Tolomatic
EXCELLENCE IN MOTION®

CC CABLE CYLINDER

RODLESS CYLINDER

CONTENTS

CABLE CYLINDER

ENDURANCE TECHNOLOGY℠

Endurance Technology features are designed for maximum durability to provide extended service life.

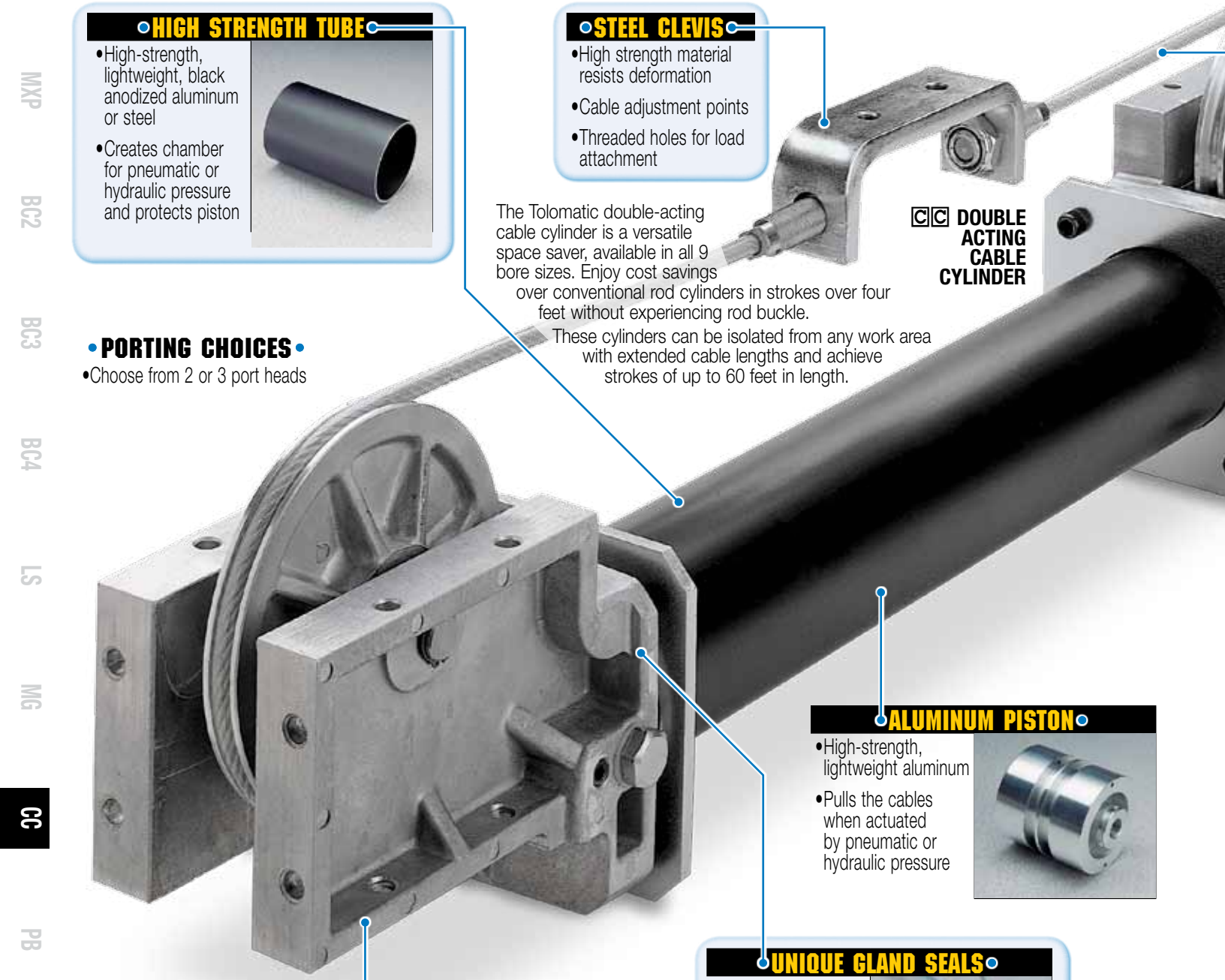
Tolomatic invented the first ever rodless cylinder in 1956 - the cable cylinder. First designed into the bagger/sealer used in the flour industry the cable cylinder continues to power applications in the 21st century. Built-to-order in stroke lengths up to 282 inches.

HIGH STRENGTH TUBE

- High-strength, lightweight, black anodized aluminum or steel
- Creates chamber for pneumatic or hydraulic pressure and protects piston

STEEL CLEVIS

- High strength material resists deformation
- Cable adjustment points
- Threaded holes for load attachment



CC DOUBLE ACTING CABLE CYLINDER

The Tolomatic double-acting cable cylinder is a versatile space saver, available in all 9 bore sizes. Enjoy cost savings over conventional rod cylinders in strokes over four feet without experiencing rod buckle.

These cylinders can be isolated from any work area with extended cable lengths and achieve strokes of up to 60 feet in length.

PORTING CHOICES

- Choose from 2 or 3 port heads

ALUMINUM PISTON

- High-strength, lightweight aluminum
- Pulls the cables when actuated by pneumatic or hydraulic pressure

UNIQUE GLAND SEALS

- Tight seal for cables to pass through
- Easy installation
- Snap In/Out cable seals or encapsulated gland seals depending on bore size

DIE CAST HEAD ASSEMBLY

- High-strength, lightweight anodized aluminum
- Protects piston and creates chamber for pneumatic or hydraulic pressure

LOCATE REMOTELY

- Cylinder can be located away from work area. Useful in harsh environments and if space/weight are limited

TOLOMATIC…THE RODLESS CYLINDER LEADER

MIL SPEC CABLES

- Field proven to provide millions of cycles of uninterrupted service
- Nylon jacketed aircraft cables manufactured under Mil Spec. MiL-W-83420D

SA SINGLE ACTING CABLE CYLINDER

- Use in vertical applications when double acting cable cylinder is not required
- Can be positioned horizontally and achieve vertical movement

DP DOUBLE PURCHASE CABLE CYLINDER

- Doubles the velocity and stroke capacity of cable cylinder without increasing space requirements
- Stroke lengths up to 120 feet (36.6m)
- Isolates cylinder from harsh environments

TC TRACK CABLE CYLINDER

- Guides and supports load
- Precision linear ball bearings on hardened ground steel shafts

OPTIONS

AUTO TENSIONER
- Maintains proper cable tension
- Maximizes service life of both cable and seals

CALIPER DISC BRAKE HM HN
- Best mounting choice in most applications

STEEL TUBE
- For extra strength & use in harsh environments

3 PORTED HEAD
- For convenient air connection

SWITCHES
- Available in Reed and Triac
- 15ft. cable with flying leads; available with quick-disconnect couplers

SEALS OF VITON® MATERIAL V
- Long lasting seal option
- High temperature applications

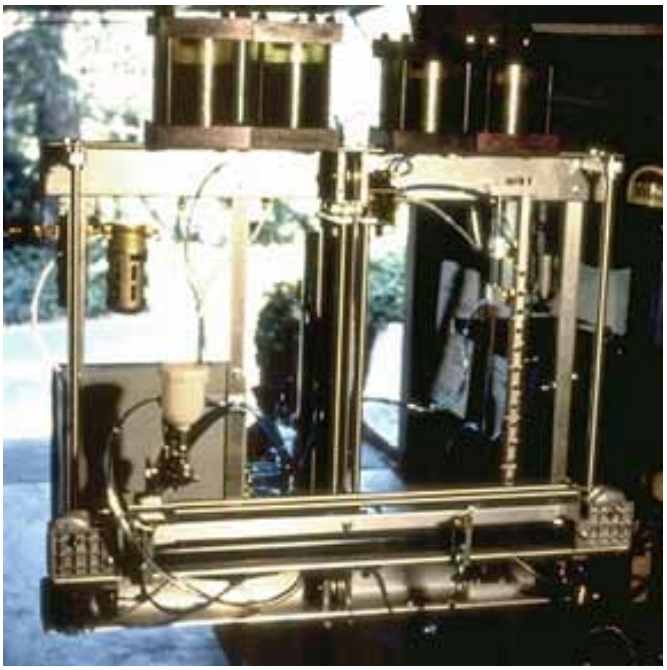
EXTRA CABLE XA XB
- To remotely locate cable cylinder

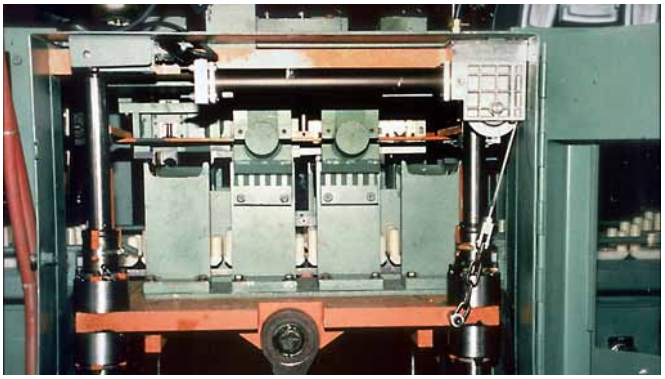
CC Cable Cylinder

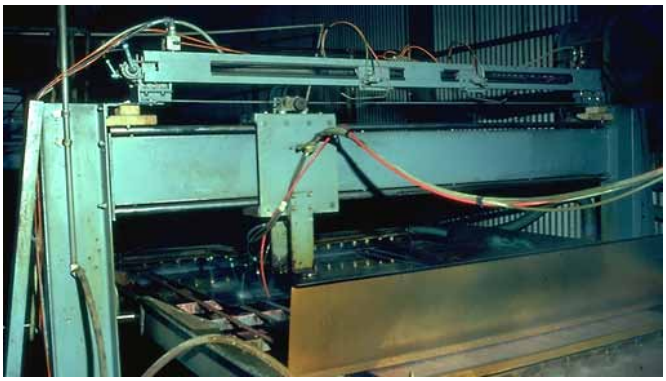
APPLICATIONS

Tolomatic invented the first ever rodless cylinder in 1956 - the cable cylinder. First designed into the bagger/sealer used in the flour industry the cable cylinder continues to power applications in the 21st century. The cable cylinder has been a key component in the following industries:

- Packaging
- Automotive
- Food & Beverage
- Material Handling & Conveying
- Plastic Injection Molding
- Metal Processing
- Paper and Textiles
- Medical
- Electronics
- Printing
- Many Others

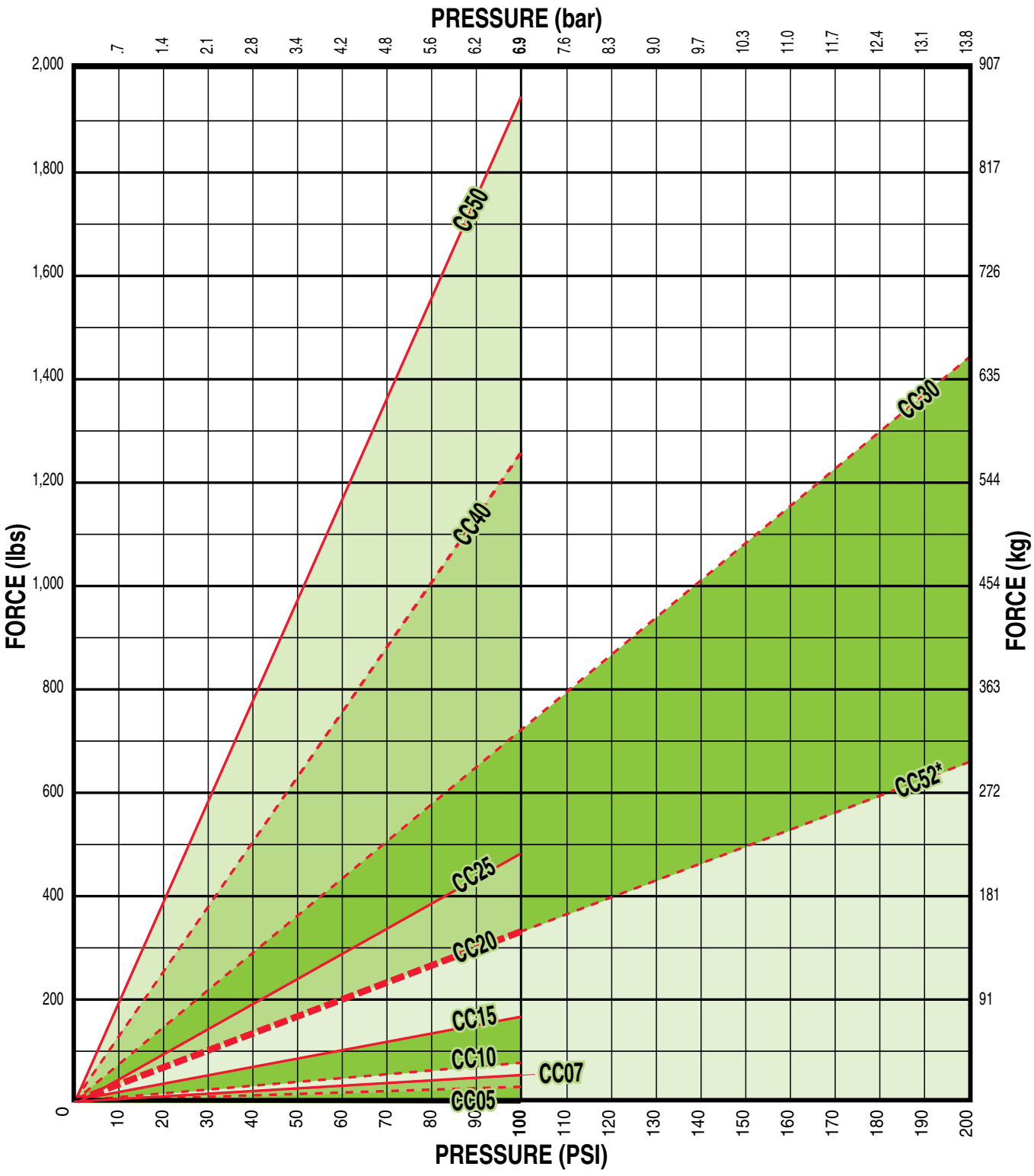






PERFORMANCE

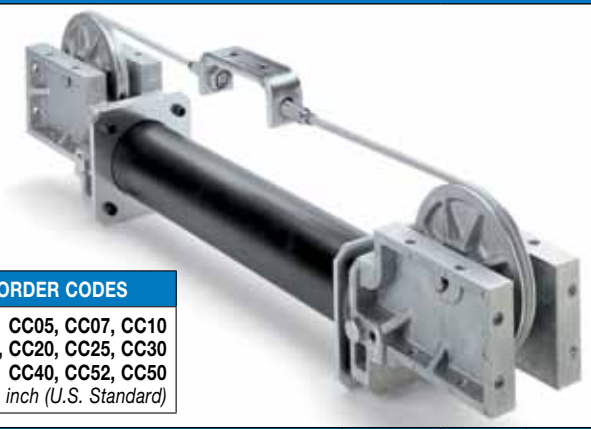
CABLE CYLINDER THEORETICAL FORCE VS PRESSURE



*CC52 up to 500 psi

CC Double Acting Cable Cylinder - All Sizes

FEATURES AND OPTIONS



ORDER CODES

CC05, CC07, CC10
CC15, CC20, CC25, CC30
CC40, CC52, CC50
inch (U.S. Standard)

The Tolomatic double-acting cable cylinder is a versatile space saver, available in all 9 bore sizes. Enjoy cost savings over conventional rod cylinders in strokes over four feet with out experiencing rod buckle.

These cylinders can be isolated from any work area with extended cable lengths. Contact Tolomatic to achieve strokes of up to 60 feet in length.

CC OPTIONS	Order Code	Page	CC05	CC07	CC10	CC15	CC20	CC25	CC30	CC40	CC52	CC50
Auto Tensioner w/ one 1" Stroke Unit	HI, HJ	CC_22	–	OP	OP	OP	OP	OP	OP	OP	OP	–
Auto Tensioner w/ two 1" Stroke Units	HI, HJ	CC_22	–	OP	OP	OP	OP	OP	OP	OP	OP	–
Auto Tensioner w/ one 2" Stroke Unit	HK,HL	CC_22	–	–	–	–	OP	OP	OP	OP	OP	OP
Auto Tensioner w/ two 2" Stroke Units	HK,HL	CC_22	–	–	–	–	OP	OP	OP	OP	OP	OP
Caliper Disc Brake	HM, HN	CC_25	–	–	–	OP	OP	OP	OP	OP	OP	OP
Switches (DC Reed & Triac)	(several)	CC_28	OP	OP	OP	OP	OP	OP	OP	OP	OP	OP
Aluminum Tube			ST	ST	ST	ST	ST	ST	ST	ST	ST	ST
Steel Tube (Switches NOT available)	S		–	–	OP	OP	OP	OP	OP	OP	OP	OP
Seals of Viton® Material	V		–	OP	OP	OP	OP	OP	OP	OP	OP	OP
3 Ported Heads	HG		OP	OP	OP	OP	OP	OP	OP	OP	OP	OP
MORE INFORMATION	**Page**											
Application Guidelines	CC_36		ST	ST	ST	ST	ST	ST	ST	ST	ST	ST
Cushion Needle Adjustment	CC_38		–	ST	ST	ST	ST	ST	ST	ST	ST	ST
Ordering	CC_40		ST	ST	ST	ST	ST	ST	ST	ST	ST	ST
Selection	CC_30		ST	ST	ST	ST	ST	ST	ST	ST	ST	ST
Caliper Disc Brake Option Selection	CC_32		–	–	–	OP	OP	OP	OP	OP	OP	OP
STANDARD FEATURE	**Page**											
Fixed Orifice Cushions	CC_38		–	ST	ST	–	–	–	–	–	–	–
Adjustable Cushions	CC_38		–	–	–	ST	ST	ST	ST	ST	ST	ST
Single Ported Head			ST	ST	ST	ST	ST	ST	ST	ST	ST	ST

– = Not Available OP = Optional ST = Standard

Double Acting Cable Cylinder - CC05, CC07, CC10

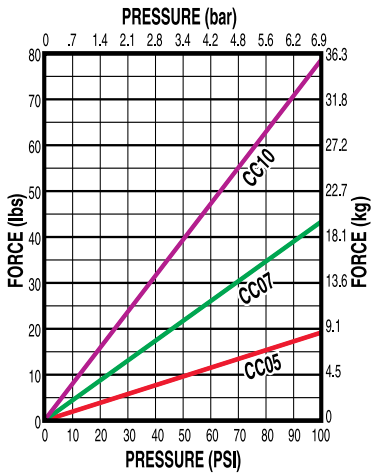
OVERALL UNIT SPECIFICATIONS					
			CC05	CC07	CC10
BORE SIZE		in	0.50	0.75	1.00
MAX STROKE		in	54	138	282
		mm	*1372*	*3505*	*7163*
BASE WEIGHT	Alum.	lb	1.38	1.38	1.38
		kg	*0.63*	*0.63*	*0.63*
	Steel	lb	NA	NA	1.49
		kg	*NA*	*NA*	*0.68*
WEIGHT PER UNIT OF STROKE	Alum.	lb per in	0.011	0.034	0.043
		g per mm	*0.197*	*0.606*	*0.768*
	Steel	lb per in	NA	NA	0.125
		g per mm	*NA*	*NA*	*2.244*
MAX PRESSURE		PSI	100	100	100
		bar	*6.9*	*6.9*	*6.9*
MAX TEMP		°F	140	140	140
		°C	*60*	*60*	*60*
MAX FORCE OUTPUT		lb	19.4	43.5	77.9
		N	*86.3*	*193.5*	*346.5*

TUBING SPECIFICATIONS					
			CC05	CC07	CC10
DEAD LENGTH*		in	1.11	1.18	1.31
		mm	*28.2*	*30*	*33.3*
WALL THICKNESS		in	0.0937	0.125	0.125
		mm	*2.38*	*3.175*	*3.175*
MATERIAL			Alum.	Alum.	Alum or Steel
TUBE SUPPORT SPAN	Alum.	in	60	60	72
		mm	*1524*	*1524*	*1829*
	Steel	in	NA	NA	78
		mm	*NA*	*NA*	*1981*

*Add to stroke length to determine overall length

CABLE SPECIFICATIONS				
		CC05	CC07	CC10
WIRE DIA	in	0.0468	0.0468	0.0468
	mm	*1.189*	*1.189*	*1.189*
NYLON O.D.	in	0.0937	0.0937	0.0937
	mm	*2.38*	*2.38*	*2.38*
STRAND CONFIGURATION		7 x 7	7 x 7	7 x 7
TENSILE STRENGTH	lb	270	270	270
	kg	*122.47*	*122.47*	*122.47*
PROOF-LOAD TORQUE	in-lb	15	15	15
	N-m	*1.69*	*1.69*	*1.69*
PRETENSIONING TORQUE	in-lb	2.5	2.5	2.5
	N-m	*0.28*	*0.28*	*0.28*

THEORETICAL FORCE vs PRESSURE



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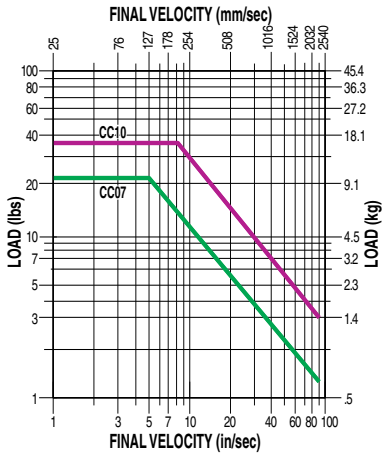
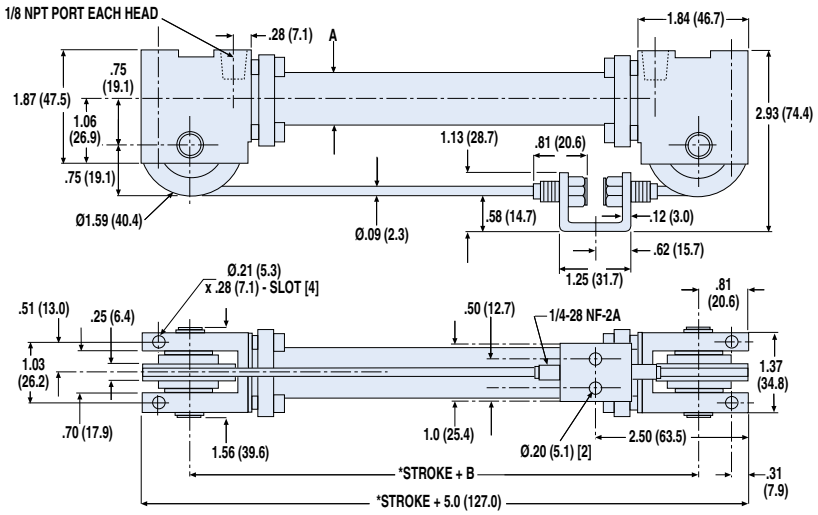


CC10
CC07
CC05

NOTE: The CC05 cylinder does not have cushions.

DIMENSIONS



*If M option (magnet) is ordered add 1.62" (41.2mm) to the overall length

	CC05	CC07	CC10
A	Ø.63 (16.0)	Ø1.00 (25.4)	Ø1.25 (31.8)
B	3.38 (85.8)	3.43 (87.1)	3.43 (87.1)

Dimensions in inches, in parentheses ( ) dimensions in millimeters

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

Double Acting Cable Cylinder - CC15

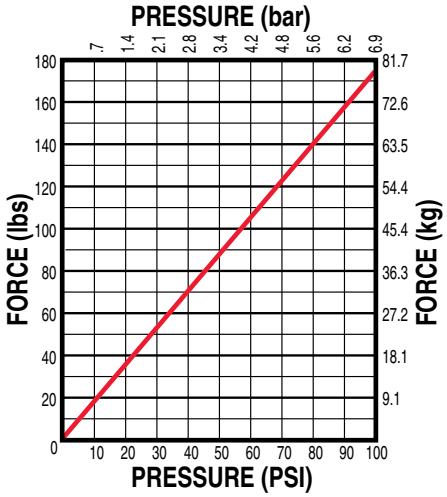
OVERALL UNIT SPECIFICATIONS			CC15
BORE SIZE		in	1.50
MAX STROKE		in	280
		mm	*7112*
BASE WEIGHT	Alum.	lb	5.12
		kg	*2.32*
	Steel	lb	5.27
		kg	*2.39*
WEIGHT PER UNIT OF STROKE	Alum.	lb per in	0.063
		g per mm	*1.1259*
	Steel	lb per in	0.181
		g per mm	*3.2322*
MAX PRESSURE		PSI	100
		bar	*6.9*
MAX TEMP		°F	140
		°C	*60*
MAX FORCE OUTPUT		lb	174
		N	*774.0*

TUBING SPECIFICATIONS			CC15
DEAD LENGTH*		in	3.40
		mm	*86.4*
WALL THICKNESS		in	0.125
		mm	*3.175*
MATERIAL			Alum. or Steel
TUBE SUPPORT SPAN	Alum.	in	84
		mm	*2134*
	Steel	in	90
		mm	*2286*

*Add to stroke length to determine overall length

CABLE SPECIFICATIONS		CC05
WIRE DIA	in	0.0937
	mm	*2.380*
NYLON O.D.	in	0.187
	mm	*4.750*
STRAND CONFIGURATION		7 x 7
TENSILE STRENGTH	lb	920
	kg	*417.30*
PROOF-LOAD TORQUE	in-lb	45
	N-m	*5.08*
PRETENSIONING TORQUE	in-lb	8
	N-m	*0.90*

THEORETICAL FORCE vs PRESSURE



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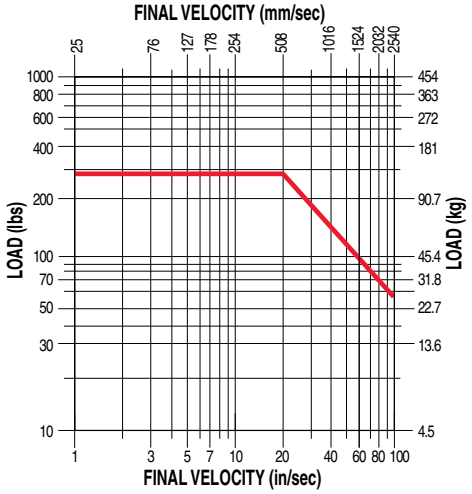
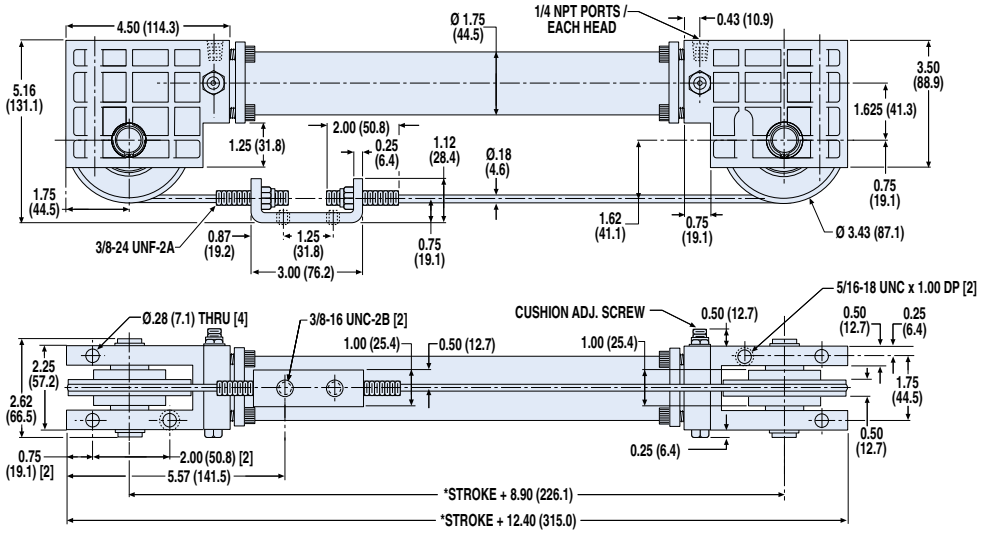


CC15

DIMENSIONS



*If M option (magnet) is ordered add .375" (9.5 mm) to the overall length

Dimensions in inches, in parentheses ( ) dimensions in millimeters

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

Double Acting Cable Cylinder - CC20, CC25

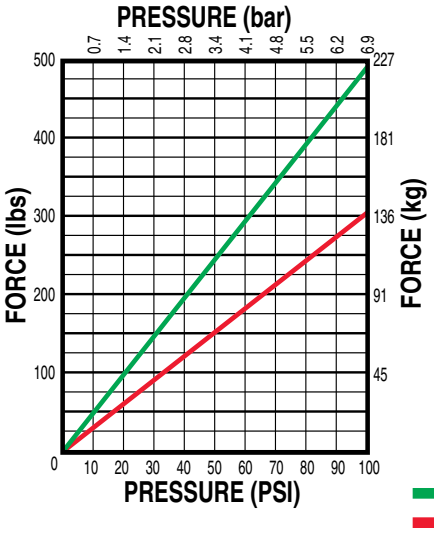
OVERALL UNIT SPECIFICATIONS			CC20	CC25
BORE SIZE		in	2.00	2.50
MAX STROKE		in	281	281
		mm	*7137*	*7137*
BASE WEIGHT	Alum.	lb	12.44	12.9
		kg	*5.64*	*5.85*
	Steel	lb	12.9	13.48
		kg	*5.85*	*6.11*
WEIGHT PER UNIT OF STROKE	Alum.	lb per in	0.083	0.103
		g per mm	*1.482*	*1.839*
	Steel	lb per in	0.236	0.292
		g per mm	*4.214*	*5.214*
MAX PRESSURE		PSI	100	100
		bar	*6.9*	*6.9*
MAX TEMP		°F	140	140
		°C	*60*	*60*
MAX FORCE OUTPUT		lb	309	486
		N	*1376*	*2162*

TUBING SPECIFICATIONS			CC20	CC25
DEAD LENGTH*		in	3.00	3.00
		mm	*76.2*	*76.2*
WALL THICKNESS		in	0.125	0.125
		mm	*3.175*	*3.175*
MATERIAL			Alum or Steel	Alum or Steel
TUBE SUPPORT SPAN	Alum.	in	90	96
		mm	*2286*	*2438*
	Steel	in	96	108
		mm	*2438*	*2743*

*Add to stroke length to determine overall length

CABLE SPECIFICATIONS		CC20	CC25
WIRE DIA	in	0.125	0.125
	mm	*3.175*	*3.175*
NYLON O.D.	in	0.250	0.250
	mm	*6.350*	*6.350*
STRAND CONFIGURATION		7 x 19	7 x 19
TENSILE STRENGTH	lb	2000	2000
	kg	*907.18*	*907.18*
PROOF-LOAD TORQUE	in-lb	115	115
	N-m	*12.99*	*12.99*
PRETENSIONING TORQUE	in-lb	46.0	73.0
	N-m	*5.20*	*8.25*

THEORETICAL FORCE vs PRESSURE



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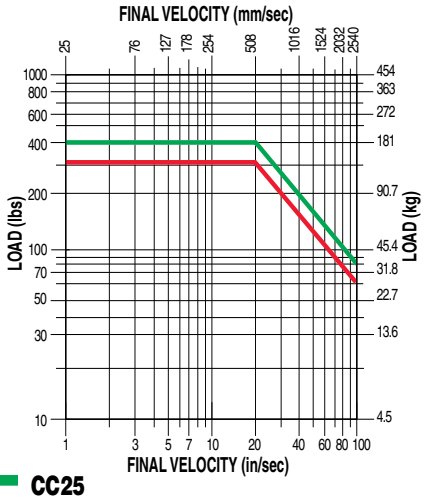

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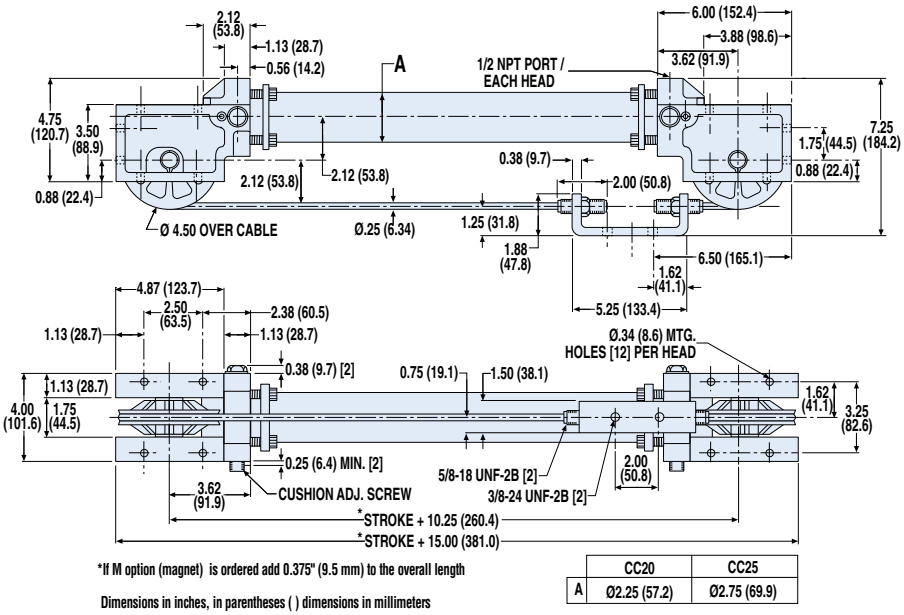


*If M option (magnet) is ordered add 0.375" (9.5 mm) to the overall length

Dimensions in inches, in parentheses ( ) dimensions in millimeters

	CC20	CC25
A	Ø2.25 (57.2)	Ø2.75 (69.9)

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

Double Acting Cable Cylinder - CC30, CC40, CC52

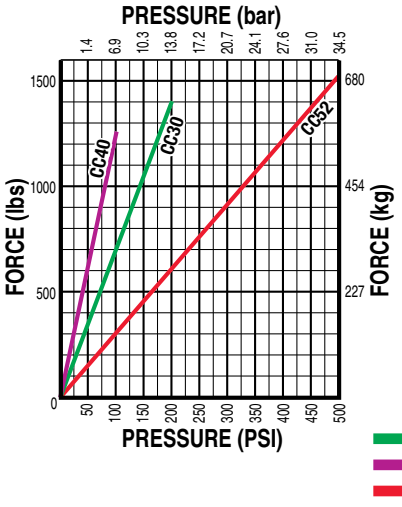
OVERALL UNIT SPECIFICATIONS					
			CC30	CC40	CC52
BORE SIZE		in	3.00	4.00	2.50
MAX STROKE		in	280	279	280
		mm	*7112*	*7087*	*7112*
BASE WEIGHT	Alum.	lb	18.69	20.75	12.44
		kg	*8.48*	*9.41*	*5.64*
	Steel	lb	19.45	22.09	12.9
		kg	*8.82*	*10.02*	*5.85*
WEIGHT PER UNIT OF STROKE	Alum.	lb per in	0.12	0.159	0.081
		g per mm	*2.143*	*2.839*	*1.446*
	Steel	lb per in	0.334	0.459	0.236
		g per mm	*5.965*	*8.197*	*4.214*
MAX PRESSURE		PSI	200	100	500
		bar	*13.8*	*6.9*	*34.5*
MAX TEMP		°F	140	140	140
		°C	*60*	*60*	*60*
MAX FORCE OUTPUT		lb	1398.4	1248.9	1532.4
		N	*6220*	*5555*	*6816*

TUBING SPECIFICATIONS					
			CC30	CC40	CC52
DEAD LENGTH*		in	3.50	4.50	3.00
		mm	*88.9*	*114.3*	*76.2*
WALL THICKNESS		in	0.125	0.125	0.125
		mm	*3.175*	*3.175*	*3.175*
MATERIAL			Alum or Steel	Alum or Steel	Alum or Steel
TUBE SUPPORT SPAN	Alum.	in	102	108	96
		mm	*2591*	*2743*	*2438*
	Steel	in	120	132	96
		mm	*3048*	*3353*	*2438*

*Add to stroke length to determine overall length

CABLE SPECIFICATIONS					
			CC30	CC40	CC52
WIRE DIA		in	0.187	0.187	0.187
		mm	*4.750*	*4.750*	*4.750*
NYLON O.D.		in	0.312	0.312	0.312
		mm	*7.925*	*7.925*	*7.925*
STRAND CONFIGURATION			7 x 19	7 x 19	7 x 19
TENSILE STRENGTH		lb	4200	4200	4200
		kg	*1905*	*1905*	*1905*
PROOF-LOAD TORQUE		in-lb	210	210	210
		N-m	*23.73*	*23.73*	*23.73*
PRETENSIONING TORQUE		in-lb	105	187.5	115
		N-m	*11.86*	*21.19*	*12.99*

THEORETICAL FORCE vs PRESSURE



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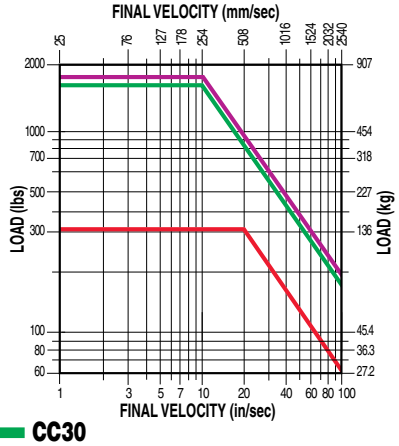
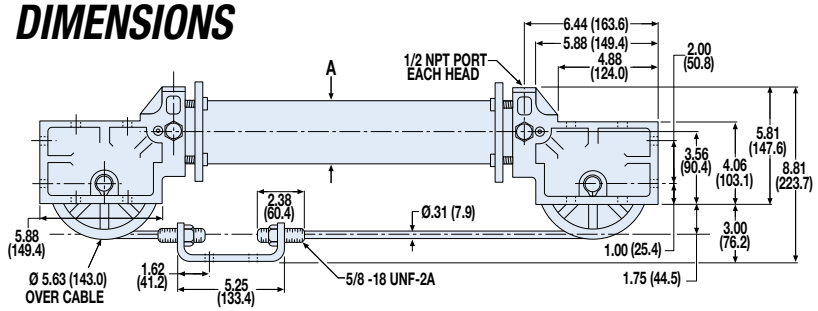
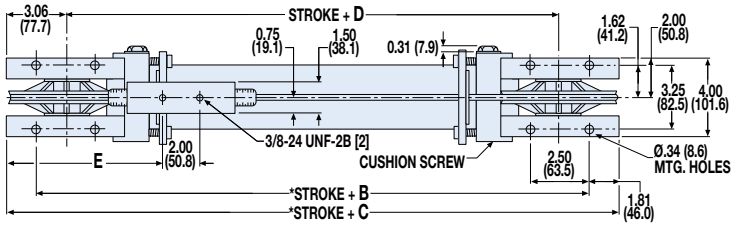


CC30
CC40
CC52

DIMENSIONS





	CC30	CC40	CC52
A	Ø3.25 (82.6)	Ø4.25 (108.0)	Ø2.25 (57.2)
B	13.87(352.3)	14.87 (377.7)	13.87 (352.3)
C	17.50 (444.5)	18.50 (469.9)	17.50 (444.5)
D	11.38 (289.1)	12.38 (314.5)	11.38 (289.1)
E	7.75 (196.9)	8.25 (209.6)	7.75 (196.9)

*If M option (magnet) is ordered add .375" (9.5 mm) to the overall length

Dimensions in inches, in parentheses ( ) dimensions in millimeters

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

Double Acting Cable Cylinder - CC50

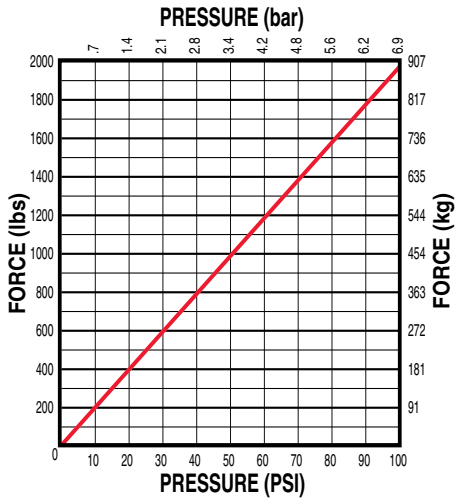
OVERALL UNIT SPECIFICATIONS			
			CC50
BORE SIZE		in	5.00
MAX STROKE		in	134
		mm	*3404*
BASE WEIGHT	Alum.	lb	30.75
		kg	*13.95*
WEIGHT PER UNIT OF STROKE	Alum.	lb per in	0.202
		g per mm	*3.786*
MAX PRESSURE		PSI	100
		bar	*6.9*
MAX TEMP		°F	140
		°C	*60*
MAX FORCE OUTPUT		lb	1919
		N	*8536*

TUBING SPECIFICATIONS			
			CC50
DEAD LENGTH*		in	6.00
		mm	*152.4*
WALL THICKNESS		in	0.125
		mm	*3.175*
MATERIAL			Alum.
TUBE SUPPORT SPAN	Alum.	in	166.8
		mm	*4237*

*Add to stroke length to determine overall length

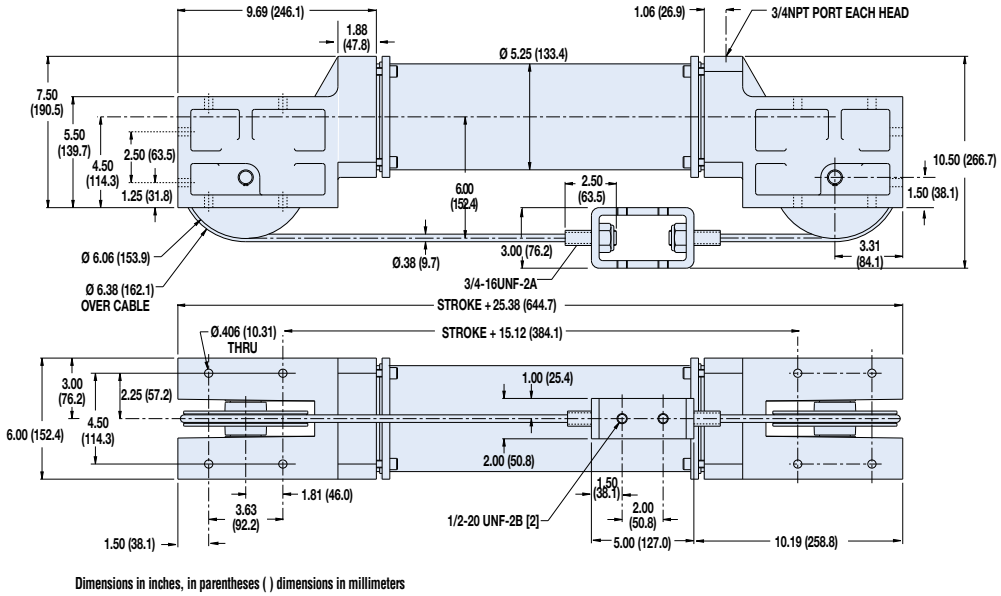
CABLE SPECIFICATIONS		
		CC50
WIRE DIA	in	0.25
	mm	*6.350*
NYLON O.D.	in	0.375
	mm	*9.525*
STRAND CONFIGURATION		7 x 19
TENSILE STRENGTH	lb	7000
	kg	*3175.13*
PROOF-LOAD TORQUE	in-lb	325
	N-m	*36.72*
PRETENSIONING TORQUE	in-lb	180
	N-m	*20.34*

THEORETICAL FORCE vs PRESSURE



NOTE: The CC50 cylinder does not have cushions.

DIMENSIONS

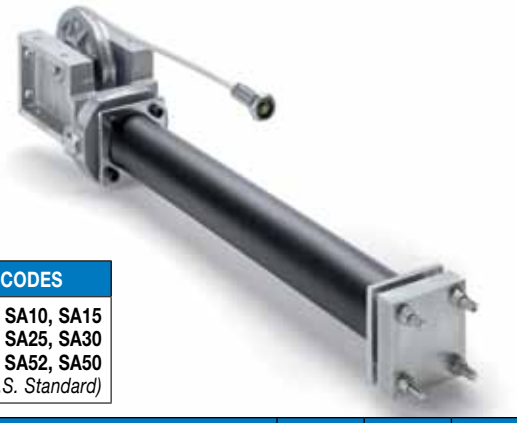


Dimensions in inches, in parentheses ( ) dimensions in millimeters

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

SA Single Acting Cable Cylinder - All Sizes

FEATURES AND OPTIONS



ORDER CODES

SA07, SA10, SA15
SA20, SA25, SA30
SA40, SA52, SA50
inch (U.S. Standard)

When a standard double-acting cable cylinder is not necessary in vertical applications, Tolomatic single-acting cable cylinders provide a cost savings advantage. Ideal for vertical lifting applications, these cylinders may be positioned horizontally and still achieve a vertical movement. Tolomatic single-acting cylinders are available in 8 bore sizes ranging from 3/4-inch to 5 inches with optional switches.

SA OPTIONS	Order Code	Page	SA07	SA10	SA15	SA20	SA25	SA30	SA40	SA52	SA50
Switches (DC Reed & Triac)	(several)	CC_28	OP	OP	OP	OP	OP	OP	OP	OP	OP
Aluminum Tube			ST	ST	ST	ST	ST	ST	ST	ST	ST
Steel Tube (Switches NOT available)	S		–	OP	OP	OP	OP	OP	OP	OP	OP
Seals of Viton® Material	V		OP	OP	OP	OP	OP	OP	OP	OP	OP
3 Ported Heads	HG		OP	OP	OP	OP	OP	OP	OP	OP	OP
MORE INFORMATION	**Page**										
Application Guidelines	CC_36		ST	ST	ST	ST	ST	ST	ST	ST	ST
Cushion Needle Adjustment	CC_38		ST	ST	ST	ST	ST	ST	ST	ST	ST
Ordering	CC_40		ST	ST	ST	ST	ST	ST	ST	ST	ST
Selection	CC_30		ST	ST	ST	ST	ST	ST	ST	ST	ST
STANDARD FEATURE	**Page**										
Fixed Orifice Cushions	CC_38		ST	ST	–	–	–	–	–	–	–
Adjustable Cushions	CC_38		–	–	ST	ST	ST	ST	ST	ST	ST
Single Ported Head			ST	ST	ST	ST	ST	ST	ST	ST	ST

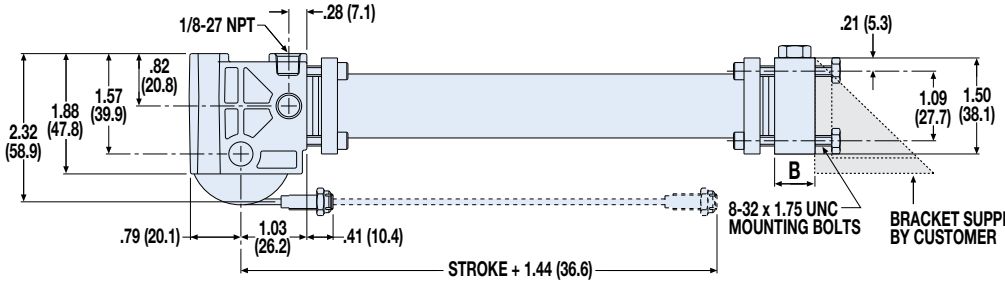
– = Not Available OP = Optional ST = Standard

NOTE: See corresponding CC (double actting cable cylinder) for performance, tubing and cable specifications Page CC_7 to Page CC_11

Single Acting Cable Cylinder - SA07, SA10, SA15

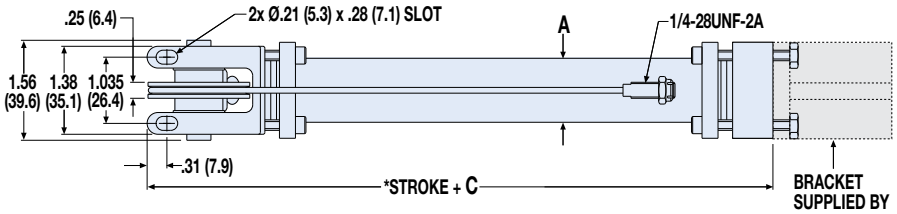
SA07, SA10

DIMENSIONS



OVERALL UNIT SPECIFICATIONS			
		SA07	SA10
BORE SIZE	in	0.75	1.00
MAX STROKE	in	138	282
	mm	*3505*	*7163*
MAX PRESSURE	PSI	100	100
	bar	*6.9*	*6.9*
MAX FORCE OUTPUT	lb	43.5	77.9
	N	*193.5*	*346.5*

NOTE: Additional specifications Page CC_7



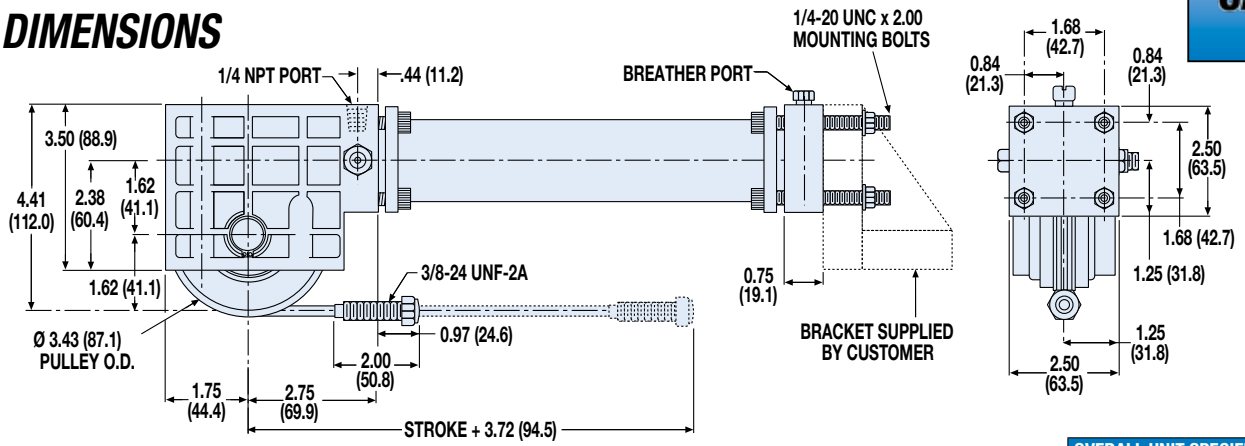
	SA07	SA10
A	Ø 1.00 (25.4)	Ø 1.25 (31.8)
B	0.50 (12.7)	0.63 (16.0)
C	3.62 (92.0)	3.81 (96.8)
D	1.46 (37.1)	1.62 (41.2)

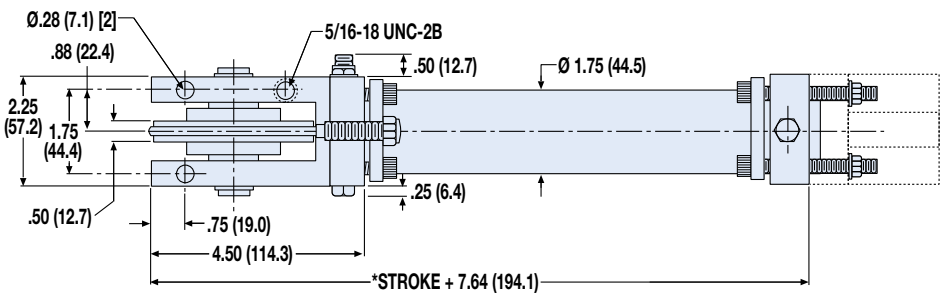
Dimensions in inches, in parentheses ( ) dimensions in millimeters

*If M option (magnet) is ordered add D to the overall length

SA15

DIMENSIONS





OVERALL UNIT SPECIFICATIONS		
		SA15
BORE SIZE	in	1.50
MAX STROKE	in	280
	mm	*7112*
MAX PRESSURE	PSI	100
	bar	*6.9*
MAX FORCE OUTPUT	lb	174
	N	*774.0*

NOTE: Additional specifications Page CC_8

Dimensions in inches, in parentheses ( ) dimensions in millimeters

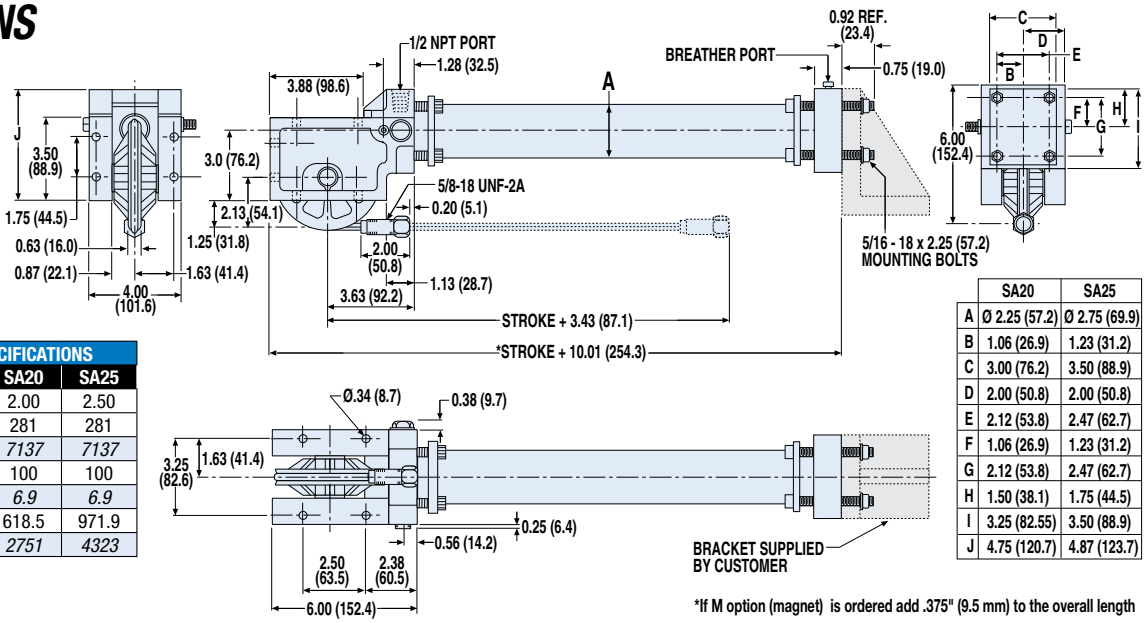
*If M option (magnet) is ordered add .375" (9.5 mm) to the overall length

Single Acting Cable Cylinder - SA20, SA25, SA30, SA40, SA52

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

SA20, SA25

DIMENSIONS



OVERALL UNIT SPECIFICATIONS		SA20	SA25
BORE SIZE	in	2.00	2.50
MAX STROKE	in	281	281
	mm	*7137*	*7137*
MAX PRESSURE	PSI	100	100
	bar	*6.9*	*6.9*
MAX FORCE OUTPUT	lb	618.5	971.9
	N	*2751*	*4323*

	SA20	SA25
A	Ø 2.25 (57.2)	Ø 2.75 (69.9)
B	1.06 (26.9)	1.23 (31.2)
C	3.00 (76.2)	3.50 (88.9)
D	2.00 (50.8)	2.00 (50.8)
E	2.12 (53.8)	2.47 (62.7)
F	1.06 (26.9)	1.23 (31.2)
G	2.12 (53.8)	2.47 (62.7)
H	1.50 (38.1)	1.75 (44.5)
I	3.25 (82.55)	3.50 (88.9)
J	4.75 (120.7)	4.87 (123.7)

NOTE: Additional specifications Page CC_9

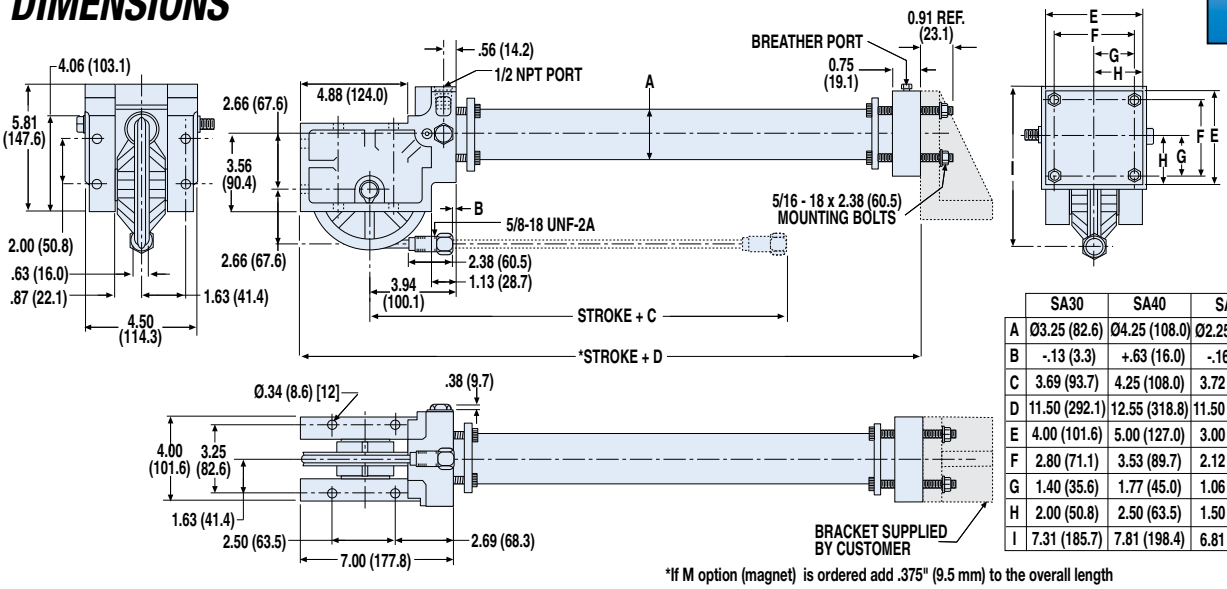
Dimensions in inches, in parentheses ( ) dimensions in millimeters

*If M option (magnet) is ordered add .375" (9.5 mm) to the overall length

SA30, SA40, SA52

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

DIMENSIONS



	SA30	SA40	SA52
A	Ø3.25 (82.6)	Ø4.25 (108.0)	Ø2.25 (57.2)
B	-.13 (3.3)	+.63 (16.0)	-.16 (4.1)
C	3.69 (93.7)	4.25 (108.0)	3.72 (94.5)
D	11.50 (292.1)	12.55 (318.8)	11.50 (292.1)
E	4.00 (101.6)	5.00 (127.0)	3.00 (76.2)
F	2.80 (71.1)	3.53 (89.7)	2.12 (53.8)
G	1.40 (35.6)	1.77 (45.0)	1.06 (26.9)
H	2.00 (50.8)	2.50 (63.5)	1.50 (38.1)
I	7.31 (185.7)	7.81 (198.4)	6.81 (76.2)

*If M option (magnet) is ordered add .375" (9.5 mm) to the overall length

OVERALL UNIT SPECIFICATIONS		SA30	SA40	SA52
BORE SIZE	in	3.00	4.00	2.50
MAX STROKE	in	280	279	280
	mm	*7112*	*7087*	*7112*
MAX PRESSURE	PSI	200	100	500
	bar	*13.8*	*6.9*	*34.5*
MAX FORCE OUTPUT	lb	1398.4	1248.9	1532.4
	N	*6220*	*5555*	*6816*

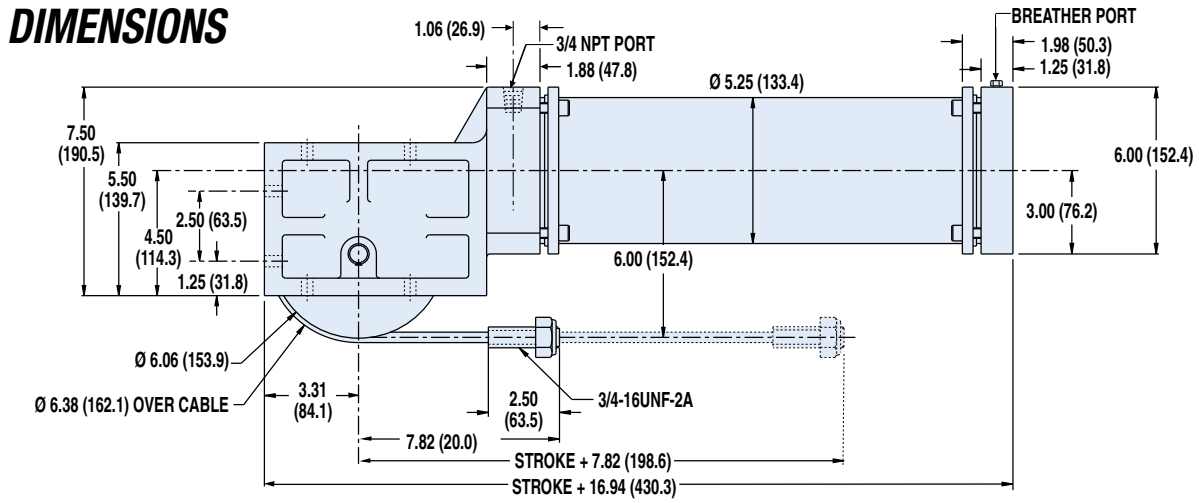
Dimensions in inches, in parentheses ( ) dimensions in millimeters

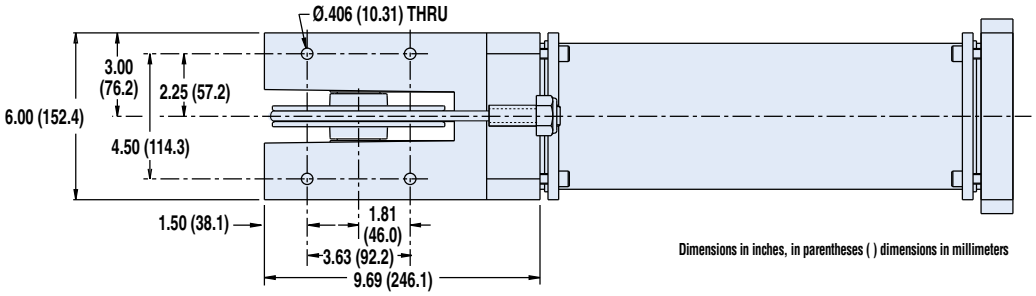
NOTE: Additional specifications Page CC_10

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

SA50

DIMENSIONS





Dimensions in inches, in parentheses ( ) dimensions in millimeters

OVERALL UNIT SPECIFICATIONS		
		SA50
BORE SIZE	in	5.00
MAX STROKE	in	134
	mm	*3404*
MAX PRESSURE	PSI	100
	bar	*6.9*
MAX FORCE OUTPUT	lb	1919
	N	*8536*

NOTE: Additional specifications Page CC_11

Double Purchase Cable Cylinder - All Sizes

FEATURES AND OPTIONS

ORDER CODES

DP15, DP20, DP25
DP30, DP40, DP52
inch (U.S. Standard)

The Tolomatic double purchase cable cylinder doubles the velocity and stroke capacity of double-acting cylinders without increasing space requirements. Available in 5 bore sizes, these cylinders can extend stroke lengths up to 120 feet with considerable cost-saving advantages and they can be placed away from hostile environments.

NOTE: Pulleys and cables used on double purchase cable cylinders are always from the next smaller model size.

NOTE: For double purchase applications, select a bore size that will accommodate twice the load force.

DP OPTIONS	Order Code	Page	DP15	DP20	DP25	DP30	DP40	DP52
Auto Tensioner w/ one 1" Stroke Unit	HI, HJ	CC_22	OP	OP	OP	OP	OP	OP
Auto Tensioner w/ two 1" Stroke Units	HI, HJ	CC_22	OP	OP	OP	OP	OP	OP
Auto Tensioner w/ one 2" Stroke Unit	HK,HL	CC_22	–	OP	OP	OP	OP	OP
Auto Tensioner w/ two 2" Stroke Units	HK,HL	CC_22	–	OP	OP	OP	OP	OP
Caliper Disc Brake	HM, HN	CC_25	OP	OP	OP	OP	OP	OP
Switches (DC Reed & Triac)	(several)	CC_28	OP	OP	OP	OP	OP	OP
Aluminum Tube			ST	ST	ST	ST	ST	ST
Steel Tube (Switches NOT available)	S		OP	OP	OP	OP	OP	OP
Seals of Viton® Material	V		OP	OP	OP	OP	OP	OP
3 Ported Heads	HG		OP	OP	OP	OP	OP	OP
MORE INFORMATION	**Page**							
Application Guidelines	CC_36		ST	ST	ST	ST	ST	ST
Cushion Needle Adjustment	CC_38		ST	ST	ST	ST	ST	ST
Ordering	CC_40		ST	ST	ST	ST	ST	ST
Selection	CC_30		ST	ST	ST	ST	ST	ST
Caliper Disc Brake Option Selection	CC_32		OP	OP	OP	OP	OP	OP
STANDARD FEATURE	**Page**							
Fixed Orifice Cushions	CC_38		–	–	–	–	–	–
Adjustable Cushions	CC_38		ST	ST	ST	ST	ST	ST
Single Ported Head			ST	ST	ST	ST	ST	ST

– = Not Available OP = Optional ST = Standard

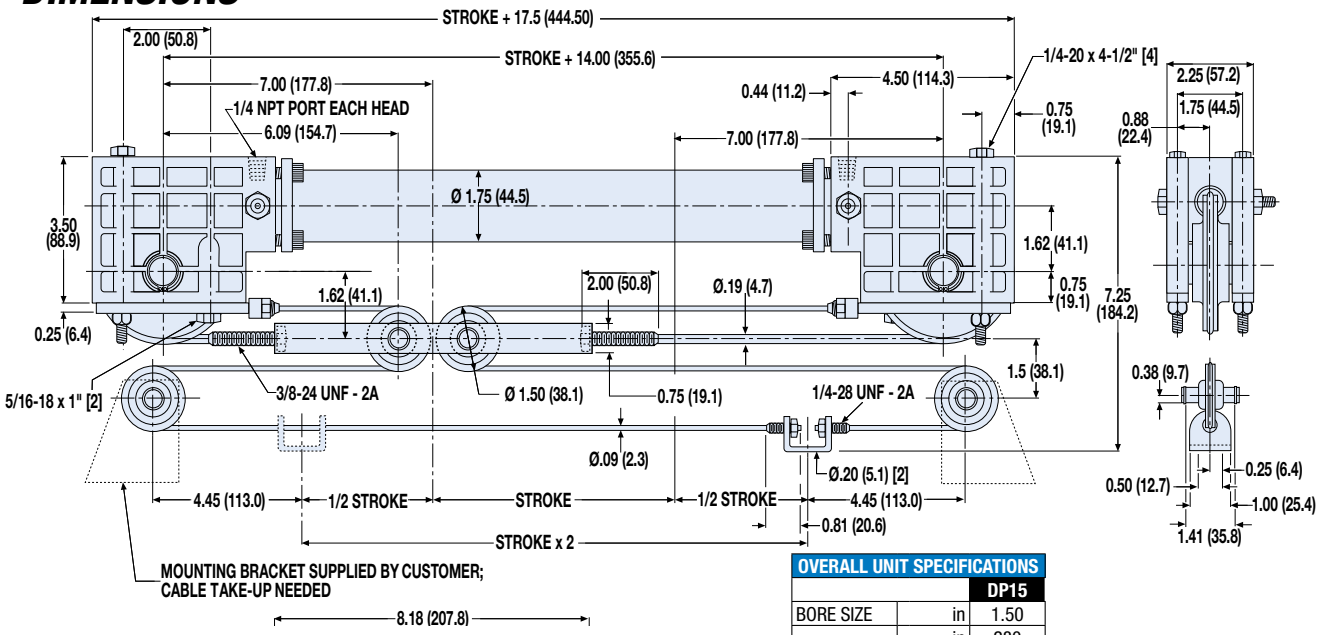
NOTE: See corresponding CC (double actting cable cylinder) for performance, tubing and cable specifications Page CC_8 to Page CC_10

Double Purchase Cable Cylinder - DP15, DP20, DP25

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

DP15

DIMENSIONS



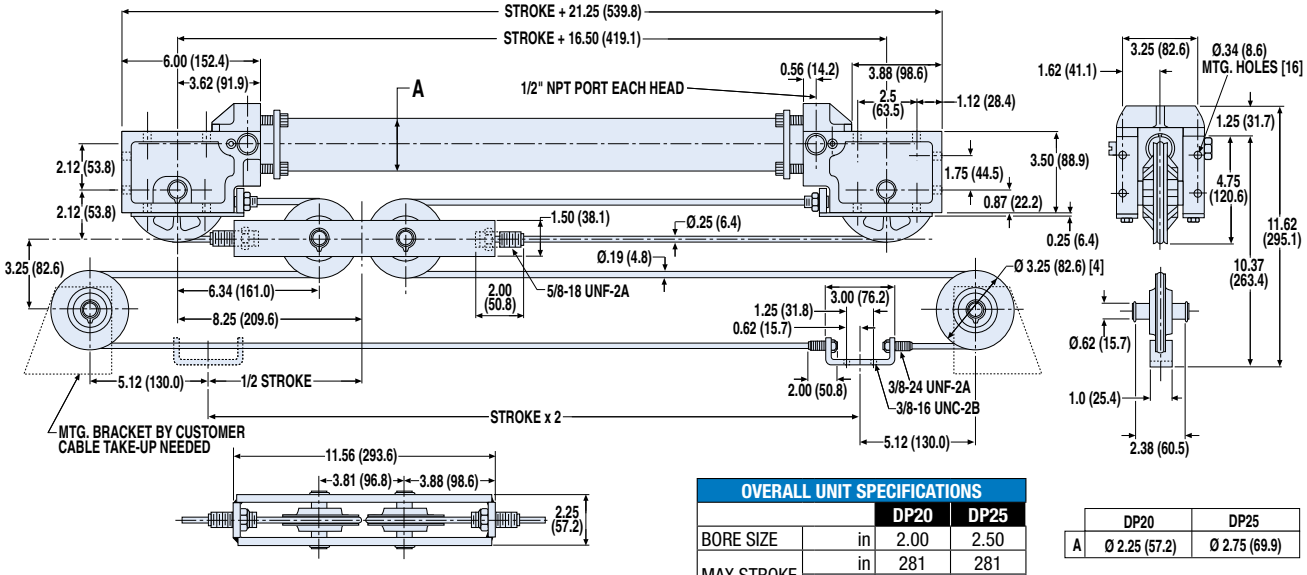
Dimensions in inches, in parentheses
( ) dimensions in millimeters

OVERALL UNIT SPECIFICATIONS		
		DP15
BORE SIZE	in	1.50
MAX STROKE	in	280
	mm	*7112*
MAX PRESSURE	PSI	100
	bar	*6.9*
MAX FORCE OUTPUT	lb	174
	N	*774.0*

NOTE: Additional specifications Page CC_8

DP20, DP25

DIMENSIONS



Dimensions in inches, in parentheses ( ) dimensions in millimeters

OVERALL UNIT SPECIFICATIONS			
		DP20	DP25
BORE SIZE	in	2.00	2.50
MAX STROKE	in	281	281
	mm	*7137*	*7137*
MAX PRESSURE	PSI	100	100
	bar	*6.9*	*6.9*
MAX FORCE OUTPUT	lb	618.5	971.9
	N	*2751*	*4323*

	DP20	DP25
A	Ø 2.25 (57.2)	Ø 2.75 (69.9)

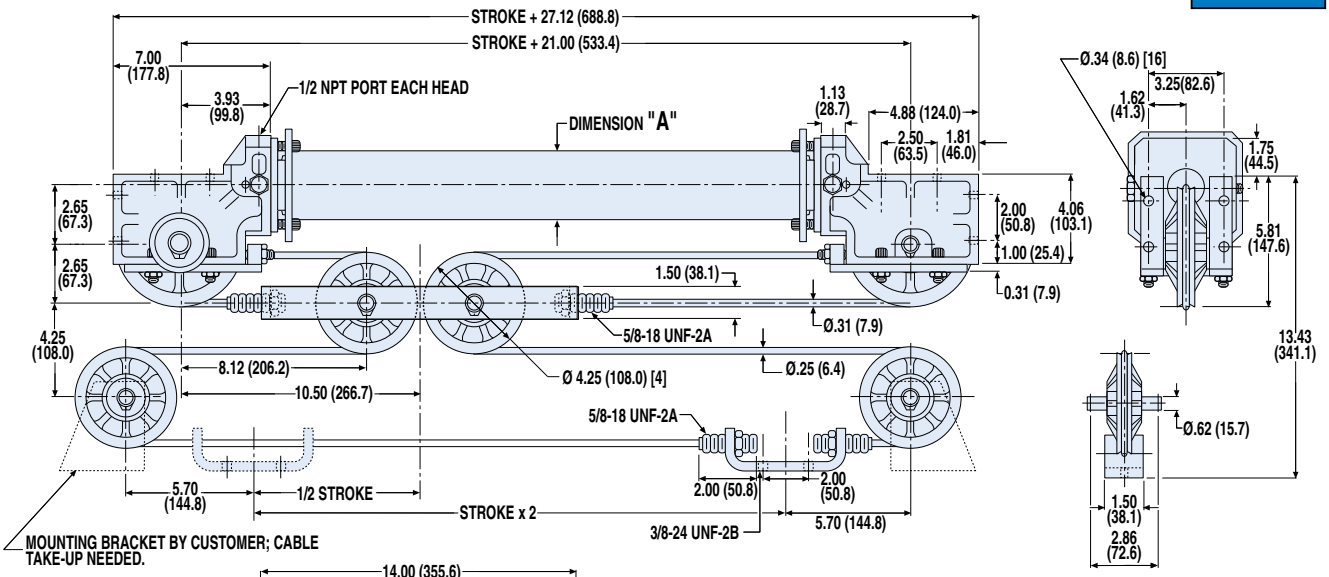
NOTE: Additional specifications Page CC_9

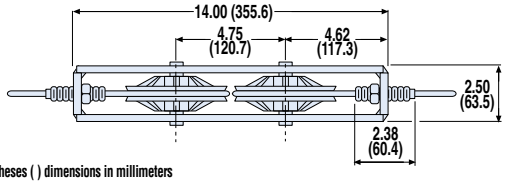
Double Purchase Cable Cylinder - DP30, DP40, DP52

DP30, DP40, DP52

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

DIMENSIONS





Dimensions in inches, in parentheses ( ) dimensions in millimeters

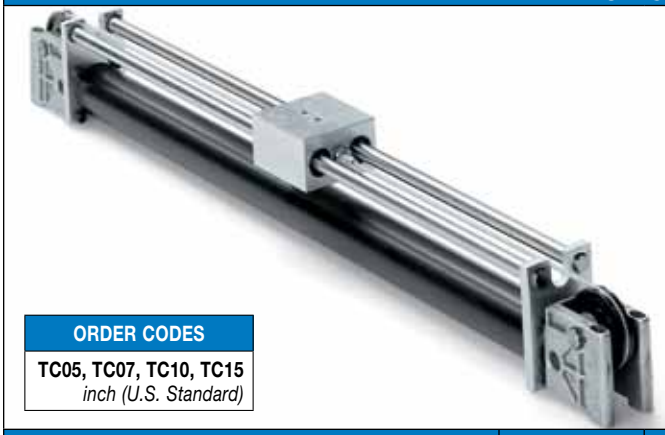
	DP30	DP40	DP52
A	Ø3.25 (82.6)	Ø4.25 (108.0)	Ø2.25 (57.2)

OVERALL UNIT SPECIFICATIONS				
		DP30	DP40	DP52
BORE SIZE	in	3.00	4.00	2.50
MAX STROKE	in	280	279	280
	mm	*7112*	*7087*	*7112*
MAX PRESSURE	PSI	200	100	500
	bar	*13.8*	*6.9*	*34.5*
MAX FORCE OUTPUT	lb	1398.4	1248.9	1532.4
	N	*6220*	*5555*	*6816*

NOTE: Additional specifications Page CC_10

TC Track Cable Cylinder - All Sizes

FEATURES AND OPTIONS



ORDER CODES

TC05, TC07, TC10, TC15
inch (U.S. Standard)

Tolomatic track cable cylinders provide a pre-packaged, pre-engineered guide and support system for greater bearing surface and larger load capacities.

An aluminum bearing block guides and supports loads on precision linear ball bearings with hardened ground steel shafts. Available in 4 bore sizes with automatic tensioners and caliper disc brake options on selected models.

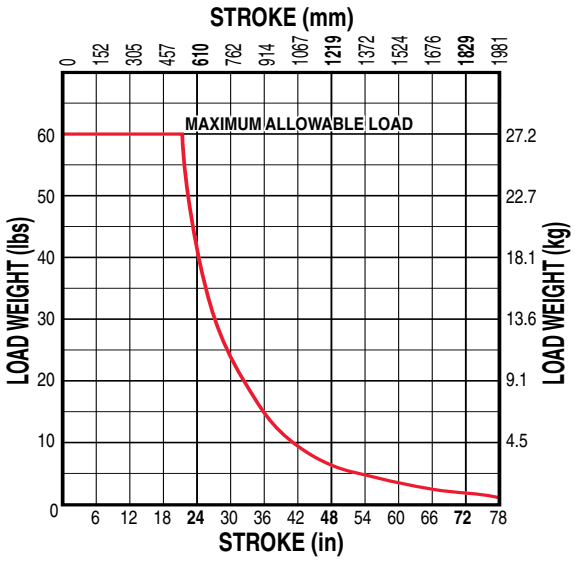
TC OPTIONS	Order Code	Page	TC05	TC07	TC10	TC15
Auto Tensioner w/ one 1" Stroke Unit	HI, HJ	CC_22	–	OP	OP	OP
Auto Tensioner w/ two 1" Stroke Units	HI, HJ	CC_22	–	OP	OP	OP
Caliper Disc Brake	HM, HN	CC_25	–	–	–	OP
Switches (DC Reed & Triac)	(several)	CC_28	OP	OP	OP	OP
Aluminum Tube			ST	ST	ST	ST
Steel Tube (Switches NOT available)	S		–	–	OP	OP
Seals of Viton® Material	V		–	OP	OP	OP
3 Ported Heads	HG		OP	OP	OP	OP
MORE INFORMATION	**Page**					
Application Guidelines	CC_36		ST	ST	ST	ST
Cushion Needle Adjustment	CC_38		–	ST	ST	ST
Ordering	CC_40		ST	ST	ST	ST
Selection	CC_30		ST	ST	ST	ST
Caliper Disc Brake Option Selection	CC_32		–	–	–	OP
STANDARD FEATURE	**Page**					
Fixed Orifice Cushions	CC_38		–	ST	ST	–
Adjustable Cushions	CC_38		–	–	–	ST
Single Ported Head			ST	ST	ST	ST

– = Not Available OP = Optional ST = Standard

NOTE: See corresponding CC (double actting cable cylinder) for performance, tubing and cable specifications Page CC_7 to Page CC_8

TC Track Cable Cylinder - TC05, TC07, TC10

LOAD WEIGHT vs STROKE TC05, TC07, TC10 (3/8" Dia. Rods at 0.30" Deflection)



NOTE: Rod deflection must not exceed .30 inches

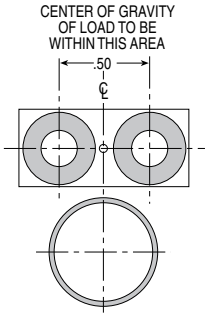
OVERALL UNIT SPECIFICATIONS				
		TC05	TC07	TC10
BORE SIZE	in	0.50	0.75	1.00
MAX STROKE	in	67.00	78.00	78.00
	mm	*1701.8*	*1981.2*	*1981.2*
MAX PRESSURE	PSI	100	100	100
	bar	*6.9*	*6.9*	*6.9*
MAX FORCE OUTPUT	lb	19.4	43.5	77.9
	N	*86.3*	*193.5*	*346.5*

NOTE: Additional specifications Page CC_7

NOTE: Moderate bending moments are acceptable, so long as the moment load does not exceed 190 inch-pounds.

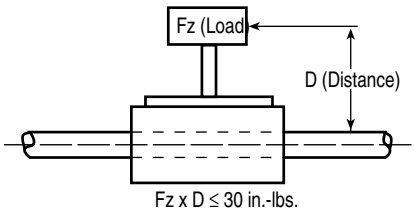
The diagrams at right, illustrate how this is calculated.

LOAD DISTRIBUTION

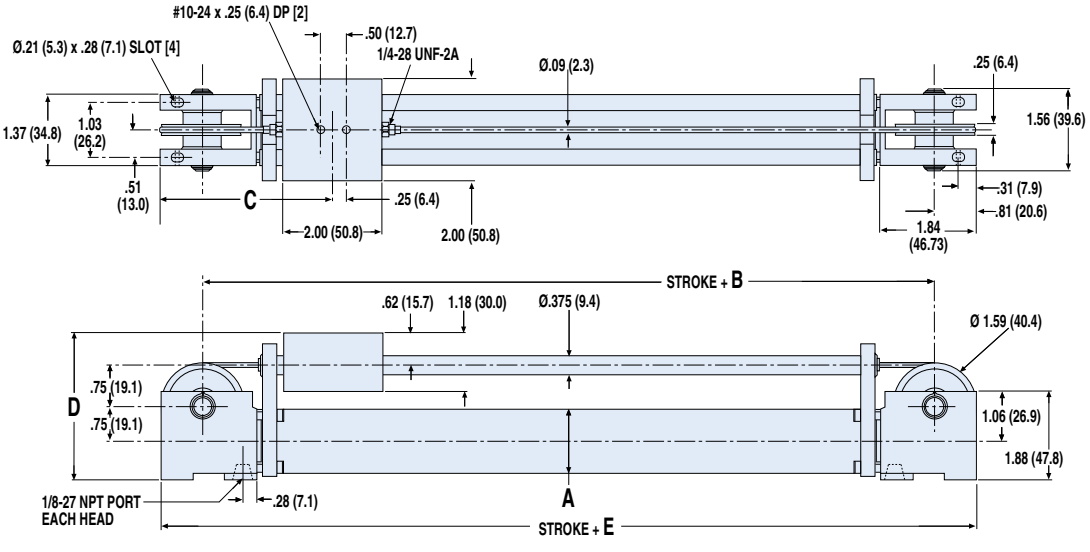


NOTE: Moderate bending moments are acceptable. The moment load must not exceed 30 inch-pounds for the 1/2 -, 3/4 - and 1-inch bore cylinders.

The diagrams, illustrate how this is calculated.



DIMENSIONS



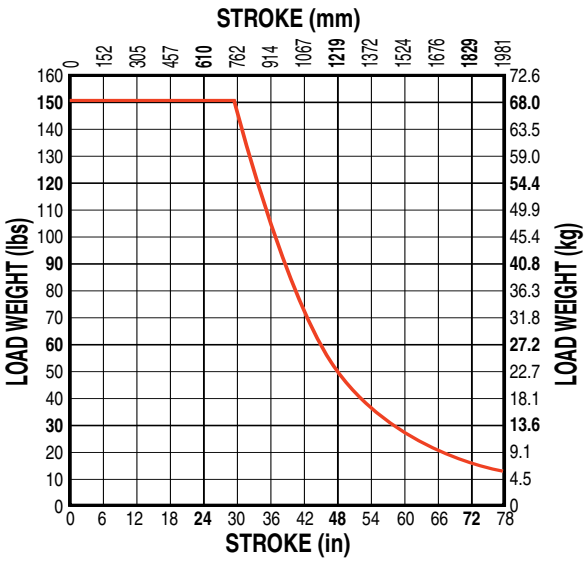
	TC05	TC07	TC10
A	0.625	1.000	1.250
mm	*15.88*	*25.40*	*31.75*
B	5.260	5.326	5.322
mm	*133.60*	*135.28*	*135.18*
C	3.44	3.46	3.48
mm	*87.4*	*87.9*	*88.4*
D	2.93	2.96	2.93
mm	*74.4*	*75.2*	*74.4*
E	6.870	6.936	6.932
mm	*174.50*	*176.17*	*176.07*

Dimensions in inches, in parentheses ( ) dimensions in millimeters

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

TC Track Cable Cylinder - TC15

LOAD WEIGHT vs STROKE TC15 (5/8" Dia. Rods at 0.30" Deflection)

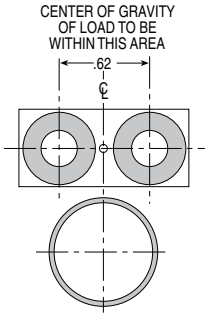


NOTE: Rod deflection must not exceed .30 inches

OVERALL UNIT SPECIFICATIONS		
		CC15
BORE SIZE	in	1.50
MAX STROKE	in	282.59
	mm	*7177.9*
MAX PRESSURE	PSI	100
	bar	*6.9*
MAX FORCE OUTPUT	lb	174
	N	*774.0*

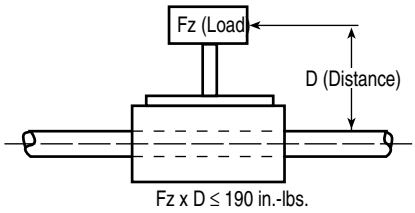
NOTE: Additional specifications Page CC_8

LOAD DISTRIBUTION

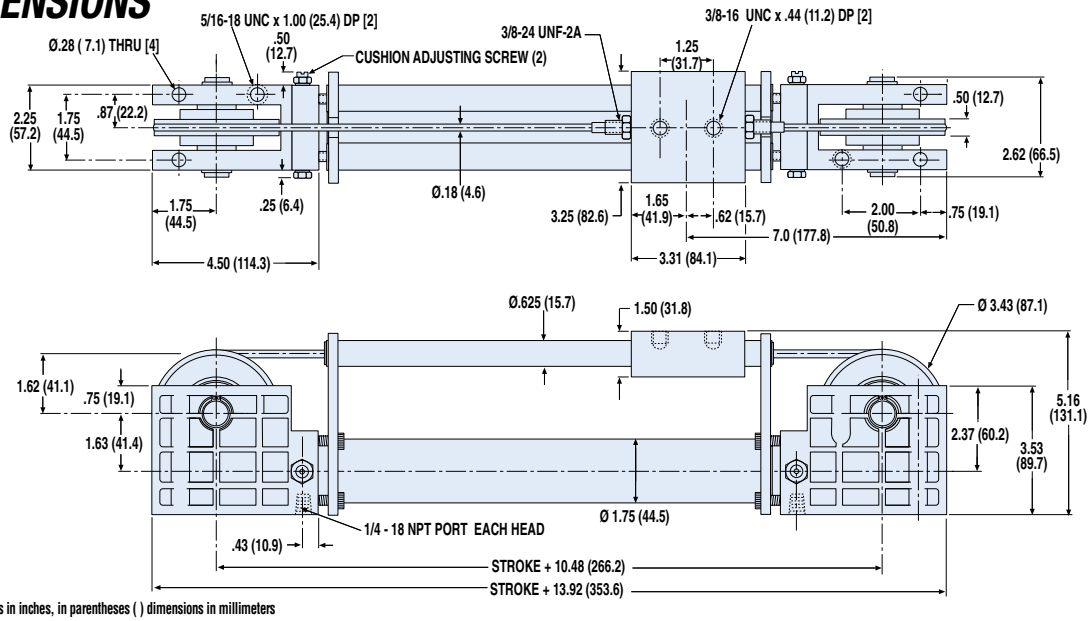


NOTE: Moderate bending moments are acceptable. The moment load must not exceed 190 inch-pounds for the 1-1/2 bore cylinder.

The diagrams, illustrate how this is calculated.



DIMENSIONS

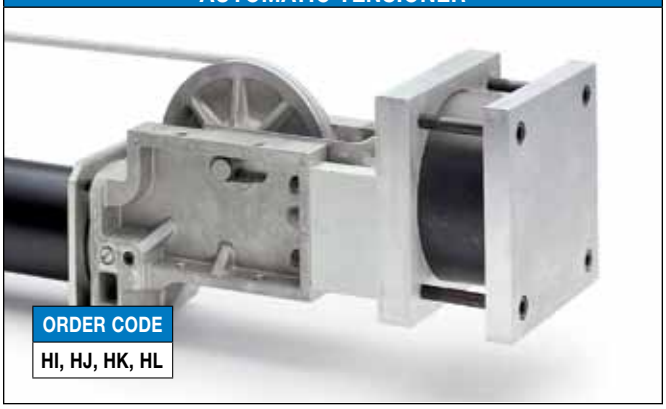


Dimensions in inches, in parentheses ( ) dimensions in millimeters

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

CC Automatic Tensioner - All Sizes

AUTOMATIC TENSIONER



ORDER CODE

HI, HJ, HK, HL

Automatic tensioners are required when a cylinder's stroke length is beyond the maximum stroke length for full manual cable adjustment for that bore size. The AT unit keeps the cable rigid and ensures maximum service life of both the cable and gland seals. AT units are also recommended for vertical lifting or severe, high-cyclic applications.

The standard automatic tensioner unit has a 1-inch stroke, providing 2 inches of cable take-up. A 2-inch stroke AT unit may be installed on a cylinder, providing 4 inches of cable take-up. Refer to the tables below for tensioner stroke options
on available bore sizes.

MAXIMUM STROKE LENGTHS FOR CYLINDERS WITH AUTO TENSIONERS

NOTE: A cable cylinder should be completely proof-loaded and pretensioned with either the Torque Method or the Field Method in order for the auto tensioner to achieve the maximum stroke lengths shown in the table below. (For more information on proof-loading and pretensioning, please see page CC_36)

	STROKE LENGTHS IN INCHES BASED ON CYLINDER'S MAXIMUM OPERATING PRESSURE									
STROKE OPTIONS	**CC05**	**CC07**	**CC10**	**CC15**	**CC20**	**CC25**	**CC30**	**CC40**	**CC50**	**CC52**
Auto Tensioner with one 1" stroke unit	NA	134.4	134.4	361.2	260.4	159.6	243.6	134.4	NA	266.8
Auto Tensioner with two 1" stroke units	NA	252.0	252.0	579.6	369.6	266.8	344.4	193.2	NA	327.6
Auto Tensioner with one 2" stroke unit	NA	NA	NA	NA	369.6	266.8	344.4	193.2	468.0	327.6
Auto Tensioner with two 2" stroke units	NA	NA	NA	NA	524.4	322.8	487.2	277.2	714.0	472.8

Above Dimensions in inches

	STROKE LENGTHS IN METERS BASED ON CYLINDER'S MAXIMUM OPERATING PRESSURE									
STROKE OPTIONS	**CC05**	**CC07**	**CC10**	**CC15**	**CC20**	**CC25**	**CC30**	**CC40**	**CC50**	**CC52**
Auto Tensioner with one 1" stroke unit	*NA*	*3.41*	*3.41*	*9.17*	*6.61*	*4.05*	*6.19*	*3.41*	*NA*	*6.78*
Auto Tensioner with two 1" stroke units	*NA*	*6.40*	*6.40*	*14.72*	*9.39*	*6.78*	*8.75*	*4.91*	*NA*	*8.32*
Auto Tensioner with one 2" stroke unit	*NA*	*NA*	*NA*	*NA*	*9.39*	*6.78*	*8.75*	*4.91*	*11.89*	*8.32*
Auto Tensioner with two 2" stroke units	*NA*	*NA*	*NA*	*NA*	*13.32*	*8.20*	*12.37*	*7.04*	*18.14*	*12.01*

Above Dimensions in METERS

NOTE: Tube couplers are required on cable cylinders with strokes over 280 inches (7.11m).

Maximum stroke lengths in the above table can be extended by using the percentage of the pressure differential between the cylinder's actual operating pressure and the maximum operating pressure.

Example: If the cylinder selected is a CC15 ($1^1/2$-inch bore) with one 1-inch stroke AT unit:

Actual PSI: 80
Max. PSI: 100
Differential: 20%
20% x 361.2 in. (maximum stroke) = 72.24 in.
72.24 in. + 361.2 in. = 433.44 in. (36.12 feet)

All AT units should be plumbed with a separate, regulated non-fluctuating pressure source which is a set percentage of the actual cylinder operating pressure. These are listed in the table at the right.

NOTE: When using an AT unit in an application where the cylinder is loaded in only one direction, it is recommended to have the AT unit located so the load direction of travel is away from the AT unit. On vertical applications, the AT unit should be located on the bottom.

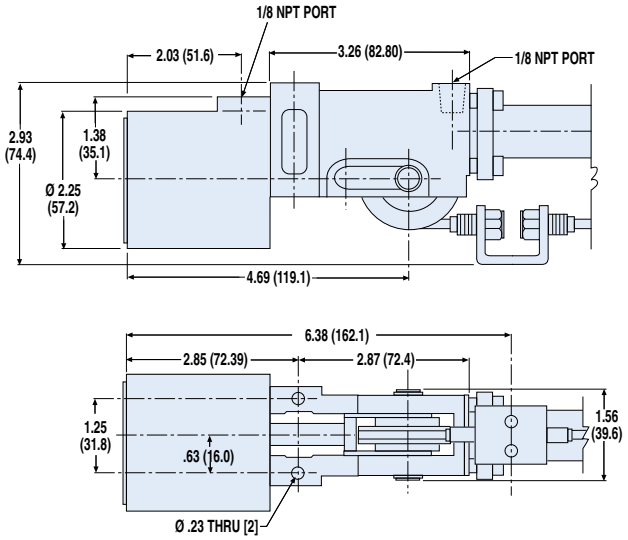
AUTO TENSIONER PRESSURE SETTINGS

FOR MODEL	% OF LOAD PRESSURE
CC07	22%
CC10	40%
CC15	86%
CC20	32%
CC25	51%
CC30	54%
CC40	96%
CC50	75%
CC52	24%

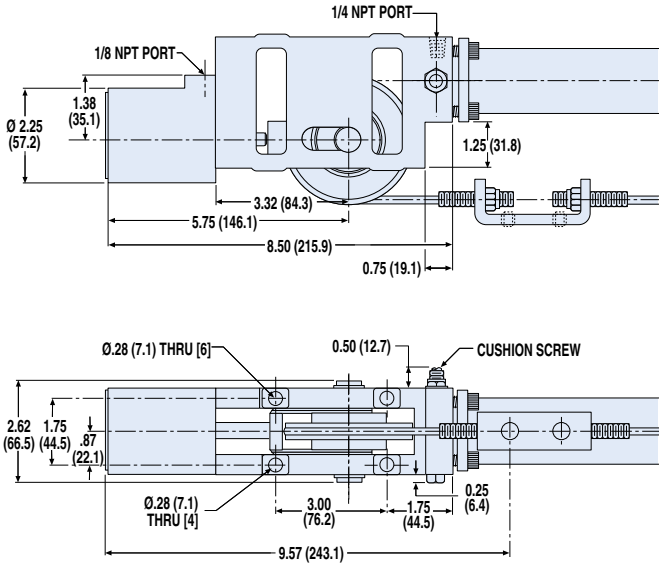
3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

DIMENSIONS

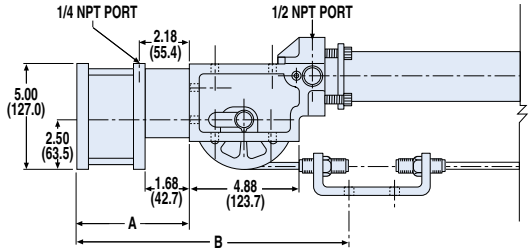
AT FOR CC07, CC10



AT FOR CC15

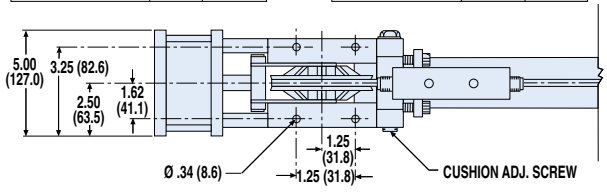


AT FOR CC20, CC25



MODEL	A	B
1" Stroke Tensioner	5.66"	12.16"
2" Stroke Tensioner	6.66"	13.16"

MODEL	A	B
1" Stroke Tensioner	143.8mm	308.9mm
2" Stroke Tensioner	169.2mm	334.3mm



Dimensions in inches, in parentheses ( ) dimensions in millimeters

SPACE AND WEIGHT REQUIREMENTS		
MODEL	DEAD LENGTH (in)*	WEIGHT (lbs)
CC07	8.87	1.06
CC10	8.87	1.06
CC15	16.41	2.76
CC20	20.66	8.41
CC25	20.66	8.41

*Add dead length to stroke length to determine overall cylinder length

SPACE AND WEIGHT REQUIREMENTS		
MODEL	DEAD LENGTH (mm)*	WEIGHT (kg)
CC07	225	0.48
CC10	225	0.48
CC15	417	1.25
CC20	525	3.81
CC25	525	3.81

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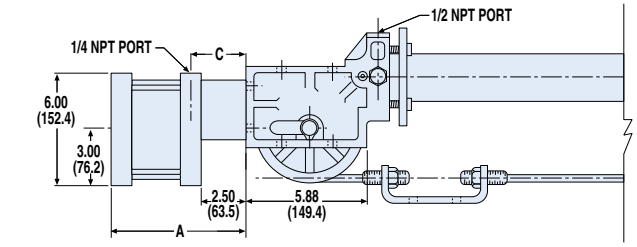
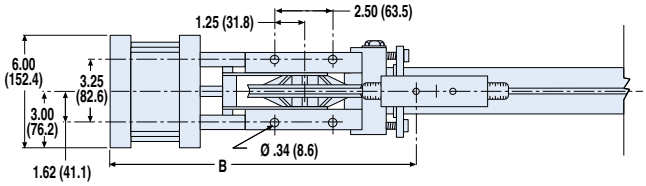
DIMENSIONS

AT FOR CC30, CC40, CC52

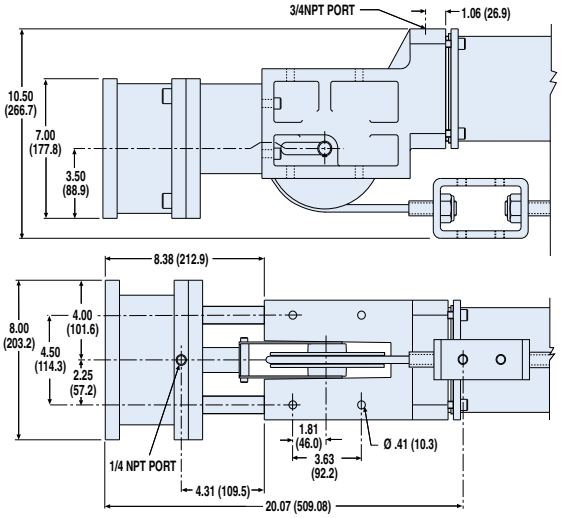


MODEL	A	B	C
1" Stroke Tensioner	6.38"	14.12"	3.01"
2" Stroke Tensioner	7.38"	15.12"	3.50"

MODEL	A	B	C
1" Stroke Tensioner	162.1mm	358.6mm	76.5mm
2" Stroke Tensioner	187.5mm	384.0mm	88.9mm



AT FOR CC50



Dimensions in inches, in parentheses ( ) dimensions in millimeters

SPACE AND WEIGHT REQUIREMENTS		
MODEL	DEAD LENGTH (in)*	WEIGHT (lbs)
CC30	23.88	14.36
CC40	24.88	14.36
CC52	23.88	14.36
CC50	33.75	23.68

*Add dead length to stroke length to determine overall cylinder length

SPACE AND WEIGHT REQUIREMENTS		
MODEL	DEAD LENGTH (mm)*	WEIGHT (kg)
CC30	607	6.51
CC40	632	6.51
CC52	607	6.51
CC50	857	10.74

CC Cylinder/Brake Combinations - All Sizes

CALIPER DISC BRAKE

ORDER CODE
HM, HN

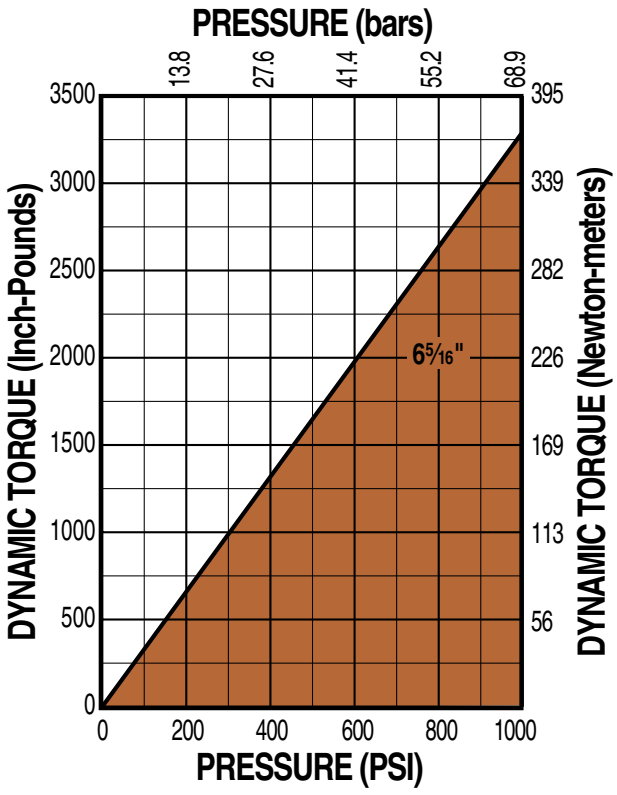
Caliper disc brakes can be used to add holding force in horizontal applications and aid in deceleration at the end of stroke. Caliper disc brakes must be used with an automatic tensioner to function properly. See page CC_32 for selection information and braking formulae.

NOTE: Tolomatic's H20DARC is used on all available models. See part numbers below:

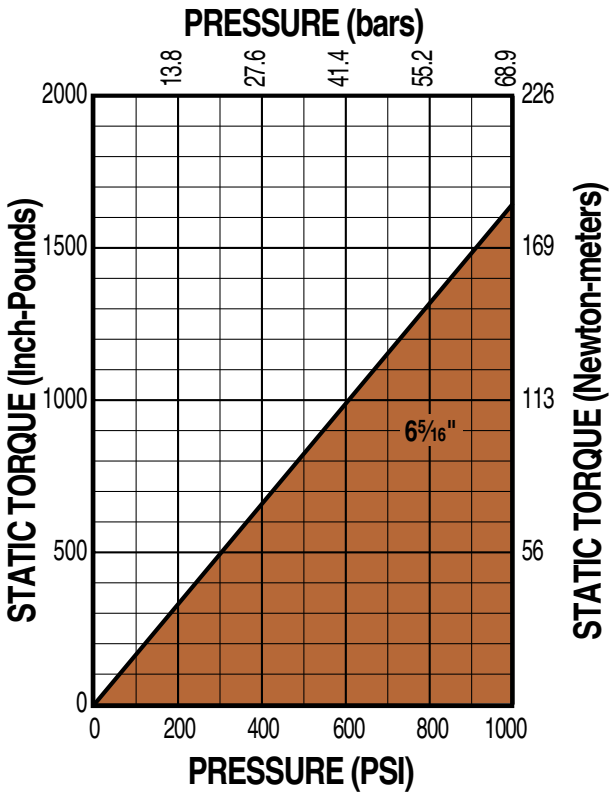
	CC15	CC20	CC25	CC30	CC40	CC52
Brake Number	0728-0010	0728-0010	0728-0010	0728-0010	0728-0010	0728-0010
Disc & Hub No.	0801-0008	0801-0010	0801-0010	0801-0010	0801-0010	0801-0010

See catalog 9900-4009 for detailed information on brakes and discs.

DYNAMIC TORQUE
H-20 BRAKE with 6-5/16" DISC
(FOR CC15, CC20, CC25, CC30, CC40, CC52)



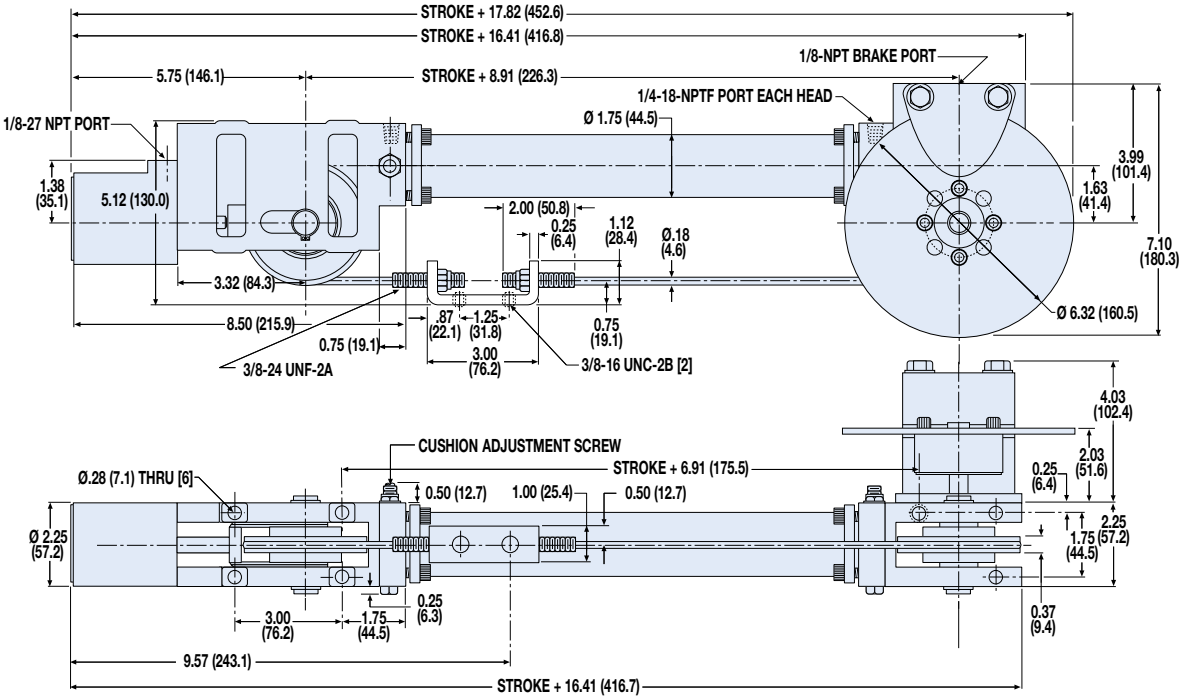
STATIC TORQUE
H-20 BRAKE with 6-5/16" DISC
(FOR CC15, CC20, CC25, CC30, CC40, CC52)



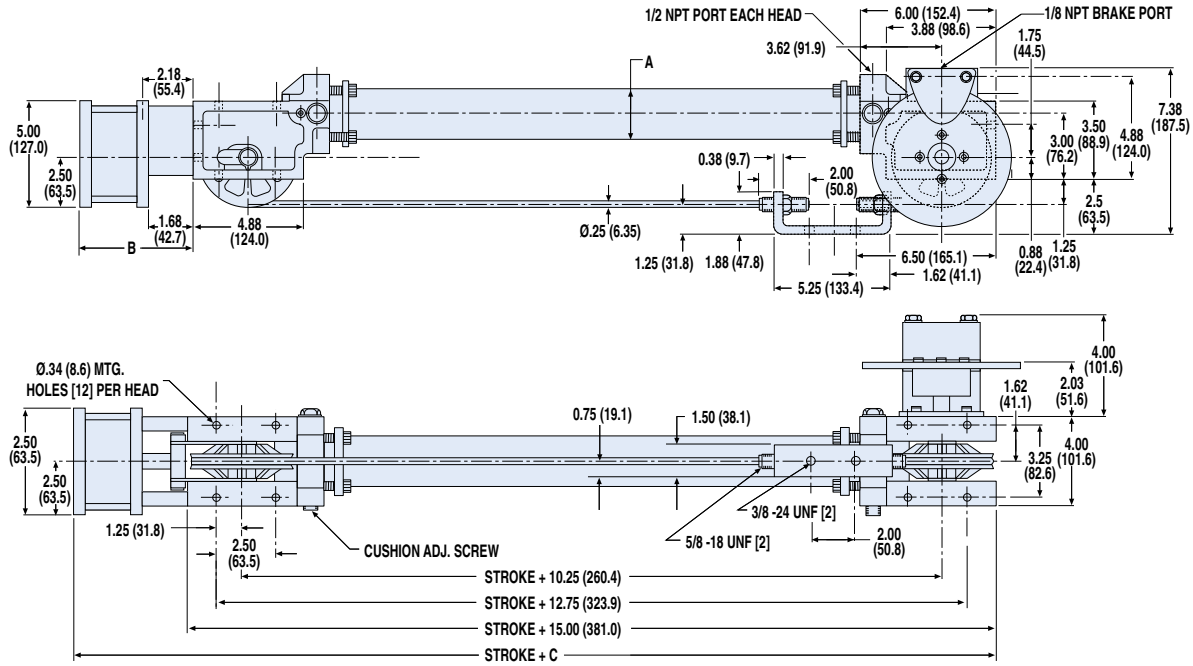
3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

DIMENSIONS

CYLINDER/ BRAKE COMBINATION FOR CC15



CYLINDER/ BRAKE COMBINATION FOR CC20, CC25



MODEL	A	B	C
CC20 w/ 1" Stroke Tensioner	Ø 2.25"	5.66"	20.66"
CC20 w/ 2" Stroke Tensioner	Ø 2.25"	6.66"	22.15"
CC25 w/ 1" Stroke Tensioner	Ø 2.75"	5.66"	20.66"
CC25 w/ 2" Stroke Tensioner	Ø 2.75"	6.66"	22.15"

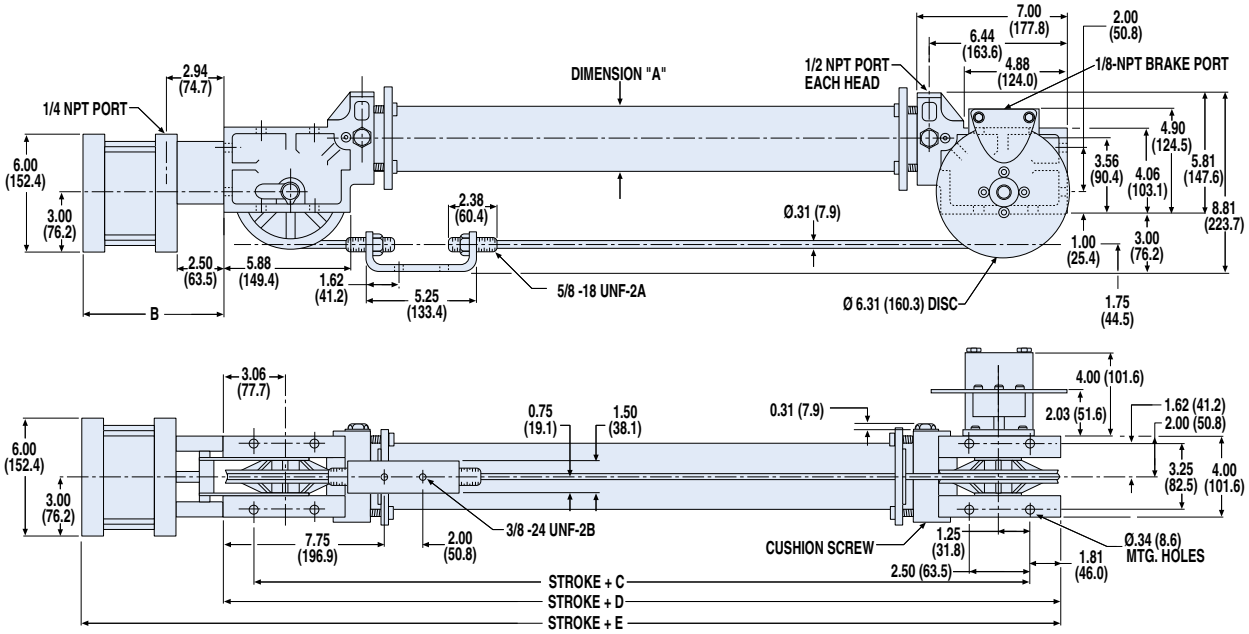
MODEL	A	B	C
CC20 w/ 1" Stroke Tensioner	Ø 57.2mm	143.8mm	524.7mm
CC20 w/ 2" Stroke Tensioner	Ø 57.2mm	169.2mm	561.6mm
CC25 w/ 1" Stroke Tensioner	Ø 69.9mm	143.8mm	524.7mm
CC25 w/ 2" Stroke Tensioner	Ø 69.9mm	169.2mm	561.6mm

Dimensions in inches, in parentheses ( ) dimensions in millimeters

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

DIMENSIONS

CYLINDER/ BRAKE COMBINATION FOR CC20, CC40, CC52



MODEL	A	B	C	D	E
CC30 w/ 1" Stroke Tensioner	Ø 3.25"	6.38"	13.87"	17.50"	23.89"
CC30 w/ 2" Stroke Tensioner	Ø 3.25"	7.38"	13.87"	17.50"	24.89"
CC40 w/ 1" Stroke Tensioner	Ø 4.25"	6.38"	14.07"	18.50"	24.89"
CC40 w/ 2" Stroke Tensioner	Ø 4.25"	7.38"	14.07"	18.50"	25.88"
CC52 w/ 1" Stroke Tensioner	Ø 2.25"	6.38"	13.87"	17.50"	23.89"
CC52 w/ 2" Stroke Tensioner	Ø 2.25"	7.38"	13.87"	17.50"	24.09"

MODEL	A	B	C	D	E
CC30 w/ 1" Stroke Tensioner	Ø 82.6mm	162.1mm	352.3mm	444.5mm	609.1mm
CC30 w/ 2" Stroke Tensioner	Ø 82.6mm	187.5mm	352.3mm	444.5mm	634.5mm
CC40 w/ 1" Stroke Tensioner	Ø 108.0mm	162.1mm	357.4mm	469.9mm	609.1mm
CC40 w/ 2" Stroke Tensioner	Ø 108.0mm	187.5mm	357.4mm	469.9mm	634.5mm
CC52 w/ 1" Stroke Tensioner	Ø 57.2mm	162.1mm	352.3mm	444.5mm	609.1mm
CC52 w/ 2" Stroke Tensioner	Ø 57.2mm	187.5mm	352.3mm	444.5mm	634.5mm

Dimensions in inches, in parentheses ( ) dimensions in millimeters

CC, SA, DP, TC Switches - All Sizes

SWITCHES

There are 10 sensing choices: DC reed, form A (open) or form C (open or closed); AC reed (Triac, open); Hall-effect, sourcing, PNP (open); Hall-effect, sinking, NPN (open); each with either flying leads or QD (quick disconnect). Commonly used to send analog signals to PLC (programmable logic controllers), TLL, CMOS circuit or other controller device. These switches are activated by the actuator's magnet.

Switches contain reverse polarity protection. QD cables are shielded; shield should be terminated at flying lead end.

If necessary to remove factory installed switches, be sure to reinstall on the same of side of actuator with scored face of switch toward internal magnet.

SPECIFICATIONS

		REED DC				REED AC	
ORDER CODE		RT	RM	BT	BM	CT	CM
PART NUMBER		3600-9082	3600-9083	3600-9084	3600-9085	3600-9086	3600-9087
LEAD		5m	QD*	5m	QD*	5m	QD*
CABLE SHIELDING		Unshielded	Shielded†	Unshielded	Shielded†	Unshielded	Shielded†
SWITCHING LOGIC		"A" Normally Open		"C" Normally Open or Closed		Triac Normally Open	
MECHANICAL CONTACTS		Single-Pole Single-Throw		Single-Pole Double-Throw		Single-Pole Single-Throw	
COIL DIRECT		Yes		Yes		Yes	
POWER LED		None		None		None	
SIGNAL LED		Red					
OPERATING VOLTAGE		200 Vdc max.		120 Vdc max.		120 Vac max.	
OUTPUT RATING		—				—	
OPERATING TIME		0.6 msec max. (including bounce)		0.7 msec max. (including bounce)		—	
OPERATING TEMPERATURE		-40°F [-40°C] to 158°F [70°C]					
RELEASE TIME		1.0 msec. max.				—	
ON TRIP POINT		—				—	
OFF TRIP POINT		—				—	
**POWER RATING (WATTS)		10.0 §		3.0 §§		10.0	
VOLTAGE DROP		2.6 V typical at 100 mA		NA		—	
RESISTANCE		0.1 Ω Initial (Max.)				—	
CURRENT CONSUMPTION		—				1 Amp at 86°F [30°C]	0.5 Amp at 140°F [60°C]
FREQUENCY		—				47 - 63 Hz	
CABLE MIN. BEND RADIUS	STATIC	0.630" *[16mm]*					
	DYNAMIC	Not Recommended					

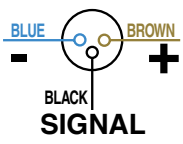
CAUTION: DO NOT OVER TIGHTEN SWITCH HARDWARE WHEN INSTALLING!

** **WARNING**: Do not exceed power rating (Watt = Voltage X Amperage). Permanent damage to sensor will occur.

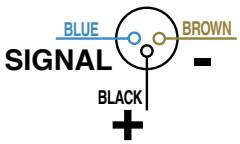
*QD = Quick Disconnect; Male coupler is located 6" [152mm} from sensor,
Female coupler to flying lead (part #2503-1025) distance is 197" [5m] also see Cable Shielding specification above

REPLACEMENT OF QD SWITCHES MANUFACTURED BEFORE JULY 1, 1997: It will be necessary to replace or rewire the female end coupler.

CURRENT
Quick disconnect Wiring



OLD
Quick disconnect Wiring



Reed Switch Life Expectancy: Up to 200,000,000 cycles (depending on load current, duty cycle and environmental conditions)

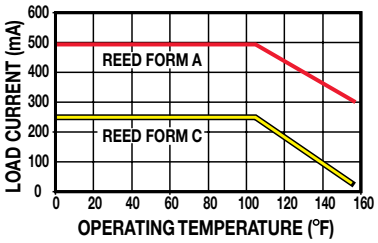
†Shielded from the female quick disconnect coupler to the flying leads. Shield should be terminated at flying lead end.

§ Maximum current 500mA (not to exceed 10VA) Refer to Temperature vs. Current graph and Voltage Derating graph

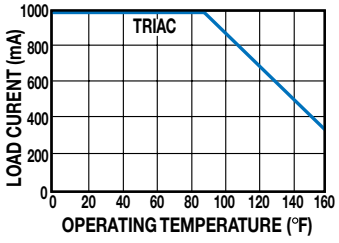
§§ Maximum current 250mA (not to exceed 3VA) Refer to Temperature vs. Current graph and Voltage Derating graph

PERFORMANCE

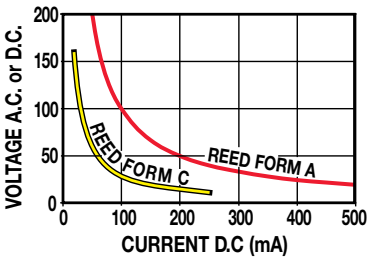
TEMP. vs CURRENT, DC REED



TEMP. vs CURRENT, AC REED

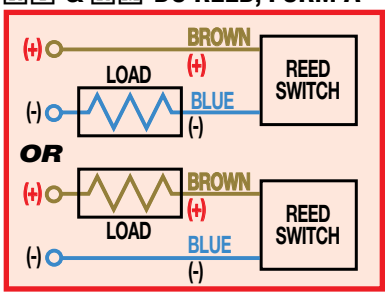


VOLTAGE DERATING, DC REED

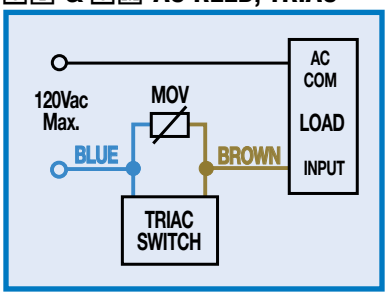


WIRING DIAGRAMS

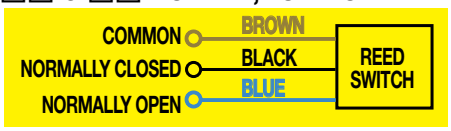
RT & RM DC REED, FORM A



CT & CM AC REED, TRIAC



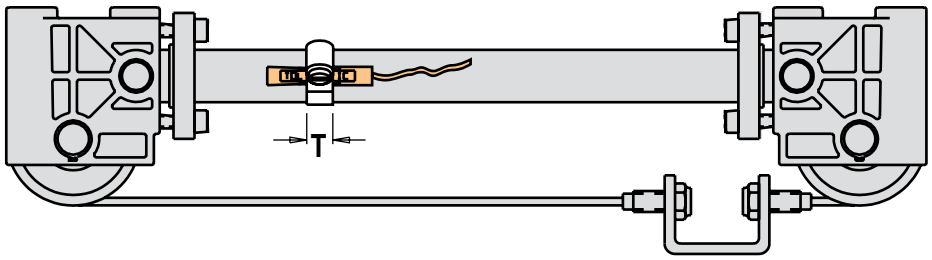
BT & BM DC REED, FORM C



INSTALLATION INFORMATION

THE NOTCHED FACE OF THE SWITCH INDICATES THE SENSING SURFACE AND MUST FACE TOWARD THE MAGNET.

DIMENSIONS



MODEL	BORE	A*	B	C	T
CCM05	0.50	0.81	1.09	0.35	0.31
CCM07	0.75	0.81	1.09	0.35	0.31
CCM10	1.00	1.12	1.65	0.35	0.31
CCM15	1.50	1.56	2.15	0.35	0.31
CCM20	2.00	2.08	2.65	0.35	0.31
CCM52	2.00	2.08	2.65	0.35	0.31
CCM25	2.50	2.75	3.15	0.35	0.31
CCM30	3.00	3.25	3.65	0.35	0.31
CCM40	4.00	4.25	4.65	0.35	0.56
CCM50	5.00	5.25	5.65	0.35	0.56

Above dimensions in inches
*Inside Dimension ±.06"

MODEL	BORE	A*	B	C	T
CCM05	0.50"	20.57	27.69	8.76	7.87
CCM07	0.75"	20.57	27.69	8.76	7.87
CCM10	1.00"	28.45	41.91	8.76	7.87
CCM15	1.50"	39.62	54.61	8.76	7.87
CCM20	2.00"	52.83	67.31	8.76	7.87
CCM52	2.00"	52.83	67.31	8.76	7.87
CCM25	2.50"	69.85	80.01	8.76	7.87
CCM30	3.00"	82.55	92.71	8.76	7.87
CCM40	4.00"	107.95	118.11	8.76	14.22
CCM50	5.00"	133.35	143.51	8.76	14.22

Above dimensions in millimeters
*Inside Dimension ±1.5mm

NOTE: HALL-EFFECT SWITCHES ARE NOT AVAILABLE FOR CABLE CYLINDERS
SWITCHES ARE NOT AVAILABLE FOR CABLE CYLINDERS WITH STEEL TUBE
DEAD LENGTH WILL INCREASE ON MOST MODELS, SEE BELOW

	MODEL	CCM05	CCM07 SAM07	CCM10 SAM10	CCM15 SAM15	CCM20 SAM20	CCM52 SAM52	CCM25 SAM25	CCM30 SAM30	CCM40 SAM40	CCM50
	BORE	0.50"	0.75"	1.00"	1.50"	2.00"	2.00"	2.50"	3.00"	4.00"	5.00"
SPACE REQUIREMENTS - ADD DEAD LENGTH TO STROKE LENGTH	IN.	1.62	1.62	1.62	0.375	0.375	0.375	0.375	0.375	0.375	0
	MM	41.2	41.2	41.2	9.5	9.5	9.5	9.5	9.5	9.5	0

CC: Cable Cylinder Selection Guidelines - All Sizes

EXTERNAL LOAD GUIDANCE AND SUPPORT

The process of selecting a cable cylinder for a given application can be complex. It is highly recommended that you contact Tolomatic or a Tolomatic Distributor for assistance in selecting the best actuator for your application. The following overview of the selection guidelines are for educational purposes only.

1 COMPILE APPLICATION REQUIREMENTS

To determine the appropriate Cable Cylinder for an application, compile the following information:

- Available pressure (PSI)
- Weight of load (lbs. or kgs.)
- Orientation of load (lbs. or kgs.)
- Velocity of load (in./sec. or mm/sec.)
- Stroke length (in. or mm)

2 SELECT CYLINDER SIZE

- Consult the Theoretical Force vs. Pressure charts.
- Cross-reference the load force (or load weight if force is not known) and the available operating pressure. If the intersection falls below the diagonal line, and if moments do not exceed maximum values listed for that model (see Step 3), the actuator will accommodate the application. If the intersection is above the diagonal line, a larger cylinder bore size should be considered.

NOTE: Additional force may be required to obtain the necessary acceleration for vertical or horizontal loads.

3 DETERMINE INTERNAL CUSHION CAPACITY

- Consult the Cushion Data chart for the model selected. The velocities listed on the cushion charts are final or cushion impact velocities. On applications where the internal cushions or bumpers are to be used, be sure the actual, final or impact velocity is known. If the velocity is not known, use of limit switches with valve deceleration circuits or shock absorbers should be considered. Cross-reference the final velocity and weight of the load. If the intersection is below the diagonal lines, the internal cushions on the actuator may be used. If the point falls above the dashed diagonal line or if the velocity is not known, use deceleration circuits, external shock absorbers or select a larger cylinder with greater cushion capacity. On high-cyclic applications, use of external stops is strongly recommended.

NOTE: The 1/2-inch and 5-inch cable cylinders and all sizes of magnetically coupled cylinders do not have internal cushions.

The 1/2-inch cable cylinder can handle only very light inertial loads (5 pounds or less). Heavier loads require external stops or shock absorbers.

4 DETERMINE THE MAXIMUM STROKE LENGTHS FOR FULL MANUAL CABLE ADJUSTMENT (CC ONLY)

Once you have selected the proper bore size for your application and determined the cylinder's cushion capacity, you need to determine the physical stroke length limitation of the cylinder. Refer to the table below to find the bore size selected and its maximum stroke length.

NOTE: Maximum recommended stroke length for full manual cable adjustment is the maximum stroke length at which the cables can be properly proof-loaded, pretensioned and maintained at the required tension by manually adjusting the clevis terminal lock nuts. Maximum stroke length is based on the cylinder's maximum pressure rating.

If the stroke length for your application falls within the maximum stroke length for full manual cable adjustment, your model selection is complete. (Refer to graph on page CC_31.)

IMPORTANT NOTE: Once a cylinder is installed in an application, but before putting it into service, the cables must be proof-loaded and pretensioned for proper operation. Refer to Application Guidelines on page CC_36 for proof-loading and pretensioning methods.

If your stroke length is beyond the maximum stroke lengths shown, you have two options available.

1. Increase the maximum stroke length of the selected cylinder size by the percentage of the pressure differential between the cylinder's actual operating pressure and the cylinder's maximum rated operating pressure.

Example: If the cylinder selected is a CC15 (1½ - inch bore):

Actual PSI:	**80**
Max. PSI:	**100**
Differential:	**20%**

20% x 126 in. (maximum stroke) = 25.2 in.

25.2 + 126 = 151.2 in. (12.6 feet)

2. If your required stroke length is still more than the increased stroke length determined from option "1.", an automatic tensioner (AT) or multiple tensioners may be required.

For maximum stroke lengths when using auto tensioners, refer to the chart on page CC_22.

NOTE: When using auto tensioners, the cylinder's cables must be proof-loaded and pretensioned before pressure is applied to the AT unit. Refer to Application Guidelines on page CC_36 for proper proof-loading and pretensioning methods.

Auto tensioners are strongly recommended for vertical lifting applications and severe, high-cyclic applications even when the cylinder's stroke is within the maximum stroke length at full manual cable adjustment.

5 CONSIDER OPTIONS

Avialable options for cable cylinders include:

- Auto Tensioner
- Caliper Disc Brake
- Switches (DC Reed & Triac)
- Steel Tube *(Switches NOT available)*
- Seals of Viton® Material
- 3 Ported Heads

CC: Cable Cylinder Selection Example

The procedure for selection of cable cylinder and magnetically coupled cylinder are very similar. For illustrative purposes, charts for the CC10 model are used in this example.

1 COMPILE APPLICATION REQUIREMENTS

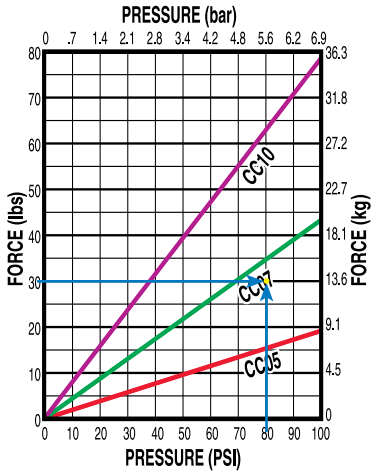
- Available pressure 80 psi
- Weight of load 30 lbs.
- Orientation of load horiz.
- Final velocity* of load 10"per sec
- Stroke length 68"

*2x average velocity, see page CC_38

2 SELECT CYLINDER SIZE

- Consult the Theoretical Force vs. Pressure charts.
- Cross-reference the load force and the available operating pressure. In this example a CC07

THEORETICAL FORCE vs PRESSURE

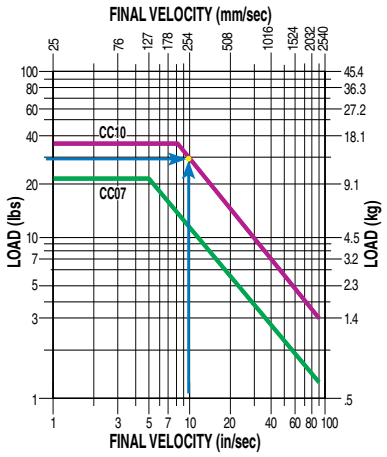


3 DETERMINE INTERNAL CUSHION CAPACITY

- Consult the Cushion Data Chart for the model selected.

In this example the calculated value for the final velocity and the load intersect at the line for the internal cushions capacity. Thus the CC10 will work for this application.

CUSHION DATA



4 DETERMINE THE MAXIMUM STROKE LENGTHS FOR FULL MANUAL CABLE ADJUSTMENT (CC ONLY)

- Consult the chart at right.

In our example we are using 80 PSI, the chart indicates a maximum of 100 PSI, so we can calculate the maximum stroke length with manual adjustment:

1.20 x 20.4" = 24.48"

Our stroke length is 68" so it will require the automatic tensioner option.

5 CONSIDER OPTIONS

This application will use Form C dc Reed switches to signal other units in this automated system.

The final configurated string will appear as follows:

CCM10SK68.000HIBM2

CC MAXIMUM STROKE LENGTHS

For Full Manual Cable Adjustment

	BORE	MAX PRESSURE		MAX STROKE	
	in	PSI	*bar*	in	*mm*
CC05	0.50	100	*6.89*	20.40	*518.2*
CC07	0.75	100	*6.89*	20.40	*518.2*
CC10	1.00	100	*6.89*	20.40	*518.2*
CC15	1.50	100	*6.89*	126.00	*3200.4*
CC20	2.00	200	*13.79*	159.60	*4053.8*
CC25	2.50	200	*13.79*	100.80	*2560.3*
CC30	3.00	200	*13.79*	151.20	*3840.5*
CC40	4.00	200	*13.79*	84.00	*2133.6*
CC50	5.00	100	*6.89*	222.00	*5638.8*
CC52	2.00	500	*34.47*	134.40	*3413.8*

CC: Caliper Disc Brake for Cable Cylinder Selection Guidelines

CALIPER DISC BRAKE

ORDER CODE

HM, HN

DETERMINE THE LOAD CONFIGURATION AND THE HOLDING CAPACITY OF THE BRAKE

The following steps will help determine the adequate stopping time and distance for the cable cylinder equipped with a caliper disc brake under various conditions and loads.

1. *Select the bore size of the cable cylinder based on load to be moved.* Determine load pressure. Set regulator at 25% above load pressure (P_c).

2. *Calculate the unbalanced cylinder force* (F_c) ***only*** *if pressure is applied when braking.* If pressure is removed prior to braking, go on to 3.

$$F_c = P_c \times A_c$$

3. *Calculate the tangential braking force required.* This is (F_{tr}) when pressure is removed prior to braking, or (F_{ta}) when pressure is still *applied* when braking. Refer to illustrations in Figure 1.

NOMENCLATURE

- a = Deceleration, in/sec^2
- g = Deceleration due to gravity = 386.4 in/sec^2
- f^* = Coefficient of friction of sliding load
- f_c = Coefficient of friction between cable and sheave
- F_c = Unbalanced cylinder force, lbs.
- F_{ta} = Tangential braking force required with pressure still applied when braking, lbs.
- F_{tr} = Tangential braking force required with pressure removed prior to braking, lbs.
- L_{tr} = Tension in cable of brake side half while braking with pressure removed, lbs.
- L_{ta} = Tension in cable of brake side half while braking with pressure applied, lbs.
- L_{trm} = Maximum tension in cable with pressure removed while braking, lbs.
- L_{tam} = Maximum tension in cable with pressure applied while braking, lbs.
- S = Stopping distance, inches
- T = Stopping time, seconds
- V = Velocity of load, in/sec.
- W = Weight of load, lbs.
- W_e = Equivalent Load, lbs. $W_e = W(\sin\vartheta + f\cos\vartheta)$
- ϑ = Angle of inclination ($\theta = 0°$ for horizontal; $\theta = 90°$ for vertical)
- R_s = Root radius of sheave groove, inches
- P_c = Load Pressure, PSI
- A_c = Area of cable cylinder bore, in^2
- P_t = Load Pressure, PSI
- A_t = Area of tensioner cylinder, in^2
- P_{ba} = Brake pressure setting. Pressure applied while braking, PSI
- P_{br} = Brake pressure setting. Pressure removed while braking, PSI

**Customer must precisely determine coefficient of friction (f), if this value is used.*

Carefully note conditions:

$$F_{tr} = W\left[\left(\frac{a}{g} - \sin\vartheta\right) - (f\cos\vartheta)\right], \text{ Horizontal or Load rising}$$

$$F_{tr} = W\left[\left(\frac{a}{g} + \sin\vartheta\right) - (f\cos\vartheta)\right], \text{ Load falling}$$

$$F_{ta} = F_c + W\left(\frac{a}{g} - f\right), \text{ Horizontal loads}$$

$$= F_c + W\left[\left(\frac{a}{g} - \sin\vartheta\right) - (f\cos\vartheta)\right], \text{ Incline load rising}$$

$$= F_c + W\left(\frac{a}{g} - 1\right), \text{ Vertical load rising}$$

In the above expressions (a) can be calculated from:

$$a = \frac{V^2}{2S} \text{ or } \frac{V}{T}, \text{ In./Sec.}^2$$

4. *Calculate the tension required in brake side cable at the time of braking.*

$$L_{tr} = \frac{F_{tr}}{0.369}, \text{ lbs.; Pressure removed while braking}$$

$$L_{ta} = \frac{F_{ta}}{0.369}, \text{ lbs.; Pressure applied while braking}$$

CC: Caliper Disc Brake for Cable Cylinder Selection Guidelines

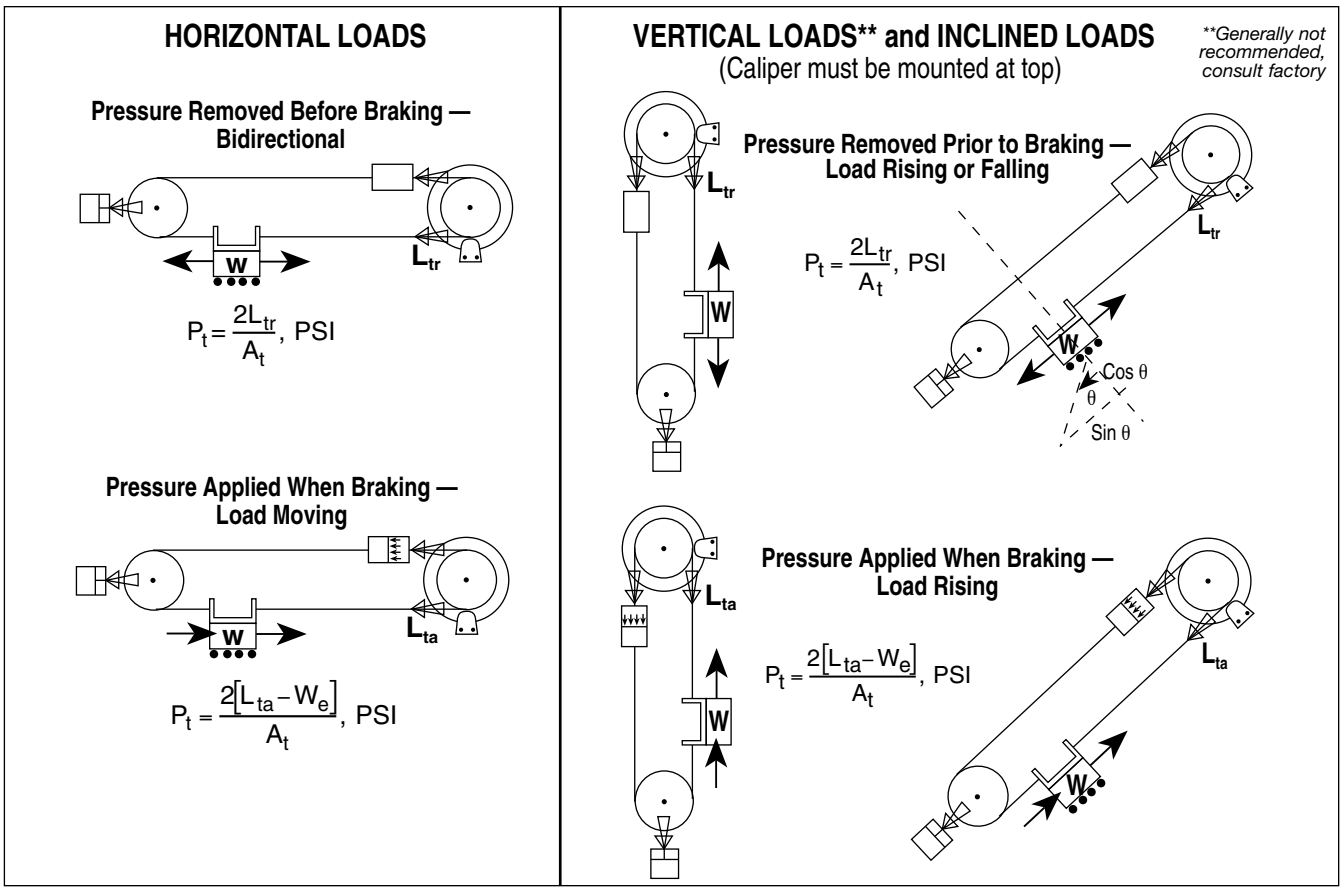


Figure 1

5. *Calculate tensioner pressure setting,* (P_t) *based on type of load configuration. See Figure 1 and Table 1*

6. *Calculate maximum tension in the cable with* ***pressure removed*** *prior to braking* (L_{trm}) *or with* ***pressure applied*** *when braking* (L_{tam}).

Horizontal Loads:

$L_{trm} = L_{tr} + W_e$, lbs.; Pressure removed prior to braking bidirectional

$L_{tam} = L_{ta}$, lbs.; Pressure applied when braking and load moving toward caliper

$L_{tam} = L_{ta} + 2W_e$, lbs.; Pressure applied when braking and load moving away from caliper.

Vertical or Inclined Loads:

$L_{trm} = L_{tr} + W_e$, lbs.; Pressure removed prior to braking and load rising or falling

$L_{tam} = L_{ta}$, lbs.; Pressure still applied when braking and load rising

7. *Carefully check that* (L_{trm}) *or* (L_{tam}) *does not exceed 60% of the cable tensile strength*.* If they exceed the 60% figure, either stopping time or stopping distance has to be increased. Repeat steps 1- 7.

8. *Calculate the brake operating pressure. See Table 1*

$P_{br} = .113[L_{tr}R_s]$, PSI; Pressure removed prior to braking

$P_{ba} = .113[L_{ta}R_s]$, PSI; Pressure still applied when braking

9. *If pressure is removed prior to braking, check to see if brake can hold the load if application is either vertical or inclined.*

The brake can hold the load if:

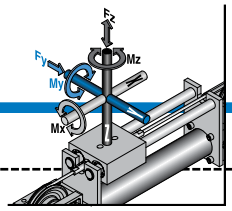
$.369\ L_{tr} \geq W_e$

*Refer to Cable Specifications in the double-acting cable cylinder section of this catalog for cable tensile strengths.

Table 1

	A_t; in^2	R_s; in.	A_c; in^2
CC07	2.30		
CC10	2.30		
CC15	2.30	1.531	1.767
CC20	11.96	2.00	3.142
CC25	11.96	2.00	4.909
CC30	16.20	2.50	7.069
CC40	16.20	2.50	12.566
CC52	16.20	2.50	3.142
CC50	27.05		

Application Data Worksheet



STROKE LENGTH _____
☐ inch (S K) (U.S. Standard) ☐ millimeters (Metric)

AVAILABLE AIR PRESSURE _____
☐ PSI (U.S. Standard) ☐ bar (Metric)

REQUIRED THRUST FORCE _____
☐ lbf (U.S. Standard) ☐ N (Metric)

LOAD _____
☐ lb (U.S. Standard) ☐ kg (Metric)

LOAD CENTER OF GRAVITY DISTANCE TO CARRIER CENTER
d_x _____
d_y _____
d_z _____
☐ inch (U.S. Standard) ☐ millimeters (Metric)

ORIENTATION

FORCES APPLIED TO CARRIER
F_z _____
F_y _____
☐ lbf (U.S. Standard) ☐ N (Metric)

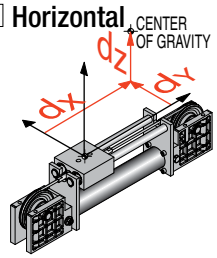
BENDING MOMENTS APPLIED TO CARRIER
M_x _____
M_y _____
M_z _____
☐ in-lbs (U.S. Standard) ☐ N-m (Metric)

FINAL VELOCITY _____
☐ in/sec (U.S. Standard) ☐ mm/sec (Metric)

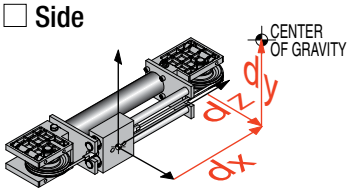
MOVE TIME sec. _____

NO. OF CYCLES _____
☐ per minute ☐ per hour

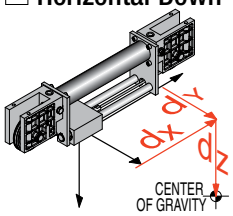
☐ **Horizontal**



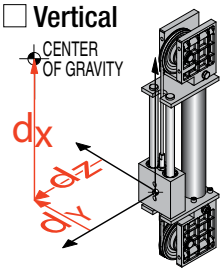
☐ **Side**



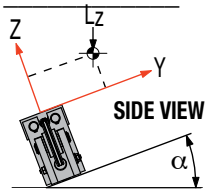
☐ **Horizontal Down**

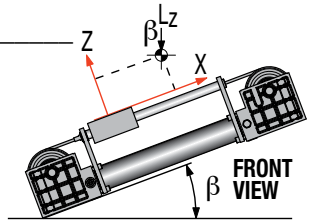


☐ **Vertical**



☐ **Angled** α _____





OTHER ISSUES: (i.e. Environment, Temperature, Contamination, etc.) _____

Contact information: _____

Fax (1-763-478-8080) or call Tolomatic (1-800-328-2174) with the above information. We will provide any assistance needed to determine the proper actuator.

TC: Track Cable Cylinder Selection Guidelines - All Sizes

PROVIDING LOAD GUIDANCE AND SUPPORT

1 COMPILE APPLICATION REQUIREMENTS

To determine the appropriate Track Cable Cylinder for an application, compile the following information:

- Available pressure (PSI)
- Weight of load (lbs. or kgs.)
- Orientation of load (lbs. or kgs.)
- Velocity of load (in./sec. or mm/sec.)
- Stroke length (in. or mm)

2 SELECT CYLINDER SIZE

- Consult the Theoretical Force vs. Pressure charts.
- Cross-reference the load force (or load weight if force is not known) and the available operating pressure. If the intersection falls below the diagonal line, and if moments do not exceed maximum values listed for that model (see Step 3), the actuator will accommodate the application. If the intersection is above the diagonal line, a larger cylinder bore size should be considered.

NOTE: Additional force may be required to obtain the necessary acceleration for vertical or horizontal loads.

3 KEEP UNDER MAXIMUM STROKE LENGTH

There are specific maximum stroke lengths for each model.
TC05: 67.00"
TC07: 78.00"
TC10: 78.00"
TC15: 282.59"

4 DETERMINE NATURE OF LOAD AND THE EFFECT OF BENDING MOMENTS

If the actuator will guide and support a load located directly over the center of carrier, bending moments will not be a factor in the actuator selection. Track Cable Cylinders perform best that way. See the Bending Moments Formulae below if your application requires the load to be away from center of the carrier.

5 DETERMINE THE BEARING ROD LOAD CAPACITY

Determine whether the Load Weight and Stroke Length will be within the load capacity for the bearing rods.

Cross reference the load weight and stroke on the Load Weight vs. Stroke chart for the selected bore size. (Page CC_20, CC_21) If the intersection falls within the curve, the cylinder will accommodate the application requirements. If the intersection falls outside the curve, consult the chart of a larger bore size that will accommodate the required load weight and stroke for your application.

The weight on the bearing rods causes them to bend or deflect slightly over their length. This deflection is increased for longer rods and/or higher weights on the bearing block. For proper operation, rod deflection must not exceed .30 of an inch.

6 DETERMINE INTERNAL CUSHION CAPACITY

- Consult the Cushion Data chart (Cushion Data for Track Cable Cylinders page CC_7 to CC_11) for the model selected. The velocities listed on the cushion charts are final or cushion impact velocities. On applications where internal cushions are to be used, be sure the actual, final or impact velocity is known. If the velocity is not known, use of limit switches with valve deceleration circuits or shock absorbers should be considered.

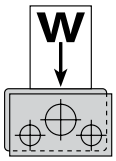
BENDING MOMENTS

Loading Equation Data

MODEL	BORE SIZE	A (in.)	D (in.)	F (lbs.)	G (lbs.)
TC05	1/2"	1.09	1.0	14.00	–
TC07	3/4"	1.09	1.0	14.00	–
TC10	1"	1.09	1.0	14.00	–
TC15	1-1/2"	1.68	2.31	90.00	–

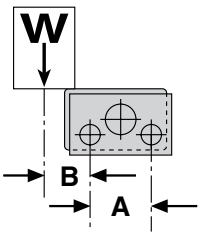
"L" MOMENT

$$L = \frac{W}{2}$$



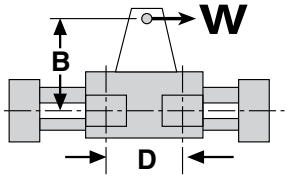
"Mx" MOMENT

$$L = \frac{WB}{A}$$



"My" / "Mz" MOMENT

$$F \text{ or } G = 2L = \frac{WB}{D}$$



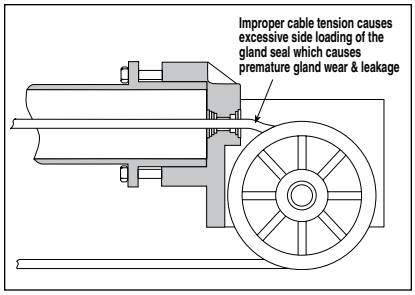
Loading Equation Key

A = Distance between shaft centers.
B = Distance from load center to center of nearest shaft (in.); determined by application.
L = Load per shaft (lbs.).
W = Payload weight (lbs.).
D = Axial distance between center of bearings (in.).
F = Max. bearing sliding load (linear bearings) (lbs.)
G = Max. bearing sliding load (sintered bronze bearings) (lbs.)

CC Cable Cylinder Application Guidelines - All Sizes

1 PROOF-LOADING AND PRETENSIONING CABLES

Once installed, but before putting in service, the cables on the cylinder should be proof-loaded and pretensioned to ensure that they are rigid for the maximum service life of the cylinder.



Proof-loading and pretensioning involve removing the two types of stretch in the cable by adjusting the clevis terminal lock nuts.

- *Proof-loading* – When cables are manufactured, individual wires and strands are laid in position but left slightly loose. When subjected to proof-loading the wires align themselves, tighten and constructional stretch in the cable is eliminated.
- *Pretensioning*– Elastic stretch in cable is inherent in the wire itself. It is removed when subjected to pretensioning.

There are two ways to proof-load and pretension a cylinder's cables — The Torque Method or The Field Method. These two methods are explained at right. Either method may be used.

All cables should be checked periodically from a preventative maintenance standpoint. When installing new cable assemblies proof-load and pretension using these same methods.

THE TORQUE METHOD

1. Tighten the clevis terminal lock nuts equally with a torque wrench to the values listed under Proof-loading torque in the Proof-loading, Pretensioning table below.
2. Let tightened nuts sit for 30 seconds.
3. Loosen the lock nuts to remove tension (but tight enough to eliminate any slack).
4. Re-torque clevis terminal lock nuts equally with a torque wrench to the total pretensioning figures listed in the table below.

PROOF-LOADING AND PRETENSIONING TORQUE OF CABLES

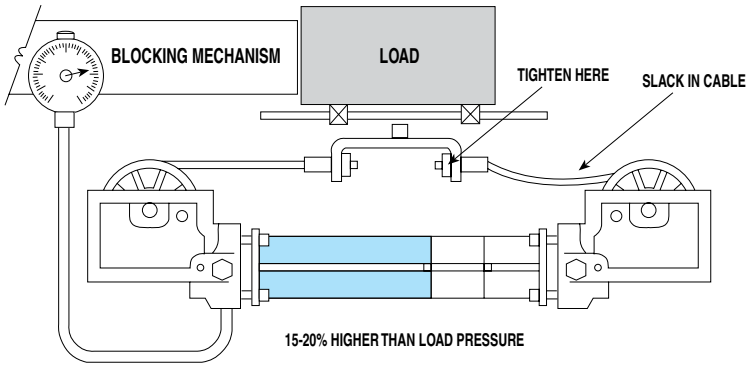
CC Model	Proof-loading Torque		Pretensioning Torque		+ Starting Torque of Nuts on Terminals		= Total Pretensioning Torque	
CC05	15in.-lbs.	1.69N-m	2.5in.-lbs.	0.28N-m	10in.-lbs.	1.13 N-m	12.5in.-lbs.	1.41 N-m
CC07	15in.-lbs.	1.69N-m	2.5in.-lbs.	0.28N-m	10in.-lbs.	1.13 N-m	12.5in.-lbs.	1.41 N-m
CC10	15in.-lbs.	1.69N-m	2.5in.-lbs.	0.28N-m	10in.-lbs.	1.13 N-m	12.5in.-lbs.	1.41 N-m
CC15	45in.-lbs.	5.08N-m	8.0in.-lbs.	0.90N-m	20in.-lbs.	2.26 N-m	28.8in.-lbs.	3.25 N-m
CC20	115in.-lbs.	12.99N-m	46.0in.-lbs.	5.20N-m	25in.-lbs.	2.82 N-m	71.0in.-lbs.	8.02 N-m
CC25	115in.-lbs.	12.99N-m	73.0in.-lbs.	8.25N-m	25in.-lbs.	2.82 N-m	98.0in.-lbs.	11.07 N-m
CC30	210in.-lbs.	23.73N-m	105.0in.-lbs.	11.86N-m	25in.-lbs.	2.82 N-m	130.0in.-lbs.	14.69 N-m
CC40	210in.-lbs.	23.73N-m	187.5in.-lbs.	21.19N-m	25in.-lbs.	2.82 N-m	212.5in.-lbs.	24.01 N-m
CC50	325in.-lbs.	36.72N-m	180.0in.-lbs.	20.34N-m	30in.-lbs.	3.39 N-m	210.0in.-lbs.	23.73 N-m
CC52	210in.-lbs.	23.73N-m	115.0in.-lbs.	12.99N-m	25in.-lbs.	2.82 N-m	140.0in.-lbs.	15.82 N-m

THE FIELD METHOD

The Field Method simplifies Proof-loading and Pretensioning the cable cylinder by combining the two processes.

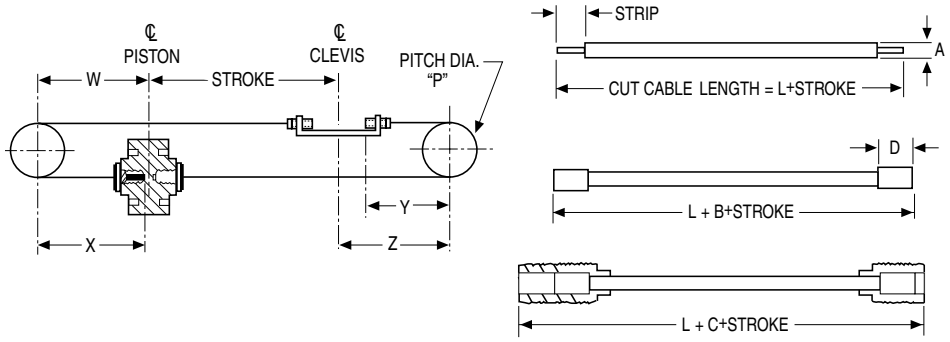
1. Block the load some distance from the end of stroke to keep the piston from bottoming.
2. Apply a pressure that is 15% to 20% higher than the actual load pressure.

   NOTE: Load pressure is defined as the pressure required to move the load. When the load is stopped externally, before the piston bottoms, the relief valve or regulator setting becomes the load pressure.
3. Upon pressurizing, one cable will become tight while the other will become slack. Manually adjust out the slack with a wrench on the clevis terminal lock nut.
4. Release the pressure, block the load on the other side and repeat steps 1 through 3. When these steps are done, turn down the regulator pressure to the normal operating pressure and remove the block.



2 DETERMINING SPECIAL CABLE LENGTHS

When an application requires a specialized cable length, use the dimensional table and illustrations to determine the proper cable length.



MODEL	P		W		X		Y		Z		STRIP		A		B		C		D		L(std) + Stroke	
	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.
CC05	1.500	38.1	1.687	42.8	1.350	34.3	1.406	35.7	1.687	42.8	0.328	8.3	0.093	2.4	0.234	5.9	0.375	9.5	0.437	11.1	4.68	118.9
CC07	1.500	38.1	1.687	42.8	1.350	34.3	1.406	35.7	1.687	42.8	0.328	8.3	0.093	2.4	0.234	5.9	0.375	9.5	0.437	11.1	4.68	118.9
CC10	1.500	38.1	1.687	42.8	1.350	34.3	1.406	35.7	1.687	42.8	0.328	8.3	0.093	2.4	0.234	5.9	0.375	9.5	0.437	11.1	4.68	118.9
CC15	3.250	82.6	4.452	113.1	4.325	109.9	3.725	94.6	4.452	113.1	0.468	11.9	0.187	4.7	0.343	8.7	0.420	10.7	0.828	21.0	12.50	317.5
CC20	4.250	108.0	5.125	130.2	4.688	119.1	3.426	87.0	5.125	130.2	0.620	15.7	0.250	6.4	0.641	16.3	0.540	13.7	1.060	26.9	14.25	362.0
CC25	4.250	108.0	5.125	130.2	4.688	119.1	3.426	87.0	5.125	130.2	0.620	15.7	0.250	6.4	0.641	16.3	0.540	13.7	1.060	26.9	14.25	362.0
CC30	5.312	134.9	5.687	144.4	5.000	127.0	3.601	91.5	5.687	144.4	0.844	21.4	0.312	7.9	0.500	12.7	0.195	5.0	1.100	27.9	17.00	431.8
CC40	5.312	134.9	6.187	157.1	5.000	127.0	4.315	109.6	6.187	157.1	0.844	21.4	0.312	7.9	0.500	12.7	0.195	5.0	1.100	27.9	17.50	444.5
CC50	6.000	152.4	9.370	238.0	8.630	219.2	7.820	198.6	9.370	238.0	1.180	30.0	0.375	9.5	1.000	25.4	0.500	12.7	1.930	49.0	24.55	623.6
CC52	5.312	134.9	5.702	144.8	5.000	127.0	3.850	97.8	5.702	144.8	0.844	21.4	0.312	7.9	0.500	12.7	0.195	5.0	1.100	27.9	17.00	431.8

3 LUBRICATION GUIDELINES

All Tolomatic cable cylinders require internal lubrication unless specified. To ensure maximum cylinder life, the following guidelines should be followed.

- ***Filtration***

  We recommend the use of dry, filtered air in our products. "Filtered air" means a level of 10 Micron or less. "Dry" means air should be free of appreciable amounts of moisture. Regular maintenance of installed filters will generally keep excess moisture in check.

- ***External Lubricators***

  External lubrication should be utilized for maximum service life of pneumatic cable cylinders. Lubrication must be maintained in a constant supply or the results will be a dry cylinder prone to premature wear.

  Oil lubricators, (mist or drop) should supply a minimum of 1 drop per 20 standard cubic feet per minute to the cylinder. As a rule of thumb, double that rate if water in the system is suspected. Demanding conditions may require more lubricant.

  We recommend a **non-detergent, 20cP @ 140˚F** 10-weight lubricant. Optimum conditions for standard cylinder operation are **+32˚ to +125˚F *(+0˚ to 51.6˚C).***

- ***Sanitary environments***

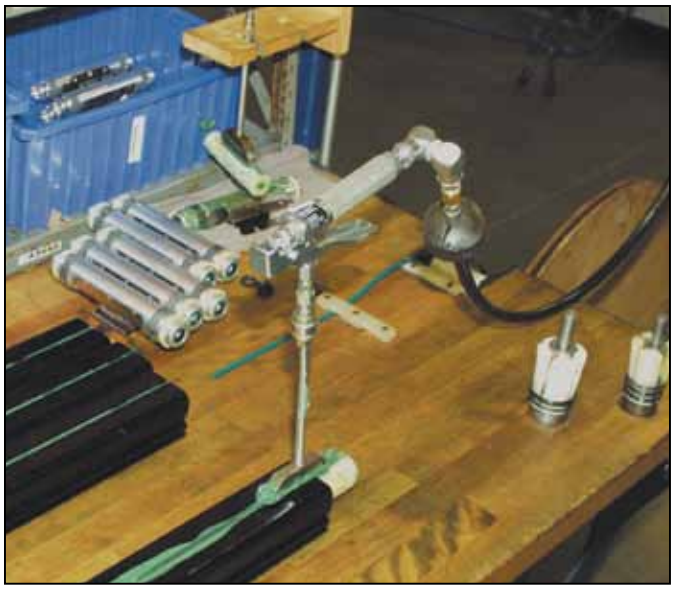
  Oil mist lubricators must dispense "Food Grade" lubricants to the air supply. Use fluids with ORAL **LD50 toxicity ratings of 35 or higher** such as **Multitherm® PG-1 or equivalent.** Demanding conditions can require a review of the application.

Application Guidelines

The following conditional statements are intended as general guidelines for use of Tolomatic actuators. Since all applications have their own specific operating requirements, consult Tolomatic, Inc. or your local Tolomatic distributor if an application is unconventional or if questions arise regarding the selection process.

CUSHION NEEDLE ADJUSTMENT (BC2, BC3, BC4, CC, SA, DP, TC ONLY)

Adjust the cushion needles in the cylinder heads carefully to obtain a smooth, hesitation free deceleration for your particular application. If there are questions on proper adjustment, please consult Tolomatic, Inc.



LUBRICATION GUIDELINES

All Tolomatic actuators (except Cable Cylinders) are prelubricated at the factory. To ensure maximum actuator life, the following guidelines should be followed.

- **Filtration**

  We recommend the use of dry, filtered air in our products. "Filtered air" means a level of 10 Micron or less. "Dry" means air should be free of appreciable amounts of moisture. Regular maintenance of installed filters will generally keep excess moisture in check.

- **External Lubricators (optional)**

  The factory prelubrication of Tolomatic actuators will provide optimal performance without the use of external lubrication. However, external lubricators can further extend service life of pneumatic actuators if the supply is kept constant.

  Oil lubricators, (mist or drop) should supply a minimum of 1 drop per 20 standard cubic feet per minute to the cylinder. As a rule of thumb, double that rate if water in the system is suspected. Demanding conditions may require more lubricant.

  If lubricators are used, we recommend a non-detergent, 20cP @ 140˚F 10-weight lubricant. Optimum conditions for standard cylinder operation are +32˚ to +150˚F (+0˚ to 65.5˚C).

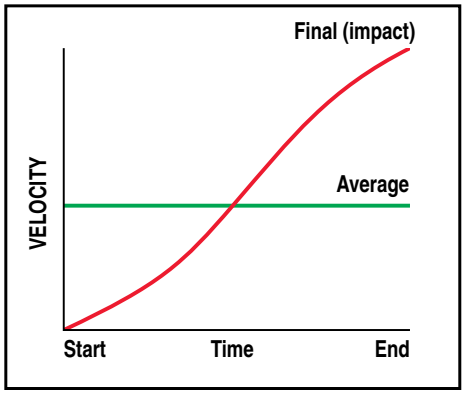
  NOTE: Use of external lubricators may wash away the factory installed lubrication. External lubricants must be maintained in a constant supply or the results will be a dry actuator prone to premature wear.

- **Sanitary Environments**

  Oil mist lubricators must dispense "Food Grade" lubricants to the air supply. Use fluids with ORAL LD50 toxicity ratings of 35 or higher such as Multitherm® PG-1 or equivalent. Demanding conditions can require a review of the application.

FINAL VELOCITY CALCULATION

Velocity calculations for all rodless cylinders need to differentiate between final velocity and average velocity. For example: Stroking a 100-inch BC3 model in one second yields an average velocity of 100 inches per second. To properly determine the inertial forces for cushioning, it is important to know the final (or impact) velocity. Rodless cylinders accelerate and decelerate at each end of the stroke. Therefore this acceleration must be considered (see diagram).



If final (or impact) velocity cannot be calculated directly, a reasonable guideline is to use 2 x average velocity.

CC, SA, DP, TC Service Parts Ordering - ALL Sizes

CABLE ASSEMBLIES[1] AND REPAIR KITS[2] PART NUMBERS

Find the appropriate part number for the specific model and specify that part number with your stroke length when ordering.

MODEL	CABLE ASSY.	REPAIR KITS
CC05	CACC05	RKCC05
TC05	CATC05	RKTC05
CCM05	CACCM05	RKCCM05
TCM05	CATCM05	RKTCM05
CC07	CACC07	RKCC07
SA07	CASA07	RKSA07
TC07	CATC07	RKTC07
CCM07	CACCM07	RKCCM07
SAM07	CASAM07	RKSAM07
TCM07	CATCM07	RKTCM07
CC10	CACC10	RKCC10
SA10	CASA10	RKSA10
TC10	CATC10	RKTC10
CCM10	CACCM10	RKCCM10
SAM10	CASAM10	RKSAM10
TCM10	CATCM15	RKTCM10
CC15	CACC15	RKCC15
DP15	CADP15	RKDP15
SA15	CASA15	RKSA15
TC15	CATC15	RKTC15
CCM15	CACCM15	RKCCM15
DPM15	CADPM15	RKDPM15
SAM15	CASAM15	RKSAM15
TCM15	CATCM15	RKTCM15
CC20	CACC20	RKCC20
DP20	CADP20	RKDP20
SA20	CASA20	RKSA20
CCM20	CACCM20	RKCCM20
DPM20	CADPM20	RKDPM20
SAM20	CASAM20	RKSAM20
CC25	CACC25	RKCC25
DP25	CADP25	RKDP25
SA25	CASA25	RKSA25
CCM25	CACCM25	RKCCM25
DPM25	CADPM25	RKDPM25
SAM25	CASAM52	RKSAM25
CC52	CACC52	RKCC52
DP52	CADP52	RKDP52
SA52	CASA52	RKSA52
CCM52	CACCM52	RKCCM52
DPM52	CADPM52	RKDPM52
SAM52	CASAM52	RKSAM52
CC30	CACC30	RKCC30
DP30	CADP30	RKDP30
SA30	CASA30	RKSA30
CCM30	CACCM30	RKCCM30
DPM30	CADPM30	RKDPM30
SAM30	CASAM30	RKSAM30
CC40	CACC40	RKCC40
DP40	CADP40	RKDP40
SA40	CASA40	RKSA40
CCM40	CACCM40	RKCCM40
DPM40	CADPM40	RKDPM40
SAM40	CASAM40	RKSAM40
CC50(ALL)	CACC50	RKCC50
SA50(ALL)	CASA50	RKSA50

CONFIGURATED REPAIR KIT[2] ORDERING EXAMPLE:

OPTION	MODEL, BORE				STROKE				
RK	CC	V	M	07	SK	42	·	5	

Where **RK** is the Repair Kit code, **CCVM** is the Cable Cylinder Code with seals of Viton® material, 07 is the .75" bore and **SK 42.5** indicates a stroke length of 42.5 inches.

Service Parts Ordering NOTES:

1. Cable Assemblies contain: one Cable Assembly (specify stroke).
2. Repair Kits contain: two Cable Assemblies (specify stroke) and all wearable seals required to rebuild the cylinder.

SWITCH ORDERING

PART NUMBER ORDERING No Mounting Hardware or FE conn. included		CONFIG. CODE ORDERING Mounting Hardware & FE conn. included
PART NO.	DESCRIPTION	CODE
3600-9084	Switch Only, Reed, Form C, 5m	BT
3600-9085	Switch Only, Reed, Form C, Male Conn.	BM
3600-9082	Switch Only, Reed, Form A, 5m	RT
3600-9083	Switch Only, Reed, Form A, Male Conn.	RM
3600-9086	Switch Only, Triac, 5m	CT
3600-9087	Switch Only, Triac, Male Conn.	CM
2503-1025	Connector (Female) 5 meter lead	

NOTE: When ordered by Config. Code Female connector & all mounting hardware is included

Switch Ordering NOTES:

To order field retrofit switch and hardware kits for all Tolomatic actuators: SW (Then the model and bore size, and type of switch required)
Example: SWCCM15RT
(Hardware and Form A Reed switch with 5 meter lead for 1.5" bore cable cylinder)

Cable Cylinder Ordering - CC, SA, DP, TC - All Sizes

MODEL, BORE, STROKE

CC V _ M 15 SK125.250

OPTIONS

END #1 HJ END #1 HG RT2 XA_._ XB_._

MODEL

CC	Double Acting Cable Cylinder
SA	Single Acting Cable Cylinder
DP	Double Purchase Cable Cylinder
TC	Track Cable Cylinder

SEALS

V	Seals of Viton® material

TUBING

S	Steel Tube *Not available for 05, 07 or 50 size* *Switches cannot be used with steel tubing*

SWITCH MAGNET

M	Internally Mounted Magnet *Required for use with switches* *Magnet will increase dead length of CC, SA & DP actuator (see page CC_29)*

BORE SIZE

05	0.50" *(16mm)*	**25**	2.50" *(63mm)*
07	0.75" *(19mm)*	**30**	3.00" *(76mm)*
10	1.00" *(25mm)*	**40**	4.00" *(100mm)*
12	1.25" *(32mm)*	**50**	5.00" *(127mm)*
15	1.50" *(40mm)*	**52**	2.00" [500 PSI] *(50mm)*
20	2.00" *(50mm)*		

STROKE LENGTH

SK_._._	Enter desired stroke length in decimal inches

NOTE: Strokes over 281" (7137mm) require Tube Couplers. Consult Tolomatic for lead time. Max. stroke length varies by model and bore size, see dimensions page for specification.

HEAD OPTIONS *(CC_22 & CC_25)*

Single-ported heads are standard on all cylinders.
Enter head options for [END #1, right end] and/or [END #2, left end] of the cylinder

[1,3]HG	3-ported head
HI	1" auto tensioner assembly
[3]HJ	1" auto tensioner assembly with 3-ported head
HK	2" auto tensioner assembly
[3]HL	2" auto tensioner assembly with 3-ported head
[2]HM	caliper disc brake assembly
[2,3]HN	caliper disc brake assembly with 3-ported head

[1]Only head option available for single-acting cylinders

[2]Autotensioner assembly required on one end of the cylinder

[3]Cushions are removed on all 3-ported heads

SWITCHES *(CC_28)*

TYPE		QUICK-DISCONNECT	CODE	QUANTITY	LEAD LENGTH
REED	Form A	QD	**RM**	After code enter quantity desired	5 meters
		no	**RT**		
	Form C	QD	**BM**		
		no	**BT**		
TRIAC		QD	**CM**		
		no	**CT**		

EXTRA CABLE

XA	for extra beyond standard in inches
XB	for extra beyond standard in inches

Not all codes listed are compatible with all options. Contact Tolomatic with any questions.

Tolomatic
EXCELLENCE IN MOTION®

BC2 SOLID BEARING RODLESS CYLINDER

CONTENTS

BC2 BAND CYLINDER

ENDURANCE TECHNOLOGY℠

Endurance Technology features are designed for maximum durability to provide extended service life.

The BC2 is the direct descendent of the industry's first pneumatic rodless cylinder, manufactured by Tolomatic, the number one rodless supplier. Featuring durable stainless steel bands, field replaceable engineered bearings and a large carrier mounting pattern the BC2 is a great solution for applications that require increased Mx bending moment capacity. Built-to-order in stroke lengths up to 350 inches.

FORMED STEEL PISTON BRACKET

- Provides maximum strength at major stress points
- Heat treated carbon steel withstands the toughest dynamic forces
- Strongest bracket design in the industry assures long life with less maintenance

3-PORTED HEADS

- Standard feature
- Simplifies air connections

RIGID BLACK-ANODIZED EXTRUDED ALUMINUM TUBE

- Stronger, stiffer tube retains tolerance specs when chamber is pressurized
- Keeps sealing band in place for maximized air efficiency
- Tube supports are minimized
- Solid structural support provides durability and long life performance

ADJUSTABLE CARRIER BRACKET

- 2-bolt adjustment instead of a series of set screws
- Easy to set tension for freer running or stiffer systems
- Minimizes free play while maintaining a higher level of load guidance

ADJUSTABLE CUSHIONS

- Adjustable cushions are standard, not optional
- Easy screw adjustment for end-of-stroke deceleration
- Protects actuator and load from damage

FORMED END CAP WIPER SEAL

- Keeps contaminants from entering the sealing area
- Protects internal components
- Reduces maintenance while increasing productivity

STAINLESS STEEL SEALING BAND SYSTEM

- Fatigue resistant stainless steel bands are specifically made to provide longer life and will not elongate, like elastomers
- Outer band keeps out contaminants for extended performance
- Inner band provides a smooth surface for less seal wear

LOAD-BEARING CARRIER DESIGN

- Load and piston are independent - piston floats, resulting in less friction and longer seal life
- Engineered resin load bearings offer consistently low friction and long wear

OPTIONS

AUXILIARY CARRIER
- Substantially higher load capacity
- Substantially higher bending moment capacity

FLOATING MOUNT
- Compensates for non-parallelism between band cylinder and externally guided load

TUBE SUPPORT MOUNTS
- Used for intermediate support

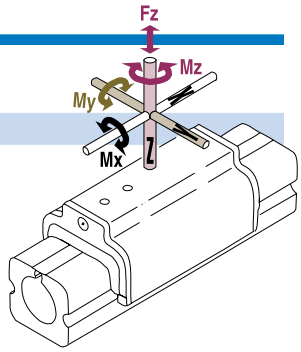
FOOT MOUNTS
- For end mounting of band cylinder

SHOCK ABSORBERS
- Smooth deceleration
- Allows increased operating speed
- Self-compensates for load or speed changes
- Minimizes impact load to equipment
- Higher equipment productivity
- Adjustable position shocks available

SWITCHES
- Available in Reed, Hall-effect and Triac
- 15ft. cable with flying leads; available with quick-disconnect couplers

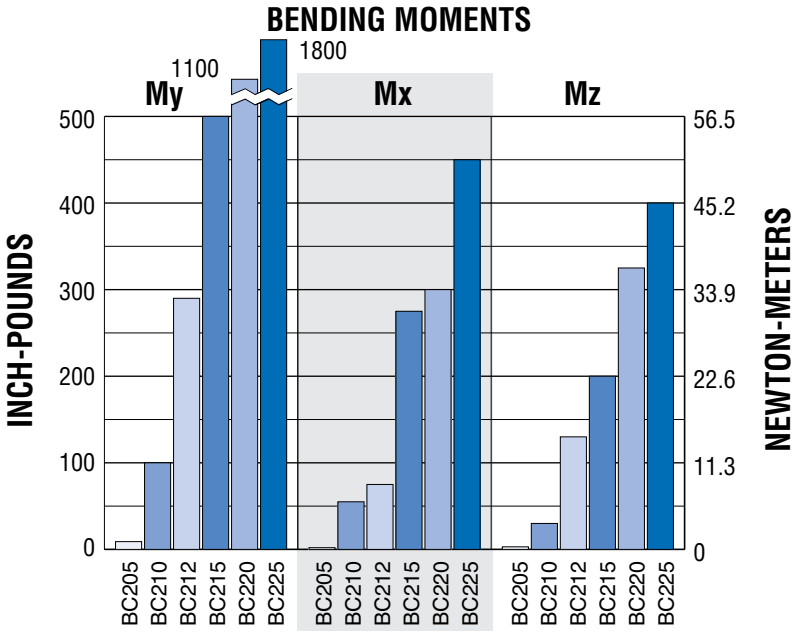
BC2 Solid Bearing Rodless Cylinder

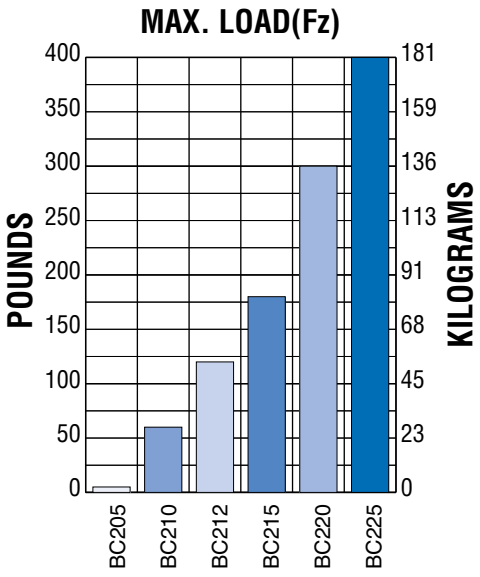
PERFORMANCE



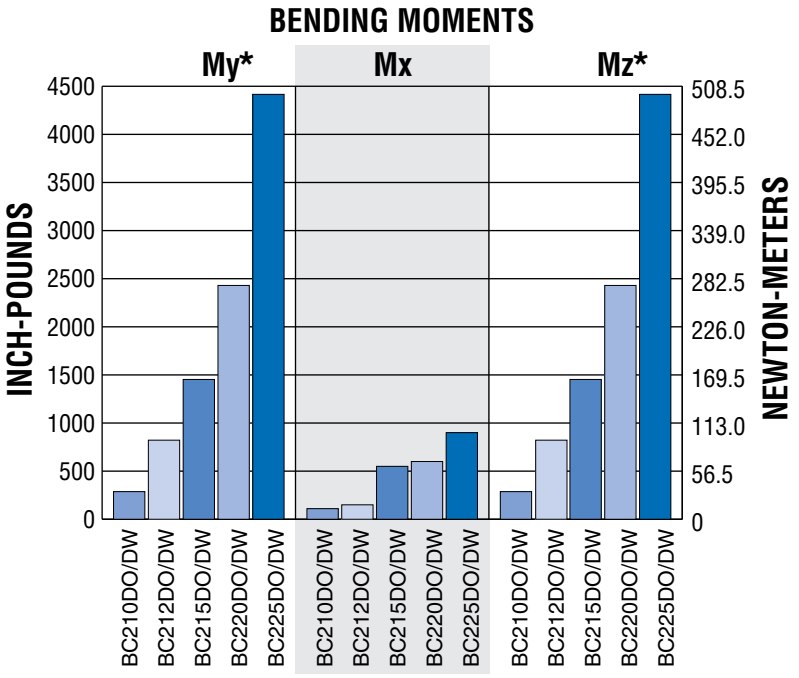
BC2 BENDING MOMENTS AND LOAD, ALL SIZES

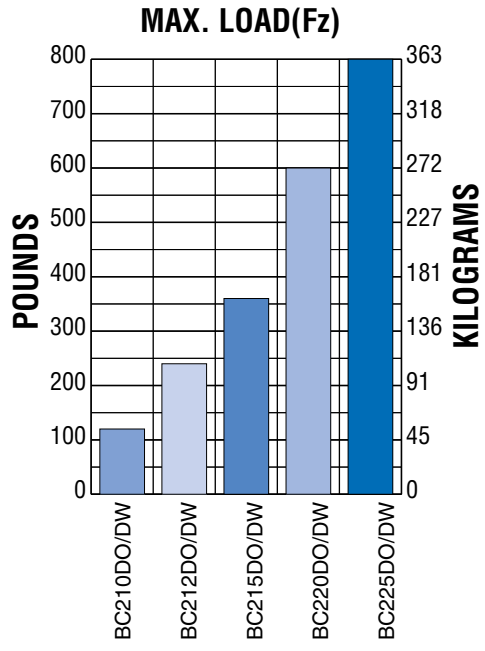
STANDARD ACTUATOR





AUXILIARY CARRIER OPTION



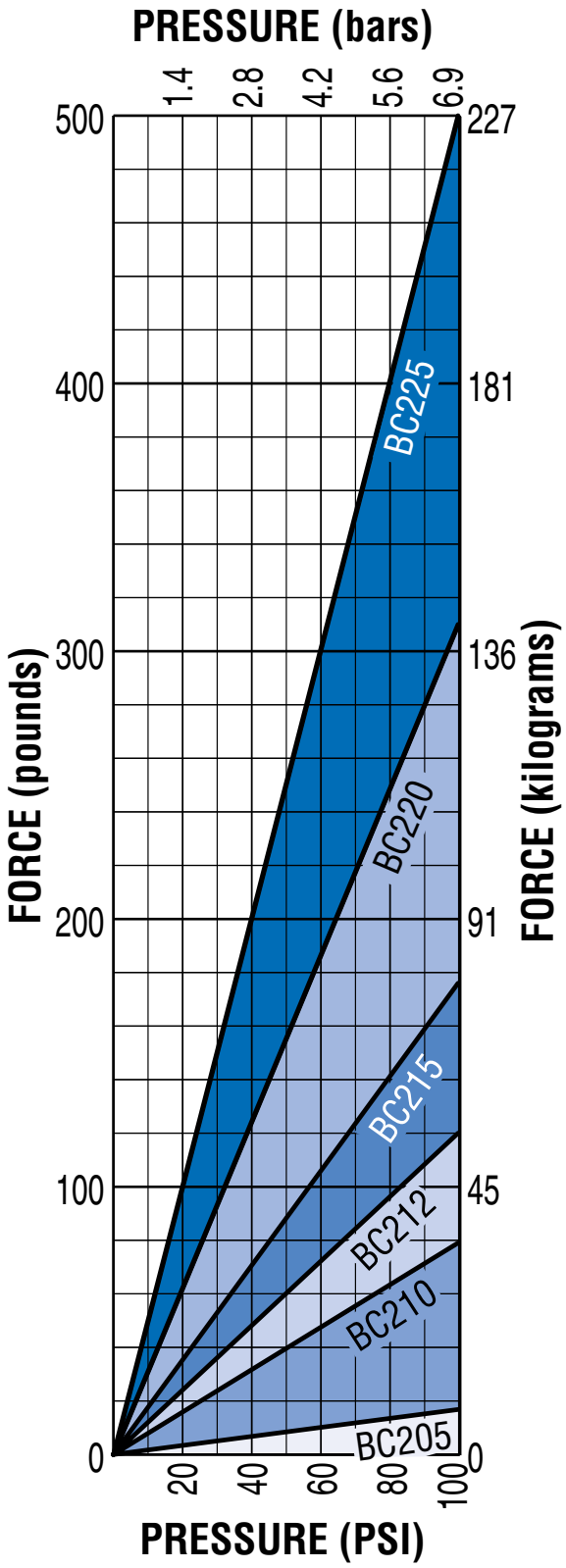


*Auxiliary carrier bending moments indicated are at minimum center to center distance. Additional My + Mz load capacity can be obtained by increasing "D" dimension. Refer to auxiliary carrier data on page BC2_14.

BC2 Solid Bearing Rodless Cylinder

PERFORMANCE

BC2 THEORETICAL FORCE vs PRESSURE



GUIDELINES

BC2 CARRIER BRACKET BOLT ADJUSTMENT

BC2 carrier bracket adjustment bolts should be adjusted to suit each individual application, depending on the degree of rigidity required. A good starting point is to tighten the nut on the bolt until there is no lateral movement of the bolt. Then, equally tighten each nut on the carrier bolt while moving the carrier by hand along the length of the stroke. When all lateral play in the carrier is eliminated and free movement along the length of the stroke is maintained, your carrier bracket is adjusted properly. Some applications may require fine tuning of this adjustment to gain more lateral play or a higher degree of rigidity. In demanding applications, carrier adjustments should be done periodically.

BC205 Solid Bearing Rodless Cylinder

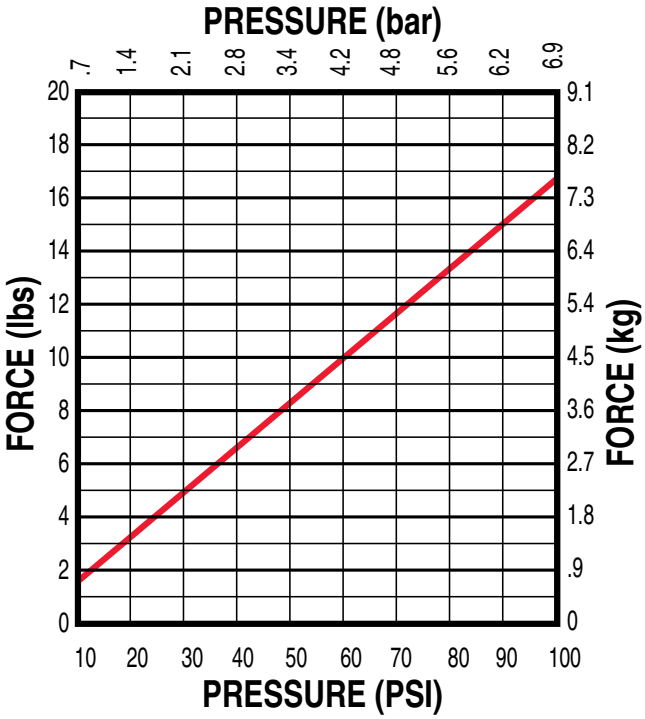
PERFORMANCE

BC205

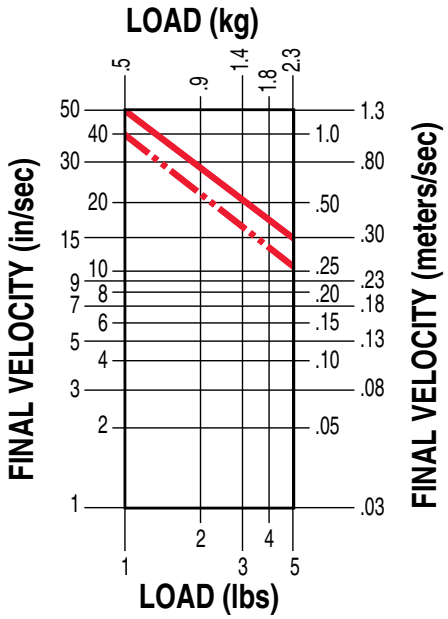
ORDER CODES
BC205 *inch (U.S. Standard)*
BC2M05 *(metric with taper port)*

BC205 OPTIONS	Page
Floating Mount	BC2_18
Foot Mount	BC2_17
Switches	BC2_20
Tube Supports	BC2_16
MORE INFORMATION	**Page**
Application Guidelines	BC2_26
Ordering	BC2_28
Selection	BC2_25

THEORETICAL FORCE vs PRESSURE



BUMPER DAMPENING

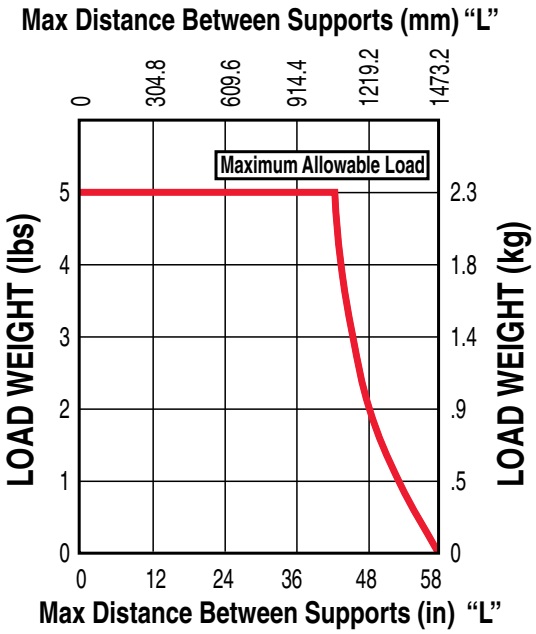


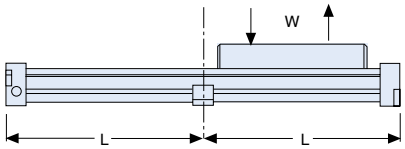
NOTE:

Max. for any application

Max. for continuously cycled application

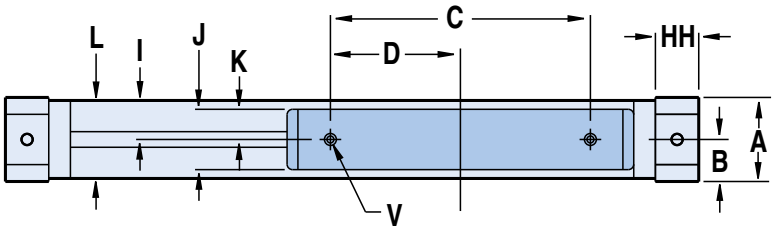
TUBE SUPPORT REQUIREMENTS

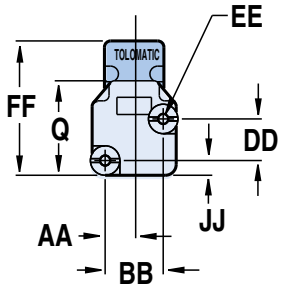


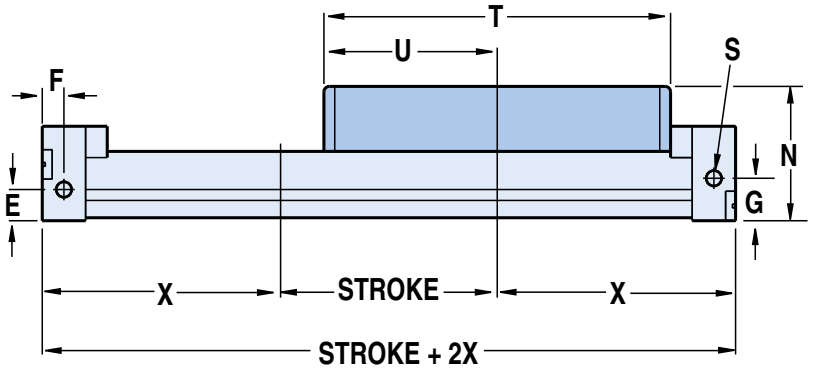


BC205 Solid Bearing Rodless Cylinder

DIMENSIONS



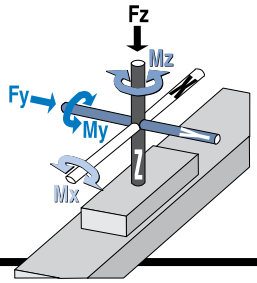




	05	M05
A	0.97	24.6
B	0.48	12.3
C	3.00	76.2
D	1.50	38.1
E	0.36	9.1
F	0.25	6.35
G	0.49	12.4
I	0.45	11.45
J	0.70	17.8
K	0.35	8.9
L	0.90	22.9
N	1.55	39.4
Q	1.09	27.7
S	#10-32 UNF	M5
T	4.00	101.6
U	2.00	50.8
V	2x #6-32 UNC x .38 DEEP	M3 x 9.7 DEEP
X*	2.60 @ 80-100 PSI	66.0 @ 80-100 PSI
	2.66 @ 40-80 PSI	67.6 @ 40-80 PSI
	2.71 @ 0-40 PSI	68.8 @ 0-40 PSI
AA	0.33	8.4
BB	0.66	16.8
DD	0.48	12.2
EE	4x #6-32UNC x .25 DEEP	M3 x 6.4 DEEP
FF	1.55	39.4
HH	0.50	12.7
JJ	0.17	4.3
	INCHES	MILLIMETERS

SPECIFICATIONS

BC205 BENDING MOMENTS AND LOAD



	BORE SIZE	MAX. BENDING MOMENT			MAX. LOAD
		My	Mx	Mz	Fz
05	0.50 in	9.0 in-lbs	2.0 in-lbs	3.0 in-lbs	5.0 lbs
M05	12 mm	1.01 N-m	0.22 N-m	0.33 N-m	2.27 kg

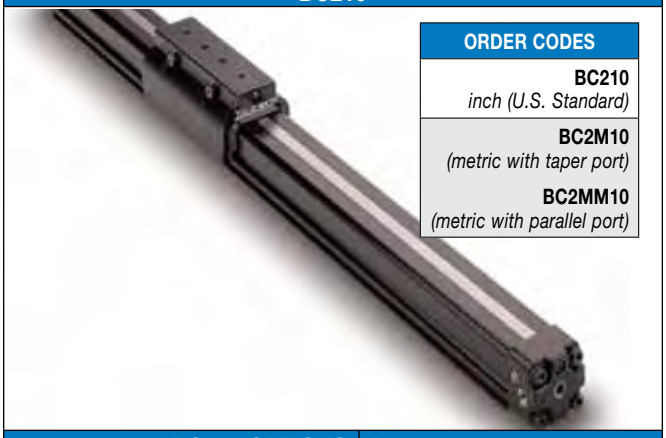
	BORE SIZE	WEIGHT		MAX. STROKE LENGTH*	MAX. PRESSURE	TEMPERATURE RANGE
		BASE	PER UNIT OF STOKE			
05	0.50 in	0.38 lb	0.036 lb/in	171 in	100 PSI	20° to 140° F
M05	12 mm	0.169 kg	0.0164 kg/mm	4343 mm	6.895 bar	-7° to 60° C

*For longer strokes, alternate materials, mounting and/or fasteners – consult Tolomatic

BC210 Solid Bearing Rodless Cylinder

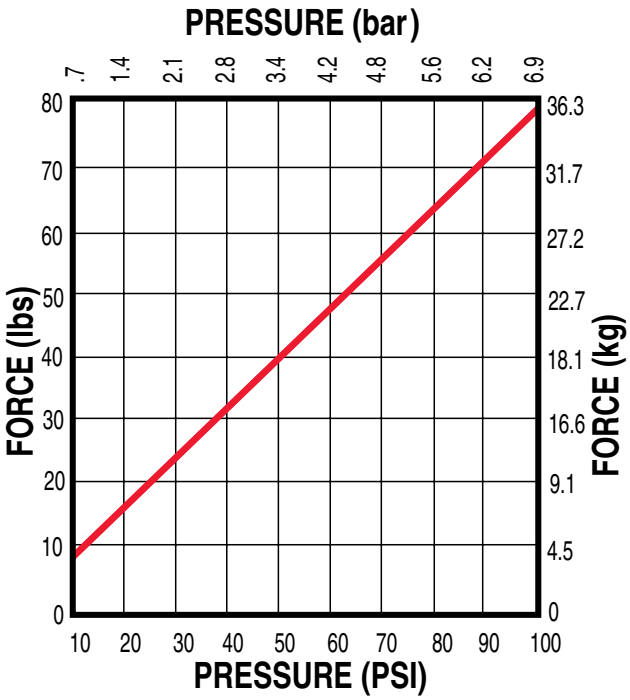
PERFORMANCE

BC210

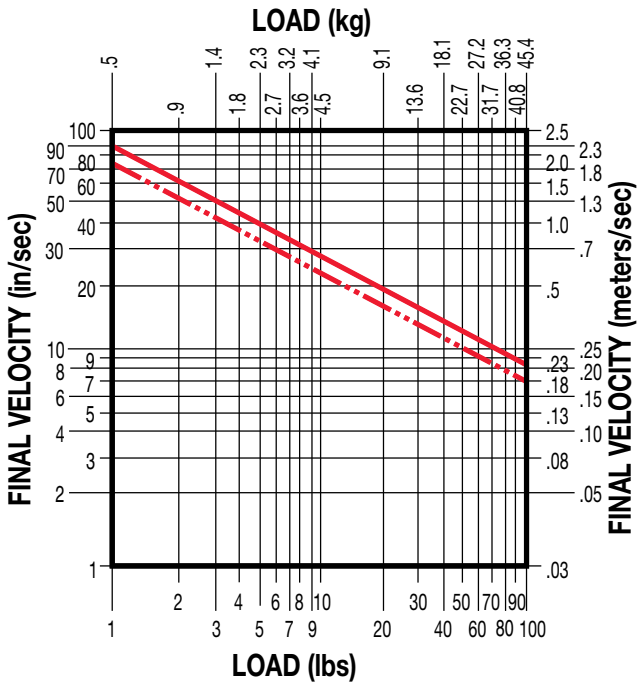


ORDER CODES
BC210 *inch (U.S. Standard)*
BC2M10 *(metric with taper port)*
BC2MM10 *(metric with parallel port)*

THEORETICAL FORCE vs PRESSURE



CUSHION DATA

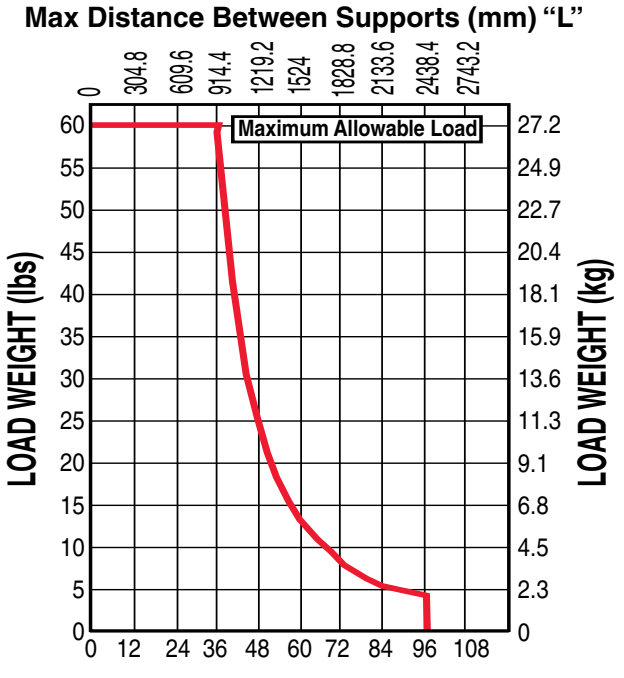


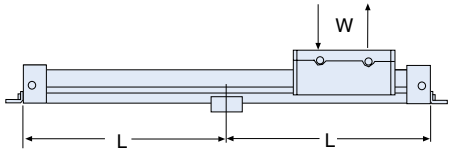
NOTE:

Max. for any application

Max. for continuously cycled application

TUBE SUPPORT REQUIREMENTS

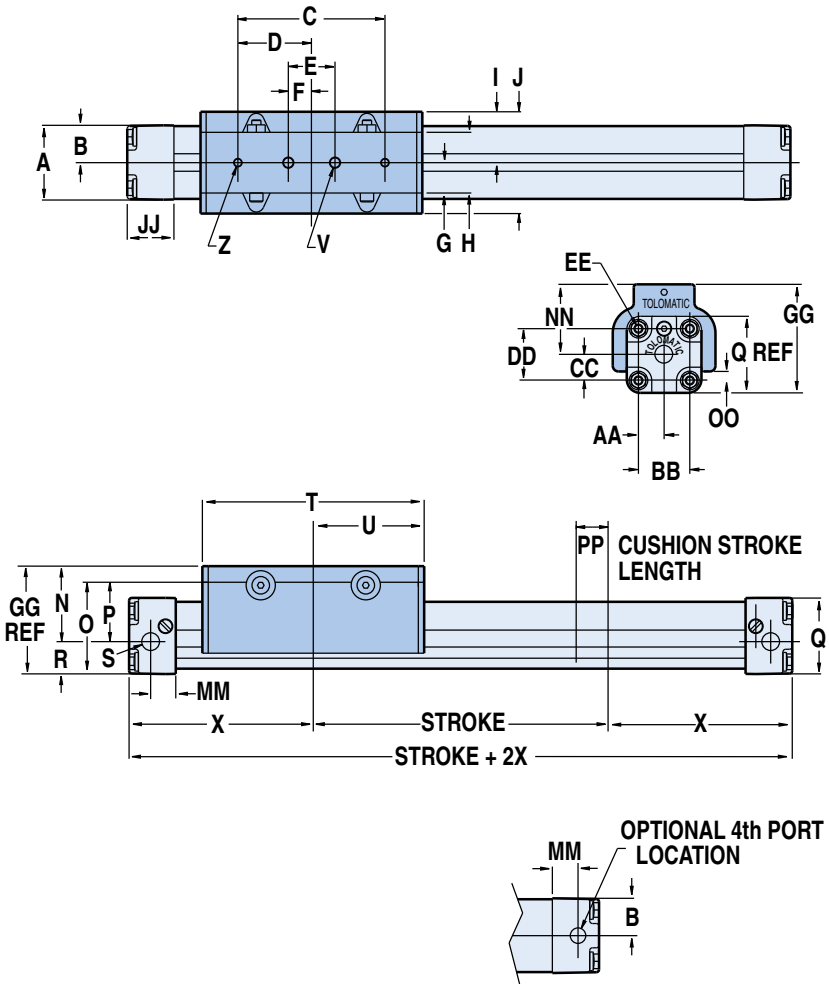




Tolomatic EXCELLENCE IN MOTION

BC210 Solid Bearing Rodless Cylinder

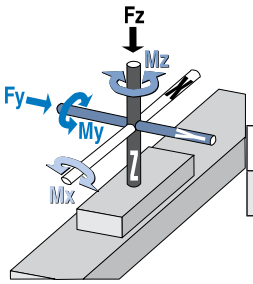
DIMENSIONS



	10	M(MM)10
A	1.58	40.1
B	0.79	20.1
C	3.15	80.0
D	1.57	40.0
E	1.00	25.4
F	0.50	12.7
G	0.65	16.5
H	1.30	33.0
I	1.09	27.7
J	2.18	55.4
N	1.62	41.2
O	1.88	47.7
P	1.20	30.5
Q	1.64	41.5
R	0.68	17.3
S	1/8 NPT (3)	M 1/8 BSPT(3)
		MM1/8 BSPP(3)
T	4.75	120.7
U	2.37	60.2
V	1/4-20 UNC X .25 DEEP	M6 X 6 DEEP
X	3.94	100.1
Z	10-32 UNC X .25 DEEP	M6 X 6 DEEP
AA	0.55	14.0
BB	1.10	27.9
CC	0.55	14.0
DD	1.10	27.9
EE	10-24 X .43 DEEP	M5 X 11.0 DEEP
GG	2.30	58.4
JJ	1.00	25.4
MM	0.55	14.0
NN	1.50	38.1
OO	0.18	4.7
PP	0.68	17.3
	INCHES	MILLIMETERS

SPECIFICATIONS

BC210 BENDING MOMENTS AND LOAD



	BORE SIZE	MAX. BENDING MOMENT			MAX. LOAD
		My	Mx	Mz	Fz
10	1.00 in	100 in-lbs	55 in-lbs	30 in-lbs	60 lbs
M(MM)10	25 mm	11.29 N-m	6.21 N-m	3.39 N-m	27.21 kg

	BORE SIZE	WEIGHT		MAX. STROKE LENGTH*	MAX. PRESSURE	TEMPERATURE RANGE
		BASE	PER UNIT OF STOKE			
10	1.00 in	2.26 lbs	0.14 lbs/in	350 in	100 PSI	20° to 140° F
M(MM)10	25 mm	1.025 kg	0.0024 kg/mm	8890 mm	6.895 bar	-7° to 60° C

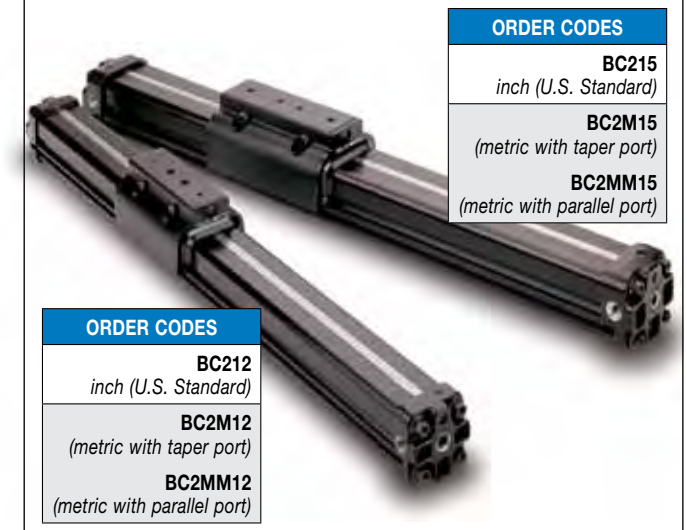
***For longer strokes, alternate materials, mounting and/or fasteners – consult Tolomatic**

BC212 & BC215 Solid Bearing Rodless Cylinder

PERFORMANCE

BC212
BC215

BC212 & BC215



ORDER CODES

BC215
inch (U.S. Standard)

BC2M15
(metric with taper port)

BC2MM15
(metric with parallel port)

ORDER CODES

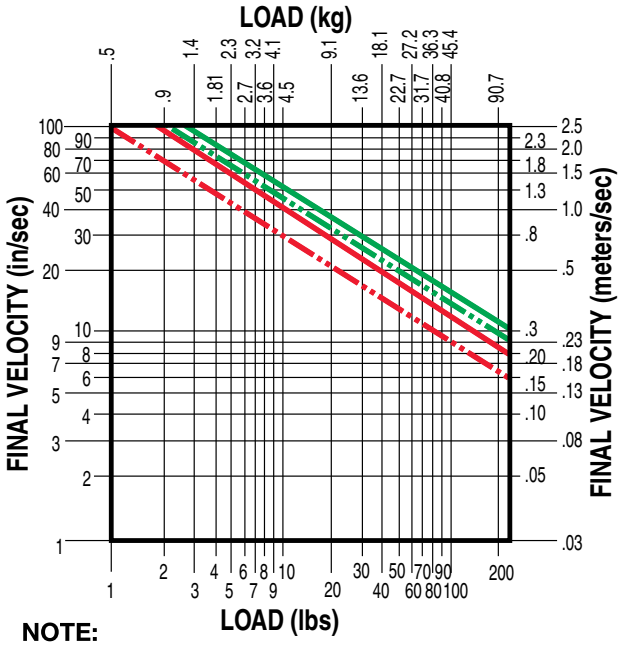
BC212
inch (U.S. Standard)

BC2M12
(metric with taper port)

BC2MM12
(metric with parallel port)

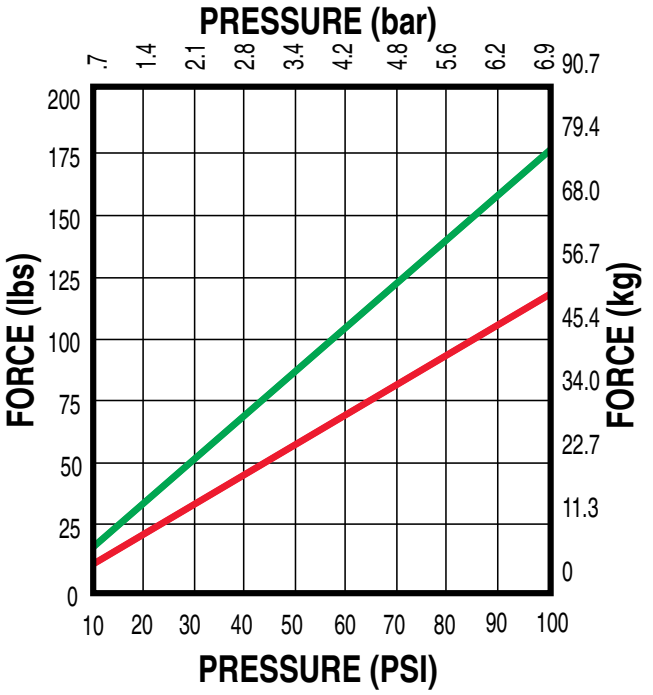
BC212 & BC215 OPTIONS	Page
Auxiliary Carrier	BC2_14
Floating Mount	BC2_18
Foot Mount	BC2_17
Shock Absorbers	BC2_22
Switches	BC2_20
Tube Supports	BC2_16
MORE INFORMATION	**Page**
Application Guidelines	BC2_26
Ordering	BC2_28
Selection	BC2_25

CUSHION DATA

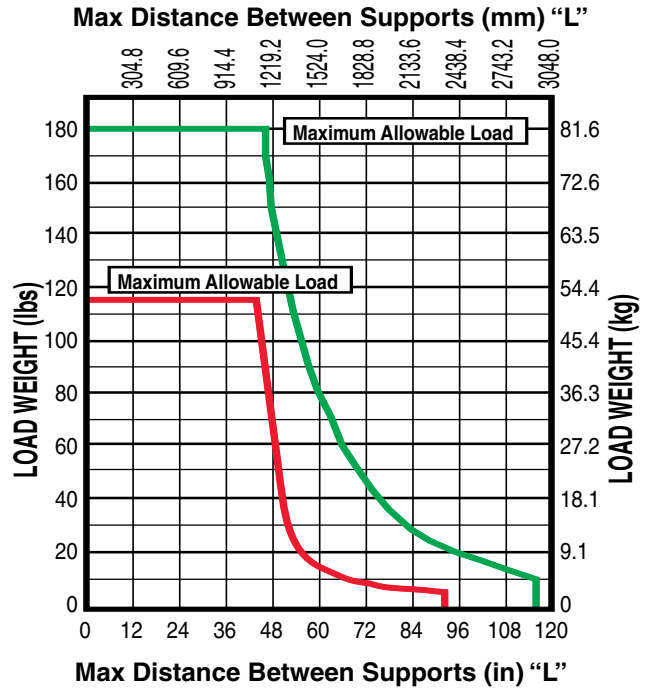


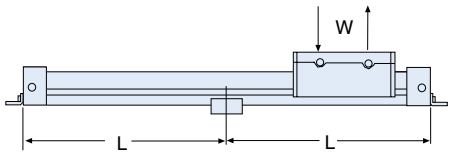
NOTE:
Max. for any application
Max. for continuously cycled application

THEORETICAL FORCE vs PRESSURE



TUBE SUPPORT REQUIREMENTS

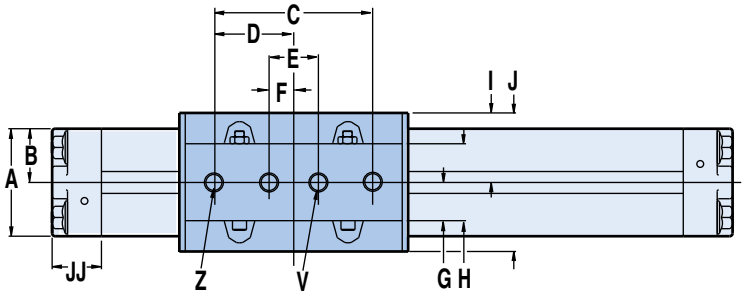


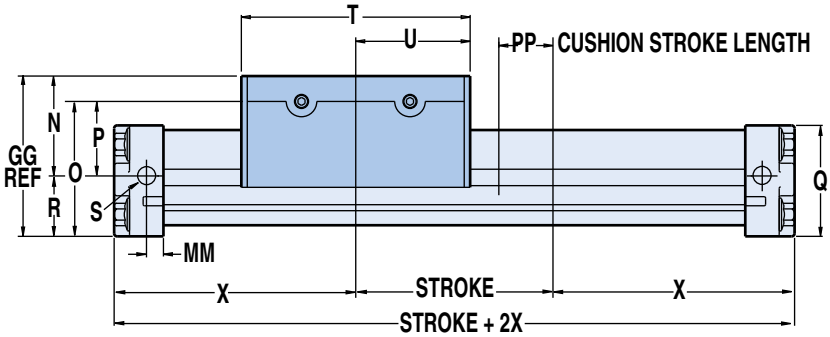


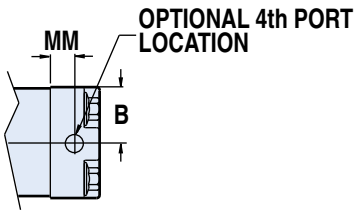
Tolomatic EXCELLENCE IN MOTION

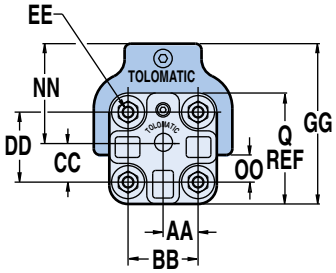
BC212 & BC215 Solid Bearing Rodless Cylinder

DIMENSIONS





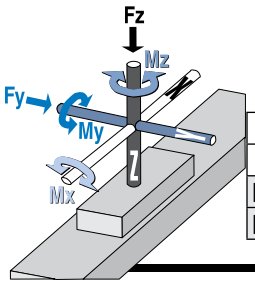




	12	15	M(MM)12	M(MM)15
A	2.18	2.85	55.4	72.4
B	1.09	1.42	27.7	36.1
C	3.20	4.25	81.3	108.0
D	1.60	2.12	40.6	53.8
E	1.00	1.00	25.4	25.4
F	0.50	0.50	12.7	12.7
G	0.78	0.90	19.8	22.9
H	1.56	1.80	39.6	45.7
I	1.41	1.75	35.8	44.5
J	2.82	3.50	71.6	89.0
N	1.83	2.13	46.5	54.1
O	2.48	2.95	63.0	74.9
P	1.25	1.51	31.0	38.4
Q	2.25	2.59	57.2	65.8
R	1.23	1.41	31.2	36.6
S	1/4 NPT (3)	1/4 NPT (3)	M 1/4 BSPT(3) MM 1/4 BSPP(3)	M 1/4 BSPT(3) MM 1/4 BSPP(3)
T	4.64	5.91	117.9	150.1
U	2.32	2.96	58.9	75.1
V	5/16-18 UNC x .31 DP	1/4-20 UNC x .38 DP	M8 x 7 DP	M8 x 10 DP
X	4.87	5.91	123.7	150.1
Z	1/4-20 UNC x .31 DP	5/16-18 UNC x .38 DP	M8 x 7 DP	M8 x 10 DP
AA	0.71	0.91	18.0	23.1
BB	1.42	1.81	36.1	46.0
CC	0.78	1.03	19.8	26.2
DD	1.42	1.81	36.1	46.0
EE	1/4-20 x .47 DP	1/4-20 x .47 DP	M6 x 12 DP	M6 x 12 DP
GG	3.06	3.54	77.7	90.7
JJ	1.00	1.25	25.4	31.8
MM	0.34	0.50	8.6	12.7
NN	1.83	2.13	46.5	54.1
OO	0.35	0.28	9.0	7.0
PP	1.10	1.29	27.9	32.7
	INCHES		MILLIMETERS	

SPECIFICATIONS

BC212/15 BENDING MOMENTS AND LOAD



BORE SIZE		MAX. BENDING MOMENT			MAX. LOAD
		My	Mx	Mz	Fz
12	1.25 in	290 in-lbs	75 in-lbs	130 in-lbs	120 lbs
15	1.50 in	500 in-lbs	275 in-lbs	200 in-lbs	180 lbs
M(MM)12	32 mm	32.77 N-m	8.47 N-m	14.69 N-m	54.42 kg
M(MM)15	40 mm	56.49 N-m	31.07 N-m	22.60 N-m	81.63 kg

	BORE SIZE	WEIGHT		MAX. STROKE LENGTH*	MAX. PRESSURE	TEMPERATURE RANGE
		BASE	PER UNIT OF STOKE			
12	1.25 in	4.56 lbs	0.21 lbs/in	288 in	100 PSI	20° to 140° F
15	1.50 in	8.18 lbs	0.34 lbs/in	298 in	100 PSI	20° to 140° F
M(MM)12	32 mm	2.068 kg	0.0036 kg/mm	7315 mm	6.895 bar	-7° to 60° C
M(MM)15	40 mm	3.7 kg	0.0058 kg/mm	7569 mm	6.895 bar	-7° to 60° C

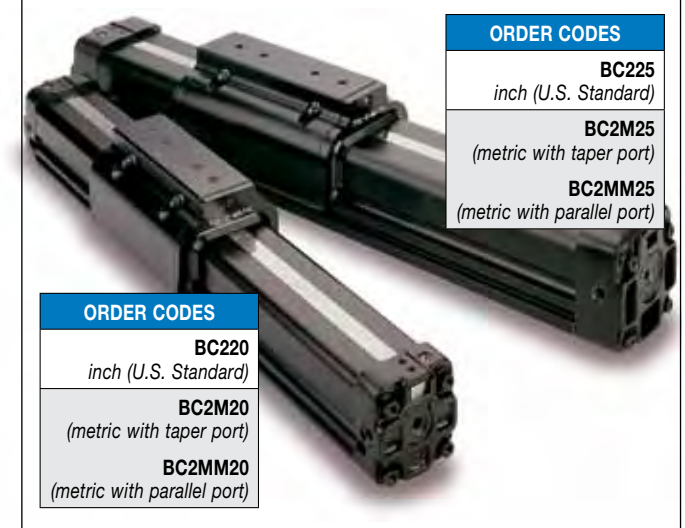
***For longer strokes, alternate materials, mounting and/or fasteners – consult Tolomatic**

BC220 & BC225 Solid Bearing Rodless Cylinder

PERFORMANCE

BC220
BC225

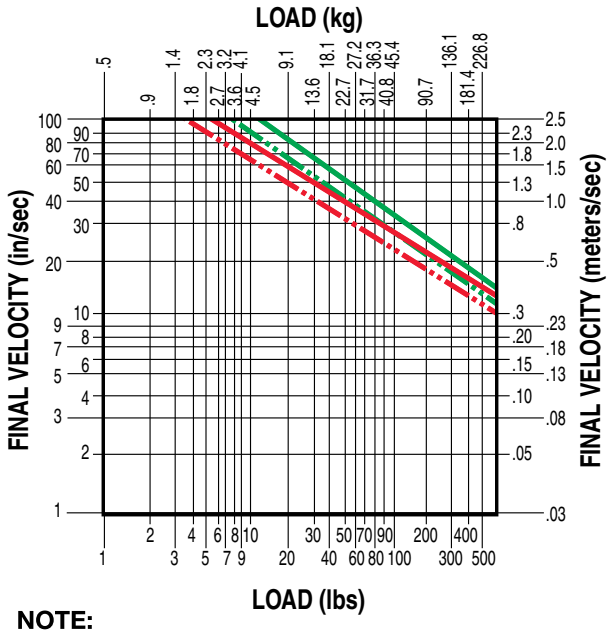
BC220 & BC225



ORDER CODES
BC225 *inch (U.S. Standard)*
BC2M25 *(metric with taper port)*
BC2MM25 *(metric with parallel port)*

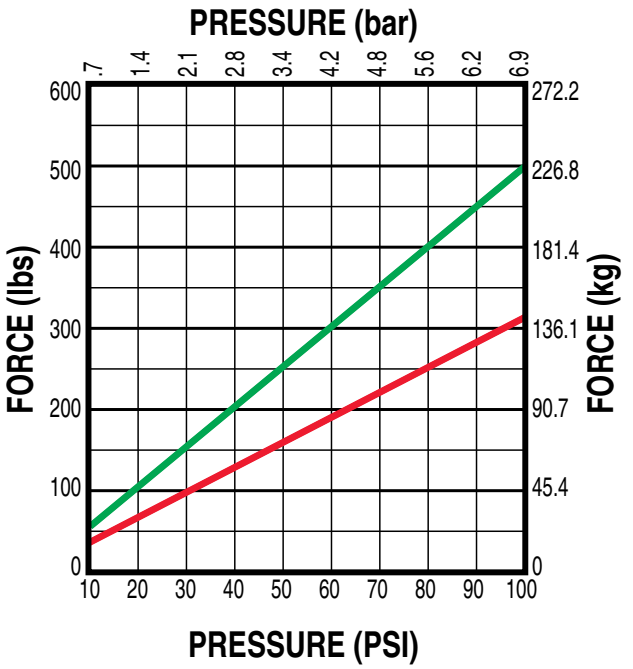
ORDER CODES
BC220 *inch (U.S. Standard)*
BC2M20 *(metric with taper port)*
BC2MM20 *(metric with parallel port)*

CUSHION DATA

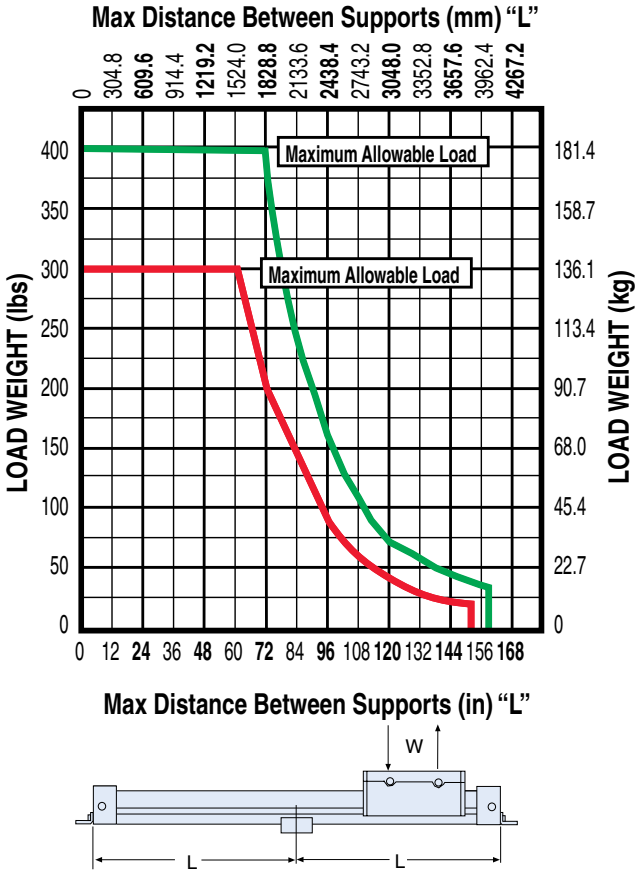


NOTE:
Max. for any application
Max. for continuously cycled application

THEORETICAL FORCE vs PRESSURE

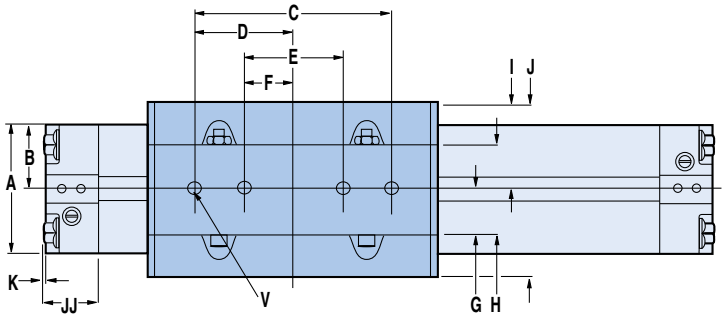


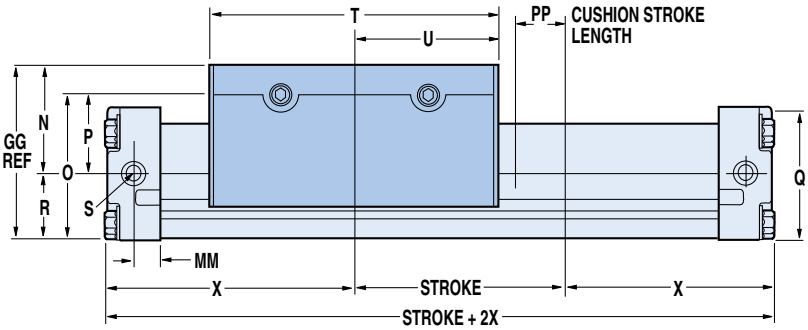
TUBE SUPPORT REQUIREMENTS

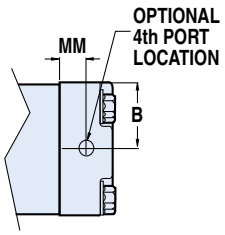


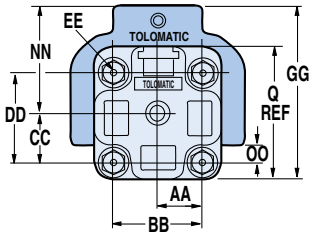
BC220 & BC225 Solid Bearing Rodless Cylinder

DIMENSIONS





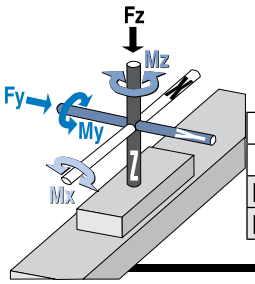




	20	25	M(MM)20	M(MM)25
A	3.25	4.25	82.6	108.0
B	1.62	2.13	41.1	54.1
C	5.00	6.00	127.0	152.4
D	2.50	3.00	63.5	76.2
E	2.50	3.00	63.5	76.2
F	1.25	1.50	31.8	38.1
G	1.16	1.27	29.5	32.4
H	2.30	2.55	58.4	64.8
I	2.22	2.81	56.4	71.4
J	4.44	5.62	112.8	142.8
K	0.06	0.03	1.5	0.8
N	2.75	3.20	69.9	81.3
O	3.69	4.67	93.7	118.6
P	2.00	2.37	50.8	60.2
Q	3.38	4.37	85.9	111.0
R	1.69	2.30	42.9	58.4
S	3/8 NPT (3)	3/8 NPT (3)	M 3/8 BSPT(3) MM 3/8 BSPP(3)	M 3/8 BSPT(3) MM 3/8 BSPP(3)
T	7.37	8.86	187.2	225.0
U	3.68	4.43	93.5	112.5
V	3/8-16 UNC x .44 DP	3/8-16 UNC x .50 DP	M10 x 11 DP	M10 x 12 DP
X	6.30	8.45	160.0	214.6
AA	1.12	1.44	28.5	36.6
BB	2.25	2.88	57.2	73.2
CC	1.25	1.75	31.8	44.5
DD	2.25	2.88	57.2	73.2
EE	5/16-18 x .88 DP	5/16-18 x .88 DP	M8 x 22 DP	M8 x 22 DP
GG	4.44	5.50	112.8	139.7
JJ	1.44	2.06	36.6	52.3
MM	0.69	1.00	17.5	25.4
NN	2.75	3.20	69.9	81.3
OO	0.43	0.76	10.9	19.3
PP	1.35	1.97	34.3	50.0
	INCHES		MILLIMETERS	

SPECIFICATIONS

BC220/25 BENDING MOMENTS AND LOAD



	BORE SIZE	MAX. BENDING MOMENT			MAX. LOAD
		My	Mx	Mz	Fz
20	2.00 in	1,100 in-lbs	300 in-lbs	325 in-lbs	300 lbs
25	2.50 in	1,800 in-lbs	450 in-lbs	400 in-lbs	400 lbs
M(MM)20	50 mm	124.28 N-m	33.90 N-m	36.72 N-m	136.05 kg
M(MM)25	63 mm	203.37 N-m	50.84 N-m	45.19 N-m	181.4 kg

	BORE SIZE	WEIGHT		MAX. STROKE LENGTH*	MAX. PRESSURE	TEMPERATURE RANGE
		BASE	PER UNIT OF STOKE			
20	2.00 in	14.12 lbs	0.54 lbs/in	274 in	100 PSI	20° to 140° F
25	2.50 in	31.90 lbs	1.01 lbs/in	163 in	100 PSI	20° to 140° F
M(MM)20	50 mm	6.4 kg	0.0093 kg/mm	6959 mm	6.895 bar	-7° to 60° C
M(MM)25	63 mm	14.467 kg	0.0173 kg/mm	4140 mm	6.895 bar	-7° to 60° C

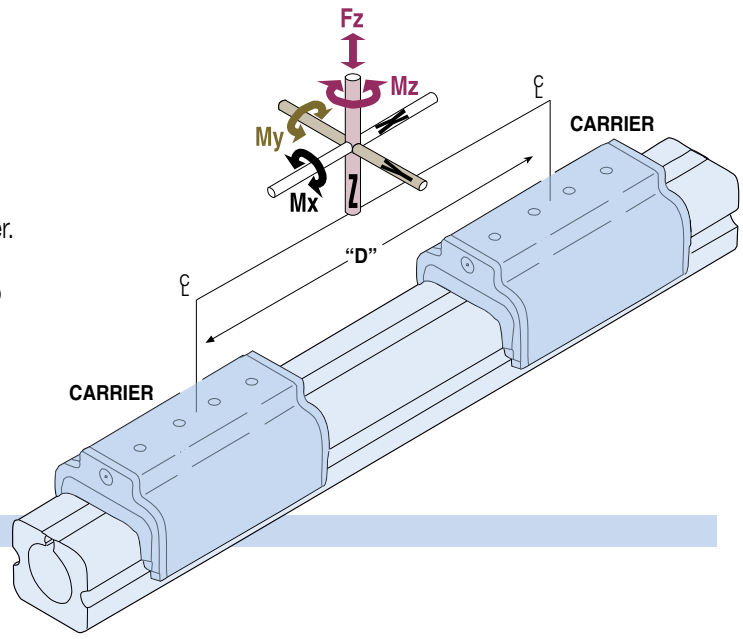
***For longer strokes, alternate materials, mounting and/or fasteners – consult Tolomatic**

BC2 Auxiliary Carrier - 10, 12, 15, 20, 25 Sizes

PERFORMANCE

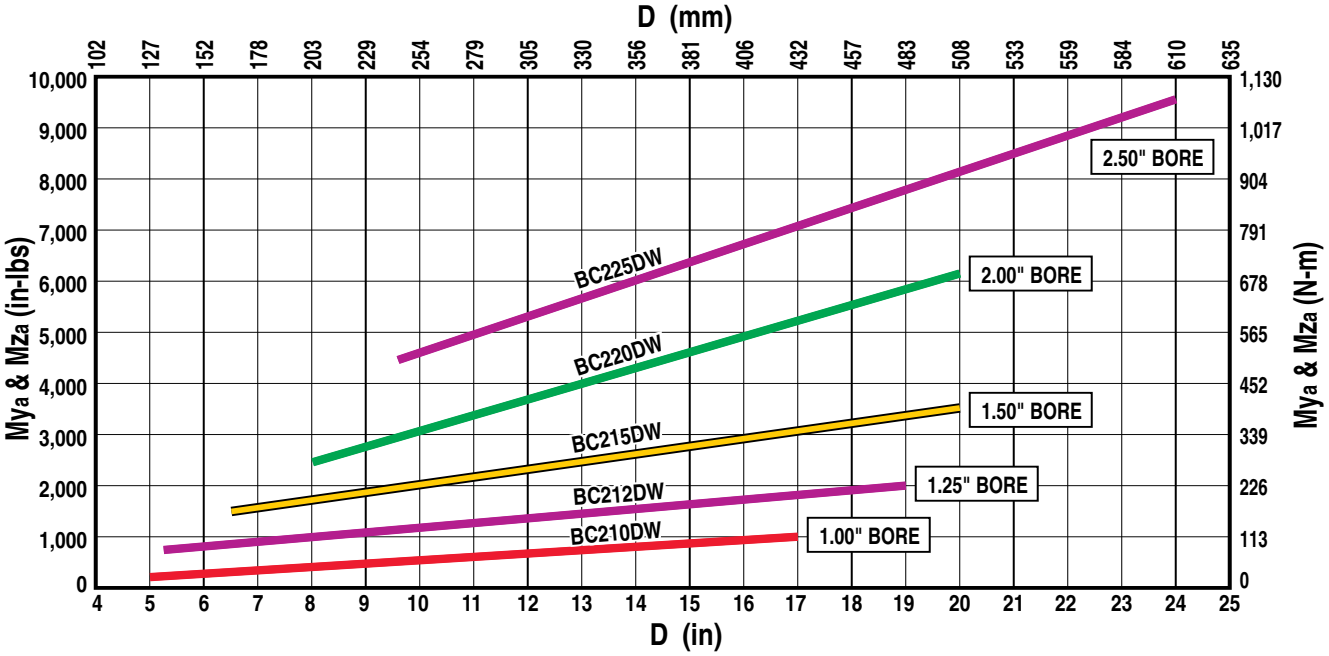
The auxiliary carrier option substantially increases load carrying and bending moments capacity over the standard single carrier models. As a general rule, the auxiliary carrier option is highly recommended in vertical applications (My) if the distance from the carrier mounting surface to the load center of gravity (CG) exceeds the overall length of the carrier. Auxiliary carriers can be ordered with (DW) or without (DO) an internal piston. (Auxiliary carriers without a piston have no cushion on the cylinder end closest to the auxiliary carrier.)

NOTE: breakaway pressure will increase when using auxiliary carrier.



BENDING MOMENTS

MOMENT LOAD vs. DISTANCE



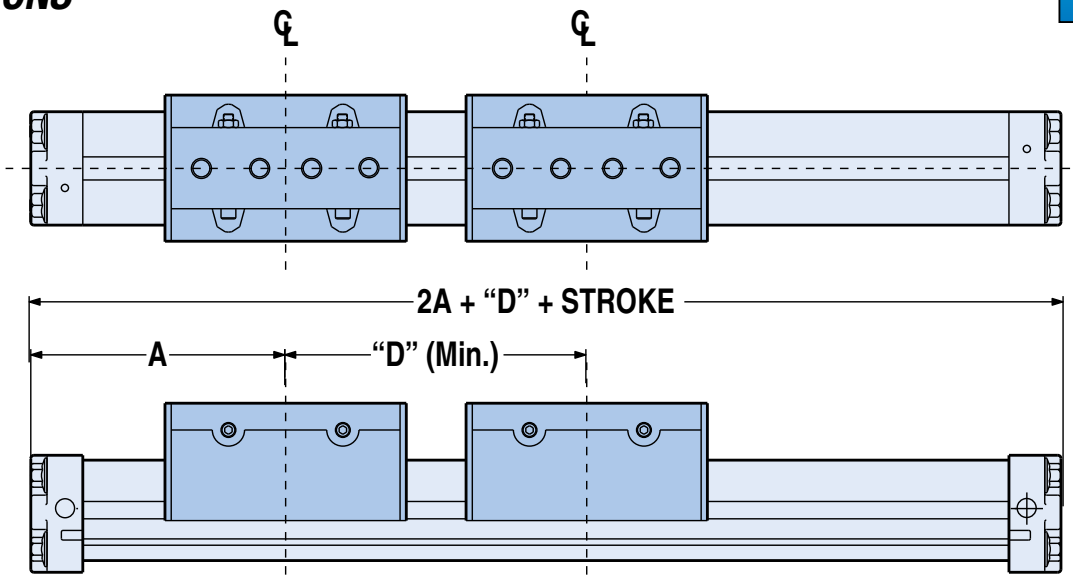
Rates were calculated with the following assumptions:
1.) Coupling between carriers is rigid. **2.)** Load is equally distributed between carriers.
3.) Coupling device applies no misalignment loads to carriers.

	BORE SIZE		"D" MINIMUM *				MAX. BENDING MOMENT						MAX. LOAD	
			(w/o Piston)		(w/ Piston)		My**		Mx		Mz**		Fz	
	in	mm	in	mm	in	mm	in-lbs	N-m	in-lbs	N-m	in-lbs	N-m	lbs	kg
10	1.00	25	5.07	129.0	5.07	129.0	287	32.4	110	12.4	287	32.4	120	54.4
12	1.25	32	5.17	131.0	6.85	174.0	822	92.9	150	16.9	822	92.9	240	108.9
15	1.50	40	6.46	164.0	8.07	205.0	1,453	164.1	550	62.1	1,453	164.1	360	163.3
20	2.00	50	8.10	206.0	8.10	206.0	2,430	274.6	600	67.8	2,430	274.6	600	272.2
25	2.50	63	9.62	244.0	11.04	2810.4	4,416	498.9	900	101.7	4,416	498.9	800	362.9

* "D" is distance between carriers
** Loads calculated are at minimum "D", for substantially higher My and Mz loads increase "D" and refer to graph above

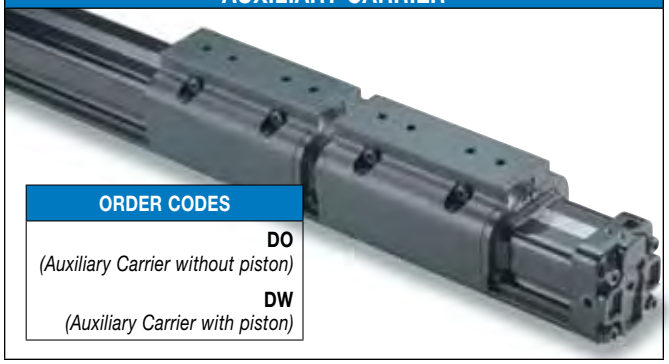
BC2 Auxiliary Carrier - 10, 12, 15, 20, 25 Sizes

DIMENSIONS



	BORE SIZE		A		"D" MINIMUM * (w/o Piston)		"D" MINIMUM * (w/ Piston)	
	in	mm	in	mm	in	mm	in	mm
10	1.00	25	3.94	100.1	5.07	129.0	5.07	129.0
12	1.25	32	4.90	124.5	5.17	131.0	6.85	174.0
15	1.50	40	5.91	150.1	6.46	164.0	8.07	205.0
20	2.00	50	6.30	160.0	8.10	206.0	8.10	206.0
25	2.50	63	8.46	214.9	9.62	244.0	11.04	280.4

AUXILIARY CARRIER



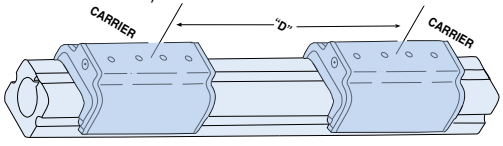
ORDER CODES

DO
(Auxiliary Carrier without piston)

DW
(Auxiliary Carrier with piston)

ORDERING INFORMATION

When ordering, determine the minimum distance required between carriers (dimension "D" in Auxiliary Carrier Bending Moments chart).

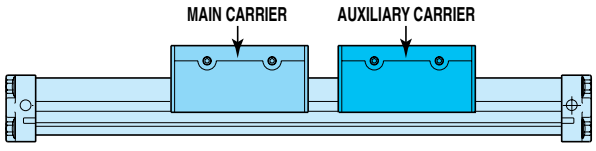


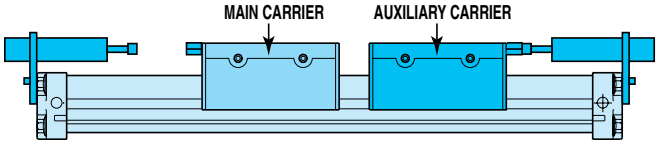
Determine your working stroke and your "D" dimension, then enter these into your configuration string. (Example: BC215SK50.00DW15.00RT2) The configurator will calculate the overall length of the actuator.

ASSEMBLY INFORMATION

IMPORTANT INFORMATION REGARDING AUXILIARY CARRIER PLACEMENT

When a BC2 cylinder is ordered with auxiliary carrier, it is always placed to the right (while facing the switch mounted or open port side) of the main carrier. This is for auxiliary carriers with (DW)/or without (DO) piston and for units with/ or without shock absorbers. When the auxiliary carrier is ordered without (DO) piston the carrier without piston will be marked.





BC2 Tube Supports - ALL Sizes

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

TUBE SUPPORT

ORDER CODE

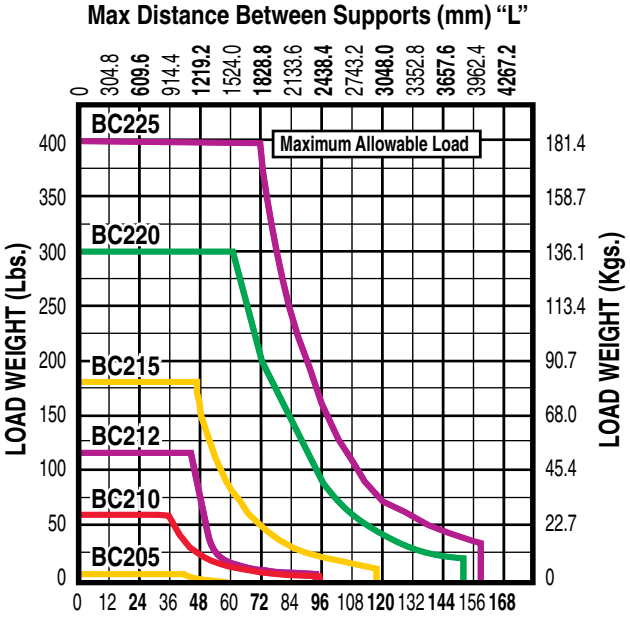
TS_
(_ = Number ordered)

Tube supports are mounted to the BC2 band cylinder during assembly procedure. Made of black-anodized aluminum, tube supports are designed to fit into dovetail grooves which run the length of the cylinder tube. Refer to the tube support graph to determine the number of tube supports required.

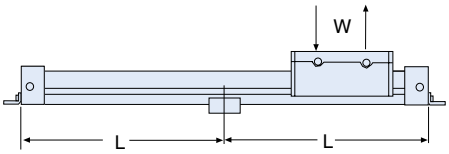
NOTE: Switches cannot be mounted on the same face of the actuator as tube supports.

PERFORMANCE

TUBE SUPPORT REQUIREMENTS

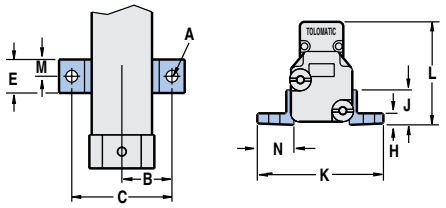


Max Distance Between Supports (in.) "L"

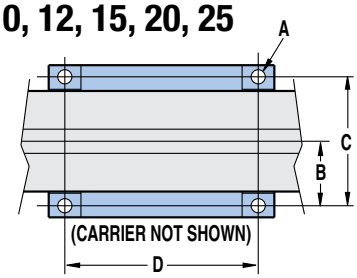


DIMENSIONS

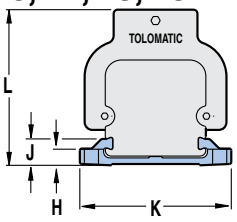
05



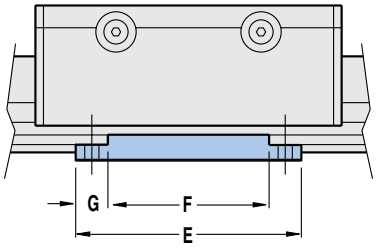
10, 12, 15, 20, 25



10, 12, 15, 20



10, 12, 15, 20, 25



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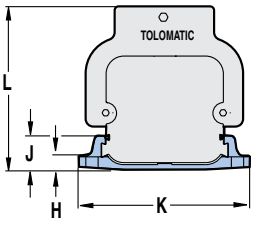


	BORE SIZE	A Ø	B	C	D	E	F	G	H	J	K	L	M	N
05	0.50	0.18	0.75	1.50	–	0.50	–	–	0.18	0.54	1.88	1.60	0.65	0.50
10	1.00	0.22	1.00	2.00	3.00	3.50	2.50	0.50	0.25	0.41	2.36	2.43	–	–
12	1.25	0.27	1.31	2.63	4.50	5.00	4.00	0.50	0.40	0.81	3.12	3.23	–	–
15	1.50	0.27	1.50	3.00	4.50	5.00	4.00	0.50	0.31	0.70	3.50	3.62	–	–
20	2.00	0.41	1.875	3.750	5.75	6.38	5.00	0.69	0.375	0.87	4.44	4.53	–	–
25	2.50	0.42	2.563	5.125	7.75	8.50	7.00	0.75	0.437	1.17	6.00	5.56	–	–

Dimensions in inches

	BORE SIZE	A Ø	B	C	D	E	F	G	H	J	K	L	M	N
M(MM)05	12	4.6	19.1	38.1	–	12.7	–	–	4.6	13.7	47.7	40.6	16.5	12.7
M(MM)10	25	5.6	25.4	50.8	76.2	88.9	63.5	12.7	6.3	10.4	59.9	61.7	–	–
M(MM)12	32	6.7	33.3	66.8	114.3	127.0	101.6	12.7	10.2	20.6	79.2	82.0	–	–
M(MM)15	40	6.7	38.1	76.2	114.3	127.0	101.6	12.7	7.9	17.8	88.9	91.9	–	–
M(MM)20	50	10.5	47.6	95.3	146.1	162.1	127.0	17.5	9.5	22.1	112.8	115.1	–	–
M(MM)25	63	10.7	65.1	130.2	196.9	215.9	177.8	19.1	11.1	29.7	152.4	141.2	–	–

Dimensions in millimeters

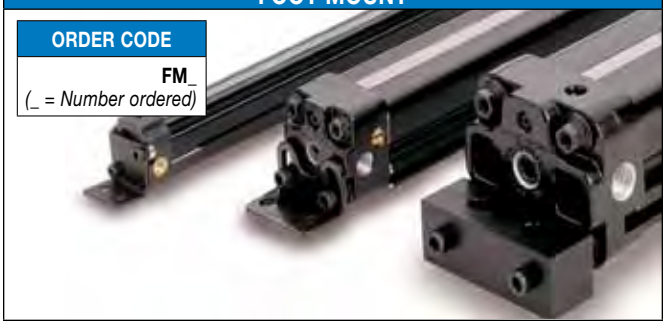
BC2 Foot Mounts - ALL Sizes

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

FOOT MOUNT

ORDER CODE

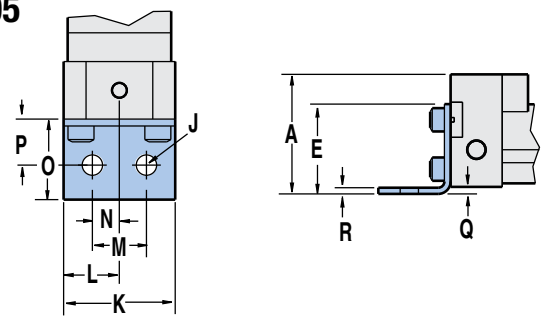
FM_
(_ = Number ordered)



For mounting other than flush. Foot mounts may be specified on one or both ends of the cylinder.

DIMENSIONS

05



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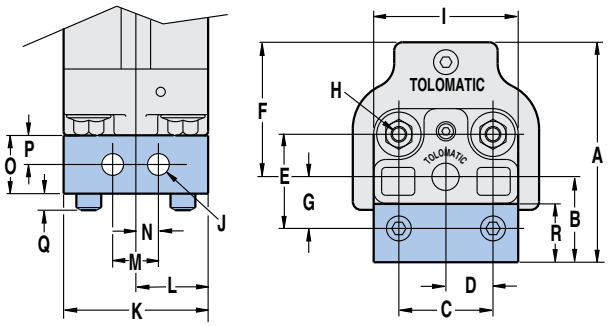
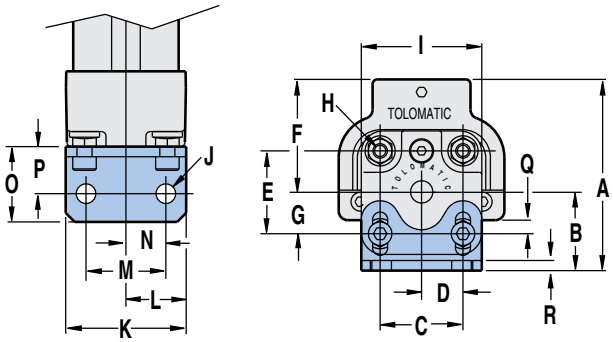
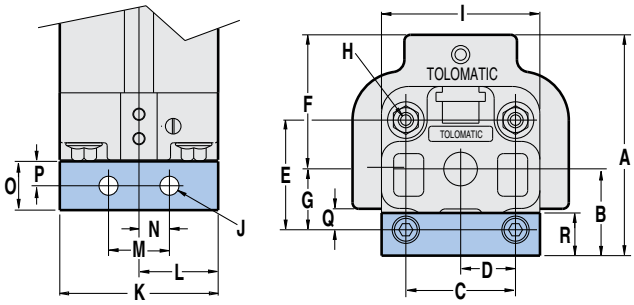


10, 12



20,25



	BORE SIZE	A	B	C	D	E	F	G	H	I	J Ø	K	L	M	N	O	P	Q	R
05	0.50	1.62	–	–	–	0.87	–	–	–	–	0.180	0.97	0.49	0.47	0.24	0.70	0.40	0.06	0.06
10	1.00	2.36/2.73	0.86/1.23	1.10	0.55	1.10	1.50	0.55	#10-24 x .43 DP	1.58	0.260	1.60	0.80	1.06	0.53	1.00	0.63	0.18	0.14
12	1.25	3.21/3.71	1.38/1.88	1.42	0.71	1.42	1.83	0.78	1/4-20 x .47 DP	2.18	0.328	2.09	1.05	1.42	0.71	0.84	0.49	0.35	0.13
15	1.50	3.69	1.56	1.82	0.91	1.81	2.13	1.03	1/4-20 x .47 DP	2.85	0.328	2.83	1.42	1.18	0.59	1.00	0.50	0.25	1.00
20	2.00	4.53	1.78	2.25	1.13	2.25	2.75	1.25	5/16-18 x 1.0 DP	3.25	0.390	3.25	1.63	1.25	0.63	1.00	0.50	0.43	0.88
25	2.50	5.65	2.45	2.88	1.44	2.88	3.20	1.75	5/16-18 x 1.0 DP	4.25	0.437	4.25	2.13	1.89	0.95	1.18	0.59	0.76	1.00

Dimensions in inches

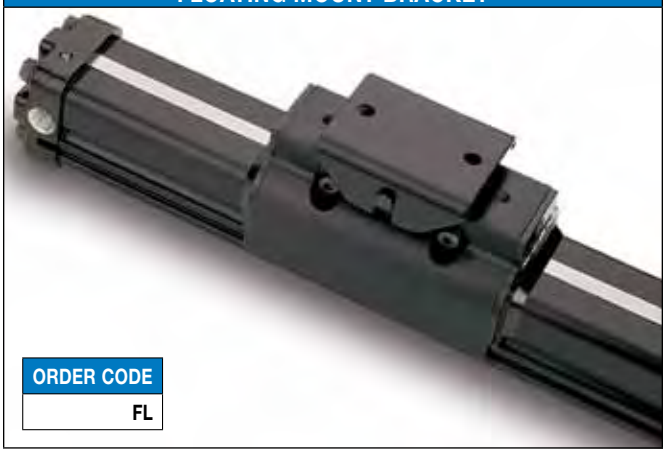
	BORE SIZE	A	B	C	D	E	F	G	H	I	J Ø	K	L	M	N	O	P	Q	R
M(MM)05	12	41.1	–	–	–	22.1	–	–	–	–	4.6	24.6	12.3	11.9	6.0	20.4	10.2	1.5	1.5
M(MM)10	25	59.7/69.3	21.8/31.2	27.9	14.0	27.9	38.1	14.0	M5 x 11 DP	40.1	6.6	40.6	20.3	26.9	13.5	25.4	15.9	4.7	3.4
M(MM)12	32	81.5/94.2	35.1/47.8	36.1	18.0	36.1	46.5	19.8	M6 x 12 DP	55.4	8.3	53.1	26.7	36.1	18.0	21.3	12.4	9.0	3.2
M(MM)15	40	93.7	39.6	46.2	23.1	46.0	54.1	26.2	M6 x 12 DP	72.4	8.3	71.9	36.1	30.0	15.0	25.4	12.7	6.0	25.4
M(MM)20	50	115.1	45.7	57.2	28.7	57.2	69.9	31.8	M8 x 25 DP	82.6	9.9	82.6	41.2	31.8	16.0	25.4	12.7	10.9	22.2
M(MM)25	63	143.5	62.2	73.2	35.6	73.2	81.3	44.5	M8 x 25 DP	108.0	11.1	108.0	54.1	48.0	24.1	30.0	15.0	19.3	25.4

Dimensions in millimeters

BC2 Floating Mount Bracket - ALL Sizes

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

FLOATING MOUNT BRACKET



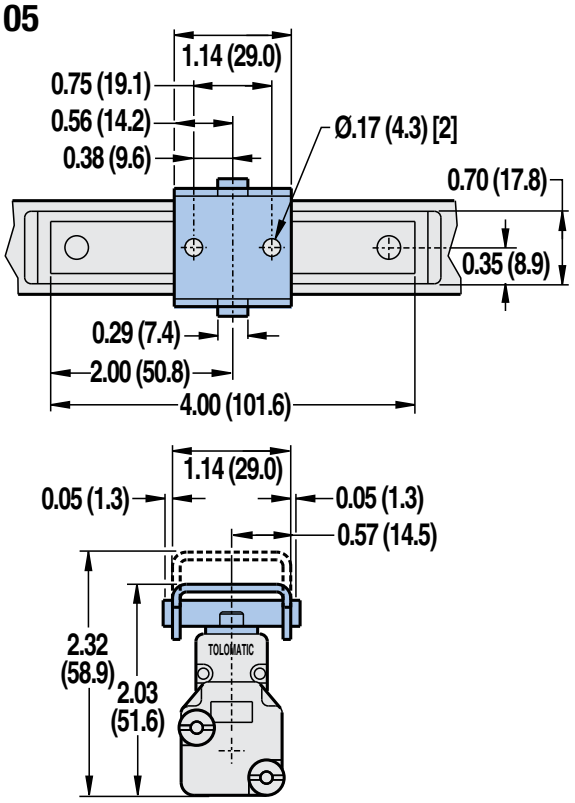
ORDER CODE
FL

For applications where a BC2 band cylinder is moving a load that is externally guided and supported. An externally guided load, not parallel to the BC2 band cylinder may result in cylinder binding. The floating mount bracket compensates for nonparallelism between the cylinder and the external guide.

(Floating mount brackets are not to be used in conjunction with shock absorbers)

DIMENSIONS

05



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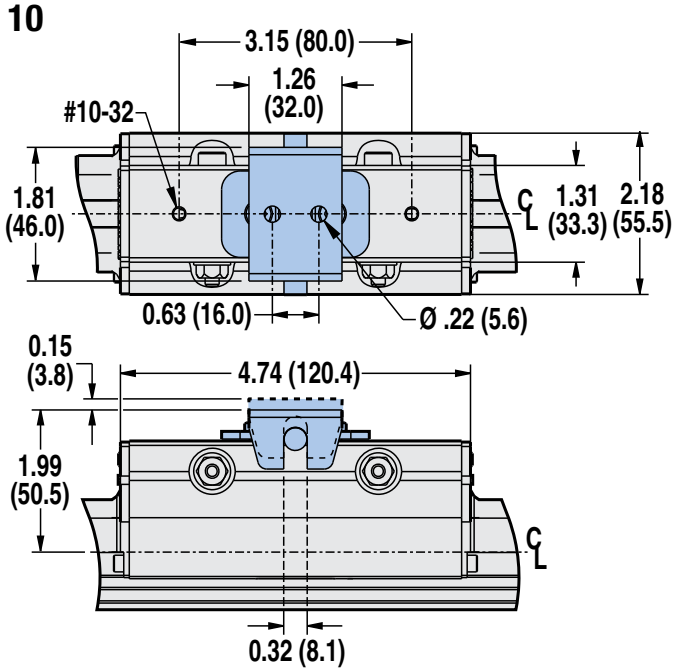
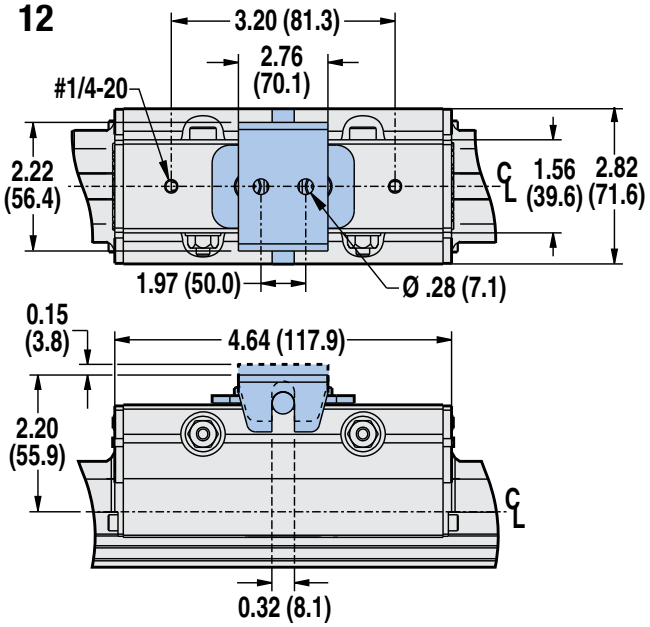


Dimensions in inches (parenthesis indicate dimensions in millimeters)

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

DIMENSIONS

12



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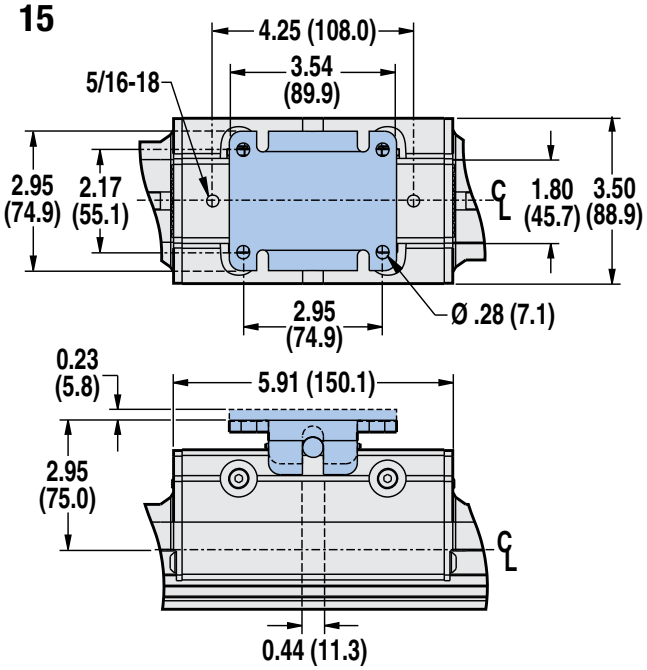
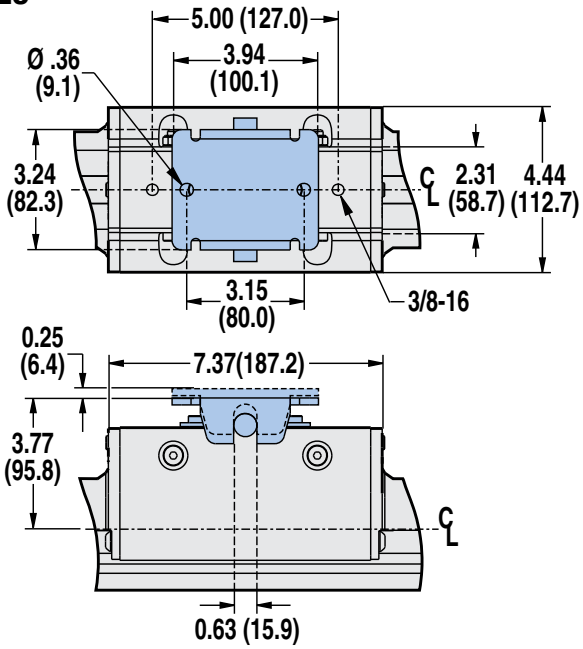
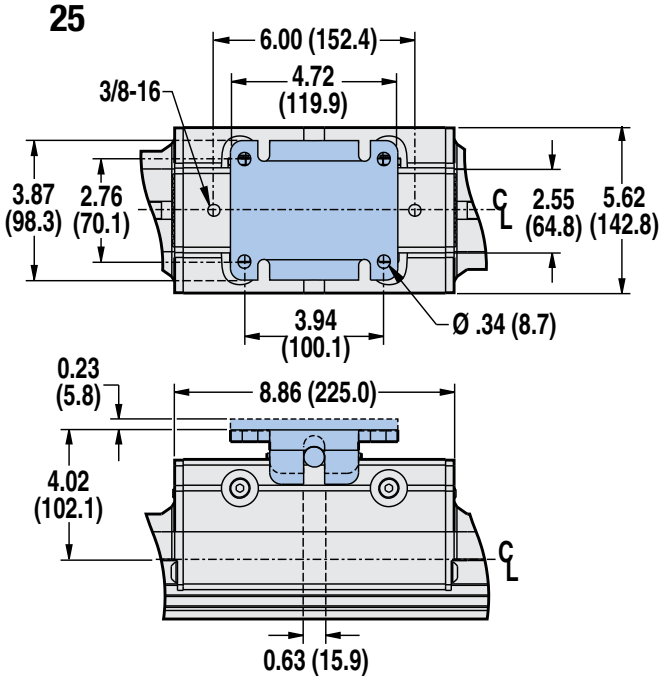


20



25



Dimensions in inches (parenthesis indicate dimensions in millimeters)

BC2 Switches - ALL Sizes

SWITCHES

There are 10 sensing choices: DC reed, form A (open) or form C (open or closed); AC reed (Triac, open); Hall-effect, sourcing, PNP (open); Hall-effect, sinking, NPN (open); each with either flying leads or QD (quick disconnect). Commonly used to send analog signals to PLC (programmable logic controllers), TLL, CMOS circuit or other controller device. These switches are activated by the actuator's magnet.

Switches contain reverse polarity protection. QD cables are shielded; shield should be terminated at flying lead end.

If necessary to remove factory installed switches, be sure to reinstall on the same of side of actuator with scored face of switch toward internal magnet.

SPECIFICATIONS

		REED DC				REED AC		HALL-EFFECT DC			
ORDER CODE		RT	RM	BT	BM	CT	CM	TT	TM	KT	KM
PART NUMBER		3600-9082	3600-9083	3600-9084	3600-9085	3600-9086	3600-9087	3600-9088	3600-9089	3600-9090	3600-9091
LEAD		5m	QD*	5m	QD*	5m	QD*	5m	QD*	5m	QD*
CABLE SHIELDING		Unshielded	Shielded†	Unshielded	Shielded†	Unshielded	Shielded†	Unshielded	Shielded†	Unshielded	Shielded†
SWITCHING LOGIC		"A" Normally Open		"C" Normally Open or Closed		Triac Normally Open		PNP (Sourcing) Normally Open		NPN (Sinking) Normally Open	
MECHANICAL CONTACTS		Single-Pole Single-Throw		Single-Pole Double-Throw		Single-Pole Single-Throw		NO, These Are Solid State Components			
COIL DIRECT		Yes		Yes		Yes		—			
POWER LED		None		None		None		None		None	
SIGNAL LED		Red						Red		Red	
OPERATING VOLTAGE		200 Vdc max.		120 Vdc max.		120 Vac max.		5 - 25 Vdc			
OUTPUT RATING		—				—		25 Vdc, 200mA dc			
OPERATING TIME		0.6 msec max. (including bounce)		0.7 msec max. (including bounce)		—		< 10 micro sec.			
OPERATING TEMPERATURE		-40°F [-40°C] to 158°F [70°C]						0°F [-18°C] to 150°F [66°C]			
RELEASE TIME		1.0 msec. max.				—		—			
ON TRIP POINT		—				—		150 Gauss maximum			
OFF TRIP POINT		—				—		40 Gauss minimum			
****POWER RATING (WATTS)**		10.0 §		3.0 §§		10.0		5.0			
VOLTAGE DROP		2.6 V typical at 100 mA		NA		—		—			
RESISTANCE		0.1 Ω Initial (Max.)				—		—			
CURRENT CONSUMPTION		—				1 Amp at 86°F [30°C]	0.5 Amp at 140°F [60°C]	200 mA at 25 Vdc			
FREQUENCY		—				47 - 63 Hz		—			
CABLE MIN. BEND RADIUS	**STATIC**	0.630" *[16mm]*									
	DYNAMIC	Not Recommended									

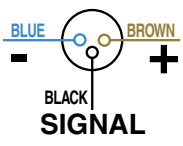
CAUTION: DO NOT OVER TIGHTEN SWITCH HARDWARE WHEN INSTALLING!

** **WARNING**: Do not exceed power rating (Watt = Voltage X Amperage). Permanent damage to sensor will occur.

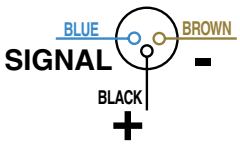
*QD = Quick Disconnect; Male coupler is located 6" [152mm} from sensor, Female coupler to flying lead (part #2503-1025) distance is 197" [5m] also see Cable Shielding specification above

REPLACEMENT OF QD SWITCHES MANUFACTURED BEFORE JULY 1, 1997: It will be necessary to replace or rewire the female end coupler.

CURRENT
Quick disconnect Wiring



OLD
Quick disconnect Wiring



Reed Switch Life Expectancy: Up to 200,000,000 cycles (depending on load current, duty cycle and environmental conditions)

†Shielded from the female quick disconnect coupler to the flying leads. Shield should be terminated at flying lead end.

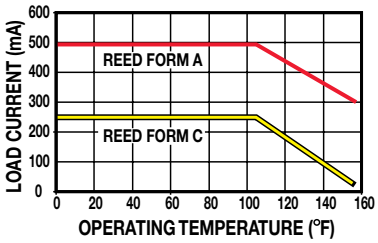
§ Maximum current 500mA (not to exceed 10VA) Refer to Temperature vs. Current graph and Voltage Derating graph

§§ Maximum current 250mA (not to exceed 3VA) Refer to Temperature vs. Current graph and Voltage Derating graph

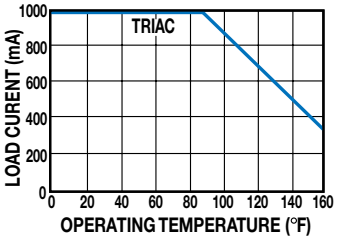
BC2 Switches - ALL Sizes

PERFORMANCE

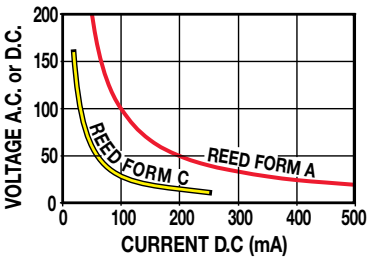
TEMP. vs CURRENT, DC REED



TEMP. vs CURRENT, AC REED

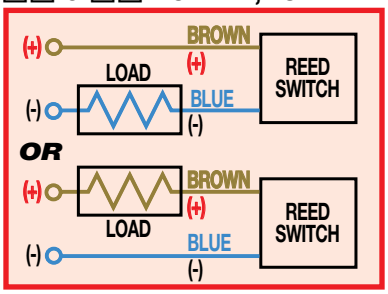


VOLTAGE DERATING, DC REED

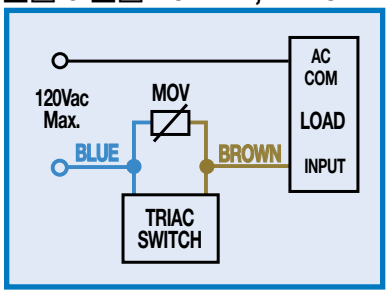


WIRING DIAGRAMS

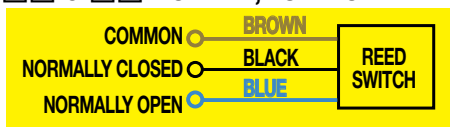
RT & RM DC REED, FORM A



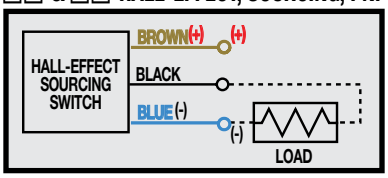
CT & CM AC REED, TRIAC



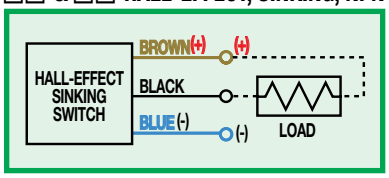
BT & BM DC REED, FORM C



TT & TM HALL-EFFECT, SOURCING, PNP



KT & KM HALL-EFFECT, SINKING, NPN



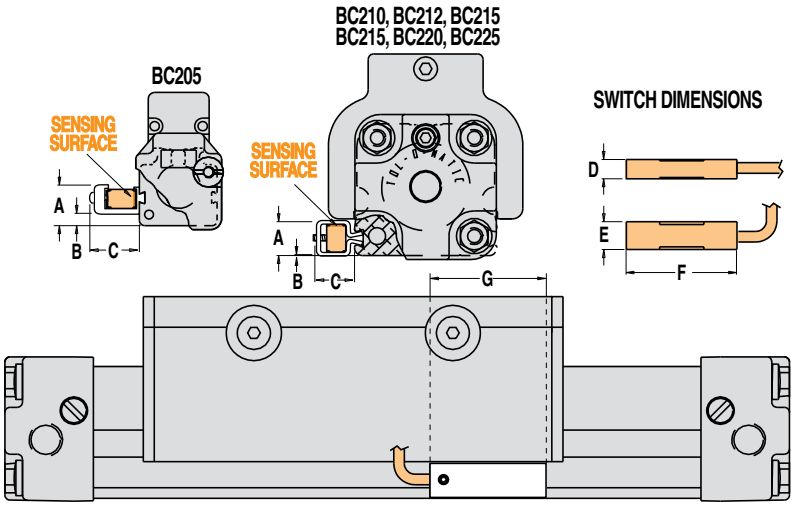
INSTALLATION INFORMATION

THE NOTCHED FACE OF THE SWITCH INDICATES THE SENSING SURFACE AND MUST FACE TOWARD THE MAGNET.

HALL-EFFECT SWITCHES ARE NOT AVAILABLE FOR BC205

Some actuators may require switch mounting on a specific side of the assembly. Call Tolomatic for details.

DIMENSIONS



SIZE	BORE	A	B	C	D	E	F	G
05	0.50	0.445	0.157	0.518	0.219	0.315	1.25	1.45
10	1.00	0.383	0.011	0.448	0.219	0.315	1.25	1.45
12	1.25	0.541	0.169	0.448	0.219	0.315	1.25	1.45
15	1.50	0.548	0.161	0.432	0.219	0.315	1.25	1.45
20	2.00	0.732	0.344	0.448	0.219	0.315	1.25	1.45
25	2.50	1.082	0.710	0.432	0.219	0.315	1.25	1.45

Dimensions in inches

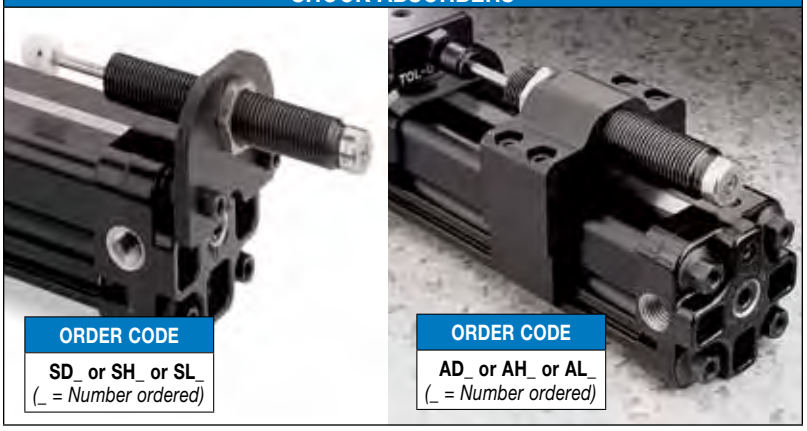
SIZE	BORE	A	B	C	D	E	F	G
M05	12	11.30	3.99	13.16	5.56	8.00	31.75	36.83
M10	25	9.73	0.28	11.38	5.56	8.00	31.75	36.83
M12	32	13.74	4.29	11.38	5.56	8.00	31.75	36.83
M15	40	13.92	4.09	10.97	5.56	8.00	31.75	36.83
M20	50	18.59	8.74	11.38	5.56	8.00	31.75	36.83
M25	63	27.48	18.03	10.97	5.56	8.00	31.75	36.83

Dimensions in millimeters

BC2 Shock Absorbers - 10, 12, 15, 20, 25 Sizes

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

SHOCK ABSORBERS



ORDER CODE
SD_ or SH_ or SL_
(_ = Number ordered)

ORDER CODE
AD_ or AH_ or AL_
(_ = Number ordered)

Rodless cylinders with standard internal cushion offer an effective method of decelerating loads. However, all Tolomatic rodless cylinders are capable of carrying heavier loads at higher velocities than the cylinder cushion can absorb. Optional shock absorbers can be used to increase the cylinder's life and broaden the application range for the cylinder model you have chosen.

Tolomatic offers two types of shock absorber options for use with rodless cylinders. Standard shock absorbers, which are positioned on the cylinder heads for end-of-stroke deceleration and adjustable shock absorbers which allows the shock to be positioned at any point along the cylinder.

Typical shock absorber life varies between 1-2 million cycles (depending on environment) appropriate preventative maintenance should be considered in high cyclic applications.

NOTE: When 2 shock absorbers are ordered, the unit will be assembled with NO internal cushions.

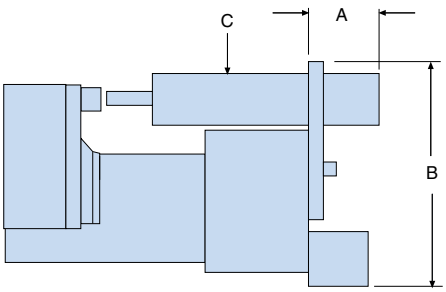
NOTE: Adjustable shock absorbers will reduce stroke length. To maintain desired stroke length: when ordering increase stroke length by the dimension in the table below for each adjustable shock absorber ordered.

10	12	15	20	25
0.75" *[19.0mm]*	0.03" *[0.7mm]*	0.35" *[8.9mm]*	0.85" *[21.6mm]*	0.85" *[21.6mm]*

CAUTION: In applications which result in a load bending moment at deceleration, care should be taken to decelerate the load rather than the carrier of the band cylinder.

DIMENSIONS

STANDARD SHOCK



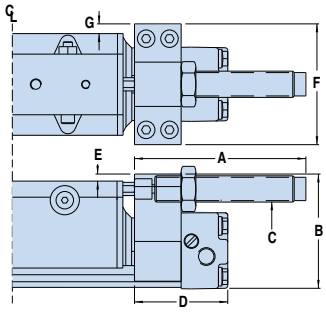
SIZE	BORE	A	B	C (Thread Size)
10	1.00	2.35	2.50	9/16-18 UNF-2B
12	1.25	2.23	3.50	3/4-16 UNF-2B
15	1.50	2.23	4.00	3/4-16 UNF-2B
20	2.00	2.62	4.70	1-12 UNF-2B
25	2.50	1.17	6.00	1-12 UNF-2B

Dimensions in inches

SIZE	BORE	A	B	C (Thread Size)
M10	*25*	*59.7*	*63.5*	*M14x1.5-6g*
M12	*32*	*56.6*	*88.9*	*M20x1.5-6g*
M15	*40*	*56.6*	*101.6*	*M20x1.5-6g*
M20	*50*	*66.5*	*119.4*	*M25x1.5-6g*
M25	*63*	*29.7*	*152.4*	*M25x1.5-6g*

Dimensions in millimeters

ADJUSTABLE POSITION SHOCK



SIZE	BORE	A	B	C (Thread Size)	D	E	F	G
10	1.00	3.68	2.45	9/16-18 UNF-2B	2.00	0.15	2.59	0.21
12	1.25	4.39	3.19	3/4-16 UNF-2B	2.25	0.13	2.82	0
15	1.50	4.39	3.62	3/4-16 UNF-2B	2.50	0.05	3.50	0
20	2.00	4.75	4.60	1-12 UNF-2B	3.13	0.16	4.44	0
25	2.50	4.75	5.63	1-12 UNF-2B	4.47	0.17	5.63	0

Dimensions in inches

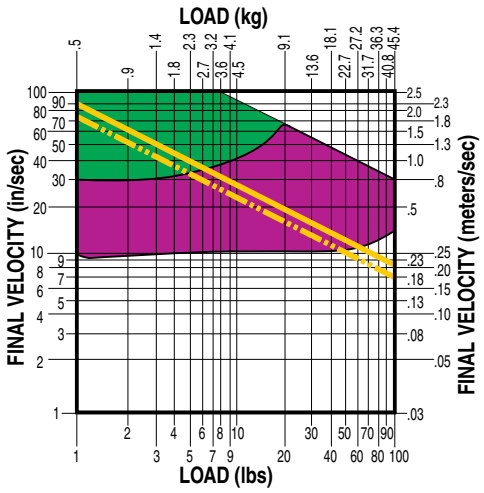
SIZE	BORE	A	B	C (Thread Size)	D	E	F	G
M10	*25*	*93.5*	*62.2*	*M14x1.5-6g*	*50.8*	*3.8*	*65.8*	*5.3*
M12	*32*	*111.5*	*81.0*	*M20x1.5-6g*	*57.2*	*3.3*	*71.6*	*0*
M15	*40*	*111.5*	*92.0*	*M20x1.5-6g*	*63.5*	*1.3*	*88.9*	*0*
M20	*50*	*120.7*	*116.8*	*M25x1.5-6g*	*79.5*	*4.1*	*112.8*	*0*
M25	*63*	*120.7*	*143.0*	*M25x1.5-6g*	*113.5*	*4.3*	*143.0*	*0*

Dimensions in millimeters

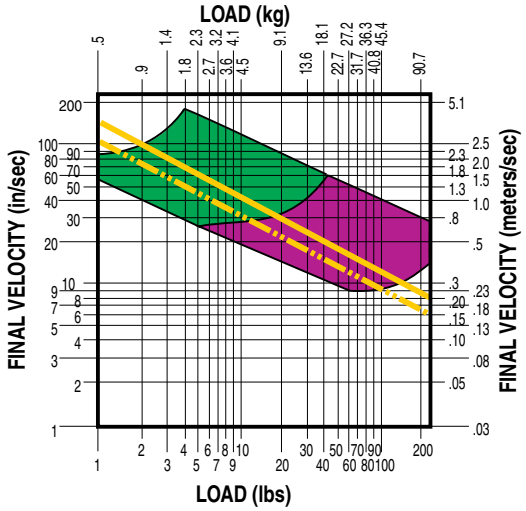
BC2 Shock Absorbers - 10, 12, 15, 20, 25 Sizes: PERFORMANCE

VELOCITY vs LOAD

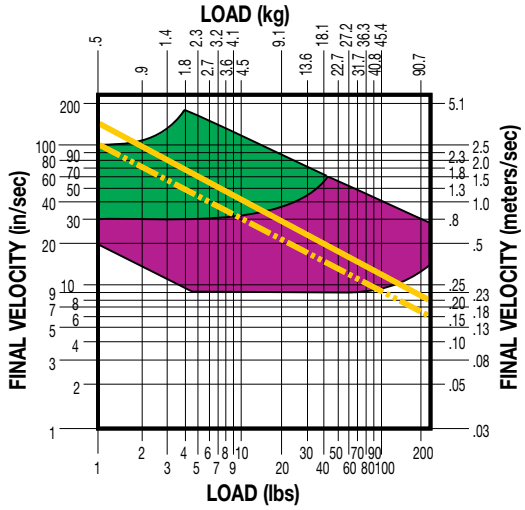
BC210



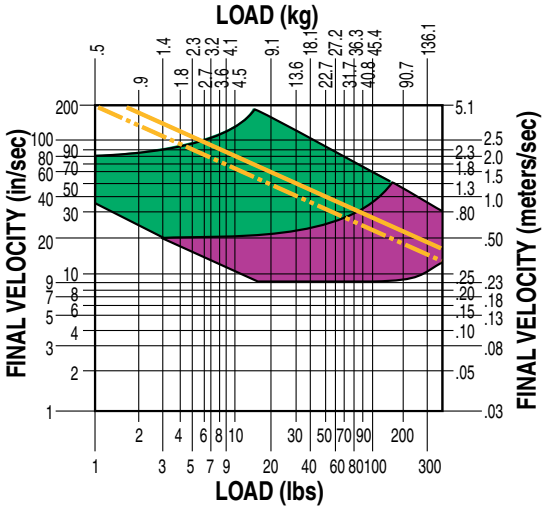
BC212



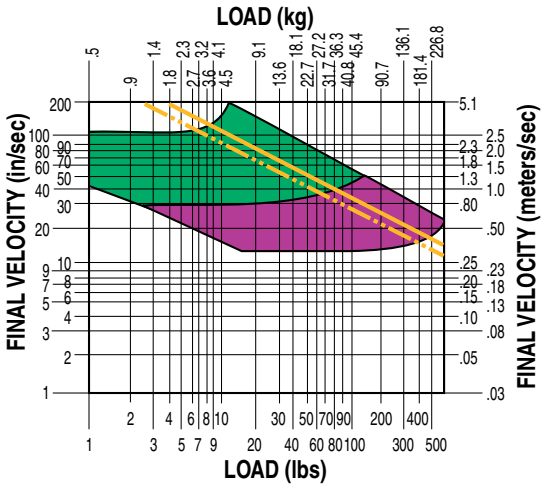
BC215



BC220



BC225



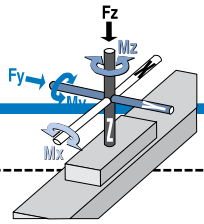
LIGHT DUTY (Light load/High velocity)

HEAVY DUTY (Heavy load/Low velocity)

AIR CUSHION DATA

NOTE: If final (or impact) velocity cannot be calculated directly, a reasonable guideline to use is 2 x average velocity.

Application Data Worksheet



STROKE LENGTH _____
☐ inch (S K) (U.S. Standard) ☐ millimeters (Metric)

AVAILABLE AIR PRESSURE _____
☐ PSI (U.S. Standard) ☐ bar (Metric)

REQUIRED THRUST FORCE _____
☐ lbf (U.S. Standard) ☐ N (Metric)

LOAD _____
☐ lb (U.S. Standard) ☐ kg (Metric)

LOAD CENTER OF GRAVITY DISTANCE TO CARRIER CENTER
d_x _____
d_y _____
d_z _____
☐ inch (U.S. Standard) ☐ millimeters (Metric)

FORCES APPLIED TO CARRIER
F_z _____
F_y _____
☐ lbf (U.S. Standard) ☐ N (Metric)

BENDING MOMENTS APPLIED TO CARRIER
M_x _____
M_y _____
M_z _____
☐ in-lbs (U.S. Standard) ☐ N-m (Metric)

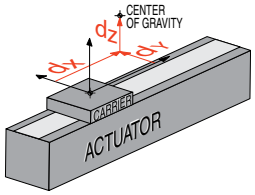
FINAL VELOCITY _____
☐ in/sec (U.S. Standard) ☐ mm/sec (Metric)

MOVE TIME sec. _____

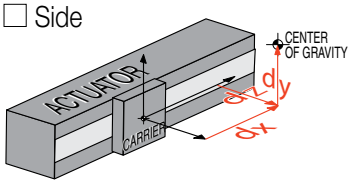
NO. OF CYCLES _____
☐ per minute ☐ per hour

ORIENTATION

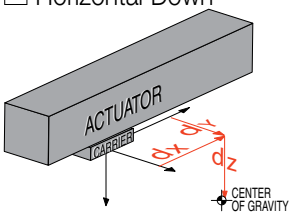
☐ Horizontal



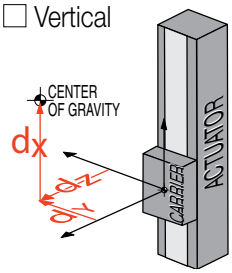
☐ Side



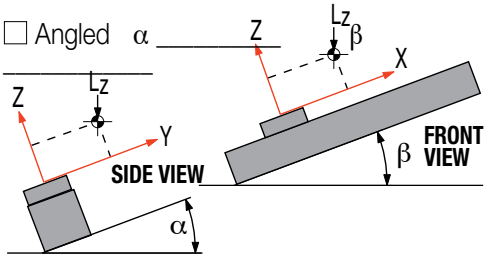
☐ Horizontal Down



☐ Vertical



☐ Angled α _____



OTHER ISSUES:
(i.e. Environment, Temperature, Contamination, etc.)
_____
_____
_____
_____

Contact information:
_____
_____
_____
_____

STOP Fax (1-763-478-8080) or call Tolomatic (1-800-328-2174) with the above information. We will provide any assistance needed to determine the proper actuator.

Rodless Cylinder Selection Guidelines - BC2, BC3, BC4, LS - All Sizes

PROVIDING LOAD GUIDANCE AND SUPPORT

The process of selecting a load bearing actuator for a given application can be complex. It is highly recommended that you contact Tolomatic or a Tolomatic Distributor for assistance in selecting the best actuator for your application. The following overview of the selection guidelines are for educational purposes only.

1 COMPILE APPLICATION REQUIREMENTS

To determine the appropriate Band Cylinder or Linear Slide model for an application, compile the following information:

- Available pressure (PSI)
- Weight of load (lbs or kg)
- Orientation of load (lbs or kgs)
- Velocity of load (in/sec or mm/sec)
- Stroke length (in or mm)

HINT: Use Tolomatic sizing and selection software, download at: tolomatic.com

2 SELECT CYLINDER SIZE

- Consult the Theoretical Force vs. Pressure charts.
- Cross-reference the load force (or load weight if force is not known) and the available operating pressure. If the intersection falls below the diagonal line, and if moments do not exceed maximum values listed for that model (see Step 3), the actuator will accommodate the application.

  If the intersection is above the diagonal line, a larger cylinder bore size should be considered.

NOTE: Additional force may be required to obtain the necessary acceleration for vertical or horizontal loads.

3 DETERMINE NATURE OF LOAD AND THE EFFECT OF BENDING MOMENTS

If the cylinder will guide and support a load located directly over the center of carrier, bending moments will not be a factor in the cylinder selection.

NOTE: The maximum load "L" must not exceed the capacity limits of the cylinder selected.

- Bending Moments

  For off center or side loads, determine the distance from the center of mass of the load to the center of the carrier bracket. This measurement is needed to calculate the torque for bending moments. (Refer to Bending Moment chart for each model.)

  Should the resulting maximum bending moment exceed figures indicated on the chart, external guides, auxiliary carrier/s or a larger cylinder should be considered.

- Auxiliary Carrier Bending Moments

  The auxiliary carrier option (available on most models) increases load carrying capacity and bending moments. Auxiliary carriers can be ordered with or without an internal piston. (Auxiliary carriers without a piston have no internal cushion on the cylinder end closest to the auxiliary carrier.)

  IMPORTANT: When ordering, determine the working stroke, then the minimum distance required between carriers (dimension "D" in Auxiliary Carrier Bending Moments chart). When ordered, Tolomatic's configurator will calculate the overall length of the actuator.

NOTE: breakaway pressure will increase when using auxiliary carriers.

4 DETERMINE INTERNAL CUSHION CAPACITY

- Consult the Cushion Data chart for the model selected. The velocities listed on the cushion charts are final or cushion impact velocities. On applications where the internal cushions or bumpers are to be used, be sure the actual, final or impact velocity is known. If the velocity is not known, use of limit switches with valve deceleration circuits or shock absorbers should be considered. NOTE: The BC205 uses external bumpers in place of internal cushions, LS05 & LS10 do not have cushions or bumpers.
- Cross-reference the final velocity and weight of the load. If the intersection is below the diagonal lines, the internal cushions on the actuator may be used. If the point falls above the dashed diagonal line or if the velocity is not known, use deceleration circuits, external shock absorbers or select a larger cylinder with greater cushion capacity. On high-cyclic applications, use of external stops is strongly recommended.

5 DETERMINE TUBE SUPPORT REQUIREMENTS

- Consult the Tube Support chart for the model selected.
- Cross reference the load weight and maximum distance between supports.

6 CONSIDER OPTIONS

- Switches– dc Reed, Hall-effect or ac Triac

Band Cylinders and Linear Slides each have different standard features and options. Check the options section for the actuator you have selected.

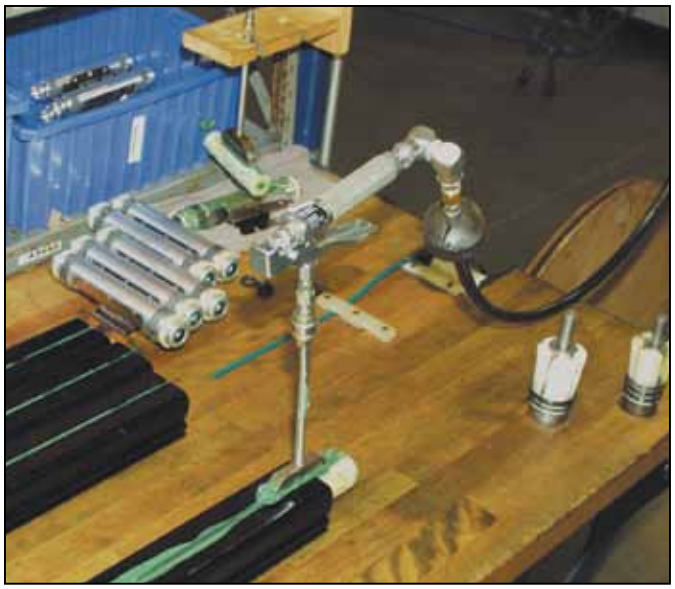
- Shock Absorbers– if needed.
- Foot Mounting Kits
- Floating Mount Bracket – use when lack of parallelism occurs between the cylinder and an external guided and supported load.
- Single End Porting (BC3, BC4)
- Long Carrier (BC4)
- Proximity Sensors (LS)
- Dual 180° Carrier (BC3)

Application Guidelines

The following conditional statements are intended as general guidelines for use of Tolomatic actuators. Since all applications have their own specific operating requirements, consult Tolomatic, Inc. or your local Tolomatic distributor if an application is unconventional or if questions arise regarding the selection process.

CUSHION NEEDLE ADJUSTMENT (BC2, BC3, BC4, CC, SA, DP, TC ONLY)

Adjust the cushion needles in the cylinder heads carefully to obtain a smooth, hesitation free deceleration for your particular application. If there are questions on proper adjustment, please consult Tolomatic, Inc.



LUBRICATION GUIDELINES

All Tolomatic actuators (except Cable Cylinders) are prelubricated at the factory. To ensure maximum actuator life, the following guidelines should be followed.

- **Filtration**

  We recommend the use of dry, filtered air in our products. "Filtered air" means a level of 10 Micron or less. "Dry" means air should be free of appreciable amounts of moisture. Regular maintenance of installed filters will generally keep excess moisture in check.

- **External Lubricators (optional)**

  The factory prelubrication of Tolomatic actuators will provide optimal performance without the use of external lubrication. However, external lubricators can further extend service life of pneumatic actuators if the supply is kept constant.

  Oil lubricators, (mist or drop) should supply a minimum of 1 drop per 20 standard cubic feet per minute to the cylinder. As a rule of thumb, double that rate if water in the system is suspected. Demanding conditions may require more lubricant.

  If lubricators are used, we recommend a non-detergent, 20cP @ 140˚F 10-weight lubricant. Optimum conditions for standard cylinder operation are +32˚ to +150˚F (+0˚ to 65.5˚C).

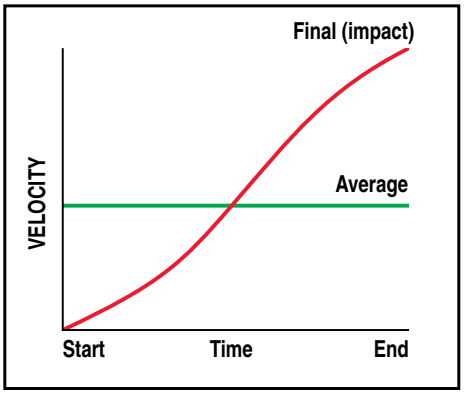
  NOTE: Use of external lubricators may wash away the factory installed lubrication. External lubricants must be maintained in a constant supply or the results will be a dry actuator prone to premature wear.

- **Sanitary Environments**

  Oil mist lubricators must dispense "Food Grade" lubricants to the air supply. Use fluids with ORAL LD50 toxicity ratings of 35 or higher such as Multitherm® PG-1 or equivalent. Demanding conditions can require a review of the application.

FINAL VELOCITY CALCULATION

Velocity calculations for all rodless cylinders need to differentiate between final velocity and average velocity. For example: Stroking a 100-inch BC3 model in one second yields an average velocity of 100 inches per second. To properly determine the inertial forces for cushioning, it is important to know the final (or impact) velocity. Rodless cylinders accelerate and decelerate at each end of the stroke. Therefore this acceleration must be considered (see diagram).



If final (or impact) velocity cannot be calculated directly, a reasonable guideline is to use 2 x average velocity.

BC2 Service Parts Ordering - ALL Sizes

Inch (U.S. Standard) SIZE	05	10	12	15	20	25
Aux. Carrier Assembly (w/piston) (each)	NA	0510-9057	0512-9057	0515-9057	0520-9057	0525-9057
Aux. Carrier Assembly (wo/piston) (each)	NA	0510-9095	0512-9095	0515-9095	0520-9095	0525-9095
Floating Mount Bracket Kit	0905-9115	0510-9007	0512-9007	0515-9007	0520-9007	0525-9007
Foot Mount Kit[1]	0905-9010	0510-9125	0512-9125	0515-9125	0520-9125	0525-9125
Shock Field Retrofit Kit – Heavy Duty[2,8]	NA	0510-9090	0512-9090	0515-9090	0520-9090	0525-9090
Shock Field Retrofit Kit – Light Duty[2,8]	NA	0510-9091	0512-9091	0515-9091	0520-9091	0525-9091
Shock Field Mount Kit (Hardware Only)[3,8]	NA	0510-9092	0512-9092	0515-9092	0520-9092	0525-9092
Adj. Shock Field Retrofit Kit – Heavy Duty[2]	NA	0510-9048	0512-9011	0515-9011	0520-9011	0525-9011
Adj. Shock Field Retrofit Kit – Light Duty[2]	NA	0510-9049	0512-9012	0515-9012	0520-9012	0525-9012
Adj. Shock Field Mount Kit (Hardware Only)[3]	NA	0510-9072	0512-9072	0515-9072	0520-9072	0525-9013
Tube Supports[4]	0905-1034	4510-1010	4512-1010	4515-1010	4520-1010	4525-1010
Switch Hardware Only	0505-9999	0510-9999	0512-9999	0515-9999	0520-9999	0525-9999
Repair Kits[5,6,7]	RKBC205	RKBC210	RKBC212	RKBC215	RKBC220	RKBC225

Metric SIZE	M(MM)05	M(MM)10	M(MM)12	M(MM)15	M(MM)20	M(MM)25
Aux. Carrier Assembly (w/piston) (each)	NA	4510-9057	4512-9057	4515-9057	4520-9057	4525-9057
Aux. Carrier Assembly (wo/piston) (each)	NA	4510-9095	4512-9095	4515-9095	4520-9095	4525-9095
Floating Mount Bracket Kit	4905-9115	4510-9007	4512-9007	4515-9007	4520-9007	4525-9007
Foot Mount Kit[1]	4905-9010	4510-9125	4512-9125	4515-9125	4520-9125	4525-9125
Shock Field Retrofit Kit – Heavy Duty[2,8]	NA	4510-9090	4512-9090	4515-9090	4520-9090	4525-9090
Shock Field Retrofit Kit – Light Duty[2,8]	NA	4510-9091	4512-9091	4515-9091	4520-9091	4525-9091
Shock Field Mount Kit (Hardware Only)[3,8]	NA	4510-9092	4512-9092	4515-9092	4520-9092	4525-9092
Adj. Shock Field Retrofit Kit – Heavy Duty[2]	NA	4510-9013	4512-9013	4515-9013	4520-9013	4525-9013
Adj. Shock Field Retrofit Kit – Light Duty[2]	NA	4510-9014	4512-9014	4515-9014	4520-9014	4525-9014
Adj. Shock Field Mount Kit (Hardware Only)[3]	NA	4510-9025	4512-9025	4515-9025	4520-9025	4525-9025
Tube Supports[4]	0905-1034	4510-1010	4512-1010	4515-1010	4520-1010	4525-1010
Switch Hardware Only	0505-9999	0510-9999	0512-9999	0515-9999	0520-9999	0525-9999
Repair Kits[5,6,7]	RKBC2M(MM)05	RKBC2M(MM)10	RKBC2M(MM)12	RKBC2M(MM)15	RKBC2M(MM)20	RKBC2M(MM)25

PART NUMBER ORDERING No Mounting Hardware or FE conn. included		CONFIG. CODE ORDERING Mounting Hardware & FE conn. included
PART NO.	DESCRIPTION	CODE
3600-9084	Switch Only, Reed, Form C, 5m	BT
3600-9085	Switch Only, Reed, Form C, Male Conn.	BM
3600-9082	Switch Only, Reed, Form A, 5m	RT
3600-9083	Switch Only, Reed, Form A, Male Conn.	RM
3600-9086	Switch Only, Triac, 5m	CT
3600-9087	Switch Only, Triac, Male Conn.	CM
3600-9090	Switch Only, Hall-effect, Sinking, 5m	KT
3600-9091	Switch Only, Hall-effect, Sinking, Male Conn.	KM
3600-9088	Switch Only, Hall-effect, Sourcing, 5m	TT
3600-9089	Switch Only, Hall-effect, Sourcing, Male Conn.	TM
2503-1025	Connector (Female) 5 meter lead	

NOTE: When ordered by Config. Code Female connector & all mounting hardware is included

Switch Ordering NOTES:

To order field retrofit switch and hardware kits for all Tolomatic actuators: SW (Then the model and bore size, and type of switch required)
Example: SWBC215RT
(Hardware and Form A Reed switch with 5 meter lead for 1.5" bore BC2 band cylinder)

Mounting hardware is required if replacing switch for any actuator manufactured before 7/1/97

Service Parts Ordering NOTES:

1. Foot Mount Kit contains two foot mount brackets and mounting hardware
2. Shock Field Retrofit Kit contains one Shock Absorber and mounting hardware
3. Shock Field Mount Kit contains one set of mounting hardware only
4. A minimum of 2 (two) Tube Supports required per cylinder
5. Repair Kit for 05 size contains O-rings, U-Cups, End Caps, Wear Strips, Band Inserts, Spring Clamps, Sealing Band, Dust Band and Shock Absorbing Pads
6. Repair Kit for 10, 12, 15, 20 & 25 size contains End Caps, Bearing Rods, O-rings, U-cups, Wear Rings, Cushion Seals, Band Inserts, Spring Clamps, Sealing Band and Dust Band.
7. When ordering repair kits, specify stroke as "SK" then indicate the desired length in decimal inches after the order code indicated above. EXAMPLE: RKBC210SK10.00
8. Standard end-of-stroke shock absorbers are designed to operate without the assistance of the standard band cylinder cushion. To ensure proper shock absorber performance, make sure the air cushion is disabled.

NA = Not Available

BC2 Ordering - ALL Sizes

MODEL, BORE, STROKE

BC2_ _ 10 SK100.250

OPTIONS

DW6.0 TS3 FM2 SH2 BM2

MODEL & MOUNTING

BC2	BC2 Band Cylinder - inch (U.S. Standard)
BC2M	metric mounting with taper port
BC2MM	metric mounting with parallel port

BORE SIZE

05	0.50" *(12mm)*
10	1.00" *(25mm)*
12	1.25" *(32mm)*
15	1.50" *(40mm)*
20	2.00" *(50mm)*
25	2.50" *(63mm)*

STROKE LENGTH

SK_._ _ Enter desired stroke length in decimal inches

MAXIMUM STROKE

SIZE	BC2 in	BC2M(MM) *mm*
05	171	*4,343*
10	350	*8,890*
12	288	*7,315*
15	298	*7,569*
20	274	*6,959*
25	163	*4,140*

AUXILIARY CARRIER *(BC2_14)*

DW	Auxiliary carrier With piston & "D" distance
DO	Auxiliary carrier Without piston & "D" distance
_ _._ _	"D" Distance between carriers

Not available for 05 size

MINIMUM "D" DISTANCE BETWEEN CARRIERS

	(DO) w/o Piston		(DW) w/ Piston	
	in	*mm*	in	*mm*
10	5.07	*129*	5.07	*129*
12	5.17	*131*	6.85	*174*
15	6.46	*164*	8.07	*205*
20	8.10	*206*	8.10	*206*
25	9.62	*244*	11.06	*281*

When ordering auxiliary carrier option, enter the distance required between carriers. The configurator will calculate the overall length of the actuator.

TUBE SUPPORTS *(BC2_16)*

TS_ Tube Support & number required

FOOT MOUNT *(BC2_17)*

FM_ Foot Mount & number required (1 or 2)

FLOATING MOUNT *(BC2_18)*

FL Floating Mount Bracket

Not compatible with shock absorbers

PORTING OPTION

HDL	4-Ported Head - Left End
HDR	4-Ported Head - Right End
HDB	4-Ported Head - Both Ends

Not available for 05 size

SHOCK ABSORBERS *(BC2_22)*

SD_	Shock hardware Only and number required
SH_	Shock, Heavy duty and number required
SL_	Shock, Light duty and number required
***AD_**	Adjustable shock hardware Only and number required
***AH_**	Adjustable shock, Heavy duty and number required
***AL_**	Adjustable shock, Light duty and number required

Not available for 05 size

**NOTE: Adjustable Shock will reduce working stroke (see page BC2_22)*

SWITCHES *(BC2_20)*

TYPE		QUICK-DISCONNECT	CODE	QUANTITY	LEAD LENGTH
REED	Form A	QD	**RM**	After code enter quantity desired	5 meters
		no	**RT**		
	Form C	QD	**BM**		
		no	**BT**		
HALL-EFFECT	Sinking	QD	***KM**		
		no	***KT**		
	Sourcing	QD	***TM**		
		no	***TT**		
TRIAC		QD	**CM**		
		no	**CT**		

MDR Dual Magnet (Reed, Hall-effect, Triac)

* *Not available for 05 size*

Not all codes listed are compatible with all options. Contact Tolomatic with any questions.

Tolomatic
EXCELLENCE IN MOTION®

BC3 RECIRCULATING BALL BEARING RODLESS CYLINDER

CONTENTS

BC3 BAND CYLINDER

ENDURANCE TECHNOLOGY℠

Endurance Technology features are designed for maximum durability to provide extended service life.

The BC3 is the most capable pneumatic rodless cylinder in the industry today. Featuring durable stainless steel bands, a reliable recirculating ball bearing design and smooth, low breakaway pressure the BC3 is a great solution for applications with high load and bending moment requirements. Built-to-order in stroke lengths up to 205 inches.

FORMED END CAP WIPER SEAL

- Keeps contaminants from entering the sealing area
- Protects internal components
- Reduces maintenance while increasing productivity

SEALED BALL BEARING SYSTEM

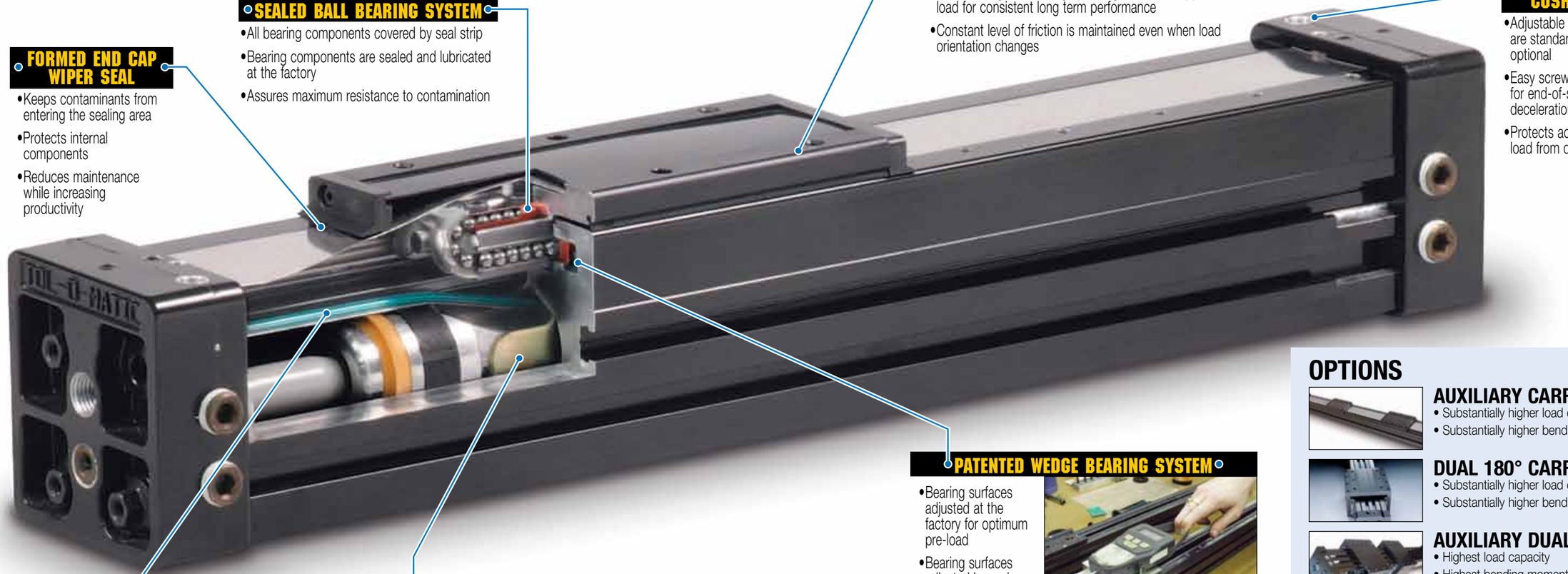
- All bearing components covered by seal strip
- Bearing components are sealed and lubricated at the factory
- Assures maximum resistance to contamination

LOAD-BEARING CARRIER DESIGN

- Load and piston are independent - piston floats, resulting in less friction and longer seal life
- Recirculating ball bearing system guides and supports load for consistent long term performance
- Constant level of friction is maintained even when load orientation changes

ADJUSTABLE CUSHIONS

- Adjustable cushions are standard, not optional
- Easy screw adjustment for end-of-stroke deceleration
- Protects actuator and load from damage



STAINLESS STEEL SEALING BAND SYSTEM

- Fatigue resistant stainless steel bands are specifically made to provide longer life and will not elongate, like elastomers
- Outer band keeps out contaminants for extended performance
- Inner band provides a smooth surface for less seal wear

FORMED STEEL PISTON BRACKET

- Provides maximum strength at major stress points
- Heat treated carbon steel withstands the toughest dynamic forces
- Strongest bracket design in the industry assures long life with less maintenance

PATENTED WEDGE BEARING SYSTEM

- Bearing surfaces adjusted at the factory for optimum pre-load
- Bearing surfaces adjusted by and supported by a steel wedge assuring long term stability

OPTIONS

AUXILIARY CARRIER
- Substantially higher load capacity
- Substantially higher bending moment capacity

DUAL 180° CARRIER
- Substantially higher load capacity
- Substantially higher bending moment capacity

AUXILIARY DUAL 180°
- Highest load capacity
- Highest bending moment capacity

TUBE SUPPORT MOUNTS
- Used for intermediate support

FOOT MOUNTS
- For end mounting of band cylinder

SHOCK ABSORBERS
- Smooth deceleration, higher productivity
- Allows increased operating speed
- Self-compensates for load or speed changes
- Minimizes impact load to equipment
- Adjustable position shocks available

SWITCHES
- Available in Reed, Hall-effect and Triac
- 15ft. cable with flying leads; available with quick-disconnect couplers

BC3 Recirculating Ball Bearing Rodless Cylinder

APPLICATIONS

Material Handling

Automatic sorting of products on conveyors.

Customer Challenge:

A manufacturer of sorting equipment had created some in-house automation solutions on their sorting equipment but they could not achieve the speed or reliability to keep up with their distribution requirements. They needed to speed up production and find a way to sort to more locations with limited floor space.

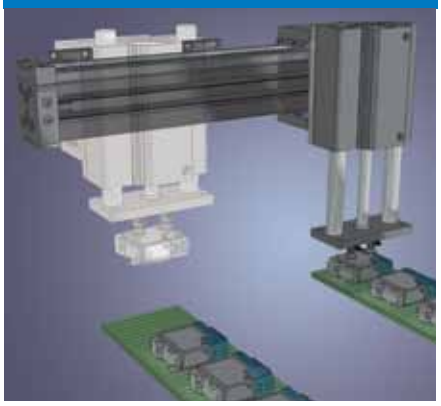
Tolomatic Solution:

A BC3 rodless pneumatic cylinder with was selected for this application because of their space-saving characteristics. The BC3 cylinder sits parallel over the top of the conveyor and is fitted with a paddle. The BC3 cylinder moves the paddle which pushes product both directions to different conveyors. Speed requirements of 30 in/sec were achieved easily achieved.

Result:

The rodless approach provided long-lasting durability for reliable performance at the required speed. The customer achieved flexibility on the number of products they could sort and increased the number of sorting locations maximizing their limited floor space. Most important, they were able to meet their distribution demands. The customer ordered 300 units for a total of $400,000.

Material Handling



A pick and place application for moving product between conveyors.

Customer Challenge:

A manufacturer of consumer electronic equipment needed a method to move finished product from one conveyor to another quickly without damage or waste.

Application Requirements:

- Fast response, throughput of 20 products per minute
- Consistent positioning
- End-of-stroke adjustment to accommodate varying product lines

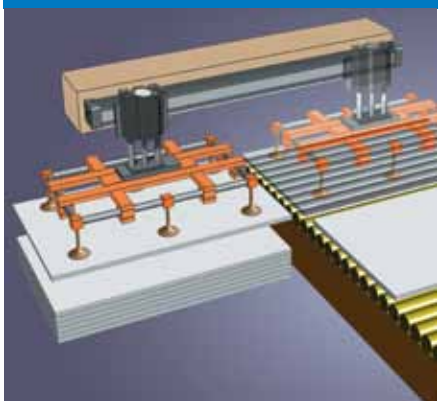
Tolomatic Solution:

This side mounted BC3D Band Cylinder with dual 180° option provides the motion along the X axis and support for the PB2 rod cylinder slide which provides the Y axis motion. In this application dual vacuum cups are used, however they are often replaced with a gripper unit with custom tooled fingers for product that does not present a smooth flat surface.

Result:

This continuing customer is pleased with the durability, price and delivery that the BC3 and PB2 actuators manufactured by Tolomatic provide.

Material Handling



Vacuumized sheet transfer application.

Customer Challenge:

A manufacturer of battery chargers needed a method of taking sheet metal off of pallets and placing onto the assembly line. Speed is critical and end-of-stroke position must be consistent, thus, Tolomatic pneumatic products were chosen for this system.

Application Requirements:

- Fast response, 1 part must be reoriented and moved each 3 seconds
- Movement from end-of-stroke to end-of-stroke with consistent positioning
- Low cost
- End-of-stroke adjustment

Tolomatic Solution:

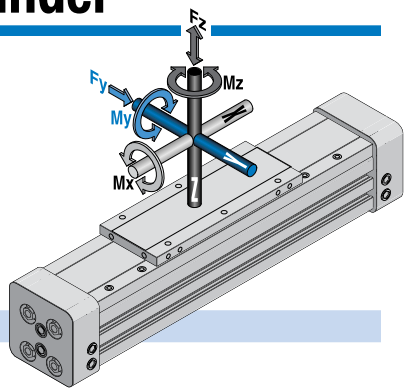
This application uses a Tolomatic PB2 Rod Cylinder Slide, attached to a BC3 Band Cylinder with adjustable shocks. This actuator assembly moves the vacuum grid attachment that holds the sheet metal.

Result:

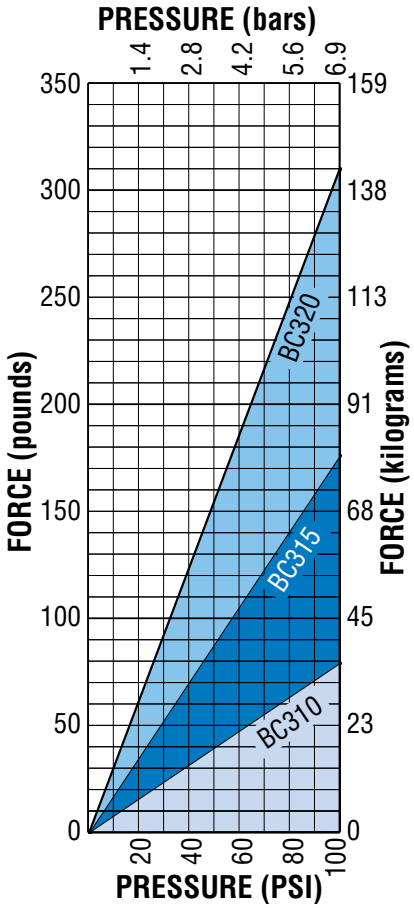
The BC3 and PB2 has long-lasting durability for reliable performance at the required speed. This continuing customer is pleased with the price and delivery that Tolomatic provides.

BC3 Recirculating Ball Bearing Rodless Cylinder

PERFORMANCE

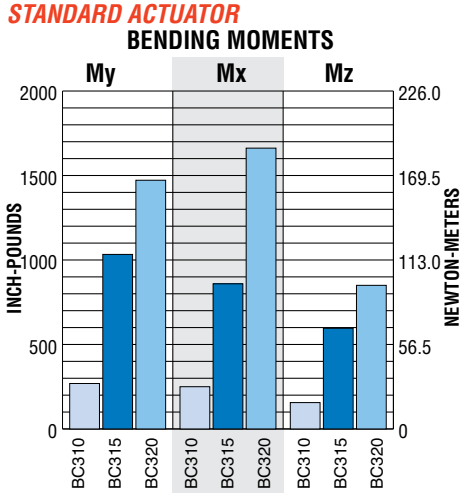


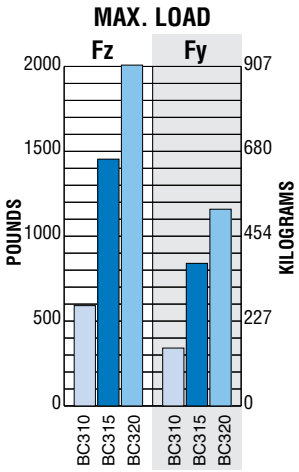
THEORETICAL FORCE vs PRESSURE



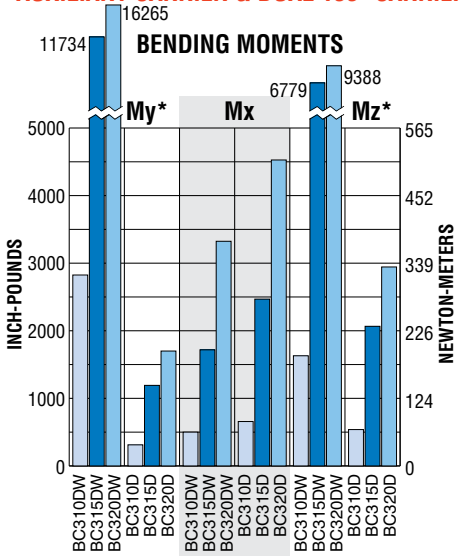
BENDING MOMENTS, LOAD

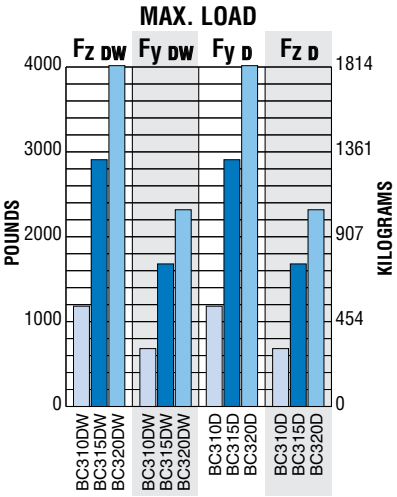
STANDARD ACTUATOR





*AUXILIARY CARRIER & DUAL 180° CARRIER** OPTIONS*





*Auxiliary carrier bending moments indicated are at minimum center to center distance. Additional My + Mz load capacity can be obtained by increasing "D" dimension. Refer to auxiliary carrier data on page BC3_16.

**Dual 180° carrier bending moments are not an exact comparison with other types of carriers. See page BC3_14.

BC310 Band Cylinder

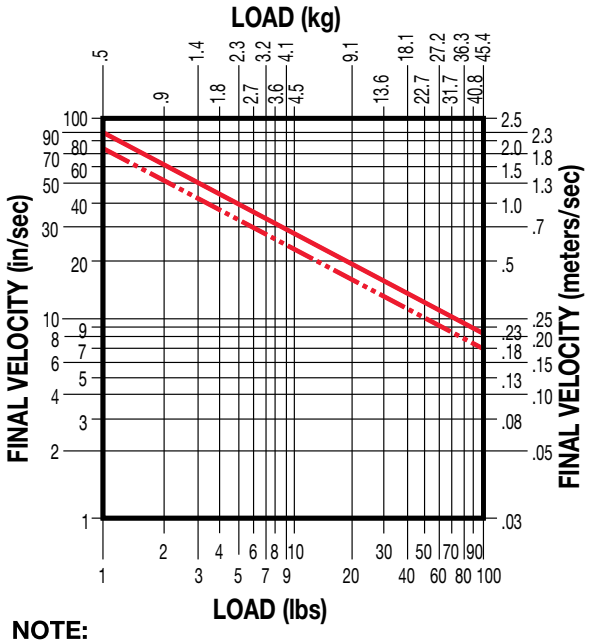
PERFORMANCE

BC310

ORDER CODES
BC310 *inch (U.S. Standard)*
BC3M10 *(metric with taper port)*
BC3MM10 *(metric with parallel port)*

BC310 OPTIONS	Page
Auxiliary Carrier	BC3_16
Auxiliary Dual 180° Carrier	BC3_17
Dual 180° Carrier	BC3_14
Foot Mounts	BC3_13
Shock Absorbers	BC3_21
Switches	BC3_19
Tube Supports	BC3_12
MORE INFORMATION	**Page**
Application Guidelines	BC3_25
Cushion Needle Adjustment	BC3_25
Ordering	BC3_28
Selection	BC3_24
STANDARD FEATURE	**Page**
Single End Porting	BC3_18

CUSHION DATA

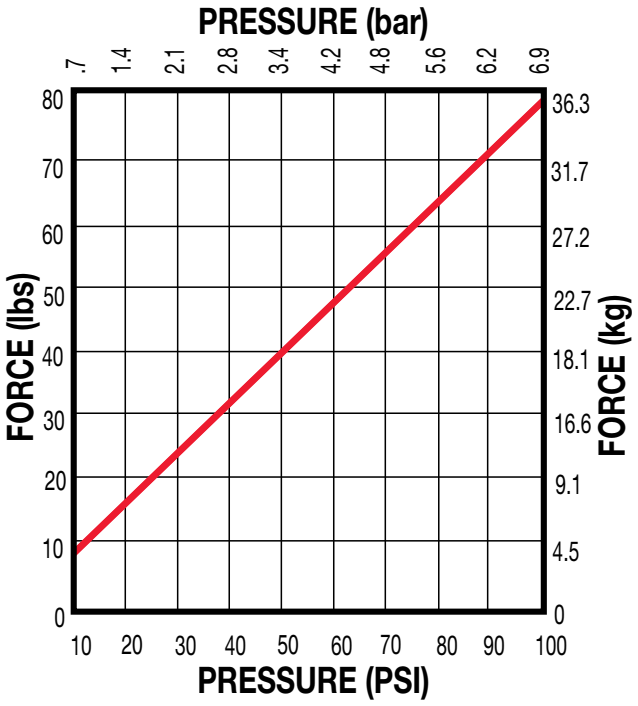


NOTE:

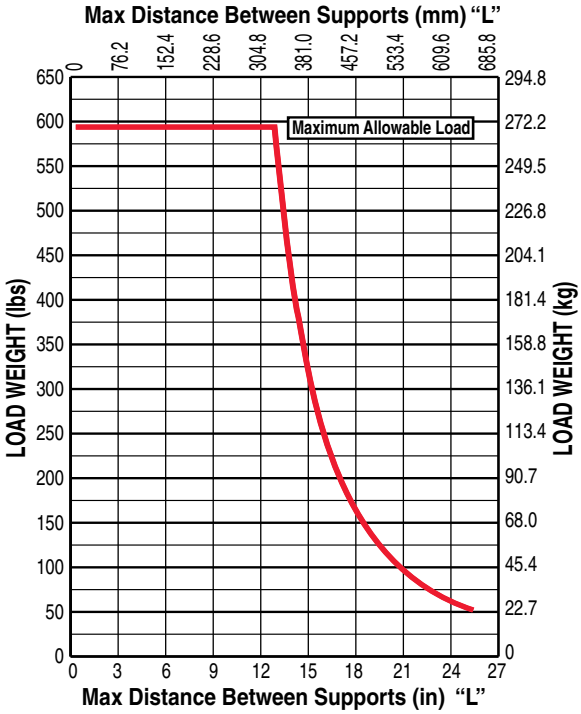
Max. for any application

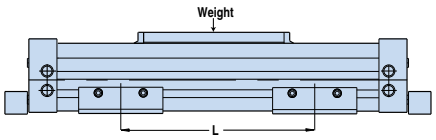
Max. for continuously cycled application

THEORETICAL FORCE vs PRESSURE



TUBE SUPPORT REQUIREMENTS

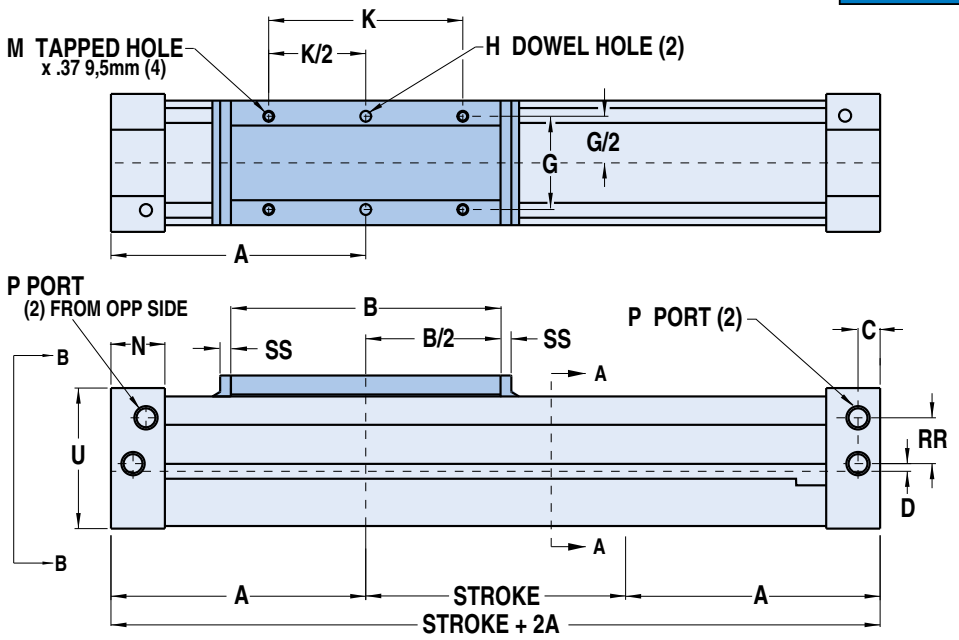


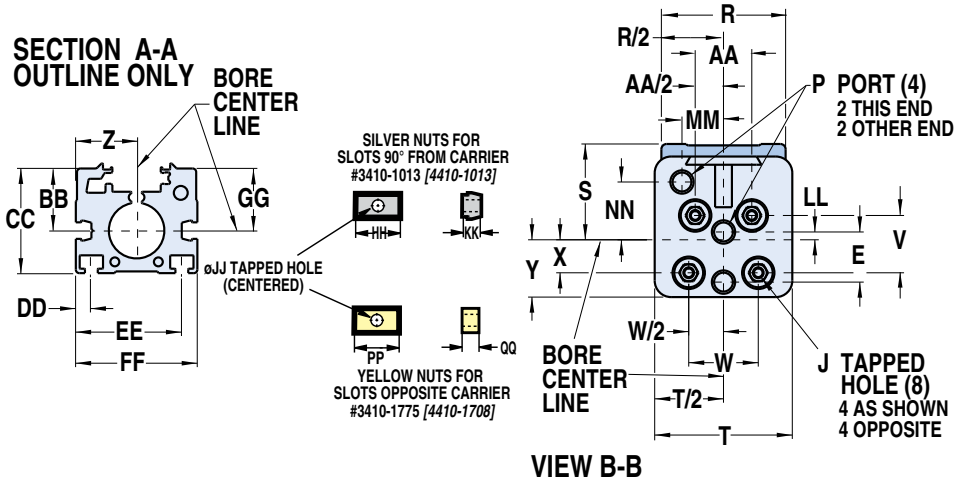


BC310 Band Cylinder

DIMENSIONS

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM



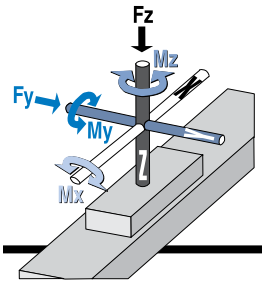


	MODELS	
	BC310	BC3M/MM10
A	3.94	100.0
B	3.67	93.3
C	.45	11.4
D	.047	1.19
E	.611	15.52
G	1.781	45.24
H*	.252/.251 x .25	6.045/6.020 x 6.4
J	10-24 x .43	M5-0.8 x 11.0
K	2.250	57.15
M	1/4-20	M6-1.0
N	1.00	25.4
P	1/8-27 NPT	**M** 1/8-28 BSPT **MM** 1/8-28 BSPP
R	2.16	54.8
S	1.54	39.1
T	2.19	55.6
U	2.17	55.1
V	.750	19.05
W	1.250	31.75
X	.330	8.38
Y	.76	19.3
Z	1.094	27.79
AA	1.063	27.00
BB	1.12	28.45
CC	1.88	47.8
DD	.266	6.76
EE	1.922	48.82
FF	2.19	55.6
GG	1.12	28.45
HH	.66	16.8
JJ	10-24	M5-0.8
KK	.25	6.4
LL	.142	3.61
MM	.547	13.89
NN	.890	22.6
PP	.75	19.1
QQ	.188	4.8
RR	.845	21.46
SS	.203	5.2
	INCHES	MILLIMETERS

*DOWEL PINS ⌖ .003 Ⓜ
⌖ .076 Ⓜ

SPECIFICATIONS

BC310 BENDING MOMENTS AND LOAD



	BORE SIZE	MAX. BENDING MOMENT			MAX. LOAD	
		My	Mx	Mz	Fz	Fy
10	1.00 in	269 in-lbs	250 in-lbs	156 in-lbs	591 lbs	341 lbs
M10	*25 mm*	*30.4 N-m*	*28.2 N-m*	*17.9 N-m*	*268.1 kg*	*154.7 kg*

	BORE SIZE	WEIGHT		MAX. STROKE LENGTH**	MAX. PRESSURE	TEMPERATURE RANGE
		BASE	PER UNIT OF STOKE			
10	1.00 in	2.71 lbs	0.23 lbs/in	205 in	100 PSI	20° to 140° F
M(MM)10	*25 mm*	*1.23 kg*	*0.0041 kg/mm*	*5207 mm*	*6.895 bar*	*-7° to 60° C*

****For longer strokes, alternate materials, mounting and/or fasteners – consult Tolomatic**

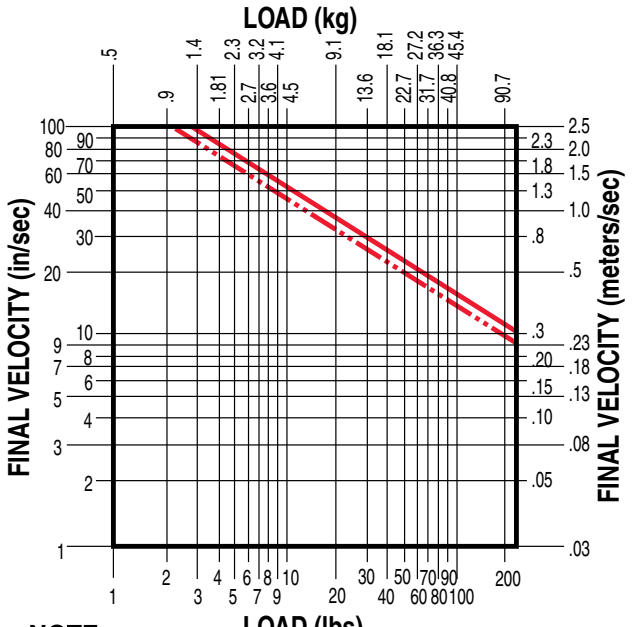
BC315 Band Cylinder

PERFORMANCE

BC315

ORDER CODES
BC315 *inch (U.S. Standard)*
BC3M15 *(metric with taper port)*
BC3MM15 *(metric with parallel port)*

CUSHION DATA

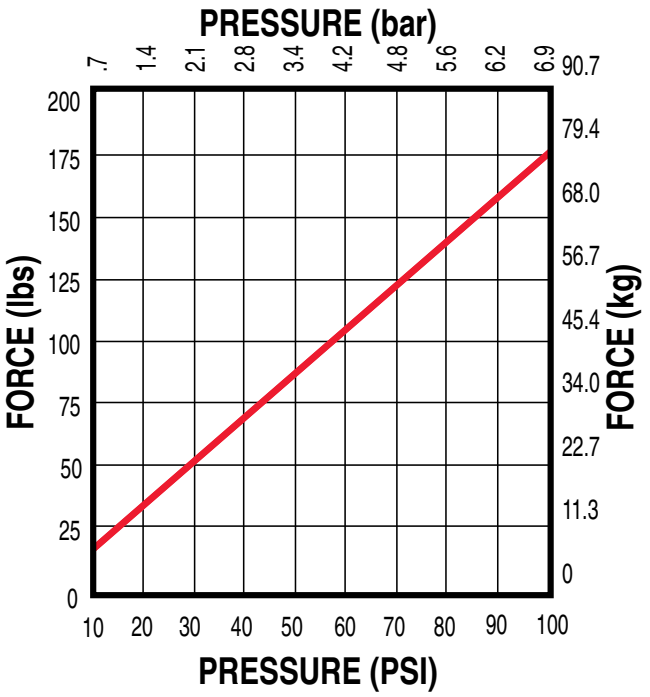


NOTE:

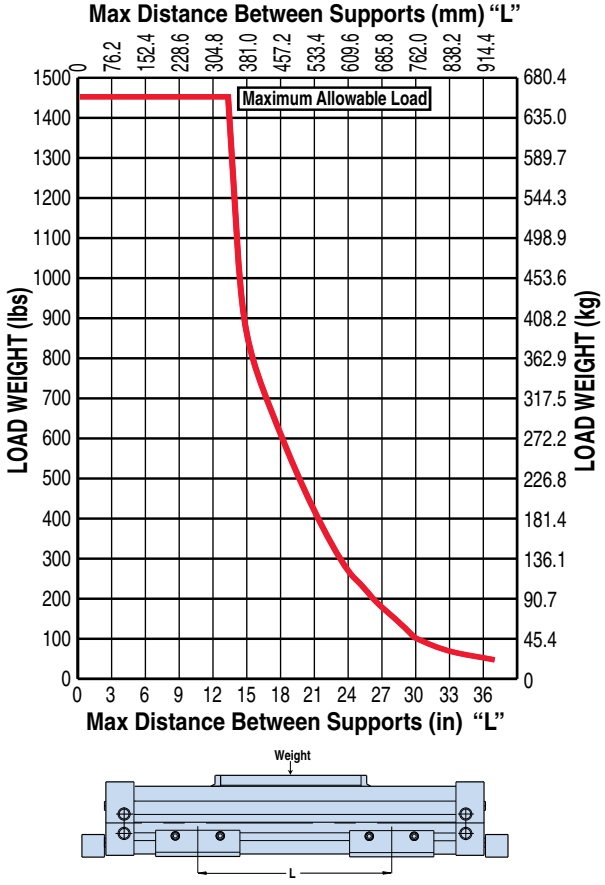
Max. for any application

Max. for continuously cycled application

THEORETICAL FORCE vs PRESSURE



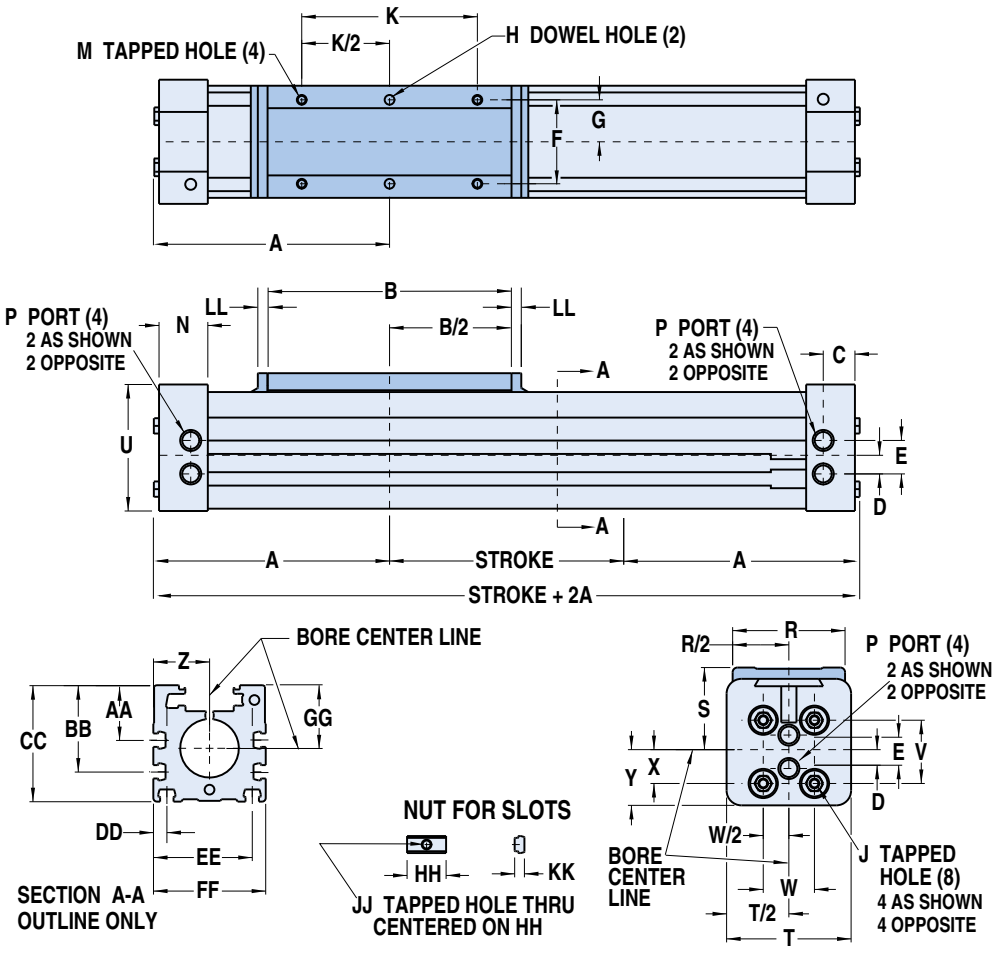
TUBE SUPPORT REQUIREMENTS



BC315 Band Cylinder

DIMENSIONS

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

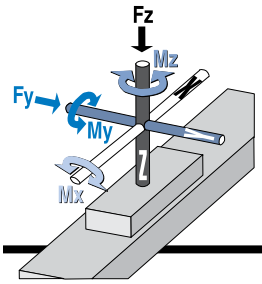


	MODELS	
	BC315	BC3M/MM15
A	5.93	150.7
B	6.25	158.8
C	.84	21.3
D	.48	12.2
E	.86	21.8
F	2.156	54.76
G	1.078	27.38
H*	.252-.251 x .25	6.045-6.020 x 6.4
J	1/4-20 x .47	M6-1 x 12
K	4.500	114.30
M	1/4-20 X .44	M6- x 11
N	1.27	32.3
P	1/4-18 NPT	M 1/4-19 BSPT MM 1/4-19 BSPP
R	2.88	73.0
S	2.109	53.57
T	3.19	81.0
U	3.25	82.6
V	1.625	41.28
W	1.313	33.35
X	.875	22.23
Y	1.46	37.1
Z	1.44	36.5
AA	1.41	35.81
BB	2.22	56.38
CC	2.99	75.95
DD	.35	8.9
EE	2.53	64.3
FF	2.88	73.0
GG	1.62	41.15
HH	.75	19.1
JJ	1/4-20	M6-1
KK	.25	6.4
LL	.25	6.4
	INCHES	MILLIMETERS

*DOWEL PINS ⌖ .003 Ⓜ
⌖ .076 Ⓜ

SPECIFICATIONS

BC315 BENDING MOMENTS AND LOAD



	BORE SIZE	MAX. BENDING MOMENT			MAX. LOAD	
		My	Mx	Mz	Fz	Fy
15	1.50 in	1033 in-lbs	859 in-lbs	596 in-lbs	1454 lbs	840 lbs
M15	*40 mm*	*116.7 N-m*	*97.1 N-m*	*67.3 N-m*	*659.5 kg*	*381.0 kg*

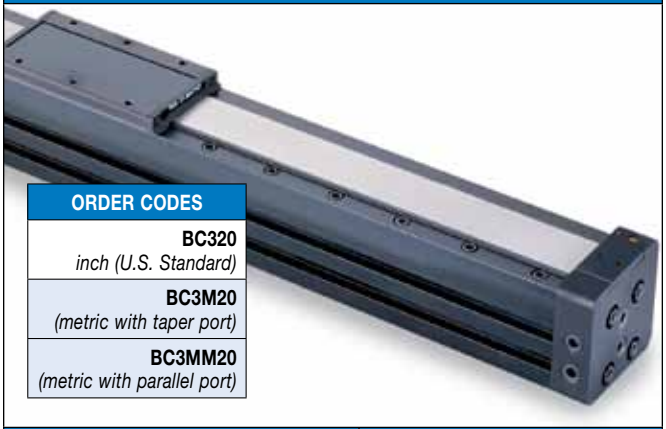
	BORE SIZE	WEIGHT		MAX. STROKE LENGTH**	MAX. PRESSURE	TEMPERATURE RANGE
		BASE	PER UNIT OF STOKE			
15	1.50 in	10.94 lbs	0.53 lbs/in	202 in	100 PSI	20° to 140° F
M(MM)15	*40 mm*	*4.96 kg*	*0.0095 kg/mm*	*5130 mm*	*6.895 bar*	*-7° to 60° C*

**For longer strokes, alternate materials, mounting and/or fasteners – consult Tolomatic

BC320 Band Cylinder

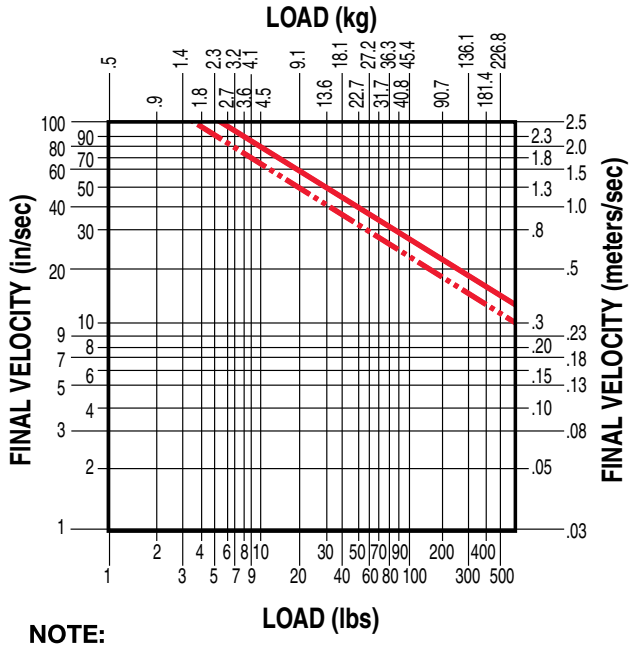
PERFORMANCE

BC320



ORDER CODES
BC320 *inch (U.S. Standard)*
BC3M20 *(metric with taper port)*
BC3MM20 *(metric with parallel port)*

CUSHION DATA

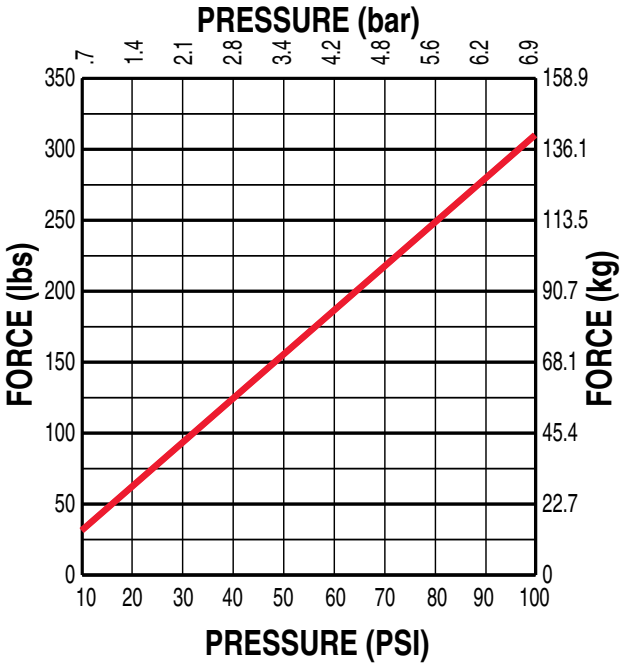


NOTE:

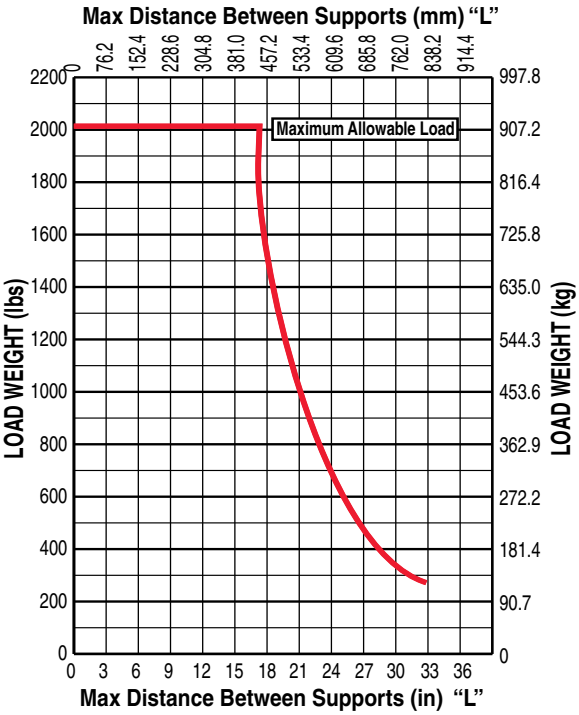
Max. for any application

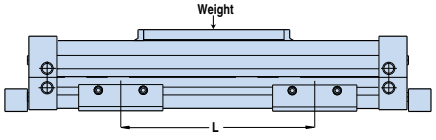
Max. for continuously cycled application

THEORETICAL FORCE vs PRESSURE



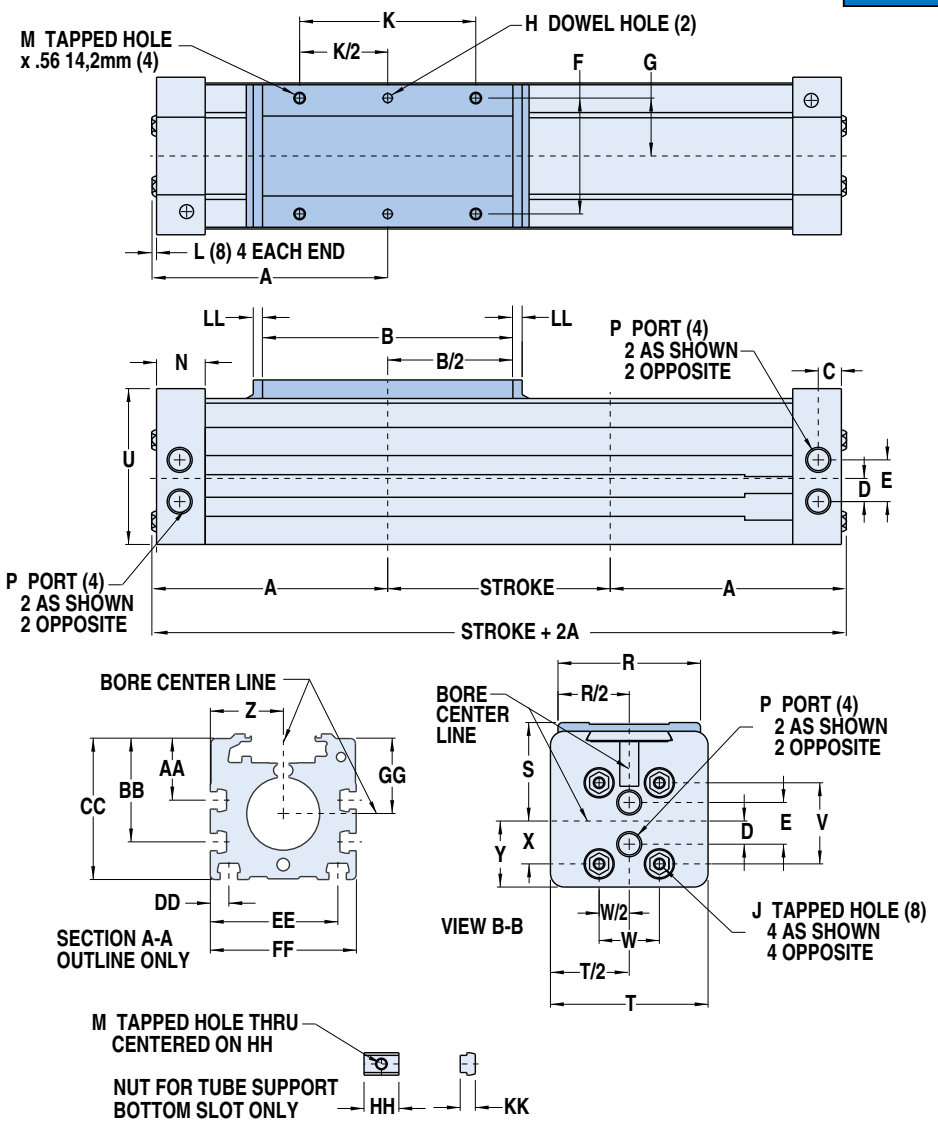
TUBE SUPPORT REQUIREMENTS





BC320 Band Cylinder

DIMENSIONS

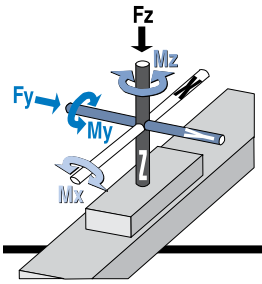


	MODELS	
	BC320	BC3M/MM20
A	6.27	159.0
B	6.75	171.5
C	0.625	15.88
D	0.625	15.88
E	1.125	28.58
F	3.125	79.38
G	1.563	39.70
H*	.252/.251 x .25	6.045/6.020 x 6.4
J	5/16-18 x .88	M8-1.25 x 22
K	4.750	120.65
L	0.063	1.60
M	5/16-18	M8-1.25
N	1.31	33.3
P	3/8-18 NPT	M 3/8-19 BSPT MM 3/8-19 BSPP
R	3.84	97.5
S	2.663	67.64
T	4.25	108.0
U	4.20	106.7
V	2.188	55.58
W	1.625	41.28
X	1.156	29.36
Y	1.78	45.2
Z	1.969	50.01
AA	1.67	42.4
BB	2.80	71.0
CC	3.81	96.7
DD	0.500	12.70
EE	3.438	87.33
FF	3.94	100.1
GG	2.03	51.6
HH	0.94	23.9
JJ	5/16-18	M8-1.25
KK	.41	10.4
LL	.25	6.4
	INCHES	MILLIMETERS

*DOWEL PINS ⌖ .003 Ⓜ
⌖ .076 Ⓜ

SPECIFICATIONS

BC320 BENDING MOMENTS AND LOAD



	BORE SIZE	MAX. BENDING MOMENT			MAX. LOAD	
		My	Mx	Mz	Fz	Fy
20	2.00 in	1472 in-lbs	1662 in-lbs	850 in-lbs	2008 lbs	1159 lbs
M20	*50 mm*	*166.3 N-m*	*187.8 N-m*	*96.0 N-m*	*910.8 kg*	*525.77 kg*

	BORE SIZE	WEIGHT		MAX. STROKE LENGTH**	MAX. PRESSURE	TEMPERATURE RANGE
		BASE	PER UNIT OF STOKE			
20	2.00 in	17.00 lbs	0.86 lbs/in	142 in	100 PSI	20° to 140° F
M(MM)20	*50 mm*	*7.71 kg*	*0.0154 kg/mm*	*3606 mm*	*6.895 bar*	*-7° to 60° C*

**For longer strokes, alternate materials, mounting and/or fasteners – consult Tolomatic

BC3 TUBE SUPPORTS - All Sizes

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

TUBE SUPPORT

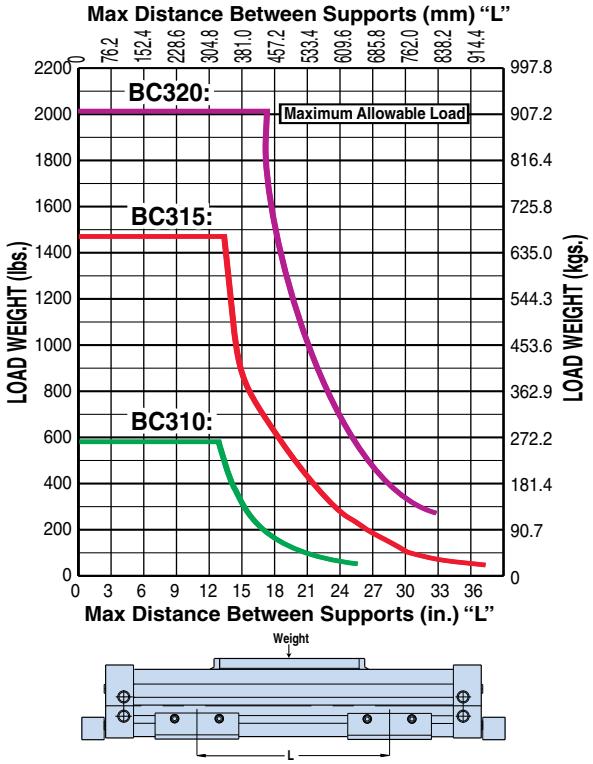
ORDER CODE

TS_
(_ = Number ordered)

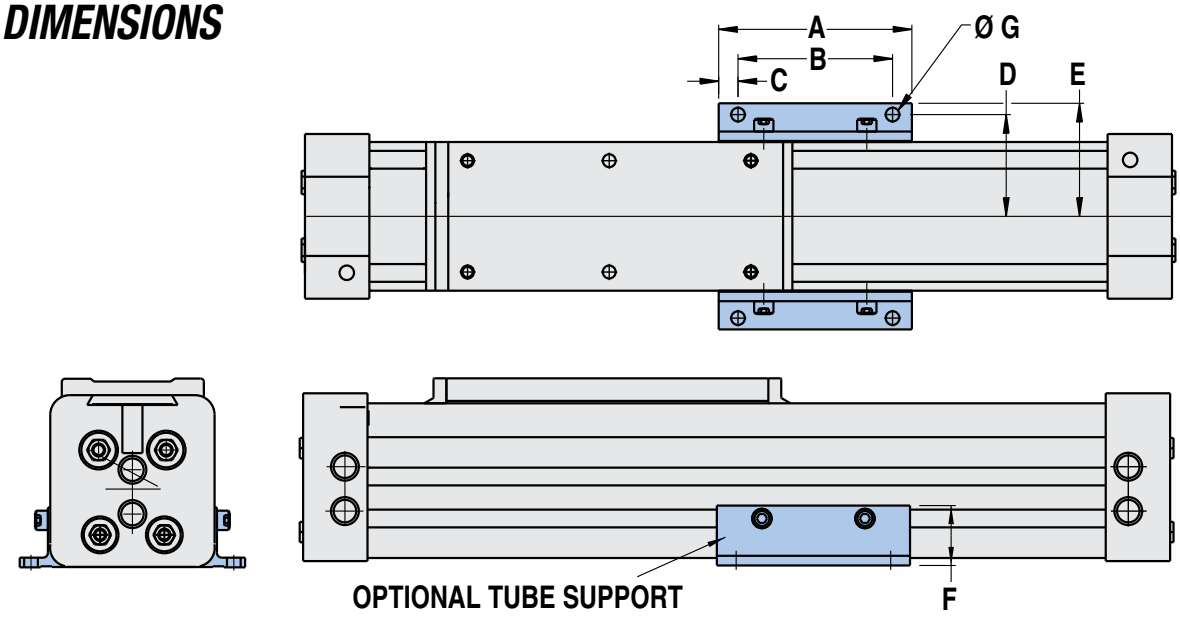
For intermediate support, tube support brackets can be mounted to the BC3 model. Made of black-anodized aluminum, the brackets are attached to the bottom and sides of the cylinder tube with rail nuts. The number of tube support brackets required and their placement depends on the overall length of the BC3 model and the load weight being moved and supported. Refer to the tube support data chart below. Note: Switches cannot be mounted on the same face of the actuator as tube supports.

PERFORMANCE

TUBE SUPPORT REQUIREMENTS



DIMENSIONS



	BORE SIZE	A	B	C	D	E	F	G
10	1.00	2.75	2.250	0.25	1.53	1.76	1.09	0.206
15	1.50	3.75	3.000	0.38	1.97	2.19	1.16	0.266
20	2.00	4.00	3.375	0.31	2.56	2.84	1.50	0.328

Dimensions in inches

	BORE SIZE	A	B	C	D	E	F	G
M10	*25*	*69.85*	*57.15*	*6.4*	*38.9*	*44.7*	*27.7*	*5.232*
M15	*40*	*95.30*	*76.20*	*9.7*	*50.0*	*55.6*	*29.5*	*6.756*
M20	*50*	*101.60*	*85.73*	*7.9*	*65.0*	*72.1*	*38.1*	*8.331*

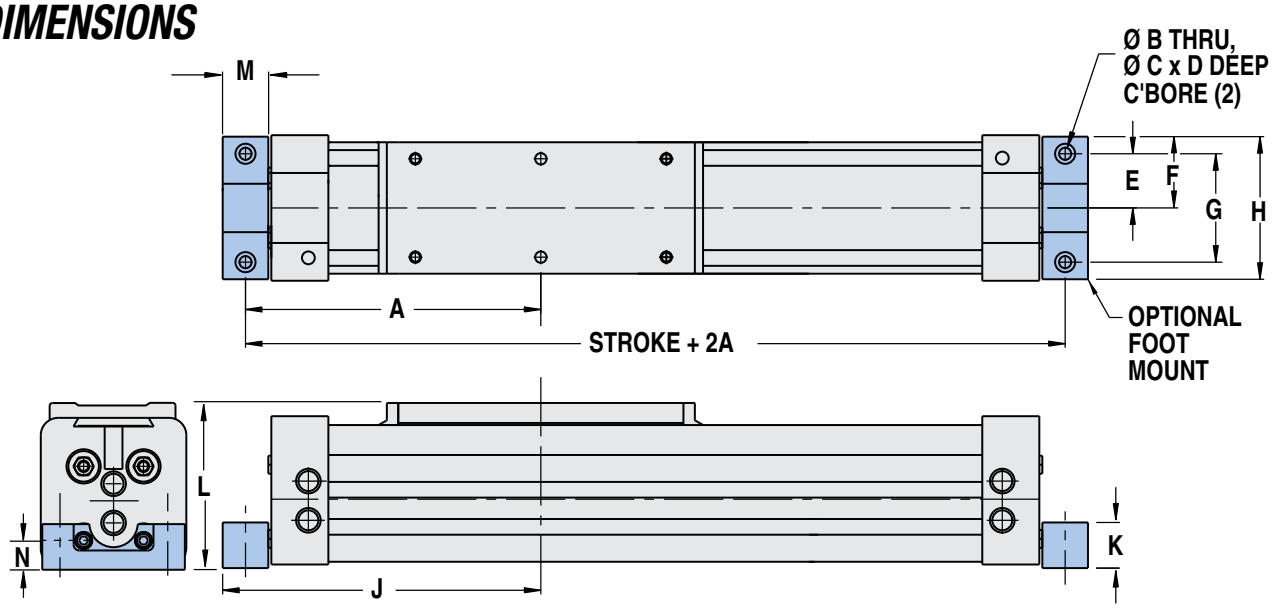
Dimensions in millimeters

BC3 FOOT MOUNT KIT - All Sizes

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

Foot mounts are an option on BC3 Series Band Cylinders when an application requires the mounting to be different than flush. They may be specified on one or both ends of the cylinder.

DIMENSIONS



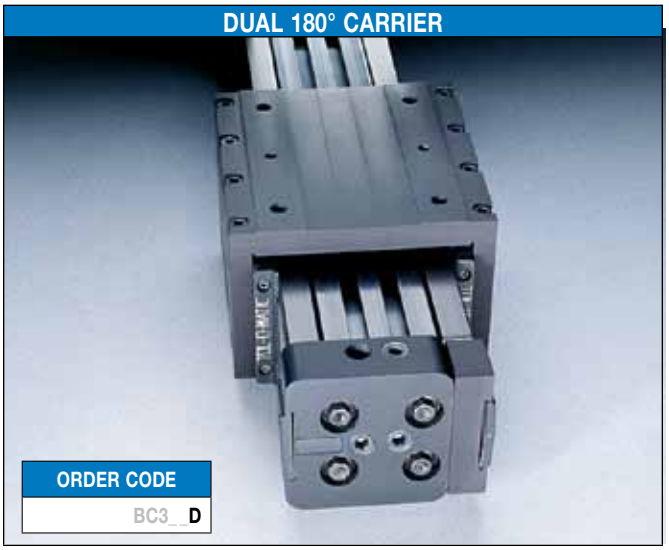
	BORE SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N
10	1.00	4.31	Ø.206	Ø .38	0.22	0.906	1.095	1.812	2.19	4.69	0.88	2.44	0.75	0.574
15	1.25	6.43	Ø.266	Ø .44	0.28	1.188	1.560	2.375	3.13	6.93	1.00	3.63	1.00	0.641
20	1.50	6.80	Ø.328	Ø .53	0.34	1.500	2.000	3.000	4.00	7.30	1.13	4.53	1.00	0.719

Dimensions in inches

	BORE SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N
M10	25	109.5	Ø 5.23	Ø 9.7	5.6	23.01	27.8	46.02	55.6	119.1	22.4	62.0	19.1	14.6
M15	32	163.4	Ø 6.76	Ø 11.2	7.1	30.18	39.7	60.33	79.4	176.1	25.4	92.2	25.4	16.3
M20	40	172.7	Ø 8.33	Ø 13.5	8.6	38.10	50.8	76.20	101.6	185.4	28.7	115.1	25.4	18.3

Dimensions in millimeters

BC3 DUAL 180° CARRIER - All Sizes



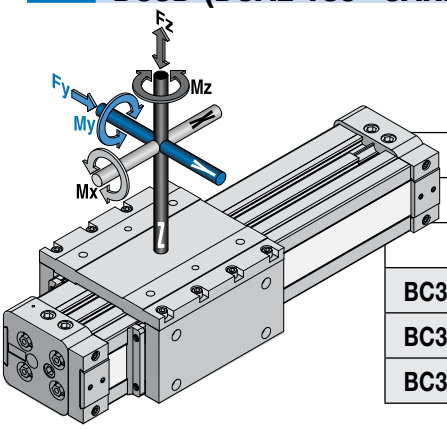
DUAL 180° CARRIER

The Dual 180° Carrier option may be used when load factors exceed those of a single carrier actuator. This option allows the load to be rotated 90° from the cylinder's carrier providing an additional load bearing mounting surface.

NOTE: The Dual 180° Carrier option requires its own proprietary tube supports and foot mounts. See dimensional information below. Breakaway pressure will increase when using the Dual 180° Carrier option.

PERFORMANCE

BC3D (DUAL 180° CARRIER) BENDING MOMENTS AND LOAD



	BORE SIZE	MAX. BENDING MOMENT			MAX. LOAD	
		My	Mx	Mz	Fz	Fy
BC310D	1.00 in.	312 in.-lbs.	657 in.-lbs.	538 in.-lbs.	1182 lbs.	682 lbs.
BC315D	1.50 in.	1192 in.-lbs.	2468 in.-lbs.	2066 in.-lbs.	2908 lbs.	1680 lbs.
BC320D	2.00 in.	1700 in.-lbs.	4527 in.-lbs.	2944 in.-lbs.	4016 lbs.	2318 lbs.
BC3M(MM)10D	*25mm*	*35.3 N-m*	*74.2 N-m*	*60.8 N-m*	*536.1 kgs.*	*309.3 kgs.*
BC3M(MM)15D	*40mm*	*134.7 N-m*	*278.9 N-m*	*233.4 N-m*	*1319.0 kgs.*	*762.0 kgs.*
BC3M(MM)20D	*50mm*	*192.1 N-m*	*511.5 N-m*	*332.6 N-m*	*1821.6 kgs.*	*1051.4 kgs.*

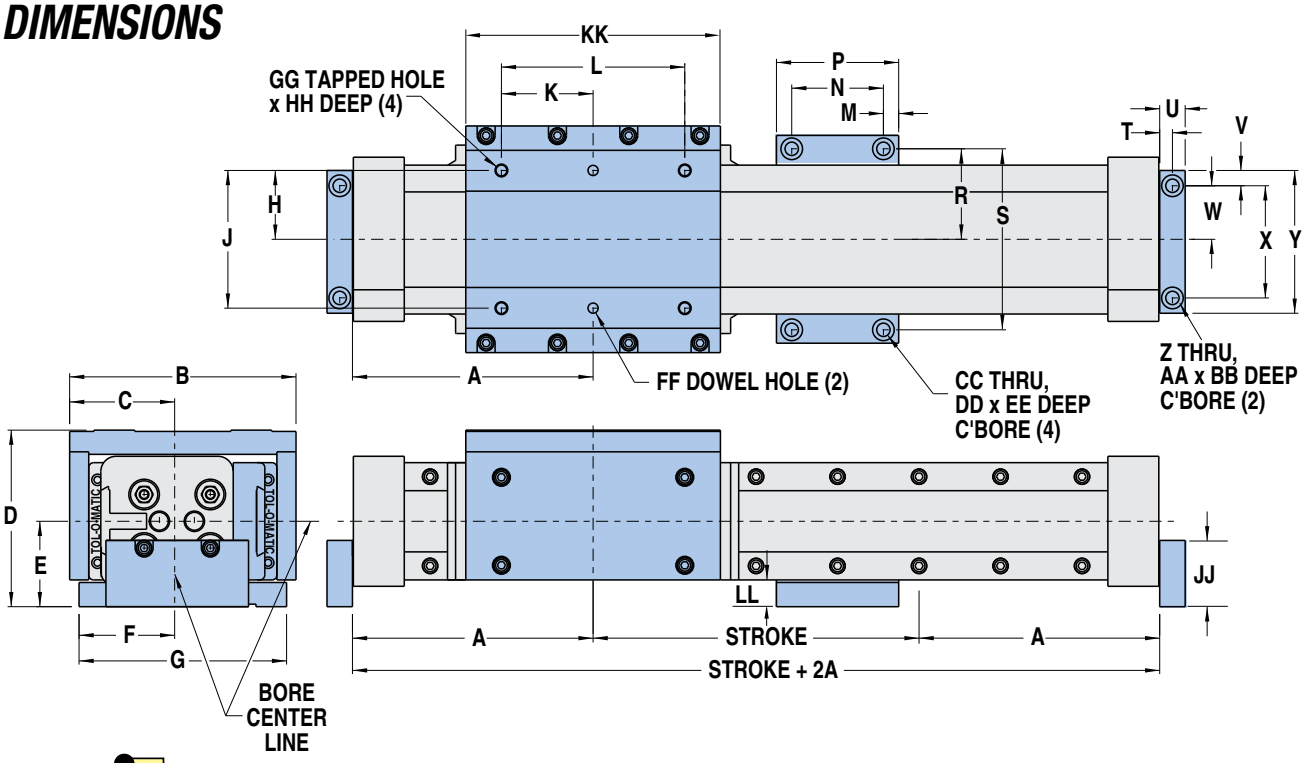
	BORE SIZE	WEIGHT**		MAX. STROKE LENGTH*	MAX. PRESSURE	TEMPERATURE RANGE
		BASE	PER UNIT OF STOKE			
BC310D	1.00 in.	5.37 lbs.	0.32 lbs.	205 in	100 PSI	20° to 140° F
BC315D	1.50 in.	17.2 lbs.	0.69 lbs.	202 in		
BC320D	2.00 in.	28.9 lbs.	1.12 lbs.	142 in		
BC3M(MM)10D	*25mm*	*2.43 kgs.*	*0.14 kgs.*	*5207 mm*	*6.895 bar*	*-7° to 60° C*
BC3M(MM)15D	*40mm*	*7.76 kgs.*	*0.31 kgs.*	*5130 mm*		
BC3M(MM)20D	*50mm*	*13.11 kgs.*	*0.50 kgs.*	*3606 mm*		

***For longer strokes, alternate materials, mounting and/or fasteners – consult Tolomatic**

****Use these figures to calculate actuator weight instead of standard weights on pages BC3_7, BC3_9, BC3_11**

BC3 DUAL 180° CARRIER - All Sizes

DIMENSIONS



NOTE: In vertical mounting applications, supplemental mounting may be required besides factory foot mounts.

Optional Tube Supports and Foot Mounts are shown.

MODELS	BORE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S
BC310	1.0 in.	3.93	4.31	2.13	3.33	1.61	1.75	3.50	1.192	2.437	1.531	3.062	.28	2.563	3.12	1.469	2.937
BC315	1.5 in.	5.93	6.00	2.78	4.33	2.09	2.35	5.09	1.48	3.375	2.250	4.500	.38	2.250	3.00	2.02	4.437
BC320	2.0 in.	6.27	7.41	3.51	5.30	2.59	2.80	6.00	2.358	5.125	3.000	6.000	.38	2.250	3.00	2.422	5.250

MODELS	BORE	T	U	V	W	X	Y	Z	AA	BB	CC	DD	EE	FF*	GG	HH	JJ	KK	LL
BC310	1.0 in.	.307	.62	.28	.891	1.688	2.25	.266	.44	.28	.266	.44	.28	.252/.251 x .25	1/4-20	.47	1.25	3.67	.52
BC315	1.5 in.	.312	.62	.38	1.312	2.750	3.50	.266	.44	.28	.328	.53	.34	.252/.251 x .25	5/16-18	.59	1.62	6.25	.66
BC320	2.0 in.	.312	.62	.31	1.625	3.375	4.00	.328	.53	.34	.391	.63	.41	.252/.251 x .25	3/8-16	.66	2.00	6.75	.63

Dimensions in inches

MODELS	BORE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S
BC3M(MM)10	25 mm	99.8	109.5	54.1	84.6	40.9	44.5	88.9	30.28	61.90	38.89	77.77	7.1	65.10	79.2	37.31	74.60
BC3M(MM)15	40 mm	150.6	152.4	70.61	110.0	53.1	59.7	129.3	37.59	85.73	57.15	114.30	9.7	57.15	76.2	51.31	112.70
BC3M(MM)20	50 mm	159.3	188.2	89.15	135.6	68.8	71.1	152.4	59.89	130.18	76.20	152.40	9.7	57.15	76.2	61.52	133.35

MODELS	BORE	T	U	V	W	X	Y	Z	AA	BB	CC	DD	EE	FF*	GG	HH	JJ	KK	LL
BC3M(MM)10	25 mm	7.80	15.7	7.1	22.63	42.88	57.2	6.76	11.2	7.1	6.8	11.2	7.1	6.045/6.020 x 6.4	M6 x 1.00	11.9	31.8	93.2	13.2
BC3M(MM)15	40 mm	7.92	15.7	9.7	33.32	69.85	88.9	6.76	11.2	7.1	8.33	13.5	8.6	6.045/6.020 x 6.4	M8 x 1.25	15.0	41.1	158.8	16.8
BC3M(MM)20	50 mm	7.92	15.7	7.9	41.28	85.73	101.6	8.33	13.5	8.6	9.93	16.0	10.4	6.045/6.020 x 6.4	M10 x 1.50	16.8	50.8	171.8	16.0

Dimensions in millimeters

*DOWEL PINS ⌖ .003 Ⓜ
⌖ .076 Ⓜ

BC3 AUXILIARY CARRIER - All Sizes

AUXILIARY CARRIER

ORDER CODE

DW_ _ . _
(with piston, indicate distance "D" between carriers)

AUXILIARY CARRIER

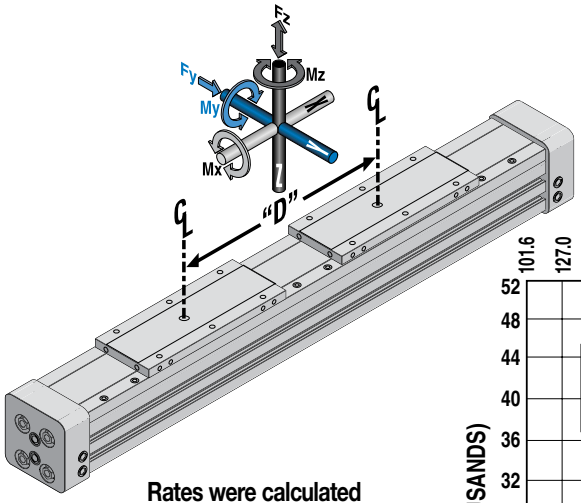
The auxiliary carrier option substantially increases load carrying capacity and bending moments. Auxiliary carriers can only be ordered with an internal piston. When ordering, determine the minimum distance required between carriers (dimension "D" in Auxiliary Carrier Bending Moments chart below). Determine your working stroke. Enter these into your configuration string. (Example BC315SK50.00DW10.00) the configurator will calculate the overall length of the actuator.

ORDERING PROCEDURE

NOTE: Breakaway pressure will increase when using auxiliary carriers.

PERFORMANCE

BC3--DW (AUXILIARY CARRIER) BENDING MOMENTS AND LOAD



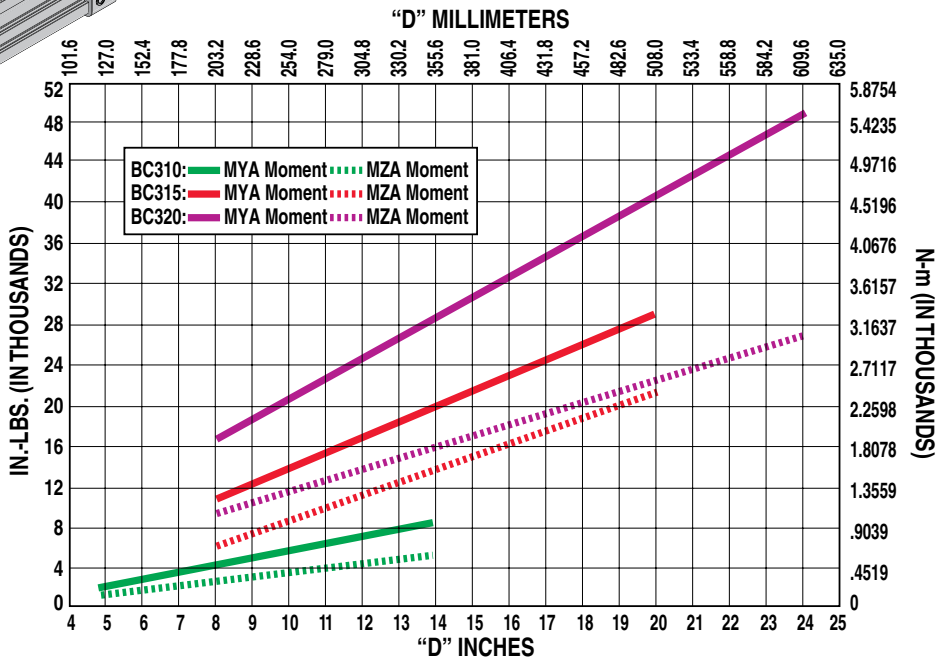
Rates were calculated with the following assumptions:

1.) Coupling between carriers is rigid.

2.) Load is equally distributed between carriers.

3.) Coupling device applies no misalignment loads to carriers.

LOAD vs. DISTANCE BC3 SERIES

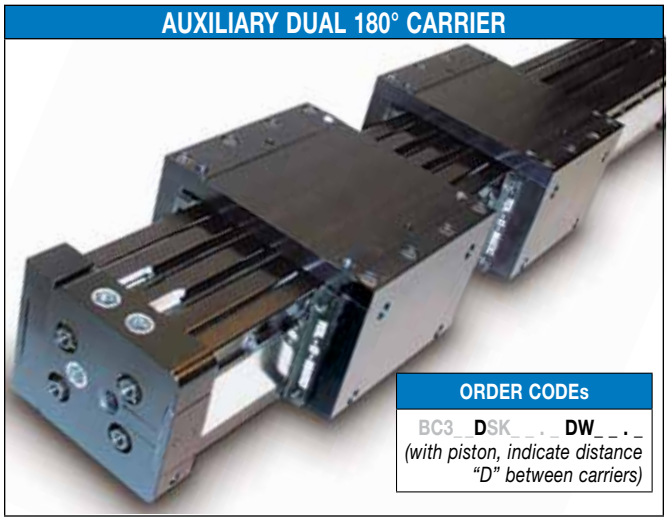


MODEL NO.	"D"* MIN.	MAXIMUM BENDING MOMENT			MAXIMUM LOAD	
		M_{YA}**	M_{XA}	M_{ZA}**	F_{ZA}	F_{YA}
BC310DW	4.88 in.	2825 in.-lbs.	500 in.-lbs.	1630 in.-lbs.	1182 lbs.	682 lbs.
BC315DW	8.07 in.	11734 in.-lbs.	1718 in.-lbs.	6779 in.-lbs.	2908 lbs.	1680 lbs.
BC320DW	8.10 in.	16265 in.-lbs.	3324 in.-lbs.	9388 in.-lbs.	4016 lbs.	2318 lbs.
BC3M(MM)10DW	124.0mm	319.2 N-m	56.5 N-m	184.2 N-m	536.1 kgs.	309.3 kgs.
BC3M(MM)15DW	205.0mm	1325.8 N-m	194.1 N-m	765.9 N-m	1319.0 kgs.	762.0 kgs.
BC3M(MM)20DW	205.7mm	1837.8 N-m	375.6 N-m	1060.8 N-m	1821.6 kgs.	1051.4 kgs.

*** D is distance between carriers.**

**** Loads calculated are at minimum "D", for substantially higher My + Mz loads increase "D' and refer to graph at left**

BC3 AUXILIARY DUAL 180° CARRIER - All Sizes



AUXILIARY DUAL 180° CARRIER

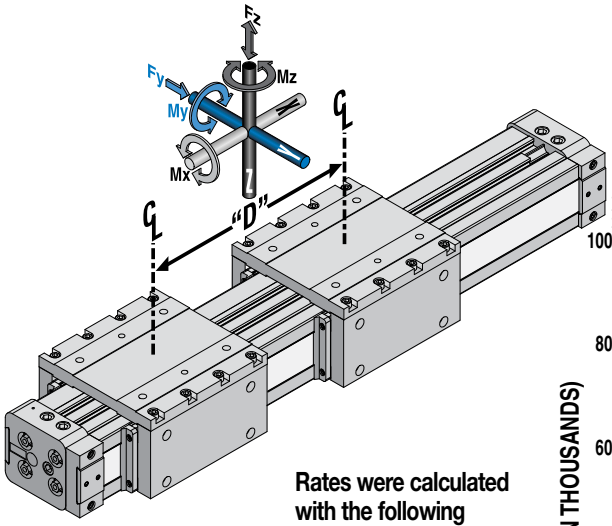
The auxiliary dual 180° carrier option substantially increases load carrying capacity and bending moments. Auxiliary carriers can only be ordered with an internal piston. When ordering, determine the minimum distance required between carriers (dimension "D" in Auxiliary Dual 180° Carrier Bending Moments chart below). Determine your working stroke. Enter these into your configuration string. (Example BC3D15SK50.00DW10.00) The configurator will calculate the overall length of the actuator.

ORDERING PROCEDURE

NOTE: Breakaway pressure will increase when using auxiliary dual 180° carriers.

PERFORMANCE

BC3D--DW (DUAL 180°, AUXILIARY CARRIER) BENDING MOMENTS AND LOAD

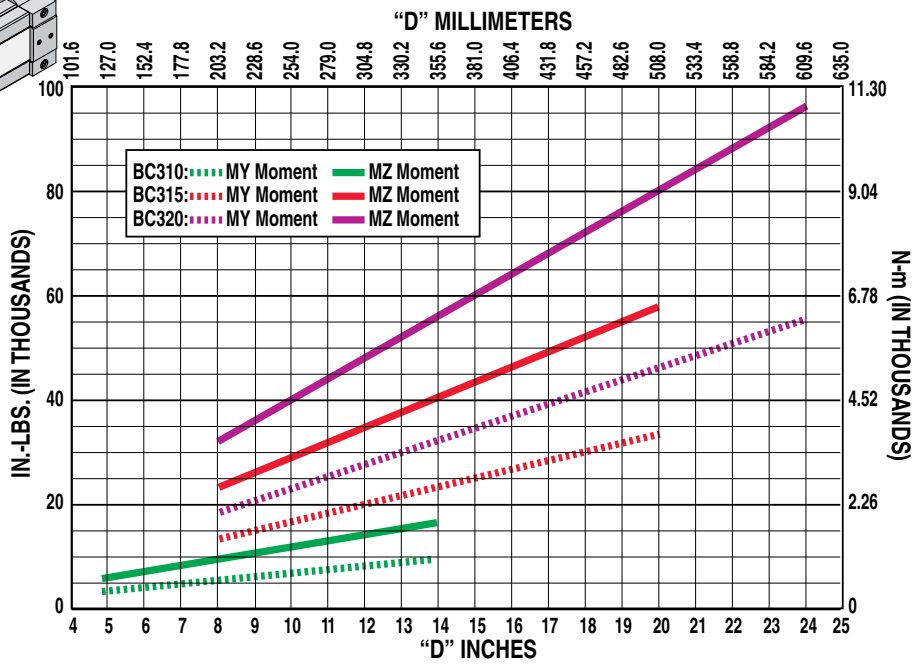


Rates were calculated with the following assumptions:

1.) Coupling between carriers is rigid.

2.) Load is equally distributed between carriers.

3.) Coupling device applies no misalignment loads to carriers.

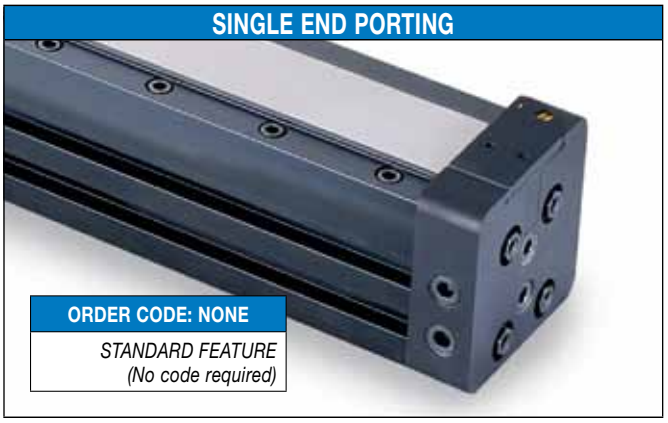


MODEL NO.	"D"* MIN.	MAXIMUM BENDING MOMENT			MAXIMUM LOAD	
		M_Y**	M_X	M_Z**	F_Z	F_Y
BC3D10DW	4.88 in.	3328 in.-lbs.	1314 in.-lbs.	5768 in.-lbs.	1364 lbs.	2364 lbs.
BC3D15DW	8.07 in.	13558 in.-lbs.	4936 in.-lbs.	23468 in.-lbs.	3360 lbs.	5816 lbs.
BC3D20DW	8.10 in.	18776 in.-lbs.	9054 in.-lbs.	32530 in.-lbs.	4636 lbs.	8032 lbs.
BC3M(MM)D10DW	124.0mm	373 N-m	147 N-m	646 N-m	619 kgs.	1072 kgs.
BC3M(MM)D15DW	205.0mm	1518 N-m	553 N-m	2628 N-m	1524 kgs.	2638 kgs.
BC3M(MM)D20DW	205.7mm	2103 N-m	1014 N-m	3643 N-m	2103 kgs.	3643 kgs.

*** D is distance between carriers.**

**** Loads calculated are at minimum "D", for substantially higher My + Mz loads increase "D' and refer to graph at left**

BC3 SINGLE END PORTING - All Sizes



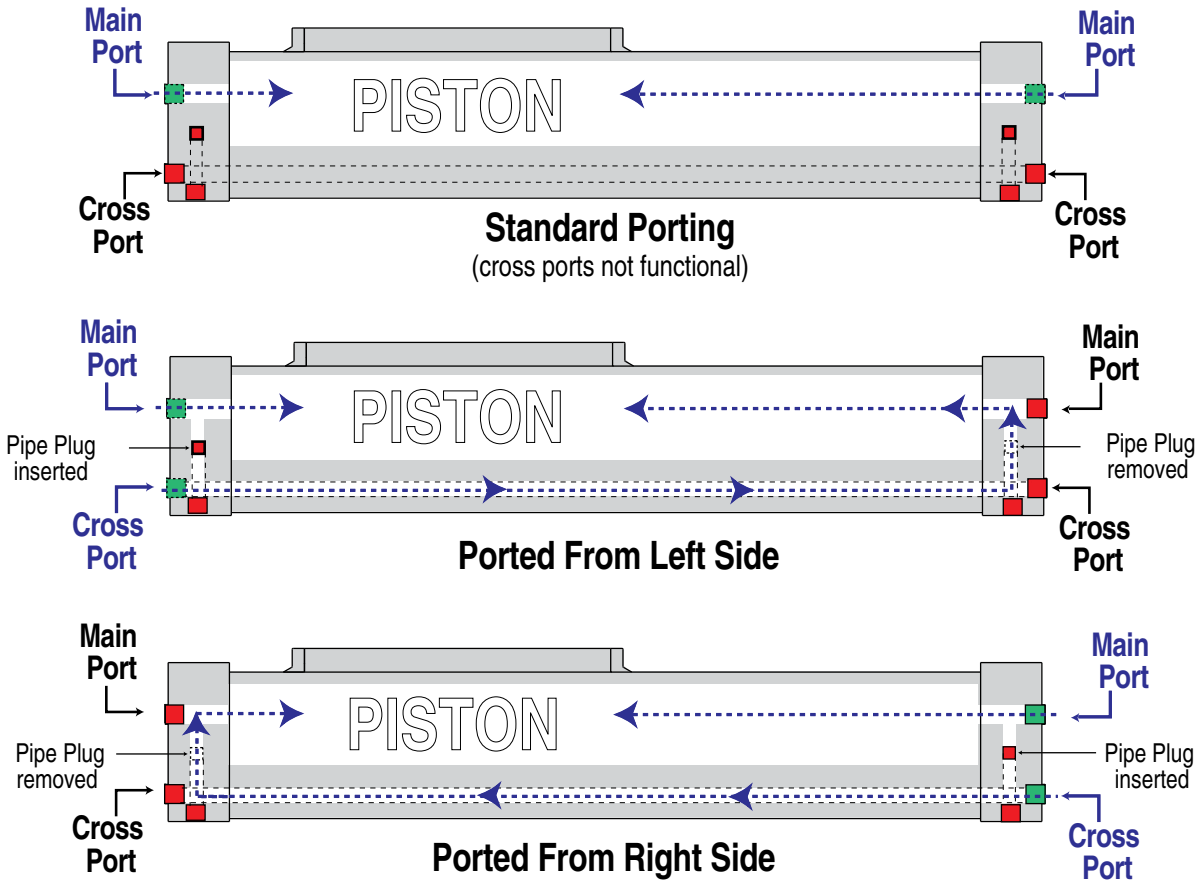
The BC3 is uniquely designed for multiple port locations including single end porting. This is a standard feature on all bore sizes of the BC3. The lower ports on the head assembly only function when used to cross port the cylinder for single end porting.

To convert to single end porting, remove access pipe plug fitting from the opposite head assembly that the air lines will be installed into. Then remove the internal port pipe plug. Reinstall access pipe plug into the bottom of the head. Remove pipe plug from the head that the air lines will be installed.

AIR FLOW DIAGRAMS

SINGLE END PORTING ALLOWS THE GREATEST FLEXIBILITY IN AIR HOOK UP

Converting from Standard porting to Left or Right side porting can be achieved if plugs are placed as in the diagram below.



Diagrams shown for BC315 and BC320

Note: Standard porting may be field converted to ported from left or ported from right. For complete instructions refer to parts sheet.

BC3 SWITCHES - All Sizes

SWITCHES

There are 10 sensing choices: DC reed, form A (open) or form C (open or closed); AC reed (Triac, open); Hall-effect, sourcing, PNP (open); Hall-effect, sinking, NPN (open); each with either flying leads or QD (quick disconnect). Commonly used to send analog signals to PLC (programmable logic controllers), TLL, CMOS circuit or other controller device. These switches are activated by the actuator's magnet.

Switches contain reverse polarity protection. QD cables are shielded; shield should be terminated at flying lead end.

If necessary to remove factory installed switches, be sure to reinstall on the same of side of actuator with scored face of switch toward internal magnet.

SPECIFICATIONS

		REED DC				REED AC		HALL-EFFECT DC			
ORDER CODE		RT	RM	BT	BM	CT	CM	TT	TM	KT	KM
PART NUMBER		3600-9082	3600-9083	3600-9084	3600-9085	3600-9086	3600-9087	3600-9088	3600-9089	3600-9090	3600-9091
LEAD		5m	QD*	5m	QD*	5m	QD*	5m	QD*	5m	QD*
CABLE SHIELDING		Unshielded	Shielded†	Unshielded	Shielded†	Unshielded	Shielded†	Unshielded	Shielded†	Unshielded	Shielded†
SWITCHING LOGIC		"A" Normally Open		"C" Normally Open or Closed		Triac Normally Open		PNP (Sourcing) Normally Open		NPN (Sinking) Normally Open	
MECHANICAL CONTACTS		Single-Pole Single-Throw		Single-Pole Double-Throw		Single-Pole Single-Throw		NO, These Are Solid State Components			
COIL DIRECT		Yes		Yes		Yes		—			
POWER LED		None		None		None		None		None	
SIGNAL LED		Red						Red		Red	
OPERATING VOLTAGE		200 Vdc max.		120 Vdc max.		120 Vac max.		5 - 25 Vdc			
OUTPUT RATING		—				—		25 Vdc, 200mA dc			
OPERATING TIME		0.6 msec max. (including bounce)		0.7 msec max. (including bounce)		—		< 10 micro sec.			
OPERATING TEMPERATURE		-40°F [-40°C] to 158°F [70°C]						0°F [-18°C] to 150°F [66°C]			
RELEASE TIME		1.0 msec. max.				—		—			
ON TRIP POINT		—				—		150 Gauss maximum			
OFF TRIP POINT		—				—		40 Gauss minimum			
****POWER RATING (WATTS)**		10.0 §		3.0 §§		10.0		5.0			
VOLTAGE DROP		2.6 V typical at 100 mA		NA		—		—			
RESISTANCE		0.1 Ω Initial (Max.)				—		—			
CURRENT CONSUMPTION		—				1 Amp at 86°F [30°C]	0.5 Amp at 140°F [60°C]	200 mA at 25 Vdc			
FREQUENCY		—				47 - 63 Hz		—			
CABLE MIN. BEND RADIUS	**STATIC**	0.630" *[16mm]*									
	DYNAMIC	Not Recommended									

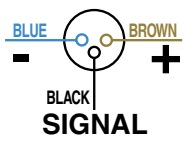
CAUTION: DO NOT OVER TIGHTEN SWITCH HARDWARE WHEN INSTALLING!

** **WARNING**: Do not exceed power rating (Watt = Voltage X Amperage). Permanent damage to sensor will occur.

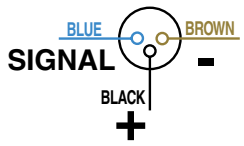
*QD = Quick Disconnect; Male coupler is located 6" [152mm} from sensor, Female coupler to flying lead (part #2503-1025) distance is 197" [5m] also see Cable Shielding specification above

REPLACEMENT OF QD SWITCHES MANUFACTURED BEFORE JULY 1, 1997: It will be necessary to replace or rewire the female end coupler.

CURRENT
Quick disconnect Wiring



OLD
Quick disconnect Wiring



Reed Switch Life Expectancy: Up to 200,000,000 cycles (depending on load current, duty cycle and environmental conditions)

†Shielded from the female quick disconnect coupler to the flying leads. Shield should be terminated at flying lead end.

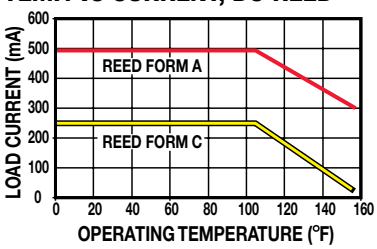
§ Maximum current 500mA (not to exceed 10VA) Refer to Temperature vs. Current graph and Voltage Derating graph

§§ Maximum current 250mA (not to exceed 3VA) Refer to Temperature vs. Current graph and Voltage Derating graph

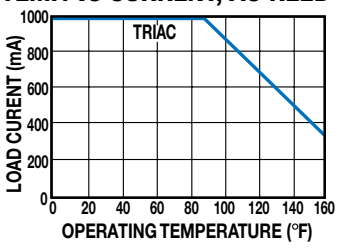
BC3 SWITCHES - All Sizes

PERFORMANCE

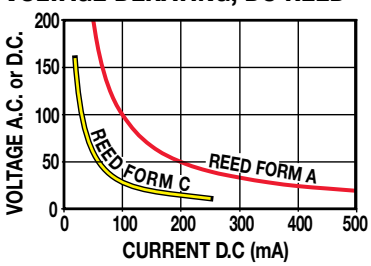
TEMP. vs CURRENT, DC REED



TEMP. vs CURRENT, AC REED

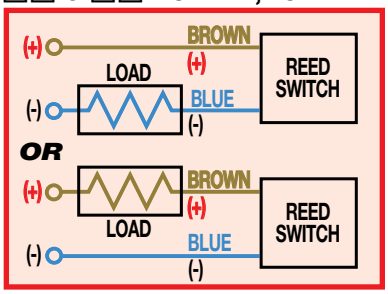


VOLTAGE DERATING, DC REED

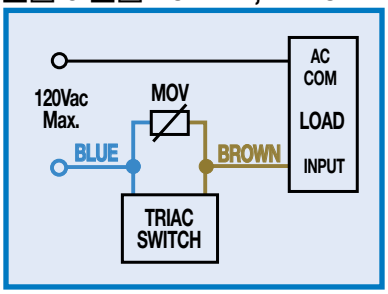


WIRING DIAGRAMS

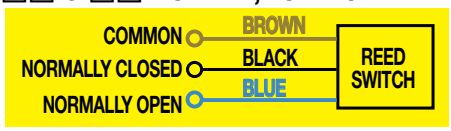
RT & RM DC REED, FORM A



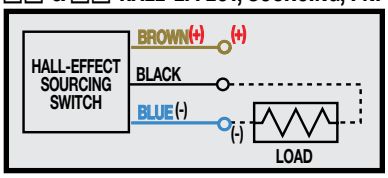
CT & CM AC REED, TRIAC



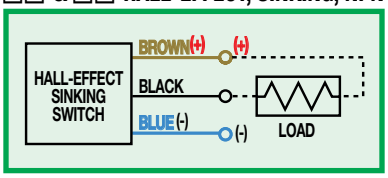
BT & BM DC REED, FORM C



TT & TM HALL-EFFECT, SOURCING, PNP



KT & KM HALL-EFFECT, SINKING, NPN



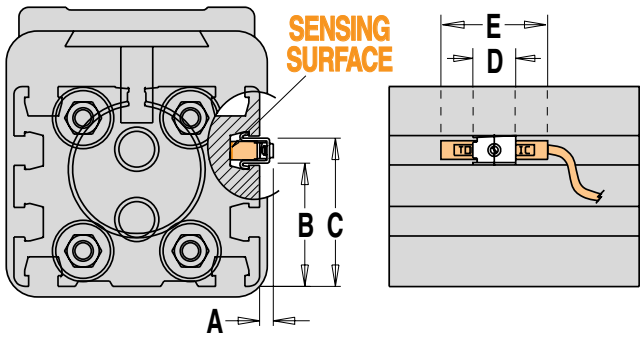
INSTALLATION INFORMATION

THE NOTCHED FACE OF THE SWITCH INDICATES THE SENSING SURFACE AND MUST FACE TOWARD THE MAGNET.

THE NOTCHED GROOVE IN THE ACTUATOR INDICATES THE GROOVE TO INSTALL THE SWITCH. CONTACT TOLOMATIC IF SWITCHES ARE REQUIRED ON ANOTHER SIDE OF ACTUATOR.

Some actuators may require switch mounting on a specific side of the assembly. Call Tolomatic for details.

DIMENSIONS



SIZE	BORE	A	B	C	D	E
10	1.000	0.194	0.822	0.906	0.500	1.250
15	1.500	0.160	1.428	1.721	0.500	1.250
20	2.000	0.036	1.994	2.287	0.500	1.250

Dimensions in inches

SIZE	BORE	A	B	C	D	E
M10	25	4.93	20.88	23.01	12.70	31.75
M15	40	4.06	36.27	43.71	12.70	31.75
M20	50	0.91	50.65	58.09	12.70	31.75

Dimensions in millimeters

BC3 SHOCK ABSORBERS - All Sizes

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

SHOCK ABSORBERS

ORDER CODE

AD_ or AH_ or AL_
(_ = Number ordered)

Rodless cylinders with standard internal cushion offer an effective method of decelerating loads. However, all Tolomatic rodless cylinders are capable of carrying heavier loads at higher velocities than the cylinder cushion can absorb. Optional shock absorbers can be used to increase the cylinder's life and broaden the application range for the cylinder model you have chosen.

Tolomatic offers adjustable shock absorbers for the BC3. They allow the shock to be positioned at any point along the cylinder.

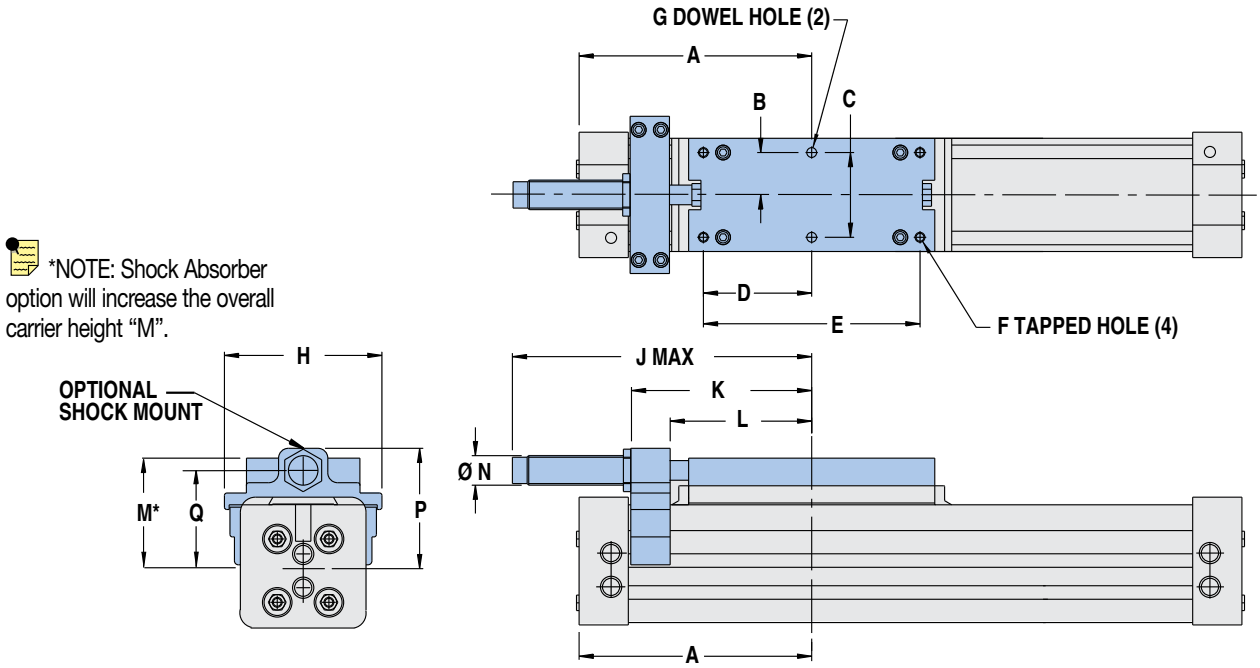
A shock stop plate must be used in conjunction with the BC3 shock to provide a stopping surface on the carrier.

Typical shock absorber life varies between 1-2 million cycles (depending on environment) appropriate preventative maintenance should be considered in high cyclic applications.

NOTE: When 2 shock absorbers are ordered, the unit will be assembled with NO internal cushions.

CAUTION: In applications which result in a load bending moment at deceleration, care should be taken to decelerate the load rather than the carrier of the band cylinder.

DIMENSIONS



SIZE	BORE	A	B	C	D	E	F	G**	H	J	K	L	M	N	P	Q
10	1.00	3.93	0.890	1.781	1.562	3.125	1/4-20 x .50DP	.252-.251 x .25	3.09	5.47	2.91	2.22	2.223	0.50	2.46	1.964
15	1.50	5.93	1.078	2.156	2.750	5.500	1/4-20 x .50DP	.252-.251 x .25	4.00	7.65	4.59	3.59	2.812	0.75	3.06	2.495
20	2.00	6.27	1.563	3.125	2.938	5.875	5/16-18 x .75DP	.252-.251 x .69	5.06	8.14	4.88	3.88	3.594	1.00	3.88	3.230

**DOWEL PINS ⌖ .003 Ⓜ

Dimensions in inches

SIZE	BORE	A	B	C	D	E	F	G**	H	J	K	L	M	N	P	Q
M10	25	99.8	22.62	45.24	39.69	79.38	M6-1.0 x 12.7DP	6.05-6.02 x 6.4	78.5	138.9	73.9	56.4	56.46	14.0	62.5	49.89
M15	40	150.7	27.38	54.76	69.85	139.70	M6-1.0 x 12.7DP	6.05-6.02 x 6.4	101.6	194.2	116.6	91.2	71.42	20.0	77.7	63.37
M20	50	159.3	39.69	79.38	76.62	149.23	M8-1.25 x 19.1DP	6.05-6.02 x 17.5	128.5	206.8	124.0	98.6	91.29	25.4	98.6	82.04

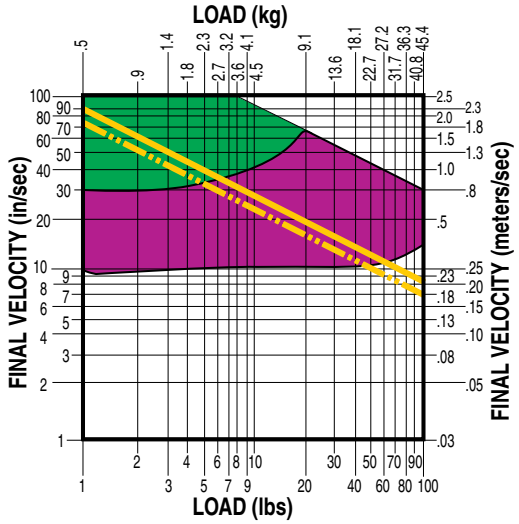
**DOWEL PINS ⌖ .076 Ⓜ

Dimensions in millimeters

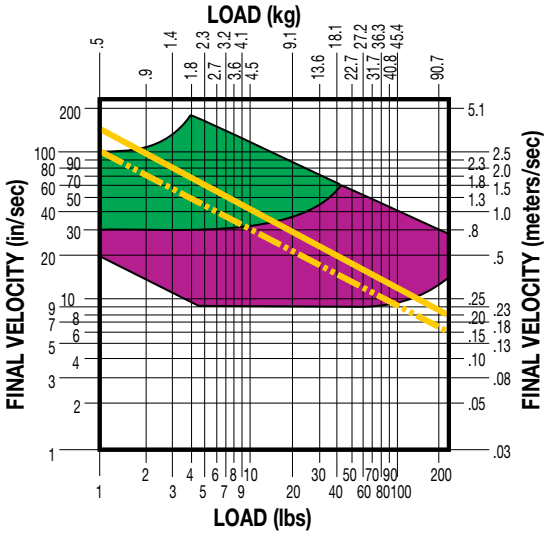
BC3 Shock Absorbers - All Sizes - PERFORMANCE

VELOCITY vs LOAD

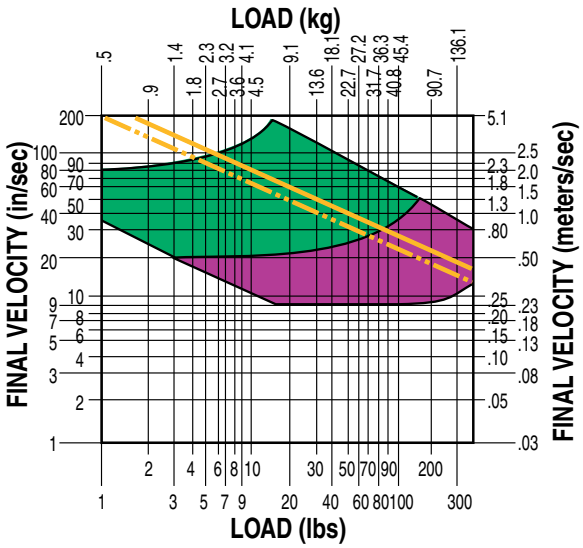
BC310



BC315



BC320



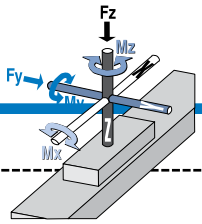
LIGHT DUTY (Light load/High velocity)

HEAVY DUTY (Heavy load/Low velocity)

AIR CUSHION DATA

NOTE: If final (or impact) velocity cannot be calculated directly, a reasonable guideline to use is 2 x average velocity.

Application Data Worksheet



STROKE LENGTH _____
☐ inch (SK) (U.S. Standard) ☐ millimeters (Metric)

AVAILABLE AIR PRESSURE _____
☐ PSI (U.S. Standard) ☐ bar (Metric)

REQUIRED THRUST FORCE _____
☐ lbf (U.S. Standard) ☐ N (Metric)

LOAD _____
☐ lb (U.S. Standard) ☐ kg (Metric)

LOAD CENTER OF GRAVITY DISTANCE TO CARRIER CENTER
d_x _____
d_y _____
d_z _____
☐ inch (U.S. Standard) ☐ millimeters (Metric)

FORCES APPLIED TO CARRIER
F_z _____
F_y _____
☐ lbf (U.S. Standard) ☐ N (Metric)

BENDING MOMENTS APPLIED TO CARRIER
M_x _____
M_y _____
M_z _____
☐ in-lbs (U.S. Standard) ☐ N-m (Metric)

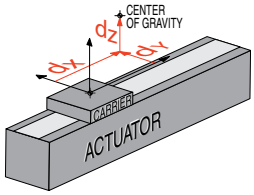
FINAL VELOCITY _____
☐ in/sec (U.S. Standard) ☐ mm/sec (Metric)

MOVE TIME sec. _____

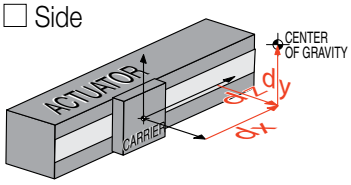
NO. OF CYCLES _____
☐ per minute ☐ per hour

ORIENTATION

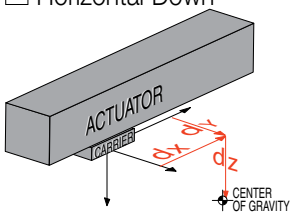
☐ Horizontal



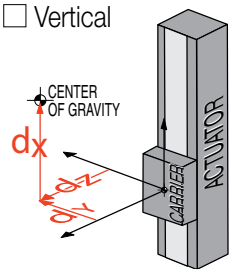
☐ Side



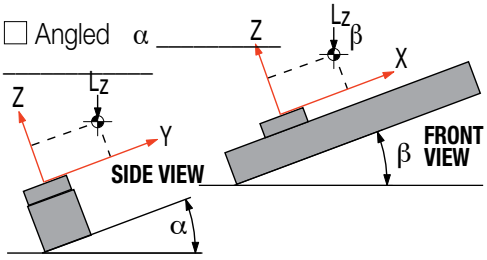
☐ Horizontal Down



☐ Vertical



☐ Angled α _____



OTHER ISSUES:
(i.e. Environment, Temperature, Contamination, etc.)

_____
_____
_____
_____

Contact information: _____
_____
_____
_____

STOP Fax (1-763-478-8080) or call Tolomatic (1-800-328-2174) with the above information. We will provide any assistance needed to determine the proper actuator.

Rodless Cylinder Selection Guidelines - BC2, BC3, BC4, LS - All Sizes

PROVIDING LOAD GUIDANCE AND SUPPORT

The process of selecting a load bearing actuator for a given application can be complex. It is highly recommended that you contact Tolomatic or a Tolomatic Distributor for assistance in selecting the best actuator for your application. The following overview of the selection guidelines are for educational purposes only.

1 COMPILE APPLICATION REQUIREMENTS

To determine the appropriate Band Cylinder or Linear Slide model for an application, compile the following information:

- Available pressure (PSI)
- Weight of load (lbs or kg)
- Orientation of load (lbs or kgs)
- Velocity of load (in/sec or mm/sec)
- Stroke length (in or mm)

HINT: Use Tolomatic sizing and selection software, download at: tolomatic.com

2 SELECT CYLINDER SIZE

- Consult the Theoretical Force vs. Pressure charts.
- Cross-reference the load force (or load weight if force is not known) and the available operating pressure. If the intersection falls below the diagonal line, and if moments do not exceed maximum values listed for that model (see Step 3), the actuator will accommodate the application.

  If the intersection is above the diagonal line, a larger cylinder bore size should be considered.

NOTE: Additional force may be required to obtain the necessary acceleration for vertical or horizontal loads.

3 DETERMINE NATURE OF LOAD AND THE EFFECT OF BENDING MOMENTS

If the cylinder will guide and support a load located directly over the center of carrier, bending moments will not be a factor in the cylinder selection.

NOTE: The maximum load "L" must not exceed the capacity limits of the cylinder selected.

- Bending Moments

  For off center or side loads, determine the distance from the center of mass of the load to the center of the carrier bracket. This measurement is needed to calculate the torque for bending moments. (Refer to Bending Moment chart for each model.)

  Should the resulting maximum bending moment exceed figures indicated on the chart, external guides, auxiliary carrier/s or a larger cylinder should be considered.

- Auxiliary Carrier Bending Moments

  The auxiliary carrier option (available on most models) increases load carrying capacity and bending moments. Auxiliary carriers can be ordered with or without an internal piston. (Auxiliary carriers without a piston have no internal cushion on the cylinder end closest to the auxiliary carrier.)

  IMPORTANT: When ordering, determine the working stroke, then the minimum distance required between carriers (dimension "D" in Auxiliary Carrier Bending Moments chart). When ordered, Tolomatic's configurator will calculate the overall length of the actuator.

NOTE: breakaway pressure will increase when using auxiliary carriers.

4 DETERMINE INTERNAL CUSHION CAPACITY

- Consult the Cushion Data chart for the model selected. The velocities listed on the cushion charts are final or cushion impact velocities. On applications where the internal cushions or bumpers are to be used, be sure the actual, final or impact velocity is known. If the velocity is not known, use of limit switches with valve deceleration circuits or shock absorbers should be considered. NOTE: The BC205 uses external bumpers in place of internal cushions, LS05 & LS10 do not have cushions or bumpers.
- Cross-reference the final velocity and weight of the load. If the intersection is below the diagonal lines, the internal cushions on the actuator may be used. If the point falls above the dashed diagonal line or if the velocity is not known, use deceleration circuits, external shock absorbers or select a larger cylinder with greater cushion capacity. On high-cyclic applications, use of external stops is strongly recommended.

5 DETERMINE TUBE SUPPORT REQUIREMENTS

- Consult the Tube Support chart for the model selected.
- Cross reference the load weight and maximum distance between supports.

6 CONSIDER OPTIONS

- Switches– dc Reed, Hall-effect or ac Triac

Band Cylinders and Linear Slides each have different standard features and options. Check the options section for the actuator you have selected.

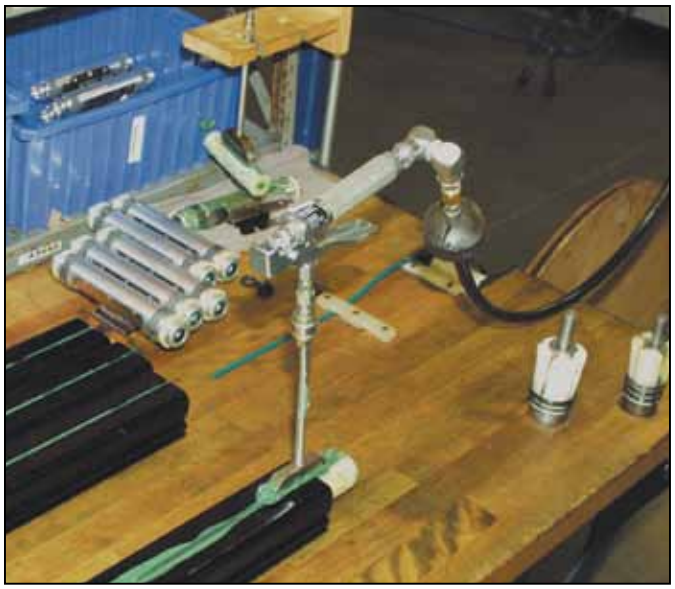
- Shock Absorbers– if needed.
- Foot Mounting Kits
- Floating Mount Bracket – use when lack of parallelism occurs between the cylinder and an external guided and supported load.
- Single End Porting (BC3, BC4)
- Long Carrier (BC4)
- Proximity Sensors (LS)
- Dual 180° Carrier (BC3)

Application Guidelines

The following conditional statements are intended as general guidelines for use of Tolomatic actuators. Since all applications have their own specific operating requirements, consult Tolomatic, Inc. or your local Tolomatic distributor if an application is unconventional or if questions arise regarding the selection process.

CUSHION NEEDLE ADJUSTMENT (BC2, BC3, BC4, CC, SA, DP, TC ONLY)

Adjust the cushion needles in the cylinder heads carefully to obtain a smooth, hesitation free deceleration for your particular application. If there are questions on proper adjustment, please consult Tolomatic, Inc.



LUBRICATION GUIDELINES

All Tolomatic actuators (except Cable Cylinders) are prelubricated at the factory. To ensure maximum actuator life, the following guidelines should be followed.

- **Filtration**

  We recommend the use of dry, filtered air in our products. "Filtered air" means a level of 10 Micron or less. "Dry" means air should be free of appreciable amounts of moisture. Regular maintenance of installed filters will generally keep excess moisture in check.

- **External Lubricators (optional)**

  The factory prelubrication of Tolomatic actuators will provide optimal performance without the use of external lubrication. However, external lubricators can further extend service life of pneumatic actuators if the supply is kept constant.

  Oil lubricators, (mist or drop) should supply a minimum of 1 drop per 20 standard cubic feet per minute to the cylinder. As a rule of thumb, double that rate if water in the system is suspected. Demanding conditions may require more lubricant.

  If lubricators are used, we recommend a non-detergent, 20cP @ 140˚F 10-weight lubricant. Optimum conditions for standard cylinder operation are +32˚ to +150˚F (+0˚ to 65.5˚C).

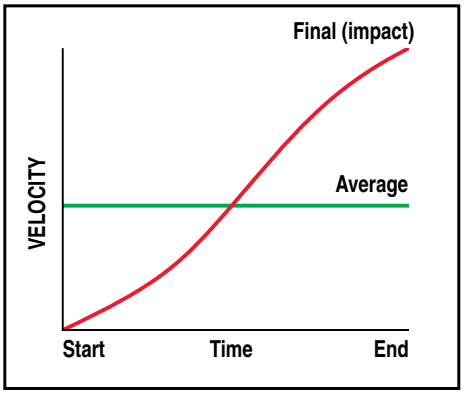
  NOTE: Use of external lubricators may wash away the factory installed lubrication. External lubricants must be maintained in a constant supply or the results will be a dry actuator prone to premature wear.

- **Sanitary Environments**

  Oil mist lubricators must dispense "Food Grade" lubricants to the air supply. Use fluids with ORAL LD50 toxicity ratings of 35 or higher such as Multitherm® PG-1 or equivalent. Demanding conditions can require a review of the application.

FINAL VELOCITY CALCULATION

Velocity calculations for all rodless cylinders need to differentiate between final velocity and average velocity. For example: Stroking a 100-inch BC3 model in one second yields an average velocity of 100 inches per second. To properly determine the inertial forces for cushioning, it is important to know the final (or impact) velocity. Rodless cylinders accelerate and decelerate at each end of the stroke. Therefore this acceleration must be considered (see diagram).



If final (or impact) velocity cannot be calculated directly, a reasonable guideline is to use 2 x average velocity.

BC3 APPLICATION GUIDELINES

BC3 DECELERATION CONSIDERATIONS

While the BC3 is capable of carrying very large loads, consideration must be given to how to stop the load at the end of stroke. If Tolomatic cushions or shocks are to be used, please stay within the specifications on page BC3_22. If you should decide to utilize another type of shock absorber, be sure that the deceleration of the load is smooth and over adequate distance.

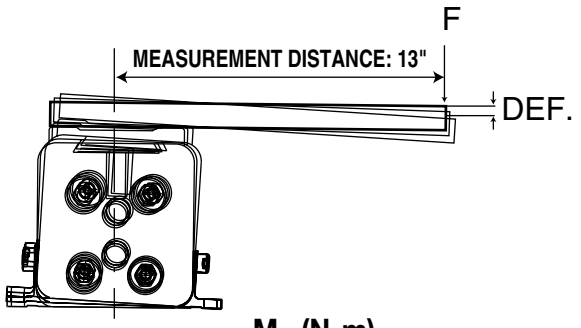
⚠ CAUTION: In applications which result in a load bending moment at deceleration, care should be taken to decelerate the load rather than the carrier of the band cylinder.

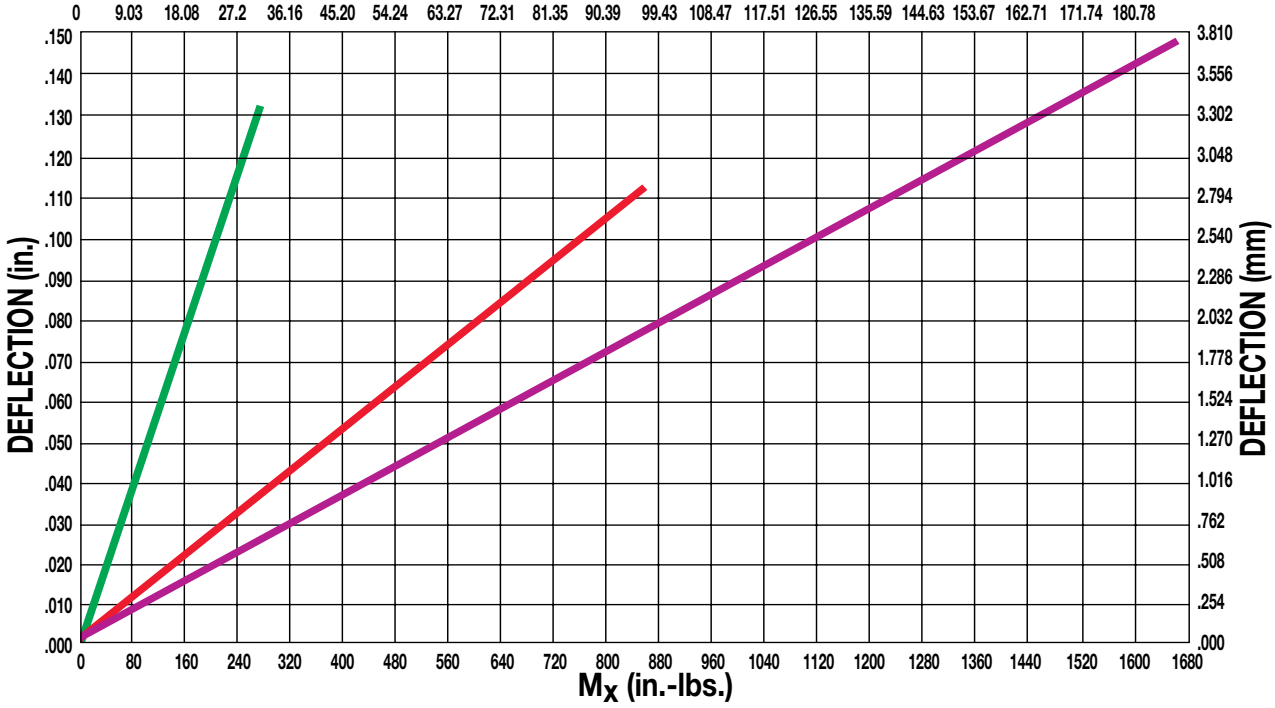
BC3 BEARING LUBRICATION

The bearing system for the BC3 is prelubricated at the factory with a high quality No. 2 lithium-soap base grease. Relubrication is recommended every 10 million linear feet using a lithium-soap base grease for optimal bearing performance. To relubricate, lift back upper sealing band and apply grease directly to the stationary ball ways. Applications that are exposed to moisture or dirt, may require more frequent relubrication.

PERFORMANCE

BC3 CYLINDER/LOAD DEFLECTION





BC310:
BC315:
BC320:

Deflection figures were calculated with the following considerations:
1.) Tube supports spaced at mimimum distances for each bore size.
2.) Measurement distance from center of carrier is 13 inches.

BC3 Service Parts Ordering - ALL Sizes

Inch (U.S. Standard) SIZE	10	D10	15	D15	20	D20
Foot Mount Kits[1]	3410-9005	3410-9025	3415-9005	3415-9025	3420-9005	3420-9025
Shock Mount Kit w/ Shock[2] – Heavy Duty	3410-9013	3410-9013	3415-9013	3415-9013	3420-9013	3420-9013
Shock Mount Kit w/ Shock[2] – Lite Duty	3410-9010	3410-9010	3415-9010	3415-9010	3420-9010	3420-9010
Shock Mount Kit w/o Shock[3] (Hardware Only)	3410-9003	3410-9003	3415-9003	3415-9003	3420-9003	3420-9003
Shock Stop Plate Kit[4]	3410-9004	3410-9004	3415-9004	3415-9004	3420-9004	3420-9004
Tube Supports[5]	3410-9006	3410-9026	3415-9006	3415-9026	3420-9006	3420-9026
Switch Hardware Only	3410-9999	3410-9999	3415-9999	3415-9999	3420-9999	3420-9999
Repair Kit[6]	RKBC310	RKBC3D10	RKBC315	RKBC3D15	RKBC320	RKBC3D20

Metric SIZE	M10	MD10	M15	MD15	M20	MD20
Foot Mount Kits[1]	4410-9005	4410-9025	4415-9005	4415-9025	4420-9005	4420-9025
Shock Mount Kit w/ Shock[2] – Heavy Duty	4410-9013	4410-9013	4415-9013	4415-9013	4420-9013	4420-9013
Shock Mount Kit w/ Shock[2] – Lite Duty	4410-9010	4410-9010	4415-9010	4415-9010	4420-9010	4420-9010
Shock Mount Kit w/o Shock[3] (Hardware Only)	4410-9003	4410-9003	4415-9003	4415-9003	4420-9003	4420-9003
Shock Stop Plate Kit[4]	4410-9004	4410-9004	4415-9004	4415-9004	4420-9004	4420-9004
Tube Supports[5]	4410-9006	4410-9026	4415-9006	4415-9026	4420-9006	4420-9026
Switch Hardware Only	3410-9999	3410-9999	3415-9999	3415-9999	3420-9999	3420-9999
Repair Kit[6]	RKBC3M10	RKBC3DM10	RKBC3M15	RKBC3DM15	RKBC3M20	RKBC3DM20

PART NUMBER ORDERING No Mounting Hardware or FE conn. included		CONFIG. CODE ORDERING Mounting Hardware & FE conn. included
PART NO.	DESCRIPTION	CODE
3600-9084	Switch Only, Reed, Form C, 5m	BT
3600-9085	Switch Only, Reed, Form C, Male Conn.	BM
3600-9082	Switch Only, Reed, Form A, 5m	RT
3600-9083	Switch Only, Reed, Form A, Male Conn.	RM
3600-9086	Switch Only, Triac, 5m	CT
3600-9087	Switch Only, Triac, Male Conn.	CM
3600-9090	Switch Only, Hall-effect, Sinking, 5m	KT
3600-9091	Switch Only, Hall-effect, Sinking, Male Conn.	KM
3600-9088	Switch Only, Hall-effect, Sourcing, 5m	TT
3600-9089	Switch Only, Hall-effect, Sourcing, Male Conn.	TM
2503-1025	Connector (Female) 5 meter lead	

NOTE: When ordered by Config. Code Female connector & all mounting hardware is included

Switch Ordering NOTES:

To order field retrofit switch and hardware kits for all Tolomatic actuators: SW (Then the model and bore size, and type of switch required)
Example: SWBC315RT
(Hardware and Form A Reed switch with 5 meter lead for 1.5" bore BC3 band cylinder)

Mounting hardware is required if replacing switch for any actuator manufactured before 7/1/97

Service Parts Ordering NOTES:

1. Foot Mount Kit contains one bracket and mounting hardware.
2. Shock Field Retrofit Kit contains one shock absorber and mounting hardware.
3. Shock Field Mount Kit contains one set of mounting hardware.
4. Shock Stop Plate Kit contains shock plate, impact bolts, screws and dowel pins.
5. Contains one tube support and mounting hardware.
6. Repair Kit contains external dust band, internal seal band, wipers, end caps and internal soft seals. Stroke length must be indicated after repair kit code.

BC3 Ordering - ALL Sizes

MODEL, BORE, STROKE

BC3_ _ D 10 SK100.250

OPTIONS

DW6.0 TS3 FM2 AH2 BM2

MODEL & MOUNTING

BC3	BC3 Band Cylinder - inch (U.S. Standard)
BC3M	metric mounting with taper port
BC3MM	metric mounting with parallel port

DUAL 180° CARRIER *(BC3_14)*

D	Dual 180° Carrier Option

BORE SIZE

10	1.00"	*(25mm)*
15	1.50"	*(40mm)*
20	2.00"	*(50mm)*

STROKE LENGTH

SK_._ _ Enter desired stroke length in decimal inches

MAXIMUM STROKE

SIZE	BC3 in	BC3M(MM) *mm*
10	205	*5,207*
15	202	*5,130*
20	142	*3,606*

NOTE: Prelubrication is standard on all BC3 Band Cylinders (see Application Guidelines on page BC3_25)

Not all codes listed are compatible with all options. Contact Tolomatic with any questions.

AUXILIARY CARRIER *(BC3_16)*

DW	Auxiliary carrier With piston & "D" distance
_ _._ _	"D" Distance between carriers

MINIMUM "D" DISTANCE BETWEEN CARRIERS

	with Piston	
	in	*mm*
10	4.88	*124.0*
15	8.07	*205.0*
20	8.10	*205.7*

When ordering auxiliary carrier option, enter the distance required between carriers. The configurator will calculate the overall length of the actuator.

TUBE SUPPORTS *(BC3_12)*

TS_	Tube Support & number required

Each TS includes two (2) tube support halves

T-NUTS

TN_	additional T-Nuts (see individual dimensional drawings for sizes)

FOOT MOUNT *(BC3_13)*

FM_	Foot Mount & number required (1 or 2)

SHOCK ABSORBERS *(BC3_21)*

***AD**_	Shock hardware Only and number required
***AH**_	Shock, Heavy duty and number required
***AL**_	Shock, Light duty and number required

**NOTE: When shock absorbers are ordered cushion seals are removed.*

SWITCHES *(BC3_19)*

TYPE		QUICK-DISCONNECT	CODE	QUANTITY	LEAD LENGTH
REED	Form A	QD	**RM**	After code enter quantity desired	5 meters
		no	**RT**		
	Form C	QD	**BM**		
		no	**BT**		
HALL-EFFECT	Sinking	QD	**KM**		
		no	**KT**		
	Sourcing	QD	**TM**		
		no	**TT**		
TRIAC		QD	**CM**		
		no	**CT**		

Tolomatic
EXCELLENCE IN MOTION®

MXE SCREW DRIVE ACTUATORS

ENDURANCE TECHNOLOGY℠

S SOLID BEARING
P PROFILED RAIL

MAXIMUM DURABILITY

THE MXE ELECTRIC ACTUATOR – DESIGNED TO OUTLAST EVERY RODLESS ACTUATOR ON THE MARKET

The MXE electric actuator is exactly what you expect from the industry's number one rodless supplier. Designed with our exclusive ENDURANCE TECHNOLOGY℠ features, the MX delivers superior performance to meet the most demanding applications. Nobody knows rodless like Tolomatic, and the MX proves it.

- **DURABLE BEARINGS.** Two bearing choices to match your application needs. Solid bearing design optimizes stress distribution for optimal performance. Profiled rail design uses THK® Caged Ball® technology to reduce friction and extend actuator life.
- **DURABLE BANDS.** Stainless steel bands are stronger and will not elongate like elastomer (non-metallic) bands, providing a reliable seal over the life of the actuator.

S-SOLID BEARING

- Large bearing surface contact area optimizes stress distribution on bearing for long service life
- Large carrier mounting pattern for more load stability and compatibility with existing BCS applications
- Engineered bearing material does not require additional lubrication
- Solid bearings are field replaceable

P-PROFILED RAIL

- THK® Caged Ball® bearings with reduced friction for reliable service life
- High load and bending moment capacities
- Low profile to fit your application
- High precision bearings feature smooth, low breakaway motion

5 DAYS BUILT-TO-ORDER

Our broad line of MX products includes electric actuators (belt-drive & screw-drive) and pneumatic rodless cylinders. See page 55 for more information.

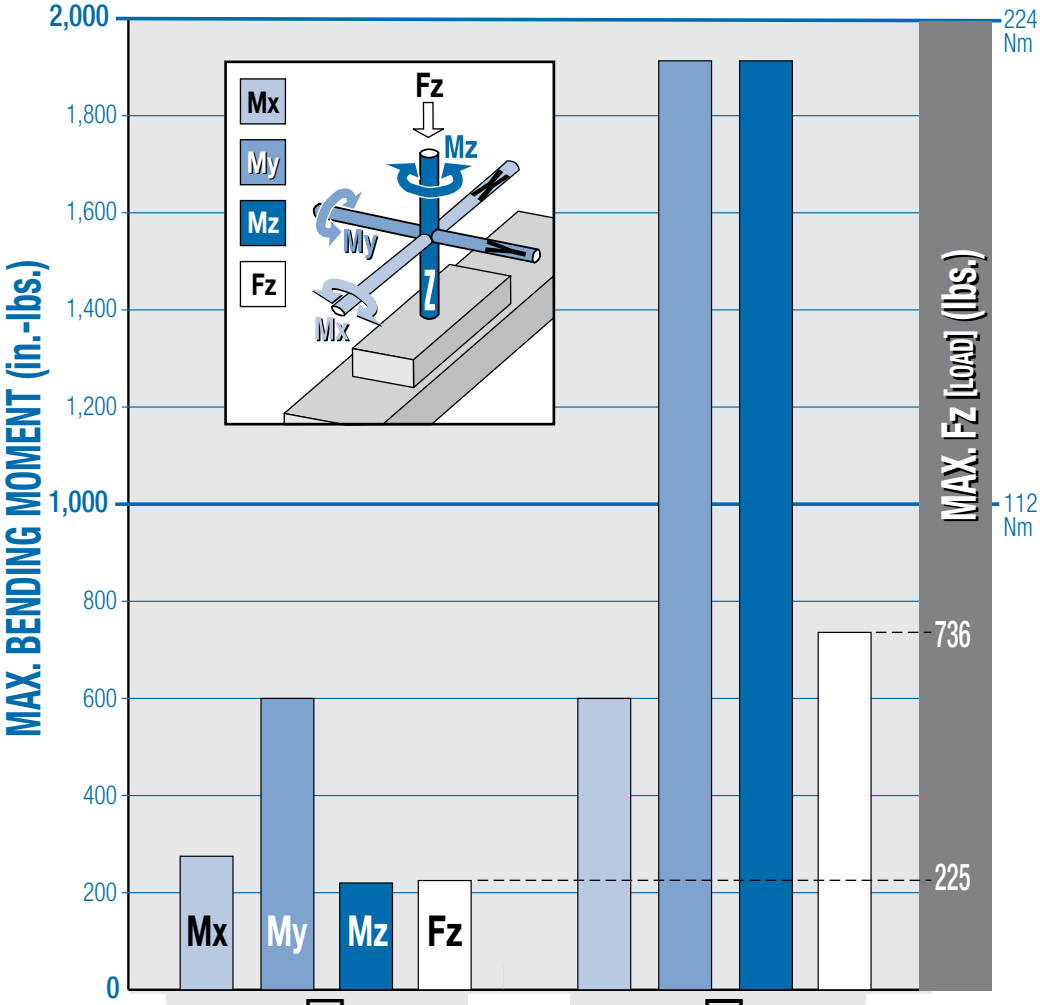
World class product performance, five days built-to-order and legendary customer service . . . *what you expect from the leader* . . . Tolomatic!

SELECT THE PERFORMANCE YOU NEED

Choose from: • Two Bearing Models • Six Actuator Sizes • Built to Your Specified Stroke Length

MOMENT & LOAD CAPACITY COMPARISON

Graph for model comparison, data from MXE40 actuator



Tolomatic MX Electric Actuator Model	S 	P 
Bearing Type	Solid Bearing	Profiled Rail
Moment Capacity	Moderate + Mx Capacity	High
Ideal Applications	• Side Loads • Moderate or Light Loads • Guided Loads	• High Moment Loads • High Speeds with Heavy Loads • High Precision
Product Features	**Page 4**	**Page 6**

TABLE OF CONTENTS

S SOLID BEARING

ENDURANCE TECHNOLOGY℠

Endurance Technology features are designed for maximum durability to provide extended service life.

STAINLESS STEEL BAND

- Exterior dust band made of fatigue resistant stainless steel

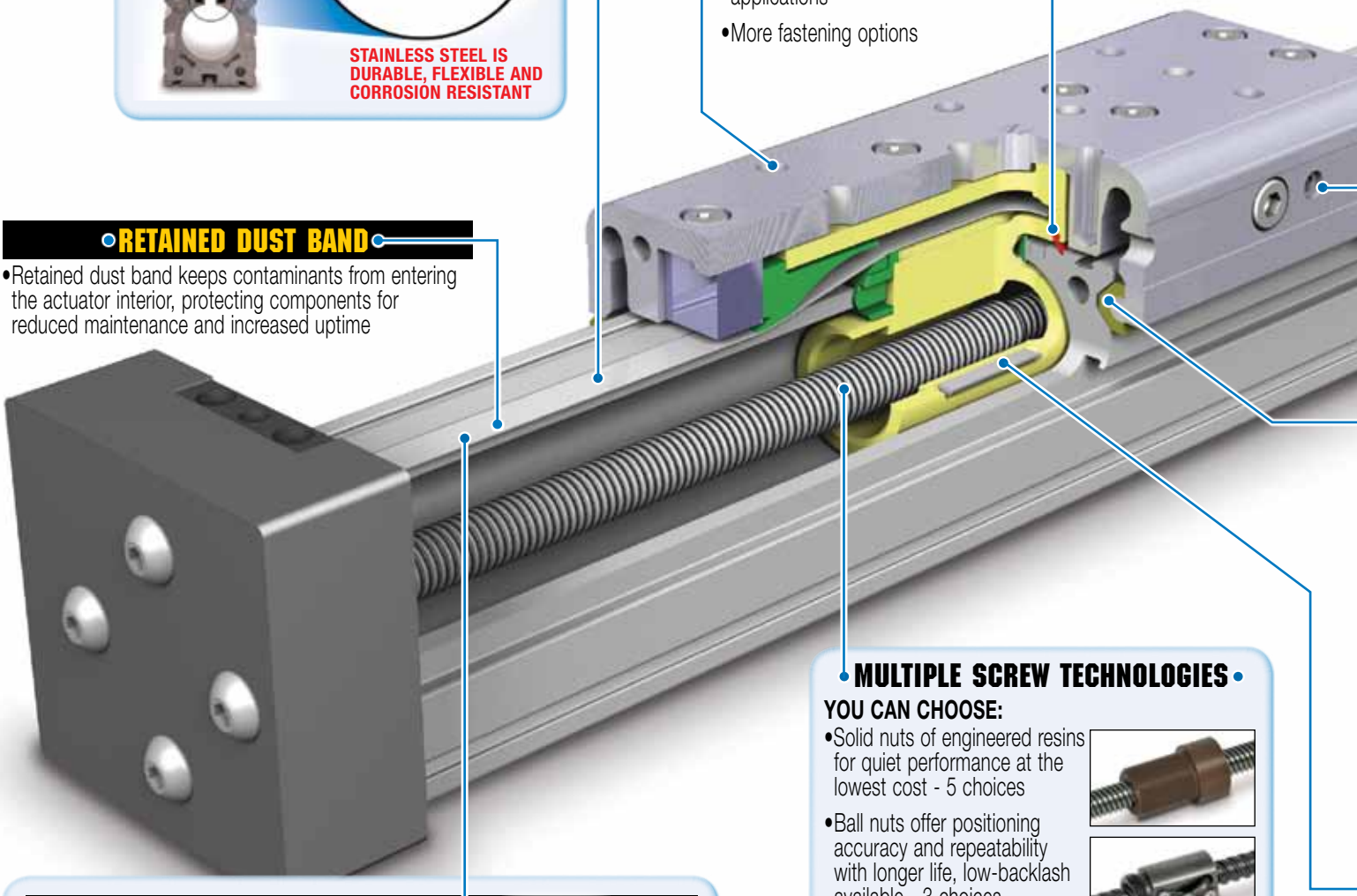
STAINLESS STEEL IS DURABLE, FLEXIBLE AND CORROSION RESISTANT

LARGE FLEXIBLE MOUNTING PATTERN

- Carrier gives more load stability
- Compatibility with existing BCS applications
- More fastening options

DUST WIPER

- Formed end cap and side dust wipers keep contaminants from entering the actuator's internal area



RETAINED DUST BAND

- Retained dust band keeps contaminants from entering the actuator interior, protecting components for reduced maintenance and increased uptime

MULTIPLE SCREW TECHNOLOGIES

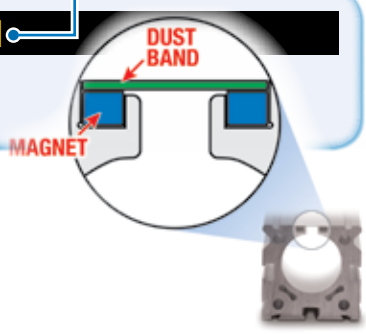
YOU CAN CHOOSE:

- Solid nuts of engineered resins for quiet performance at the lowest cost - 5 choices

- Ball nuts offer positioning accuracy and repeatability with longer life, low-backlash available - 3 choices

NON-WEAR BAND RETENTION

- Magnetically retained band is not subject to wear as are mechanically retained systems



INCH OR METRIC MOUNTING

- Your choice of inch *(US standard)* or metric mounting to the carrier

YOUR MOTOR HERE

YOU CAN CHOOSE:

- Motor or gearbox supplied and installed by Tolomatic
- Specify the device to be installed and actuator ships with proper mounting hardware - MXE is a "Your Motor Here" actuator for easy in-line motor installation. Check our website (www.tolomatic.com/ymh) for complete YMH information
- Specify and ship your device to Tolomatic for factory installation

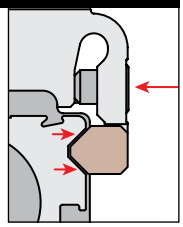
MOTOR ORIENTATION

YOU CAN CHOOSE:

- In-line option directly couples the driving shaft and is a one-piece housing construction for optimum alignment and support of the motor
- Reverse-parallel option minimizes the overall length and offers a 1:1 or 2:1 belt ratio

NON-BINDING BEARING ARMS

- Bearings are tensioned indirectly, providing bind free adjustment



TRAPEZOIDAL BEARINGS

- Trapezoidal design maximizes bearing surface area for less pressure on bearing surfaces; less pressure results in less wear
- Engineered bearing material has low static and dynamic friction with low wear properties for long lasting, smooth operation
- Bearings are field replaceable for extended service life

INTERNAL MAGNETS

- Standard feature that allows sensor installation on the open side or bottom of the extrusion

NOTE: Boxed letters indicate ordering codes

OPTIONS

AUXILIARY CARRIER D C

- 2X higher Fz (load) capacity
- High bending moment capacity

FLOATING MOUNT F L

- Compensates for non-parallelism between MX actuator and externally guided load

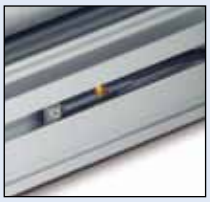
TUBE CLAMPS T C

- Used for intermediate support
- Flush with bottom of actuator to retain low profile
- Drop-in, adjustable mounting locations

(MXE16 uses T-nuts with mounting plates)

MOUNTING PLATES M P

- To provide clearance for motor and mount
- Use in conjunction with tube clamps



SWITCHES

- Wide variety of sensing choices: Reed, Solid State PNP or NPN, all available normally open or normally closed
- Flush mount, drop-in installation
- Bright LEDs, power & signal indication
- CE rated, RoHS compliant

P PROFILED RAIL

ENDURANCE TECHNOLOGY℠

Endurance Technology features are designed for maximum durability to provide extended service life.

CAGED BALL® BEARINGS

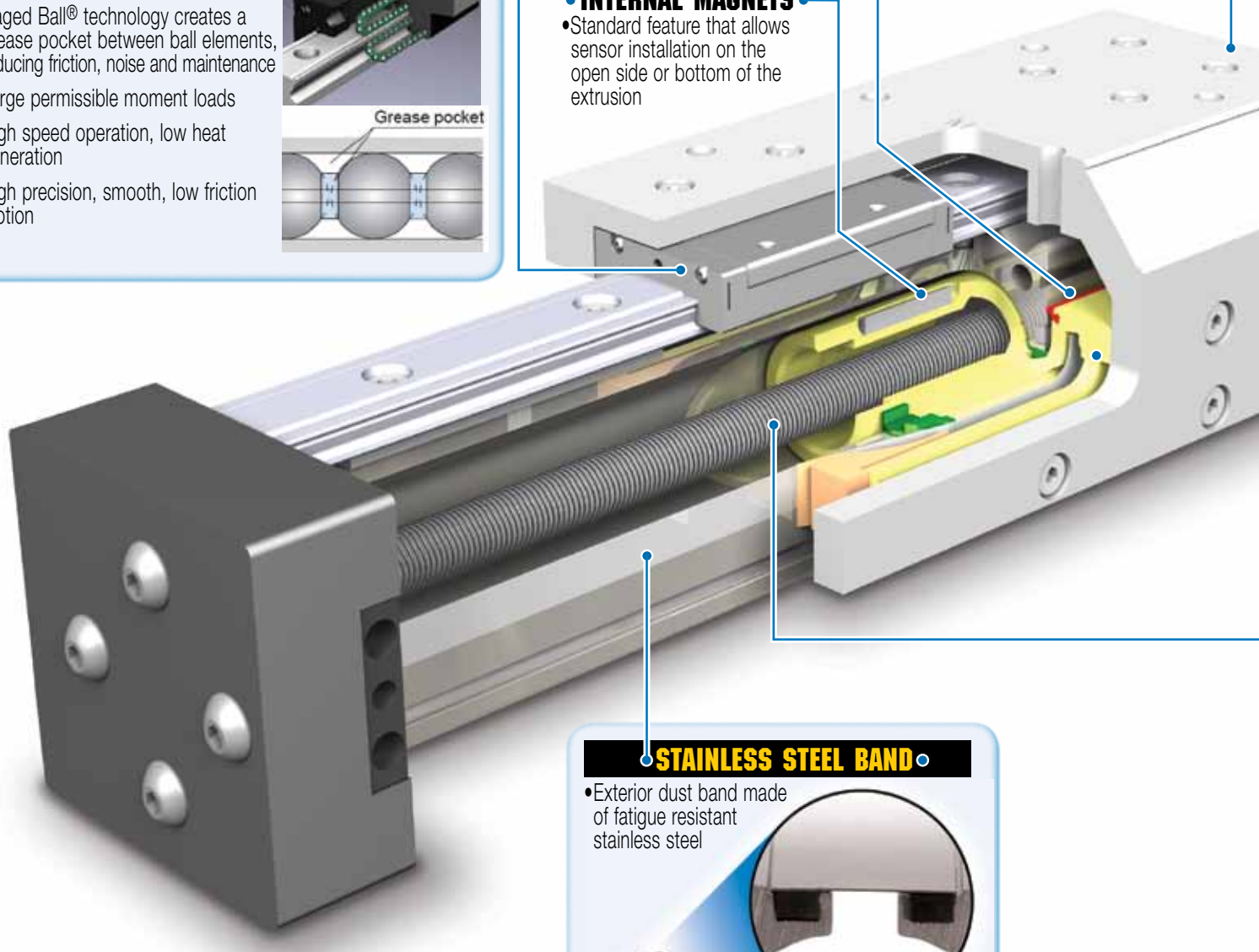
- THK® Caged Ball® bearings are used to reduce friction and extend actuator life
- Caged Ball® technology creates a grease pocket between ball elements, reducing friction, noise and maintenance
- Large permissible moment loads
- High speed operation, low heat generation
- High precision, smooth, low friction motion

DUST WIPER

- Formed end cap and side dust wipers keep contaminants from entering the actuator's internal area

INTERNAL MAGNETS

- Standard feature that allows sensor installation on the open side or bottom of the extrusion



STAINLESS STEEL BAND

- Exterior dust band made of fatigue resistant stainless steel

STAINLESS STEEL IS DURABLE, FLEXIBLE AND CORROSION RESISTANT

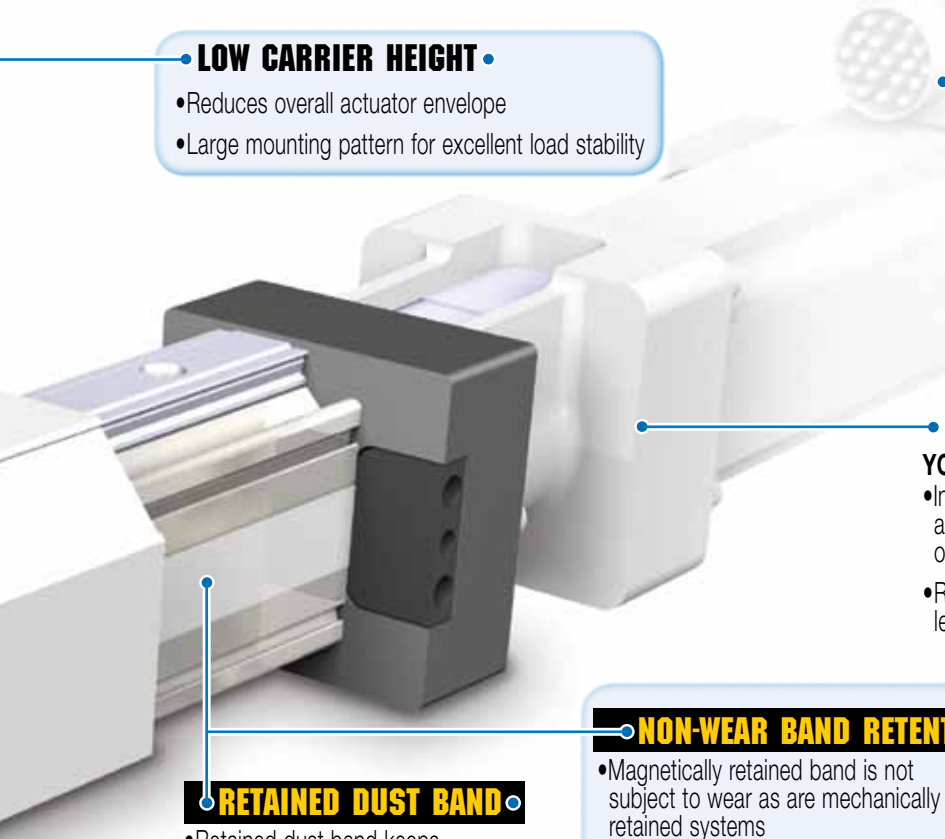
INCH OR METRIC MOUNTING

- Your choice of inch *(US standard)* or metric mounting to the carrier

...MAXIMUM DURABILITY

LOW CARRIER HEIGHT

- Reduces overall actuator envelope
- Large mounting pattern for excellent load stability



YOUR MOTOR HERE

YOU CAN CHOOSE:

- Motor or gearbox supplied and installed by Tolomatic
- Specify the device to be installed and actuator ships with proper mounting hardware - MXE is a "Your Motor Here" actuator for easy in-line motor installation. Check our website (www.tolomatic.com/ymh) for complete information
- Specify and ship your device to Tolomatic for factory installation

MOTOR ORIENTATION

YOU CAN CHOOSE:

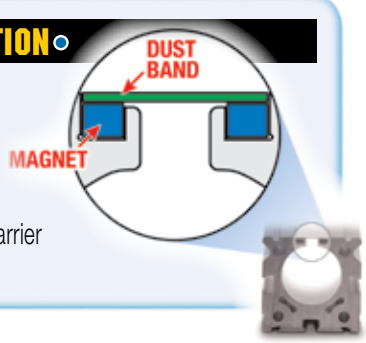
- In-line option directly couples the driving shaft and is a one-piece housing construction for optimum alignment and support of the motor
- Reverse-parallel option minimizes the overall length and offers a 1:1 or 2:1 belt ratio

RETAINED DUST BAND

- Retained dust band keeps contaminants from entering the actuator interior, protecting components for reduced maintenance and increased uptime

NON-WEAR BAND RETENTION

- Magnetically retained band is not subject to wear as are mechanically retained systems
- Immediate band engagement and release results in less drag on carrier for lower friction force during initial carrier movement



MULTIPLE SCREW TECHNOLOGIES

YOU CAN CHOOSE:

- Solid nuts of engineered resins offer quiet performance at the lowest cost - 5 choices
- Ball nuts offer positioning accuracy and repeatability with longer life, low-backlash available - 3 choices

NOTE: Boxed letters indicate ordering codes

OPTIONS

AUXILIARY CARRIER [D][C]

- 2X higher Fz (load) capacity
- High bending moment capacity

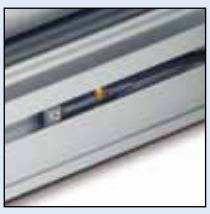
TUBE CLAMPS [T][C]

- Used for intermediate support
- Flush with bottom of actuator to retain low profile
- Drop-in, adjustable mounting locations

(MXE16 uses T-nuts with Mounting Plates)

MOUNTING PLATES [M][P]

- To provide clearance for motor and mount
- Use in conjunction with tube clamps

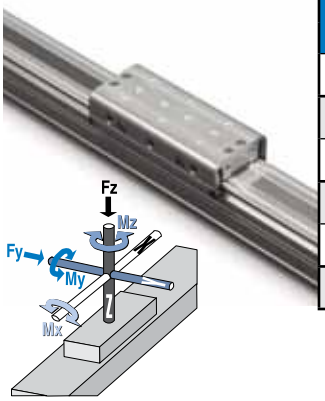


SWITCHES

- Wide variety of sensing choices: Reed, Solid State PNP or NPN, all available normally open or normally closed
- Flush mount, drop-in installation
- Bright LEDs, power & signal indication
- CE rated, RoHS compliant

S SOLID BEARING MOMENT AND LOAD CAPACITY

STANDARD CARRIER



SIZE	MAXIMUM BENDING MOMENTS						MAX. LOAD	
	Mx		My		Mz		Fz	
	in-lbs	N-m	in-lbs	N-m	in-lbs	N-m	lbf	N
16	22	*2.5*	19	*2.1*	25	*2.8*	35	*156*
25	60	*6.8*	110	*12.4*	34	*3.8*	70	*311*
32	100	*11.3*	350	*39.5*	140	*15.8*	150	*667*
40	275	*31.1*	600	*67.8*	220	*24.9*	225	*1,001*
50	315	*35.6*	1,155	*131*	341	*38.5*	315	*1,401*
63	585	*66.1*	2,340	*264*	520	*58.8*	520	*2,313*

The above ratings are the maximum values for shock-free, vibration-free operation in a typical industrial environment, which must not be exceeded even in dynamic operation. Contact Tolomatic for assistance in selecting the most appropriate actuator for your application.

Use sizing software or call Tolomatic (1-800-328-2174) with application information. We will provide any assistance needed to determine the proper MXE screw-driven actuator.

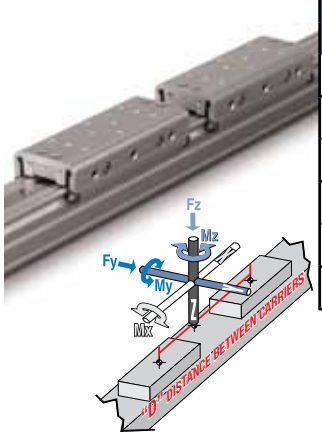
The moment and load capacity of the actuator's bearing system is based on an L10 life of 200,000,000 linear inches of travel. Life of the actuator will vary for each application depending on the combined loads, motion parameters and operating conditions. The load factor (L_F) for each application must not exceed a value of 1 (as calculated below). Exceeding a load factor of 1 will diminish the actuator's rated life.

$$L_F = \frac{Mx}{Mx_{max}} + \frac{My}{My_{max}} + \frac{Mz}{Mz_{max}} + \frac{Fy}{Fy_{max}} + \frac{Fz}{Fz_{max}} \leq 1$$

With combined loads, L_F must not exceed the value 1.

[S] SOLID BEARING MOMENT AND LOAD CAPACITY

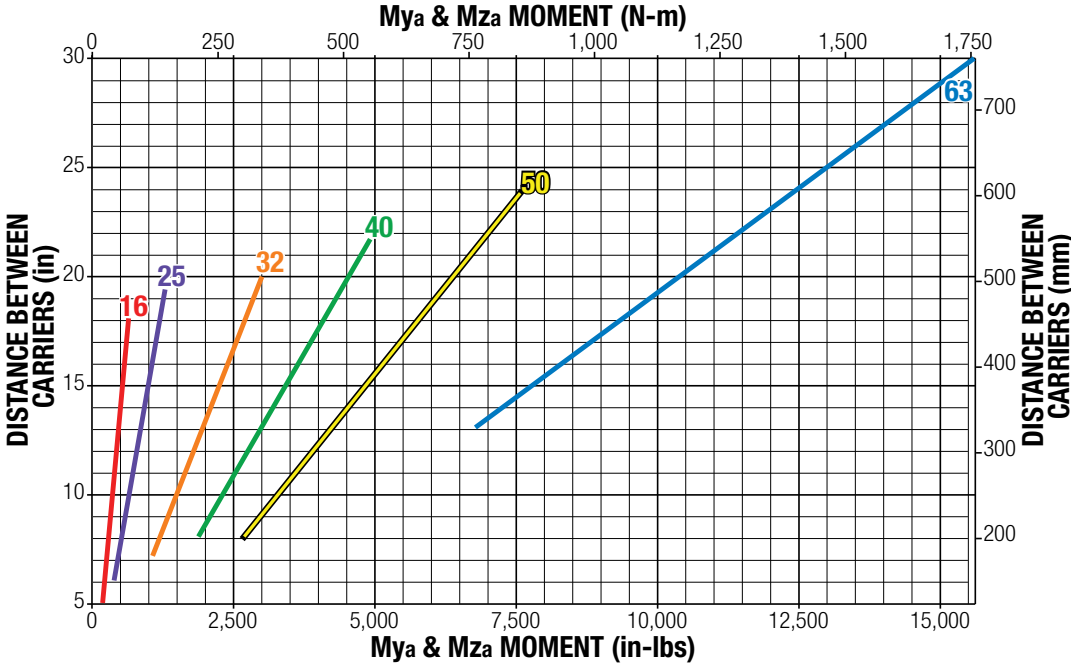
[DC] AUXILIARY CARRIER



AUXILIARY CARRIER BENDING MOMENTS WITH INCREASED "D" DISTANCE BETWEEN CARRIERS

SIZE	"D" MINIMUM		MAXIMUM BENDING MOMENTS*						MAX. LOAD	
			Mxa		Mya		Mza		Fza	
	in	mm	in-lbs	N-m	in-lbs	N-m	in-lbs	N-m	lbf	N
16	5.0	*127*	44	*5.0*	175	*19.8*	175	*19.8*	70	*311*
25	6.0	*152*	120	*13.6*	420	*47.5*	420	*47.5*	140	*623*
32	7.0	*178*	200	*22.6*	1,050	*119*	1,050	*119*	300	*1,334*
40	8.5	*216*	550	*62.1*	1,913	*216*	1,913	*216*	450	*2,002*
50	8.6	*218*	630	*71.2*	2,709	*306*	2,709	*306*	630	*2,802*
63	13.0	*330*	1,170	*132*	6,760	*764*	6,760	*764*	1,040	*4,626*

*At minimum "D" distance see graph below for complete information



Ratings were calculated with the following conditions:

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

The above ratings are the maximum values for shock-free, vibration-free operation in a typical industrial environment, which must not be exceeded even in dynamic operation. Contact Tolomatic for assistance in selecting the most appropriate actuator for your application.

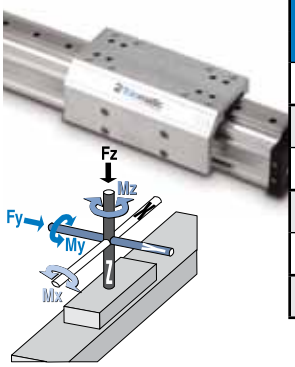
With combined loads, L_F must not exceed the value 1.

$$L_F = \frac{Mx}{Mx_{max}} + \frac{My}{My_{max}} + \frac{Mz}{Mz_{max}} + \frac{Fy}{Fy_{max}} + \frac{Fz}{Fz_{max}} \leq 1$$

P PROFILED RAIL MOMENT AND LOAD CAPACITY

⚠ Mating surface of mounted component must maintain a flatness of at least .0015" [0.040 mm]

STANDARD CARRIER



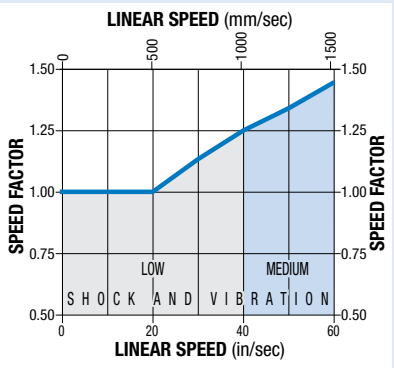
SIZE	MAXIMUM BENDING MOMENTS						MAXIMUM LOAD			
	Mx		My		Mz		Fy		Fz	
	in-lbs	N-m	in-lbs	N-m	in-lbs	N-m	lbf	N	lbf	N
16	39	*4.5*	339	*38.3*	339	*38.3*	217	*966*	217	*966*
25	126	*14.3*	502	*56.7*	377	*42.6*	449	*1,996*	449	*1,996*
32	226	*25.6*	1,344	*152*	1,344	*152*	569	*2,531*	569	*2,531*
40	604	*68.2*	1,913	*216*	1,913	*216*	736	*3,274*	736	*3,274*
50	811	*91.7*	3,483	*394*	3,483	*394*	1,014	*4,510*	1,014	*4,510*
63	1,019	*115*	5,339	*603*	5,339	*603*	1,292	*5,745*	1,292	*5,745*

Use sizing software or call Tolomatic (1-800-328-2174) with application information. We will provide any assistance needed to determine the proper MXE screw-driven actuator.

⚠ ***The above ratings are the maximum values for shock-free, vibration-free operation in a typical industrial environment, which must not be exceeded even in dynamic operation. Contact Tolomatic for assistance in selecting the most appropriate actuator for your application.***

SPEED FACTOR

FOR APPLICATIONS WITH HIGH SPEED OR SIGNIFICANT SHOCK AND VIBRATION: Calculated values of loads and bending moments must be increased by speed factor from the graph at right to obtain full rated life of profiled rail bearing system.



PROFILED RAIL LUBRICATION

Proper lubrication of profiled rail bearing system is essential for normal operation and achievement of full rated life of MX--P actuators. Lubrication should be performed at intervals of 4,000,000 inches of travel or once every year, whichever occurs first. **However, operating conditions such as high speed or significant shock and vibration may require more frequent lubrication.** Please consult Tolomatic for recommendations.

Recommended grease types:

1. Refined mineral oil-based multi-purpose grease with lithium thickening agent.
2. High-grade synthetic oil-based grease with urea thickening agent.

The moment and load capacity of the actuator's bearing system is based on an L10 life of 200,000,000 linear inches of travel. Life of the actuator will vary for each application depending on the combined loads, motion parameters and operating conditions. The load factor (L_F) for each application must not exceed a value of 1 (as calculated below). Exceeding a load factor of 1 will diminish the actuator's rated life.

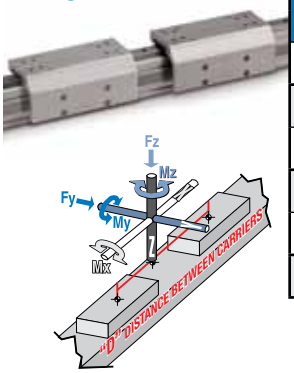
$$L_F = \frac{Mx}{Mx_{max}} + \frac{My}{My_{max}} + \frac{Mz}{Mz_{max}} + \frac{Fy}{Fy_{max}} + \frac{Fz}{Fz_{max}} \leq 1$$

With combined loads, L_F must not exceed the value 1.

P PROFILED RAIL MOMENT AND LOAD CAPACITY

⚠ Mating surface of mounted component must maintain a flatness of at least .0015" [0.040 mm]

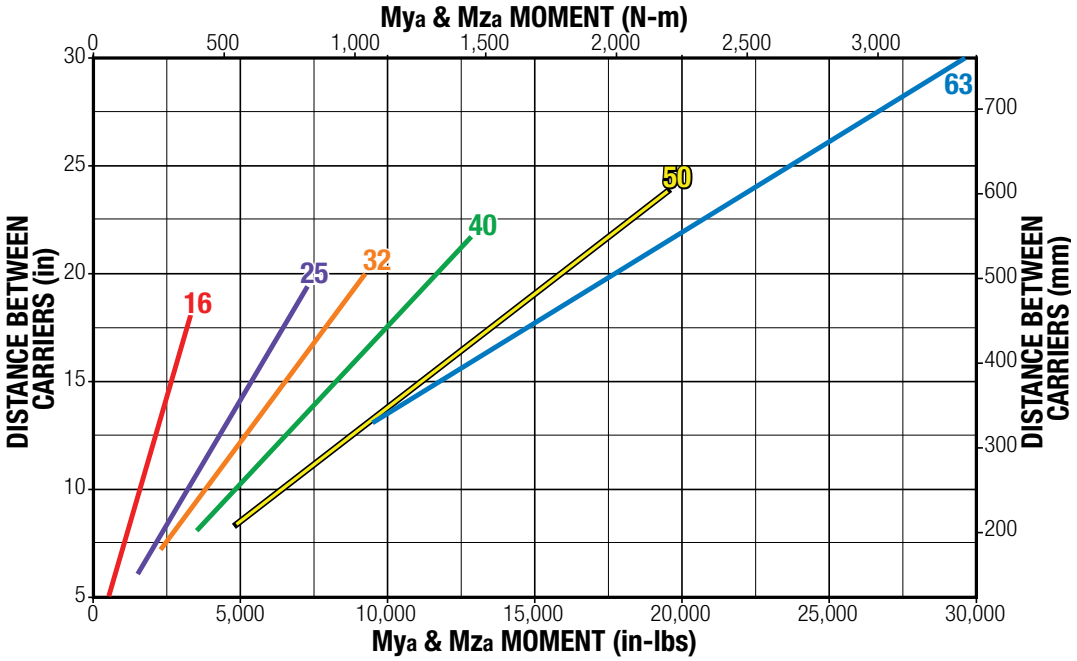
DC AUXILIARY CARRIER



SIZE	"D" MINIMUM		MAXIMUM BENDING MOMENTS*						MAXIMUM LOAD			
			Mxa		Mya		Mza		Fya		Fza	
	in	mm	in-lbs	N-m	in-lbs	N-m	in-lbs	N-m	lbf	N	lbf	N
16	5.0	*127*	79	*8.9*	620	*70.0*	620	*70.0*	434	*1,932*	434	*1,932*
25	6.0	*152*	252	*28.5*	1,610	*182*	1,610	*182*	898	*3,993*	898	*3,993*
32	7.0	*178*	453	*51.1*	2,202	*249*	2,202	*249*	1,138	*5,063*	1,138	*5,063*
40	8.5	*216*	1,208	*136*	3,601	*407*	3,601	*407*	1,472	*6,549*	1,472	*6,549*
50	8.6	*218*	1,623	*183*	4,966	*561*	4,966	*561*	2,028	*9,020*	2,028	*9,020*
63	13.0	*330*	2,038	*230*	9,508	*1,074*	9,508	*1,074*	2,583	*11,490*	2,583	*11,490*

*At minimum "D" distance see below for complete information

AUXILIARY CARRIER BENDING MOMENTS WITH INCREASED "D" DISTANCE BETWEEN CARRIERS



Ratings were calculated with the following conditions:

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

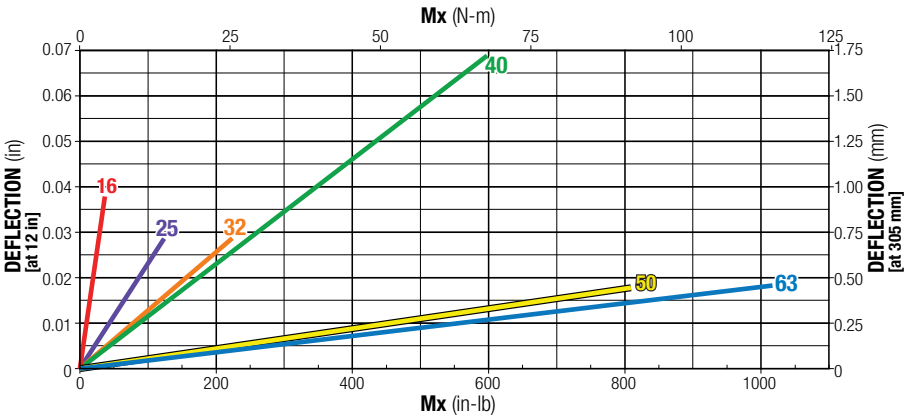
⚠ ***The above ratings are the maximum values for shock-free, vibration-free operation in a typical industrial environment, which must not be exceeded even in dynamic operation. Contact Tolomatic for assistance in selecting the most appropriate actuator for your application.***

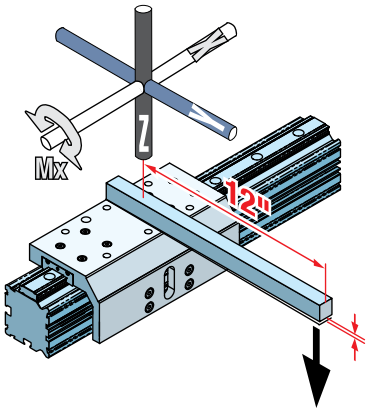
With combined loads, L_F must not exceed the value 1.

$$L_F = \frac{Mx}{Mx_{max}} + \frac{My}{My_{max}} + \frac{Mz}{Mz_{max}} + \frac{Fy}{Fy_{max}} + \frac{Fz}{Fz_{max}} \leq 1$$

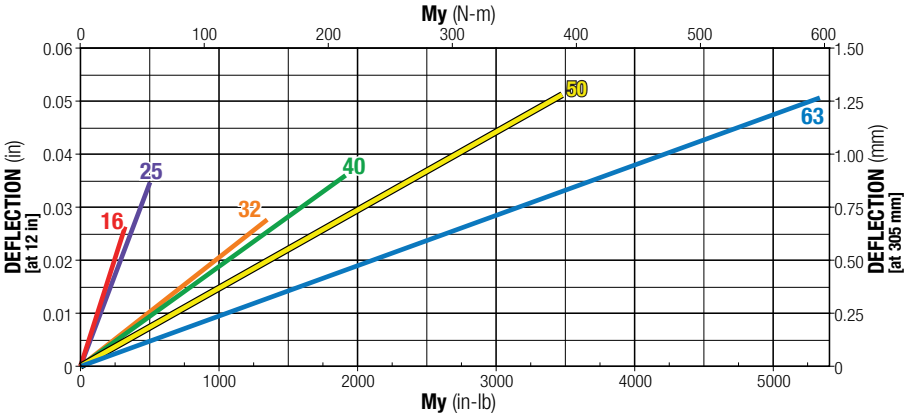
LOAD DEFLECTION

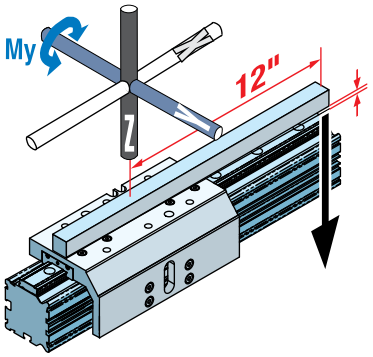
DEFLECTION ABOUT X AXIS



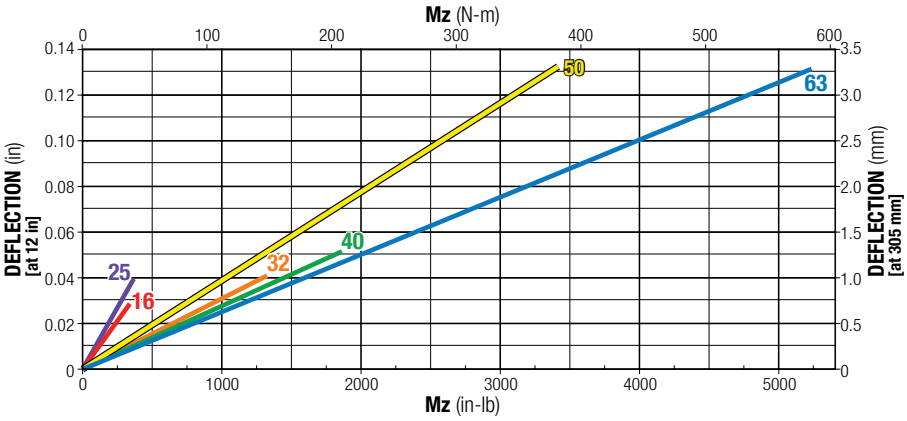


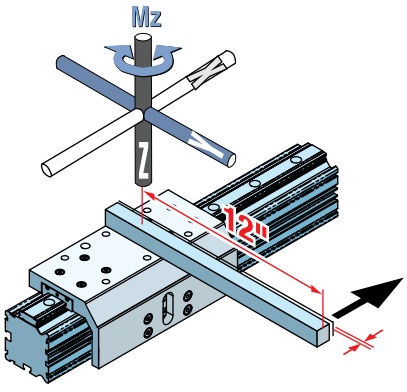
DEFLECTION ABOUT Y AXIS





DEFLECTION ABOUT Z AXIS





DEFLECTION TESTING WAS DONE UNDER THESE CRITERIA:

1.) Actuator was properly mounted with distance between mounting plates within recommendations (see Tube Clamp Requirements page 16)

2.) Deflection was measured at 12" from center of carrier as shown

[S] & [P] ACTUATOR SPECIFICATIONS AND BREAKAWAY TORQUE

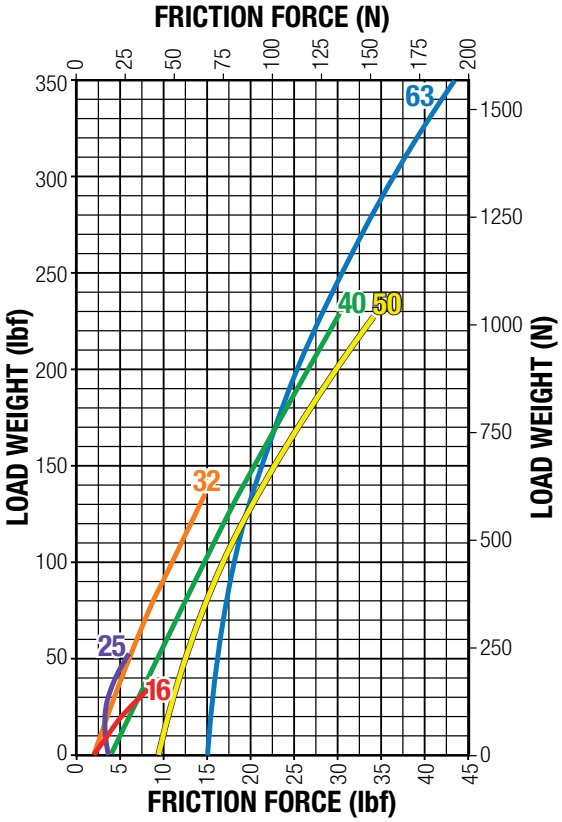
GENERAL ACTUATOR SPECIFICATIONS

ACTUATOR SERIES	CARRIER WEIGHT (including nut bracket assembly)				BASE ACTUATOR WEIGHT (excluding nut bracket and carrier assembly)				WEIGHT PER UNIT OF STROKE				STRAIGHTNESS / FLATNESS*		TEMPERATURE RANGE	
	[S] SOLID		[P] PROFILED		[S] SOLID		[P] PROFILED		[S] SOLID		[P] PROFILED					
	lb	*kg*	lb	*kg*	lb	*kg*	lb	*kg*	lb/in	*kg/mm*	lb/in	*kg/mm*	in	*mm*	°F	*°C*
MXE16	0.47	*0.21*	0.58	*0.26*	1.24	*0.56*	1.43	*0.65*	0.10	*0.0018*	0.12	*0.0021*	.00067 x L†	*.0170 x L†*	40 to 130	*4 to 54*
MXE25	0.91	*0.41*	1.02	*0.46*	2.11	*0.96*	2.44	*1.11*	0.19	*0.0034*	0.25	*0.0045*				
MXE32	1.74	*0.79*	2.12	*0.96*	2.74	*1.24*	3.30	*1.50*	0.29	*0.0052*	0.37	*0.0066*				
MXE40	3.15	*1.43*	3.72	*1.69*	5.34	*2.42*	6.88	*3.12*	0.40	*0.0071*	0.58	*0.0104*				
MXE50	5.27	*2.39*	6.97	*3.16*	14.91	*6.76*	18.27	*8.29*	0.64	*0.0114*	0.84	*0.0150*				
MXE63	12.96	*5.88*	14.92	*6.77*	35.05	*15.90*	39.34	*17.84*	1.08	*0.0193*	1.36	*0.0243*				

IP Rating - 44 *Approximately equivalent to the requirements of IP44*
(protected against ingress of solid particles greater than .039 in (1 mm) and splashing water)

*Actuator mounted on a flat surface and fully restrained
(See tube clamp graphs page 16)
† L = Maximum distance between tube clamps

FRICTION FORCE [S]-ACTUATORS



BREAKAWAY TORQUE

ACTUATOR SERIES	SCREW DIAMETER		SCREW TYPE	SCREW PITCH	BREAKAWAY TORQUE			
					SINGLE CARRIER		AUXILIARY CARRIER	
	in	*mm*		rev/in	oz-in	*N-m*	oz-in	*N-m*
MXE16	0.250	*6.35*	SN	02	10	*0.071*	14	*0.099*
	0.250	*6.35*	SN	04	10	*0.071*	14	*0.099*
	0.250	*6.35*	SN	16	10	*0.071*	14	*0.099*
MXE25	0.375	*9.53*	BN	08	16	*0.113*	18	*0.127*
	0.375	*9.53*	BNL	08	16	*0.113*	18	*0.127*
	0.500	*12.70*	SN	01	30	*0.212*	46	*0.325*
	0.500	*12.70*	SN	02	25	*0.177*	35	*0.247*
	0.500	*12.70*	SN	05	18	*0.127*	22	*0.155*
MXE32	0.375	*9.53*	BN	08	16	*0.113*	18	*0.127*
	0.375	*9.53*	BNL	08	16	*0.113*	18	*0.127*
	0.500	*12.70*	SN	01	30	*0.212*	46	*0.325*
	0.500	*12.70*	SN	02	25	*0.177*	35	*0.247*
	0.500	*12.70*	SN	05	18	*0.127*	22	*0.155*
MXE40	0.500	*12.70*	BN	02	28	*0.198*	35	*0.247*
	0.500	*12.70*	BNL	02	28	*0.198*	35	*0.247*
	0.625	*15.88*	BN	05	35	*0.247*	45	*0.318*
	0.625	*15.88*	BNL	05	35	*0.247*	45	*0.318*
	0.625	*15.88*	SN	02	35	*0.245*	44	*0.311*
	0.750	*19.05*	SN	01	50	*0.353*	72	*0.508*
MXE50	0.750	*19.05*	BN	02	40	*0.282*	50	*0.353*
	0.750	*19.05*	BNL	02	40	*0.282*	50	*0.353*
	0.750	*19.05*	BN	05	35	*0.247*	45	*0.318*
	0.750	*19.05*	BNL	05	35	*0.247*	45	*0.318*
	0.750	*19.05*	SN	01	50	*0.353*	72	*0.508*
	0.750	*19.05*	SN	02	35	*0.247*	44	*0.311*
MXE63	1.000	*25.40*	BN	01	75	*0.530*	107	*0.756*
	1.000	*25.40*	BNL	01	75	*0.530*	107	*0.756*
	1.000	*25.40*	BN	02	75	*0.530*	107	*0.756*
	1.000	*25.40*	BNL	02	75	*0.530*	107	*0.756*
	1.000	*25.40*	BN	04	85	*0.600*	121	*0.855*
	1.000	*25.40*	BNL	04	85	*0.600*	121	*0.855*
	1.000	*25.40*	SN	04	75	*0.530*	107	*0.756*

S & P SPECIFICATIONS

SCREW SPECIFICATIONS

ACTUATOR SERIES	SCREW DIAMETER		SCREW TYPE	SCREW PITCH	SCREW LEAD		LEAD ACCURACY		BACKLASH		MAX THRUST		MAX STROKE	
	in	*mm*		rev/in	in	*mm*	in/ft	*mm/300mm*	in	*mm*	lb	*N*	in	*mm*
MXE16	0.250	*6.35*	SN	02	0.50	*12.70*	0.005	*0.13*	0.015	*0.38*	45	*200*	29	*737*
	0.250	*6.35*	SN	04	0.25	*6.35*	0.005	*0.13*	0.015	*0.38*	45	*200*	29	*737*
	0.250	*6.35*	SN	16	0.06	*1.59*	0.005	*0.13*	0.015	*0.38*	45	*200*	29	*737*
MXE25	0.375	*9.53*	BN	08	0.13	*3.18*	0.004	*0.10*	0.015	*0.38*	130	*578*	61	*1549*
	0.375	*9.53*	BNL	08	0.13	*3.18*	0.004	*0.10*	0.002	*0.05*	130	*578*	61	*1549*
	0.500	*12.70*	SN	01	1.00	*25.40*	0.006	*0.15*	0.007	*0.18*	170	*756*	85	*2159*
	0.500	*12.70*	SN	02	0.50	*12.70*	0.005	*0.13*	0.007	*0.18*	170	*756*	120	*3048*
	0.500	*12.70*	SN	05	0.20	*5.08*	0.006	*0.15*	0.007	*0.18*	170	*756*	120	*3048*
MXE32	0.375	*9.53*	BN	08	0.13	*3.18*	0.004	*0.10*	0.015	*0.38*	130	*578*	61	*1549*
	0.375	*9.53*	BNL	08	0.13	*3.18*	0.004	*0.10*	0.002	*0.05*	130	*578*	61	*1549*
	0.500	*12.70*	SN	01	1.00	*25.40*	0.006	*0.15*	0.007	*0.18*	170	*756*	85	*2159*
	0.500	*12.70*	SN	02	0.50	*12.70*	0.005	*0.13*	0.007	*0.18*	170	*756*	120	*3048*
	0.500	*12.70*	SN	05	0.20	*5.08*	0.006	*0.15*	0.007	*0.18*	170	*756*	120	*3048*
MXE40	0.500	*12.70*	BN	02	0.50	*12.70*	0.003	*0.08*	0.015	*0.38*	800	*3559*	59	*1499*
	0.500	*12.70*	BNL	02	0.50	*12.70*	0.003	*0.08*	0.002	*0.05*	800	*3559*	59	*1499*
	0.625	*15.88*	BN	05	0.20	*5.08*	0.003	*0.08*	0.015	*0.38*	800	*3559*	59	*1499*
	0.625	*15.88*	BNL	05	0.20	*5.08*	0.003	*0.08*	0.002	*0.05*	800	*3559*	59	*1499*
	0.625	*15.88*	SN	02	0.50	*12.70*	0.005	*0.13*	0.007	*0.18*	200	*890*	120	*3048*
	0.750	*19.05*	SN	01	1.00	*25.40*	0.005	*0.13*	0.007	*0.18*	300	*1334*	120	*3048*
MXE50	0.750	*19.05*	BN	02	0.50	*12.70*	0.004	*0.10*	0.015	*0.38*	2700	*12010*	120	*3048*
	0.750	*19.05*	BNL	02	0.50	*12.70*	0.004	*0.10*	0.002	*0.05*	2700	*12010*	120	*3048*
	0.750	*19.05*	BN	05	0.20	*5.08*	0.003	*0.08*	0.015	*0.38*	950	*4226*	120	*3048*
	0.750	*19.05*	BNL	05	0.20	*5.08*	0.003	*0.08*	0.002	*0.05*	950	*4226*	120	*3048*
	0.750	*19.05*	SN	02	0.50	*12.70*	0.005	*0.13*	0.007	*0.18*	300	*1335*	120	*3048*
	0.750	*19.05*	SN	01	1.00	*25.40*	0.005	*0.13*	0.007	*0.18*	300	*1335*	120	*3048*
MXE63	1.000	*25.40*	BN	01	1.00	*25.40*	0.004	*0.10*	0.015	*0.38*	2500	*11121*	103	*2616*
	1.000	*25.40*	BNL	01	1.00	*25.40*	0.004	*0.10*	0.002	*0.05*	2500	*11121*	103	*2616*
	1.000	*25.40*	BN	02	0.50	*12.70*	0.004	*0.10*	0.015	*0.38*	4300	*19127*	103	*2616*
	1.000	*25.40*	BNL	02	0.50	*12.70*	0.004	*0.10*	0.002	*0.05*	4300	*19127*	103	*2616*
	1.000	*25.40*	BN	04	0.25	*6.35*	0.004	*0.10*	0.015	*0.38*	3300	*14679*	103	*2616*
	1.000	*25.40*	BNL	04	0.25	*6.35*	0.004	*0.10*	0.002	*0.05*	3300	*14679*	103	*2616*
	1.000	*25.40*	SN	04	0.25	*6.35*	0.010	*0.25*	0.007	*0.18*	400	*1779*	103	*2616*

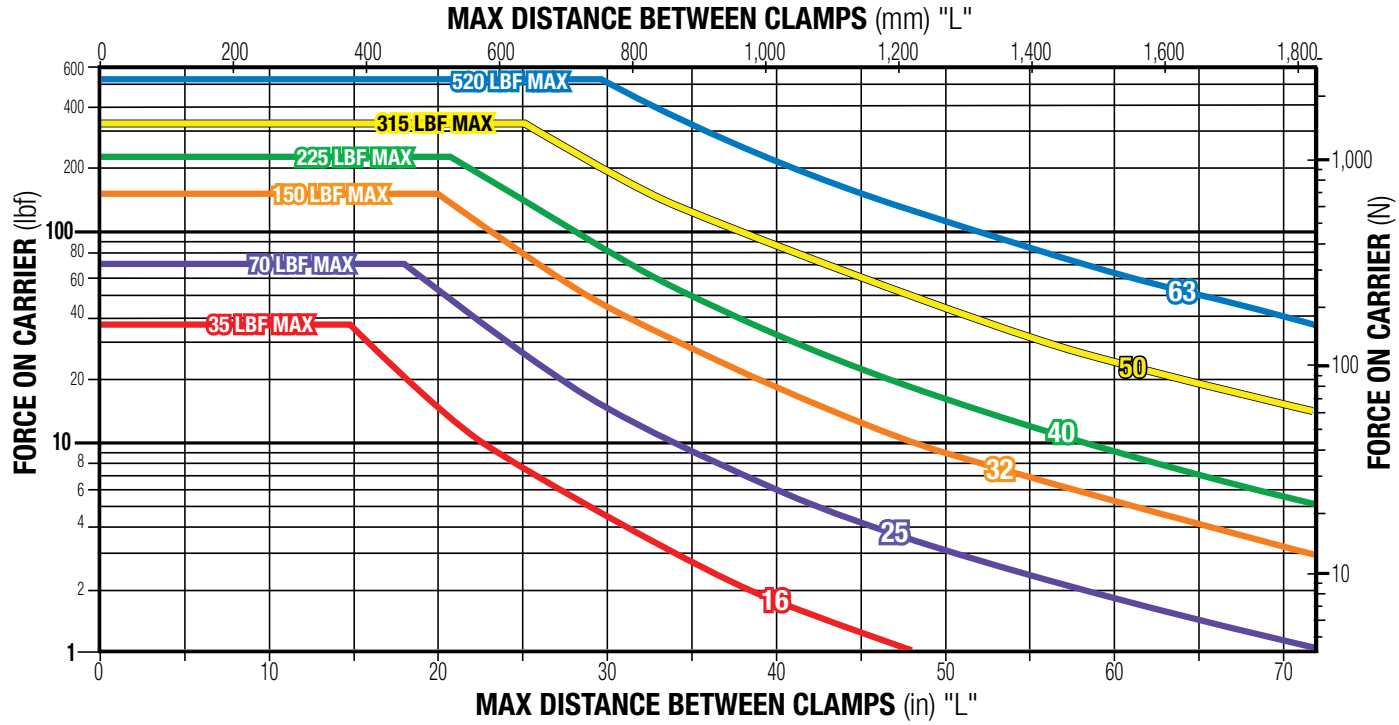
[S] & [P] SPECIFICATIONS

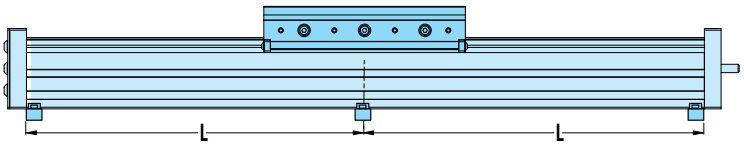
REFLECTED INERTIA

ACTUATOR SERIES	SCREW DIAMETER		SCREW TYPE	SCREW PITCH	REFLECTED INERTIA									
					BASE ACTUATOR								PER IN OF STROKE	
					[S] SOLID				[P] PROFILED RAIL					
					IN-LINE		REV PARALLEL		IN-LINE		REV PARALLEL			
	in	*mm*		rev/in	lb-in²	*kg-cm²*	lb-in²	*kg-cm²*	lb-in²	*kg-cm²*	lb-in²	*kg-cm²*	lb-in²	*kg-cm²*
MXE16	0.250	*6.35*	SN	02	0.0058	*0.0170*	0.0058	*0.0170*	0.0069	*0.0202*	0.0069	*0.0202*	0.0001	*0.0003*
	0.250	*6.35*	SN	04	0.0020	*0.0059*	0.0020	*0.0059*	0.0023	*0.0067*	0.0023	*0.0067*	0.0001	*0.0003*
	0.250	*6.35*	SN	16	0.0009	*0.0026*	0.0009	*0.0026*	0.0009	*0.0026*	0.0009	*0.0026*	0.0001	*0.0003*
MXE25	0.375	*9.53*	BN	08	0.0062	*0.0182*	0.0062	*0.0182*	0.0063	*0.0183*	0.0063	*0.0183*	0.0005	*0.0015*
	0.375	*9.53*	BNL	08	0.0062	*0.0182*	0.0062	*0.018*	0.0063	*0.0183*	0.0063	*0.0183*	0.0005	*0.0015*
	0.500	*12.70*	SN	01	0.0498	*0.1456*	0.0498	*0.1456*	0.0541	*0.1583*	0.0541	*0.1583*	0.0017	*0.0050*
	0.500	*12.70*	SN	02	0.0213	*0.0623*	0.0213	*0.0623*	0.0224	*0.0654*	0.0224	*0.0654*	0.0017	*0.0050*
	0.500	*12.70*	SN	05	0.0133	*0.0390*	0.0133	*0.0390*	0.0135	*0.0395*	0.0135	*0.0395*	0.0017	*0.0050*
MXE32	0.375	*9.53*	BN	08	0.0066	*0.0193*	0.0066	*0.0193*	0.0068	*0.0198*	0.0068	*0.0198*	0.0005	*0.0015*
	0.375	*9.53*	BNL	08	0.0066	*0.0193*	0.0066	*0.0193*	0.0068	*0.0198*	0.0068	*0.0198*	0.0005	*0.0015*
	0.500	*12.70*	SN	01	0.0832	*0.2436*	0.0842	*0.2465*	0.1005	*0.2940*	0.1015	*0.2969*	0.0017	*0.0050*
	0.500	*12.70*	SN	02	0.0296	*0.0868*	0.0306	*0.0897*	0.0340	*0.0994*	0.0350	*0.1023*	0.0017	*0.0050*
	0.500	*12.70*	SN	05	0.0147	*0.0429*	0.0157	*0.0458*	0.0153	*0.0449*	0.0163	*0.0478*	0.0017	*0.0050*
MXE40	0.500	*12.70*	BN	02	0.0502	*0.1468*	0.0502	*0.1470*	0.0544	*0.1593*	0.0545	*0.1594*	0.0017	*0.0050*
	0.500	*12.70*	BNL	02	0.0502	*0.1480*	0.0512	*0.1497*	0.0544	*0.1593*	0.0545	*0.1594*	0.0017	*0.0050*
	0.625	*15.88*	BN	05	0.0506	*0.1480*	0.0512	*0.1497*	0.0512	*0.1500*	0.0518	*0.1517*	0.0042	*0.0123*
	0.625	*15.88*	BNL	05	0.0506	*0.1480*	0.0512	*0.1497*	0.0512	*0.1500*	0.0518	*0.1517*	0.0042	*0.0123*
	0.625	*15.88*	SN	02	0.0781	*0.2286*	0.0787	*0.2304*	0.0842	*0.2463*	0.0848	*0.2480*	0.0042	*0.0123*
	0.750	*19.05*	SN	01	0.2035	*0.5956*	0.2041	*0.5973*	0.2276	*0.6661*	0.2282	*0.6679*	0.0087	*0.0255*
MXE50	0.750	*19.05*	BN	02	0.1438	*0.4208*	0.1451	*0.4246*	0.1565	*0.4580*	0.1578	*0.4618*	0.0087	*0.0255*
	0.750	*19.05*	BNL	02	0.1438	*0.4208*	0.1451	*0.4246*	0.1565	*0.4580*	0.1578	*0.4618*	0.0087	*0.0255*
	0.750	*19.05*	BN	05	0.1104	*0.3231*	0.1117	*0.3269*	0.1124	*0.3289*	0.1137	*0.3327*	0.0087	*0.0255*
	0.750	*19.05*	BNL	05	0.1104	*0.3231*	0.1117	*0.3269*	0.1124	*0.3289*	0.1137	*0.3327*	0.0087	*0.0255*
	0.750	*19.05*	SN	02	0.1528	*0.4472*	0.1541	*0.4510*	0.1708	*0.4998*	0.1721	*0.5036*	0.0087	*0.0255*
	0.750	*19.05*	SN	01	0.2969	*0.8689*	0.2982	*0.8727*	0.3688	*1.0793*	0.3701	*1.0831*	0.0087	*0.0255*
MXE63	1.000	*25.40*	BN	01	0.8865	*2.5943*	0.8873	*2.5966*	0.9466	*2.7688*	0.9474	*2.7711*	0.0275	*0.0805*
	1.000	*25.40*	BNL	01	0.8865	*2.5943*	0.8873	*2.5966*	0.9466	*2.7688*	0.9474	*2.7711*	0.0275	*0.0805*
	1.000	*25.40*	BN	02	0.5966	*1.7459*	0.5974	*1.7482*	0.6116	*1.7889*	0.6124	*1.7813*	0.0275	*0.0805*
	1.000	*25.40*	BNL	02	0.5966	*1.7459*	0.5974	*1.7482*	0.6116	*1.7889*	0.6124	*1.7813*	0.0275	*0.0805*
	1.000	*25.40*	BN	04	0.5245	*1.5349*	0.5253	*1.5372*	0.5282	*1.5450*	0.5290	*1.5473*	0.0275	*0.0805*
	1.000	*25.40*	BNL	04	0.5245	*1.5349*	0.5253	*1.5372*	0.5282	*1.5450*	0.5290	*1.5473*	0.0275	*0.0805*
	1.000	*25.40*	SN	04	0.5319	*1.5566*	0.5327	*1.5589*	0.5372	*1.5713*	0.5380	*1.5737*	0.0275	*0.0805*

S & P TUBE CLAMP REQUIREMENTS

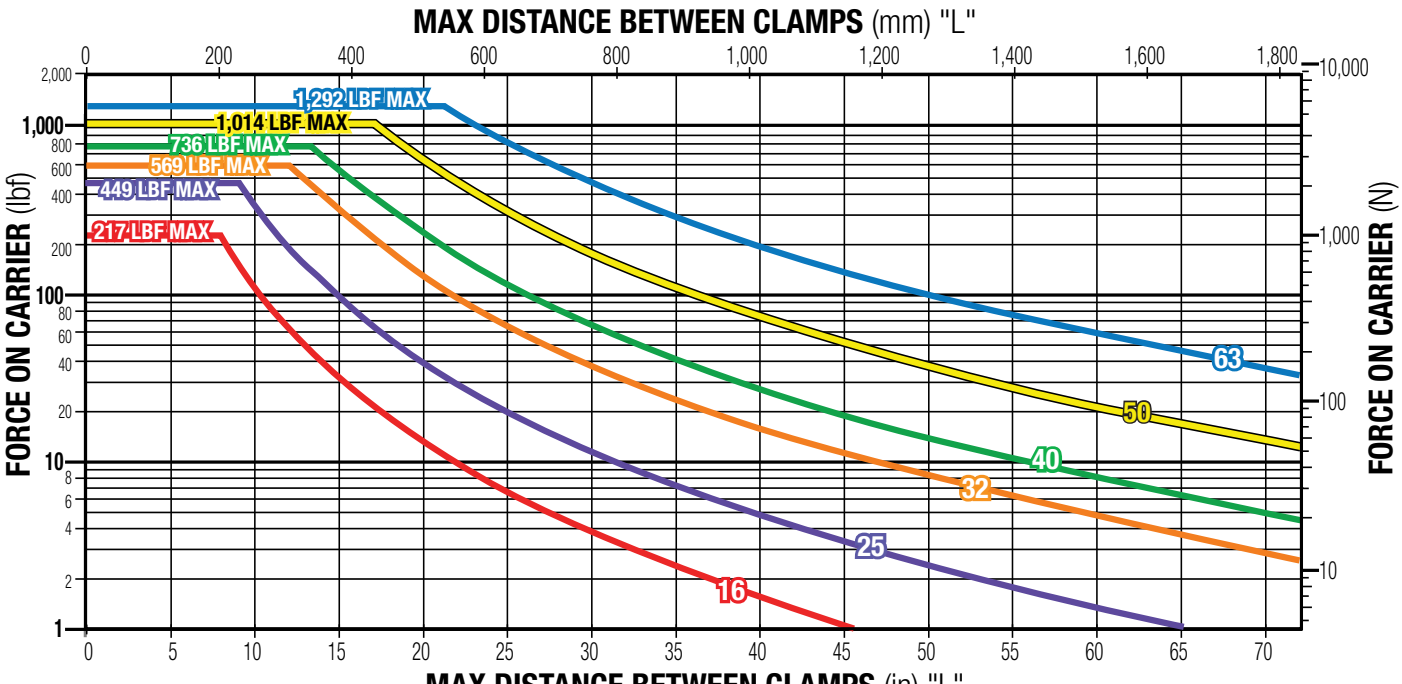
S SOLID BEARING

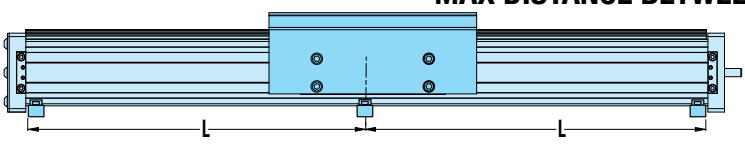




NOTE: MXE16 uses T-Nuts with mounting plates

P PROFILED RAIL BEARING

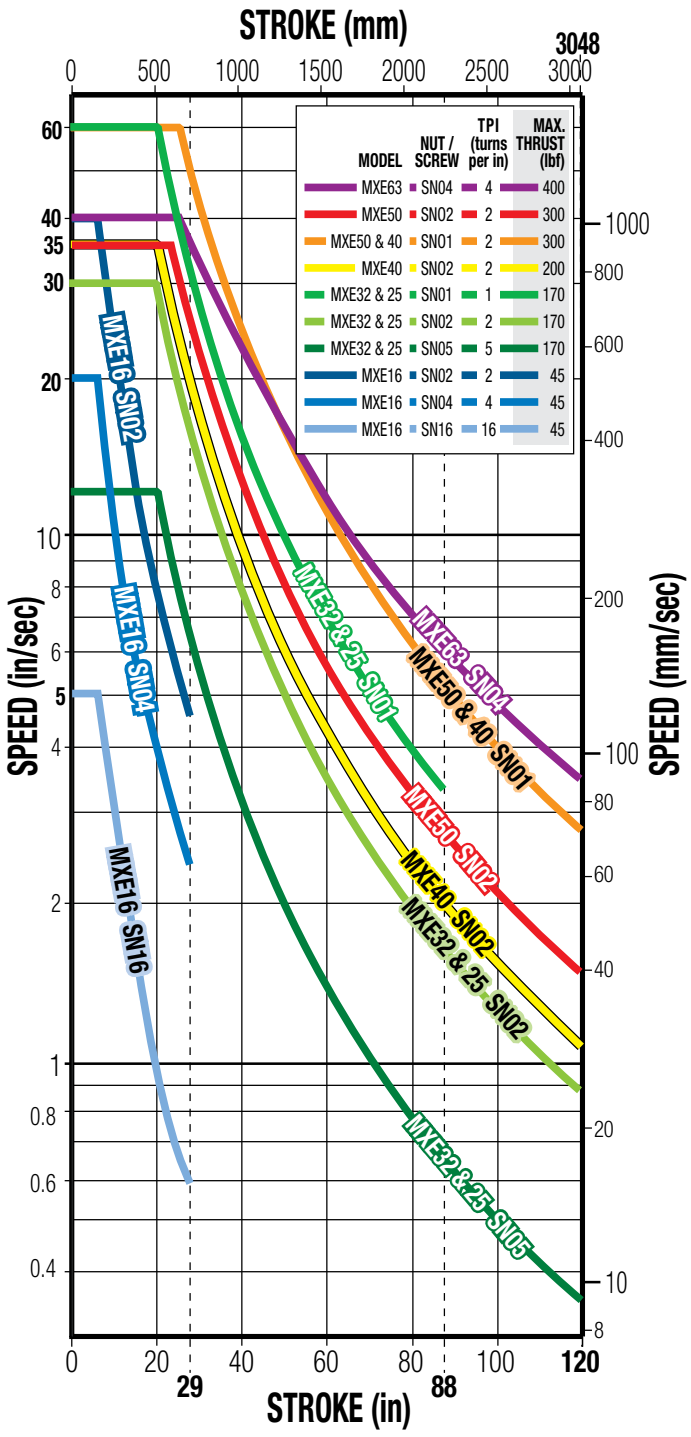




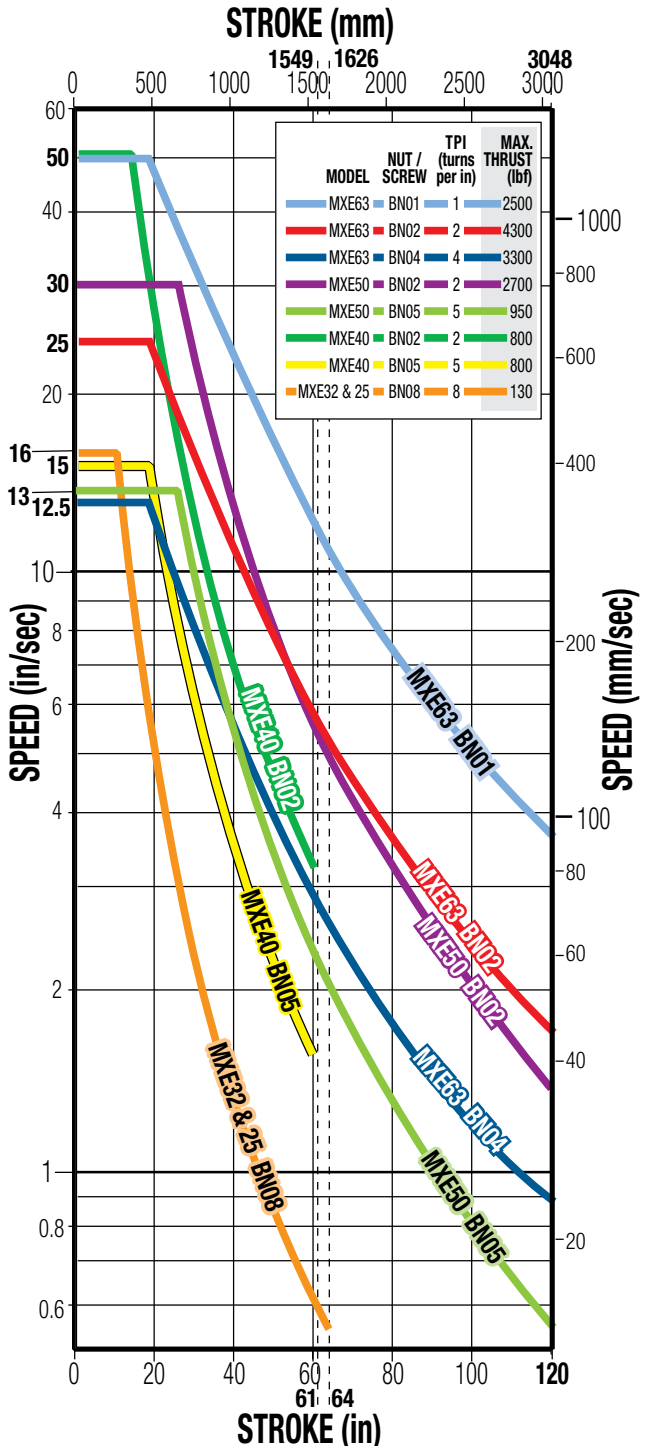
NOTE: MXE16 uses T-Nuts with mounting plates

SCREW CRITICAL SPEED CAPACITIES

MXE ACME SCREW CRITICAL SPEED



MXE BALL SCREW CRITICAL SPEED



⚠ ** Maximum thrust is the maximum continuous dynamic thrust subject to Thrust x Velocity limitation.*

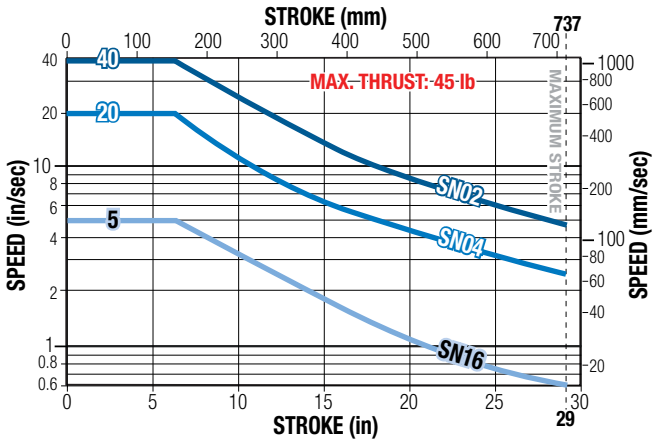
Dotted lines represent maximum stroke for screw selections.

For Screw PV limits, refer to the individual charts on the following pages for each actuator body size.

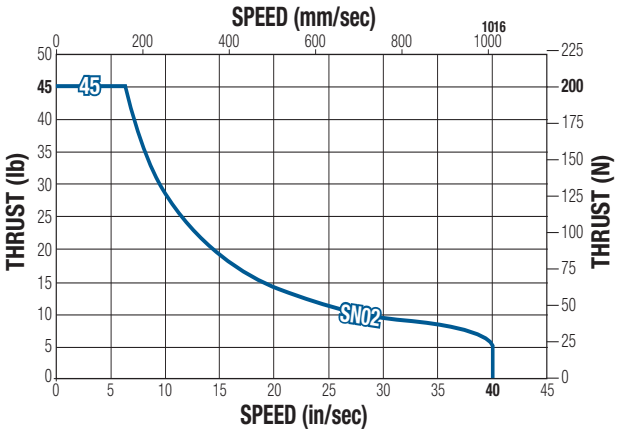
SCREW CODE	DESCRIPTION
SN	Solid Nut
BN	Ball Nut
BNL	Low Backlash Ball Nut

MXE16 ACME SCREW CRITICAL SPEED AND PV LIMITS

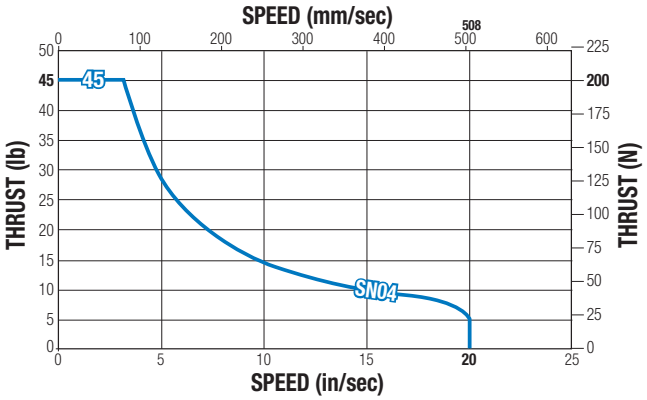
Critical Speed: 0.250" ACME



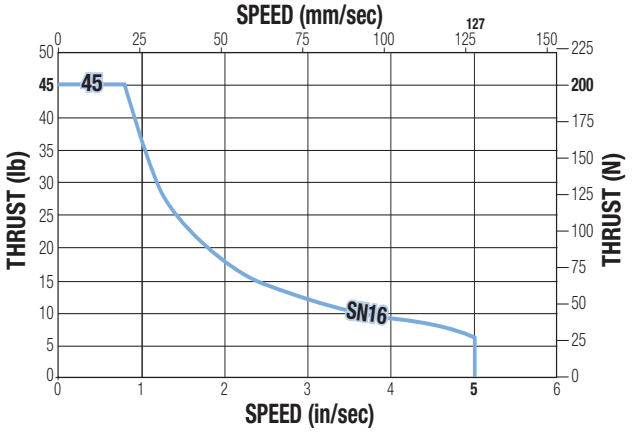
PV Limits: 2TPI Acme Screw



PV Limits: 4TPI Acme Screw



PV Limits: 16TPI Acme Screw



SN = Solid Nut

⚠ **** Maximum thrust is the maximum continuous dynamic thrust subject to Thrust x Velocity Limitation.***

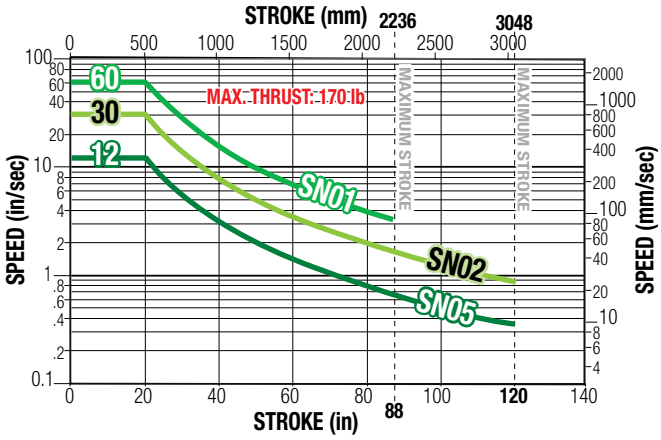
PV LIMITS: Any material which carries a sliding load is limited by heat buildup. The factors that affect heat generation rate in an application are the pressure on the nut in pounds per square inch and the surface velocity in feet per minute. The product of these factors provides a measure of the severity of an application.

$$\left(\frac{P}{\text{Thrust (Max. Thrust Rating)}}\right) \times \left(\frac{V}{\text{Speed (Max. Speed Rating)}}\right) \leq 0.1$$

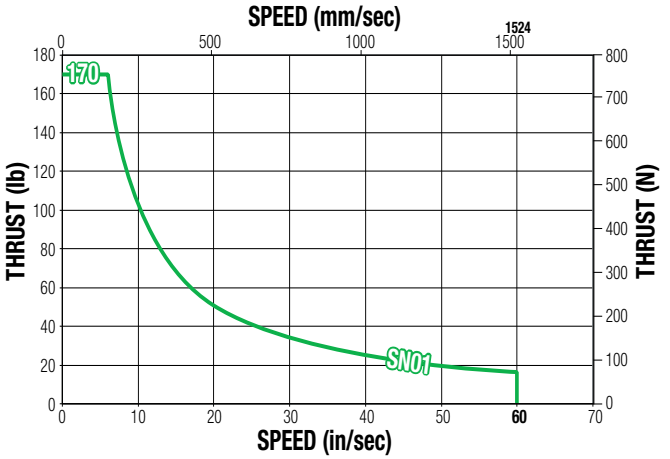
$$\left(\frac{\text{Thrust}}{\text{(Max. Thrust Rating)}}\right) \times \left(\frac{\text{Speed}}{\text{(Max. Speed Rating)}}\right) \leq 0.1$$

MXE25 & 32 ACME SCREW CRITICAL SPEED AND PV LIMITS

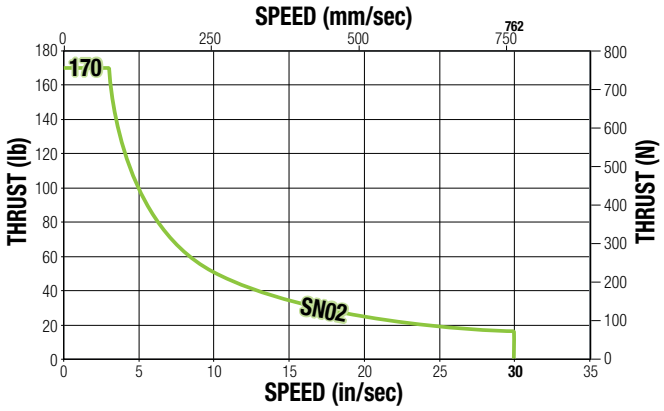
Critical Speed: 0.5" ACME



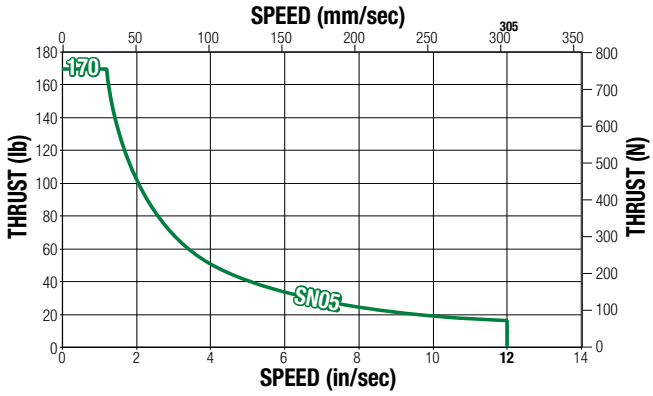
PV Limits: 1TPI Acme Screw



PV Limits: 2TPI Acme Screw



PV Limits: 5TPI Acme Screw



SN = Solid Nut

⚠ **** Maximum thrust is the maximum continuous dynamic thrust subject to Thrust x Velocity Limitation.***

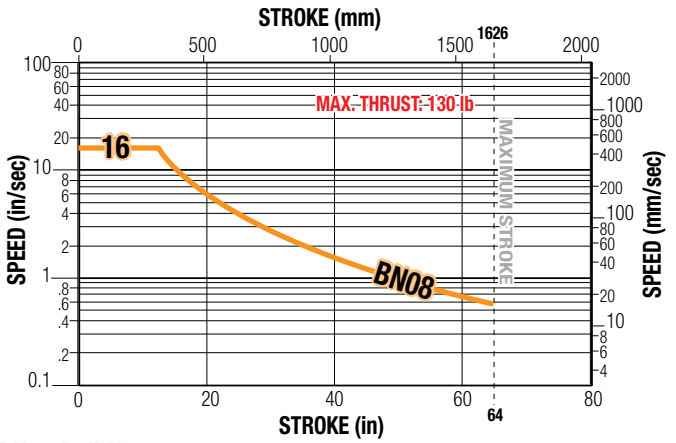
PV LIMITS: Any material which carries a sliding load is limited by heat buildup. The factors that affect heat generation rate in an application are the pressure on the nut in pounds per square inch and the surface velocity in feet per minute. The product of these factors provides a measure of the severity of an application.

$$\left(\frac{P}{\text{Thrust (Max. Thrust Rating)}}\right) \times \left(\frac{V}{\text{Speed (Max. Speed Rating)}}\right) \leq 0.1$$

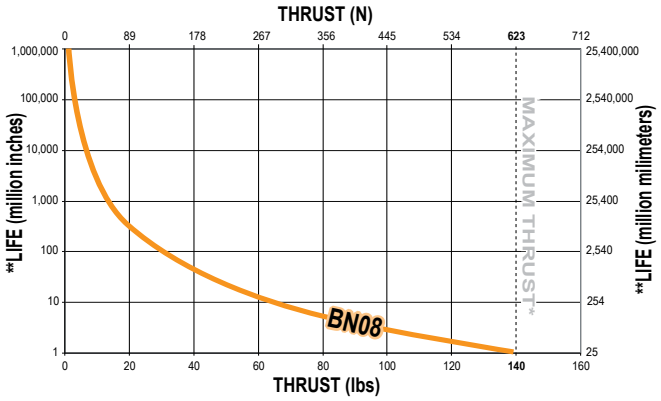
$$\left(\frac{\text{Thrust}}{\text{(Max. Thrust Rating)}}\right) \times \left(\frac{\text{Speed}}{\text{(Max. Speed Rating)}}\right) \leq 0.1$$

MXE25 & 32 BALL SCREW CRITICAL SPEED AND THEORETICAL LIFE

Critical Speed: 0.375", 8TPI Ball Screw



Life: 0.375", 8TPI Ball Screw



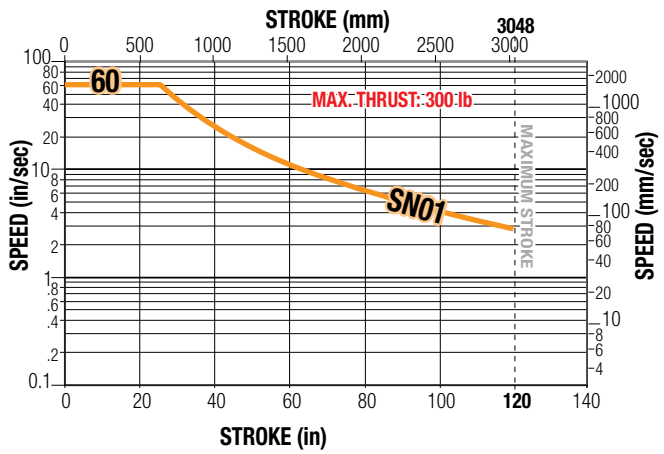
BN = *Ball Nut*

⚠ **Maximum thrust reflects 90% reliability for 1 million linear inches of travel.*

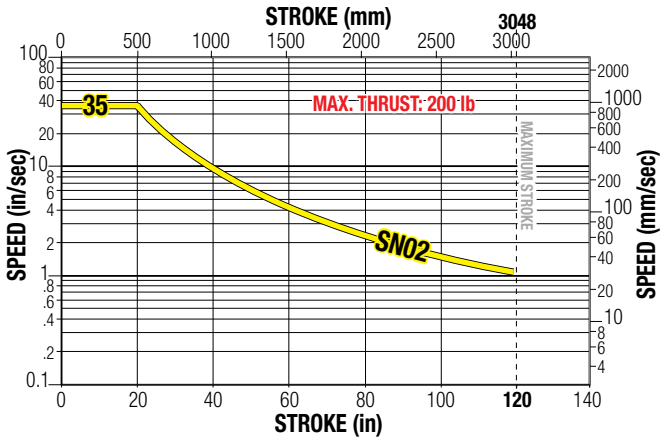
***Life indicates theoretical maximum life of screw only, under ideal conditions and does not indicate expected life of actuator.*

MXE40 ACME SCREW CRITICAL SPEED AND PV LIMITS

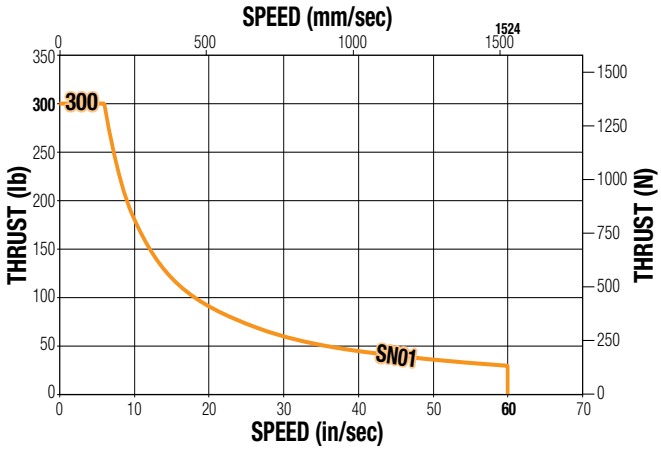
Critical Speed: 0.75" 1TPI Acme Screw



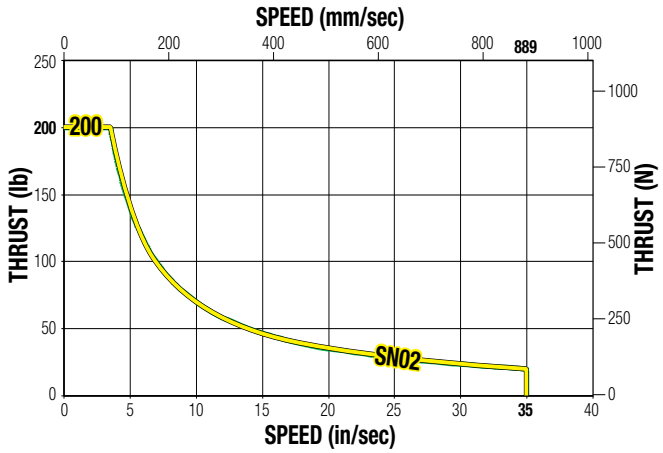
Critical Speed: 0.625" 2TPI Acme Screw



PV Limits: 1TPI Acme Screw



PV Limits: 2TPI Acme Screw



SN = Solid Nut

⚠ **** Maximum thrust is the maximum continuous dynamic thrust subject to Thrust x Velocity Limitation.***

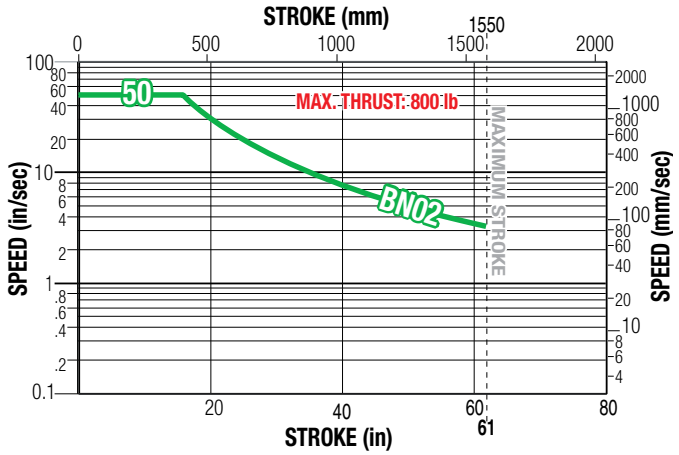
PV LIMITS: Any material which carries a sliding load is limited by heat buildup. The factors that affect heat generation rate in an application are the pressure on the nut in pounds per square inch and the surface velocity in feet per minute. The product of these factors provides a measure of the severity of an application.

$$\left(\frac{P}{\text{Thrust}\ (\text{Max. Thrust Rating})}\right) \times \left(\frac{V}{\text{Speed}\ (\text{Max. Speed Rating})}\right) \leq 0.1$$

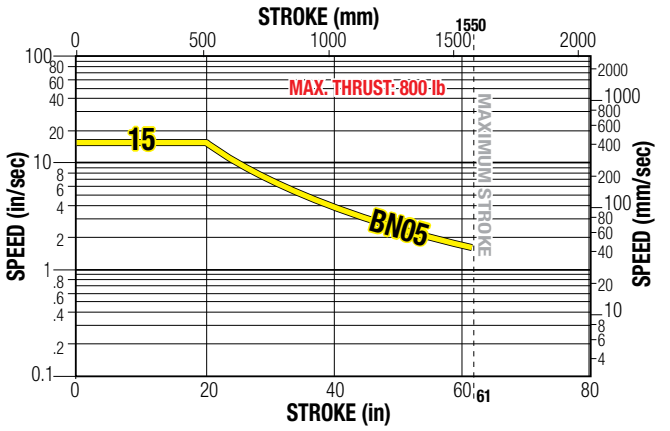
$$\left(\frac{P}{\text{Thrust}\ (\text{Max. Thrust Rating})}\right) \times \left(\frac{V}{\text{Speed}\ (\text{Max. Speed Rating})}\right) \leq 0.1$$

MXE40 BALL SCREW CRITICAL SPEED AND THEORETICAL LIFE

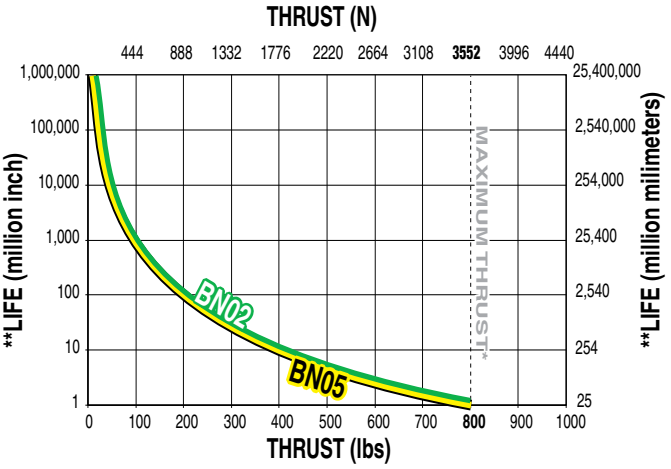
Critical Speed: 0.5", 2TPI Ball Screw



Critical Speed: 0.625", 5TPI Ball Screw



Life: 0.5" and 0.625" Ball Screws



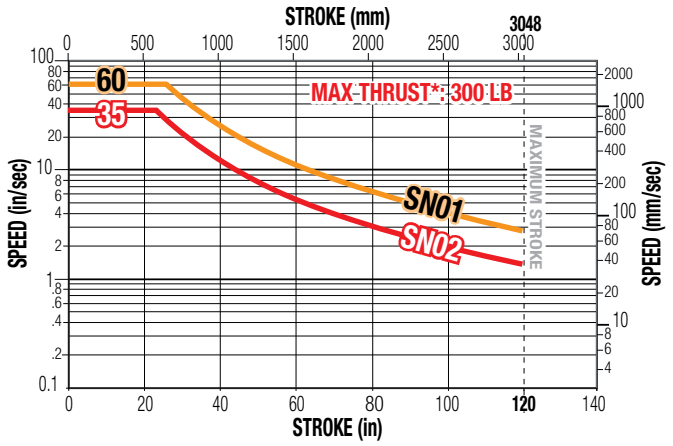
BN = *Ball Nut*

⚠ **Maximum thrust reflects 90% reliability for 1 million linear inches of travel.*

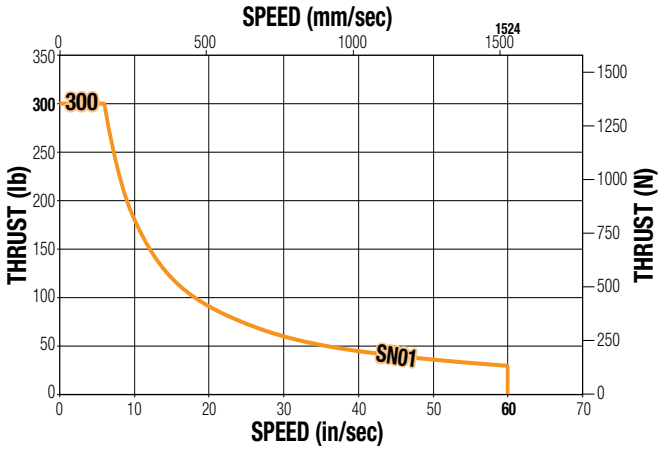
***Life indicates theoretical maximum life of screw only, under ideal conditions and does not indicate expected life of actuator.*

MXE50 ACME SCREW CRITICAL SPEED AND PV LIMITS

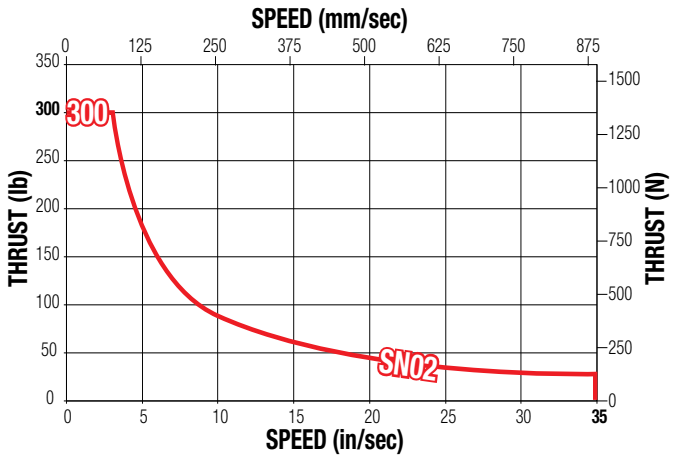
Critical Speed: 0.75" 1 & 2TPI Acme Screw



PV Limits: 1TPI Acme Screw



PV Limits: 2TPI Acme Screw



SN = Solid Nut

⚠ **** Maximum thrust is the maximum continuous dynamic thrust subject to Thrust x Velocity Limitation.***

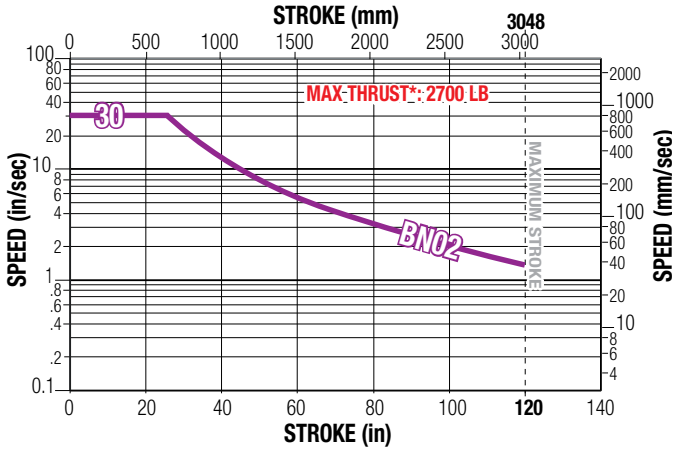
PV LIMITS: Any material which carries a sliding load is limited by heat buildup. The factors that affect heat generation rate in an application are the pressure on the nut in pounds per square inch and the surface velocity in feet per minute. The product of these factors provides a measure of the severity of an application.

$$\left(\frac{P}{\text{Thrust}}{\text{(Max. Thrust Rating)}}\right) \times \left(\frac{V}{\text{Speed}}{\text{(Max. Speed Rating)}}\right) \leq 0.1$$

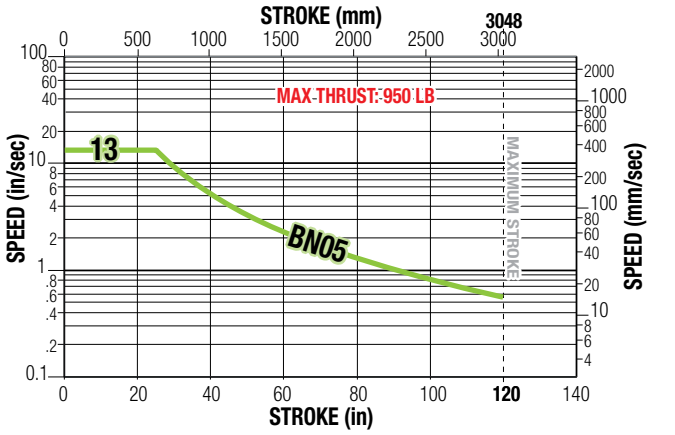
$$\left(\frac{\text{Thrust}}{\text{(Max. Thrust Rating)}}\right) \times \left(\frac{\text{Speed}}{\text{(Max. Speed Rating)}}\right) \leq 0.1$$

MXE50 BALL SCREW CRITICAL SPEED AND THEORETICAL LIFE

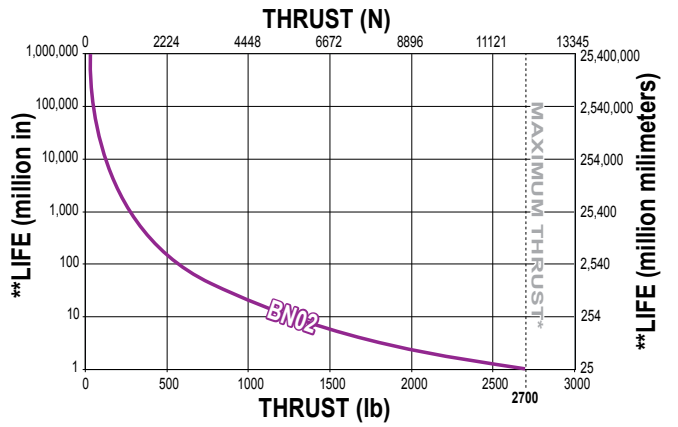
Critical Speed: 0.75", 2TPI Ball Screw



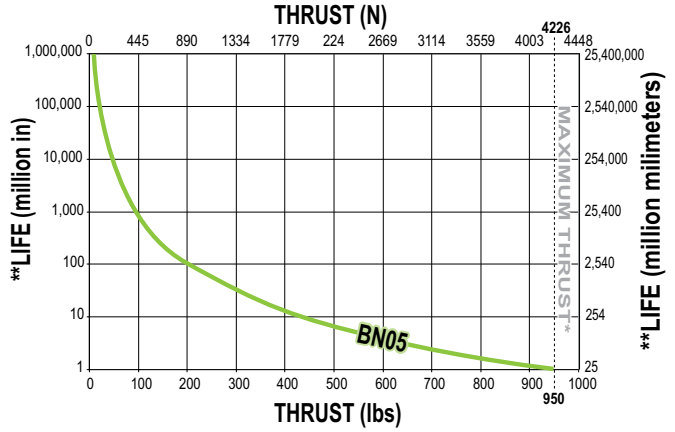
Critical Speed: 0.75", 5TPI Ball Screw



Life: 0.75", 2TPI Ball Screws



Life: 0.75", 5TPI Ball Screws



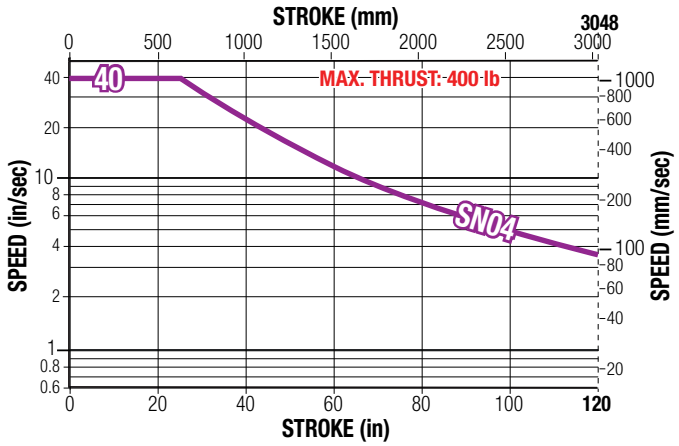
BN = *Ball Nut*

⚠ **Maximum thrust reflects 90% reliability for 1 million linear inches of travel.*

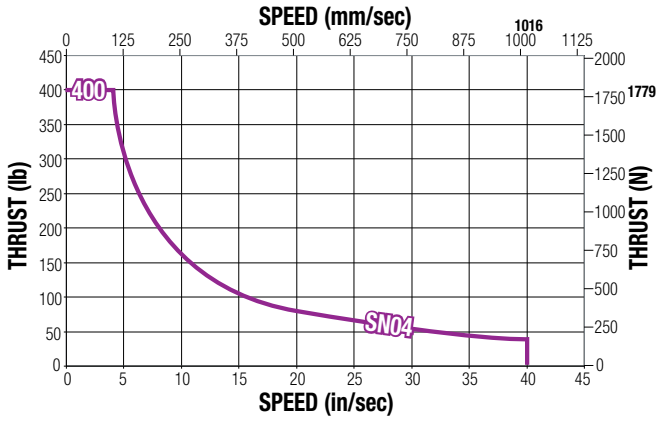
***Life indicates theoretical maximum life of screw only, under ideal conditions and does not indicate expected life of actuator.*

MXE63 ACME SCREW CRITICAL SPEED AND PV LIMITS

Critical Speed: 1", 4TPI Acme Screw



PV Limits: 4TPI Acme Screw



SN = Solid Nut

⚠ ** Maximum thrust is the maximum continuous dynamic thrust subject to Thrust x Velocity Limitation.*

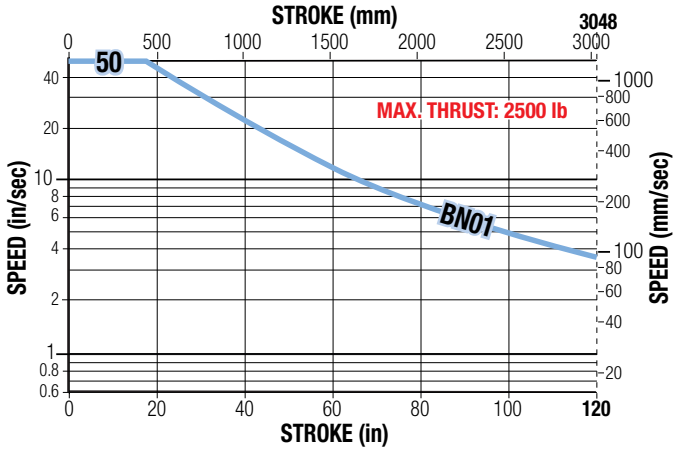
PV LIMITS: Any material which carries a sliding load is limited by heat buildup. The factors that affect heat generation rate in an application are the pressure on the nut in pounds per square inch and the surface velocity in feet per minute. The product of these factors provides a measure of the severity of an application.

$$\left(\frac{P}{\text{Thrust (Max. Thrust Rating)}}\right) \times \left(\frac{V}{\text{Speed (Max. Speed Rating)}}\right) \leq 0.1$$

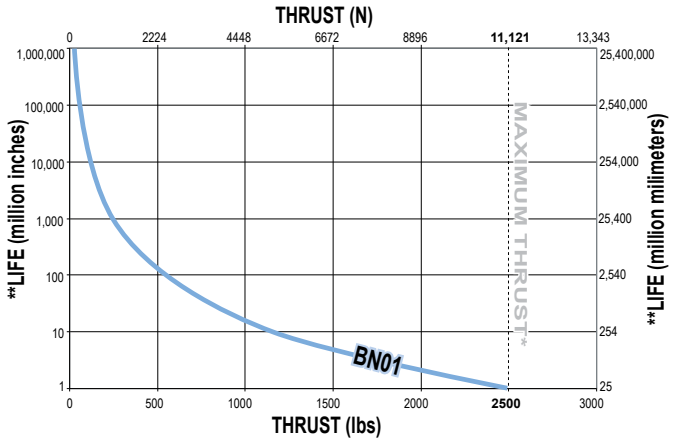
$$\frac{P}{\text{Thrust (Max. Thrust Rating)}} \times \frac{V}{\text{Speed (Max. Speed Rating)}} \leq 0.1$$

MXE63 BALL SCREW CRITICAL SPEED AND THEORETICAL LIFE

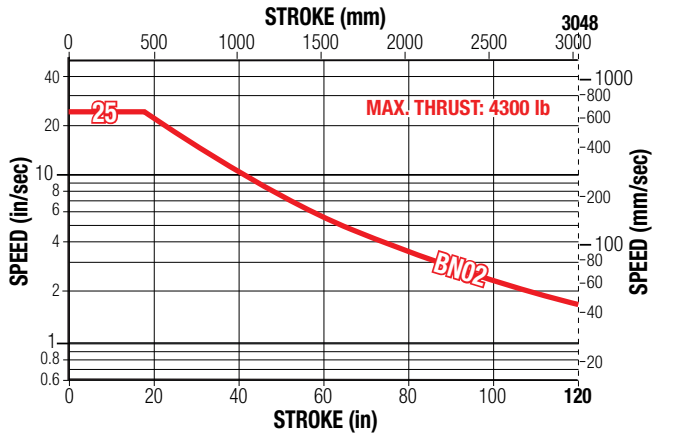
Critical Speed: 1", 1TPI Ball Screw



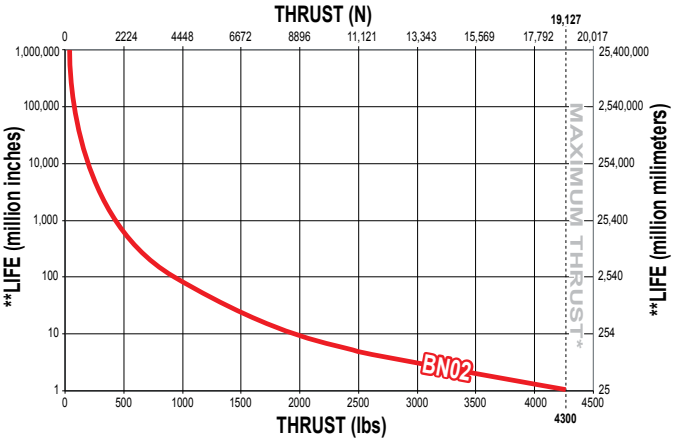
Life: 1", 1TPI Ball Screw



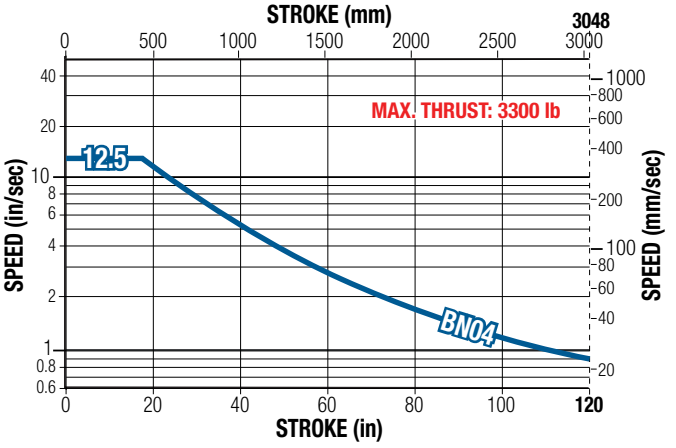
Critical Speed: 1", 2TPI Ball Screw



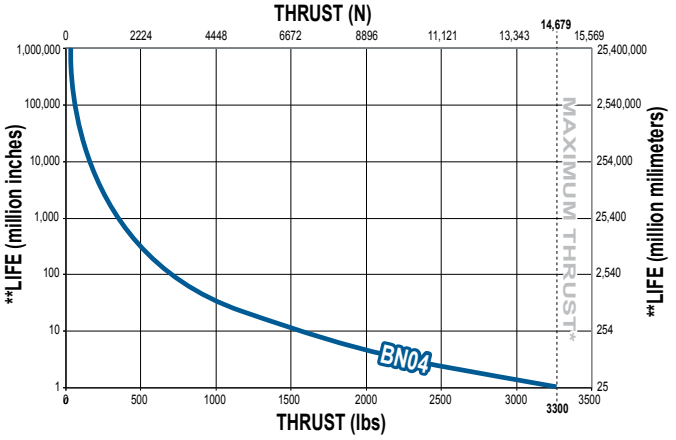
Life: 1", 2TPI Ball Screw



Critical Speed: 1", 4TPI Ball Screw



Life: 1", 4TPI Ball Screw

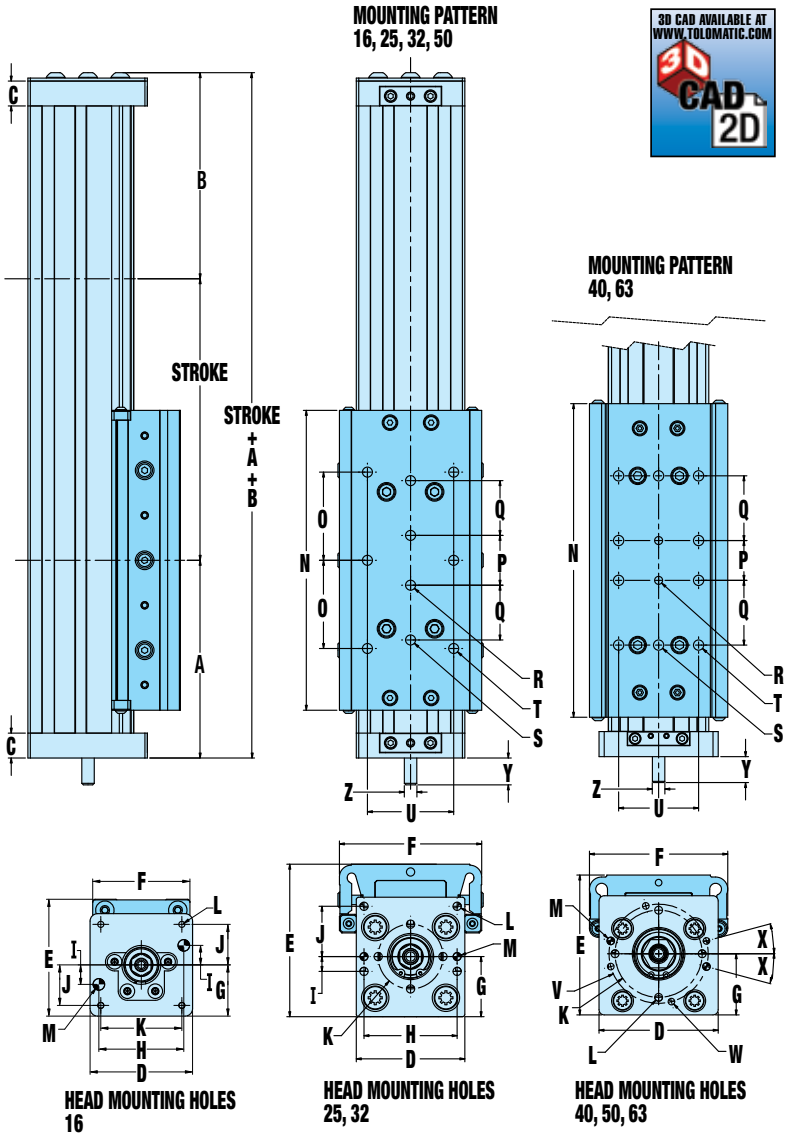


BN = *Ball Nut*

⚠ **Maximum thrust reflects 90% reliability for 1 million linear inches of travel.*

***Life indicates theoretical maximum life of screw only, under ideal conditions and does not indicate expected life of actuator.*

S-SOLID BEARING ACTUATOR DIMENSIONS

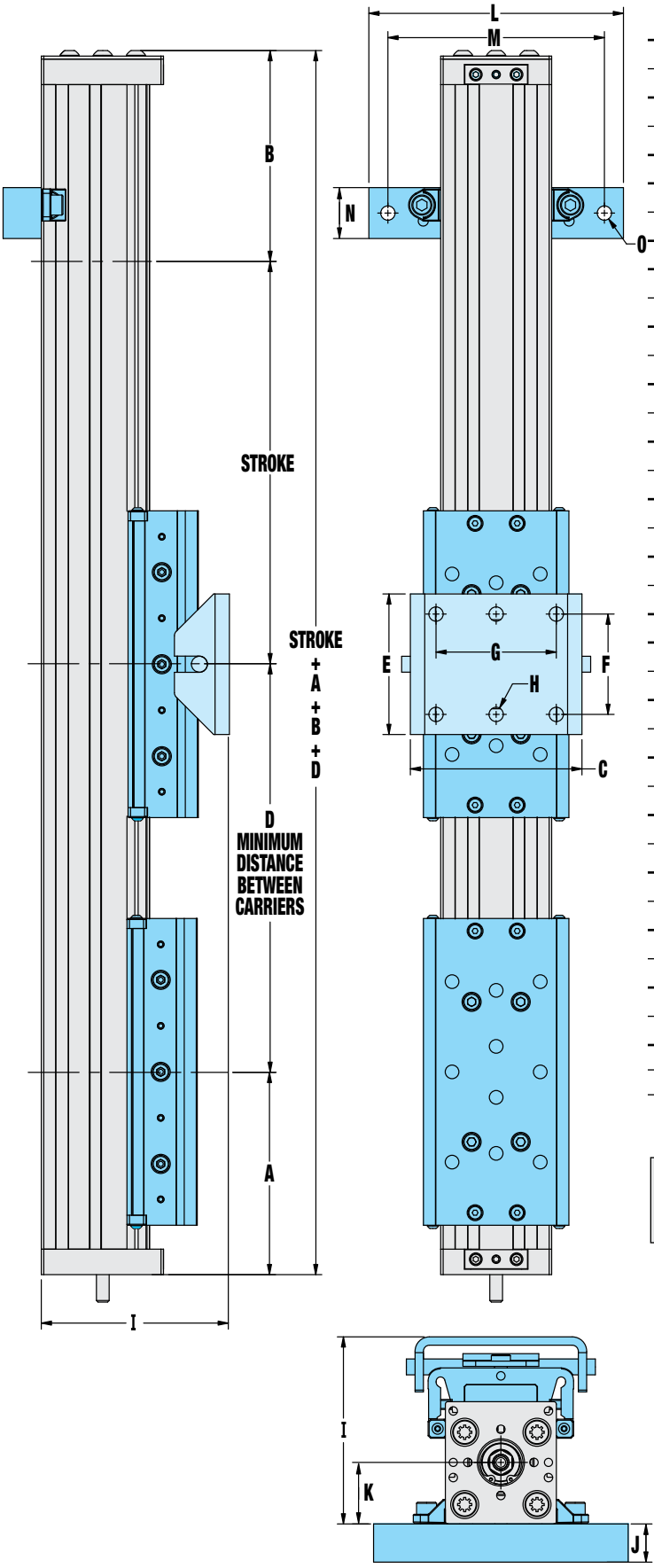


	MXE16	MXE25	MXE32	MXE40	MXE50	MXE63
A	2.72	3.79	3.97	4.93	5.58	8.32
mm	*69.1*	*96.3*	*100.9*	*125.2*	*141.7*	*211.3*
B	2.84	3.96	4.14	5.12	5.82	8.51
mm	*72.1*	*100.6*	*105.1*	*130*	*147.8*	*216.2*
C	0.50	0.92	0.50	0.63	1.31	1.88
mm	*12.7*	*23.4*	*12.7*	*16*	*33.3*	*47.8*
D	1.66	2.25	2.18	2.99	3.47	4.33
mm	*42.2*	*57.2*	*55.4*	*75.9*	*88.1*	*110.0*
E	1.89	2.30	3.06	3.51	4.44	5.50
mm	*48.0*	*58.4*	*77.8*	*89.2*	*112.8*	*139.7*
F	1.58	2.18	2.86	3.47	4.10	5.59
mm	*40.1*	*55.4*	*72.6*	*88.2*	*104.1*	*142.0*
G	0.83	0.95	1.21	1.54	1.82	2.30
mm	*21.1*	*24.1*	*30.7*	*39.1*	*46.2*	*58.4*
H	1.38	1.87	1.87	-	-	-
mm	*35.1*	*47.5*	*47.5*	-	-	-
I	0.32	0.30	0.30	-	-	-
mm	*8.1*	*7.6*	*7.6*	-	-	-
J	0.66	1.01	1.01	-	-	-
mm	*16.8*	*25.7*	*25.7*	-	-	-
K	1.31	Ø1.30	Ø1.30	Ø2.19	Ø2.69	Ø3.01
mm	*33.3*	*Ø33.0*	*Ø33.0*	*Ø55.6*	*Ø68.3*	*Ø76.5*
L	M3x0.5 (4)	M5x0.8 (8)	M5x0.8 (8)	M6x1.0 (4)	M6x1.0 (4)	M6x1.0 (4)
mm	*M3x0.5 (4)*	*M5x0.8 (8)*	*M5x0.8 (8)*	*M6x1.0 (4)*	*M6x1.0 (4)*	*M6x1.0 (4)*
M	Ø.188 (2)	Ø.158 (2)	Ø.158 (2)	Ø.189 (2)	Ø.188 (2)	Ø.188 (2)
mm	*Ø4.78 (2)*	*Ø4.01 (2)*	*Ø4.01 (2)*	*Ø4.80 (2)*	*Ø4.78 (2)*	*Ø4.78 (2)*
N	4.12	5.31	6.02	7.87	7.91	12.11
mm	*104.6*	*134.9*	*153*	*200*	*200.9*	*307.6*
O	1.18	1.57	1.77	-	1.88	-
mm	*30.0*	*39.9*	*45*	-	*47.8*	-
P	-	1.00	1.00	1.00	2.50	3.00
mm	-	*25.4*	*25.4*	*25.4*	*63.5*	*76.2*
Q	-	1.07	1.10	1.63	1.25	1.50
mm	-	*27.2*	*28*	*41.3*	*31.8*	*38.1*
R	-	1/4-20 (2)	1/4-20 (2)	1/4-20 (2)	3/8-16 (2)	3/8-16 (2)
mm	-	*M6x1.0 (2)*	*M8x1.25 (2)*	*M8x1.25 (2)*	*M10x1.5 (2)*	*M10x1.5 (2)*
S	-	#10-32 (2)	1/4-20 (2)	5/16-18 (2)	3/8-16 (2)	3/8-16 (2)
mm	-	*M6x1.0 (2)*	*M8x1.25 (2)*	*M8x1.25 (2)*	*M10x1.5 (2)*	*M10x1.5 (2)*
T	#8-32 (6)	1/4-20 (6)	1/4-20 (6)	5/16-18 (8)	3/8-16 (6)	3/8-16 (8)
mm	*M4x0.7 (6)*	*M6x1.0 (6)*	*M8x1.25 (6)*	*M8x1.25 (8)*	*M10x1.5 (6)*	*M10x1.5 (8)*
U	1.18	1.18	1.73	2.00	2.59	3.25
mm	*30.0*	*30.0*	*44.0*	*51.0*	*65.8*	*82.6*
V	-	-	-	Ø2.49	Ø3.01	Ø3.01
mm	-	-	-	*Ø63.2*	*Ø76.5*	*Ø76.5*
W	-	-	-	M5x0.8 (4)	M5x0.8 (4)	M5x0.8 (4)
mm	-	-	-	*M5x0.8 (4)*	*M5x0.8 (4)*	*M5x0.8 (4)*
X	-	-	-	15°	15°	15°
mm	-	-	-	*15°*	*15°*	*15°*

Y (Shaft length)	MXE16	MXE25	MXE32	MXE40	MXE50	MXE63
LMI	0.64	0.55	0.55	0.69	1.35	1.35
mm	*16.3*	*14.0*	*14.0*	*17.5*	*34.3*	*34.3*
17 FRAME RP	0.87	-	-	-	-	-
mm	*22.1*	-	-	-	-	-
23 FRAME RP	-	1.99	1.99	1.99	2.10	1.92
mm	-	*50.5*	*50.5*	*50.5*	*53.3*	*48.8*
34 FRAME RP	-	2.20	2.20	2.20	2.10	1.92
mm	-	*55.9*	*55.9*	*55.9*	*53.3*	*48.8*
56 FRAME RP	-	-	-	-	-	1.92
mm	-	-	-	-	-	*48.8*

Z (Shaft dia.)	MXE16	MXE25	MXE32	MXE40	MXE50	MXE63
LMI (BN02)	0.156	0.25	0.25	0.312	0.5	–
mm	*3.96*	*6.35*	*6.35*	*7.92*	*12.70*	–
LMI (all others)	0.156	0.25	0.25	0.393	0.5	0.5
mm	*3.96*	*6.35*	*6.35*	*9.98*	*12.70*	*12.70*
RP (BN02)	0.156	0.25	0.25	0.25	0.5	0.5
mm	*3.96*	*6.35*	*6.35*	*6.35*	*12.70*	*12.70*
RP (all others)	0.156	0.25	0.25	0.375	0.5	0.5
mm	*3.96*	*6.35*	*6.35*	*9.53*	*12.70*	*12.70*

S-SOLID BEARING OPTION DIMENSIONS



	MXE16S	MXE25S	MXE32S	MXE40S	MXE50S	MXE63S
A	2.72	3.79	3.97	4.93	5.58	8.32
mm	*69.1*	*96.3*	*100.9*	*125.2*	*141.7*	*211.3*
B	2.84	3.96	4.14	5.12	5.82	8.51
mm	*72.1*	*100.6*	*105.1*	*130*	*147.8*	*216.2*
AUXILIARY CARRIER						
D	5.00	6.00	7.00	8.50	8.60	13.00
mm	*127.0*	*152.4*	*177.8*	*215.9*	*218.4*	*330.2*
FLOATING MOUNT						
C	1.86	2.52	3.37	4.32	5.04	6.10
mm	*47.2*	*64.1*	*93.3*	*109.7*	*128.0*	*154.9*
E	0.98	1.25	2.76	3.94	3.94	5.00
mm	*24.9*	*31.8*	*70.1*	*100.0*	*100.0*	*127.0*
F	0.47	0.63	1.97	2.95	3.15	3.94
mm	*11.9*	*15.9*	*50.0*	*74.9*	*80.0*	*100.1*
G	-	-	-	2.17	-	2.76
mm	*-*	*-*	*-*	*55.1*	*-*	*70.1*
H*	Ø.18 (2)	Ø.24 (2)	Ø.28 (2)	Ø.28 (4)	Ø.36 (2)	Ø.34 (4)
mm	*Ø4.6 (2)*	*Ø6.1 (2)*	*Ø7.1 (2)*	*Ø7.1 (4)*	*Ø9.1 (2)*	*Ø8.6 (4)*
I	2.28	2.80	3.67	4.26	5.24	6.17
mm	*57.9*	*71.0*	*93.3*	*108.2*	*133.1*	*156.7*
MOUNTING PLATE/TUBE CLAMP KITS						
J**	0.50	1.00	0.75	0.63	1.25	1.00
mm	*12.7*	*25.4*	*19.1*	*16.0*	*31.8*	*25.4*
J***	-	1.38	1.13	1.00	1.25	1.00
mm	*-*	*35.1*	*28.7*	*25.4*	*31.8*	*25.4*
K	0.83	0.95	1.21	1.54	1.82	2.30
mm	*21.1*	*24.1*	*30.7*	*39.1*	*46.2*	*58.4*
L	2.50	4.00	5.00	5.00	5.60	8.00
mm	*63.5*	*101.6*	*127.0*	*127.0*	*142.2*	*203.2*
M	1.88	3.39	4.25	4.41	5.00	7.00
mm	*47.8*	*86.0*	*108.0*	*112.0*	*127.0*	*177.8*
N	1.00	1.00	1.00	0.79	0.79	1.00
mm	*25.4*	*25.4*	*25.4*	*20.0*	*20.0*	*25.4*
O	Ø.22 (2)	Ø.22 (2)	Ø.28 (2)	Ø.28 (2)	Ø.28 (2)	Ø.42 (2)
mm	*Ø5.6 (2)*	*Ø5.6 (2)*	*Ø7.1 (2)*	*Ø7.1 (2)*	*Ø7.1 (2)*	*Ø10.7 (2)*

* MXE16, MXE25, MXE32 & MXE50 USE 2 CENTER HOLES, MXE40 & MXE63 USE 4 CORNER HOLES

** MOUNTING PLATE THICKNESS FOR 23 FRAME MOTORS (17 FRAME MOTORS ON MXE16)

*** MOUNTING PLATE THICKNESS FOR 34 FRAME MOTORS (AND 56 FRAME MOTORS ON MXE63)

NOTE: MXE16 uses MP (mounting plate) with included T-nuts

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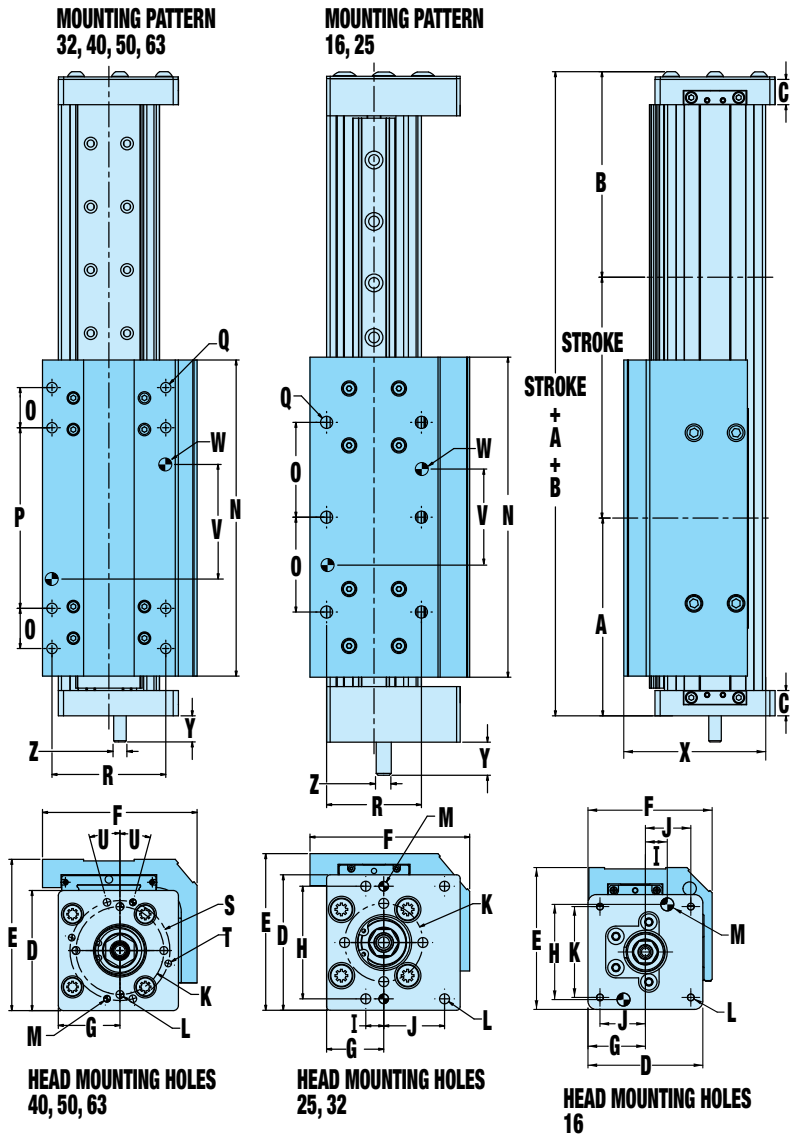
P-PROFILED RAIL ACTUATOR DIMENSIONS

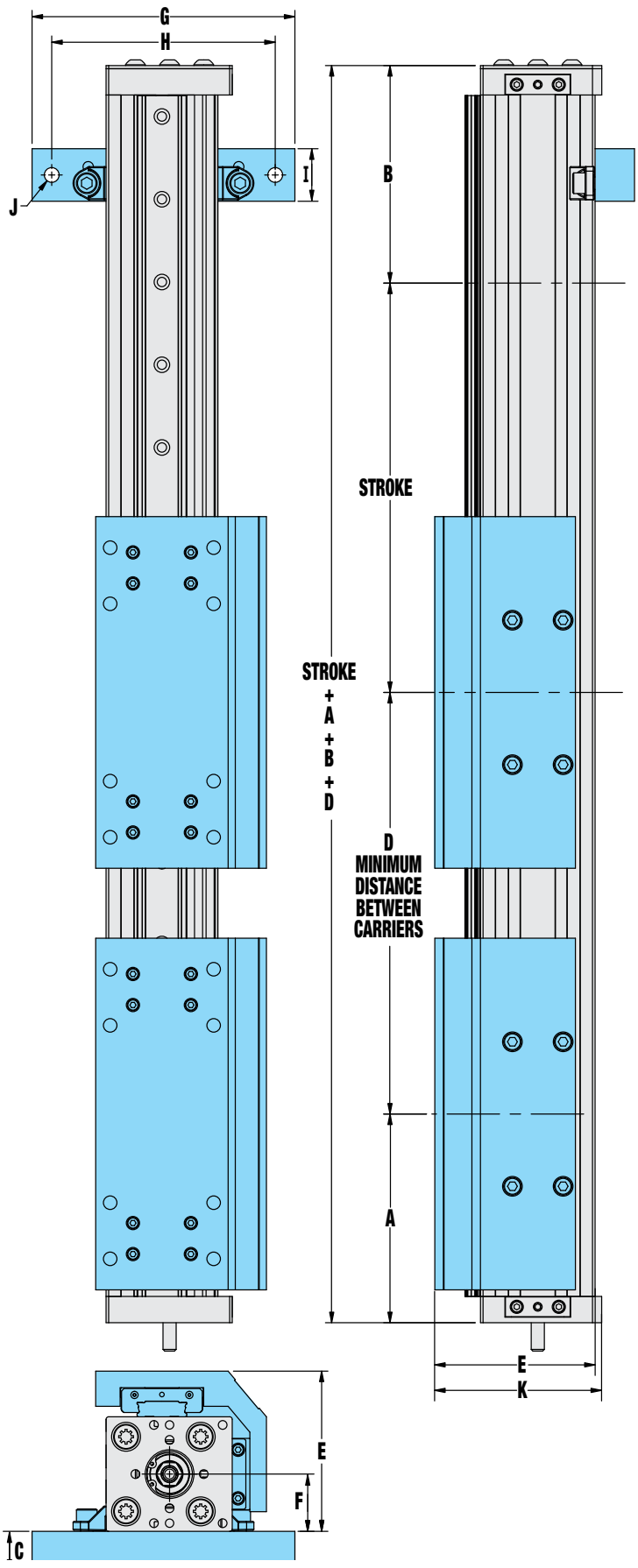


	MXE16	MXE25	MXE32	MXE40	MXE50	MXE63
A	2.72	3.79	3.97	4.93	5.58	8.32
mm	*69.1*	*96.3*	*100.9*	*125.2*	*141.7*	*211.3*
B	2.84	3.96	4.14	5.12	5.82	8.51
mm	*72.1*	*100.6*	*105.1*	*130.0*	*147.8*	*216.2*
C	0.50	0.92	0.50	0.63	1.31	1.88
mm	*12.7*	*23.4*	*12.7*	*16.0*	*33.3*	*47.8*
D	1.66	2.25	2.18	2.99	3.47	4.33
mm	*42.2*	*57.2*	*55.4*	*75.9*	*88.0*	*110.0*
E	2.05	2.60	3.05	3.77	4.90	5.71
mm	*52.1*	*66.1*	*77.4*	*95.7*	*124.5*	*145.0*
F	1.80	2.65	3.25	3.85	4.62	5.65
mm	*45.7*	*67.4*	*82.6*	*97.8*	*117.3*	*143.5*
G	0.83	0.95	1.21	1.54	1.82	2.30
mm	*21.1*	*24.1*	*30.7*	*39.1*	*46.2*	*58.4*
H	1.38	1.87	1.87	-	-	-
mm	*35.1*	*47.5*	*47.5*	-	-	-
I	0.32	0.30	0.30	-	-	-
mm	*8.1*	*7.6*	*7.6*	-	-	-
J	0.66	1.01	1.01	-	-	-
mm	*16.8*	*25.7*	*25.7*	-	-	-
K	1.31	Ø1.30	Ø1.30	Ø2.19	Ø2.69	Ø2.19
mm	*33.3*	*Ø33.0*	*Ø33.0*	*Ø55.6*	*Ø68.3*	*Ø55.6*
L	M3x0.5 (4)	M5x0.8 (8)	M5x0.8 (8)	M6x1.0 (4)	M6x1.0 (4)	M6x1.0 (4)
mm	*M3x0.5 (4)*	*M5x0.8 (8)*	*M5x0.8 (8)*	*M6x1.0 (4)*	*M6x1.0 (4)*	*M6x1.0 (4)*
M	Ø.188 (2)	Ø.158 (2)	Ø.158 (2)	Ø.189 (2)	Ø.188 (2)	Ø.188 (2)
mm	*Ø4.78 (2)*	*Ø4.01 (2)*	*Ø4.01 (2)*	*Ø4.80 (2)*	*Ø4.78 (2)*	*Ø4.78 (2)*
N	4.33	5.31	6.69	7.87	8.50	12.11
mm	*110.0*	*135.0*	*170.0*	*200*	*215.9*	*207.6*
O	1.58	1.57	1.07	1.00	1.00	1.57
mm	*40.0*	*40.0*	*27.2*	*25.4*	*25.4*	*39.9*
P	-	-	3.37	4.50	2.75	5.12
mm	*-*	*-*	*85.6*	*114.3*	*69.9*	*130.0*
Q	#8-32 (6)	1/4-20 (6)	5/16-18 (8)	5/16-18 (8)	5/16-18 (8)	3/18-16 (8)
mm	*M4x0.7 (6)*	*M6x1.0 (6)*	*M8x1.25 (8)*	*M8x1.25 (8)*	*M8x1.25 (8)*	*M10x1.5 (8)*
R	1.10	1.57	1.97	2.84	3.13	3.87
mm	*28.0*	*40.0*	*50.0*	*72.1*	*79.5*	*98.3*
S	-	-	-	Ø2.49	Ø3.01	Ø3.01
mm	*-*	*-*	*-*	*Ø63.2*	*Ø76.5*	*Ø76.5*
T	-	-	-	M5x0.8 (4)	M5x0.8 (4)	M5x0.8 (4)
mm	*-*	*-*	*-*	*M5x0.8 (4)*	*M5x0.8 (4)*	*M5x0.8 (4)*
U	-	-	-	15°	15°	15°
mm	*-*	*-*	*-*	*15°*	*15°*	*15°*
V	1.58	1.58	1.77	2.50	1.50	2.56
mm	*40.0*	*40.0*	*45.0*	*63.5*	*38.1*	*65.0*
W	5/32	1/4	5/16	5/16	5/16	3/8
mm	*M4*	*M6*	*M8*	*M8*	*M8*	*M8*
X	1.81	2.30	3.05	3.53	4.71	5.51
mm	*46.0*	*58.5*	*77.4*	*89.7*	*119.7*	*140.0*

Y (Shaft length)	MXE16	MXE25	MXE32	MXE40	MXE50	MXE63
LMI	0.64	0.55	0.55	0.69	1.35	1.35
mm	*16.3*	*14*	*14*	*17.5*	*34.3*	*34.3*
17 FRAME RP	0.87	-	-	-	-	-
mm	*22.1*	*-*	*-*	*-*	*-*	*-*
23 FRAME RP	-	1.99	1.99	1.99	2.10	1.92
mm	*-*	*50.5*	*50.5*	*50.5*	*53.3*	*48.8*
34 FRAME RP	-	2.2	2.2	2.2	2.10	1.92
mm	*-*	*55.9*	*55.9*	*55.9*	*53.3*	*48.8*
56 FRAME RP	-	-	-	-	-	1.92
mm	*-*	*-*	*-*	*-*	*-*	*48.8*

Z (Shaft dia.)	MXE16	MXE25	MXE32	MXE40	MXE50	MXE63
LMI (BN02)	0.156	0.25	0.25	0.312	0.5	–
mm	*3.96*	*6.35*	*6.35*	*7.92*	*12.70*	*–*
LMI (all others)	0.156	0.25	0.25	0.393	0.5	0.5
mm	*3.96*	*6.35*	*6.35*	*9.98*	*12.70*	*12.70*
RP (BN02)	0.156	0.25	0.25	0.25	0.5	0.5
mm	*3.96*	*6.35*	*6.35*	*6.35*	*12.70*	*12.70*
RP (all others)	0.156	0.25	0.25	0.375	0.5	0.5
mm	*3.96*	*6.35*	*6.35*	*9.53*	*12.70*	*12.70*

P-PROFILED RAIL OPTION DIMENSIONS



	MXE16S	MXE25S	MXE32S	MXE40S	MXE50S	MXE63S
A	2.72	3.79	3.97	4.93	5.58	8.32
mm	*69.1*	*96.3*	*100.9*	*125.2*	*141.7*	*211.3*
B	2.84	3.96	4.14	5.12	5.82	8.51
mm	*72.1*	*100.6*	*105.1*	*130*	*147.8*	*216.2*
AUXILIARY CARRIER						
D	5.00	6.00	7.00	8.50	8.60	13.00
mm	*127.0*	*152.4*	*177.8*	*215.9*	*218.4*	*330.2*
MOUNTING PLATE/TUBE CLAMP KITS						
C*	0.50	1.00	0.75	0.63	1.25	1.00
mm	*12.7*	*25.4*	*19.1*	*16.0*	*31.8*	*25.4*
C**	-	1.38	1.13	1.00	1.25	1.00
mm	*-*	*35.1*	*28.7*	*25.4*	*31.8*	*25.4*
E	1.81	2.30	3.05	3.53	4.71	5.51
mm	*46.0*	*58.5*	*77.4*	*89.7*	*119.7*	*140.0*
F	0.83	0.95	1.21	1.54	1.82	2.30
mm	*21.1*	*24.1*	*30.7*	*39.1*	*46.2*	*58.4*
G	2.50	4.00	5.00	5.00	5.60	8.00
mm	*63.5*	*101.6*	*127.0*	*127.0*	*142.2*	*203.2*
H	1.88	3.39	4.25	4.41	5.00	7.00
mm	*47.8*	*86.0*	*108.0*	*112.0*	*127.0*	*177.8*
I	1.00	1.00	1.00	0.79	0.79	1.00
mm	*25.4*	*25.4*	*25.4*	*20.0*	*20.0*	*25.4*
J	Ø.22 (2)	Ø.22 (2)	Ø.28 (2)	Ø.28 (2)	Ø.28 (2)	Ø.42 (2)
mm	*Ø5.6 (2)*	*Ø5.6 (2)*	*Ø7.1 (2)*	*Ø7.1 (2)*	*Ø7.1 (2)*	*Ø10.7 (2)*
K	2.05	2.60	3.05	3.77	1.90	5.71
mm	*52.1*	*66.1*	*77.4*	*95.7*	*124.5*	*145.0*

* MOUNTING PLATE THICKNESS FOR 23 FRAME MOTORS (17 FRAME MOTORS ON MXE16)

** MOUNTING PLATE THICKNESS FOR 34 FRAME MOTORS (AND 56 FRAME MOTORS ON MXE63)

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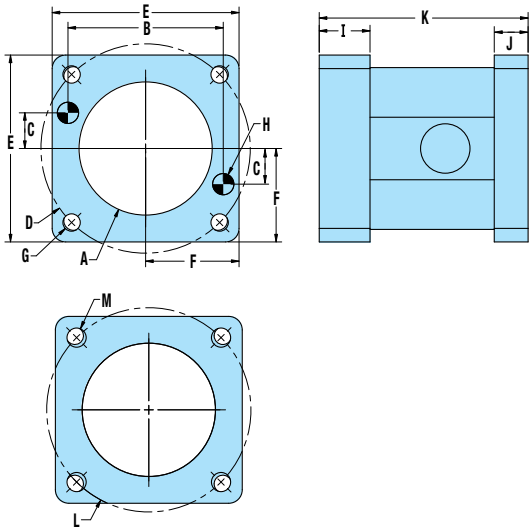
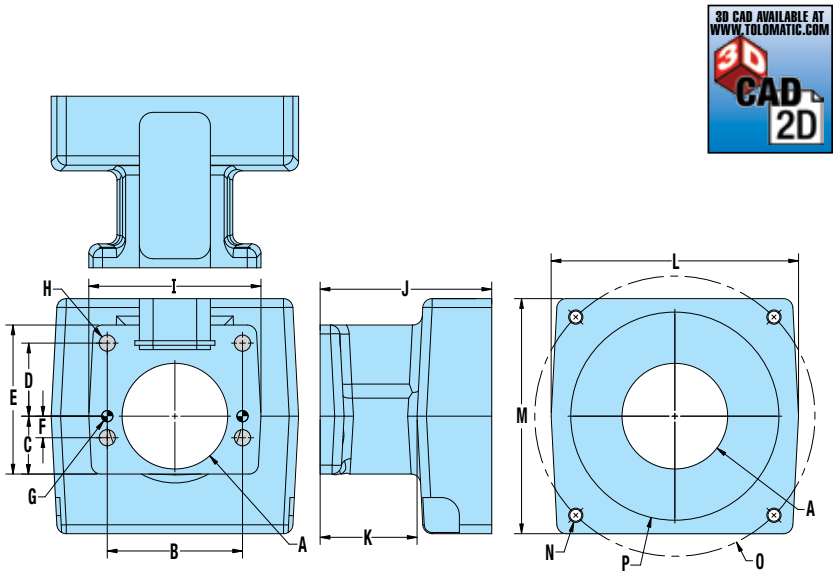
S-SOLID BEARING AND P-PROFILED RAIL IN-LINE MOTOR MOUNTING

MXE16



	MRV11
A	Ø1.18
mm	*Ø30.0*
B	1.376
mm	*34.95*
C	0.316
mm	*8.03*
D	Ø1.855 BC
mm	*Ø47.12 BC*
E	1.656
mm	*42.06*
F	0.828
mm	*21.03*
G	Ø.154 (4)
mm	*Ø3.91 (4)*
H	Ø.1885/.1895 x .16 DP (2)
mm	*Ø4.788/4.813 x 4.1 DP (2)*
I	0.45
mm	*11.4*
J	0.30
mm	*7.6*
K	1.85
mm	*47.0*
L	Ø 1.810 BC
mm	*Ø 45.97 BC*
M	Ø.170 THRU (4)
mm	*4.32 THRU (4)*

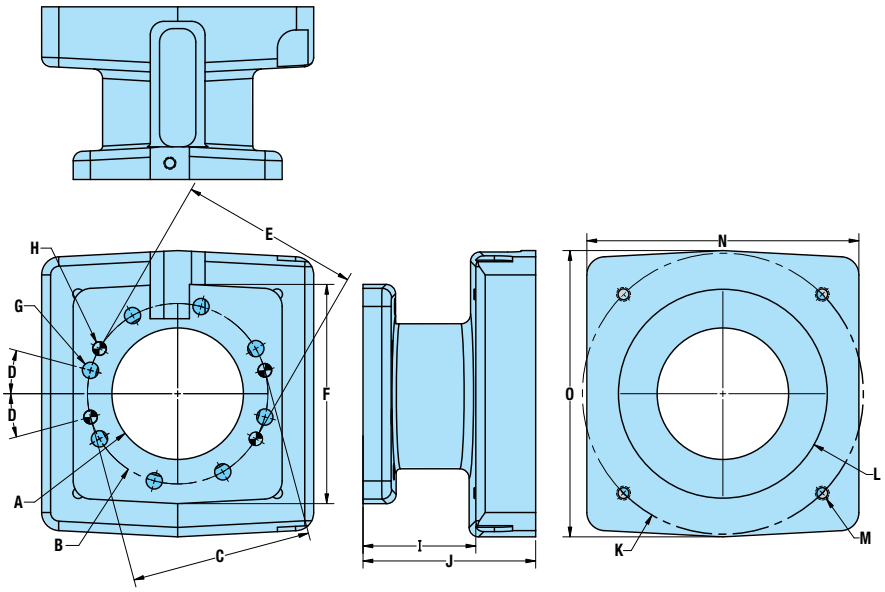
MXE25/32



	MRV2x	MRS2x	MRS3x
A	Ø1.46	Ø1.46	Ø1.46
mm	*Ø37.1*	*Ø37.1*	*Ø37.1*
B	1.870	1.870	1.870
mm	*47.50*	*47.50*	*47.50*
C	.800	.800	.800
mm	*20.32*	*20.32*	*20.32*
D	1.010	1.010	1.010
mm	*25.65*	*25.65*	*25.65*
E	2.06	2.06	2.06
mm	*52.3*	*52.3*	*52.3*
F	.298	.298	.298
mm	*7.57*	*7.57*	*7.57*
G	Ø.1555/.1560 x .23 DP (2)	Ø.1555/.1560 x .23 DP (2)	Ø.1555/.1560 x .23 DP (2)
mm	*Ø3.948/3.961 x 5.8 DP (2)*	*Ø3.948/3.961 x 5.8 DP (2)*	*Ø3.948/3.961 x 5.8 DP (2)*
H	Ø.22 THRU (4)	Ø.22 THRU (4)	Ø.22 THRU (4)
mm	*Ø5.7 THRU (4)*	*Ø5.7 THRU (4)*	*Ø5.7 THRU (4)*
I	2.38	2.38	2.38
mm	*60.5*	*60.5*	*60.5*
J	2.49	1.93	2.37
mm	*63.2*	*49.0*	*60.2*
K	1.34	1.34	1.34
mm	*34.0*	*34.0*	*34.0*
L	2.80	2.60	3.42
mm	*71.1*	*66.0*	*86.9*
M	2.80	2.60	3.25
mm	*71.1*	*66.0*	*82.6*
N	#10-24 x 0.75 DP (4)	M5X0.8 x .40 DP (4)	M5X0.8 x .40 DP (4)
mm	*#10-24 x 19.1 DP (4)*	*M5X0.8 x 10.2 DP (4)*	*M5X0.8 x 10.2 DP (4)*
O	Ø2.625 BC	Ø2.625 BC	Ø3.875 BC
mm	*Ø66.68 BC*	*Ø66.68 BC*	*Ø98.43 BC*
P	Ø1.504	Ø1.504	Ø2.877
mm	*Ø38.20*	*Ø38.20*	*Ø73.08*

S-SOLID BEARING AND P-PROFILED RAIL IN-LINE MOTOR MOUNTING

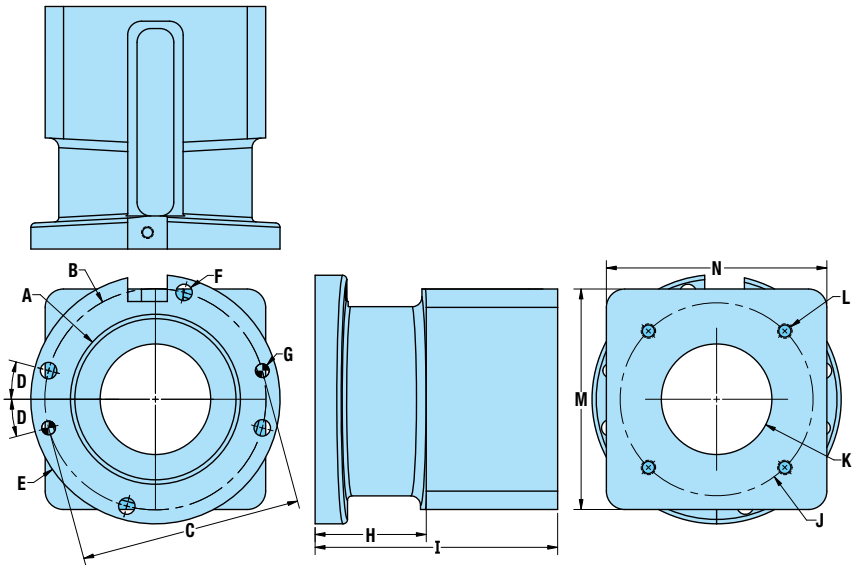
MXE40



	MRV2x	MRV3x	MRS2x	MRS3x
A	Ø1.81	Ø1.81	Ø1.81	Ø1.81
mm	*Ø46.0*	*Ø46.0*	*Ø46.0*	*Ø46.0*
B	Ø2.488 BC	Ø2.488 BC	Ø2.488 BC	Ø2.488 BC
mm	*Ø63.20 BC*	*Ø63.20 BC*	*Ø63.20 BC*	*Ø63.20 BC*
C	2.488	2.488	2.488	2.488
mm	*63.20*	*63.20*	*63.20*	*63.20*
D	15°	15°	15°	15°
mm	*15°*	*15°*	*15°*	*15°*
E	2.488	2.488	-	-
mm	*63.20*	*63.20*	*-*	*-*
F	3.02	3.02	3.02	3.02
mm	*76.7*	*76.7*	*76.7*	*76.7*
G	Ø.22 THRU (8)	Ø.22 THRU (8)	Ø.22 THRU (4)	Ø.22 THRU (4)
mm	*Ø.57 THRU (8)*	*Ø.57 THRU (8)*	*Ø.57 THRU (4)*	*Ø.57 THRU (4)*
H	Ø.1865/.1875 x .23 DP (4)	Ø.1865/.1875 x .23 DP (4)	Ø.1865/.1875 x .23 DP (2)	Ø.1865/.1875 x .23 DP (2)
mm	*Ø4.737/4.763 x 5.8 DP (4)*	*Ø4.737/4.763 x 5.8 DP (4)*	*Ø4.737/4.763 x 5.8 DP (2)*	*Ø4.737/4.763 x 5.8 DP (2)*
I	1.53	1.56	1.52	1.56
mm	*38.9*	*39.6*	*38.6*	*39.6*
J	2.63	2.38	2.07	2.95
mm	*66.8*	*60.5*	*52.6*	*74.9*
K	Ø2.625 BC	Ø3.875 BC	Ø2.625 BC	Ø3.875 BC
mm	*Ø66.68 BC*	*Ø98.43 BC*	*Ø66.68 BC*	*Ø98.43 BC*
L	Ø1.504	Ø2.879	Ø1.504	Ø2.879
mm	*Ø38.2*	*Ø73.13*	*Ø38.2*	*Ø73.13*
M	#10-24 x .75 DP (4)	#10-24 x .75 DP (4)	M5x0.8 x .41 (4)	M5x0.8 x .41 (4)
mm	*#10-24 x 19.1 DP (4)*	*#10-24 x 19.1 DP (4)*	*M5x0.8 x 10.4 (4)*	*M5x0.8 x 10.4 (4)*
N	2.63	3.75	2.35	3.75
mm	*66.8*	*95.3*	*59.7*	*95.3*
O	2.63	3.95	2.35	3.95
mm	*66.8*	*100.3*	*59.7*	*100.3*

S-SOLID BEARING AND P-PROFILED RAIL IN-LINE MOTOR MOUNTING

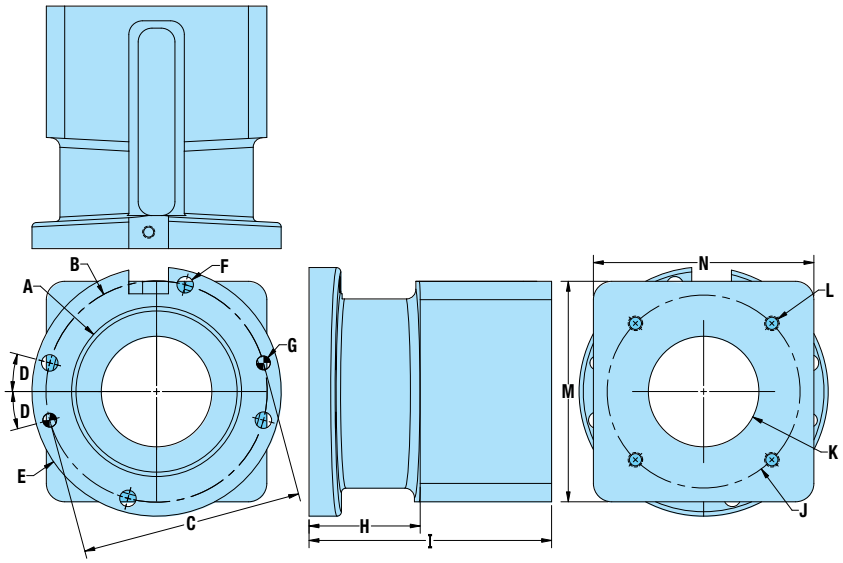
MXE50



	MRV2x	MRV3x, GH3x	MRS2x	MRS3x	GH2x
A	Ø2.31	Ø2.31	Ø2.31	Ø2.31	Ø2.31
mm	*Ø58.7*	*Ø58.7*	*Ø58.7*	*Ø58.7*	*Ø58.7*
B	Ø3.010 BC	Ø3.010 BC	Ø3.010 BC	Ø3.010 BC	Ø3.010 BC
mm	*Ø76.45 BC*	*Ø76.45 BC*	*Ø76.45 BC*	*Ø76.45 BC*	*Ø76.45 BC*
C	3.010	3.010	3.010	3.010	3.010
mm	*76.45*	*76.45*	*76.45*	*76.45*	*76.45*
D	15°	15°	15°	15°	15°
mm	*15°*	*15°*	*15°*	*15°*	*15°*
E	Ø3.390	Ø3.390	Ø3.390	Ø3.390	Ø3.390
mm	*Ø86.11*	*Ø86.11*	*Ø86.11*	*Ø86.11*	*Ø86.11*
F	Ø.22 THRU (4)	Ø.22 THRU (4)	Ø.22 THRU (4)	Ø.22 THRU (4)	Ø.22 THRU (4)
mm	*Ø5.6 THRU (4)*	*Ø5.6 THRU (4)*	*Ø5.6 THRU (4)*	*Ø5.6 THRU (4)*	*Ø5.6 THRU (4)*
G	.1865/.1875 x .23 DP (2)	.1865/.1875 x .23 DP (2)	.1865/.1875 x .23 DP (2)	.1865/.1875 x .23 DP (2)	.1865/.1875 x .23 DP (2)
mm	*4.737/4.763 x 5.8 DP (2)*	*4.737/4.763 x 5.8 DP (2)*	*4.737/4.763 x 5.8 DP (2)*	*4.737/4.763 x 5.8 DP (2)*	*4.737/4.763 x 5.8 DP (2)*
H	1.50	1.50	1.50	1.50	1.50
mm	*38.1*	*38.1*	*38.1*	*38.1*	*38.1*
I	3.30	3.05	2.77	3.24	3.05
mm	*83.8*	*77.5*	*70.4*	*82.3*	*77.5*
J	Ø2.625 BC	Ø3.875 BC	Ø2.625 BC	Ø3.875 BC	Ø2.625 BC
mm	*Ø66.68 BC*	*Ø98.43 BC*	*Ø66.68 BC*	*Ø98.43 BC*	*Ø66.68 BC*
K	Ø1.504	Ø2.880	Ø1.504	Ø2.880	Ø1.504
mm	*Ø38.20*	*Ø73.15*	*Ø38.20*	*Ø73.15*	*Ø38.20*
L	M5x0.8 x .75 DP	M5x0.8 x .75 DP	M5x0.8 x .40 DP	M5x0.8 x .51 DP	M5x0.8 x .75 DP
mm	*M5x0.8 x 19.1 DP*	*M5x0.8 x 19.1 DP*	*M5x0.8 x 10.2 DP*	*M5x0.8 x 13.0 DP*	*M5x0.8 x 19.1 DP*
M	3.00	3.95	2.69	3.95	3.00
mm	*76.2*	*100.2*	*68.3*	*100.2*	*76.2*
N	3.00	3.75	2.69	3.75	3.00
mm	*76.2*	*95.3*	*68.3*	*95.3*	*76.2*

S-SOLID BEARING AND P-PROFILED RAIL IN-LINE MOTOR MOUNTING

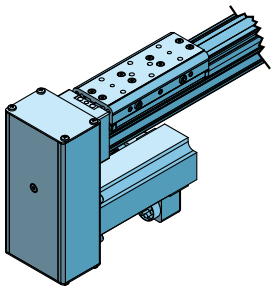
MXE63



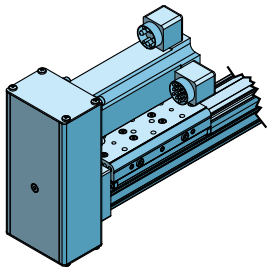
	MRV2x, GH2x	MRV3x, MRS3x	MRV5x, GH3x
A	Ø2.31	Ø2.31	Ø2.31
mm	*Ø58.7*	*Ø58.7*	*Ø58.7*
B	Ø3.010 BC	Ø3.010 BC	Ø3.010 BC
mm	*Ø76.45 BC*	*Ø76.45 BC*	*Ø76.45 BC*
C	3.010	3.010	3.010
mm	*76.45*	*76.45*	*76.45*
D	15°	15°	15°
mm	*15°*	*15°*	*15°*
E	Ø3.390	Ø3.390	Ø3.390
mm	*Ø86.11*	*Ø86.11*	*Ø86.11*
F	Ø.22 THRU (4)	Ø.22 THRU (4)	Ø.22 THRU (4)
mm	*Ø5.6 THRU (4)*	*Ø5.6 THRU (4)*	*Ø5.6 THRU (4)*
G	.1865/.1875 x .23 DP (2)	.1865/.1875 x .23 DP (2)	.1865/.1875 x .23 DP (2)
mm	*4.737/4.763 x 5.8 DP (2)*	*4.737/4.763 x 5.8 DP (2)*	*4.737/4.763 x 5.8 DP (2)*
H	1.50	1.50	1.50
mm	*38.1*	*38.1*	*38.1*
I	3.30	3.24	3.83
mm	*83.8*	*82.3*	*97.3*
J	Ø2.625 BC	Ø3.875 BC	Ø3.875 BC
mm	*Ø66.68 BC*	*Ø98.43 BC*	*Ø98.43 BC*
K	Ø1.504	Ø2.880	Ø2.880
mm	*Ø38.20*	*Ø73.15*	*Ø73.15*
L	M5x0.8 x .75 DP	M5x0.8 x .51 DP	M5x0.8 x .75 DP
mm	*M5x0.8 x 19.1 DP*	*M5x0.8 x 13.0 DP*	*M5x0.8 x 19.1 DP*
M	3.00	3.95	3.95
mm	*76.2*	*100.2*	*100.2*
N	3.00	3.75	3.75
mm	*76.2*	*95.3*	*95.3*

S-SOLID BEARING REVERSE PARALLEL MOTOR MOUNTING DIMENSIONS

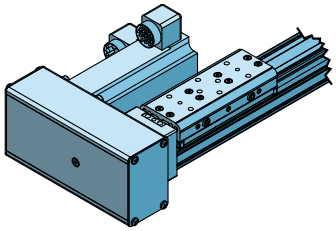
MXE16S & MXE25S



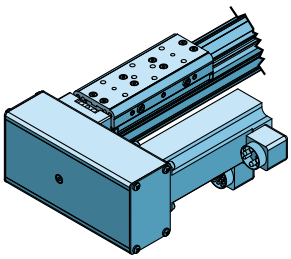
REVERSE-PARALLEL BOTTOM (RPB)
mounting surface shown UP



REVERSE-PARALLEL TOP (RPT)
mounting surface shown UP



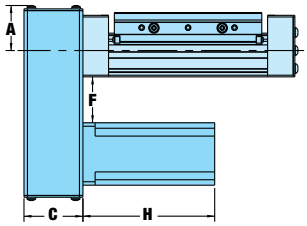
REVERSE-PARALLEL LEFT (RPL)
mounting surface shown UP



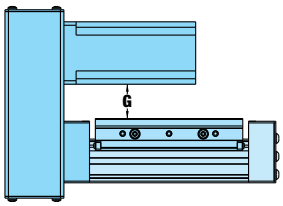
REVERSE-PARALLEL RIGHT (RPR)
mounting surface shown UP

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

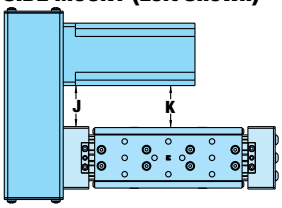
BOTTOM MOUNT



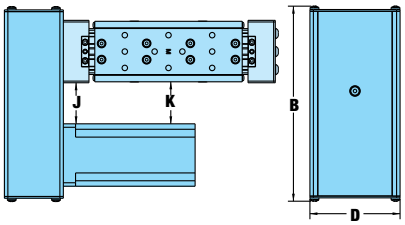
TOP MOUNT



SIDE MOUNT (Left Shown)



SIDE MOUNT (Right Shown)



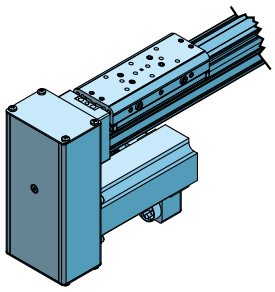
		WEIGHT OF REDUCTION DRIVE				REDUCTION INERTIA AT MOTOR SHAFT			
		1:1		2:1		1:1		2:1	
ACTUATOR	MOTOR	lbs	*kg*	lbs	*kg*	lb-in²	*kg-cm²*	lb-in²	*kg-cm²*
MXE16	MRV BRUSHLESS 17 FRAME	0.55	*0.25*	0.58	*0.27*	0.001	*0.0029*	0.002	*0.0059*
MXE25	MRV BRUSHLESS ALL FRAME SIZES	2.06	*0.93*	2.06	*0.93*	0.087	*0.2559*	0.112	*0.3291*
MXE25	MRS STEPPER 23-FRAME	1.92	*0.87*	1.92	*0.87*	0.022	*0.064*	0.046	*0.135*
MXE25	MRS STEPPER 34-FRAME	2.34	*1.06*	2.34	*1.06*	0.025	*0.073*	0.050	*0.146*

REDUCTION EFFICIENCY: 0.95

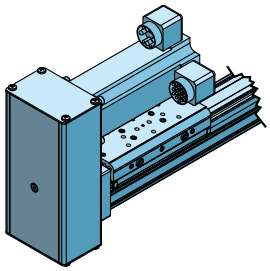
			A		B		C		D		F		G		H		J		K	
		MOTOR	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*
BRUSHLESS	16	MRV11	0.88	*22.2*	4.59	*116.6*	0.72	*18.3*	1.94	*49.3*	1.18	*30.0*	1.00	*25.4*	4.65	*118.1*	1.18	*30.0*	–	–
BRUSHLESS	MXE25	MRV21	1.44	*36.6*	6.96	*176.8*	2.13	*54.1*	3.25	*82.6*	1.60	*40.6*	1.27	*32.3*	4.75	*120.7*	1.45	*36.8*	1.48	*37.6*
BRUSHLESS	MXE25	MRV22	1.44	*36.6*	6.96	*176.8*	2.13	*54.1*	3.25	*82.6*	1.60	*40.6*	1.27	*32.3*	5.75	*146.1*	1.45	*36.8*	1.48	*37.6*
BRUSHLESS	MXE25	MRV23	1.44	*36.6*	6.96	*176.8*	2.13	*54.1*	3.25	*82.6*	1.60	*40.6*	1.27	*32.3*	6.75	*171.5*	1.45	*36.8*	1.48	*37.6*
BRUSHLESS	MXE25	MRV24	1.44	*36.6*	6.96	*176.8*	2.13	*54.1*	3.25	*82.6*	1.60	*40.6*	1.27	*32.3*	7.75	*196.9*	1.45	*36.8*	1.48	*37.6*
STEPPER	MXE25	MRS21	1.44	*36.6*	6.96	*176.8*	2.13	*54.1*	3.25	*82.6*	1.60	*40.6*	1.27	*32.3*	1.71	*43.4*	1.45	*36.8*	1.48	*37.6*
STEPPER	MXE25	MRS22	1.44	*36.6*	6.96	*176.8*	2.13	*54.1*	3.25	*82.6*	1.60	*40.6*	1.27	*32.3*	2.19	*55.6*	1.45	*36.8*	1.48	*37.6*
STEPPER	MXE25	MRS23	1.44	*36.6*	6.96	*176.8*	2.13	*54.1*	3.25	*82.6*	1.60	*40.6*	1.27	*32.3*	3.05	*77.5*	1.45	*36.8*	1.48	*37.6*
STEPPER	MXE25	MRS31	1.96	*49.8*	7.47	*189.7*	2.38	*60.5*	4.00	*101.6*	1.02	*25.9*	0.69	*17.5*	3.11	*79.0*	0.87	*22.1*	0.9	*22.9*
STEPPER	MXE25	MRS32	1.96	*49.8*	7.47	*189.7*	2.38	*60.5*	4.00	*101.6*	1.02	*25.9*	0.69	*17.5*	4.63	*117.6*	0.87	*22.1*	0.9	*22.9*
STEPPER	MXE25	MRS33	1.96	*49.8*	7.47	*189.7*	2.38	*60.5*	4.00	*101.6*	1.02	*25.9*	0.69	*17.5*	6.14	*156.0*	0.87	*22.1*	0.9	*22.9*

S-SOLID BEARING REVERSE PARALLEL MOTOR MOUNTING DIMENSIONS

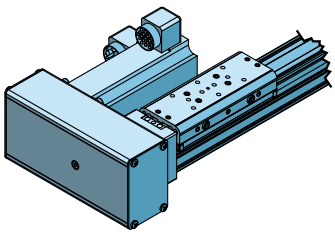
MXE32S



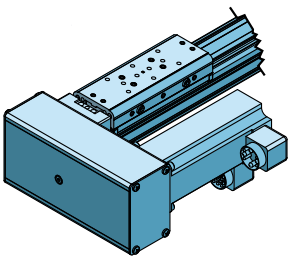
REVERSE-PARALLEL BOTTOM (RPB)
mounting surface shown UP



REVERSE-PARALLEL TOP (RPT)
mounting surface shown UP



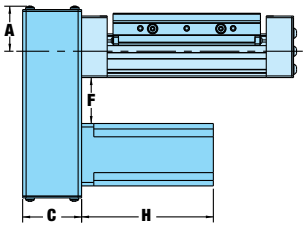
REVERSE-PARALLEL LEFT (RPL)
mounting surface shown UP



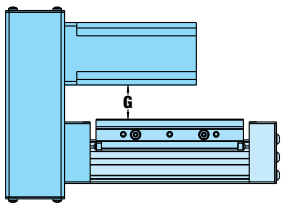
REVERSE-PARALLEL RIGHT (RPR)
mounting surface shown UP

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

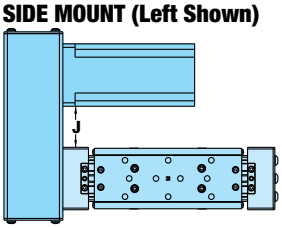
BOTTOM MOUNT



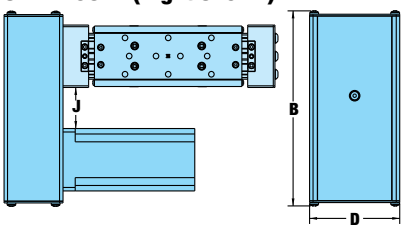
TOP MOUNT



SIDE MOUNT (Left Shown)



SIDE MOUNT (Right Shown)



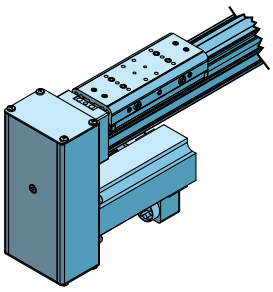
	WEIGHT OF REDUCTION DRIVE				REDUCTION INERTIA AT MOTOR SHAFT			
	1:1		2:1		1:1		2:1	
MOTOR	lbs	*kg*	lbs	*kg*	lb-in²	*kg-cm²*	lb-in²	*kg-cm²*
MRV BRUSHLESS ALL FRAME SIZES	2.06	*0.93*	2.06	*0.93*	0.087	*0.2559*	0.112	*0.3291*
MRS STEPPER 23-FRAME	1.92	*0.87*	1.92	*0.87*	0.022	*0.064*	0.046	*0.135*
MRS STEPPER 34-FRAME	2.34	*1.06*	2.34	*1.06*	0.025	*0.073*	0.050	*0.146*

REDUCTION EFFICIENCY: 0.95

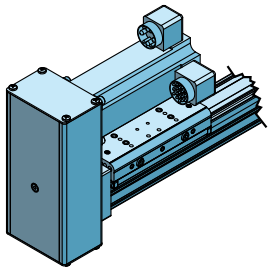
		A		B		C		D		F		G		H		J	
	MOTOR	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*
BRUSHLESS	**MRV21**	1.44	*36.6*	6.96	*176.8*	2.13	*54.1*	3.25	*82.6*	1.40	*35.6*	0.75	*19.1*	4.75	*120.7*	1.18	*30.0*
	MRV22	1.44	*36.6*	6.96	*176.8*	2.13	*54.1*	3.25	*82.6*	1.40	*35.6*	0.75	*19.1*	5.75	*146.1*	1.18	*30.0*
	MRV23	1.44	*36.6*	6.96	*176.8*	2.13	*54.1*	3.25	*82.6*	1.40	*35.6*	0.75	*19.1*	6.75	*171.5*	1.18	*30.0*
	MRV24	1.44	*36.6*	6.96	*176.8*	2.13	*54.1*	3.25	*82.6*	1.40	*35.6*	0.75	*19.1*	7.75	*196.9*	1.18	*30.0*
STEPPER	**MRS21**	1.44	*36.6*	6.96	*176.8*	2.13	*54.1*	3.25	*82.6*	1.40	*35.6*	0.75	*19.1*	1.71	*43.4*	1.18	*30.0*
	MRS22	1.44	*36.6*	6.96	*176.8*	2.13	*54.1*	3.25	*82.6*	1.40	*35.6*	0.75	*19.1*	2.19	*55.6*	1.18	*30.0*
	MRS23	1.44	*36.6*	6.96	*176.8*	2.13	*54.1*	3.25	*82.6*	1.40	*35.6*	0.75	*19.1*	3.05	*77.5*	1.18	*30.0*
	MRS31	1.96	*49.8*	7.47	*189.7*	2.38	*60.5*	4.00	*101.6*	0.82	*20.8*	0.17	*4.3*	3.11	*79.0*	0.6	*15.2*
	MRS32	1.96	*49.8*	7.47	*189.7*	2.38	*60.5*	4.00	*101.6*	0.82	*20.8*	0.17	*4.3*	4.63	*117.6*	0.6	*15.2*
	MRS33	1.96	*49.8*	7.47	*189.7*	2.38	*60.5*	4.00	*101.6*	0.82	*20.8*	0.17	*4.3*	6.14	*156.0*	0.6	*15.2*

S-SOLID BEARING REVERSE PARALLEL MOTOR MOUNTING DIMENSIONS

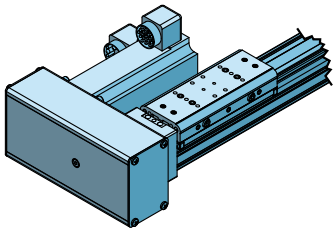
MXE40S



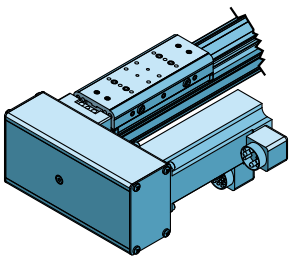
REVERSE-PARALLEL BOTTOM (RPB)
mounting surface shown UP



REVERSE-PARALLEL TOP (RPT)
mounting surface shown UP



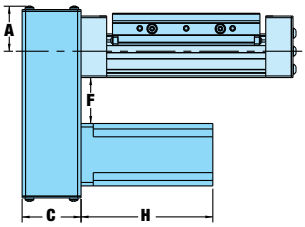
REVERSE-PARALLEL LEFT (RPL)
mounting surface shown UP



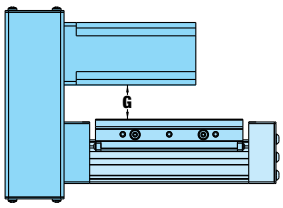
REVERSE-PARALLEL RIGHT (RPR)
mounting surface shown UP

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

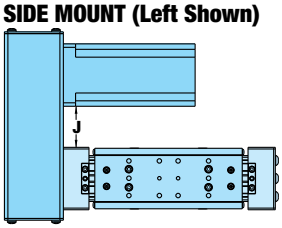
BOTTOM MOUNT



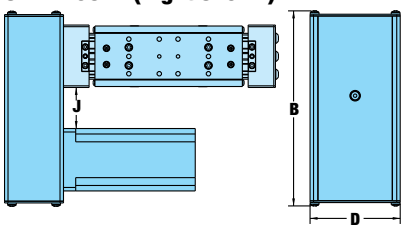
TOP MOUNT



SIDE MOUNT (Left Shown)



SIDE MOUNT (Right Shown)



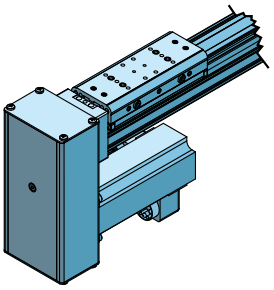
	WEIGHT OF REDUCTION DRIVE				REDUCTION INERTIA AT MOTOR SHAFT			
	1:1		2:1		1:1		2:1	
MOTOR	lbs	*kg*	lbs	*kg*	lb-in²	*kg-cm²*	lb-in²	*kg-cm²*
MRV BRUSHLESS ALL FRAME SIZES	2.17	*0.98*	2.40	*1.09*	0.070	*0.2043*	0.095	*0.2767*
MRS STEPPER 23-FRAME	2.03	*0.92*	2.26	*1.03*	0.022	*0.064*	0.054	*0.159*
MRS STEPPER 34-FRAME	2.49	*1.13*	2.72	*1.23*	0.025	*0.073*	0.058	*0.168*

REDUCTION EFFICIENCY: 0.95

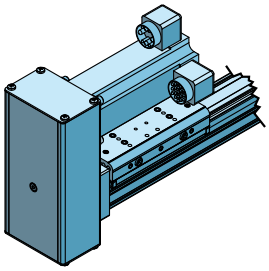
		A		B		C		D		F		G		H		J	
	MOTOR	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*
BRUSHLESS	MRV21	1.44	*36.6*	7.46	*189.5*	2.13	*54.1*	3.25	*82.6*	1.57	*39.9*	1.13	*28.7*	4.75	*120.7*	1.37	*34.8*
	MRV22	1.44	*36.6*	7.46	*189.5*	2.13	*54.1*	3.25	*82.6*	1.57	*39.9*	1.13	*28.7*	5.75	*146.1*	1.37	*34.8*
	MRV23	1.44	*36.6*	7.46	*189.5*	2.13	*54.1*	3.25	*82.6*	1.57	*39.9*	1.13	*28.7*	6.75	*171.5*	1.37	*34.8*
	MRV24	1.44	*36.6*	7.46	*189.5*	2.13	*54.1*	3.25	*82.6*	1.57	*39.9*	1.13	*28.7*	7.75	*196.9*	1.37	*34.8*
	MRV31	2.12	*53.8*	8.14	*206.8*	2.38	*60.5*	4.00	*101.6*	0.92	*23.4*	0.48	*12.2*	6.11	*155.2*	0.72	*18.3*
	MRV32	2.12	*53.8*	8.14	*206.8*	2.38	*60.5*	4.00	*101.6*	0.92	*23.4*	0.48	*12.2*	7.36	*186.9*	0.72	*18.3*
	MRV33	2.12	*53.8*	8.14	*206.8*	2.38	*60.5*	4.00	*101.6*	0.92	*23.4*	0.48	*12.2*	8.61	*218.7*	0.72	*18.3*
STEPPER	MRS21	1.44	*36.6*	7.46	*189.5*	2.13	*54.1*	3.25	*82.6*	1.57	*39.9*	1.13	*28.7*	1.71	*43.4*	1.37	*34.8*
	MRS22	1.44	*36.6*	7.46	*189.5*	2.13	*54.1*	3.25	*82.6*	1.57	*39.9*	1.13	*28.7*	2.19	*55.6*	1.37	*34.8*
	MRS23	1.44	*36.6*	7.46	*189.5*	2.13	*54.1*	3.25	*82.6*	1.57	*39.9*	1.13	*28.7*	3.05	*77.5*	1.37	*34.8*
	MRS31	2.12	*53.8*	8.14	*206.8*	2.38	*60.5*	4.00	*101.6*	0.99	*25.1*	0.55	*14.0*	3.11	*79.0*	0.79	*22.1*
	MRS32	2.12	*53.8*	8.14	*206.8*	2.38	*60.5*	4.00	*101.6*	0.99	*25.1*	0.55	*14.0*	4.63	*117.6*	0.79	*22.1*
	MRS33	2.12	*53.8*	8.14	*206.8*	2.38	*60.5*	4.00	*101.6*	0.99	*25.1*	0.55	*14.0*	6.14	*156.0*	0.79	*22.1*

S-SOLID BEARING REVERSE PARALLEL MOTOR MOUNTING DIMENSIONS

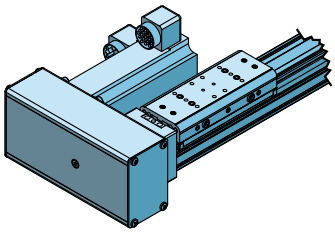
MXE50S



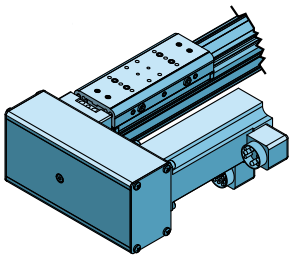
REVERSE-PARALLEL BOTTOM (RPB)
mounting surface shown UP



REVERSE-PARALLEL TOP (RPT)
mounting surface shown UP



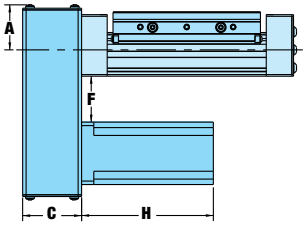
REVERSE-PARALLEL LEFT (RPL)
mounting surface shown UP



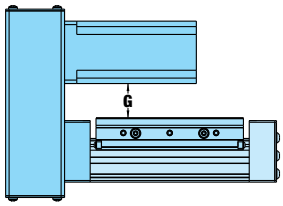
REVERSE-PARALLEL RIGHT (RPR)
mounting surface shown UP

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

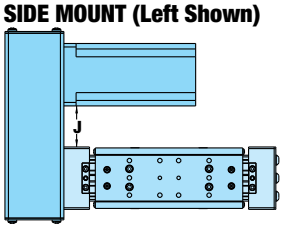
BOTTOM MOUNT



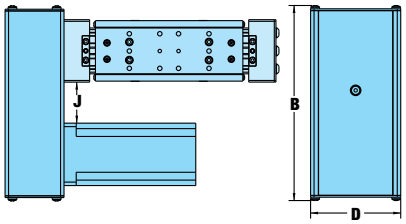
TOP MOUNT



SIDE MOUNT (Left Shown)



SIDE MOUNT (Right Shown)



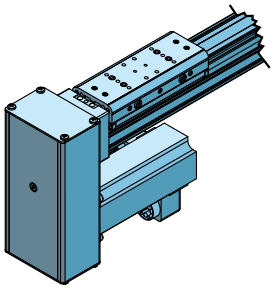
	WEIGHT OF REDUCTION DRIVE				REDUCTION INERTIA AT MOTOR SHAFT			
	1:1		2:1		1:1		2:1	
MOTOR	lbs	*kg*	lbs	*kg*	lb-in²	*kg-cm²*	lb-in²	*kg-cm²*
MRV BRUSHLESS 23-FRAME	3.49	*1.58*	4.41	*2.00*	0.090	*0.2634*	0.254	*0.7433*
MRV BRUSHLESS 34-FRAME	3.96	*1.80*	4.86	*2.21*	0.090	*0.2634*	0.254	*0.7433*
MRS STEPPER 23-FRAME	3.49	*1.58*	4.41	*2.00*	0.090	*0.2634*	0.254	*0.7433*
MRS STEPPER 34-FRAME	3.96	*1.80*	4.86	*2.21*	0.090	*0.2634*	0.254	*0.7433*

REDUCTION EFFICIENCY: 0.95

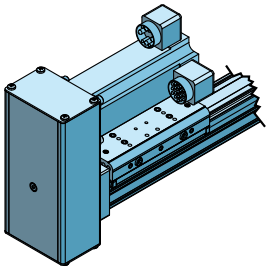
		A		B		C		D		F		G		H		J	
	MOTOR	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*
BRUSHLESS	MRV21	2.51	*63.8*	9.39	*238.5*	2.38	*60.5*	4.00	*101.6*	2.32	*58.9*	1.52	*38.6*	4.75	*120.7*	2.41	*61.2*
	MRV22	2.51	*63.8*	9.39	*238.5*	2.38	*60.5*	4.00	*101.6*	2.32	*58.9*	1.52	*38.6*	5.75	*146.1*	2.41	*61.2*
	MRV23	2.51	*63.8*	9.39	*238.5*	2.38	*60.5*	4.00	*101.6*	2.32	*58.9*	1.52	*38.6*	6.75	*171.5*	2.41	*61.2*
	MRV24	2.51	*63.8*	9.39	*238.5*	2.38	*60.5*	4.00	*101.6*	2.32	*58.9*	1.52	*38.6*	7.75	*196.9*	2.41	*61.2*
	MRV31	2.51	*63.8*	9.39	*238.5*	2.38	*60.5*	4.00	*101.6*	1.66	*42.2*	0.86	*21.8*	6.11	*155.2*	1.75	*44.5*
	MRV32	2.51	*63.8*	9.39	*238.5*	2.38	*60.5*	4.00	*101.6*	1.66	*42.2*	0.86	*21.8*	7.36	*186.9*	1.75	*44.5*
	MRV33	2.51	*63.8*	9.39	*238.5*	2.38	*60.5*	4.00	*101.6*	1.66	*42.2*	0.86	*21.8*	8.61	*218.7*	1.75	*44.5*
STEPPER	MRS21	2.51	*63.8*	9.39	*238.5*	2.38	*60.5*	4.00	*101.6*	2.32	*58.9*	1.52	*38.6*	1.71	*43.4*	2.41	*61.2*
	MRS22	2.51	*63.8*	9.39	*238.5*	2.38	*60.5*	4.00	*101.6*	2.32	*58.9*	1.52	*38.6*	2.19	*55.6*	2.41	*61.2*
	MRS23	2.51	*63.8*	9.39	*238.5*	2.38	*60.5*	4.00	*101.6*	2.32	*58.9*	1.52	*38.6*	3.05	*77.5*	2.41	*61.2*
	MRS31	2.51	*63.8*	9.39	*238.5*	2.38	*60.5*	4.00	*101.6*	1.66	*42.2*	0.86	*21.8*	3.11	*79.0*	1.75	*44.5*
	MRS32	2.51	*63.8*	9.39	*238.5*	2.38	*60.5*	4.00	*101.6*	1.66	*42.2*	0.86	*21.8*	4.63	*117.6*	1.75	*44.5*
	MRS33	2.51	*63.8*	9.39	*238.5*	2.38	*60.5*	4.00	*101.6*	1.66	*42.2*	0.86	*21.8*	6.14	*156.0*	1.75	*44.5*

S-SOLID BEARING REVERSE PARALLEL MOTOR MOUNTING DIMENSIONS

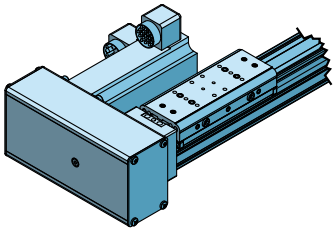
MXE63S



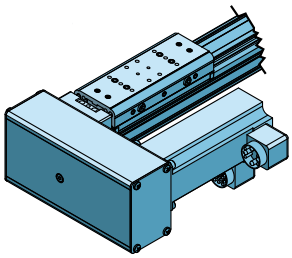
REVERSE-PARALLEL BOTTOM (RPB)
mounting surface shown UP



REVERSE-PARALLEL TOP (RPT)
mounting surface shown UP



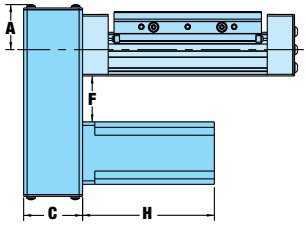
REVERSE-PARALLEL LEFT (RPL)
mounting surface shown UP



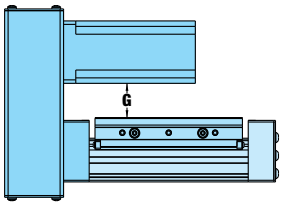
REVERSE-PARALLEL RIGHT (RPR)
mounting surface shown UP

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

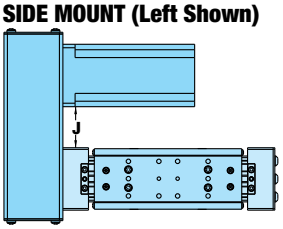
BOTTOM MOUNT



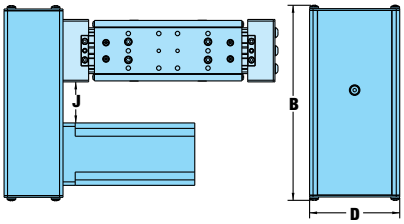
TOP MOUNT



SIDE MOUNT (Left Shown)



SIDE MOUNT (Right Shown)



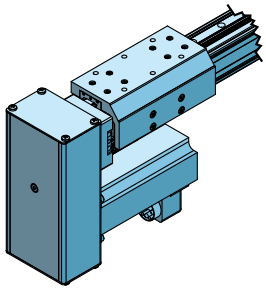
	WEIGHT OF REDUCTION DRIVE				REDUCTION INERTIA AT MOTOR SHAFT			
	1:1		2:1		1:1		2:1	
MOTOR	lbs	*kg*	lbs	*kg*	lb-in²	*kg-cm²*	lb-in²	*kg-cm²*
MRV BRUSHLESS 23-FRAME	3.49	*1.58*	4.41	*2.00*	0.090	*0.2634*	0.254	*0.7433*
MRV BRUSHLESS 34-FRAME	3.94	*1.79*	4.84	*2.19*	0.087	*0.2546*	0.251	*0.7345*
MRV BRUSHLESS 56-FRAME	4.20	*1.91*	5.10	*2.31*	0.087	*0.2546*	0.251	*0.7345*
MRS STEPPER 34-FRAME	3.96	*1.80*	4.86	*2.21*	0.090	*0.2634*	0.254	*0.7433*

REDUCTION EFFICIENCY: 0.95

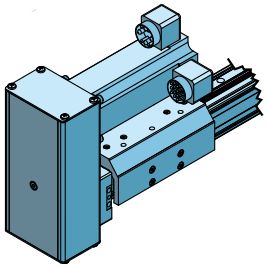
		A		B		C		D		F		G		H		J	
	MOTOR	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*
BRUSHLESS	MRV21	2.19	*55.6*	9.23	*234.4*	2.59	*65.8*	5.00	*127.0*	0.95	*24.1*	1.85	*47.0*	4.75	*120.7*	1.98	*50.3*
	MRV22	2.19	*55.6*	9.23	*234.4*	2.59	*65.8*	5.00	*127.0*	0.95	*24.1*	1.85	*47.0*	5.75	*146.1*	1.98	*50.3*
	MRV23	2.19	*55.6*	9.23	*234.4*	2.59	*65.8*	5.00	*127.0*	0.95	*24.1*	1.85	*47.0*	6.75	*171.5*	1.98	*50.3*
	MRV24	2.19	*55.6*	9.23	*234.4*	2.59	*65.8*	5.00	*127.0*	0.95	*24.1*	1.85	*47.0*	7.75	*196.9*	1.98	*50.3*
	MRV31	2.19	*55.6*	10.80	*275.0*	2.59	*65.8*	5.00	*127.0*	2.33	*59.2*	1.43	*36.3*	6.11	*155.2*	2.46	*62.5*
	MRV32	2.19	*55.6*	10.80	*275.0*	2.59	*65.8*	5.00	*127.0*	2.33	*59.2*	1.43	*36.3*	7.36	*186.9*	2.46	*62.5*
	MRV33	2.19	*55.6*	10.80	*275.0*	2.59	*65.8*	5.00	*127.0*	2.33	*59.2*	1.43	*36.3*	8.61	*218.7*	2.46	*62.5*
	MRV51	2.19	*55.6*	11.60	*294.1*	2.59	*65.8*	5.00	*127.0*	1.72	*43.7*	0.83	*21.1*	9.96	*253.0*	1.86	*47.2*
STEPPER	MRS31	2.19	*55.6*	10.80	*275.0*	2.59	*65.8*	5.00	*127.0*	2.33	*59.2*	1.43	*36.3*	3.11	*79.0*	2.46	*62.5*
	MRS32	2.19	*55.6*	10.80	*275.0*	2.59	*65.8*	5.00	*127.0*	2.33	*59.2*	1.43	*36.3*	4.63	*117.6*	2.46	*62.5*
	MRS33	2.19	*55.6*	10.80	*275.0*	2.59	*65.8*	5.00	*127.0*	2.33	*59.2*	1.43	*36.3*	6.14	*156.0*	2.46	*62.5*

P-PROFILED RAIL REVERSE PARALLEL MOTOR MOUNTING DIMENSIONS

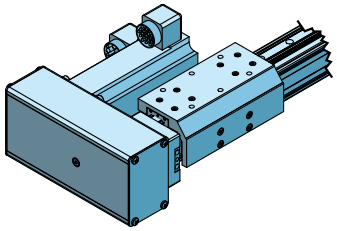
MXE16P & MXE25P



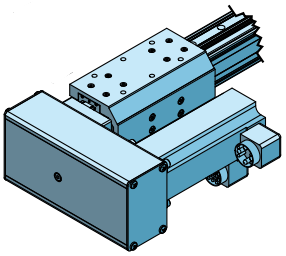
REVERSE-PARALLEL BOTTOM (RPB)
mounting surface shown UP



REVERSE-PARALLEL TOP (RPT)
mounting surface shown UP



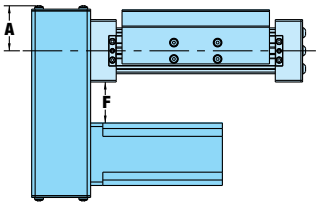
REVERSE-PARALLEL LEFT (RPL)
mounting surface shown UP



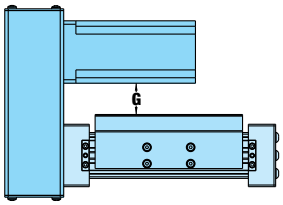
REVERSE-PARALLEL RIGHT (RPR)
mounting surface shown UP

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

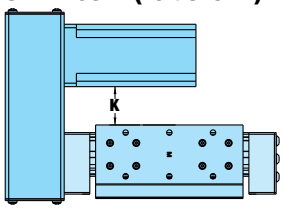
BOTTOM MOUNT



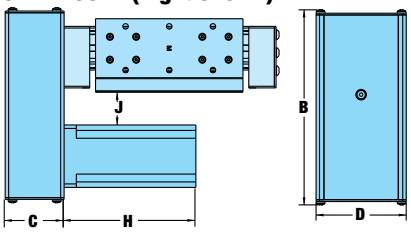
TOP MOUNT



SIDE MOUNT (Left Shown)



SIDE MOUNT (Right Shown)



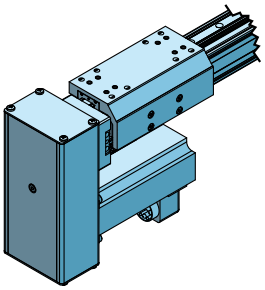
		WEIGHT OF REDUCTION DRIVE				REDUCTION INERTIA AT MOTOR SHAFT			
		1:1		2:1		1:1		2:1	
ACTUATOR	MOTOR	lbs	*kg*	lbs	*kg*	lb-in²	*kg-cm²*	lb-in²	*kg-cm²*
MXE16	MRV BRUSHLESS 17 FRAME	0.55	*0.25*	0.58	*0.27*	0.001	*0.0029*	0.002	*0.0059*
MXE25	MRV BRUSHLESS ALL FRAME SIZES	2.06	*0.93*	2.06	*0.93*	0.087	*0.2559*	0.112	*0.3291*
MXE25	MRS STEPPER 23-FRAME	1.92	*0.87*	1.92	*0.87*	0.022	*0.064*	0.046	*0.135*
MXE25	MRS STEPPER 34-FRAME	2.34	*1.06*	2.34	*1.06*	0.025	*0.073*	0.050	*0.146*

REDUCTION EFFICIENCY: 0.95

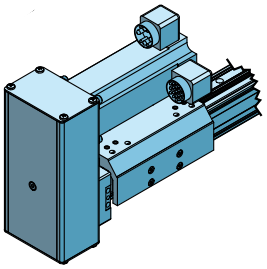
			A		B		C		D		F		G		H		J		K	
		MOTOR	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*
BRUSHLESS	16	MRV11	0.88	*22.2*	4.59	*116.6*	0.72	*18.3*	1.94	*49.3*	1.18	*30.0*	0.85	*21.6*	4.65	*118.1*	1.04	*26.4*	1.19	*30.2*
BRUSHLESS	MXE25	MRV21	1.44	*36.6*	6.96	*176.8*	2.13	*54.1*	3.25	*82.6*	1.48	*37.6*	1.13	*28.7*	4.75	*120.7*	1.18	*30.0*	1.38	*35.1*
BRUSHLESS	MXE25	MRV22	1.44	*36.6*	6.96	*176.8*	2.13	*54.1*	3.25	*82.6*	1.48	*37.6*	1.13	*28.7*	5.75	*146.1*	1.18	*30.0*	1.38	*35.1*
BRUSHLESS	MXE25	MRV23	1.44	*36.6*	6.96	*176.8*	2.13	*54.1*	3.25	*82.6*	1.48	*37.6*	1.13	*28.7*	6.75	*171.5*	1.18	*30.0*	1.38	*35.1*
BRUSHLESS	MXE25	MRV24	1.44	*36.6*	6.96	*176.8*	2.13	*54.1*	3.25	*82.6*	1.48	*37.6*	1.13	*28.7*	7.75	*196.9*	1.18	*30.0*	1.38	*35.1*
STEPPER	MXE25	MRS21	1.44	*36.6*	6.96	*176.8*	2.13	*54.1*	3.25	*82.6*	1.48	*37.6*	1.13	*28.7*	1.71	*43.4*	1.18	*30.0*	1.38	*35.1*
STEPPER	MXE25	MRS22	1.44	*36.6*	6.96	*176.8*	2.13	*54.1*	3.25	*82.6*	1.48	*37.6*	1.13	*28.7*	2.19	*55.6*	1.18	*30.0*	1.38	*35.1*
STEPPER	MXE25	MRS23	1.44	*36.6*	6.96	*176.8*	2.13	*54.1*	3.25	*82.6*	1.48	*37.6*	1.13	*28.7*	3.05	*77.5*	1.18	*30.0*	1.38	*35.1*
STEPPER	MXE25	MRS31	1.96	*49.8*	7.47	*189.7*	2.38	*60.5*	4.00	*101.6*	0.90	*22.9*	0.55	*14.0*	3.11	*79.0*	0.66	*16.8*	0.8	*20.3*
STEPPER	MXE25	MRS32	1.96	*49.8*	7.47	*189.7*	2.38	*60.5*	4.00	*101.6*	0.90	*22.9*	0.55	*14.0*	4.63	*117.6*	0.66	*16.8*	0.8	*20.3*
STEPPER	MXE25	MRS33	1.96	*49.8*	7.47	*189.7*	2.38	*60.5*	4.00	*101.6*	0.90	*22.9*	0.55	*14.0*	6.14	*156.0*	0.66	*16.8*	0.8	*20.3*

P-PROFILED RAIL REVERSE PARALLEL MOTOR MOUNTING DIMENSIONS

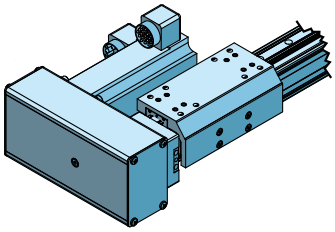
MXE32P



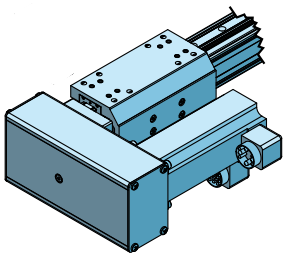
REVERSE-PARALLEL BOTTOM (RPB)
mounting surface shown UP



REVERSE-PARALLEL TOP (RPT)
mounting surface shown UP



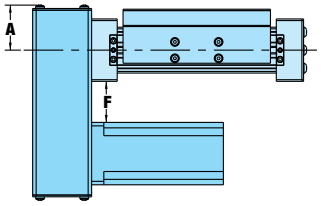
REVERSE-PARALLEL LEFT (RPL)
mounting surface shown UP



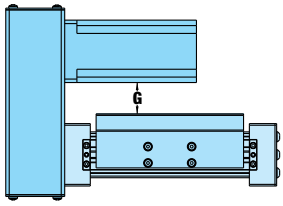
REVERSE-PARALLEL RIGHT (RPR)
mounting surface shown UP

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

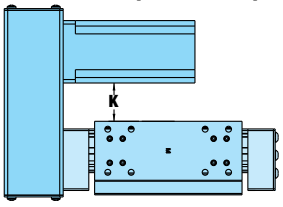
BOTTOM MOUNT



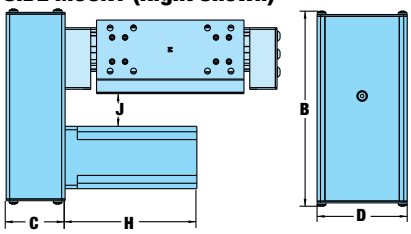
TOP MOUNT



SIDE MOUNT (Left Shown)



SIDE MOUNT (Right Shown)



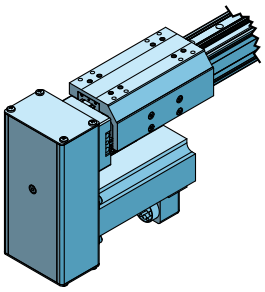
MOTOR	WEIGHT OF REDUCTION DRIVE 1:1 lbs	kg	2:1 lbs	kg	REDUCTION INERTIA AT MOTOR SHAFT 1:1 lb-in²	kg-cm²	2:1 lb-in²	kg-cm²
MRV BRUSHLESS ALL FRAME SIZES	2.06	0.93	2.06	0.93	0.087	0.2559	0.112	0.3291
MRS STEPPER 23-FRAME	1.92	0.87	1.92	0.87	0.022	0.064	0.046	0.135
MRS STEPPER 34-FRAME	2.34	1.06	2.34	1.06	0.025	0.073	0.050	0.146

REDUCTION EFFICIENCY: 0.95

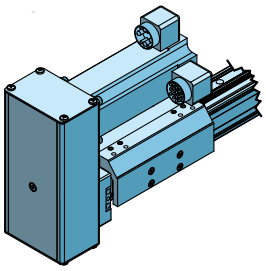
	MOTOR	A in.	A mm	B in.	B mm	C in.	C mm	D in.	D mm	F in.	F mm	G in.	G mm	H in.	H mm	J in.	J mm	K in.	K mm
BRUSHLESS	MRV21	1.44	36.6	6.96	176.8	2.13	54.1	3.25	82.6	1.52	38.6	0.65	16.5	4.75	120.7	0.76	19.3	1.20	30.5
BRUSHLESS	MRV22	1.44	36.6	6.96	176.8	2.13	54.1	3.25	82.6	1.52	38.6	0.65	16.5	5.75	146.1	0.76	19.3	1.20	30.5
BRUSHLESS	MRV23	1.44	36.6	6.96	176.8	2.13	54.1	3.25	82.6	1.52	38.6	0.65	16.5	6.75	171.5	0.76	19.3	1.20	30.5
BRUSHLESS	MRV24	1.44	36.6	6.96	176.8	2.13	54.1	3.25	82.6	1.52	38.6	0.65	16.5	7.75	196.9	0.76	19.3	1.20	30.5
STEPPER	MRS21	1.44	36.6	6.96	176.8	2.13	54.1	3.25	82.6	1.52	38.6	0.65	16.5	1.71	43.4	0.76	19.3	1.20	30.5
STEPPER	MRS22	1.44	36.6	6.96	176.8	2.13	54.1	3.25	82.6	1.52	38.6	0.65	16.5	2.19	55.6	0.76	19.3	1.20	30.5
STEPPER	MRS23	1.44	36.6	6.96	176.8	2.13	54.1	3.25	82.6	1.52	38.6	0.65	16.5	3.05	77.5	0.76	19.3	1.20	30.5
STEPPER	MRS31	1.96	49.8	7.47	189.7	2.38	60.5	4.00	101.6	0.94	23.9	0.07	1.8	3.11	79.0	0.18	4.6	0.62	15.7
STEPPER	MRS32	1.96	49.8	7.47	189.7	2.38	60.5	4.00	101.6	0.94	23.9	0.07	1.8	4.63	117.6	0.18	4.6	0.62	15.7
STEPPER	MRS33	1.96	49.8	7.47	189.7	2.38	60.5	4.00	101.6	0.94	23.9	0.07	1.8	6.14	156.0	0.18	4.6	0.60	15.7

P-PROFILED RAIL REVERSE PARALLEL MOTOR MOUNTING DIMENSIONS

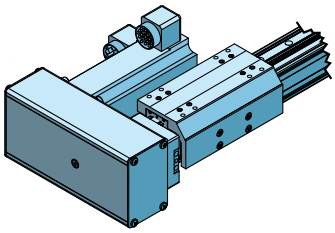
MXE40P



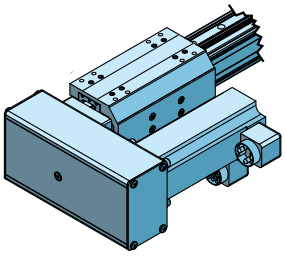
REVERSE-PARALLEL BOTTOM (RPB)
mounting surface shown UP



REVERSE-PARALLEL TOP (RPT)
mounting surface shown UP

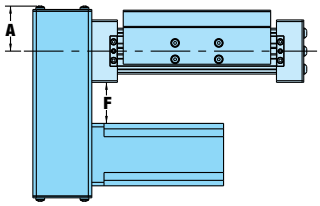


REVERSE-PARALLEL LEFT (RPL)
mounting surface shown UP

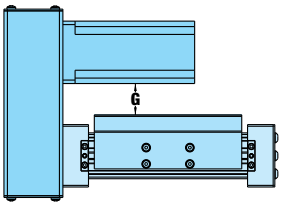


REVERSE-PARALLEL RIGHT (RPR)
mounting surface shown UP

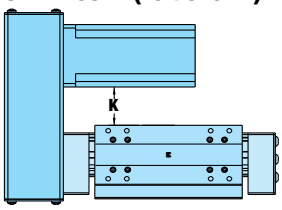
BOTTOM MOUNT



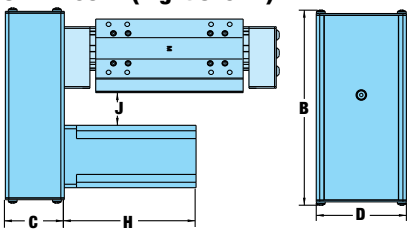
TOP MOUNT



SIDE MOUNT (Left Shown)



SIDE MOUNT (Right Shown)



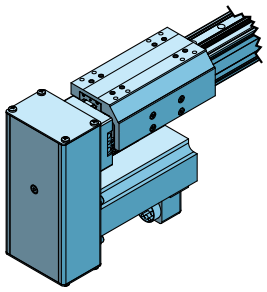
	WEIGHT OF REDUCTION DRIVE				REDUCTION INERTIA AT MOTOR SHAFT			
	1:1		2:1		1:1		2:1	
MOTOR	lbs	*kg*	lbs	*kg*	lb-in²	*kg-cm²*	lb-in²	*kg-cm²*
MRV BRUSHLESS ALL FRAME SIZES	2.17	*0.98*	2.40	*1.09*	0.070	*0.2043*	0.095	*0.2767*
MRS STEPPER 23-FRAME	2.03	*0.92*	2.26	*1.03*	0.022	*0.064*	0.054	*0.159*
MRS STEPPER 34-FRAME	2.49	*1.13*	2.72	*1.23*	0.025	*0.073*	0.058	*0.168*

REDUCTION EFFICIENCY: 0.95

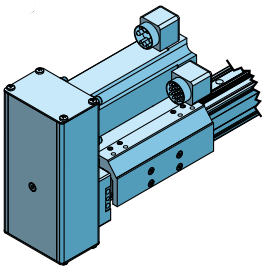
		A		B		C		D		F		G		H		J		K	
	MOTOR	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*
BRUSHLESS	**MRV21**	1.44	*36.6*	7.46	*189.5*	2.13	*54.1*	3.25	*82.6*	1.61	*40.9*	0.83	*21.1*	4.75	*120.7*	1.18	*30.0*	1.18	*30.0*
	MRV22	1.44	*36.6*	7.46	*189.5*	2.13	*54.1*	3.25	*82.6*	1.61	*40.9*	0.83	*21.1*	5.75	*146.1*	1.18	*30.0*	1.18	*30.0*
	MRV23	1.44	*36.6*	7.46	*189.5*	2.13	*54.1*	3.25	*82.6*	1.61	*40.9*	0.83	*21.1*	6.75	*171.5*	1.18	*30.0*	1.18	*30.0*
	MRV24	1.44	*36.6*	7.46	*189.5*	2.13	*54.1*	3.25	*82.6*	1.61	*40.9*	0.83	*21.1*	7.75	*196.9*	1.18	*30.0*	1.18	*30.0*
	MRV31	2.12	*53.8*	8.14	*206.8*	2.38	*60.5*	4.00	*101.6*	0.96	*24.4*	0.18	*4.6*	6.11	*155.2*	0.53	*13.5*	0.53	*13.5*
	MRV32	2.12	*53.8*	8.14	*206.8*	2.38	*60.5*	4.00	*101.6*	0.96	*24.4*	0.18	*4.6*	7.36	*186.9*	0.53	*13.5*	0.53	*13.5*
	MRV33	2.12	*53.8*	8.14	*206.8*	2.38	*60.5*	4.00	*101.6*	0.96	*24.4*	0.18	*4.6*	8.61	*218.7*	0.53	*13.5*	0.53	*13.5*
STEPPER	**MRS21**	1.44	*36.6*	7.46	*189.5*	2.13	*54.1*	3.25	*82.6*	1.61	*40.9*	0.83	*21.1*	1.71	*43.4*	1.18	*30.0*	1.18	*30.0*
	MRS22	1.44	*36.6*	7.46	*189.5*	2.13	*54.1*	3.25	*82.6*	1.61	*40.9*	0.83	*21.1*	2.19	*55.6*	1.18	*30.0*	1.18	*30.0*
	MRS23	1.44	*36.6*	7.46	*189.5*	2.13	*54.1*	3.25	*82.6*	1.61	*40.9*	0.83	*21.1*	3.05	*77.5*	1.18	*30.0*	1.18	*30.0*
	MRS31	1.96	*49.8*	8.14	*206.8*	2.38	*60.5*	4.00	*101.6*	1.03	*26.2*	0.25	*6.4*	3.11	*79.0*	0.6	*15.2*	0.6	*15.2*
	MRS32	1.96	*49.8*	8.14	*206.8*	2.38	*60.5*	4.00	*101.6*	1.03	*26.2*	0.25	*6.4*	4.63	*117.6*	0.6	*15.2*	0.6	*15.2*
	MRS33	1.96	*49.8*	8.14	*206.8*	2.38	*60.5*	4.00	*101.6*	1.03	*26.2*	0.25	*6.4*	6.14	*156.0*	0.6	*15.2*	0.6	*15.2*

P-PROFILED RAIL REVERSE PARALLEL MOTOR MOUNTING DIMENSIONS

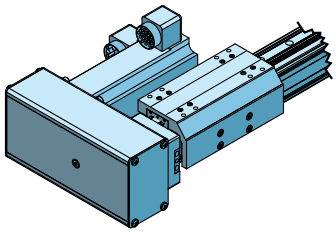
MXE50P



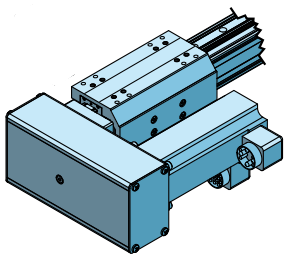
REVERSE-PARALLEL BOTTOM (RPB)
mounting surface shown UP



REVERSE-PARALLEL TOP (RPT)
mounting surface shown UP



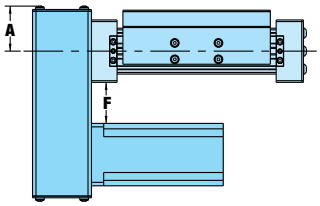
REVERSE-PARALLEL LEFT (RPL)
mounting surface shown UP



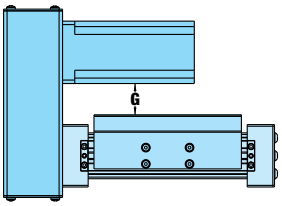
REVERSE-PARALLEL RIGHT (RPR)
mounting surface shown UP

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

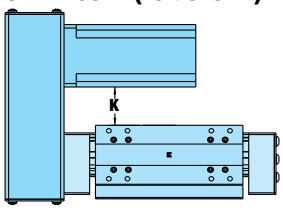
BOTTOM MOUNT



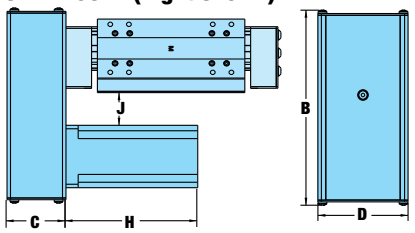
TOP MOUNT



SIDE MOUNT (Left Shown)



SIDE MOUNT (Right Shown)



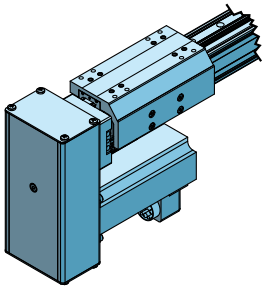
MOTOR	WEIGHT OF REDUCTION DRIVE 1:1 lbs	WEIGHT OF REDUCTION DRIVE 1:1 *kg*	WEIGHT OF REDUCTION DRIVE 2:1 lbs	WEIGHT OF REDUCTION DRIVE 2:1 *kg*	REDUCTION INERTIA AT MOTOR SHAFT 1:1 lb-in²	REDUCTION INERTIA AT MOTOR SHAFT 1:1 *kg-cm²*	REDUCTION INERTIA AT MOTOR SHAFT 2:1 lb-in²	REDUCTION INERTIA AT MOTOR SHAFT 2:1 *kg-cm²*
MRV BRUSHLESS 23-FRAME	3.49	*1.58*	4.41	*2.00*	0.090	*0.2634*	0.254	*0.7433*
MRV BRUSHLESS 34-FRAME	3.96	*1.80*	4.86	*2.21*	0.090	*0.2634*	0.254	*0.7433*
MRS STEPPER 23-FRAME	3.49	*1.58*	4.41	*2.00*	0.090	*0.2634*	0.254	*0.7433*
MRS STEPPER 34-FRAME	3.96	*1.80*	4.86	*2.21*	0.090	*0.2634*	0.254	*0.7433*

REDUCTION EFFICIENCY: 0.95

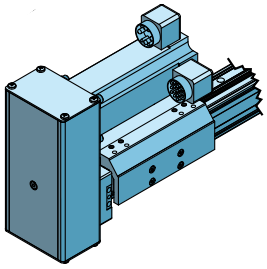
	MOTOR	A in.	A *mm*	B in.	B *mm*	C in.	C *mm*	D in.	D *mm*	F in.	F *mm*	G in.	G *mm*	H in.	H *mm*	J in.	J *mm*	K in.	K *mm*
BRUSHLESS	MRV21	2.51	*63.8*	9.39	*238.5*	2.38	*60.5*	4.00	*101.6*	2.41	*61.2*	0.98	*24.9*	4.75	*120.7*	1.62	*41.1*	2.03	*51.6*
BRUSHLESS	MRV22	2.51	*63.8*	9.39	*238.5*	2.38	*60.5*	4.00	*101.6*	2.41	*61.2*	0.98	*24.9*	5.75	*146.1*	1.62	*41.1*	2.03	*51.6*
BRUSHLESS	MRV23	2.51	*63.8*	9.39	*238.5*	2.38	*60.5*	4.00	*101.6*	2.41	*61.2*	0.98	*24.9*	6.75	*171.5*	1.62	*41.1*	2.03	*51.6*
BRUSHLESS	MRV24	2.51	*63.8*	9.39	*238.5*	2.38	*60.5*	4.00	*101.6*	2.41	*61.2*	0.98	*24.9*	7.75	*196.9*	1.62	*41.1*	2.03	*51.6*
BRUSHLESS	MRV31	2.51	*63.8*	9.39	*238.5*	2.38	*60.5*	4.00	*101.6*	1.75	*44.5*	0.32	*8.1*	6.11	*155.2*	0.96	*24.4*	1.37	*34.8*
BRUSHLESS	MRV32	2.51	*63.8*	9.39	*238.5*	2.38	*60.5*	4.00	*101.6*	1.75	*44.5*	0.32	*8.1*	7.36	*186.9*	0.96	*24.4*	1.37	*34.8*
BRUSHLESS	MRV33	2.51	*63.8*	9.39	*238.5*	2.38	*60.5*	4.00	*101.6*	1.75	*44.5*	0.32	*8.1*	8.61	*218.7*	0.96	*24.4*	1.37	*34.8*
STEPPER	MRS21	2.51	*63.8*	9.39	*238.5*	2.38	*60.5*	4.00	*101.6*	2.41	*61.2*	0.98	*24.9*	1.71	*43.4*	1.62	*41.1*	2.03	*51.6*
STEPPER	MRS22	2.51	*63.8*	9.39	*238.5*	2.38	*60.5*	4.00	*101.6*	2.41	*61.2*	0.98	*24.9*	2.19	*55.6*	1.62	*41.1*	2.03	*51.6*
STEPPER	MRS23	2.51	*63.8*	9.39	*238.5*	2.38	*60.5*	4.00	*101.6*	2.41	*61.2*	0.98	*24.9*	3.05	*77.5*	1.62	*41.1*	2.03	*51.6*
STEPPER	MRS31	2.51	*63.8*	9.39	*238.5*	2.38	*60.5*	4.00	*101.6*	1.75	*44.5*	0.32	*8.1*	3.11	*79.0*	0.96	*24.4*	1.37	*34.8*
STEPPER	MRS32	2.51	*63.8*	9.39	*238.5*	2.38	*60.5*	4.00	*101.6*	1.75	*44.5*	0.32	*8.1*	4.63	*117.6*	0.96	*24.4*	1.37	*34.8*
STEPPER	MRS33	2.51	*63.8*	9.39	*238.5*	2.38	*60.5*	4.00	*101.6*	1.75	*44.5*	0.32	*8.1*	6.14	*156.0*	0.96	*24.4*	1.37	*34.8*

P-PROFILED RAIL REVERSE PARALLEL MOTOR MOUNTING DIMENSIONS

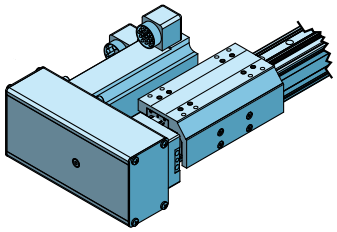
MXE63P



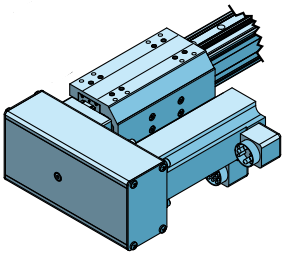
REVERSE-PARALLEL BOTTOM (RPB)
mounting surface shown UP



REVERSE-PARALLEL TOP (RPT)
mounting surface shown UP



REVERSE-PARALLEL LEFT (RPL)
mounting surface shown UP



REVERSE-PARALLEL RIGHT (RPR)
mounting surface shown UP

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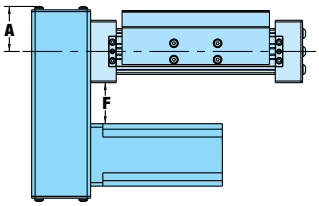
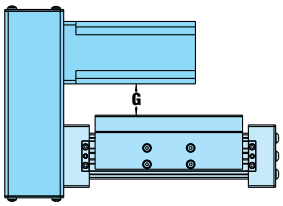
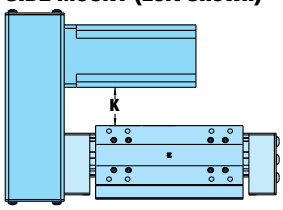
BOTTOM MOUNT



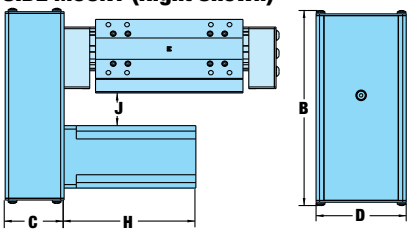
TOP MOUNT



SIDE MOUNT (Left Shown)



SIDE MOUNT (Right Shown)



	WEIGHT OF REDUCTION DRIVE				REDUCTION INERTIA AT MOTOR SHAFT			
	1:1		2:1		1:1		2:1	
MOTOR	lbs	*kg*	lbs	*kg*	lb-in²	*kg-cm²*	lb-in²	*kg-cm²*
MRV BRUSHLESS 23-FRAME	3.49	*1.58*	4.41	*2.00*	0.090	*0.2634*	0.254	*0.7433*
MRV BRUSHLESS 34-FRAME	3.94	*1.79*	4.84	*2.19*	0.087	*0.2546*	0.251	*0.7345*
MRV BRUSHLESS 56-FRAME	4.20	*1.91*	5.10	*2.31*	0.087	*0.2546*	0.251	*0.7345*
MRS STEPPER 34-FRAME	3.96	*1.80*	4.86	*2.21*	0.090	*0.2634*	0.254	*0.7433*

REDUCTION EFFICIENCY: 0.95

		A		B		C		D		F		G		H		J		K	
	MOTOR	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*	in.	*mm*
BRUSHLESS	MRV21	2.19	*55.6*	9.23	*234.4*	2.59	*65.8*	5.00	*127.0*	1.98	*50.3*	0.60	*15.2*	4.75	*120.7*	1.10	*27.9*	1.54	*39.1*
	MRV22	2.19	*55.6*	9.23	*234.4*	2.59	*65.8*	5.00	*127.0*	1.98	*50.3*	0.60	*15.2*	5.75	*146.1*	1.10	*27.9*	1.54	*39.1*
	MRV23	2.19	*55.6*	9.23	*234.4*	2.59	*65.8*	5.00	*127.0*	1.98	*50.3*	0.60	*15.2*	6.75	*171.5*	1.10	*27.9*	1.54	*39.1*
	MRV24	2.19	*55.6*	9.23	*234.4*	2.59	*65.8*	5.00	*127.0*	1.98	*50.3*	0.60	*15.2*	7.75	*196.9*	1.10	*27.9*	1.54	*39.1*
	MRV31	2.19	*55.6*	10.82	*274.8*	2.59	*65.8*	5.00	*127.0*	2.46	*62.5*	1.08	*27.4*	6.11	*155.2*	1.58	*40.1*	2.02	*51.3*
	MRV32	2.19	*55.6*	10.82	*274.8*	2.59	*65.8*	5.00	*127.0*	2.46	*62.5*	1.08	*27.4*	7.36	*186.9*	1.58	*40.1*	2.02	*51.3*
	MRV33	2.19	*55.6*	10.82	*274.8*	2.59	*65.8*	5.00	*127.0*	2.46	*62.5*	1.08	*27.4*	8.61	*218.7*	1.58	*40.1*	2.02	*51.3*
	MRV51	2.19	*55.6*	11.58	*294.1*	2.59	*65.8*	5.00	*127.0*	1.86	*47.2*	0.48	*12.2*	9.96	*253.0*	0.98	*24.9*	1.41	*35.8*
STEPPER	MRS31	2.19	*55.6*	10.82	*274.8*	2.59	*65.8*	5.00	*127.0*	2.46	*62.5*	1.08	*27.4*	3.11	*79.0*	1.58	*40.1*	2.02	*51.3*
	MRS32	2.19	*55.6*	10.82	*274.8*	2.59	*65.8*	5.00	*127.0*	2.46	*62.5*	1.08	*27.4*	4.63	*117.6*	1.58	*40.1*	2.02	*51.3*
	MRS33	2.19	*55.6*	10.82	*274.8*	2.59	*65.8*	5.00	*127.0*	2.46	*62.5*	1.08	*27.4*	6.14	*156.0*	1.58	*40.1*	2.02	*51.3*

SWITCHES
SPECIFICATIONS

RoHS COMPLIANT CE

MX products offer a wide range of sensing choices. There are 12 switch choices: reed, solid state PNP (sourcing) or solid state NPN (sinking); in normally open or normally closed; with flying leads or quick-disconnect.

Commonly used for end-of-stroke positioning, these switches allow drop-in installation anywhere along the entire actuator length. The one-piece design includes the retained fastening hardware and is designed for any open side or bottom slot on the MX. The internal piston magnet is a standard feature, therefore these switches can be installed in the field at any time.

Switches are used to send digital signals to PLC (programmable logic controller), TTL, CMOS circuit or other controller device. Switches contain reverse polarity protection. Solid state QD cables are shielded; shield should be terminated at flying lead end.

All switches are CE rated and are RoHS compliant. Switches feature bright red or yellow LED signal indicators; solid state switches also have green LED power indicators.

	Order Code	Part Number	Lead	Switching Logic	Power LED	Signal LED	Operating Voltage	**Power Rating (Watts)	Switching Current (mA max.)	Current Consumption	Voltage Drop	Leakage Current	Temp. Range	Shock / Vibration
REED	RY	8100-9082	5m	SPST Normally Open	—	Red	5 - 240 AC/DC	**10.0	100mA	—	3.0 V max.	—	14 to 158°F [-10 to 70°C]	50 G / 9 G
	RK	8100-9083	QD*		Tolomatic 81009082									
	NY	8100-9084	5m	SPST Normally Closed	—	Yellow	5 - 110 AC/DC							
	NK	8100-9085	QD*		Tolomatic 81009084									
SOLID STATE	TY	8100-9088	5m	PNP (Sourcing) Normally Open	Green	Yellow	10 - 30 VDC	**3.0	100mA	20 mA @ 24V	2.0 V max.	0.05 mA max.		
	TK	8100-9089	QD*		Tolomatic 81009088									
	KY	8100-9090	5m	NPN (Sinking) Normally Open	Green	Red								
	KK	8100-9091	QD*		Tolomatic 81009090									
	PY	8100-9092	5m	PNP (Sourcing) Normally Closed	Green	Yellow								
	PK	8100-9093	QD*		Tolomatic 81009092									
	HY	8100-9094	5m	NPN (Sinking) Normally Closed	Green	Red								
	HK	8100-9095	QD*		Tolomatic 81009094									

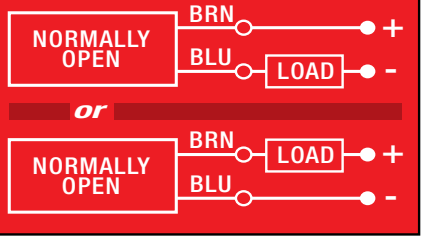
*QD = Quick-disconnect Enclosure classification IEC 529 IP67 (NEMA 6) CABLES: Robotic grade, oil resistant polyurethane jacket, PVC insulation

⚠**WARNING: Do not exceed power rating (Watt = Voltage x Amperage). Permanent damage to sensor will occur.

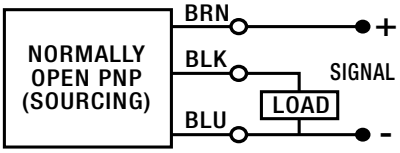
SWITCHES

WIRING DIAGRAMS

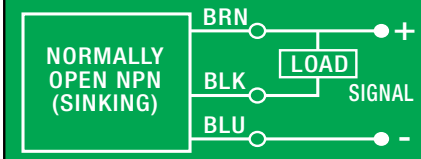
RY, #8100-9082, • RK, #8100-9083
REED • NORMALLY OPEN



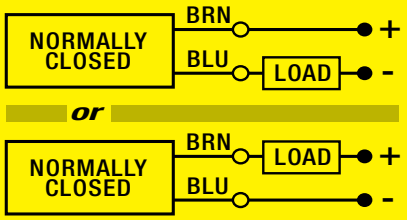
TY, #8100-9088, • TK, #8100-9089
SOLID STATE • NORMALLY OPEN • PNP



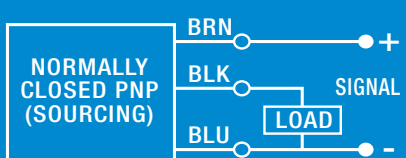
KY, #8100-9090, • KK, #8100-9091
SOLID STATE • NORMALLY OPEN • NPN



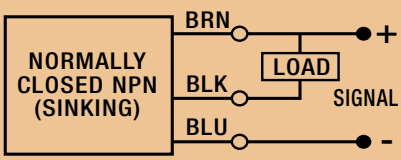
NY, #8100-9084, • NK, #8100-9085
REED • NORMALLY CLOSED



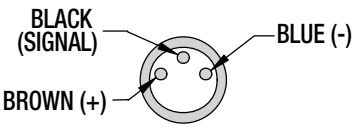
PY, #8100-9092, • PK, #8100-9093
SOLID STATE • NORMALLY CLOSED • PNP



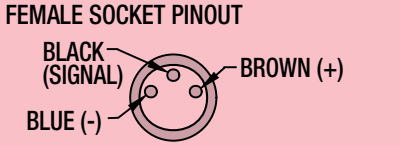
HY, #8100-9094, • HK, #8100-9095
SOLID STATE • NORMALLY CLOSED • NPN



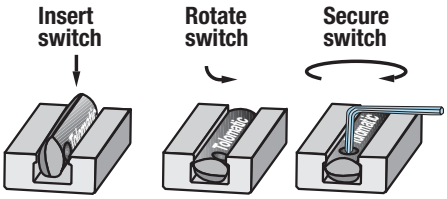
QUICK DISCONNECT MALE PLUG PINOUT



#8100-9080 QUICK DISCONNECT
FEMALE SOCKET PINOUT



SWITCH INSTALLATION AND REPLACEMENT

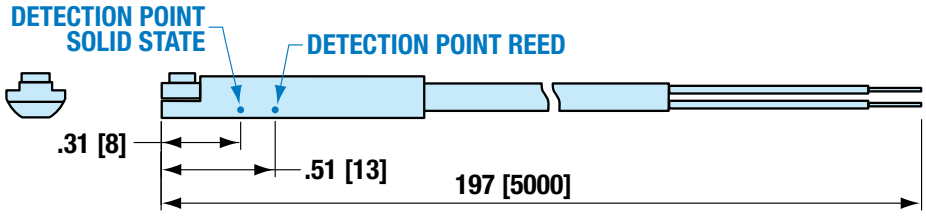


Place switch in side groove on tube at desired location with "Tolomatic" facing outward. While applying light pressure to the switch, rotate the switch is halfway into the groove. Maintaining light pressure, rotate the switch in the opposite direction until it is fully inside the groove with "Tolomatic" visible. Re-position the switch to the exact location and lock the switch securely into place by tightening the screw on the switch.

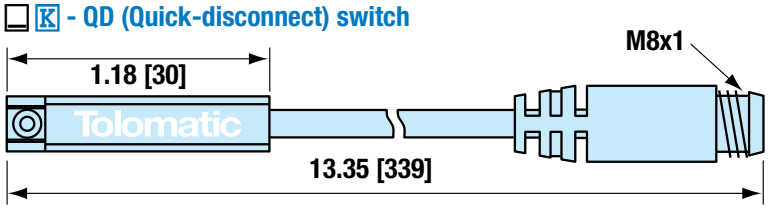
SWITCHES

SWITCH DIMENSIONS

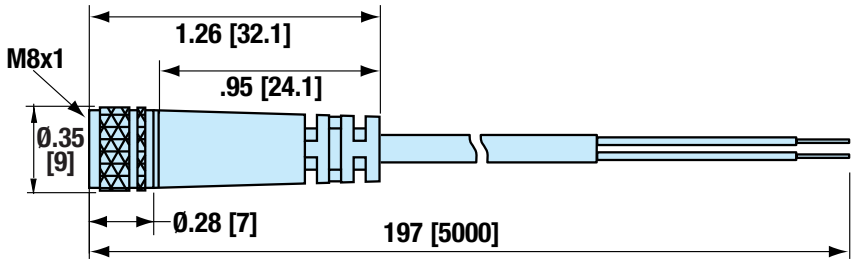
☐ Y - direct connect



☐ K - QD (Quick-disconnect) switch



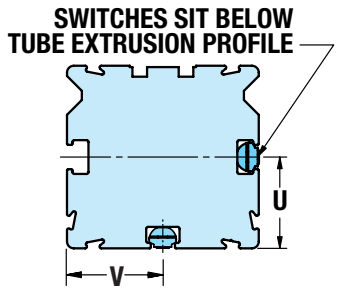
8100-9080 - QD Cable



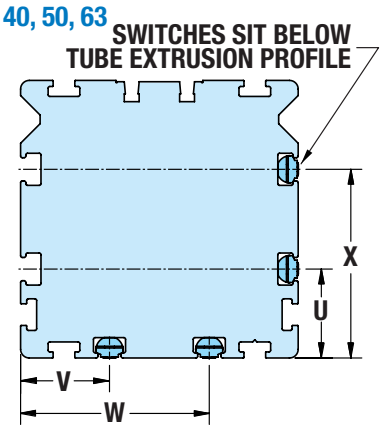
Dimensions in inches [brackets indicate dimensions in millimeters]

MOUNTING DIMENSIONS

16, 25, 32



40, 50, 63



SWITCH MOUNTING

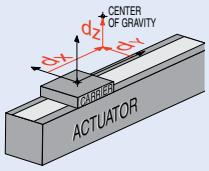
	16	25	32	40	50	63
U	0.31	0.79	1.06	0.81	1.08	1.50
mm	*7.9*	*20.0*	*27.0*	*20.5*	*27.4*	*38.0*
V	0.59	0.83	1.09	0.81	1.08	1.50
mm	*15.0*	*21.0*	*27.7*	*20.5*	*27.4*	*38.0*
W	–	–	–	1.71	2.02	2.44
mm	*–*	*–*	*–*	*43.5*	*51.4*	*62.0*
X	–	–	–	1.71	2.02	2.44
mm	*–*	*–*	*–*	*43.5*	*51.4*	*62.0*

COMPILE APPLICATION REQUIREMENTS

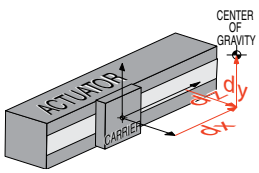
APPLICATION DATA WORKSHEET
Fill in known data. Not all information is required for all applications

ORIENTATION

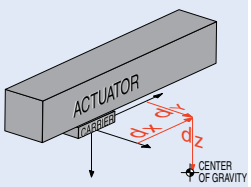
☐ Horizontal



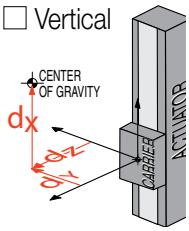
☐ Side



☐ Horizontal Down

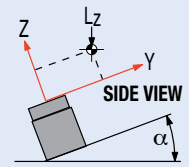


☐ Vertical

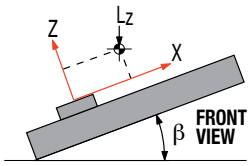


☐ Angled °

α _____



β _____



☐ Load attached to carrier OR ☐ Load supported by other mechanism

DISTANCE FROM CENTER OF CARRIER TO LOAD CENTER OF GRAVITY

d_x _____
d_y _____
d_z _____

☐ inch (U.S. Standard) ☐ millimeter (Metric)

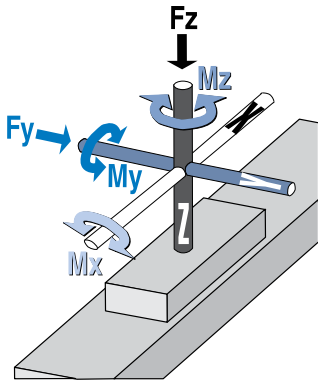
STROKE LENGTH _____

☐ inch (SK) (U.S. Standard) ☐ millimeters (SM) (Metric)

NOTE: If load or force on carrier changes during cycle use the highest numbers for calculations

LOAD _____

☐ lb. (U.S. Standard) ☐ kg. (Metric)



FORCES APPLIED TO CARRIER

F_z _____
F_y _____

☐ lbf. (U.S. Standard) ☐ N (Metric)

BENDING MOMENTS APPLIED TO CARRIER

M_x _____
M_y _____
M_z _____

☐ in.-lbs. (U.S. Standard) ☐ N-m (Metric)

PRECISION

Repeatability _____

☐ inch ☐ millimeters

OPERATING ENVIRONMENT

Temperature, Contamination, etc.

_____
_____
_____

MOVE PROFILE

Move Distance _____

☐ inch ☐ millimeters

Dwell Time After Move_____

Max. Speed _____

☐ in/sec ☐ mm/sec

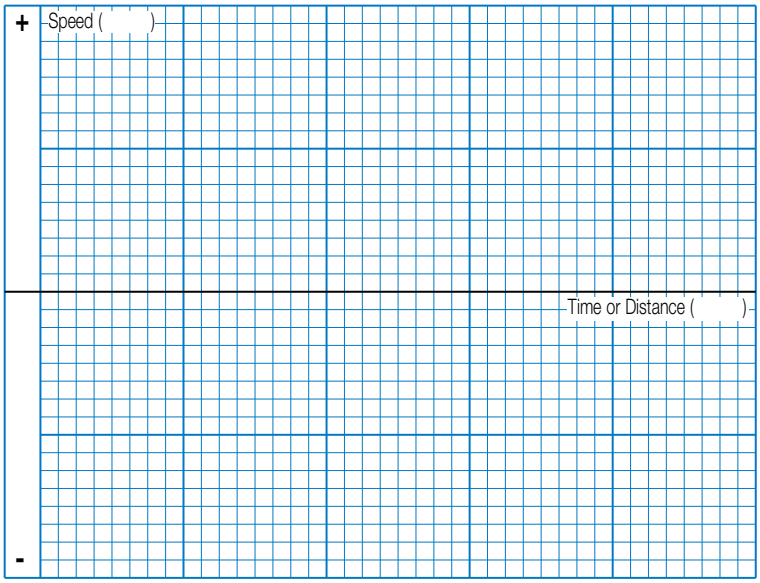
MOVE TIME _____

☐ sec

NO. OF CYCLES _____

☐ per minute ☐ per hour

MOTION PROFILE



Graph your most demanding cycle, including accel/decel, velocity and dwell times. You may also want to indicate load variations and I/O changes during the cycle. Label axes with proper scale and units.

CONTACT INFORMATION

Name, Phone, Email _____
Co. Name, Etc. _____
_____

STOP **USE THE TOLOMATIC SIZING AND SELECTION SOFTWARE AVAILABLE ON-LINE AT www.tolomatic.com OR... CALL TOLOMATIC 1-800-328-2174** with the above information. We will provide any assistance needed to determine the proper MX actuator for the job.

FAX 1-763-478-8080

SELECTION GUIDELINES

The process of selecting a load bearing actuator for a given application can be complex. It is highly recommended that you contact Tolomatic or a Tolomatic Distributor for assistance in selecting the best actuator for your application. The following overview of the selection guidelines are for educational purposes only.

1 CHOOSE ACTUATOR BEARING STYLE & SIZE

Choose an actuator that has the thrust, speed and moment load capacity to move the load. Use the Speed/Stroke graph (page 17) for the screw and the Moment and Load Capacity tables (pg. 8-11) for the actuator.

2 COMPARE LOAD TO MAXIMUM LOAD CAPACITIES

Calculate the application load (combination of load mass and forces applied to the carrier) and application bending moments (sum of all moments Mx, My, and Mz applied to the carrier). Be sure to evaluate the magnitude of dynamic inertia moments. When a rigidly attached load mass is accelerated or decelerated, its inertia induces bending moments on the carrier. Careful attention to how the load is decelerated at the end of the stroke is required for extended actuator performance and application safety. If either load or any of your moments exceed figures indicated in the Moment and Load Capacity tables (pg. 8-11) for the actuator consider:

1) Higher capacity bearing style i.e. S Solid to P Profiled Rail

2) A larger actuator size

3) Auxiliary carrier

4) External guide system

3 CALCULATE LOAD FACTOR LF

For loads with a center of gravity offset from the carrier account for both applied (static) and dynamic loads. The load factor (LF) must not exceed the value of 1.

$$L_F = \frac{Mx}{Mx_{max}} + \frac{My}{My_{max}} + \frac{Mz}{Mz_{max}} + \frac{Fy}{Fy_{max}} + \frac{Fz}{Fz_{max}} \leq 1$$

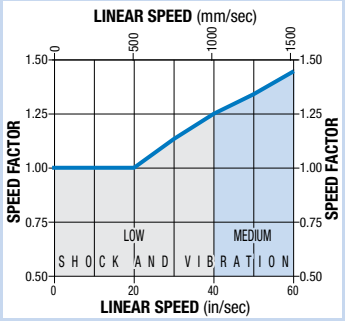
If LF does exceed the value of 1, consider the four choices listed in step #2.

4 ESTABLISH YOUR MOTION PROFILE AND CALCULATE ACCELERATION RATE

Using the application stroke length and maximum carrier velocity (or time to complete the linear motion), establish the motion profile. Select either triangular (accel-decel) or trapezoidal (accel-constant speed-decel) profile. Now calculate the maximum acceleration and deceleration rates of the move. Acceleration/deceleration should not exceed critical speed (page 17) for the screw/nut combination chosen. Also, do not exceed safe rates of dynamic inertia moments determined in step #3.

SPEED FACTOR

FOR APPLICATIONS WITH HIGH SPEED OR SIGNIFICANT SHOCK AND VIBRATION: Calculated values of loads and bending moments must be increased by speed factor from the graph below to obtain full rated life of profiled rail bearing system.



5 SELECT THE LEAD SCREW

Based on the application requirements for accuracy, backlash, quiet operation, life, etc. select the appropriate lead screw type (Acme screw with a solid nut or ball screw with a standard or anti-backlash nut) and the pitch (lead). For additional information on screw selection, consult "*Which Screw? Picking the Right Technology*" (#9900-4644) available at www.tolomatic.com.

6 SELECT MOTOR (GEARHEAD IF NECESSARY) AND DRIVE

To help select a motor and drive, use the sizing equations located in the Engineering Resources section of the Tolomatic Electric Products Catalog (#3600-4609) to calculate the application thrust and torque requirements. Refer to Motor sections to determine the motor and drive.

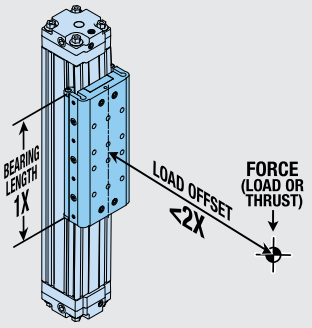
7 DETERMINE TUBE CLAMP/MOUNTING PLATE REQUIREMENTS

- Consult the Tube Clamp Requirements graph for the model selected (page 16)
- Cross reference the application load and maximum distance between supports
- Select the appropriate number of tube clamps, and mounting plates if required for motor and adapter clearance.

8 CONSIDER OPTIONS

- Choose metric or inch (US standard) load mounting. (When ordering use S K for inch and S M for metric)
- Switches - Reed, Solid State PNP or NPN, all available normally open or normally closed
- F L Floating mount bracket - used when lack of parallelism occurs between the actuator and an externally guided and supported load (available for S Solid bearing style MXE actuators)

S SOLID BEARING 2:1 RULE



For applications using S solid bearings, binding or interrupted motion may occur if the load offset is equal to or greater than twice the bearing length (1X). *LOAD OFFSET is defined as: the distance from the applied force (or the load center of gravity) to the centerline of the carrier.*

If the load offset cannot be changed consider:

1.) Higher capacity bearing style, i.e. S to P

2.) Larger Bore Cylinder

3.) Auxiliary Carrier

4.) Add External Guides

ADD YOUR MOTION CONTROL SYSTEM TO THE MXE or

MRS STEPPER SYSTEM

STEPPER DRIVE AND CONTROLLER

The DS [STAC6-S] & SI [STAC6-Si] represent the latest developments in stepper drive technology, incorporating features that derive the highest performance from today's stepper motors. Anti-resonance and waveform damping control algorithms provide excellent performance.

- Current Output 0.5 to 6.0 A
- 90-135 VAC Input
- 167V Bus
- Set-up and configuration software
- Configurable idle current reduction
- External control options
- Pulse and direction
- Analog command signal
- Host command via RS232/485
- Integral control options -
  Si Programmer™ - intuitive easy-to-use graphical programming language

⚠ DS [STAC6 S]

⚠ SI [STAC6 Si]

LATEST IN MICROSTEPPING TECHNOLOGY

- *ANTI-RESONANCE*
  Achieves higher speeds and better torque utilization
- *COMMAND SIGNAL SMOOTHING*
  Soften effect of changes in velocity and direction
- *MICROSTEP EMULATION*
  Smooth, high resolution motion across range of speeds
- *SELF TEST*
  Measure motor parameters automatically to optimize system performance
- *TORQUE RIPPLE SMOOTHING*
  Adjusts current waveform to reduce low speed torque ripple, providing smoother motion at low speeds

⚠ ***Please note the Tolomatic ordering codes. Use these codes when ordering stepper components from Tolomatic***
(Applied Motion Products model equivalents appear in [brackets])

STEPPER ACCESSORIES

HUB *MULTI-AXIS MOTION HUB WITH I/O*

- Networks Stepper products for multi-axis motion applications

MMI *OPERATOR INTERFACE*

- Allows visual setup of the panel to show a particular action taking place, or to prompt the user to make a decision or provide information such as move distance, move speed, repeat count

BOB *BREAK OUT BOARD*

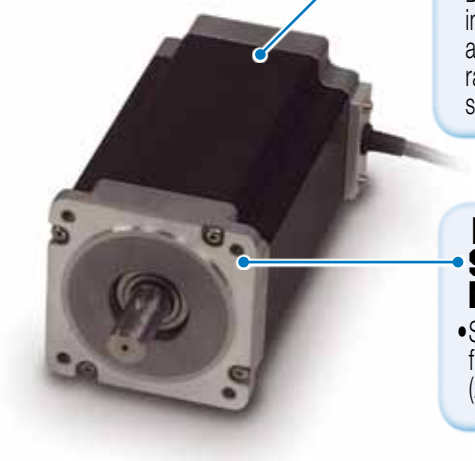
- Connects the I/O points of the DS [STAC6-S] & SI [STAC6-Si]

COMPLETE INFORMATION:
www.tolomatic.com

STEPPER MOTORS

NEMA 23-Frame and 34-Frame MRS Stepper Motors

- Speeds up to 3,000 RPM
- High resolution (up to 51,200 steps per rev)
- Holding torque to 1845 oz-in (13.03 Nm)
- 2000 line quadrature encoder option
- 10 ft. power cables with connector pre-wired



HYBRID MOTOR DESIGN

- Designed for increased torque and acceleration rates over a wider speed range

INDUSTRY STANDARD MOUNTING

- Standard NEMA frame sizes (23 and 34)

SELECT A COMPLETE SYSTEM FROM TOLOMATIC

MRV SERVO SYSTEM

DIGITAL SERVO DRIVE AND CONTROLLER

Designed by Tolomatic, the Axiom Plus PV combines the functions of a servo drive, motion controller and programmable logic controller in a single package. Our all-in-one design eliminates the confusion of multiple software packages, removes discrete wiring or network programming between controllers, and simplifies application programming.

The free Windows®-based software package programs the PLC functions in a standard ladder logic environment and the motion control functions in a simple graphical motion editor.

INNOVATIVE SERVO TECHNOLOGY

- *FLUX VECTOR CURRENT CONTROL*
  Provides closed loop motor control of torque producing current by sensing motor current in each individual motor phase. This gives a high bandwidth torque response over the full speed range with high efficiency and minimal phase lag
- *PLUGGABLE SCREW TERMINAL BLOCKS*
  Allows easier termination, quick connection or removal of wiring and direct access to signals for testing with a meter
- *MODBUS RTU COMMUNICATIONS*
  Standard Modbus RTU is built into the drive for communications to other controllers or operator interfaces
- *AMPLIFIER ONLY OPTION*
  The DV (drive only) version is for use with an external controller that provides analog velocity, analog torque or step commands

SPECIFICATIONS:

	PV10	PV20	PV30
Input Line	95 - 250 VAC, 1Ø or 3Ø		
Input Hz	47 - 63 Hz		
Output Current Peak (A_{peak})	10	20	30
Output Current Cont (A_{cont})	5	10	15
Output Power Cont (kW)	1.4	2.8	4.2
Discrete Inputs	15, optically isolated 5-25VDC		
Discrete Outputs	8, optically isolated 5-25VDC		
Analog Inputs	1, 14-bit Differential ±10VDC		

SERVO MOTORS

The MRV series of brushless servo motors is available in a wide range of torque outputs to meet your demanding applications. These motors are designed for precision motion profiles, low inertia, maximum power density and long continuous life.

SPECIFICATIONS:

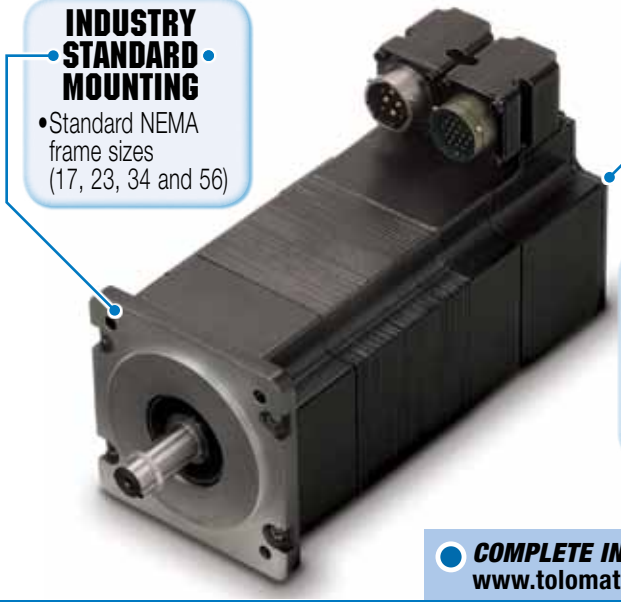
	TORQUE Cont. (lb-in)	TORQUE Peak (lb-in)	Max. Speed (RPM)	Rotor Inertia (lb-in²)
MRV11	3	12	5000	0.02
MRV21	4	11	6000	0.05
MRV22	8	22	6000	0.10
MRV23	11	33	6000	0.14
MRV24	15	47	6000	0.19
MRV31	17	85	6000	0.38
MRV32	30	150	6000	0.69
MRV33	44	220	6000	1.00
MRV51	80	240	3000	2.53

HIGH RESOLUTION ENCODER

- 1000 line quadrature industry standard incremental encoder feedback

INDUSTRY STANDARD MOUNTING

- Standard NEMA frame sizes (17, 23, 34 and 56)



INTEGRAL PROTECTION

- Thermistor provides over temperature protection
- IP65 rated

COMPLETE INFORMATION:
www.tolomatic.com

ADJUSTMENT PROCEDURES

[S] SOLID BEARING CARRIER ADJUSTMENT

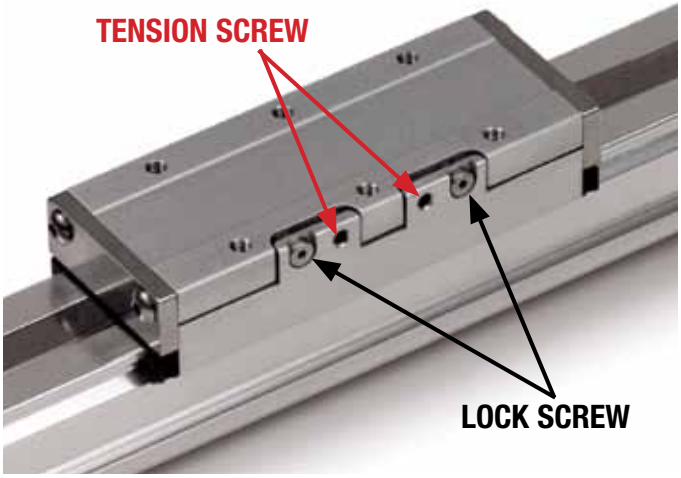
16 Series

NOTE: MXE16S requires a different carrier adjustment procedure, see below.

Tools Required:

Inch Models: 1/16 inch and 2.5mm Hex Wrench (Key)
Metric Models: 2 and 2.5 mm Hex Wrench (Key)

1. Loosen endplate screws on both ends of the carrier.
2. Fully loosen all tension and lock screws. They do not need to be removed, just fully loosened.



3. Tighten tension screws by turning them clockwise until the carrier is just tight enough so that no side-to-side rocking motion is present and it can easily be moved by hand over the entire stroke length with no hesitation. Very little torque on the screws is required to obtain this condition.

Note: The Tension Screws are the small set screw style fastener. The Lock Screws are the larger, low head, hex drive screws.

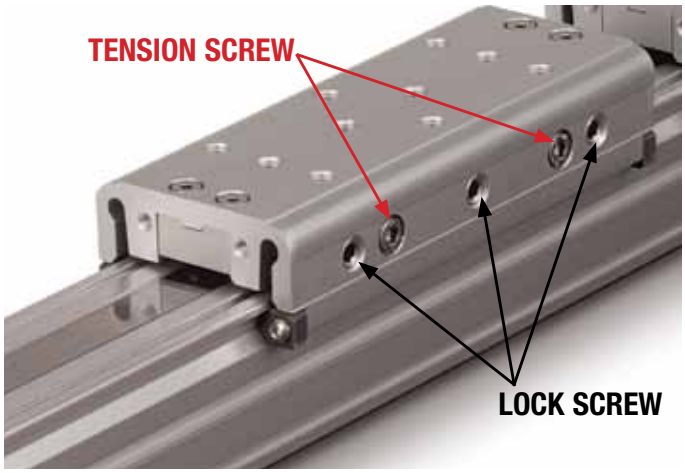
4. Tighten lock screws by turning them clockwise until tight. The carrier should feel snug in relation to the tube, with no side-to-side rocking motion present. If the carrier becomes too loose, loosen the lock screws, tighten the tension screws and then retighten the lock screws.
5. Once ideal carrier tension is achieved, fully tighten end plate screws on both ends of the carrier.

Allen wrench sizes for carrier adjustment, Solid bearing actuators

	Tension Screw		Lock Screw	
	in	*mm*	in	*mm*
16	1/16	*2*	1/16	*2*
25	5/32	*4*	1/8	*3*
32	5/32	*4*	3/32	*2*
40	5/32	*4*	1/8	*3*
50	3/16	*4*	3/32	*2.5*
63	1/4	*5*	3/16	*5*

25, 32, 40, 50, 63 Series

The [S] solid bearing carrier will provide for maximum life when properly adjusted. The carrier design contains both tension and lock screws. The tension screws control the amount of pressure placed on the carrier bearings. The lock screws lock the tension screws in place and provide fine adjustment of the carrier bearings. The number of tension and lock screws will vary depending on the bore size of the actuator.



1. Fully loosen all tension and lock screws. They do not need to be removed, just fully loosened.
2. Tighten tension screws on both sides of carrier roughly 1/8 to 1/4 turn clockwise past where the screw starts to feel snug. The carrier should be very difficult or impossible to move by hand.
3. Next, adjust the lock screws on both sides of the carrier roughly 1/8 to 1/4 turn clockwise past where the screw starts to engage.
4. Ideal carrier tension is achieved when the carrier feels snug in relation to the tube. No rocking motion should be present. The carrier should be loose enough to be moved by hand over the entire length of the actuator. If after this process the carrier has become too loose, equally adjust all of the lock screws with a slight 1/32 turn counter-clockwise. A carrier that is adjusted too tight will increase the breakaway pressure required for motion; in extreme cases no motion will occur when air is applied.

During the application duty cycle, this process may need to be repeated. Keeping the carrier properly adjusted will prolong the life of the [S] solid bearing system.

SERVICE PARTS ORDERING

REPAIR KITS

Repair kit includes: dust band, end caps, [Also for S style: bearings and bearing caps]

The part number for a repair kit begins with RK followed by model, actuator size, bearing type, and stroke length (SK = inch/US Standard, SM = metric) (NOTE: If unit has an auxiliary carrier also include DC and distance between carrier centers)

SWITCHES

TO ORDER SERVICE PARTS SWITCHES:

Switches for MXE include retained mounting hardware and are the same for all actuator sizes and bearing styles

Code	Part Number	Lead	Normally	Sensor Type
RY	8100-9082	5m (197 in)	Open	Reed
RK	8100-9083*	Quick-disconnect		
NY	8100-9084	5m (197 in)	Closed	Reed
NK	8100-9085*	Quick-disconnect		
TY	8100-9088	5m (197 in)	Open	Solid State PNP
TK	8100-9089*	Quick-disconnect		
KY	8100-9090	5m (197 in)	Open	Solid State NPN
KK	8100-9091*	Quick-disconnect		
PY	8100-9092	5m (197 in)	Closed	Solid State PNP
PK	8100-9093*	Quick-disconnect		
HY	8100-9094	5m (197 in)	Closed	Solid State NPN
HK	8100-9095*	Quick-disconnect		

*Also order mating QD cable #8100-9080

	8100-9080	Mating QD (Quick-disconnect) cable 197 in. (5m)

OPTIONS

MOUNTING OPTIONS		16		25		32	
		S Solid	P Profiled Rail	S Solid	P Profiled Rail	S Solid	P Profiled Rail
Floating Mount	Inch	8116-9536	NA	8125-9536	NA	8132-9536	NA
	Metric	*8116-9036*	*NA*	*8125-9036*	*NA*	*8132-9036*	*NA*
Tube Clamps	(2 Clamps)	NA	NA	8125-9018	8125-9018	8132-9018	8132-9018
Mounting Plate Kit	17-Frame	8316-9016	8316-9016	NA	NA	NA	NA
	23-Frame	NA	NA	8325-9016	8325-9016	8332-9016	8332-9016
	34-Frame	NA	NA	8325-9017	8325-9017	8332-9017	8332-9017

MOUNTING OPTIONS		40		50		63	
		S Solid	P Profiled Rail	S Solid	P Profiled Rail	S Solid	P Profiled Rail
Floating Mount Kit	Inch	8140-9536	NA	8150-9536	NA	8163-9536	NA
	Metric	*8140-9036*	*NA*	*8150-9036*	*NA*	*8163-9036*	*NA*
Tube Clamps	(2 Clamps)	8140-9018	8140-9018	8150-9018	8150-9018	8163-9018	8163-9018
Mounting Plate Kit	23-Frame	8340-9016	8340-9016	8350-9016	8350-9016	8363-9016	8363-9016
	34-Frame	8340-9017	8340-9017	8350-9016	8350-9016	8363-9016	8363-9016
	56-Frame	NA	NA	NA	NA	8363-9016	8363-9016

ORDERING

MODEL SELECTION (MUST BE IN THIS ORDER)

MXE 40 P SN02 SM2007.02 LMI

OPTIONS (IN ANY ORDER)

DC215.9 TC8 TK2

MODEL

MXE MX Rodless Electric Actuator

SERIES

16 Series actuator	**40** Series actuator
25 Series actuator	**50** Series actuator
32 Series actuator	**63** Series actuator

BEARING

S Solid Bearing
P Profiled Rail

NUT/SCREW CONFIGURATION

SOLID NUT / PITCH (turn/in)	SERIES
SN01	MXE 25, 32, 40, 50
SN02	MXE 16, 25, 32, 40, 50
SN05	MXE 25, 32
SN04	MXE 16, 63
SN16	MXE 16

BALL NUT / PITCH (turn/in)	SERIES
BN01	MXE 63
BNL01	MXE 63
BN02	MXE 40, 50, 63
BNL02	MXE 40, 50, 63
BN04	MXE 63
BNL04	MXE 63
BN05	MXE 40, 50
BNL05	MXE 40, 50
BN08	MXE 25, 32
BNL08	MXE 25, 32

STROKE LENGTH & MOUNTING TYPE

SK_ _ _ _._ _ Stroke, enter desired stroke length in **inches**

SM_ _ _ _ _._ _ Stroke, enter desired stroke length in **millimeters**

NOTE: Actuator mounting threads and mounting fasteners will be either inch or metric; depending on how stroke length is indicated

SK=inch mounting

SM= metric mounting

MOTOR MOUNTING / REDUCTION

(must choose one)

LMI In-Line mounting
LME23 Ext. shaft for RP & 23 frame motor
LME34 Ext. shaft for RP & 34 frame motor

⚠ *A motor size and code must be selected when specifying a reverse-parallel mounting configuration. Reference the motor ordering pages in Electric Products Catalog #3600-4609.*

RPL1 1:1 Reverse-Parallel mount left
RPR1 1:1 Reverse-Parallel mount right
RPB1 1:1 Reverse-Parallel mount bottom
RPT1 1:1 Reverse-Parallel mount top
RPL2 2:1 Reverse-Parallel mount left
RPR2 2:1 Reverse-Parallel mount right
RPB2 2:1 Reverse-Parallel mount bottom
RPT2 2:1 Reverse-Parallel mount top

MOTOR / DRIVE / CONTROLLER / PLANETARY GEARBOX

⚠ *Reference the ordering pages in Electric Products Catalog #3600-4609 Stepper Products Brochure #3600-4160 & Planetary Gearbox Doc. #3600-4161*

Visit www.tolomatic.com for the most up-to-date information or call Tolomatic 1-800-328-2174

AUXILIARY CARRIER

DC_ _ _._ _ _ Auxiliary Carrier, enter center-to-center spacing desired in **inches** (SK) or **millimeters** (SM)

(Same unit of measure as stroke length is required)

⚠ **Center-to-center spacing between carriers adds to overall length of the actuator,** this distance will not be subtracted from stroke length specified in the previous step

MOUNTING

TC_ Tube Clamps, enter number of pairs
FL Floating Mount
MP_ Mounting Plates, & quantity

⚠ NOTE: Floating Mount is not available with "P" Profiled Rail

SWITCHES

RY_ Reed Switch (Normally Open) with 5-meter lead, & enter quantity desired
RK_ Reed Switch (Normally Open) with 5-meter lead/QD, & quantity
NY_ Reed Switch (Normally Closed) with 5-meter lead, & quantity
NK_ Reed Switch (Normally Closed) with 5-meter lead/QD, & quantity

TY_ Solid State Switch PNP (Normally Open) w/ 5-meter lead, & quantity
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HY_ Solid State Switch NPN (Normally Closed) w/ 5-meter lead, & quantity
HK_ Solid State Switch NPN (Normally Closed) w/ 5-meter lead/QD, & quantity

VISIT www.tolomatic.com/mxe FOR COMPLETE, UP-TO-DATE INFORMATION

⚠ ***Not all codes listed are compatible with all options.***

Call Tolomatic 1-800-328-2174 to determine available options and accessories based on your application requirements.

TOLOMATIC ALSO OFFERS THE MXB BELT DRIVEN ELECTRIC ACTUATOR - DESIGNED TO OUTLAST EVERY BELT DRIVEN ACTUATOR ON THE MARKET

- MXB-[U] & MXB-[P]: Low profile to fit your application
- MXB-[P]: High precision bearings feature smooth, low breakaway motion
- MXB-[P]: Durable profiled rail design uses THK® Caged Ball® technology to reduce friction and extend actuator life.
- MXB-[P]: High load and bending moment capacities

The use of synchronous belts, often referred to as timing belts, have become a standard in the automated motion industry as an alternate to screw drive mechanisms for producing linear motion. MXB-[U] and MXB-[P] belt driven actuators are an excellent solution for applications that require:

- High linear velocities
- High acceleration rates
- Long stroke lengths
- Excellent repeatability
- High duty cycles

Tolomatic belt driven actuators can achieve linear acceleration up to 1200 in/sec^2,
MXB-U velocity of up to 200 in/sec (5 m/sec) and
MXB-P velocity of up to 150 in/sec (3.8 m/sec).

Choose from our broad line of MX products:

ELECTRIC				PNEUMATIC		
MXB		MXE		MXP		
Belt Driven		Screw Driven		Rodless Cylinder		
						
[P] Profiled Rail	[U] Unguided	[P] Profiled Rail	[S] Solid Bearing	[P] Profiled Rail	[S] Solid Bearing	[N] Internal Bearing
MXB16P	MXB16U	MXE16P	MXE16S	MXP16P	MXP16S	MXP16N
MXB25P	MXB25U	MXE25P	MXE25S	MXP25P	MXP25S	MXP25N
MXB32P	MXB32U	MXE32P	MXE32S	MXP32P	MXP32S	MXP32N
MXB40P	MXB40U	MXE40P	MXE40S	MXP40P	MXP40S	MXP40N
MXB50P	MXB50U	MXE50P	MXE50S	MXP50P	MXP50S	MXP50N
MXB63P	MXB63U	MXE63P	MXE63S	MXP63P	MXP63S	MXP63N

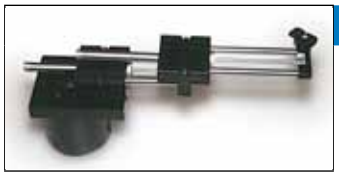
THE TOLOMATIC DIFFERENCE What you expect from the industry leader:

EXCELLENT CUSTOMER SERVICE & TECHNICAL SUPPORT

Our people make the difference! Expect prompt, courteous replies to all of your application and product questions.

INDUSTRY LEADING DELIVERIES

Standard catalog products are built to order and ready-to-ship in 5 days or less. Modified and custom products ship weeks ahead of the competition.



INNOVATIVE PRODUCTS

From standard catalog products... to modified products... to completely unique custom products, Tolomatic designs and builds the best solutions for your challenging applications.

SIZING & SELECTION SOFTWARE

Windows® compatible, downloadable from our website – FREE – the best tool of its kind on the market! Product selection has never been easier.

3D MODELS & 2D DRAWINGS AVAILABLE ON THE WEB

Easy to access CAD files are available in many popular formats.

ALSO CONSIDER THESE OTHER TOLOMATIC PRODUCTS:

PNEUMATIC PRODUCTS

RODLESS CYLINDERS: Band Cylinders, Cable Cylinders, MAGNETICALLY COUPLED CYLINDERS/SLIDES; GUIDED ROD CYLINDER SLIDES; ROTARY ACTUATORS

"FOLDOUT" BROCHURE #9900-9075 PRODUCTS BROCHURE #9900-4028 www.tolomatic.com/pneumatic

ELECTRIC PRODUCTS

ROD & GUIDED ROD STYLE ACTUATORS, HIGH THRUST ACTUATORS, SCREW & BELT DRIVE RODLESS ACTUATORS, MOTORS, AXIOM DRIVES/CONTROLLERS

"FOLDOUT" BROCHURE #9900-9074 PRODUCTS BROCHURE #9900-4016 www.tolomatic.com/electric

POWER TRANSMISSION PRODUCTS

GEARBOXES: Float-A-Shaft®, Slide-Rite®; DISC CONE CLUTCH; CALIPER DISC BRAKE

"FOLDOUT" BROCHURE #9900-9076 PRODUCTS BROCHURE #9900-4029 www.tolomatic.com/pt

Tolomatic
EXCELLENCE IN MOTION®

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Phone: (763) 478-8000 • Fax: (763) 478-8080

Toll-Free: 1-800-328-2174
Email: help@tolomatic.com • http://www.tolomatic.com

Visit www.tolomatic.com for the most up-to-date technical information

Tolomatic
EXCELLENCE *IN MOTION*®

MXP BAND CYLINDER

ENDURANCE TECHNOLOGY℠

[N] INTERNAL BEARING
[S] SOLID BEARING
[P] PROFILED RAIL

MAXIMUM DURABILITY

Tolomatic
EXCELLENCE IN MOTION®

ENDURANCE TECHNOLOGY℠

Pneumatic Actuators

- *Largest selection of rodless cylinders* in band, cable, and magnetically coupled styles with a wide range of load capacities.
- *Power-Block rod cylinder slides* for maximum force in a short stroke package, perfect for conveyor stops or load lifting applications.

Electric Actuators

- *Rod screw actuators* for maximum thrust in short stroke applications. Guided screw models are available for applications that require additional guidance.
- *Integrated motor actuators* in both roller and ball screw technologies deliver high thrust capacities and 100% duty cycle.
- *Rodless screw and belt designs* solve a wide range of moment, load, precision, speed, and performance requirements.

Drives & Motors

- *Brushless servo controllers, drives and motors* provide smooth, quiet operation and high performance.
- *Microstepping controllers, drives and motors* achieve precise positioning at economical prices.
- *Easy-to-use, Windows® based programming and setup software.*
- *Your Motor Here* program matches a Tolomatic actuator to customer motor and supplies the motor adapter plate free of charge, mounted and shipped with the actuator.

More solutions. Built to last.

Power Transmission

- *Float-A-Shaft® and Slide-Rite® right-angle gearboxes* turn power around any corner.
- *Caliper disc brakes* in mechanical, hydraulic, pneumatic and spring-applied models offer a wide variety of industrial stopping power.
- *Disc cone clutches* with high torque output and non-slip, dependable performance.

Customized Products

- *Quick turnaround on custom modifications* to Tolomatic standard products.
- *Linear motion solutions with custom design and prototype services.*

Service & Tech Support

- *Fast service and full technical support.*
- *All catalog products are built-to-order and shipped in 5 days or less.*

5 DAYS BUILT-TO-ORDER

- *CAD files & sizing and selection software available online at* **www.tolomatic.com**

ACTUATOR SIZING

3D CAD 2D

TABLE OF CONTENTS

INTRODUCING THE MXP BAND CYLINDER – DESIGNED TO OUTLAST EVERY RODLESS CYLINDER ON THE MARKET

The MXP pneumatic rodless cylinder is exactly what you expect from the industry's number one rodless supplier. Designed with our exclusive ENDURANCE TECHNOLOGY℠ features, the MXP delivers superior performance to meet the most demanding applications. Nobody knows rodless like Tolomatic, and the MXP proves it.

- **DURABLE BEARINGS.** Three bearing choices to match your application needs. Profiled rail design reduces friction and extends actuator life. Solid bearing design reduces stress concentration for optimum performance. Internal bearing design is permanently lubricated for long, trouble-free service.

- **DURABLE BANDS.** Stainless steel bands are stronger and will not elongate like elastomer (non-metallic) bands, providing reliable sealing over the life of the actuator.

N-INTERNAL BEARING

- Low cost solution for applications with limited load and bending moment requirements
- Lowest breakaway pressure
- Best in many vertical applications
- Permanently lubed internal bearing

S-SOLID BEARING

- Increased Mx moment capacity
- Large bearing surface contact area optimizes stress distribution on bearing for long service life
- Large carrier mounting pattern for more load stability and compatibility with existing BC2 applications
- Engineered bearing material does not require additional lubrication
- Solid bearings are field replaceable

P-PROFILED RAIL

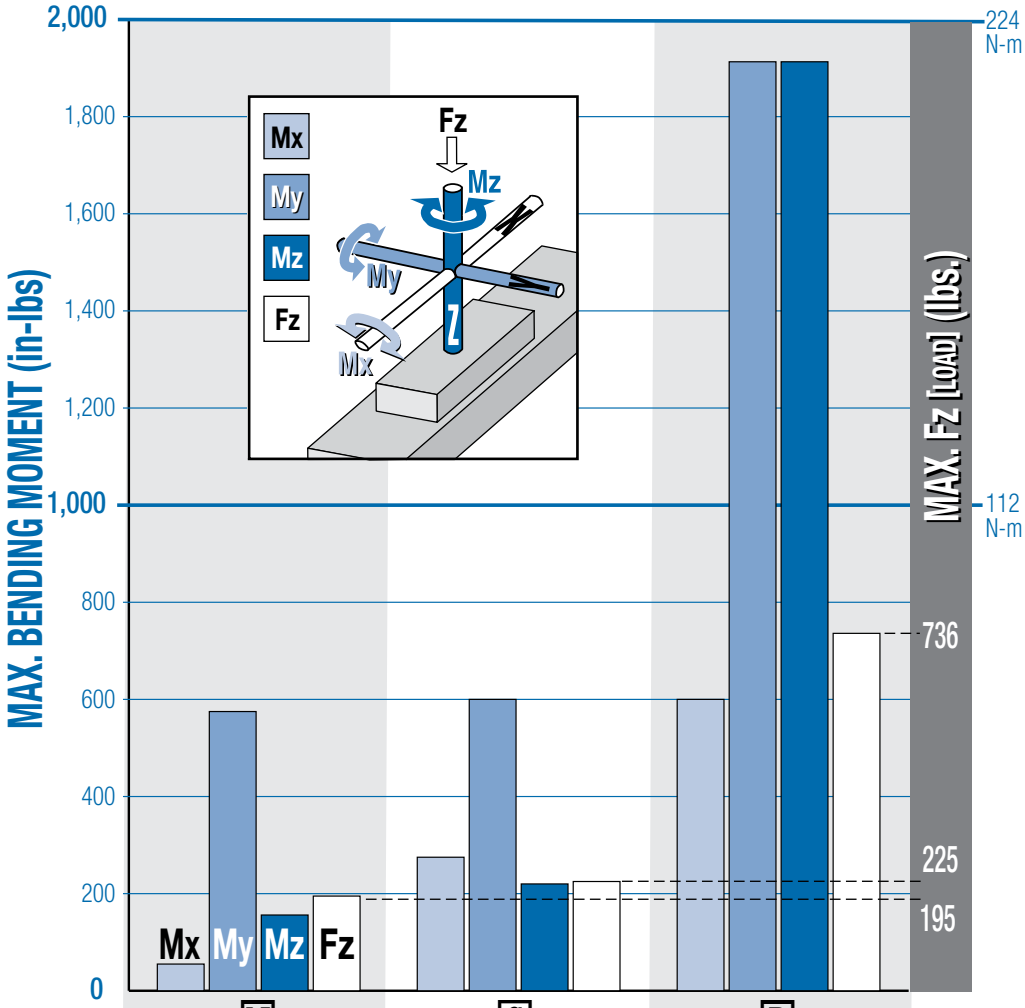
- Recirculating ball bearing design offers reduced friction for reliable service life
- High load and bending moment capacities
- Low profile to fit your application
- High precision bearings feature smooth, low breakaway motion

SELECT THE PERFORMANCE YOU NEED

Choose from: • Three Bearing Models • Six Bore Sizes • Built to Your Specified Stroke Length!

MOMENT & LOAD CAPACITY COMPARISON

Graph for model comparison, data from MXP40, 38mm (1.5") bore



Tolomatic MXP Band Cylinder Model			
Bearing Type	Internal Bearing	Solid Bearing	Profiled Rail
Moment Capacity	Moderate	Moderate + Mx	High
Isolated Piston	No	Yes	Yes
Ideal Applications	• Guided Loads • Vertical Orientation	• Side Loads • Impact Loads	• High Moment Loads • High Speeds with Heavy Loads • High Precision
Product Details	Page MXP_6	Page MXP_8	Page MXP_10

N INTERNAL BEARING

ENDURANCE TECHNOLOGY℠

INTERNAL BEARINGS

- Design maximizes piston bearing surface area for less pressure on bearing surfaces, less pressure results in less wear
- Permanent lubrication for low friction and extended bearing life
- Internal location provides protection from external contaminants, extending life

STAINLESS STEEL BANDS

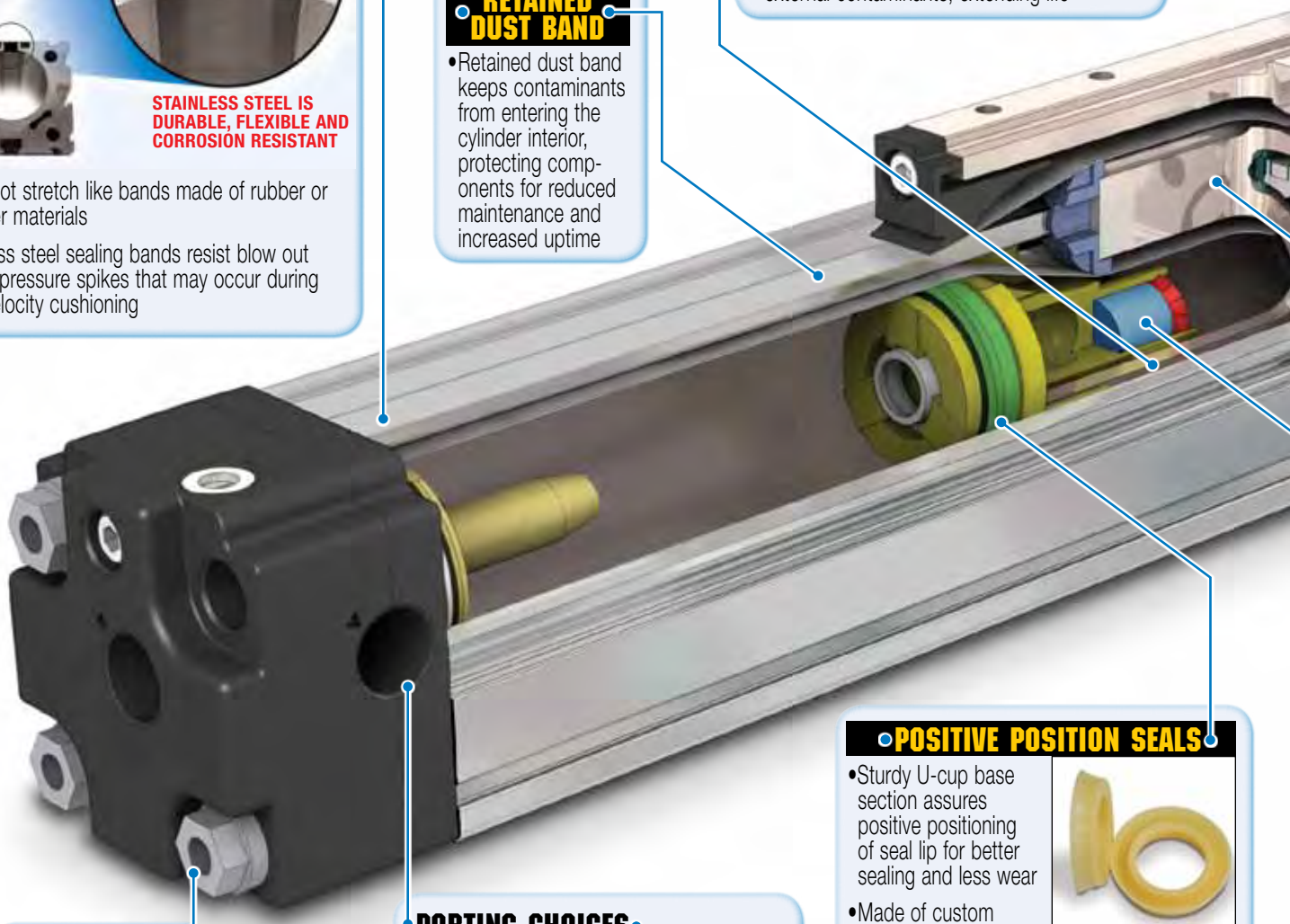
- Both interior sealing band and exterior dust band made of fatigue resistant stainless steel

STAINLESS STEEL IS DURABLE, FLEXIBLE AND CORROSION RESISTANT

- Does not stretch like bands made of rubber or polymer materials
- Stainless steel sealing bands resist blow out during pressure spikes that may occur during high velocity cushioning

RETAINED DUST BAND

- Retained dust band keeps contaminants from entering the cylinder interior, protecting components for reduced maintenance and increased uptime



POSITIVE POSITION SEALS

- Sturdy U-cup base section assures positive positioning of seal lip for better sealing and less wear
- Made of custom formulated polyurethane for pliable, wear resistant seal lip

DIRECT MOUNT

- Head bolts are tapped for direct mounting

PORTING CHOICES

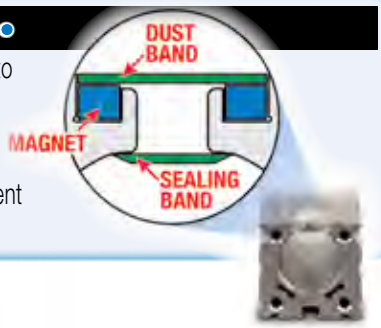
- 4-ported heads are standard to allow air connections on sides, end or bottom
- Single-end porting allows convenient one end air connection
- NPT, Metric Parallel (ISO-G/BSP) & Metric Taper (Rc/BST) available on both metric and inch *(US standard)* mount actuators

INCH OR METRIC MOUNTING

- Your choice of inch *(US standard)* or metric fasteners for carrier and head bolt mounting

NON-WEAR BAND RETENTION

- Magnetically retained bands are not subject to wear as are mechanically retained systems
- Immediate band engagement and release results in less drag on piston for lower breakaway force during initial carrier movement



DUST WIPER

- Formed end cap and side dust wipers keep contaminants from entering the cylinder's internal area

ADJUSTABLE CUSHIONS

- Easy screw adjustment for smooth deceleration protecting actuator from high stress at end-of-stroke
- Adjustable cushions with retained stainless steel needle screw for increased safety

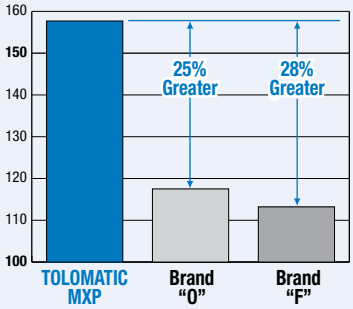
INTERNAL MAGNETS

- Standard feature that allows sensor installation on left, right or bottom of the extrusion

HIGH STRENGTH PISTON

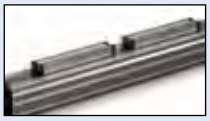
- Single piece extrusion for piston bracket and carrier reduces failure points
- Piston bracket neck cross-sectional area is up to 28% greater than competitive designs, providing increased durability

25mm PISTON BRACKET MINIMUM CROSS-SECTIONAL AREA (mm²)



NOTE: Boxed letters indicate ordering codes

OPTIONS



AUXILIARY CARRIER [D] [W]
- 2X higher Fz (load) capacity
- High bending moment capacity

FLOATING MOUNT [F] [L]
- Compensates for non-parallelism between MXP band cylinder and externally guided load

TUBE CLAMPS [T] [C]
- Used for intermediate support
- Flush with bottom of actuator to retain low profile
- Drop-in, adjustable mounting locations

FOOT MOUNTS [F] [M]
- For end mounting of MXP band cylinder
- Use to bottom or side mount actuator

SHOCK ABSORBERS [A] [L] [S] [L] [A] [H] [S] [H]
- Allows increased operating speed and load
- Self-compensates for load or speed changes
- Minimizes impact load to equipment
- Fixed or adjustable position shocks

SINGLE-END PORTING [S]
- Convenient single-end air connection (not available on MXP16)

SWITCHES
- Wide variety of sensing choices: Reed, Solid State PNP or NPN, all available normally open or normally closed
- Flush mount, drop-in installation, anytime
- Bright LEDs, power & signal indication
- CE rated, RoHS compliant

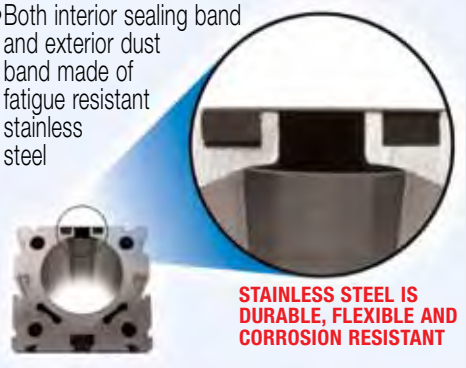
S SOLID BEARING

ENDURANCE TECHNOLOGY℠

Endurance Technology features are designed for maximum durability to provide extended service life.

STAINLESS STEEL BANDS

- Both interior sealing band and exterior dust band made of fatigue resistant stainless steel



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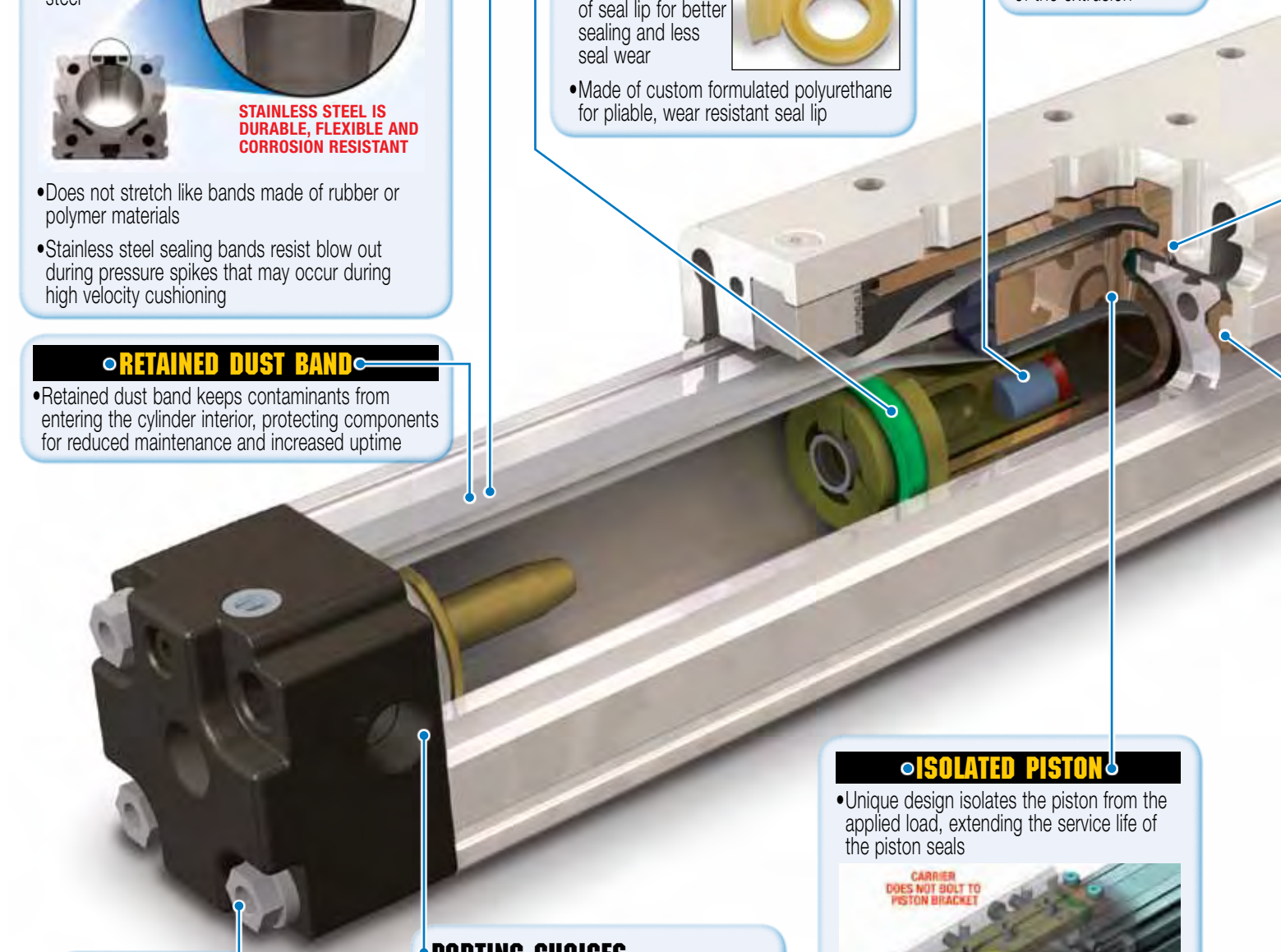

ISOLATED PISTON

- Unique design isolates the piston from the applied load, extending the service life of the piston seals

- Piston remains isolated even when the carrier is deflected under load
- Piston bracket and carrier feature single piece extrusions, reducing failure points

DIRECT MOUNT

- Head bolts are tapped for direct mounting

PORTING CHOICES

- 4-ported heads are standard to allow air connections on sides, end or bottom
- Single-end porting allows convenient one end air connection
- NPT, Metric Parallel (ISO-G/BSP) & Metric Taper (Rc/BST) available on both metric and inch *(US standard)* mount actuators

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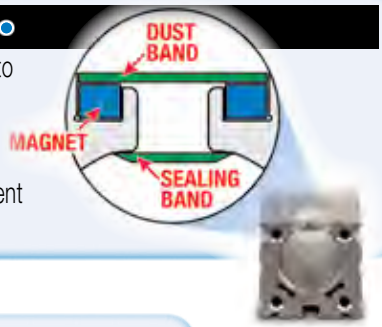

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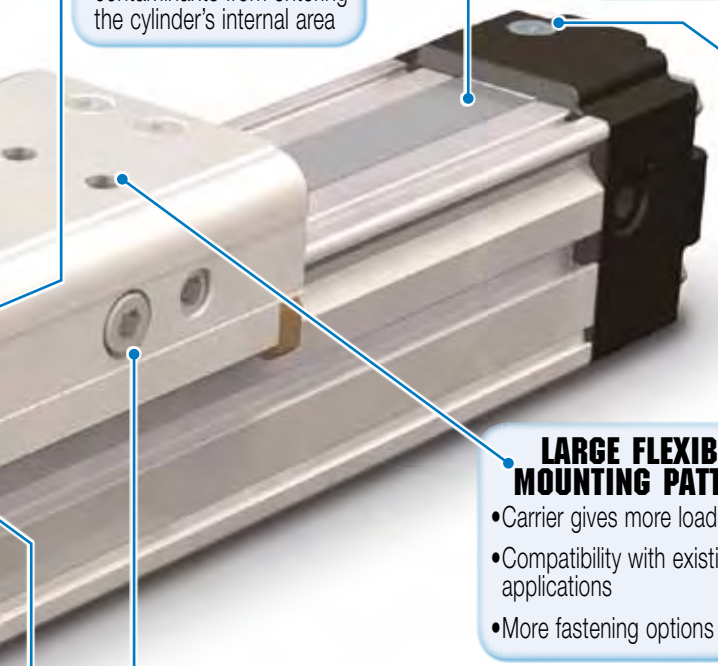
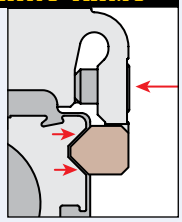


LARGE FLEXIBLE MOUNTING PATTERN

- Carrier gives more load stability
- Compatibility with existing BC2 applications
- More fastening options

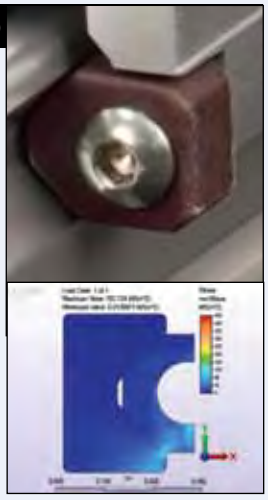
NON-BINDING BEARING ARMS

- Bearings are tensioned indirectly, providing bind free adjustment



TRAPEZOIDAL BEARINGS

- Trapezoidal design maximizes bearing surface area for less pressure on bearing surfaces; less pressure results in less wear
- Engineered bearing material has low static and dynamic friction with low wear properties for long lasting, smooth operation
- Bearings are field replaceable for extended service life



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- For end mounting of MXP band cylinder
- Use to bottom or side mount actuator

SHOCK ABSORBERS [A] [L] [S] [L] [A] [H] [S] [H]

- Allows increased operating speed and load
- Self-compensates for load or speed changes
- Minimizes impact load to equipment
- Fixed or adjustable position shocks

SINGLE-END PORTING [S]

- Convenient single-end air connection (not available on MXP16)

SWITCHES

- Wide variety of sensing choices: Reed, Solid State PNP or NPN, all available normally open or normally closed
- Flush mount, drop-in installation, anytime
- Bright LEDs, power & signal indication
- CE rated, RoHS compliant

P PROFILED RAIL

ENDURANCE TECHNOLOGY℠

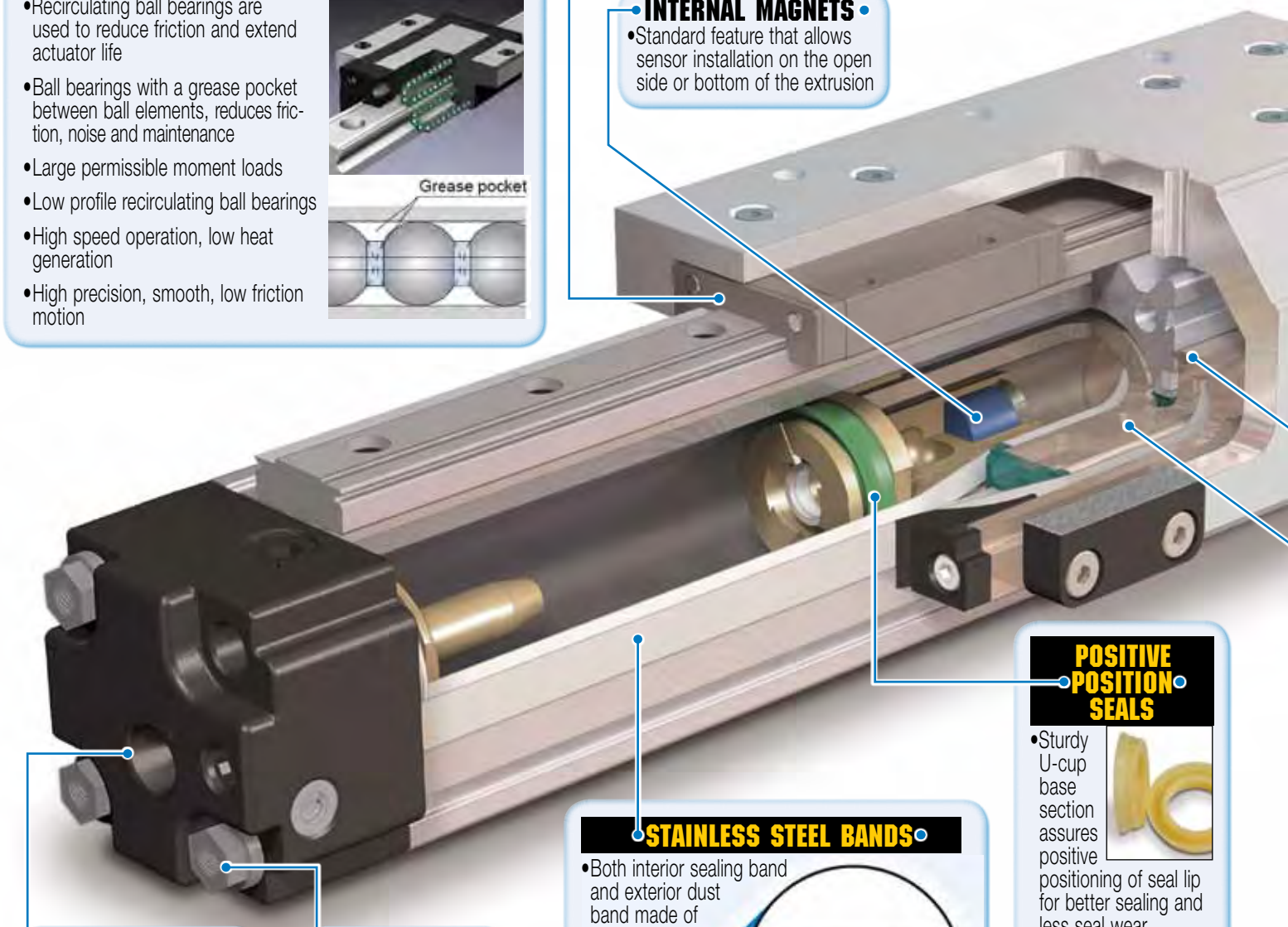
Endurance Technology features are designed for maximum durability to provide extended service life.

RECIRCULATING BALL BEARINGS

- Recirculating ball bearings are used to reduce friction and extend actuator life
- Ball bearings with a grease pocket between ball elements, reduces friction, noise and maintenance
- Large permissible moment loads
- Low profile recirculating ball bearings
- High speed operation, low heat generation
- High precision, smooth, low friction motion

INTERNAL MAGNETS

- Standard feature that allows sensor installation on the open side or bottom of the extrusion



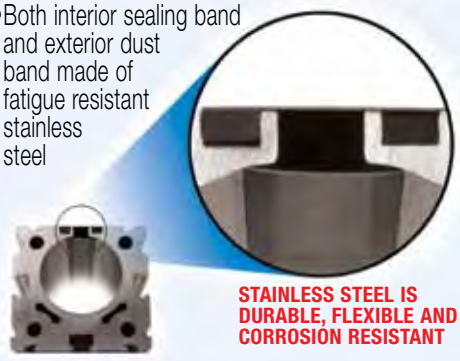
POSITIVE POSITION SEALS

- Sturdy U-cup base section assures positive positioning of seal lip for better sealing and less seal wear

- Made of custom formulated polyurethane for pliable, wear resistant seal lip

STAINLESS STEEL BANDS

- Both interior sealing band and exterior dust band made of fatigue resistant stainless steel



STAINLESS STEEL IS DURABLE, FLEXIBLE AND CORROSION RESISTANT

- Does not stretch like bands made of rubber or polymer materials
- Stainless steel sealing bands resist blow out during pressure spikes that may occur during high velocity cushioning

PORTING CHOICES

- 4-ported heads are standard to allow air connections on side, top or end
- Single-end porting allows convenient one end air connection
- NPT, Metric Parallel (ISO-G/BSP) & Metric Taper (Rc/BST) available on both metric and inch *(US standard)* mount actuators

DIRECT MOUNT

- Head bolts are tapped for direct mounting

INCH OR METRIC MOUNTING

- Your choice of inch *(US standard)* or metric fasteners for carrier and head bolt mounting

...MAXIMUM DURABILITY

LOW CARRIER HEIGHT

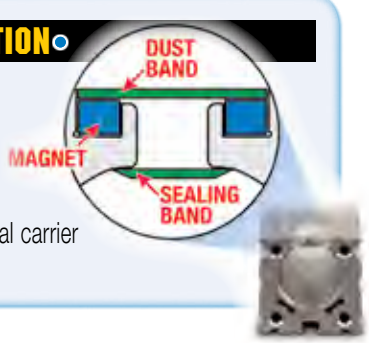
- Reduces overall cylinder envelope
- Large mounting pattern for high load stability

ADJUSTABLE CUSHIONS

- Easy screw adjustment for smooth deceleration protecting actuator from high stress at end-of-stroke
- Adjustable cushions with retained stainless steel needle screw for increased safety

NON-WEAR BAND RETENTION

- Magnetically retained bands are not subject to wear as are mechanically retained systems
- Immediate band engagement and release results in less drag on piston for lower breakaway force during initial carrier movement



RETAINED DUST BAND

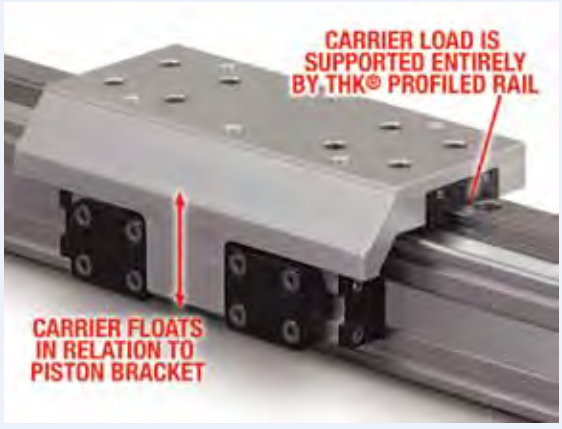
- Retained dust band keeps contaminants from entering the cylinder interior, protecting components for reduced maintenance and increased uptime

DUST WIPER

- Formed end cap and side dust wipers keep contaminants from entering the cylinder's internal area

ISOLATED PISTON

- Unique design isolates the piston from the applied load, extending the service life of the piston seals



- Piston remains isolated even when the carrier is deflected under load
- Piston bracket and carrier feature single piece extrusions, reducing failure points

NOTE: Boxed letters indicate ordering codes

OPTIONS

AUXILIARY CARRIER [D] [W]

- 2X higher Fz (load) capacity
- High bending moment capacity

TUBE CLAMPS [T] [C]

- Used for intermediate support
- Flush with bottom of actuator to retain low profile
- Drop-in, adjustable mounting locations

FOOT MOUNTS [F] [M]

- For end mounting of MXP band cylinder
- Use to bottom or side mount actuator

SHOCK ABSORBERS [A] [L] [S] [L] [A] [H] [S] [H]

- Allows increased operating speed and load
- Self-compensates for load or speed changes
- Minimizes impact load to equipment
- Fixed or adjustable position shocks

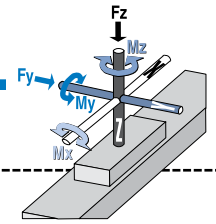
SINGLE-END PORTING [S]

- Convenient single-end air connection (not available on MXP16)

SWITCHES

- Wide variety of sensing choices: Reed, Solid State PNP or NPN, all available normally open or normally closed
- Flush mount, drop-in installation, anytime
- Bright LEDs, power & signal indication
- CE rated, RoHS compliant

SELECTION GUIDELINES



1 COMPILE APPLICATION REQUIREMENTS

APPLICATION DATA WORKSHEET

STROKE LENGTH _____
☐ inch (S K) (U.S. Standard) ☐ millimeters (S M) (Metric)

AVAILABLE AIR PRESSURE _____
☐ PSI (U.S. Standard) ☐ bar (Metric)

REQUIRED THRUST FORCE _____
☐ lbf (U.S. Standard) ☐ N (Metric)

LOAD _____
☐ lb (U.S. Standard) ☐ kg (Metric)

LOAD CENTER OF GRAVITY DISTANCE TO CARRIER CENTER
d_x _____
d_y _____
d_z _____
☐ inch (U.S. Standard) ☐ millimeters (Metric)

FORCES APPLIED TO CARRIER
F_z _____
F_y _____
☐ lbf (U.S. Standard) ☐ N (Metric)

BENDING MOMENTS APPLIED TO CARRIER
M_x _____
M_y _____
M_z _____
☐ in-lbs (U.S. Standard) ☐ N-m (Metric)

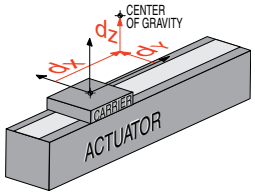
FINAL VELOCITY _____
☐ in/sec (U.S. Standard) ☐ mm/sec (Metric)

MOVE TIME sec. _____

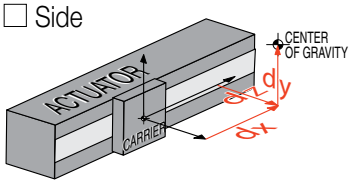
NO. OF CYCLES _____
☐ per minute ☐ per hour

ORIENTATION

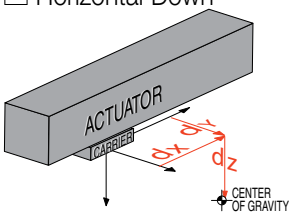
☐ Horizontal



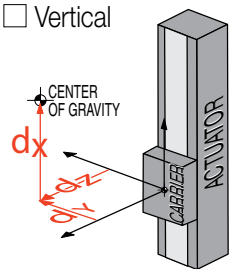
☐ Side



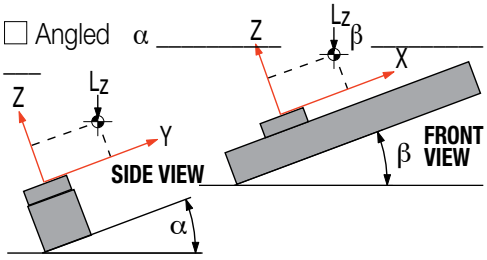
☐ Horizontal Down



☐ Vertical



☐ Angled α _____



OTHER ISSUES:
(i.e. Environment, Temperature, Contamination, etc.)

_____
_____
_____
_____

Contact information: _____
_____
_____
_____

STOP Fax (1-763-478-8080) or call Tolomatic (1-800-328-2174) with the above information. We will provide any assistance needed to determine the proper MXP Band Cylinder.

The process of selecting a load bearing actuator for a given application can be complex. It is highly recommended that you contact Tolomatic for assistance in selecting the best actuator for your application. The following overview of the selection guidelines are for educational purposes only.

2 DETERMINE BORE SIZE

- Consult the Theoretical Force vs. Pressure graph. (See graph at right)
- Find the intersection of the available pressure and required thrust force. If the intersection falls below the plotted bore size curve, the actuator will supply adequate force for the application. If the intersection is above the curve, a larger cylinder bore size will be required.

⚠ NOTE: Additional force may be required to obtain the necessary acceleration within desired cycle time.

3 COMPARE LOAD TO MAXIMUM LOAD CAPACITIES

Calculate the following static loads: Mx, My, Mz, Fy, Fz

Loads = Applied Moments + Forces

If the load of your application exceeds figures indicated in the MOMENT AND LOAD CAPACITY tables (See pages MXP_14-19) consider:

1.) Higher capacity bearing style, i.e. N to S, S to P

2.) Larger Bore Cylinder

3.) Auxiliary Carrier

4.) Add External Guides

4 CALCULATE LOAD FACTOR L_F

For combined loads the Load Factor (L_F) must not exceed the value 1.

$$L_F = \frac{Mx}{Mx_{max}} + \frac{My}{My_{max}} + \frac{Mz}{Mz_{max}} + \frac{Fy}{Fy_{max}} + \frac{Fz}{Fz_{max}} \leq 1$$

If L_F exceeds the value 1, then consider the four choices listed in step #3.

SHOCKS

If the intersection of the final velocity and load mass falls in the shaded regions, then shock absorbers should be used.

6 CONSIDER PEAK DYNAMIC INERTIA MOMENTS

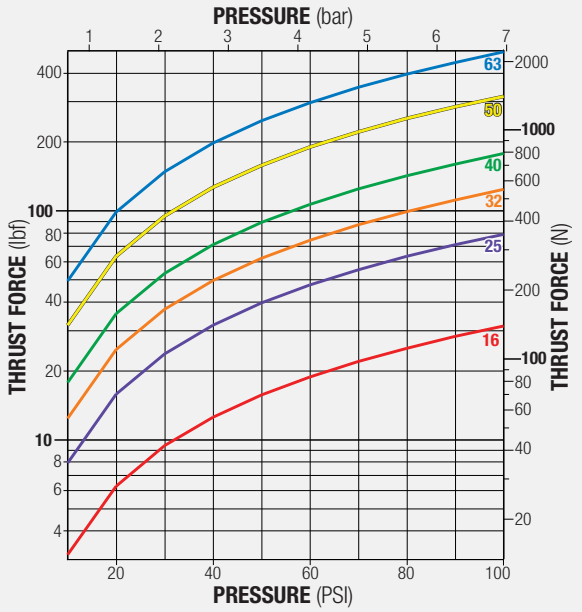
When a rigidly attached load mass is accelerated or decelerated, its inertia induces bending moments on the carrier. The magnitude of these inertia moments can be larger than the applied loads. Careful attention to how the load is decelerated at the end of stroke is required for extended actuator performance and application safety.

Evaluate the dynamic inertia moment data:
1.) The length of deceleration distance
2.) The load attached to the carrier
3.) The distance of the load mass center of gravity from the carrier, and
4.) The final velocity of the carrier.

If dynamic inertia moments are excessive, consider the four choices listed in step #3 or consider these deceleration methods:

- **Reduce final velocity** with flow controls or reduced pressure.
- **Pneumatic valve deceleration circuits.** By reducing the speed before the cushion or shock is reached, the load can decelerate over a longer distance, thereby reducing the deceleration moments.
- **Position shock absorbers at the load's center of gravity.** This will greatly reduce the moment load applied to the carrier.

THEORETICAL FORCE VS PRESSURE



5 DETERMINE CUSHION & SHOCK CAPACITY

Consult the Cushion and Shock Absorber Performance charts for the model selected (see page MXP_22). The velocities listed on the cushion charts are final or impact velocities. If the final or impact velocity is not known, use of valve deceleration circuits or shock absorbers should be considered.

CUSHIONS

Find the intersection of the final velocity and load mass. If the intersection is below the diagonal lines, the internal cushions on the actuator may be used.

[P] PROFILED RAIL DECELERATION CONSIDERATIONS

While the [P] Profiled Rail MXP is capable of carrying very large loads, consideration must be given to how to stop the load at the end of stroke. If Tolomatic cushions or shocks are used, stay within the specifications defined. If another type of shock absorber is used, be sure that the deceleration of the load is smooth and over an adequate distance.

7 DETERMINE TUBE CLAMP REQUIREMENTS

- Consult the Tube Clamp Requirement chart for the model selected (page MXP_23-24).
- Cross-reference the load force and maximum distance between supports.
- Divide stroke length by max. distance calculated above to determine number of tube clamps to order.

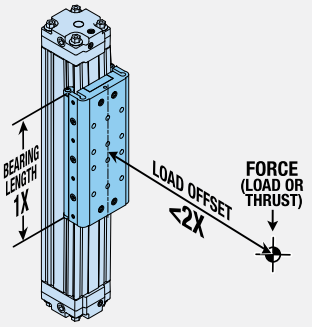
8 CONSIDER PORTING AND OPTIONS

- Choose Single End Porting or Dual End Porting
- Choose NPT, Metric Parallel *(ISO-G/BSP)* or Metric Taper *(Rc/BST)* Ports

OPTIONS:

- Switches – Reed, Solid State PNP or NPN, all available normally open or normally closed
- Shock Absorbers – Heavy or light duty, fixed or adjustable mount – recommended for longer life in most applications
- Foot Mounts
- Floating Mount Bracket – used when lack of parallelism occurs between the cylinder and an externally guided and supported load. Available for [N] internal & [S] solid bearing styles

[S] SOLID BEARING 2:1 RULE



For applications using [S] solid bearings, binding or interrupted motion may occur if the load offset is equal to or greater than twice the bearing length (1X). *LOAD OFFSET is defined as: the distance from the applied force (or the load center of gravity) to the centerline of the carrier.*

If the load offset cannot be changed consider:

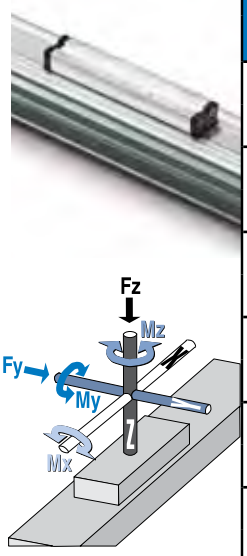
1.) Higher capacity bearing style, i.e. [S] to [P]

2.) Larger Bore Cylinder

3.) Auxiliary Carrier

4.) Add External Guides

STANDARD



BORE			MAXIMUM BENDING MOMENTS Mx	My	Mz	MAX. LOAD Fz	THRUST (at 100 PSI)
16	Inch	0.63 in	3 in-lbs	35 in-lbs	5 in-lbs	30 lbf	30.7 lbf
	Metric	*16 mm*	*0.3 N-m*	*4.0 N-m*	*0.6 N-m*	*133 N*	*136 N*
25	Inch	1.00 in	9 in-lbs	132 in-lbs	27 in-lbs	65 lbf	78.5 lbf
	Metric	*25 mm*	*1.0 N-m*	*14.9 N-m*	*3.1 N-m*	*289 N*	*349 N*
32	Inch	1.25 in	36 in-lbs	318 in-lbs	120 in-lbs	115 lbf	123 lbf
	Metric	*32 mm*	*4.1 N-m*	*35.9 N-m*	*13.6 N-m*	*512 N*	*546 N*
40	Inch	1.50 in	55 in-lbs	575 in-lbs	156 in-lbs	195 lbf	177 lbf
	Metric	*38 mm*	*6.2 N-m*	*65 N-m*	*17.6 N-m*	*867 N*	*786 N*
50	Inch	2.00 in	98 in-lbs	1,017 in-lbs	172 in-lbs	270 lbf	314 lbf
	Metric	*50 mm*	*11.1 N-m*	*115 N-m*	*19.4 N-m*	*1,201 N*	*1,397 N*
63	Inch	2.50 in	120 in-lbs	1,776 in-lbs	216 in-lbs	370 lbf	491 lbf
	Metric	*64 mm*	*13.6 N-m*	*201 N-m*	*24.4 N-m*	*1,646 N*	*2,184 N*

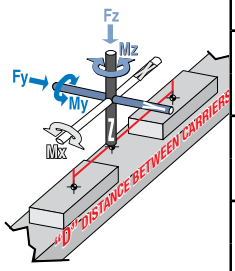
The moment and load capacity of the actuator's bearing system is based on an L10 life of 200,000,000 linear inches of travel. Life of the actuator will vary for each application depending on the combined loads, motion parameters and operating conditions. The load factor (L_F) ratios for each application must not exceed a value of 1 (as calculated below). Exceeding a load factor of 1 will diminish the actuator's rated life.

$$L_F = \frac{Mx}{Mx_{max}} + \frac{My}{My_{max}} + \frac{Mz}{Mz_{max}} + \frac{Fy}{Fy_{max}} + \frac{Fz}{Fz_{max}} \leq 1$$

With combined loads, L_F must not exceed the value 1.

Ratings are the maximum values for shock-free, vibration-free operation in a typical industrial environment. Contact Tolomatic for assistance in selecting the most appropriate actuator for your application.

DW AUXILIARY CARRIER



BORE			"D" MIN	MAXIMUM BENDING MOMENTS MxA	MyA*	MzA*	MAX. LOAD FzA	THRUST (at 100 PSI)
16	Inch	0.63 in	5.0 in	3 in-lbs	150 in-lbs	81 in-lbs	60 lbf	30.7 lbf
	Metric	*16 mm*	*127 mm*	*0.3 N-m*	*16.9 N-m*	*9.1 N-m*	*267 N*	*136 N*
25	Inch	1.00 in	6.0 in	9 in-lbs	390 in-lbs	143 in-lbs	130 lbf	78.5 lbf
	Metric	*25 mm*	*152 mm*	*1.0 N-m*	*44.1 N-m*	*16.2 N-m*	*578 N*	*349 N*
32	Inch	1.25 in	7.0 in	36 in-lbs	805 in-lbs	302 in-lbs	230 lbf	123 lbf
	Metric	*32 mm*	*178 mm*	*4.1 N-m*	*91.0 N-m*	*34.1 N-m*	*1,023 N*	*546 N*
40	Inch	1.50 in	8.5 in	55 in-lbs	1,658 in-lbs	413 in-lbs	390 lbf	177 lbf
	Metric	*38 mm*	*216 mm*	*6.2 N-m*	*187 N-m*	*46.7 N-m*	*1,735 N*	*786 N*
50	Inch	2.00 in	8.6 in	98 in-lbs	2,322 in-lbs	707 in-lbs	540 lbf	314 lbf
	Metric	*50 mm*	*218 mm*	*11.1 N-m*	*262 N-m*	*79.8 N-m*	*2,402 N*	*1,397 N*
63	Inch	2.50 in	13.0 in	120 in-lbs	4,810 in-lbs	808 in-lbs	740 lbf	491 lbf
	Metric	*64 mm*	*330 mm*	*13.6 N-m*	*544 N-m*	*91.0 N-m*	*3,292 N*	*2,184 N*

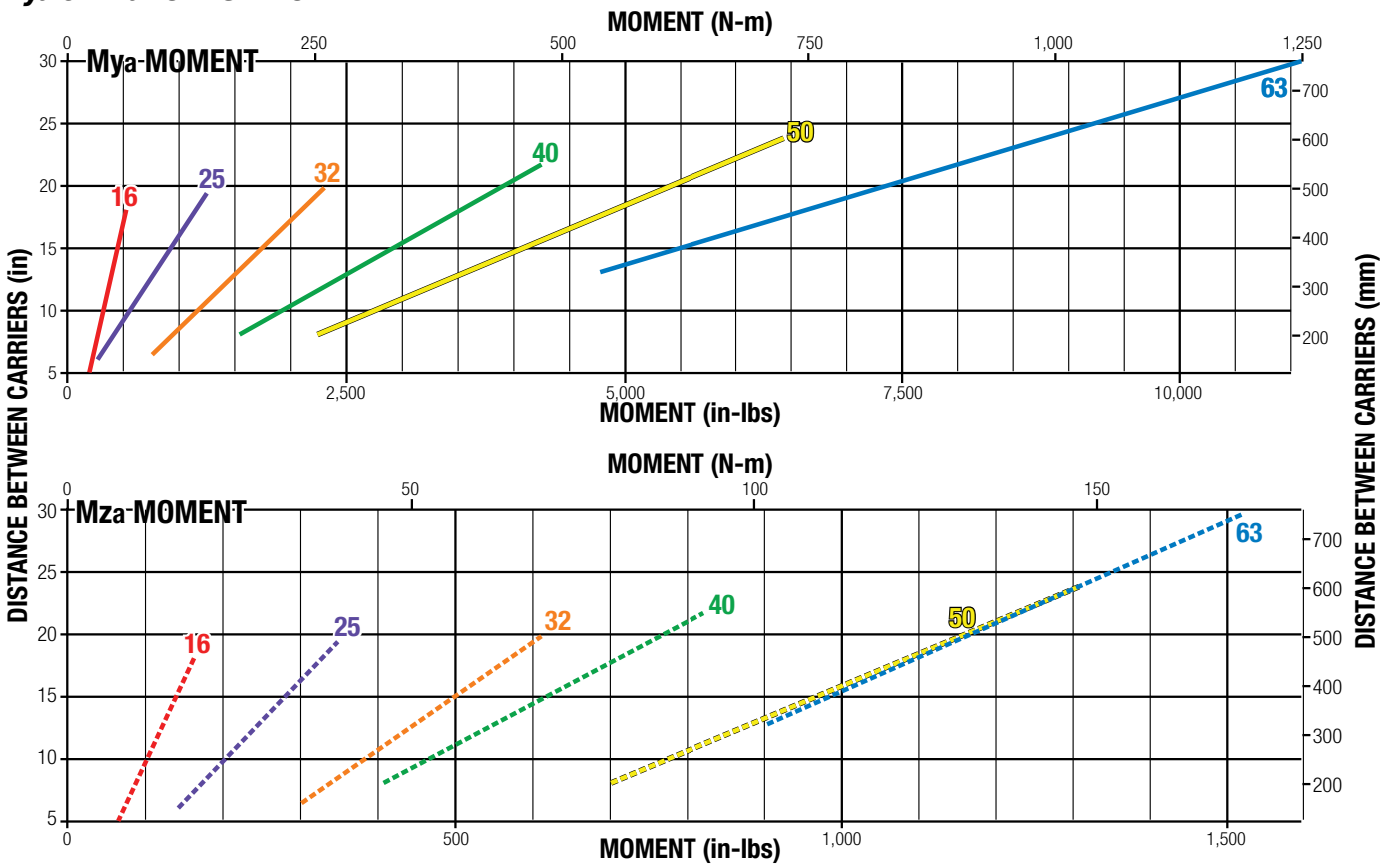
*At minimum "D" distance between carriers see graph below for other distances

With combined loads, L_F must not exceed the value 1.

$$L_F = \frac{Mx}{Mx_{max}} + \frac{My}{My_{max}} + \frac{Mz}{Mz_{max}} + \frac{Fy}{Fy_{max}} + \frac{Fz}{Fz_{max}} \leq 1$$

Ratings are the maximum values for shock-free, vibration-free operation in a typical industrial environment. Contact Tolomatic for assistance in selecting the most appropriate actuator for your application.

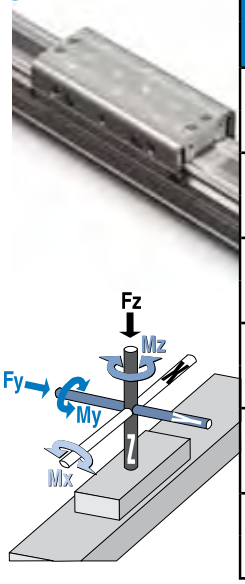
Mya & Mza vs. DISTANCE



Ratings were calculated with the following conditions:

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

STANDARD



BORE			MAXIMUM BENDING MOMENTS Mx	My	Mz	MAX. LOAD Fz	THRUST (at 100 PSI)
16	Inch	0.63 in	22 in-lbs	19 in-lbs	25 in-lbs	35 lbf	30.7 lbf
	Metric	*16 mm*	*2.5 N-m*	*2.1 N-m*	*2.8 N-m*	*156 N*	*136 N*
25	Inch	1.00 in	60 in-lbs	110 in-lbs	34 in-lbs	70 lbf	78.5 lbf
	Metric	*25 mm*	*6.8 N-m*	*12.4 N-m*	*3.8 N-m*	*311 N*	*349 N*
32	Inch	1.25 in	100 in-lbs	350 in-lbs	140 in-lbs	150 lbf	123 lbf
	Metric	*32 mm*	*11.3 N-m*	*39.5 N-m*	*15.8 N-m*	*667 N*	*546 N*
40	Inch	1.50 in	275 in-lbs	600 in-lbs	220 in-lbs	225 lbf	177 lbf
	Metric	*38 mm*	*31.1 N-m*	*67.8 N-m*	*24.9 N-m*	*1,001 N*	*786 N*
50	Inch	2.00 in	315 in-lbs	1,155 in-lbs	341 in-lbs	315 lbf	314 lbf
	Metric	*50 mm*	*35.6 N-m*	*131 N-m*	*38.5 N-m*	*1,401 N*	*1,397 N*
63	Inch	2.50 in	585 in-lbs	2,340 in-lbs	520 in-lbs	520 lbf	491 lbf
	Metric	*64 mm*	*66.1 N-m*	*264 N-m*	*58.8 N-m*	*2,313 N*	*2,184 N*

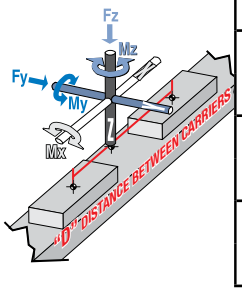
The moment and load capacity of the actuator's bearing system is based on an L10 life of 200,000,000 linear inches of travel. Life of the actuator will vary for each application depending on the combined loads, motion parameters and operating conditions. The load factor (L_F) ratios for each application must not exceed a value of 1 (as calculated below). Exceeding a load factor of 1 will diminish the actuator's rated life.

$$L_F = \frac{Mx}{Mx_{max}} + \frac{My}{My_{max}} + \frac{Mz}{Mz_{max}} + \frac{Fy}{Fy_{max}} + \frac{Fz}{Fz_{max}} \leq 1$$

With combined loads, L_F must not exceed the value 1.

Ratings are the maximum values for shock-free, vibration-free operation in a typical industrial environment. Contact Tolomatic for assistance in selecting the most appropriate actuator for your application.

DW AUXILIARY CARRIER



BORE			"D" MIN	MAXIMUM BENDING MOMENTS* MXA	MYA	MZA	MAX. LOAD FZA	THRUST (at 100 PSI)
16	Inch	0.63 in	5.0 in	44 in-lbs	175 in-lbs	175 in-lbs	70 lbf	30.7 lbf
	Metric	*16 mm*	*127 mm*	*5.0 N-m*	*19.8 N-m*	*19.8 N-m*	*311 N*	*136 N*
25	Inch	1.00 in	6.0 in	120 in-lbs	420 in-lbs	420 in-lbs	140 lbf	78.5 lbf
	Metric	*25 mm*	*152 mm*	*13.6 N-m*	*47.5 N-m*	*47.5 N-m*	*623 N*	*349 N*
32	Inch	1.25 in	7.0 in	200 in-lbs	1,050 in-lbs	1,050 in-lbs	300 lbf	123 lbf
	Metric	*32 mm*	*178 mm*	*22.6 N-m*	*119 N-m*	*119 N-m*	*1,334 N*	*546 N*
40	Inch	1.50 in	8.5 in	550 in-lbs	1,913 in-lbs	1,913 in-lbs	450 lbf	177 lbf
	Metric	*38 mm*	*216 mm*	*62.1 N-m*	*216 N-m*	*216 N-m*	*2,002 N*	*786 N*
50	Inch	2.00 in	8.6 in	630 in-lbs	2,709 in-lbs	2,709 in-lbs	630 lbf	314 lbf
	Metric	*50 mm*	*218 mm*	*71.2 N-m*	*306 N-m*	*306 N-m*	*2,802 N*	*1,397 N*
63	Inch	2.50 in	13.0 in	1,170 in-lbs	6,760 in-lbs	6,760 in-lbs	1,040 lbf	491 lbf
	Metric	*64 mm*	*330 mm*	*132 N-m*	*764 N-m*	*764 N-m*	*4,626 N*	*2,184 N*

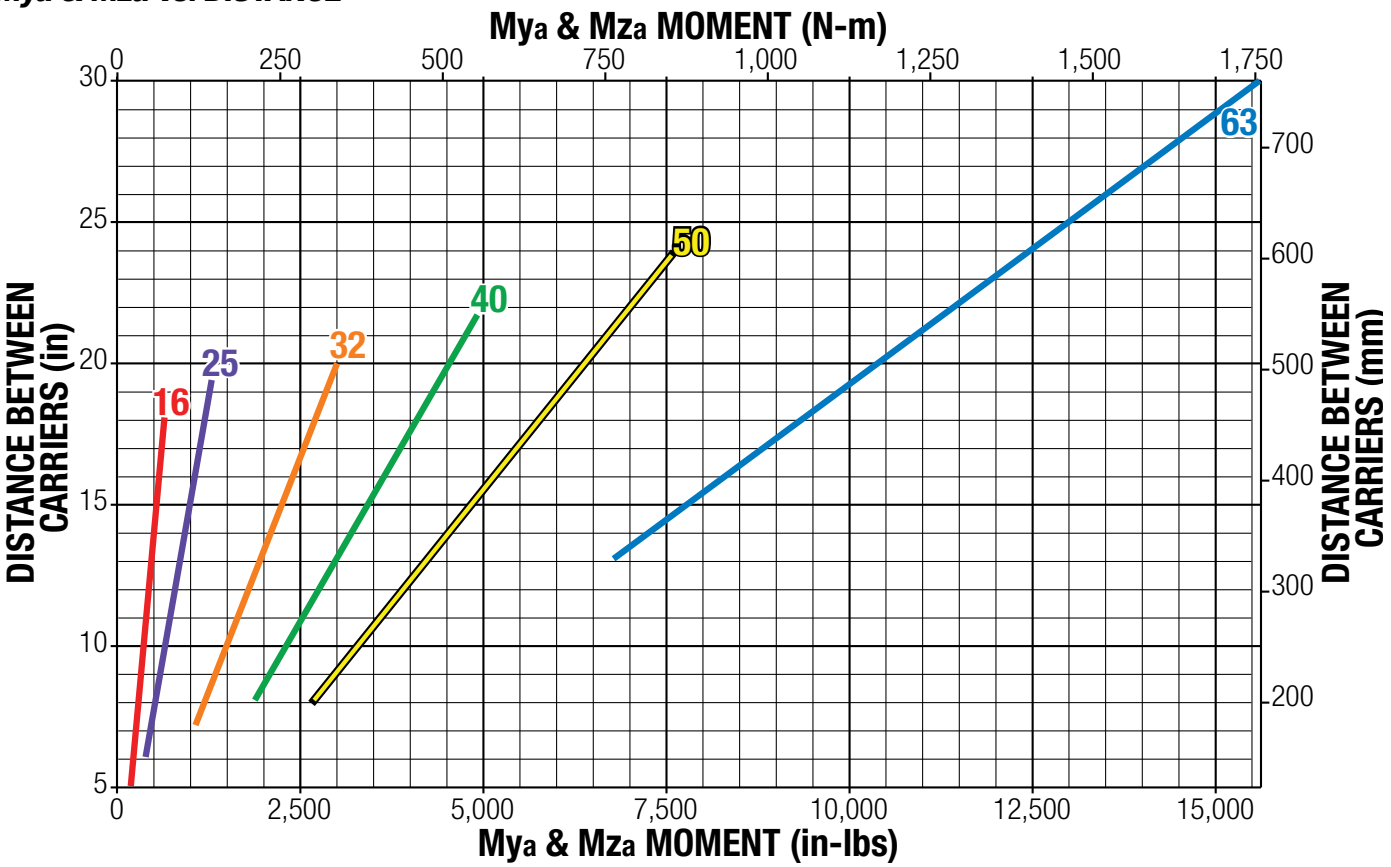
*At minimum "D" distance between carriers see graph below for other distances

With combined loads, L_F must not exceed the value 1.

$$L_F = \frac{Mx}{Mx_{max}} + \frac{My}{My_{max}} + \frac{Mz}{Mz_{max}} + \frac{Fy}{Fy_{max}} + \frac{Fz}{Fz_{max}} \leq 1$$

Ratings are the maximum values for shock-free, vibration-free operation in a typical industrial environment. Contact Tolomatic for assistance in selecting the most appropriate actuator for your application.

Mya & Mza vs. DISTANCE

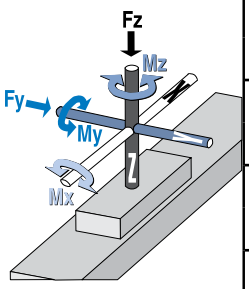


Ratings were calculated with the following conditions:

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

MOMENT AND LOAD CAPACITY

STANDARD



BORE			MAXIMUM BENDING MOMENTS Mx	My	Mz	MAX. LOAD Fy	Fz	THRUST (at 100 PSI)
16	Inch	0.63 in	39 in-lbs	339 in-lbs	339 in-lbs	217 lbf	217 lbf	30.7 lbf
	Metric	*16 mm*	*4.5 N-m*	*38.3 N-m*	*38.3 N-m*	*966 N*	*966 N*	*136 N*
25	Inch	1.00 in	126 in-lbs	502 in-lbs	377 in-lbs	449 lbf	449 lbf	78.5 lbf
	Metric	*25 mm*	*14.3 N-m*	*56.7 N-m*	*42.6 N-m*	*1,996 N*	*1,996 N*	*349 N*
32	Inch	1.25 in	226 in-lbs	1,344 in-lbs	1,344 in-lbs	569 lbf	569 lbf	123 lbf
	Metric	*32 mm*	*25.6 N-m*	*152 N-m*	*152 N-m*	*2,531 N*	*2,531 N*	*546 N*
40	Inch	1.50 in	600 in-lbs	1,913 in-lbs	1,913 in-lbs	736 lbf	736 lbf	177 lbf
	Metric	*38 mm*	*67.8 N-m*	*216 N-m*	*216 N-m*	*3,274 N*	*3,274 N*	*786 N*
50	Inch	2.00 in	811 in-lbs	3,483 in-lbs	3,483 in-lbs	1,014 lbf	1,014 lbf	314 lbf
	Metric	*50 mm*	*91.7 N-m*	*394 N-m*	*394 N-m*	*4,510 N*	*4,510 N*	*1,397 N*
63	Inch	2.50 in	1,019 in-lbs	5,339 in-lbs	5,339 in-lbs	1,292 lbf	1,292 lbf	491 lbf
	Metric	*64 mm*	*115 N-m*	*603 N-m*	*603 N-m*	*5,745 N*	*5,745 N*	*2,184 N*

NOTE: Mating surface of component mounted to carrier must maintain a flatness of at least 0.0015" (0.040 mm)

Ratings are the maximum values for shock-free, vibration-free operation in a typical industrial environment. Contact Tolomatic for assistance in selecting the most appropriate actuator for your application.

ACTUATOR SIZING

Use sizing software or call Tolomatic (1-800-328-2174) with application information. We will provide any assistance needed to determine the proper MXP band cylinder.

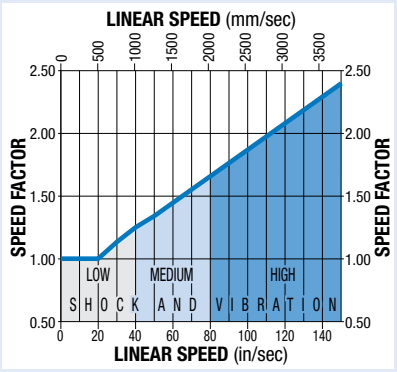
The moment and load capacity of the actuator's bearing system is based on an L10 life of 200,000,000 linear inches of travel. Life of the actuator will vary for each application depending on the combined loads, motion parameters and operating conditions. The load factor (L_F) ratios for each application must not exceed a value of 1 (as calculated below). Exceeding a load factor of 1 will diminish the actuator's rated life.

$$L_F = \frac{Mx}{Mx_{max}} + \frac{My}{My_{max}} + \frac{Mz}{Mz_{max}} + \frac{Fy}{Fy_{max}} + \frac{Fz}{Fz_{max}} \leq 1$$

With combined loads, L_F must not exceed the value 1.

SPEED FACTOR

FOR APPLICATIONS WITH HIGH SPEED OR SIGNIFICANT SHOCK AND VIBRATION: Calculated values of loads and bending moments must be increased by speed factor from the graph at right to obtain full rated life of profiled rail bearing system.



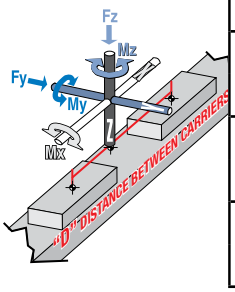
PROFILED RAIL LUBRICATION

Proper lubrication of profiled rail bearing system is essential for normal operation and achievement of full rated life of MX--P actuators. Lubrication should be performed at intervals of 4,000,000 inches of travel or once every year, whichever occurs first. **However, operating conditions such as high speed or significant shock and vibration may require more frequent lubrication.** Please consult Tolomatic for recommendations.

Recommended grease types:

1. Refined mineral oil-based multi-purpose grease with lithium thickening agent.
2. High-grade synthetic oil-based grease with urea thickening agent.

DW AUXILIARY CARRIER



BORE			"D" MIN	MAXIMUM BENDING MOMENTS* MXA	MYA	MZA	MAX. LOAD FZA	FYA	THRUST (at 100 PSI)
16	Inch	0.63 in	5.0 in	79 in-lbs	620 in-lbs	620 in-lbs	434 lbf	434 lbf	30.7 lbf
	Metric	*16 mm*	*127 mm*	*8.9 N-m*	*70.1 N-m*	*70.1 N-m*	*1,932 N*	*1,932 N*	*136 N*
25	Inch	1.00 in	6.0 in	252 in-lbs	1,610 in-lbs	1,610 in-lbs	898 lbf	898 lbf	78.5 lbf
	Metric	*25 mm*	*152 mm*	*28.5 N-m*	*182 N-m*	*182 N-m*	*3,993 N*	*3,993 N*	*349 N*
32	Inch	1.25 in	7.0 in	453 in-lbs	2,202 in-lbs	2,202 in-lbs	1,138 lbf	1,138 lbf	123 lbf
	Metric	*32 mm*	*178 mm*	*51.1 N-m*	*249 N-m*	*249 N-m*	*5,063 N*	*5,063 N*	*546 N*
40	Inch	1.50 in	8.5 in	1,208 in-lbs	3,601 in-lbs	3,601 in-lbs	1,472 lbf	1,472 lbf	177 lbf
	Metric	*38 mm*	*216 mm*	*137 N-m*	*407 N-m*	*407 N-m*	*6,549 N*	*6,549 N*	*786 N*
50	Inch	2.00 in	8.6 in	1,623 in-lbs	4,966 in-lbs	4,966 in-lbs	2,028 lbf	2,028 lbf	314 lbf
	Metric	*50 mm*	*218 mm*	*183 N-m*	*561 N-m*	*561 N-m*	*9,020 N*	*9,020 N*	*1,397 N*
63	Inch	2.50 in	13.0 in	2,038 in-lbs	9,508 in-lbs	9,508 in-lbs	2,583 lbf	2,583 lbf	491 lbf
	Metric	*64 mm*	*330 mm*	*230 N-m*	*1,074 N-m*	*1,074 N-m*	*11,490 N*	*11,490 N*	*2,184 N*

*At minimum "D" distance between carriers see graph below for other distances

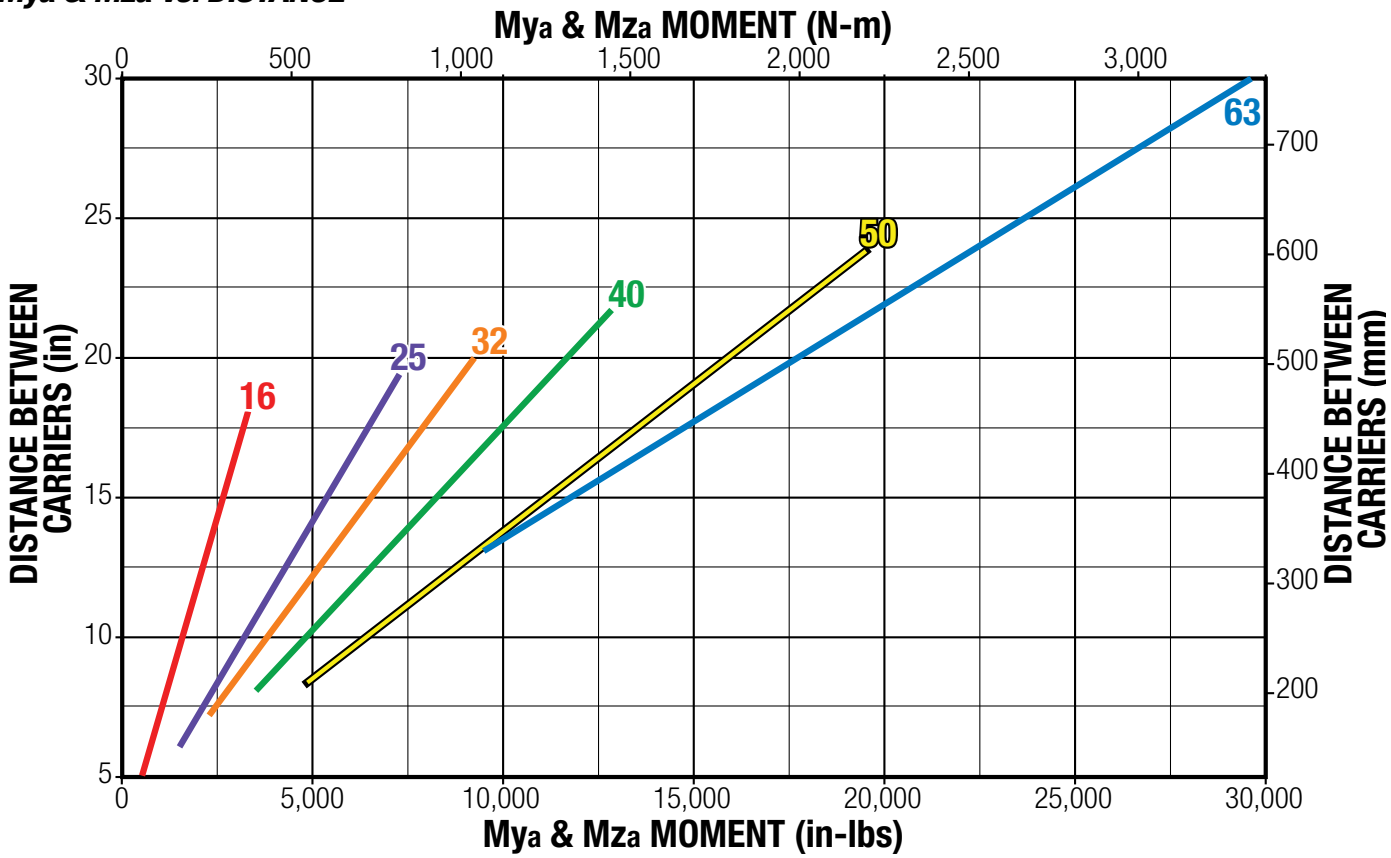
With combined loads, L_F must not exceed the value 1.

$$L_F = \frac{Mx}{Mx_{max}} + \frac{My}{My_{max}} + \frac{Mz}{Mz_{max}} + \frac{Fy}{Fy_{max}} + \frac{Fz}{Fz_{max}} \leq 1$$

Ratings are the maximum values for shock-free, vibration-free operation in a typical industrial environment. Contact Tolomatic for assistance in selecting the most appropriate actuator for your application.

NOTE: Mating surface of component mounted to carrier must maintain a flatness of at least 0.0015" (0.040 mm)

Mya & Mza vs. DISTANCE

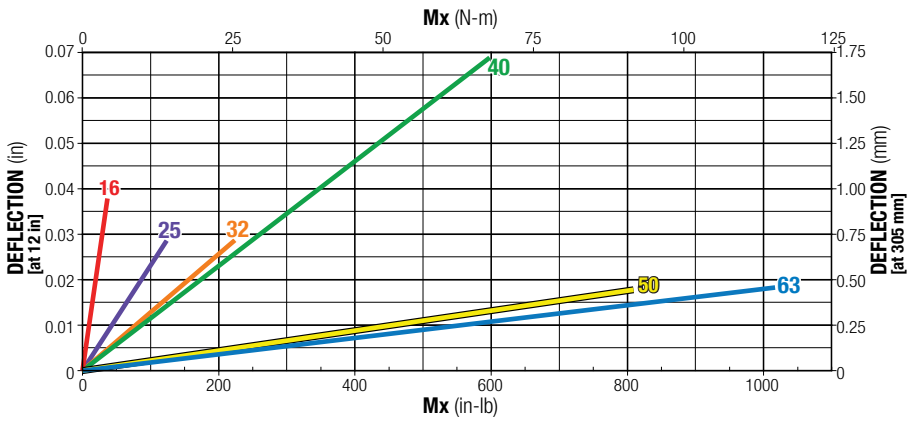


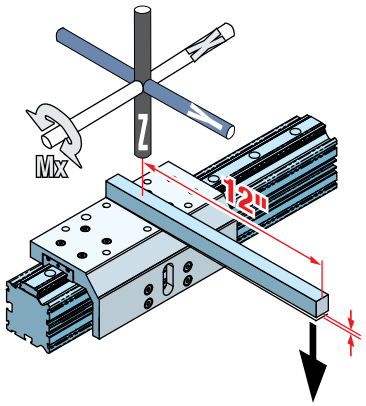
Ratings were calculated with the following conditions:

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

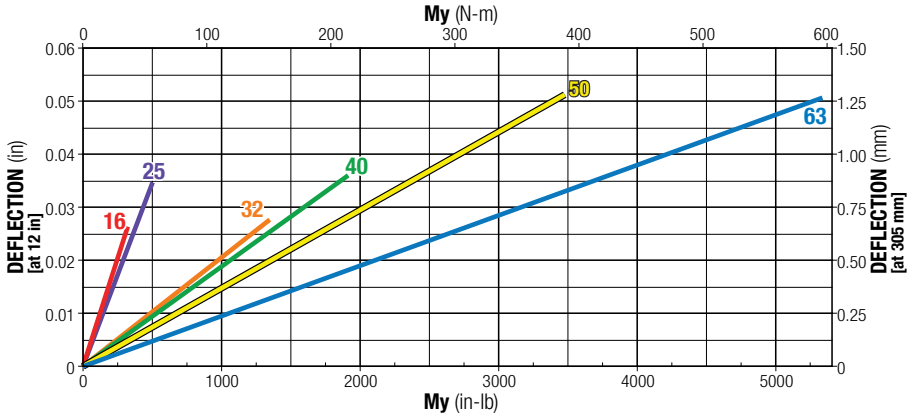
LOAD DEFLECTION

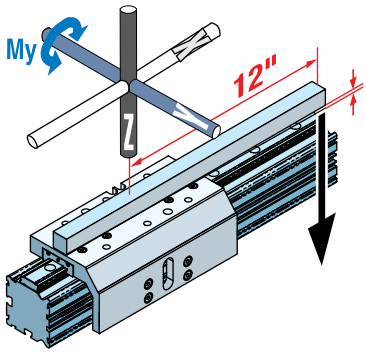
DEFLECTION ABOUT X AXIS



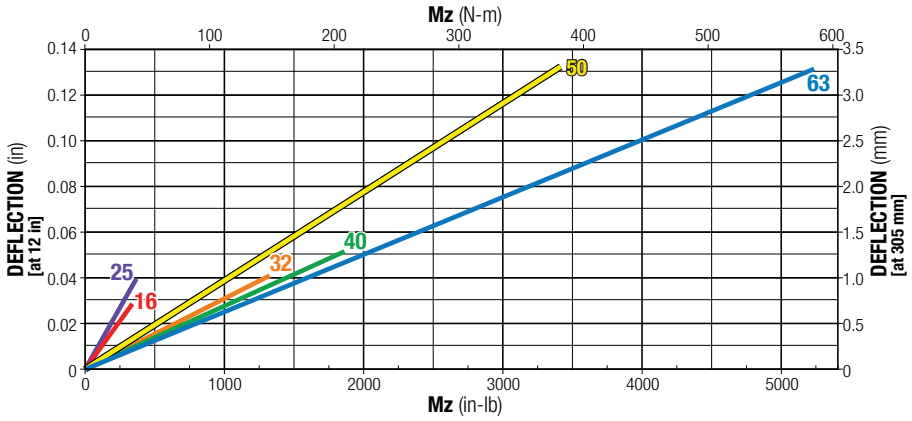


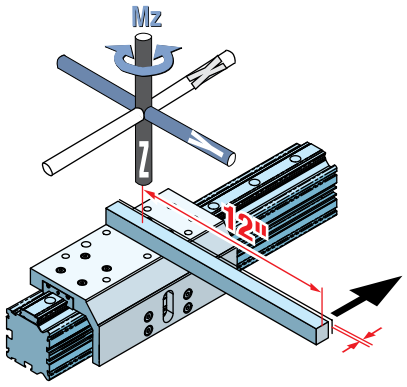
DEFLECTION ABOUT Y AXIS





DEFLECTION ABOUT Z AXIS





DEFLECTION TESTING WAS DONE UNDER THESE CRITERIA:

1.) Actuator was properly mounted with distance between mounting plates within recommendations (see Tube Clamp Requirements page MXP_24)

2.) Deflection was measured at 12" from center of carrier as shown

SPECIFICATIONS

		SIZE	16	25	32	40	50	63
ACTUAL BORE SIZE		in	0.63	1.00	1.25	1.50	2.00	2.50
		mm	*16*	*25*	*32*	*38*	*50*	*64*
BASE WEIGHT	N INTERNAL BEARING	lb	0.73	1.70	3.58	5.57	11.07	22.59
		kg	*0.33*	*0.77*	*1.62*	*2.53*	*5.02*	*10.25*
	S SOLID BEARING	lb	1.07	2.30	4.68	7.64	14.03	30.78
		kg	*0.48*	*1.04*	*2.12*	*3.47*	*6.36*	*13.96*
	P PROFILED RAIL	lb	1.25	2.94	5.89	9.91	17.22	31.64
		kg	*0.57*	*1.33*	*2.67*	*4.5*	*7.81*	*14.35*
WEIGHT PER UNIT OF STROKE	N INTERNAL & S SOLID	lb/in	0.082	0.134	0.233	0.306	0.513	0.879
		kg/mm	*0.0015*	*0.0024*	*0.0042*	*0.0055*	*0.0092*	*0.0157*
	P PROFILED RAIL	lb/in	0.102	0.192	0.316	0.491	0.701	1.153
		kg/mm	*0.0018*	*0.0034*	*0.0056*	*0.0088*	*0.0125*	*0.0206*
MAXIMUM STROKE LENGTH		in	206	206	205	203	203	103
		mm	*5232*	*5232*	*5207*	*5156*	*5156*	*2616*
AUXILIARY CARRIER; MIN. "D" BETWEEN CARRIERS		in	5.00	6.00	7.00	8.50	8.60	13.00
		mm	*127.0*	*152.4*	*177.8*	*215.9*	*218.4*	*330.2*
MAXIMUM OPERATING PRESSURE		PSI	100					
		bar	*6.9*					
TEMPERATURE RANGE		°F	20 to 140					
		°C	*-7 to 60*					

TIPS FOR MAXIMIZING BAND CYLINDER LIFE

TO GET THE MOST LIFE OUT OF YOUR MXP BAND CYLINDER FOLLOW THESE SIMPLE GUIDELINES WHEN SIZING A BAND CYLINDER FOR AN APPLICATION.

Four factors that affect the life of a band cylinder are Load, Speed, Environment and Deceleration. The following tips will help you select the appropriate band cylinder for a specific application's loads and speeds to maximize actuator life.

1 LOAD: KEEP THE LOAD FACTOR LESS THAN 1

Applications with multiple loads put additional stress on the band cylinder's bearing system. It is important to account for all these loads to make sure the bearing system is not over loaded. Both static and dynamic loads need to be addressed.

The formula below can be used to calculate the load factor:

$$L_F = \frac{Mx}{Mx_{max}} + \frac{My}{My_{max}} + \frac{Mz}{Mz_{max}} + \frac{Fy}{Fy_{max}} + \frac{Fz}{Fz_{max}} \leq 1$$

2 SPEED: REDUCE SPEEDS

High speeds and cycle rates stress the band cylinder's guidance system more than slower applications. Keeping speeds reduced will optimize the life of the actuator.

3 ENVIRONMENT: KEEP CONTAMINATION OFF BAND AND MOVING SURFACES

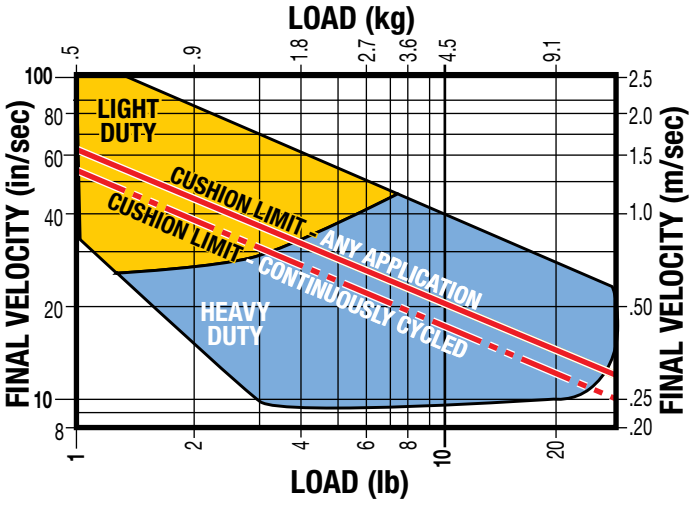
Contamination will decrease band cylinder service life. Service life can be improved by orienting the band and bearing system 180 degrees from the contamination source. For instance, if solid particulates are falling on the actuator, it is best to try to orient the band cylinder so that the band and bearing system are shielded from the particulates.

4 DECELERATION: DECELERATE WITH SHOCK ABSORBERS

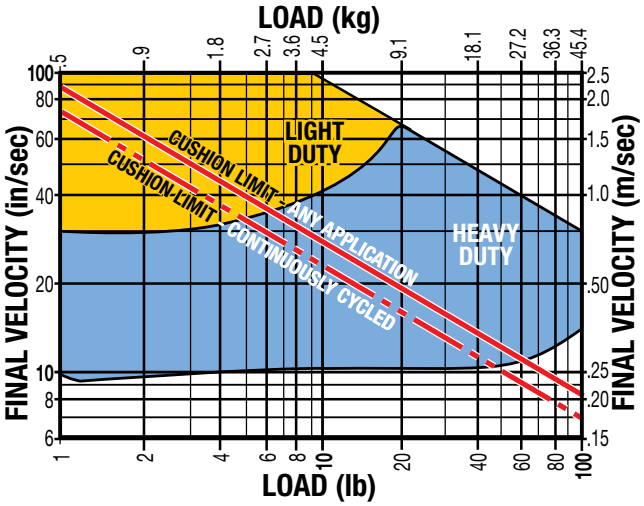
Shock absorbers provide the most controlled and reliable deceleration at the end of stroke. Stopping in a controlled fashion will significantly decrease the inertia loads on the carrier bearings, extending cylinder life. The best location for shock absorbers is at the center of gravity of the load.

CUSHION & SHOCK ABSORBER PERFORMANCE

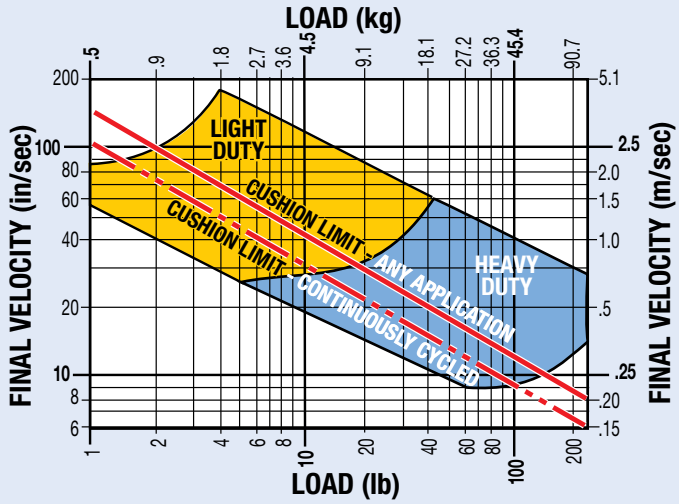
MXP16 (ALL BEARINGS)



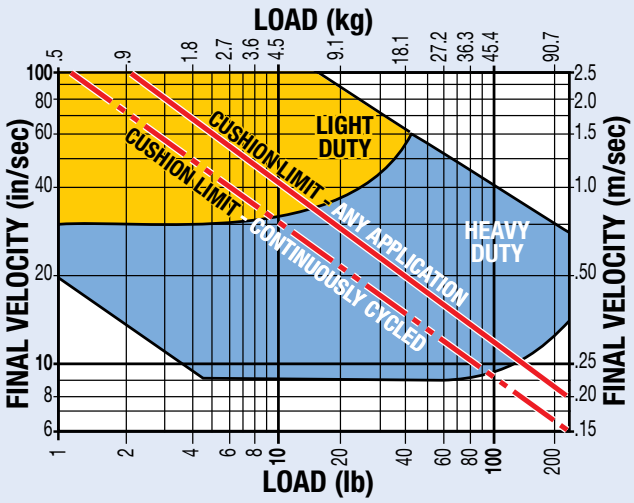
MXP25 (ALL BEARINGS)



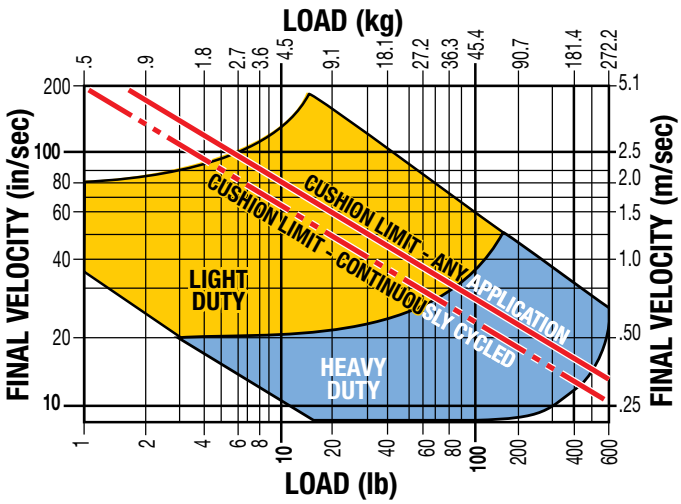
MXP32 (ALL BEARINGS)



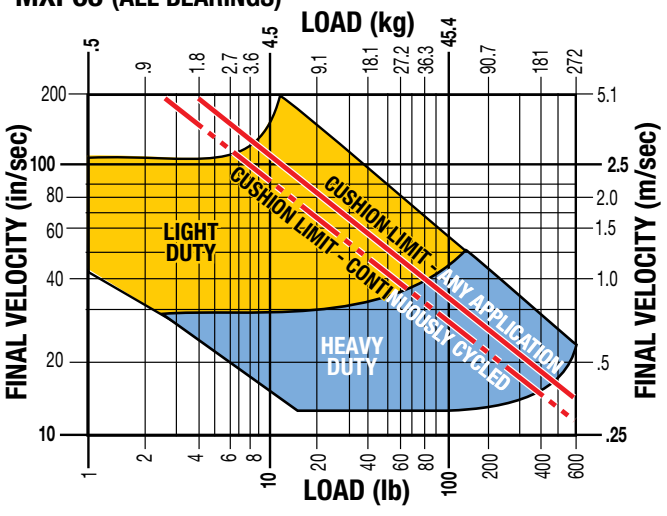
MXP40 (ALL BEARINGS)



MXP50 (ALL BEARINGS)



MXP63 (ALL BEARINGS)

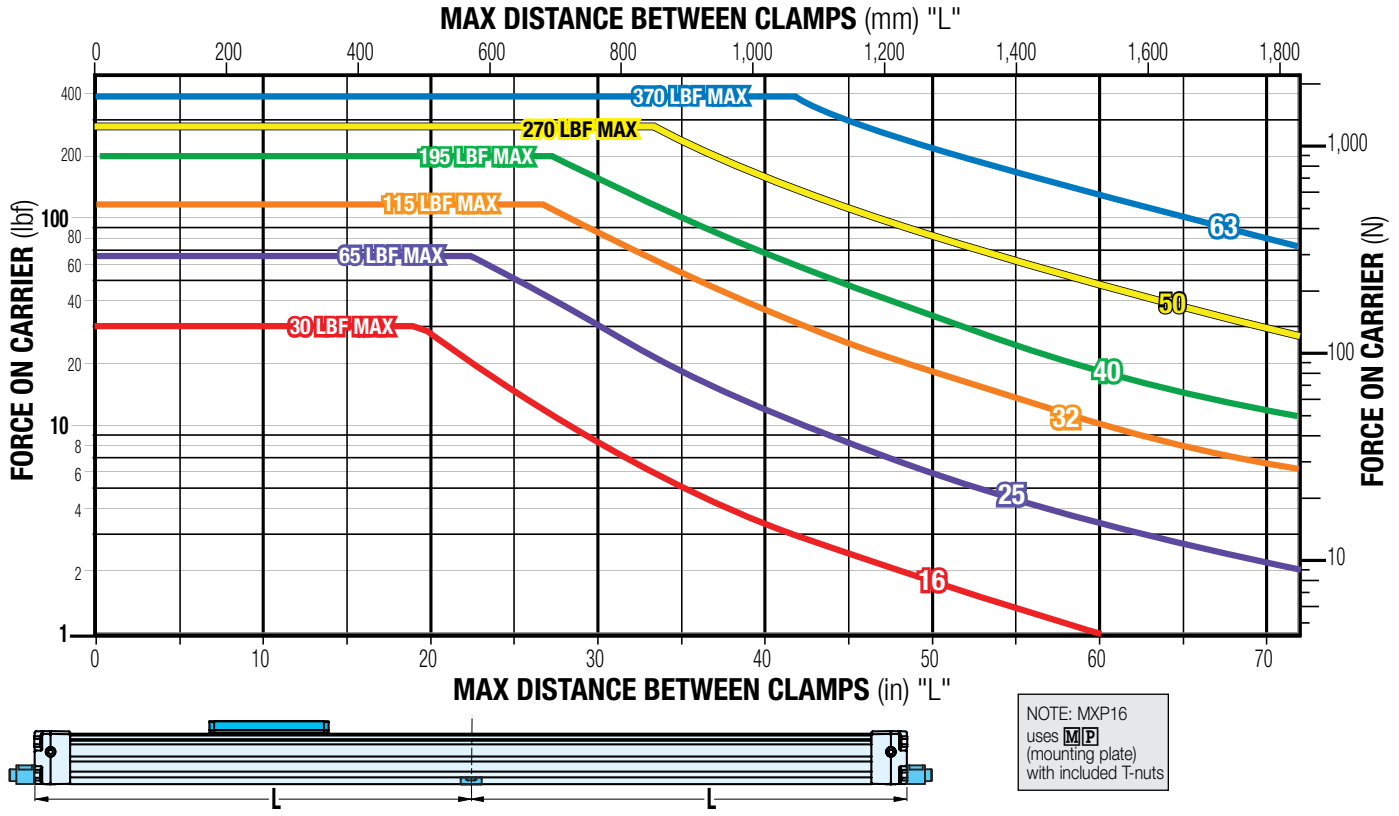


NOTE: If final (impact) velocity cannot be calculated directly, a reasonable guideline to use is 2X average velocity.

⚠ NOTE: When 2 shock absorbers are ordered, the MXP will be assembled with NO internal cushion seals.

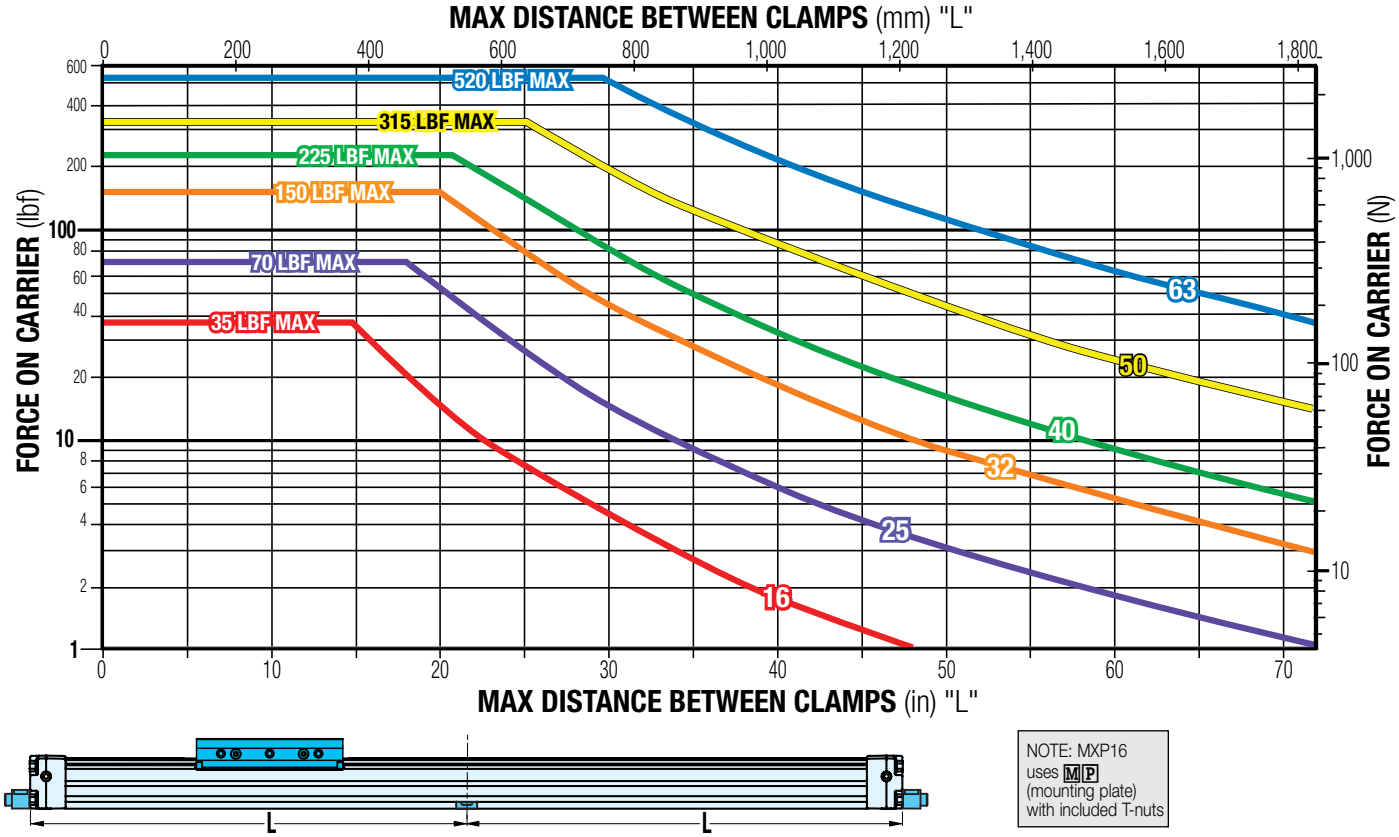
TUBE CLAMP REQUIREMENTS

N - INTERNAL BEARING



NOTE: MXP16 uses MP (mounting plate) with included T-nuts

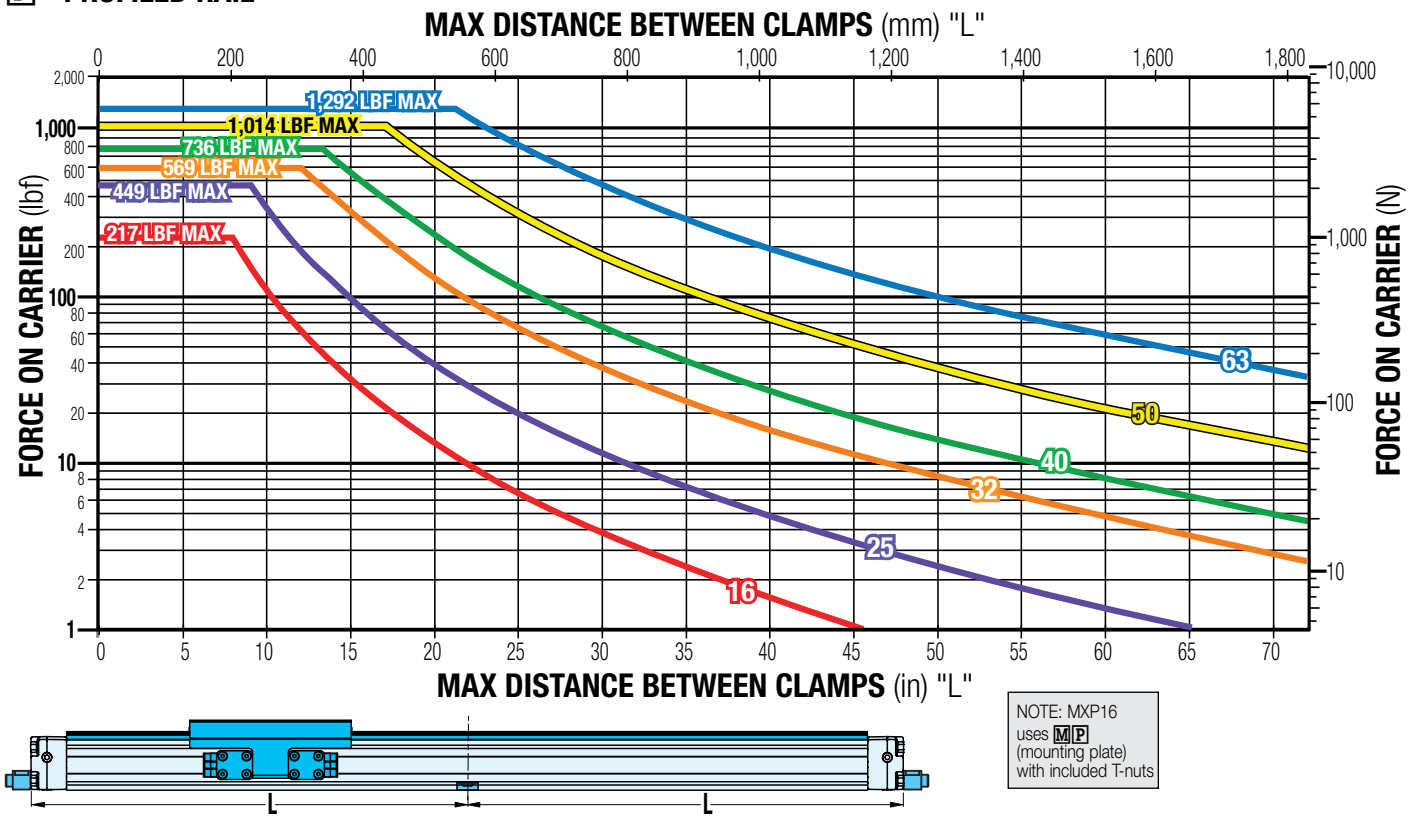
S - SOLID BEARING



NOTE: MXP16 uses MP (mounting plate) with included T-nuts

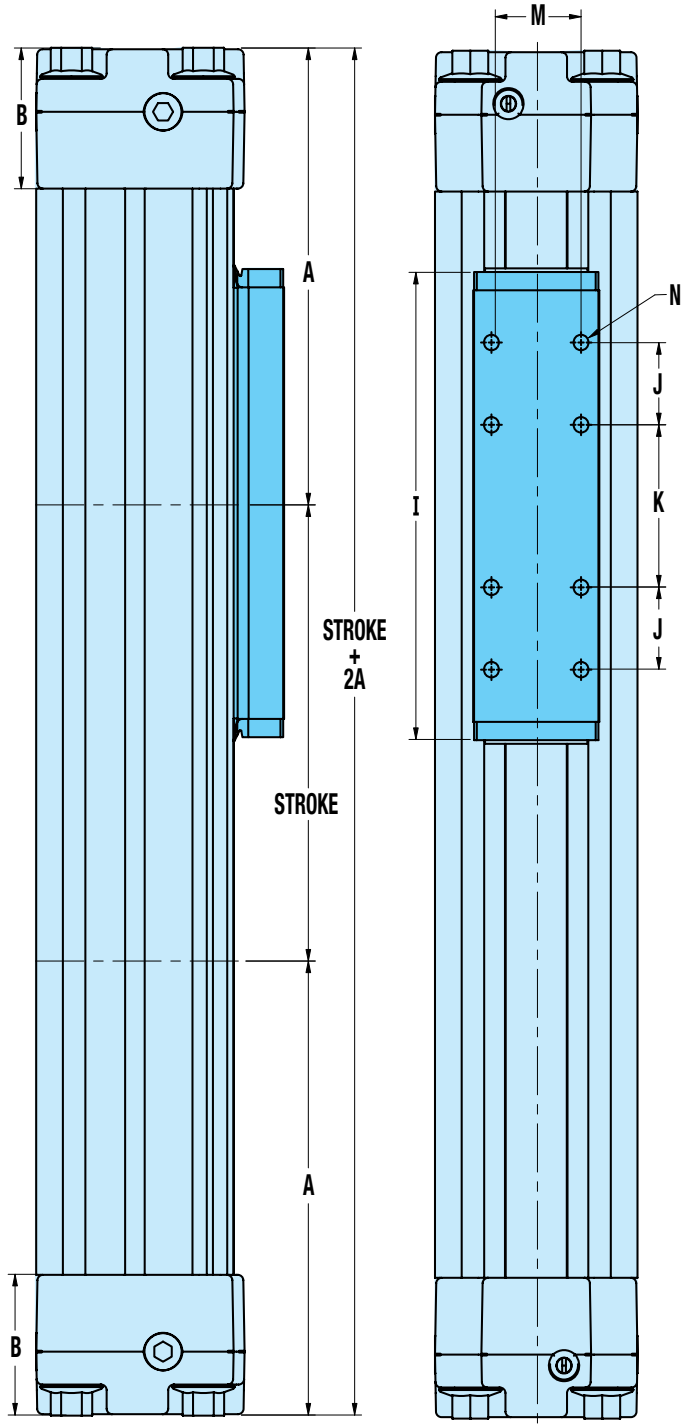
TUBE CLAMP REQUIREMENTS

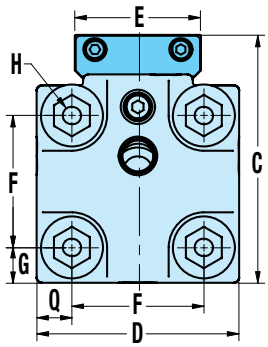
P - PROFILED RAIL



NOTE: MXP16 uses M P (mounting plate) with included T-nuts

N-INTERNAL BEARING ACTUATOR DIMENSIONS





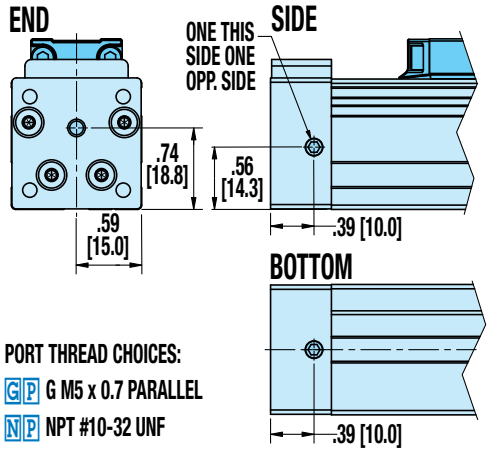
3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
A	3.13	3.94	4.90	5.82	6.29	8.45
mm	*79.6*	*100.2*	*124.5*	*147.7*	*159.8*	*214.5*
B	0.55	1.11	1.50	1.50	1.97	1.97
mm	*14.0*	*28.3*	*38.1*	*38.0*	*50.0*	*50.0*
C	1.55	2.07	2.67	2.98	3.86	4.76
mm	*39.3*	*52.6*	*67.8*	*75.8*	*98.1*	*120.8*
D	1.18	1.65	2.18	2.52	3.01	3.94
mm	*30.0*	*42.0*	*55.4*	*64.0*	*78.7*	*100.0*
E	0.83	0.83	1.36	1.61	2.13	2.44
mm	*21.0*	*21.0*	*34.5*	*41.0*	*54.0*	*62.0*
F	0.85	1.10	1.42	1.81	2.25	2.87
mm	*21.5*	*27.9*	*36.1*	*46.0*	*57.2*	*73.0*
G	0.17	0.25	0.38	0.35	0.43	0.53
mm	*4.3*	*6.3*	*9.7*	*9.0*	*10.8*	*13.5*
H	#8-32 (8)	#10-24 (8)	1/4-20 (8)	1/4-20 (8)	5/16-18 (8)	5/16-18 (8)
mm	*M4x0.7 (8)*	*M5x0.8 (8)*	*M6x1.0 (8)*	*M6x1.0 (8)*	*M8x1.25 (8)*	*M8x1.25 (8)*
I	3.78	4.45	5.04	5.87	6.57	9.69
mm	*96.0*	*113.0*	*128.0*	*149.0*	*166.8*	*246.0*
J	0.59	0.79	0.89	0.63	1.13	1.18
mm	*15.0*	*20.0*	*22.5*	*15.9*	*28.6*	*30.0*
K	1.18	1.57	1.75	3.00	2.25	4.33
mm	*30.0*	*40.0*	*44.5*	*76.2*	*57.2*	*110.0*
M	0.63	0.59	0.96	1.05	1.50	1.69
mm	*16.0*	*15.0*	*24.5*	*26.7*	*38.1*	*43.0*
N	#6-32 (8)	#8-32 (8)	#10-32 (8)	1/4-20 (8)	5/16-18 (8)	3/8-16 (8)
mm	*M3x0.5 (8)*	*M4x0.7 (8)*	*M5x0.8 (8)*	*M6x1.0 (8)*	*M8x1.25 (8)*	*M10x1.5 (8)*
Q	0.17	0.28	0.38	0.35	0.43	0.53
mm	*4.3*	*7.0*	*9.7*	*9.0*	*10.8*	*13.5*

N-INTERNAL BEARING PORTING DIMENSIONS MXP16N, MXP25N, MXP32N

DUAL END PORTING

16mm BORE

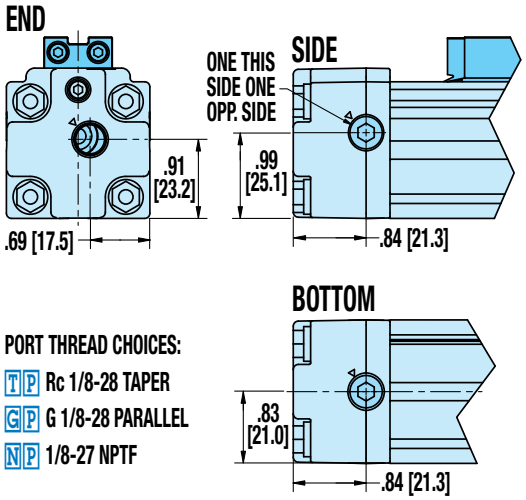


PORT THREAD CHOICES:
- GP G M5 x 0.7 PARALLEL
- NP NPT #10-32 UNF

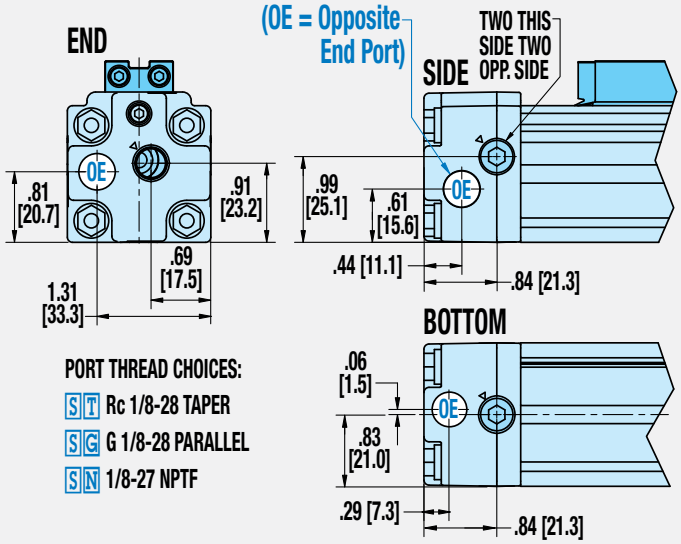
SINGLE-END PORTING

Not Available for 16mm BORE

25mm BORE

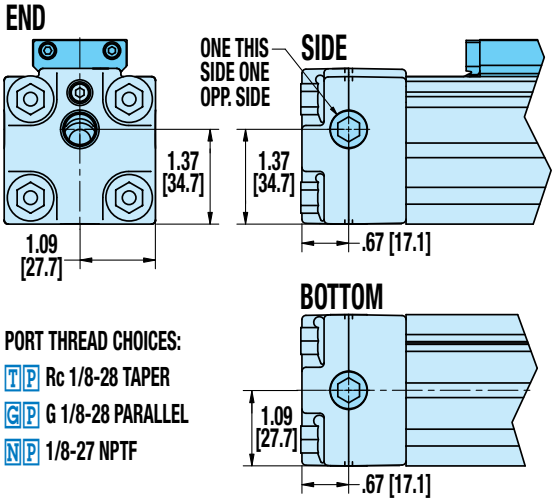


PORT THREAD CHOICES:
- TP Rc 1/8-28 TAPER
- GP G 1/8-28 PARALLEL
- NP 1/8-27 NPTF

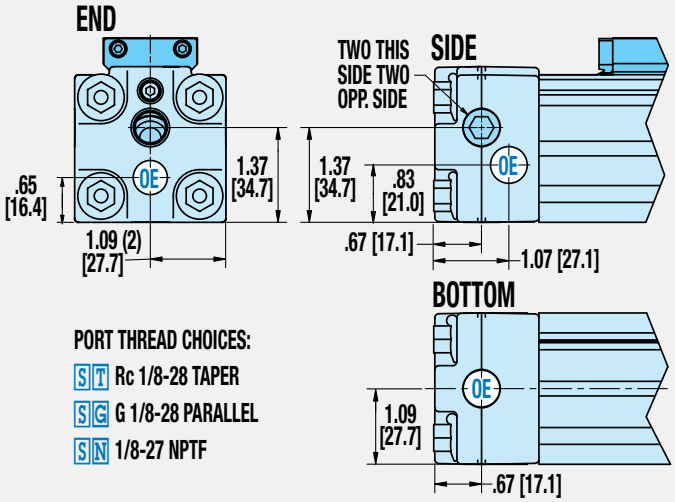


PORT THREAD CHOICES:
- ST Rc 1/8-28 TAPER
- SG G 1/8-28 PARALLEL
- SN 1/8-27 NPTF

32mm BORE



PORT THREAD CHOICES:
- TP Rc 1/8-28 TAPER
- GP G 1/8-28 PARALLEL
- NP 1/8-27 NPTF



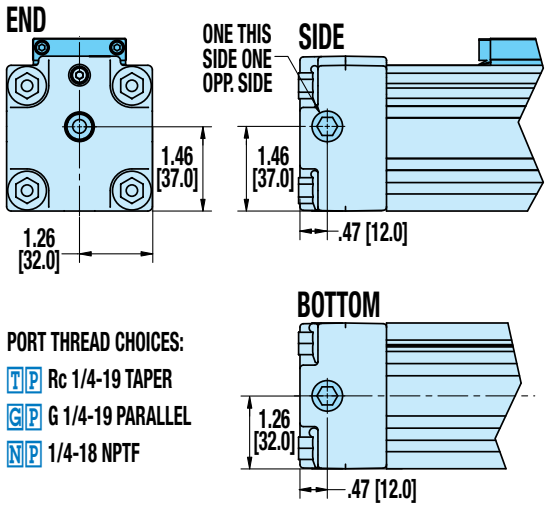
PORT THREAD CHOICES:
- ST Rc 1/8-28 TAPER
- SG G 1/8-28 PARALLEL
- SN 1/8-27 NPTF

3D CAD AVAILABLE at www.tolomatic.com

Dimensions in inches [brackets indicate dimensions in millimeters]

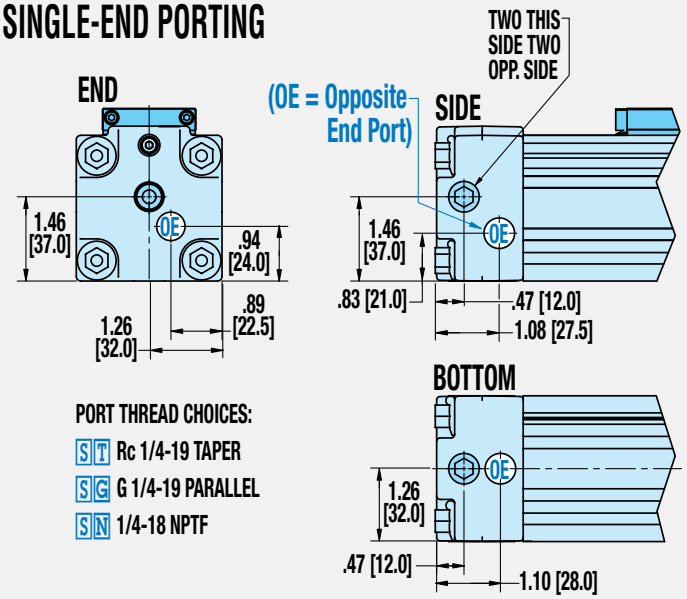
40mm BORE

DUAL END PORTING



PORT THREAD CHOICES:
- TP Rc 1/4-19 TAPER
- GP G 1/4-19 PARALLEL
- NP 1/4-18 NPTF

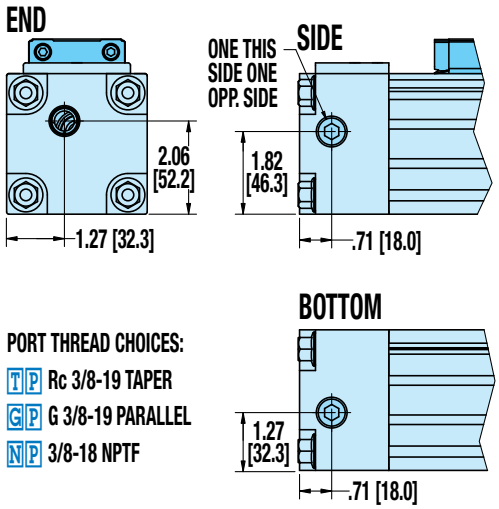
SINGLE-END PORTING



PORT THREAD CHOICES:
- ST Rc 1/4-19 TAPER
- SG G 1/4-19 PARALLEL
- SN 1/4-18 NPTF

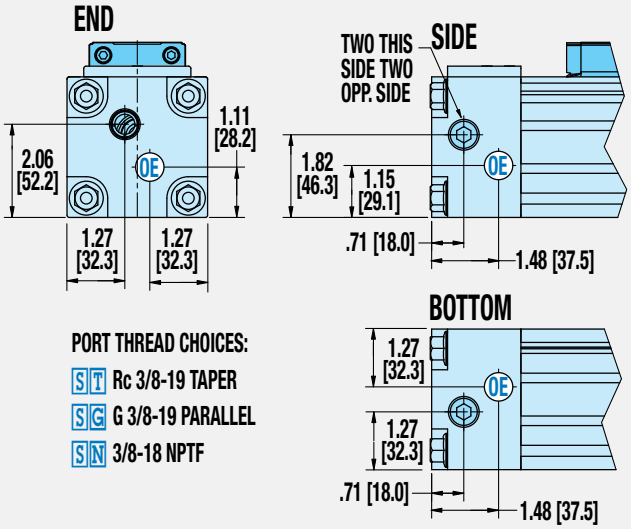
50mm BORE

DUAL END PORTING



PORT THREAD CHOICES:
- TP Rc 3/8-19 TAPER
- GP G 3/8-19 PARALLEL
- NP 3/8-18 NPTF

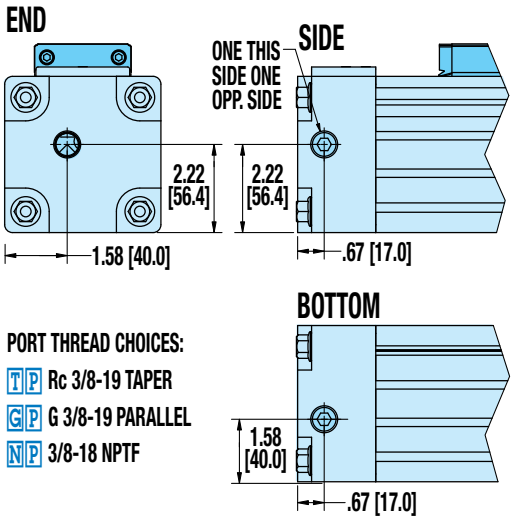
SINGLE-END PORTING



PORT THREAD CHOICES:
- ST Rc 3/8-19 TAPER
- SG G 3/8-19 PARALLEL
- SN 3/8-18 NPTF

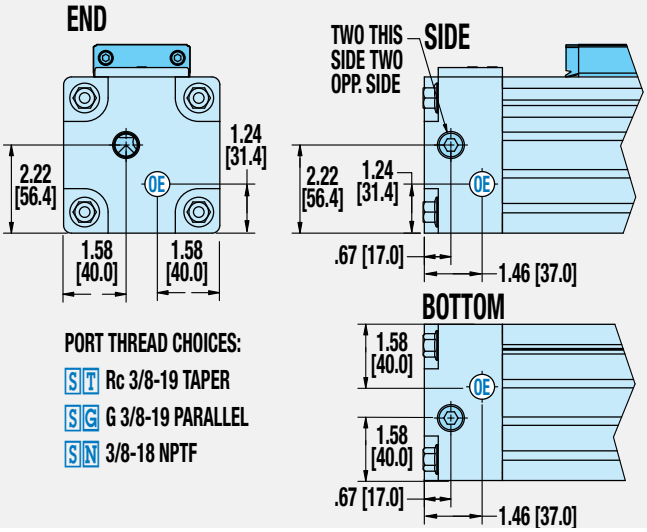
63mm BORE

DUAL END PORTING



PORT THREAD CHOICES:
- TP Rc 3/8-19 TAPER
- GP G 3/8-19 PARALLEL
- NP 3/8-18 NPTF

SINGLE-END PORTING



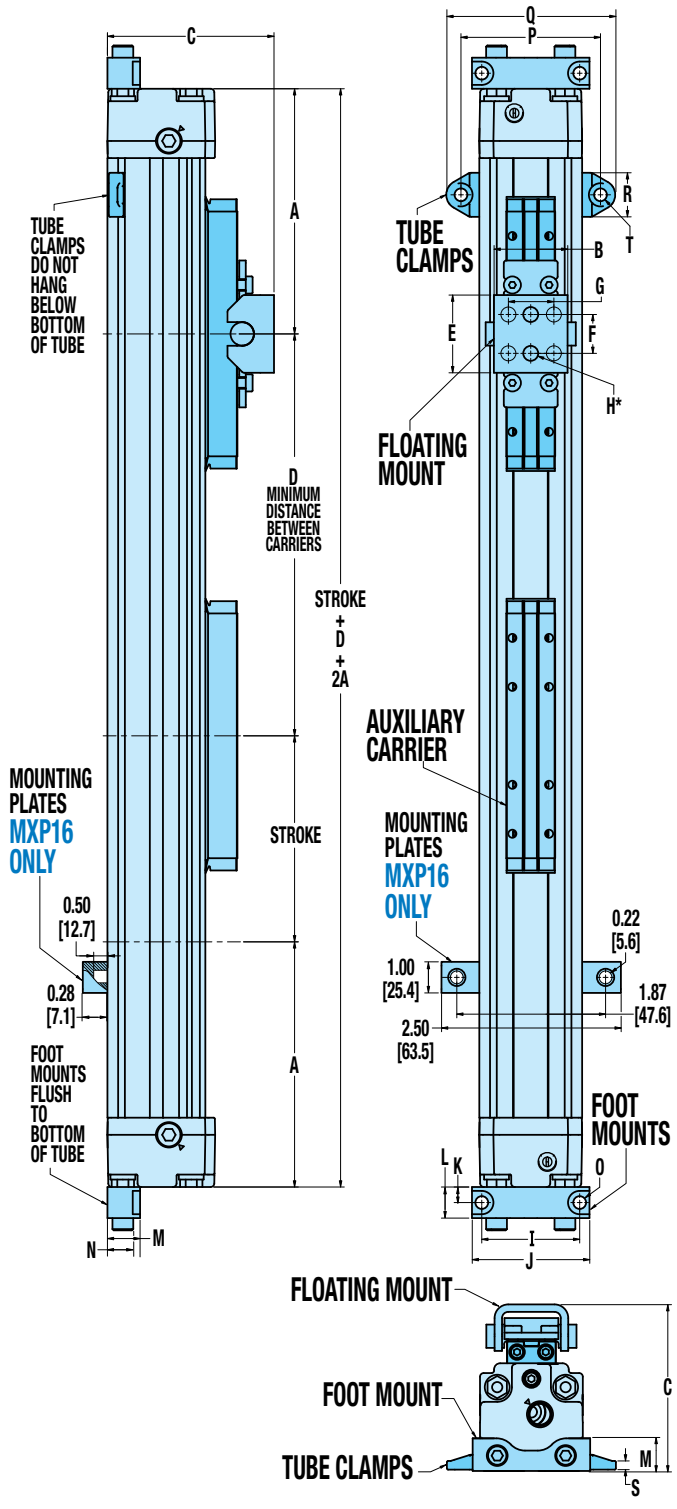
PORT THREAD CHOICES:
- ST Rc 3/8-19 TAPER
- SG G 3/8-19 PARALLEL
- SN 3/8-18 NPTF

3D CAD AVAILABLE at www.tolomatic.com

Dimensions in inches [brackets indicate dimensions in millimeters]

N-INTERNAL BEARING OPTION DIMENSIONS

AUXILIARY CARRIER, FLOATING MOUNT, FOOT MOUNT, TUBE CLAMPS



	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
A	3.13	3.94	4.90	5.82	6.29	8.45
mm	*79.6*	*100.2*	*124.5*	*147.7*	*159.8*	*214.5*
AUXILIARY CARRIER						
D	5.00	6.00	7.00	8.50	8.60	13.00
mm	*127.0*	*152.4*	*177.8*	*215.9*	*218.4*	*330.0*
FLOATING MOUNT						
B	1.27	1.19	2.08	2.55	3.24	3.15
mm	*32.2*	*30.1*	*52.8*	*64.7*	*82.3*	*80.0*
C	1.97	2.66	3.70	4.07	4.66	5.57
mm	*50.1*	*67.5*	*94.1*	*103.3*	*118.4*	*141.6*
E	0.90	1.25	1.50	1.50	3.94	5.20
mm	*22.9*	*31.8*	*38.1*	*38.1*	*100.1*	*132.0*
F	0.50	0.63	0.75	0.79	3.15	4.33
mm	*12.7*	*15.9*	*19.1*	*20.0*	*80.0*	*110.0*
G	-	-	1.00	1.38	-	1.69
mm	*-*	*-*	*25.4*	*35.0*	*-*	*43.0*
H*	0.17(2)	0.24(2)	0.28(4)	0.28(4)	0.36(2)	0.34(4)
mm	*4.3(2)*	*6.1(2)*	*7.1(4)*	*7.1(4)*	*9.1(2)*	*8.7(4)*
FOOT MOUNTS						
I	1.26	1.57	2.01	2.52	3.11	3.94
mm	*32.0*	*40.0*	*51.0*	*64.0*	*78.9*	*100.0*
J	1.57	1.89	2.36	2.91	3.67	4.72
mm	*40.0*	*48.0*	*60.0*	*74.0*	*93.2*	*120.0*
K	0.16	0.25	0.37	0.47	0.50	0.59
mm	*4.0*	*6.4*	*9.5*	*12.0*	*12.7*	*15.0*
L	0.31	0.50	0.75	0.94	1.00	1.18
mm	*8.0*	*12.7*	*19.0*	*24.0*	*25.4*	*30.0*
M	0.35	0.52	0.91	0.73	1.00	1.06
mm	*8.9*	*13.3*	*23.0*	*18.5*	*25.4*	*27.0*
N	-	0.41	0.71	0.45	0.69	0.65
mm	*-*	*10.3*	*18.0*	*11.4*	*17.4*	*16.5*
O	0.18	0.20	0.22	0.28	0.35	0.42
mm	*4.6*	*5.2*	*5.5*	*7.1*	*9.0*	*10.7*
TUBE CLAMPS						
P	-	2.24	2.92	3.26	3.84	5.19
mm	*-*	*57.0*	*74.1*	*82.7*	*97.5*	*131.7*
Q	-	2.72	3.44	3.81	4.39	5.93
mm	*-*	*69.0*	*87.4*	*96.7*	*111.5*	*150.7*
R	-	0.71	0.63	0.55	0.55	0.75
mm	*-*	*18.0*	*16.0*	*14.0*	*14.0*	*19.0*
S	-	0.14	0.17	0.15	0.15	0.24
mm	*-*	*3.6*	*4.3*	*3.8*	*3.8*	*6.1*
T	-	0.20	0.28	0.28	0.28	0.42
mm	*-*	*5.2*	*7.1*	*7.1*	*7.1*	*10.7*

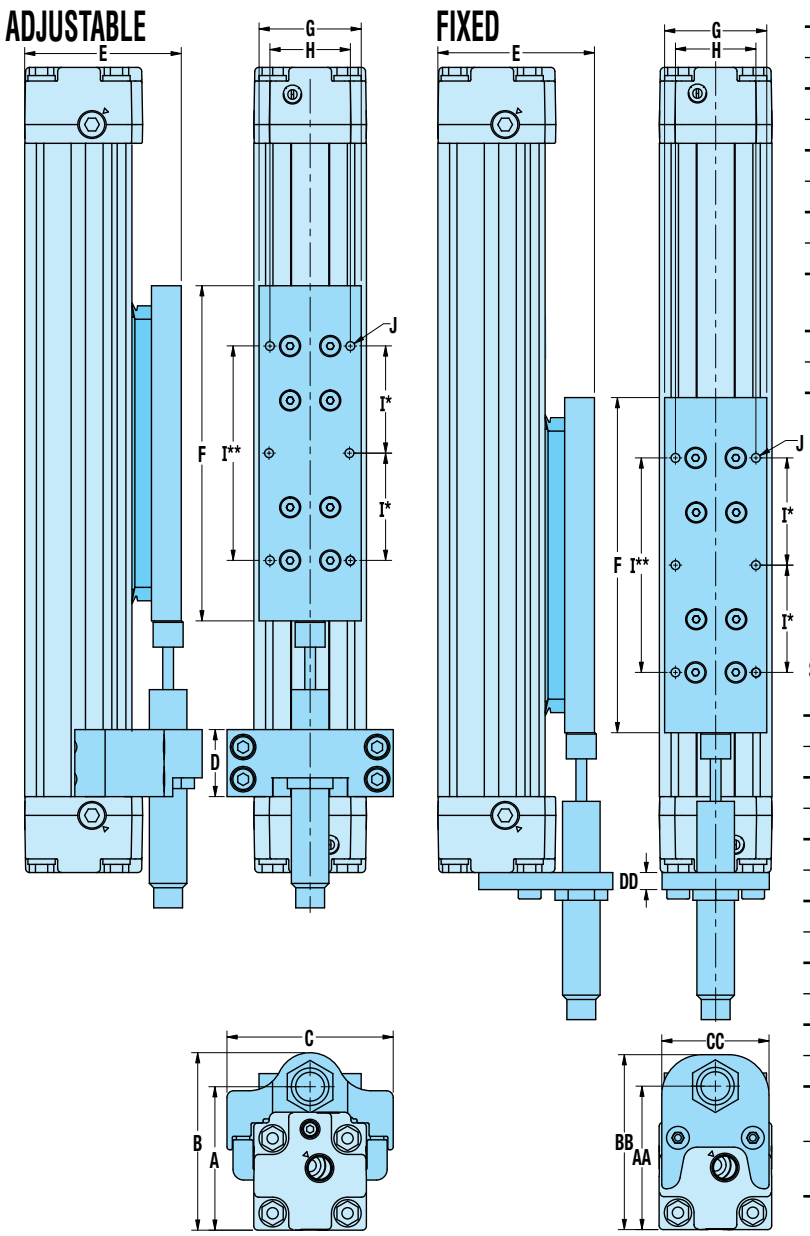
**MXP16, 25 & 50 use 2 center holes,*
MXP32, 40 & 63 use 4 corner holes

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

NOTE: Auxiliary carrier is N-Internal Bearing carrier, see page MXP_25 for carrier size and mounting dimensions

N-INTERNAL BEARING OPTION DIMENSIONS

ADJUSTABLE AND FIXED SHOCK ABSORBERS



ADJUSTABLE SHOCK ABSORBER

	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
A	1.65	2.11	2.91	3.32	4.24	5.21
mm	*42.0*	*53.5*	*73.8*	*84.4*	*107.6*	*132.4*
B	1.97	2.61	3.35	3.87	4.87	5.91
mm	*50.0*	*66.2*	*85.0*	*98.4*	*123.8*	*150.0*
C	1.74	2.44	2.95	3.43	4.09	5.20
mm	*44.3*	*62.0*	*74.9*	*87.0*	*103.9*	*132.0*
D	0.71	0.98	1.25	0.98	1.22	1.26
mm	*18.0*	*25.0*	*31.8*	*25.0*	*31.0*	*32.0*

Stroke Adder: Adjustable Shock Absorber

in	0.49	1.06	1.17	0.76	0.81	0.51
mm	*12.4*	*26.8*	*29.8*	*19.3*	*20.5*	*13.0*

⚠ NOTE: For each adjustable shock absorber ordered, add Stroke Adder value to required stroke to determine configurated actuator stroke.

Required Stroke + (Adj. Shock Quantity x Stroke Adder value) = Configurated Actuator Stroke

Example: MXP25N, 500mm stroke required, 2 adjustable shocks

500 + (2 x 26.8) = 500 + 53.6 = 553.6mm

SHOCK PLATE

	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
E	1.81	2.28	3.17	3.61	4.55	5.65
mm	*46.0*	*57.9*	*80.5*	*91.8*	*115.6*	*143.4*
F	3.86	4.92	5.20	6.72***	6.65	10.29****
mm	*98.0*	*125.0*	*132.0*	*170.8****	*168.8*	*261.4****
G	0.94	1.50	1.32	1.61	2.13	2.44
mm	*24.0*	*38.1*	*33.5*	*41.0*	*54.0*	*62.0*
H	0.63	1.18	0.96	1.05	1.50	1.69
mm	*16.0*	*30.0*	*24.5*	*26.7*	*38.1*	*43.0*
I*	0.89	1.57	-	-	-	-
mm	*22.5*	*40.0*	*-*	*-*	*-*	*-*
I**	-	-	1.75	3.00	2.25	4.33
mm	*-*	*-*	*44.5*	*76.2*	*57.2*	*110.0*
J	#8-32 (6)	#8-32 (6)	#10-32 (4)	1/4-20 (4)	5/16-18 (4)	3/8-16 (4)
mm	*M4x0.8 (6)*	*M4x0.8 (6)*	*M5x0.8 (4)*	*M6x1.0 (4)*	*M8x1.25 (4)*	*M10x1.5 (4)*

**MXP16 & 25 Shock plate has 6 mounting holes*

***MXP32, 40, 50 & 63 Shock plate has 4 mounting holes*

****MXP40 Shock Stop Plate has impact bolts. Actual plate length is 5.98" (152mm); Impact bolts, one on each end, add .74" (18.8mm) to total length*

*****MXP63 Shock Stop Plate has impact bolts. Actual plate length is 9.84" (250mm); Impact bolts, one on each end, add .45" (11.4mm) to total length*

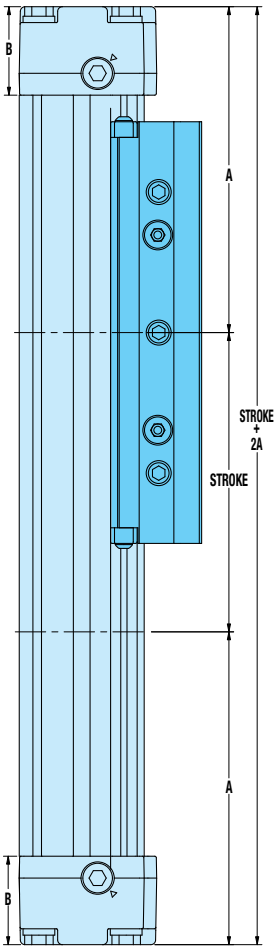
FIXED SHOCK ABSORBER

	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
AA	1.65	2.11	2.91	3.32	4.24	5.21
mm	*42.0*	*53.5*	*73.8*	*84.4*	*107.6*	*132.3*
BB	1.95	2.57	3.42	3.87	5.09	5.92
mm	*49.5*	*65.3*	*86.8*	*98.4*	*129.2*	*150.3*
CC	1.17	1.57	2.00	2.44	2.83	3.66
mm	*29.8*	*40.0*	*50.8*	*62.0*	*72.0*	*93.0*
DD	0.13	0.25	0.25	0.25	0.50	0.50
mm	*3.3*	*6.4*	*6.4*	*6.4*	*12.7*	*12.7*

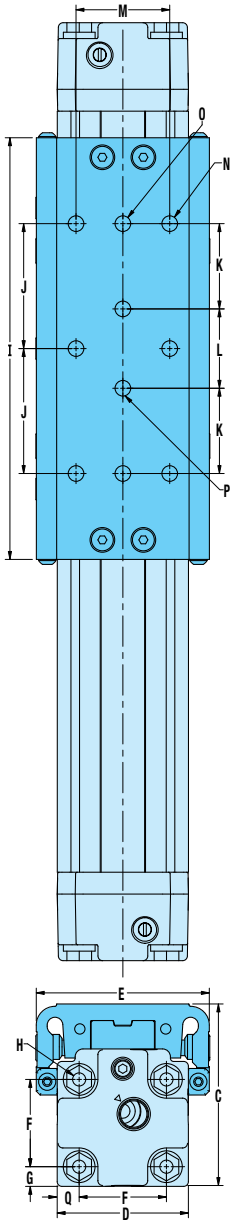
3D CAD AVAILABLE AT WWW.TOLOMATIC.COM CAD 2D

NOTE: Auxiliary carrier is N-Internal Bearing carrier, see page MXP_25 for carrier size and mounting dimensions

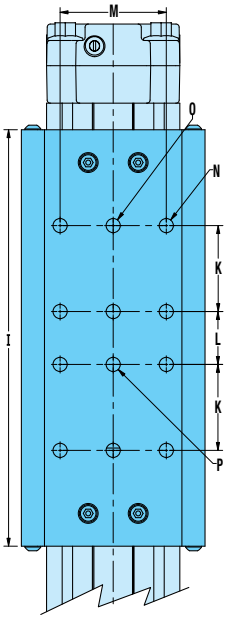
S-SOLID BEARING ACTUATOR DIMENSIONS



MOUNTING PATTERN MXP16, 25, 32, 50



MOUNTING PATTERN MXP40, 63

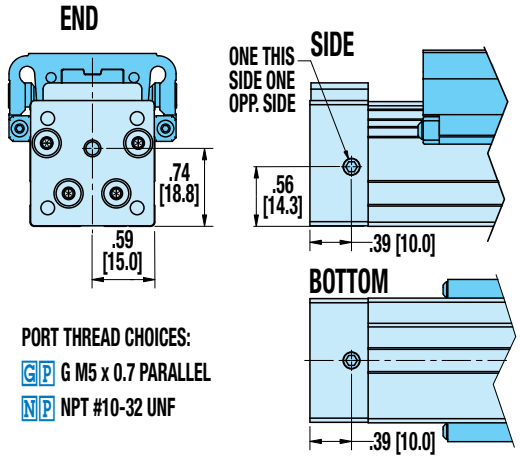


	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
A	3.13	3.94	4.90	5.82	6.29	8.45
mm	*79.6*	*100.2*	*124.5*	*147.7*	*159.8*	*214.5*
B	0.55	1.11	1.50	1.50	1.97	1.97
mm	*14.0*	*28.3*	*38.1*	*38.0*	*50.0*	*50.0*
C	1.80	2.30	3.06	3.51	4.44	5.48
mm	*45.8*	*58.4*	*77.8*	*89.2*	*112.8*	*139.1*
D	1.18	1.65	2.18	2.52	3.01	3.94
mm	*30.0*	*42.0*	*55.4*	*64.0*	*78.7*	*100.0*
E	2.18	2.18	2.86	3.47	4.01	5.59
mm	*55.4*	*55.4*	*72.6*	*88.2*	*104.1*	*142.0*
F	0.85	1.10	1.42	1.81	2.25	2.87
mm	*21.5*	*27.9*	*36.1*	*46.0*	*57.2*	*73.0*
G	0.17	0.25	0.38	0.35	0.43	0.53
mm	*4.3*	*6.3*	*9.7*	*9.0*	*10.8*	*13.5*
H	#8-32 (8)	#10-24 (8)	1/4-20 (8)	1/4-20 (8)	5/16-18 (8)	5/16-18 (8)
mm	*M4x0.7 (8)*	*M5x0.8 (8)*	*M6x1.0 (8)*	*M6x1.0 (8)*	*M8x1.25 (8)*	*M8x1.25 (8)*
I	4.12	5.31	6.02	7.87	7.91	12.11
mm	*104.6*	*135.0*	*153.0*	*200.0*	*200.8*	*307.5*
J	1.18	1.57	1.77	-	1.87	-
mm	*30.0*	*40.0*	*45.0*	*-*	*47.6*	*-*
K	-	1.07	1.10	1.63	1.25	1.50
mm	*-*	*27.3*	*28.0*	*41.3*	*31.8*	*38.1*
L	-	1.00	1.00	1.00	2.50	3.00
mm	*-*	*25.4*	*25.4*	*25.4*	*63.5*	*76.2*
M	1.18	1.18	1.73	2.01	2.59	3.25
mm	*30.0*	*30.0*	*44.0*	*51.0*	*65.8*	*82.6*
N	#8-32 (6)	1/4-20 (6)	1/4-20 (6)	5/16-18 (8)	3/8-16 (6)	3/8-16 (8)
mm	*M4x0.7 (6)*	*M6x1.0 (6)*	*M8x1.25 (6)*	*M8x1.25 (8)*	*M10x1.5 (6)*	*M10x1.5 (8)*
O	-	#10-32 (2)	1/4-20 (2)	5/16-18 (2)	3/8-16 (2)	3/8-16 (2)
mm	*-*	*M6x1.0 (2)*	*M8x1.25 (2)*	*M8x1.25 (2)*	*M10x1.5 (2)*	*M10x1.5 (2)*
P	-	1/4-20 (2)	1/4-20 (2)	1/4-20 (2)	3/8-16 (2)	3/8-16 (2)
mm	*-*	*M6x1.0 (2)*	*M8x1.25 (2)*	*M8x1.25 (2)*	*M10x1.5 (2)*	*M10x1.5 (2)*
Q	0.17	0.28	0.38	0.35	0.43	0.53
mm	*4.3*	*7.0*	*9.7*	*9.0*	*10.8*	*13.5*

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

DUAL END PORTING

16mm BORE

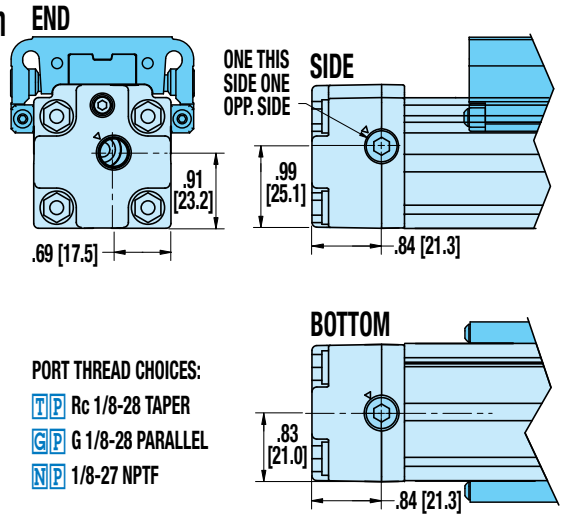


PORT THREAD CHOICES:
- GP G M5 x 0.7 PARALLEL
- NP NPT #10-32 UNF

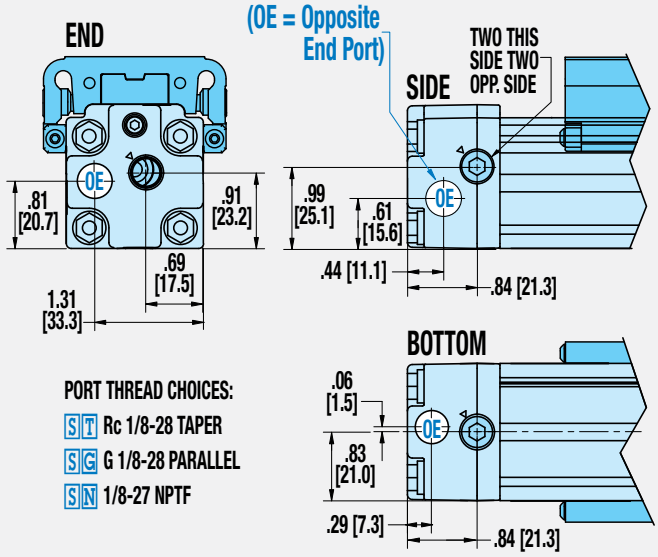
SINGLE-END PORTING

Not Available for 16mm BORE

25mm BORE

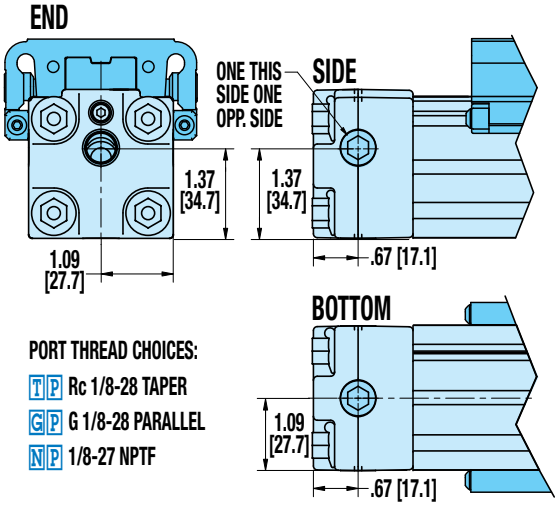


PORT THREAD CHOICES:
- TP Rc 1/8-28 TAPER
- GP G 1/8-28 PARALLEL
- NP 1/8-27 NPTF

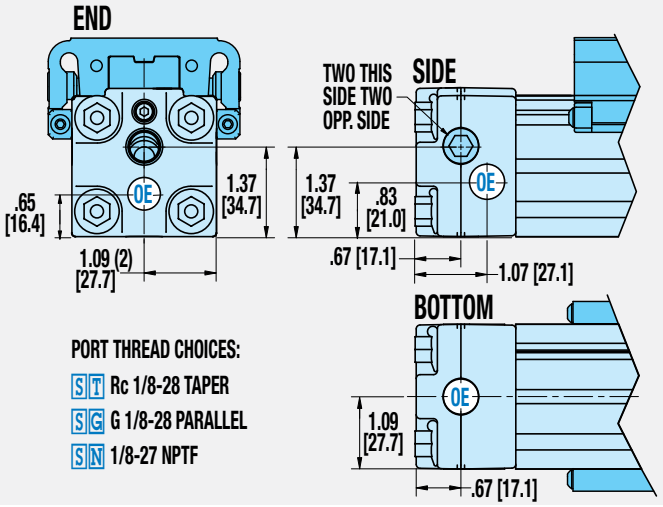


PORT THREAD CHOICES:
- ST Rc 1/8-28 TAPER
- SG G 1/8-28 PARALLEL
- SN 1/8-27 NPTF

32mm BORE



PORT THREAD CHOICES:
- TP Rc 1/8-28 TAPER
- GP G 1/8-28 PARALLEL
- NP 1/8-27 NPTF



PORT THREAD CHOICES:
- ST Rc 1/8-28 TAPER
- SG G 1/8-28 PARALLEL
- SN 1/8-27 NPTF

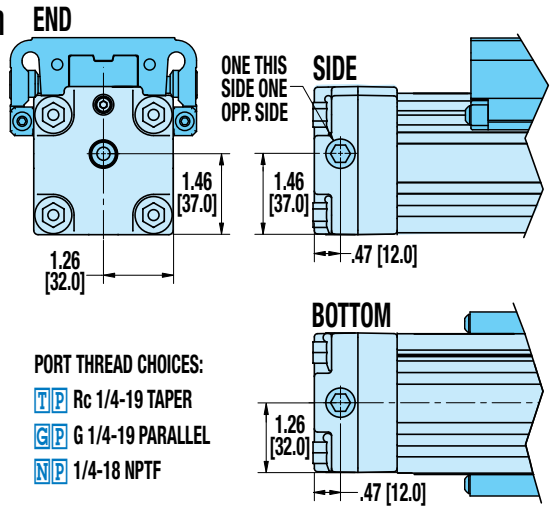
3D CAD AVAILABLE at www.tolomatic.com

Dimensions in inches [brackets indicate dimensions in millimeters]

S-SOLID BEARING PORTING DIMENSIONS MXP40S, MXP50S, MXP63S

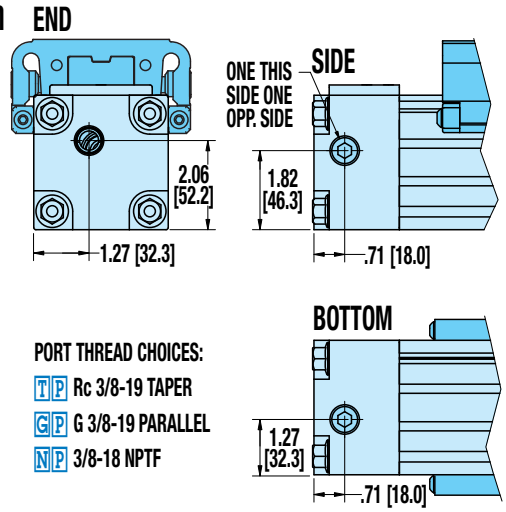
DUAL END PORTING

40mm BORE



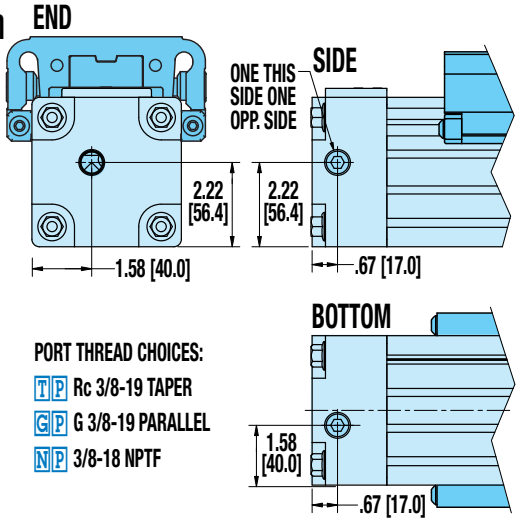
PORT THREAD CHOICES:
- TP Rc 1/4-19 TAPER
- GP G 1/4-19 PARALLEL
- NP 1/4-18 NPTF

50mm BORE



PORT THREAD CHOICES:
- TP Rc 3/8-19 TAPER
- GP G 3/8-19 PARALLEL
- NP 3/8-18 NPTF

63mm BORE

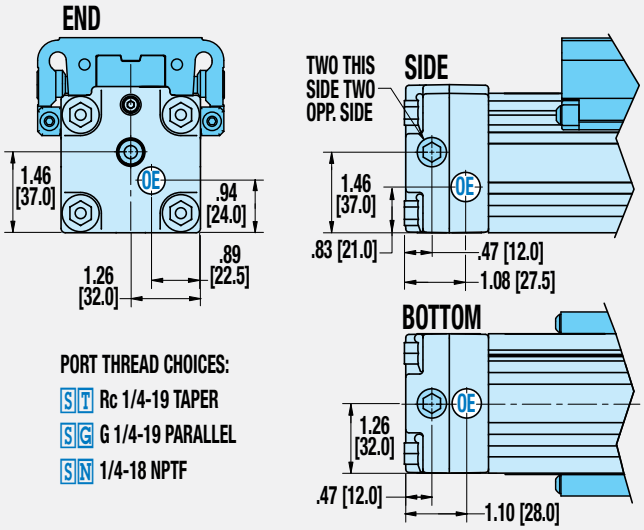


PORT THREAD CHOICES:
- TP Rc 3/8-19 TAPER
- GP G 3/8-19 PARALLEL
- NP 3/8-18 NPTF

3D CAD AVAILABLE at www.tolomatic.com

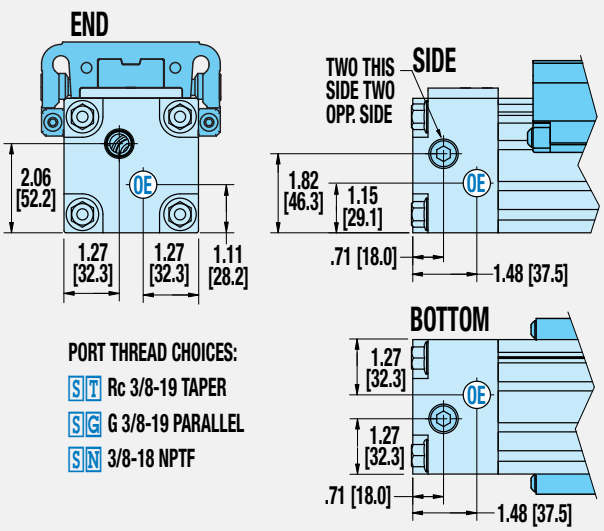
SINGLE-END PORTING

40mm BORE



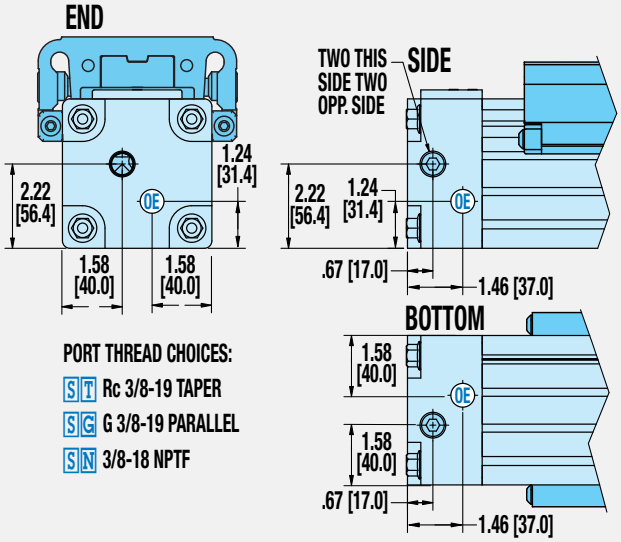
PORT THREAD CHOICES:
- ST Rc 1/4-19 TAPER
- SG G 1/4-19 PARALLEL
- SN 1/4-18 NPTF

50mm BORE



PORT THREAD CHOICES:
- ST Rc 3/8-19 TAPER
- SG G 3/8-19 PARALLEL
- SN 3/8-18 NPTF

63mm BORE

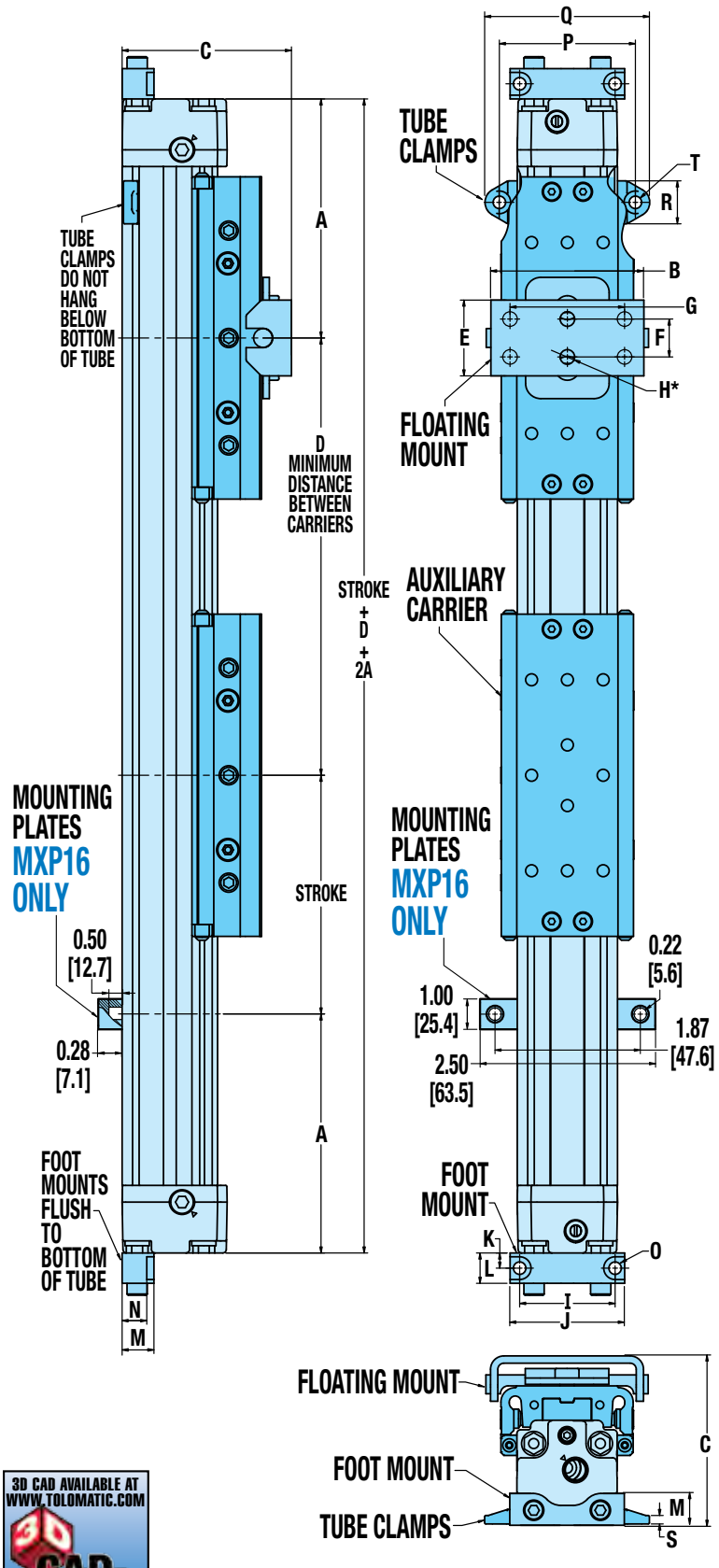


PORT THREAD CHOICES:
- ST Rc 3/8-19 TAPER
- SG G 3/8-19 PARALLEL
- SN 3/8-18 NPTF

Dimensions in inches [brackets indicate dimensions in millimeters]

S-SOLID BEARING OPTION DIMENSIONS

AUXILIARY CARRIER, FLOATING MOUNT, FOOT MOUNT, TUBE CLAMPS



	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
A	3.13	3.94	4.90	5.82	6.29	8.45
mm	*79.6*	*100.2*	*124.5*	*147.7*	*159.8*	*214.5*
AUXILIARY CARRIER						
D	5.00	6.00	7.00	8.50	8.60	13.00
mm	*127.0*	*152.4*	*177.8*	*215.9*	*218.4*	*330.0*
FLOATING MOUNT						
B	1.86	2.52	3.37	4.32	5.04	6.10
mm	*47.3*	*64.1*	*85.6*	*109.7*	*128.0*	*155.0*
C	2.31	2.80	3.67	4.26	5.24	6.17
mm	58.7	71.0	93.3	108.2	133.1	156.8
E	0.98	1.25	2.76	3.94	3.94	5.00
mm	*25.0*	*31.8*	*70.1*	*100.0*	*100.1*	*127.0*
F	0.47	0.63	1.97	2.95	3.15	3.94
mm	*12.0*	*15.9*	*50.0*	*74.9*	*80.0*	*100.1*
G	-	-	-	2.17	-	2.76
mm	*-*	*-*	*-*	*55.1*	*-*	*70.1*
H*	0.18(2)	0.24(2)	0.28(2)	0.28(4)	0.36(2)	0.34(4)
mm	*4.5(2)*	*6.1(2)*	*7.1(2)*	*7.1(4)*	*9.1(2)*	*8.7(4)*
FOOT MOUNT						
I	1.26	1.57	2.01	2.52	3.11	3.94
mm	*32.0*	*40.0*	*51.0*	*64.0*	*78.9*	*100.0*
J	1.57	1.89	2.36	2.91	3.67	4.72
mm	*40.0*	*48.0*	*60.0*	*74.0*	*93.2*	*120.0*
K	0.16	0.25	0.37	0.47	0.50	0.59
mm	*4.0*	*6.4*	*9.5*	*12.0*	*12.7*	*15.0*
L	0.31	0.50	0.75	0.94	1.00	1.18
mm	*8.0*	*12.7*	*19.0*	*24.0*	*25.4*	*30.0*
M	0.35	0.52	0.91	0.73	1.00	1.06
mm	*8.9*	*13.3*	*23.0*	*18.5*	*25.4*	*27.0*
N	-	0.41	0.71	0.45	0.69	0.65
mm	*-*	*10.3*	*18.0*	*11.4*	*17.4*	*16.5*
O	0.18	0.20	0.22	0.28	0.35	0.42
mm	*4.6*	*5.2*	*5.5*	*7.1*	*9.0*	*10.7*
TUBE CLAMPS						
P	-	2.24	2.92	3.26	3.84	5.19
mm	*-*	*57.0*	*74.1*	*82.7*	*97.5*	*131.7*
Q	-	2.72	3.44	3.81	4.39	5.93
mm	*-*	*69.0*	*87.4*	*96.7*	*111.5*	*150.7*
R	-	0.71	0.63	0.55	0.55	0.75
mm	*-*	*18.0*	*16.0*	*14.0*	*14.0*	*19.0*
S	-	0.14	0.17	0.15	0.15	0.24
mm	*-*	*3.6*	*4.3*	*3.8*	*3.8*	*6.1*
T	-	0.20	0.28	0.28	0.28	0.42
mm	*-*	*5.2*	*7.1*	*7.1*	*7.1*	*10.7*

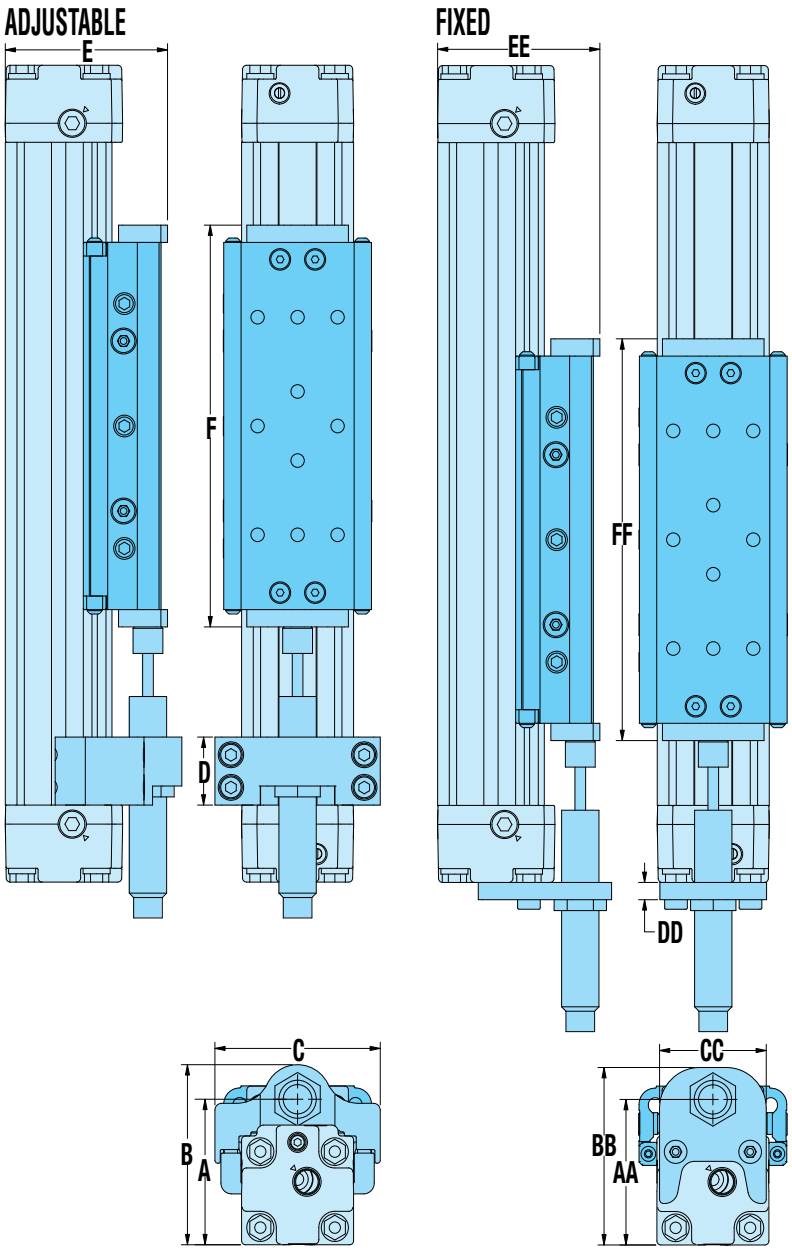
**MXP16, 25, 32 & 50 use 2 center holes, MXP40 & 63 use 4 corner holes*

NOTE: Auxiliary carrier is S-Solid Bearing carrier, see page MXP_30 for carrier size and mounting dimensions

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

S-SOLID BEARING OPTION DIMENSIONS

ADJUSTABLE AND FIXED SHOCK ABSORBERS



ADJUSTABLE SHOCK ABSORBER

	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
A	1.65	2.11	2.91	3.32	4.24	5.21
mm	*42.0*	*53.5*	*73.8*	*84.4*	*107.6*	*132.4*
B	1.97	2.61	3.35	3.87	4.87	5.91
mm	*50.0*	*66.2*	*85.0*	*98.4*	*123.8*	*150.0*
C	1.74	2.44	2.95	3.43	4.09	5.20
mm	*44.3*	*62.0*	*74.9*	*87.0*	*103.9*	*132.0*
D	0.71	0.98	1.25	0.98	1.22	1.26
mm	*18.0*	*25.0*	*31.8*	*25.0*	*31.0*	*32.0*
E	1.80	2.39[1]	3.20[2]	3.57[3]	4.53[4]	5.50[5]
mm	*45.8*	*60.8[1]*	*81.2[2]*	*90.7[3]*	*115.1[4]*	*139.7[5]*
F	4.12	5.81[1]	6.76[2]	8.61[3]	8.35[4]	12.56[5]
mm	*104.6*	*147.7[1]*	*171.8[2]*	*218.8[3]*	*212.2[4]*	*318.9[5]*

Stroke Adder: Adjustable Shock Absorber

in.	0.62	1.50	1.96	1.70	1.66	1.65
mm	*15.7*	*38.1*	*49.7*	*43.3*	*42.1*	*41.8*

⚠ NOTE: For each adjustable shock absorber ordered, add Stroke Adder value to required stroke to determine configurated actuator stroke.

Required Stroke + (Adj. Shock Quantity x Stroke Adder value) = Configurated Actuator Stroke

Example: MXP25S, 500mm stroke required, 2 adjustable shocks

500 + (2 x 38.1) = 500 + 76.2 = 576.2mm

FIXED SHOCK ABSORBER

	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
AA	1.65	2.11	2.91	3.32	4.24	5.21
mm	*42.0*	*53.5*	*73.8*	*84.4*	*107.6*	*132.4*
BB	1.95	2.57	3.42	3.87	5.10	5.92
mm	*49.5*	*65.3*	*86.8*	*98.4*	*129.6*	*150.3*
CC	1.17	1.57	2.00	2.44	2.83	3.66
mm	*29.8*	*40.0*	*50.8*	*62.0*	*72.0*	*93.0*
DD	0.13	0.25	0.25	0.25	0.50	0.50
mm	*3.3*	*6.4*	*6.4*	*6.4*	*12.7*	*12.7*
EE	1.80	2.39[1]	3.20[2]	3.57[3]	4.53[4]	5.50[5]
mm	*45.8*	*60.8[1]*	*81.2[2]*	*90.7[3]*	*115.1[4]*	*139.7[5]*
FF	4.12	5.81[1]	6.76[2]	8.61[3]	8.35[4]	12.56[5]
mm	*104.6*	*147.7[1]*	*171.8[2]*	*218.8[3]*	*212.2[4]*	*318.9[5]*

[1]Carrier is standard MXP25S, 2.30" (58.4mm) high X 5.31" (135.0mm) long, Impact plates on each end of carrier add .09" (2.4mm) to total height and .50" (12.7mm) to total length

[2]Carrier is standard MXP32S, 3.06" (77.8mm) high X 6.02" (153.0mm) long, Impact bolts on each end of carrier add .13" (3.4mm) to total height and .74" (18.8mm) to total length

[3]Carrier is standard MXP40S, 3.51" (89.2mm) high X 7.87" (200.0mm) long, Impact bolts on each end of carrier add .06" (1.5mm) to total height and .74" (18.8mm) to total length

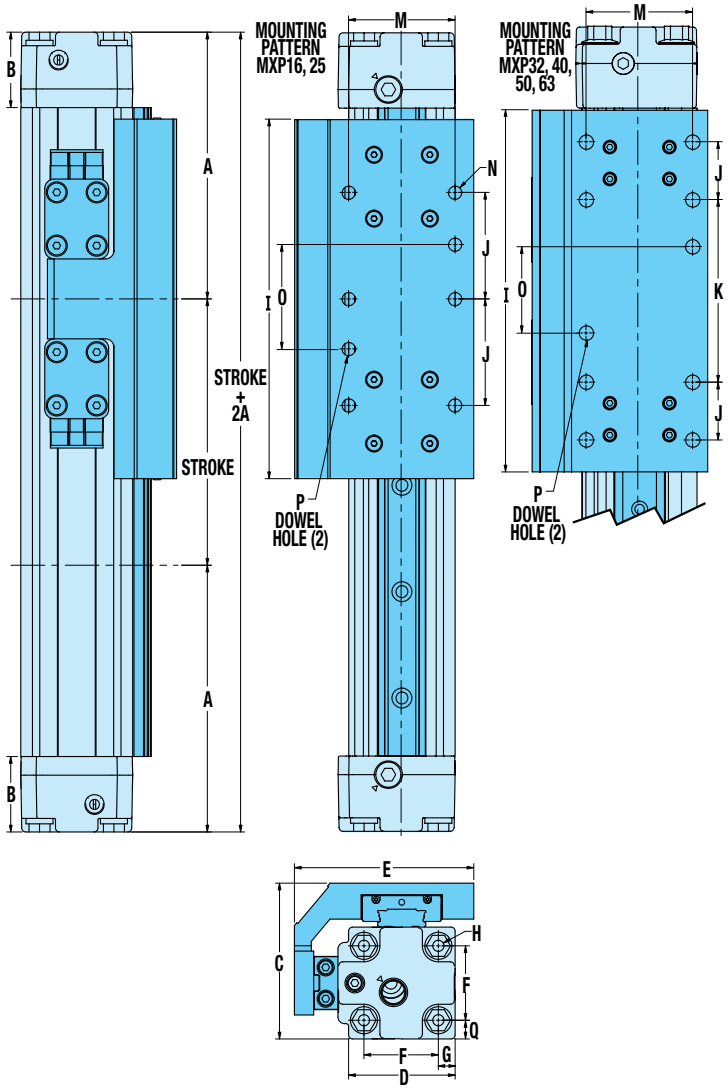
[4]Carrier is standard MXP50S, 4.44" (112.8mm) high X 7.91" (200.8mm) long, Impact bolts on each end of carrier add .09" (2.3mm) to total height and .45" (11.4mm) to total length

[5]Carrier is standard MXP63S, 5.48" (139.1mm) high X 12.11" (307.5mm) long, Impact bolts on each end of carrier add .45" (11.4mm) to total length

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

NOTE: Auxiliary carrier is S-Solid Bearing carrier, see page MXP_30 for carrier size and mounting dimensions

P-PROFILED RAIL ACTUATOR DIMENSIONS

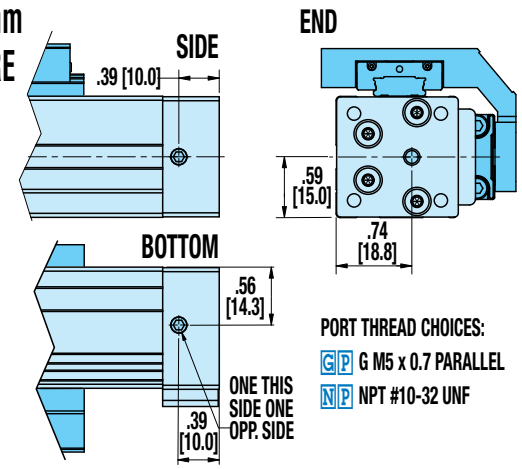


	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
A	3.13	3.94	4.90	5.82	6.29	8.45
mm	*79.6*	*100.2*	*124.5*	*147.7*	*159.8*	*214.5*
B	0.55	1.11	1.50	1.50	1.97	1.97
mm	*14.0*	*28.3*	*38.1*	*38.0*	*50.0*	*50.0*
C	1.81	2.30	3.05	3.53	4.71	5.51
mm	*46.0*	*58.5*	*77.4*	*89.7*	*119.7*	*140.0*
D	1.19	1.57	2.13	2.52	3.01	2.87
mm	*30.3*	*40.0*	*54.0*	*64.0*	*78.7*	*73.0*
E	1.78	2.65	3.25	3.85	4.62	5.65
mm	*45.3*	*67.4*	*82.5*	*97.8*	*117.4*	*143.6*
F	0.85	1.10	1.42	1.81	2.25	2.87
mm	*21.5*	*27.9*	*36.1*	*46.0*	*57.2*	*73.0*
G	0.17	0.28	0.38	0.35	0.43	0.53
mm	*4.3*	*7.0*	*9.7*	*9.0*	*10.8*	*13.5*
H	#8-32 (8)	#10-24 (8)	1/4-20 (8)	1/4-20 (8)	5/16-18 (8)	5/16-18 (8)
mm	*M4x0.7 (8)*	*M5x0.8 (8)*	*M6x1.0 (8)*	*M6x1.0 (8)*	*M8x1.25 (8)*	*M8x1.25 (8)*
I	4.33	5.31	6.69	7.87	8.50	12.00
mm	*110.0*	*135.0*	*170.0*	*200.0*	*216.0*	*304.8*
J	1.57	1.57	1.07	1.00	1.00	1.57
mm	*40.0*	*40.0*	*27.1*	*25.4*	*25.4*	*40.0*
K	-	-	3.37	4.50	2.75	5.12
mm	*-*	*-*	*85.7*	*114.3*	*69.9*	*130.0*
M	1.10	1.57	1.97	2.83	3.13	3.87
mm	*28.0*	*40.0*	*50.0*	*72.0*	*79.4*	*98.3*
N	#8-32 (6)	1/4-20 (6)	5/16-18 (8)	5/16-18 (8)	5/16-18 (10)	3/8-16 (8)
mm	*M4x0.7 (6)*	*M6x1.0 (6)*	*M8x1.25 (8)*	*M8x1.25 (8)*	*M8x1.25 (10)*	*M10x1.5 (8)*
O	1.57	1.57	1.77	2.50	1.50	2.56
mm	*40.0*	*40.0*	*45.0*	*63.5*	*38.1*	*65.0*
P	5/32" (2)	1/4" (2)	5/16" (2)	5/16" (2)	5/16" (2)	3/8" (2)
mm	*M4 (2)*	*M6 (2)*	*M8 (2)*	*M8 (2)*	*M8 (2)*	*M8 (2)*
Q	0.17	0.28	0.38	0.35	0.43	0.53
mm	*4.3*	*7.0*	*9.7*	*9.0*	*10.8*	*13.5*

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

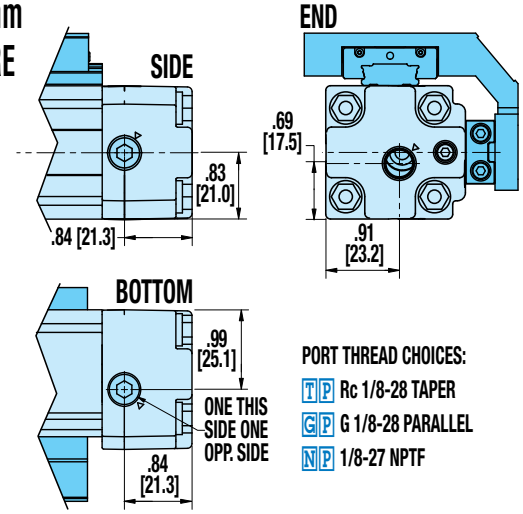
DUAL END PORTING

16mm BORE



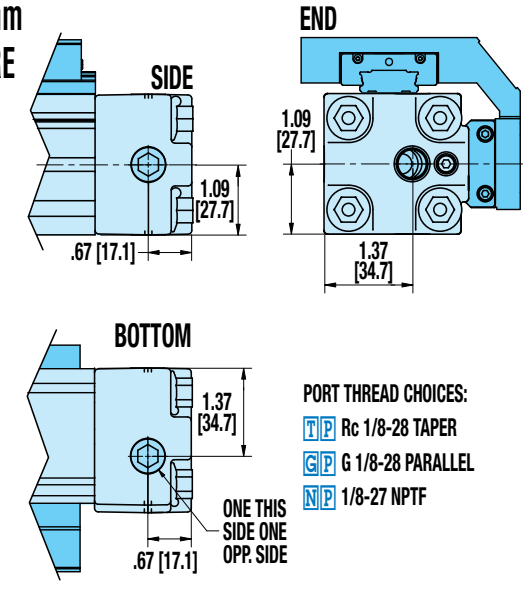
PORT THREAD CHOICES:
- GP G M5 x 0.7 PARALLEL
- NP NPT #10-32 UNF

25mm BORE



PORT THREAD CHOICES:
- TP Rc 1/8-28 TAPER
- GP G 1/8-28 PARALLEL
- NP 1/8-27 NPTF

32mm BORE

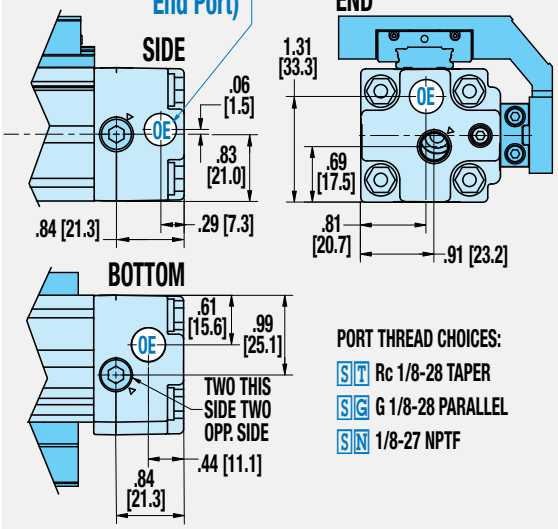


PORT THREAD CHOICES:
- TP Rc 1/8-28 TAPER
- GP G 1/8-28 PARALLEL
- NP 1/8-27 NPTF

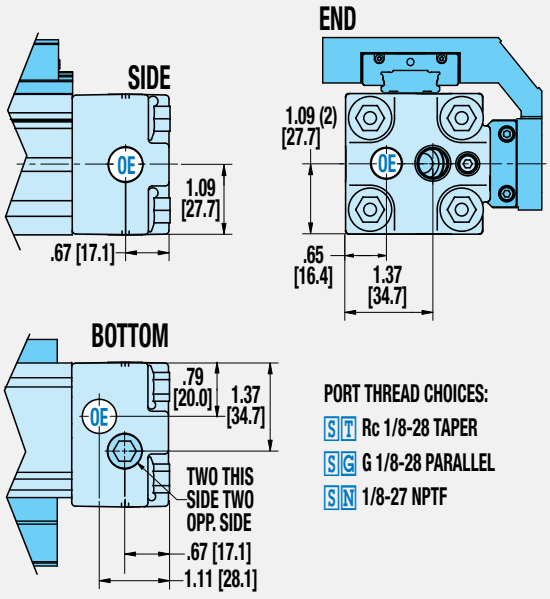
SINGLE-END PORTING

Not Available for 16mm BORE

(OE = Opposite End Port)



PORT THREAD CHOICES:
- ST Rc 1/8-28 TAPER
- SG G 1/8-28 PARALLEL
- SN 1/8-27 NPTF



PORT THREAD CHOICES:
- ST Rc 1/8-28 TAPER
- SG G 1/8-28 PARALLEL
- SN 1/8-27 NPTF

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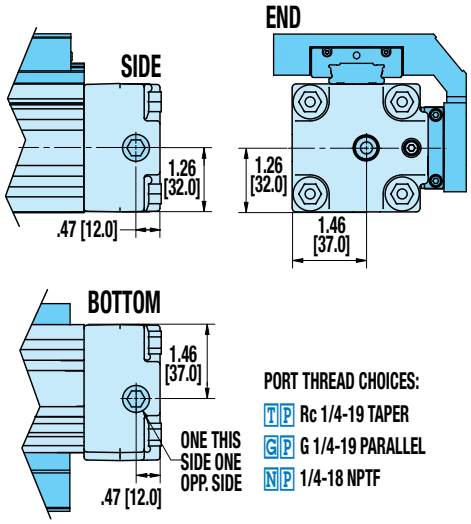
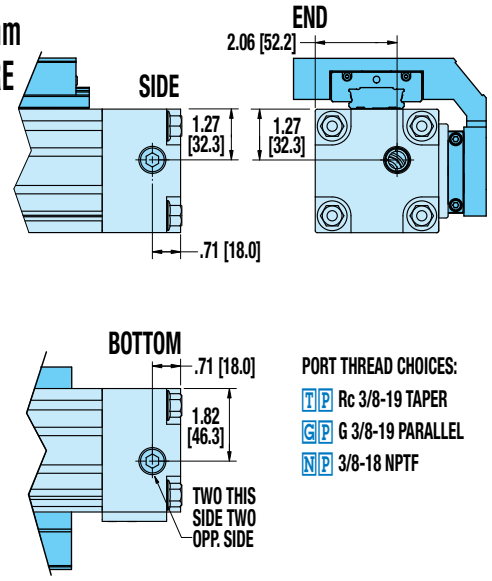
DUAL END PORTING

40mm BORE



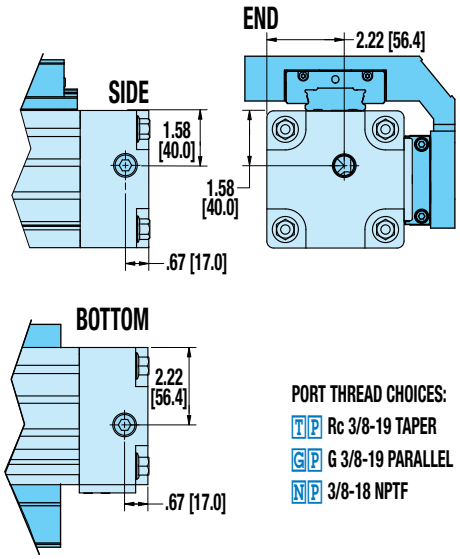
PORT THREAD CHOICES:
- TP Rc 1/4-19 TAPER
- GP G 1/4-19 PARALLEL
- NP 1/4-18 NPTF

50mm BORE



PORT THREAD CHOICES:
- TP Rc 3/8-19 TAPER
- GP G 3/8-19 PARALLEL
- NP 3/8-18 NPTF

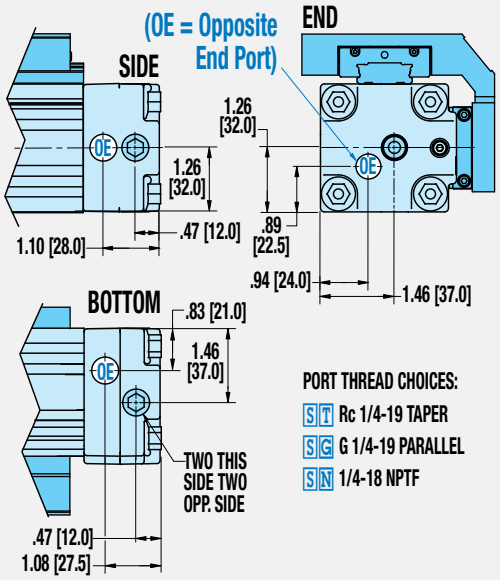
63mm BORE



PORT THREAD CHOICES:
- TP Rc 3/8-19 TAPER
- GP G 3/8-19 PARALLEL
- NP 3/8-18 NPTF

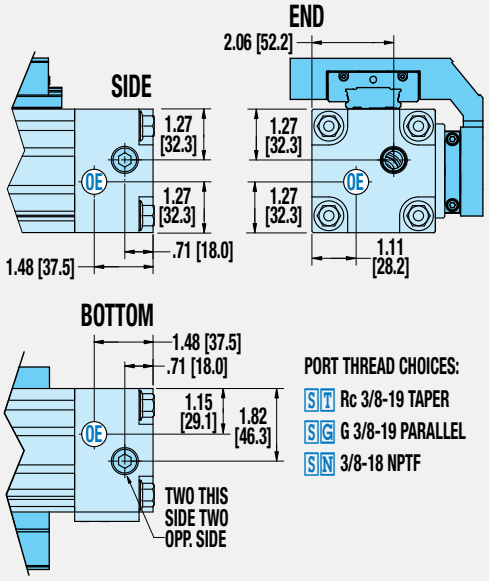
SINGLE-END PORTING

40mm BORE



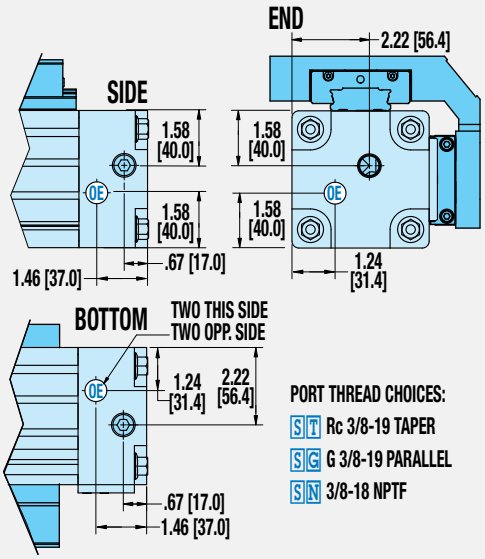
PORT THREAD CHOICES:
- ST Rc 1/4-19 TAPER
- SG G 1/4-19 PARALLEL
- SN 1/4-18 NPTF

50mm BORE



PORT THREAD CHOICES:
- ST Rc 3/8-19 TAPER
- SG G 3/8-19 PARALLEL
- SN 3/8-18 NPTF

63mm BORE

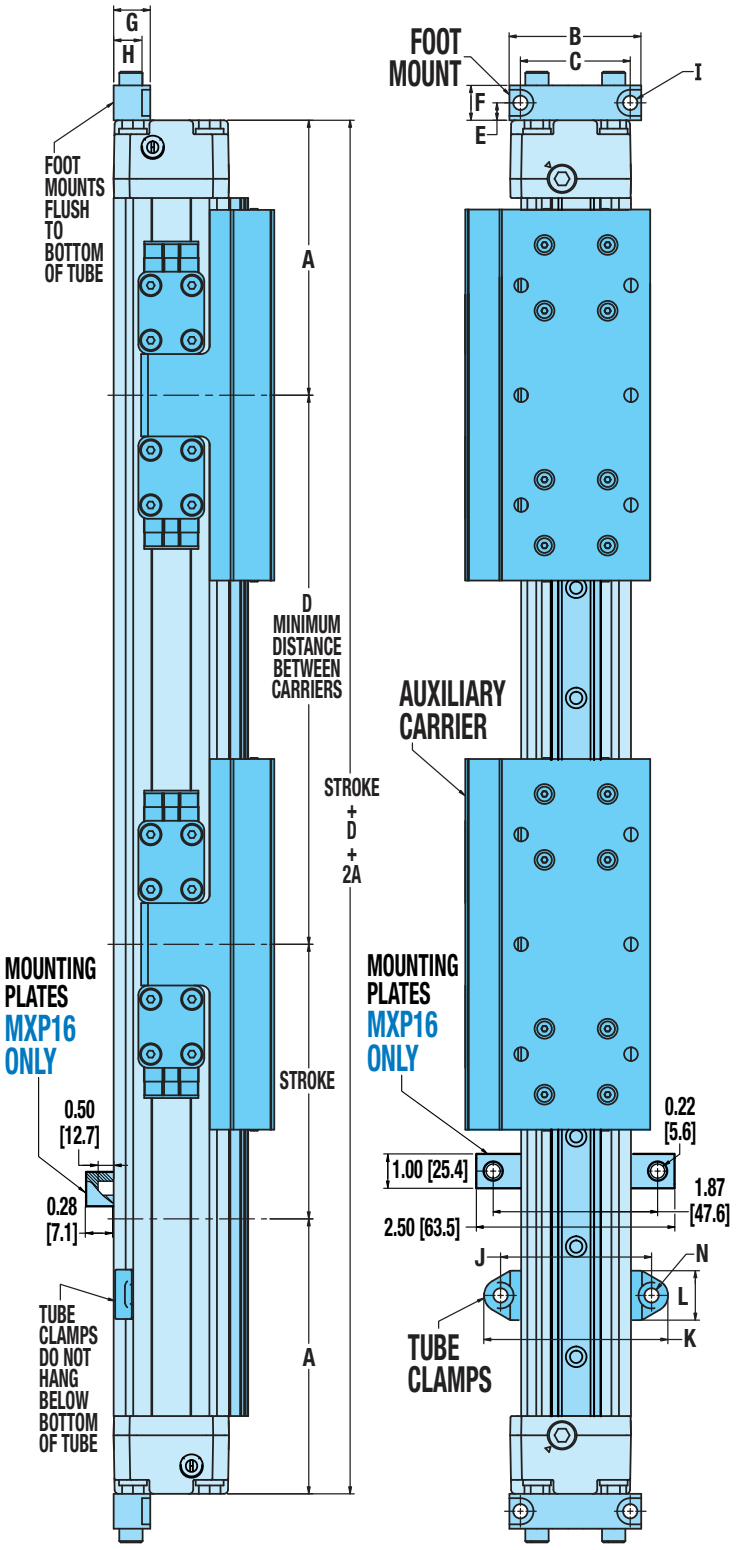


PORT THREAD CHOICES:
- ST Rc 3/8-19 TAPER
- SG G 3/8-19 PARALLEL
- SN 3/8-18 NPTF

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

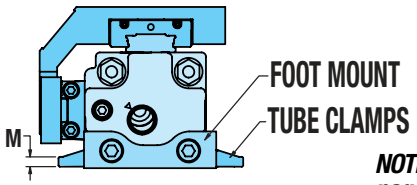
P-PROFILED RAIL OPTION DIMENSIONS

AUXILIARY CARRIER, FOOT MOUNT, TUBE CLAMPS



	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
A	3.13	3.94	4.90	5.82	6.29	8.45
mm	*79.6*	*100.2*	*124.5*	*147.7*	*159.8*	*214.5*
AUXILIARY CARRIER						
D	5.00	6.00	7.00	8.50	8.60	13.00
mm	*127.0*	*152.4*	*177.8*	*215.9*	*218.4*	*330.0*
FOOT MOUNT						
B	1.57	1.89	2.36	2.91	3.67	4.72
mm	*40.0*	*48.0*	*60.0*	*74.0*	*93.2*	*120.0*
C	1.26	1.57	2.01	2.52	3.11	3.94
mm	*32.0*	*40.0*	*51.0*	*64.0*	*78.9*	*100.0*
E	0.16	0.25	0.37	0.47	0.50	0.59
mm	*4.0*	*6.4*	*9.5*	*12.0*	*12.7*	*15.0*
F	0.31	0.50	0.75	0.94	1.00	1.18
mm	*8.0*	*12.7*	*19.0*	*24.0*	*25.4*	*30.0*
G	0.35	0.52	0.91	0.73	1.00	1.06
mm	*8.9*	*13.3*	*23.0*	*18.5*	*25.4*	*27.0*
H	-	0.41	0.71	0.45	0.69	0.65
mm	*-*	*10.3*	*18.0*	*11.4*	*17.4*	*16.5*
I	0.18	0.20	0.22	0.28	0.35	0.42
mm	*4.6*	*5.2*	*5.5*	*7.1*	*9.0*	*10.7*
TUBE CLAMPS						
J	-	2.17	2.86	3.26	3.84	5.19
mm	*-*	*55.0*	*72.7*	*82.7*	*97.5*	*131.7*
K	-	2.64	3.39	3.81	4.39	5.93
mm	*-*	*67.0*	*86.0*	*96.7*	*111.5*	*150.7*
L	-	0.71	0.63	0.55	0.55	0.75
mm	*-*	*18.0*	*16.0*	*14.0*	*14.0*	*19.0*
M	-	0.14	0.17	0.15	0.15	0.24
mm	*-*	*3.6*	*4.3*	*3.8*	*3.8*	*6.1*
N	-	0.20	0.28	0.28	0.28	0.42
mm	*-*	*5.2*	*7.1*	*7.1*	*7.1*	*10.7*

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

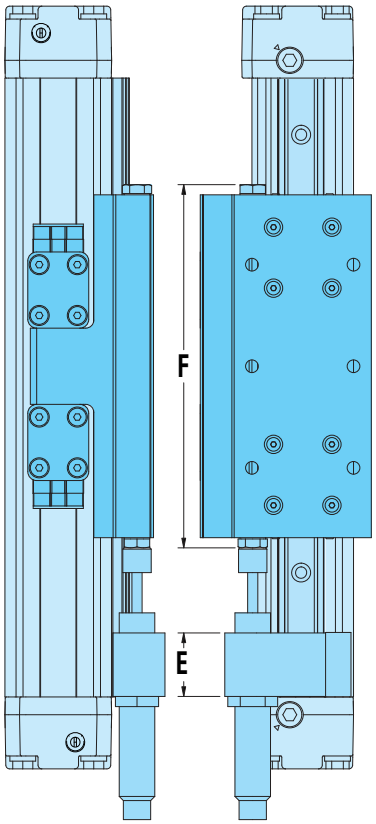


NOTE: Auxiliary carrier is P-Prodiled Rail carrier, see page MXP_35 for carrier size and mounting dimensions

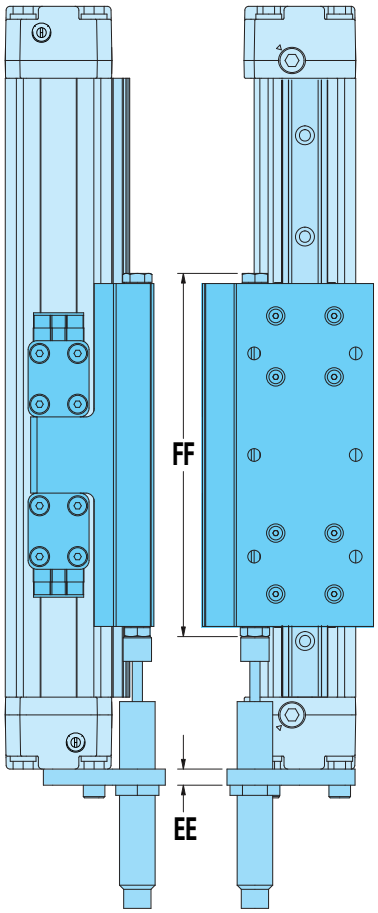
Tolomatic EXCELLENCE IN MOTION

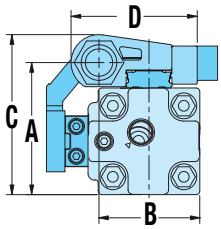
ADJUSTABLE AND FIXED SHOCK ABSORBERS

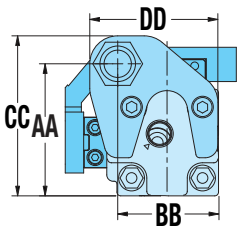
ADJUSTABLE



FIXED







ADJUSTABLE SHOCK ABSORBER

	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
A	1.51	2.05	2.87	3.28	4.20	5.04
mm	*38.3*	*52.0*	*72.9*	*83.2*	*106.7*	*128.0*
B	1.38	1.56	2.25	2.63	3.55	3.97
mm	*35.0*	*39.7*	*57.2*	*66.8*	*90.2*	*100.8*
C	1.75	2.48	3.46	3.90	4.80	5.73
mm	*44.5*	*63.0*	*87.9*	*99.0*	*121.8*	*145.5*
D	1.54	1.96	2.63	3.17	3.55	4.07
mm	*39.2*	*49.7*	*66.7*	*80.6*	*90.2*	*103.3*
E	0.79	0.98	1.00	0.98	1.26	1.26
mm	*20.0*	*25.0*	*25.4*	*25.0*	*32.0*	*32.0*
F	4.65[1]	5.63[2]	7.43[3]	8.61[4]	8.95[5]	12.45[6]
mm	*118.0[1]*	*143.0[2]*	*188.8[3]*	*218.8[4]*	*227.4[5]*	*316.2[6]*

Stroke Adder: Adjustable Shock Absorber

in	0.96	2.10	2.73	2.40	3.15	2.74
mm	*24.4*	*53.3*	*69.3*	*61.0*	*80.0*	*69.6*

⚠ NOTE: For each adjustable shock absorber ordered, add Stroke Adder value to required stroke to determine configurated actuator stroke.

Required Stroke + (Adj. Shock Quantity x Stroke Adder value) = Configurated Actuator Stroke

Example: MXP25P, 500mm stroke required, 2 adjustable shocks

500 + (2 x 53.3) = 500 + 106.6 = 606.6mm

FIXED SHOCK ABSORBER

	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
AA	1.51	2.05	2.89	3.32	4.38	5.22
mm	*38.3*	*52.0*	*73.4*	*84.4*	*111.2*	*132.5*
BB	1.38	1.56	–	–	–	–
mm	*35.0*	*39.7*	–	–	–	–
CC	1.80	2.48	3.41	3.87	5.09	5.93
mm	*45.8*	*63.0*	*86.5*	*98.4*	*129.2*	*150.5*
DD	1.66	1.98	2.00	2.44	2.83	3.66
mm	*42.2*	*50.4*	*50.8*	*62.0*	*72.0*	*93.0*
EE	0.13	0.25	0.25	0.25	0.50	0.50
mm	*3.3*	*6.4*	*6.4*	*6.4*	*12.7*	*12.7*
FF	4.65[1]	5.63[2]	7.43[3]	8.61[4]	8.95[5]	12.45[6]
mm	*118.0[1]*	*143.0[2]*	*188.8[3]*	*218.8[4]*	*227.4[5]*	*316.2[6]*

[1]*Carrier is standard MXP16P, 4.33" (110.0mm) long, Impact bolts on each end of carrier add .31" (8.0mm) to total length*

[2]*Carrier is standard MXP25P, 5.31" (135.0mm) long, Impact bolts on each end of carrier add .31" (8.0mm) to total length*

[3]*Carrier is standard MXP32P, 6.69" (170.0mm) long, Impact bolts on each end of carrier add .74" (18.8mm) to total length*

[4]*Carrier is standard MXP40P, 7.87" (200.0mm) long, Impact bolts on each end of carrier add .74" (18.8mm) to total length*

[5]*Carrier is standard MXP50P, 8.50" (216.0mm) long, Impact bolts on each end of carrier add .45" (11.4mm) to total length*

[6]*Carrier is standard MXP63P, 12.00" (304.8mm) long, Impact bolts on each end of carrier add .45" (11.4mm) to total length*

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NOTE: Auxiliary carrier is P-Prodiled Rail carrier, see page MXP_35 for carrier size and mounting dimensions

SWITCHES

SPECIFICATIONS

RoHS COMPLIANT CE

MX products offer a large number of sensing choices. There are 12 switch choices: reed, solid state PNP (sourcing) or solid state NPN (sinking); in normally open or normally closed; with flying leads or quick-disconnnects.

Commonly used for end-of-stroke positioning, these switches allow drop-in installation anywhere along the entire actuator length. The one-piece design includes the retained fastening hardware and is designed for any open side or bottom slot on the MX. The internal piston magnet is a standard feature, therefore these switches can be installed in the field at anytime.

Switches are used to send digital signals to PLC (programmable logic controller), TTL, CMOS circuit or other controller device. Switches contain reverse polarity protection. Solid state QD cables are shielded; shield should be terminated at flying lead end.

All switches are CE rated and are RoHS compliant. Switches feature bright red or yellow LED signal indicators; solid state switches also have green LED power indicators.

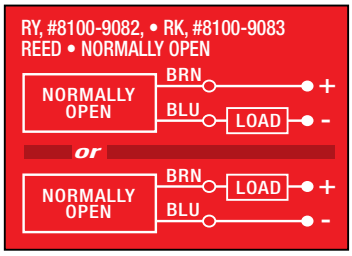
	Order Code	Part Number	Lead	Switching Logic	Power LED	Signal LED	Operating Voltage	*Power Rating (Watts)	Switching Current (mA max.)	Current Con-sumption	Voltage Drop	Leakage Current	Temp. Range	Shock / Vibration
REED	RY	8100-9082	5m	SPST Normally Open	—	Red	5 - 240 AC/DC	*10.0	100mA	—	3.0 V max.	—	14 to 158°F [-10 to 70°C]	50 G / 9 G
	RK	8100-9083	Quick Disconnect		Tolomatic 81009082									
	NY	8100-9084	5m	SPST Normally Closed	—	Yellow	5 - 110 AC/DC							
	NK	8100-9085	Quick Disconnect		Tolomatic 81009084									
SOLID STATE	TY	8100-9088	5m	PNP (Sourcing) Normally Open	Green	Yellow	10 - 30 Vdc	*3.0	100mA	20 mA @ 24V	2.0 V max.	0.05 mA max.		
	TK	8100-9089	Quick Disconnect		Tolomatic 81009088									
	KY	8100-9090	5m	NPN (Sinking) Normally Open	Green	Red								
	KK	8100-9091	Quick Disconnect		Tolomatic 81009090									
	PY	8100-9092	5m	PNP (Sourcing) Normally Closed	Green	Yellow								
	PK	8100-9093	Quick Disconnect		Tolomatic 81009092									
	HY	8100-9094	5m	NPN (Sinking) Normally Closed	Green	Red								
	HK	8100-9095	Quick Disconnect		Tolomatic 81009094									

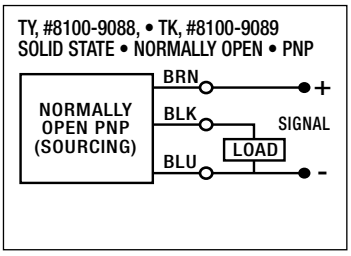
Enclosure classification IEC 529 IP67 (NEMA 6)

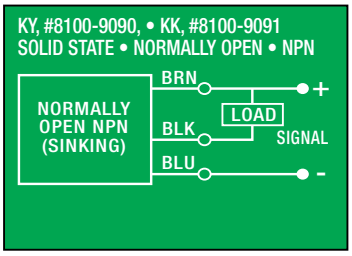
CABLES: Robotic grade, oil resistant polyurethane jacket, PVC insulation

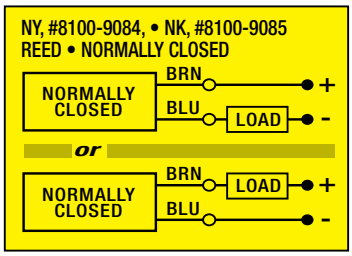
⚠ *WARNING: Do not exceed power rating (Watt = Voltage x Amperage). Permanent damage to sensor will occur.

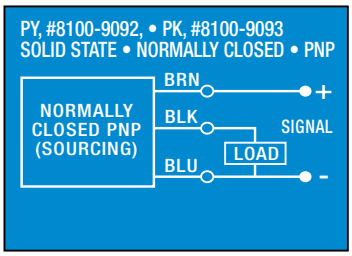
WIRING DIAGRAMS

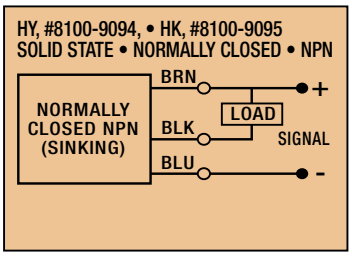


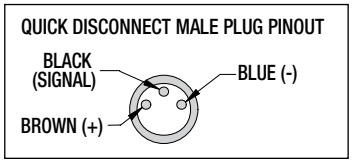


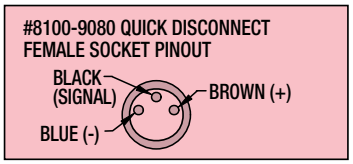






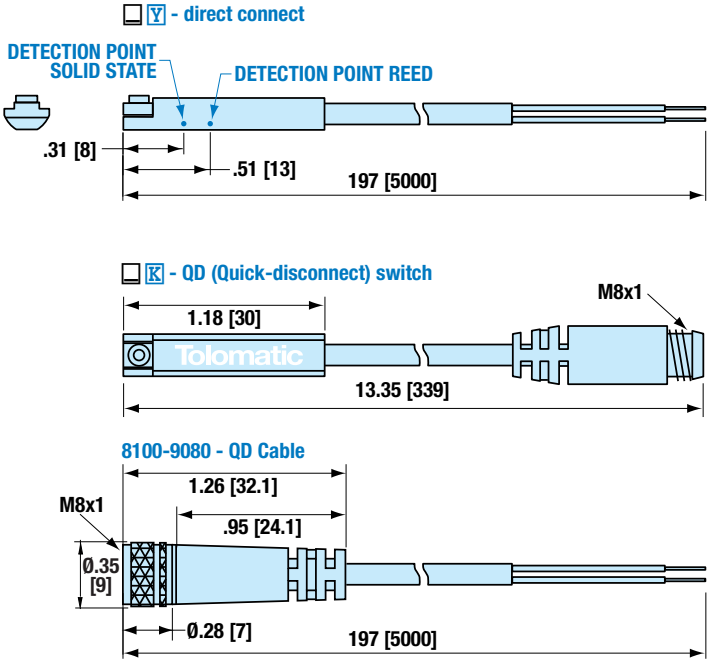






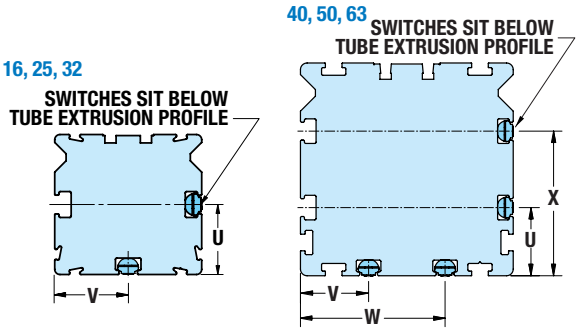
DIMENSIONS

SWITCH DIMENSIONS



Dimensions in inches [brackets indicate dimensions in millimeters]

MOUNTING DIMENSIONS

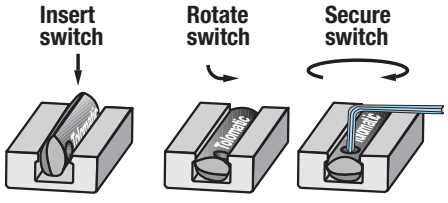


SWITCH MOUNTING

	16	25	32	40	50	63
U	0.31	0.79	1.06	0.81	1.08	1.50
mm	*7.9*	*20.0*	*27.0*	*20.5*	*27.4*	*38.0*
V	0.59	0.83	1.09	0.81	1.08	1.50
mm	*15.0*	*21.0*	*27.7*	*20.5*	*27.4*	*38.0*
W	–	–	–	1.71	2.02	2.44
mm	–	–	–	*43.5*	*51.4*	*62.0*
X	–	–	–	1.71	2.02	2.44
mm	–	–	–	*43.5*	*51.4*	*62.0*

SWITCH INSTALLATION AND REPLACEMENT

Place switch in side groove on tube at desired location with "Tolomatic" facing outward. While applying light pressure to the switch, rotate the switch halfway into the groove. Maintaining light pressure, rotate the switch in the opposite direction until the it is fully inside the groove with "Tolomatic" visible. Re-position the switch to the exact location and lock the switch securely into place by tightening the screw on the switch.



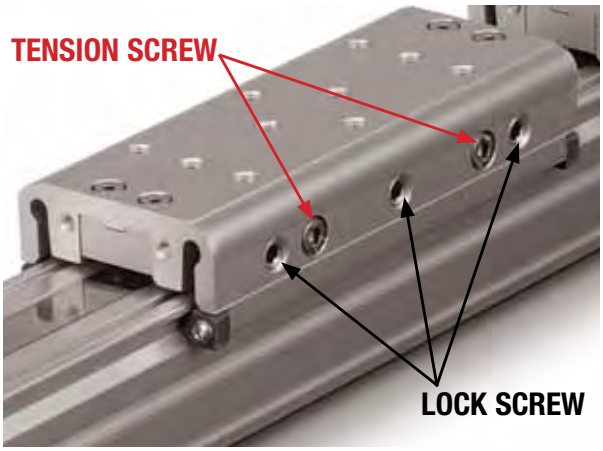
ADJUSTMENT PROCEDURES

CUSHION NEEDLE ADJUSTMENT

Adjust the cushion needle in the cylinder heads carefully to obtain proper deceleration for your particular application. Proper cushion needle adjustment is achieved when the carrier reaches the end of travel at a velocity approaching zero. If the carrier reaches the end of stroke at velocity, then the cushion needs to be increased by turning the cushion needle screw clockwise. If the carrier stalls or bounces (quickly oscillating directions) before it reaches the end of stroke, then the cushion needs to be decreased by turning the cushion needle screw counterclockwise. Improper cushion adjustment may cause premature failure of the actuator. Call Tolomatic with any questions.

[S] SOLID BEARING CARRIER ADJUSTMENT

The [S] solid bearing carrier will provide for maximum life when properly adjusted. The carrier design contains both tension and lock screws. The tension screws control the amount of pressure placed on the carrier bearings. The lock screws lock the tension screws in place and provide fine adjustment of the carrier bearings. The number of tension and lock screws will vary depending on the bore size of the actuator.



1. Fully loosen all tension and lock screws. They do not need to be removed, just fully loosened.
2. Tighten tension screws on both sides of carrier roughly 1/8 to 1/4 turn clockwise past where the screw starts to feel snug. The carrier should be very difficult or impossible to move by hand.
3. Next, adjust the lock screws on both sides of the carrier roughly 1/8 to 1/4 turn clockwise past where the screw starts to engage.
4. Ideal carrier tension is achieved when the carrier feels snug in relation to the tube. No rocking motion should be present. The carrier should be loose enough to be moved by hand over the entire length of the actuator. If after this process the carrier has become too loose, equally adjust all of the lock screws with a slight 1/32 turn counterclockwise. A carrier that is adjusted too tight will increase the breakaway pressure required for motion; in extreme cases no motion will occur when air is applied.

During the service life, this process may need to be repeated. Keeping the carrier properly adjusted will prolong the life of the [S] solid bearing system.

Allen wrench sizes for carrier adjustment, Solid bearing actuators

	Tension Screw		Lock Screw	
	in	*mm*	in	*mm*
16	1/16	*2*	1/16	*2*
25	5/32	*4*	1/8	*3*
32	5/32	*4*	3/32	*2*
40	5/32	*4*	1/8	*3*
50	3/16	*4*	3/32	*2.5*
63	1/4	*5*	3/16	*5*

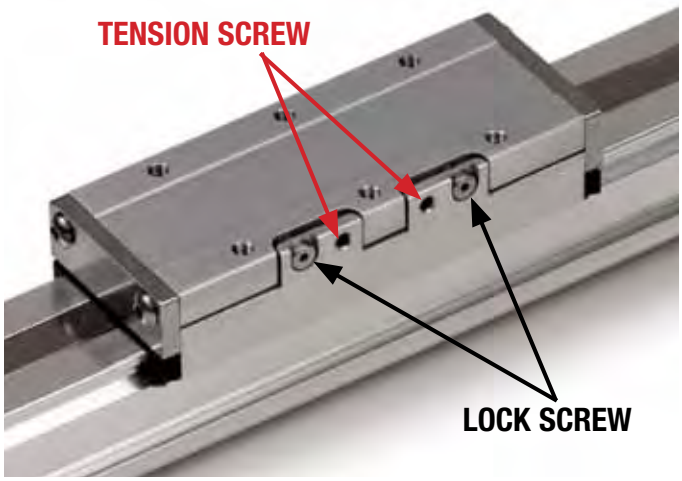
MXP16

NOTE: MXP16S requires a different carrier adjustment procedure, see below.

Tools Required:

Inch Models: 1/16 inch and 2.5mm Hex Wrench (Key)
Metric Models: 2 and 2.5 mm Hex Wrench (Key)

1. Loosen endplate screws on both ends of the carrier.
2. Fully loosen all tension and lock screws. They do not need to be removed, just fully loosened.



3. Tighten tension screws by turning them clockwise until the carrier is just tight enough so that no side-to-side rocking motion is present and it can easily be moved by hand over the entire stroke length with no hesitation. Very little torque on the screws is required to obtain this condition.

Note: The Tension Screws are the small set screw style fastener. The Lock Screws are the larger, low head, hex drive screws.

4. Tighten lock screws by turning them clockwise until tight. The carrier should feel snug in relation to the tube, with no side-to-side rocking motion present. If the carrier becomes too loose, loosen the lock screws, tighten the tension screws and then retighten the lock screws.
5. Once ideal carrier tension is achieved, fully tighten end plate screws on both ends of the carrier.

SERVICE PARTS

REPAIR KITS

Repair kit includes: dust band, seal band, end caps, internal soft seals (piston seals, cushion seals, wipers), [Also for S style: bearings and bearing caps]

The part number for a repair kit begins with RK followed by model, bore size, bearing type, and stroke length (SK = inch/US Standard, SM = metric) (NOTE: If unit has an auxiliary carrier also include DW and distance between carrier centers)

REPAIR KIT	MODEL	BORE SIZE	BEARING TYPE	STROKE METRIC	STROKE LENGTH	AUXILIARY CARRIER	DISTANCE BETWEEN CARRIERS
RK	MXP	40	S	SM	2007.02	DW	215.9

SWITCHES

TO ORDER SERVICE PARTS SWITCHES:

Switches for MXP include retained mounting hardware and are the same for all bore sizes and bearing styles

Code		Part Number	Lead	Normally	Sensor Type
RY		8100-9082	5m (197 in)	Open	Reed
RK		8100-9083*	Quick-disconnect		
NY		8100-9084	5m (197 in)	Closed	Reed
NK		8100-9085*	Quick-disconnect		
TY		8100-9088	5m (197 in)	Open	Solid State PNP
TK		8100-9089*	Quick-disconnect		
KY		8100-9090	5m (197 in)	Open	Solid State NPN
KK		8100-9091*	Quick-disconnect		
PY		8100-9092	5m (197 in)	Closed	Solid State PNP
PK		8100-9093*	Quick-disconnect		
HY		8100-9094	5m (197 in)	Closed	Solid State NPN
HK		8100-9095*	Quick-disconnect		

*Also order mating QD cable #8100-9080

	8100-9080	Mating QD (Quick-disconnect) cable 197 in. (5m)

To order switches using configurated parts string (will include mating female QD cable if required)

SWITCH KIT	MODEL	BORE SIZE	BEARING TYPE	SWITCH CODE	QUANTITY
SW	MXP	25	N	RK	2

SERVICE PARTS MXP16, MXP25, MXP32

MOUNTING OPTIONS		16			25			32		
		N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail
Foot Mount (1 bracket, 2 bolts)	Inch	8116-9519	8116-9519	8116-9519	8125-9519	8125-9519	8125-9519	8132-9519	8132-9519	8132-9519
	Metric	*8116-9019*	*8116-9019*	*8116-9019*	*8125-9019*	*8125-9019*	*8125-9019*	*8132-9019*	*8132-9019*	*8132-9019*
Tube Clamp (2 clamps)		NA	NA	NA	8125-9018	8125-9018	8125-9018	8132-9018	8132-9018	8132-9018
Floating Mount (brackets, pin, mounting fasteners)	Inch	8116-9535	8116-9536	NA	8125-9535	8125-9536	NA	8132-9535	8132-9536	NA
	Metric	*8116-9035*	*8116-9036*	*NA*	*8125-9035*	*8125-9036*	*NA*	*8132-9035*	*8132-9036*	*NA*
Mounting Plate (1 plate, 2 bolts)	Inch	8316-9016	8316-9016	8316-9016						
	Metric	*8316-9016*	*8316-9016*	*8316-9016*						

SHOCK ABSORBER KITS		16			25			32		
		N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail
Fixed Shock Absorber Kit - Light Duty (1 shock absorber, all required hardware)	Inch	8116-9510	8116-9511	8116-9512	8125-9510	8125-9511	8125-9512	8132-9510	8132-9511	8132-9512
	Metric	*8116-9010*	*8116-9011*	*8116-9012*	*8125-9010*	*8125-9011*	*8125-9012*	*8132-9010*	*8132-9011*	*8132-9012*
Fixed Shock Absorber Kit - Heavy Duty (1 shock absorber, all required hardware)	Inch	8116-9525	8116-9526	8116-9527	8125-9525	8125-9526	8125-9527	8132-9525	8132-9526	8132-9527
	Metric	*8116-9025*	*8116-9026*	*8116-9027*	*8125-9025*	*8125-9026*	*8125-9027*	*8132-9025*	*8132-9026*	*8132-9027*
***Adjustable Shock Absorber Kit - Light Duty** (1 shock absorber, all required hardware)	Inch	8116-9515	8116-9016	8116-9517	8125-9515	8125-9016	8125-9517	8132-9515	8132-9016	8132-9517
	Metric	*8116-9015*	*8116-9016*	*8125-9017*	*8125-9015*	*8125-9016*	*8125-9017*	*8132-9015*	*8132-9016*	*8132-9017*
***Adjustable Shock Absorber Kit - Heavy Duty** (1 shock absorber, all required hardware)	Inch	8116-9530	8116-9031	8116-9032	8125-9530	8125-9031	8125-9532	8132-9530	8132-9031	8132-9532
	Metric	*8116-9030*	*8116-9031*	*8116-9032*	*8125-9030*	*8125-9031*	*8125-9032*	*8132-9030*	*8132-9031*	*8132-9032*

SHOCK PARTS		16			25			32		
		N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail
Fixed Shock Absorber Mounting Hardware (1 shock mount)	Inch	8116-9520	8116-9520	8116-9522	8125-9520	8125-9520	8125-9522	8132-9520	8132-9520	8132-9522
	Metric	*8116-9020*	*8116-9020*	*8116-9022*	*8125-9020*	*8125-9020*	*8125-9022*	*8132-9020*	*8132-9020*	*8132-9022*
***Adj. Shock Absorber Mounting Hardware** (1 shock mount)		8116-9023	8116-9023	8116-9024	8125-9023	8125-9023	8125-9024	8132-9023	8132-9023	8132-9024
Shock Stop Kit (Hardware needed for shock to strike carrier)	Inch	8116-9521	NA	8116-9034	8125-9521	8125-9013	8125-9534	8132-9521	4912-1063	8132-9534
	Metric	*8116-9021*	*NA*	*8116-9034*	*8125-9021*	*8125-9013*	*8125-9034*	*8132-9021*	*4912-1063*	*8132-9034*
Shock Absorber - Heavy Duty (1 shock absorber)		7906-1066	7906-1066	7906-1066	4910-1338	4910-1338	4910-1338	4912-1068	4912-1068	4912-1068
Shock Absorber - Light Duty (1 shock absorber)		7906-1065	7906-1065	7906-1065	4910-1337	4910-1337	4910-1337	4912-1067	4912-1067	4912-1067

*NOTE: N Internal bearing: Adjustable shock absorbers will decrease actuator stroke, see ⚠ Stroke Adder note on page MXP_29 for more information.
S Solid bearing: Adjustable shock absorbers will decrease actuator stroke, see ⚠ Stroke Adder note on page MXP_34 for more information.
P Profiled rail: Adjustable shock absorbers will decrease actuator stroke, see ⚠ Stroke Adder note on page MXP_39 for more information.

SERVICE PARTS MXP40, MXP50, MXP63

MOUNTING OPTIONS		40			50			63		
		N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail
Foot Mount (1 bracket, 2 bolts)	Inch	8140-9519	8140-9519	8140-9519	8150-9519	8150-9519	8150-9519	8163-9519	8163-9519	8163-9519
	Metric	*8140-9019*	*8140-9019*	*8140-9019*	*8150-9019*	*8150-9019*	*8150-9019*	*8163-9019*	*8163-9019*	*8163-9019*
Tube Clamp (2 clamps)		8140-9018	8140-9018	8140-9018	8140-9018	8140-9018	8140-9018	8163-9018	8163-9018	8163-9018
Floating Mount (brackets, pin, mounting fasteners)	Inch	8140-9535	8140-9536	NA	8150-9535	8150-9536	NA	8163-9535	8163-9536	NA
	Metric	*8140-9035*	*8140-9036*	*NA*	*8150-9035*	*8150-9036*	*NA*	*8163-9035*	*8163-9036*	*NA*

SHOCK ABSORBER KITS		40			50			63		
		N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail
Fixed Shock Absorber Kit - Light Duty (1 shock absorber, all required hardware)	Inch	8140-9510	8140-9511	8140-9512	8150-9510	8150-9511	8150-9512	8163-9510	8163-9511	8163-9512
	Metric	*8140-9010*	*8140-9011*	*8140-9012*	*8150-9010*	*8150-9011*	*8150-9012*	*8163-9010*	*8163-9011*	*8163-9012*
Fixed Shock Absorber Kit - Heavy Duty (1 shock absorber, all required hardware)	Inch	8140-9525	8140-9526	8140-9527	8150-9525	8150-9526	8150-9527	8163-9525	8163-9526	8163-9527
	Metric	*8140-9025*	*8140-9026*	*8140-9027*	*8150-9025*	*8150-9026*	*8150-9027*	*8163-9025*	*8163-9026*	*8163-9027*
***Adjustable Shock Absorber Kit - Light Duty** (1 shock absorber, all required hardware)	Inch	8140-9515	8140-9016	8140-9517	8150-9515	8150-9016	8150-9517	8163-9515	8163-9016	8163-9517
	Metric	*8140-9015*	*8140-9016*	*8140-9017*	*8150-9015*	*8150-9016*	*8150-9017*	*8163-9015*	*8163-9016*	*8163-9017*
***Adjustable Shock Absorber Kit - Heavy Duty** (1 shock absorber, all required hardware)	Inch	8140-9530	8140-9031	8140-9532	8150-9530	8150-9031	8150-9532	8163-9530	8163-9031	8163-9532
	Metric	*8140-9030*	*8140-9031*	*8140-9032*	*8150-9030*	*8150-9031*	*8150-9032*	*8163-9030*	*8163-9031*	*8163-9032*

SHOCK PARTS		40			50			63		
		N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail
Fixed Shock Absorber Mounting Hardware (1 shock mount)	Inch	8140-9520	8140-9520	8140-9520	8150-9520	8150-9520	8150-9522	8163-9520	8163-9520	8163-9520
	Metric	*8140-9020*	*8140-9020*	*8140-9020*	*8150-9020*	*8150-9020*	*8150-9022*	*8163-9020*	*8163-9020*	*8163-9020*
***Adj. Shock Absorber Mounting Hardware** (1 shock mount)		8140-9023	8140-9023	8140-9024	8150-9023	8150-9023	8163-9024	8163-9023	8163-9023	8163-9024
Shock Stop Kit (Hardware needed for shock to strike carrier)	Inch	8140-9521	4912-1063	8140-9534	8150-9521	4415-1003	8150-9034	8163-9521	4915-1003	8150-9034
	Metric	*8140-9021*	*4912-1063*	*8140-9034*	*8150-9021*	*4415-1003*	*8150-9034*	*8163-9021*	*4915-1003*	*8150-9034*
Shock Absorber - Heavy Duty (1 shock absorber)		4912-1068	4912-1068	4912-1068	4920-1069	4920-1069	4920-1069	4920-1069	4920-1069	4920-1069
Shock Absorber - Light Duty (1 shock absorber)		4912-1067	4912-1067	4912-1067	4920-1068	4920-1068	4920-1068	4920-1068	4920-1068	4920 -1068

*NOTE: N Internal bearing: Adjustable shock absorbers will decrease actuator stroke, see ⚠ Stroke Adder note on page MXP_29 for more information.
S Solid bearing: Adjustable shock absorbers will decrease actuator stroke, see ⚠ Stroke Adder note on page MXP_34 for more information.
P Profiled rail: Adjustable shock absorbers will decrease actuator stroke, see ⚠ Stroke Adder note on page MXP_39 for more information.

ORDERING

MODEL SELECTION (MUST BE IN THIS ORDER)

MXP 40 P SN SM2007·02

OPTIONS (IN ANY ORDER)

DW215·9 FM2 TC8 TK2 AH2 ___

MODEL

MXP MXP Pneumatic Band Cylinder

BORE

16 16 mm (5/8-inch) bore
25 25 mm (1-inch) bore
32 32 mm (1 1/4-inch) bore
40 38 mm (1 1/2-inch) bore
50 50 mm (2-inch) bore
63 64 mm (2 1/2-inch) bore

BEARING

N Internal Bearing
S Solid Bearing
P Profiled Rail

PORTING

TP Metric Taper (Rc/BST), Dual-end
GP Metric Parallel (ISO-G/BSP), Dual-end
NP NPT, Dual-end
ST Single-end, Metric Taper
SG Single-end, Metric Parallel
SN Single-end, NPT

⚠ Single End Porting ST SG SN is not available for MXP16

⚠ Metric Taper Porting TP is not available for MXP16

STROKE LENGTH & MOUNTING TYPE

SK_ _ _._ _ _ Stroke, enter desired stroke length in **inches**

SM_ _ _ _ _._ _ _ Stroke, enter desired stroke length in **millimeters**

NOTE: Actuator mounting threads and mounting fasteners will be either inch or metric; depending on how stroke length is indicated

SK=inch mounting

SM= metric mounting

AUXILIARY CARRIER

DW_ _ _._ _ _ Auxiliary Carrier, enter center-to-center spacing desired in **inches** (SK) or **millimeters** (SM)

(Same unit of measure as stroke length is required)

⚠ **Center-to-center spacing between carriers adds to overall length of the actuator,** this distance will not be subtracted from stroke length specified in the previous step

MOUNTING

FM_ Foot Mount, enter quantity desired
TC_ Tube Clamps, enter number of pairs (Not available on MXP16)
MP_ Mounting Plate (includes T-Nuts) for MXP16 ONLY
FL Floating Mount

⚠ NOTE: Floating Mount is not available with "P" Profiled Rail

⚠ NOTE: Shock Absorbers are not available with Floating Mount

SWITCHES

RY_ Reed Switch (Normally Open) with 5-meter lead, & enter quantity desired
RK_ Reed Switch (Normally Open) with 5-meter lead/QD, & quantity
NY_ Reed Switch (Normally Closed) with 5-meter lead, & quantity
NK_ Reed Switch (Normally Closed) with 5-meter lead/QD, & quantity

TY_ Solid State Switch PNP (Normally Open) w/ 5-meter lead, & quantity
TK_ Solid State Switch PNP (Normally Open) w/ 5-meter lead/QD, & quantity
KY_ Solid State Switch NPN (Normally Open) w/ 5-meter lead, & quantity
KK_ Solid State Switch NPN (Normally Open) w/ 5-meter lead/QD, & quantity

PY_ Solid State Switch PNP (Normally Closed) w/ 5-meter lead, & quantity
PK_ Solid State Switch PNP (Normally Closed) w/ 5-meter lead/QD, & quantity
HY_ Solid State Switch NPN (Normally Closed) w/ 5-meter lead, & quantity
HK_ Solid State Switch NPN (Normally Closed) w/ 5-meter lead/QD, & quantity

SHOCK ABSORBER

SD_ Fixed Shock Hardware & enter quantity desired
SL_ Fixed Shock Light Duty & enter quantity desired
SH_ Fixed Shock Heavy Duty & enter quantity desired

AD_ Adjustable Shock Hardware & enter quantity desired
AL_ Adjustable Shock Light Duty & enter quantity desired
AH_ Adjustable Shock Heavy Duty & enter quantity desired

⚠ NOTE: Adjustable Shock Absorbers reduce usable stroke length of the actuator. Please see the following pages for required stroke adder.
N Internal Bearing.....pg. MXP_29
S Solid Bearing.....pg. MXP_34
P Profiled Rail .....pg. MXP_39

⚠ NOTE: Floating Mount is not available with Shock Absorbers

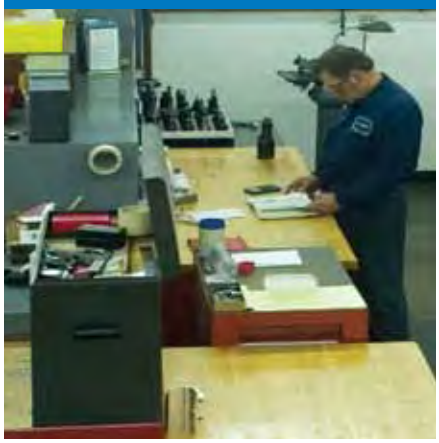
VISIT www.tolomatic.com/mxp FOR COMPLETE, UP-TO-DATE INFORMATION

⚠ ***Not all codes listed are compatible with all options.***

Call Tolomatic to determine available options and accessories based on your application requirements.

CUSTOM, MODIFIED AND STANDARD PRODUCT SOLUTIONS

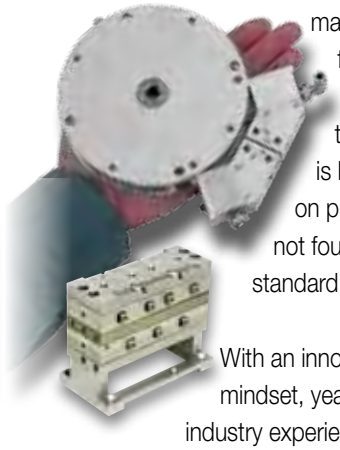
CUSTOM CAPABILITIES



Tolomatic's custom model shop can create first-piece prototypes with the industry's fastest turnaround times.

Custom Solutions are Standard Business

Hundreds of customers partner with Tolomatic to solve unique automation application challenges. We are geared to handle design requests–from our Model Shop (for fast prototypes) all the way through our ISO 9001:2000 certified manufacturing facility. Over 33% of our total business is based on products not found in our standard catalog.



With an innovation mindset, years of solid industry experience, and fast response times, let Tolomatic help you get the job done. If you are looking for linear motion solutions–pneumatic or electromechanical–and you cannot find a catalog product, get with Tolomatic. You will experience what we mean by **Excellence in Motion**.

MATERIAL HANDLING

Conveying machinery with built-in lane diverters offer a compact footprint with optimal performance.

Customer Challenge:

The traditional method of using tie rod cylinders to operate diverters required too much space to fit in space-restrictive production areas.

Tolomatic Solution:

Tolomatic recommended a series of pneumatic rodless band cylinders that could be easily retrofitted into production lines by offering a variety of mounting options. The manufacturer's customers were pleased with the space saving results and durability of the machines. The result was an increase of repeat customers for the manufacturer.

PACKAGING

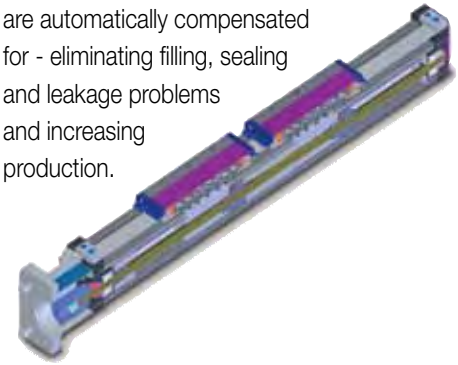
Modular bagging system fills and seals a wide range of materials and bag sizes.

Customer Challenge:

A leader in packaging technology was faced with the problem of compensating for inconsistent bag dimensions on its modular bag filling and sealing system. Irregularly sized bags required manual setup and were slowing the production process which required high-speed accuracy and flexibility.

Tolomatic Solution:

Tolomatic supplied a series of customized electric screw drive actuators that precisely positioned the incoming bags before insertion into the filling/sealing line. Two actuators adjust the vertical position and two others center the bags in the tray. The results: variations in bag lengths and widths are automatically compensated for - eliminating filling, sealing and leakage problems and increasing production.



The best motion control and linear motion solutions for your applications.

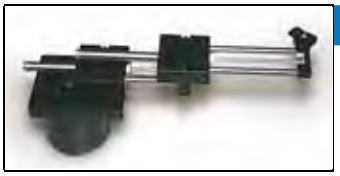
THE TOLOMATIC DIFFERENCE What you expect from the industry leader:

EXCELLENT CUSTOMER SERVICE & TECHNICAL SUPPORT

Our people make the difference! Expect prompt, courteous replies to all of your application and product questions.

INDUSTRY LEADING DELIVERIES

Tolomatic continues to offer the fastest delivery of standard catalog products. Modified and custom products ship weeks ahead of the competition.



INNOVATIVE PRODUCTS

From standard catalog products... to modified products... to completely unique custom products, Tolomatic designs and builds the best solutions for your challenging applications.

ONLINE SIZING & SELECTION SOFTWARE

Online sizing that is easy to use, accurate and always up-to-date. Input your application data and the software will determine a Tolomatic electric actuator to meet your requirements.

3D MODELS & 2D DRAWINGS AVAILABLE ON THE WEB

Easy to access CAD files are available in many popular formats.

ALSO CONSIDER THESE OTHER TOLOMATIC PRODUCTS:

PNEUMATIC PRODUCTS

RODLESS CYLINDERS: Band Cylinders, Cable Cylinders, MAGNETICALLY COUPLED CYLINDERS/SLIDES; GUIDED ROD CYLINDER SLIDES

"FOLDOUT" BROCHURE #9900-9075
PRODUCTS BROCHURE #9900-4028

ELECTRIC PRODUCTS

ROD & GUIDED ROD STYLE ACTUATORS, HIGH THRUST ACTUATORS, SCREW & BELT DRIVE RODLESS ACTUATORS, MOTORS, DRIVES AND CONTROLLERS

"FOLDOUT" BROCHURE #9900-9074
PRODUCTS BROCHURE #9900-4016

POWER TRANSMISSION PRODUCTS

GEARBOXES: Float-A-Shaft®, Slide-Rite®; DISC CONE CLUTCH; CALIPER DISC BRAKES

"FOLDOUT" BROCHURE #9900-9076
PRODUCTS BROCHURE #9900-4029

Tolomatic
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Visit www.tolomatic.com for the most up-to-date technical information

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Tolomatic
EXCELLENCE *IN MOTION*®

MXP BAND CYLINDER

ENDURANCE TECHNOLOGY℠

[N] INTERNAL BEARING
[S] SOLID BEARING
[P] PROFILED RAIL

MAXIMUM DURABILITY

Tolomatic
EXCELLENCE IN MOTION®

ENDURANCE TECHNOLOGY℠

Pneumatic Actuators

- *Largest selection of rodless cylinders* in band, cable, and magnetically coupled styles with a wide range of load capacities.
- *Power-Block rod cylinder slides* for maximum force in a short stroke package, perfect for conveyor stops or load lifting applications.

Electric Actuators

- *Rod screw actuators* for maximum thrust in short stroke applications. Guided screw models are available for applications that require additional guidance.
- *Integrated motor actuators* in both roller and ball screw technologies deliver high thrust capacities and 100% duty cycle.
- *Rodless screw and belt designs* solve a wide range of moment, load, precision, speed, and performance requirements.

Drives & Motors

- *Brushless servo controllers, drives and motors* provide smooth, quiet operation and high performance.
- *Microstepping controllers, drives and motors* achieve precise positioning at economical prices.
- *Easy-to-use, Windows® based programming and setup software.*
- *Your Motor Here* program matches a Tolomatic actuator to customer motor and supplies the motor adapter plate free of charge, mounted and shipped with the actuator.

More solutions. Built to last.

Power Transmission

- *Float-A-Shaft® and Slide-Rite® right-angle gearboxes* turn power around any corner.
- *Caliper disc brakes* in mechanical, hydraulic, pneumatic and spring-applied models offer a wide variety of industrial stopping power.
- *Disc cone clutches* with high torque output and non-slip, dependable performance.

Customized Products

- *Quick turnaround on custom modifications* to Tolomatic standard products.
- *Linear motion solutions with custom design and prototype services.*

Service & Tech Support

- *Fast service and full technical support.*
- *All catalog products are built-to-order and shipped in 5 days or less.*

5 DAYS BUILT-TO-ORDER

- *CAD files & sizing and selection software available online at* **www.tolomatic.com**

ACTUATOR SIZING

3D CAD 2D

TABLE OF CONTENTS

INTRODUCING THE MXP BAND CYLINDER – DESIGNED TO OUTLAST EVERY RODLESS CYLINDER ON THE MARKET

The MXP pneumatic rodless cylinder is exactly what you expect from the industry's number one rodless supplier. Designed with our exclusive ENDURANCE TECHNOLOGY℠ features, the MXP delivers superior performance to meet the most demanding applications. Nobody knows rodless like Tolomatic, and the MXP proves it.

- **DURABLE BEARINGS.** Three bearing choices to match your application needs. Profiled rail design reduces friction and extends actuator life. Solid bearing design reduces stress concentration for optimum performance. Internal bearing design is permanently lubricated for long, trouble-free service.

- **DURABLE BANDS.** Stainless steel bands are stronger and will not elongate like elastomer (non-metallic) bands, providing reliable sealing over the life of the actuator.

N-INTERNAL BEARING

- Low cost solution for applications with limited load and bending moment requirements
- Lowest breakaway pressure
- Best in many vertical applications
- Permanently lubed internal bearing

S-SOLID BEARING

- Increased Mx moment capacity
- Large bearing surface contact area optimizes stress distribution on bearing for long service life
- Large carrier mounting pattern for more load stability and compatibility with existing BC2 applications
- Engineered bearing material does not require additional lubrication
- Solid bearings are field replaceable

P-PROFILED RAIL

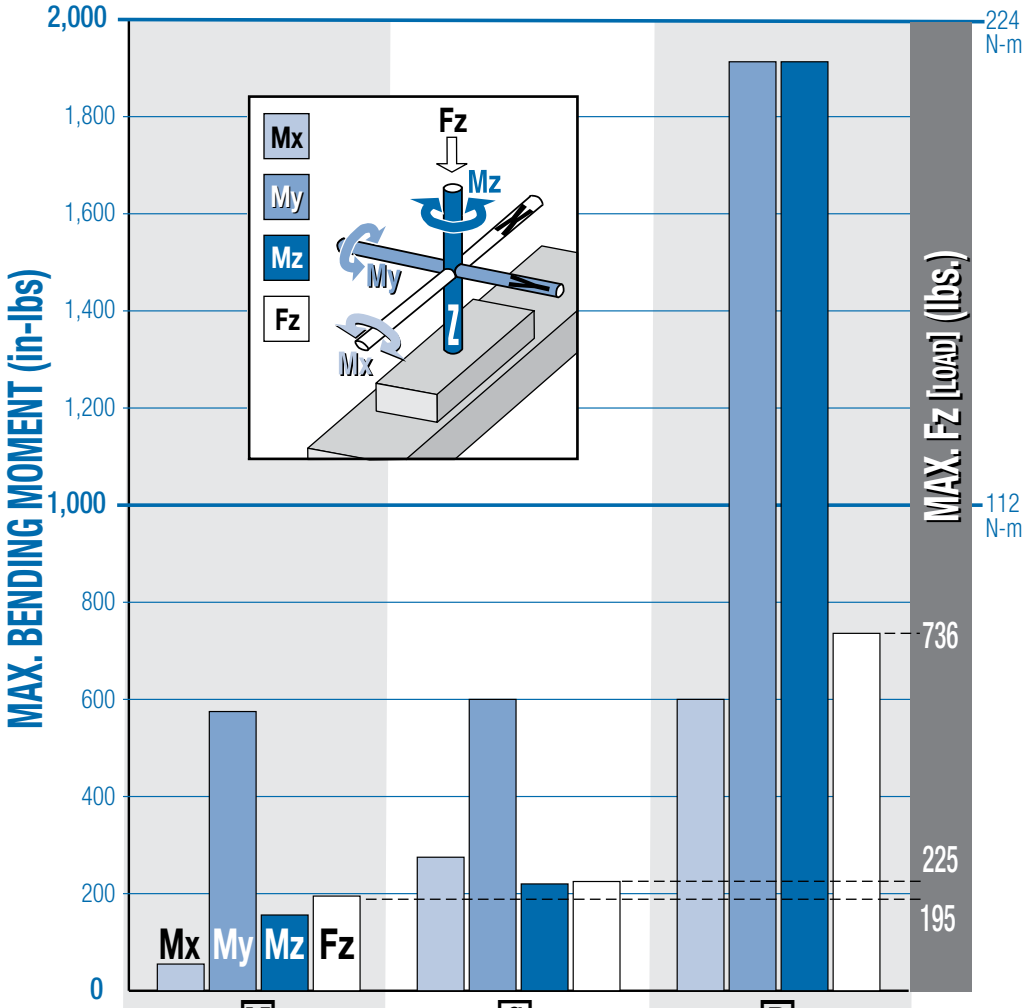
- Recirculating ball bearing design offers reduced friction for reliable service life
- High load and bending moment capacities
- Low profile to fit your application
- High precision bearings feature smooth, low breakaway motion

SELECT THE PERFORMANCE YOU NEED

Choose from: • Three Bearing Models • Six Bore Sizes • Built to Your Specified Stroke Length!

MOMENT & LOAD CAPACITY COMPARISON

Graph for model comparison, data from MXP40, 38mm (1.5") bore



Tolomatic MXP Band Cylinder Model			
Bearing Type	Internal Bearing	Solid Bearing	Profiled Rail
Moment Capacity	Moderate	Moderate + Mx	High
Isolated Piston	No	Yes	Yes
Ideal Applications	• Guided Loads • Vertical Orientation	• Side Loads • Impact Loads	• High Moment Loads • High Speeds with Heavy Loads • High Precision
Product Details	Page MXP_6	Page MXP_8	Page MXP_10

N INTERNAL BEARING

ENDURANCE TECHNOLOGY℠

INTERNAL BEARINGS

- Design maximizes piston bearing surface area for less pressure on bearing surfaces, less pressure results in less wear
- Permanent lubrication for low friction and extended bearing life
- Internal location provides protection from external contaminants, extending life

STAINLESS STEEL BANDS

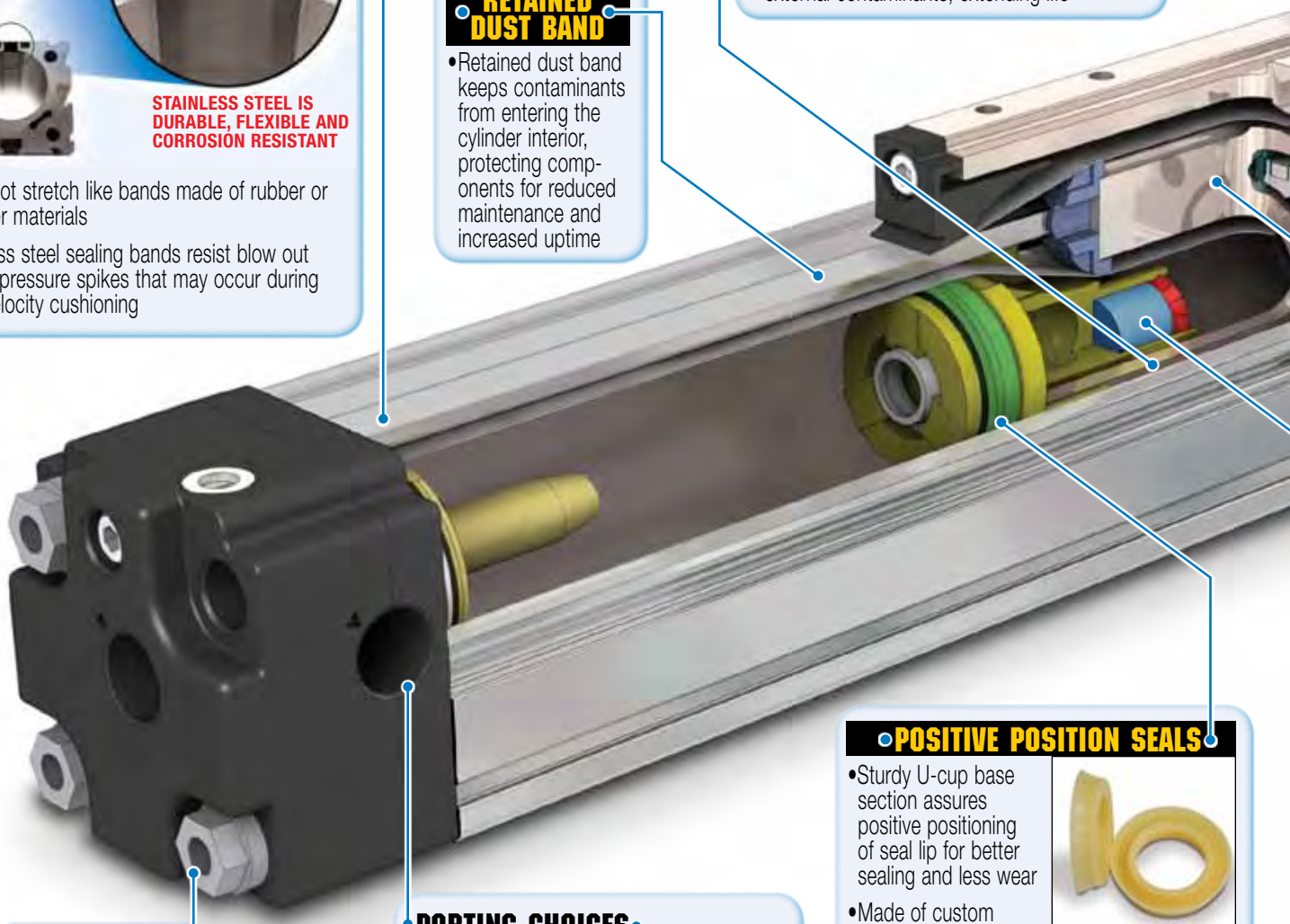
- Both interior sealing band and exterior dust band made of fatigue resistant stainless steel

STAINLESS STEEL IS DURABLE, FLEXIBLE AND CORROSION RESISTANT

- Does not stretch like bands made of rubber or polymer materials
- Stainless steel sealing bands resist blow out during pressure spikes that may occur during high velocity cushioning

RETAINED DUST BAND

- Retained dust band keeps contaminants from entering the cylinder interior, protecting components for reduced maintenance and increased uptime



POSITIVE POSITION SEALS

- Sturdy U-cup base section assures positive positioning of seal lip for better sealing and less wear
- Made of custom formulated polyurethane for pliable, wear resistant seal lip

DIRECT MOUNT

- Head bolts are tapped for direct mounting

PORTING CHOICES

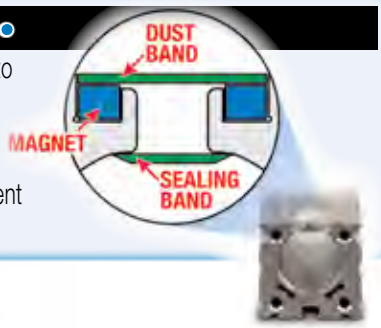
- 4-ported heads are standard to allow air connections on sides, end or bottom
- Single-end porting allows convenient one end air connection
- NPT, Metric Parallel (ISO-G/BSP) & Metric Taper (Rc/BST) available on both metric and inch *(US standard)* mount actuators

INCH OR METRIC MOUNTING

- Your choice of inch *(US standard)* or metric fasteners for carrier and head bolt mounting

NON-WEAR BAND RETENTION

- Magnetically retained bands are not subject to wear as are mechanically retained systems
- Immediate band engagement and release results in less drag on piston for lower breakaway force during initial carrier movement



DUST WIPER

- Formed end cap and side dust wipers keep contaminants from entering the cylinder's internal area

ADJUSTABLE CUSHIONS

- Easy screw adjustment for smooth deceleration protecting actuator from high stress at end-of-stroke
- Adjustable cushions with retained stainless steel needle screw for increased safety

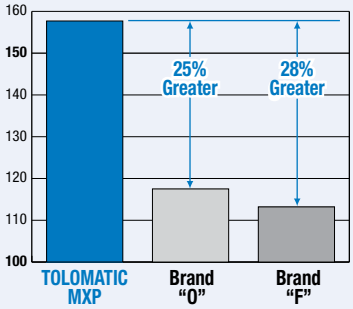
INTERNAL MAGNETS

- Standard feature that allows sensor installation on left, right or bottom of the extrusion

HIGH STRENGTH PISTON

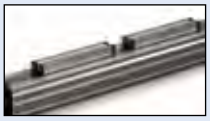
- Single piece extrusion for piston bracket and carrier reduces failure points
- Piston bracket neck cross-sectional area is up to 28% greater than competitive designs, providing increased durability

25mm PISTON BRACKET MINIMUM CROSS-SECTIONAL AREA (mm²)



NOTE: Boxed letters indicate ordering codes

OPTIONS



AUXILIARY CARRIER [D] [W]
- 2X higher Fz (load) capacity
- High bending moment capacity

FLOATING MOUNT [F] [L]
- Compensates for non-parallelism between MXP band cylinder and externally guided load

TUBE CLAMPS [T] [C]
- Used for intermediate support
- Flush with bottom of actuator to retain low profile
- Drop-in, adjustable mounting locations

FOOT MOUNTS [F] [M]
- For end mounting of MXP band cylinder
- Use to bottom or side mount actuator

SHOCK ABSORBERS [A] [L] [S] [L] [A] [H] [S] [H]
- Allows increased operating speed and load
- Self-compensates for load or speed changes
- Minimizes impact load to equipment
- Fixed or adjustable position shocks

SINGLE-END PORTING [S]
- Convenient single-end air connection (not available on MXP16)

SWITCHES
- Wide variety of sensing choices: Reed, Solid State PNP or NPN, all available normally open or normally closed
- Flush mount, drop-in installation, anytime
- Bright LEDs, power & signal indication
- CE rated, RoHS compliant

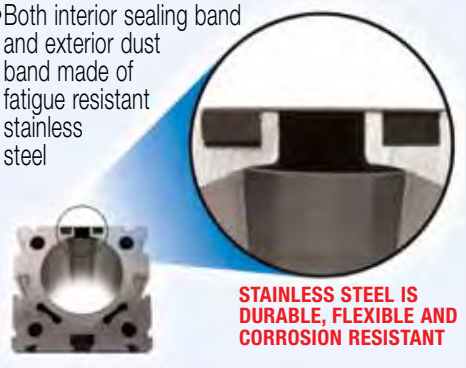
S SOLID BEARING

ENDURANCE TECHNOLOGY℠

Endurance Technology features are designed for maximum durability to provide extended service life.

STAINLESS STEEL BANDS

- Both interior sealing band and exterior dust band made of fatigue resistant stainless steel



- Does not stretch like bands made of rubber or polymer materials
- Stainless steel sealing bands resist blow out during pressure spikes that may occur during high velocity cushioning

RETAINED DUST BAND

- Retained dust band keeps contaminants from entering the cylinder interior, protecting components for reduced maintenance and increased uptime

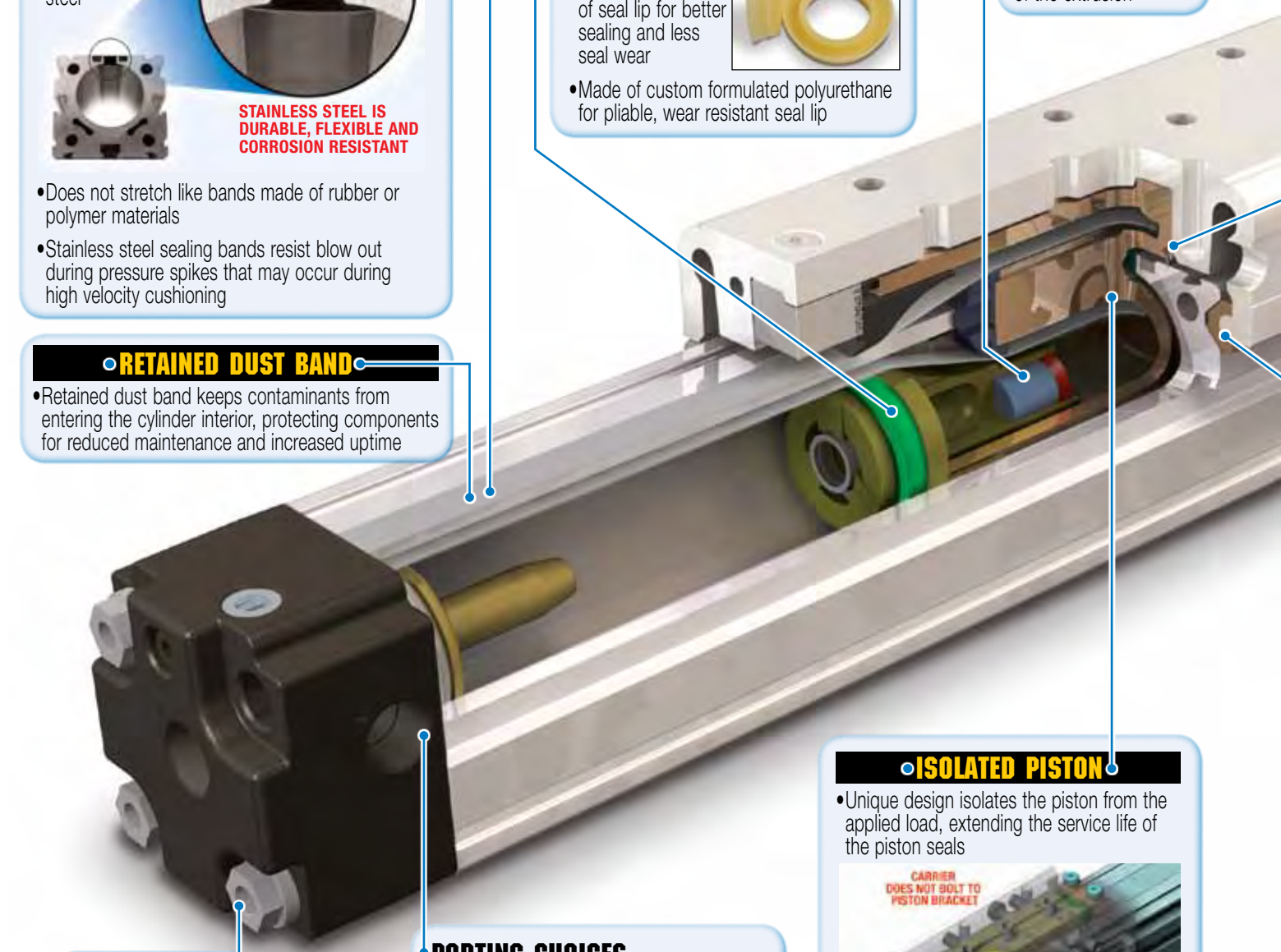
POSITIVE POSITION SEALS

- Sturdy U-cup base section assures positive positioning of seal lip for better sealing and less seal wear

- Made of custom formulated polyurethane for pliable, wear resistant seal lip

INTERNAL MAGNETS

- Standard feature that allows sensor installation on left, right or bottom of the extrusion



ISOLATED PISTON

- Unique design isolates the piston from the applied load, extending the service life of the piston seals

- Piston remains isolated even when the carrier is deflected under load
- Piston bracket and carrier feature single piece extrusions, reducing failure points

DIRECT MOUNT

- Head bolts are tapped for direct mounting

PORTING CHOICES

- 4-ported heads are standard to allow air connections on sides, end or bottom
- Single-end porting allows convenient one end air connection
- NPT, Metric Parallel (ISO-G/BSP) & Metric Taper (Rc/BST) available on both metric and inch *(US standard)* mount actuators

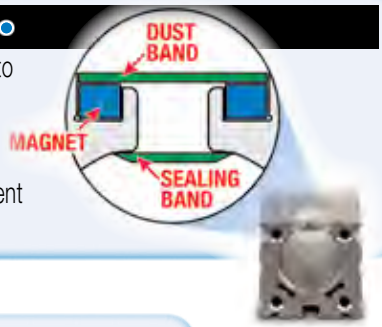
INCH OR METRIC MOUNTING

- Your choice of inch *(US standard)* or metric fasteners for carrier and head bolt mounting

...MAXIMUM DURABILITY

NON-WEAR BAND RETENTION

- Magnetically retained bands are not subject to wear as are mechanically retained systems
- Immediate band engagement and release results in less drag on piston for lower breakaway force during initial carrier movement

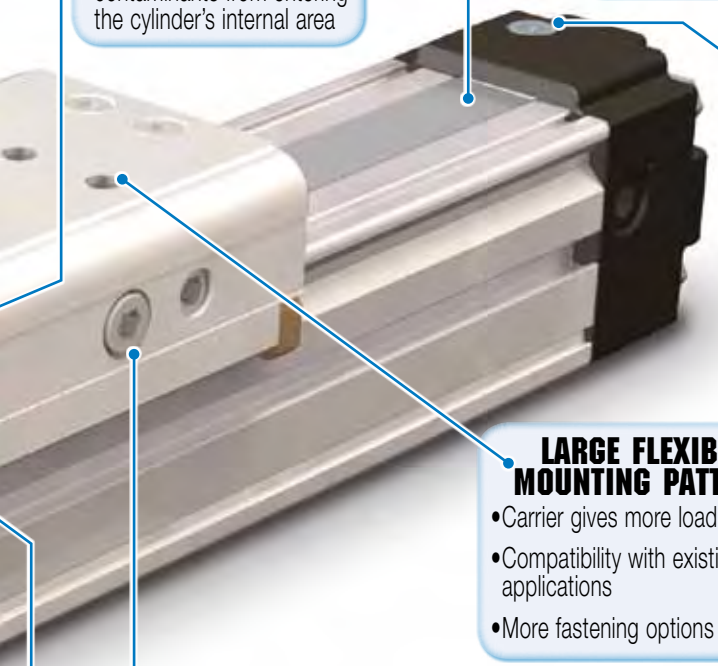


DUST WIPER

- Formed end cap and side dust wipers keep contaminants from entering the cylinder's internal area

ADJUSTABLE CUSHIONS

- Easy screw adjustment for smooth deceleration protecting actuator from high stress at end-of-stroke
- Adjustable cushions with retained stainless steel needle screw for increased safety

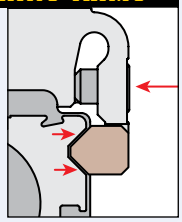


LARGE FLEXIBLE MOUNTING PATTERN

- Carrier gives more load stability
- Compatibility with existing BC2 applications
- More fastening options

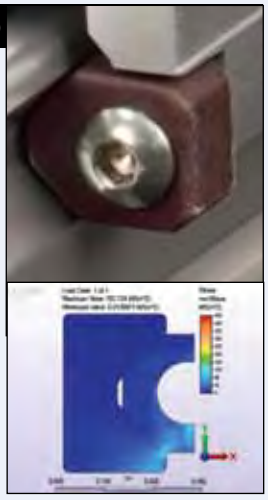
NON-BINDING BEARING ARMS

- Bearings are tensioned indirectly, providing bind free adjustment



TRAPEZOIDAL BEARINGS

- Trapezoidal design maximizes bearing surface area for less pressure on bearing surfaces; less pressure results in less wear
- Engineered bearing material has low static and dynamic friction with low wear properties for long lasting, smooth operation
- Bearings are field replaceable for extended service life



NOTE: Boxed letters indicate ordering codes

OPTIONS

AUXILIARY CARRIER [D] [W]

- 2X higher Fz (load) capacity
- High bending moment capacity

FLOATING MOUNT [F] [L]

- Compensates for non-parallelism between MXP band cylinder and externally guided load

TUBE CLAMPS [T] [C]

- Used for intermediate support
- Flush with bottom of actuator to retain low profile
- Drop-in, adjustable mounting locations

FOOT MOUNTS [F] [M]

- For end mounting of MXP band cylinder
- Use to bottom or side mount actuator

SHOCK ABSORBERS [A] [L] [S] [L] [A] [H] [S] [H]

- Allows increased operating speed and load
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- Minimizes impact load to equipment
- Fixed or adjustable position shocks

SINGLE-END PORTING [S]

- Convenient single-end air connection (not available on MXP16)

SWITCHES

- Wide variety of sensing choices: Reed, Solid State PNP or NPN, all available normally open or normally closed
- Flush mount, drop-in installation, anytime
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- CE rated, RoHS compliant

P PROFILED RAIL

ENDURANCE TECHNOLOGY℠

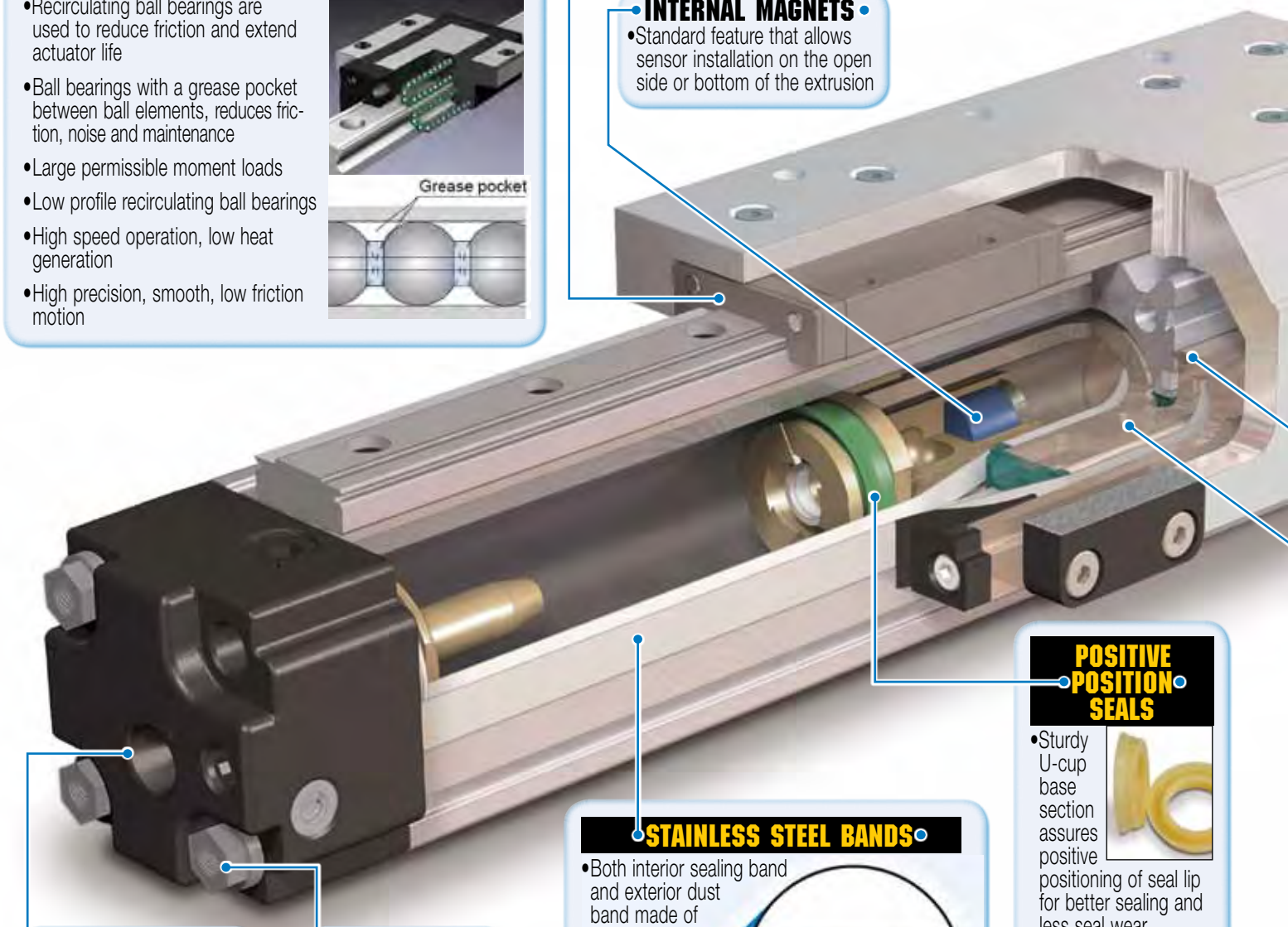
Endurance Technology features are designed for maximum durability to provide extended service life.

RECIRCULATING BALL BEARINGS

- Recirculating ball bearings are used to reduce friction and extend actuator life
- Ball bearings with a grease pocket between ball elements, reduces friction, noise and maintenance
- Large permissible moment loads
- Low profile recirculating ball bearings
- High speed operation, low heat generation
- High precision, smooth, low friction motion

INTERNAL MAGNETS

- Standard feature that allows sensor installation on the open side or bottom of the extrusion



POSITIVE POSITION SEALS

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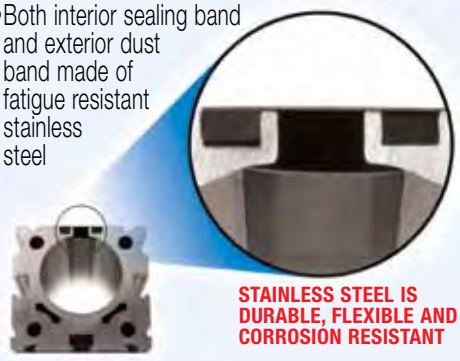

STAINLESS STEEL IS DURABLE, FLEXIBLE AND CORROSION RESISTANT

- Does not stretch like bands made of rubber or polymer materials
- Stainless steel sealing bands resist blow out during pressure spikes that may occur during high velocity cushioning

PORTING CHOICES

- 4-ported heads are standard to allow air connections on side, top or end
- Single-end porting allows convenient one end air connection
- NPT, Metric Parallel (ISO-G/BSP) & Metric Taper (Rc/BST) available on both metric and inch *(US standard)* mount actuators

DIRECT MOUNT

- Head bolts are tapped for direct mounting

INCH OR METRIC MOUNTING

- Your choice of inch *(US standard)* or metric fasteners for carrier and head bolt mounting

...MAXIMUM DURABILITY

LOW CARRIER HEIGHT

- Reduces overall cylinder envelope
- Large mounting pattern for high load stability

ADJUSTABLE CUSHIONS

- Easy screw adjustment for smooth deceleration protecting actuator from high stress at end-of-stroke
- Adjustable cushions with retained stainless steel needle screw for increased safety

NON-WEAR BAND RETENTION

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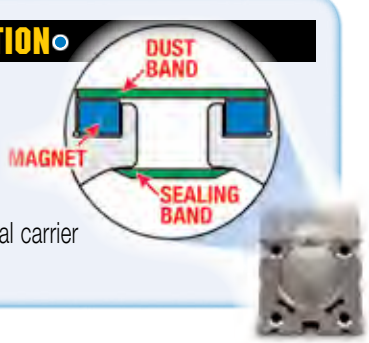

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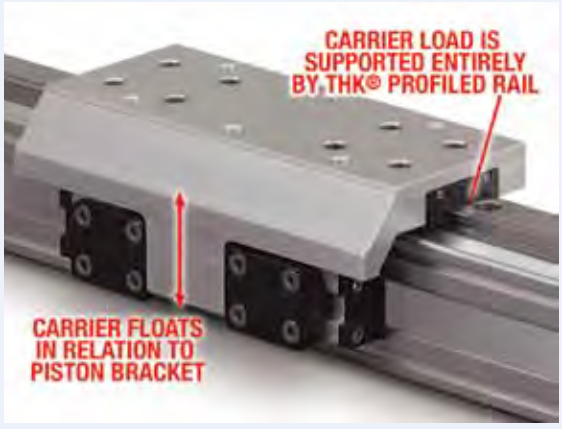

- Piston remains isolated even when the carrier is deflected under load
- Piston bracket and carrier feature single piece extrusions, reducing failure points

NOTE: Boxed letters indicate ordering codes

OPTIONS

AUXILIARY CARRIER [D] [W]

- 2X higher Fz (load) capacity
- High bending moment capacity

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- Allows increased operating speed and load
- Self-compensates for load or speed changes
- Minimizes impact load to equipment
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SINGLE-END PORTING [S]

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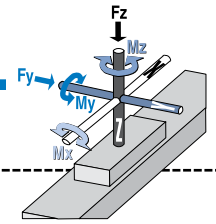
SWITCHES

- Wide variety of sensing choices: Reed, Solid State PNP or NPN, all available normally open or normally closed
- Flush mount, drop-in installation, anytime
- Bright LEDs, power & signal indication
- CE rated, RoHS compliant

SELECTION GUIDELINES



1 COMPILE APPLICATION REQUIREMENTS

APPLICATION DATA WORKSHEET

STROKE LENGTH _____
☐ inch (S K) (U.S. Standard) ☐ millimeters (S M) (Metric)

AVAILABLE AIR PRESSURE _____
☐ PSI (U.S. Standard) ☐ bar (Metric)

REQUIRED THRUST FORCE _____
☐ lbf (U.S. Standard) ☐ N (Metric)

LOAD _____
☐ lb (U.S. Standard) ☐ kg (Metric)

LOAD CENTER OF GRAVITY DISTANCE TO CARRIER CENTER
d_x _____
d_y _____
d_z _____
☐ inch (U.S. Standard) ☐ millimeters (Metric)

FORCES APPLIED TO CARRIER
F_z _____
F_y _____
☐ lbf (U.S. Standard) ☐ N (Metric)

BENDING MOMENTS APPLIED TO CARRIER
M_x _____
M_y _____
M_z _____
☐ in-lbs (U.S. Standard) ☐ N-m (Metric)

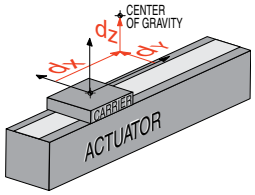
FINAL VELOCITY _____
☐ in/sec (U.S. Standard) ☐ mm/sec (Metric)

MOVE TIME sec. _____

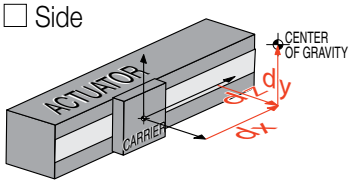
NO. OF CYCLES _____
☐ per minute ☐ per hour

ORIENTATION

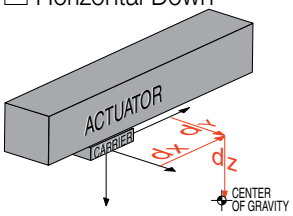
☐ Horizontal



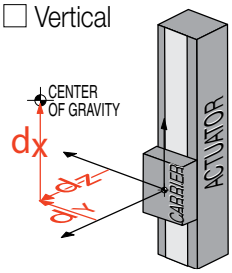
☐ Side



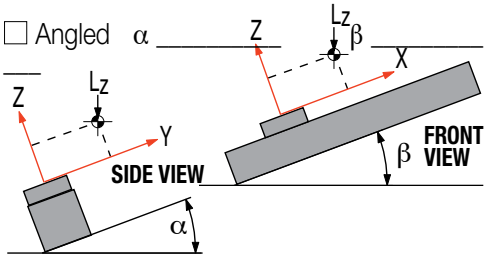
☐ Horizontal Down



☐ Vertical



☐ Angled α _____



OTHER ISSUES:
(i.e. Environment, Temperature, Contamination, etc.)

_____
_____
_____
_____

Contact information: _____
_____
_____
_____

STOP Fax (1-763-478-8080) or call Tolomatic (1-800-328-2174) with the above information. We will provide any assistance needed to determine the proper MXP Band Cylinder.

The process of selecting a load bearing actuator for a given application can be complex. It is highly recommended that you contact Tolomatic for assistance in selecting the best actuator for your application. The following overview of the selection guidelines are for educational purposes only.

2 DETERMINE BORE SIZE

- Consult the Theoretical Force vs. Pressure graph. (See graph at right)
- Find the intersection of the available pressure and required thrust force. If the intersection falls below the plotted bore size curve, the actuator will supply adequate force for the application. If the intersection is above the curve, a larger cylinder bore size will be required.

⚠ NOTE: Additional force may be required to obtain the necessary acceleration within desired cycle time.

3 COMPARE LOAD TO MAXIMUM LOAD CAPACITIES

Calculate the following static loads: Mx, My, Mz, Fy, Fz

Loads = Applied Moments + Forces

If the load of your application exceeds figures indicated in the MOMENT AND LOAD CAPACITY tables (See pages MXP_14-19) consider:

1.) Higher capacity bearing style, i.e. N to S, S to P

2.) Larger Bore Cylinder

3.) Auxiliary Carrier

4.) Add External Guides

4 CALCULATE LOAD FACTOR L_F

For combined loads the Load Factor (L_F) must not exceed the value 1.

$$L_F = \frac{Mx}{Mx_{max}} + \frac{My}{My_{max}} + \frac{Mz}{Mz_{max}} + \frac{Fy}{Fy_{max}} + \frac{Fz}{Fz_{max}} \leq 1$$

If L_F exceeds the value 1, then consider the four choices listed in step #3.

SHOCKS

If the intersection of the final velocity and load mass falls in the shaded regions, then shock absorbers should be used.

6 CONSIDER PEAK DYNAMIC INERTIA MOMENTS

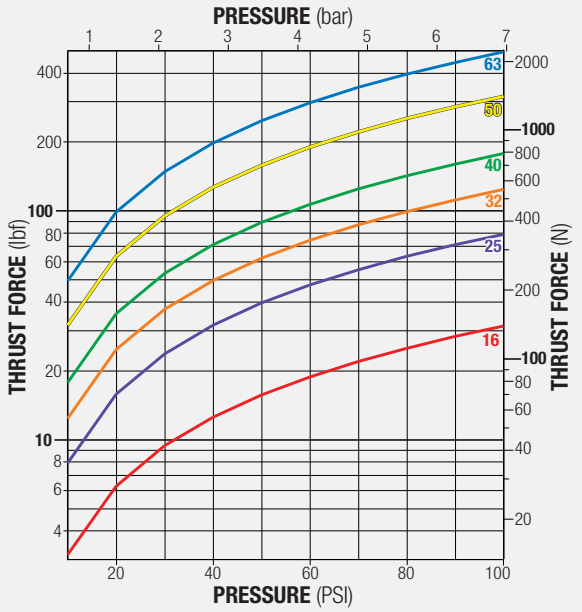
When a rigidly attached load mass is accelerated or decelerated, its inertia induces bending moments on the carrier. The magnitude of these inertia moments can be larger than the applied loads. Careful attention to how the load is decelerated at the end of stroke is required for extended actuator performance and application safety.

Evaluate the dynamic inertia moment data:
1.) The length of deceleration distance
2.) The load attached to the carrier
3.) The distance of the load mass center of gravity from the carrier, and
4.) The final velocity of the carrier.

If dynamic inertia moments are excessive, consider the four choices listed in step #3 or consider these deceleration methods:

- **Reduce final velocity** with flow controls or reduced pressure.
- **Pneumatic valve deceleration circuits.** By reducing the speed before the cushion or shock is reached, the load can decelerate over a longer distance, thereby reducing the deceleration moments.
- **Position shock absorbers at the load's center of gravity.** This will greatly reduce the moment load applied to the carrier.

THEORETICAL FORCE VS PRESSURE



5 DETERMINE CUSHION & SHOCK CAPACITY

Consult the Cushion and Shock Absorber Performance charts for the model selected (see page MXP_22). The velocities listed on the cushion charts are final or impact velocities. If the final or impact velocity is not known, use of valve deceleration circuits or shock absorbers should be considered.

CUSHIONS

Find the intersection of the final velocity and load mass. If the intersection is below the diagonal lines, the internal cushions on the actuator may be used.

[P] PROFILED RAIL DECELERATION CONSIDERATIONS

While the [P] Profiled Rail MXP is capable of carrying very large loads, consideration must be given to how to stop the load at the end of stroke. If Tolomatic cushions or shocks are used, stay within the specifications defined. If another type of shock absorber is used, be sure that the deceleration of the load is smooth and over an adequate distance.

7 DETERMINE TUBE CLAMP REQUIREMENTS

- Consult the Tube Clamp Requirement chart for the model selected (page MXP_23-24).
- Cross-reference the load force and maximum distance between supports.
- Divide stroke length by max. distance calculated above to determine number of tube clamps to order.

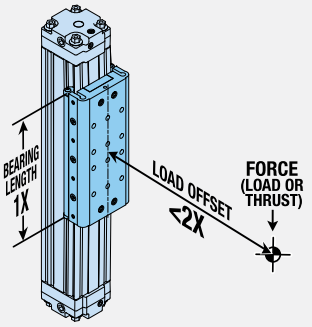
8 CONSIDER PORTING AND OPTIONS

- Choose Single End Porting or Dual End Porting
- Choose NPT, Metric Parallel *(ISO-G/BSP)* or Metric Taper *(Rc/BST)* Ports

OPTIONS:

- Switches – Reed, Solid State PNP or NPN, all available normally open or normally closed
- Shock Absorbers – Heavy or light duty, fixed or adjustable mount – recommended for longer life in most applications
- Foot Mounts
- Floating Mount Bracket – used when lack of parallelism occurs between the cylinder and an externally guided and supported load. Available for [N] internal & [S] solid bearing styles

[S] SOLID BEARING 2:1 RULE



For applications using [S] solid bearings, binding or interrupted motion may occur if the load offset is equal to or greater than twice the bearing length (1X). *LOAD OFFSET is defined as: the distance from the applied force (or the load center of gravity) to the centerline of the carrier.*

If the load offset cannot be changed consider:

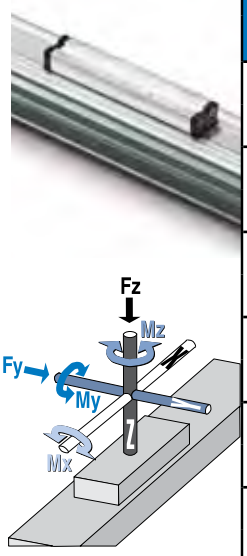
1.) Higher capacity bearing style, i.e. [S] to [P]

2.) Larger Bore Cylinder

3.) Auxiliary Carrier

4.) Add External Guides

STANDARD



BORE			MAXIMUM BENDING MOMENTS Mx	My	Mz	MAX. LOAD Fz	THRUST (at 100 PSI)
16	Inch	0.63 in	3 in-lbs	35 in-lbs	5 in-lbs	30 lbf	30.7 lbf
	Metric	*16 mm*	*0.3 N-m*	*4.0 N-m*	*0.6 N-m*	*133 N*	*136 N*
25	Inch	1.00 in	9 in-lbs	132 in-lbs	27 in-lbs	65 lbf	78.5 lbf
	Metric	*25 mm*	*1.0 N-m*	*14.9 N-m*	*3.1 N-m*	*289 N*	*349 N*
32	Inch	1.25 in	36 in-lbs	318 in-lbs	120 in-lbs	115 lbf	123 lbf
	Metric	*32 mm*	*4.1 N-m*	*35.9 N-m*	*13.6 N-m*	*512 N*	*546 N*
40	Inch	1.50 in	55 in-lbs	575 in-lbs	156 in-lbs	195 lbf	177 lbf
	Metric	*38 mm*	*6.2 N-m*	*65 N-m*	*17.6 N-m*	*867 N*	*786 N*
50	Inch	2.00 in	98 in-lbs	1,017 in-lbs	172 in-lbs	270 lbf	314 lbf
	Metric	*50 mm*	*11.1 N-m*	*115 N-m*	*19.4 N-m*	*1,201 N*	*1,397 N*
63	Inch	2.50 in	120 in-lbs	1,776 in-lbs	216 in-lbs	370 lbf	491 lbf
	Metric	*64 mm*	*13.6 N-m*	*201 N-m*	*24.4 N-m*	*1,646 N*	*2,184 N*

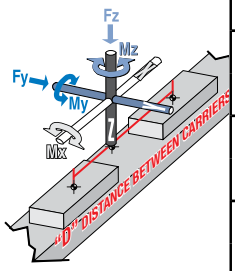
The moment and load capacity of the actuator's bearing system is based on an L10 life of 200,000,000 linear inches of travel. Life of the actuator will vary for each application depending on the combined loads, motion parameters and operating conditions. The load factor (L_F) ratios for each application must not exceed a value of 1 (as calculated below). Exceeding a load factor of 1 will diminish the actuator's rated life.

$$L_F = \frac{Mx}{Mx_{max}} + \frac{My}{My_{max}} + \frac{Mz}{Mz_{max}} + \frac{Fy}{Fy_{max}} + \frac{Fz}{Fz_{max}} \leq 1$$

With combined loads, L_F must not exceed the value 1.

Ratings are the maximum values for shock-free, vibration-free operation in a typical industrial environment. Contact Tolomatic for assistance in selecting the most appropriate actuator for your application.

DW AUXILIARY CARRIER



BORE			"D" MIN	MAXIMUM BENDING MOMENTS MxA	MyA*	MzA*	MAX. LOAD FzA	THRUST (at 100 PSI)
16	Inch	0.63 in	5.0 in	3 in-lbs	150 in-lbs	81 in-lbs	60 lbf	30.7 lbf
	Metric	*16 mm*	*127 mm*	*0.3 N-m*	*16.9 N-m*	*9.1 N-m*	*267 N*	*136 N*
25	Inch	1.00 in	6.0 in	9 in-lbs	390 in-lbs	143 in-lbs	130 lbf	78.5 lbf
	Metric	*25 mm*	*152 mm*	*1.0 N-m*	*44.1 N-m*	*16.2 N-m*	*578 N*	*349 N*
32	Inch	1.25 in	7.0 in	36 in-lbs	805 in-lbs	302 in-lbs	230 lbf	123 lbf
	Metric	*32 mm*	*178 mm*	*4.1 N-m*	*91.0 N-m*	*34.1 N-m*	*1,023 N*	*546 N*
40	Inch	1.50 in	8.5 in	55 in-lbs	1,658 in-lbs	413 in-lbs	390 lbf	177 lbf
	Metric	*38 mm*	*216 mm*	*6.2 N-m*	*187 N-m*	*46.7 N-m*	*1,735 N*	*786 N*
50	Inch	2.00 in	8.6 in	98 in-lbs	2,322 in-lbs	707 in-lbs	540 lbf	314 lbf
	Metric	*50 mm*	*218 mm*	*11.1 N-m*	*262 N-m*	*79.8 N-m*	*2,402 N*	*1,397 N*
63	Inch	2.50 in	13.0 in	120 in-lbs	4,810 in-lbs	808 in-lbs	740 lbf	491 lbf
	Metric	*64 mm*	*330 mm*	*13.6 N-m*	*544 N-m*	*91.0 N-m*	*3,292 N*	*2,184 N*

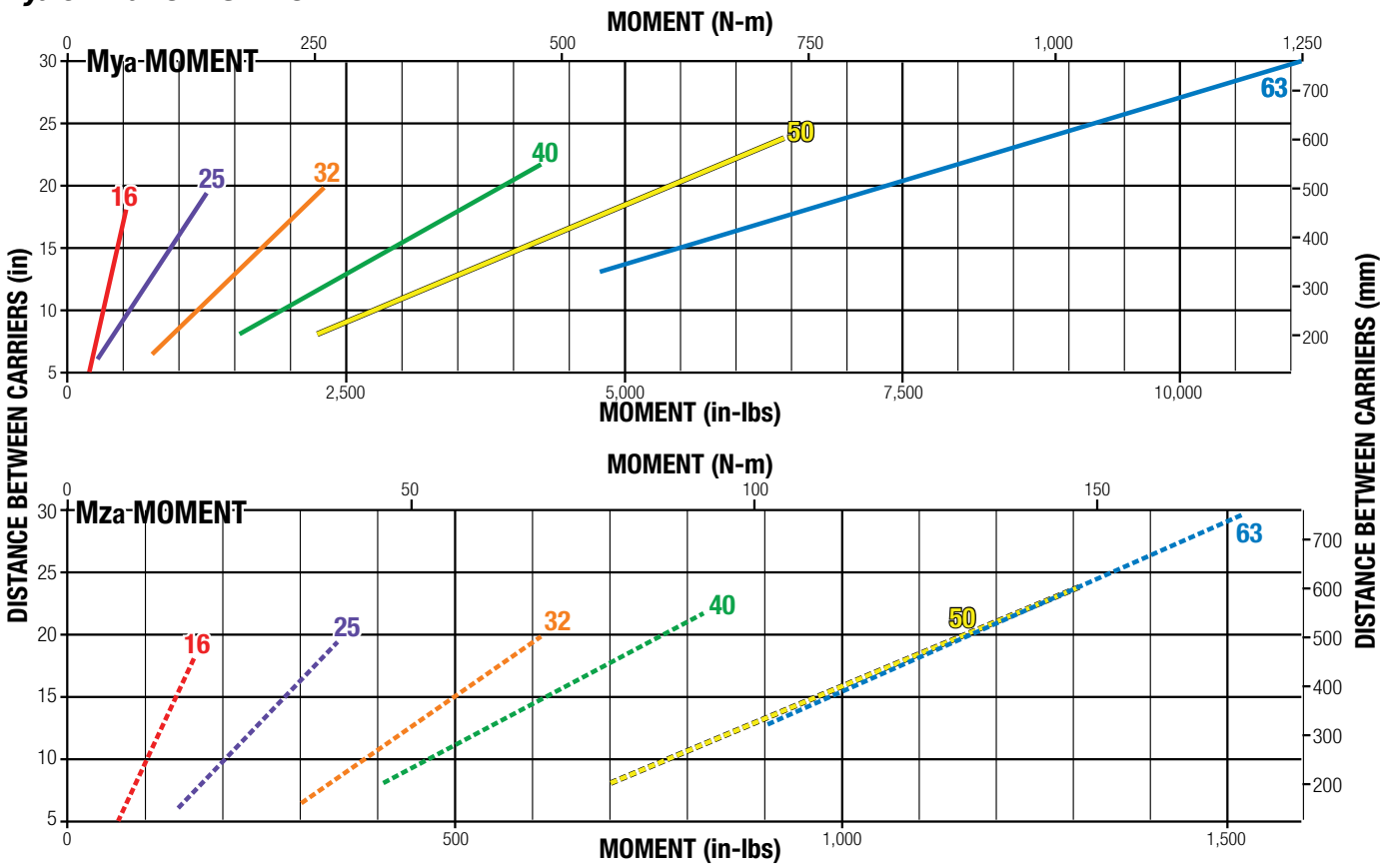
*At minimum "D" distance between carriers see graph below for other distances

With combined loads, L_F must not exceed the value 1.

$$L_F = \frac{Mx}{Mx_{max}} + \frac{My}{My_{max}} + \frac{Mz}{Mz_{max}} + \frac{Fy}{Fy_{max}} + \frac{Fz}{Fz_{max}} \leq 1$$

Ratings are the maximum values for shock-free, vibration-free operation in a typical industrial environment. Contact Tolomatic for assistance in selecting the most appropriate actuator for your application.

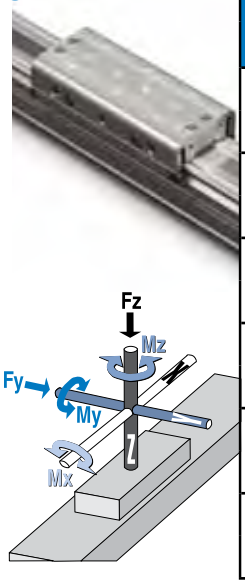
Mya & Mza vs. DISTANCE



Ratings were calculated with the following conditions:

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

STANDARD



BORE			MAXIMUM BENDING MOMENTS Mx	My	Mz	MAX. LOAD Fz	THRUST (at 100 PSI)
16	Inch	0.63 in	22 in-lbs	19 in-lbs	25 in-lbs	35 lbf	30.7 lbf
	Metric	*16 mm*	*2.5 N-m*	*2.1 N-m*	*2.8 N-m*	*156 N*	*136 N*
25	Inch	1.00 in	60 in-lbs	110 in-lbs	34 in-lbs	70 lbf	78.5 lbf
	Metric	*25 mm*	*6.8 N-m*	*12.4 N-m*	*3.8 N-m*	*311 N*	*349 N*
32	Inch	1.25 in	100 in-lbs	350 in-lbs	140 in-lbs	150 lbf	123 lbf
	Metric	*32 mm*	*11.3 N-m*	*39.5 N-m*	*15.8 N-m*	*667 N*	*546 N*
40	Inch	1.50 in	275 in-lbs	600 in-lbs	220 in-lbs	225 lbf	177 lbf
	Metric	*38 mm*	*31.1 N-m*	*67.8 N-m*	*24.9 N-m*	*1,001 N*	*786 N*
50	Inch	2.00 in	315 in-lbs	1,155 in-lbs	341 in-lbs	315 lbf	314 lbf
	Metric	*50 mm*	*35.6 N-m*	*131 N-m*	*38.5 N-m*	*1,401 N*	*1,397 N*
63	Inch	2.50 in	585 in-lbs	2,340 in-lbs	520 in-lbs	520 lbf	491 lbf
	Metric	*64 mm*	*66.1 N-m*	*264 N-m*	*58.8 N-m*	*2,313 N*	*2,184 N*

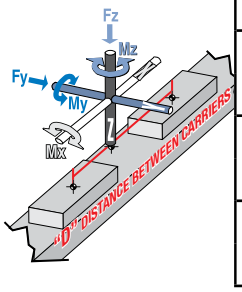
The moment and load capacity of the actuator's bearing system is based on an L10 life of 200,000,000 linear inches of travel. Life of the actuator will vary for each application depending on the combined loads, motion parameters and operating conditions. The load factor (L_F) ratios for each application must not exceed a value of 1 (as calculated below). Exceeding a load factor of 1 will diminish the actuator's rated life.

$$L_F = \frac{Mx}{Mx_{max}} + \frac{My}{My_{max}} + \frac{Mz}{Mz_{max}} + \frac{Fy}{Fy_{max}} + \frac{Fz}{Fz_{max}} \leq 1$$

With combined loads, L_F must not exceed the value 1.

Ratings are the maximum values for shock-free, vibration-free operation in a typical industrial environment. Contact Tolomatic for assistance in selecting the most appropriate actuator for your application.

DW AUXILIARY CARRIER



BORE			"D" MIN	MAXIMUM BENDING MOMENTS* MXA	MYA	MZA	MAX. LOAD FZA	THRUST (at 100 PSI)
16	Inch	0.63 in	5.0 in	44 in-lbs	175 in-lbs	175 in-lbs	70 lbf	30.7 lbf
	Metric	*16 mm*	*127 mm*	*5.0 N-m*	*19.8 N-m*	*19.8 N-m*	*311 N*	*136 N*
25	Inch	1.00 in	6.0 in	120 in-lbs	420 in-lbs	420 in-lbs	140 lbf	78.5 lbf
	Metric	*25 mm*	*152 mm*	*13.6 N-m*	*47.5 N-m*	*47.5 N-m*	*623 N*	*349 N*
32	Inch	1.25 in	7.0 in	200 in-lbs	1,050 in-lbs	1,050 in-lbs	300 lbf	123 lbf
	Metric	*32 mm*	*178 mm*	*22.6 N-m*	*119 N-m*	*119 N-m*	*1,334 N*	*546 N*
40	Inch	1.50 in	8.5 in	550 in-lbs	1,913 in-lbs	1,913 in-lbs	450 lbf	177 lbf
	Metric	*38 mm*	*216 mm*	*62.1 N-m*	*216 N-m*	*216 N-m*	*2,002 N*	*786 N*
50	Inch	2.00 in	8.6 in	630 in-lbs	2,709 in-lbs	2,709 in-lbs	630 lbf	314 lbf
	Metric	*50 mm*	*218 mm*	*71.2 N-m*	*306 N-m*	*306 N-m*	*2,802 N*	*1,397 N*
63	Inch	2.50 in	13.0 in	1,170 in-lbs	6,760 in-lbs	6,760 in-lbs	1,040 lbf	491 lbf
	Metric	*64 mm*	*330 mm*	*132 N-m*	*764 N-m*	*764 N-m*	*4,626 N*	*2,184 N*

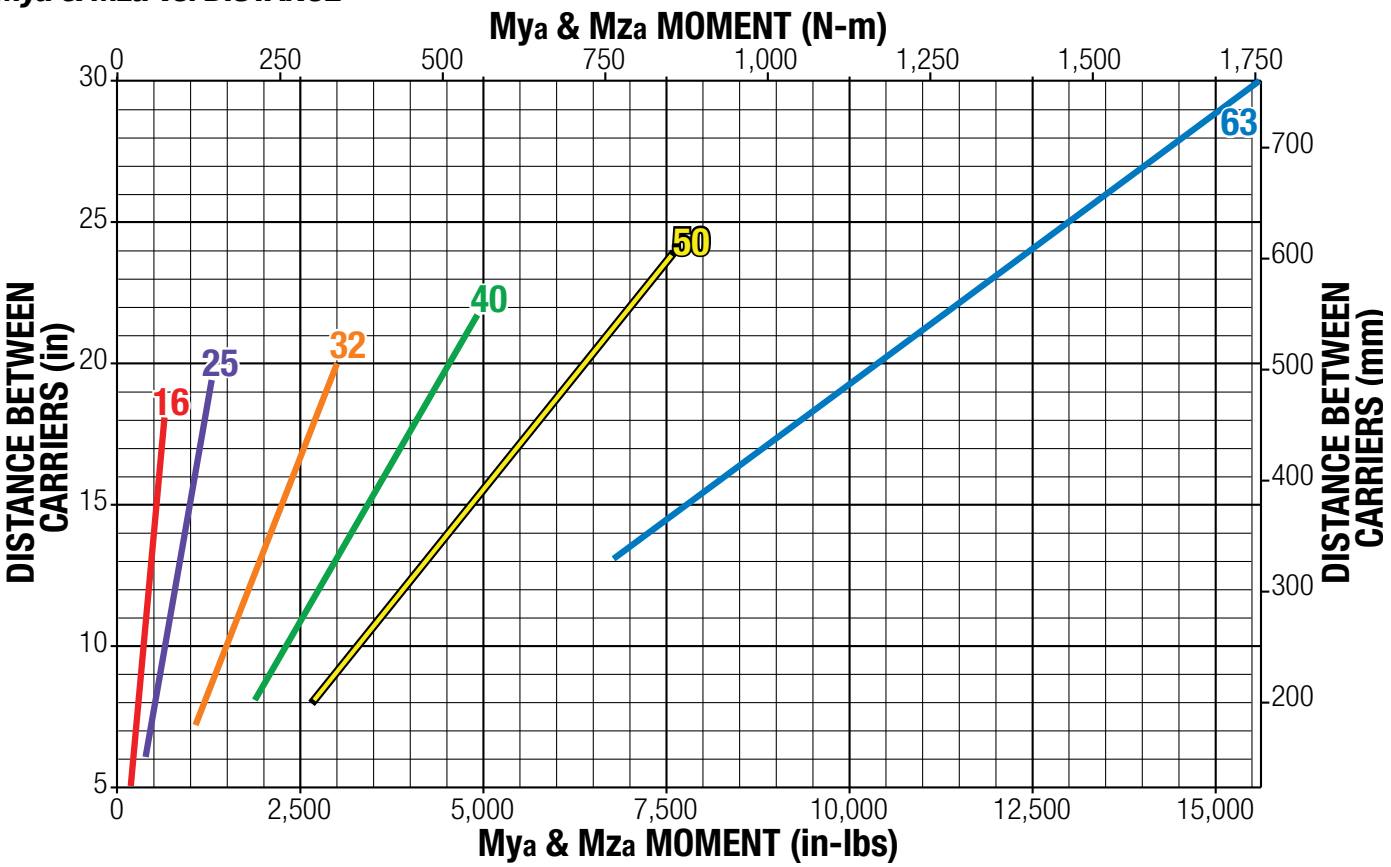
*At minimum "D" distance between carriers see graph below for other distances

With combined loads, L_F must not exceed the value 1.

$$L_F = \frac{Mx}{Mx_{max}} + \frac{My}{My_{max}} + \frac{Mz}{Mz_{max}} + \frac{Fy}{Fy_{max}} + \frac{Fz}{Fz_{max}} \leq 1$$

Ratings are the maximum values for shock-free, vibration-free operation in a typical industrial environment. Contact Tolomatic for assistance in selecting the most appropriate actuator for your application.

Mya & Mza vs. DISTANCE

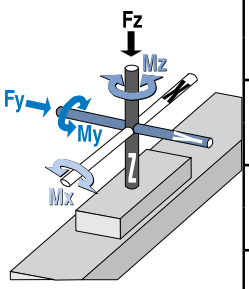


Ratings were calculated with the following conditions:

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

MOMENT AND LOAD CAPACITY

STANDARD



BORE			MAXIMUM BENDING MOMENTS Mx	My	Mz	MAX. LOAD Fy	Fz	THRUST (at 100 PSI)
16	Inch	0.63 in	39 in-lbs	339 in-lbs	339 in-lbs	217 lbf	217 lbf	30.7 lbf
	Metric	*16 mm*	*4.5 N-m*	*38.3 N-m*	*38.3 N-m*	*966 N*	*966 N*	*136 N*
25	Inch	1.00 in	126 in-lbs	502 in-lbs	377 in-lbs	449 lbf	449 lbf	78.5 lbf
	Metric	*25 mm*	*14.3 N-m*	*56.7 N-m*	*42.6 N-m*	*1,996 N*	*1,996 N*	*349 N*
32	Inch	1.25 in	226 in-lbs	1,344 in-lbs	1,344 in-lbs	569 lbf	569 lbf	123 lbf
	Metric	*32 mm*	*25.6 N-m*	*152 N-m*	*152 N-m*	*2,531 N*	*2,531 N*	*546 N*
40	Inch	1.50 in	600 in-lbs	1,913 in-lbs	1,913 in-lbs	736 lbf	736 lbf	177 lbf
	Metric	*38 mm*	*67.8 N-m*	*216 N-m*	*216 N-m*	*3,274 N*	*3,274 N*	*786 N*
50	Inch	2.00 in	811 in-lbs	3,483 in-lbs	3,483 in-lbs	1,014 lbf	1,014 lbf	314 lbf
	Metric	*50 mm*	*91.7 N-m*	*394 N-m*	*394 N-m*	*4,510 N*	*4,510 N*	*1,397 N*
63	Inch	2.50 in	1,019 in-lbs	5,339 in-lbs	5,339 in-lbs	1,292 lbf	1,292 lbf	491 lbf
	Metric	*64 mm*	*115 N-m*	*603 N-m*	*603 N-m*	*5,745 N*	*5,745 N*	*2,184 N*

NOTE: Mating surface of component mounted to carrier must maintain a flatness of at least 0.0015" (0.040 mm)

Ratings are the maximum values for shock-free, vibration-free operation in a typical industrial environment. Contact Tolomatic for assistance in selecting the most appropriate actuator for your application.

ACTUATOR SIZING

Use sizing software or call Tolomatic (1-800-328-2174) with application information. We will provide any assistance needed to determine the proper MXP band cylinder.

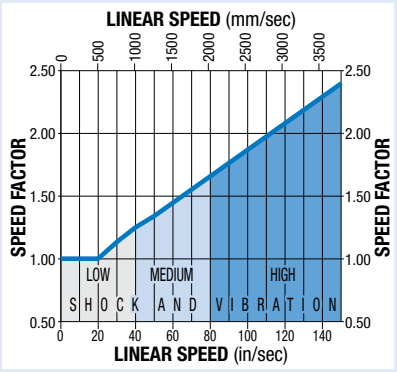
The moment and load capacity of the actuator's bearing system is based on an L10 life of 200,000,000 linear inches of travel. Life of the actuator will vary for each application depending on the combined loads, motion parameters and operating conditions. The load factor (L_F) ratios for each application must not exceed a value of 1 (as calculated below). Exceeding a load factor of 1 will diminish the actuator's rated life.

$$L_F = \frac{Mx}{Mx_{max}} + \frac{My}{My_{max}} + \frac{Mz}{Mz_{max}} + \frac{Fy}{Fy_{max}} + \frac{Fz}{Fz_{max}} \leq 1$$

With combined loads, L_F must not exceed the value 1.

SPEED FACTOR

FOR APPLICATIONS WITH HIGH SPEED OR SIGNIFICANT SHOCK AND VIBRATION: Calculated values of loads and bending moments must be increased by speed factor from the graph at right to obtain full rated life of profiled rail bearing system.



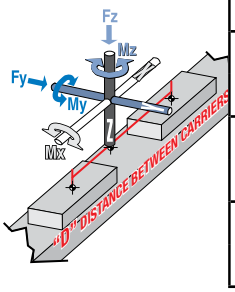
PROFILED RAIL LUBRICATION

Proper lubrication of profiled rail bearing system is essential for normal operation and achievement of full rated life of MX--P actuators. Lubrication should be performed at intervals of 4,000,000 inches of travel or once every year, whichever occurs first. **However, operating conditions such as high speed or significant shock and vibration may require more frequent lubrication.** Please consult Tolomatic for recommendations.

Recommended grease types:

1. Refined mineral oil-based multi-purpose grease with lithium thickening agent.
2. High-grade synthetic oil-based grease with urea thickening agent.

DW AUXILIARY CARRIER



BORE			"D" MIN	MAXIMUM BENDING MOMENTS* MXA	MYA	MZA	MAX. LOAD FZA	FYA	THRUST (at 100 PSI)
16	Inch	0.63 in	5.0 in	79 in-lbs	620 in-lbs	620 in-lbs	434 lbf	434 lbf	30.7 lbf
	Metric	*16 mm*	*127 mm*	*8.9 N-m*	*70.1 N-m*	*70.1 N-m*	*1,932 N*	*1,932 N*	*136 N*
25	Inch	1.00 in	6.0 in	252 in-lbs	1,610 in-lbs	1,610 in-lbs	898 lbf	898 lbf	78.5 lbf
	Metric	*25 mm*	*152 mm*	*28.5 N-m*	*182 N-m*	*182 N-m*	*3,993 N*	*3,993 N*	*349 N*
32	Inch	1.25 in	7.0 in	453 in-lbs	2,202 in-lbs	2,202 in-lbs	1,138 lbf	1,138 lbf	123 lbf
	Metric	*32 mm*	*178 mm*	*51.1 N-m*	*249 N-m*	*249 N-m*	*5,063 N*	*5,063 N*	*546 N*
40	Inch	1.50 in	8.5 in	1,208 in-lbs	3,601 in-lbs	3,601 in-lbs	1,472 lbf	1,472 lbf	177 lbf
	Metric	*38 mm*	*216 mm*	*137 N-m*	*407 N-m*	*407 N-m*	*6,549 N*	*6,549 N*	*786 N*
50	Inch	2.00 in	8.6 in	1,623 in-lbs	4,966 in-lbs	4,966 in-lbs	2,028 lbf	2,028 lbf	314 lbf
	Metric	*50 mm*	*218 mm*	*183 N-m*	*561 N-m*	*561 N-m*	*9,020 N*	*9,020 N*	*1,397 N*
63	Inch	2.50 in	13.0 in	2,038 in-lbs	9,508 in-lbs	9,508 in-lbs	2,583 lbf	2,583 lbf	491 lbf
	Metric	*64 mm*	*330 mm*	*230 N-m*	*1,074 N-m*	*1,074 N-m*	*11,490 N*	*11,490 N*	*2,184 N*

*At minimum "D" distance between carriers see graph below for other distances

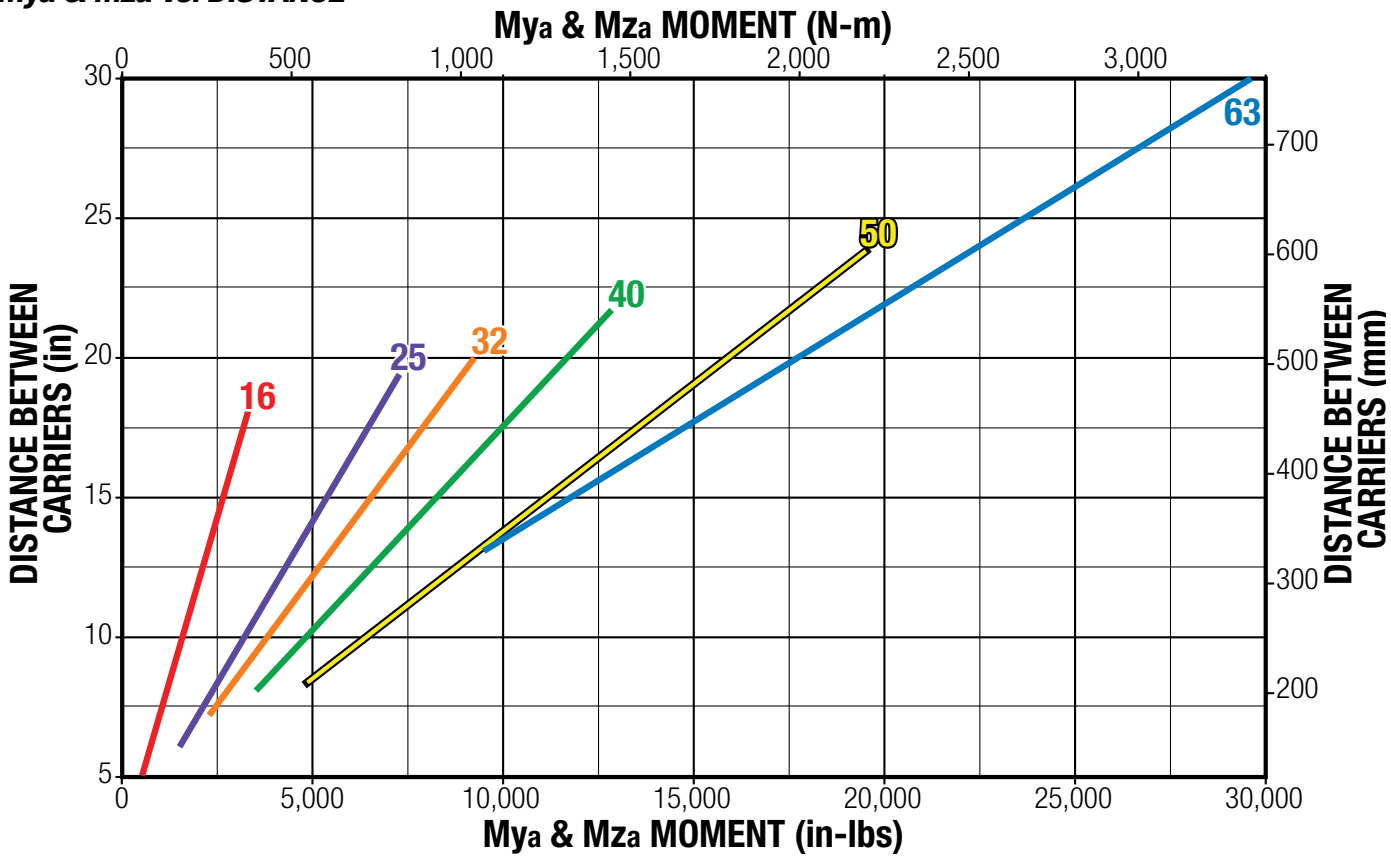
With combined loads, L_F must not exceed the value 1.

$$L_F = \frac{Mx}{Mx_{max}} + \frac{My}{My_{max}} + \frac{Mz}{Mz_{max}} + \frac{Fy}{Fy_{max}} + \frac{Fz}{Fz_{max}} \leq 1$$

Ratings are the maximum values for shock-free, vibration-free operation in a typical industrial environment. Contact Tolomatic for assistance in selecting the most appropriate actuator for your application.

NOTE: Mating surface of component mounted to carrier must maintain a flatness of at least 0.0015" (0.040 mm)

Mya & Mza vs. DISTANCE

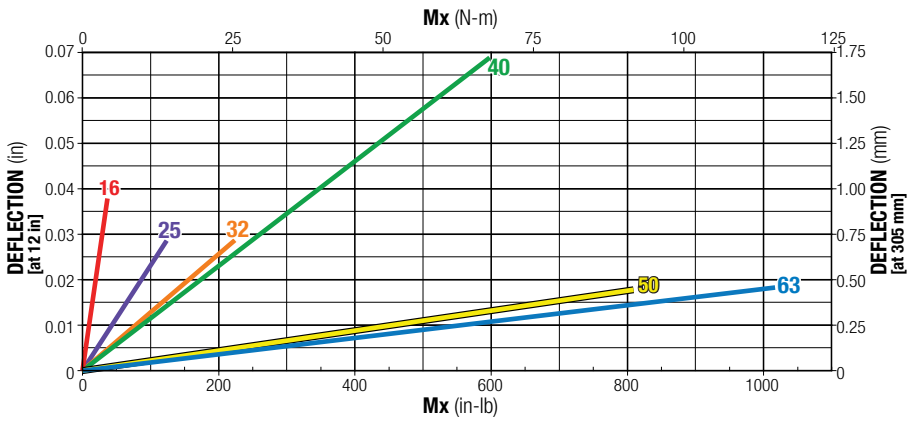


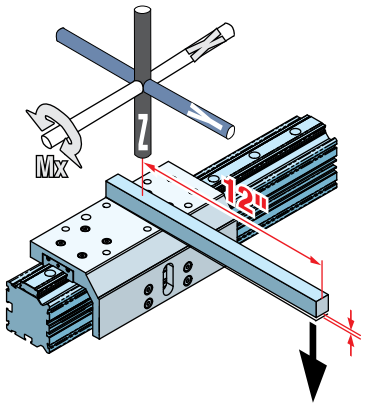
Ratings were calculated with the following conditions:

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

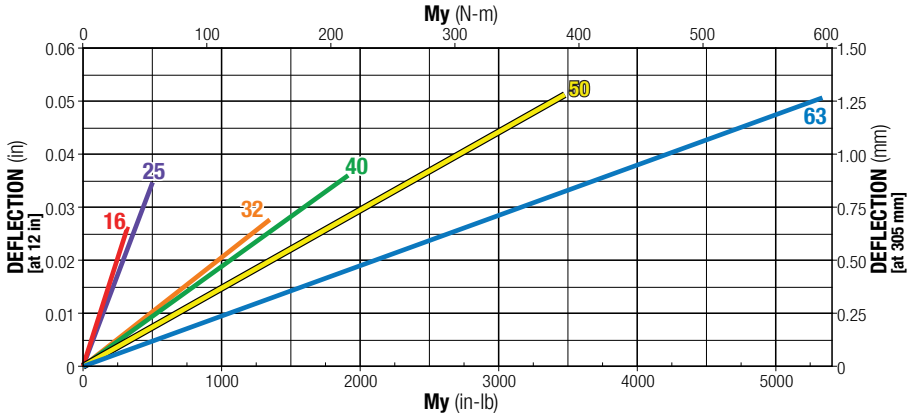
LOAD DEFLECTION

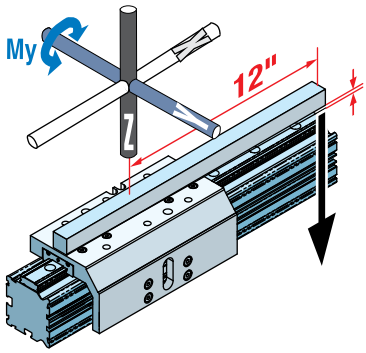
DEFLECTION ABOUT X AXIS



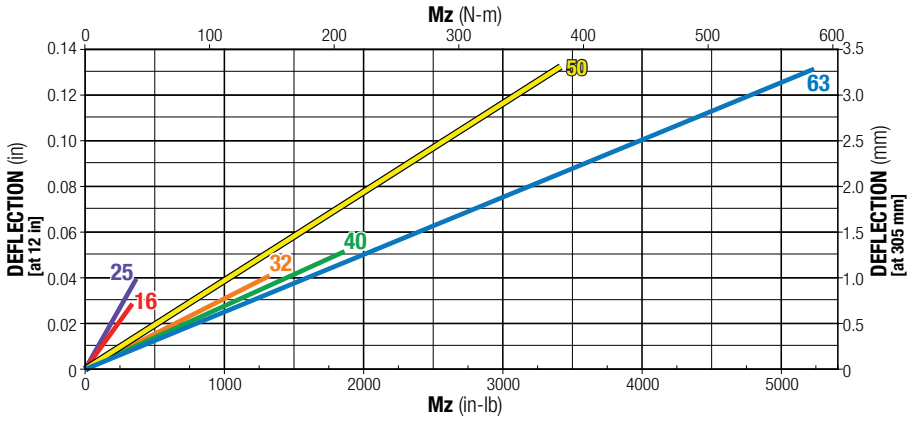


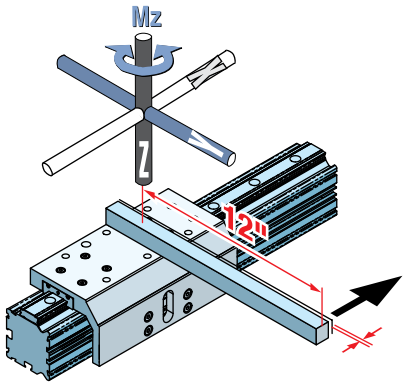
DEFLECTION ABOUT Y AXIS





DEFLECTION ABOUT Z AXIS





DEFLECTION TESTING WAS DONE UNDER THESE CRITERIA:

1.) Actuator was properly mounted with distance between mounting plates within recommendations (see Tube Clamp Requirements page MXP_24)

2.) Deflection was measured at 12" from center of carrier as shown

SPECIFICATIONS

		SIZE	16	25	32	40	50	63
ACTUAL BORE SIZE		in	0.63	1.00	1.25	1.50	2.00	2.50
		mm	*16*	*25*	*32*	*38*	*50*	*64*
BASE WEIGHT	N INTERNAL BEARING	lb	0.73	1.70	3.58	5.57	11.07	22.59
		kg	*0.33*	*0.77*	*1.62*	*2.53*	*5.02*	*10.25*
	S SOLID BEARING	lb	1.07	2.30	4.68	7.64	14.03	30.78
		kg	*0.48*	*1.04*	*2.12*	*3.47*	*6.36*	*13.96*
	P PROFILED RAIL	lb	1.25	2.94	5.89	9.91	17.22	31.64
		kg	*0.57*	*1.33*	*2.67*	*4.5*	*7.81*	*14.35*
WEIGHT PER UNIT OF STROKE	N INTERNAL & S SOLID	lb/in	0.082	0.134	0.233	0.306	0.513	0.879
		kg/mm	*0.0015*	*0.0024*	*0.0042*	*0.0055*	*0.0092*	*0.0157*
	P PROFILED RAIL	lb/in	0.102	0.192	0.316	0.491	0.701	1.153
		kg/mm	*0.0018*	*0.0034*	*0.0056*	*0.0088*	*0.0125*	*0.0206*
MAXIMUM STROKE LENGTH		in	206	206	205	203	203	103
		mm	*5232*	*5232*	*5207*	*5156*	*5156*	*2616*
AUXILIARY CARRIER; MIN. "D" BETWEEN CARRIERS		in	5.00	6.00	7.00	8.50	8.60	13.00
		mm	*127.0*	*152.4*	*177.8*	*215.9*	*218.4*	*330.2*
MAXIMUM OPERATING PRESSURE		PSI	100					
		bar	*6.9*					
TEMPERATURE RANGE		°F	20 to 140					
		°C	*-7 to 60*					

TIPS FOR MAXIMIZING BAND CYLINDER LIFE

TO GET THE MOST LIFE OUT OF YOUR MXP BAND CYLINDER FOLLOW THESE SIMPLE GUIDELINES WHEN SIZING A BAND CYLINDER FOR AN APPLICATION.

Four factors that affect the life of a band cylinder are Load, Speed, Environment and Deceleration. The following tips will help you select the appropriate band cylinder for a specific application's loads and speeds to maximize actuator life.

1 LOAD: KEEP THE LOAD FACTOR LESS THAN 1

Applications with multiple loads put additional stress on the band cylinder's bearing system. It is important to account for all these loads to make sure the bearing system is not over loaded. Both static and dynamic loads need to be addressed.

The formula below can be used to calculate the load factor:

$$L_F = \frac{Mx}{Mx_{max}} + \frac{My}{My_{max}} + \frac{Mz}{Mz_{max}} + \frac{Fy}{Fy_{max}} + \frac{Fz}{Fz_{max}} \leq 1$$

2 SPEED: REDUCE SPEEDS

High speeds and cycle rates stress the band cylinder's guidance system more than slower applications. Keeping speeds reduced will optimize the life of the actuator.

3 ENVIRONMENT: KEEP CONTAMINATION OFF BAND AND MOVING SURFACES

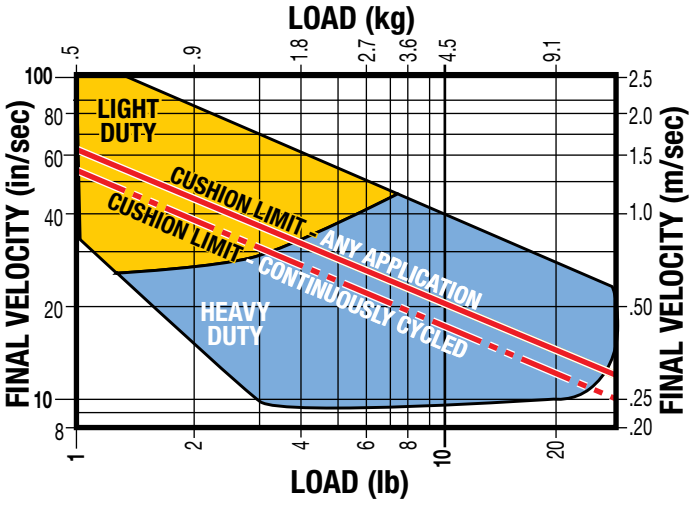
Contamination will decrease band cylinder service life. Service life can be improved by orienting the band and bearing system 180 degrees from the contamination source. For instance, if solid particulates are falling on the actuator, it is best to try to orient the band cylinder so that the band and bearing system are shielded from the particulates.

4 DECELERATION: DECELERATE WITH SHOCK ABSORBERS

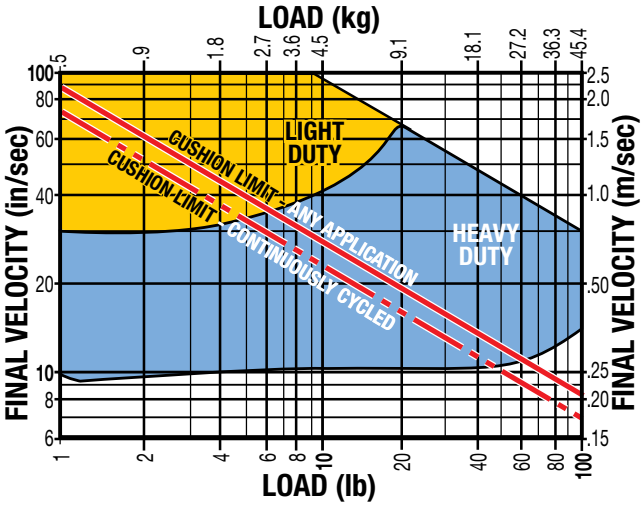
Shock absorbers provide the most controlled and reliable deceleration at the end of stroke. Stopping in a controlled fashion will significantly decrease the inertia loads on the carrier bearings, extending cylinder life. The best location for shock absorbers is at the center of gravity of the load.

CUSHION & SHOCK ABSORBER PERFORMANCE

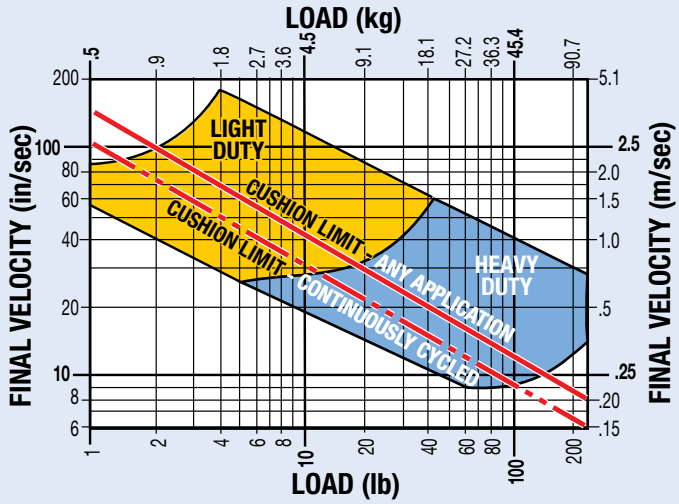
MXP16 (ALL BEARINGS)



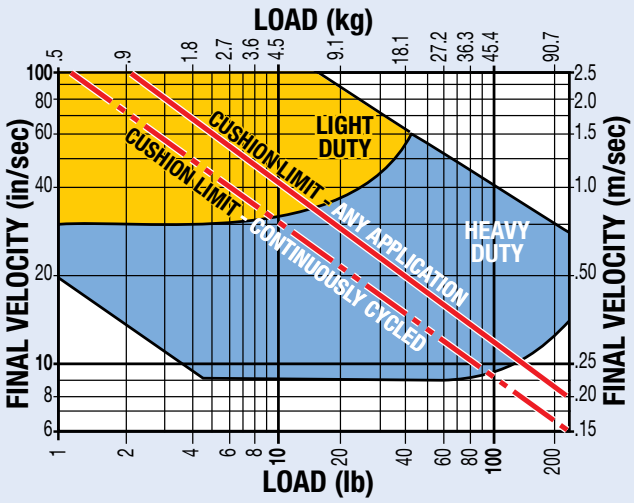
MXP25 (ALL BEARINGS)



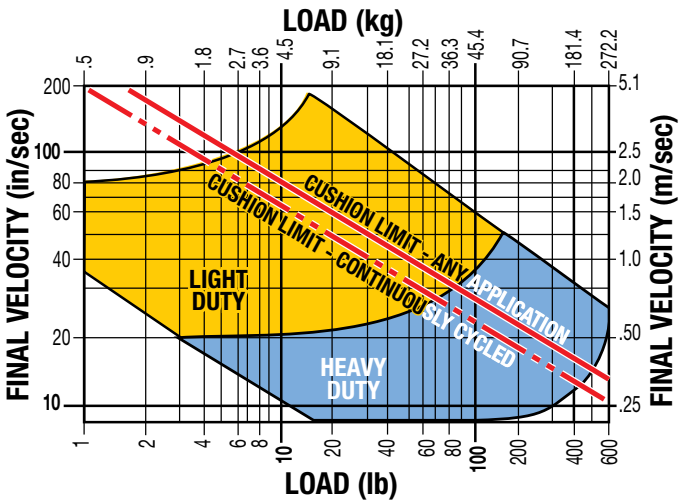
MXP32 (ALL BEARINGS)



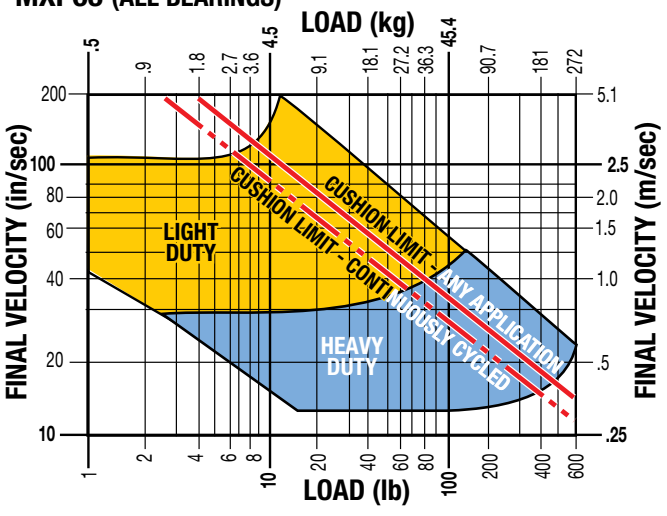
MXP40 (ALL BEARINGS)



MXP50 (ALL BEARINGS)



MXP63 (ALL BEARINGS)

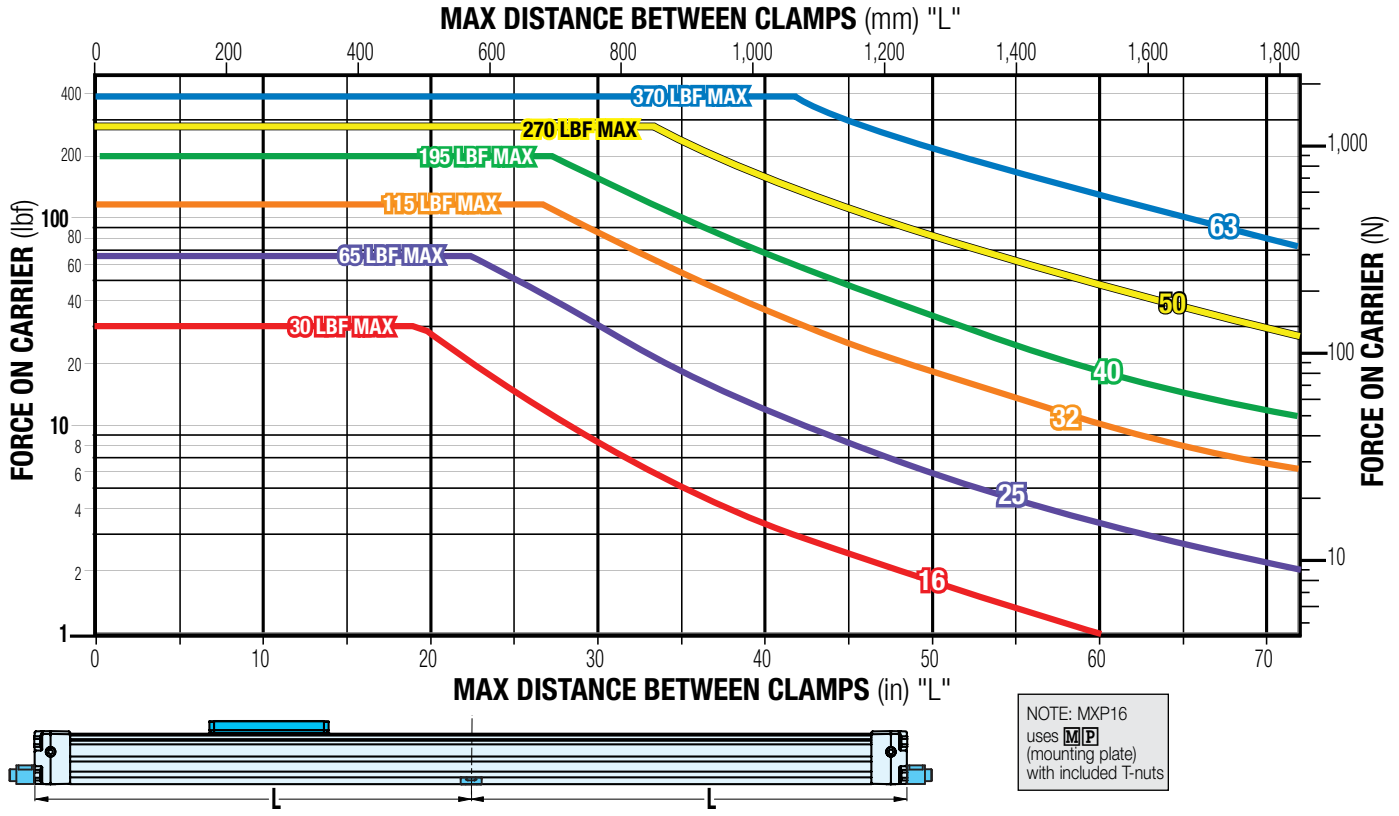


NOTE: If final (impact) velocity cannot be calculated directly, a reasonable guideline to use is 2X average velocity.

⚠ NOTE: When 2 shock absorbers are ordered, the MXP will be assembled with NO internal cushion seals.

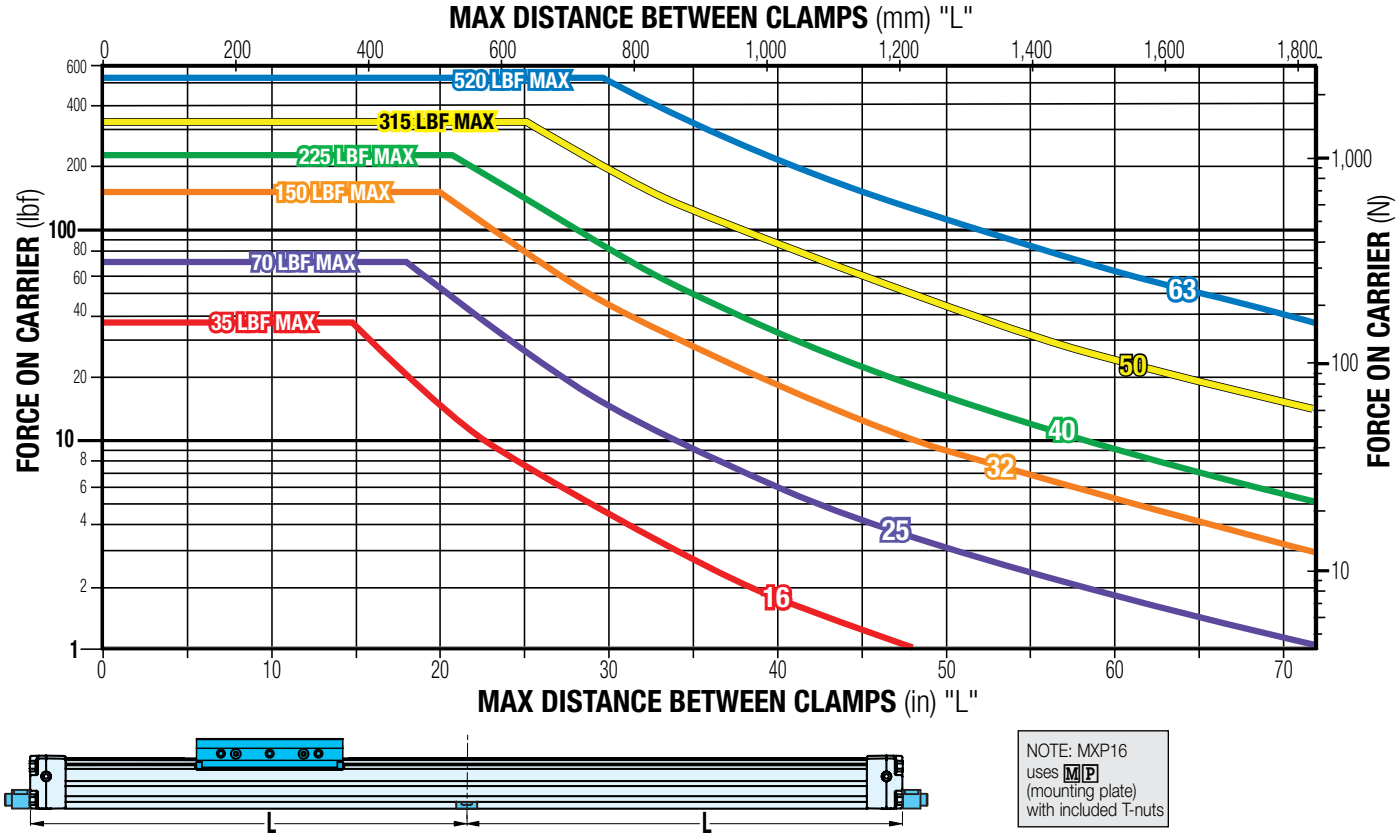
TUBE CLAMP REQUIREMENTS

N - INTERNAL BEARING



NOTE: MXP16 uses MP (mounting plate) with included T-nuts

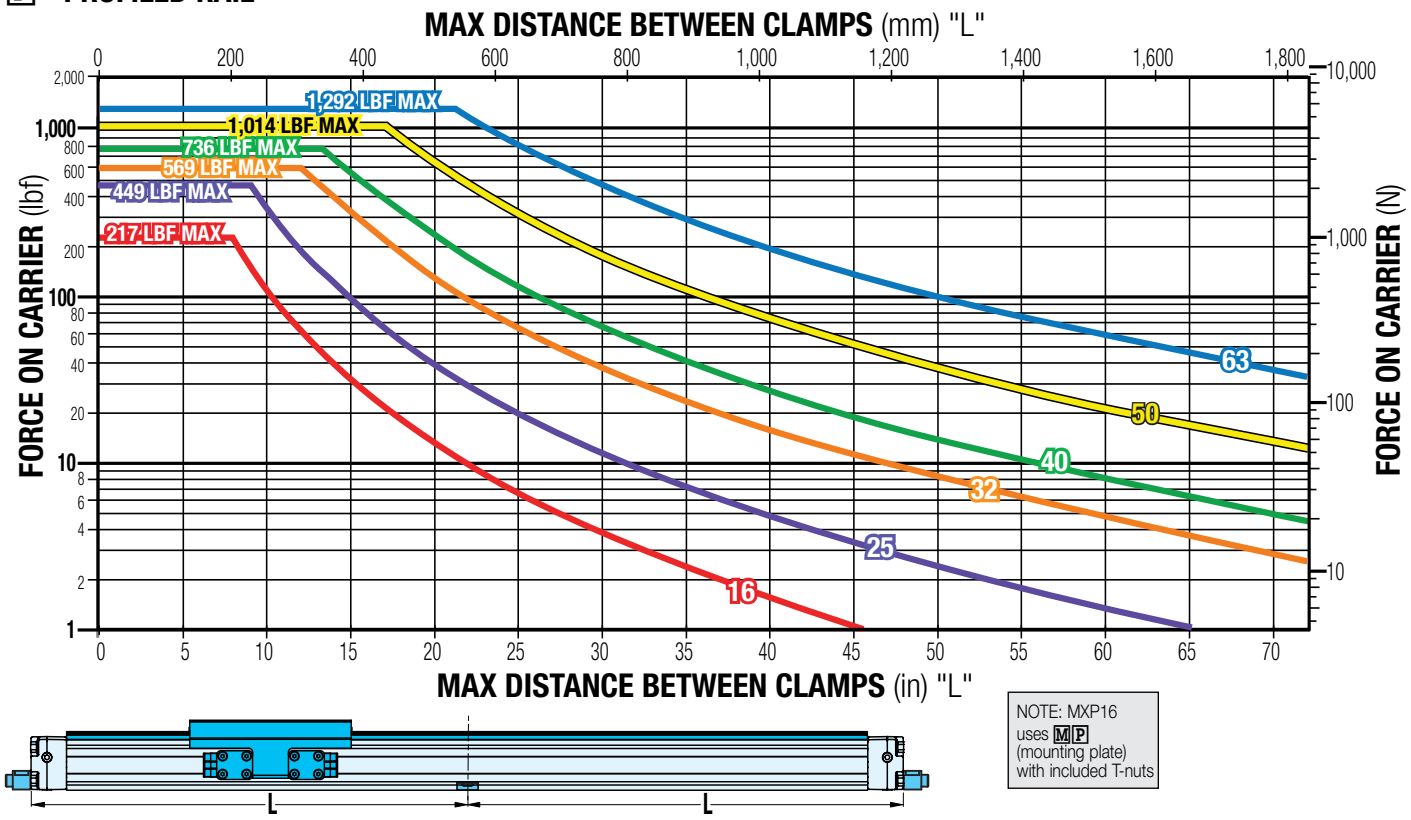
S - SOLID BEARING



NOTE: MXP16 uses MP (mounting plate) with included T-nuts

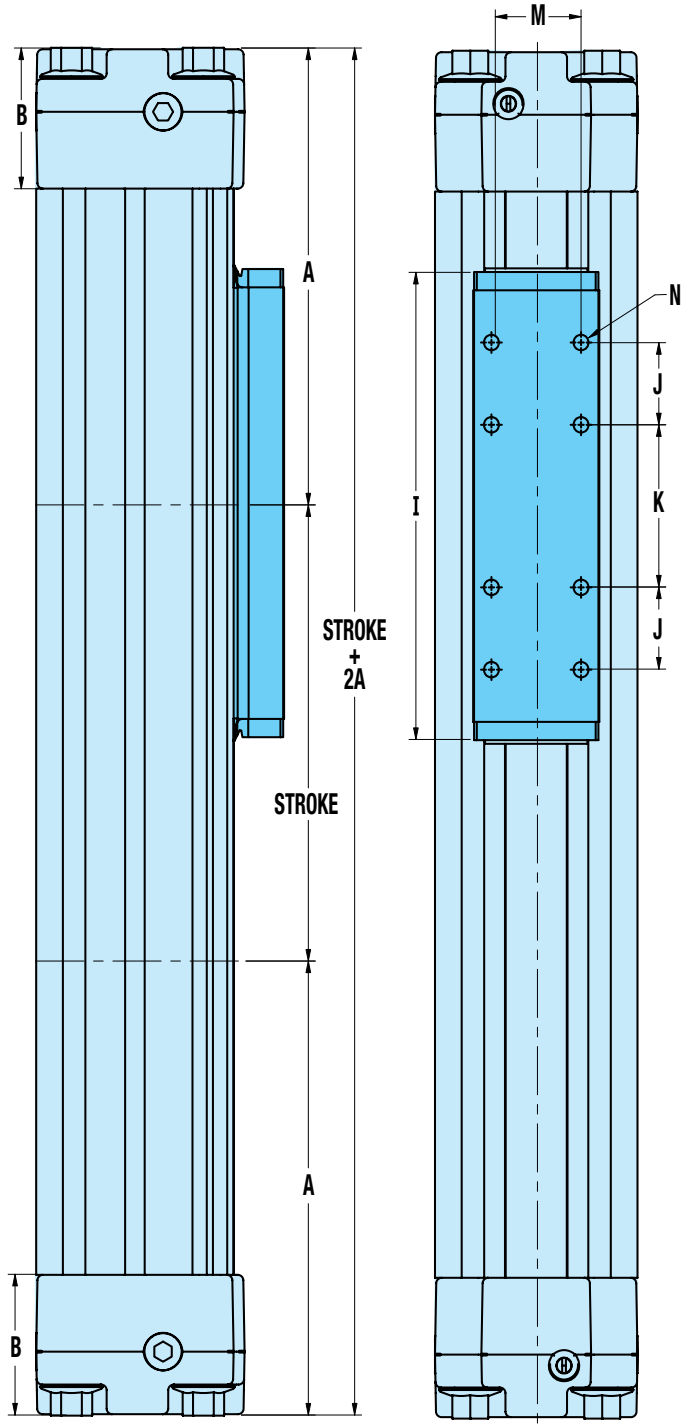
TUBE CLAMP REQUIREMENTS

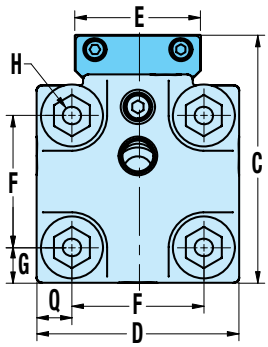
P - PROFILED RAIL



NOTE: MXP16 uses M P (mounting plate) with included T-nuts

N-INTERNAL BEARING ACTUATOR DIMENSIONS





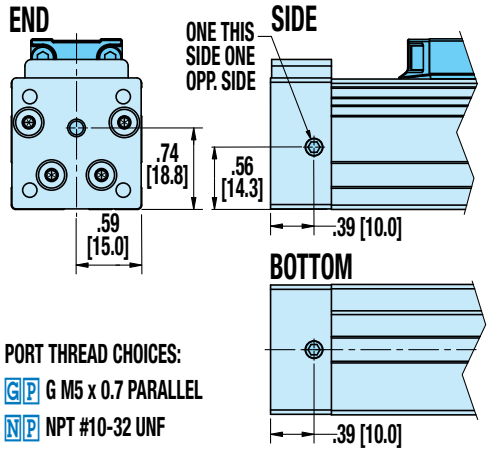
3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
A	3.13	3.94	4.90	5.82	6.29	8.45
mm	*79.6*	*100.2*	*124.5*	*147.7*	*159.8*	*214.5*
B	0.55	1.11	1.50	1.50	1.97	1.97
mm	*14.0*	*28.3*	*38.1*	*38.0*	*50.0*	*50.0*
C	1.55	2.07	2.67	2.98	3.86	4.76
mm	*39.3*	*52.6*	*67.8*	*75.8*	*98.1*	*120.8*
D	1.18	1.65	2.18	2.52	3.01	3.94
mm	*30.0*	*42.0*	*55.4*	*64.0*	*78.7*	*100.0*
E	0.83	0.83	1.36	1.61	2.13	2.44
mm	*21.0*	*21.0*	*34.5*	*41.0*	*54.0*	*62.0*
F	0.85	1.10	1.42	1.81	2.25	2.87
mm	*21.5*	*27.9*	*36.1*	*46.0*	*57.2*	*73.0*
G	0.17	0.25	0.38	0.35	0.43	0.53
mm	*4.3*	*6.3*	*9.7*	*9.0*	*10.8*	*13.5*
H	#8-32 (8)	#10-24 (8)	1/4-20 (8)	1/4-20 (8)	5/16-18 (8)	5/16-18 (8)
mm	*M4x0.7 (8)*	*M5x0.8 (8)*	*M6x1.0 (8)*	*M6x1.0 (8)*	*M8x1.25 (8)*	*M8x1.25 (8)*
I	3.78	4.45	5.04	5.87	6.57	9.69
mm	*96.0*	*113.0*	*128.0*	*149.0*	*166.8*	*246.0*
J	0.59	0.79	0.89	0.63	1.13	1.18
mm	*15.0*	*20.0*	*22.5*	*15.9*	*28.6*	*30.0*
K	1.18	1.57	1.75	3.00	2.25	4.33
mm	*30.0*	*40.0*	*44.5*	*76.2*	*57.2*	*110.0*
M	0.63	0.59	0.96	1.05	1.50	1.69
mm	*16.0*	*15.0*	*24.5*	*26.7*	*38.1*	*43.0*
N	#6-32 (8)	#8-32 (8)	#10-32 (8)	1/4-20 (8)	5/16-18 (8)	3/8-16 (8)
mm	*M3x0.5 (8)*	*M4x0.7 (8)*	*M5x0.8 (8)*	*M6x1.0 (8)*	*M8x1.25 (8)*	*M10x1.5 (8)*
Q	0.17	0.28	0.38	0.35	0.43	0.53
mm	*4.3*	*7.0*	*9.7*	*9.0*	*10.8*	*13.5*

N-INTERNAL BEARING PORTING DIMENSIONS MXP16N, MXP25N, MXP32N

DUAL END PORTING

16mm BORE

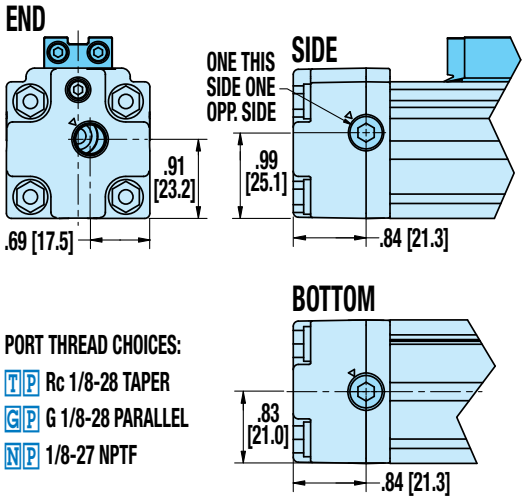


PORT THREAD CHOICES:
- GP G M5 x 0.7 PARALLEL
- NP NPT #10-32 UNF

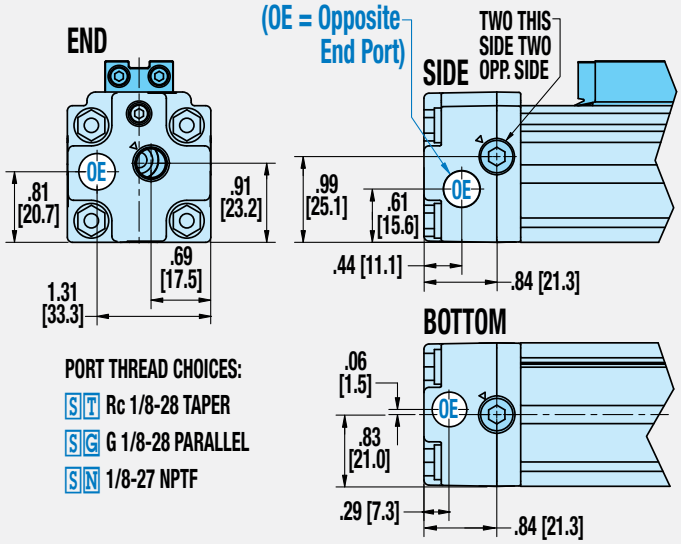
SINGLE-END PORTING

Not Available for 16mm BORE

25mm BORE

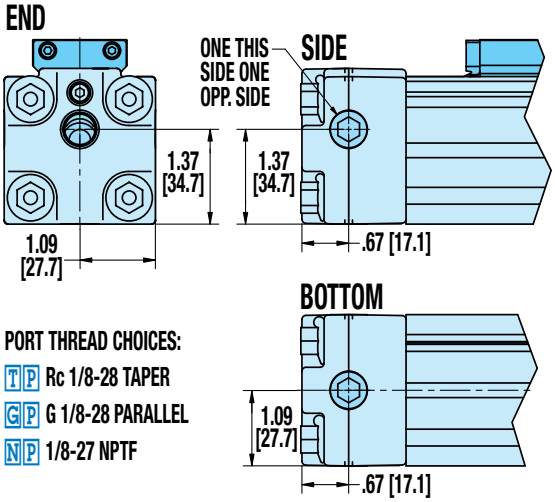


PORT THREAD CHOICES:
- TP Rc 1/8-28 TAPER
- GP G 1/8-28 PARALLEL
- NP 1/8-27 NPTF

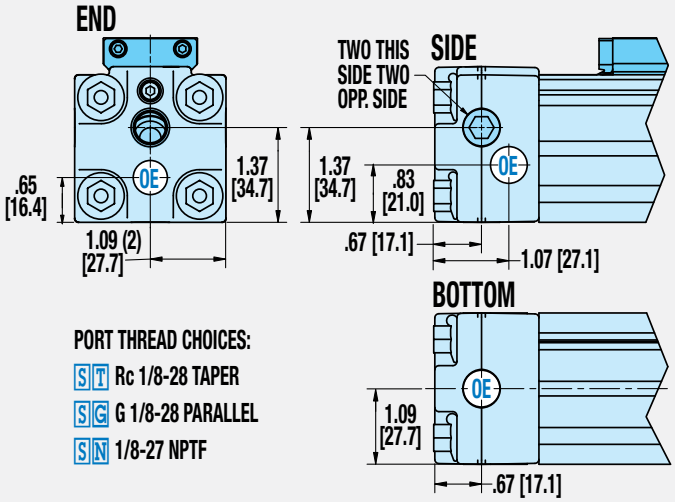


PORT THREAD CHOICES:
- ST Rc 1/8-28 TAPER
- SG G 1/8-28 PARALLEL
- SN 1/8-27 NPTF

32mm BORE



PORT THREAD CHOICES:
- TP Rc 1/8-28 TAPER
- GP G 1/8-28 PARALLEL
- NP 1/8-27 NPTF



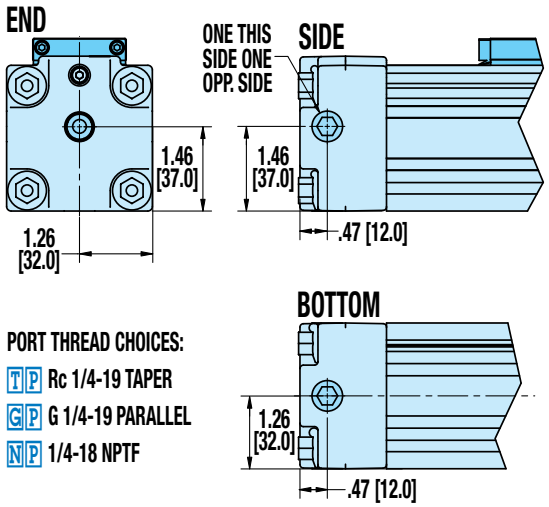
PORT THREAD CHOICES:
- ST Rc 1/8-28 TAPER
- SG G 1/8-28 PARALLEL
- SN 1/8-27 NPTF

3D CAD AVAILABLE at www.tolomatic.com

Dimensions in inches [brackets indicate dimensions in millimeters]

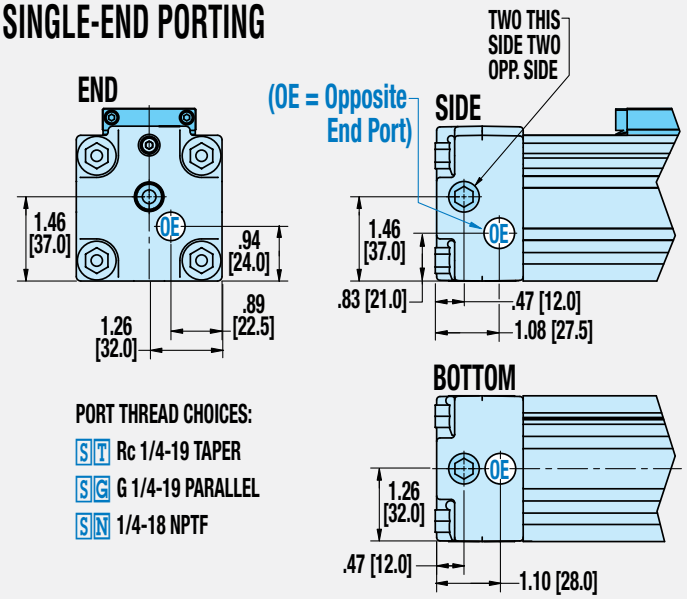
40mm BORE

DUAL END PORTING



PORT THREAD CHOICES:
- TP Rc 1/4-19 TAPER
- GP G 1/4-19 PARALLEL
- NP 1/4-18 NPTF

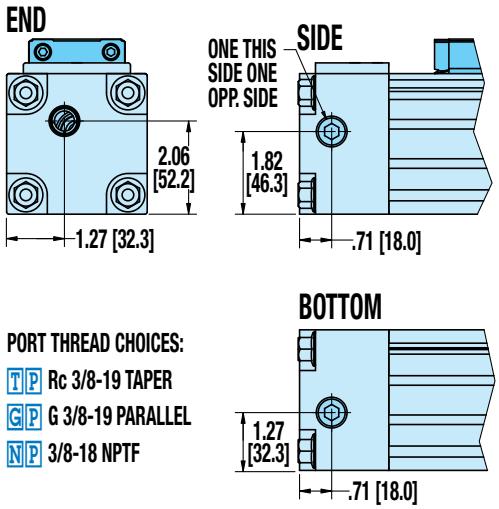
SINGLE-END PORTING



PORT THREAD CHOICES:
- ST Rc 1/4-19 TAPER
- SG G 1/4-19 PARALLEL
- SN 1/4-18 NPTF

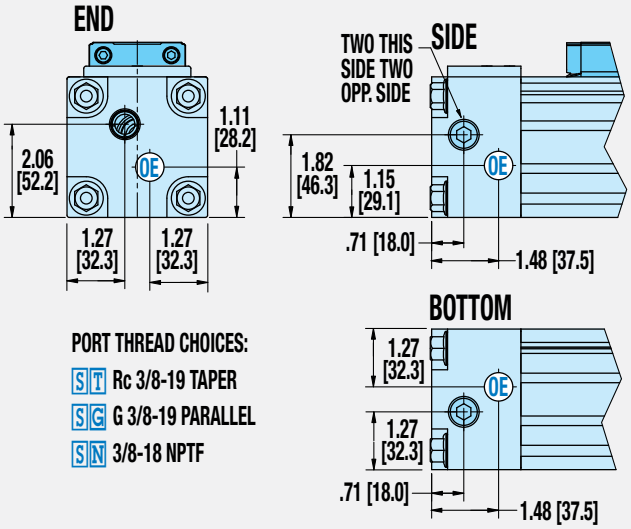
50mm BORE

DUAL END PORTING



PORT THREAD CHOICES:
- TP Rc 3/8-19 TAPER
- GP G 3/8-19 PARALLEL
- NP 3/8-18 NPTF

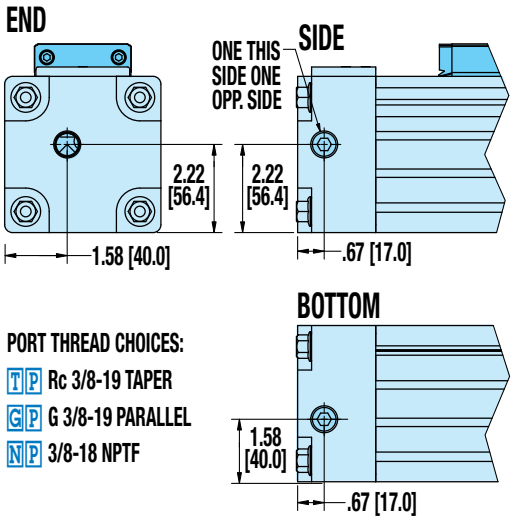
SINGLE-END PORTING



PORT THREAD CHOICES:
- ST Rc 3/8-19 TAPER
- SG G 3/8-19 PARALLEL
- SN 3/8-18 NPTF

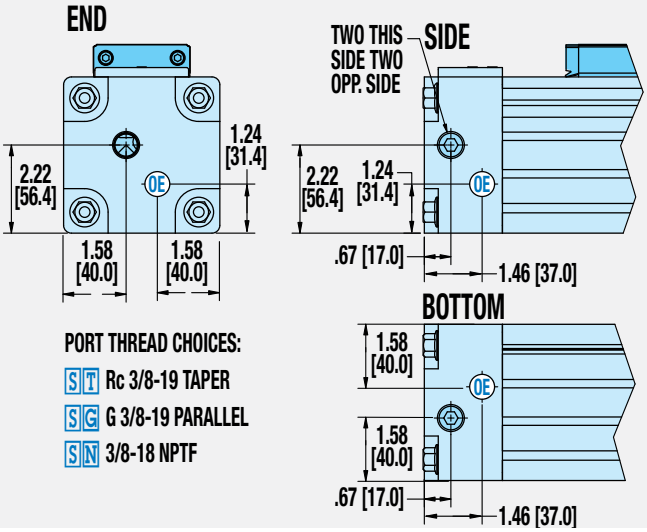
63mm BORE

DUAL END PORTING



PORT THREAD CHOICES:
- TP Rc 3/8-19 TAPER
- GP G 3/8-19 PARALLEL
- NP 3/8-18 NPTF

SINGLE-END PORTING



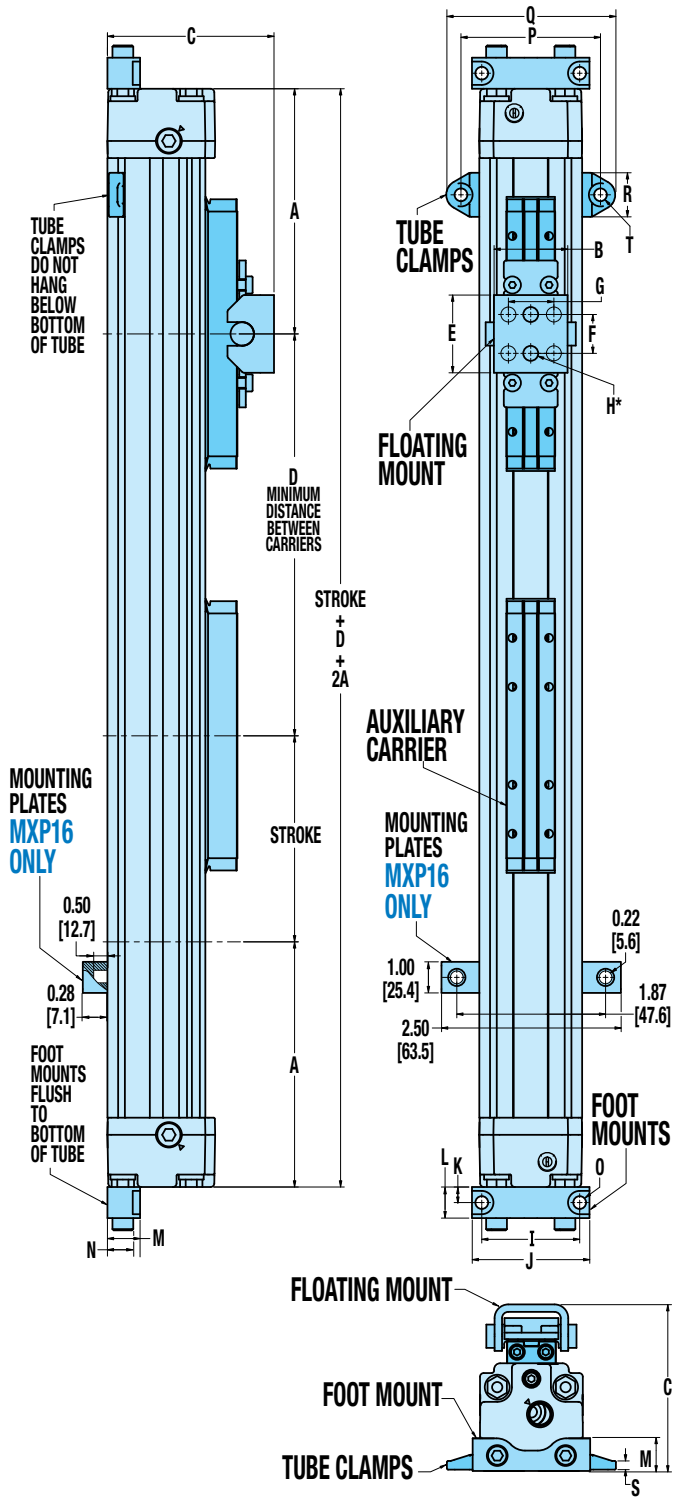
PORT THREAD CHOICES:
- ST Rc 3/8-19 TAPER
- SG G 3/8-19 PARALLEL
- SN 3/8-18 NPTF

3D CAD AVAILABLE at www.tolomatic.com

Dimensions in inches [brackets indicate dimensions in millimeters]

N-INTERNAL BEARING OPTION DIMENSIONS

AUXILIARY CARRIER, FLOATING MOUNT, FOOT MOUNT, TUBE CLAMPS



	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
A	3.13	3.94	4.90	5.82	6.29	8.45
mm	*79.6*	*100.2*	*124.5*	*147.7*	*159.8*	*214.5*
AUXILIARY CARRIER						
D	5.00	6.00	7.00	8.50	8.60	13.00
mm	*127.0*	*152.4*	*177.8*	*215.9*	*218.4*	*330.0*
FLOATING MOUNT						
B	1.27	1.19	2.08	2.55	3.24	3.15
mm	*32.2*	*30.1*	*52.8*	*64.7*	*82.3*	*80.0*
C	1.97	2.66	3.70	4.07	4.66	5.57
mm	*50.1*	*67.5*	*94.1*	*103.3*	*118.4*	*141.6*
E	0.90	1.25	1.50	1.50	3.94	5.20
mm	*22.9*	*31.8*	*38.1*	*38.1*	*100.1*	*132.0*
F	0.50	0.63	0.75	0.79	3.15	4.33
mm	*12.7*	*15.9*	*19.1*	*20.0*	*80.0*	*110.0*
G	-	-	1.00	1.38	-	1.69
mm	*-*	*-*	*25.4*	*35.0*	*-*	*43.0*
H*	0.17(2)	0.24(2)	0.28(4)	0.28(4)	0.36(2)	0.34(4)
mm	*4.3(2)*	*6.1(2)*	*7.1(4)*	*7.1(4)*	*9.1(2)*	*8.7(4)*
FOOT MOUNTS						
I	1.26	1.57	2.01	2.52	3.11	3.94
mm	*32.0*	*40.0*	*51.0*	*64.0*	*78.9*	*100.0*
J	1.57	1.89	2.36	2.91	3.67	4.72
mm	*40.0*	*48.0*	*60.0*	*74.0*	*93.2*	*120.0*
K	0.16	0.25	0.37	0.47	0.50	0.59
mm	*4.0*	*6.4*	*9.5*	*12.0*	*12.7*	*15.0*
L	0.31	0.50	0.75	0.94	1.00	1.18
mm	*8.0*	*12.7*	*19.0*	*24.0*	*25.4*	*30.0*
M	0.35	0.52	0.91	0.73	1.00	1.06
mm	*8.9*	*13.3*	*23.0*	*18.5*	*25.4*	*27.0*
N	-	0.41	0.71	0.45	0.69	0.65
mm	*-*	*10.3*	*18.0*	*11.4*	*17.4*	*16.5*
O	0.18	0.20	0.22	0.28	0.35	0.42
mm	*4.6*	*5.2*	*5.5*	*7.1*	*9.0*	*10.7*
TUBE CLAMPS						
P	-	2.24	2.92	3.26	3.84	5.19
mm	*-*	*57.0*	*74.1*	*82.7*	*97.5*	*131.7*
Q	-	2.72	3.44	3.81	4.39	5.93
mm	*-*	*69.0*	*87.4*	*96.7*	*111.5*	*150.7*
R	-	0.71	0.63	0.55	0.55	0.75
mm	*-*	*18.0*	*16.0*	*14.0*	*14.0*	*19.0*
S	-	0.14	0.17	0.15	0.15	0.24
mm	*-*	*3.6*	*4.3*	*3.8*	*3.8*	*6.1*
T	-	0.20	0.28	0.28	0.28	0.42
mm	*-*	*5.2*	*7.1*	*7.1*	*7.1*	*10.7*

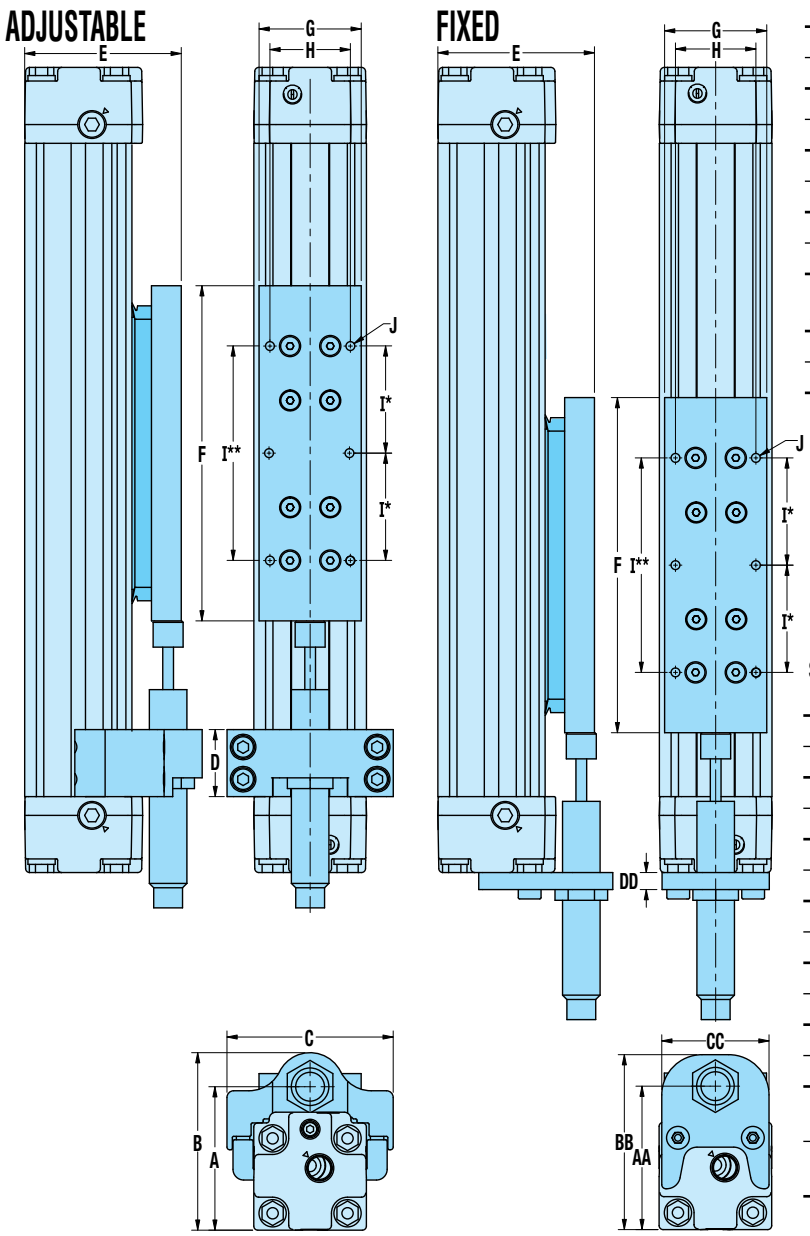
**MXP16, 25 & 50 use 2 center holes,*
MXP32, 40 & 63 use 4 corner holes

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

NOTE: Auxiliary carrier is N-Internal Bearing carrier, see page MXP_25 for carrier size and mounting dimensions

N-INTERNAL BEARING OPTION DIMENSIONS

ADJUSTABLE AND FIXED SHOCK ABSORBERS



ADJUSTABLE SHOCK ABSORBER

	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
A	1.65	2.11	2.91	3.32	4.24	5.21
mm	*42.0*	*53.5*	*73.8*	*84.4*	*107.6*	*132.4*
B	1.97	2.61	3.35	3.87	4.87	5.91
mm	*50.0*	*66.2*	*85.0*	*98.4*	*123.8*	*150.0*
C	1.74	2.44	2.95	3.43	4.09	5.20
mm	*44.3*	*62.0*	*74.9*	*87.0*	*103.9*	*132.0*
D	0.71	0.98	1.25	0.98	1.22	1.26
mm	*18.0*	*25.0*	*31.8*	*25.0*	*31.0*	*32.0*

Stroke Adder: Adjustable Shock Absorber

in	0.49	1.06	1.17	0.76	0.81	0.51
mm	*12.4*	*26.8*	*29.8*	*19.3*	*20.5*	*13.0*

⚠ NOTE: For each adjustable shock absorber ordered, add Stroke Adder value to required stroke to determine configurated actuator stroke.

Required Stroke + (Adj. Shock Quantity x Stroke Adder value) = Configurated Actuator Stroke

Example: MXP25N, 500mm stroke required, 2 adjustable shocks

500 + (2 x 26.8) = 500 + 53.6 = 553.6mm

SHOCK PLATE

	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
E	1.81	2.28	3.17	3.61	4.55	5.65
mm	*46.0*	*57.9*	*80.5*	*91.8*	*115.6*	*143.4*
F	3.86	4.92	5.20	6.72***	6.65	10.29****
mm	*98.0*	*125.0*	*132.0*	*170.8****	*168.8*	*261.4****
G	0.94	1.50	1.32	1.61	2.13	2.44
mm	*24.0*	*38.1*	*33.5*	*41.0*	*54.0*	*62.0*
H	0.63	1.18	0.96	1.05	1.50	1.69
mm	*16.0*	*30.0*	*24.5*	*26.7*	*38.1*	*43.0*
I*	0.89	1.57	-	-	-	-
mm	*22.5*	*40.0*	*-*	*-*	*-*	*-*
I**	-	-	1.75	3.00	2.25	4.33
mm	*-*	*-*	*44.5*	*76.2*	*57.2*	*110.0*
J	#8-32 (6)	#8-32 (6)	#10-32 (4)	1/4-20 (4)	5/16-18 (4)	3/8-16 (4)
mm	*M4x0.8 (6)*	*M4x0.8 (6)*	*M5x0.8 (4)*	*M6x1.0 (4)*	*M8x1.25 (4)*	*M10x1.5 (4)*

**MXP16 & 25 Shock plate has 6 mounting holes*

***MXP32, 40, 50 & 63 Shock plate has 4 mounting holes*

****MXP40 Shock Stop Plate has impact bolts. Actual plate length is 5.98" (152mm); Impact bolts, one on each end, add .74" (18.8mm) to total length*

*****MXP63 Shock Stop Plate has impact bolts. Actual plate length is 9.84" (250mm); Impact bolts, one on each end, add .45" (11.4mm) to total length*

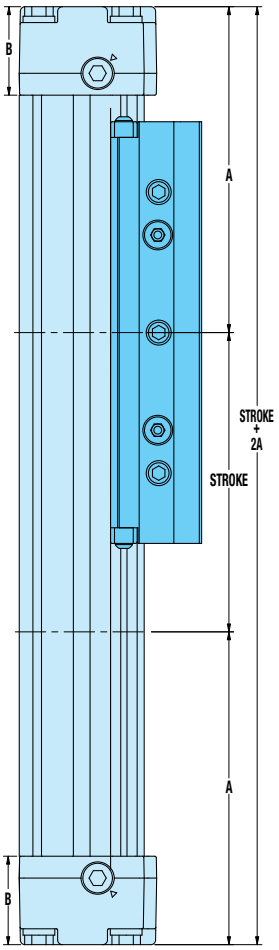
FIXED SHOCK ABSORBER

	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
AA	1.65	2.11	2.91	3.32	4.24	5.21
mm	*42.0*	*53.5*	*73.8*	*84.4*	*107.6*	*132.3*
BB	1.95	2.57	3.42	3.87	5.09	5.92
mm	*49.5*	*65.3*	*86.8*	*98.4*	*129.2*	*150.3*
CC	1.17	1.57	2.00	2.44	2.83	3.66
mm	*29.8*	*40.0*	*50.8*	*62.0*	*72.0*	*93.0*
DD	0.13	0.25	0.25	0.25	0.50	0.50
mm	*3.3*	*6.4*	*6.4*	*6.4*	*12.7*	*12.7*

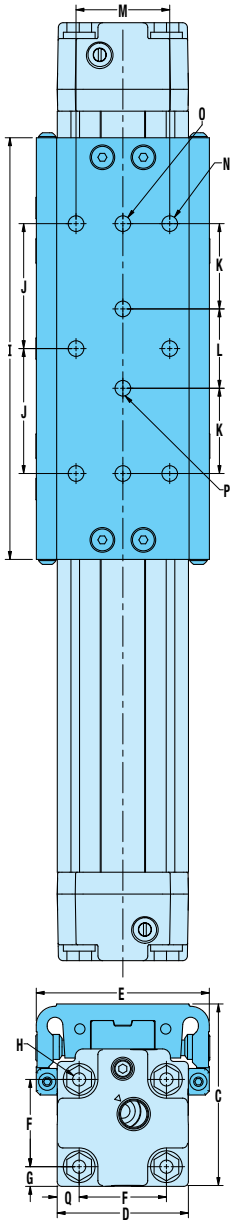
3D CAD AVAILABLE AT WWW.TOLOMATIC.COM CAD 2D

NOTE: Auxiliary carrier is N-Internal Bearing carrier, see page MXP_25 for carrier size and mounting dimensions

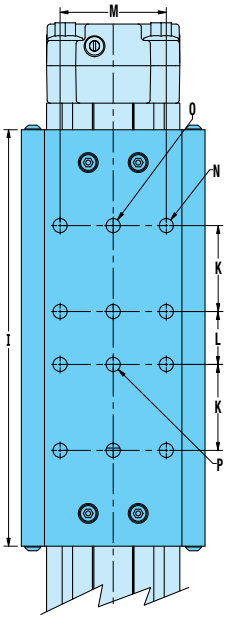
S-SOLID BEARING ACTUATOR DIMENSIONS



MOUNTING PATTERN MXP16, 25, 32, 50



MOUNTING PATTERN MXP40, 63

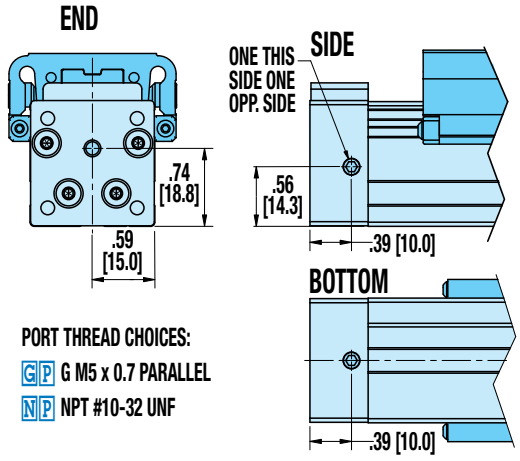


	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
A	3.13	3.94	4.90	5.82	6.29	8.45
mm	*79.6*	*100.2*	*124.5*	*147.7*	*159.8*	*214.5*
B	0.55	1.11	1.50	1.50	1.97	1.97
mm	*14.0*	*28.3*	*38.1*	*38.0*	*50.0*	*50.0*
C	1.80	2.30	3.06	3.51	4.44	5.48
mm	*45.8*	*58.4*	*77.8*	*89.2*	*112.8*	*139.1*
D	1.18	1.65	2.18	2.52	3.01	3.94
mm	*30.0*	*42.0*	*55.4*	*64.0*	*78.7*	*100.0*
E	2.18	2.18	2.86	3.47	4.01	5.59
mm	*55.4*	*55.4*	*72.6*	*88.2*	*104.1*	*142.0*
F	0.85	1.10	1.42	1.81	2.25	2.87
mm	*21.5*	*27.9*	*36.1*	*46.0*	*57.2*	*73.0*
G	0.17	0.25	0.38	0.35	0.43	0.53
mm	*4.3*	*6.3*	*9.7*	*9.0*	*10.8*	*13.5*
H	#8-32 (8)	#10-24 (8)	1/4-20 (8)	1/4-20 (8)	5/16-18 (8)	5/16-18 (8)
mm	*M4x0.7 (8)*	*M5x0.8 (8)*	*M6x1.0 (8)*	*M6x1.0 (8)*	*M8x1.25 (8)*	*M8x1.25 (8)*
I	4.12	5.31	6.02	7.87	7.91	12.11
mm	*104.6*	*135.0*	*153.0*	*200.0*	*200.8*	*307.5*
J	1.18	1.57	1.77	-	1.87	-
mm	*30.0*	*40.0*	*45.0*	*-*	*47.6*	*-*
K	-	1.07	1.10	1.63	1.25	1.50
mm	*-*	*27.3*	*28.0*	*41.3*	*31.8*	*38.1*
L	-	1.00	1.00	1.00	2.50	3.00
mm	*-*	*25.4*	*25.4*	*25.4*	*63.5*	*76.2*
M	1.18	1.18	1.73	2.01	2.59	3.25
mm	*30.0*	*30.0*	*44.0*	*51.0*	*65.8*	*82.6*
N	#8-32 (6)	1/4-20 (6)	1/4-20 (6)	5/16-18 (8)	3/8-16 (6)	3/8-16 (8)
mm	*M4x0.7 (6)*	*M6x1.0 (6)*	*M8x1.25 (6)*	*M8x1.25 (8)*	*M10x1.5 (6)*	*M10x1.5 (8)*
O	-	#10-32 (2)	1/4-20 (2)	5/16-18 (2)	3/8-16 (2)	3/8-16 (2)
mm	*-*	*M6x1.0 (2)*	*M8x1.25 (2)*	*M8x1.25 (2)*	*M10x1.5 (2)*	*M10x1.5 (2)*
P	-	1/4-20 (2)	1/4-20 (2)	1/4-20 (2)	3/8-16 (2)	3/8-16 (2)
mm	*-*	*M6x1.0 (2)*	*M8x1.25 (2)*	*M8x1.25 (2)*	*M10x1.5 (2)*	*M10x1.5 (2)*
Q	0.17	0.28	0.38	0.35	0.43	0.53
mm	*4.3*	*7.0*	*9.7*	*9.0*	*10.8*	*13.5*

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

DUAL END PORTING

16mm BORE

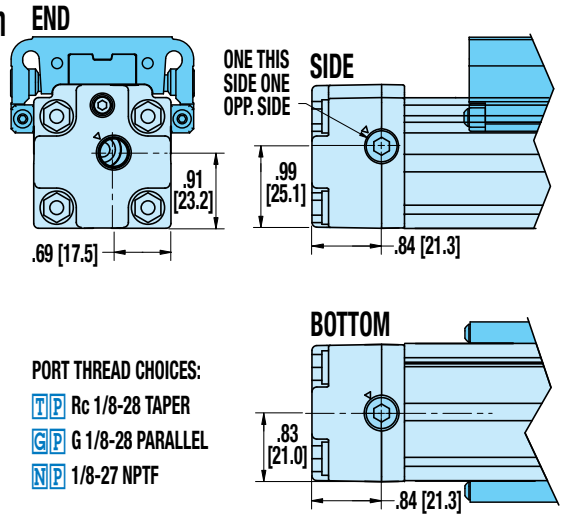


PORT THREAD CHOICES:
- GP G M5 x 0.7 PARALLEL
- NP NPT #10-32 UNF

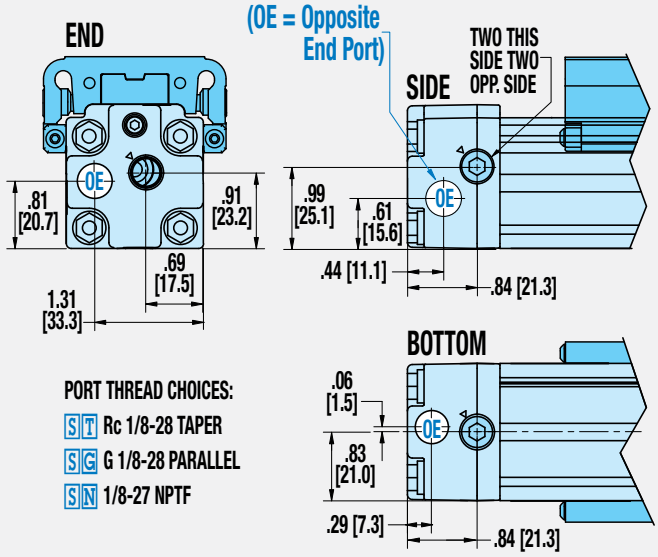
SINGLE-END PORTING

Not Available for 16mm BORE

25mm BORE

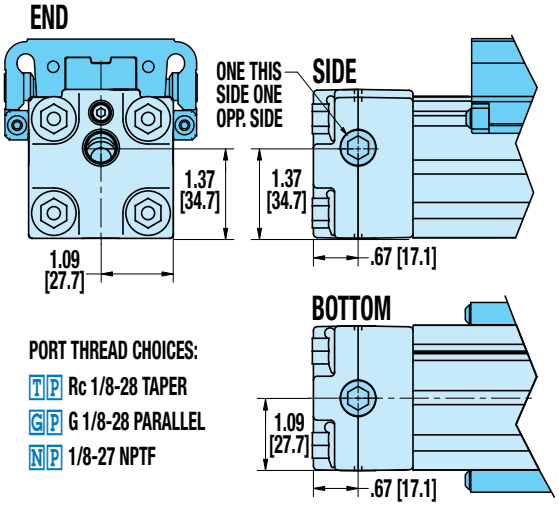


PORT THREAD CHOICES:
- TP Rc 1/8-28 TAPER
- GP G 1/8-28 PARALLEL
- NP 1/8-27 NPTF

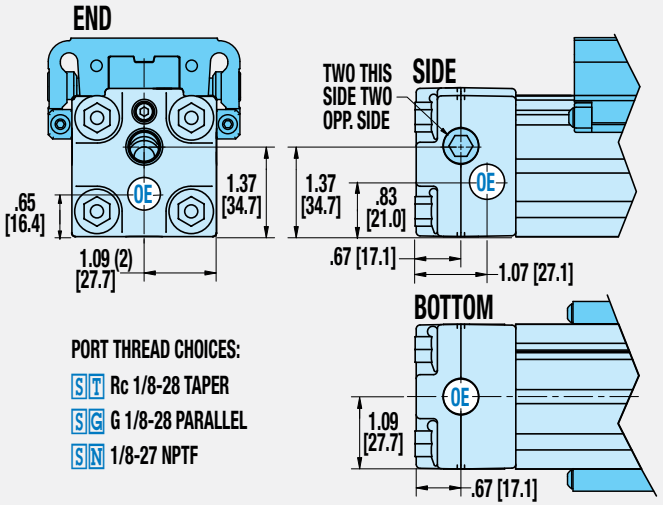


PORT THREAD CHOICES:
- ST Rc 1/8-28 TAPER
- SG G 1/8-28 PARALLEL
- SN 1/8-27 NPTF

32mm BORE



PORT THREAD CHOICES:
- TP Rc 1/8-28 TAPER
- GP G 1/8-28 PARALLEL
- NP 1/8-27 NPTF



PORT THREAD CHOICES:
- ST Rc 1/8-28 TAPER
- SG G 1/8-28 PARALLEL
- SN 1/8-27 NPTF

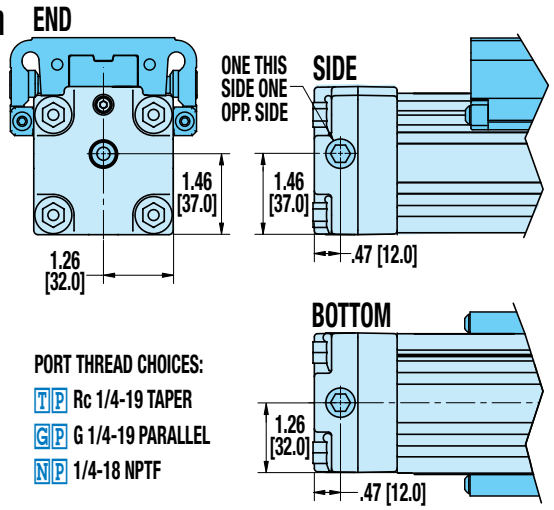
3D CAD AVAILABLE at www.tolomatic.com

Dimensions in inches [brackets indicate dimensions in millimeters]

S-SOLID BEARING PORTING DIMENSIONS MXP40S, MXP50S, MXP63S

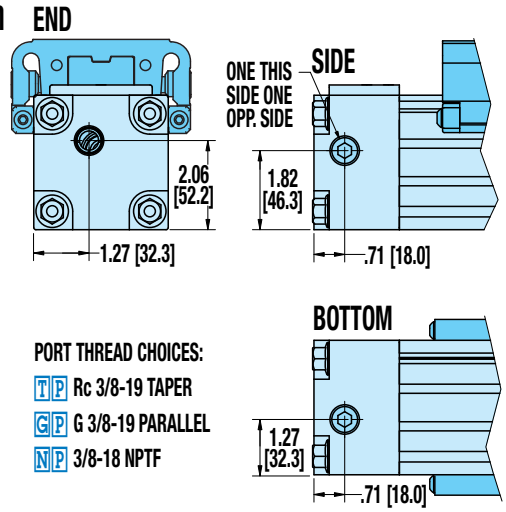
DUAL END PORTING

40mm BORE



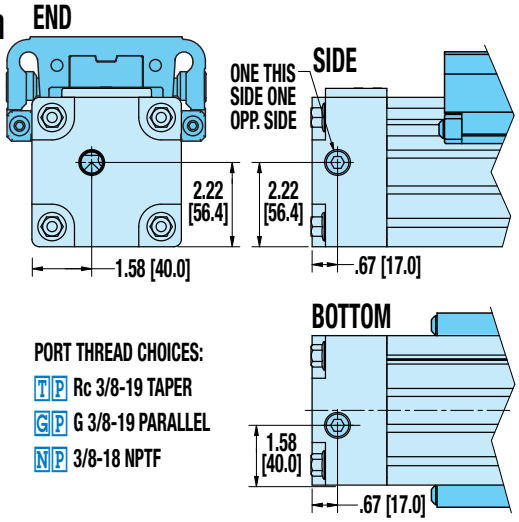
PORT THREAD CHOICES:
- TP Rc 1/4-19 TAPER
- GP G 1/4-19 PARALLEL
- NP 1/4-18 NPTF

50mm BORE



PORT THREAD CHOICES:
- TP Rc 3/8-19 TAPER
- GP G 3/8-19 PARALLEL
- NP 3/8-18 NPTF

63mm BORE

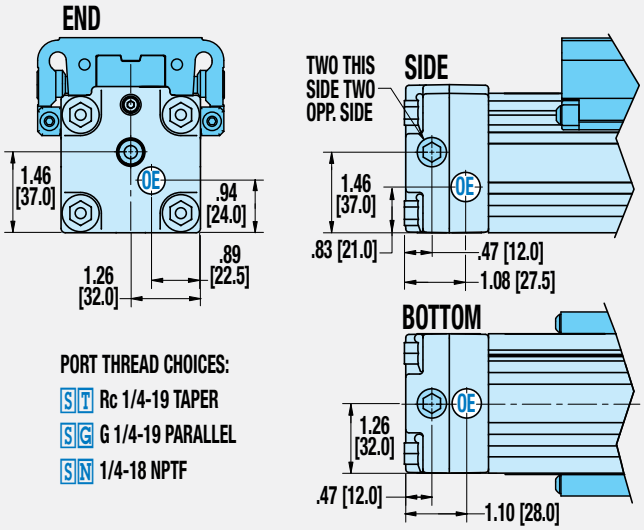


PORT THREAD CHOICES:
- TP Rc 3/8-19 TAPER
- GP G 3/8-19 PARALLEL
- NP 3/8-18 NPTF

3D CAD AVAILABLE at www.tolomatic.com

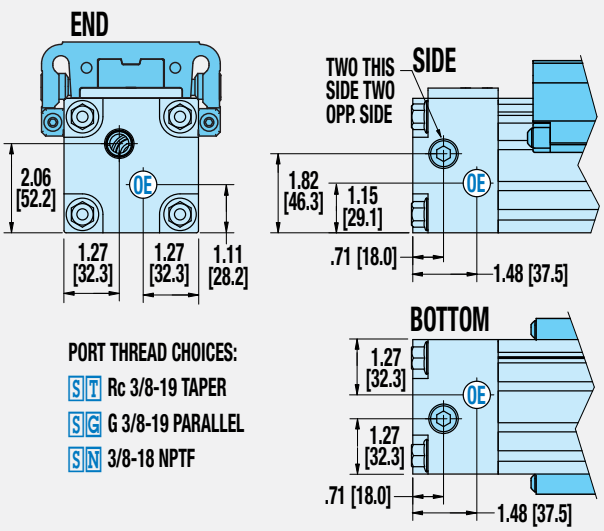
SINGLE-END PORTING

40mm BORE



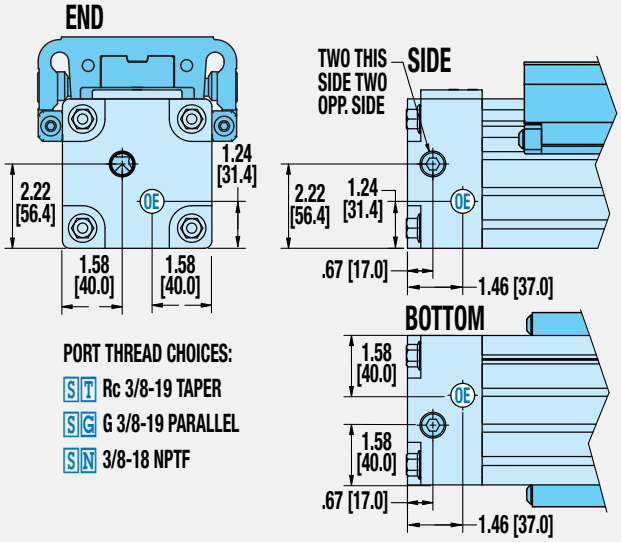
PORT THREAD CHOICES:
- ST Rc 1/4-19 TAPER
- SG G 1/4-19 PARALLEL
- SN 1/4-18 NPTF

50mm BORE



PORT THREAD CHOICES:
- ST Rc 3/8-19 TAPER
- SG G 3/8-19 PARALLEL
- SN 3/8-18 NPTF

63mm BORE

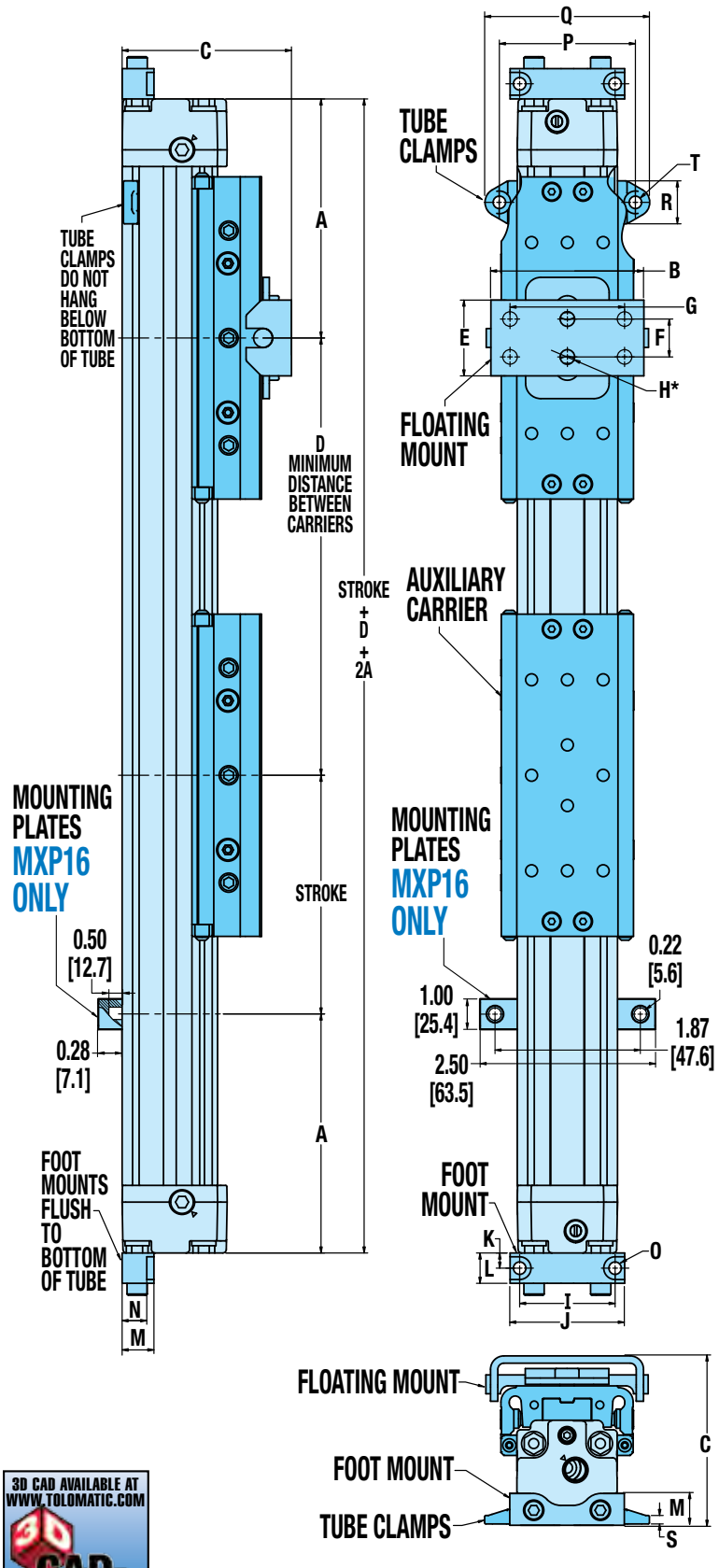


PORT THREAD CHOICES:
- ST Rc 3/8-19 TAPER
- SG G 3/8-19 PARALLEL
- SN 3/8-18 NPTF

Dimensions in inches [brackets indicate dimensions in millimeters]

S-SOLID BEARING OPTION DIMENSIONS

AUXILIARY CARRIER, FLOATING MOUNT, FOOT MOUNT, TUBE CLAMPS



	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
A	3.13	3.94	4.90	5.82	6.29	8.45
mm	*79.6*	*100.2*	*124.5*	*147.7*	*159.8*	*214.5*
AUXILIARY CARRIER						
D	5.00	6.00	7.00	8.50	8.60	13.00
mm	*127.0*	*152.4*	*177.8*	*215.9*	*218.4*	*330.0*
FLOATING MOUNT						
B	1.86	2.52	3.37	4.32	5.04	6.10
mm	*47.3*	*64.1*	*85.6*	*109.7*	*128.0*	*155.0*
C	2.31	2.80	3.67	4.26	5.24	6.17
mm	58.7	71.0	93.3	108.2	133.1	156.8
E	0.98	1.25	2.76	3.94	3.94	5.00
mm	*25.0*	*31.8*	*70.1*	*100.0*	*100.1*	*127.0*
F	0.47	0.63	1.97	2.95	3.15	3.94
mm	*12.0*	*15.9*	*50.0*	*74.9*	*80.0*	*100.1*
G	-	-	-	2.17	-	2.76
mm	*-*	*-*	*-*	*55.1*	*-*	*70.1*
H*	0.18(2)	0.24(2)	0.28(2)	0.28(4)	0.36(2)	0.34(4)
mm	*4.5(2)*	*6.1(2)*	*7.1(2)*	*7.1(4)*	*9.1(2)*	*8.7(4)*
FOOT MOUNT						
I	1.26	1.57	2.01	2.52	3.11	3.94
mm	*32.0*	*40.0*	*51.0*	*64.0*	*78.9*	*100.0*
J	1.57	1.89	2.36	2.91	3.67	4.72
mm	*40.0*	*48.0*	*60.0*	*74.0*	*93.2*	*120.0*
K	0.16	0.25	0.37	0.47	0.50	0.59
mm	*4.0*	*6.4*	*9.5*	*12.0*	*12.7*	*15.0*
L	0.31	0.50	0.75	0.94	1.00	1.18
mm	*8.0*	*12.7*	*19.0*	*24.0*	*25.4*	*30.0*
M	0.35	0.52	0.91	0.73	1.00	1.06
mm	*8.9*	*13.3*	*23.0*	*18.5*	*25.4*	*27.0*
N	-	0.41	0.71	0.45	0.69	0.65
mm	*-*	*10.3*	*18.0*	*11.4*	*17.4*	*16.5*
O	0.18	0.20	0.22	0.28	0.35	0.42
mm	*4.6*	*5.2*	*5.5*	*7.1*	*9.0*	*10.7*
TUBE CLAMPS						
P	-	2.24	2.92	3.26	3.84	5.19
mm	*-*	*57.0*	*74.1*	*82.7*	*97.5*	*131.7*
Q	-	2.72	3.44	3.81	4.39	5.93
mm	*-*	*69.0*	*87.4*	*96.7*	*111.5*	*150.7*
R	-	0.71	0.63	0.55	0.55	0.75
mm	*-*	*18.0*	*16.0*	*14.0*	*14.0*	*19.0*
S	-	0.14	0.17	0.15	0.15	0.24
mm	*-*	*3.6*	*4.3*	*3.8*	*3.8*	*6.1*
T	-	0.20	0.28	0.28	0.28	0.42
mm	*-*	*5.2*	*7.1*	*7.1*	*7.1*	*10.7*

**MXP16, 25, 32 & 50 use 2 center holes, MXP40 & 63 use 4 corner holes*

NOTE: Auxiliary carrier is S-Solid Bearing carrier, see page MXP_30 for carrier size and mounting dimensions

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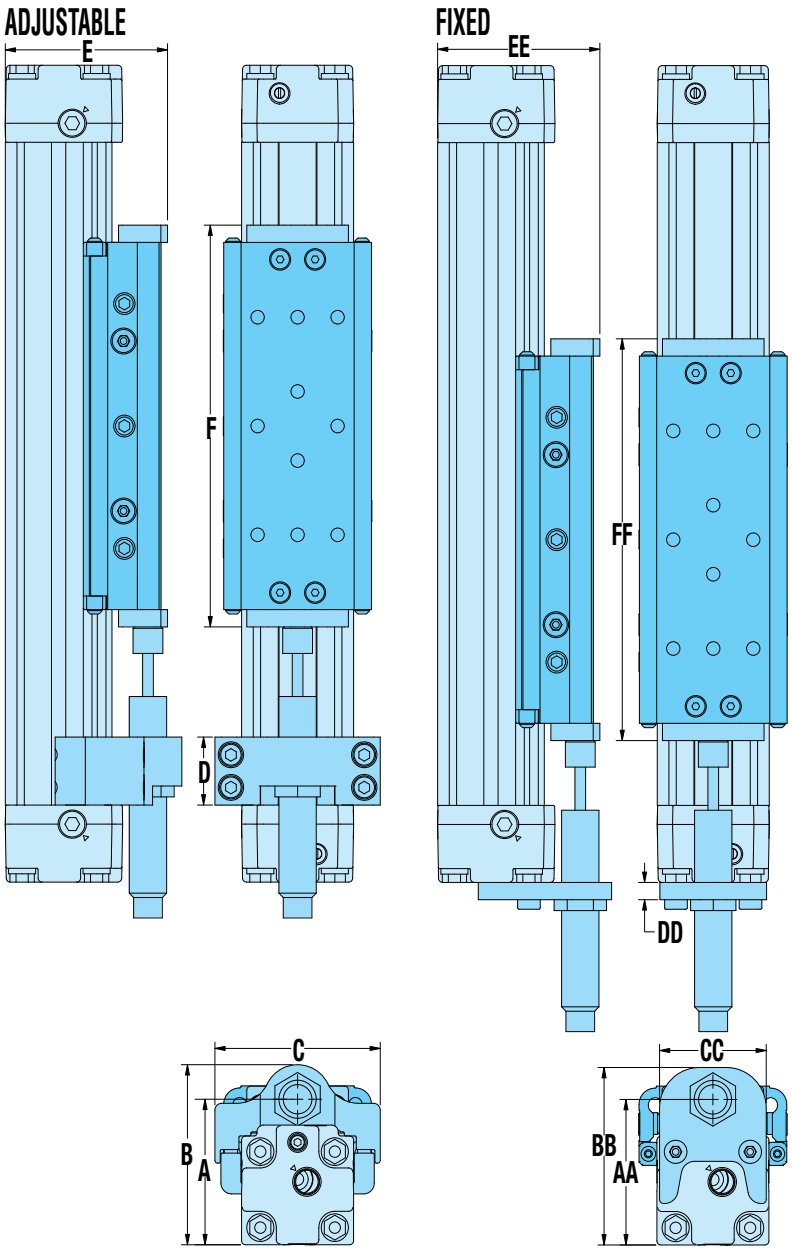
S-SOLID BEARING OPTION DIMENSIONS

ADJUSTABLE AND FIXED SHOCK ABSORBERS



ADJUSTABLE SHOCK ABSORBER

	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
A	1.65	2.11	2.91	3.32	4.24	5.21
mm	*42.0*	*53.5*	*73.8*	*84.4*	*107.6*	*132.4*
B	1.97	2.61	3.35	3.87	4.87	5.91
mm	*50.0*	*66.2*	*85.0*	*98.4*	*123.8*	*150.0*
C	1.74	2.44	2.95	3.43	4.09	5.20
mm	*44.3*	*62.0*	*74.9*	*87.0*	*103.9*	*132.0*
D	0.71	0.98	1.25	0.98	1.22	1.26
mm	*18.0*	*25.0*	*31.8*	*25.0*	*31.0*	*32.0*
E	1.80	2.39[1]	3.20[2]	3.57[3]	4.53[4]	5.50[5]
mm	*45.8*	*60.8[1]*	*81.2[2]*	*90.7[3]*	*115.1[4]*	*139.7[5]*
F	4.12	5.81[1]	6.76[2]	8.61[3]	8.35[4]	12.56[5]
mm	*104.6*	*147.7[1]*	*171.8[2]*	*218.8[3]*	*212.2[4]*	*318.9[5]*

Stroke Adder: Adjustable Shock Absorber

in.	0.62	1.50	1.96	1.70	1.66	1.65
mm	*15.7*	*38.1*	*49.7*	*43.3*	*42.1*	*41.8*

⚠ NOTE: For each adjustable shock absorber ordered, add Stroke Adder value to required stroke to determine configurated actuator stroke.

Required Stroke + (Adj. Shock Quantity x Stroke Adder value) = Configurated Actuator Stroke

Example: MXP25S, 500mm stroke required, 2 adjustable shocks

500 + (2 x 38.1) = 500 + 76.2 = 576.2mm

FIXED SHOCK ABSORBER

	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
AA	1.65	2.11	2.91	3.32	4.24	5.21
mm	*42.0*	*53.5*	*73.8*	*84.4*	*107.6*	*132.4*
BB	1.95	2.57	3.42	3.87	5.10	5.92
mm	*49.5*	*65.3*	*86.8*	*98.4*	*129.6*	*150.3*
CC	1.17	1.57	2.00	2.44	2.83	3.66
mm	*29.8*	*40.0*	*50.8*	*62.0*	*72.0*	*93.0*
DD	0.13	0.25	0.25	0.25	0.50	0.50
mm	*3.3*	*6.4*	*6.4*	*6.4*	*12.7*	*12.7*
EE	1.80	2.39[1]	3.20[2]	3.57[3]	4.53[4]	5.50[5]
mm	*45.8*	*60.8[1]*	*81.2[2]*	*90.7[3]*	*115.1[4]*	*139.7[5]*
FF	4.12	5.81[1]	6.76[2]	8.61[3]	8.35[4]	12.56[5]
mm	*104.6*	*147.7[1]*	*171.8[2]*	*218.8[3]*	*212.2[4]*	*318.9[5]*

[1]Carrier is standard MXP25S, 2.30" (58.4mm) high X 5.31" (135.0mm) long, Impact plates on each end of carrier add .09" (2.4mm) to total height and .50" (12.7mm) to total length

[2]Carrier is standard MXP32S, 3.06" (77.8mm) high X 6.02" (153.0mm) long, Impact bolts on each end of carrier add .13" (3.4mm) to total height and .74" (18.8mm) to total length

[3]Carrier is standard MXP40S, 3.51" (89.2mm) high X 7.87" (200.0mm) long, Impact bolts on each end of carrier add .06" (1.5mm) to total height and .74" (18.8mm) to total length

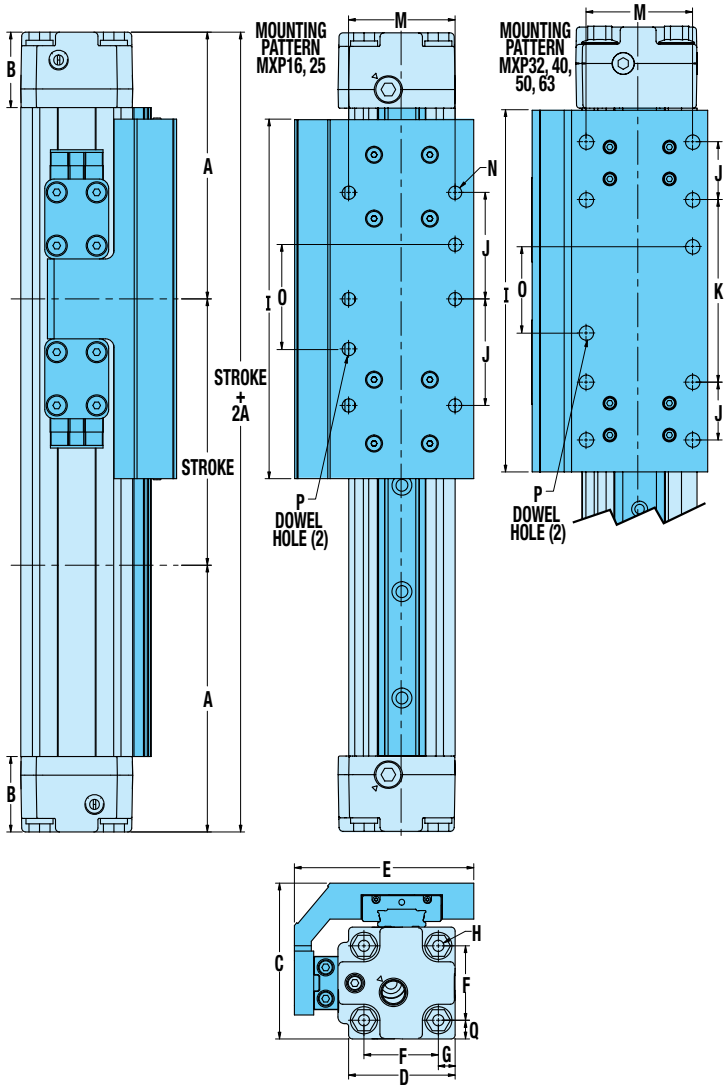
[4]Carrier is standard MXP50S, 4.44" (112.8mm) high X 7.91" (200.8mm) long, Impact bolts on each end of carrier add .09" (2.3mm) to total height and .45" (11.4mm) to total length

[5]Carrier is standard MXP63S, 5.48" (139.1mm) high X 12.11" (307.5mm) long, Impact bolts on each end of carrier add .45" (11.4mm) to total length

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

NOTE: Auxiliary carrier is S-Solid Bearing carrier, see page MXP_30 for carrier size and mounting dimensions

P-PROFILED RAIL ACTUATOR DIMENSIONS

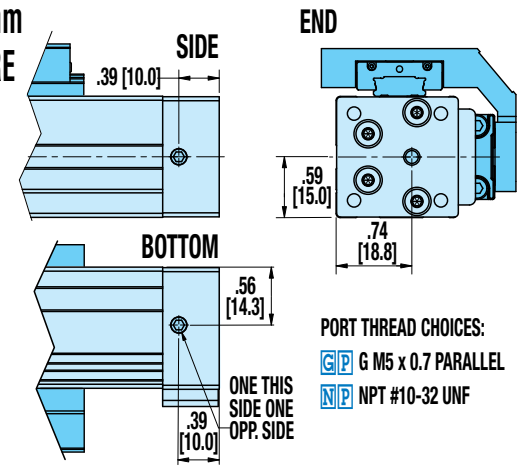


	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
A	3.13	3.94	4.90	5.82	6.29	8.45
mm	*79.6*	*100.2*	*124.5*	*147.7*	*159.8*	*214.5*
B	0.55	1.11	1.50	1.50	1.97	1.97
mm	*14.0*	*28.3*	*38.1*	*38.0*	*50.0*	*50.0*
C	1.81	2.30	3.05	3.53	4.71	5.51
mm	*46.0*	*58.5*	*77.4*	*89.7*	*119.7*	*140.0*
D	1.19	1.57	2.13	2.52	3.01	2.87
mm	*30.3*	*40.0*	*54.0*	*64.0*	*78.7*	*73.0*
E	1.78	2.65	3.25	3.85	4.62	5.65
mm	*45.3*	*67.4*	*82.5*	*97.8*	*117.4*	*143.6*
F	0.85	1.10	1.42	1.81	2.25	2.87
mm	*21.5*	*27.9*	*36.1*	*46.0*	*57.2*	*73.0*
G	0.17	0.28	0.38	0.35	0.43	0.53
mm	*4.3*	*7.0*	*9.7*	*9.0*	*10.8*	*13.5*
H	#8-32 (8)	#10-24 (8)	1/4-20 (8)	1/4-20 (8)	5/16-18 (8)	5/16-18 (8)
mm	*M4x0.7 (8)*	*M5x0.8 (8)*	*M6x1.0 (8)*	*M6x1.0 (8)*	*M8x1.25 (8)*	*M8x1.25 (8)*
I	4.33	5.31	6.69	7.87	8.50	12.00
mm	*110.0*	*135.0*	*170.0*	*200.0*	*216.0*	*304.8*
J	1.57	1.57	1.07	1.00	1.00	1.57
mm	*40.0*	*40.0*	*27.1*	*25.4*	*25.4*	*40.0*
K	-	-	3.37	4.50	2.75	5.12
mm	*-*	*-*	*85.7*	*114.3*	*69.9*	*130.0*
M	1.10	1.57	1.97	2.83	3.13	3.87
mm	*28.0*	*40.0*	*50.0*	*72.0*	*79.4*	*98.3*
N	#8-32 (6)	1/4-20 (6)	5/16-18 (8)	5/16-18 (8)	5/16-18 (10)	3/8-16 (8)
mm	*M4x0.7 (6)*	*M6x1.0 (6)*	*M8x1.25 (8)*	*M8x1.25 (8)*	*M8x1.25 (10)*	*M10x1.5 (8)*
O	1.57	1.57	1.77	2.50	1.50	2.56
mm	*40.0*	*40.0*	*45.0*	*63.5*	*38.1*	*65.0*
P	5/32" (2)	1/4" (2)	5/16" (2)	5/16" (2)	5/16" (2)	3/8" (2)
mm	*M4 (2)*	*M6 (2)*	*M8 (2)*	*M8 (2)*	*M8 (2)*	*M8 (2)*
Q	0.17	0.28	0.38	0.35	0.43	0.53
mm	*4.3*	*7.0*	*9.7*	*9.0*	*10.8*	*13.5*

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

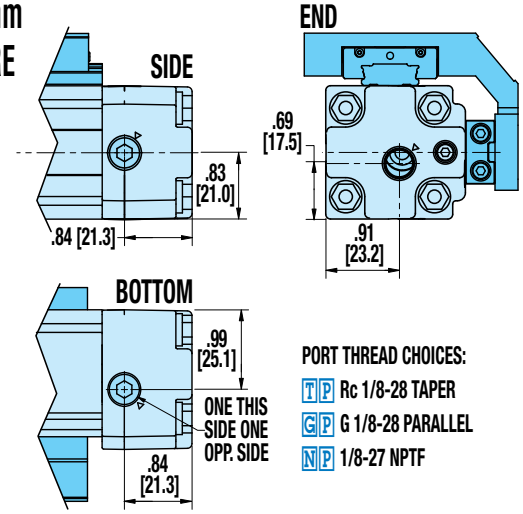
DUAL END PORTING

16mm BORE



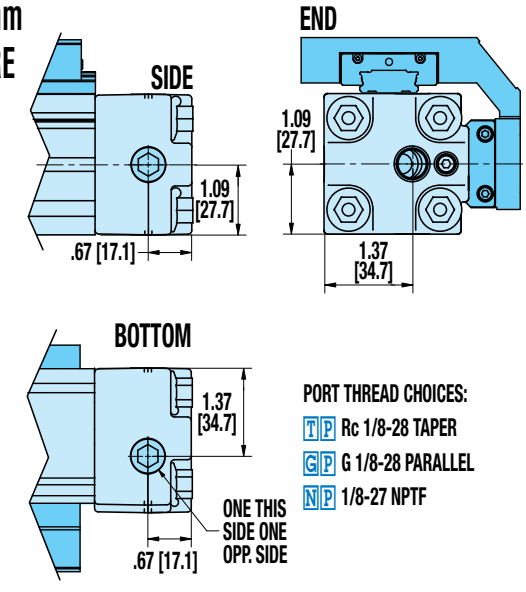
PORT THREAD CHOICES:
- GP G M5 x 0.7 PARALLEL
- NP NPT #10-32 UNF

25mm BORE



PORT THREAD CHOICES:
- TP Rc 1/8-28 TAPER
- GP G 1/8-28 PARALLEL
- NP 1/8-27 NPTF

32mm BORE

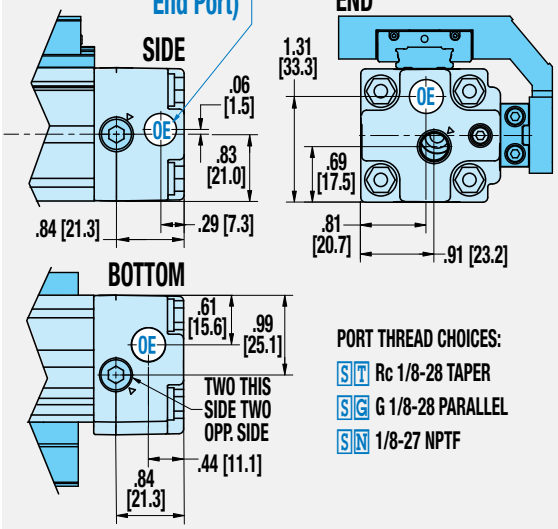


PORT THREAD CHOICES:
- TP Rc 1/8-28 TAPER
- GP G 1/8-28 PARALLEL
- NP 1/8-27 NPTF

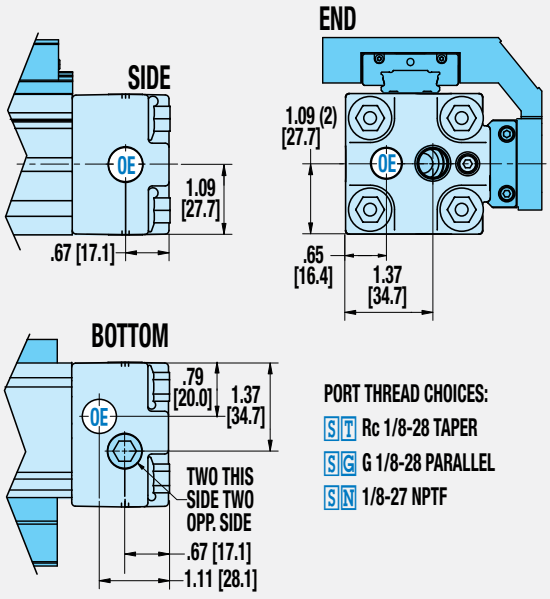
SINGLE-END PORTING

Not Available for 16mm BORE

(OE = Opposite End Port)



PORT THREAD CHOICES:
- ST Rc 1/8-28 TAPER
- SG G 1/8-28 PARALLEL
- SN 1/8-27 NPTF

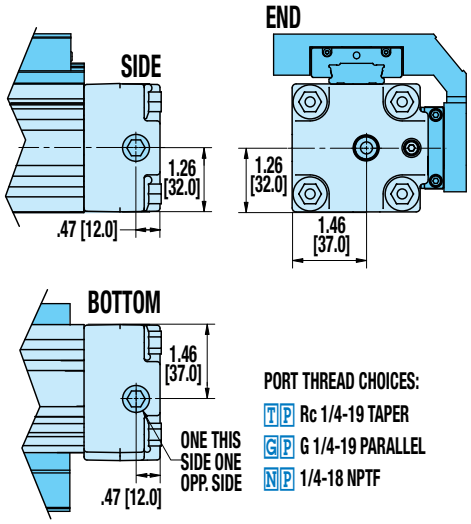


PORT THREAD CHOICES:
- ST Rc 1/8-28 TAPER
- SG G 1/8-28 PARALLEL
- SN 1/8-27 NPTF

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

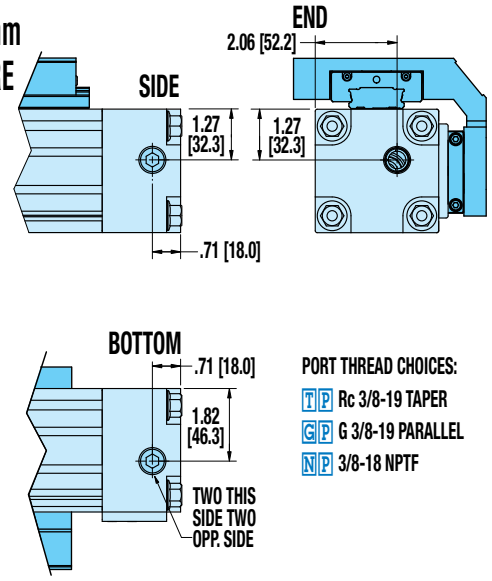
DUAL END PORTING

40mm BORE



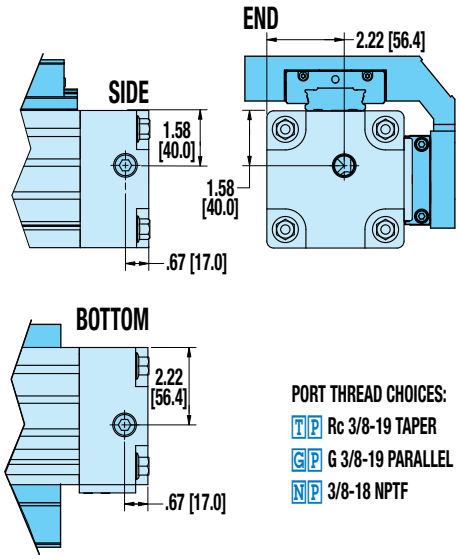
PORT THREAD CHOICES:
- TP Rc 1/4-19 TAPER
- GP G 1/4-19 PARALLEL
- NP 1/4-18 NPTF

50mm BORE



PORT THREAD CHOICES:
- TP Rc 3/8-19 TAPER
- GP G 3/8-19 PARALLEL
- NP 3/8-18 NPTF

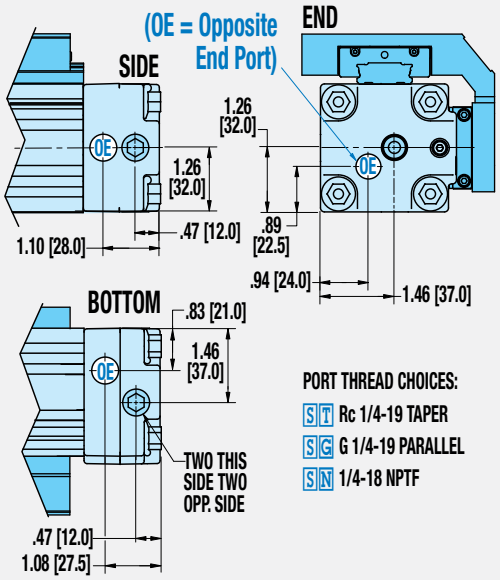
63mm BORE



PORT THREAD CHOICES:
- TP Rc 3/8-19 TAPER
- GP G 3/8-19 PARALLEL
- NP 3/8-18 NPTF

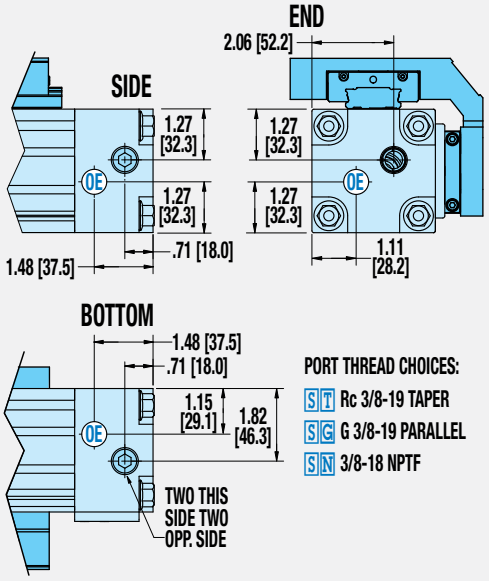
SINGLE-END PORTING

40mm BORE



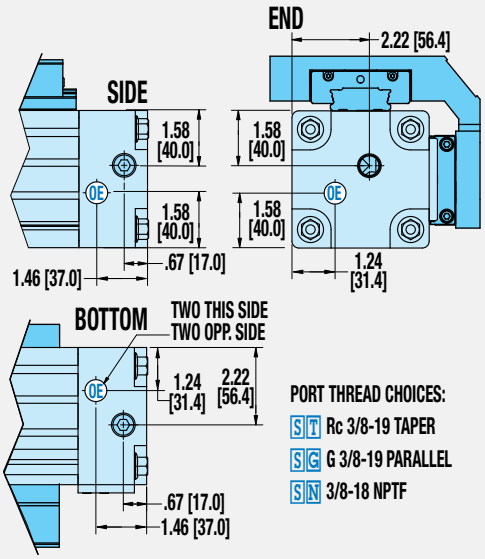
PORT THREAD CHOICES:
- ST Rc 1/4-19 TAPER
- SG G 1/4-19 PARALLEL
- SN 1/4-18 NPTF

50mm BORE



PORT THREAD CHOICES:
- ST Rc 3/8-19 TAPER
- SG G 3/8-19 PARALLEL
- SN 3/8-18 NPTF

63mm BORE



PORT THREAD CHOICES:
- ST Rc 3/8-19 TAPER
- SG G 3/8-19 PARALLEL
- SN 3/8-18 NPTF

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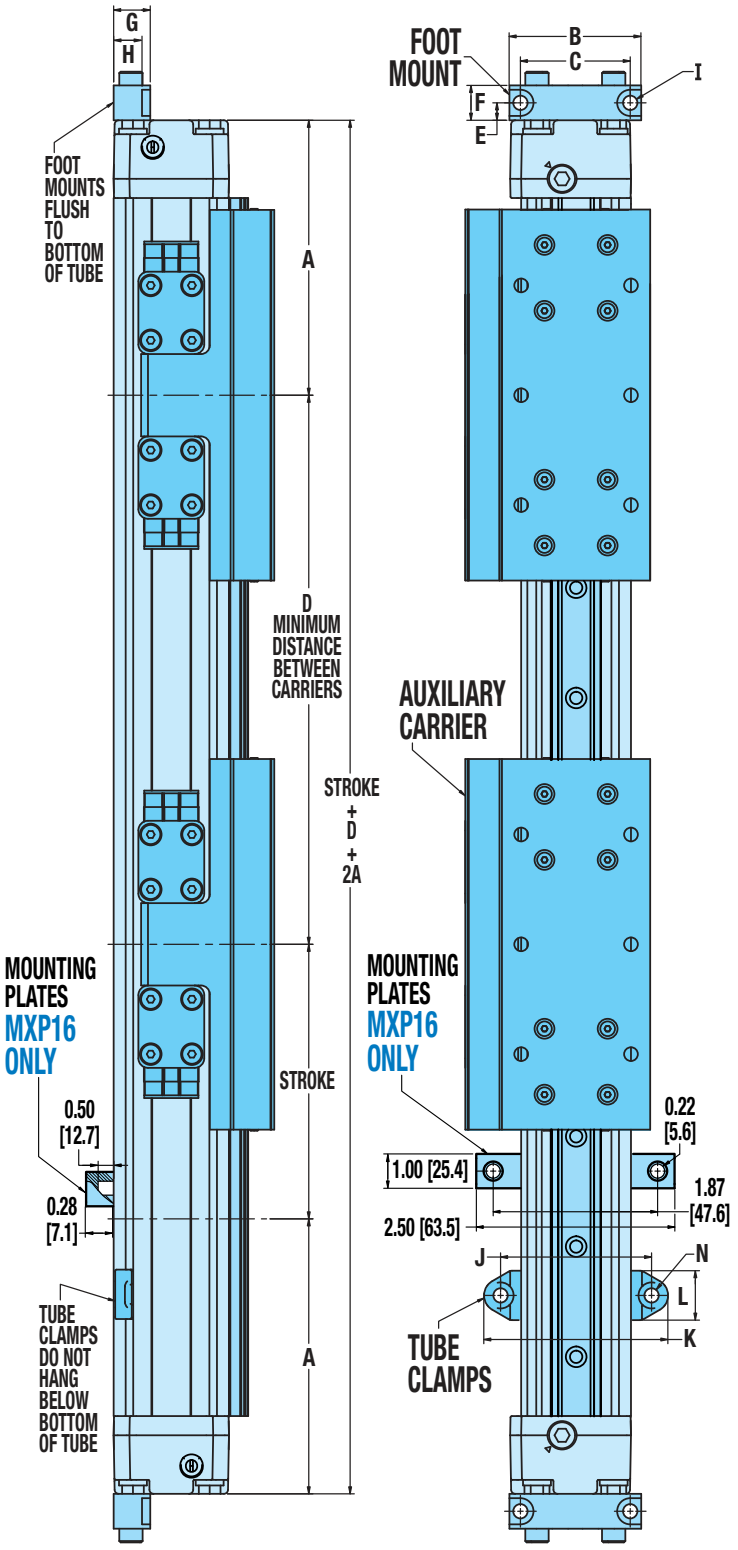
P-PROFILED RAIL OPTION DIMENSIONS

AUXILIARY CARRIER, FOOT MOUNT, TUBE CLAMPS



	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
A	3.13	3.94	4.90	5.82	6.29	8.45
mm	*79.6*	*100.2*	*124.5*	*147.7*	*159.8*	*214.5*
AUXILIARY CARRIER						
D	5.00	6.00	7.00	8.50	8.60	13.00
mm	*127.0*	*152.4*	*177.8*	*215.9*	*218.4*	*330.0*
FOOT MOUNT						
B	1.57	1.89	2.36	2.91	3.67	4.72
mm	*40.0*	*48.0*	*60.0*	*74.0*	*93.2*	*120.0*
C	1.26	1.57	2.01	2.52	3.11	3.94
mm	*32.0*	*40.0*	*51.0*	*64.0*	*78.9*	*100.0*
E	0.16	0.25	0.37	0.47	0.50	0.59
mm	*4.0*	*6.4*	*9.5*	*12.0*	*12.7*	*15.0*
F	0.31	0.50	0.75	0.94	1.00	1.18
mm	*8.0*	*12.7*	*19.0*	*24.0*	*25.4*	*30.0*
G	0.35	0.52	0.91	0.73	1.00	1.06
mm	*8.9*	*13.3*	*23.0*	*18.5*	*25.4*	*27.0*
H	-	0.41	0.71	0.45	0.69	0.65
mm	*-*	*10.3*	*18.0*	*11.4*	*17.4*	*16.5*
I	0.18	0.20	0.22	0.28	0.35	0.42
mm	*4.6*	*5.2*	*5.5*	*7.1*	*9.0*	*10.7*
TUBE CLAMPS						
J	-	2.17	2.86	3.26	3.84	5.19
mm	*-*	*55.0*	*72.7*	*82.7*	*97.5*	*131.7*
K	-	2.64	3.39	3.81	4.39	5.93
mm	*-*	*67.0*	*86.0*	*96.7*	*111.5*	*150.7*
L	-	0.71	0.63	0.55	0.55	0.75
mm	*-*	*18.0*	*16.0*	*14.0*	*14.0*	*19.0*
M	-	0.14	0.17	0.15	0.15	0.24
mm	*-*	*3.6*	*4.3*	*3.8*	*3.8*	*6.1*
N	-	0.20	0.28	0.28	0.28	0.42
mm	*-*	*5.2*	*7.1*	*7.1*	*7.1*	*10.7*

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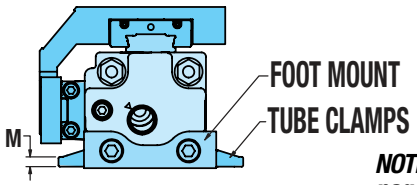
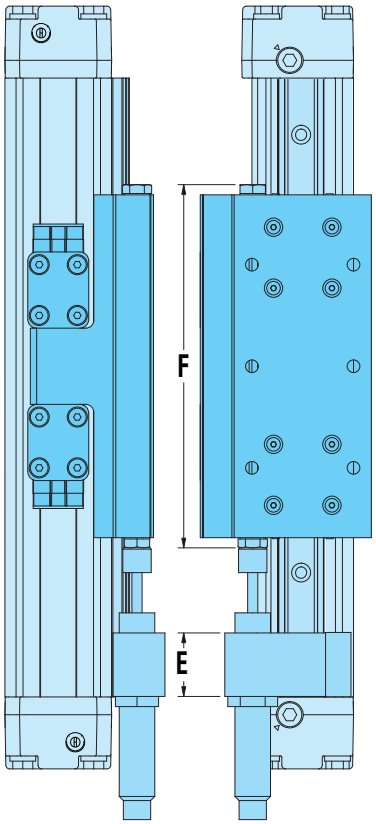


NOTE: Auxiliary carrier is P-Prodiled Rail carrier, see page MXP_35 for carrier size and mounting dimensions

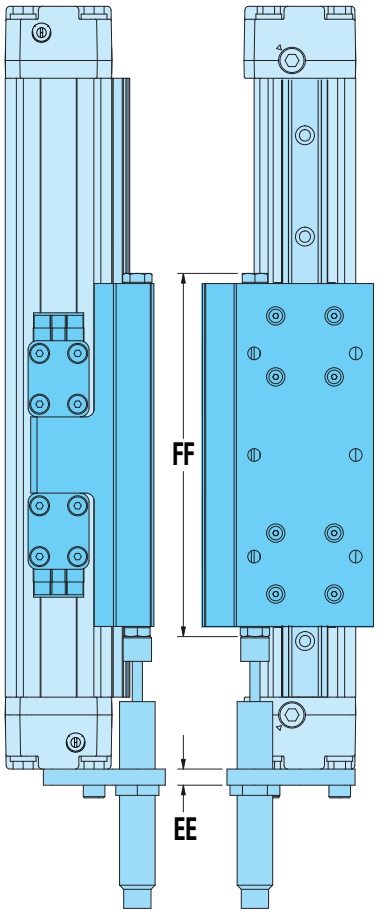
Tolomatic EXCELLENCE IN MOTION

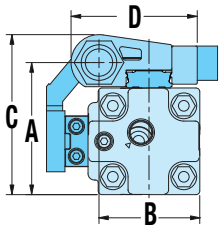
ADJUSTABLE AND FIXED SHOCK ABSORBERS

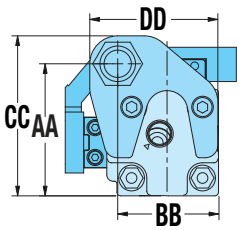
ADJUSTABLE



FIXED







ADJUSTABLE SHOCK ABSORBER

	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
A	1.51	2.05	2.87	3.28	4.20	5.04
mm	*38.3*	*52.0*	*72.9*	*83.2*	*106.7*	*128.0*
B	1.38	1.56	2.25	2.63	3.55	3.97
mm	*35.0*	*39.7*	*57.2*	*66.8*	*90.2*	*100.8*
C	1.75	2.48	3.46	3.90	4.80	5.73
mm	*44.5*	*63.0*	*87.9*	*99.0*	*121.8*	*145.5*
D	1.54	1.96	2.63	3.17	3.55	4.07
mm	*39.2*	*49.7*	*66.7*	*80.6*	*90.2*	*103.3*
E	0.79	0.98	1.00	0.98	1.26	1.26
mm	*20.0*	*25.0*	*25.4*	*25.0*	*32.0*	*32.0*
F	4.65[1]	5.63[2]	7.43[3]	8.61[4]	8.95[5]	12.45[6]
mm	*118.0[1]*	*143.0[2]*	*188.8[3]*	*218.8[4]*	*227.4[5]*	*316.2[6]*

Stroke Adder: Adjustable Shock Absorber

in	0.96	2.10	2.73	2.40	3.15	2.74
mm	*24.4*	*53.3*	*69.3*	*61.0*	*80.0*	*69.6*

⚠ NOTE: For each adjustable shock absorber ordered, add Stroke Adder value to required stroke to determine configurated actuator stroke.

Required Stroke + (Adj. Shock Quantity x Stroke Adder value) = Configurated Actuator Stroke

Example: MXP25P, 500mm stroke required, 2 adjustable shocks

500 + (2 x 53.3) = 500 + 106.6 = 606.6mm

FIXED SHOCK ABSORBER

	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
AA	1.51	2.05	2.89	3.32	4.38	5.22
mm	*38.3*	*52.0*	*73.4*	*84.4*	*111.2*	*132.5*
BB	1.38	1.56	–	–	–	–
mm	*35.0*	*39.7*	–	–	–	–
CC	1.80	2.48	3.41	3.87	5.09	5.93
mm	*45.8*	*63.0*	*86.5*	*98.4*	*129.2*	*150.5*
DD	1.66	1.98	2.00	2.44	2.83	3.66
mm	*42.2*	*50.4*	*50.8*	*62.0*	*72.0*	*93.0*
EE	0.13	0.25	0.25	0.25	0.50	0.50
mm	*3.3*	*6.4*	*6.4*	*6.4*	*12.7*	*12.7*
FF	4.65[1]	5.63[2]	7.43[3]	8.61[4]	8.95[5]	12.45[6]
mm	*118.0[1]*	*143.0[2]*	*188.8[3]*	*218.8[4]*	*227.4[5]*	*316.2[6]*

[1]*Carrier is standard MXP16P, 4.33" (110.0mm) long, Impact bolts on each end of carrier add .31" (8.0mm) to total length*

[2]*Carrier is standard MXP25P, 5.31" (135.0mm) long, Impact bolts on each end of carrier add .31" (8.0mm) to total length*

[3]*Carrier is standard MXP32P, 6.69" (170.0mm) long, Impact bolts on each end of carrier add .74" (18.8mm) to total length*

[4]*Carrier is standard MXP40P, 7.87" (200.0mm) long, Impact bolts on each end of carrier add .74" (18.8mm) to total length*

[5]*Carrier is standard MXP50P, 8.50" (216.0mm) long, Impact bolts on each end of carrier add .45" (11.4mm) to total length*

[6]*Carrier is standard MXP63P, 12.00" (304.8mm) long, Impact bolts on each end of carrier add .45" (11.4mm) to total length*

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NOTE: Auxiliary carrier is P-Prodiled Rail carrier, see page MXP_35 for carrier size and mounting dimensions

SWITCHES

SPECIFICATIONS

RoHS COMPLIANT CE

MX products offer a large number of sensing choices. There are 12 switch choices: reed, solid state PNP (sourcing) or solid state NPN (sinking); in normally open or normally closed; with flying leads or quick-disconnnects.

Commonly used for end-of-stroke positioning, these switches allow drop-in installation anywhere along the entire actuator length. The one-piece design includes the retained fastening hardware and is designed for any open side or bottom slot on the MX. The internal piston magnet is a standard feature, therefore these switches can be installed in the field at anytime.

Switches are used to send digital signals to PLC (programmable logic controller), TTL, CMOS circuit or other controller device. Switches contain reverse polarity protection. Solid state QD cables are shielded; shield should be terminated at flying lead end.

All switches are CE rated and are RoHS compliant. Switches feature bright red or yellow LED signal indicators; solid state switches also have green LED power indicators.

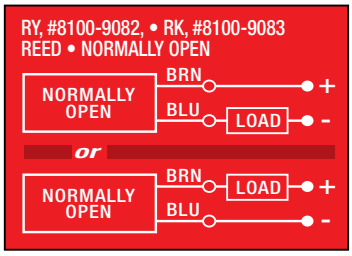
	Order Code	Part Number	Lead	Switching Logic	Power LED	Signal LED	Operating Voltage	*Power Rating (Watts)	Switching Current (mA max.)	Current Con-sumption	Voltage Drop	Leakage Current	Temp. Range	Shock / Vibration
REED	RY	8100-9082	5m	SPST Normally Open	—	Red	5 - 240 AC/DC	*10.0	100mA	—	3.0 V max.	—	14 to 158°F [-10 to 70°C]	50 G / 9 G
	RK	8100-9083	Quick Disconnect		Tolomatic 81009082									
	NY	8100-9084	5m	SPST Normally Closed	—	Yellow	5 - 110 AC/DC							
	NK	8100-9085	Quick Disconnect		Tolomatic 81009084									
SOLID STATE	TY	8100-9088	5m	PNP (Sourcing) Normally Open	Green	Yellow	10 - 30 Vdc	*3.0	100mA	20 mA @ 24V	2.0 V max.	0.05 mA max.		
	TK	8100-9089	Quick Disconnect		Tolomatic 81009088									
	KY	8100-9090	5m	NPN (Sinking) Normally Open	Green	Red								
	KK	8100-9091	Quick Disconnect		Tolomatic 81009090									
	PY	8100-9092	5m	PNP (Sourcing) Normally Closed	Green	Yellow								
	PK	8100-9093	Quick Disconnect		Tolomatic 81009092									
	HY	8100-9094	5m	NPN (Sinking) Normally Closed	Green	Red								
	HK	8100-9095	Quick Disconnect		Tolomatic 81009094									

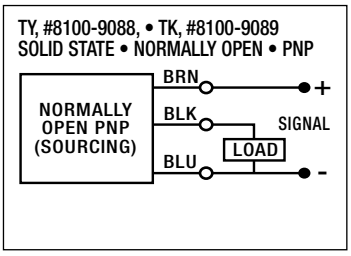
Enclosure classification IEC 529 IP67 (NEMA 6)

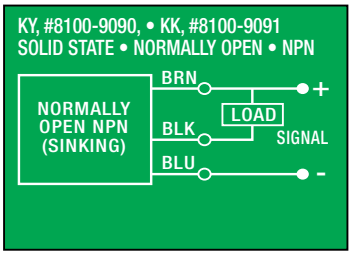
CABLES: Robotic grade, oil resistant polyurethane jacket, PVC insulation

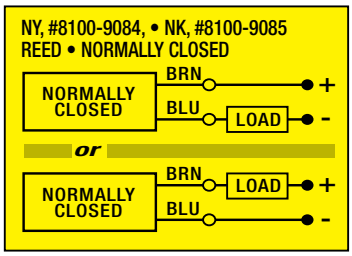
⚠ *WARNING: Do not exceed power rating (Watt = Voltage x Amperage). Permanent damage to sensor will occur.

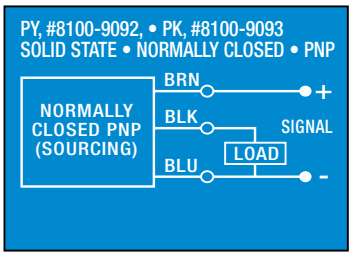
WIRING DIAGRAMS

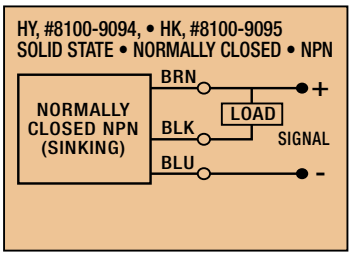


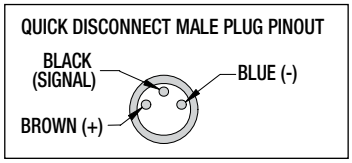


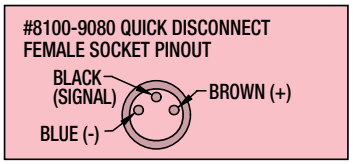






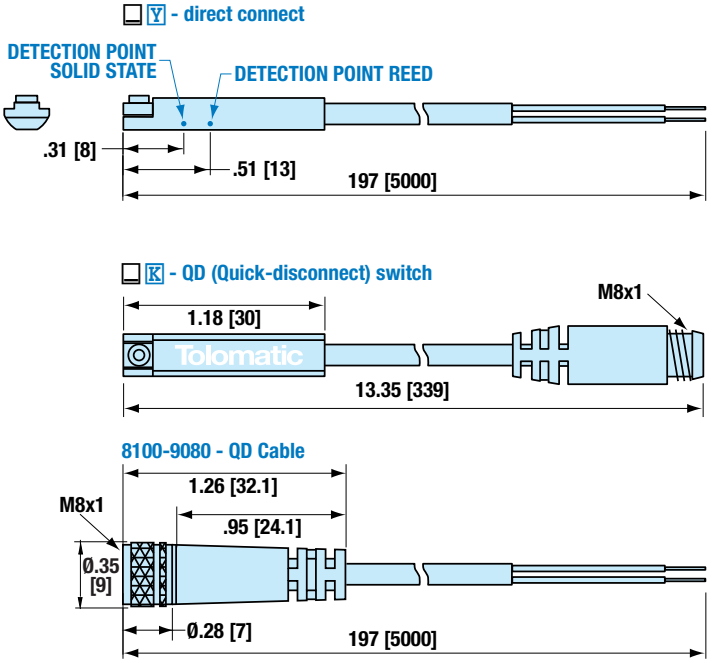






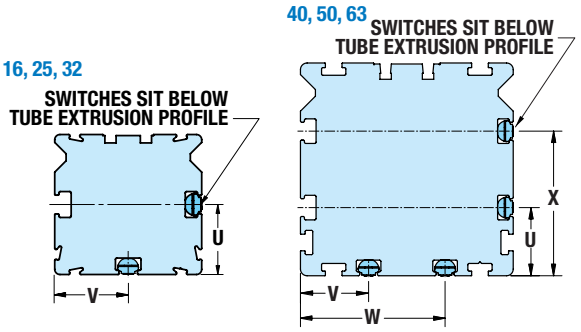
DIMENSIONS

SWITCH DIMENSIONS



Dimensions in inches [brackets indicate dimensions in millimeters]

MOUNTING DIMENSIONS

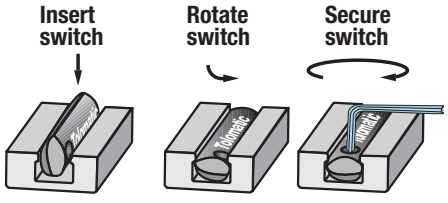


SWITCH MOUNTING

	16	25	32	40	50	63
U	0.31	0.79	1.06	0.81	1.08	1.50
mm	*7.9*	*20.0*	*27.0*	*20.5*	*27.4*	*38.0*
V	0.59	0.83	1.09	0.81	1.08	1.50
mm	*15.0*	*21.0*	*27.7*	*20.5*	*27.4*	*38.0*
W	–	–	–	1.71	2.02	2.44
mm	–	–	–	*43.5*	*51.4*	*62.0*
X	–	–	–	1.71	2.02	2.44
mm	–	–	–	*43.5*	*51.4*	*62.0*

SWITCH INSTALLATION AND REPLACEMENT

Place switch in side groove on tube at desired location with "Tolomatic" facing outward. While applying light pressure to the switch, rotate the switch halfway into the groove. Maintaining light pressure, rotate the switch in the opposite direction until the it is fully inside the groove with "Tolomatic" visible. Re-position the switch to the exact location and lock the switch securely into place by tightening the screw on the switch.



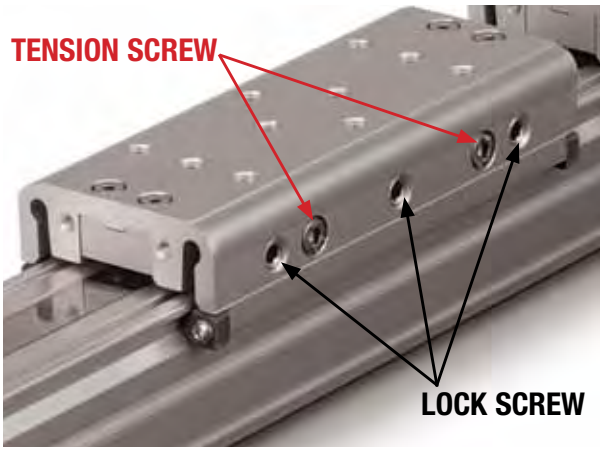
ADJUSTMENT PROCEDURES

CUSHION NEEDLE ADJUSTMENT

Adjust the cushion needle in the cylinder heads carefully to obtain proper deceleration for your particular application. Proper cushion needle adjustment is achieved when the carrier reaches the end of travel at a velocity approaching zero. If the carrier reaches the end of stroke at velocity, then the cushion needs to be increased by turning the cushion needle screw clockwise. If the carrier stalls or bounces (quickly oscillating directions) before it reaches the end of stroke, then the cushion needs to be decreased by turning the cushion needle screw counterclockwise. Improper cushion adjustment may cause premature failure of the actuator. Call Tolomatic with any questions.

[S] SOLID BEARING CARRIER ADJUSTMENT

The [S] solid bearing carrier will provide for maximum life when properly adjusted. The carrier design contains both tension and lock screws. The tension screws control the amount of pressure placed on the carrier bearings. The lock screws lock the tension screws in place and provide fine adjustment of the carrier bearings. The number of tension and lock screws will vary depending on the bore size of the actuator.



1. Fully loosen all tension and lock screws. They do not need to be removed, just fully loosened.
2. Tighten tension screws on both sides of carrier roughly 1/8 to 1/4 turn clockwise past where the screw starts to feel snug. The carrier should be very difficult or impossible to move by hand.
3. Next, adjust the lock screws on both sides of the carrier roughly 1/8 to 1/4 turn clockwise past where the screw starts to engage.
4. Ideal carrier tension is achieved when the carrier feels snug in relation to the tube. No rocking motion should be present. The carrier should be loose enough to be moved by hand over the entire length of the actuator. If after this process the carrier has become too loose, equally adjust all of the lock screws with a slight 1/32 turn counterclockwise. A carrier that is adjusted too tight will increase the breakaway pressure required for motion; in extreme cases no motion will occur when air is applied.

During the service life, this process may need to be repeated. Keeping the carrier properly adjusted will prolong the life of the [S] solid bearing system.

Allen wrench sizes for carrier adjustment, Solid bearing actuators

	Tension Screw		Lock Screw	
	in	*mm*	in	*mm*
16	1/16	*2*	1/16	*2*
25	5/32	*4*	1/8	*3*
32	5/32	*4*	3/32	*2*
40	5/32	*4*	1/8	*3*
50	3/16	*4*	3/32	*2.5*
63	1/4	*5*	3/16	*5*

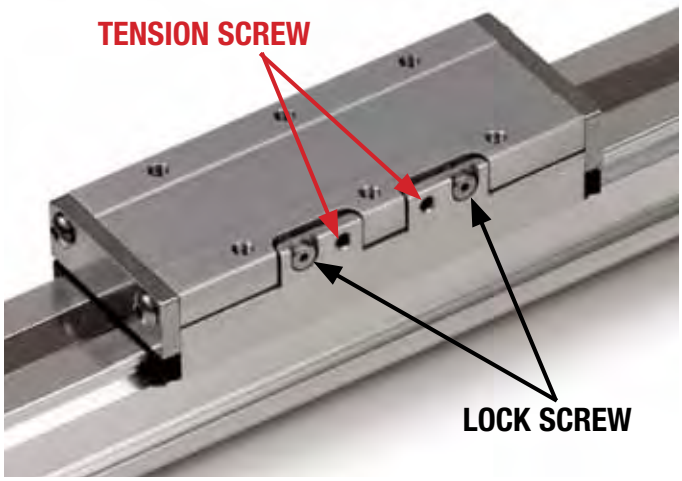
MXP16

NOTE: MXP16S requires a different carrier adjustment procedure, see below.

Tools Required:

Inch Models: 1/16 inch and 2.5mm Hex Wrench (Key)
Metric Models: 2 and 2.5 mm Hex Wrench (Key)

1. Loosen endplate screws on both ends of the carrier.
2. Fully loosen all tension and lock screws. They do not need to be removed, just fully loosened.



3. Tighten tension screws by turning them clockwise until the carrier is just tight enough so that no side-to-side rocking motion is present and it can easily be moved by hand over the entire stroke length with no hesitation. Very little torque on the screws is required to obtain this condition.

Note: The Tension Screws are the small set screw style fastener. The Lock Screws are the larger, low head, hex drive screws.

4. Tighten lock screws by turning them clockwise until tight. The carrier should feel snug in relation to the tube, with no side-to-side rocking motion present. If the carrier becomes too loose, loosen the lock screws, tighten the tension screws and then retighten the lock screws.
5. Once ideal carrier tension is achieved, fully tighten end plate screws on both ends of the carrier.

SERVICE PARTS

REPAIR KITS

Repair kit includes: dust band, seal band, end caps, internal soft seals (piston seals, cushion seals, wipers), [Also for S style: bearings and bearing caps]

The part number for a repair kit begins with RK followed by model, bore size, bearing type, and stroke length (SK = inch/US Standard, SM = metric) (NOTE: If unit has an auxiliary carrier also include DW and distance between carrier centers)

REPAIR KIT	MODEL	BORE SIZE	BEARING TYPE	STROKE METRIC	STROKE LENGTH	AUXILIARY CARRIER	DISTANCE BETWEEN CARRIERS
RK	MXP	40	S	SM	2007.02	DW	215.9

SWITCHES

TO ORDER SERVICE PARTS SWITCHES:

Switches for MXP include retained mounting hardware and are the same for all bore sizes and bearing styles

Code		Part Number	Lead	Normally	Sensor Type
RY		8100-9082	5m (197 in)	Open	Reed
RK		8100-9083*	Quick-disconnect		
NY		8100-9084	5m (197 in)	Closed	Reed
NK		8100-9085*	Quick-disconnect		
TY		8100-9088	5m (197 in)	Open	Solid State PNP
TK		8100-9089*	Quick-disconnect		
KY		8100-9090	5m (197 in)	Open	Solid State NPN
KK		8100-9091*	Quick-disconnect		
PY		8100-9092	5m (197 in)	Closed	Solid State PNP
PK		8100-9093*	Quick-disconnect		
HY		8100-9094	5m (197 in)	Closed	Solid State NPN
HK		8100-9095*	Quick-disconnect		

*Also order mating QD cable #8100-9080

	8100-9080	Mating QD (Quick-disconnect) cable 197 in. (5m)

To order switches using configurated parts string (will include mating female QD cable if required)

SWITCH KIT	MODEL	BORE SIZE	BEARING TYPE	SWITCH CODE	QUANTITY
SW	MXP	25	N	RK	2

SERVICE PARTS MXP16, MXP25, MXP32

MOUNTING OPTIONS		16			25			32		
		N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail
Foot Mount (1 bracket, 2 bolts)	Inch	8116-9519	8116-9519	8116-9519	8125-9519	8125-9519	8125-9519	8132-9519	8132-9519	8132-9519
	Metric	*8116-9019*	*8116-9019*	*8116-9019*	*8125-9019*	*8125-9019*	*8125-9019*	*8132-9019*	*8132-9019*	*8132-9019*
Tube Clamp (2 clamps)		NA	NA	NA	8125-9018	8125-9018	8125-9018	8132-9018	8132-9018	8132-9018
Floating Mount (brackets, pin, mounting fasteners)	Inch	8116-9535	8116-9536	NA	8125-9535	8125-9536	NA	8132-9535	8132-9536	NA
	Metric	*8116-9035*	*8116-9036*	*NA*	*8125-9035*	*8125-9036*	*NA*	*8132-9035*	*8132-9036*	*NA*
Mounting Plate (1 plate, 2 bolts)	Inch	8316-9016	8316-9016	8316-9016						
	Metric	*8316-9016*	*8316-9016*	*8316-9016*						

SHOCK ABSORBER KITS		16			25			32		
		N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail
Fixed Shock Absorber Kit - Light Duty (1 shock absorber, all required hardware)	Inch	8116-9510	8116-9511	8116-9512	8125-9510	8125-9511	8125-9512	8132-9510	8132-9511	8132-9512
	Metric	*8116-9010*	*8116-9011*	*8116-9012*	*8125-9010*	*8125-9011*	*8125-9012*	*8132-9010*	*8132-9011*	*8132-9012*
Fixed Shock Absorber Kit - Heavy Duty (1 shock absorber, all required hardware)	Inch	8116-9525	8116-9526	8116-9527	8125-9525	8125-9526	8125-9527	8132-9525	8132-9526	8132-9527
	Metric	*8116-9025*	*8116-9026*	*8116-9027*	*8125-9025*	*8125-9026*	*8125-9027*	*8132-9025*	*8132-9026*	*8132-9027*
***Adjustable Shock Absorber Kit - Light Duty** (1 shock absorber, all required hardware)	Inch	8116-9515	8116-9016	8116-9517	8125-9515	8125-9016	8125-9517	8132-9515	8132-9016	8132-9517
	Metric	*8116-9015*	*8116-9016*	*8125-9017*	*8125-9015*	*8125-9016*	*8125-9017*	*8132-9015*	*8132-9016*	*8132-9017*
***Adjustable Shock Absorber Kit - Heavy Duty** (1 shock absorber, all required hardware)	Inch	8116-9530	8116-9031	8116-9032	8125-9530	8125-9031	8125-9532	8132-9530	8132-9031	8132-9532
	Metric	*8116-9030*	*8116-9031*	*8116-9032*	*8125-9030*	*8125-9031*	*8125-9032*	*8132-9030*	*8132-9031*	*8132-9032*

SHOCK PARTS		16			25			32		
		N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail
Fixed Shock Absorber Mounting Hardware (1 shock mount)	Inch	8116-9520	8116-9520	8116-9522	8125-9520	8125-9520	8125-9522	8132-9520	8132-9520	8132-9522
	Metric	*8116-9020*	*8116-9020*	*8116-9022*	*8125-9020*	*8125-9020*	*8125-9022*	*8132-9020*	*8132-9020*	*8132-9022*
***Adj. Shock Absorber Mounting Hardware** (1 shock mount)		8116-9023	8116-9023	8116-9024	8125-9023	8125-9023	8125-9024	8132-9023	8132-9023	8132-9024
Shock Stop Kit (Hardware needed for shock to strike carrier)	Inch	8116-9521	NA	8116-9034	8125-9521	8125-9013	8125-9534	8132-9521	4912-1063	8132-9534
	Metric	*8116-9021*	*NA*	*8116-9034*	*8125-9021*	*8125-9013*	*8125-9034*	*8132-9021*	*4912-1063*	*8132-9034*
Shock Absorber - Heavy Duty (1 shock absorber)		7906-1066	7906-1066	7906-1066	4910-1338	4910-1338	4910-1338	4912-1068	4912-1068	4912-1068
Shock Absorber - Light Duty (1 shock absorber)		7906-1065	7906-1065	7906-1065	4910-1337	4910-1337	4910-1337	4912-1067	4912-1067	4912-1067

*NOTE: N Internal bearing: Adjustable shock absorbers will decrease actuator stroke, see ⚠ Stroke Adder note on page MXP_29 for more information.
S Solid bearing: Adjustable shock absorbers will decrease actuator stroke, see ⚠ Stroke Adder note on page MXP_34 for more information.
P Profiled rail: Adjustable shock absorbers will decrease actuator stroke, see ⚠ Stroke Adder note on page MXP_39 for more information.

SERVICE PARTS MXP40, MXP50, MXP63

MOUNTING OPTIONS		40			50			63		
		N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail
Foot Mount (1 bracket, 2 bolts)	Inch	8140-9519	8140-9519	8140-9519	8150-9519	8150-9519	8150-9519	8163-9519	8163-9519	8163-9519
	Metric	*8140-9019*	*8140-9019*	*8140-9019*	*8150-9019*	*8150-9019*	*8150-9019*	*8163-9019*	*8163-9019*	*8163-9019*
Tube Clamp (2 clamps)		8140-9018	8140-9018	8140-9018	8140-9018	8140-9018	8140-9018	8163-9018	8163-9018	8163-9018
Floating Mount (brackets, pin, mounting fasteners)	Inch	8140-9535	8140-9536	NA	8150-9535	8150-9536	NA	8163-9535	8163-9536	NA
	Metric	*8140-9035*	*8140-9036*	*NA*	*8150-9035*	*8150-9036*	*NA*	*8163-9035*	*8163-9036*	*NA*

SHOCK ABSORBER KITS		40			50			63		
		N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail
Fixed Shock Absorber Kit - Light Duty (1 shock absorber, all required hardware)	Inch	8140-9510	8140-9511	8140-9512	8150-9510	8150-9511	8150-9512	8163-9510	8163-9511	8163-9512
	Metric	*8140-9010*	*8140-9011*	*8140-9012*	*8150-9010*	*8150-9011*	*8150-9012*	*8163-9010*	*8163-9011*	*8163-9012*
Fixed Shock Absorber Kit - Heavy Duty (1 shock absorber, all required hardware)	Inch	8140-9525	8140-9526	8140-9527	8150-9525	8150-9526	8150-9527	8163-9525	8163-9526	8163-9527
	Metric	*8140-9025*	*8140-9026*	*8140-9027*	*8150-9025*	*8150-9026*	*8150-9027*	*8163-9025*	*8163-9026*	*8163-9027*
***Adjustable Shock Absorber Kit - Light Duty** (1 shock absorber, all required hardware)	Inch	8140-9515	8140-9016	8140-9517	8150-9515	8150-9016	8150-9517	8163-9515	8163-9016	8163-9517
	Metric	*8140-9015*	*8140-9016*	*8140-9017*	*8150-9015*	*8150-9016*	*8150-9017*	*8163-9015*	*8163-9016*	*8163-9017*
***Adjustable Shock Absorber Kit - Heavy Duty** (1 shock absorber, all required hardware)	Inch	8140-9530	8140-9031	8140-9532	8150-9530	8150-9031	8150-9532	8163-9530	8163-9031	8163-9532
	Metric	*8140-9030*	*8140-9031*	*8140-9032*	*8150-9030*	*8150-9031*	*8150-9032*	*8163-9030*	*8163-9031*	*8163-9032*

SHOCK PARTS		40			50			63		
		N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail
Fixed Shock Absorber Mounting Hardware (1 shock mount)	Inch	8140-9520	8140-9520	8140-9520	8150-9520	8150-9520	8150-9522	8163-9520	8163-9520	8163-9520
	Metric	*8140-9020*	*8140-9020*	*8140-9020*	*8150-9020*	*8150-9020*	*8150-9022*	*8163-9020*	*8163-9020*	*8163-9020*
***Adj. Shock Absorber Mounting Hardware** (1 shock mount)		8140-9023	8140-9023	8140-9024	8150-9023	8150-9023	8163-9024	8163-9023	8163-9023	8163-9024
Shock Stop Kit (Hardware needed for shock to strike carrier)	Inch	8140-9521	4912-1063	8140-9534	8150-9521	4415-1003	8150-9034	8163-9521	4915-1003	8150-9034
	Metric	*8140-9021*	*4912-1063*	*8140-9034*	*8150-9021*	*4415-1003*	*8150-9034*	*8163-9021*	*4915-1003*	*8150-9034*
Shock Absorber - Heavy Duty (1 shock absorber)		4912-1068	4912-1068	4912-1068	4920-1069	4920-1069	4920-1069	4920-1069	4920-1069	4920-1069
Shock Absorber - Light Duty (1 shock absorber)		4912-1067	4912-1067	4912-1067	4920-1068	4920-1068	4920-1068	4920-1068	4920-1068	4920 -1068

*NOTE: N Internal bearing: Adjustable shock absorbers will decrease actuator stroke, see ⚠ Stroke Adder note on page MXP_29 for more information.
S Solid bearing: Adjustable shock absorbers will decrease actuator stroke, see ⚠ Stroke Adder note on page MXP_34 for more information.
P Profiled rail: Adjustable shock absorbers will decrease actuator stroke, see ⚠ Stroke Adder note on page MXP_39 for more information.

ORDERING

MODEL SELECTION (MUST BE IN THIS ORDER)

MXP 40 P SN SM2007·02

OPTIONS (IN ANY ORDER)

DW215·9 FM2 TC8 TK2 AH2 ___

MODEL

MXP MXP Pneumatic Band Cylinder

BORE

16 16 mm (5/8-inch) bore
25 25 mm (1-inch) bore
32 32 mm (1 1/4-inch) bore
40 38 mm (1 1/2-inch) bore
50 50 mm (2-inch) bore
63 64 mm (2 1/2-inch) bore

BEARING

N Internal Bearing
S Solid Bearing
P Profiled Rail

PORTING

TP Metric Taper (Rc/BST), Dual-end
GP Metric Parallel (ISO-G/BSP), Dual-end
NP NPT, Dual-end
ST Single-end, Metric Taper
SG Single-end, Metric Parallel
SN Single-end, NPT

⚠ Single End Porting ST SG SN is not available for MXP16

⚠ Metric Taper Porting TP is not available for MXP16

STROKE LENGTH & MOUNTING TYPE

SK_ _ _._ _ _ Stroke, enter desired stroke length in **inches**

SM_ _ _ _ _._ _ _ Stroke, enter desired stroke length in **millimeters**

NOTE: Actuator mounting threads and mounting fasteners will be either inch or metric; depending on how stroke length is indicated

SK=inch mounting

SM= metric mounting

AUXILIARY CARRIER

DW_ _ _._ _ _ Auxiliary Carrier, enter center-to-center spacing desired in **inches** (SK) or **millimeters** (SM)

(Same unit of measure as stroke length is required)

⚠ **Center-to-center spacing between carriers adds to overall length of the actuator,** this distance will not be subtracted from stroke length specified in the previous step

MOUNTING

FM_ Foot Mount, enter quantity desired
TC_ Tube Clamps, enter number of pairs (Not available on MXP16)
MP_ Mounting Plate (includes T-Nuts) for MXP16 ONLY
FL Floating Mount

⚠ NOTE: Floating Mount is not available with "P" Profiled Rail

⚠ NOTE: Shock Absorbers are not available with Floating Mount

SWITCHES

RY_ Reed Switch (Normally Open) with 5-meter lead, & enter quantity desired
RK_ Reed Switch (Normally Open) with 5-meter lead/QD, & quantity
NY_ Reed Switch (Normally Closed) with 5-meter lead, & quantity
NK_ Reed Switch (Normally Closed) with 5-meter lead/QD, & quantity

TY_ Solid State Switch PNP (Normally Open) w/ 5-meter lead, & quantity
TK_ Solid State Switch PNP (Normally Open) w/ 5-meter lead/QD, & quantity
KY_ Solid State Switch NPN (Normally Open) w/ 5-meter lead, & quantity
KK_ Solid State Switch NPN (Normally Open) w/ 5-meter lead/QD, & quantity

PY_ Solid State Switch PNP (Normally Closed) w/ 5-meter lead, & quantity
PK_ Solid State Switch PNP (Normally Closed) w/ 5-meter lead/QD, & quantity
HY_ Solid State Switch NPN (Normally Closed) w/ 5-meter lead, & quantity
HK_ Solid State Switch NPN (Normally Closed) w/ 5-meter lead/QD, & quantity

SHOCK ABSORBER

SD_ Fixed Shock Hardware & enter quantity desired
SL_ Fixed Shock Light Duty & enter quantity desired
SH_ Fixed Shock Heavy Duty & enter quantity desired

AD_ Adjustable Shock Hardware & enter quantity desired
AL_ Adjustable Shock Light Duty & enter quantity desired
AH_ Adjustable Shock Heavy Duty & enter quantity desired

⚠ NOTE: Adjustable Shock Absorbers reduce usable stroke length of the actuator. Please see the following pages for required stroke adder.
N Internal Bearing.....pg. MXP_29
S Solid Bearing.....pg. MXP_34
P Profiled Rail .....pg. MXP_39

⚠ NOTE: Floating Mount is not available with Shock Absorbers

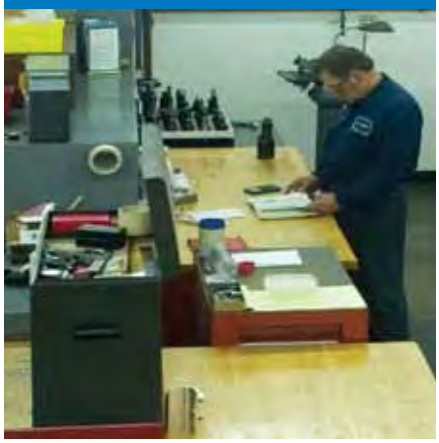
VISIT www.tolomatic.com/mxp FOR COMPLETE, UP-TO-DATE INFORMATION

⚠ ***Not all codes listed are compatible with all options.***

Call Tolomatic to determine available options and accessories based on your application requirements.

CUSTOM, MODIFIED AND STANDARD PRODUCT SOLUTIONS

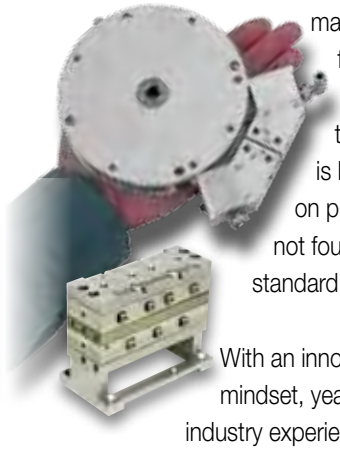
CUSTOM CAPABILITIES



Tolomatic's custom model shop can create first-piece prototypes with the industry's fastest turnaround times.

Custom Solutions are Standard Business

Hundreds of customers partner with Tolomatic to solve unique automation application challenges. We are geared to handle design requests–from our Model Shop (for fast prototypes) all the way through our ISO 9001:2000 certified manufacturing facility. Over 33% of our total business is based on products not found in our standard catalog.



With an innovation mindset, years of solid industry experience, and fast response times, let Tolomatic help you get the job done. If you are looking for linear motion solutions–pneumatic or electromechanical–and you cannot find a catalog product, get with Tolomatic. You will experience what we mean by **Excellence in Motion**.

MATERIAL HANDLING

Conveying machinery with built-in lane diverters offer a compact footprint with optimal performance.

Customer Challenge:

The traditional method of using tie rod cylinders to operate diverters required too much space to fit in space-restrictive production areas.

Tolomatic Solution:

Tolomatic recommended a series of pneumatic rodless band cylinders that could be easily retrofitted into production lines by offering a variety of mounting options. The manufacturer's customers were pleased with the space saving results and durability of the machines. The result was an increase of repeat customers for the manufacturer.

PACKAGING

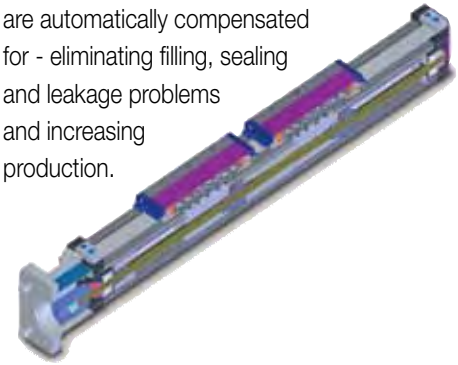
Modular bagging system fills and seals a wide range of materials and bag sizes.

Customer Challenge:

A leader in packaging technology was faced with the problem of compensating for inconsistent bag dimensions on its modular bag filling and sealing system. Irregularly sized bags required manual setup and were slowing the production process which required high-speed accuracy and flexibility.

Tolomatic Solution:

Tolomatic supplied a series of customized electric screw drive actuators that precisely positioned the incoming bags before insertion into the filling/sealing line. Two actuators adjust the vertical position and two others center the bags in the tray. The results: variations in bag lengths and widths are automatically compensated for - eliminating filling, sealing and leakage problems and increasing production.



The best motion control and linear motion solutions for your applications.

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Our people make the difference! Expect prompt, courteous replies to all of your application and product questions.

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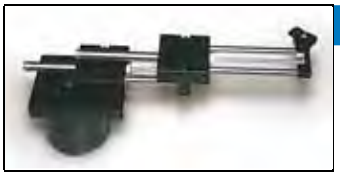
Tolomatic continues to offer the fastest delivery of standard catalog products. Modified and custom products ship weeks ahead of the competition.



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From standard catalog products... to modified products... to completely unique custom products, Tolomatic designs and builds the best solutions for your challenging applications.

ONLINE SIZING & SELECTION SOFTWARE

Online sizing that is easy to use, accurate and always up-to-date. Input your application data and the software will determine a Tolomatic electric actuator to meet your requirements.

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RODLESS CYLINDERS: Band Cylinders, Cable Cylinders, MAGNETICALLY COUPLED CYLINDERS/SLIDES; GUIDED ROD CYLINDER SLIDES

"FOLDOUT" BROCHURE #9900-9075
PRODUCTS BROCHURE #9900-4028

ELECTRIC PRODUCTS

ROD & GUIDED ROD STYLE ACTUATORS, HIGH THRUST ACTUATORS, SCREW & BELT DRIVE RODLESS ACTUATORS, MOTORS, DRIVES AND CONTROLLERS

"FOLDOUT" BROCHURE #9900-9074
PRODUCTS BROCHURE #9900-4016

POWER TRANSMISSION PRODUCTS

GEARBOXES: Float-A-Shaft®, Slide-Rite®; DISC CONE CLUTCH; CALIPER DISC BRAKES

"FOLDOUT" BROCHURE #9900-9076
PRODUCTS BROCHURE #9900-4029

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EXCELLENCE IN MOTION

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Tolomatic
EXCELLENCE *IN MOTION*®

MXP BAND CYLINDER

ENDURANCE TECHNOLOGY℠

[N] INTERNAL BEARING
[S] SOLID BEARING
[P] PROFILED RAIL

MAXIMUM DURABILITY

Tolomatic
EXCELLENCE IN MOTION®

ENDURANCE TECHNOLOGY℠

Pneumatic Actuators

- *Largest selection of rodless cylinders* in band, cable, and magnetically coupled styles with a wide range of load capacities.
- *Power-Block rod cylinder slides* for maximum force in a short stroke package, perfect for conveyor stops or load lifting applications.

Electric Actuators

- *Rod screw actuators* for maximum thrust in short stroke applications. Guided screw models are available for applications that require additional guidance.
- *Integrated motor actuators* in both roller and ball screw technologies deliver high thrust capacities and 100% duty cycle.
- *Rodless screw and belt designs* solve a wide range of moment, load, precision, speed, and performance requirements.

Drives & Motors

- *Brushless servo controllers, drives and motors* provide smooth, quiet operation and high performance.
- *Microstepping controllers, drives and motors* achieve precise positioning at economical prices.
- *Easy-to-use, Windows® based programming and setup software.*
- *Your Motor Here* program matches a Tolomatic actuator to customer motor and supplies the motor adapter plate free of charge, mounted and shipped with the actuator.

More solutions. Built to last.

Power Transmission

- *Float-A-Shaft® and Slide-Rite® right-angle gearboxes* turn power around any corner.
- *Caliper disc brakes* in mechanical, hydraulic, pneumatic and spring-applied models offer a wide variety of industrial stopping power.
- *Disc cone clutches* with high torque output and non-slip, dependable performance.

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- *Quick turnaround on custom modifications* to Tolomatic standard products.
- *Linear motion solutions with custom design and prototype services.*

Service & Tech Support

- *Fast service and full technical support.*
- *All catalog products are built-to-order and shipped in 5 days or less.*

5 DAYS BUILT-TO-ORDER

- *CAD files & sizing and selection software available online at* **www.tolomatic.com**

ACTUATOR SIZING

3D CAD 2D

TABLE OF CONTENTS

INTRODUCING THE MXP BAND CYLINDER – DESIGNED TO OUTLAST EVERY RODLESS CYLINDER ON THE MARKET

The MXP pneumatic rodless cylinder is exactly what you expect from the industry's number one rodless supplier. Designed with our exclusive ENDURANCE TECHNOLOGY℠ features, the MXP delivers superior performance to meet the most demanding applications. Nobody knows rodless like Tolomatic, and the MXP proves it.

- **DURABLE BEARINGS.** Three bearing choices to match your application needs. Profiled rail design reduces friction and extends actuator life. Solid bearing design reduces stress concentration for optimum performance. Internal bearing design is permanently lubricated for long, trouble-free service.

- **DURABLE BANDS.** Stainless steel bands are stronger and will not elongate like elastomer (non-metallic) bands, providing reliable sealing over the life of the actuator.

N-INTERNAL BEARING

- Low cost solution for applications with limited load and bending moment requirements
- Lowest breakaway pressure
- Best in many vertical applications
- Permanently lubed internal bearing

S-SOLID BEARING

- Increased Mx moment capacity
- Large bearing surface contact area optimizes stress distribution on bearing for long service life
- Large carrier mounting pattern for more load stability and compatibility with existing BC2 applications
- Engineered bearing material does not require additional lubrication
- Solid bearings are field replaceable

P-PROFILED RAIL

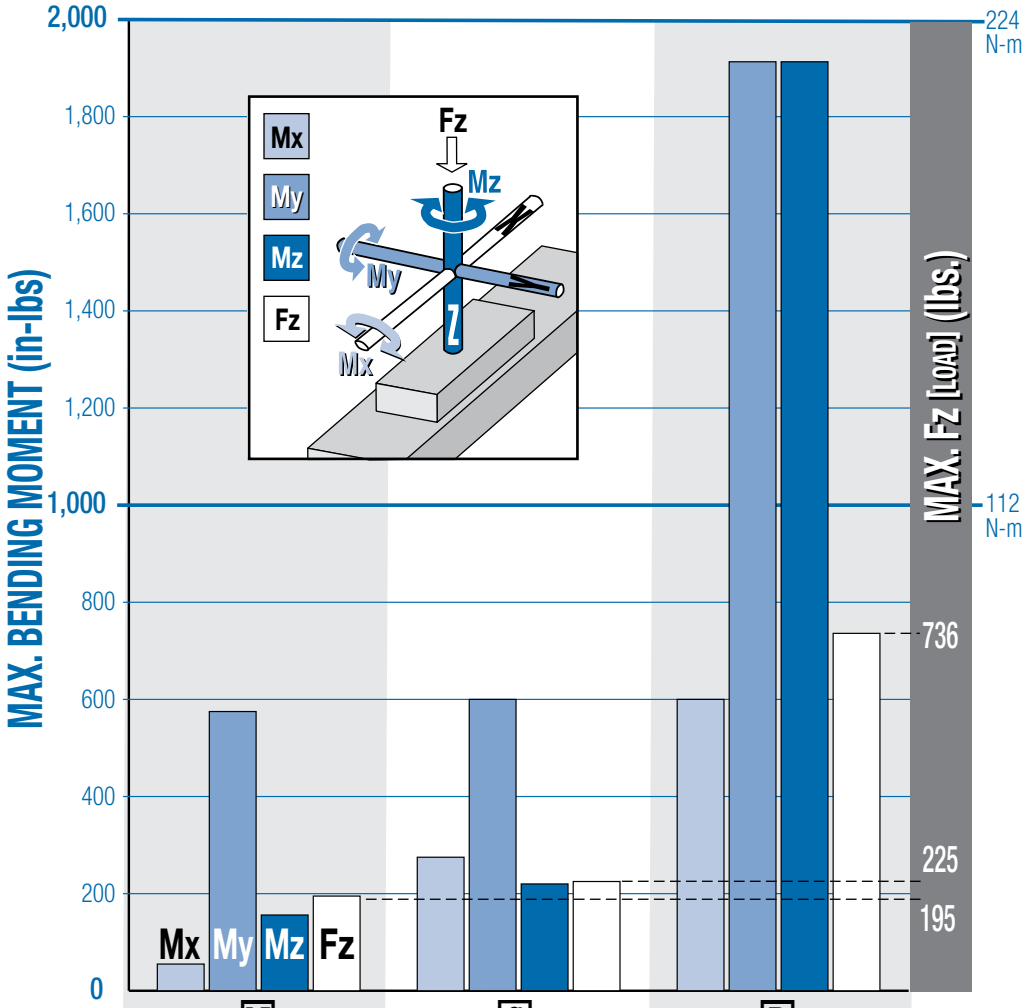
- Recirculating ball bearing design offers reduced friction for reliable service life
- High load and bending moment capacities
- Low profile to fit your application
- High precision bearings feature smooth, low breakaway motion

SELECT THE PERFORMANCE YOU NEED

Choose from: • Three Bearing Models • Six Bore Sizes • Built to Your Specified Stroke Length!

MOMENT & LOAD CAPACITY COMPARISON

Graph for model comparison, data from MXP40, 38mm (1.5") bore



Tolomatic MXP Band Cylinder Model			
Bearing Type	Internal Bearing	Solid Bearing	Profiled Rail
Moment Capacity	Moderate	Moderate + Mx	High
Isolated Piston	No	Yes	Yes
Ideal Applications	• Guided Loads • Vertical Orientation	• Side Loads • Impact Loads	• High Moment Loads • High Speeds with Heavy Loads • High Precision
Product Details	Page MXP_6	Page MXP_8	Page MXP_10

N INTERNAL BEARING

ENDURANCE TECHNOLOGY℠

INTERNAL BEARINGS

- Design maximizes piston bearing surface area for less pressure on bearing surfaces, less pressure results in less wear
- Permanent lubrication for low friction and extended bearing life
- Internal location provides protection from external contaminants, extending life

STAINLESS STEEL BANDS

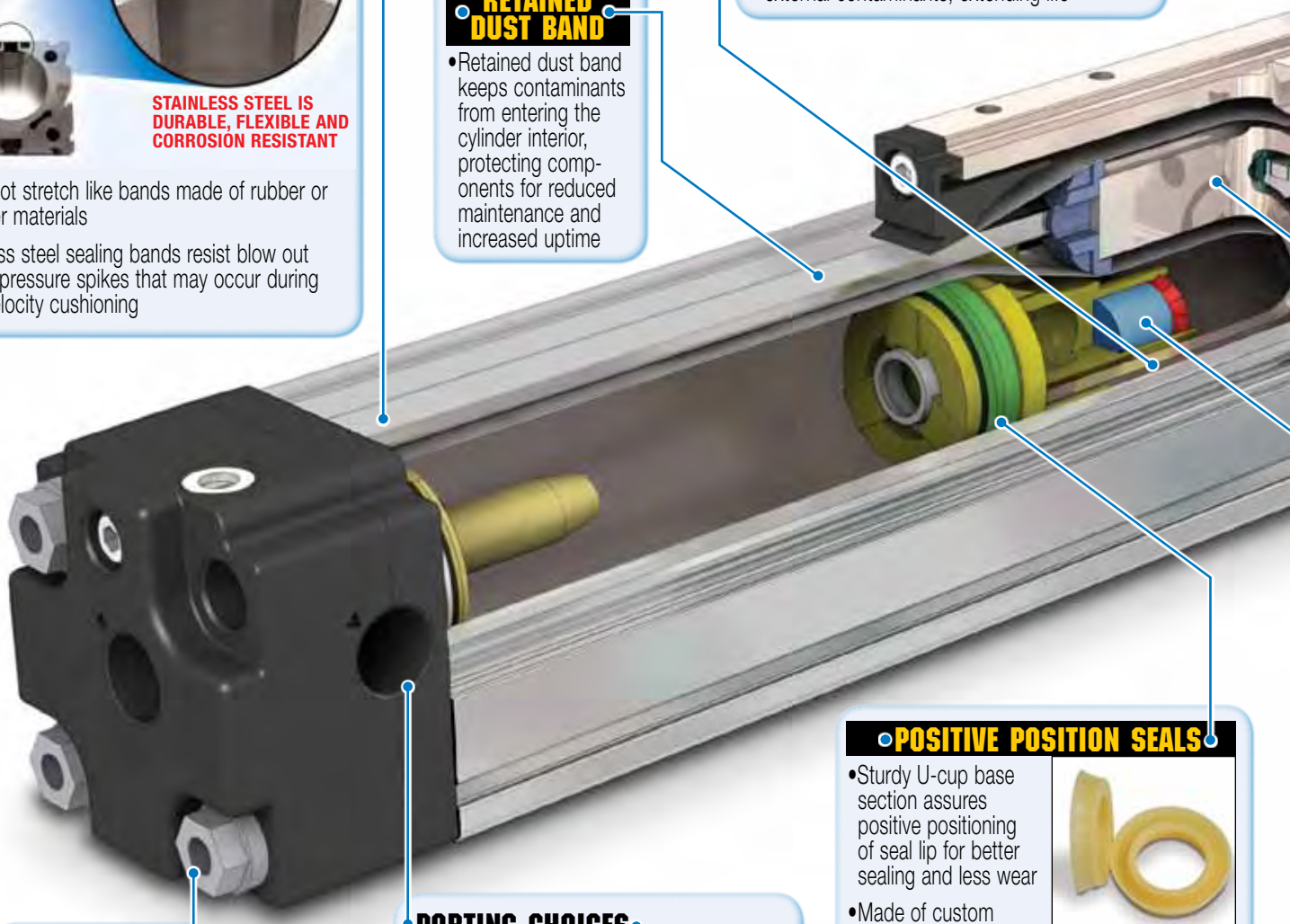
- Both interior sealing band and exterior dust band made of fatigue resistant stainless steel

STAINLESS STEEL IS DURABLE, FLEXIBLE AND CORROSION RESISTANT

- Does not stretch like bands made of rubber or polymer materials
- Stainless steel sealing bands resist blow out during pressure spikes that may occur during high velocity cushioning

RETAINED DUST BAND

- Retained dust band keeps contaminants from entering the cylinder interior, protecting components for reduced maintenance and increased uptime



POSITIVE POSITION SEALS

- Sturdy U-cup base section assures positive positioning of seal lip for better sealing and less wear
- Made of custom formulated polyurethane for pliable, wear resistant seal lip

DIRECT MOUNT

- Head bolts are tapped for direct mounting

PORTING CHOICES

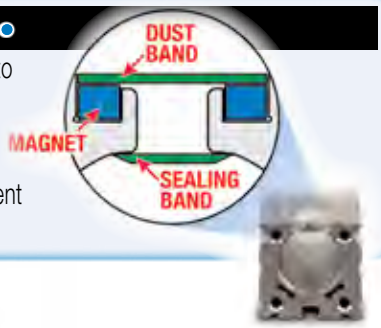
- 4-ported heads are standard to allow air connections on sides, end or bottom
- Single-end porting allows convenient one end air connection
- NPT, Metric Parallel (ISO-G/BSP) & Metric Taper (Rc/BST) available on both metric and inch *(US standard)* mount actuators

INCH OR METRIC MOUNTING

- Your choice of inch *(US standard)* or metric fasteners for carrier and head bolt mounting

NON-WEAR BAND RETENTION

- Magnetically retained bands are not subject to wear as are mechanically retained systems
- Immediate band engagement and release results in less drag on piston for lower breakaway force during initial carrier movement



DUST WIPER

- Formed end cap and side dust wipers keep contaminants from entering the cylinder's internal area

ADJUSTABLE CUSHIONS

- Easy screw adjustment for smooth deceleration protecting actuator from high stress at end-of-stroke
- Adjustable cushions with retained stainless steel needle screw for increased safety

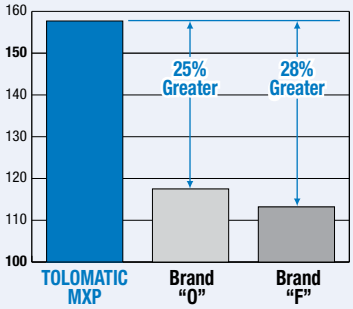
INTERNAL MAGNETS

- Standard feature that allows sensor installation on left, right or bottom of the extrusion

HIGH STRENGTH PISTON

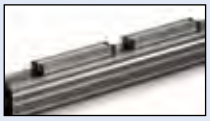
- Single piece extrusion for piston bracket and carrier reduces failure points
- Piston bracket neck cross-sectional area is up to 28% greater than competitive designs, providing increased durability

25mm PISTON BRACKET MINIMUM CROSS-SECTIONAL AREA (mm²)



NOTE: Boxed letters indicate ordering codes

OPTIONS



AUXILIARY CARRIER [D] [W]
- 2X higher Fz (load) capacity
- High bending moment capacity

FLOATING MOUNT [F] [L]
- Compensates for non-parallelism between MXP band cylinder and externally guided load

TUBE CLAMPS [T] [C]
- Used for intermediate support
- Flush with bottom of actuator to retain low profile
- Drop-in, adjustable mounting locations

FOOT MOUNTS [F] [M]
- For end mounting of MXP band cylinder
- Use to bottom or side mount actuator

SHOCK ABSORBERS [A] [L] [S] [L] [A] [H] [S] [H]
- Allows increased operating speed and load
- Self-compensates for load or speed changes
- Minimizes impact load to equipment
- Fixed or adjustable position shocks

SINGLE-END PORTING [S]
- Convenient single-end air connection (not available on MXP16)

SWITCHES
- Wide variety of sensing choices: Reed, Solid State PNP or NPN, all available normally open or normally closed
- Flush mount, drop-in installation, anytime
- Bright LEDs, power & signal indication
- CE rated, RoHS compliant

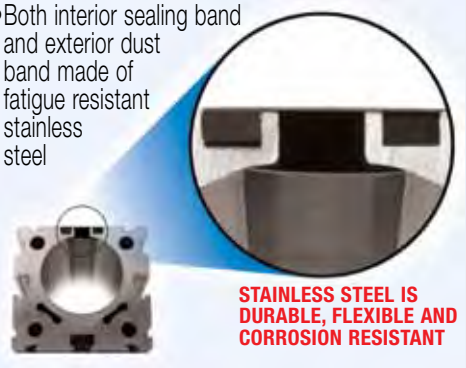
S SOLID BEARING

ENDURANCE TECHNOLOGY℠

Endurance Technology features are designed for maximum durability to provide extended service life.

STAINLESS STEEL BANDS

- Both interior sealing band and exterior dust band made of fatigue resistant stainless steel



- Does not stretch like bands made of rubber or polymer materials
- Stainless steel sealing bands resist blow out during pressure spikes that may occur during high velocity cushioning

RETAINED DUST BAND

- Retained dust band keeps contaminants from entering the cylinder interior, protecting components for reduced maintenance and increased uptime

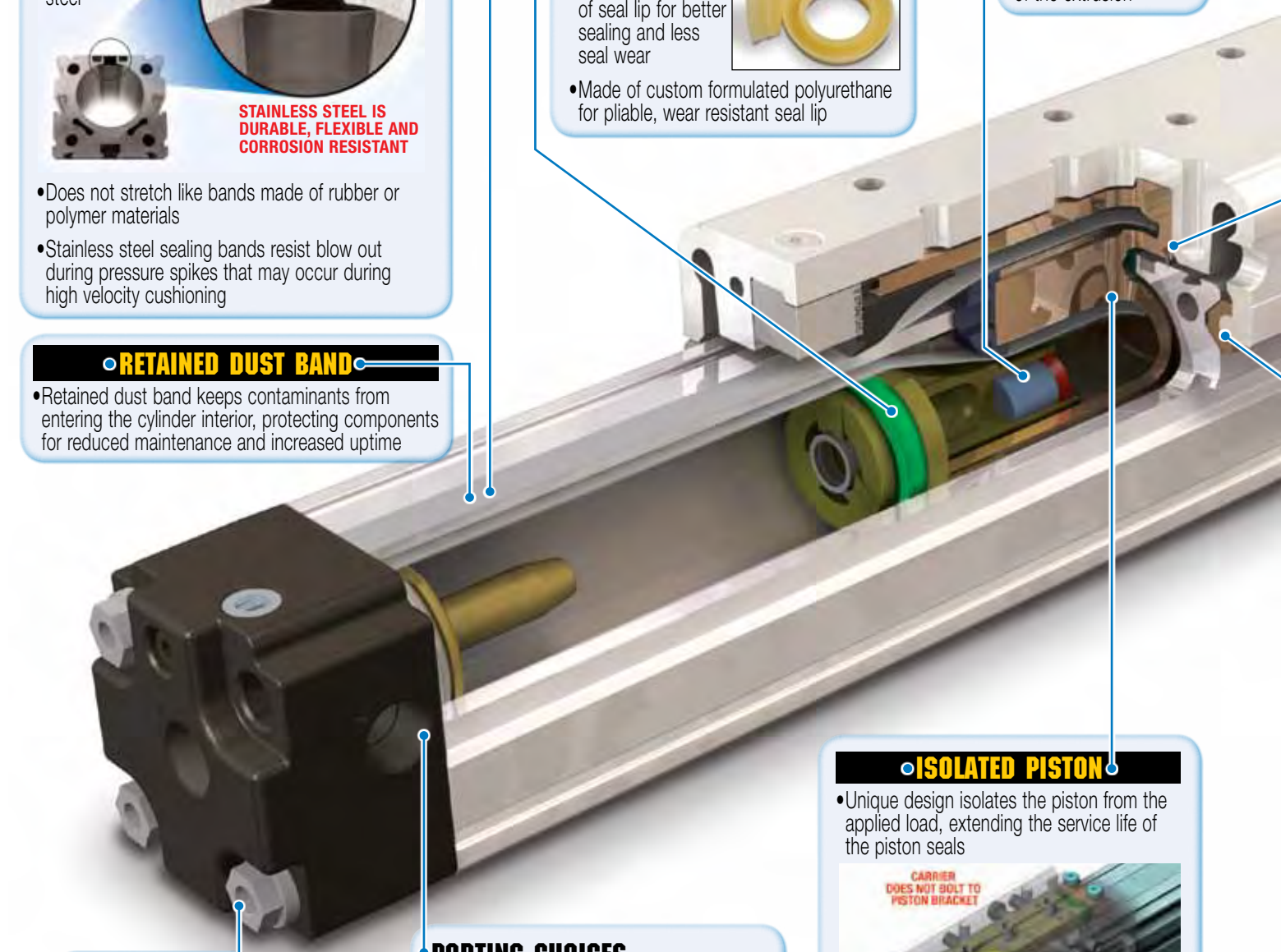
POSITIVE POSITION SEALS

- Sturdy U-cup base section assures positive positioning of seal lip for better sealing and less seal wear

- Made of custom formulated polyurethane for pliable, wear resistant seal lip

INTERNAL MAGNETS

- Standard feature that allows sensor installation on left, right or bottom of the extrusion



ISOLATED PISTON

- Unique design isolates the piston from the applied load, extending the service life of the piston seals

- Piston remains isolated even when the carrier is deflected under load
- Piston bracket and carrier feature single piece extrusions, reducing failure points

DIRECT MOUNT

- Head bolts are tapped for direct mounting

PORTING CHOICES

- 4-ported heads are standard to allow air connections on sides, end or bottom
- Single-end porting allows convenient one end air connection
- NPT, Metric Parallel (ISO-G/BSP) & Metric Taper (Rc/BST) available on both metric and inch *(US standard)* mount actuators

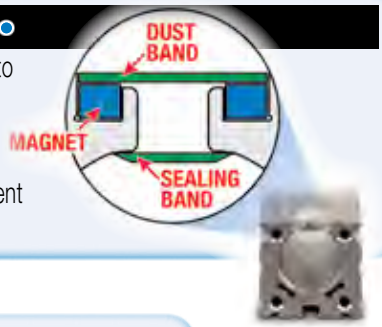
INCH OR METRIC MOUNTING

- Your choice of inch *(US standard)* or metric fasteners for carrier and head bolt mounting

...MAXIMUM DURABILITY

NON-WEAR BAND RETENTION

- Magnetically retained bands are not subject to wear as are mechanically retained systems
- Immediate band engagement and release results in less drag on piston for lower breakaway force during initial carrier movement

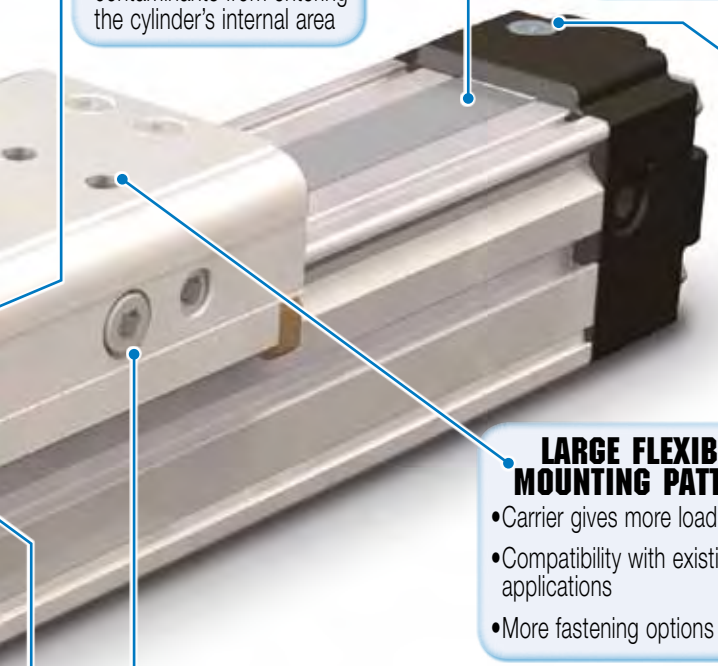


DUST WIPER

- Formed end cap and side dust wipers keep contaminants from entering the cylinder's internal area

ADJUSTABLE CUSHIONS

- Easy screw adjustment for smooth deceleration protecting actuator from high stress at end-of-stroke
- Adjustable cushions with retained stainless steel needle screw for increased safety

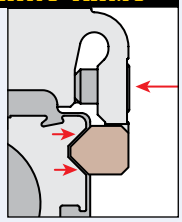


LARGE FLEXIBLE MOUNTING PATTERN

- Carrier gives more load stability
- Compatibility with existing BC2 applications
- More fastening options

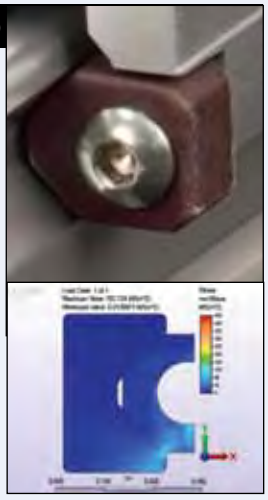
NON-BINDING BEARING ARMS

- Bearings are tensioned indirectly, providing bind free adjustment



TRAPEZOIDAL BEARINGS

- Trapezoidal design maximizes bearing surface area for less pressure on bearing surfaces; less pressure results in less wear
- Engineered bearing material has low static and dynamic friction with low wear properties for long lasting, smooth operation
- Bearings are field replaceable for extended service life



NOTE: Boxed letters indicate ordering codes

OPTIONS

AUXILIARY CARRIER [D] [W]

- 2X higher Fz (load) capacity
- High bending moment capacity

FLOATING MOUNT [F] [L]

- Compensates for non-parallelism between MXP band cylinder and externally guided load

TUBE CLAMPS [T] [C]

- Used for intermediate support
- Flush with bottom of actuator to retain low profile
- Drop-in, adjustable mounting locations

FOOT MOUNTS [F] [M]

- For end mounting of MXP band cylinder
- Use to bottom or side mount actuator

SHOCK ABSORBERS [A] [L] [S] [L] [A] [H] [S] [H]

- Allows increased operating speed and load
- Self-compensates for load or speed changes
- Minimizes impact load to equipment
- Fixed or adjustable position shocks

SINGLE-END PORTING [S]

- Convenient single-end air connection (not available on MXP16)

SWITCHES

- Wide variety of sensing choices: Reed, Solid State PNP or NPN, all available normally open or normally closed
- Flush mount, drop-in installation, anytime
- Bright LEDs, power & signal indication
- CE rated, RoHS compliant

P PROFILED RAIL

ENDURANCE TECHNOLOGY℠

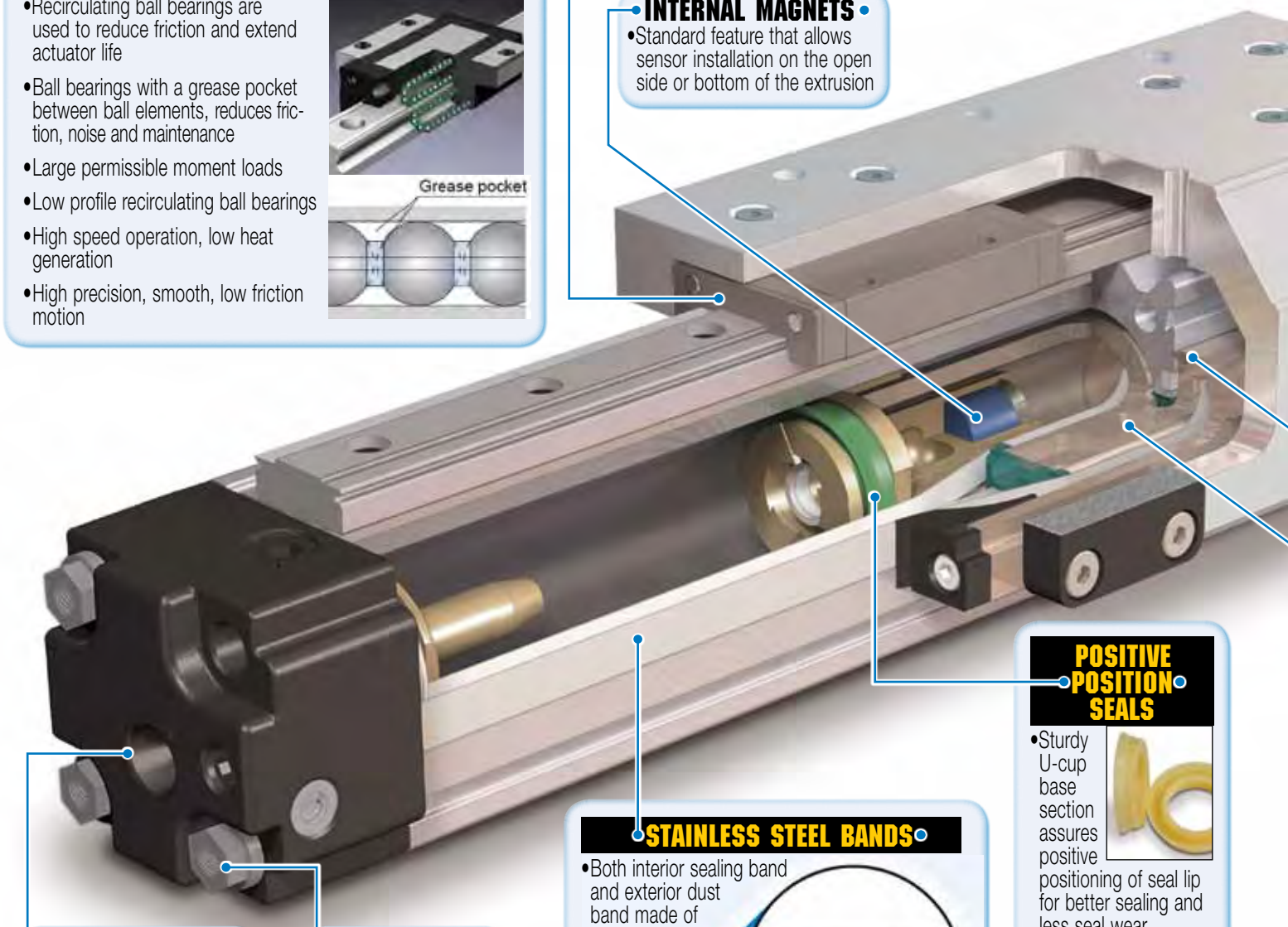
Endurance Technology features are designed for maximum durability to provide extended service life.

RECIRCULATING BALL BEARINGS

- Recirculating ball bearings are used to reduce friction and extend actuator life
- Ball bearings with a grease pocket between ball elements, reduces friction, noise and maintenance
- Large permissible moment loads
- Low profile recirculating ball bearings
- High speed operation, low heat generation
- High precision, smooth, low friction motion

INTERNAL MAGNETS

- Standard feature that allows sensor installation on the open side or bottom of the extrusion



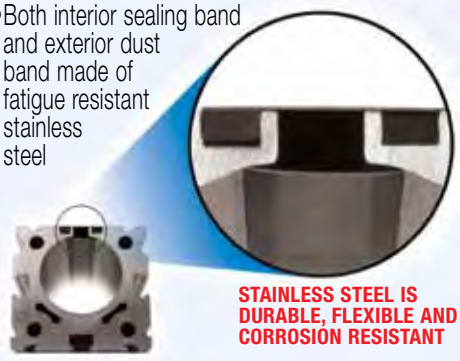
POSITIVE POSITION SEALS

- Sturdy U-cup base section assures positive positioning of seal lip for better sealing and less seal wear

- Made of custom formulated polyurethane for pliable, wear resistant seal lip

STAINLESS STEEL BANDS

- Both interior sealing band and exterior dust band made of fatigue resistant stainless steel



STAINLESS STEEL IS DURABLE, FLEXIBLE AND CORROSION RESISTANT

- Does not stretch like bands made of rubber or polymer materials
- Stainless steel sealing bands resist blow out during pressure spikes that may occur during high velocity cushioning

PORTING CHOICES

- 4-ported heads are standard to allow air connections on side, top or end
- Single-end porting allows convenient one end air connection
- NPT, Metric Parallel (ISO-G/BSP) & Metric Taper (Rc/BST) available on both metric and inch *(US standard)* mount actuators

DIRECT MOUNT

- Head bolts are tapped for direct mounting

INCH OR METRIC MOUNTING

- Your choice of inch *(US standard)* or metric fasteners for carrier and head bolt mounting

...MAXIMUM DURABILITY

LOW CARRIER HEIGHT

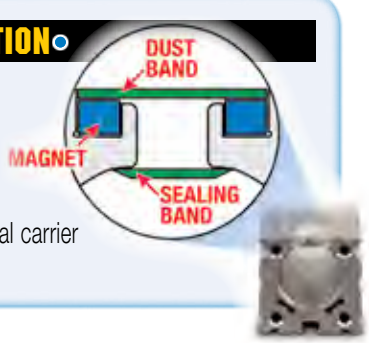
- Reduces overall cylinder envelope
- Large mounting pattern for high load stability

ADJUSTABLE CUSHIONS

- Easy screw adjustment for smooth deceleration protecting actuator from high stress at end-of-stroke
- Adjustable cushions with retained stainless steel needle screw for increased safety

NON-WEAR BAND RETENTION

- Magnetically retained bands are not subject to wear as are mechanically retained systems
- Immediate band engagement and release results in less drag on piston for lower breakaway force during initial carrier movement



RETAINED DUST BAND

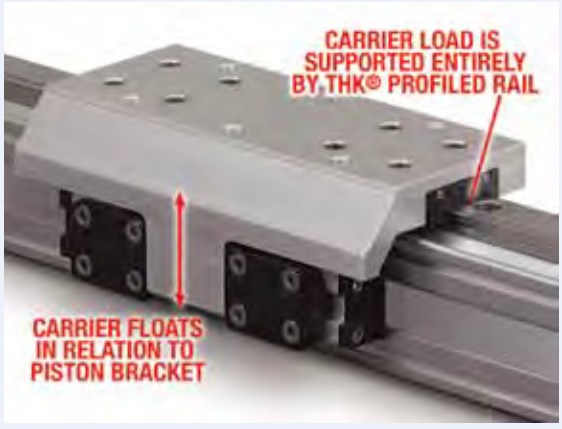
- Retained dust band keeps contaminants from entering the cylinder interior, protecting components for reduced maintenance and increased uptime

DUST WIPER

- Formed end cap and side dust wipers keep contaminants from entering the cylinder's internal area

ISOLATED PISTON

- Unique design isolates the piston from the applied load, extending the service life of the piston seals



- Piston remains isolated even when the carrier is deflected under load
- Piston bracket and carrier feature single piece extrusions, reducing failure points

NOTE: Boxed letters indicate ordering codes

OPTIONS

AUXILIARY CARRIER [D] [W]

- 2X higher Fz (load) capacity
- High bending moment capacity

TUBE CLAMPS [T] [C]

- Used for intermediate support
- Flush with bottom of actuator to retain low profile
- Drop-in, adjustable mounting locations

FOOT MOUNTS [F] [M]

- For end mounting of MXP band cylinder
- Use to bottom or side mount actuator

SHOCK ABSORBERS [A] [L] [S] [L] [A] [H] [S] [H]

- Allows increased operating speed and load
- Self-compensates for load or speed changes
- Minimizes impact load to equipment
- Fixed or adjustable position shocks

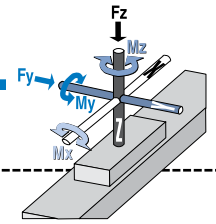
SINGLE-END PORTING [S]

- Convenient single-end air connection (not available on MXP16)

SWITCHES

- Wide variety of sensing choices: Reed, Solid State PNP or NPN, all available normally open or normally closed
- Flush mount, drop-in installation, anytime
- Bright LEDs, power & signal indication
- CE rated, RoHS compliant

SELECTION GUIDELINES



1 COMPILE APPLICATION REQUIREMENTS

APPLICATION DATA WORKSHEET

STROKE LENGTH _____
☐ inch (S K) (U.S. Standard) ☐ millimeters (S M) (Metric)

AVAILABLE AIR PRESSURE _____
☐ PSI (U.S. Standard) ☐ bar (Metric)

REQUIRED THRUST FORCE _____
☐ lbf (U.S. Standard) ☐ N (Metric)

LOAD _____
☐ lb (U.S. Standard) ☐ kg (Metric)

LOAD CENTER OF GRAVITY DISTANCE TO CARRIER CENTER
d_x _____
d_y _____
d_z _____
☐ inch (U.S. Standard) ☐ millimeters (Metric)

FORCES APPLIED TO CARRIER
F_z _____
F_y _____
☐ lbf (U.S. Standard) ☐ N (Metric)

BENDING MOMENTS APPLIED TO CARRIER
M_x _____
M_y _____
M_z _____
☐ in-lbs (U.S. Standard) ☐ N-m (Metric)

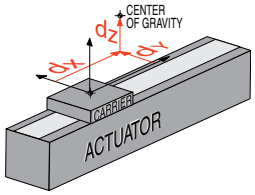
FINAL VELOCITY _____
☐ in/sec (U.S. Standard) ☐ mm/sec (Metric)

MOVE TIME sec. _____

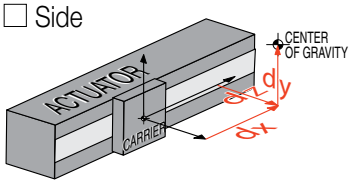
NO. OF CYCLES _____
☐ per minute ☐ per hour

ORIENTATION

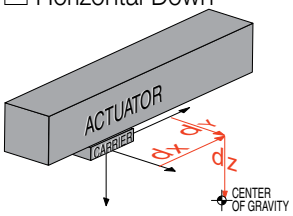
☐ Horizontal



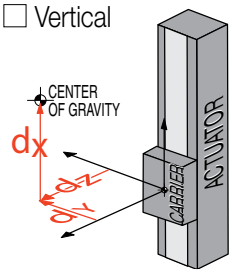
☐ Side



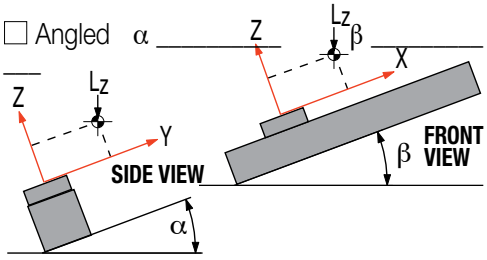
☐ Horizontal Down



☐ Vertical



☐ Angled α _____



OTHER ISSUES:
(i.e. Environment, Temperature, Contamination, etc.)

_____
_____
_____
_____

Contact information: _____
_____
_____
_____

STOP Fax (1-763-478-8080) or call Tolomatic (1-800-328-2174) with the above information. We will provide any assistance needed to determine the proper MXP Band Cylinder.

The process of selecting a load bearing actuator for a given application can be complex. It is highly recommended that you contact Tolomatic for assistance in selecting the best actuator for your application. The following overview of the selection guidelines are for educational purposes only.

2 DETERMINE BORE SIZE

- Consult the Theoretical Force vs. Pressure graph. (See graph at right)
- Find the intersection of the available pressure and required thrust force. If the intersection falls below the plotted bore size curve, the actuator will supply adequate force for the application. If the intersection is above the curve, a larger cylinder bore size will be required.

⚠ NOTE: Additional force may be required to obtain the necessary acceleration within desired cycle time.

3 COMPARE LOAD TO MAXIMUM LOAD CAPACITIES

Calculate the following static loads: Mx, My, Mz, Fy, Fz

Loads = Applied Moments + Forces

If the load of your application exceeds figures indicated in the MOMENT AND LOAD CAPACITY tables (See pages MXP_14-19) consider:

1.) Higher capacity bearing style, i.e. N to S, S to P

2.) Larger Bore Cylinder

3.) Auxiliary Carrier

4.) Add External Guides

4 CALCULATE LOAD FACTOR L_F

For combined loads the Load Factor (L_F) must not exceed the value 1.

$$L_F = \frac{Mx}{Mx_{max}} + \frac{My}{My_{max}} + \frac{Mz}{Mz_{max}} + \frac{Fy}{Fy_{max}} + \frac{Fz}{Fz_{max}} \leq 1$$

If L_F exceeds the value 1, then consider the four choices listed in step #3.

SHOCKS

If the intersection of the final velocity and load mass falls in the shaded regions, then shock absorbers should be used.

6 CONSIDER PEAK DYNAMIC INERTIA MOMENTS

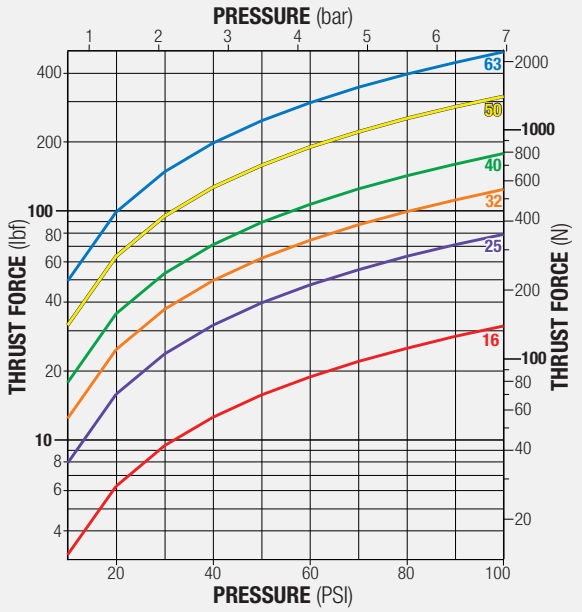
When a rigidly attached load mass is accelerated or decelerated, its inertia induces bending moments on the carrier. The magnitude of these inertia moments can be larger than the applied loads. Careful attention to how the load is decelerated at the end of stroke is required for extended actuator performance and application safety.

Evaluate the dynamic inertia moment data:
1.) The length of deceleration distance
2.) The load attached to the carrier
3.) The distance of the load mass center of gravity from the carrier, and
4.) The final velocity of the carrier.

If dynamic inertia moments are excessive, consider the four choices listed in step #3 or consider these deceleration methods:

- **Reduce final velocity** with flow controls or reduced pressure.
- **Pneumatic valve deceleration circuits.** By reducing the speed before the cushion or shock is reached, the load can decelerate over a longer distance, thereby reducing the deceleration moments.
- **Position shock absorbers at the load's center of gravity.** This will greatly reduce the moment load applied to the carrier.

THEORETICAL FORCE VS PRESSURE



5 DETERMINE CUSHION & SHOCK CAPACITY

Consult the Cushion and Shock Absorber Performance charts for the model selected (see page MXP_22). The velocities listed on the cushion charts are final or impact velocities. If the final or impact velocity is not known, use of valve deceleration circuits or shock absorbers should be considered.

CUSHIONS

Find the intersection of the final velocity and load mass. If the intersection is below the diagonal lines, the internal cushions on the actuator may be used.

[P] PROFILED RAIL DECELERATION CONSIDERATIONS

While the [P] Profiled Rail MXP is capable of carrying very large loads, consideration must be given to how to stop the load at the end of stroke. If Tolomatic cushions or shocks are used, stay within the specifications defined. If another type of shock absorber is used, be sure that the deceleration of the load is smooth and over an adequate distance.

7 DETERMINE TUBE CLAMP REQUIREMENTS

- Consult the Tube Clamp Requirement chart for the model selected (page MXP_23-24).
- Cross-reference the load force and maximum distance between supports.
- Divide stroke length by max. distance calculated above to determine number of tube clamps to order.

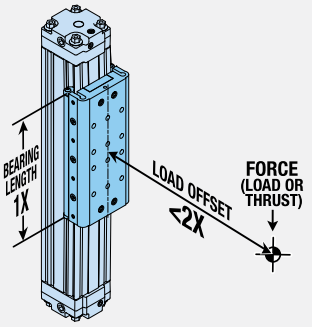
8 CONSIDER PORTING AND OPTIONS

- Choose Single End Porting or Dual End Porting
- Choose NPT, Metric Parallel *(ISO-G/BSP)* or Metric Taper *(Rc/BST)* Ports

OPTIONS:

- Switches – Reed, Solid State PNP or NPN, all available normally open or normally closed
- Shock Absorbers – Heavy or light duty, fixed or adjustable mount – recommended for longer life in most applications
- Foot Mounts
- Floating Mount Bracket – used when lack of parallelism occurs between the cylinder and an externally guided and supported load. Available for [N] internal & [S] solid bearing styles

[S] SOLID BEARING 2:1 RULE



For applications using [S] solid bearings, binding or interrupted motion may occur if the load offset is equal to or greater than twice the bearing length (1X). *LOAD OFFSET is defined as: the distance from the applied force (or the load center of gravity) to the centerline of the carrier.*

If the load offset cannot be changed consider:

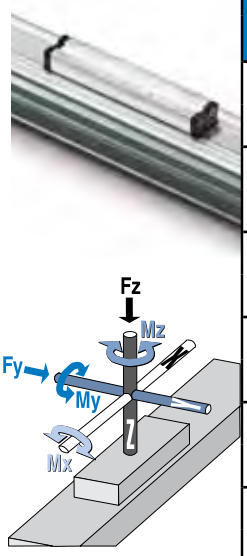
1.) Higher capacity bearing style, i.e. [S] to [P]

2.) Larger Bore Cylinder

3.) Auxiliary Carrier

4.) Add External Guides

STANDARD



BORE			MAXIMUM BENDING MOMENTS Mx	My	Mz	MAX. LOAD Fz	THRUST (at 100 PSI)
16	Inch	0.63 in	3 in-lbs	35 in-lbs	5 in-lbs	30 lbf	30.7 lbf
	Metric	*16 mm*	*0.3 N-m*	*4.0 N-m*	*0.6 N-m*	*133 N*	*136 N*
25	Inch	1.00 in	9 in-lbs	132 in-lbs	27 in-lbs	65 lbf	78.5 lbf
	Metric	*25 mm*	*1.0 N-m*	*14.9 N-m*	*3.1 N-m*	*289 N*	*349 N*
32	Inch	1.25 in	36 in-lbs	318 in-lbs	120 in-lbs	115 lbf	123 lbf
	Metric	*32 mm*	*4.1 N-m*	*35.9 N-m*	*13.6 N-m*	*512 N*	*546 N*
40	Inch	1.50 in	55 in-lbs	575 in-lbs	156 in-lbs	195 lbf	177 lbf
	Metric	*38 mm*	*6.2 N-m*	*65 N-m*	*17.6 N-m*	*867 N*	*786 N*
50	Inch	2.00 in	98 in-lbs	1,017 in-lbs	172 in-lbs	270 lbf	314 lbf
	Metric	*50 mm*	*11.1 N-m*	*115 N-m*	*19.4 N-m*	*1,201 N*	*1,397 N*
63	Inch	2.50 in	120 in-lbs	1,776 in-lbs	216 in-lbs	370 lbf	491 lbf
	Metric	*64 mm*	*13.6 N-m*	*201 N-m*	*24.4 N-m*	*1,646 N*	*2,184 N*

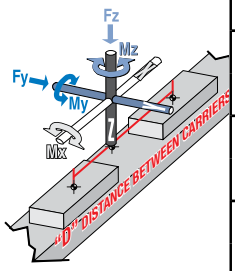
The moment and load capacity of the actuator's bearing system is based on an L10 life of 200,000,000 linear inches of travel. Life of the actuator will vary for each application depending on the combined loads, motion parameters and operating conditions. The load factor (L_F) ratios for each application must not exceed a value of 1 (as calculated below). Exceeding a load factor of 1 will diminish the actuator's rated life.

$$L_F = \frac{Mx}{Mx_{max}} + \frac{My}{My_{max}} + \frac{Mz}{Mz_{max}} + \frac{Fy}{Fy_{max}} + \frac{Fz}{Fz_{max}} \leq 1$$

With combined loads, L_F must not exceed the value 1.

Ratings are the maximum values for shock-free, vibration-free operation in a typical industrial environment. Contact Tolomatic for assistance in selecting the most appropriate actuator for your application.

DW AUXILIARY CARRIER



BORE			"D" MIN	MAXIMUM BENDING MOMENTS MxA	MyA*	MzA*	MAX. LOAD FzA	THRUST (at 100 PSI)
16	Inch	0.63 in	5.0 in	3 in-lbs	150 in-lbs	81 in-lbs	60 lbf	30.7 lbf
	Metric	*16 mm*	*127 mm*	*0.3 N-m*	*16.9 N-m*	*9.1 N-m*	*267 N*	*136 N*
25	Inch	1.00 in	6.0 in	9 in-lbs	390 in-lbs	143 in-lbs	130 lbf	78.5 lbf
	Metric	*25 mm*	*152 mm*	*1.0 N-m*	*44.1 N-m*	*16.2 N-m*	*578 N*	*349 N*
32	Inch	1.25 in	7.0 in	36 in-lbs	805 in-lbs	302 in-lbs	230 lbf	123 lbf
	Metric	*32 mm*	*178 mm*	*4.1 N-m*	*91.0 N-m*	*34.1 N-m*	*1,023 N*	*546 N*
40	Inch	1.50 in	8.5 in	55 in-lbs	1,658 in-lbs	413 in-lbs	390 lbf	177 lbf
	Metric	*38 mm*	*216 mm*	*6.2 N-m*	*187 N-m*	*46.7 N-m*	*1,735 N*	*786 N*
50	Inch	2.00 in	8.6 in	98 in-lbs	2,322 in-lbs	707 in-lbs	540 lbf	314 lbf
	Metric	*50 mm*	*218 mm*	*11.1 N-m*	*262 N-m*	*79.8 N-m*	*2,402 N*	*1,397 N*
63	Inch	2.50 in	13.0 in	120 in-lbs	4,810 in-lbs	808 in-lbs	740 lbf	491 lbf
	Metric	*64 mm*	*330 mm*	*13.6 N-m*	*544 N-m*	*91.0 N-m*	*3,292 N*	*2,184 N*

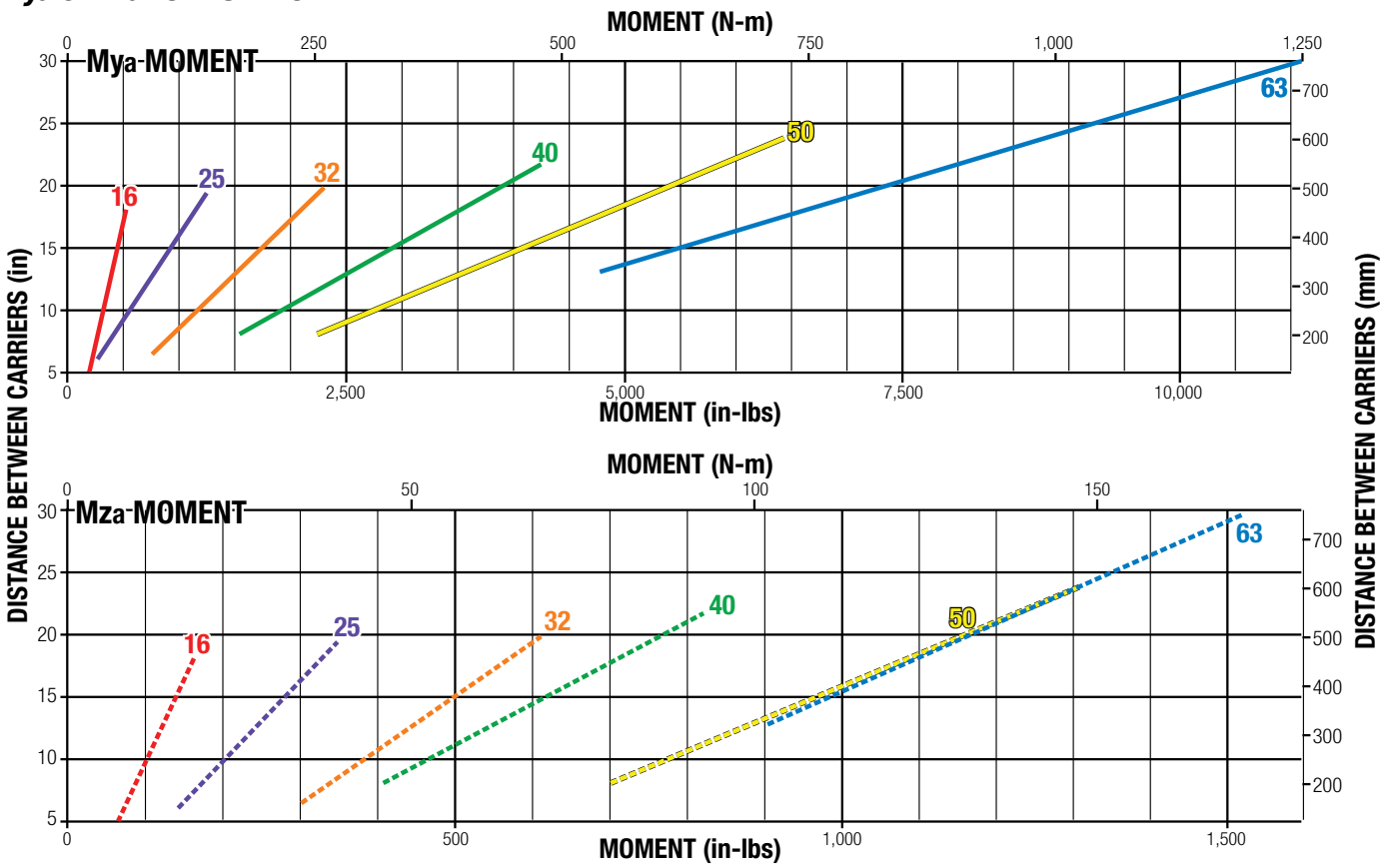
*At minimum "D" distance between carriers see graph below for other distances

With combined loads, L_F must not exceed the value 1.

$$L_F = \frac{Mx}{Mx_{max}} + \frac{My}{My_{max}} + \frac{Mz}{Mz_{max}} + \frac{Fy}{Fy_{max}} + \frac{Fz}{Fz_{max}} \leq 1$$

Ratings are the maximum values for shock-free, vibration-free operation in a typical industrial environment. Contact Tolomatic for assistance in selecting the most appropriate actuator for your application.

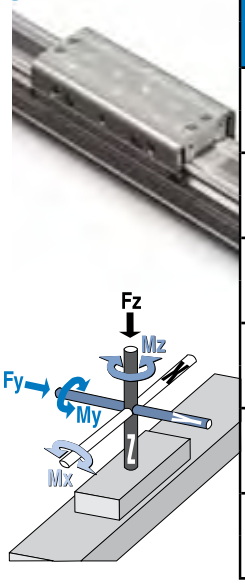
Mya & Mza vs. DISTANCE



Ratings were calculated with the following conditions:

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

STANDARD



BORE			MAXIMUM BENDING MOMENTS Mx	My	Mz	MAX. LOAD Fz	THRUST (at 100 PSI)
16	Inch	0.63 in	22 in-lbs	19 in-lbs	25 in-lbs	35 lbf	30.7 lbf
	Metric	*16 mm*	*2.5 N-m*	*2.1 N-m*	*2.8 N-m*	*156 N*	*136 N*
25	Inch	1.00 in	60 in-lbs	110 in-lbs	34 in-lbs	70 lbf	78.5 lbf
	Metric	*25 mm*	*6.8 N-m*	*12.4 N-m*	*3.8 N-m*	*311 N*	*349 N*
32	Inch	1.25 in	100 in-lbs	350 in-lbs	140 in-lbs	150 lbf	123 lbf
	Metric	*32 mm*	*11.3 N-m*	*39.5 N-m*	*15.8 N-m*	*667 N*	*546 N*
40	Inch	1.50 in	275 in-lbs	600 in-lbs	220 in-lbs	225 lbf	177 lbf
	Metric	*38 mm*	*31.1 N-m*	*67.8 N-m*	*24.9 N-m*	*1,001 N*	*786 N*
50	Inch	2.00 in	315 in-lbs	1,155 in-lbs	341 in-lbs	315 lbf	314 lbf
	Metric	*50 mm*	*35.6 N-m*	*131 N-m*	*38.5 N-m*	*1,401 N*	*1,397 N*
63	Inch	2.50 in	585 in-lbs	2,340 in-lbs	520 in-lbs	520 lbf	491 lbf
	Metric	*64 mm*	*66.1 N-m*	*264 N-m*	*58.8 N-m*	*2,313 N*	*2,184 N*

The moment and load capacity of the actuator's bearing system is based on an L10 life of 200,000,000 linear inches of travel. Life of the actuator will vary for each application depending on the combined loads, motion parameters and operating conditions. The load factor (L_F) ratios for each application must not exceed a value of 1 (as calculated below). Exceeding a load factor of 1 will diminish the actuator's rated life.

$$L_F = \frac{Mx}{Mx_{max}} + \frac{My}{My_{max}} + \frac{Mz}{Mz_{max}} + \frac{Fy}{Fy_{max}} + \frac{Fz}{Fz_{max}} \leq 1$$

With combined loads, L_F must not exceed the value 1.

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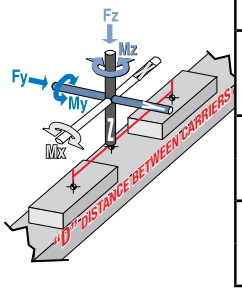
DW AUXILIARY CARRIER



BORE			"D" MIN	MAXIMUM BENDING MOMENTS* MXA	MYA	MZA	MAX. LOAD FZA	THRUST (at 100 PSI)
16	Inch	0.63 in	5.0 in	44 in-lbs	175 in-lbs	175 in-lbs	70 lbf	30.7 lbf
	Metric	*16 mm*	*127 mm*	*5.0 N-m*	*19.8 N-m*	*19.8 N-m*	*311 N*	*136 N*
25	Inch	1.00 in	6.0 in	120 in-lbs	420 in-lbs	420 in-lbs	140 lbf	78.5 lbf
	Metric	*25 mm*	*152 mm*	*13.6 N-m*	*47.5 N-m*	*47.5 N-m*	*623 N*	*349 N*
32	Inch	1.25 in	7.0 in	200 in-lbs	1,050 in-lbs	1,050 in-lbs	300 lbf	123 lbf
	Metric	*32 mm*	*178 mm*	*22.6 N-m*	*119 N-m*	*119 N-m*	*1,334 N*	*546 N*
40	Inch	1.50 in	8.5 in	550 in-lbs	1,913 in-lbs	1,913 in-lbs	450 lbf	177 lbf
	Metric	*38 mm*	*216 mm*	*62.1 N-m*	*216 N-m*	*216 N-m*	*2,002 N*	*786 N*
50	Inch	2.00 in	8.6 in	630 in-lbs	2,709 in-lbs	2,709 in-lbs	630 lbf	314 lbf
	Metric	*50 mm*	*218 mm*	*71.2 N-m*	*306 N-m*	*306 N-m*	*2,802 N*	*1,397 N*
63	Inch	2.50 in	13.0 in	1,170 in-lbs	6,760 in-lbs	6,760 in-lbs	1,040 lbf	491 lbf
	Metric	*64 mm*	*330 mm*	*132 N-m*	*764 N-m*	*764 N-m*	*4,626 N*	*2,184 N*

*At minimum "D" distance between carriers see graph below for other distances

With combined loads, L_F must not exceed the value 1.

$$L_F = \frac{Mx}{Mx_{max}} + \frac{My}{My_{max}} + \frac{Mz}{Mz_{max}} + \frac{Fy}{Fy_{max}} + \frac{Fz}{Fz_{max}} \leq 1$$

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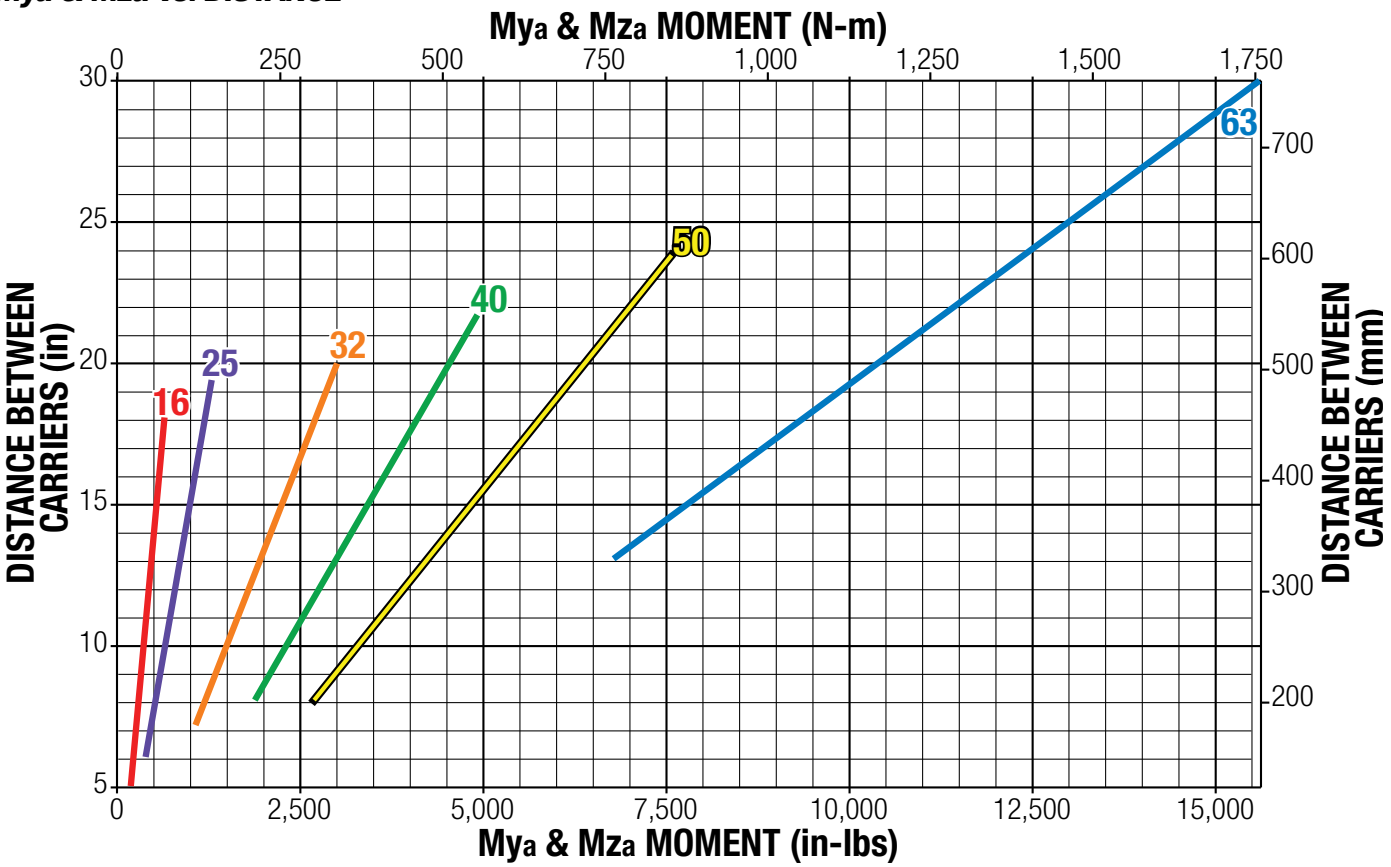
Mya & Mza vs. DISTANCE

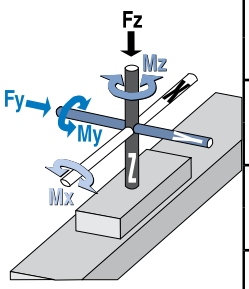


Ratings were calculated with the following conditions:

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

MOMENT AND LOAD CAPACITY

STANDARD



BORE			MAXIMUM BENDING MOMENTS Mx	My	Mz	MAX. LOAD Fy	Fz	THRUST (at 100 PSI)
16	Inch	0.63 in	39 in-lbs	339 in-lbs	339 in-lbs	217 lbf	217 lbf	30.7 lbf
	Metric	*16 mm*	*4.5 N-m*	*38.3 N-m*	*38.3 N-m*	*966 N*	*966 N*	*136 N*
25	Inch	1.00 in	126 in-lbs	502 in-lbs	377 in-lbs	449 lbf	449 lbf	78.5 lbf
	Metric	*25 mm*	*14.3 N-m*	*56.7 N-m*	*42.6 N-m*	*1,996 N*	*1,996 N*	*349 N*
32	Inch	1.25 in	226 in-lbs	1,344 in-lbs	1,344 in-lbs	569 lbf	569 lbf	123 lbf
	Metric	*32 mm*	*25.6 N-m*	*152 N-m*	*152 N-m*	*2,531 N*	*2,531 N*	*546 N*
40	Inch	1.50 in	600 in-lbs	1,913 in-lbs	1,913 in-lbs	736 lbf	736 lbf	177 lbf
	Metric	*38 mm*	*67.8 N-m*	*216 N-m*	*216 N-m*	*3,274 N*	*3,274 N*	*786 N*
50	Inch	2.00 in	811 in-lbs	3,483 in-lbs	3,483 in-lbs	1,014 lbf	1,014 lbf	314 lbf
	Metric	*50 mm*	*91.7 N-m*	*394 N-m*	*394 N-m*	*4,510 N*	*4,510 N*	*1,397 N*
63	Inch	2.50 in	1,019 in-lbs	5,339 in-lbs	5,339 in-lbs	1,292 lbf	1,292 lbf	491 lbf
	Metric	*64 mm*	*115 N-m*	*603 N-m*	*603 N-m*	*5,745 N*	*5,745 N*	*2,184 N*

NOTE: Mating surface of component mounted to carrier must maintain a flatness of at least 0.0015" (0.040 mm)

Ratings are the maximum values for shock-free, vibration-free operation in a typical industrial environment. Contact Tolomatic for assistance in selecting the most appropriate actuator for your application.

ACTUATOR SIZING

Use sizing software or call Tolomatic (1-800-328-2174) with application information. We will provide any assistance needed to determine the proper MXP band cylinder.

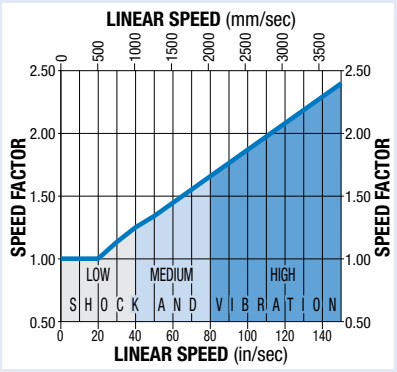
The moment and load capacity of the actuator's bearing system is based on an L10 life of 200,000,000 linear inches of travel. Life of the actuator will vary for each application depending on the combined loads, motion parameters and operating conditions. The load factor (L_F) ratios for each application must not exceed a value of 1 (as calculated below). Exceeding a load factor of 1 will diminish the actuator's rated life.

$$L_F = \frac{Mx}{Mx_{max}} + \frac{My}{My_{max}} + \frac{Mz}{Mz_{max}} + \frac{Fy}{Fy_{max}} + \frac{Fz}{Fz_{max}} \leq 1$$

With combined loads, L_F must not exceed the value 1.

SPEED FACTOR

FOR APPLICATIONS WITH HIGH SPEED OR SIGNIFICANT SHOCK AND VIBRATION: Calculated values of loads and bending moments must be increased by speed factor from the graph at right to obtain full rated life of profiled rail bearing system.



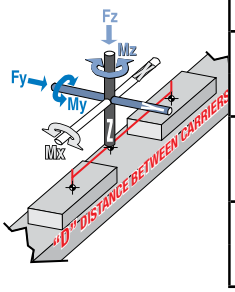
PROFILED RAIL LUBRICATION

Proper lubrication of profiled rail bearing system is essential for normal operation and achievement of full rated life of MX--P actuators. Lubrication should be performed at intervals of 4,000,000 inches of travel or once every year, whichever occurs first. **However, operating conditions such as high speed or significant shock and vibration may require more frequent lubrication.** Please consult Tolomatic for recommendations.

Recommended grease types:

1. Refined mineral oil-based multi-purpose grease with lithium thickening agent.
2. High-grade synthetic oil-based grease with urea thickening agent.

DW AUXILIARY CARRIER



BORE			"D" MIN	MAXIMUM BENDING MOMENTS* MXA	MYA	MZA	MAX. LOAD FZA	FYA	THRUST (at 100 PSI)
16	Inch	0.63 in	5.0 in	79 in-lbs	620 in-lbs	620 in-lbs	434 lbf	434 lbf	30.7 lbf
	Metric	*16 mm*	*127 mm*	*8.9 N-m*	*70.1 N-m*	*70.1 N-m*	*1,932 N*	*1,932 N*	*136 N*
25	Inch	1.00 in	6.0 in	252 in-lbs	1,610 in-lbs	1,610 in-lbs	898 lbf	898 lbf	78.5 lbf
	Metric	*25 mm*	*152 mm*	*28.5 N-m*	*182 N-m*	*182 N-m*	*3,993 N*	*3,993 N*	*349 N*
32	Inch	1.25 in	7.0 in	453 in-lbs	2,202 in-lbs	2,202 in-lbs	1,138 lbf	1,138 lbf	123 lbf
	Metric	*32 mm*	*178 mm*	*51.1 N-m*	*249 N-m*	*249 N-m*	*5,063 N*	*5,063 N*	*546 N*
40	Inch	1.50 in	8.5 in	1,208 in-lbs	3,601 in-lbs	3,601 in-lbs	1,472 lbf	1,472 lbf	177 lbf
	Metric	*38 mm*	*216 mm*	*137 N-m*	*407 N-m*	*407 N-m*	*6,549 N*	*6,549 N*	*786 N*
50	Inch	2.00 in	8.6 in	1,623 in-lbs	4,966 in-lbs	4,966 in-lbs	2,028 lbf	2,028 lbf	314 lbf
	Metric	*50 mm*	*218 mm*	*183 N-m*	*561 N-m*	*561 N-m*	*9,020 N*	*9,020 N*	*1,397 N*
63	Inch	2.50 in	13.0 in	2,038 in-lbs	9,508 in-lbs	9,508 in-lbs	2,583 lbf	2,583 lbf	491 lbf
	Metric	*64 mm*	*330 mm*	*230 N-m*	*1,074 N-m*	*1,074 N-m*	*11,490 N*	*11,490 N*	*2,184 N*

*At minimum "D" distance between carriers see graph below for other distances

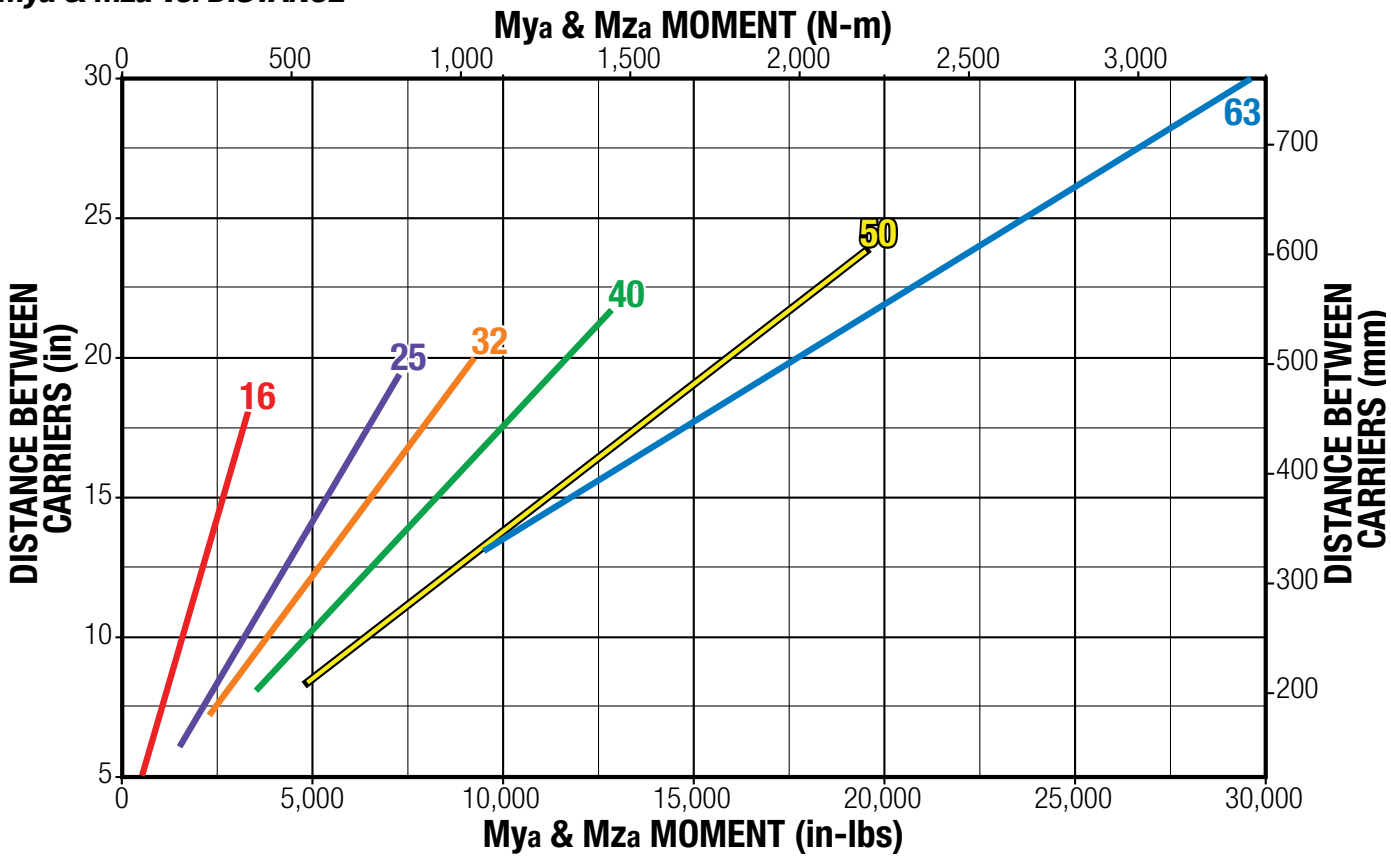
With combined loads, L_F must not exceed the value 1.

$$L_F = \frac{Mx}{Mx_{max}} + \frac{My}{My_{max}} + \frac{Mz}{Mz_{max}} + \frac{Fy}{Fy_{max}} + \frac{Fz}{Fz_{max}} \leq 1$$

Ratings are the maximum values for shock-free, vibration-free operation in a typical industrial environment. Contact Tolomatic for assistance in selecting the most appropriate actuator for your application.

NOTE: Mating surface of component mounted to carrier must maintain a flatness of at least 0.0015" (0.040 mm)

Mya & Mza vs. DISTANCE

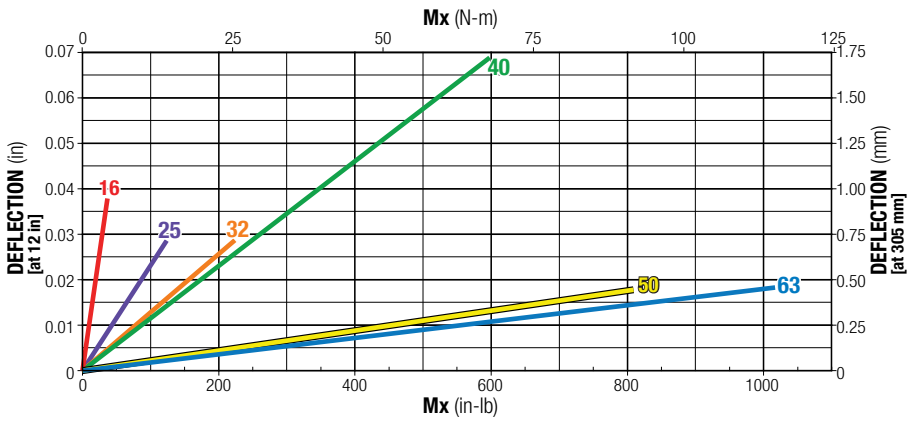


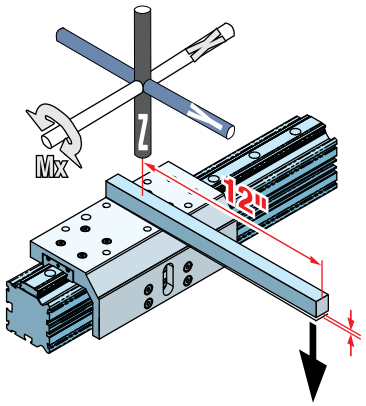
Ratings were calculated with the following conditions:

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

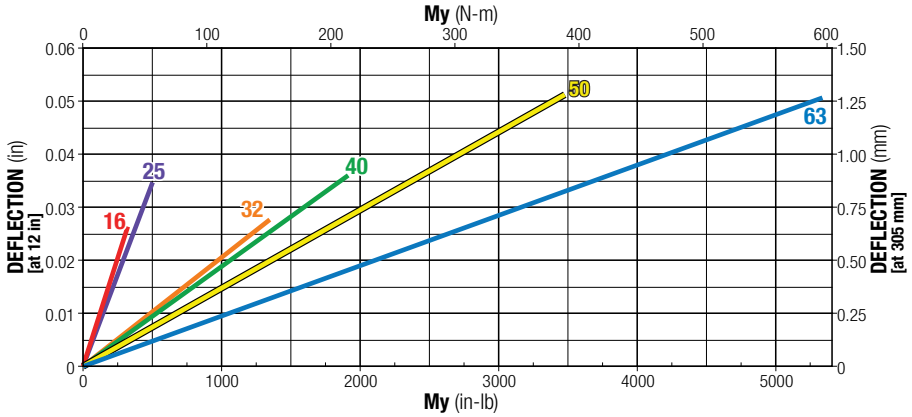
LOAD DEFLECTION

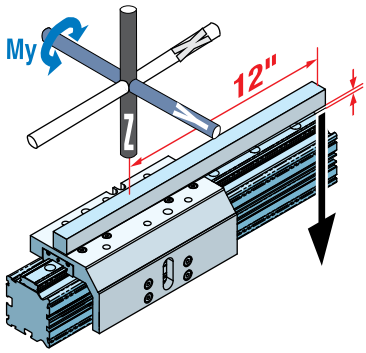
DEFLECTION ABOUT X AXIS



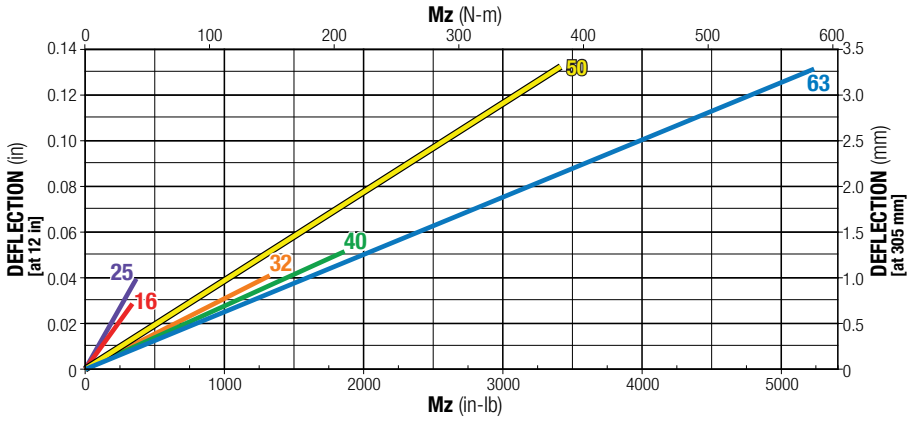


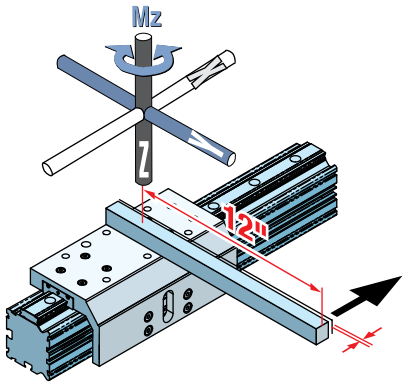
DEFLECTION ABOUT Y AXIS





DEFLECTION ABOUT Z AXIS





DEFLECTION TESTING WAS DONE UNDER THESE CRITERIA:

1.) Actuator was properly mounted with distance between mounting plates within recommendations (see Tube Clamp Requirements page MXP_24)

2.) Deflection was measured at 12" from center of carrier as shown

SPECIFICATIONS

		SIZE	16	25	32	40	50	63
ACTUAL BORE SIZE		in	0.63	1.00	1.25	1.50	2.00	2.50
		mm	*16*	*25*	*32*	*38*	*50*	*64*
BASE WEIGHT	N INTERNAL BEARING	lb	0.73	1.70	3.58	5.57	11.07	22.59
		kg	*0.33*	*0.77*	*1.62*	*2.53*	*5.02*	*10.25*
	S SOLID BEARING	lb	1.07	2.30	4.68	7.64	14.03	30.78
		kg	*0.48*	*1.04*	*2.12*	*3.47*	*6.36*	*13.96*
	P PROFILED RAIL	lb	1.25	2.94	5.89	9.91	17.22	31.64
		kg	*0.57*	*1.33*	*2.67*	*4.5*	*7.81*	*14.35*
WEIGHT PER UNIT OF STROKE	N INTERNAL & S SOLID	lb/in	0.082	0.134	0.233	0.306	0.513	0.879
		kg/mm	*0.0015*	*0.0024*	*0.0042*	*0.0055*	*0.0092*	*0.0157*
	P PROFILED RAIL	lb/in	0.102	0.192	0.316	0.491	0.701	1.153
		kg/mm	*0.0018*	*0.0034*	*0.0056*	*0.0088*	*0.0125*	*0.0206*
MAXIMUM STROKE LENGTH		in	206	206	205	203	203	103
		mm	*5232*	*5232*	*5207*	*5156*	*5156*	*2616*
AUXILIARY CARRIER; MIN. "D" BETWEEN CARRIERS		in	5.00	6.00	7.00	8.50	8.60	13.00
		mm	*127.0*	*152.4*	*177.8*	*215.9*	*218.4*	*330.2*
MAXIMUM OPERATING PRESSURE		PSI	100					
		bar	*6.9*					
TEMPERATURE RANGE		°F	20 to 140					
		°C	*-7 to 60*					

TIPS FOR MAXIMIZING BAND CYLINDER LIFE

TO GET THE MOST LIFE OUT OF YOUR MXP BAND CYLINDER FOLLOW THESE SIMPLE GUIDELINES WHEN SIZING A BAND CYLINDER FOR AN APPLICATION.

Four factors that affect the life of a band cylinder are Load, Speed, Environment and Deceleration. The following tips will help you select the appropriate band cylinder for a specific application's loads and speeds to maximize actuator life.

1 LOAD: KEEP THE LOAD FACTOR LESS THAN 1

Applications with multiple loads put additional stress on the band cylinder's bearing system. It is important to account for all these loads to make sure the bearing system is not over loaded. Both static and dynamic loads need to be addressed.

The formula below can be used to calculate the load factor:

$$L_F = \frac{Mx}{Mx_{max}} + \frac{My}{My_{max}} + \frac{Mz}{Mz_{max}} + \frac{Fy}{Fy_{max}} + \frac{Fz}{Fz_{max}} \leq 1$$

2 SPEED: REDUCE SPEEDS

High speeds and cycle rates stress the band cylinder's guidance system more than slower applications. Keeping speeds reduced will optimize the life of the actuator.

3 ENVIRONMENT: KEEP CONTAMINATION OFF BAND AND MOVING SURFACES

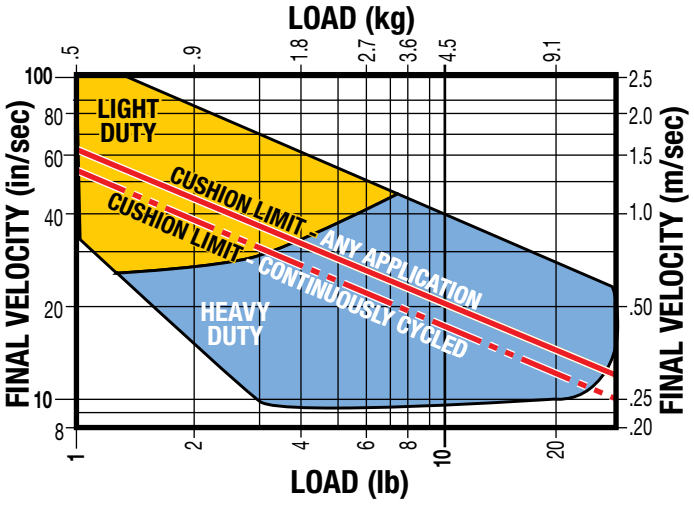
Contamination will decrease band cylinder service life. Service life can be improved by orienting the band and bearing system 180 degrees from the contamination source. For instance, if solid particulates are falling on the actuator, it is best to try to orient the band cylinder so that the band and bearing system are shielded from the particulates.

4 DECELERATION: DECELERATE WITH SHOCK ABSORBERS

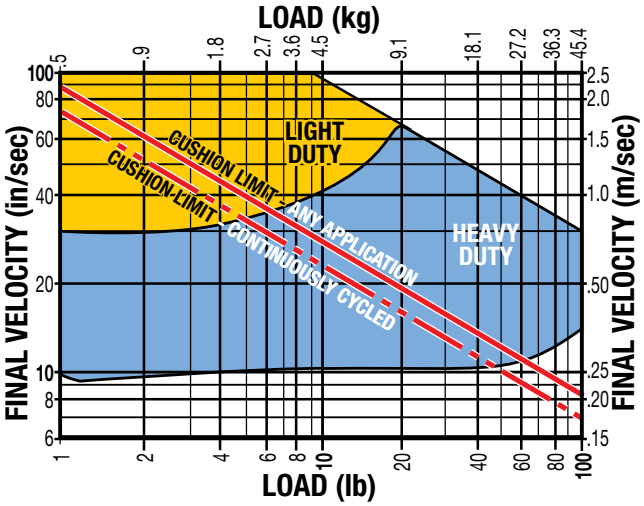
Shock absorbers provide the most controlled and reliable deceleration at the end of stroke. Stopping in a controlled fashion will significantly decrease the inertia loads on the carrier bearings, extending cylinder life. The best location for shock absorbers is at the center of gravity of the load.

CUSHION & SHOCK ABSORBER PERFORMANCE

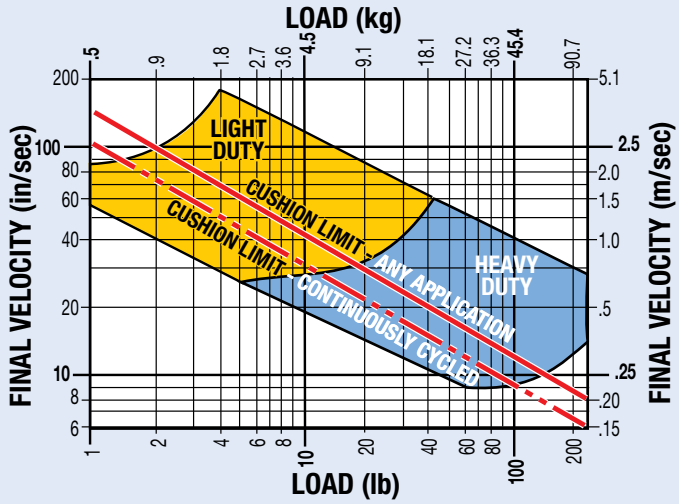
MXP16 (ALL BEARINGS)



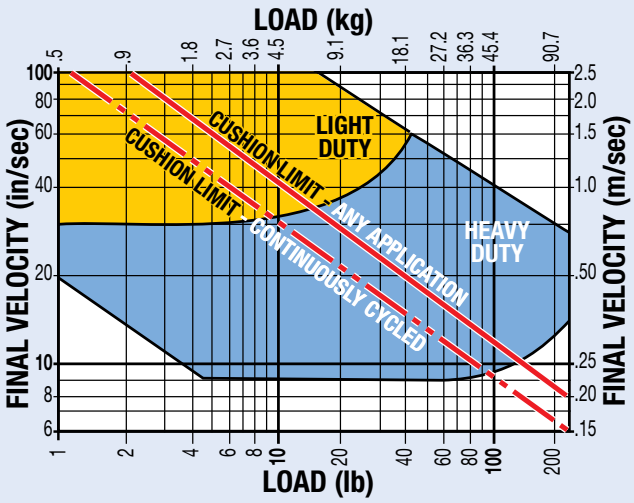
MXP25 (ALL BEARINGS)



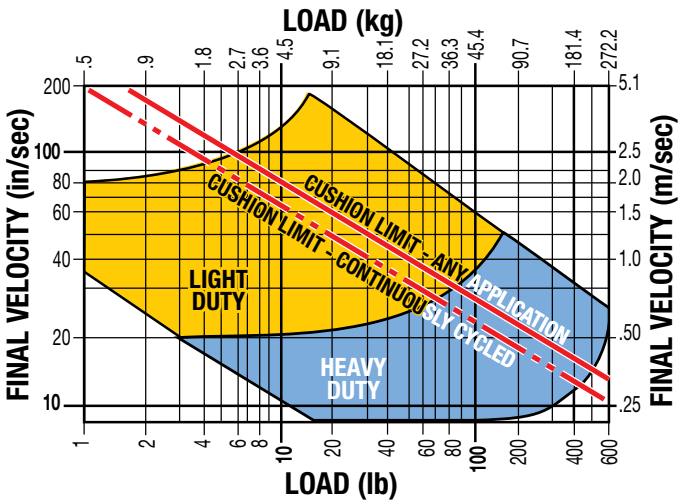
MXP32 (ALL BEARINGS)



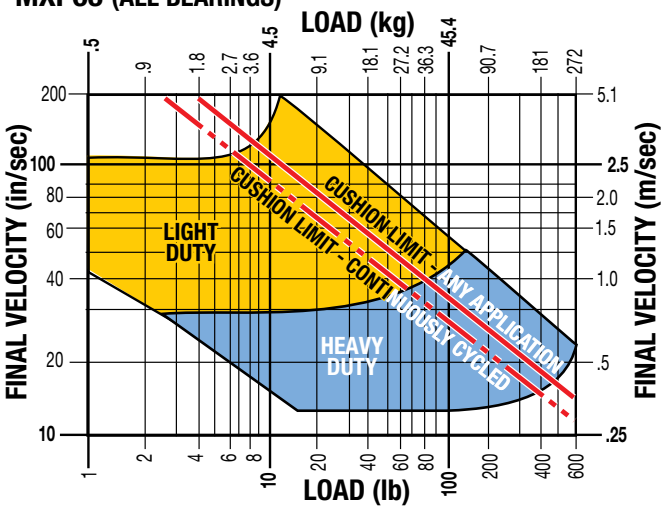
MXP40 (ALL BEARINGS)



MXP50 (ALL BEARINGS)



MXP63 (ALL BEARINGS)

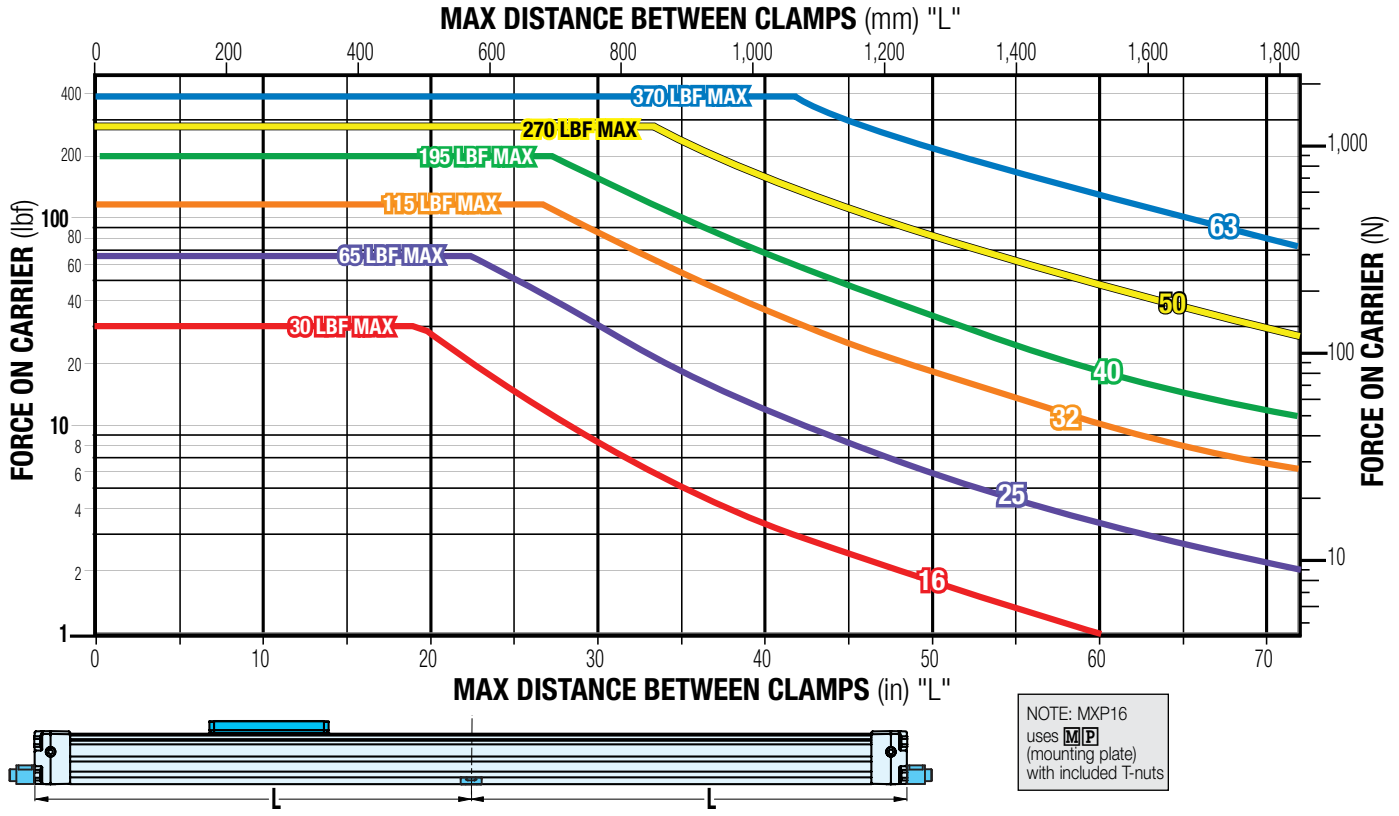


NOTE: If final (impact) velocity cannot be calculated directly, a reasonable guideline to use is 2X average velocity.

⚠ NOTE: When 2 shock absorbers are ordered, the MXP will be assembled with NO internal cushion seals.

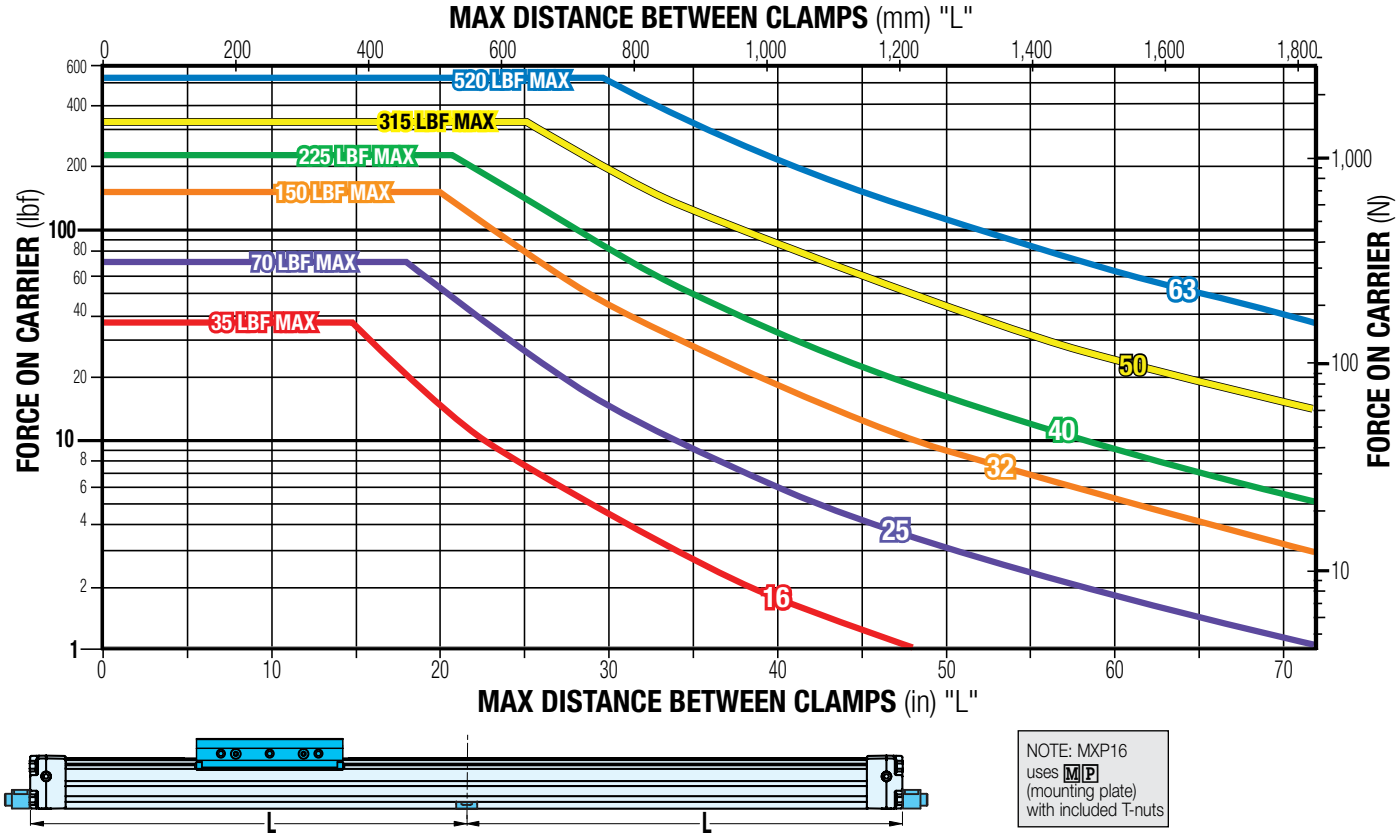
TUBE CLAMP REQUIREMENTS

N - INTERNAL BEARING



NOTE: MXP16 uses MP (mounting plate) with included T-nuts

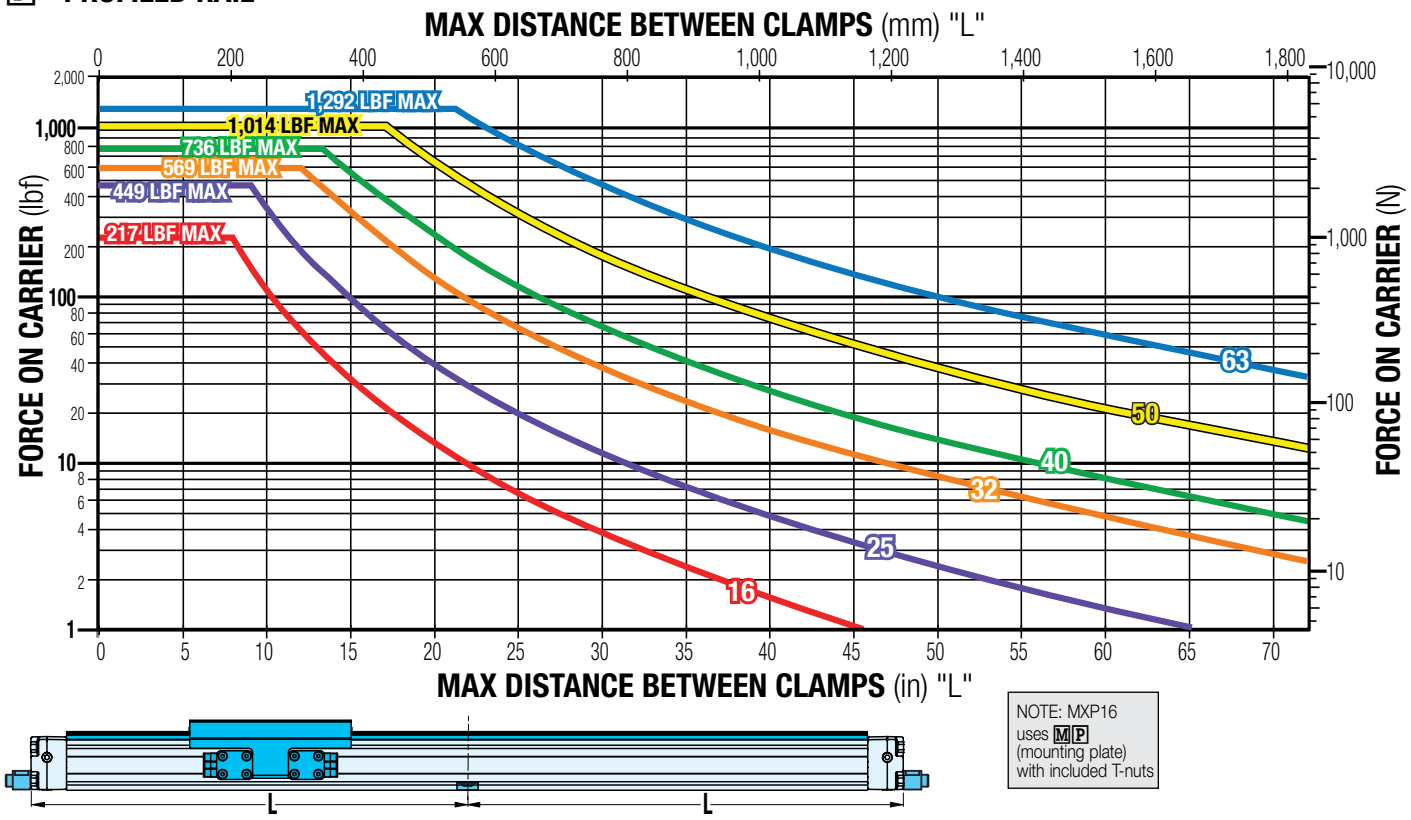
S - SOLID BEARING



NOTE: MXP16 uses MP (mounting plate) with included T-nuts

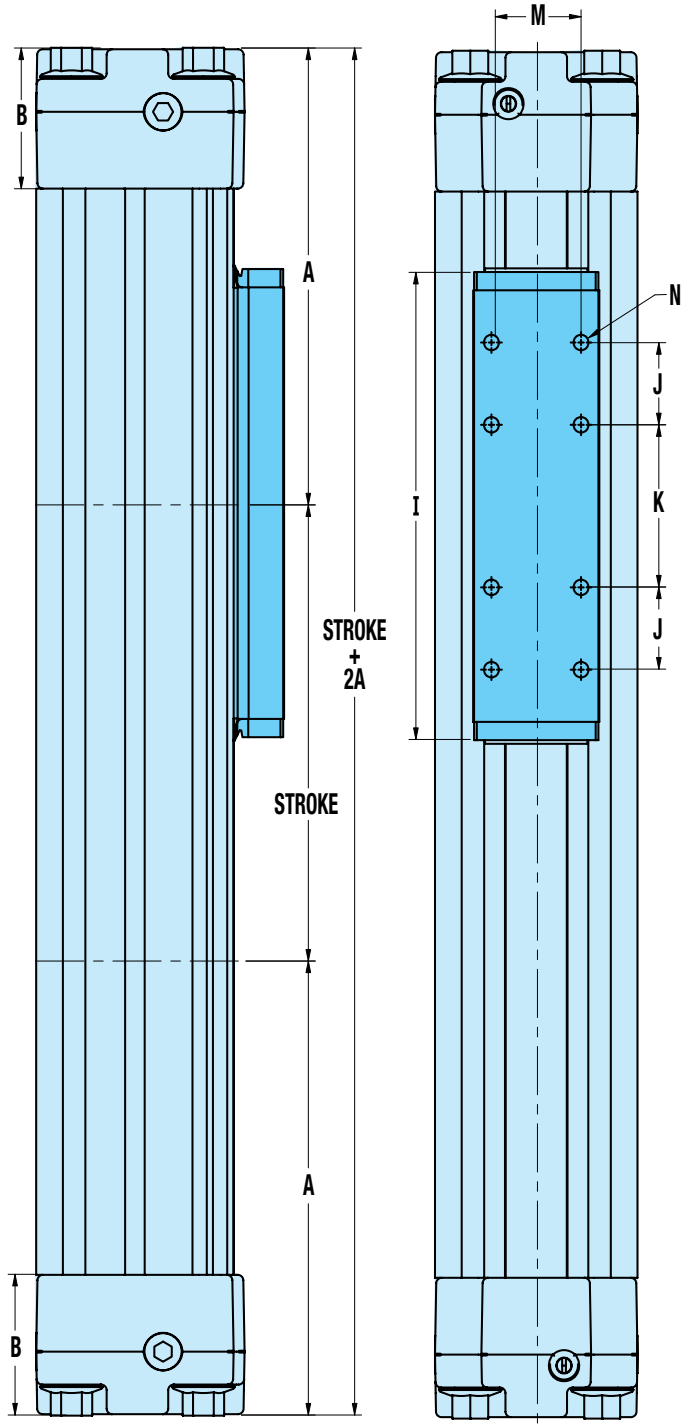
TUBE CLAMP REQUIREMENTS

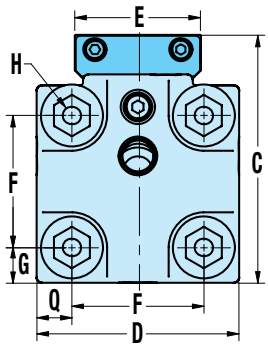
P - PROFILED RAIL



NOTE: MXP16 uses M P (mounting plate) with included T-nuts

N-INTERNAL BEARING ACTUATOR DIMENSIONS





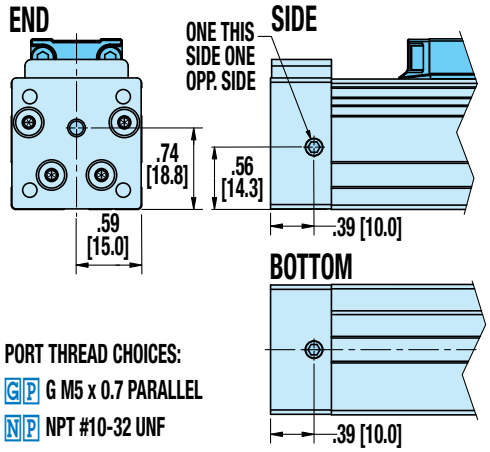
3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
A	3.13	3.94	4.90	5.82	6.29	8.45
mm	*79.6*	*100.2*	*124.5*	*147.7*	*159.8*	*214.5*
B	0.55	1.11	1.50	1.50	1.97	1.97
mm	*14.0*	*28.3*	*38.1*	*38.0*	*50.0*	*50.0*
C	1.55	2.07	2.67	2.98	3.86	4.76
mm	*39.3*	*52.6*	*67.8*	*75.8*	*98.1*	*120.8*
D	1.18	1.65	2.18	2.52	3.01	3.94
mm	*30.0*	*42.0*	*55.4*	*64.0*	*78.7*	*100.0*
E	0.83	0.83	1.36	1.61	2.13	2.44
mm	*21.0*	*21.0*	*34.5*	*41.0*	*54.0*	*62.0*
F	0.85	1.10	1.42	1.81	2.25	2.87
mm	*21.5*	*27.9*	*36.1*	*46.0*	*57.2*	*73.0*
G	0.17	0.25	0.38	0.35	0.43	0.53
mm	*4.3*	*6.3*	*9.7*	*9.0*	*10.8*	*13.5*
H	#8-32 (8)	#10-24 (8)	1/4-20 (8)	1/4-20 (8)	5/16-18 (8)	5/16-18 (8)
mm	*M4x0.7 (8)*	*M5x0.8 (8)*	*M6x1.0 (8)*	*M6x1.0 (8)*	*M8x1.25 (8)*	*M8x1.25 (8)*
I	3.78	4.45	5.04	5.87	6.57	9.69
mm	*96.0*	*113.0*	*128.0*	*149.0*	*166.8*	*246.0*
J	0.59	0.79	0.89	0.63	1.13	1.18
mm	*15.0*	*20.0*	*22.5*	*15.9*	*28.6*	*30.0*
K	1.18	1.57	1.75	3.00	2.25	4.33
mm	*30.0*	*40.0*	*44.5*	*76.2*	*57.2*	*110.0*
M	0.63	0.59	0.96	1.05	1.50	1.69
mm	*16.0*	*15.0*	*24.5*	*26.7*	*38.1*	*43.0*
N	#6-32 (8)	#8-32 (8)	#10-32 (8)	1/4-20 (8)	5/16-18 (8)	3/8-16 (8)
mm	*M3x0.5 (8)*	*M4x0.7 (8)*	*M5x0.8 (8)*	*M6x1.0 (8)*	*M8x1.25 (8)*	*M10x1.5 (8)*
Q	0.17	0.28	0.38	0.35	0.43	0.53
mm	*4.3*	*7.0*	*9.7*	*9.0*	*10.8*	*13.5*

N-INTERNAL BEARING PORTING DIMENSIONS MXP16N, MXP25N, MXP32N

DUAL END PORTING

16mm BORE

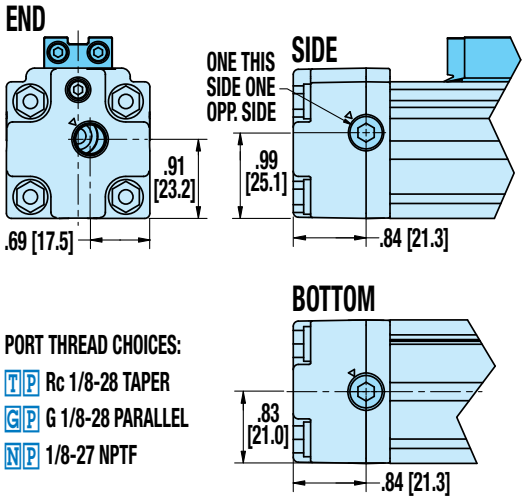


PORT THREAD CHOICES:
- GP G M5 x 0.7 PARALLEL
- NP NPT #10-32 UNF

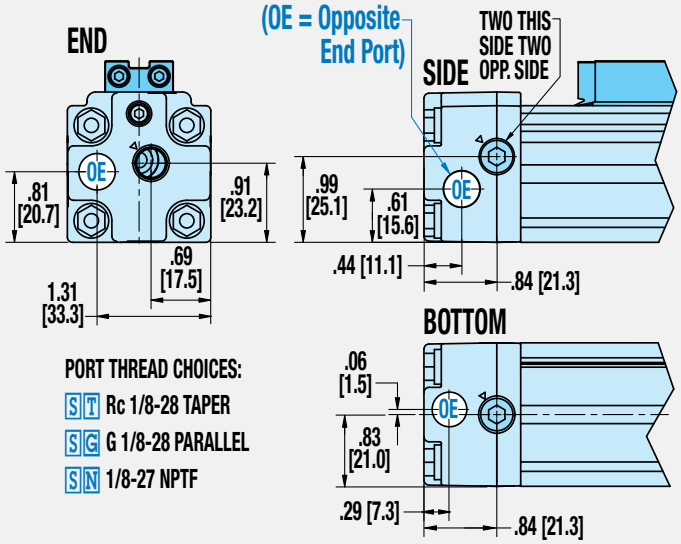
SINGLE-END PORTING

Not Available for 16mm BORE

25mm BORE

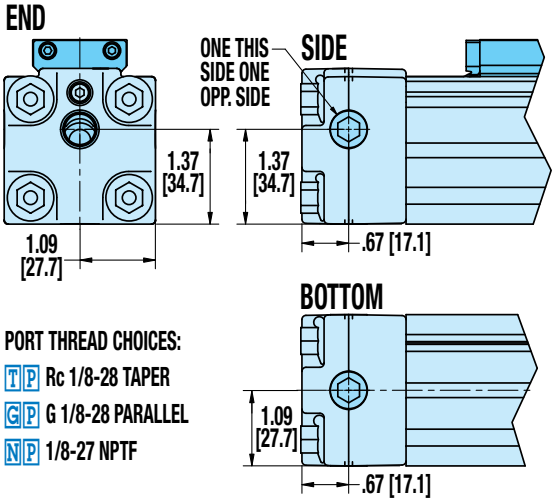


PORT THREAD CHOICES:
- TP Rc 1/8-28 TAPER
- GP G 1/8-28 PARALLEL
- NP 1/8-27 NPTF

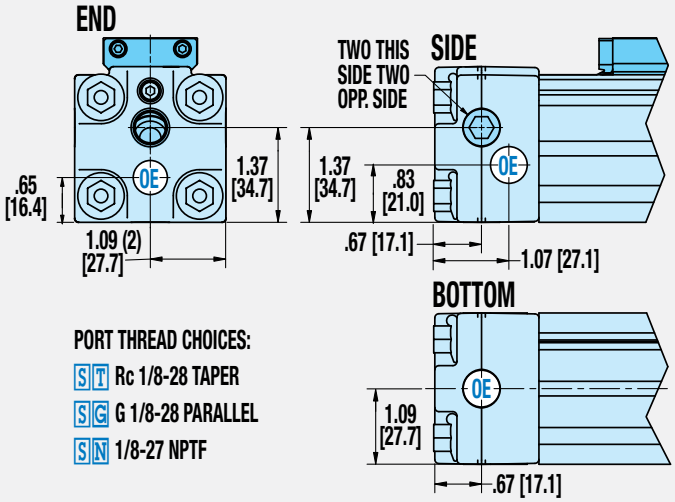


PORT THREAD CHOICES:
- ST Rc 1/8-28 TAPER
- SG G 1/8-28 PARALLEL
- SN 1/8-27 NPTF

32mm BORE



PORT THREAD CHOICES:
- TP Rc 1/8-28 TAPER
- GP G 1/8-28 PARALLEL
- NP 1/8-27 NPTF



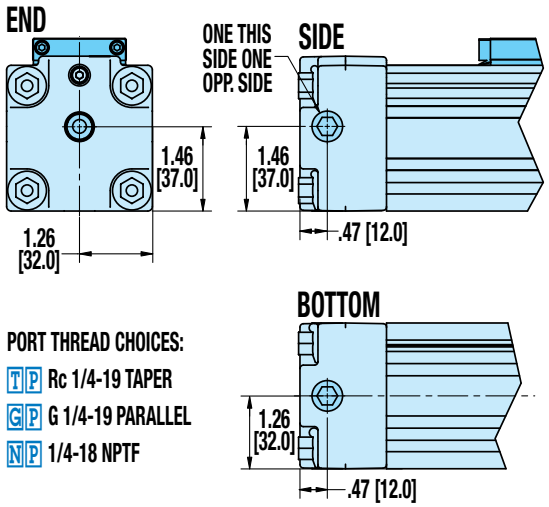
PORT THREAD CHOICES:
- ST Rc 1/8-28 TAPER
- SG G 1/8-28 PARALLEL
- SN 1/8-27 NPTF

3D CAD AVAILABLE at www.tolomatic.com

Dimensions in inches [brackets indicate dimensions in millimeters]

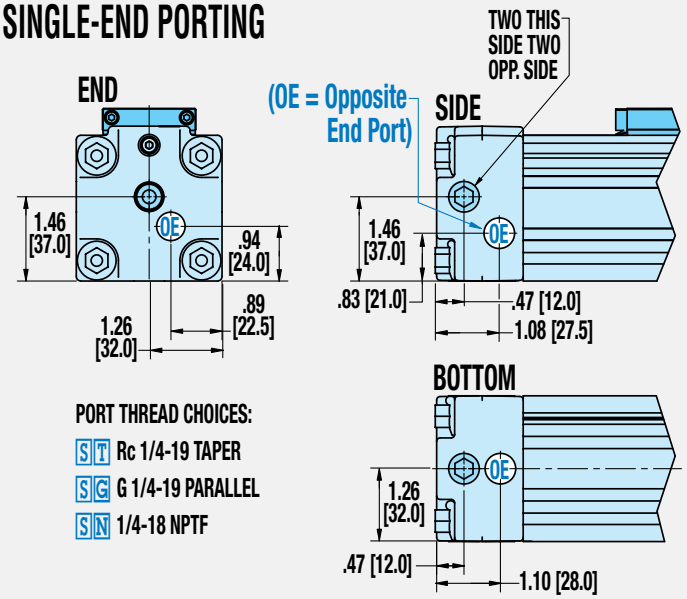
40mm BORE

DUAL END PORTING



PORT THREAD CHOICES:
- TP Rc 1/4-19 TAPER
- GP G 1/4-19 PARALLEL
- NP 1/4-18 NPTF

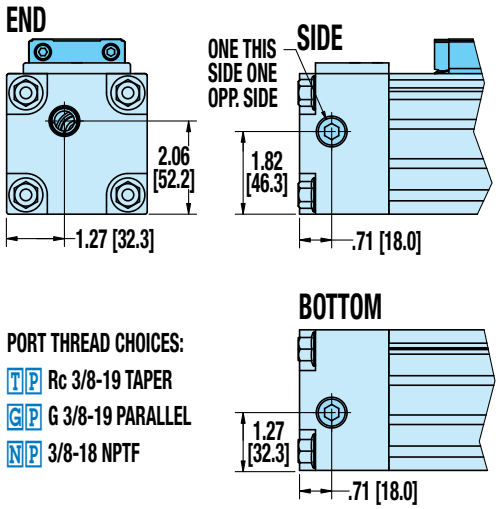
SINGLE-END PORTING



PORT THREAD CHOICES:
- ST Rc 1/4-19 TAPER
- SG G 1/4-19 PARALLEL
- SN 1/4-18 NPTF

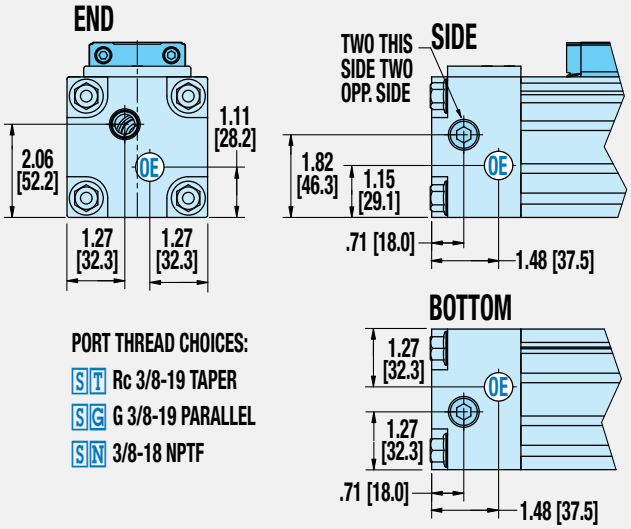
50mm BORE

DUAL END PORTING



PORT THREAD CHOICES:
- TP Rc 3/8-19 TAPER
- GP G 3/8-19 PARALLEL
- NP 3/8-18 NPTF

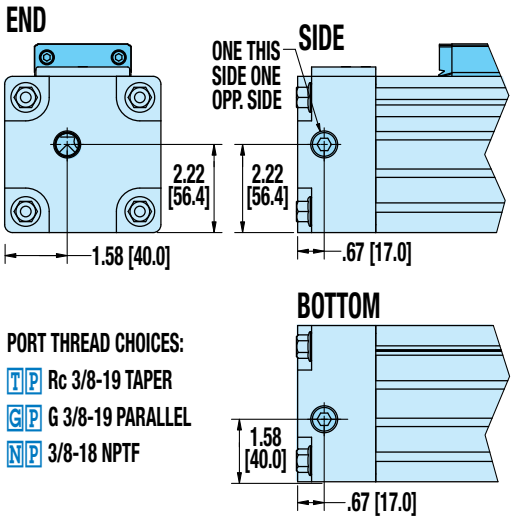
SINGLE-END PORTING



PORT THREAD CHOICES:
- ST Rc 3/8-19 TAPER
- SG G 3/8-19 PARALLEL
- SN 3/8-18 NPTF

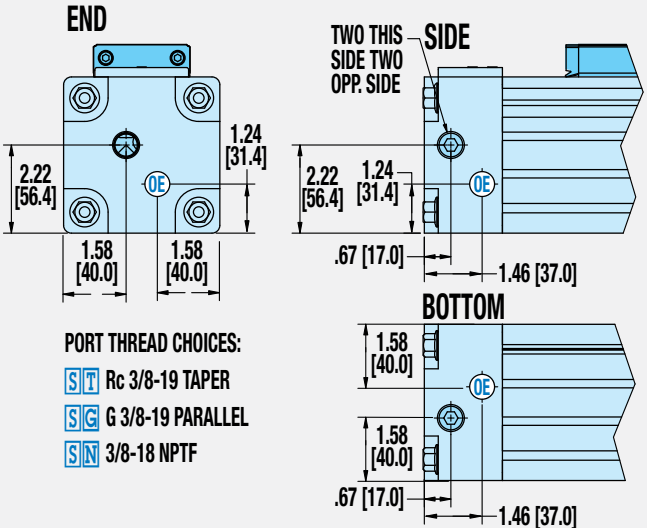
63mm BORE

DUAL END PORTING



PORT THREAD CHOICES:
- TP Rc 3/8-19 TAPER
- GP G 3/8-19 PARALLEL
- NP 3/8-18 NPTF

SINGLE-END PORTING



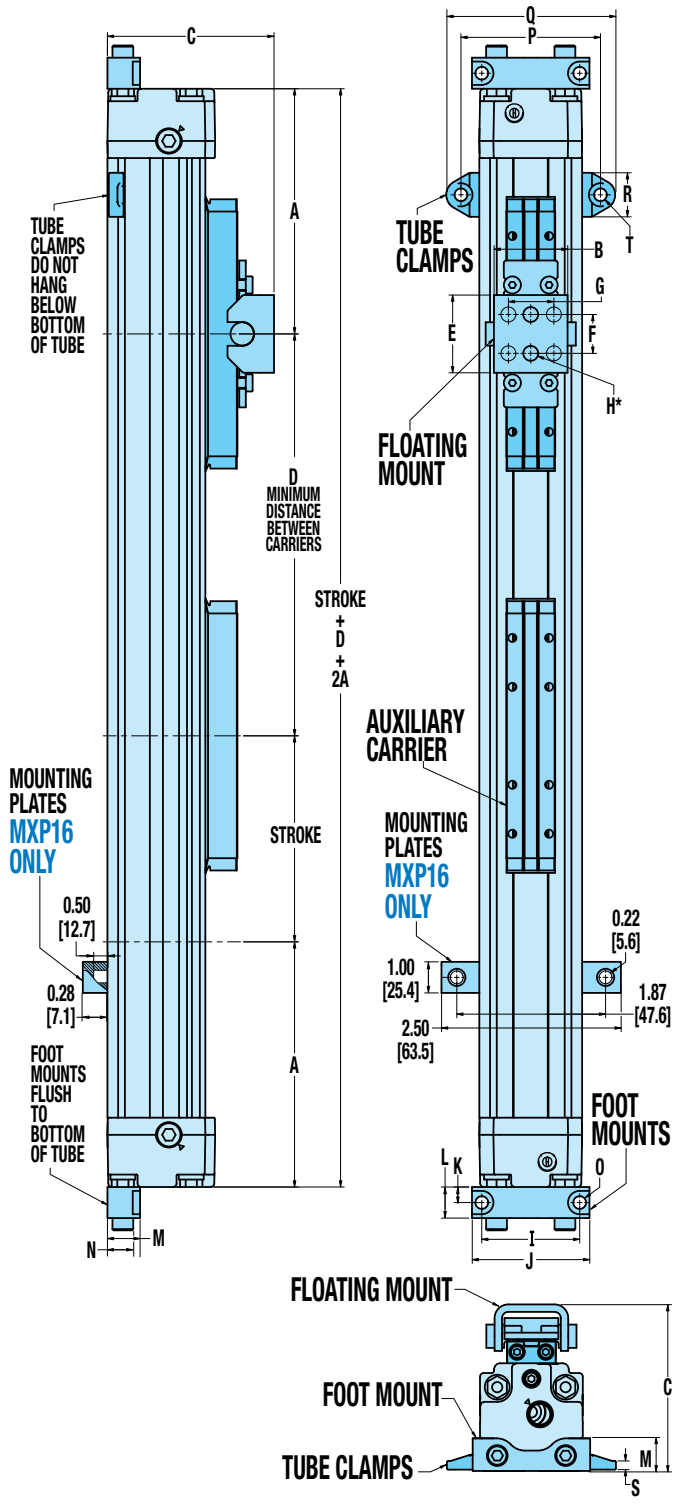
PORT THREAD CHOICES:
- ST Rc 3/8-19 TAPER
- SG G 3/8-19 PARALLEL
- SN 3/8-18 NPTF

3D CAD AVAILABLE at www.tolomatic.com

Dimensions in inches [brackets indicate dimensions in millimeters]

N-INTERNAL BEARING OPTION DIMENSIONS

AUXILIARY CARRIER, FLOATING MOUNT, FOOT MOUNT, TUBE CLAMPS



	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
A	3.13	3.94	4.90	5.82	6.29	8.45
mm	*79.6*	*100.2*	*124.5*	*147.7*	*159.8*	*214.5*
AUXILIARY CARRIER						
D	5.00	6.00	7.00	8.50	8.60	13.00
mm	*127.0*	*152.4*	*177.8*	*215.9*	*218.4*	*330.0*
FLOATING MOUNT						
B	1.27	1.19	2.08	2.55	3.24	3.15
mm	*32.2*	*30.1*	*52.8*	*64.7*	*82.3*	*80.0*
C	1.97	2.66	3.70	4.07	4.66	5.57
mm	*50.1*	*67.5*	*94.1*	*103.3*	*118.4*	*141.6*
E	0.90	1.25	1.50	1.50	3.94	5.20
mm	*22.9*	*31.8*	*38.1*	*38.1*	*100.1*	*132.0*
F	0.50	0.63	0.75	0.79	3.15	4.33
mm	*12.7*	*15.9*	*19.1*	*20.0*	*80.0*	*110.0*
G	-	-	1.00	1.38	-	1.69
mm	*-*	*-*	*25.4*	*35.0*	*-*	*43.0*
H*	0.17(2)	0.24(2)	0.28(4)	0.28(4)	0.36(2)	0.34(4)
mm	*4.3(2)*	*6.1(2)*	*7.1(4)*	*7.1(4)*	*9.1(2)*	*8.7(4)*
FOOT MOUNTS						
I	1.26	1.57	2.01	2.52	3.11	3.94
mm	*32.0*	*40.0*	*51.0*	*64.0*	*78.9*	*100.0*
J	1.57	1.89	2.36	2.91	3.67	4.72
mm	*40.0*	*48.0*	*60.0*	*74.0*	*93.2*	*120.0*
K	0.16	0.25	0.37	0.47	0.50	0.59
mm	*4.0*	*6.4*	*9.5*	*12.0*	*12.7*	*15.0*
L	0.31	0.50	0.75	0.94	1.00	1.18
mm	*8.0*	*12.7*	*19.0*	*24.0*	*25.4*	*30.0*
M	0.35	0.52	0.91	0.73	1.00	1.06
mm	*8.9*	*13.3*	*23.0*	*18.5*	*25.4*	*27.0*
N	-	0.41	0.71	0.45	0.69	0.65
mm	*-*	*10.3*	*18.0*	*11.4*	*17.4*	*16.5*
O	0.18	0.20	0.22	0.28	0.35	0.42
mm	*4.6*	*5.2*	*5.5*	*7.1*	*9.0*	*10.7*
TUBE CLAMPS						
P	-	2.24	2.92	3.26	3.84	5.19
mm	*-*	*57.0*	*74.1*	*82.7*	*97.5*	*131.7*
Q	-	2.72	3.44	3.81	4.39	5.93
mm	*-*	*69.0*	*87.4*	*96.7*	*111.5*	*150.7*
R	-	0.71	0.63	0.55	0.55	0.75
mm	*-*	*18.0*	*16.0*	*14.0*	*14.0*	*19.0*
S	-	0.14	0.17	0.15	0.15	0.24
mm	*-*	*3.6*	*4.3*	*3.8*	*3.8*	*6.1*
T	-	0.20	0.28	0.28	0.28	0.42
mm	*-*	*5.2*	*7.1*	*7.1*	*7.1*	*10.7*

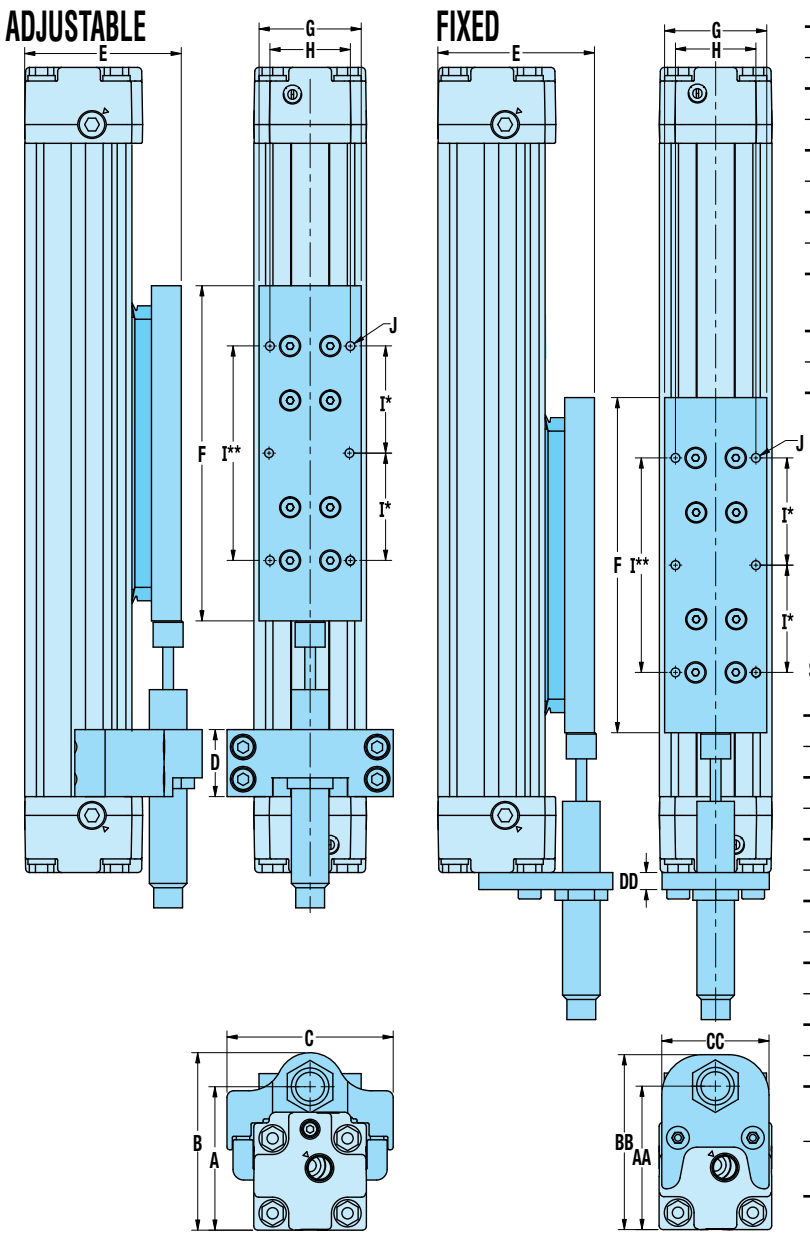
**MXP16, 25 & 50 use 2 center holes,*
MXP32, 40 & 63 use 4 corner holes

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

NOTE: Auxiliary carrier is N-Internal Bearing carrier, see page MXP_25 for carrier size and mounting dimensions

N-INTERNAL BEARING OPTION DIMENSIONS

ADJUSTABLE AND FIXED SHOCK ABSORBERS



ADJUSTABLE SHOCK ABSORBER

	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
A	1.65	2.11	2.91	3.32	4.24	5.21
mm	*42.0*	*53.5*	*73.8*	*84.4*	*107.6*	*132.4*
B	1.97	2.61	3.35	3.87	4.87	5.91
mm	*50.0*	*66.2*	*85.0*	*98.4*	*123.8*	*150.0*
C	1.74	2.44	2.95	3.43	4.09	5.20
mm	*44.3*	*62.0*	*74.9*	*87.0*	*103.9*	*132.0*
D	0.71	0.98	1.25	0.98	1.22	1.26
mm	*18.0*	*25.0*	*31.8*	*25.0*	*31.0*	*32.0*

Stroke Adder: Adjustable Shock Absorber

in	0.49	1.06	1.17	0.76	0.81	0.51
mm	*12.4*	*26.8*	*29.8*	*19.3*	*20.5*	*13.0*

⚠ NOTE: For each adjustable shock absorber ordered, add Stroke Adder value to required stroke to determine configurated actuator stroke.

Required Stroke + (Adj. Shock Quantity x Stroke Adder value) = Configurated Actuator Stroke

Example: MXP25N, 500mm stroke required, 2 adjustable shocks

500 + (2 x 26.8) = 500 + 53.6 = 553.6mm

SHOCK PLATE

	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
E	1.81	2.28	3.17	3.61	4.55	5.65
mm	*46.0*	*57.9*	*80.5*	*91.8*	*115.6*	*143.4*
F	3.86	4.92	5.20	6.72***	6.65	10.29****
mm	*98.0*	*125.0*	*132.0*	*170.8****	*168.8*	*261.4****
G	0.94	1.50	1.32	1.61	2.13	2.44
mm	*24.0*	*38.1*	*33.5*	*41.0*	*54.0*	*62.0*
H	0.63	1.18	0.96	1.05	1.50	1.69
mm	*16.0*	*30.0*	*24.5*	*26.7*	*38.1*	*43.0*
I*	0.89	1.57	-	-	-	-
mm	*22.5*	*40.0*	*-*	*-*	*-*	*-*
I**	-	-	1.75	3.00	2.25	4.33
mm	*-*	*-*	*44.5*	*76.2*	*57.2*	*110.0*
J	#8-32 (6)	#8-32 (6)	#10-32 (4)	1/4-20 (4)	5/16-18 (4)	3/8-16 (4)
mm	*M4x0.8 (6)*	*M4x0.8 (6)*	*M5x0.8 (4)*	*M6x1.0 (4)*	*M8x1.25 (4)*	*M10x1.5 (4)*

**MXP16 & 25 Shock plate has 6 mounting holes*

***MXP32, 40, 50 & 63 Shock plate has 4 mounting holes*

****MXP40 Shock Stop Plate has impact bolts. Actual plate length is 5.98" (152mm); Impact bolts, one on each end, add .74" (18.8mm) to total length*

*****MXP63 Shock Stop Plate has impact bolts. Actual plate length is 9.84" (250mm); Impact bolts, one on each end, add .45" (11.4mm) to total length*

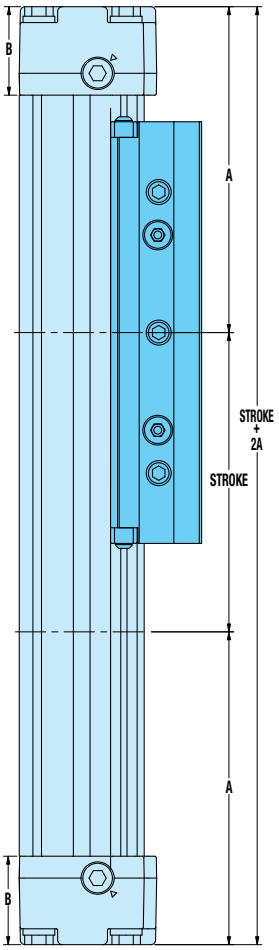
FIXED SHOCK ABSORBER

	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
AA	1.65	2.11	2.91	3.32	4.24	5.21
mm	*42.0*	*53.5*	*73.8*	*84.4*	*107.6*	*132.3*
BB	1.95	2.57	3.42	3.87	5.09	5.92
mm	*49.5*	*65.3*	*86.8*	*98.4*	*129.2*	*150.3*
CC	1.17	1.57	2.00	2.44	2.83	3.66
mm	*29.8*	*40.0*	*50.8*	*62.0*	*72.0*	*93.0*
DD	0.13	0.25	0.25	0.25	0.50	0.50
mm	*3.3*	*6.4*	*6.4*	*6.4*	*12.7*	*12.7*

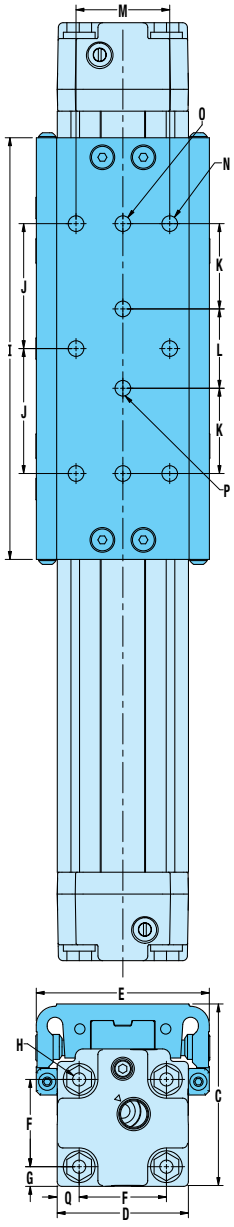
3D CAD AVAILABLE AT WWW.TOLOMATIC.COM CAD 2D

NOTE: Auxiliary carrier is N-Internal Bearing carrier, see page MXP_25 for carrier size and mounting dimensions

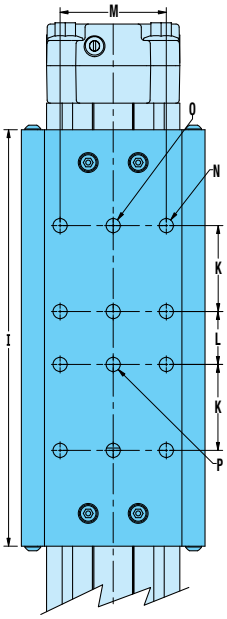
S-SOLID BEARING ACTUATOR DIMENSIONS



MOUNTING PATTERN MXP16, 25, 32, 50



MOUNTING PATTERN MXP40, 63



	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
A	3.13	3.94	4.90	5.82	6.29	8.45
mm	*79.6*	*100.2*	*124.5*	*147.7*	*159.8*	*214.5*
B	0.55	1.11	1.50	1.50	1.97	1.97
mm	*14.0*	*28.3*	*38.1*	*38.0*	*50.0*	*50.0*
C	1.80	2.30	3.06	3.51	4.44	5.48
mm	*45.8*	*58.4*	*77.8*	*89.2*	*112.8*	*139.1*
D	1.18	1.65	2.18	2.52	3.01	3.94
mm	*30.0*	*42.0*	*55.4*	*64.0*	*78.7*	*100.0*
E	2.18	2.18	2.86	3.47	4.01	5.59
mm	*55.4*	*55.4*	*72.6*	*88.2*	*104.1*	*142.0*
F	0.85	1.10	1.42	1.81	2.25	2.87
mm	*21.5*	*27.9*	*36.1*	*46.0*	*57.2*	*73.0*
G	0.17	0.25	0.38	0.35	0.43	0.53
mm	*4.3*	*6.3*	*9.7*	*9.0*	*10.8*	*13.5*
H	#8-32 (8)	#10-24 (8)	1/4-20 (8)	1/4-20 (8)	5/16-18 (8)	5/16-18 (8)
mm	*M4x0.7 (8)*	*M5x0.8 (8)*	*M6x1.0 (8)*	*M6x1.0 (8)*	*M8x1.25 (8)*	*M8x1.25 (8)*
I	4.12	5.31	6.02	7.87	7.91	12.11
mm	*104.6*	*135.0*	*153.0*	*200.0*	*200.8*	*307.5*
J	1.18	1.57	1.77	-	1.87	-
mm	*30.0*	*40.0*	*45.0*	*-*	*47.6*	*-*
K	-	1.07	1.10	1.63	1.25	1.50
mm	*-*	*27.3*	*28.0*	*41.3*	*31.8*	*38.1*
L	-	1.00	1.00	1.00	2.50	3.00
mm	*-*	*25.4*	*25.4*	*25.4*	*63.5*	*76.2*
M	1.18	1.18	1.73	2.01	2.59	3.25
mm	*30.0*	*30.0*	*44.0*	*51.0*	*65.8*	*82.6*
N	#8-32 (6)	1/4-20 (6)	1/4-20 (6)	5/16-18 (8)	3/8-16 (6)	3/8-16 (8)
mm	*M4x0.7 (6)*	*M6x1.0 (6)*	*M8x1.25 (6)*	*M8x1.25 (8)*	*M10x1.5 (6)*	*M10x1.5 (8)*
O	-	#10-32 (2)	1/4-20 (2)	5/16-18 (2)	3/8-16 (2)	3/8-16 (2)
mm	*-*	*M6x1.0 (2)*	*M8x1.25 (2)*	*M8x1.25 (2)*	*M10x1.5 (2)*	*M10x1.5 (2)*
P	-	1/4-20 (2)	1/4-20 (2)	1/4-20 (2)	3/8-16 (2)	3/8-16 (2)
mm	*-*	*M6x1.0 (2)*	*M8x1.25 (2)*	*M8x1.25 (2)*	*M10x1.5 (2)*	*M10x1.5 (2)*
Q	0.17	0.28	0.38	0.35	0.43	0.53
mm	*4.3*	*7.0*	*9.7*	*9.0*	*10.8*	*13.5*

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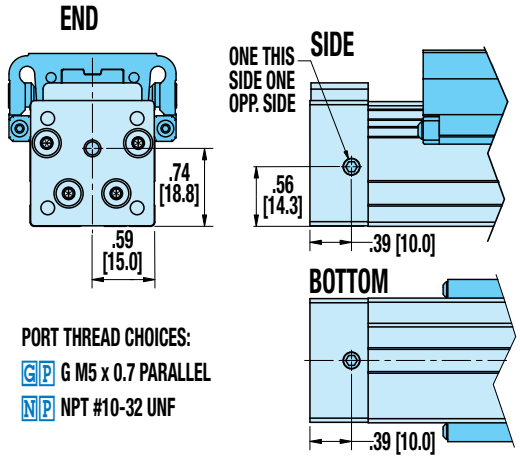
DUAL END PORTING

16mm BORE

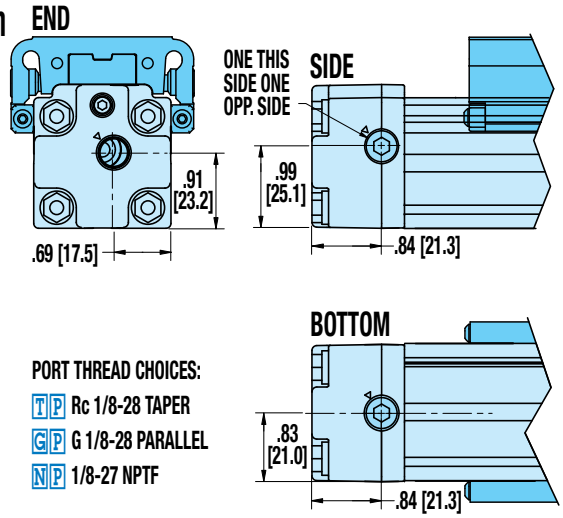


PORT THREAD CHOICES:
- GP G M5 x 0.7 PARALLEL
- NP NPT #10-32 UNF

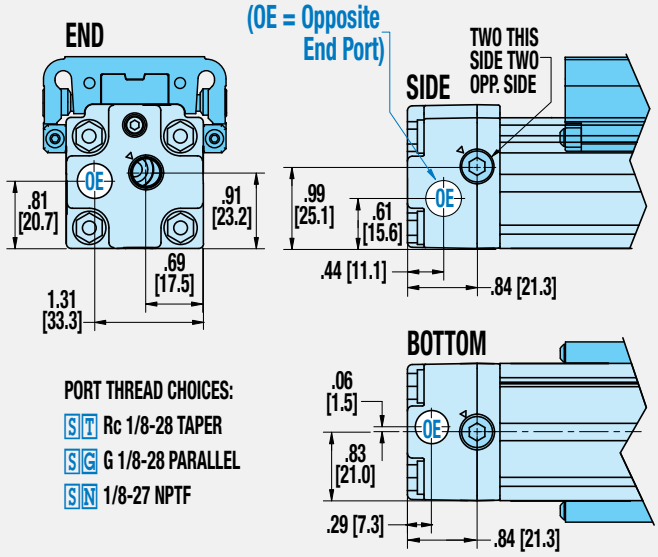
SINGLE-END PORTING

Not Available for 16mm BORE

25mm BORE

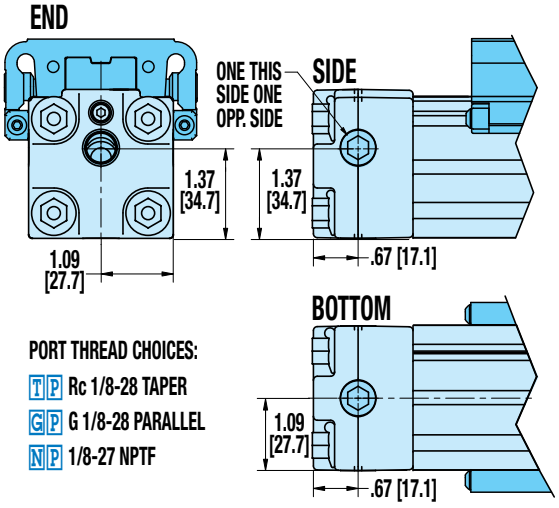


PORT THREAD CHOICES:
- TP Rc 1/8-28 TAPER
- GP G 1/8-28 PARALLEL
- NP 1/8-27 NPTF

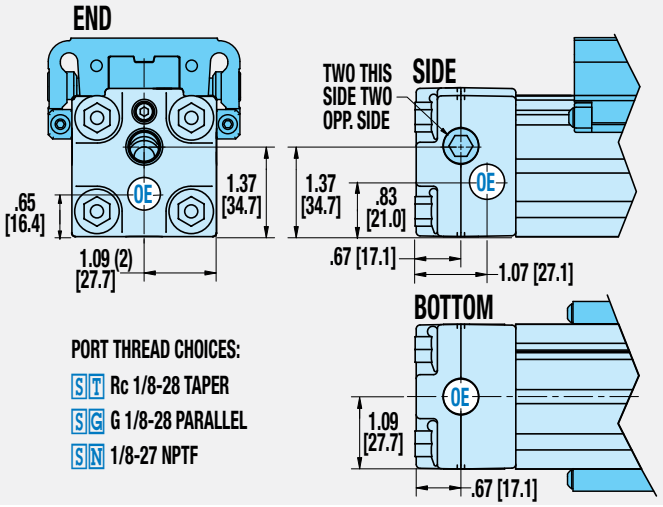


PORT THREAD CHOICES:
- ST Rc 1/8-28 TAPER
- SG G 1/8-28 PARALLEL
- SN 1/8-27 NPTF

32mm BORE



PORT THREAD CHOICES:
- TP Rc 1/8-28 TAPER
- GP G 1/8-28 PARALLEL
- NP 1/8-27 NPTF



PORT THREAD CHOICES:
- ST Rc 1/8-28 TAPER
- SG G 1/8-28 PARALLEL
- SN 1/8-27 NPTF

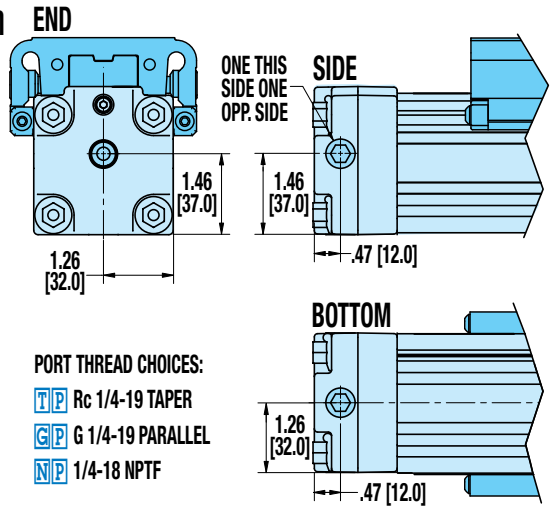
3D CAD AVAILABLE at www.tolomatic.com

Dimensions in inches [brackets indicate dimensions in millimeters]

S-SOLID BEARING PORTING DIMENSIONS MXP40S, MXP50S, MXP63S

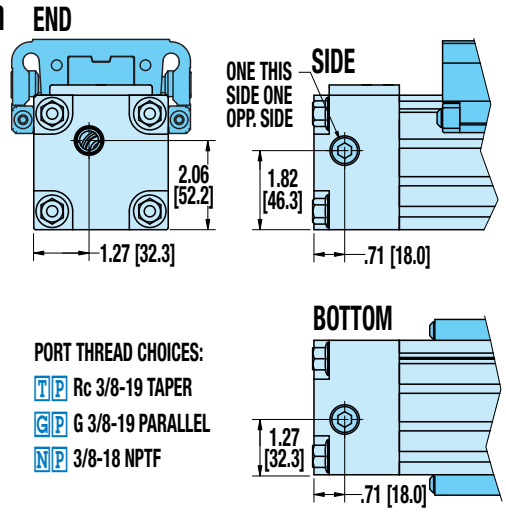
DUAL END PORTING

40mm BORE



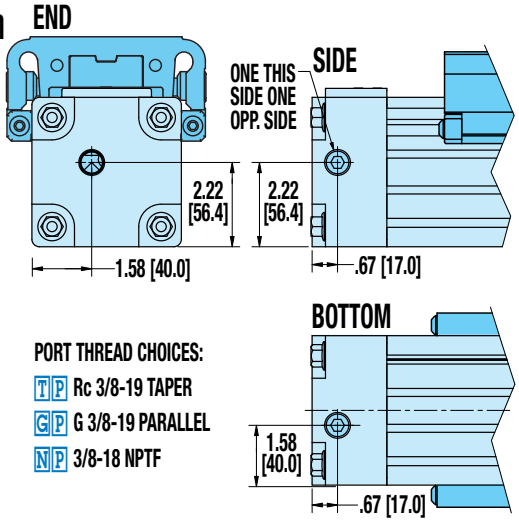
PORT THREAD CHOICES:
- TP Rc 1/4-19 TAPER
- GP G 1/4-19 PARALLEL
- NP 1/4-18 NPTF

50mm BORE



PORT THREAD CHOICES:
- TP Rc 3/8-19 TAPER
- GP G 3/8-19 PARALLEL
- NP 3/8-18 NPTF

63mm BORE

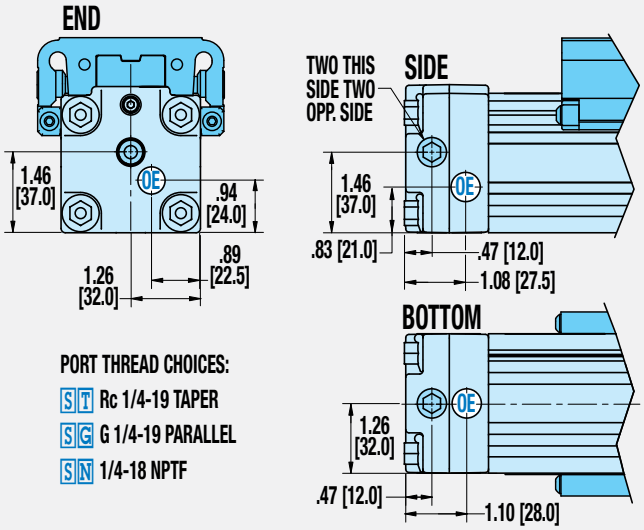


PORT THREAD CHOICES:
- TP Rc 3/8-19 TAPER
- GP G 3/8-19 PARALLEL
- NP 3/8-18 NPTF

3D CAD AVAILABLE at www.tolomatic.com

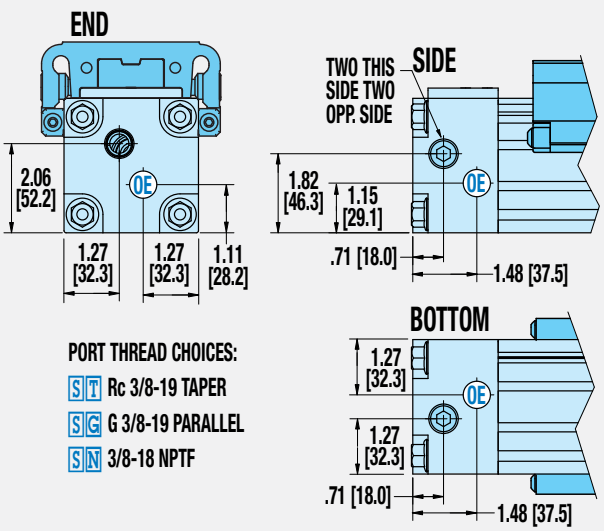
SINGLE-END PORTING

40mm BORE



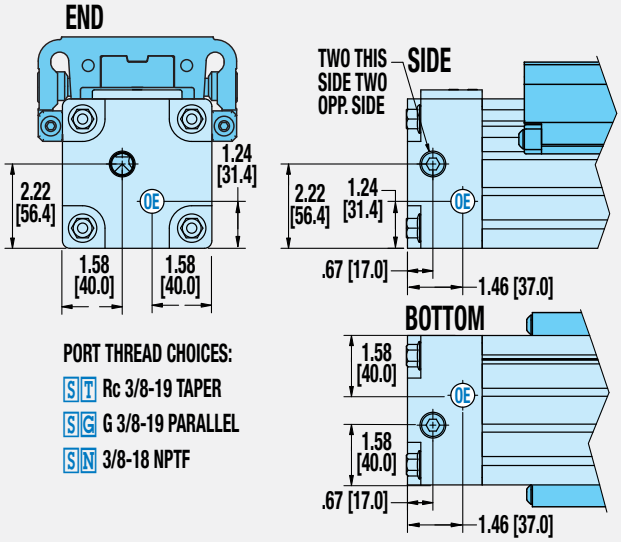
PORT THREAD CHOICES:
- ST Rc 1/4-19 TAPER
- SG G 1/4-19 PARALLEL
- SN 1/4-18 NPTF

50mm BORE



PORT THREAD CHOICES:
- ST Rc 3/8-19 TAPER
- SG G 3/8-19 PARALLEL
- SN 3/8-18 NPTF

63mm BORE

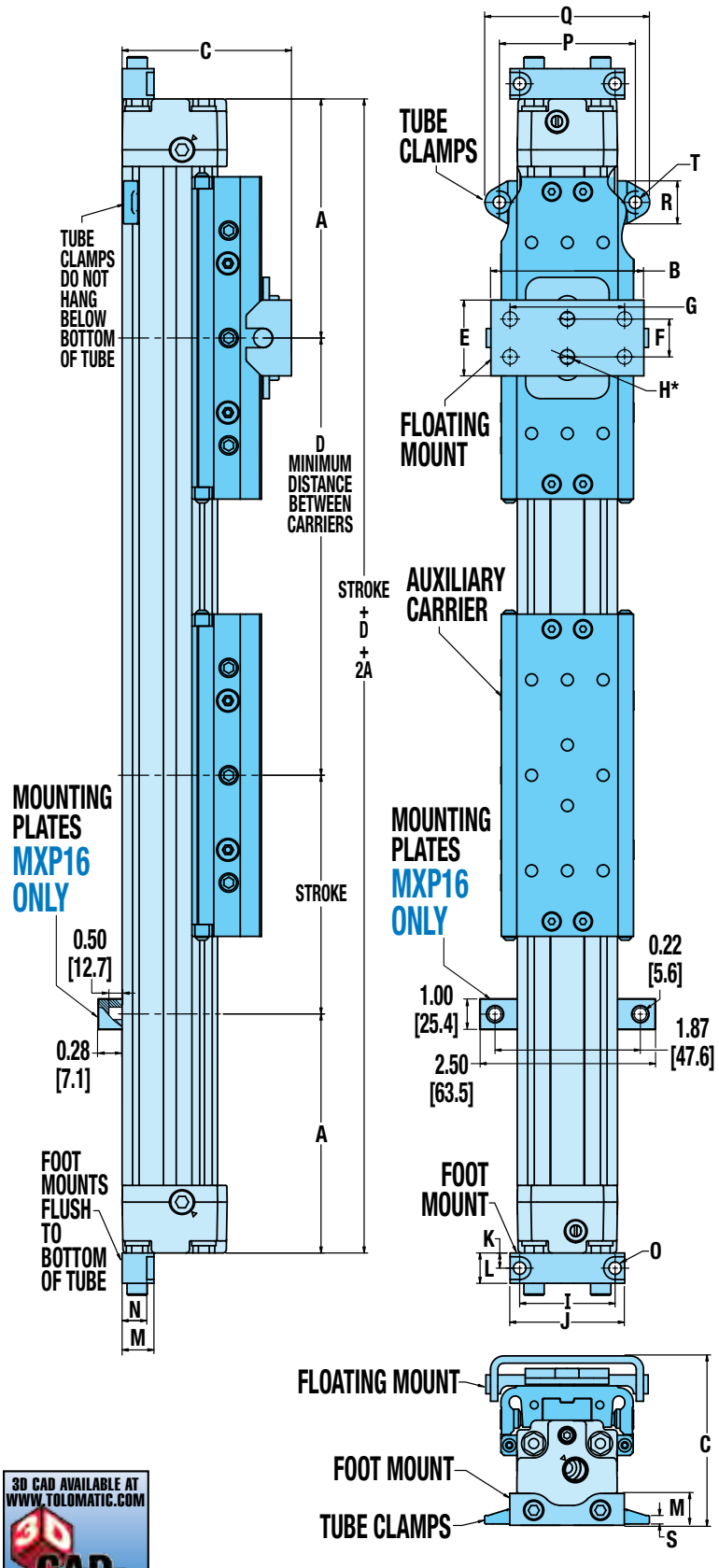


PORT THREAD CHOICES:
- ST Rc 3/8-19 TAPER
- SG G 3/8-19 PARALLEL
- SN 3/8-18 NPTF

Dimensions in inches [brackets indicate dimensions in millimeters]

S-SOLID BEARING OPTION DIMENSIONS

AUXILIARY CARRIER, FLOATING MOUNT, FOOT MOUNT, TUBE CLAMPS



	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
A	3.13	3.94	4.90	5.82	6.29	8.45
mm	*79.6*	*100.2*	*124.5*	*147.7*	*159.8*	*214.5*
AUXILIARY CARRIER						
D	5.00	6.00	7.00	8.50	8.60	13.00
mm	*127.0*	*152.4*	*177.8*	*215.9*	*218.4*	*330.0*
FLOATING MOUNT						
B	1.86	2.52	3.37	4.32	5.04	6.10
mm	*47.3*	*64.1*	*85.6*	*109.7*	*128.0*	*155.0*
C	2.31	2.80	3.67	4.26	5.24	6.17
mm	58.7	71.0	93.3	108.2	133.1	156.8
E	0.98	1.25	2.76	3.94	3.94	5.00
mm	*25.0*	*31.8*	*70.1*	*100.0*	*100.1*	*127.0*
F	0.47	0.63	1.97	2.95	3.15	3.94
mm	*12.0*	*15.9*	*50.0*	*74.9*	*80.0*	*100.1*
G	-	-	-	2.17	-	2.76
mm	*-*	*-*	*-*	*55.1*	*-*	*70.1*
H*	0.18(2)	0.24(2)	0.28(2)	0.28(4)	0.36(2)	0.34(4)
mm	*4.5(2)*	*6.1(2)*	*7.1(2)*	*7.1(4)*	*9.1(2)*	*8.7(4)*
FOOT MOUNT						
I	1.26	1.57	2.01	2.52	3.11	3.94
mm	*32.0*	*40.0*	*51.0*	*64.0*	*78.9*	*100.0*
J	1.57	1.89	2.36	2.91	3.67	4.72
mm	*40.0*	*48.0*	*60.0*	*74.0*	*93.2*	*120.0*
K	0.16	0.25	0.37	0.47	0.50	0.59
mm	*4.0*	*6.4*	*9.5*	*12.0*	*12.7*	*15.0*
L	0.31	0.50	0.75	0.94	1.00	1.18
mm	*8.0*	*12.7*	*19.0*	*24.0*	*25.4*	*30.0*
M	0.35	0.52	0.91	0.73	1.00	1.06
mm	*8.9*	*13.3*	*23.0*	*18.5*	*25.4*	*27.0*
N	-	0.41	0.71	0.45	0.69	0.65
mm	*-*	*10.3*	*18.0*	*11.4*	*17.4*	*16.5*
O	0.18	0.20	0.22	0.28	0.35	0.42
mm	*4.6*	*5.2*	*5.5*	*7.1*	*9.0*	*10.7*
TUBE CLAMPS						
P	-	2.24	2.92	3.26	3.84	5.19
mm	*-*	*57.0*	*74.1*	*82.7*	*97.5*	*131.7*
Q	-	2.72	3.44	3.81	4.39	5.93
mm	*-*	*69.0*	*87.4*	*96.7*	*111.5*	*150.7*
R	-	0.71	0.63	0.55	0.55	0.75
mm	*-*	*18.0*	*16.0*	*14.0*	*14.0*	*19.0*
S	-	0.14	0.17	0.15	0.15	0.24
mm	*-*	*3.6*	*4.3*	*3.8*	*3.8*	*6.1*
T	-	0.20	0.28	0.28	0.28	0.42
mm	*-*	*5.2*	*7.1*	*7.1*	*7.1*	*10.7*

**MXP16, 25, 32 & 50 use 2 center holes, MXP40 & 63 use 4 corner holes*

NOTE: Auxiliary carrier is S-Solid Bearing carrier, see page MXP_30 for carrier size and mounting dimensions

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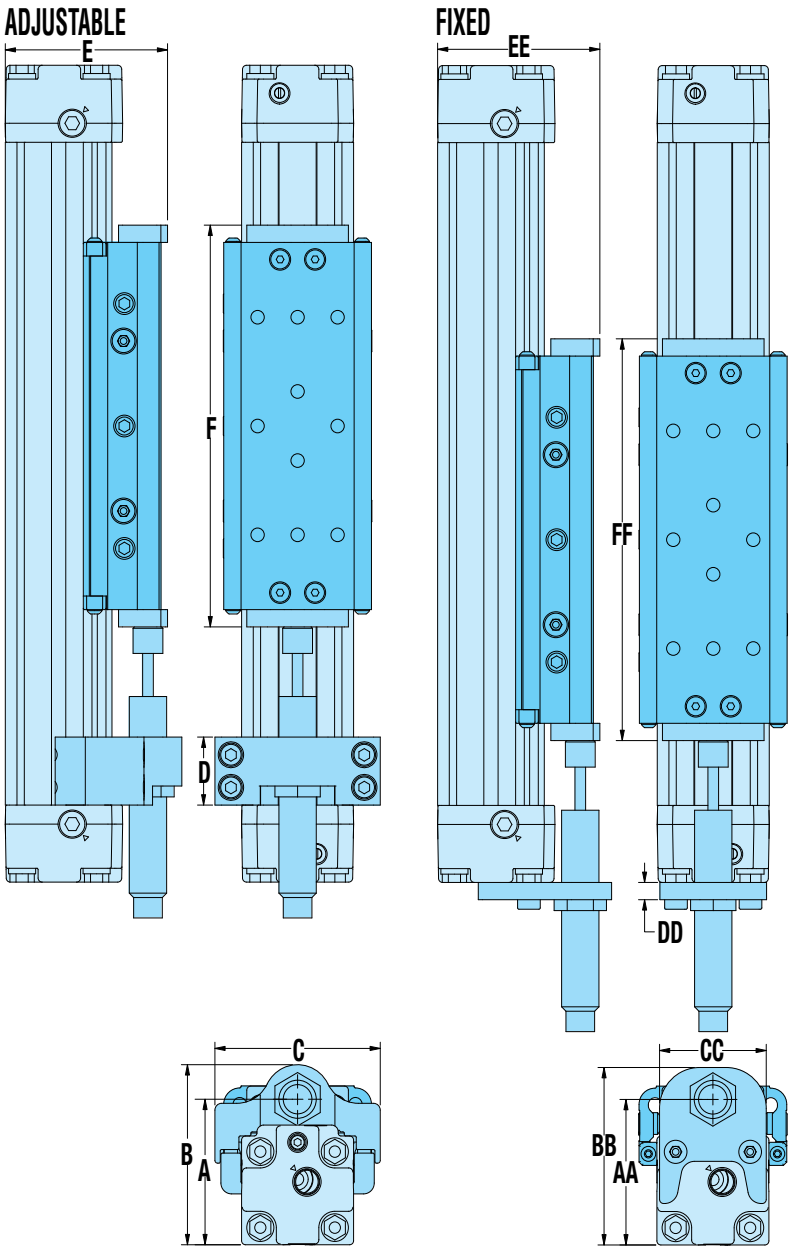
S-SOLID BEARING OPTION DIMENSIONS

ADJUSTABLE AND FIXED SHOCK ABSORBERS



ADJUSTABLE SHOCK ABSORBER

	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
A	1.65	2.11	2.91	3.32	4.24	5.21
mm	*42.0*	*53.5*	*73.8*	*84.4*	*107.6*	*132.4*
B	1.97	2.61	3.35	3.87	4.87	5.91
mm	*50.0*	*66.2*	*85.0*	*98.4*	*123.8*	*150.0*
C	1.74	2.44	2.95	3.43	4.09	5.20
mm	*44.3*	*62.0*	*74.9*	*87.0*	*103.9*	*132.0*
D	0.71	0.98	1.25	0.98	1.22	1.26
mm	*18.0*	*25.0*	*31.8*	*25.0*	*31.0*	*32.0*
E	1.80	2.39[1]	3.20[2]	3.57[3]	4.53[4]	5.50[5]
mm	*45.8*	*60.8[1]*	*81.2[2]*	*90.7[3]*	*115.1[4]*	*139.7[5]*
F	4.12	5.81[1]	6.76[2]	8.61[3]	8.35[4]	12.56[5]
mm	*104.6*	*147.7[1]*	*171.8[2]*	*218.8[3]*	*212.2[4]*	*318.9[5]*

Stroke Adder: Adjustable Shock Absorber

in.	0.62	1.50	1.96	1.70	1.66	1.65
mm	*15.7*	*38.1*	*49.7*	*43.3*	*42.1*	*41.8*

⚠ NOTE: For each adjustable shock absorber ordered, add Stroke Adder value to required stroke to determine configurated actuator stroke.

Required Stroke + (Adj. Shock Quantity x Stroke Adder value) = Configurated Actuator Stroke

Example: MXP25S, 500mm stroke required, 2 adjustable shocks

500 + (2 x 38.1) = 500 + 76.2 = 576.2mm

FIXED SHOCK ABSORBER

	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
AA	1.65	2.11	2.91	3.32	4.24	5.21
mm	*42.0*	*53.5*	*73.8*	*84.4*	*107.6*	*132.4*
BB	1.95	2.57	3.42	3.87	5.10	5.92
mm	*49.5*	*65.3*	*86.8*	*98.4*	*129.6*	*150.3*
CC	1.17	1.57	2.00	2.44	2.83	3.66
mm	*29.8*	*40.0*	*50.8*	*62.0*	*72.0*	*93.0*
DD	0.13	0.25	0.25	0.25	0.50	0.50
mm	*3.3*	*6.4*	*6.4*	*6.4*	*12.7*	*12.7*
EE	1.80	2.39[1]	3.20[2]	3.57[3]	4.53[4]	5.50[5]
mm	*45.8*	*60.8[1]*	*81.2[2]*	*90.7[3]*	*115.1[4]*	*139.7[5]*
FF	4.12	5.81[1]	6.76[2]	8.61[3]	8.35[4]	12.56[5]
mm	*104.6*	*147.7[1]*	*171.8[2]*	*218.8[3]*	*212.2[4]*	*318.9[5]*

[1]Carrier is standard MXP25S, 2.30" (58.4mm) high X 5.31" (135.0mm) long, Impact plates on each end of carrier add .09" (2.4mm) to total height and .50" (12.7mm) to total length

[2]Carrier is standard MXP32S, 3.06" (77.8mm) high X 6.02" (153.0mm) long, Impact bolts on each end of carrier add .13" (3.4mm) to total height and .74" (18.8mm) to total length

[3]Carrier is standard MXP40S, 3.51" (89.2mm) high X 7.87" (200.0mm) long, Impact bolts on each end of carrier add .06" (1.5mm) to total height and .74" (18.8mm) to total length

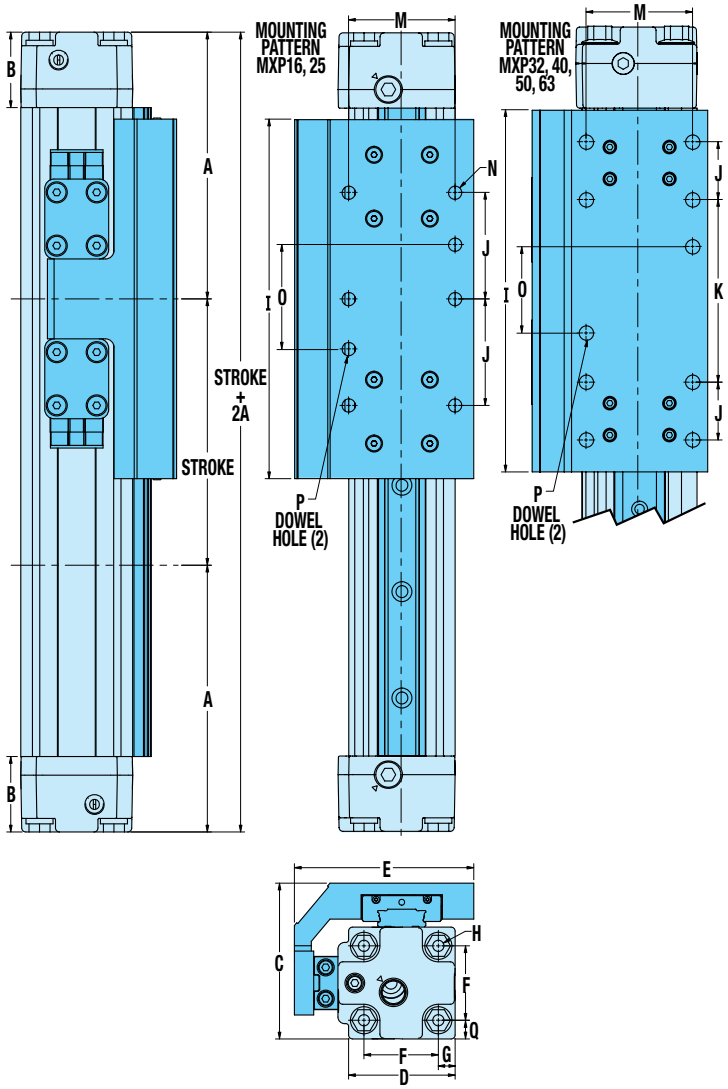
[4]Carrier is standard MXP50S, 4.44" (112.8mm) high X 7.91" (200.8mm) long, Impact bolts on each end of carrier add .09" (2.3mm) to total height and .45" (11.4mm) to total length

[5]Carrier is standard MXP63S, 5.48" (139.1mm) high X 12.11" (307.5mm) long, Impact bolts on each end of carrier add .45" (11.4mm) to total length

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

NOTE: Auxiliary carrier is S-Solid Bearing carrier, see page MXP_30 for carrier size and mounting dimensions

P-PROFILED RAIL ACTUATOR DIMENSIONS



	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
A	3.13	3.94	4.90	5.82	6.29	8.45
mm	*79.6*	*100.2*	*124.5*	*147.7*	*159.8*	*214.5*
B	0.55	1.11	1.50	1.50	1.97	1.97
mm	*14.0*	*28.3*	*38.1*	*38.0*	*50.0*	*50.0*
C	1.81	2.30	3.05	3.53	4.71	5.51
mm	*46.0*	*58.5*	*77.4*	*89.7*	*119.7*	*140.0*
D	1.19	1.57	2.13	2.52	3.01	2.87
mm	*30.3*	*40.0*	*54.0*	*64.0*	*78.7*	*73.0*
E	1.78	2.65	3.25	3.85	4.62	5.65
mm	*45.3*	*67.4*	*82.5*	*97.8*	*117.4*	*143.6*
F	0.85	1.10	1.42	1.81	2.25	2.87
mm	*21.5*	*27.9*	*36.1*	*46.0*	*57.2*	*73.0*
G	0.17	0.28	0.38	0.35	0.43	0.53
mm	*4.3*	*7.0*	*9.7*	*9.0*	*10.8*	*13.5*
H	#8-32 (8)	#10-24 (8)	1/4-20 (8)	1/4-20 (8)	5/16-18 (8)	5/16-18 (8)
mm	*M4x0.7 (8)*	*M5x0.8 (8)*	*M6x1.0 (8)*	*M6x1.0 (8)*	*M8x1.25 (8)*	*M8x1.25 (8)*
I	4.33	5.31	6.69	7.87	8.50	12.00
mm	*110.0*	*135.0*	*170.0*	*200.0*	*216.0*	*304.8*
J	1.57	1.57	1.07	1.00	1.00	1.57
mm	*40.0*	*40.0*	*27.1*	*25.4*	*25.4*	*40.0*
K	-	-	3.37	4.50	2.75	5.12
mm	*-*	*-*	*85.7*	*114.3*	*69.9*	*130.0*
M	1.10	1.57	1.97	2.83	3.13	3.87
mm	*28.0*	*40.0*	*50.0*	*72.0*	*79.4*	*98.3*
N	#8-32 (6)	1/4-20 (6)	5/16-18 (8)	5/16-18 (8)	5/16-18 (10)	3/8-16 (8)
mm	*M4x0.7 (6)*	*M6x1.0 (6)*	*M8x1.25 (8)*	*M8x1.25 (8)*	*M8x1.25 (10)*	*M10x1.5 (8)*
O	1.57	1.57	1.77	2.50	1.50	2.56
mm	*40.0*	*40.0*	*45.0*	*63.5*	*38.1*	*65.0*
P	5/32" (2)	1/4" (2)	5/16" (2)	5/16" (2)	5/16" (2)	3/8" (2)
mm	*M4 (2)*	*M6 (2)*	*M8 (2)*	*M8 (2)*	*M8 (2)*	*M8 (2)*
Q	0.17	0.28	0.38	0.35	0.43	0.53
mm	*4.3*	*7.0*	*9.7*	*9.0*	*10.8*	*13.5*

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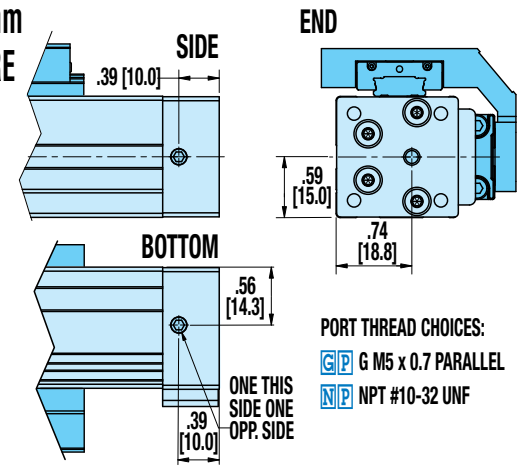
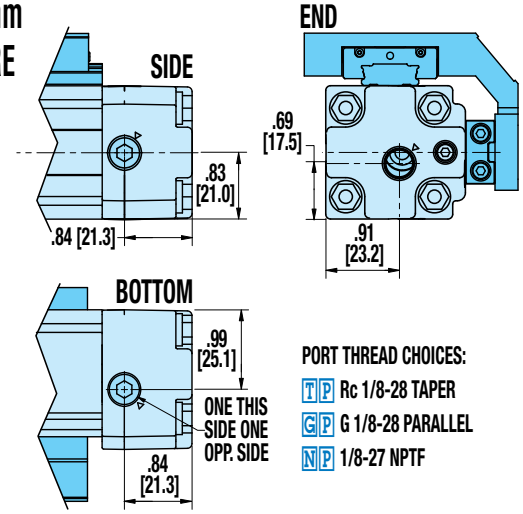
DUAL END PORTING

16mm BORE



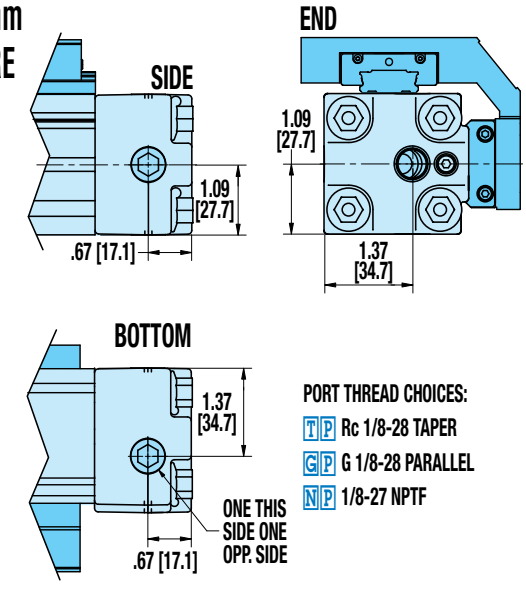
PORT THREAD CHOICES:
- GP G M5 x 0.7 PARALLEL
- NP NPT #10-32 UNF

25mm BORE



PORT THREAD CHOICES:
- TP Rc 1/8-28 TAPER
- GP G 1/8-28 PARALLEL
- NP 1/8-27 NPTF

32mm BORE

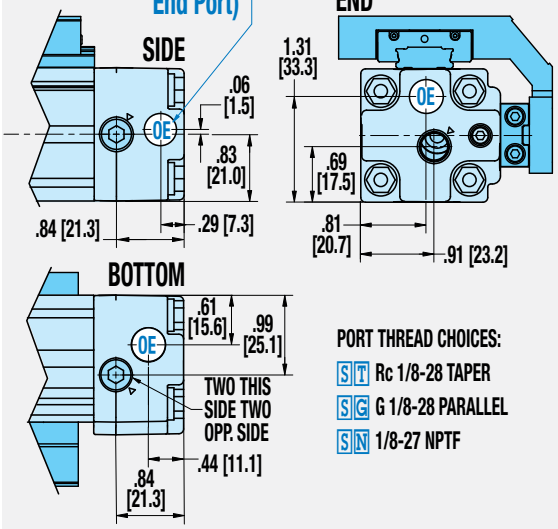


PORT THREAD CHOICES:
- TP Rc 1/8-28 TAPER
- GP G 1/8-28 PARALLEL
- NP 1/8-27 NPTF

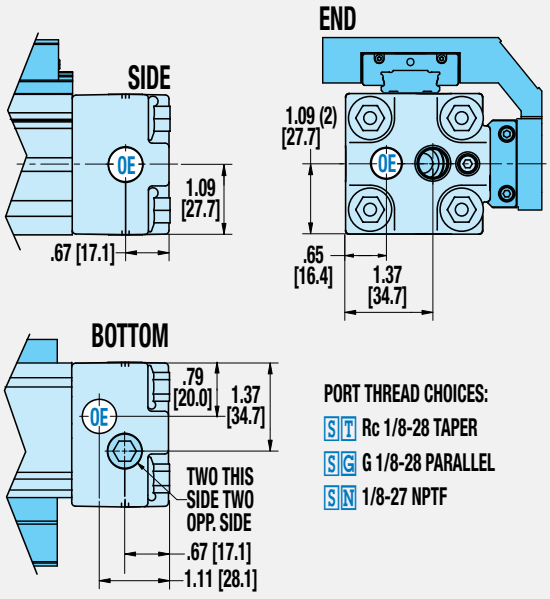
SINGLE-END PORTING

Not Available for 16mm BORE

(OE = Opposite End Port)



PORT THREAD CHOICES:
- ST Rc 1/8-28 TAPER
- SG G 1/8-28 PARALLEL
- SN 1/8-27 NPTF



PORT THREAD CHOICES:
- ST Rc 1/8-28 TAPER
- SG G 1/8-28 PARALLEL
- SN 1/8-27 NPTF

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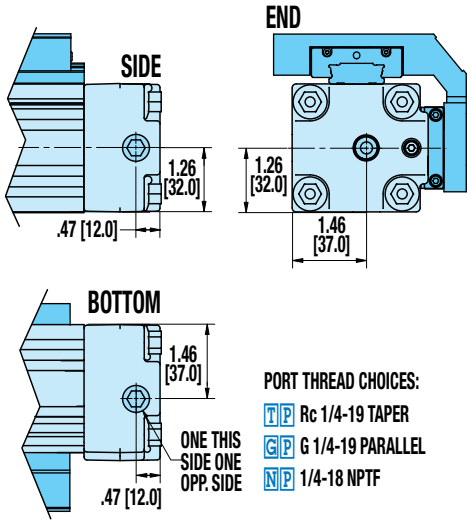
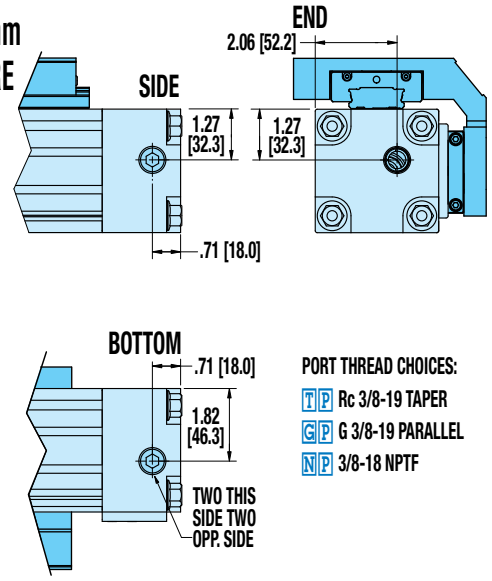
DUAL END PORTING

40mm BORE



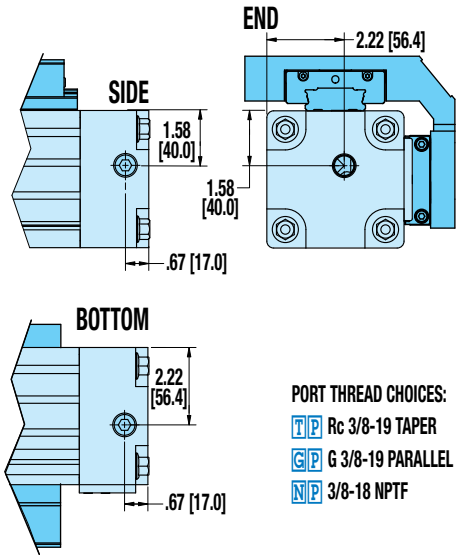
PORT THREAD CHOICES:
- TP Rc 1/4-19 TAPER
- GP G 1/4-19 PARALLEL
- NP 1/4-18 NPTF

50mm BORE



PORT THREAD CHOICES:
- TP Rc 3/8-19 TAPER
- GP G 3/8-19 PARALLEL
- NP 3/8-18 NPTF

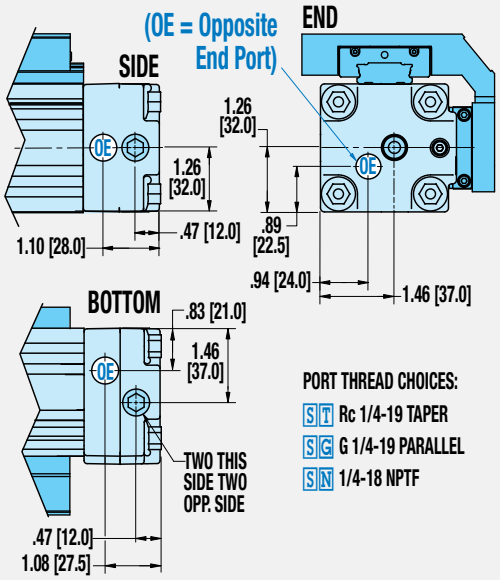
63mm BORE



PORT THREAD CHOICES:
- TP Rc 3/8-19 TAPER
- GP G 3/8-19 PARALLEL
- NP 3/8-18 NPTF

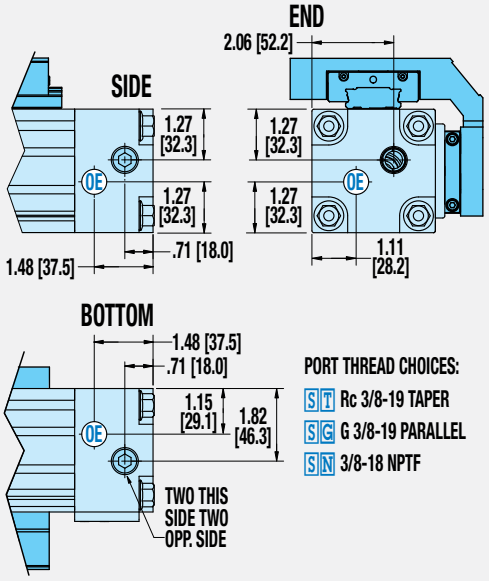
SINGLE-END PORTING

40mm BORE



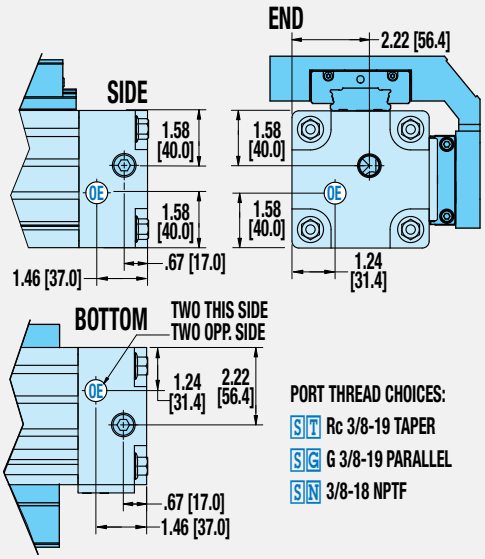
PORT THREAD CHOICES:
- ST Rc 1/4-19 TAPER
- SG G 1/4-19 PARALLEL
- SN 1/4-18 NPTF

50mm BORE



PORT THREAD CHOICES:
- ST Rc 3/8-19 TAPER
- SG G 3/8-19 PARALLEL
- SN 3/8-18 NPTF

63mm BORE



PORT THREAD CHOICES:
- ST Rc 3/8-19 TAPER
- SG G 3/8-19 PARALLEL
- SN 3/8-18 NPTF

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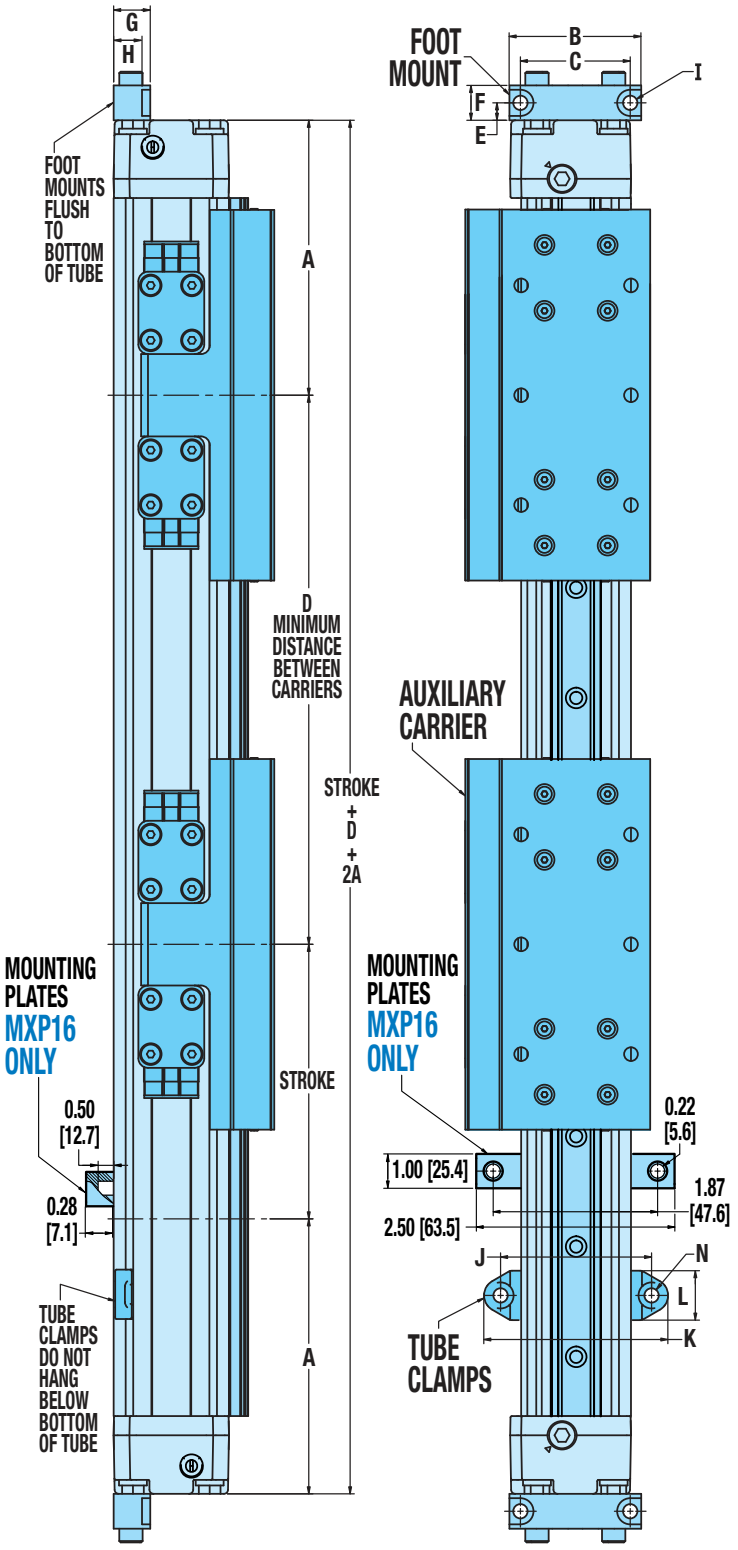
P-PROFILED RAIL OPTION DIMENSIONS

AUXILIARY CARRIER, FOOT MOUNT, TUBE CLAMPS



	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
A	3.13	3.94	4.90	5.82	6.29	8.45
mm	*79.6*	*100.2*	*124.5*	*147.7*	*159.8*	*214.5*
AUXILIARY CARRIER						
D	5.00	6.00	7.00	8.50	8.60	13.00
mm	*127.0*	*152.4*	*177.8*	*215.9*	*218.4*	*330.0*
FOOT MOUNT						
B	1.57	1.89	2.36	2.91	3.67	4.72
mm	*40.0*	*48.0*	*60.0*	*74.0*	*93.2*	*120.0*
C	1.26	1.57	2.01	2.52	3.11	3.94
mm	*32.0*	*40.0*	*51.0*	*64.0*	*78.9*	*100.0*
E	0.16	0.25	0.37	0.47	0.50	0.59
mm	*4.0*	*6.4*	*9.5*	*12.0*	*12.7*	*15.0*
F	0.31	0.50	0.75	0.94	1.00	1.18
mm	*8.0*	*12.7*	*19.0*	*24.0*	*25.4*	*30.0*
G	0.35	0.52	0.91	0.73	1.00	1.06
mm	*8.9*	*13.3*	*23.0*	*18.5*	*25.4*	*27.0*
H	-	0.41	0.71	0.45	0.69	0.65
mm	*-*	*10.3*	*18.0*	*11.4*	*17.4*	*16.5*
I	0.18	0.20	0.22	0.28	0.35	0.42
mm	*4.6*	*5.2*	*5.5*	*7.1*	*9.0*	*10.7*
TUBE CLAMPS						
J	-	2.17	2.86	3.26	3.84	5.19
mm	*-*	*55.0*	*72.7*	*82.7*	*97.5*	*131.7*
K	-	2.64	3.39	3.81	4.39	5.93
mm	*-*	*67.0*	*86.0*	*96.7*	*111.5*	*150.7*
L	-	0.71	0.63	0.55	0.55	0.75
mm	*-*	*18.0*	*16.0*	*14.0*	*14.0*	*19.0*
M	-	0.14	0.17	0.15	0.15	0.24
mm	*-*	*3.6*	*4.3*	*3.8*	*3.8*	*6.1*
N	-	0.20	0.28	0.28	0.28	0.42
mm	*-*	*5.2*	*7.1*	*7.1*	*7.1*	*10.7*

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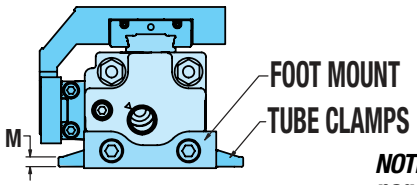
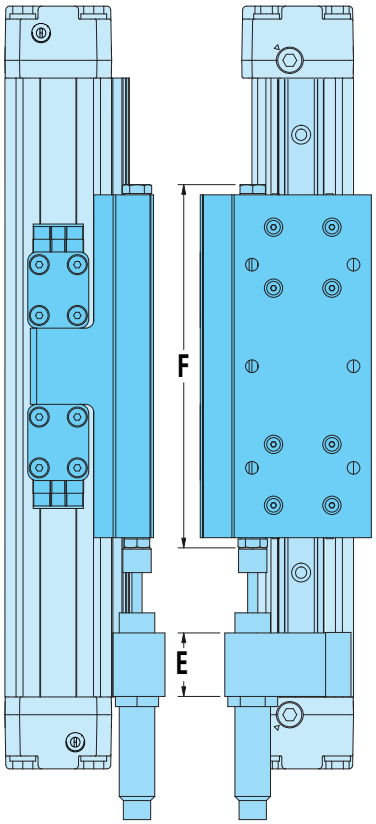


NOTE: Auxiliary carrier is P-Prodiled Rail carrier, see page MXP_35 for carrier size and mounting dimensions

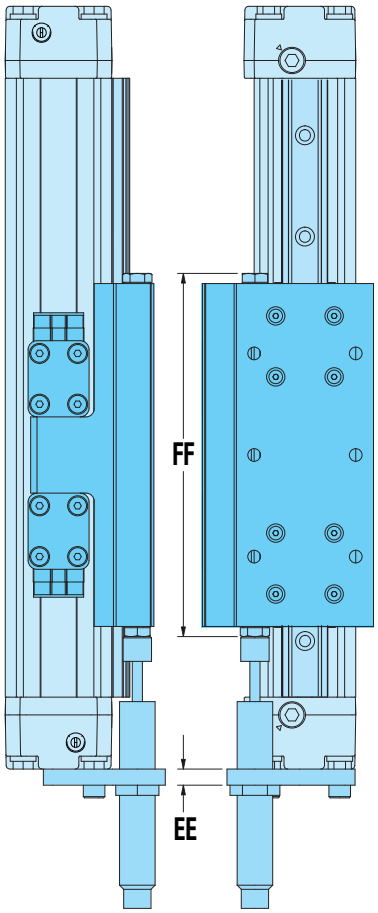
Tolomatic EXCELLENCE IN MOTION

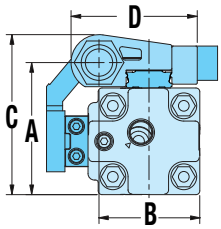
ADJUSTABLE AND FIXED SHOCK ABSORBERS

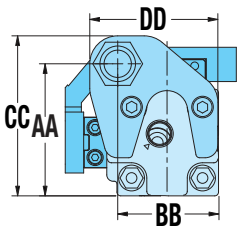
ADJUSTABLE



FIXED







ADJUSTABLE SHOCK ABSORBER

	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
A	1.51	2.05	2.87	3.28	4.20	5.04
mm	*38.3*	*52.0*	*72.9*	*83.2*	*106.7*	*128.0*
B	1.38	1.56	2.25	2.63	3.55	3.97
mm	*35.0*	*39.7*	*57.2*	*66.8*	*90.2*	*100.8*
C	1.75	2.48	3.46	3.90	4.80	5.73
mm	*44.5*	*63.0*	*87.9*	*99.0*	*121.8*	*145.5*
D	1.54	1.96	2.63	3.17	3.55	4.07
mm	*39.2*	*49.7*	*66.7*	*80.6*	*90.2*	*103.3*
E	0.79	0.98	1.00	0.98	1.26	1.26
mm	*20.0*	*25.0*	*25.4*	*25.0*	*32.0*	*32.0*
F	4.65[1]	5.63[2]	7.43[3]	8.61[4]	8.95[5]	12.45[6]
mm	*118.0[1]*	*143.0[2]*	*188.8[3]*	*218.8[4]*	*227.4[5]*	*316.2[6]*

Stroke Adder: Adjustable Shock Absorber

in	0.96	2.10	2.73	2.40	3.15	2.74
mm	*24.4*	*53.3*	*69.3*	*61.0*	*80.0*	*69.6*

⚠ NOTE: For each adjustable shock absorber ordered, add Stroke Adder value to required stroke to determine configurated actuator stroke.

Required Stroke + (Adj. Shock Quantity x Stroke Adder value) = Configurated Actuator Stroke

Example: MXP25P, 500mm stroke required, 2 adjustable shocks

500 + (2 x 53.3) = 500 + 106.6 = 606.6mm

FIXED SHOCK ABSORBER

	MXP16	MXP25	MXP32	MXP40	MXP50	MXP63
AA	1.51	2.05	2.89	3.32	4.38	5.22
mm	*38.3*	*52.0*	*73.4*	*84.4*	*111.2*	*132.5*
BB	1.38	1.56	–	–	–	–
mm	*35.0*	*39.7*	–	–	–	–
CC	1.80	2.48	3.41	3.87	5.09	5.93
mm	*45.8*	*63.0*	*86.5*	*98.4*	*129.2*	*150.5*
DD	1.66	1.98	2.00	2.44	2.83	3.66
mm	*42.2*	*50.4*	*50.8*	*62.0*	*72.0*	*93.0*
EE	0.13	0.25	0.25	0.25	0.50	0.50
mm	*3.3*	*6.4*	*6.4*	*6.4*	*12.7*	*12.7*
FF	4.65[1]	5.63[2]	7.43[3]	8.61[4]	8.95[5]	12.45[6]
mm	*118.0[1]*	*143.0[2]*	*188.8[3]*	*218.8[4]*	*227.4[5]*	*316.2[6]*

[1]*Carrier is standard MXP16P, 4.33" (110.0mm) long, Impact bolts on each end of carrier add .31" (8.0mm) to total length*

[2]*Carrier is standard MXP25P, 5.31" (135.0mm) long, Impact bolts on each end of carrier add .31" (8.0mm) to total length*

[3]*Carrier is standard MXP32P, 6.69" (170.0mm) long, Impact bolts on each end of carrier add .74" (18.8mm) to total length*

[4]*Carrier is standard MXP40P, 7.87" (200.0mm) long, Impact bolts on each end of carrier add .74" (18.8mm) to total length*

[5]*Carrier is standard MXP50P, 8.50" (216.0mm) long, Impact bolts on each end of carrier add .45" (11.4mm) to total length*

[6]*Carrier is standard MXP63P, 12.00" (304.8mm) long, Impact bolts on each end of carrier add .45" (11.4mm) to total length*

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NOTE: Auxiliary carrier is P-Prodiled Rail carrier, see page MXP_35 for carrier size and mounting dimensions

SWITCHES

SPECIFICATIONS

RoHS COMPLIANT CE

MX products offer a large number of sensing choices. There are 12 switch choices: reed, solid state PNP (sourcing) or solid state NPN (sinking); in normally open or normally closed; with flying leads or quick-disconnnects.

Commonly used for end-of-stroke positioning, these switches allow drop-in installation anywhere along the entire actuator length. The one-piece design includes the retained fastening hardware and is designed for any open side or bottom slot on the MX. The internal piston magnet is a standard feature, therefore these switches can be installed in the field at anytime.

Switches are used to send digital signals to PLC (programmable logic controller), TTL, CMOS circuit or other controller device. Switches contain reverse polarity protection. Solid state QD cables are shielded; shield should be terminated at flying lead end.

All switches are CE rated and are RoHS compliant. Switches feature bright red or yellow LED signal indicators; solid state switches also have green LED power indicators.

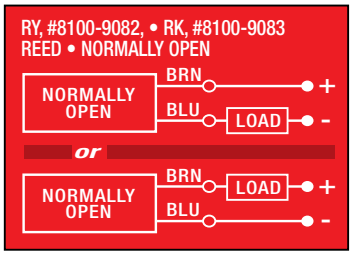
	Order Code	Part Number	Lead	Switching Logic	Power LED	Signal LED	Operating Voltage	*Power Rating (Watts)	Switching Current (mA max.)	Current Con-sumption	Voltage Drop	Leakage Current	Temp. Range	Shock / Vibration
REED	RY	8100-9082	5m	SPST Normally Open	—	Red	5 - 240 AC/DC	*10.0	100mA	—	3.0 V max.	—	14 to 158°F [-10 to 70°C]	50 G / 9 G
	RK	8100-9083	Quick Disconnect		Tolomatic 81009082									
	NY	8100-9084	5m	SPST Normally Closed	—	Yellow	5 - 110 AC/DC							
	NK	8100-9085	Quick Disconnect		Tolomatic 81009084									
SOLID STATE	TY	8100-9088	5m	PNP (Sourcing) Normally Open	Green	Yellow	10 - 30 Vdc	*3.0	100mA	20 mA @ 24V	2.0 V max.	0.05 mA max.		
	TK	8100-9089	Quick Disconnect		Tolomatic 81009088									
	KY	8100-9090	5m	NPN (Sinking) Normally Open	Green	Red								
	KK	8100-9091	Quick Disconnect		Tolomatic 81009090									
	PY	8100-9092	5m	PNP (Sourcing) Normally Closed	Green	Yellow								
	PK	8100-9093	Quick Disconnect		Tolomatic 81009092									
	HY	8100-9094	5m	NPN (Sinking) Normally Closed	Green	Red								
	HK	8100-9095	Quick Disconnect		Tolomatic 81009094									

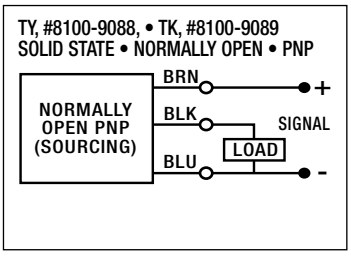
Enclosure classification IEC 529 IP67 (NEMA 6)

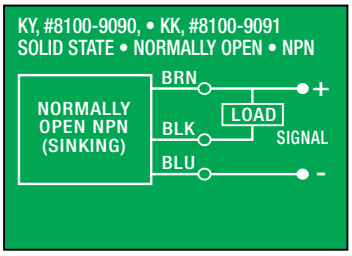
CABLES: Robotic grade, oil resistant polyurethane jacket, PVC insulation

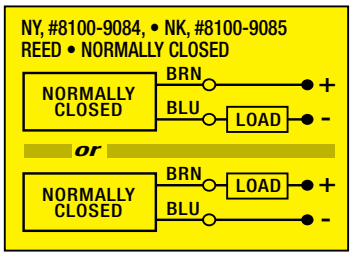
⚠ *WARNING: Do not exceed power rating (Watt = Voltage x Amperage). Permanent damage to sensor will occur.

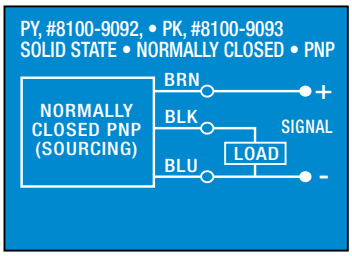
WIRING DIAGRAMS

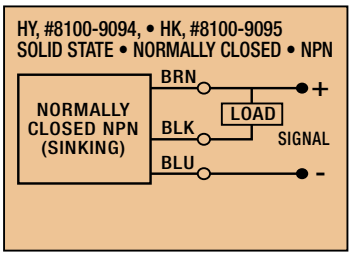


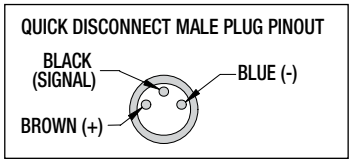


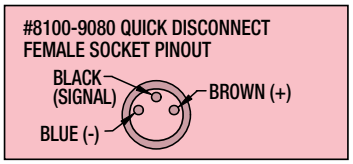






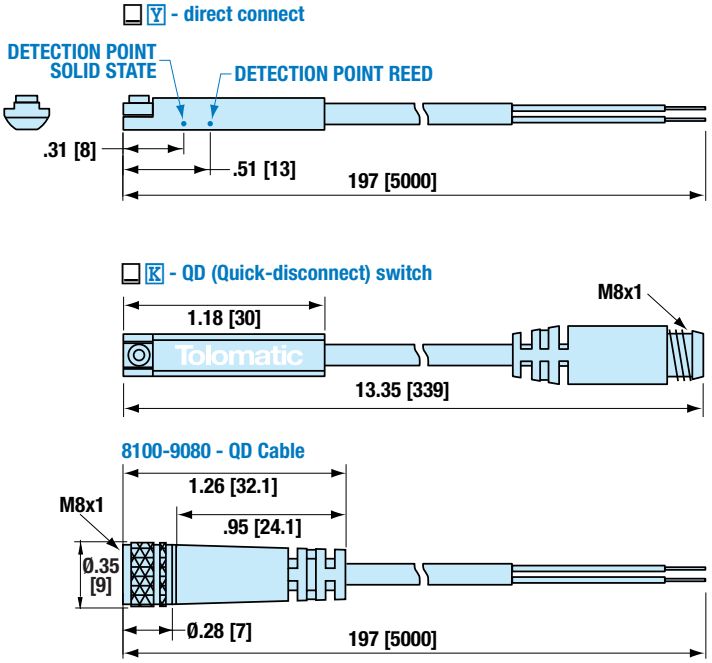






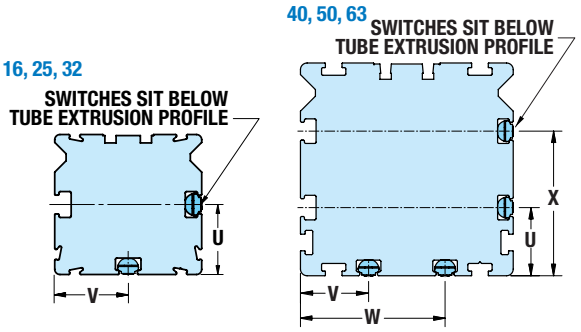
DIMENSIONS

SWITCH DIMENSIONS



Dimensions in inches [brackets indicate dimensions in millimeters]

MOUNTING DIMENSIONS

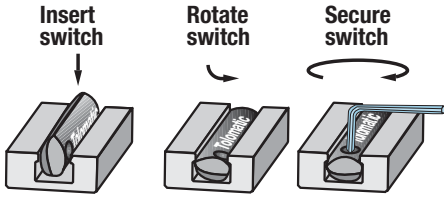


SWITCH MOUNTING

	16	25	32	40	50	63
U	0.31	0.79	1.06	0.81	1.08	1.50
mm	*7.9*	*20.0*	*27.0*	*20.5*	*27.4*	*38.0*
V	0.59	0.83	1.09	0.81	1.08	1.50
mm	*15.0*	*21.0*	*27.7*	*20.5*	*27.4*	*38.0*
W	–	–	–	1.71	2.02	2.44
mm	–	–	–	*43.5*	*51.4*	*62.0*
X	–	–	–	1.71	2.02	2.44
mm	–	–	–	*43.5*	*51.4*	*62.0*

SWITCH INSTALLATION AND REPLACEMENT

Place switch in side groove on tube at desired location with "Tolomatic" facing outward. While applying light pressure to the switch, rotate the switch halfway into the groove. Maintaining light pressure, rotate the switch in the opposite direction until the it is fully inside the groove with "Tolomatic" visible. Re-position the switch to the exact location and lock the switch securely into place by tightening the screw on the switch.



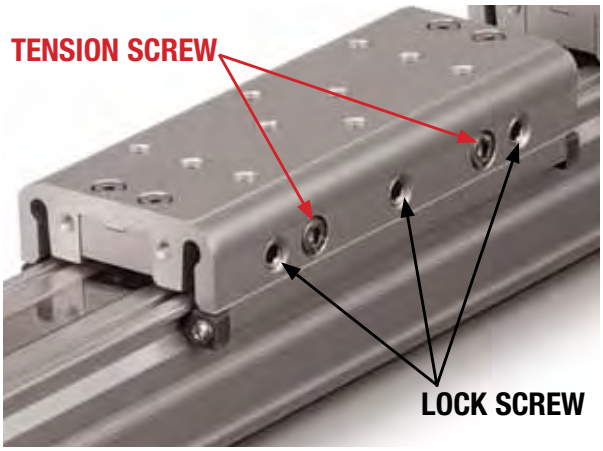
ADJUSTMENT PROCEDURES

CUSHION NEEDLE ADJUSTMENT

Adjust the cushion needle in the cylinder heads carefully to obtain proper deceleration for your particular application. Proper cushion needle adjustment is achieved when the carrier reaches the end of travel at a velocity approaching zero. If the carrier reaches the end of stroke at velocity, then the cushion needs to be increased by turning the cushion needle screw clockwise. If the carrier stalls or bounces (quickly oscillating directions) before it reaches the end of stroke, then the cushion needs to be decreased by turning the cushion needle screw counterclockwise. Improper cushion adjustment may cause premature failure of the actuator. Call Tolomatic with any questions.

[S] SOLID BEARING CARRIER ADJUSTMENT

The [S] solid bearing carrier will provide for maximum life when properly adjusted. The carrier design contains both tension and lock screws. The tension screws control the amount of pressure placed on the carrier bearings. The lock screws lock the tension screws in place and provide fine adjustment of the carrier bearings. The number of tension and lock screws will vary depending on the bore size of the actuator.



1. Fully loosen all tension and lock screws. They do not need to be removed, just fully loosened.
2. Tighten tension screws on both sides of carrier roughly 1/8 to 1/4 turn clockwise past where the screw starts to feel snug. The carrier should be very difficult or impossible to move by hand.
3. Next, adjust the lock screws on both sides of the carrier roughly 1/8 to 1/4 turn clockwise past where the screw starts to engage.
4. Ideal carrier tension is achieved when the carrier feels snug in relation to the tube. No rocking motion should be present. The carrier should be loose enough to be moved by hand over the entire length of the actuator. If after this process the carrier has become too loose, equally adjust all of the lock screws with a slight 1/32 turn counterclockwise. A carrier that is adjusted too tight will increase the breakaway pressure required for motion; in extreme cases no motion will occur when air is applied.

During the service life, this process may need to be repeated. Keeping the carrier properly adjusted will prolong the life of the [S] solid bearing system.

Allen wrench sizes for carrier adjustment, Solid bearing actuators

	Tension Screw		Lock Screw	
	in	*mm*	in	*mm*
16	1/16	*2*	1/16	*2*
25	5/32	*4*	1/8	*3*
32	5/32	*4*	3/32	*2*
40	5/32	*4*	1/8	*3*
50	3/16	*4*	3/32	*2.5*
63	1/4	*5*	3/16	*5*

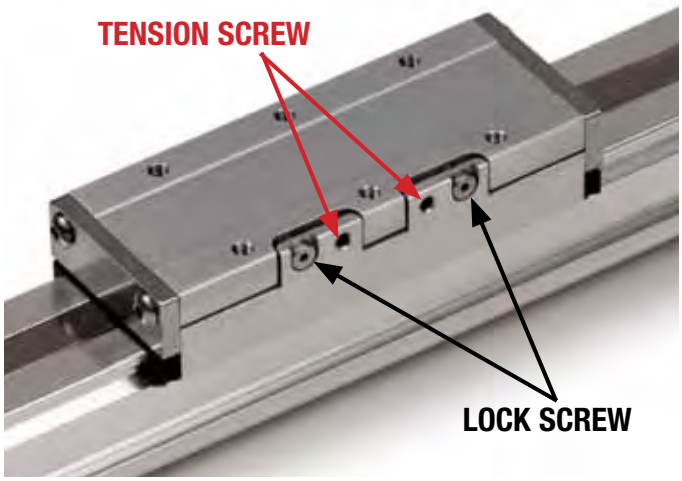
MXP16

NOTE: MXP16S requires a different carrier adjustment procedure, see below.

Tools Required:

Inch Models: 1/16 inch and 2.5mm Hex Wrench (Key)
Metric Models: 2 and 2.5 mm Hex Wrench (Key)

1. Loosen endplate screws on both ends of the carrier.
2. Fully loosen all tension and lock screws. They do not need to be removed, just fully loosened.



3. Tighten tension screws by turning them clockwise until the carrier is just tight enough so that no side-to-side rocking motion is present and it can easily be moved by hand over the entire stroke length with no hesitation. Very little torque on the screws is required to obtain this condition.

Note: The Tension Screws are the small set screw style fastener. The Lock Screws are the larger, low head, hex drive screws.

4. Tighten lock screws by turning them clockwise until tight. The carrier should feel snug in relation to the tube, with no side-to-side rocking motion present. If the carrier becomes too loose, loosen the lock screws, tighten the tension screws and then retighten the lock screws.
5. Once ideal carrier tension is achieved, fully tighten end plate screws on both ends of the carrier.

SERVICE PARTS

REPAIR KITS

Repair kit includes: dust band, seal band, end caps, internal soft seals (piston seals, cushion seals, wipers), [Also for S style: bearings and bearing caps]

The part number for a repair kit begins with RK followed by model, bore size, bearing type, and stroke length (SK = inch/US Standard, SM = metric) (NOTE: If unit has an auxiliary carrier also include DW and distance between carrier centers)

REPAIR KIT	MODEL	BORE SIZE	BEARING TYPE	STROKE METRIC	STROKE LENGTH	AUXILIARY CARRIER	DISTANCE BETWEEN CARRIERS
RK	MXP	40	S	SM	2007.02	DW	215.9

SWITCHES

TO ORDER SERVICE PARTS SWITCHES:

Switches for MXP include retained mounting hardware and are the same for all bore sizes and bearing styles

Code		Part Number	Lead	Normally	Sensor Type
RY		8100-9082	5m (197 in)	Open	Reed
RK		8100-9083*	Quick-disconnect		
NY		8100-9084	5m (197 in)	Closed	Reed
NK		8100-9085*	Quick-disconnect		
TY		8100-9088	5m (197 in)	Open	Solid State PNP
TK		8100-9089*	Quick-disconnect		
KY		8100-9090	5m (197 in)	Open	Solid State NPN
KK		8100-9091*	Quick-disconnect		
PY		8100-9092	5m (197 in)	Closed	Solid State PNP
PK		8100-9093*	Quick-disconnect		
HY		8100-9094	5m (197 in)	Closed	Solid State NPN
HK		8100-9095*	Quick-disconnect		

*Also order mating QD cable #8100-9080

	8100-9080	Mating QD (Quick-disconnect) cable 197 in. (5m)

To order switches using configurated parts string (will include mating female QD cable if required)

SWITCH KIT	MODEL	BORE SIZE	BEARING TYPE	SWITCH CODE	QUANTITY
SW	MXP	25	N	RK	2

SERVICE PARTS MXP16, MXP25, MXP32

MOUNTING OPTIONS		16			25			32		
		N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail
Foot Mount (1 bracket, 2 bolts)	Inch	8116-9519	8116-9519	8116-9519	8125-9519	8125-9519	8125-9519	8132-9519	8132-9519	8132-9519
	Metric	*8116-9019*	*8116-9019*	*8116-9019*	*8125-9019*	*8125-9019*	*8125-9019*	*8132-9019*	*8132-9019*	*8132-9019*
Tube Clamp (2 clamps)		NA	NA	NA	8125-9018	8125-9018	8125-9018	8132-9018	8132-9018	8132-9018
Floating Mount (brackets, pin, mounting fasteners)	Inch	8116-9535	8116-9536	NA	8125-9535	8125-9536	NA	8132-9535	8132-9536	NA
	Metric	*8116-9035*	*8116-9036*	*NA*	*8125-9035*	*8125-9036*	*NA*	*8132-9035*	*8132-9036*	*NA*
Mounting Plate (1 plate, 2 bolts)	Inch	8316-9016	8316-9016	8316-9016						
	Metric	*8316-9016*	*8316-9016*	*8316-9016*						

SHOCK ABSORBER KITS		16			25			32		
		N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail
Fixed Shock Absorber Kit - Light Duty (1 shock absorber, all required hardware)	Inch	8116-9510	8116-9511	8116-9512	8125-9510	8125-9511	8125-9512	8132-9510	8132-9511	8132-9512
	Metric	*8116-9010*	*8116-9011*	*8116-9012*	*8125-9010*	*8125-9011*	*8125-9012*	*8132-9010*	*8132-9011*	*8132-9012*
Fixed Shock Absorber Kit - Heavy Duty (1 shock absorber, all required hardware)	Inch	8116-9525	8116-9526	8116-9527	8125-9525	8125-9526	8125-9527	8132-9525	8132-9526	8132-9527
	Metric	*8116-9025*	*8116-9026*	*8116-9027*	*8125-9025*	*8125-9026*	*8125-9027*	*8132-9025*	*8132-9026*	*8132-9027*
***Adjustable Shock Absorber Kit - Light Duty** (1 shock absorber, all required hardware)	Inch	8116-9515	8116-9016	8116-9517	8125-9515	8125-9016	8125-9517	8132-9515	8132-9016	8132-9517
	Metric	*8116-9015*	*8116-9016*	*8125-9017*	*8125-9015*	*8125-9016*	*8125-9017*	*8132-9015*	*8132-9016*	*8132-9017*
***Adjustable Shock Absorber Kit - Heavy Duty** (1 shock absorber, all required hardware)	Inch	8116-9530	8116-9031	8116-9032	8125-9530	8125-9031	8125-9532	8132-9530	8132-9031	8132-9532
	Metric	*8116-9030*	*8116-9031*	*8116-9032*	*8125-9030*	*8125-9031*	*8125-9032*	*8132-9030*	*8132-9031*	*8132-9032*

SHOCK PARTS		16			25			32		
		N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail
Fixed Shock Absorber Mounting Hardware (1 shock mount)	Inch	8116-9520	8116-9520	8116-9522	8125-9520	8125-9520	8125-9522	8132-9520	8132-9520	8132-9522
	Metric	*8116-9020*	*8116-9020*	*8116-9022*	*8125-9020*	*8125-9020*	*8125-9022*	*8132-9020*	*8132-9020*	*8132-9022*
***Adj. Shock Absorber Mounting Hardware** (1 shock mount)		8116-9023	8116-9023	8116-9024	8125-9023	8125-9023	8125-9024	8132-9023	8132-9023	8132-9024
Shock Stop Kit (Hardware needed for shock to strike carrier)	Inch	8116-9521	NA	8116-9034	8125-9521	8125-9013	8125-9534	8132-9521	4912-1063	8132-9534
	Metric	*8116-9021*	*NA*	*8116-9034*	*8125-9021*	*8125-9013*	*8125-9034*	*8132-9021*	*4912-1063*	*8132-9034*
Shock Absorber - Heavy Duty (1 shock absorber)		7906-1066	7906-1066	7906-1066	4910-1338	4910-1338	4910-1338	4912-1068	4912-1068	4912-1068
Shock Absorber - Light Duty (1 shock absorber)		7906-1065	7906-1065	7906-1065	4910-1337	4910-1337	4910-1337	4912-1067	4912-1067	4912-1067

*NOTE: N Internal bearing: Adjustable shock absorbers will decrease actuator stroke, see ⚠ Stroke Adder note on page MXP_29 for more information.
S Solid bearing: Adjustable shock absorbers will decrease actuator stroke, see ⚠ Stroke Adder note on page MXP_34 for more information.
P Profiled rail: Adjustable shock absorbers will decrease actuator stroke, see ⚠ Stroke Adder note on page MXP_39 for more information.

SERVICE PARTS MXP40, MXP50, MXP63

MOUNTING OPTIONS		40			50			63		
		N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail
Foot Mount (1 bracket, 2 bolts)	Inch	8140-9519	8140-9519	8140-9519	8150-9519	8150-9519	8150-9519	8163-9519	8163-9519	8163-9519
	Metric	*8140-9019*	*8140-9019*	*8140-9019*	*8150-9019*	*8150-9019*	*8150-9019*	*8163-9019*	*8163-9019*	*8163-9019*
Tube Clamp (2 clamps)		8140-9018	8140-9018	8140-9018	8140-9018	8140-9018	8140-9018	8163-9018	8163-9018	8163-9018
Floating Mount (brackets, pin, mounting fasteners)	Inch	8140-9535	8140-9536	NA	8150-9535	8150-9536	NA	8163-9535	8163-9536	NA
	Metric	*8140-9035*	*8140-9036*	*NA*	*8150-9035*	*8150-9036*	*NA*	*8163-9035*	*8163-9036*	*NA*

SHOCK ABSORBER KITS		40			50			63		
		N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail
Fixed Shock Absorber Kit - Light Duty (1 shock absorber, all required hardware)	Inch	8140-9510	8140-9511	8140-9512	8150-9510	8150-9511	8150-9512	8163-9510	8163-9511	8163-9512
	Metric	*8140-9010*	*8140-9011*	*8140-9012*	*8150-9010*	*8150-9011*	*8150-9012*	*8163-9010*	*8163-9011*	*8163-9012*
Fixed Shock Absorber Kit - Heavy Duty (1 shock absorber, all required hardware)	Inch	8140-9525	8140-9526	8140-9527	8150-9525	8150-9526	8150-9527	8163-9525	8163-9526	8163-9527
	Metric	*8140-9025*	*8140-9026*	*8140-9027*	*8150-9025*	*8150-9026*	*8150-9027*	*8163-9025*	*8163-9026*	*8163-9027*
***Adjustable Shock Absorber Kit - Light Duty** (1 shock absorber, all required hardware)	Inch	8140-9515	8140-9016	8140-9517	8150-9515	8150-9016	8150-9517	8163-9515	8163-9016	8163-9517
	Metric	*8140-9015*	*8140-9016*	*8140-9017*	*8150-9015*	*8150-9016*	*8150-9017*	*8163-9015*	*8163-9016*	*8163-9017*
***Adjustable Shock Absorber Kit - Heavy Duty** (1 shock absorber, all required hardware)	Inch	8140-9530	8140-9031	8140-9532	8150-9530	8150-9031	8150-9532	8163-9530	8163-9031	8163-9532
	Metric	*8140-9030*	*8140-9031*	*8140-9032*	*8150-9030*	*8150-9031*	*8150-9032*	*8163-9030*	*8163-9031*	*8163-9032*

SHOCK PARTS		40			50			63		
		N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail	N Internal	S Solid	P Profiled Rail
Fixed Shock Absorber Mounting Hardware (1 shock mount)	Inch	8140-9520	8140-9520	8140-9520	8150-9520	8150-9520	8150-9522	8163-9520	8163-9520	8163-9520
	Metric	*8140-9020*	*8140-9020*	*8140-9020*	*8150-9020*	*8150-9020*	*8150-9022*	*8163-9020*	*8163-9020*	*8163-9020*
***Adj. Shock Absorber Mounting Hardware** (1 shock mount)		8140-9023	8140-9023	8140-9024	8150-9023	8150-9023	8163-9024	8163-9023	8163-9023	8163-9024
Shock Stop Kit (Hardware needed for shock to strike carrier)	Inch	8140-9521	4912-1063	8140-9534	8150-9521	4415-1003	8150-9034	8163-9521	4915-1003	8150-9034
	Metric	*8140-9021*	*4912-1063*	*8140-9034*	*8150-9021*	*4415-1003*	*8150-9034*	*8163-9021*	*4915-1003*	*8150-9034*
Shock Absorber - Heavy Duty (1 shock absorber)		4912-1068	4912-1068	4912-1068	4920-1069	4920-1069	4920-1069	4920-1069	4920-1069	4920-1069
Shock Absorber - Light Duty (1 shock absorber)		4912-1067	4912-1067	4912-1067	4920-1068	4920-1068	4920-1068	4920-1068	4920-1068	4920 -1068

*NOTE: N Internal bearing: Adjustable shock absorbers will decrease actuator stroke, see ⚠ Stroke Adder note on page MXP_29 for more information.
S Solid bearing: Adjustable shock absorbers will decrease actuator stroke, see ⚠ Stroke Adder note on page MXP_34 for more information.
P Profiled rail: Adjustable shock absorbers will decrease actuator stroke, see ⚠ Stroke Adder note on page MXP_39 for more information.

ORDERING

MODEL SELECTION (MUST BE IN THIS ORDER)

MXP 40 P SN SM2007·02

OPTIONS (IN ANY ORDER)

DW215·9 FM2 TC8 TK2 AH2 ___

MODEL

MXP MXP Pneumatic Band Cylinder

BORE

16 16 mm (5/8-inch) bore
25 25 mm (1-inch) bore
32 32 mm (1 1/4-inch) bore
40 38 mm (1 1/2-inch) bore
50 50 mm (2-inch) bore
63 64 mm (2 1/2-inch) bore

BEARING

N Internal Bearing
S Solid Bearing
P Profiled Rail

PORTING

TP Metric Taper (Rc/BST), Dual-end
GP Metric Parallel (ISO-G/BSP), Dual-end
NP NPT, Dual-end
ST Single-end, Metric Taper
SG Single-end, Metric Parallel
SN Single-end, NPT

⚠ Single End Porting ST SG SN is not available for MXP16

⚠ Metric Taper Porting TP is not available for MXP16

STROKE LENGTH & MOUNTING TYPE

SK_ _ _._ _ _ Stroke, enter desired stroke length in **inches**

SM_ _ _ _ _._ _ _ Stroke, enter desired stroke length in **millimeters**

NOTE: Actuator mounting threads and mounting fasteners will be either inch or metric; depending on how stroke length is indicated

SK=inch mounting

SM= metric mounting

AUXILIARY CARRIER

DW_ _ _._ _ _ Auxiliary Carrier, enter center-to-center spacing desired in **inches** (SK) or **millimeters** (SM)

(Same unit of measure as stroke length is required)

⚠ **Center-to-center spacing between carriers adds to overall length of the actuator,** this distance will not be subtracted from stroke length specified in the previous step

MOUNTING

FM_ Foot Mount, enter quantity desired
TC_ Tube Clamps, enter number of pairs (Not available on MXP16)
MP_ Mounting Plate (includes T-Nuts) for MXP16 ONLY
FL Floating Mount

⚠ NOTE: Floating Mount is not available with "P" Profiled Rail

⚠ NOTE: Shock Absorbers are not available with Floating Mount

SWITCHES

RY_ Reed Switch (Normally Open) with 5-meter lead, & enter quantity desired
RK_ Reed Switch (Normally Open) with 5-meter lead/QD, & quantity
NY_ Reed Switch (Normally Closed) with 5-meter lead, & quantity
NK_ Reed Switch (Normally Closed) with 5-meter lead/QD, & quantity

TY_ Solid State Switch PNP (Normally Open) w/ 5-meter lead, & quantity
TK_ Solid State Switch PNP (Normally Open) w/ 5-meter lead/QD, & quantity
KY_ Solid State Switch NPN (Normally Open) w/ 5-meter lead, & quantity
KK_ Solid State Switch NPN (Normally Open) w/ 5-meter lead/QD, & quantity

PY_ Solid State Switch PNP (Normally Closed) w/ 5-meter lead, & quantity
PK_ Solid State Switch PNP (Normally Closed) w/ 5-meter lead/QD, & quantity
HY_ Solid State Switch NPN (Normally Closed) w/ 5-meter lead, & quantity
HK_ Solid State Switch NPN (Normally Closed) w/ 5-meter lead/QD, & quantity

SHOCK ABSORBER

SD_ Fixed Shock Hardware & enter quantity desired
SL_ Fixed Shock Light Duty & enter quantity desired
SH_ Fixed Shock Heavy Duty & enter quantity desired

AD_ Adjustable Shock Hardware & enter quantity desired
AL_ Adjustable Shock Light Duty & enter quantity desired
AH_ Adjustable Shock Heavy Duty & enter quantity desired

⚠ NOTE: Adjustable Shock Absorbers reduce usable stroke length of the actuator. Please see the following pages for required stroke adder.
N Internal Bearing.....pg. MXP_29
S Solid Bearing.....pg. MXP_34
P Profiled Rail .....pg. MXP_39

⚠ NOTE: Floating Mount is not available with Shock Absorbers

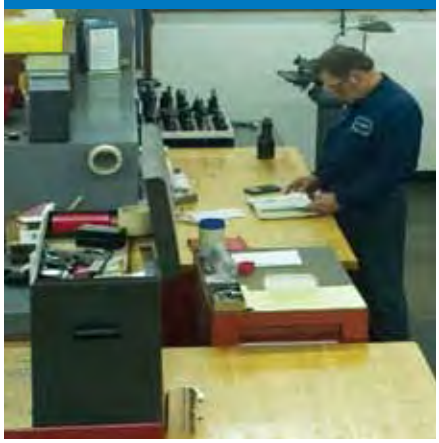
VISIT www.tolomatic.com/mxp FOR COMPLETE, UP-TO-DATE INFORMATION

⚠ ***Not all codes listed are compatible with all options.***

Call Tolomatic to determine available options and accessories based on your application requirements.

CUSTOM, MODIFIED AND STANDARD PRODUCT SOLUTIONS

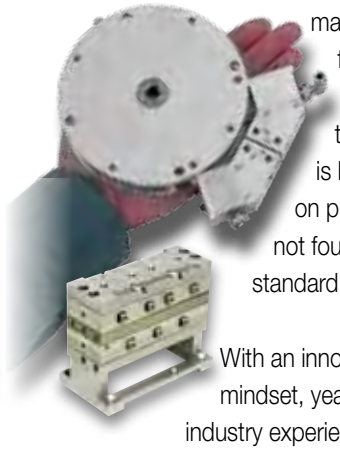
CUSTOM CAPABILITIES



Tolomatic's custom model shop can create first-piece prototypes with the industry's fastest turnaround times.

Custom Solutions are Standard Business

Hundreds of customers partner with Tolomatic to solve unique automation application challenges. We are geared to handle design requests–from our Model Shop (for fast prototypes) all the way through our ISO 9001:2000 certified manufacturing facility. Over 33% of our total business is based on products not found in our standard catalog.



With an innovation mindset, years of solid industry experience, and fast response times, let Tolomatic help you get the job done. If you are looking for linear motion solutions–pneumatic or electromechanical–and you cannot find a catalog product, get with Tolomatic. You will experience what we mean by **Excellence in Motion**.

MATERIAL HANDLING

Conveying machinery with built-in lane diverters offer a compact footprint with optimal performance.

Customer Challenge:

The traditional method of using tie rod cylinders to operate diverters required too much space to fit in space-restrictive production areas.

Tolomatic Solution:

Tolomatic recommended a series of pneumatic rodless band cylinders that could be easily retrofitted into production lines by offering a variety of mounting options. The manufacturer's customers were pleased with the space saving results and durability of the machines. The result was an increase of repeat customers for the manufacturer.

PACKAGING

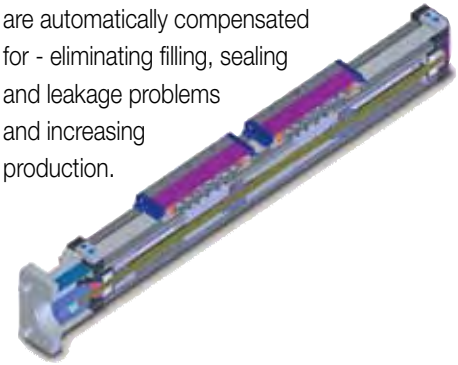
Modular bagging system fills and seals a wide range of materials and bag sizes.

Customer Challenge:

A leader in packaging technology was faced with the problem of compensating for inconsistent bag dimensions on its modular bag filling and sealing system. Irregularly sized bags required manual setup and were slowing the production process which required high-speed accuracy and flexibility.

Tolomatic Solution:

Tolomatic supplied a series of customized electric screw drive actuators that precisely positioned the incoming bags before insertion into the filling/sealing line. Two actuators adjust the vertical position and two others center the bags in the tray. The results: variations in bag lengths and widths are automatically compensated for - eliminating filling, sealing and leakage problems and increasing production.



The best motion control and linear motion solutions for your applications.

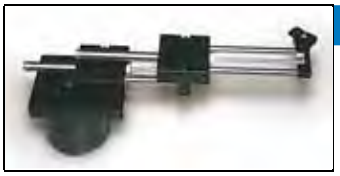
THE TOLOMATIC DIFFERENCE What you expect from the industry leader:

EXCELLENT CUSTOMER SERVICE & TECHNICAL SUPPORT

Our people make the difference! Expect prompt, courteous replies to all of your application and product questions.

INDUSTRY LEADING DELIVERIES

Tolomatic continues to offer the fastest delivery of standard catalog products. Modified and custom products ship weeks ahead of the competition.



INNOVATIVE PRODUCTS

From standard catalog products... to modified products... to completely unique custom products, Tolomatic designs and builds the best solutions for your challenging applications.

ONLINE SIZING & SELECTION SOFTWARE

Online sizing that is easy to use, accurate and always up-to-date. Input your application data and the software will determine a Tolomatic electric actuator to meet your requirements.

3D MODELS & 2D DRAWINGS AVAILABLE ON THE WEB

Easy to access CAD files are available in many popular formats.

ALSO CONSIDER THESE OTHER TOLOMATIC PRODUCTS:

PNEUMATIC PRODUCTS

RODLESS CYLINDERS: Band Cylinders, Cable Cylinders, MAGNETICALLY COUPLED CYLINDERS/SLIDES; GUIDED ROD CYLINDER SLIDES

"FOLDOUT" BROCHURE #9900-9075
PRODUCTS BROCHURE #9900-4028

ELECTRIC PRODUCTS

ROD & GUIDED ROD STYLE ACTUATORS, HIGH THRUST ACTUATORS, SCREW & BELT DRIVE RODLESS ACTUATORS, MOTORS, DRIVES AND CONTROLLERS

"FOLDOUT" BROCHURE #9900-9074
PRODUCTS BROCHURE #9900-4016

POWER TRANSMISSION PRODUCTS

GEARBOXES: Float-A-Shaft®, Slide-Rite®; DISC CONE CLUTCH; CALIPER DISC BRAKES

"FOLDOUT" BROCHURE #9900-9076
PRODUCTS BROCHURE #9900-4029

Tolomatic
EXCELLENCE IN MOTION

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LITERATURE NUMBER: 8100-4000_06.01

Tolomatic
EXCELLENCE IN MOTION®

MG & MGS MAGNETICALLY COUPLED RODLESS CYLINDER/SLIDE

CONTENTS

MAG COUPLED CYLINDER

ENDURANCE TECHNOLOGY℠

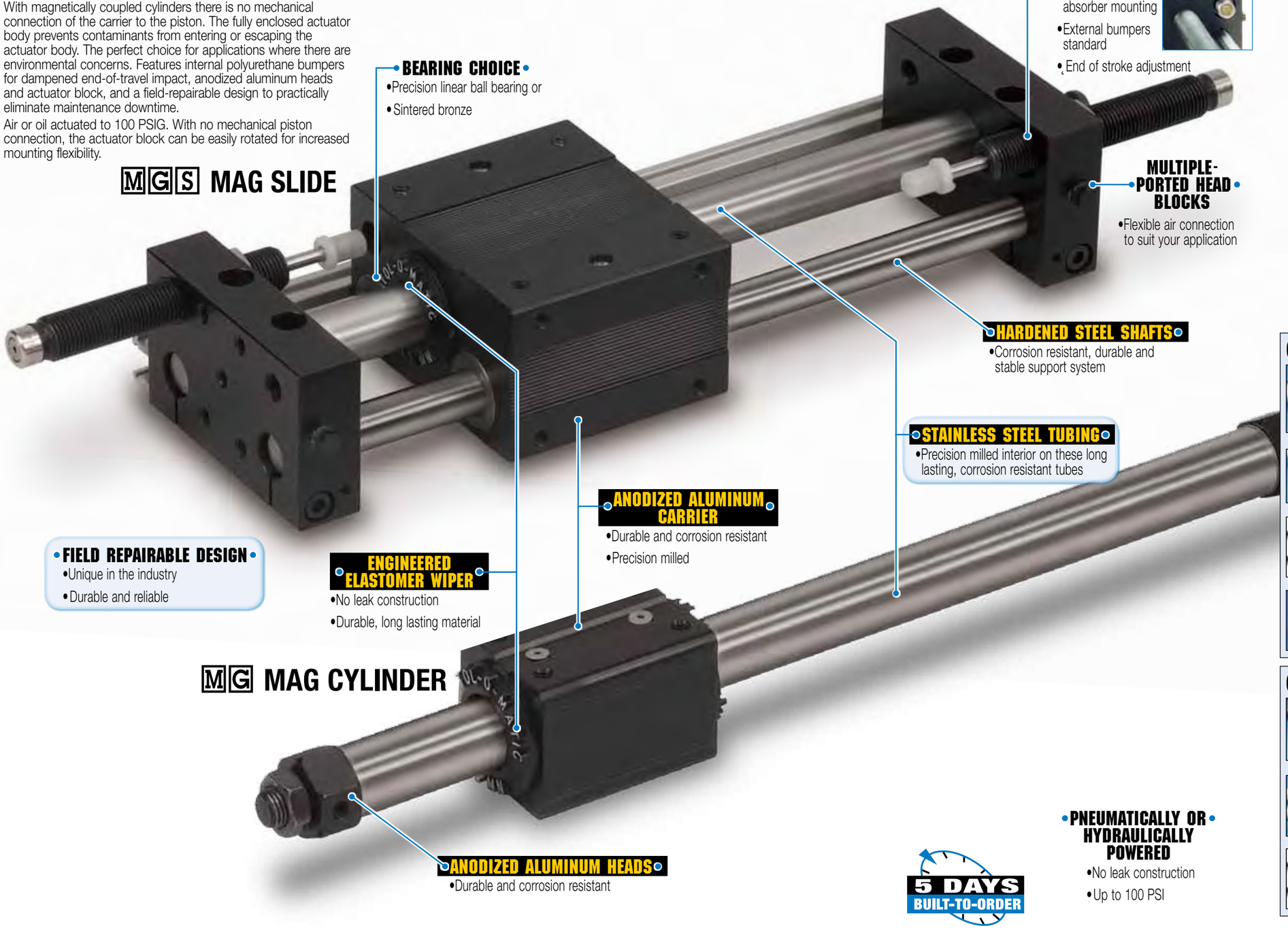
Endurance Technology features are designed for maximum durability to provide extended service life.

With magnetically coupled cylinders there is no mechanical connection of the carrier to the piston. The fully enclosed actuator body prevents contaminants from entering or escaping the actuator body. The perfect choice for applications where there are environmental concerns. Features internal polyurethane bumpers for dampened end-of-travel impact, anodized aluminum heads and actuator block, and a field-repairable design to practically eliminate maintenance downtime.

Air or oil actuated to 100 PSIG. With no mechanical piston connection, the actuator block can be easily rotated for increased mounting flexibility.

MGS MAG SLIDE

MG MAG CYLINDER



BEARING CHOICE
- Precision linear ball bearing or
- Sintered bronze

DECELERATION
- Built-in shock absorber mounting
- External bumpers standard
- End of stroke adjustment

MULTIPLE-PORTED HEAD BLOCKS
- Flexible air connection to suit your application

HARDENED STEEL SHAFTS
- Corrosion resistant, durable and stable support system

STAINLESS STEEL TUBING
- Precision milled interior on these long lasting, corrosion resistant tubes

ANODIZED ALUMINUM CARRIER
- Durable and corrosion resistant
- Precision milled

ENGINEERED ELASTOMER WIPER
- No leak construction
- Durable, long lasting material

FIELD REPAIRABLE DESIGN
- Unique in the industry
- Durable and reliable

ANODIZED ALUMINUM HEADS
- Durable and corrosion resistant

PNEUMATICALLY OR HYDRAULICALLY POWERED
- No leak construction
- Up to 100 PSI

5 DAYS BUILT-TO-ORDER

MAGNETIC FORCE CONNECTS PISTON TO CARRIER

- Rare earth magnets create positive connecton between piston and carrier
- 3 coupling strengths
- Decouples at known force (useful in a variety of applications)
- Wear bearing for long life

OPTIONS - CYLINDER

FLOATING MOUNT BRACKET FL
- Compensates for non-parallelism between cylinder and independently guided load
- Makes installation easier, increases actuator block bearing life

FOOT MOUNT FM
- Best mounting choice in most applications
- Made from plated stamped steel

SWITCHES
- Available in Reed, Hall-effect and Triac
- 15ft. cable with flying leads; available with quick-disconnect couplers

CORROSION RESISTANT
- Stainless steel components with seals for use in harsh environments

OPTIONS - SLIDE

SHOCK ABSORBERS SL SH
- Smoother deceleration
- Self-compensates for load changes
- Reduces need for equipment maintenance

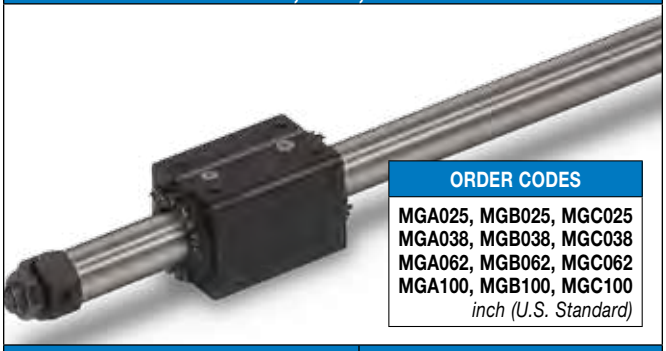
PROXIMITY SENSOR
- L.E.D. deivce senses end-of-stroke with one of two normally open inductive dc proximity sensors.

SWITCHES
- Available in Reed, Hall-effect and Triac
- 15ft. cable with flying leads; available with quick-disconnect couplers

MG Magnetically Coupled Cylinder - All Sizes

PERFORMANCE

MGA, MGB, MGC



ORDER CODES

MGA025, MGB025, MGC025
MGA038, MGB038, MGC038
MGA062, MGB062, MGC062
MGA100, MGB100, MGC100
inch (U.S. Standard)

MG OPTIONS	Page
Floating Mount Bracket	MG_9
Foot Mounts	MG_8
Switches	MG_10
MORE INFORMATION	**Page**
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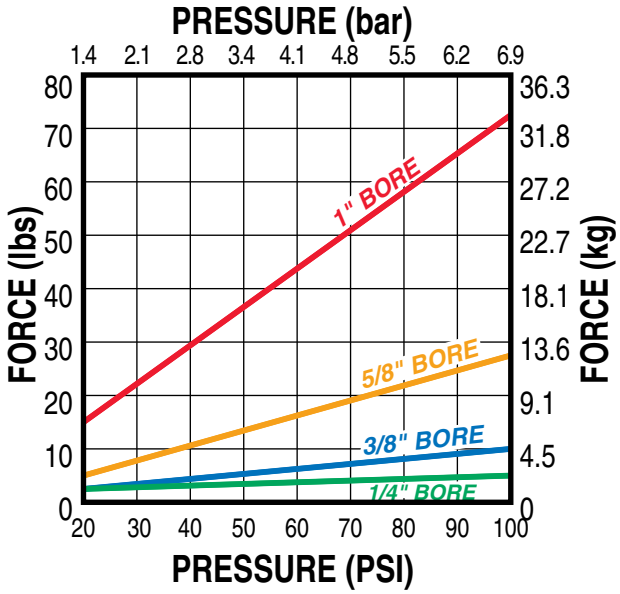
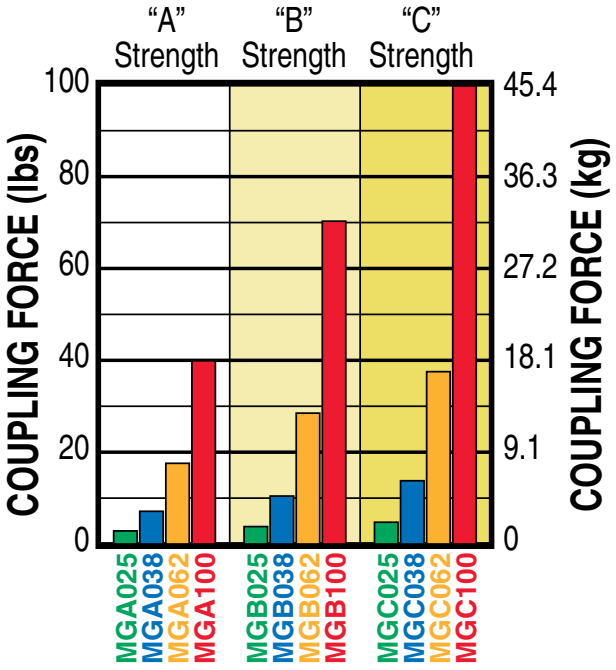
THEORETICAL FORCE vs PRESSURE



MAGNETIC COUPLING STRENGTH

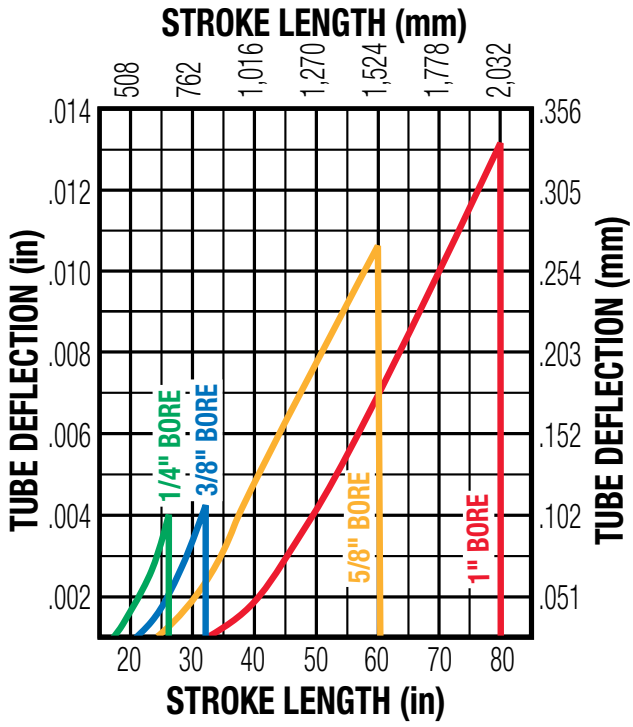


NOTES REGARDING MAGNETIC COUPLING

1) De-coupling will occur if coupling force is exceeded.

2) All coupling forces listed are for horizontal applications. For vertical applications, Tolomatic recommends using a 2-to-1 coupling force safety factor.

TUBE DEFLECTION

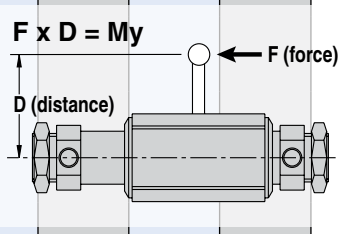


MG Magnetically Coupled Cylinder - All Sizes

SPECIFICATIONS

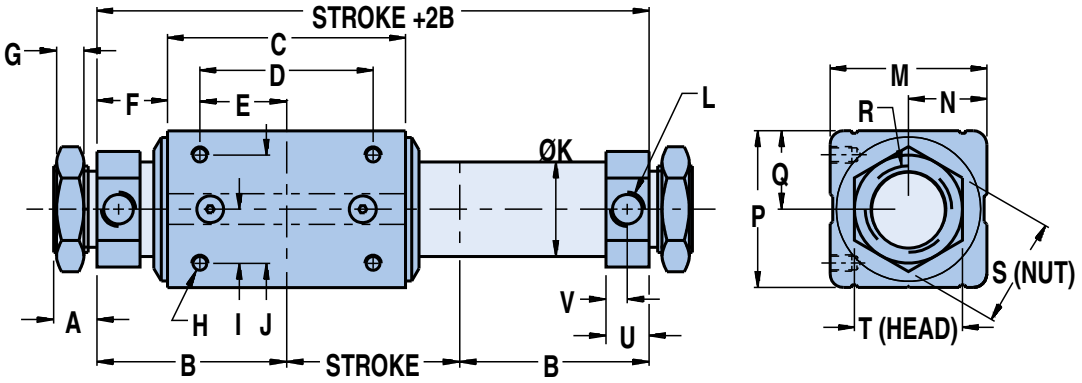
MGA, MGB, MGC BENDING MOMENT, WEIGHT, ETC.

MAGNET CODE	SIZE	BORE SIZE in	BORE SIZE mm	BASE WEIGHT lbs	BASE WEIGHT kg	WEIGHT/UNIT lbs/in	WEIGHT/UNIT kg/mm	MAX. STROKE in	MAX. STROKE mm	MAX. BENDING MOMENT My in-lbs	MAX. BENDING MOMENT My N-m	MAX. PRESSURE PSI	MAX. PRESSURE bar	TEMPERATURE RANGE °F	TEMPERATURE RANGE °C
A				0.12	0.05										
B	025	0.250	6.4	0.12	0.05	0.01	0.00018	26.00	660.4	3.00	0.339				
C				0.13	0.06										
A				0.20	0.09										
B	038	0.375	9.5	0.21	0.10	0.01	0.00018	32.00	812.8	4.00	0.452				
C				0.24	0.11										
A				0.49	0.22										
B	062	0.625	16	0.51	0.23	0.02	0.00036	60.00	1524.0	9.00	1.017				
C				0.57	0.26										
A				1.52	0.69										
B	100	1.000	25	1.55	0.70	0.04	0.00071	80.00	2032.0	35.00	3.954				
C				1.79	0.81										
												100	6.895	20° to 140°	-7° to 60°



*For longer strokes, alternate materials, mounting and/or fasteners – consult Tolomatic

DIMENSIONS



	BORE	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V
025	0.250	0.47	0.23	#5-40UNC x .18	0.20	0.39	Ø.31	#10-32	0.67	0.34	0.67	0.34	3/8-24UNF	0.56	0.56	0.41	0.21
038	0.375	0.50	0.23	#5-40UNC x .18	0.31	0.63	Ø.44	#10-32	0.98	0.49	0.98	0.49	3/8-24UNF	0.56	0.56	0.41	0.21
062	0.625	0.67	0.23	#8-32UNC x .24	0.37	0.75	Ø.69	#10-32	1.38	0.69	1.38	0.69	3/8-24UNF	0.56	0.75	0.44	0.22
100	1.000	0.81	0.32	#10-32UNC x .25	0.62	1.25	Ø1.09	1/8 NPT	1.81	0.91	1.81	0.91	1-12UNF	1.25	1.25	0.50	0.25

Dimensions in inches

	BORE	A	B	B*	C	C*	D	E
025	0.250	0.38	1.25	1.32	1.56	1.70	1.00	0.50
038	0.375	0.38	1.25	1.35	1.50	1.70	1.12	0.56
062	0.625	0.38	1.62	1.75	1.92	2.19	1.50	0.75
100	1.000	0.50	2.19	2.40	2.75	3.17	2.00	1.00

Dimensions in inches

*For "C strength" configurations only.

	BORE	A	B	B*	C	C*	D	E
025	6.4	9.7	31.8	33.5	39.6	43.2	25.4	12.7
038	9.5	9.7	31.8	34.3	38.1	43.2	28.4	14.2
062	16	9.7	41.1	44.5	48.8	55.6	38.1	19.1
100	25	12.7	55.6	61.0	69.9	80.5	50.8	25.4

Dimensions in millimeters

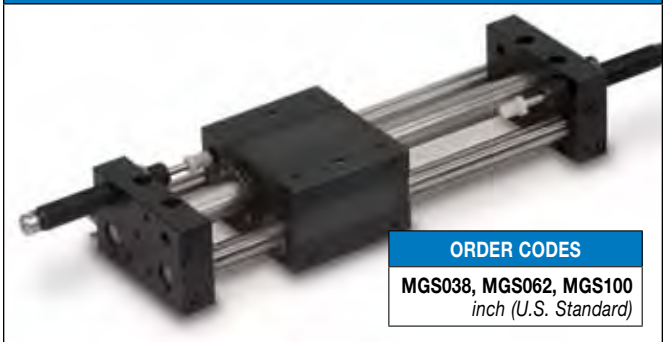
	BORE	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V
025	6.4	11.9	5.8	#5-40UNC x .18	5.1	9.9	7.9	#10-32	17.0	8.6	17.0	8.6	3/8-24UNF	14.2	14.2	10.4	5.3
038	9.5	12.7	5.8	#5-40UNC x .18	7.9	16.0	11.2	#10-32	24.9	12.4	24.9	12.4	3/8-24UNF	14.2	14.2	10.4	5.3
062	16	17.0	5.8	#8-32UNC x .24	9.4	19.1	17.5	#10-32	35.1	17.5	35.1	17.5	3/8-24UNF	14.2	19.1	11.2	5.6
100	25	20.6	8.1	#10-32UNC x .25	15.7	31.8	27.7	1/8 NPT	46.0	23.1	46.0	23.1	1-12UNF	31.8	31.8	12.7	6.4

Dimensions in millimeters

MGS Magnetically Coupled Slide - All Sizes

PERFORMANCE

MGS



ORDER CODES

MGS038, MGS062, MGS100
inch (U.S. Standard)

MGS OPTIONS	Page
Proximity Sensor	MG_12
Shock Absorber	MG_13
Switches	MG_10
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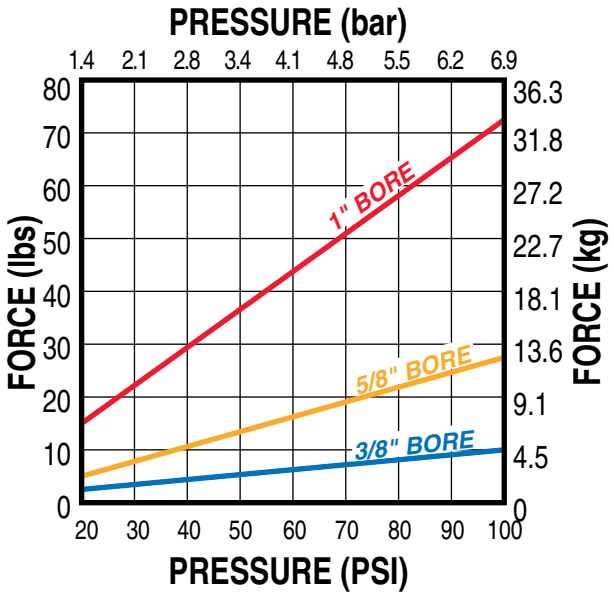
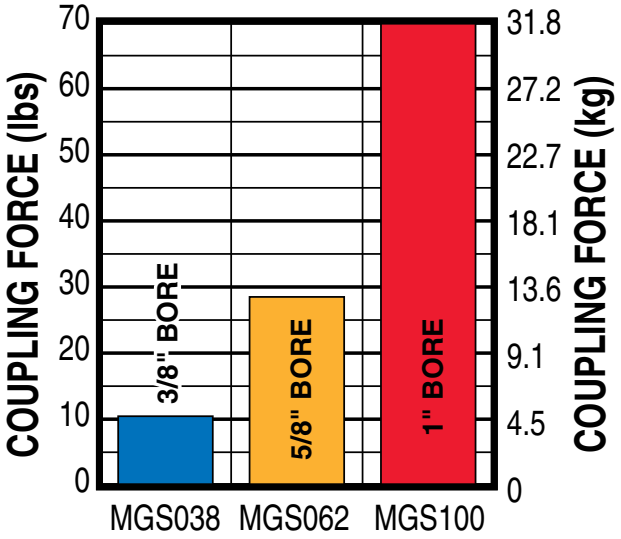
Selection	MG_17

THEORETICAL FORCE vs PRESSURE



MAGNETIC COUPLING STRENGTH

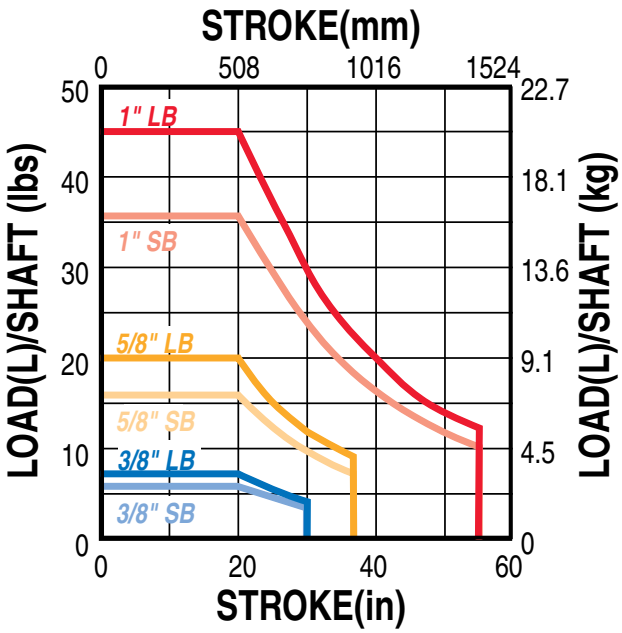


NOTES REGARDING MAGNETIC COUPLING

1) De-coupling will occur if coupling force is exceeded.

2) All coupling forces listed are for horizontal applications. For vertical applications, Tolomatic recommends using a 2-to-1 coupling force safety factor.

LOAD vs STROKE



SB = Sintered Bronze Bearings
LB = Linear Ball Bearings

Also see formulae on page MG_12

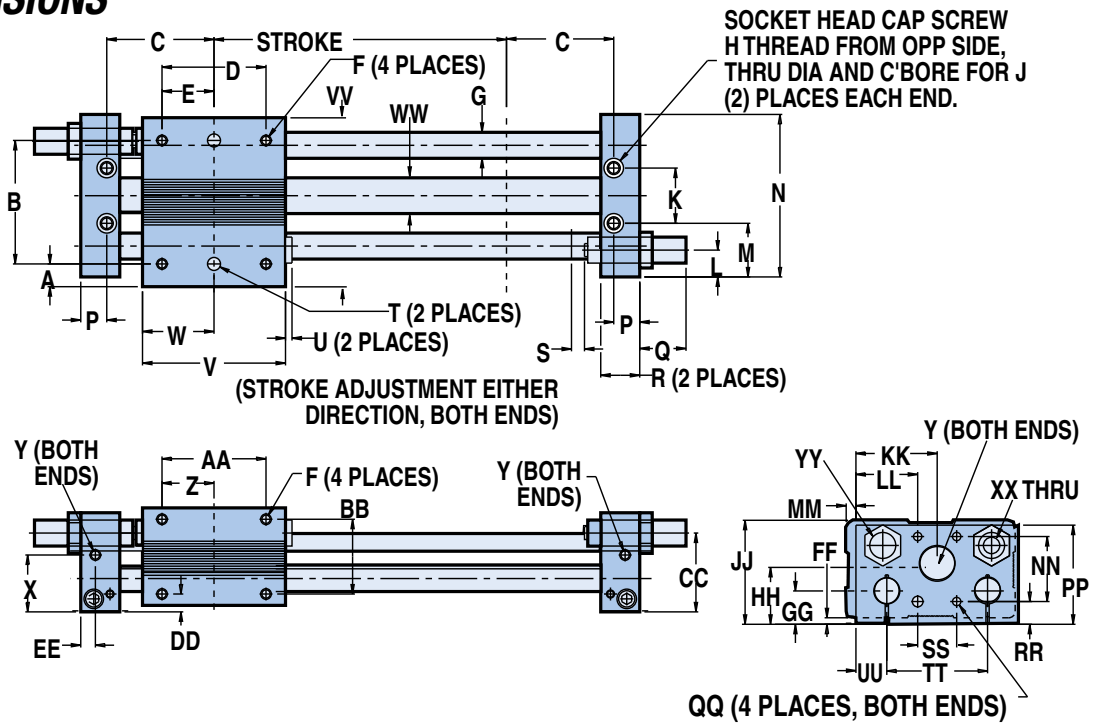
MGS Magnetically Coupled Slide - All Sizes

SPECIFICATIONS

SIZE	BORE SIZE in	BORE SIZE mm	BASE WEIGHT lbs	BASE WEIGHT kg	WEIGHT/UNIT lbs/in	WEIGHT/UNIT kg/mm	MAX. STROKE in	MAX. STROKE mm	MAX. PRESSURE PSI	MAX. PRESSURE bar	TEMPERATURE RANGE °F	TEMPERATURE RANGE °C
038	0.375	9.5	1.24	0.56	0.004	0.000071	30.00	762.0	100	6.895	20° to 140°	-7° to 60°
062	0.625	16	3.14	1.42	0.130	0.002322	37.00	939.8				
100	1.000	25	4.89	2.22	0.180	0.003214	55.00	1397.0				

***For longer strokes, alternate materials, mounting and/or fasteners – consult Tolomatic**

DIMENSIONS



MODEL	BORE	A	B*	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W
MGS038	0.375	0.30	1.875	1.66	1.19	0.59	10-24 x .38 DP	0.38	1/4-20 x .50 DP	#8	0.75	0.45	0.81	2.38	0.41	1.26 max.	0.63	0.25	.2495/.2500 x .20 DP	0.13	2.00	1.00
MGS062	0.625	0.44	2.375	2.06	2.00	1.00	10-24 x .38 DP	0.50	1/4-20 x .50 DP	#10	1.06	0.52	1.03	3.12	0.50	1.14 max.	0.75	0.25	.2495/.2500 x .20 DP	0.13	2.75	1.38
MGS100	1.000	0.42	3.250	2.28	2.50	1.25	10-24 x .38 DP	0.63	1/4-20 x .50 DP	#10	1.63	0.63	1.22	4.06	0.53	1.14 max.	0.75	0.25	.2495/.2500 x .20 DP	0.13	3.25	1.63

MODEL	X	Y	Z	AA	BB	CC	DD	EE	FF	GG	HH	JJ	KK	LL	MM	NN	PP	QQ	RR	SS	TT	UU	VV	WW	XX	YY
MGS038	1.03	#10-32 Port	0.81	1.63	1.06	1.34	0.44	0.19	0.25	0.66	1.08	1.69	1.19	0.81	0.16	0.75	1.62	8-32 x .31 DP	0.56	0.75	1.44	0.47	2.47	0.44	M8-1	3/8-32 Thru,Ø.500x.31DP
MGS062	1.09	#10-32 Port	1.00	2.00	1.44	1.52	0.34	0.28	0.13	0.64	1.08	2.00	1.56	1.19	0.19	1.25	1.91	10-24 x .38 DP	0.44	0.75	1.94	0.59	3.25	0.69	M8-1	1/2-20 Thru,Ø.625x.33DP
MGS100	1.31	1/8-27 Port	1.00	2.00	1.69	1.75	0.34	0.28	0.13	0.81	1.31	2.34	2.08	1.47	0.09	1.13	2.22	10-24 x .38 DP	0.75	1.13	2.63	0.72	4.09	1.09	M8-1	9/16-18 Thru,Ø.688x.31DP

Tolerance between dowel pins is ±.001"

Above dimensions in inches

MODEL	BORE	A	B*	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W
MGS038	9.5	7.6	47.6	42.2	30.2	15.0	10-24 x .38 DP	9.7	1/4-20 x .50 DP	#8	19.1	11.4	20.6	60.5	10.4	32.0 max.	16.0	6.4	.2495/.2500 x .20 DP	3.3	50.8	25.4
MGS062	15.9	11.2	60.3	52.3	50.8	25.4	10-24 x .38 DP	12.7	1/4-20 x .50 DP	#10	26.9	13.2	26.2	79.2	12.7	29.0 max.	19.1	6.4	.2495/.2500 x .20 DP	3.3	69.9	35.1
MGS100	25.4	10.7	82.6	57.9	63.5	31.8	10-24 x .38 DP	16.0	1/4-20 x .50 DP	#10	41.4	16.0	31.0	103.1	13.5	29.0 max.	19.1	6.4	.2495/.2500 x .20 DP	3.3	82.6	41.4

MODEL	X	Y	Z	AA	BB	CC	DD	EE	FF	GG	HH	JJ	KK	LL	MM	NN	PP	QQ	RR	SS	TT	UU	VV	WW	XX	YY
MGS038	26.2	#10-32 Port	20.6	41.4	26.9	34.0	11.2	4.8	6.4	16.8	27.4	42.9	30.2	20.6	4.1	19.1	41.1	8-32 x .31 DP	14.2	19.1	36.6	11.9	62.7	11.2	M8-1	3/8-32 Thru,Ø.500x.31DP
MGS062	27.7	#10-32 Port	25.4	50.8	36.6	38.6	8.6	7.1	3.3	16.3	27.4	50.8	39.6	30.2	4.8	31.8	48.5	10-24 x .38 DP	11.2	19.1	49.3	15.0	82.6	17.5	M8-1	1/2-20 Thru,Ø.625x.33DP
MGS100	33.3	1/8-27 Port	25.4	50.8	42.9	44.5	8.6	7.1	3.3	20.6	33.3	59.4	52.8	37.3	2.3	28.7	56.4	10-24 x .38 DP	19.1	28.7	66.8	18.3	103.9	27.7	M8-1	9/16-18 Thru,Ø.688x.31DP

Tolerance between dowel pins is ±.025mm

Above dimensions in millimeters

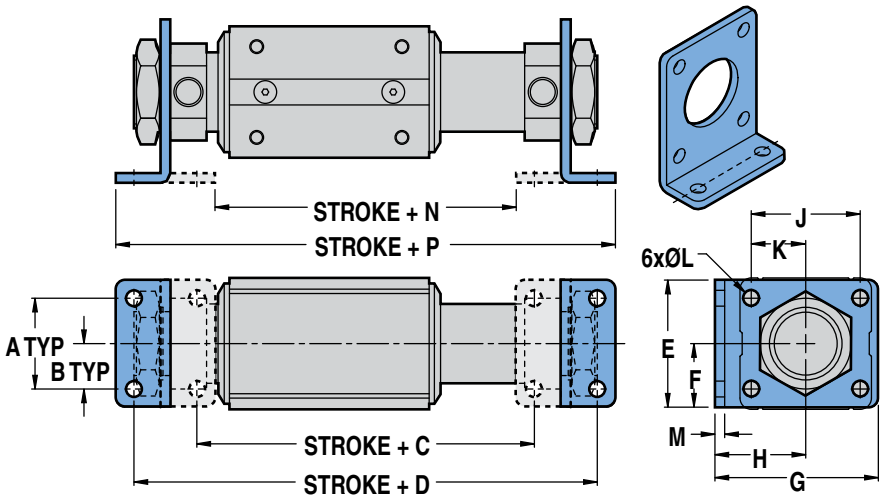
MG Foot Mount - All Sizes

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

Foot Mount

Foot mounts are an excellent mounting alternative. Made from plated stamped steel, foot mounts are attached to cylinder heads as shown in the dimension drawing, below. Foot mounts may be ordered for one or both ends of the cylinder. Foot mounts can then be attached to almost any surface at a 90° angle to provide solid support without affecting stroke.

DIMENSIONS



	BORE	A	B	C	C*	D	D*	E	F	G	H	J	K	L	M	N	N*	P	P*
025	0.250	1.13	0.56	2.06	2.20	3.06	3.20	1.50	0.75	1.16	0.72	0.50	0.25	Ø.17	0.06	1.49	1.89	3.36	3.23
038	0.375	1.13	0.56	2.06	2.26	3.06	3.26	1.50	0.75	1.16	0.72	0.50	0.25	Ø.17	0.06	1.49	1.95	3.36	3.29
062	0.625	1.13	0.56	2.80	3.07	3.80	4.07	1.50	0.75	1.16	0.72	0.50	0.25	Ø.17	0.06	2.50	2.77	4.12	4.39
100	1.000	1.25	0.63	3.65	4.07	5.38	5.80	1.75	0.88	2.25	1.25	1.50	0.75	Ø.22	0.13	3.15	3.58	5.88	6.31

Dimensions in inches

**For "C strength" configurations only.*

	BORE	A	B	C	C*	D	D*	E	F	G	H	J	K	L	M	N	N*	P	P*
025	6.4	28.7	14.2	52.3	55.9	77.7	81.3	38.1	19.1	29.5	18.3	12.7	6.4	4.3	1.5	37.8	48.0	85.3	82.0
038	9.5	28.7	14.2	52.3	57.4	77.7	82.8	38.1	19.1	29.5	18.3	12.7	6.4	4.3	1.5	37.8	49.5	85.3	83.6
062	16	28.7	14.2	71.1	78.0	96.5	103.4	38.1	19.1	29.5	18.3	12.7	6.4	4.3	1.5	63.5	70.4	104.6	111.5
100	25	31.8	16.0	92.7	103.4	136.7	147.3	44.5	22.4	57.2	31.8	38.1	19.1	5.6	3.3	80.0	90.9	149.4	160.3

Dimensions in millimeters

SIZE	BORE SIZE		WEIGHT	
	in	mm	lbs	kg
025	0.250	6.4	0.07	0.032
038	0.375	9.5	0.07	0.032
062	0.625	16	0.17	0.077
100	1.000	25	0.28	0.127

MG Floating Mount Bracket - All Sizes

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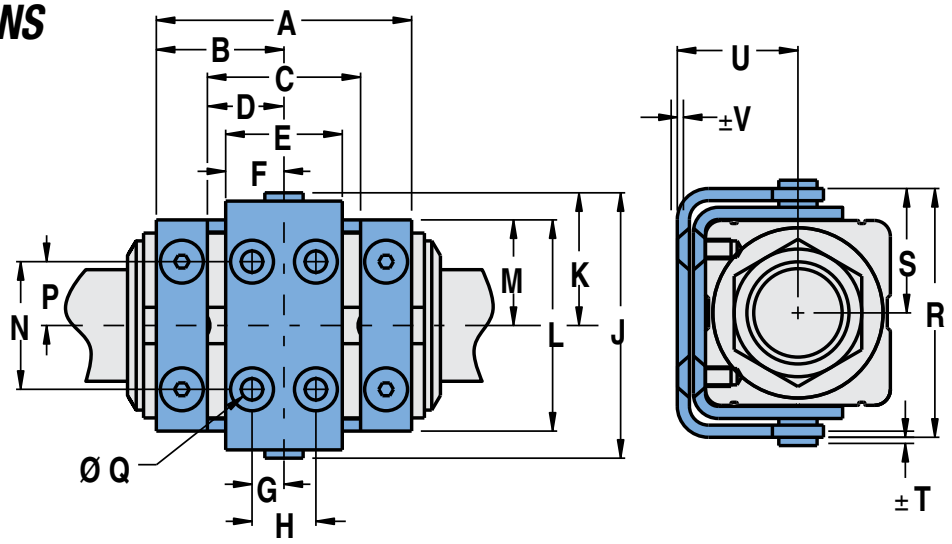
Floating Mount Bracket

The integral floating mount bracket is available for applications in which a load is externally guided and supported and there is a need to compensate for non-parallelism between the cylinder and the independently-guided load.

Loads which are not parallel to the cylinder may result in the cylinder binding if the floating mount bracket is not used. Also, use of the floating mount is highly recommended to provide easier set-up of guide/support system and to help increase actuator block bearing life.

DIMENSIONS



	BORE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V
025	0.250	1.34	0.67	0.66	0.33	0.63	0.31	0.16	0.31	1.26	0.63	0.87	0.43	0.37	0.18	Ø.14	1.14	0.57	0.04	0.53	0.08
038	0.375	1.47	0.73	0.78	0.39	0.69	0.34	0.16	0.31	1.57	0.78	1.18	0.59	0.63	0.31	Ø.14	1.45	0.72	0.04	0.69	0.08
062	0.625	1.88	0.94	1.12	0.56	0.79	0.39	0.19	0.38	2.09	1.05	1.64	0.82	0.75	0.38	Ø.19	1.99	0.99	0.04	0.93	0.08
100	1.000	2.50	1.25	1.50	0.75	1.14	0.57	0.31	0.62	2.60	1.30	2.07	1.03	1.25	0.63	Ø.248	2.44	1.22	0.06	1.20	0.08

Dimensions in inches

	BORE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V
025	*6.4*	*34.0*	*17.0*	*16.8*	*8.4*	*16.0*	*7.9*	*4.1*	*7.9*	*32.0*	*16.0*	*22.1*	*10.9*	*9.4*	*4.6*	*3.6*	*29.0*	*14.5*	*1.0*	*13.5*	*2.0*
038	*9.5*	*37.3*	*18.5*	*19.8*	*9.9*	*17.5*	*8.6*	*4.1*	*7.9*	*39.9*	*19.8*	*30.0*	*15.0*	*16.0*	*7.9*	*3.6*	*36.8*	*18.3*	*1.0*	*17.5*	*2.0*
062	*15.9*	*47.8*	*23.9*	*28.4*	*14.2*	*20.1*	*9.9*	*4.8*	*9.7*	*53.1*	*26.7*	*41.7*	*20.8*	*19.1*	*9.7*	*4.8*	*50.5*	*25.1*	*1.0*	*23.6*	*2.0*
100	*25.4*	*63.5*	*31.8*	*38.1*	*19.1*	*29.0*	*14.5*	*7.9*	*15.7*	*66.0*	*33.0*	*52.6*	*26.2*	*31.8*	*16.0*	*6.3*	*62.0*	*31.0*	*1.5*	*30.5*	*2.0*

Dimensions in millimeters

SIZE	BORE SIZE		WEIGHT	
	in	*mm*	lbs	*kg*
025	0.250	*6.4*	0.06	*0.027*
038	0.375	*9.5*	0.08	*0.036*
062	0.625	*16*	0.18	*0.082*
100	1.000	*25*	0.33	*0.150*

MG & MGS Switches - All Sizes

SWITCHES

There are 10 sensing choices: DC reed, form A (open) or form C (open or closed); AC reed (Triac, open); Hall-effect, sourcing, PNP (open); Hall-effect, sinking, NPN (open); each with either flying leads or QD (quick disconnect). Commonly used to send analog signals to PLC (programmable logic controllers), TLL, CMOS circuit or other controller device. These switches are activated by the actuator's magnet.

Switches contain reverse polarity protection. QD cables are shielded; shield should be terminated at flying lead end.

If necessary to remove factory installed switches, be sure to reinstall on the same of side of actuator with scored face of switch toward internal magnet.

SPECIFICATIONS

		REED DC				REED AC		HALL-EFFECT DC			
ORDER CODE		RT	RM	BT	BM	CT	CM	TT	TM	KT	KM
PART NUMBER		3600-9082	3600-9083	3600-9084	3600-9085	3600-9086	3600-9087	3600-9088	3600-9089	3600-9090	3600-9091
LEAD		5m	QD*	5m	QD*	5m	QD*	5m	QD*	5m	QD*
CABLE SHIELDING		Unshielded	Shielded†	Unshielded	Shielded†	Unshielded	Shielded†	Unshielded	Shielded†	Unshielded	Shielded†
SWITCHING LOGIC		"A" Normally Open		"C" Normally Open or Closed		Triac Normally Open		PNP (Sourcing) Normally Open		NPN (Sinking) Normally Open	
MECHANICAL CONTACTS		Single-Pole Single-Throw		Single-Pole Double-Throw		Single-Pole Single-Throw		NO, These Are Solid State Components			
COIL DIRECT		Yes		Yes		Yes		—			
POWER LED		None		None		None		None		None	
SIGNAL LED		Red						Red		Red	
OPERATING VOLTAGE		200 Vdc max.		120 Vdc max.		120 Vac max.		5 - 25 Vdc			
OUTPUT RATING		—				—		25 Vdc, 200mA dc			
OPERATING TIME		0.6 msec max. (including bounce)		0.7 msec max. (including bounce)		—		< 10 micro sec.			
OPERATING TEMPERATURE		-40°F [-40°C] to 158°F [70°C]						0°F [-18°C] to 150°F [66°C]			
RELEASE TIME		1.0 msec. max.				—		—			
ON TRIP POINT		—				—		150 Gauss maximum			
OFF TRIP POINT		—				—		40 Gauss minimum			
****POWER RATING (WATTS)**		10.0 §		3.0 §§		10.0		5.0			
VOLTAGE DROP		2.6 V typical at 100 mA		NA		—		—			
RESISTANCE		0.1 Ω Initial (Max.)				—		—			
CURRENT CONSUMPTION		—				1 Amp at 86°F [30°C]	0.5 Amp at 140°F [60°C]	200 mA at 25 Vdc			
FREQUENCY		—				47 - 63 Hz		—			
CABLE MIN. BEND RADIUS	**STATIC**	0.630" *[16mm]*									
	DYNAMIC	Not Recommended									

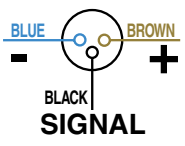
CAUTION: DO NOT OVER TIGHTEN SWITCH HARDWARE WHEN INSTALLING!

** **WARNING**: Do not exceed power rating (Watt = Voltage X Amperage). Permanent damage to sensor will occur.

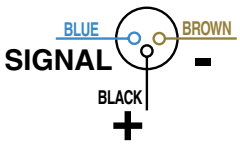
*QD = Quick Disconnect; Male coupler is located 6" [152mm] from sensor, Female coupler to flying lead (part #2503-1025) distance is 197" [5m] also see Cable Shielding specification above

REPLACEMENT OF QD SWITCHES MANUFACTURED BEFORE JULY 1, 1997: It will be necessary to replace or rewire the female end coupler.

CURRENT
Quick disconnect Wiring



OLD
Quick disconnect Wiring



Reed Switch Life Expectancy: Up to 200,000,000 cycles (depending on load current, duty cycle and environmental conditions)

†Shielded from the female quick disconnect coupler to the flying leads. Shield should be terminated at flying lead end.

§ Maximum current 500mA (not to exceed 10VA) Refer to Temperature vs. Current graph and Voltage Derating graph

§§ Maximum current 250mA (not to exceed 3VA) Refer to Temperature vs. Current graph and Voltage Derating graph

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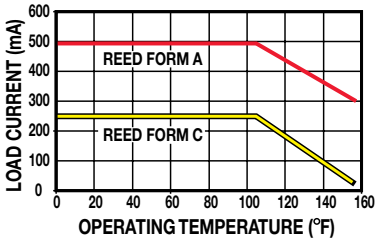
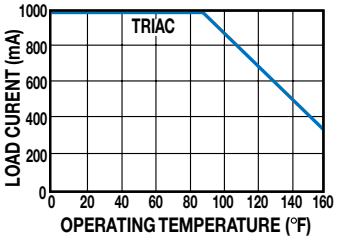
PERFORMANCE

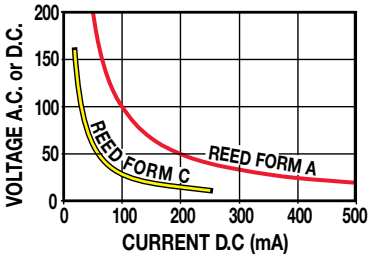
TEMP. vs CURRENT, DC REED



TEMP. vs CURRENT, AC REED

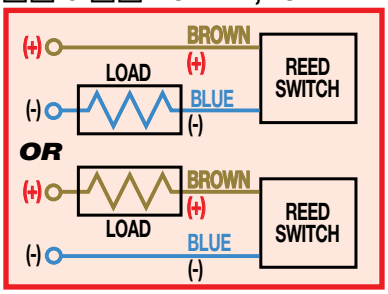


VOLTAGE DERATING, DC REED

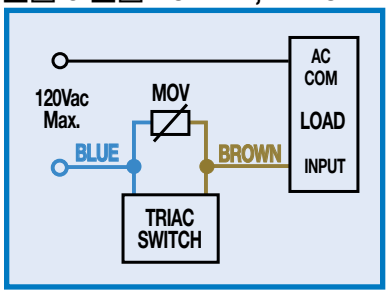


WIRING DIAGRAMS

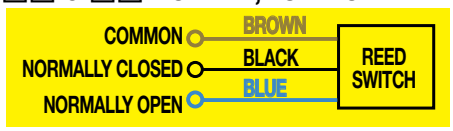
RT & RM DC REED, FORM A



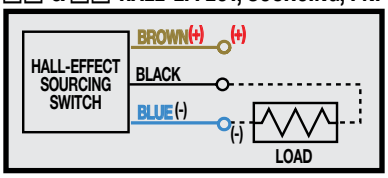
CT & CM AC REED, TRIAC



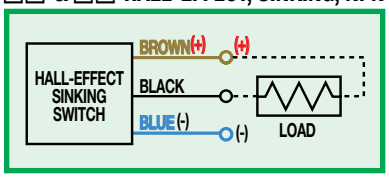
BT & BM DC REED, FORM C



TT & TM HALL-EFFECT, SOURCING, PNP



KT & KM HALL-EFFECT, SINKING, NPN

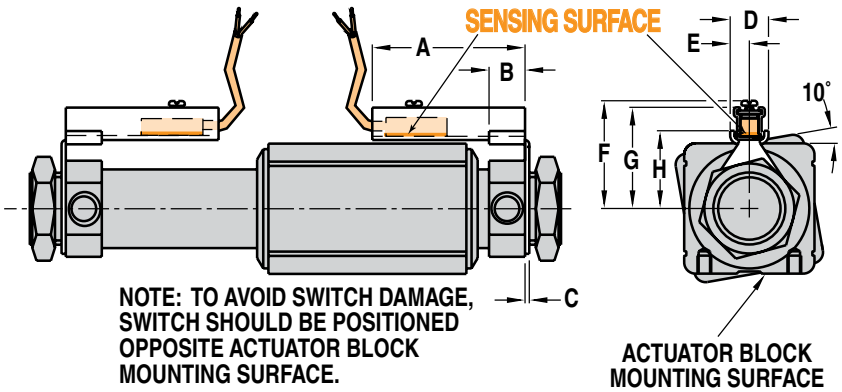


INSTALLATION INFORMATION

THE NOTCHED FACE OF THE SWITCH INDICATES THE SENSING SURFACE AND MUST FACE TOWARD THE MAGNET.

MG Magnetically Coupled Cylinder

DIMENSIONS



	BORE	A	B	C	D	E	F	G	H
025	0.250	1.23	0.40	0.06	0.53	0.27	0.91	0.88	0.51
038	0.375	1.23	0.40	0.06	0.53	0.27	1.07	1.04	0.67
062	0.625	1.60	0.45	0.06	0.53	0.27	1.27	1.24	0.87
100	1.000	2.12	0.50	0.06	0.53	0.27	1.48	1.45	1.08

Dimensions in inches

	BORE	A	B	C	D	E	F	G	H
025	6.4	31.24	10.16	1.52	13.46	6.86	23.16	22.35	12.95
038	9.5	31.24	10.16	1.52	13.46	6.86	27.18	26.42	17.02
062	15.9	40.64	11.43	1.52	13.46	6.86	32.26	31.50	22.10
100	25.4	53.85	12.70	1.52	13.46	6.86	37.59	36.83	27.43

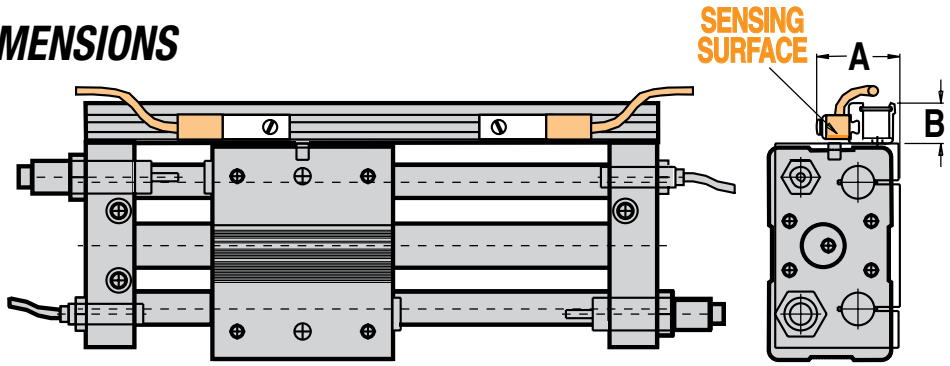
Dimensions in millimeters

MGS Switches - All Sizes

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

MGS Magnetically Coupled Slide

DIMENSIONS



	BORE	A	B
038	0.375	1.24	0.47
062	0.625	1.16	0.47
100	1.000	1.47	0.47

Dimensions in inches

	BORE	A	B
038	*9.5*	*31.50*	*11.94*
062	*15.9*	*29.46*	*11.94*
100	*25.4*	*37.34*	*11.94*

Dimensions in millimeters

MGS Proximity Sensor

Proximity Sensor

ORDER CODES

NP_, PN_

This L.E.D. device senses end-of-stroke with one of two normally open inductive d.c. proximity sensors. NPN supplies a sinking signal; PNP supplies a sourcing signal to a device such as a programmable logic controller.

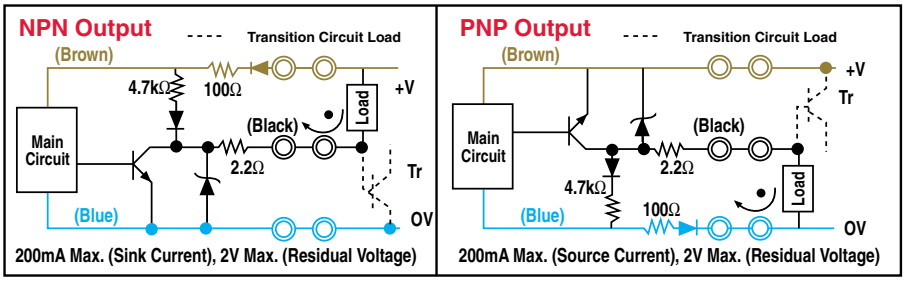
Ambient Temp.: -13° to 158° F., (-25° to 70° C.)

NEMA Encl. Rating: 1, 3, 4, 6, 12, 13

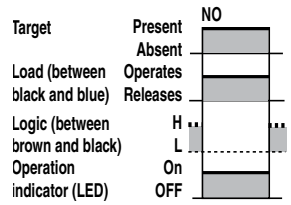
Lead Length: 6.56 feet (2.0m)

Max. Sensing Distance: 0.016" (0.4mm)

Wiring Diagrams



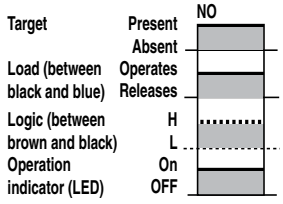
NPN Output



Short-Circuit Indication

The load output immediately turns off and remains off until the short-circuit protection is reset.

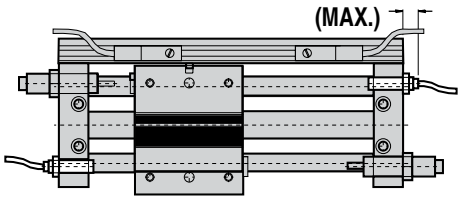
PNP Output



Resetting Short-Circuit Protection

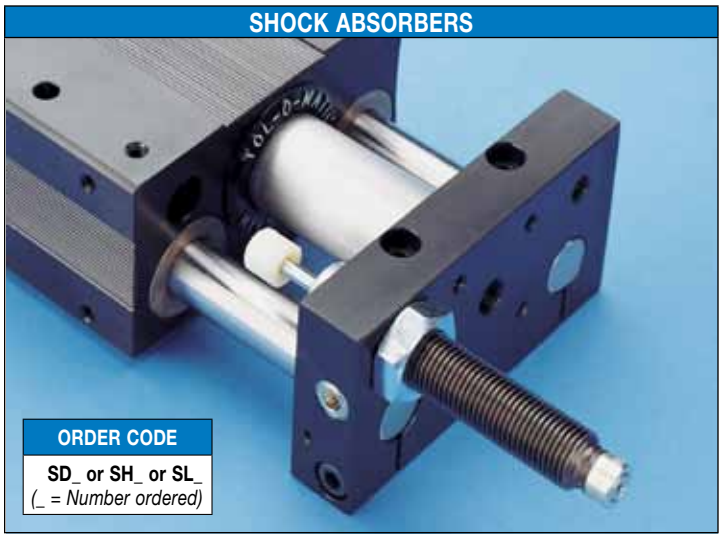
To reset the short-circuit protection, repair the short. The short-circuit protection will then automatically reset.

DIMENSIONS



SIZE	BORE in	BORE mm	B in	B mm	WEIGHT lbs	WEIGHT kg
038	0.375	*9.5*	0.63	*16.0*	0.24	*0.109*
062	0.625	*16*	0.52	*13.2*	0.24	*0.109*
100	1.000	*25*	0.52	*13.2*	0.25	*0.113*

MGS Shock Absorbers - All Sizes



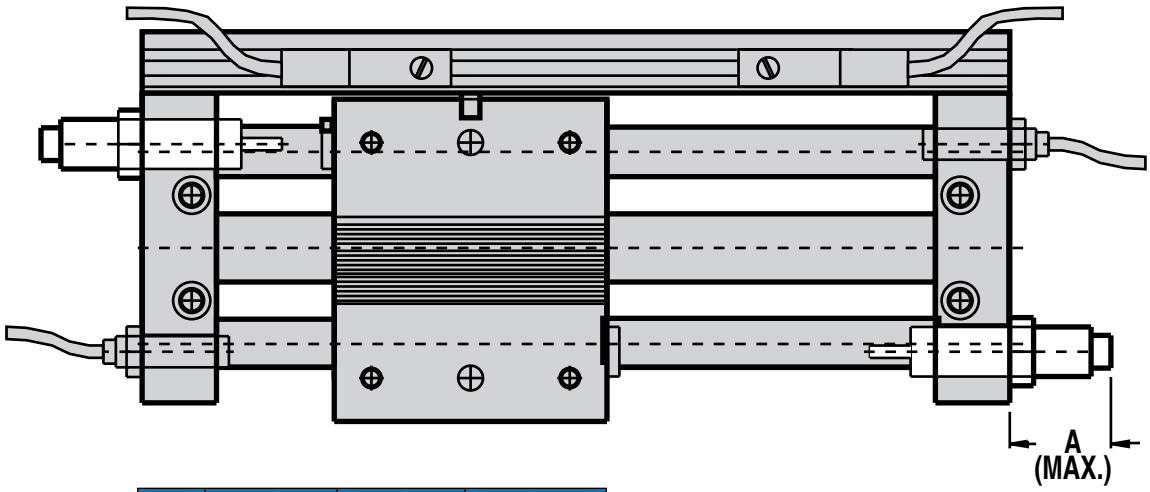
Magnetically coupled slides with standard internal bumpers offer an effective method of decelerating loads. However, magnetically coupled slides are capable of carrying heavier loads at higher velocities than the internal bumpers can absorb. Optional shock absorbers can be used to increase the unit's life and broaden the application range for the magnetically coupled slide you have chosen.

Typical shock absorber life varies between 1-2 million cycles (depending on environment). Appropriate preventative maintenance should be considered in high cyclic applications.

⚠ CAUTION: In applications which result in a load bending moment at deceleration, care should be taken to decelerate the load rather than the carrier of the magnetically coupled slide.

DIMENSIONS

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM

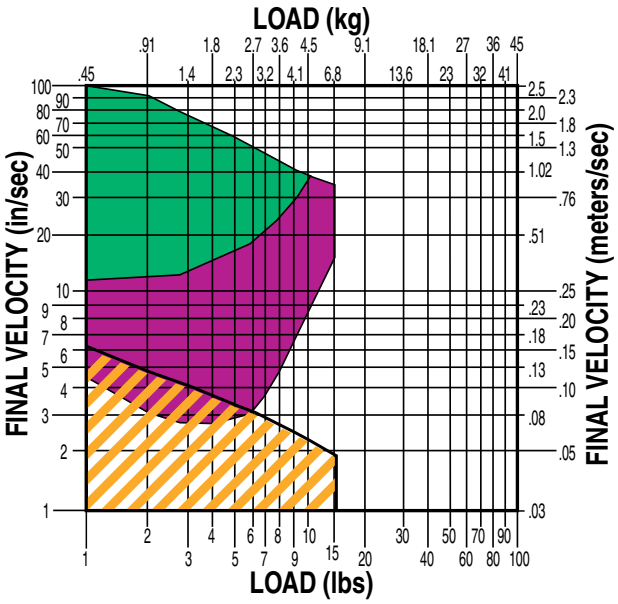


SIZE	BORE		A		WEIGHT	
	in	*mm*	in	*mm*	lbs	*kg*
038	0.375	*9.5*	0.94	*23.9*	0.01	*0.005*
062	0.625	*16*	2.48	*63.0*	0.02	*0.009*
100	1.000	*25*	2.63	*66.8*	0.04	*0.018*

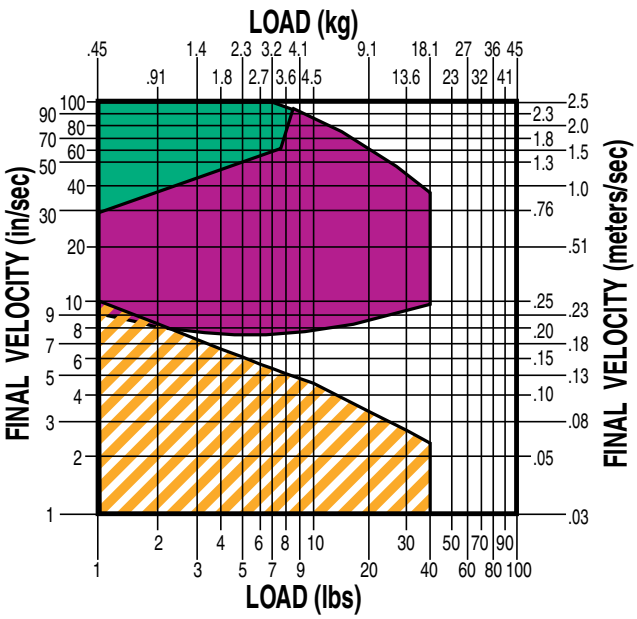
MGS Shock Absorbers - All Sizes - PERFORMANCE

VELOCITY vs LOAD

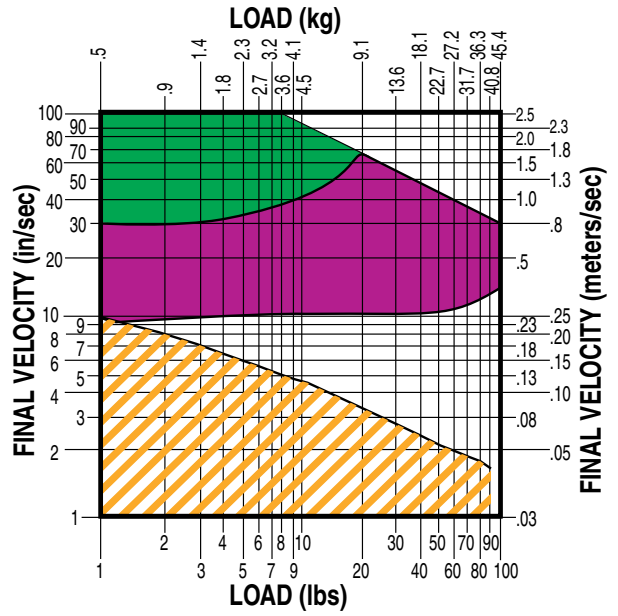
MGS038



MGS062



MGS100



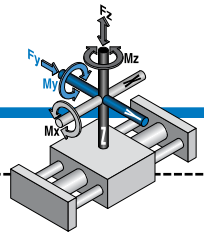
LIGHT DUTY (Light load/High velocity)

HEAVY DUTY (Heavy load/Low velocity)

Bumpers

NOTE: If final (or impact) velocity cannot be calculated directly, a reasonable guideline to use is 2 x average velocity.

Application Data Worksheet



STROKE LENGTH _____
☐ inch (SK) (U.S. Standard) ☐ millimeters (Metric)

AVAILABLE AIR PRESSURE _____
☐ PSI (U.S. Standard) ☐ bar (Metric)

REQUIRED THRUST FORCE _____
☐ lbf (U.S. Standard) ☐ N (Metric)

LOAD _____
☐ lb (U.S. Standard) ☐ kg (Metric)

LOAD CENTER OF GRAVITY DISTANCE TO CARRIER CENTER
d_x _____
d_y _____
d_z _____
☐ inch (U.S. Standard) ☐ millimeters (Metric)

FORCES APPLIED TO CARRIER
F_z _____
F_y _____
☐ lbf (U.S. Standard) ☐ N (Metric)

BENDING MOMENTS APPLIED TO CARRIER
M_x _____
M_y _____
M_z _____
☐ in-lbs (U.S. Standard) ☐ N-m (Metric)

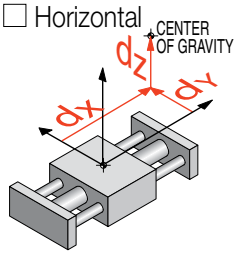
FINAL VELOCITY _____
☐ in/sec (U.S. Standard) ☐ mm/sec (Metric)

MOVE TIME sec. _____

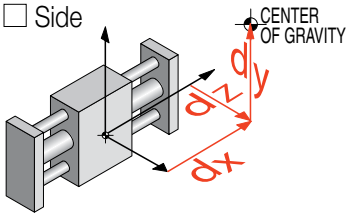
NO. OF CYCLES _____
☐ per minute ☐ per hour

ORIENTATION

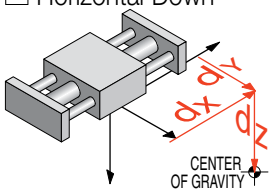
☐ Horizontal



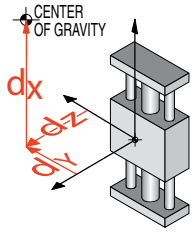
☐ Side



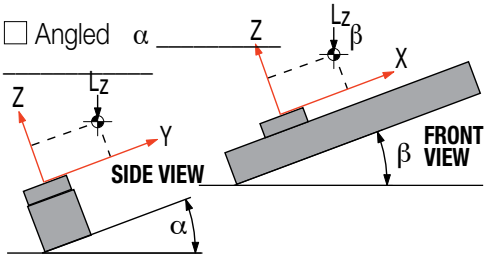
☐ Horizontal Down



☐ Vertical



☐ Angled α _____



OTHER ISSUES:
(i.e. Environment, Temperature, Contamination, etc.)

_____
_____
_____
_____

Contact information: _____
_____
_____
_____

STOP Fax (1-763-478-8080) or call Tolomatic (1-800-328-2174) with the above information. We will provide any assistance needed to determine the proper actuator.

MG: Mag Coupled Cylinder Selection Guidelines - All Sizes

EXTERNAL LOAD GUIDANCE AND SUPPORT

The process of selecting a magnetically coupled cylinder for a given application can be complex. It is highly recommended that you contact Tolomatic or a Tolomatic Distributor for assistance in selecting the best actuator for your application. The following overview of the selection guidelines are for educational purposes only.

1 COMPILE APPLICATION REQUIREMENTS

To determine the appropriate Magnetically Coupled Cylinder model for an application, compile the following information:

- Available pressure (PSI)
- Weight of load (lbs. or kgs.)
- Orientation of load (lbs. or kgs.)
- Velocity of load (in./sec. or mm/sec.)
- Stroke length (in. or mm)

2 SELECT CYLINDER SIZE

- Consult the Theoretical Force vs. Pressure charts.
- Cross-reference the load force (or load weight if force is not known) and the available operating pressure. If the intersection falls below the diagonal line, and if moments do not exceed maximum values listed for that model (see Step 3), the actuator will accommodate the application. If the intersection is above the diagonal line, a larger cylinder bore size should be considered.

NOTE: Additional force may be required to obtain the necessary acceleration for vertical or horizontal loads.

3 DETERMINE COUPLING FORCE REQUIREMENTS

Use the following formula:

$F = .013 \times \text{Weight} \times \text{Velocity}^2$

Calculated value must be less than the Magnetic Coupling Strength values.
(page MG_4)

4 DETERMINE INTERNAL CUSHION CAPACITY

- Consult the Cushion Data chart for the model selected. The velocities listed on the cushion charts are final or cushion impact velocities. On applications where the internal cushions or bumpers are to be used, be sure the actual, final or impact velocity is known. If the velocity is not known, use of limit switches with valve deceleration circuits or shock absorbers should be considered.

Cross-reference the final velocity and weight of the load. If the intersection is below the diagonal lines, the internal cushions on the actuator may be used. If the point falls above the dashed diagonal line or if the velocity is not known, use deceleration circuits, external shock absorbers or select a larger cylinder with greater cushion capacity. On high-cyclic applications, use of external stops is strongly recommended.

NOTE: Magnetically coupled cylinders do not have internal cushions. Heavier loads require external stops or shock absorbers.

MGS: Mag Coupled Slide Selection Guidelines - All Sizes

PROVIDING LOAD GUIDANCE AND SUPPORT

1 COMPILE APPLICATION REQUIREMENTS

To determine the appropriate Magnetically Coupled Slide for an application, compile the following information:

- Available pressure (PSI)
- Weight of load (lbs. or kgs.)
- Orientation of load (lbs. or kgs.)
- Velocity of load (in./sec. or mm/sec.)
- Stroke length (in. or mm)

2 SELECT CYLINDER SIZE

- Consult the Theoretical Force vs. Pressure charts.
- Cross-reference the load force (or load weight if force is not known) and the available operating pressure. If the intersection falls below the diagonal line, and if moments do not exceed maximum values listed for that model (see Step 3), the actuator will accommodate the application. If the intersection is above the diagonal line, a larger cylinder bore size should be considered.

NOTE: Additional force may be required to obtain the necessary acceleration for vertical or horizontal loads.

3 KEEP UNDER MAXIMUM STROKE LENGTH

There are specific maximum stroke lengths for each model.
MGS038: 30.00”
MGS062: 37.00”
MGS100: 55.00”

4 DETERMINE NATURE OF LOAD AND THE EFFECT OF BENDING MOMENTS

If the actuator will guide and support a load located directly over the center of carrier, bending moments will not be a factor in the actuator selection. Magnetically Coupled Slides perform best that way. See the Bending Moments Formulae below if your application requires the load to be away from center of the carrier.

5 DETERMINE THE BEARING ROD LOAD CAPACITY

Determine whether the Load Weight and Stroke Length will be within the load capacity for the bearing rods.

Cross reference the load weight and stroke on the Load Weight vs. Stroke chart for the selected bore size. (Page MG_6) If the intersection falls below the curve, the cylinder will accommodate the application requirements. If the intersection falls outside the curve, consult the chart of a larger bore size that will accommodate the required load weight and stroke for your application.

The weight on the bearing rods causes them to bend or deflect slightly over their length. This deflection is increased for longer rods and/or higher weights on the bearing block. For proper operation, rod deflection must not exceed .30".

6 DETERMINE COUPLING FORCE REQUIRED

- Consult the Mag Coupling Strength chart (page MG_6). If the load value is less than the coupling force for the chosen actuator, it may be used for the application. If the load value is greater than the coupling force for the chosen actuator, select a larger actuator.

7 DETERMINE INTERNAL BUMPER CAPACITY

- Consult the Cushion Data chart (Bumper Data for Magnetically Coupled Slides page MG_14) for the model selected. The velocities listed on the cushion charts are final or cushion impact velocities. On applications where internal bumpers are to be used, be sure the actual, final or impact velocity is known. If the velocity is not known, use of limit switches with valve deceleration circuits or shock absorbers should be considered.

BENDING MOMENTS

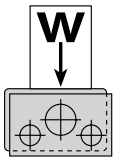
Loading Equation Data

MODEL	BORE SIZE	A (in.)	D (in.)	F (lbs.)	G (lbs.)
MGS038	3/8"	1.44	1.13	14.00	11.00
MGS062	5/8"	1.94	1.50	40.00	32.00
MGS100	1"	2.62	2.00	90.00	72.00

*(See **MGS Load vs Stroke** graph on page MG_6)*

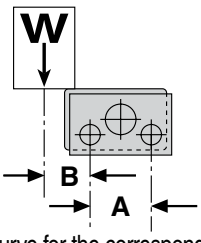
“L” MOMENT

$$L = \frac{W}{2}$$



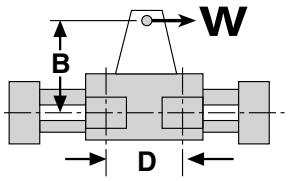
“Mx” MOMENT

$$L = \frac{WB}{A}$$



“My” / “Mz” MOMENT

$$F \text{ or } G = 2L = \frac{WB}{D}$$



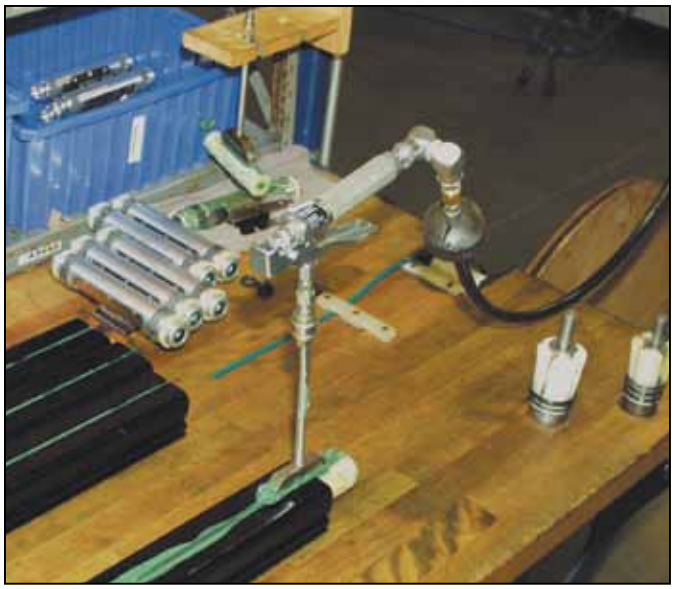
L should be below curve for the corresponding slide on the “Load vs. Stroke” chart (for sintered bronze or linear bearings - Mag Coupled Slides).

Loading Equation Key

A = Distance between shaft centers
B = Distance from load center to center of nearest shaft (in.); determined by application
L = Load per shaft (lbs.)
W = Payload weight (lbs.)
D = Axial distance between center of bearings (in.)
F = Max. bearing sliding load (linear bearings) (lbs.)
G = Max. bearing sliding load (sintered bronze bearings) (lbs.)

Application Guidelines

The following conditional statements are intended as general guidelines for use of Tolomatic actuators. Since all applications have their own specific operating requirements, consult Tolomatic, Inc. or your local Tolomatic distributor if an application is unconventional or if questions arise regarding the selection process.



LUBRICATION GUIDELINES

All Tolomatic actuators (except Cable Cylinders) are prelubricated at the factory. To ensure maximum actuator life, the following guidelines should be followed.

- **Filtration**

  We recommend the use of dry, filtered air in our products. "Filtered air" means a level of 10 Micron or less. "Dry" means air should be free of appreciable amounts of moisture. Regular maintenance of installed filters will generally keep excess moisture in check.

- **External Lubricators (optional)**

  The factory prelubrication of Tolomatic actuators will provide optimal performance without the use of external lubrication. However, external lubricators can further extend service life of pneumatic actuators if the supply is kept constant.

  Oil lubricators, (mist or drop) should supply a minimum of 1 drop per 20 standard cubic feet per minute to the cylinder. As a rule of thumb, double that rate if water in the system is suspected. Demanding conditions may require more lubricant.

  If lubricators are used, we recommend a non-detergent, 20cP @ 140˚F 10-weight lubricant. Optimum conditions for standard cylinder operation are +32˚ to +150˚F (+0˚ to 65.5˚C).

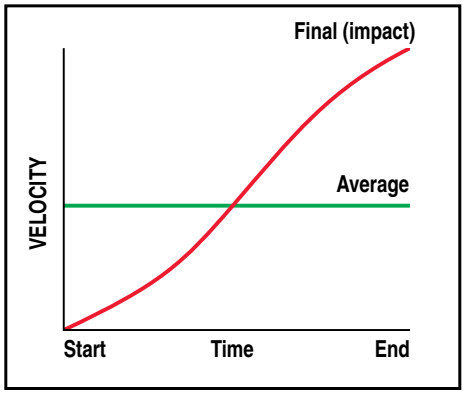
  NOTE: Use of external lubricators may wash away the factory installed lubrication. External lubricants must be maintained in a constant supply or the results will be a dry actuator prone to premature wear.

- **Sanitary Environments**

  Oil mist lubricators must dispense "Food Grade" lubricants to the air supply. Use fluids with ORAL LD50 toxicity ratings of 35 or higher such as Multitherm® PG-1 or equivalent. Demanding conditions can require a review of the application.

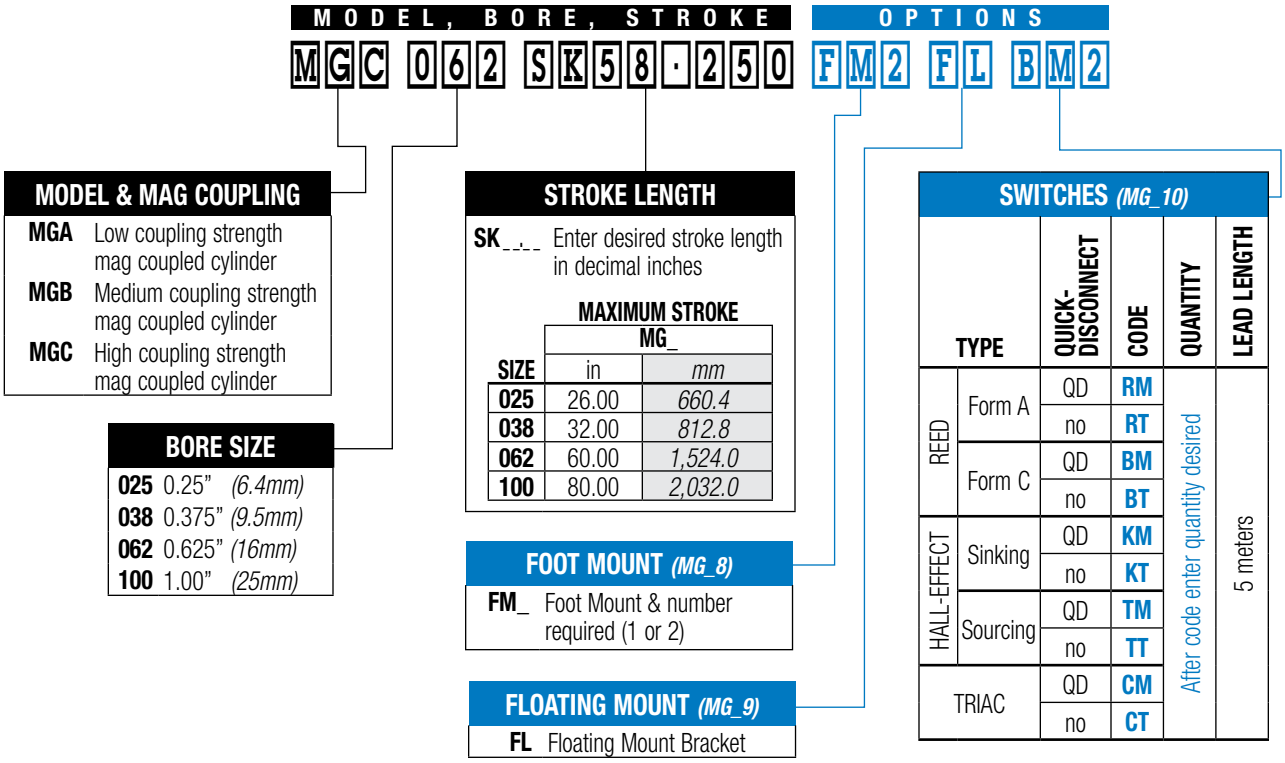
FINAL VELOCITY CALCULATION

Velocity calculations for all rodless cylinders need to differentiate between final velocity and average velocity. For example: Stroking a 100-inch BC3 model in one second yields an average velocity of 100 inches per second. To properly determine the inertial forces for cushioning, it is important to know the final (or impact) velocity. Rodless cylinders accelerate and decelerate at each end of the stroke. Therefore this acceleration must be considered (see diagram).



If final (or impact) velocity cannot be calculated directly, a reasonable guideline is to use 2 x average velocity.

MG Ordering - ALL Sizes



MG Service Parts Ordering - ALL Sizes

PART NUMBER ORDERING No Mounting Hardware or FE conn. included		CONFIG. CODE ORDERING Mounting Hardware & FE conn. included
PART NO.	DESCRIPTION	CODE
3600-9084	Switch Only, Reed, Form C, 5m	BT
3600-9085	Switch Only, Reed, Form C, Male Conn.	BM
3600-9082	Switch Only, Reed, Form A, 5m	RT
3600-9083	Switch Only, Reed, Form A, Male Conn.	RM
3600-9086	Switch Only, Triac, 5m	CT
3600-9087	Switch Only, Triac, Male Conn.	CM
3600-9090	Switch Only, Hall-effect, Sinking, 5m	KT
3600-9091	Switch Only, Hall-effect, Sinking, Male Conn.	KM
3600-9088	Switch Only, Hall-effect, Sourcing, 5m	TT
3600-9089	Switch Only, Hall-effect, Sourcing, Male Conn.	TM
2503-1025	Connector (Female) 5 meter lead	

NOTE: When ordered by Config. Code Female connector & all mounting hardware is included

Switch Ordering NOTES:

To order field retrofit switch and hardware kits for all Tolomatic actuators: SW (Then the model and bore size, and type of switch required)
Example: SWMGC062RT
(Hardware and Form A Reed switch with 5 meter lead for 0.625" bore Mag coupled cylinder)

Mounting hardware is required if replacing switch for any actuator manufactured before 7/1/97

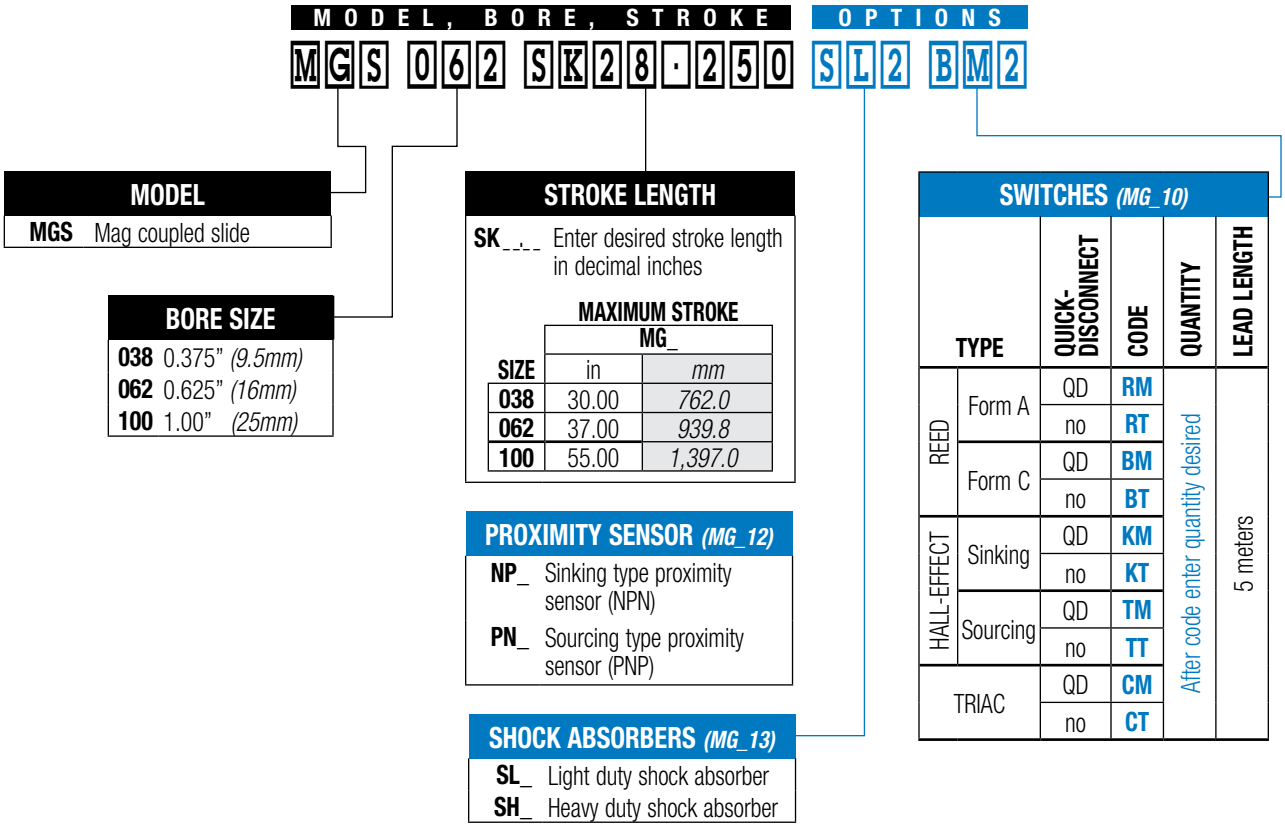
SIZE	025	038	062	100
Floating Mount Kit	2402-9005	2403-9005	2406-9005	2410-9005
Foot Mount Kit[1]	2402-9011	2402-9011	2402-9011	2410-9011
Switch Hardware	2402-9999	2402-9999	2402-9999	2402-9999

Service Parts Ordering NOTES:

1 Foot Mount Kit contains two (2) brackets.

_ = numeric entry required

MGS Ordering - ALL Sizes



MGS Service Parts Ordering - ALL Sizes

PART NUMBER ORDERING (No Mounting Hardware or FE conn. included)		CONFIG. CODE ORDERING (Mounting Hardware & FE conn. included)
PART NO.	DESCRIPTION	CODE
3600-9084	Switch Only, Reed, Form C, 5m	BT
3600-9085	Switch Only, Reed, Form C, Male Conn.	BM
3600-9082	Switch Only, Reed, Form A, 5m	RT
3600-9083	Switch Only, Reed, Form A, Male Conn.	RM
3600-9086	Switch Only, Triac, 5m	CT
3600-9087	Switch Only, Triac, Male Conn.	CM
3600-9090	Switch Only, Hall-effect, Sinking, 5m	KT
3600-9091	Switch Only, Hall-effect, Sinking, Male Conn.	KM
3600-9088	Switch Only, Hall-effect, Sourcing, 5m	TT
3600-9089	Switch Only, Hall-effect, Sourcing, Male Conn.	TM
2503-1025	Connector (Female) 5 meter lead	

NOTE: When ordered by Config. Code Female connector & all mounting hardware is included

SIZE	038	062	100
Shock Absorbers Light Duty	2403-1062	2406-1063	0910-1479
Shock Absorbers Heavy Duty	0605-1006	2406-1062	0910-1480
NPN Sinking Proximity Sensor	2410-1048	2410-1048	2410-1048
PNP Sourcing Proximity Sensor	2410-1053	2410-1053	2410-1053
Switch Rail	2403-8888	2406-8888	2410-8888
Magnet	2410-9020	2410-9020	2410-9020

Switch Ordering NOTES:

To order field retrofit switch and hardware kits for all Tolomatic actuators: SW (Then the model and bore size, and type of switch required)
Example: SWMGS062RT
(Hardware and Form A Reed switch with 5 meter lead for 0.625" bore Mag coupled slide)

Mounting hardware is required if replacing switch for any actuator manufactured before 7/1/97