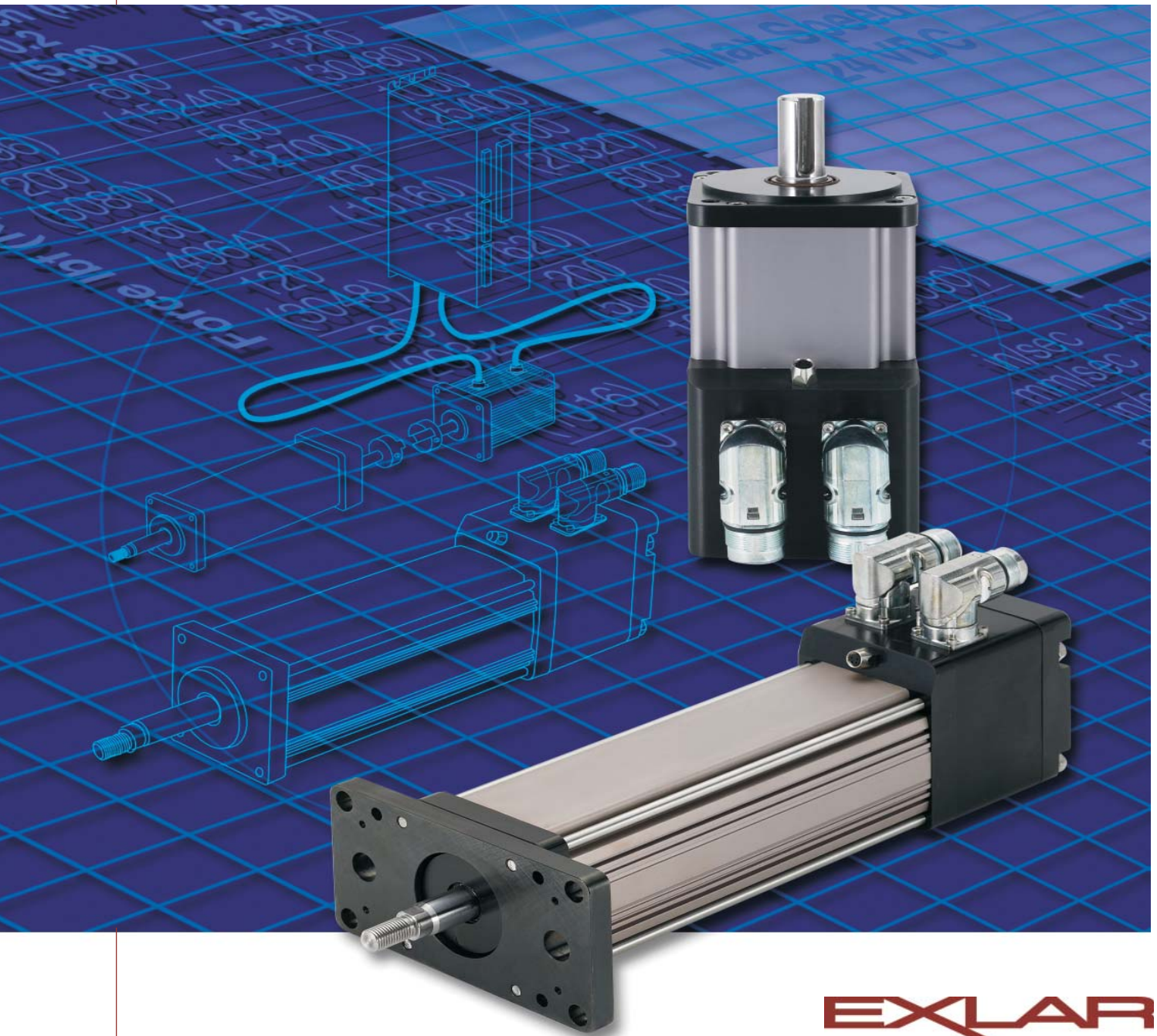


TRITEX

Linear and Rotary Electric Actuation . . .

- ▶ Without the oil and air of fluid power
- ▶ Without the amplifier, cables and panel space of a servo system



EXLAR

Three Technologies—One Actuator

Exlar's Tritex™ Series actuators combine three technologies to deliver for the first time a truly simple and low-cost electric alternative for fluid power actuators and costly servo systems.

Tritex actuators represent an all-electric actuator solution for moving and/or positioning mechanical devices in a large variety of commercial, industrial or military grade applications. Tritex actuators eliminate the

need for pneumatic and hydraulic cylinders while improving position performance, reducing cycle times and eliminating the maintenance associated with fluid power devices.

Ball screw mechanisms, or separately mounted gear reducers are also a thing of the past. Rotary-to-linear converters or mechanical reducers necessary to move the load are embedded into the Tritex design.

Less is More

The Tritex Series of electric actuators combine a brushless motor, servo amplifier and position controller in a single

industrial grade enclosure. This eliminates both the external servo amplifier and the expensive and failure prone cables associated with a typical servo system. Servo system component selection, design and installation are completely eliminated. Trouble shooting and debugging of individual components; gear reducers, rotary-to-linear converter mechanisms and the complex wiring layout typical of such a system are gone. Moreover, the panel space for a separately mounted amplifier and installation of that amplifier are no longer necessary.

Rotary Applications

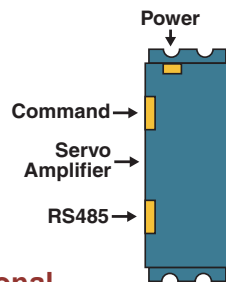
Tritex rotary motors and gear-motors provide high response and precise control of a rotatable shaft similar to that found in any electric motor. The difference is that with Tritex you can program (via your PC) the rotational speed and position of the output shaft in response to external commands. For example, the motor can be commanded to rotate at a controlled velocity and precisely stop at a pre-programmed position upon receiving a command to do so. You



can also program the unit to run at a preset velocity until a switch input is received or a pre-programmed torque level is produced against a load. Alternatively, the rotary

Tritex can be set up to follow an analog signal, either voltage or current, representing your choice of torque, velocity, or position.

Signals for initiating the preprogrammed velocity and position commands come from optically isolated inputs or directly via the Modbus serial communication channel provided on each Tritex unit. Likewise, isolated output commands of the status and events allow precise coordination with your system controls or machine operator.

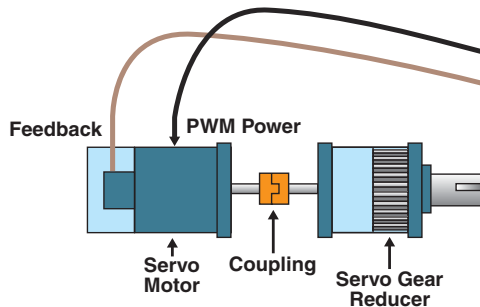
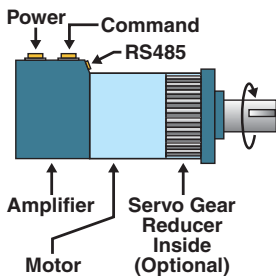


Conventional Rotary Servo System

Optional Internal Gear Reducer

If the application requires greater torque and less speed than available with the base unit, the Tritex is available with an integral servo grade planetary gear reducer. Gear ratios of 4:1 to 100:1 allow the power of Tritex to be applied over a broad range of torque requirements.

Tritex Actuator



Linear Applications

Tritex linear actuators employ Exlar's patented, inverted roller screw mechanism for converting the rotational motion generated within the Tritex actuator to the highly robust and long-life linear motion required to solve applications that previously required pneumatic or hydraulic cylinders. No additional mechanisms (such as acme or ball screws) are necessary to convert the actuator's rotary power



to the linear motion required to move the load.

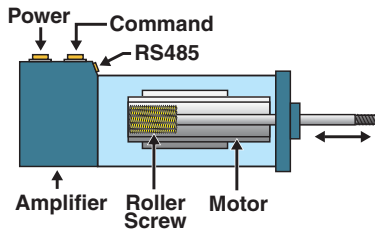
The Tritex linear actuator contains the same control capability of the Tritex rotary actuator. (See

previous page.)

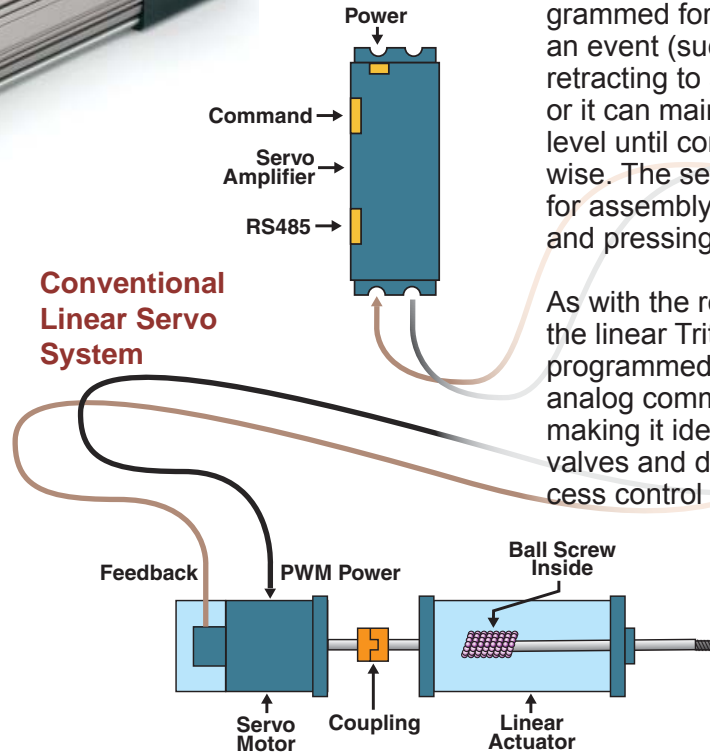
In addition, the Tritex software allows you to create a sequence which causes the actuator, when commanded, to move forward while pressing an object into position. You can establish a pre-programmed force which triggers an event (such as stopping or retracting to another position) or it can maintain that force level until commanded otherwise. The sequence is ideal for assembly, test, fastening and pressing applications.

As with the rotary Tritex, the linear Tritex can be programmed to follow an analog command signal, making it ideal for controlling valves and dampers in process control applications.

Tritex Actuator



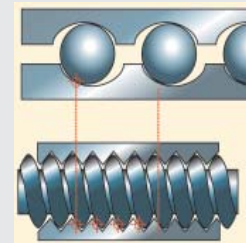
Conventional Linear Servo System



Roller Screw Basics

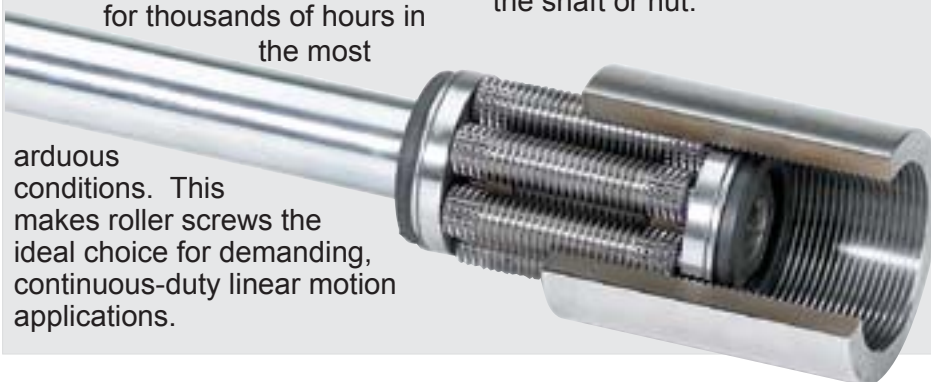
Exlar's patented, inverted roller screw is a mechanism for converting rotary torque into linear motion, in a similar manner to acme screws or ball screws. But, unlike those devices, roller screws can carry heavy loads for thousands of hours in the most

The difference is in the roller screw's design for transmitting forces. Multiple threaded helical rollers are assembled in a planetary arrangement around a threaded shaft as seen below, which converts a motor's rotary motion into linear movement of the shaft or nut.



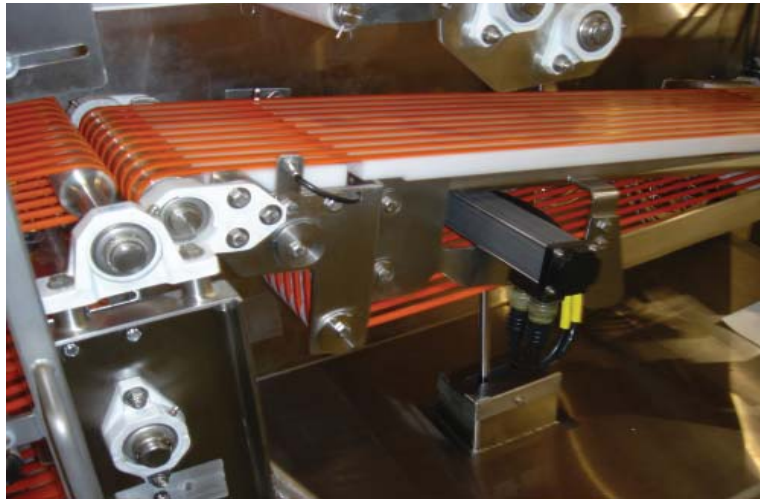
Compare a similar size ball screw to Exlar's planetary roller screw design and see many more contact points on the roller screw. This results in up to 15 times the load-carrying capacity of ball screws and improved stiffness.

arduous conditions. This makes roller screws the ideal choice for demanding, continuous-duty linear motion applications.



The Exlar Advantage

Exlar has delivered thousands of roller screw based linear actuator solutions around the world in applications ranging from weld guns to controlling fuel or steam valves on turbine generators. Exlar's linear actuators provide trouble-free, precise linear motion control for millions of cycles of operation.



Food Processing

Typical Applications

- Process Control
- Defense
- Aerospace
- Test
- Simulation
- Food Processing
- Industrial Automation
- Forestry



Cut-to-Length in Sawmills

Tritex Product Features

- 24 to 48 VDC Power
- Integrated brushless motor, amplifier & controller
- Multiple termination and connector options

Rotary Tritex

- 60 and 90 mm frame sizes
- Up to 42 lbf-in (4.7 Nm) continuous and 84 lbf-in (9.4 Nm) peak torque
- IP65 sealing
- Integrated planetary gearing option 4:1 to 100:1 ratios
- Up to 5000 rpm base motor speed



Simulation

- Semi-conductor
- Remote Vehicles
- Medical Equipment
- Automotive Assembly
- Molding
- Die Casting
- Welding



Process Control in Power Plants



Linear Tritex

- 2 and 3 inch (51 and 76 mm) frame sizes
- 3 to 18 inch (75 to 455 mm) strokes available
- 0.1, 0.2, 0.4 and 0.5 inch lead (2.54, 5.08, 10.16 and 12.7 mm) planetary roller screws
- Up to 1250 lbf (5560 N) max continuous thrust capacity, 2270 lbf (10,000N) peak
- Up to 33 inches (838 mm) per second max linear velocity
- IP54 sealing standard, IP65 optional
- Multiple mounting options

Tritex Series Operation

The Tritex Series actuators can operate in one of five different motion producing modes. These modes solve an endless variety of applications in industrial automation, medical equipment, fastening and joining, blow molding, injection molding, testing, food processing, and more.

Programmed functions are stored in the Tritex non-volatile memory. An RS/485 series interface allows control, programming and monitoring of all aspects of the motor or actuator as it performs your application.

Operating Modes

1) Move To A Position (Or Switch)

The Tritex Series actuators allow you to execute your programmed positions or distances. You may also use a limit switch or other input device as the end condition of a move. This combination of index flexibility provides a simple solution for point-to-point indexing.



2) Move To A Preset Force Or Torque

The Tritex Series allows you to terminate your move upon the achievement of a programmed torque or force. This is an ideal mode for pressing and clamping applications.

3) Position Proportional To An Analog Signal

Ideal for process control solutions, the Tritex Series provides the functionality to position valve's dampers by following an analog input signal. This allows the Tritex Series to be a drop-in replacement for inconvenient and inefficient hydraulic and pneumatic solutions already positioning to analog signals.

4) Velocity Proportional to An Analog Signal

Tritex actuators offer you the capability to control velocity with an analog signal. This is particularly useful with Tritex rotary actuators offering precise control of the speed of any process or operation.

5) Force/Torque Proportional to Analog Signal

Perfect for pressing and torquing applications, you can control torque from an analog input.

Communications & I/O

Digital I/O: 8 input, 4 output, 10-24 VDC, optically isolated

Selectable Input Functions

Enable • Initiate Move (1-4) • Dedicated Position • Jog+ • Jog- • Jog Fast • Home • Extend Switch • Retract Switch • Home Switch • Teach Enable • Teach Move (1-4) • Stop • Hold

• Alternate Mode; allows allows you to switch between 2 operating modes.

Selectable Output Functions

Enabled • Homed • Ready (Enabled and Homed) • Fault • Warning • Fault or Warning Active • Move (1-4) in Progress • Homing • Jogging • Jogging+ • Jogging- • Motion • In Position • At Home Position • At Move (1-4) • Position • Stopped • Holding • In Current Limit • In Current Fold back • Above Rated Current • Maintain a Preset Force • Home

Analog Input: 0 to +10 VDC or 4-20mA, 12 bit resolution

• Force/torque • velocity • position

Analog Output: 4-20mA, 11 bit resolution

• Force/torque • velocity • position

Serial Interface: RS485, Modbus RTU

• Programming • controlling • monitoring

Custom Products

While Exlar delivers Tritex actuators off the shelf, Exlar prides itself in its ability to modify the products thereby fulfilling your exact needs and assuring the success of your application.

Exlar also welcomes the opportunity to work with you to develop custom software pages tailored to your application needs. Customer logos, specialty control pages and pre-configured setups are just some of the software tools that we can provide to make Tritex products a perfect fit for your application.

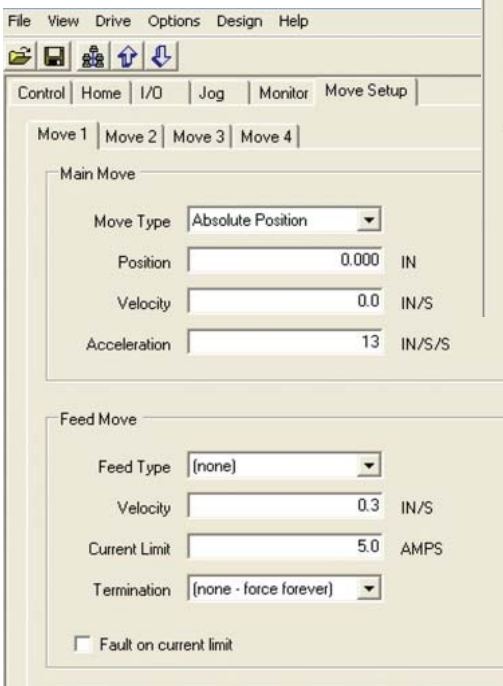
Contact Exlar at (952) 368-3434 or info@exlar.com to discuss the details.

Expert User Interface

Expert, the Tritex user interface software, provides you with a simple way to select all aspects of configuration and control required to set up and operate a Tritex actuator. Easy-to-use tabbed pages provide access to input all of the parameters necessary to successfully configure your motion application. 'Application' files give you a convenient way to store and redistribute configurations amongst multiple computers, and 'Drive' files allow the same configuration to be distributed to multiple Tritex actuators. Motion setup, homing, teach mode, tuning parameters, jogging, I/O configuration, and local control are all accomplished with ease using Expert software.

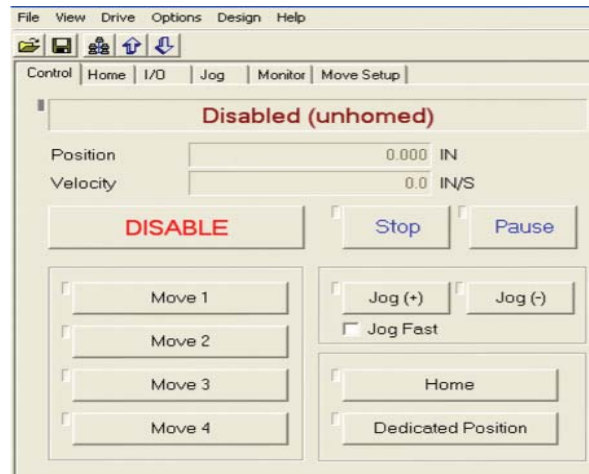
Motion Setup

Within the Expert software, Exlar provides several system configurations for various applications.



These can serve as your configuration, or as a starting point for your configuration. Alternatively, you can begin from scratch selecting configuration details specific to your application.

Easy selection of move conditions, distance, speed and acceleration are shown in the setup screen shown lower left.



You can configure move to position, move to switch, or move to force motion at the click of a button. The Tritex products offer absolute and incremental motion, as well as feed moves ending on a condition like a specific force being reached, or an input being triggered by a proximity switch.

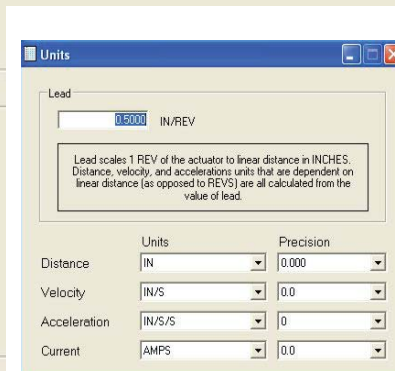
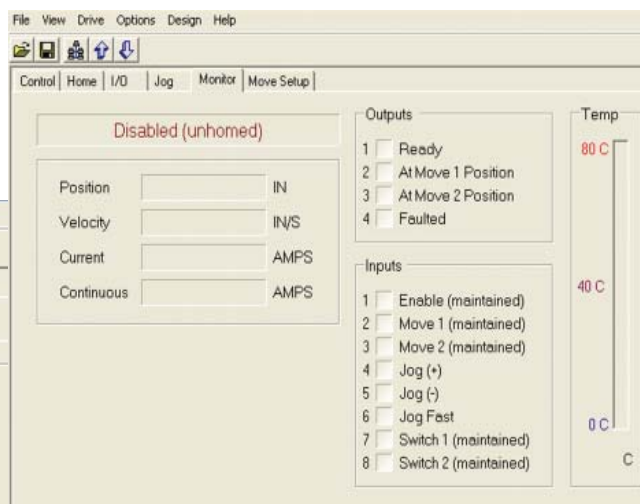
The Expert software gives you the flexibility to format your units as you wish for your your application as shown left below.

Control Page

The Expert control page gives you the ability to operate or initiate all motion functions from one single, simple screen. This screen provides you very easy system

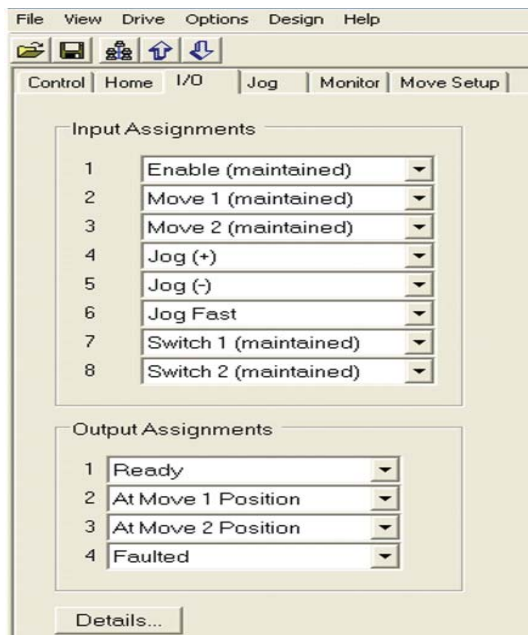
start up and testing without all the inconvenience of machine wiring.

This page offers the capability to enable and disable the drive and perform fast and slow jogs. This gives you the ability to verify motion before needing any I/O wiring.



Monitor Page

All input functions can be monitored and activated from the Expert Monitor Page, and all output functions can be monitored. These functions can be monitored and controlled, even if they are not programmed as the function of any particular hardware input or output. Information on critical fault and status data is available as a separate page, or as a fixed window on the bottom of each page of the software.



Configuring I/O

Configuring I/O points to one of over 40 available input or output functions couldn't be easier. A pull-down menu adjacent to each I/O point allows all I/O to be set up in minutes.

Inputs can be configured to be maintained, or momentary, depending on the application requirements.

Input and output logic can also be inverted with a simple click.

Homing

The Tritex homing setup is simple to use. It allows you to home to an input, by using a proximity or limit switch, or allows homing to a specific force or torque.

This type of homing is ideal for setting up applications that require motion referenced to a hard stop, like the closed position of a valve, or the final position of a press.

Teach Mode

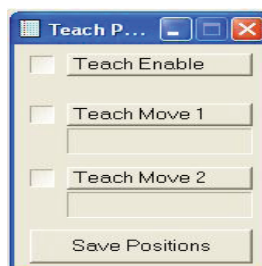
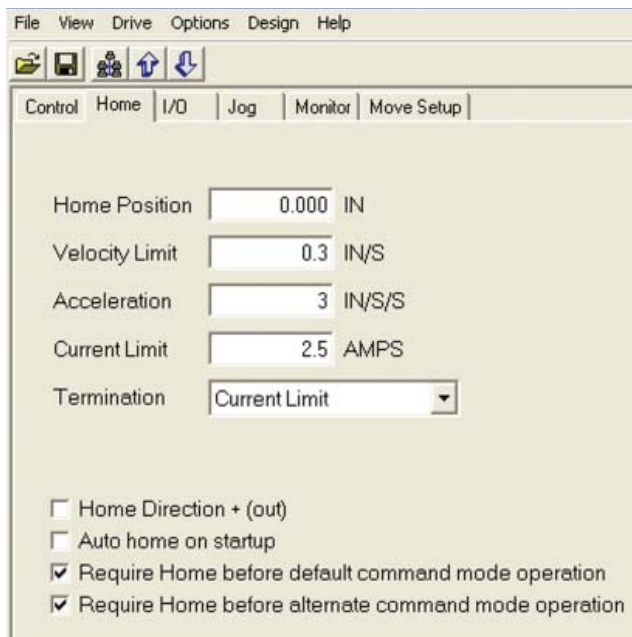
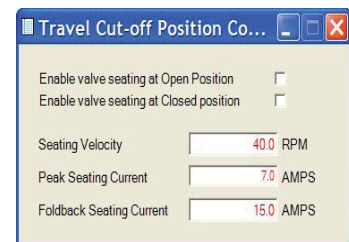
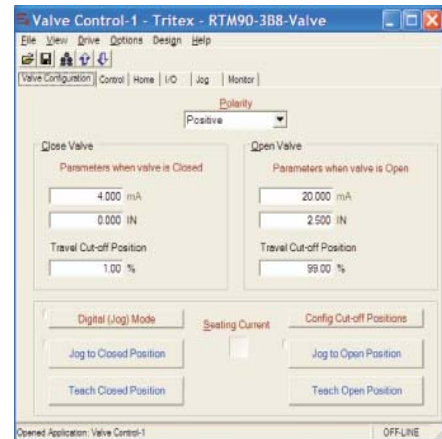
To provide the easiest motion set up possible, Tritex products offer 'Teach mode.' In this mode, you can jog the actuator to the desired

position, and activate an input, or click a button in the Expert software and the current position of the actuator becomes the defined distance or absolute position associated with a particular move command.

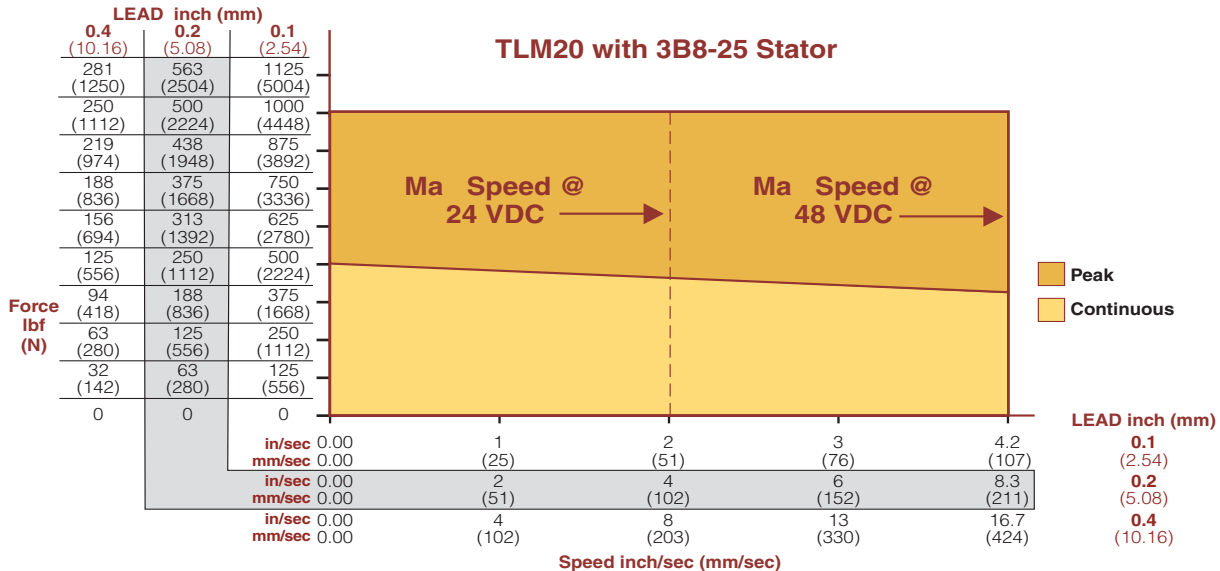
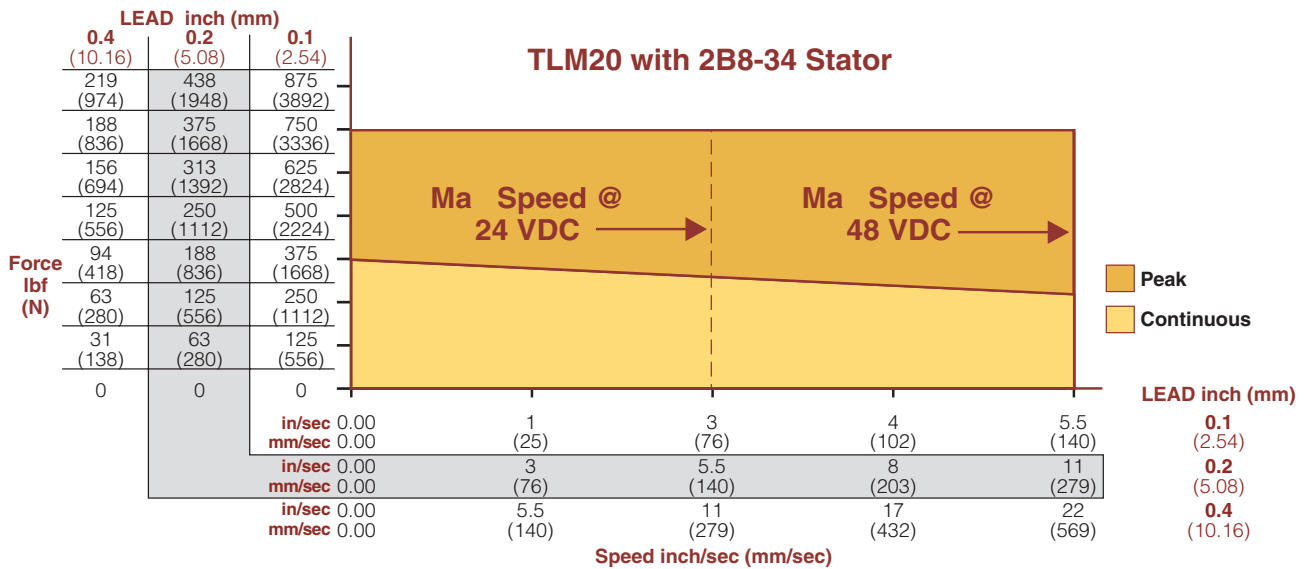
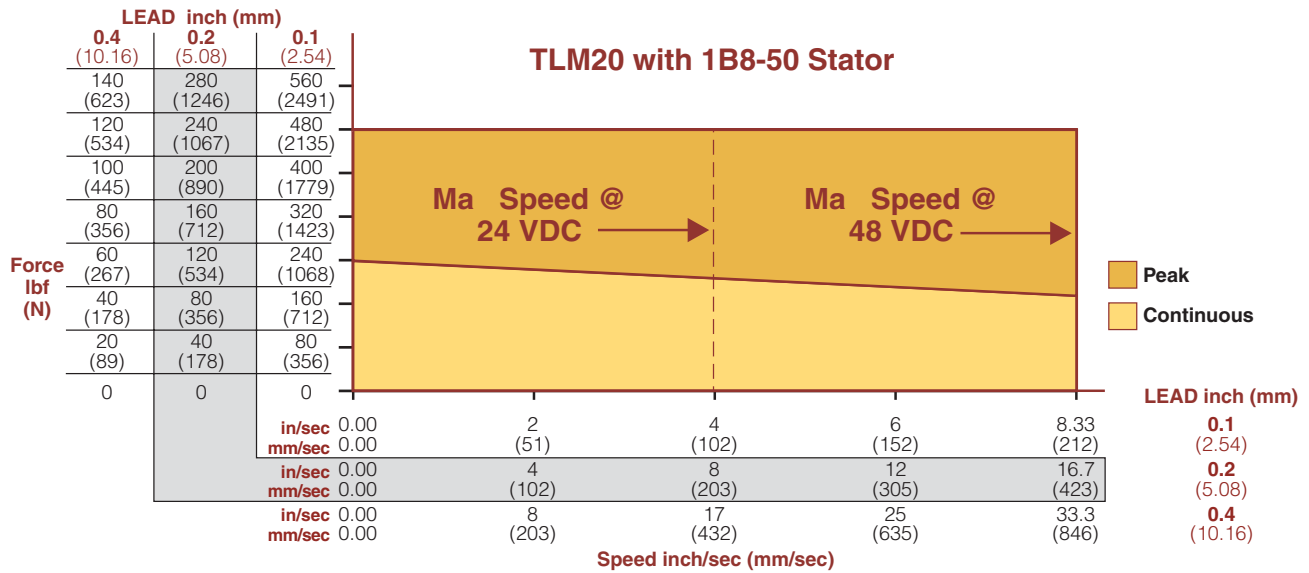
Valve Software

Tritex actuators provide a perfect solution for your valve actuation needs. Small hysteresis and dead band, quick response to small signal changes and stable dynamic responses are all key parameters that the Tritex delivers. Our valve software is simple to use, featuring a teach mode for foolproof configuration. Included is a settable valve cut off position feature that enables a firm valve seat on both new valves, or retrofitted valves.

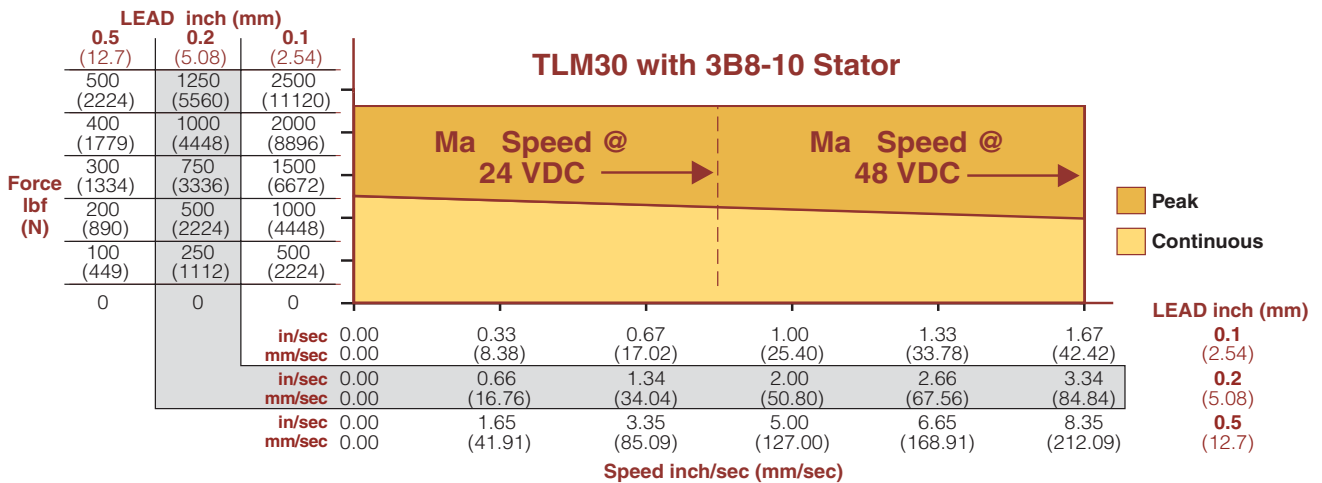
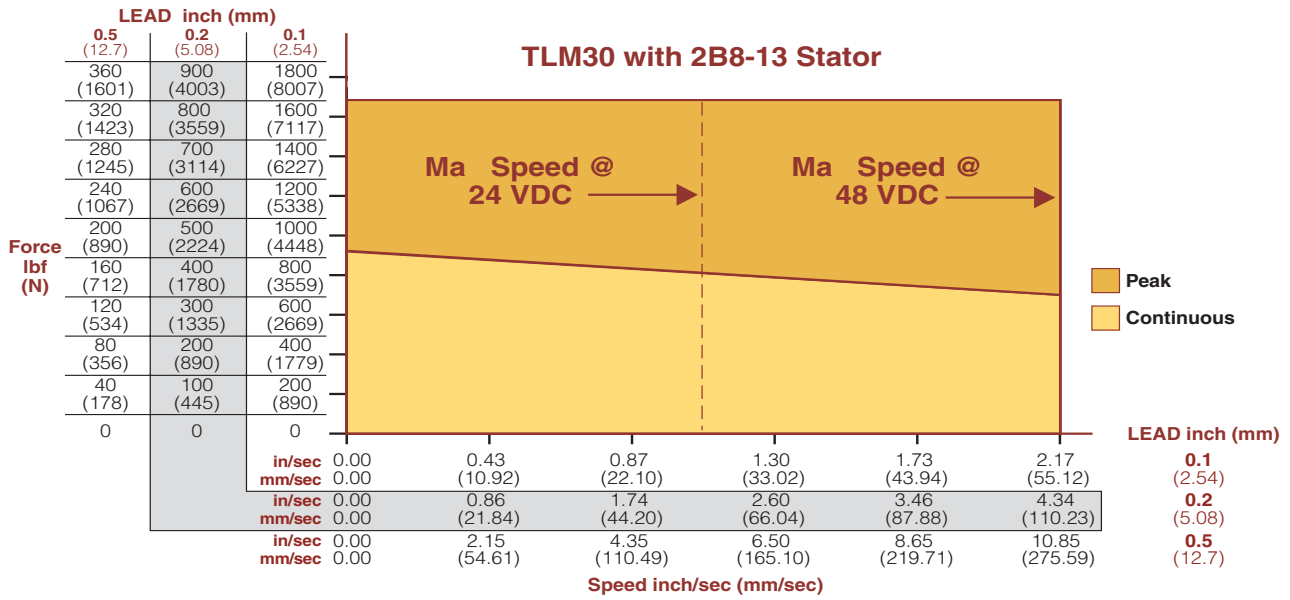
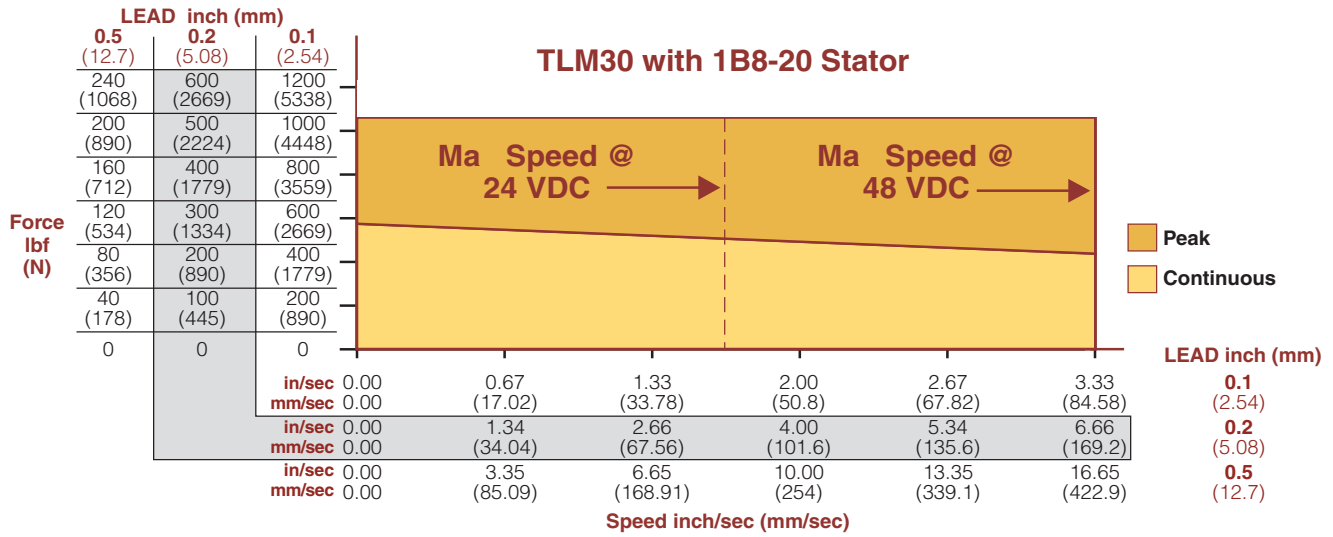
Available in both rotary and linear versions, Tritex actuators can be mounted on any valve from any manufacturer.



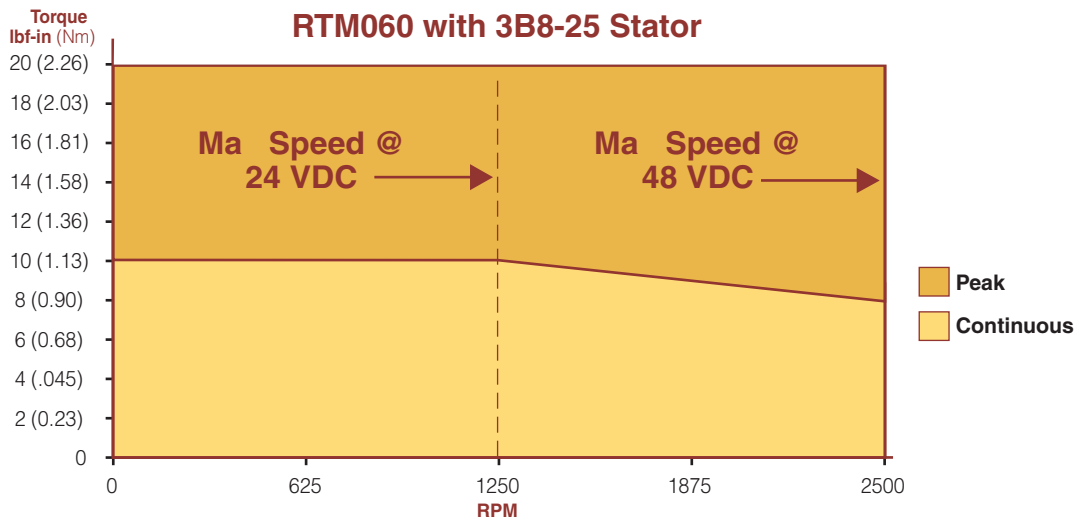
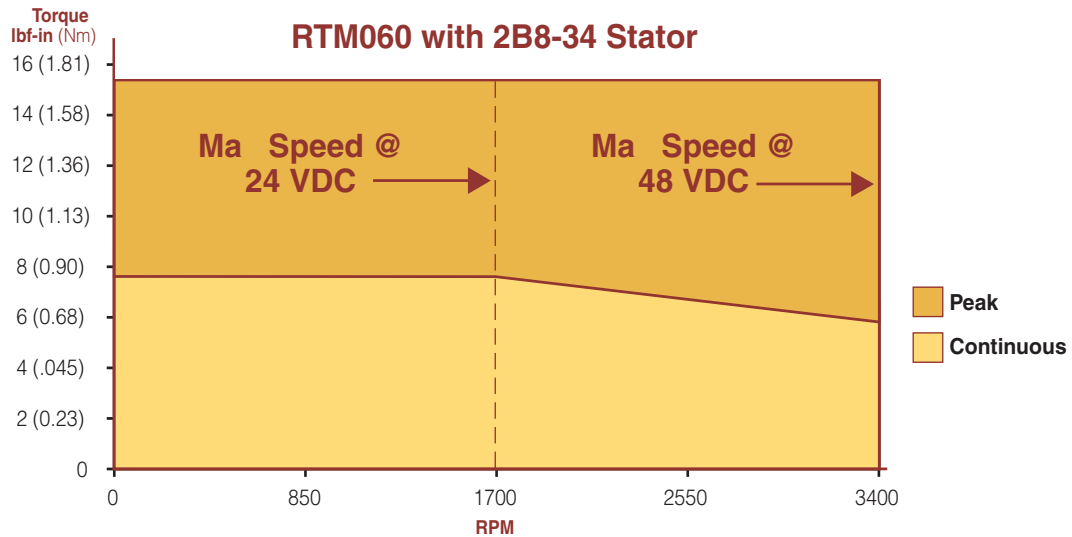
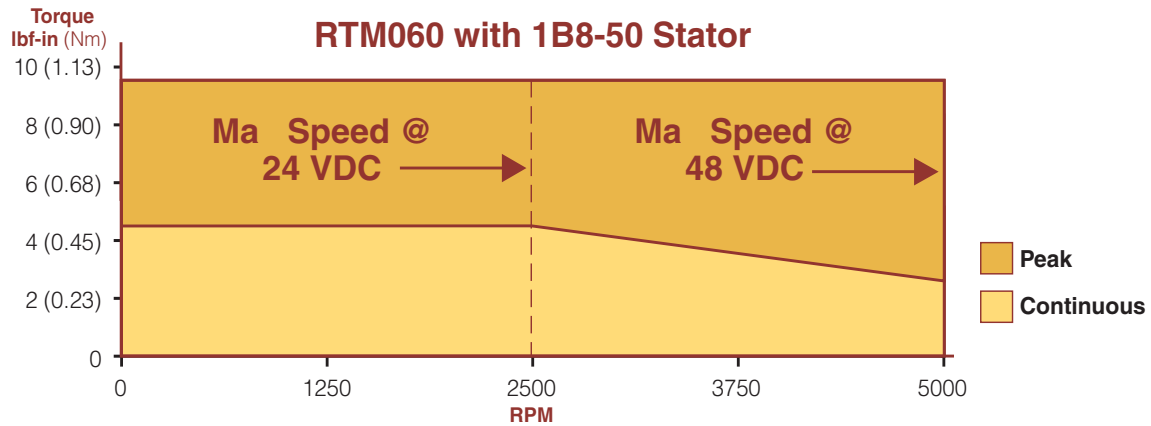
TLM20 Speed vs. Force Curves



TLM30 Speed vs. Force Curves

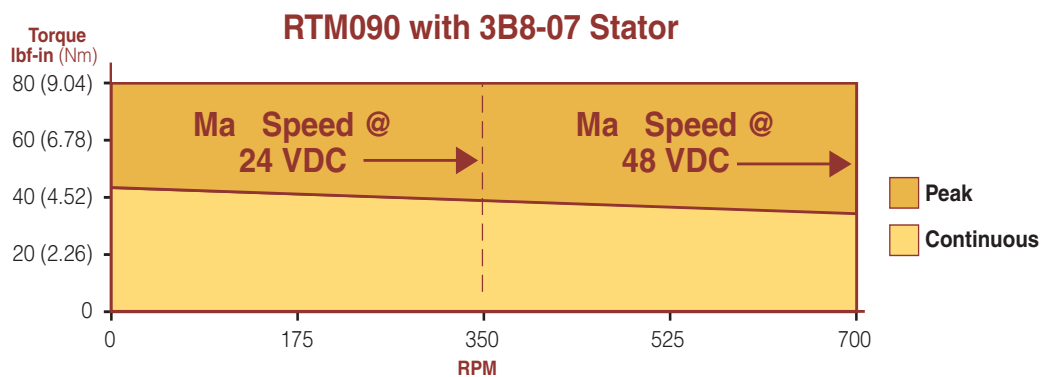
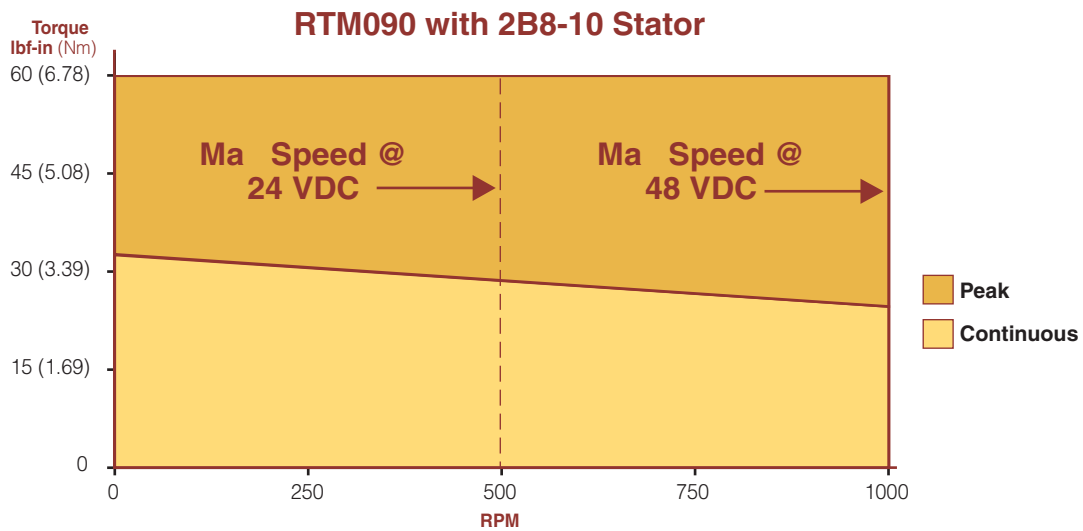
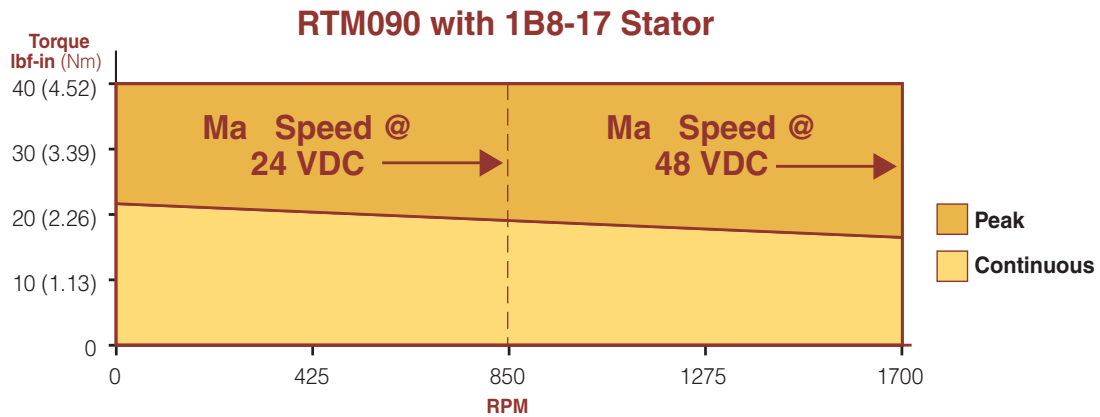


RTM060 Speed vs. Torque Curves



*For RTG gearmotors, multiply torque by your ratio and efficiency. Divide speed by gear ratio.

RTM090 Speed vs. Torque Curves



*For RTG gearmotors, multiply torque by your ratio and efficiency. Divide speed by gear ratio.

TLM20 and TLM30 Performance Specifications

TLM20 LINEAR ACTUATOR PERFORMANCE SPECIFICATIONS					
Backlash		in (mm)	.008 (.20)		
Lead Accuracy		in/ft (mm/300 mm)	.001 (.025)		
Maximum Radial Load		lb (N)	15 (67)		
Environmental Rating: Std			IP54		
		Stator	1 Stack 1B8-50	2 Stack 2B8-34	3 Stack 3B8-25
Lead		RPM at 48 VDC*	5000	3400	2500
0.1	Stall Force	lbf (N)	239 (1063)	377 (1677)	503 (2237)
	Max Speed	in/sec (mm/sec)	8.33 (212)	5.66 (144)	4.17 (106)
0.2	Stall Force	lbf (N)	119 (529)	188 (836)	251 (1117)
	Max Speed	in/sec (mm/sec)	16.66 (424)	11.33 (288)	8.33 (212)
0.4	Stall Force	lbf (N)	60 (267)	94 (418)	126 (560)
	Max Speed	in/sec (m/sec)	33.33 (848)	22.66 (575)	16.66 (424)
Power Supply Current Draw at Rated Power (48 V)		Amps	10	10	10
Resolution		0.001 revolution x lead			
Accuracy (not including backlash)		+/- 0.01 revolution x lead			
Stroke Length in (mm)		3 (75)	6 (150)	10 (254)	12 (300)
Approximate Weight lbm (kg)		7 (3.2)	8.5 (3.9)	10 (4.5)	11.5 (5.2)

TLM30 LINEAR ACTUATOR PERFORMANCE SPECIFICATIONS						
Backlash		in (mm)	.008 (.20)			
Lead Accuracy		in/ft (mm/300 mm)	.001 (.025)			
Maximum Radial Load		lb (N)	20 (90)			
Environmental Rating: Std			IP54			
		Stator	1 Stack 1B8-20	2 Stack 2B8-13	3 Stack 3B8-10	
Lead		RPM at 48 VDC*	2000	1300	1000	
0.1	Stall Force	lbf (N)	585 (2606)	935 (4159)	1250 (5560)	
	Max Speed	in/sec (mm/sec)	3.33 (84.6)	2.17 (55.1)	1.67 (42.4)	
0.2	Stall Force	lbf (N)	293 (1303)	468 (2082)	625 (2780)	
	Max Speed	in/sec (mm/sec)	6.67 (169.4)	4.33 (109.9)	3.33 (84.6)	
0.5	Stall Force	lbf (N)	117 (520)	187 (832)	250 (1112)	
	Max Speed	in/sec (m/sec)	16.67 (423.4)	10.83 (275.1)	8.33 (211.6)	
Power Supply Current Draw at Rated Power (48 V)		Amps	10	10	10	
Resolution		0.001 revolution x lead				
Accuracy (not including backlash)		+/- 0.01 revolution x lead				
Stroke Length in (mm)		3 (75)	6 (150)	10 (254)	12 (300)	18 (450)
Approximate Weight lbm (kg)		10 (4.5)	12 (5.4)	19.5 (8.8)	21 (9.5)	25.5 (11.6)

*RPM @ 24 VDC = 1/2 of listed value

RTM060 Performance Specifications

RTM060 ROTARY MOTOR TORQUE AND SPEED RATINGS

For output torque of RTG gearmotors, multiply by ratio and efficiency. Please note maximum allowable output torques in the table top of page 14.

	Stator	1 Stack 1B8-50	2 Stack 2B8-34	3 Stack 3B8-25
	RPM at 48 VDC*	5000	3400	2500
Cont. Torque	lbf-in (Nm)	4.7 (.53)	7.5 (.85)	10 (1.13)
Peak Torque	lbf-in (Nm)	9.4 (1.06)	15 (1.69)	20 (2.26)
Power Supply Current Draw at Rated Power (48 V)	Amps	10	10	10
Resolution	0.001 revolution / ratio			
Accuracy (not including backlash)	+/- 0.01 revolution / ratio			

RTM/RTG060 INERTIA

	Stator	1 Stack	2 Stack	3 Stack
RTM Motor Armature Inertia (+/-5%)	lb-in-sec ² (kg-cm ²)	0.000237 (0.268)	0.000413 (0.466)	0.000589 (0.665)
RTG Gearmotor Armature Inertia*	lb-in-sec ² (kg-cm ²)	0.000226 (0.255)	0.000401 (0.453)	0.000576 (0.651)

*Add armature inertia to gearing inertia for total RTM system inertia.

RTM060 RADIAL LOAD AND BEARING LIFE

RPM	50	100	250	500	1000
lbf (N)	195 (867)	155 (690)	114 (507)	90 (400)	72 (320)

Side load ratings shown above are for 10,000 hour bearing life at 25 mm from motor face at given rpm.

RTM60 MOTOR AND RTG090 GEARMOTOR WEIGHTS

		RTM060 Without Gears	RTG060 with 1 Stage Gearing	RTG060 with 2 Stage Gearing
1 Stack Stator	lb (kg)	3.0 (1.4)	7.5 (3.4)	9.3 (4.2)
2 Stack Stator	lb (kg)	4.1 (1.9)	8.6 (3.9)	10.4 (4.7)
3 Stack Stator	lb (kg)	5.2 (2.4)	9.7 (4.4)	11.5 (5.2)

*RPM @ 24 VDC = 1/2 of listed value

RTG060 Performance Specifications

RTG060 GEARMOTOR MECHANICAL RATINGS									
		Output Torque at Motor Speed for 10,000 Hour Life							
		Maximum Allowable Output Torque - Set by User		1000 RPM		3000 RPM		5000 RPM	
Model	Ratio	lbf-in	Nm	lbf-in	Nm	lbf-in	Nm	lbf-in	Nm
RTG060-004	4:1	603	(68.1)	144	(16.2)	104	(11.7)	88	(9.9)
RTG060-005	5:1	522	(58.9)	170	(19.2)	125	(14.1)	105	(11.9)
RTG060-010	10:1	327	(36.9)	200	(22.6)	140	(15.8)	120	(13.6)
RTG060-016	16:1	603	(68.1)	224	(25.3)	160	(18.1)	136	(15.4)
RTG060-020	20:1	603	(68.1)	240	(27.1)	170	(19.2)	146	(16.5)
RTG060-025	25:1	522	(58.9)	275	(31.1)	200	(22.6)	180	(20.3)
RTG060-040	40:1	603	(68.1)	288	(32.5)	208	(23.5)	180	(20.3)
RTG060-050	50:1	522	(58.9)	340	(38.4)	245	(27.7)	210	(23.7)
RTG060-100	100:1	327	(36.9)	320	(36.1)	280	(31.6)	240	(27.1)

Two torque ratings for the RTG gearmotors are given in the table above. The left hand columns give the maximum (peak) allowable output torque for the indicated ratios of each size RTG gearmotor. This **is not** the rated output torque of the motor multiplied by the ratio of the reducer.

It is possible to select a configuration of the motor selection and gear ratio such that the rated motor torque, multiplied by the gear ratio exceeds these ratings. It is the responsibility of the user to ensure that the settings of the system do not allow these values to be exceeded.

The right hand columns give the output torque at the indicated speed which will result in 10,000 hour life (L10). The setup of the system will determine the actual output torque and speed.

RTG060 GEARING REFLECTED INERTIA					
Single Reduction			Double Reduction		
Gear Stages	lbf-in-sec ²	(kg-cm ²)	Gear Stages	lbf-in-sec ²	(kg-cm ²)
4:1	0.0000132	(0.0149)	16:1	0.0000121	(0.0137)
5:1	0.0000087	(0.00984)	20:1, 25:1	0.0000080	(0.00906)
10:1	0.0000023	(0.00261)	40:1, 50:1, 100:1	0.0000021	(0.00242)

RTG060 BACKLASH AND EFFICIENCY		
	Single Reduction	Double Reduction
Backlash at 1% Rated Torque	10 Arc min	13 Arc min
Efficiency	91%	86%

RTM090 Performance Specifications

RTM090 ROTARY MOTOR TORQUE AND SPEED RATINGS

For output torque of RTG gearmotors, multiply by ratio and efficiency. Please note maximum allowable output torques in the table top of page 16.

	Stator	1 Stack 1B8-17	2 Stack 2B8-10	3 Stack 3B8-07
	RPM at 48 VDC*	1700	1000	700
Cont. Torque	lbf-in (Nm)	17.9 (2)	30.3 (3.4)	41.7 (4.7)
Peak Torque	lbf-in (Nm)	35.8 (4)	60.6 (6.8)	83.4 (9.4)
Power Supply Current Draw at Rated Power (48 V)	Amps	12	10	10
Resolution	0.001 revolution / ratio			
Accuracy (not including backlash)	+/- 0.01 revolution / ratio			

RTM/RTG090 INERTIA

	Stator	1 Stack	2 Stack	3 Stack
RTM Motor Armature Inertia (+/-5%)	lb-in-sec ² (kg-cm ²)	0.00054 (0.609)	0.00097 (1.09)	0.00140 (1.58)
RTG Gearmotor Armature Inertia*	lb-in-sec ² (kg-cm ²)	0.00114 (1.29)	0.00157 (1.77)	0.00200 (2.26)

*Add armature inertia to gearing inertia for total RTM system inertia.

RTM090 RADIAL LOAD AND BEARING LIFE

RPM	50	100	250	500	1000
lbf (N)	389 (1730)	309 (1375)	227 (1010)	180 (801)	143 (636)

Side load ratings shown above are for 10,000 hour bearing life at 25mm from motor face at given rpm.

RTM90 MOTOR AND RTG090 GEARMOTOR WEIGHTS

		RTM090 Without Gears	RTG090 with 1 Stage Gearing	RTG090 with 2 Stage Gearing
1 Stack Stator	lb (kg)	5.4 (2.5)	12.8 (5.8)	14.8 (6.7)
2 Stack Stator	lb (kg)	7.8 (3.5)	15.2 (6.9)	17.2 (7.8)
3 Stack Stator	lb (kg)	10.2 (4.6)	17.6 (7.9)	19.6 (8.9)

*RPM @ 24 VDC = 1/2 of listed value

RTG090 Performance Specifications

RTG090 GEARMOTOR MECHANICAL RATINGS									
		Output Torque at Motor Speed for 10,000 Hour Life							
		Maximum Allowable Output Torque - Set by User		1000 RPM		1500 RPM		2000 RPM	
Model	Ratio	lbf-in	Nm	lbf-in	Nm	lbf-in	Nm	lbf-in	Nm
RTG090-004	4:1	2078	234.8	600	(67.8)	552	(62.4)	504	(56.9)
RTG090-005	5:1	1798	203.1	775	(87.6)	714	(80.7)	652	(73.7)
RTG090-010	10:1	1126	127.2	890	(100.6)	820	(92.7)	750	(84.7)
RTG090-016	16:1	2078	234.8	912	(103.4)	830	(94.7)	763	(86.2)
RTG090-020	20:1	2078	234.8	980	(110.7)	900	(101.7)	820	(92.6)
RTG090-025	25:1	1798	203.1	1250	(141.2)	1150	(130)	1050	(118.6)
RTG090-040	40:1	2078	234.8	1200	(135.6)	1107	(125)	1013	(114.4)
RTG090-050	50:1	1798	203.1	1550	(169.4)	1434	(162)	1317	(148.8)
RTG090-100	100:1	1126	127.2	1100	(124.3)	1100	(124.3)	1100	(124.3)

Two torque ratings for the RTG gearmotors are given in the table above. The left hand columns give the maximum (peak) allowable output torque for the indicated ratios of each size RTG gearmotor. This is **not** the rated output torque of the motor multiplied by the ratio of the reducer.

It is possible to select a configuration of the motor selection and gear ratio such that the rated motor torque, multiplied by the gear ratio exceeds these ratings. It is the responsibility of the user to ensure that the settings of the system do not allow these values to be exceeded.

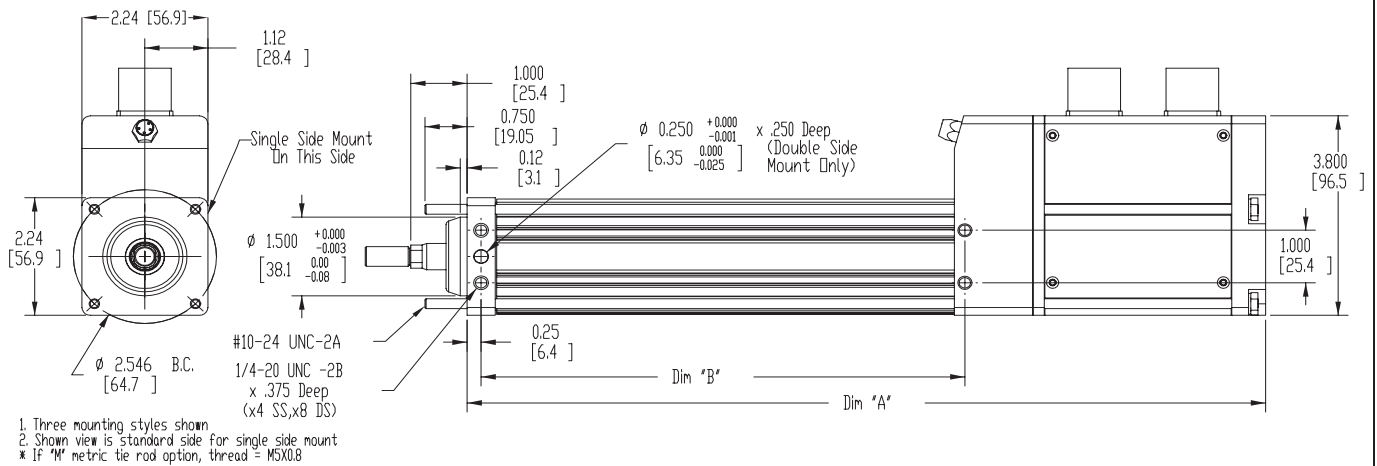
The right hand columns give the output torque at the indicated speed which will result in 10,000 hour life (L10). The setup of the system will determine the actual output torque and speed.

RTG090 GEARING REFLECTED INERTIA					
Single Reduction			Double Reduction		
Gear Stages	lbf-in-sec ²	(kg-cm ²)	Gear Stages	lbf-in-sec ²	(kg-cm ²)
4:1	0.000154	(0.174)	16:1	0.000115	(0.130)
5:1	0.000100	(0.113)	20:1, 25:1	0.0000756	(0.0854)
10:1	0.0000265	(0.0300)	40:1, 50:1, 100:1	0.0000203	(0.0230)

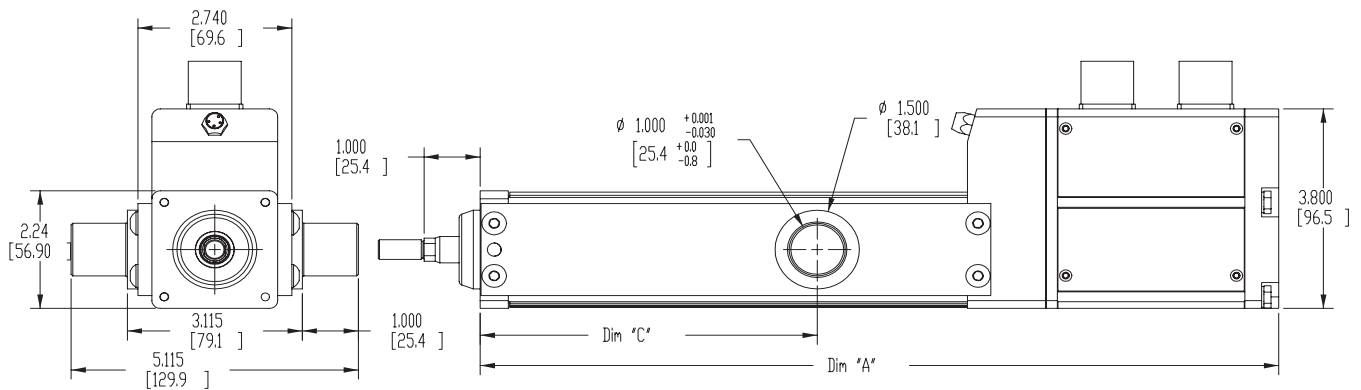
RTG090 BACKLASH AND EFFICIENCY		
	Single Reduction	Double Reduction
Backlash at 1% Rated Torque	10 Arc min	13 Arc min
Efficiency	91%	86%

TLM20 Dimensions

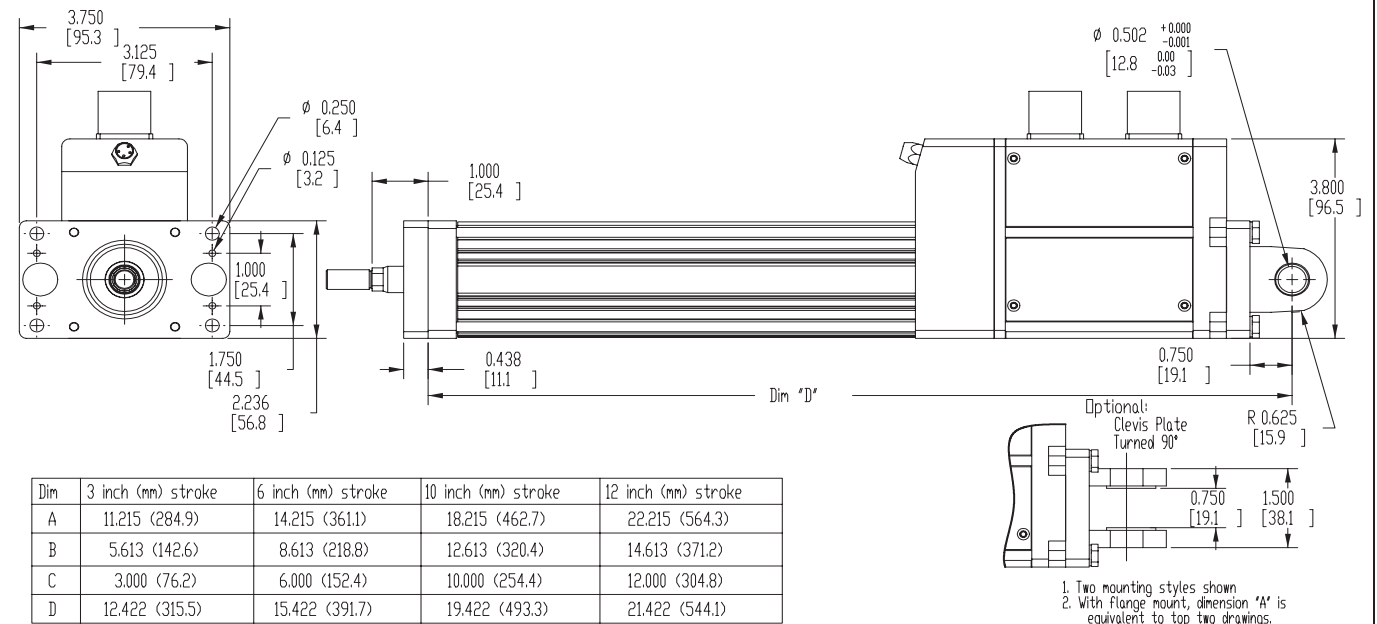
TLM20, Double Side Mounts or Extended Tie Rod Mount



TLM20 Side Trunnion Mount

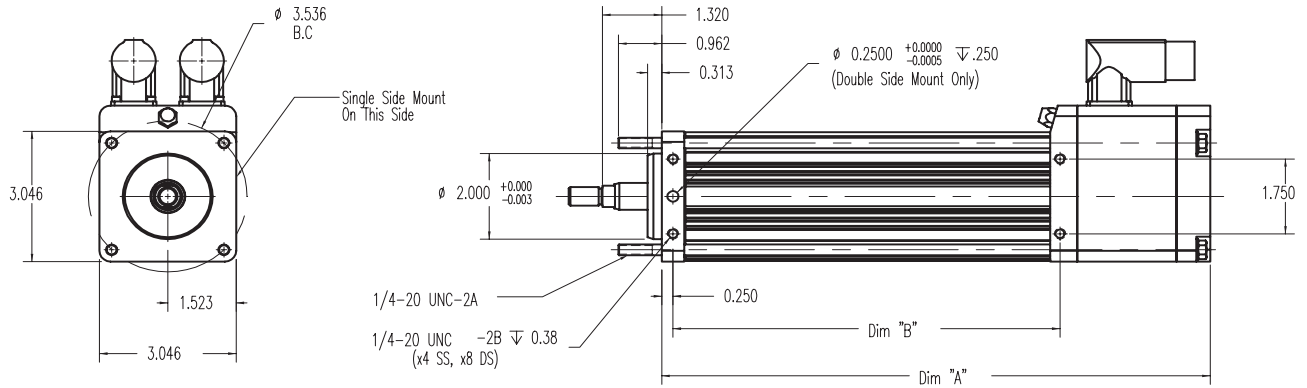


TLM20 Rear Clevis Mount or Front Flange Mount

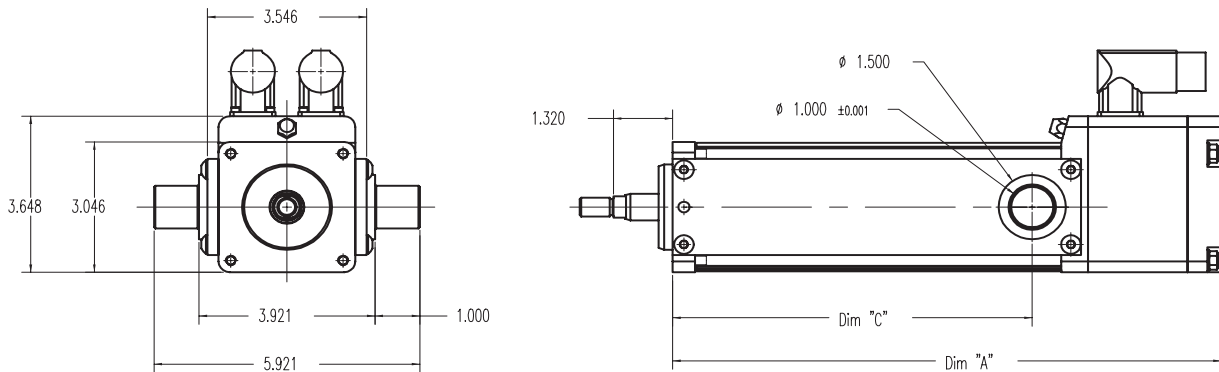


TLM30 Dimensions

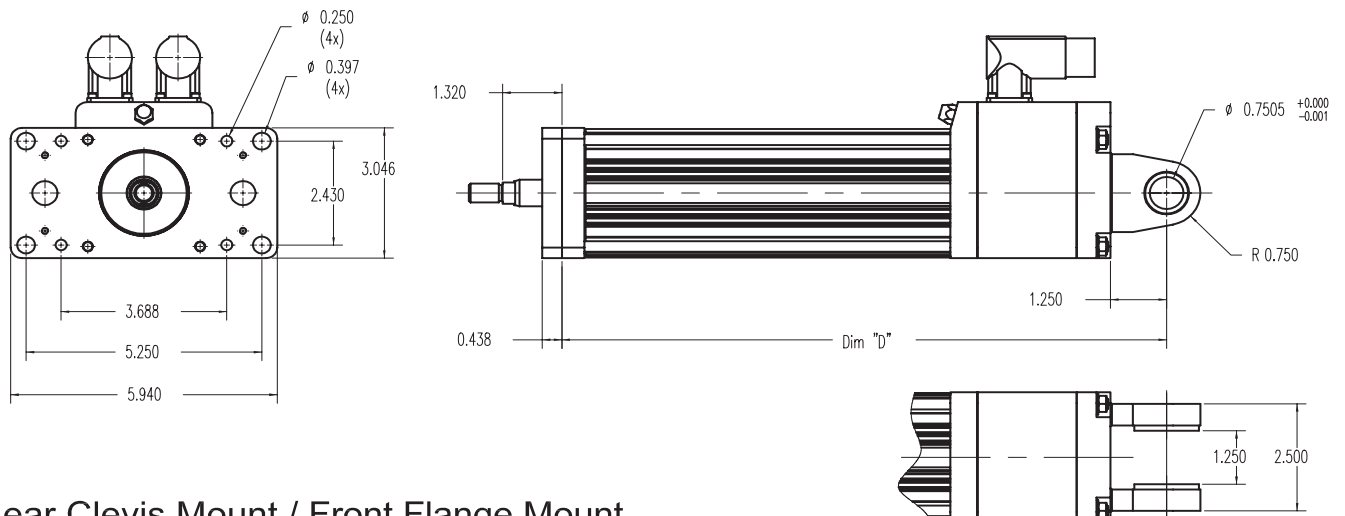
Dim	3 Inch Stroke	6 Inch Stroke	10 Inch Stroke	14 Inch Stroke	18 Inch Stroke
A	9.743	12.216	16.715	20.715	24.715
B	6.147	8.620	13.119	17.119	21.119
C	5.380	8.006	10.000	14.000	18.000
D	10.993	13.466	17.965	21.965	25.965



Single & Double Side Mounts / Extended Tie Rod Mount



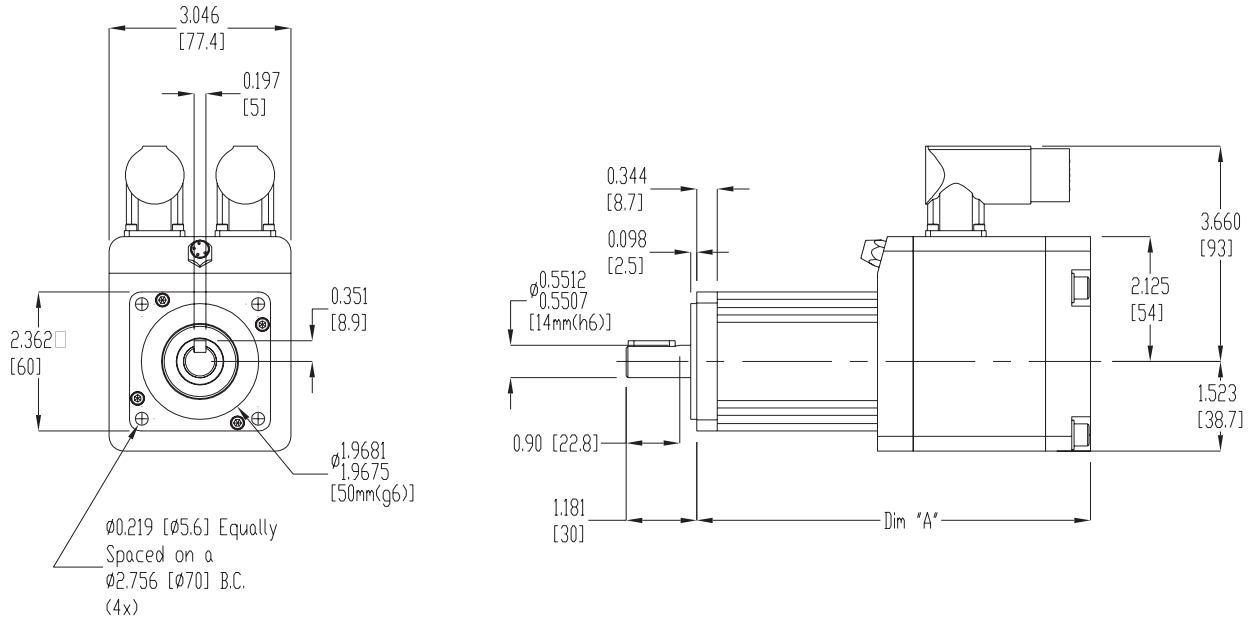
Side Trunion Mount



Rear Clevis Mount / Front Flange Mount

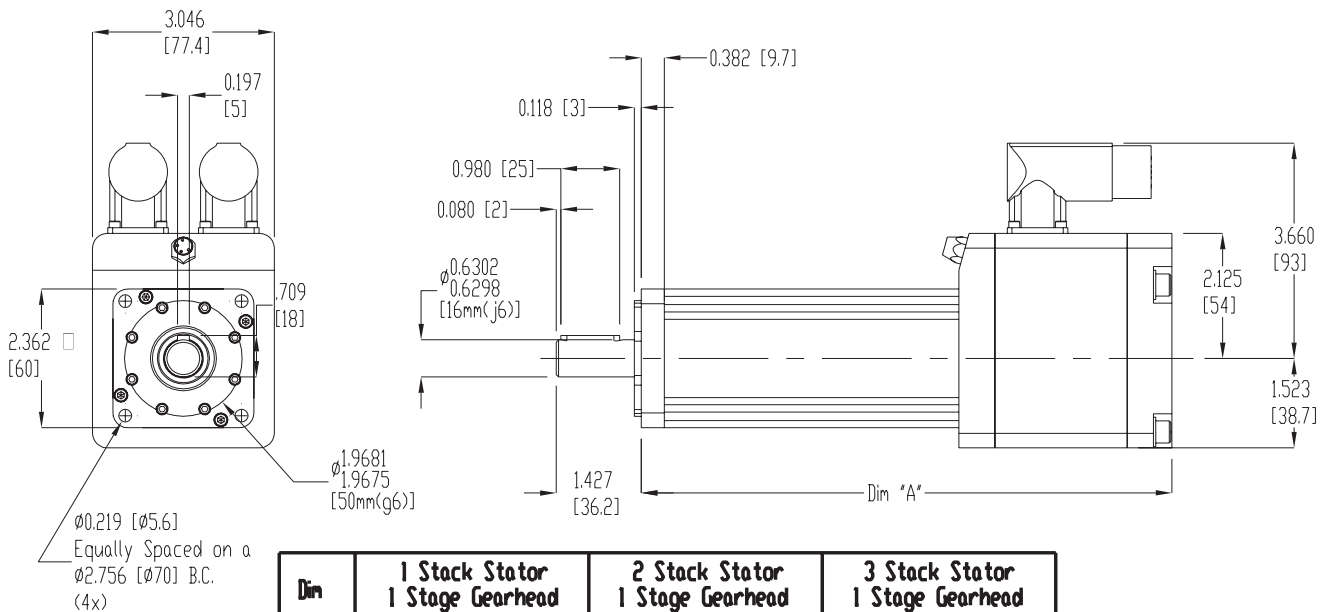
RTM060 / RTG060 Dimensions

RTM60



Dim "A"	
1 Stack, no brake	6.592 [167]
2 Stack, no brake	7.842 [199]
3 Stack, no brake	9.092 [231]

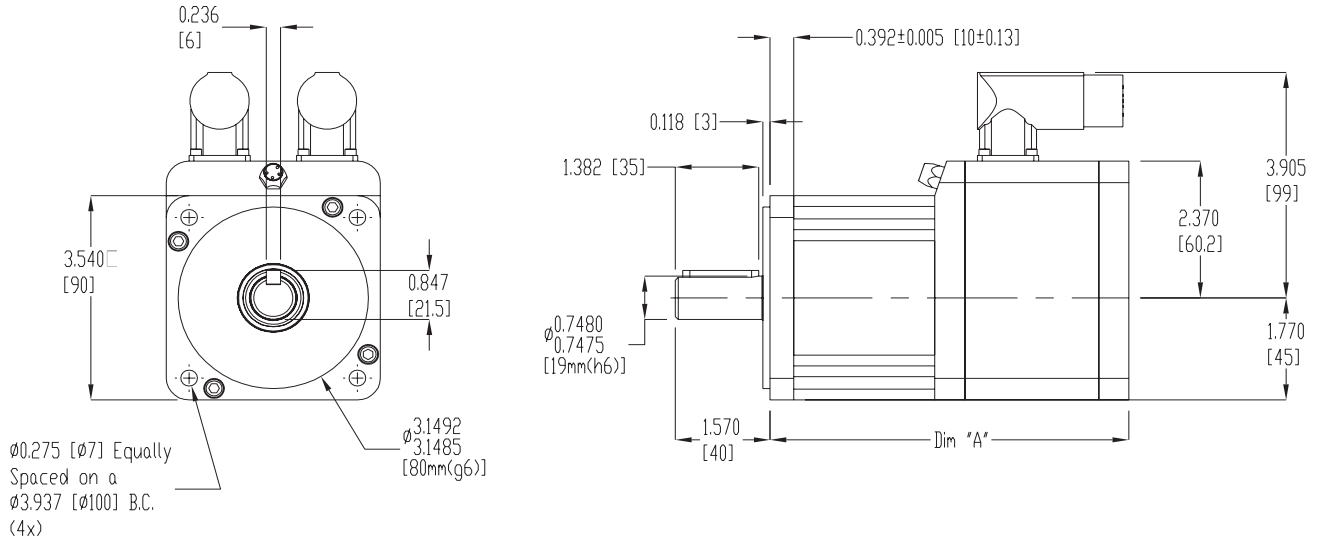
RTG60



Dim	1 Stack Stator 1 Stage Gearhead	2 Stack Stator 1 Stage Gearhead	3 Stack Stator 1 Stage Gearhead
A	8.882 [226]	10.132 [257]	11.382 [289]
Dim	1 Stack Stator 2 Stage Gearhead	2 Stack Stator 2 Stage Gearhead	3 Stack Stator 2 Stage Gearhead
A	9.927 [252]	11.177 [284]	12.427 [316]

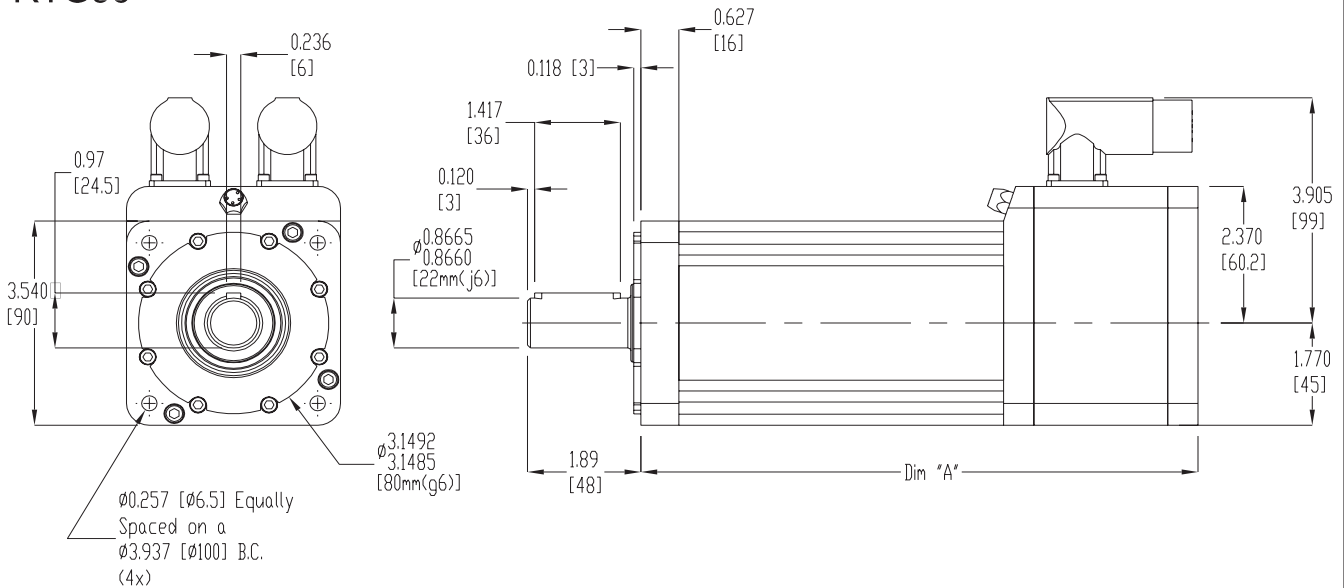
RTM090 / RTG090 Dimensions

RTM90



Dim "A"	
1 Stack, no brake	5.937 [151]
2 Stack, no brake	6.937 [176]
3 Stack, no brake	7.937 [202]

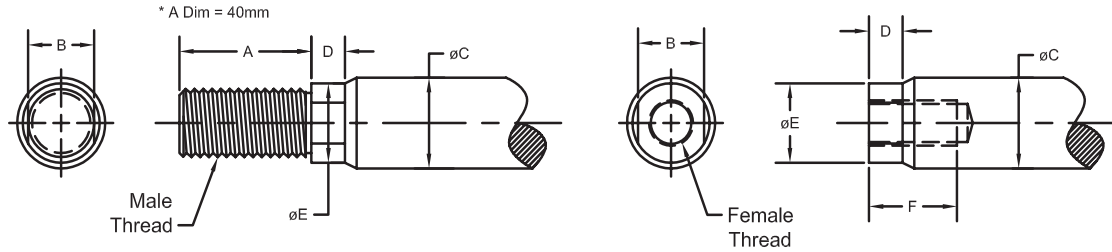
RTG90



Dim	1 Stack Stator 1 Stage Gearhead	2 Stack Stator 1 Stage Gearhead	3 Stack Stator 1 Stage Gearhead
A	9.217 [234]	10.217 [260]	11.217 [285]
Dim	1 Stack Stator 2 Stage Gearhead	2 Stack Stator 2 Stage Gearhead	3 Stack Stator 2 Stage Gearhead
A	10.482 [266]	11.482 [292]	12.482 [317]

Rod End Drawings

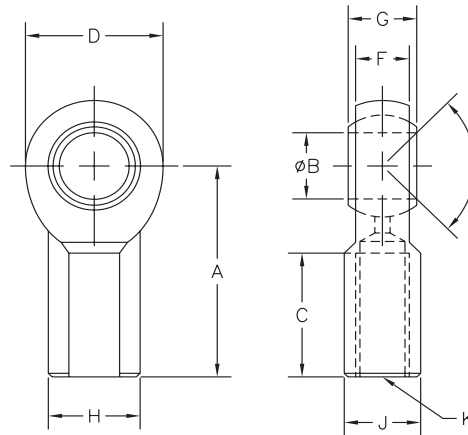
TLM Rod Ends



	A inch (mm)	B inch (mm)	øC inch (mm)	D inch (mm)	øE inch (mm)	F inch (mm)	Male U.S.	Male Metric	Female U.S.	Female Metric
TLM20	0.813 (20.7)	0.375 (9.5)	0.500 (12.7)	0.200 (5.1)	0.440 (11.2)	0.750 (19.1)	3/8-24 UNF-2A	M8X1	5/16-24 UNF-2B	M8X1
TLM30	0.750 (19.1)	0.500 (12.7)	0.625 (15.9)	0.281 (7.1)	0.562 (14.3)	0.750 (19.1)	7/16-20 UNF-2A	M12X1.75 *	7/16-20 UNF-2A	M10X1.5

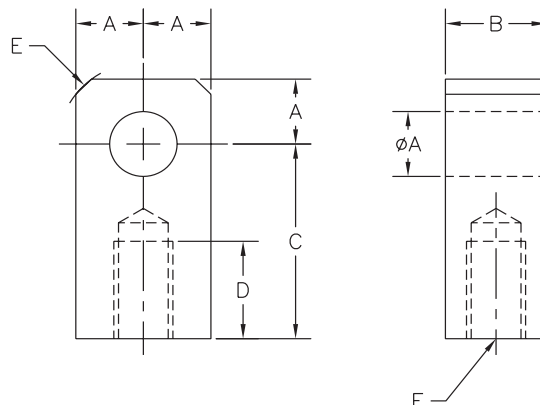
Spherical Rod Eye Dimensions

	TLM20 SRM038	TLM30 SRM044
A	1.625" (41.3 mm)	1.81" (46.0 mm)
øB	0.375" (9.525 mm)	0.438" (11.13 mm)
C	.906" (23.0 mm)	1.06" (26.9 mm)
D	1.0" (25.6 mm)	1.13" (28.7 mm)
E	12 Deg	14 Deg
F	.406" (10.3 mm)	0.44" (11.1 mm)
G	.500" (12.7 mm)	0.56" (14.2 mm)
H	.688" (17.7 mm)	0.75" (19.1 mm)
J	.562" (14.3 mm)	0.63" (16.0 mm)
K	3/8-24	7/16-20

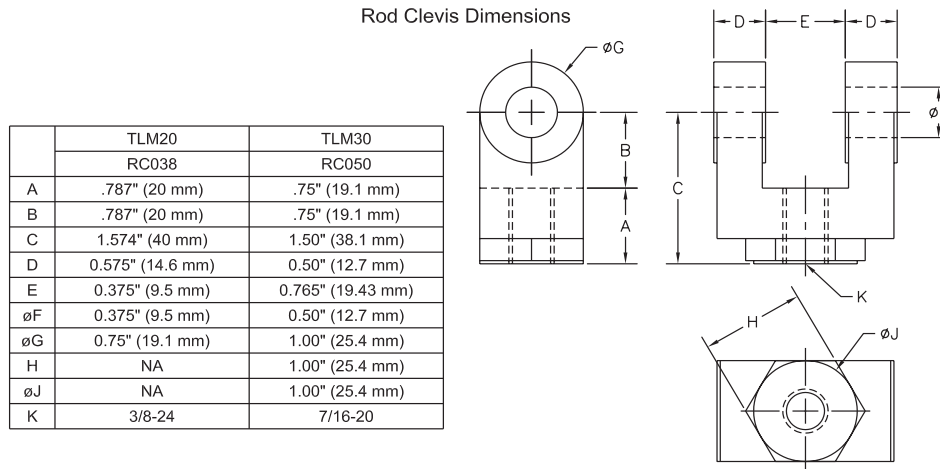


Rod Eye Dimensions

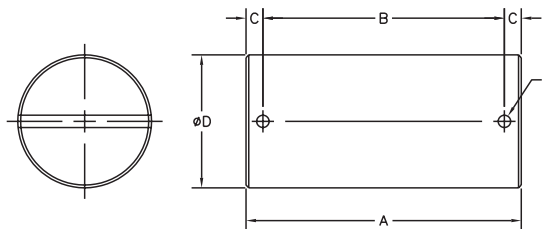
	TLM30 RE050
øA	0.50" (12.70 mm)
B	0.75" (19.1 mm)
C	1.50" (38.1 mm)
D	0.75" (19.1 mm)
E	0.63" (15.9mm)
F	7/16-20



Rod End Drawings (continued)



Clevis Pin Dimensions



	A	B	C	øD	øE
CP050 - TLM20 Clevis and TLM30 Rod Eye and Rod Clevis	2.28" (57.9 mm)	1.94" (49.28 mm)	0.17" (4.32 mm)	0.50" (12.7 mm)	0.095" (2.41 mm)
CP075 - TLM30 Rear Clevis	3.09" (78.5 mm)	2.72" (69.1 mm)	0.19" (4.82 mm)	0.75" (19.1 mm)	0.14" (3.56 mm)

Options/Accessories



Model TT232485

The Model TT232485 is a feature packed RS232 to RS-422/485 9-pin converter. It converts unbalanced, full or half duplex RS-232 signals to balanced, full or half-duplex RS422 or RS-485 signals at baud rates up to 115.2 kbps. In addition, the unit optically isolates and surge suppresses the RS-422/485 lines. The driver uses automatic SD (send data) or TS (handshake) control, or can be configured as always enabled for use in RS-422 systems.



Model TTUSB485

The TTUSB485 is a USB (Universal Serial Bus) port to 2 or 4 wire isolated RS-485/422 converter. This converter requires no PCI/ISA slots or IRQs. Simply plug the converter into an available USB port on your computer or hub. Windows will configure the converter as an additional COM port, compatible with your Windows applications. The serial port side can be set up for an RS-422 or RS-485 network. A pair of LEDs shows when RS485/422 data is being received or transmitted. The USB side permits quick setup. USB bus supplies power so no separate power supply is needed.



Model TTPS1048

The Model TTPS1048 unregulated power supply line is designed for high current applications at low cost when full regulation is not required.



Model TTSR1

Shunt regulator dissipates excess kinetic or potential energy to prevent amplifier over-voltage shut down.

TRITEX TLM SERIES ORDERING GUIDE

TLM-BB-CCDD-EFG-HHH-HH - (XX..XX - #####)	
AAA = Actuator Type	G = Rod End
TLM = Tritex Linear Actuator	M = Male US Standard Thread A = Male Metric
BB = Actuator Frame Size	F = Female US Standard B = Female Metric
20 = 2 inch nominal frame actuator	X = Special (please specify)
30 = 3 inch nominal frame actuator	HHH-HH = Motor Stator
CC = Stroke Length	TLM20
03 = 3 inch (75 mm)	1B8-50 = 1 Stack, 5000 rpm at 48 VDC, 2500 rpm at 24 VDC
06 = 6 inch (150 mm)	2B8-34 = 2 Stack, 3400 rpm at 48 VDC, 1700 rpm at 24 VDC
10 = 10 inch (254 mm)	3B8-25 = 3 Stack, 2500 rpm at 48 VDC, 1250 rpm at 24 VDC
12 = 12 inch (305 mm)	TLM30
18 = 18 inch (457 mm) (TLM30 only)	1B8-20 = 1 Stack, 2000 rpm at 48 VDC, 1000 rpm at 24 VDC
DD = Lead (linear motion per screw revolution)	2B8-13 = 2 Stack, 1300 rpm at 48 VDC, 750 rpm at 24 VDC
01 = 0.1 inch	3B8-10 = 3 Stack, 1000 rpm at 48 VDC, 500 rpm at 24 VDC (not available in 3 inch stroke)
02 = 0.2 inch	
04 = 0.4 inch (TLM20 only)	X..XX = Travel and Housing Options (Multiple Possible)
05 = 0.5 inch (TLM30 only)	Travel Options
E = Connections	AR = External Anti-rotate L1/2/3 = External Limit Switches*
I = Exlar Std M23 style connector	PF = Preloaded Follower RB = Rear Brake (future option)
B = Embedded leads, 3 ft	XT = Special Travel Options
P = Embedded leads w/plug, std M23 style connector, 3 ft.	Housing Options
X = Special (please specify)	P5 = IP65 sealed housing
F = Mounting	Special Motor Options
C = Rear Clevis D = Double Side Mount	XL = Special Lubrication
E = Extended Tie Rod F = Front Flange	XM = Special Motor Option
S = Side Mount T = Side Trunnion	##### = 5 digit PN assigned to designate special model no.
M = Metric Extended Tie Rod X = Special	Optional 5 digit assigned PN to designate unique model numbers

TRITEX RTM/G SERIES ORDERING GUIDE

RTM/G-BBB-CCC-DE-FFF-FF- (XX...XX) - #####	
AAA = Actuator Type	E = Connector Options
RTM = Tritex Rotary Motor	I = Exlar Std M23 style connector B = Embedded leads
RTG = Tritex Rotary Gearmotor	P = Embedded leads w/plug X = Special (please specify)
BBB = Frame Size	FFF-FF = Motor Stators
060 = 60 mm	RTM / RTG060
090 = 90 mm	1B8-50 = 1 Stack, 5000 rpm at 48 VDC, 2500 rpm at 24 VDC
CCC = Gear Ratio	2B8-34 = 2 Stack, 3400 rpm at 48 VDC, 1700 rpm at 24 VDC
Blank = RTM	3B8-25 = 3 Stack, 2500 rpm at 48 VDC, 1250 rpm at 24 VDC
Single Reduction Ratios	Double Reduction Ratios
004 = 4:1	016 = 16:1 020 = 20:1
005 = 5:1	025 = 25:1 040 = 40:1
010 = 10:1	050 = 50:1 100 = 100:1
D = Shaft Type	XX = Special Options
K = Keyed	XH = Special Housing Options
R = Smooth/Round	XM = Special Motor Options
X = Special Shaft	XL = Special Lubrication
	##### = 5 digit PN assigned to designate special model no.
	Optional 5 digit assigned PN to designate unique model number

TRITEX SERIES CABLES

Power Cables, molded M23 style connector, 8 pin	TTIPC-xxx
I/O Cables, molded M23 style connector, 19 pin	TTIOC-xxx
Communication Cable, PICO type connector, 4 pin	TTCOM-xxx
xxx = length in feet. Std lengths 15, 25, 50 feet	

* The dynamic load rating of zero backlash, preloaded screws is 63% of the dynamic load rating of the std non-preloaded screws. The calculated travel life of a preloaded screw will be 25% of the calculated travel life of the same size and lead of a non-preloaded screw.



The Company - Headquartered in suburban Minneapolis, Minnesota, Exlar serves a global customer base with an extensive standard product line and complete engineering support for custom actuator applications.

Exlar supports a large network of sales representatives in North America. To find your local dealer, visit our website at www.exlar.com or call our headquarters at 952-368-3434. For assistance outside North America, please contact Exlar direct or one of our worldwide partners listed below.

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ATB Automation nv/sa.
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www.atb-automation.be

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353 65 683 9369
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