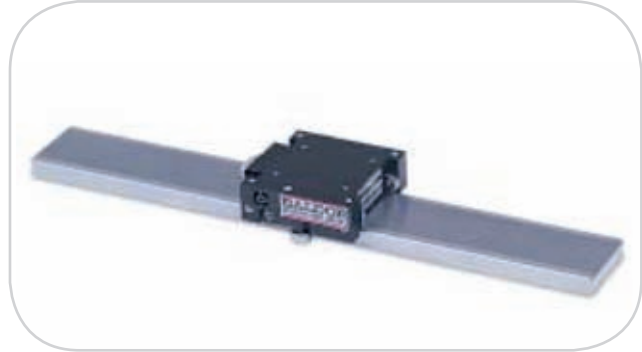


Single-Axis Stepper Motor

- › Cost effective linear motion
- › Open loop - no tuning or encoder are necessary
- › Use with microstepping drive
- › Multiple forcers with overlapping trajectories on a single platen
- › Ceiling or wall mountable
- › 9.8 m/s² [1g] typical accelerations @ 1 m/s [40 lps]
- › Acceleration up to 59 m/s² [6g] under 0.25 m/s [10 lps]
- › Forces to 222.4N [50 Lbs.]
- › High repeatability 10 μm [0.0004 in]
- › Unlimited travel
- › Rapid settling times
- › Roller bearings on 0600 and 1300 series. High stiffness air bearings on 2000 and 2500 series



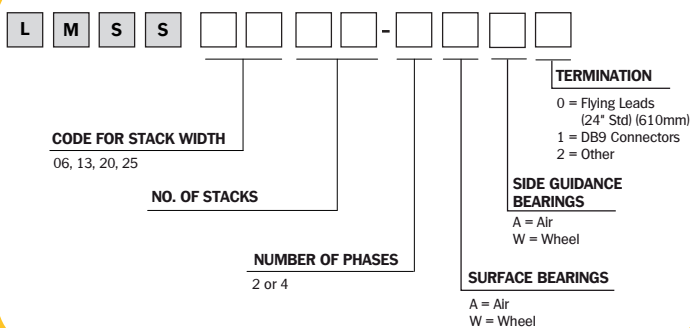
The open-loop linear stepper motor provides the most economical linear motor positioning package. It is possible to stack the single axis linear stepper to provide multiple axes. Packages are made up of two components: a moving forcer (with bearings) and a stationary platen.

The forcer is made of two laminated steel cores precisely slotted with teeth and a single permanent magnet. The coil is inserted into the laminated assembly with leads provided at the beginnings and ends of the coils. Two interconnected coils result in a 2-phase motor, and four interconnected coils result in a 4-phase motor. The laminated assembly is encapsulated in an aluminum housing. The forcer is available in different sizes, depending on the application's force requirements.

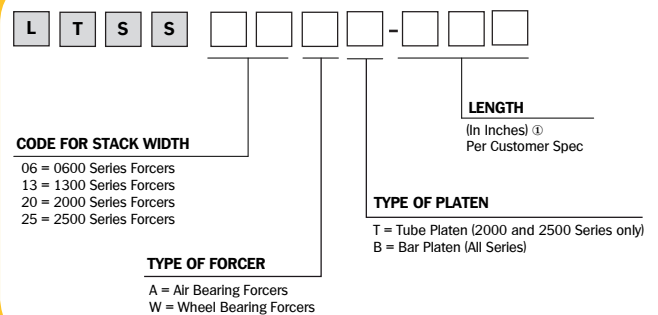
The platen has a photo-chemically etched teeth on a steel bar filled with epoxy, ground and nickel plated. Standard mounting holes are provided on forcer and platen. Upon special request platens can be stacked end-to-end for unlimited lengths. The magnetic-attractive force between the forcer and platen is used as a preload for the bearing system. The magnetic - attractive force enables the motor to be run in an inverted position. The platen to forcer air gap is maintained by the integral bearing system. The customer must bring power to the forcer with an umbilical cable.

› Ordering Information

Primary (Forcer)

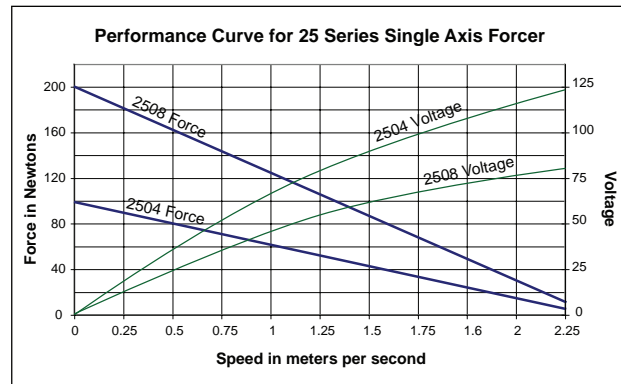
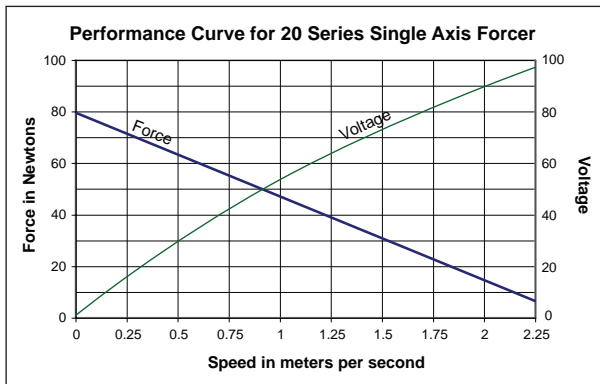
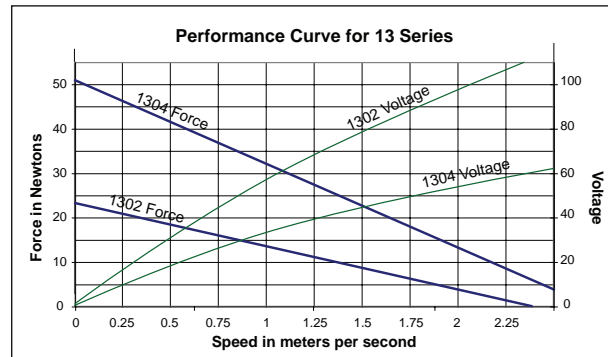
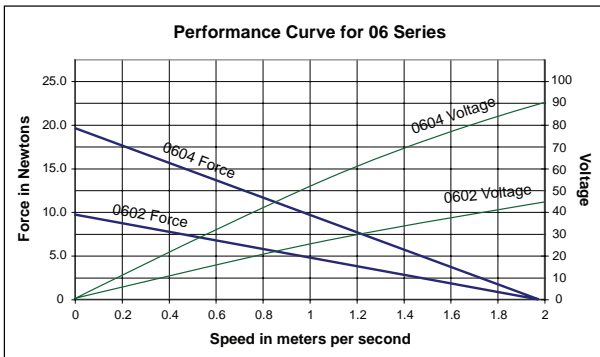


Secondary (Track)



Single-Axis Stepper Motor Technical Data

Performance Curves



Technical Data

2-phase Single Axis Forcers

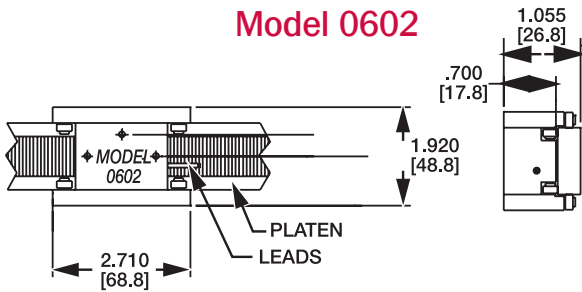
Catalog Number	No. of phases	Static Force		Force @ 40 inches/sec		Inductance (Coil)	Resistance	Amps/Phase		Weight		Bearing Type	Air Bearing Requirement		Attractive Force	
		N	Lbs	N	Lbs			mH	Ohms	Amps	Kg		Lbs	-	CFM	L/min
LMSS0602-2WW0	2	10	2.2	5	1.2	1.2	1.5	1.5	0.18	0.4	Wheel	NA	NA	72	16	
LMSS0604-2WW0	2	20	4.4	11	2.4	2.3	3.0	1.5	0.27	0.6	Wheel	NA	NA	140	32	
LMSS1302-2WW1	2	23	5.1	12	2.8	2.6	2.2	2	0.36	0.8	Wheel	NA	NA	200	45	
LMSS1304-2AW1	2	50	11.3	28	6.2	1.3	1.1	4	0.41	0.9	Air	7	0.25	400	90	
LMSS2004-2AW1	2	80	18.0	44	9.9	1.6	1.6	4	0.50	1.1	Air	25	0.90	665	150	
LMSS2504-2AW1	2	100	22.5	55	12.4	2.2	2.2	4	0.55	1.2	Air	8	0.30	845	190	
LMSS2508-2AW1	2	200	45.0	110	24.8	4.0	3.7	8	1.09	2.4	Air	10	0.35	1690	380	

NOTES:

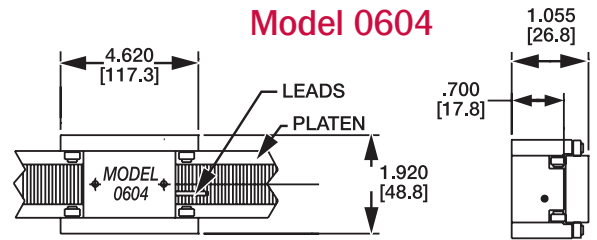
- (1) Four phase is available with the same force ratings and physical size except LMSS0602 and LMSS1302
 - (2) Air bearing units use a side ball bearing for lateral guidance as standard. Side air bearings are optional and requires using a tube platen. Repeatability = 10um (+0.0004 in). Resolution= 2.5um (+0.0001 in), Cyclic error= ±0.0002 in ±5µm (±0.0002 in) *dependent on drive electronics and system implementation Wheel Bearing Airgap= 0.0015 in (38µm), Air Bearing Airgap= 0.0008 in (20µm), Air Pressure= 60-80 psi (4.1-5.5 bar) with a 3 micron filter.
- All specifications are for reference only

Single-Axis Stepper Forcer Dimensions

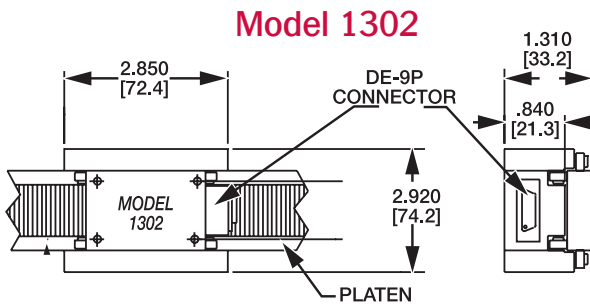
Model 0602



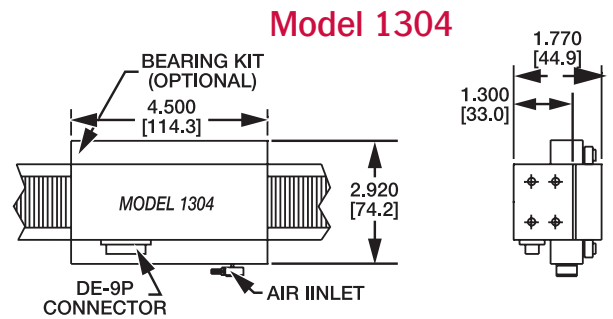
Model 0604



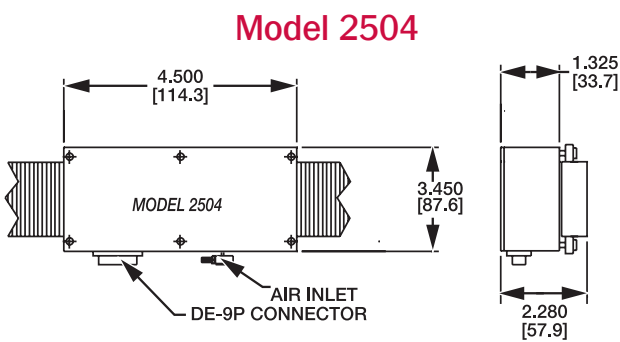
Model 1302



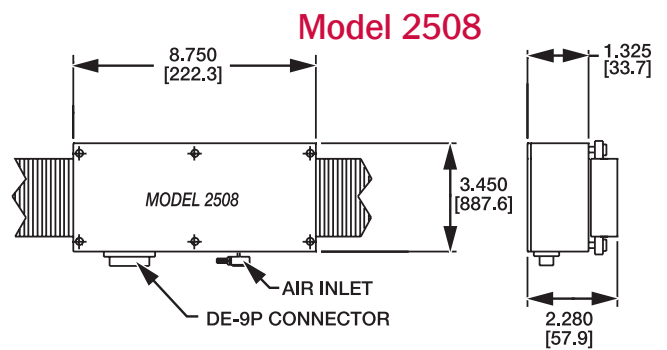
Model 1304



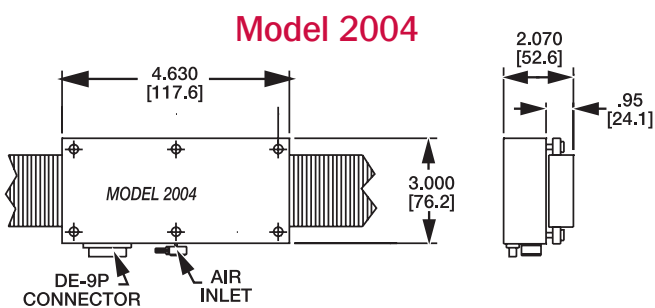
Model 2504



Model 2508

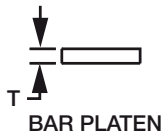
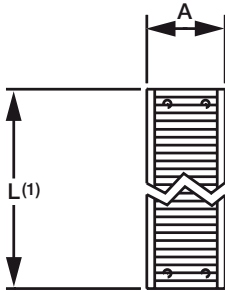


Model 2004

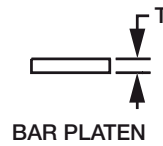
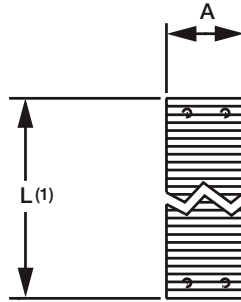


Single Axis Stepper Motor Platen Dimensions

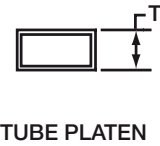
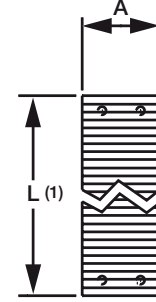
SERIES
0600 and 1300



SERIES
2000



SERIES
2000 and 2500



LTSS Series Platen Dimensions

Series	Catalog Number	A		T		Weight	
		mm	in	mm	in	kg/m	Lbs/in
0600 Bar	LTSS06WB-XXX	30.7	1.21	8.9	0.35	2.11	0.118
1300 Bar	LTSS13XB-XXX	49.8	1.96	11.9	0.468	4.72	0.264
2000 Bar	LTSS20XB-XXX	49.8	1.96	11.9	0.468	4.72	0.264
2000 Tube	LTSS20XT-XXX	49.8	1.96	24.4	1.035	3.94	0.193
2500 Bar	LTSS25XB-XXX	76.2	3.0	24.4	0.96	12.15	0.680
2500 Tube	LTSS25XT-XXX	76.2	3.0	24.4	1.035	5.06	0.283

NOTE:

- (1) Platen will be cut to length (L) per customer specification.
- (2) Bottom mounting holes pattern is as shown.
- (3) Bar platen is parallel to less than 0.0005 inch/12 ft to attain this flatness the bar must be mounted to a flat customer supplied surface
- (4) XXX = Length in inches (1 inch = 25.4 mm)

Dual-Axis Stepper Motor

- › Two-axis motion in a single plane - provides lowest cost dual-axis positioning stage
- › Acceleration to 49 m/s² [5g]
- › High repeatability 1 μm [0.00004 in]
- › Flatness = 18 μm/300 mm [0.0007 in/ft]
- › Resolution = Full Step / Number of micro-steps
- › 2-phase min. 5 μm [0.0002 in]
- › 4-phase min. 2.5 μm [0.0001 in]
- › Platens up to 1.45 x 2.87 m [57 x 113 in]
- › Open or Closed loop
- › Encoders available
- › Multiple forcers with overlapping trajectories on a single platen
- › High stiffness air bearings
- › Mount face up or inverted.



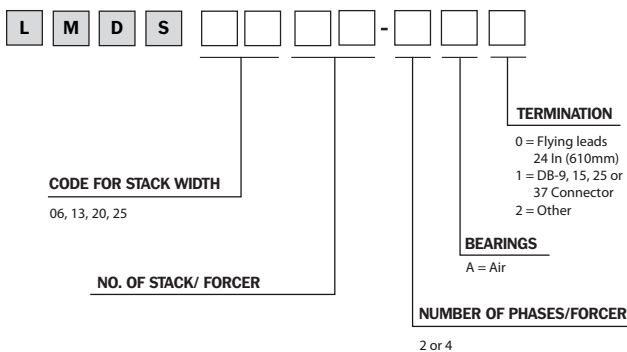
The open-loop linear stepper motor provides the most economical linear motor positioning package. The compact dual-axis stepper motor provides travel along two axes in a single plane. The dual axis package is comprised of two components: a moving forcer (with air bearings) and a stationary platen.

The forcer is made of four single-axis coil assemblies. Two of the forcer assemblies are mounted in series to provide a thrust in the X direction and the other two are mounted orthogonal (at 90 deg. to the first two assemblies) to provide thrust in the Y direction. The forcer assemblies are encapsulated in a hard anodized aluminum housing. The motor's surface is lapped to provide a flat surface for the air bearing with the floating height of the air bearing being less than 25 μm [0.0008 in]. The forcer is available in eight sizes, depending on the application's force requirements.

The platen is a photo-chemically etched steel plate that is filled with epoxy and ground. Standard mounting holes are provided and the platen is available in sizes up to 1.45 x 2.87 m [57 x 113 in]. Preload for the bearing system is provided by the magnetic-attractive force between the forcer and the platen. The customer must bring power to the forcer with a cable, and provide the bearing air supply.

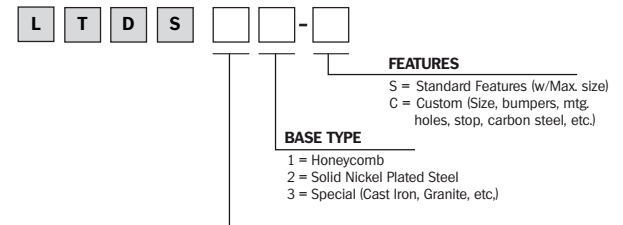
› Ordering Information

Primary (Forcer)



- Size Class is dependent on Base Size.
- Maximum dimensions for the size classes are shown.
- Larger size choices will fall into next size class.
- Usable Platen Area is 76mm (3") less than dimensions shown.

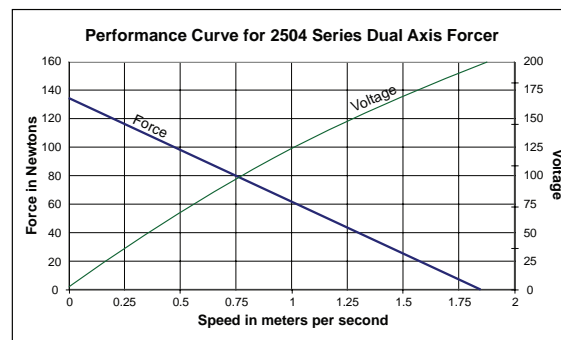
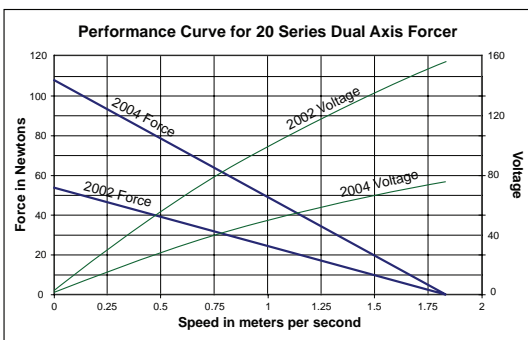
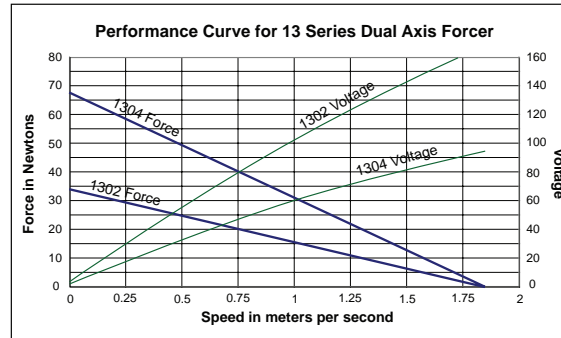
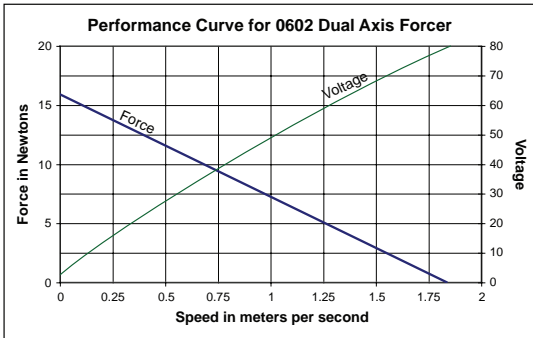
Secondary (Platen)



Size	Overall Size mm [inch]
D = Double	1575 x 991 [62 x 39]
L = Long	1397 x 889 [55 x 35]
F = Full	1092 x 838 [43 x 33]
T = 3 Quarters	838 x 838 [33 x 33]
H = Half	838 x 584 [33 x 23]
Q = Quarter	584 x 457 [23 x 18]
S = Sixth	457 x 415 [18 x 16.33]
E = Eight	457 x 330 [18 x 13]

Dual-Axis Stepper Motor Technical Data

› Performance Curves



› Technical Data

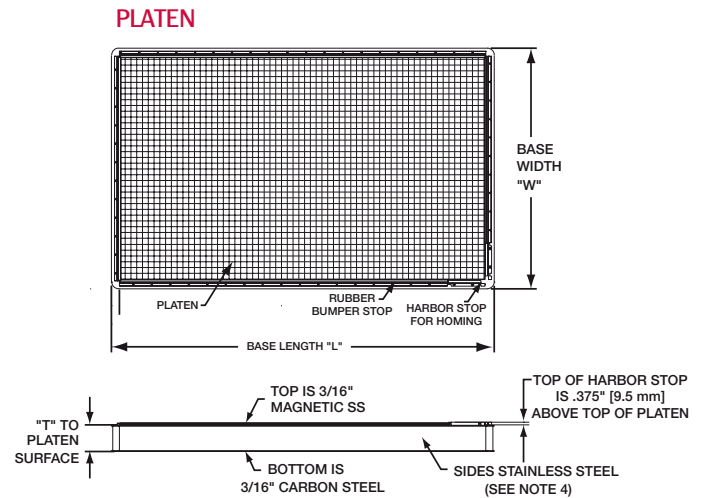
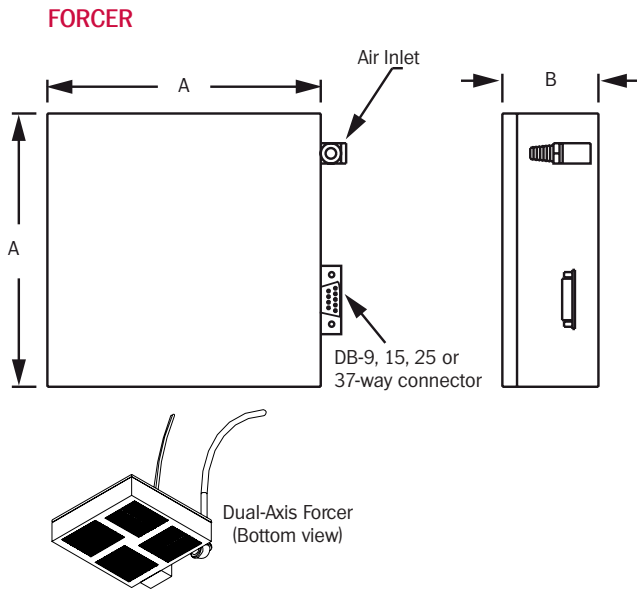
2-phase Dual Axis Forcers

Catalog Number	No. of phases (1)	Static Force		Force @ 40 inches/sec		Inductance (Coil)	Resistance/Phase	Amps/Phase	Weight		Air Bearing Requirement		Attractive Force	
		N	Lbs	N	Lbs				mH	ohms	Amps	kg	Lbs	L/min
LMDS0602-2A0	2	15	3.3	7	1.5	3.3	3.1	2	0.36	0.8	6	0.20	160	36
LMDS1302-2A0	2	33	7.4	15	3.4	5.2	4.2	2	0.50	1.1	8	0.27	400	90
LMDS2002-2A0	2(1)	54	12.1	25	5.5	1.7	1.7	2	0.73	1.6	12	0.42	710	160
LMDS1304-2A0	2(1)	67	15.0	30	6.8	2.9	2.2	4	1.45	3.2	18	0.64	890	200
LMDS2004-2A0	2(1)	110	24.5	48	10.8	3.3	3.2	4	2.05	4.5	22	0.78	1420	320
LMDS2504-2A0	2(1)	134	30.0	60	13.5	4.4	3.8	4	2.32	5.1	25	0.90	1780	400

NOTES:

- (1) Four phase is available with the same force ratings and physical size. Typically, a 4-phase motor has twice the resolution as a 2-phase. The maximum 4-phase resolution is about $\pm 2 \mu\text{m}$.
- › Bi-directional repeatability = $\pm 5 \mu\text{m}$ (± 0.0002 in). Unidirectional repeatability better than .0001 inch.
- › Resolution = $2.5 \mu\text{m}$ (0.0002 in), Cyclic error = $\pm 5 \mu\text{m}$ (± 0.0002 in) independent on drive electronics and system implementation
- › Standard Pitch 1.016 mm (0.04 in), Optional Pitch 0.508 mm (0.02 in)
- › Air Bearing Airgap = $20 \mu\text{m}$ (0.0008 in), Air Pressure = 4-5.5 bar (60-80 psi) with a 5 micron filter.
- › All specifications are for reference only.

Dual-Axis Stepper Motor Dimensions



FORCER

Catalog Number	A		B		Weight	
	mm	in	mm	in	Kg	Lbs
LMDS - 0602	80.0	3.15	28	1.1	0.36	0.8
LMDS - 1302	96.5	3.80	30	1.2	0.50	1.1
LMDS - 2002	120.7	4.75	30	1.2	0.73	1.6
LMDS - 1304	149.4	5.88	302	1.2	1.45	3.2
LMDS - 2004	165.1	6.50	30	1.2	2.05	4.5
LMDS - 2504	177.8	7.0	36.8	1.45	2.32	5.1

PLATEN

Catalog Number	Overall Length "L"		Overall Width "M"		Platen Thickness "T"		Usable Length		Usable Width		Platen Weight	
	m	in	m	in	mm	in	m	in	m	in	Kg	Lbs
LTDS-EX-2	0.46	18	0.33	13.00	13.5	0.53	0.38	15.00	0.25	10.00	16	35
LTDS-SX-2	0.46	18	0.41	16.33	19.8	0.78	0.38	15.00	0.34	13.33	29	64
LTDS-QX-2	0.58	23	0.46	18.00	19.8	0.78	0.51	20.00	0.38	15.00	31	91
LTDS-HX-2	0.84	33	0.58	23.00	26.2	1.03	0.76	30.00	0.51	20.00	100	220
LTDS-TX-2	0.84	33	0.84	33.00	26.2	1.03	0.76	30.00	0.76	30.00	143	315
LTDS-FX-2	1.09	43	0.84	33.00	26.2	1.03	1.02	40.00	0.76	30.00	186	410
LTDS-LX-2	1.41	55	0.89	35.00	26.2	1.03	1.33	52.50	0.81	32.00	254	560
LTDS-DX-2	1.57	62	0.99	39.00	26.2	1.03	1.50	59.00	0.91	36.00	318	700

NOTES:

- (1) Nickel plated steel or cast iron (RoHS compliant)
- (2) Flatness: Top: 12.7 microns/305mm (± 0.0005 inch/foot typical)
- (3) Add 12mm [0.40 inch] thickness for bumpers (Standard on all platens with two harbor stop homing devices at right corner)
- (4) Parallelism of top to bottom: inch 0.254mm ± 0.10 typical.
- (5) Larger size platens available on request