Rated	p. 29 - 34
	GPF Brush DC Motor Drive 20 - 80 Vdc, 6 & 12.5 amp Rated	p. 35 & 36
Encoders		p. 37 - 40
	Bearing Encoders Available in 3 Channel and Commutation types Line Counts from 1000 to 5000	p. 37 & 38
	Modular Encoders Available in 2 and 3 Channel types Line Counts, 500 & 1000	p. 39 & 40
Cables		p. 42 - 44
	Cables for LE Series Motors Power, Hall Commutation and Encoder Cables Connectorized for LE Motors	p. 42
	Cables for DE Series Motors Power & Signal Cables w/ Molded MS Connectors Connectorized for DE Motors	p. 43 & 44
Brakes		p. 45
	E Series "Bolt-on" Brakes Available in Nema 17, 23 and 34 Spring Applied Brakes - Power Release Type 24 Vdc Supply Voltage Clamp on Collar IP 42 Rated Construction	
Gearing		p. 46
	J5222 Series Planetary "Bolt-on" Gearbox Available in Nema 23 Torque Range up to 90 lb-in. Clamp on Pinion Compatible with LG45, LE45 and LK45 Motors	
Power Supplies		p. 47
Unit Conversion Tables and Time Constants		p. 48



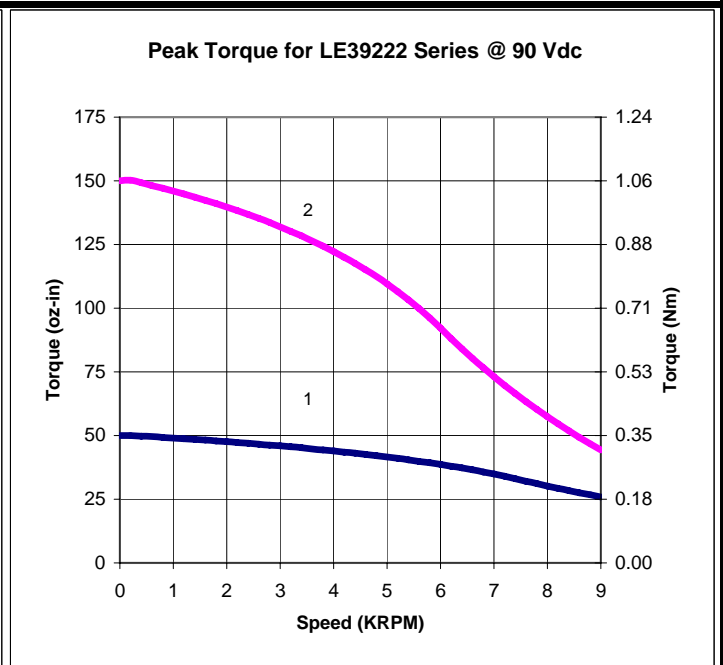
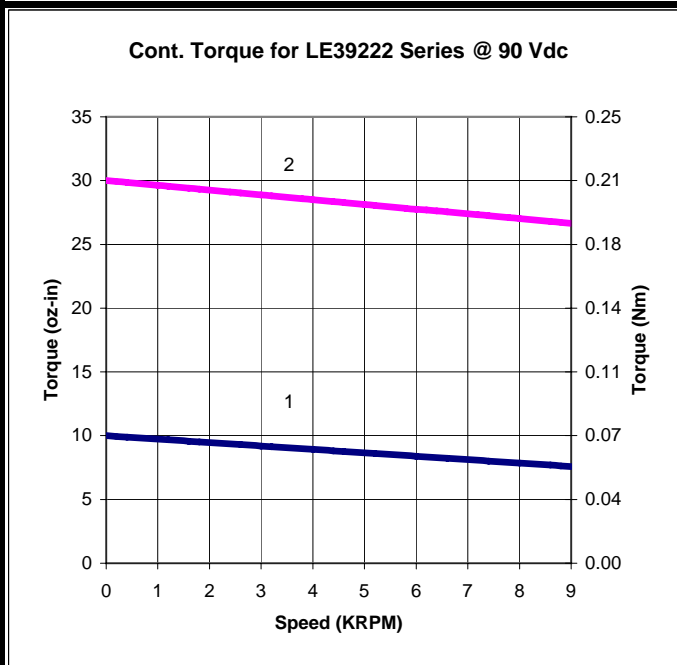
LE39222 Brushless Motor

- 1.75 Inch Size 17 Motor
- Continuous Torques from 10 to 30 oz-in
- Speeds up to 9000 rpm
- Voltage Rating up to 90 Vdc
- 6.2 lb Radial Load 1/2" from Front Face
- Nema 17 Mounting
- Optical Encoders - Economical to High Precision, Optional
- "Bolt On" Precision Gearhead, Optional



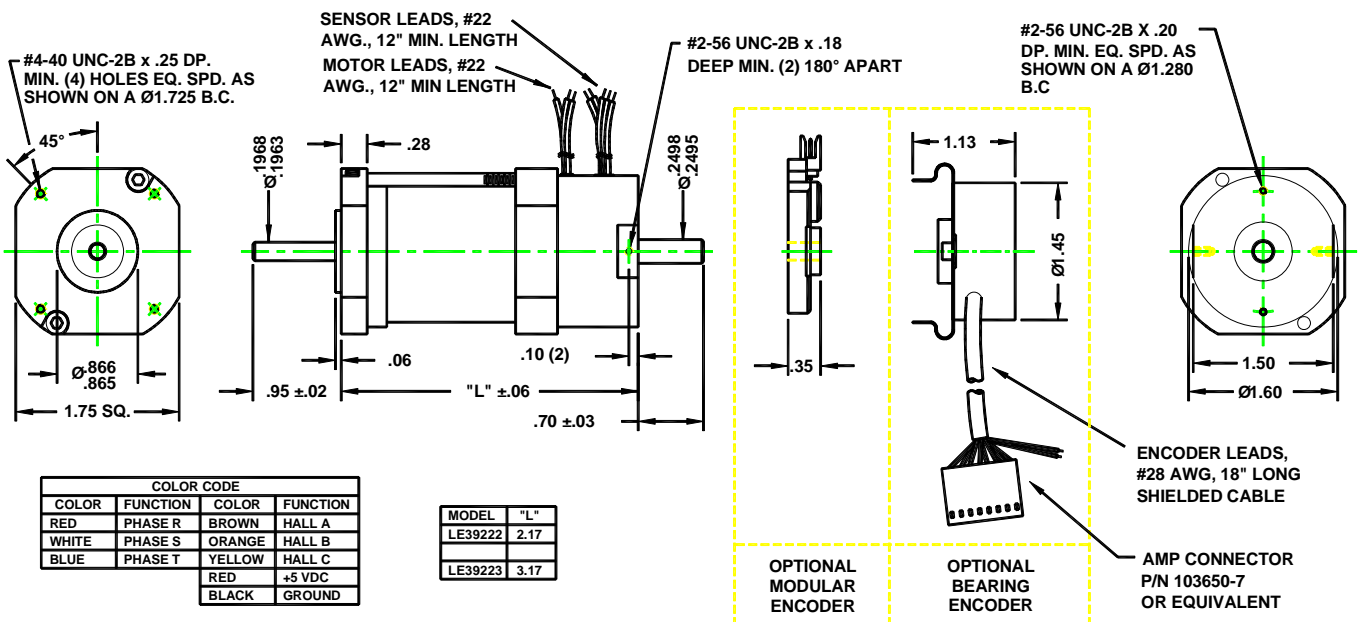
Catalog Number	Torque		Speed	Voltage	Current		Torque		Voltage	Res. Rt	Ind. L	Inertia		Weight
	Cont. Tcs	Peak Tps	@ Vt ω	Terminal Vt	Cont. Ics	Peak Ips	Constant Kt	Constant Ke	Jm					
	Nm / oz-in	Nm / oz-in	RPM	V dc	A	A	Nm / A	oz-in / A	V / KRPM			kg-cm ²	oz-in-s ²	
LE39222	0.07 / 10	0.35 / 50	9000	90	1.7	8.6	0.043	6.06	4.48	5.82	2.38	0.0169	0.00024	0.29 / 0.64
LE39223	0.21 / 30	1.06 / 150	9000	90	3.7	18.4	0.060	8.51	6.29	2.14	1.60	0.0438	0.00062	0.48 / 1.05

Notes: 1) 155C winding temp for Tc, Ic, Tp, Ip. All others @ 25C, 2) Tolerance on winding constants (+/- 10%), Resistance and Inductance (+/- 15%),



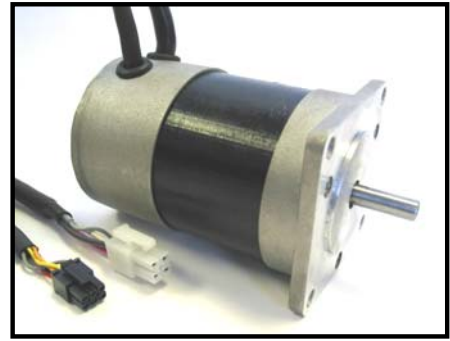
Curves: 1) LE39222, 2) LE39223

System Performance may differ depending on the drive capability



LE45022 Brushless Motor

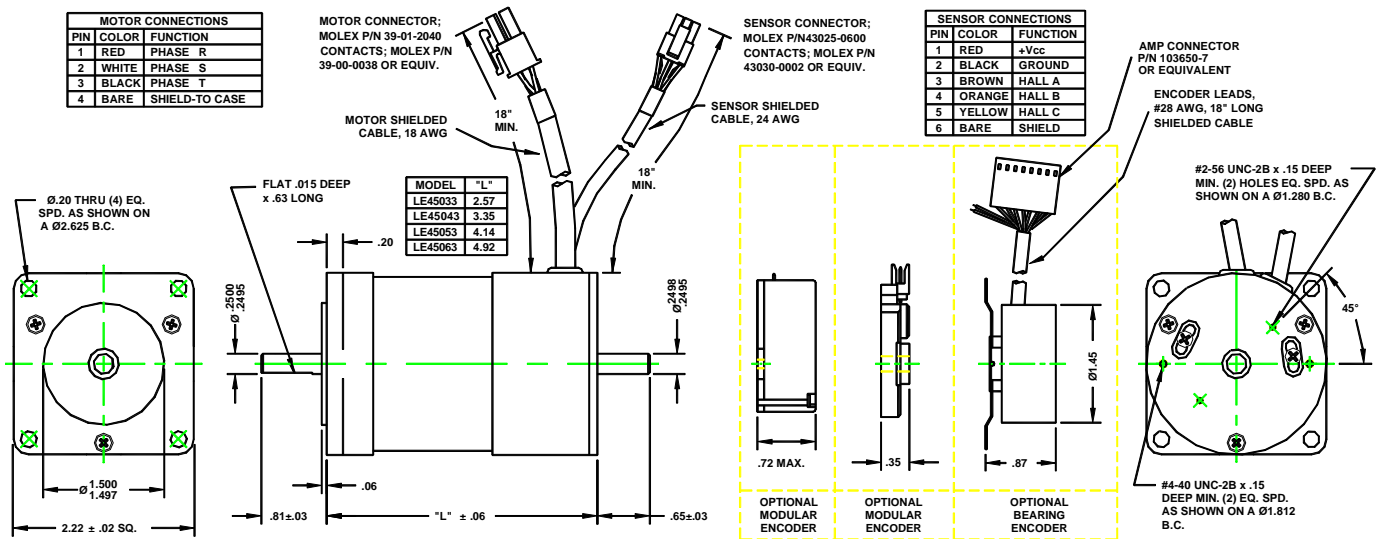
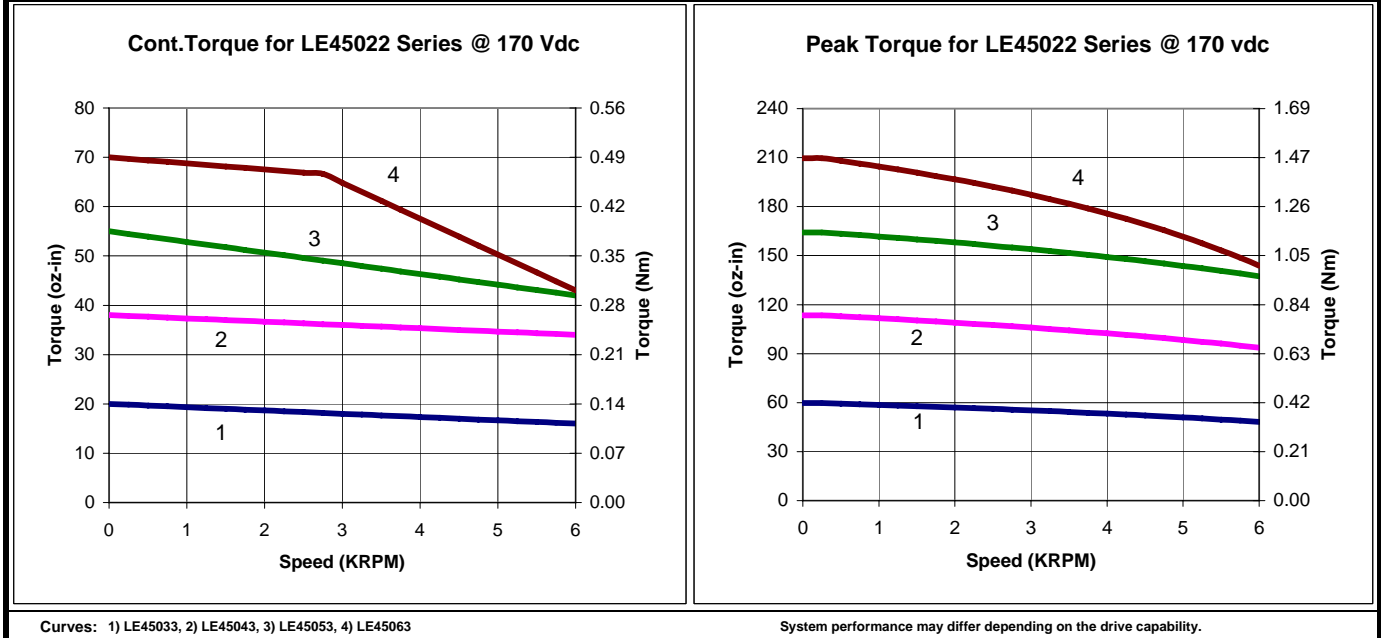
- 2.25 Inch Size 23 Motor
- Continuous Torques from 20 to 70 oz-in
- Speeds up to 6000 rpm
- Voltage Rating up to 170 Vdc
- 8 Lb Radial Load 1/2" from Front Face
- Optical Encoders - High Precision w/Bearing, Optional
- NEMA 23 Low Cost Planetary, Optional
- "Bolt On" Brake or Precision Gearhead, Optional



LE45022 Instrument Grade Brushless Motor

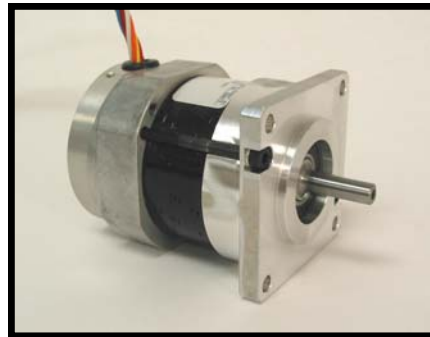
Catalog Number	Torque		Speed @ Vt ω RPM	Voltage Terminal Vt V dc	Current		Torque Constant		Voltage Constant Ke V / KRPM	Res. Rt ohms	Ind. L mH	Inertia		Weight Kg / lb
	Cont. Tcs Nm / oz-in	Peak Tps Nm / oz-in			Cont. Ics A	Peak Ips A	Nm / A	oz-in / A				kg-cm ²	oz-in-s ²	
LE45033	0.14 / 20	0.42 / 60	6000	170	1.8	5.5	0.0840	11.90	8.8	4.10	6.80	0.078	0.0011	0.54 / 1.2
LE45043	0.27 / 38	0.81 / 114	6000	170	3.4	10.1	0.0869	12.30	9.1	1.40	3.10	0.120	0.0017	0.81 / 1.8
LE45053	0.39 / 55	1.17 / 165	6000	170	4.8	14.4	0.0879	12.44	9.2	1.10	2.30	0.177	0.0025	1.02 / 2.3
LE45063	0.49 / 70	1.48 / 210	5000	170	4.5	13.6	0.1184	16.77	12.4	1.220	3.30	0.2260	0.0032	1.27 / 2.8

Notes: 1) 125C winding temp for Tc, Ic, Tp, Ip. All others @ 25C, 2) Tolerance on winding constants (+/- 10%), Resistance and Inductance (+/- 15%).



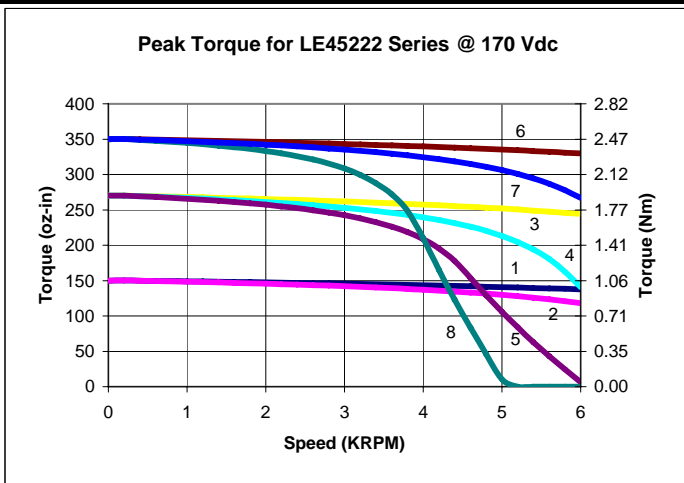
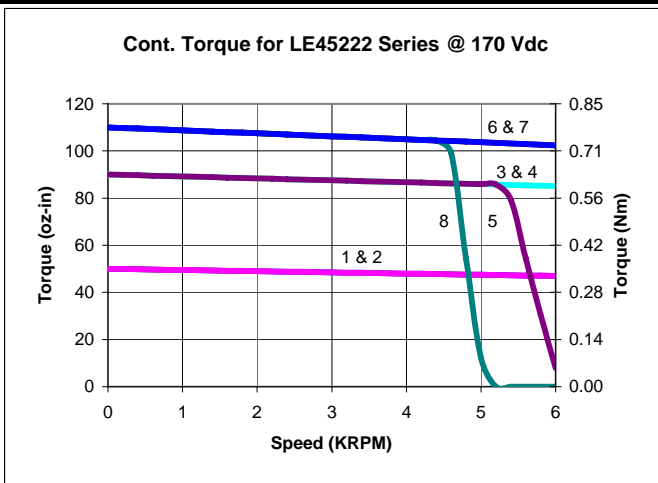
LE45222 Brushless Motor

- 2.25 Inch Size 23 Motor
- Continuous Torques from 50 to 110 oz-in
- Speeds up to 6000 rpm
- Voltage Rating up to 170 Vdc
- 16 Lb Radial Load 1/2" from Front Face
- Optical Encoders - High Precision w/Bearing, Optional
- NEMA 23 Low Cost Planetary, Optional
- "Bolt On" Brake or Precision Gearhead, Optional



Catalog Number	Torque		Speed	Voltage	Current		Torque		Voltage	Res. Rt	Ind. L	Inertia		Weight
	Cont. Tcs	Peak Tps	@ Vt ω	Terminal Vt	Cont. Ics	Peak Ips	Constant Kt	Constant Ke	kg-cm ²			oz-in-s ²		
	Nm / oz-in	Nm / oz-in	RPM	V dc	A	A	Nm / A	oz-in / A	V / KRPM	ohms	mH			Kg / lb
LE45222	0.35 / 50	1.06 / 150	6000	170	3.4	10.3	0.107	15.1	11.2	2.09	1.60	0.1342	0.0019	0.91 / 2
LE45225	0.35 / 50	1.06 / 150	6000	170	2.3	6.9	0.160	22.7	16.8	5.01	3.61	0.1342	0.0019	0.91 / 2
LE45223	0.64 / 90	1.91 / 270	6000	170	5.0	14.9	0.134	18.9	14.0	1.16	1.07	0.2613	0.0037	1.32 / 2.9
LE45226	0.64 / 90	1.91 / 270	6000	170	3.1	9.3	0.214	30.3	22.4	2.95	2.70	0.2613	0.0037	1.32 / 2.9
LE45227	0.64 / 90	1.91 / 270	4900	170	2.5	7.4	0.267	37.9	28.0	4.66	4.29	0.2613	0.0037	1.32 / 2.9
LE45224	0.78 / 110	2.33 / 330	6000	170	6.7	20.2	0.120	17.0	12.6	0.586	0.54	0.3884	0.0055	1.72 / 3.8
LE45228	0.78 / 110	2.33 / 330	6000	170	4.0	12.1	0.201	28.4	21.0	1.55	1.50	0.3884	0.0055	1.72 / 3.8
LE45229	0.78 / 110	2.33 / 330	4200	170	2.5	7.6	0.321	45.4	33.6	3.94	3.85	0.3884	0.0055	1.72 / 3.8

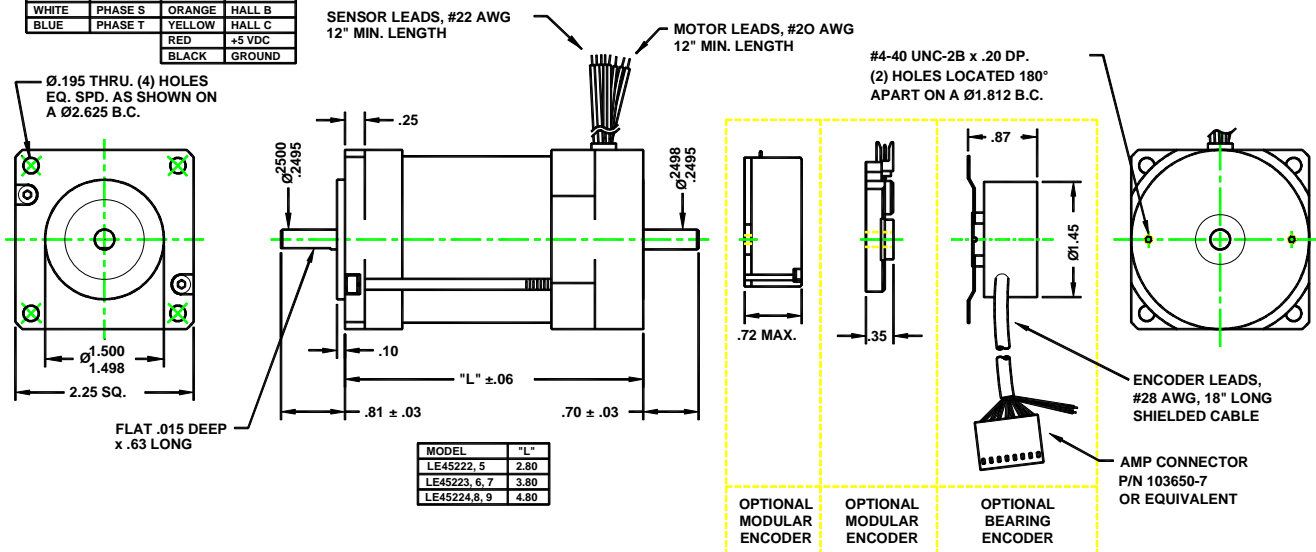
Notes: 1) 125C winding temp for Tc, Ic, Tp, Ip. All others @ 25C. 2) Tolerance on winding constants (+/- 10%), Resistance and Inductance (+/- 15%).



Curves: 1) LE45222, 2) LE45225, 3) LE45223, 4) LE45226, 5) LE45227, 6) LE45224, 7) LE45228, 8) LE45229

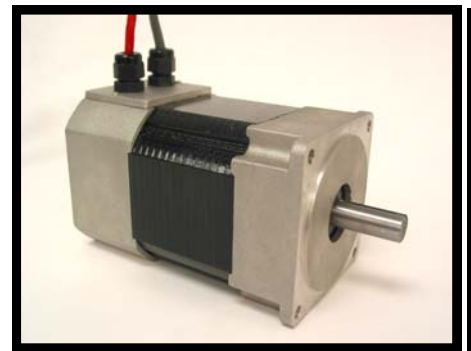
System Performance may differ due to drive capability

COLOR CODE			
COLOR	FUNCTION	COLOR	FUNCTION
RED	PHASE R	BROWN	HALL A
WHITE	PHASE S	ORANGE	HALL B
BLUE	PHASE T	YELLOW	HALL C
		RED	+5 VDC
		BLACK	GROUND



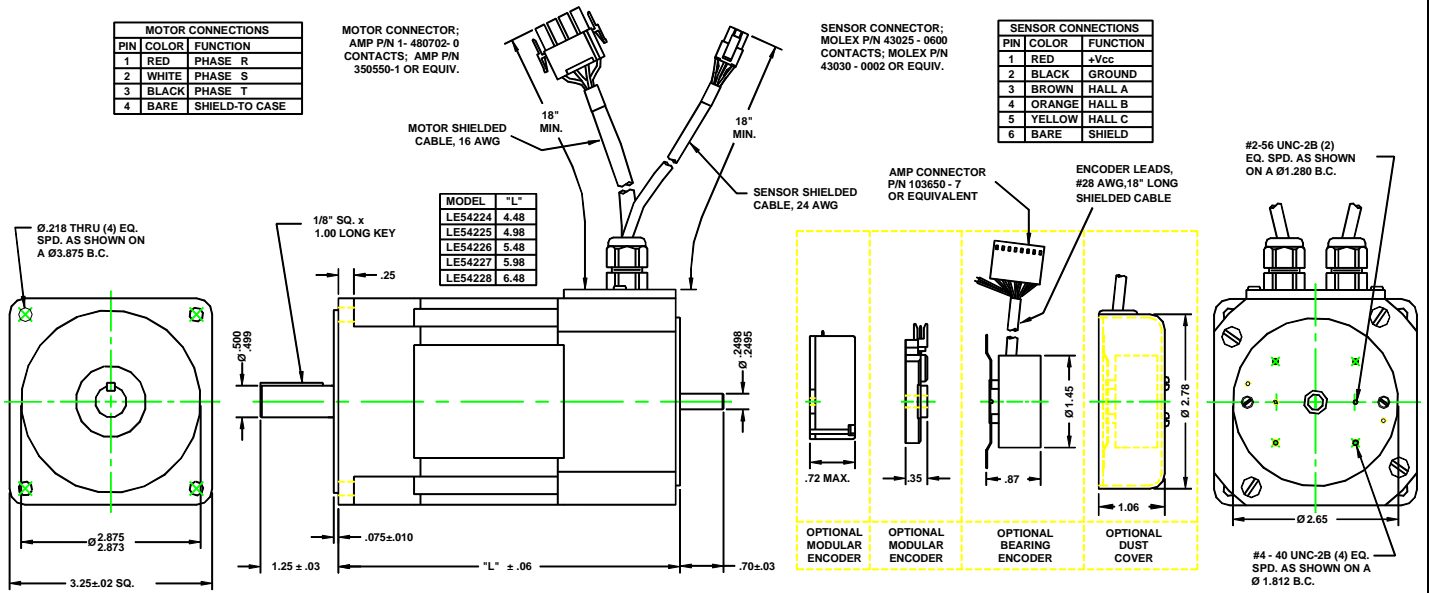
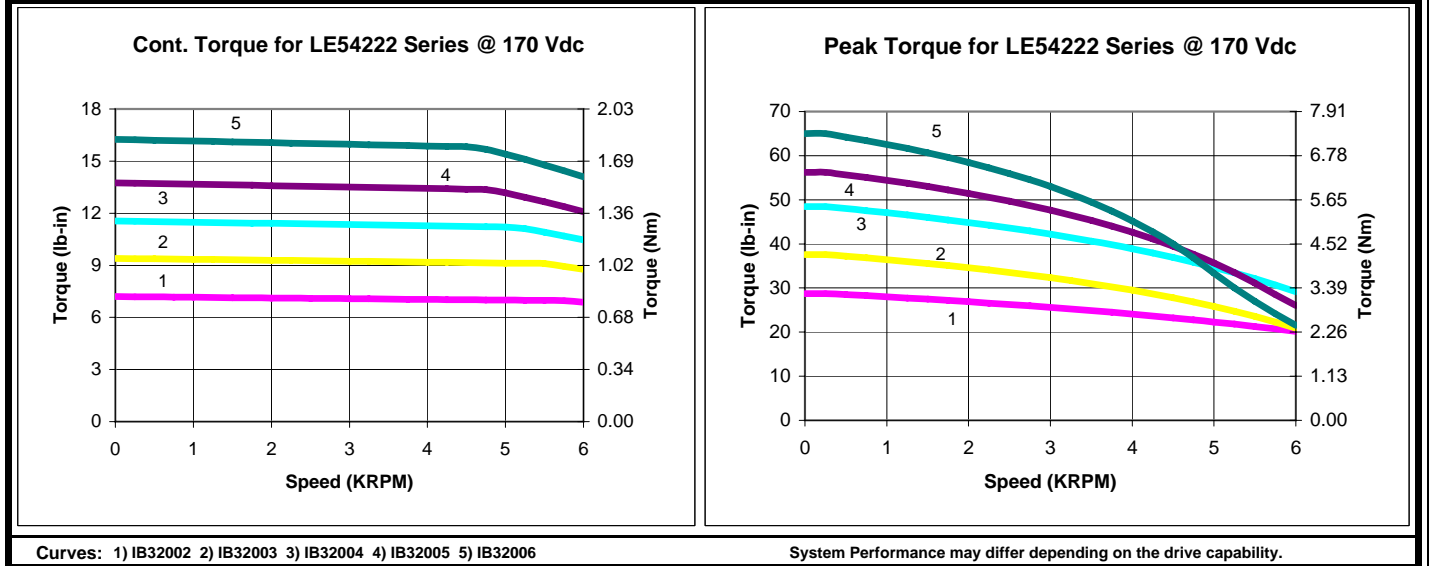
LE54222 Brushless Motor

- 3.25 Inch NEMA 34
- Continuous Torques from 7 to 16 lb-in
- Speeds up to 6000 rpm
- Voltage Rating up to 170 Vdc
- Integrated Hall Effect Commutation
- 30 Lb Radial Load Capacity, 1/2" from Front Face
- Optical Encoders - Economical to High Precision, Optional
- NEMA 34 "Bolt On" Brake or Precision Gearhead, Optional



Catalog Number	Torque		Speed @ Vt ω RPM	Voltage Terminal Vt V dc	Current		Torque Constant		Voltage Constant Ke V / KRPM	Res. Rt ohms	Ind. L mH	Inertia		Weight Kg / lb
	Cont. Tcs Nm / lb-in	Peak Tps Nm / lb-in			Cont. Ics A	Peak Ips A	Nm / A	lb-in / A				kg-cm ²	lb-in-s ²	
LE54224	0.81 / 7.2	3.25 / 28.75	6000	170	10.2	40.8	0.099	0.88	10.41	0.620	1.85	0.994	0.00088	2.49 / 5.5
LE54225	1.06 / 9.4	4.25 / 37.6	6000	170	10.1	40.4	0.132	1.16	13.78	0.590	2.19	1.277	0.00113	3.04 / 6.7
LE54226	1.3 / 11.55	5.47 / 48.45	6000	170	12.8	53.6	0.128	1.13	13.38	0.410	1.54	1.559	0.00138	3.54 / 7.8
LE54227	1.55 / 13.75	6.36 / 56.25	6000	170	12.7	52.1	0.153	1.35	15.97	0.456	1.74	1.842	0.00163	4.08 / 9
LE54228	1.84 / 16.25	7.34 / 65	5000	170	13.0	52.0	0.177	1.56	18.5	0.498	1.95	2.124	0.00188	4.67 / 10.3

Notes: 1) 155C winding temp for Tc, Ic, Tp, Ip. All others @ 25C. 2) Tolerance on winding constants (+/- 10%), Resistance and Inductance (+/- 15%).

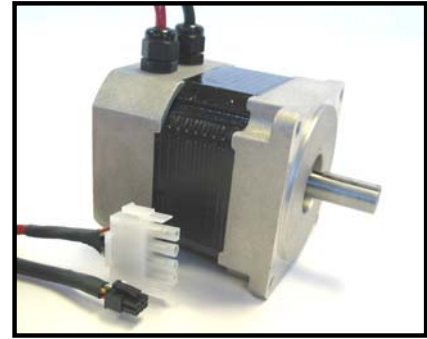


LE56222 Brushless Motor

- 3.25 Inch NEMA 34 w/ Heavy Duty Shaft
- Continuous Torques from 5.6 to 18 lb-in
- Speeds up to 6000 rpm
- Voltage Rating up to 170 Vdc
- Integrated Hall Effect Commutation
- 30 Lb Radial Load Capacity, 1/2" from Front Face
- Optical Encoders - Economical to High Precision, Optional
- NEMA 34 HD "Bolt On" Brake or Precision Gearhead, Optional

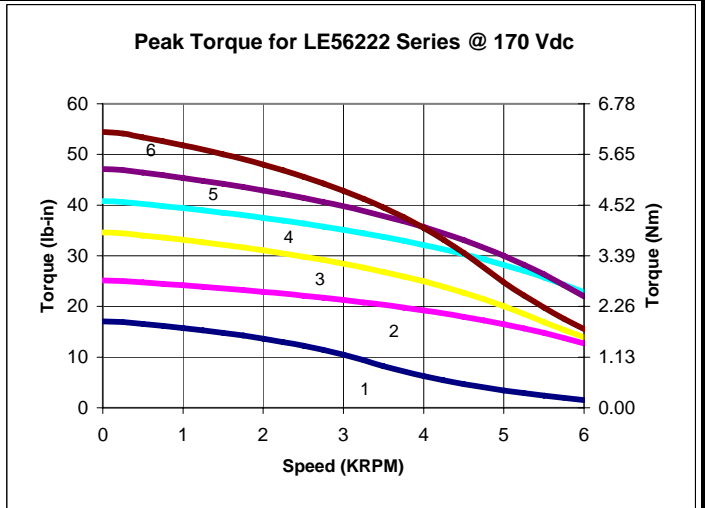
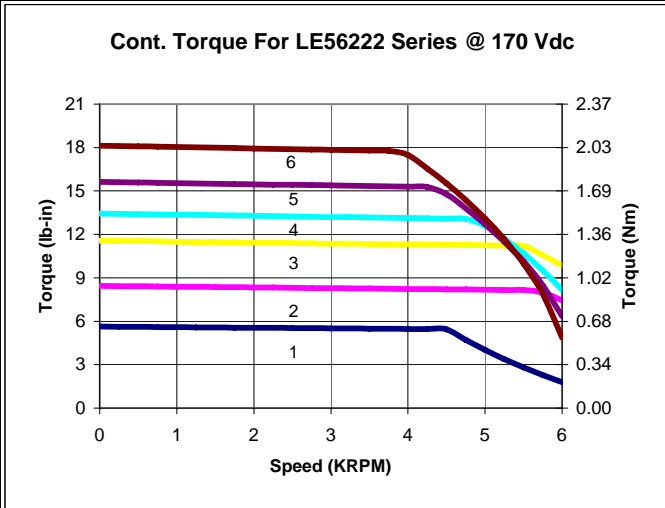


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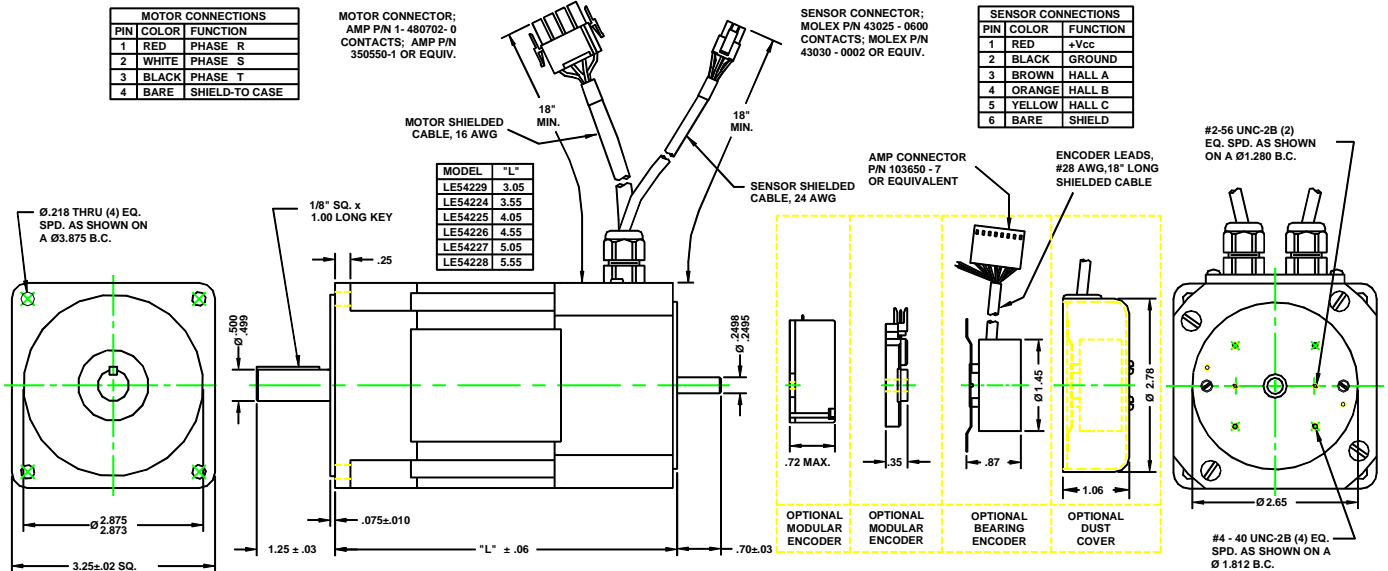
Catalog Number	Torque		Speed	Voltage	Current		Torque		Voltage	Res. Rt	Ind. L	Inertia		Weight
	Cont. Tcs	Peak Tps	@ Vt ω	Terminal Vt	Cont. Ics	Peak Ips	Constant Kt	Constant Ke	Jm			kg-cm ²	lb-in-s ²	
	Nm / lb-in	Nm / lb-in	RPM	V dc	A	A	Nm / A	lb-in / A	V / KRPM	ohms	mH			Kg / lb
LE56229	0.64 / 5.63	1.91 / 16.9	5000	170	3.0	9.1	0.228	2.02	23.9	2.010	8.46	0.678	0.0006	1.5 / 3.3
LE56224	0.95 / 8.44	2.82 / 25	6000	170	7.2	21.4	0.143	1.27	15	0.443	1.89	1.017	0.0009	2 / 4.4
LE56225	1.31 / 11.56	3.89 / 34.4	6000	170	8.9	26.5	0.159	1.41	16.7	0.405	1.69	1.243	0.0011	2.49 / 5.5
LE56226	1.52 / 13.44	4.59 / 40.6	5000	170	11.8	35.5	0.140	1.24	14.7	0.259	1.05	1.582	0.0014	3.04 / 6.7
LE56227	1.77 / 15.63	5.3 / 46.9	4500	170	12.1	36.3	0.159	1.40	16.6	0.224	1.08	2.034	0.0018	3.54 / 7.8
LE56228	2.05 / 18.13	6.11 / 54.1	4000	170	11.8	35.3	0.188	1.67	19.7	0.346	1.38	2.373	0.0021	4.08 / 9

Notes: 1) 125C winding temp for Tc, Ic, Tp, Ip. All others @ 25C. 2) Tolerance on winding constants (+/-Resistance and inductance (+/- 15%).



Curves: 1) LE56229 2) LE56224 3) LE56225 4) LE56226 5) LE56227 6) LE56228

System Performance may differ depending on the drive capability.



LE68222 Brushless Motor

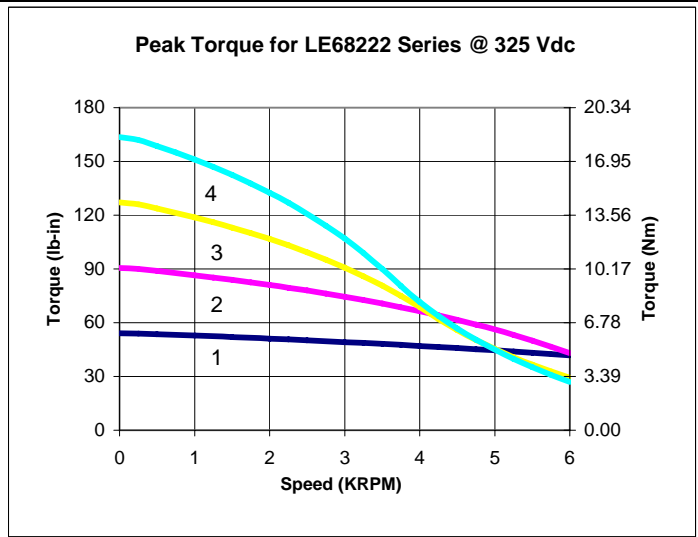
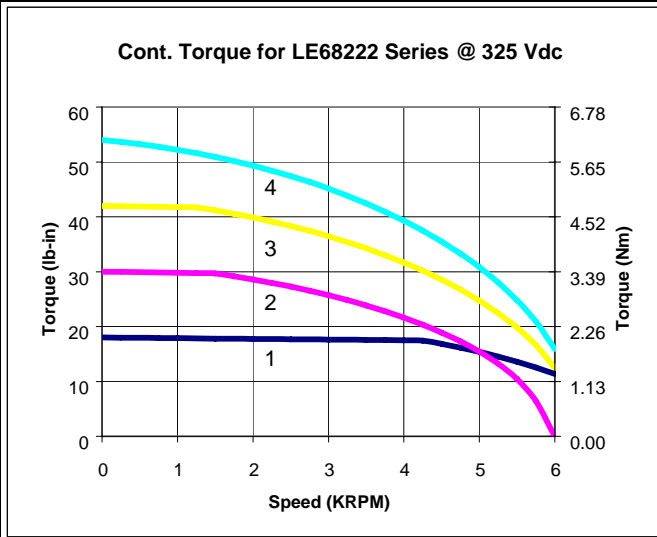
- 4.75 Inch Size 56
- Continuous Torques from 18 to 54 lb-in
- Speeds up to 6000 rpm
- Voltage Rating up to 325 Vdc
- Integrated Hall Effect Commutation
- 90 Lb Radial Load Capacity, 1/2" from Front Face
- Optical Encoders - High Precision, Optional
- NEMA 56 "Bolt On" Precision Gearheads, Optional



LE68222 Instrument Brushless Motor

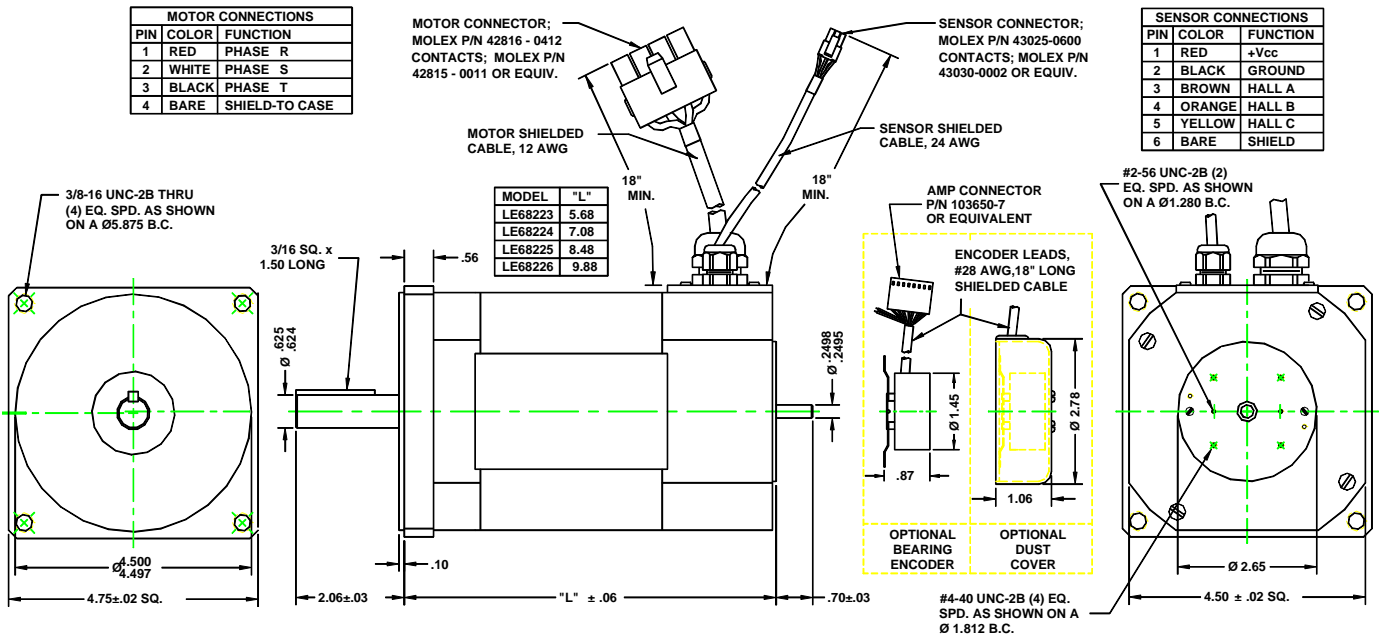
Catalog Number	Torque		Speed	Voltage	Current		Torque Constant		Voltage	Res. Rt	Ind. L	Inertia		Weight
	Cont. Tcs	Peak Tps	@ Vt ω	Terminal Vt	Cont. Ics	Peak Ips	Nm / A	lb-in / A	Constant Ke			V / KRPM	kg-cm ²	
LE68223	2.03 / 18	6.1 / 54	6000	325	16.7	50.1	0.152	1.35	15.9	0.22	1.27	7.91	0.007	4.99 / 11
LE68224	3.39 / 30	10.17 / 90	5000	325	17.4	52.2	0.243	2.15	25.5	0.32	2.06	12.43	0.011	7.71 / 17
LE68225	4.75 / 42	14.24 / 126	5000	325	17.9	53.8	0.331	2.93	34.6	0.45	2.82	16.95	0.015	10.88 / 24
LE68226	6.1 / 54	18.3 / 162	5000	325	20.9	62.7	0.365	3.23	38.2	0.45	2.77	21.47	0.019	13.61 / 30

Notes: 1) 155C winding temp for Tc, Ic, Tp, Ip. All others @ 25C. 2) Tolerance on winding constants (+/- 10%), Rand Inductance (+/- 15%), a



Curves 1) LE68223 2) LE68224 3) LE68225 4) LE68226

System Performance may differ depending on the drive capability.



DE45222 Brushless Motor

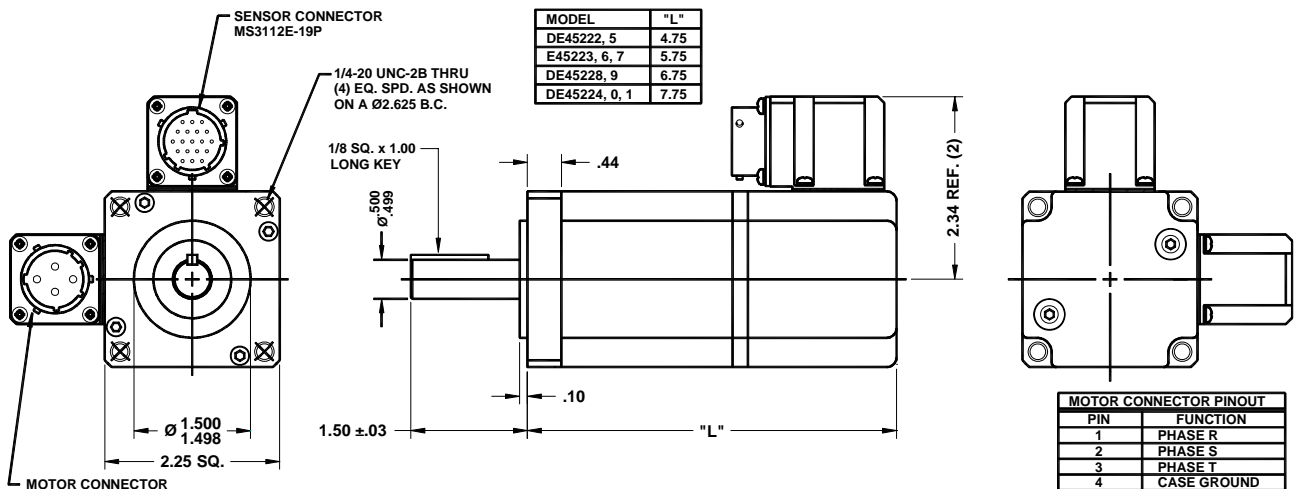
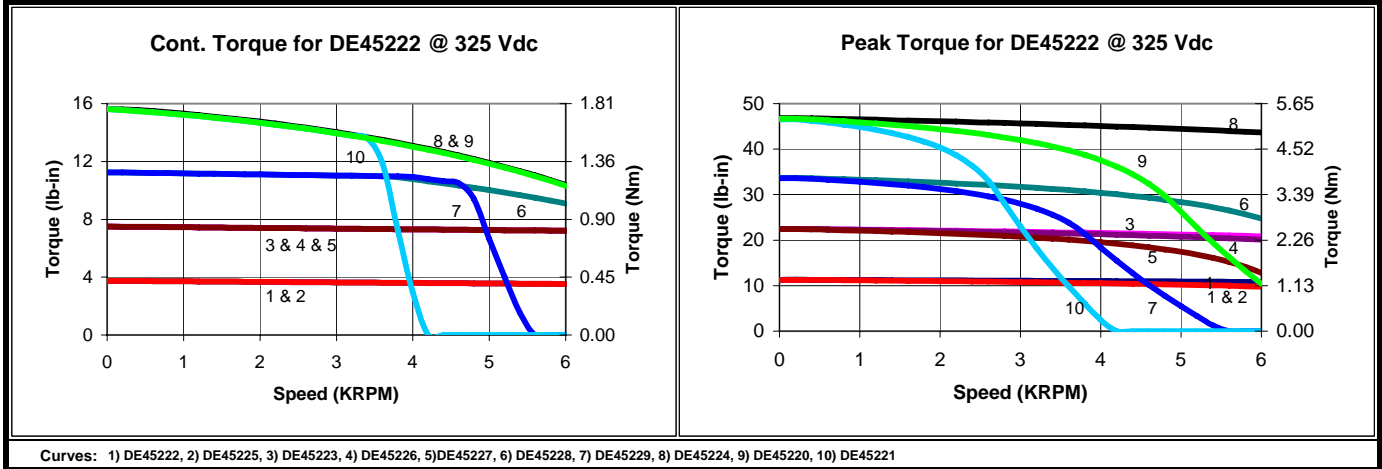
- 2.25 Inch Size 23 Motor
- Continuous Torques from 3.75 to 15.6 lb-in
- Speeds up to 6000 rpm
- Voltage Rating up to 325 Vdc
- 20 Lb Radial Load 1/2" from Front Face
- IP65 Sealing w/ Shaft Seal
- Optical Encoders - High Precision w/Bearing, Optional
- "Bolt On" Brake or Precision Gearhead, Optional



DE45222 Automation Brushless Motor

Catalog Number	Torque		Speed @ Vt ω RPM	Voltage Terminal Vt V dc	Current		Torque Constant		Voltage Constant Ke V / KRPM	Res. Rt ohms	Ind. L mH	Inertia		Weight Kg / lb
	Cont. Tcs Nm / lb-in	Peak Tps Nm / lb-in			Cont. Ics A	Peak Ips A	Nm / A	lb-in / A				kg-cm ²	lb-in-s ²	
DE45222	0.42 / 3.75	1.28 / 11.3	6000	325	4.1	12.2	0.114	1.00	11.9	2.2	1.81	0.158	0.00014	1 / 2.2
DE45225	0.42 / 3.75	1.28 / 11.3	6000	325	2.0	5.9	0.234	2.07	24.5	9.2	7.68	0.158	0.00014	1 / 2.2
DE45223	0.85 / 7.5	2.54 / 22.5	6000	325	4.9	14.8	0.187	1.66	19.6	2.0	2.10	0.294	0.00026	1.41 / 3.1
DE45226	0.85 / 7.5	2.54 / 22.5	6000	325	4.1	12.2	0.227	2.01	23.8	3.1	3.10	0.294	0.00026	1.41 / 3.1
DE45227	0.85 / 7.5	2.54 / 22.5	6000	325	2.5	7.4	0.374	3.31	39.2	8.3	8.41	0.294	0.00026	1.41 / 3.1
DE45228	1.27 / 11.25	3.82 / 33.8	6000	325	4.3	12.9	0.321	2.84	33.6	3.9	3.85	0.418	0.00037	1.81 / 4
DE45229	1.27 / 11.25	3.82 / 33.8	4000	325	2.5	7.4	0.561	4.97	58.8	11.0	11.81	0.418	0.00037	1.81 / 4
DE45224	1.76 / 15.62	5.3 / 46.9	6000	325	10.0	30.0	0.192	1.70	20.1	0.8	1.20	0.565	0.0005	2.27 / 5
DE45220	1.76 / 15.62	5.3 / 46.9	5500	325	4.2	12.7	0.454	4.02	47.6	5.2	5.62	0.565	0.0005	2.27 / 5
DE45221	1.76 / 15.62	5.3 / 46.9	3000	325	2.6	7.7	0.749	6.63	78.4	13.6	15.26	0.565	0.0005	2.27 / 5

Notes: 1) 125C winding temp for Tc, Ic, Tp, Ip. All others @ 25C. 2) Tolerance on winding constants (+/- 10%), Resistance and Inductance (+/- 15%).



SENSOR CONNECTOR PINOUT							
PIN	FUNCTION	PIN	FUNCTION	PIN	FUNCTION	PIN	FUNCTION
A	THERMOSTAT	E	N.C.	J	SENSOR GROUND	N	N.C.
B	THERMOSTAT	F	N.C.	K	N.C.	P	N.C.
C	HALL B	G	N.C.	L	+5-15 VDC SENSOR	R	HALL C
D	N.C.	H	N.C.	M	HALL A	S	N.C.

Available Options (see pages) - Encoders p.37 & 38 - Cables p.43 & 44 - Brakes p.45 - Drives p.23, 24, 25, 26, 27 & 28

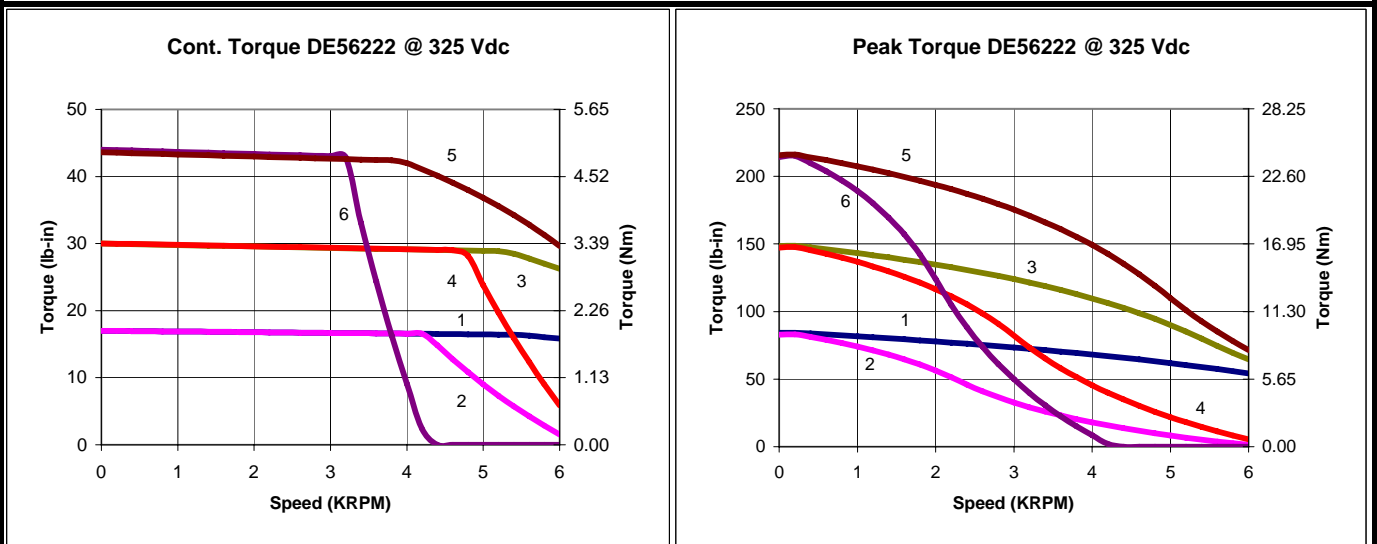
DE56222 Brushless Motor

- 3.25 Inch Size 34 Motor
- Continuous Torques from 17 to 44 lb-in
- Speeds up to 6000 rpm
- Voltage Rating up to 325 Vdc
- 30 Lb Radial Load 1/2" from Front Face
- IP65 Sealing w/ Shaft Seal
- Optical Encoders - High Precision w/Bearing, Optional
- "Bolt On" Brake or Precision Gearhead, Optional



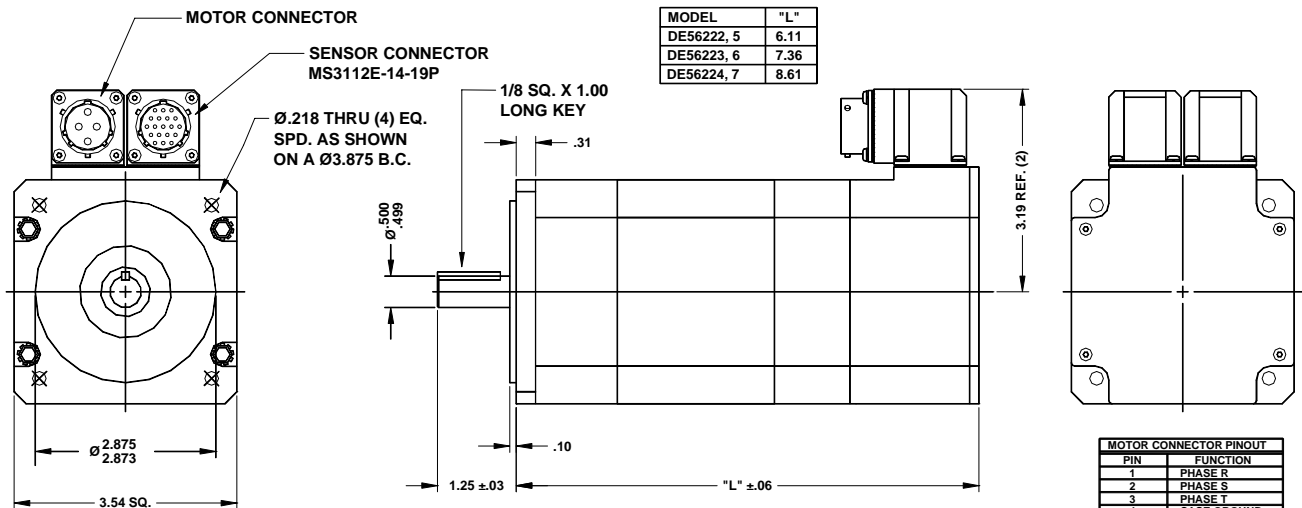
Catalog Number	Torque		Speed	Voltage	Current		Torque		Voltage	Res. Rt	Ind. L	Inertia		Weight
	Cont. Tcs	Peak Tps	@ Vt ω	Terminal Vt	Cont. Ics	Peak Ips	Constant Kt	Constant Ke	Jm			kg-cm ²	lb-in-s ²	
	Nm / lb-in	Nm / lb-in	RPM	V dc	A	A	Nm / A	lb-in / A	V / KRPM	ohms	mH			Kg / lb
DE56222	1.92 / 17	9.6 / 85	6000	325	10.5	52.4	0.191	1.69	20	1.10	2.60	1.130	0.001	3.63 / 8
DE56225	1.92 / 17	9.6 / 85	4200	325	4.0	20.1	0.496	4.39	52	6.77	17.41	1.130	0.001	3.63 / 8
DE56223	3.39 / 30	16.95 / 150	6000	325	12.3	61.6	0.286	2.54	30	0.80	2.50	2.034	0.0018	5.22 / 11.5
DE56226	3.39 / 30	16.95 / 150	4500	325	7.3	36.5	0.484	4.28	50.7	2.14	7.32	2.034	0.0018	5.22 / 11.5
DE56224	4.97 / 44	24.86 / 220	6000	325	15.5	77.5	0.334	2.96	35	0.60	2.10	2.938	0.0026	6.8 / 15
DE56227	4.97 / 44	24.86 / 220	3000	325	7.1	35.7	0.726	6.42	76	2.60	10.40	2.938	0.0026	6.8 / 15

Notes: 1) 155C winding temp for Tc, Ic, Tp, Ip. All others @ 25C. 2) Tolerance on winding constants (+/- 10%), Resistance and Inductance (+/- 15%).



Curves: 1) DE56222, 2) DE56225, 3) DE56223, 4) DE56226, 5) DE56224, 6) DE56227

System performance may vary depending on the drive capability.



MODEL	"L"
DE56222, 5	6.11
DE56223, 6	7.36
DE56224, 7	8.61

PIN	FUNCTION
1	PHASE R
2	PHASE S
3	PHASE T
4	CASE GROUND

SENSOR CONNECTOR PINOUT							
PIN	FUNCTION	PIN	FUNCTION	PIN	FUNCTION	PIN	FUNCTION
A	THERMOSTAT	E	N.C.	J	SENSOR GROUND	N	N.C.
B	THERMOSTAT	F	N.C.	K	N.C.	P	N.C.
C	HALL B	G	N.C.	L	+5VDC SENSOR	R	HALL C
D	N.C.	H	N.C.	M	HALL A	S	N.C.
						T	N.C.
						U	N.C.
						V	N.C.

DE60222 Brushless Motor

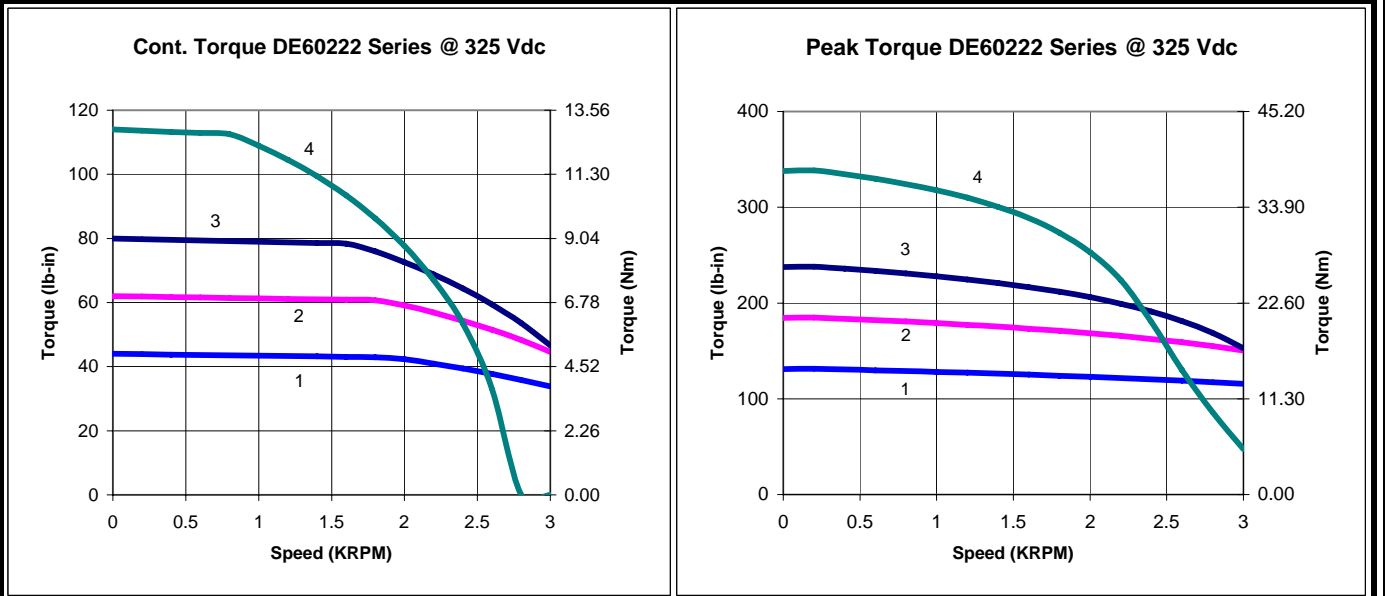
- 4.75 Inch Nema 56 Motor
- Continuous Torques from 44 to 114 lb-in
- Speeds up to 3000 rpm
- Voltage Rating up to 325 Vdc
- 100 Lb Radial Load 1/2" from Front Face
- IP65 Sealing w/ Shaft Seal
- Optical Encoders - High Precision w/Bearing, Optional
- Precision Gearhead, Optional



DE60222 Automation Brushless Motor

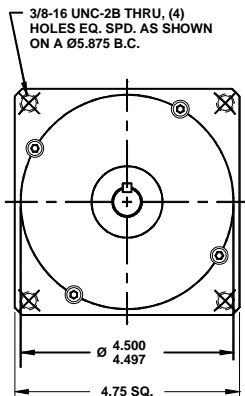
Catalog Number	Torque		Speed	Voltage	Current		Torque		Voltage	Res. Rt	Ind. L	Inertia		Weight
	Cont. Tcs	Peak Tps	@ Vt ω	Terminal Vt	Cont. Ics	Peak Ips	Constant Kt	Constant Ke	Jm			lb-in-s ²		
	Nm / lb-in	Nm / lb-in	RPM	V dc	A	A	Nm / A	lb-in / A	V / KRPM	ohms	mH	kg-cm ²	lb-in-s ²	Kg / lb
DE60222	4.97 / 44	14.91 / 132	3000	325	14.5	43.5	0.372	3.30	39	0.48	2.41	3.84	0.0034	8.16 / 18
DE60223	7.01 / 62	21.02 / 186	3000	325	14.8	44.3	0.516	4.56	54	0.48	2.85	5.65	0.005	9.98 / 22
DE60224	9.04 / 80	27.12 / 240	3000	325	14.3	42.9	0.688	6.09	72	0.54	3.64	7.46	0.0066	11.79 / 26
DE60225	12.88 / 114	38.64 / 342	2000	325	13.6	40.7	1.031	9.13	108	0.72	5.23	10.96	0.0097	15.42 / 34

Notes: 1) 125C winding temp for Tc, Ic, Tp, Ip. All others @ 25C, 2) Tolerance on winding constants (+/- 10%), Resistance and Inductance (+/- 15%).

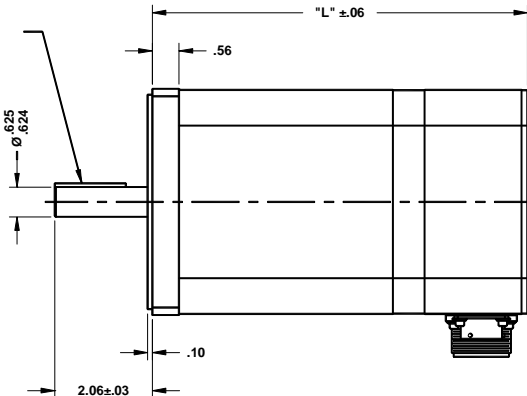


Curves: 1) DE60222, 2) DE60223, 3) DE60224, 4) DE60225

System performance may differ depending on the drive capability.

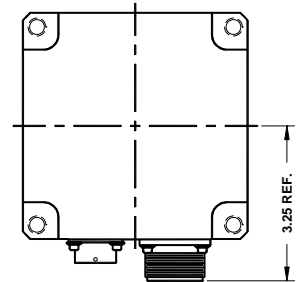


3/16" SQ. KEY X 1 1/2" LONG



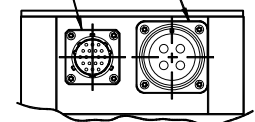
MODEL	"L"
DE60222	7.93
DE60223	8.93
DE60224	9.93
DE60225	11.93

MOTOR CONNECTOR PINOUT	
PIN	FUNCTION
A	PHASE R
B	PHASE S
C	PHASE T
D	CASE GROUND



SENSOR CONNECTOR MS3112E-14-19P

MOTOR CONNECTOR MS3102E-20-4P



SENSOR CONNECTOR PINOUT							
PIN	FUNCTION	PIN	FUNCTION	PIN	FUNCTION	PIN	FUNCTION
A	THERMOSTAT	E	N.C.	J	SENSOR GROUND	N	N.C.
B	THERMOSTAT	F	N.C.	K	N.C.	P	N.C.
C	HALL B	G	N.C.	L	+5-15 VDC SENSOR	R	HALL C
D	N.C.	H	N.C.	M	HALL A	S	N.C.

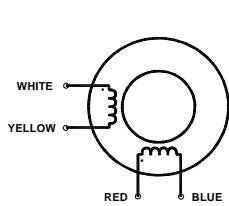
LV39 Instrument Grade Step Motor

- 1.7 Inch Square (42mm) Size 17 Motor
- High Torque per Volume w/ High Stepping Rate
- Multiple Winding Configuration for Unipolar and Bipolar connections
- 1.8 Degree Step Angle (200 Full Steps / Rev)
- Ideal for 1/2 Step and Microstepping
- Single and Double Shaft (Encoder Ready) Configurations
- Nema Class B Insulation
- Optional Encoders and NEMA 17 "Bolt On" Brakes & Gearheads

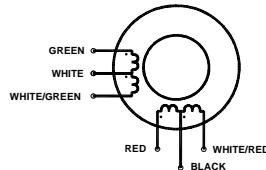


Catalog Number		Number of Leads	Phase Connection Types	Holding Torque		Voltage / phase	Current Rated / ph	Phase Res.	Phase Ind.	Inertia		Weight		Length	
Shaft Configuration	Double			Single	Th - Minimum					oz-in	Vdc	Ip	Rt	L	Jm
LV 39 223	LV 39 234	6	Parallel Series Unipolar	14	20	1.8	0.4	4.60	4.6	18	0.00025	0.2	0.44	34	1.34
				20	29	2.6	0.3	9.20	18.4						
				14	20	1.8	0.4	4.60	4.6						
LV 39 229	LV 39 225	4	4 lead	17	24	1.5	1.5	1.00	1.2	18	0.00025	0.2	0.44	34	1.34
LV 39 221	LV 39 238	6	Parallel Series Unipolar	24	34	5.0	0.8	6.20	8.8	55	0.00078	0.3	0.57	39	1.54
				34	48	7.0	0.6	12.40	35.2						
				24	34	5.0	0.8	6.20	8.8						
LV 39 227	LV 39 230	4	4 lead	31	44	4.6	1.0	4.60	8.9	32	0.00045	0.3	0.66	43	1.69
LV 39 233	LV 39 242	8	Parallel Series Unipolar	55	78	5.1	1.1	4.50	9.5	68	0.00096	0.3	0.73	47	1.85
				55	78	10.2	0.6	18.00	38.0						
				38	54	7.2	0.8	9.00	9.5						

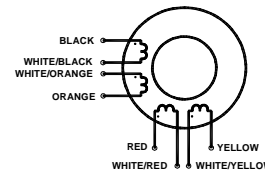
Notes: 1) Max. Terminal Voltage = 48 Vdc 2) -20 to 50 Degree C ambient operating Temperature 3) +/- 5% non-cumulative step accuracy



LEAD WIRE COLOR	WHITE	YELLOW	RED	BLUE
BIPOLAR DRIVE	A	A̅	B	B̅
UNIPOLAR DRIVE	A	COM	B	COM

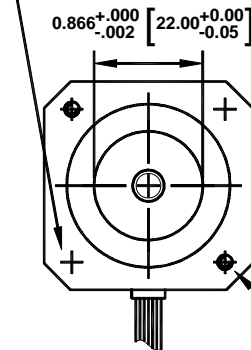


LEAD WIRE COLOR	GREEN	WHITE	WHITE GREEN	RED	BLACK	WHITE RED
BIPOLAR DRIVE	A	A̅	N/C	B	B̅	N/C
UNIPOLAR DRIVE	A	COM	B	C	COM	D

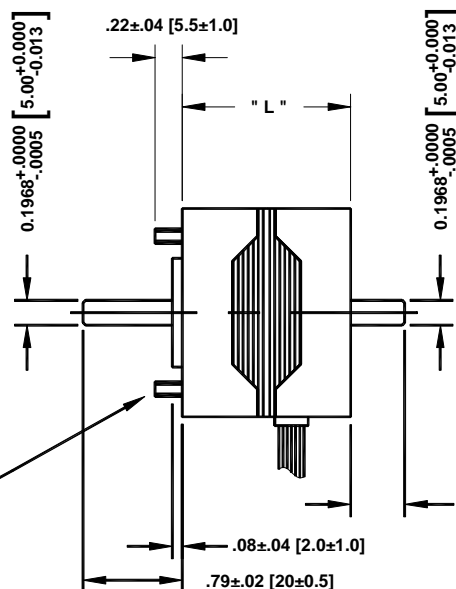


LEAD WIRE COLOR	BLACK	ORANGE	BLACK ORANGE	RED	YELLOW	RED YELLOW	WHITE	WHITE
BIPOLAR DRIVE	A	A	A	B	B	B	C	C
UNIPOLAR DRIVE	A	COM	B	C	COM	D	COM	D

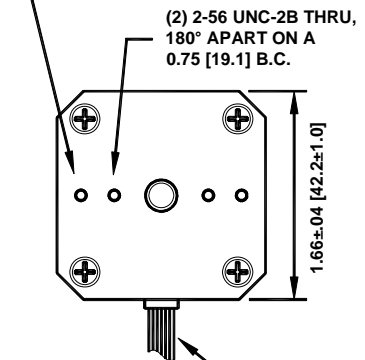
LV39220/237, 221/238, 232/231, 233/242:
(4) 4-40 UNC-2B X 0.18 [4.5] MIN DEEP, EQ. SPD AS SHOWN ON A 1.726±0.010 [43.84±0.25] B.C.



LV39223/234, 229/225:
(2) M3 X 0.5-6H STUD, EQ. SPD AS SHOWN ON A 1.726±0.010 [43.84±0.25] B.C.

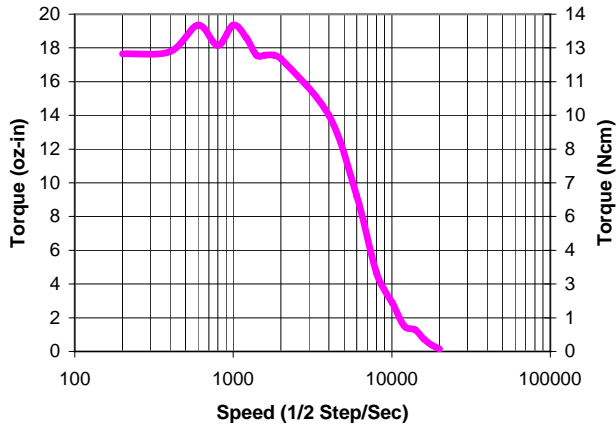


(2) 2-56 UNC-2B THRU, 180° APART ON A 1.28 [32.5] B.C.

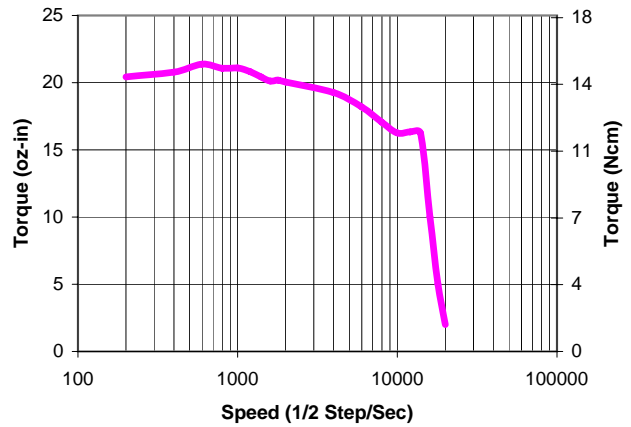


Speed Torque Performance Curves

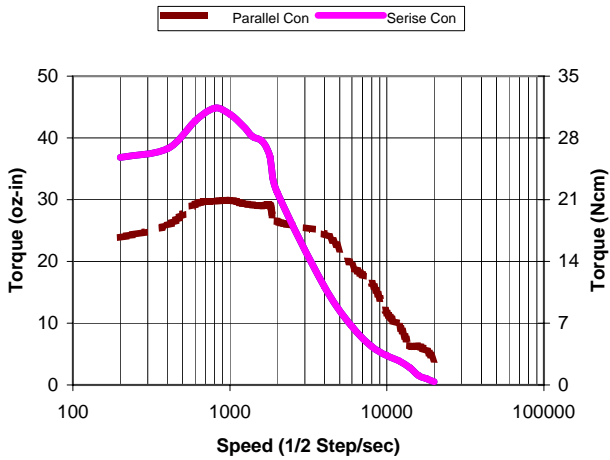
**LV39024 / 223 @ 36 Vdc & 0.3 Amp
Parallel Connections**



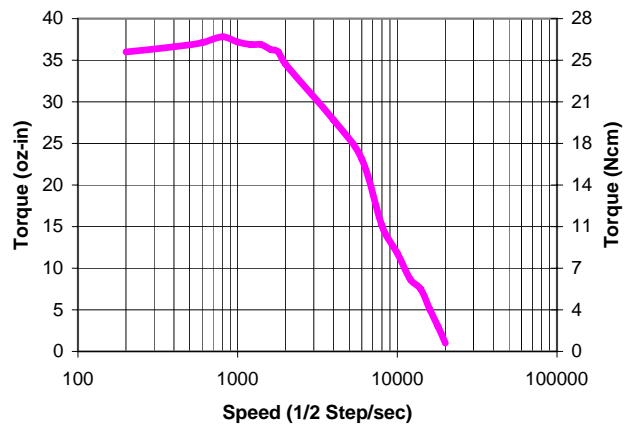
LV39225 / 229 @ 36 Vdc & 1.5 Amps



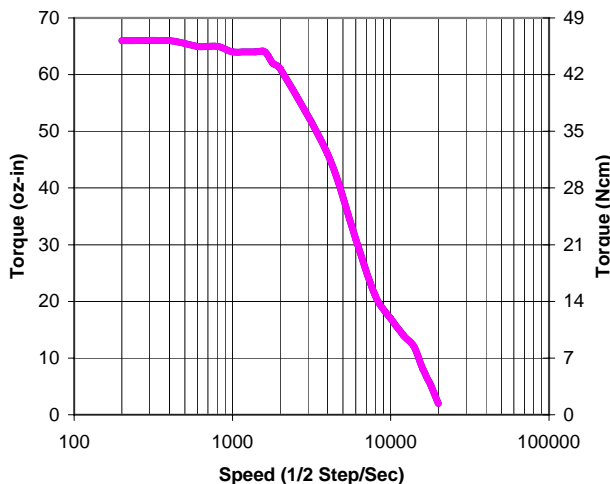
**LV39238 / 221 @ 36 VDC
Parallel & Series Connections**



LV39230 / 227 @ 36 Vdc & 1 Amp



**LV39242 / 233 @ 36 Vdc & 1.13 Amps
Parallel Connections**



Curves: System performance may differ depending on the drive capability.

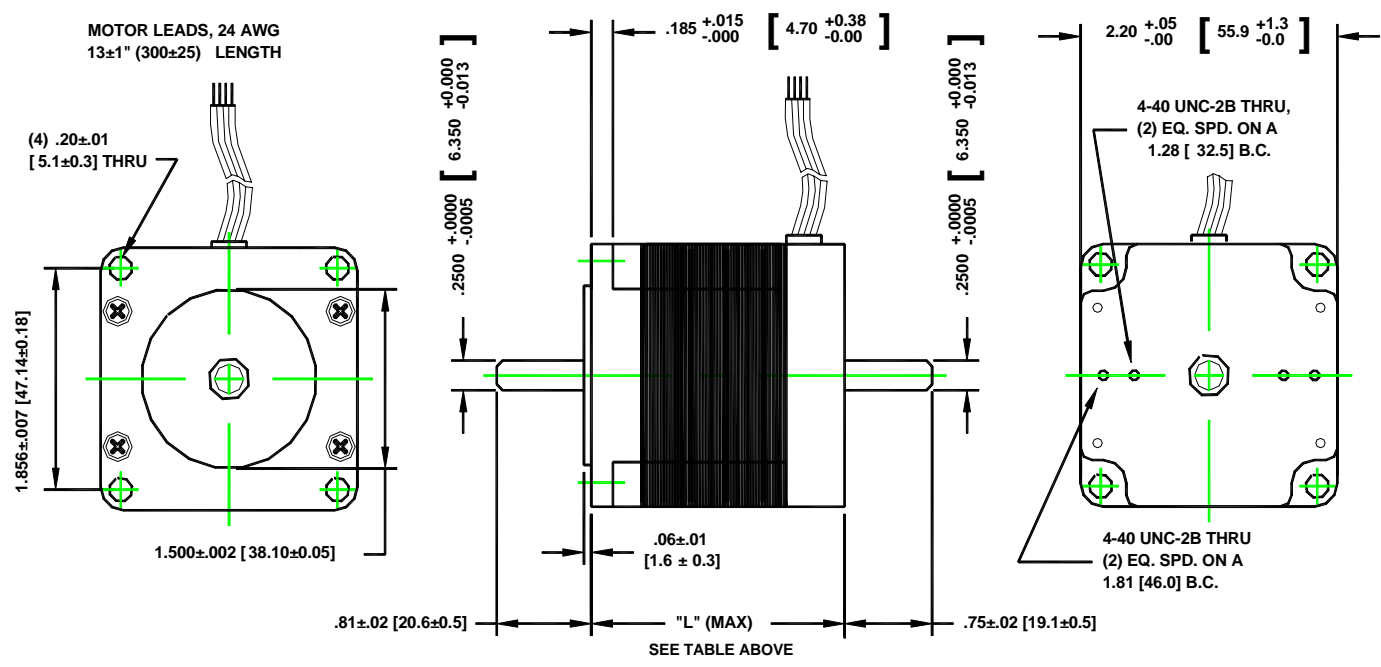
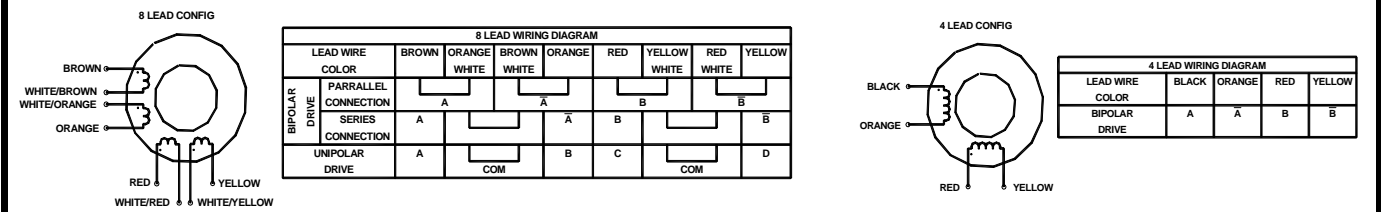
LK45 High Performance Step Motor

- 2.20 Inch Square (56mm) NEMA 23 Motor
- High Torque per Volume w/ High Stepping Rate
- Multiple Winding Configuration for Unipolar and Bipolar connections
- 1.8 Degree Step Angle (200 Full Steps / Rev)
- Ideal for 1/2 Step and Microstepping
- Single and Double Shaft (Encoder Ready) Configurations
- Nema Class B Insulation
- Optional Encoders and NEMA 23 "Bolt On" Brakes & Gearheads

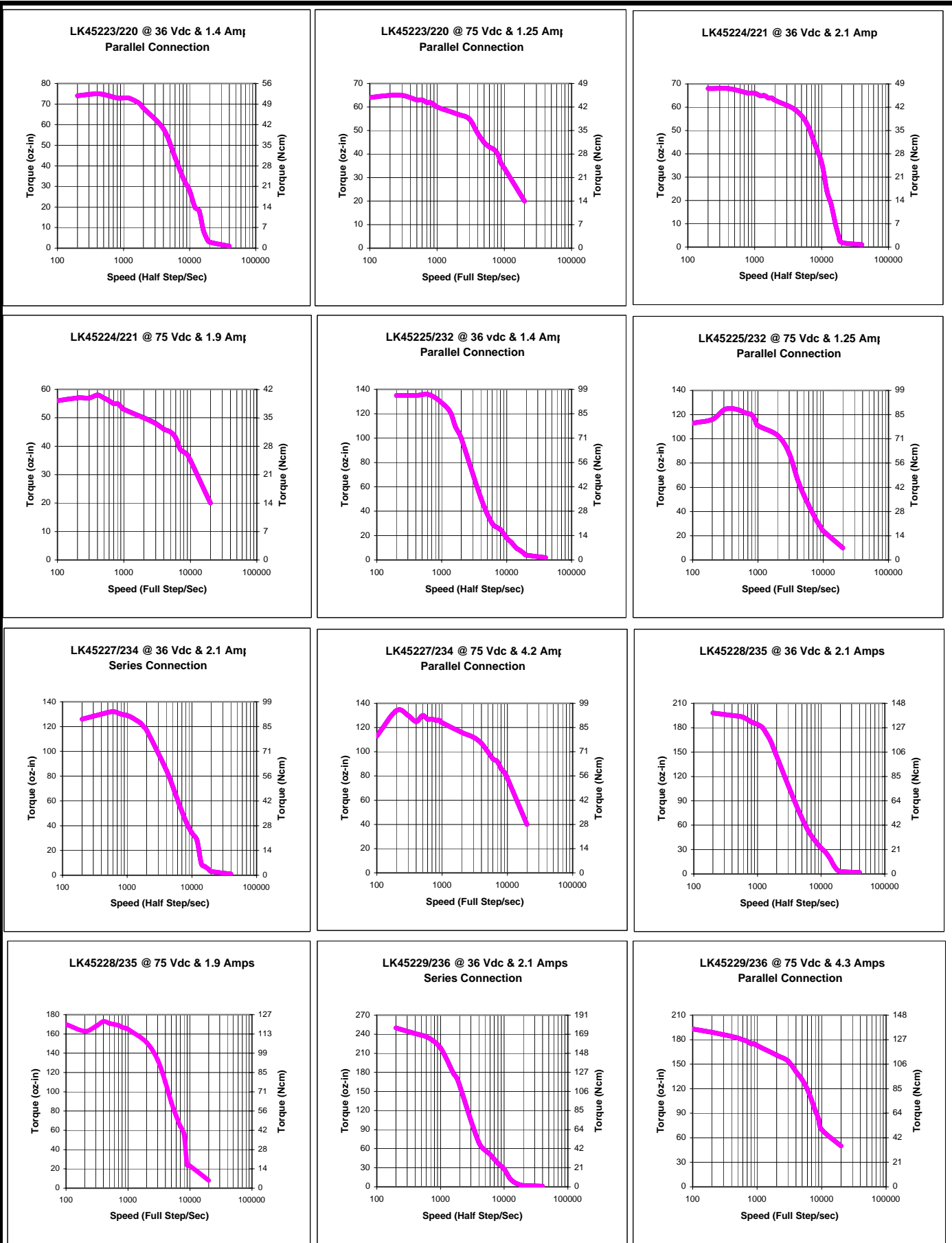


Catalog Number		Number of Leads	Phase Connection Types	Holding Torque		Voltage / phase	Current Rated / ph	Phase Res.	Phase Ind.	Inertia		Weight		Length	
Double	Single			2 Phases On	Th - Minimum					Vt	I _p	R _t	L	J _m	W
				Ncm	oz-in	Vdc	Amps DC	Ohms	mH	g-cm ²	oz-in-s ²	kg	lb	mm	inch
LK 45 220	LK 45 223	8	Parallel Series Unipolar	54	76	3.3	1.4	2.30	4.6	77	0.00109	0.5	1.10	41	1.61
				54	76	6.5	0.7	9.20	18.4						
				38	54	4.6	1.0	4.60	4.6						
LK 45 221	LK 45 224	4	4 lead	54	76	2.2	2.2	1.00	2.1	77	0.00109	0.5	1.10	41	1.61
LK 45 232	LK 45 225	8	Parallel Series Unipolar	111	157	4.4	1.4	3.10	8.8	220	0.00312	0.7	1.54	55	2.17
				111	157	8.8	0.7	12.40	35.2						
				78	110	6.2	1.0	6.20	8.8						
LK 45 234	LK 45 227	8	Parallel Series Unipolar	111	157	1.5	4.2	0.35	0.9	220	0.00312	0.7	1.54	55	2.17
				111	157	3.0	2.1	1.40	3.6						
				78	110	2.1	3.0	0.70	0.9						
LK 45 235	LK 45 228	4	4 lead	182	258	4.2	2.1	2.00	6.5	340	0.00482	1.0	2.20	77	3.03
LK 45 236	LK 45 229	8	Parallel Series Unipolar	182	258	2.3	4.2	0.55	1.7	340	0.00482	1.0	2.20	77	3.03
				182	258	4.7	2.1	2.20	6.8						
				128	181	3.3	3.0	1.10	1.7						

Notes: 1) Max. Terminal Voltage = 90 Vdc 2) -20 to 50 Degree C ambient operating Temperature 3) +/- 5% non-cumulative step accuracy



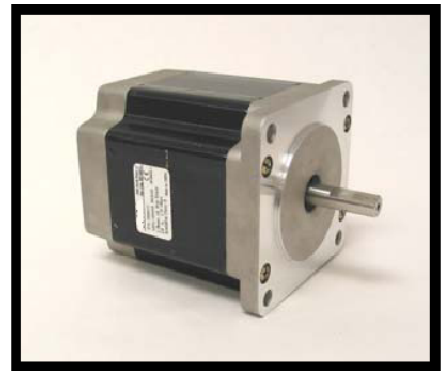
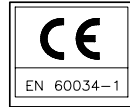
Speed Torque Performance Curves



Curves: System performance may differ depending on the drive capability.

LK56 High Performance Step Motor

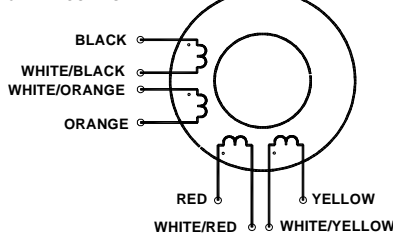
- 3.38 Inch Square (86 mm) NEMA 34 Motor
- High Torque per Volume w/ High Stepping Rate
- Multiple Winding Configuration for Unipolar and Bipolar connections
- 1.8 Degree Step Angle (200 Full Steps / Rev)
- Ideal for 1/2 Step and Microstepping
- Single and Double Shaft (Encoder Ready) Configurations
- Nema Class B Insulation
- Optional Encoders and NEMA 34 "Bolt On" Brakes & Gearheads



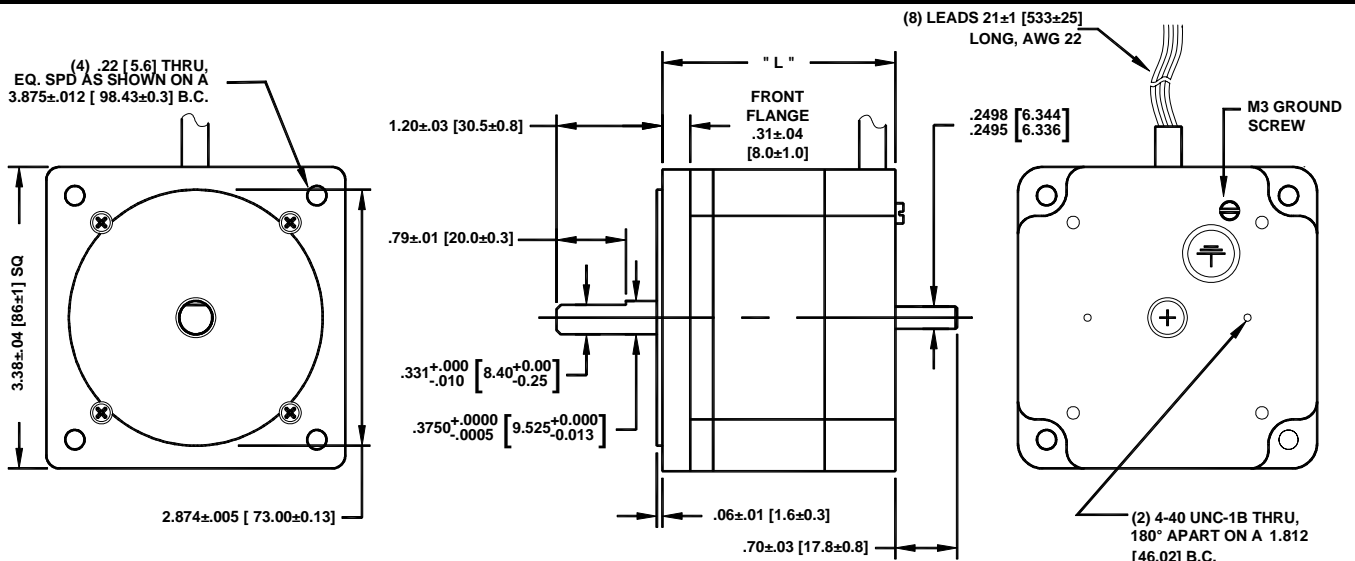
Catalog Number		Number of Leads	Phase Connection Types	Holding Torque		Voltage / phase Vdc	Current Rated / ph Ip Amps DC	Phase Res. Rt Ohms	Phase Ind. L mH	Inertia Jm		Weight W		Length Lm	
Double Shaft Configuration	Single			Ncm	oz-in					g-cm ²	oz-in-s ²	kg	lb	mm	inch
LK 56 320	LK 56 323	8	Parallel Series Unipolar	319	452	4.9	2.0	2.50	21.0	660	0.00935	1.7	3.75	67	2.64
				319	452	9.9	1.0	10.00	84.0						
				230	326	7.0	1.4	5.00	21.0						
LK 56 321	LK 56 324	8	Parallel Series Unipolar	319	452	2.6	4.0	0.65	5.1	660	0.00935	1.7	3.75	67	2.64
				319	452	5.1	2.0	2.60	20.4						
				230	326	3.6	2.8	1.30	5.1						
LK 56 332	LK 56 325	8	Parallel Series Unipolar	319	452	0.9	6.1	0.15	2.1	660	0.00935	1.7	3.75	67	2.64
				319	452	1.8	3.0	0.60	8.4						
				230	326	1.3	4.3	0.30	2.1						
LK 56 333	LK 56 326	8	Parallel Series Unipolar	538	762	3.4	4.0	0.85	7.7	1200	0.01699	2.5	5.51	94	3.70
				538	762	6.7	2.0	3.40	30.8						
				380	538	4.8	2.8	1.70	7.7						
LK 56 334	LK 56 327	8	Parallel Series Unipolar	538	762	2.3	6.1	0.38	3.5	1200	0.01699	2.5	5.51	94	3.70
				538	762	4.6	3.0	1.50	14.0						
				380	538	3.2	4.3	0.75	3.5						
IH 34 335	LK 56 328	8	Parallel Series Unipolar	920	1303	3.7	4.9	0.75	8.5	1800	0.02549	3.8	8.27	126	4.94
				920	1303	7.4	2.5	3.00	34.0						
				650	920	5.3	3.5	1.50	8.5						
IH 34 336	LK 56 329	8	Parallel Series Unipolar	920	1303	2.3	9.0	0.25	2.5	1800	0.02549	3.8	8.27	126	4.94
				920	1303	4.5	4.5	1.00	10.0						
				650	920	3.2	6.4	0.50	2.5						

Notes: 1) Max. Terminal Voltage = 170 Vdc 2) -20 to 50 Degree C ambient operating Temp. 3) +/- 5% non-cumulative step accuracy

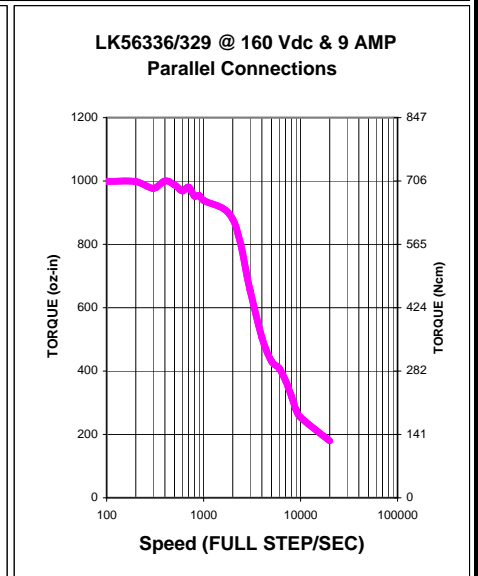
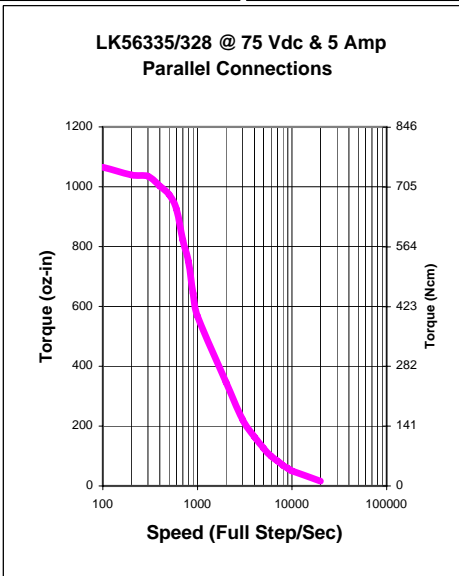
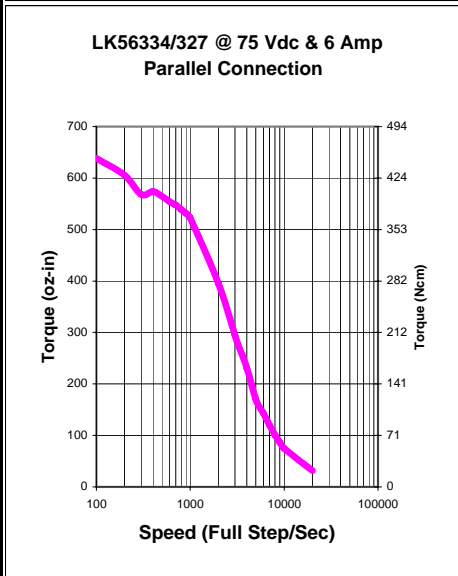
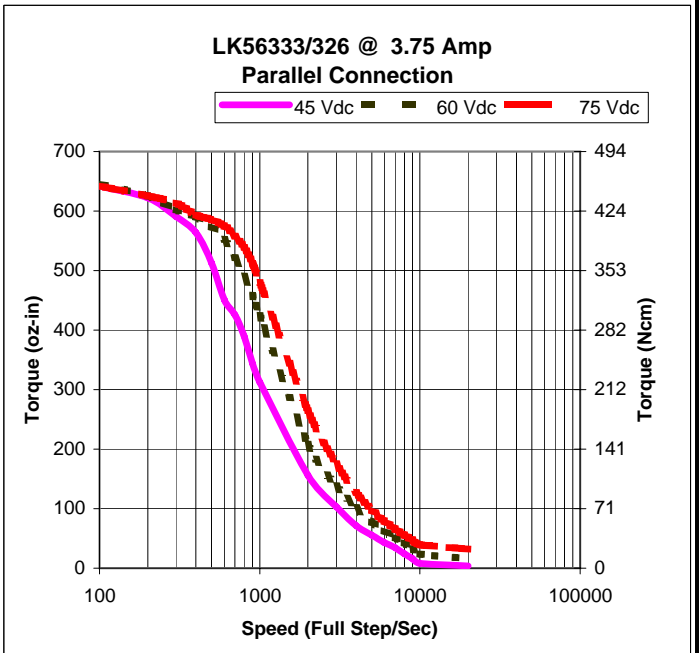
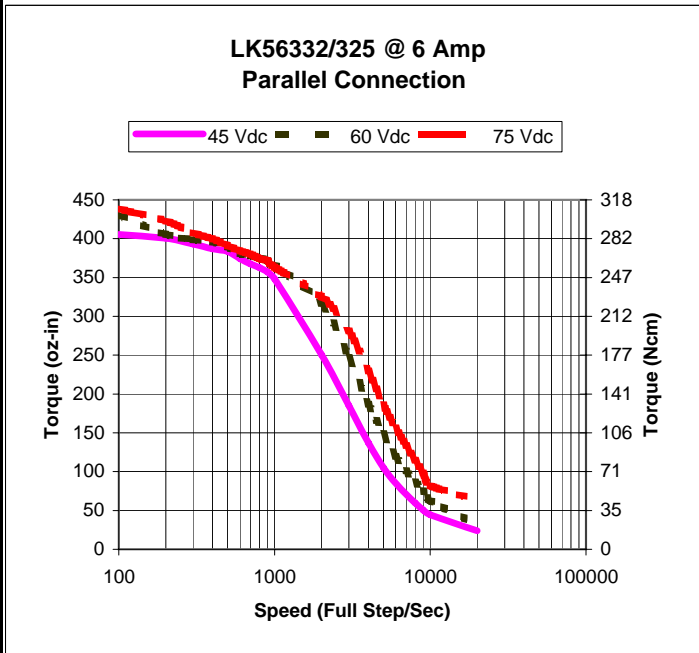
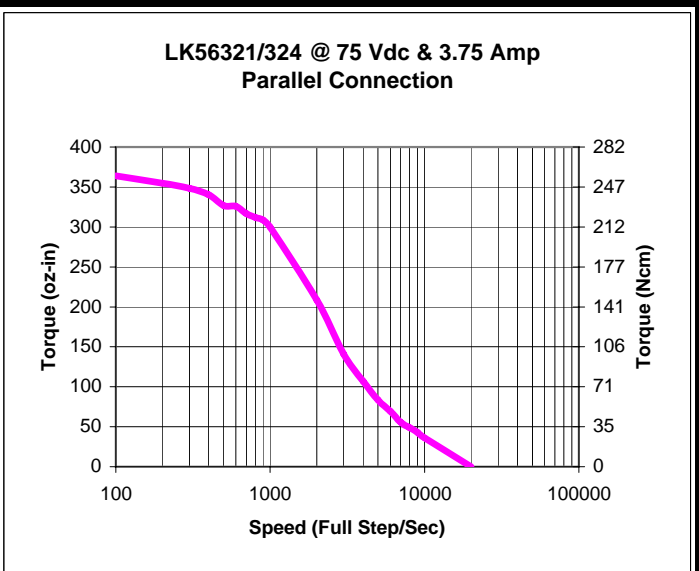
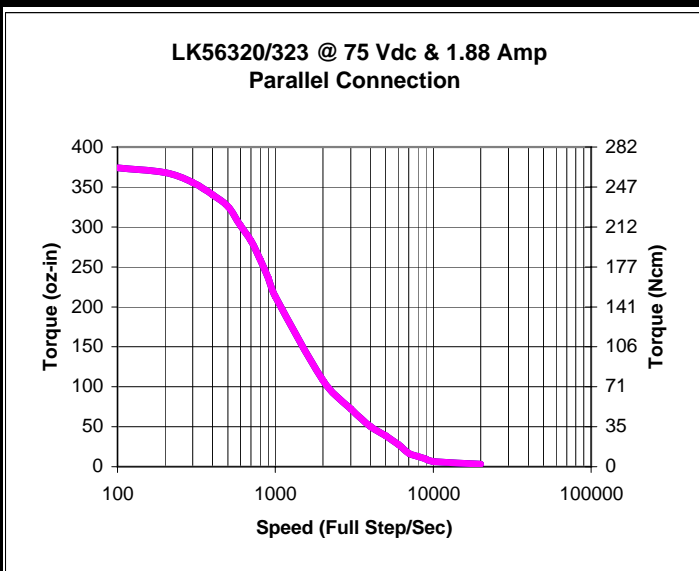
8 LEAD CONFIG



		BLACK	ORANGE	BLACK	ORANGE	RED	YELLOW	RED	YELLOW
		WHITE	WHITE	WHITE	WHITE	WHITE	WHITE	WHITE	WHITE
BIPOLAR DRIVE	PARRALLEL CONNECTION	A		A		B		B	
	SERIES CONNECTION	A	A		B	B		B	B
	UNIPOLAR DRIVE	A	COM		B	COM		D	D



Speed Torque Performance Curves



Curves: System performance may differ depending on the drive capability.

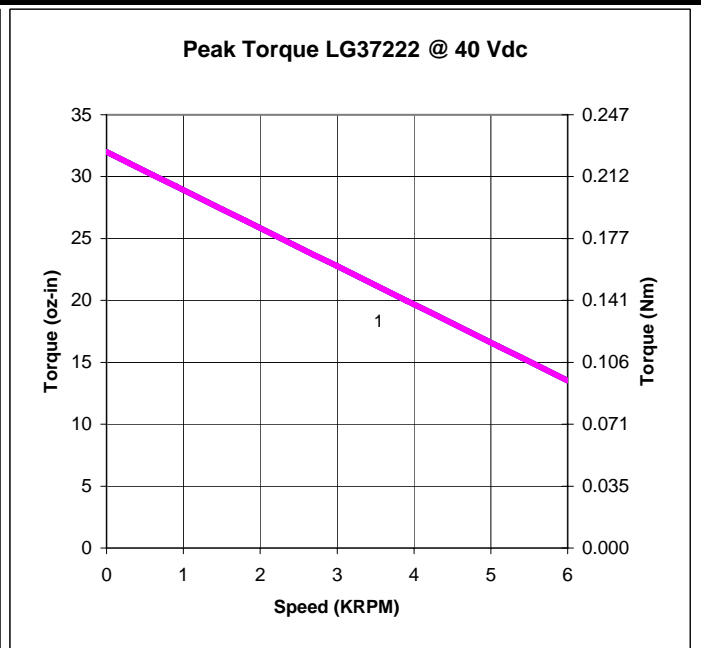
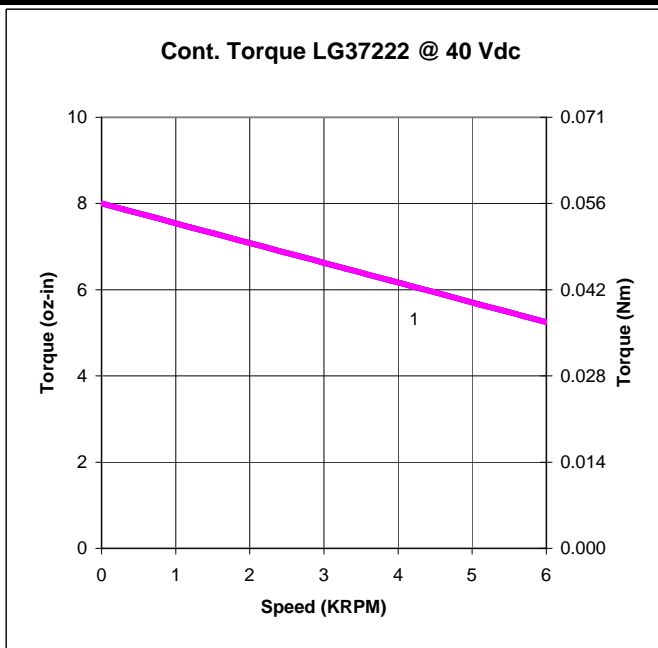
LG37222 DC Brush Moto

- 1.5 Inch Motor
- Continuous Torque, 8 oz-in
- Speeds up to 6000 rpm
- Voltage Rating up to 40 Vdc
- 10 Lb Radial Load 1/2" from Front Face
- Optical Encoders - Precision Modular, Optional
- "Bolt On" Brake or Precision Gearhead, Optional



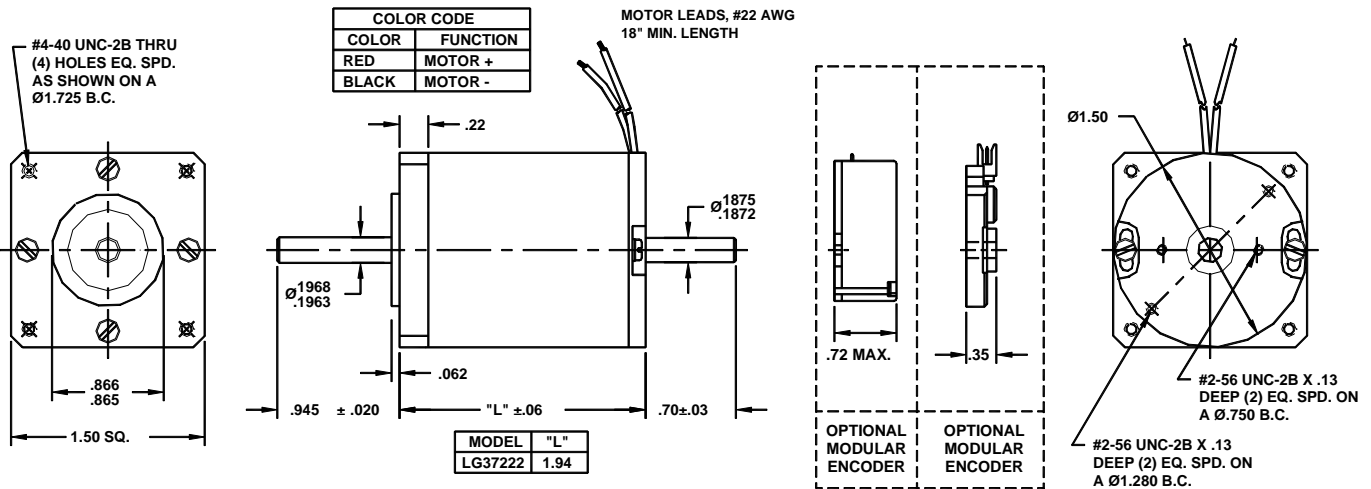
Catalog Number	Torque		Speed @ Vt ω RPM	Voltage Terminal Vt V dc	Current		Torque Constant		Voltage Constant Ke V / KRPM	Res. Rt ohms	Ind. L mH	Inertia		Weight Kg / lb
	Cont. Tcs	Peak Tps			Cont. Ics	Peak Ips	Nm / A	oz-in / A				Jm	oz-in-s ²	
	Nm / oz-in	Nm / oz-in	A	A	Nm / A	oz-in / A	kg-cm ²	oz-in-s ²						
LG37222	0.056 / 8	0.23 / 32	6000	40	1.9	7.7	0.0306	4.33	3.2	4.400	1.10	0.0212	0.0003	0.29 / 0.65

Notes: 1) 155C winding temp for Tc, Ic, Tp, Ip. All others @ 25C. 2) Tolerance on winding constants (+/- 10%), Resistance and Inductance (+/- 15%).



Curves: 1) LG37222

System Performance may differ depending on the drive capability



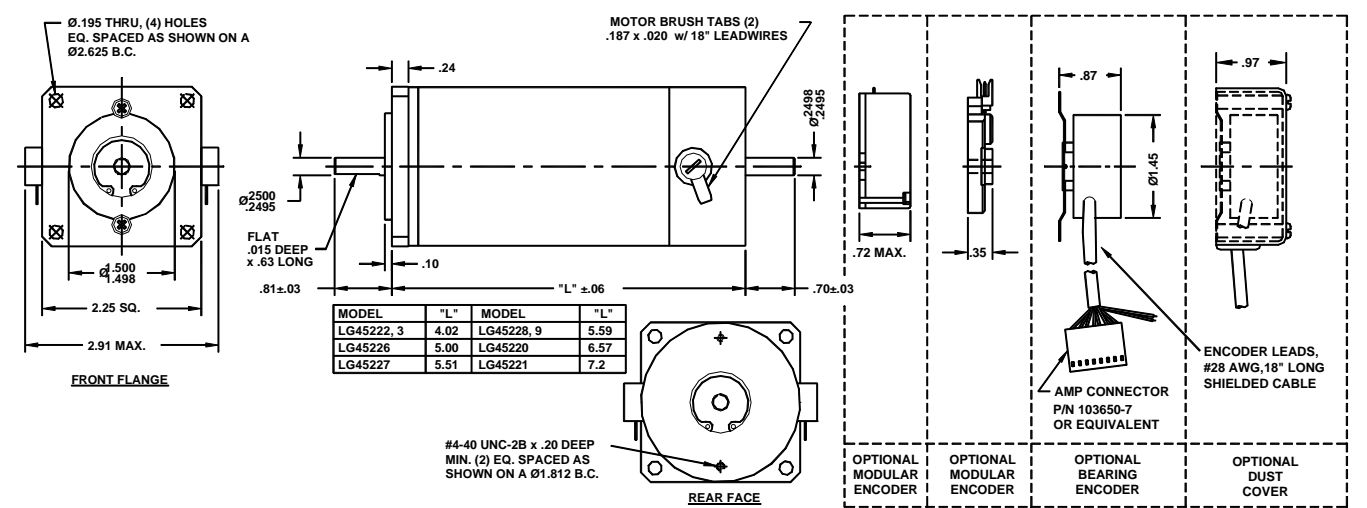
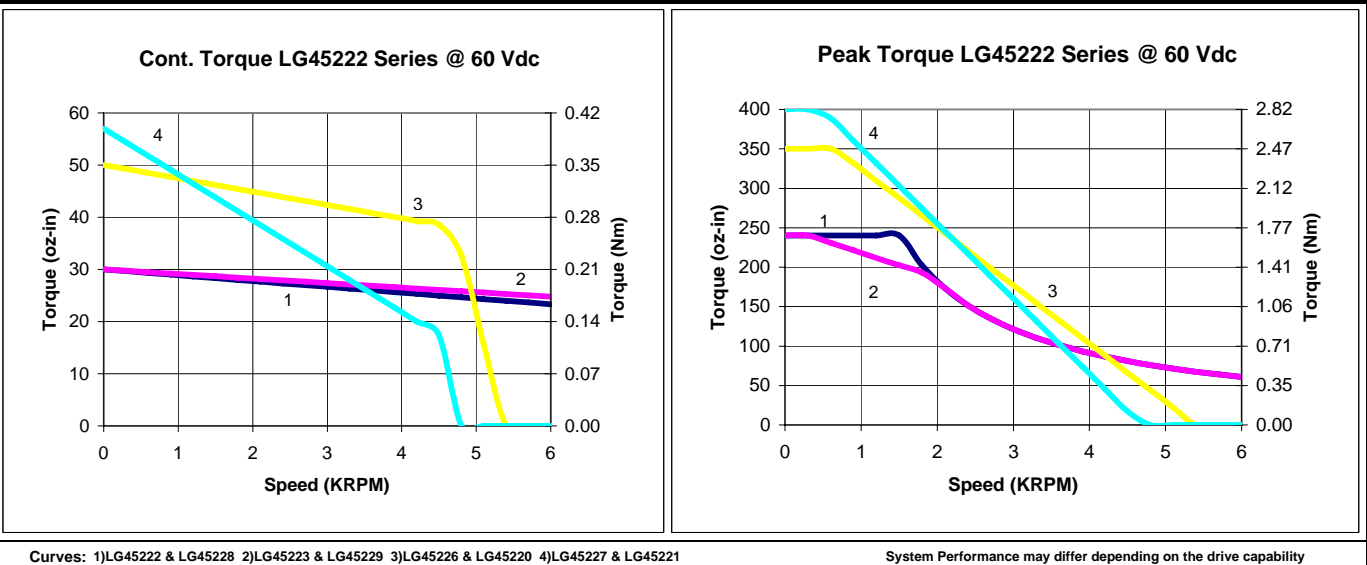
LG45222 DC Brush Motor

- 2.25 Inch NEMA 23 Motor
- Continuous Torque From 30 TO 57 oz-in
- Voltage Rating up to 60 Vdc w/ Speeds to 6000 rpm
- 10 Lb Radial Load 1/2" from Front Face
- Motor / Tachometer Versions (shaded), 14 V/Krpm
- Optical Encoders - Economical to High Precision, Optional
- NEMA 23 Low Cost Planetary Gearhead, Optional
- "Bolt On" Brake or Precision Gearhead, Optional



Catalog Number	Torque		Speed @ Vt ω RPM	Voltage Terminal Vt V dc	Current		Torque Constant		Voltage Constant Ke V / KRPM	Res. Rt ohms	Ind. L mH	Inertia		Weight Kg / lb
	Cont. Tcs Nm / oz-in	Peak Tps Nm / oz-in			Cont. Ics A	Peak Ips A	Nm / A	oz-in / A				kg-cm ²	oz-in-s ²	
LG45222	0.212 / 30	1.7 / 240	6000	60	4.3	34.0	0.0554	7.84	5.8	1.15	1.40	0.268	0.0038	1 / 2.2
LG45228	0.212 / 30	1.7 / 240	6000	60	4.3	34.0	0.0554	7.84	5.8	1.15	1.40	0.367	0.0052	1.29 / 2.85
LG45223	0.212 / 30	1.7 / 240	6000	60	3.3	26.7	0.0707	10.01	7.4	1.50	3.39	0.268	0.0038	1 / 2.2
LG45229	0.212 / 30	1.7 / 240	6000	60	3.3	26.7	0.0707	10.01	7.4	1.50	3.39	0.367	0.0052	1.29 / 2.85
LG45226	0.35 / 50	2.47 / 350	4700	60	3.7	26.1	0.1050	14.87	11	2.00	5.20	0.438	0.0062	1.41 / 3.1
LG45220	0.35 / 50	2.47 / 350	4700	60	3.7	26.1	0.1050	14.87	11	2.00	5.20	0.537	0.0076	1.7 / 3.75
LG45227	0.4 / 57	2.83 / 400	4000	60	3.7	25.9	0.1213	17.17	12.7	2.20	6.40	0.530	0.0075	1.59 / 3.5
LG45221	0.4 / 57	2.83 / 400	4000	60	3.7	25.9	0.1213	17.17	12.7	2.20	6.40	0.629	0.0089	1.88 / 4.15

Notes: 1) 155C winding temp. All others @ 25C. 2) Tolerance on winding constants (+/- 10%). Resistance and Inductance (+/- 15%).



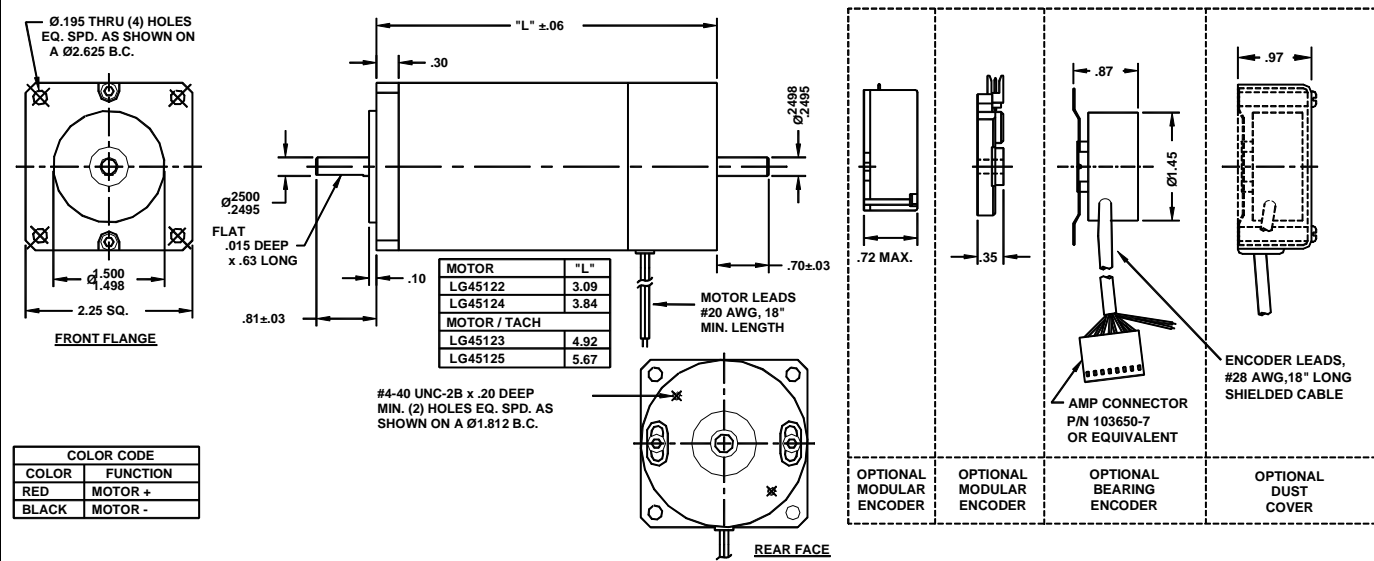
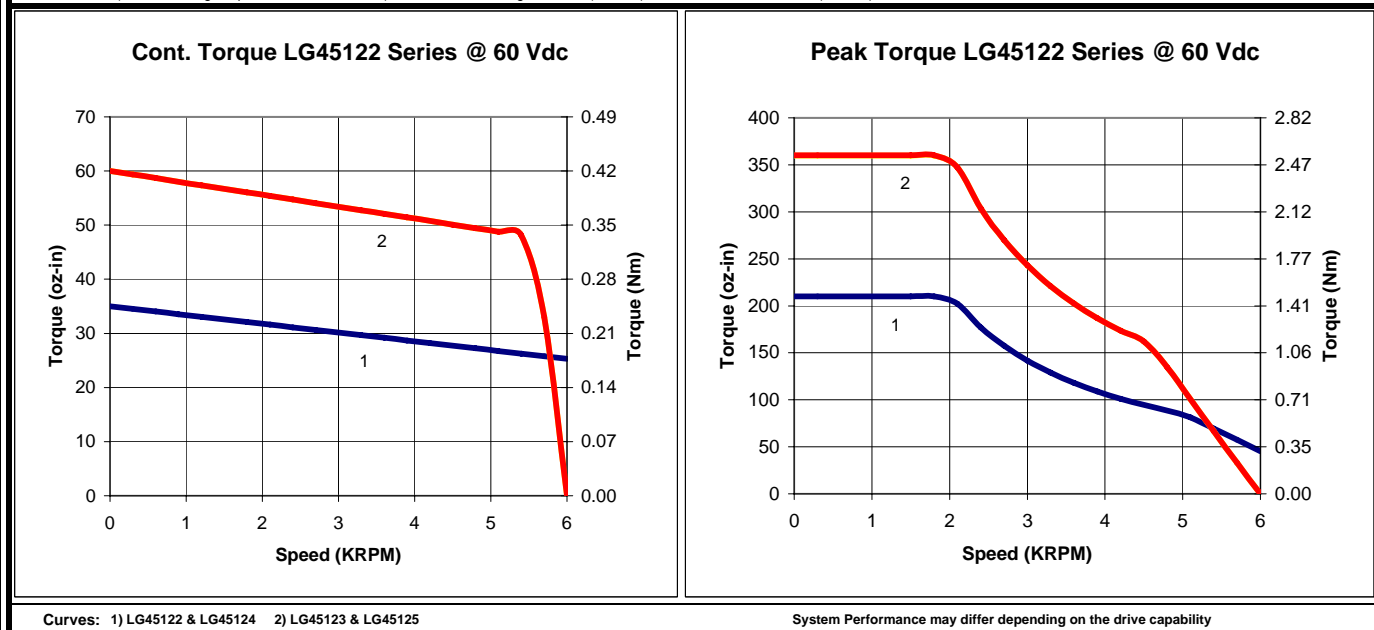
LG45122 DC Brush Motor

- 2.25 Inch NEMA 23 Motor
- Continuous Torque FROM 35 TO 150 oz-in
- Voltage Rating up to 60 Vdc w/ Speeds to 6000 rpm
- 10 Lb Radial Load 1/2" from Front Face
- Motor / Tachometer Versions (shaded), 7 V/Krpm
- Optical Encoders - Economical to High Precision, Optional
- NEMA 23 Low Cost Planetary Gearhead, Optional
- "Bolt On" Brake or Precision Gearhead, Optional



Catalog Number	Torque		Speed	Voltage	Current		Torque		Voltage	Res. Rt	Ind. L	Inertia		Weight
	Cont. Tcs	Peak Tps	@ Vt ω	Terminal Vt	Cont. Ics	Peak Ips	Constant Kt	Constant Ke	Jm			oz-in-s ²	Kg / lb	
	Nm / oz-in	Nm / oz-in	RPM	V dc	A	A	Nm / A	oz-in / A	V / KRPM	ohms	mH	kg-cm ²	oz-in-s ²	
LG45122	0.247 / 35	1.48 / 210	6000	60	3.5	20.8	0.0792	11.21	8.29	1.383	1.00	0.3178	0.0045	0.91 / 2
LG45123	0.247 / 35	1.48 / 210	6000	60	3.5	20.8	0.0792	11.21	8.29	1.383	1.00	0.3955	0.0056	1.22 / 2.7
LG45124	0.42 / 60	2.54 / 360	5500	60	5.0	29.7	0.0950	13.45	9.95	0.750	0.50	0.6356	0.009	1.59 / 3.5
LG45125	0.42 / 60	2.54 / 360	5500	60	5.0	29.7	0.0950	13.45	9.95	0.750	0.50	0.7133	0.0101	1.9 / 4.2

Notes: 1) 155C winding temp. All others @ 25C, 2) Tolerance on winding constants (+/- 10%), Resistance and Inductance (+/- 15%).



LG55222 DC Brush Motor

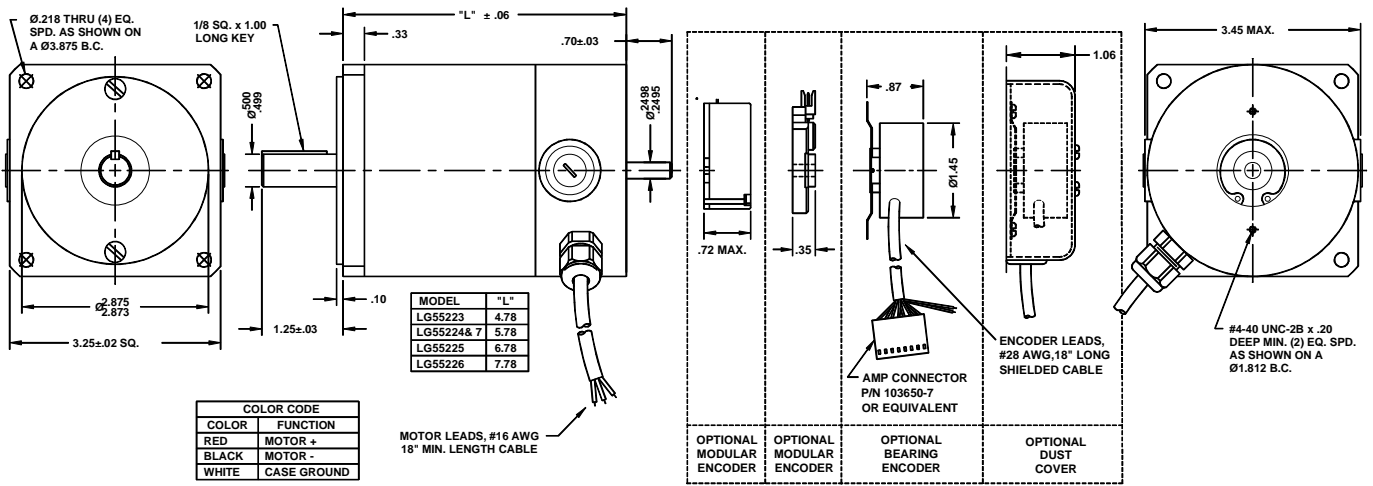
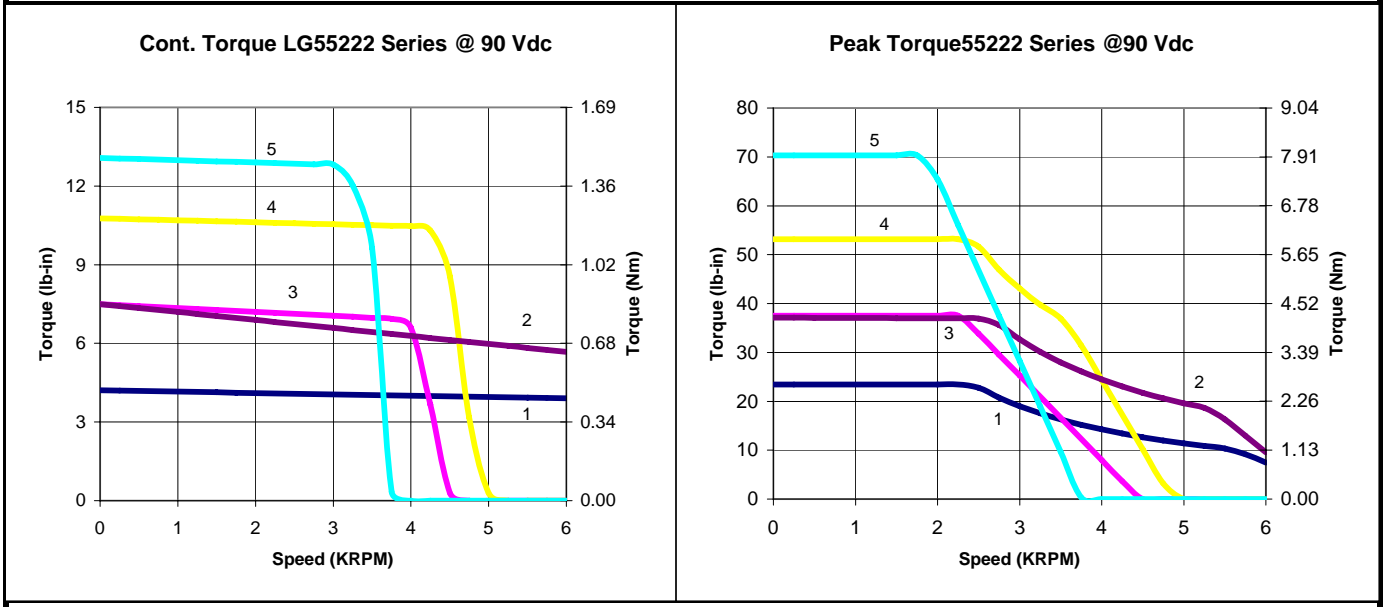
- 3.25 Inch HD NEMA 34 Motor
- Continuous Torque From 4.7 to 14 lb-in
- Speeds to 6000 rpm
- Voltage Rating up to 90 Vdc
- 30 Lb Radial Load 1/2" from Front Face
- Smooth, low cogging Magnetics
- Optical Encoders - Economical to High Precision, Optional
- "Bolt On" Brake or Precision Gearhead, Optional



LG55222 Instrument Grade DC Brush Motor

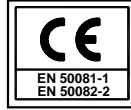
Catalog Number	Torque		Speed	Voltage	Current		Torque		Voltage	Res. Rt	Ind. L	Inertia		Weight
	Cont. Tcs	Peak Tps	@ Vt ω	Terminal Vt	Cont. Ics	Peak Ips	Constant Kt	Constant Ke	kg-cm ²			lb-in-s ²		
	Nm / lb-in	Nm / lb-in	RPM	V dc	A	A	Nm / A	lb-in / A	V / KRPM	ohms	mH			Kg / lb
LG55223	0.53 / 4.69	2.65 / 23.4	6000	90	4.9	24.7	0.1194	1.06	12.5	1.31	4.08	1.34	0.00119	2.54 / 5.6
LG55227	0.85 / 7.5	4.24 / 37.5	6000	90	7.4	36.9	0.1276	1.13	13.36	0.82	2.31	2.37	0.0021	3.27 / 7.2
LG55224	0.85 / 7.5	4.24 / 37.5	4000	90	4.9	24.6	0.1910	1.69	20	1.31	4.35	2.37	0.0021	3.27 / 7.2
LG55225	1.2 / 10.6	6 / 53.1	4200	90	7.6	38.0	0.1757	1.56	18.4	0.68	2.35	3.39	0.003	3.99 / 8.8
LG55226	1.59 / 14.1	7.94 / 70.3	3200	90	7.8	38.8	0.2273	2.01	23.8	0.86	2.76	4.45	0.00394	4.76 / 10.5

Notes: 1) 155C winding temp. All others @ 25C. 2) Tolerance on winding constants (+/- 10%), Resistance and Inductance (+/- 15%).



EPF 8F & 9G Servo Drives

- Economical Analog, 4 Quadrant Brushless Servo Drive
- 20 - 80 Vdc Rated Supply Input
- Current Ratings 6 & 7A Continuous, 12 & 15 Peak
- Dip Switch Selectable Settings
- Torque & Velocity Control Modes
- Output short circuit and over temperature protection
- Compact, Surface-mount Drive Technology
- Inaudible, High Frequency PWM switching
- UL Recognized, CE Marked



Drive Performance

Catalog Number	Voltage Range Vdc	Maximum Voltage Vdc	Max. Current Rating		Input Command Vdc range	Min. Load Inductance mH	Switching Frequency kHz	Bandwidth kHz	Over Voltage Shut Down V dc	Weight	
			Cont. Amps	Peak Amps						Kg	Lb
EPF 8F	20 - 60 V	60	6	12	+ / - 10	0.200	33	2.5	62	0.28	0.63
EPF 9G	20 - 80 V	80	7.5	15	+ / - 10	0.200	33	2.5	86	0.28	0.63

Motor / Drive System Performance

Torque Limits		Speed	Rated Torque		Rated Speed	Rated Bus Voltage	Motor Inertia	Motor Diameter	Motor Catalog Number	Drive Catalog Number
Cont. Stall Tcs oz-in	Peak Stall Tps oz-in	Limit Wnl rpm	Cont. Rated Tcr oz-in	Peak Rated Tpr oz-in	Speed Wr rpm	Vb Vdc	Jm oz-in-s ²	inch	Number	Number
2	10	9000	1	3	9000	40	0.00001	1	LE32222	EPF 8F
4	20	9000	2	5	9000	60	0.00002	1	LE32223	EPF 8F
10	50	9000	7	14	7500	60	0.00024	1.5 0	LE39222	EPF 8F
30	92	9000	26	40	6000	60	0.00062	1.75	LE39223	EPF 8F
20	60	6000	15	27	4000	60	0.0011	2.25	LE45033	EPF 8F
38	114	6000	29	52	4000	60	0.0017	2.25	LE45043	EPF 8F
55	143	6000	40	75	4000	60	0.0025	2.25	LE45053	EPF 8F
70	210	6000	66	104	3000	80	0.0032	2.25	LE45063	EPF 9G
50	150	5200	45	75	3750	60	0.0019	2.25	LE45222	EPF 8F
50	150	3450	45	84	2000	60	0.0019	2.25	LE45225	EPF 8F
90	218	4150	82	152	3000	60	0.0037	2.25	LE45223	EPF 8F
90	270	2600	83	155	1750	60	0.0037	2.25	LE45226	EPF 9G
110	245	6000	98	183	5000	80	0.0055	2.25	LE45224	EPF 9G
110	327	2750	101	190	2100	60	0.0055	2.25	LE45228	EPF 8F
Tcs lb-in	Tps lb-in	Wnl rpm	Tcr lb-in	Tpr lb-in	Wr rpm	Vb Vdc	Jm lb-in-s ²	Diameter inch	Catalog Number	Catalog Number
6.3	13	6000	5.91	10.06	4250	60	0.00088	3.2 5	LE54224	EPF 9G
8.39	17	6000	7.87	13.00	3250	60	0.00113	3.25	LE54225	EPF 9G
5.6	17	3200	4.69	7.80	1250	80	0.0006	3.25	LE56229	EPF 9G
8.4	18	5100	7.03	10.69	2500	80	0.0009	3.25	LE56224	EPF 9G
3.8	11	4800	2.91	4.75	3500	60	0.00014	2.25	DE45222	EPF 8F
3.8	11	2350	2.97	4.63	1400	60	0.00014	2.25	DE45225	EPF 8F
7.5	23	3900	6.00	9.50	3000	80	0.00026	2.25	DE45223	EPF 9G
7.5	23	2400	6.00	9.00	1750	60	0.00026	2.25	DE45226	EPF 8F
11.3	33	1700	9.20	14.50	1000	60	0.00037	2.25	DE45228	EPF 8F
17.0	63	1450	15.57	23.00	750	80	0.001	3.25	DE56225	EPF 9G
30.0	62	1500	27.50	46.00	800	80	0.0018	3.25	DE56226	EPF 9G
44.0	93	1000	40.75	66.00	500	80	0.0026	3.25	DE56227	EPF 9G

The EPF 8F and 9G are stand alone, compact, high efficiency brushless drives providing economical analog torque or velocity control of low to medium power permanent magnet brushless motors. These Drives require an unregulated DC power supply. These Models interface with typical digital position loop controllers or can be operated as a stand-alone drive.

Protection / Diagnostics

- Over-voltage protection
- Over-current protection
- Over Temperature protection
- Build in Test mode
- LED Status Indicator
- Short Circuit Protection

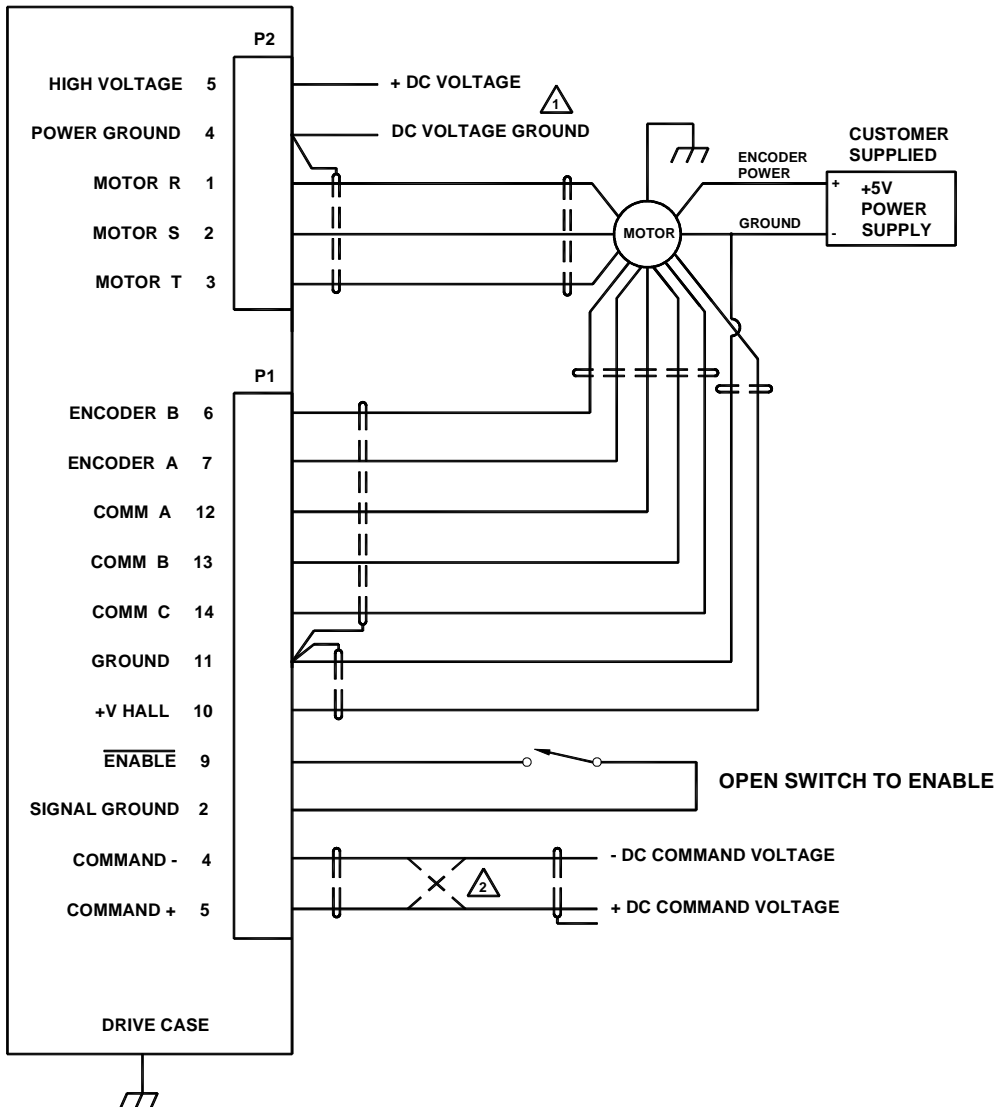
Adjustments

- Loop & Command Gain
- Current Limit (Peak and continuous)
- Offset

General Features

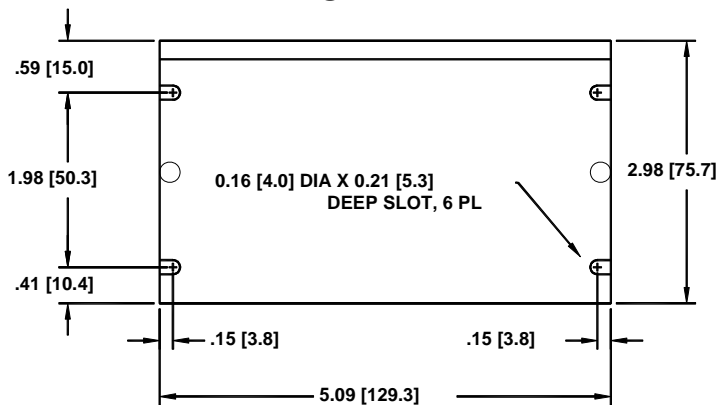
- Back or Side Panel Mounting
- +/- 5V Regulated Outputs (5 mA)
- Current Monitor Output
- Velocity Monitor Output
- Fault Output
- Modes (current, encoder, open loop)
- 120/60 degree Hall Phasing (switch select)
- Differential analog Command Input +/- 10V

Typical Connection Diagram - EPF 8F & 9G

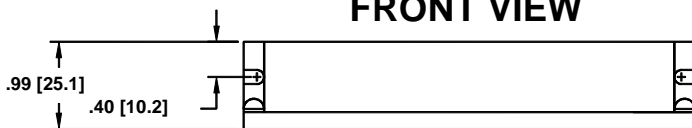


Dimensions - EPF 8F & 9G

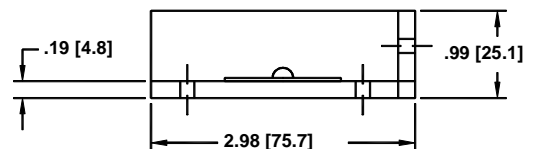
TOP VIEW



FRONT VIEW

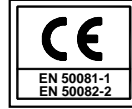


SIDE VIEW



EPF 340 Servo Drives

- Economical Analog, 4 Quadrant Brushless Servo Drive
- 115 Vac Line Input
- Current Rated at 12.5A Continuous, 25A Peak
- Dip Switch Selectable Settings
- Torque & Velocity Control Modes
- Output short circuit and over temperature protection
- Compact, Surface-mount Drive Technology
- Inaudible, High Frequency PWM switching
- UL Recognized, CE Marked



Drive Performance

Catalog Number	Voltage Range Vac	Maximum Voltage Vdc	Max. Current Rating		Input Command Vdc range	Min. Load Inductance mH	Switching Frequency kHz	Bandwidth kHz	Over Voltage Shut Down V dc	Weight	
			Cont. Amps	Peak Amps						Kg	Lb
EPF 340	25 - 130 V	170	12.5	25	+ / - 10	0.250	22	2.5	190	1.13	2.5

Motor / Drive System Performance

Torque Limits		Speed Limit Wnl rpm	Rated Torque		Rated Speed Wr rpm	Rated Bus Voltage Vb Vdc	Motor Inertia Jm lb-in-s ²	Motor Diameter inch	Motor Catalog Number	Drive Catalog Number
Cont. Stall Tcs lb-in	Peak Stall Tps lb-in		Cont. Rated Tcr lb-in	Peak Rated Tpr lb-in						
7.2	18	6000	5.04	12.41	6000	170	0.00088	3.25	LE54224	EPF 340
9.40	23	6000	6.45	15.04	6000	170	0.00113	3.25	LE54225	EPF 340
11.3	23	6000	7.71	18.85	6000	170	0.00138	3.25	LE54226	EPF 340
13.5	27	6000	8.91	20.51	6000	170	0.00163	3.25	LE54227	EPF 340
15.6	31	5000	11.36	24.97	5000	170	0.00188	3.25	LE54228	EPF 340
5.6	17	5000	4.63	8.73	3000	170	0.0006	3.25	LE56229	EPF 340
8.4	25	6000	6.92	13.33	5000	170	0.0009	3.25	LE56224	EPF 340
11.6	32	6000	9.59	17.72	4500	170	0.0011	3.25	LE56225	EPF 340
13.4	29	5000	11.14	22.39	4500	170	0.0014	3.25	LE56226	EPF 340
15.6	32	4500	13.02	26.08	4000	170	0.0018	3.25	LE56227	EPF 340
18.1	38	4000	14.91	28.01	4000	170	0.0021	3.25	LE56228	EPF 340
3.8	11	6000	2.87	5.94	4500	170	0.00014	2.25	DE45225	EPF 340
7.5	23	6000	5.88	11.88	6000	170	0.00026	2.25	DE45223	EPF 340
7.5	23	6000	5.92	11.5	5000	170	0.00026	2.25	DE45226	EPF 340
7.5	23	4200	6.01	11.13	3000	170	0.00026	2.25	DE45227	EPF 340
11.3	34	4900	9.01	14.68	3500	170	0.00037	2.25	DE45228	EPF 340
15.6	39	6000	8.37	20.78	6000	170	0.0005	2.25	DE45224	EPF 340
17.0	41	6000	15.06	26.38	4000	170	0.001	3.25	DE56222	EPF 340
30.0	61	5450	26.91	40.41	3500	170	0.0018	3.25	DE56223	EPF 340

Notes 1) System Performance may differ somewhat from these nominal values

The EPF 340 is a compact, high efficiency brushless drive providing economical analog torque or velocity control of medium power permanent magnet brushless motors. These drives have an integrated power supply and operate off 115V Vac. These Models interface with typical digital position loop controllers or can be operated as a stand-alone drive.

Protection / Diagnostics

- Over-voltage protection
- Over-current protection
- Over Temperature protection
- Build in Test Mode
- LED Status Indicator
- Short Circuit Protection (built in fuses)

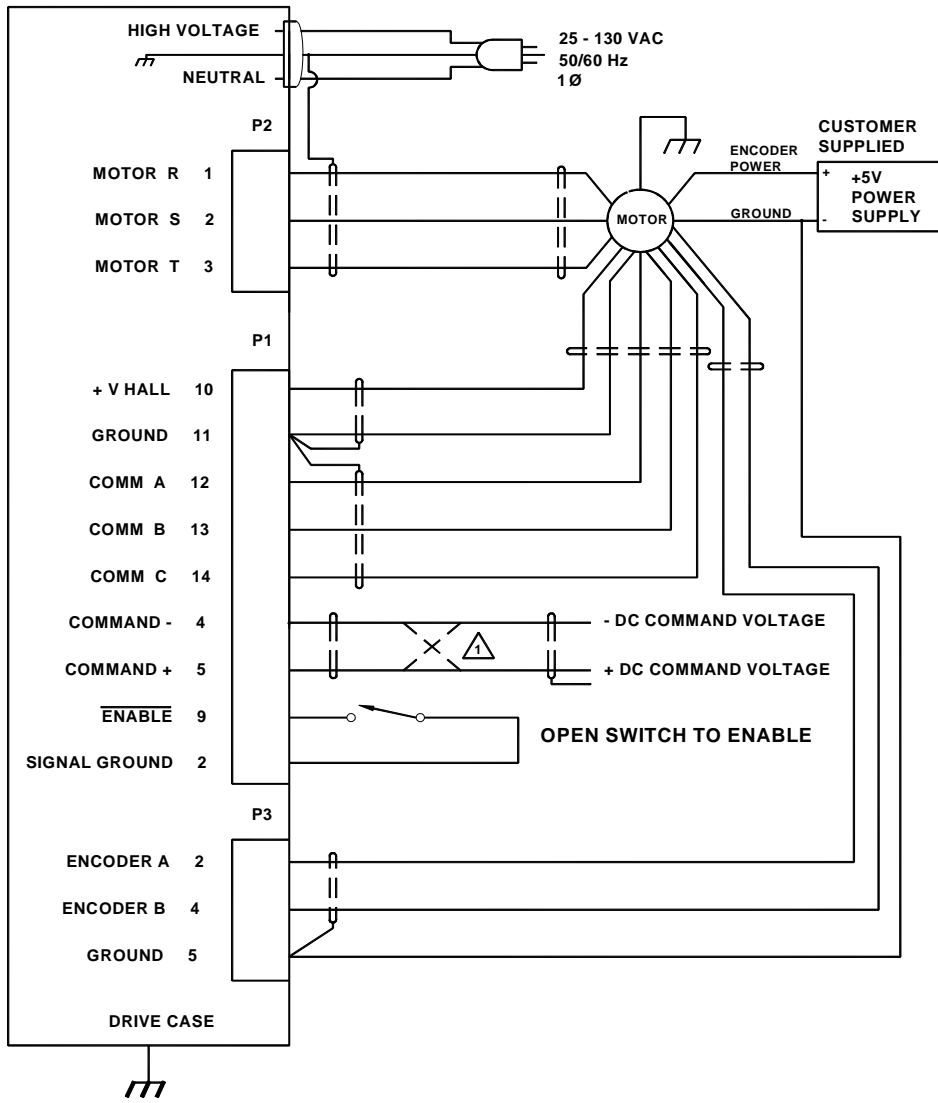
Adjustments

- Loop & Command Gain
- Current Limit (Peak and continuous)
- Offset

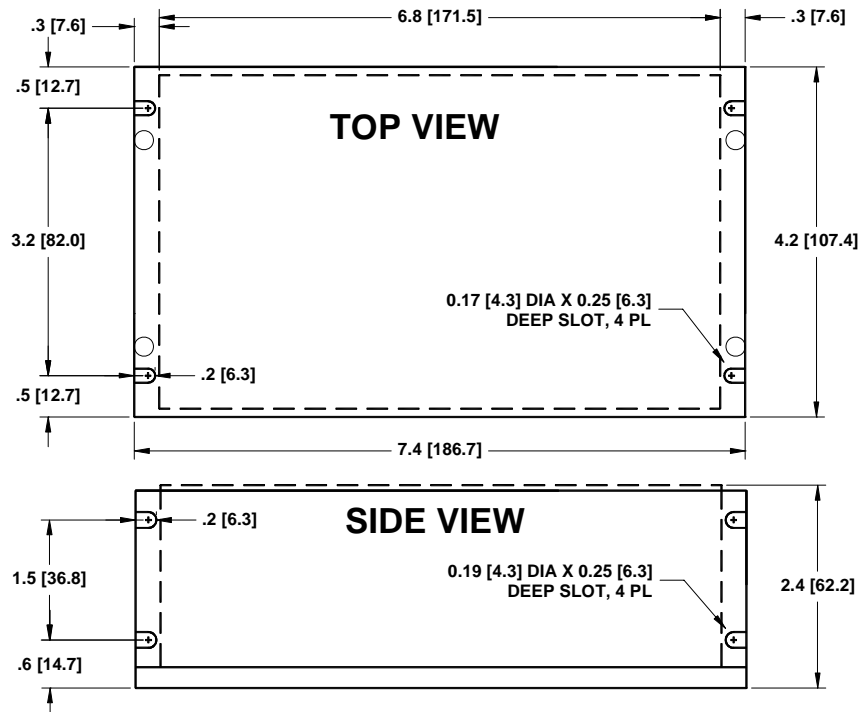
General Features

- Back or Side Panel Mounting
- +/- 10 V Regulated Outputs (5mA)
- Built in Shunt Regulator
- Inhibit Line (turns off outputs)
- Modes (current, velocity, open loop)
- 2 Velocity Modes Option (tach or encoder)
- Fault, Current and Velocity Outputs
- Differential analog Command Input +/- 10V

Typical Connection Diagram - EPF 340



Dimensions - EPF 340



EPF 34K Servo Drives

- Economical Analog, 4 Quadrant Brushless Servo Drive
- 208 / 230 Vac Line Input
- Current Rated at 12.5A Continuous, 25A Peak
- Dip Switch Selectable Settings
- Torque & Velocity Control Modes
- Output short circuit and over temperature protection
- Fault and Current Monitor Outputs
- Inaudible, High Frequency PWM switching
- Compact, Surface-mount Drive Technology
- Contact MCG for Motor power cables
- UL Recognized, CE Marked



Drive Performance

Catalog Number	Voltage Range	Maximum Voltage	Max. Current Rating		Input Command	Min. Load Inductance	Switching Frequency	Bandwidth	Over Voltage Shut Down	Weight	
	Vac	Vdc	Cont. Amps	Peak Amps	Vdc range	mH	kHz	kHz	V dc	Kg	Lb
EPF 34K	70 - 270 V	325	12.5	25	+ / - 10	0.660	20	2.5	390	2.17	4.8

Motor / Drive System Performance

Torque Limits		Speed	Rated Torque		Rated Speed	Rated Bus Voltage	Motor Inertia	Motor Diameter	Motor Catalog Number	Drive Catalog Number
Cont. Stall Tcs	Peak Stall Tps	Limit Wnl	Cont. Rated Tcr	Peak Rated Tpr	Wr	Vb	Jm	inch		
lb-in	lb-in	rpm	lb-in	lb-in	rpm	Vdc	lb-in-s ²			
11.3	34	4000	8.99	17.32	4000	325	0.00037	2.25	DE45229	EPF 34K
15.6	47	5500	10.05	25.82	4500	325	0.0005	2.25	DE45229	EPF 34K
17.0	85	4200	15.39	28.64	2500	325	0.001	3.25	DE46225	EPF 34K
30.0	103	4500	26.65	40.16	4000	325	0.0018	3.25	DE46226	EPF 34K
44.0	154	4100	40.12	68.11	2500	325	0.0026	3.25	DE46227	EPF 34K

Notes 1) System Performance may differ somewhat from these nominal values

The EPF 34K is a compact, high efficiency brushless drive providing economical analog torque or velocity control of medium power permanent magnet brushless motors. These drives have an integrated power supply and operate off 208 / 230 Vac. These Models interface with typical digital position loop controllers or can be operated as a stand-alone drive.

Protection / Diagnostics

- Over-voltage protection
- Over-current protection
- Over Temperature protection
- Build in Test Mode
- LED Status Indicator
- Short Circuit Protection (built in fuses)

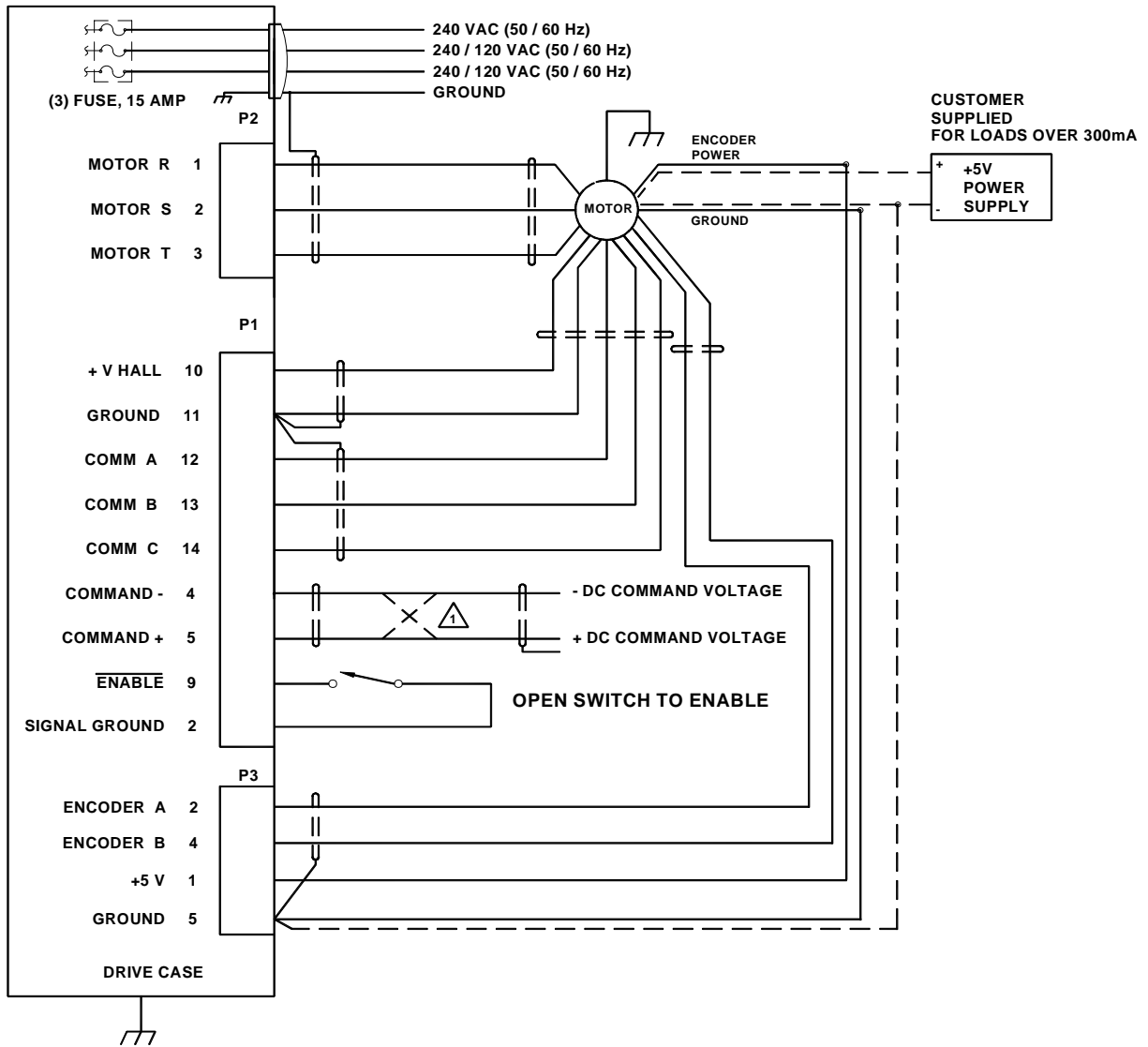
Adjustments

- Loop & Command Gain
- Current Limit (Peak and continuous)
- Offset

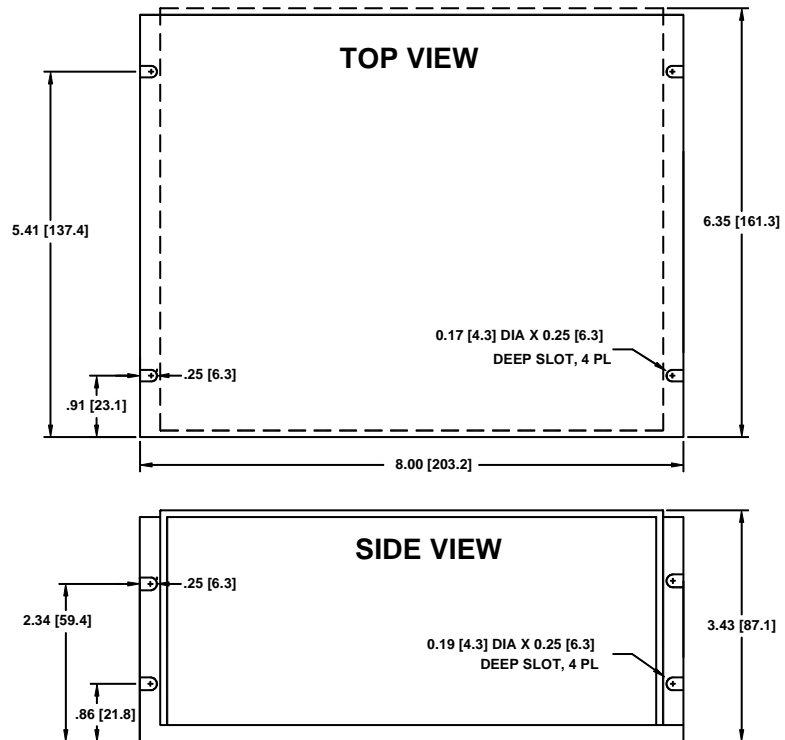
General Features

- Back or Side Panel Mounting
- +/- 10 V Regulated Outputs (5mA)
- Built in Shunt Regulator
- Inhibit Line (turns off outputs)
- Modes (current, velocity, open loop)
- 3 Velocity Modes Option (tach, hall or encoder)
- Fault, Current and Velocity Outputs
- Differential analog Command Input +/- 10V

Typical Connection Diagram - EPF 34K

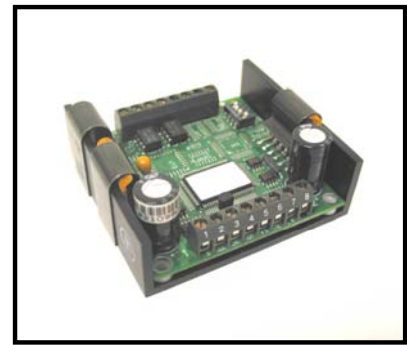


Dimensions - EPF 34K



PVG 47F Microstepping Driver

- Compact size using ASIC and SMT Technology
- 12 - 48 Vdc Rated Supply Input
- 0.4 - 3 Arms Rated Phase Current, Up to 4 Amps Peak
- Optically Isolated STEP, DIRECTION, ENABLE, and RESET inputs
- Up to 10 MHz STEP Frequency Input
- Microstep resolutions up to 51,200 s/rev with 1.8 Degree Motors
- Full STEP and FAULT Outputs
- Single and Double Shaft (Encoder Ready) Motor Configurations



Drive Performance								
Catalog Number	Voltage Range Vdc	Current Rating		Switch Freq kHz	Steps per revolution (1.8 Degree Two Phase Motor)	Weight		
		RMS Ic	Peak Ip			Kg	Lb	
PVG 47F	+12 to 48	0.40 to 3	0.57 to 4	20	400, 800, 1k, 1600, 2k, 3200, 5k, 6400, 10k, 12800, 25k, 25600, 50k, 51200	0.113	0.25	

Holding Torque 2 Phases On Th - Minimum		Current Rated / ph Iph Amps DC	Phase Connection Types	Motor Inertia Jm		Motor Diameter		Motor Length Lm		Motor Weight W		Motor Catalog Number Shaft Configuration		Drive Catalog Number
Ncm	oz-in			g-cm ²	oz-in-s ²	mm	inch	mm	inch	kg	lb	Double	Single	
14	20	0.4	Parallel Series	18	0.00025	42	1.66	34	1.34	0.2	0.44	LK 45 223	LK 45 223	PVG 47F
20	29	0.3										LK 45 224	LK 45 224	
17	24	1.5	4 lead	18	0.00025	42	1.66	34	1.34	0.2	0.44	LK 45 229	LK 45 225	PVG 47F
24	34	0.8	Parallel Series	55	0.00078	42	1.66	39	1.54	0.3	0.57	LK 45 221	LK 45 238	PVG 47F
34	48	0.6										LK 45 227	LK 45 230	
31	44	1.0	4 lead	32	0.00045	42	1.66	43	1.69	0.3	0.66	LK 45 227	LK 45 230	PVG 47F
55	78	1.1	Parallel Series	68	0.00096	42	1.66	47	1.85	0.3	0.73	LK 45 011	LK 45 242	PVG 47F
55	78	0.6										LK 45 011	LK 45 242	
54	76	1.4	Parallel Series	77	0.00109	56	2.20	41	1.61	0.5	1.10	LK 45 220	LK 45 223	PVG 47F
54	76	0.7										LK 45 221	LK 45 224	
54	76	2.2	4 lead	77	0.00109	56	2.20	41	1.61	0.5	1.10	LK 45 221	LK 45 224	PVG 47F
111	157	1.4	Parallel Series	220	0.00312	56	2.20	55	2.17	0.7	1.54	LK 45 232	LK 45 225	PVG 47F
111	157	0.7										LK 45 234	LK 45 227	
111	157	2.1	Series	220	0.00312	56	2.20	55	2.17	0.7	1.54	LK 45 234	LK 45 227	PVG 47F
182	258	2.1	4 lead	340	0.00482	56	2.20	77	3.03	1.0	2.20	LK 45 235	LK 45 228	PVG 47F
182	258	2.1	Series	340	0.00482	56	2.20	77	3.03	1.0	2.20	LK 45 236	LK 45 229	PVG 47F
319	452	2.0	Parallel Series	660	0.00935	86	3.39	67	2.64	1.7	3.75	IH 34 320	IH 34 323	PVG 47F
319	452	1.0										IH 34 321	IH 34 324	
319	452	2.0	Series	660	0.00935	86	3.39	67	2.64	1.7	3.75	IH 34 321	IH 34 324	PVG 47F
319	452	3.0	Series	660	0.00935	86	3.39	67	2.64	1.7	3.75	IH 34 332	IH 34 325	PVG 47F
538	762	2.0	Series	1200	0.01699	86	3.39	94	3.70	2.5	5.51	IH 34 333	IH 34 326	PVG 47F
538	762	3.0	Series	1200	0.01699	86	3.39	94	3.70	2.5	5.51	IH 34 334	IH 34 327	PVG 47F
920	1303	2.5	Series	1800	0.02549	86	3.39	126	4.94	3.8	8.27	IH 34 335	IH 34 328	PVG 47F

The PVG 47F is an economical and compact size microstepping driver for use with Step Motors. These Drives require single an unregulated DC power supply. These Models interface with typical Indexers.

Protection / Diagnostics

- Thermal
- Phase to ground
- Phase to Phase
- Voltage to Phase
- Fault Output

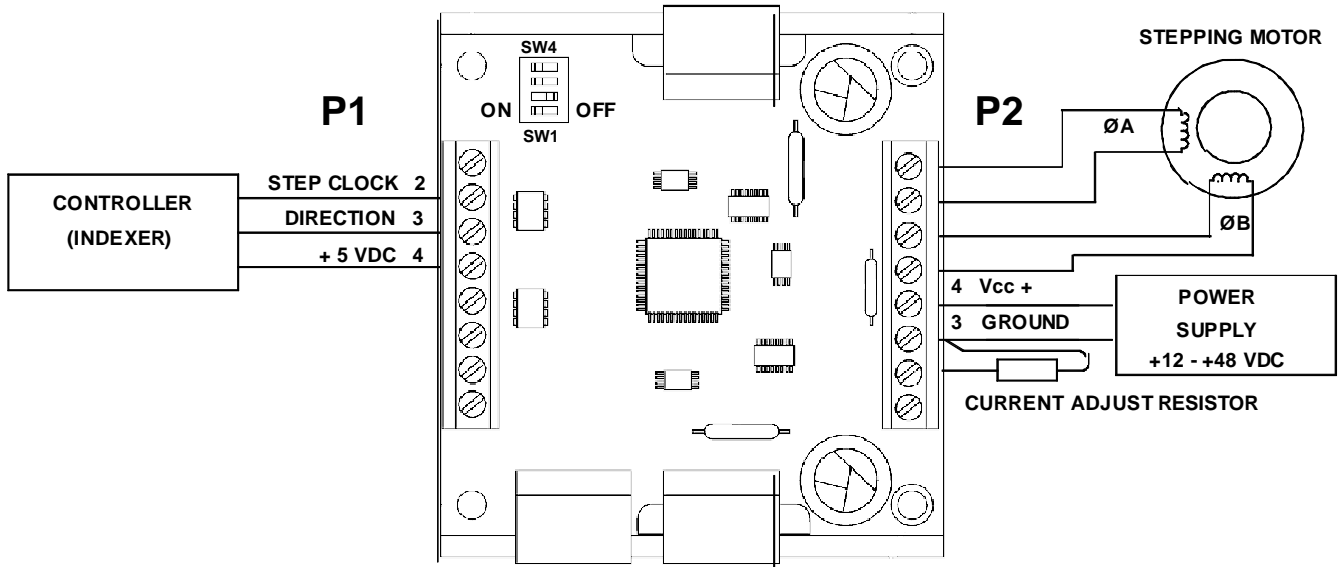
Adjustments

- 14 microstep resolutions, dip switch selectable both in decimal and binary
- Microstep resolutions can be changed "on the Fly" without requiring driver reset
- Adjustable output current (per phase) via an external resistor
- Adjustable Idle Current Reduction via an external resistor. Automatically reduces idle currents at dwell

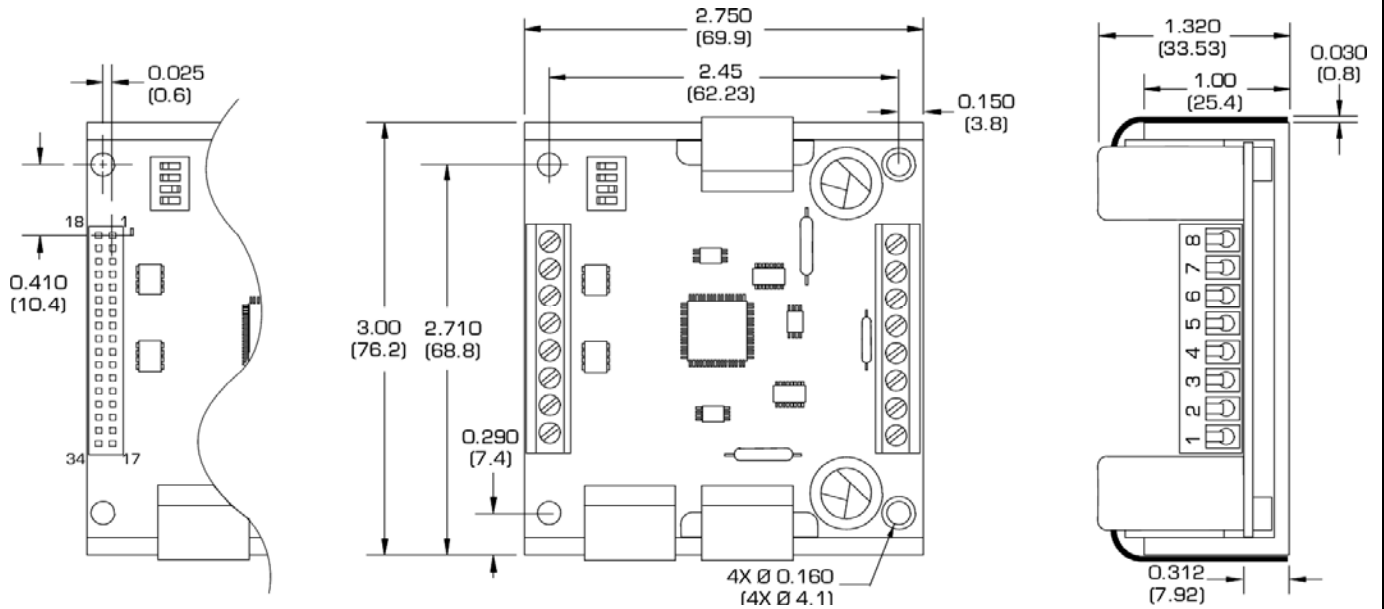
General Features

- No minimum motor inductance required
- Automatically switches between Slow and Fast decay for unmatched performance
- Power and Signal Screw terminal connectors.

Typical Connection Diagram - PVG 47F



Dimensions - PVG 47F



PVG 72G Microstepping Driver

- Compact size using ASIC and SMT Technology
- 24 - 75 Vdc Rated Supply Input
- 0.625 - 5 Arms Rated Phase Current, Up to 7.1 Amps Peak
- Optically Isolated STEP, DIRECTION and ENABLE inputs
- Up to 2 MHz STEP Frequency Input
- Microstep resolutions up to 51,200 s/rev with 1.8 Degree Motors
- Idle Current Reduction (ICR) reduces current under no command
- Single and Double Shaft (Encoder Ready) Motor Configurations



Drive Performance								
Catalog Number	Voltage Range Vdc	Current Rating		Switch Freq kHz	Steps per revolution (1.8 Degree Two Phase Motor)	Weight		
		RMS Ic	Peak Ip			Kg	Lb	
PVG 72G	+24 to 75	0.625 to 5	0.625 to 7.1	20	200, 400, 800, 1k, 1600, 2k, 3.2k, 5k, 6.4k, 10k, 12.8k, 25k, 25.6k, 50k & 51.2k	0.454	1.00	

Holding Torque 2 Phases On Th - Minimum		Current Rated / ph Iph Amps DC	Phase Connection Types	Motor Inertia Jm		Motor Diameter		Motor Length Lm		Motor Weight W		Motor Catalog Number Shaft Configuration		Drive Catalog Number
Ncm	oz-in			g-cm ²	oz-in-s ²	mm	inch	mm	inch	kg	lb	Double	Single	
17	24	1.5	4 lead	18	0.00025	42	1.66	34	1.34	0.2	0.44	LV 39 229	LV 39 225	PVG 72G
24	34	0.8	Parallel Series	55	0.00078	42	1.66	39	1.54	0.3	0.57	LV 39 221	LV 39 238	PVG 72G
34	48	0.6												
31	44	1.0	4 lead	32	0.00045	42	1.66	43	1.69	0.3	0.66	LV 39 227	LV 39 230	PVG 72G
55	78	1.1	Parallel Series	68	0.00096	42	1.66	47	1.85	0.3	0.73	LV 39 233	LV 39 242	PVG 72G
55	78	0.6												
54	76	1.4	Parallel Series	77	0.00109	56	2.20	41	1.61	0.5	1.10	LK 45 220	LK45 223	PVG 72G
54	76	0.7												
54	76	2.2	4 lead	77	0.00109	56	2.20	41	1.61	0.5	1.10	LK 45 221	LK 45 224	PVG 72G
111	157	1.4	Parallel Series	220	0.00312	56	2.20	55	2.17	0.7	1.54	LK 45 232	LK 45 225	PVG 72G
111	157	0.7												
111	157	4.2	Parallel Series	220	0.00312	56	2.20	55	2.17	0.7	1.54	LK 45 234	LK 45227	PVG 72G
111	157	2.1												
182	258	2.1	4 lead	340	0.00482	56	2.20	77	3.03	1.0	2.20	LK 45 235	LK 45228	PVG 72G
182	258	4.2	Parallel Series	340	0.00482	56	2.20	77	3.03	1.0	2.20	LK 45 236	LK 45 229	PVG 72G
182	258	2.1												
319	452	2.0	Parallel Series	660	0.00935	86	3.39	67	2.64	1.7	3.75	LK 56 320	LK 56 323	PVG 72G
319	452	1.0												
319	452	4.0	Parallel Series	660	0.00935	86	3.39	67	2.64	1.7	3.75	LK 56 321	LK 56 324	PVG 72G
319	452	2.0												
319	452	3.0	Series	660	0.00935	86	3.39	67	2.64	1.7	3.75	LK 56 332	LK 56 325	PVG 72G
538	762	4.0	Parallel Series	1200	0.01699	86	3.39	94	3.70	2.5	5.51	LK 56 333	LK 56 326	PVG 72G
538	762	2.0												
538	762	3.0	Series	1200	0.01699	86	3.39	94	3.70	2.5	5.51	LK 56 334	LK 56 327	PVG 72G
920	1303	4.9	Parallel Series	1800	0.02549	86	3.39	126	4.94	3.8	8.27	LK 56 335	LK 56 328	PVG 72G
920	1303	2.5												
920	1303	4.5	Series	1800	0.02549	86	3.39	126	4.94	3.8	8.27	LK 56 336	LK 56 329	PVG 72G

Warning: Maximum Bus Voltage for the IS17 is 48 Vdc

The PVG 72G is an economical and compact size microstepping driver for use with Step Motors. These Drives require an unregulated DC power supply. These Models interface with typical Indexers.

Protection / Diagnostics

- Thermal
- Phase to Phase
- Fault Output
- Phase to ground
- Voltage to Phase
- Internal power supply under-voltage

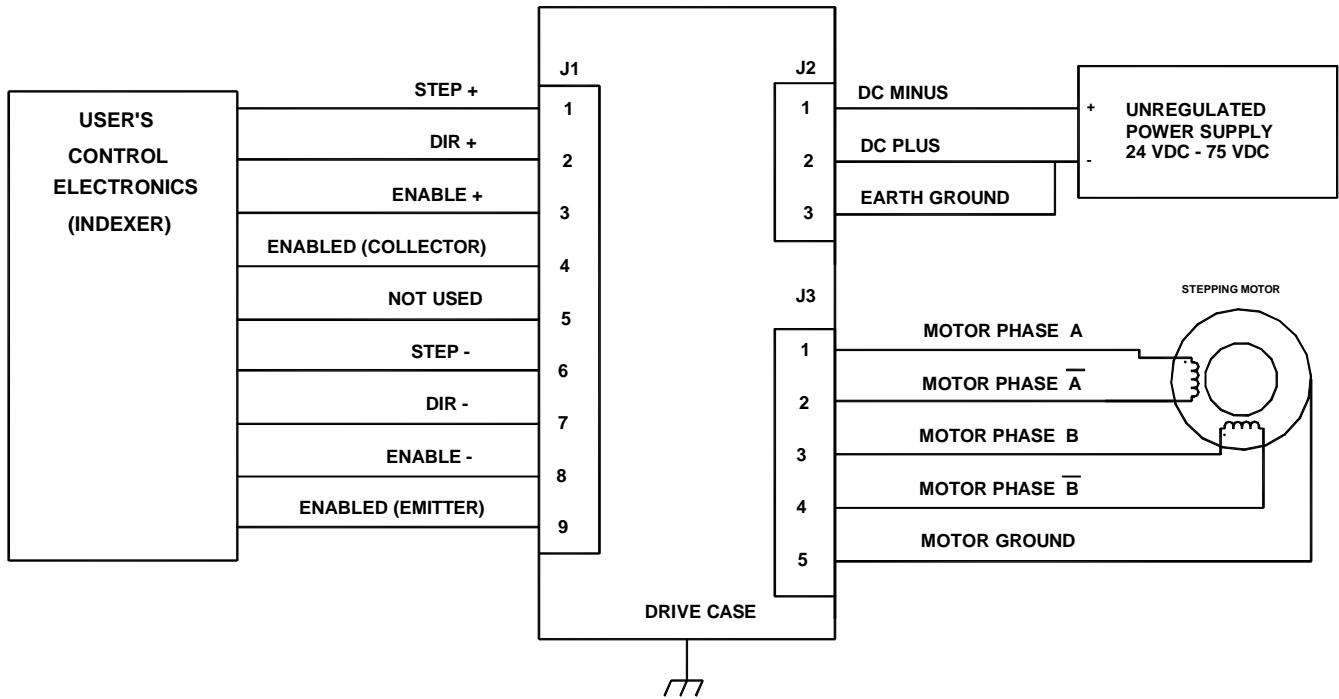
Adjustments

- 15 microstep resolutions, dip switch selectable both in decimal and binary
- Step filter response (digital filter to reduce noise on the step input)
- Adjustable output current (per phase) via dip switch setting (fixed 0.625 amp increments)
- Adjustable idle current reduction time response(0.05, 0.1 or 1.0 sec). Automatically reduces idle currents at dwell
- Enable Sense Control can be changed via a jumper setting

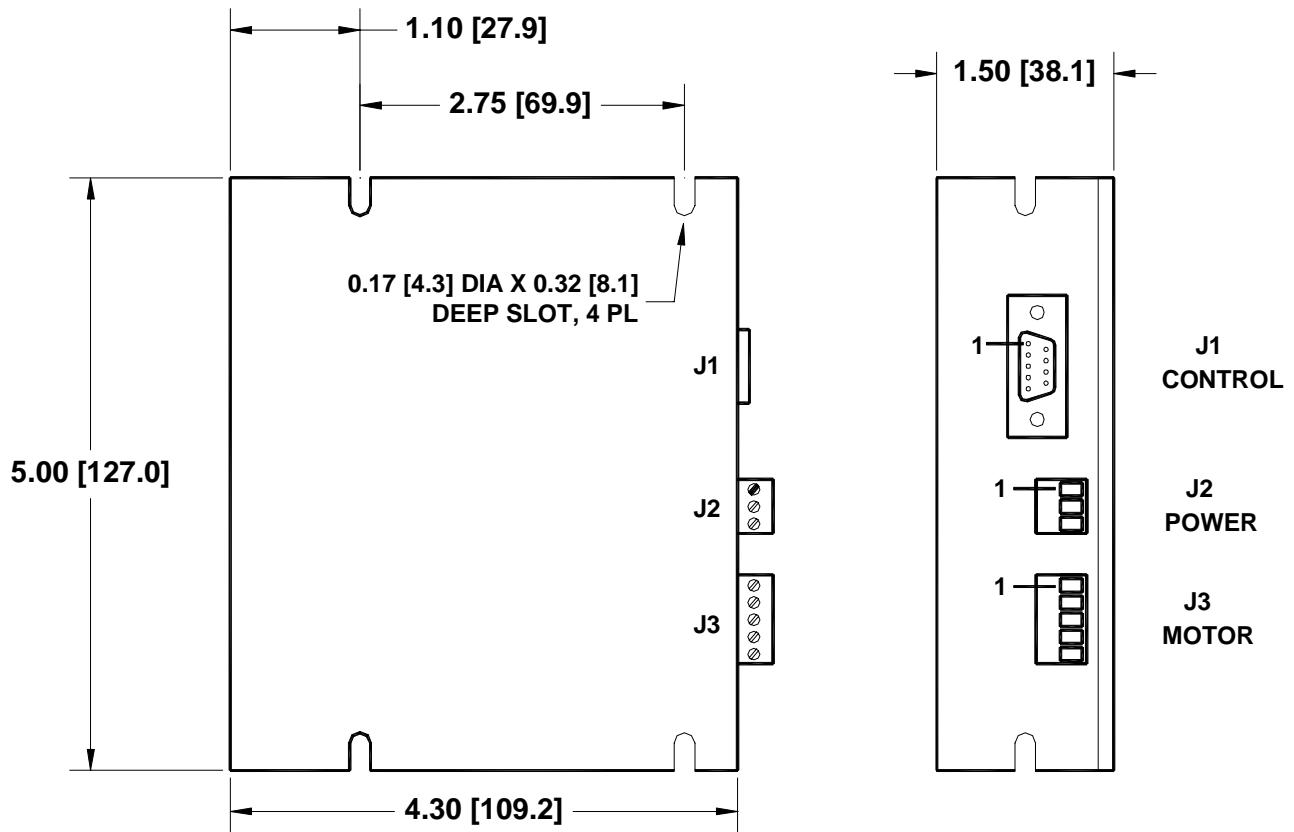
General Features

- No minimum motor inductance required
- Single power supply
- Built in Mid-range instability circuit (electronic damping) to maintain torque at high speeds

Typical Connection Diagram - PVG 72G



Dimensions - PVG 72G



The PVG 72G should be mounted to transfer from its aluminum base. Additional heatsinking can be provided through an optional side mounted heat sink. This increases the width from 0.85" to 2.35". Further details are provided in the user manual.

PVR 82G Oscillator / Microstepping Driver

- Compact size using ASIC and SMT Technology
- 24 - 75 Vdc Rated Supply Input
- 0.625 - 5 Arms Rated Phase Current, Up to 7.1 Amps Peak
- Adjustable Acceleration and Deceleration rates
- Two independent run speeds
- Optically isolated signal RUN/STOP, LOW SPEED, DIR and ENABLE
- Analog command input (scaleable)
- Internal or External speed command



Drive Performance								
Catalog Number	Voltage Range Vdc	Current Rating		Switch Freq kHz	Steps per revolution (1.8 Degree Two Phase Motor)	Weight		
		RMS Ic	Peak Ip			Kg	Lb	
PVR 82G	+24 to 75	0.625 to 5	0.625 to 7.1	20	200, 400, 800, 1k, 1600, 2k, 3.2k, 5k, 6.4k, 10k, 12.8k, 25k, 25.6k, 50k & 51.2k	0.454	1.00	

Holding Torque 2 Phases On Th - Minimum		Current Rated / ph Iph Amps DC	Phase Connection Types	Motor Inertia Jm		Motor Diameter		Motor Length Lm		Motor Weight W		Motor Catalog Number Shaft Configuration		Drive Catalog Number
Ncm	oz-in			g-cm ²	oz-in-s ²	mm	inch	mm	inch	kg	lb	Double	Single	
17	24	1.5	4 lead	18	0.00025	42	1.66	34	1.34	0.2	0.44	LV 39 229	LV 39 225	PVR 82G
24	34	0.8	Parallel Series	55	0.00078	42	1.66	39	1.54	0.3	0.57	LV 39 221	LV 39 238	PVR 82G
34	48	0.6												
31	44	1.0	4 lead	32	0.00045	42	1.66	43	1.69	0.3	0.66	LV 39 227	LV 39 230	PVR 82G
55	78	1.1	Parallel Series	68	0.00096	42	1.66	47	1.85	0.3	0.73	LV 39 233	LV 39 242	PVR 82G
55	78	0.6												
54	76	1.4	Parallel Series	77	0.00109	56	2.20	41	1.61	0.5	1.10	LK 45 220	LK 45223	PVR 82G
54	76	0.7												
54	76	2.2	4 lead	77	0.00109	56	2.20	41	1.61	0.5	1.10	LK 45 221	LK 45224	PVR 82G
111	157	1.4	Parallel Series	220	0.00312	56	2.20	55	2.17	0.7	1.54	LK 45 232	LK 45225	PVR 82G
111	157	0.7												
111	157	4.2	Parallel Series	220	0.00312	56	2.20	55	2.17	0.7	1.54	LK 45 234	LK 45227	PVR 82G
111	157	2.1												
182	258	2.1	4 lead	340	0.00482	56	2.20	77	3.03	1.0	2.20	LK 45 235	LK 45228	PVR 82G
182	258	4.2	Parallel Series	340	0.00482	56	2.20	77	3.03	1.0	2.20	LK 45 236	LK 45229	PVR 82G
182	258	2.1												
319	452	2.0	Parallel Series	660	0.00935	86	3.39	67	2.64	1.7	3.75	LK 56320	LK 56323	PVR 82G
319	452	1.0												
319	452	4.0	Parallel Series	660	0.00935	86	3.39	67	2.64	1.7	3.75	LK 56321	LK 56324	PVR 82G
319	452	2.0												
319	452	3.0	Series	660	0.00935	86	3.39	67	2.64	1.7	3.75	LK 56332	LK 56325	PVR 82G
538	762	4.0	Parallel Series	1200	0.01699	86	3.39	94	3.70	2.5	5.51	LK 56333	LK 56326	PVR 82G
538	762	2.0												
538	762	3.0	Series	1200	0.01699	86	3.39	94	3.70	2.5	5.51	LK 56334	LK 56327	PVR 82G
920	1303	4.9	Parallel Series	1800	0.02549	86	3.39	126	4.94	3.8	8.27	LK 56335	LK 56328	PVR 82G
920	1303	2.5												
920	1303	4.5	Series	1800	0.02549	86	3.39	126	4.94	3.8	8.27	LK 56336	LK 56329	PVR 82G

Notes: Visit www.mcq-net.com for more individual CAD drawings & data Warning: Maximum Bus Voltage for the IS17 is 48 Vdc

The PVR 82G is an economical and compact size microstepping driver for use with Step Motors. These Drives require an unregulated DC power supply. These Models interface with typical PLC or Motion Control Cards

Protection / Diagnostics

- Thermal
- Phase to Phase
- Phase to ground
- Voltage to Phase
- Enable LED indicator
- Internal power supply under-voltage

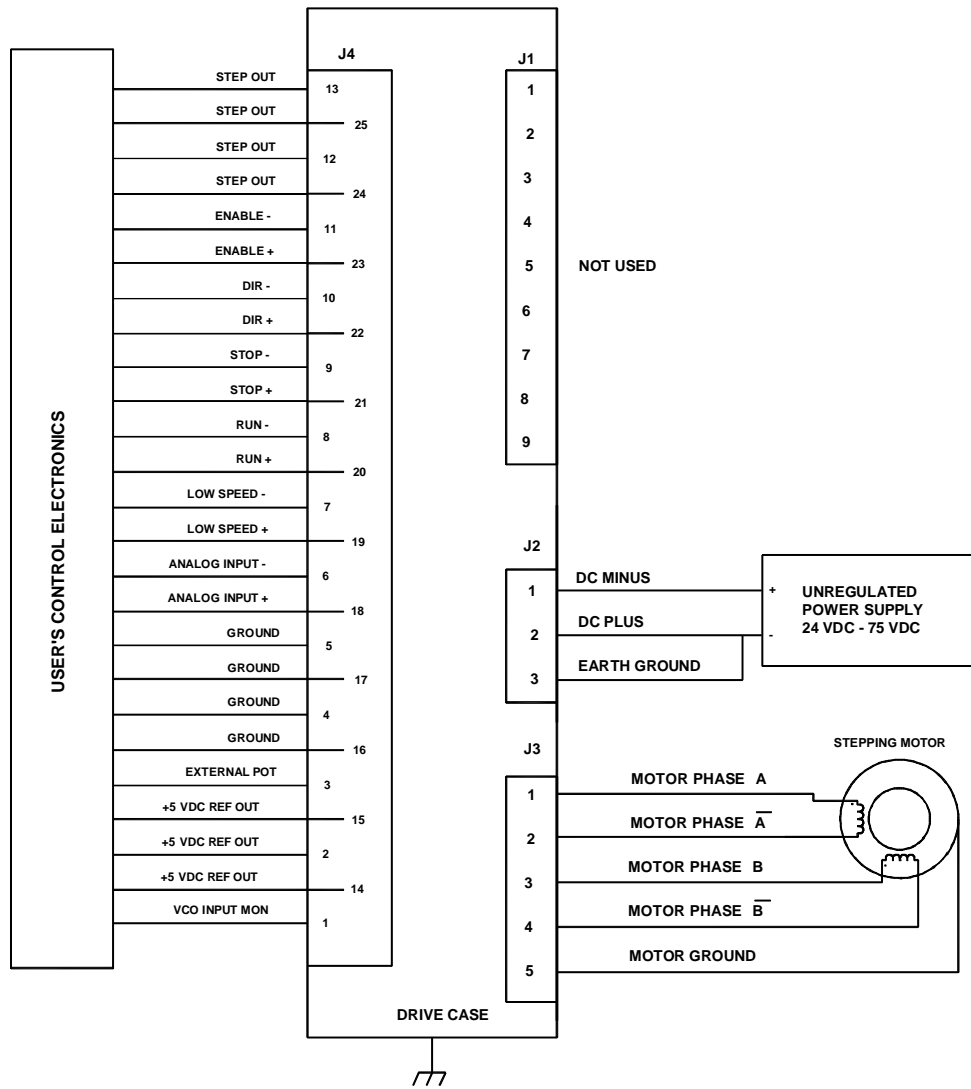
Adjustments

- 15 microstep resolutions, dip switch selectable both in decimal and binary
- Step filter response (digital filter to reduce noise on the step input)
- Adjustable output current (per phase) via dip switch setting (fixed 0.625 amp increments)
- Adjustable idle current reduction time response(0.05, 0.1 or 1.0 sec). Automatically reduces idle currents at dwell
- Enable Sense Control can be changed via a jumper setting

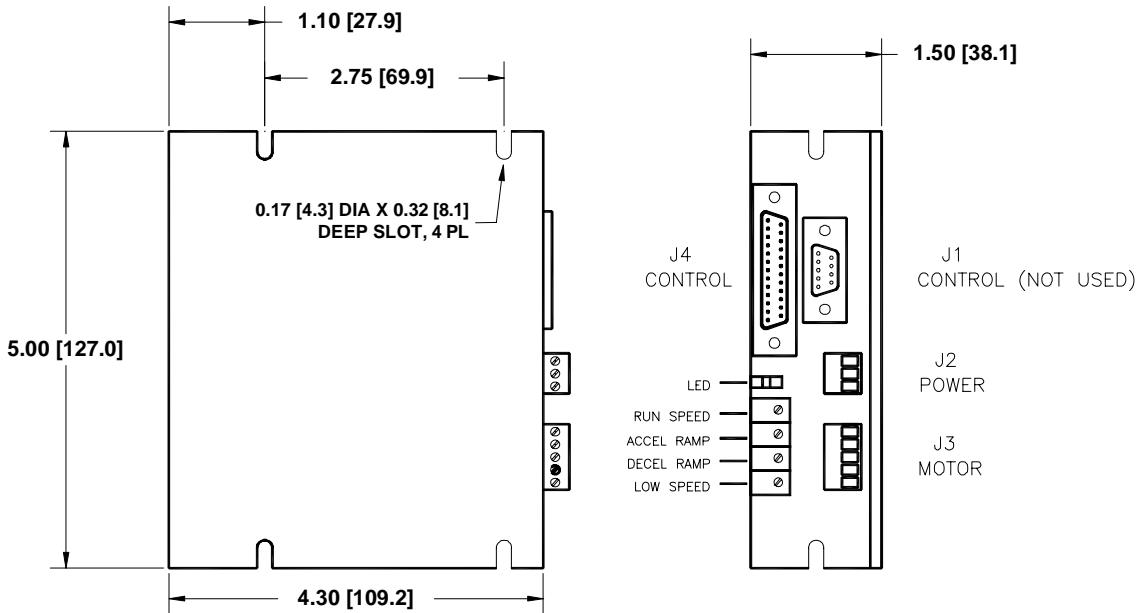
General Features

- No minimum motor inductance required
- Single power supply
- Built in Mid-range instability circuit (electronic damping) to maintain torque at high speeds

Typical Connection Diagram - PVR 82G



Dimensions - PVR 82G



The PVR 82G should be mounted to transfer from its aluminum base. Additional heatsinking can be provided through an optional side mounted heat sink. This increases the width from 0.85" to 2.35". Further details are provided in the user manual.

GPF 8G & 34G Servo Drives

- Economical Analog, 4 Quadrant DC Servo Drive
- 20 - 80 Vdc Rated Supply Input
- Current Ratings 6 & 12A Continuous, 12 & 25 Peak
- Dip Switch Selectable Settings
- Torque & Velocity Control Modes
- Output short circuit and over temperature protection
- Inaudible, High Frequency PWM switching
- Compact, Surface-mount Drive Technology
- UL Recognized, CE Marked



Drive Performance

Catalog Number	Voltage Range	Maximum Voltage	Max. Current Rating		Input Command	Min. Load Inductance	Switching Frequency	Bandwidth	Over Voltage Shut Down	Weight	
	Vdc	Vdc	Cont. Amps	Peak Amps	Vdc range	mH	kHz	kHz	V dc	Kg	Lb
GPF 8G	20 - 80 V	80	6	12.5	+ / - 10	0.200	36	2.5	86	0.28	0.63
GPF 34G	20 - 80 V	80	12.5	25	+ / - 10	0.200	22	2.5	86	0.28	0.63

Motor / Drive System Performance

Torque Limits		Speed	Rated Torque		Rated Speed	Rated Bus Voltage	Motor Inertia	Motor Diameter	Motor Catalog Number	Drive Catalog Number
Cont. Stall Tcs	Peak Stall Tps	Limit Wnl	Cont. Rated Tcr	Peak Rated Tpr	Speed Wr	Voltage Vb	Jm	Diameter	Catalog Number	Catalog Number
oz-in	oz-in	rpm	oz-in	oz-in	rpm	Vdc	oz-in-s ²	inch		
8	32	6000	5.9	12.6	6000	40	0.0003	1.5	LG37222	GPF 8G
30	88	6000	25	60	6000	60	0.0038	2.25	LG45222	GPF 8G
30	113	6000	25	60	6000	60	0.0038	2.25	LG45223	GPF 8G
50	167	4700	41	91	4000	60	0.0062	2.25	LG45226	GPF 8G
57	193	4000	47	100	3500	60	0.0075	2.25	LG45227	GPF 8G
35	135	6000	23	50	6000	60	0.0045	2.25	LG45122	GPF 8G
60	161	5500	40	94	5000	60	0.009	2.25	LG45124	GPF 8G
Tcs	Tps	Wnl	Tcr	Tpr	Wr	Vb	Jm	Diameter	Catalog Number	Catalog Number
lb-in	lb-in	rpm	lb-in	lb-in	rpm	Vdc	lb-in-s ²	inch		
4.69	13	6000	3.6	7.7	5000	80	0.00119	3.25	LG55223	GPF 8G
7.5	20	4000	6.1	12.5	3250	80	0.0021	3.25	LG55224	GPF 8G
10.60	37	4200	8	16	3750	80	0.003	3.25	LG55225	GPF 34G
14.1	48	3200	10.5	21.5	2750	80	0.00394	3.25	LG55226	GPF 34G

Notes 1) System Performance may differ somewhat from these nominal values 2) The GPF 34G can be used in place of the GPF 8G for greater intermittent duty.

The GPF 8G and 34G are stand alone, compact, high efficiency brush DC drives providing economical analog torque or velocity control of low to medium power permanent magnet brushed type DC motors. These Drives require an unregulated DC power supply. These Models interface with typical digital position loop controllers or can be operated as a stand-alone drive.

Protection / Diagnostics

- Over-voltage protection
- Over-current protection
- Over Temperature protection
- Test Mode Built In
- LED Status Indicator
- Short Circuit Protection

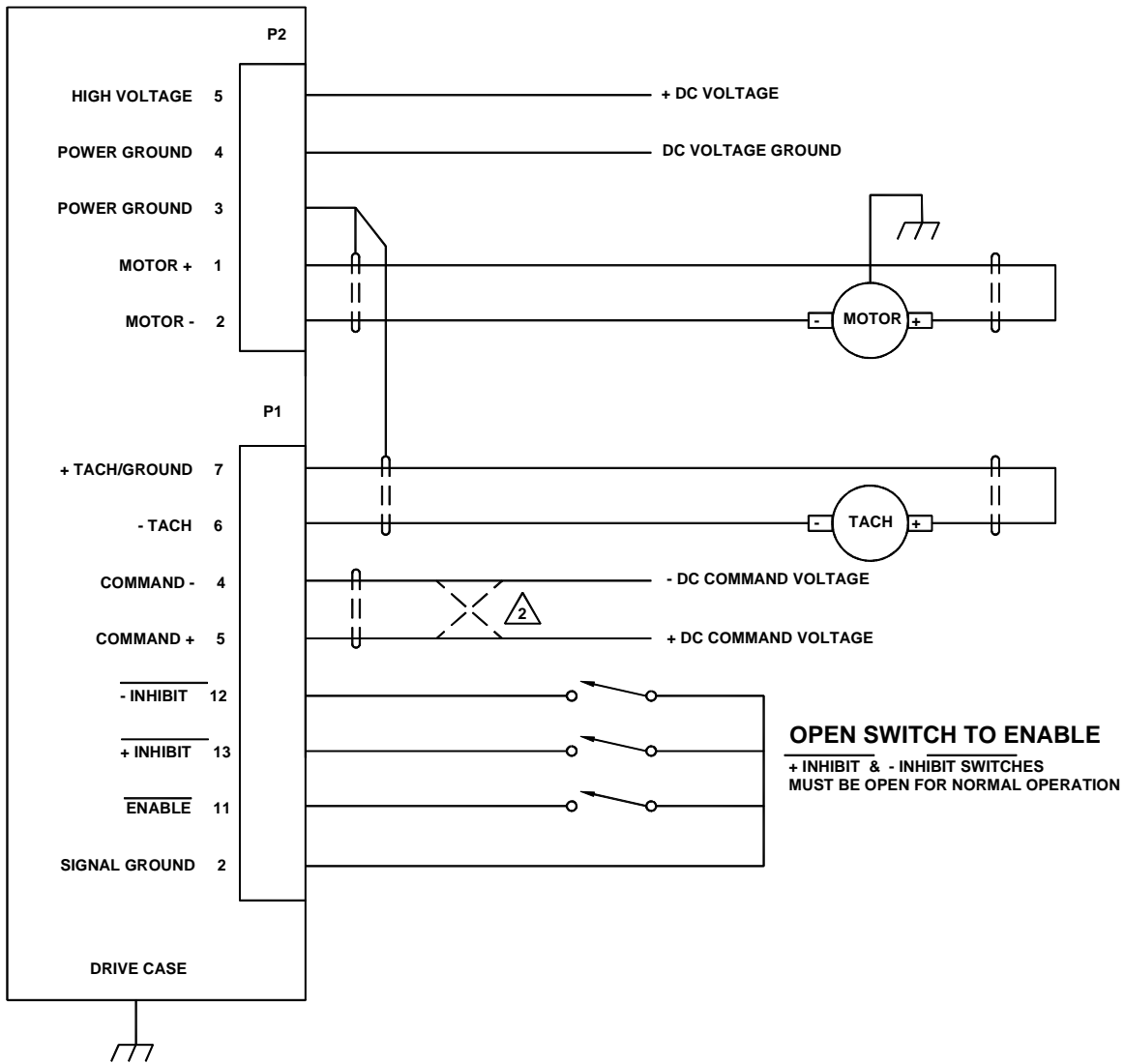
Adjustments

- Loop Gain
- Command Gain
- Current Limit (Peak and continuous)
- Independent current limits
- Offset

General Features

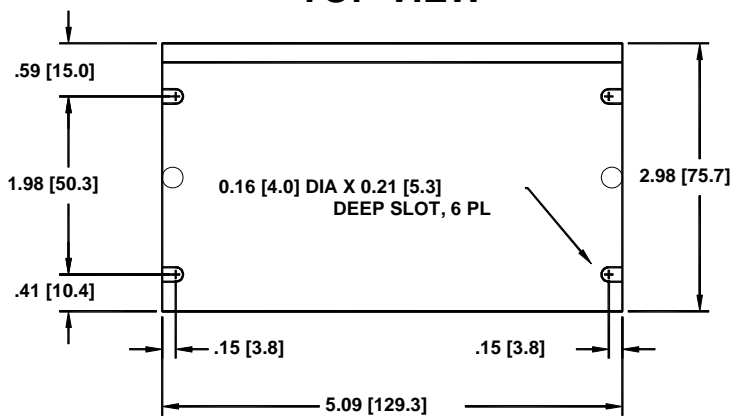
- Back or Side Panel Mounting
- +/- 5V Regulated Outputs (5mA)
- Tach Input to velocity loop (60VDC)
- Differential analog Input +/- 10 Vdc
- Inhibit Line (turns off outputs)
- Directional Inhibits (End of Travel)
- Modes (current, voltage, velocity & IR comp)
- Contact us for Motor power cables
- Fault Output
- Current Monitor Out

Typical Connection Diagram - GPF 8G & 34G



Dimensions - GPF 8G & 34G

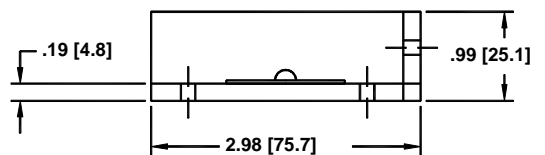
TOP VIEW



FRONT VIEW

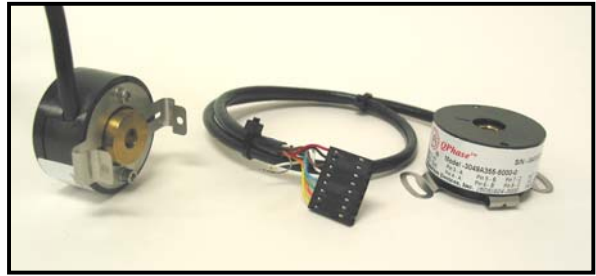


SIDE VIEW



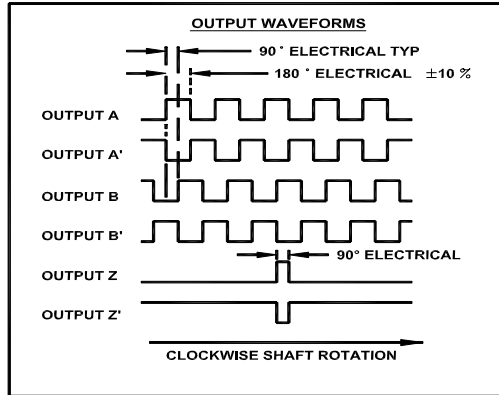
Bearing Style, 3-Channel Encoder

- Output Channels - A, B, Z
- Differential Line Drivers
- IP 40 Rated
- Power Requirement - 125 mA @ 5VDC
- 500 kHz Maximum Operating Frequency
- Inertia - 150 μ oiss (.00015 oz-in-sec²)
- Factory or user mountable

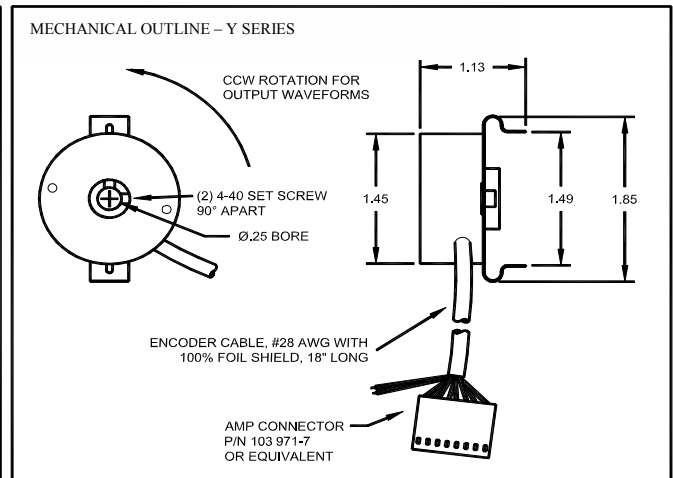
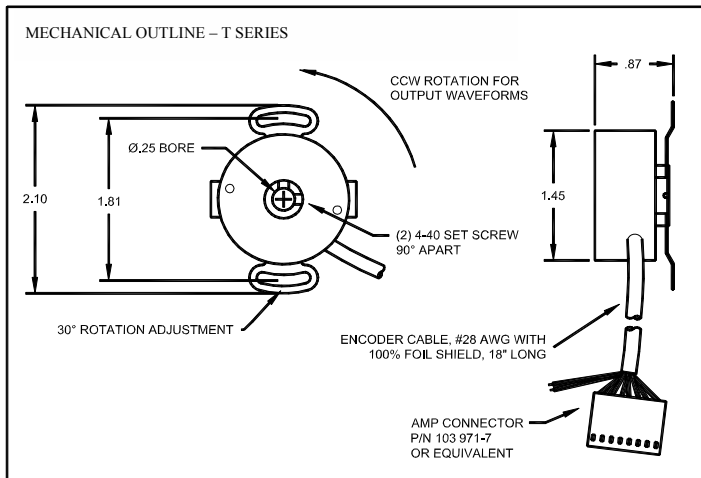


Catalog Number	Style	Line Count
T3	Standard	1000
Y3	Small Dia.	1000
T5	Standard	2000
Y5	Small Dia.	2000
T7	Standard	2500
Y7	Small Dia.	2500
T0	Standard	5000
Y0	Small Dia.	5000

Note: Other line counts are available for special order



ENCODER CONNECTIONS		
PIN	COLOR	FUNCTION
1	RED	+VDC
2	BLACK	COMMON
3	BROWN	OUTPUT A
4	WHITE	OUTPUT A'
5	BLUE	OUTPUT B
6	GREEN	OUTPUT B'
7	ORANGE	OUTPUT Z
8	YELLOW	OUTPUT Z'
N/C	BLACK/WHITE	CASE GROUND
N/C	DRAIN WIRE	CABLE SHIELD



Application Note:

These are High Quality General Purpose Encoders for use on Brush, Stepper, and Brushless Motors with integral Hall Effect Commutation that are to be used with "Analog" type Drives. There is no pre-determined relationship between the encoder signals and the electrical properties of the motor to which it is mounted.(i.e., Index to Hall)

For customers using Brushless Motors with "Digital" type Drives, we recommend that the "Bearing Style Commutation Encoder" be used. These encoders (factory installed only) do have a fixed relationship between the encoder signals and the electrical properties of the motor to which it is mounted. This allows "drop-in" replaceability without the need to "initialize" each new motor. Other benefits are also realized with this style encoder - see App. Note for that product.

Cables of various lengths are also available - see Cable section.

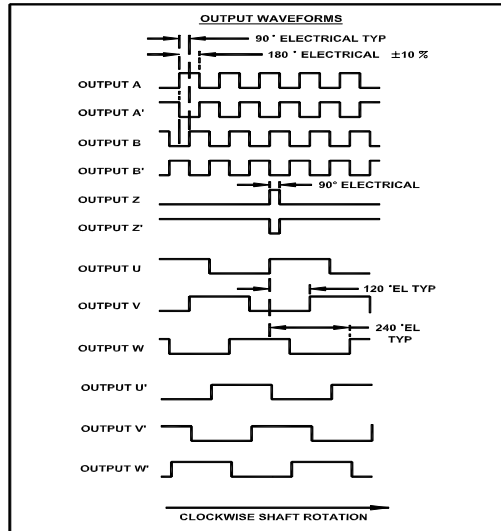
Bearing Style, Data plus Commutation Encoder

- Output Channels - A, B, Z, U, V, W
- Differential Line Drivers, all channels
- IP 40 Rated
- Power Requirement - 200 mA @ 5VDC
- 500 kHz Maximum Operating Frequency
- Inertia - 150 μ oiss (.00015 oz-in-sec²)
- 1 degree (mech) accuracy of commutators
- Factory installed only

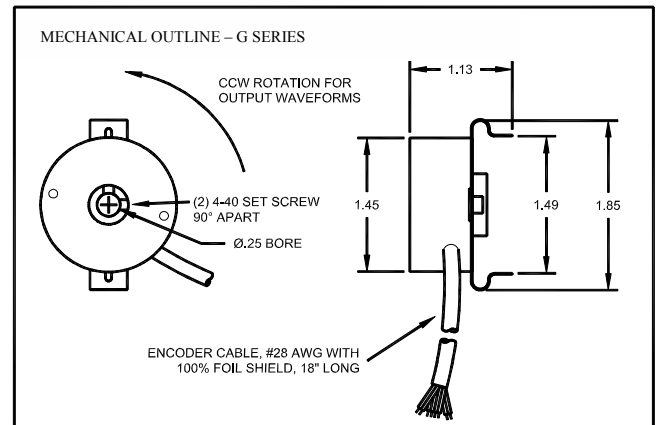
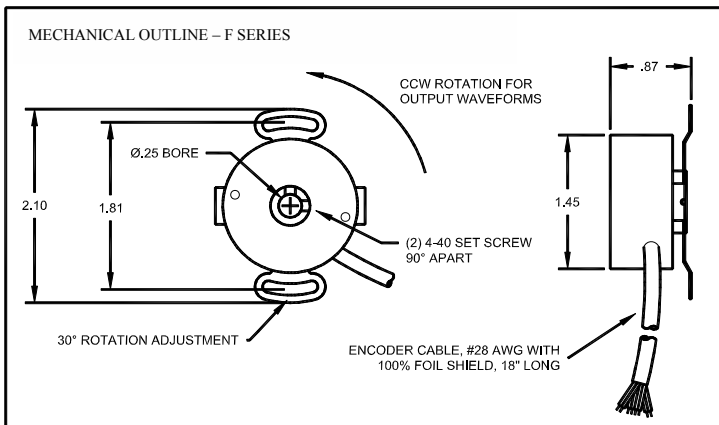


Catalog Number	Style	Line Count	Pole Count
F3	Standard	1000	4
FD	Standard	1000	8
G3	Small Dia.	1000	4
F3	Standard	2000	4
FF	Standard	2000	8
G5	Small Dia.	2000	4
F7	Standard	2500	4
FH	Standard	2500	8
G7	Small Dia.	2500	4
F0	Standard	5000	4
FK	Standard	5000	8
G0	Small Dia.	5000	4

Note: Other line counts are available for special order



ENCODER CONNECTIONS	
COLOR	FUNCTION
RED	+VDC
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'
WHITE/BLACK	CASE GROUND
DRAIN WIRE	CABLE SHIELD



Application Note:

These are High Quality Encoders with integral bearings and flex mount which eliminate any alignment issues due to mounting. They feature the standard data channels and also precision "absolute" channels for the commutation of Brushless Motors. All outputs have differential line drivers which are commonly used by "Digital" drives and significantly reduce noise issues, especially with longer cables. These units are factory mounted on the motors and aligned to the motor's electrical properties which allows "drop-in" replaceability without the need to "initialize" each new motor. Additionally, the precision of the commutation channels is superior to that typically achieved with Hall signals resulting in highest system performance.

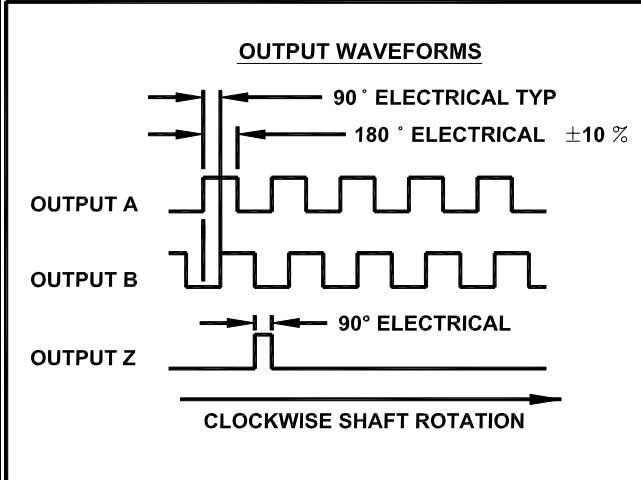
Modular Encoders

- Most Economical Encoder Choice
- 500 Line, 3 Channel Versions
- 1000 Line 2 Channel Versions
- IP 40 Rated
- Factory Installed Only

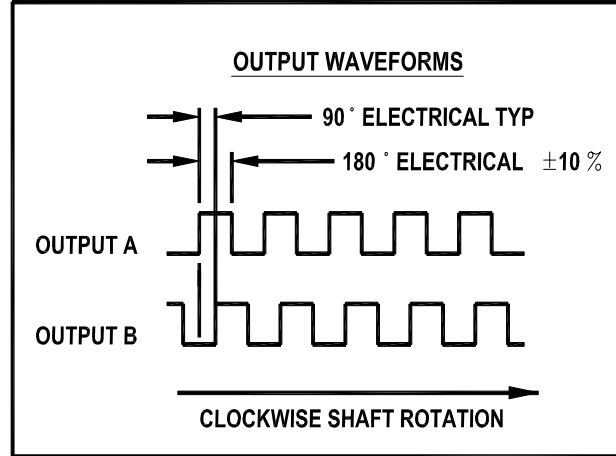


Catalog Number	Line Count	Output Channels	Line Driver	Power Requirement	Inertia oz-in-s ²	Max. Freq.	Hub I.D. (inches)
H8	500	A, B, Z	No	85 mA @ 5VDC	8×10^{-6}	100 kHz	0.1875
K3	500	A, B, Z	No	85 mA @ 5VDC	8×10^{-6}	100 kHz	0.250
K4	1000	A, B	No	85 mA @ 5VDC	8×10^{-6}	100 kHz	0.250

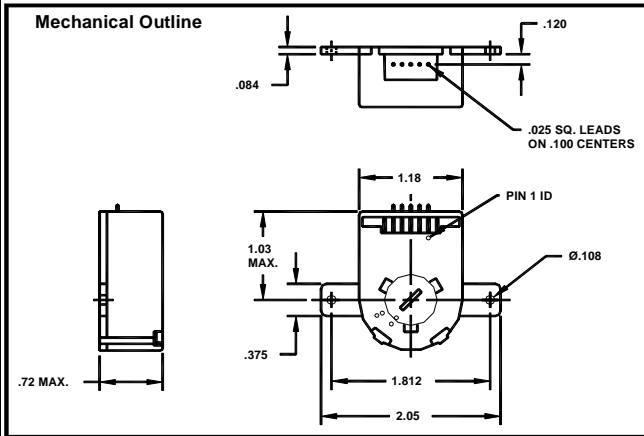
Timing for 3 Channel Encoders H8& K3



Timing for 2 Channel Encoders K4



Dimensions



Connection H8 & K3

ENCODER CONNECTIONS	
PIN	FUNCTION
1	GROUND
2	INDEX
3	CH. A
4	V _{CC} = +5V
5	CH. B

Connection K4

ENCODER CONNECTIONS	
PIN	FUNCTION
1	GROUND
2	N/C
3	CH. A
4	V _{CC} = +5V
5	CH. B

Application Note:

H8 Encoders have the mounting ears removed and use internal mounting screws not shown. This effects the LE32222 Series.

Optional Cable Assembly:

18" Cable Assembly for K3 & K4 Encoders

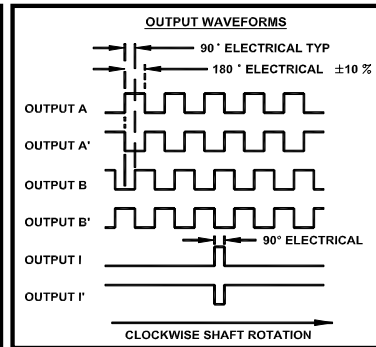
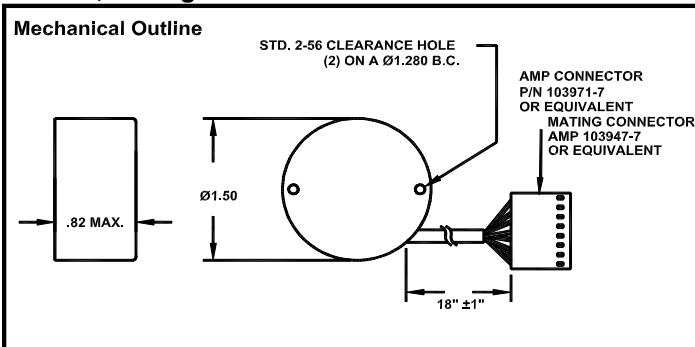
Modular Encoders

- Most Economical Encoder Choice
- 500 & 1000 Line
- 3 Channel Versions
- IP 40 Rated
- Factory Installed Only



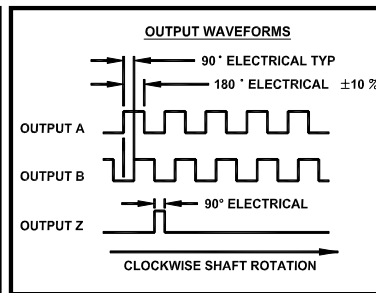
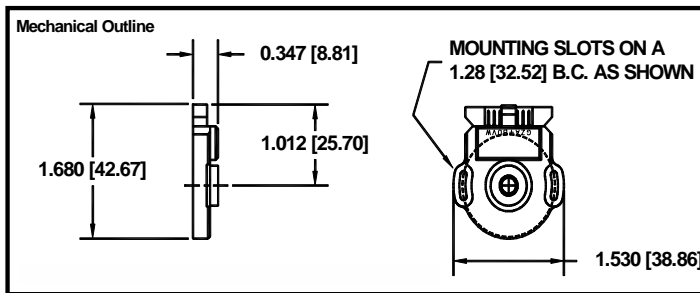
Catalog Number	Line Count	Output Channels	Line Driver	Power Requirement	Inertia oz-in-s ²	Max. Freq.	Hub I.D. (inches)
H9	1000	A, B, I	Yes	135 mA @ 5VDC	7.3×10^{-5}	200 kHz	0.1875
U3	500	A, B, Z	No	60 mA @ 5VDC	1.17×10^{-5}	300 kHz	0.250
U4	1000	A, B, Z	No	60 mA @ 5VDC	1.17×10^{-5}	300 kHz	0.250

Outline, Timing and Connections for H9



PIN	COLOR	FUNCTION
1	RED	V _{CC} =+5V
2	BLACK	GROUND
3	WHITE	CH. A
4	YELLOW	CH. A'
5	GREEN	CH. B
6	BLUE	CH. B'
7	ORANGE	INDEX
8	BROWN	INDEX'

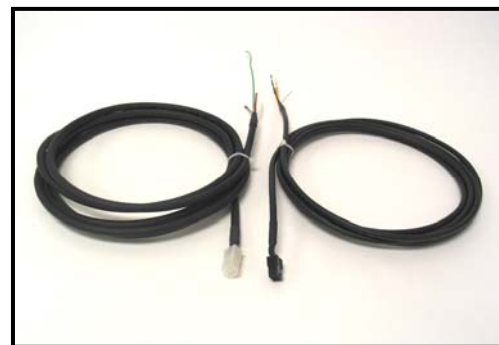
Outline, Timing and Connections for U3 and U4



PIN	FUNCTION
1	GND
2	CH. Z
3	CH. A
4	+5V
5	CH. B

Cables for Instrument Grade ("LE" Series) Motors

- Very Low Cost
- Power, Commutation and Encoder cable assemblies
- Cable Assemblies available for LE45, LE54 & LE56 Series
- Latching Connectors for Positive Retention
- Double Shielded for Maximum Noise Immunity
- Cable material is UL recognized
- NOT for Continuous Flex applications
- 10 ft and 25 ft lengths available
- "Make 'em Yourself" components also available



POWER	Application	Motor Frame Size	Catalog Number 10 ft	Catalog Number 25 ft	Notes	Pinout Chart
	"Generic" (flying leads)	2 inch	S4-32	S4-47	16 AWG, 3 conductor, 80 Deg.C, 300V, Foil & Braid Shielded, UL2464	1
	3 inch	S5-32	S5-47	14 AWG, 3 conductor, 80 Deg.C, 600V, Foil & Braid Shielded, UL2463	1	

FEEDBACK	Application	Function (All Frame Sizes)	Catalog Number 10 ft	Catalog Number 25 ft	Notes	Pinout Chart
	Generic (flying leads)	Hall Commutation	IK-32	IK-47	24 AWG, 5 conductor, 80 Deg.C, 300V, Foil & Braid Shield, UL2464	2
	Std. Encoder	IH-32	IH-47	24 AWG, 4 1/2 pair, 80 Deg.C, 300V, Foil & Braid Shield, UL2464	3	

Full technical data including pinouts, wire colors, and information about the cable materials can be found in the "Cables" section of our website. Most drawings are available for download in both .pdf and .dwg formats.

COMPONENTS	Parts to "Make Your Own" Cables		
	Cat.Number	Description	Notes
	1922749	Mating Connector Kit for 2" Motor Power	Contains 4-Position Connector Body and Crimp Contacts (2 spare)
	1922740	Mating Connector Kit for 3" Motor Power	Contains 4-Position Connector Body and Crimp Contacts (2 spare)
	1922748	Mating Conn. Kit - Commutation (IB 23x, IB320, IB340 & IB460 sizes)	Contains 6-Position Connector Body and Crimp Contacts (2 spare)
	1922744	Mating Connector Kit for Std. Encoder (3-chan. w/ complements)	Contains 8-Pos.Conn.Body, Crimp Contacts (2 spare) and Latching adapter
	0322349	"Raw" cable for 2" Motor Power	16 AWG, 3 conductor, 80 Deg.C, 300V, Foil & Braid Shielded, UL2464
	0322340	"Raw" cable for 3" Motor Power	14 AWG, 3 conductor, 80 Deg.C, 600V, Foil & Braid Shielded, UL2463
	0322355	"Raw" Cable for Commutators	24 AWG, 5 conductor, 80 Deg.C, 300V, Foil & Braid Shield, UL2464
	0322356	"Raw" Cable for Std. Encoder (3-chan. w/ complements)	24 AWG, 4 1/2 pair, 80 Deg.C, 300V, Foil & Braid Shield, UL2464

Application Notes:

High Flex Applications - All cables listed above are not intended for continuous flexing or twisting (High Flex) applications. Cables are intended for stationary cable tray or fixed harness environments.

Minimum Bending Radius - Excessive bending of cables can cause insulation or conductor failure. The minimum bend radius of a fixed cable is no less than eight times (8X) the cable diameter.

Connection Information:

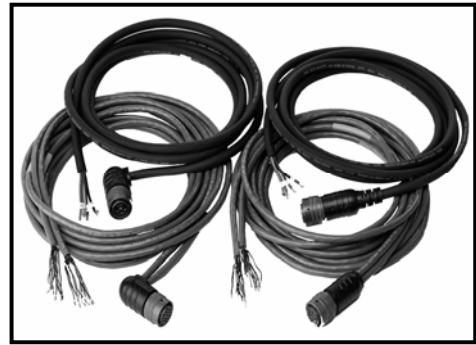
Function	Color	Pin#
Phase R	Red	1
Phase S	Wht	2
Phase T	Blk	3
Case Gnd	Shield	4

Function	Color	Pin#
Vcc	Red	1
Gnd	Black	2
Comm A	Brown (1)	3
Comm B	Orange	4
Comm C	Yellow (2)	5
Cable Shield	Shield	6

Function	Color	Pin#
Vcc	Red	1
Common	Black	2
A	Brown	3
/A	White	4
B	Blue	5
/B	Green	6
Z	Orange	7
/Z	Yellow	8
Case Gnd	Wht/Blk	NC
Cable Shield	bare	NC

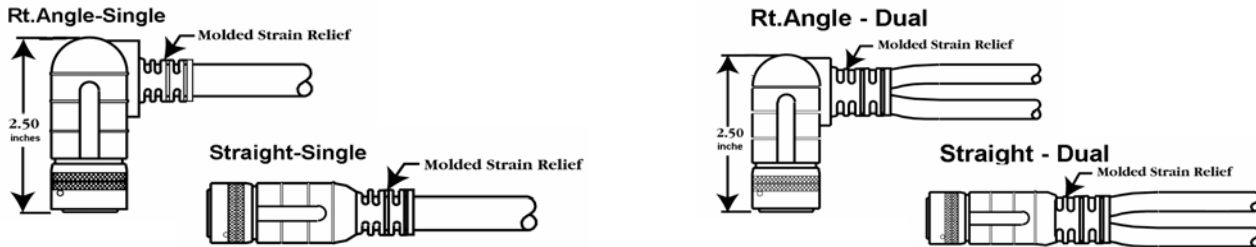
Cables for Automation Grade ("DE" Series) Motors

- MS Type Connectors for reliability
- Bayonet Style connectors for ease of use
- Molded Strain Relief yields durability
- Cable material is UL recognized
- NOT for Continuous Flex applications
- 10 ft, 25 ft and 50 ft lengths available
- "Make 'em Yourself" components also available



POWER	Application	Style	DE45224 DE45220 DE45221	All Other DE45222 Series	All DE56222 Series	All DE60222 Series	Notes
	"Generic" (flying leads)	Straight Rt. Angle	VSD45xxx USD45xxx	(1) USD45xxx	VSD45xxx USD45xxx	VSD6048xxx	(1) Due to motor length and connector orientation most DE45222 Series Motors will have interference issues when using straight cables (motor end), therefore right angle connectors are recommended.

FEEDBACK	Application	Style	DE45224 DE45220 DE45221	All Other DE45222 Series	All DE56222 Series	All DE60222 Series	Notes
	"Generic" (flying leads)	Straight-Single(2) Rt. Angle-Single(2)	VIM8GGxxx UIM8GGxxx	(1) UIM8GGxxx	VIM8GGxxx UIM8GGxxx	VIM8GGxxx UIM8GGxxx	(1) Due to motor length and connector orientation most DE45222 Series Motors will have interference issues when using straight cables (motor end), therefore the use of right angle connectors is recommended.
"Generic" (flying leads)	Straight-Dual(3) Rt.Angle-Dual(3)	VIDxxx UIDxxx	(1) UIDxxx	VIDxxx UIDxxx	VIDxxx UIDxxx	(2) Single Feedback cable (10 pair) is designed for Encoder and Commutation signals routing to a single location (including up to all 6 complementary signals).	
BMC6C or BMC7D	Straight-Dual(3) Rt.Angle-Dual(3)	VIDFGxxx UIDFGxxx	(1) UIDFGxxx	VIDFGxxx UIDFGxxx	VIDFGxxx UIDFGxxx	(3) Dual Feedback cable is designed to provide separate cables (signals) to both drive and independent motion controller.	
BMC12	Straight-Dual(3) Rt.Angle-Dual(3)	VIDMOKxxx UIDMOKxxx	(1) UIDMOKxxx	VIDMOKxxx UIDMOKxxx	VIDMOKxxx UIDMOKxxx		



Full technical data including pinouts, wire colors, and information about the cable materials can be found in the "Cables" section of our website. Most drawings are available for download in both .pdf and .dwg formats.

ORDER	How to Order Cable Assemblies - Example shown below				Steps
	Cable Type	10 Ft	25 Ft	50 Ft	
	VSD45xxx	232	247	272	Pick Cable Type from Choices above
	VSD45		247		Choose Length Option which meets or exceeds your length requirement
	VSD45247 (= Example)				Combine to form final Catalog Number to Order

Application Note:

High Flex Applications - All cables listed above are not intended for continuous flexing or twisting (High Flex) applications. Cables are intended for stationary cable tray or fixed harness environments.

Minimum Bending Radius - Excessive bending of cables can cause insulation or conductor failure. The minimum bend radius of a fixed cable is no less than eight times (8X) the cable diameter.

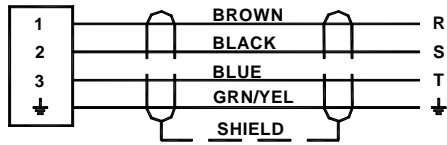
COMPONENTS	Parts to "Make Your Own" Cables		
	Cat.Number	Description	Notes
	1922448	Power Connector for AB23000 and AB34000 Series Motors	Straight Plug with Strain Relief, Shell Size 14, 8 Socket Contacts
	8122430	Power Connector for AB48000 Series Motors	Straight Plug with Strain Relief, Shell Size 20, 4 Socket Contacts
	1922449	Feedback Connector for All AB Series Motors	Straight Plug with Strain Relief, Shell Size 14, 19 Socket Contacts
	FS36	"Raw" Power Cable for AB23000 and AB34000 Series Motors	14 AWG, 15 Amps, 4 cond. Twisted with overall braided shield
	FS34	"Raw" Power Cable for AB48000 Series Motors	12 AWG, 20 Amps, 4 cond. Twisted with overall braided shield
	F146	"Raw" Feedback Cable for All AB Series Motors	24 AWG, 1.4 Amps, 6 twisted pairs, overall polyester/foil shield with drain wire

Cables for Automation Grade ("DE" Series) Motors

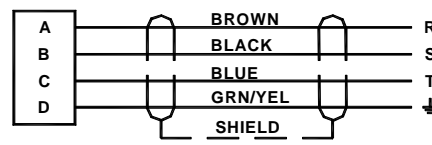
Connection Information:

Power Cables

DE45222 and DE56222 Series

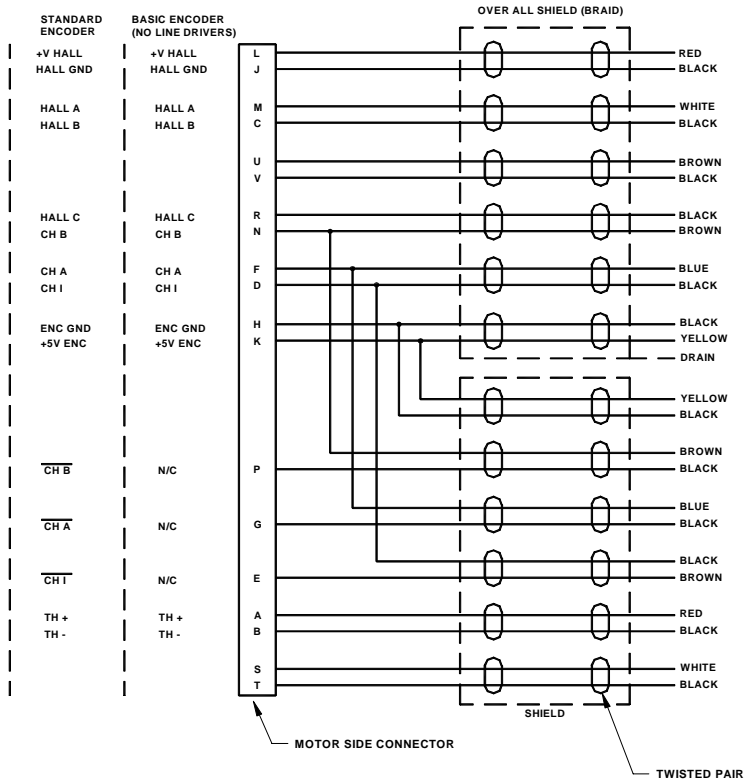


DE60222 Series

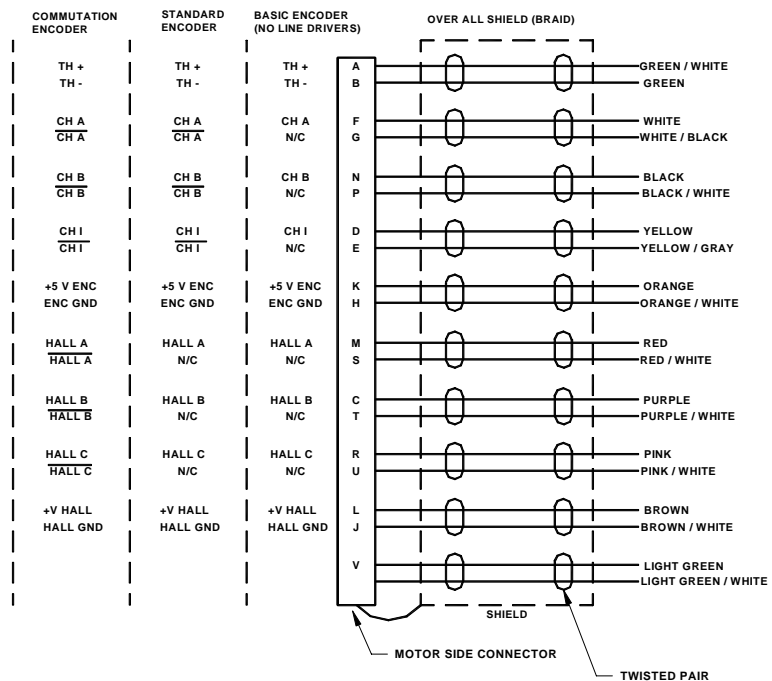


Feedback Cables

"Dual" Cables



"Single" Cables



Brakes, Bolt-on

- NEMA 17, 23 and 34 Sizes
- "Fail-Safe" Type (Apply power to release)
- 24 Vdc Supply Voltage
- Clamp On Collar Requires no motor modifications
- Simplifies Stocking - Not requiring custom Brake Motor
- Available with Heavy Duty shaft inputs
- Nema Output Flanges couple to Nema Gear reducers



Catalog Number	Input Flange	Output Flange	Holding Torque lb-in (Nm)	Input Diameter inch (mm)	Output Diameter inch (mm)	Max. Motor Shaft Length inch (mm)	Voltage (Vdc)	Current (Amps)	Resistance (Ohms)	Inertia oz-in-s ² (kg-cm ²)	Weight lb (kg)
E9	N17	N17	1.00 (0.113)	0.197 (5.00)	0.197 (5.00)	0.97 (24.638)	24	0.220	117	0.00010 (0.0070)	0.44 (0.198)
E5	N23	N23	3.00 (0.339)	1/4 (6.35)	1/4 (6.35)	0.94 (23.87)	24	0.181	132	0.00051 (0.03596)	1.06 (0.482)
E8	HD Shaft	HD Shaft	3.00 (0.339)	1/2 (12.70)	1/2 (12.70)	1.60 (40.64)	24	0.181	132	0.00051 (0.03596)	1.06 (0.482)
E6	N34	N34	15.00 (1.695)	3/8 (9.53)	1/2 (12.70)	1.30 (33.02)	24	0.369	65	0.0045 (0.318)	2.88 (1.304)
E6-N	N34	N34	15.00 (1.695)	3/8 (9.53)	3/8 (9.53)	1.30 (33.02)	24	0.369	65	0.0045 (0.318)	2.88 (1.304)
E7	HD Shaft	HD Shaft	15.00 (1.695)	1/2 (12.70)	1/2 (12.70)	1.30 (33.02)	24	0.369	65	0.0045 (0.318)	2.88 (1.304)

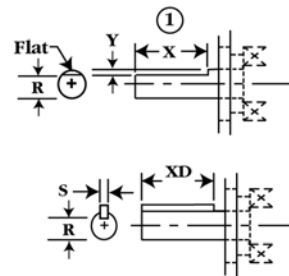
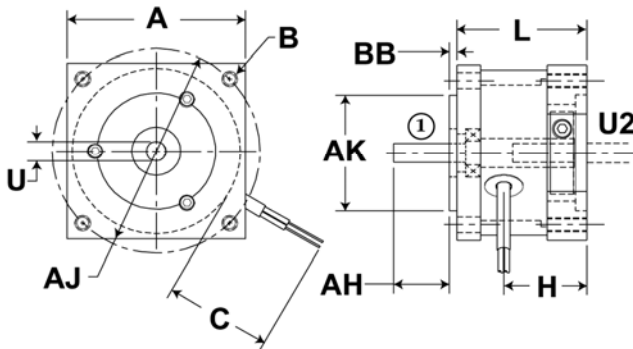
Data at 20 degrees C

Dimensions - inches (mm)

	E9	E5	E8	E6	E6-N	E7
A (3)	1.650 (41.91)	2.250 (57.15)	2.250 (57.15)	3.250 (82.55)	3.250 (82.55)	3.250 (82.55)
B (4x)	#4-40 UNC-2B	0.205 (5.21)	0.205 (5.21)	0.222 (5.64)	0.222 (5.64)	0.222 (5.64)
C (2)	11.5 (292.0)	16.75 (425.0)	16.75 (425.0)	18.0 (457.0)	18.0 (457.0)	18.0 (457.0)
H (3)	0.82 (20.83)	1.18 (29.97)	1.18 (29.97)	1.58 (40.13)	1.58 (40.13)	1.58 (40.13)
L (1)	1.51 (38.35)	1.78 (45.2)	3.031 (76.99)	2.58 (65.53)	2.58 (65.53)	2.58 (65.53)
U (1)	0.197 (5.00)	0.250 (6.35)	0.4997 (12.69)	0.4997 (12.69)	0.4997 (12.69)	0.4997 (12.69)
U2 (3)	0.100 (2.54)	0.145 (3.68)	0.145 (3.68)	0.145 (3.68)	0.145 (3.68)	0.145 (3.68)
AH (3)	0.71 (18.03)	0.70 (17.78)	0.70 (17.78)	1.16 (29.46)	1.16 (29.46)	1.16 (29.46)
AJ (3)	1.725 (43.82)	2.625 (66.68)	2.625 (66.68)	3.875 (98.43)	3.875 (98.43)	3.875 (98.43)
AK (1)	0.8662 (22.00)	1.500 (38.1)	1.500 (38.1)	2.875 (73.03)	2.875 (73.03)	2.875 (73.03)
BB (3)	0.08 (2.03)	0.10 (2.54)	0.10 (2.54)	0.10 (2.54)	0.10 (2.54)	0.10 (2.54)

(1) Maximum Values (2) Minimum Values (3) Nominal (4x) 4 places

Note: These brakes are not IP65 rated and should not be used in an environment that could affect brake performance.



Model	Output Shaft Dimensions		
	X	Y	R
E9	0.59	0.02	0.177
E5	0.63	0.015	0.235

Model	S	XD	R
	E8	1/8 sq.	0.63
E6	1/8 sq.	1.00	0.375
E6-N	1/8 sq.	1.00	0.3125
E7	1/8 sq.	1.00	0.375

J5222 Planetary Gear Reducer

- 2.25 Inch NEMA 23
- Continuous Torques up to 60 lb-in
- Peak Torques up to 90 lb-in
- Ratios 5, 10, 15, 25, 50 & 100 Standard
- "Clamp On" Pinion
- Low Cost Powder Metal Gearing Assembly
- 75 Lb Radial and Axial Load Capacity
- "Bolt On" to NEMA 23 Motors

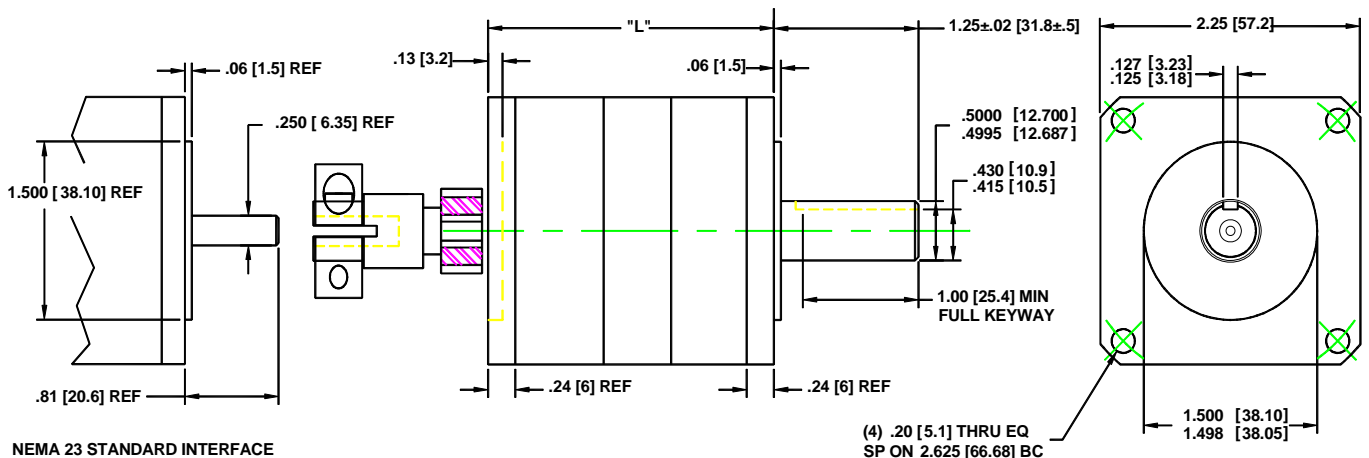


Catalog Number	Ratio n : 1	Torque		Speed Output Max. rpm	Speed Input Max. rpm	Stage No.	Efficiency %	Gearbox Max. Length L mm / in	Weight kg / lb
		Cont. Tcs Nm / lb-in	Peak Tps Nm / lb-in						
J5227	5	6.78 / 60	10.2 / 90	600	3000	1	90%	75.4 / 2.97	0.4 / 0.9
J5232	10	6.78 / 60	10.2 / 90	300	3000	2	80%	90.2 / 3.55	0.6 / 1.3
J5237	15	6.78 / 60	10.2 / 90	200	3000	2	80%	98.3 / 3.87	0.8 / 1.8
J5247	25	6.78 / 60	10.2 / 90	120.0	3000	2	80%	98.3 / 3.87	0.8 / 1.8
J5272	50	6.78 / 60	10.2 / 90	60.0	3000	3	70%	113 / 4.45	1 / 2.2
J5322	100	6.78 / 60	10.2 / 90	30.0	3000	4	60%	128.3 / 5.05	1.2 / 2.6

Notes: 1) Backlash accuracy will be typically less than 3 Deg., 2) Add gear length to motor length

Typical Combinations		Ke v/krpm	Motor Length mm / in	Perform	Units	Gear Ratios					
Gear #	Motor #					5	10	15	25	50	100
DC Gearmotor Combinations											
J5xxx -	LG45222	5.8	102.1 / 4.02	Speed	rpm	600	300	200	120.0	60.0	30.0
				Tc	Nm / lb-in	0.95 / 8.4	1.69 / 15	2.54 / 23	4.2 / 38	6.8 / 60	6.8 / 60
				lc	amps	2.9	2.9	2.9	2.9	2.7	1.57
J5xxx -	LG45226	11	127 / 5	Speed	rpm	600	300	200	120.0	60.0	30.0
				Tc	Nm / lb-in	1.59 / 14.1	2.82 / 25	4.24 / 38	6.8 / 60	6.8 / 60	6.8 / 60
				lc	amps	4.9	4.9	4.9	4.7	2.7	1.57
Brushless Gearmotor Combinations											
J5xxx -	LG45032	8.2	65.3 / 2.57	Speed	rpm	600	300	200	120.0	60.0	30.0
				Tc	Nm / lb-in	0.65 / 5.8	1.15 / 10	1.73 / 15	2.9 / 26	5.1 / 45	6.8 / 60
				lc	amps	2.0	2.0	2.0	2.0	2.0	1.57
J5xxx -	LG45052	8.4	105.2 / 4.14	Speed	rpm	600	300	200	120.0	60.0	30.0
				Tc	Nm / lb-in	1.79 / 15.8	3.18 / 28	4.76 / 42	6.8 / 60	6.8 / 60	6.8 / 60
				lc	amps	5.5	5.5	5.5	4.7	2.7	1.57

Notes 1) Many other gearmotor combinations exist - consult factory, 2) Add Gear & Motor length 3) Add ratio value to J5 Model number as in chart above

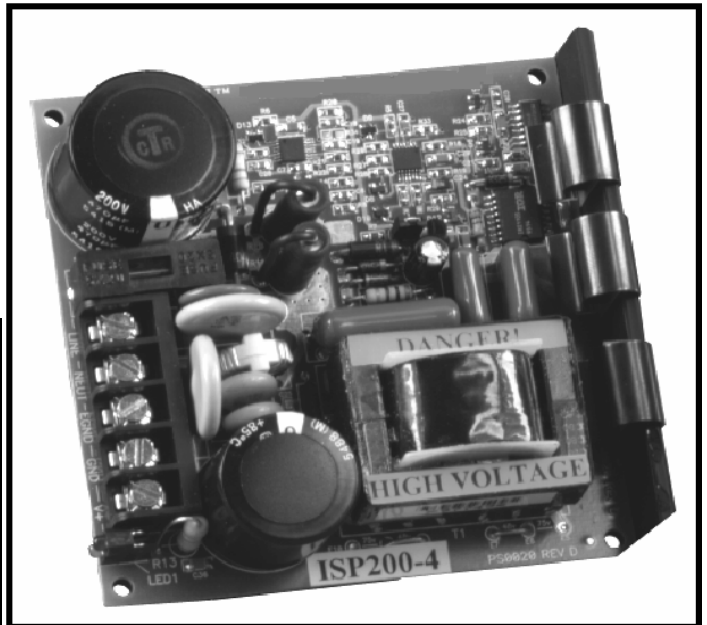


Power Supplies

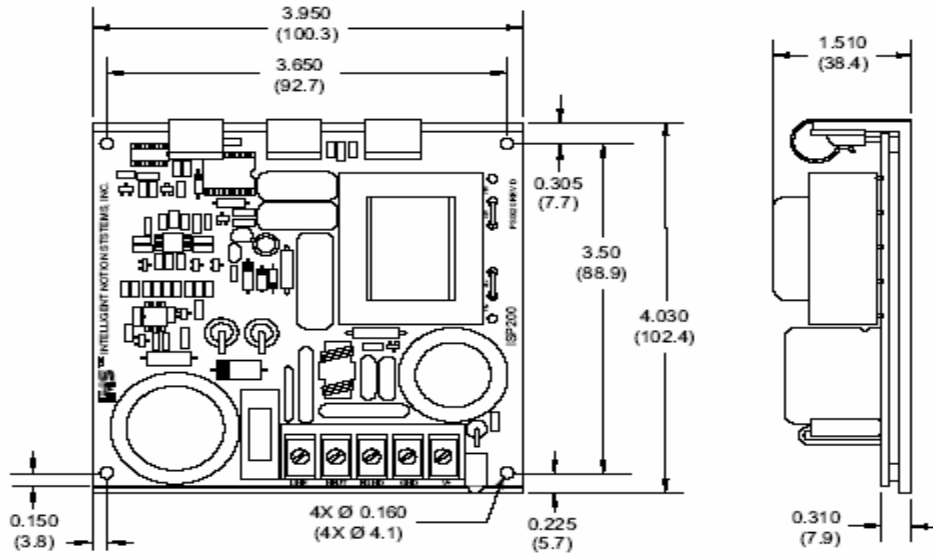
- Efficient Switch Mode Type Supplies
- Effective for Step and DC Motor Controls
- Light Weight and Compact
- Input Voltage: 102-132 Vac, 50/60 Hz
- Soft Start reduces initial power line surge
- Short Circuit, Overvoltage and Thermal Protection

General Specifications

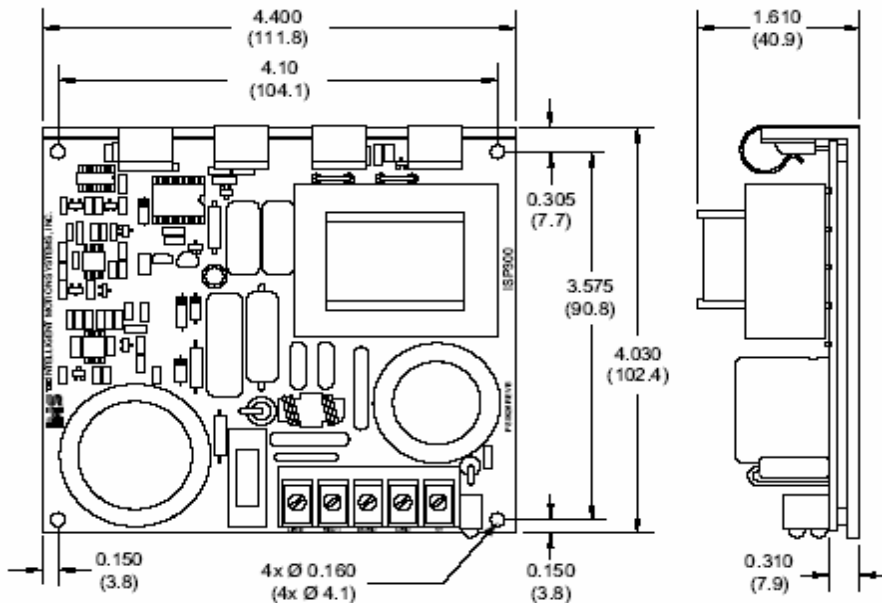
	VSV 47G	VSV 72G
No-Load Output Voltage	45 VDC (nominal)	75 VDC (nominal)
Max. Cont. DC Output Current	3 Amps	4 Amps
Peak Output Power	150 Watts	300 Watts
Operating Temperature	-25 to +50 Deg. C	-25 to +50 Deg. C
Storage Temperature	-25 to +125 Deg. C	-25 to +125 Deg. C
Max. Heat Sink Temperature	70 Deg.C	70 Deg.C
Dimensions (inches)	4.03 x 3.95 x 1.51	4.03 x 4.40 x 1.61
Weight	0.75 lbs.	0.77 lbs
Fusing (5x20 mm slow-blow)	2 Amps	4 Amps



Dimensions - VSV 47G



Dimensions - VSV 72G



Conversion Table

Torque Conversions (To convert from A to B simply multiply "A" by the entry in the table)								
A ^B	oz-in	lb-in	lb-ft	gm-cm	Kg-cm	Kg-m	N-cm	N-m
oz-in	1	6.25x10 ⁻²	5.208x10 ⁻³	72.007	7.2x10 ⁻²	7.2x10 ⁻⁴	0.7061	7.061x10 ⁻³
lb-in	16	1	8.333x10 ⁻²	1152	1.152	1.152x10 ⁻²	11.2	0.112
lb-ft	192	12	1	13820	13.825	0.138	135.5	1.355
gm-cm	1.388x10 ⁻²	8.679x10 ⁻⁴	7.233x10 ⁻⁵	1	10 ⁻³	10 ⁻⁵	9.806x10 ⁻³	9.806x10 ⁻⁵
Kg-cm	13.877	0.8679	7.233x10 ⁻²	1000	1	10 ⁻²	9.806	9.806x10 ⁻²
Kg-m	1.388x10 ³	86.796	7.233	10 ⁵	100	1	980.6	9.806
N-cm	1.41612	8.85x10 ⁻²	7.37x10 ⁻³	1.019x10 ²	0.10197	1.01x10 ⁻³	1	10 ⁻²
N-m	141.612	8.85	0.737	1.019x10 ⁴	10.197	0.101	100	1

Moment of Inertia Conversions (To convert from A to B simply multiply "A" by the entry in the table)										
A ^B	oz-in ²	oz-in-sec ²	lb-in ²	lb-in-sec ²	lb-ft ²	lb-ft-sec ²	gm-cm ²	gm-cm-sec ²	Kg-cm ²	Kg-cm-sec ²
oz-in ²	1	2.59x10 ⁻³	0.0625	1.61x10 ⁻⁴	4.34x10 ⁻⁴	1.34x10 ⁻⁵	182.9	0.186	0.182	1.86x10 ⁻⁴
oz-in-sec ²	386.08	1	24.13	6.25x10 ⁻²	0.1675	5.2x10 ⁻³	7.06x10 ⁴	72	70.615	7.2x10 ⁻²
lb-in ²	16	4.14x10 ⁻²	1	2.59x10 ⁻³	6.94x10 ⁻³	2.15x10 ⁻⁴	2.92x10 ³	2.984	2.926	2.98x10 ⁻³
lb-in-sec ²	6.177x10 ³	16	386.08	1	2.681	8.33x10 ⁻²	1.129x10 ⁶	1.152x10 ³	1.129x10 ³	1.152
lb-ft ²	2304	5.967	144	0.3729	1	3.1x10 ⁻²	4.21x10 ⁵	429.71	421.4	0.4297
lb-ft-sec ²	7.41x10 ⁴	192	4.63x10 ³	12	32.17	1	1.355x10 ⁷	1.38x10 ⁴	1.35x10 ⁴	13.825
gm-cm ²	5.46x10 ⁻³	1.41x10 ⁻⁵	3.417x10 ⁻⁴	8.85x10 ⁻⁷	2.37x10 ⁻⁶	7.37x10 ⁻⁸	1	1.01x10 ⁻³	10 ⁻³	1.01x10 ⁻⁶
gm-cm-sec ²	5.36	1.38x10 ⁻²	0.335	8.67x10 ⁻⁴	2.32x10 ⁻³	7.23x10 ⁻⁵	980.6	1	0.9806	10 ⁻³
Kg-cm ²	5.46	1.41x10 ⁻²	0.3417	8.85x10 ⁻⁴	2.37x10 ⁻³	7.37x10 ⁻⁵	1000	1.019	1	1.019x10 ⁻³
Kg-cm-sec ²	5.36x10 ³	13.887	335.1	0.8679	2.327	7.23x10 ⁻²	9.8x10 ⁵	1000	980.66	1

The motor Torque/Speed curves are published under the following test conditions:

1. Motor is operated in its full electrical rating (I cont., I peak, and terminal voltage) and mechanical ratings (top speed) and maximum motor winding temperature.
2. 25°C ambient temperature.
3. Motor frames NEMA 23 and NEMA 34 are mounted to 10" x 10" x ¼" aluminum heat sink.
4. Motor frame NEMA 56 is mounted to 18" x 18" x ½" aluminum heat sink.

Time Constants

Servo Motor Time Constant - Electrical τ_e (seconds)

The electrical time constant is defined as the time required for current to attain 63.2% of its final value. Expressed mathematically it is the ratio of the rotor inductance in Henries to rotor resistance in Ohms:

$$\tau_e = (L/R)$$

(Second, Henries, Ohms)

Servo Motor Time Constant - Mechanical τ_m (seconds)

The mechanical time constant is defined as the time required for an unloaded motor to attain 63.2% of its final speed resulting from the application of a step input voltage. It can be calculated from the formula:

English units - $\tau_m = (142) ((J_m R) / (K_e * K_t))$	Metric units - $\tau_m = ((J_m R) / (K_e * K_t))$
(Second, oz-in-sec ² , ohm, oz-in/Amp, V/Krpm)	(Second, Kgm ² , ohm, V/rad sec ⁻¹ , Nm/Amp)

Brushless Servo Motor with Sine Drives Time Constant

<u>Electrical</u> τ_e (seconds)	<u>Mechanical</u> τ_m (seconds)
$\tau_e = (2 * L_{L-L}) / ((\sqrt{3}) * R_{L-L})$	$\tau_m = ((90.68752) * (R_{L-L}) * (J_m)) / (K_e * K_t)$

NOTE: K_e = The **Peak** line to line value in Vpeak/KRPM (=RMS value/0.707 **or** = DC value/0.95)

K_t = The **Peak** line to line value in lb-in/Amp peak (=RMS value/0.707 **or** = DC value/0.95)

L_{L-L} = Inductance line to line in mH

R_{L-L} = Resistance line to line in ohms J_m = Motor inertia in lb-in-sec²





