TRS
TWIN PROFILE RAIL STAGE
STROKE CONFIGURABLE ACTUATOR

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.

A Comparison of Screw Drive Actuators

<table>
<thead>
<tr>
<th></th>
<th>TRS</th>
<th>B3S</th>
<th>MXE-S</th>
<th>MXE-P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Features</td>
<td>Superior rigidity, high moment load capacities</td>
<td>Internal bearing, highest load and bending moments</td>
<td>Basic guidance and support</td>
<td>High load and bending moment capacities</td>
</tr>
<tr>
<td>Load up to:</td>
<td>(with options)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1,356 lb [615 kg]</td>
<td>8,000 lb [3,629 kg]</td>
<td>1,040 lb [472 kg]</td>
<td>2,584 lb [1,172 kg]</td>
</tr>
<tr>
<td>Thrust up to:</td>
<td></td>
<td>2,700 lbf [12 kN]</td>
<td>4,300 lbf [19.1 kN]</td>
<td>4,300 lbf 19.1 kN</td>
</tr>
<tr>
<td>Speed up to:</td>
<td></td>
<td>60 in/sec [1,500 mm/sec]</td>
<td>60 in/sec [1,500 mm/sec]</td>
<td>60 in/sec [1,500 mm/sec]</td>
</tr>
<tr>
<td>Stroke Length up to:</td>
<td>43 in [1,090 mm]</td>
<td>179 in [4,550 mm]</td>
<td>179 in [4,550 mm]</td>
<td>179 in [4,550 mm]</td>
</tr>
<tr>
<td>Screw/Nut Type</td>
<td>Ball &amp; Roller</td>
<td>Solid &amp; Ball</td>
<td>Solid &amp; Ball</td>
<td>Solid &amp; Ball</td>
</tr>
<tr>
<td>Literature Number:</td>
<td>3600-4222</td>
<td>3600-4176</td>
<td>8300-4000</td>
<td>8300-4000</td>
</tr>
</tbody>
</table>

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

- 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)

Laser Engraving

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

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ELECTROMATE
Toll Free Phone (877) SERVO98
www.electromate.com
sales@electromate.com
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.

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

**MULTIPLE SCREW TECHNOLOGIES**

<table>
<thead>
<tr>
<th>ROLLER NUT</th>
<th>BALL NUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roller nuts provide the highest thrust and life ratings available</td>
<td>Ball nuts offer efficiency at a cost effective price</td>
</tr>
</tbody>
</table>

**SCREW ACCURACY**
- **ROLLER NUT**: ± 0.0102mm/300mm; ± 0.0004”/ft.
- **BALL NUT**: ± 0.051mm/300mm; ± 0.002”/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

**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
MAXIMUM DURABILITY

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

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

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

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sales@electromate.com
BENDING MOMENTS

*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

<table>
<thead>
<tr>
<th>ACTUATOR</th>
<th>SCREW CODE</th>
<th>LEAD MOTOR CONFIG</th>
<th>LEAD ACCURACY</th>
<th>BACKLASH</th>
<th>MAXIMUM THRUST</th>
<th>MAXIMUM STROKE</th>
<th>INERTIA</th>
<th>DYNAMIC FRICTION TORQUE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>BASE ACTUATOR</td>
<td>PER/in OF STROKE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>In Line</td>
<td>Rev. Parallel</td>
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<td></td>
<td></td>
<td></td>
<td>(N·m)</td>
<td>(N·m)</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>(kg·m²)</td>
<td>(kg·m²)</td>
</tr>
<tr>
<td>TRS100</td>
<td>BNM05 5</td>
<td>BOTH</td>
<td>0.07 - 0.12</td>
<td>2,500</td>
<td>750</td>
<td>40.82</td>
<td>135.32</td>
<td>1.29</td>
</tr>
<tr>
<td></td>
<td>BNM10 10</td>
<td>BOTH</td>
<td>0.07 - 0.12</td>
<td>2,500</td>
<td>750</td>
<td>45.35</td>
<td>139.85</td>
<td>1.29</td>
</tr>
<tr>
<td>TRS165</td>
<td>RN05 5 LMI</td>
<td>0.010</td>
<td>0.03</td>
<td>2,500</td>
<td>575</td>
<td>38.48</td>
<td>—</td>
<td>0.99</td>
</tr>
<tr>
<td></td>
<td>RN05 5 RP</td>
<td>0.010</td>
<td>0.03</td>
<td>2,500</td>
<td>557</td>
<td>—</td>
<td>132.98</td>
<td>0.99</td>
</tr>
<tr>
<td></td>
<td>RN10 10 LMI</td>
<td>0.010</td>
<td>0.03</td>
<td>2,500</td>
<td>575</td>
<td>41.67</td>
<td>—</td>
<td>0.99</td>
</tr>
<tr>
<td></td>
<td>RN10 10 RP</td>
<td>0.010</td>
<td>0.03</td>
<td>2,500</td>
<td>557</td>
<td>—</td>
<td>136.16</td>
<td>0.99</td>
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TRS LEAD SCREWS U.S. CONVENTIONAL

<table>
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<tr>
<th>ACTUATOR</th>
<th>SCREW CODE</th>
<th>LEAD MOTOR CONFIG</th>
<th>LEAD ACCURACY</th>
<th>BACKLASH</th>
<th>MAXIMUM THRUST</th>
<th>MAXIMUM STROKE</th>
<th>INERTIA</th>
<th>DYNAMIC FRICTION TORQUE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>BASE ACTUATOR</td>
<td>PER/in OF STROKE</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>In Line</td>
<td>Rev. Parallel</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(lb·in²)</td>
<td>(lb·in²)</td>
</tr>
<tr>
<td>TRS100</td>
<td>BNM05 5</td>
<td>BOTH</td>
<td>0.0028 - 0.0050</td>
<td>562</td>
<td>29.5</td>
<td>0.1397</td>
<td>0.4631</td>
<td>0.0044</td>
</tr>
<tr>
<td></td>
<td>BNM10 10</td>
<td>BOTH</td>
<td>0.0028 - 0.0050</td>
<td>562</td>
<td>29.5</td>
<td>0.1552</td>
<td>0.4786</td>
<td>0.0044</td>
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<tr>
<td>TRS165</td>
<td>RN05 5 LMI</td>
<td>0.0004</td>
<td>0.0012</td>
<td>562</td>
<td>22.6</td>
<td>0.1317</td>
<td>—</td>
<td>0.0034</td>
</tr>
<tr>
<td></td>
<td>RN05 5 RP</td>
<td>0.0004</td>
<td>0.0012</td>
<td>562</td>
<td>21.9</td>
<td>0.1426</td>
<td>—</td>
<td>0.0034</td>
</tr>
<tr>
<td></td>
<td>RN10 10 LMI</td>
<td>0.0004</td>
<td>0.0012</td>
<td>562</td>
<td>22.6</td>
<td>0.1426</td>
<td>—</td>
<td>0.0034</td>
</tr>
<tr>
<td></td>
<td>RN10 10 RP</td>
<td>0.0004</td>
<td>0.0012</td>
<td>562</td>
<td>21.9</td>
<td>—</td>
<td>0.466</td>
<td>0.0034</td>
</tr>
</tbody>
</table>

TRS CARRIER TO CARRIER MAX. LOAD

Contact the factory for higher accuracy and lower backlash options.

Screw Type Description
RN Roller Nut
BN Ball Nut

www.sizeit.tolomatic.com
for fast, accurate actuator selection

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www.electromate.com
sales@electromate.com
TRS Twin Rail Stage Actuator

ACTUATOR SPECIFICATIONS

<table>
<thead>
<tr>
<th></th>
<th>TRS100</th>
<th></th>
<th>TRS165</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LMI</td>
<td>RP</td>
<td>LMI</td>
<td>RP</td>
</tr>
<tr>
<td>Ball Nut</td>
<td>2.16</td>
<td>2.16</td>
<td>3.20</td>
<td>3.20</td>
</tr>
<tr>
<td>Roller Nut</td>
<td>4.75</td>
<td>4.75</td>
<td>7.06</td>
<td>7.06</td>
</tr>
<tr>
<td>Carrier Assembly Weight</td>
<td>5.97</td>
<td>7.79</td>
<td>8.44</td>
<td>10.26</td>
</tr>
<tr>
<td>Base Weight (incl. carrier)</td>
<td>9.73</td>
<td>15.59</td>
<td>16.59</td>
<td>23.57</td>
</tr>
<tr>
<td>Weight per unit of stroke</td>
<td>0.010</td>
<td>0.010</td>
<td>0.015</td>
<td>0.015</td>
</tr>
<tr>
<td>Carrier Assembly Weight</td>
<td>4.75</td>
<td>4.75</td>
<td>7.06</td>
<td>7.06</td>
</tr>
<tr>
<td>Base Weight (incl. carrier)</td>
<td>13.17</td>
<td>17.18</td>
<td>18.61</td>
<td>22.62</td>
</tr>
<tr>
<td>Weight per unit of stroke</td>
<td>0.56</td>
<td>0.56</td>
<td>0.81</td>
<td>0.81</td>
</tr>
<tr>
<td>Temperature Range</td>
<td>4-54 °C; 40-130 °F</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

STRAIGHTNESS AND FLATNESS

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

FRICCTION FORCE

\[
N = 0.003 \times \text{LOAD (kg)} + 17.6
\]
\[
lbf = 0.0003 \times \text{LOAD (lb)} + 3.96
\]

TRS SUPPORT RECOMMENDATIONS

- 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.

Actuator body theoretical axial deflection will not exceed 0.015 in (0.38mm)
SCREW/NUT COMBINATIONS

TRS BALL & ROLLER SCREW CRITICAL SPEED CAPACITIES

<table>
<thead>
<tr>
<th>SCREW TYPE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>RN</td>
<td>Roller Nut</td>
</tr>
<tr>
<td>BN</td>
<td>Ball Nut</td>
</tr>
</tbody>
</table>

**SCREW LIFE CALCULATION**

<table>
<thead>
<tr>
<th>LIFE (million inches of travel)</th>
<th>AXIAL FORCE (lbf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10,000,000</td>
<td>100,000,000</td>
</tr>
<tr>
<td>100,000,000</td>
<td>200,000,000</td>
</tr>
<tr>
<td>1,000,000</td>
<td>1,000,000</td>
</tr>
<tr>
<td>10,000</td>
<td>10,000</td>
</tr>
<tr>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

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

DIMENSIONS, Top View

**TRS165**

- Dimensions in inches
- [brackets indicate dimensions in mm]

**TRS100 C2C**

- Dimensions in inches
- [brackets indicate dimensions in mm]

**TRS100**

- Dimensions in inches
- [brackets indicate dimensions in mm]

TOLOMATIC.COM/CAD
DOWNLOAD 3D CAD
ALWAYS USE CAD SOLID MODEL TO DETERMINE CRITICAL DIMENSIONS
### DIMENSIONS: Toe Clamps

**END VIEW**
- [6.7] 0.26

**TOP VIEW**
- TRS100 TOE CLAMP MOUNTING AREA [230.0] 9.06 + STROKE
- TRS165 TOE CLAMP MOUNTING AREA [240.0] 9.45 + STROKE

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

### DIMENSIONS: Switch Rail

**END VIEW**
- [10.6] 0.42

**SIDE VIEW**
- TRS100 = [250.0] 9.84 + Stroke; TRS165 = [260.0] 10.24 + Stroke

**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

**TRS100**
- M6x1.0 \(\varphi .47\) [12.0] (4)
- SPACED AS SHOWN ON \(\varnothing 2.599\) [65.00] B.C.

**TRS165**
- M6x1.0 \(\varphi .51\) [13.0] (4)
- SPACED AS SHOWN ON \(\varnothing 2.362\) [60.00] B.C.

_(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

*RANGE 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

DIMENSIONS: RP Motor Mounts: TRS165

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.

<table>
<thead>
<tr>
<th>Order Code</th>
<th>Lead</th>
<th>Switching Logic</th>
<th>Power LED</th>
<th>Signal LED</th>
<th>Operating Voltage</th>
<th><strong>Power Rating (Watts)</strong></th>
<th>Switching Current (mA max.)</th>
<th>Current Consumption</th>
<th>Voltage Drop</th>
<th>Leakage Current</th>
<th>Temp. Range</th>
<th>Shock / Vibration</th>
</tr>
</thead>
<tbody>
<tr>
<td>REED</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>RY</td>
<td>SPST</td>
<td>Red</td>
<td>—</td>
<td>5 - 240 AC/DC</td>
<td><strong>10.0</strong></td>
<td>100mA</td>
<td>—</td>
<td>3.0 V max.</td>
<td>—</td>
<td>14 to 158°F</td>
<td>50 G / 9 G</td>
</tr>
<tr>
<td></td>
<td>RK</td>
<td>QD*</td>
<td>—</td>
<td>—</td>
<td>5 - 110 AC/DC</td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td>NY</td>
<td>SPST</td>
<td>Yellow</td>
<td>—</td>
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<td></td>
<td>NK</td>
<td>QD*</td>
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<td>—</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>SOLID STATE</td>
<td>TK</td>
<td>NPN (Sourcing)</td>
<td>Green</td>
<td>Yellow</td>
<td>10 - 30 VDC</td>
<td><strong>3.0</strong></td>
<td>100mA</td>
<td>20 mA @ 24V</td>
<td>2.0 V max.</td>
<td>0.05 mA max.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TY</td>
<td>QD*</td>
<td>—</td>
<td>—</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PK</td>
<td>QD*</td>
<td>—</td>
<td>—</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>KY</td>
<td>NPN (Sinking)</td>
<td>Green</td>
<td>Red</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PK</td>
<td>QD*</td>
<td>—</td>
<td>—</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*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

**REED • NORMALLY OPEN**
- **RY & RK**
- **NY & NK**

**SOLID STATE • NORMALLY OPEN • PNP**
- **TY & TK**
- **PY & PK**

**SOLID STATE • NORMALLY OPEN • NPN**
- **KY & KK**
- **HY & HK**

**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**

See Page 12 for Switch Rail Dimensions

**DETECTION POINT REED**

- **Solid State**
- **Detection Point**

**QD (Quick-disconnect) switch**

- **M8x1**
- **1.18 [30]**
- **13.35 [339]**

**QD Cable**

- **M8x1**
- **1.26 [32.1]**
- **0.28 [7]**

Dimensions in inches [brackets indicate dimensions in millimeters]
COMPILE APPLICATION REQUIREMENTS

ORIENTATION

- Horizontal
- Side
- Horizontal Down
- Vertical

- Angled °

- Front View
- Side View

DISTANCE FROM CENTER OF CARRIER
dx ______
dy ______
dz ______

TO LOAD CENTER OF GRAVITY

- Inch (U.S. Standard)
- Millimeter (Metric)

STROKE LENGTH

- Inch (SK)
- Millimeter (SM)

BENDING MOMENTS APPLIED TO CARRIER

- Mx ______
- My ______
- Mz ______

- In.-lbf. (U.S. Standard)
- N-m (Metric)

PRECISION

Repeatability

- Inch
- Millimeter

OPERATING ENVIRONMENT

Temperature, Contamination, etc.

LOAD

- Lb. (U.S. Standard)
- Kg. (Metric)

- Lbf. (U.S. Standard)
- N (Metric)

MOVE PROFILE

Move Distance

- Inch
- Millimeters

Dwell Time After Move

Max. Speed

- In/sec
- Mm/sec

MOVE TIME

- Sec

NO. OF CYCLES

- Per minute
- Per hour

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.

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

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.

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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 SizeIt 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 (L_f) 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 L_f 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 SizeIt 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.

Use Tolomatic Sizing Software to determine available options and accessories based on your application requirements.
# TRS Twin Rail Stage Actuator

## ORDERING

**BASE MODEL SPECIFICATIONS**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>TRS  Twin Rail Stage</th>
</tr>
</thead>
</table>

**SIZE**

<table>
<thead>
<tr>
<th>Size</th>
<th>100</th>
<th>165</th>
</tr>
</thead>
</table>

**NUT/SCREW CONFIGURATION**

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BNM05</td>
<td>Ball Nut, 5 mm lead</td>
</tr>
<tr>
<td>BNM10</td>
<td>Ball Nut, 10 mm lead</td>
</tr>
<tr>
<td>RN05</td>
<td>Roller Nut, 5 mm lead</td>
</tr>
<tr>
<td>RN10</td>
<td>Roller Nut, 10 mm lead</td>
</tr>
</tbody>
</table>

**STROKE LENGTH**

<table>
<thead>
<tr>
<th>Stroke Length</th>
<th>SM Stroke, then enter desired stroke length in millimeters</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX. STROKE</td>
<td>TRS100 750 mm 29.5 in</td>
</tr>
<tr>
<td></td>
<td>TRS165 1100 mm 43.3 in</td>
</tr>
</tbody>
</table>

**MOTOR MOUNTING / REDUCTIONS**

<table>
<thead>
<tr>
<th>Mounting Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LMI</td>
<td>In-Line mount</td>
</tr>
<tr>
<td>RPL1</td>
<td>1:1 Reverse-Parallel mount left</td>
</tr>
<tr>
<td>RPR1</td>
<td>1:1 Reverse-Parallel mount right</td>
</tr>
<tr>
<td>RPB1</td>
<td>1:1 Reverse-Parallel mount bottom</td>
</tr>
<tr>
<td>RPT1</td>
<td>1:1 Reverse-Parallel mount top</td>
</tr>
</tbody>
</table>

**BASE MOUNTING**

<table>
<thead>
<tr>
<th>Mounting Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blank</td>
<td>Standard bottom threaded holes, no Toe clamp mounting slots</td>
</tr>
<tr>
<td>TCx</td>
<td>Toe clamps + mounting slots* x = number of toe clamps</td>
</tr>
</tbody>
</table>

**CARRIER MOUNTING**

<table>
<thead>
<tr>
<th>Mounting Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blank</td>
<td>Standard Carrier</td>
</tr>
<tr>
<td>C2C</td>
<td>Carrier-to-carrier mounting**</td>
</tr>
</tbody>
</table>

**MOTOR**

<table>
<thead>
<tr>
<th>Motor Mount Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>YM_</td>
<td>Your Motor Here (≤ 70 mm flange)</td>
</tr>
</tbody>
</table>

**NOTE:** Not all codes listed are compatible with all options.

---

**BASE MODEL SPECIFICATIONS OPTIONS**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>Dust Band Repair Kit</td>
</tr>
<tr>
<td>R</td>
<td>Reed Switch (Normally Open) with 5-meter lead, &amp; enter quantity desired</td>
</tr>
<tr>
<td>N</td>
<td>Reed Switch (Normally Closed) with 5-meter lead, &amp; quantity</td>
</tr>
<tr>
<td>Y</td>
<td>Reed Switch (Normally Open) with 5-meter lead/QD, &amp; quantity</td>
</tr>
<tr>
<td>K</td>
<td>Reed Switch (Normally Closed) with 5-meter lead/QD, &amp; quantity</td>
</tr>
</tbody>
</table>

**OPTIONS SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C2C</td>
<td>Carrier-to-carrier mounting**</td>
</tr>
<tr>
<td>*</td>
<td>Only available with 100 mm frame size</td>
</tr>
</tbody>
</table>

**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**

<table>
<thead>
<tr>
<th>Switch Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RY_</td>
<td>Reed Switch (Normally Open) with 5-meter lead, &amp; enter quantity desired</td>
</tr>
<tr>
<td>RK_</td>
<td>Reed Switch (Normally Open) with 5-meter lead/QD, &amp; quantity</td>
</tr>
<tr>
<td>NY_</td>
<td>Reed Switch (Normally Closed) with 5-meter lead, &amp; quantity</td>
</tr>
<tr>
<td>NK_</td>
<td>Reed Switch (Normally Closed) with 5-meter lead/QD, &amp; quantity</td>
</tr>
<tr>
<td>TY_</td>
<td>Solid State Switch PNP (Normally Open) with 5-meter lead, &amp; quantity</td>
</tr>
<tr>
<td>TK_</td>
<td>Solid State Switch PNP (Normally Open) with 5-meter lead/QD, &amp; quantity</td>
</tr>
<tr>
<td>KY_</td>
<td>Solid State Switch NPN (Normally Open) with 5-meter lead, &amp; quantity</td>
</tr>
<tr>
<td>KK_</td>
<td>Solid State Switch NPN (Normally Open) with 5-meter lead/QD, &amp; quantity</td>
</tr>
<tr>
<td>PY_</td>
<td>Solid State Switch PNP (Normally Closed) with 5-meter lead, &amp; quantity</td>
</tr>
<tr>
<td>PK_</td>
<td>Solid State Switch PNP (Normally Closed) with 5-meter lead/QD, &amp; quantity</td>
</tr>
<tr>
<td>HY_</td>
<td>Solid State Switch NPN (Normally Closed) with 5-meter lead, &amp; quantity</td>
</tr>
<tr>
<td>HK_</td>
<td>Solid State Switch NPN (Normally Closed) with 5-meter lead/QD, &amp; quantity</td>
</tr>
</tbody>
</table>

**FIELD RETROFIT**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dust Band Repair Kit</td>
<td>RK then Model &amp; Stroke in millimeters DB</td>
</tr>
</tbody>
</table>

**Example:**

RK TRS 100 SM200.50 DB

---

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Motor Mounts Made-to-Order

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for fast, accurate actuator selection

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

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

**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.

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**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

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

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

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

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