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SM SERIES STEPPER MOTORS

Hybrid, Permanent Magnet Motors



- Industry-standard NEMA 23, 34, and 42 frame sizes for ease of installation
- Torque of 0.27 to 7.42 N-m (38 to 1050 oz-in) covers virtually any application requirement
- Standard 200 full step (1.8 degree/step) design is ideal for microstepping to 50,000 steps/revolution
- High quality materials used throughout, including stainless-steel shaft and double-shielded ball bearings
- Excellent non-cumulative step accuracy of $\pm 3\%$

Aerotech offers seven standard models of hybrid, permanent magnet stepper motors. Covering the torque range of 0.27 to 7.42 N-m (38 to 1050 oz-in), these motors are well-suited for virtually all applications that employ stepping and/or microstepping drives.

Aerotech's stepper motors meet NEMA frame size standards for flange-mounted size 23, size 34, and size 42 motors. High quality materials and construction ensure a long service life, even in harsh environments.

Standard Models

Standard models have flying leads (enclosed terminals on the 1010SM), rear shaft extensions, and load-end shaft flats for secure load coupling. The motors have a standard black textured finish.

Optional rear housings are available that provide either a bulkhead connector or integral cable

termination. Rear housing models include versions with a high-accuracy home marker encoder, standard optical encoder, and manual adjustment knob.



SM stepper motors on Aerotech's high-performance positioning stages




Home Marker Models

An optional home marker encoder can be added to the standard models. The home marker provides an inexpensive means of establishing a highly accurate (0.1 micron in most Aerotech positioning systems) home reference.

The home marker encoder is protected in a rugged rear motor housing that also provides either a connector ("B" versions) or integral cable/connector ("C" versions) termination of the encoder's leads, as well as the motor and limit switch leads.

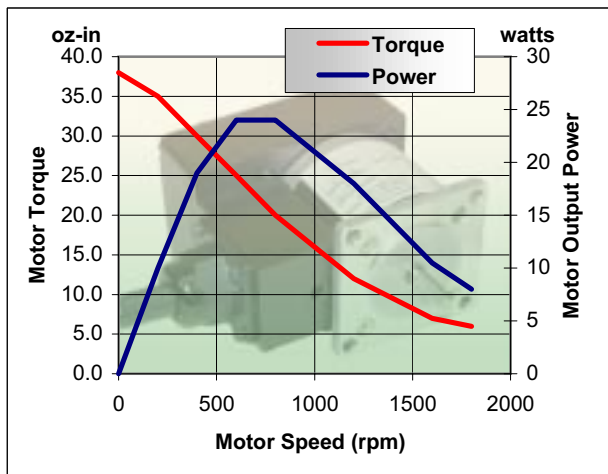
Optical Encoder Models

An optical encoder with 500 or 1000 ppr is available for the SM series. The three-channel (A, B, marker), amplified-sine or line-driver encoder is housed in a rugged rear motor housing. All leads, including the motor and limit switch leads, are terminated in a connector ("B" versions) or integral cable/connector ("C" versions). 

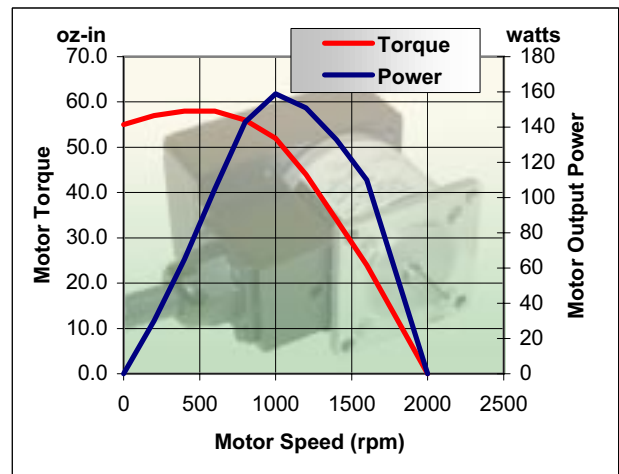
SM Series Stepper Motor Specifications / Performance

MOTOR MODEL	UNITS	50SM	55SM	101SM	140SM
NEMA Motor Frame Size		23			
Stall Torque	N-m (oz-in)	0.3 (38)	0.4 (55)	0.6 (90)	1.0 (140)
Rated Phase Current	Amps	1	0.8	5	1.4
Recommended Driver Bus Voltage	Volts	40	160	40	160
Rotor Inertia	kg-m ² (oz-in-s ²)	12 x 10 ⁻⁶ (1.66 x 10 ⁻³)	10 x 10 ⁻⁶ (1.42 x 10 ⁻³)	35 x 10 ⁻⁶ (5 x 10 ⁻³)	
Full Step Angle	Degrees	1.8			
Accuracy	Degrees	±0.054 (non-cumulative)			
Maximum Radial Load	N (lb)	67 (15)			
Maximum Thrust Load	N (lb)	111 (25)			
Weight	kg (lb)	0.6 (1.4)	0.7 (1.5)	1.3 (2.8)	1.4 (3.1)

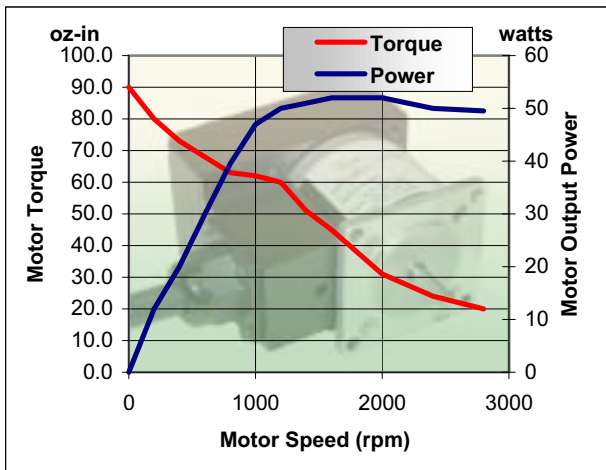
50SM



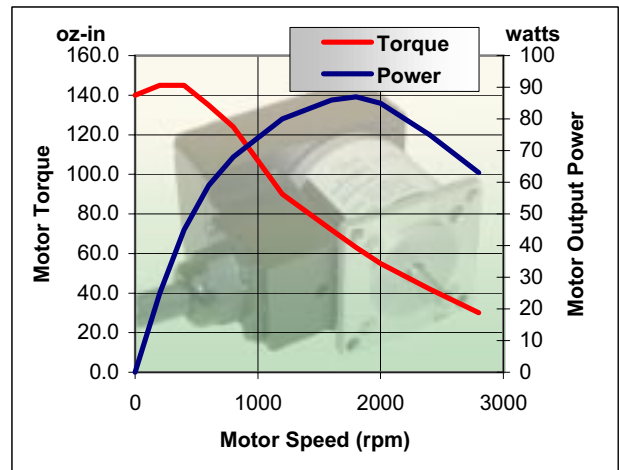
55SM



101SM



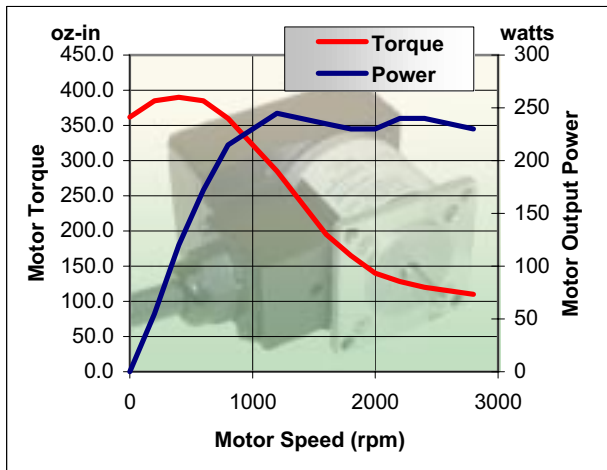
140SM



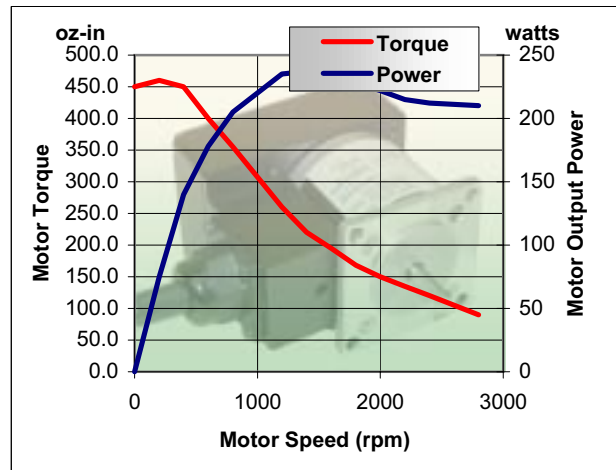
SM Series Stepper Motor Specifications / Performance

MOTOR MODEL	UNITS	310SM	450SM	1010SM
NEMA Motor Frame Size		34		42
Stall Torque	N-m (oz-in)	2.6 (370)	3.2 (450)	7.4 (1050)
Rated Phase Current	Amps	6	3.5	8.6
Recommended Driver Bus Voltage	Volts	80	160	
Rotor Inertia	kg-m ² (oz-in-s ²)	187 x 10 ⁻⁶ (27 x 10 ⁻³)		805 x 10 ⁻⁶ (114 x 10 ⁻³)
Full Step Angle	Degrees	1.8		
Accuracy	Degrees	±0.054 (non-cumulative)		
Maximum Radial Load	N (lb)	156 (35)	111 (25)	178 (40)
Maximum Thrust Load	N (lb)	267 (60)	222 (50)	556 (125)
Weight	kg (lb)	3.5 (7.8)	3.6 (8.0)	9.1 (20)

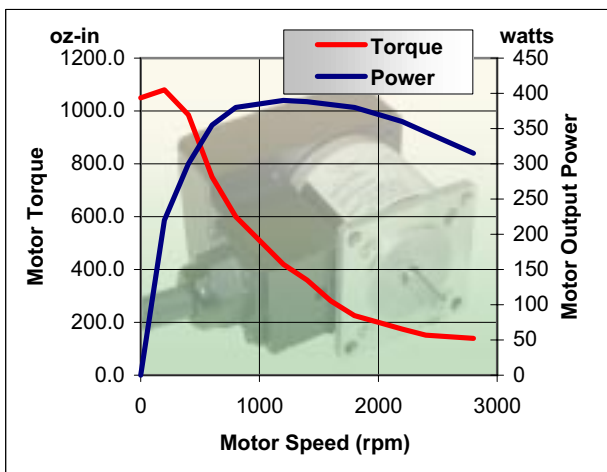
310SM



450SM

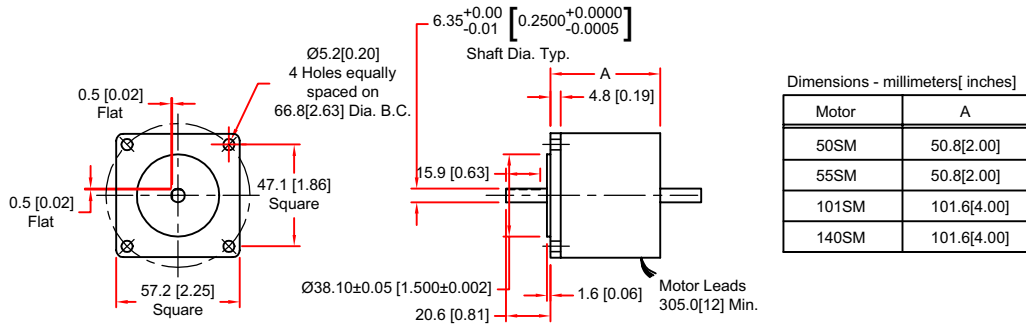


1010SM

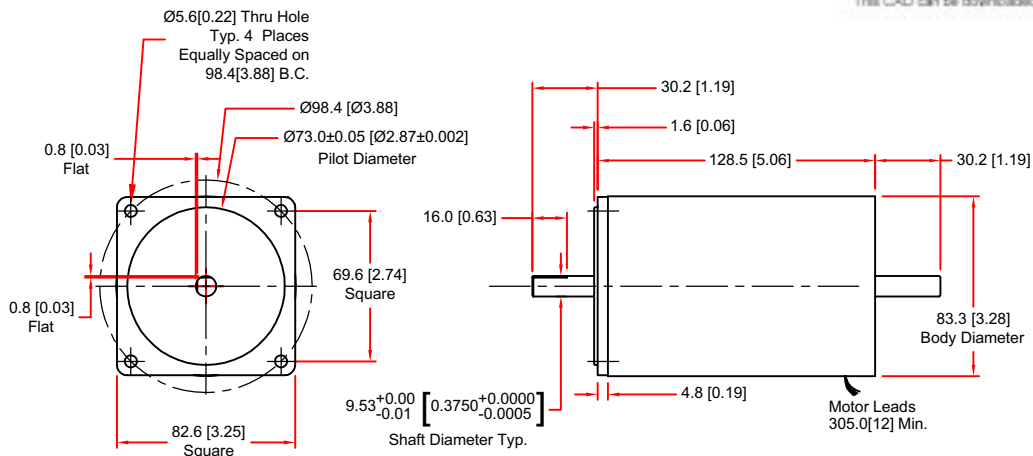


SM Series Stepper Motor Dimensions

NEMA 23 Frame Stepper Motors: 50SM, 55SM, 101SM, 140SM

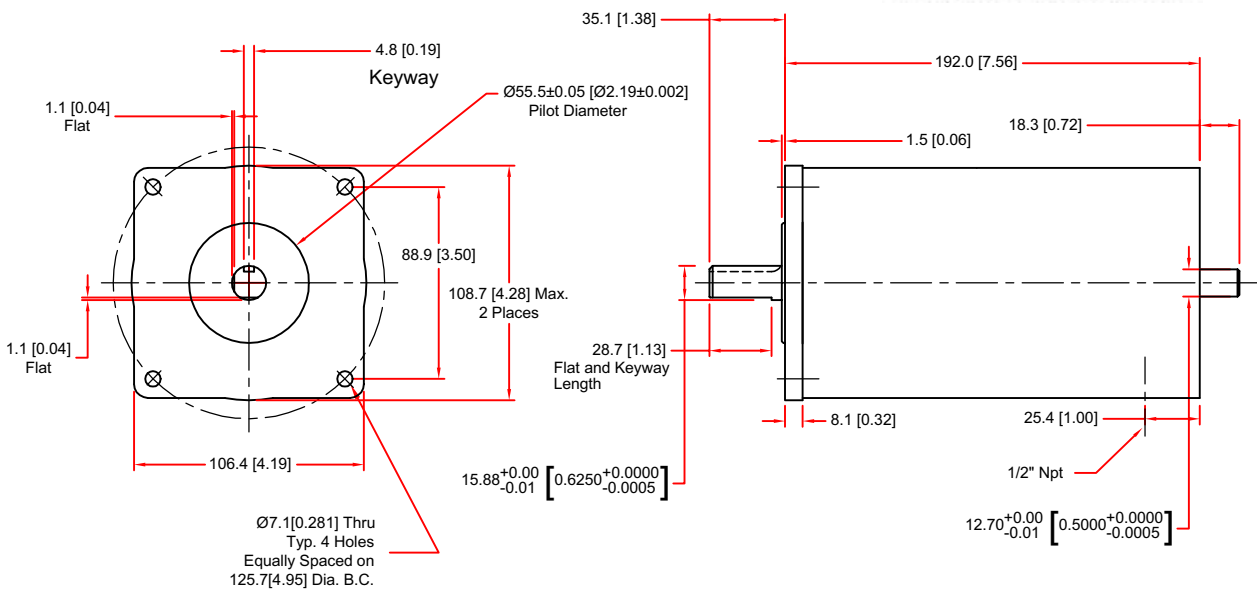


NEMA 34 Frame Stepper Motors: 310SM and 450SM



This CAD can be downloaded from our web site.

NEMA 42 Frame Size Stepper Motor: 1010SM

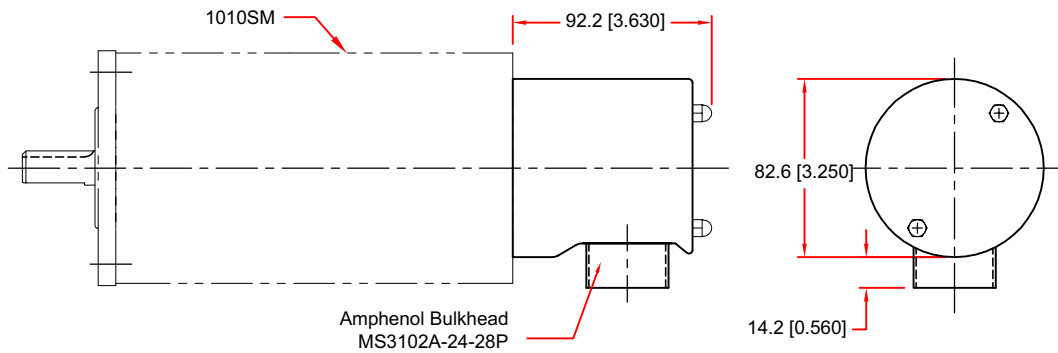


This CAD can be downloaded from our web site.

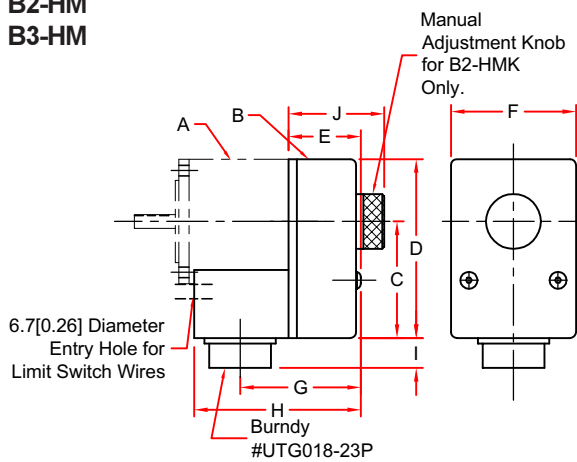


SM Series Stepper Motor Dimensions

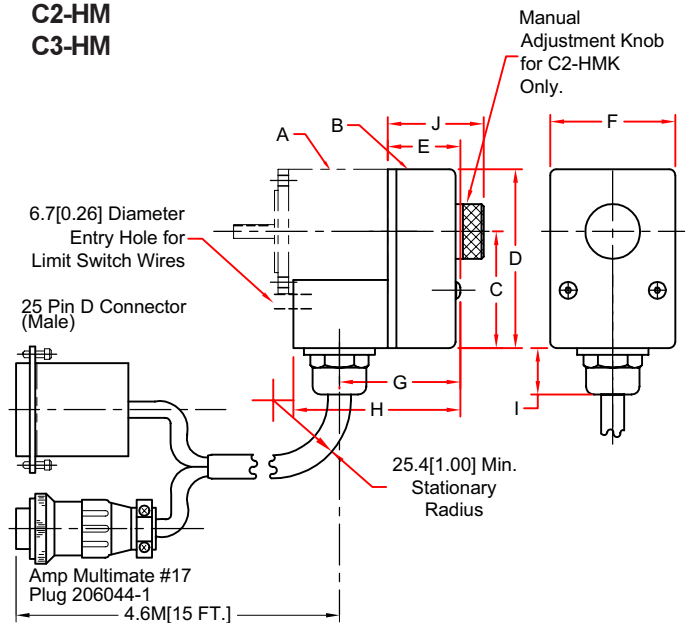
B4-HM



B2-HM B3-HM



C2-HM C3-HM



ROTARY MOTORS



This CAD can be downloaded from our web site.

Dimensions - millimeters[inches]

	A	B	C	D	E	F	G	H	I	J
50SM 55SM 101SM 140SM		C2-HM	54.1[2.13]	83.3[3.28]	33.5[1.32]	57.9[2.28]	55.9[2.20]	77.2[3.04]	21.6[0.86]	—
		B2-HM	54.1[2.13]	83.3[3.28]	33.5[1.32]	57.9[2.28]	55.9[2.20]	77.2[3.04]	13.7[0.54]	—
310SM 450SM		C3-HM	61.5[2.42]	104.7[4.12]	36.8[1.45]	86.4[3.40]	66.0[2.60]	87.6[3.45]	21.6[0.86]	—
		B3-HM	61.5[2.42]	104.7[4.12]	36.8[1.45]	86.4[3.40]	66.0[2.60]	87.6[3.45]	13.7[0.54]	—
50SM 55SM 101SM 140SM		C2-HMK	54.1[2.13]	83.3[3.28]	33.5[1.32]	57.9[2.28]	55.9[2.20]	77.2[3.04]	21.6[0.86]	44.5[1.75]
		B2-HMK	54.1[2.13]	83.3[3.28]	33.5[1.32]	57.9[2.28]	55.9[2.20]	77.2[3.04]	13.7[0.54]	44.5[1.75]



SM Series Motor Ordering Information

PART NUMBER AND ORDERING EXAMPLE: 50SMB2-E500AS

50SM	B2	-E500AS
Stepping Motor Model	Rear Housing	Marker/Encoder/Knob
50SM, 55SM, 101SM, 140SM, 310SM, 450SM, 1010SM	B2, B3, B4 = Housing with connector C2, C3, C4, C2N, C2EN, C3N, C3EN = Housings with integral cable/connector	HM = Home marker encoder HMK = Home marker encoder plus manual adjustment knob (B2, C2 models only) ExxxxA = Optical encoder, amplified sine-wave output (specify resolution "xxxx") ExxxxLD = Optical encoder, line driver output (specify resolution "xxxx")

Stepper Motors: Permanent Magnet, SM Series

50SM	NEMA 23 - 0.3 N-m (38 oz-in) 1.8 degree stepping motor
55SM	NEMA 23 - 0.4 N-m (55 oz-in) 1.8 degree stepping motor
101SM	NEMA 23 - 0.6 N-m (90 oz-in) 1.8 degree stepping motor
140SM	NEMA 23 - 1.0 N-m (140 oz-in) 1.8 degree stepping motor
310SM	NEMA 34 - 2.6 N-m (370 oz-in) 1.8 degree stepping motor
450SM	NEMA 34 - 3.2 N-m (450 oz-in) 1.8 degree stepping motor
1010SM	NEMA 42 - 7.4 N-m (1050 oz-in) 1.8 degree stepping motor

Rear Housing Options

B2	Rear housing, connector for NEMA 23 motor, with limit switch wiring
C2	Rear housing, integral cable/connector for NEMA 23 motor, no limit switch wiring
C2N	Rear housing, integral cable/connector for NEMA 23 motor, with limit switch wiring
C2EN	Rear housing, integral end-exit cable/connector for NEMA 23 motor, with limit switch wiring
B3	Rear housing, connector for NEMA 34 motor (Requires HM), with limit switch wiring
B3E	Rear housing, end-exit connector for NEMA 34 motor, with limit switch wiring (Requires HM)
C3	Rear housing, integral cable/connector for NEMA 34 motor (Requires HM)
C3N	Rear housing, integral cable/connector for NEMA 34 motor, with limit switch wiring
C3EN	Rear housing, integral end-exit cable/connector for NEMA 34 motor, with limit switch wiring
B4	Rear housing, connector for NEMA 42 motor, with limit switch wiring (Requires HM)
-K	Adjust knob for NEMA 23 stepper motors
-K	NEMA 34, 42 Adjust knob for NEMA 34, 42 stepper motors
-HM	Home marker encoder
-HMK	Home marker encoder and manual adjust knob (NEMA 23 motor only)
-ExxxxAS **	Rotary encoder with amplified sine output
-ExxxxLD **	Rotary encoder with line driver output

* Marker/encoder/knob options not available on C4 and P

** Specify encoder resolution ("xxxx") in steps per rev when ordering

Mating Connectors

MCB2B3	Mate for B2 and B3 stepper cans
MCMS	Mate for MS connector on B4 stepper can (MS3102A-24)
MCKU10	Two connector mates for the two connectors on the C2 and C3 integral cables
W100	Option to make integral cable wiring compatible with the U100
P *	UNIDEX 100 mating connector for 55SM, 140SM, 450SM motors

