Tolomatic™
EXCELLENCE *IN MOTION*

TKS10

SCREW DRIVE ELECTRIC RODLESS ACTUATOR

ENDURANCE TECHNOLOGY℠
A Tolomatic Design Principle

LINEAR SOLUTIONS MADE EASY

Tolomatic TKS10 Electric Rodless Actuator

High Precision Rodless Actuator

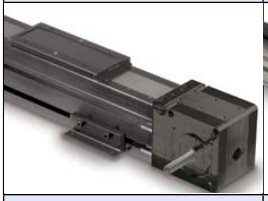
The TKS10 linear table style actuator is designed for applications carrying light load and requiring high precision in parameters such as flatness, straightness and accuracy. The TKS10 actuator utilizes two parallel profiled rails with four recirculating ball linear guides to provide consistent and precise performance. Built-to-order in stroke lengths up to 2.4 m [96 inches].

A Comparison of Screw Drive Actuators

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

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

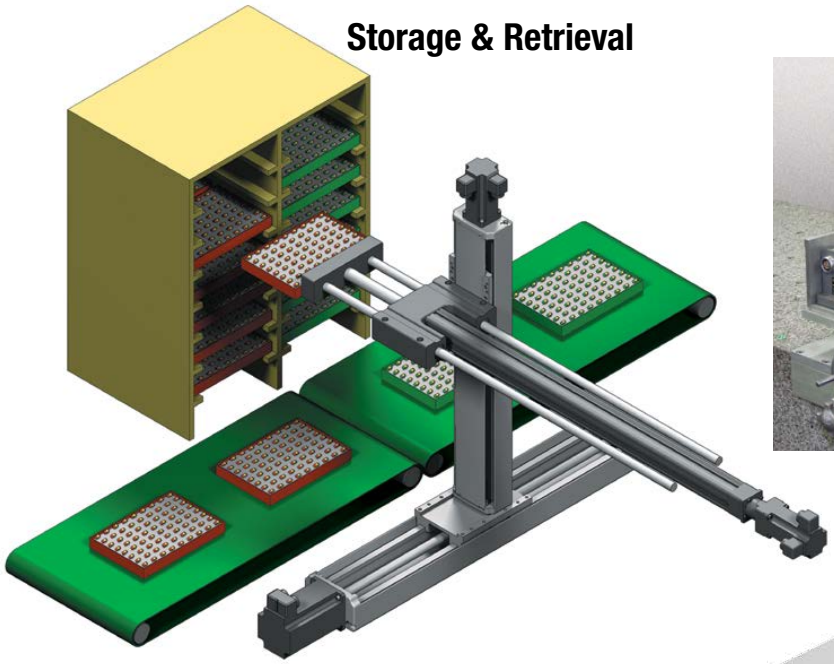
A Comparison of Belt Drive Actuators

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

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

TKS10 Applications

Storage & Retrieval



Inspection & Measurement

Custom Two Direction TKS

- Animation
- Assembly machinery
- Automotive
- Cosmetics
- Cycle testing
- Inspection & measurement
- Laser positioning
- Machine tools
- Material handling
- Medical equipment
- Packaging equipment
- Pick & place
- Precision grinders
- Product test simulations
- Semiconductor
- Stage motion control
- Table positioning
- Tension control
- Test stands
- Water jet control
- Wave generation
- and many more

Semiconductor Inspection

TKS PRECISION SCREW DRIVE ACTUATOR

ENDURANCE TECHNOLOGY℠

A Tolomatic Design Principle

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

The TKS linear table style actuator is designed for applications carrying moderate load and requiring high precision in parameters such as flatness, straightness and accuracy. The TKS actuator utilizes two parallel profiled rails with four recirculating ball linear guides to provide consistent and precise performance. Built-to-order in stroke lengths up to 2.4 m [96 inches] with your choice of screw technology.

MULTIPLE SCREW TECHNOLOGIES

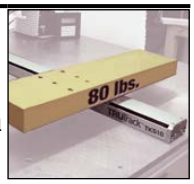
YOU CAN CHOOSE:

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

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

PRECISION MACHINED TABLE DESIGN

A low profile design accommodates multiple mounting designs and assures a rigid and secure load



SCREW SUPPORT BEARINGS

Unique high thrust bearing assembly design eliminates runout and isolates the motor from axial forces

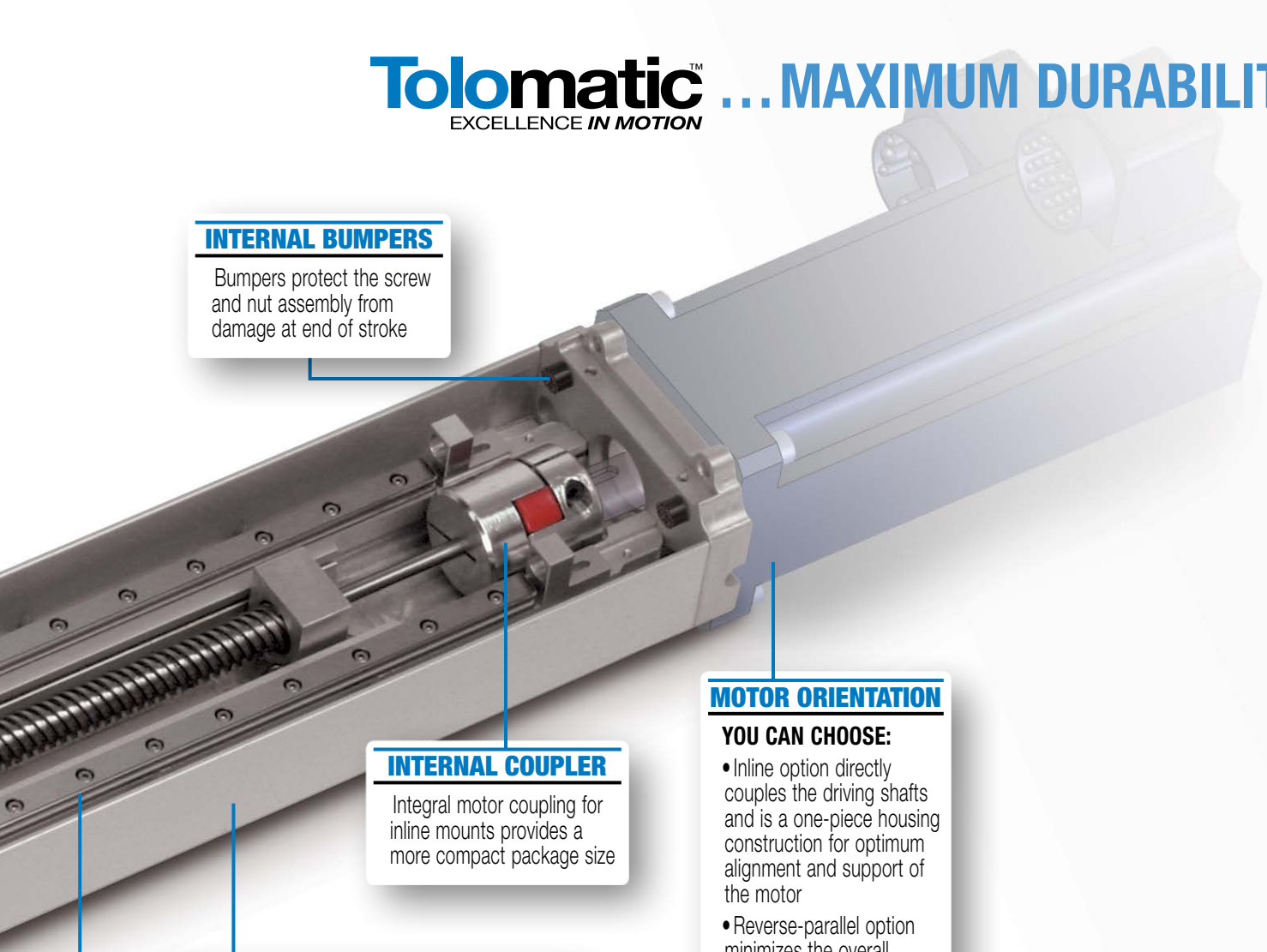
TWIN LINEAR RAILS AND BEARINGS

- Industry leading bearing system for consistent tracking, low friction and extended performance
- Superior straightness and flatness is verified at the factory below 0.0002 inches per inch
- Four bearing blocks provide rigid support of the carrier with the lowest possible deflection

INTERNAL SWITCHES

End of travel and home positioning sensors are integral into the body of the actuator for clean and easy management

...MAXIMUM DURABILITY



INTERNAL BUMPERS

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

INTERNAL COUPLER

Integral motor coupling for inline mounts provides a more compact package size

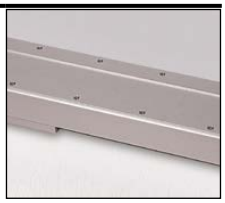
MOTOR ORIENTATION

YOU CAN CHOOSE:

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

LIGHTWEIGHT ALUMINUM DESIGN

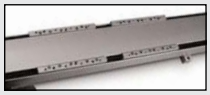
- Clear anodized extrusion design is optimized for rigidity and strength
- Mounting holes placed evenly throughout the stroke maintain rigidity



REMOVABLE COVER

Provides rapid access to internal components and protects mechanisms from incidental damage

OPTIONS



CARRIER OPTIONS

- **AUXILIARY CARRIER** Doubles the load capacity and increases pitch and yaw bending moment capacities

SEALING OPTIONS

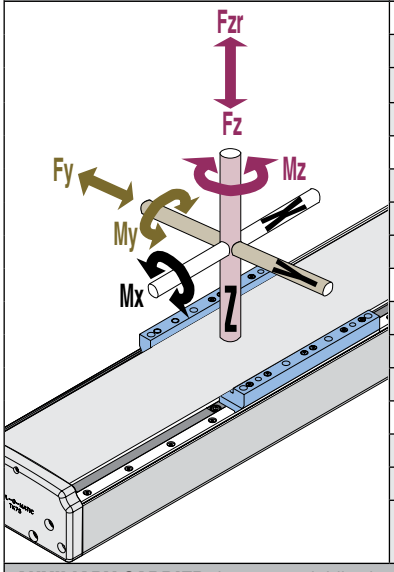
- **BELLOWS** provides additional protection of mechanical components in dirty environments

SWITCHES

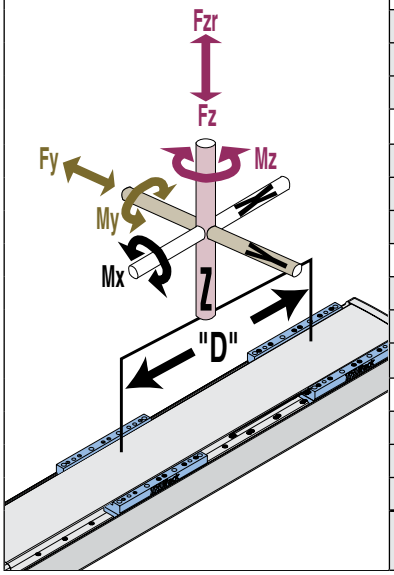
Styles include: reed or hall-effect.
5 m potted cable with flying leads

TKS10 SPECIFICATIONS

BENDING MOMENTS AND LOADS



STANDARD CARRIER		MAXIMUM BENDING MOMENTS AND LOADS* Metric		U.S. Conventional	
Max. Dynamic Bending Moments		TKS10		TKS10	
Mx (Roll)	*N-m*	*9.6*	lb-in	85
My (Pitch)	*N-m*	*26.4*	lb-in	234
Mz (Yaw)	*N-m*	*26.4*	lb-in	234
Max. Dynamic Loads				
Fy (Radial Load)	*N*	*445*	lb	100
Fz (Lateral Load)	*N*	*445*	lb	100
Fzr (Reverse Lateral Load)	*N*	*445*	lb	100
Max. Static Bending Moments				
Mx (Roll)	*N-m*	*19.2*	lb-in	170
My (Pitch)	*N-m*	*52.9*	lb-in	468
Mz (Yaw)	*N-m*	*52.9*	lb-in	468
Max. Static Loads				
Fy (Radial Load)	*N*	*890*	lb	200
Fz (Lateral Load)	*N*	*890*	lb	200
Fzr (Reverse Lateral Load)	*N*	*890*	lb	200



AUXILIARY CARRIER: Increases rigidity, load-carrying capacity and moments		Metric	U.S. Conventional	
Max. Dynamic Bending Moments**		TKS10DC	TKS10	
Mx (Roll)	*N-m*	*19.2*	lb-in	170
My (Pitch)	*N-m*	*63.6*	lb-in	563
Mz (Yaw)	*N-m*	*63.6*	lb-in	563
Max. Dynamic Loads				
Fy (Radial Load)	*N*	*890*	lb	200
Fz (Lateral Load)	*N*	*890*	lb	200
Fzr (Reverse Lateral Load)	*N*	*890*	lb	200
Max. Static Bending Moments**				
Mx (Roll)	*N-m*	*38*	lb-in	340
My (Pitch)	*N-m*	*127*	lb-in	1,126
Mz (Yaw)	*N-m*	*127*	lb-in	1,126
Max. Static Loads				
Fy (Radial Load)	*N*	*1,780*	lb	400
Fz (Lateral Load)	*N*	*1,780*	lb	400
Fzr (Reverse Lateral Load)	*N*	*1,780*	lb	400
Min. Dimension 'D'	*mm*	*142.9*	in	5.63

*** Bending moments & load specifications are based on (5,000 KM) 200,000,000 linear inches of carrier travel.**

Breakaway torque will increase when using the Auxiliary carrier option. When ordering, determine your working stroke and enter this value into the configuration string. Overall actuator length will automatically be calculated.

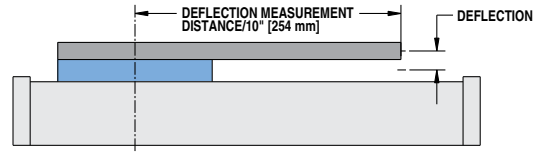
Deflection Considerations: In applications where substantial Mx or My moments come into play, deflection of the cylinder tube, carrier and supports must be considered. The deflection factors shown in the Load Deflection charts, are based on cylinder mounted with tube supports at minimum recommended spacing.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

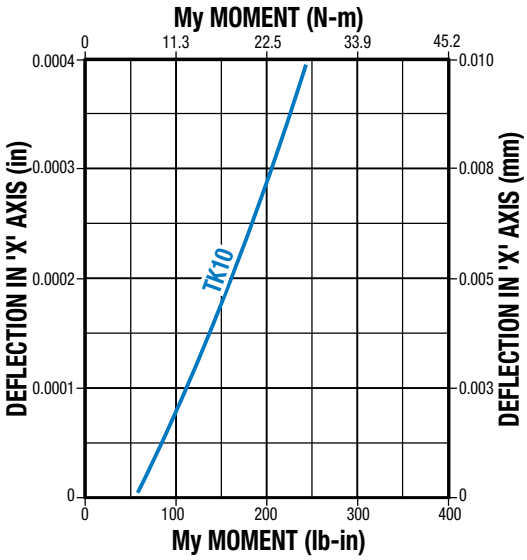
**** Loads shown in table are at minimum "D" dimension, for ratings with longer "D" dimension see graph on page TK_7.**

TKS10 SPECIFICATIONS

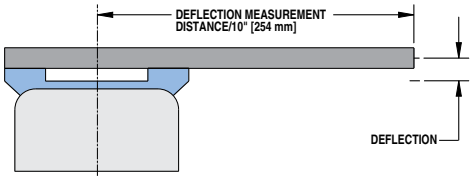
LOAD DEFLECTION

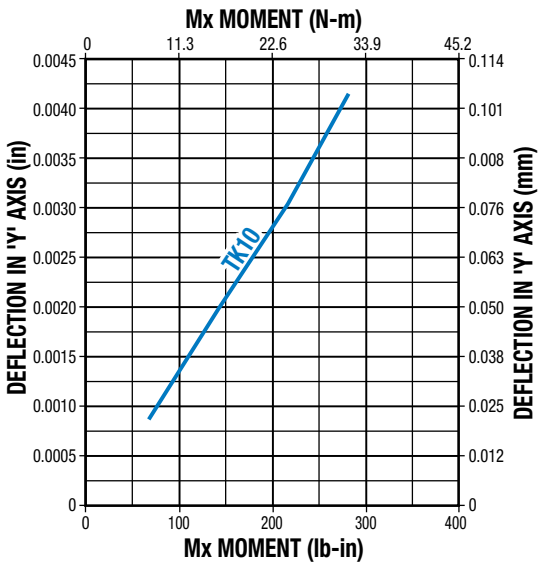
X-AXIS DEFLECTION





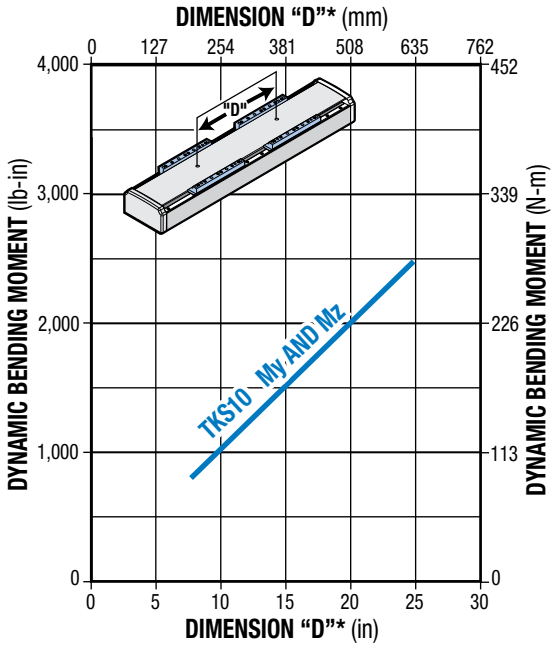
Y-AXIS DEFLECTION





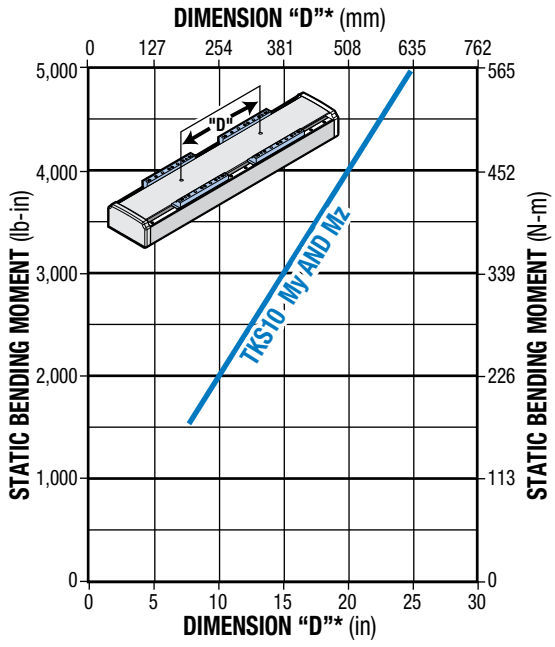
AUXILIARY CARRIER: BENDING MOMENT AT 'D' DISTANCE

DYNAMIC BENDING MOMENT



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.

STATIC BENDING MOMENT

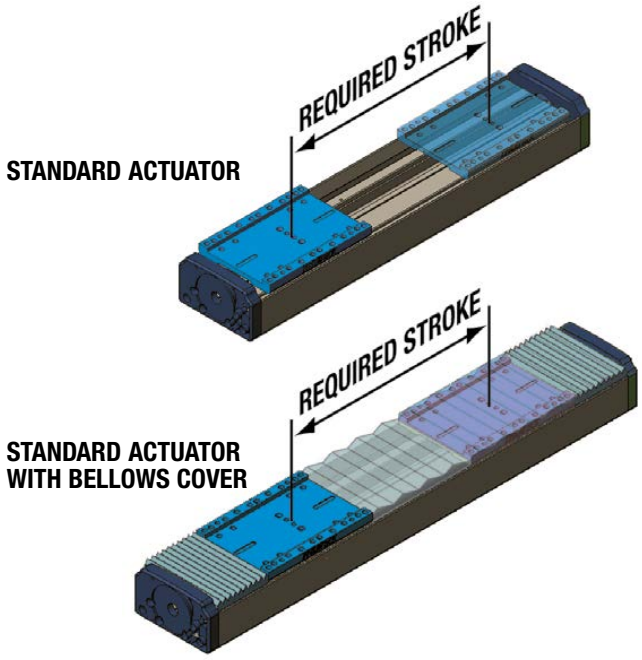


* Customer must specify Dimension "D" (Distance between carrier center lines) in configuration string.

Minimum "D" dimension is 142.9 mm (5.63").

TKS10 SPECIFICATIONS

BELLOWS STROKE REQUIREMENTS



MAXIMUM AVAILABLE STROKE FOR BELLOWS OPTION

	TKS		TKB
	Ball Nut	Solid Nut	
10	*610*	*1626*	*1626*

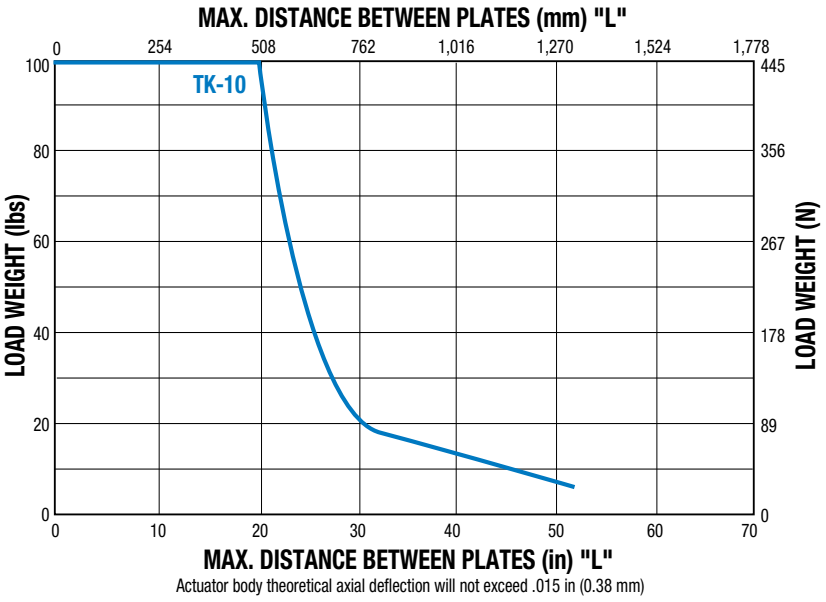
Dimensions in millimeters

	TKS		TKB
	Ball Nut	Solid Nut	
10	24	64	64

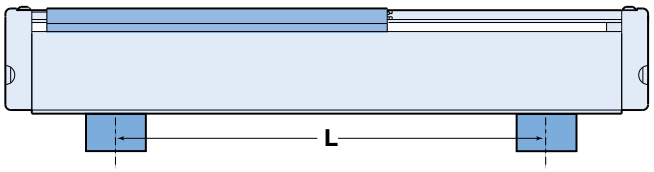
Dimensions in inches

BELLOWS COVER OPTION INCREASES OVERALL ACTUATOR LENGTH BY 0.508 x STROKE

MOUNTING PLATE RECOMMENDATIONS



Actuator body theoretical axial deflection will not exceed .015 in (0.38 mm)



FRICTION FORCE

N = 0.003 x LOAD (kg) + 17.6

lbf = 0.0003 x LOAD (lb) + 3.96

LUBRICATION

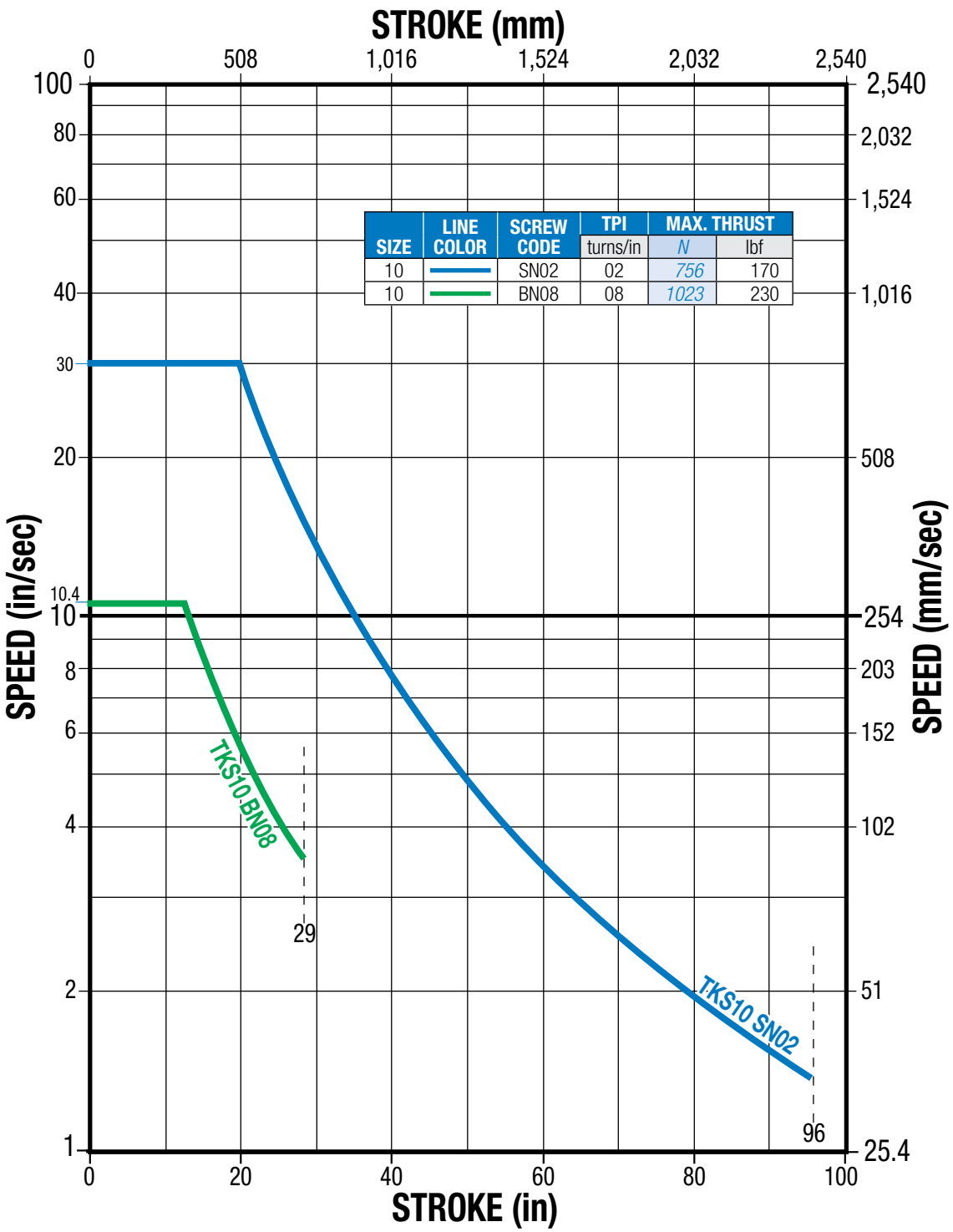
Proper and adequate lubrication is essential for normal operation of TruTrack actuators. Poor lubrication will cause quicker wear and decrease service life of the actuator. For general use, lubrication should be performed at intervals of (100 km) 4,000,000 linear inches of travel or once every year, whichever occurs first. However, the operating conditions of certain applications may require more frequent lubrication. Please consult Tolomatic for recommendations.

Recommended greases:

- Multi-purpose grease based on refined mineral oil containing lithium thickening agent (excellent at high pressures, excellent viscosity stability).
- Grease based on a high-grade synthetic oil containing a urea thickening agent (long life, wide temperature range).

SCREW/NUT COMBINATIONS

TKS ACME & BALL SCREW CRITICAL SPEED CAPACITIES



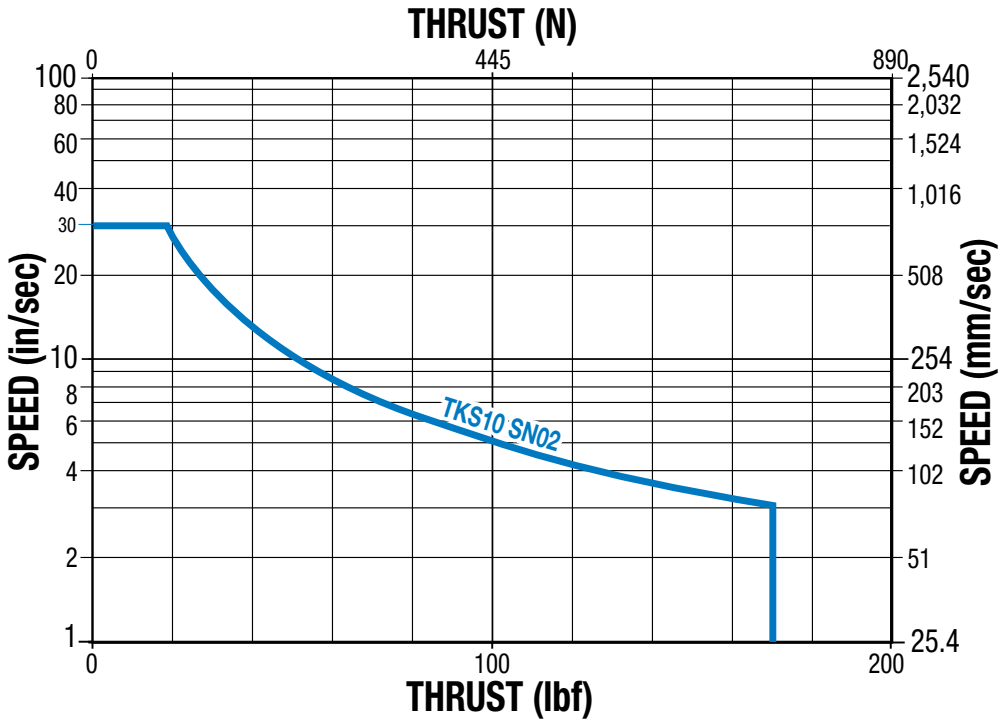
SIZE	LINE COLOR	SCREW CODE	TPI	MAX. THRUST	
			turns/in	*N*	lbf
10		SN02	02	*756*	170
10		BN08	08	*1023*	230

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

Dashed line represents maximum stroke for screw selections.

SCREW TYPE DESCRIPTION	
SN	Solid Nut
BN	Ball Nut

TKS ACME SCREW PV LIMITS



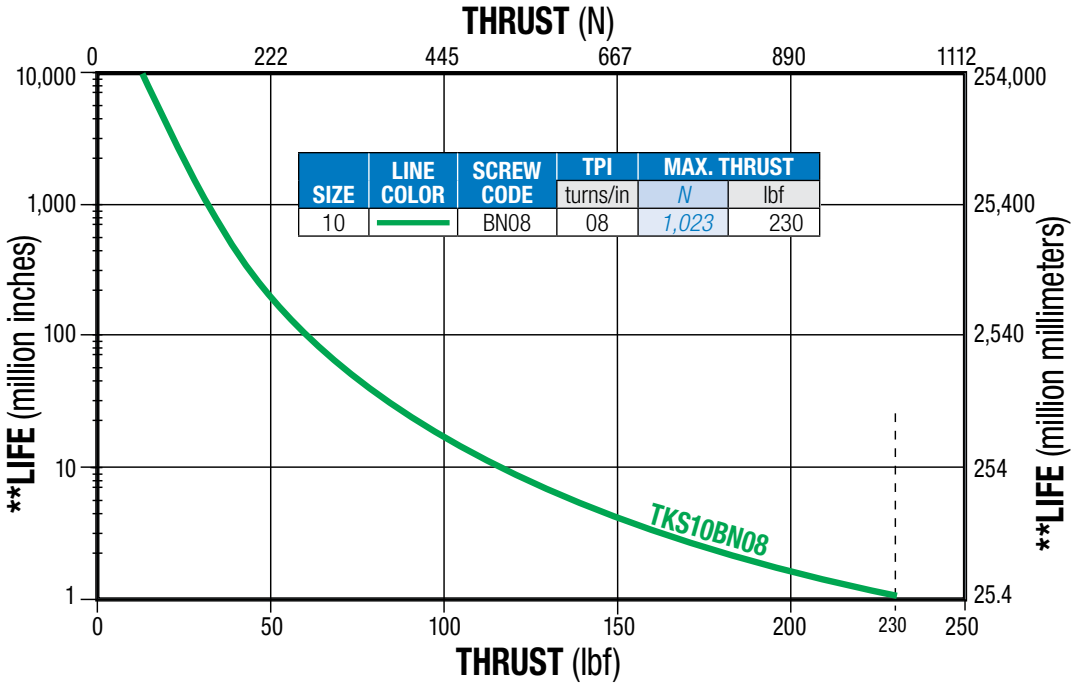
⚠ * Maximum thrust is the maximum continuous dynamic thrust subject to Thrust x Velocity Limitation.

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

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

$$\text{P} \text{ x } \text{V} \leq 0.1$$

BALL SCREW LIFE CALCULATION



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

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

TKS Rodless Screw Drive Actuator

TKS SPECIFICATIONS

SPECIFICATIONS RELATED TO ACTUATOR SIZE AND SCREW SELECTION

TKS LEAD SCREWS METRIC											
ACTUATOR	SCREW DIA. (in)	SCREW CODE	TPI (turns/ in)	LEAD ACCURACY (mm/300)	BACKLASH (mm)	MAXIMUM THRUST* (N)	MAXIMUM STROKE (mm)	INERTIA (kg-m² x 10⁻⁶) BASE ACTUATOR In Line	INERTIA (kg-m² x 10⁻⁶) BASE ACTUATOR Rev. Parallel	INERTIA (kg-m² x 10⁻⁶) PER/in OF STROKE	BREAKAWAY TORQUE (N-m)
TKS10	*0.500*	*SN*	*2*	*0.0762*	*0.1778*	*756*	*2,438*	*3.69*	*4.65*	*0.50*	*0.11*
	0.375	*BN*	*8*	*0.1016*	*0.0508*	*1,023*	*737*	*0.85*	*1.11*	*0.15*	*0.09*

TKS LEAD SCREWS U.S. CONVENTIONAL											
ACTUATOR	SCREW DIA. (in)	SCREW CODE	TPI (turns/ in)	LEAD ACCURACY (in/ft)	BACKLASH (in)	MAXIMUM THRUST* (lb)	MAXIMUM STROKE (in)	INERTIA (lb-in²) BASE ACTUATOR In Line	INERTIA (lb-in²) BASE ACTUATOR Rev. Parallel	INERTIA (lb-in²) PER/in OF STROKE	BREAKAWAY TORQUE (lb-in)
TKS10	0.500	SN	2	0.003	0.007	170	96	0.0126	0.0159	0.0017	0.938
	0.375	BN	8	0.004	0.002	230	29	0.0029	0.0038	0.0005	0.813

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 25 million linear millimeters of travel.**

SCREW TYPE	DESCRIPTION
SN	Solid Nut
BN	Ball Nut

ACTUATOR SPECIFICATIONS

	METRIC		U.S. CONVENTIONAL	
SPECIFICATIONS		TKS10		TKS10
Carrier weight	*kg*	*0.25*	lb	0.56
Base weight (in-line model, including carrier • motor not included)	*kg*	*1.46*	lb	3.22
Weight per/in (mm) of stroke	*kg*	*0.10*	lb	0.229
Straightness (YX Plane) (unconstrained [1])	*mm/mm*	*0.0004*	in/in	0.0004
Straightness (YX Plane) (constrained [2])	*mm/mm*	*0.0002*	in/in	0.0002
Flatness (ZX Plane) (unconstrained [1])	*mm/mm*	*0.0008*	in/in	0.0008
Flatness (ZX Plane) (constrained [2])	*mm/mm*	*0.0002*	in/in	0.0002
Screw uni-directional repeatability [3]	*mm*	*±0.010*	in	±0.0004
Temperature Range [4]	*°C*	*4-54*	°F	40-130

1 Listed values are intended for reference purposes only, and not as an engineering standard of absolute tolerance for a given actuator. Values were derived from testing of characteristic samples of appropriate products, and indicate an expected range of deviation from a theoretical straight line in the indicated plane of carrier motion. 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. For more information on how these values were obtained, please read the white paper on this subject available at www.tolomatic.com.

2 Actuator mounted on a flat surface and fully restrained.

3 Ball screw; not including backlash

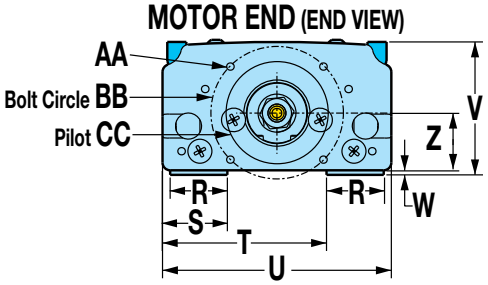
4 Heat generated by the motor and drive should be taken into consideration as well as linear velocity and work cycle time. For applications that require operation outside of the recommended temperature range, contact the factory.

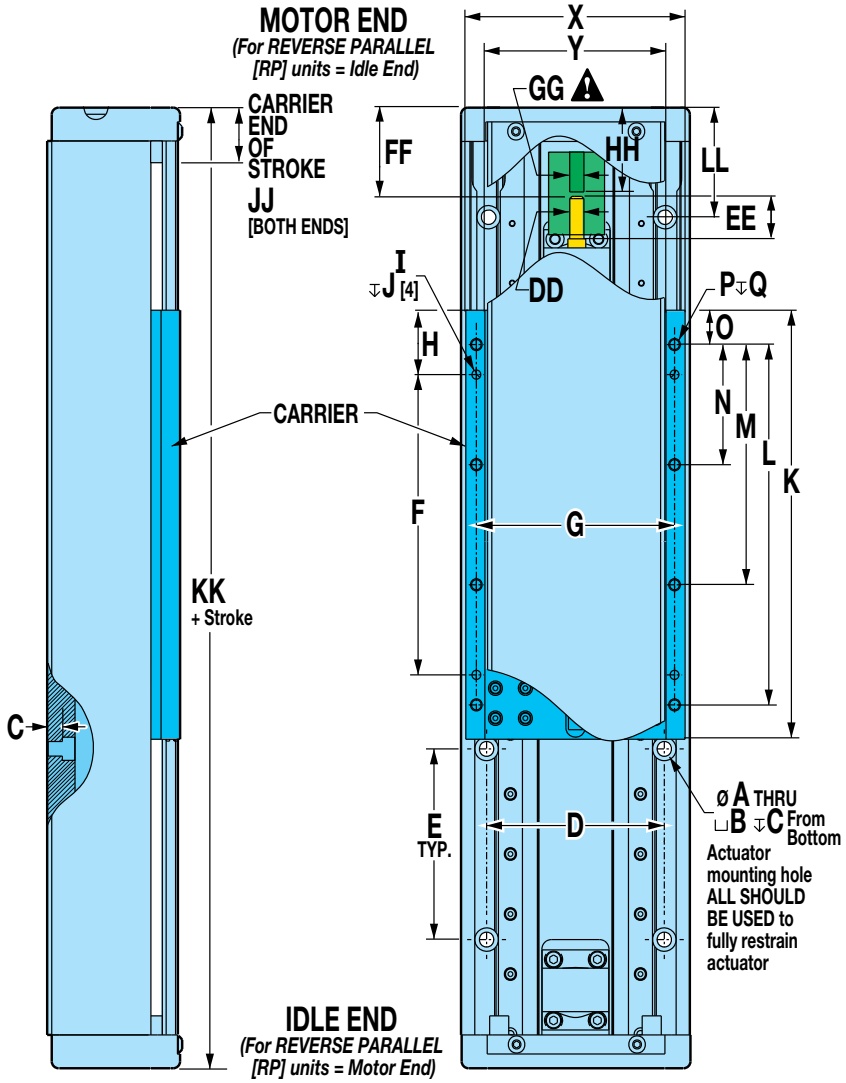
LARGE FRAME MOTORS AND SMALLER SIZE ACTUATORS: Cantilevered motors need to be supported, if subjected to continuous rapid reversing duty and/or under dynamic conditions.

TKS Rodless Screw Drive Actuator

DIMENSIONS

3D CAD AVAILABLE AT WWW.TOLOMATIC.COM
ALWAYS USE CONFIGURATED CAD SOLID MODEL TO DETERMINE CRITICAL DIMENSIONS





When specifying the XY/XJ shaft option: If a Tolomatic motor is not specified in the configuration string, customer's motor must conform to the shaft dimensions shown for mounting compatibility. Please specify you motor type and frame size when ordering.

NOTE: MRV motors are discontinued contact Tolomatic for equivalent replacement

SIZE	10
A	4.8
B	7.9
C	6.1
D	59.18
E	63.50
F	100.00
G	66.00
H	21.4
I	3.0
J	Thru
K	142.9
L	120.02
M	80.00
N	40.00
O	11.4
P	M4
Q	7.9
R	19.1
S	21.6
T	54.6
U	76.2
V	44.2
W	1.5
X	73.0
Y	60.3
Z	19.1

Dimensions in millimeters

SIZE	10
A	Ø.19
B	Ø.31
C	0.24
D	2.330
E	2.500
F	3.937
G	2.599
H	0.84
I	Ø.12
J	Thru
K	5.63
L	4.725
M	3.150
N	1.575
O	0.45
P	M4
Q	0.31
R	0.75
S	0.85
T	2.15
U	3.00
V	1.74
W	0.06
X	2.88
Y	2.38
Z	0.75

Dimensions in inches

SIZE	10		
Frame	17	23	
		MRS	Brushless
AA	#6-32	M5	M5
BB Ø	45.97	66.68	66.68
CC Ø	30.02	38.13	38.13
Shaft DD	4.78		
Shaft EE	17.6	19.7	14.6
Shaft FF	29.5	29.1	34.2
Coupler GG	8.00	6.35	12.70
Coupler HH	25.4	20.0	38.1
JJ	17.5	19.1	17.5
KK	177.8	179.4	
LL	36.5	38.1	

Dimensions in millimeters

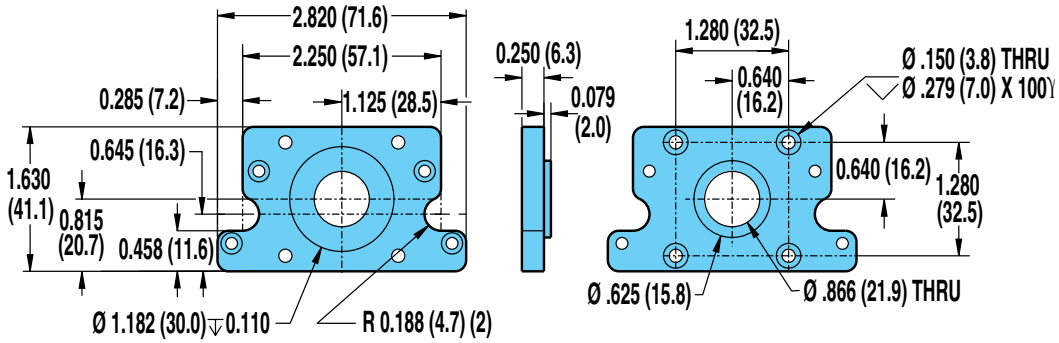
SIZE	10		
Frame	17	23	
		MRS	Brushless
AA	#6-32	M5	M5
BB Ø	1.810	2.625	2.625
CC Ø	1.182	1.501	1.501
Shaft DD	Ø.188		
Shaft EE	0.70	0.78	0.58
Shaft FF	1.16	1.15	1.35
Coupler GG	0.315	0.250	0.500
Coupler HH	1.00	0.79	1.50
JJ	0.69	motor = 0.75 idle = 0.69	
KK	7.00	7.06	
LL	1.44	1.50	

Dimensions in inches

DIMENSIONS

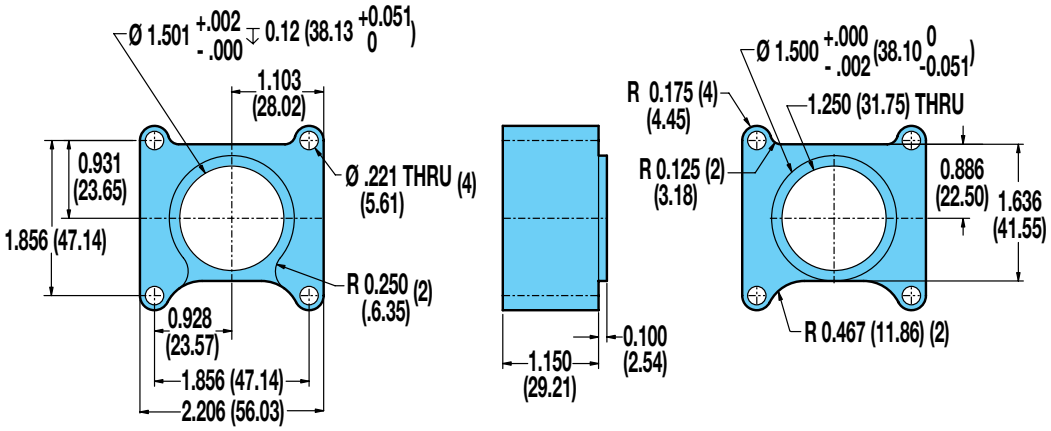
NOTE: MRB & MRV motors are discontinued
contact Tolomatic for information

TKS10: IN-LINE MOUNT FOR 17-FRAME BRUSHLESS MOTORS



17-frame motors cannot be mounted directly to the actuator head and require the use of the motor adapter plate shown. Gearbox option is not available with 17-frame motors.

TKS10: IN-LINE MOUNT FOR 23-FRAME BRUSHLESS MOTORS OR GEARBOX

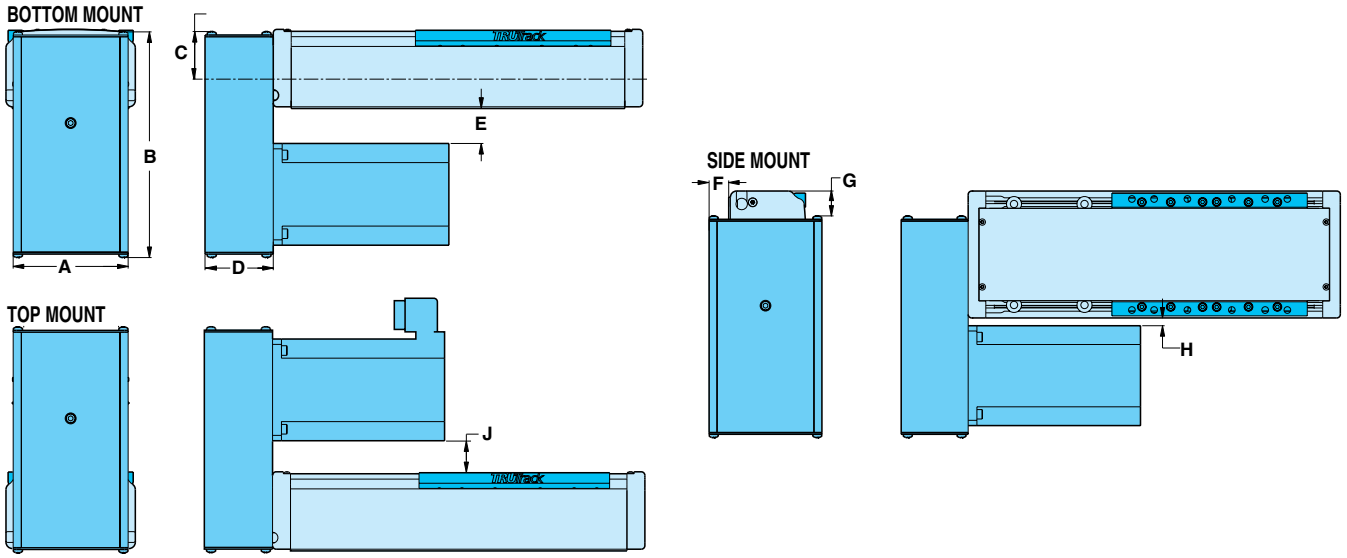


23-frame motors cannot be mounted directly to the actuator head and requires the use of the motor adapter plate shown.

INTERCHANGING MOTORS: Leadscrews on TruTrack actuators are specific to the motor type specified. Motor mounting plates do not provide for interchanging servo or stepper motors. For gearhead dimensions and specifications, refer to literature #3600-4161

DIMENSIONS

TKS: REVERSE PARALLEL MOUNTING



DIMENSIONS		A	B	C	D	E	F	G	H	J
		mm	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*
BRUSHLESS TKS10	11, 21, 22, 23, 24 Frame Motor	*82.6*	*144.8*	*32.3*	*54.1*	*24.9* / 23 Frame	*20.8*	*9.7*	*7.4* / 23 Frame	*21.8*

DIMENSIONS		A	B	C	D	E	F	G	H	J
		in.	in.	in.	in.	in.	in.	in.	in.	in.
BRUSHLESS TKS10	11, 21, 22, 23, 24 Frame Motor	3.25	5.70	1.27	2.13	0.98 / 23 Frame	0.82	0.38	0.29 / 23 Frame	0.86

SPECIFICATIONS		WEIGHT OF REDUCTION DRIVE		REDUCTION INERTIA AT MOTOR SHAFT	
		1:1	2:1	1:1	2:1
		kg	*kg*	*kg-cm²*	*kg-cm²*
BRUSH-LESS TKS10	11, 21, 22, 23, 24 Frame Motor	*0.82*	*0.82*	*0.1141*	*0.1368*

REDUCTION EFFICIENCY: 0.95

SPECIFICATIONS		WEIGHT OF REDUCTION DRIVE		REDUCTION INERTIA AT MOTOR SHAFT	
		1:1	2:1	1:1	2:1
		lbs	lbs	lb-in²	lb-in²
BRUSH-LESS TKS10	11, 21, 22, 23, 24 Frame Motor	1.80	1.80	0.039	0.047

REDUCTION EFFICIENCY: 0.95

TKS Precision Screw Drive Actuator

SWITCHES

There are 4 sensing choices: DC reed, form A (open) or form C (open or closed); Hall-effect, sourcing, PNP (open); Hall-effect, sinking, NPN (open); each with either flying leads. Commonly used to send analog signals to PLC (programmable logic controllers), TLL, CMOS circuit or other controller device. These switches are activated by the actuator's magnet.

Switches contain reverse polarity protection.

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

SPECIFICATIONS

		REED DC		HALL-EFFECT DC	
ORDER CODE		RT	BT	TT	KT
LEAD		5M	5M	5M	5M
CABLE SHIELDING		UNSHIELDED	UNSHIELDED	UNSHIELDED	UNSHIELDED
SWITCHING LOGIC		"A" NORMALLY OPEN	"C" NORMALLY OPEN OR CLOSED	PNP (SOURCING) NORMALLY OPEN	NPN (SINKING) NORMALLY OPEN
MECHANICAL CONTACTS		SINGLE-POLE SINGLE-THROW	SINGLE-POLE DOUBLE-THROW	NO, THESE ARE SOLID STATE COMPONENTS	
COIL DIRECT		YES	YES	—	
POWER LED		NONE	NONE	NONE	NONE
SIGNAL LED		RED TOL-O-MATIC		RED TOL-O-MATIC	RED TOL-O-MATIC
OPERATING VOLTAGE		200 VDC MAX.	120 VDC MAX.	5 - 25 VDC	
OUTPUT RATING		—		25 VDC, 200MA DC	
OPERATING TIME		0.6 MSEC MAX. (INCLUDING BOUNCE)	0.7 MSEC MAX. (INCLUDING BOUNCE)	< 10 MICRO SEC.	
OPERATING TEMPERATURE		-40°F [-40°C] TO 158°F [70°C]		0°F [-18°C] TO 150°F [66°C]	
RELEASE TIME		1.0 MSEC. MAX.		—	
ON TRIP POINT		—		150 GAUSS MAXIMUM	
OFF TRIP POINT		—		40 GAUSS MINIMUM	
****POWER RATING (WATTS)**		10.0 §	3.0 §§	5.0	
VOLTAGE DROP		2.6 V TYPICAL AT 100 MA	NA	—	
RESISTANCE		0.1 Ω INITIAL (MAX.)		—	
CURRENT CONSUMPTION		—		200 MA AT 25 VDC	
CABLE MIN. BEND RADIUS	**STATIC**	0.630" *[16MM]*			
	DYNAMIC	NOT RECOMMENDED			

CAUTION: DO NOT OVER TIGHTEN SWITCH HARDWARE WHEN INSTALLING!

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

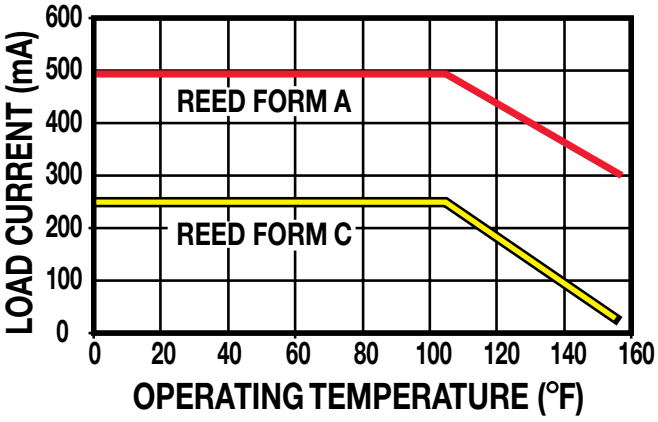
§ Maximum current 500mA (not to exceed 10VA) Refer to Temperature vs. Current graph and Voltage Derating graph

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

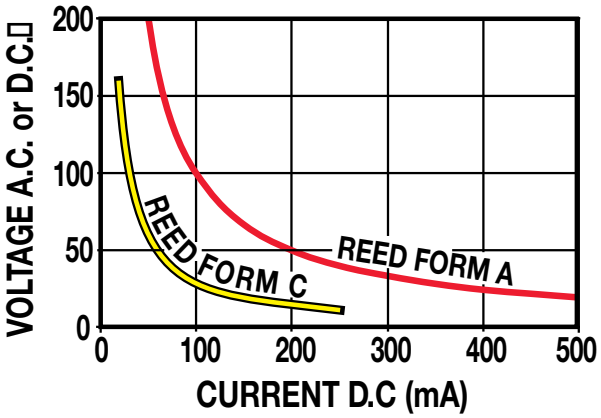
Reed Switch Life Expectancy: Up to 200,000,000 cycles (depending on load current, duty cycle and environmental conditions)

SWITCH PERFORMANCE

TEMP. vs CURRENT, DC REED

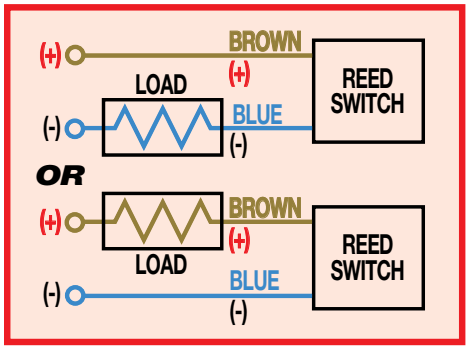


VOLTAGE DERATING, DC REED

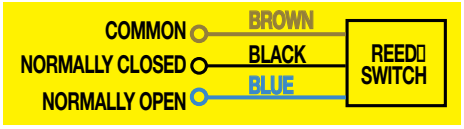


WIRING DIAGRAMS

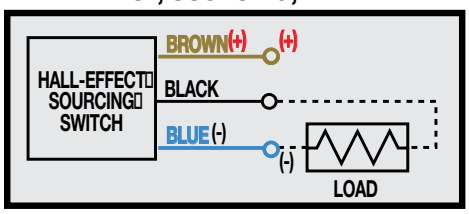
DC REED, FORM A



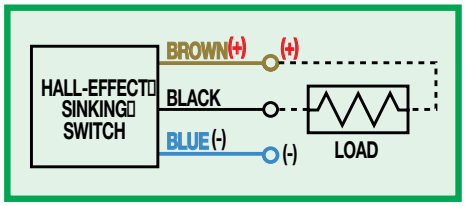
DC REED, FORM C



HALL-EFFECT, SOURCING, PNP



HALL-EFFECT, SINKING, NPN



INSTALLATION INFORMATION

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

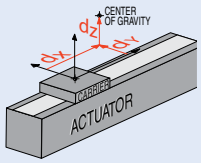
COMPILE APPLICATION REQUIREMENTS

APPLICATION DATA WORKSHEET

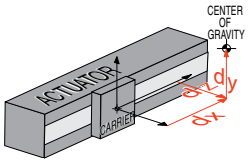
Fill in known data. Not all information is required for all applications

ORIENTATION

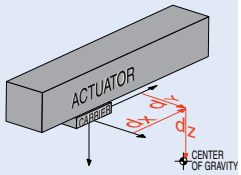
☐ Horizontal



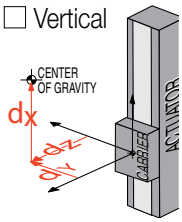
☐ Side



☐ Horizontal Down

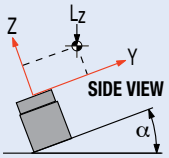


☐ Vertical

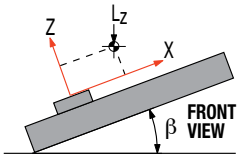


☐ Angled °

α _____



β _____



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

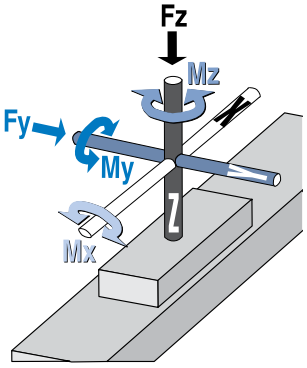
DISTANCE FROM CENTER OF CARRIER TO LOAD CENTER OF GRAVITY

d_x _____
d_y _____
d_z _____

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

STROKE LENGTH _____

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



BENDING MOMENTS APPLIED TO CARRIER

M_x _____
M_y _____
M_z _____

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

PRECISION

Repeatability _____

☐ inch ☐ millimeters

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

OPERATING ENVIRONMENT

Temperature, Contamination, etc.

_____
_____
_____

LOAD _____

☐ lb. (U.S. Standard) ☐ kg. (Metric)

THRUST REQUIRED

F_z _____
F_y _____

☐ lbf. (U.S. Standard) ☐ N (Metric)

MOVE PROFILE

Move Distance _____

☐ inch ☐ millimeters

Dwell Time After Move_____

Max. Speed _____

☐ in/sec ☐ mm/sec

MOVE TIME _____

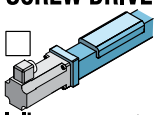
☐ sec

NO. OF CYCLES _____

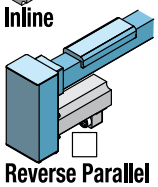
☐ per minute ☐ per hour

SCREW DRIVE

☐



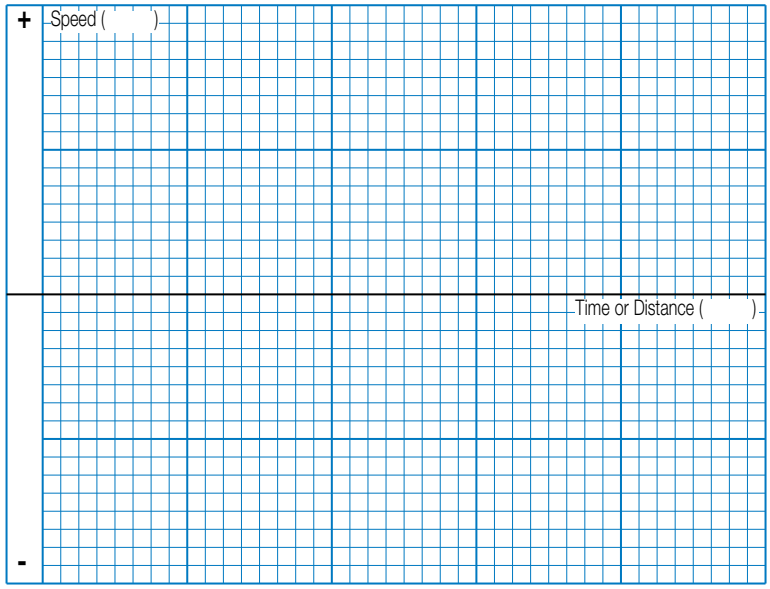
Inline



☐

Reverse Parallel

MOTION PROFILE



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

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

FAX 1-763-478-8080

CONTACT INFORMATION

Name, Phone, Email
Co. Name, Etc.

_____
_____
_____

SELECTION GUIDELINES

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

1 CHOOSE ACTUATOR SIZE

Choose an actuator that has the thrust, speed and moment load capacity to move the load. Use the Critical Speed graph (page TK_9) for the screw and the Moment and Load Capacity table (pg. TK_6) for the actuator.

2 COMPARE LOAD TO MAXIMUM LOAD CAPACITIES

Calculate the application load (combination of load mass and forces applied to the carrier) and application bending moments (sum of all moments Mx, My, and Mz applied to the carrier). Be sure to evaluate the magnitude of dynamic inertia moments. When a rigidly attached load mass is accelerated or decelerated, its inertia induces bending moments on the carrier. Careful attention to how the load is decelerated at the end of the stroke is required for extended actuator performance and application safety. If either load or any of your moments exceed figures indicated in the Moment and Load Capacity table (pg. TK_6) for the actuator consider:

1) Higher capacity bearing style

2) A larger actuator size

3) Auxiliary carrier

4) External guide system

3 CALCULATE LOAD FACTOR LF

For loads with a center of gravity offset from the carrier account for both applied (static) and dynamic loads. The load factor (LF) must not exceed the value of 1.5

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

If LF does exceed the value of 1.5, consider the four choices listed in step #2.

4 ESTABLISH YOUR MOTION PROFILE AND CALCULATE ACCELERATION RATE

Using the application stroke length and maximum carrier velocity (or time to complete the linear motion), establish the motion profile. Select either triangular (accel-decel) or trapezoidal (accel-constant speed-decel) profile. Now calculate the maximum acceleration and deceleration rates of the move. A TKS screw-driven actuator speed should not exceed the value in the critical speed capacity graph (page TK_9) for the screw/nut combination chosen. Also, do not exceed safe rates of dynamic inertia moments determined in step #3.

5 SELECT THE LEAD SCREW

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

6 SELECT MOTOR (GEARHEAD IF NECESSARY) AND DRIVE

To help select a motor and drive, use the sizing equations located in the Engineering Resources section [ENGR] to calculate the application thrust and torque requirements. Refer to Motor sections & [MRS] to determine the motor and drive.

7 DETERMINE MOUNTING PLATE REQUIREMENTS

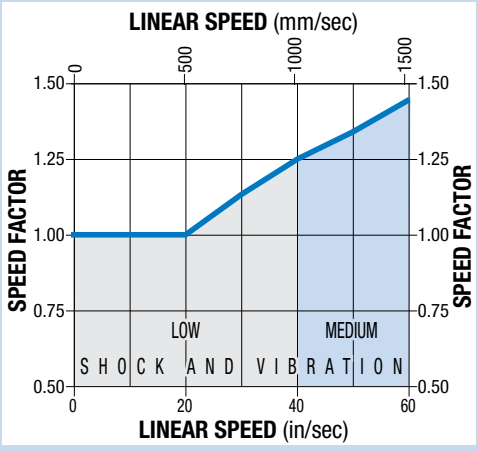
- Consult the Support Recommendations graph for the model selected (page TK_8)
- Cross reference the application load and maximum distance between supports
- Select the appropriate number of mounting plates if required for motor and adapter clearance.

8 CONSIDER OPTIONS

- BE2 Bellows for ingress protection
- LU Low dust generating grease
- Switches - Reed, Solid State PNP or NPN, all available normally open or normally closed

SPEED FACTOR

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



ACTUATOR SIZING

ORDERING

BASE MODEL SPECIFICATIONS

OPTIONS SPECIFICATIONS

T	K	S	1	0	S	N	0	2	S	K	5	5	L	M	I	D	C	1	8	K	T	2	B	E	2	M	P	4

MODEL

TKS TruTrack Screw Drive Actuator

PAYLOAD LIMITS

10 37 kg

NUT/SCREW CONFIGURATION

MODELS

SOLID NUT / PITCH (turn/in)	SERIES
SN02	TKS10

BALL NUT / PITCH (turn/in)	SERIES
BN08	TKS10

STROKE LENGTH

SK Stroke, then enter desired stroke length in decimal inches

	MODEL	MAX. STROKE	
TKS10SN02	Solid Nut	*2438*	96.0
TKS10BN08	Ball Nut	*736*	29.0
		mm	in

*Actuator cover has maximum stroke of 1,219 mm (48 in)

MOTOR MOUNTING / REDUCTIONS

⚠ **The length on the leadscrew and coupling device is determined by motor selection. Motor type and frame size must be specified when ordering.**

(must choose one)

LMI In-Line mount
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

When the LMG option is selected, the configurator picks the appropriate screw and hardware to accommodate the mounting of the gearhead based on motor selection. A gearhead reduction must also be indicated in the configuration string.

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

SWITCHES

RT_ Reed Switch (Form A) with 5-meter lead, and quantity desired
BT_ Reed Switch (Form C) with 5-meter lead, and quantity desired
KT_ Hall-effect Sinking Switch with 5-meter lead, and quantity desired
TT_ Hall-effect Sourcing Switch with 5-meter lead, and quantity desired
SP*_ Sensor Package

*Includes: Two Form C reed switches w/5-meter leads, mounted 1" from end-of-stroke and one Hall-effect sinking switch w/5-meter lead, mounted 2" from end-of-stroke on motor end.

BELLOWS

BE2 Bellows option (increases the dead length of the actuator, see pg. TK_8

MOUNTING PLATES

MP_ Mounting Plates plus quantity desired

FIELD RETROFIT KITS

ITEM	TKS10	TKS25	TKS50	TKS75
Mounting Plates	0601-9803	0602-9803	0603-9803	0604-9803

DISCONTINUED

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

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

The Tolomatic Difference Expect More From the Industry Leader:

INNOVATIVE PRODUCTS

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

FAST DELIVERY

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

ACTUATOR SIZING

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

YOUR MOTOR HERE

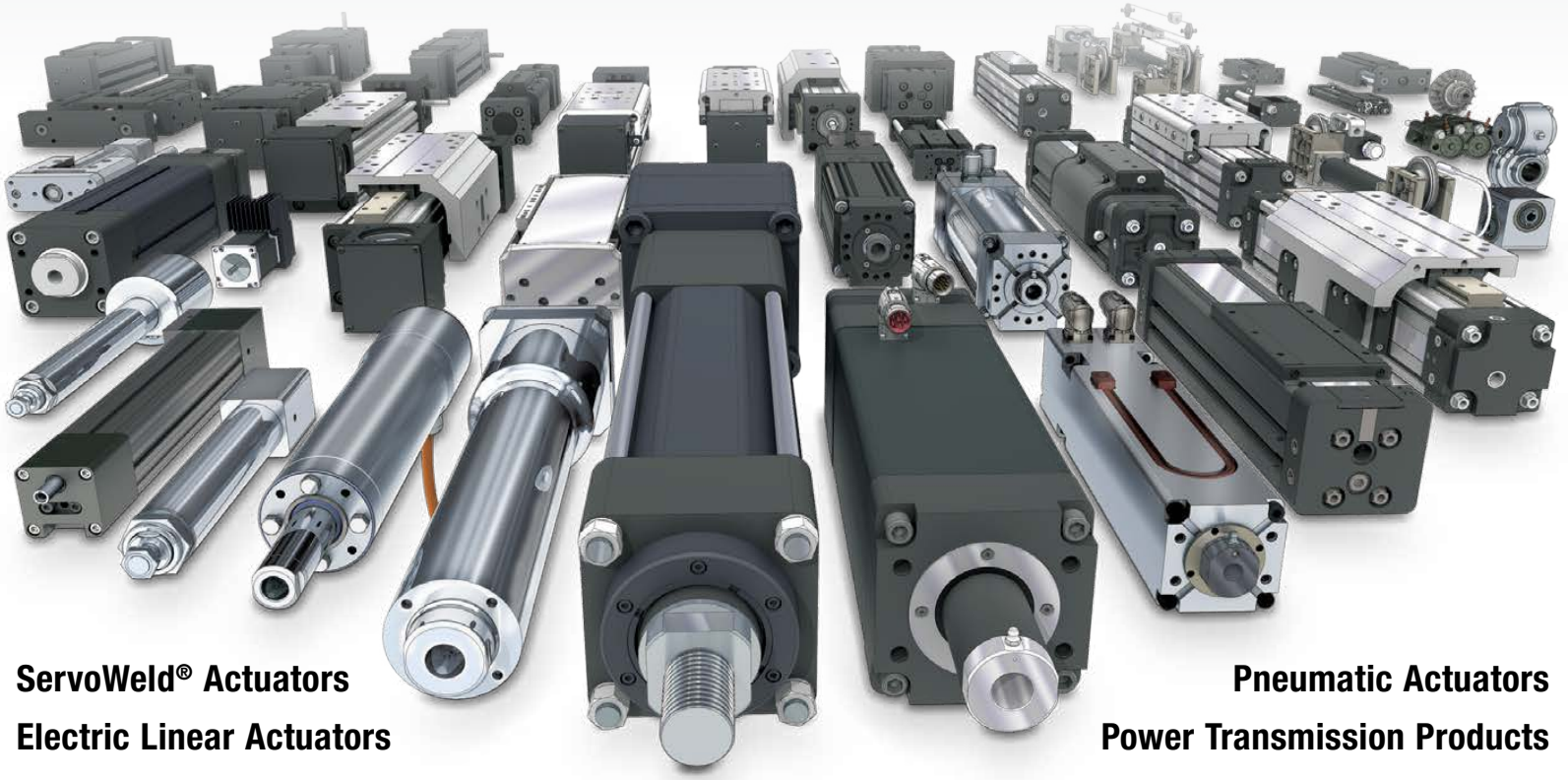
Match your motor with compatible mounting plates that ship with any Tolomatic electric actuator.

LIBRARY

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

TECHNICAL SUPPORT

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



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sales@tolomatic.com
www.tolomatic.com

MEXICO
Centro de Servicio
Parque Tecnológico Innovación
Int. 23, Lateral Estatal 431,
Santiago de Querétaro,
El Marqués, México, C.P. 76246
Phone: +1 (763) 478-8000
help@tolomatic.com

EUROPE
Tolomatic Europe GmbH
Elisabethenstr. 20
65428 Rüsselsheim
Germany
Phone: +49 6142 17604-0
help@tolomatic.eu

CHINA
Tolomatic Automation Products (Suzhou) Co. Ltd.
No. 60 Chuangye Street, Building 2
Huqiu District, SND Suzhou
Jiangsu 215011 - P.R. China
Phone: +86 (512) 6750-8506
TolomaticChina@tolomatic.com

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