

**CURTISS -  
WRIGHT**



**Tritex® TTX Series Product Catalog**



# Tritex® TTX Series

## Intelligent Servo Drive/Motor/Actuator

By combining the latest electronic power technology with advanced thermal management modeling technology, Exlar® has set a new benchmark for electric actuator performance versus size. TTX Series actuators now integrate an AC or DC powered servo drive, digital position controller, brushless motor and linear actuator in one elegant, compact, sealed package. Now you can distribute motion control and resolve your application challenges with one integrated device. Simply connect power, I/O, communications and go!

## Reduce Panel Space

TTX Series actuators are the highest power density, smallest footprint servo drive devices on the market. Finally, you can incorporate a fully electronic solution in the space of your existing hydraulic or pneumatic cylinder. You can also eliminate troublesome ball screw actuators; and the space previously consumed by panel mount servo drives and motion controllers is no longer needed. TTX Series actuators may also reduce the size of your machine design while significantly improving reliability.

## Reduce Costs

Now you can eliminate the labor costs for mounting and wiring panels because the TTX Series houses the servo drive, digital positioner, and actuator in one convenient package. Cable costs are also significantly reduced by eliminating the need for expensive, high-maintenance specialty servo cables. All that is required is an economical standard AC or DC power cord, and standard communication cable for digital and analog I/O.

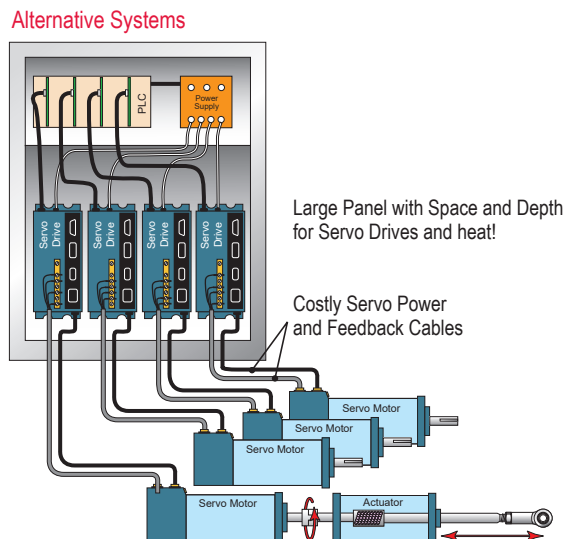
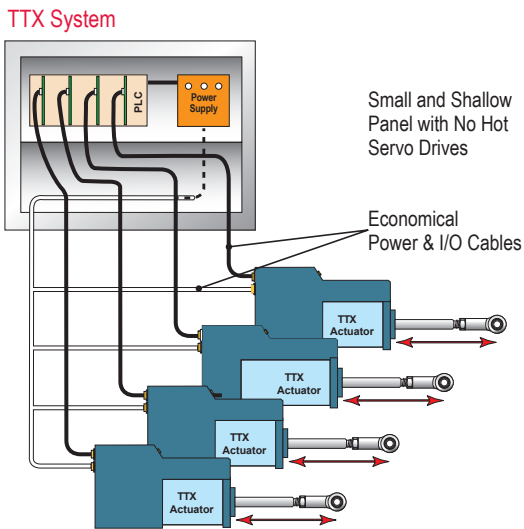
These actuators also eliminate the issues associated with power signals and feedback signals traveling long distances from servo drive to servo motor. With the TTX Series, the servo drive and motor are always integrated in the same housing.

## Flexible Communications

Digital and analog I/O, plus popular communication networks, such as Modbus TCP, Modbus RTU (standard), EtherNet/IP, and PROFINET IO, allow the TTX Series to become an integral part of your control architecture or machine control processes.

## Improves Power, Performance, and Reliability

TTX Series actuators give you unrivaled power, performance, and reliability. No longer are you limited to trivial amounts of force or speeds so slow that many motion applications are not possible.



## Linear Applications

TTX Series linear actuators employ a superior inverted roller screw mechanism for converting rotary motion to highly robust and long-life linear motion. These characteristics enable the TTX Series actuator 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 into linear motion in order to move the load.

The simple to configure, yet robust interface software allows either the AC or DC TTX Series actuators to perform nearly any motion control application. The TTX Series linear actuator can be programmed to follow an analog command signal, making it ideal for numerous factory automation applications

## Tritex TTX Series Models

### TTX Series AC and DC Models

- TTX Series high mechanical capacity actuator

#### Feedback Type

- Absolute Feedback (analog hall with multi-turn, battery backup)

#### Option Boards and I/O

Standard I/O:

- 8 - Digital Inputs
- 8 - Digital Outputs
- 1 -  $\pm 10$  V Analog Input
- 1 - 0-10 V Analog Output

EtherNet/IP - Includes all standard I/O

Modbus TCP - Includes all standard I/O

PROFINET I/O - Includes all standard I/O

4-20 mA - 4 digital inputs, 3 digital outputs, Isolated 4-20 mA input, Isolated 4-20 mA output

#### Standard Communications (All Models):

- 1 RS485 port, Modbus RTU, opto-isolated for programming, controlling and monitoring

### TTX Series Option Boards

- Option boards offer adding functionality to the base TTX Series actuators
  - Terminal board for customer I/O
  - Isolated 4-20 mA analog input and output
- Communication buses
  - EtherNet/IP
  - Modbus TCP
  - PROFINET IO

#### Connectivity

- Internal terminals accessible through removable cover
- M23 Power Connector (DC & AC Models differ)
- M23 I/O
- M8 connector for RS485 (may use internal connection instead)
- M12 connector for Ethernet options (may use internal connection instead)
- Power and I/O connectors may be removed by customer for M25 threaded port
- Power and I/O connectors may be replaced by customer with cable glands
- Power and I/O connectors may be replaced by customer with 1/2 inch NPT adaptors

## Tritex TTX Series Operation

The TTX 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 TTX Series non-volatile memory. A standard RS485 serial interface allows control, programming, and monitoring of all aspects of the motor or actuator as it performs your application. Optional communications protocols are available.

## Operating Modes

1. *Move to a position (or switch)*  
The TTX Series actuators allow you to execute up to 16 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*  
The TTX 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 TTX Series provides the functionality to position a control valve by following an analog input signal. Therefore, it delivers precise valve control — which can be challenging with other electric, hydraulic, or pneumatic actuators.
4. *Velocity proportional to an analog signal*  
TTX Series actuators offer you the capability to control velocity with an analog signal.
5. *Force proportional to analog signal*  
Perfect for pressing applications, you can control force with an analog input while in force mode.

### Selectable Input Functions

- Enable • Execute Move (0-15) • Dedicated Position • Jog+
- Jog- • Jog Fast • Home • Extend Switch • Retract Switch
- Home Switch • Teach Enable • Teach Move (1-16)
- Select Move • Stop • Hold • Reset Faults
- Alternate Mode (allows you to switch between 2 operating modes)

### Selectable Output Functions

- Enabled • Homed • Ready (Enabled and Homed)
- Fault • Warning • Fault or Warning Active
- Move (0-15) in Progress • Homing • Jogging
- Jogging+ • Jogging- • Motion • In Position
- At Home Position • At Move (0-15) • Position
- Stopped • Holding • In Current Limit • In Current Fold Back
- Above Rated Current • Home

## Expert User Interface

Expert, the TTX user interface software, provides you with a simple way to select all aspects of configuration and control required to set up and operate a TTX Series 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 TTX Series actuators. Motion setup, homing, teach mode, tuning parameters, jogging, I/O configurations, and local control are all accomplished with ease using Expert software.

## Protocol Options

The standard communication protocol for Tritex is an RS485 connection using Modbus RTU. The Modbus protocol provides a simple and robust method to connect industrial electronic devices on the same network. The Expert software acts as a Modbus Master and the TTX Series acts as the follower device, only responding to requests commanded through the software. The Expert software allows full access to commissioning, configuring, monitoring, and controlling the TTX Series.

In addition, the following protocol options are available by selecting the communication option boards. Initial commissioning of a TTX Series actuator must be performed with the Modbus RTU protocol.

### Modbus TCP

Modbus TCP couples Modbus communication structure from Modbus RTU with Ethernet connectivity. The Modbus TCP option is fully supported by the Expert software and offers seamless commissioning, configuring, monitoring and controlling the Tritex II.

Communication protocol DSP 301 is supported as well as DSP 402 supporting Profile Torque, Profile Velocity, Profile Position and Homing. Setup on the system is most easily achieved with the Expert software using the RS485 port. A Modbus mapping table allows you to map all of the parameters you wish to read and modify into a register bank of up to 100 registers. This allows a PLC program to perform a single read operation and a single write operation to all the parameters.

### EtherNet/IP

EtherNet/IP allows you to change, monitor, and control the TTX through implicit or explicit messaging initiated from your Rockwell PLC. Tritex parameters are set up through the Expert software using a TTX Series parameter to EtherNet/IP parameter mapping table. Up to 100 input, and 100 output 16 bit registers can be mapped to TTX Series parameters.

### PROFINET IO

PROFINET IO allows you to change, monitor and control the TTX Series from your PROFINET enabled PLC. Tritex parameters are set up through the Expert software using a TTX Series parameter to PROFINET IO parameter mapping table. Up to 100 input and 100 output, 16 bit registers can be mapped to TTX Series parameters.

## Modbus Mapping Screen

The screenshot shows the 'Modbus Mapping' screen in the Expert software. The window title is 'Sales Demo - Tritex - Sales Demo'. The interface is divided into several sections:

- Left Panel:** A tree view showing system configuration. The 'Modbus Mapping' option is selected under the 'Networks' section.
- Central Panel:** The 'Modbus Mapping' screen, which is currently showing the 'Input Mapping' tab. It features a 'Variables List' on the left and a 'Tritex Inputs from Host Outputs < Write >' table on the right. The table lists parameters to be added to the translation table, including their Modbus ID and description.
- Right Panel:** The 'Input Function Control' panel, which contains various control buttons such as 'Enable (Momentary)', 'Stop', 'Pause', 'Jog (+)', 'Jog (-)', 'Jog Fast', 'Alternate Mode', 'Home', 'Dedicated Position', 'Define Home', 'Teach Enable', 'Reset Faults', 'Moves Maintained', 'Moves Momentary', 'Moves Teach', and 'Switches'.
- Bottom Panel:** The 'Status' section, which shows the current status of the system as 'Disabled'. It also displays real-time values for Position (0.000 REVS), Velocity (0.0 RPM), and Current (0.0 AMPS), along with 'Fault' and 'Warning' indicators and 'Reset Faults' and 'Diagnostics' buttons.

## Motion Setup

Exlar configuration provides several templates for various applications. These can serve as your configuration, or as a starting point for your configuration. You can also begin by selecting configuration details specific to your application. At the click of a button, you can configure a move to position, move to switch, or move to force motion. TTX Series products offer absolute and incremental motion, as well as moves ending on a condition, such as a specific force or torque.

## Control Page

The Expert control page gives you the ability to initiate all motion functions from one simple screen. This screen provides you with very easy system start-up and testing, without all the inconvenience of machine wiring.

The control 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.

## Monitoring and Diagnostics

All input functions can be monitored and activated from the Expert monitor page, and all output functions can be monitored. Critical fault and status data is available as a separate page as well as a fixed window on the bottom of each page of the software.

## Configuring I/O

A drop down menu allows all I/O to be set up in a matter of minutes. Inputs can be configured to be maintained or momentary, depending on the application requirements. Input and output logic can be inverted with a single click.

## Scope

The Expert Software includes a four-channel digital oscilloscope feature.

You can select up to four Tritex drive parameters to be monitored simultaneously.

For high speed requirements, the data can be captured in the drive's memory at an adjustable rate, down to 100 micro seconds, and then uploaded for plotting. The plots can be saved or printed, and the captured data can be saved as a comma separated file for further analysis with third party spreadsheets.

## Homing

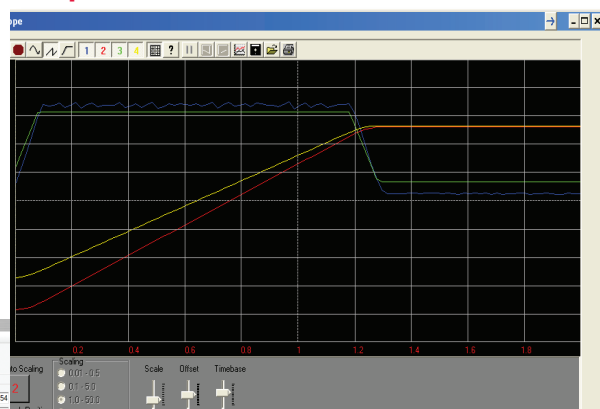
You can home to an input, by using a proximity or limit switch, or home to a specific force or torque.

Homing to a force or torque 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

In this mode, you can jog the actuator to the desired position, and activate an input. Alternatively, you can 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.

## Scope



## Ethernet IP Mapping Screen

Parameter	Access
0-Reserved	
1-Control InputEvents.Mode	
2-Control InputEvents.MoveLevel	
3-Control InputEvents.Motion	
4-Control Host.CommandMode	
5-Control Host.Position (low)	
6-Control Host.Position (high)	
7-Control Host.Velocity (low)	
8-Control Host.Velocity (high)	
9-Control Host.Acceleration (low)	
10-Control Host.Acceleration (high)	
11-Control Host.Current	
12-Control InputEvents.MoveEdge	
13-open	
14-open	
15-open	
16-open	

## Application Flexibility

TTX Series actuators outperform other electric, hydraulic and pneumatic actuators by providing small hysteresis and dead band, quick response to small signal changes, and stable dynamic responses. Fully programmable to follow an analog or digital signal representing either position or force, the TTX Series linear actuator is well suited for many applications with thrust requirements up to 4404 N.

Additionally, TTX Series actuators can be mounted on any valve from any manufacturer giving you maximum flexibility.

## Tritex TTX Benefits

### Extreme Accuracy

Exlar actuators do not rely on air or oil pressure to move. Each move can be programmed resulting in accuracy and repeatability better than 0.1%.

### 100% Duty Cycle

The design of the Tritex TTX allows for reliable, long life (15x similar sized ballscrew actuators) at 100% duty cycle operation due to an integrated inverted roller screw, a high-torque servo motor, and a decentralized servo drive into a compact, power-dense package.

### Built in Positioner

TTX Series actuators include a built in positioner with a 4-20 mA or digital signal to tell you the exact stroke position. An analog output is also available.

## Flexibility

These actuators include digital I/O and analog control. This provides the user with options for additional control such as emergency stop, +/- jog, or various diagnostic conditions.

## Low Power Consumption

The TTX Series actuator only uses the current needed for a given force. This extreme efficiency makes it suitable for use with solar panels and batteries.

## Fast Response and Stroke Speeds

Most other electric actuators are known for being slow—a major disadvantage. TTX Series response rate is measured in milliseconds. Stroke speeds can be up to 762 mm/s.

## Hydraulic Replacement

Tritex actuators have comparable capabilities as hydraulic cylinders but without the cost or maintenance issues. High force, fast speeds, and precise movements make it a superior substitute for traditional hydraulic applications.

## Absolute Feedback

The absolute feedback option gives the actuator memory after teaching the motion limits. So upon power loss, the battery backup will maintain the motion limits.

## Diagnostics

All inputs and outputs can be monitored including position, temperature, current, and many more. An oscilloscope feature allows you to select up to four parameters to be monitored simultaneously. The data can be captured in the drive's memory at an adjustable rate, down to 100 microsecond, and then uploaded for plotting.

The screenshot displays a comprehensive control and monitoring interface for the TTX Series actuator. It is divided into several functional areas:

- Actuator Direction:** A dropdown menu set to 'Extend to Close'.
- Close Valve:** Parameters when valve is Closed, with input fields for 4.00 mA and 0.00 REVS.
- Open Valve:** Parameters when valve is Open, with input fields for 20.00 mA and 0.00 REVS.
- Valve Stroke:** A text box explaining that the stroke length is the difference between the Open and Closed Valve Positions, with a note that the Open Valve Position must be greater than the Closed Valve Position.
- Velocity/Acceleration:** Velocity Limit set to 100.0 RPM and Acceleration Limit set to 3000 RPM/S.
- Manual Teach Controls:** Includes a 'Digital (Log) Mode' button and four jog/teach buttons: 'Jog to Closed Position', 'Setting Current', 'Jog to Open Position', 'Teach Closed Position', and 'Teach Open Position'.
- Valve Setting:**
  - Close Valve: Travel Cutoff Position set to 0.00 %.
  - Open Valve: Travel Cutoff Position set to 100.00 %.
  - Checkboxes for 'Enable valve setting at Closed position' and 'Enable valve setting at Open position'.
  - Setting Limits:
    - Setting Velocity: 10.0 RPM
    - Peak Setting Current: 2.0 AMPS
    - Foldback Setting Current: 2.0 AMPS
- System Status (Top Left):** Power-Up: 69 Time: 19.08 HRS.
- Last Fault/Warning:** A table listing various faults and their counts and times.
- Recent Fault History:** A table listing recent faults with columns for Power-Up, Time, and Fault Name.
- Maximum Stress Values:**
  - Current: 20.5 AMPS
  - Voltage: 114.72 VOLTS
  - Board Temp: 52.5 DEG(C)
  - Actuator Temp: 0.0 DEG(C)
- Clear Run Time:** A button to reset the run time.
- Current Power-On Stress Values:**
  - Current: 0.0
  - Voltage: 23.91

## TTX Series Agency Approval

Shown below are additional agency approvals applied to TTX Series Actuators.

Agency Standards & Approvals			
		TTX-AC Models	TTX-DC Models
UL		UL 1004-1	N/A
		UL 1004-3	
		UL 1004-6	
		UL 508C (TTX AC)	
CSA		CSA C22.2 NO. 77	N/A
		CSA C22.2 NO. 100	
		CSA C22.2 NO. 274 (PCB)	
CE	EMC	EN 61800-3:2004+A1:2012 Part 3	EN 61800-3
	Safety	EN 61800-5-1	N/A
	RoHS	RoHS 2011/65/EU	RoHS 2011/65/EU
UKCA		EN 61800-3:2004+A1:2012 Part 3	EN 61800-3:2004+A1:2012 Part 3
Vibration	Qual. Test Only	2.5 grms; 5 to 500 Hz	5.0 grms; 5 to 500 Hz
ODVA		EtherNet/IP	EtherNet/IP
PROFINET		PI Tested for PROFINET IO	PI Tested for PROFINET IO



## TTX Series (AC Power)

### No Compromising on Power, Performance or Reliability

With forces up to 5,897 N (1,326 lbf) continuous and speeds to 635 mm/s (25 in/s), the AC TTX Series linear actuators also offer a benefit that no other integrated product offers: POWER! No longer are you limited to trivial amounts of force, or speeds so slow that many motion applications are not possible. The TTX Series with AC power electronics operates with maximum reliability over a broad range of ambient temperatures: 0 °C to +65 °C. The AC powered TTX Series actuators contain a 1.5 kW servo amplifier and a very capable motion controller. With standard features such as analog following for position, compound moves, move chaining, and individual force/torque control for each move, the TTX Series is the ideal solution for most motion applications.

#### TTX Series Models

- TTX Series high mechanical capacity actuator, 80 mm

#### Power Requirements

- AC Power 100-200 Vac, ±10%, single phase
- Built-in AC line filter
- Connections for external braking resistor

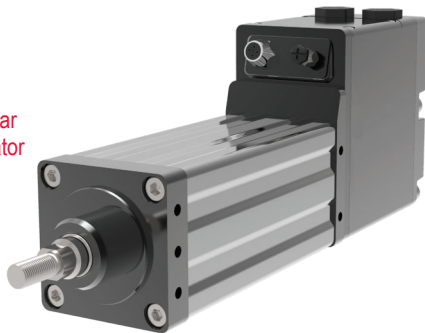
#### Feedback

- Absolute Feedback (analog hall with multi-turn, battery backup)

#### Connectivity

- Internal terminals accessible through removable cover
- M23 connectors
- M8 connector for RS485
- M12 connector for Ethernet options

TTX Linear  
AC Actuator



## TTX Series (DC Power)

### Linear Actuators

No Compromising on Power, Performance or Reliability  
With forces up to 4,970 N (1,117 lbf) continuous and speeds up to 508 mm/s (20 in/s). The DC TTX Series linear actuators also offer a benefit that no other integrated product offers: POWER! No longer are you limited to trivial amounts of force, or speeds so slow that many motion applications are not possible. The new TTX Series with DC power electronics operates with maximum reliability over a large temperature range: 0 °C to +65 °C. The DC powered TTX Series actuators contain a 750 W servo amplifier and a very capable motion controller. With standard features such as analog following for position, compound moves, move chaining, and individual force/torque control for each move, the TTX Series is the ideal solution for most motion applications.

#### TTX Series Models

- TTX Series high mechanical capacity actuator, 80 mm

#### Power Requirements

- DC Power 12-48 Vdc nominal
- Connections for external braking resistor

#### Feedback

- Absolute Feedback (analog hall with multi-turn, battery backup)

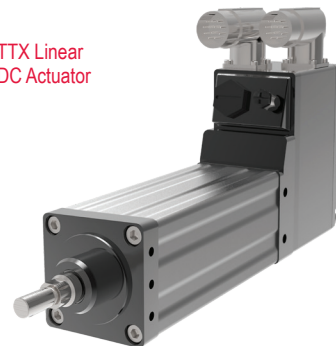
#### Connectivity

- Internal terminals accessible through removable cover
- M23 connectors
- M8 connector for RS485
- M12 connector for Ethernet options

#### Operating Conditions and Usage for AC and DC Units

Accuracy:		
Screw Lead Error	µm / 300 mm	25
	in/ft	0.001
Screw Travel Variation	µm / 300 mm	30
	in/ft	0.0012
Screw Lead Backlash		0.1524 mm Maximum 0.006 in Maximum
IP Rating		IP66S
Standard Ambient Temperature*	°C	0 to 65
	°F	32 to 149
Friction Torque (typical)	Frame Size (Nm)	060 (0.12)
		080 (0.23)

TTX Linear  
DC Actuator



## Communications & I/O

All models include digital IO and an isolated RS485 communication port. Digital I/O is isolated from other channels as a group, with all channels referenced to the negative side of the I/O supply.

The IO count and type vary with the actuator model and option module selected.

TTX AC and DC I/O		
	SIO, EIP, PIO, TCP	IA4
Digital inputs	8	4
Digital outputs	4	3
Analog input, voltage	1	0
Analog output, voltage	1	0
Analog input 4-20 mA	0	1
Analog output 4-20 mA	0	1

### Digital Inputs:

10 to 30 Vdc Opto-isolated but common return

### Digital Outputs:

30 Vdc maximum

Opto-isolated but common supply & return

100 mA continuous output Isolated

### SIO

#### Analog Input (Voltage):

±10 Vdc Range

13 bit resolution over full range

May be assigned to control Position, Velocity, Torque, or Velocity Override.

#### Analog Output (Voltage):

0 -10 Vdc Range

11 bit resolution over full range

May be assigned to monitor one of many internal parameters.

### IA4

#### Analog Input (4-20 mA):

16 bit resolution Isolated

Assignable to Position, Velocity, or Torque command

#### Analog Output (4-20 mA):

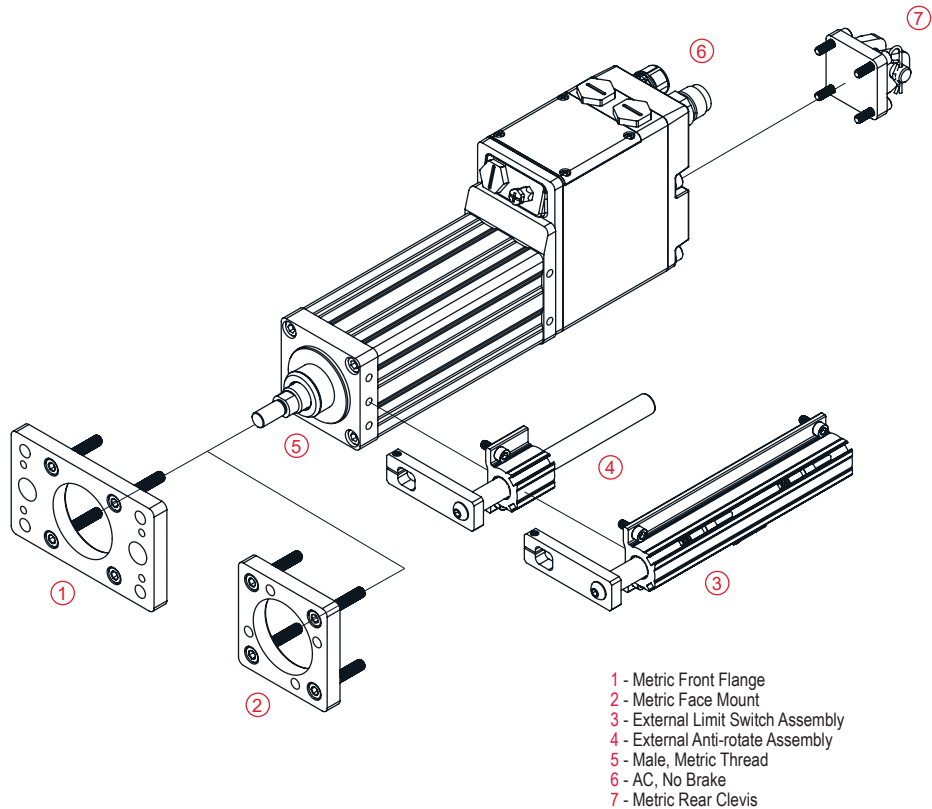
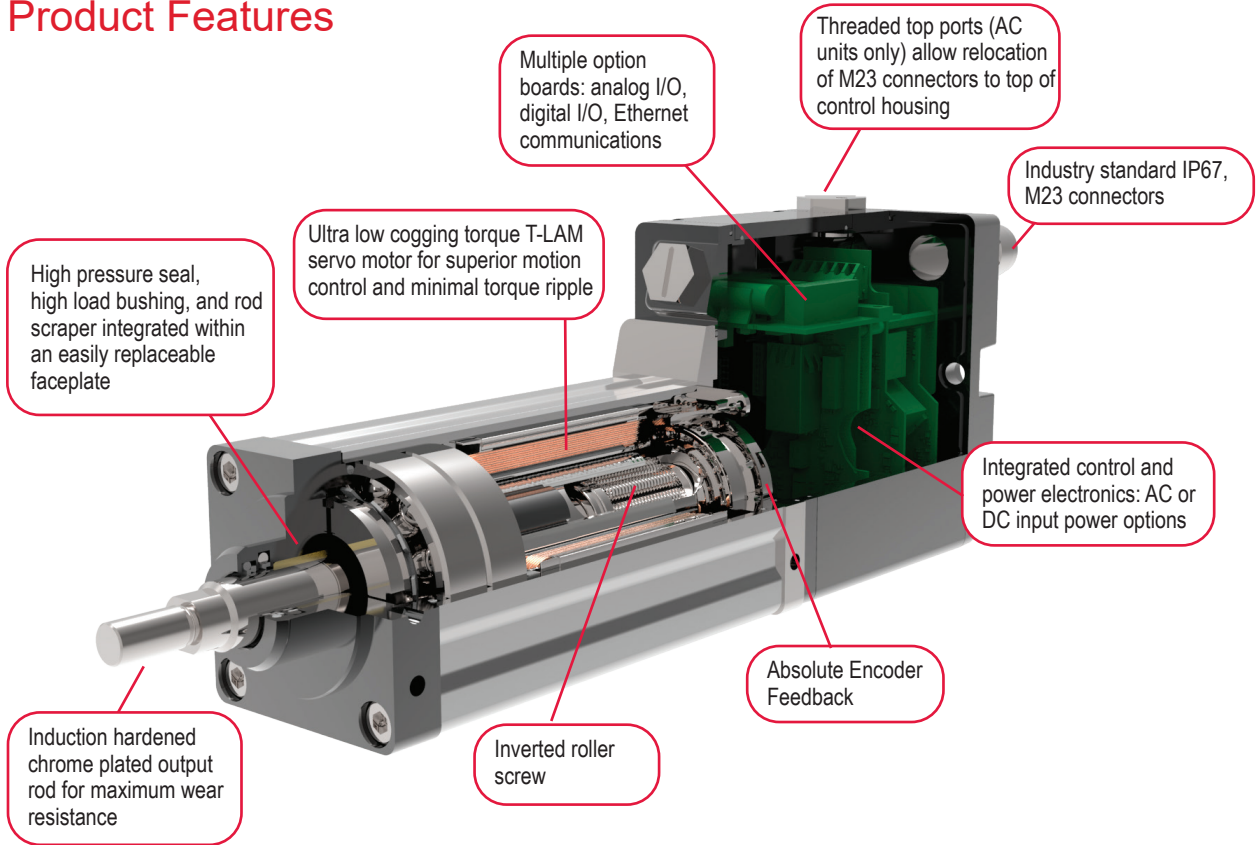
12 bit resolution

Assignable to Position, Velocity, Current, Temperature, etc

### Standard Communications:

1 RS485 port opto-isolated, for programming, controlling and monitoring. Uses Modbus RTU protocol

# Product Features



# Tritex TTX Mechanical Specifications

## TTX060

	Stroke mm (in)	Screw Lead mm (in)	Continuous Force Rating N (lbf)	Peak Force Rating N (lbf)	Max Velocity mm/s (in/s)	Dynamic Load Rating N (lbf)	Armature Inertia kg-m <sup>2</sup> (in-lb-s <sup>2</sup> )	Maximum Continuous Input Current
			D (Vdc)	D (Vdc)	D (Vdc)	D (Vdc) Arms		
TTX060-080-01	80 (3.15)	2.54 (0.1)	2,566 (577)	4,618 (1,038)	202 (8.3)	9,230 (2,075)	0.00007367 (0.000652)	18.0
TTX060-080-02		5.08 (0.2)	1,363 (306)	2,454 (552)	423 (16.7)	6,850 (1,540)		
TTX060-080-04		10.16 (0.4)	722 (162)	1,299 (292)	847 (33.3)	5,471 (1,230)		
TTX060-150-01	150 (5.9)	2.54 (0.1)	2,566 (577)	4,618 (1,038)	202 (8.3)	9,230 (2,075)	0.00008689 (0.000769)	
TTX060-150-02		5.08 (0.2)	1,363 (306)	2,454 (552)	423 (16.7)	6,850 (1,540)		
TTX060-150-04		10.16 (0.4)	722 (162)	1,299 (292)	847 (33.3)	5,471 (1,230)		
TTX060-300-01	300 (11.8)	2.54 (0.1)	2,566 (577)	4,618 (1,038)	202 (8.3)	9,230 (2,075)	0.00011537 (0.001021)	
TTX060-300-02		5.08 (0.2)	1,363 (306)	2,454 (552)	423 (16.7)	6,850 (1,540)		
TTX060-300-04		10.16 (0.4)	722 (162)	1,299 (292)	847 (33.3)	5,471 (1,230)		

Specifications subject to change without notice.

Test data derived using NEMA recommended aluminum heatsink 10" x 10" x 3/8" at 25 °C ambient.

Maximum velocities listed at maximum voltages

## TTX080

	Stroke mm (in)	Screw Lead mm (in)	Continuous Force Rating N (lbf)		Peak Force Rating N (lbf)		Max Velocity mm/s (in/s)		Dynamic Load Rating N (lbf)	Armature Inertia kg-m <sup>2</sup> (in-lb-s <sup>2</sup> )	Maximum Continuous Input Current	
			4 (Vac)	D (Vdc)	4 (Vac)	D (Vdc)	4 (Vac)	D (Vdc)			A (Vac) Arms	D (Vdc) Arms
TTX080-100-01	100 (3.9)	2.54 (0.1)	5,897 (1,326)	4,970 (1,117)	11,794 (2,651)	8,946 (2,011)	127 (5.0)	102 (4.0)	24,535 (5,516)	0.000340 (0.003013)	4.1	18.0
TTX080-100-02		5.08 (0.2)	3,342 (751)	2,816 (633)	6,683 (1,502)	5,069 (1,140)	254 (10.0)	203 (8.0)	25,798 (5,800)			
TTX080-100-05		12.7 (0.5)	1,415 (318)	1,193 (268)	2,830 (636)	2,147 (483)	635 (25.0)	508 (20.0)	21,795 (4,900)			
TTX080-150-01	150 (5.9)	2.54 (0.1)	5,897 (1,326)	4,970 (1,117)	11,794 (2,651)	8,946 (2,011)	127 (5.0)	102 (4.0)	24,535 (5,516)	0.000369 (0.003267)		
TTX080-150-02		5.08 (0.2)	3,342 (751)	2,816 (633)	6,683 (1,502)	5,069 (1,140)	254 (10.0)	203 (8.0)	25,798 (5,800)			
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TTX080-300-01	300 (11.8)	2.54 (0.1)	5,897 (1,326)	4,970 (1,117)	11,794 (2,651)	8,946 (2,011)	127 (5.0)	102 (4.0)	24,535 (5,516)	0.000455 (0.004029)		
TTX080-300-02		5.08 (0.2)	3,342 (751)	2,816 (633)	6,683 (1,502)	5,069 (1,140)	254 (10.0)	203 (8.0)	25,798 (5,800)			
TTX080-300-05		12.7 (0.5)	1,415 (318)	1,193 (268)	2,830 (636)	2,147 (483)	635 (25.0)	508 (20.0)	21,795 (4,900)			
TTX080-450-01	450 (17.7)	2.54 (0.1)	5,897 (1,326)	4,970 (1,117)	11,794 (2,651)	8,946 (2,011)	127 (5.0)	102 (4.0)	24,535 (5,516)	0.000541 (0.004790)		
TTX080-450-02		5.08 (0.2)	3,342 (751)	2,816 (633)	6,683 (1,502)	5,069 (1,140)	254 (10.0)	203 (8.0)	25,798 (5,800)			
TTX080-450-05		12.7 (0.5)	1,415 (318)	1,193 (268)	2,830 (636)	2,147 (483)	635 (25.0)	508 (20.0)	21,795 (4,900)			

Specifications subject to change without notice.

Test data derived using NEMA recommended aluminum heatsink 10" x 10" x 3/8" at 25 °C ambient.

Maximum velocities listed at maximum voltages

# Tritex TTX Weights

## TTX060

Description	Weight kg (lb)
TTX060-080	2.32 (5.11)
TTX060-150	2.82 (6.2)
TTX060-300	3.88 (8.54)
Brake Adder	0.65 (1.42)
Front Flange (1)	0.4 (0.89)
Tapped Face (3)	0.25 (.54)
Rear Clevis (5)	0.21 (0.46)
Imperial Flange (F)	0.3 (0.67)
Imperial Clevis (C)	0.33 (0.72)
Anti Rotate (80 mm stroke)	0.46 (1.0)
Anti Rotate (150 mm stroke)	0.54 (1.2)
Anti Rotate (300 mm stroke)	0.72 (1.6)
Limit Switch Assembly (80 mm stroke)	0.67 (1.5)
Limit Switch Assembly (150 mm stroke)	0.81 (1.8)
Limit Switch Assembly (300 mm stroke)	1.11 (2.5)

## TTX080

Description	Weight kg (lb)
TTX080-100	5.5 (12.2)
TTX080-150	6.2 (13.5)
TTX080-300	8.0 (17.6)
TTX080-450	9.8 (21.6)
Brake Adder	1.1 (2.5)
Front Flange (1)	1.0 (2.2)
Tapped Face (3)	0.6 (1.2)
Rear Clevis (5)	0.4 (0.8)
Imperial Flange (F)	0.8 (1.8)
Imperial Clevis (C)	0.8 (1.7)
Anti Rotate (100 mm stroke)	0.5 (1.1)
Anti Rotate (150 mm stroke)	0.6 (1.3)
Anti Rotate (300 mm stroke)	0.8 (1.8)
Anti Rotate (450 mm stroke)	1.1 (2.4)
Limit Switch Assembly (100 mm stroke)	0.9 (1.9)
Limit Switch Assembly (150 mm stroke)	1.0 (2.3)
Limit Switch Assembly (300 mm stroke)	1.6 (3.5)
Limit Switch Assembly (450 mm stroke)	2.1 (4.7)

### TTX060 Brake Specifications

Brake Holding Torque (minimum)	Nm	2.5
	lbf-in	22
Brake Voltage	Vdc	24 (-10%/+6%)
Nominal Brake Current at 24 Vdc	A	0.46
Brake Engage/Disengage Time (typical)	ms	10/25

### TTX080 Brake Specifications

Brake Holding Torque (minimum)	Nm	4.5
	lbf-in	40
Brake Voltage	Vdc	24 (-10%/+6%)
Nominal Brake Current at 24 Vdc	A	0.5
Brake Engage/Disengage Time (typical)	ms	18/35

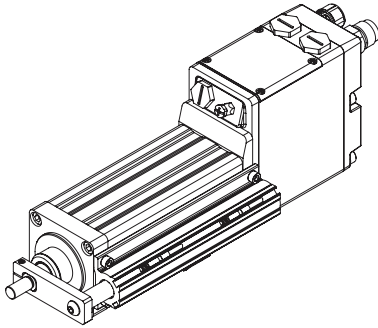
## Tritex TTX Options

### Internal Holding Brake

This option provides an internal holding brake. The brake is spring activated and electrically released.

### External Anti-rotate Assembly

This option allows external limit switches to be mounted to the TTX Series Actuator. Anti-rotation is required for operation. These switches provide travel indication to the controller and are adjustable (Limit switches sold separately).



The external limit switch accessory for the TTX Series of linear actuators allows the user to externally mount adjustable switches for use as the end of travel limit switches or home position sensors.

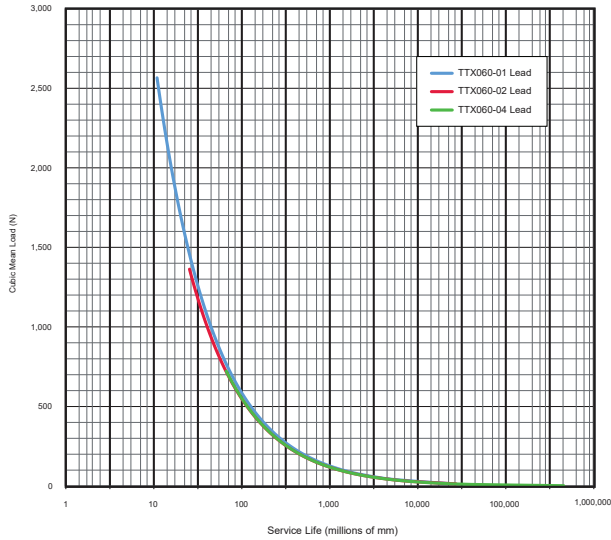
(Limit switches sold separately from actuator)

NOTE: Accessory option "L" required in model mask to order

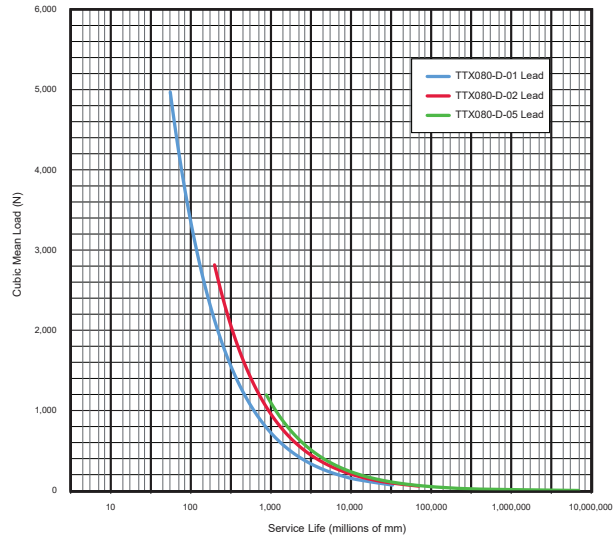
Switch Type	Exlar Part Number	Turck Part Number
Normally Closed Switch, PNP	43404	BIM-UNT-RP6X
Normally Open Switch, PNP	43403	BIM-UNT-AP6X
Normally Closed Switch, NPN	67635	BIM-UNT-RN6X
Normally Open Switch, NPN	67634	BIM-UNT-AN6X

# Tritex TTX L10 Estimated Service Life

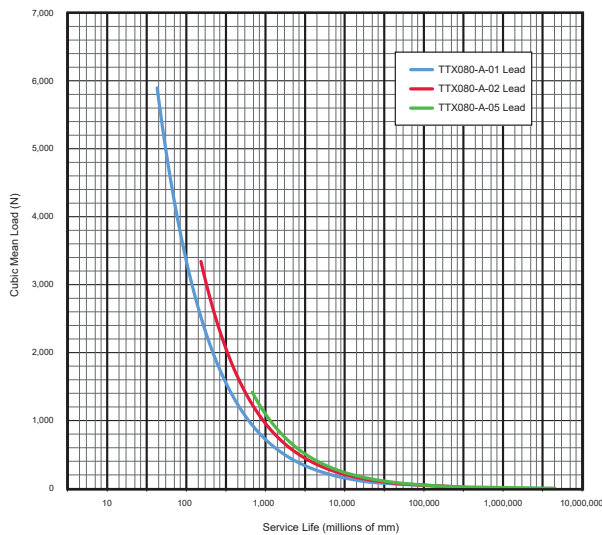
### TTX060 - DC Voltage



### TTX080 - DC Voltage



### TTX080- AC Voltage



#### Service Life Estimate Assumptions:

- Sufficient quality and quantity of lubrication is maintained throughout service life (please refer to the engineering reference section for lubrication interval estimates.)
- Bearing and screw temperature between 20 °C and 40 °C
- No mechanical hard stops (external or internal) or impact loads
- No external side loads
- Does not apply to short stroke, high frequency applications such as fatigue testing or short stroke, high force applications such as pressing. (For information on calculating estimating life for unique applications please refer to the engineering reference section.)

The  $L_{10}$  expected life of a roller screw linear actuator is expressed as the linear travel distance that 90% of properly maintained roller screws are expected to meet or exceed. For higher than 90% reliability, the result should be multiplied by the following factors: 95% x 0.62; 96% x 0.53; 97% x 0.44; 98% x 0.33; 99% x 0.21. This is not a guarantee; these charts should be used for estimation purposes only.

The underlying formula that defines this value is:

Travel life in millions of inches, where:

$C_a$  = Dynamic load rating (lbf)

$F_{cml}$  = Cubic mean applied load (lbf)

$\ell$  = Roller screw lead (inches)

$$L_{10} = \left( \frac{C_a}{F_{cml}} \right)^3 \times \ell$$

For additional details on calculating estimated service life, please refer [www.exlar.com](http://www.exlar.com).



# Speed vs. Force Curves

## Temperature Derating

The speed/torque curves are based on 25 °C ambient conditions. The actuators may be operated at ambient temperatures up to 85 °C.

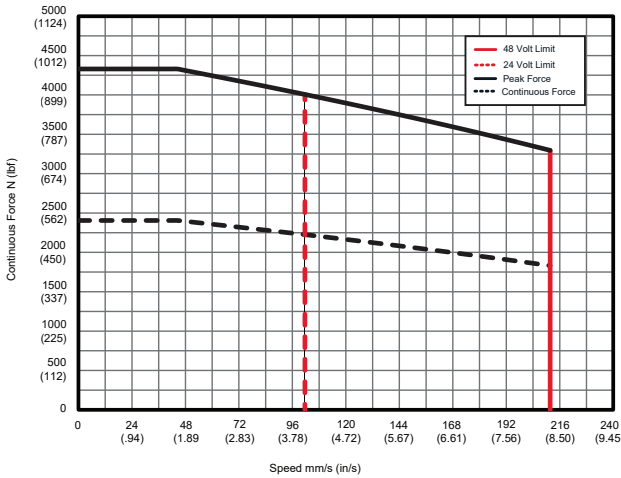
Elevated Ambient Temp Factor (%) =

$$100\% \times \sqrt{\frac{\text{Max Rated Temp } [ \sim 130 \text{ } ^\circ\text{C} ] - \text{Environment Temp } [ \text{in } ^\circ\text{C} ]}{\text{Max Rated Temp } [ \sim 130 \text{ } ^\circ\text{C} ] - \text{Rated Ambient } [ \sim 25 \text{ } ^\circ\text{C} ]}} =$$

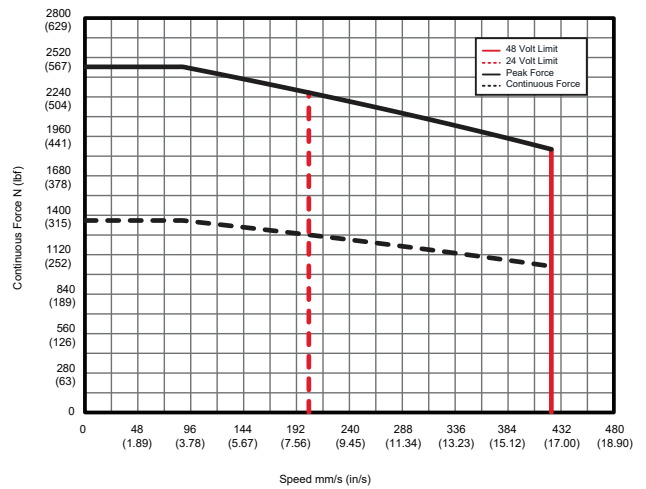
$$100\% \times \sqrt{\frac{130 \text{ } ^\circ\text{C} - \text{Environment Temp}}{105 \text{ } ^\circ\text{C}}} = \text{\% of published continuous @ } 25 \text{ } ^\circ\text{C}$$

## TTX060 DC Voltage

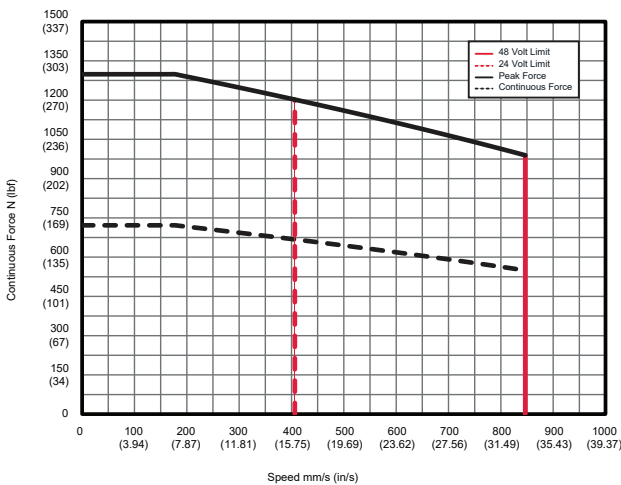
**TTX060 - 01**  
2.54 mm (0.1 in) Screw Lead



**TTX060 - 02**  
5.08 mm (0.2 in) Screw Lead



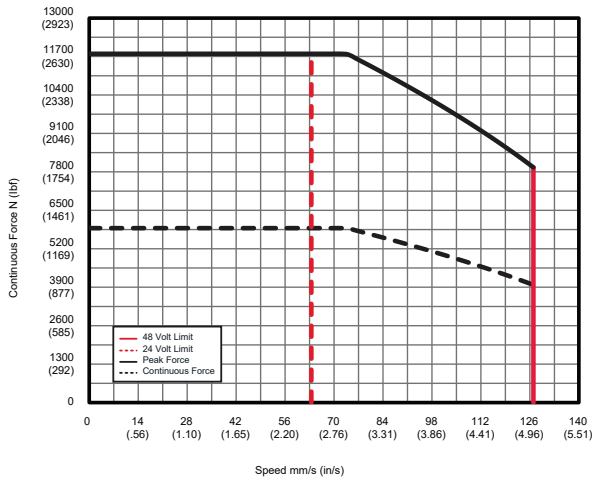
**TTX060 - 04**  
10.16 mm (0.4 in) Screw Lead



## TTX080 - AC Voltage

### TTX080 - 01

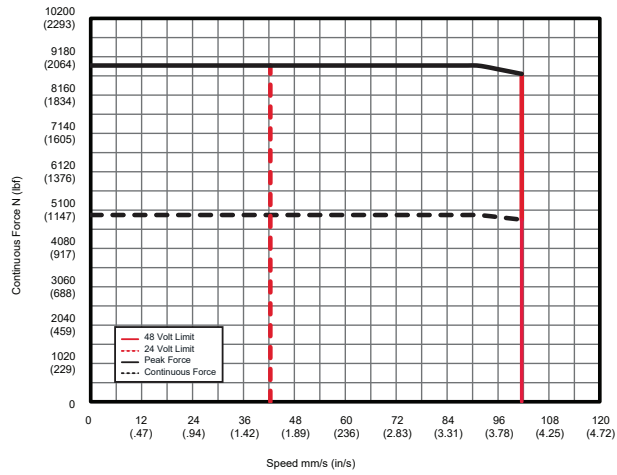
2.54 mm (0.1 in) Screw Lead



## TTX080 - DC Voltage

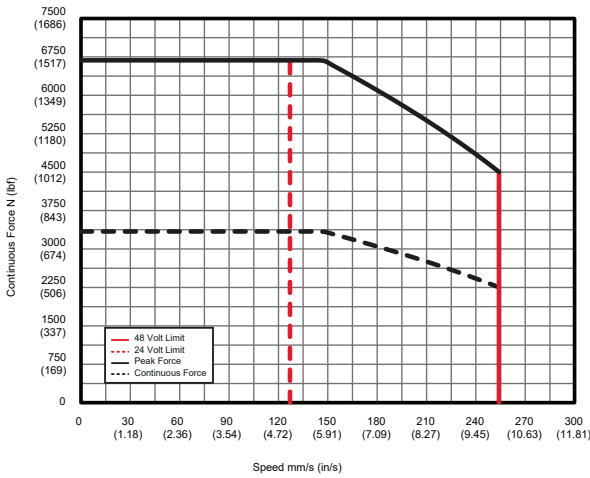
### TTX080 - 01

2.54 mm (0.1 in) Screw Lead



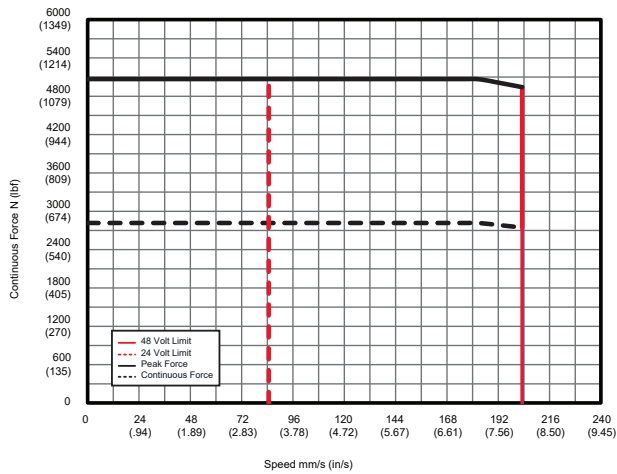
### TTX080 - 02

5.08 mm (0.2 in) Screw Lead



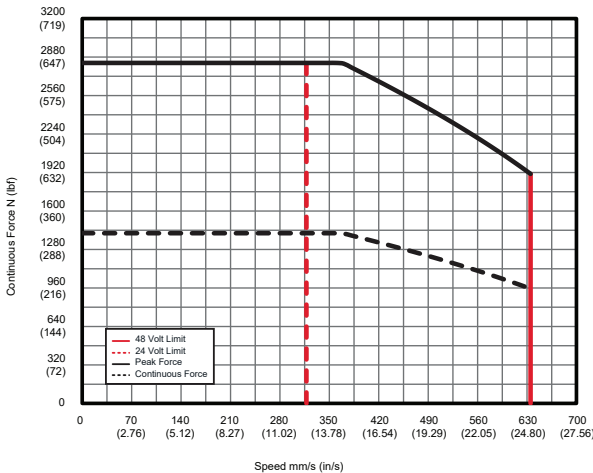
### TTX080 - 02

5.08 mm (0.2 in) Screw Lead



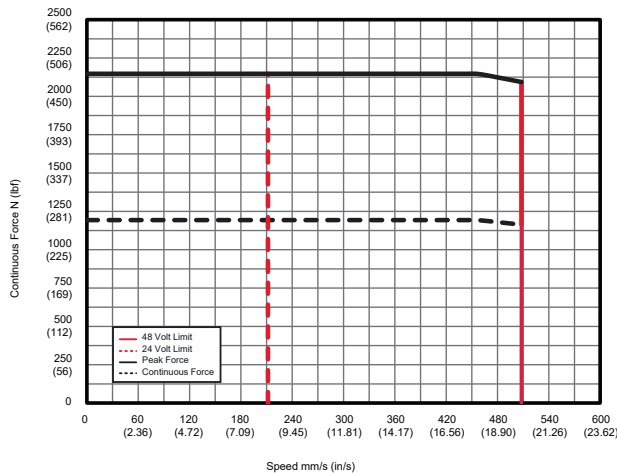
### TTX080 - 05

12.7 mm (0.5 in) Screw Lead



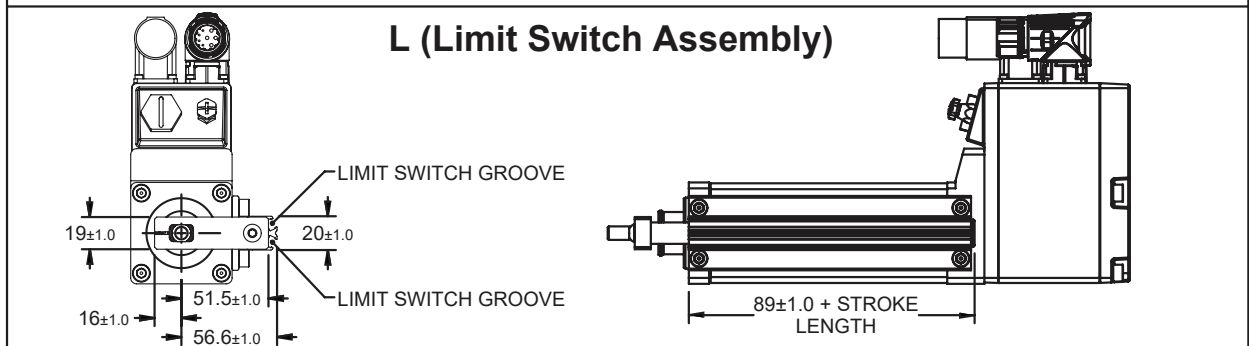
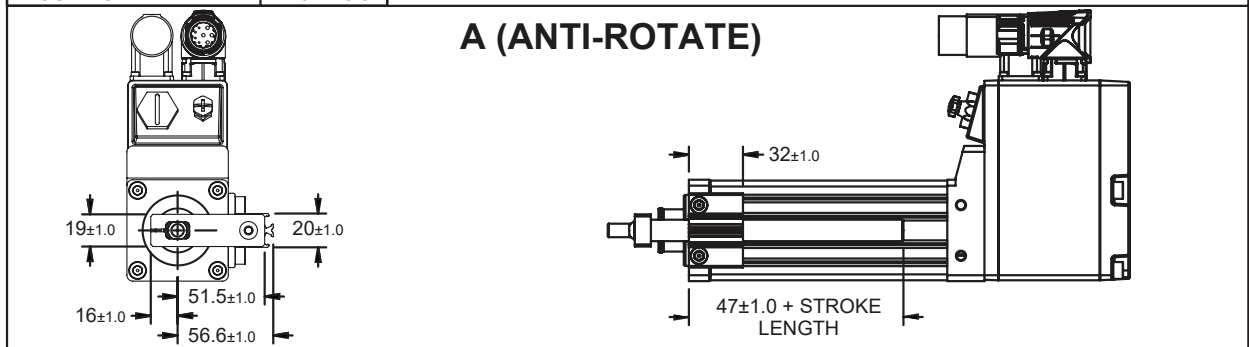
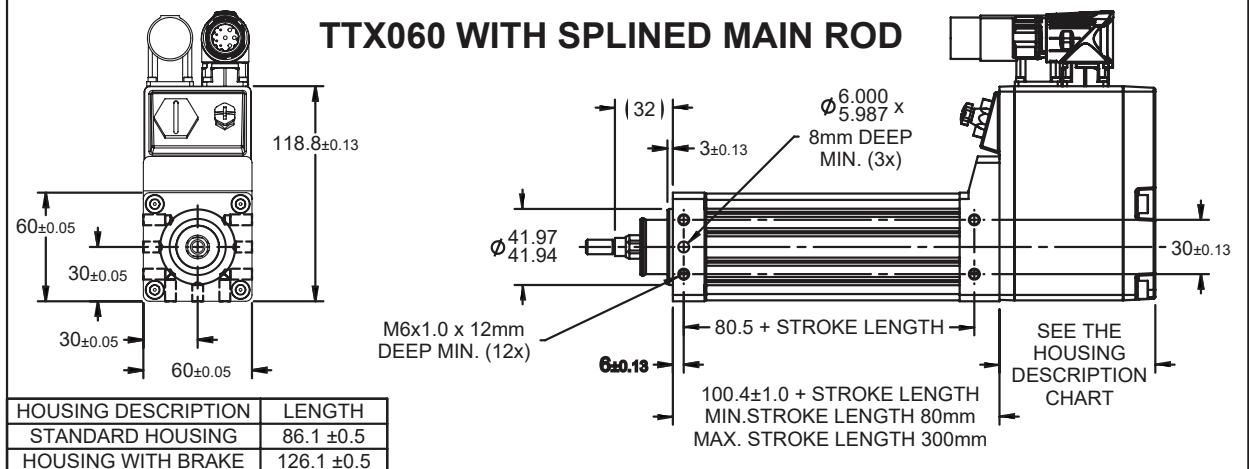
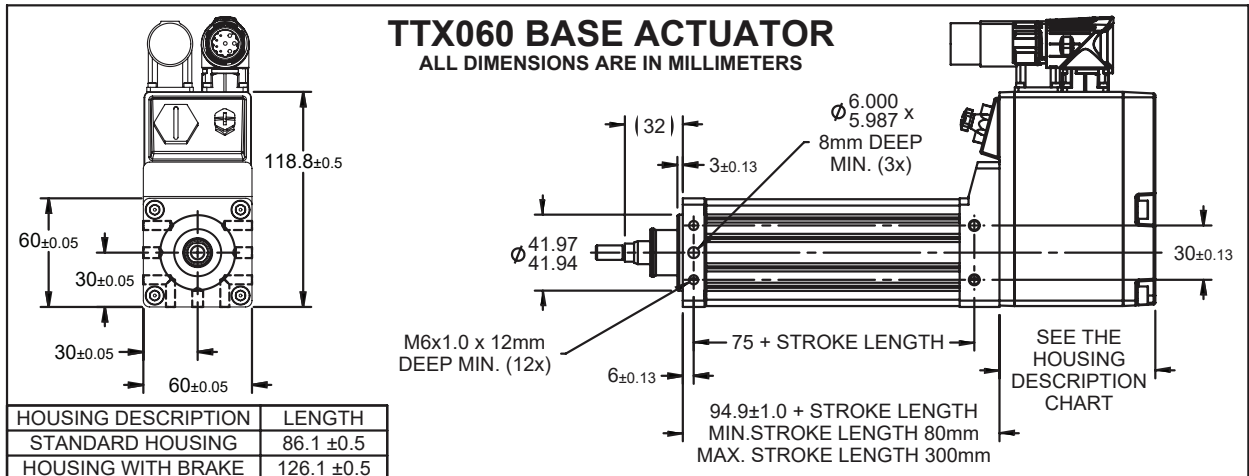
### TTX080 - 05

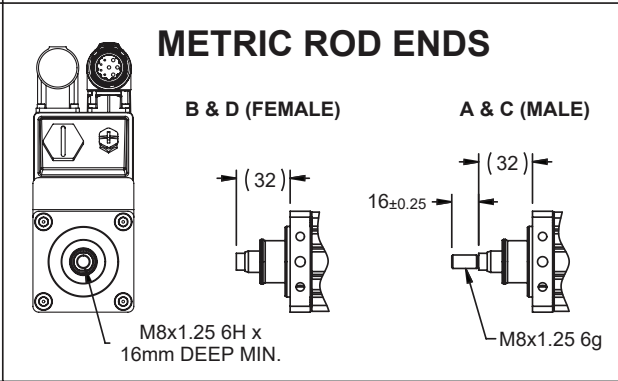
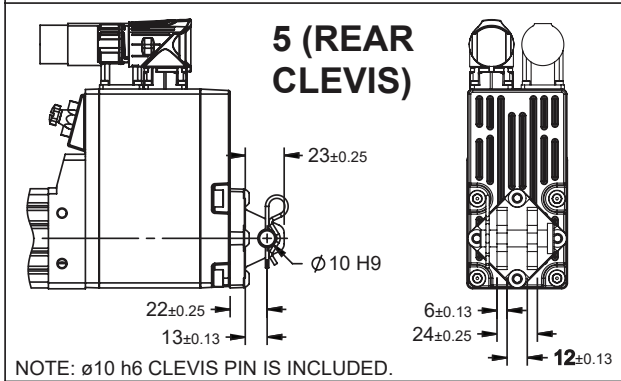
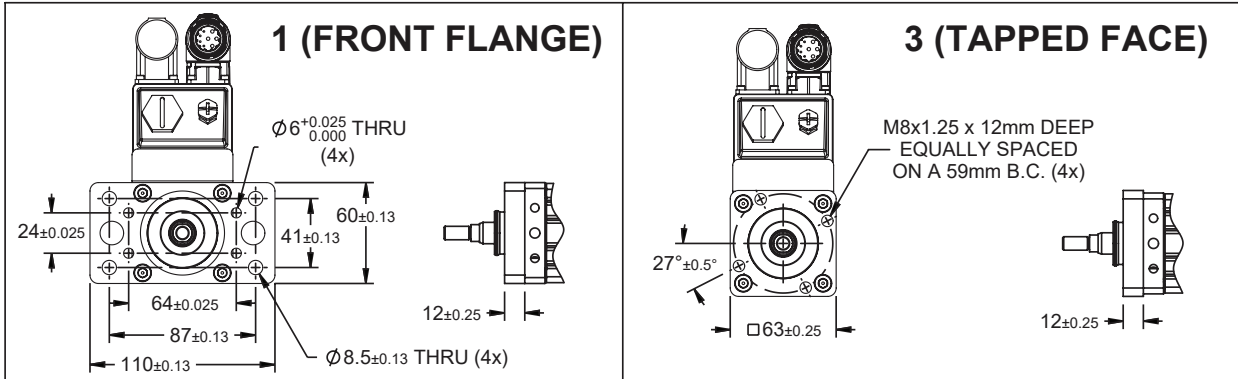
12.7 mm (0.5 in) Screw Lead



\*Test data derived using NEMA recommended aluminum heatsink 10" x 10" x 3/8" at 25 °C ambient.

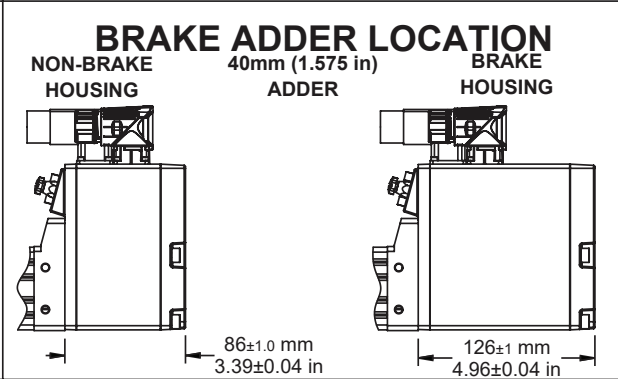
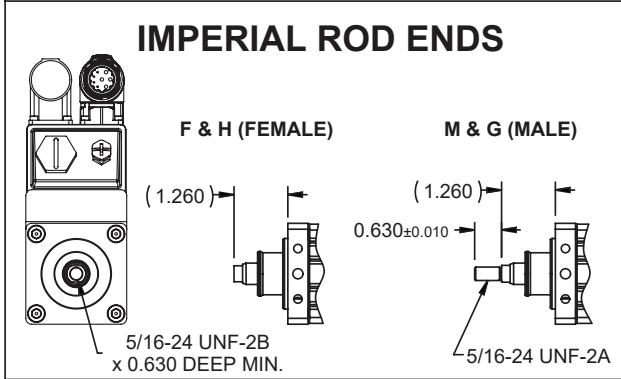
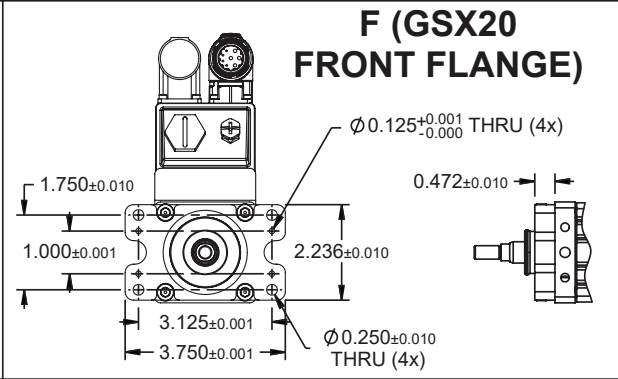
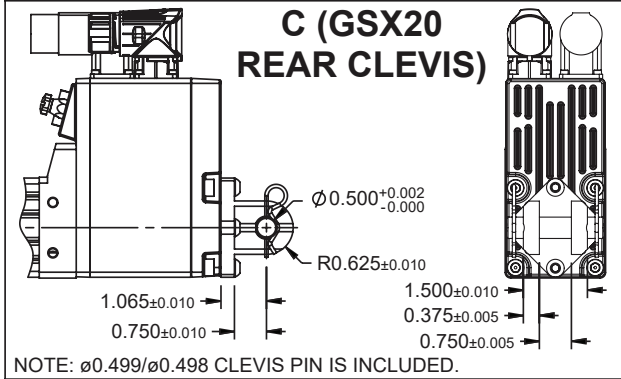
# Tritex TTX Dimensions





## TTX060 IMPERIAL OPTIONS

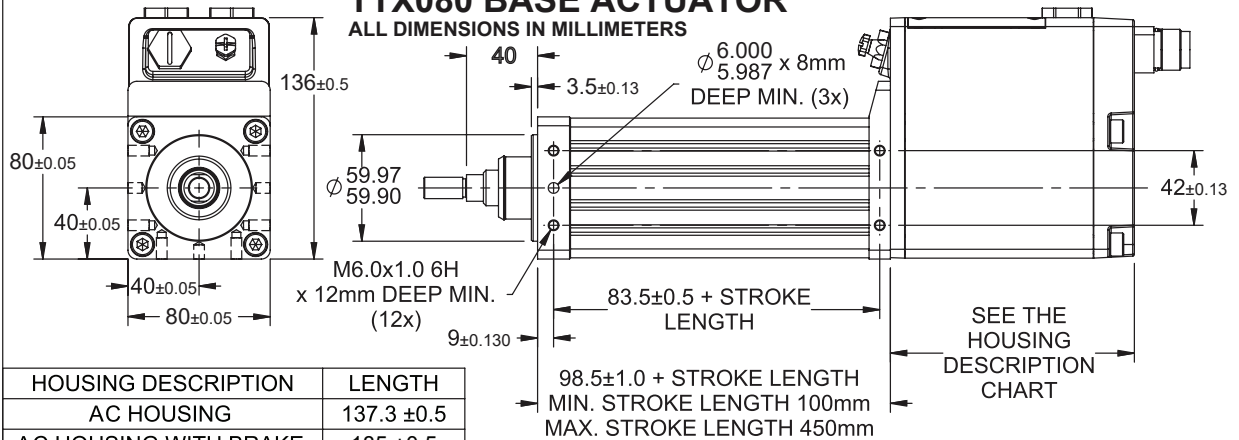
ALL DIMENSIONS ARE IN INCHES



Pre-sale drawings and models are representative and are subject to change. Visit [exlar.com](http://exlar.com) to download a 3D model of your desired configuration.

# TTX080 BASE ACTUATOR

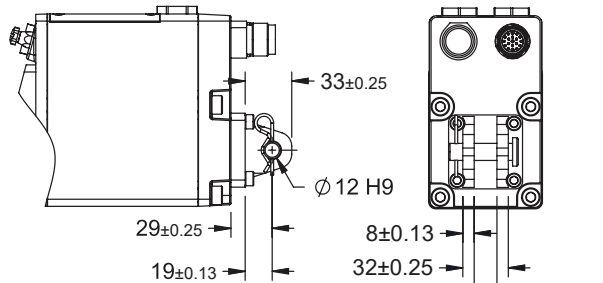
ALL DIMENSIONS IN MILLIMETERS



HOUSING DESCRIPTION	LENGTH
AC HOUSING	$137.3 \pm 0.5$
AC HOUSING WITH BRAKE	$185 \pm 0.5$
DC HOUSING	$116.5 \pm 0.5$
DC HOUSING WITH BRAKE	$164.3 \pm 0.5$

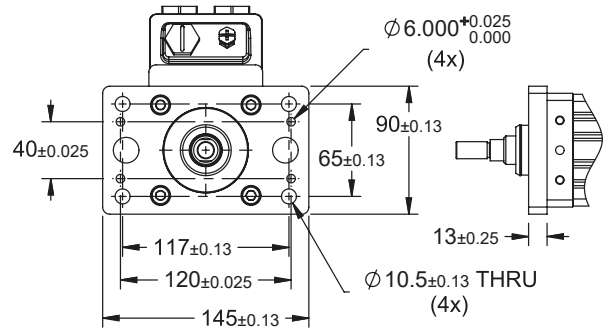
NOTE: ADD 40mm TO THE OVERALL LENGTH IF ORDERING A BRAKE. THE SIDE MOUNT DISTANCE IS NOT AFFECTED.

## 5 (REAR CLEVIS)

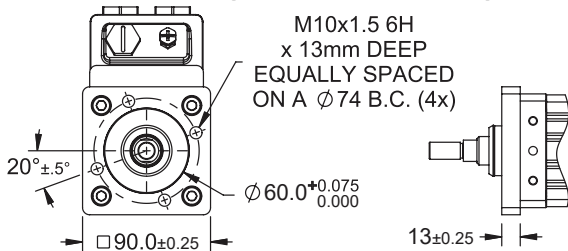


NOTE:  $\phi 12$  h6 CLEVIS PIN IS INCLUDED.

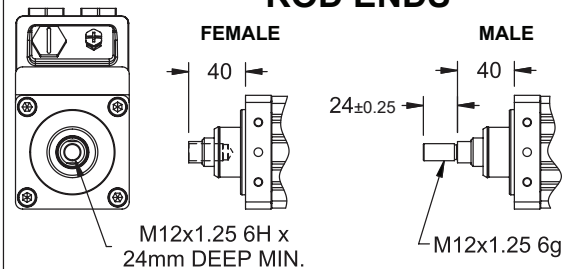
## 1 (FRONT FLANGE)



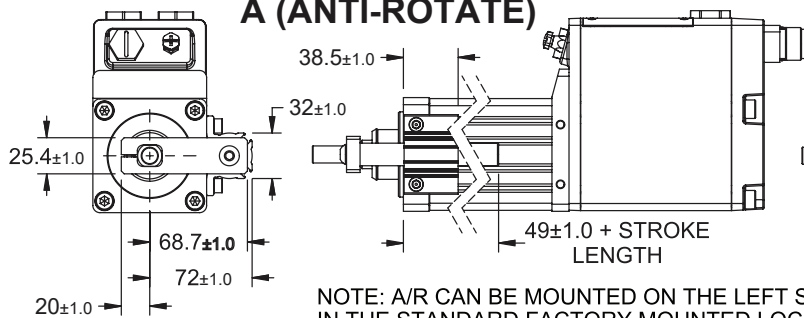
## 3 (TAPPED FACE)



## ROD ENDS

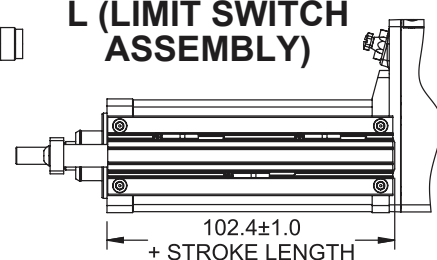


## A (ANTI-ROTATE)



NOTE: A/R CAN BE MOUNTED ON THE LEFT SIDE, RIGHT SIDE OR BOTTOM. SHOWN IN THE STANDARD FACTORY MOUNTED LOCATION. (SWITCHES SOLD SEPARATELY)

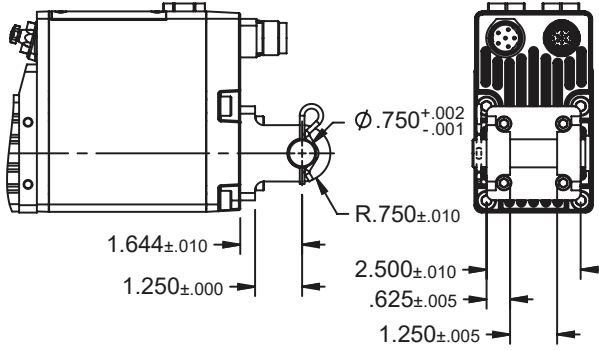
## L (LIMIT SWITCH ASSEMBLY)



## TTX080 IMPERIAL OPTIONS

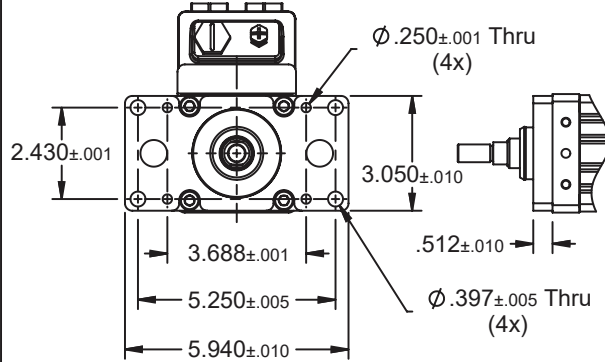
ALL DIMENSIONS IN INCHES

### C (GSX30 REAR CLEVIS)

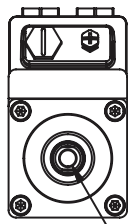


NOTE:  $\phi 0.746/\phi 0.741$  CLEVIS PIN IS INCLUDED.

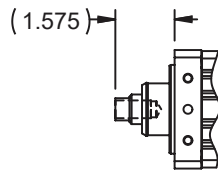
### F (GSX30 FRONT FLANGE)



## ROD ENDS

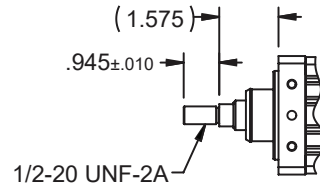


F (FEMALE)



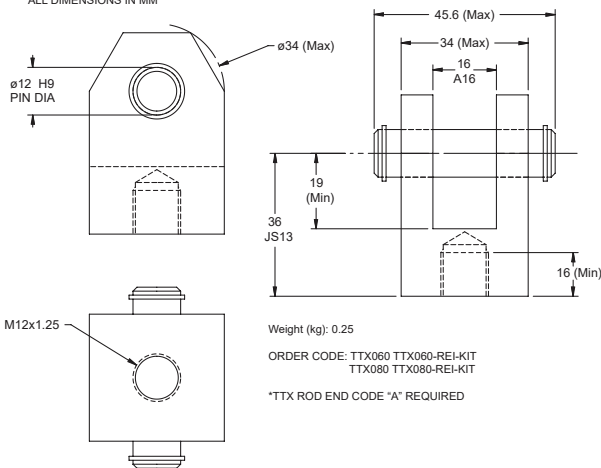
1/2-20 UNF-2B  
x 28mm DEEP MIN.

M (MALE)



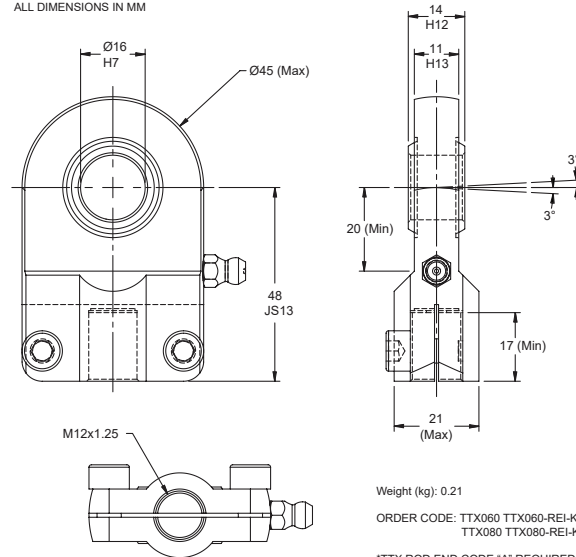
## ROD CLEVIS

ALL DIMENSIONS IN MM



## SPHERICAL ROD EYE

ALL DIMENSIONS IN MM



## Tritex TTX Cables and Accessories

TTX Series Cables & Accessories	Part No.
<b>"I" Connection</b>	
Power cables, molded M23 style connector, 8 pin, xxx = length in feet. Standard lengths 15, 25, 50 feet (DC Stator)	CBL-TTIPC-SMI-xxx
Power cable with M23 6 pin xxx = Length in feet, std lengths 15, 25, 50, 75, 100 (AC Stator)	CBL-T2IPC-SMI-xxx
I/O cables, molded M23 style connector, 19 pin, xx = length in feet. Standard lengths 15, 25, 50 feet	CBL-TTIOC-SMI-xxx
<b>Communications Accessories - RECOMMENDED PC COMMUNICATIONS CABLE</b>	
PC to TTX Communications cable-USB/RS485 to M8 connector, 6 feet	CBL-T2USB485-M8-006
PC to TTX Communications cable-USB/RS485 to M8 connector, 15 feet	CBL-T2USB485-M8-015
<b>Multi-Drop RS485 Accessories</b>	
RS485 splitter - M8 Pin plug to double M8 Socket receptacle	TT485SP
Multidrop Communications Cable for use with TT485SP, 6 feet	CBL-TTDAS-006
Multidrop Communications Cable for use with TT485SP, 15 feet	CBL-TTDAS-015
<b>Multi-Purpose Communications Accessories</b>	
Communication cable, PICO type connector, 4 pin, xxx = length in meters, Standard lengths 4.572, 7.62, 15.24 meters	CBL-TTCOM-xxx



CBL-T2USB485-M8-006 or 015  
Our recommended communications cable.  
No special drivers or setup required for use with MS Windows™.



CBL-TTIOC-SMI-xxx



CBL-TTIPC-SMI-xxx / CBL-T2IPC-SMI-xxx



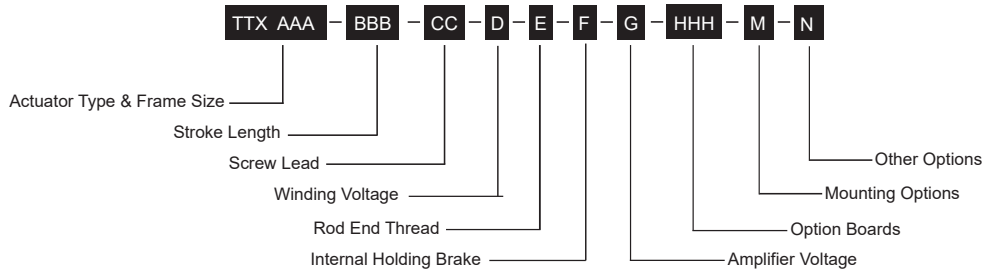
CBL-TTCOM-xxx  
Use with CBL-T2USB485-xxx  
for long cable runs.



CBL-TTDAS-006 or 015  
For use with TT485SP for  
multi-drop applications.



TT485SP  
RS485 communications splitter.  
Use to daisy-chain multiple TTX  
actuators.



**Actuator Type**

TTX = Intelligent Drive / Motor / Actuator

**AAA = Actuator Frame Size**

060 = 60 mm (2.36 in)  
080 = 80 mm (3.15 in)

**BBB = Stroke Length**

080 = 80 mm - TTX060 only  
100 = 100 mm - TTX080 only  
150 = 150 mm  
300 = 300 mm  
450 = 450 mm - TTX080 only

**CC = Screw Lead**

01 = 2.54 mm (0.1 in)  
02 = 5.08 mm (0.2 in)  
04 = 10.2 mm (0.4 in) - TTX060 only  
05 = 12.7 mm (0.5 in) - TTX080 only

**D = Winding Voltage**

4 = 230 Vac Max - TTX080 only  
D = 48 Vdc Max

**E = Rod End Thread**

A = Male Metric  
B = Female Metric<sup>2</sup>  
C = Male Metric, Splined<sup>2</sup>  
D = Female Metric, Splined<sup>2</sup>  
F = Female Standard<sup>2</sup>  
G = Male Standard, Splined<sup>2</sup>  
H = Female Standard, Splined<sup>2</sup>  
L = Female Metric, 17-4 Stainless<sup>2</sup>  
M = Male Standard<sup>2</sup>  
R = Male Metric, 17-4 Stainless<sup>2</sup>  
V = Female Standard, 17-4 Stainless<sup>2</sup>  
W = Male Standard, 17-4 Stainless<sup>2</sup>

**F = Internal Holding Brake**

N = No Brake  
B = Internal Holding Brake, Electrically Released

**G = Amplifier Voltage**

A = 230 Vac 1-ph Max Input - TTX080 only  
D = 48 Vdc Max Input

**HHH = Option Boards**

SIO = Standard I/O Interconnect  
IA4 = 4-20 mA Analog I/O  
EIP = SIO plus EtherNet/IP w/M12 connector  
PIO = SIO plus PROFINET IO w/M12 connector  
TCP = SIO plus Modbus TCP w/M12 connector

**M = Mounting Options**

N = None  
1 = Front Flange, Metric  
3 = Tapped Face, Metric  
5 = Rear Clevis, Metric  
F = Front Flange, Standard<sup>2</sup>  
C = Rear Clevis, Standard<sup>2</sup>

**N = Accessory Options**

N = None  
A = Anti-Rotate Assembly  
L = Limit Switch Housing / Anti-Rotate Assembly<sup>1</sup>

<sup>1</sup>Switches sold separately  
<sup>2</sup>Available option. May add lead time.



For options or specials not listed above or for extended temperature operation, please contact Exlar



## Warranty and Limitations of Liability

**WARRANTY AND LIMITATION OF LIABILITY:** Please see our warranty on our website here: [Division Policies | About | Actuation Division | Curtiss-Wright Actuation Group \(cw-actuation.com\)](#) for details.

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