

ML Series

MINIATURE SCREW-DRIVEN LINEAR ACTUATOR



Compact and easy to install, a low cost linear solution perfectly suited for the medical industry, life science and small scale automation applications.

FEATURES & BENEFITS

- Small, Compact Profile - 28 x 32 mm
- Patent Pending SIMO[®] process for machine tool performance at extruded prices
- Lead Screw Driven - High accuracy and precise repeatability
- Many Multi-Axis Configurations - Easy assembly
- Long Travel Lengths - up to 650 mm

MLC

MLB

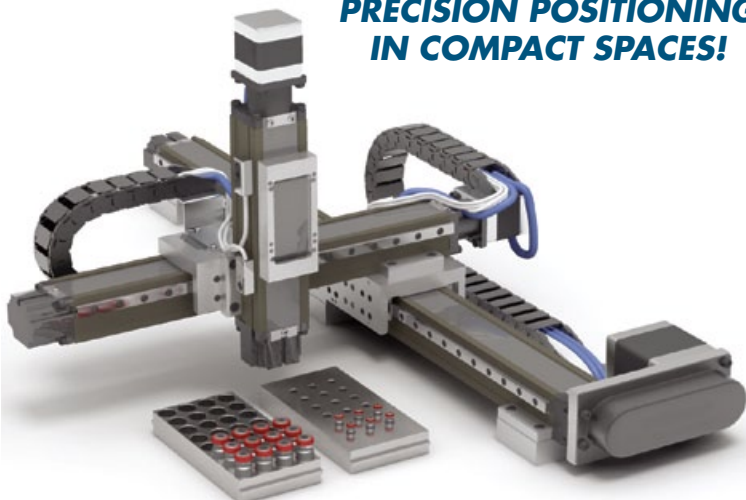
MLD



ML PRODUCT SERIES

- **MLB** (Integrated Motors) - pre-mounted Omron[®] servo motors, Fastech[®] or PBC[®] brand stepper motors.
- **MLC** (Motor Mount Only) - designed motor mounts and couplings for easy mounting and extended life.
- **MLD** (Hand driven)- adjustable hand operated knob and optional brake for precision control.
- **MLE** - Designed to provide, uniform ultra smooth velocity and reduce velocity ripple. Perfect for precision scanning and printing applications. (not shown)

LOW COST SOLUTION FOR PRECISION POSITIONING IN COMPACT SPACES!

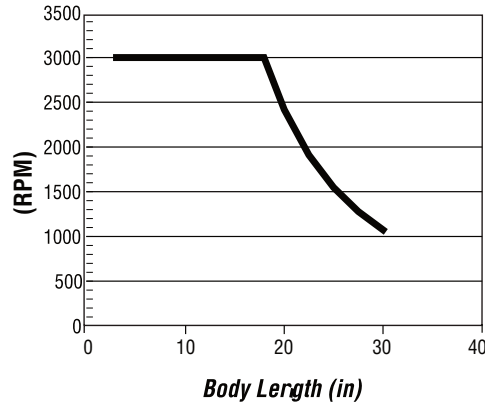
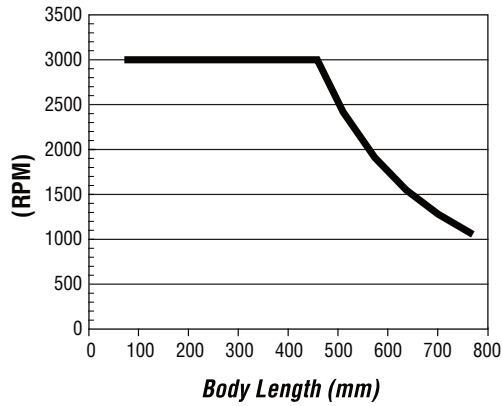


Size		mm	28 x 32	in	1.10 x 1.26	
Max. Load - Lite Preload - <i>anti-backlash</i> - Normal Preload - <i>anti-backlash</i> - Standard	F _x	N	44	lbf	10	
			89		20	
			267		60	
	F _y		107		24	
	F _z		178		40	
Max. Moments	M _x	Nm	1.4	lbf-in	12.4	
			M _y		1.4	12.4
			M _z		1.4	12.4
Bending Moment of Inertia (second moment of area)	I _y	cm ⁴	2.4	in ⁴	0.058	
			I _z		4.4	0.106
Base Weight without Motor		Kg	0.06	lbf	0.13	
Add for 100 mm of stroke			0.15		0.34	
Total Carriage Mass			0.020		0.044	
Total Carriage Mass & Top Plate		0.059	0.130			
Coefficient of Friction		0.19				
Max. Speed		m/s	1.9	in/s	75	
Max. Stroke Length			650		25.6	
Min. Stroke Length		mm	5	in	0.2	
Nominal Screw Diameter			10.0		0.375	
Max RPM		3000				
No Load Torque Nut - Lite Preload - <i>anti-backlash</i> - Normal Preload <i>anti-backlash</i> - Standard	Nm	lbf-in	0.0565	0.50	0.94	
			0.106			0.062
			0.007			
Linear Guide - Single Linear Guide - Dual Linear Guides	Nm	lbf-in	.017	0.15	0.30	
			.034			
Seal Strip - with Seal Strip - without Seal Strip	Nm	lbf-in	.028	0.25	0	
			0			
Screw Lead Accuracy*		mm/mm	.0006	in/in	.0006	

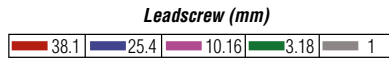
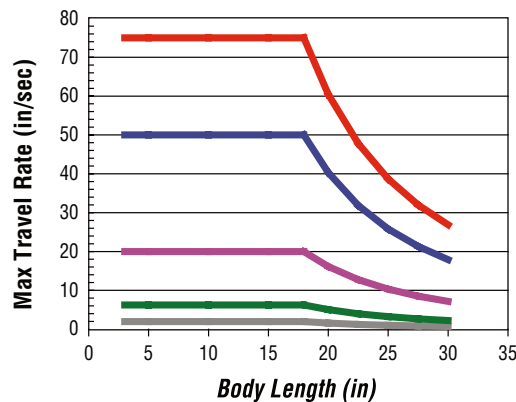
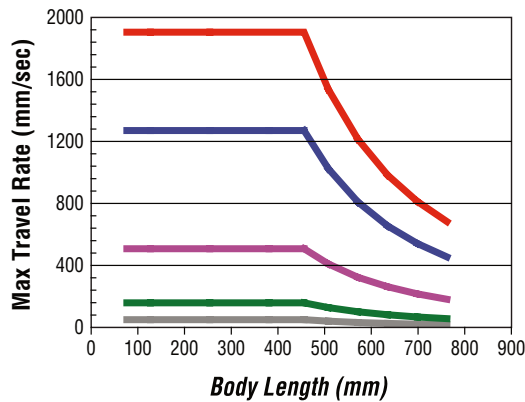
* Higher accuracies are available to .0001 mm/mm (in/in). Contact manufacturer for details. Specifications are subject to change without notice.

LOAD RANGE

80% CRITICAL SPEED



TRAVEL RATES



LINEAR GUIDE SUPPORTS			(1) SINGLE		(2) DUAL				(1) SINGLE		(2) DUAL	
			# of runner blocks on each guide						# of runner blocks on each guide			
			1	2	1	2			1	2	1	2
Max. Load Anti-Backlash Standard Nut	- Lite Preload - Normal Preload	Fx	N	44	44	44	44	lbf	10	10	10	10
				89	89	89	89		20	20	20	20
				267	267	267	267		60	60	60	60
Max. Moments		Fy	N	180	250	445	890	lbf-in	40	56	100	200
				267	356	445	890		60	80	100	200
				1.8	3.6	8.6	18		16	32	76	160
Bending Moment of Inertia (Second moment of area)		Fz	Nm	1.8	5	3.6	10	in ⁴	16	44	32	88
				1.8	5	3.6	10		16	44	32	88
				2.4	2.4	2.4	2.4		0.058	0.058	0.058	0.058
Base Weight without Motor		ly	cm ⁴	4.4	4.4	4.4	4.4	lbf	0.106	0.106	0.106	0.106
				0.127	0.136	0.195	0.205		0.28	0.30	0.43	0.45
Add for 100mm of Stroke		Iz		0.18	0.18	0.21	0.21		0.40	0.40	0.46	0.46
Total Carriage Mass				.109	.117	.159	.175	lbf	.240	.257	.350	.385
Coefficient of Friction				0.19		0.01			0.19		0.01	

NOTE:

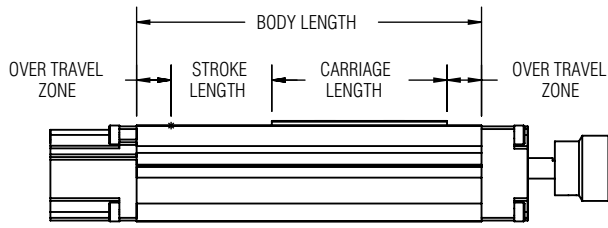
- Moment arms for calculating moments should be measured from the center of the extrusion.
- Limit switches must be used in order to prevent the carriage from contacting the actuator end blocks, resulting in damage.
- Servo drive system - Recommended over-travel of 20 mm
- Stepper motors or manual hand cranks system - add 5 mm of over-travel.

For combined loads, loading cannot exceed the following formula.

$$\frac{F_{yA}}{F_y} + \frac{F_{zA}}{F_z} + \frac{M_{xA}}{M_x} + \frac{M_{yA}}{M_y} + \frac{M_{zA}}{M_z} \leq 1$$

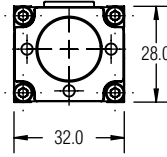


DIMENSIONAL INFORMATION

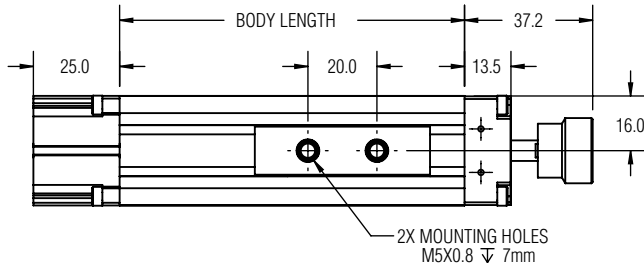
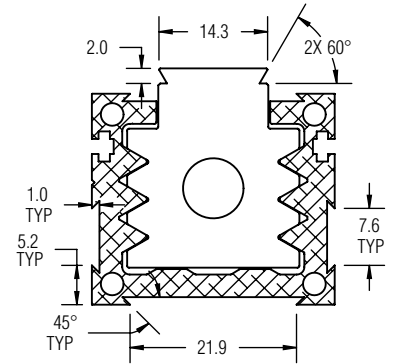


OVER TRAVEL =
 0mm Hand
 10mm Stepper
 20mm Servo

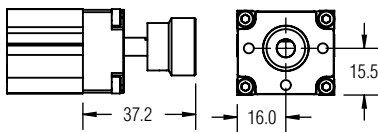
NOTES: BODY LENGTH = STROKE + CARRIAGE LENGTH + (2X OVER TRAVEL)



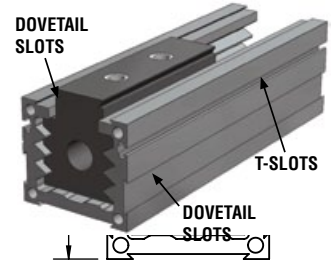
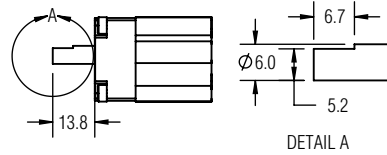
DOVETAILS



KNOB

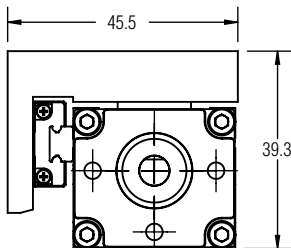


SHAFT ONLY

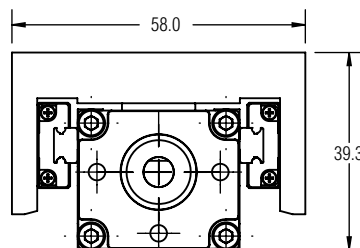


NO DOVETAIL

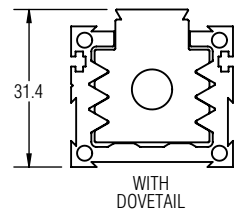
(1) EXTERNAL LINEAR GUIDE



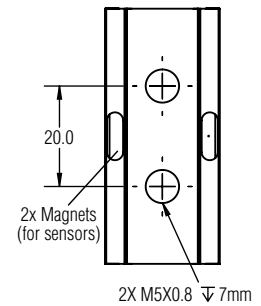
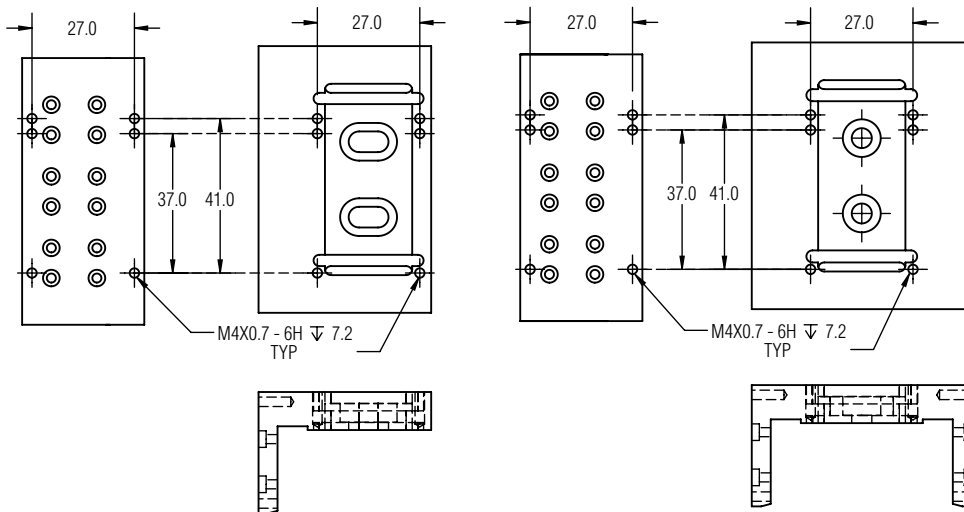
(2) EXTERNAL LINEAR GUIDE



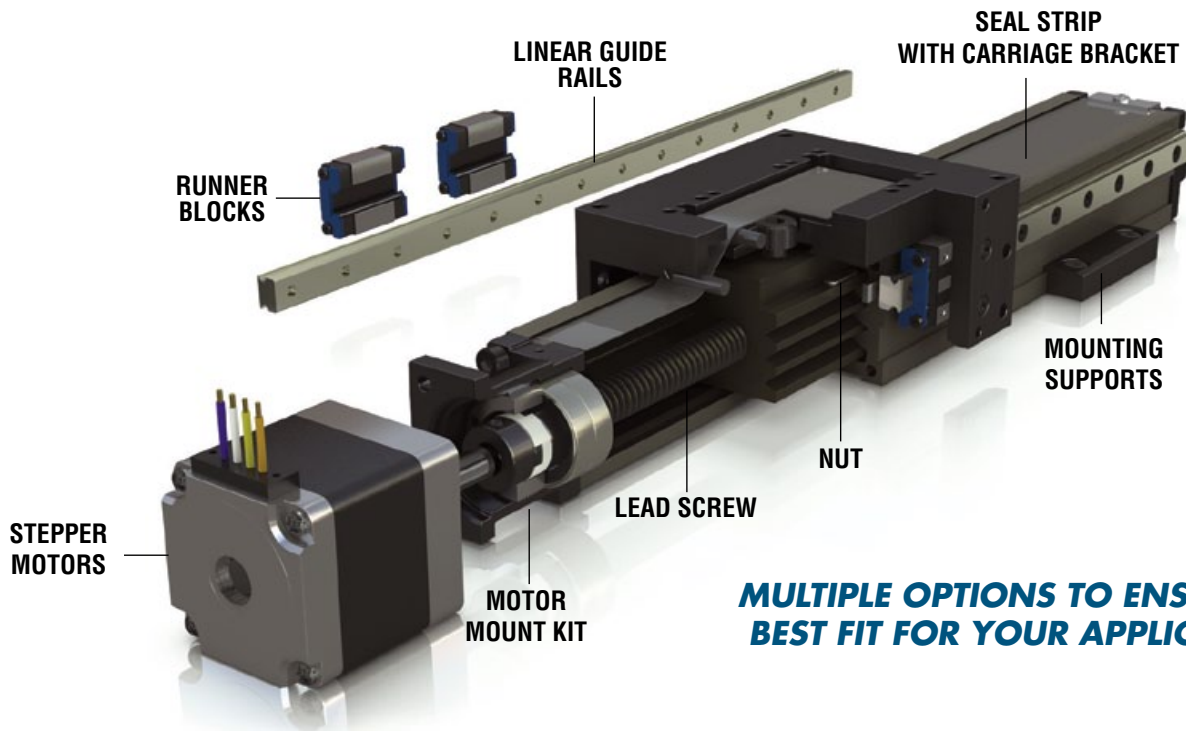
AVAILABLE IN LEFT OR RIGHT SIDE MOUNT



CARRIAGE MOUNT



ORDERING OPTIONS & ACCESSORIES



MULTIPLE OPTIONS TO ENSURE THE BEST FIT FOR YOUR APPLICATION!

ORDERING OPTIONS	
	Linear Guide Supports - Provides increased load and moment capacities. Available in single or dual rails with runner blocks.
	Lead Screws - 1mm (0.039"), 3 mm (0.125"), 10 mm (0.4"), 25mm (1"), 38mm (1.5") <i>Contact manufacturer for other available sizes.</i>
	Nut Type Standard or optional anti-blash nut for applications requiring high bi-directional accuracy and repeatability.
	Seal Strip Prevent debris from entering or exiting the actuator.
	Stepper Motors - PBC brand motors are designed to reduce length in the ML actuator. Standard NEMA and metric sizes available in single, double or triple stack. Fastech® motors offer state-of-the-art monitoring and drive advancements into their EZi-step motor for precision, speed and power. Available in open or closed loop designs.
	Servo motors - Omron high-precision positioning with improved response and vibration control. Available in 40 & 60 mm.

ACCESSORIES	
	Mounting Supports Dovetail clamps and riser plates for stable positioning and surface mounting.
	Motor Coupling Extends life of the motor and provides shortest overall length.
	Position Sensor Attaches to housing to precisely signal when the carriage has reached limit or home positions.
	Replacement Parts Fast replacement parts at a moments notice. Side motor brackets, covers and pulley belt system
	Upgrade System Parts Carriage Bracket Kit, Linear Guide Support Kit, Seal Strip Kit
	Cable Carrier Extruded one-piece or snap together side bands for various cable carrier cavities and application requirements.

TO ORDER CALL: 1(800) 962-8979

Product information and 2D/3D CAD drawings available for download at www.pbclinear.com
For technical & application information call **1-888-962-8979**.

The data and specifications in this publication have been carefully compiled and are believed to be accurate and correct. However, it is the responsibility of the user to determine and ensure the suitability of PBC Linear® products for a specific application. PBC Linear® only obligation will be to repair or replace without charge, any defective components if returned promptly. No liability is assumed beyond such replacement. Specifications are subject to change without notice. LITMLA-001 [r10-12]

