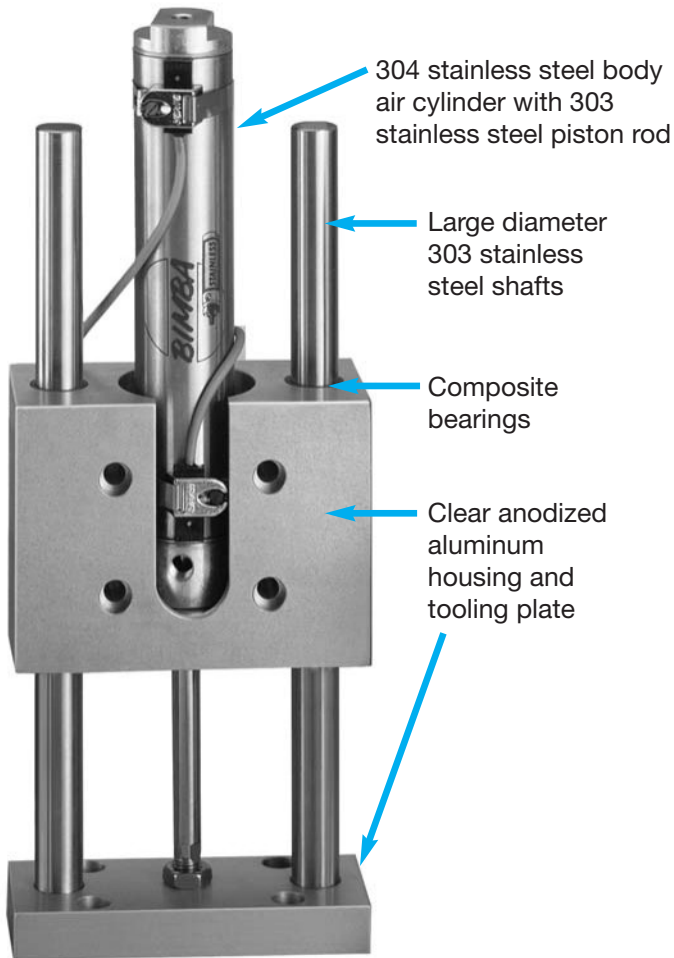


# Bimba Linear Thrusters

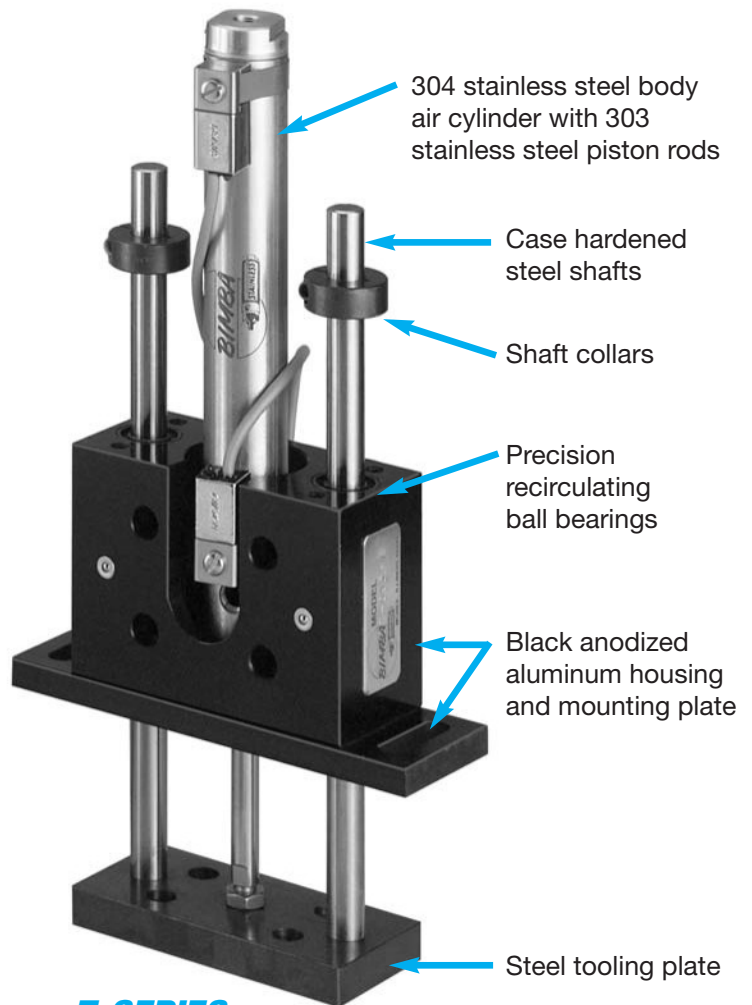
## ADVANTAGES

- Bimba stainless steel body air cylinders for long, reliable life.
- Optional magnetic piston for use with Hall Effect or Magnetic Reed Switches. (Hall Effect Switch not available for 9/16" bore.)
- Optional adjustable cushions for smooth deceleration of load at end of stroke. (Not available for 9/16".)
- Optional internal or external bumpers to absorb shock or adjust stroke.
- Easily accessible ports.
- Choice of TE (composite bearing) and T (ball bearing).



## TE SERIES

- Large diameter stainless steel shafts (hard chrome plated carbon steel on 2-1/2" and 3" bores).
- Mounting plate and shaft collars optional.
- High-strength composite bearing made of fiber-imbedded plastic.
- Composite bearing may perform better in certain environments (for example, dust or lint).
- Composite bearing/stainless steel shaft combination is ideal for corrosive environments.
- High load capabilities.



## T SERIES

- Less friction
- High precision
- Easily accessible lubrication ports
- Mounting plate and shaft collars standard

# Bimba Extruded Linear Thrusters



The Bimba Extruded Thruster is a rugged, guided actuator with a cylinder integral to the thruster block. The sleek body incorporates switch mounting, for a clean, space-efficient package.

## How to Order

The model number for Extruded Linear Thrusters consists of three alphanumeric clusters. These designate product type, bore size and stroke length, and options.

Please note the following features are standard, and are included in all model numbers: E (inch-series threading), and M (magnet for position sensing).

Model	
ET	Extruded Thruster Extended Shafts; 4 bushings
ETS	Extruded Thruster Shafts Flush; 2 bushings
ETD	Extruded Thruster Double-end; Saddle Mount

Bore Sizes
12 - 12mm
16 - 16mm
20 - 20mm
25 - 25mm
32 - 32mm

Options	
U.S. Customary Units	
<b>E</b>	Inch Series Porting/Mounting <b>*Standard; included in all model numbers</b>
External Bumpers	
<b>EB</b>	External Bumpers, Retract
<b>EB1</b>	External Bumpers, Extend
<b>EB2</b>	External Bumpers, Both Ends
ETS - EB available only	
No Stroke Reduction with Bumpers	
Extend Bumpers include One Set of Collars	
Shock Absorbers	
<b>K__</b>	First _ will be: 1-Both Ends 2-Extend Only 3-Retract Only
	Second _ will be: 1-Light Duty 2-Medium Duty 3-Heavy Duty
ETS - K3 available only (retract only)	
See Minimum Stroke Note in Stroke Table	
Magnetic Position Sensing	
<b>M</b>	MRS Position Sensing <b>*Standard; included in all model numbers</b>
Alternate Port Location	
<b>P</b>	Ports on Top Surface Must be specified if Option X is ordered
Fluoroelastomer Seals	
<b>V</b>	High Temperature (0 to 275 deg F)
Ball Bushings	
<b>X</b>	Ball Bushings and Hardened Shafts Must specify Option P with X Option

**ET - 16100 - EK12M**

Standard Stroke Lengths 5mm Increments to 255mm		
Exceptions		
ET with Option X (Ball Bearings)	ET with Option K (Shock Absorbers)	ETD with Option X Only 2 Bushings (not 4) when stroke is less than
Minimum Stroke Length		
26mm	N/A	26mm
26mm	N/A	26mm
26mm	N/A	26mm
39mm	16mm	39mm
42mm	45mm	42mm

## List Prices

Model Type	12mm	16mm	20mm	25mm	32mm
ET (extended shafts, 4 bushings)	\$136.80	\$148.05	\$158.35	\$178.65	\$234.80
add per 5mm stroke	0.65	0.75	0.80	0.85	1.20
ETS (shafts flush, 2 bushings)	134.05	145.15	155.20	175.10	230.15
add per 5mm stroke	0.60	0.65	0.70	0.75	1.00
ETD (double-end, saddle mount)	150.50	162.95	174.20	196.55	258.30
add per 5mm stroke	0.65	0.75	0.80	0.85	1.20

Options	12mm	16mm	20mm	25mm	32mm
EB (External Bumpers, Retract)	6.60	6.60	8.80	10.95	13.15
EB1 (External Bumpers, Extend)	19.70	19.70	24.05	29.00	32.80
EB2 (External Bumpers, Both Ends)	26.25	26.25	32.80	39.90	45.90
K__ (Shock Absorbers); Per End	90.30	114.30	127.75	142.00	153.55
V (High Temperature Seals)	11.35	13.50	13.60	15.60	17.85
X (Ball Bushings) ETS	54.60	54.60	65.55	68.25	79.50
X (Ball Bushings) ET and ETD	109.20	109.20	131.05	136.50	158.95

No Charge Options: P  
Included as Standard in Base: E, M

# Bimba Extruded Linear Thrusters

## Engineering Specifications

Maximum Operating Pressure	140 psi (10 bar)
Temperature Range	15 to 160 degrees F (-10 to 70 degrees C)
Expected Service Life	1,500 miles (with filtered, lubricated air)
Cylinder Lubrication	PTFE grease

Theoretical Cylinder Forces  
 FORCE = Power Factor (PF) x Input Pressure  
 PF x bar = kg; PF x psi = pounds

Bore	Input = PSI		Input = Bar	
	PF Extend	PF Retract	PF Extend	PF Retract
12mm	0.2	0.1	1.1	0.8
16mm	0.3	0.2	2.0	1.5
20mm	0.5	0.4	3.1	2.4
25mm	0.8	0.6	4.9	3.8
32mm	1.2	0.9	8.0	6.0

Tooling Plate Endplay  
 Maximum Tooling Plate Movement  
 in Unloaded Condition (values in inches)

ETS; with Standard Bearings

Bore	25mm	50mm	75mm	100mm	125mm	150mm	175mm	200mm	225mm	250mm	275mm
12mm	0.017	0.025	0.033	0.041	0.050	0.058	0.066	0.075	0.083	0.091	0.100
16mm	0.017	0.025	0.033	0.041	0.050	0.058	0.066	0.075	0.083	0.091	0.100
20mm	0.015	0.023	0.030	0.037	0.045	0.052	0.059	0.067	0.074	0.081	0.089
25mm	0.013	0.019	0.024	0.030	0.035	0.041	0.046	0.052	0.057	0.063	0.069
32mm	0.012	0.017	0.022	0.026	0.031	0.036	0.041	0.045	0.050	0.055	0.059

ETS; with Ball Bearings

Bore	25mm	50mm	75mm	100mm	125mm	150mm	175mm	200mm	225mm	250mm	275mm
12mm	0.006	0.008	0.011	0.013	0.016	0.018	0.020	0.023	0.025	0.028	0.030
16mm	0.006	0.008	0.011	0.013	0.016	0.018	0.020	0.023	0.025	0.028	0.030
20mm	0.006	0.009	0.011	0.014	0.016	0.019	0.021	0.024	0.027	0.029	0.032
25mm	0.005	0.006	0.008	0.009	0.011	0.013	0.014	0.016	0.018	0.019	0.021
32mm	0.006	0.007	0.009	0.011	0.013	0.015	0.016	0.018	0.020	0.022	0.024

ET and ETD; with Standard Bearings

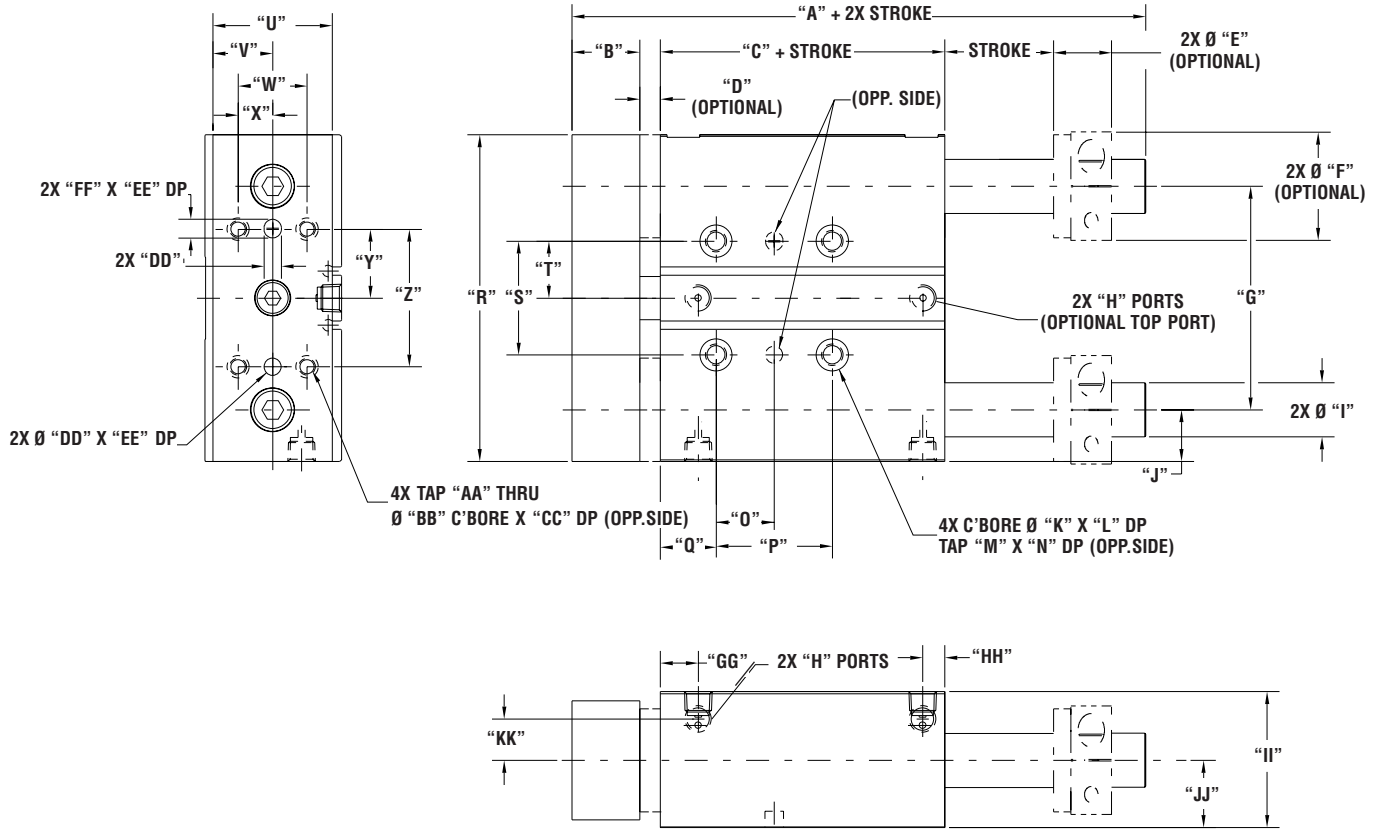
Bore	25mm	50mm	75mm	100mm	125mm	150mm	175mm	200mm	225mm	250mm	275mm
12mm	0.005	0.005	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
16mm	0.005	0.005	0.005	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
20mm	0.005	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.007
25mm	0.005	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
32mm	0.006	0.006	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007

ET and ETD; with Ball Bearings

Endplay on all ET and ETD Thrusters with Option "X" not to exceed .003"

# Bimba Extruded Linear Thrusters

## Dimensions - ET



Bore	A	B	C	D	E	F	G	H	I
12mm	3.20	.55	1.66	.25	.60	.95	2.00	#10-32	.39 (10mm)
16mm	3.36	.55	1.81	.25	.60	.95	2.00	#10-32	.39 (10mm)
20mm	3.79	.62	1.91	.25	.68	1.10	2.50	1/8 NPT	.47 (12mm)
25mm	3.90	.79	1.96	.25	.76	1.34	2.75	1/8 NPT	.63 (16mm)
32mm	4.43	.98	2.21	.25	.84	1.57	3.25	1/8 NPT	.79 (20mm)

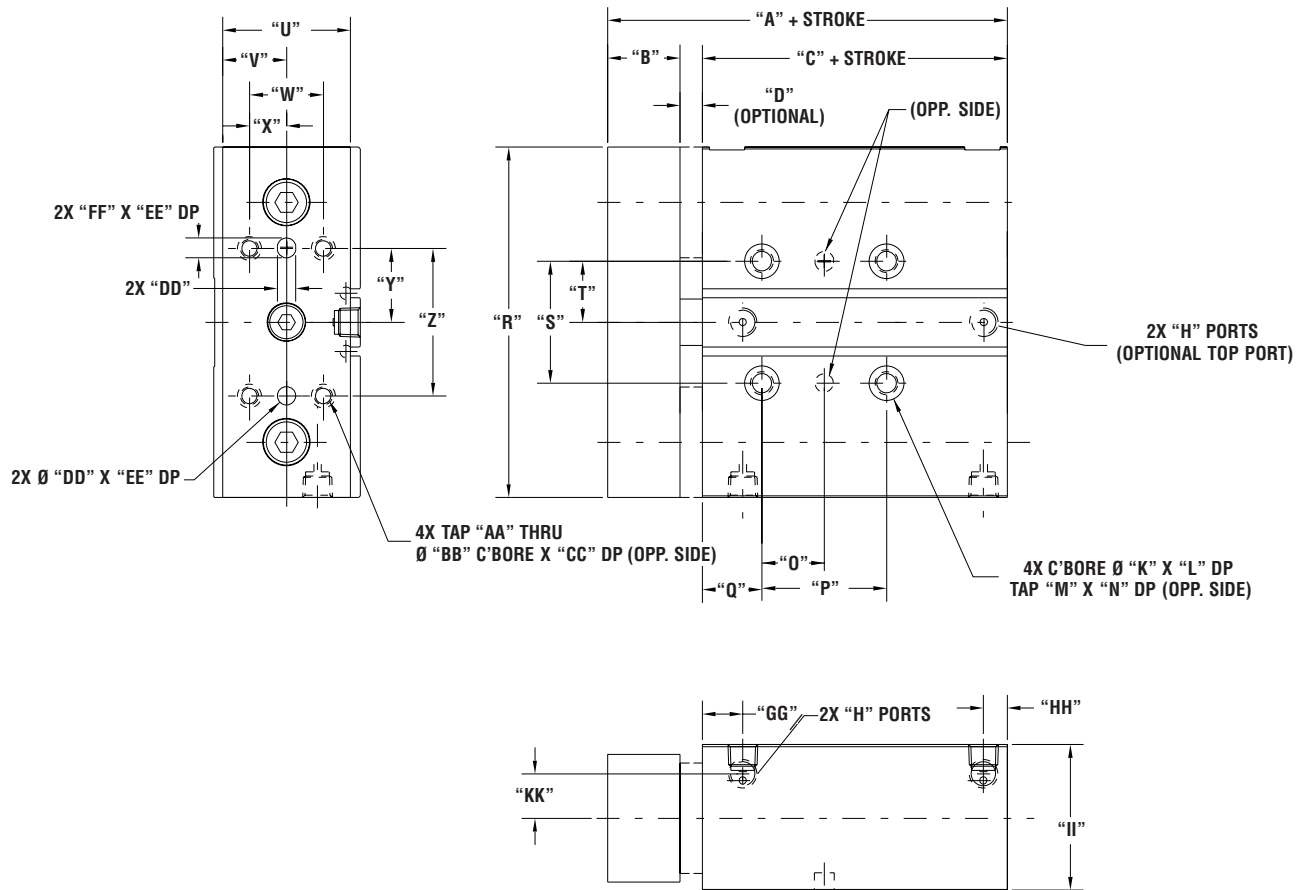
Bore	J	K	L	M	N	O	P	Q	R	S
12mm	.43	.28	.16	#10-32	.50	.44	.88	.63	2.85	1.00
16mm	.43	.28	.16	#10-32	.50	.53	1.06	.65	2.85	1.00
20mm	.50	.38	.21	1/4-20	.63	.63	1.25	.79	3.50	1.39
25mm	.62	.38	.21	1/4-20	.63	.75	1.50	.79	3.99	1.39
32mm	.75	.47	.26	5/16-18	.77	.84	1.69	.85	4.75	1.65

Bore	T	U	V	W	X	Y	Z	AA	BB	CC
12mm	.50	.86	.43	.50	.25	.50	1.00	#8-32	.25	.20
16mm	.50	.86	.43	.63	.31	.63	1.25	#8-32	.25	.20
20mm	.69	1.10	.55	.75	.38	.75	1.50	#10-32	.28	.20
25mm	.69	1.30	.65	.88	.44	.88	1.75	#10-32	.28	.30
32mm	.82	1.73	.87	1.00	.50	1.00	2.00	1/4-20	.33	.44

Bore	DD	EE	FF	GG	HH	II	JJ	KK
12mm	.16	.14	.20	.48	.19	.98	.45	.37
16mm	.19	.20	.24	.51	.19	1.11	.45	.37
20mm	.19	.20	.24	.57	.32	1.36	.57	.49
25mm	.25	.24	.28	.57	.32	1.49	.73	.50
32mm	.25	.24	.28	.63	.32	1.98	.98	.58

# Bimba Extruded Linear Thrusters

## Dimensions - ETS



Bore	A*	B	C	D	H	K	L	M	N	O
12mm	2.21	.55	1.66	.25	#10-32	.28	.16	#10-32	.50	.44
16mm	2.36	.55	1.81	.25	#10-32	.28	.16	#10-32	.50	.53
20mm	2.53	.62	1.91	.25	1/8 NPT	.38	.21	1/4-20	.63	.63
25mm	2.75	.79	1.96	.25	1/8 NPT	.38	.21	1/4-20	.63	.75
32mm	3.19	.98	2.21	.25	1/8 NPT	.47	.26	5/16-18	.77	.84

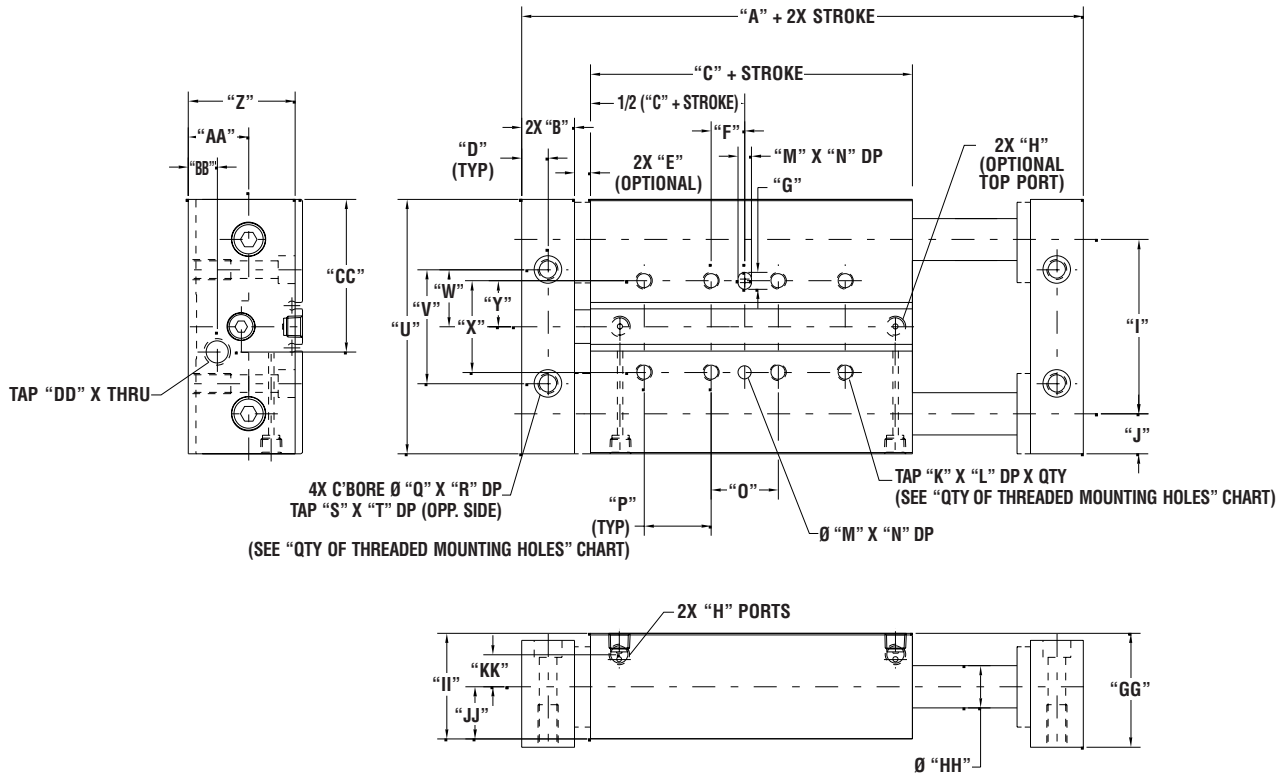
Bore	P	Q	R	S	T	U	V	W	X	Y
12mm	.88	.63	2.85	1.00	.50	.86	.43	.50	.25	.50
16mm	1.06	.65	2.85	1.00	.50	.86	.43	.63	.31	.63
20mm	1.25	.79	3.50	1.39	.69	1.10	.55	.75	.38	.75
25mm	1.50	.79	3.99	1.39	.69	1.30	.65	.88	.44	.88
32mm	1.69	.85	4.75	1.65	.82	1.73	.87	1.00	.50	1.00

Bore	Z	AA	BB	CC	DD	EE	FF	GG	HH	II	KK
12mm	1.00	#8-32	.25	.20	.16	.14	.20	.48	.19	.98	.37
16mm	1.25	#8-32	.25	.20	.19	.20	.24	.51	.19	1.11	.37
20mm	1.50	#10-32	.28	.20	.19	.20	.24	.57	.32	1.36	.49
25mm	1.75	#10-32	.28	.30	.25	.24	.28	.57	.32	1.49	.50
32mm	2.00	1/4-20	.33	.44	.25	.24	.28	.63	.32	1.98	.58

\*Optional bumpers (EB) add .25" to overall length

# Bimba Extruded Linear Thrusters

## Dimensions - ETD



Bore	A*	B	C	D	E	F	G	H	I
12mm	2.76	.55	1.66	.28	.25	.44	.20	#10-32	2.00
16mm	2.91	.55	1.81	.28	.25	.53	.24	#10-32	2.00
20mm	3.16	.62	1.91	.31	.25	.63	.24	1/8 NPT	2.50
25mm	3.54	.79	1.96	.39	.25	.75	.28	1/8 NPT	2.75
32mm	4.18	.98	2.21	.49	.25	1.69	.28	1/8 NPT	3.25

Bore	J	K	L	M	N	O	P**	Q	R	S
12mm	.43	#10-32	.50	.16	.14	.88	.88	.36	.19	1/4-28
16mm	.43	#10-32	.50	.19	.20	1.06	1.00	.43	.26	5/16-24
20mm	.50	1/4-20	.63	.19	.20	1.25	1.25	.43	.27	5/16-24
25mm	.62	1/4-20	.63	.25	.24	1.50	1.50	.52	.32	3/8-24
32mm	.75	5/16-18	.77	.25	.24	1.69	1.69	.52	.32	3/8-24

Bore	T	U	V	W	X	Y	Z	AA	BB	CC
12mm	.49	2.85	1.31	.66	1.00	.50	.84	.56	.28	1.13
16mm	.50	2.85	1.26	1.00	1.00	.50	.84	.56	.26	1.16
20mm	.68	3.50	1.69	1.25	1.39	.69	1.08	.64	.31	1.31
25mm	.58	3.99	1.76	1.38	1.39	.69	1.28	.95	.35	2.41
32mm	.80	4.75	2.13	1.63	1.65	.83	1.71	1.12	.41	1.83

Bore	DD	EE	FF	GG	HH	II	JJ	KK
12mm	M8 x 1.0	.48	.19	1.09	.39 (10mm)	.98	.45	.37
16mm	M8 x 1.0	.51	.19	1.22	.39 (10mm)	1.11	.45	.37
20mm	M10 x 1.0	.57	.32	1.43	.47 (12mm)	1.36	.57	.49
25mm	M12 x 1.0	.57	.32	1.70	.63 (16mm)	1.48	.73	.50
32mm	M14 x 1.0	.63	.32	2.12	.79 (20mm)	1.98	.98	.58

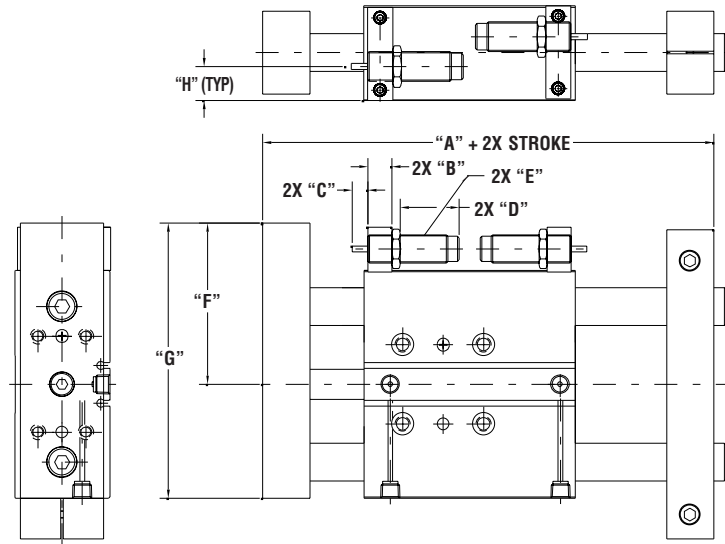
### \*\*Quantity of Threaded Mounting Holes

Bore	4	8	12	16	20	24
	<i>For stroke lengths (mm):</i>					
12mm	13.5 - 57.9	58.0 - 102.3	102.4 - 146.8	146.9 - 191.2	191.3 - 235.7	235.8 - 254.0
16mm	16.0 - 69.6	69.7 - 123.6	123.7 - 177.6	177.7 - 231.6	231.7 - 254.0	N/A
20mm	26.0 - 89.3	89.4 - 152.8	152.9 - 216.3	216.4 - 254.0	N/A	N/A
25mm	31.0 - 107.0	107.1 - 183.2	183.3 - 254.0	N/A	N/A	N/A
32mm	33.0 - 118.6	118.7 - 203.6	203.7 - 254.0	N/A	N/A	N/A

\*Optional bumpers (EB, EB1, EB2) add .25" per end to overall length

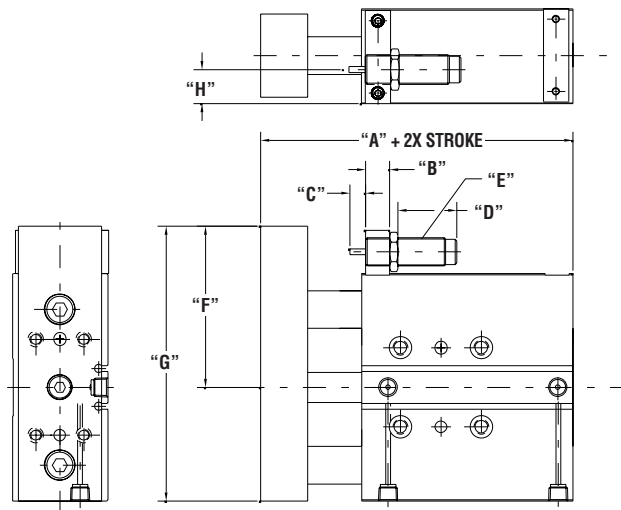
# Bimba Extruded Linear Thrusters

## Dimensions Options-ET with Shock Absorbers



Bore	A	B	C	D	E	F	G	H
12mm	3.20	0.23	0.06	0.89	M8 x 1.0	1.91	3.34	0.20
16mm	3.36	0.23	0.06	0.89	M8 x 1.0	1.91	3.34	0.33
20mm	3.79	0.31	0.11	0.82	M10 x 1.0	2.42	4.17	0.79
25mm	3.90	0.39	0.12	1.57	M12 x 1.0	2.71	4.70	0.36
32mm	4.43	0.47	0.10	2.77	M14 x 1.0	3.23	5.60	0.56

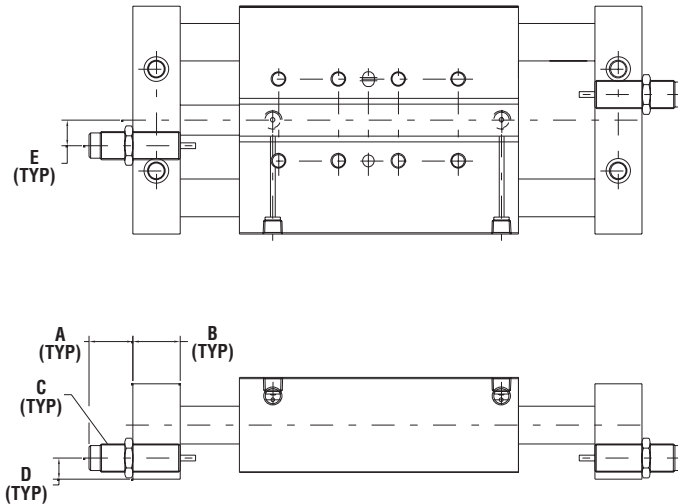
## Dimensions Options-ETS with Shock Absorbers



Bore	A	B	C	D	E	F	G	H
12mm	2.46	0.23	0.06	0.89	M8 x 1.0	1.91	3.34	0.20
16mm	2.61	0.23	0.06	0.89	M8 x 1.0	1.91	3.34	0.33
20mm	2.78	0.31	0.11	0.82	M10 x 1.0	2.42	4.17	0.79
25mm	3.00	0.39	0.12	1.57	M12 x 1.0	2.71	4.70	0.36
32mm	3.44	0.47	0.10	2.77	M14 x 1.0	3.23	5.60	0.56

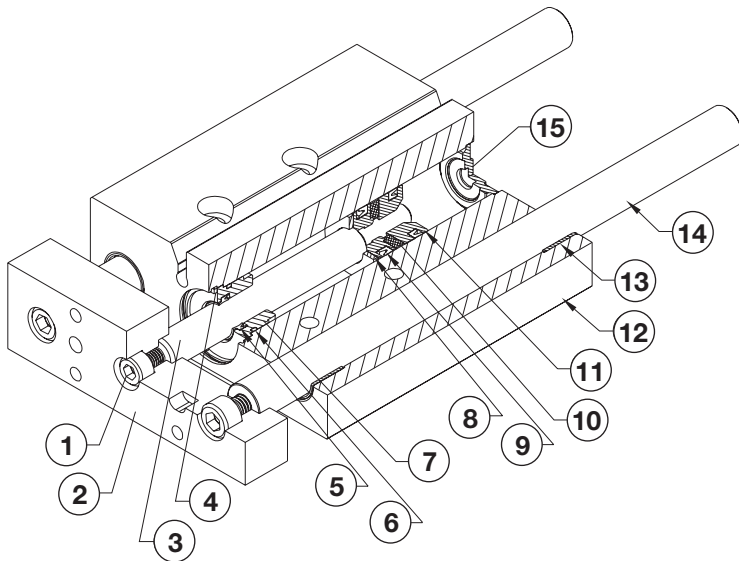
# Bimba Extruded Linear Thrusters

## Dimensions Options-ETD with Shock Absorbers



Bore	A	B	C	D	E
12mm	0.57	0.55	M8 x 1.0	0.28	0.30
16mm	0.57	0.55	M8 x 1.0	0.26	0.27
20mm	0.51	0.62	M10 x 1.0	0.31	0.44
25mm	1.17	0.79	M12 x 1.0	0.35	0.42
32mm	2.25	0.99	M14 x 1.0	0.41	0.55

## Components/Materials of Construction



Item #	Description	Material
1	Assembly Bolt	Zinc-Plated Steel
2	Tooling Plate	Anodized Aluminum
3	Piston Rod	Hard Chrome Plated Stainless Steel
4	Retaining Ring	Zinc-Plated Steel
5	Rod Seal	Nitrile (Fluoroelastomer optional)
6	Rod Guide Seal	Nitrile (Fluoroelastomer optional)
7	Rod Guide	Anodized Aluminum
8	Bumper	Urethane
9	Piston Seal	Nitrile (Fluoroelastomer optional)
10	Magnet	Nitrile
11	Piston	Aluminum
12	Body	Anodized Aluminum
13	Guide Bushing	Self-Lubricating Nylon Ball Bushings optional
14	Guide Shaft	Hard Chrome Plated Stainless Steel Case Hardened Steel with X Option
15	Rear Head	Anodized Aluminum

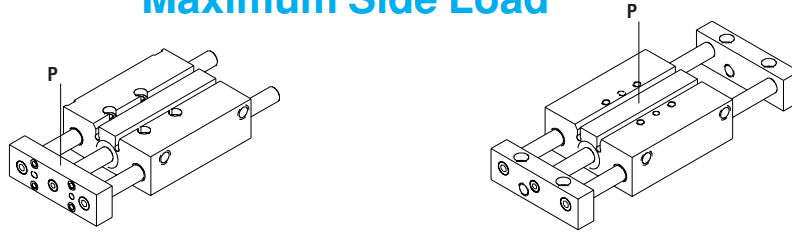
Basic Repair Kit includes: Piston Seals, Rod Seal, and Rod Guide Seal.  
Specify as K-B-ET- (bore size) - V (if applicable)

Kit	Bore				
	12mm	16mm	20mm	25mm	32mm
K-B-ET-__	\$7.75	\$8.05	\$8.85	\$9.40	\$9.95
K-B-ET-__-V	12.10	14.10	14.35	16.55	19.85



# Bimba Extruded Linear Thrusters

## Maximum Side Load



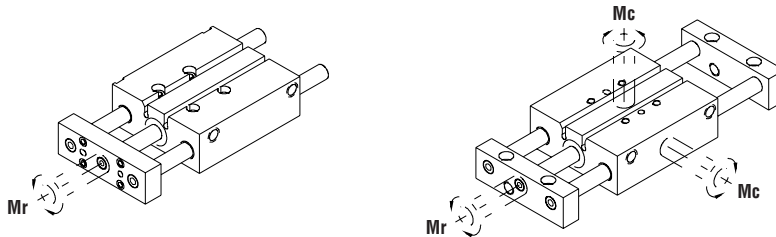
Maximum Load "P" as shown for ET, ETS, ETD  
with Standard Bearings (pounds)

Bore	ET	ETD	ETS; by Stroke										
			25mm	50mm	75mm	100mm	125mm	150mm	175mm	200mm	225mm	250mm	275mm
12mm	19	64	3.5	2.2	1.6	1.3	1.0	0.9	0.8	0.7	0.6	0.6	0.5
16mm	19	64	3.5	2.2	1.6	1.3	1.0	0.9	0.8	0.7	0.6	0.6	0.5
20mm	26	92	5.6	3.7	2.8	2.2	1.8	1.6	1.4	1.2	1.1	1.0	0.9
25mm	43	156	11.1	7.5	5.7	4.6	3.8	3.3	2.9	2.6	2.3	2.1	1.9
32mm	68	255	21.5	15.0	11.6	9.4	7.9	6.8	6.0	5.4	4.9	4.4	4.1

Maximum Load "P" as shown for ET, ETS, ETD  
with Ball Bearings, Option "X" (pounds)

For Ball Bearing model, use 2x Load Rating for Standard Bearings in above table.

## Maximum Moments



Maximum Radial Moment ( $M_r$ ) as shown for ET, ETS, ETD  
Standard Bearings (inch-pounds)

Standard Bearings

Bore	ET/ETD	ETS
12mm	64	32
16mm	64	32
20mm	115	57
25mm	214	107
32mm	414	207

For Ball Bearing model, use 2x Moment Rating for Standard Bearings in above table.

Maximum Axial ( $M_a$ ) and Cross ( $M_c$ ) Moments as shown for ETD  
Standard Bearings (inch-pounds)

ETD; by Stroke

Bore	25mm	50mm	75mm	100mm	125mm	150mm	175mm	200mm	225mm	250mm	275mm
12mm	72	104	136	168	200	232	264	296	328	360	392
16mm	77	109	141	173	205	237	269	301	332	365	370
20mm	112	158	203	250	295	341	387	433	478	525	570
25mm	184	262	340	417	495	573	650	729	806	885	960
32mm	309	437	564	690	819	947	1074	1200	1329	1457	1584

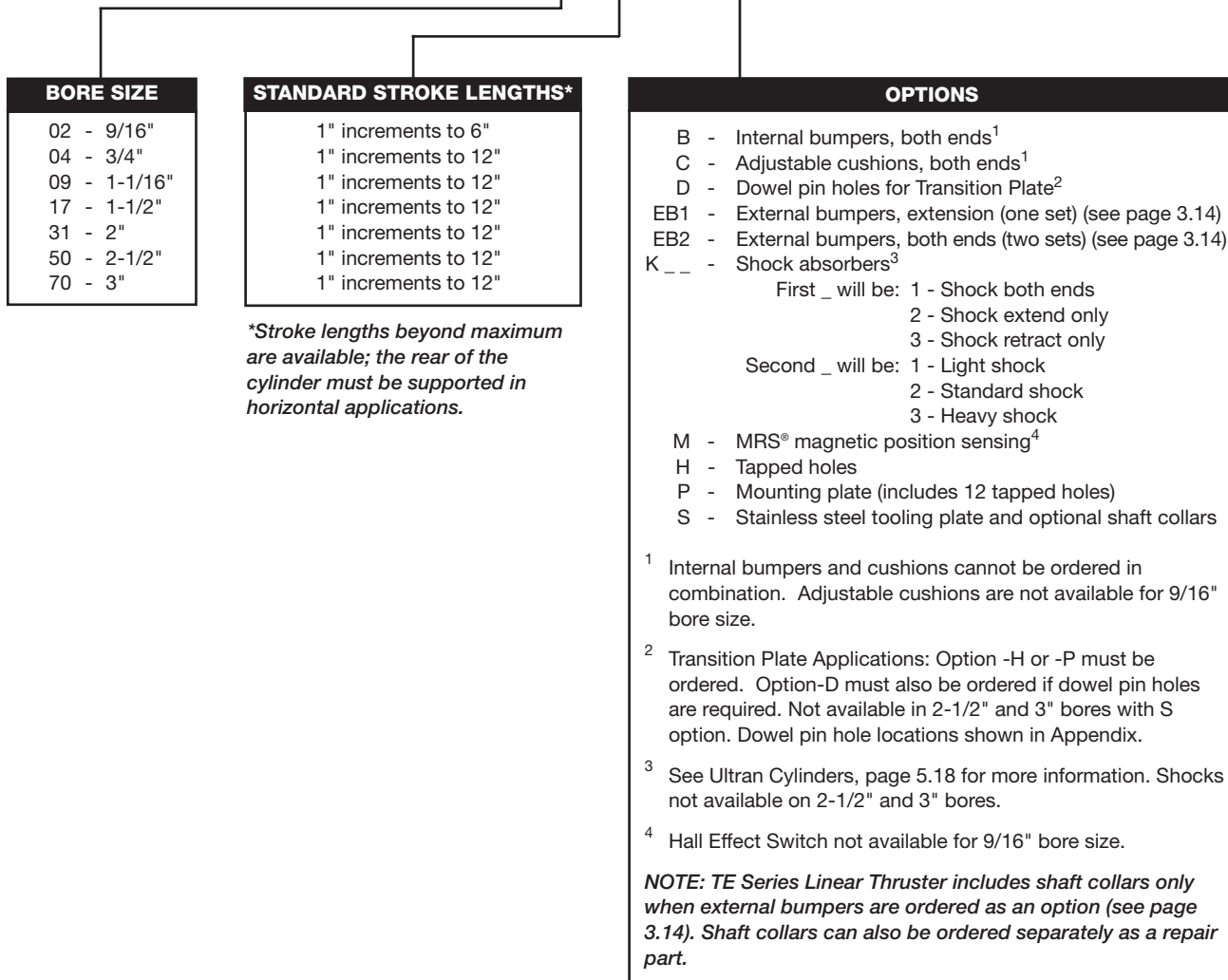
For Ball Bearing model, use 2x Moment Rating for Standard Bearings in above table.

## How to Order

The model number of all Linear Thrusters consists of three alphanumeric clusters. These designate product type, bore size and stroke length, and options. Please refer to the charts below for an example of model

number TE-098-EB1M. This is a 1-1/16" bore, 8" stroke TE series Linear Thruster with extension external bumpers and a magnet for position sensing.

### TE-098-EB1M



### Approximate Power Factors

9/16" = 0.2	For example, a TE-046-EB1M will exert a force of 0.4 times the air line pressure; a TE-173-EB1M will exert a force of 1.7 times the air pressure, etc.
3/4" = 0.4	
1-1/16" = 0.9	
1-1/2" = 1.7	
2" = 3.1	
2-1/2" = 5.0	
3" = 7.0	

# Bimba Linear Thrusters-TE Series (Composite Bearings)

## List Prices

Basic Model	Base Price by Bore Size						
	02	04	09	17	31	50	70
	9/16"	3/4"	1-1/16"	1-1/2"	2"	2-1/2"	3"
TE	\$160.85	\$174.15	\$210.15	\$298.45	\$441.85	\$719.80	\$1178.90
Adder per 1" of Stroke	3.05	3.55	4.00	5.65	7.50	6.60	7.10

Options	Adders by Bore Size						
	9/16"	3/4"	1-1/16"	1-1/2"	2"	2-1/2"	3"
B-Internal Bumpers, Both Ends	\$3.95	\$3.95	\$3.95	\$4.85	\$6.20	\$5.95	\$7.70
C-Adjustable Cushions, Both Ends	N/A	12.95	14.40	16.80	27.60	32.80	37.20
D-Dowel Pin Holes— Standard Tooling Plate	5.60	7.15	10.40	14.00	14.25	20.60	28.90
D-Dowel Pin Holes—Stainless Steel Tooling Plate	8.40	9.90	16.65	21.60	23.35	N/A	N/A
EB1-External Bumpers, Extension (1 set)	31.10	32.90	36.10	39.30	45.65	79.35	126.15
EB1-with S-Option	44.45	46.90	51.55	56.20	65.20	N/A	N/A
EB2-External Bumpers, Both Ends (2 sets)	55.65	57.35	62.30	67.15	78.05	147.75	235.85
EB2-with S-Option	79.50	81.85	89.05	95.95	111.40	N/A	N/A
H-12 Tapped Holes	6.40	6.40	6.40	7.75	8.85	28.35	40.60
K-Shock Absorbers, Per End	90.30	114.30	127.75	153.55	205.45	N/A	N/A
M-MRS Magnetic Position Sensing	9.20	9.20	11.50	13.85	16.10	15.35	27.30
P-Mounting Plate*	21.85	24.60	30.05	41.10	54.75	90.00	126.90
S-Stainless Steel Tooling Plate	35.85	39.90	53.85	61.70	114.70	339.35	404.35

\*Option P includes 12 tapped holes (option H)

## Engineering Data

- Rated 250 psi
- Low breakaway friction

### Components:

- 303 stainless steel shafts
- Clear anodized aluminum housing and tooling plate
- Plastic composite guide shaft bearings

### Cylinder:

- 304 stainless steel body
- High-strength aluminum alloy porting ends
- 303 stainless steel piston rods
- Buna N "U" cup seals
- Sintered bronze rod guide bushing

### Options:

- Internal Buna N or external urethane bumpers
- Patented adjustable cushions\*
- Buna N magnet for position sensing

\* U.S. Patent nos. 4,794,681 and 4,862,786

### Temperature Range:

Buna N seals with a temperature range of -20°F (-25°C) to 200°F (95°C) are standard in all BIMBA air cylinders. High temperature option A seals rated for higher temperature applications are available. If cylinders are operated at temperatures below 0°F for extended time periods, special modifications may be required. Special seal materials are available on request.

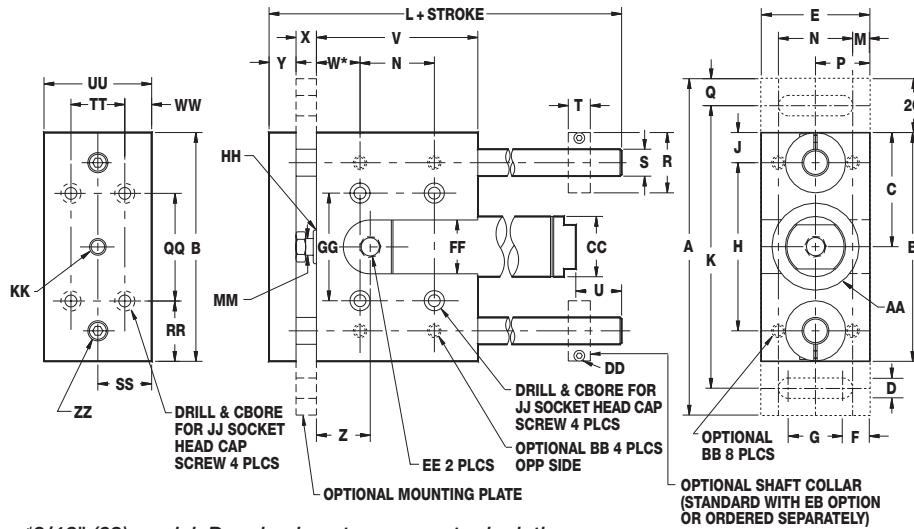
With -M option: -20°F to +185°F (-25°C to +85°C).

### Lubrication:

Air cylinders are pre-lubricated and sealed at the factory for extensive maintenance-free life. Cylinder life can be lengthened by providing additional lubricant with an air line mist lubricator or direct introduction of oil to the cylinder every 500 hours of operation. Recommended oils are medium to heavy inhibited hydraulic and general purpose oil.

# Bimba Linear Thrusters-TE Series (Composite Bearings)

## Dimensions (in.)



\*9/16" (02) model: Drawing is not an accurate depiction.

Bore	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
9/16" (02)	3.50	2.50	1.25	0.22	1.00	0.31	0.38	1.75	0.38	3.00	3.50	0.12	0.75	0.50	0.25
3/4" (04)	4.50	3.00	1.50	0.25	1.25	0.38	0.50	2.12	0.44	3.75	4.25	0.16	0.94	0.62	0.38
1-1/16" (09)	6.25	4.25	2.12	0.38	2.00	0.50	1.00	3.12	0.56	5.25	5.00	0.31	1.38	1.00	0.50
1-1/2" (17)	7.50	5.50	2.75	0.44	2.50	0.59	1.31	4.00	0.75	6.50	6.38	0.38	1.75	1.25	0.50
2" (31)	8.00	6.00	3.00	0.44	3.00	0.75	1.50	4.25	0.88	7.00	7.12	0.50	2.00	1.50	0.50
2-1/2" (50)	11.50	7.50	3.75	0.69	3.50	0.84	1.81	5.37	1.06	9.50	9.75	0.50	2.50	1.75	1.00
3" (70)	13.00	9.00	4.50	0.81	4.50	1.15	2.19	6.50	1.25	11.00	11.50	0.75	3.00	2.25	1.00

Bore	R	S	T	U	V	W	X	Y	Z	AA	BB	CC	DD	EE
9/16" (02)	0.88	0.38	0.34	0.60	2.25	1.25	0.25	0.38	0.86	0.75	8-32	0.62	6-32	10-32
3/4" (04)	1.12	0.50	0.41	0.52	2.50	0.78	0.38	0.50	0.85	1.00	10-32	0.81	8-32	1/8 NPT
1-1/16" (09)	1.31	0.62	0.44	0.98	3.00	0.81	0.38	0.62	1.00	1.50	1/4-20	1.12	10-32	1/8 NPT
1-1/2" (17)	1.50	0.75	0.50	1.57	4.00	1.12	0.50	0.75	1.38	2.00	5/16-18	1.56	1/4-28	1/8 NPT
2" (31)	1.62	0.88	0.50	1.07	4.00	1.00	0.75	1.00	1.60	2.25	5/16-18	2.08	1/4-28	1/4 NPT
2 1/2" (50)	1.87	1.13	0.50	2.20	6.00	1.75	0.75	1.25	1.45	3.00	3/8-16	2.62	1/4-28	1/4-NPT
3" (70)	2.25	1.38	0.56	3.73	7.00	2.00	1.00	1.50	1.62	3.50	1/2-13	3.12	1/4-28	3/8 NPT

Bore	FF	GG	HH	JJ	KK	MM	QQ	RR	SS	TT	UU	WW	ZZ
9/16" (02)	0.69	1.00	7/16-20	#8	10-32	0.19	1.25	0.63	0.45	0.60	0.90	0.15	#10-32
3/4" (04)	0.94	1.25	5/8-18	#10	1/4-28	0.25	1.50	0.75	0.58	0.75	1.15	0.20	1/4-20
1-1/16" (09)	1.12	1.88	5/8-18	1/4	5/16-24	0.31	2.00	1.12	0.88	1.00	1.75	0.38	5/16-18
1-1/2" (17)	1.12	2.38	3/4-16	5/16	7/16-20	0.44	3.00	1.25	1.12	1.50	2.25	0.38	3/8-16
2" (31)	1.25	2.70	1-1/4-12	5/16	1/2-20	0.62	3.00	1.50	1.38	2.00	2.75	0.38	3/8-16
2-1/2" (50)	1.50	3.50	1 3/8-12	3/8	1/2-20	0.63	3.75	1.88	1.63	2.25	3.25	0.50	1/2-13
3" (70)	1.75	4.20	1 1/2-12	1/2	5/8-18	0.75	4.50	2.25	2.00	2.75	4.00	0.63	3/4-16

Linear Thrusters ordered with adjustable cushions incorporate a side port on rear of cylinder.

# Bimba Linear Thrusters-TE Series (Composite Bearings)

## Repair Parts

Add the bore size to the basic model number shown below. For the Basic Shaft, specify the stroke length in inches and indicate options -EB1 or -EB2 as applicable. For example, shaft collars for a 1-1/16" bore Linear Thruster Series TE would be SCTE-09.

The Basic Shaft for the same thruster with 8-1/2" stroke would be BSTE-09-8.5. Cylinder repair part number corresponds to number shown on cylinder shipped with Linear Thruster.

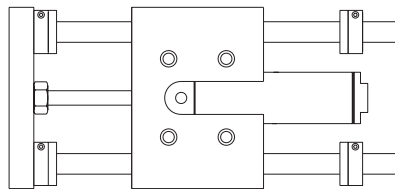
Part #	Description	Quantity
BTE-□	Shaft Bearing	4
BSTE-□	-X.XX Basic Shaft	2
EBTE-□	External Bumper	2 or 4
LT-Bore Stroke-D	Cylinder	1
LT-Bore Stroke-DB	Cylinder	1
LT-Bore Stroke-DM*	Cylinder	1
LT-Bore Stroke-DBM*	Cylinder	1
LTC-Bore Stroke-D	Cylinder	1
LTC-Bore Stroke-DM	Cylinder	1
SCTE-□	Shaft Collars	2 or 4
TNTE-□	Cylinder Lock Nut	1

\*For 1-1/16" bore use LTE prefix.

## External Bumpers

### Use and Dimensional Changes

Guide Shaft Extension with Bumpers (in.)	
Bore Size	Length Adder
9/16"	0.5
3/4"	0.5
1-1/16"	0.63
1-1/2"	0.75
2"	0.875
2-1/2"	1.38
3"	1.50



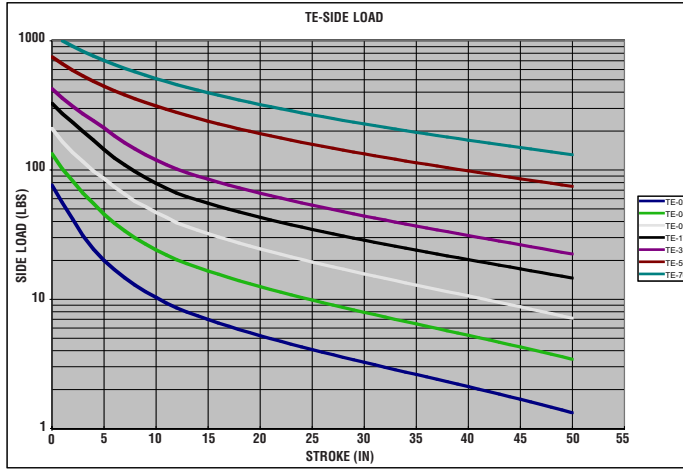
Retraction Stroke Reduction with Bumpers (in.)		
Bore Size	Reduction	
	Standard	with Mounting Plate Option
9/16"	0.34	0.59
3/4"	0.28	0.66
1-1/16"	0.31	0.69
1-1/2"	0.25	0.75
2"	0	0.75
2-1/2"	.25	1.00
3"	.31	1.31

The stroke can be adjusted with external urethane bumpers. These are available on one or both ends (-EB1 and -EB2 options). They are 1/4" thick in all bore sizes, and fit over the guide shafts at the ends of the housing (see illustration). Shaft collars are supplied with each set of bumpers to eliminate movement possible with high loads and velocities. Thus,

with -EB1 option, there will be a total of two collars; with -EB2 option, there will be four shaft collars. **Guide shafts are lengthened so stroke on extension isn't affected; however, bumpers reduce the retraction stroke (see charts above).** Higher loads and velocities may dictate the use of external means of deceleration such as shock absorbers.

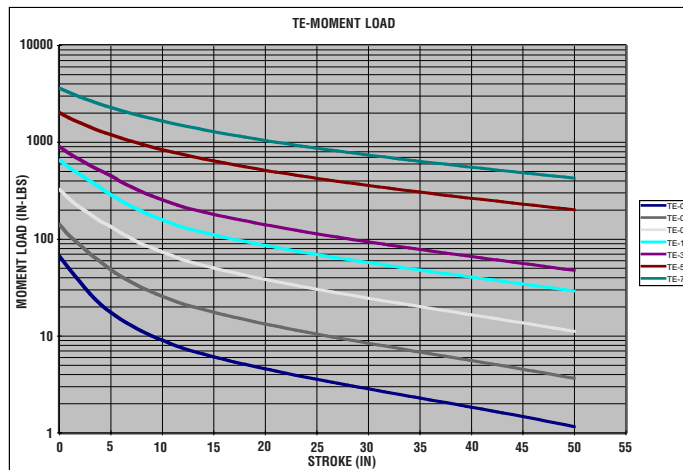
# Bimba Linear Thrusters-TE Series (Composite Bearings)

## TE - Maximum Side Loads (lbs.)



	TE-02	TE-04	TE-09	TE-17	TE-31	TE-50	TE-70
0	76.52	133.95	210.00	328.24	425.18	752.44	1000.00
1	55.80	102.00	165.60	273.00	359.17	661.79	999.87
2	41.50	82.00	136.00	233.00	310.00	590.30	905.30
3	31.00	66.00	116.00	199.00	271.00	532.45	826.67
4	24.40	55.02	98.00	170.00	240.00	484.67	760.25
5	19.96	45.50	86.00	144.00	211.67	444.52	703.38
6	16.94	38.78	74.00	124.00	183.91	410.31	654.14
7	14.65	33.77	65.00	109.00	162.33	380.80	611.07
8	12.83	29.78	57.00	97.00	145.22	355.07	573.07
9	11.44	26.71	52.00	87.00	131.26	332.44	539.30
10	10.32	24.11	47.00	79.00	119.66	312.38	509.07
11	9.30	21.99	43.00	72.00	109.74	294.46	481.85
12	8.54	20.16	39.00	66.00	101.38	278.35	457.20
13	7.95	18.81	36.46	62.03	95.03	263.80	434.78
14	7.43	17.61	34.20	58.48	89.66	250.57	414.28
15	6.96	16.53	32.17	55.27	84.80	238.50	395.47
16	6.54	15.57	30.35	52.36	80.39	227.44	378.15
17	6.16	14.70	28.69	49.71	76.36	217.25	362.13
18	5.82	13.90	27.18	47.28	72.67	207.85	347.28
19	5.51	13.18	25.79	45.05	69.26	199.14	333.46
20	5.22	12.51	24.52	42.99	66.12	191.04	320.58
21	4.95	11.89	23.34	41.08	63.20	183.49	308.53
22	4.71	11.32	22.25	39.31	60.49	176.43	297.23
23	4.48	10.79	21.23	37.66	57.96	169.82	286.62
24	4.27	10.30	20.29	36.12	55.59	163.62	276.63
25	4.07	9.84	19.40	34.67	53.37	157.77	267.21
26	3.89	9.41	18.57	33.31	51.28	152.26	258.30
27	3.71	9.00	17.79	32.03	49.32	147.06	249.87
28	3.55	8.62	17.06	30.83	47.46	142.13	241.87
29	3.39	8.25	16.36	29.69	45.70	137.46	234.28
30	3.25	7.91	15.70	28.61	44.04	133.02	227.05
31	3.11	7.59	15.08	27.58	42.46	128.79	220.17
32	2.97	7.28	14.48	26.61	40.96	124.77	213.60
33	2.85	6.98	13.92	25.68	39.52	120.93	207.32
34	2.73	6.70	13.38	24.79	38.16	117.27	201.32
35	2.61	6.43	12.86	23.95	36.85	113.76	195.58
36	2.50	6.18	12.37	23.14	35.60	110.41	190.07
37	2.40	5.93	11.90	22.37	34.41	107.19	184.78
38	2.29	5.69	11.44	21.63	33.26	104.10	179.71
39	2.20	5.47	11.01	20.91	32.16	101.13	174.82
40	2.10	5.25	10.59	20.23	31.10	98.27	170.12
41	2.01	5.04	10.19	19.57	30.08	95.52	165.60
42	1.93	4.83	9.80	18.94	29.10	92.87	161.23
43	1.84	4.64	9.42	18.33	28.15	90.32	157.01
44	1.76	4.45	9.06	17.74	27.24	87.85	152.94
45	1.68	4.26	8.71	17.17	26.35	85.47	149.01
46	1.60	4.09	8.37	16.61	25.50	83.16	145.20
47	1.53	3.91	8.04	16.08	24.67	80.93	141.52
48	1.46	3.75	7.73	15.56	23.87	78.77	137.95
49	1.39	3.58	7.42	15.06	23.09	76.67	134.49
50	1.32	3.43	7.12	14.58	22.34	74.64	131.13

## TE - Maximum Moments (in.-lbs.)

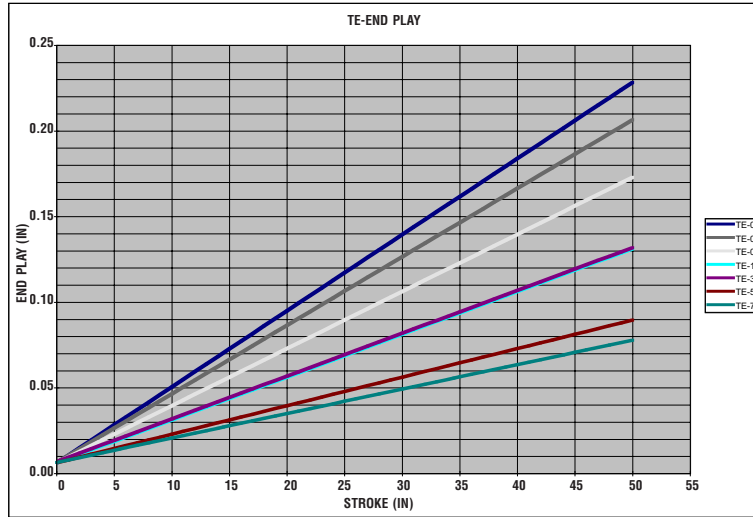


	TE-02	TE-04	TE-09	TE-17	TE-31	TE-50	TE-70
0	66.96	142.32	328.12	656.48	903.51	2022.18	3623.75
1	48.83	108.38	258.75	546.00	763.24	1778.57	3249.57
2	36.31	87.13	212.50	466.00	658.75	1586.43	2942.22
3	27.13	70.13	181.25	398.00	575.88	1430.96	2686.67
4	21.35	58.46	153.13	340.00	510.00	1302.54	2470.80
5	17.47	48.34	134.38	288.00	449.80	1194.65	2285.99
6	14.82	41.20	115.63	248.00	390.81	1102.70	2125.94
7	12.82	35.88	101.56	218.00	344.95	1023.39	1985.97
8	11.23	31.64	89.06	194.00	308.59	954.26	1862.49
9	10.01	28.38	81.25	174.00	278.93	893.44	1752.72
10	9.03	25.62	73.44	158.00	254.28	839.52	1654.47
11	8.14	23.36	67.19	144.00	233.20	791.36	1566.00
12	7.47	21.42	60.94	132.00	215.43	748.08	1485.90
13	6.95	19.98	56.97	124.07	201.93	708.96	1413.03
14	6.50	18.71	53.44	116.95	190.52	673.41	1346.42
15	6.09	17.57	50.27	110.54	180.20	640.97	1285.29
16	5.72	16.54	47.41	104.72	170.83	611.24	1228.98
17	5.39	15.62	44.82	99.42	162.27	583.87	1176.92
18	5.09	14.77	42.46	94.56	154.41	558.60	1128.65
19	4.82	14.00	40.30	90.10	147.18	535.18	1083.75
20	4.57	13.29	38.31	85.98	140.50	513.41	1041.87
21	4.34	12.64	36.47	82.17	134.30	493.13	1002.71
22	4.12	12.03	34.76	78.62	128.54	474.16	966.01
23	3.92	11.47	33.18	75.32	123.16	456.40	931.52
24	3.74	10.94	31.70	72.23	118.13	439.72	899.05
25	3.56	10.45	30.32	69.34	113.42	424.01	868.43
26	3.40	9.99	29.02	66.62	108.98	409.21	839.48
27	3.25	9.56	27.80	64.07	104.80	395.21	812.08
28	3.10	9.15	26.65	61.65	100.86	381.97	786.09
29	2.97	8.77	25.56	59.37	97.12	369.41	761.40
30	2.84	8.41	24.53	57.21	93.59	357.48	737.91
31	2.72	8.06	23.56	55.16	90.23	346.14	715.54
32	2.60	7.73	22.63	53.21	87.03	335.33	694.19
33	2.49	7.42	21.74	51.36	83.99	325.01	673.80
34	2.39	7.12	20.90	49.59	81.09	315.16	654.30
35	2.29	6.83	20.10	47.90	78.31	305.74	635.63
36	2.19	6.56	19.33	46.28	75.66	296.71	617.73
37	2.10	6.30	18.59	44.74	73.12	288.06	600.55
38	2.01	6.05	17.88	43.25	70.68	279.76	584.05
39	1.92	5.81	17.20	41.83	68.34	271.78	568.18
40	1.84	5.58	16.55	40.46	66.09	264.10	552.90
41	1.76	5.35	15.92	39.14	63.92	256.71	538.18
42	1.68	5.14	15.31	37.87	61.83	249.59	523.99
43	1.61	4.93	14.73	36.65	59.82	242.73	510.30
44	1.54	4.73	14.16	35.47	57.88	236.09	497.07
45	1.47	4.53	13.61	34.33	56.00	229.69	484.28
46	1.40	4.34	13.08	33.23	54.19	223.49	471.91
47	1.34	4.16	12.57	32.16	52.43	217.50	459.93
48	1.28	3.98	12.07	31.13	50.73	211.69	448.33
49	1.21	3.81	11.59	30.12	49.08	206.06	437.08
50	1.15	3.64	11.12	29.15	47.47	200.60	426.16

Frictional characteristics of TE Series Linear Thrusters deteriorate as stroke length increases.

# Bimba Linear Thrusters-TE Series (Composite Bearings)

## TE - Tooling Plate End Play (in.)



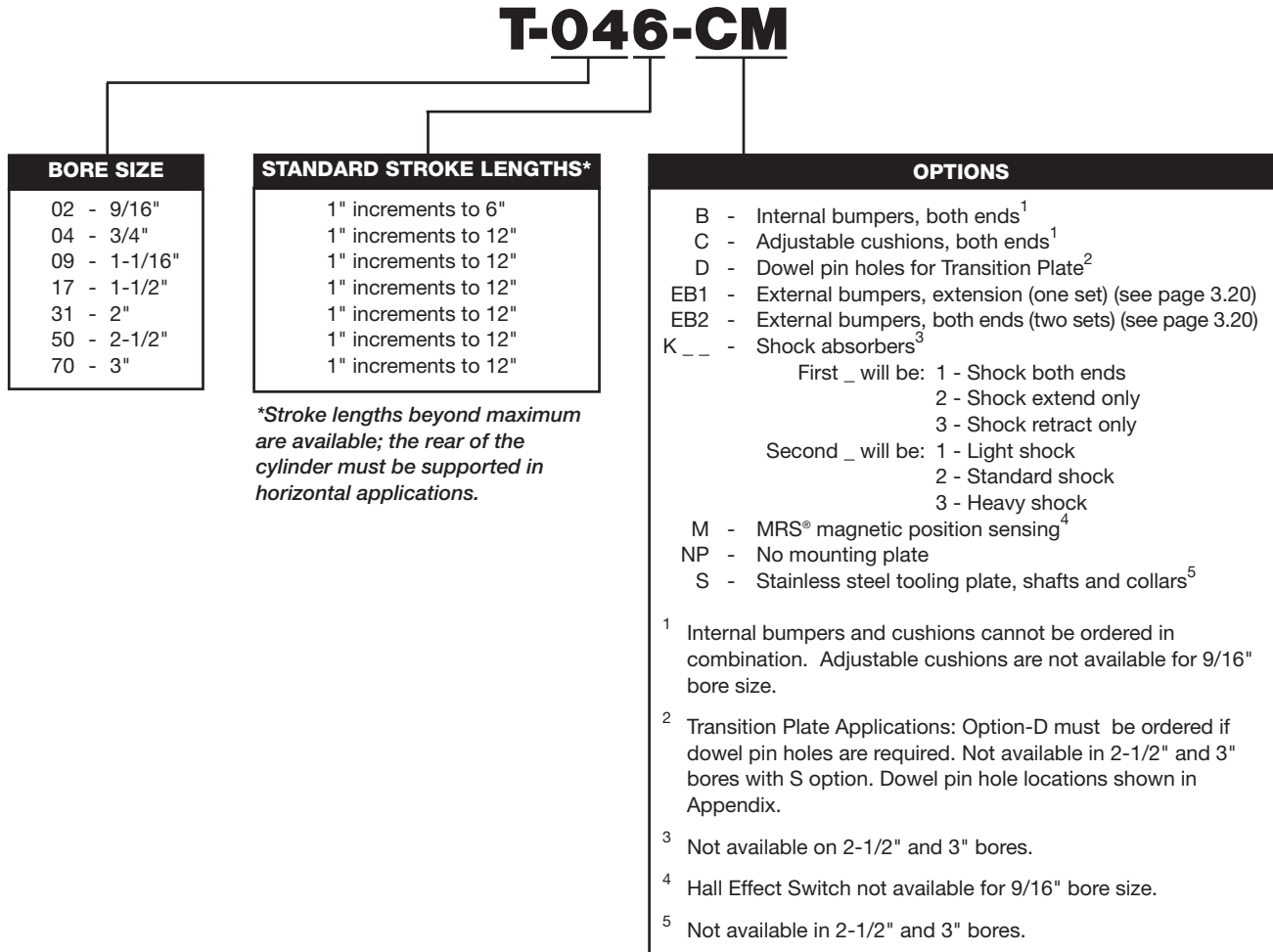
	TE-02	TE-04	TE-09	TE-17	TE-31	TE-50	TE-70
0	0.006	0.007	0.006	0.006	0.007	0.006	0.006
1	0.011	0.011	0.010	0.009	0.009	0.008	0.008
2	0.015	0.015	0.013	0.011	0.012	0.010	0.009
3	0.019	0.019	0.016	0.014	0.014	0.011	0.011
4	0.024	0.023	0.020	0.016	0.017	0.013	0.012
5	0.028	0.027	0.023	0.019	0.019	0.015	0.014
6	0.033	0.031	0.026	0.021	0.022	0.016	0.015
7	0.037	0.035	0.030	0.024	0.024	0.018	0.016
8	0.042	0.039	0.033	0.026	0.027	0.020	0.018
9	0.046	0.043	0.036	0.029	0.029	0.021	0.019
10	0.051	0.047	0.040	0.031	0.032	0.023	0.021
11	0.055	0.051	0.043	0.034	0.034	0.025	0.022
12	0.059	0.055	0.046	0.036	0.037	0.026	0.024
13	0.064	0.059	0.050	0.039	0.039	0.028	0.025
14	0.068	0.063	0.053	0.041	0.042	0.030	0.026
15	0.073	0.067	0.056	0.044	0.044	0.031	0.028
16	0.077	0.071	0.060	0.046	0.047	0.033	0.029
17	0.082	0.075	0.063	0.049	0.049	0.035	0.031
18	0.086	0.079	0.066	0.051	0.052	0.036	0.032
19	0.091	0.083	0.070	0.054	0.054	0.038	0.034
20	0.095	0.087	0.073	0.056	0.057	0.040	0.035
21	0.099	0.091	0.076	0.059	0.059	0.041	0.036
22	0.104	0.095	0.080	0.061	0.062	0.043	0.038
23	0.108	0.099	0.083	0.064	0.064	0.045	0.039
24	0.113	0.103	0.086	0.066	0.067	0.046	0.041
25	0.117	0.107	0.090	0.069	0.069	0.048	0.042
26	0.122	0.111	0.093	0.071	0.072	0.050	0.044
27	0.126	0.115	0.096	0.074	0.074	0.051	0.045
28	0.131	0.119	0.100	0.076	0.077	0.053	0.046
29	0.135	0.123	0.103	0.079	0.079	0.055	0.048
30	0.139	0.127	0.106	0.081	0.082	0.056	0.049
31	0.144	0.131	0.110	0.084	0.084	0.058	0.051
32	0.148	0.135	0.113	0.086	0.087	0.060	0.052
33	0.153	0.139	0.116	0.089	0.089	0.061	0.054
34	0.157	0.143	0.120	0.091	0.092	0.063	0.055
35	0.162	0.147	0.123	0.094	0.094	0.065	0.056
36	0.166	0.151	0.126	0.096	0.097	0.066	0.058
37	0.171	0.155	0.130	0.099	0.099	0.068	0.059
38	0.175	0.159	0.133	0.101	0.102	0.070	0.061
39	0.179	0.163	0.136	0.104	0.104	0.071	0.062
40	0.184	0.167	0.140	0.106	0.107	0.073	0.064
41	0.188	0.171	0.143	0.109	0.109	0.075	0.065
42	0.193	0.175	0.146	0.111	0.112	0.076	0.066
43	0.197	0.179	0.150	0.114	0.114	0.078	0.068
44	0.202	0.183	0.153	0.116	0.117	0.080	0.069
45	0.206	0.187	0.156	0.119	0.119	0.081	0.071
46	0.211	0.191	0.160	0.121	0.122	0.083	0.072
47	0.215	0.195	0.163	0.124	0.124	0.085	0.074
48	0.219	0.199	0.166	0.126	0.127	0.086	0.075
49	0.224	0.203	0.170	0.129	0.129	0.088	0.076
50	0.228	0.207	0.173	0.131	0.132	0.090	0.078

# Bimba Linear Thrusters-T Series (Ball Bearings)

## How to Order

The model number of all Linear Thrusters consists of three alphanumeric clusters. These designate product type, bore size and stroke length, and options. Please refer to the charts below for an example of model

number T-046-CM. This is a 3/4" bore, 6" stroke Linear Thruster with adjustable cushions and a magnet for position sensing.



### Approximate Power Factors

9/16"	=	0.2	For example, a T-046-CM will exert a force of 0.4 times the air line pressure; a T-173-M will exert a force of 1.7 times the air pressure, etc.
3/4"	=	0.4	
1-1/16"	=	0.9	
1-1/2"	=	1.7	
2"	=	3.1	
2-1/2"	=	5.0	
3"	=	7.0	



# Bimba Linear Thrusters-T Series (Ball Bearings)

## List Prices

Basic Model	Base Price by Bore Size						
	9/16"	3/4"	1-1/16"	1-1/2"	2"	2-1/2"	3"
T	\$283.75	\$316.45	\$331.35	\$467.35	\$648.85	\$1278.20	\$2422.30
Adder per 1" of Stroke	3.60	3.60	3.80	5.40	6.00	6.60	7.70

Options	Adders by Bore Size						
	9/16"	3/4"	1-1/16"	1-1/2"	2"	2-1/2"	3"
B-Internal Bumpers, Both Ends	\$3.95	\$3.95	\$3.95	\$4.85	\$6.20	\$5.95	\$7.70
C-Adjustable Cushions, Both Ends	N/A	12.95	14.40	16.80	27.60	32.80	37.20
D-Dowel Pin Holes— Standard Tooling Plate	5.60	7.15	10.40	14.00	14.25	20.60	28.90
D-Dowel Pin Holes—Stainless Steel Tooling Plate	8.40	9.90	16.65	21.60	23.35	N/A	N/A
EB1-External Bumpers, Extension (1 set)	24.55	24.55	26.25	27.85	32.40	68.15	116.55
EB1-with S-Option	34.80	34.80	38.25	45.25	55.65	N/A	N/A
EB2-External Bumpers, Both Ends (2 sets)	49.10	49.10	52.45	55.65	64.85	125.35	221.00
EB2-with S-Option	69.55	69.55	76.55	90.45	111.25	105.95	105.95
K-Shock Absorbers, Per End	90.30	114.30	127.75	153.55	205.45	N/A	N/A
M-MRS Magnetic Position Sensing	9.20	9.20	11.50	13.85	16.10	15.35	27.30
NP-No Mounting Plate (Deduct from Price)	(5.70)	(6.85)	(10.55)	(16.05)	(30.05)	(54.15)	(105.15)
S-Stainless Steel Tooling Plate, Shafts and Collars (Base Price)	81.65	110.25	128.85	182.15	281.15	N/A	N/A
Adder Per Inch of Stroke	6.00	6.20	6.70	8.00	8.90	N/A	N/A

## Engineering Data

- Rated 250 psi
- Low breakaway friction

### Components:

- Case hardened steel shafts
- Steel tooling plate and collars
- Black anodized aluminum housing and mounting plate
- Precision recirculating ball bearings

### Cylinder:

- 304 stainless steel body
- High-strength aluminum alloy porting ends
- 303 stainless steel piston rods
- Buna N "U" cup seals
- Sintered bronze rod guide bushing

### Options:

- Internal Buna N or external urethane bumpers
- Patented adjustable cushions\*
- Buna N magnet for position sensing

### Temperature Range:

Buna N seals with a temperature range of -20°F (-25°C) to 200°F (95°C) are standard in all BIMBA air cylinders. High temperature option A seals rated for higher temperature applications are available. If cylinders are operated at temperatures below 0°F for extended time periods, special modifications may be required. Special seal materials are available on request.

With -M option: -20°F to +185°F (-25°C to +85°C)

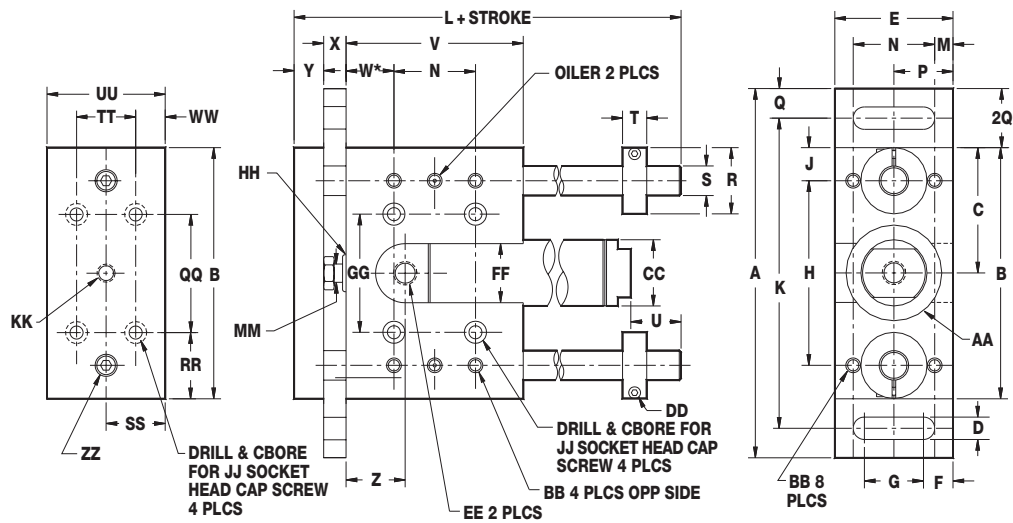
### Lubrication:

Air cylinders are pre-lubricated and sealed at the factory for extensive maintenance-free life. Cylinder life can be lengthened by providing additional lubricant with an air line mist lubricator or direct introduction of oil to the cylinder every 500 hours of operation. Recommended oils are medium to heavy inhibited hydraulic and general purpose oil.

The two spring-loaded oiler ports on the housing face should also receive several drops of the same oil every 100 hours of operation. For applications that involve rapid cycling, oil these ports more often.

# Bimba Linear Thrusters-T Series (Ball Bearings)

## Dimensions



\*9/16" (02) model: Drawing is not an accurate depiction.

Bore	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
9/16" (02)	3.50	2.50	1.25	0.22	1.00	0.31	0.38	1.75	0.38	3.00	3.50	0.12	0.75	0.50	0.25	0.62
3/4" (04)	4.50	3.00	1.50	0.25	1.25	0.38	0.50	2.12	0.44	3.75	4.12	0.16	0.94	0.62	0.38	0.88
1-1/16" (09)	6.25	4.25	2.12	0.38	2.00	0.50	1.00	3.12	0.56	5.25	4.75	0.31	1.38	1.00	0.50	1.12
1-1/2" (17)	7.50	5.50	2.75	0.44	2.50	0.59	1.31	4.00	0.75	6.50	6.25	0.38	1.75	1.25	0.50	1.31
2" (31)	9.50	7.00	3.50	0.56	4.00	1.22	1.56	5.00	1.00	8.25	7.00	0.94	2.12	2.00	0.63	1.50
2-1/2" (50)	12.50	8.50	4.25	0.63	4.50	1.25	2.00	6.25	1.13	10.50	9.50	0.94	2.63	2.25	1.00	1.75
3" (70)	15.00	11.00	5.50	0.81	6.00	1.41	3.19	8.00	1.50	13.00	11.50	1.00	4.00	3.00	1.00	2.06

Bore	S	T	U	V	W	X	Y	Z	AA	BB	CC	DD	EE	FF
9/16" (02)	0.25	0.28	0.67	2.25	1.25	0.25	0.31	0.86	0.75	8-32	0.62	4-40	10-32	0.69
3/4" (04)	0.38	0.34	0.51	2.50	0.78	0.38	0.38	0.85	0.94	10-32	0.81	6-32	1/8 NPT	0.94
1-1/16" (09)	0.50	0.41	0.85	3.00	0.81	0.38	0.50	1.00	1.62	1/4-20	1.12	8-32	1/8 NPT	1.12
1-1/2" (17)	0.62	0.44	1.44	4.00	1.12	0.50	0.75	1.50	2.12	5/16-18	1.56	10-32	1/8 NPT	1.12
2" (31)	0.75	0.50	0.95	4.00	0.94	0.75	1.00	1.60	3.00	3/8-16	2.08	1/4-28	1/4 NPT	1.25
2-1/2" (50)	1.00	0.50	2.92	6.00	1.69	0.75	1.25	1.48	3.50	3/8-16	2.62	1/4-28	1/4 NPT	1.25
3" (70)	1.25	0.50	3.75	7.00	1.50	1.00	1.50	1.88	4.63	1/2-13	3.12	1/4-28	3/8 NPT	1.25

Bore	GG	HH	JJ	KK	MM	QQ	RR	SS	TT	UU	WW	ZZ
9/16" (02)	1.00	7/16-20	#8	10-32	0.19	1.25	0.62	0.50	0.60	1.00	0.20	N/A
3/4" (04)	1.25	5/8-18	#10	1/4-28	0.25	1.50	0.75	0.62	0.75	1.25	0.25	10-32
1-1/16" (09)	1.88	5/8-18	1/4	5/16-24	0.31	2.00	1.12	1.00	1.00	2.00	0.50	1/4-20
1-1/2" (17)	2.38	3/4-16	5/16	7/16-20	0.437	3.00	1.25	1.25	1.50	2.50	0.50	3/8-16
2" (31)	3.25	1-1/4-12	3/8	1/2-20	0.625	4.00	1.50	1.50	2.00	3.00	0.50	3/8-16
2-1/2" (50)	4.10	1-3/8-12	3/8	1/2-20	0.63	4.75	1.76	2.00	3.00	4.00	N/A	1/2-13
3" (70)	5.25	1-1/2-12	1/2	5/8-18	0.75	6.00	2.50	2.00	3.00	4.00	N/A	3/4-16

Linear Thrusters ordered with adjustable cushions incorporate a side port on rear of cylinder.

# Bimba Linear Thrusters-T Series (Ball Bearings)

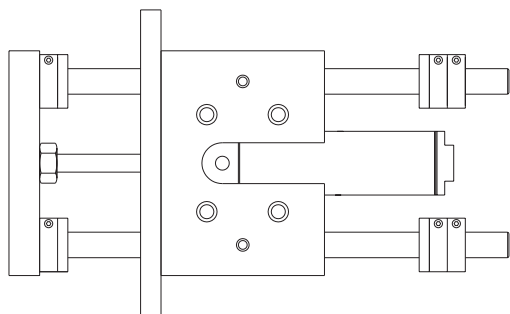
## External Bumpers

### Use and Dimensional Changes

The stroke can be adjusted with external urethane bumpers. These are available on one or both ends (-EB1 and -EB2 options). They are 1/4" thick in all bore sizes, and fit over the guide shafts at the ends of the housing (see illustration). Shaft collars are supplied with each set of bumpers to eliminate movement possible with high loads and velocities. Thus, with -EB1 option, there will be a total of four collars; with -EB2 option, there will be six shaft collars. Flat stainless steel washers are also installed to protect the shaft seals from impact damage. **Guide shafts are lengthened so stroke on extension isn't affected; however, bumpers reduce the retraction stroke if the mounting plate is used in the shipped position (see charts below).** Higher loads and velocities may dictate the use of external means of deceleration such as shock absorbers.

Guide Shaft Extension with Bumpers (in.)		Retraction Stroke Reduction with Bumpers (in.)		
Bore Size	Length Adder	Bore Size	With Mounting Plate	Without Mounting Plate
9/16"	0.5	9/16"	0.56	.31
3/4"	0.5	3/4"	0.62	.24
1-1/16"	0.63	1-1/16"	0.70	N/A
1-1/2"	0.75	1-1/2"	0.73	.25
2"	0.875	2"	0.81	N/A
2-1/2"	1.38	2-1/2"	1.06	0.31
3"	1.50	3"	1.31	0.31

**NOTE: The single set of shaft collars supplied with each Linear Thruster are for setup only. DO NOT use them to limit the stroke or damage can occur.**



## Repair Parts

Add the bore size to the basic model number shown below. For the Basic Shaft, specify the stroke length in inches and indicate options -EB1 or -EB2 and -S as applicable. For example, shaft seals for a 1-1/16" bore Linear Thruster would be S-09. The Basic Shaft for the same thruster with 8-1/2" stroke would be BS-09-8.5. Cylinder repair part number corresponds to number shown on cylinder shipped with Linear Thruster.

Part #	Description	Quantity
B-□	Shaft Bearing	4
BS-□	-X.XX Basic Shaft	2
EB-□	External Bumper Assembly	2 or 4
LT-Bore Stroke-D	Cylinder	1
LT-Bore Stroke-DB	Cylinder	1
LT-Bore Stroke-DM*	Cylinder	1
LT-Bore Stroke-DBM*	Cylinder	1
LTC-Bore Stroke-D	Cylinder	1
LTC-Bore Stroke-DM	Cylinder	1
S-□	Shaft Seal	4
SC-□	Shaft Collars	2, 4 or 6
TN-□	Cylinder Lock Nut	1

**NOTE: We recommend that if bearings are replaced, seals be replaced at the same time.**

\*For 1-1/16" bore use LTE prefix.

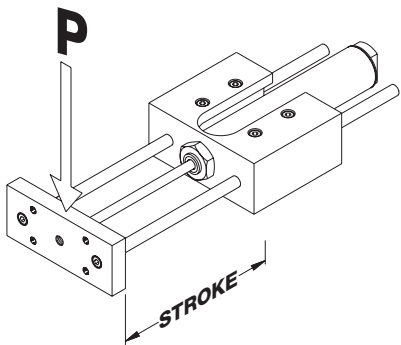
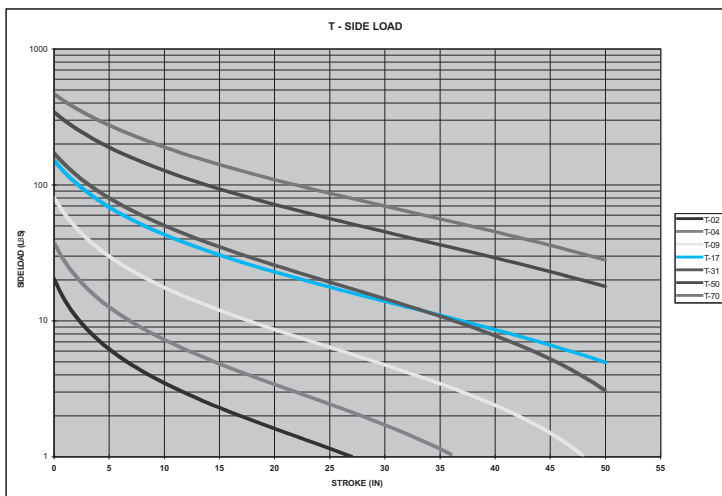
## Approximate Weights

(T and TE Series)

Bore	Base Weight (oz.)	Adder per 1" (oz.)	Mounting Plate (oz.)
9/16" (02)	13	1	1
3/4" (04)	32	2.2	2.2
1-1/16" (09)	46	5.7	5
1-1/2" (17)	154	6.3	10
2" (31)	296	8.3	32
Model T			
2-1/2" (50)	586	9.9	191
3" (70)	1048	15.2	408
Model TE			
2-1/2" (50)	400	11.7	137
3" (70)	640	17.6	265

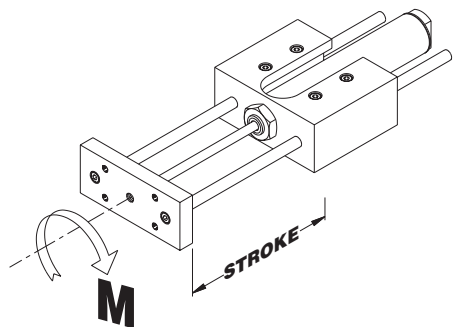
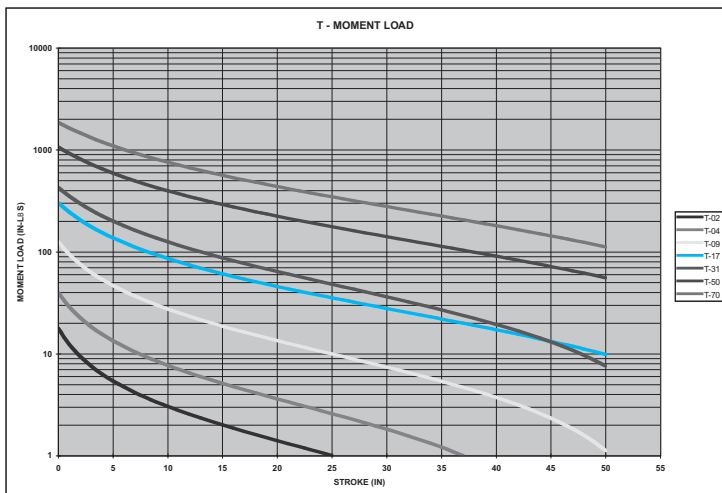
# Bimba Linear Thrusters-T Series (Ball Bearings)

## T - Maximum Side Loads (lbs.)



	T-02	T-04	T-09	T-17	T-31	T-50	T-70
0	20.34	37.49	80.50	151.62	171.30	342.37	465.67
1	14.11	27.17	60.61	122.73	140.62	295.93	410.17
2	10.76	21.23	48.46	102.88	118.91	260.13	365.92
3	8.67	17.38	40.26	88.39	102.73	231.67	329.78
4	7.24	14.66	34.34	77.34	90.19	208.50	299.70
5	6.19	12.65	29.87	68.63	80.18	189.25	274.27
6	5.40	11.09	26.37	61.58	72.00	173.00	252.46
7	4.77	9.85	23.54	55.75	65.19	159.10	233.56
8	4.26	8.83	21.22	50.86	59.41	147.06	217.00
9	3.84	7.98	19.27	46.68	54.46	136.52	202.37
10	3.48	7.26	17.61	43.07	50.16	127.22	189.34
11	3.18	6.64	16.17	39.92	46.38	118.95	177.66
12	2.91	6.10	14.92	37.14	43.04	111.54	167.13
13	2.68	5.63	13.82	34.67	40.06	104.85	157.57
14	2.48	5.21	12.83	32.47	37.39	98.80	148.86
15	2.30	4.83	11.96	30.48	34.97	93.28	140.88
16	2.13	4.49	11.16	28.67	32.77	88.23	133.54
17	1.98	4.18	10.44	27.03	30.77	83.58	126.77
18	1.85	3.90	9.79	25.53	28.92	79.30	120.49
19	1.72	3.64	9.18	24.15	27.22	75.33	114.66
20	1.61	3.40	8.63	22.87	25.65	71.64	109.22
21	1.50	3.18	8.11	21.69	24.19	68.20	104.14
22	1.41	2.98	7.64	20.59	22.83	64.99	99.37
23	1.31	2.78	7.19	19.57	21.56	61.97	94.89
24	1.23	2.60	6.78	18.61	20.37	59.14	90.67
25	1.15	2.44	6.39	17.71	19.25	56.48	86.68
26	1.07	2.28	6.02	16.86	18.20	53.96	82.91
27	1.00	2.12	5.67	16.06	17.20	51.58	79.34
28		1.98	5.34	15.31	16.26	49.32	75.94
29		1.84	5.03	14.60	15.36	47.18	72.72
30		1.71	4.74	13.92	14.51	45.14	69.64
31		1.59	4.45	13.28	13.70	43.20	66.71
32		1.47	4.18	12.66	12.93	41.35	63.90
33		1.36	3.93	12.08	12.19	39.58	61.22
34		1.25	3.68	11.52	11.48	37.89	58.64
35		1.14	3.45	10.98	10.80	36.26	56.18
36		1.04	3.22	10.47	10.15	34.70	53.80
37			3.00	9.98	9.52	33.21	51.52
38			2.79	9.50	8.92	31.77	49.33
39			2.59	9.05	8.34	30.38	47.21
40			2.39	8.61	7.78	29.05	45.16
41			2.20	8.19	7.24	27.76	43.19
42			2.02	7.78	6.72	26.51	41.28
43			1.84	7.38	6.21	25.30	39.43
44			1.67	7.00	5.72	24.14	37.64
45			1.50	6.63	5.24	23.01	35.91
46			1.33	6.27	4.78	21.91	34.22
47			1.17	5.92	4.33	20.85	32.59
48			1.02	5.58	3.89	19.82	31.00
49				5.25	3.47	18.82	29.46
50				4.93	3.05	17.84	27.95

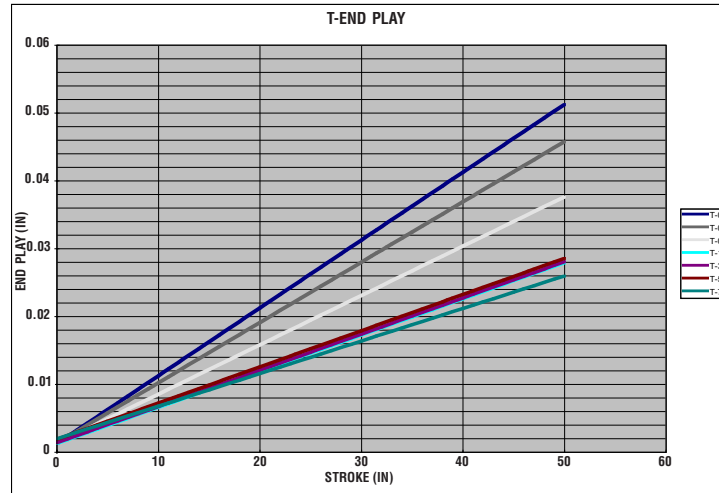
## T - Maximum Moments (in.-lbs.)



	T-02	T-04	T-09	T-17	T-31	T-50	T-70
0	17.80	39.83	125.78	303.23	428.25	1069.92	1862.69
1	12.35	28.86	94.70	245.46	351.56	924.78	1640.70
2	9.42	22.56	75.72	205.76	297.28	812.90	1463.66
3	7.59	18.46	62.90	176.78	256.83	723.97	1319.12
4	6.33	15.58	53.66	154.68	225.48	651.55	1198.81
5	5.42	13.44	46.67	137.26	200.46	591.41	1097.07
6	4.72	11.78	41.20	123.16	180.01	540.64	1009.86
7	4.17	10.46	36.79	111.51	162.96	497.18	934.23
8	3.73	9.38	33.16	101.71	148.53	459.55	868.00
9	3.36	8.48	30.11	93.36	136.15	426.62	809.47
10	3.05	7.72	27.51	86.14	125.39	397.56	757.37
11	2.78	7.06	25.27	79.84	115.96	371.71	710.65
12	2.55	6.49	23.31	74.28	107.61	348.55	668.51
13	2.35	5.98	21.59	69.35	100.16	327.67	630.29
14	2.17	5.54	20.05	64.93	93.47	308.74	595.44
15	2.01	5.13	18.68	60.95	87.43	291.49	563.53
16	1.86	4.77	17.44	57.35	81.93	275.71	534.18
17	1.73	4.45	16.32	54.06	76.91	261.19	507.08
18	1.62	4.15	15.29	51.06	72.31	247.80	481.98
19	1.51	3.87	14.35	48.30	68.06	235.40	458.64
20	1.41	3.62	13.48	45.74	64.13	223.87	436.89
21	1.32	3.38	12.68	43.38	60.48	213.12	416.54
22	1.23	3.16	11.93	41.18	57.08	203.08	397.47
23	1.15	2.96	11.24	39.13	53.91	193.66	379.55
24	1.08	2.77	10.59	37.22	50.93	184.82	362.66
25	1.01	2.59	9.98	35.42	48.13	176.49	346.72
26		2.42	9.40	33.72	45.49	168.62	331.64
27		2.26	8.86	32.13	43.00	161.18	317.35
28		2.10	8.35	30.62	40.64	154.13	303.78
29		1.96	7.86	29.19	38.40	147.44	290.87
30		1.82	7.40	27.84	36.27	141.07	278.56
31		1.69	6.96	26.55	34.25	135.01	266.83
32		1.56	6.54	25.33	32.31	129.22	255.61
33		1.44	6.14	24.16	30.47	123.69	244.87
34		1.33	5.75	23.04	28.70	118.39	234.58
35		1.21	5.38	21.97	27.00	113.32	224.70
36		1.11	5.03	20.94	25.37	108.45	215.22
37		1.00	4.69	19.96	23.81	103.77	206.09
38			4.36	19.01	22.30	99.27	197.30
39			4.04	18.10	20.85	94.94	188.83
40			3.74	17.22	19.45	90.77	180.65
41			3.44	16.37	18.10	86.74	172.76
42			3.15	15.56	16.79	82.84	165.12
43			2.87	14.77	15.52	79.08	157.73
44			2.60	14.00	14.29	75.43	150.57
45			2.34	13.26	13.10	71.90	143.63
46			2.08	12.54	11.95	68.48	136.90
47			1.83	11.84	10.82	65.16	130.36
48			1.59	11.17	9.73	61.94	124.00
49			1.36	10.51	8.66	58.80	117.82
50			1.13	9.87	7.63	55.75	111.81

# Bimba Linear Thrusters-T Series (Ball Bearings)

## T - Tooling Plate End Play (in.)



	T-02	T-04	T-09	T-17	T-31	T-50	T-70
0	0.001	0.001	0.001	0.001	0.001	0.002	0.002
1	0.002	0.002	0.002	0.002	0.002	0.002	0.002
2	0.003	0.003	0.003	0.002	0.002	0.003	0.003
3	0.004	0.004	0.003	0.003	0.003	0.004	0.003
4	0.005	0.005	0.004	0.003	0.004	0.004	0.004
5	0.006	0.006	0.005	0.004	0.004	0.005	0.004
6	0.007	0.007	0.006	0.004	0.005	0.005	0.005
7	0.008	0.008	0.006	0.005	0.005	0.006	0.005
8	0.009	0.008	0.007	0.006	0.006	0.006	0.006
9	0.010	0.009	0.008	0.006	0.006	0.007	0.006
10	0.011	0.010	0.009	0.007	0.007	0.007	0.007
11	0.012	0.011	0.009	0.007	0.007	0.008	0.007
12	0.013	0.012	0.010	0.008	0.008	0.008	0.008
13	0.014	0.013	0.011	0.008	0.008	0.009	0.008
14	0.015	0.014	0.011	0.009	0.009	0.009	0.009
15	0.016	0.015	0.012	0.009	0.009	0.010	0.009
16	0.017	0.016	0.013	0.010	0.010	0.010	0.010
17	0.018	0.016	0.014	0.010	0.010	0.011	0.010
18	0.019	0.017	0.014	0.011	0.011	0.012	0.011
19	0.020	0.018	0.015	0.011	0.012	0.012	0.011
20	0.021	0.019	0.016	0.012	0.012	0.013	0.012
21	0.022	0.020	0.017	0.012	0.013	0.013	0.012
22	0.023	0.021	0.017	0.013	0.013	0.014	0.013
23	0.024	0.022	0.018	0.014	0.014	0.014	0.013
24	0.025	0.023	0.019	0.014	0.014	0.015	0.014
25	0.026	0.024	0.019	0.015	0.015	0.015	0.014
26	0.027	0.024	0.020	0.015	0.015	0.016	0.014
27	0.028	0.025	0.021	0.016	0.016	0.016	0.015
28	0.029	0.026	0.022	0.016	0.016	0.017	0.015
29	0.030	0.027	0.022	0.017	0.017	0.017	0.016
30	0.031	0.028	0.023	0.017	0.017	0.018	0.016
31	0.032	0.029	0.024	0.018	0.018	0.018	0.017
32	0.033	0.030	0.025	0.018	0.018	0.019	0.017
33	0.034	0.031	0.025	0.019	0.019	0.020	0.018
34	0.035	0.032	0.026	0.019	0.020	0.020	0.018
35	0.036	0.032	0.027	0.020	0.020	0.021	0.019
36	0.037	0.033	0.027	0.020	0.021	0.021	0.019
37	0.038	0.034	0.028	0.021	0.021	0.022	0.020
38	0.039	0.035	0.029	0.022	0.022	0.022	0.020
39	0.040	0.036	0.030	0.022	0.022	0.023	0.021
40	0.041	0.037	0.030	0.023	0.023	0.023	0.021
41	0.042	0.038	0.031	0.023	0.023	0.024	0.022
42	0.043	0.039	0.032	0.024	0.024	0.024	0.022
43	0.044	0.040	0.033	0.024	0.024	0.025	0.023
44	0.045	0.040	0.033	0.025	0.025	0.025	0.023
45	0.046	0.041	0.034	0.025	0.025	0.026	0.024
46	0.047	0.042	0.035	0.026	0.026	0.026	0.024
47	0.048	0.043	0.035	0.026	0.026	0.027	0.025
48	0.049	0.044	0.036	0.027	0.027	0.028	0.025
49	0.050	0.045	0.037	0.027	0.028	0.028	0.026
50	0.051	0.046	0.038	0.028	0.028	0.029	0.026

# Bimba Multiple Position Linear Thrusters



Bimba's Multiple Position Linear Thrusters incorporate a double-acting, single rod end cylinder that provides three positions with just one cylinder.

Extruded Linear Thrusters

TE Series (Composite Bearings)

T Series (Ball Bearings)

Multiple Position Linear Thrusters

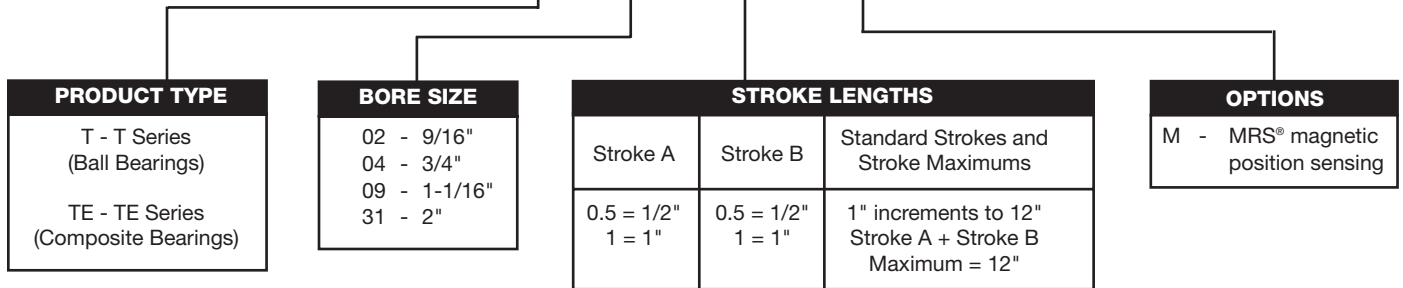
Linear Thrusters Checklist

Pneu Moment (Pneumatic Actuators)

Pneu Moment (Application Checklist)

## How to Order

### T-09 1/2 - M



## List Prices

Additional pricing can be found on pages 3.12 and 3.18

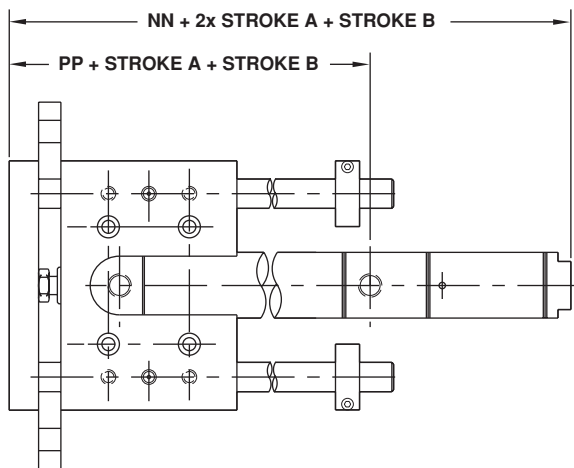
Bore	Add to Base	Stroke adder**	
		Total combined stroke adder per inch	
		T	TE
9/16" (02)	\$16.40	\$3.45	\$2.75
3/4" (04)	19.15	3.45	3.25
1-1/16" (09)	21.85	3.65	3.65
1-1/2" (17)	24.60	5.10	5.10
2" (31)	27.30	5.75	6.80

\*\*Total combined stroke = (2 x Stroke A) + Stroke B  
Note: Cushions are not available in three-position cylinder

# Bimba Multiple Position Linear Thrusters

## Dimensions

### T and TE Series



(T Series shown)

Bore Size	NN	PP
9/16" (02)	4.67	2.80
3/4" (04)	6.11	3.76
1-1/16" (09)	6.62	3.90
1-1/2" (17)	7.62	4.81
2" (31)	9.61	6.14

Note: Additional T and TE dimensions can be found on page 3.13 and 3.19.

## Engineering Data

- Rated 250 psi
- Low breakaway friction

### Components:

- Case hardened or hard chrome plated carbon steel shafts
- Steel or clear anodized aluminum tooling plate and collars
- Precision recirculating ball bearings or plastic composite

### Cylinder:

- 304 stainless steel body
- High-strength aluminum alloy porting ends
- 303 stainless steel piston rods
- Buna N "U" cup seals
- Sintered bronze rod guide bushings

### Options:

- Internal Buna N or external urethane bumpers
- Buna N magnet for position sensing

### Temperature Range:

Buna N seals with a temperature range of  $-20^{\circ}\text{F}$  ( $-25^{\circ}\text{C}$ ) to  $200^{\circ}\text{F}$  ( $95^{\circ}\text{C}$ ) are standard in all Bimba air cylinders. High temperature option A seals rated for higher temperature applications are available. If cylinders are operated at temperatures below  $0^{\circ}\text{F}$  for extended time periods, special modifications may be required. Special seal materials are available upon request.

With -M option:  $-20^{\circ}\text{F}$  to  $+185^{\circ}\text{F}$  ( $-25^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ )

### Lubrication:

Air cylinders are pre-lubricated and sealed at the factory for extensive maintenance-free life. Cylinder life can be lengthened by providing additional lubricant with an air line mist lubricator or direct introduction of oil to the cylinder every 500 hours of operation. Recommended oil is medium to heavy inhibited hydraulic and general purpose oil.

The two spring-loaded oiler ports on the housing face should also receive several drops of the same oil every 100 hours of operation. For applications that involve rapid cycling, oil these ports more often.

T-700 series incorporates grease fittings.

# Bimba Linear Thrusters Checklist

## Linear Thruster Application Checklist

This checklist makes sizing and selecting Bimba actuators easier. Bimba's Engineering Department will assist you by providing a detailed analysis of your application and, based on the information in the application checklist, will help you choose the actuators best suited to your needs.

**Step 1. Photocopy the sketch and checklist sheets.**

**Step 2. Complete the sketch and checklist.**

**Step 3. Mail or fax the sketch and checklist to your local stocking distributor.**

**Date:** \_\_\_\_\_

**Your Name:** \_\_\_\_\_

**Company:** \_\_\_\_\_

**Address:** \_\_\_\_\_

**Phone:** \_\_\_\_\_

**Fax:** \_\_\_\_\_

Extruded Linear Thrusters

TE Series (Composite Bearings)

T Series (Ball Bearings)

Multiple Position Linear Thrusters

Linear Thrusters Checklist

Pneu Moment (Pneumatic Actuators)

Pneu Moment (Application Checklist)

**1. Type of Linear Thruster selected.**

- T Series       TE Series

**2. What is the weight of the load being moved?**

\_\_\_\_\_ (lbs.)

**3. What is the required stroke length?**

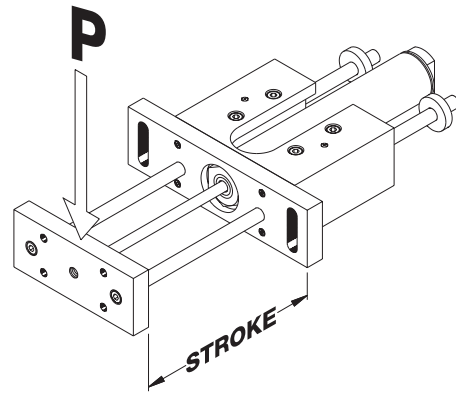
\_\_\_\_\_ (in.)

**4. How will the Linear Thruster be mounted?**

- Horizontally.  
 Vertically, tooling plate at top.  
 Vertically, tooling plate at bottom.

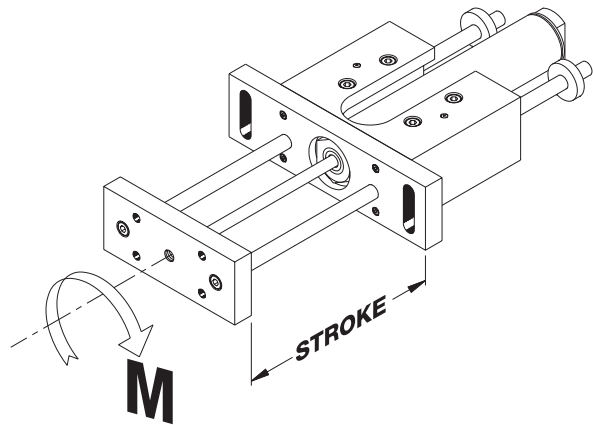
**5. What kind of force does the load place on the tooling plate?**

- Side load \_\_\_\_\_ (lbs)



Maximum Side Load

- Moment \_\_\_\_\_ (lbs)



Maximum Moments



# Bimba PneuMoment™ Pneumatic Actuators

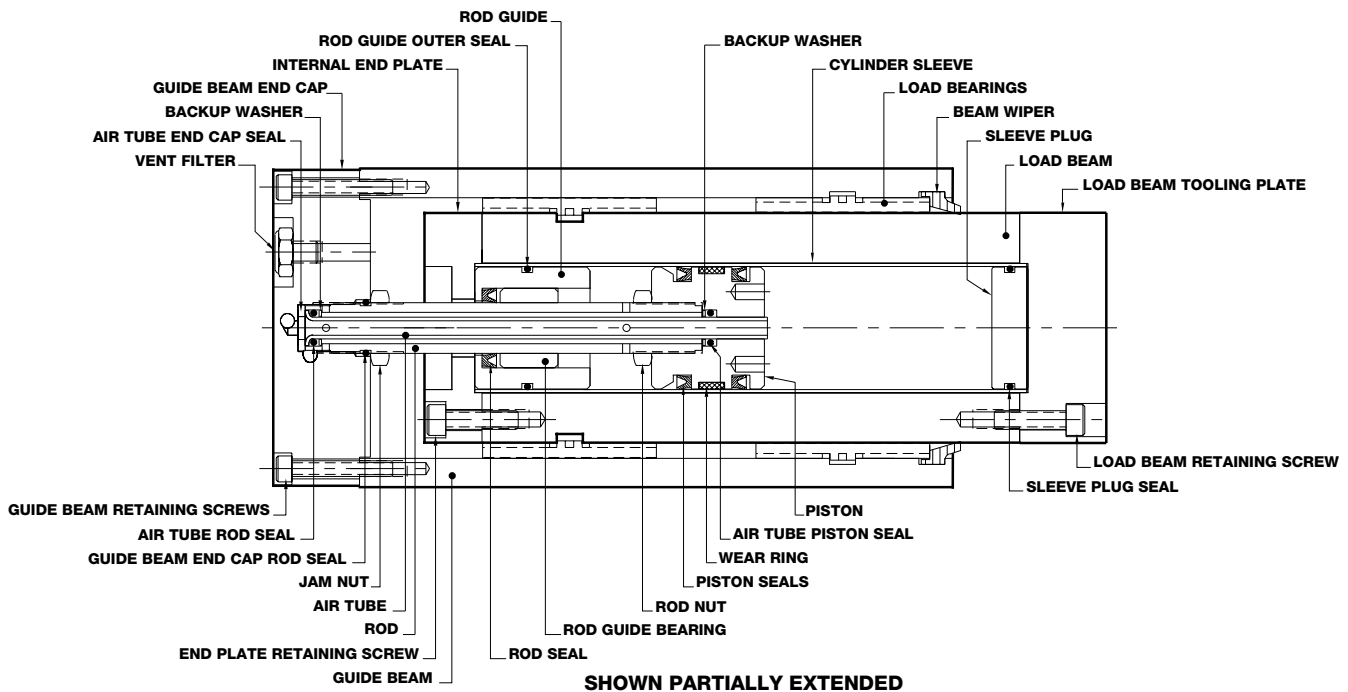
## ADVANTAGES

The Bimba PneuMoment pneumatic actuator features a revolutionary, compact design that uses conventional pneumatic technology but has the capacity to carry high loads and moments.

The PneuMoment guide beam provides the mounting surface and remains stationary, and the load beam provides the motion, extending and retracting. A stationary piston and rod assembly is attached to the guide beam end cap. The piston rod is a coaxial assembly of two hollow rods which convey air to and from each side of the piston. Air let into one hollow rod

pressurizes the chamber at one end of the piston, causing the load beam to extend. Air let into the other rod pressurizes the other end of the piston and causes the load beam to retract.

The PneuMoment has eight flat bearings to support the load beam. These bearings ride on hard anodized, PTFE-impregnated surfaces to allow the PneuMoment to carry heavy loads and large moments. No lubrication is needed for the bearings, although standard air line lubrication should be used to enhance the actuator's seal life.



## FEATURES AND BENEFITS

- Carries high moment loads
- Compact design
- Long life
- Available in U.S. customary units (inches) or metric
- Non-lube bearings
- Built-in track for position sensing switches
- Guide beam end cap ports transmit air or vacuum through the actuator from the guide beam end cap to connect additional automation devices such as grippers
- Corrosion-resistant, hard coat anodized aluminum load and guide beams with PTFE impregnation
- Standard vacuum port for clean room applications
- Standard side or end ports
- Base, front or rear flange mounting

## OPTIONS

- Internal or external bumpers
- External shock absorbers for retract and extend strokes
- Internal stroke adjustment – full stroke, retract and extend (1-1/16" and 2" bores only)
- Magnetic Position Sensing
- Auxiliary ports to transmit air or vacuum through the actuator to operate automation devices.

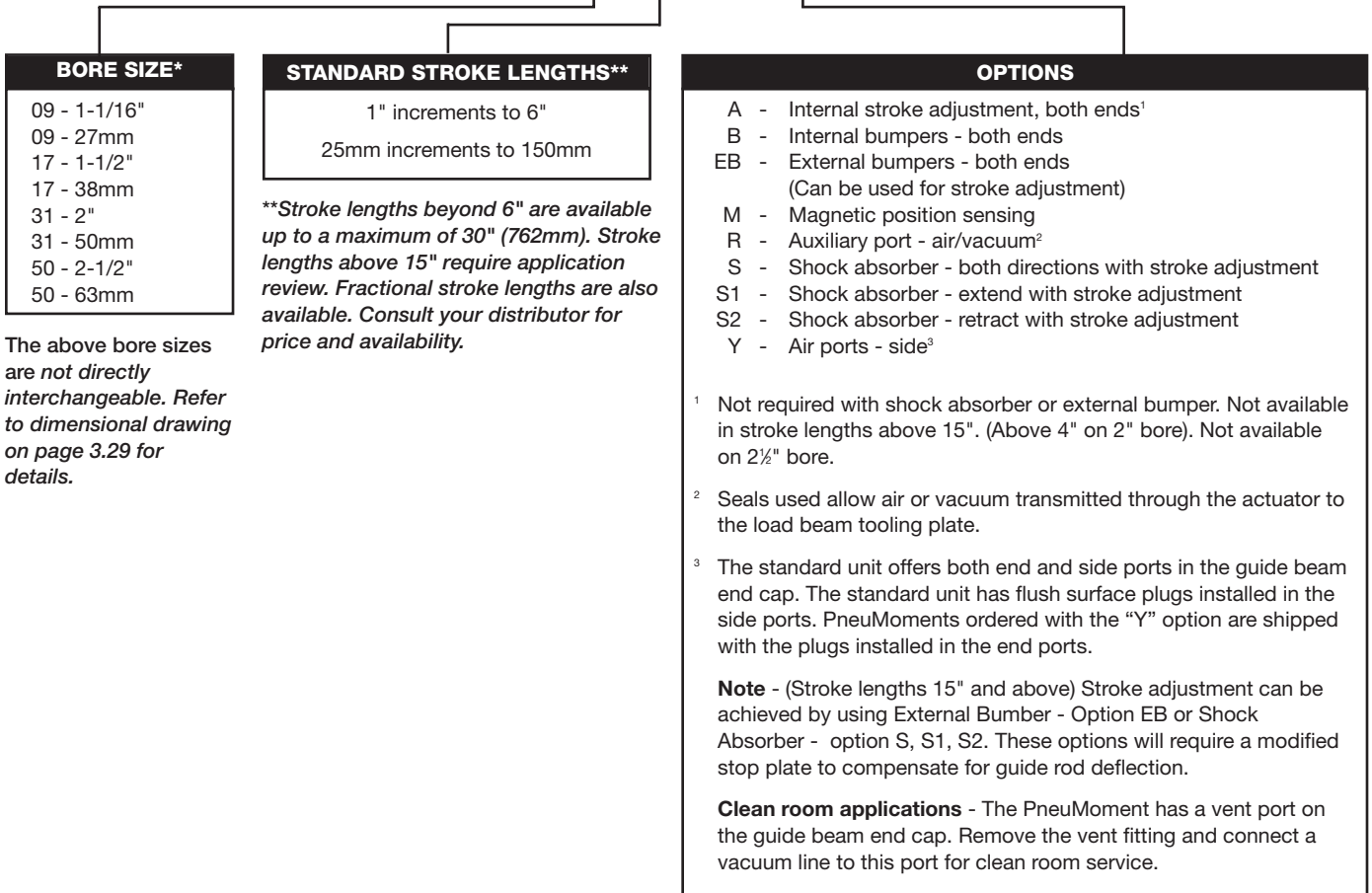
## How to Order

The model number consists of three alphanumeric clusters. These designate product type, bore size and stroke length, and options. Please refer to the example and charts below to determine the model number needed. The U.S. customary units (inch) model

example shown below include options for external bumpers, magnetic position sensing, auxiliary port and plugs installed in the guide beam end cap ports.

PRODUCT TYPE	
PM	- U.S. Customary units
PMM	- (metric) (All external fasteners and ports are metric)

## PM-096-EBMRY



### Option/Combination Availability

Bore	A	B	EB	M	R	S	Y
1-1/16" (27mm)	M,R,Y	M,R,Y	M,R,Y	A,B,EB,R,S,Y	A,B,EB,M,S,Y	M,R,Y	A,B,EB,M,R,S
1-1/2" (38mm)	N/A	M,R,Y	M,R,Y	B,EB,R,S,Y	B,EB,M,S,Y	M,R,Y	B,EB,M,R,S
2" (50mm)	M,R,Y	M,R,Y	M,R,Y	A,B,EB,R,S,Y	A,B,EB,M,S,Y	M,R,Y	A,B,EB,M,R,S,Y
2-1/2" (63mm)	N/A	M,R,Y	M,R,Y	B,EB,R,S,Y	A,B,EB,M,S,Y	M,R,Y	A,B,EB,M,R,S,Y

# Bimba PneuMoment™ Pneumatic Actuators

## List Prices

	Base Model PM / PMM	A	B	EB	M	R	S	S1	S2	Y	
<b>Base Price</b>	09 (1-1/16")	\$283.95	\$52.40	\$14.50	\$107.55	\$3.90	\$49.45	\$267.95	\$215.95	\$215.95	N/C
	17 (1-1/2")	391.40	N/A								
	31 - (2")	545.75	204.00	16.55	192.95	13.25	55.15	547.95	400.25	400.25	N/C
	50 - (2-1/2")	744.20	N/A								
<b>Stroke Adder per inch/ 25mm of stroke</b>	09 (1-1/16")	6.10	1.70	N/C	.85	N/C	.30	.85	.85	.85	N/C
	17 (1-1/2")	8.60	N/A								
	31 - (2")	14.35	2.25	N/C	2.35	N/C	1.25	2.35	2.35	2.35	N/C
	50 - (2-1/2")	16.55	N/A								

### Mounting Accessories for 1-1/16" and 1-1/2" Bores

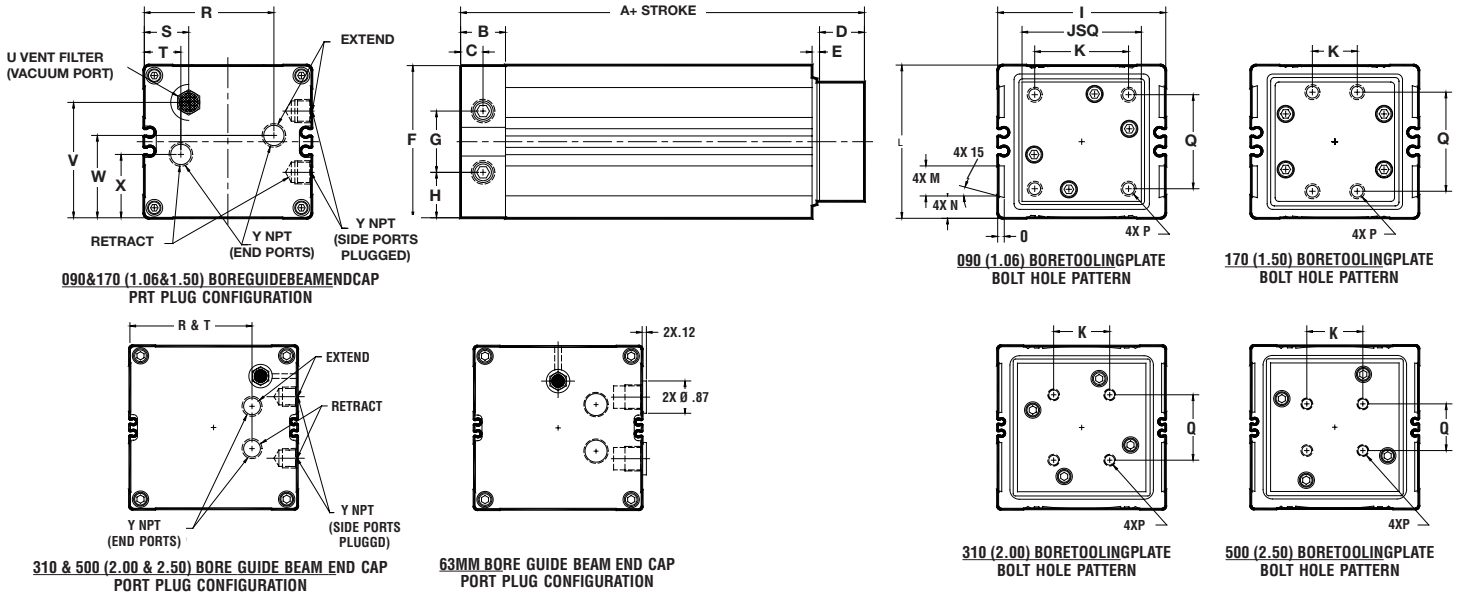
Description	Model Number	List Price	Model Number	List Price
4 Mounting Clamps with Through Holes (U.S. Customary Units and Metric)	1-1/6" - 1-1/2"		2" - 2-1/2"	
	PM-MC-09	\$39.65	PM-MC-31	\$55.15
End Flange Brackets with 4 Clamps – Threaded Hole (U.S. Customary Units Only)	PM-EF-09	67.70	PM-EF-31	93.75
End Flange Brackets with 4 Clamps – Threaded Hole (Metric)	PMM-EF-09	74.30	PMM-EF-31	93.75
End Flange Brackets with 4 Clamps – Through Hole (U.S. Customary Units)	PM-EFT-09	67.70	PM-EFT-31	88.20
End Flange Brackets with 4 Clamps – Through Hole (Metric)	PMM-EFT-09	67.70	PMM-EFT-31	88.20

### Repair Parts 1-1/16" and 1-1/2" Bores

Order #	Part Description	Quantity	
<b>Seal Kits</b> 1-1/16" – PMKS-09 1-1/2" – PMKS-17 2" – PMKS-31 2-1/2" – PMKS-50 (US and Metric)	Piston Seals	2	
	Air Tube Piston Seal	2	
	Rod Guide Inner Seal	1	
	Rod Guide Outer Seal	1	
	Rod Seal	1	
	Sleeve Plug Seal	1	
	Beam Wiper	1	
	Tube Gasket	1	
	Wrench – For Piston Removal	1	
1-1/16" 1-1/2"	RD-76758 (U.S. Customary)	Replacement Shock	1
27mm 38mm	RD-68404-M (Metric)	Replacement Shock	1
2" 2-1/2"	RD-80179 (U.S. Customary)	Replacement Shock	1
31mm 50mm	RD-80179-M (Metric)	Replacement Shock	1

# Bimba PneuMoment™ Pneumatic Actuators

## Basic Model



Bore	A	B	C	D	E	F	G	H	I	J	K	L	M	
(09)	1-1/16"	5.75	0.75	0.38	0.75	0.12	2.54	1.02	0.76	2.81	2.00	1.57	2.56	0.50
	27mm	146.0	19.0	9.5	19.0	3.2	64.6	26.0	19.3	71.4	50.7	39.9	65.0	12.7
(17)	1-1/2"	5.88	0.88	0.33	0.75	0.12	2.54	1.17	0.69	2.81	2.00	0.75	2.56	0.50
	38mm	149.4	22.4	8.4	19.0	3.2	64.6	29.7	17.4	71.4	50.7	19.0	65.0	12.7
(31)	2"	10.48	1.19	0.59	1.00	0.12	4.35	1.65	1.35	4.50	3.43	1.50	4.38	1.28
	50mm	266.2	30.1	15.1	25.4	3.2	110.6	41.9	34.4	114.3	87.1	38.1	111.1	32.6
(50)	2-1/2"	10.48	1.19	0.59	1.00	0.12	4.35	1.65	1.35	4.50	3.43	1.50	4.38	1.28
	63mm	266.2	30.1	15.1	25.4	3.2	110.6	41.9	34.4	114.3	87.1	38.1	111.1	32.6

Bore	N	O	P	Q	R	S	T	U	V	W	X	Y	
(09)	1-1/16"	0.38	0.11	1/4-20 UNC	1.57	2.17	0.74	0.61	#10-32	1.93	1.38	1.06	1/8 NPT
	27mm	9.5	2.8	M6 x 1.0	39.9	55.0	18.8	15.5	M5x0.8	49.0	35.0	26.9	G 1/8
(17)	1-1/2"	0.38	0.11	1/4-20 UNC	1.66	1.98	1.25	0.81	#10-32	1.93	1.76	0.88	1/4 NPT
	38mm	9.5	2.8	M6 x 1.0	42.1	50.4	31.8	20.5	M5x0.8	49.0	44.8	22.4	G 1/4
(31)	2"	0.50	0.11	5/16-18 UNC	1.75	3.50	3.27	N/A	1/8 NPT	3.55	2.74	1.61	3/8 NPT
	50mm	12.7	2.8	M8 x 1.25	44.5	88.8	83.0	N/A	G 1/8	90.2	69.7	40.9	G 1/4
(50)	2-1/2"	0.50	0.11	5/16-18 UNC	1.25	2.24	3.26	N/A	1/8 NPT	3.43	2.80	1.55	3/8 NPT
	63mm	12.7	2.8	M8 x 1.25	31.8	56.9	82.8	N/A	G 1/8	87.1	71.1	39.5	G 1/4

### Ports

The basic unit offers both end and side ports in the guide beam end cap. The unit is supplied with flush surface plugs installed in the side ports unless the PneuMoment is ordered with the "Y" option. This no charge option has the plugs installed in the end ports.

### Vent Filter – Vacuum Port

The vent port can be used to connect a vacuum line. Remove the vent filter and connect a vacuum line to this port for clean room applications.

Extruded Linear Thrusters

TE Series (Composite Bearings)

T Series (Ball Bearings)

Multiple Position Linear Thrusters

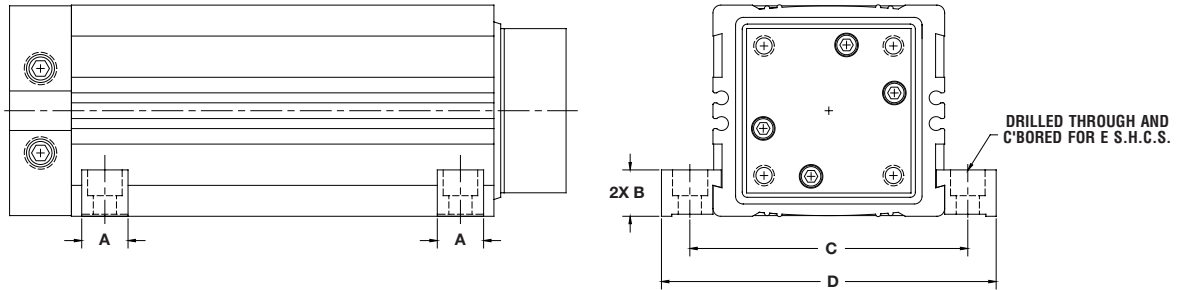
Linear Thrusters Checklist

Pneu Moment (Pneumatic Actuators)

Pneu Moment (Application Checklist)

## Mounting Accessories

### Mounting Clamps



Mounting clamps can be used any time the PneuMoment is mounted to a flat surface. They are supplied with through holes for socket head cap screws. The clamps connect to the channel that runs along the length of the guide beam. Mounting clamps can be located anywhere along the length of the guide beam but we recommend they be as close to the ends as possible with the width of the clamp engaged into the guide beam channel. Mounting clamps are supplied in packets of four. The same clamp is used for U.S. customary unit and metric mountings.

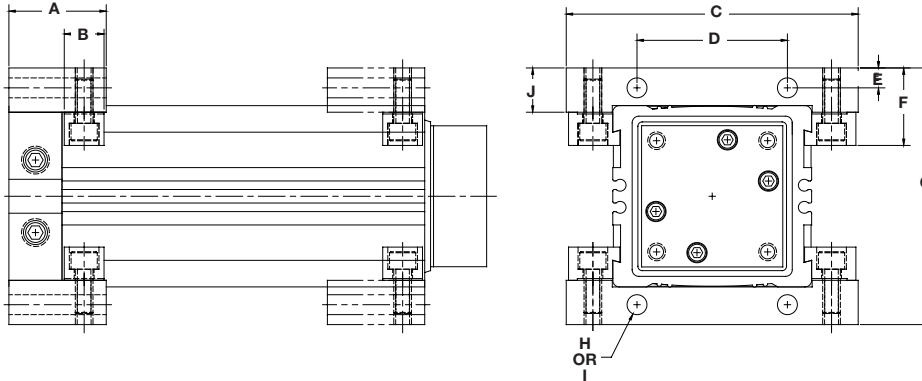
	Bore	Part No.	A	B	C	D	E
(09)	1-1/16"-1-1/2"	PM-MC-09	0.56	0.56	3.37	4.06	1/4-20 UNC
	(27mm-38mm)		14.3	14.3	85.6	103.1	M6 x 1.0
(31)	2"-2-1/2"	PM-MC-31	1.50	.69	5.30	6.18	3/8-16 UNC
(50)	(50mm-63mm)		38.1	17.5	134.5	156.9	M10 x 1.5

## Mounting Accessories

### End Flanges

End flanges can be used to mount the actuator at either end of the guide beam. The clamps connect to the flange bracket using screws and threaded holes. Two flange bracket styles are available; one with through

holes and the other with threaded holes. End flanges are supplied in a kit containing two flange brackets and four clamps.



**Threaded Holes (U.S. PM-EF-09, Metric PMM-EF-09\*) U.S. PM-EF-31, Metric PMM-EF-31**  
**Through Holes (U.S. PM-EFT-09, Metric PMM-EFT-09\*) U.S. PM-EFT-31, Metric PMM-EFT-31**

Bore	A	B	C	D	E	F	G	H	I	J
1-1/16", 1-1/2"	1.50	0.56	4.12	2.12	0.28	1.06	3.62	0.28	1/4-20 UNC	0.62
(27mm), (38mm)	38.3	14.3	104.8	53.9	7.1	27.0	92.0	7.1	M6 x 1.0	15.9
2" - 2-1/2"	2.74	1.50	6.25	3.82	0.38	1.47	5.88	0.41	3/8-16 UNC	0.92
(50mm), (63mm)	69.6	38.1	158.9	97.1	9.5	37.4	149.2	0.42	M10 x 1.5	23.4

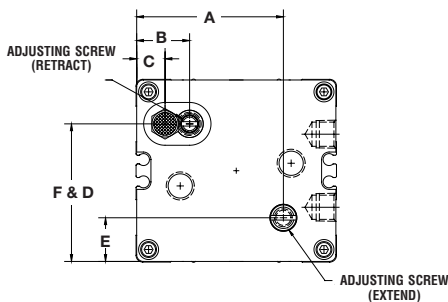
\*1-1/16" and 1-1/2" bore sizes use the same End Flange.  
 2" and 2-1/2" bore sizes use the same End Flange.

## Options

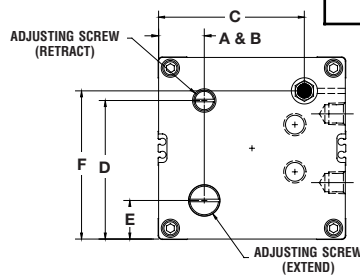
### Internal Stroke Adjustment – Option A

Optional internal stroke adjustment screws on the rear of the guide beam end cap limit the stroke in either direction. Each screw limits the stroke in one direction. Approximate adjustment per 1/4 turn – Extend .008", Retract .014" for 1-1/16 (27mm) bore. Extend .021", Retract .025" for 2" (31mm) bore.

Note: Within the unit's stroke length there are no dimensional limitations for either extend or retract adjustments. Not compatible with shock absorbers, external bumpers or internal bumpers.



090 (1.06) BORE INTERNAL STROKE ADJUSTER CONFIGURATION



310 (2.00) BORE INTERNAL STROKE ADJUSTER CONFIGURATION

Bore	A	B	C	D	E
(09) 1-1/16"	2.06	0.73	0.36	1.94	0.61
(27mm)	52.2	18.5	9.1	49.3	15.5

Option A – is not available for 1-1/2" and 2-1/2" bore. Use External Bumper – Option EB to achieve stroke adjustment.

## Options

### Internal Bumpers – Option B

Provides internal bumpers for end of stroke noise reduction in both directions.

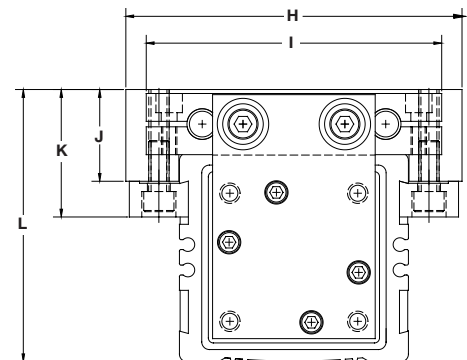
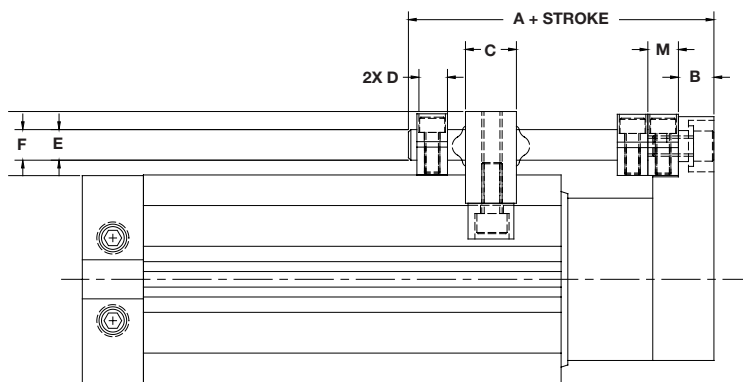
### Air Pressure Effect on Stroke

Air Pressure	20 psi	40 psi	60 psi	80 psi
1-1/16", 1-1/2"	-0.77	-0.047	-0.020	0
27mm, 38mm	-19.0mm	-1.2mm	-0.51mm	0
2"	-0.090	-0.080	-0.020	0
50mm	-2.3mm	-2mm	-0.5mm	0
2-1/2"	-0.027	-0.018	-0.010	0
63mm	-0.68mm	-.45mm	-.25mm	0

### External Bumpers – Option EB

Optional external bumpers provide both end-of-stroke noise reduction and end-of-stroke adjustment. The external bumper assembly is mounted to the actuator with clamps that connect to the channel that runs along the length of the guide beam.

Note: not compatible with shock absorbers, end flange mounting on the guide beam end, internal stroke adjustment and internal bumpers.



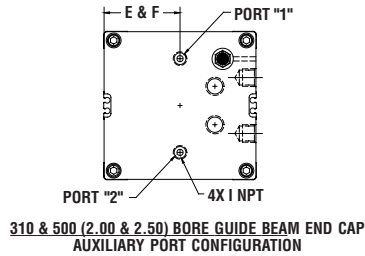
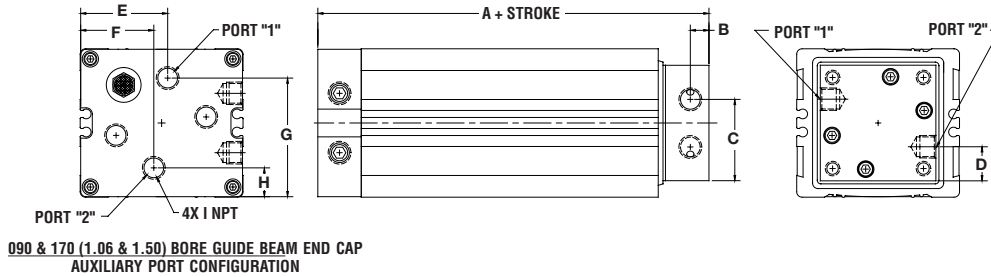
Bore		A	B	C	D	E	F	G	H	I	J	K	L
(09), (17)	1-1/16", 1-1/2"	2.75	0.44	0.62	0.38	0.38	0.73	0.75	4.12	3.62	1.16	1.59	3.37
	(27mm), (38mm)	69.8	11.1	15.9	9.5	9.5	18.5	19.0	104.8	92.0	29.4	40.5	85.6

Bore		A	B	C	D	E	F	G	H	I	J	K	L	M
(31)	2" - 2-1/2"	4.44	0.68	1.54	0.50	0.62	1.56	1.57	6.25	5.69	1.75	2.30	5.95	0.75
(50)	50mm - 63mm	112.8	17.3	39.1	12.7	15.9	39.6	40.0	158.9	144.4	44.3	58.3	151.1	19.1

## Options

### Auxiliary Port-Air/Vacuum – Option R

Optional air/vacuum ports can be supplied to transmit air or vacuum through the actuator to the load beam tooling plate for use by other automation devices.



	Bore	A	B	C	D	E	F	G	H	I
(09)	1-1/16"	5.75	0.32	1.41	0.59	1.50	1.26	2.05	0.50	1/8 NPT
	(27mm)	146.0	8.2	35.8	14.9	38.1	32.1	52.0	12.6	G 1/8
(17)	1-1/2"	5.88	0.32	1.00	1.00	0.65	2.06	2.02	0.48	1/8 NPT
	(38mm)	149.4	8.2	25.3	25.3	16.5	52.2	51.3	12.2	G 1/8
(31)	2"	10.48	0.50	2.84	0.60	2.24	2.24	3.56	0.80	1/8 NPT
	50mm	266.2	12.7	72.1	15.2	56.9	56.9	90.4	20.2	G 1/8
(50)	2-1/2"	10.48	0.50	1.68	1.76	0.99	3.49	3.43	0.83	1/4 NPT
	63mm	266.2	12.7	42.6	44.7	25.1	88.7	87.1	21.0	G 1/4



## Engineering Specifications

### Components:

Guide beam	PTFE-impregnated, hard-coat anodized extruded aluminum
Load beam	PTFE-impregnated, hard-coat anodized extruded aluminum
Guide beam end cap	Black anodized aluminum
Load beam tooling plate	Black anodized aluminum
Load bearings	PTFE-filled polymer
Beam wiper	Urethane
Rod	Welded DOM steel
Air tube	304 stainless steel
Internal end plate	6061 aluminum
Cylinder sleeve	304 stainless steel
Sleeve plug	2011 aluminum
Rod guide	2011 aluminum
Rod guide bearing	Phosphor bronze
Rod nut	Carbon steel-plated
Piston	2011 aluminum
Port plugs	Galvanized steel
Vent filter	Sintered bronze
Sleeve plug seal	Buna-N
Piston seal	Buna-N
Rod guide outer seal	Buna-N
Rod guide seal	Buna-N
Air tube piston seal	Buna-N
Air tube end cap seal	Buna-N
Retaining screws	Grade 8 Alloy Steel

### Rated Air Pressure

150 psi (10.34 bar)

### Power Factors

#### 1-1/16" bore

Extend .888 x Air Pressure

Retract .734 x Air Pressure

#### 1-1/2" bore

Extend 1.7 x Air Pressure

Retract 1.5 x Air Pressure

#### 2" bore

Extend 3.1 x Air Pressure

Retract 2.65 x Air Pressure

#### 2-1/2" bore

Extend 5.0 x Air Pressure

Retract 4.42 x Air Pressure

### Velocity @ 80 psi

1-1/16" bore – 27mm-27 in/sec.

1-1/2" bore – 38mm-27 in/sec.

2" bore – 30 in/sec.

2-1/2" bore – 26 in/sec.

\*Special units with increased velocity are available.

Contact your Bimba distributor.

### Temperature Range:

-20°F to 140°F (-29°C to 60°C)

### Breakaway:

Less than 13 psi (.89 bar)

### Lubrication:

All Bimba PneuMoment actuators are pre-lubricated with our special HT-99 lubrication and sealed at the factory for extensive maintenance-free life. Actuator life can be extended by providing additional lubricant with an air line mist lubricator. Actuator life is also dependent upon operational temperature, velocity and load. The PTFE-filled plastic bearings are installed "dry" and should require no additional lubrication for the life of the bearing.

### Options:

Bumpers (internal & external)	Urethane
Stroke adjusters	303 stainless steel
Shock absorbers	Anodized aluminum end plates, 303 stainless steel guide rods
Auxiliary air tube	303 stainless steel
Magnet	Neodymium

## Weights

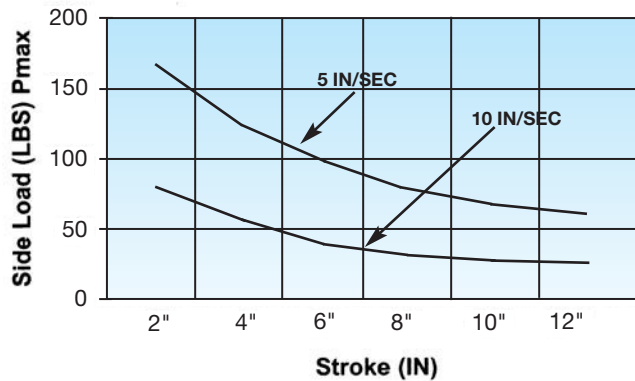
Weights – Pounds (Kilograms)								
Model / Option	1-1/16" (09)		1-1/2" (17)		2" Bore		2-1/2" Bore	
	At 0" Stroke	Adder Per Inch (25mm) of Stroke	At 0" Stroke	Adder Per Inch (25mm) of Stroke	At 0" Stroke	Adder Per Inch of Stroke	At 0" Stroke	Adder Per Inch of Stroke
Standard Model	2.75 (1.25)	0.37 (0.17)	3.30 (1.50)	.44 (.20)	17 lb.	.98 lb.	16.9 lb.	1.12 lb.
Adder for A Option	0.5 (0.23)	0.04 (0.02)	N/A	N/A	.59	.067	N/A	N/A
Adder for B Option	0.01 (0.004)	N/A	0.01 (0.004)	N/A	0.03	N/A	0.03	N/A
Adder for EB Option	1.75 (0.79)	0.06 (0.03)	1.75 (0.79)	0.06 (0.03)	5.47	0.17	5.47	0.17
Adder for R Option	0.15 (0.07)	0.06 (0.03)	0.15 (0.07)	0.06 (0.03)	0.15	0.02	0.15	0.02
Adder for S Option	3.62 (1.64)	0.06 (0.03)	3.62 (1.64)	0.06 (0.03)	9.67	0.17	9.67	0.17
Adder for S1 Option	3.43 (1.56)	0.06 (0.03)	3.43 (1.56)	0.06 (0.03)	8.5	0.17	8.5	0.17
Adder for S2 Option	3.43 (1.56)	0.06 (0.03)	3.43 (1.56)	0.06 (0.03)	8.5	0.17	8.5	0.17

## Application Considerations

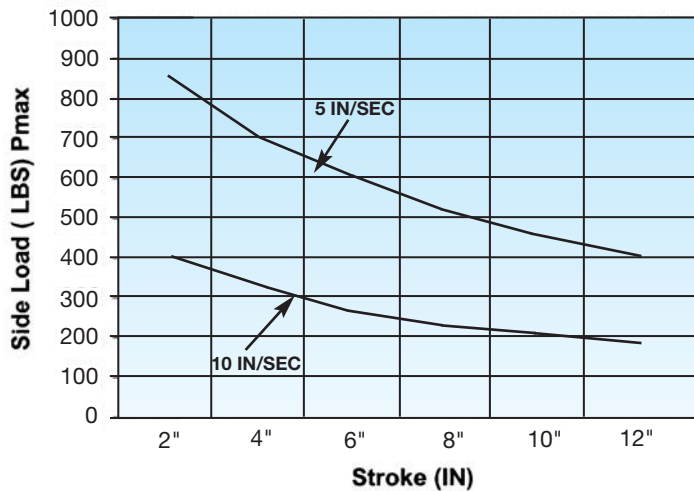
### Maximum Allowable Side Load (Pmax)

These graphs illustrate PneuMoments capability to carry large sides loads. Examples for all four bore sizes are shown. Use the formulas on page 3.37 to calculate the maximum allowable side load using your application perimeters or visit our website and use the PneuMoment sizing program. 80 degree F temperature used for graph calculations.

**Max Side Load (Pmax) 1-1/16" and 1-1/2" Bores**



**Max Side Load (Pmax) 2" and 2-1/2" Bores**



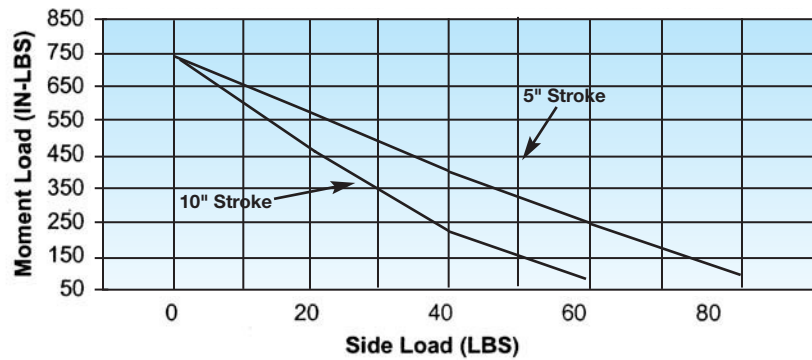
## Application Considerations

### Combination Side and Moment Load

The following graphs illustrate PneuMoments capability to carry a combination of side and moment load. Examples for all 4 bore sizes are shown. Use the formulas on page 3.37 to calculate the maximum load carrying capabilities for your application or visit our web-site and use the PneuMoment sizing program. 80 degree F temperature used for graph calculations.

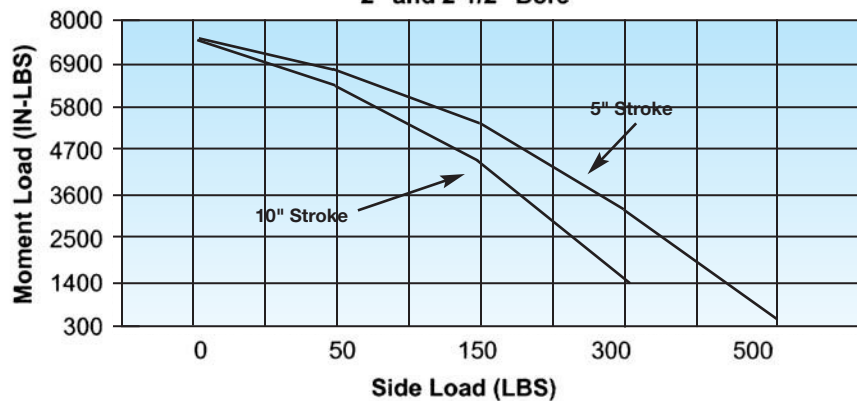
#### Combination Side and Moment Load

1-1/16" and 1-1/2" Bore



#### Combination Side and Moment Load

2" and 2-1/2" Bore

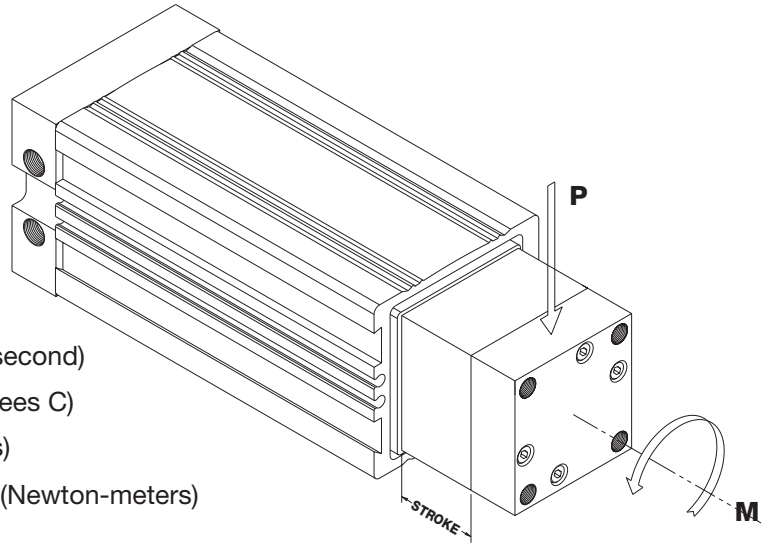


## Application Considerations

### Capability

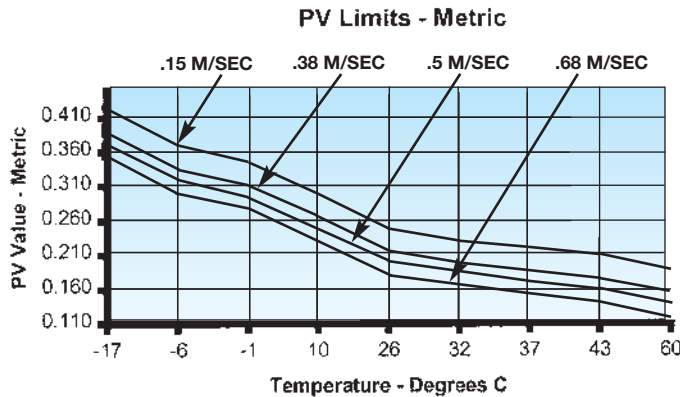
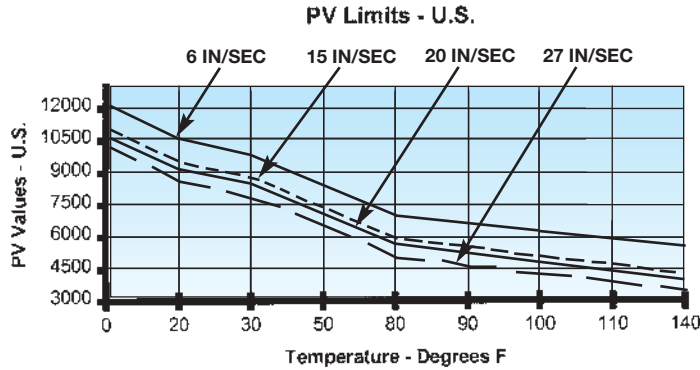
Use the following formulas to calculate PneuMoment's capability to solve your application requirement.

- $S_{MAX}$  = The maximum allowable stress in the bearing material in psi (MPa)
- PV = One of the limiting factors of the bearing depending on ambient temperature and cycle velocity.
- V = Velocity in feet per minute (meters per second)
- T = Ambient temperature in degrees F (degrees C)
- $P_{MAX}$  = Maximum side load in pounds (Newtons)
- $M_{MAX}$  = Maximum moment load in inch-pounds (Newton-meters)
- P = Actual side load in pounds (Newtons)
- M = Actual Moment Load in inch-pounds (Newton-meters)
- W = Actual load weight in pounds (kilograms)



Please note that a sizing program located on our website can perform these calculations for you.  
**Step One: For all bore sizes - find the PV Value from the charts below or calculate it using the formula:**

- U.S. PV (psi\*ft/min.) =  $0.044V^2 - 25.6V + 0.27T^2 - 87T + 12,970$
  - Metric PV (MPa\*m/s) =  $(1703V^2 - 5039.4V + 0.875T^2 - 125.5T + 10462.5) / 28550$
- T = Ambient temperature degrees - F or C



## Application Considerations

### Step Two: Calculate maximum bearing stress

$S_{max} = PV$  Limit (U.S. or Metric) / Velocity (ft/min. or n/m<sup>2</sup>)

All bore sizes use this calculation

### Step Three: Calculate maximum Moment Load

**1-1/16"(27mm) or 1-1/2"(38mm) bore sizes:**  
 U.S. -  $M_{max}$  (in/lbs.) = 3.165 x  $S_{max}$   
 Metric -  $M_{max}$  (nm) = 51.79 x  $S_{max}$

**2"(31mm) or 2-1/2"(50mm) bore sizes:**  
 U.S. -  $M_{max}$  (in/lbs.) = 31.841 x  $S_{max}$   
 Metric -  $M_{max}$  (nm) = 515.448 x  $S_{max}$

### Step Four: Calculate maximum Side Load

**1-1/16"(27mm) or 1-1/2"(38mm) bore sizes:**  
 U.S. -  $P_{max}$  (lbs.) = (3.281 x  $S_{max}$ ) / (3.5 + stroke)  
 Metric -  $P_{max}$  (n) = (53,240 x  $S_{max}$ ) / (88.9 + stroke)

**2"(31mm) or 2-1/2"(50mm) bore sizes:**  
 U.S. -  $P_{max}$  (lbs.) = (26.416 x  $S_{max}$ ) / (6.720 + stroke)  
 Metric -  $P_{max}$  (n) = (432,423 x  $S_{max}$ ) / (170.69 + Stroke)

### Applications with both Moment and Side load

If you know the actual  
 Moment load ( M ) in/lbs. or (nm)

### Calculate the allowable Side Load

**1-1/16"(27mm) or 1-1/2"(38mm) bore sizes:**  
 U.S. -  $P_{max}$  (lbs.) = ( $S_{max} - M$  / 3.165) x 3.281 / (3.5 + stroke)  
 Metric -  $P_{max}$  (n) = ( $S_{max} - M$  / 51.87) x 53,240 / (88.9 + stroke)

**2"(31mm) or 2-1/2"(50mm) bore sizes:**  
 $P_{max}$  (lbs.) = ( $S_{max} - M$  / 31.841) x 26.416 / (6.720 + stroke)  
 $P_{max}$  (n) = ( $S_{max} - M$  / 515.448) x 432,423 / (170.69 + stroke)

If you know the actual Side load ( P ) lbs. Or (n)

### Calculate the allowable Moment Load

**1-1/16"(27mm) or 1-1/2"(38mm) bore sizes:**  
 $M_{max}$  (in/lbs.) = 3.165 x { $S_{max} - [P$  x (3.5 + stroke) / 3.281]}

$M_{max}$  (nm) = 51.87 x { $S_{max} - [P$  x (88.9 + stroke) / 53,770]}

**2"(31mm) or 2-1/2"(50mm) bore sizes:**  
 $M_{max}$  (in/lbs.) = 31.841 x { $S_{max} - [P$  x (6.720 + stroke) / 26.416]}

$M_{max}$  (nm) = 515.448 x { $S_{max} - [P$  x (170.69 + stroke) / 432,423]}

### Kinetic Energy

PneuMoment maximum KE rating:

Bore	KE
1-1/16"(27mm) or 1-1/2"(38mm)	.135 (ft./lbs.) – 0.183 (nm)
2"(31mm) or 2-1/2"(63mm)	.270 (ft./lbs.) – 0.366 (nm)

Loads generating a KE factor above these KE values require - Shock Option (S) or other external deceleration devices. To calculate the applications KE rating use the formula  $1/2mV^2$ ; where m is the mass of the load, V is the velocity in ft./sec. or m/s, i.e. 4 in/sec would be expressed as 4/12 or .33 ft./sec.

Additional KE information:

<b>1-1/16"(27mm) or 1-1/2"(38mm)</b>	U.S. $m = \{W + [0.162 * (3.5 + \text{stroke(in)})]\} / 32.179$ slugs Metric $m = \{W + [0.028 * (88.9 + \text{stroke(mm)})]\} / 9.81$
<b>2"(31mm) or 2-1/2"(50mm)</b>	U.S. $m = \{W + [0.916 * (6.72 + \text{stroke(in)})]\} / 32.179$ slugs Metric $m = \{W + [.1635 * (170.69 + \text{stroke(mm)})]\} / 9.81$
W = actual side load being moved	

### Deflection and End Play

Due to the structural integrity of PneuMoment's guide and load beams, deflection at end of stroke is negligible within its maximum loading capabilities. However, bearing clearance between the guide beam and load beam may affect end-of-stroke position. Please contact Bimba if you need additional information.

PneuMoment Stroke Length	1-1/16"(27mm) or 1-1/2"(38mm) 5 lbs. (1.86 kg) load applied	2"(31mm) or 2-1/2"(50mm) 35 lbs. (13.06 kg) load applied
1"	.0083" - (.210mm)	.0025" - (.064mm)
2"	.0110" - (.279mm)	.0040" - (.102mm)
3"	.0140" - (.355mm)	.0045" - (.114mm)
4"	.0174" - (.441mm)	.0055" - (.140mm)
5"	.0210" - (.533mm)	.0075" - (.190mm)
6"	.0251" - (.637mm)	.0095" - (.241mm)
7"	.0294" - (.746mm)	.0110" - (.279mm)
8"	.0341" - (.866mm)	.0125" - (.318mm)
9"	.0391" - (.993mm)	.0140" - (.356mm)
10"	.0444" - (1.12mm)	.0150" - (.381mm)

## PneuMoment™ Application Checklist

Extruded Linear Thrusters

TE Series (Composite Bearings)

T Series (Ball Bearings)

Multiple Position Linear Thrusters

Linear Thrusters Checklist

Pneu Moment (Pneumatic Actuators)

Pneu Moment (Application Checklist)

This checklist makes sizing and selecting Bimba PneuMoment easier. Bimba's Engineering Department will assist you by providing a detailed analysis of your application and, based on the information provided, will help you choose the actuator that best fits your needs.

**Step 1. Photocopy this page and complete all applicable information.**

**Step 2. Mail or fax your information to your local stocking distributor.**

**Date:** \_\_\_\_\_

**Your Name:** \_\_\_\_\_

**Company:** \_\_\_\_\_

**Address:** \_\_\_\_\_

**Phone:** \_\_\_\_\_

**Fax:** \_\_\_\_\_

**1. How will the cylinder be mounted? (Check all that apply)**

- Horizontally     Vertically  
 Base             Rear Flange     Front Flange

**2. What is your operating air pressure?**

\_\_\_\_\_ psi                      \_\_\_\_\_ (bar)

**3. What is the weight of the load being moved?**

\_\_\_\_\_ lbs.                      \_\_\_\_\_ (kg.)

**4. How far is the center of the load from the surface of the dynamic member?**

\_\_\_\_\_ inches                      \_\_\_\_\_ (mm)

**5. What is the desired stroke length?**

\_\_\_\_\_ inches                      \_\_\_\_\_ (mm)

**6. What is the maximum velocity of the load?**

\_\_\_\_\_ ft./second                      \_\_\_\_\_ (m/second)

**7. Will external deceleration devices be used?**

- Yes                       No

**8. Will PneuMoment shock absorbers be used to slow down the load?**

- Yes                       No

**9. What is the ambient operating temperature?**

\_\_\_\_\_ °F                      \_\_\_\_\_ °C

**10. Do you need position sensing?**

- Yes                       No

**If yes,**

- end-of-stroke                       mid-stroke

**Briefly describe the environment the PneuMoment will be used in:**

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Application Sketch** (include sketch of external guide/support)

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# Notes

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# Notes



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# Notes