

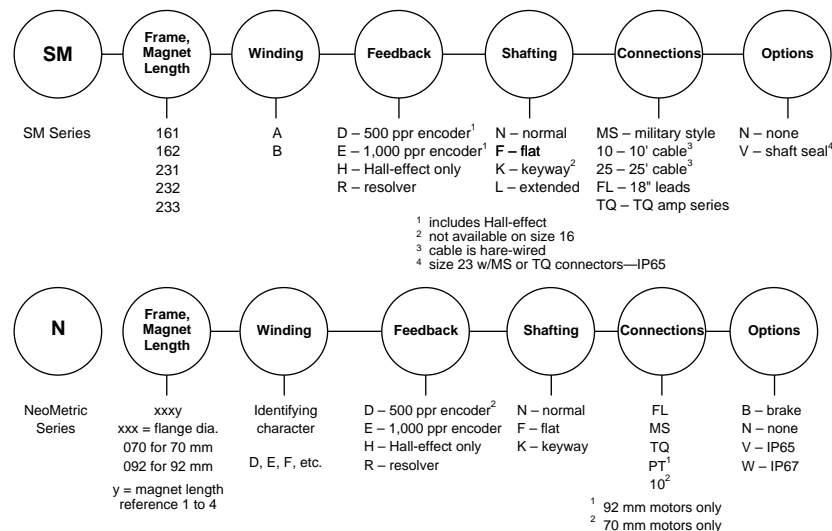
CHAPTER ③

Specifications

Complete specifications for the OEM670/OEM675 Drive are listed in the following pages.

Specifications are also listed for Compumotor SM and NeoMetric Series servo motors, along with speed/torque curves and dimensions for the motors.

The motors are described by the following numbering system:



The motors are equipped with Hall effect outputs for commutation feedback. Each motor has an encoder for feedback to the controller. The motors are available with NEMA flanges for compatibility with standard X-Y stages and gear boxes.

Encoder specifications and pinouts are listed after the motor specifications.

Specifications: OEM670T/OEM675T Torque Drive

OEM670T/OEM675T Torque Drive – Specifications		
POWER INPUT		
	Voltage	24-75VDC
	Current	Ø-12 amps
POWER OUTPUT—MOTOR		
	Peak Current	12A (approx 2 sec maximum duration at 45°C ambient temperature. See <i>Current Foldback</i> for details)
	Continuous Current	6A
	Voltage	90VDC maximum
	Peak Power	840W (1.1 hp) (@75V supply voltage)
	Continuous Power	420W (0.56 hp)
	Switching Frequency	20 kHz
	Bandwidth	2 kHz typical (dependant on motor)
	Transconductance	1 volt = 1.2 amp
	Commutation	120° Hall Effect Sensors for Six-State Commutation Method, or Brushed DC Motor
	Short Circuit Protected	Yes
POWER OUTPUT—HALL EFFECT SENSORS		
	Voltage	+5VDC ± 0.5VDC
	Current	50 mA (maximum)
	Short Circuit Protected	NO
POWER OUTPUT—TO CONTROLLER OUTPUT STAGE		
	Voltage	+15VDC ± 1.5VDC -15VDC ± 1.5VDC
	Current	10 mA maximum, each output
	Short Circuit Protected	NO
CONTROL INPUTS		
	Command Input	-10V to +10V analog voltage 1 volt input = 1.2 amp output
	Enable Input	Active LOW: Ø-0.8V @ 2mA When disabled: Internal 2.49 KΩ pullup resistor to +5VDC
HALL INPUTS		
	Low State	Ø-0.8V
	High State	Internal 1 KΩ pullup resistor to +5V
	Input Frequency	Ø-2 kHz maximum

OEM670T/OEM675T Torque Drive – Specs. (contin.)	
SIGNAL OUTPUTS	
Fault Output	Active HIGH: open collector output, maximum volts = 24VDC
	Inactive LOW: \emptyset -0.4VDC at \emptyset -20 mA
Current Monitor	-10V to +10V analog voltage
	Scale: 1V corresponds to 1.2A output
	Output Impedance: 10 K Ω
LEDs	GREEN: power
	RED: various fault conditions
	see <i>Troubleshooting</i> for details
PROTECTIVE CIRCUITS	
Short Circuit	Turns Off Outputs to Motor; Latched
Over Temperature	55°C \pm 5°C trip temperature; Latched
Overvoltage	95V \pm 5V trip voltage; Latched
Undervoltage	21.5V maximum; not Latched
Current Foldback	Configurable with 3 resistors
	see <i>Special Internal Circuits</i> for details
MOTOR CHARACTERISTICS	
Minimum Inductance	50 μ H (micro Henrys)
Minimum Resistance	0.25 Ω
Loop Gain Adjustment	Configurable with one resistor
	see <i>Special Internal Circuits</i> for details
TEMPERATURE	
Minimum Temperature	\emptyset °C (32°F)
Maximum Temperature	45°C (113°F)
Max. Heatplate Temp	45°C (113°F)
Package Dissipation	Heatplate: 0 to 30W, depending on motor current; $P = (I_{AVG}/12 A)30 W$
	Cover: 3 watts maximum
MECHANICAL	
Power Connector	10 pin screw terminal
	14 AWG (2.5 mm ²) maximum wire size
Input/Output Connector	25 Pin D-connector
Size	5x1.6x3.5 in (127x41x89 mm) approx.
Dimensions	see <i>Chapter ② Installation</i>
Weight	12 ounces (0.35 kg)

③ Specifications • OEM670/OEM675

**Specifications:
OEM670SD/OEM675SD Step & Direction Drive**

OEM670SD/OEM675SD Step & Direction Drive		
POWER INPUT		
	Voltage	24-75VDC
	Current	Ø-12 amps
POWER OUTPUT—MOTOR		
	Peak Current	12A (approx 2 sec maximum duration at 45°C ambient temperature. See <i>Current Foldback</i> for details)
	Continuous Current	6A
	Voltage	90VDC maximum
	Peak Power	840W (1.1 hp) (@75V supply voltage)
	Continuous Power	420W (0.56 hp)
	Switching Frequency	20 kHz
	Bandwidth	2 kHz typical (dependant on motor)
	Transconductance	1 volt = 1.2 amp
	Commutation	120° Hall Effect Sensors for Six-State Commutation Method, or Brushed DC Motor
	Short Circuit Protected	Yes
POWER OUTPUT—HALL EFFECT SENSORS		
	Voltage	+5VDC ± 0.5VDC
	Current	50 mA (maximum)
	Short Circuit Protected	NO
POWER OUTPUT—TO ENCODER		
	Voltage	+5VDC
	Current	200 mA maximum, each output
	Short Circuit Protected	NO
CONTROL INPUTS		
	Step+/Step-	5V maximum input Input current: 12 mA max., 6.3 mA min.
	Direction+/Direction-	5V maximum input Input current: 12 mA max., 6.3 mA min.
		Pos. input = clockwise motor rotation
HALL INPUTS		
	Low State	Ø-0.8V
	High State	Internal 1 KΩ pullup resistor to +5V
	Input Frequency	Ø-2 kHz maximum

OEM670SD/OEM675SD Step & Direction Drive (contin.)		
SIGNAL OUTPUTS		
	Fault Output-Isolated	50V max voltage, 10 mA max current
	Fault Output-Not Isolat.	24V max voltage, 20 mA max current
	Velocity Monitor	1V per 10 kHz pre-quad. encoder freq.
	Current Monitor	1V output per 1.2A motor current
		Output Impedance: 10 K Ω
	LEDs	GREEN: power
		RED: various fault conditions
		see <i>Troubleshooting</i> for details
PROTECTIVE CIRCUITS		
	Short Circuit	Turns Off Outputs to Motor; Latched
	Over Temperature	55°C \pm 5°C trip temperature; Latched
	Overvoltage	95V \pm 5V trip voltage; Latched
	Undervoltage	21.5V maximum; not Latched
	Current Foldback	Configurable with 3 resistors
		see <i>Special Internal Circuits</i> for details
	Position Error	2047–16383 post-quad encoder counts
MOTOR CHARACTERISTICS		
	Minimum Inductance	50 μ H (micro Henrys)
	Minimum Resistance	0.25 Ω
	Loop Gain Adjustment	Configurable with one resistor
		see <i>Special Internal Circuits</i> for details
TEMPERATURE		
	Minimum Temperature	0°C (32°F)
	Maximum Temperature	45°C (113°F)
	Max. Heatplate Temp	45°C (113°F)
	Package Dissipation	Heatplate: 0 to 30W, depending on motor current; $P = (I_{AVG}/12 A)30 W$
		Cover: 3 watts maximum
MECHANICAL		
	Power Connector	10 pin screw terminal
		14 AWG (2.5 mm ²) maximum wire size
	Input/Output Connector	25 Pin D-connector
	Size	5 x 1.6 x 3.5 in (127 x 41 x 89 mm) approx.
	Dimensions	see <i>Chapter ② Installation</i>
	Weight	14 ounces (0.4 kg)

③ **Specifications • OEM670/OEM675**

Motor Specifications: SM160

Parameter	Symbol	Units	SM160A	SM160B
Stall Torque Continuous ¹	T_{cs}	lb-in/oz-in	0.88/14.1	0.89/14.2
		N-m	0.10	0.10
Stall Current Continuous ¹	I_{cs}	amperes-rms	2.6	5.1
Rated Speed ²	ω_r	rpm	7500	7500
Peak Torque ^{1,6}	T_{pk}	lb-in/oz-in	2.65/42.4	2.67/42.7
		N-m	0.30	0.30
Peak Current, rms ¹	I_{pk}	amperes	7.8	15.2
Torque @ Rated Speed ¹	T_c	lb-in/oz-in	0.66/10.5	0.66/10.5
		N-m	0.075	0.075
Rated Power—Output Shaft ¹	P_o	watts	58	58
Voltage Constant ^{3,4}	K_b	volts/radian/sec	0.0384	0.0198
Voltage Constant ^{3,4}	K_e	volts/KRPM	4.02	2.08
Torque Constant ^{3,4}	K_t	oz-in/amp rms	5.43	2.81
		N-m/amp rms	0.038	0.020
Resistance ^{1,3}	R	ohms	3.43	0.9
Inductance ⁵	L	millihenries	0.53	0.13
Thermal Resistance ¹	R_{th}	°C/watt	3.2	3.2
Motor Constant	K_m	oz-in/ $\sqrt{\text{watt}}$	2.93	2.96
		N-m/ $\sqrt{\text{watt}}$	0.021	0.021
Viscous Damping	B	oz-in/Krpm	0.267	0.267
		N-m/Krpm	0.002	0.002
Torque/Static Friction	T_f	oz-in	1.0	1.0
		N-m	0.007	0.007
Thermal Time Constant	τ_{th}	minutes	23	23
Electrical Time Constant	τ_e	milliseconds	0.16	0.15
Mechanical Time Constant	τ_m	milliseconds	0.73	0.72
Rotor Inertia	J	lb-in-sec ²	0.0000443	0.0000443
		kg-m ² x 10 ⁻⁶	5.0	5.0
Weight	#	pounds	0.72	0.72
		kilograms	0.327	0.327
Winding Class			H	H

¹ @ 25°C ambient with 10 x 10 x 25 in. aluminum mounting plate, 90°C winding temperature. At 40°C ambient, derate phase currents and torques by 12%.

² With 500 ppr encoders. For 1,000 ppr encoders, derate to 6,000 rpm. For higher speed operation, please contact factory.

³ ±10% line-to-line

⁴ Peak value

⁵ ±30%, line-to-line, inductance bridge measurement @ 1 kHz

⁶ Peak current for 1 second with initial winding temperature of 60°C or less.
All specifications are subject to engineering change.

Motor Specifications: SM161 and SM162

Parameter	Symbol	Units	SM161A	SM161B	SM162A	SM162B
Stall Torque Continuous ¹	T_{cs}	lb-in/oz-in	1.5/24	1.5/24	2.75/44	2.75/44
		N-m	0.169	0.169	0.311	0.311
Stall Current Continuous ¹	I_{cs}	amperes-rms	2.1	4.1	2.1	4.0
Rated Speed ²	ω_r	rpm	7,500	7,500	7,500	7,500
Peak Torque ^{1,6}	T_{pk}	lb-in/oz-in	4.5/72	4.5/72	8.25/132	8.25/132
		N-m	0.509	0.509	0.933	0.933
Peak Current, rms ¹	I_{pk}	amperes	10.5	20.5	10.5	20.0
Torque @ Rated Speed ¹	T_c	lb-in/oz-in	1.25/20	1.25/20	2.56/41	2.56/41
		N-m	0.141	0.141	0.290	0.290
Rated Power—Output Shaft ¹	P_o	watts	110	110	222	227
Voltage Constant ^{3,4}	K_b	volts/radian/sec	0.079	0.041	0.147	0.078
Voltage Constant ^{3,4}	K_e	volts/KRPM	8.27	4.29	15.39	8.17
Torque Constant ^{3,4}	K_t	oz-in/amp rms	11.18	5.8	20.8	11.05
		N-m/amp rms	0.079	0.041	0.147	0.078
Resistance ^{1,3}	R	ohms	4.53	1.24	6.5	1.73
Inductance ⁵	L	millihenries	0.808	0.21	1.39	0.334
Thermal Resistance ¹	R_{th}	°C/watt	2.75	2.67	2.0	2.01
Motor Constant	Km	oz-in/ $\sqrt{\text{watt}}$	5.36	5.26	8.66	8.36
		N-m/ $\sqrt{\text{watt}}$	0.038	0.037	0.061	0.059
Viscous Damping	B	oz-in/Krpm	0.257	0.171	0.234	0.276
		N-m/Krpm	0.002	0.001	0.002	0.002
Torque/Static Friction	T_f	oz-in	1.0	1.0	1.1	1.1
		N-m	0.007	0.007	0.007	0.007
Thermal Time Constant	τ_{th}	minutes	30	30	30	3.0
Electrical Time Constant	τ_e	milliseconds	0.178	0.169	0.21	0.193
Mechanical Time Constant	τ_m	milliseconds	9.2	9.4	5	6.2
Rotor Inertia	J	lb-in-sec ²	0.000094	0.000094	0.000163	0.000163
		kg-m ² x 10 ⁻⁶	10.6	10.6	18.4	18.4
Weight	#	pounds	1.1	1.1	1.6	1.6
		kilograms	0.50	0.50	0.73	0.73
Winding Class			H	H	H	H

¹ @ 25°C ambient with 10 x 10 x 25 in. aluminum mounting plate, 90°C winding temperature. At 40°C ambient, derate phase currents and torques by 12%.

² With 500 ppr encoders. For 1,000 ppr encoders, derate to 6,000 rpm. For higher speed operation, please contact factory.

³ ±10% line-to-line

⁴ Peak value

⁵ ±30%, line-to-line, inductance bridge measurement @ 1 kHz

⁶ Peak current for 1 second with initial winding temperature of 60°C or less.
All specifications are subject to engineering change.

③ Specifications • OEM670/OEM675

Motor Specifications: SM230 and SM231

Parameter	Symbol	Units	SM230A	SM230B	SM231A	SM231B
Stall Torque Continuous ¹	T_{cs}	lb-in/oz-in	1.8/28.9	1.7/27.6	2.87/50	2.87/46
		N-m	0.204	0.195	0.353	0.353
Stall Current Continuous ¹	I_{cs}	amperes-rms	2.5	5.0	2.1	4.1
Rated Speed ²	ω_r	rpm	7500	7500	7,500	7,500
Peak Torque ^{1,6}	T_{pk}	lb-in/oz-in	5.4/87	5.2/83	8.61/150	8.61/150
		N-m	0.615	0.587	1.060	1.060
Peak Current, rms ¹	I_{pk}	amperes	7.5	15	10.5	20.5
Torque @ Rated Speed ¹	T_c	lb-in/oz-in	1.5/24	1.4/23	2.37/38	2.25/36
		N-m	0.170	0.163	0.269	0.254
Rated Power—Output Shaft ¹	P_o	watts	134	127	205	205
Voltage Constant ^{3,4}	K_b	volts/radian/sec	0.081	0.0391	0.169	0.079
Voltage Constant ^{3,4}	K_e	volts/KRPM	8.52	4.09	16.86	8.27
Torque Constant ^{3,4}	K_t	oz-in/amp rms	11.52	5.54	22.8	11.18
		N-m/amp rms	0.081	0.039	0.161	0.079
Resistance ^{1,3}	R	ohms	4.43	1.12	5.22	1.46
Inductance ⁵	L	millihenries	1.19	0.28	1.64	0.44
Thermal Resistance ¹	R_{th}	°C/watt	2.67	2.67	2.23	1.86
Motor Constant	Km	oz-in/ \sqrt{watt}	5.47	5.24	9.97	9.68
		N-m/ \sqrt{watt}	0.039	0.037	0.070	0.068
Viscous Damping	B	oz-in/Krpm	0.375	0.375	0.565	0.266
		N-m/Krpm	0.003	0.003	0.004	0.002
Torque/Static Friction	T_f	oz-in	1.0	1.0	1.2	1.2
		N-m	0.007	0.007	0.008	0.008
Thermal Time Constant	τ_{th}	minutes	30	30	30	30
Electrical Time Constant	τ_e	milliseconds	0.27	0.25	0.31	0.3
Mechanical Time Constant	τ_m	milliseconds	16.97	18.51	13.7	14.5
Rotor Inertia	J	lb-in-sec ²	0.000224	0.000224	0.00046	0.00046
		kg-m ² x 10 ⁻⁶	25.3	25.3	52.0	52.0
Weight	#	pounds	1.2	1.2	2.6	2.6
		kilograms	0.54	0.54	1.18	1.18
Winding Class			H	H	H	H

¹ @ 25°C ambient with 10 x 10 x 25 in. aluminum mounting plate, 90°C winding temperature. At 40°C ambient, derate phase currents and torques by 12%.

² With 500 ppr encoders. For 1,000 ppr encoders, derate to 6,000 rpm. For higher speed operation, please contact factory.

³ ±10% line-to-line

⁴ Peak value

⁵ ±30%, line-to-line, inductance bridge measurement @ 1 kHz

⁶ Peak current for 1 second with initial winding temperature of 60°C or less.

All specifications are subject to engineering change.

Motor Specifications: SM232 and SM233

Parameter	Symbol	Units	SM232A	SM232B	SM233A	SM233B
Stall Torque Continuous ¹	T_{cs}	lb-in/oz-in	5.75/92	6.12/98	8.75/144	8.75/140
		N-m	0.650	0.693	1.08	0.989
Stall Current Continuous ¹	I_{cs}	amperes-rms	2.1	4.1	2.1	4.1
Rated Speed	ω_r	rpm	4,500	7,500 ²	2,800	7,500 ²
Peak Torque ^{1,6}	T_{pk}	lb-in/oz-in	17.25/276	18.36/294	26.25/432	26.25/432
		N-m	1.95	2.08	3.05	3.05
Peak Current, rms ¹	I_{pk}	amperes	10.5	20.5	10.5	20.5
Torque @ Rated Speed ¹	T_c	lb-in/oz-in	4.87/78	5.12/82	8.37/134	7.12/114
		N-m	0.551	0.580	0.947	0.806
Rated Power—Output Shaft ¹	P_o	watts	260	450	277	505
Voltage Constant ^{3,4}	K_b	volts/radian/sec	0.31	0.169	0.484	0.242
Voltage Constant ^{3,4}	K_e	volts/KRPM	32.45	17.69	50.6	25.33
Torque Constant ^{3,4}	K_t	oz-in/amp rms	43.89	23.91	68.53	34.23
		N-m/amp rms	0.310	0.169	0.484	0.242
Resistance ^{1,3}	R	ohms	7.5	2.01	9.65	2.58
Inductance ⁵	L	millihenries	2.9	0.782	4.08	1.06
Thermal Resistance ¹	R_{th}	°C/watt	1.58	1.5	1.25	1.26
Motor Constant	Km	oz-in/ $\sqrt{\text{watt}}$	15.99	16.86	22.00	21.25
		N-m/ $\sqrt{\text{watt}}$	0.113	0.119	0.155	0.150
Viscous Damping	B	oz-in/Krpm	0.525	0.328	0.778	0.459
		N-m/Krpm	0.004	0.002	0.005	0.003
Torque/Static Friction	T_f	oz-in	2.0	2.0	2.25	2.25
		N-m	0.014	0.014	0.016	0.016
Thermal Time Constant	τ_{th}	minutes	35	35	40	40
Electrical Time Constant	τ_e	milliseconds	0.39	0.39	0.42	0.41
Mechanical Time Constant	τ_m	milliseconds	8.6	8.8	5.4	7.0
Rotor Inertia	J	lb-in-sec ²	0.00082	0.00082	0.00117	0.00117
		kg-m ² x 10 ⁻⁶	92.6	92.6	132.2	132.2
Weight	#	pounds	3.5	3.5	4.4	4.4
		kilograms	1.59	1.59	2.00	2.00
Winding Class			H	H	H	H

¹ @ 25°C ambient with 10 x 10 x 25 in. aluminum mounting plate, 90°C winding temperature. At 40°C ambient, derate phase currents and torques by 12%.

² With 500 ppr encoders. For 1,000 ppr encoders, derate to 6,000 rpm. For higher speed operation, please contact factory.

³ ±10% line-to-line

⁴ Peak value

⁵ ±30%, line-to-line, inductance bridge measurement @ 1 kHz

⁶ Peak current for 1 second with initial winding temperature of 60°C or less.
All specifications are subject to engineering change.

③ **Specifications • OEM670/OEM675**

Motor Specifications: NeoMetric N0701 and N0702

Parameter	Symbol	Units	N0701 or N0341		N0702 or N0342	
			D	F	E	F
Winding Selection						
Stall Torque Continuous ^{1, 4}	T_{cs}	lb-in	5.8		10.6	
		N-m	0.65		1.20	
Stall Current Continuous ^{1, 2}	I_{cs}	amperes-rms	2.92	4.56	3.36	4.67
Rated Speed ⁷	ω_r	rpm	4850	7500	3025	4380
Peak Torque ¹	T_{pk}	lb-in	17.3		32.0	
		N-m	1.96		3.62	
Peak Current, rms ^{1, 6}	I_{pk}	amperes	8.8	13.7	10.1	14.0
Torque @ Rated Speed ¹	T_c	lb-in	4.6	4.7	8.6	8.6
		N-m	0.52	0.53	0.97	0.97
Rated Power—Output Shaft ¹	P_o	watts	265	415	309	447
Voltage Constant ^{3, 4}	K_v	volts/radian/sec	0.221	0.14	0.353	0.253
Voltage Constant ^{3, 4}	K_s	volts/KRPM	23.11	14.67	36.97	26.52
Torque Constant ^{3, 4}	K_t	lb-in/amp rms	1.95	1.24	3.12	2.24
		N-m/amp rms	0.22	0.14	0.35	0.25
Resistance ³	R	ohms	5.52	2.27	5.22	2.7
Inductance ⁵	L	millihenries	12.98	5.23	15.86	8.16
Thermal Resistance ¹	$R_{\theta n}$	°C/watt	1.44		1.15	
Motor Constant	K_m	lb-in/ $\sqrt{\text{watt}}$	0.83	0.82	1.37	1.36
		N-m/ $\sqrt{\text{watt}}$	0.09	0.09	0.15	0.15
Viscous Damping	B	lb-in/Krpm	0.0438		0.050	
		N-m/Krpm	0.0050		0.0056	
Torque-Static Friction	T_f	oz-in	1.4		2.1	
		N-m	0.010		0.015	
Thermal Time Constant	τ_{th}	minutes	45		45	
Electrical Time Constant	τ_e	milliseconds	2.35		3.03	
Mechanical Time Constant	τ_m	milliseconds	1.3		0.77	
Rotor Inertia	J	lb-in-sec ²	0.000106		0.000173	
		kg-m ² x 10 ⁻⁶	12.0		19.5	
Weight	#	pounds	3.54		4.53	
		kilograms	1.47		2.05	
Winding Class			H		H	

¹ @ 25°C ambient with 10 x 10 x 0.25 in. aluminum mounting plate, 90°C encoder temperature.

² RMS current, line-to-line, six state commutation

³ ±10% line-to-line

⁴ Peak value

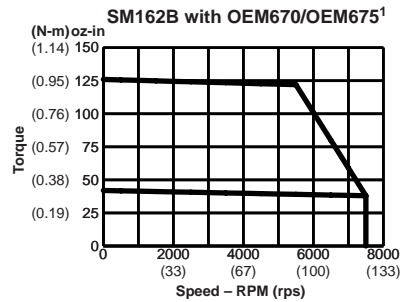
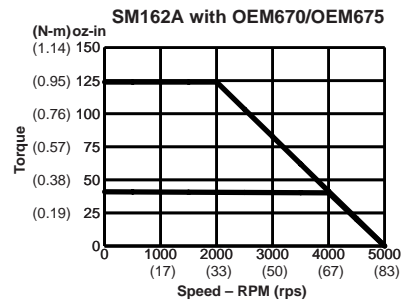
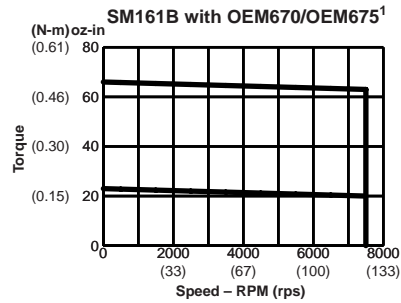
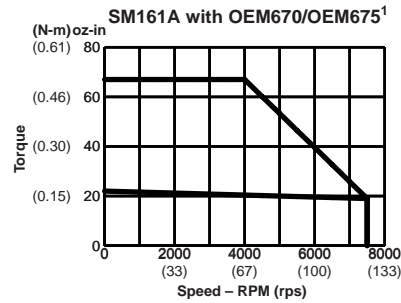
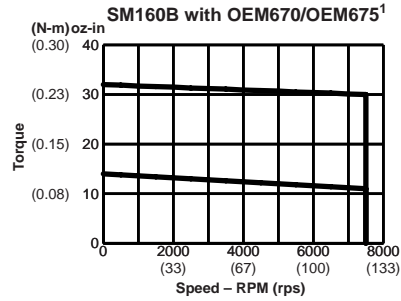
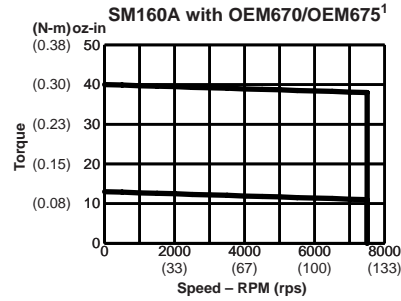
⁵ ±30%, line-to-line, inductance bridge measurement @ 1 kHz

⁶ Peak current for 2 second maximum with initial winding temperature of 40°C

⁷ For "E", encoder option, 1000 ppr, maximum velocity is 6000 RPM

All specifications are subject to engineering change.

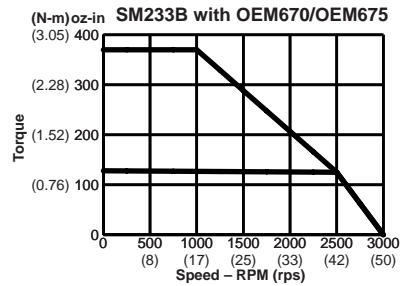
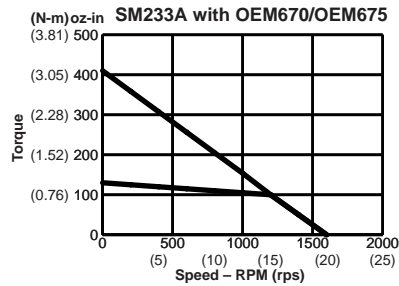
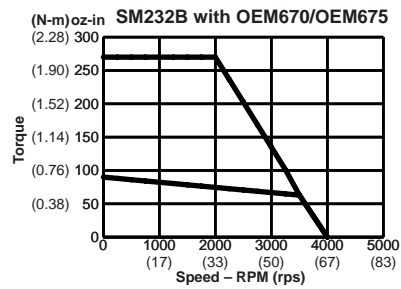
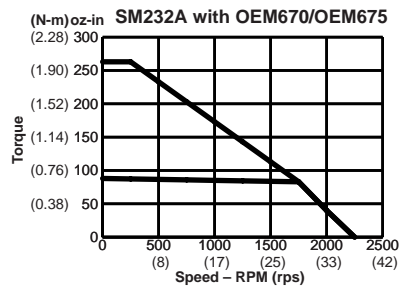
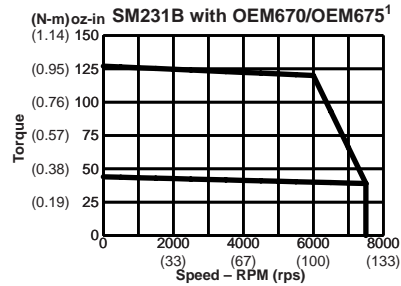
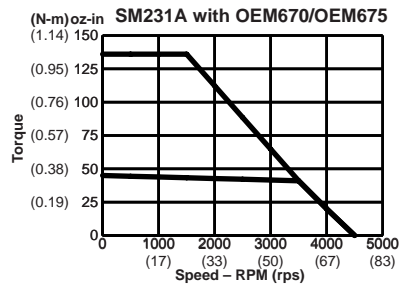
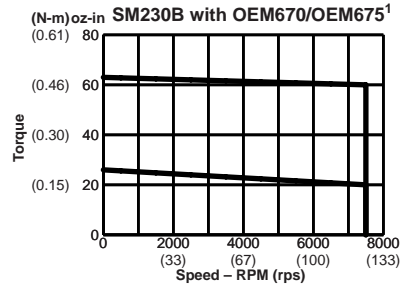
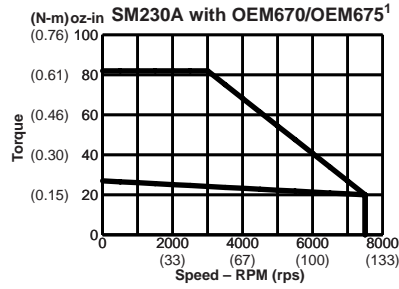
Speed/Torque Curves^{2,3}: SM 160, SM161 and SM162



¹ For "E" encoder option (1000 ppr), maximum velocity is 6,000 rpm (100 rps).
² With 75VDC bus voltage; 25°C (77°F) ambient temperature.
³ Although speed/torque curves are the same for the OEM670 and OEM675, the OEM670's current compensation loop is optimized for NeoMetric (slotted) motors; the OEM675's current compensation loop is optimized for SM (slotless) motors. We strongly recommend that you use the OEM670 with NeoMetric motors, and use the OEM675 with SM motors. This provides the optimum system transient response.

③ Specifications • OEM670/OEM675

Speed/Torque Curves^{2,3}: SM230, SM231, SM232, SM233

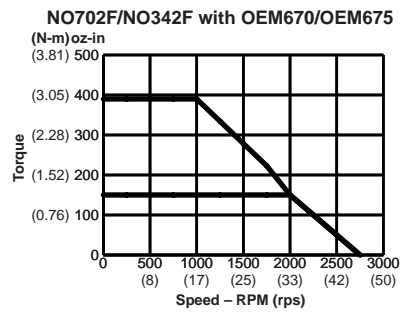
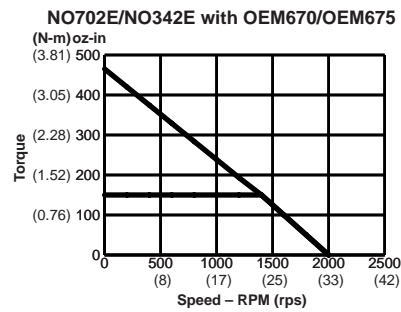
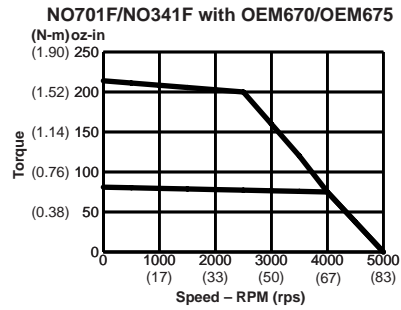
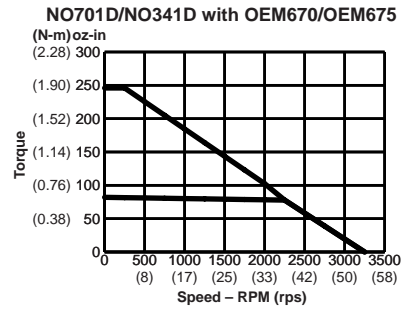


¹ For "E" encoder option (1000 ppr), maximum velocity is 6,000 rpm (100 rps).

² With 75VDC bus voltage; 25°C (77°F) ambient temperature.

³ Although speed/torque curves are the same for the OEM670 and OEM675, the OEM670's current compensation loop is optimized for NeoMetric (slotted) motors; the OEM675's current compensation loop is optimized for SM (slotless) motors. We strongly recommend that you use the OEM670 with NeoMetric motors, and use the OEM675 with SM motors. This provides the optimum system transient response.

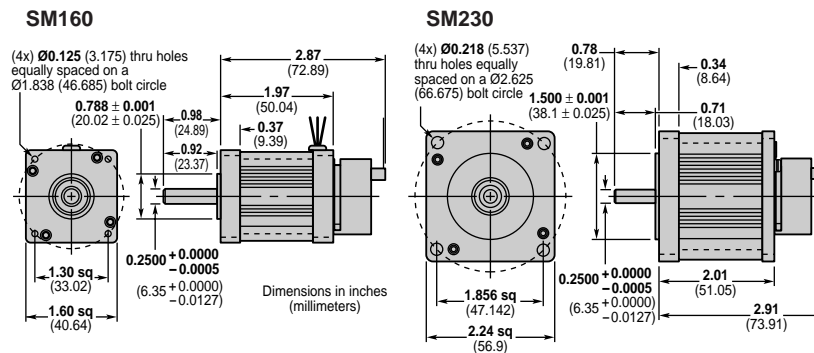
Speed/Torque Curves^{1,2}: NeoMetric Motors



¹ With 75VDC bus voltage; 25°C (77°F) ambient temperature.

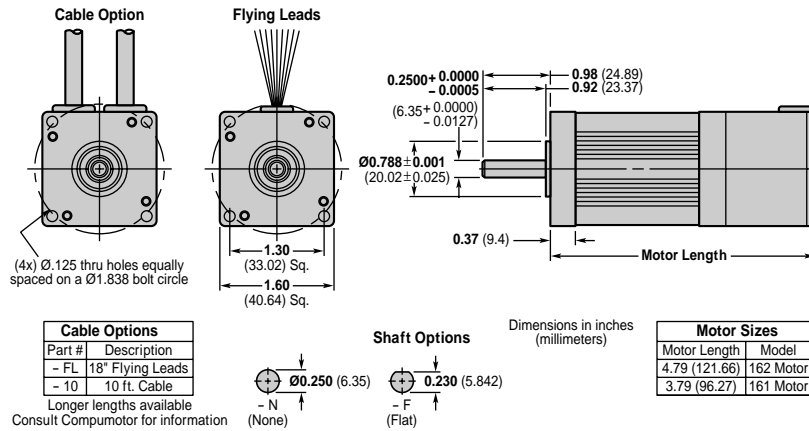
² Although speed/torque curves are the same for the OEM670 and OEM675, the OEM670's current compensation loop is optimized for NeoMetric (slotted) motors; the OEM675's current compensation loop is optimized for SM (slotless) motors. We strongly recommend that you use the OEM670 with NeoMetric motors, and use the OEM675 with SM motors. This provides the optimum system transient response.

Motor Dimensions: Compumotor SM160 and SM230

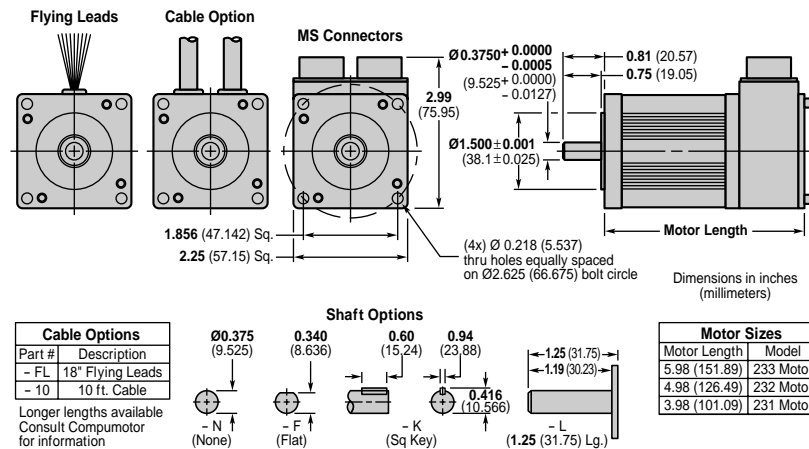


③ Specifications • OEM670/OEM675

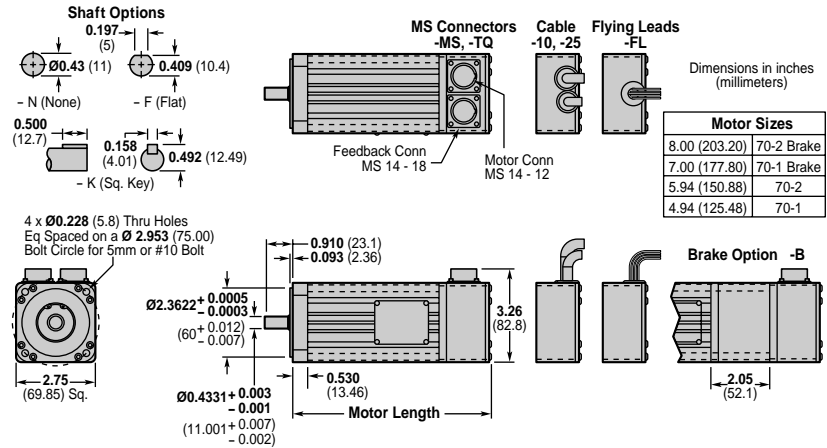
Motor Dimensions: Compumotor SM Series, Size 16



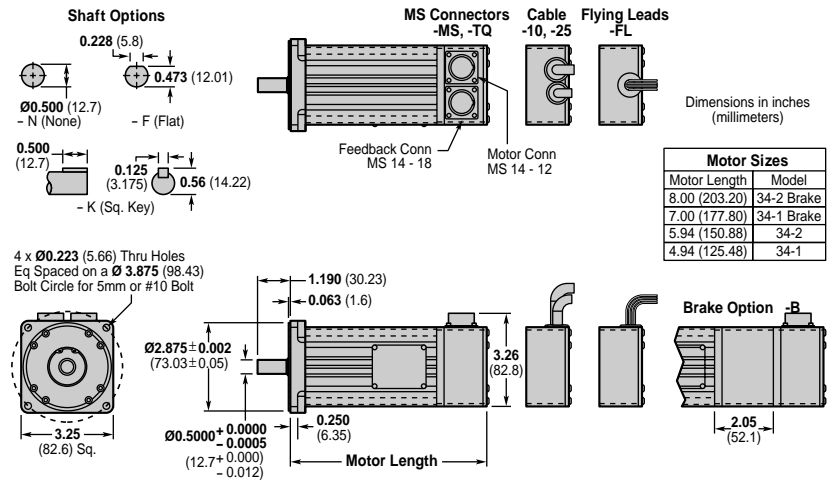
Motor Dimensions: Compumotor SM Series, Size 23



Motor Dimensions: NeoMetric Series, Size 70



Motor Dimensions: NeoMetric Series, Size 34



③ *Specifications • OEM670/OEM675*

Encoder Specifications

The same type of encoder is used on all SM and NeoMetric Series motors. Encoders have either 500 lines ("-D") or 1000 lines ("-E").

Mechanical

Accuracy ± 2 min of arc

Electrical

Input power 5 VDC $\pm 5\%$, 135 mA
Operating frequency 100 kHz max
Output device 26LS31
Sink/Source, nominal 20 mA
Suggested user interface 26LS32

Hall Effect Specifications

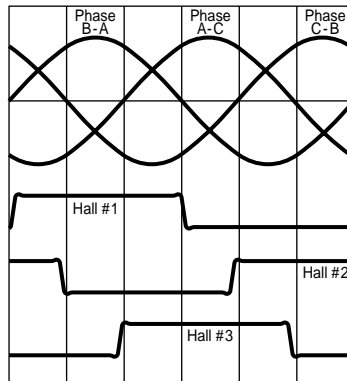
Specifications for Hall effect outputs on SM and NeoMetric Series motors are listed below.

Electrical

Input power 5 VDC $\pm 5\%$, 80 mA
Output device, open collector LM339
Maximum pull up 30 VDC
Sink 16 mA

COMMUTATION CHART

Clockwise rotation as viewed from front shaft.



Motor Wiring Information

SM MOTORS – SIZE 16 AND SIZE 23

Motor Phase

Designation	-MS Option	-TQ Option	-H Option	-FL Option -10 Option -25 Option
	Pin No. MS14-12	Pin No. MS14-12	Pin No. MS14-12	Wire Color
Phase A	J	J	J	Red/Yellow
Phase B	K	K	K	White/Yellow
Phase C	L	L	L	Black/Yellow
Ground	M	M	M	Green/Yellow
Shield	NC	NC	NC	—
Temp ¹	G	G	G	Yellow
Temp ¹	H	H	H	Yellow

Encoder

Designation	Pin No. MS14-18	Pin No. MS14-18	Not Applicable	Wire Color
Vcc	H	H	—	Red
Ground	G	G	—	Black
CH A+	A	A	—	White
CH A-	B	B	—	Yellow
CH B+	C	C	—	Green
CH B-	D	D	—	Blue
Index +	E	E	—	Orange
Index -	F	F	—	Brown
Shield	NC	NC	—	—

Hall-effect

Designation	Pin No. MS14-18	Pin No. MS14-12	Pin No. MS14-12	Wire Color
Hall GND	K	F	F	White/Green
Hall +5	M	B	B	White/Blue
Hall 1	T	C	C	White/Brown
Hall 2	U	D	D	White/Orange
Hall 3	P	E	E	White/Violet

Wiring color is provided for flying lead or cable versions.

③ **Specifications • OEM670/OEM675**

NEOMETRIC MOTORS – SIZE 070 (SIZE 034)

Motor Phase

Designation	Pin No. MS14-12	Wire Color
Phase A	J	Red/Yellow
Phase B	K	White/Yellow
Phase C	L	Black/Yellow
Ground	M	Green/Yellow
Shield	NC	—
Continue for “H” or “TQ” Options		
Temp	G	Orange/Yellow
Temp	H	or Yellow (T)
Hall GND	F	White/Green
Hall +5	B	White/Blue
Hall 1	C	White/Brown
Hall 2	D	White/Orange
Hall 3	E	White/Violet

Encoder/Commutation Connections

Designation	Pin No. MS14-18	Wire Color
Encoder		
+5 VDC	H	Red
Ground	G	Black
CH A+	A	White
CH A-	B	Yellow
CH B+	C	Green
CH B-	D	Blue
Index +	E	Orange
Index -	F	Brown
Commutation		
Hall GND	K	White/Green
Hall +5	M	White/Blue
Hall 1	T	White/Brown
Hall 2	U	White/Orange
Hall 3	P	White/Violet
Temp	L	Orange/Yellow
Temp	N	or Yellow (T)
Brake Option		
Brake	R	Red/Blue
Brake	S	Red/Blue