

Size 23, Encoder Feedback, Specifications

Parameter	Symbol	Units	SM230A	SM230B	SM231A	SM231B	SM232A	SM232B	SM233A	SM233B
Stall Torque Continuous ¹	T_{cs}	lb-in	1.7	1.6	3.8	3.4	6.6	7.0	10.1	9.7
		oz-in	27	26	61	54	106	111	161	156
		Nm	0.19	0.18	0.43	0.38	0.74	0.78	1.13	1.09
Stall Current Continuous ^{1,4,8}	$I_{cs}(\text{sine})$	Amps Peak	2.7	5.5	2.9	5.5	2.8	5.4	2.7	5.3
Stall Current Continuous ^{1,7}	$I_{cs}(\text{trap})$	Amps DC	2.4	4.7	2.5	4.8	2.4	4.7	2.4	4.5
Peak Torque ⁶	T_{pk}	lb-in	5.1	4.9	11.3	10.0	19.8	20.9	30.2	29.2
		oz-in	82	78	181	160	316	334	483	467
		Nm	0.57	0.55	1.27	1.12	2.21	2.34	3.38	3.27
Peak Current ^{4,6,8}	$I_{pk}(\text{sine})$	Amps Peak	8.2	16.4	8.8	16.6	8.3	16.1	8.1	15.8
Peak Current ^{6,7}	$I_{pk}(\text{trap})$	Amps DC	7.1	14.2	7.6	14.3	7.2	14.0	7.1	13.6
Rated Speed ²	ω_r	rpm	7500	7500	7500	7500	7500	7500	5800	5800
Current@Rated Speed	$I_r(\text{sine})$	Amps	2.4	4.9	2.5	4.8	2.3	4.5	2.4	4.6
Current@Rated Speed	$I_r(\text{trap})$	Amps	2.1	4.2	2.2	4.2	2.0	3.9	2.0	4.0
Torque@Rated Speed	T_r	lb-in	1.4	1.3	2.9	2.8	5.1	5.4	8.1	7.6
		oz-in	22	21	47	44	81	86	129	121
		Nm	0.15	0.15	0.33	0.31	0.57	0.60	0.90	0.85
Shaft Power@Rated Speed	P_o	watts	122	116	261	244	449	477	553	519
Voltage Constant ^{3,4}	K_b	Volts/rad/s	0.081	0.039	0.169	0.079	0.310	0.169	0.484	0.242
Voltage Constant ^{3,4}	K_e	Volts/KRPM	8.48	4.09	17.70	8.27	32.46	17.70	50.68	25.34
Torque Constant ⁹	$K_t(\text{sine})$	oz-in/Amp Peak	9.93	4.79	20.72	9.69	38.02	20.72	59.35	29.68
		Nm/Amp Peak	0.070	0.034	0.145	0.068	0.266	0.145	0.415	0.208
		oz-in/Amp DC	11.47	5.54	23.93	11.19	43.90	23.93	68.53	34.27
Torque Constant ^{3,4}	$K_t(\text{trap})$	Nm/Amp DC	0.080	0.039	0.168	0.078	0.307	0.168	0.480	0.240
Resistance ³	R	Ohms	4.43	1.12	5.22	1.46	7.50	2.00	9.65	2.58
Inductance ⁵	L	mH	1.19	0.28	1.64	0.44	2.90	0.78	4.08	1.06
Maximum Bus Voltage	V_m	Volts DC	100	100	170	170	340	170	340	170
Therm. Resistance Wind-Amb	$R_{th} w-a$	°C/watt	2.67	2.67	2.00	2.00	1.54	1.54	1.25	1.25
Motor Constant	K_m	oz-in/ $\sqrt{\text{watt}}$	5.45	5.23	10.47	9.26	16.03	16.92	22.06	21.33
		Nm/ $\sqrt{\text{watt}}$	0.038	0.037	0.073	0.065	0.112	0.118	0.154	0.149
Viscous Damping	B	oz-in/Krpm	0.160	0.160	0.250	0.250	0.360	0.360	0.540	0.540
		Nm/Krpm	1.12 E-3	1.12 E-3	1.75 E-3	1.75 E-3	2.52 E-3	2.52 E-3	3.78 E-3	3.78 E-3
Static Friction	T_f	oz-in	0.20	0.20	0.30	0.30	0.70	0.70	1.00	1.00
		Nm	1.40 E-3	1.40 E-3	2.10 E-3	2.10 E-3	4.90 E-3	4.90 E-3	7.00 E-3	7.00 E-3
Motor Thermal Time Constant	τ_{th}	minutes	18.3	18.3	20	20	21.6	21.6	23.3	23.3
Electrical Time Constant	τ_{elec}	milliseconds	0.27	0.25	0.31	0.30	0.39	0.39	0.42	0.41
Mechanical Time Constant	τ_{mch}	milliseconds	18.3	19.9	9.5	12.2	7.2	6.5	5.4	5.8
Intermittent Torque Duration ¹⁰	T_{2x}	seconds	11	11	11	11	18	18	20	20
Peak Torque Duration ¹¹	T_{3x}	seconds	5	5	4	4	6	6	7	7
Rotor Inertia	J	lb-in-sec ²	2.4 E-4	2.4 E-4	4.6 E-4	4.6 E-4	8.2 E-4	8.2 E-4	1.2 E-3	1.2 E-3
		kg-m ²	2.7 E-5	2.7 E-5	5.2 E-5	5.2 E-5	9.3 E-5	9.3 E-5	1.3 E-4	1.3 E-4
Number of Poles	Np		4	4	4	4	4	4	4	4
Weight	#	lbs	1.2	1.2	2.1	2.1	3.0	3.0	3.9	3.9
		kg	0.5	0.5	1.0	1.0	1.4	1.4	1.8	1.8
Winding Class			H	H	H	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 12%.

² Maximum speed is 7500RPM 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% line-to-line

⁴ Value is measured peak of sine wave.

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

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 applied with initial winding temp at 60°C.

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

Note: These specifications are based on theoretical motor performance and are not specific to any amplifier.

Servo Motors

