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

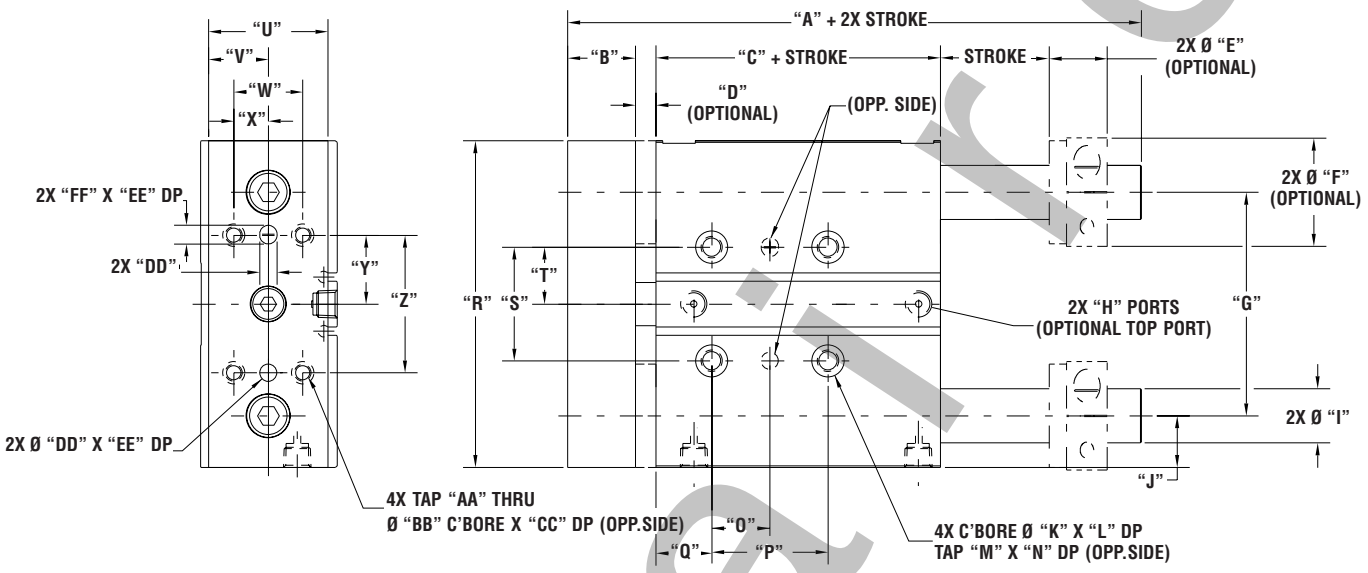
Bore	25mm	50mm	75mm	100mm	125mm	150mm	175mm	200mm	225mm	250mm	275mm
12mm	0.006	0.008	0.011	0.013	0.016	0.018	0.020	0.023	0.025	0.028	0.030
16mm	0.006	0.008	0.011	0.013	0.016	0.018	0.020	0.023	0.025	0.028	0.030
20mm	0.006	0.009	0.011	0.014	0.016	0.019	0.021	0.024	0.027	0.029	0.032
25mm	0.005	0.006	0.008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

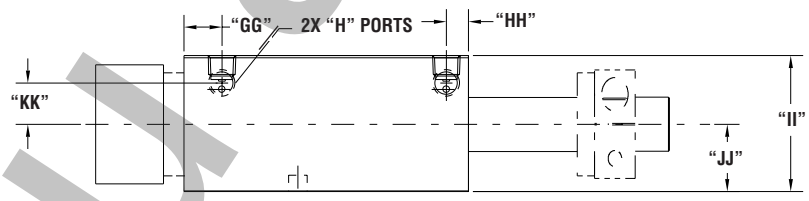
ET and ETD; with Standard Bearings

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"

Dimensions - ET





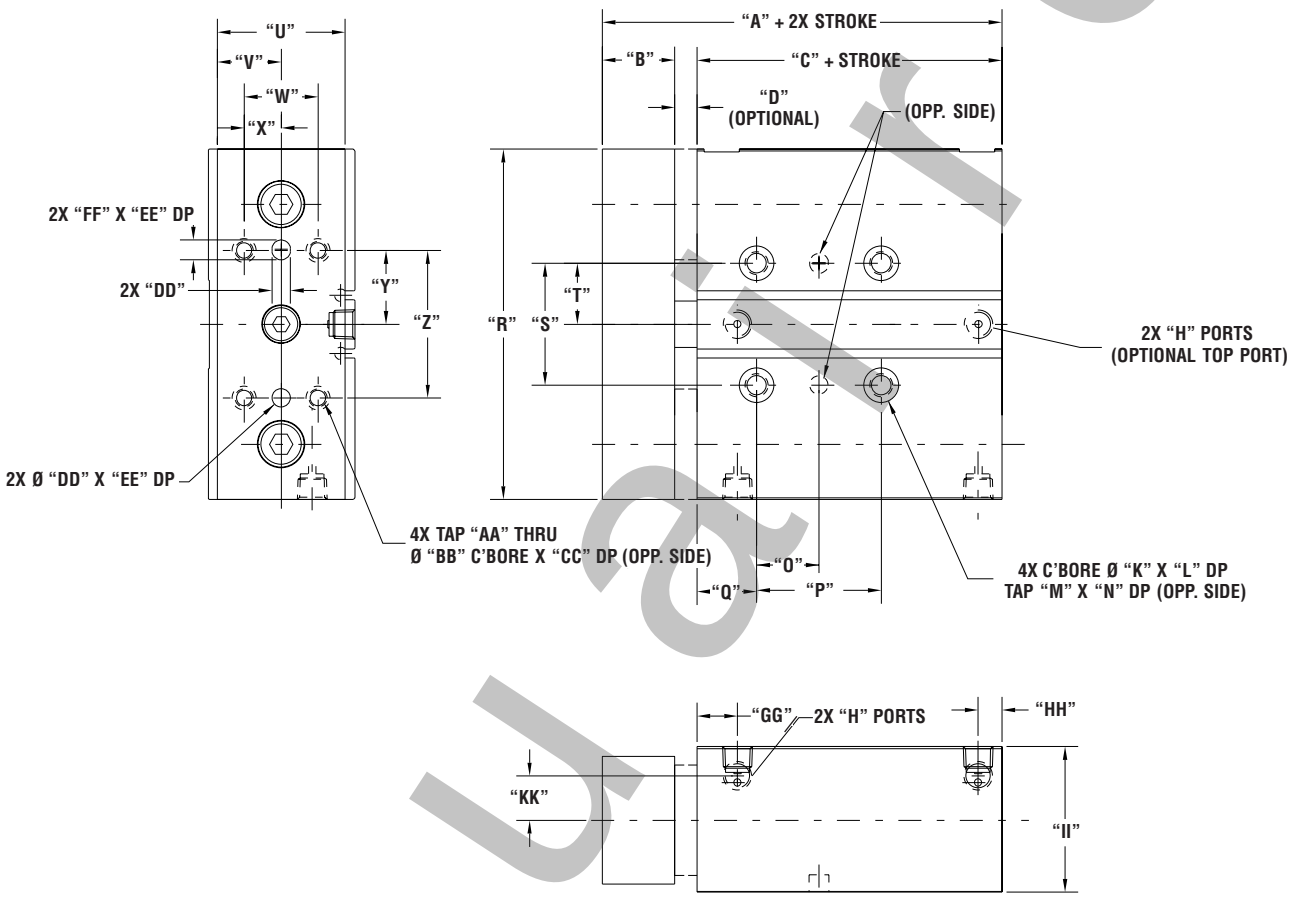
Bore	A	B	C	D	E	F	G	H	I
12mm	3.20	.55	1.66	.25	.60	.95	2.00	#10-32	.39 (10mm)
16mm	3.36	.55	1.81	.25	.60	.95	2.00	#10-32	.39 (10mm)
20mm	3.79	.62	1.91	.25	.68	1.10	2.50	1/8 NPT	.47 (12mm)
25mm	3.90	.79	1.96	.25	.76	1.34	2.75	1/8 NPT	.63 (16mm)
32mm	4.43	.98	2.21	.25	.84	1.57	3.25	1/8 NPT	.79 (20mm)

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

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

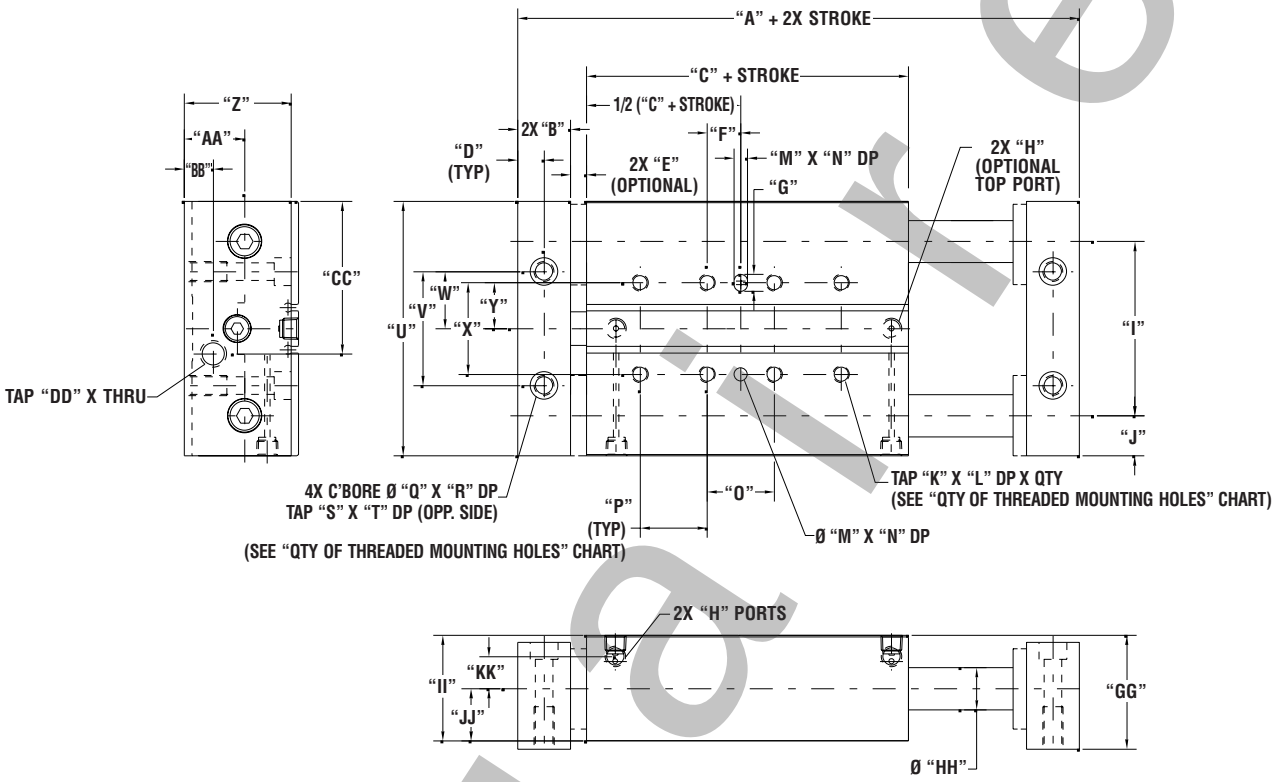
Bore	P	Q	R	S	T	U	V	W	X	Y
12mm	.88	.63	2.85	1.00	.50	.86	.43	.50	.25	.50
16mm	1.06	.65	2.85	1.00	.50	.86	.43	.63	.31	.63
20mm	1.25	.79	3.50	1.39	.69	1.10	.55	.75	.38	.75
25mm	1.50	.79	3.99	1.39	.69	1.30	.65	.88	.44	.88
32mm	1.69	.85	4.75	1.65	.82	1.73	.87	1.00	.50	1.00

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 Extended 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	3.83	.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	2.00	1.00	1.00	.50	.84	.56	.26	1.16
20mm	.68	3.50	2.50	1.25	1.39	.69	1.08	.64	.31	1.31
25mm	.58	3.99	2.75	1.38	1.39	.69	1.28	.95	.35	1.58
32mm	.80	4.75	3.25	1.63	1.65	.83	1.71	1.12	.41	1.83

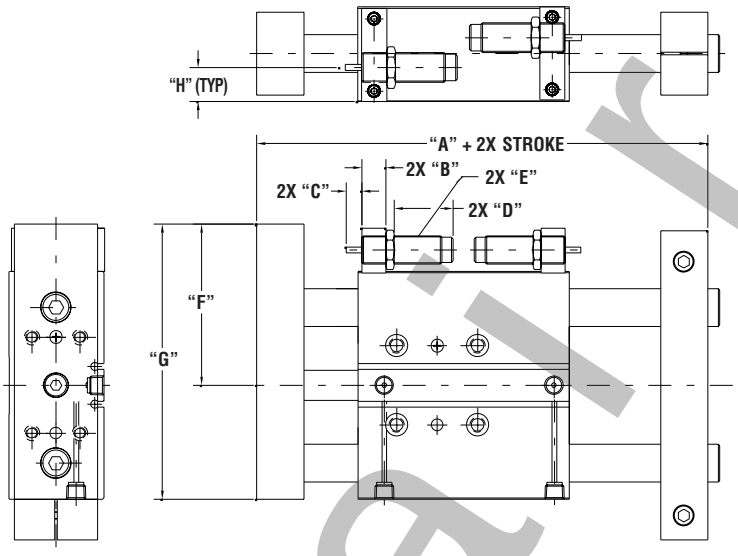
Bore	DD	EE	FF	GG	HH	II	JJ	KK
12mm	M8 x 1.0	.48	.19	1.09	.39 (10mm)	.98	.45	.37
16mm	M8 x 1.0	.51	.19	1.22	.39 (10mm)	1.11	.45	.37
20mm	M10 x 1.0	.57	.32	1.43	.47 (12mm)	1.36	.57	.49
25mm	M12 x 1.0	.57	.32	1.70	.63 (16mm)	1.48	.73	.50
32mm	M14 x 1.0	.63	.32	2.12	.79 (20mm)	1.98	.98	.58

**Quantity of Threaded Mounting Holes

Bore	4	8	12	16	20	24
	For stroke lengths (mm):					
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

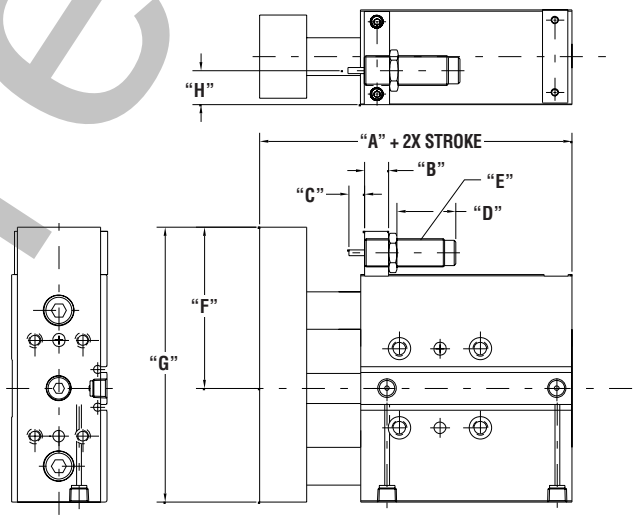
*Optional bumpers (EB, EB1, EB2) add .25" per end to overall length

Dimensions
Options-ET with Shock Absorbers



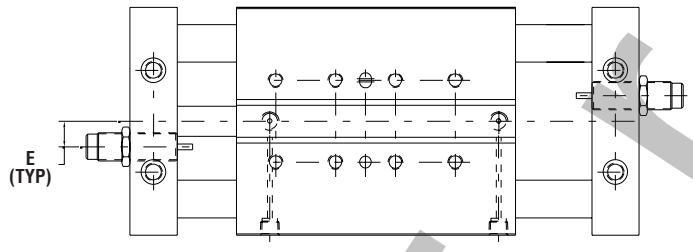
Bore	A	B	C	D	E	F	G	H
12mm	3.20	0.23	0.06	0.89	M8 x 1.0	1.91	3.34	0.20
16mm	3.36	0.23	0.06	0.89	M8 x 1.0	1.91	3.34	0.33
20mm	3.79	0.31	0.11	0.82	M10 x 1.0	2.42	4.17	0.79
25mm	3.90	0.39	0.12	1.57	M12 x 1.0	2.71	4.70	0.36
32mm	4.43	0.47	0.10	2.77	M14 x 1.0	3.23	5.60	0.56

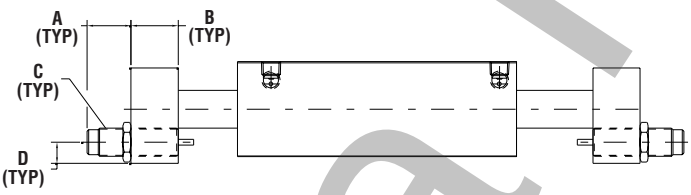
Dimensions
Options-ETS with Shock Absorbers



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

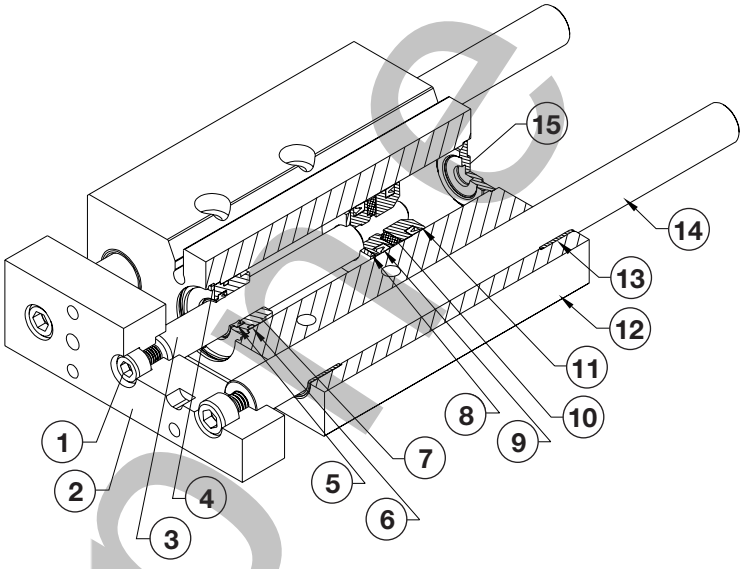
Dimensions
Options-ETD with Shock Absorbers





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	0.58
32mm	2.25	0.99	M14 x 1.0	0.41	0.55

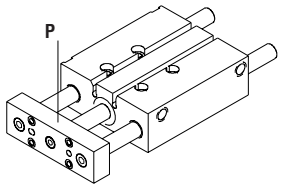
Components/Materials of Construction

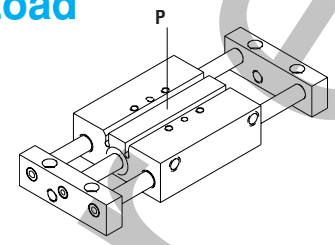


Item #	Description	Material
1	Assembly Bolt	Zinc-Plated Steel
2	Tooling Plate	Anodized Aluminum
3	Piston Rod	Hard Chrome Plated Stainless Steel
4	Retaining Ring	Zinc-Plated Steel
5	Rod Seal	Nitrile (Fluoroelastomer optional)
6	Rod Guide Seal	Nitrile (Fluoroelastomer optional)
7	Rod Guide	Anodized Aluminum
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)

Maximum Side Load





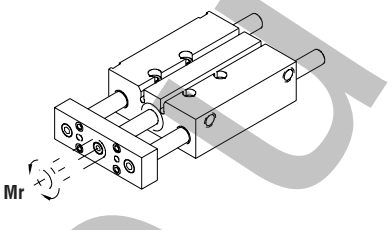
Maximum Load "P" as shown for ET, ETS, ETD
with Standard Bearings (pounds)

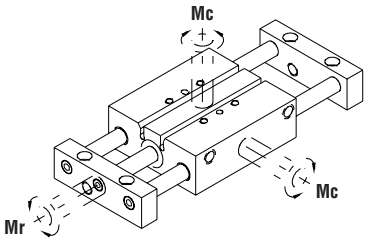
			ETS; by Stroke										
Bore	**ET**	**ETD**	**25mm**	**50mm**	**75mm**	**100 mm**	**125mm**	**150mm**	**175mm**	**200mm**	**225mm**	**250mm**	**275mm**
12mm	19	64	3.5	2.2	1.6	1.3	1.0	0.9	0.8	0.7	0.6	0.6	0.5
16mm	19	64	3.5	2.2	1.6	1.3	1.0	0.9	0.8	0.7	0.6	0.6	0.5
20mm	26	92	5.6	3.7	2.8	2.2	1.8	1.6	1.4	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 (Mr) 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.

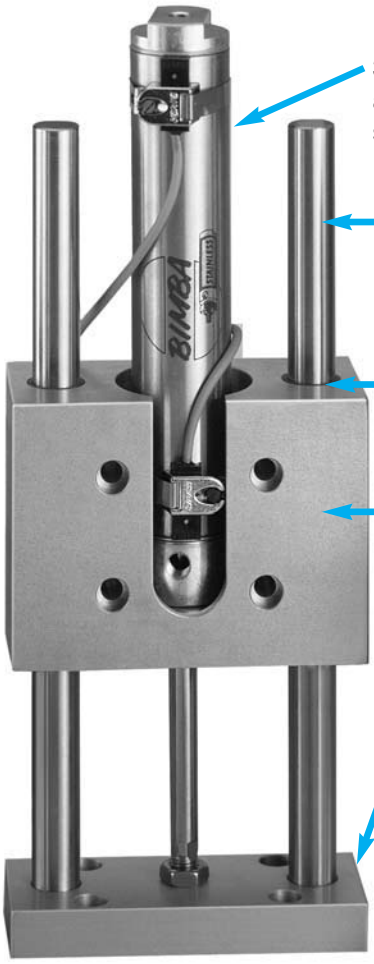
Maximum Axial (Ma) and Cross (Mc) Moments as shown for ETD
Standard Bearings (inch-pounds)

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.

Bimba Linear Thruster

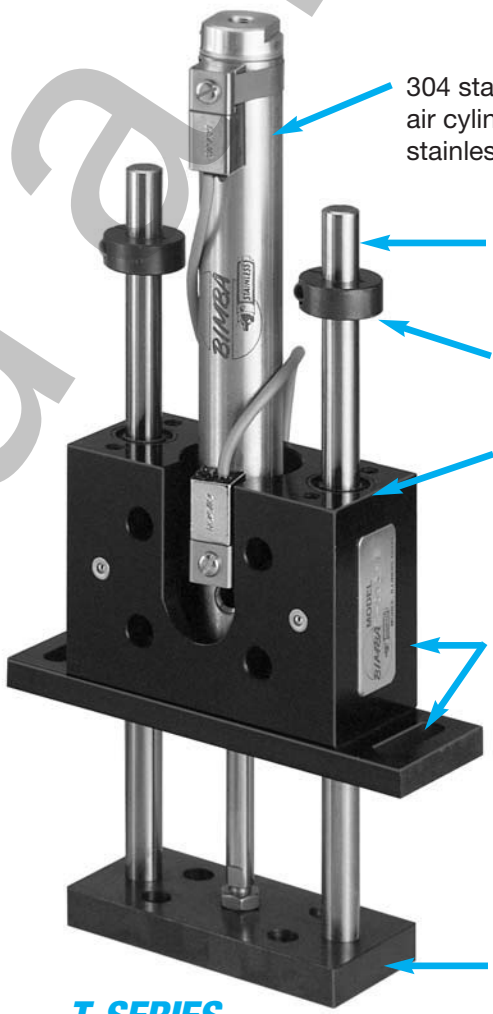


TE SERIES

- 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.

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).



T SERIES

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

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

BORE SIZE	STANDARD STROKE LENGTHS*
02 - 9/16"	1" increments to 6"
04 - 3/4"	1" increments to 12"
09 - 1-1/16"	1" increments to 12"
17 - 1-1/2"	1" increments to 12"
31 - 2"	1" increments to 12"
50 - 2-1/2"	1" increments to 12"
70 - 3"	1" increments to 12"

**Stroke lengths beyond maximum are available; the rear of the cylinder must be supported in horizontal applications.*

OPTIONS

- B - Internal bumpers, both ends[1]
- C - Adjustable cushions, both ends[1]
- D - Dowel pin holes for Transition Plate[2]
- EB1 - External bumpers, extension (one set) (see page13)
- EB2 - External bumpers, both ends (two sets) (see page 13)
- K _ _ - Shock absorbers[3]
  - First _ will be: 1 - Shock both ends; 2 - Shock extend only; 3 - Shock retract only
  - Second _ will be: 1 - Light shock; 2 - Standard shock; 3 - Heavy shock
- M - MRS® magnetic position sensing[4]
- H - Tapped holes
- P - Mounting plate (includes 12 tapped holes)
- S - Stainless steel tooling plate and optional shaft collars

[1] Internal bumpers and cushions cannot be ordered in combination. Adjustable cushions are not available for 9/16" bore size.

[2] Transition Plate Applications: Option -H or -P must be ordered. Option-D must also be ordered if dowel pin holes are required. Not available in 2-1/2" and 3" bores. Dowel pin hole locations shown in Appendix.

[3] See page 67 for more information. Shocks not available on 2-1/2" and 3" bores.

[4] Hall Effect Switch not available for 9/16" bore size.

NOTE: TE Series Linear Thruster includes shaft collars only when external bumpers are ordered as an option (see page 12). Shaft collars can also be ordered separately as a repair part.

Approximate Power Factors

9/16"	=	0.2
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

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.

Bimba Linear Thruster- TE Series (Composite Bearings)

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

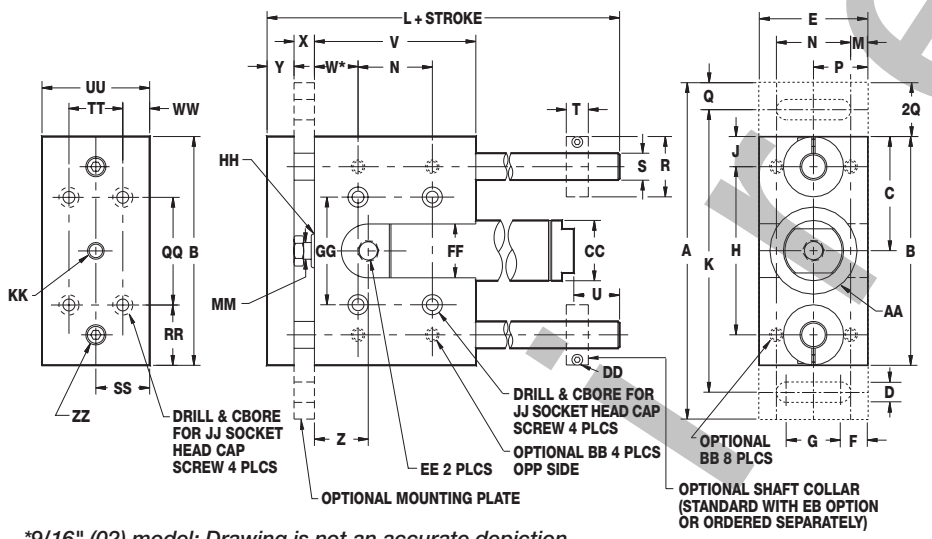
* U.S. Patent nos. 4,794,681 and 4,862,786

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 Thruster- 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
21/2" (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.

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.

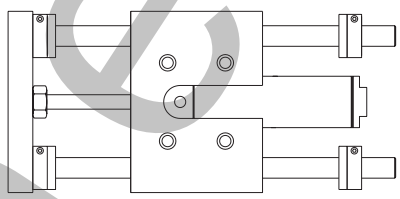
Part #	Description	Quantity
BTE-☐	Shaft Bearing	4
BSTE-☐	-X.XX Basic Shaft	2
EBTE-☐	External Bumper	2 or 4
LT-Bore Stroke-D	Cylinder	1
LT-Bore Stroke-DB	Cylinder	1
LT-Bore Stroke-DM*	Cylinder	1
LT-Bore Stroke-DBM*	Cylinder	1
LTC-Bore Stroke-D	Cylinder	1
LTC-Bore Stroke-DM	Cylinder	1
SCTE-☐	Shaft Collars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

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

External Bumpers

Use and Dimensional Changes

Guide Shaft Extention 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.

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.

T-046-CM

BORE SIZE
02 - 9/16"
04 - 3/4"
09 - 1-1/16"
17 - 1-1/2"
31 - 2"
50 - 2-1/2"
70 - 3"

STANDARD STROKE LENGTHS*
1" increments to 6"
1" increments to 12"
1" increments to 12"
1" increments to 12"
1" increments to 12"
1" increments to 12"
1" increments to 12"

**Stroke lengths beyond maximum are available; the rear of the cylinder must be supported in horizontal applications.*

OPTIONS

- B - Internal bumpers, both ends[1]
- C - Adjustable cushions, both ends[1]
- D - Dowel pin holes for Transition Plate[2]
- EB1 - External bumpers, extension (one set) (see page 18)
- EB2 - External bumpers, both ends (two sets) (see page 18)
- K _ _ - Shock absorbers[3]
  - First _ will be: 1 - Shock both ends; 2 - Shock extend only; 3 - Shock retract only
  - Second _ will be: 1 - Light shock; 2 - Standard shock; 3 - Heavy shock
- M - MRS® magnetic position sensing[4]
- NP - No mounting plate
- S - Stainless steel tooling plate, shafts and collars[5]

[1] Internal bumpers and cushions cannot be ordered in combination. Adjustable cushions are not available for 9/16" bore size.

[2] Transition Plate Applications: Option-D must be ordered if dowel pin holes are required. Not available in 2-1/2" and 3" bores. Dowel pin hole locations shown in Appendix.

[3] Not available on 2-1/2" and 3" bores.

[4] Hall Effect Switch not available for 9/16" bore size.

[5] Not available in 2-1/2" and 3" bores.

Approximate Power Factors

9/16"	=	0.2
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

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.

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:

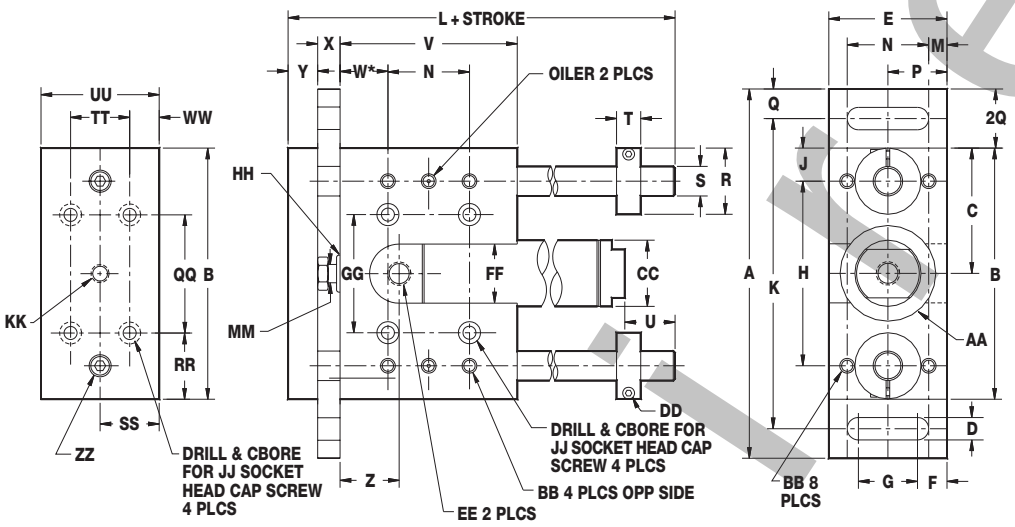
- Internal Buna N or external urethane bumpers
- Patented adjustable cushions*
- Buna N magnet for position sensing

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.

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.

External Bumpers

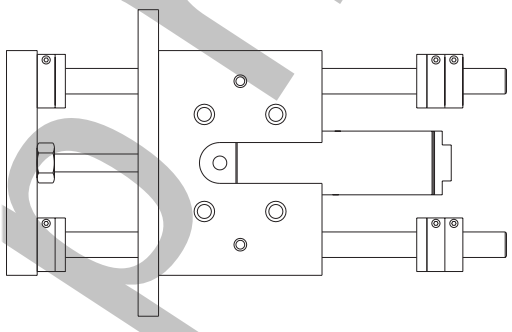
Use and Dimensional Changes

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 Extention 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	With Mounting Plate	Without Mounting Plate
9/16"	0.56	.31
3/4"	0.62	.24
1-1/16"	0.70	N/A
1-1/2"	0.73	.25
2"	0.81	N/A
2-1/2"	1.06	0.31
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.*

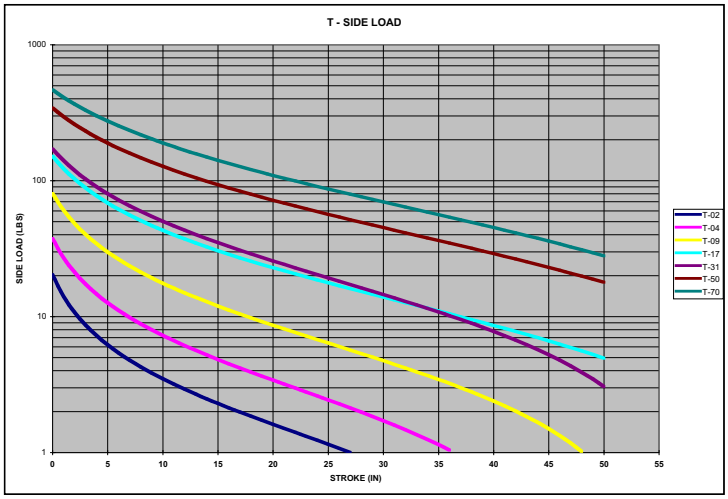
Approximate Weights

(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

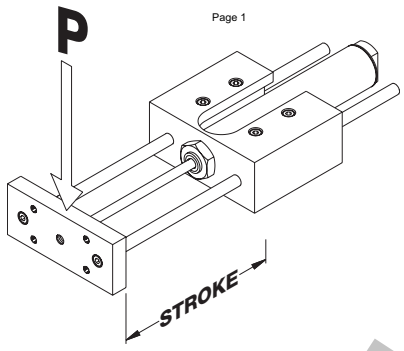
Bimba Linear Thruster- T Series (Ball Bearings)

T - Maximum Side Loads (lbs.)

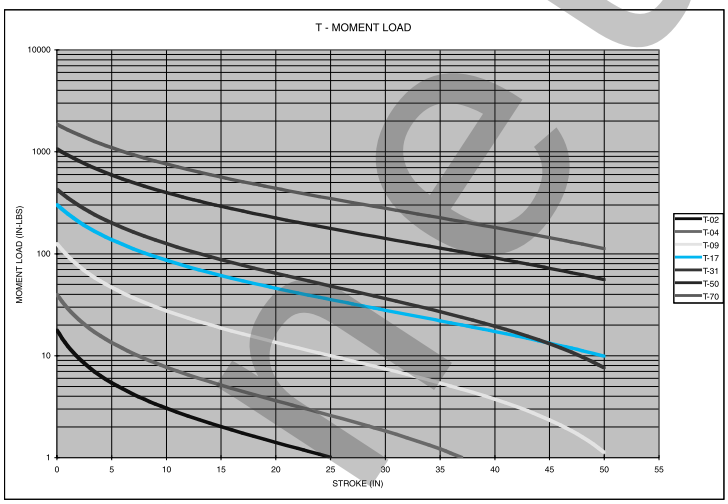


	T-02	T-04	T-09	T-17	T-31	T-50	T-70
0	20.34	37.49	80.50	151.62	171.30	342.37	465.67
1	14.11	27.17	60.61	122.73	140.62	295.93	410.17
2	10.76	21.23	48.46	102.88	118.91	260.13	365.92
3	8.67	17.38	40.26	88.39	102.73	231.67	329.78
4	7.24	14.66	34.34	77.34	90.19	208.50	299.70
5	6.19	12.65	29.87	68.63	80.18	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

Page 1

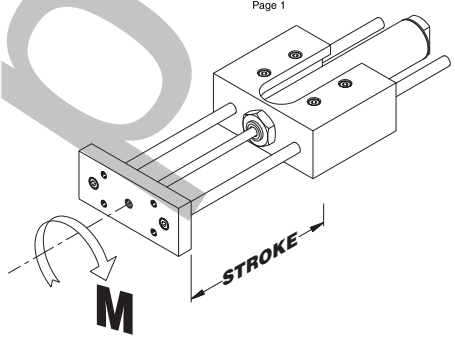


T - Maximum Moments (in.-lbs.)



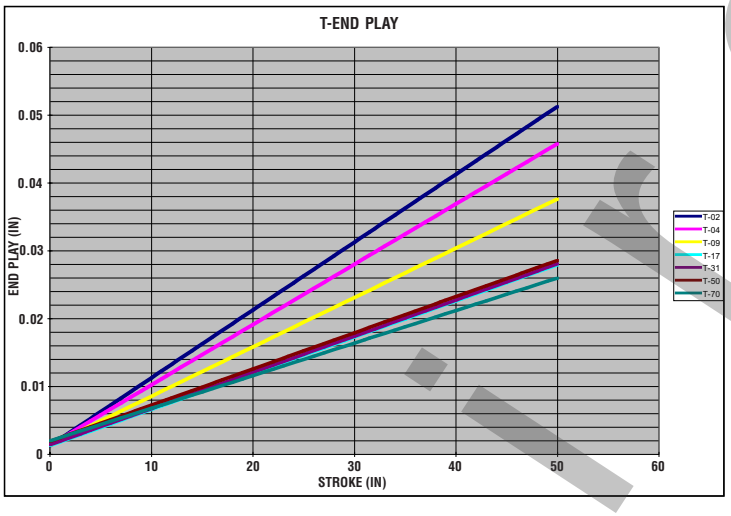
	T-02	T-04	T-09	T-17	T-31	T-50	T-70
0	17.80	39.83	125.78	303.23	428.25	1069.92	1862.69
1	12.35	28.86	94.70	245.46	351.56	924.78	1640.70
2	9.42	22.56	75.72	205.76	297.28	812.90	1463.66
3	7.59	18.46	62.90	176.78	256.83	723.97	1319.12
4	6.33	15.58	53.66	154.68	225.48	651.55	1198.81
5	5.42	13.44	46.67	137.26	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

Page 1



Bimba Linear Thruster- T Series (Ball Bearings)

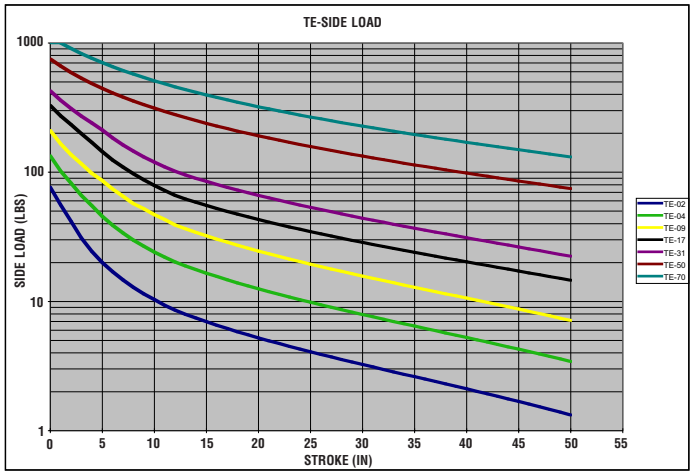
T - Tooling Plate End Play (in.)



	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 Linear Thruster- TE Series (Ball 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

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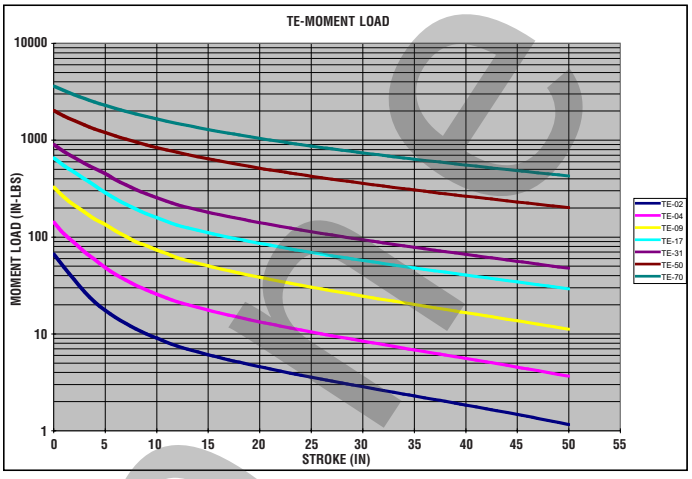
TE - Maximum Moments (in.-lbs.)



	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

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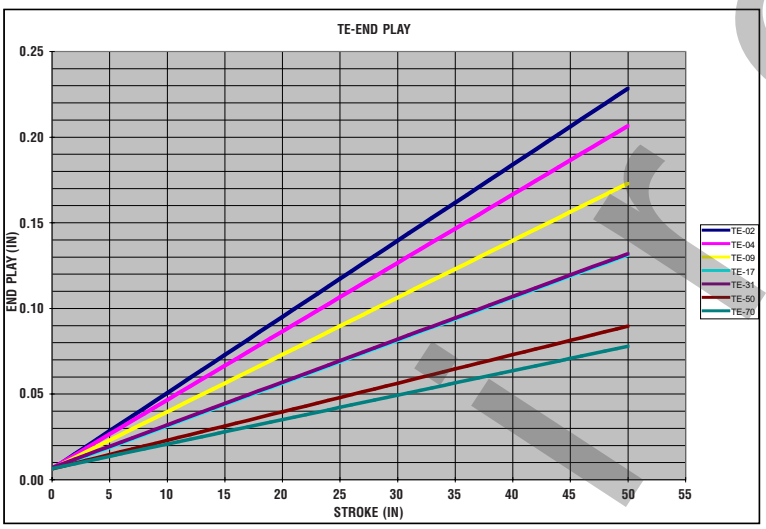
Fricitional characteristics of TE Series Linear Thrusters deteriorate as stroke length increases.

Bimba Linear Thruster- TE Series (Ball 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 Multiple Position Linear Thruster

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

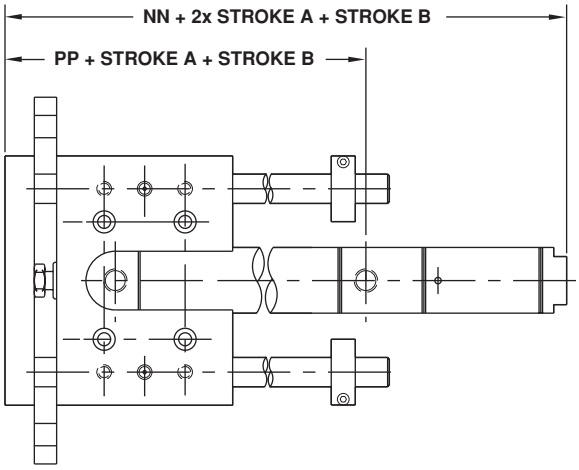
How to Order

T- 09 1/2 - M

PRODUCT TYPE	BORE SIZE	STROKE LENGTHS			OPTIONS
		Stroke A	Stroke B	Standard Strokes and Stroke Maximums	
T - T Series (Ball Bearings) TE - TE Series (Composite Bearings)	02 - 9/16" 04 - 3/4" 09 - 1-1/16" 31 - 2"	0.5 = 1/2" 1 = 1"	0.5 = 1/2" 1 = 1"	1" increments to 12" Stroke A + Stroke B Maximum = 12"	M - MRS® magnetic position sensing

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 11 and 15.

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°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 upon 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 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.