LINEAR SLIDE

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SIZING & SELECTION
SOFTWARE FOR
BAND CYLINDERS
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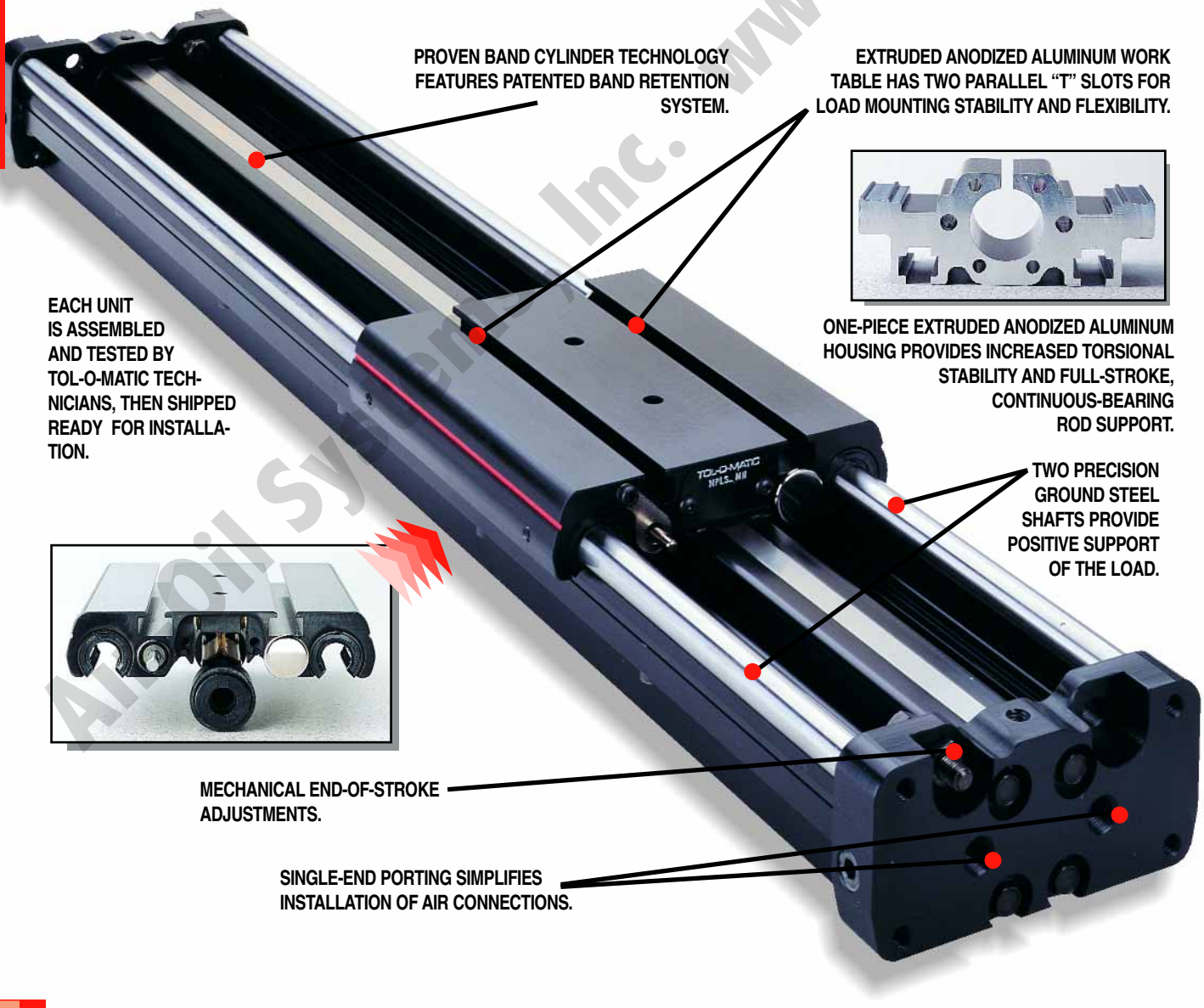
LINEAR SLIDE

Tol-O-Matic linear slides provide pre-engineered, pre-assembled and pre-tested solutions to many of today's most challenging linear motion application needs. Available in 1/2-inch and 1-inch bore sizes, these ready-to-install slides feature a rigid, torque-resistant low-profile design for increased torsional stability and mounting flexibility — an excellent choice for high-precision X-Y and space-saving applications.

The 1/2-inch bore size features composite bearings for high load capacity, low noise and high resistance to contaminants. The 1-inch bore size features precision linear bearings for long life, high load capacity and low friction. Both sizes are based on a one-piece extruded housing that serves as the base plate for mounting the bearing rods, thus, eliminating rod deflection. The result is a rigid, torque-resistant, low-profile unit that provides load guide and support along the entire stroke of the slide.

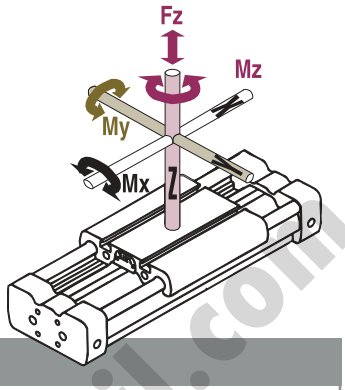
Tol-O-Matic linear slides offer a number of advantages over other manufacturers including a patented non-magnetic sealing band retention system (U.S. Patent No. 4,545,290). This field-proven system also includes a stainless steel outer dust band held tightly in place by a T-shaped elastomer strip bonded to the band's surface. The resulting non-magnetic, metal-to-metal seal provides a positive barrier against possible contamination of internal components.



The graphs on this page are intended for a quick reference to help in determining the Linear Slide that will work for your project.

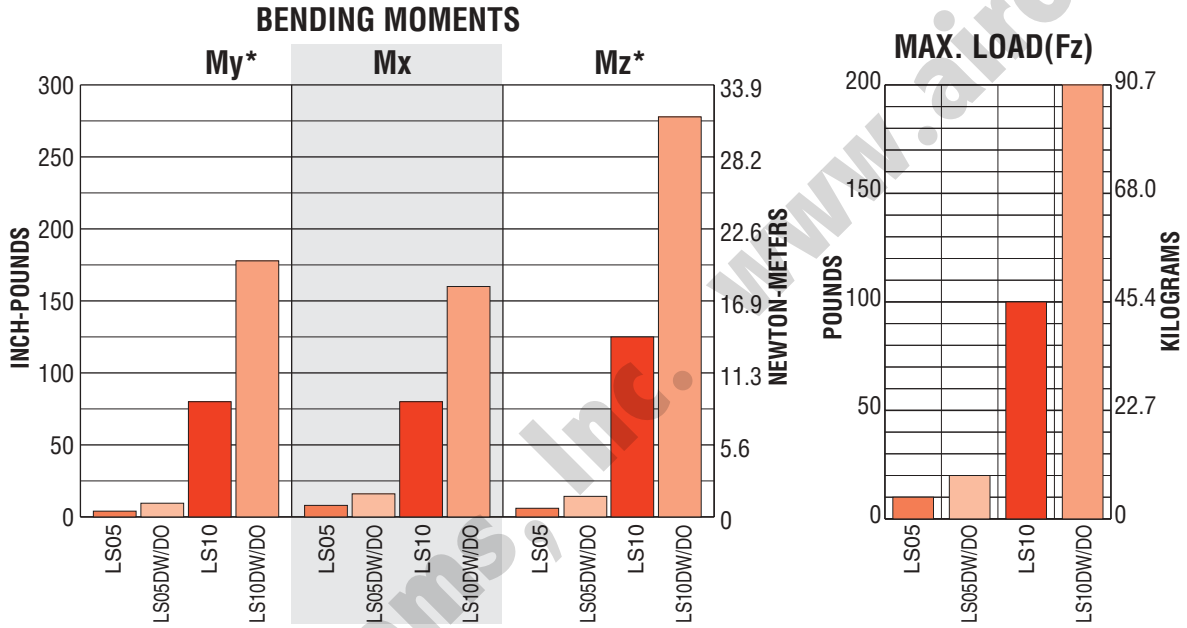
Refer to page 88 in this section to find step by step directions to size and select the best rodless cylinder for the job.

The following pages detail each of the two sizes of the LS, giving bore size, weights, force, bearing life vs. load support requirement and available options.



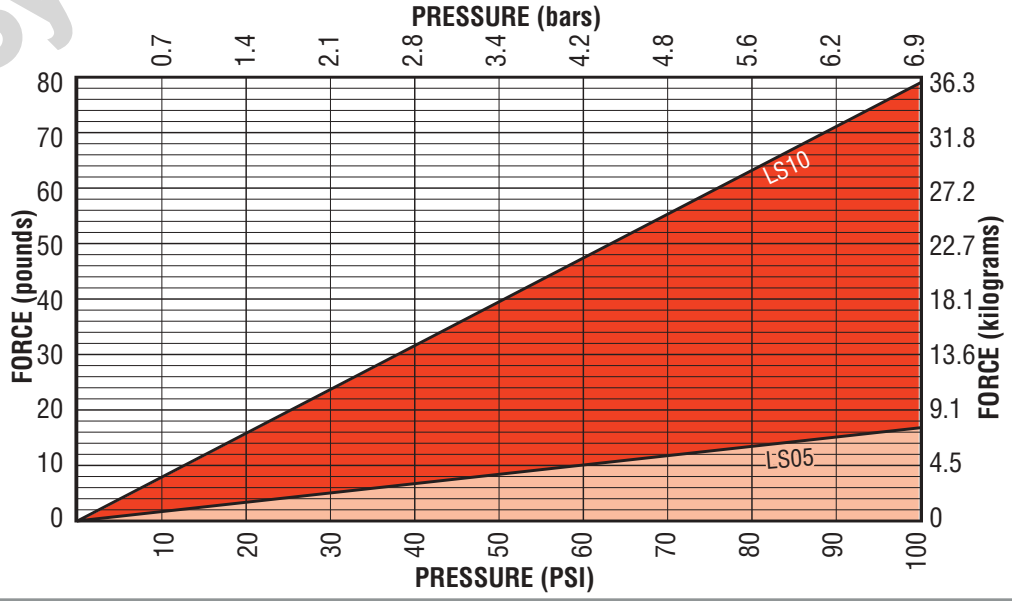
LS BENDING MOMENTS, LOAD : LS05, LS10

STANDARD ACTUATOR & AUXILIARY CARRIER OPTION



*Auxiliary carrier bending moments indicated are at minimum center to center distance. Additional My + Mz load capacity can be obtained by increasing "D" dimension. Refer to auxiliary carrier data on page 84

LS THEORETICAL FORCE VS PRESSURE: LS05, LS10



LS05 LINEAR SLIDE

Tol-O-Matic linear slides are comprehensive, pre-engineered, self-supporting slide systems. Designed for engineers assembling slide systems using pneumatic rodless cylinders, these units are able to carry loads while functioning as an actuator.

The LS05 features a one-piece extruded anodized aluminum housing which increases torsional stability and provides continuous bearing rod support through the full stroke length. This model also features composite bearings allowing the slide to operate in any attitude.

MODELS:
LS05
LSMM05 (Metric)

Bore Size:
0.50 in./ 12 mm

Base Weight:
1.2 lbs./ .54 kgs.

Weight Per in. of Stroke:
.15 lb./ .068 kgs.

Maximum Stroke Length
72 in. / 1829 mm
(For longer stroke lengths, please consult the factory)

Max Pressure:
100 PSI / 6.895 bar

Temp. Range:
20° to 140° F. / -7° to 60° C.

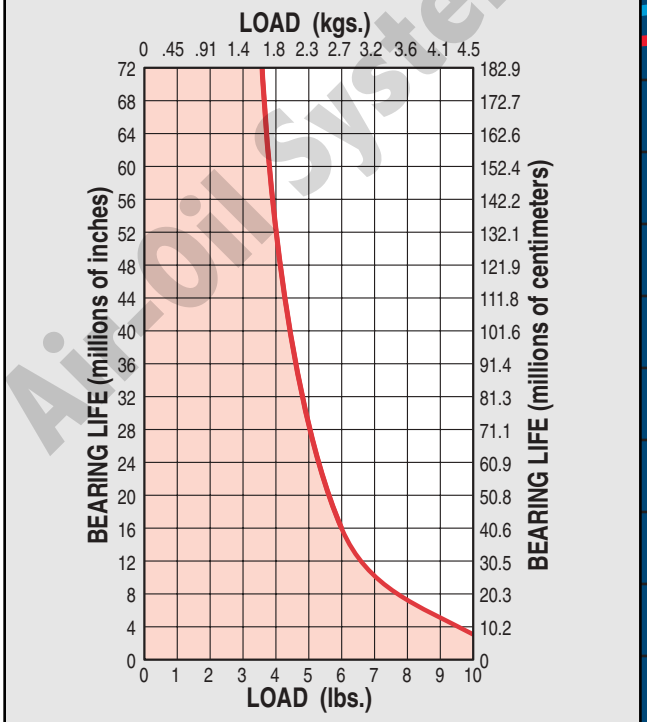
End-of-Stroke Positioning Accuracy:
±0.0005" / 0.0127mm

Stroke Adjustment
±0.12" per end / ±3.05mm per end

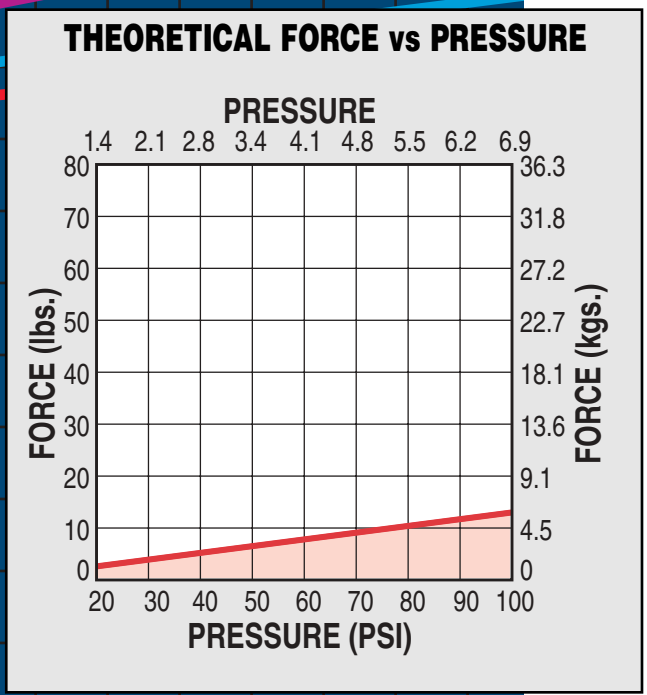
LS05 OPTIONS

PERFORMANCE DATA

BEARING LIFE vs LOAD

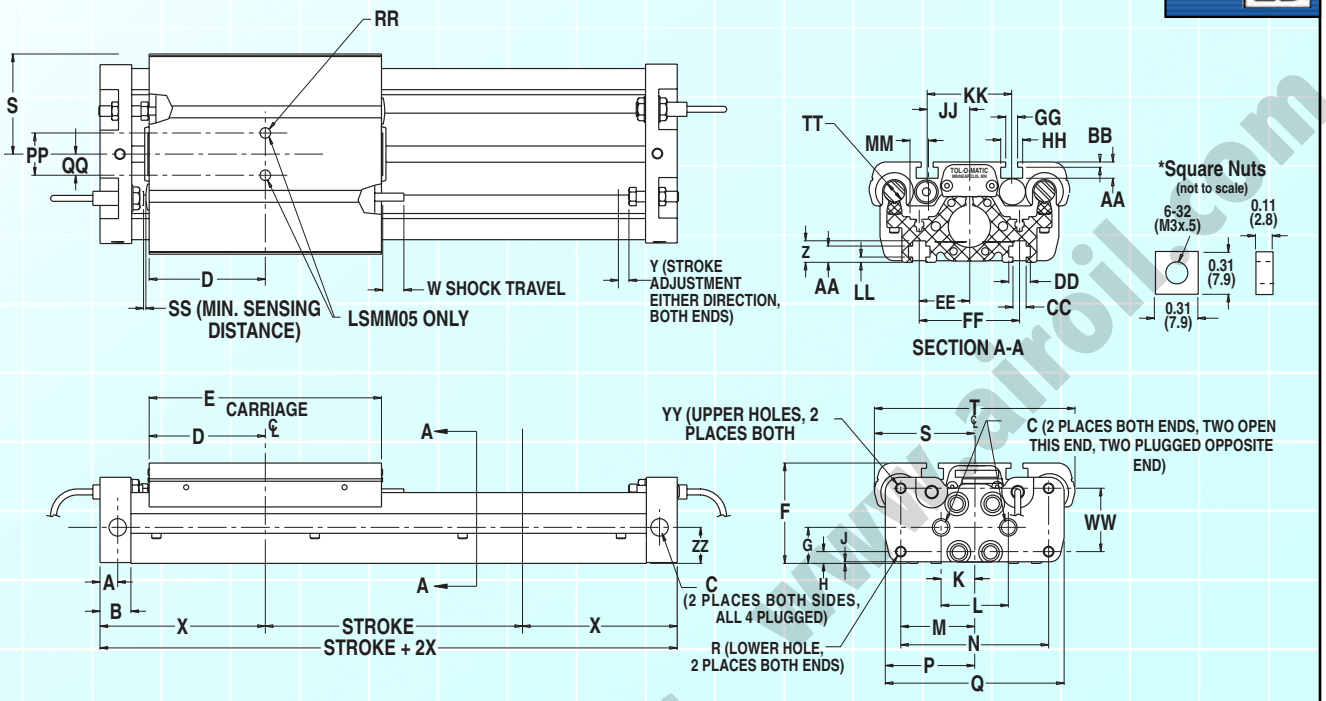


THEORETICAL FORCE vs PRESSURE



DIMENSIONAL DATA

2D CAD AVAILABLE AT WWW.TOLOMATIC.COM



MODEL	BORE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	W	X	Y	Z
LS05	.50	0.32	0.50	#10-32 PORTS	1.82	3.63	1.31	0.43	0.24	0.02	0.88	1.75	1.13	2.25	1.39	2.78	#10-24 x .38 DP	1.50	3.00	0.18	2.69	0.13	0.34

MODEL	BORE	AA	BB	CC	DD	EE	FF	GG	HH	JJ	KK	LL	MM	PP	QQ	RR	SS	TT	WW	YY	ZZ
LS05	.50	0.19	0.06	0.16	0.33	0.81	1.63	0.16	0.33	0.94	1.88	0.13	0.28	1.00	0.50	.13 x .09 DP	0.04	.25 Nominal	0.50	#10-24 x .21 DP	.47

Above Dimensions in Inches

MODEL	BORE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	W	X	Y	Z
LSMM05	12	8.10	12.70	M5 x 0.8	46.10	92.20	33.30	10.80	6.00	0.50	22.23	44.45	28.58	57.15	35.50	70.60	M5 x 0.8 x 10 DP	38.10	76.20	4.60	62.90	3.20	8.59

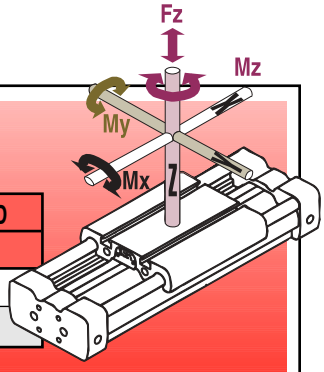
MODEL	BORE	AA	BB	CC	DD	EE	FF	GG	HH	JJ	KK	LL	MM	PP	QQ	RR	SS	TT	WW	YY	ZZ
LSMM05	12	4.88	1.57	3.96	8.43	20.62	41.28	3.96	8.43	23.83	47.63	3.18	7.14	25.40	12.70	3.18 x2.4 DP	1.00	6.35 Nominal	12.70	M5 x 0.8 x 5 DP	11.8

Above Dimensions in Millimeters

***NOTE:** Four square nuts are provided with each linear slide for base mounting. Additionally 2 square nuts are provided for 30" of stroke and 2 for every 20" of stroke thereafter.*

BENDING MOMENTS

MODEL NO.	BORE SIZE	MAXIMUM BENDING MOMENT			MAX. LOAD
		My	Mx	Mz	Fz
LS05	.50 in.	4 in.-lbs.	8 in.-lbs.	6 in.-lbs.	10 lbs.
LSMM05	12 mm	0.45 N-m	0.90 N-m	0.68 N-m	4.5 kgs.



LS10 LINEAR SLIDE

The LS10 features a one-piece extruded anodized aluminum housing which increases torsional stability and provides continuous bearing rod support through the full stroke length. This model features precision linear ball bearings allowing the slide to operate in any attitude.

MODELS:
LS10
LSMM10 (Metric)

Bore Size:
1.00 in./ 25 mm

Base Weight:
5.2 lbs./ 2.36 kgs.

Weight Per in. of Stroke:
0.4 lb./ .181 kgs.

Maximum Stroke Length
72 in. / 1829 mm
(For longer stroke lengths, please consult the factory)

Max Pressure:
100 PSI / 6.895 bar

Temp. Range:
20° to 140° F. / -7° to 60° C.

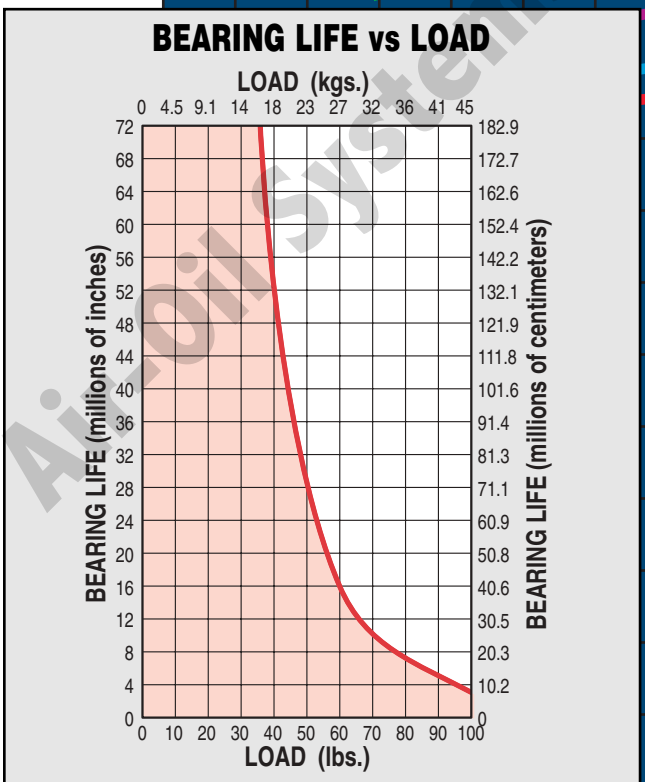
End-of-Stroke Positioning Accuracy:
±0.0005" / 0.0127mm

Stroke Adjustment
±0.25" per end / ±6.35mm per end

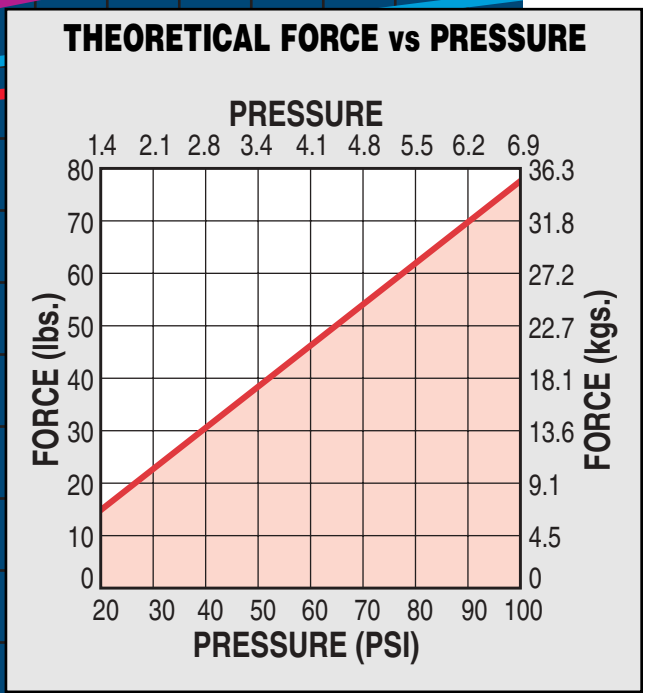
LS10 OPTIONS

PERFORMANCE DATA

BEARING LIFE vs LOAD

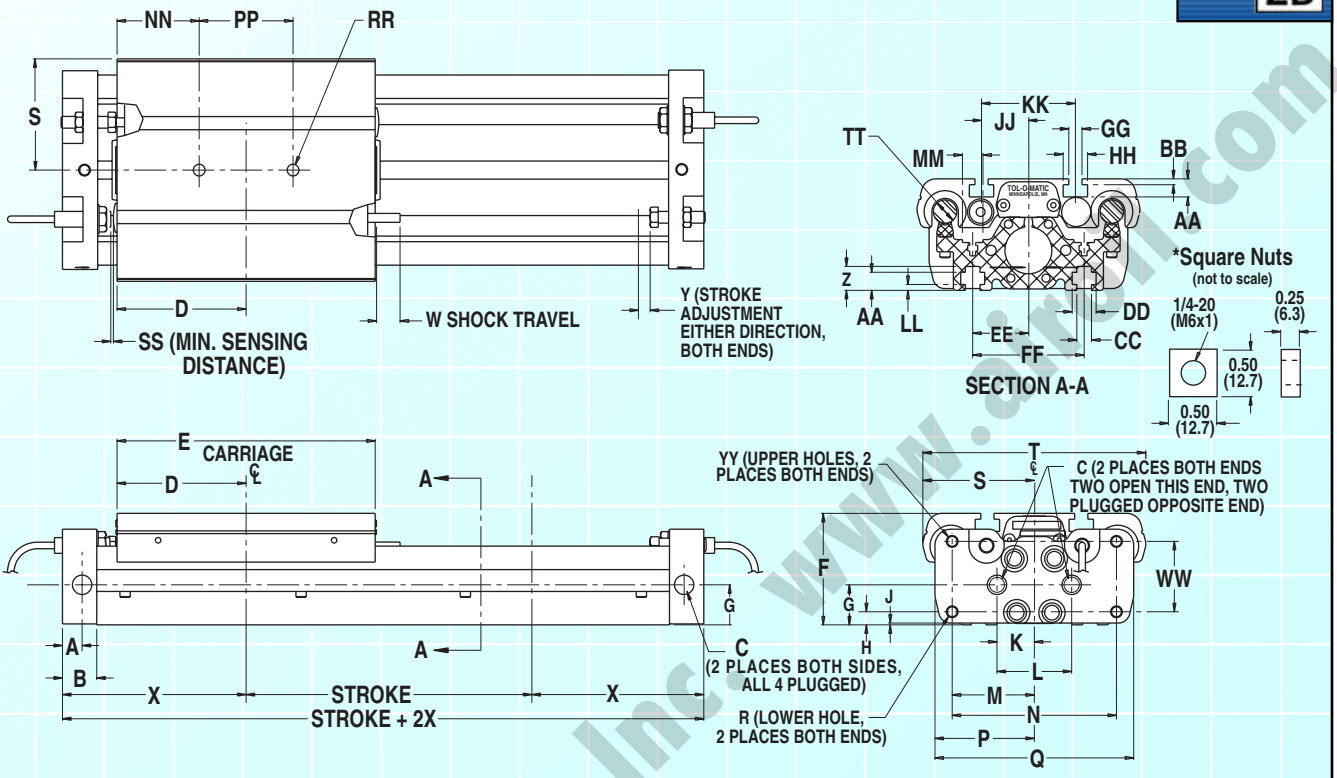


THEORETICAL FORCE vs PRESSURE



DIMENSIONAL DATA

2D CAD AVAILABLE AT WWW.TOLOMATIC.COM



MODEL	BORE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	W	X	Y	Z
LS10	1.00	0.42	0.73	1/8 NPT PORT	2.75	5.50	2.38	0.86	0.28	0.04	0.80	1.59	1.75	3.50	2.13	4.25	1/4-20 x .50 DP	2.38	4.75	0.43	3.89	0.25	0.51

MODEL	BORE	AA	BB	CC	DD	EE	FF	GG	HH	JJ	KK	LL	MM	NN	PP	RR	SS	TT	WW	YY
LS10	1.00	0.39	0.10	0.31	0.51	1.19	2.38	0.28	0.52	1.00	2.00	0.13	0.44	1.75	2.00	.25 x .20 DP	0.04	.472 Nominal	1.50	1/4-20 x .38 DP

Above Dimensions in Inches

MODEL	BORE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	W	X	Y	Z
LSMM10	25	10.70	18.50	G 1/8-28 Parallel	69.90	139.70	60.50	21.72	7.10	1.00	20.30	40.40	44.45	88.90	54.10	107.90	M6 x 1.0 x 12 DP	60.50	120.70	10.90	98.81	6.40	12.90

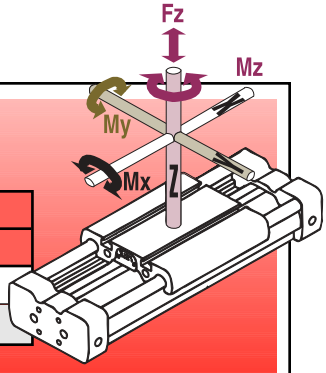
MODEL	BORE	AA	BB	CC	DD	EE	FF	GG	HH	JJ	KK	LL	MM	NN	PP	RR	SS	TT	WW	YY
LSMM10	25	9.78	2.54	7.92	12.95	30.18	60.33	7.14	13.21	25.40	50.80	3.18	11.13	44.45	50.80	6.35 x 5.1 DP	1.00	12.0 Nominal	38.10	M6 x 1.0 x 9 DP

Above Dimensions in Millimeters

***NOTE:** Four square nuts are provided with each linear slide for base mounting. Additionally 2 square nuts are provided for every 20" of stroke.*

BENDING MOMENTS

MODEL NO.	BORE SIZE	MAXIMUM BENDING MOMENT			MAX. LOAD
		My	Mx	Mz	Fz
LS10	1.00 in.	80 in.-lbs.	80 in.-lbs.	125 in.-lbs.	100 lbs.
LSMM10	25 mm	9 N-m	9 N-m	14 N-m	45.4 kgs.

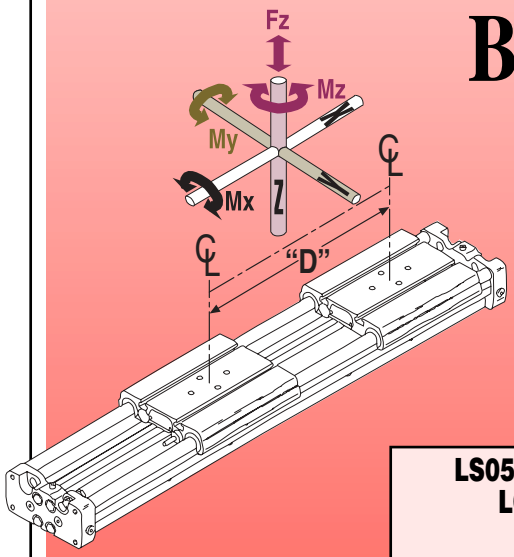


AUXILIARY CARRIER

Available on all linear slide models, the dual carrier option can increase load carrying capacity and bending moments. Auxiliary carriers may be ordered with or without an internal piston. Determine your working stroke and your "D" dimension. Enter these values into the configuration string. (Example: LS10SK20.00DW6.00) The configurator will calculate the overall length of the actuator. See "Ordering," page 86.

ORDERING PROCEDURE

NOTE: Use of this option will increase breakaway pressure and decrease the effective stroke of the slide based on the distance between the center lines of the carriers.



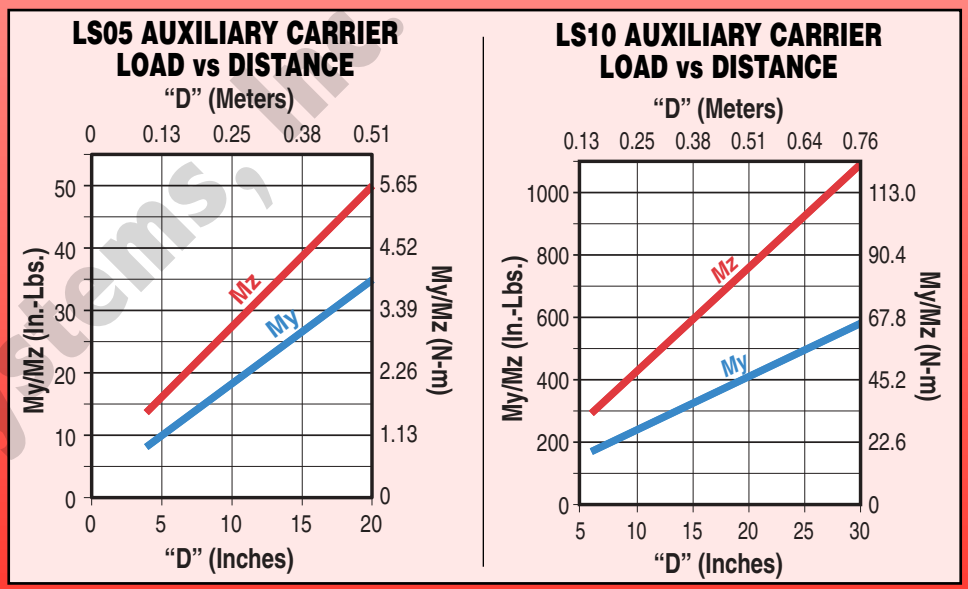
BENDING MOMENTS

MODEL NO.	DIM "D" MIN.	MAXIMUM BENDING MOMENT			MAX. LOAD
		My*	Mx	Mz*	Fz
LS05	3.63 in.	9.51 in.-lbs.	16.00 in.-lbs.	14.27 in.-lbs.	20 lbs.
LSMM05	92.2 mm	1.07 N-m	1.81 N-m	1.61 N-m	9.08 kgs.
LS10	5.75 in.	177.80 in.-lbs.	160.00 in.-lbs.	277.80 in.-lbs.	200 lbs.
LSMM10	146.1 mm	20.09 N-m	18.08 N-m	31.30 N-m	90.8 kgs.

*Auxiliary carrier bending moments indicated are at minimum center to center distance. Additional My + Mz load capacity can be obtained by increasing "D" dimension. See graphs below.

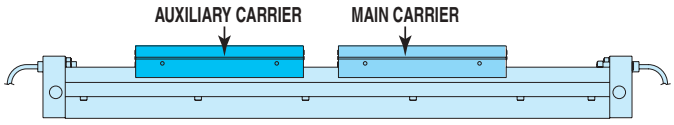
Rates were calculated with the following assumptions:

1. Coupling between carriers is rigid.
2. Load is equally distributed between the carriers.
3. Coupling device applies no misalignment loads to carriers.

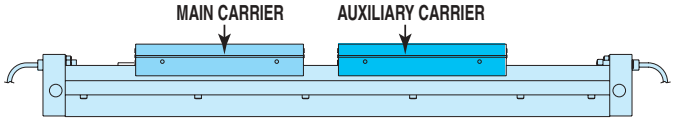


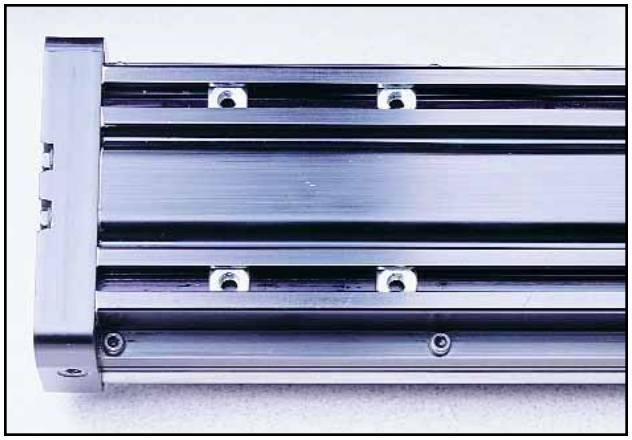
IMPORTANT INFORMATION REGARDING AUXILIARY CARRIER PLACEMENT

When a cylinder is ordered without shock absorbers, the auxiliary carrier is always placed to the left (while facing the switch mounted or open port side) of the main carrier.



When a cylinder is ordered with shock absorbers, the auxiliary carrier is always placed to the right (while facing the switch mounted or open port side) of the main carrier.



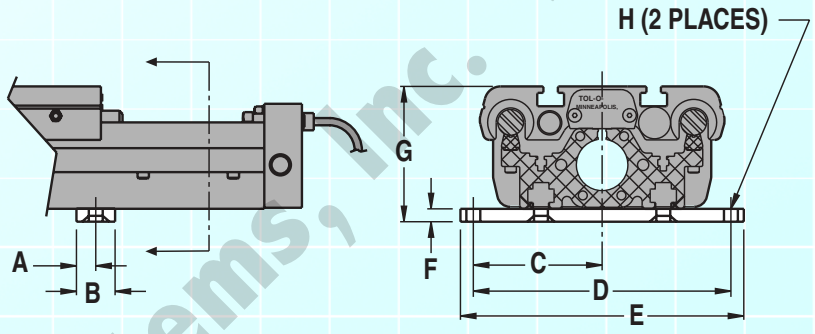


Base mounting linear slides may be accomplished by fastening directly to "T" slot nuts provided in the base of the slide or by using the base mounting plates shown below. These plates are also used as a mounting surface when using tube supports (see chart at the bottom of this page).

NOTE: Four "T"nuts are standard for up to 24 inches of stroke. Two "T"nuts are added for every additional 20 inches of stroke.

DIMENSIONAL DATA

2D CAD AVAILABLE AT WWW.TOLOMATIC.COM



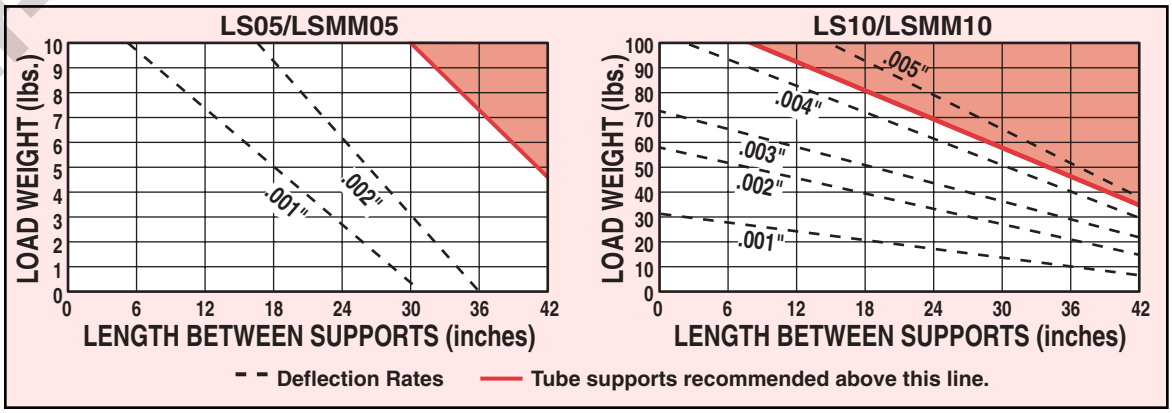
MODEL	BORE	A	B	C	D	E	F	G	H
LS05	0.50	0.38	0.75	1.6	3.3	3.6	0.25	1.6	.156 Dia.
LS10	1.00	0.38	0.75	2.5	5	5.5	0.25	2.63	.270 Dia.

Above Dimensions in Inches

MODEL	BORE	A	B	C	D	E	F	G	H
LSMM05	12	9.7	19.1	41.4	82.6	92.2	6.4	39.6	3.96 Dia.
LSMM10	25	9.7	19.1	63.5	127	139.7	6.4	66.8	6.86 Dia.

Above Dimensions in Millimeters

Supports



LS - ORDERING

CONFIGURATOR EXAMPLE

MODEL, BORE, AND STROKE | **ACCESSORIES AND OPTIONS**

1.		2.		3.								4.												
L	S			1	0	S	K		2	4	.	8	7	5	S	H	2	B	T	2							

In the example shown above, the order is configured for a standard 1"-bore linear slide with a 24 7/8" stroke, two heavy duty shock absorbers, and two Form C reed switches with a 5-meter lead.

1. MODEL TYPE

Enter:
LS for **standard**
LSMM for **metric**

2. TUBE BORE DIAMETER

Enter:
05 for **1/2"** bore
10 for **1"** bore

3. STROKE LENGTH

Enter:
SK and the desired stroke **in decimal inches***
*(72" max.; leave unused boxes blank.)

4. ACCESSORIES AND OPTIONS

Once the model, bore size and stroke have been determined you can add any of the options or accessory items shown below in any order. If the optional item indicates an "x", specify quantity.

When ordered with any LS Series model, all options and accessories listed will be factory installed unless specified. For special model and option requirements not shown, consult Tol-O-Matic, Inc.

OPTIONS AND ACCESSORIES CODES

x = Quantity (0 = Magnet and switch rail only)

Enter:

DW**	Auxiliary Carrier (with piston)
DO**	Dual Carrier (without piston)
MPx	Supports
NPx	Proximinity Sensor sinking type (NPN)
PNx	Proximinity Sensor sourcing type (PNP)
SLx §	Standard Shock, Lite Duty (ea)
SHx §	Standard Shock, Heavy Duty (ea)
BTx	Form C Reed Switch 5-meter lead.
BMx	Form C Reed Switch 5-meter lead Quick-disconnect
RTx	Form A Reed Switch 5-meter lead.
RMx	Form A Reed Switch 5-meter lead Quick-disconnect
CTx	AC Triac Reed Switch 5-meter lead
CMx	AC Triac Reed Switch 5-meter lead Quick-disconnect
KTx	Hall-Effect (Sinking) 5-meter lead
KMx	Hall-Effect (Sinking) 5-meter lead Quick Disconnect
TTx	Hall-Effect (Sourcing) 5-meter lead
TMx	Hall-Effect (Sourcing) 5-meter lead Quick Disconnect

§ *NOTE: Actuators ordered without selecting a shock absorber MUST have external stops. The LS does NOT have internal bumpers or cushions.*

When ordered with any actuator, all options and accessories listed will be factory installed unless specified. For special model and option requirements not shown, consult Tol-O-Matic, Inc.

When ordering auxiliary **carrier option, determine the minimum distance required between carriers (dimension "D" in Auxiliary Carrier Bending Moments chart, page 84). Determine your working stroke and your "D" dimension, then enter these into your configuration string. (Example: LS10SK20.00DW15.00RT2) **The configurator will calculate the overall length of the actuator.**

ORDERING PROCEDURE

LS - FIELD RETROFIT

Should field retrofitting or replacement of any available Linear Slide option or accessory be required, use the alphabetical listings in the table below to find the appropriate part number for the item desired. Specify part number and quantity when ordering.

OPTIONS AND ACCESSORIES	LS 05	LS 10	LSMM05	LSMM10
Base Mounting Plates	0605-9010	0610-9010	5605-9010	5610-9010
Inductive DC Proximity Sensors[2] - 10-24 volts NPN No Sink	0605-1023	0610-1023	0605-1023	0610-1023
Inductive DC Proximity Sensors[2] - 10-24 volts PNP No Source	0605-1024	0610-1024	0605-1024	0610-1024
*Switch Rail and Rail Hardware (specify stroke)	0605-9100	0610-9100	0605-9100	0610-9100
*Switch Kit - Hardware Only	0605-9999	0610-9999	0605-9999	0610-9999
Shock Absorbers Field Retrofit Kit[1,3] - Heavy Duty	0605-9009	0610-9023	0605-9009	0610-9023
Shock Absorbers Field Retrofit Kit[1,3] - Lite Duty	0605-9008	0610-9022	0605-9008	0610-9022
T-Nuts (Each)	0605-1042	0610-1042	5605-1042	5610-1042

1 Shock Absorber Kits contain one shock and mounting hardware.

2 Proximity Sensors for the LS05 have 5mm thread size; LS10 have 8mm thread size.

3 NOTE: Actuators ordered without selecting a shock absorber MUST have external stops. The LS does NOT have internal bumpers or cushions.

KIT (HARDWARE & SWITCH)	DESCRIPTION	SWITCH ONLY (NO HARDWARE)
BT	Form C Reed Switch with 5 meter lead	3600-9084
BM	Form C Reed Switch with Quick-disconnect Coupler (Male)	3600-9085
RT	Form A Reed Switch with 5 meter lead	3600-9082
RM	Form A Reed Switch with Quick-disconnect Coupler (Male)	3600-9083
CT	ac Triac Reed Switch with 5 meter lead	3600-9086
CM	ac Triac Reed Switch with Quick-disconnect Coupler (Male)	3600-9087
KT	Hall-effect (Sinking) Switch with 5 meter lead	3600-9090
KM	Hall-effect (Sinking) Switch with Quick-disconnect Coupler (Male)	3600-9091
TT	Hall-effect (Sourcing) Switch with 5 meter lead	3600-9088
TM	Hall-effect (Sourcing) Switch with Q-D Coupler (Male)	3600-9089
	Connector (Female) 5 meter lead	2503-1025

OPTION	MODEL				SWITCH	
S	W	L	S	1	0	R	T

To order field retrofit switch and hardware kits for all Tol-O-Matic actuators: SW (Then the model and bore size, and type of switch needed)

Example: SWLS10RT
(Hardware and Form A Reed switch with 5 meter lead for 1.0" bore LS linear slide)

Because this switch is replacing an older style switch, a switch rail and rail hardware kit #0610-9100 also needs to be ordered.

*Field Retrofit Switches

- Replacing an existing switch on actuator manufactured AFTER 7/1/97:
  Order from part numbers on table above
- Replacing an existing switch on actuator manufactured BEFORE 7/1/97:
  Order via configurator code at left. (NOTE: Also order switch rail.)
- Adding switch to an actuator that has not had a switch in the past:
  Order via configurator code at left. (NOTE: Also order switch rail.)

(NOTE: If replacing a quick-disconnect switch manufactured before 7-1-97 it will also be necessary to replace or rewire the female-end coupler with the in-line splice. See page 175.