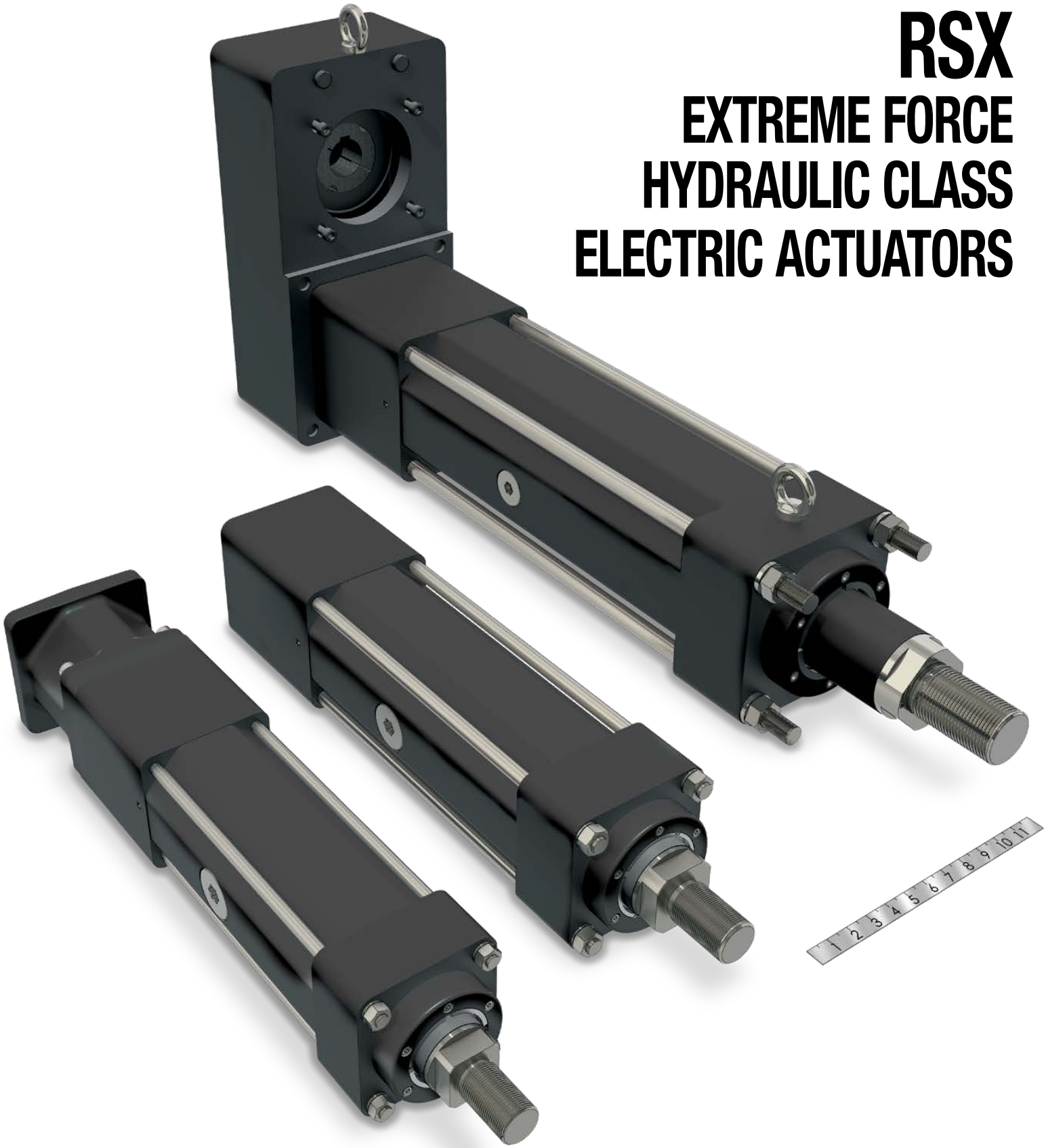
Tolomatic™
EXCELLENCE *IN MOTION*

ENDURANCE TECHNOLOGY℠
A Tolomatic Design Principle

# RSX
## EXTREME FORCE HYDRAULIC CLASS ELECTRIC ACTUATORS



**LINEAR SOLUTIONS MADE EASY**

# RSX Extreme Force, Hydraulic Class Electric Actuator

## WHAT IS THE RSX?

RSX actuators are an ideal choice for replacing hydraulic cylinders. These high force electric actuators are available for forces up to 50,000 lbf (222.4 kN). Designed for 100% duty cycle, rugged service and long life.

The RSX utilizes planetary roller screws for long lasting consistent performance. Additionally, the RSX uses Tolomatic's popular Your Motor Here program which allows RSX to easily mount many servo motor and gearboxes on the market.

**Fast delivery Built-to-Order**


## TOLOMATIC'S ELECTRIC ROD-STYLE ACTUATORS

| | ERD | RSH | RSA | RSX | GSA | IMA |
|---|---|---|---|---|---|---|
| |  |  |  |  |  |  |
| | **Rod-Style Actuator** | **Hygienic Rod-Style Actuator** | **Rod-Style Actuator** | **Rod-Style Actuator** | **Guided Rod-Style Actuator** | **Integrated Servo Actuator** |
| **Force** up to: | 2.22 kN *(500 lbf)* | 35 kN *(7,943 lbf)* | 58 kN *(13,039 lbf)* | 222.4 kN *(50,000 lbf)* | 4.23 kN *(950 lbf)* | 30.6 kN *(6,875 lbf)* |
| **Speed** up to: | 1,016 mm/sec *(40 in/sec)* | 498 mm/sec *(19.6 in/sec)* | 3,124 mm/sec *(123 in/sec)* | 760 mm/sec *(29.9 in/sec)* | 3,124 mm/sec *(123 in/sec)* | 1,334 mm/sec *(52.5 in/sec)* |
| **Stroke Length** up to: | 609 mm *(24 in)* | 1,219 mm *(48 in)* | 1,524 mm *(60 in)* | 890 mm *(35 in)* | 914 mm *(36 in)* | 457 mm *(18 in)* |
| **Screw/Nut Type** | Solid, Ball & Roller | Ball & Roller | Solid, Ball & Roller | Roller | Solid & Ball | Ball & Roller |
| | *For complete information see www.tolomatic.com or literature number:* | | | | | |
| **Literature Number:** | 2190-4000 | 2100-4010 | 3600-4166 | 2171-4001 | 3600-4166 | 2700-4000 |

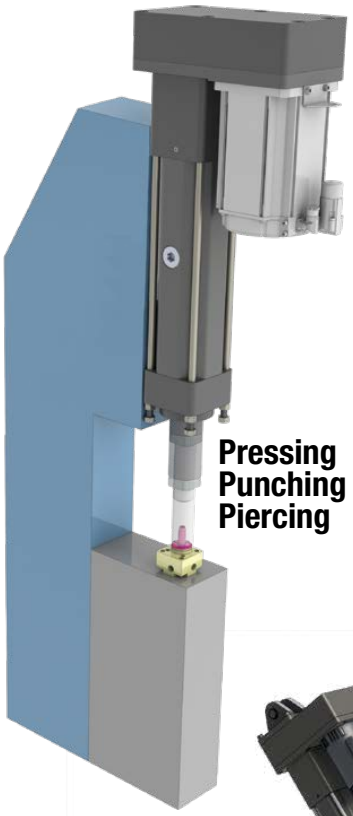
*(Not all models deliver maximum values listed, i.e.: Maximum thrust may not be available with maximum speed)*

# RSX Extreme Force, Hydraulic Class Electric Actuator

## Applications

**Volumetric pumps**
**Injection molding**

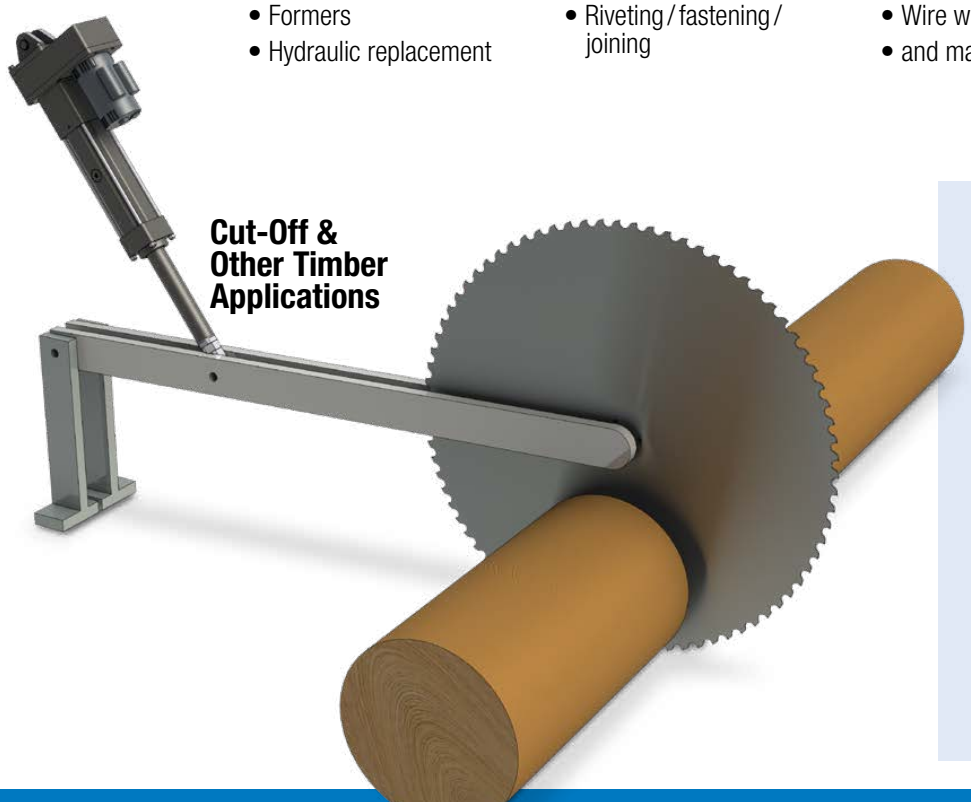
**Motion simulators**



**Pressing**
**Punching**
**Piercing**

**Other Applications:**

- Active Security Barrier
- Assembly machinery
- Automatic tool changers
- Automotive
- Clamping
- Converting
- Cycle testing
- Fillers
- Formers
- Hydraulic replacement
- Machine tools
- Open / close doors
- Parts clamping
- Piercing
- Precision grinders
- Product test simulations
- Pressing
- Punching
- Riveting / fastening / joining
- Sawmill equipment
- Stamping
- Tension control
- Test stands
- Tube bending
- Wave generation
- Web guidance
- Welding
- Wire winding
- and many more



**Cut-Off &**
**Other Timber**
**Applications**

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# RSX ELECTRIC ROD-STYLE ACTUATOR

## ENDURANCE TECHNOLOGY℠

A Tolomatic Design Principle

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

The RSX series high force electric actuators with planetary roller screws are designed for rugged service, long life and are an ideal choice for replacing hydraulic cylinders.

### IP65 STANDARD

Protection against dust and water spray (static)

### IP67 OPTION

Protection against dust and water spray (static)

### YOUR MOTOR HERE

*YOU CAN CHOOSE:*

- Specify the motor to be installed and actuator ships with proper mounting hardware
- Specify and ship your device to Tolomatic for factory installation

### HIGH POSITIONAL ACCURACY

| SCREW ACCURACY | | |
|---|---|---|
| Roller Nut | ± 0.0102mm/300mm | *± 0.0004"/ft.* |

### LUBE ACCESS PORT

- This re-lubrication system provides extended screw service life
- Convenient lubrication without disassembly
- Grease zerk fitting

### SUPERIOR CONSTRUCTION

- Steel parts are black or clear zinc plated for corrosion resistance
- Aluminum parts are Type III hardcoat black anodized for high surface hardness

### FIELD REPLACEABLE CARTRIDGE

- Scraper and dual seal design prevent contaminants from entering the housing for extended life of the actuator
- One piece assembly designed for easy field replacement

### THRUST TUBE

- Steel thrust tube supports extremely high force capabilities
- Salt bath nitride treatment provides excellent corrosion resistance, surface hardness and is very resistant to adherence of potential contaminants

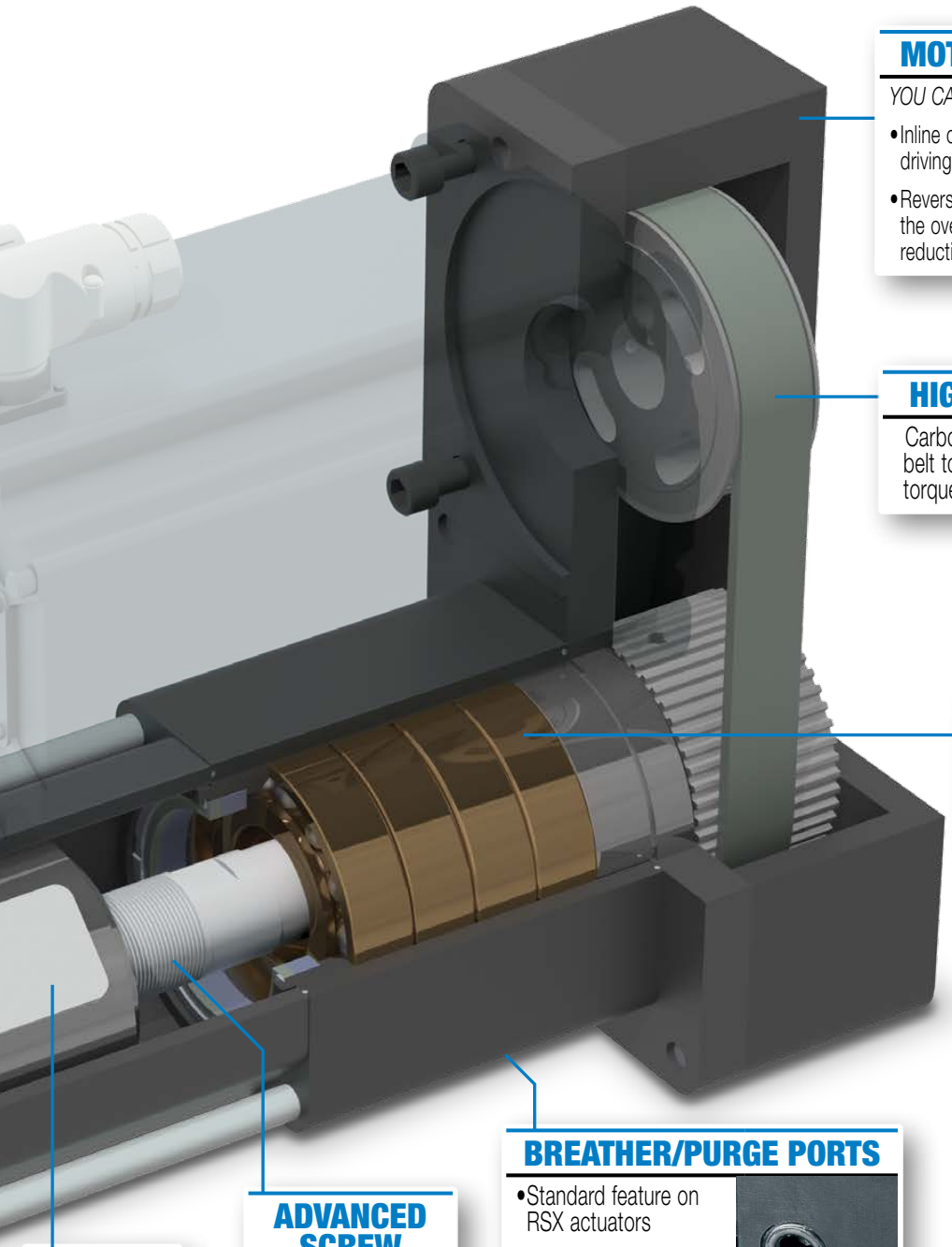
### NOSE BEARING

- Support the thrust tube and nut assembly through entire stroke length
- Unique nose bearing material allows for smooth operation

### HEAVY DUTY INTERNAL BUMPER

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

# ...MAXIMUM DURABILITY



## MOTOR ORIENTATION

*YOU CAN CHOOSE:*

- Inline option directly couples the driving shaft
- Reverse-parallel option minimizes the overall length and offers a belt reduction drive with a 1:1 or 2:1 ratio

## HIGH POWER TIMING BELT

Carbon fiber tensile reinforced synchronous belt to ensure smooth transmission of high torques in a compact design.

## HIGH FORCE ANGULAR CONTACT BEARINGS

Four ball bearings to support high axial loads & forces for long life

## INTERNAL ANTI-ROTATE

Composite bearings prevent rotation of the thrust tube

## ADVANCED SCREW TECHNOLOGY

Precision ground planetary roller screws provide the highest force and life ratings available

## BREATHER/PURGE PORTS

- Standard feature on RSX actuators
- Located on both the bottom and the opposite side of the actuator

- Use as Breather Port: allows air flow into the interior of the actuator. Prevents additional load on the motor caused by air buildup due to fast cycling of the RSX. Use as Purge Port: positive pressure with air lines and filters ensure contaminants do not enter the interior of the actuator.

## MOUNTING OPTIONS

- Front Flange
- Extended Tie Rods
- Trunnion
- Mounting Plates

## ROD END OPTIONS

- Rod Clevis
- Threaded Rod (standard)
- Extended Rod

## SENSOR OPTIONS

- Solid state NPN, PNP or reed
- Tie Rod Clip

## OIL COOLED

- For extended high duty cycle/ high force performance

# RSX096P PRESS MODEL

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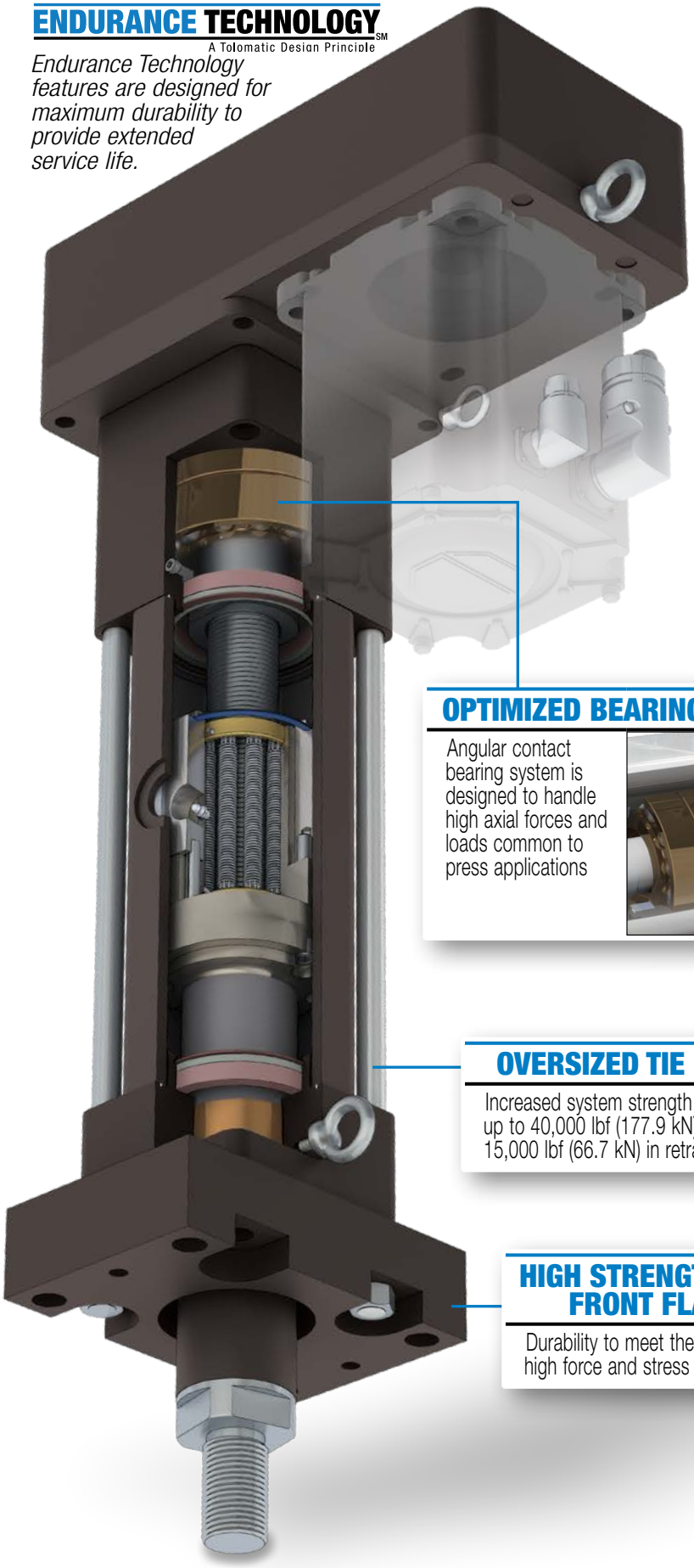
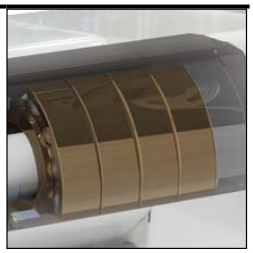
*Endurance Technology features are designed for maximum durability to provide extended service life.*

The RSX096P press actuator expands the extend force capability to 40,000 lbf (178 kN) making it well suited for applications such as pressing, riveting, clinching and many others. The RSX096P press model has all the features of the standard RSX on pages 4 & 5 plus oversized tie rods, a bearing system optimized for high force extend, and a high strength steel front flange.



## OPTIMIZED BEARING SYSTEM

Angular contact bearing system is designed to handle high axial forces and loads common to press applications



## OVERSIZED TIE RODS

Increased system strength to handle up to 40,000 lbf (177.9 kN) in extend; 15,000 lbf (66.7 kN) in retract

## HIGH STRENGTH STEEL FRONT FLANGE

Durability to meet the demands of high force and stress applications

**Fast delivery Built-to-Order**

# RSX096 OIL COOLED OPTION

**Contact Tolomatic for RSX080 & RSX128 Oil Cooled Option**

Tolomatic™ EXCELLENCE IN MOTION
…MAXIMUM DURABILITY

## RSX ACTUATORS

- An ideal choice for replacing hydraulic cylinders
- Available for forces up to 50,000 lbf (222 kN)
- Designed for 100% duty cycle, rugged service and long life

## OIL COOLED OPTION

- Provides up to 2 times the work capacity compared to standard grease RSX actuators.

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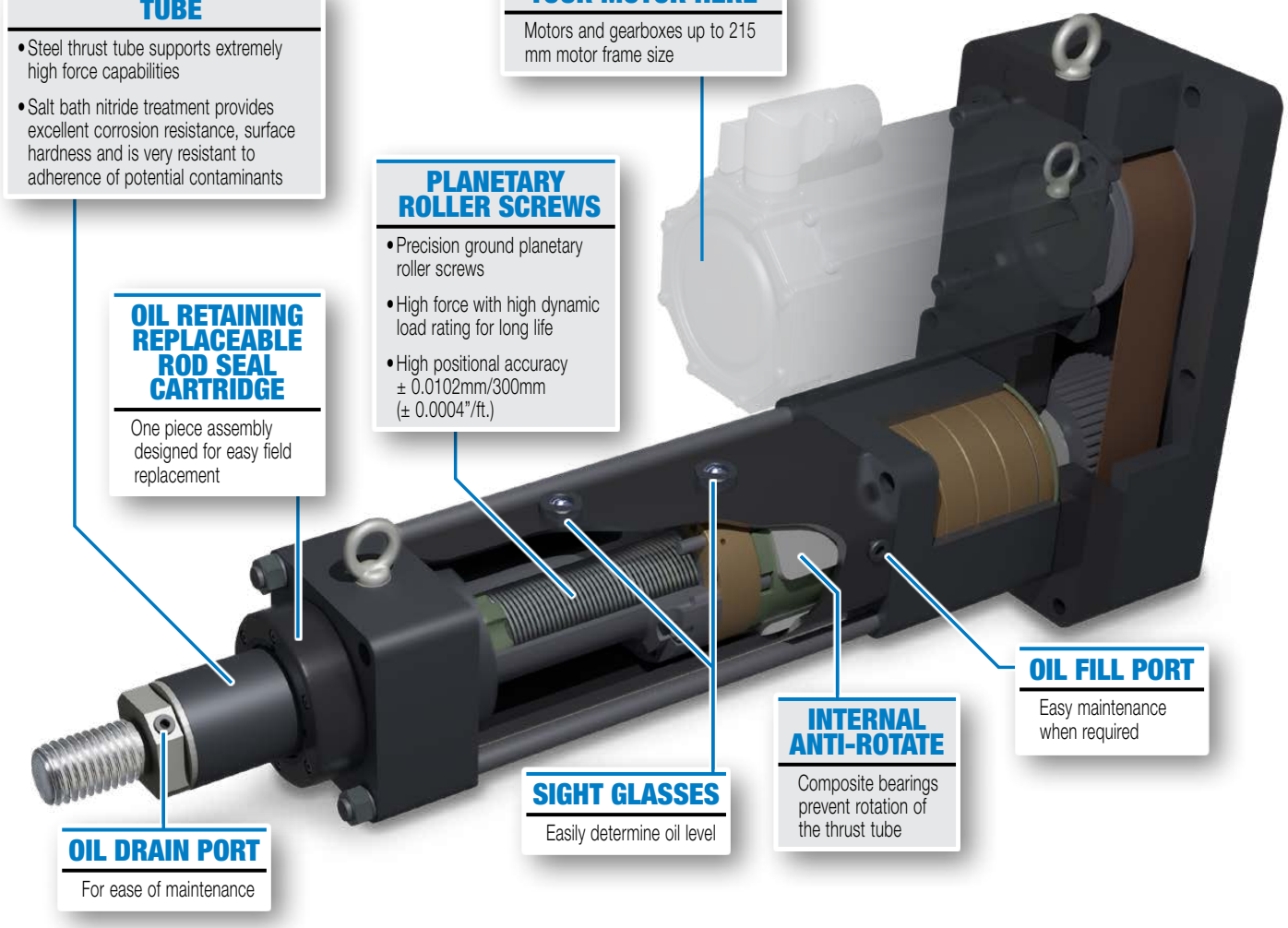
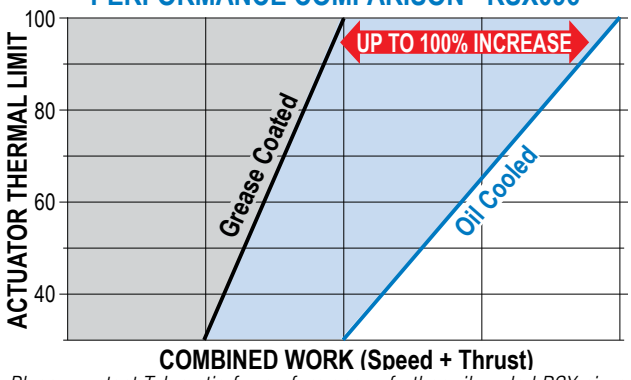



## What does Oil Cooled mean?

An unpressurized synthetic oil bath around the screw and nut replaces the standard (extreme temperature and pressure rated) grease. The oil bath efficiently reduces internal temperatures while simultaneously providing lubrication.

### PERFORMANCE COMPARISON - RSX096




*Please contact Tolomatic for performance of other oil cooled RSX sizes*

# FOOD GRADE RSX

## ENDURANCE TECHNOLOGY℠

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...MAXIMUM DURABILITY

The food grade RSX has all the features of the RSX shown on the previous pages plus additional features that are suited to challenging environments: 316 Stainless steel thrust rod, rod end, tie rods, fasteners; food grade white paint; IP67 rating; and food grade grease. The food grade RSX is a great option for the food & beverage processing environment. Contact Tolomatic for lead time and application review.

### STAINLESS STEEL MOTOR MOUNTING PLATE

316 series stainless steel for corrosion resistance

### SMOOTH BODY DESIGN

Fewer collection points for contaminants in wash-down environments

### STAINLESS STEEL RODS

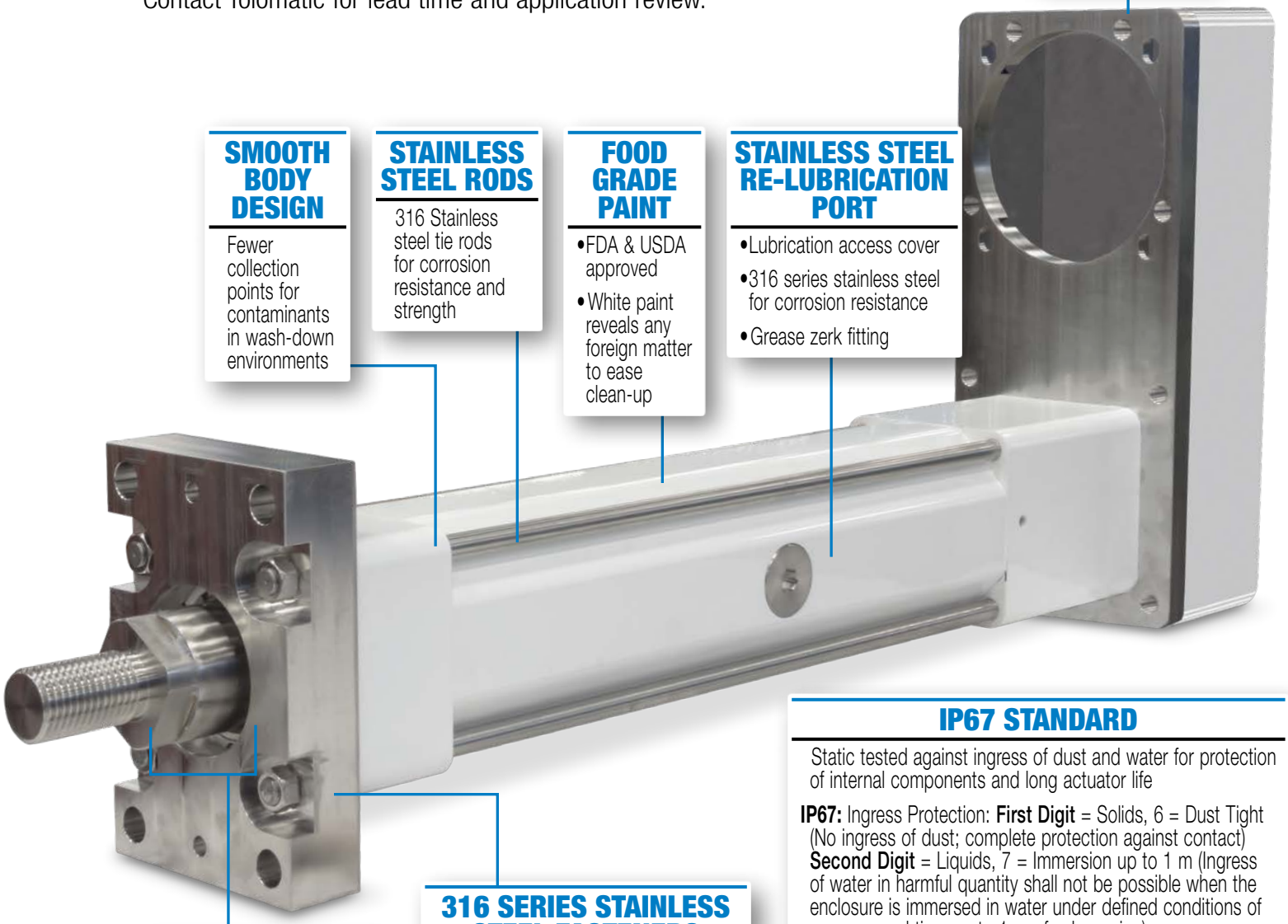
316 Stainless steel tie rods for corrosion resistance and strength

### FOOD GRADE PAINT

- FDA & USDA approved
- White paint reveals any foreign matter to ease clean-up

### STAINLESS STEEL RE-LUBRICATION PORT

- Lubrication access cover
- 316 series stainless steel for corrosion resistance
- Grease zerk fitting



### IP67 STANDARD

Static tested against ingress of dust and water for protection of internal components and long actuator life

**IP67:** Ingress Protection: **First Digit** = Solids, 6 = Dust Tight (No ingress of dust; complete protection against contact) **Second Digit** = Liquids, 7 = Immersion up to 1 m (Ingress of water in harmful quantity shall not be possible when the enclosure is immersed in water under defined conditions of pressure and time up to 1 m of submersion)

Contact Tolomatic for lead time and application review of Food Grade RSX

### STAINLESS STEEL THRUST ROD & ROD END

Corrosion resistant 316 series stainless steel thrust rod and rod end

### 316 SERIES STAINLESS STEEL FASTENERS

- Stainless steel fasteners for corrosion resistance
- Hex bolts for fewer collection points for contaminants in wash-down environments

# RSX Extreme Force, Hydraulic Class Electric Actuator

## Specifications

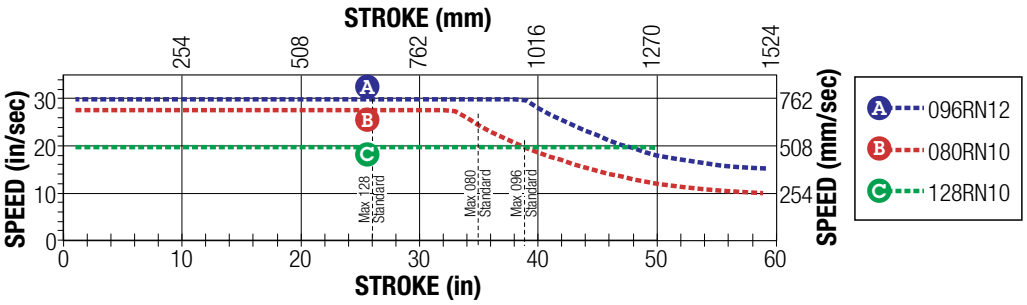
| RSX SIZE | MIN. STROKE | MAX. STROKE STANDARD | MAX. STROKE EXTENDED* | MAX. STROKE TRR STANDARD | MAX. STROKE TRR EXTENDED* | SCREW CODE | SCREW LEAD | LEAD ACCURACY | BACK–LASH | MAX. FORCE | MAX. SPEED | DYNAMIC LOAD RATING | DYNAMIC TORQUE TO OVERCOME FRICTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mm | mm | mm | mm | mm | | mm/rev | mm/300mm | mm | kN | mm/sec | kN | N-m |
| 080 | 75 | 890 | 1500 | 820 | 1430 | RN10 | 10.00 | 0.01 | 0.030 | 80.07 | 701 | 173.1 | 6.21 |
| 096 | 75 | 960 | 1500 | 880 | 1420 | RN12 | 12.00 | 0.01 | 0.030 | 133.45† | 759 | 269.3 | 6.21 |
| 096P | 75 | 450 | — | — | — | RN12 | 12.00 | 0.01 | 0.030 | 177.93** | 759 | 269.3 | 6.21 |
| 128◊ | 75 | 660 | 1230 | 550 | 1120 | RN10 | 10.00 | 0.01 | 0.030 | 222.41 | 500 | 442.7 | 8.47 |
| | in | in | in | in | in | | turns/in | in/ft | in | lbf | in/sec | lbf | lbf-in |
| 080 | 2.95 | 35.0 | 59.1 | 32.3 | 56.3 | RN10 | 2.54 | 0.0004 | 0.0012 | 18,000 | 27.6 | 38,914 | 55.0 |
| 096 | 2.95 | 37.8 | 59.1 | 34.6 | 55.9 | RN12 | 2.12 | 0.0004 | 0.0012 | 30,000† | 29.9 | 60,541 | 55.0 |
| 096P | 2.95 | 17.7 | — | — | — | RN12 | 2.12 | 0.0004 | 0.0012 | 40,000** | 29.9 | 60,541 | 55.0 |
| 128◊ | 2.95 | 26.0 | 48.4 | 21.7 | 44.1 | RN10 | 2.54 | 0.0004 | 0.0012 | 50,000 | 19.7 | 99,519 | 75.0 |

* Any stroke length above standard and up to max. extended stroke length, may require longer production time, contact Tolomatic.
** Max. force only in extend (retract force 15,000 lbf; 66.7 kN) TRR = Trunnion option †Requires HT1 Option
◊ RSX128P now available with press capability up to 60,000 lbf (266.9kN) Contact Tolomatic for more information.

| RSX SIZE | SCREW CODE | INERTIA BASE ACTUATOR LMI | INERTIA BASE ACTUATOR RP1 ST | INERTIA BASE ACTUATOR RP1HT | INERTIA BASE ACTUATOR RP2 ST | INERTIA BASE ACTUATOR RP2 HT | INERTIA PER UNIT | WEIGHT BASE ACTUATOR LMI | WEIGHT BASE ACTUATOR RP1 ST | WEIGHT BASE ACTUATOR RP1HT | WEIGHT BASE ACTUATOR RP2 ST | WEIGHT BASE ACTUATOR RP2 HT | WEIGHT PER UNIT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | kg-m² x 10⁻⁴ | | | | | kg-m² x 10⁻⁴ per mm | kg | | | | | kg per mm |
| 080 | RN10 | 56.9 | 102.8 | 102.8 | 42.0 | 42.0 | 0.02 | 35.16 | 40.81 | 40.81 | 40.77 | 40.77 | 0.03 |
| 096 | RN12 | 178.7 | 216.2 | 253.7 | 92.4 | 100.5 | 0.04 | 65.60 | 73.13 | 75.23 | 73.60 | 74.11 | 0.04 |
| 096P | RN12 | 178.7 | 216.2 | 253.7 | 92.4 | 100.5 | 0.04 | 68.85 | — | 80.19 | — | 79.07 | 0.04 |
| 128 | RN10 | 708.8 | 676.8 | 676.8 | 269.6 | 269.6 | 0.11 | 192.10 | 207.70 | 207.70 | 280.40 | 280.40 | 0.08 |
| | | lb-in² | | | | | lb-in² per in | lb | | | | | lb per in |
| 080 | RN10 | 19.4 | 35.13 | 35.13 | 14.36 | 14.36 | 0.15 | 77.51 | 89.96 | 89.96 | 89.88 | 89.88 | 1.72 |
| 096 | RN12 | 61.1 | 73.87 | 86.70 | 31.59 | 34.19 | 0.33 | 144.63 | 161.22 | 165.86 | 162.27 | 163.38 | 2.31 |
| 096P | RN12 | 61.1 | 73.87 | 86.70 | 31.59 | 34.19 | 0.33 | 151.78 | — | 176.78 | — | 174.32 | 2.40 |
| 128 | RN10 | 242.2 | 231.29 | 231.29 | 92.11 | 92.11 | 0.98 | 423.60 | 457.80 | 457.80 | 459.40 | 459.40 | 4.40 |

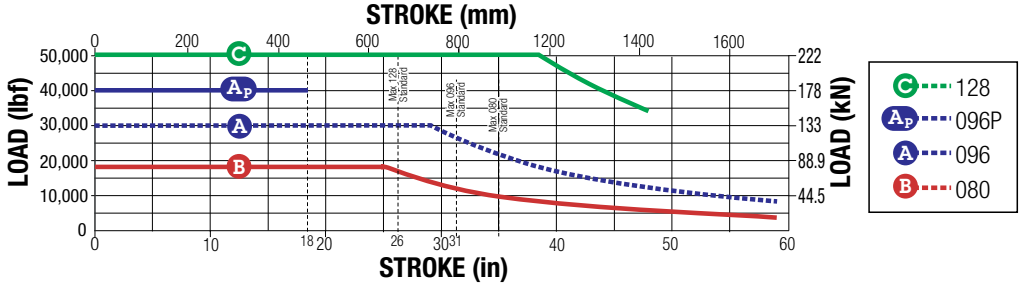
**TEMP. RANGE:** Standard 4° to 54°C (40° to 130°F). For extended ranges -30C° to 60°C (-22° to 140°F) contact Tolomatic for application review.

## SIZE: ALL: CRITICAL SPEED CAPACITIES*





## SIZE: ALL: SCREW BUCKLING LOAD*




*NOTE: When using Trunnion Mount, (TRR) consider the stroke to be longer when determining Critical Speed and Buckling Load:

| | mm | in |
|---|---|---|
| RSX080 | 68.1 | 2.68 |
| RSX096 | 72.4 | 2.85 |
| RSX128 | 108.0 | 4.25 |

## RSX Standard Actuators Expected Life:

*NOTE: The* $L_{10}$ *expected life of a ball or roller screw linear actuator is expressed as the linear travel distance that 90% of properly maintained ball or roller screw manufactured are expected to meet or exceed. This is not a guarantee and this graph should be used for estimation purposes only.*

*The underlying formula that defines this value is:*

$$L_{10} = \left(\frac{C}{P_e}\right)^3 \bullet \ell \equiv$$

$L_{10}$ *Travel life in millions of units (in or mm), where:*

**C** = Dynamic load rating (lbf) or *(N)*

$\mathbf{P_e}$ = Equivalent load (lbf) or *(N)*
*If load is constant across all movements then:*
actual load = equivalent load

$\ell$ = Screw lead (in/rev) *(mm/rev)*

*Use the "***Equivalent Load***" calculation below, when the load is not constant throughout the entire stroke. In cases where there is only minor variation in loading, use greatest load for life calculations.*

*Where:*

$$P_e = \sqrt[3]{\frac{L_1(P_1)^3 + L_2(P_2)^3 + L_3(P_3)^3 + L_n(P_n)^3}{L}}$$

$\mathbf{P_e}$ = Equivalent load (lbf) or *(N)*

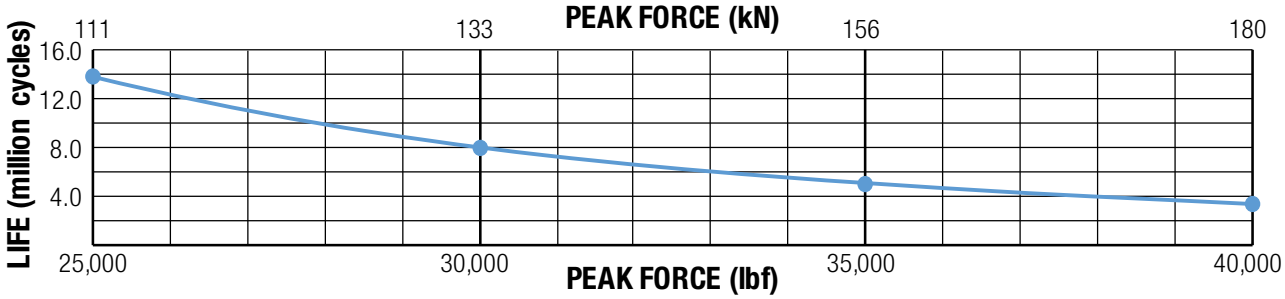
$\mathbf{P_n}$ = Each increment at different load (lbf) or *(N)*

**L** = Total distanced traveled per cycle (extend + retract stroke) $[L = L_1 + L_2 + L_3 + L_n]$

$\mathbf{L_n}$ = Each increment of stroke at different load (in) or *(mm)*

## RSX096P Press Model Expected Life:

The RSX096P (RSX Press Model) L10 expected life calculation is modified to consider only high force press (or similar) cycles. The calculation is modified because in applications such as pressing (or similar), repeated high force cycles on the same position of the roller screw will focus the stress in one area or location which may limit the life of the device. In the standard L10 calculation, the lower force motion segments may significantly lower the equivalent load leading to an inflated life estimation. This modified L10 expected life calculation for press (or similar) applications with the high force segment over a distance of one screw lead or less results in the following life estimation graph:




**NOTE:** The L10 life estimation method does not include failures caused by other conditions such as contamination, misalignment, improper lubrication and exceeding actuator specifications

## RE-LUBRICATION RECOMMENDATION:

Lubrication requirements for electric actuators depend on the motion cycle (velocity, force, duty cycle), type of application, ambient temperature, environmental surrounding and various other factors.

For many general purpose applications, Tolomatic ball screw actuators are typically considered lubricated for life unless otherwise specified, such as those actuator models outfitted with a re-lubrication feature. For roller screw or ball screw actuators outfitted with a re-lubrication feature, Tolomatic recommends to re-lubricate the actuator at least once per year or every 1,000,000 cycles, whichever comes first, to maximize service life. For more demanding applications such as pressing, high frequency or other highly stressed applications, the re-lubrication interval for these actuators will vary and will need to be more frequent. In these demanding applications, it is recommended to execute at least 5 full stroke moves every 5,000 cycles of operation (or more frequent if possible) to re-distribute the grease within the actuator.

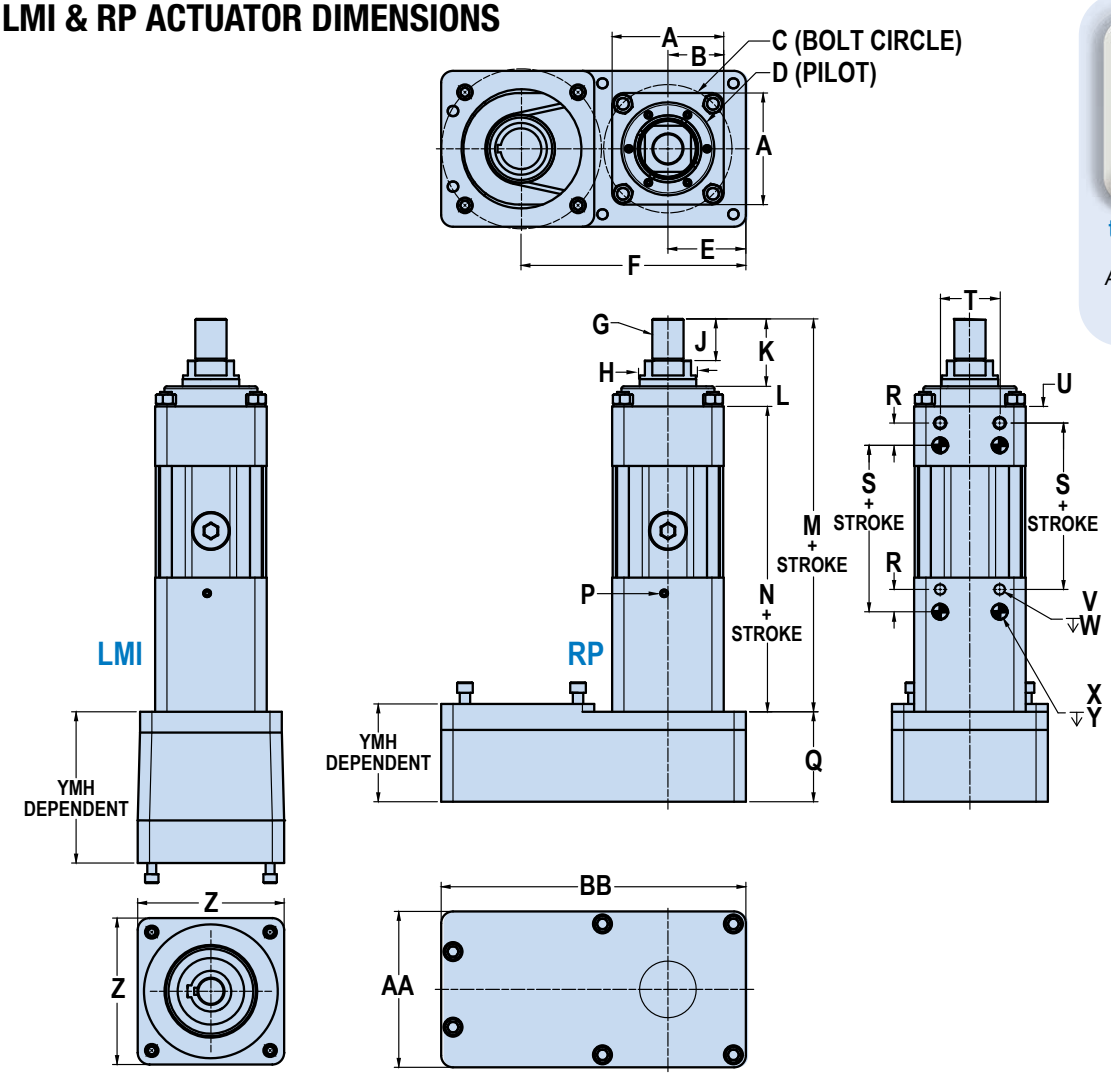
Re-lubricate with Tolomatic Grease into the grease port located on the side of the actuator.

For RSX096 OIL Option refer to the RSX Oil Cooled Option Operation and Maintenance Addendum (https://www.tolomatic.com/storyslab?resid=3483)

| | RSX080 | RSX096(P) | RSX128 |
|---|---|---|---|
| Quantity (g) | 8.0 + (0.020 x Stroke$^{mm}$) | 9.5 + (0.025 x Stroke$^{mm}$) | 12.0 + (0.027 x Stroke$^{mm}$) |
| Quantity (oz) | 0.28 + (0.018 x Stroke$^{in}$) | 0.34 + (0.022 x Stroke$^{in}$) | 0.42 + (0.024 x Stroke$^{in}$) |

Stroke$^{mm}$ = Stroke length in millimeters  Stroke$^{in}$ = Stroke length in inches

## LMI & RP ACTUATOR DIMENSIONS




tolomatic.com/CAD
**Download 3D CAD**
*Always use CAD solid model to determine critical dimensions*

| | 080 | 096 | 128 |
|---|---|---|---|
| **A** | 135.0 | 150.0 | 220.0 |
| **B** | 67.5 | 75.0 | 110.0 |
| **C** | 150.00 | 171.0 | 250.0 |
| **D** | 110.00 (+0.00) (-0.03) | 125.00 (+0.00) (-0.03) | 175.0 (+0.00) (-0.03) |
| **E** | 88.9 | 104.8 | 145.5 |
| **F** | RP1 | | |
| | 272.9 | 304.8 | 425.6 |
| | RP2 | | |
| | 271.1 | 302.3 | 427.2 |
| **G** | STANDARD | | |
| | M36 x 3.0-6g | M42 x 4.5-6g | M64 x 3.0-6g |
| **Hø** | 63.388 / 63.449 | 76.093 / 76.149 | 101.488 / 101.549 |
| THREAD LENGTH | | | |
| **J** | 60.0 | 69.9 | 105.0 |
| FULL RETRACT | | | |
| **K** | 95.0 | 104.8 | 165.1 |
| **L** | 27.0 | 27.0 | 33.0 |
| **M** | 474.7 | 601.1 | 803.9 |
| **N** | 352.7 | 469.2 | 605.8 |

| | 080 | 096 | 128 |
|---|---|---|---|
| **P** | RC 1/8 -28 X 38.1 DP (Plugged) | RC 1/8 -28 X 38.1 DP (Plugged) | RC 1/4 -19 X 38.1 DP (Plugged) |
| **Q** | 96.0 | 124.7 | 184.2 |
| **R** | 30.0 | 30.0 | 40.0 |
| **S** | 210.9 | 282.4 | 369.0 |
| **T** | 70.0 | 80.0 | 115.0 |
| **U** | 18.0 | 22.3 | 35.0 |
| **V** | M12 x 1.75-6H | M16 x 2.0-6H | M20 x 2.5-6H |
| **W** | ↧ 18.0 (4) | ↧ 20.0 (4) | ↧ 20.0 (4) |
| **X** | 16.025 16.012 | 20.025 20.013 | 20.025 20.013 |
| **Y** | ↧ 15.0 (4) | ↧ 15.0 (4) | ↧ 20.0 (4) |
| **Z** | 152.4 | 196.9 | 287.8 |
| **AA** | 177.8 | 209.6 | 291.1 |
| **BB** | 355.6 | 409.6 | 589.8 |

Dimensions in millimeters

| | 080 | 096 | 128 |
|---|---|---|---|
| **A** | *5.31* | *5.91* | *8.66* |
| **B** | *2.66* | *2.95* | *4.33* |
| **C** | *5.905* | *6.73* | *9.84* |
| **D** | *4.331 (+0.000) (-0.001)* | *4.921 (+0.000) (-0.001)* | *6.89 (+0.000) (-0.001)* |
| **E** | *3.50* | *4.13* | *5.73* |
| **F** | RP1 | | |
| | *10.74* | *12.00* | *16.75* |
| | RP2 | | |
| | *10.67* | *11.90* | *16.82* |
| **G** | SR1 OPTION | | |
| | *1½-12 UN-2A* | *1⅞-12 UN-2A* | *2½-8 UN-2A* |
| **Hø** | *2.4956 / 2.4980* | *2.9958 / 2.9980* | *3.9956 / 3.9980* |
| THREAD LENGTH | | | |
| **J** | *2.36* | *2.75* | *4.13* |
| FULL RETRACT | | | |
| **K** | *3.74* | *4.13* | *6.50* |
| **L** | *1.06* | *1.06* | *1.30* |
| **M** | *18.69* | *23.66* | *31.65* |
| **N** | *13.89* | *18.47* | *23.85* |

| | 080 | 096 | 128 |
|---|---|---|---|
| **P** | RC 1/8 -28 X 38.1 DP (Plugged) | RC 1/8 -28 X 38.1 DP (Plugged) | RC 1/4 -19 X 38.1 DP (Plugged) |
| **Q** | *3.78* | *4.91* | *7.25* |
| **R** | *1.18* | *1.18* | *1.57* |
| **S** | *8.30* | *11.12* | *14.53* |
| **T** | *2.76* | *3.15* | *4.53* |
| **U** | *0.71* | *0.88* | *1.38* |
| **V** | M12 x 1.75-6H | M16 x 2.0-6H | M20 x 2.5-6H |
| **W** | ↧ *.71 (4)* | ↧ *.79 (4)* | ↧ *.79 (4)* |
| **X** | *Ø.6309 Ø.6304* | *Ø.7884 Ø.7879* | *Ø.7884 Ø.7879* |
| **Y** | ↧ *.59 (4)* | ↧ *.59 (4)* | ↧ *.79 (4)* |
| **Z** | *6.00* | *7.75* | *11.33* |
| **AA** | *7.00* | *8.25* | *11.46* |
| **BB** | *14.00* | *16.13* | *23.22* |

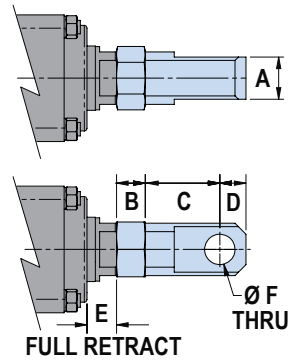
*Dimensions in inches*

# RSX Extreme Force, Hydraulic Class Electric Actuator

SIZE: **ALL**

## DIMENSIONS

### CLEVIS OPTION (CLV)




| | 080 | 096 | 128 |
|---|---|---|---|
| A | 40.00<br>39.59 | 50.00<br>49.59 | 60.00<br>59.26 |
| B | 29.0 | 34.0 | 51.0 |
| C | 75.0 | 88.3 | 137.0 |
| D | 25.0 | 31.0 | 45.0 |
| E | 35.0 | 35.0 | 61.2 |
| F | 28.05<br>28.00 | 36.06<br>36.00 | 45.06<br>45.00 |

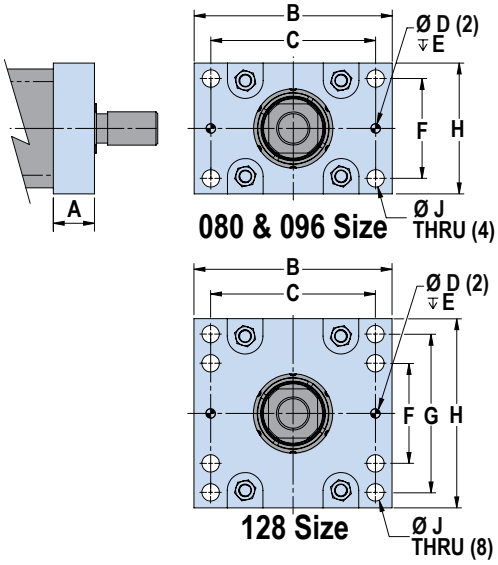
Dimensions in millimeters

| | 080 | 096 | 128 |
|---|---|---|---|
| A | *1.575*<br>*1.559* | *1.969*<br>*1.953* | *2.362*<br>*2.333* |
| B | *1.14* | *1.34* | *2.01* |
| C | *2.95* | *3.48* | *5.39* |
| D | *0.98* | *1.22* | *1.77* |
| E | *1.38* | *1.38* | *2.41* |
| F | *1.104*<br>*1.102* | *1.420*<br>*1.417* | *1.774*<br>*1.772* |

*Dimensions in inches*

**tolomatic.com/CAD**
**Download 3D CAD**
*Always use CAD solid model to determine critical dimensions*

### FRONT FLANGE OPTION (FFG)



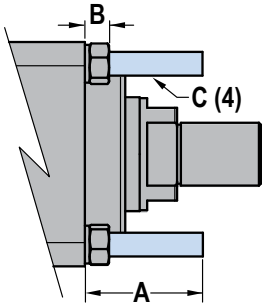

| | 080 | 096 | 128 |
|---|---|---|---|
| A | 42.0 | 62.0 | 85.0 |
| B | 225.0 | 250.0 | 360.0 |
| C | 180.0 | 208.0 | 300.0 |
| D | 10.013<br>10.000 | 12.025<br>12.013 | 20.033<br>20.013 |
| E | 12.0 | 12.0 | 20.0 |
| F | 100.0 | 126.0 | 190.0 |
| G | – | – | |
| H | 150.0 | 165.0 | 245.0 |
| J | 18.0 | 22.0 | 26.2 |

Dimensions in millimeters

| | 080 | 096 | 128 |
|---|---|---|---|
| A | *1.65* | *2.44* | *3.35* |
| B | *8.86* | *9.84* | *14.17* |
| C | *7.09* | *8.19* | *11.81* |
| D | *0.3942*<br>*0.3937* | *0.4734*<br>*0.4729* | *0.7887*<br>*0.7879* |
| E | *0.47* | *0.47* | *0.798* |
| F | *3.94* | *4.96* | *7.48* |
| G | – | – | |
| H | *5.91* | *6.50* | *9.65* |
| J | *0.71* | *0.87* | *1.03* |

*Dimensions in inches*

### EXTENDED TIE ROD OPTION (XT)

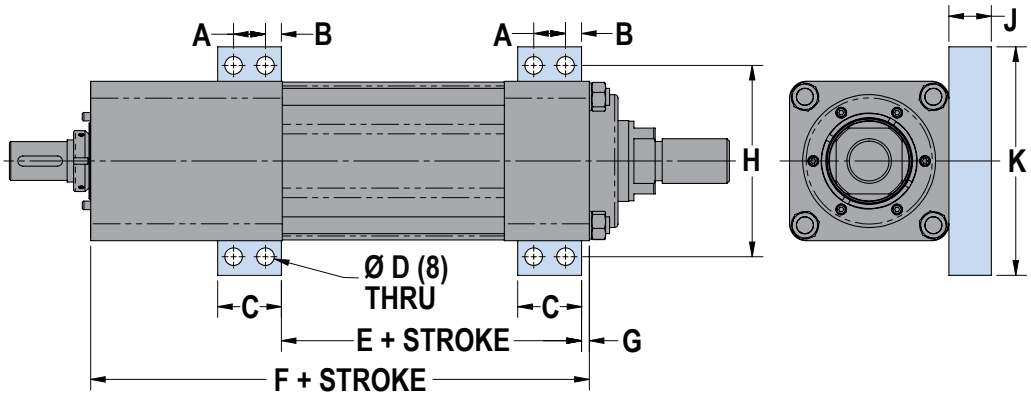



| | | 080 | 096 | 128 |
|---|---|---|---|---|
| A MIN | mm | 50.0 | 50.0 | 50.0 |
| | *in* | *1.97* | *1.97* | *1.97* |
| A MAX | mm | 100.0 | 100.0 | 100.0 |
| | *in* | *3.94* | *3.94* | *3.94* |
| B | mm | 13.3 | 15.3 | 26.9 |
| | *in* | *0.52* | *0.60* | *1.06* |
| C (4) | | M14 x 2.0-6g | M16 x 1.5-6g | M24 x 3.0-6g |

*A = Customer Specified Length*

### IMPERIAL THREAD OPTION (SRI)

## MOUNTING PLATE OPTION (MP2) DIMENSIONS




tolomatic.com/CAD
**Download 3D CAD**
*Always use CAD solid model to determine critical dimensions*

| | 080 | 096 | 128 |
|---|---|---|---|
| A | 30.0 | 30.0 | 40.0 |
| B | 12.5 | 15.0 | 22.5 |
| C | 55.0 | 60.0 | 85.0 |
| D | 12.7 | 16.7 | 21.0 |
| E | 210.9 | 282.4 | 477.0 |
| F | 352.7 | 469.2 | 712.6 |
| G | 5.5 | 7.3 | 12.5 |

| | 080 | 096 | 128 |
|---|---|---|---|
| H | 170.0 | 180.0 | 260.0 |
| J | 31.4 | 40.0 | 45.0 |
| K | 200.0 | 215.0 | 305.0 |

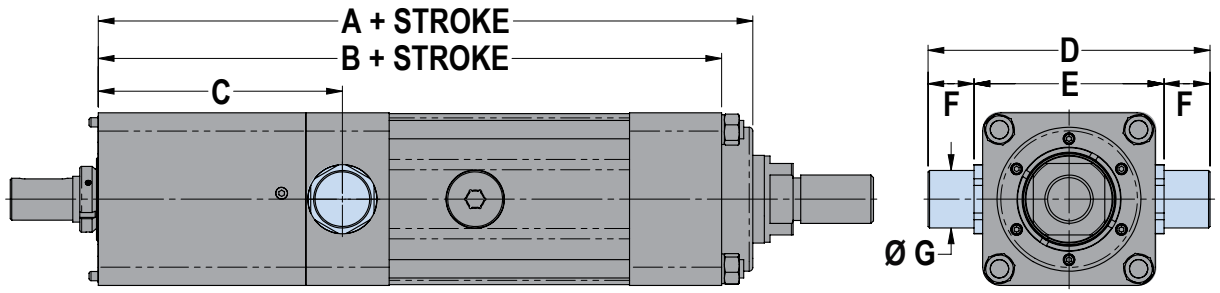
Dimensions in millimeters

| | 080 | 096 | 128 |
|---|---|---|---|
| A | *1.18* | *1.18* | *1.57* |
| B | *0.49* | *0.59* | *0.89* |
| C | *2.17* | *2.36* | *3.35* |
| D | *0.50* | *0.66* | *0.83* |
| E | *8.30* | *11.12* | *18.78* |
| F | *13.89* | *18.47* | *28.06* |
| G | *0.22* | *0.29* | *0.49* |

| | 080 | 096 | 128 |
|---|---|---|---|
| H | *6.69* | *7.09* | *10.24* |
| J | *1.24* | *1.57* | *1.77* |
| K | *7.87* | *8.46* | *12.01* |

*Dimensions in inches*

## TRUNNION OPTION (TRR) DIMENSIONS




| | 080 | 096 | 128 |
|---|---|---|---|
| A | 447.8 | 568.6 | 746.7 |
| B | 420.8 | 541.6 | 713.7 |
| C | 171.5 | 212.1 | 268.1 |
| D | 214.0 | 245.0 | 340.0 |
| E | 150.0 | 165.0 | 220.0 |

| | 080 | 096 | 128 |
|---|---|---|---|
| F | 32.0 | 40.0 | 50.0 |
| G | 39.98<br>39.95 | 49.98<br>49.94 | 62.97<br>62.92 |

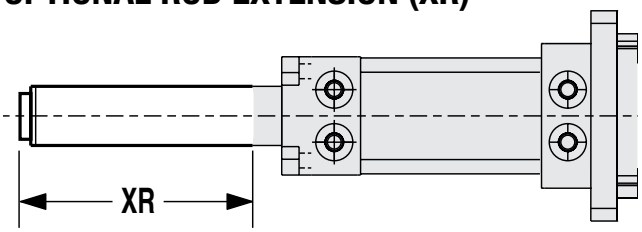
Dimensions in millimeters

| | 080 | 096 | 128 |
|---|---|---|---|
| A | *17.63* | *22.39* | *29.40* |
| B | *16.57* | *21.32* | *28.10* |
| C | *6.75* | *8.35* | *10.56* |
| D | *8.43* | *9.65* | *13.39* |
| E | *5.91* | *6.50* | *8.66* |

| | 080 | 096 | 128 |
|---|---|---|---|
| F | *1.26* | *1.57* | *1.97* |
| G | *1.574*<br>*1.573* | *1.968*<br>*1.966* | *2.479*<br>*2.477* |

*Dimensions in inches*

## OPTIONAL ROD EXTENSION (XR)




The thrust rod length can be extended by specifying the rod extension option. This does not increase the working stroke, only the length of the thrust rod.

*NOTE: Please consult Tolomatic if your application requires rod extension length greater than 100 mm (3.9 in).*

# RSX Extreme Force, Hydraulic Class Electric Actuator

## SWITCHES

RSX actuators 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 installation anywhere along the entire actuator length. The internal magnet is a standard feature. Switches can be installed in the field at any time.

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.

RoHS COMPLIANT CE

| | 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 | RY | 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 |
| | RK | QD* | | Tolomatic 81009082 | | | | | | | | | |
| | NY | 5m | SPST Normally Closed | — | Yellow | 5 - 110 AC/DC | | | | | | | |
| | NK | QD* | | Tolomatic 81009084 | | | | | | | | | |
| SOLID STATE | TY | 5m | PNP (Sourcing) Normally Open | Green | Yellow | 10 - 30 VDC | **3.0 | 100mA | 20 mA @ 24V | 2.0 V max. | 0.05 mA max. | | |
| | TK | QD* | | Tolomatic 81009088 | | | | | | | | | |
| | KY | 5m | NPN (Sinking) Normally Open | Green | Red | | | | | | | | |
| | KK | QD* | | Tolomatic 81009090 | | | | | | | | | |
| | PY | 5m | PNP (Sourcing) Normally Closed | Green | Yellow | | | | | | | | |
| | PK | QD* | | Tolomatic 81009092 | | | | | | | | | |
| | HY | 5m | NPN (Sinking) Normally Closed | Green | Red | | | | | | | | |
| | HK | QD* | | Tolomatic 81009094 | | | | | | | | | |

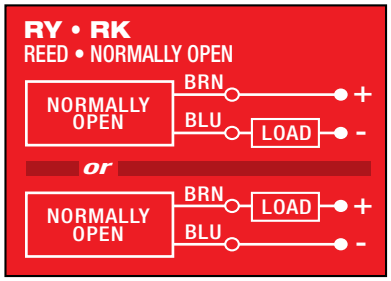
*QD = Quick-disconnect  Enclosure classification IEC 529 IP67 (NEMA 6)  CABLES: Robotic grade, oil resistant polyurethane jacket, PVC insulation

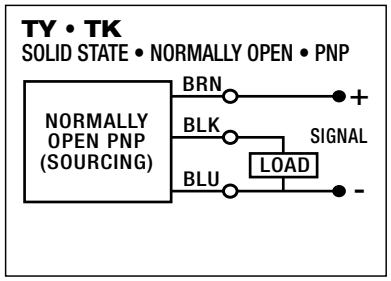
⚠ **WARNING: Do not exceed power rating (Watt = Voltage x Amperage). Permanent damage to sensor will occur.

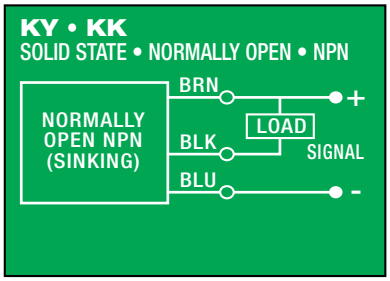
## SWITCH INSTALLATION

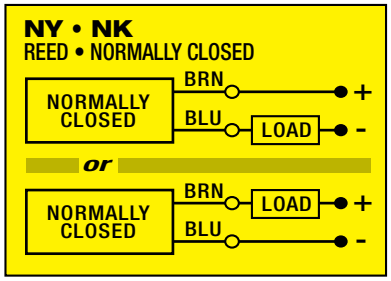
Place switch bracket onto any one of the four tie rods that run the length of the extruded tube. Insert the switch with set screw and the word "Tolomatic" facing up and slide into the mating slot on the bracket. Position the bracket with the switch to the exact location desired, with the bracket tight to the surface of the extrusion, then lock the bracket securely into place by tightening the set screw with the Allen wrench provided. Then tighten the switch into the bracket with a small slotted screwdriver.

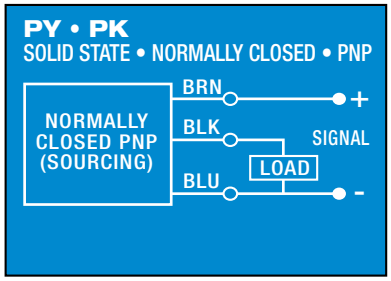
## WIRING DIAGRAMS

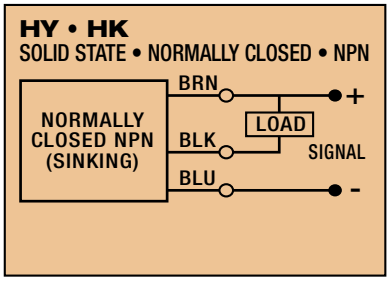


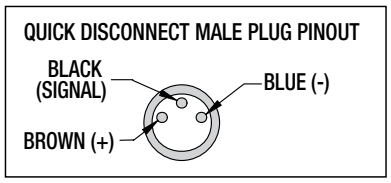



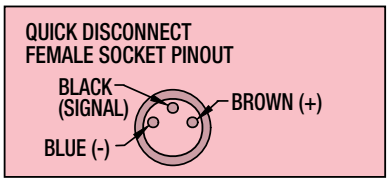



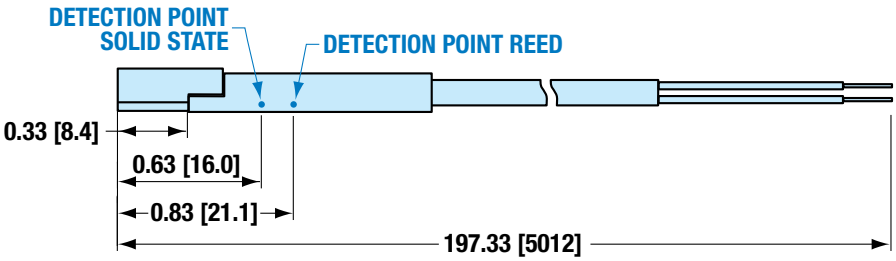



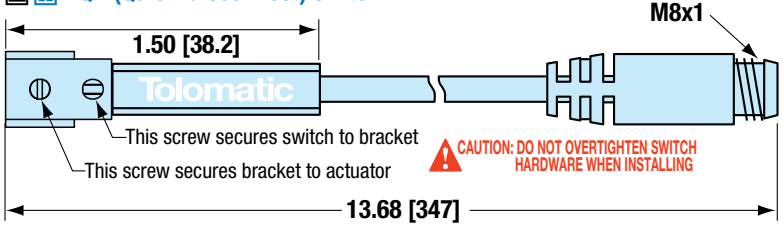




## SWITCH DIMENSIONS

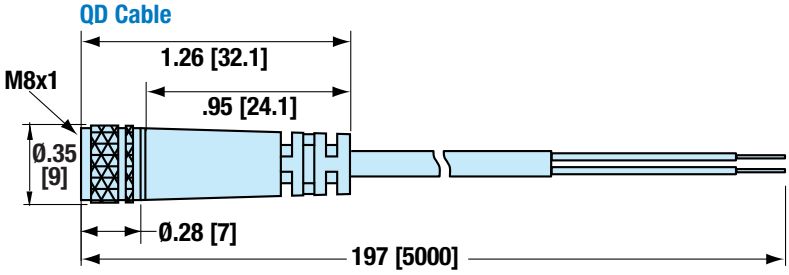
☐ Y - direct connect



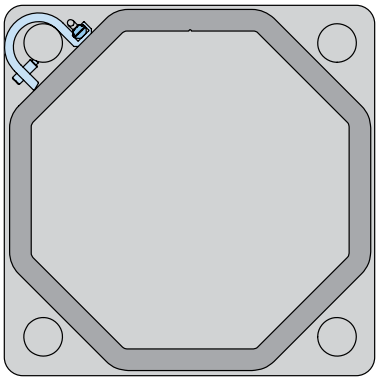

☐ K - QD (Quick-disconnect) switch




QD Cable




## SWITCH MOUNTING



The switch bracket and switch does not extend beyond the profile of the RSX heads.

# Electric Rod-Style Actuator Application Worksheet

**USE THE TOLOMATIC SIZING AND SELECTION SOFTWARE AVAILABLE ON-LINE AT www.tolomatic.com**

**or call Tolomatic at 1-800-328-2174.** We will provide any assistance needed to determine the proper actuator for the job.

## ACTUATOR ORIENTATION

☐ Horizontal

☐ Incline ° α _____


☐ Vertical Motor End Up

☐ Vertical Motor End Down

## APPLICATION ENVIRONMENT

☐ Caustic Washdown

☐ Ingress Protection

☐ Nonstandard Temperature: _____ ☐ °F ☐ °C

Actuator Environment Description: _____

_____

_____

_____

## ACTUATOR REQUIREMENTS

Stroke Length: _____ ☐ in ☐ mm

Repeatability: _____ ☐ in ☐ mm

Number of Cycles: _____ ☐ per minute ☐ per sec

Actuator to Hold Position: ☐ required ☐ not required

*If Hold Required:* ☐ After Move ☐ During Power Loss

## ADDITIONAL DETAILS

_____

_____

_____

_____

## MOTION AND FORCES

### EXTEND

Move Distance: _____ ☐ in ☐ mm

Max Speed: _____ ☐ in/sec ☐ mm/sec

Move Time: _____ ☒ sec

Dwell Time After Move: _____ ☒ sec

### RETRACT

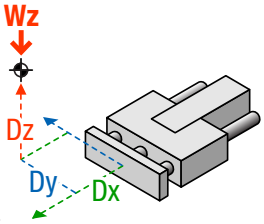
Move Distance: _____ ☐ in ☐ mm

Max Speed: _____ ☐ in/sec ☐ mm/sec

Move Time: _____ ☒ sec

Dwell Time After Move: _____ ☒ sec

### LOAD




Load: _____ ☐ lb ☐ kg

Supported by Actuator: _____ %

Moment Prevention: ☐ Guided/Supported

Distance From Tooling Plate to Load Center of Gravity:

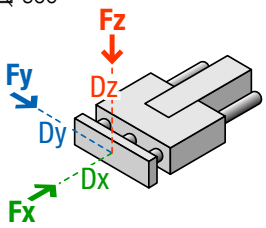
Load dx: _____ ☐ in ☐ mm

Load dy: _____ ☐ in ☐ mm

Load dz: _____ ☐ in ☐ mm

Assign to Moves: ☐ Extend ☐ Retract

### FORCE




Force: _____ ☐ lbf ☐ N

Force Direction: ☐ Toward ☐ Away

Direction of Applied Force: ☐ Fx ☐ Fy ☐ Fz

Center of Applied Force:

Force dx: _____ ☐ in ☐ mm

Force dy: _____ ☐ in ☐ mm

Force dz: _____ ☐ in ☐ mm

Assign to Moves: ☐ Extend ☐ Retract

## MOTOR DETAILS

Motor Type: ☐ Third Party Motor ☐ Tolomatic motor

Your Motor Here Code (YMH): YM_____

Additional Motor Information: _____

_____

_____

_____

## CONTACT INFORMATION

Name: _____

Company: _____

Address: _____

_____

Email: _____

Phone: _____

## Selection Guidelines

### 1 ESTABLISH MOTION PROFILE

Using the application stroke length, desired cycle time, loads and forces, establish the motion profile details including linear velocity and force in each of its segments.

### 2 SELECT ACTUATOR SIZE AND SCREW TYPE

Based on the required velocities and forces, select an actuator size including the lead of the roller screw assembly..

### 3 VERIFY CRITICAL SPEED OF THE SCREW

Verify that the application's peak linear velocity does not exceed the critical speed value for the size and lead of the screw selected.

### 4 VERIFY AXIAL BUCKLING STRENGTH OF THE SCREW

Verify that the peak force does not exceed the critical buckling force for the size of the screw selected.

### 5 COMPARE APPLICATION'S PEAK PARAMETERS TO PEAK CAPACITY (PEAK REGION) OF SELECTED ACTUATOR

Calculate the application's required peak force and peak velocity and compare to the graphs. The selection must satisfy the application's peak requirements.

### 6 CONSIDER THERMAL MITIGATION

Determine whether the oil cooled option is necessary based on the calculated screw thermals in the application.

### 7 CONSIDER LUBRICATION INTERVAL

Evaluate the recommended lubrication interval with respect to the application motion profile.
See page RSX_10 for complete lubrication information.

The above guidelines are for reference only.
Use Tolomatic online sizing software for best results.

### 8 TEMPERATURE CONSIDERATIONS

If the application's ambient temperature lies outside of the standard range (see page RSX_9), contact Tolomatic.

### 9 SELECT A MOTOR-ACTUATOR CONFIGURATION

Select an inline or a reverse-parallel motor configuration.

### 10 ESTABLISH TOTAL TORQUE REQUIREMENTS

Calculate total system inertia, the peak and the RMS torque required from the motor to overcome internal friction, external forces and accelerate/decelerate the load.

### 11 SELECT A MOTOR

Use the obtained total torque value to select a motor and a reduction device (if required). Verify that the peak torque value is below the motor's peak torque curve, and that the continuous torque value is below the motor's continuous torque curve. Verify the minimum torque margin (15%). Verify the inertia match.

### 12 SELECT OPTIONAL POSITION SENSORS

12 sensor choices include: reed, solid state PNP or NPN, all in normally open or normally closed, with flying leads or quick-disconnect couplers.

### 13 SELECT ACTUATOR MOUNTING

Mounting options include: TRN trunnion mount, FFG front flange mount, MP2 mounting plates.

### 14 SELECT ROD END OPTIONS

Rod end options include: CLV clevis rod end.

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

# RSX Extreme Force, Hydraulic Class Electric Actuator

## Ordering

**ACTUATOR** **OPTIONS**

RSX 096 RN12 SM4500 RP1 HT1 FFG OIL CLV XR10 KK2 YM_ _ _

### MODEL & MOUNTING

| | |
|---|---|
| RSX | Rod-Style Actuator, |

### SIZE

| | |
|---|---|
| **080, 096, 128** | |
| **096P** | Press Model |

### NUT/SCREW

| SIZE | CODE | LEAD (mm/rev) |
|---|---|---|
| **080** | RN | 10 |
| **096** | RN | 12 |
| **128** | RN | 10 |

### STROKE LENGTH

SM_ _ _ Enter desired stroke length in millimeters

Minimum Stroke: 75mm (2.95 in)

| SIZE | MAX. STROKE | *TRR |
|---|---|---|
| | mm | mm |
| **080** | 890 | 820 |
| **096** | 800 | 725 |
| **096P** | 450 | — |
| **128** | 665 | 555 |
| | in | in |
| **080** | 35.03 | 32.28 |
| **096** | 31.49 | 28.54 |
| **096P** | 17.71 | — |
| **128** | 26.18 | 21.85 |

*TRR = Trunnion Option

**Fast delivery Built-to-Order**

### MOTOR MOUNTING

| | |
|---|---|
| LMI | In-line motor mount |
| RP1 | 1:1 ratio, reverse parallel motor mount |
| RP2 | 2:1 ratio, reverse parallel motor mount |

### STANDARD OR HIGH TORQUE

| | |
|---|---|
| ST1* | Standard Actuator |
| HT1** | High Torque Option |

*Only available with RP option on RSX096

**Use sizing software to determine if HT1 is required for torque and motor specifications

### TRUNNION MOUNT

TRR* Trunnion mount

*NOTE: Trunnion mount is not available for field retrofit, contact Tolomatic for details*

*Not available for RSX096P

### IP67

IP67 Ingress protection (Note: if not specified standard IP65 actuator will be built)

### ACTUATOR MOUNTING

*For all motor mounts:*

| | |
|---|---|
| FFG | Front Flange Mount |
| MP2 | Mounting Plates (2 required) |
| XT | Extended Tie Rods (min. 50mm, max. 100mm) |

### OIL COOLED

OIL For extended high duty cycle/high force performance

NOTE: The RSX actuator with oil cooled option is IP67 rated. To get a motor gasket select IP67 option

**Not all codes listed are compatible with all options. Contact Tolomatic with any questions.**

### ROD END

*Externally threaded rod end is standard*

| | |
|---|---|
| CLV* | Clevis Rod End |
| SR1* | Imperial Thread |

*Not available for RSX096P

### ROD EXTENSION

XR_ _ _ _ Enter desired rod extension in millimeters

*NOTE: XR option does not increase the working stroke, only the length of the thrust rod.*

*NOTE: Please consult Tolomatic if your application requires rod extension length greater than 100 mm (3.9 in).*

### SWITCHES

| TYPE | LOGIC | NORMALLY | QUICK-DISCONNECT | CODE | QUANTITY | LEAD LENGTH |
|---|---|---|---|---|---|---|
| REED | SPST | Open | no | RY | After code enter quantity desired | 5 meters (16.4 feet) |
| | | | yes | RK | | |
| | | Closed | no | NY | | |
| | | | yes | NK | | |
| SOLID STATE | PNP | Open | no | TY | | |
| | | | yes | TK | | |
| | NPN | Open | no | KY | | |
| | | | yes | KK | | |
| | PNP | Closed | no | PY | | |
| | | | yes | PK | | |
| | NPN | Closed | no | HY | | |
| | | | yes | HK | | |

### YOUR MOTOR HERE

YM_ _ _ _ _ Motor mount for non-Tolomatic motor. www.tolomatic.com

**Contact Tolomatic for food grade option lead time and application review.**

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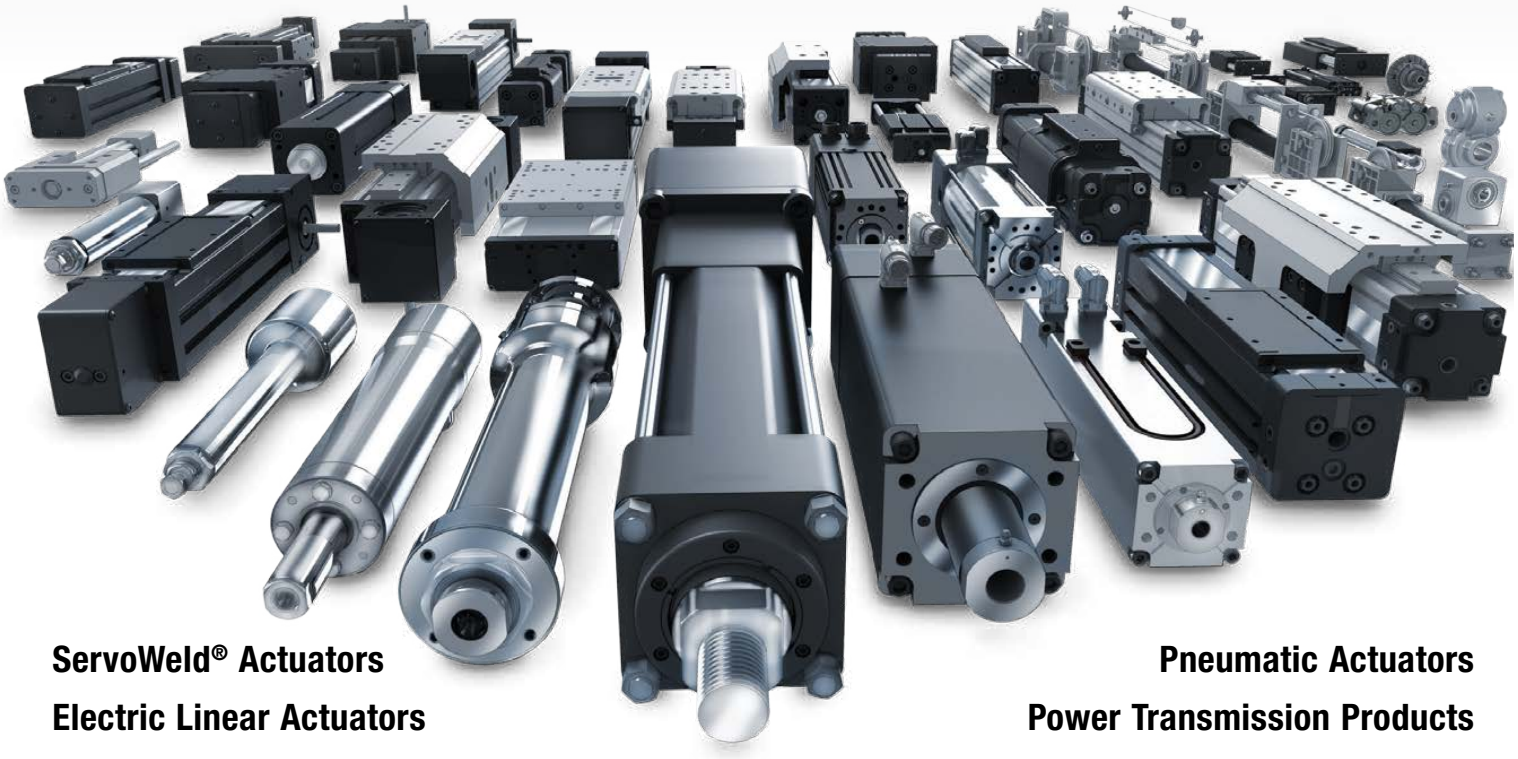

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