

B3W RODLESS BELT DRIVEN ACTUATOR

ENDURANCE TECHNOLOGYSM

B3W

CONTENTS

Tolomatic	2
Overview & Options	3
Features	4 - 5
Advantages & Applications	6
Belt Construction and Performance ...	7
Specifications ..	8 - 11
Dimensions ...	12 - 20
Switches	21 - 22
Ordering	23

MAXIMUM DURABILITY

THE TOLOMATIC DIFFERENCE

What you expect from the industry leader:



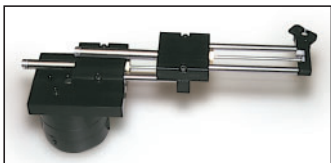
EXCELLENT CUSTOMER SERVICE & TECHNICAL SUPPORT

Our people make the difference! Expect prompt, courteous replies to all of your application and product questions.



INDUSTRY LEADING DELIVERIES

Standard catalog products are built to order and ready-to-ship in 5 days or less. Modified and custom products ship weeks ahead of the competition.



INNOVATIVE PRODUCTS

From standard catalog products... to modified products... to completely unique custom products, Tolomatic designs and builds the best solutions for your challenging applications.



SIZING & SELECTION SOFTWARE

Windows® compatible, downloadable from our website – FREE – the best tool of its kind on the market! Product selection has never been easier.



3D MODELS & 2D DRAWINGS AVAILABLE ON THE WEB

Easy to access CAD files are available in many popular formats.

ALSO CONSIDER THESE OTHER TOLOMATIC PRODUCTS:

PNEUMATIC PRODUCTS



RODLESS CYLINDERS: Band Cylinders, Cable Cylinders, MAGNETICALLY COUPLED CYLINDERS/SLIDES; GUIDED ROD CYLINDER SLIDES

"FOLDOUT" BROCHURE #9900-9075 BAND CYLINDER BROCHURE #9900-4015 CATALOG #9900-4000 www.tolomatic.com/pneumatic

ELECTRIC PRODUCTS



ROD & GUIDED ROD STYLE ACTUATORS, HIGH THRUST ACTUATORS, SCREW & BELT DRIVE RODLESS ACTUATORS, MOTORS, AXIOM DRIVES/CONTROLLERS

"FOLDOUT" BROCHURE #9900-9074 ELECTRIC PRODUCTS BROCHURE #9900-4016 MXE BROCHURE #8300-4000 STEPPER BROCHURE #3600-4160 www.tolomatic.com/electric

POWER TRANSMISSION PRODUCTS



GEARBOXES: Float-A-Shaft™, Slide-Rite™; DISC CONE CLUTCH; CALIPER DISC BRAKE

"FOLDOUT" BROCHURE #9900-9076 CATALOG #9900-4009 www.tolomatic.com/pt



3800 County Road 116 • Hamel, MN 55340 U.S.A.
Phone: (763) 478-8000 • Fax: (763) 478-8080

Toll-Free: 1-800-328-2174

Email: help@tolomatic.com • <http://www.tolomatic.com>

All brand and product names are trademarks or registered trademarks of their respective owners. Information in this document is believed accurate at time of printing. However, Tolomatic assumes no responsibility for its use or for any errors that may appear in this document. Tolomatic reserves the right to change the design or operation of the equipment described herein and any associated motion products without notice. Information in this document is subject to change without notice.

Visit www.tolomatic.com for the most up-to-date technical information



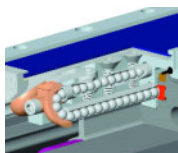
B3W Rodless Belt Driven Actuator

OVERVIEW & OPTIONS

APPLICATION BENEFITS

- Accommodate heavy loads
- Handle high moment loads with consistent, smooth operation
- Cost-effective alternative to auxiliary rail systems
- Consistent work point deflection through life of product
- 100% duty cycle

BEARING SYSTEM



- Heavy duty recirculating bearings in gothic arch rail guide.
- Wear resistance with repeatable accuracy
- Patented* sealed bearing system — for long life
- High load and moment capacities
- Consistent tracking for full actuator life

STANDARD MOUNTING



- B3W actuators have T-nut mounting in the body base with four T-nuts for the first 24 inches of stroke. Two nuts are provided for each additional 20 inches.

ACTUATOR/MOTOR FACTORS

- Actuator's operating temperature range (40-130° F, 4-54° C) should take into consideration heat generated by the motor and drive, linear velocity and work cycle time.
- For large frame motors or small actuators, cantilevered motors need to be supported, if subjected to continuous rapid reversing duty and/or under dynamic conditions.

AVAILABLE OPTIONS



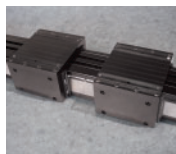
Tube Supports: Provide intermediate support of actuator body at the recommended intervals.



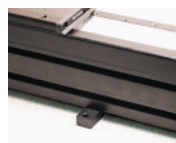
Auxiliary Carrier: Increases rigidity, load-carrying capacity and bending moments.



Dual 180° Carrier: Allows load to be rotated 90° from the cylinder's carrier, providing an additional load bearing surface. Requires its own proprietary tube supports and foot mounts.



Auxiliary Dual 180° Carrier: Substantially increases loads and moments.

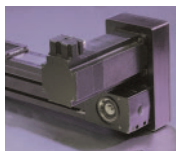


Mounting Plates: Provide clearance height for motors and motor mounts when mounting an actuator on a flush surface and provide the means for top mounting access. Kits include plates and mounting screws.



Motor Mounting and Gearhead Reduction:

Direct-Drive – Drive motor is mounted directly to the drive end assembly.



Reduction Drive – Mounts the motor to the reduction assembly, providing 3:1 speed reduction from the motor to the belt drive wheel.



Planetary Gearboxes – Designed for applications requiring reduction for higher torque at lower speeds. Tolomatic, in partnership with Apex Dynamics, offers high precision, high speed, single stage, true planetary gearboxes. Gear ratios of 5:1 and 10:1 are available and compatible with our 23 and 34 frame MRV brushless servo and MRS stepper motors.



Switches: Reed, dc Hall-effect and ac TRIAC.

* U.S. Patent No. 5,555,789

A

B

MXE-S

MXE-P

MXB-U

MXB-P

B3S

B3W

TKS

TKB

BCS

SLS

ROD STYLE ACTUATORS

RSA

GSWA

GSA

CONTROL SYSTEMS +

MRV

MRS

GEARBOX

SWITCH

C

A

B3W Rodless Belt Driven Actuator

B

OVERVIEW

ENDURANCE TECHNOLOGYSM

Look for this endurance technology symbol indicating our durability design features

The B3W rodless style actuator is designed for carrying moderate to heavy loads at moderate to high speeds with large bending moment capacities. Based upon the BC3 pneumatic band cylinder, it utilizes a patented integral recirculating ball bearing guidance system that provides consistent and durable performance. Customized stroke lengths up to 292 inches are available. Contact your local distributor or Tolomatic for more information.



MADE IN U.S.A.

• YOUR MOTOR HERE •

YOU CAN CHOOSE:

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

• MOTOR ORIENTATION •

YOU CAN CHOOSE:

- Direct drive option directly couples the driving shafts and is a one-piece housing construction for optimum alignment and support of the motor
- Reduction drive option offers the ability to reduce the reflected inertia and lower the motor torque requirements

• 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

• MULTIPLE BELT TECHNOLOGIES •

YOU CAN CHOOSE:

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

• INTERNAL BUMPERS •

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



MXE-S

MXE-P

MXB-U

MXB-P

B3S

B3W

TKS

TKB

BCS

SLS

RSA

GSA

GSA

MRV

MRS

GEARBOX

SWITCH

C

B3W Rodless Belt Driven Actuator

OVERVIEW

TOLOMATIC... MAXIMUM DURABILITY

PATENTED WEDGE 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



FORMED END CAP WIPERS

- Prevents contaminants from entering the sealing band area to protect internal components

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



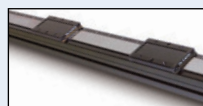
LOAD-BEARING CARRIER DESIGN

- Recirculating ball bearing system provides guidance, high efficiency and long life
- Load and moments are transmitted directly to the actuator body

STAINLESS STEEL SEALING BAND

- Prevents contaminants from entering the bearing 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 belt

OPTIONS



CARRIER OPTIONS

AUXILIARY CARRIER doubles the load capacity and increases pitch and yaw bending moment capacities



DUAL 180° CARRIER increases 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



METRIC OPTION

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

SWITCHES

Styles include: reed, Hall-effect or triac

MXE-S
MXE-P
MXB-U
MXB-P
B3S
B3W
TKS
TKB
BCS
SLS

RSA
GSWA
GSA

MRV
MRS
GEARBOX
SWITCH

B3W Rodless Belt Driven Actuator

ADVANTAGES AND APPLICATIONS

ADVANTAGES OF BELT SOLUTIONS

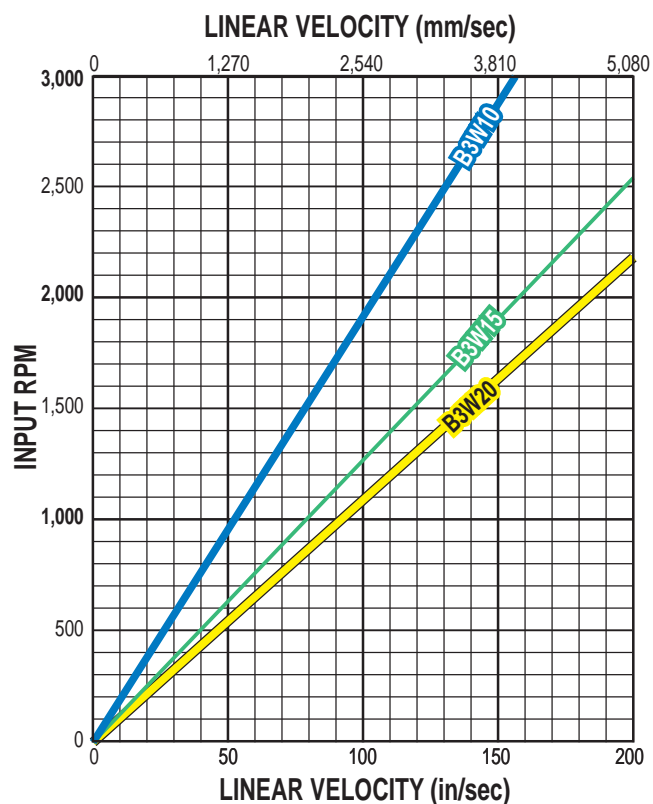
The use of synchronous belts, often referred to as timing belts, have become a standard in the automated motion industry as an alternate to screw drive mechanisms for producing linear motion.

This design for linear motion provides an excellent solution for applications that require:

- High-speed linear velocities
- High acceleration rates
- Long length strokes
- Excellent repeatability
- High duty cycles

A belt solution is ideal for linear positioning and gantry applications. Linear velocities can now reach up to 200 in/sec with acceleration rates at 1200 in/sec². Belting material is available in lengths that allow stroke lengths over 24 feet, two to three times longer than screw actuators.

CARRIER SPEED CAPABILITIES

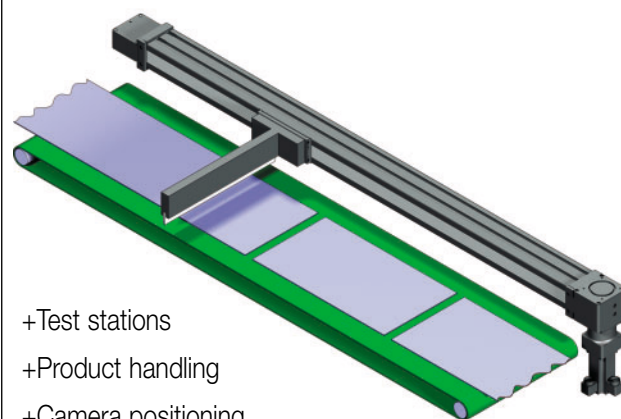


APPLICATION OF BELT ACTUATORS

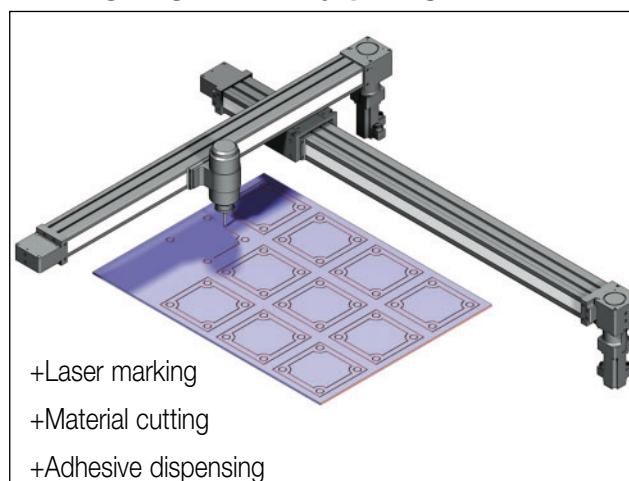
A rodless belt actuator integrates the advantages of a linear belt solution with a load support and guidance system. This combination allows you to install a pre-assembled and compact solution, often without the need of external guide rails or load support systems. Available in multiple frame sizes with options such as dual carriers and dual support systems, you can choose the proper level of load and moment support required for your application. The result of this combination is a belt actuator that is:

- Easy to size, design and order
- Quick to install and maintain
- Simple to integrate and control
- Provides a lower installed cost

APPLICATION: High Speed Flying Cut Off



APPLICATION: X-Y Multi Axis



B3W Rodless Belt Driven Actuator

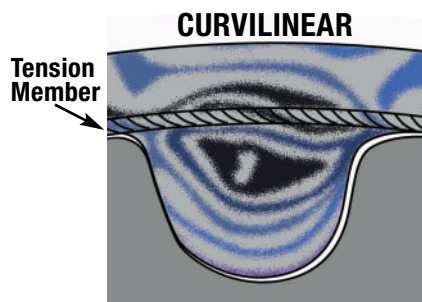
BELT CONSTRUCTION AND PERFORMANCE

BELT CONSTRUCTION

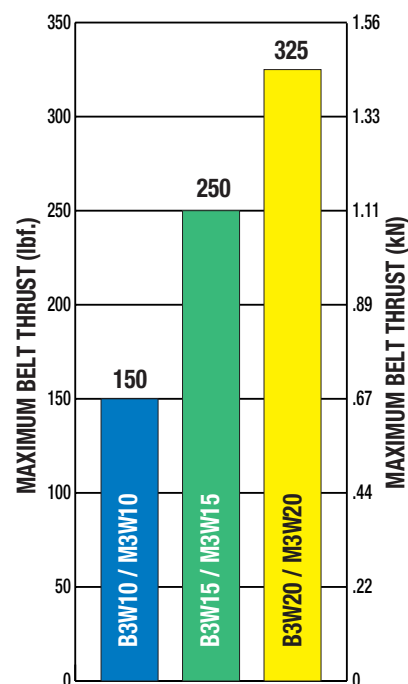
ENDURANCE TECHNOLOGYSM

Tolomatic installs an HTD synchronous belt in the B3W product line that features a curvilinear tooth profile. This type of 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 more cogging-resistant at a given tension, preventing potentially damaging positioning errors.

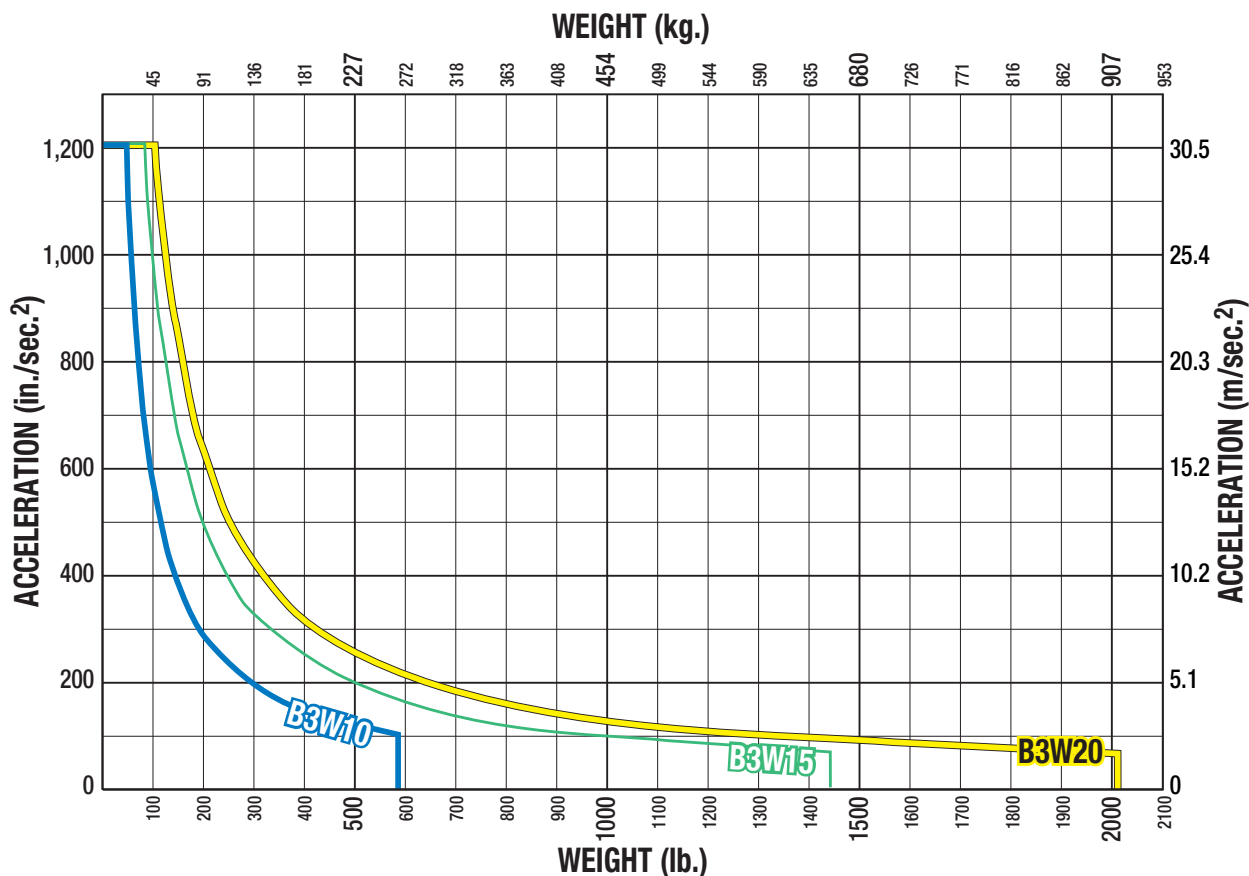
Tolomatic's standard belt is a polyurethane material reinforced with steel tension members to produce high carrier thrusts without belt stretch. A Kevlar[®] reinforced belt featuring equal thrust capability is also available for applications that may experience high shock loading.



MAXIMUM BELT THRUST



MAXIMUM ACCELERATION AS A FUNCTION OF LOAD WEIGHT



MXE-S
MXE-P
MXB-U
MXB-P
B3S
B3W
TKS
TKB
BCS
SLS

RSA
GSWA
GSA

MRV
MRS
GEARBOX
SWITCH

B3W Rodless Belt Driven Actuator

SPECIFICATIONS



B3W SPECIFICATIONS

		STANDARD			METRIC			
		B3W10	B3W15	B3W20		M3W10	M3W15	M3W20
Max. Stroke	in	204	204	156	mm	5,182	5,182	3,962
Max. Velocity	in/sec	200	200	200	m/sec	5.08	5.08	5.08
Max. Acceleration	in/sec ²	1,200	1,200	1,200	m/sec ²	30.48	30.48	30.48
Max. Input Torque	lb-in	75.23	112.80	244.40	N-m	8.50	12.75	27.61
Breakaway Torque	lb-in	9.38	12.50	28.13	N-m	1.06	1.41	3.18
Dual 180 or Aux Carrier	lb-in	11.88	15.00	31.25	N-m	1.34	1.69	3.53
Dual 180 & Aux Carrier	lb-in	16.88	25.00	47.50	N-m	1.91	2.82	5.37
Pulley Pitch Dia.	in	1.003	1.504	1.754	mm	25.48	38.20	44.55
Stoke per Rev.	in/rev	3.151	4.725	5.510	mm/rev	80.04	120.02	139.95
Repeatability	in	+/- 0.002	+/- 0.002	+/- 0.002	mm	+/- 0.05	+/- 0.05	+/- 0.05
Straightness & Flatness ¹	in	0.00067 x L*	0.00067 x L*	0.00067 x L*	mm	0.017 x L*	0.017 x L*	0.017 x L*
Temp. Range ²	°F	40 - 130	40 - 130	40 - 130	°C	4 - 54	4 - 54	4 - 54
IP Rating ³	IP	44	44	44	IP	44	44	44
Weight (zero stroke)	lb	7.54	25.12	35.40	kg	3.42	11.39	16.06
Weight (per unit of stroke)	lb/in	0.389	0.395	0.716	kg/mm	0.0069	0.0071	0.0128
Weight of pulley	lb	0.015	0.054	0.1036	kg	0.0068	0.0244	0.0470
Weight of carrier	lb	0.85	1.56	2.14	kg	0.39	0.71	0.97
Inertia (zero stroke)	lb-in ²	0.2846	1.3917	2.6607	kg-cm ²	0.833	4.073	7.786
Inertia (per unit of stroke)	lb-in ² /in	0.0016	0.0017	0.0114	kg-cm ² /mm	0.00018	0.00020	0.00131
Inertia of pulley	lb-in ²	0.0093	0.0748	0.1441	kg-cm ²	0.027	0.219	0.422
Inertia of carrier	lb-in ²	0.1041	0.5089	0.9728	kg-cm ²	0.305	1.489	2.847



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 Support Recommendations graph pg 10.

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 (zero stroke) + [Inertia (per unit of stroke) x number of units]
(For weight calculation substitute inertia with weight in the above formula)

B3W Rodless Belt Driven Actuator

SPECIFICATIONS



DYNAMIC BENDING MOMENTS AND LOADS

		STANDARD			METRIC		
STANDARD CARRIER		B3W10	B3W15	B3W20	M3W10	M3W15	M3W20
	Mx Moment (Roll) (lb-in : N-m)	250	859	1,662	28.2	97.1	187.8
	My Moment (Pitch) (lb-in : N-m)	269	1,033	1,472	30.4	116.7	166.3
	Mz Moment (Yaw) (lb-in : N-m)	156	596	850	17.6	67.3	96.0
	Fy Load (Radial) (lb : N)	341	840	1,159	1,517	3,737	5,155
	Fz Load (Lateral) (lb : N)	591	1454	2008	2,629	6,468	8,932
AUXILIARY CARRIER: Increases rigidity, load-carrying capacity and moments		B3W10	B3W15	B3W20	M3W10	M3W15	M3W20
	Mx Moment (Roll) *(lb-in : N-m)	500	1,718	3,324	56.5	194.1	375.6
	My Moment (Pitch) *(lb-in : N-m)	2,825	11,734	16,265	319.2	1,325.8	1,837.7
	Mz Moment (Yaw) *(lb-in : N-m)	1,630	6,779	9,388	184.2	765.9	1,060.7
	Fy Load (Radial) (lb : N)	682	1,680	2,318	3,034	7,473	10,311
	Fz Load (Lateral) (lb : N)	1,182	2,908	4,016	5,258	12,935	17,864
	Minimum Dimension 'D' (in : mm)	4.88	8.07	8.10	124.0	205.2	205.7
DUAL 180° CARRIER: Allows 90° rotation of load, adds load bearing surface		B3WD10	B3WD15	B3WD20	M3WD10	M3WD15	M3WD20
	Mx Moment (Roll) (lb-in : N-m)	657	2,468	4,527	74.2	278.8	511.5
	My Moment (Pitch) (lb-in : N-m)	312	1,192	1,700	35.3	134.7	192.1
	Mz Moment (Yaw) (lb-in : N-m)	538	2,066	2,944	60.8	233.4	332.6
	Fy Load (Radial) (lb : N)	1,182	2,908	4,016	5,258	12,935	17,864
	Fz Load (Lateral) (lb : N)	682	1,680	2,318	3,034	7,473	10,311
	Minimum Dimension 'D' (in : mm)	4.88	8.07	8.10	124.0	205.0	205.7
AUXILIARY DUAL 180° CARRIER: Substantially increases moment and loads		B3WD10	B3WD15	B3WD20	M3WD10	M3WD15	M3WD20
	Mx Moment (Roll) *(lb-in : N-m)	1,314	4,936	9,054	148.5	557.7	1,023.0
	My Moment (Pitch) *(lb-in : N-m)	3,328	13,558	18,776	376.0	1,531.9	2,121.4
	Mz Moment (Yaw) *(lb-in : N-m)	5,768	23,468	32,530	651.7	2,651.5	3,675.4
	Fy Load (Radial) (lb : N)	2,364	5,816	8,032	10,516	25,871	35,728
	Fz Load (Lateral) (lb : N)	1,364	3,360	4,636	6,067	14,946	20,622
	Minimum Dimension 'D' (in : mm)	4.88	8.07	8.10	124.0	205.0	205.7

! 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 11.

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 (see formula at right). Exceeding a load factor of 1 will diminish the actuator's 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_F must not exceed the value 1.

A

B

MXE-S

MXE-P

MXB-U

MXB-P

B3S

B3W

TKS

TKB

BCS

SLS

RSA

GSA

GSA

MRV

MRS

GEARBOX

SWITCH

C

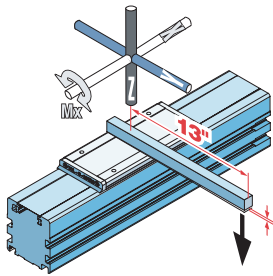
B3W Rodless Belt Driven Actuator

SPECIFICATIONS



LOAD DEFLECTION

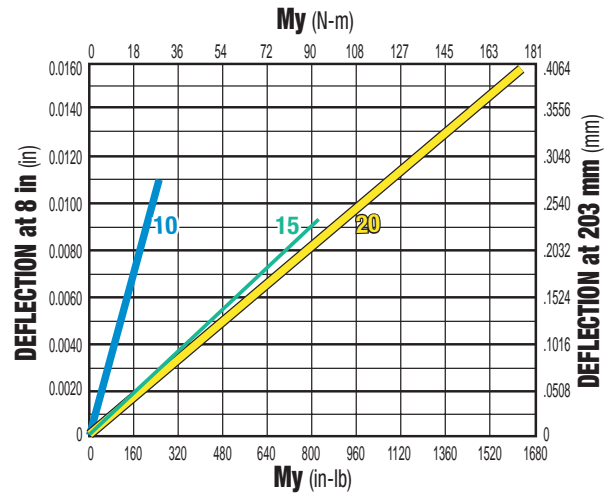
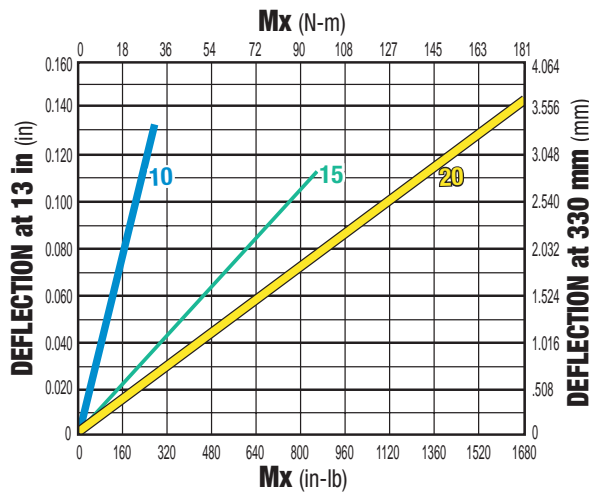
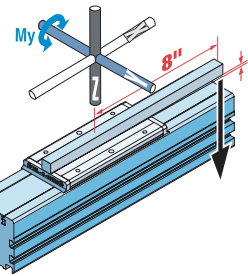
DEFLECTION ABOUT X AXIS



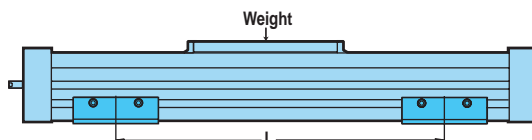
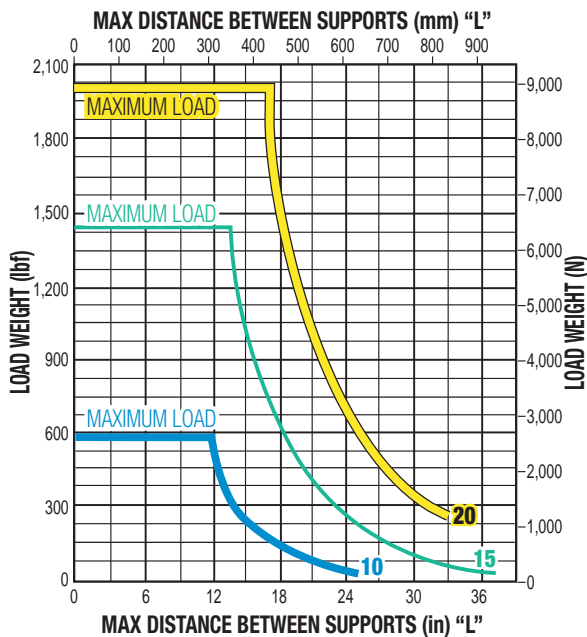
DEFLECTION TESTING WAS DONE UNDER THESE CRITERIA:

- 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 ($M_x = 13"$, $M_y = 8"$)

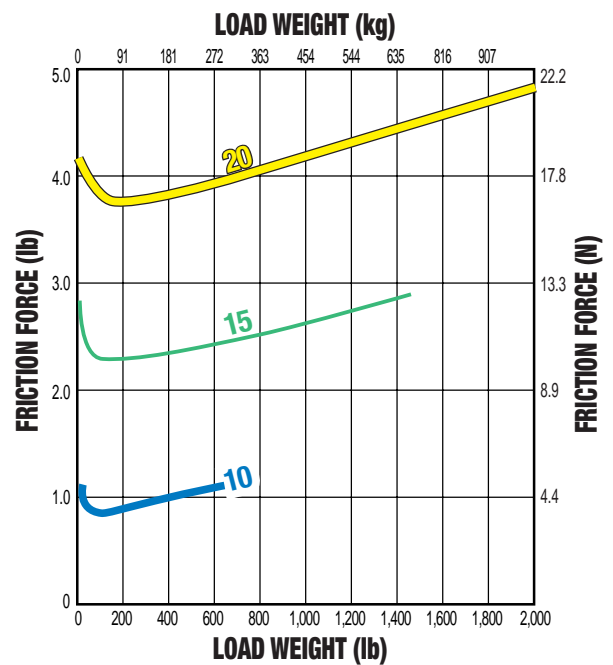
DEFLECTION ABOUT Y AXIS



SUPPORT RECOMMENDATIONS



FRICTION FORCE

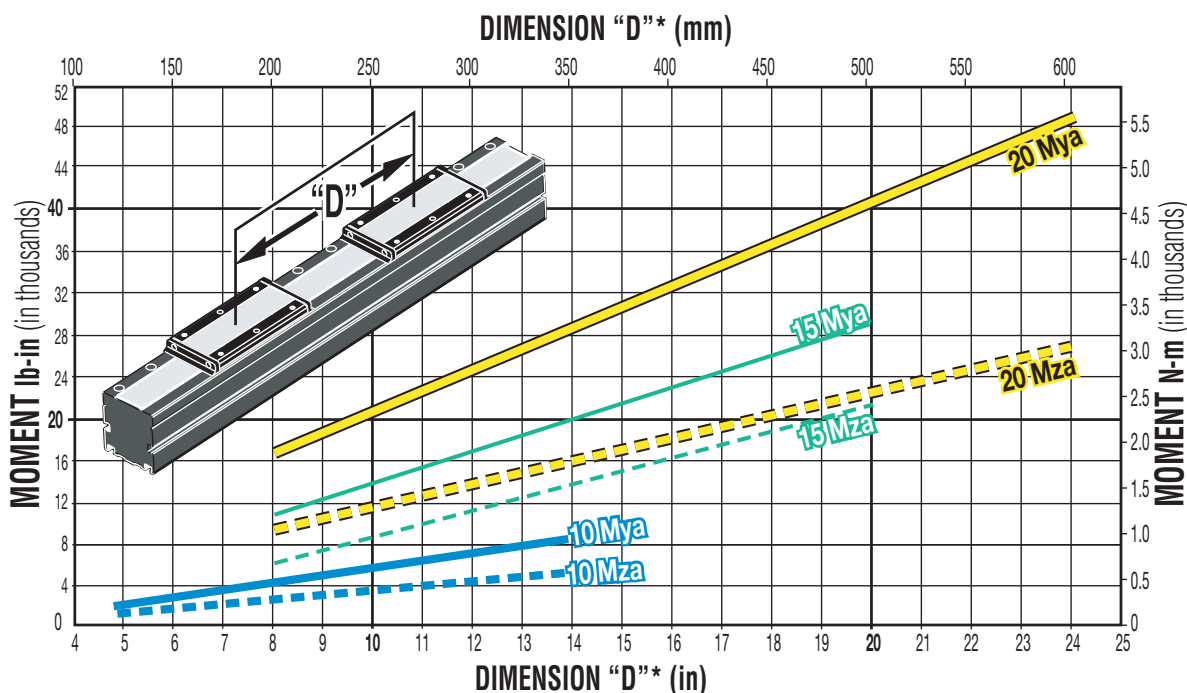


B3W Rodless Belt Driven Actuator

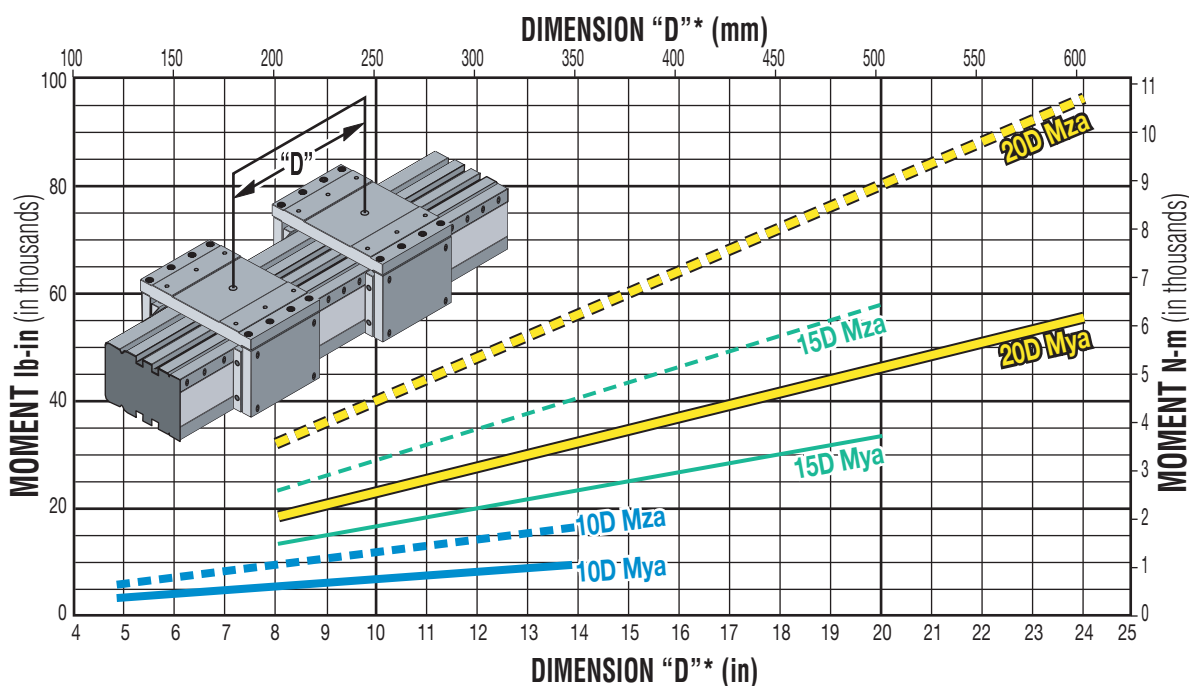
SPECIFICATIONS



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.

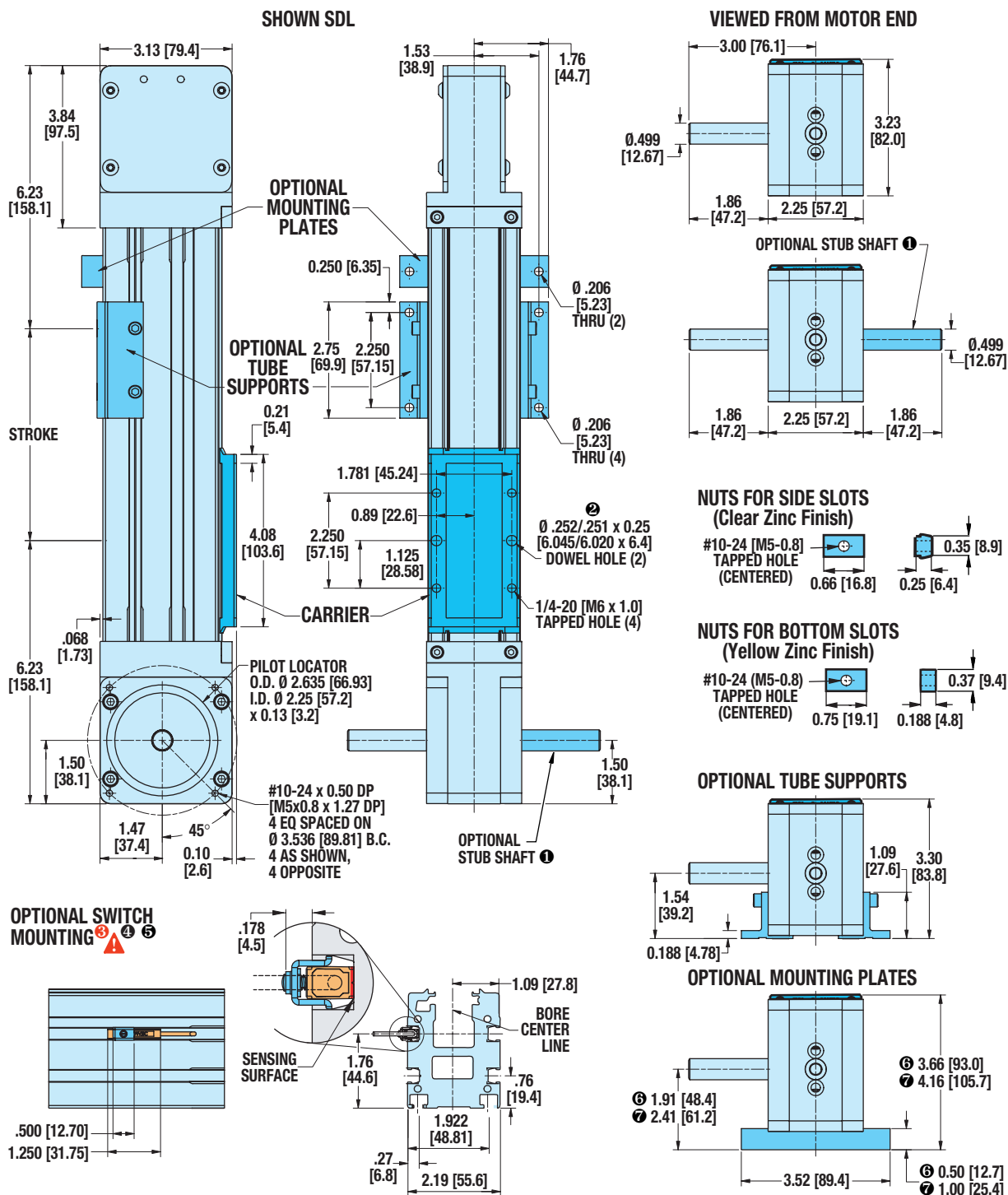
Life of the actuator will vary for each application depending on the combined loads, motion parameters and operating conditions. The load factor (L_F) ratios for each application must not exceed a value of 1 (see formula at right). Exceeding a load factor of 1 will diminish the actuator's rated life.

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

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

MXE-S
MXE-P
MXB-U
MXB-P
B3S
B3W
TKS
TKB
BCS
SLS
RSA
GSWA
GSA
MRV
MRS
GEARBOX
SWITCH

B3W10 ACTUATOR AND OPTIONS



① ONE STUB SHAFT IS STANDARD ON ALL B3W ACTUATORS

② DOWEL PINS $\varnothing .003 (.08\text{mm})$ (M)

3 CAUTION: DO NOT OVERTIGHTEN SWITCH HARDWARE WHEN INSTALLING

④ NOTE: The scored face of the switch indicates the sensing surface and must face toward the magnet

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

⑥ WHEN USED WITH 23-FRAME MOTORS

⑦ WHEN USED WITH 34-FRAME MOTORS

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

B3W Rodless Belt Driven Actuator

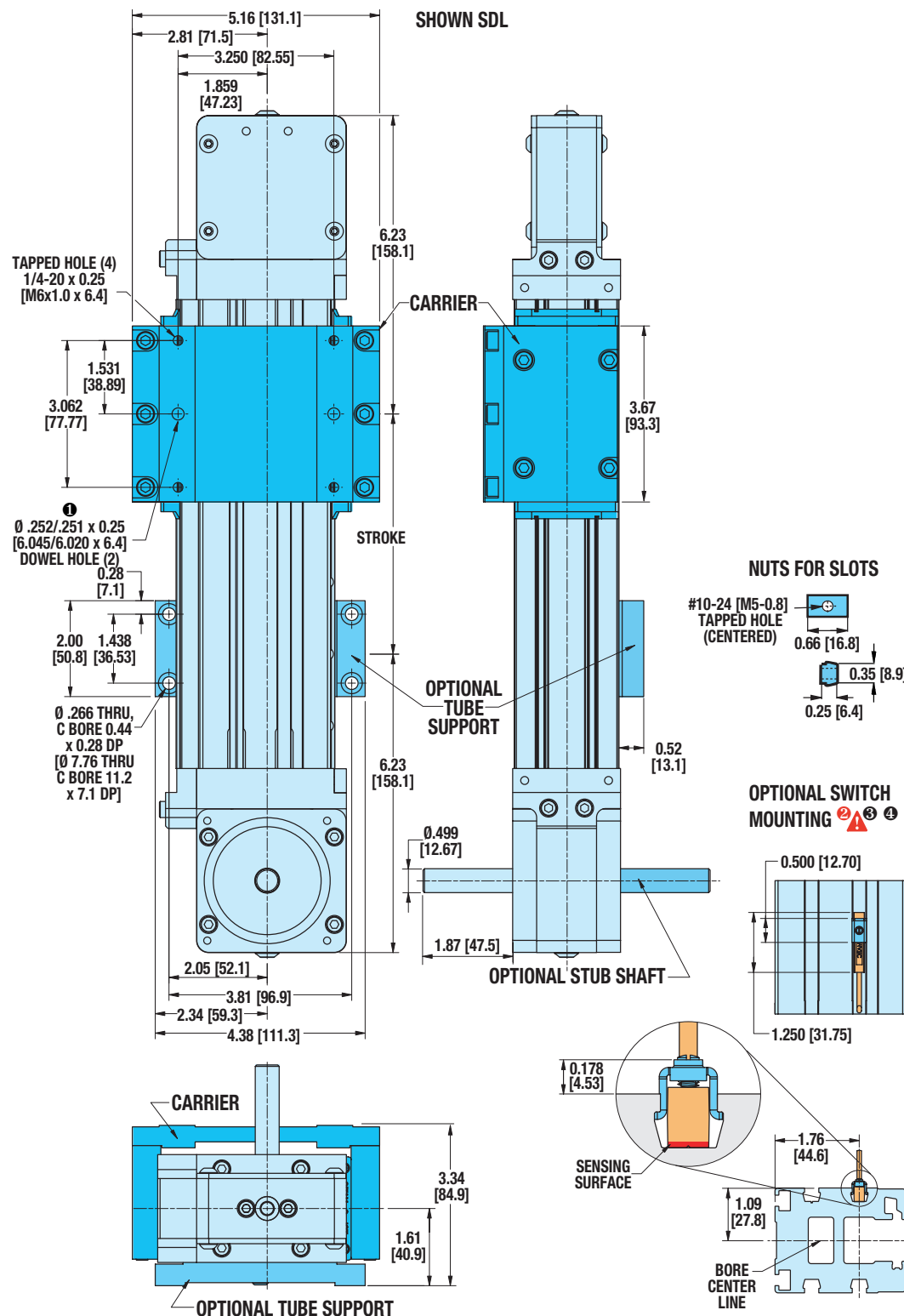
DIMENSIONS

B3WD10 DUAL 180° OPTION

3D CAD AVAILABLE AT
WWW.TOLOMATIC.COM



WWW.SDCENTRAL.COM



① DOWEL PINS $\frac{1}{16}$.003 (.08mm) (M)

② **CAUTION: DO NOT OVERTIGHTEN SWITCH HARDWARE WHEN INSTALLING**

③ NOTE: The scored face of the switch indicates the sensing surface and must face toward the magnet

④ NOTE: Some actuators require switch mounting on a specific side of the actuator. Call Tolomatic 1-800-328-2174 for details

RODLESS ACTUATORS	MXE-S
	MXE-P
	MXB-U
	MXB-P
ROD STYLE ACTUATORS	B3S
	B3W
	TKS
	TKB
CONTROL SYSTEMS +	BCS
	SLS
CONTROL SYSTEMS +	MRV
	MRS
	GEARBOX
	SWITCH

A

B

B3W15 Rodless Belt Driven Actuator

DIMENSIONS

B3W15 ACTUATOR AND OPTIONS



MXE-S

MXE-P

MXB-U

MXB-P

B3S

B3W

TKS

TKB

BCS

SLS

RSA

GSA

GSA

MRV

MRS

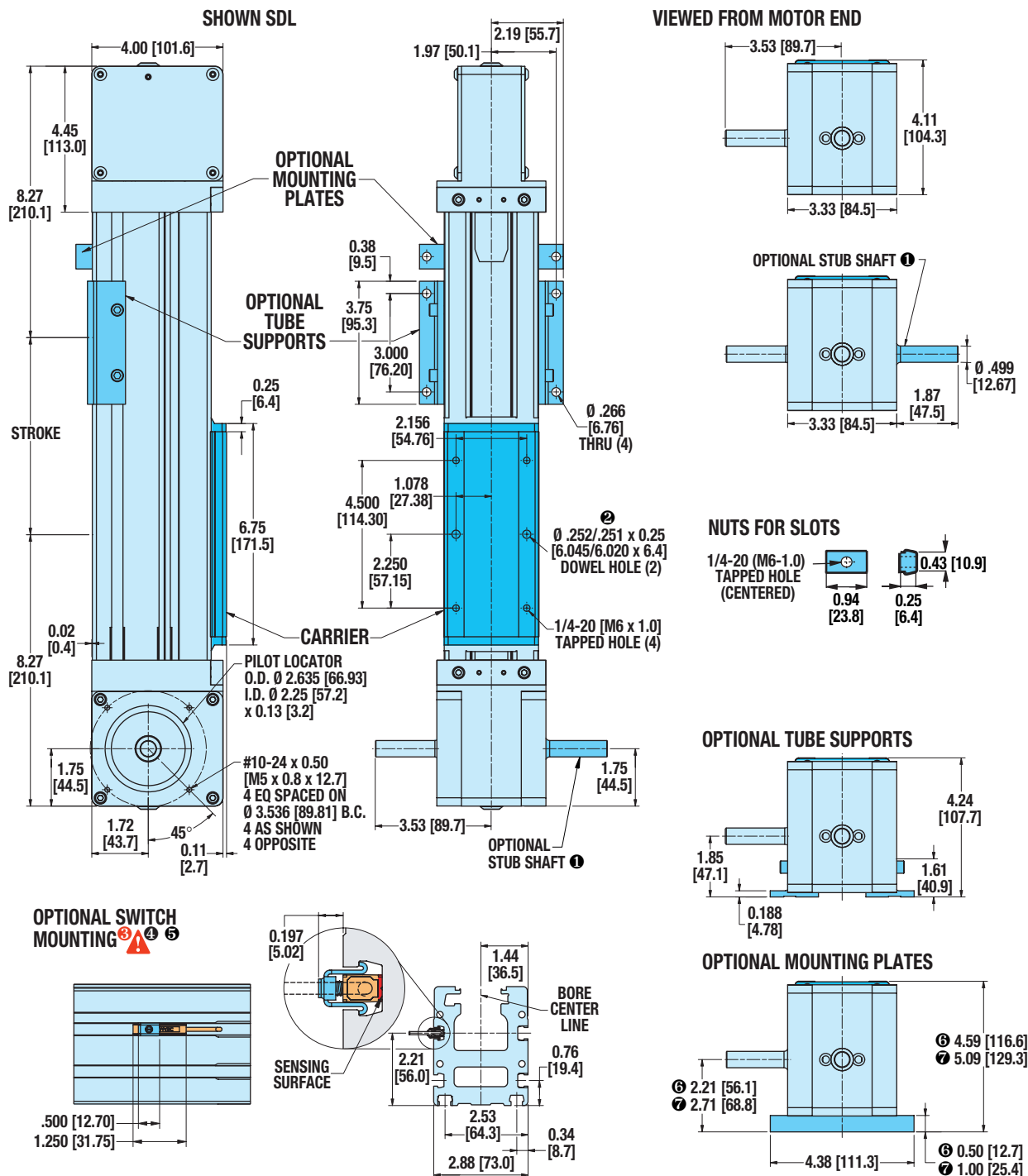
GEARBOX

SWITCH

RODLESS ACTUATORS

ROD STYLE ACTUATORS

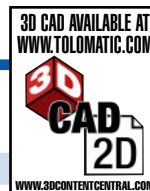
CONTROL SYSTEMS +



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

DIMENSIONS

B3WD15 DUAL 180° OPTION



A

B

MXE-S

MXE-P

MXB-U

MXB-P

RODLESS ACTUATORS

B3S

B3W

TKS

TKB

BCS

SLS

ROD STYLE ACTUATORS

RSA

GSWA

GSA

CONTROL SYSTEMS +

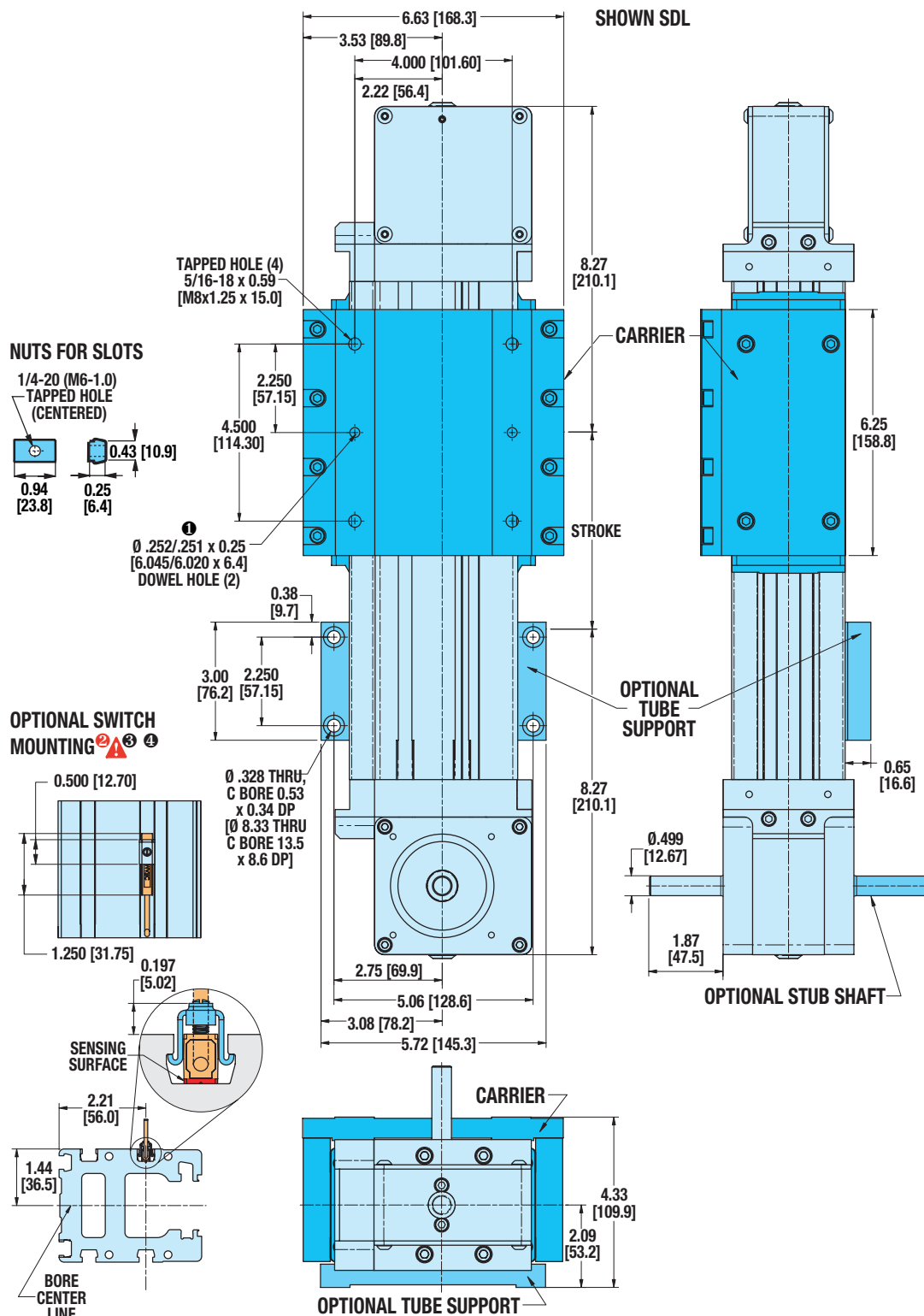
MRV

MRS

GEARBOX

SWITCH

C



1 DOWEL PINS \varnothing .003 (.08mm) \textcircled{M}

2 CAUTION: DO NOT OVERTIGHTEN SWITCH HARDWARE WHEN INSTALLING

③ NOTE: The scored face of the switch indicates the sensing surface and must face toward the magnet

④ NOTE: Some actuators require switch mounting on a specific side of the actuator.
Call Tolomatic 1-800-328-2174 for details

A

B

MXE-S

MXE-P

MXB-U

MXB-P

B3S

B3W

TKS

TKB

BCS

SLS

RSA

GSA

GSA

MRV

MRS

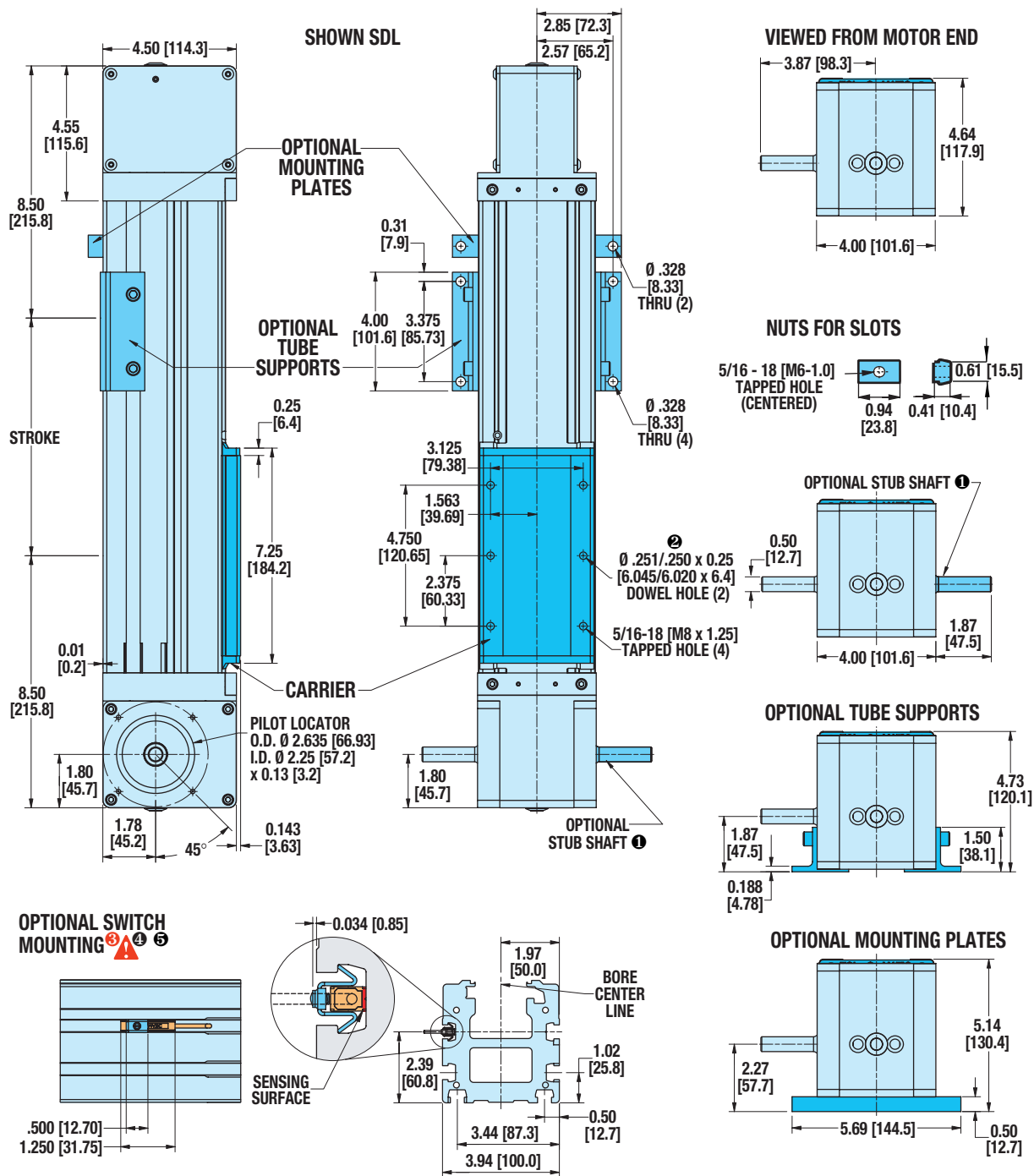
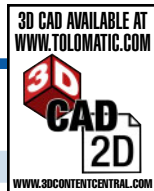
GEARBOX

SWITCH

B3W20 Rodless Belt Driven Actuator

DIMENSIONS

B3W20 ACTUATOR AND OPTIONS



① ONE STUB SHAFT IS STANDARD ON ALL B3W ACTUATORS

② DOWEL PINS $\pm .003 (.08\text{mm})$ M

⚠ **CAUTION: DO NOT OVERTIGHTEN SWITCH HARDWARE WHEN INSTALLING**

④ **NOTE:** The scored face of the switch indicates the sensing surface and must face toward the magnet

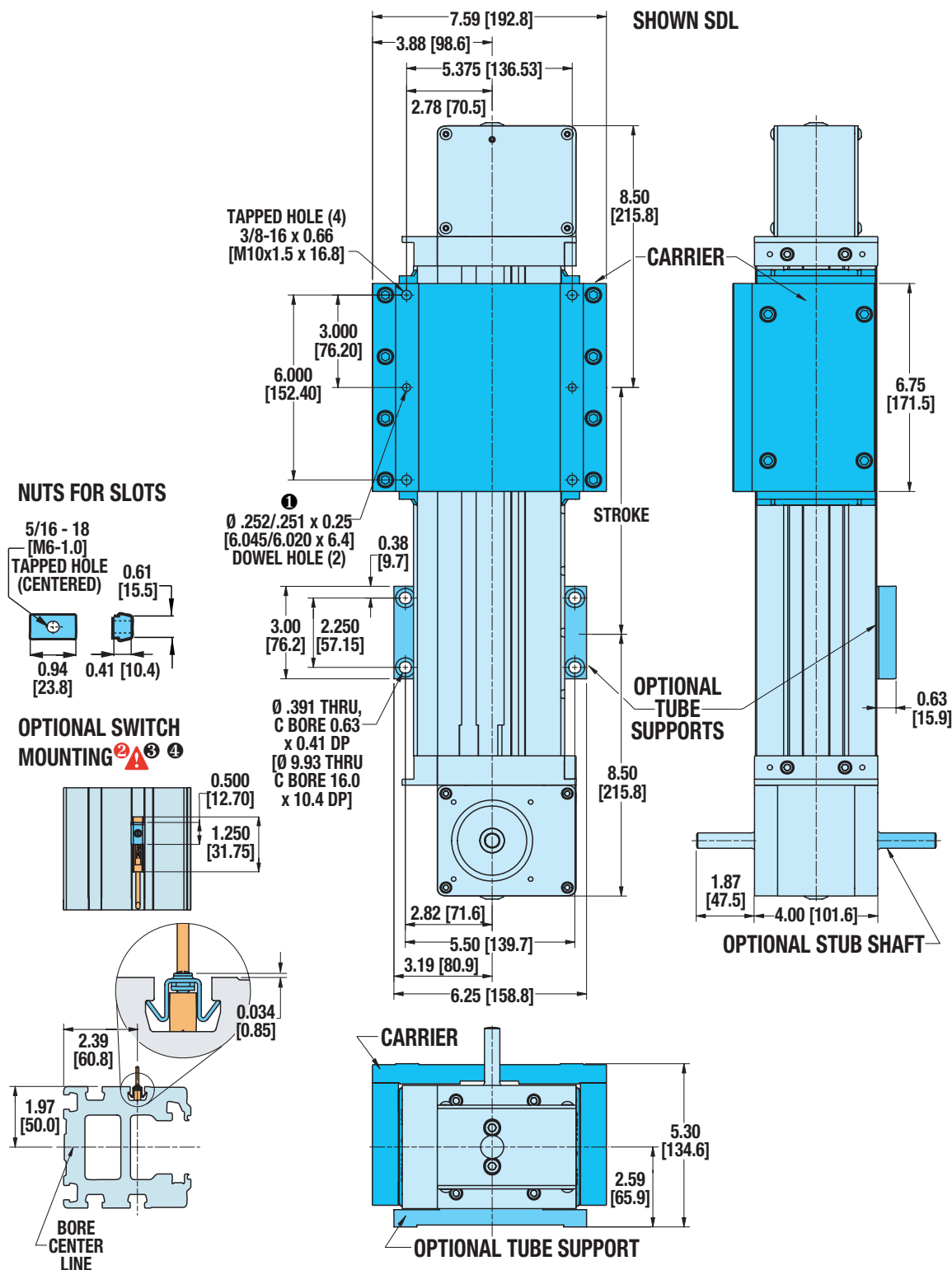
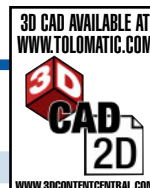
⑤ **NOTE:** Some actuators require switch mounting on a specific side of the actuator. Call Tolomatic 1-800-328-2174 for details

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

B3W Rodless Belt Driven Actuator

DIMENSIONS

B3WD20 DUAL 180° OPTION



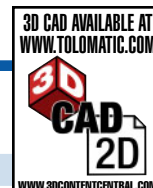
MXE-S
MXE-P
MXB-U
MXB-P
B3S
B3W
TKS
TKB
BCS
SLS
RSA
GSWA
GSA
MRV
MRS
GEARBOX
SWITCH

A

B

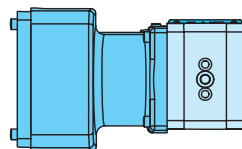
B3W10 Rodless Belt Driven Actuator

DIMENSIONS

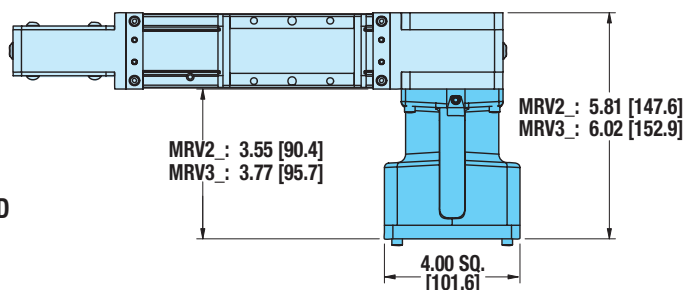


B3W(D)10 DIRECT DRIVE MOTOR MOUNTING

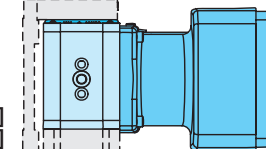
LEFT (SDL)



VIEWED FROM MOTOR END



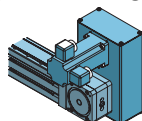
RIGHT (SDR)



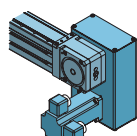
OPTIONAL DUAL 180° CARRIER

B3W(D)10 REDUCTION DRIVE MOTOR MOUNTING

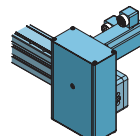
STANDARD CARRIER



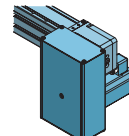
TOP LEFT (SDTL)



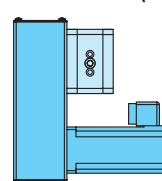
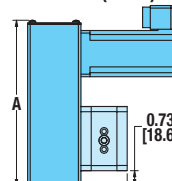
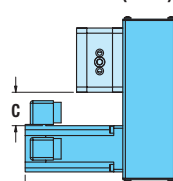
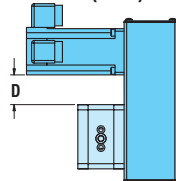
BOTTOM LEFT (SDBL)



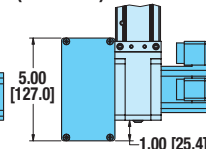
TOP RIGHT (SDTR)



BOTTOM RIGHT (SDBR)

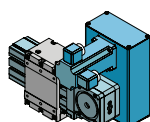


(TOP VIEW)

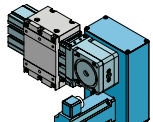


2.59 [65.9] 4.84 [123.0]

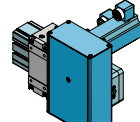
DUAL 180° CARRIER



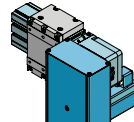
TOP LEFT (SDTL)



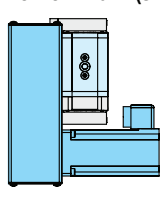
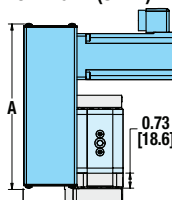
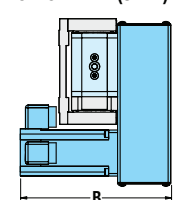
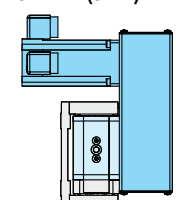
BOTTOM LEFT (SDBL)



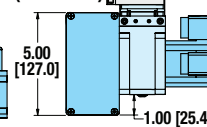
TOP RIGHT (SDTR)



BOTTOM RIGHT (SDBR)



(TOP VIEW)



2.59 [65.9] 4.84 [123.0]

DIMENSIONS

	MOTOR	A		B		C		D	
		in.	mm	in.	mm	in.	mm	in.	mm
BRUSHLESS	MRV21	8.05	204.5	7.34	186.4	1.63	41.4	1.44	36.6
	MRV22	8.05	204.5	8.34	211.8	1.63	41.4	1.44	36.6
	MRV23	8.05	204.5	9.34	237.2	1.63	41.4	1.44	36.6
	MRV24	8.05	204.5	10.34	262.6	1.63	41.4	1.44	36.6
	MRV31	8.57	217.7	8.70	221.0	0.98	24.9	0.80	20.3
	MRV32	8.57	217.7	9.95	252.7	0.98	24.9	0.80	20.3
	MRV33	8.57	217.7	11.20	284.5	0.98	24.9	0.80	20.3

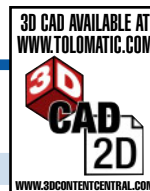
SPECIFICATIONS

	MOTOR	WEIGHT OF REDUCTION DRIVE		REDUCTION INERTIA AT MOTOR SHAFT	
		lb	kg	lb-in ²	kg-cm ²
BRUSHLESS	MRV21, 22, 23, 24	3.40	1.54	0.213	0.6233
	MRV31, 32, 33	3.92	1.78	0.213	0.6233

3:1 REDUCTION EFFICIENCY: 0.95

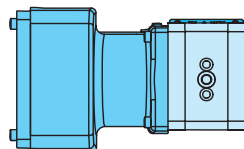
B3W Rodless Belt Driven Actuator

DIMENSIONS

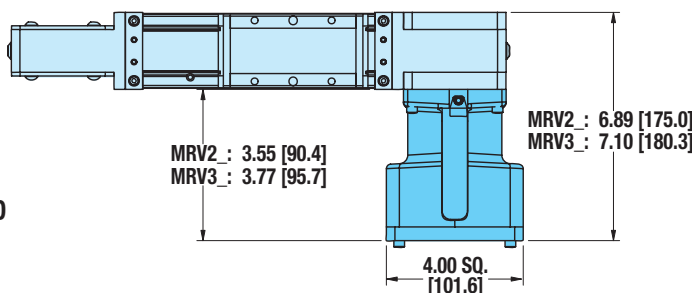


B3W(D)15 DIRECT DRIVE MOTOR MOUNTING

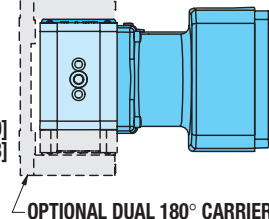
LEFT (SDL)



VIEWED FROM MOTOR END



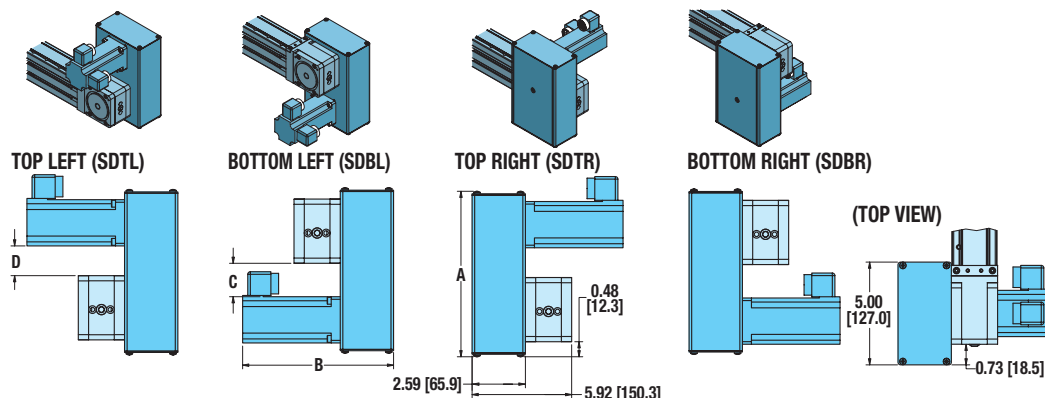
RIGHT (SDR)



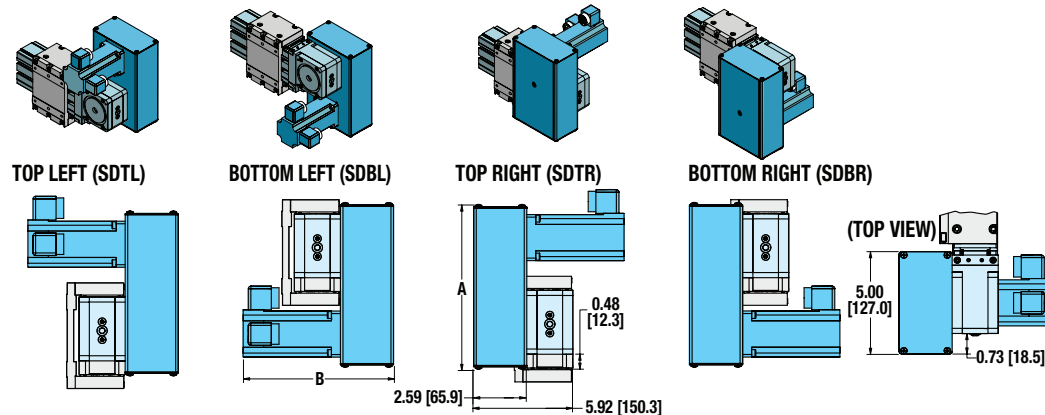
OPTIONAL DUAL 180° CARRIER

B3W(D)15 REDUCTION DRIVE MOTOR MOUNTING

STANDARD CARRIER



DUAL 180° CARRIER



DIMENSIONS

	MOTOR	A		B		C		D	
		in.	mm	in.	mm	in.	mm	in.	mm
BRUSHLESS	MRV21	8.05	204.5	7.34	186.4	1.38	35.1	0.82	20.8
	MRV22	8.05	204.5	8.34	211.8	1.38	35.1	0.82	20.8
	MRV23	8.05	204.5	9.34	237.2	1.38	35.1	0.82	20.8
	MRV24	8.05	204.5	10.34	262.6	1.38	35.1	0.82	20.8
	MRV31	8.57	217.7	8.70	221.0	0.73	18.5	0.18	4.6
	MRV32	8.57	217.7	9.95	252.7	0.73	18.5	0.18	4.6
	MRV33	8.57	217.7	11.20	284.5	0.73	18.5	0.18	4.6

SPECIFICATIONS

	MOTOR	WEIGHT OF REDUCTION DRIVE		REDUCTION INERTIA AT MOTOR SHAFT	
		lb	kg	lb-in ²	kg-cm ²
BRUSHLESS	MRV21, 22, 23, 24	3.40	1.54	0.213	0.6233
	MRV31, 32, 33	3.92	1.78	0.213	0.6233

3:1 REDUCTION EFFICIENCY: 0.95

A

B

MXE-S

MXE-P

MXB-U

MXB-P

B3S

B3W

TKS

TKB

BCS

SLS

RSA

GSA

GSA

MRV

MRS

GEARBOX

SWITCH

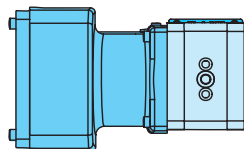
C

B3W20 Rodless Belt Driven Actuator

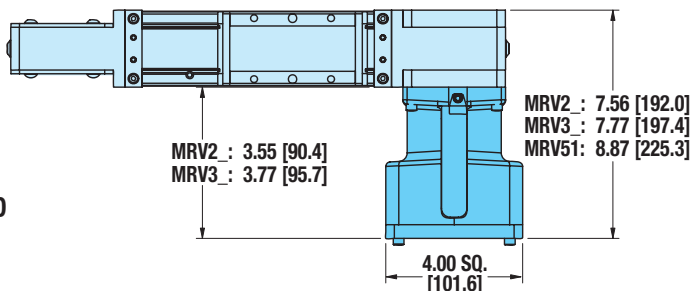
DIMENSIONS

B3W(D)20 DIRECT DRIVE MOTOR MOUNTING

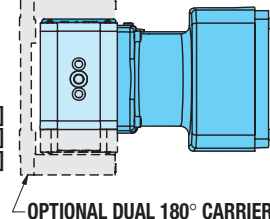
LEFT (SDL)



VIEWED FROM MOTOR END

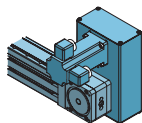


RIGHT (SDR)

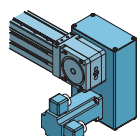
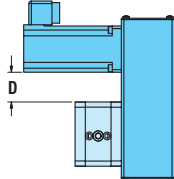


B3W(D)20 REDUCTION DRIVE MOTOR MOUNTING

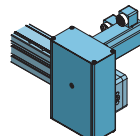
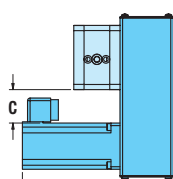
STANDARD CARRIER



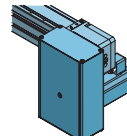
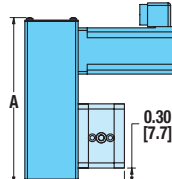
TOP LEFT (SDTL)



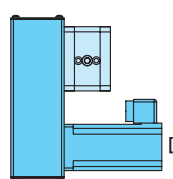
BOTTOM LEFT (SDBL)



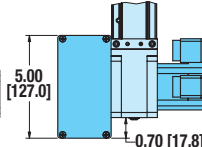
TOP RIGHT (SDTR)



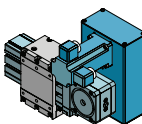
BOTTOM RIGHT (SDBR)



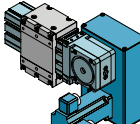
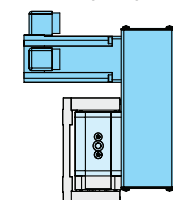
(TOP VIEW)



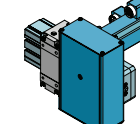
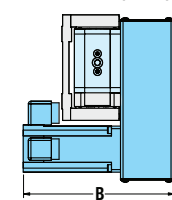
DUAL 180° CARRIER



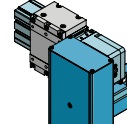
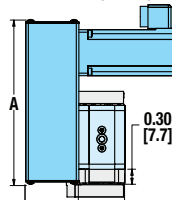
TOP LEFT (SDTL)



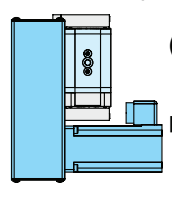
BOTTOM LEFT (SDBL)



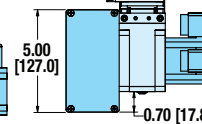
TOP RIGHT (SDTR)



BOTTOM RIGHT (SDBR)



(TOP VIEW)



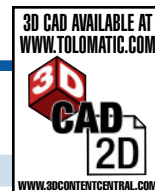
DIMENSIONS

	MOTOR	A		B		C		D	
		in.	mm	in.	mm	in.	mm	in.	mm
BRUSHLESS	MRV21	8.05	204.5	7.34	186.4	1.32	33.5	0.38	9.7
	MRV22	8.05	204.5	8.34	211.8	1.32	33.5	0.38	9.7
	MRV23	8.05	204.5	9.34	237.2	1.32	33.5	0.38	9.7
	MRV24	8.05	204.5	10.34	262.6	1.32	33.5	0.38	9.7
	MRV31	9.31	236.5	8.70	221.0	1.41	35.8	0.47	11.9
	MRV32	9.31	236.5	9.95	252.7	1.41	35.8	0.47	11.9
	MRV33	9.31	236.5	11.20	284.5	1.41	35.8	0.47	11.9
	MRV51	11.73	297.9	12.55	318.8	2.40	61.0	1.45	36.8

SPECIFICATIONS

	MOTOR	WEIGHT OF REDUCTION DRIVE		REDUCTION INERTIA AT MOTOR SHAFT	
		lb	kg	lb-in ²	kg-cm ²
BRUSHLESS	MRV21, 22, 23, 24	3.40	1.54	0.213	0.6233
	MRV31, 32, 33	3.92	1.78	0.213	0.6233
	MRV51	4.78	2.17	0.213	0.6233

3:1 REDUCTION EFFICIENCY: 0.95



B3W Rodless Belt Driven Actuator

SWITCHES

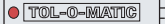
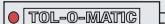
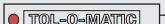


There are 10 sensing choices for this actuator: DC reed, form A (open) or form C (open or closed); AC reed (Triac, open); Hall-effect, sourcing, PNP (open); Hall-effect, sinking, NPN (open); each with either flying leads or QD (quick disconnect). Commonly used to send analog signals to PLC (programmable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

	Order Code	Part Number	Lead	Switching Logic	Cable Shielding	Cable Minimum Bend Radius		Power LED	Signal LED	Operating Voltage	**Power Rating (Watts)	Voltage Drop	Current Consumption	Temp. Range
REED DC	R T	3600-9082	5m	“A” Normally Open	Unshielded	0.630" [16mm]	not recommended	None	Red	200 Vdc max.	10.0\$	2.6 V typical at 100 mA	—	
	R M	3600-9083	QD*		Shielded†	0.630" [16mm]	1.260" [32mm]							
	B T	3600-9084	5m	“C” Normally Open or Closed	Unshielded	0.630" [16mm]	not recommended	None	None	120 Vdc max.	3.0\$\$	NA		
	B M	3600-9085	QD*		Shielded†	0.630" [16mm]	1.260" [32mm]							
REED AC	C T	3600-9086	5m	Triac Normally Open	Unshielded	0.630" [16mm]	not recommended	None	None	120 Vac max.	10.0	—	1 Amp at 86° F [30°C]	-40° to 158° F
	C M	3600-9087	QD*		Shielded†	0.630" [16mm]	1.260" [32mm]						0.5 Amp at 140° F [60°C]	
hALL-EFFECT DC	T T	3600-9088	5m	PNP (Sourcing) Normally Open	Unshielded	0.630" [16mm]	not recommended	None	Red	5 - 25 Vdc	5.0	—	200mA @25Vdc	
	T M	3600-9089	QD*		Shielded†	0.630" [16mm]	1.260" [32mm]							
	K T	3600-9090	5m	NPN (Sinking) Normally Open	Unshielded	0.630" [16mm]	not recommended	None	Red					
	K M	3600-9091	QD*		Shielded†	0.630" [16mm]	1.260" [32mm]							

CAUTION: DO NOT OVER TIGHTEN SWITCH HARDWARE WHEN INSTALLING!

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

*QD = Quick Disconnect; Male coupler is located 6" [152mm] from sensor,

Female coupler to flying lead (part #2503-1025) distance is 197" [5m] also see Cable Shielding specification above

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



†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

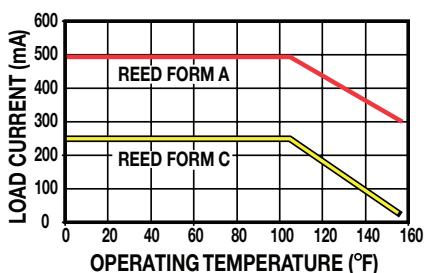
\$\$ Maximum current 250mA (not to exceed 3VA) Refer to Temperature vs. Current graph and Voltage Derating graph

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

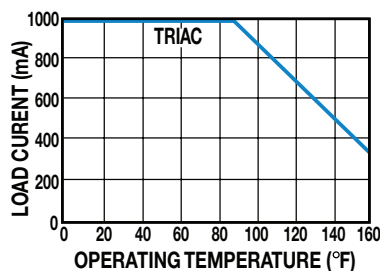
B3W Rodless Belt Driven Actuator

SWITCHES

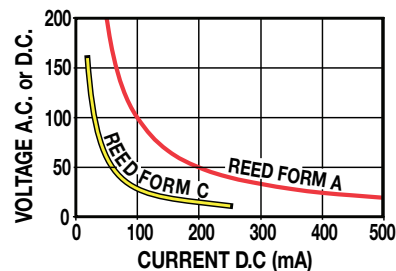
TEMP. vs CURRENT, DC REED



TEMP. vs CURRENT, AC REED

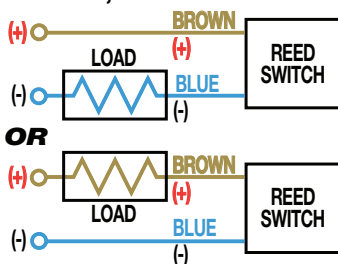


VOLTAGE DERATING, DC REED

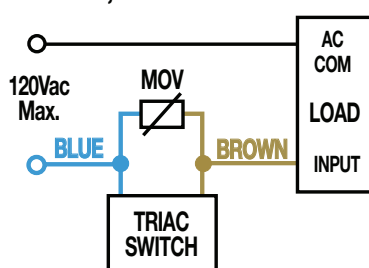


WIRING DIAGRAMS

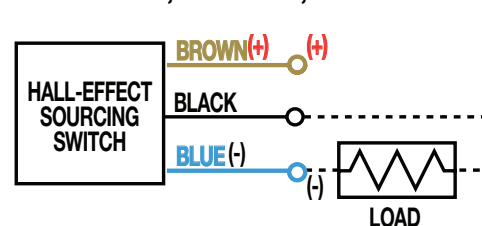
DC REED, FORM A



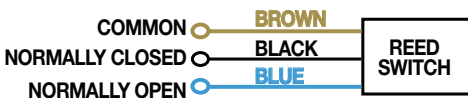
AC REED, TRIAC



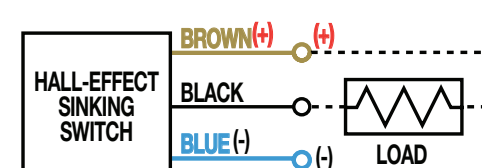
HALL-EFFECT, SOURCING, PNP



DC REED, FORM C



HALL-EFFECT, SINKING, NPN



⚠ 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.

B3W Rodless Belt Driven Actuator

OVERVIEW



BASE MODEL SPECIFICATIONS

B3WD 20 BWS40 SK56 SDTR

OPTIONS SPECIFICATIONS

DC18 TS2 BM2 TN16

MODEL TYPE

- B3W** B3W Series Belt Drive
B3WD B3W Series Belt Drive with Dual 180° Carrier
M3W* B3W Series Metric Belt Drive
M3WD* B3W Series Metric Belt Drive with Dual 180° Carrier

* The M3W metric version provides metric tapped holes for mounting of the load to the carrier and of the actuator to mounting surfaces

TUBE BORE DIAMETER

- 10** 1-inch (25 mm) bore
15 1 1/2-inch (40 mm) bore
20 2-inch (50 mm) bore

BELT MATERIAL AND WIDTH

- BWS18** 18mm Polyurethane Steel belt (B3W10)
BWS30 30mm Polyurethane Steel belt (B3W15)
BWS40 40mm Polyurethane Steel belt (B3W20)

STROKE LENGTH

- SK** _____ Stroke, enter desired stroke length in decimal inches

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. Reference the ordering pages* in sections F, G and H for the motor types and selections.

- 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, enter center-to-center spacing desired in decimal inches.

⚠ Center-to-Center spacing will add to overall dead length and will not subtract from the stroke length

SUPPORTS AND MOUNTING PLATES

(both may be selected)

- TS** _____ Tube Supports, enter quantity desired
MP _____ Mounting Plates, enter quantity desired

SWITCHES

- RM** _____ Reed Switch (Form A) with 5-meter lead/QD, enter quantity desired
RT _____ Reed Switch (Form A) with 5-meter lead, enter quantity desired
BM _____ Reed Switch (Form C) with 5-meter lead/QD, enter quantity desired
BT _____ Reed Switch (Form C) with 5-meter lead, enter quantity desired
KM _____ Hall-effect Sinking Switch with 5-meter lead/QD, enter quantity desired
KT _____ Hall-effect Sinking Switch with 5-meter lead, enter quantity desired
TM _____ Hall-effect Sourcing Switch with 5-meter lead/QD, enter quantity desired
TT _____ Hall-effect Sourcing Switch with 5-meter lead, enter quantity desired
CM _____ TRIAC Switch with 5-meter lead/QD, enter quantity desired
CT _____ TRIAC Switch with 5-meter lead, enter quantity desired

T-NUTS

- TN** _____ Additional T-Nuts, enter quantity

TO ORDER MOTORS/CONTROLS/INTERFACES

- BRUSHLESS SERVO** (see MRV section)
STEPPER (see MRS section)

in Axidyne Catalog #3600-4609



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	B3W15	B3W20	M3W10	M3W15	M3W20
Tube Supports	3410-9006	3415-9006	3420-9006	4410-9006	4415-9006	4420-9006
Tube Supports (B3WD Dual 180° models)	3410-9170	3415-9170	3420-9170	4410-9170	4415-9170	4420-9170
1/2" Mounting Plates (MRV 23-frame motors)	3410-9056	3415-9056	—	4410-9030	4415-9030	—
1/2" Mounting Plates (MRV all frame motors)	—	—	3420-9056	—	—	4420-9030
1" Mounting Plates (MRV all frame motors)	3410-9057	—	—	4410-9031	—	—
1" Mounting Plates (MRV 34-frame motors)	—	3415-9057	—	—	4415-9031	—

RODLESS ACTUATORS	MXE-S
	MXE-P
	MXB-U
	MXB-P
	B3S
ROD STYLE ACTUATORS	B3W
	TKS
	TKB
	BCS
	SLS
CONTROL SYSTEMS +	MRV
	MRS
	GEARBOX
	SWITCH