



Axi-dyne® B3S/M3S Screw Drives

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

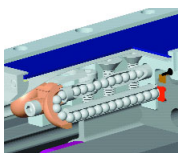


RODLESS

B3S Screw Drive

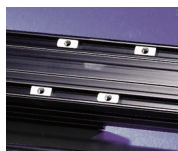
- Application Benefits
- Bearing System
- Standard Mounting
- Actuator/Motor Factors
- Available Options

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

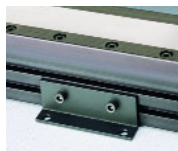


- B3S actuators have T-nut mounting in the body base with four T-nuts for the first 24 inches of stroke. Two nuts are provided for each additional 20 inches.

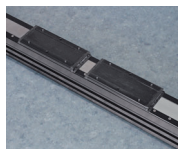
ACTUATOR/MOTOR FACTORS

- 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.

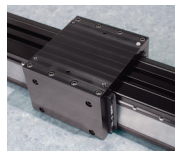
AVAILABLE OPTIONS



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



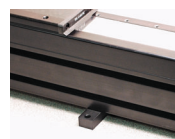
Auxiliary Carrier: Increases rigidity, load-carrying capacity and bending moments.



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.

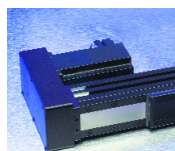


Mounting Plates: Provide clearance height for motors and motor mounts when mounting an actuator on a flush surface and provide the means for top mounting access. Kits include plates and mounting screws.



Motor Mounting and Gearhead Reduction:

In-line Motor Mounting—This motor mounting option uses a spacer and coupler to join the motor to the actuator shaft.



Reverse-parallel Motor Mounting—These factory assembled configurations allow offset mounting of the motor to either side of, or below the actuator. Available in 1:1 or 2:1 drive ratios, they offer quiet, zero-backlash coupling of the motor to the actuator screw shaft.



Gearhead Reduction—Gearheads are available for applications requiring reduction for inertia matching or higher torque at lower speeds. High efficiency, single stage, true planetary gearheads are available in 5.5:1 and 10:1 ratios for reduction solutions with most Tol-O-Matic NEMA 23 and 34 face motors. For gearhead specifications and dimensions, see page F-10.



Switches: Reed, dc Hall-effect and ac TRIAC. See page I-1.

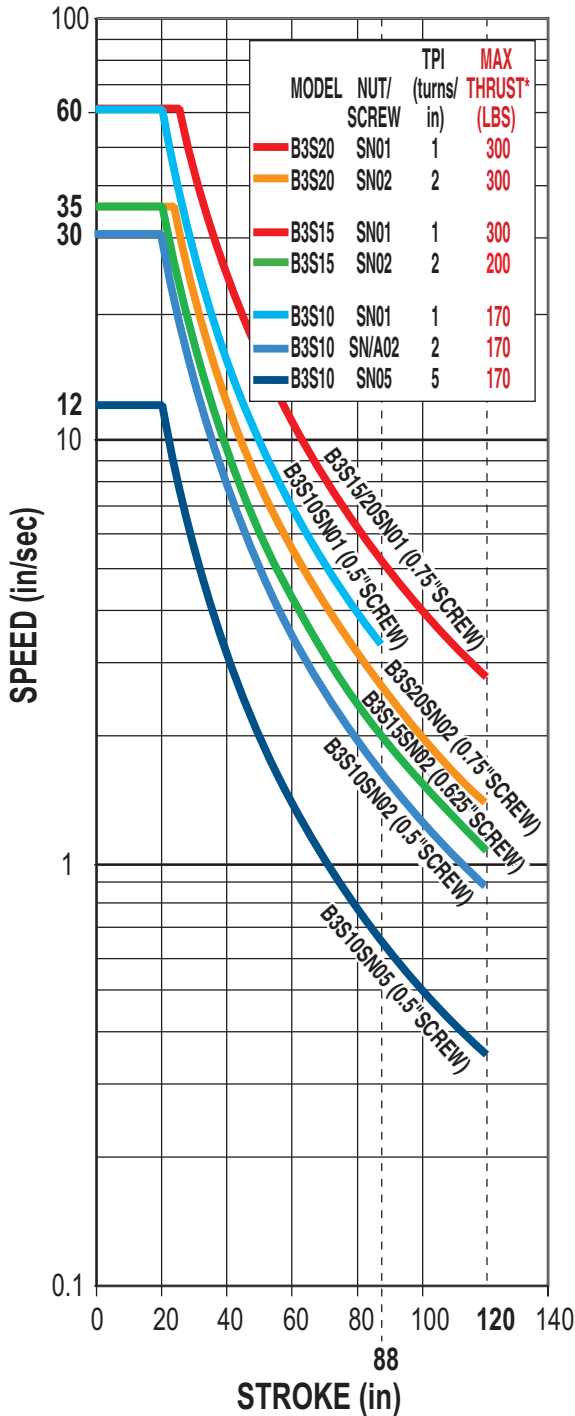
* U.S. Patent No. 5,555,789

Axi-dyne® B3S/M3S Screw Drives

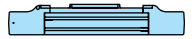
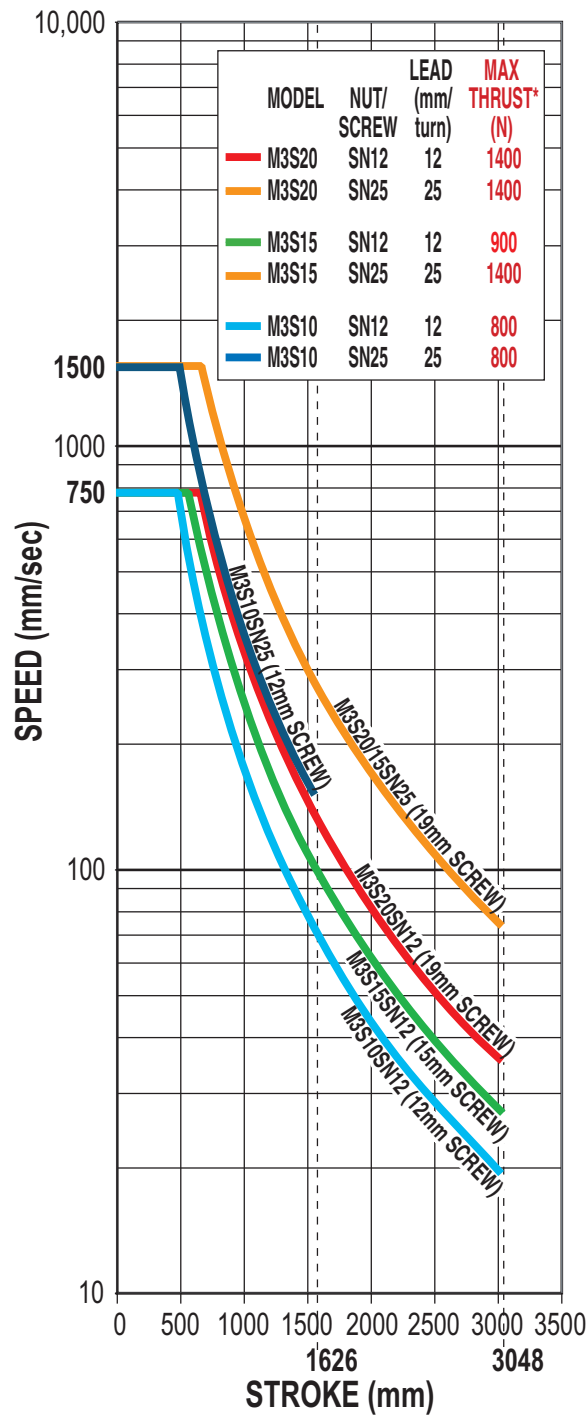
ACME SCREW/NUT COMBINATIONS

ACME SCREW CRITICAL SPEED CAPACITIES

CRITICAL SPEED WITH ENGLISH ACME SCREW



CRITICAL SPEED WITH METRIC ACME SCREW



RODLESS

B3S/M3S Series

- Acme screw/nut combinations
- Screw critical speed capacities



* 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.

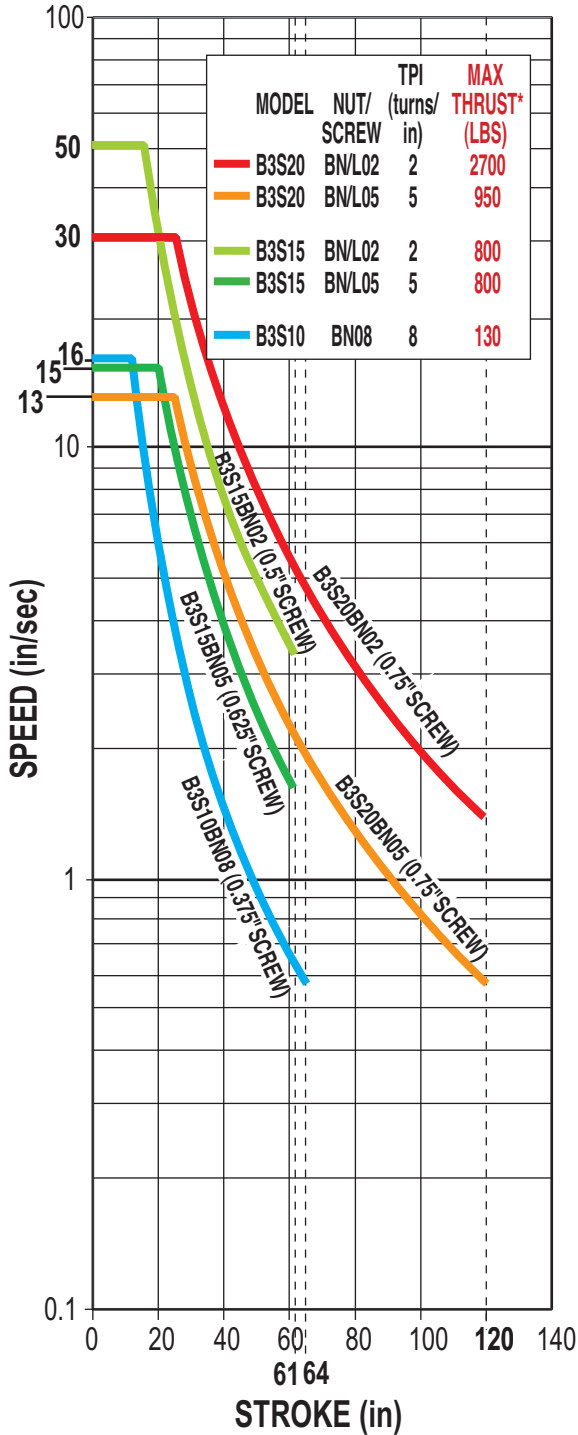
SCREW CODE	DESCRIPTION
SN	Solid Nut
SNA	Anti-backlash Solid Nut

Axi-dyne® B3S/M3S Screw Drives

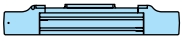
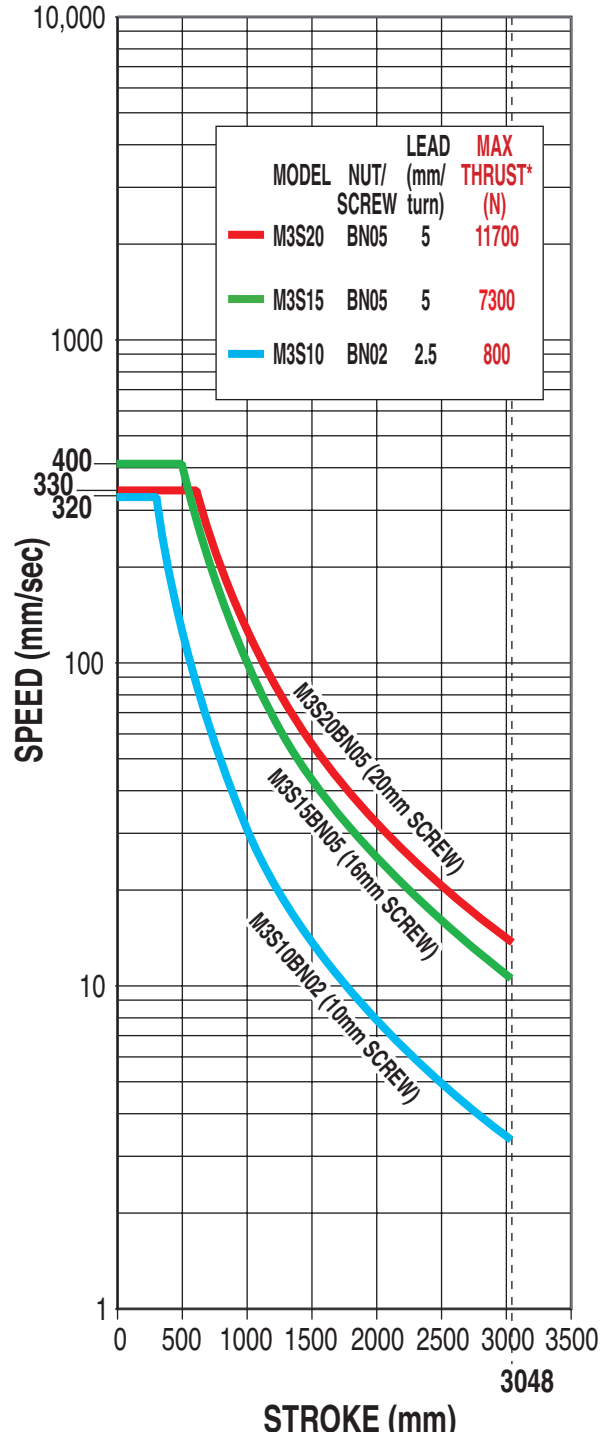
BALL SCREW/NUT COMBINATIONS

BALL SCREW CRITICAL SPEED CAPACITIES

CRITICAL SPEED WITH ENGLISH BALL SCREW



CRITICAL SPEED WITH METRIC BALL SCREW



RODLESS

B3S/M3S Series

- Ball screw/nut combinations
- Ball screw critical speed capacities



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

Dotted lines represent maximum stroke for screw selections.

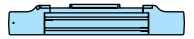
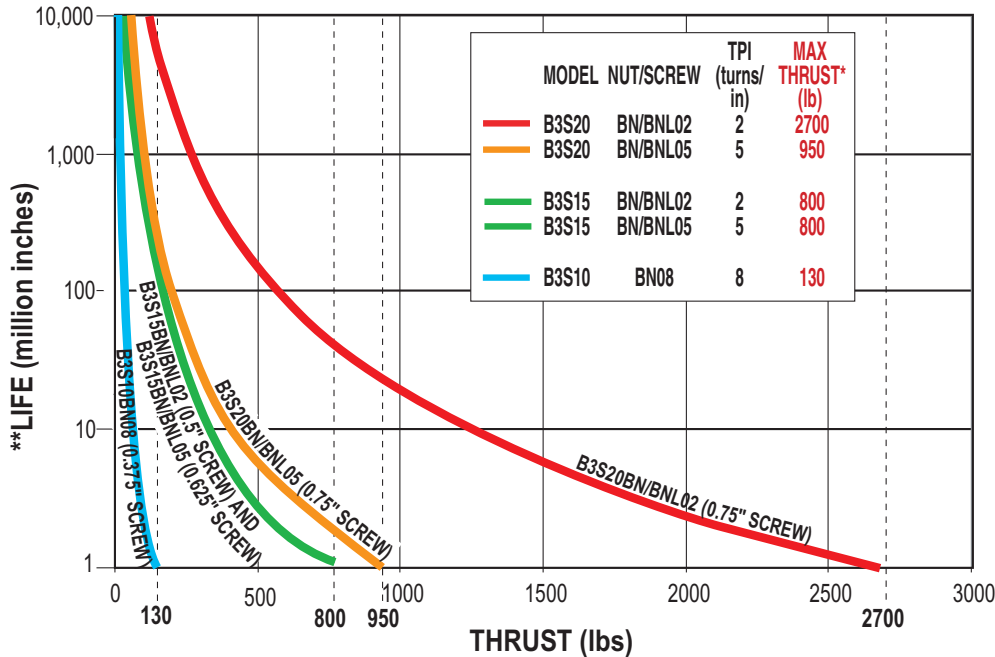
SCREW CODE	DESCRIPTION
BN	Ball Nut
BNL	Low-Backlash Ball Nut

Axi-dyne® B3S/M3S Screw Drives

BALL SCREW/NUT COMBINATIONS

BALL SCREW LIFE CALCULATIONS

LIFE CAPACITIES WITH ENGLISH BALL SCREW

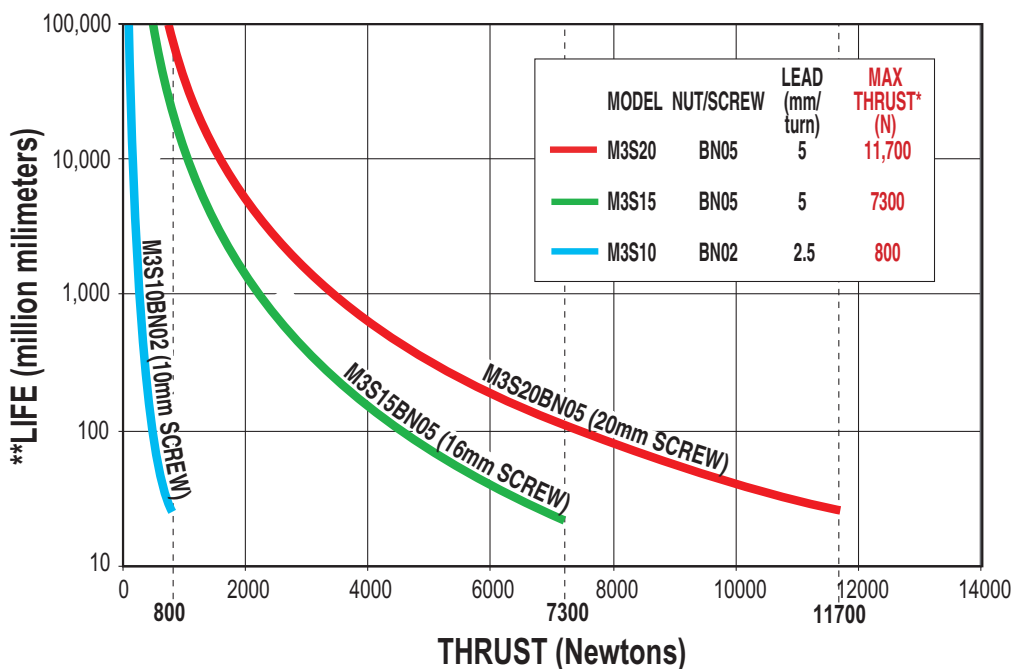


RODLESS

B3S/M3S Series

- Ball screw life calculations

LIFE CAPACITIES WITH METRIC BALL SCREW



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

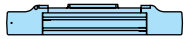
Dotted lines represent maximum thrust for screw selections.

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

B3S/M3S Screw Drives

OVERALL SERIES SPECIFICATIONS

SPECIFICATIONS RELATED TO ACTUATOR SIZE AND SCREW SELECTION



RODLESS

B3S/M3S Series

• Actuator/screw specifications

ENGLISH LEAD SCREWS											
ACTUATOR SERIES	SCREW DIA. (in)	SCREW TYPE	TPI (turns/in)	LEAD ACCURACY (in/ft)	BACKLASH (in)	MAXIMUM THRUST* (lb)	MAXIMUM STROKE (in)	INERTIA (lb-in ²)			BREAKAWAY TORQUE (lb-in)
								BASE ACTUATOR		PER/in OF STROKE	
								In Line	Rev. Parallel		
B3S10	0.375	BN	08	0.004	0.015	130	64	0.0034	0.0042	0.0005	1.125
	0.375	BNL	08	0.004	0.002	130	64	0.0034	0.0042	0.0005	1.125
	0.500	SN	05	0.006	0.007	170	120	0.0114	0.0142	0.0017	1.250
	0.500	SN	02	0.005	0.007	170	120	0.0159	0.0187	0.0017	1.750
	0.500	SNA	02	0.005	0.003	170	120	0.0193	0.0221	0.0017	1.750
	0.500	SN	01	0.006	0.007	170	88	0.0320	0.0348	0.0017	2.500
B3S15	0.500	BN	02	0.003	0.015	800	61	0.0253	0.0282	0.0017	1.563
	0.500	BNL	02	0.003	0.002	800	61	0.0253	0.0282	0.0017	1.563
	0.625	SN	02	0.005	0.007	200	120	0.0480	0.0550	0.0042	1.875
	0.625	BN	05	0.003	0.015	800	61	0.0397	0.0467	0.0042	1.250
	0.625	BNL	05	0.003	0.002	800	61	0.0397	0.0467	0.0042	1.250
	0.750	SN	01	0.005	0.007	300	120	0.1185	0.1329	0.0087	2.813
B3S20	0.750	SN	02	0.005	0.007	300	120	0.1159	0.1224	0.0087	3.438
	0.750	SN	01	0.005	0.007	300	120	0.1565	0.1630	0.0087	5.000
	0.750	BN	02	0.004	0.015	2700	120	0.1159	0.1224	0.0087	3.125
	0.750	BNL	02	0.004	0.002	2700	120	0.1159	0.1224	0.0087	3.125
	0.750	BN	05	0.003	0.015	950	120	0.1045	0.1110	0.0087	2.188
	0.750	BNL	05	0.003	0.002	950	120	0.1045	0.1110	0.0087	2.188

METRIC LEAD SCREWS											
ACTUATOR SERIES	SCREW DIA. (mm)	SCREW TYPE	LEAD (mm/turn)	LEAD ACCURACY (mm/300)	BACKLASH (mm)	MAXIMUM THRUST* (N)	MAXIMUM STROKE (mm)	INERTIA (kg-m ² x 10 ⁻⁶)			BREAKAWAY TORQUE (N-m)
								BASE ACTUATOR		PER/mm OF STROKE	
								In Line	Rev. Parallel		
M3S10	10	BN	2.5	0.13	0.38	800	1626	1.14	1.43	0.176	0.13
	10	BNL	2.5	0.13	0.05	800	1626	1.14	1.43	0.176	0.13
	12	SN	12	0.13	0.18	800	3048	3.03	4.50	0.410	0.20
	12	SN	25	0.13	0.18	800	3048	8.54	9.21	0.410	0.28
M3S15	15	SN	12	0.13	0.18	900	3048	11.35	12.96	0.966	0.27
	16	BN	5	0.13	0.38	7300	1549	11.93	14.04	1.258	0.16
	16	BNL	5	0.13	0.05	7300	1549	11.93	14.04	1.258	0.16
M3S20	19	SN	25	0.13	0.18	1400	3048	34.05	38.26	2.517	0.32
	19	SN	12	0.13	0.18	1400	3048	44.96	35.04	2.517	0.39
	19	SN	25	0.13	0.18	1400	3048	33.14	46.86	2.517	0.57
	20	BN	5	0.13	0.38	11700	3048	36.97	39.28	3.102	0.25
20	BNL	5	0.13	0.05	11700	3048	36.97	39.28	3.102	0.25	

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



Contact the factory for higher accuracy and lower backlash options.

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

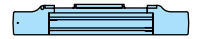
For ball screws, maximum thrust reflects 90% reliability for 1 million linear inches of travel.

Axi-dyne® B3S/M3S Screw Drives

OVERALL SERIES SPECIFICATIONS

GENERAL ACTUATOR SPECIFICATIONS

B3S ENGLISH ACTUATORS						
ACTUATOR SERIES	CARRIER WEIGHT (lb)	BASE WEIGHT (lb)	WEIGHT PER/IN OF STROKE (lb)	STRAIGHTNESS & FLATNESS (in) ¹ (Supported)	TEMPERATURE RANGE ² (F°)	IP RATING ³
B3S10	0.85	2.15	0.300	0.00067 x L*	40 - 130	44
B3S15	1.56	8.75	0.570	0.00067 x L*	40 - 130	44
B3S20	2.15	14.38	0.880	0.00067 x L*	40 - 130	44



RODLESS

M3S METRIC ACTUATORS						
ACTUATOR SERIES	CARRIER WEIGHT (kg)	BASE WEIGHT (kg)	WEIGHT PER/mm OF STROKE (g)	STRAIGHTNESS & FLATNESS (mm) ¹ (Supported)	TEMP. RANGE ² (C°)	IP RATING ³
M3S10	0.40	1.00	5.40	0.00067 x L*	4 - 54	44
M3S15	0.70	3.96	10.18	0.00067 x L*	4 - 54	44
M3S20	0.97	6.52	15.73	0.00067 x L*	4 - 54	44

B3S/M3S Series

- General actuator specifications
- Friction Force
- Support recommendations



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.

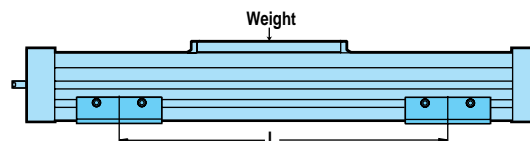
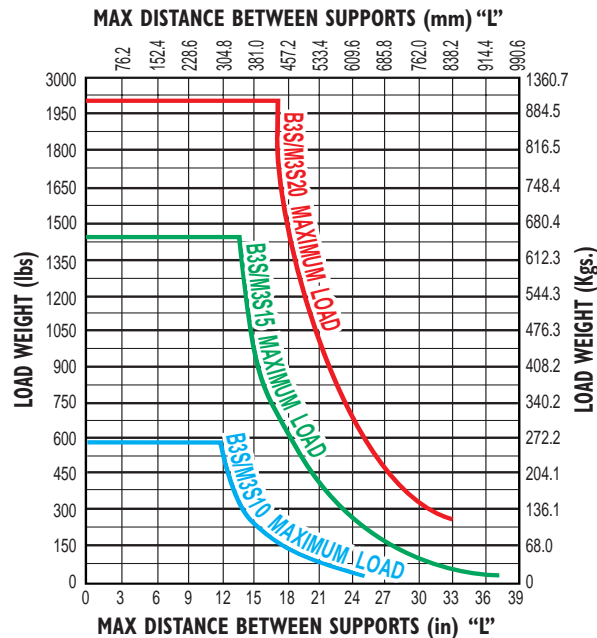
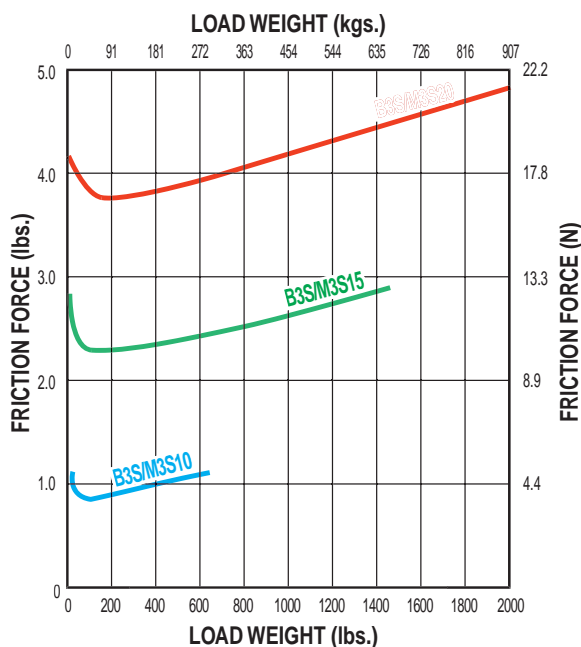
³ Protected against ingress of solid particles greater than .039 in (1mm) and splashing water.

* "L" is maximum distance between supports— See the support recommendation diagram below.

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.

SUPPORT RECOMMENDATIONS

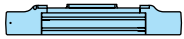
FRICITION FORCE



Axi-dyne® B3S/M3S Screw Drives

OVERALL SERIES SPECIFICATIONS

DYNAMIC BENDING MOMENTS AND LOADS



RODLESS

B3S/M3S Series

- Bending moments and loads

STANDARD CARRIER		MAXIMUM BENDING MOMENTS AND LOADS			ENGLISH			METRIC		
		B3S10	B3S15	B3S20	M3S10	M3S15	M3S20			
	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	1,454	2,008	2,629	6,468	8,932		
AUXILIARY CARRIER: Increases rigidity, load-carrying capacity and moments			B3S10	B3S15	B3S20	M3S10	M3S15	M3S20		
	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			B3SD10	B3SD15	B3SD20	M3SD10	M3SD15	M3SD20		
	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		
AUXILIARY DUAL 180° CARRIER: Substantially increases moment and loads			B3SD10	B3SD15	B3SD20	M3SD10	M3SD15	M3SD20		
	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 your 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 graph on page C-9 or C-10.

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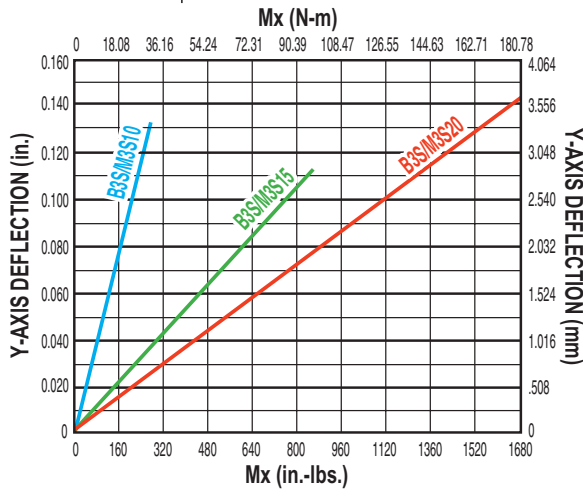
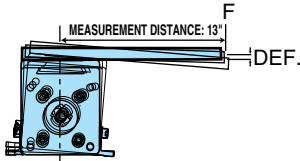
OVERALL SERIES SPECIFICATIONS

LOAD DEFLECTION

Y-AXIS DEFLECTION

Figures calculated with the following considerations:

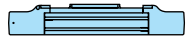
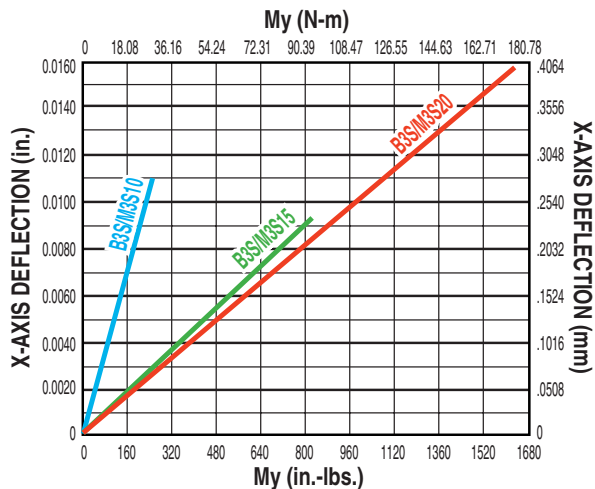
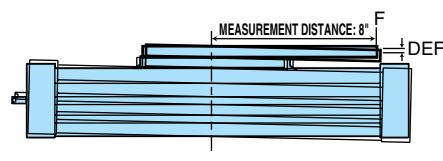
- 1.) Tube supports spaced at minimum distances for each bore size
- 2.) Measurement distance from F to center of carrier is 13 inches



X-AXIS DEFLECTION

Figures calculated with the following considerations:

- 1.) Tube supports spaced at minimum distances for each bore size
- 2.) Measurement distance from F to center of carrier is 8 inches

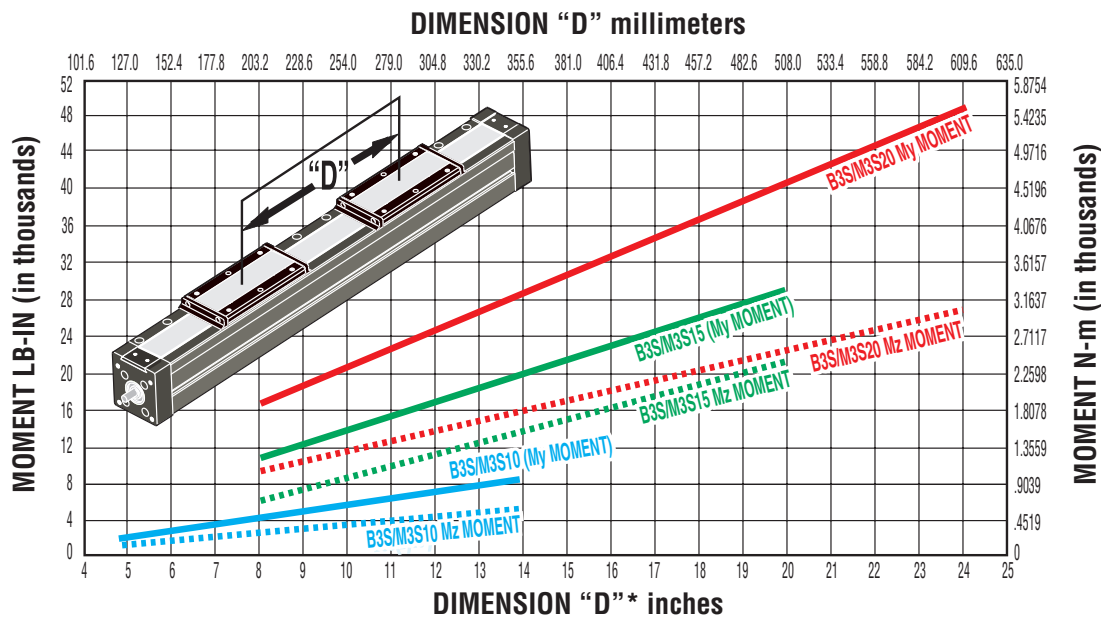


RODLESS

B3S/M3S Series

- Load deflection
- Distance between auxiliary carriers

AUXILIARY CARRIER: BENDING MOMENT AT 'D' DISTANCE



Rates shown on charts were calculated with these assumptions:

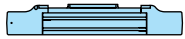
- 1.) Coupling between carriers is rigid.
- 2.) Load is equally distributed between carriers.
- 3.) Coupling device applies no misalignment loads to carriers.

* Customer must specify Dimension "D" (Distance between carrier center lines) in configuration string.

Axi-dyne® B3S/M3S Screw Drives

OVERALL SERIES SPECIFICATIONS

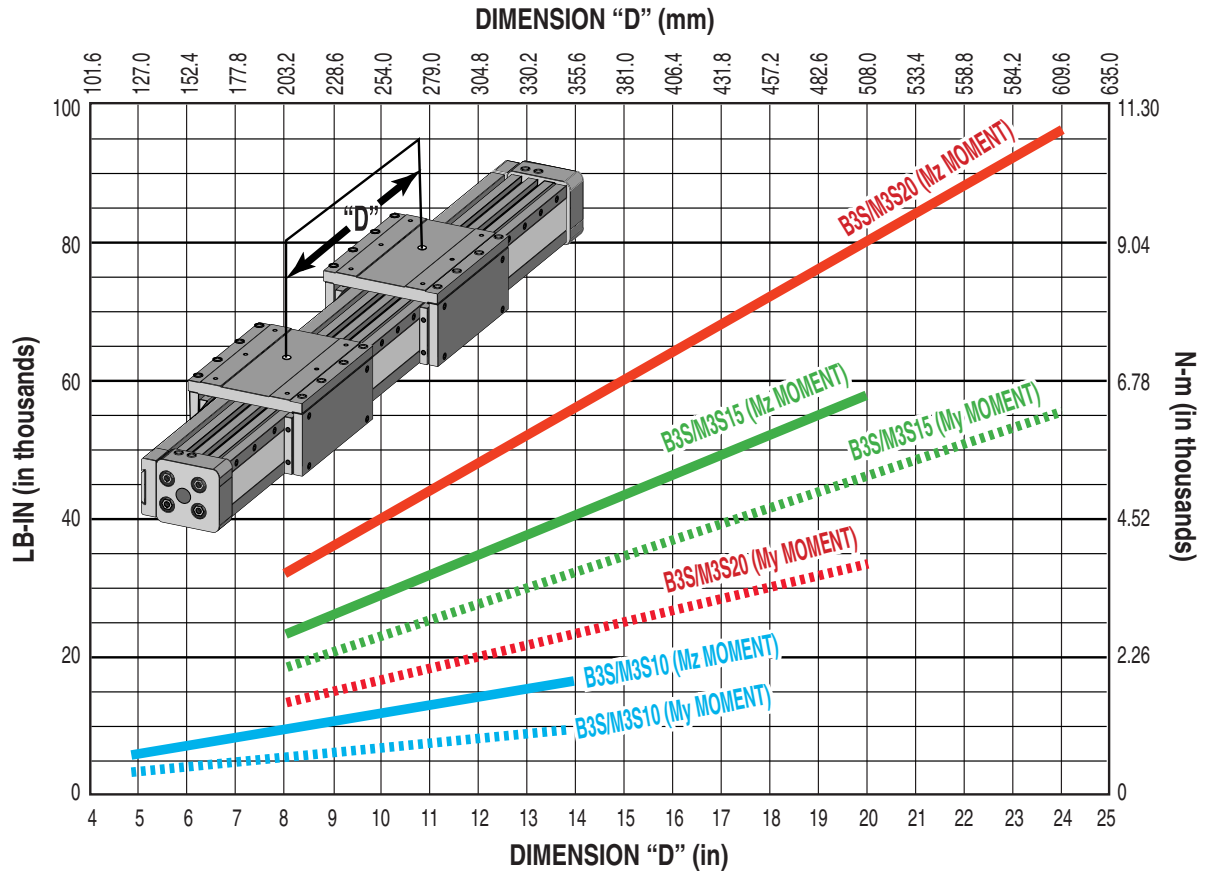
AUXILIARY DUAL 180° CARRIER: BENDING MOMENT AT 'D' DISTANCE



RODLESS

B3S/M3S Series

- Distance between auxiliary dual 180° carriers



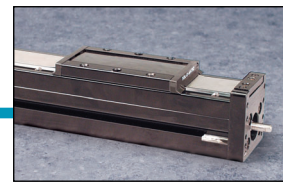
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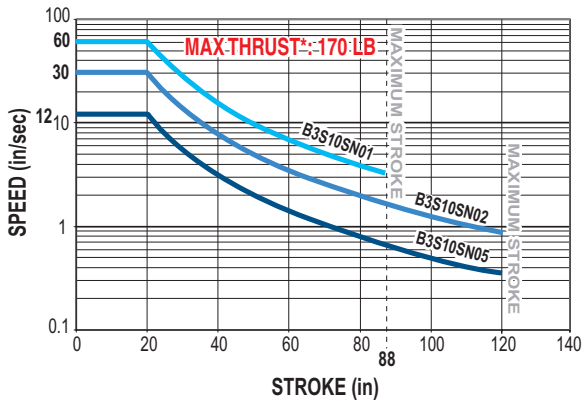
Axi-dyne® B3S/M3S10 Series

ACME SCREW SPECIFICATIONS

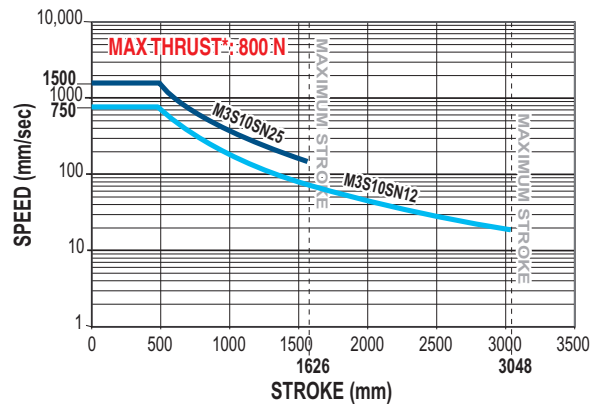


B3S10/M3S10 ACME SCREW CRITICAL SPEED AND PV LIMITS

CRITICAL SPEED WITH 1/2" ENGLISH ACME SCREW



CRITICAL SPEED WITH 12mm METRIC ACME SCREW

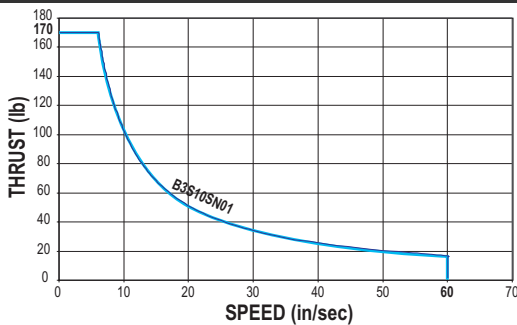


RODLESS

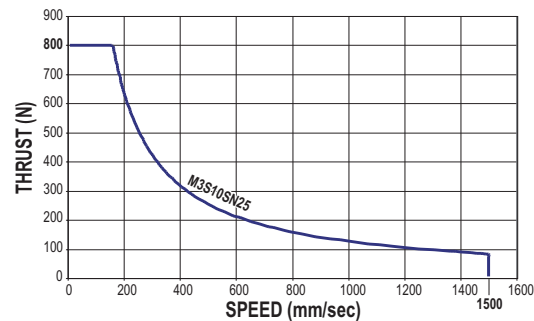
B3S/M3S10 Series

- Acme screw critical speed capacities and PV limits

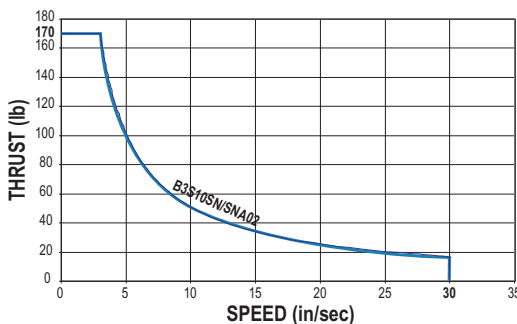
PV LIMITS: 1/2" 1 TPI ENGLISH ACME SCREW



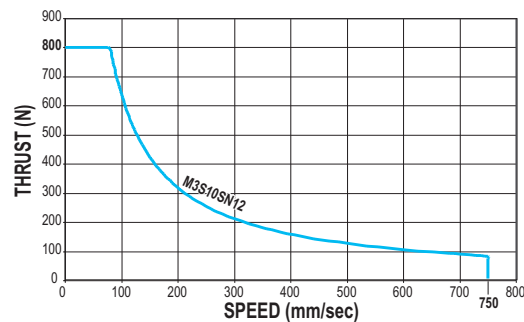
PV LIMITS: 12mm ACME METRIC SCREW w/25mm LEAD



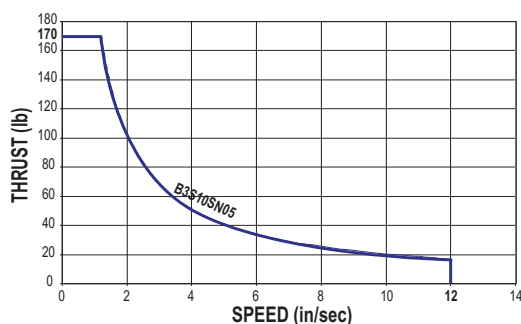
PV LIMITS: 1/2" 2 TPI ENGLISH ACME SCREW



PV LIMITS: 12mm ACME METRIC SCREW w/12mm LEAD



PV LIMITS: 1/2" 5 TPI ENGLISH ACME SCREW



SN = Solid Nut

SNA = Solid Anti-backlash Nut



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

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

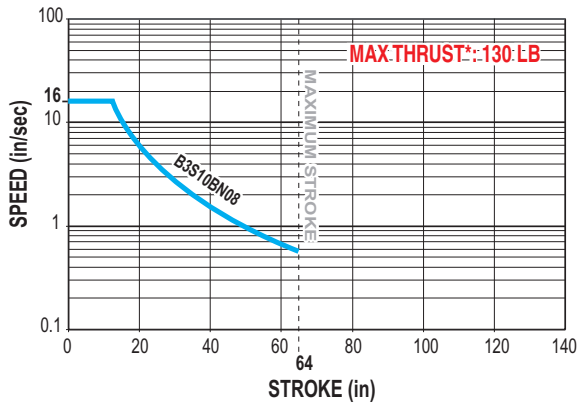
$$P = \frac{\text{Thrust}}{\text{Max. Thrust Rating}} \times V = \frac{\text{Speed}}{\text{Max. Speed Rating}} \leq 0.1$$

Axi dyne® B3S/M3S10 Series

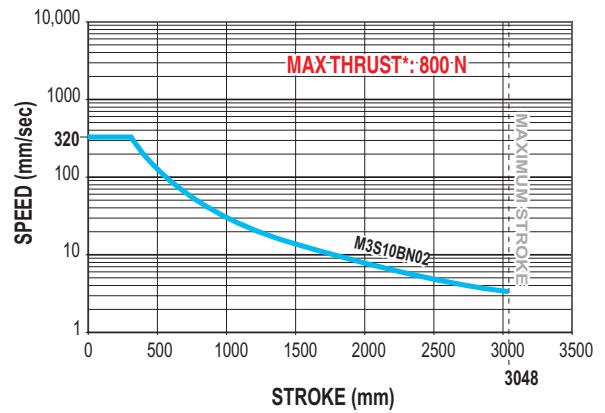
BALL SCREW SPECIFICATIONS

B3S/M3S10 BALL SCREW SPECIFICATIONS

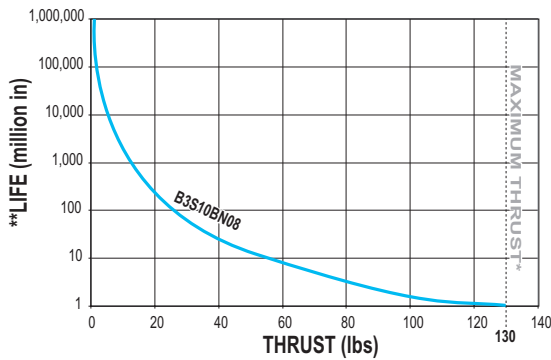
CRITICAL SPEED WITH 3/8" ENGLISH BALL SCREW



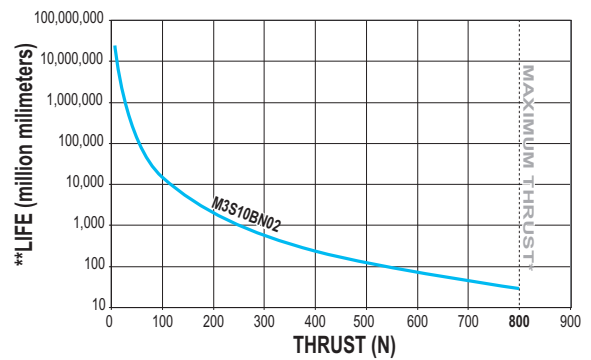
CRITICAL SPEED WITH 10mm METRIC BALL SCREW



LIFE CALCULATION: 3/8" 8TPI ENGLISH BALL SCREW



LIFE CALCULATION: 10mm METRIC BALL SCREW w/2.5mm LEAD

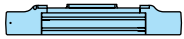


BN = Ball Nut



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

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



RODLESS

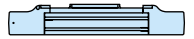
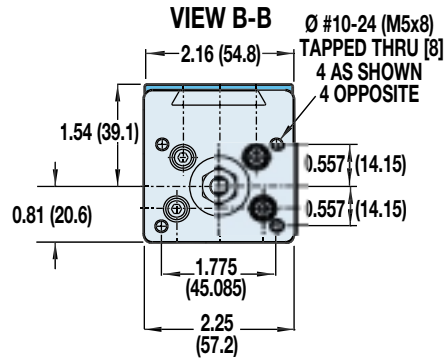
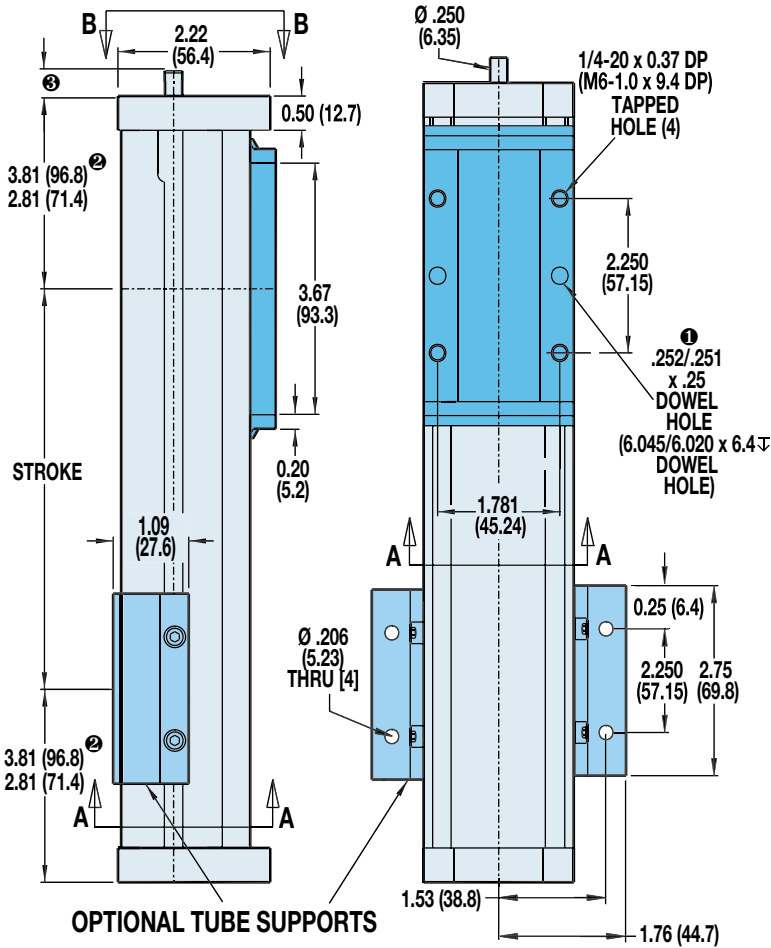
B3S/M3S10 Series

- Ball screw critical speed capacities and life calculations

Axi-dyne® B3S/M3S10 Series

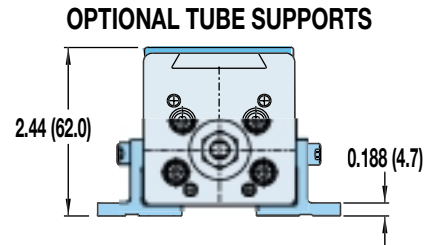
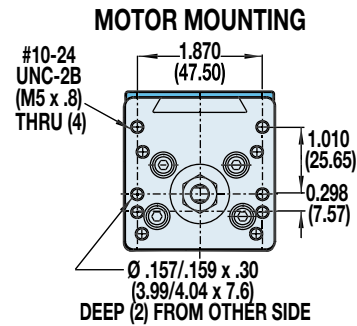
DIMENSIONS

B3S10/M3S10 ACTUATOR AND OPTIONS

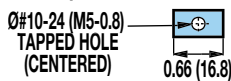


RODLESS

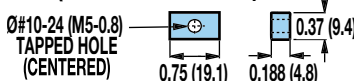
B3S/M3S10 Series
 • Actuator and options dimensions



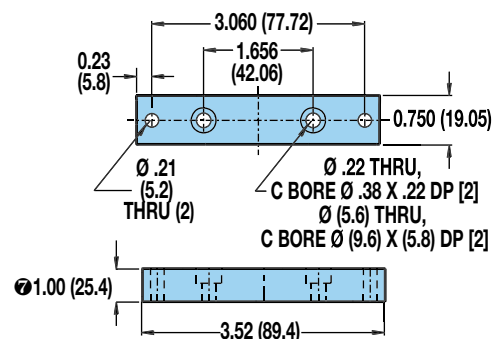
NUTS FOR SIDE SLOTS
 (Clear Zinc Finish)



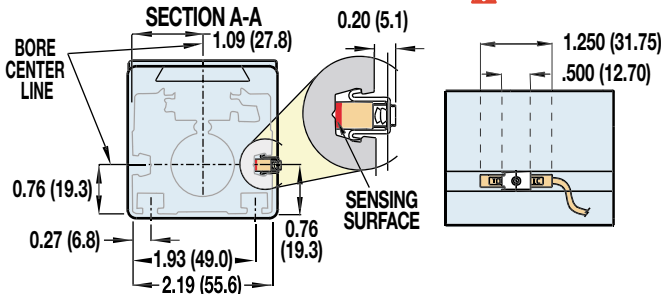
NUTS FOR BOTTOM SLOTS
 (Yellow Zinc Finish)



OPTIONAL MOUNTING PLATES



OPTIONAL SWITCH MOUNTING (1) (2) (3) (4)



(1) DOWEL PINS $\text{Ø} .003$ (08mm) (M)

(2) FOR SNAO2 STYLE ONLY

(3) 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)

(4) **CAUTION: DO NOT OVERTIGHTEN SWITCH HARDWARE WHEN INSTALLING**

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

(6) **NOTE:** Some actuators require switch mounting on a specific side of the actuator. Call Tol-O-Matic 1-800-328-2174 for details

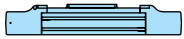
(7) **WHEN USED WITH 34-FRAME MOTORS OR ALL MRV MOTORS.**

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

Axi-dyne® B3S/M3S10 Series

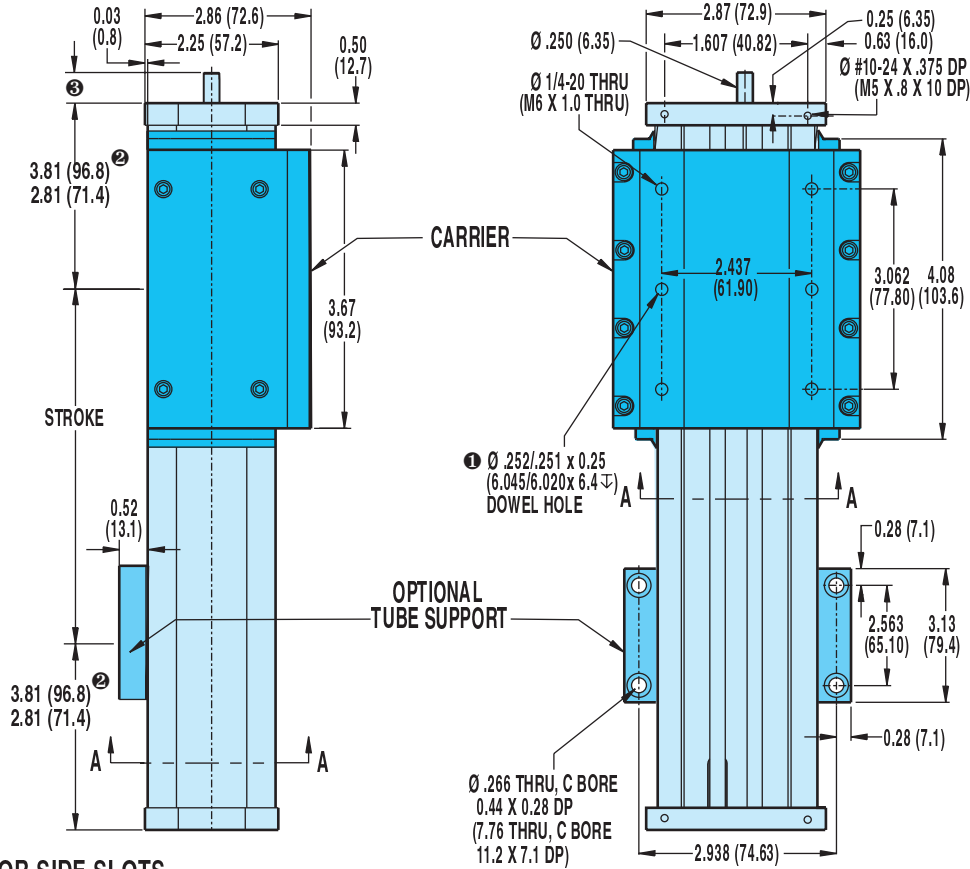
DIMENSIONS

B3SD/M3SD10 DUAL 180° OPTION

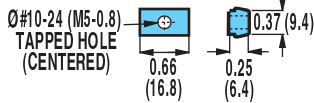


RODLESS

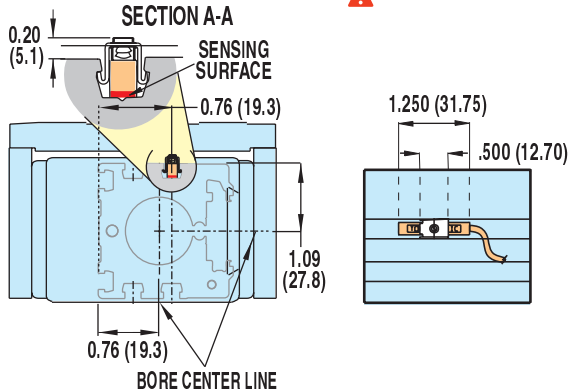
B3S/M3S10 Series
• Dual 180° carrier dimensions



NUTS FOR SIDE SLOTS (Clear Zinc Finish)



OPTIONAL SWITCH MOUNTING



① DOWEL PINS $\frac{\text{M}}{\text{M}}$.003 (0.08mm) M

② FOR SNAQ2 STYLE ONLY

③ 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)

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

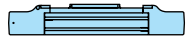
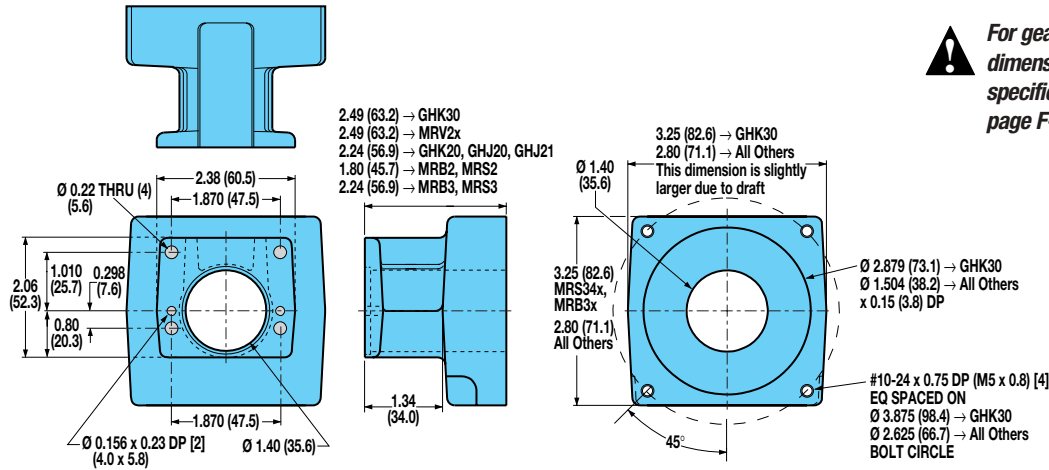
⑤ NOTE: The scored face of the switch indicates the sensing surface and must face toward the magnet

⑥ NOTE: Some actuators require switch mounting on a specific side of the actuator. Call Tol-O-Matic 1-800-328-2174 for details

Axi dyne® B3S/M3S10 Series

DIMENSIONS

B3S/M3S10: IN-LINE MOUNT FOR MOTORS OR GEARHEADS



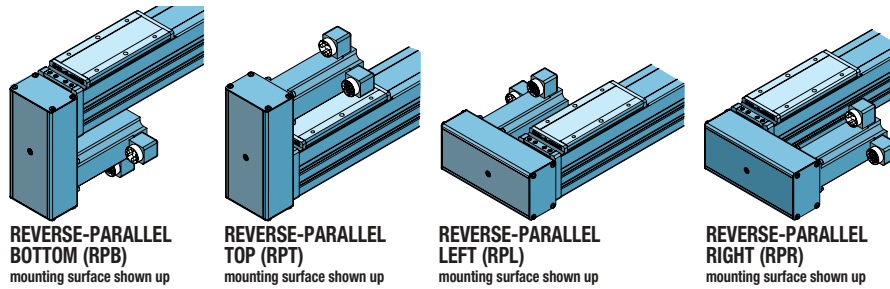
RODLESS

B3S/M3S10 Series

- In-line mounting dimensions
- Reverse parallel mounting

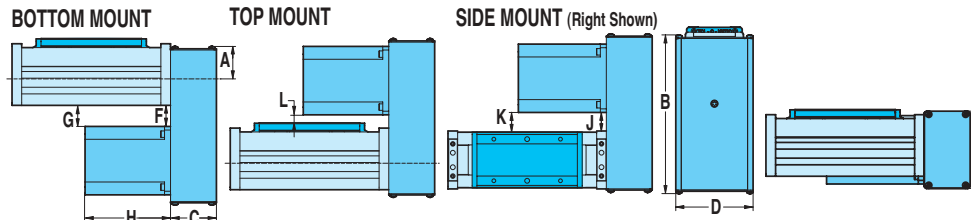
B3S/M3S10: REVERSE PARALLEL MOUNTING

STANDARD CARRIER



SPECIFICATIONS:

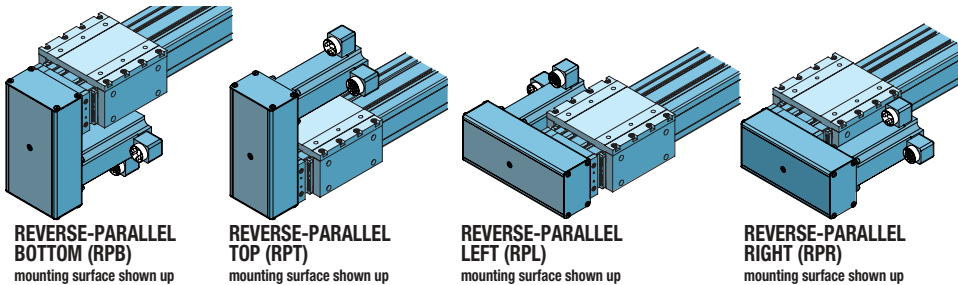
Motor	MRV21,22,23,24	
Reduction Drive Weight	1:1 & 2:1 Ratio	2.06 lb. 0.9344 kg.
Reduction Inertia at Motor Shaft	1:1 Ratio	0.0875 0.2559
	2:1 Ratio	0.1125 0.3291
		lb-in ² kg-cm ²
Reduction Efficiency:	0.95	

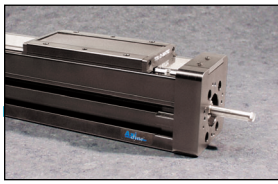


DIMENSIONS

	MOTOR		A		B		C		D		F		G		H		J		K		L	
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
BRUSHLESS	MRV21	1.44	36.6	6.96	176.7	2.13	54.0	3.25	82.6	1.80	45.6	1.84	46.8	4.75	120.7	1.48	37.6	1.51	38.4	1.06	26.9	
	MRV22	1.44	36.6	6.96	176.7	2.13	54.0	3.25	82.6	1.80	45.6	1.84	46.8	5.75	146.1	1.48	37.6	1.51	38.4	1.06	26.9	
	MRV23	1.44	36.6	6.96	176.7	2.13	54.0	3.25	82.6	1.80	45.6	1.84	46.8	6.75	171.5	1.48	37.6	1.51	38.4	1.06	26.9	
	MRV24	1.44	36.6	6.96	176.7	2.13	54.0	3.25	82.6	1.80	45.6	1.84	46.8	7.75	196.9	1.48	37.6	1.51	38.4	1.06	26.9	

DUAL 180° CARRIER

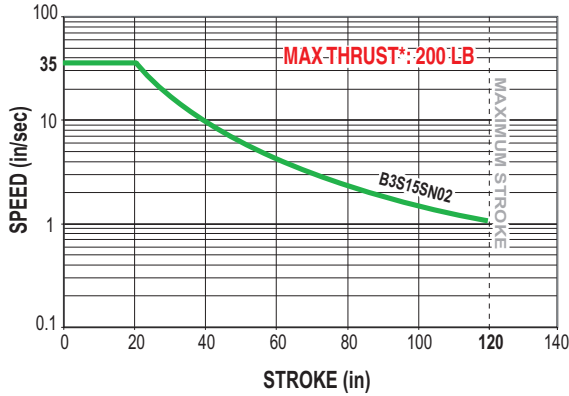




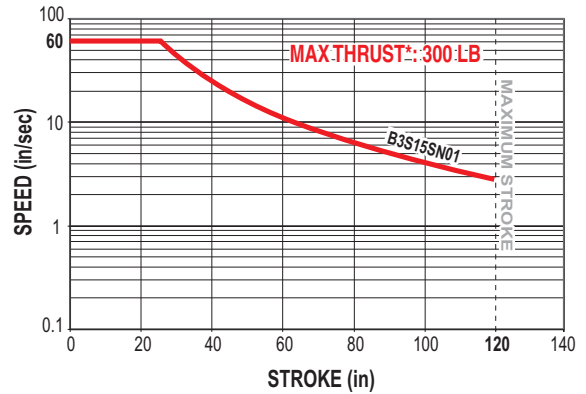
Axi-dyne® B3S/M3S15 Series ACME SCREW SPECIFICATIONS

B3S15 ENGLISH ACME SCREW SPECIFICATIONS

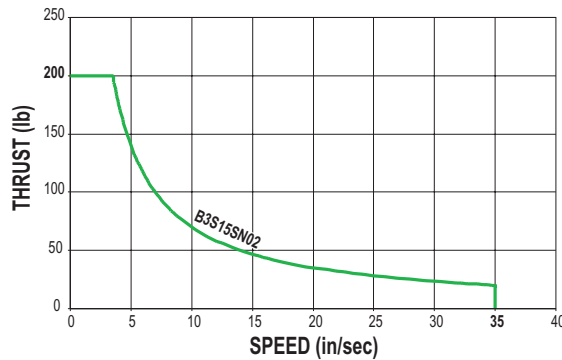
CRITICAL SPEED WITH 5/8" ENGLISH ACME SCREW



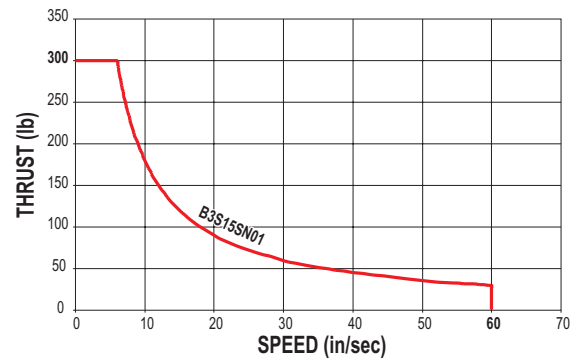
CRITICAL SPEED WITH 3/4" ENGLISH ACME SCREW



PV LIMITS: 5/8" 2TPI ENGLISH ACME SCREW



PV LIMITS: 3/4" 1TPI ENGLISH ACME SCREW



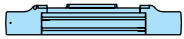
SN = Solid Nut

SNA = Solid Anti-backlash Nut

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

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

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



RODLESS

B3S/M3S15 Series

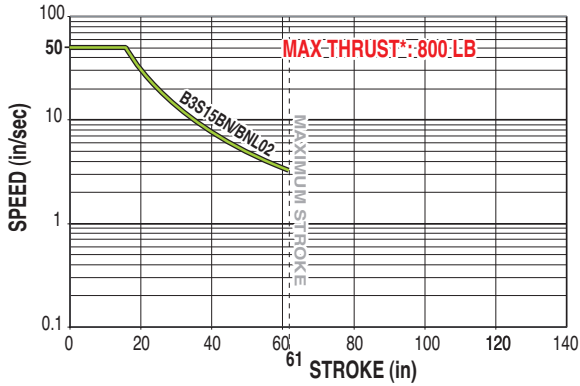
- English acme screw critical speed capacities and PV limits

Axi-dyne® B3S/M3S I5 Series

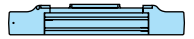
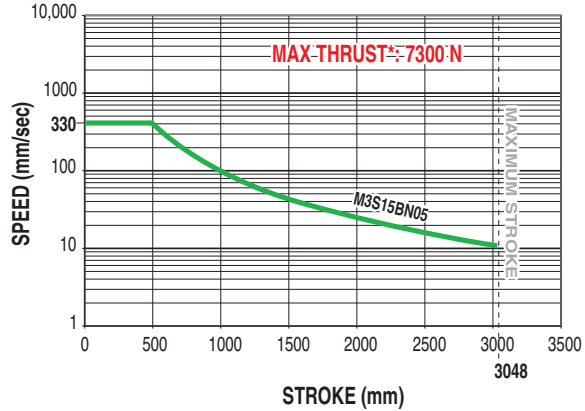
BALL SCREW SPECIFICATIONS

B3S/M3S I5 BALL SCREW SPECIFICATIONS

CRITICAL SPEED WITH 1/2" ENGLISH BALL SCREW



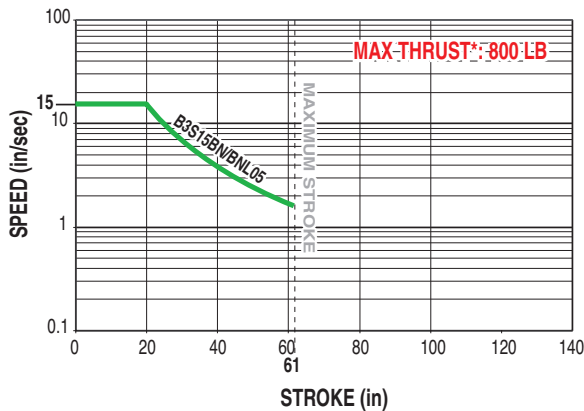
CRITICAL SPEED WITH 16mm METRIC BALL SCREW



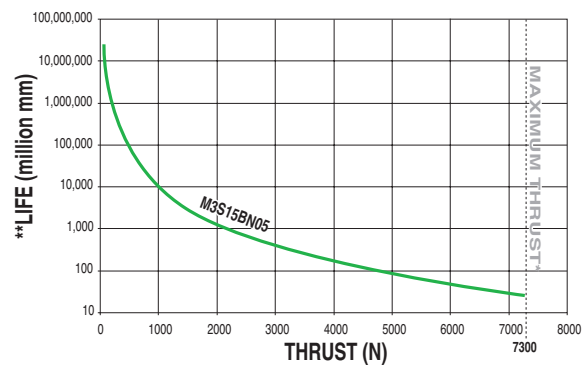
RODLESS

B3S/M3S I5 Series
 • Ball screw critical speed capacities and life calculations

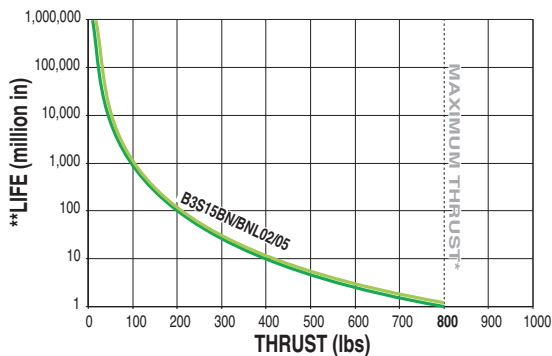
CRITICAL SPEED WITH 5/8" ENGLISH BALL SCREW



LIFE CALCULATION: 16mm METRIC BALL SCREW w/5mm LEAD



LIFE CALCULATION: 1/2" w/2TPI & 5/8" w/5TPI ENGLISH BALL SCREW



BN = Ball Nut
 BNL = Ball Nut with Low-Backlash



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

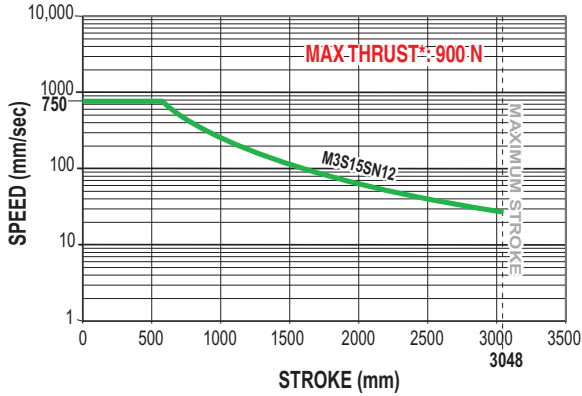
**Life indicates theoretical maximum life of screw only, under ideal conditions and does not indicate expected life of actuator.

Axi dyne® B3S/M3S15 Series

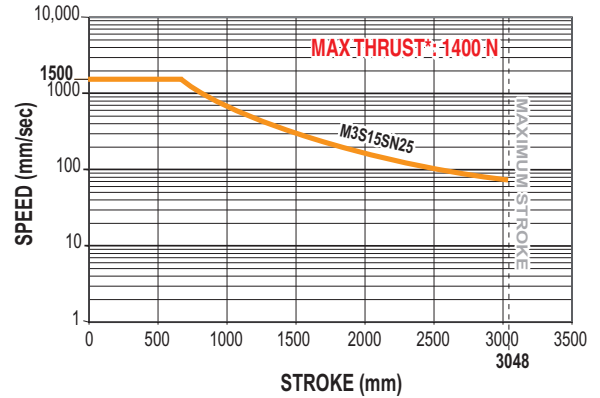
ACME SCREW SPECIFICATIONS

M3S15 METRIC ACME SCREW SPECIFICATIONS

CRITICAL SPEED WITH 15mm METRIC ACME SCREW



CRITICAL SPEED WITH 19mm METRIC ACME SCREW

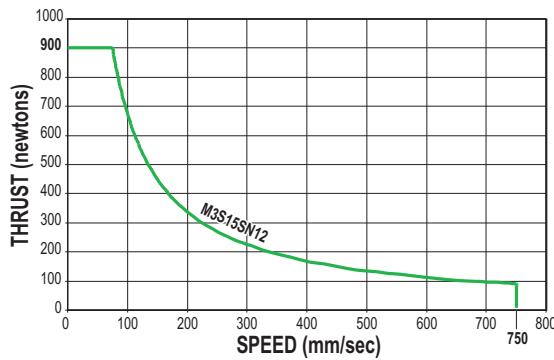


RODLESS

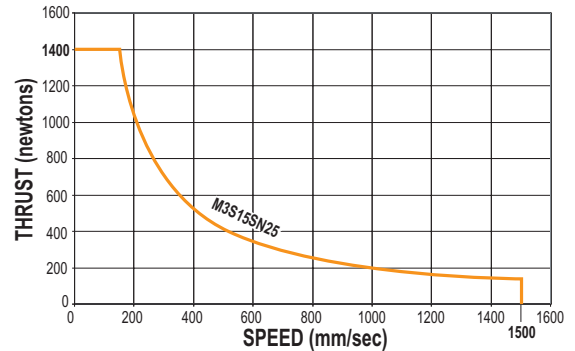
B3S/M3S15 Series

- Metric acme screw critical speed capacities and PV limits

PV LIMITS: 15mm METRIC ACME SCREW w/12mm LEAD



PV LIMITS: 19mm METRIC ACME SCREW w/25mm LEAD



SN = Solid Nut



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

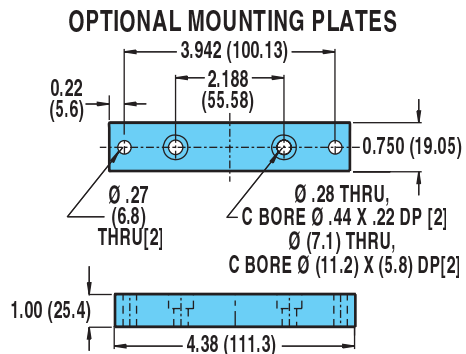
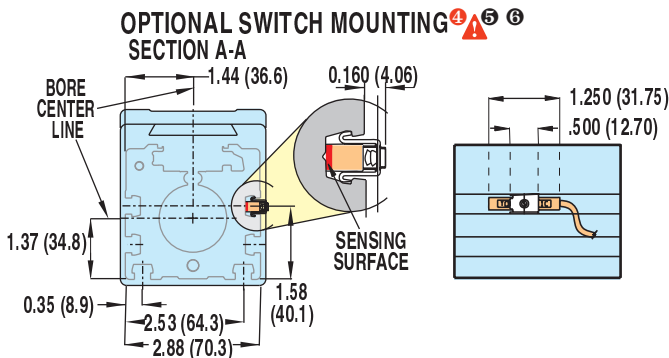
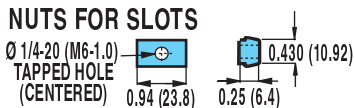
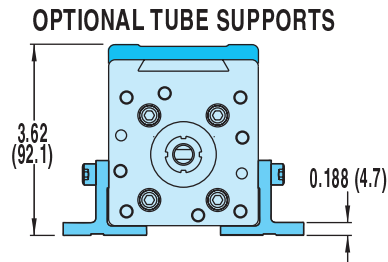
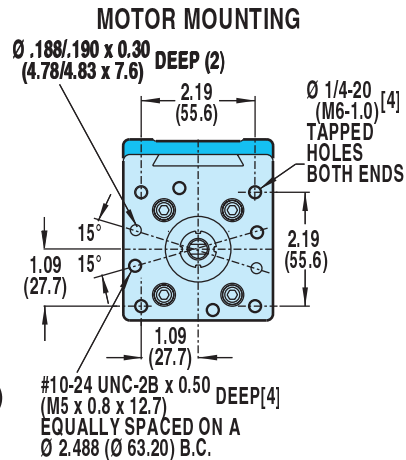
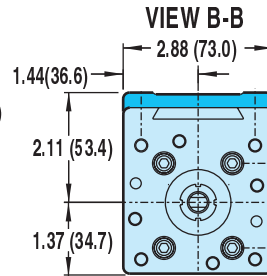
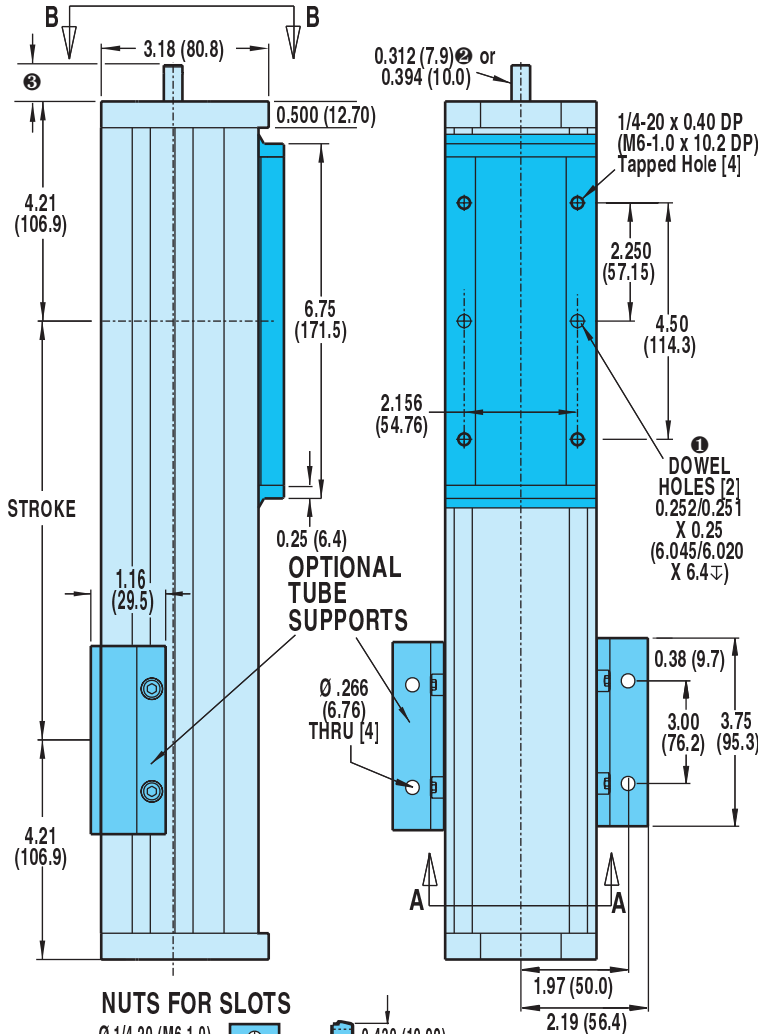
PV LIMITS: Any material which carries a sliding load is limited by heat buildup. The factors that affect heat generation rate in an application are the pressure on the nut in pounds per square inch and the surface velocity in feet per minute. The product of these factors provides a measure of the severity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

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

Axi-dyne® B3S/M3S15 Series

DIMENSIONS

B3S15/M3S15 ACTUATOR AND OPTIONS



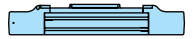
- ① DOWEL PINS Ⓢ .003 (08mm) Ⓜ
- ② FOR B3S15BN02 & B3S15BNL02
- ③ SHAFT LENGTH

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)

⚠️ CAUTION: DO NOT OVERTIGHTEN SWITCH HARDWARE WHEN INSTALLING

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

Ⓜ NOTE: Some actuators require switch mounting on a specific side of the actuator. Call Tol-O-Matic 1-800-328-2174 for details



RODLESS

B3S/M3S15 Series

• Actuator and option dimensions

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

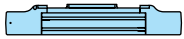
AXIDYNE ELECTRIC MOTION CONTROL FROM TOL-O-MATIC • 1-800-328-2174 • 763-478-8000 • www.tolomatic.com

For Sales and Support, Contact Walker EMD • Toll-free: (800) 876-4444 • Tel: (203) 426-7700 • Fax: (203) 426-7800 • www.walkeremd.com

Axi-dyne® B3S/M3S15 Series

DIMENSIONS

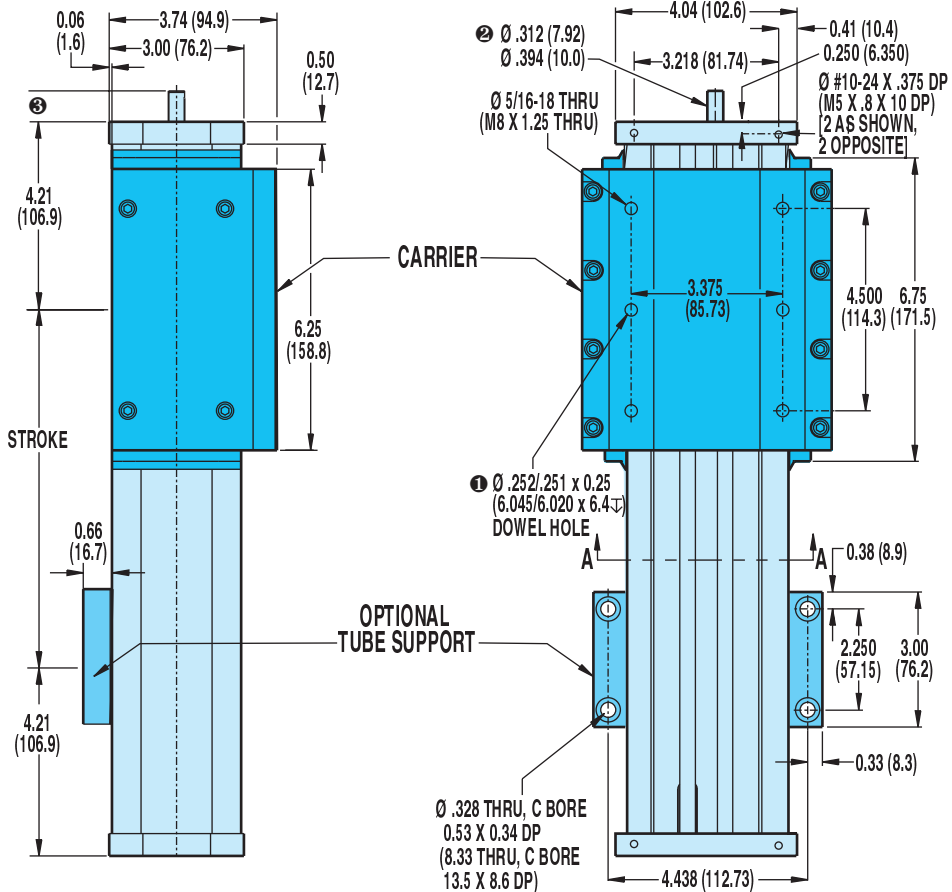
B3SD/M3SD15 DUAL 180° OPTION



RODLESS

B3S/M3S15 Series

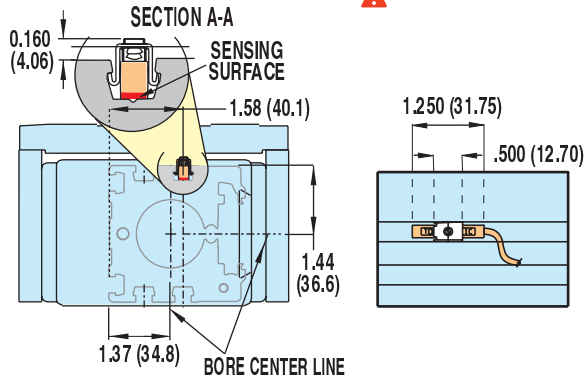
- Dual 180° option dimensions



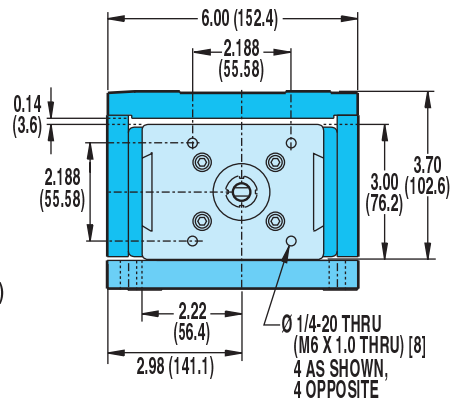
NUTS FOR SLOTS



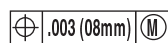
OPTIONAL SWITCH MOUNTING



END VIEW



1 DOWEL PINS



2 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)

3 FOR B3S15BN02 & B3S15BNL02

4 CAUTION: DO NOT OVERTIGHTEN SWITCH HARDWARE WHEN INSTALLING

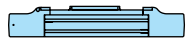
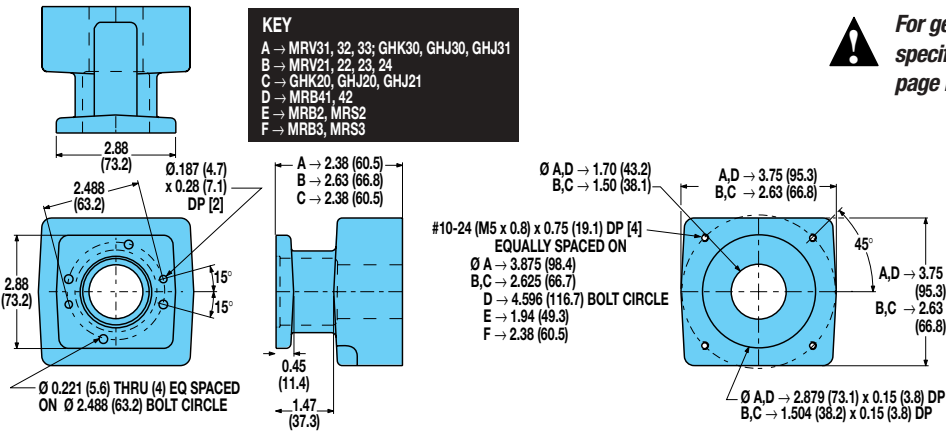
5 NOTE: The scored face of the switch indicates the sensing surface and must face toward the magnet

6 NOTE: Some actuators require switch mounting on a specific side of the actuator. Call Tol-O-Matic 1-800-328-2174 for details

Axi-dyne® B3S/M3S I5 Series

DIMENSIONS

B3S/M3S I5: IN-LINE MOUNT FOR MOTORS OR GEARHEADS

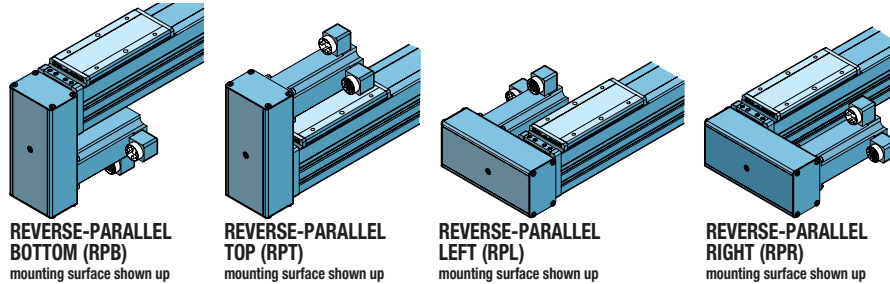


RODLESS

- B3S/M3S I5 Series**
- In-line motor mounting dimensions
 - Reverse parallel mounting

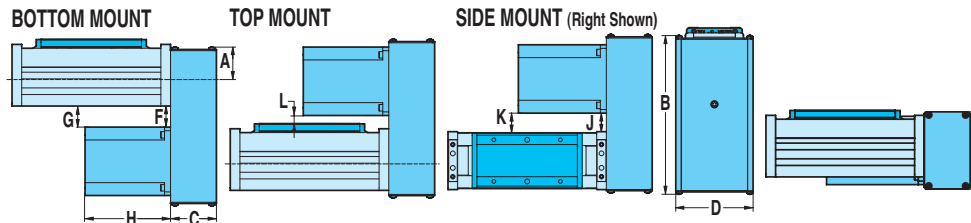
B3S/M3S I5: REVERSE PARALLEL MOUNTING

STANDARD CARRIER



SPECIFICATIONS:

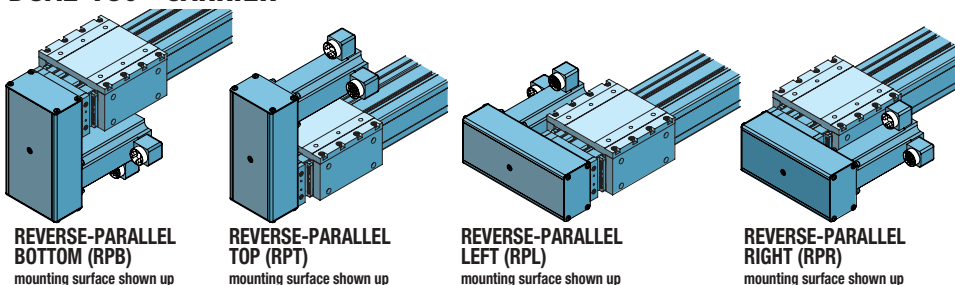
Motor	MRV21, 22, 23, 24, 31, 32, 33		
Reduction Drive Weight			
1:1 Ratio	2.17 lb.	0.98 kg.	
2:1 Ratio	2.40 lb.	1.09 kg.	
Reduction Inertia at Motor Shaft			
1:1 Ratio	0.070	0.2043	
2:1 Ratio	0.095	0.2767	
	lb-in ²	kg-cm ²	
Reduction Efficiency:	0.95		



DIMENSIONS

MOTOR	A		B		C		D		F		G		H		J		K		L		
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	
BRUSHLESS	MRV21	1.44	36.6	7.46	189.4	2.13	54.0	3.25	82.6	1.74	44.1	1.74	44.1	4.75	120.7	1.61	40.8	1.67	42.3	1.00	25.3
	MRV22	1.44	36.6	7.46	189.4	2.13	54.0	3.25	82.6	1.74	44.1	1.74	44.1	5.75	146.1	1.61	40.8	1.67	42.3	1.00	25.3
	MRV23	1.44	36.6	7.46	189.4	2.13	54.0	3.25	82.6	1.74	44.1	1.74	44.1	6.75	171.5	1.61	40.8	1.67	42.3	1.00	25.3
	MRV24	1.44	36.6	7.46	189.4	2.13	54.0	3.25	82.6	1.74	44.1	1.74	44.1	7.75	196.9	1.61	40.8	1.67	42.3	1.00	25.3
	MRV31	2.12	53.8	8.14	206.6	2.38	60.3	4.00	101.6	1.09	27.7	1.09	27.7	6.11	155.2	0.96	24.4	1.02	25.9	0.35	8.9
	MRV32	2.12	53.8	8.14	206.6	2.38	60.3	4.00	101.6	1.09	27.7	1.09	27.7	7.36	186.9	0.96	24.4	1.02	25.9	0.35	8.9
	MRV33	2.12	53.8	8.14	206.6	2.38	60.3	4.00	101.6	1.09	27.7	1.09	27.7	8.61	218.7	0.96	24.4	1.02	25.9	0.35	8.9

DUAL 180° CARRIER

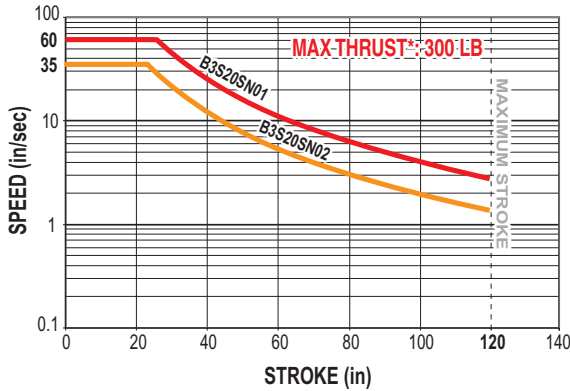




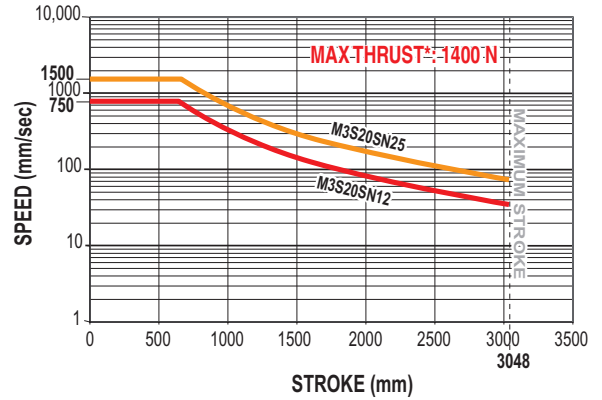
Axi-dyne® B3S/M3S20 ACME SCREW SPECIFICATIONS

B3S/M3S20 ACME SCREW SPECIFICATIONS

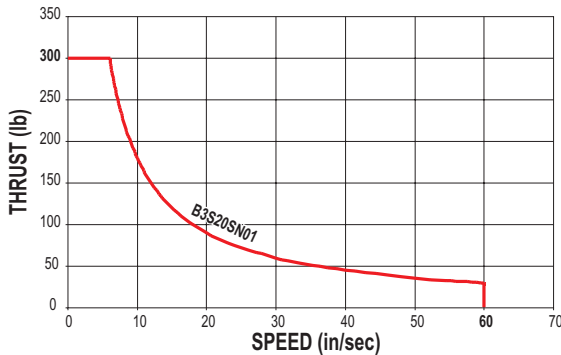
CRITICAL SPEED WITH 3/4" ENGLISH ACME SCREW



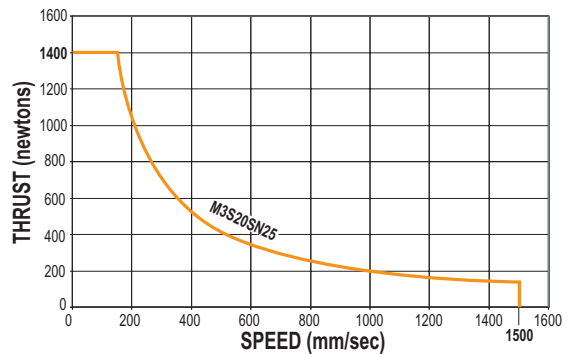
CRITICAL SPEED WITH 19mm METRIC ACME SCREW



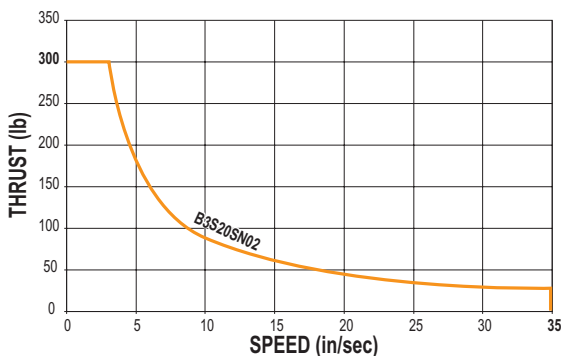
PV LIMITS: 3/4" 1TPI ENGLISH ACME SCREW



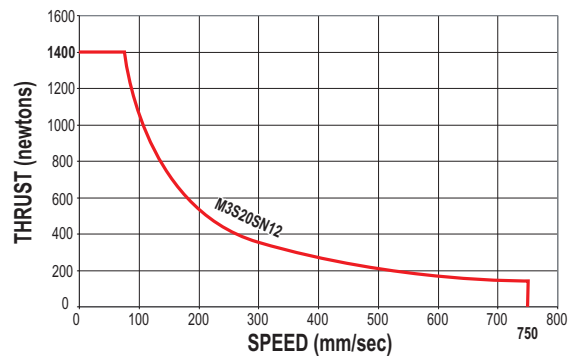
PV LIMITS: 19mm METRIC ACME SCREW w/25mm LEAD



PV LIMITS: 3/4" 2TPI ENGLISH ACME SCREW



PV LIMITS: 19mm METRIC ACME SCREW w/12mm LEAD



SN = Solid Nut

SNA = Solid Anti-backlash Nut



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

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

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



RODLESS

B3S/M3S20 Series

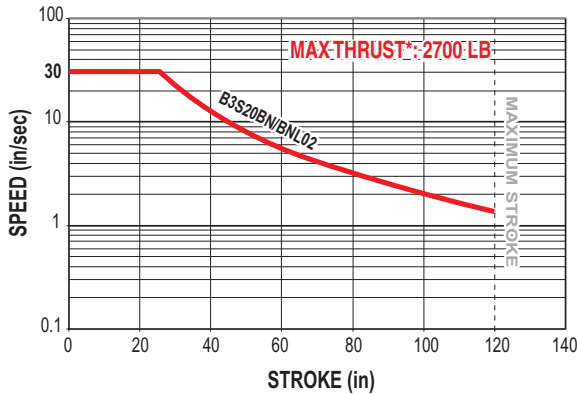
- Acme screw critical speed capacities and PV limits

Axi dyne® B3S/M3S20 Series

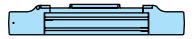
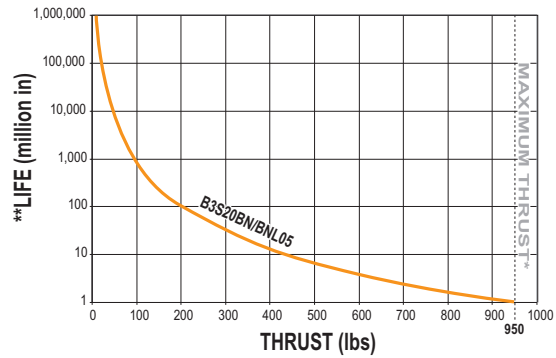
BALL SCREW SPECIFICATIONS

B3S20/M3S20 BALL SCREW SPECIFICATIONS

CRITICAL SPEED WITH 3/4" ENGLISH BALL SCREW, 2TPI



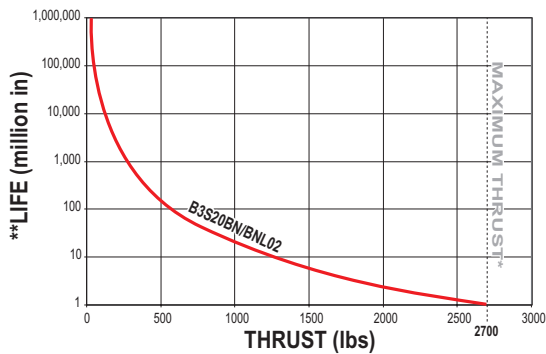
LIFE CALCULATION: 3/4" ENGLISH BALL SCREW, 5TPI



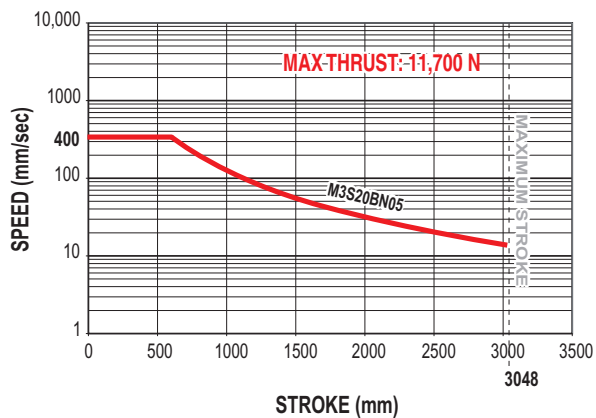
RODLESS

B3S/M3S20 Series
 • Ball screw critical speed capacities and life calculations

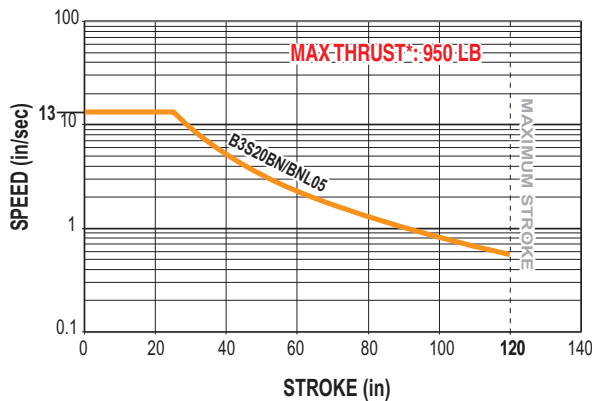
LIFE CALCULATION: 3/4" ENGLISH BALL SCREW, 2TPI



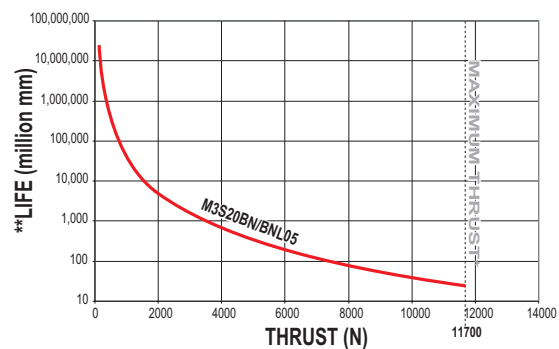
CRITICAL SPEED WITH 20mm METRIC BALL SCREW



CRITICAL SPEED WITH 3/4" ENGLISH BALL SCREW, 5TPI



LIFE CALCULATION: 20mm METRIC BALL SCREW w/5mm LEAD



BN = Ball Nut

BNL = Ball Nut with Low-Backlash



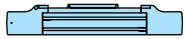
* Maximum thrust reflects 90% reliability for 1 million linear inches of travel.

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

Axi-dyne® B3S/M3S20 Series

DIMENSIONS

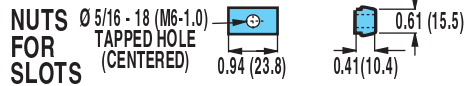
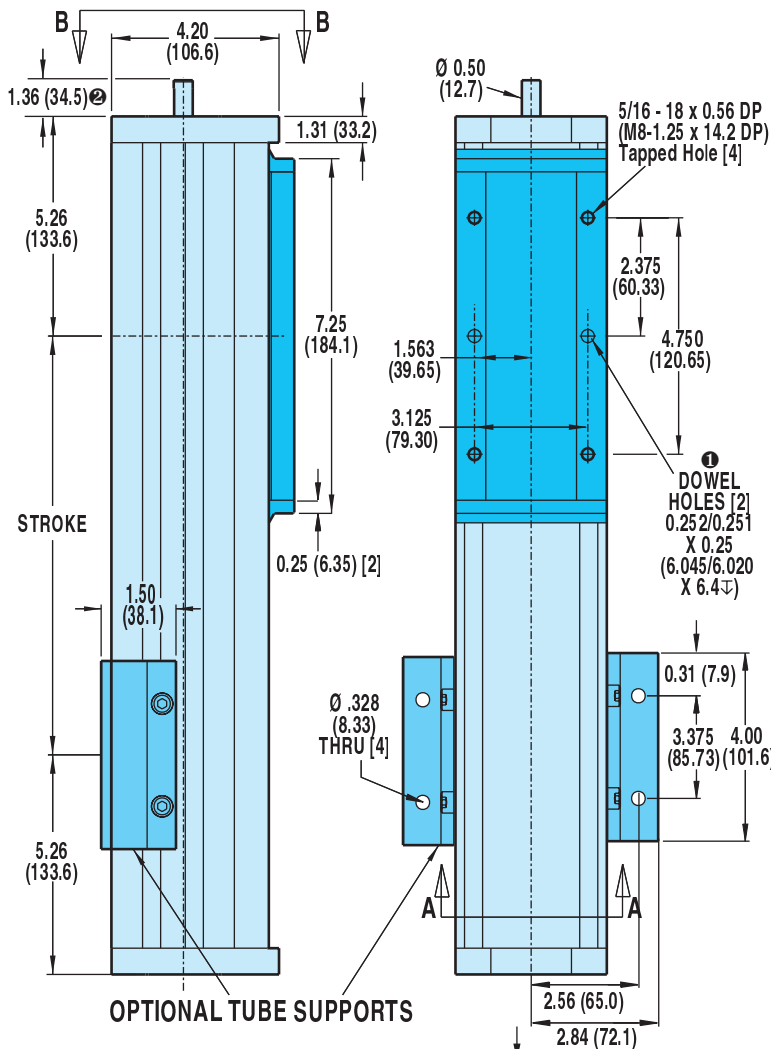
B3S20 ACTUATOR AND OPTIONS



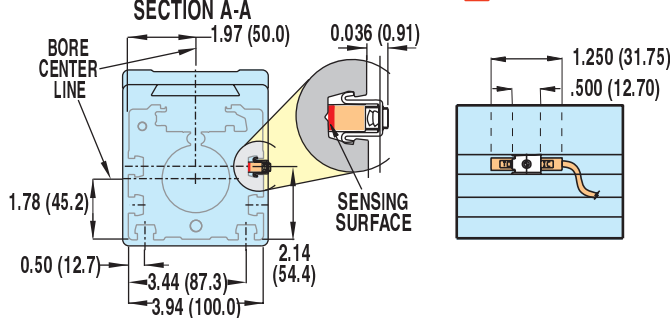
RODLESS

B3S/M3S20 Series

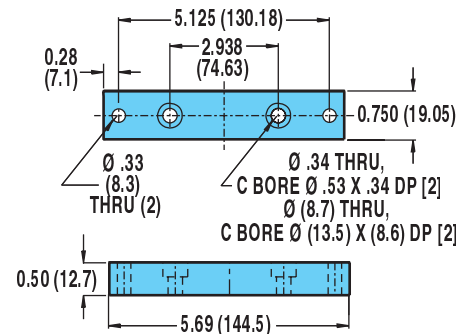
• Actuator and option dimensions



OPTIONAL SWITCH MOUNTING



OPTIONAL MOUNTING PLATES



- ① DOWEL PINS \oplus .003 (08mm) M
- ② FOR EXTENDED SHAFT 2.11 (53.6)

⚠ CAUTION: DO NOT OVERTIGHTEN SWITCH HARDWARE WHEN INSTALLING

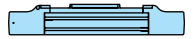
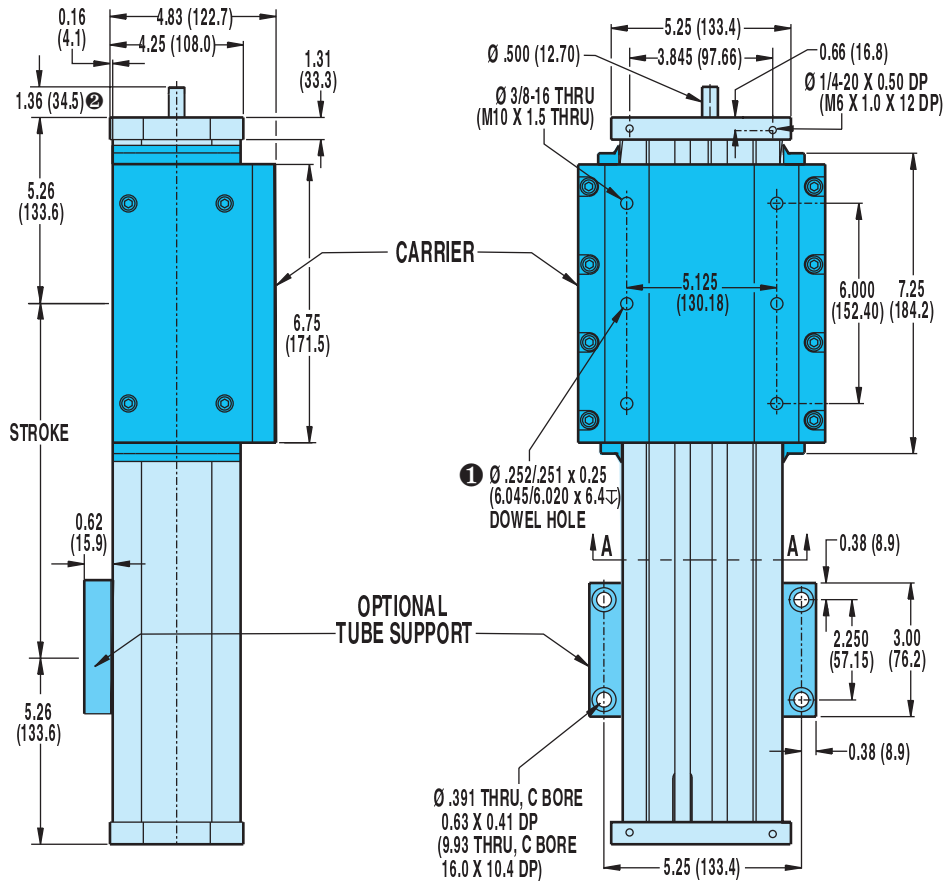
④ NOTE: The scored face of the switch indicates the sensing surface and must face toward the magnet

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

Axi-dyne® B3S/M3S20 Series

DIMENSIONS

B3SD/M3SD20 DUAL 180° OPTION

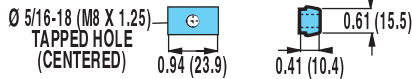


RODLESS

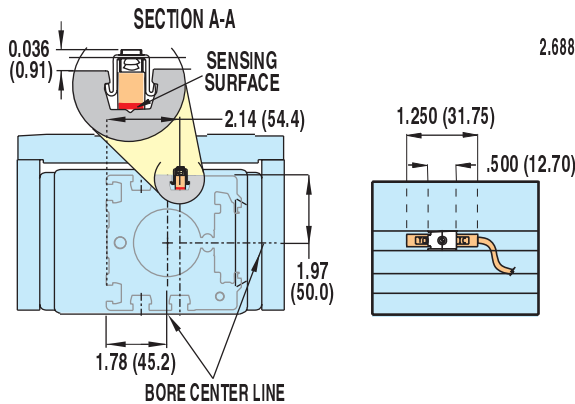
B3S/M3S20 Series

- Dual 180° option dimensions

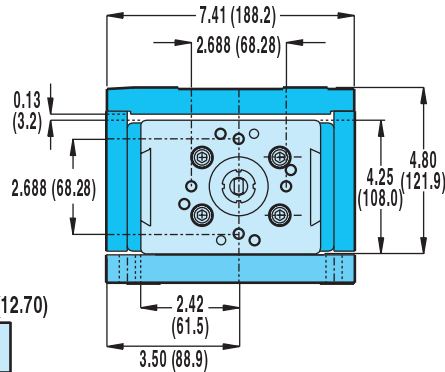
NUTS FOR SLOTS



OPTIONAL SWITCH MOUNTING



END VIEW



① DOWEL PINS $\varnothing .003$ (08mm) 

② FOR EXTENDED SHAFT 2.11 (53.6)

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

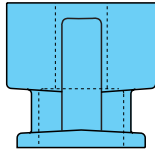
④ NOTE: The scored face of the switch indicates the sensing surface and must face toward the magnet

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

Axi-dyne® B3S/M3S20 Series

DIMENSIONS

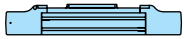
B3S/M3S20: IN-LINE MOUNT FOR MOTORS OR GEARHEADS



KEY
 A → MRV31, 32, 33; GHK30, GHJ30, GHJ31
 B → MRV21, 22, 23, 24
 C → GHK20, GHJ20, GHJ21
 D → MRB 41, MRB42
 E → MRB2, MRS2
 F → MRB3, MRS3



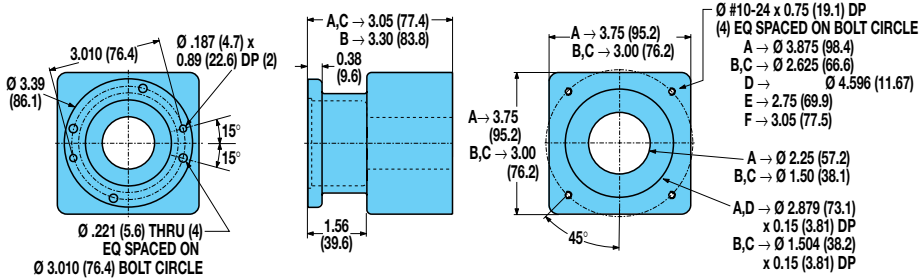
For gearhead dimensions and specifications, refer to page F-10.



RODLESS

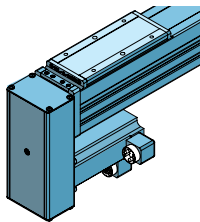
B3S/M3S20 Series

- In-line motor mounting dimensions
- Reverse parallel motor mounting



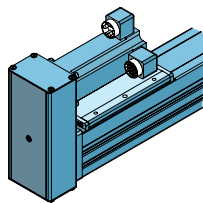
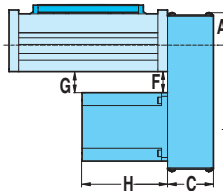
B3S/M3S20: REVERSE PARALLEL MOUNTING

STANDARD CARRIER



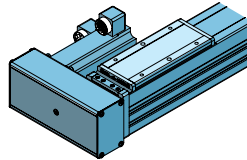
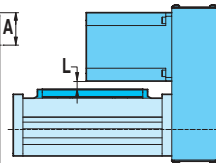
REVERSE-PARALLEL BOTTOM (RPB)
mounting surface shown up

BOTTOM MOUNT



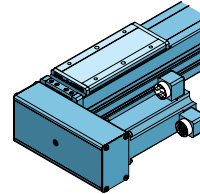
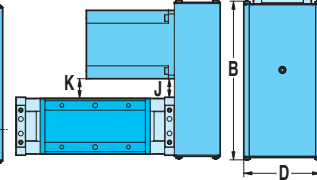
REVERSE-PARALLEL TOP (RPT)
mounting surface shown up

TOP MOUNT

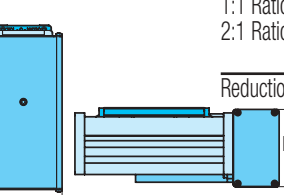


REVERSE-PARALLEL LEFT (RPL)
mounting surface shown up

SIDE MOUNT (Right Shown)



REVERSE-PARALLEL RIGHT (RPR)
mounting surface shown up



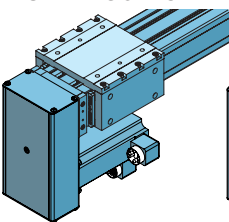
SPECIFICATIONS:

Motor	MRV21, 22, 23, 24	
Reduction Drive Weight		
1:1 Ratio	3.07 lb.	1.39 kg.
2:1 Ratio	3.23 lb.	1.47 kg.
Motor	MRV31, 32, 33,	
Reduction Drive Weight		
1:1 Ratio	3.13 lb.	1.42 kg.
2:1 Ratio	3.29 lb.	1.49 kg.
Reduction Inertia at Motor Shaft		
1:1 Ratio	0.118	0.3447
2:1 Ratio	0.100	0.2928
	lb-in ²	kg-cm ²
Reduction Efficiency:	0.95	

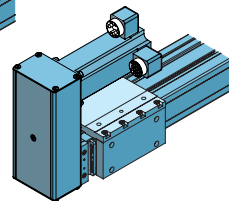
DIMENSIONS

	MOTOR		A		B		C		D		F		G		H		J		K		L	
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
BRUSHLESS	MRV21	1.44	36.6	9.31	236.5	2.38	60.3	4.00	101.6	2.34	59.5	2.35	59.6	4.75	120.7	2.00	50.8	2.16	54.7	1.47	37.2	
	MRV22	1.44	36.6	9.31	236.5	2.38	60.3	4.00	101.6	2.34	59.5	2.35	59.6	5.75	146.1	2.00	50.8	2.16	54.7	1.47	37.2	
	MRV23	1.44	36.6	9.31	236.5	2.38	60.3	4.00	101.6	2.34	59.5	2.35	59.6	6.75	171.5	2.00	50.8	2.16	54.7	1.47	37.2	
	MRV24	1.44	36.6	9.31	236.5	2.38	60.3	4.00	101.6	2.34	59.5	2.35	59.6	7.75	196.9	2.00	50.8	2.16	54.7	1.47	37.2	
	MRV31	1.96	49.7	9.83	249.6	2.38	60.3	4.00	101.6	1.70	43.2	1.70	43.2	6.11	155.2	1.36	34.4	1.51	38.4	0.82	20.9	
	MRV32	1.96	49.7	9.83	249.6	2.38	60.3	4.00	101.6	1.70	43.2	1.70	43.2	7.36	186.9	1.36	34.4	1.51	38.4	0.82	20.9	
	MRV33	1.96	49.7	9.83	249.6	2.38	60.3	4.00	101.6	1.70	43.2	1.70	43.2	8.61	218.7	1.36	34.4	1.51	38.4	0.82	20.9	

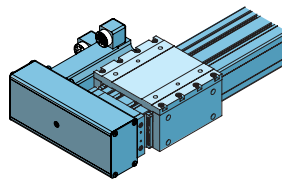
DUAL 180° CARRIER



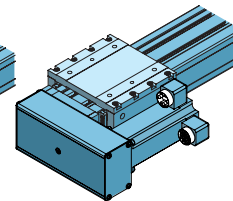
REVERSE-PARALLEL BOTTOM (RPB)
mounting surface shown up



REVERSE-PARALLEL TOP (RPT)
mounting surface shown up



REVERSE-PARALLEL LEFT (RPL)
mounting surface shown up



REVERSE-PARALLEL RIGHT (RPR)
mounting surface shown up

Axi-dyne® B3S/M3S Screw Drives

ORDERING

BASE MODEL SPECIFICATIONS

B3SD 20 BNL02 SK36 LMI

OPTIONS SPECIFICATIONS

DC18 TS2 BM2 TN8

MODEL TYPE

B3S B3S Series English Screw Drive
B3SD B3S Series English Screw Drive with Dual 180° Carrier
M3S B3S Series Metric Screw Drive
M3SD B3S Series Metric Screw Drive with Dual 180° Carrier

TUBE BORE DIAMETER

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

NUT/SCREW CONFIGURATION

ENGLISH MODELS

SOLID NUT / PITCH (turn/in) SERIES
SN01 B3S(D)10, 15, 20
SN02 B3S(D)10, 15, 20
SNA02 B3S(D)10, 15
SN05 B3S(D)10

BALL NUT / PITCH (turn/in) SERIES
BN02 B3S(D)15, 20
BNL02 B3S(D)15, 20
BN05 B3S(D)15, 20
BNL05 B3S(D)15, 20
BN08 B3S(D)10
BNL08 B3S(D)10

METRIC MODELS

SOLID NUT / LEAD (mm/turn) SERIES
SN12 M3S(D)10, 15, 20
SN25 M3S(D)10, 15, 20

BALL NUT / LEAD (mm/turn) SERIES
BN02 M3S(D)10
BNL02 M3S(D)10
BN05 M3S(D)15, 20
BNL05 M3S(D)15, 20

STROKE LENGTH

SK Stroke, then enter desired stroke length in decimal inches

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
LME40 Ext. shaft for RP & 40 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. Reference the ordering pages in sections F, G and H for the motor types and selections.*

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

TO ORDER MOTORS/CONTROLS/INTERFACES

 **BRUSHLESS SERVO (SEE PAGE F-33)**

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

Use the Tol-O-Motion™ Sizing Software to determine available options and accessories based on your application requirements.

AUXILIARY CARRIER

DC_ Auxiliary Carrier, then 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 plus quantity desired
****MP_** Mounting Plates plus quantity desired

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

SWITCHES

RM_ Reed Switch (Form A) with 5-meter lead/QD, and quantity desired
RT_ Reed Switch (Form A) with 5-meter lead, and quantity desired
BM_ Reed Switch (Form C) with 5-meter lead/QD, and quantity desired
BT_ Reed Switch (Form C) with 5-meter lead, and quantity desired
KM_ Hall-effect Sinking Switch with 5-meter lead/QD, and quantity desired
KT_ Hall-effect Sinking Switch with 5-meter lead, and quantity desired
TM_ Hall-effect Sourcing Switch with 5-meter lead/QD, and quantity desired
TT_ Hall-effect Sourcing Switch with 5-meter lead, and quantity desired
CM_ TRIAC Switch with 5-meter lead/QD, and quantity desired
CT_ TRIAC Switch with 5-meter lead, and quantity desired

T-NUTS

TN_ Additional T-Nuts and quantity



RODLESS

B3S/M3S Series

• Ordering

FIELD RETROFIT KITS

ITEM	B3S10	B3S15	B3S20	M3S10	M3S15	M3S20
Tube Supports	3410-9006	3415-9006	3420-9006	4410-9006	4415-9006	4420-9006
Tube Supports (B3SD Dual 180° models)	3410-9026	3415-9026	3420-9026	4410-9026	4415-9026	4420-9026
1/2" Mounting Plates	—	3415-9056	—	—	4415-9030	—
1/2" Mounting Plates (MRB/MRS/MRV all frame motors)	—	—	3420-9056	—	—	4420-9030
1" Mounting Plates (MRB/MRS 23-frame; MRV all frame motors)	3410-9057	—	—	4410-9031	—	—
1" Mounting Plates (MRB/MRS/MRV 34-frame motors)	—	3415-9057	—	—	4415-9031	—
Optional MP Plate (1/2" B3S10/M3S10 Mounting Plate)	3410-9056	—	—	4410-9030	—	—