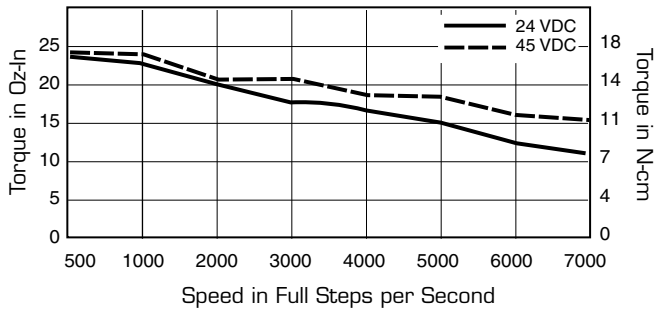
STEPPING MOTORS

ENHANCED SIZE 17 1.8° HYBRID STEPPING MOTORS

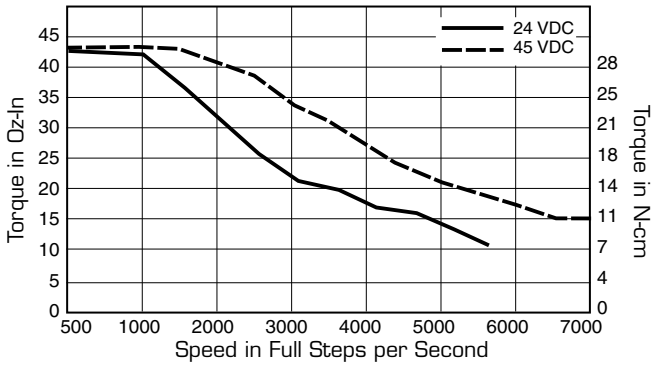
Specifications S=Single Shaft (D=Double Shaft)	Holding Torque oz-in (N-cm)	Phase Current Amps	Number of Leads	Phase Resistance Ohms	Phase Inductance mH	Detent Torque oz-in (N-cm)	Rotor Inertia oz-in-sec^2 (kg-cm^2)	L_{MAX} Length inches (cm)	Weight oz (gm)
M-1713-1.5S (D)	32 (23)	1.5	4	1.3	2.1	1.7 (1.2)	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

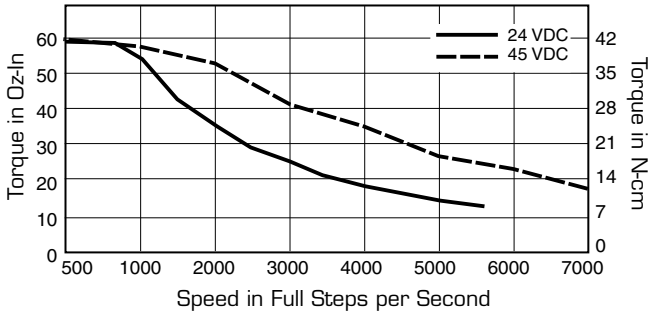
M-1713-1.5 1.5 Amps RMS



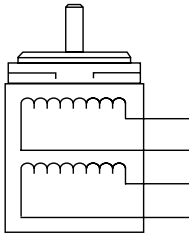
M-1715-1.5 1.5 Amps RMS



M-1719-1.5 1.5 Amps RMS



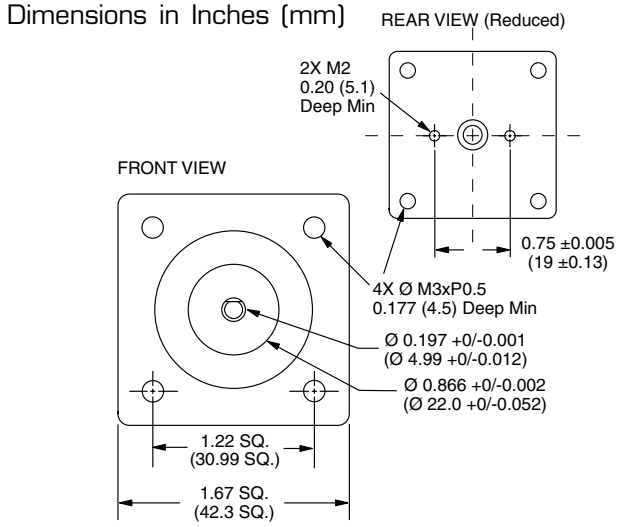
CONNECTION

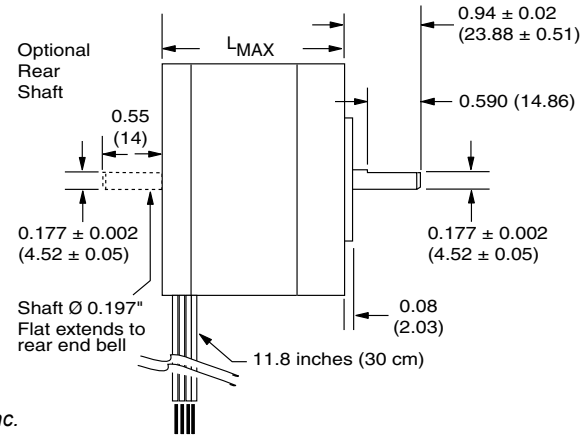


Motor Connection	
WIRE COLOR	PHASE
red	ØA
blue	Ø$\overline{A}$
green	ØB
black	Ø$\overline{B}$

MECHANICAL

Dimensions in Inches (mm)

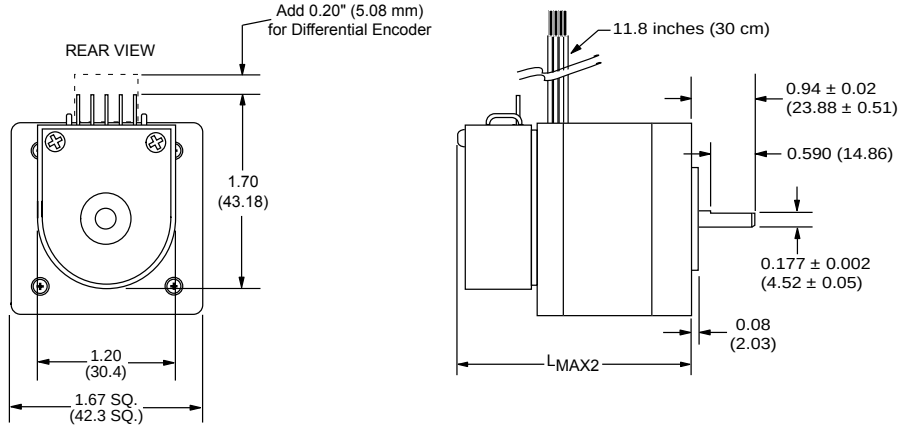




ENHANCED SIZE 17 1.8° HYBRID STEPPING MOTORS WITH ENCODER

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

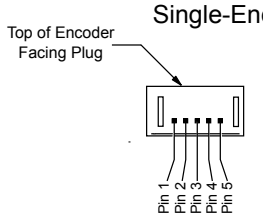
Dimensions in Inches (mm)



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

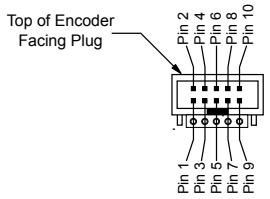
ENCODER PIN ASSIGNMENTS

Single-End Encoder



Pin 1: Ground
Pin 2: Index
Pin 3: Channel A
Pin 4: +5VDC Input
Pin 5: Channel B

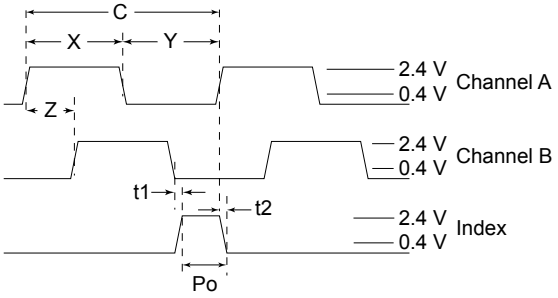
Differential Encoder



Pin 1: No Connect
Pin 2: +5VDC Input
Pin 3: Ground
Pin 4: No Connect
Pin 5: Channel A -
Pin 6: Channel A +
Pin 7: Channel B -
Pin 8: Channel B +
Pin 9: Index -
Pin 10: Index +

ENCODER TIMING DIAGRAMS

Single End Encoder



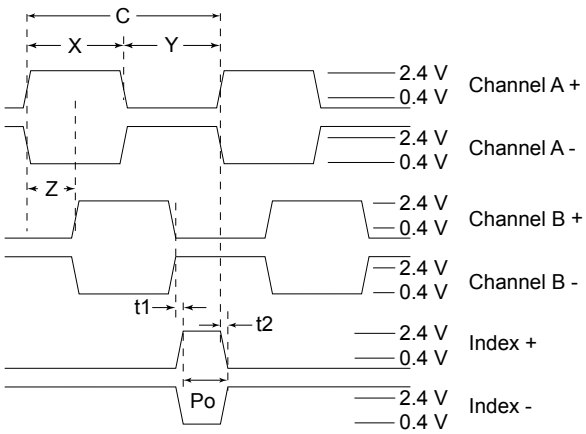
Rotation:
CW – B Leads A
CCW – A Leads B

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.

Differential Encoder



(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.