

Compumotor BE Series Size 16 Specifications



Compumotor’s BE Series brushless servo motors produce high continuous stall torque in a cost-reduced package.

The increased torque of the BE series motors is the result of additional magnetic poles on the rotor. Traditional motors in these frame sizes have four magnetic poles on the rotor, while the BE Series motors have eight poles.

The cost reduction of the BE series motors is achieved from their open-lamination design. Unlike traditional servo motors, the BE series motors do not have a metal housing. Instead, the laminations of the motor stator are shaped into the body of the motor. This design reduces both material costs and time required assembling the motor.

The BE Series motors are created using Compumotor’s proven bridged stator design. This two-piece lamination design simplifies the manufacturing process, creating further cost savings. The bridged stator construction also results in less audible noise being generated by the motor.



Part Numbering System

BE	161	C	J -	N	MS	N
<u>BE Series</u>	<u>Frame, Magnet Length</u>	<u>Winding</u>	<u>Feedback</u>	<u>Shafting</u>	<u>Connection</u>	<u>Options</u>
	161 162 163	C, D, F	J – 2000 ppr encoder	N – Normal F – Flat	FO – Flying leads w/ plastic encoder cover FL – Flying leads w/ connector housing 10 – 10’ cable MS – Military style TQ – Military style	N -None

BE Series, Size 16, Encoder Feedback Specifications (Sizes 161C – 162D)

Parameter:	Symbol:	Units:	BE161C	BE161D	BE161F	BE162C	BE162D
Stall Torque Continuous [1]	Tcs	lb-in	1.3	1.4	1.4	2.3	2.5
		oz-in	21	23	22	37	39
		Nm	0.15	0.16	0.15	0.26	0.28
Stall Current Cont [1, 4, 8]	lcs(sine)	Amps Peak	2.9	4.6	7.0	3.0	4.5
Stall Current Cont [1, 7]	lcs(trap)	Amps DC	2.5	4.0	6.0	2.6	3.9
Peak Torque [6]	Tpk	lb-in	4.0	4.2	4.1	6.9	7.4
		oz-in	64	68	66	111	118
		Nm	0.45	0.47	0.46	0.78	0.83
Peak Current [4, 6, 8]	lpc(sine)	Amps Peak	8.6	13.7	20.9	9.1	13.4
Peak Current [6, 7]	lpc(trap)	Amps DC	7.4	11.9	18.1	7.9	11.6
Rated Speed [2]	Wr	rpm	5000	5000	5000	5000	5000
Current@Rated Speed	lr(sine)	Amps Peak	2.7	4.2	6.5	2.7	4.0
Current@Rated Speed	lr(trap)	Amps	2.3	3.7	5.6	2.3	3.4
Torque@Rated Speed	Tr	lb-in	1.1	1.1	1.1	1.9	2.0
		oz-in	17	18	18	30	32
		Nm	0.12	0.13	0.12	0.21	0.22
Shaft Power@Rated Speed	Po	watts	63	67	65	109	117
Voltage Constant [3, 4]	Kb	Volts/rad/s	0.061	0.040	0.026	0.100	0.072
Voltage Constant [3, 4]	Ke	Volts/KRPM	6.38	4.22	2.69	10.42	7.55
Torque Constant [9]	Kt(sine)	oz-in/Amps Peak	7.47	4.94	3.15	12.20	8.84
		Nm/Amp Peak	0.052	0.035	0.022	0.085	0.062
Torque Constant [3, 4]	Kt(trap)	oz-in/Amp DC	8.62	5.71	3.64	14.09	10.21
		Nm/Amp DC	0.060	0.040	0.025	0.099	0.071
Resistance [3]	R	Ohms	4.31	1.71	0.74	4.38	2.03
Inductance [5]	L	mH	12.10	5.30	2.16	16.14	8.46
Maximum Bus Voltage	Vm	Volts DC	340	170	170	340	170
Thermal Resistance Wind-Amb	Rth w-a	C/watt	2.70	2.70	2.70	2.37	2.37
Motor Constant	Km	oz-in/sqrt(watt)	4.15	4.36	4.23	6.73	7.17
		Nm/sqrt(watt)	0.029	0.031	0.030	0.047	0.050
Viscous Damping	B	oz-in/Krpm	0.500	0.500	0.500	0.600	0.600
		Nm/Krpm	3.5E-03	3.5E-03	3.5E-03	4.2E-03	4.2E-03
Static Friction	Tf	oz-in	0.25	0.25	0.25	0.40	0.40
		Nm	1.8E-03	1.8E-03	1.8E-03	2.8E-03	2.8E-03
Motor Thermal Time Constant	Tau_th	minutes	8.3	8.3	8.3	8.3	8.3
Electrical Time Constant	Tau_elec	milliseconds	2.81	3.10	2.92	3.68	4.17
Mechanical Time Constant	Tau_mch	milliseconds	1.4	1.3	1.4	0.9	0.8
Intermittent Torque Duration [10]	T_2x	seconds	27	27	27	39	39
Peak Torque Duration [11]	T_3x	seconds	11	11	11	16	16
Rotor Inertia	J	lb-in-sec ²	1.1E-05	1.1E-05	1.1E-05	1.8E-05	1.8E-05
		kg-m ²	1.2E-06	1.2E-06	1.2E-06	2.0E-06	2.0E-06
Number of Poles	Np		8	8	8	8	8
Weight	#	lbs	0.6	0.6	0.6	0.8	0.8
		kg	0.3	0.3	0.3	0.3	0.3
Winding Class			H	H	H	H	H

- 1 @ 25°C ambient, 125°C winding temperature, motor connected to a 10"x10"x1/4" aluminum mounting plate @40°C ambient derate phase currents and torques by 6%.
- 2 Maximum speed is 5000 RPM. 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 trapezoidally (six state) commutated motor.
- 8 Peak of the sinusoidal current in any phase for a sinusoidally commutated motor.
- 9 Total motor torque per peak of the sinusoidal amps measured in any phase, +/-10%.
- 10 Maximum Time duration with 2 times rated current applied with initial winding temp at 60°C.
- 11 Maximum Time duration with 3 times rated current applied with initial winding temp at 60°C.

BE Series, Size 16, Encoder Feedback Specifications (Sizes 162F – 164C)

Parameter:	Symbol:	Units:	BE162F	BE163C	BE163D	BE163F	BE164C
Stall Torque Continuous [1]	Tcs	lb-in	2.4	2.9	3.0	3.0	3.6
		oz-in	39	47	48	48	58
		Nm	0.27	0.33	0.34	0.33	0.40
Stall Current Cont [1, 4, 8]	lcs(sine)	Amps Peak	6.8	2.9	4.0	6.3	3.0
Stall Current Cont [1, 7]	lcs(trap)	Amps DC	5.9	2.5	3.5	5.4	2.6
Peak Torque [6]	Tpk	lb-in	7.2	8.8	9.1	8.9	10.8
		oz-in	116	142	145	143	173
		Nm	0.81	0.99	1.01	1.00	1.21
Peak Current [4, 6, 8]	lpc(sine)	Amps Peak	20.4	8.6	12.1	18.8	9.1
Peak Current [6, 7]	lpc(trap)	Amps DC	17.7	7.5	10.5	16.3	7.9
Rated Speed [2]	Wr	rpm	5000	5000	5000	5000	5000
Current@Rated Speed	lr(sine)	Amps Peak	6.1	2.4	3.4	5.3	2.5
Current@Rated Speed	lr(trap)	Amps	5.2	2.1	3.0	4.6	2.2
Torque@Rated Speed	Tr	lb-in	1.9	2.2	2.3	2.3	2.7
		oz-in	31	36	37	36	43
		Nm	0.22	0.25	0.26	0.25	0.30
Shaft Power@Rated Speed	Po	watts	115	132	136	133	159
Voltage Constant [3, 4]	Kb	Volts/rad/s	0.046	0.134	0.098	0.062	0.154
Voltage Constant [3, 4]	Ke	Volts/KRPM	4.85	14.01	10.24	6.47	16.17
Torque Constant [9]	Kt(sine)	oz-in/Amps Peak	5.68	16.41	11.99	7.58	18.93
		Nm/Amp Peak	0.040	0.115	0.084	0.053	0.133
Torque Constant [3, 4]	Kt(trap)	oz-in/Amp DC	6.56	18.95	13.85	8.75	21.86
		Nm/Amp DC	0.046	0.133	0.097	0.061	0.153
Resistance [3]	R	Ohms	0.87	4.77	2.42	1.00	4.65
Inductance [5]	L	mH	3.50	19.45	10.39	4.15	19.43
Maximum Bus Voltage	Vm	Volts DC	170	340	170	170	340
Thermal Resistance Wind-Amb	Rth w-a	C/watt	2.37	2.43	2.43	2.43	2.21
Motor Constant	Km	oz-in/sqrt(watt)	7.03	8.67	8.90	8.75	10.14
		Nm/sqrt(watt)	0.049	0.061	0.062	0.061	0.071
Viscous Damping	B	oz-in/Krpm	0.600	0.700	0.700	0.700	0.800
		Nm/Krpm	4.2E-03	4.9E-03	4.9E-03	4.9E-03	5.6E-03
Static Friction	Tf	oz-in	0.40	0.60	0.60	0.60	0.80
		Nm	2.8E-03	4.2E-03	4.2E-03	4.2E-03	5.6E-03
Motor Thermal Time Constant	Tau_th	minutes	8.3	10.0	10.0	10.0	11.6
Electrical Time Constant	Tau_elec	millisecs	4.02	4.08	4.29	4.15	4.18
Mechanical Time Constant	Tau_mch	millisecs	0.8	0.7	0.7	0.7	0.7
Intermittent Torque Duration [10]	T_2x	seconds	39	52	52	52	58
Peak Torque Duration [11]	T_3x	seconds	16	20	20	20	23
Rotor Inertia	J	lb-in-sec ²	1.8E-05	2.4E-05	2.4E-05	2.4E-05	3.1E-05
		kg-m ²	2.0E-06	2.7E-06	2.7E-06	2.7E-06	3.5E-06
Number of Poles	Np		8	8	8	8	8
Weight	#	lbs	0.8	1.1	1.1	1.1	1.3
		kg	0.3	0.5	0.5	0.5	0.6
Winding Class			H	H	H	H	H

1 @ 25°C ambient, 125°C winding temperature, motor connected to a 10"x10"x1/4" aluminum mounting plate
@40°C ambient derate phase currents and torques by 6%.

2 Maximum speed is 5000 RPM. 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 trapezoidally (six state) commutated motor.

8 Peak of the sinusoidal current in any phase for a sinusoidally commutated motor.

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

10 Maximum Time duration with 2 times rated current applied with initial winding temp at 60°C.

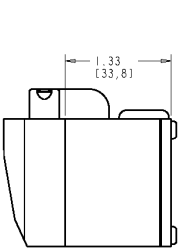
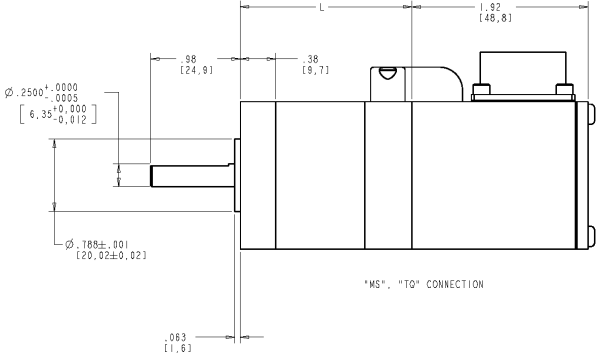
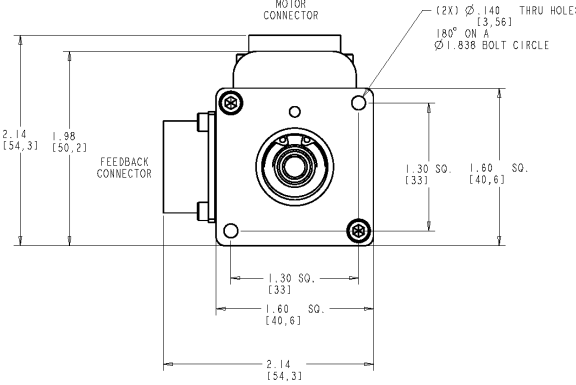
11 Maximum Time duration with 3 times rated current applied with initial winding temp at 60°C.

BE Series, Size 16, Encoder Feedback Specifications (Sizes 164D – 164F)

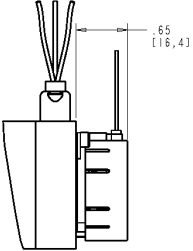
Parameter:	Symbol:	Units:	BE164D	BE164F
Stall Torque Continuous [1]	Tcs	lb-in	3.8	3.8
		oz-in	61	61
		Nm	0.43	0.42
Stall Current Continuous [1, 4, 8]	Ics(sine)	Amps Peak	3.8	6.0
Stall Current Continuous [1, 7]	Ics(trap)	Amps DC	3.3	5.2
Peak Torque [6]	Tpk	lb-in	11.4	11.4
		oz-in	183	182
		Nm	1.28	1.27
Peak Current [4, 6, 8]	Ipk(sine)	Amps Peak	11.4	18.0
Peak Current [6, 7]	Ipk(trap)	Amps DC	9.9	15.6
Rated Speed [2]	Wr	rpm	5000	5000
Current@Rated Speed	Ir(sine)	Amps Peak	3.2	5.0
Current@Rated Speed	Ir(trap)	Amps	2.7	4.3
Torque@Rated Speed	Tr	lb-in	2.8	2.8
		oz-in	46	45
		Nm	0.32	0.32
Shaft Power@Rated Speed	Po	watts	168	168
Voltage Constant [3, 4]	Kb	Volts/rad/s	0.130	0.082
Voltage Constant [3, 4]	Ke	Volts/KRPM	13.66	8.63
Torque Constant [9]	Kt(sine)	oz-in/Amps Peak	15.99	10.10
		Nm/Amp Peak	0.112	0.071
Torque Constant [3, 4]	Kt(trap)	oz-in/Amp DC	18.46	11.67
		Nm/Amp DC	0.129	0.082
Resistance [3]	R	Ohms	2.98	1.20
Inductance [5]	L	mH	13.86	5.53
Maximum Bus Voltage	Vm	Volts DC	170	170
Thermal Resistance Wind-Amb	Rth w-a	C/watt	2.21	2.21
Motor Constant	Km	oz-in/sqrt(watt)	10.70	10.65
		Nm/sqrt(watt)	0.075	0.075
Viscous Damping	B	oz-in/Krpm	0.800	0.800
		Nm/Krpm	5.6E-03	5.6E-03
Static Friction	Tf	oz-in	0.80	0.80
		Nm	5.6E-03	5.6E-03
Motor Thermal Time Constant	Tau_th	minutes	11.6	11.6
Electrical Time Constant	Tau_elec	millisecs	4.65	4.61
Mechanical Time Constant	Tau_mch	millisecs	0.6	0.6
Intermittent Torque Duration [10]	T_2x	seconds	58	58
Peak Torque Duration [11]	T_3x	seconds	23	23
Rotor Inertia	J	lb-in-sec ²	3.1E-05	3.1E-05
		kg-m ²	3.5E-06	3.5E-06
Number of Poles	Np		8	8
Weight	#	lbs	1.3	1.3
		kg	0.6	0.6
Winding Class			H	H

- 1 @ 25°C ambient, 125°C winding temperature, motor connected to a 10"x10"x1/4" aluminum mounting plate @40°C ambient derate phase currents and torques by 6%.
- 2 Maximum speed is 5000 RPM. For higher speed operation please call the factory.
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Product Dimensions



CABLE / FLYING LEAD CONNECTION



EXPOSED ENCODER (+0) OPTION

MOTOR SIZES	
MODEL	L
BE161	1.37 [34.8]
BE162	1.87 [47.5]
BE163	2.37 [60.2]
BE164	2.87 [72.9]

