CHAPTER TWO

2 Rotary Servo Motors

Recommended Drive/Motor Systems

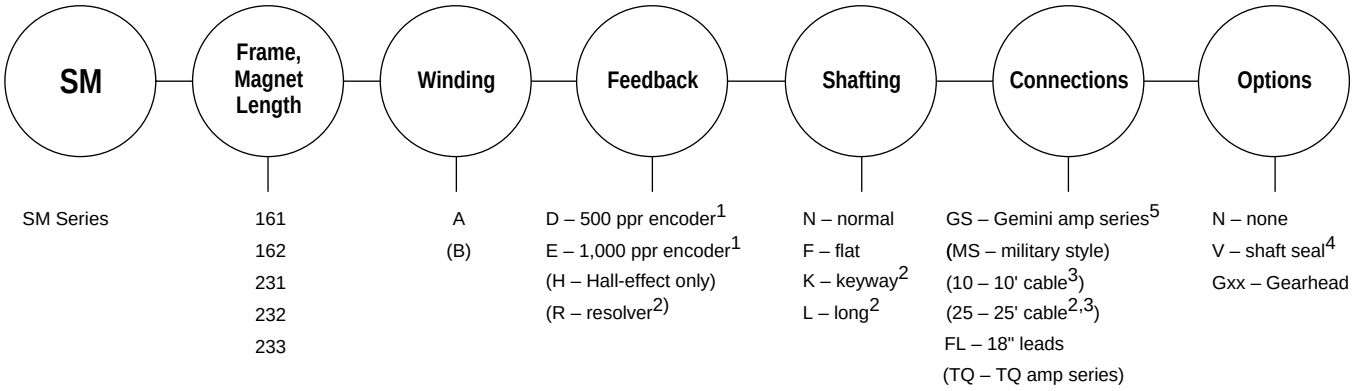
We recommend you use the following motors with drives listed in the *Recommended Drive Type* column.

Motor Model Number	Recommended Drive Type
SM161A	GV-L3E
SM162A	GV-L3E
SM231A	GV-L3E
SM232A	GV-L3E
SM233A	GV-L3E
N0701D	GV-U6E
N0701F	GV-U6E
N0702E	GV-U6E
N0702F	GV-U6E
N0703F	GV-U6E
N0703G	GV-U12E
N0704F	GV-U6E
N0704G	GV-U12E
J0701D	GV-U6E
J0701F	GV-U6E
J0702E	GV-U6E
J0702F	GV-U6E
J0703F	GV-U6E
J0703G	GV-U12E
N0921F	GV-U6E
N0921G	GV-U12E
N0922G	GV-U12E
N0922J	GV-U12E
NO923H	GV-U12E
NO923K	GV-H20E
NO924J	GV-U12E
NO924K	GV-H20E
J0921F	GV-U6E
J0921G	GV-U12E
J0922G	GV-U12E
J0922J	GV-U12E
J0923H	GV-U12E
JO923K	GV-H20E

Part Numbering System

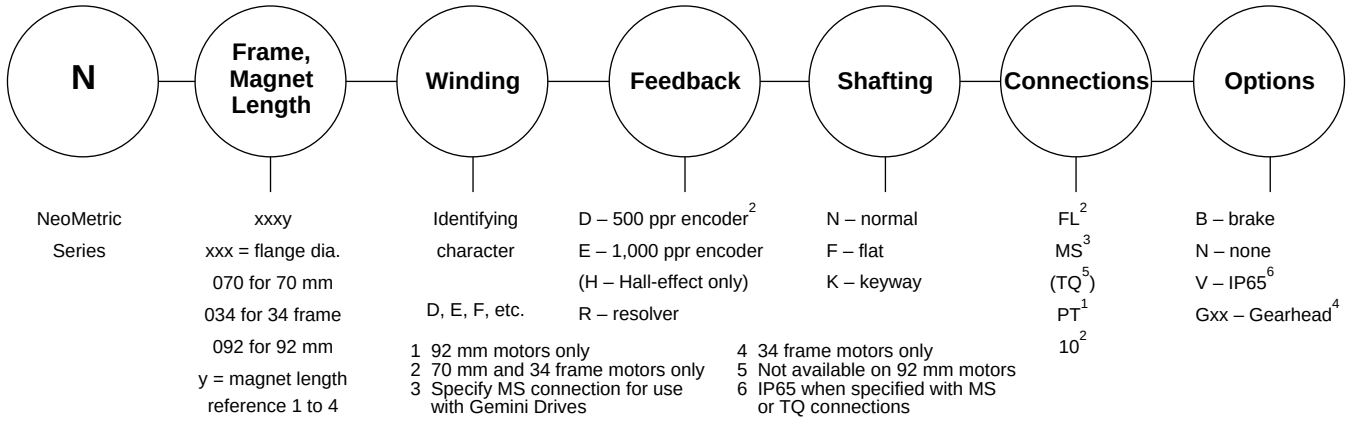
NOTE: Diagrams list *all* motor options. Those options not compatible with Gemini drives are shown in parentheses.

SM Series Motors



1 Includes Hall effect
2 Not available on size 16
3 Cable is hard wired
4 Sizes 16 and 23 with GS, MS, or TQ connectors—IP65
5 Specify GS connections for use with Gemini drives

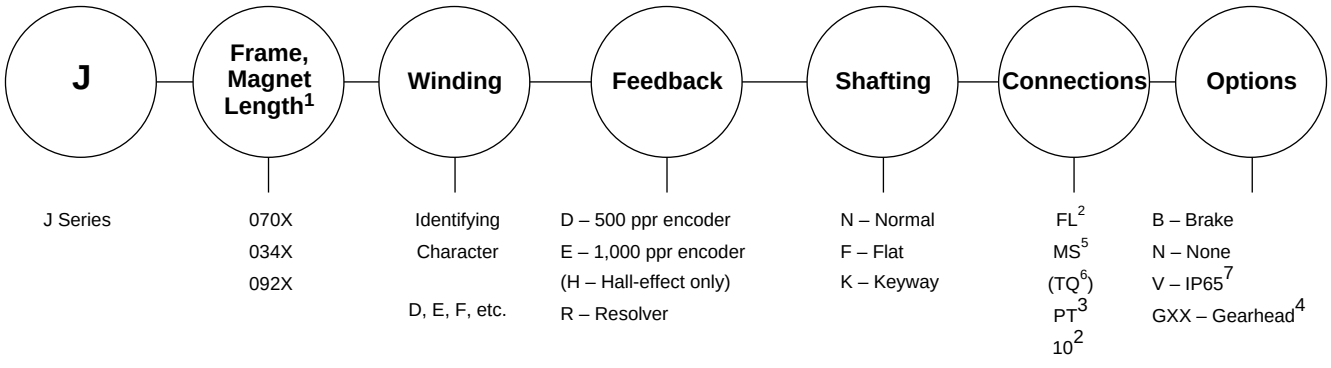
NeoMetric Series Motors



1 92 mm motors only
2 70 mm and 34 frame motors only
3 Specify MS connection for use with Gemini Drives
4 34 frame motors only
5 Not available on 92 mm motors
6 IP65 when specified with MS or TQ connections

Example: N0703FE-KMSB

J Series Motors



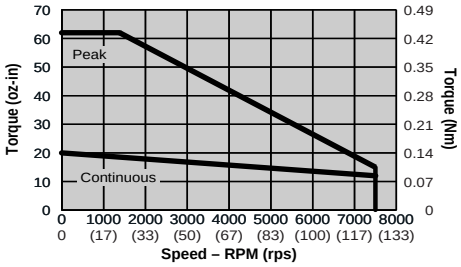
Example: J0702FE-KMSB

1 Four stack frame sizes not available in J Series
2 70 mm only
3 92 mm only
4 34 Frame motors only
5 Specify MS connection for use with Gemini drive
6 Not available on 92 mm motors
7 IP65 when specified with MS or TQ connection

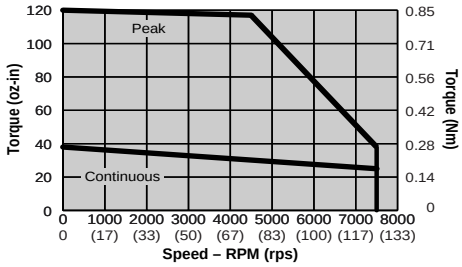
Speed/Torque Curves

SM Series Motors, Encoder Feedback

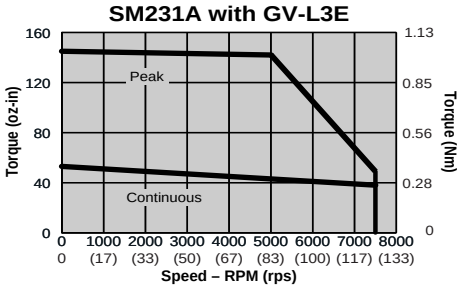
SM161A with GV-L3E



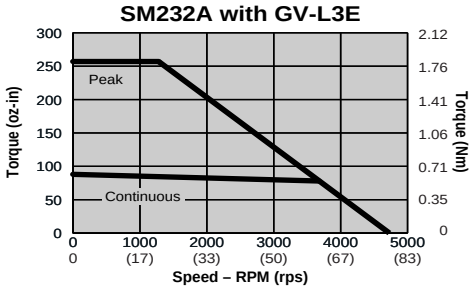
SM162A with GV-L3E



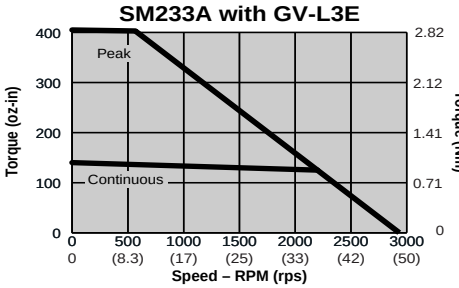
SM231A with GV-L3E



SM232A with GV-L3E



SM233A with GV-L3E



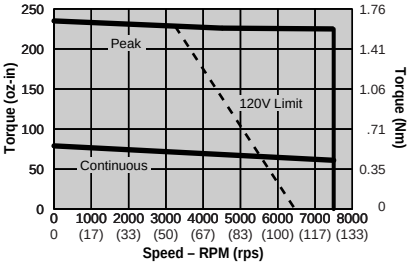
NOTES:

- For “E” encoder option (4,000 counts per revolution, post quadrature), maximum velocity is 6,000 rpm (100 rps).
- Speed/torque curves limited to 7,500 rpm (motor mechanical limit).
- Solid lines designate 120VAC operation, continuous and peak.
- Curves represent 120VAC (nominal) operation.
- Actual speed/torque curves may vary ±10%
- Speed/torque curves are based on motor current values listed in *Motor Parameter Table*, available on the Motion Planner CD-ROM and on the Compumotor web site.
- For speed/torque curves of motors that may have been released after this manual was published, see the *Gemini Motor Reference* section of the Compumotor web site.

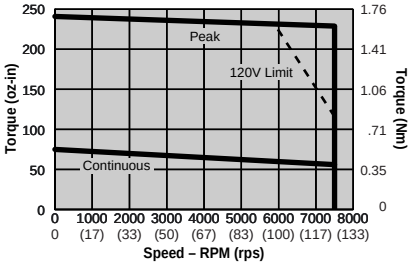
NeoMetric Series Motors, 70 mm and 34 Frame, Encoder Feedback

J Series Motors, 70 mm and 34 Frame, Encoder Feedback

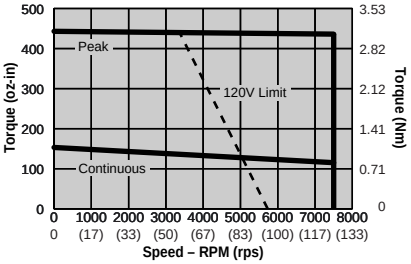
N0701D/J0701D with GV-U6E



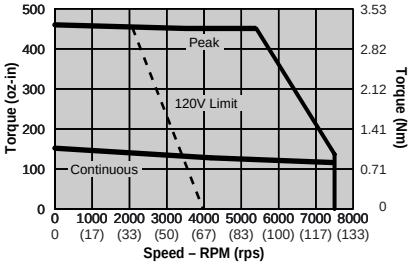
N0701F/J0701F with GV-U6E



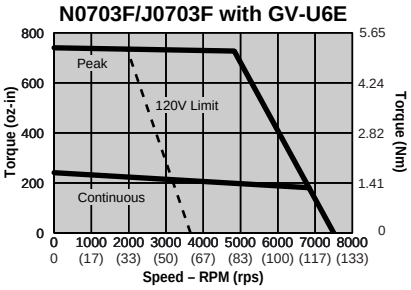
N0702F/J0702F with GV-U6E



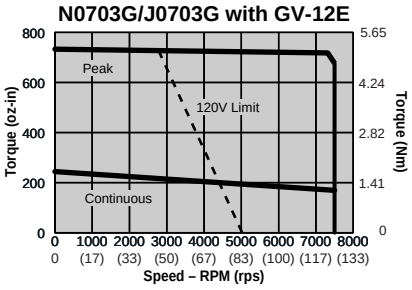
N0702E/J0702E with GV-U6E



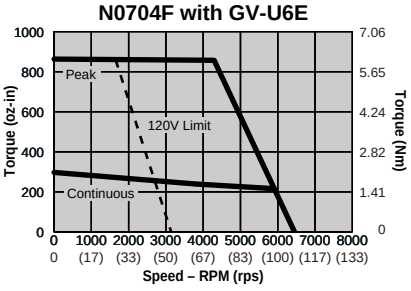
N0703F/J0703F with GV-U6E



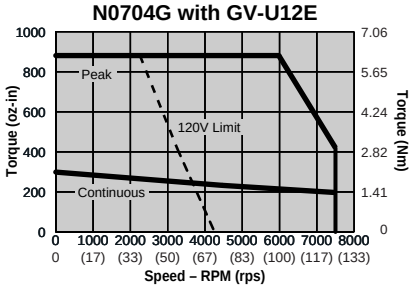
N0703G/J0703G with GV-12E



N0704F with GV-U6E



N0704G with GV-U12E



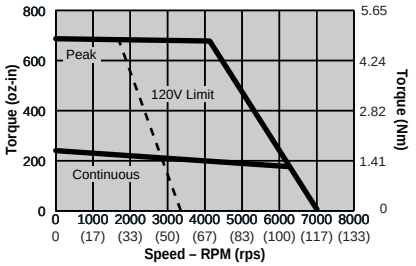
NOTES:

- For “E” encoder option (4,000 counts per revolution, post quadrature), maximum velocity is 6,000 rpm (100 rps).
- Speed/torque curves limited to 7,500 rpm (motor mechanical limit).
- Solid lines designate 240VAC operation, continuous and peak.
- Dashed line designates 120VAC speed limit.
- Curves represent 120VAC (nominal) and 240VAC (nominal) operation.
- Actual speed/torques may vary ±10%
- Speed/torque curves are based on motor current values listed in *Motor Parameter Table*, available on the Motion Planner CD-ROM and on the Compumotor web site.
- For speed/torque curves of motors that may have been released after this manual was published, see the *Gemini Motor Reference* section of the Compumotor web site.

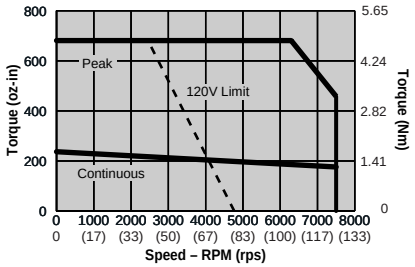
NeoMetric Series Motors, 92 mm, Encoder Feedback

J Series Motors, 92 mm, Encoder Feedback

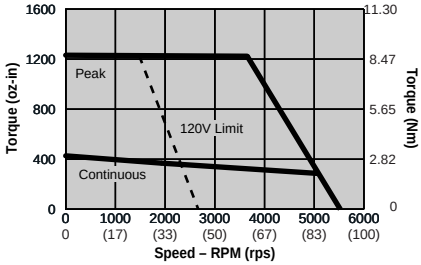
N0921F/J0921F with GV-U6E



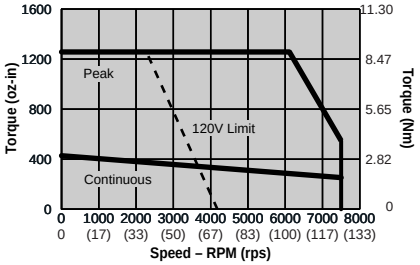
N0921G/J0921G with GV-U12E



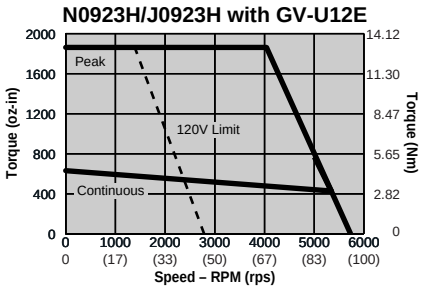
N0922G/J0922G with GV-U12E



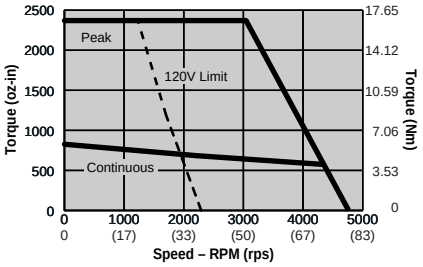
N0922J/J0922J with GV-U12E



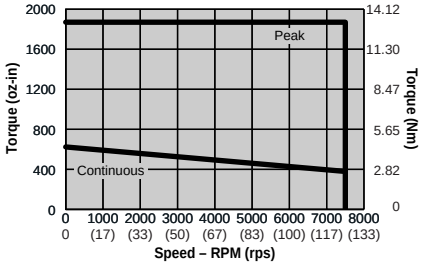
N0923H/J0923H with GV-U12E



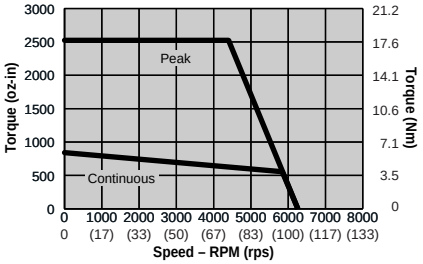
N0924J with GV-U12E



N0923K/J0923K with GV-H20E



N0924K with GV-H20E



NOTES:

- For “E” encoder option (4,000 counts per revolution, post quadrature), maximum velocity is 6,000 rpm (100 rps).
- Speed/torque curves limited to 7,500 rpm (motor mechanical limit).
- Solid lines designate 240VAC operation, continuous and peak.
- Dashed line designates 120VAC speed limit.
- Curves represent 120VAC (nominal) and 240VAC (nominal) operation.
- Actual speed/torques may vary ±10%
- Speed/torque curves are based on motor current values listed in *Motor Parameter Table*, available on the Motion Planner CD-ROM and on the Compumotor web site.
- For speed/torque curves of motors that may have been released after this manual was published, see the *Gemini Motor Reference* section of the Compumotor web site.

Specifications

Data listed is for motor only. Drive specifications may change some values.

SM Series, 16 Frame and 23 Frame, Encoder Feedback [10]

Parameter:	Symbol:	Units:	SM161A	SM162A	SM231A	SM232A	SM233A
Stall Torque Continous [1]	Tcs	lb-in	1.6	2.9	3.8	6.6	10.1
		oz-in	26	47	61	106	161
		Nm	0.18	0.33	0.43	0.74	1.13
Stall Current Continuous [1, 4, 8]	Ics(sine)	Amps Peak	2.7	2.6	2.9	2.8	2.7
Stall Current Continuous [1, 7]	Ics(trap)	Amps DC	2.3	2.3	2.5	2.4	2.4
Peak Torque [6]	Tpk	lb-in	4.9	8.8	11.3	19.8	30.2
		oz-in	78	141	181	316	483
		Nm	0.55	0.99	1.27	2.21	3.38
Peak Current [4, 6, 8]	Ipk(sine)	Amps Peak	8.1	7.8	8.8	8.3	8.1
Peak Current [6, 7]	Ipk(trap)	Amps DC	7.0	6.8	7.6	7.2	7.1
Rated Speed [2]	Wr	rpm	7500	7500	7500	7500	5800
Current @ Rated Speed	Ir(sine)	Amps	2.2	2.2	2.5	2.3	2.4
Current @ Rated Speed	Ir(trap)	Amps	1.9	1.9	2.2	2.0	2.0
Torque @ Rated Speed	Tr	lb-in	1.1	2.3	2.9	5.1	8.1
		oz-in	18	37	47	81	129
		Nm	0.13	0.26	0.33	0.57	0.90
Shaft Power @ Rated Speed	Po	watts	97	205	261	449	553
Voltage Constant [3, 4]	Kb	Volts/rad/s	0.079	0.147	0.169	0.310	0.484
Voltage Constant [3, 4]	Ke	Volts/KRPM	8.27	15.39	17.70	32.46	50.68
Torque Constant [9]	Kt(sine)	oz-in/Amp Peak	9.69	18.03	20.72	38.02	59.35
		Nm/Amp Peak	0.068	0.126	0.145	0.266	0.415
Torque Constant [3, 4]	Kt(trap)	oz-in/Amps DC	11.19	20.82	23.93	43.90	68.53
		Nm/Amp DC	0.078	0.146	0.168	0.307	0.480
Resistance [3]	R	Ohms	4.53	6.50	5.22	7.50	9.65
Inductance [5]	L	mH	0.81	1.39	1.64	2.90	4.08
Maximum Bus Voltage	Vm	Volts DC	170	170	170	340	340
Thermal Resistance Wind-Amb	Rth w-a	C/watt	2.70	2.00	2.00	1.54	1.25
Thermal Resistance Wind-Case	Rth w-c	C/watt	1.19	0.78	0.85	0.51	0.37
Motor Constant	Km	oz-in/sqrt(watt)	5.26	8.16	10.47	16.03	22.06
		Nm/sqrt(watt)	0.037	0.057	0.073	0.112	0.154
Viscous Damping	B	oz-in/Krpm	0.284	0.300	0.250	0.360	0.540
		mNm/Krpm	1.99	2.10	1.75	2.52	3.78
Static Friction	Tf	oz-in	0.15	0.20	0.30	0.70	1.00
		mNm	1.05	1.40	2.10	4.90	7.00
Motor Thermal Time Constant	Tau_th	minutes	11.6	14.2	20	21.6	23.3
Winding Thermal Time Const	Tau_wnd	minutes	0.33	0.33	0.33	0.33	0.33
Electrical Time Constant	Tau_elec	millisecs	0.18	0.21	0.31	0.39	0.42
Mechanical Time Constant	Tau_mch	millisecs	7.7	5.5	9.5	7.2	5.4
Intermittent Torque Duration [10]	T_2x	seconds	9	14	11	18	20
Peak Torque Duration [11]	T_3x	seconds	4	5	4	6	7
Rotor Inertia	J	lb-in-sec^2	0.000094	0.000163	0.00046	0.00082	0.00117
		oz-in^2	0.58	1.01	2.84	5.07	7.23
		kg-m^2	0.0000106	0.0000184	0.000052	0.000093	0.000132
Number of Poles	Np		4	4	4	4	4
Weight	#	lbs	1.1	1.6	2.1	3.0	3.9
		kg	0.5	0.7	1.0	1.4	1.8
Winding Class			H	H	H	H	H

1 @ 25C ambient, 125C winding temperature, motor connected to a 10"x10"x1/4" aluminum mounting plate.
@40C ambient derate phase currents and torques by 12%.

2 Maximum speed is 7500 RPM with 500 line Encoder. For 1000 line encoders, derate to 6000RPM.
For higher speed operation please call the factory.

3 Measured Line to Line, +/- 10%.

4 Value is measured peak of sine wave.

5 +/-30%, Line-to-Line, inductance bridge measurement @1Khz.

6 Initial winding temperature must be 60 C or less before Peak Current is Applied.

7 DC current through a pair of motor phases of a trapaziodally (six state) commutated motor.

8 Peak of the sinusiodal current in any phase for a sinusiodally comutated motor.

9 Total motor torque per peak of the sinusiodal amps measured in any phase, +/-10%.

10 Data listed is for motor only. Drive specifications may change some values.

NeoMetric Series/J Series, 70 mm and 34 Frame, Encoder Feedback [10]

Parameter:	Symbol:	Units:	N0701D or N0341D	N0701F or N0341F	N0702E or N0342E	N0702F or N0342F	N0703F or N0343F	N0703G or N0343G	N0704F or N0344F	N0704G or N0344G
Stall Torque Continous [1]	Tcs	lb-in	5.7	5.6	10.4	10.4	15.8	15.8	19.5	19.5
		oz-in	91	90	167	166	252	252	311	312
		Nm	0.63	0.63	1.17	1.16	1.77	1.77	2.18	2.19
Stall Current Continuous [1, 4, 8]	Ics(sine)	Amps Peak	3.3	5.2	3.8	5.4	5.2	7.3	5.4	7.5
Stall Current Continuous [1, 7]	Ics(trap)	Amps DC	2.9	4.5	3.3	4.6	4.5	6.3	4.7	6.5
Peak Torque [6]	Tpk	lb-in	17.0	16.8	31.2	31.1	47.3	47.3	58.4	58.6
		oz-in	272	269	500	498	757	757	934	937
		Nm	1.90	1.88	3.50	3.49	5.30	5.30	6.54	6.56
Peak Current [4, 6, 8]	Ipk(sine)	Amps Peak	10.0	15.6	11.5	16.1	15.7	21.9	16.3	22.6
Peak Current [6, 7]	Ipk(trap)	Amps DC	8.7	13.5	10.0	13.9	13.6	19.0	14.1	19.6
Rated Speed [2]	Wr	rpm	7500	7500	7500	7500	6800	7500	5500	7500
Current @ Rated Speed	Ir(sine)	Amps	3.0	4.7	3.2	4.5	4.4	5.8	4.6	5.6
Current @ Rated Speed	Ir(trap)	Amps	2.6	4.1	2.8	3.9	3.8	5.0	4.0	4.9
Torque @ Rated Speed	Tr	lb-in	4.7	4.6	7.1	7.9	10.8	11.4	14.1	12.6
		oz-in	75	74	114	126	173	182	226	201
		Nm	0.53	0.52	0.80	0.88	1.21	1.27	1.58	1.41
Shaft Power @ Rated Speed	Po	watts	416	411	632	699	870	1010	919	1115
Voltage Constant [3, 4]	Kb	Volts/rad/s	0.221	0.140	0.353	0.253	0.392	0.282	0.468	0.338
Voltage Constant [3, 4]	Ke	Volts/KRPM	23.14	14.66	36.97	26.49	41.05	29.53	49.01	35.40
Torque Constant [9]	Kt(sine)	oz-in/Amp Peak	27.10	17.17	43.29	31.03	48.07	34.58	57.39	41.45
		Nm/Amp Peak	0.190	0.120	0.303	0.217	0.336	0.242	0.402	0.290
Torque Constant [3, 4]	Kt(trap)	oz-in/Amp DC	31.29	19.82	49.98	35.82	55.51	39.93	66.27	47.86
		Nm/Amp DC	0.219	0.139	0.350	0.251	0.389	0.280	0.464	0.335
Resistance [3]	R	Ohms	5.52	2.27	5.22	2.70	3.36	1.74	3.47	1.80
Inductance [5]	L	mH	12.98	5.23	15.80	8.16	12.13	6.30	14.50	7.55
Maxumum Bus Voltage	Vm	Volts DC	340	340	340	340	340	340	340	340
Thermal Res Wind-Amb	Rth w-a	C/watt	1.44	1.44	1.15	1.15	0.96	0.96	0.87	0.87
Thermal Res Wind-Case	Rth w-c	C/watt	0.66	0.66	0.39	0.39	0.24	0.24	0.21	0.21
Motor Constant	Km	oz-in/sqrt(watt)	13.32	13.16	21.88	21.80	30.28	30.27	35.57	35.67
		Nm/sqrt(watt)	0.093	0.092	0.153	0.153	0.212	0.212	0.249	0.250
Viscous Damping	B	oz-in/Krpm	0.2	0.2	0.4	0.4	0.6	0.6	0.8	0.8
		mNm/krpm	1.4	1.4	2.8	2.8	4.2	4.2	5.6	5.6
Static Friction	Tf	oz-in	0.8	0.8	1.6	1.6	2.4	2.4	3.2	3.2
		mNm	5.6	5.6	11.2	11.2	16.8	16.8	22.4	22.4
Motor Thermal Time Constant	Tau_th	minutes	16.6	16.6	21.7	21.7	22.5	22.5	23.3	23.3
Winding Thermal Time Const	Tau_wnd	minutes	0.66	0.66	0.58	0.58	0.53	0.53	0.5	0.5
Electrical Time Constant	Tau_elec	millisecs	2.35	2.30	3.03	3.02	3.61	3.62	4.18	4.19
Mechanical Time Constant	Tau_mch	millisecs	1.6	1.7	0.6	0.6	0.6	0.6	0.6	0.6
Intermittent Torque Duration [10]	T_2x	seconds	22	22	32	32	39	39	38	38
Peak Torque Duration [11]	T_3x	seconds	9	9	11	11	13	13	12	12
Rotor Inertia	J	lb-in-sec^2	0.000106	0.000106	0.000173	0.000173	0.00024	0.00024	0.000307	0.000307
		oz-in^2	0.65	0.65	1.07	1.07	1.48	1.48	1.90	1.90
		kg-m^2	0.0000120	0.0000120	0.0000195	0.0000195	0.0000271	0.0000271	0.0000347	0.0000347
Number of Poles	Np		4	4	4	4	4	4	4	4
Weight	#	lbs	3.5	3.5	4.5	4.5	6.0	6.0	7.3	7.3
		kg	1.6	1.6	2.1	2.1	2.7	2.7	3.3	3.3
Winding Class			H	H	H	H	H	H	H	H

1 @ 25C ambient, 125C winding temperature, motor connected to a 10"x10"x1/4" aluminum mounting plate.
@40C ambient derate phase currents and torques by 12%.

2 Maximum speed is 7500 RPM with 500 line Encoder. For 1000 line encoders, derate to 6000RPM.
For higher speed operation please call the factory.

3 Measured Line to Line, +/- 10%.

4 Value is measured peak of sine wave.

5 +/-30%, Line-to-Line, inductance bridge measurement @1Khz.

6 Initial winding temperature must be 60 C or less before Peak Current is Applied.

7 DC current through a pair of motor phases of a trapaziodally (six state) commutated motor.

8 Peak of the sinusiodal current in any phase for a sinusiodally comutated motor.

9 Total motor torque per peak of the sinusiodal amps measured in any phase, +/-10%.

10 Data listed is for motor only. Drive specifications may change some values.

Additional J Series Specifications: Parameter:	Symbol:	Units:	N0701D or N0341D	N0701F or N0341F	N0702E or N0342E	N0702F or N0342F	N0703F or N0343F	N0703G or N0343G
Rotor Inertia	J	lb-in-sec^2	0.00114	0.00114	0.00121	0.00121	0.00128	0.00128
		oz-in^2	7.04	7.04	7.47	7.47	7.91	7.91
		kg-m^2	0.0001288	0.0001288	0.0001367	0.0001367	0.0001446	0.0001446
Mechanical Time Constant	Tau_mch	millisecs	14.7	14.7	5.7	5.7	3.2	3.2
Weight	#	lbs	4.4	4.4	5.4	5.4	6.9	6.9
		kg	2.0	2.0	2.5	2.5	3.1	3.1

NeoMetric Series/J Series, 92 mm, Encoder Feedback [10]

Parameter:	Symbol:	Units:	N0921F	N0921G	N0922G	N0922J	N0923H	N0923K	N0924J	N0924K
Stall Torque Continous [1]	Tcs	lb-in	15.5	15.6	27.6	28.3	41.3	40.6	54.6	54.8
		oz-in	249	249	442	453	660	650	873	876
		Nm	1.74	1.74	3.09	3.17	4.62	4.55	6.11	6.14
Stall Current Continuous [1, 4, 8]	Ics(sine)	Amps Peak	4.7	6.6	6.5	10.1	10.0	17.4	10.8	15.2
Stall Current Continuous [1, 7]	Ics(trap)	Amps DC	4.1	5.7	5.6	8.7	8.6	15.1	9.4	13.2
Peak Torque [6]	Tpk	lb-in	46.6	46.7	82.9	83.5	268.8	468.8	163.8	164.3
		oz-in	746	747	1327	1336	4300	7500	2620	2629
		Nm	5.22	5.23	9.29	9.35	30.10	52.50	18.34	18.41
Peak Current [4, 6, 8]	Ipk(sine)	Amps Peak	14.2	19.7	19.5	30.3	29.9	52.2	32.5	45.6
Peak Current [6, 7]	Ipk(trap)	Amps DC	12.3	17.1	26.9	26.2	25.9	45.2	28.2	39.5
Rated Speed [2]	Wr	rpm	6000	7500	4650	7300	4689	7500	3750	5250
Current @ Rated Speed	Ir(sine)	Amps	4.1	5.2	5.6	7.0	8.6	11.9	9.7	12.4
Current @ Rated Speed	Ir(trap)	Amps	3.5	4.5	4.8	6.0	7.4	10.3	8.4	10.7
Torque @ Rated Speed	Tr	lb-in	11.8	11.3	20.4	16.3	30.4	28.8	41.0	39.1
		oz-in	188	181	326	260	487	461	656	626
		Nm	1.32	1.27	2.28	1.82	3.41	3.23	4.59	4.38
Shaft Power @ Rated Speed	Po	watts	834	1004	1121	1404	1689	2557	1820	2431
Voltage Constant [3, 4]	Kb	Volts/rad/s	0.427	0.309	0.556	0.360	0.540	0.305	0.657	0.470
Voltage Constant [3, 4]	Ke	Volts/KRPM	44.72	32.36	58.22	37.70	56.55	31.94	68.80	49.22
Torque Constant [9]	Kt(sine)	oz-in/Amp Peak	52.36	37.89	68.18	44.15	66.22	37.40	80.57	57.64
		Nm/Amp Peak	0.367	0.265	0.477	0.309	0.464	0.262	0.564	0.403
Torque Constant [3, 4]	Kt(trap)	oz-in/Amp DC	60.46	43.75	78.73	50.98	76.46	43.19	93.03	66.55
		Nm/Amp DC	0.423	0.306	0.551	0.357	0.535	0.302	0.651	0.466
Resistance [3]	R	Ohms	3.72	1.94	2.32	0.96	1.28	0.42	1.22	0.62
Inductance [5]	L	mH	17.11	8.99	14.72	6.18	14.95	4.78	20.60	10.51
Maxumum Bus Voltage	Vm	Volts DC	340	340	340	340	340	340	340	340
Thermal Res Wind-Amb	Rth w-a	C/watt	1.06	1.06	0.91	0.91	0.7	0.7	0.62	0.62
Thermal Res Wind-Case	Rth w-c	C/watt	0.30	0.30	0.23	0.23	0.14	0.14	0.10	0.10
Motor Constant	Km	oz-in/sqrt(watt)	31.35	31.41	51.69	52.03	67.59	66.64	84.23	84.52
		Nm/sqrt(watt)	0.219	0.220	0.362	0.364	0.473	0.466	0.590	0.592
Viscous Damping	B	oz-in/Krpm	0.5	0.5	0.8	0.8	1.1	1.1	1.4	1.4
		mNm/krpm	3.5	3.5	5.6	5.6	7.7	7.7	9.8	9.8
Static Friction	Tf	oz-in	2.5	2.5	4.8	4.8	5.4	5.4	6.6	6.6
		mNm	17.5	17.5	33.6	33.6	37.8	37.8	46.2	46.2
Motor Thermal Time Constant	Tau_th	minutes	21.6	21.6	30	30	35	35	37	37
Winding Thermal Time Const	Tau_wnd	minutes	0.8	0.8	0.5	0.5	0.5	0.5	0.4	0.4
Electrical Time Constant	Tau_elec	millisecs	4.60	4.63	6.34	6.44	11.68	11.38	16.89	16.95
Mechanical Time Constant	Tau_mch	millisecs	0.8	0.8	0.5	0.5	0.4	0.5	0.4	0.4
Intermittent Torque Duration [10]	T_2x	seconds	48	48	39	39	61	61	61	61
Peak Torque Duration [11]	T_3x	seconds	17	17	13	13	16	16	15	15
Rotor Inertia	J	lb-in-sec^2	0.000363	0.000363	0.000623	0.000623	0.000883	0.000883	0.00114	0.00114
		oz-in^2	2.24	2.24	3.85	3.85	5.45	5.45	7.04	7.04
		kg-m^2	0.0000410	0.0000410	0.0000704	0.0000704	0.0000998	0.0000998	0.0001288	0.0001288
Number of Poles	Np		4	4	4	4	4	4	4	4
Weight	#	lbs	8.1	8.1	11.7	11.7	15.1	15.1	18.0	18.0
		kg	3.7	3.7	5.3	5.3	6.9	6.9	8.2	8.2
Winding Class			H	H	H	H	H	H	H	H

1 @ 25C ambient, 125C winding temperature, motor connected to a 10"x10"x1/4" aluminum mounting plate.
@40C ambient derate phase currents and torques by 12%.

2 Maximum speed is 7500 RPM with 500 line Encoder. For 1000 line encoders, derate to 6000RPM.
For higher speed operation please call the factory.

3 Measured Line to Line, +/- 10%.

4 Value is measured peak of sine wave.

5 +/-30%, Line-to-Line, inductance bridge measurement @1Khz.

6 Initial winding temperature must be 60 C or less before Peak Current is Applied.

7 DC current through a pair of motor phases of a trapaziodally (six state) commutated motor.

8 Peak of the sinusiodal current in any phase for a sinusiodally comutated motor.

9 Total motor torque per peak of the sinusiodal amps measured in any phase, +/-10%.

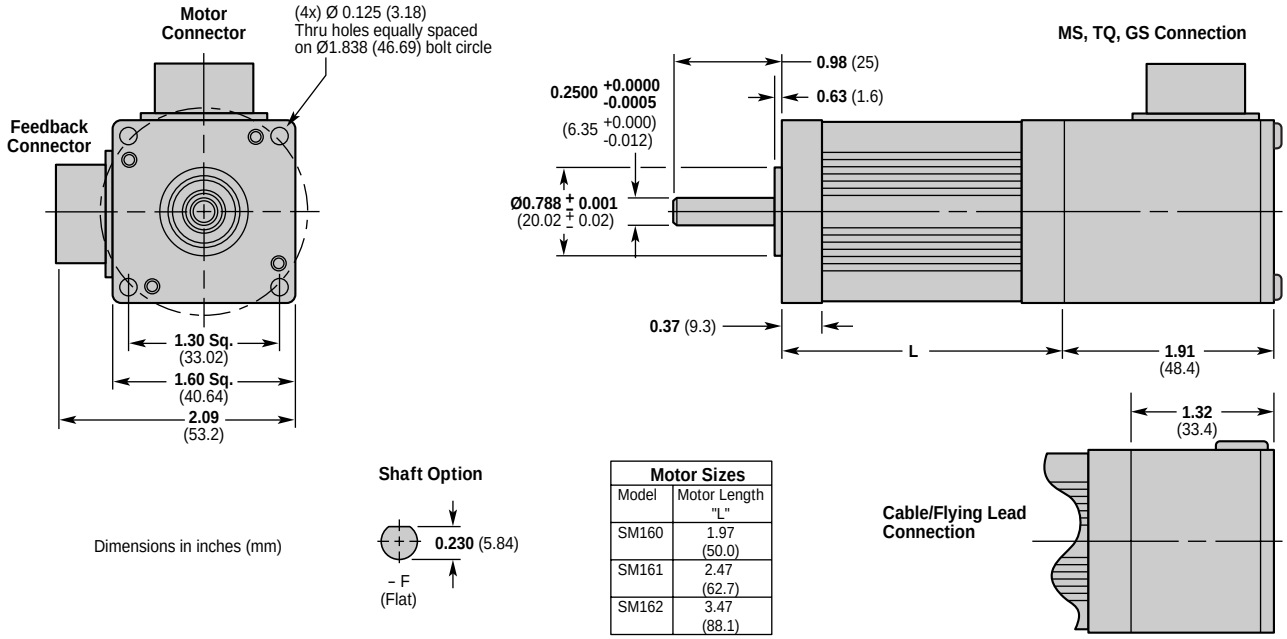
10 Data listed is for motor only. Drive specifications may change some values.

Additional J Series Specifications

Parameter:	Symbol:	Units:	N0921F	N0921G	N0922G	N0922J	N0923H	N0923K
Rotor Inertia	J	lb-in-sec^2	0.00423	0.00423	0.00450	0.00450	0.00480	0.00480
		oz-in^2	26.13	26.13	27.80	27.80	29.65	29.65
		kg-m^2	0.0004779	0.0004779	0.0005084	0.0005084	0.0005423	0.0005423
Mechanical Time Constant	Tau_mch	millisecs	10.0	10.0	3.9	3.9	2.4	2.4
Weight	#	lbs	9.9	9.9	13.5	13.5	16.9	16.9
		kg	4.5	4.5	6.1	6.1	7.7	7.7

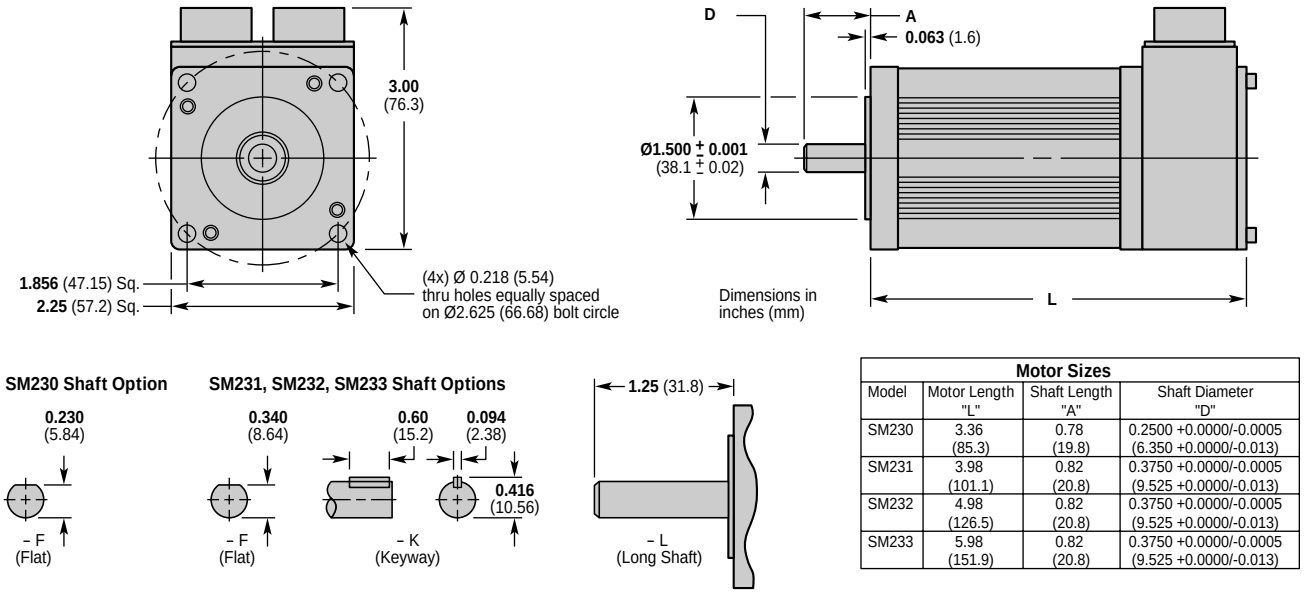
Dimensions

SM Series, 16 Frame, Encoder Feedback



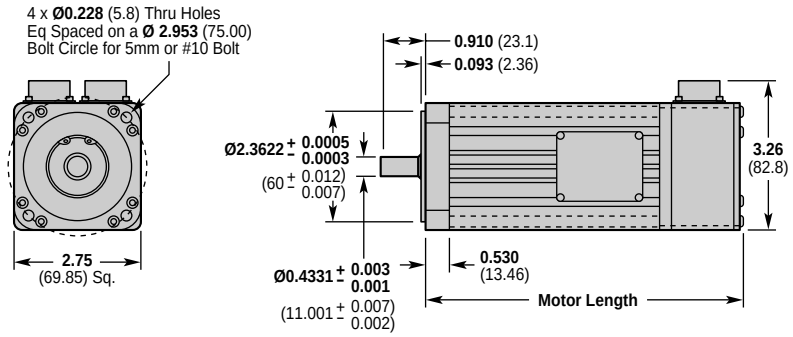
Motor Sizes	
Model	Motor Length "L"
SM160	1.97 (50.0)
SM161	2.47 (62.7)
SM162	3.47 (88.1)

SM Series, 23 Frame, Encoder Feedback



Motor Sizes			
Model	Motor Length "L"	Shaft Length "A"	Shaft Diameter "D"
SM230	3.36 (85.3)	0.78 (19.8)	0.2500 +0.0000/-0.0005 (6.350 +0.0000/-0.013)
SM231	3.98 (101.1)	0.82 (20.8)	0.3750 +0.0000/-0.0005 (9.525 +0.0000/-0.013)
SM232	4.98 (126.5)	0.82 (20.8)	0.3750 +0.0000/-0.0005 (9.525 +0.0000/-0.013)
SM233	5.98 (151.9)	0.82 (20.8)	0.3750 +0.0000/-0.0005 (9.525 +0.0000/-0.013)

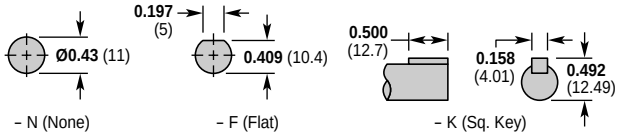
NeoMetric Series and J Series, Size 70



Motor Sizes		
Motor Length	NeoMetric	J Series
10.00 (254.00)	70-4 Brake	J0703 Brake
9.00 (228.60)	70-3 Brake	J0702 Brake
8.00 (203.20)	70-2 Brake	J0701 Brake
7.00 (177.80)	70-1 Brake	
7.94 (201.68)	70-4	J0703
6.94 (176.28)	70-3	J0702
5.94 (150.88)	70-2	J0701
4.94 (125.48)	70-1	

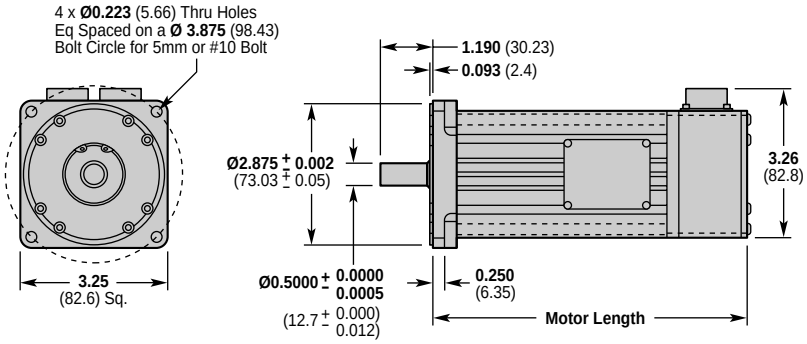
Dimensions in inches (mm)

Shaft Options



– N (None) – F (Flat) – K (Sq. Key)

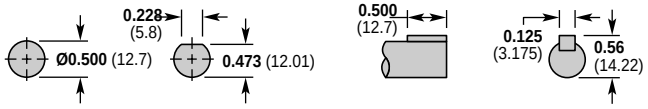
NeoMetric Series and J Series, Size 34



Motor Sizes		
Motor Length	NeoMetric	J Series
10.00 (254.00)	34-4 Brake	J0343 Brake
9.00 (228.60)	34-3 Brake	J0342 Brake
8.00 (203.20)	34-2 Brake	J0341 Brake
7.00 (177.80)	34-1 Brake	
7.94 (201.68)	34-4	J0343
6.94 (176.28)	34-3	J0342
5.94 (150.88)	34-2	J0341
4.94 (125.48)	34-1	

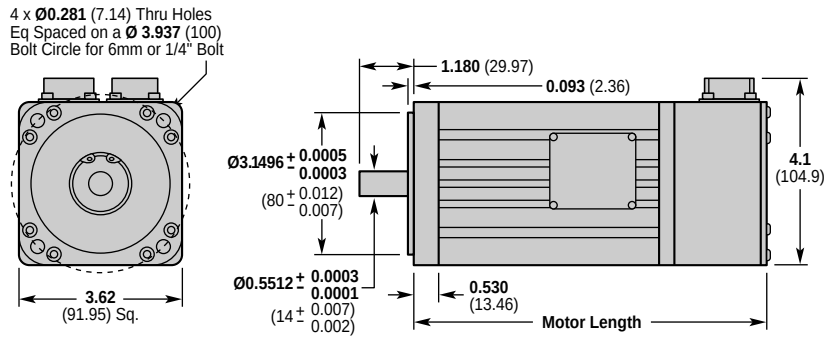
Dimensions in inches (mm)

Shaft Options



– N (None) – F (Flat) – K (Sq. Key)

NeoMetric Series and J Series, Size 92

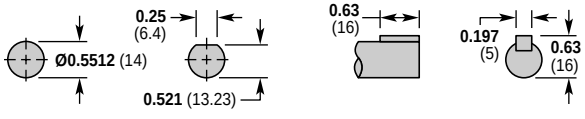


Motor Sizes		
Motor Length	NeoMetric	J Series
13.50 (342.90)	92-4 Brake	J0923 Brake
12.00 (304.80)	92-3 Brake	J0922 Brake
10.50 (266.70)	92-2 Brake	J0921 Brake
9.00 (228.60)	92-1 Brake	
11.13 (282.70)	92-4	J0923
9.63 (244.60)	92-3	J0922
8.13 (206.50)	92-2	J0921
6.63 (168.40)	92-1	

Note: For PT option add 1.40 inches

Dimensions in inches (mm)

Shaft Options



– N (None) – F (Flat) – K (Sq. Key)

Wiring Information

SM Series, 16 Frame and 23 Frame, Encoder Feedback – Cable Sets

Specify the GS connection option when operating SM motors with Gemini drives. The GS option provides quick disconnect, bayonet style connectors attached to the motor body. Wiring for the GS option is similar to the MS option, except the temperature switch leads have been moved to the feedback connector.

The following cable sets are available for SM Series motors with the GS connection option. These cable sets consist of one motor power cable and one feedback cable. These cables have mating motor connectors at one end, and molded connectors for wiring to a Gemini drive at the other end. These cables have a braided metal shield and are CE (EMC) compliant. The GB cable sets have leads for wiring SM motors with internal brakes; the GS cable sets do not.

23GS CABLE-XX One set of cables for SM motors with encoder feedback and GS connection option. Gemini connector end does not have brake leads. “-XX” is cable length. “23GS CABLE” sets available in lengths of 10, 25, 35 feet.

23GB CABLE-XX One set of cables for SM motors with encoder feedback and GS connection option. Gemini connector end has two brake leads. “-XX” is cable length. “23GB CABLE” sets available in lengths of 10, 25, 35 feet.

Use these cables on 16 frame motors, as well as 23 frame size motors.

NeoMetric Series and J Series, 70 mm and 34 Frame, Encoder Feedback – Cable Sets

Specify the MS connection option when operating 70 mm NeoMetric or J Series motors with Gemini drives.

The following cable sets are available for NeoMetric or J Series motors with the MS connection option. These cable sets consist of one motor power cable and one feedback cable. These cables have mating motor connectors at one end, and molded connectors for wiring to a Gemini drive at the other end. These cables have a braided metal shield and are CE (EMC) compliant. The GB cable sets have leads for wiring motors with internal brakes; the GS cable sets do not.

70GS CABLE-XX One set of cables for 70 mm motors with encoder feedback and MS connection option. Gemini connector end does not have brake leads. “-XX” is cable length. “70GS CABLE” sets available in lengths of 10, 25, 35 feet.

70GB CABLE-XX One set of cables for 70 mm motors with encoder feedback and MS connection option. Gemini connector end has two brake leads. “-XX” is cable length. “70GB CABLE” sets available in lengths of 10, 25, 35 feet.

Use these cables on 34 frame size motors, as well as 70 mm motors

NeoMetric Series and J Series, 92 mm, Encoder Feedback – Cable Sets

Specify the MS connection option when operating 92 mm NeoMetric Series motors with Gemini drives.

The following cable sets are available for 92 mm NeoMetric Series motors with the MS connection option. These cable sets consist of one motor power cable and one feedback cable. These cables have mating motor connectors at one end, and molded connectors for wiring to a Gemini drive at the other end. These cables have a braided metal shield and are CE (EMC) compliant. The GB cable sets have leads for wiring motors with internal brakes; the GS cable sets do not.

92GS CABLE-XX One set of cables for 92 mm motors with encoder feedback and MS connection option. Gemini connector end does not have brake leads. “-XX” is cable length. “92GS CABLE” sets available in lengths of 10, 25, 35 feet.

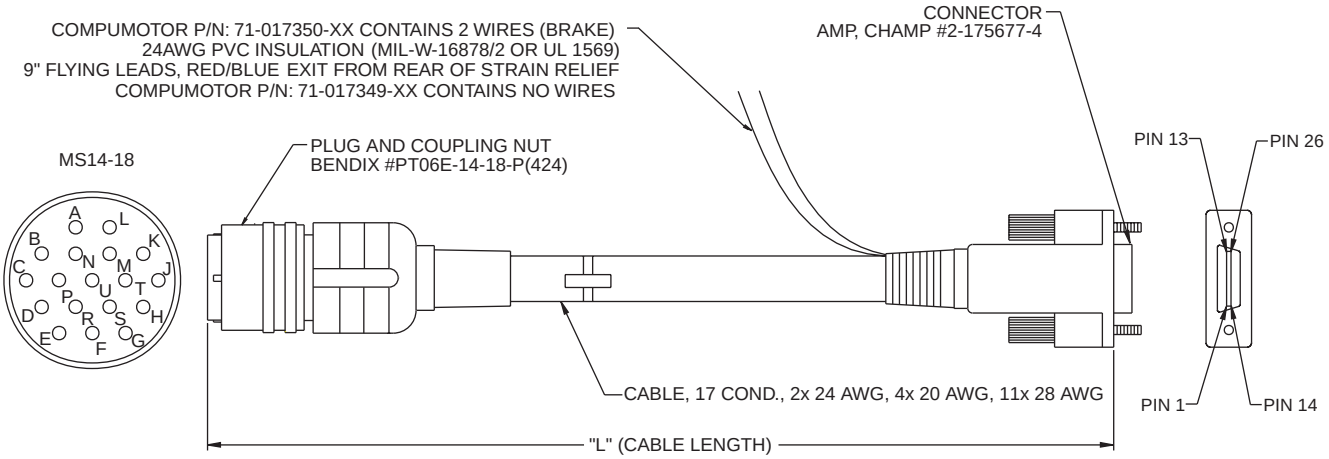
92GB CABLE-XX One set of cables for 92 mm motors with encoder feedback and MS connection option. Gemini connector end has two brake leads. “-XX” is cable length. “92GB CABLE” sets available in lengths of 10, 25, 35 feet.

Feedback Cable – Specifications

This cable is supplied as the feedback cable with the following cable sets

Without Brake Wires:	With Brake Wires:
23GS CABLE-XX	**23GB CABLE-XX**
70GS CABLE-XX	**70GB CABLE-XX**
92GS CABLE-XX	**92GB CABLE-XX**

Cable color code, dimensions, and specifications are shown below.



WIRE LIST			
MS14-18	WIRE COLOR	FUNCTION	AMP CHAMP
PIN NO.	ENCODER WIRES		
A	WHITE	CH A+	5
B	YELLOW	CH A-	6
C	GREEN	CH B+	7
D	BLUE	CH B-	8
E	ORANGE	INDEX+	9
F	BROWN	INDEX-	10
G	BLACK	GROUND	3,4
H	RED	+5V	1,2
HALL SIGNAL WIRES			
K	WHT/GRN	HALL GND	15,11
M	WHT/BLU	HALL +5V	14
P	WHT/VIO	HALL CH3	18
T	WHT/BRN	HALL CH1	16
U	WHT/ORG	HALL CH2	17
BRAKE & TEMP SW			
R	RED/BLUE	BRAKE (OPTIONAL)	N/A
S	RED/BLUE	BRAKE (OPTIONAL)	N/A
L	YEL/ORG	THERMAL SWITCH	12
N	YEL/ORG	THERMAL SWITCH	13

CABLE LENGTH	
DASH NO. (-XX)	DIM "L"
-10	10 FT. (3.0 m)
-25	25 FT. (7.6 m)
-35	35 FT. (10.6 m)

COMPUMOTOR CABLE P/N WITH 2 WIRES
FOR BRAKE CONNECTION: 71-017350-XX

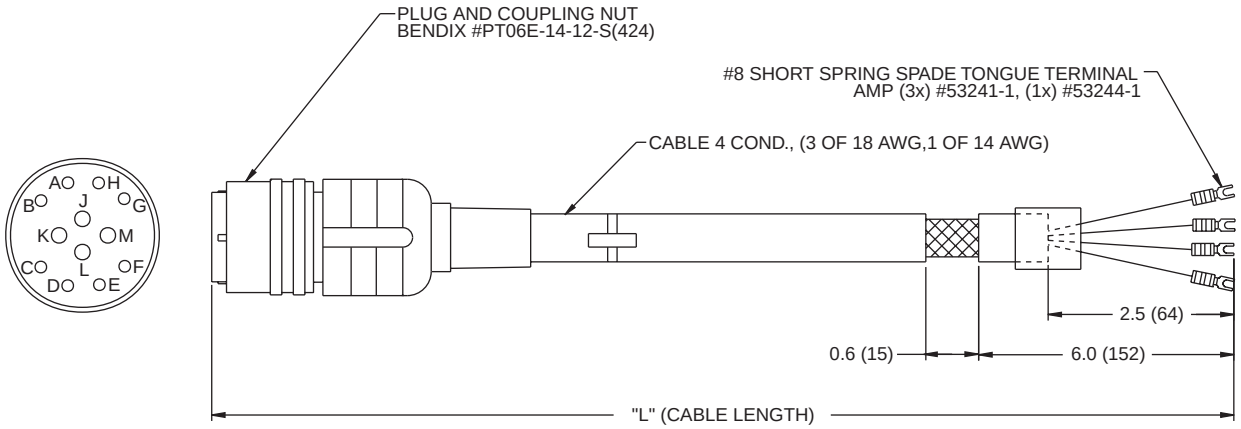
COMPUMOTOR CABLE P/N W/O 2 WIRES: 71-017349-XX

Motor Cable for SM Series Motors – Specifications

This cable is supplied as the motor cable with the following cable sets

23GS CABLE-XX 23GB CABLE-XX

Cable color code, dimensions, and specifications are shown below.



MS 14-12 CONNECTOR		
PIN NO.	WIRE COLOR	DRIVE
J	BLACK #1	U
K	BLACK #2	V
L	BLACK #3	W
M	GRN/YEL	⏚

CABLE LENGTH	
DASH NO. (-XX)	DIM "L"
-10	10 FT. (3.0 m)
-25	25 FT. (7.6 m)
-35	35 FT. (10.6 m)

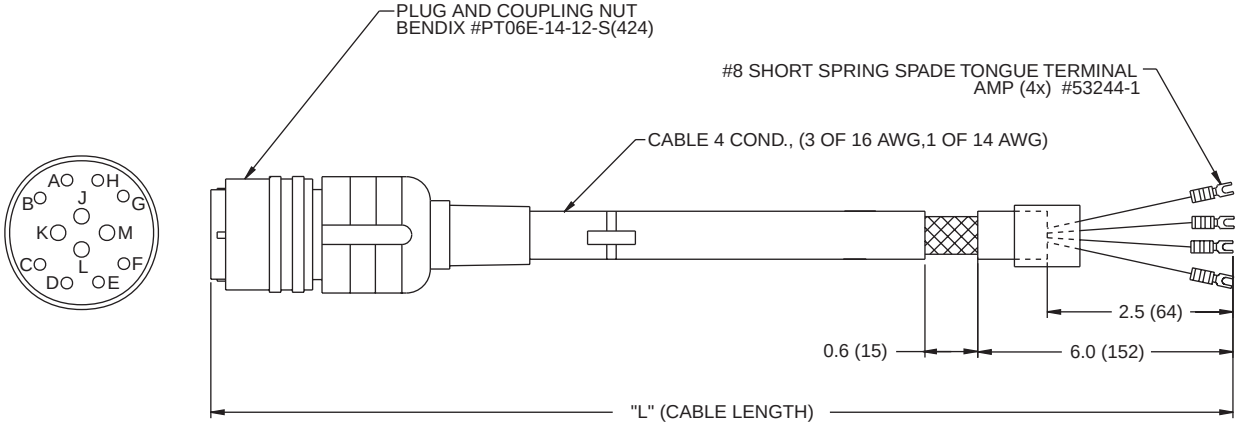
COMPUMOTOR CABLE P/N: 71-017093-XX

Motor Cable for NeoMetric and J Series, 70 mm and 34 Frame Motors – Specifications

This cable is supplied as the motor cable with the following cable sets

70GS CABLE-XX 70GB CABLE-XX

Cable color code, dimensions, and specifications are shown below.



MS 14-12 CONNECTOR		
PIN NO.	WIRE COLOR	DRIVE
J	BLACK #1	U
K	BLACK #2	V
L	BLACK #3	W
M	GRN/YEL	⏚

CABLE LENGTH	
DASH NO. (-XX)	DIM "L"
-10	10 FT. (3.0 m)
-25	25 FT. (7.6 m)
-35	35 FT. (10.6 m)

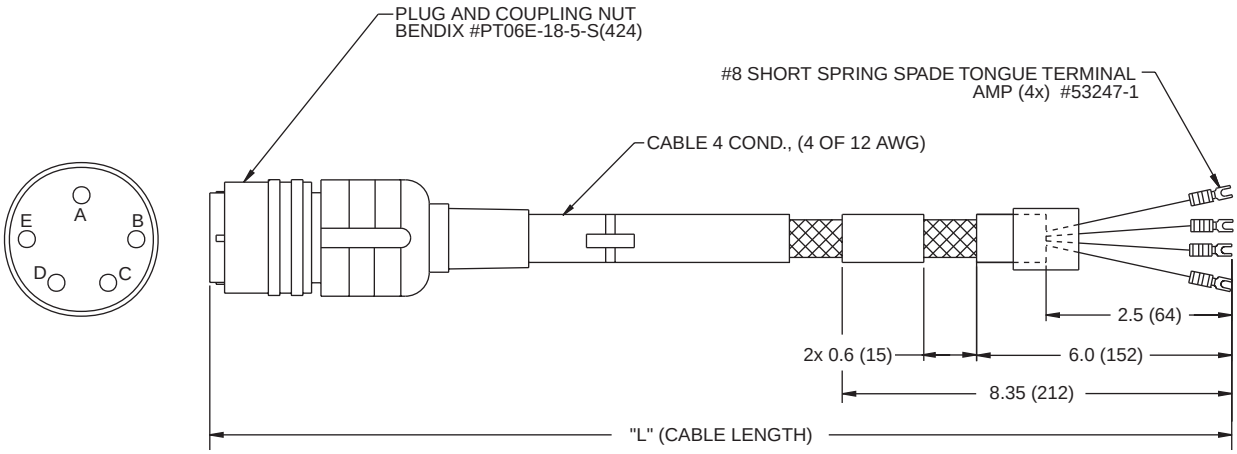
COMPUMOTOR CABLE P/N: 71-017094-XX

Motor Cable for NeoMetric and J Series, 92 mm Motors – Specifications

This cable is supplied as the motor cable with the following cable sets

92GS CABLE-XX **92GB CABLE-XX**

Cable color code, dimensions, and specifications are shown below.



MS 18-5 CONNECTOR		
PIN NO.	WIRE COLOR	DRIVE
A	BLACK #1	U
B	BLACK #2	V
C	BLACK #3	W
D	GRN/YEL	⏚

CABLE LENGTH	
DASH NO. (-XX)	DIM "L"
-10	10 FT. (3.0 m)
-25	25 FT. (7.6 m)
-35	35 FT. (10.6 m)

COMPUMOTOR CABLE P/N: 71-017095-XX

Feedback Specifications

Encoder Specifications – SM Series, NeoMetric Series, J Series

Mechanical

Accuracy	±2 min of arc

Electrical

Input Power	5VDC ±5%, 135mA
Operating frequency	100 kHz max
Output device	26LS31
Sin/Source, nominal	20mA
Suggested user interface	26LS32

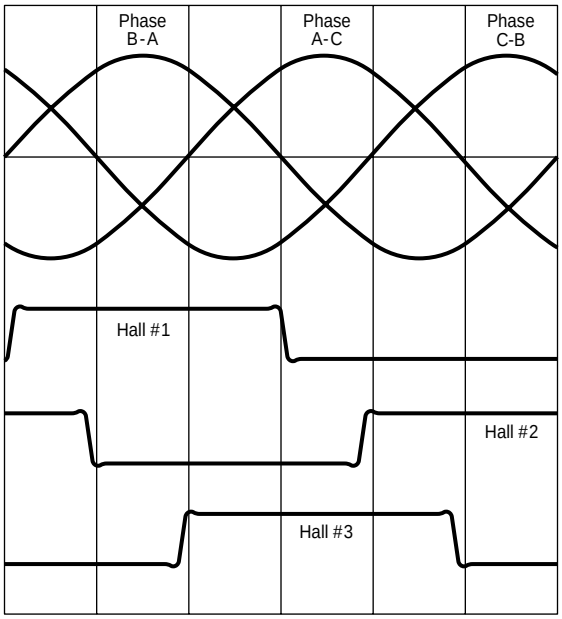
Hall Effect Specifications – SM Series, NeoMetric Series, J Series

Electrical

Input Power	5VDC ±5%, 80mA
Output device open collector	LM339
Maximum pull up	12VDC
Sink	16mA

Commutation Chart – SM Series, NeoMetric Series, J Series

Clockwise rotation as viewed from front shaft



Electrically Released Brakes

NeoMetric Series Motors

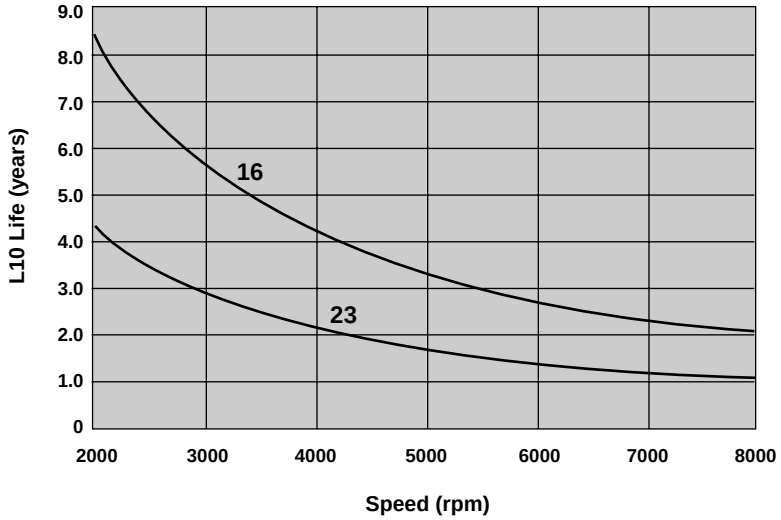
Brakes	**70 mm or 34 Frame**	**92 mm**
Static rated torque	24 in-lb; 384 oz-in; (2.69 Nm)	72 in-lb; 1152 oz-in; (8.06 Nm)
Coil voltage	24VDC	24VDC
Coil Current	0.8 amps	0.52 amps
Weight	1.0 lbs (0.45 kg)	2.51 lbs (1.13 kg)
Inertia	0.000038 lb-in-sec^2; 0.23 oz-in^2 (0.0000043 kg-m^2)	0.00015 lb-in-sec^2; 0.93 oz-in^2 (.0000169 kg-m^2)

Bearing Load and Life Information

SM Series Motors

Compumotor's SM Series and NeoMetric Series motors use ABEC5, double-shielded, pre-lubricated bearings. Bearing life is directly affected by radial and axial loading, along with operating speed. Engineering charts provide L10 life estimations for listed radial and axial forces applied to the motor shaft. This data includes the internal bearing preload and is for the shortest length motor in each frame. Longer motors will exhibit longer L10 life.

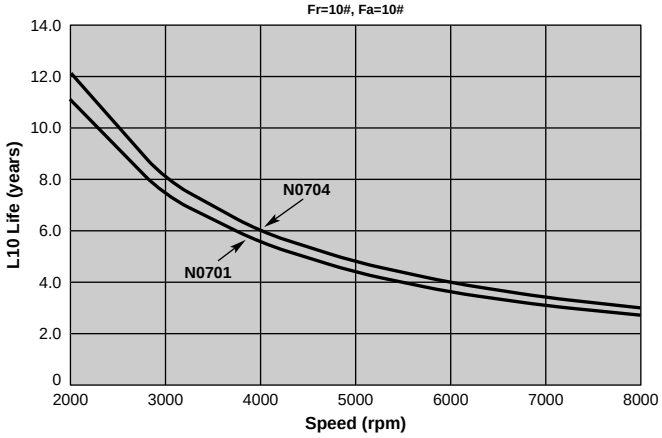
Motor Bearing System Life



	Axial lbs (kg)	Radial lbs (kg)
16	10 (4.5)	10 (4.5)
23	15 (6.75)	10 (4.5)

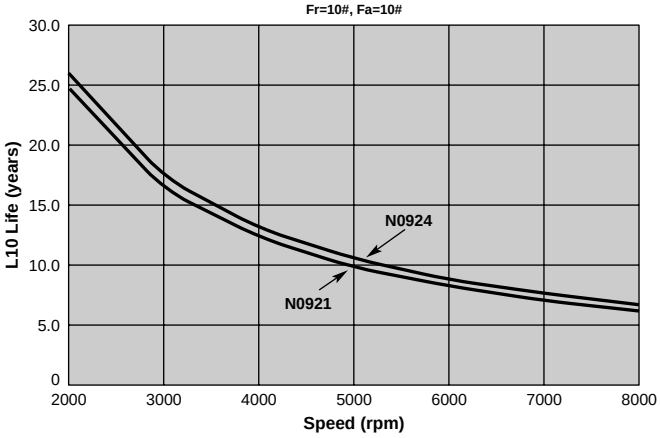
NeoMetric Series Motors and J Series Motors

Motor Bearing System Life
Fr=10#, Fa=10#



70 mm or 34 Frame Bearing Chart

Motor Bearing System Life
Fr=10#, Fa=10#



92 mm Bearing Chart