

# MXB RODLESS BELT DRIVE ACTUATORS

**ENDURANCE TECHNOLOGY**<sup>SM</sup>

A Tolomatic Design Principle

**U** UNGUIDED

**S** SOLID BEARING

**P** PROFILED RAIL



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**LINEAR SOLUTIONS MADE EASY**

# MXB Rodless Belt Drive Actuators





DESIGNED TO OUTLAST EVERY BELT DRIVE ACTUATOR ON THE MARKET



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

- MXB-**U**, MXB-**S** & MXB-**P**: Low profile to fit your application
- MXB-**S**: Engineered bearing material in trapezoidal shape for less wear, low static & dynamic friction
- MXB-**P**: High precision bearings feature smooth, low breakaway motion
- MXB-**P**: Durable profiled rail design uses recirculating ball technology to reduce friction and extend actuator life.
- MXB-**P**: High load and bending moment capacities

## A Comparison of Belt Drive Actuators

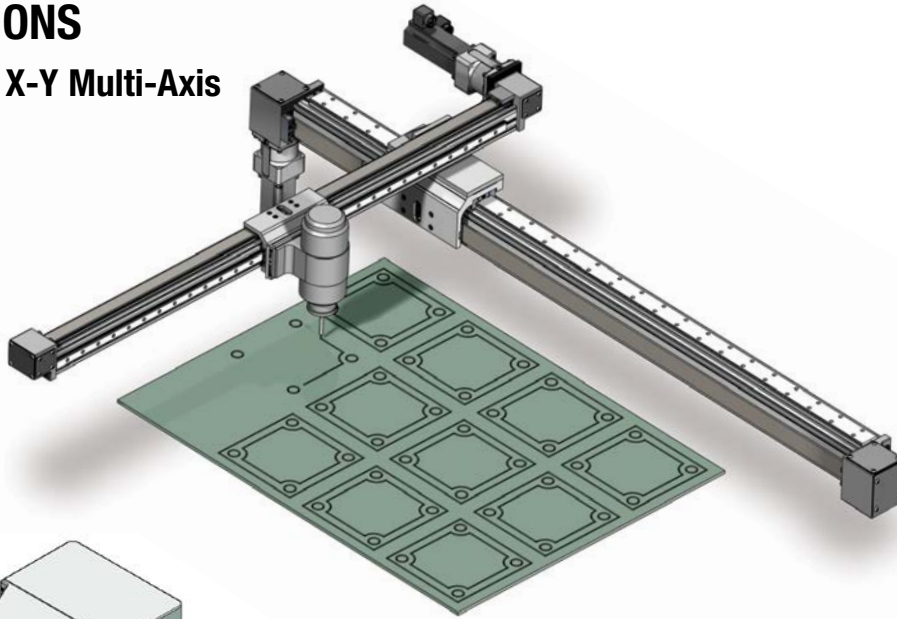
	B3W	MXB-U	MXB-S	MXB-P
				
<b>Features:</b>	High load and bending moment capacities	Basic thrust, requires external guidance and support	Medium load and bending moment capacities	High load and bending moment capacities
<b>Load up to:</b> <i>(with options)</i>	35.6 kN [8,000 lbf]	NA	4.6 kN [1,040 lbf]	11.5 kN [2,584 lbf]
<b>Thrust up to:</b>	1.4 kN [325 lbf]	1.9 kN [418 lbf]	1.9 kN [418 lbf]	1.9 kN [418 lbf]
<b>Speed up to:</b>	5.1 m/sec [200 in/sec]	5.1 m/sec [200 in/sec]	2.5 m/sec [100 in/sec]	3.9 m/sec [150 in/sec]
<b>Stroke Length up to:</b>	14.6 m [574 in]	10.5 m [414 in]	10.5 m [414 in]	10.5 m [414 in]
<b>www.tolomatic.com</b> for complete information, search by literature number:				
<b>Literature Number:</b>	3600-4176	8500-4000	8500-4000	8500-4000

(Not all models deliver ALL maximum values listed, i.e.: Maximum thrust may not be available with maximum speed)

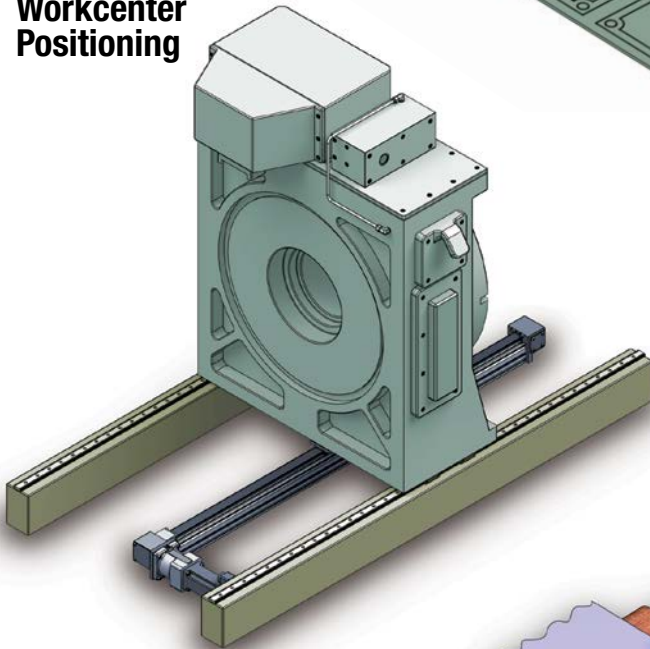
# MXB Rodless Belt Drive Actuators

## APPLICATIONS

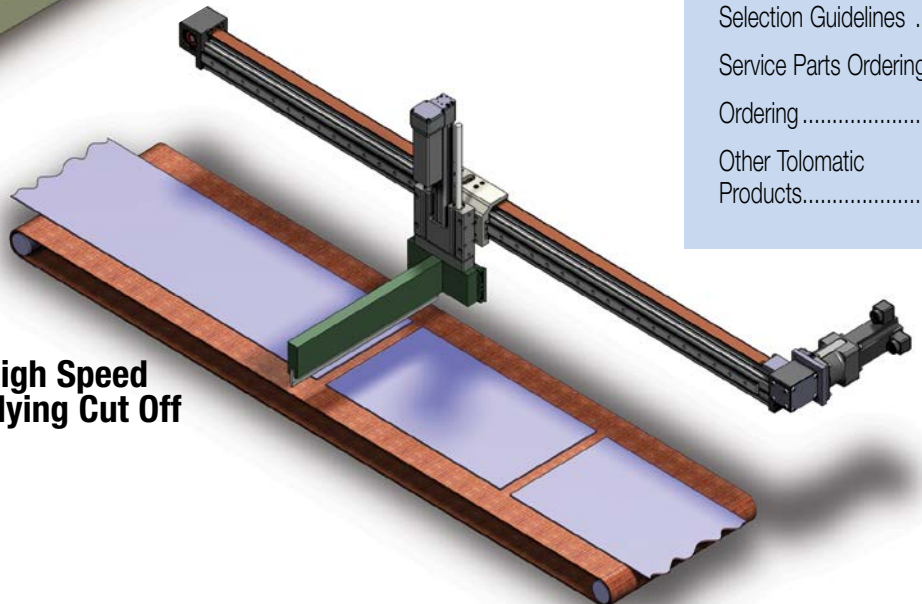
**X-Y Multi-Axis**



**Workcenter Positioning**



**High Speed Flying Cut Off**



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- Adhesive dispensing
- Aligning
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- Milling
- Packaging equipment
- Parts transfer
- Pick & place
- Positioning
- Product handling
- Pulp & Paper
- Slitting
- Sorting
- Spraying
- Stacking
- Table positioning
- Test stations
- Wire winding

# MXB-**U** UNGUIDED BELT-DRIVE ACTUATOR

## ENDURANCE TECHNOLOGY<sup>SM</sup>

A Tolomatic Design Principle

*Endurance Technology<sup>SM</sup> features are designed for maximum durability to provide extended service life.*

The MXB-U rodless actuator is a pre-assembled compact linear belt solution for use in applications with existing guides & supports. This economical actuator features speeds up to 5080 mm/sec (200 in/sec) and thrusts up to 1859 N (418 lbf). Built-to-order in stroke lengths up to 10,500 mm (414 in).

### MOTOR ORIENTATION

#### YOU CAN CHOOSE:

- Direct drive option directly couples motor to the drive shaft; one-piece housing construction for optimum alignment and support of the motor
- Reduction option in 3:1 reduction (2:1 on MXB16)

### DURABLE BELT MATERIAL

High power polyurethane HTD tooth profile belt with steel tensile members resists stretching

### YOUR MOTOR HERE

#### YOU CAN CHOOSE:

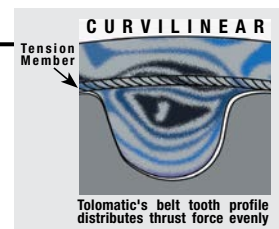
- Specify the device to be installed and actuator ships with proper mounting hardware
- Specify and ship your device to Tolomatic for factory installation
- Motor supplied and installed by Tolomatic

### OVERSIZED PULLEY BEARINGS

Drive shaft assembly incorporates oversized shielded/sealed ball bearings for long life and high speeds

### STEEL REINFORCED/HTD BELT PROFILE

- Belt of polyurethane material reinforced with steel tension members to produce high carrier thrusts without belt stretch.
- HTD tooth profile distributes tooth load more evenly and provides greater tooth shear strength, allowing for higher thrust loading.
- The deep teeth of the HTD profile are cogging-resistant, preventing potentially damaging positioning errors.



# Tolomatic... MAXIMUM DURABILITY

EXCELLENCE IN MOTION

## INCH OR METRIC MOUNTING

Your choice of blank, inch (US standard) or metric mounting to the plate

## LOW PLATE HEIGHT

Reduces overall actuator envelope

## EXTERNAL BUMPERS

Polyurethane bumpers protect the belt and clamp assembly from damage at end-of-stroke

## BELT TENSIONING SYSTEM

The open slot on the guide plate permits easy access to the belt tensioning screw. No disassembly required

## LIGHTWEIGHT ALUMINUM DESIGN

Clear anodized extrusion design is optimized for rigidity and strength

NOTE: Boxed letters indicate ordering codes

## OPTIONS



### MOUNTING PLATES **M****P**

- Provides clearance for motor and mount
- 16,25,32 sizes attach with T-Nuts
- 40,50,63 sizes attach with Tube Clamps



### HEAD COVER PLATE **H****C****2**

- Provides protection for pulley and bearing



### TUBE CLAMPS **T****C**

- Used for intermediate support
- Flush with bottom of actuator to retain low profile
- Drop-in, adjustable mounting locations (Not available on the MXB16U)



### SWITCHES

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

# MXB-S SOLID BEARING BELT-DRIVE

## ENDURANCE TECHNOLOGY<sup>SM</sup>

A Tolomatic Design Principle

Endurance Technology<sup>SM</sup> features are designed for maximum durability to provide extended service life.

The MXB-S rodless style actuator is a compact linear belt solution for use in applications requiring light to moderate load carrying and guidance. The MXB-S actuator utilizes two field replaceable solid bearings that optimize stress distribution for optimal performance, rigidity and life. This economical actuator features speeds up to 2540 mm/sec (100 in/sec) and thrusts up to 1859 N (418 lbf). Built-to-order in stroke lengths up to 10,500 mm (414 in).

**LARGE FLEXIBLE MOUNTING PATTERN**

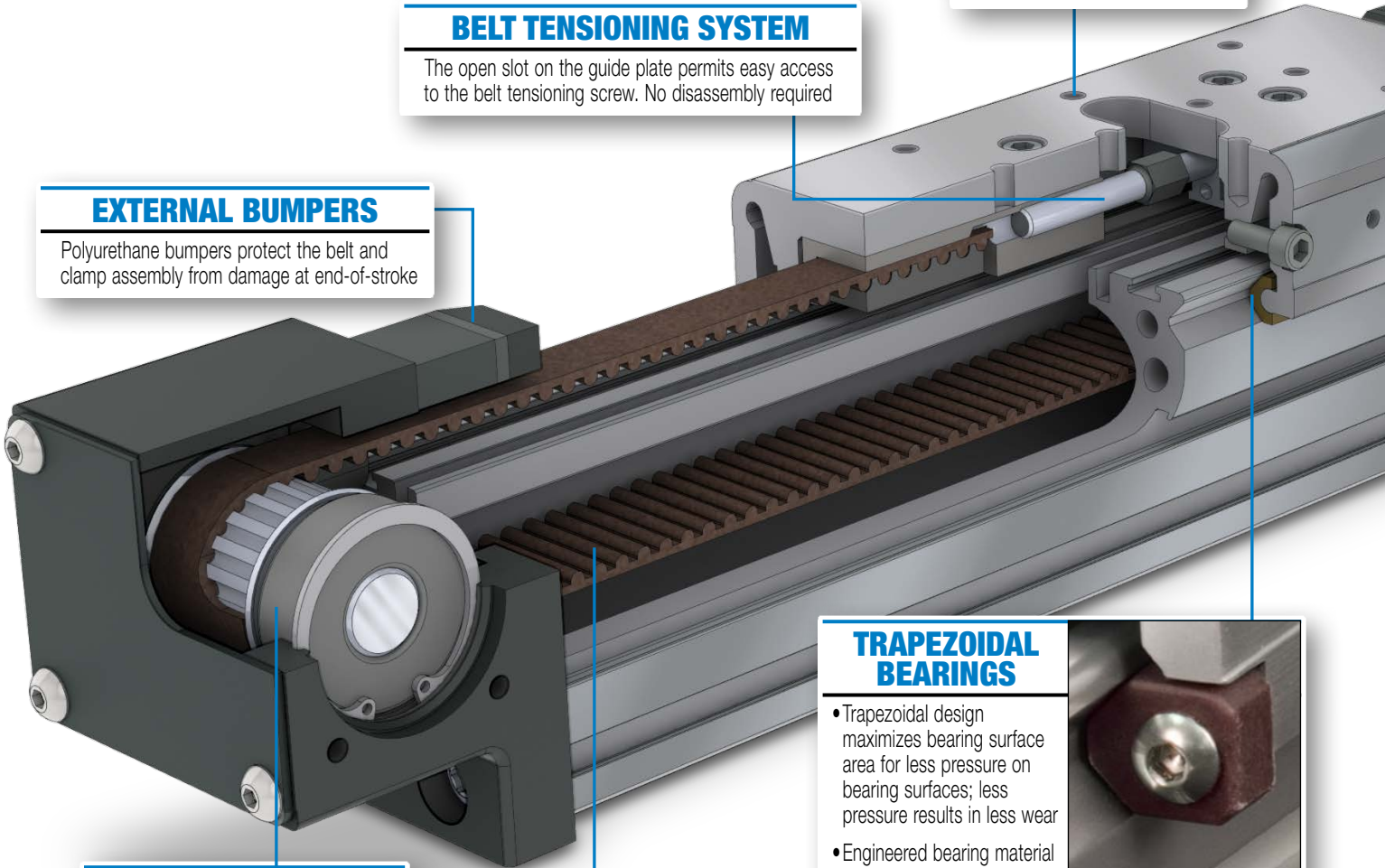
- Carrier gives more load stability
- Directly compatible with existing BCS & BC2 applications
- More fastening options

**BELT TENSIONING SYSTEM**

The open slot on the guide plate permits easy access to the belt tensioning screw. No disassembly required

**EXTERNAL BUMPERS**

Polyurethane bumpers protect the belt and clamp assembly from damage at end-of-stroke



**OVERSIZED PULLEY BEARINGS**

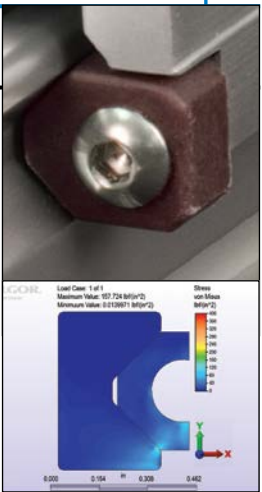
Drive shaft assembly incorporates oversized shielded/sealed ball bearings for long life and high speeds

**DURABLE BELT MATERIAL**

High power polyurethane HTD tooth profile belt with steel tensile members resists stretching

**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



## INCH OR METRIC MOUNTING

Your choice of blank, inch (US standard) or metric mounting to the plate

## MOTOR ORIENTATION

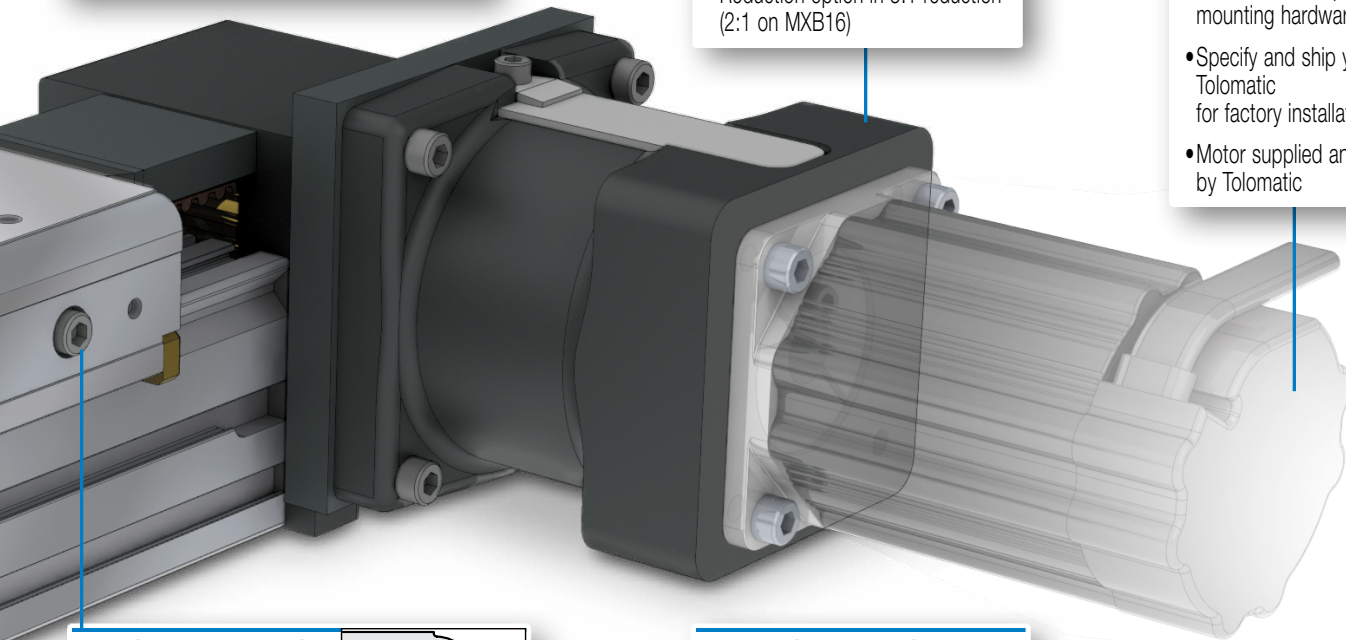
### YOU CAN CHOOSE:

- Direct drive option directly couples motor to the drive shaft; one-piece housing construction for optimum alignment and support of the motor
- Reduction option in 3:1 reduction (2:1 on MXB16)

## YOUR MOTOR HERE

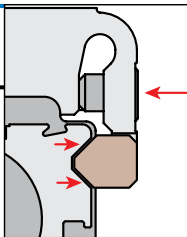
### YOU CAN CHOOSE:

- Specify the device to be installed and actuator ships with proper mounting hardware
- Specify and ship your device to Tolomatic for factory installation
- Motor supplied and installed by Tolomatic



## NON-BINDING BEARING ARMS

Bearings are tensioned indirectly, providing bind free adjustment



## LIGHTWEIGHT ALUMINUM DESIGN

Clear anodized extrusion design is optimized for rigidity and strength

## 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 (MXB16 uses T-nuts with mounting plates)

NOTE: Boxed letters indicate ordering codes



### MOUNTING PLATES **M****P**

- Provides clearance for motor and mount
- 16,25,32 sizes attach with T-Nuts
- 40,50,63 sizes attach with Tube Clamps



### HEAD COVER PLATE **H****C****2**

- Provides protection for pulley and bearing



### SWITCHES

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

# MXB-P PROFILED RAIL BELT-DRIVE ACTUATOR

## ENDURANCE TECHNOLOGY<sup>SM</sup>

A Tolomatic Design Principle

Endurance Technology<sup>SM</sup> features are designed for maximum durability to provide extended service life.

The MXB-P rodless electric belt-drive actuator is designed for applications requiring moderate to heavy load carrying and guidance. The MXB-P actuator features a profiled rail system with recirculating ball linear guides for optimal performance. The MXB-P belt-driven actuator features speeds up to 3810 mm/sec (150 in/sec) and thrusts up to 1859 N (418 lbf). Built-to-order in stroke lengths up to 10,500 mm (414 in).

### LOW CARRIER HEIGHT

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

### DURABLE BELT MATERIAL

High power polyurethane HTD tooth profile belt with steel tensile members resists stretching

### OVERSIZED PULLEY BEARINGS

Drive shaft assembly incorporates oversized shielded/sealed ball bearings for long life and high speeds

### MOTOR ORIENTATION

#### YOU CAN CHOOSE:

- Direct drive option directly couples motor to the drive shaft; one-piece housing construction for optimum alignment and support of the motor
- Reduction option in 3:1 reduction (2:1 on MXB16)

### YOUR MOTOR HERE

#### YOU CAN CHOOSE:

- Specify the device to be installed and actuator ships with proper mounting hardware
- Specify and ship your device to Tolomatic for factory installation
- Motor supplied and installed by Tolomatic

## INCH OR METRIC MOUNTING

Your choice of blank, inch (US standard) or metric mounting to the plate

## LIGHTWEIGHT ALUMINUM DESIGN

Clear anodized extrusion design is optimized for rigidity and strength

## EXTERNAL BUMPERS

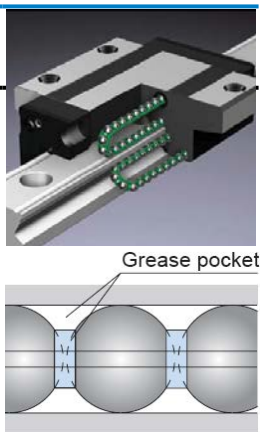
Polyurethane bumpers protect the belt and clamp assembly from damage at end-of-stroke

## BELT TENSIONING SYSTEM

The open slot on the guide plate permits easy access to the belt tensioning screw. No disassembly required

## RECIRCULATING BALL BEARINGS

- Recirculating ball bearings are used to reduce friction and extend actuator life
- Designed with a grease pocket between ball elements to reduce friction, noise and maintenance
- Large permissible moment loads
- High speed operation, low heat generation
- High precision, smooth, low friction motion



NOTE: Boxed letters indicate ordering codes

## OPTIONS



### AUXILIARY CARRIER **D****C**

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



### MOUNTING PLATES **M****P**

- Provides clearance for motor and mount
- 16,25,32 sizes attach with T-Nuts
- 40,50,63 sizes attach with Tube Clamps



### TUBE CLAMPS **T****C**

- Used for intermediate support
  - Flush with bottom of actuator to retain low profile
  - Drop-in adjustable mounting locations
- (Not available on the 16, 25 or 32 MXB-P sizes)



### HEAD COVER PLATE **H****C****2**

- Provides protection for pulley and bearing



### SWITCHES

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

# MXB Rodless Belt Drive Actuators

## ACTUATOR SPECIFICATIONS AND BREAKAWAY TORQUE

MXB U, S & P						BREAKAWAY TORQUE	
MXB SIZE	BELT WIDTH	BELT DEAD LENGTH	PULLEY PITCH DIA.	STROKE PER REV.	MAX. STROKE	SINGLE CARRIER	AUX. CARRIER OPT. (MXB-P)
	mm	mm	mm	mm	m	N-m	N-m
16	10	363.0	19.1	60.1	5.84	0.452	0.678
25	18	475.5	25.5	80.0	10.5	0.565	0.791
32	25	556.0	31.8	100.0	10.5	0.904	1.130
40	30	633.7	38.2	120.0	10.5	1.130	1.356
50	40	692.2	44.6	140.0	10.4	1.695	2.034
63	50	917.2	54.1	170.0	5.51	2.260	2.825

MXB U, S & P						BREAKAWAY TORQUE	
MXB SIZE	BELT WIDTH	BELT DEAD LENGTH	PULLEY PITCH DIA.	STROKE PER REV.	MAX. STROKE	SINGLE CARRIER	AUX. CARRIER OPT. (MXB-P)
	in	in	in	in	in	lb-in	lb-in
16	0.39	14.29	0.753	2.366	230	4.0	6.0
25	0.71	18.72	1.003	3.151	414	5.0	7.0
32	0.98	21.89	1.253	3.936	413	8.0	10.0
40	1.18	24.95	1.504	4.725	412	10.0	12.0
50	1.57	27.25	1.754	5.510	410	15.0	18.0
63	1.97	36.11	2.130	6.692	217	20.0	25.0

MXB-U SIZE	WEIGHT				INERTIA		
	PLATE ASSEMBLY	BELT TENSIONER ASSEMBLY	BASE ACTUATOR	PER cm OF STROKE	DRIVE/IDLE PULLEY ASSEMBLIES	PLATE ASSEMBLY (INCLUDING BELT TENSIONER ASSEMBLY)	PER cm OF STROKE
	kg	kg	kg	kg/cm	kg-cm <sup>2</sup>	kg-cm <sup>2</sup>	kg-cm <sup>2</sup>
16	0.05	0.05	0.72	0.0150	0.0250	0.0870	0.0006
25	0.12	0.07	1.17	0.0246	0.0759	0.3073	0.0020
32	0.22	0.13	1.89	0.0423	0.4143	0.8906	0.0043
40	0.41	0.21	3.55	0.0629	1.0884	2.2430	0.0075
50	0.47	0.33	4.50	0.0843	2.1196	3.9449	0.0135
63	1.15	0.38	7.46	0.1488	5.7101	11.1931	0.0249

MXB-U SIZE	WEIGHT				INERTIA		
	PLATE ASSEMBLY	BELT TENSIONER ASSEMBLY	BASE ACTUATOR	PER in OF STROKE	DRIVE/IDLE PULLEY ASSEMBLIES	PLATE ASSEMBLY (INCLUDING BELT TENSIONER ASSEMBLY)	PER in OF STROKE
	lb	lb	lb	lb/in	lb-in <sup>2</sup>	lb-in <sup>2</sup>	lb-in <sup>2</sup>
16	0.11	0.10	1.59	0.084	0.0085	0.0297	0.0005
25	0.27	0.15	2.59	0.138	0.0259	0.1050	0.0017
32	0.48	0.30	4.17	0.237	0.1416	0.3043	0.0037
40	0.90	0.46	7.83	0.352	0.3719	0.7665	0.0065
50	1.03	0.72	9.93	0.472	0.7243	1.3480	0.0117
63	2.54	0.83	16.44	0.833	1.9512	3.8249	0.0216

MXB-S SIZE	WEIGHT				INERTIA			
	CARRIER ASSEMBLY	BELT TENSIONER ASSEMBLY	BASE ACTUATOR	PER cm OF STROKE	DRIVE/IDLE PULLEY ASSEMBLIES	CARRIER ASSEMBLY (INCLUDING BELT TENSIONER ASSEMBLY)		PER cm OF STROKE
						SINGLE CARRIER	AUX. CARRIER OPT.	
	kg	kg	kg	kg/cm	kg-cm <sup>2</sup>	kg-cm <sup>2</sup>	kg-cm <sup>2</sup>	kg-cm <sup>2</sup>
16	0.15	0.05	0.84	0.0150	0.0250	0.1782	0.3151	0.0006
25	0.24	0.07	1.65	0.0246	0.0759	0.5060	0.9035	0.0020
32	0.45	0.14	2.63	0.0423	0.4143	1.4879	2.6365	0.0043
40	0.80	0.21	5.06	0.0629	1.0884	3.6828	6.6119	0.0075
50	1.17	0.33	7.35	0.0843	2.1196	7.4111	13.1956	0.0135
63	3.42	0.38	14.56	0.1488	5.7101	27.7891	52.8158	0.0249

MXB-S SIZE	WEIGHT				INERTIA			
	CARRIER ASSEMBLY	BELT TENSIONER ASSEMBLY	BASE ACTUATOR	PER in OF STROKE	DRIVE/IDLE PULLEY ASSEMBLIES	CARRIER ASSEMBLY (INCLUDING BELT TENSIONER ASSEMBLY)		PER in OF STROKE
						SINGLE CARRIER	AUX. CARRIER OPT.	
	lb	lb	lb	lb/in	lb-in <sup>2</sup>	lb-in <sup>2</sup>	lb-in <sup>2</sup>	lb-in <sup>2</sup>
16	0.33	0.10	1.86	0.084	0.0085	0.0609	0.1077	0.0005
25	0.54	0.15	3.64	0.138	0.0259	0.1729	0.3087	0.0017
32	1.00	0.30	5.80	0.237	0.1416	0.5084	0.9009	0.0037
40	1.77	0.46	11.16	0.352	0.3719	1.2585	2.2594	0.0065
50	2.57	0.72	16.20	0.472	0.7243	2.5325	4.5092	0.0117
63	7.54	0.83	32.10	0.833	1.9512	9.4960	18.0481	0.0216

MXB-P SIZE	WEIGHT				INERTIA			
	CARRIER ASSEMBLY	BELT TENSIONER ASSEMBLY	BASE ACTUATOR	PER cm OF STROKE	DRIVE/IDLE PULLEY ASSEMBLIES	CARRIER ASSEMBLY (INCLUDING BELT TENSIONER ASSEMBLY)		PER cm OF STROKE
						SINGLE CARRIER	AUX. CARRIER OPT.	
	kg	kg	kg	kg/cm	kg-cm <sup>2</sup>	kg-cm <sup>2</sup>	kg-cm <sup>2</sup>	kg-cm <sup>2</sup>
16	0.18	0.05	1.08	0.0183	0.0250	0.2014	0.3615	0.0006
25	0.38	0.07	1.98	0.0348	0.0759	0.7297	1.3508	0.0020
32	0.74	0.13	3.55	0.0569	0.4143	2.2232	4.1072	0.0043
40	1.14	0.21	6.38	0.0959	1.0884	4.9138	9.0740	0.0075
50	2.28	0.33	9.45	0.1337	2.1196	12.9416	24.2565	0.0135
63	4.25	0.38	16.89	0.1981	5.7101	33.8324	64.9024	0.0249

MXB-P SIZE	WEIGHT				INERTIA			
	CARRIER ASSEMBLY	BELT TENSIONER ASSEMBLY	BASE ACTUATOR	PER in OF STROKE	DRIVE/IDLE PULLEY ASSEMBLIES	CARRIER ASSEMBLY (INCLUDING BELT TENSIONER ASSEMBLY)		PER in OF STROKE
						SINGLE CARRIER	AUX. CARRIER OPT.	
	lb	lb	lb	lb/in	lb-in <sup>2</sup>	lb-in <sup>2</sup>	lb-in <sup>2</sup>	lb-in <sup>2</sup>
16	0.39	0.10	2.38	0.102	0.0085	0.0688	0.1235	0.0005
25	0.84	0.15	4.36	0.195	0.0259	0.2493	0.4616	0.0017
32	1.64	0.30	7.83	0.318	0.1416	0.7597	1.4035	0.0037
40	2.51	0.46	14.07	0.537	0.3719	1.6791	3.1007	0.0065
50	5.03	0.72	20.84	0.749	0.7243	4.4224	8.2889	0.0117
63	9.36	0.83	37.24	1.110	1.9512	11.5611	22.1783	0.0216

**MAXIMUM VELOCITY U** 5080 mm/sec *200 in/sec*

**MAXIMUM VELOCITY S** 2540 mm/sec *100 in/sec*

**MAXIMUM VELOCITY P** 3810 mm/sec *150 in/sec*

**MAXIMUM ACCELERATION** 30.48 m/sec<sup>2</sup> *1200 in/sec<sup>2</sup>*

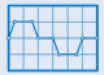
**REPEATABILITY** ± 0.051 mm *± 0.002 in*

**TEMPERATURE RANGE** -12 to 54 °C *10 to 130 °F*

**⚠** Heat generated by the motor and drive should be taken into consideration as well as linear velocity and work cycle time. For applications that require operation outside of the recommended temperature range, contact the factory.

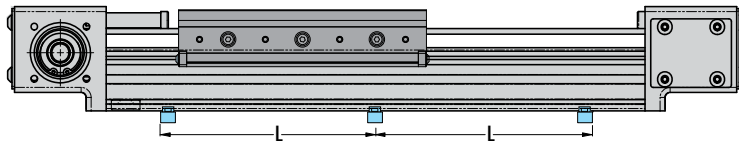
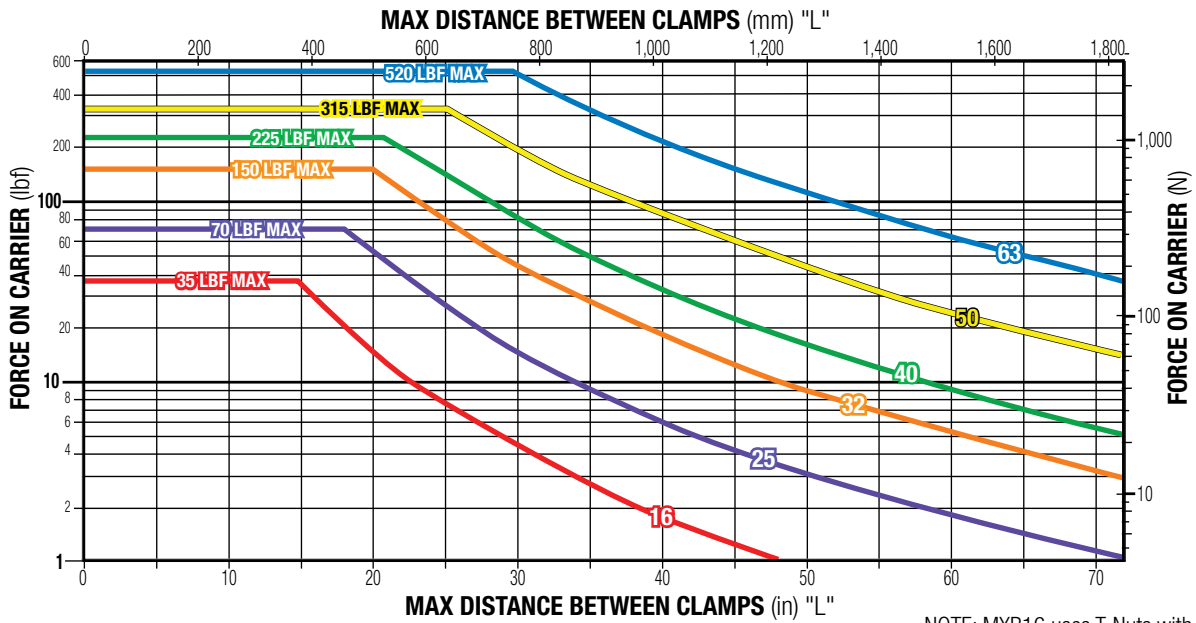
**STRAIGHTNESS, FLATNESS** 0.01702 L mm *0.00067 L in*  
Actuator mounted on a flat surface and fully restrained (see Mounting Plate Requirements, page MXB\_11) L = Maximum distance between supports

**⚠** The listed values relating to straightness/flatness are intended for reference purposes only, and not as an engineering standard of absolute tolerance for a given actuator. Appropriate installation is the single most important factor in reducing variation, so good engineering practices such as measurement, mapping, etc. must be employed in applications with stringent straightness/flatness requirements.

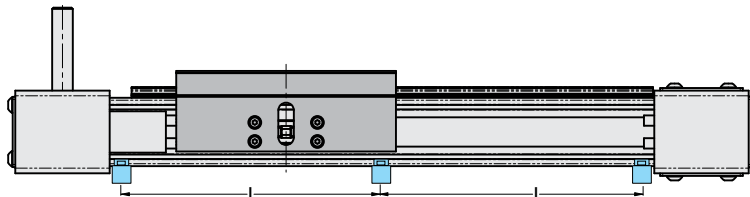
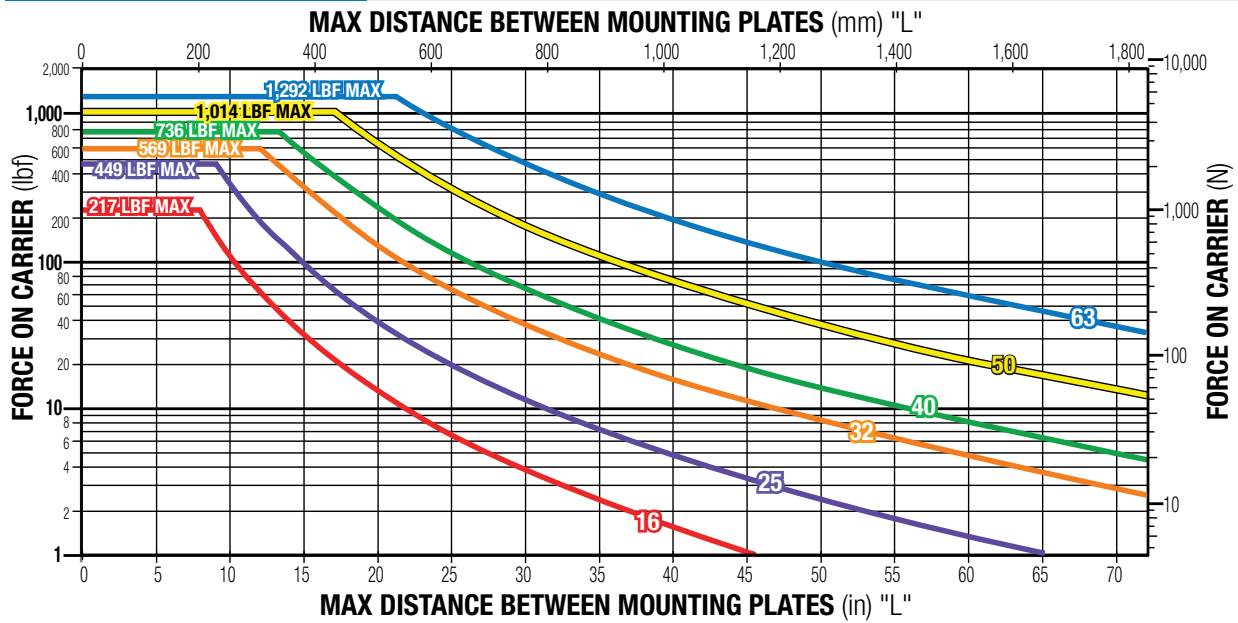


## S & P TUBE CLAMP REQUIREMENTS

### S SOLID BEARING



### P PROFILE RAIL BEARING



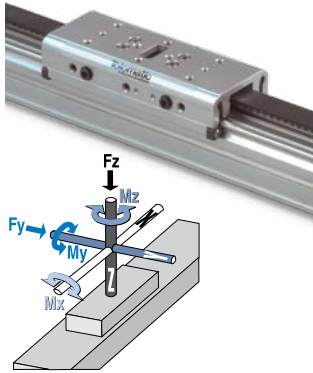
# MXB-S Rodless Belt Drive Actuators

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## S SOLID BEARING MOMENT AND LOAD CAPACITY

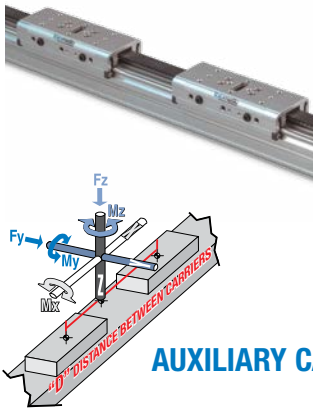
### STANDARD CARRIER



SIZE	MAX. BENDING MOMENTS			MAX. LOAD
	Mx	My	Mz	Fz
	N-m	N-m	N-m	N
16	2.5	2.1	2.8	156
25	6.8	12.4	3.8	311
32	11.3	39.5	15.8	667
40	31.1	67.8	24.9	1,001
50	35.6	131.0	38.5	1,401
63	66.1	264.0	58.8	2,313

SIZE	MAX. BENDING MOMENTS			MAX. LOAD
	Mx	My	Mz	Fz
	in-lbs	in-lbs	in-lbs	lbf
16	22	19	25	35
25	60	110	34	70
32	100	350	140	150
40	275	600	220	225
50	315	1,155	341	315
63	585	2,340	520	520

### D/AUXILIARY CARRIER

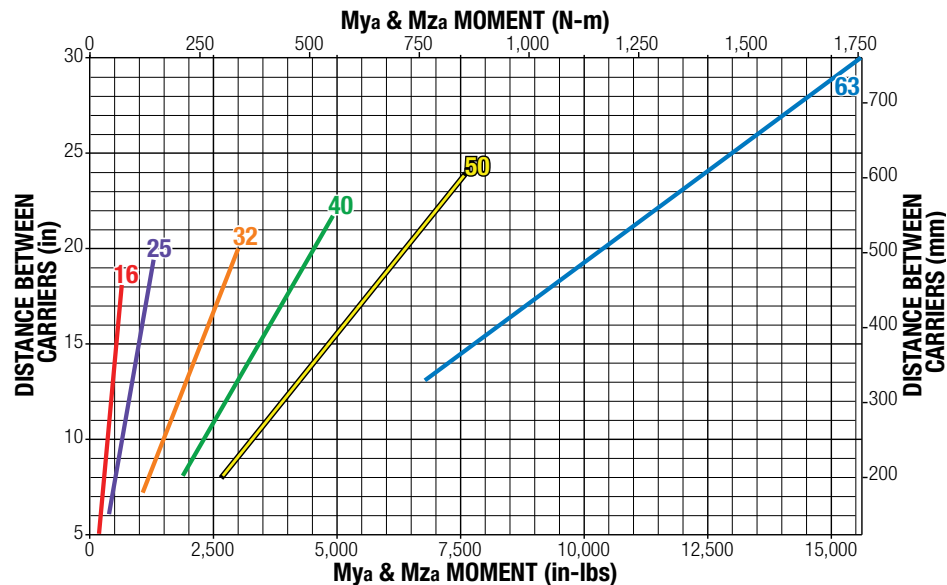


SIZE	"D" MIN. mm	MAX. BENDING MOMENTS*			MAX. LOAD
		Mxa	Mya	Mza	Fza
		N-m	N-m	N-m	N
16	127	5.0	19.8	19.8	311
25	152	13.6	47.5	47.5	623
32	178	22.6	119.0	119.0	1,334
40	216	62.1	216.0	216.0	2,002
50	218	71.2	306.0	306.0	2,802
63	330	132.0	764.0	764.0	4,626

SIZE	"D" MIN. in	MAX. BENDING MOMENTS*			MAX. LOAD
		Mxa	Mya	Mza	Fza
		in-lbs	in-lbs	in-lbs	lbf
16	5.0	44	175	175	70
25	6.0	120	420	420	140
32	7.0	200	1,050	1,050	300
40	8.5	550	1,913	1,913	450
50	8.6	630	2,709	2,709	630
63	13.0	1,170	6,760	6,760	1,040

\*At minimum "D" distance see graph 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.**

The moment and load capacity of the actuator bearing system is based on an L10 life of 5,000 linear km (2x10<sup>9</sup> in) 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<sub>F</sub>) for each application must not exceed a value of 1, as calculated below. Exceeding a load factor of 1 will diminish the actuator rated life.

$$L_F = \frac{M_x}{M_{x_{max}}} + \frac{M_y}{M_{y_{max}}} + \frac{M_z}{M_{z_{max}}} + \frac{F_y}{F_{y_{max}}} + \frac{F_z}{F_{z_{max}}} \leq 1$$

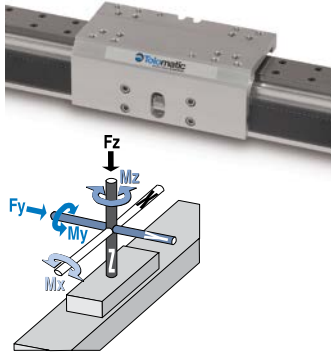
With combined loads, L<sub>F</sub> must not exceed the value 1.

# MXB-P Rodless Belt Drive Actuators

## PROFILED RAIL BEARING MOMENT AND LOAD CAPACITY

⚠ Mating surface of mounted component must maintain a flatness of at least 0.040mm [0.0015"]

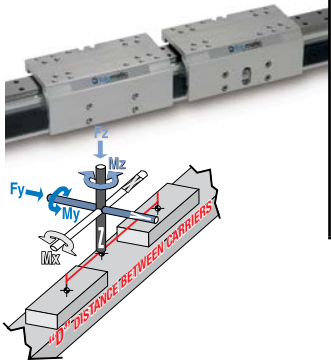
### STANDARD CARRIER



SIZE	MAX. BENDING MOMENTS			MAX. LOAD	MAX. THRUST
	Mx	My	Mz	Fy & Fz	THRUST
	N-m	N-m	N-m	N	N
16	4.5	38.3	38.3	966	169
25	14.3	56.7	42.6	1,996	672
32	25.6	152.0	152.0	2,531	930
40	68.2	216.0	216.0	3,274	1,112
50	91.7	394.0	394.0	4,510	1,446
63	115.0	603.0	603.0	5,745	1,859

SIZE	MAX. BENDING MOMENTS			MAX. LOAD	MAX. THRUST
	Mx	My	Mz	Fy & Fz	THRUST
	in-lbs	in-lbs	in-lbs	lbf	lbf
16	39	339	339	217	38
25	126	502	377	449	151
32	226	1,344	1,344	569	209
40	604	1,913	1,913	736	250
50	811	3,483	3,483	1,014	325
63	1,019	5,339	5,339	1,292	418

### AUXILIARY CARRIER



SIZE	"D" MIN.	MAX. BENDING MOMENTS			MAX. LOAD
		Mxa	Mya	Mza	Fya & Fza
		mm	N-m	N-m	N-m
16	127	8.9	70.0	70.0	1,932
25	152	28.5	182	182	3,993
32	178	51.1	249	249	5,063
40	216	136.0	407	407	6,549
50	218	183.0	561	561	9,020
63	330	230.0	1,074	1,074	11,490

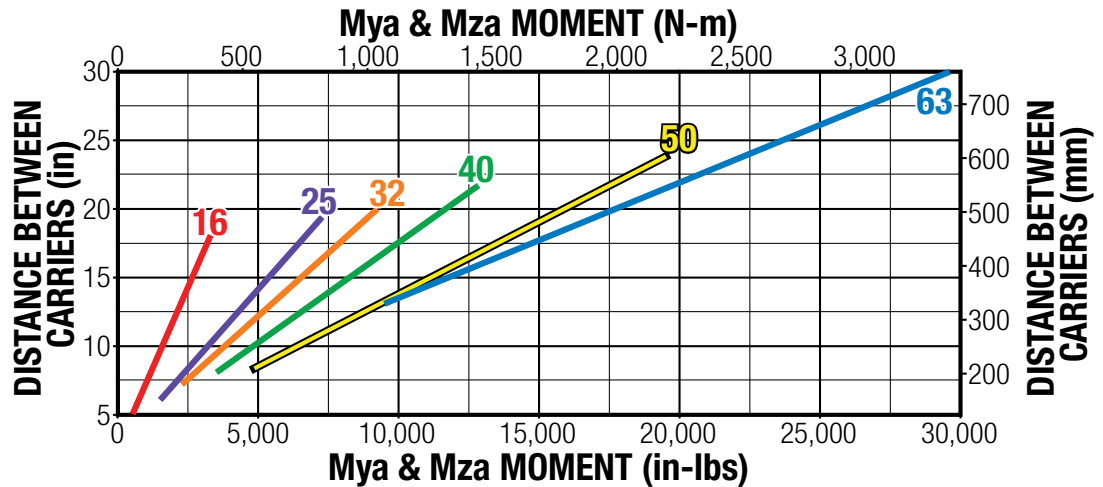
SIZE	"D" MIN.	MAX. BENDING MOMENTS			MAX. LOAD
		Mxa	Mya	Mza	Fya & Fza
		in	in-lbs	in-lbs	in-lbs
16	5.0	79	620	620	434
25	6.0	252	1,610	1,610	898
32	7.0	453	2,202	2,202	1,138
40	8.5	1,208	3,601	3,601	1,472
50	8.6	1,623	4,966	4,966	2,028
63	13.0	2,038	9,508	9,508	2,583

\*At minimum "D" distance - see graph below for bending moments at greater distances

### 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.

The moment and load capacity of the actuator bearing system is based on an L10 life of 5,000 linear km (2x10<sup>9</sup> in) 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<sub>F</sub>) for each application must not exceed a value of 1, as calculated below. Exceeding a load factor of 1 will diminish the actuator rated life.

$$L_F = \frac{M_x}{M_{x_{max}}} + \frac{M_y}{M_{y_{max}}} + \frac{M_z}{M_{z_{max}}} + \frac{F_y}{F_{y_{max}}} + \frac{F_z}{F_{z_{max}}} \leq 1$$

With combined loads, L<sub>F</sub> must not exceed the value 1.

# MXB-P Rodless Belt Drive Actuator

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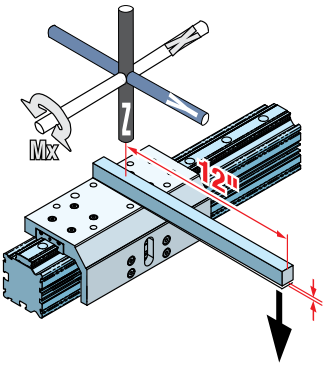
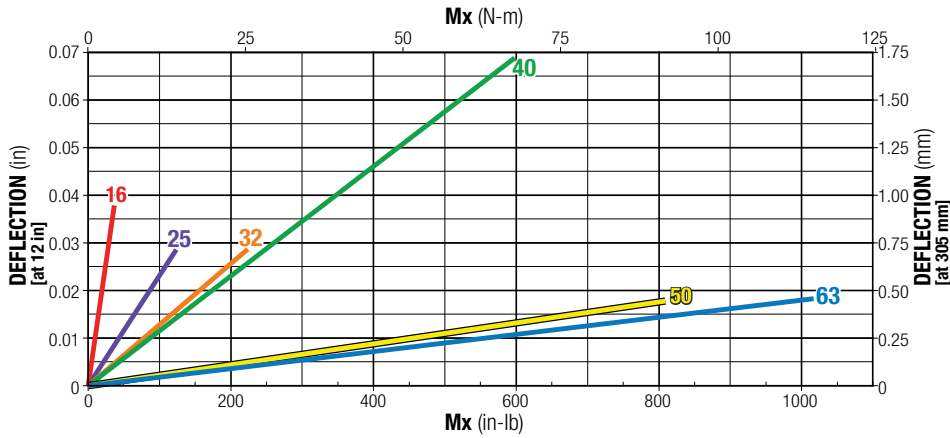


## LOAD DEFLECTION

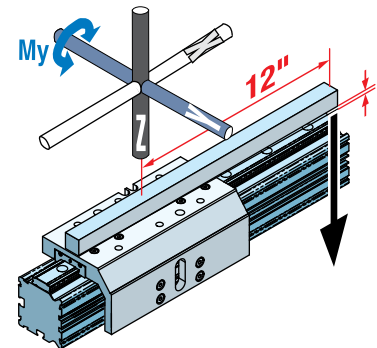
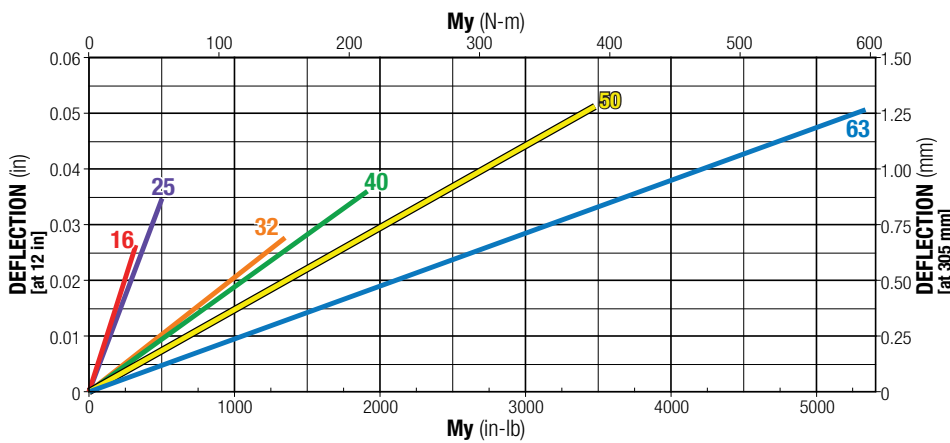
DEFLECTION TESTING WAS DONE UNDER THESE CRITERIA:

- 1.) Actuator was properly mounted with distance between mounting plates within recommendations
- 2.) Deflection was measured at 12" from center of carrier as shown (see Mounting Plate Requirements page mnt\_11)

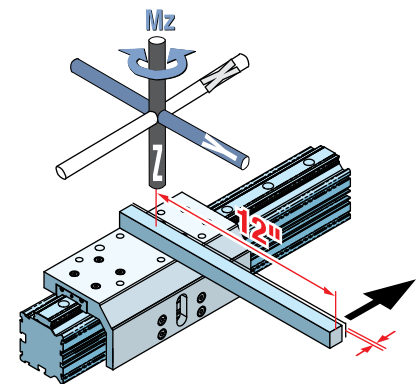
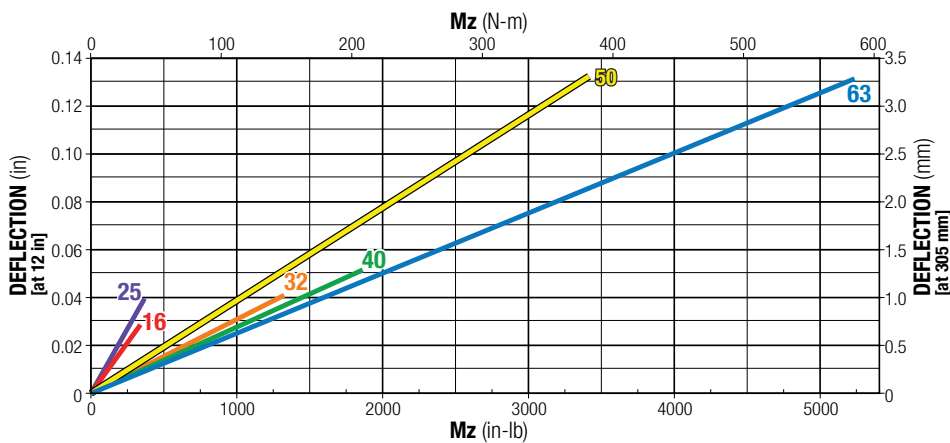
### DEFLECTION ABOUT X AXIS



### DEFLECTION ABOUT Y AXIS

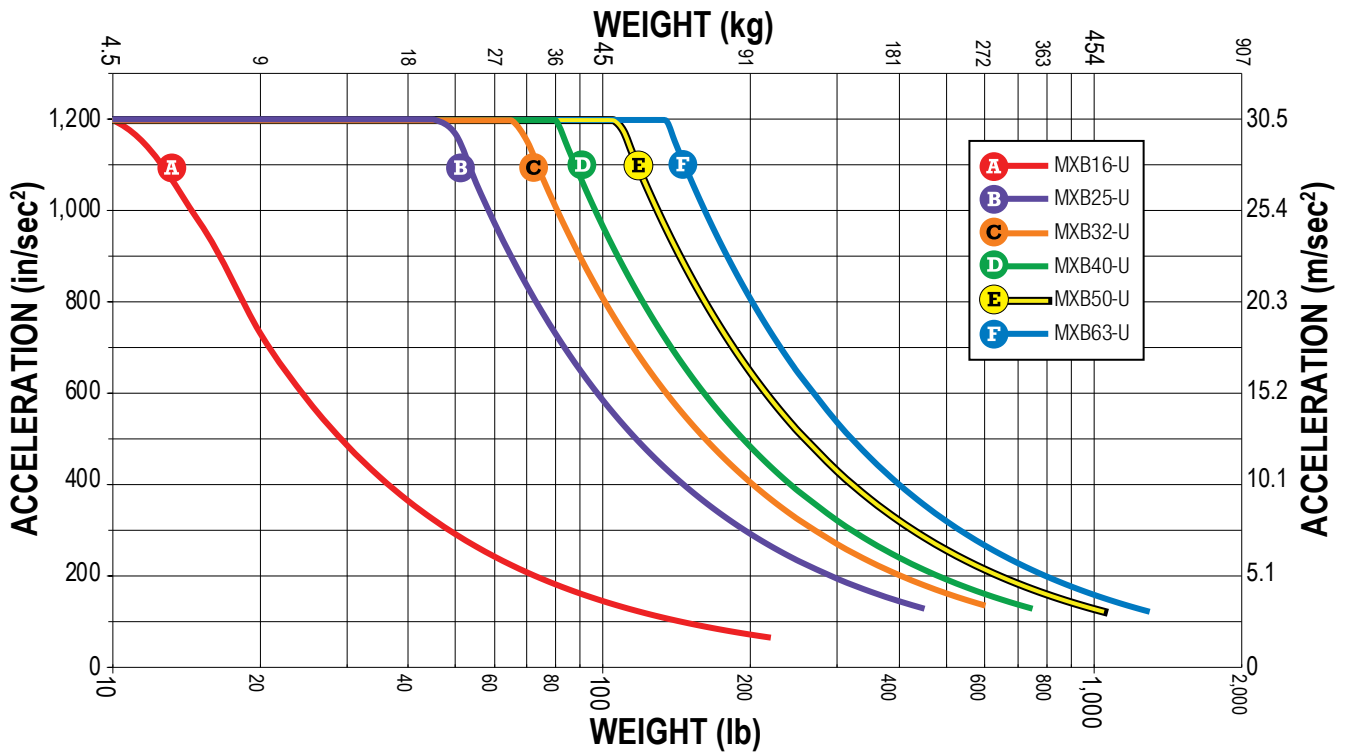


### DEFLECTION ABOUT Z AXIS

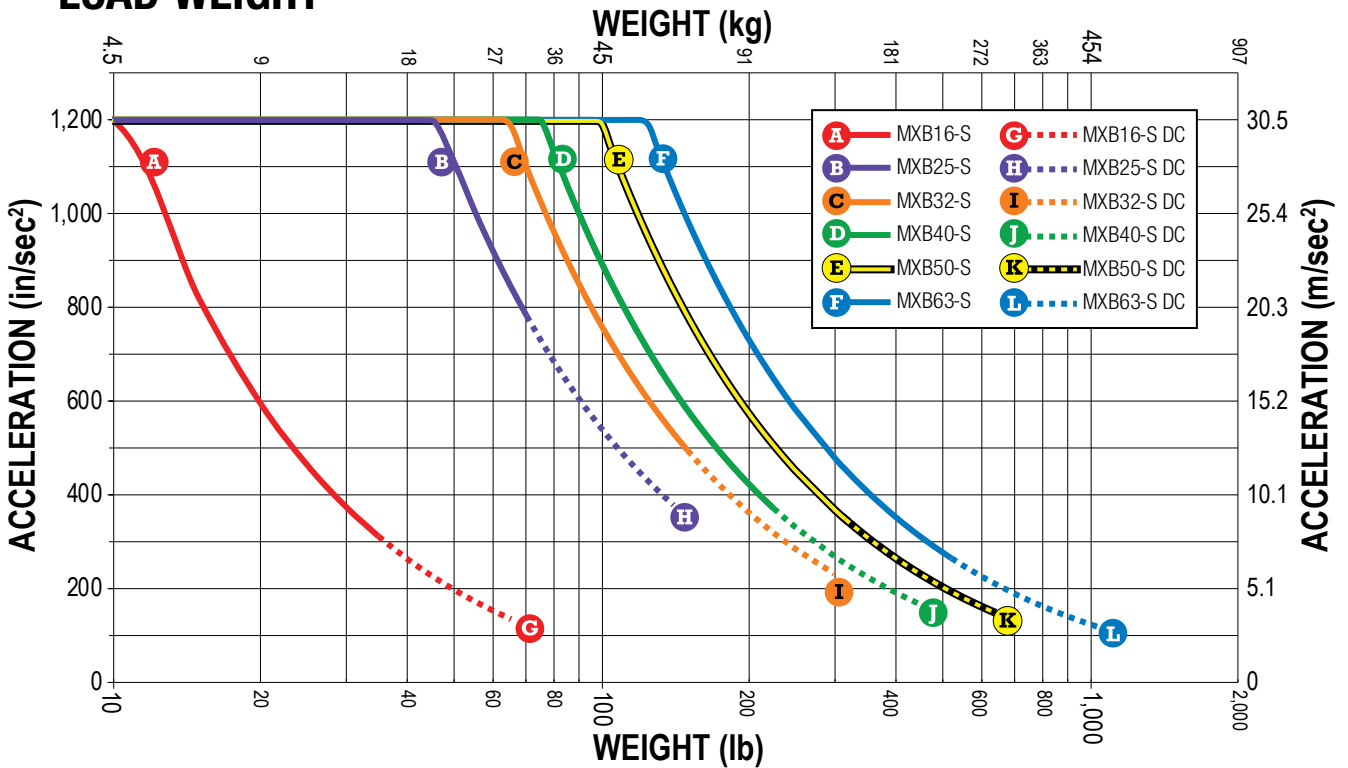


# MXB Rodless Belt Drive Actuators

## U UNGUIDED: MAXIMUM ACCELERATION AS A FUNCTION OF EXTERNALLY GUIDED LOAD WEIGHT

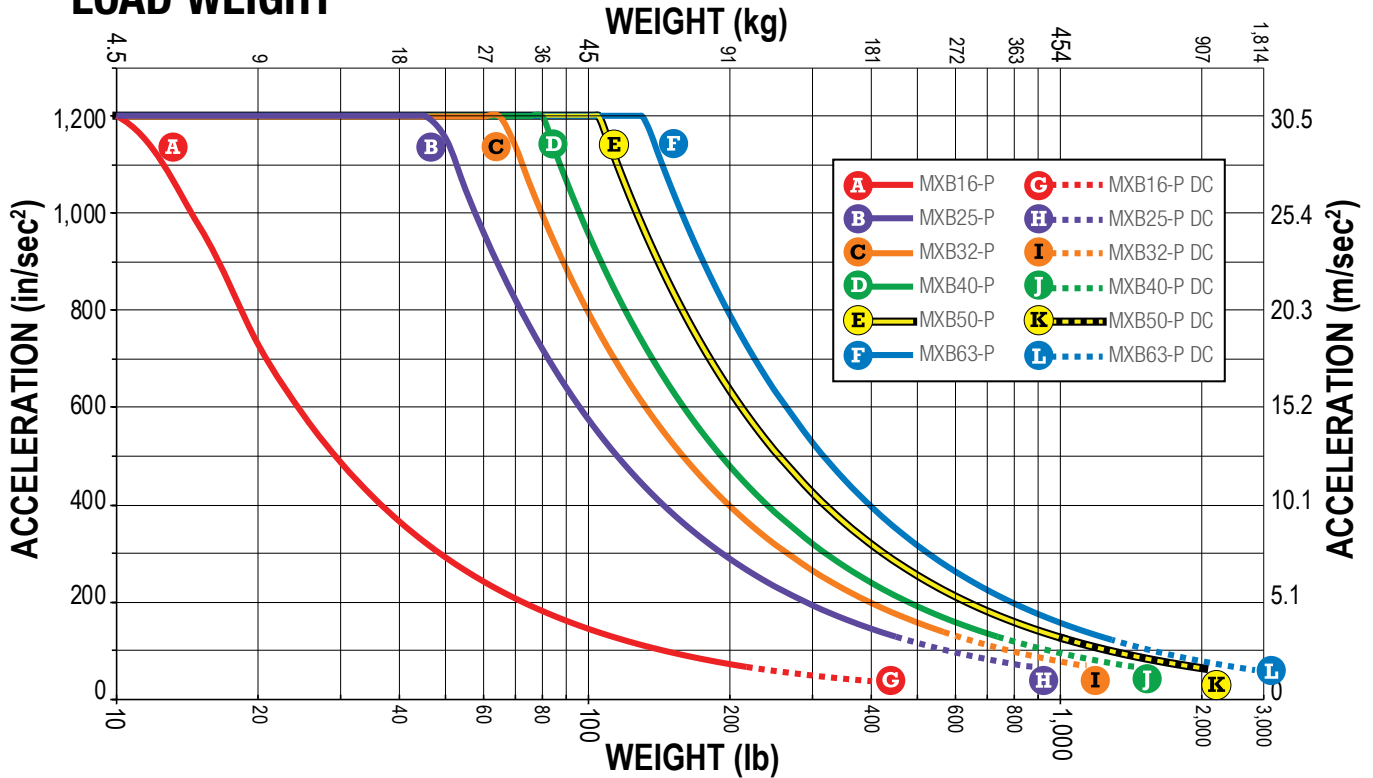


## S SOLID BEARING: MAXIMUM ACCELERATION AS A FUNCTION OF LOAD WEIGHT



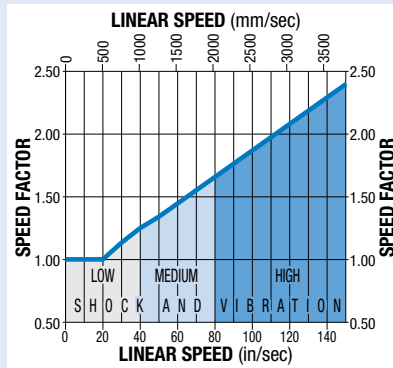
# MXB Rodless Belt Drive Actuators

## PROFILED RAIL: MAXIMUM ACCELERATION AS A FUNCTION OF LOAD WEIGHT



### 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 101 km (4x10<sup>9</sup> in) 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.

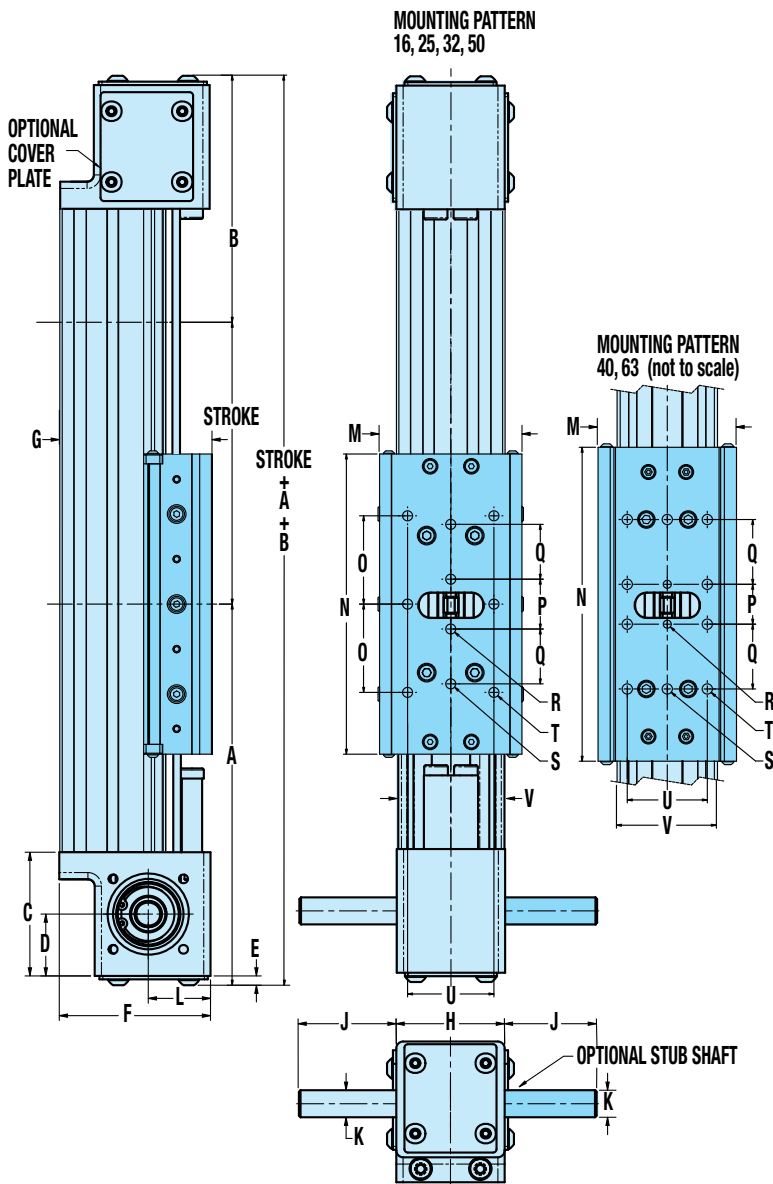


# MXB-S Rodless Belt Drive Actuator

tolomatic.com/CAD Download 3D CAD  
Always use CAD solid model to determine  
critical dimensions



## SOLID BEARING DIMENSIONS



	MXB16	MXB25	MXB32	MXB40	MXB50	MXB63
A	135.3	173.9	179.3	216.6	217.8	275.1
B	119.0	139.3	163.2	192.7	212.0	262.1
C	50.8	58.0	55.9	78.7	82.6	96.1
D	25.4	29.0	25.4	39.4	40.0	45.3
E	3.8	4.4	4.4	4.4	4.4	4.4
F	52.8	66.0	77.5	93.8	110.6	139.3
G*	45.8	58.4	77.8	89.2	112.8	139.7
H	44.5	50.8	69.9	82.6	98.4	111.1
(LMI) J	15.0	57.7	57.7	47.5	47.5	47.5
(RP) J	46.6	57.7	57.7	47.5	47.5	47.5
K	Ø9.53	Ø12.70	Ø12.70	Ø12.70	Ø12.70	Ø12.70
L	26.4	29.2	27.9	39.7	41.5	52.2
M	40.1	55.4	72.6	88.2	104.1	142
N	110.0	134.9	153	200	200.9	307.6
O	30	39.9	45	-	47.8	-
P	-	25.4	25.4	25.4	63.5	76.2
Q	-	27.2	28	41.3	31.8	38.1
R	-	M6x1.0 (2)	M8x1.25 (2)	M8x1.25 (2)	M10x1.5 (2)	M10x1.5 (2)
S	-	M6x1.0 (2)	M8x1.25 (2)	M8x1.25 (2)	M10x1.5 (2)	M10x1.5 (2)
T	M4x0.7 (6)	M6x1.0 (6)	M8x1.25 (6)	M8x1.25 (8)	M10x1.5 (6)	M10x1.5 (8)
U*	30.0	30.0	44.0	51.0	65.8	82.6
V	30.00	42.00	55.37	64.00	78.74	100.00

Dimensions in millimeters

	MXB16	MXB25	MXB32	MXB40	MXB50	MXB63
A	5.33	6.85	7.06	8.53	8.57	10.83
B	4.69	5.49	6.43	7.59	8.34	10.33
C	2.00	2.28	2.20	3.10	3.25	3.79
D	1.00	1.14	1.00	1.55	1.58	1.79
E	0.15	0.17	0.17	0.17	0.17	0.17
F	2.08	2.60	3.05	3.69	4.35	5.48
G*	1.80	2.30	3.06	3.51	4.44	5.50
H	1.75	2.00	2.75	3.25	3.88	4.38
(LMI) J	0.59	2.27	2.27	1.87	1.87	1.87
(RP) J	1.83	2.27	2.27	1.87	1.87	1.87
K	Ø0.375	Ø0.500	Ø0.500	Ø0.500	Ø0.500	Ø0.500
L	1.04	1.15	1.10	1.56	1.63	2.06
M	1.58	2.18	2.86	3.47	4.1	5.59
N	4.33	5.31	6.02	7.87	7.91	12.11
O	1.18	1.57	1.77	-	1.88	-
P	-	1.00	1.00	1.00	2.50	3.00
Q	-	1.07	1.10	1.63	1.25	1.50
R	-	1/4-20 (2)	1/4-20 (2)	1/4-20 (2)	3/8-16 (2)	3/8-16 (2)
S	-	#10-32 (2)	1/4-20 (2)	5/16-18 (2)	3/8-16 (2)	3/8-16 (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)
U*	1.18	1.18	1.73	2.00	2.59	3.25
V	1.18	1.65	2.18	2.52	3.10	3.94

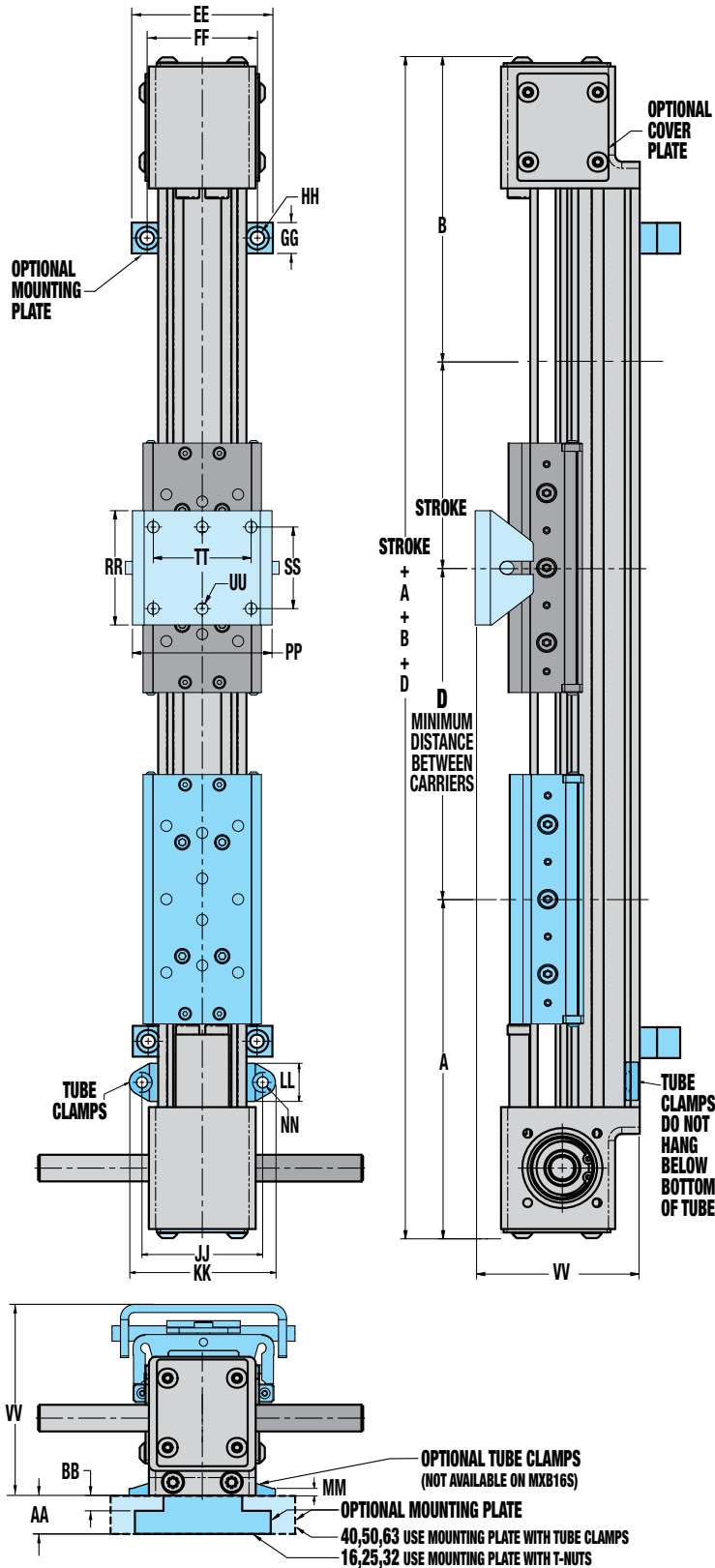
Dimensions in inches

# MXB-S Rodless Belt Drive Actuator

tolomatic.com/CAD Download 3D CAD  
Always use CAD solid model to determine  
critical dimensions



## SOLID BEARING OPTION DIMENSIONS



	MXB16	MXB25	MXB32	MXB40	MXB50	MXB63
A	135.3	173.9	179.3	216.6	217.8	275.1
B	119.0	139.3	163.2	192.7	212.0	262.1
D	127.0	152.4	177.0	215.9	216.4	330.2

### OPTIONAL MOUNTING PLATES

AA	15.9	15.9	19.1	25.4	31.8	25.4
BB	6.4	6.4	7.6	-	-	-
DD	60.9	77.7	95.2	106.1	127.4	153.3
EE	60.0	63.5	86.4	127.0	142.2	203.2
FF	44.5	50.8	59.9	112.0	127.0	177.8
GG	25.4	25.4	25.4	20.1	20.1	25.4
HH	Ø5.6 THRU └┘09.4 ▽5.6 (2)	Ø5.6 THRU └┘09.4 ▽5.6 (2)	Ø7.1 THRU └┘Ø11.2 ▽7.1 (2)	Ø7.1 THRU (2)	Ø7.1 THRU (2)	Ø7.1 THRU (2)

### OPTIONAL TUBE CLAMPS

JJ	-	57.0	74.1	82.7	97.5	131.7
KK	-	69.0	87.4	96.7	111.5	150.7
LL	-	18.0	16.0	14.0	14.0	19.0
MM	-	3.6	4.3	3.8	3.8	6.1
NN	-	5.2	7.1	7.1	7.1	10.7

### OPTIONAL FLOATING MOUNT

PP	47.2	64.1	93.3	109.7	128.0	154.9
RR	24.9	31.8	70.1	100.0	100.0	127.0
SS	11.9	15.9	50.0	74.9	80.0	100.1
TT	-	-	-	55.1	-	70.1
UU	Ø4.6 (2)	Ø6.1 (2)	Ø7.1 (2)	Ø7.1 (4)	Ø9.1 (2)	Ø8.6 (4)
VV	58.5	70.9	93.3	108.2	133.1	156.8

Dimensions in millimeters

	MXB16	MXB25	MXB32	MXB40	MXB50	MXB63
A	5.33	6.85	7.06	8.53	8.57	10.83
B	4.69	5.49	6.43	7.59	8.34	10.33
D	5.00	6.00	7.00	8.50	8.60	13.00

### OPTIONAL MOUNTING PLATES

AA	0.63	0.63	0.75	1.00	1.25	1.00
BB	0.25	0.25	0.30	-	-	-
DD	2.4	3.06	3.75	4.18	5.01	6.04
EE	2.36	2.50	3.40	5.00	5.60	8.00
FF	1.75	2.00	2.75	4.41	5.00	7.00
GG	1.00	1.00	1.00	0.79	0.79	1.00
HH	Ø.22 THRU └┘0.37 ▽.22 (2)	Ø.22 THRU └┘0.37 ▽.22 (2)	Ø.28 THRU └┘0.44 ▽.28 (2)	Ø.28 THRU (2)	Ø.28 THRU (2)	Ø.28 THRU (2)

### OPTIONAL TUBE CLAMPS

JJ	-	2.24	2.92	3.26	3.84	5.19
KK	-	2.72	3.44	3.81	4.39	5.93
LL	-	0.71	0.63	0.55	0.55	0.75
MM	-	0.14	0.17	0.15	0.15	0.24
NN	-	0.20	0.28	0.28	0.28	0.42

### OPTIONAL FLOATING MOUNT

PP	1.86	2.52	3.37	4.32	5.04	6.10
RR	0.98	1.25	2.76	3.94	3.94	5.00
SS	0.47	0.63	1.97	2.95	3.15	3.94
TT	-	-	-	2.17	-	2.76
UU	Ø.18 (2)	Ø.24 (2)	Ø.28 (2)	Ø.28 (4)	Ø.36 (2)	Ø.34 (4)
VV	2.30	2.79	3.67	4.26	5.24	6.18

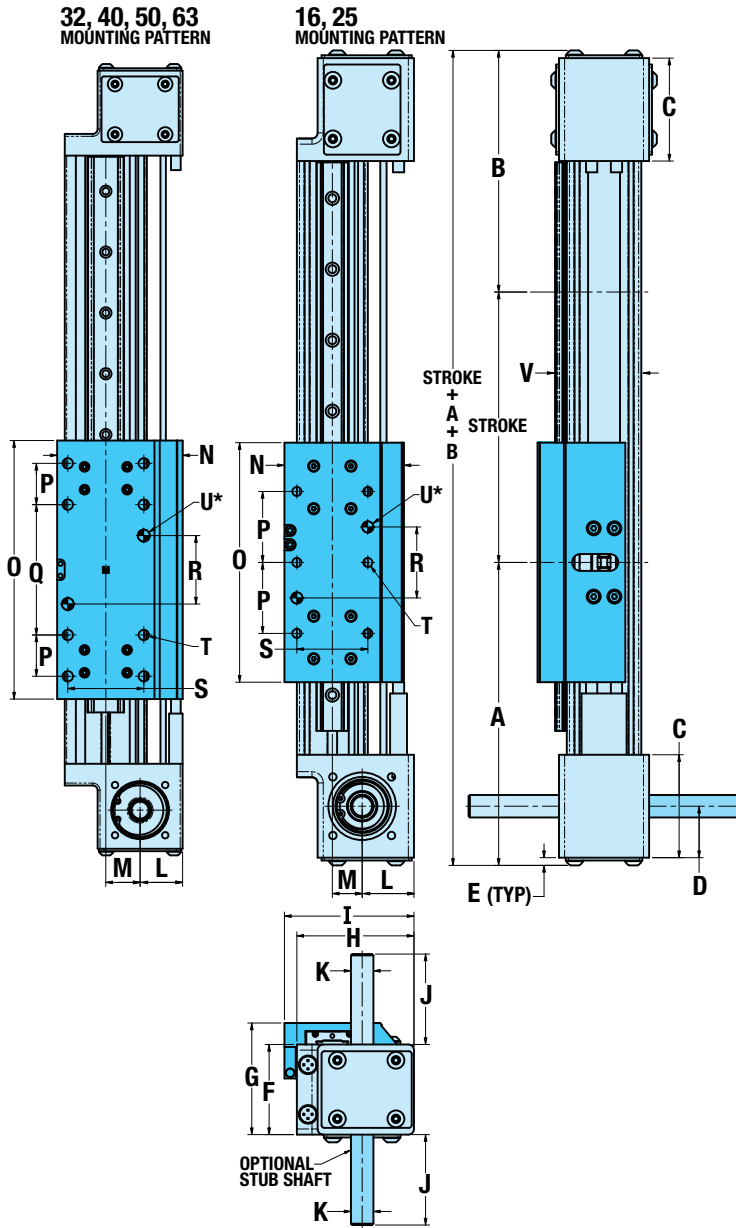
Dimensions in inches

# MXB-P Rodless Belt Drive Actuator

tolomatic.com/CAD Download 3D CAD  
Always use CAD solid model to determine  
critical dimensions



## PROFILED RAIL BEARING DIMENSIONS



	MXB16	MXB25	MXB32	MXB40	MXB50	MXB63
A	135.3	173.9	187.8	216.6	224.7	275.1
B	119.0	139.3	154.7	192.7	205.0	262.1
C	50.8	58.0	55.9	78.7	82.6	96.1
D	25.4	29.0	25.4	39.4	40.0	45.3
E	3.8	4.4	4.4	4.4	4.4	4.4
F	44.5	50.8	69.9	82.6	98.4	111.1
G	53.2	62.9	84.6	98.7	129.6	145.6
H	52.8	66.0	77.5	93.8	110.6	139.3
I	54.8	73.0	82.5	103.9	117.9	147.1
(LM)J	15.0	57.7	57.7	47.5	47.5	47.5
(RP)J	46.6	57.7	57.7	47.5	47.5	47.5
K	Ø9.53	Ø12.70	Ø12.70	Ø12.70	Ø12.70	Ø12.70
L	26.4	29.2	27.9	39.7	41.5	52.2
M	11.4	16.8	22.6	22.2	29.8	37.1
N	45.3	67.4	82.5	97.8	117.4	150.6
O	110.0	135.0	170.0	200.0	216.0	304.8
P	40.0	40.0	27.1	25.4	25.4	40.0
Q	—	—	85.7	114.3	69.8	130.0
R	40.00	40.00	45.00	63.50	38.10	65.00
S	28.00	40.00	50.00	72.00	79.38	98.30
T	M4x0.7	M6x1.0	M8x1.25	M8x1.25	M8x1.25	M10x1.5
U*	Ø4.045 / 4.020 ∇6.35	Ø6.045 / 6.020 ∇6.35	Ø8.045 / 8.020 ∇9.53	Ø8.045 / 8.020 ∇12.70	Ø8.045 / 8.020 ∇12.70	Ø10.045 / 10.020 ∇12.70
V	35.50	48.60	62.87	73.50	93.74	115.00

Dimensions in millimeters

	MXB16	MXB25	MXB32	MXB40	MXB50	MXB63
A	5.33	6.85	7.39	8.53	8.85	10.83
B	4.69	5.49	6.09	7.59	8.07	10.33
C	2.00	2.28	2.20	3.10	3.25	3.79
D	1.00	1.14	1.00	1.55	1.58	1.79
E	0.15	0.17	0.17	0.17	0.17	0.17
F	1.75	2.00	2.75	3.25	3.88	4.38
G	2.10	2.48	3.33	3.88	5.10	5.73
H	2.08	2.60	3.05	3.69	4.35	5.48
I	2.16	2.87	3.25	4.09	4.64	5.79
(LM)J	0.59	2.27	2.27	1.87	1.87	1.87
(RP)J	1.83	2.27	2.27	1.87	1.87	1.87
K	Ø0.375	Ø0.500	Ø0.500	Ø0.500	Ø0.500	Ø0.500
L	1.04	1.15	1.10	1.56	1.63	2.06
M	0.45	0.66	0.89	0.87	1.17	1.46
N	1.78	2.65	3.25	3.85	4.62	5.93
O	4.33	5.31	6.69	7.87	8.50	12.00
P	1.57	1.57	1.07	1.00	1.00	1.57
Q	—	—	3.37	4.50	2.75	5.12
R	1.575	1.575	1.772	2.500	1.500	2.559
S	1.102	1.575	1.969	2.835	3.125	3.870
T	#8-32(6)	1/4-20(6)	5/16-18(8)	5/16-18(8)	5/16-18(8)	3/8-16(8)
U*	Ø.1583 / .1573 (2) ∇.250	Ø.2520 / .2510 (2) ∇.250	Ø.3145 / .3135 (2) ∇.375	Ø.3145 / .3135 (2) ∇.500	Ø.3145 / .3135 (2) ∇.500	Ø.3770 / .3760 (2) ∇.500
V	1.40	1.91	2.48	2.89	3.69	4.53

Dimensions in inches

\*DOWEL HOLES

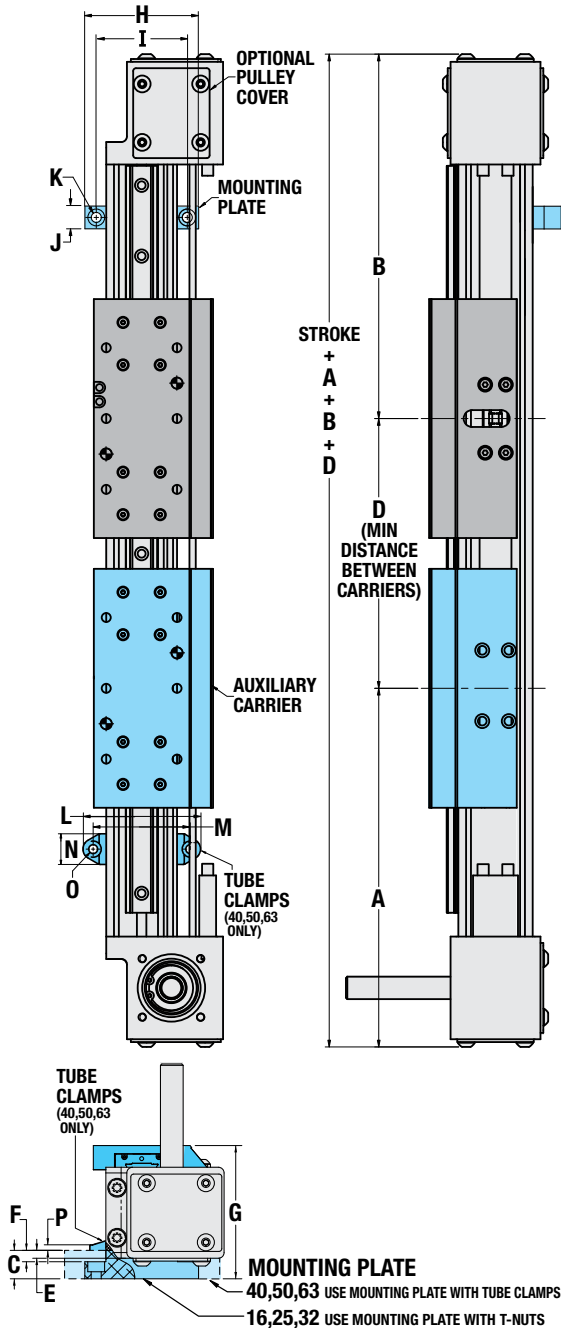
⊕	0.08 mm (M)
⊕	0.003 in (M)

# MXB-P Rodless Belt Drive Actuator

tolomatic.com/CAD Download 3D CAD  
Always use CAD solid model to determine  
critical dimensions



## PROFILED RAIL BEARING OPTION DIMENSIONS



	MXB16	MXB25	MXB32	MXB40	MXB50	MXB63
A	135.3	173.9	187.8	216.6	224.7	275.1
B	119.0	139.3	154.7	192.7	205.0	262.1
<b>AUXILIARY CARRIER</b>						
D	127.0	152.4	177.0	215.9	216.4	330.2
<b>MOUNTING PLATE</b>						
C	15.9	15.9	19.1	25.4	31.8	25.4
E	7.2	4.4	7.2	9.3	9.8	5.6
F	6.4	6.4	7.6	—	—	—
G	61.9	74.4	96.5	114.8	151.4	165.4
H	60.0	63.5	86.4	127.0	142.2	203.2
I	44.5	50.8	69.9	112.0	127.0	177.8
J	25.4	25.4	25.4	20.1	20.1	25.4
K	Ø5.6 THRU └┘09.4 ▽5.6 (2)	Ø5.6 THRU └┘09.4 ▽5.6 (2)	Ø7.1 THRU └┘10.1 ▽7.1 (2)	Ø7.1 THRU (2)	Ø7.1 THRU (2)	Ø7.1 THRU (2)
<b>TUBE CLAMPS</b>						
L	—	—	—	96.8	111.5	150.6
M	—	—	—	82.8	97.5	131.8
N	—	—	—	14.0	14.0	19.1
O	—	—	—	7.1	7.1	10.7
P	—	—	—	3.8	3.8	6.1

Dimensions in millimeters

	MXB16	MXB25	MXB32	MXB40	MXB50	MXB63
A	5.33	6.85	7.39	8.53	8.85	10.83
B	4.69	5.49	6.09	7.59	8.07	10.33
<b>AUXILIARY CARRIER</b>						
D	5.00	6.00	7.00	8.50	8.60	13.00
<b>MOUNTING PLATE</b>						
C	0.63	0.63	0.75	1.00	1.25	1.00
E	0.28	0.17	0.29	0.37	0.39	0.22
F	0.25	0.25	0.30	—	—	—
G	2.44	2.93	3.80	4.52	5.96	6.51
H	2.36	2.50	3.40	5.00	5.60	8.00
I	1.75	2.00	2.75	4.41	5.00	7.00
J	1.00	1.00	1.00	0.79	0.79	1.00
K	Ø.22 THRU └┘0.37 ▽.22 (2)	Ø.22 THRU └┘0.37 ▽.22 (2)	Ø.28 THRU └┘0.44 ▽.28 (2)	Ø.28 THRU (2)	Ø.28 THRU (2)	Ø.28 THRU (2)
<b>TUBE CLAMPS</b>						
L	—	—	—	3.81	4.39	5.93
M	—	—	—	3.26	3.84	5.19
N	—	—	—	0.55	0.55	0.75
O	—	—	—	0.28	0.28	0.42
P	—	—	—	0.15	0.15	0.24

Dimensions in inches

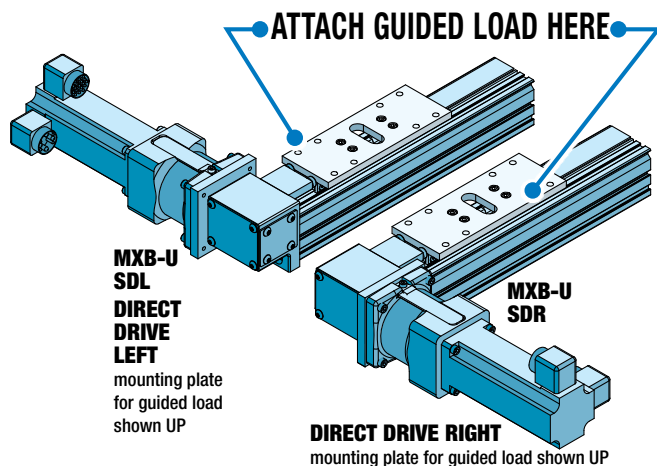
# MXB Rodless Belt Drive Actuator

[tolomatic.com/CAD](http://tolomatic.com/CAD) Download 3D CAD  
Always use CAD solid model to determine  
critical dimensions

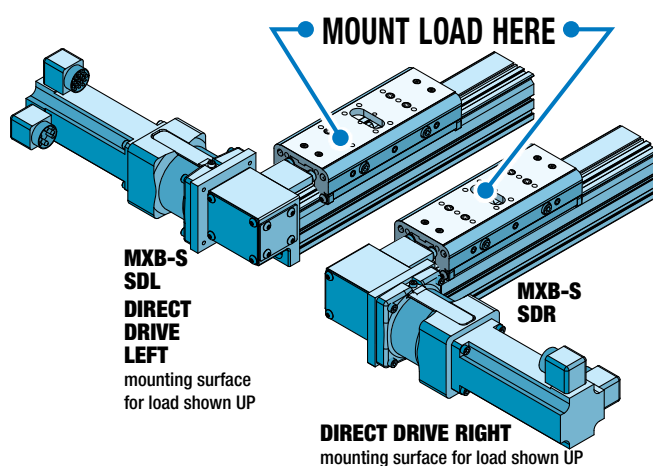


## DIRECT DRIVE MOTOR MOUNTING

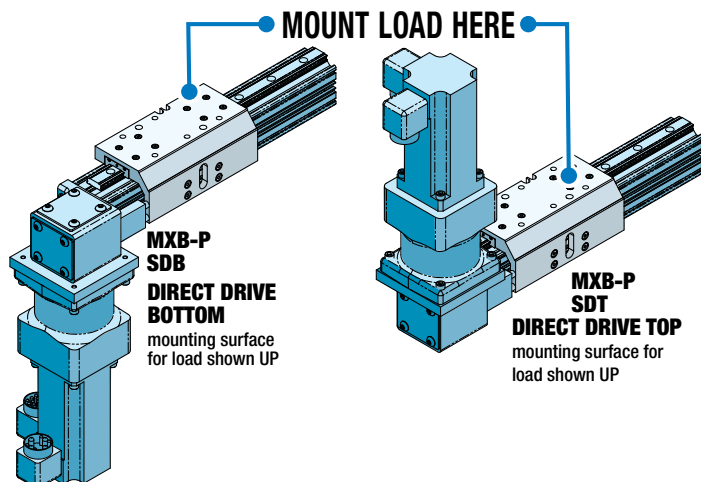
### MXB-U



### MXB-S



### MXB-P



### MOTOR MOUNTING

The MXB-P is unique among Tolomatic belt drive actuators. The mounting surface of the carrier is located 90° from the motion of the belt. The side opposite the belt is reserved for switch placement. The bottom of the actuator is reserved for mounting. If the motor is mounted in the SDT (direct drive top orientation), be sure the load mounted to the carrier does not interfere with the motor.



**LARGE FRAME MOTORS AND SMALLER SIZE ACTUATORS:** Cantilevered motors need to be supported if subjected to continuous rapid reversing duty and/or under dynamic conditions.

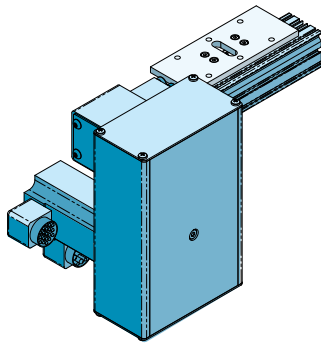
# MXB Rodless Belt Drive Actuator

tolomatic.com/CAD Download 3D CAD  
Always use CAD solid model to determine  
critical dimensions

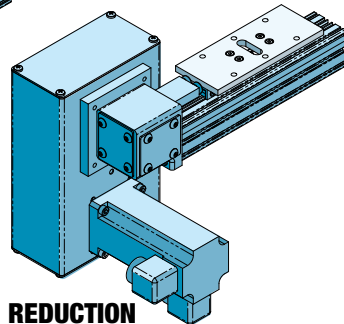


## REDUCTION DRIVE MOTOR MOUNTING

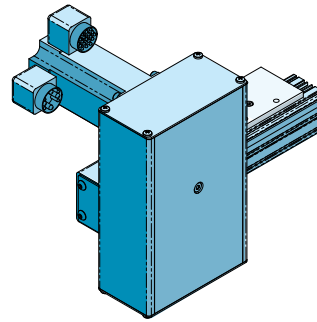
### MXB-U



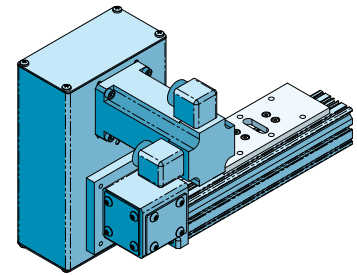
**REDUCTION DRIVE  
BOTTOM LEFT (SDBL)**  
mounting plate  
for guided load shown UP



**REDUCTION  
DRIVE  
BOTTOM RIGHT (SDBR)**  
mounting plate for  
guided load shown UP

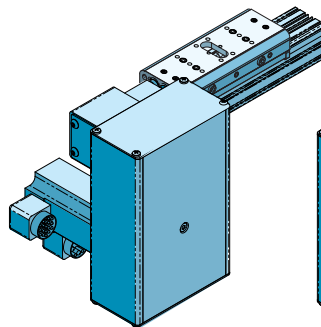


**REDUCTION DRIVE  
TOP LEFT (SDTL)**  
mounting plate for  
guided load shown UP

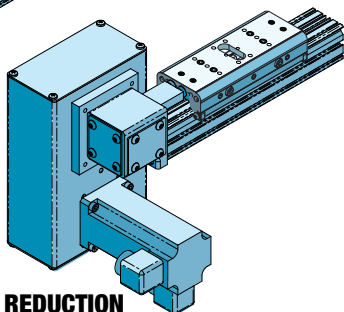


**REDUCTION DRIVE  
TOP RIGHT (SDTR)**  
mounting plate for  
guided load shown UP

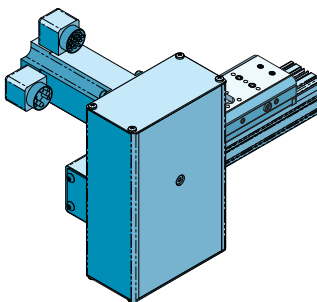
### MXB-S



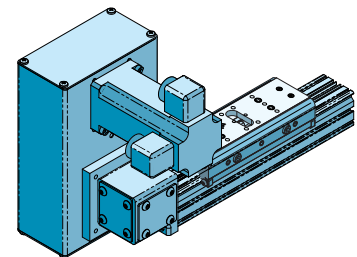
**REDUCTION DRIVE  
BOTTOM LEFT (SDBL)**  
mounting surface  
for load shown UP



**REDUCTION  
DRIVE  
BOTTOM RIGHT (SDBR)**  
mounting surface for load  
shown UP

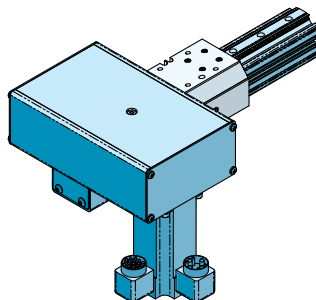


**REDUCTION DRIVE  
TOP LEFT (SDTL)**  
mounting surface  
for load shown UP

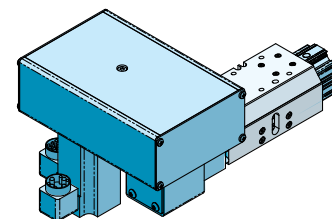


**REDUCTION DRIVE  
TOP RIGHT (SDTR)**  
mounting surface  
for load shown UP

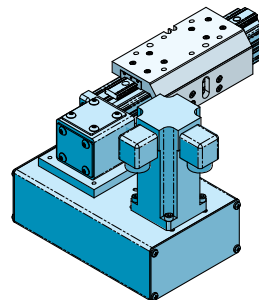
### MXB-P



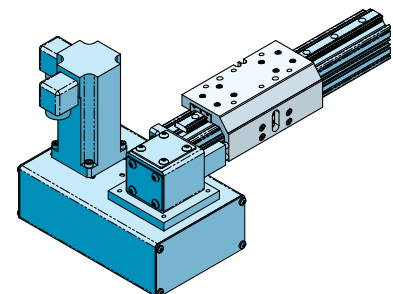
**REDUCTION DRIVE  
RIGHT BOTTOM (SDBR)**  
mounting surface  
for load shown UP



**REDUCTION DRIVE  
LEFT BOTTOM (SDLB)**  
mounting surface  
for load shown UP



**REDUCTION DRIVE  
RIGHT TOP (SDRT)**  
mounting surface  
for load shown UP



**REDUCTION DRIVE  
LEFT TOP (SDLT)**  
mounting surface  
for load shown UP

 See [tolomatic.com](http://tolomatic.com) for 3D solid model(s) with motor mounting dimensions

# MXB Rodless Belt Drive Actuator

## SWITCHES SPECIFICATIONS



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. The magnet and magnet hardware are located on the carrier. See the dimensional drawings on page **MXB\_25** for details of magnet and switch locations. Switches and magnets 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	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	<b>R Y</b>	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
	<b>R K</b>	QD*											
	<b>N Y</b>	5m	SPST Normally Closed	—	Yellow	5 - 110 AC/DC							
	<b>N K</b>	QD*											
SOLID STATE	<b>T Y</b>	5m	PNP (Sourcing) Normally Open	Green	Yellow	10 - 30 VDC	**3.0	100mA	20 mA @ 24V	2.0 V max.	0.05 mA max.		
	<b>T K</b>	QD*											
	<b>K Y</b>	5m	NPN (Sinking) Normally Open	Green	Red								
	<b>K K</b>	QD*											
	<b>P Y</b>	5m	PNP (Sourcing) Normally Closed	Green	Yellow								
	<b>P K</b>	QD*											
	<b>H Y</b>	5m	NPN (Sinking) Normally Closed	Green	Red								
	<b>H K</b>	QD*											

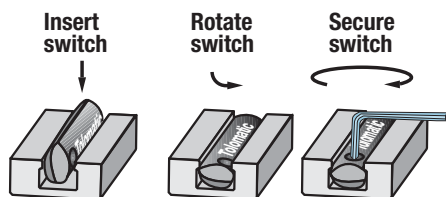
\*QD = Quick-disconnect

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.

## SWITCH INSTALLATION AND REPLACEMENT

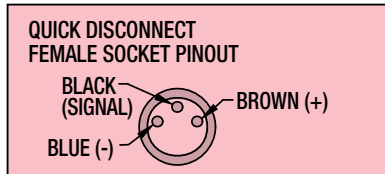
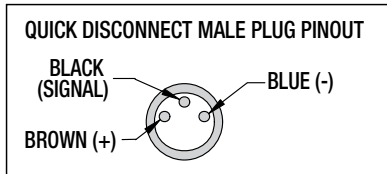
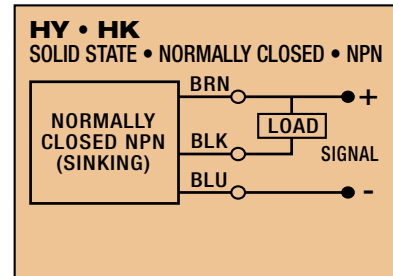
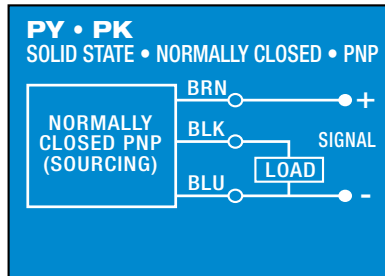
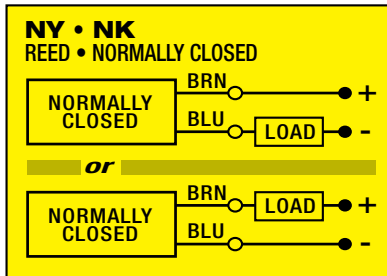
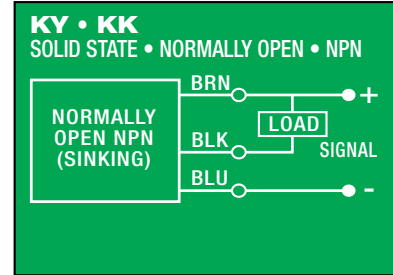
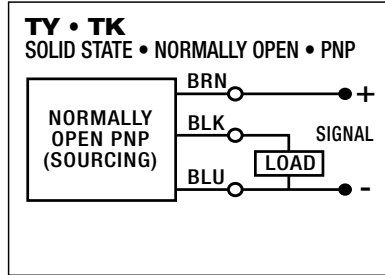
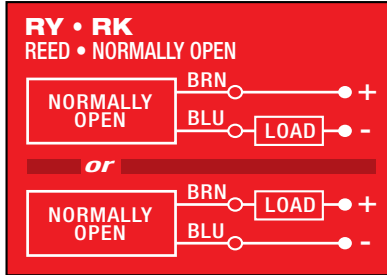


Place switch in side groove on tube at desired location with "Tolomatic" facing outward. While applying light pressure to the switch, rotate the switch halfway into the groove. Maintaining light pressure, rotate the switch in the opposite direction until it is fully inside the groove with "Tolomatic"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

# MXB Rodless Belt Drive Actuator

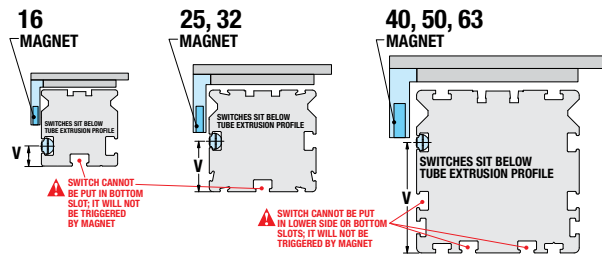
## SWITCHES

### WIRING DIAGRAMS

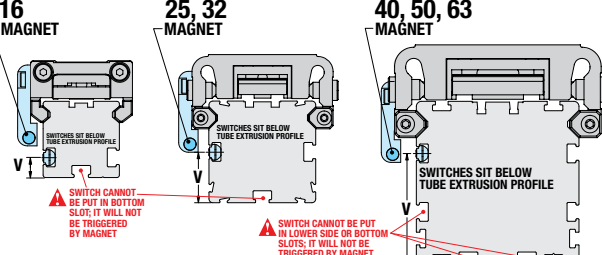


### MOUNTING DIMENSIONS

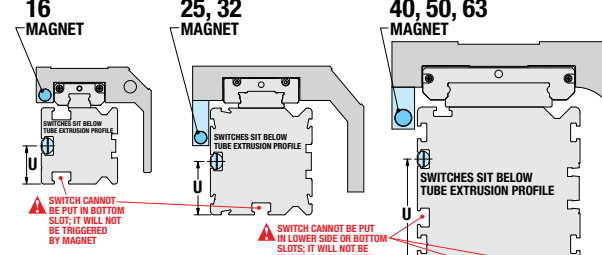
#### MXB-U



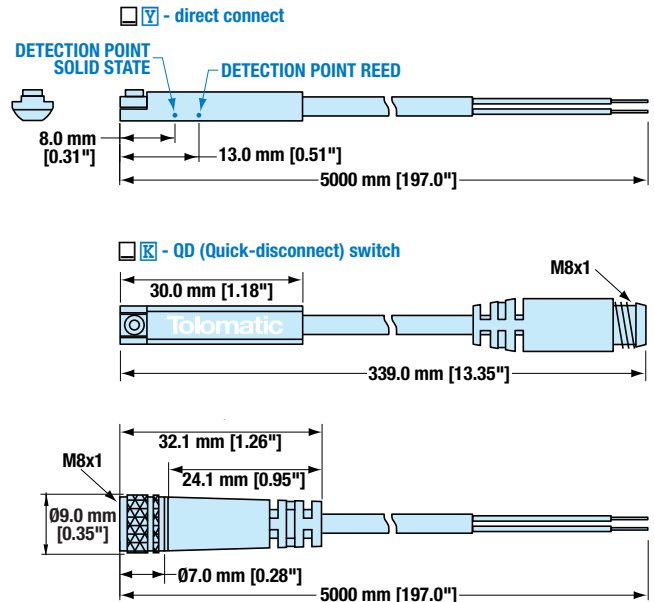
#### MXB-S



#### MXB-P



### SWITCH DIMENSIONS



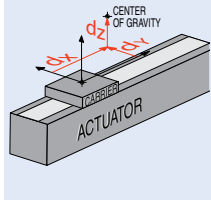
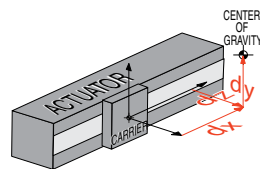
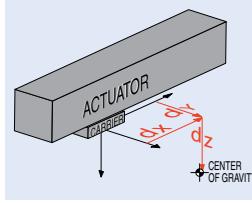
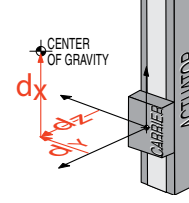
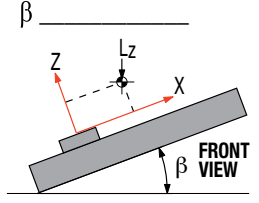
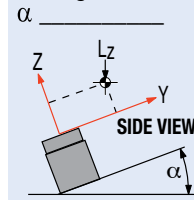
### SWITCH MOUNTING

mm	MXB16	MXB25	MXB32	MXB40	MXB50	MXB63
U	15.0	21.0	27.7	43.5	51.4	62.0
V	7.9	20.0	27.0	43.5	51.4	62.0
in	MXB16	MXB25	MXB32	MXB40	MXB50	MXB63
U	0.59	0.83	1.09	1.71	2.02	2.44
V	0.31	0.79	1.06	1.71	2.02	2.44

NOTE: When ordering switches as a service part, Magnet Housing Kit (light blue in drawings) is required if actuator was not originally ordered with switches.

# COMPILE APPLICATION REQUIREMENTS

## ORIENTATION

 Horizontal

 Side

 Horizontal Down

 Vertical

 Angled °

 Load attached to carrier OR  Load supported by other mechanism

## DISTANCE FROM CENTER OF CARRIER TO LOAD CENTER OF GRAVITY

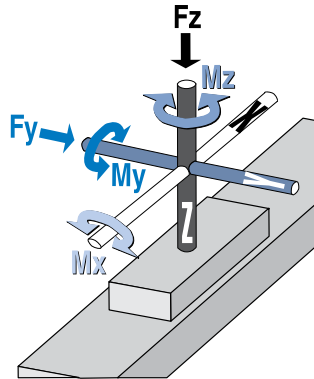
 $d_x$  \_\_\_\_\_  
 $d_y$  \_\_\_\_\_  
 $d_z$  \_\_\_\_\_

 inch  
 (U.S. Standard)

 millimeter  
 (Metric)

## STROKE LENGTH

 inch (SI)  
 (U.S. Standard)

 millimeters  
 (Metric)


## BENDING MOMENTS APPLIED TO CARRIER

 in.-lbs.  
 (U.S. Standard)

 N-m  
 (Metric)

 $M_x$  \_\_\_\_\_  
 $M_y$  \_\_\_\_\_  
 $M_z$  \_\_\_\_\_

## PRECISION

Repeatability \_\_\_\_\_

 inch

 millimeters

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

## LOAD

 lb.  
 (U.S. Standard)

 kg.  
 (Metric)

## THRUST REQUIRED

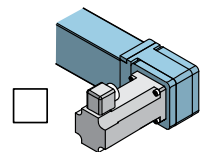
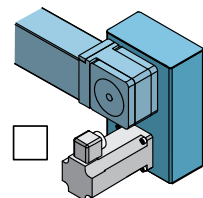
 lbf.  
 (U.S. Standard)

 N  
 (Metric)

 $F_z$  \_\_\_\_\_  
 $F_y$  \_\_\_\_\_

## OPERATING ENVIRONMENT

Temperature, Contamination, etc.


 Direct Drive

 Reduction Drive

## MOVE PROFILE

Move Distance \_\_\_\_\_

 inch

 millimeters

Dwell Time After Move \_\_\_\_\_

 in/sec

 mm/sec

Max. Speed \_\_\_\_\_

 in/sec

 mm/sec

## MOVE TIME

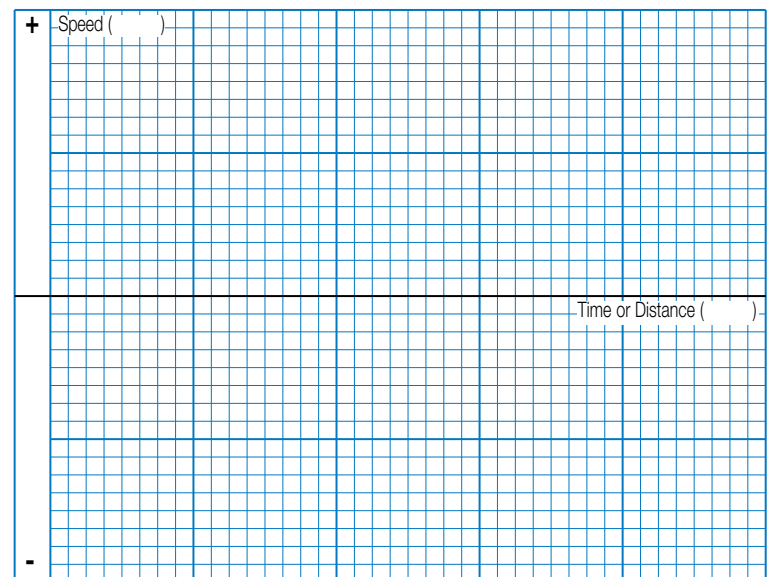
 sec

## NO. OF CYCLES

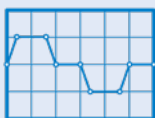
 per minute

 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.



## USE THE TOLOMATIC SIZING AND SELECTION SOFTWARE AVAILABLE ON-LINE AT

[www.tolomatic.com](http://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

## CONTACT INFORMATION

Name, Phone, Email  
 Co. Name, Etc.

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# SELECTION GUIDELINES

The process of selecting a belt drive 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 SIZE

Choose an actuator that has the thrust, speed and moment load capacity to move the load.

- A) For maximum thrust use the table below.
- B) Max. speed of MXB-U 200 in/sec (5 m/sec); Max. speed of MXB-S 100 in/sec (2.5 m/sec) Max. speed of MXB-P 150 in/sec (3.8 m/sec).
- C) For MXB-S moment and load capacities see tables on page [MXB\\_12](#). For MXB-P moment and load capacities see tables on page [MXB\\_13](#).

SIZE	MAXIMUM THRUST	
	lbf	N
16	38	169
25	151	672
32	209	930
40	250	1112
50	325	1446
63	418	1859

## 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  $M_x$ ,  $M_y$ , and  $M_z$  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 improved actuator performance and application safety. If either load or any of the moments exceed figures indicated in the Moment and Load Capacity tables (page [MXB\\_12](#) & [13](#)) for the actuator consider:

- 1) A higher capacity carrier (i.e. **S** to **P**)
- 2) A larger actuator size
- 3) Auxiliary carrier
- 4) External guide system (if the load is externally supported and guided, consider using MXB-U)

## 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.

$$L_f = \frac{M_x}{M_{x_{max}}} + \frac{M_y}{M_{y_{max}}} + \frac{M_z}{M_{z_{max}}} + \frac{F_y}{F_{y_{max}}} + \frac{F_z}{F_{z_{max}}} \leq 1$$

If  $L_f$  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  $1200 \text{ in/sec}^2$  ( $30.48 \text{ m/sec}^2$ ). Also, do not exceed safe rates of dynamic inertia moments determined in step #3.

## 5 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.

## 6 DETERMINE MOUNTING PLATE REQUIREMENTS

- Consult the Mounting Plate Requirements graph for the model selected (page [MXB\\_11](#))
- Cross reference the application load and maximum distance between supports
- Select the appropriate number of mounting plates

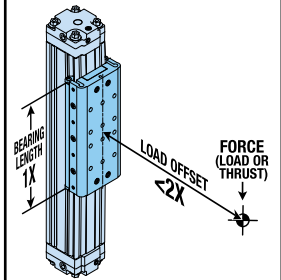
## 7 CONSIDER OPTIONS

- Choose metric or inch (U.S. standard) load mounting. When ordering use **SIX** for inch and **SIM** for metric.
- Switches - Reed, Solid State PNP or NPN, all available normally open or normally closed
- **FL** 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 MXB actuators)

## 8 CONSIDER ORIENTATION

Belt drives used in vertical applications will not prevent a load falling in the event of a timing belt failure. A secondary safety measure is recommended if a MXB is used in a safety critical vertical application.

### **S** SOLID BEARING 2:1 RULE



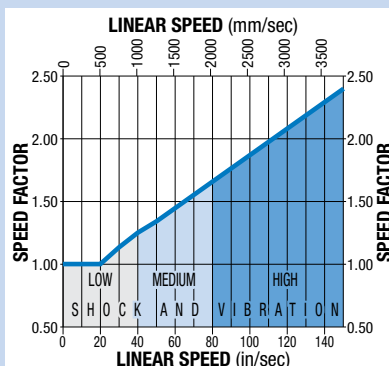
For applications using **S** solid bearings, binding or interrupted motion may occur if the load offset is equal to or greater than twice the bearing length (1X). *LOAD OFFSET is defined as: the distance from the applied force (or the load center of gravity) to the centerline of the carrier.*

If the load offset cannot be changed consider:

- 1.) Higher capacity bearing style, i.e. **S** to **P**
- 2.) Larger actuator size
- 3.) Auxiliary carrier
- 4.) Add external guides

## 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.



# MXB Rodless Belt Drive Actuators

## SERVICE PARTS ORDERING

### SWITCHES

Switches for MXB include retained mounting hardware and are the same for all actuator sizes and bearing styles

Code	Lead	Normally	Sensor Type
<b>R</b> <b>Y</b>	5m (197 in)	Open	Reed
<b>R</b> <b>K</b>	Quick-disconnect		
<b>N</b> <b>Y</b>	5m (197 in)	Closed	Reed
<b>N</b> <b>K</b>	Quick-disconnect		
<b>T</b> <b>Y</b>	5m (197 in)	Open	Solid State PNP
<b>T</b> <b>K</b>	Quick-disconnect		
<b>K</b> <b>Y</b>	5m (197 in)	Open	Solid State NPN
<b>K</b> <b>K</b>	Quick-disconnect		
<b>P</b> <b>Y</b>	5m (197 in)	Closed	Solid State PNP
<b>P</b> <b>K</b>	Quick-disconnect		
<b>H</b> <b>Y</b>	5m (197 in)	Closed	Solid State NPN
<b>H</b> <b>K</b>	Quick-disconnect		

NOTE: All switch kits include retained hardware. Quick-disconnect kits include female connector

**⚠** NOTE: When ordering switches as service part, Magnet Housing Kit is required if actuator was not originally ordered with switches

To order switch kit use configuration code for switch preceded by SW and actuator code.

EXAMPLE: **S****W****M****X****B****2****5****K****K**

KIT
ACTUATOR
SIZE
SWITCH CODE

The example is for Solid State NPN, Normally Open Switch with Quick-disconnect couplers. Each switch kit is complete with Bracket, Set Screw, Switch and mating QD cable. Note that the bracket/switch size is common and may be used on any size MXB.

[Check out our MX--S carrier adjustment video on the web](https://youtu.be/LVWPg2qfy0A)  
<https://youtu.be/LVWPg2qfy0A>

Select a complete system from tolomatic or add any motion system to Tolomatic's actuators



**YOUR MOTOR HERE® MADE-TO-ORDER MOTOR MOUNTS.**

- Tolomatic will provide a motor-specific interface for nearly any motor.

Visit [www.tolomatic.com/ymh](http://www.tolomatic.com/ymh) to find your motor/actuator match!

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www.jvl.dk

**Nidec**  
CONTROL TECHNIQUES

# MXB Rodless Belt Drive Actuators

tolomatic.com/ask  
 Technical support  
 before and after  
 purchase



## ORDERING

MODEL SELECTION (MUST BE IN THIS ORDER)

**MXB 40 P BWS30 SM2007-02**

OPTIONS (IN ANY ORDER)

**SDB DC215-9 MP8 HC2 TK2**

**MODEL**  
 MXB MX Rodless Belt Drive Actuators

**SERIES**  
 16 Series actuator    40 Series actuator  
 25 Series actuator    50 Series actuator  
 32 Series actuator    63 Series actuator

**BEARING**  
 U Unguided Carrier  
 S Solid Bearing Carrier  
 P Profiled Rail Bearing Carrier

**BELT MATERIAL AND WIDTH**  
 BWS10 10 mm Urethane Steel (MXB16)  
 BWS18 18 mm Urethane Steel (MXB25)  
 BWS25 25 mm Urethane Steel (MXB32)  
 BWS30 30 mm Urethane Steel (MXB40)  
 BWS40 40 mm Urethane Steel (MXB50)  
 BWS50 50 mm Urethane Steel (MXB63)

**STROKE LENGTH & MOUNTING TYPE**  
 SK \_\_\_\_\_ Stroke, enter desired stroke length in **inches**  
 SM† \_\_\_\_\_ Stroke, enter desired stroke length in **millimeters**  
 GPB Blank Plate (MXB-U only)  
 NO MOUNTING HOLES allowing user to drill and tap as needed  
**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**

† The metric version provides metric tapped holes for mounting of the load to the carrier and of the actuator to mounting surfaces

NOTE: Brakes mounted on reduction drives (especially in vertically positioned actuators) will not prevent back driving of the screw and the load falling under gravity in the event of a timing belt failure. An inline motor mount with a fail-safe brake mounted directly to the actuator shaft or a special geared or thru-shaft reduction drive construction should be considered if a brake is required in a safety critical application. Contact Tolomatic for alternative reduction drive brake mounting options.

Gearheads may be used with reduction drives. However, the torque on the belt and internal reduction drive components must remain below the capabilities of the assembly to prevent belt slipping or premature failure. Contact Tolomatic for additional information if required.

**U & S MOTOR MOUNTING/REDUCTION**  
 (must choose one)  
 SDL, SDLD\* Direct Drive on Left  
 SDR, SDRD\* Direct Drive on Right  
**▲ A motor size and code must be selected when specifying a 3:1 reduction. (2:1 reduction on MXB16)**  
 SDTL, SDTLD\* 3:1 Reduction on Top Left  
 SDTR, SDTRD\* 3:1 Reduction on Top Right  
 SDBL, SDBLD\* 3:1 Reduction on Left Bottom  
 SDBR, SDBRD\* 3:1 Reduction on Right Bottom  
**\*For Dual Stub Shaft Option**

**P MOTOR MOUNTING / REDUCTION**  
 (must choose one)  
 SDT, SDTD\* Direct Drive on Top  
 SDB, SDBD\* Direct Drive on Bottom  
**▲ A motor size and code must be selected when specifying a 3:1 reduction. (2:1 reduction on MXB16)**  
 SDLT, SDLTD\* 3:1 Reduction on Left Top  
 SDRT, SDRTD\* 3:1 Reduction on Right Top  
 SDLB, SDLBD\* 3:1 Reduction on Left Bottom  
 SDRB, SDRBD\* 3:1 Reduction on Right Bottom  
**\*For Dual Stub Shaft Option**

**AUXILIARY CARRIER**  
 DC \_\_\_\_\_ Auxiliary Carrier, (MXB-P only) 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**

**HEAD COVER PLATES**  
 HC2 Head Cover Plates

**MOUNTING**  
 MP\_ Mounting Plates, & quantity  
 TC\_ Tube Clamps, & quantity  
 NOTE: The MXB requires Mounting Plates to allow clearance for motor when mounted flush to surface.  
 16,25,32 sizes use T-Nuts with Mounting Plates.  
 40,50,63 sizes use Tube Clamps with Mounting Plates.

**P CARRIER ORIENTATION**  
 BIR Mirrored Carrier Design

**MOTOR / DRIVE / CONTROLLER / PLANETARY GEARBOX**  
**▲ Reference the ordering pages in Tolomatic Electric Product Brochures Stepper Products Brochure #3600-4160 & Planetary Gearbox Doc. #3600-4161**

		SWITCHES				QUANTITY	LEAD LENGTH
TYPE	LOGIC	NORMALLY	QUICK-DISCONNECT	CODE			
REED	SPST	Open	no	RY	After code enter quantity desired	5 meters (16.4 feet)	
			QD	RK			
SOLID STATE	PNP	Open	no	TY			
			QD	TK			
	NPN	Open	no	KY			
			QD	KK			
	PNP	Closed	no	PY			
			QD	PK			
NPN	Closed	no	HY				
		QD	HK				

**▲ 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.**

# The Tolomatic Difference Expect More From the Industry Leader:



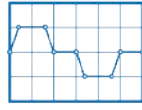
## INNOVATIVE PRODUCTS

Solutions with Endurance Technology<sup>SM</sup> for challenging applications.



## FAST DELIVERY

Built-to-order with configurable stroke lengths and flexible mounting options.



## ACTUATOR SIZING

Size and select electric actuators with our online software.



## YOUR MOTOR HERE<sup>®</sup>

Match your motor to compatible mounting plates with Tolomatic actuators.



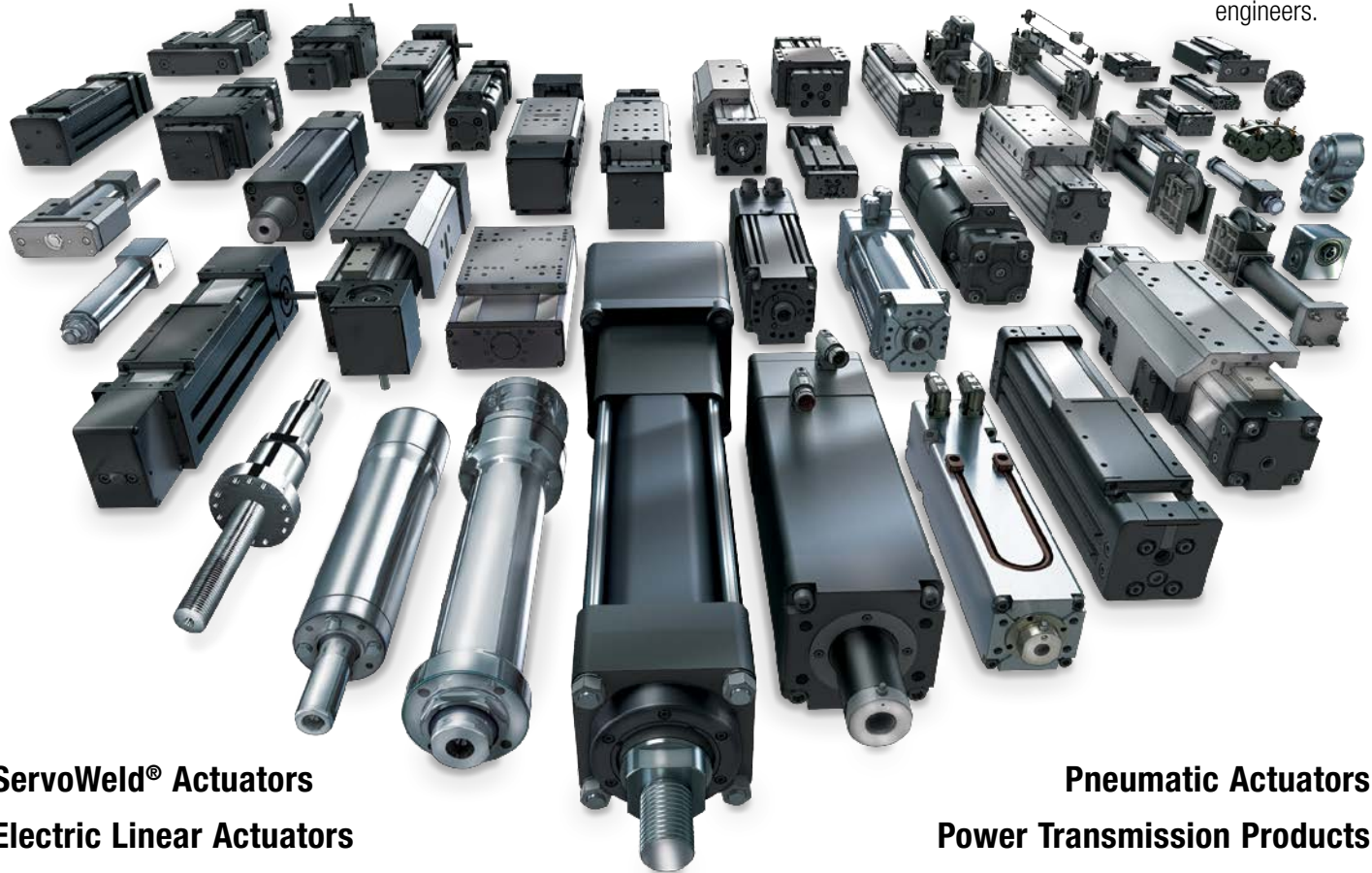
## CAD LIBRARY

Download 2D or 3D CAD files for Tolomatic products.



## TECHNICAL SUPPORT

Get a question answered or request a virtual design consultation with one of our engineers.



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**Electric Linear Actuators**

**Pneumatic Actuators**  
**Power Transmission Products**



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