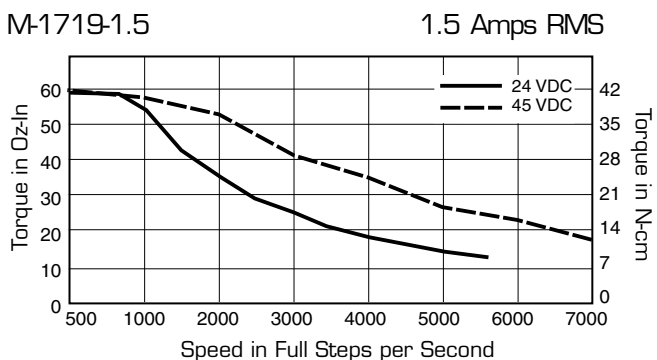
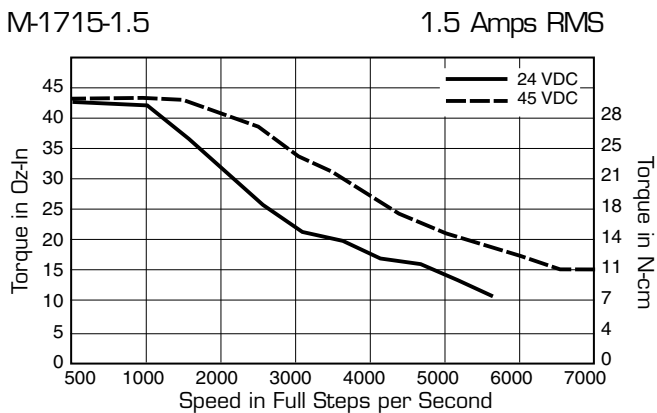
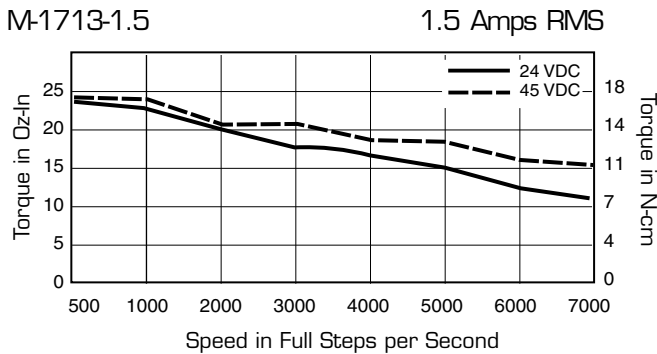


STEPPING MOTORS

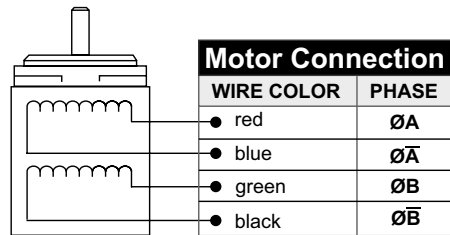
ENHANCED SIZE 17 1.8° HYBRID STEPPING MOTORS

Specifications S=Single Shaft (D=Double Shaft)	Holding Torque oz-in (N-cm)	Phase Current Amps	Number of Leads	Phase Resistance Ohms	Phase Inductance mH	Detent Torque oz-in (N-cm)	Rotor Inertia oz-in-sec ² (kg-cm ²)	L _{MAX} Length inches (cm)	Weight oz (gm)
M-1713-1.5S (D)	32 (23)	1.5	4	1.3	2.1	1.7 (1.2)	0.000538 (0.038)	1.34 (3.4)	7.4 (210)
M-1715-1.5S (D)	60 (42)	1.5	4	2.1	5.0	2.1 (1.5)	0.0008037 (0.057)	1.57 (4.0)	8.1 (230)
M-1719-1.5S (D)	75 (53)	1.5	4	2.0	3.85	3.5 (2.5)	0.0011562 (0.082)	1.89 (4.8)	12.7 (360)

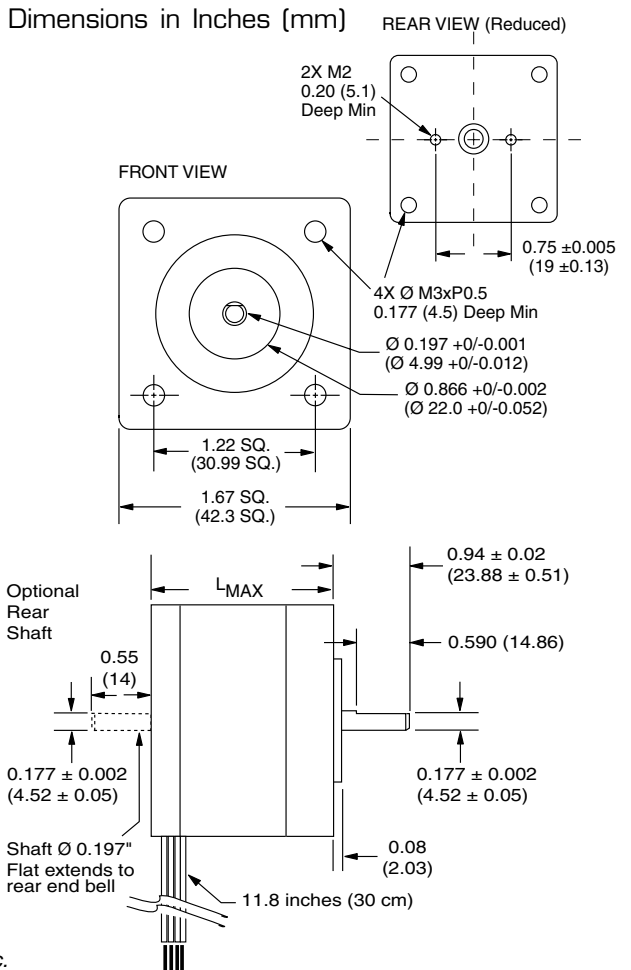
TORQUE SPEED CURVES



CONNECTION



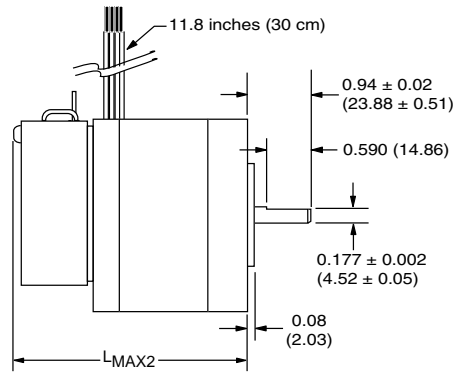
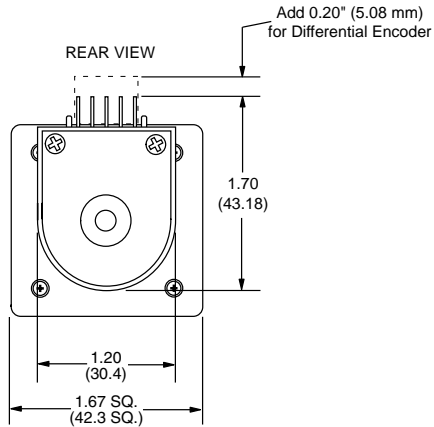
MECHANICAL



ENHANCED SIZE 17 1.8° HYBRID STEPPING MOTORS WITH ENCODER

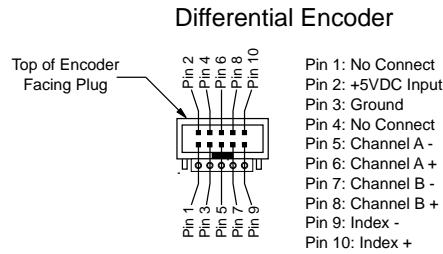
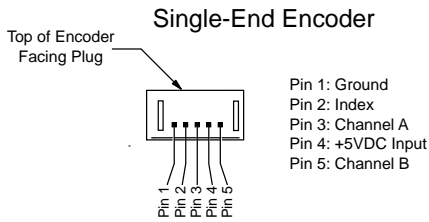
M-17 STEPPING MOTOR WITH 100 TO 1000 LINE ENCODER OPTION

Dimensions in Inches (mm)

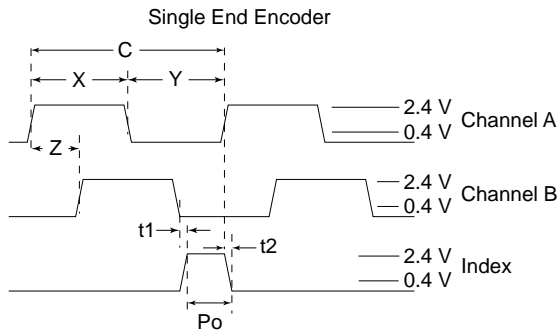


LMAX2	
Size 1713	2.05 (52.04)
Size 1715	2.28 (58.03)
Size 1719	2.60 (66.03)

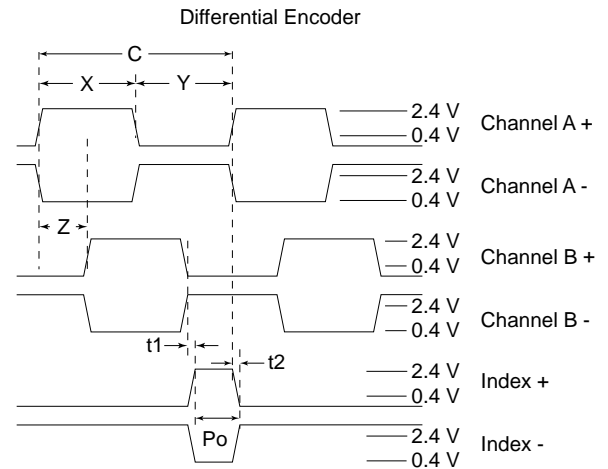
ENCODER PIN ASSIGNMENTS



ENCODER TIMING DIAGRAMS



Rotation:
CW – B Leads A
CCW – A Leads B



Characteristics

Parameter	Symbol	Min	Typ	Max	Units
Cycle Error			3	5.5	°e
Symmetry		130	180	230	°e
Quadrature		40	90	140	°e
Index Pulse Width	Po	60	90	120	°e
Index Rise After CH B or CH A fall	t1	-300	100	250	ns
Index Fall After CH A or CH B rise	t2	70	150	1000	ns

Over recommended operating range. Values are for worst error over a full rotation.

- (C)** One Cycle: 360 electrical degrees (°e)
- (X/Y)** Symmetry: A measure of the relationship between X and Y, nominally 180°e.
- (Z)** Quadrature: The phase lag or lead between channels A and B, nominally 90°e.
- (Po)** Index Pulse Width: Nominally 90°e.

Note: Rotation is as viewed from the cover side.