Tolomatic™
EXCELLENCE *IN MOTION*

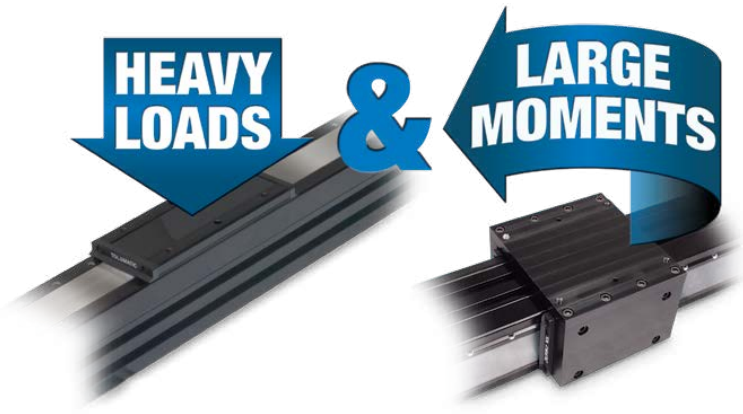
B3S & B3W ELECTRIC RODLESS ACTUATORS

ENDURANCE TECHNOLOGY℠
A Tolomatic Design Principle

B3S SCREW-DRIVE
B3W BELT-DRIVE

LINEAR SOLUTIONS MADE EASY

Tolomatic B3S & B3W Electric Rodless Actuators



The Power to Move Heavy Loads

The B3S and B3W electric rodless actuators have very large moment and load carrying capacities. The sealed recirculating ball bearing design makes it an excellent choice for challenging environments. For even higher capacity (loads up to 3,629 kg.) choose the Dual 180° Carrier and add an auxiliary carrier. Both actuators utilize a patented internal re-circulating ball bearing guidance system that provides extremely long life. These actuators are capable of carrying loads up to 3,629 kg [8,000 lbs].

A COMPARISON OF SCREW DRIVE ACTUATORS

	TKS	B3S	MXE-S	MXE-P
				
Features:	Superior rigidity, high moment load capacities	High load and bending moment capacities	Basic guidance and support	High load and bending moment capacities
Load up to: *(with options)*	0.89 kN [200 lbf]	35.6 kN [8,000 lbf]	4.6 kN [1,040 lbf]	11.5 kN [2,584 lbf]
Thrust up to:	14.5 kN [3,260 lbf]	12 kN [2,700 lbf]	19.1 kN [4,300 lbf]	19.1 kN [4,300 lbf]
Speed up to:	0.76 m/sec [30 in/sec]	1.5 m/sec [60 in/sec]	1.5 m/sec [60 in/sec]	1.5 m/sec [60 in/sec]
Stroke Length up to:	2.4 m [96 in]	4.5 m [179 in]	4.5 m [178 in]	4.5m [178 in]
Screw/Nut Type	Solid & Ball	Solid & Ball	Solid & Ball	Solid & Ball
	www.tolomatic.com for complete information, search by literature number:			
Literature Number:	3600-4609	3600-4176	8300-4000	8300-4000

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

A COMPARISON OF BELT DRIVE ACTUATORS

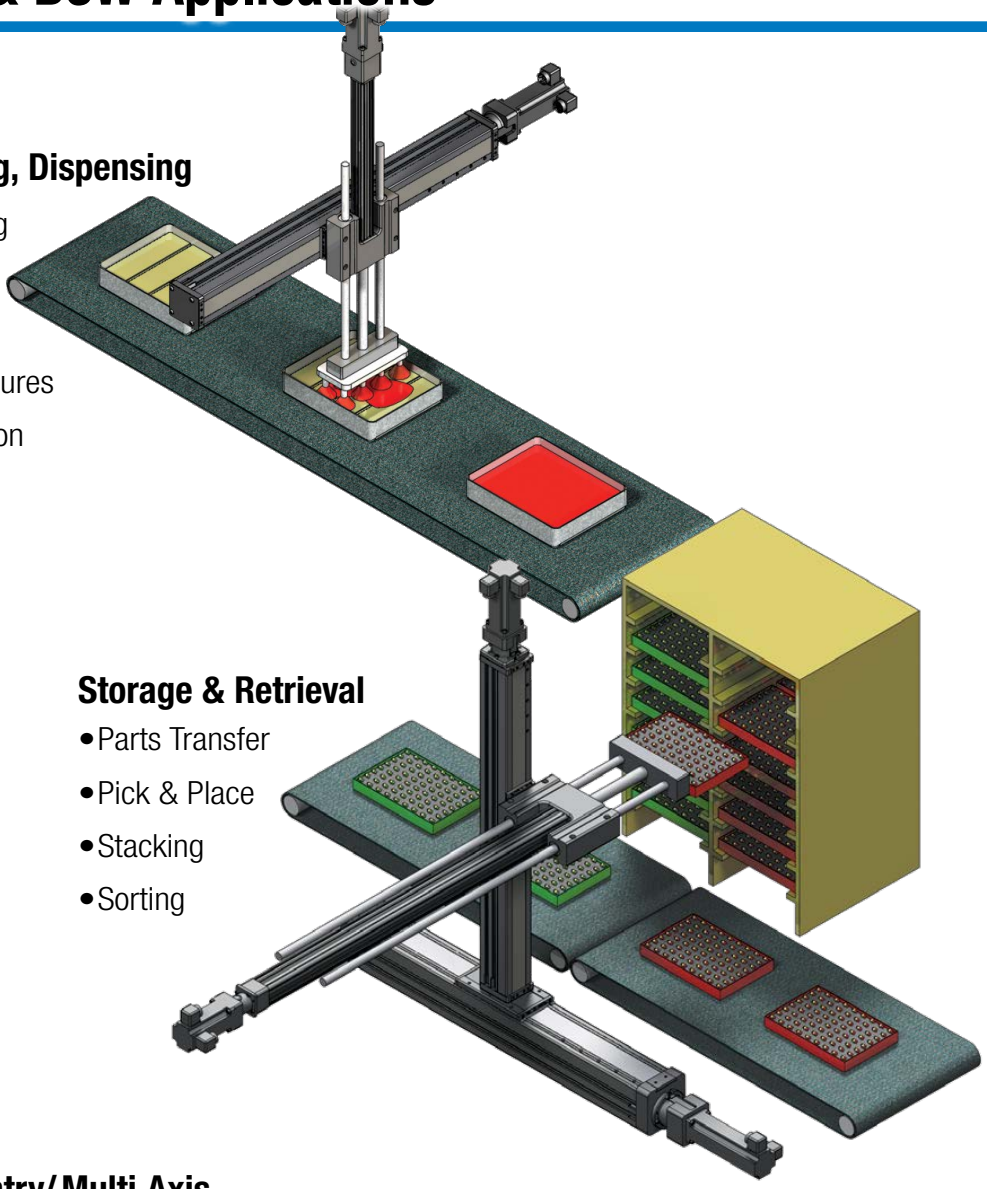
	B3W	MXB-U	MXB-P
			
Features:	High load and bending moment capacities	Basic thrust, requires external guidance and support	High load and bending moment capacities
Load up to: *(with options)*	35.6 kN [8,000 lbf]	NA	11.5 kN [2,584 lbf]
Thrust up to:	1.4 kN [325 lbf]	1.9 kN [418 lbf]	1.9 kN [418 lbf]
Speed up to:	5.1 m/sec [200 in/sec]	5.1 m/sec [200 in sec]	3.9 m/sec [150 in/sec]
Stroke Length up to:	5.3 m [207 in]	5.8 m [230 in]	5.8 m [230 in]
	www.tolomatic.com for complete information, search by literature number:		
Literature Number:	3600-4176	8500-4000	8500-4000

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

B3S & B3W Applications

Applying, Dispensing

- Spraying
- Cutting
- Slitting
- Test Fixtures
- Inspection

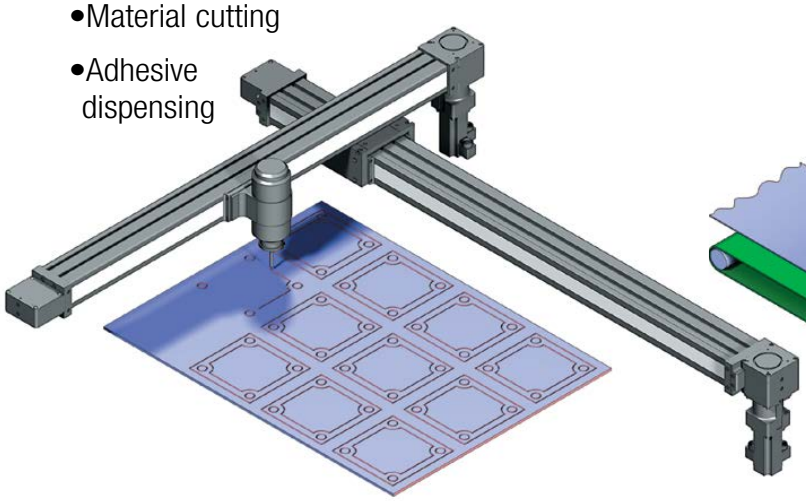


Storage & Retrieval

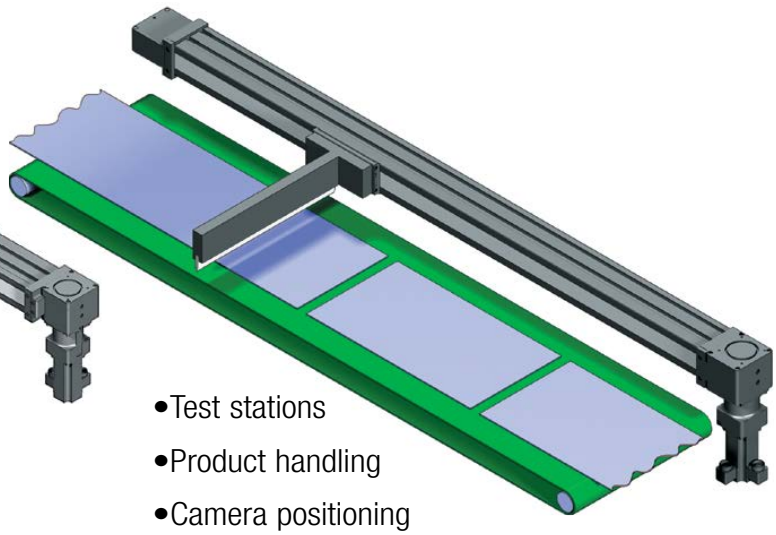
- Parts Transfer
- Pick & Place
- Stacking
- Sorting

X-Y Gantry/ Multi Axis

- Laser marking
- Material cutting
- Adhesive dispensing



High Speed Flying Cut Off



- Test stations
- Product handling
- Camera positioning

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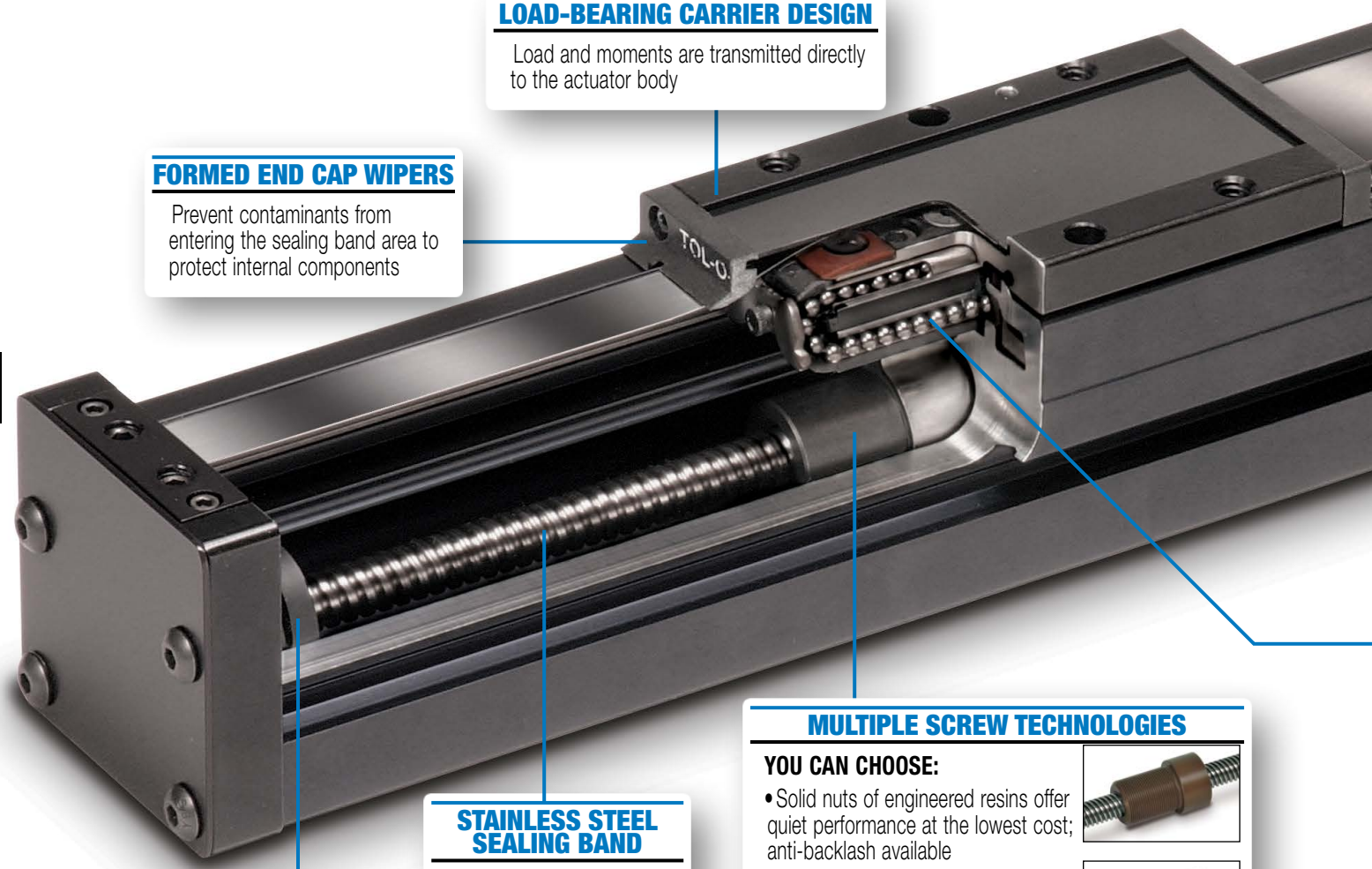
B3S RODLESS SCREW DRIVE ACTUATOR

ENDURANCE TECHNOLOGY℠

A Tolomatic Design Principle

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

The B3S rodless screw-drive electric actuator is designed for carrying moderate to heavy loads with large bending moment capacity. The B3S utilizes an integral recirculating ball bearing guidance system that provides durable performance and extremely long life. Choose from multiple screw technologies for thrust up 12 kN [2,700 lbf]. Built-to-order in stroke lengths up to 4.5 m [179 inches].



LOAD-BEARING CARRIER DESIGN

Load and moments are transmitted directly to the actuator body

FORMED END CAP WIPERS

Prevent contaminants from entering the sealing band area to protect internal components

INTERNAL BUMPERS

Bumpers protect the screw and nut assembly from damage at end of stroke

STAINLESS STEEL SEALING BAND

- Prevents contaminants from entering the screw and nut area for extended performance
- Fatigue resistant stainless steel bands are specifically made to offer long life and will not elongate
- Provides IP44 protection for bearings and screw nut

MULTIPLE SCREW TECHNOLOGIES

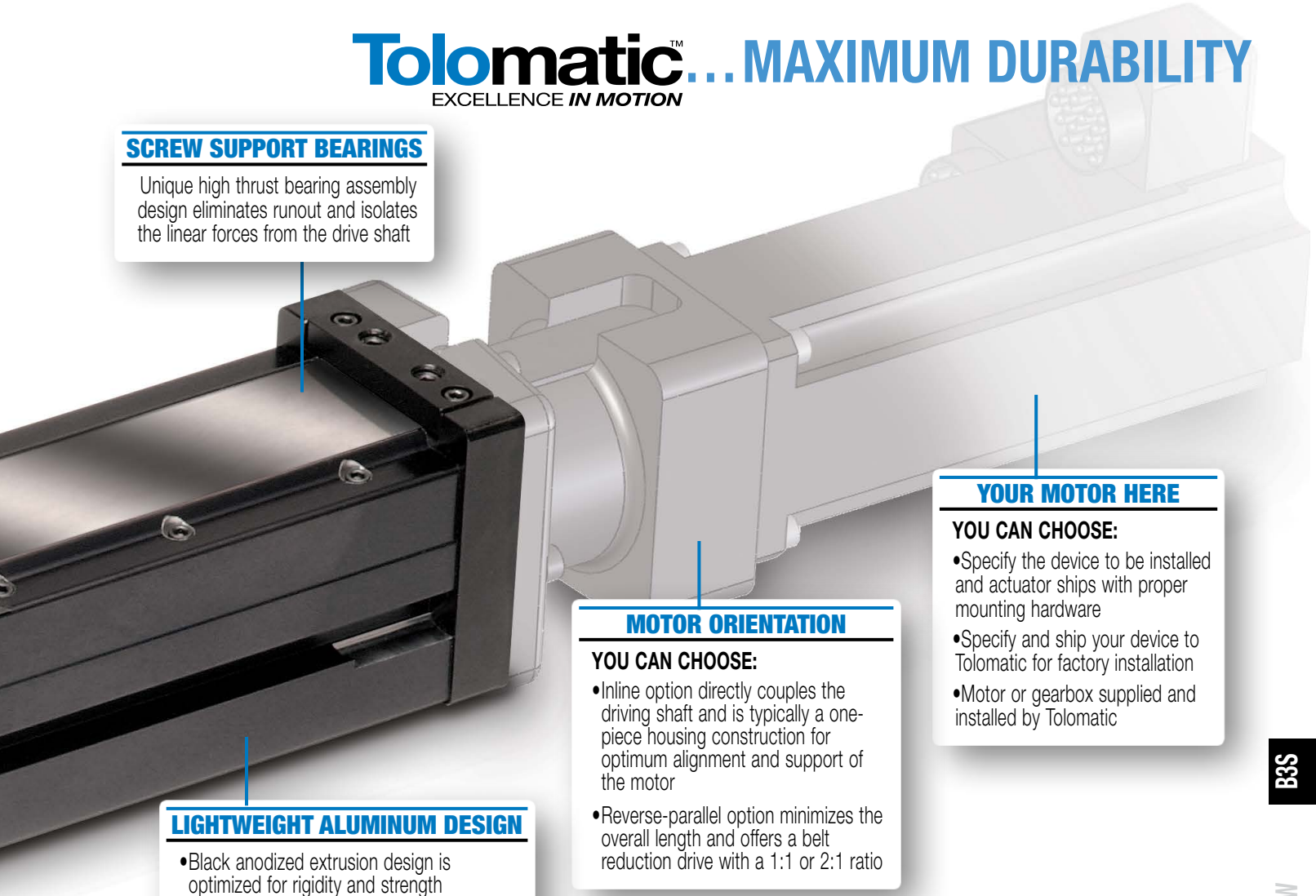
YOU CAN CHOOSE:

- Solid nuts of engineered resins offer quiet performance at the lowest cost; anti-backlash available

- Ball nuts offer positioning accuracy and repeatability with longer life; low-backlash available

SCREW SUPPORT BEARINGS

Unique high thrust bearing assembly design eliminates runout and isolates the linear forces from the drive shaft



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 or gearbox supplied and installed by Tolomatic

MOTOR ORIENTATION

YOU CAN CHOOSE:

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

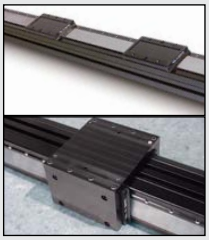
LIGHTWEIGHT ALUMINUM DESIGN

- Black anodized extrusion design is optimized for rigidity and strength
- External switch channels on both sides allow easy placement and adjustment of position indicating switches

RECIRCULATING BALL BEARING SYSTEM

- Unique design incorporates hardened steel raceways integral to the aluminum extrusion
- Bearing surfaces are adjusted at the factory for optimum preload and smooth performance
- Recirculating ball bearing system provides guidance, high efficiency and durability

OPTIONS



CARRIER OPTIONS

- **AUXILIARY CARRIER** doubles the load capacity and increases pitch and yaw bending moment capacities
- **DUAL 180° CARRIER** doubles the load capacity, increases roll and yaw bending moment capacities and offers a wide mounting platform

MOUNTING OPTIONS

- **SURFACE MOUNT** two t-slots are integral on the entire underside of the actuator body for direct mounting
- **TUBE SUPPORTS** provide intermediate support of the actuator body throughout long stroke lengths
- **MOUNTING PLATES** provide intermediate support of the actuator body throughout long stroke lengths

METRIC OPTION

Provides metric tapped holes for mounting of load to carrier and of actuator to mating surfaces

SWITCHES

Styles include: reed, hall-effect or triac. Select either 5 m potted cable with flying leads or 150 mm to quick-disconnect coupler with mating 5 m cable

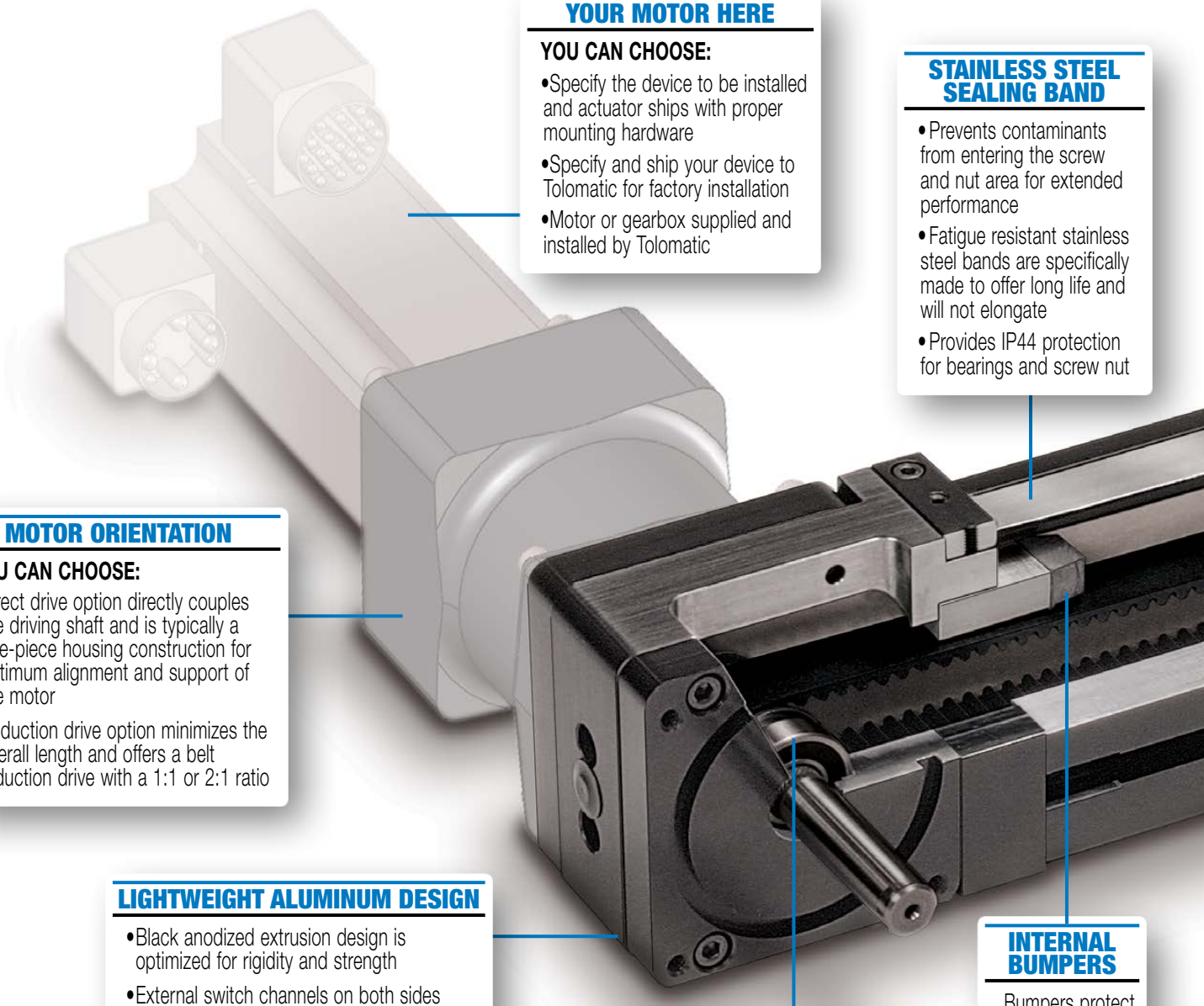
B3W RODLESS BELT-DRIVE ACTUATOR

ENDURANCE TECHNOLOGY℠

A Tolomatic Design Principle

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

The B3W rodless belt-drive electric actuator is designed for carrying moderate to heavy loads at moderate to high speeds with large bending moment capacity. The B3W utilizes an integral recirculating ball bearing guidance system that provides durable performance and extremely long life. The B3W belt-driven actuator features speeds up to 5.1 m/sec [200 in/sec]. Built-to-order in stroke lengths up to 5.3 m [207 inches].



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 or gearbox supplied and installed by Tolomatic

STAINLESS STEEL SEALING BAND

- Prevents contaminants from entering the screw and nut area for extended performance
- Fatigue resistant stainless steel bands are specifically made to offer long life and will not elongate
- Provides IP44 protection for bearings and screw nut

MOTOR ORIENTATION

YOU CAN CHOOSE:

- Direct drive option directly couples the driving shaft and is typically a one-piece housing construction for optimum alignment and support of the motor
- Reduction drive option minimizes the overall length and offers a belt reduction drive with a 1:1 or 2:1 ratio

LIGHTWEIGHT ALUMINUM DESIGN

- Black anodized extrusion design is optimized for rigidity and strength
- External switch channels on both sides allow easy placement and adjustment of position indicating switches

OVERSIZED PULLEY BEARINGS

Drive shaft assembly incorporates sealed ball bearings for complete support of the increased belt tension at high speeds

INTERNAL BUMPERS

Bumpers protect the screw and nut assembly from damage at end of stroke

BELT TENSIONING SYSTEM

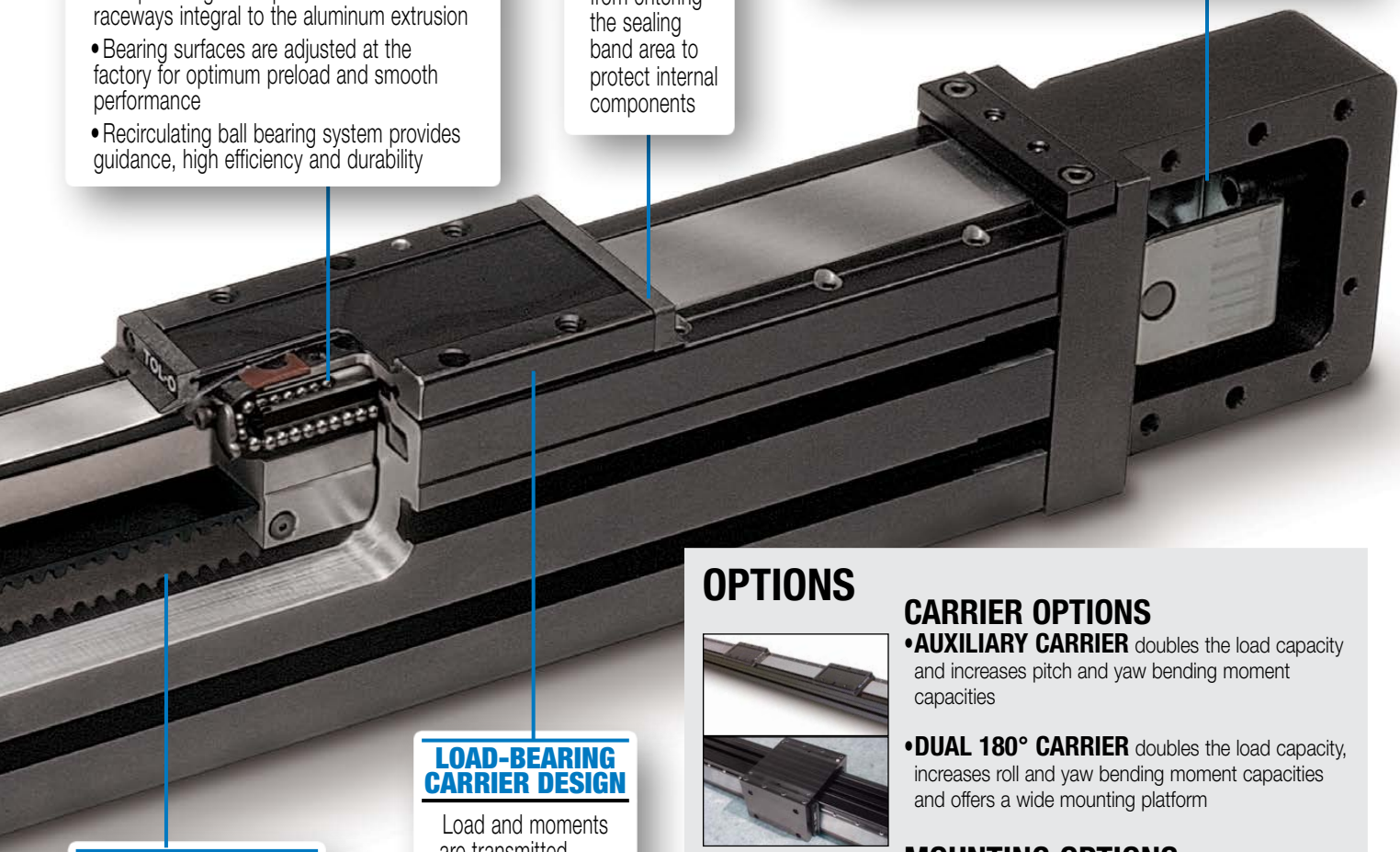
- Full access to the idle pulley allows ease of adjustment for alignment and tensioning
- Dual adjustment screws and field tensioning kit provide simple maintenance

RECIRCULATING BALL BEARING SYSTEM

- Unique design incorporates hardened steel raceways integral to the aluminum extrusion
- Bearing surfaces are adjusted at the factory for optimum preload and smooth performance
- Recirculating ball bearing system provides guidance, high efficiency and durability

FORMED END CAP WIPERS

Prevent contaminants from entering the sealing band area to protect internal components



LOAD-BEARING CARRIER DESIGN

Load and moments are transmitted directly to the actuator body

MULTIPLE BELT TECHNOLOGIES

YOU CAN CHOOSE:

- Polyurethane steel-cord reinforced HTD style belt (standard)
- Polyurethane Kevlar reinforced HTD style belt

OPTIONS

CARRIER OPTIONS

- **AUXILIARY CARRIER** doubles the load capacity and increases pitch and yaw bending moment capacities
- **DUAL 180° CARRIER** doubles the load capacity, increases roll and yaw bending moment capacities and offers a wide mounting platform

MOUNTING OPTIONS

- **SURFACE MOUNT** two t-slots are integral on the entire underside of the actuator body for direct mounting
- **TUBE SUPPORTS** provide intermediate support of the actuator body throughout long stroke lengths
- **MOUNTING PLATES** provide intermediate support of the actuator body throughout long stroke lengths

METRIC OPTION

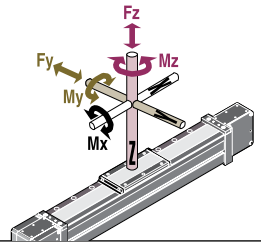
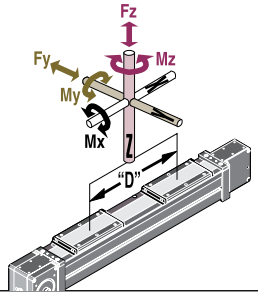
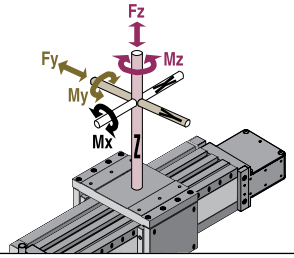
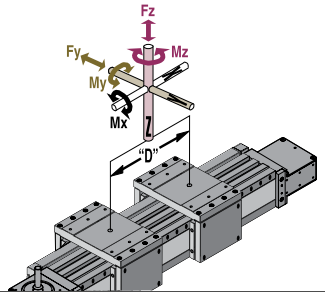
Provides metric tapped holes for mounting of load to carrier and of actuator to mating surfaces

SWITCHES

Styles include: reed, hall-effect or triac. Select either 5 m potted cable with flying leads or 150 mm to quick-disconnect coupler with mating 5 m cable

SPECIFICATIONS both Screw & Belt Drive

DYNAMIC BENDING MOMENTS AND LOADS

			METRIC			U.S. CONVENTIONAL		
SINGLE (STANDARD) CARRIER	**Size**		**10**	**15**	**20**	**10**	**15**	**20**
	**Mx Moment** (Roll)	(N-m : lb-in)	28.2	97	188	250	859	1,662
	My Moment (Pitch)	(N-m : lb-in)	30.4	117	166	269	1,033	1,472
	Mz Moment (Yaw)	(N-m : lb-in)	17.6	67	96	156	596	850
	Fy Load (Radial)	(N : lb)	1,517	3,737	5,155	341	840	1,159
	Fz Load (Lateral)	(N : lb)	2,629	6,468	8,932	591	1454	2008
AUXILIARY CARRIER: Increases rigidity, load-carrying capacity and moments	**Size**		**10**	**15**	**20**	**10**	**15**	**20**
	**Mx Moment** (Roll)	*(N-m : lb-in)	57	194	376	500	1,718	3,324
	My Moment (Pitch)	*(N-m : lb-in)	319	1,326	1,838	2,825	11,734	16,265
	Mz Moment (Yaw)	*(N-m : lb-in)	184	766	1,061	1,630	6,779	9,388
	Fy Load (Radial)	(N : lb)	3,034	7,473	10,311	682	1,680	2,318
	Fz Load (Lateral)	(N : lb)	5,258	12,935	17,864	1,182	2,908	4,016
	Minimum Dimension 'D'	(mm : in)	124	205	206	4.88	8.07	8.10
DUAL 180° CARRIER: Allows 90° rotation of load, adds load bearing surface	**Size**		**10**	**15**	**20**	**10**	**15**	**20**
	**Mx Moment** (Roll)	(N-m : lb-in)	74	279	512	657	2,468	4,527
	My Moment (Pitch)	(N-m : lb-in)	35.3	135	192	312	1,192	1,700
	Mz Moment (Yaw)	(N-m : lb-in)	61	233	333	538	2,066	2,944
	Fy Load (Radial)	(N : lb)	5,258	12,935	17,864	1,182	2,908	4,016
	Fz Load (Lateral)	(N : lb)	3,034	7,473	10,311	682	1,680	2,318
AUXILIARY DUAL 180° CARRIER: Substantially increases moment and loads	**Size**		**10**	**15**	**20**	**10**	**15**	**20**
	**Mx Moment** (Roll)	* (N-m : lb-in)	149	558	1,023	1,314	4,936	9,054
	My Moment (Pitch)	* (N-m : lb-in)	376	1,532	2,121	3,328	13,558	18,776
	Mz Moment (Yaw)	* (N-m : lb-in)	652	2,652	3,675	5,768	23,468	32,530
	Fy Load (Radial)	(N : lb)	10,516	25,871	35,728	2,364	5,816	8,032
	Fz Load (Lateral)	(N : lb)	6,067	14,946	20,622	1,364	3,360	4,636
	Minimum Dimension 'D'	(mm : in)	124	205	206	4.88	8.07	8.10

The Dual 180° carrier requires its own proprietary tube supports and foot mounts. See dimensional information. Breakaway torque will also increase when using the Auxiliary carrier or the Dual 180° carrier options. When ordering, determine working stroke and enter this value into the configuration string. Overall actuator length will automatically be calculated.

Deflection Considerations: In applications where substantial Mx or My moments come into play, deflection of the cylinder tube, carrier and supports must be considered. The deflection factors shown in the Load Deflection charts on the following page are based on cylinder mounted with tube supports at minimum recommended spacing. If more rigidity is desired, refer to the Auxiliary or Dual Carrier options.

***Loads shown in table are at minimum "D" dimension, for ratings with longer "D" dimension see graphs on page B3_10.**

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 1.5 (see formula at right). Exceeding a load factor of 1.5 will diminish the actuator's rated life.

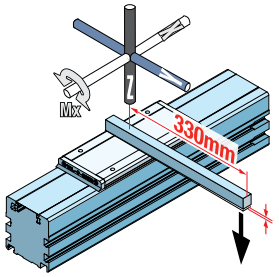
$$L_F = \frac{Mx}{Mx_{max}} + \frac{My}{My_{max}} + \frac{Mz}{Mz_{max}} + \frac{Fy}{Fy_{max}} + \frac{Fz}{Fz_{max}} \leq 1.5$$

With combined loads, L_F must not exceed the value 1.5

SPECIFICATIONS both Screw & Belt Drive

LOAD DEFLECTION

DEFLECTION ABOUT X AXIS

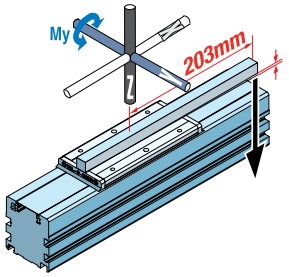


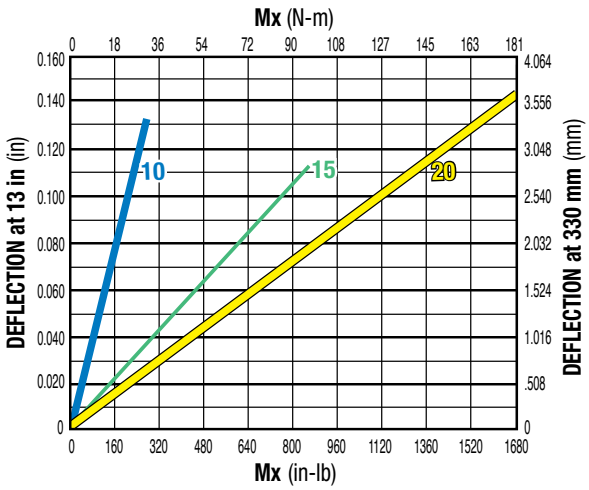
DEFLECTION TESTING WAS DONE UNDER THESE CRITERIA:

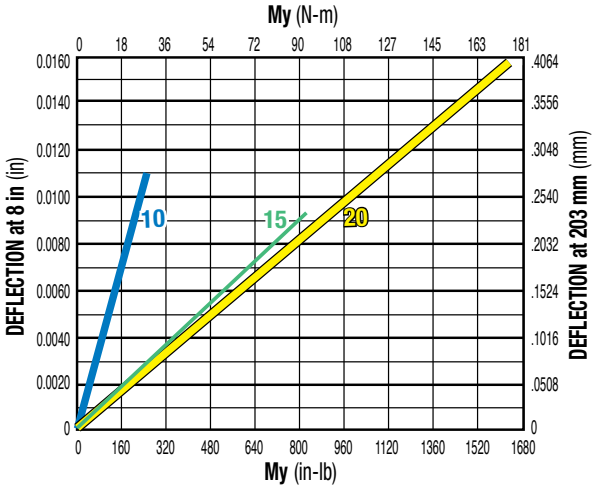
1.) Actuator was properly mounted with distance between supports within recommendations (see Support Recommendations below)

2.) Deflection was measured from center of carrier as shown (Mx = 330mm, My = 203mm)

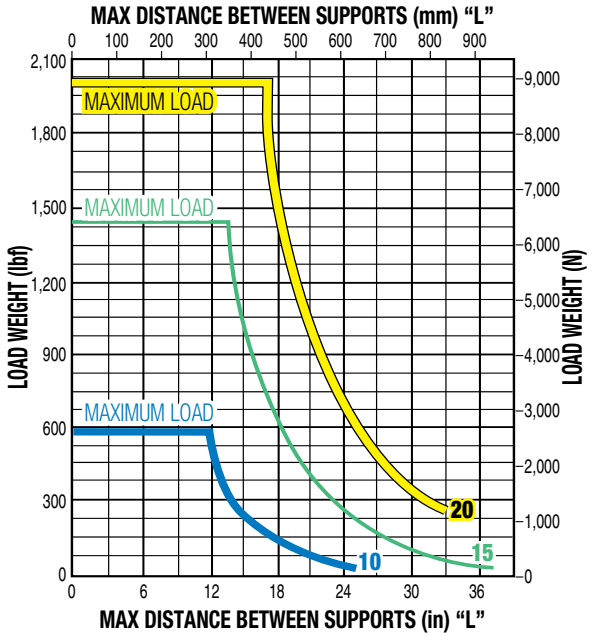
DEFLECTION ABOUT Y AXIS

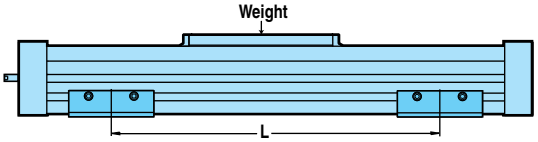




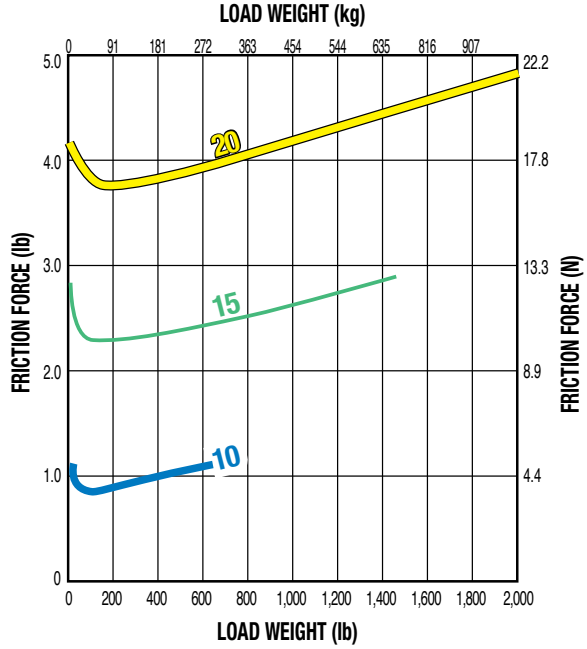


SUPPORT RECOMMENDATIONS





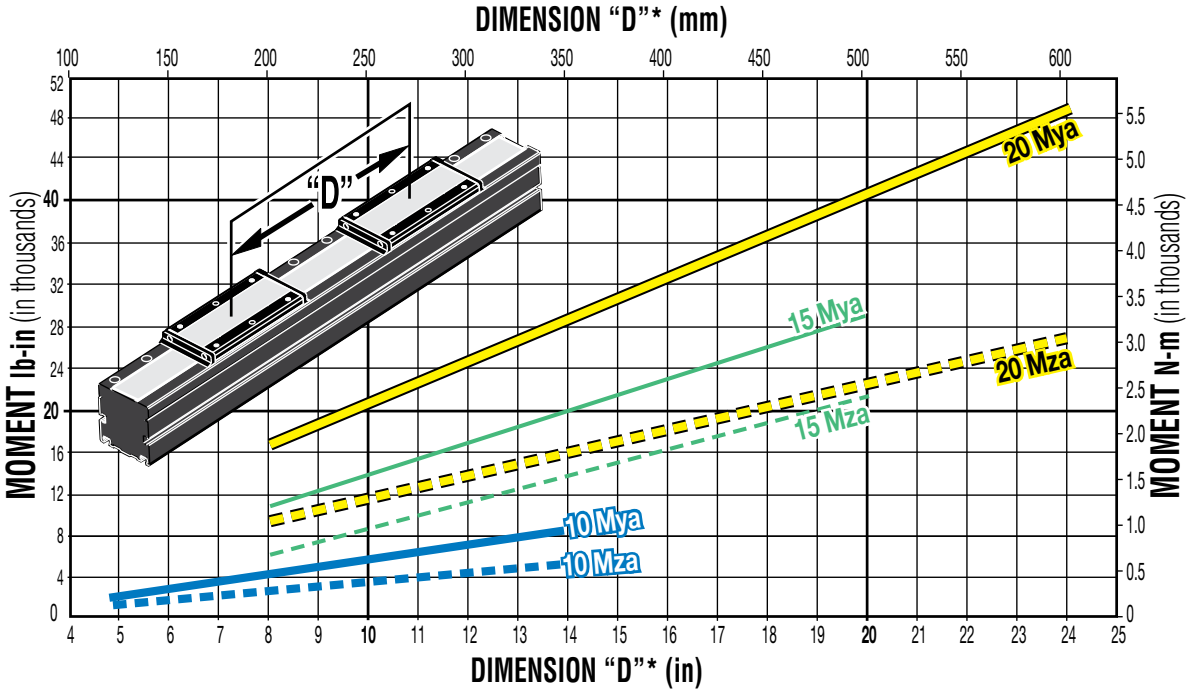
FRICTION FORCE



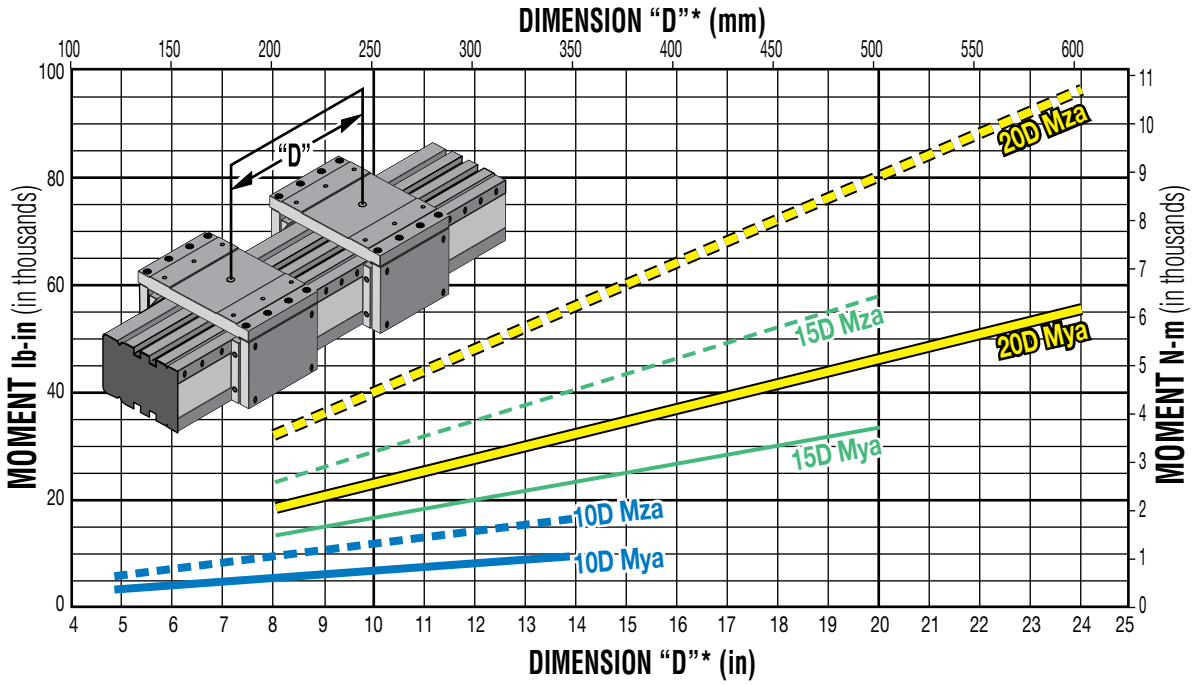
B3S

B3W

AUXILIARY CARRIER: BENDING MOMENT AT 'D' DISTANCE



AUXILIARY DUAL 180° CARRIER: BENDING MOMENT AT 'D' DISTANCE



Rates shown on both graphs were calculated with these assumptions:
1.) Coupling between carriers is rigid.
2.) Load is equally distributed between carriers.
3.) Coupling device applies no misalignment loads to carriers.

* Customer must specify Dimension "D" (Distance between carrier center lines) when ordering.

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 1.5 (see formula at right). Exceeding a load factor of 1.5 will diminish the actuator's rated life.

$$L_F = \frac{Mx}{Mx_{max}} + \frac{My}{My_{max}} + \frac{Mz}{Mz_{max}} + \frac{Fy}{Fy_{max}} + \frac{Fz}{Fz_{max}} \leq 1.5$$

With combined loads, L_F must not exceed the value 1.5

B3S Electric Screw Drive Rodless Actuators

SPECIFICATIONS Related to Actuator Size and Screw Selection

METRIC LEAD SCREWS

	SCREW DIA.	SCREW TYPE	LEAD	LEAD ACCURACY	BACKLASH	MAX THRUST*	MAX STROKE	INERTIA (kg-m² x 10⁻⁶)			BREAKAWAY TORQUE
								BASE ACTUATOR		PER/mm OF STROKE	
	(mm)		(mm/ turn)	(mm/300)	(mm)	(N)	(mm)	In Line	Rev. Parallel		(N-m)
B3S10	10	BNM	10	0.10	0.06	1832	1630	1.14	1.43	0.176	0.13
	12	SN	12.0	0.13	0.18	800	3459	3.03	4.50	0.410	0.20
	12	SN	25.0	0.13	0.18	800	1630	8.54	9.21	0.410	0.28
B3S15	15	SN	12.0	0.13	0.18	900	3388	11.35	12.96	0.966	0.27
	16	BN	5.0	0.13	0.38	7300	3388	11.93	14.04	1.258	0.16
	16	BNL	5.0	0.13	0.05	7300	3388	11.93	14.04	1.258	0.16
	19	SN	25.0	0.13	0.18	1400	3388	34.05	38.26	2.517	0.32
B3S20	20	BN	5.0	0.13	0.38	11700	3337	36.97	39.28	3.102	0.25
	20	BNL	5.0	0.13	0.05	11700	3337	36.97	39.28	3.102	0.25

INCH (US Conventional) LEAD SCREWS

	SCREW DIA.	SCREW TYPE	TPI	LEAD ACCURACY	BACKLASH	MAX THRUST*	MAX STROKE	INERTIA (lb-in²)			BREAKAWAY TORQUE
								BASE ACTUATOR		PER/in OF STROKE	
	(in)		(turns/in)	(in/ft)	(in)	(lbf)	(in)	In Line	Rev. Parallel		(lb-in)
B3S10	0.375	BN	08	0.004	0.015	130	64.2	0.0034	0.0042	0.0005	1.125
	0.375	BNL	08	0.004	0.002	130	64.2	0.0034	0.0042	0.0005	1.125
	0.500	SN	05	0.006	0.007	170	136.2	0.0114	0.0142	0.0017	1.250
	0.500	SN	02	0.005	0.007	170	134.2	0.0159	0.0187	0.0017	1.750
	0.500	SNA	02	0.005	0.003	170	134.2	0.0193	0.0221	0.0017	1.750
	0.500	SN	01	0.006	0.007	170	100.2	0.0320	0.0348	0.0017	2.500
B3S15	0.500	BN	02	0.003	0.015	800	61.4	0.0253	0.0282	0.0017	1.563
	0.500	BNL	02	0.003	0.002	800	61.4	0.0253	0.0282	0.0017	1.563
	0.625	SN	02	0.005	0.007	200	133.4	0.0480	0.0550	0.0042	1.875
	0.625	SNA	02	0.005	0.003	200	133.4	0.0480	0.0550	0.0042	1.875
	0.625	BN	05	0.003	0.015	800	61.4	0.0397	0.0467	0.0042	1.250
	0.625	BNL	05	0.003	0.002	800	61.4	0.0397	0.0467	0.0042	1.250
	0.750	SN	01	0.005	0.007	300	133.4	0.1185	0.1329	0.0087	2.813
B3S20	0.750	BN	02	0.004	0.015	2700	179.4	0.1159	0.1224	0.0087	3.125
	0.750	BNL	02	0.004	0.002	2700	179.4	0.1159	0.1224	0.0087	3.125
	0.750	BN	05	0.003	0.015	950	131.4	0.1045	0.1110	0.0087	2.188
	0.750	BNL	05	0.003	0.002	950	131.4	0.1045	0.1110	0.0087	2.188

SCREW CODE	DESCRIPTION
SN	Solid Nut
SNA	Anti-backlash Solid Nut
BN	Ball Nut
BNL	Low-Backlash Ball Nut

Contact Tolomatic for higher accuracy and lower backlash options.

*** For Acme screws, maximum thrust is the maximum continuous dynamic thrust subject to Thrust x Velocity limitation.**

For ball screws, maximum thrust reflects 90% reliability for 25 million linear millimeters of travel.

B3S Electric Screw Drive Rodless Actuators

SPECIFICATIONS

sizeit.tolomatic.com for fast, accurate actuator selection

METRIC

	WEIGHT		WEIGHT PER UNIT OF STROKE	[1] STRAIGHTNESS & FLATNESS (supported)	[2] TEMPERATURE RANGE	[3] IP RATING
	CARRIER (kg)	BASE (kg)	(g/mm)	(mm)	(°C)	
B3S10	0.40	1.00	5.40	0.00067 x L*	4 - 54	44
B3S15	0.70	3.96	10.18			
B3S20	0.97	6.52	15.73			

INCH (US Conventional)

	WEIGHT		WEIGHT PER UNIT OF STROKE	[1] STRAIGHTNESS & FLATNESS (supported)	[2] TEMPERATURE RANGE	[3] IP RATING
	CARRIER (lbs)	BASE (lbs)	(lbs/in)	(in)	(°F)	
B3S10	0.85	2.15	0.30	0.00067 x L*	40 - 130	44
B3S15	1.56	8.75	0.57			
B3S20	2.15	14.38	0.88			

[1] 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 such deviation, so good engineering practices such as measurement, mapping, etc. must be employed in applications with stringent straightness/flatness requirements.

[2] 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.

[3] Protected against ingress of solid particles greater than .039 in (1mm) and splashing water.

* "L" is maximum distance between supports— See the support recommendation graph on page B3_9.

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.

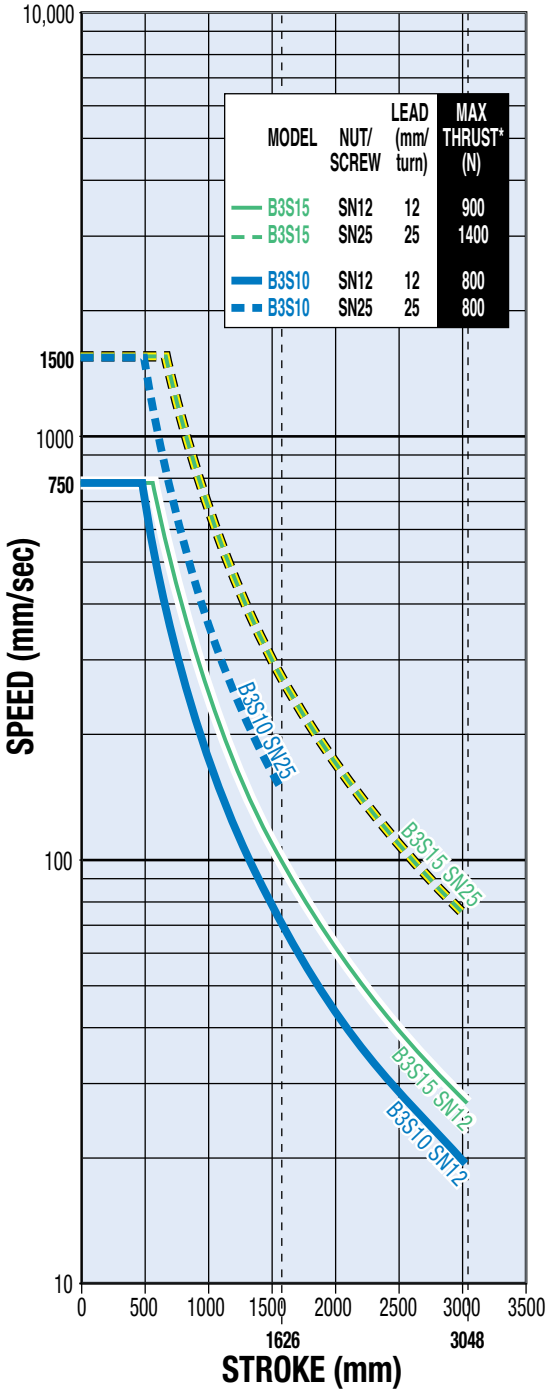
LEAD SCREW EFFICIENCY

SCREW/NUT STYLE	SIZE		
	10	15	20
Composite (ACME)	0.60		
Ball	0.90		
Ball Low Backlash	0.85		

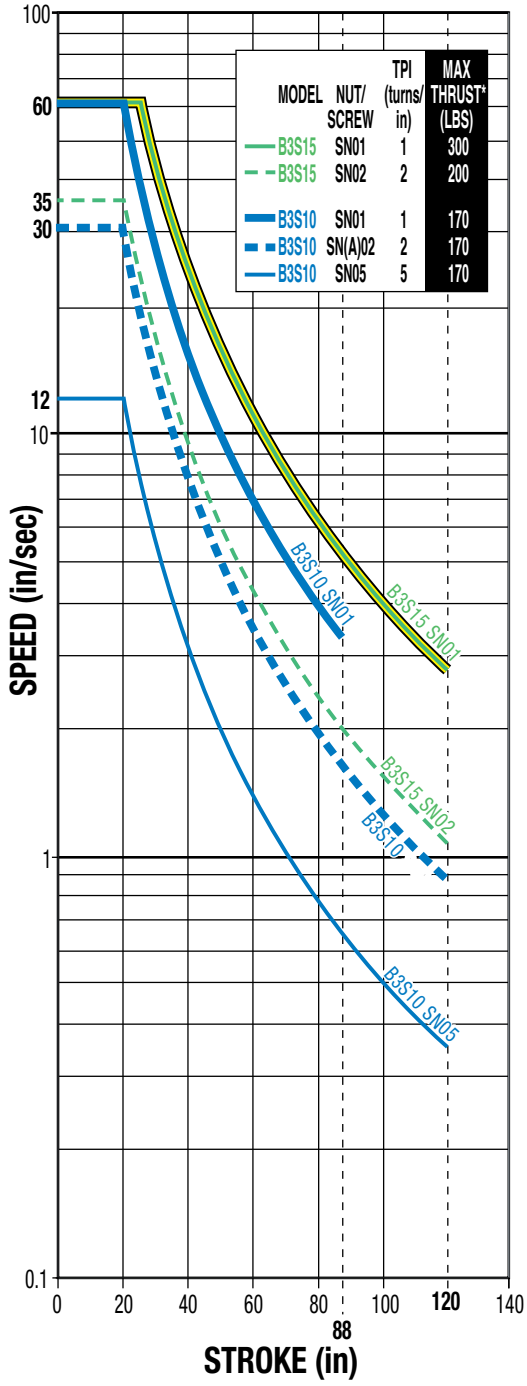
ACME SCREW/NUT COMBINATIONS

ACME SCREW CRITICAL SPEED CAPACITIES

METRIC ACME SCREW



INCH (US Conventional) ACME SCREW



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

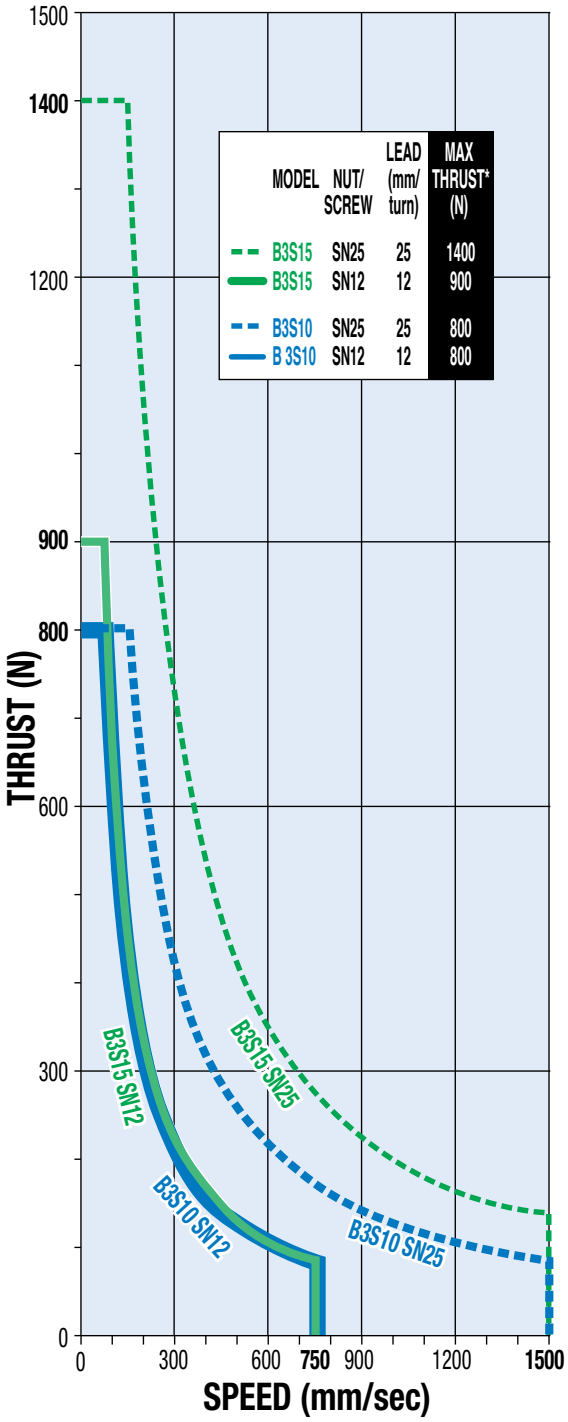
Dotted lines represent maximum stroke for screw selections.

For Screw PV limits, refer to the individual charts located in the technical section for each actuator body size.

SCREW CODE	DESCRIPTION
SN	Solid Nut
SNA	Anti-backlash Solid Nut

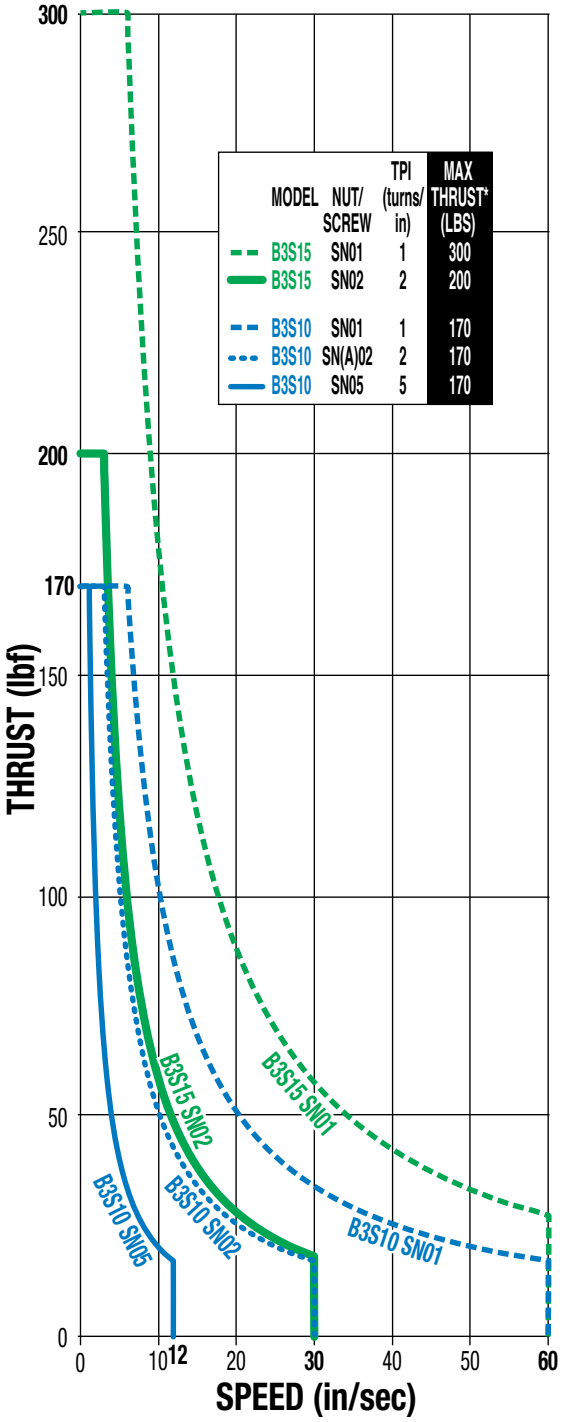
ACME SCREW PV LIMITS

METRIC ACME SCREW



MODEL	NUT/ SCREW	LEAD (mm/ turn)	MAX THRUST* (N)
B3S15	SN25	25	1400
B3S15	SN12	12	900
B3S10	SN25	25	800
B 3S10	SN12	12	800

INCH (US Conventional) ACME SCREW



MODEL	NUT/ SCREW	TPI (turns/ in)	MAX THRUST* (LBS)
B3S15	SN01	1	300
B3S15	SN02	2	200
B3S10	SN01	1	170
B3S10	SN(A)02	2	170
B3S10	SN05	5	170

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

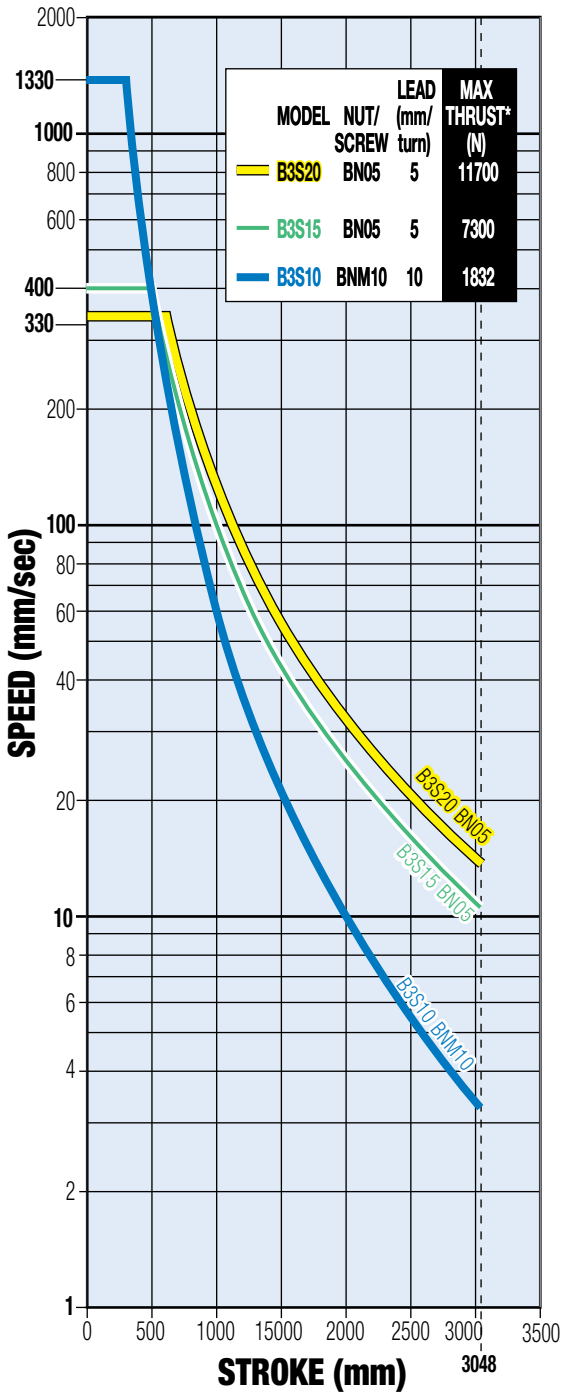
PV LIMITS: Any material which carries a sliding load is limited by heat buildup. The factors that affect heat generation rate in an application are the pressure on the nut in pounds per square inch and the surface velocity in feet per minute. The product of these factors provides a measure of the severity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

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

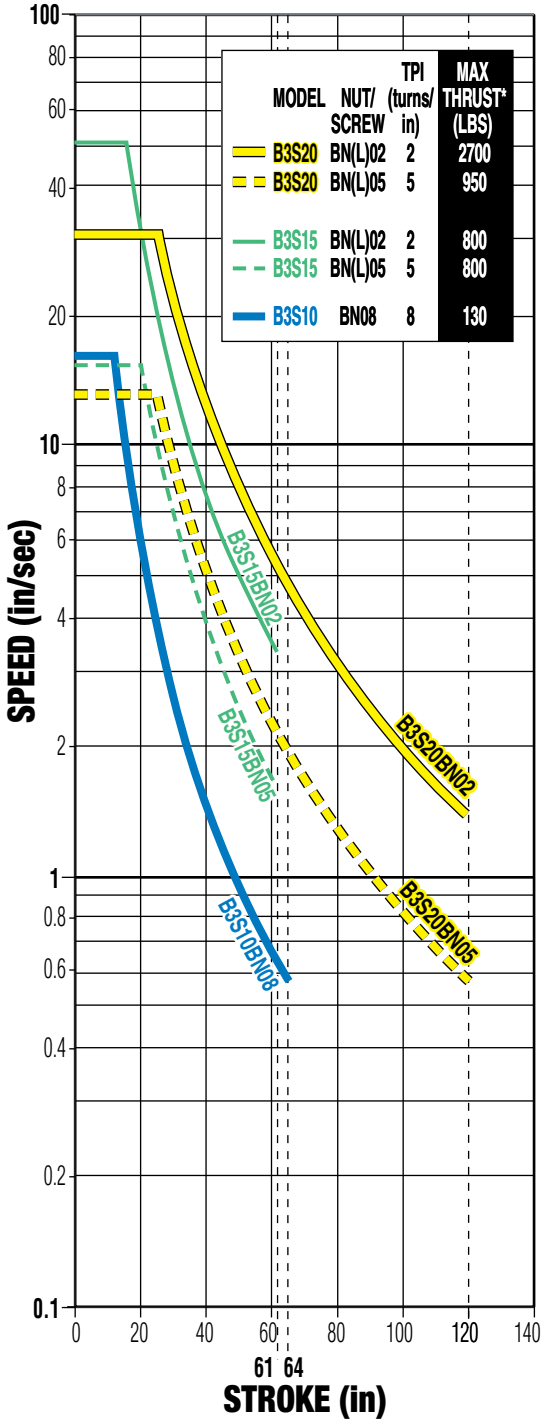
BALL SCREW/NUT COMBINATIONS

BALL SCREW CRITICAL SPEED CAPACITIES

METRIC BALL SCREW



INCH (US Conventional) BALL SCREW



* Maximum thrust reflects 90% reliability for 25 million linear millimeters of travel.

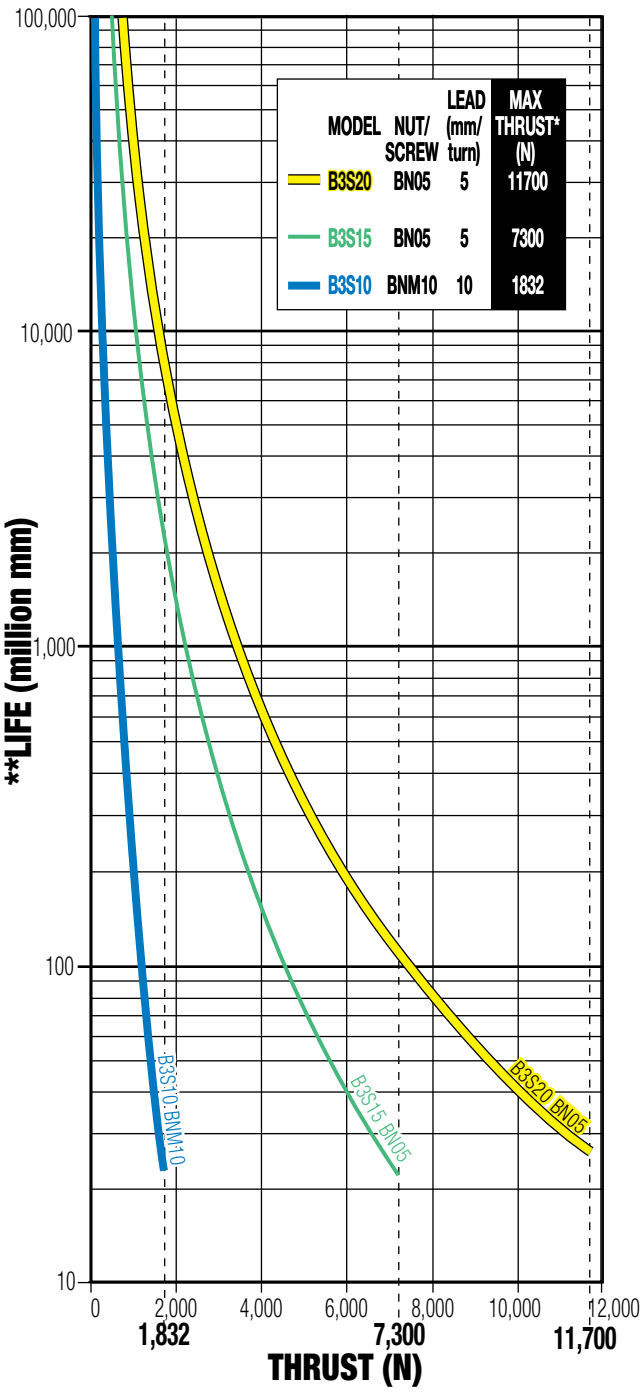
Dotted lines represent maximum stroke for screw selections.

SCREW CODE	DESCRIPTION
BN	Ball Nut
BNL	Low-Backlash Ball Nut

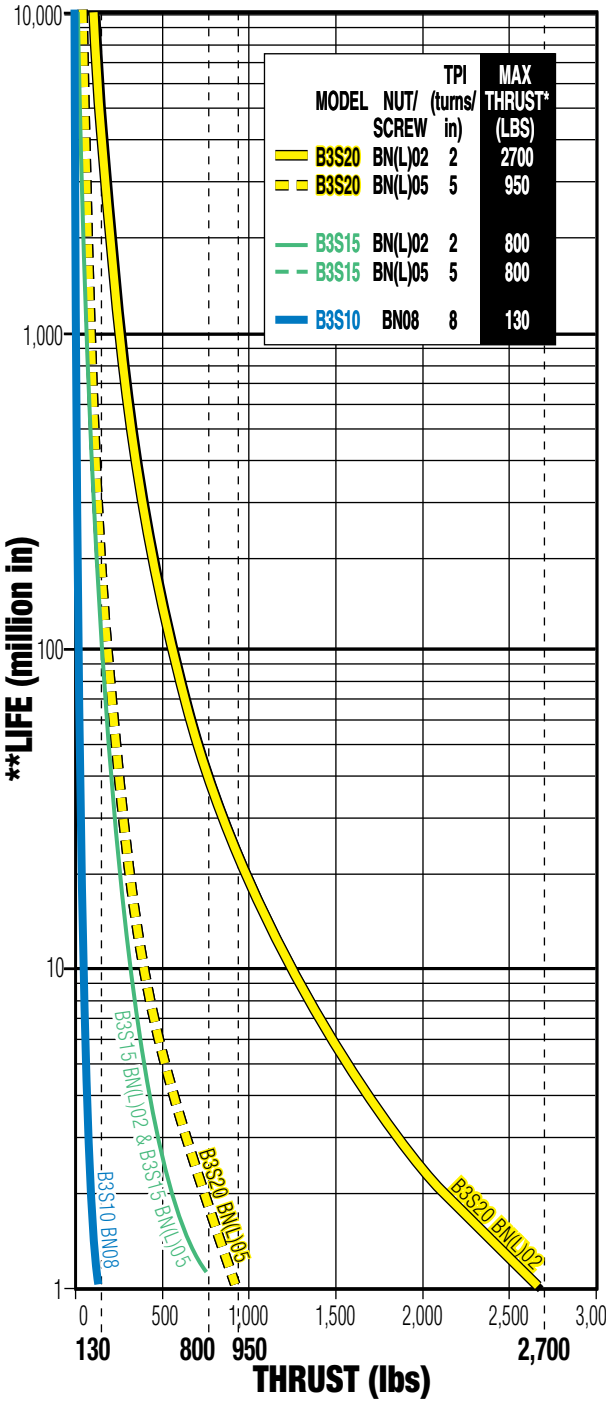
BALL SCREW/NUT COMBINATIONS

BALL SCREW LIFE CAPACITIES

METRIC BALL SCREW



INCH (US Conventional) BALL SCREW



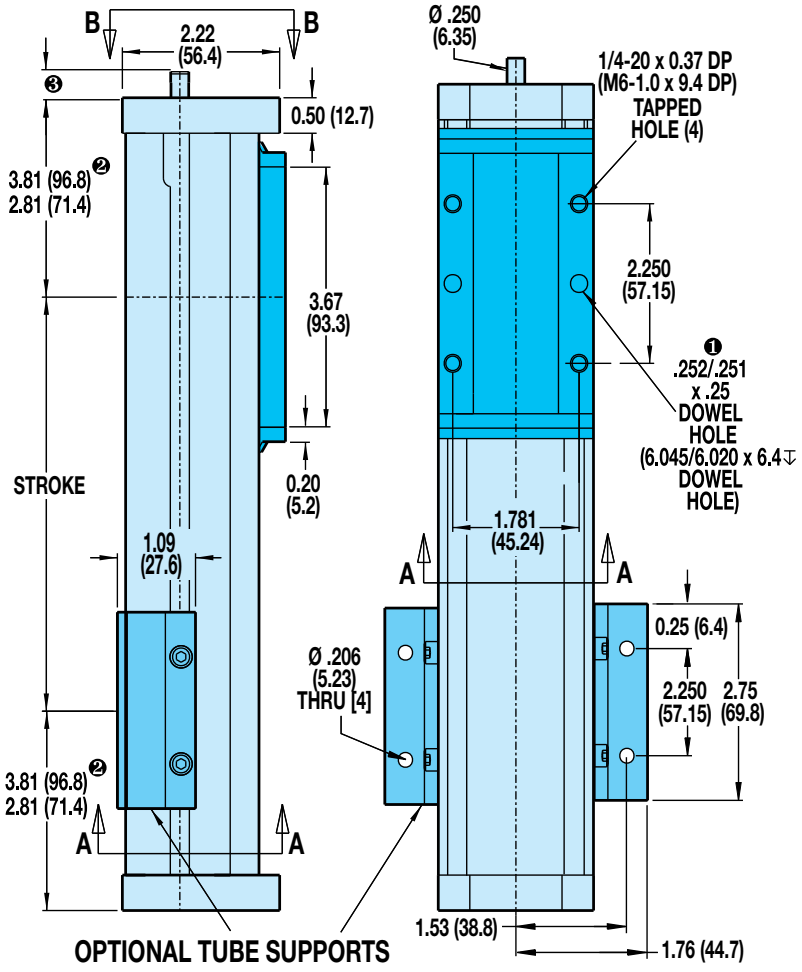
* Maximum thrust reflects 90% reliability for 25 million linear millimeters of travel.

Dotted lines represent maximum thrust for screw selections.

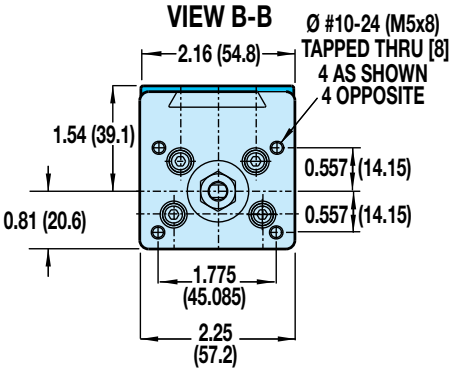
**Life indicates theoretical maximum life of screw only, under ideal conditions and does not indicate expected life of actuator.

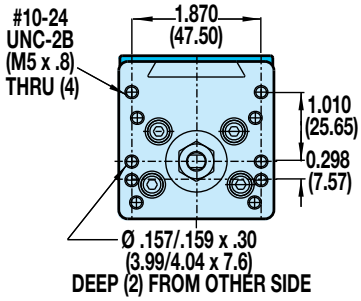
DIMENSIONS Actuator & Options

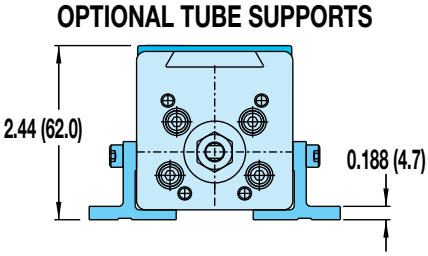
3D CAD available at www.tolomatic.com
Always use configured CAD solid model to determine critical dimensions

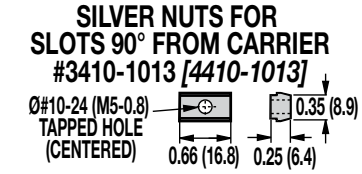


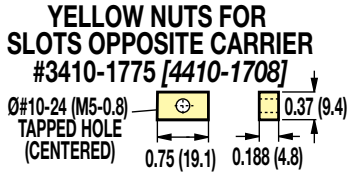
OPTIONAL TUBE SUPPORTS

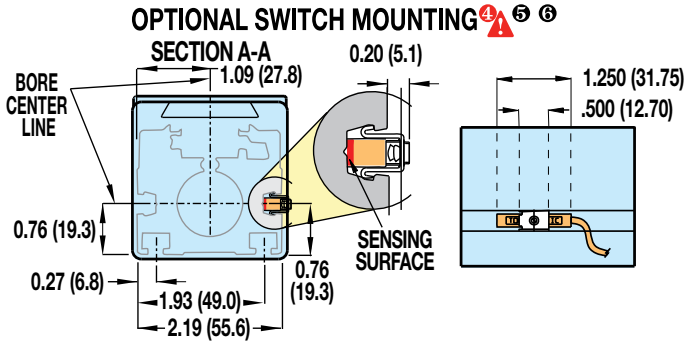


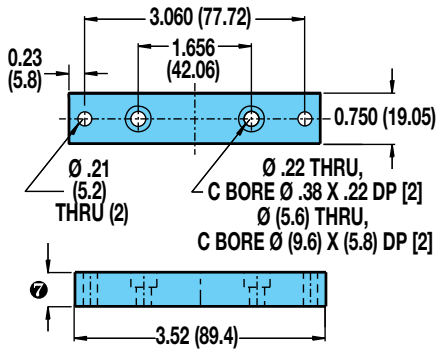












❶ DOWEL PINS ⌖ .003 (08mm) Ⓜ

❷ FOR SNAO2 STYLE ONLY

❸ SHAFT LENGTH

In-line mounting	0.55 (13.8)
Extended shaft for RP & 23-frame motor	1.99 (50.5)
Extended shaft for RP & 34-frame motor	2.20 (55.9)
Extended shaft for purchases prior to 6/24/02	1.63 (41.4)

❹ ⚠ CAUTION: DO NOT OVERTIGHTEN SWITCH HARDWARE WHEN INSTALLING

❺ NOTE: The scored face of the switch indicates the sensing surface and must face toward the magnet

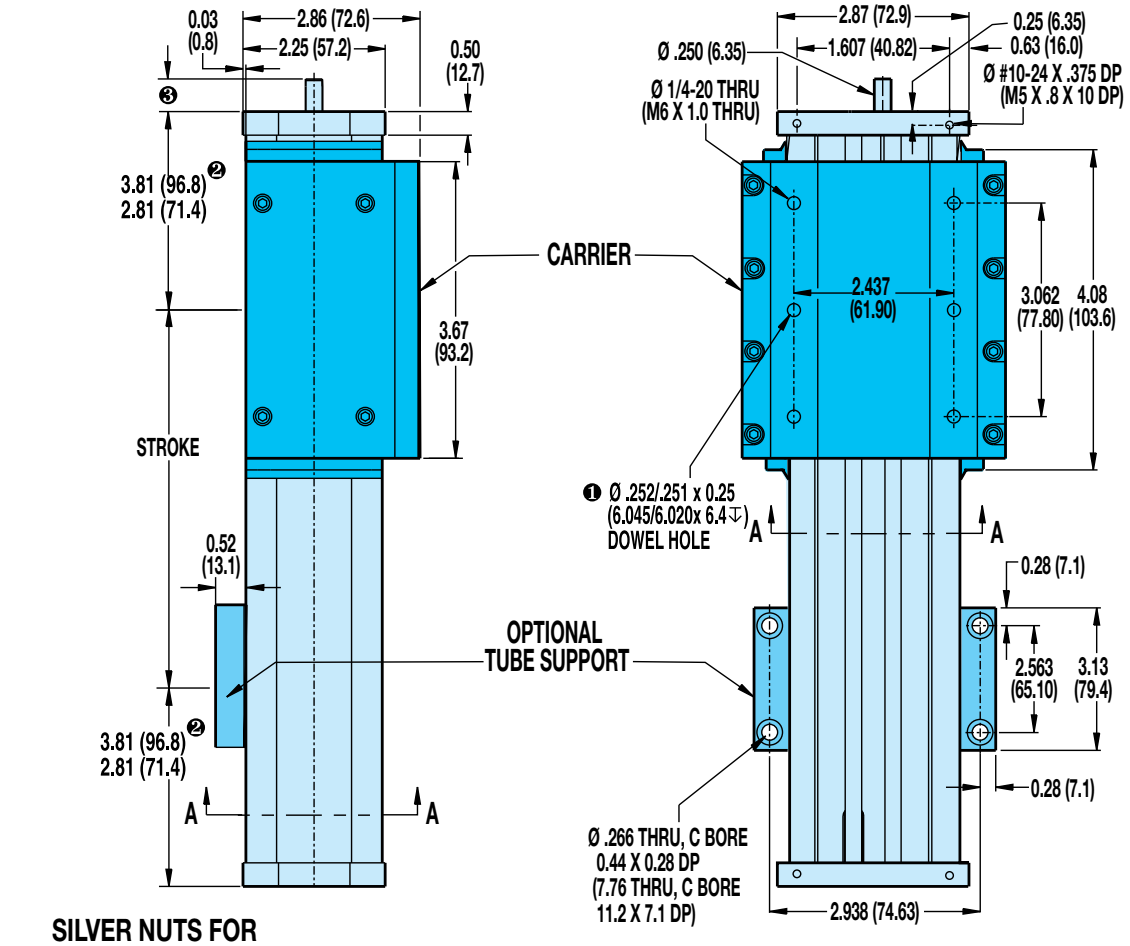
❻ NOTE: Some actuators require switch mounting on a specific side of the actuator. Call Tolomatic 1-800-328-2174 for details

❼ LMI with MRS is 1" (25.4mm) thick
LMI with all others is 1/2" (12.7mm) thick
RP, (YMH) all motors is 1/2" (12.7mm) thick

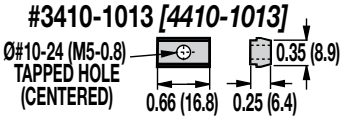
Unless otherwise noted, all dimensions shown are in inches (Dimensions in parenthesis are in millimeters)

DIMENSIONS Dual 180° Option

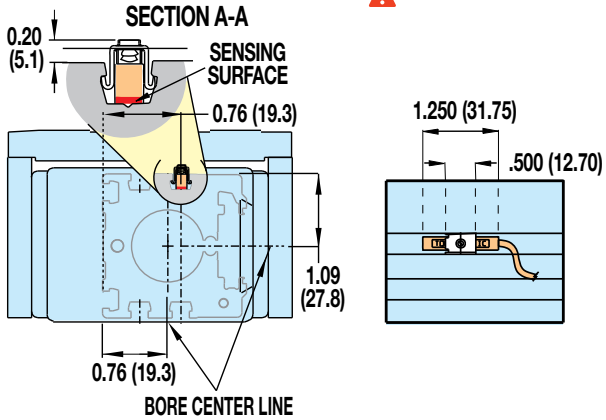
3D CAD available at www.tolomatic.com
Always use configurated CAD solid model
to determine critical dimensions



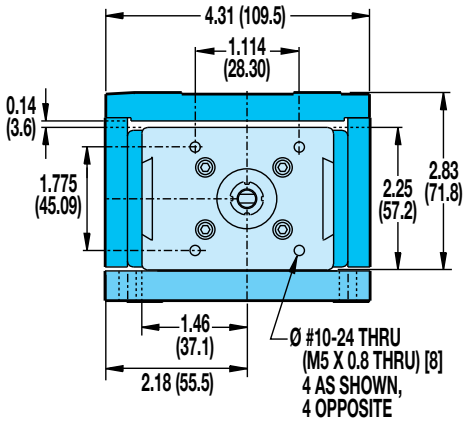
SILVER NUTS FOR SLOTS 90° FROM CARRIER #3410-1013 *[4410-1013]*



OPTIONAL SWITCH MOUNTING ❹⚠❺❻



END VIEW



❶ DOWEL PINS ⌖ | .003 (08mm) | Ⓜ

❷ FOR SNAO2 STYLE ONLY

❸ SHAFT LENGTH

In-line mounting	0.55 (13.8)
Extended shaft for RP & 23-frame motor	1.99 (50.5)
Extended shaft for RP & 34-frame motor	2.20 (55.9)
Extended shaft for purchases prior to 6/24/02	1.63 (41.4)

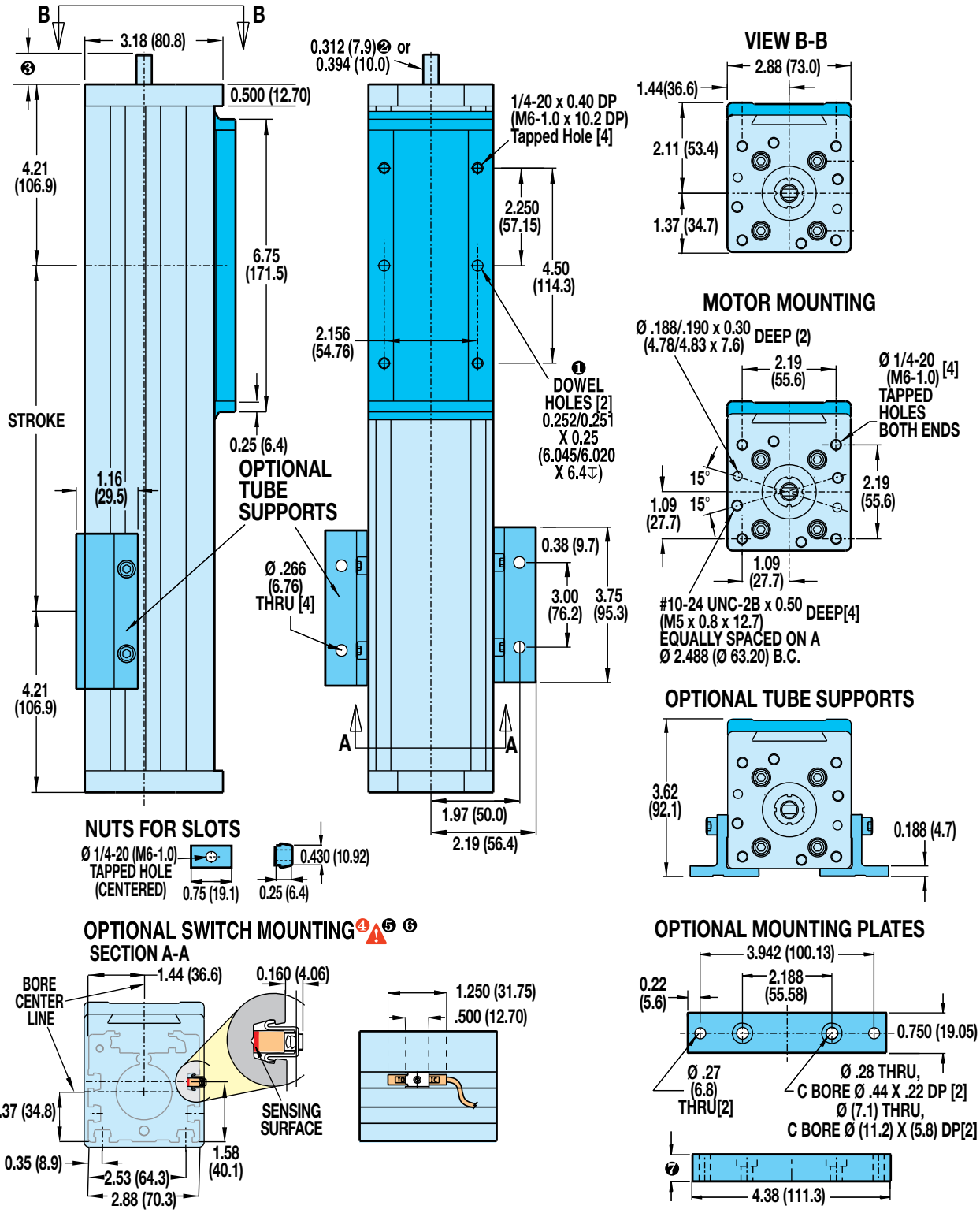
❹⚠ CAUTION: DO NOT OVERTIGHTEN SWITCH HARDWARE WHEN INSTALLING

❺ NOTE: The scored face of the switch indicates the sensing surface and must face toward the magnet

❻ NOTE: Some actuators require switch mounting on a specific side of the actuator. Call Tolomatic 1-800-328-2174 for details

B3S15 Electric Screw Drive Rodless Actuators

DIMENSIONS Actuator & Options



❶ DOWEL PINS ⌖ .003 (08mm) Ⓜ

❷ FOR B3S15BN02 & B3S15BNL02

❸ SHAFT LENGTH

In-line mounting	0.69 (17.5)
Extended shaft for RP & 23-frame motor	1.99 (50.5)
Extended shaft for RP & 34-frame motor	2.20 (55.9)
Extended shaft for purchases prior to 6/24/02	1.95 (49.5)

❹⚠ CAUTION: DO NOT OVERTIGHTEN SWITCH HARDWARE WHEN INSTALLING

❺ NOTE: The scored face of the switch indicates the sensing surface and must face toward the magnet

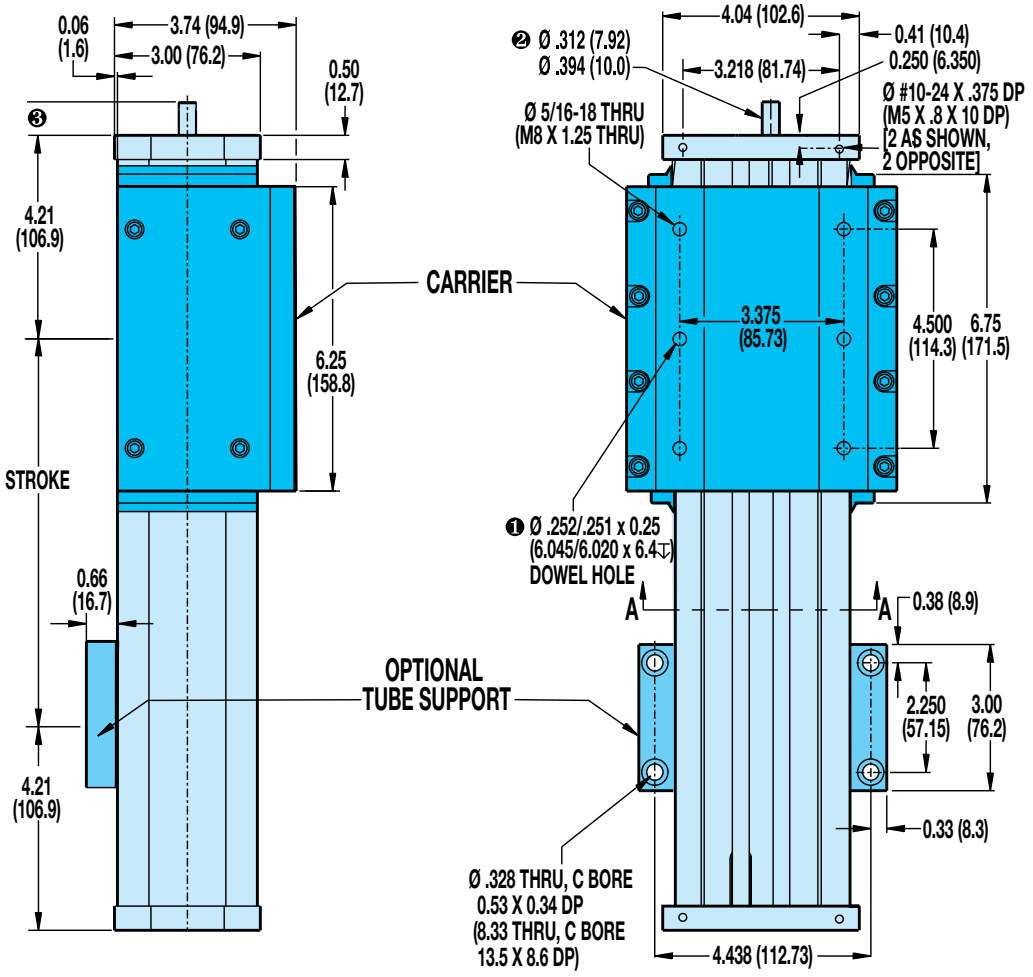
❻ NOTE: Some actuators require switch mounting on a specific side of the actuator. Call Tolomatic 1-800-328-2174 for details

❼ LMI with MRS3 is 1" (25.4mm) thick
LMI with all others is 1/2" (12.7mm) thick
RP, (YMH) all motors is 1/2" (12.7mm) thick

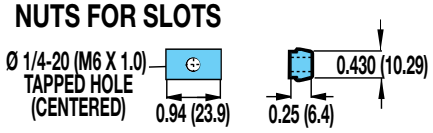
Unless otherwise noted, all dimensions shown are in inches (Dimensions in parenthesis are in millimeters)

DIMENSIONS Dual 180° Option

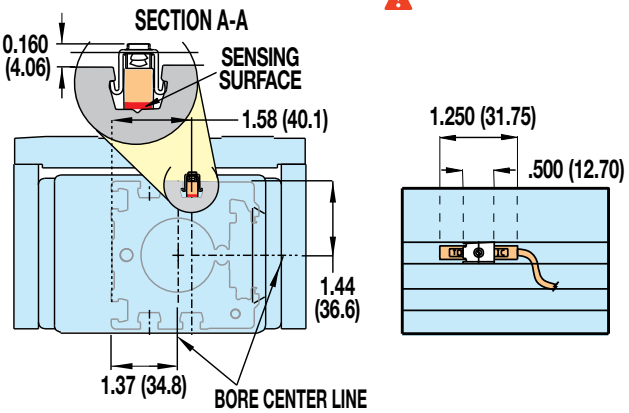
3D CAD available at www.tolomatic.com
Always use configured CAD solid model to determine critical dimensions



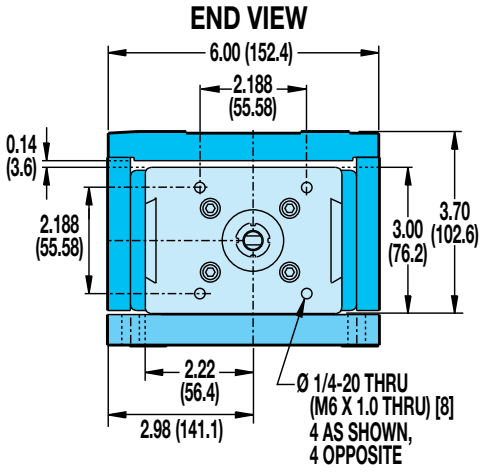
NUTS FOR SLOTS



OPTIONAL SWITCH MOUNTING ❹⚠❺❻



END VIEW



❶ DOWEL PINS

⌖ | .003 (08mm) | Ⓜ

❷ FOR B3S15BN02 & B3S15BNL02

❸ SHAFT LENGTH

In-line mounting	0.69 (17.5)
Extended shaft for RP & 23-frame motor	1.99 (50.5)
Extended shaft for RP & 34-frame motor	2.20 (55.9)
Extended shaft for purchases prior to 6/24/02	1.95 (49.5)

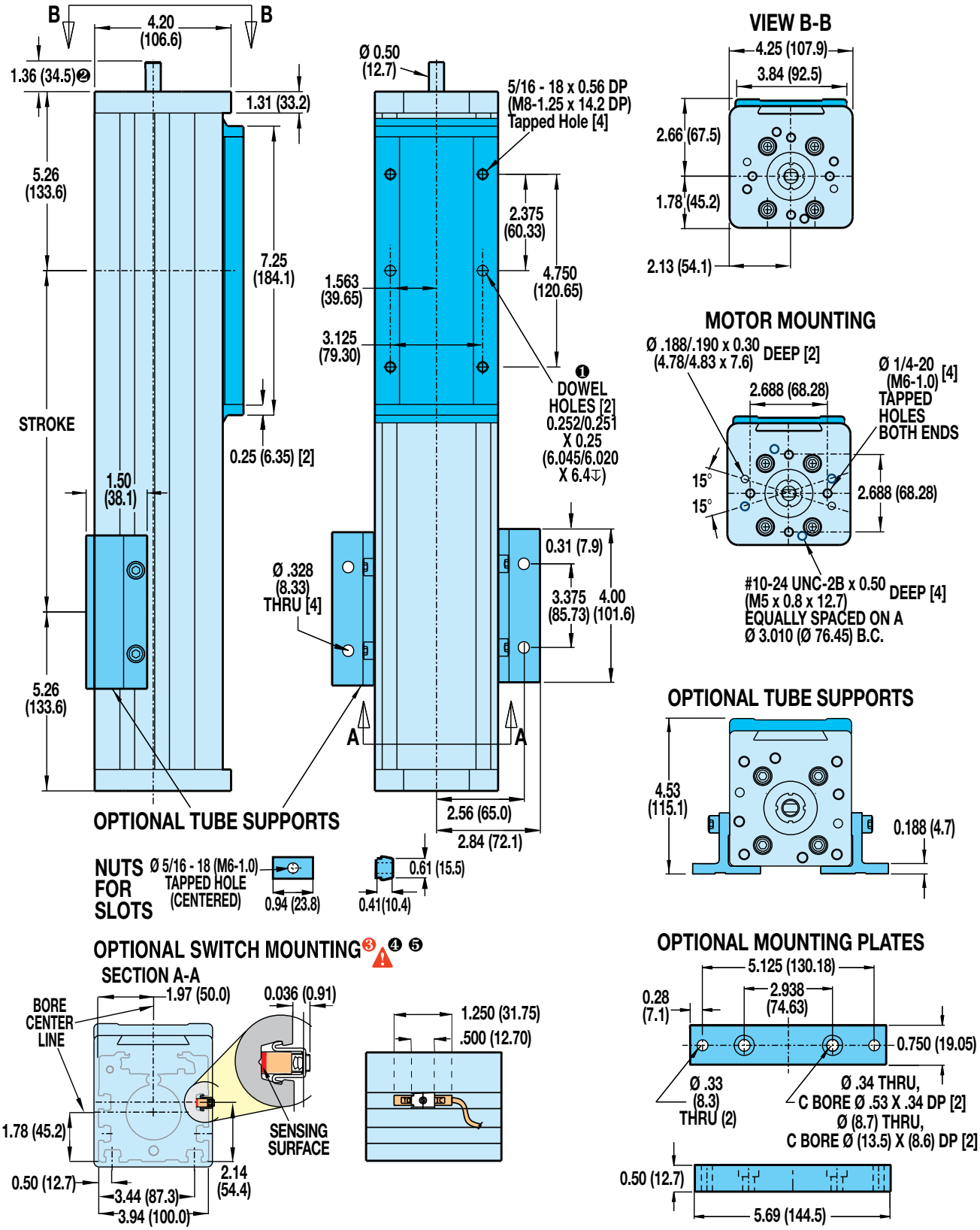
❹⚠ CAUTION: DO NOT OVERTIGHTEN SWITCH HARDWARE WHEN INSTALLING

❺ NOTE: The scored face of the switch indicates the sensing surface and must face toward the magnet

❻ NOTE: Some actuators require switch mounting on a specific side of the actuator. Call Tolomatic 1-800-328-2174 for details

B3S20 Electric Screw Drive Rodless Actuators

DIMENSIONS Actuator & Options



❶ DOWEL PINS ⌖ | .003 (08mm) | Ⓜ

❷ FOR EXTENDED SHAFT 2.11 (53.6)

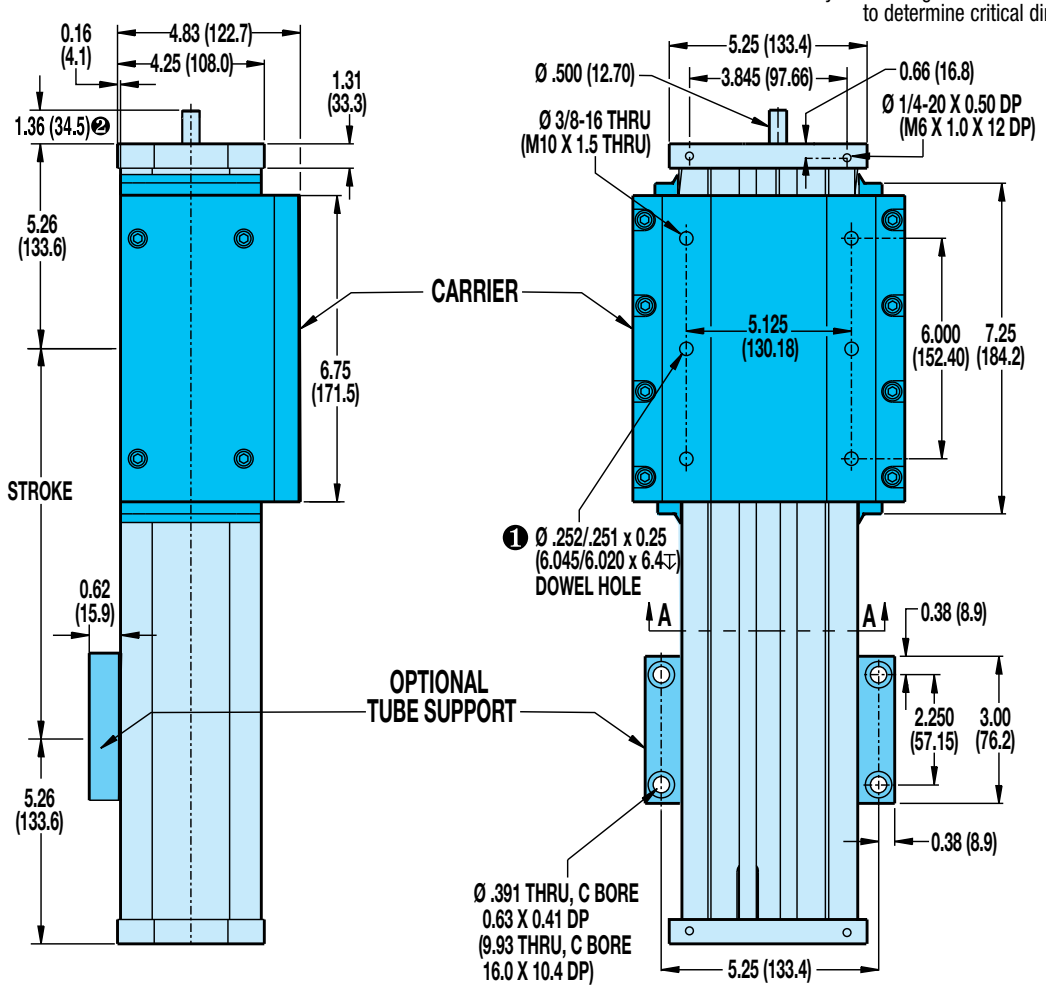
❸ ⚠ CAUTION: DO NOT OVERTIGHTEN SWITCH HARDWARE WHEN INSTALLING

❹ NOTE: The scored face of the switch indicates the sensing surface and must face toward the magnet

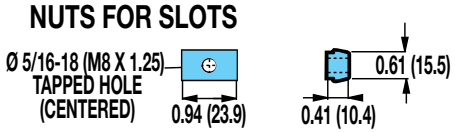
❺ NOTE: Some actuators require switch mounting on a specific side of the actuator. Call Tolomatic 1-800-328-2174 for details

DIMENSIONS Dual 180° Option

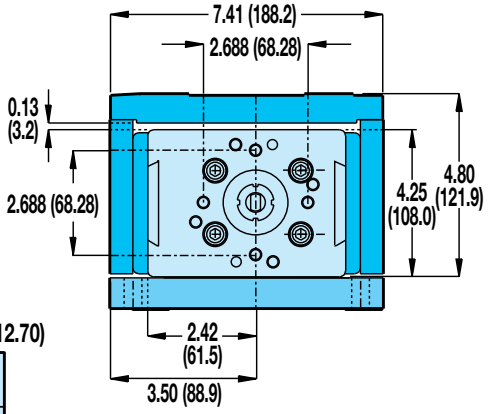
3D CAD available at www.tolomatic.com
Always use configurated CAD solid model to determine critical dimensions



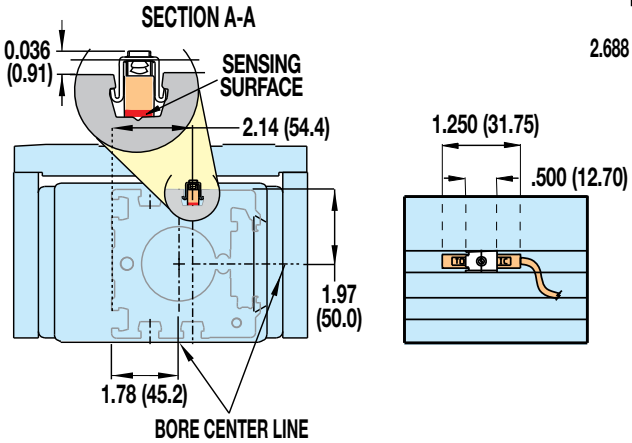
NUTS FOR SLOTS



END VIEW



OPTIONAL SWITCH MOUNTING❸⚠❹❺



❶ DOWEL PINS ⌖ .003 (08mm) Ⓜ

❷ FOR EXTENDED SHAFT 2.11 (53.6)

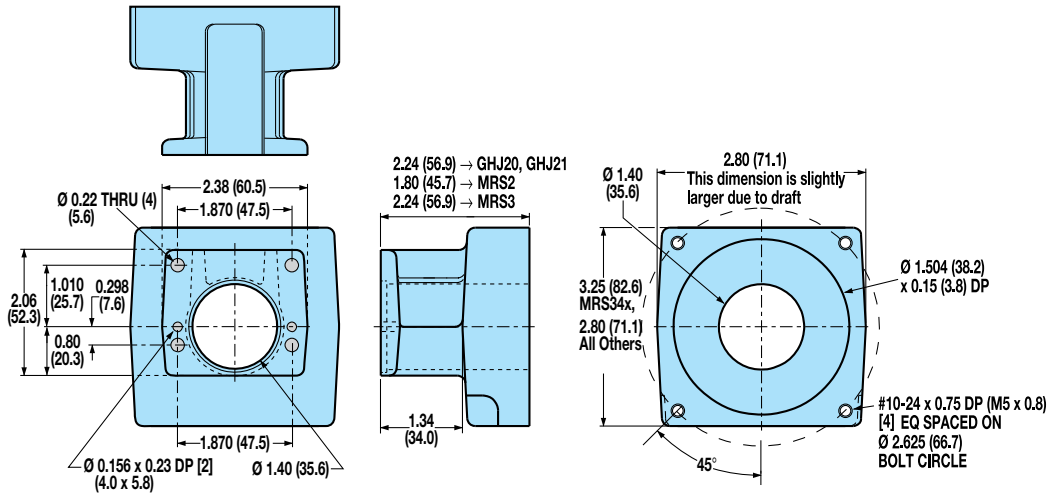
❸⚠ CAUTION: DO NOT OVERTIGHTEN SWITCH HARDWARE WHEN INSTALLING

❹ NOTE: The scored face of the switch indicates the sensing surface and must face toward the magnet

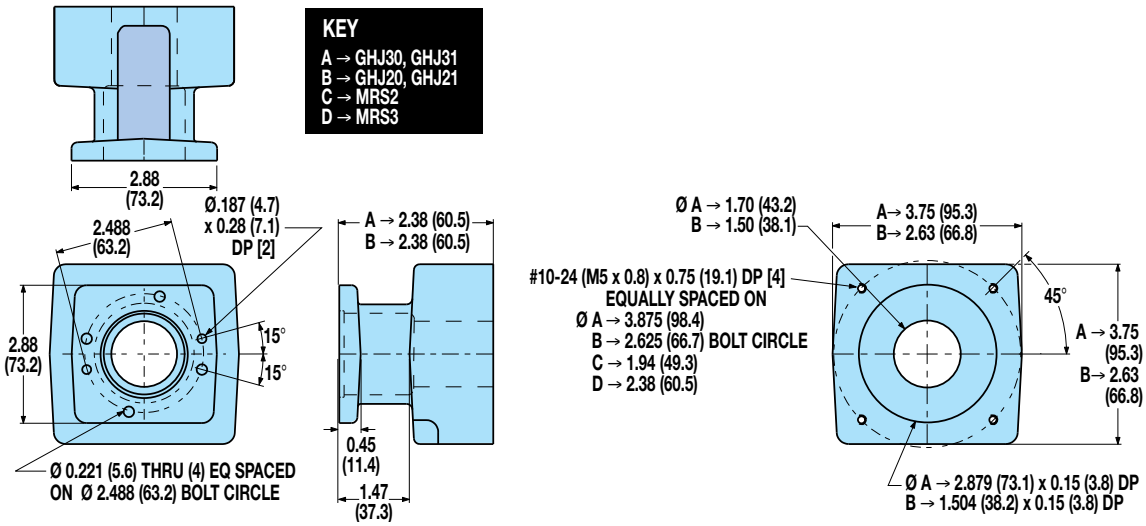
❺ NOTE: Some actuators require switch mounting on a specific side of the actuator. Call Tolomatic 1-800-328-2174 for details

DIMENSIONS Actuator & Options

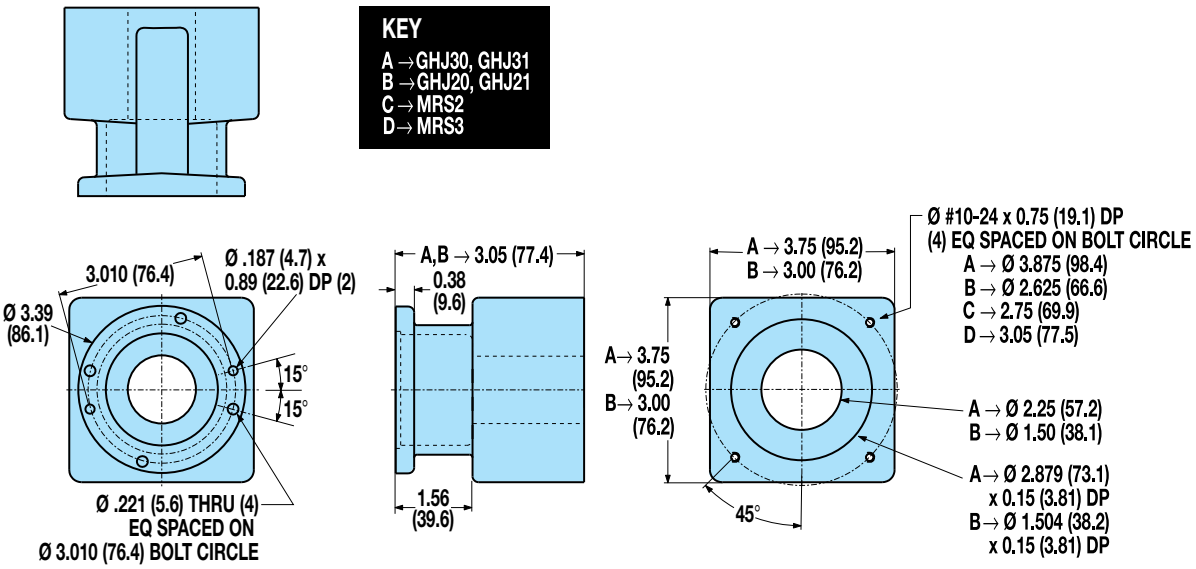
B3S10: IN-LINE MOUNT FOR MOTORS OR GEARBOXES



B3S15: IN-LINE MOUNT FOR MOTORS OR GEARBOXES



B3S20: IN-LINE MOUNT FOR MOTORS OR GEARBOXES

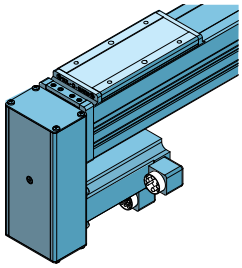


B3S Electric Screw Drive Rodless Actuators

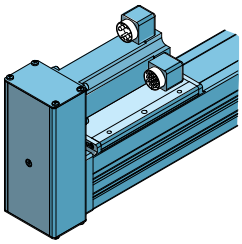
DIMENSIONS Reverse Parallel Mounting

3D CAD available at www.tolomatic.com
Always use configurated CAD solid model to determine critical dimensions

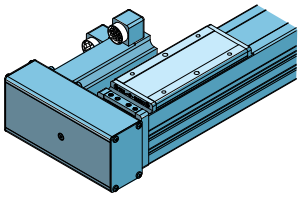
STANDARD CARRIER



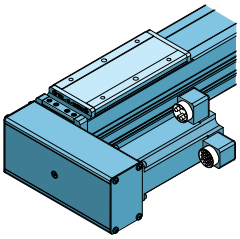
REVERSE-PARALLEL BOTTOM (RPB)
mounting surface shown up



REVERSE-PARALLEL TOP (RPT)*
mounting surface shown up

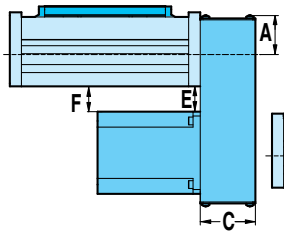


REVERSE-PARALLEL LEFT (RPL)
mounting surface shown up

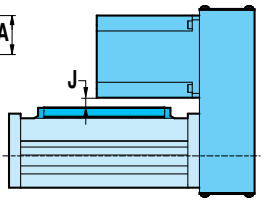


REVERSE-PARALLEL RIGHT (RPR)
mounting surface shown up

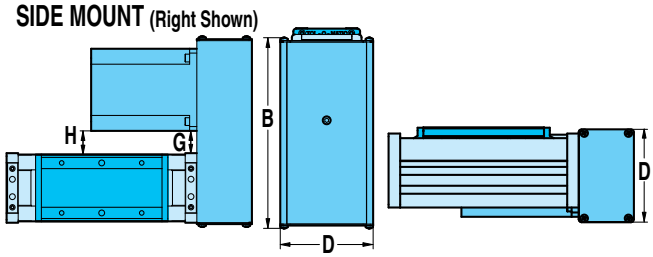
BOTTOM MOUNT



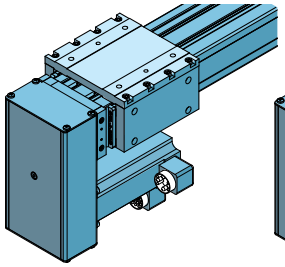
TOP MOUNT



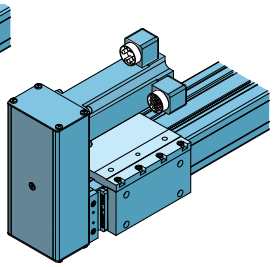
SIDE MOUNT (Right Shown)



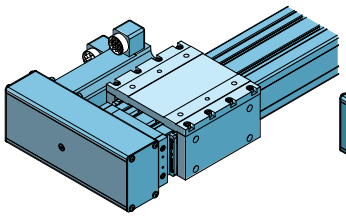
DUAL 180° CARRIER



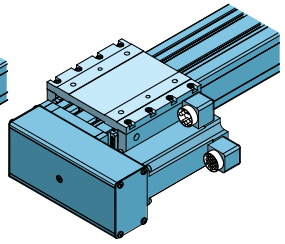
REVERSE-PARALLEL BOTTOM (RPB)
mounting surface shown up



REVERSE-PARALLEL TOP (RPT)*
mounting surface shown up



REVERSE-PARALLEL LEFT (RPL)
mounting surface shown up



REVERSE-PARALLEL RIGHT (RPR)
mounting surface shown up

Reduction Drive Weight

		kg	lb
10	1:1 & 2:1 Ratio	0.93	2.06
15	1:1 Ratio	0.98	2.17
	2:1 Ratio	1.09	2.40
20	1:1 Ratio	1.39	3.07
	2:1 Ratio	1.47	3.23
	1:1 Ratio	1.42	3.13
	2:1 Ratio	1.49	3.29

Reduction Inertia at Motor Shaft

		kg-cm²	lb-in²
10	1:1 Ratio	0.2559	0.0875
	2:1 Ratio	0.3291	0.1125
15	1:1 Ratio	0.2043	0.0700
	2:1 Ratio	0.2767	0.0950
20	1:1 Ratio	0.3447	0.1180
	2:1 Ratio	0.2928	0.1000

Reduction Efficiency: 0.95

*⚠ NOTE: RPT is generally not recommended because the load may interfere with the motor. Stops or spacers may be required.

Frame Size		A	B	C	D	E	F	G	H	J
10	23	42.6	178.6	54.0	82.6	45.6	46.8	37.6	38.4	26.9
15	23	36.6	191.3	54.0	82.6	44.1	44.1	40.8	42.3	25.3
	34	53.8	208.6	60.3	101.6	27.7	27.7	24.4	25.9	8.9
20	23	63.8	238.4	60.3	101.6	59.5	59.6	50.8	54.7	37.2
	34	63.8	251.5	60.3	101.6	43.2	43.2	34.4	38.4	20.9

Dimensions in millimeters

Frame Size		A	B	C	D	E	F	G	H	J
10	23	1.68	7.03	2.13	3.25	1.80	1.84	1.48	1.51	1.06
15	23	1.44	7.53	2.13	3.25	1.74	1.74	1.61	1.67	1.00
	34	2.12	8.21	2.38	4.00	1.09	1.09	0.96	1.02	0.35
20	23	2.51	9.38	2.38	4.00	2.34	2.35	2.00	2.16	1.47
	34	2.51	9.90	2.38	4.00	1.70	1.70	1.36	1.51	0.82

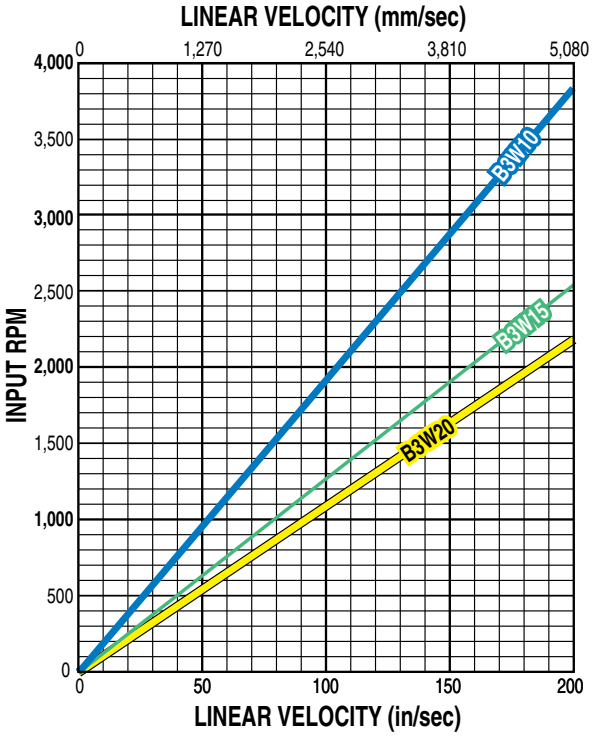
Dimensions in inches

PERFORMANCE

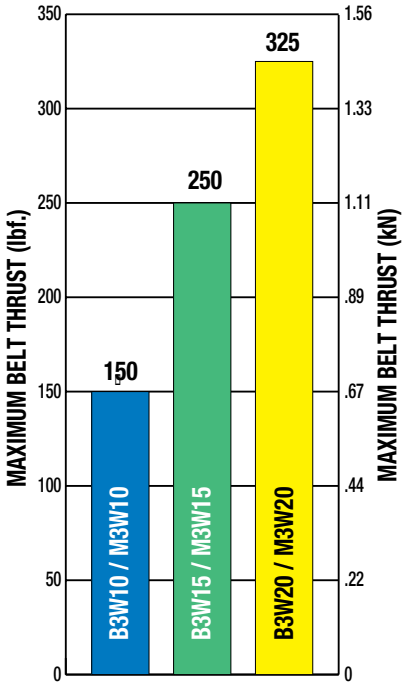
sizeit.tolomatic.com for fast, accurate actuator selection

ACTUATOR SIZING

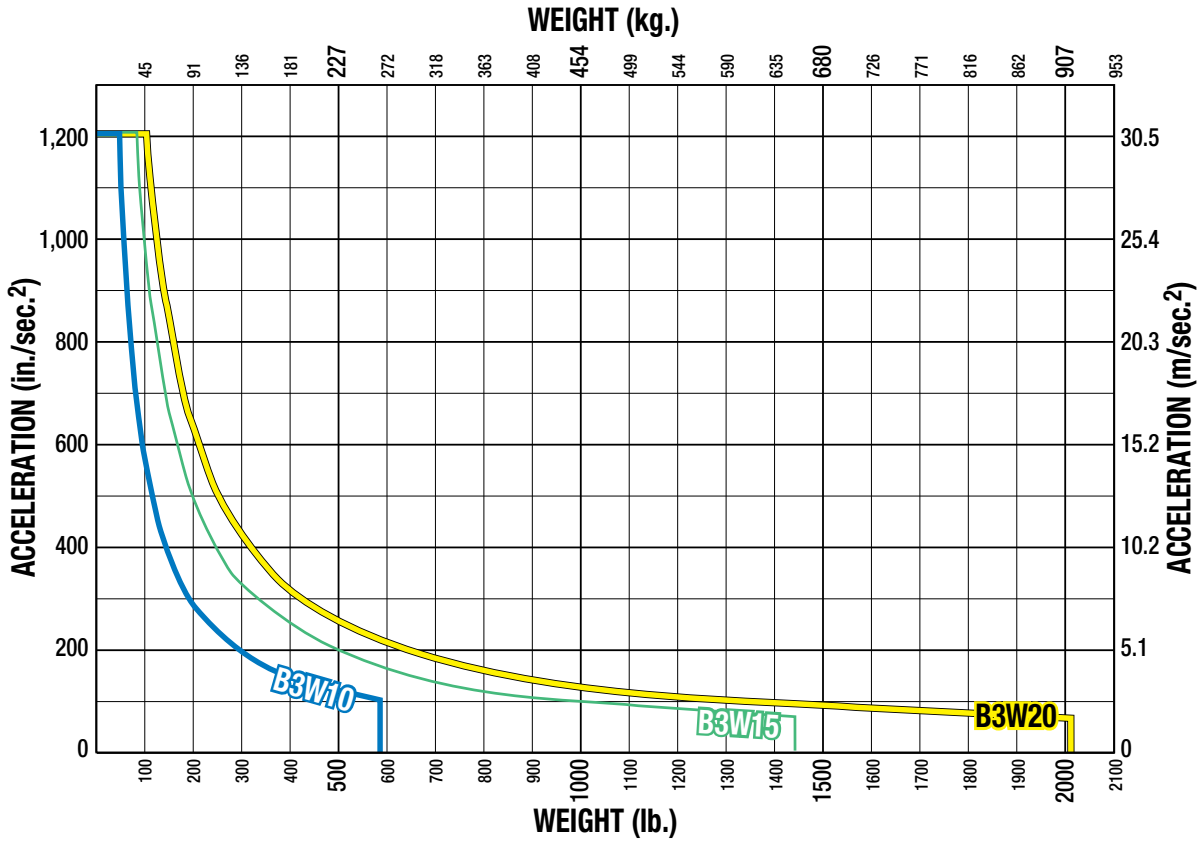
CARRIER SPEED CAPABILITIES



MAXIMUM BELT THRUST



MAXIMUM ACCELERATION AS A FUNCTION OF LOAD WEIGHT



B3W Electric Belt Drive Rodless Actuators

SPECIFICATIONS

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			METRIC				INCH (U.S. Conventional)		
			M3W10	M3W15	M3W20		B3W10	B3W15	B3W20
	Max. Stroke	mm	5,258	5,182	3,962	in	207	204	156
	Max. Velocity	m/sec	5.08	5.08	5.08	in/sec	200	200	200
	Max. Acceleration	m/sec²	30.48	30.48	30.48	in/sec²	1,200	1,200	1,200
	Max. Input Torque	N-m	8.5	21.2	32.2	lb-in	75.2	188.0	285.0
Breakaway Torque	Standard (single) Carrier	N-m	1.06	1.41	3.18	lb-in	9.38	12.5	28.13
Breakaway Torque	Dual 180° or Aux. Carrier	N-m	1.34	1.69	3.53	lb-in	11.88	15	31.25
Breakaway Torque	Dual 180 & Aux Carrier	N-m	1.91	2.82	5.37	lb-in	16.88	25	47.5
	Pulley Pitch Dia.	mm	25.48	38.2	44.55	in	1.003	1.504	1.754
	Stoke per Rev.	mm/rev	80.04	120.02	139.95	in/rev	3.151	4.725	5.51
	Repeatability	mm	+/- 0.05	+/- 0.05	+/- 0.05	in	+/- 0.002	+/- 0.002	+/- 0.002
	Straightness & Flatness[1]	mm	0.017 x L*	0.017 x L*	0.017 x L*	in	0.00067 x L*	0.00067 x L*	0.00067 x L*
	Temp. Range[2]	°C	4 - 54	4 - 54	4 - 54	°F	40 - 130	40 - 130	40 - 130
	IP Rating[3]	IP	44	44	44	IP	44	44	44
	Weight (zero stroke)	kg	3.42	11.39	16.06	lb	7.54	25.12	35.4
	Weight (per unit of stroke)	kg/mm	0.0069	0.0071	0.0128	lb/in	0.389	0.395	0.716
	Weight of pulley	kg	0.0068	0.0244	0.047	lb	0.015	0.054	0.1036
	Weight of carrier	kg	0.39	0.71	0.97	lb	0.85	1.56	2.14
	Inertia (zero stroke)	kg-cm²	0.833	4.073	7.786	lb-in²	0.2846	1.3917	2.6607
	Inertia (per unit of stroke)	kg-cm²/mm	0.00018	0.0002	0.00131	lb-in²/in	0.0016	0.0017	0.0114
	Inertia of pulley	kg-cm²	0.027	0.219	0.422	lb-in²	0.0093	0.0748	0.1441
	Inertia of carrier	kg-cm²	0.305	1.489	2.847	lb-in²	0.1041	0.5089	0.9728

[1] 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 such deviation, so good engineering practices such as measurement, mapping, etc. must be employed in applications with stringent straightness/flatness requirements.

[2] 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.

[3] Protected against ingress of solid particles greater than 1 mm (.039 in) and splashing water.

*"L" is maximum distance between supports - See Support Recommendations graph pg B3_9.

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.

NOTE: Zero stroke inertia and weight are for an assembled actuator (including carrier, pulley and belt material) that has zero stroke length. To calculate system inertia use the formula below:

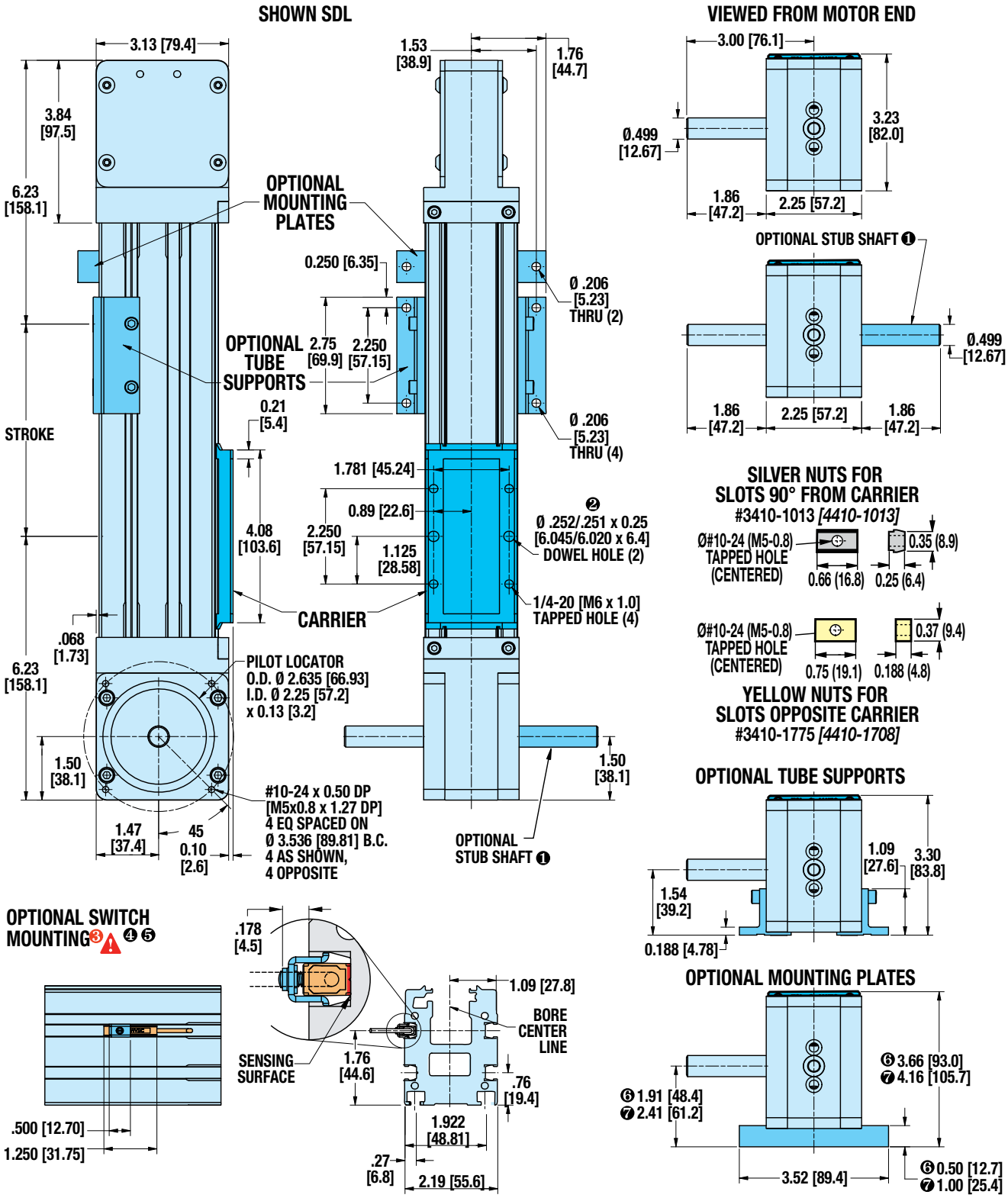
System Inertia = Inertia $_{(\text{zero stroke})}$ + [Inertia $_{(\text{per unit of stroke})}$ x number of units]

(For weight calculation substitute inertia with weight in the above formula)

B3W10 Electric Belt Drive Rodless Actuators

DIMENSIONS Actuator & Options

3D CAD available at www.tolomatic.com
Always use configured CAD solid model to determine critical dimensions



❶ ONE STUB SHAFT IS STANDARD ON ALL B3W ACTUATORS

❷ DOWEL PINS ⌖ .003 (.08mm) Ⓜ

❸ ⚠ CAUTION: DO NOT OVERTIGHTEN SWITCH HARDWARE WHEN INSTALLING

❹ NOTE: The scored face of the switch indicates the sensing surface and must face toward the magnet

❺ NOTE: Some actuators require switch mounting on a specific side of the actuator. Call Tolomatic 1-800-328-2174 for details

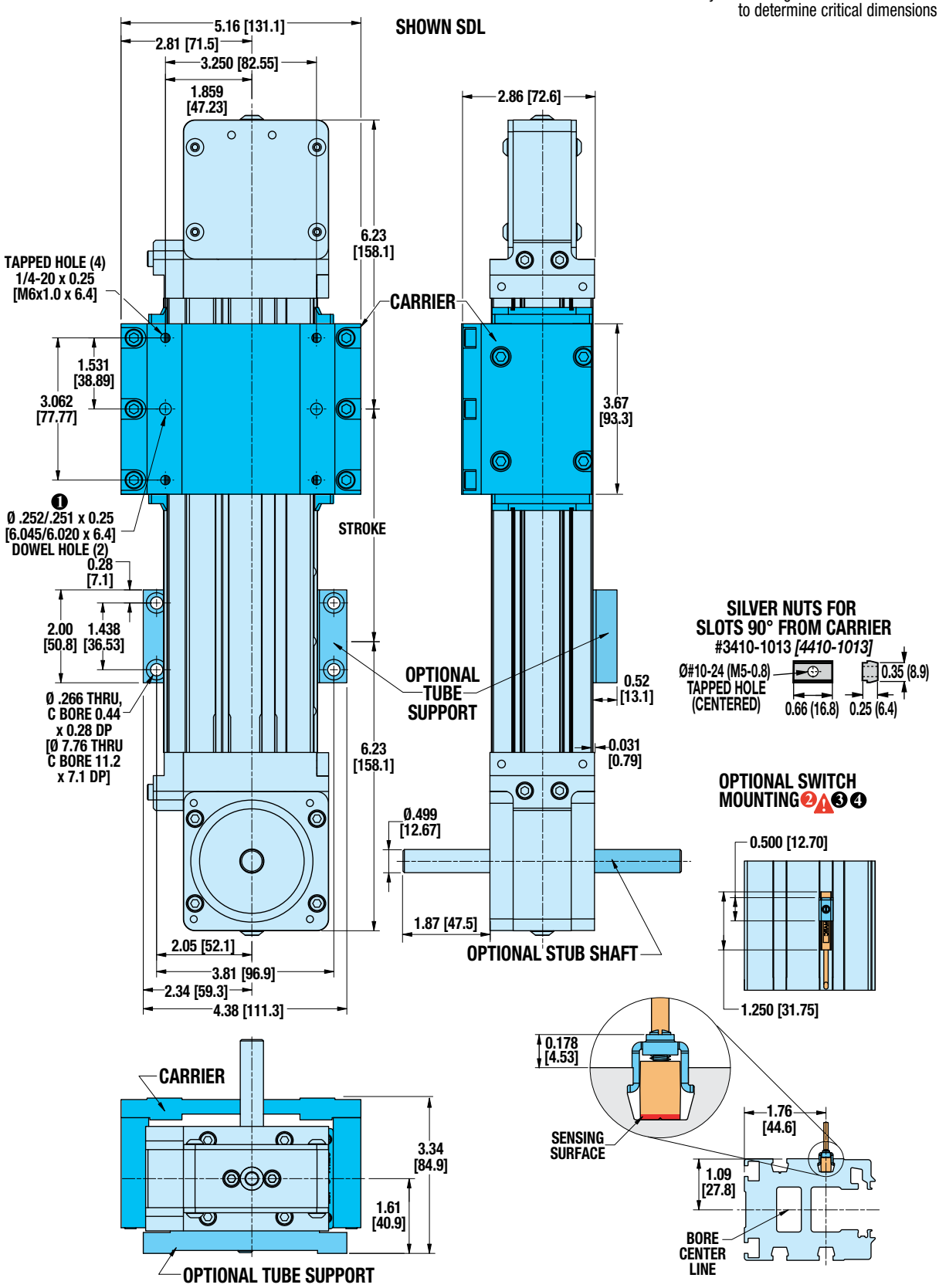
❻ WHEN USED WITH 23-FRAME MOTORS

❼ WHEN USED WITH 34-FRAME MOTORS

Unless otherwise noted, all dimensions shown are in inches [Dimensions in brackets are in millimeters]

DIMENSIONS Dual 180° Option

3D CAD available at www.tolomatic.com
Always use configurated CAD solid model to determine critical dimensions



❶ DOWEL PINS ⌖ .003 (.08mm) Ⓜ

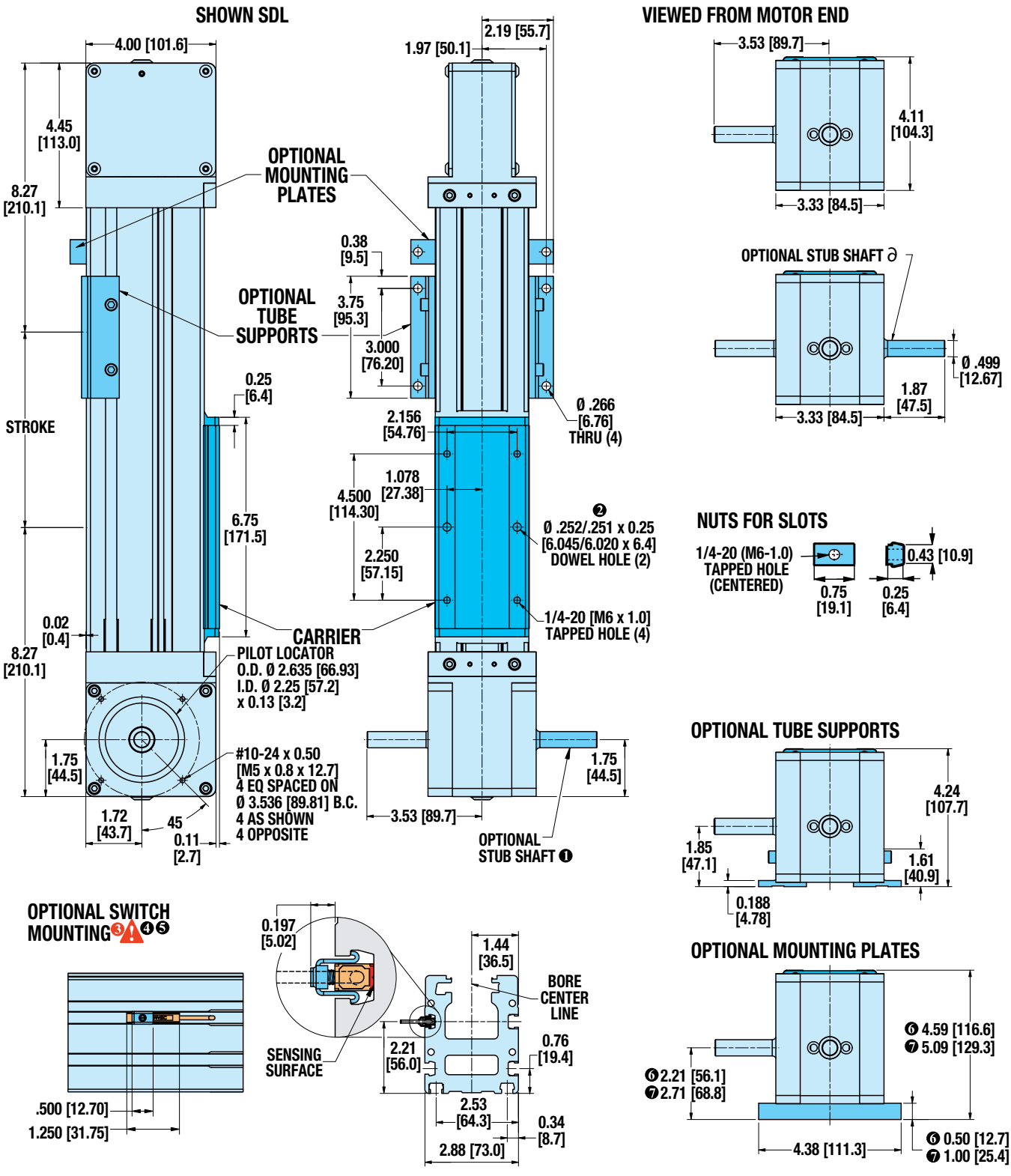
❷⚠ CAUTION: DO NOT OVERTIGHTEN SWITCH HARDWARE WHEN INSTALLING

❸ NOTE: The scored face of the switch indicates the sensing surface and must face toward the magnet

❹ NOTE: Some actuators require switch mounting on a specific side of the actuator. Call Tolomatic 1-800-328-2174 for details

B3W15 Electric Belt Drive Rodless Actuators

DIMENSIONS Actuator & Options



❶ ONE STUB SHAFT IS STANDARD ON ALL B3W ACTUATORS

❷ DOWEL PINS ⌖ .003 (.08mm) Ⓜ

❸ ⚠ CAUTION: DO NOT OVERTIGHTEN SWITCH HARDWARE WHEN INSTALLING

❹ NOTE: The scored face of the switch indicates the sensing surface and must face toward the magnet

❺ NOTE: Some actuators require switch mounting on a specific side of the actuator. Call Tolomatic 1-800-328-2174 for details

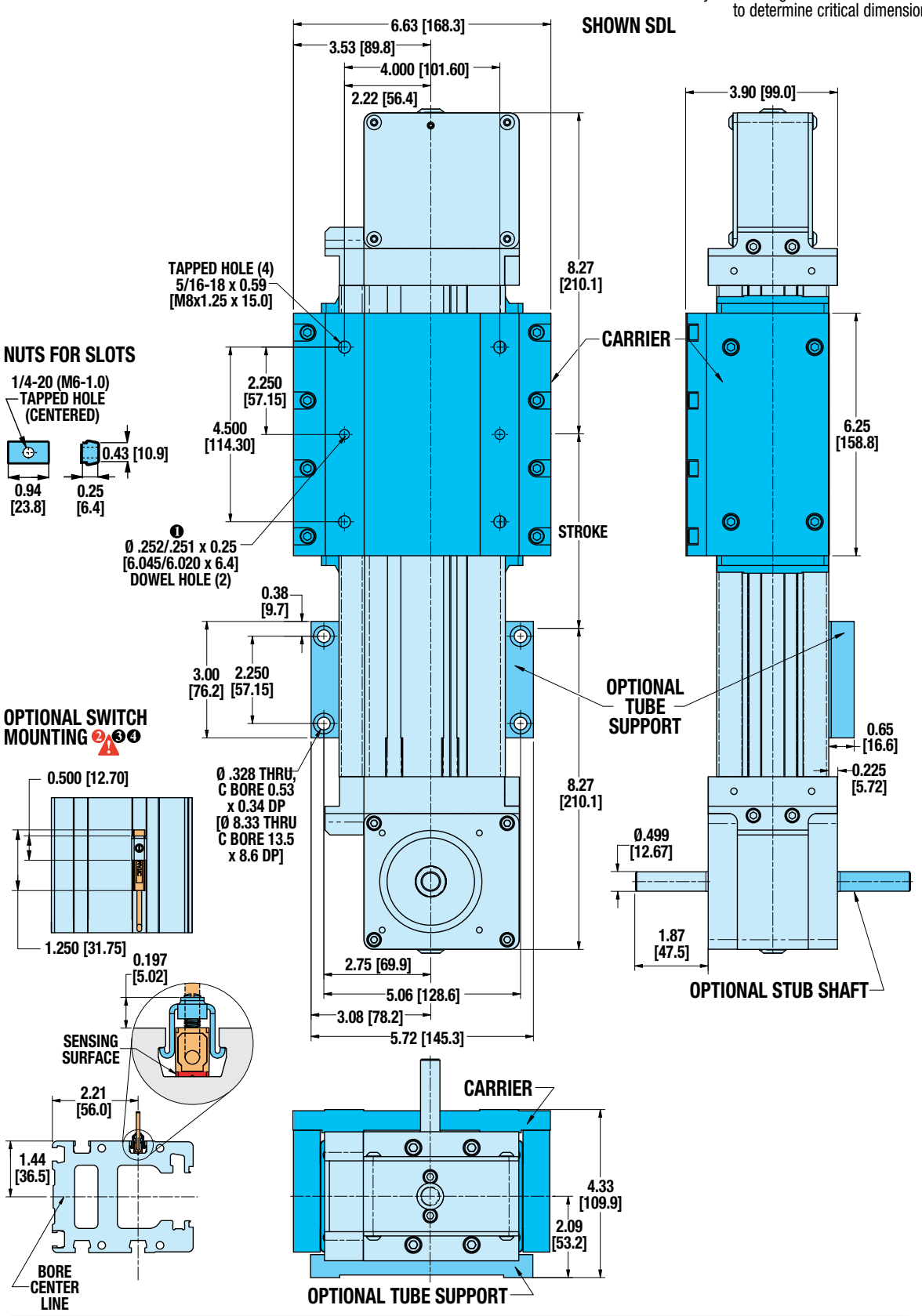
❻ WHEN USED WITH 23-FRAME MOTORS

❼ WHEN USED WITH 34-FRAME MOTORS

Unless otherwise noted, all dimensions shown are in inches [Dimensions in brackets are in millimeters]

DIMENSIONS Dual 180° Option

3D CAD available at www.tolomatic.com
Always use configurated CAD solid model to determine critical dimensions



❶ DOWEL PINS ⌖ .003 (.08mm) Ⓜ

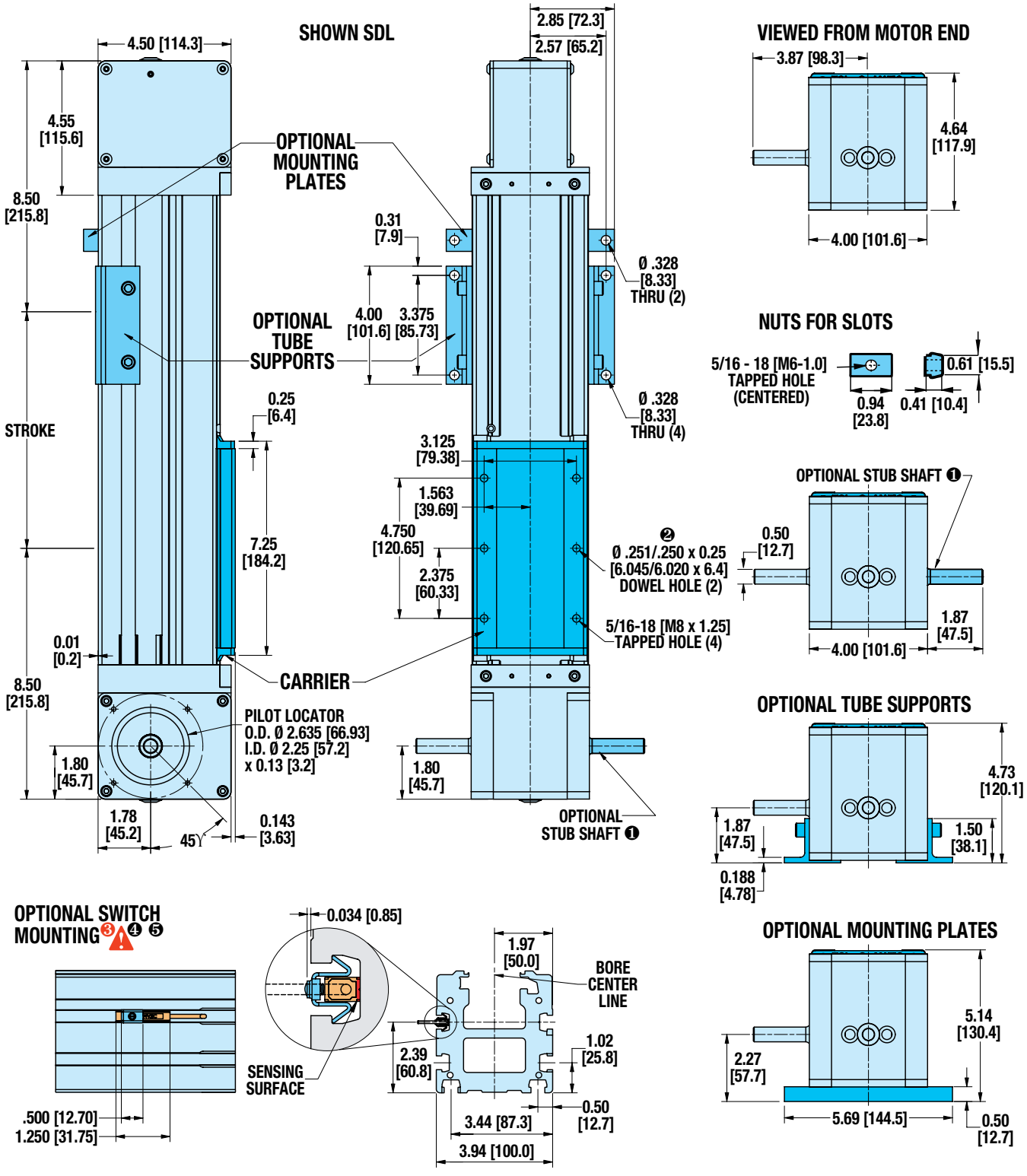
❷ ⚠ CAUTION: DO NOT OVERTIGHTEN SWITCH HARDWARE WHEN INSTALLING

❸ NOTE: The scored face of the switch indicates the sensing surface and must face toward the magnet

❹ NOTE: Some actuators require switch mounting on a specific side of the actuator. Call Tolomatic 1-800-328-2174 for details

B3W20 Electric Belt Drive Rodless Actuators

DIMENSIONS Actuator & Options



❶ ONE STUB SHAFT IS STANDARD ON ALL B3W ACTUATORS

❷ DOWEL PINS ⌖ | .003 (.08mm) | Ⓜ

❸ ⚠ CAUTION: DO NOT OVERTIGHTEN SWITCH HARDWARE WHEN INSTALLING

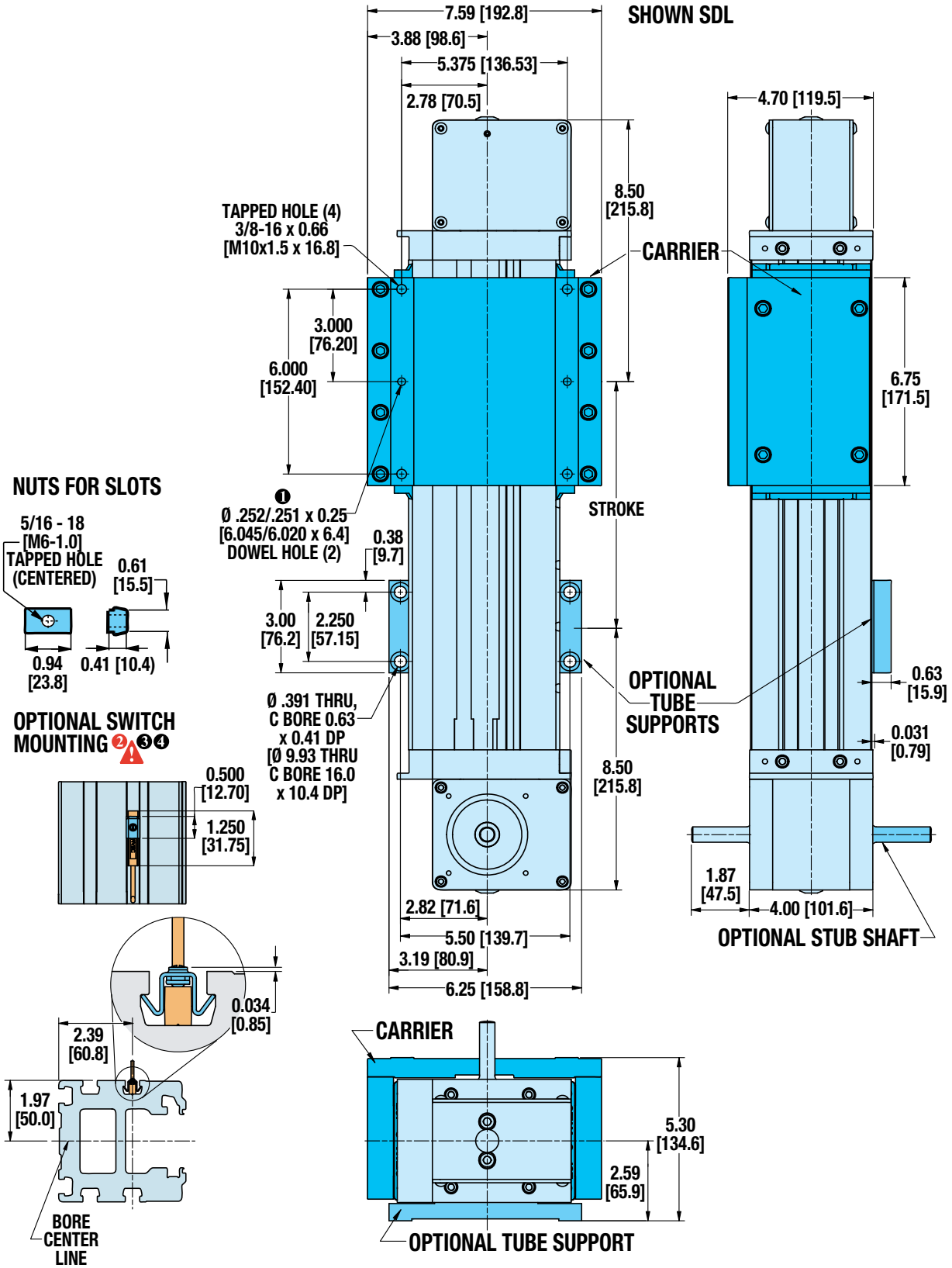
❹ NOTE: The scored face of the switch indicates the sensing surface and must face toward the magnet

❺ NOTE: Some actuators require switch mounting on a specific side of the actuator. Call Tolomatic 1-800-328-2174 for details

Unless otherwise noted, all dimensions shown are in inches [Dimensions in brackets are in millimeters]

DIMENSIONS Dual 180° Option

3D CAD available at www.tolomatic.com
Always use configured CAD solid model to determine critical dimensions



❶ DOWEL PINS ⌖ .003 (.08mm) Ⓜ

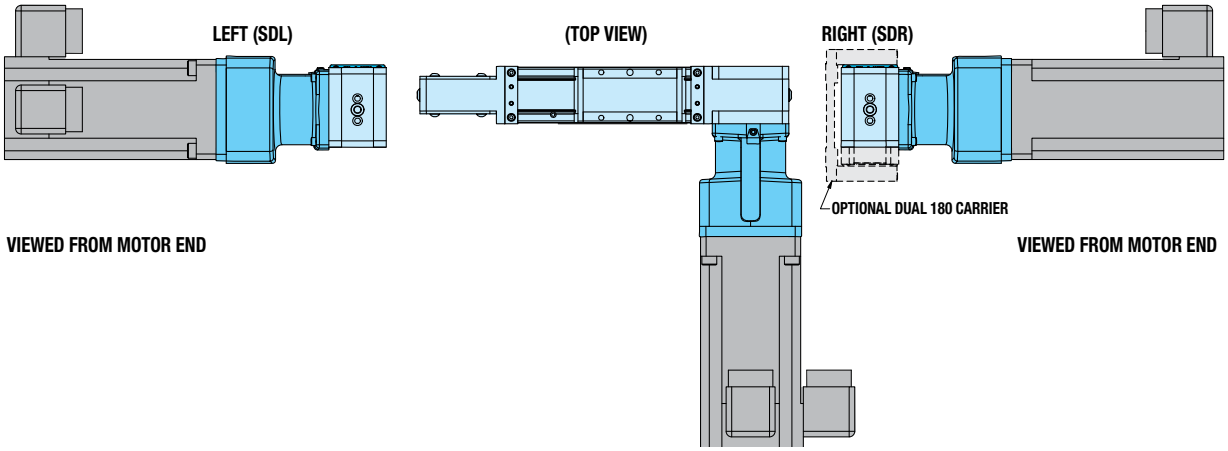
❷ ⚠ CAUTION: DO NOT OVERTIGHTEN SWITCH HARDWARE WHEN INSTALLING

❸ NOTE: The scored face of the switch indicates the sensing surface and must face toward the magnet

❹ NOTE: Some actuators require switch mounting on a specific side of the actuator. Call Tolomatic 1-800-328-2174 for details

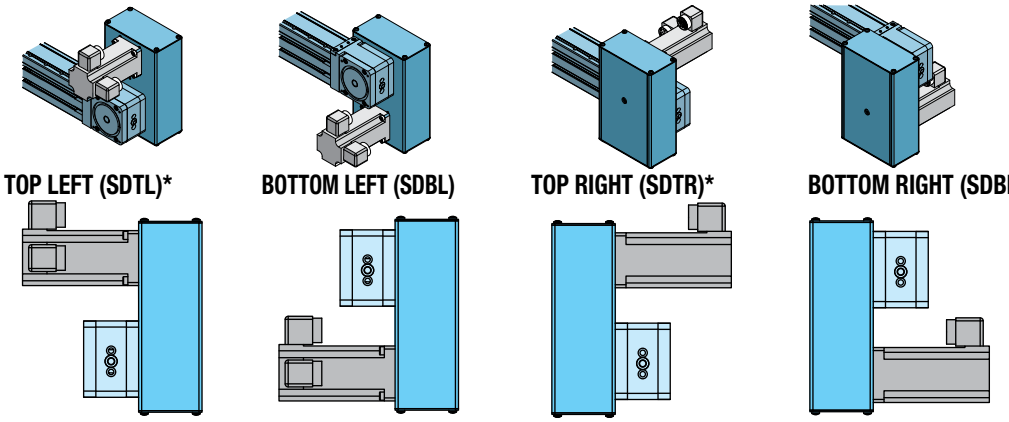
MOTOR MOUNTING

B3W DIRECT DRIVE MOTOR MOUNTING



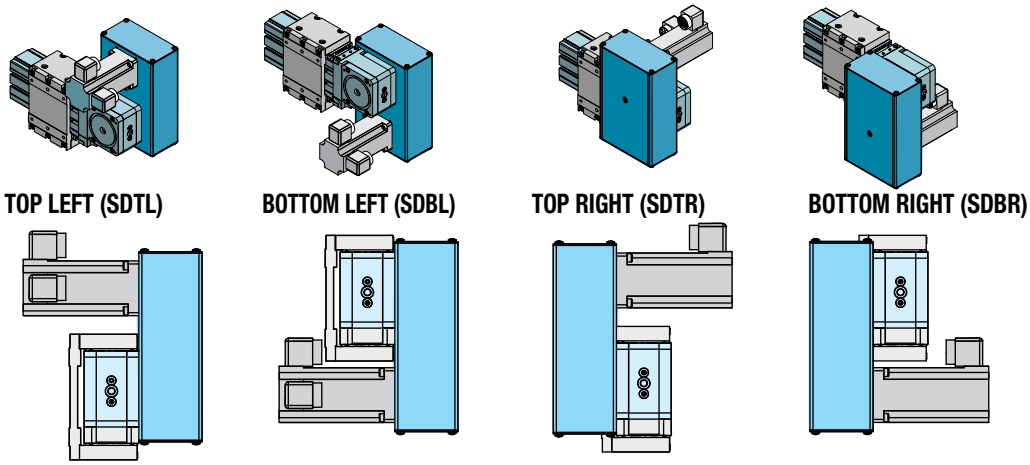
B3W(D) REDUCTION DRIVE MOTOR MOUNTING

STANDARD CARRIER



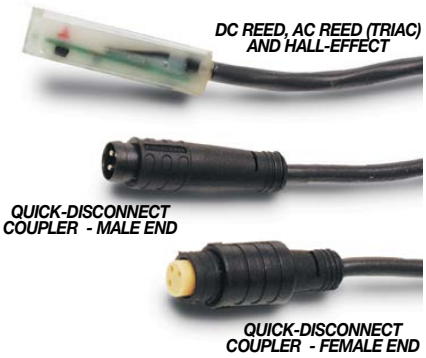
*⚠ NOTE: SDTL & SDTR are generally not recommended because the load may interfere with the motor. Stops or spacers may be required.

DUAL 180° CARRIER



B3S & B3W Electric Rodless Actuators

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
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 TOL-O-MATIC						Red TOL-O-MATIC		Red TOL-O-MATIC	
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									

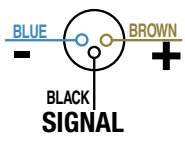
CAUTION: DO NOT OVER TIGHTEN SWITCH HARDWARE WHEN INSTALLING!

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

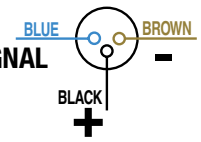
*QD = Quick Disconnect; Male coupler is located 6" [152mm} from sensor,
Female coupler to flying lead distance is 197" [5m] also see Cable Shielding specification above

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.

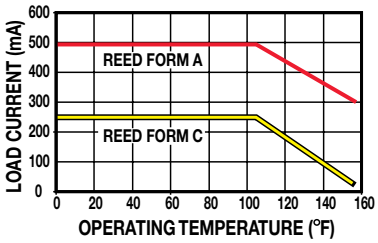
§ Maximum current 500mA (not to exceed 10VA) Refer to Temperature vs. Current graph and Voltage Derating graph

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

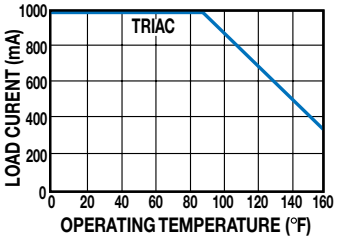
B3S & B3W Electric Rodless Actuators

SWITCH PERFORMANCE

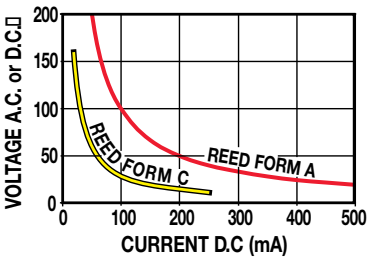
TEMP. vs CURRENT, DC REED



TEMP. vs CURRENT, AC REED

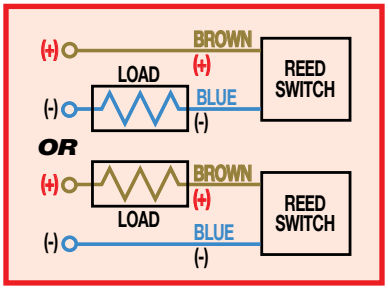


VOLTAGE DERATING, DC REED

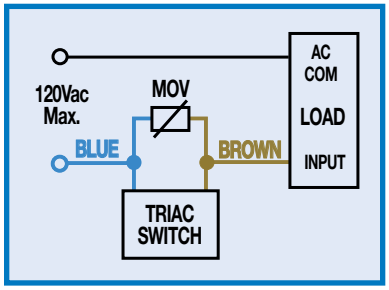


WIRING DIAGRAMS

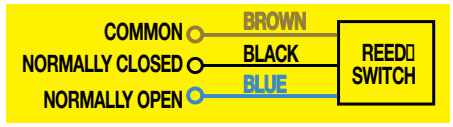
RT & RM DC REED, FORM A



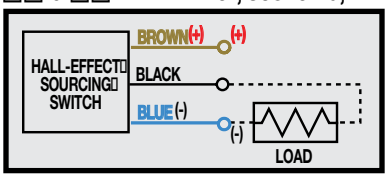
CT & CM AC REED, TRIAC



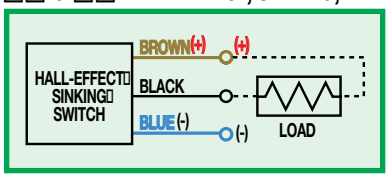
BT & BM DC REED, FORM C



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.

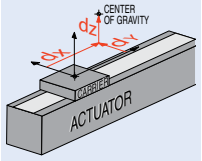
COMPILE APPLICATION REQUIREMENTS

APPLICATION DATA WORKSHEET

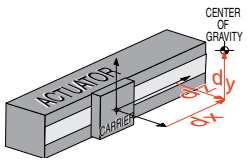
Fill in known data. Not all information is required for all applications

ORIENTATION

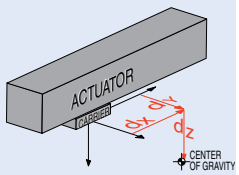
☐ Horizontal



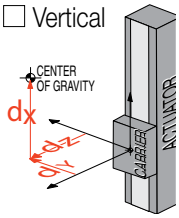
☐ Side



☐ Horizontal Down

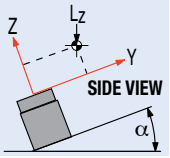


☐ Vertical

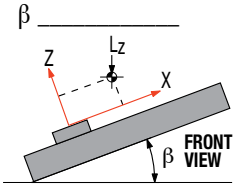


☐ Angled °

α _____



β _____



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

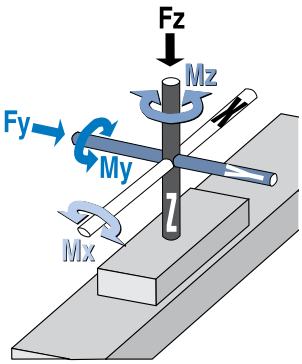
DISTANCE FROM CENTER OF CARRIER TO LOAD CENTER OF GRAVITY

d_x _____
d_y _____
d_z _____

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

STROKE LENGTH _____

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

_____
_____
_____

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

F_z _____
F_y _____

☐ lbf. (U.S. Standard) ☐ N (Metric)

MOVE PROFILE

Move Distance _____

☐ inch ☐ millimeters

Dwell Time After Move_____

Max. Speed _____

☐ in/sec ☐ mm/sec

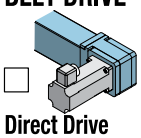
MOVE TIME _____

☐ sec

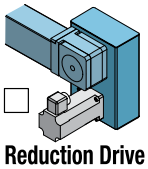
NO. OF CYCLES _____

☐ per minute ☐ per hour

BELT DRIVE

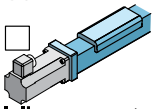


☐ Direct Drive

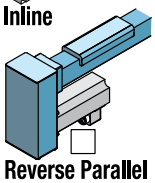


☐ Reduction Drive

SCREW DRIVE

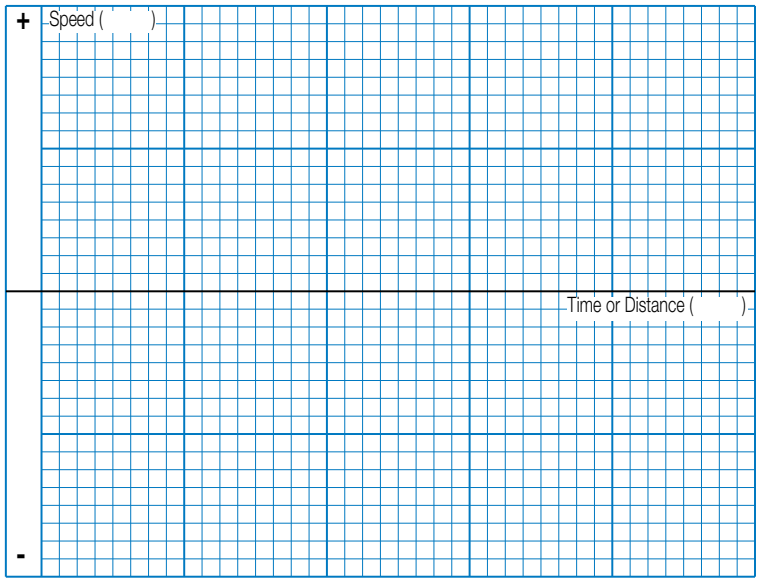


☐ Inline



☐ Reverse Parallel

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 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.

_____
_____
_____

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 SIZE

Choose an actuator that has the (A) thrust, (B) speed and (C) moment load capacity to move the load. **A.** Max Thrust: B3S see page B3_11;
B3W see page B3_25
B. Max. Speed: B3S see critical speed graphs page B3_13 to B3_15; All B3W
sizes = 200 in/sec (5m/sec).
C. Moment & Load B3S & B3W see page B3_8

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 table (page B3_8) for the actuator consider:

1) Higher capacity bearing style

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 1.5.

$$L_F = \frac{Mx}{Mx_{max}} + \frac{My}{My_{max}} + \frac{Mz}{Mz_{max}} + \frac{Fy}{Fy_{max}} + \frac{Fz}{Fz_{max}} \leq 1.5$$

If LF does exceed the value of 1.5, 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. **For the B3S** Acceleration/deceleration should not exceed critical speed (page B3_13) for the screw/nut combination chosen. **For the B3W** acceleration/deceleration should not exceed 1200 in/sec^2 (30.48 m/sec^2). Also, do not exceed safe rates of dynamic inertia moments determined in step #3.

5 SELECT THE LEAD SCREW (B3S ONLY)

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 [ENGR_] 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 SUPPPORT/ MOUNTING PLATE/ T-NUT REQUIREMENTS

- Consult the Tube Support Requirements graph for the model selected (page B3_9)
- Cross reference the application load and maximum distance between supports
- Select the appropriate number of tube supports, T-nuts or mounting plates and requirements for motor and adapter clearance.

8 CONSIDER OPTIONS

- Choose metric or inch (US Conventional) load mounting. (When ordering use S K for inch)
- Switches - Reed, Solid State PNP or NPN, all available normally open or normally closed

Use the Tolomatic Sizing & Selection Software or call Tolomatic at **1-800-328-2174**

B3S Electric Screw Drive Rodless Actuators

ORDERING

BASE MODEL | **OPTIONS**

B3S 20 D BNL02 SK36 LMI | DC18 TS2 BM2 TN8

MODEL TYPE

B3S B3S Screw Drive Rodless Actuator

SIZE

10, 15, 20

DUAL 180° CARRIER

D Dual 180° Carrier

NUT/SCREW CONFIGURATION

INCH MODELS (US Conventional)	METRIC MODELS†
SOLID NUT / PITCH (turn/in)	**SOLID NUT** / LEAD (mm/turn)
◊SN01 ◊SN02, SNA02 SN05	◊SN25 ◊SN12
◊SN (Solid Nut) not available for 20 Size	
BALL NUT / PITCH (turn/in)	**BALL NUT** / LEAD (turn/in)
BN02, BNL02 BN05, BNL05 BN08, BNL08	BNM10 BN05, BNL05 BN08, BNL08

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

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 / REDUCTIONS

(must choose one)

LMI In-Line mounting
LME23 Ext. shaft for RP & 23 frame motor
LME34 Ext. shaft for RP & 34 frame motor
***LMX** Extended shaft - old style (see note)

***For replacement actuators with extended motor shafts purchased prior to 6/24/02, use the LMX configuration code.**

⚠ **A motor size and code must be selected when specifying a reverse-parallel mounting configuration.**

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

AUXILIARY CARRIER

DC_ _Auxiliary Carrier, then 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.

SUPPORTS AND MOUNTING PLATES

(both may be selected)

TS _ Tube Supports plus quantity desired
****MP**_Mounting Plates plus quantity desired

****Mounting plates are not available on B3SD Dual 180° models.**

SWITCHES

(Quantity desired follows product code)

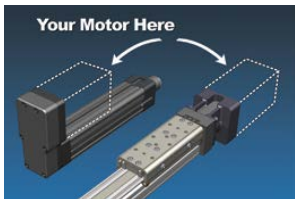
RM_ Reed Switch (Form A) with 5-meter lead/QD (Quick-disconnect)
RT_ Reed Switch (Form A) with 5-m lead
BM_ Reed Switch (Form C) with 5-meter lead/QD
BT_ Reed Switch (Form C) with 5-m lead
KM_ Hall-effect Sinking Switch with 5-meter lead/QD
KT_ Hall-effect Sinking Switch w/ 5-m lead
TM_ Hall-effect Sourcing Switch with 5-meter lead/QD
TT_ Hall-effect Sourcing Switch with 5-meter lead
CM_ TRIAC Switch with 5-meter lead/QD
CT_ TRIAC Switch with 5-meter lead

T-NUTS

TN _ Additional T-Nuts and quantity

FOOD GRADE LUBRICATION

LUB_Grease, Food/Drug



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- Select a high-performance Tolomatic electric actuator and we'll provide a motor-specific interface for your motor. With our online database, you can select from over 60 motor manufacturers and hundreds of models.

Visit **www.tolomatic.com/ymh** to find your motor/actuator match!

⚠ **Not all codes listed are compatible with all options.**

Use Tolomatic Sizing Software to determine available options and accessories based on your application requirements.

FIELD RETROFIT KITS

ITEM	B3S10_SM	B3S15_SM	B3S20_SM	B3S10_SK	B3S15_SK	B3S20_SK
Tube Supports	4410-9006	4415-9006	4420-9006	3410-9006	3415-9006	3420-9006
Tube Supports (B3SD Dual 180° models)	4410-9026	4415-9026	4420-9026	3410-9026	3415-9026	3420-9026
1/2" Mounting Plates	4410-9030	4415-9030	4420-9030	3410-9142	3415-9056	3420-9056
1" Mounting Plates	4410-9031	4415-9031	–	3410-9057	3415-9057	–

B3W Electric Belt Drive Rodless Actuators

ORDERING

BASE MODEL

B	3	W	2	0	D	BWS	4	0	SK	5	6	SDTR

OPTIONS

DC	1	8	TS	2	BM	2	TN	1	6

MODEL TYPE

B3W B3W Series Belt Drive

SIZE

10, 15, 20

DUAL 180° CARRIER

D Dual 180° Carrier

BELT MATERIAL AND WIDTH

BWS18 18mm Polyurethane Steel belt (B3W10)

BWS30 30mm Polyurethane Steel belt (B3W15)

BWS40 40mm Polyurethane Steel belt (B3W20)

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

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

MOTOR MOUNTING / REDUCTIONS

(must choose one)

SDL, SDLB* Direct Drive on left
SDR, SDRB* Direct Drive on right

⚠ **A motor size and code must be selected when specifying a 3:1 reduction.**

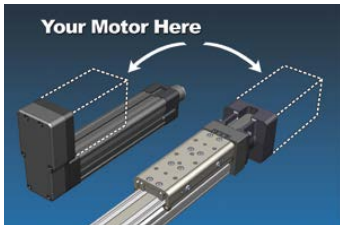
SDTL, SDTLB* 3:1 Reduction on top left
SDTR, SDTRB* 3:1 Reduction on top right
SDBL, SDBLB* 3:1 Reduction on bottom left
SDBR, SDBRB* 3:1 Reduction on bottom right
*** For Dual Stub Shaft option**

AUXILIARY CARRIER

DC_ _Auxiliary Carrier, then 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.



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Visit **www.tolomatic.com/ymh** to find your motor/actuator match!

SUPPORTS AND MOUNTING PLATES

(both may be selected)

TS _ Tube Supports, enter quantity desired
MP_ Mounting Plates, enter quantity desired

SWITCHES

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

T-NUTS

TN _ Additional T-Nuts, enter quantity

⚠ **Not all codes listed are compatible with all options.**

Use Tolomatic Sizing Software to determine available options and accessories based on your application requirements.

FIELD RETROFIT KITS

ITEM	B3W10_SM	B3W15_SM	B3W20_SM	B3W10_SK	B3W15_SK	B3W20_SK
Tube Supports	4410-9006	4415-9006	4420-9006	3410-9006	3415-9006	3420-9006
Tube Supports (B3WD Dual 180° models)	4410-9170	4415-9170	4420-9170	3410-9170	3415-9170	3420-9170
1/2" Mounting Plates (MRV 23-frame motors)	4410-9030	4415-9030	–	3410-9056	3415-9056	–
1/2" Mounting Plates (MRV all frame motors)	–	–	4420-9030	–	–	3420-9056
1" Mounting Plates (MRV all frame motors)	4410-9031	–	–	3410-9057	–	–
1" Mounting Plates (MRV 34-frame motors)	–	4415-9031	–	–	3415-9057	–

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Unique linear actuator solutions with Endurance Technology℠ to solve your challenging application requirements.

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The fastest delivery of catalog products... Built-to-order with configurable stroke lengths and flexible mounting options.

ACTUATOR SIZING

Online sizing that is easy to use, accurate and always up-to-date. Find a Tolomatic electric actuator to meet your requirements.

YOUR MOTOR HERE

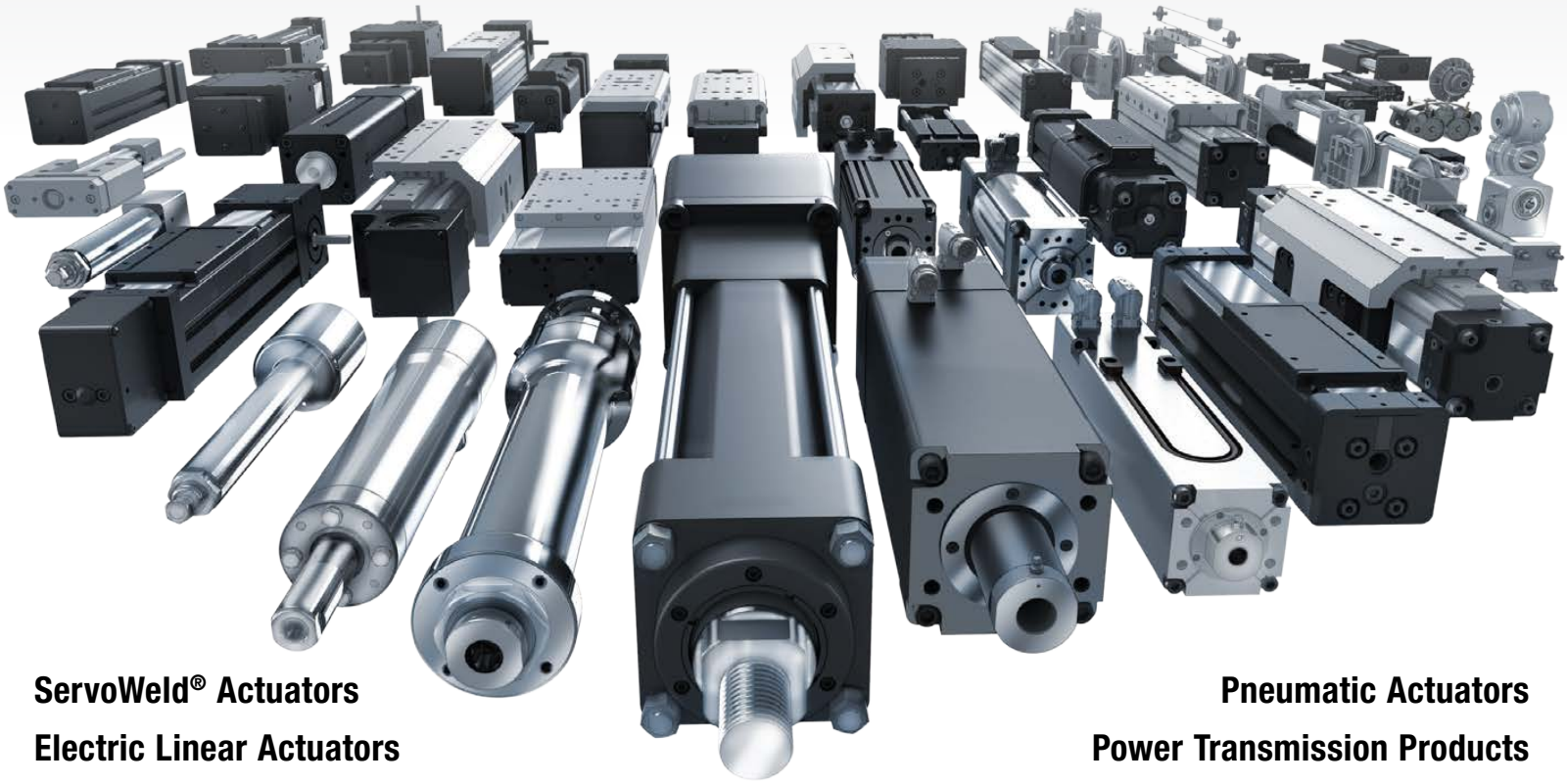
Match your motor with compatible mounting plates that ship with any Tolomatic electric actuator.

LIBRARY

Easy to access CAD files available in the most popular formats to place directly into your assembly.

TECHNICAL SUPPORT

Extensive motion control knowledge: Expect prompt, courteous replies to any application and product questions from Tolomatic's industry experts.



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