

# TRS

## TWIN PROFILE RAIL STAGE

### STROKE CONFIGURABLE ACTUATOR



TRS165STD

TRS100C2C  
(C2C: Carrier to Carrier)

TRS100STD

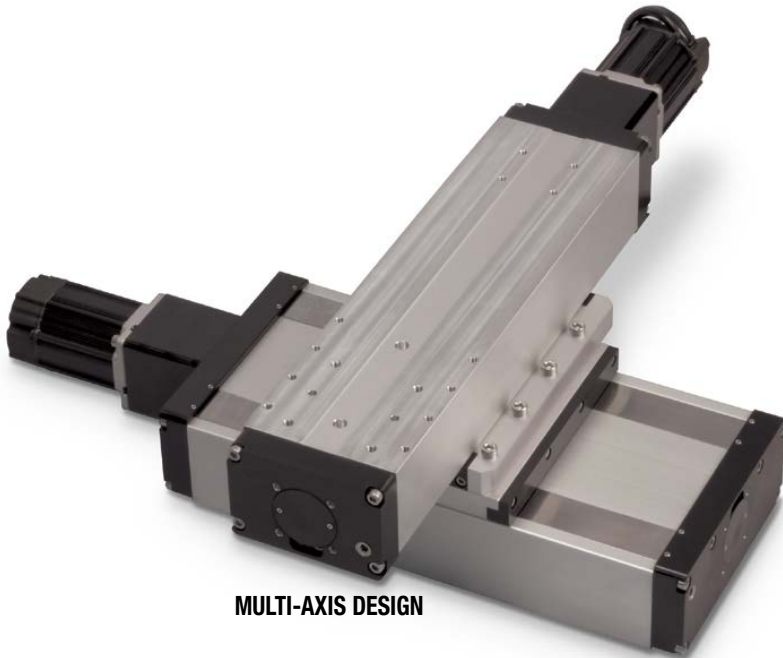
**ENCLOSED DESIGN  
PROFILED RAIL ACTUATOR**

# TRS Twin Rail Stage Actuator

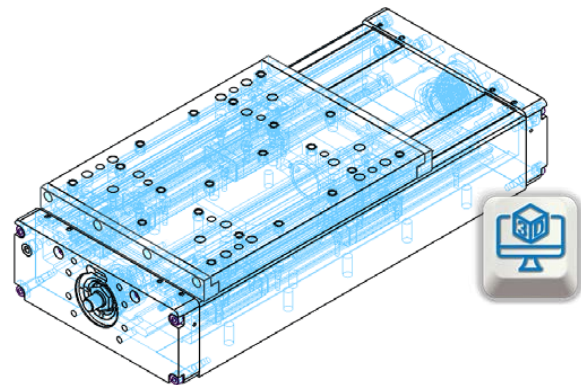
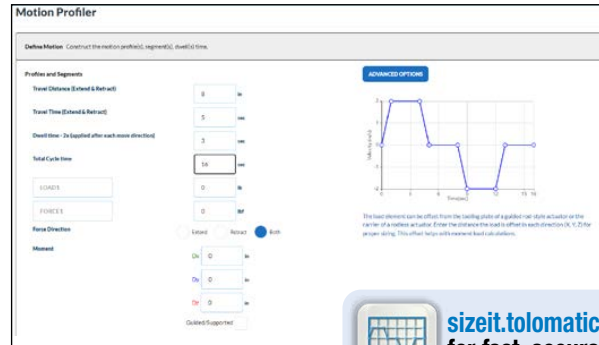
## TRS: A Rugged, Accurate Stage

The TRS is a highly capable stage product and is the perfect for a base in multi-axis systems. The machined, rigid design handles high moment loading while providing reliable positioning along the length of travel.





Maximum flexibility is achieved through stroke configurable design, ensuring the right stroke length can be selected to minimize footprint. Online CAD and Sizing tools enable rapid design iterations throughout the design process.



MULTI-AXIS DESIGN



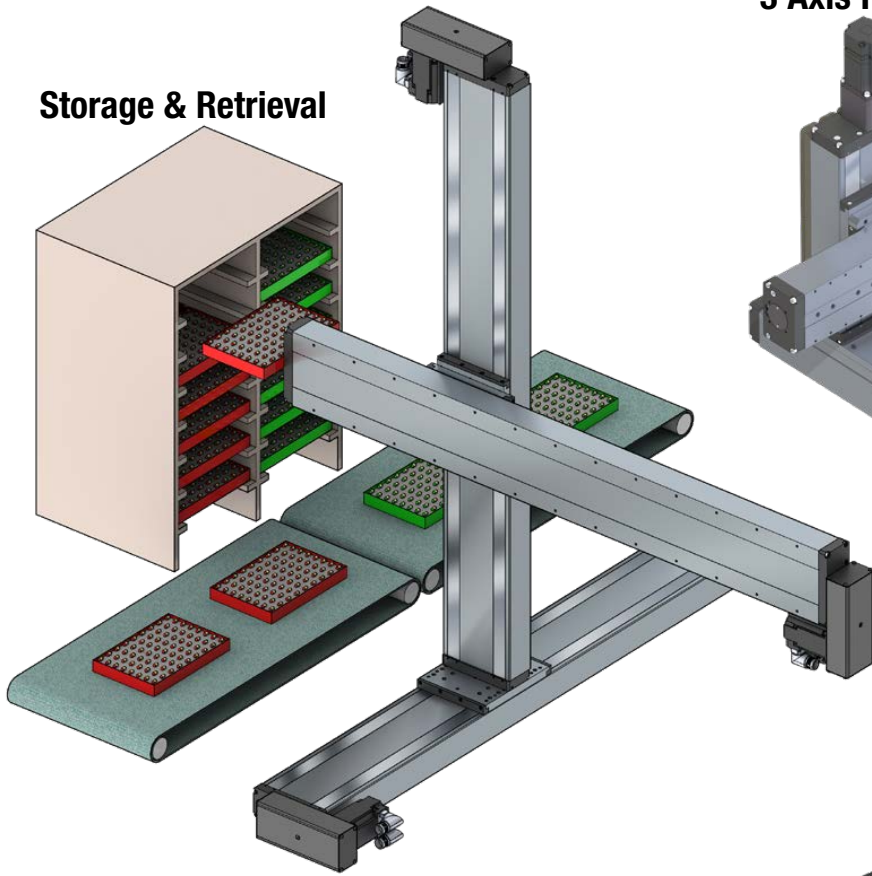
## A Comparison of Screw Drive Actuators

|   | TRS   | B3S   | MXE-S  | MXE-P   |
|---|---|---|--|---|
|   |  |  |  |  |
| <b>Features:</b>  | Superior rigidity, high moment load capacities                                      | Internal bearing, highest load and bending moments                                  | Basic guidance and support   | High load and bending moment capacities   |
| <b>Load</b> up to: <i>(with options)</i>  | 1,356 lb [615 kg]   | 8,000 lb [3,629 kg]   | 1,040 lb [472 kg]  | 2,584 lb [1,172 kg]   |
| <b>Thrust</b> up to:  | 562 lbf [2.5 kN]  | 2,700 lbf [12 kN]   | 4,300 lbf [19.1 kN]  | 4,300 lbf 19.1 kN]  |
| <b>Speed</b> up to:   | 36 in/sec [910 mm/sec]  | 60 in/sec [1,500 mm/sec]  | 60 in/sec [1,500 mm/sec]   | 60 in/sec [1,500 mm/sec]  |
| <b>Stroke Length</b> up to:   | 43 in [1,090 mm]  | 179 in [4,550 mm]   | 179 in [4,550 mm]  | 179 in [4,550 mm]   |
| <b>Screw/Nut Type</b>   | Ball & Roller   | Solid & Ball  | Solid & Ball   | Solid & Ball  |
| <b>www.tolomatic.com</b> for complete information, search by literature number: |   |   |  |   |
| <b>Literature Number:</b>   | 3600-4222   | 3600-4176   | 8300-4000  | 8300-4000   |

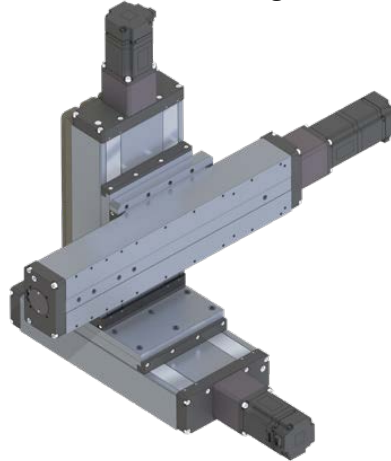
*(Not all models deliver ALL maximum values listed, i.e.: Maximum thrust may not be available with maximum speed)*

# TRS Twin Rail Stage Actuator

## Storage & Retrieval



## 3 Axis Positioning



## CONTENTS

Rodless Comparison ....TRS\_2

Applications.....TRS\_3

TRS Features .....TRS\_3

TRS Specifications .....TRS\_6

TRS Dimensions.....TRS\_11

Switches .....TRS\_13

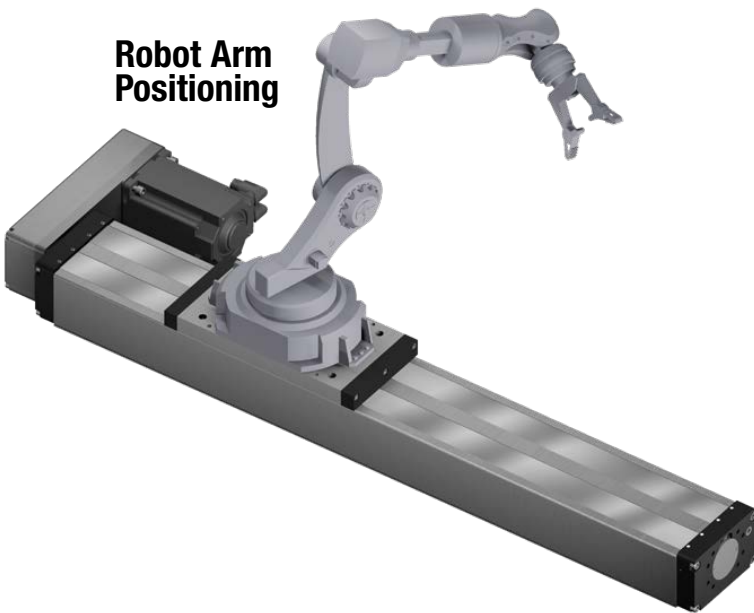
Application Data  
Worksheet.....TRS\_17

Selection Guidelines ...TRS\_18

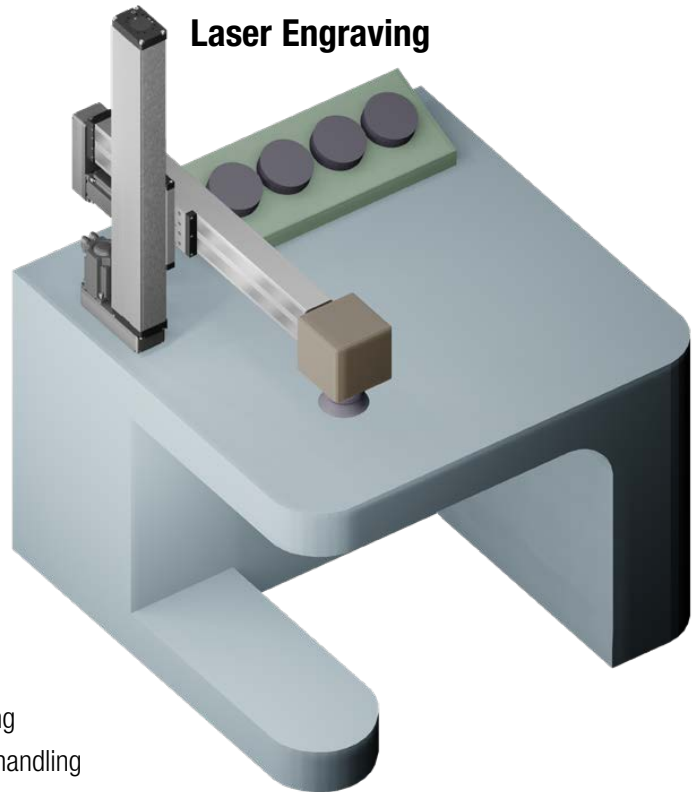
TRS Ordering .....TRS\_19

Other Tolomatic  
Products.....TRS\_20

## Robot Arm Positioning



## Laser Engraving



- Inspection and measurement
- Medical equipment
- Pick and place
- Precision grinders
- Stage motion control
- Table positioning
- Test stands
- Machine centers
- Machine tools
- Drilling
- Cutting
- Positioning
- Material handling systems
- Pick and place
- X Y Z axis (2 and 3 axis configurations)

Sold & Serviced By:



Toll Free Phone (877) SERV098

[www.electromate.com](http://www.electromate.com)

[sales@electromate.com](mailto:sales@electromate.com)

# TWIN RAIL STAGE ENCLOSED DESIGN PROFILED RAIL ACTUATOR

## ENDURANCE TECHNOLOGY<sup>SM</sup>

A Tolomatic Design Principle

*REDUCE UNPLANNED DOWNTIME: Endurance Technology features are designed for maximum durability to provide extended service life.*

The TRS Twin profile rail stage with enclosed design is built from the ground up to be highly rigid and accurate. Available in 100 and 165 sizes and capable of handling loads up to 1,356 lb (615 kg). To maximize design flexibility, the TRS actuator is stroke configurable to minimize overall machine footprint.

### CARRIER TO CARRIER MOUNTING

- Build a multi-axis system with reduced components by leveraging this standard mounting option
- Tolomatic representatives are available to assist with the sizing

### HIGH RIGIDITY

Twin rails each with 2 bearings minimizes deflection for reliable and accurate positioning along the length of travel

### MULTIPLE SCREW TECHNOLOGIES

#### ROLLER NUT

Roller nuts provide the highest thrust and life ratings available



#### BALL NUT

Ball nuts offer efficiency at a cost effective price



#### SCREW ACCURACY

$\pm 0.0102\text{mm}/300\text{mm}; \pm 0.0004\text{"/ft.}$

#### SCREW ACCURACY

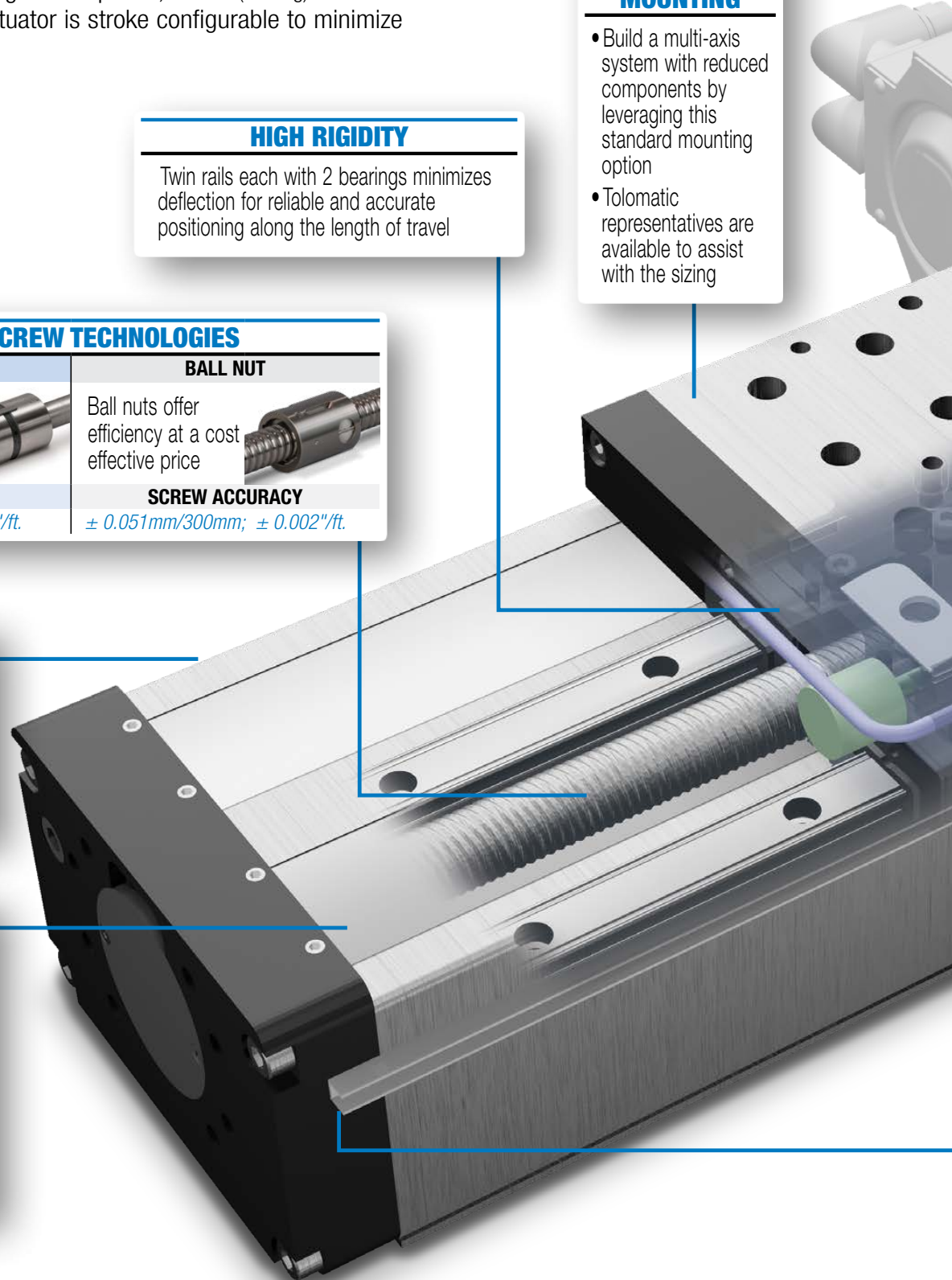
$\pm 0.051\text{mm}/300\text{mm}; \pm 0.002\text{"/ft.}$

### BREATHER/PURGE PORTS

Positive pressure with air lines and filters helps reduce contamination of the interior of the actuator

### IP44 RATED WITH STAINLESS STEEL DUST BANDS

- Perfect for industrial environments
- Limits the amount of contaminants that enter the actuator, which protects components for reduced maintenance and increased uptime



# Tolomatic™ ... MAXIMUM DURABILITY

EXCELLENCE IN MOTION

## YOUR MOTOR HERE

- For maximum design flexibility, specify the motor or gearbox to be installed with in-line or reverse parallel mounting.
- For out of the box installation, the TRS actuator ships with the proper mounting hardware

## STANDARD MOUNTING FEATURES

- **Threaded mounting holes:** Evenly spaced along the base of the actuator
- **Dowel pin holes:** Ensures the actuator can be aligned without additional modification

## CLEAN SMOOTH DESIGN

- Smooth and flat surface to create the cleanest sealing design in the industry
- Wiper and seal are integrated in carrier design to enable clean and smooth operation

## OPTIONAL TOE CLAMP MOUNTING

Slot and clamps provide convenient mounting option for fast installation



## OPTIONAL SWITCH WITH RAIL

- 12 switch choices in normally open or closed; with flying leads or quick-disconnect



- Easily adjust the location of switches along the length of the actuator

Sold & Serviced By:

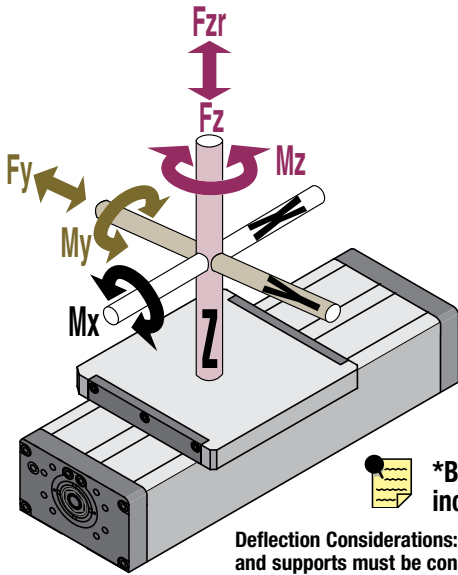
 **ELECTROMATE**

Toll Free Phone (877) SERV098  
[www.electromate.com](http://www.electromate.com)  
[sales@electromate.com](mailto:sales@electromate.com)

# TRS Twin Rail Stage Actuator



## BENDING MOMENTS



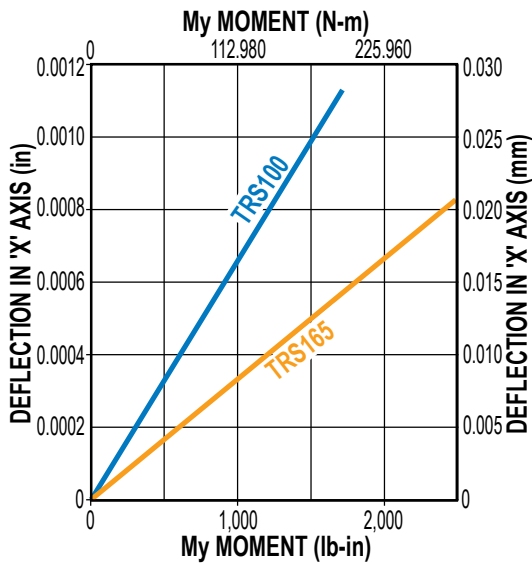
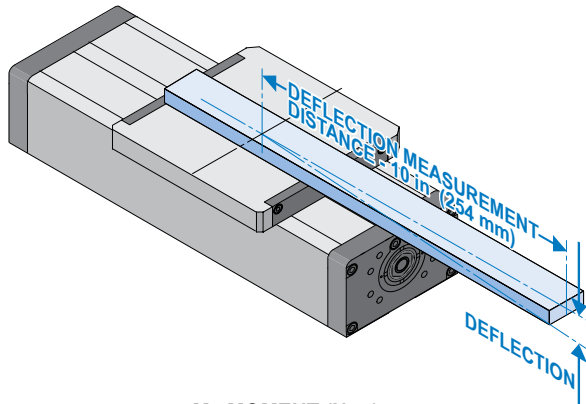
| MAX. BENDING MOMENTS AND LOADS* |     |        |     |                   |              |
|---------------------------------|-----|--------|-----|-------------------|--------------|
|                                 |     | Metric |     | U.S. Conventional |              |
| Max. Bending Moments            |     | 100    | 165 | 100               | 165          |
| <b>Mx</b> (Roll)                | N-m | 101    | 294 | lb-in             | 895, 2,604   |
| <b>My</b> (Pitch)               | N-m | 194    | 284 | lb-in             | 1,718, 2,512 |
| <b>Mz</b> (Yaw)                 | N-m | 175    | 256 | lb-in             | 1,551, 2,269 |
| Max. Loads                      |     |        |     |                   |              |
| <b>Fz</b> (Radial)              | kg  | 492    | 615 | lb                | 1,085, 1,356 |
| <b>Fzr</b> (Reverse Radial)     | kg  | 421    | 526 | lb                | 928, 1,160   |
| <b>Fy</b> (Lateral)             | kg  | 380    | 475 | lb                | 838, 1,048   |

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

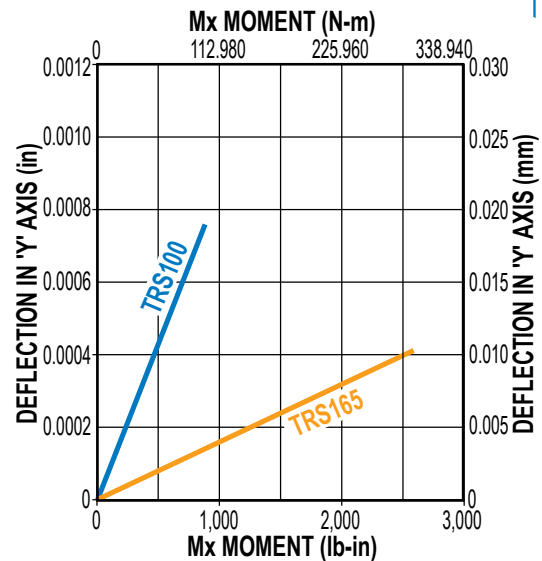
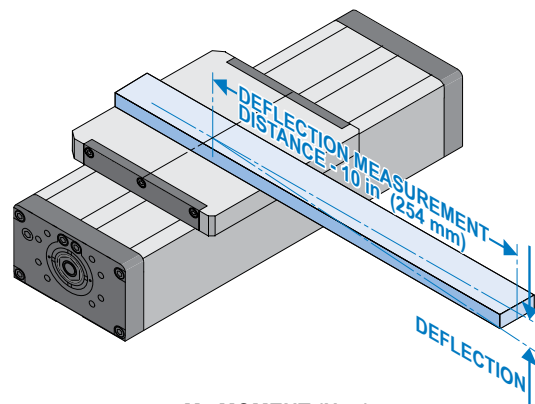
Deflection Considerations: In applications where substantial Mx or My moments come into play, deflection of the actuator frame, carrier and supports must be considered. The deflection values shown in the Load Deflection charts, are based on actuator mounted with its base fully restrained to a surface.

## LOAD DEFLECTION

### DEFLECTION ABOUT THE Y-AXIS



### DEFLECTION ABOUT THE X-AXIS



# TRS Twin Rail Stage Actuator



## TRS SPECIFICATIONS

### SPECIFICATIONS RELATED TO ACTUATOR SIZE AND SCREW SELECTION

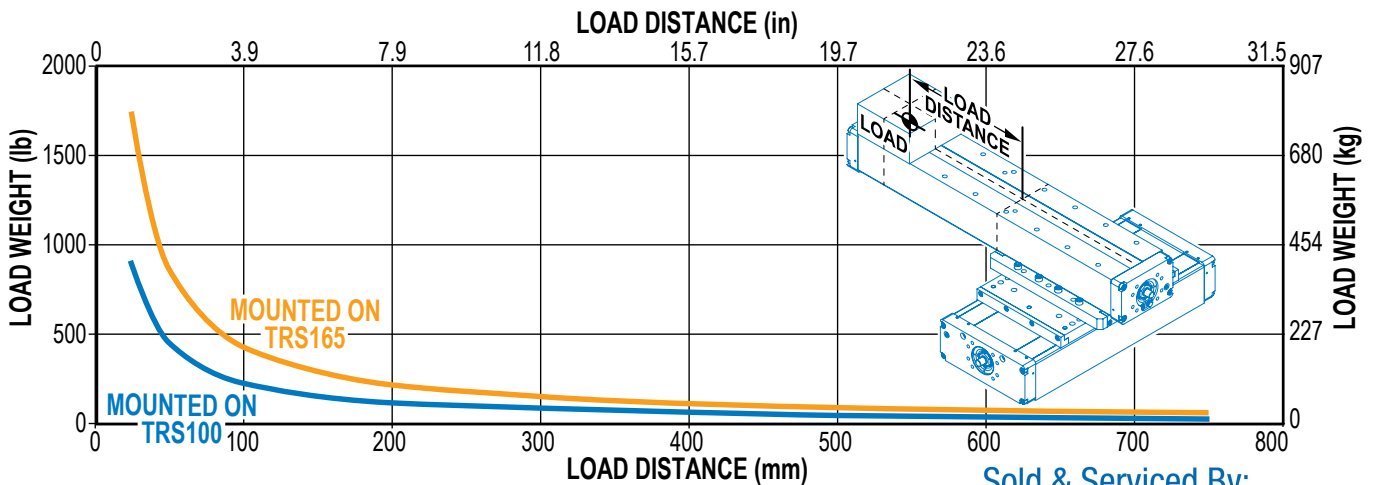
| TRS LEAD SCREWS METRIC |            |           |              |                        |               |                    |                     |   |   |  |                               |
|------------------------|------------|-----------|--------------|------------------------|---------------|--------------------|---------------------|---|---|--|-------------------------------|
| ACTUATOR               | SCREW CODE | LEAD (mm) | MOTOR CONFIG | LEAD ACCURACY (mm/300) | BACKLASH (mm) | MAXIMUM THRUST (N) | MAXIMUM STROKE (mm) | INERTIA   |   |  | DYNAMIC FRICTION TORQUE (N-m) |
|                        |            |           |              |                        |               |                    |                     | BASE ACTUATOR                                   |   | PER/in OF STROKE (kg-m <sup>2</sup> x 10 <sup>-6</sup> ) |                               |
|                        |            |           |              |                        |               |                    |                     | In Line (kg-m <sup>2</sup> x 10 <sup>-6</sup> ) | Rev. Parallel (kg-m <sup>2</sup> x 10 <sup>-6</sup> ) |  |                               |
| TRS100                 | BNM05      | 5         | BOTH         | 0.100                  | 0.07 - 0.12   | 2,500              | 750                 | 40.82   | 135.32  | 1.29   | 0.18                          |
|                        | BNM10      | 10        | BOTH         | 0.100                  | 0.07 - 0.12   | 2,500              | 750                 | 45.35   | 139.85  | 1.29   | 0.19                          |
| TRS165                 | BNM05      | 5         | BOTH         | 0.100                  | 0.07 - 0.12   | 2,500              | 1,100               | 40.67   | 135.17  | 1.29   | 0.18                          |
|                        | BNM10      | 10        | BOTH         | 0.100                  | 0.07 - 0.12   | 2,500              | 1,100               | 43.30   | 137.80  | 1.29   | 0.19                          |
|                        | RN05       | 5         | LMI          | 0.010                  | 0.03          | 2,500              | 575                 | 38.48   | —   | 0.99   | 0.21                          |
|                        | RN05       | 5         | RP           | 0.010                  | 0.03          | 2,500              | 557                 | —   | 132.98  | 0.99   | 0.23                          |
|                        | RN10       | 10        | LMI          | 0.010                  | 0.03          | 2,500              | 575                 | 41.67   | —   | 0.99   | 0.21                          |
|                        | RN10       | 10        | RP           | 0.010                  | 0.03          | 2,500              | 557                 | —   | 136.16  | 0.99   | 0.23                          |

| TRS LEAD SCREWS U.S. CONVENTIONAL |            |           |              |                       |                 |                      |                     |                               |                                     |  |                                 |
|-----------------------------------|------------|-----------|--------------|-----------------------|-----------------|----------------------|---------------------|-------------------------------|-------------------------------------|--|---------------------------------|
| ACTUATOR                          | SCREW CODE | LEAD (mm) | MOTOR CONFIG | LEAD ACCURACY (in/ft) | BACKLASH (in)   | MAXIMUM THRUST (lbf) | MAXIMUM STROKE (in) | INERTIA                       |                                     |  | DYNAMIC FRICTION TORQUE (lb-in) |
|                                   |            |           |              |                       |                 |                      |                     | BASE ACTUATOR                 |                                     | PER/in OF STROKE (lb-in <sup>2</sup> ) |                                 |
|                                   |            |           |              |                       |                 |                      |                     | In Line (lb-in <sup>2</sup> ) | Rev. Parallel (lb-in <sup>2</sup> ) |  |                                 |
| TRS100                            | BNM05      | 5         | BOTH         | 0.004                 | 0.0028 - 0.0050 | 562                  | 29.5                | 0.1397                        | 0.4631                              | 0.0044                                 | 1.56                            |
|                                   | BNM10      | 10        | BOTH         | 0.004                 | 0.0028 - 0.0050 | 562                  | 29.5                | 0.1552                        | 0.4786                              | 0.0044                                 | 1.69                            |
| TRS165                            | BNM05      | 5         | BOTH         | 0.004                 | 0.0028 - 0.0050 | 562                  | 43.3                | 0.1392                        | 0.4626                              | 0.0044                                 | 1.56                            |
|                                   | BNM10      | 10        | BOTH         | 0.004                 | 0.0028 - 0.0050 | 562                  | 43.3                | 0.1482                        | 0.4716                              | 0.0044                                 | 1.69                            |
|                                   | RN05       | 5         | LMI          | 0.0004                | 0.0012          | 562                  | 22.6                | 0.1317                        | —                                   | 0.0034                                 | 1.88                            |
|                                   | RN05       | 5         | RP           | 0.0004                | 0.0012          | 562                  | 21.9                | —                             | 0.4551                              | 0.0034                                 | 2.00                            |
|                                   | RN10       | 10        | LMI          | 0.0004                | 0.0012          | 562                  | 22.6                | 0.1426                        | —                                   | 0.0034                                 | 1.88                            |
|                                   | RN10       | 10        | RP           | 0.0004                | 0.0012          | 562                  | 21.9                | —                             | 0.466                               | 0.0034                                 | 2.00                            |

**SCREW TYPE DESCRIPTION**  
 RN Roller Nut  
 BN Ball Nut

Contact the factory for higher accuracy and lower backlash options.

### TRS CARRIER TO CARRIER MAX. LOAD



Sold & Serviced By:



Toll Free Phone (877) SERV098  
[www.electromate.com](http://www.electromate.com)  
[sales@electromate.com](mailto:sales@electromate.com)

# TRS Twin Rail Stage Actuator



## ACTUATOR SPECIFICATIONS

|                             |                    | TRS100   |       | TRS165   |       |            |       |
|-----------------------------|--------------------|----------|-------|----------|-------|------------|-------|
|                             |                    | Ball Nut |       | Ball Nut |       | Roller Nut |       |
|                             |                    | LMI      | RP    | LMI      | RP    | LMI        | RP    |
| Carrier Assembly Weight     | kg                 | 2.16     | 2.16  | 3.20     | 3.20  | 3.55       | 3.55  |
| Base Weight (incl. carrier) | kg                 | 5.97     | 7.79  | 8.44     | 10.26 | 8.74       | 10.56 |
| Weight per unit of stroke   | kg/mm              | 0.010    | 0.010 | 0.015    | 0.015 | 0.014      | 0.014 |
| Carrier Assembly Weight     | lb                 | 4.75     | 4.75  | 7.06     | 7.06  | 7.82       | 7.82  |
| Base Weight (incl. carrier) | lb                 | 13.17    | 17.18 | 18.61    | 22.62 | 19.28      | 23.29 |
| Weight per unit of stroke   | lb/in              | 0.56     | 0.56  | 0.81     | 0.81  | 0.80       | 0.80  |
| Temperature Range           | 4-54 °C; 40-130 °F |          |       |          |       |            |       |

## FRICITION FORCE

$$N = 0.003 \times \text{LOAD (kg)} + 17.6$$

$$\text{lbf} = 0.0003 \times \text{LOAD (lb)} + 3.96$$

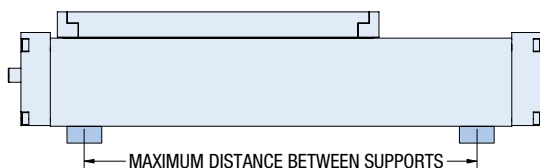
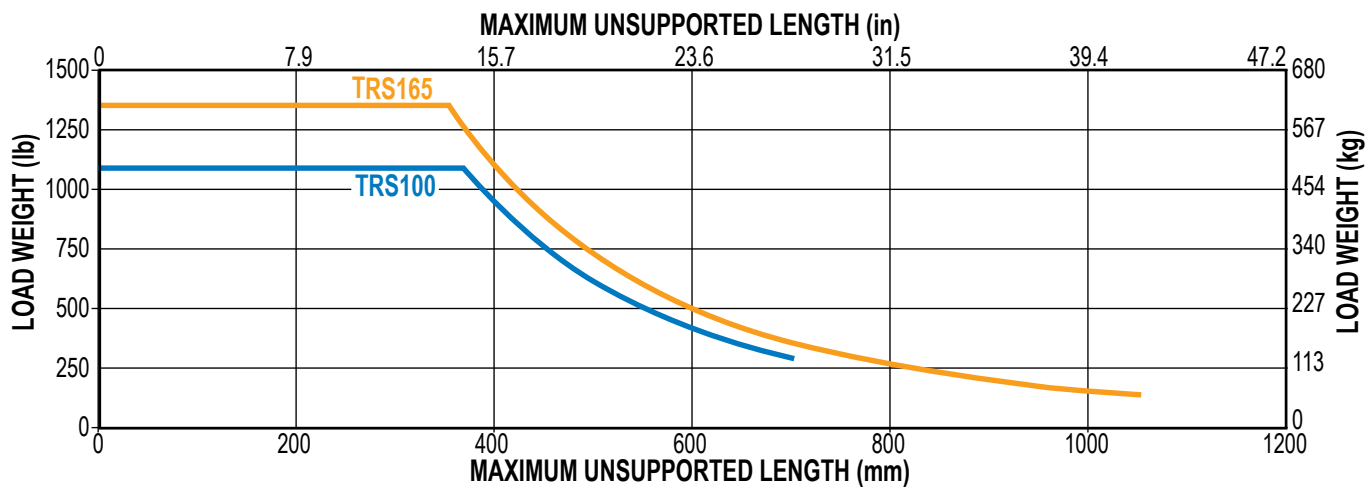
## STRAIGHTNESS AND FLATNESS

| Length of Travel      | mm | 60  | 120 | 180 | 240 | 300  | 360  | 420  | 480  | 540  | 600  | 660  | 720  | 780  | 840  | 900  | 960  | 1,020 | 1,080 | 1,100 |
|-----------------------|----|-----|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|
|                       | in | 2.4 | 4.7 | 7.1 | 9.5 | 11.8 | 14.2 | 16.5 | 18.9 | 21.3 | 23.6 | 26.0 | 28.4 | 30.7 | 33.1 | 35.4 | 37.8 | 40.2  | 42.5  | 43.3  |
| Straightness/Flatness | µm | 20  | 21  | 22  | 23  | 24   | 26   | 27   | 28   | 29   | 30   | 32   | 33   | 34   | 35   | 36   | 38   | 39    | 40    | 40    |



- Listed values are intended for reference purposes only, and not as an engineering standard of absolute tolerance for a given actuator. Reference values are measured in ideal conditions. Actual values in the field may vary due to temperature, mounting surface, or other environmental factors.
- 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.
- An option is available at additional cost to document the straightness and flatness values specific to the actuator, contact the factory prior to ordering.

## TRS SUPPORT RECOMMENDATIONS



Actuator body theoretical axial deflection will not exceed 0.015 in (0.38mm)

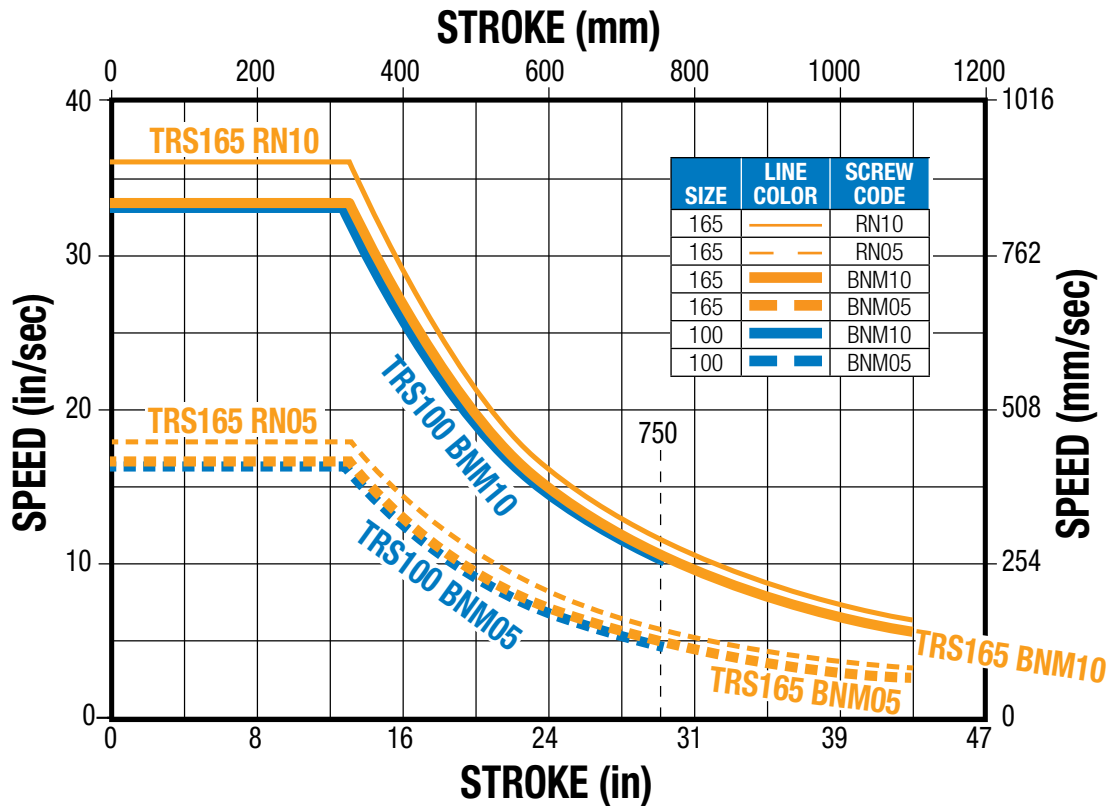


# TRS Twin Rail Stage Actuator

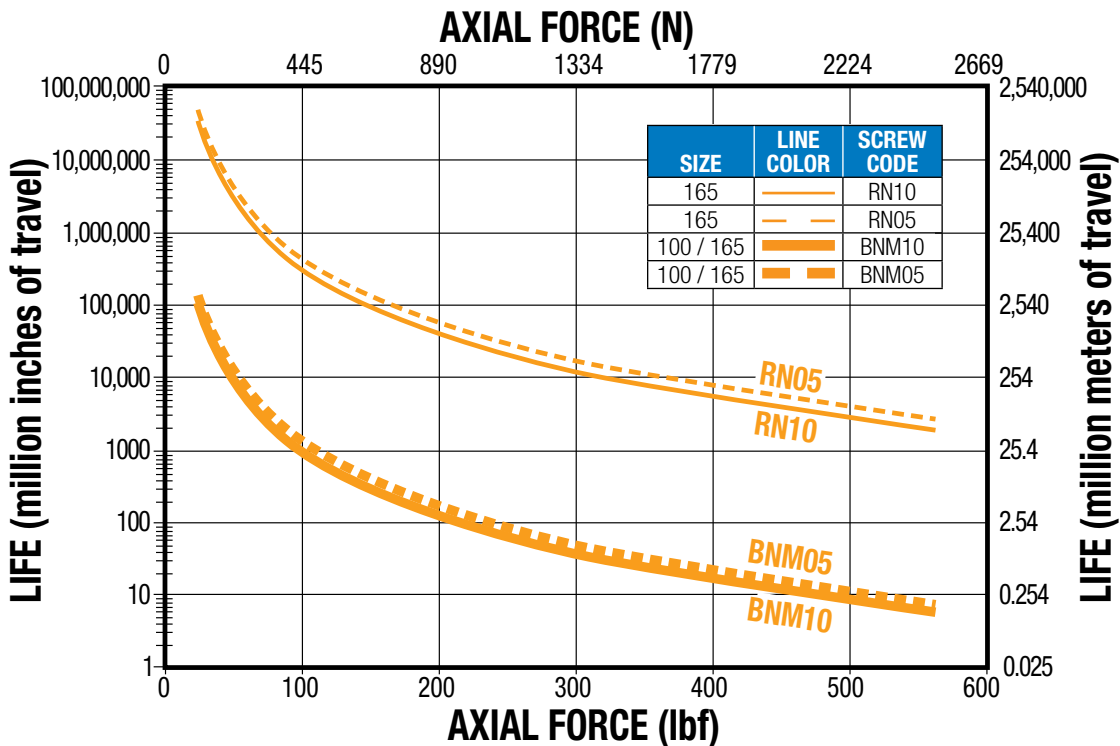


## SCREW/NUT COMBINATIONS

### TRS BALL & ROLLER SCREW CRITICAL SPEED CAPACITIES



### SCREW LIFE CALCULATION



SCREW TYPE DESCRIPTION  
 RN Roller Nut  
 BN Ball Nut

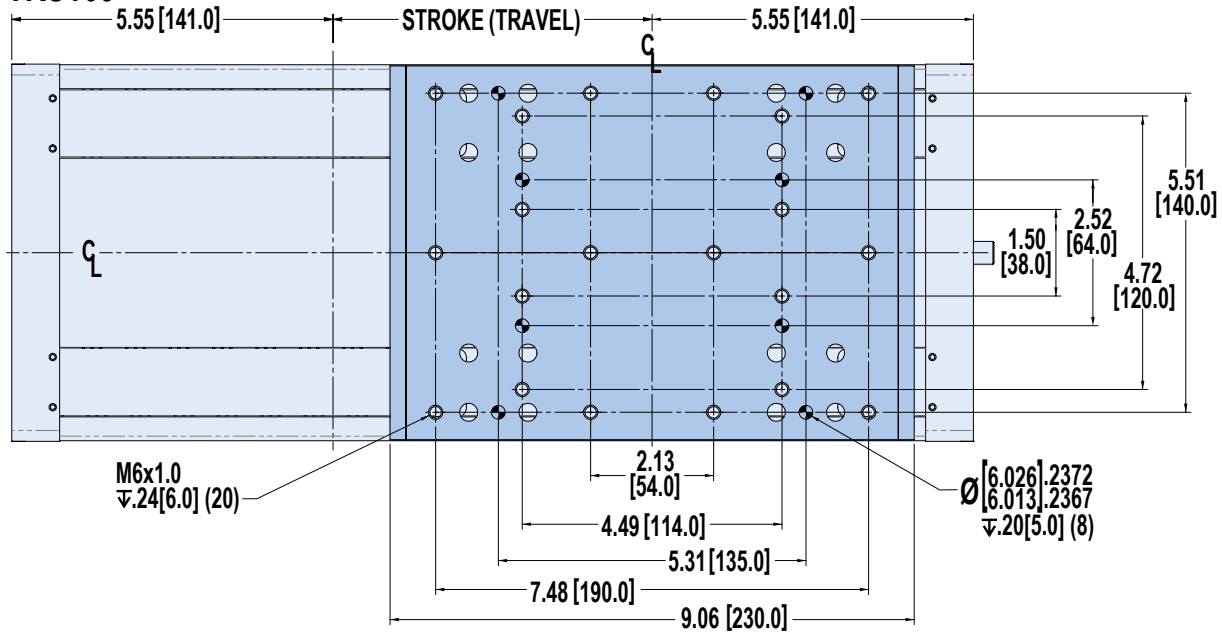
\*\*Life indicates theoretical maximum life of screw only, under ideal conditions and does not indicate expected life of actuator.

# TRS Twin Rail Stage Actuator

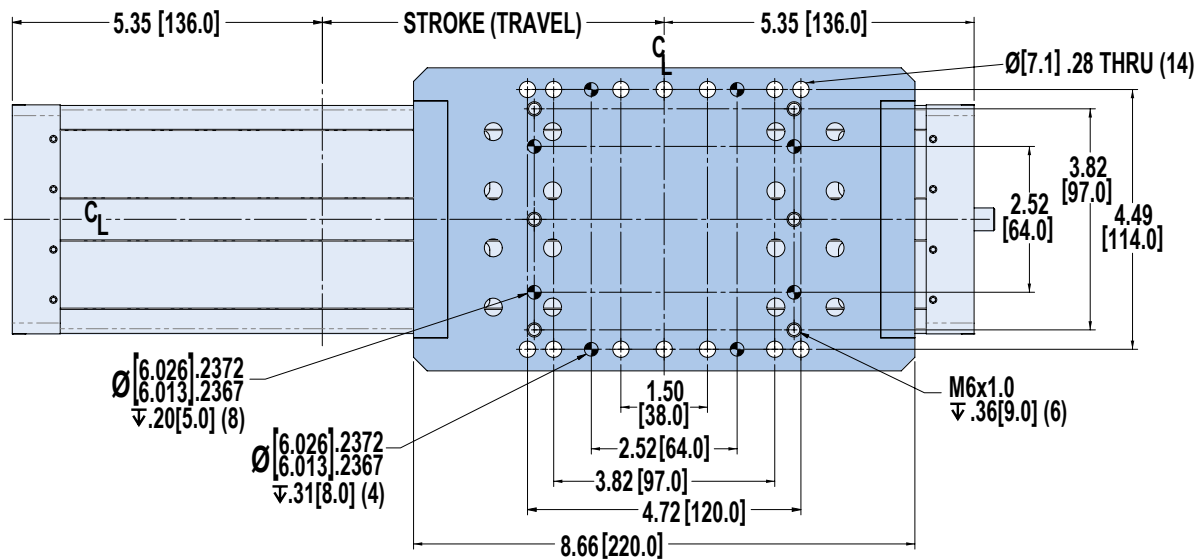
 **TOLOMATIC.COM/CAD**  
DOWNLOAD 3D CAD  
ALWAYS USE CAD SOLID MODEL TO  
DETERMINE CRITICAL DIMENSIONS

## DIMENSIONS, Top View

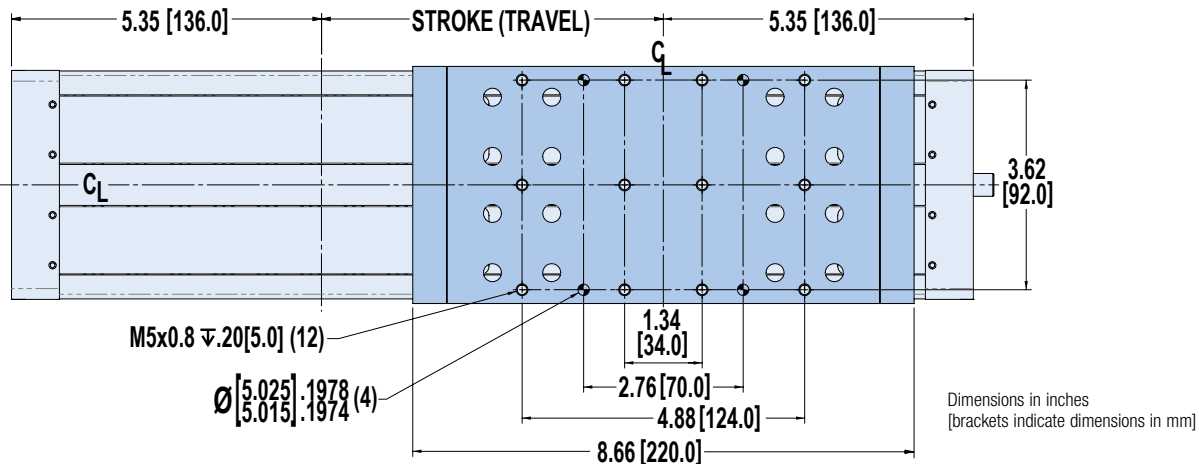
### TRS165



### TRS100 C2C

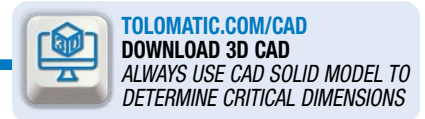


### TRS100

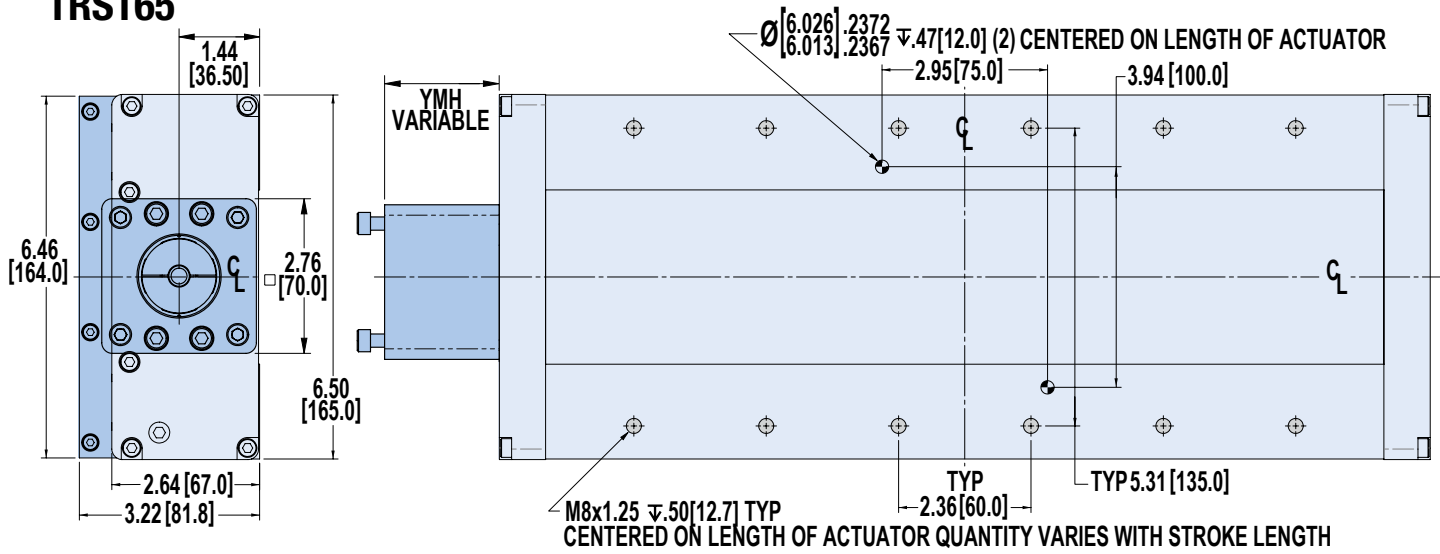


# TRS Twin Rail Stage Actuator

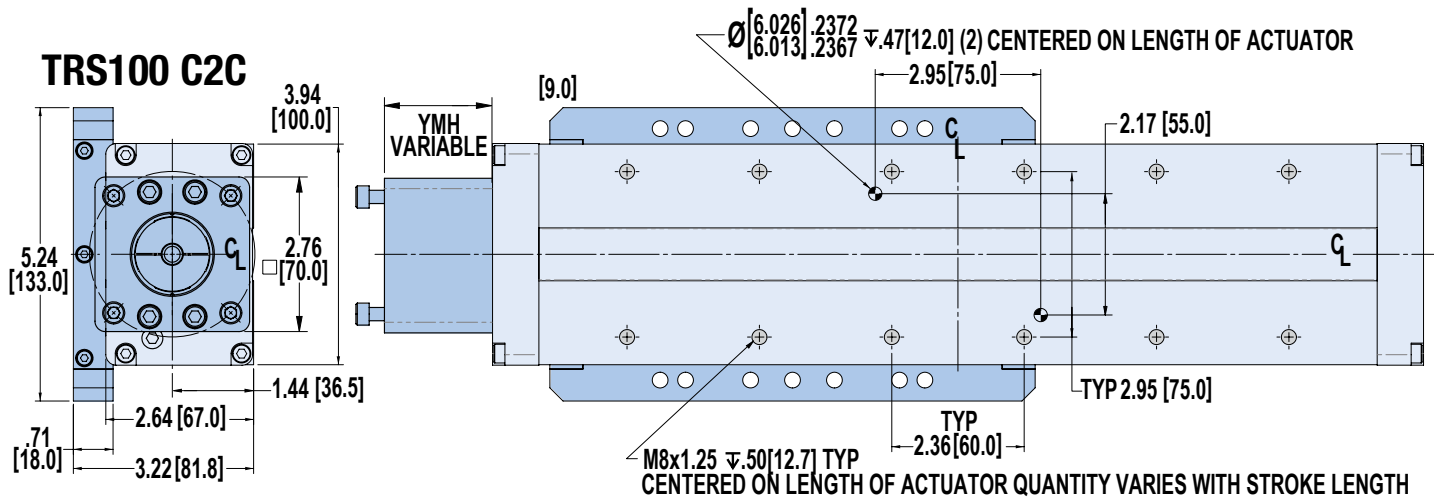
## DIMENSIONS, End & Bottom Views



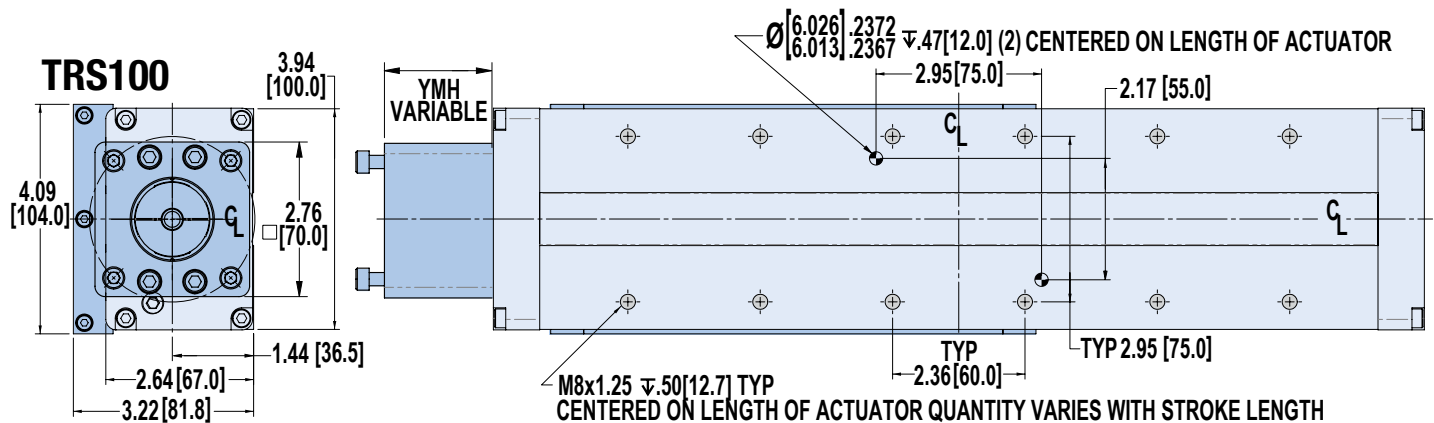
### TRS165



### TRS100 C2C



### TRS100



Dimensions in inches [brackets indicate dimensions in mm]

Sold & Serviced By:

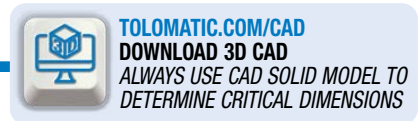


Toll Free Phone (877) SERV098

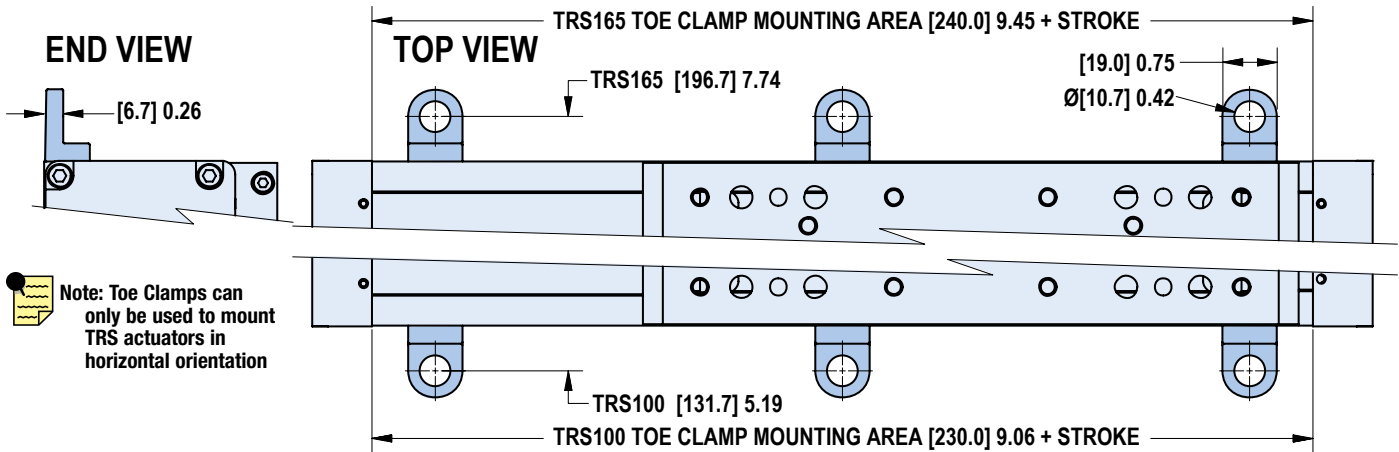
www.electromate.com

sales@electromate.com

# TRS Twin Rail Stage Actuator

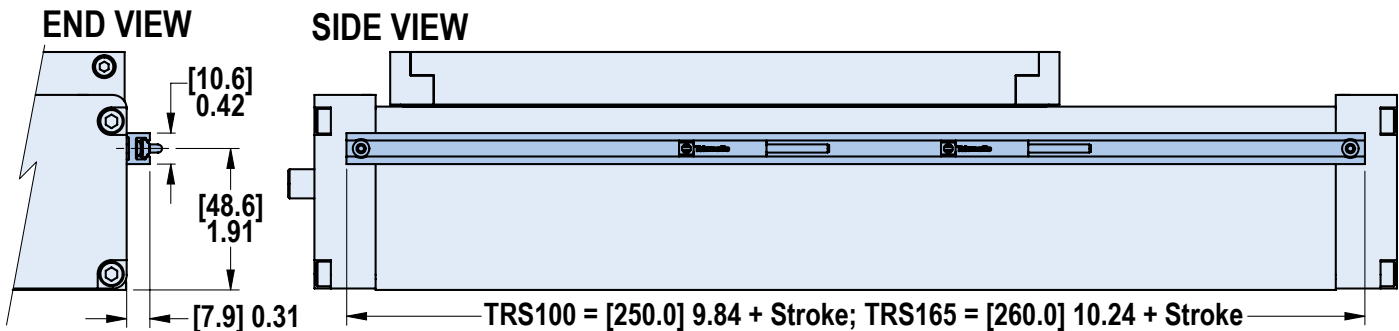


## DIMENSIONS: Toe Clamps



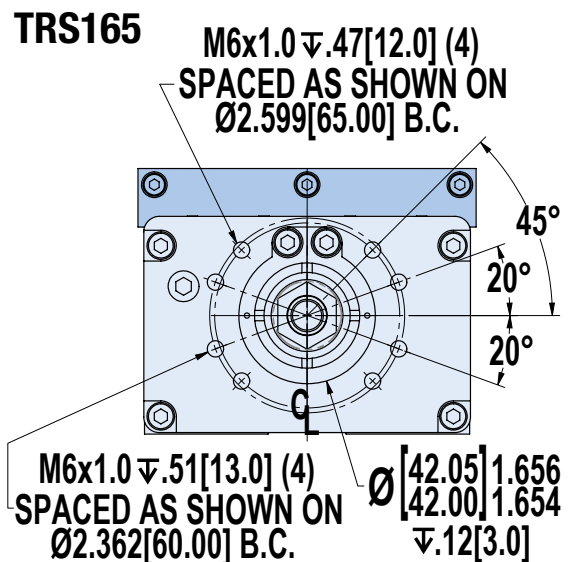
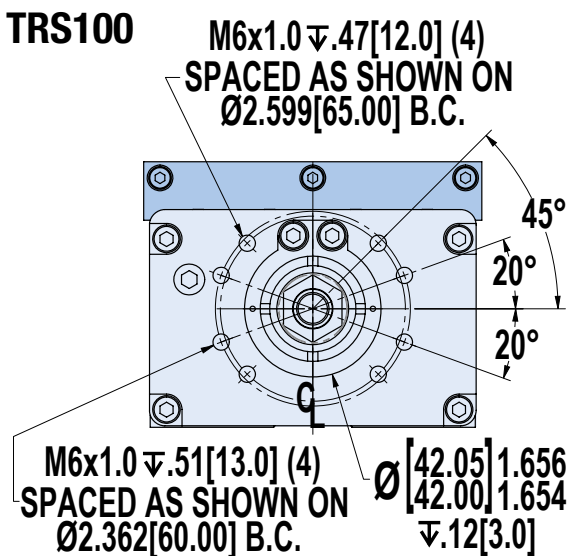
Note: Toe Clamps can only be used to mount TRS actuators in horizontal orientation

## DIMENSIONS: Switch Rail



Note: Switch rail is installed on the right side of the actuator (from the motor end) for all motor mounting configurations except RPR1 where it is installed on the left side of the actuator.


## DIMENSIONS: No Motor Mount (threaded holes and bolt circle; when no motor mount is selected)

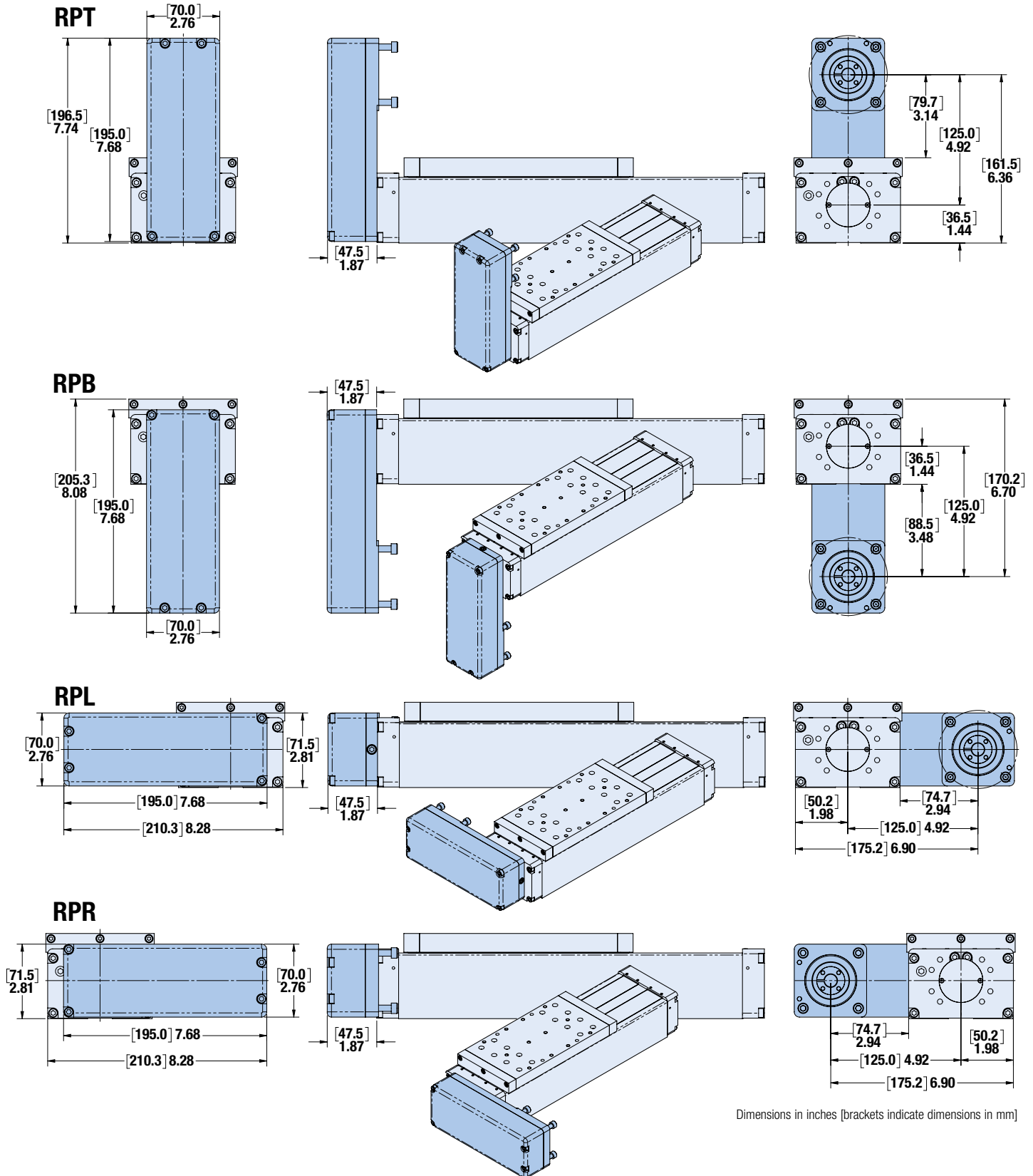


Dimensions in inches [brackets indicate dimensions in mm]

# TRS Twin Rail Stage Actuator

## DIMENSIONS: RP Motor Mounts: TRS100


**TOLOMATIC.COM/CAD**  
**DOWNLOAD 3D CAD**  
*ALWAYS USE CAD SOLID MODEL TO DETERMINE CRITICAL DIMENSIONS*



Dimensions in inches [brackets indicate dimensions in mm]



**\*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.

Sold & Serviced By:

 **ELECTROMATE**

Toll Free Phone (877) SERV098

www.electromate.com

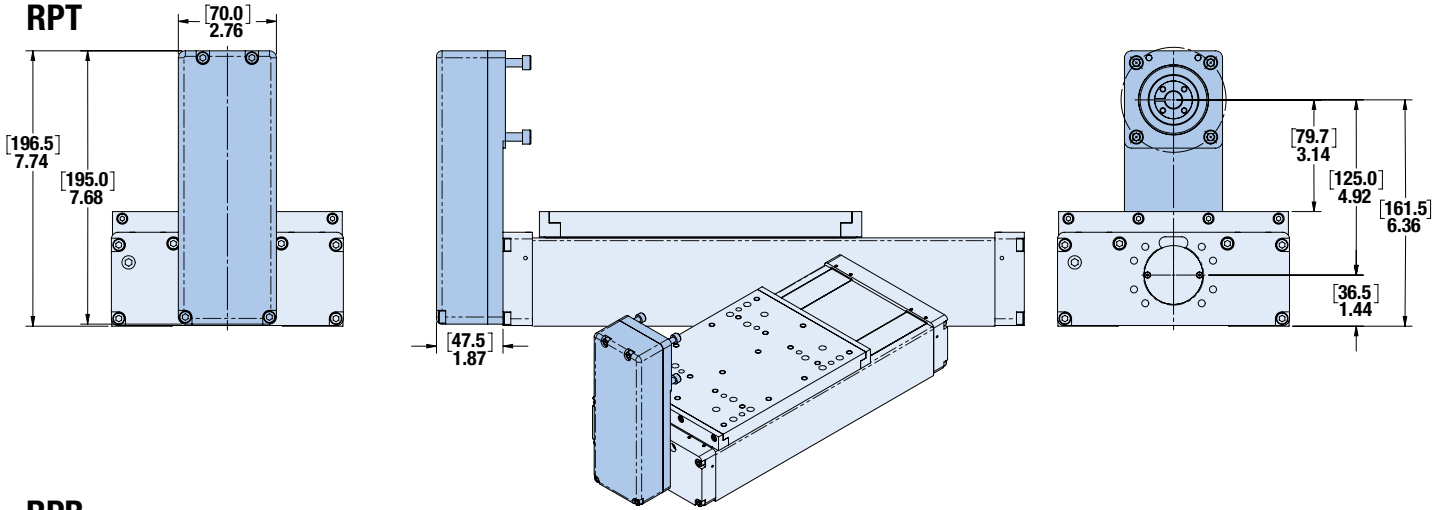
sales@electromate.com

# TRS Twin Rail Stage Actuator

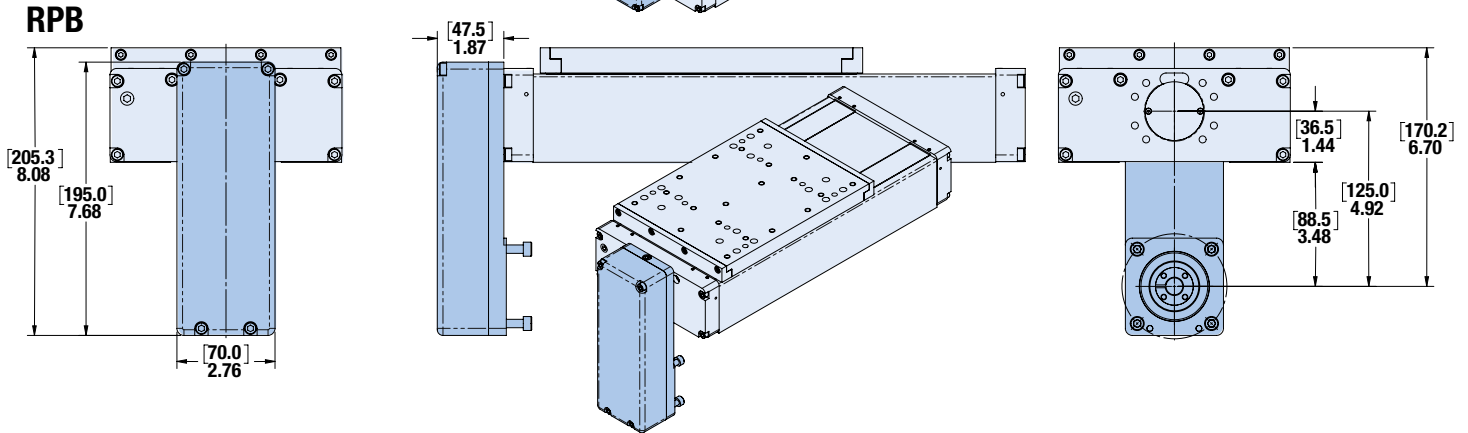

**TOLOMATIC.COM/CAD**  
**DOWNLOAD 3D CAD**  
*ALWAYS USE CAD SOLID MODEL TO DETERMINE CRITICAL DIMENSIONS*

## DIMENSIONS: RP Motor Mounts: TRS165

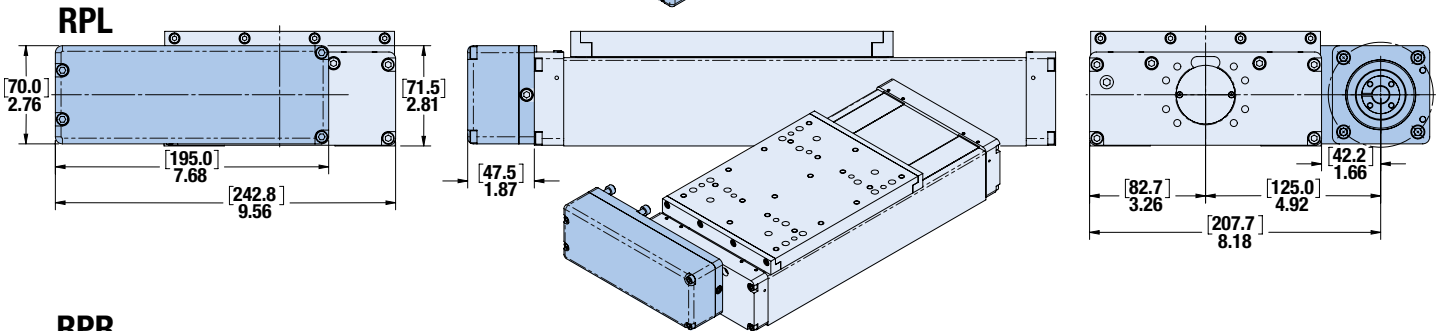
**RPT**



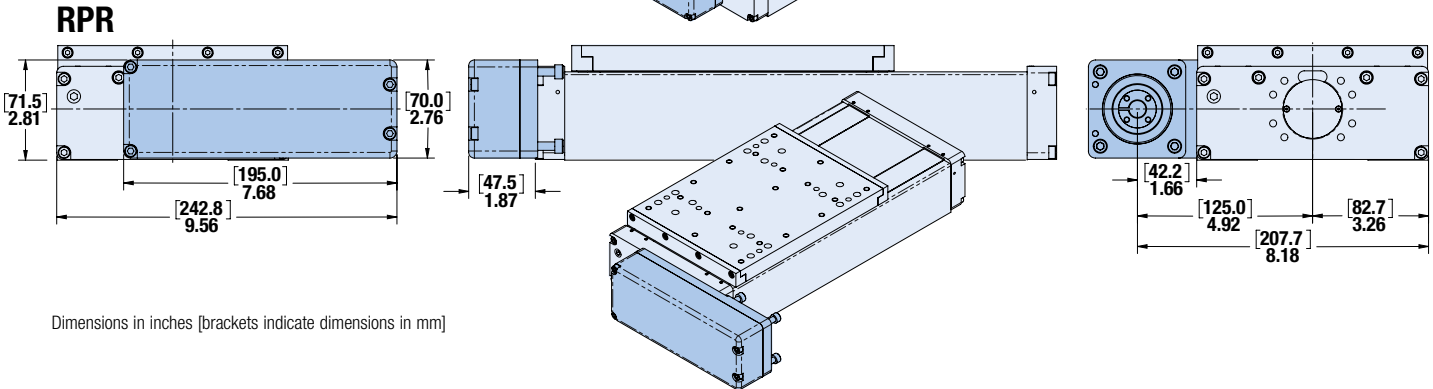
**RPB**



**RPL**



**RPR**



Dimensions in inches [brackets indicate dimensions in mm]



**\*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.

# TRS Twin Rail Stage Actuator

## SWITCHES

### SPECIFICATIONS


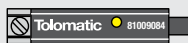






TRS products offer a wide range of sensing choices. There are 12 switch choices: reed, solid state PNP (sourcing) or solid state NPN (sinking); in normally open or normally closed; with flying leads or quick-disconnect.

Commonly used for end-of-stroke positioning, these switches allow drop-in installation anywhere along the rail on the side of the actuator. The one-piece design includes the retained fastening hardware.

Switches are used to send digital signals to PLC (programmable logic controller), TTL, CMOS circuit or other controller device. Switches contain reverse polarity protection. Solid state QD cables are shielded; shield should be terminated at flying lead end.

All switches are CE rated and are RoHS compliant. Switches feature bright red or yellow LED signal indicators; solid state switches also have green LED power indicators.

|             | Order Code | Lead | Switching Logic                | Power LED   | Signal LED | Operating Voltage | **Power Rating (Watts) | Switching Current (mA max.) | Current Consumption | Voltage Drop | Leakage Current | Temp. Range               | Shock / Vibration |
|-------------|------------|------|--------------------------------|---|------------|-------------------|------------------------|-----------------------------|---------------------|--------------|-----------------|---------------------------|-------------------|
| REED        | <b>R Y</b> | 5m   | SPST Normally Open             | —   | Red        | 5 - 240 AC/DC     | **10.0                 | 100mA                       | —                   | 3.0 V max.   | —               | 14 to 158°F [-10 to 70°C] | 50 G / 9 G        |
|             | <b>R K</b> | QD*  |                                |  |            |                   |                        |                             |                     |              |                 |                           |                   |
|             | <b>N Y</b> | 5m   | SPST Normally Closed           | —   | Yellow     | 5 - 110 AC/DC     |                        |                             |                     |              |                 |                           |                   |
|             | <b>N K</b> | QD*  |                                |  |            |                   |                        |                             |                     |              |                 |                           |                   |
| SOLID STATE | <b>T Y</b> | 5m   | PNP (Sourcing) Normally Open   | Green   | Yellow     | 10 - 30 VDC       | **3.0                  | 100mA                       | 20 mA @ 24V         | 2.0 V max.   | 0.05 mA max.    |                           |                   |
|             | <b>T K</b> | QD*  |                                |  |            |                   |                        |                             |                     |              |                 |                           |                   |
|             | <b>K Y</b> | 5m   | NPN (Sinking) Normally Open    | Green   | Red        |                   |                        |                             |                     |              |                 |                           |                   |
|             | <b>K K</b> | QD*  |                                |  |            |                   |                        |                             |                     |              |                 |                           |                   |
|             | <b>P Y</b> | 5m   | PNP (Sourcing) Normally Closed | Green   | Yellow     |                   |                        |                             |                     |              |                 |                           |                   |
|             | <b>P K</b> | QD*  |                                |  |            |                   |                        |                             |                     |              |                 |                           |                   |
|             | <b>H Y</b> | 5m   | NPN (Sinking) Normally Closed  | Green   | Red        |                   |                        |                             |                     |              |                 |                           |                   |
|             | <b>H K</b> | QD*  |                                |  |            |                   |                        |                             |                     |              |                 |                           |                   |

\*QD = Quick-disconnect

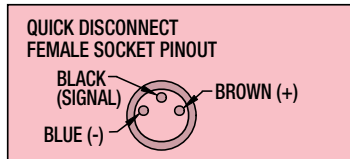
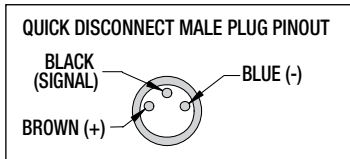
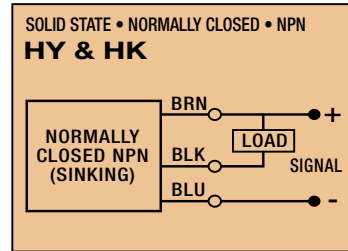
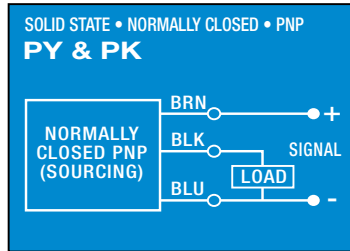
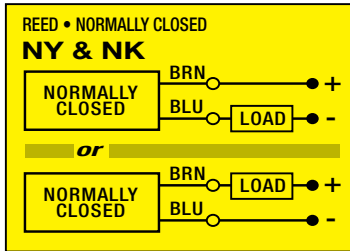
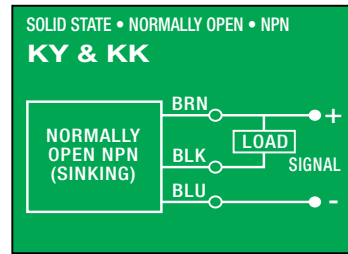
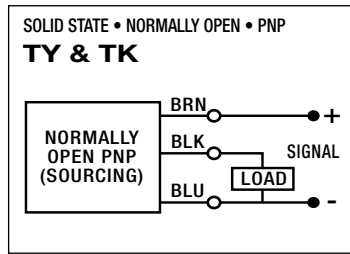
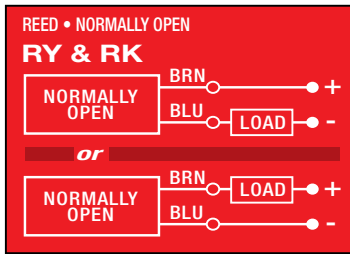
Enclosure classification IEC 529 IP67 (NEMA 6)

CABLES: Robotic grade, oil resistant polyurethane jacket, PVC insulation

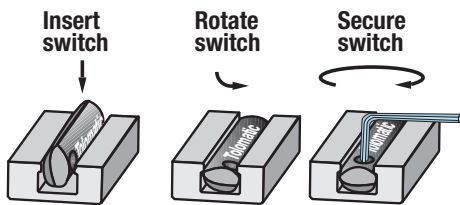
**⚠️\*\*WARNING:** Do not exceed power rating (Watt = Voltage x Amperage). Permanent damage to sensor will occur.

# TRS Twin Rail Stage Actuator

## WIRING DIAGRAMS



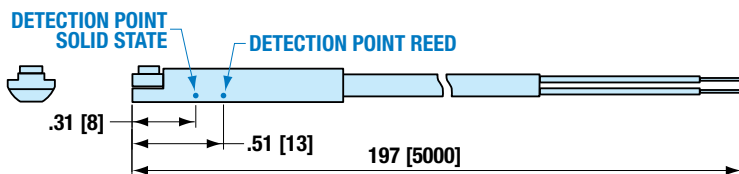
## SWITCH INSTALLATION AND REPLACEMENT



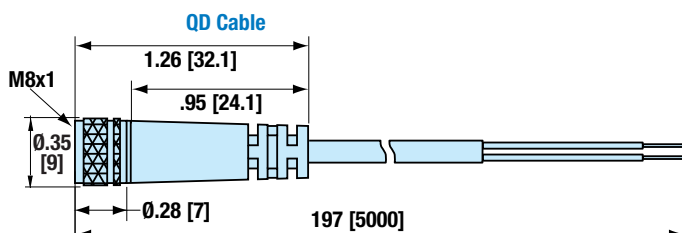
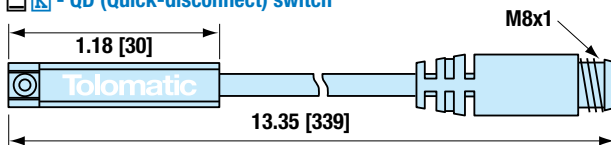
Place switch in side groove on tube at desired location with "Tolomatic" facing outward. While applying light pressure to the switch, rotate the switch halfway into the groove. Maintaining light pressure, rotate the switch in the opposite direction until it is fully inside the groove with "Tolomatic" visible. Re-position the switch to the exact location and lock the switch securely into place by tightening the screw on the switch.

## SWITCH DIMENSIONS

**Y** - direct connect



**X** - QD (Quick-disconnect) switch



See Page 12 for Switch Rail Dimensions

Dimensions in inches [brackets indicate dimensions in millimeters]

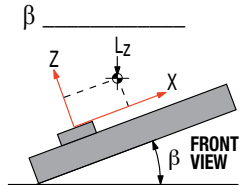
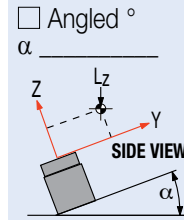
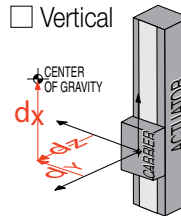
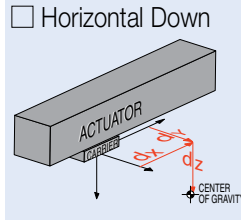
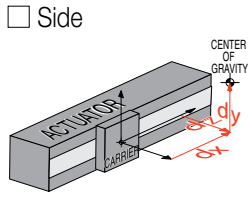
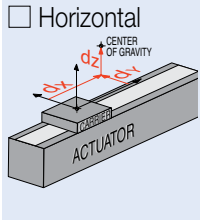


# COMPILE APPLICATION REQUIREMENTS

## APPLICATION DATA WORKSHEET

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

### ORIENTATION



Load attached to carrier OR  Load supported by other mechanism

### DISTANCE FROM CENTER OF CARRIER TO LOAD CENTER OF GRAVITY

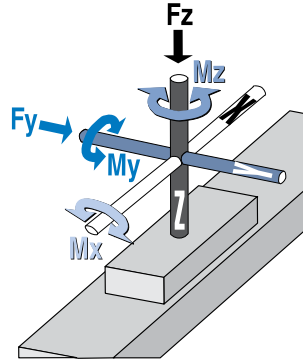
$d_x$  \_\_\_\_\_  
 $d_y$  \_\_\_\_\_  
 $d_z$  \_\_\_\_\_

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

### STROKE LENGTH \_\_\_\_\_

inch (S I) (U.S. Standard)  millimeters (S M) (Metric)

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



### BENDING MOMENTS APPLIED TO CARRIER

$M_x$  \_\_\_\_\_  
 $M_y$  \_\_\_\_\_  
 $M_z$  \_\_\_\_\_  
 in.-lbs. (U.S. Standard)  N-m (Metric)

### PRECISION

Repeatability \_\_\_\_\_  
 inch  millimeters

### LOAD \_\_\_\_\_

lb. (U.S. Standard)  kg. (Metric)

### THRUST REQUIRED

lbf. (U.S. Standard)  N (Metric)

$F_z$  \_\_\_\_\_  
 $F_y$  \_\_\_\_\_

### OPERATING ENVIRONMENT

Temperature, Contamination, etc.

### 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



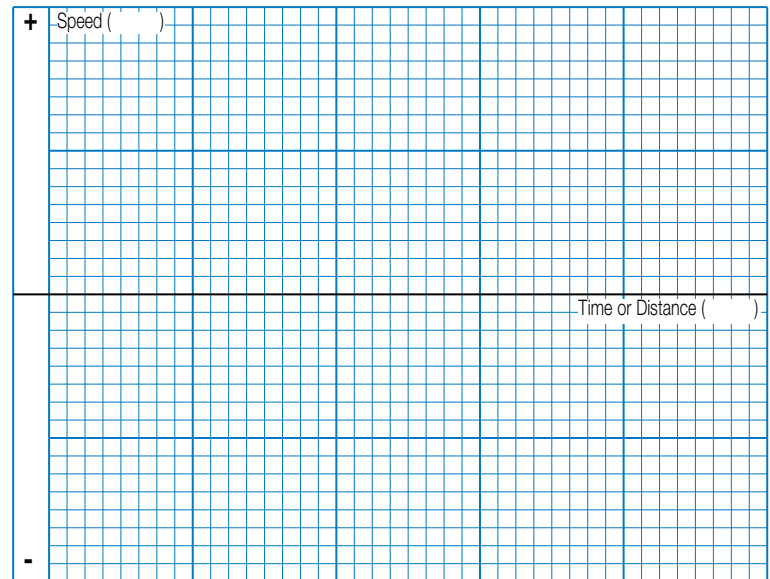
### Inline



### 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.

Sold & Serviced By:



Toll Free Phone (877) SERV098

www.electromate.com

sales@electromate.com

# 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. The Tolomatic Sizelt Software is also available on Tolomatic.com

## 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 TRS\_9) for the screw and the Moment and Load Capacity table (pg. TRS\_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. TRS\_6) for the actuator consider:

- 1) Higher capacity bearing style
- 2) A larger actuator size
- 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 1.0

$$L_f = \frac{M_x}{M_{x_{max}}} + \frac{M_y}{M_{y_{max}}} + \frac{M_z}{M_{z_{max}}} + \frac{F_y}{F_{y_{max}}} + \frac{F_z}{F_{z_{max}}} \leq 1.0$$

If LF exceeds the value of 1.0, 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 TRS twin rail screw-driven actuator speed should not exceed the value in the critical speed capacity graph (page TRS\_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 screw type (ball screw or roller screw) and the pitch (lead). For additional information on screw selection, consult "Selecting the Optimal Screw Technology" (#9900-4644) available at www.tolomatic.com.

## 6 SELECT MOTOR AND DRIVE

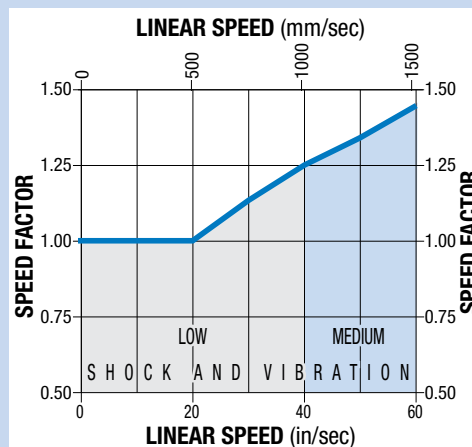
To help select a motor and drive, leverage the Tolomatic Sizelt software, available on Tolomatic.com to calculate the application thrust and torque requirements.

## 7 CONSIDER OPTIONS

- TC\_ Toe clamps
- C2C Carrier-to-carrier mounting
- 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: Loads and bending moments must be multiplied by speed factor from the graph below to obtain full rated life of profiled rail bearing system.



sizeit.tolomatic.com  
for fast, accurate  
actuator selection

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

# TRS Twin Rail Stage Actuator

## ORDERING

### BASE MODEL SPECIFICATIONS

TRS 100 BNM05 SM200.50 RPL1

**MODEL**  
**TRS** Twin Rail Stage

**SIZE**  
**100** or **165**

**NUT/SCREW CONFIGURATION**  
 BNM05 Ball Nut, 5 mm lead  
 BNM10 Ball Nut, 10 mm lead  
 RN05 Roller Nut, 5 mm lead  
 RN10 Roller Nut, 10 mm lead

**STROKE LENGTH**  
**SM** Stroke, then enter desired stroke length in millimeters

|        | MAX. STROKE |      |
|--------|-------------|------|
| TRS100 | 750         | 29.5 |
| TRS165 | 1100        | 43.3 |
|        | mm          | 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

**FIELD RETROFIT**

| ITEM                 |  |
|----------------------|--|
| Dust Band Repair Kit | <b>RK</b> then Model & Stroke in millimeters <b>DB</b> |
|                      | <i>Example: RK TRS 100 SM200.50 DB</i>                 |

### OPTIONS SPECIFICATIONS

TC6 C2C RY1 RK2 YM\_x\_x\_x\_x\_x\_x

**BASE MOUNTING**  
**Blank** Standard bottom threaded holes, no Toe clamp mounting slots  
**TCx** Toe clamps + mounting slots\*  
 \*x = number of toe clamps


**CARRIER MOUNTING**  
**Blank** Standard Carrier  
**C2C** Carrier-to-carrier mounting\*\*  
 \*\*Only available with 100 mm frame size  
**⚠** Due to the complexity of the moment loads in a carrier to carrier system, Tolomatic recommends working with a Tolomatic representative to size the system

**SWITCHES**

**RY\_** Reed Switch (Normally Open) with 5-meter lead, & enter quantity desired  
**RK\_** Reed Switch (Normally Open) with 5-meter lead/QD, & quantity  
**NY\_** Reed Switch (Normally Closed) with 5-meter lead, & quantity  
**NK\_** Reed Switch (Normally Closed) with 5-meter lead/QD, & quantity  
**TY\_** Solid State Switch PNP (Normally Open) with 5-meter lead, & quantity  
**TK\_** Solid State Switch PNP (Normally Open) with 5-meter lead/QD, & quantity  
**KY\_** Solid State Switch NPN (Normally Open) with 5-meter lead, & quantity  
**KK\_** Solid State Switch NPN (Normally Open) with 5-meter lead/QD, & quantity  
**PY\_** Solid State Switch PNP (Normally Closed) with 5-meter lead, & quantity  
**PK\_** Solid State Switch PNP (Normally Closed) with 5-meter lead/QD, & quantity  
**HY\_** Solid State Switch NPN (Normally Closed) with 5-meter lead, & quantity  
**HK\_** Solid State Switch NPN (Normally Closed) with 5-meter lead/QD, & quantity

**MOTOR**  
**YM\_** Your Motor Here (≤ 70 mm flange)

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



[tolomatic.com/ymh](http://tolomatic.com/ymh)  
**YOUR MOTOR HERE**  
 Motor Mounts  
 Made-to-Order



[sizeit.tolomatic.com](http://sizeit.tolomatic.com)  
 for fast, accurate  
 actuator selection



[tolomatic.com/ask](http://tolomatic.com/ask)  
 Technical support  
 before and after  
 purchase

Available FREE at [www.tolomatic.com](http://www.tolomatic.com)

# The Tolomatic Difference Expect More From the Industry Leader:



## INNOVATIVE PRODUCTS

Unique linear actuator solutions with Endurance Technology<sup>SM</sup> 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.



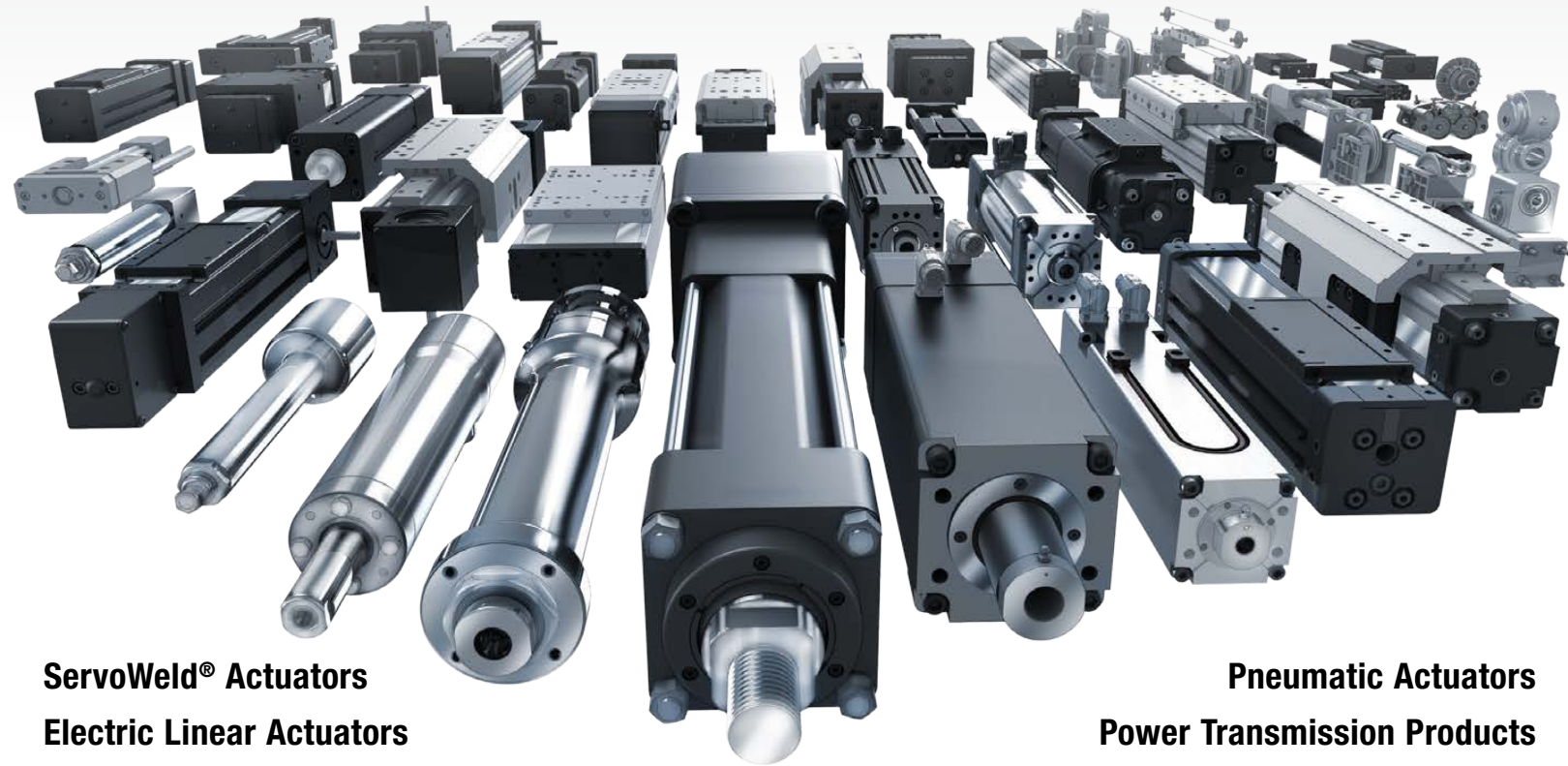
## 3D CAD LIBRARY

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.



**ServoWeld<sup>®</sup> Actuators**  
**Electric Linear Actuators**

**Pneumatic Actuators**  
**Power Transmission Products**

**Tolomatic**<sup>TM</sup>  
EXCELLENCE *IN* MOTION

COMPANY WITH  
QUALITY SYSTEM  
CERTIFIED BY DNV GL  
= ISO 9001 =  
Certified site: Hamel, MN

### USA - Headquarters

**Tolomatic Inc.**  
3800 County Road 116  
Hamel, MN 55340, USA  
**Phone:** (763) 478-8000  
Toll-Free: **1-800-328-2174**  
sales@tolomatic.com  
[www.tolomatic.com](http://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

All brand and product names are trademarks or registered trademarks of their respective owners. Information in this document is believed accurate at time of printing. However, Tolomatic assumes no responsibility for its use or for any errors

that may appear in this document. Tolomatic reserves the right to change the design or operation of the equipment described herein and any associated motion products without notice. Information in this document is subject to change without notice.

Visit [www.tolomatic.com](http://www.tolomatic.com) for the most up-to-date technical information