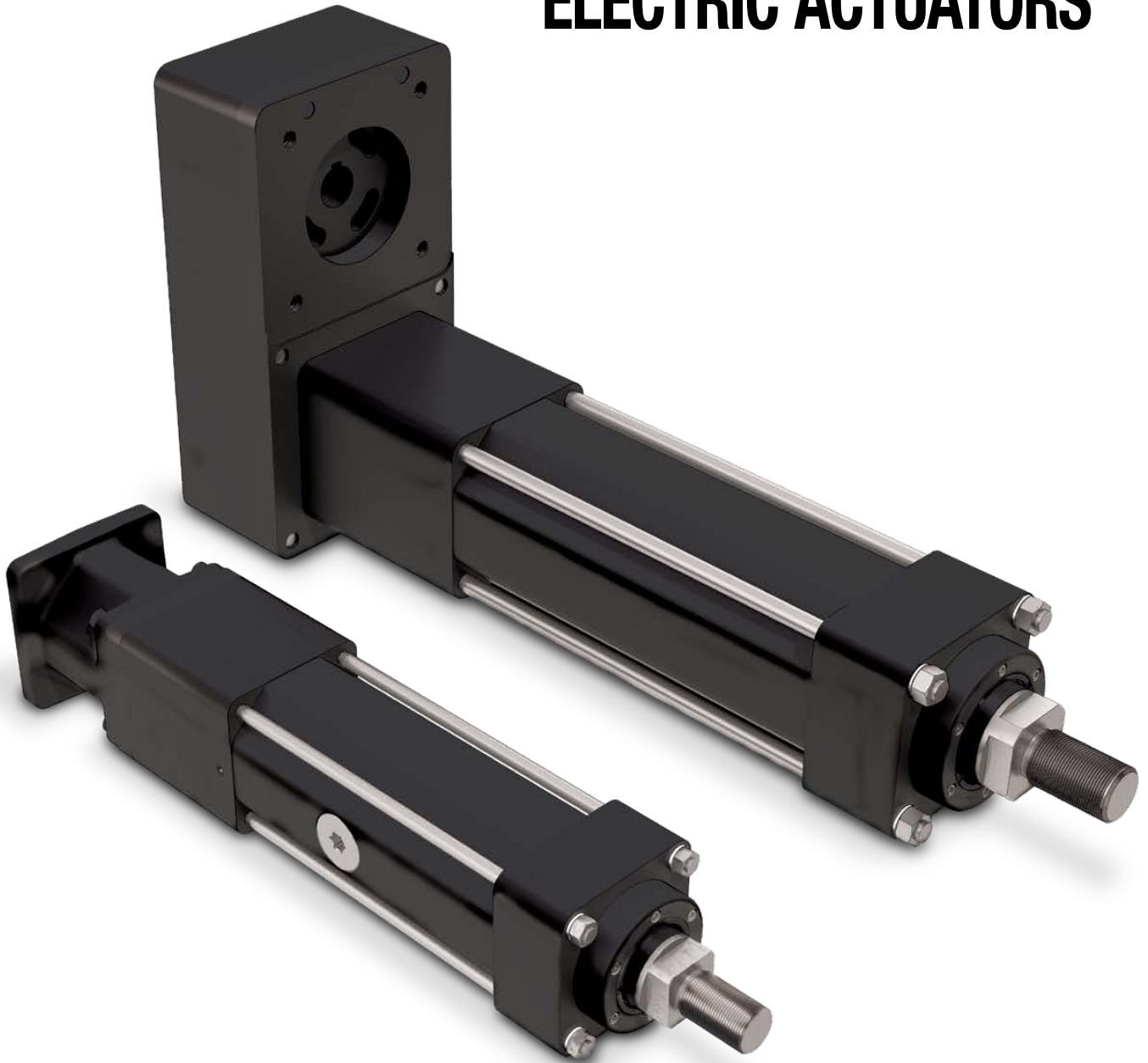


# RSX

## EXTREME FORCE, HYDRAULIC CLASS ELECTRIC ACTUATORS



# RSX Extreme Force, Hydraulic Class Electric Actuator

## WHAT IS THE RSX?






The RSX is an extreme force electric actuator designed for rugged service, long life and is an ideal choice for replacing hydraulic cylinders. The RSX utilizes 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**



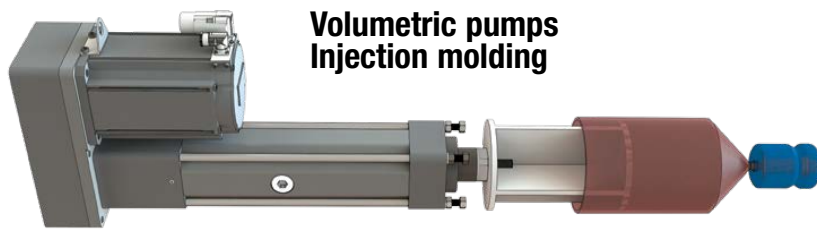
## TOLOMATIC'S ELECTRIC ROD-STYLE ACTUATORS

	ERD	RSA	RSX	GSA	IMA
					
	Rod-Style Actuator	Rod-Style Actuator	Rod-Style Actuator	Guided Rod-Style Actuator	Integrated Servo Actuator
<b>Force</b> up to:	35 kN (7,868 lbf)	58 kN (13,039 lbf)	177.9 kN (40,000 lbf)	4.23 kN (950 lbf)	30.6 kN (6,875 lbf)
<b>Speed</b> up to:	1473 mm/sec (58 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)
<b>Stroke Length</b> up to:	1000 mm (39.4 in)	1,524 mm (60 in)	890 mm (35 in)	914 mm (36 in)	457 mm (18 in)
<b>Screw/Nut Type</b>	Solid, Ball & Roller	Solid, Ball & Roller	Roller	Solid & Ball	Ball & Roller
For complete information see <a href="http://www.tolomatic.com">www.tolomatic.com</a> or literature number:					
<b>Literature Number:</b>	2190-4000	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

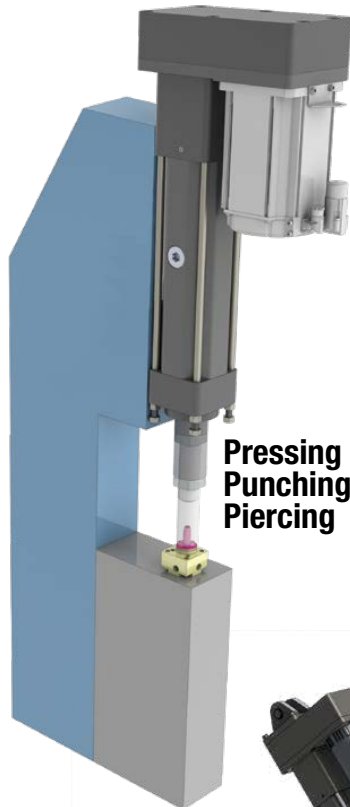
## Applications



**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**

### CONTENTS

What is the RSX? . . . . .	2
Applications . . . . .	3
Standard Features . . . . .	4
Food Grade Features . . . . .	6
Performance . . . . .	8
Dimensions . . . . .	10
Switches . . . . .	13
Application Data Worksheet. . .	15
Selection Guidelines . . . . .	16
Ordering. . . . .	17
Other Tolomatic Products . . . .	18

# RSX ELECTRIC ROD-STYLE ACTUATOR

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

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.

### 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

### IP65 STANDARD

- Protection against dust and water spray (static)

### IP67 OPTION

- Resist water ingress 1m deep for up to 30 min (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  $\pm 0.0102\text{mm}/300\text{mm}$   $\pm 0.0004\text{"/ft.}$

### 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

### LUBE ACCESS PORT

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

### NOSE BEARING

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

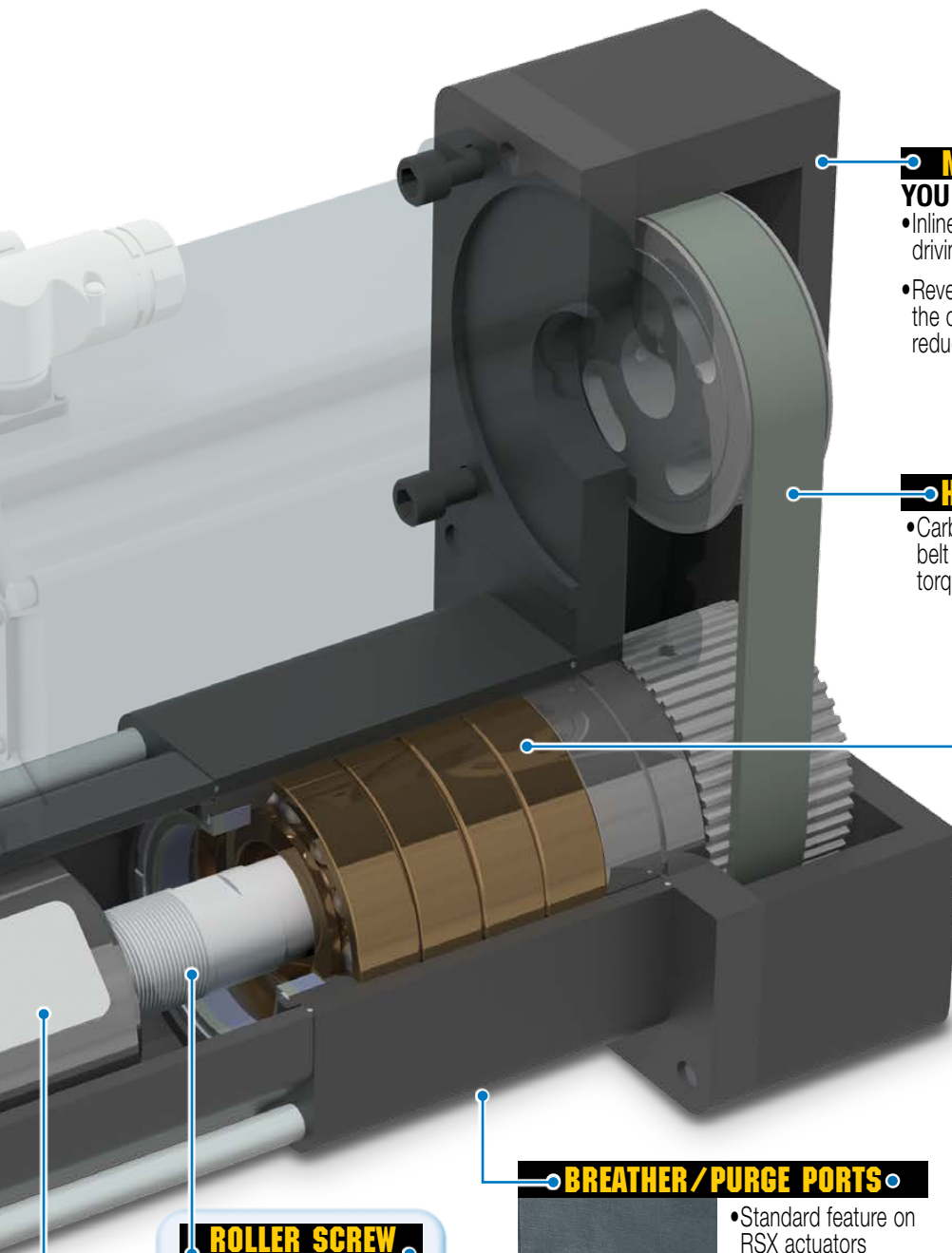
### HEAVY DUTY INTERNAL BUMPER

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



# Tolomatic™... MAXIMUM DURABILITY

EXCELLENCE IN MOTION



## 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

## 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.

## ROLLER SCREW TECHNOLOGY



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

## INTERNAL ANTI-ROTATE

- Composite bearings prevent rotation of the thrust tube

## MOUNTING OPTIONS

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

## ROD END OPTIONS

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

## SENSOR OPTIONS

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



**FAST DELIVERY  
BUILT-TO-ORDER**

# RSX096P PRESS MODEL

**Tolomatic**™  
EXCELLENCE IN MOTION  
...**MAXIMUM  
DURABILITY**

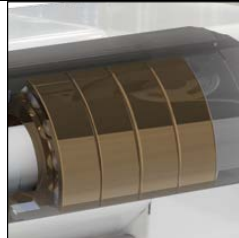
## ● **ENDURANCE TECHNOLOGY** ●<sup>SM</sup>

*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

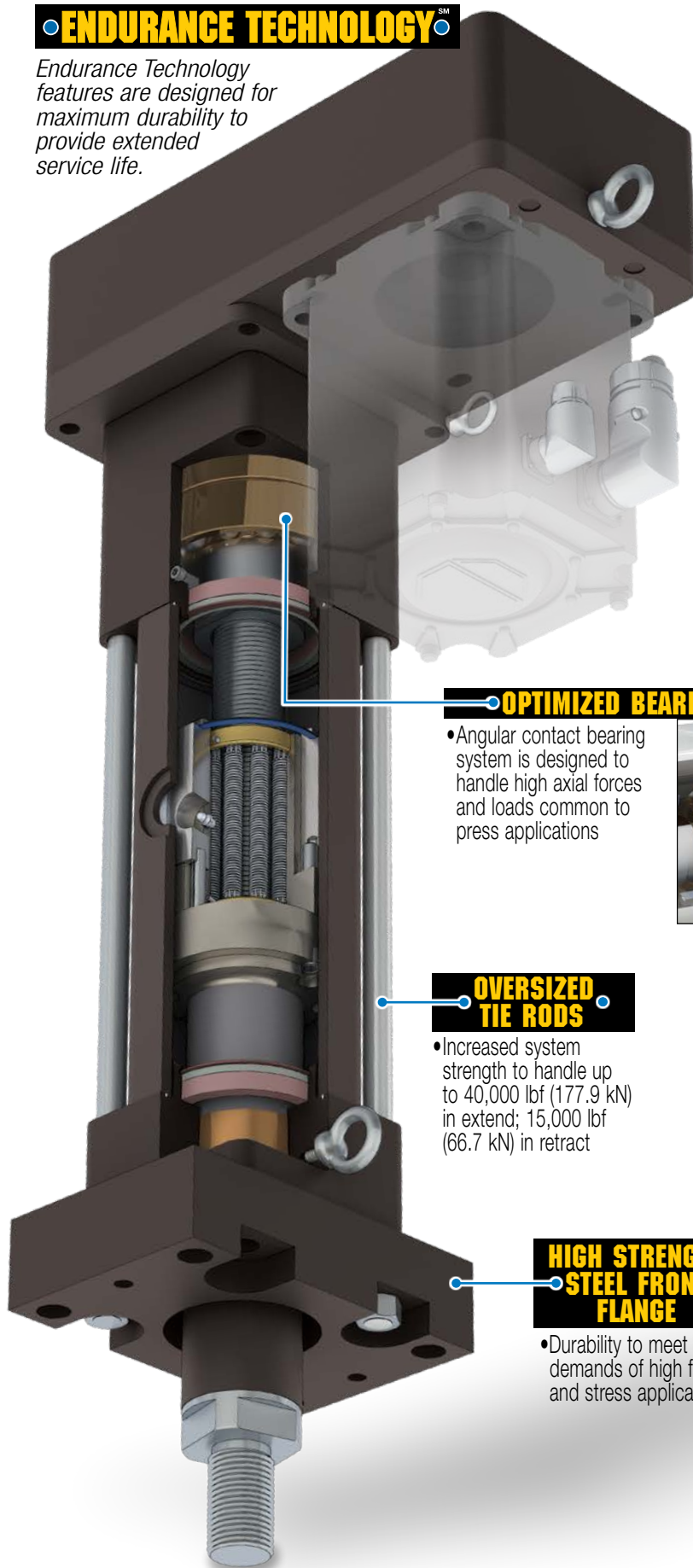


## ● **OVERSIZED TIE RODS** ●

- 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**

# FOOD GRADE RSX

**Tolomatic™**  
EXCELLENCE IN MOTION  
...**MAXIMUM DURABILITY**

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

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

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.

### 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

### STAINLESS STEEL RE-LUBRICATION PORT

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

### FOOD GRADE PAINT

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

### STAINLESS STEEL MOTOR MOUNTING PLATE

- 316 series stainless steel for corrosion resistance

### 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

### 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)

# RSX Extreme Force, Hydraulic Class Electric Actuator

## PERFORMANCE

### Specifications

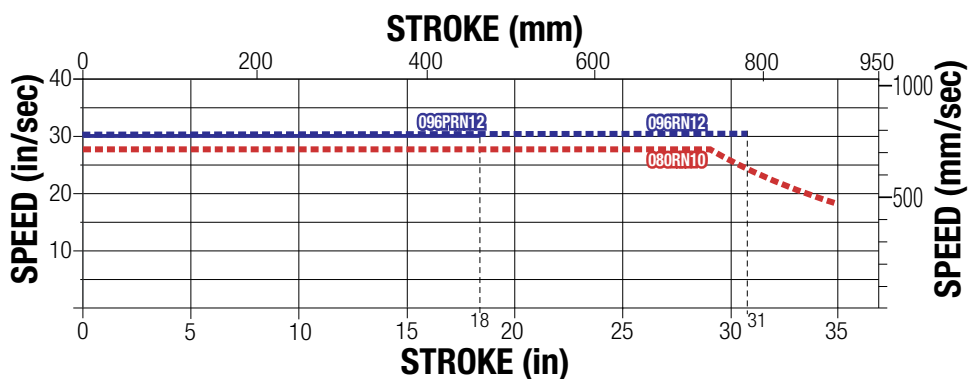
RSX SIZE	MIN. STROKE	*MAX. STROKE		SCREW CODE	SCREW LEAD	LEAD ACCURACY	BACK-LASH	MAX. FORCE	MAX. SPEED	DYNAMIC LOAD RATING	DYNAMIC TORQUE TO OVERCOME FRICTION
	mm	mm	TRR		mm/rev	mm/300mm	mm	kN	mm/sec	kN	N-m
080	75	890	820	RN10	10.00	0.01	0.030	80.07	701	173.1	6.21
096	75	800	725	RN12	12.00	0.01	0.030	133.45	759	269.3	6.21
096P	75	450	—	RN12	12.00	0.01	0.030	177.9	759	269.3	6.21
	in	in	in		turns/in	in/ft	in	lbf	in/sec	lbf	lbf-in
080	2.95	35.03	32.28	RN10	2.540	0.0004	0.0012	18,000	27.6	38,914	55.0
096	2.95	31.49	28.54	RN12	2.117	0.0004	0.0012	30,000	29.9	60,541	55.0
096P	2.95	17.71	—	RN12	2.117	0.0004	0.0012	40,000	29.9	60,541	55.0

\*Consult Tolomatic for longer strokes. TRR = Trunnion option

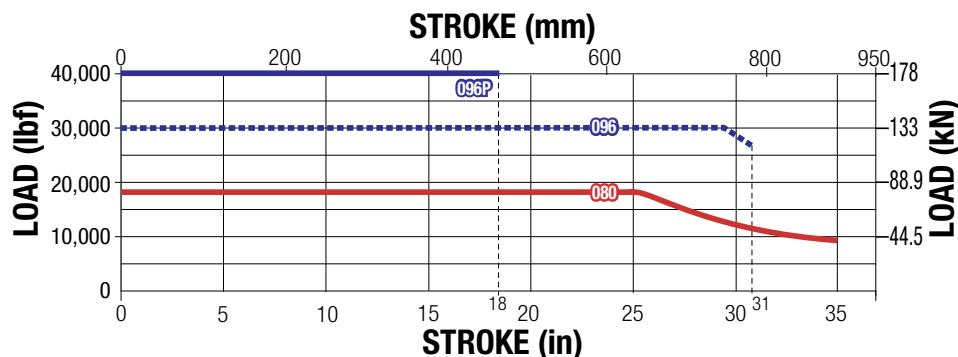
RSX SIZE	SCREW CODE	INERTIA						WEIGHT					
		BASE ACTUATOR						BASE ACTUATOR					
		kg-m <sup>2</sup> x 10 <sup>-4</sup>						kg					
		LMI	RP1 ST	RP1HT	RP2 ST	RP2HT	PER UNIT	LMI	RP1 ST	RP1HT	RP2 ST	RP2HT	PER UNIT
080	RN10	56.89	102.80		42.02		0.01772	35.16	40.81		40.77		0.03072
096	RN12	178.72	216.17	253.72	92.44	100.5	0.03804	65.60	73.13	75.23	73.60	74.11	0.04125
096P	RN12	178.72	216.17	253.72	92.44	100.5	0.03804	68.85	—	80.19	—	79.07	0.0429
		lb-in <sup>2</sup>						lb					
080	RN10	19.44	35.13		14.36		0.154	77.51	89.96		89.88		1.72
096	RN12	61.07	73.87	86.70	31.59	34.19	0.330	144.63	161.22	165.86	162.27	163.38	2.31
096P	RN12	61.07	73.87	86.70	31.59	34.19	0.330	151.78	—	176.78	—	174.32	2.40

**TEMP. RANGE:** Standard 4° to 54°C (40° to 130°F) Extended -40° to 60°C (40° to 140°F)

### 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(P)	72.4	2.85



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



# RSX Extreme Force, Hydraulic Class Electric Actuator

## ROLLER SCREW LIFE ESTIMATE

## PERFORMANCE

### 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:

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

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

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

$P_e$  = 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.

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

Where:

$P_e$  = Equivalent load (lbf) or (N)

$P_n$  = Each increment at different load (lbf) or (N)

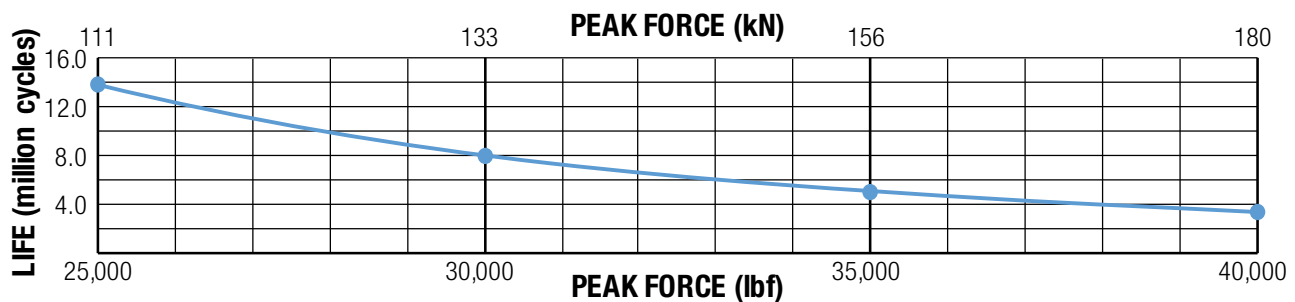
$L$  = Total distanced traveled per cycle (extend + retract stroke)

[ $L = L_1 + L_2 + L_3 + L_n$ ]

$L_n$  = 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.

	RSX080	RSX096(P)
Quantity (g)	8.0 + (0.020 x Stroke <sup>mm</sup> )	9.5 + (0.025 x Stroke <sup>mm</sup> )
Quantity (oz)	0.28 + (0.018 x Stroke <sup>in</sup> )	0.34 + (0.022 x Stroke <sup>in</sup> )

Stroke<sup>mm</sup> = Stroke length in millimeters      Stroke<sup>in</sup> = Stroke length in inches

# RSX Extreme Force, Hydraulic Class Electric Actuator

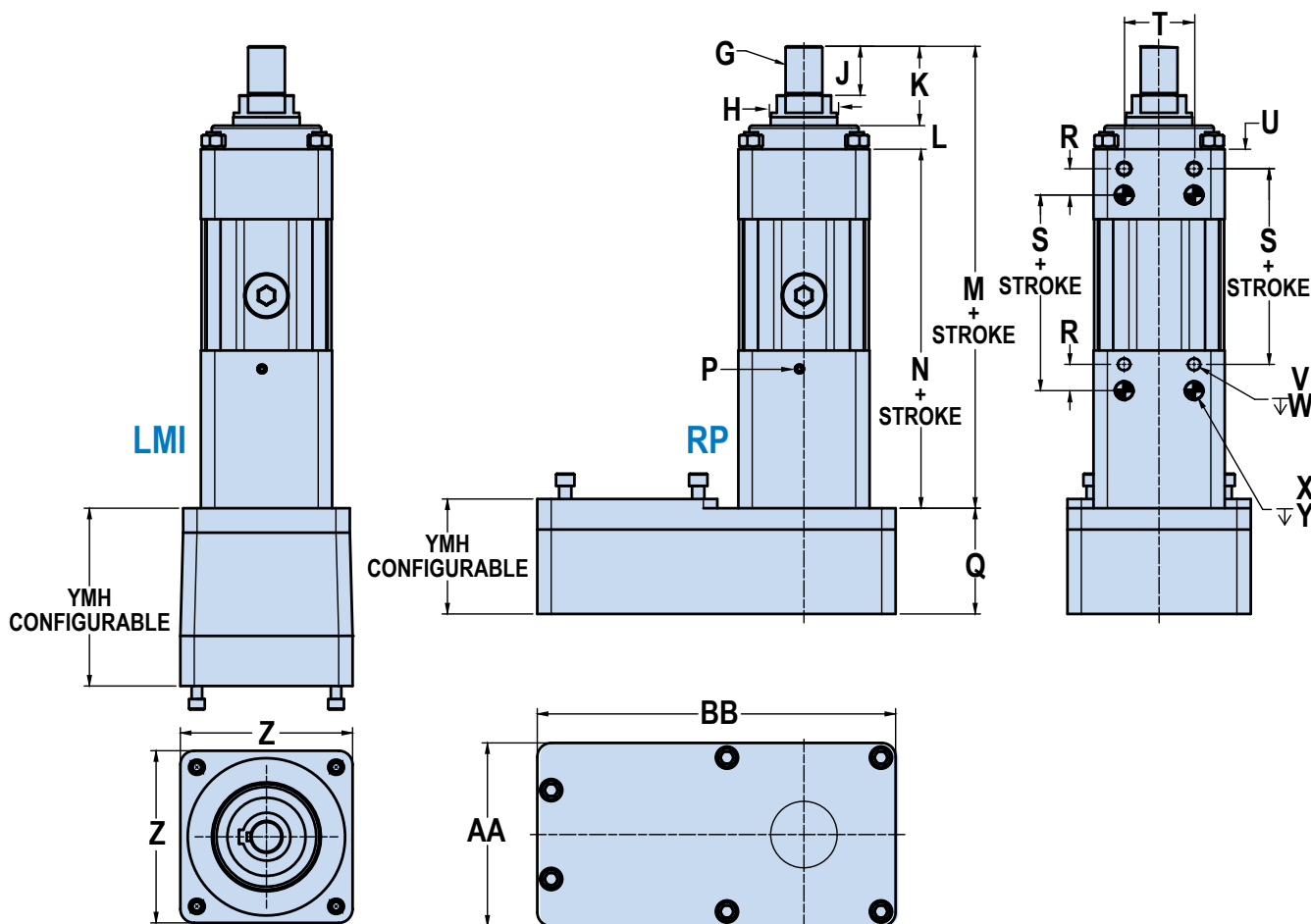
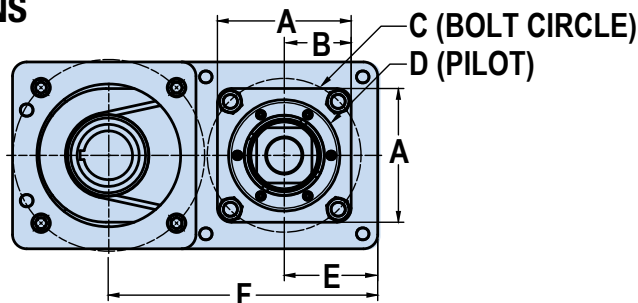
SIZE: **ALL**

3D CAD available at [www.tolomatic.com](http://www.tolomatic.com)  
Always use configured CAD solid model  
to determine critical dimensions



**DIMENSIONS**

## LMI & RP ACTUATOR DIMENSIONS



	080	096
<b>A</b>	135.0	150.0
<b>B</b>	67.5	75.0
<b>C</b>	150.00	171.0
<b>D</b>	110.00 (+0.00) (-0.03)	125.00 (+0.00) (-0.03)
<b>E</b>	88.9	104.8
<b>F</b>	RP1 272.9	304.8
	RP2 271.1	302.3
<b>G</b>	STANDARD M36 x 3.0-6g	M42 x 4.5-6g

	080	096
<b>H<sub>Ø</sub></b>	63.388 / 63.449	76.093 / 76.149
THREAD LENGTH		
<b>J</b>	60.0	69.9
FULL RETRACT		
<b>K</b>	95.0	104.8
<b>L</b>	27.0	27.0
<b>M</b>	474.7	601.1
<b>N</b>	352.7	469.2
<b>P</b>	RC 1/8 -28 X 38.1 DP (Plugged)	RC 1/8 -28 X 38.1 DP (Plugged)
<b>Q</b>	96.0	124.7
<b>R</b>	30.0	30.0

	080	096
<b>S</b>	210.9	282.4
<b>T</b>	70.0	80.0
<b>U</b>	18.0	22.3
<b>V</b>	M12 x 1.75-6H	M16 x 2.0-6H
<b>W</b>	18.0 (4)	20.0 (4)
<b>X</b>	16.025 16.012	20.025 20.013
<b>Y</b>	15.0 (4)	15.0 (4)
<b>Z</b>	152.4	196.9
<b>AA</b>	177.8	209.6
<b>BB</b>	35.6	409.6

Dimensions in millimeters

	080	096
<b>A</b>	5.31	5.91
<b>B</b>	2.66	2.95
<b>C</b>	5.905	6.73
<b>D</b>	4.331 (+0.000) (-0.001)	4.921 (+0.000) (-0.001)
<b>E</b>	3.50	4.13
<b>F</b>	RP1 10.74	12.00
	RP2 10.67	11.90
<b>G</b>	SRI OPTION	
	1½-12 UN-2A	1¾-12 UN-2A

	080	096
<b>H<sub>Ø</sub></b>	2.4956 / 2.4980	2.9958 / 2.9980
THREAD LENGTH		
<b>J</b>	2.36	2.75
FULL RETRACT		
<b>K</b>	3.74	4.13
<b>L</b>	1.06	1.06
<b>M</b>	18.69	23.66
<b>N</b>	13.89	18.47
<b>Q</b>	3.78	4.91
<b>R</b>	1.18	1.18
<b>S</b>	8.30	11.12
<b>U</b>	0.71	0.88
<b>T</b>	2.76	3.15

	080	096
<b>V</b>	M12 x 1.75-6H	M16 x 2.0-6H
<b>W</b>	0.71 (4)	0.79 (4)
<b>X</b>	0.6309 0.6304	0.7884 0.7879
<b>Y</b>	0.59 (4)	0.59 (4)
<b>Z</b>	6.00	7.75
<b>AA</b>	7.00	8.25
<b>BB</b>	14.00	16.13

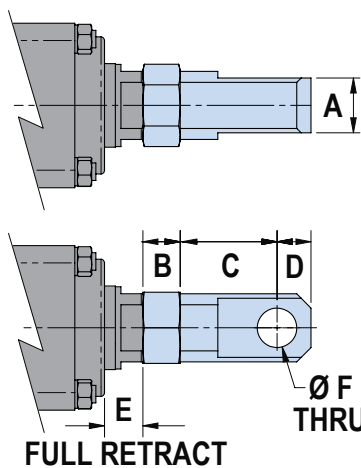
Dimensions in inches

# RSX Extreme Force, Hydraulic Class Electric Actuator

SIZE: **ALL**

**DIMENSIONS**

## CLEVIS OPTION (CLV)



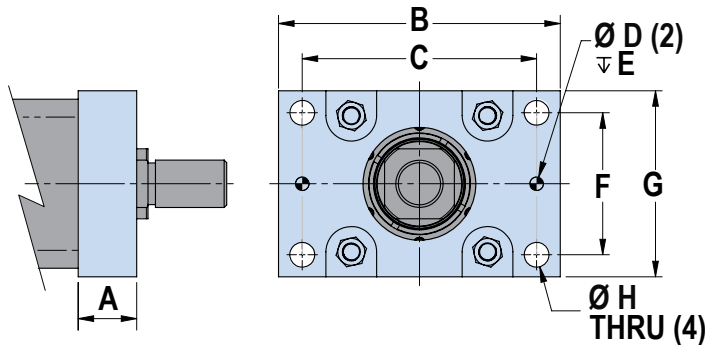
	080	096
<b>A</b>	40.00 39.59	50.00 49.59
<b>B</b>	29.0	34.0
<b>C</b>	75.0	88.3
<b>D</b>	25.0	31.0
<b>E</b>	35.0	35.0
<b>F</b>	28.05 28.00	36.06 36.00

Dimensions in millimeters

	080	096
<b>A</b>	1.575 1.559	1.969 1.953
<b>B</b>	1.14	1.34
<b>C</b>	2.95	3.48
<b>D</b>	0.98	1.22
<b>E</b>	1.38	1.38
<b>F</b>	1.104 1.102	1.420 1.417

Dimensions in inches

## FRONT FLANGE OPTION (FFG)



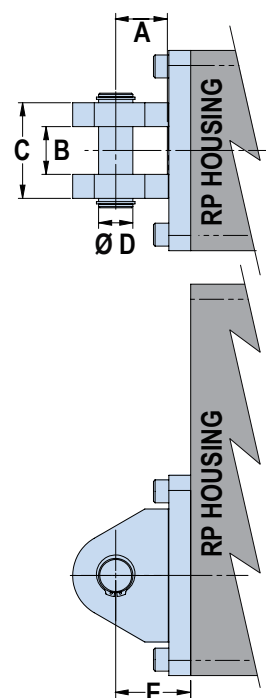
	080	096
<b>A</b>	42.0	52.0
<b>B</b>	225.0	250.0
<b>C</b>	180.0	208.0
<b>D</b>	10.013 10.000	12.025 12.013
<b>E</b>	12.0	12.0
<b>F</b>	100.0	126.0
<b>G</b>	150.0	165.0
<b>H</b>	18.0	22.0

Dimensions in millimeters

	080	096
<b>A</b>	1.65	2.05
<b>B</b>	8.86	9.84
<b>C</b>	7.09	8.19
<b>D</b>	0.3942 0.3937	0.4734 0.4729
<b>E</b>	0.47	0.47
<b>F</b>	3.94	4.96
<b>G</b>	5.91	6.50
<b>H</b>	0.71	0.87

Dimensions in inches

## REAR CLEVIS OPTION (PCD)



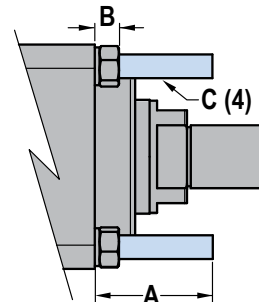
	080	096
<b>A</b>	40.5	54.0
<b>B</b>	40.69 40.31	50.70 50.32
<b>C</b>	82.3	100.3
<b>D</b>	27.978 27.940	35.980 35.940
<b>E</b>	63.4	78.4

Dimensions in millimeters

	080	096
<b>A</b>	1.60 1.602	2.13 1.996
<b>B</b>	1.587	1.981
<b>C</b>	3.24	3.95
<b>D</b>	1.1015 1.1000	1.4165 1.4150
<b>E</b>	2.50	3.09

Dimensions in inches

## EXTENDED TIE ROD OPTION (XT)



		080	096
<b>A</b>	MIN	mm 50.0 in 1.97	mm 50.0 in 1.97
	MAX	mm 100.0 in 3.94	mm 100.0 in 3.94
<b>B</b>		mm 13.3 in 0.52	mm 15.3 in 0.60
	<b>C (4)</b>	M14 x 2.0-6g	M16 x 1.5-6g

A = Customer Specified Length

## IMPERIAL THREAD OPTION (SRI)

# RSX Extreme Force, Hydraulic Class Electric Actuator

SIZE: **ALL**

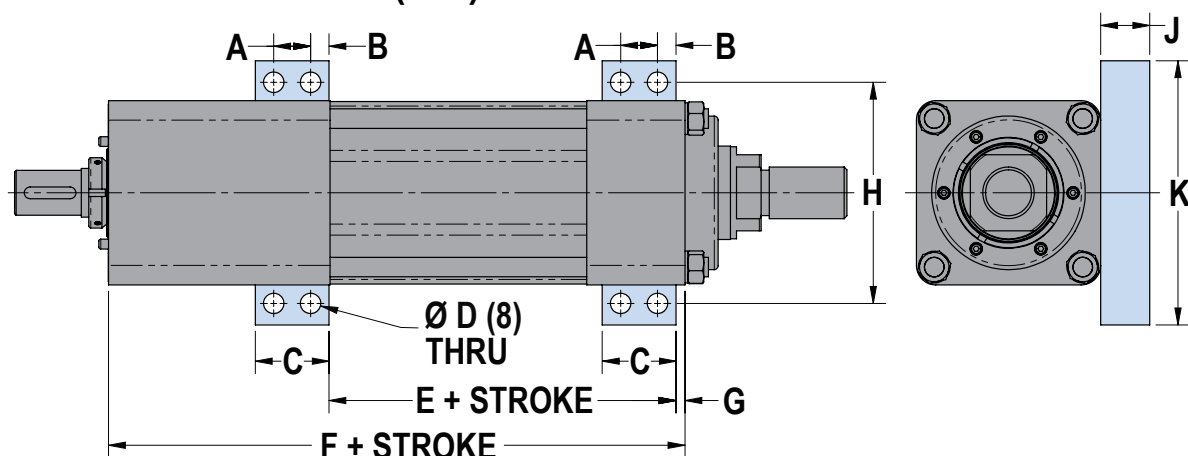
3D CAD available at [www.tolomatic.com](http://www.tolomatic.com)

Always use configured CAD solid model to determine critical dimensions



**DIMENSIONS**

## MOUNTING PLATE OPTION (MP2) DIMENSIONS



	080	096
A	30.0	30.0
B	12.5	15.0
C	55.0	60.0
D	12.7	16.7
E	210.9	282.4
F	352.7	469.2
G	5.5	7.3

	080	096
H	170.0	180.0
J	31.4	40.0
K	200.0	215.0

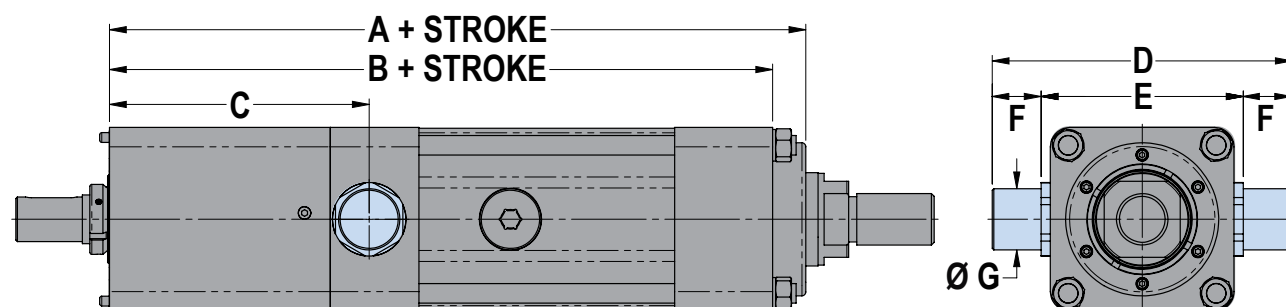
Dimensions in millimeters

	080	096
A	1.18	1.18
B	0.49	0.59
C	2.17	2.36
D	0.50	0.66
E	8.30	11.12
F	13.89	18.47
G	0.22	0.29

	080	096
H	6.69	7.09
J	1.24	1.57
K	7.87	8.46

Dimensions in inches

## TRUNNION OPTION (TRR) DIMENSIONS



	080	096
A	447.8	568.6
B	420.8	541.6
C	171.5	212.1
D	214.0	245.0
E	150.0	165.0

	080	096
F	32.0	40.0
G	39.98	49.98
	39.95	49.94

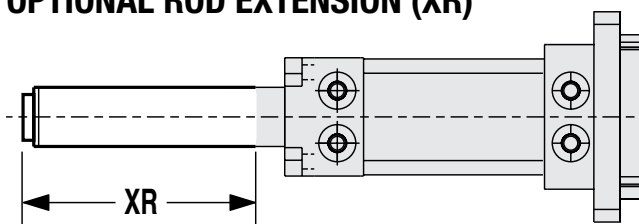
Dimensions in millimeters

	080	096
A	17.63	22.39
B	16.57	21.32
C	6.75	8.35
D	8.43	9.65
E	5.91	6.50

	080	096
F	1.26	1.57
G	1.574	1.968
	1.573	1.966

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.



	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.

## SWITCH INSTALLATION



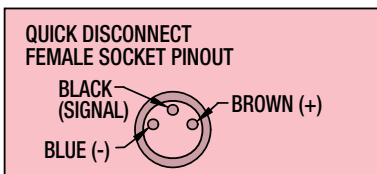
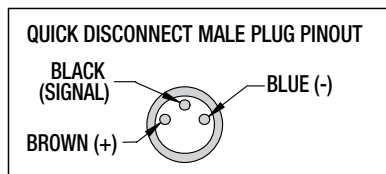
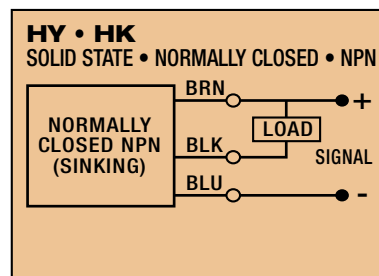
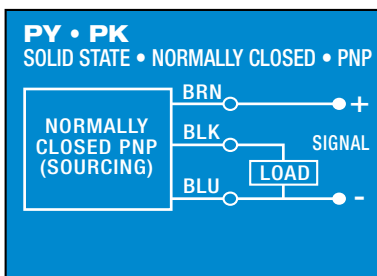
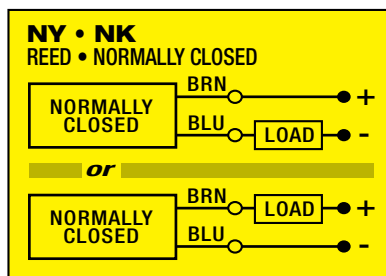
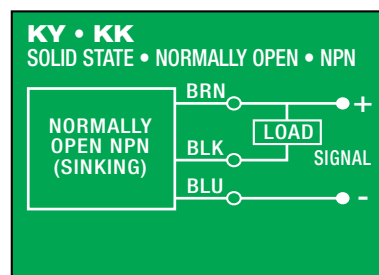
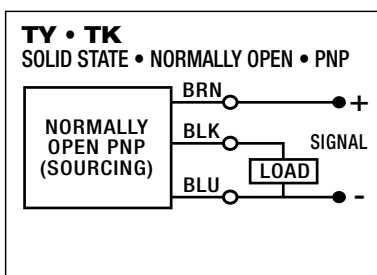
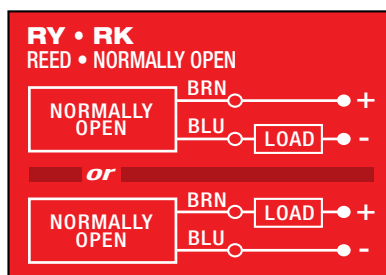
Place switch bracket onto any one of the four tie rods that run the length of the extruded tube. Insert the switch with set screw and the word "Tolomatic" facing up and slide into the mating slot on the bracket. Position the bracket with the switch to the exact location desired, with the bracket tight 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.



# RSX Extreme Force, Hydraulic Class Electric Actuator

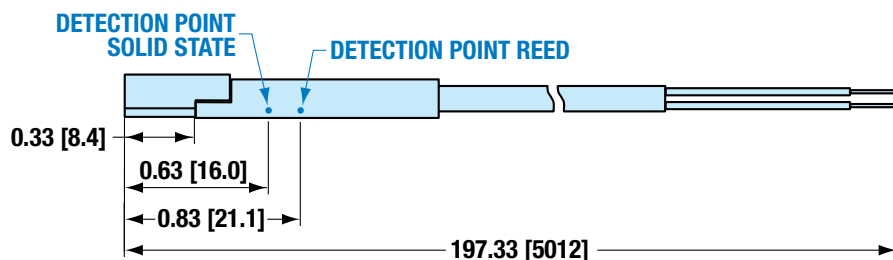
## SWITCHES

### WIRING DIAGRAMS

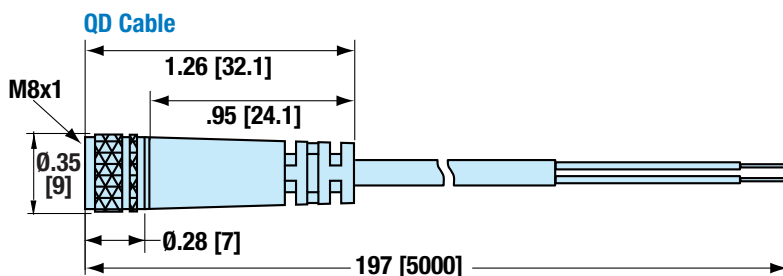
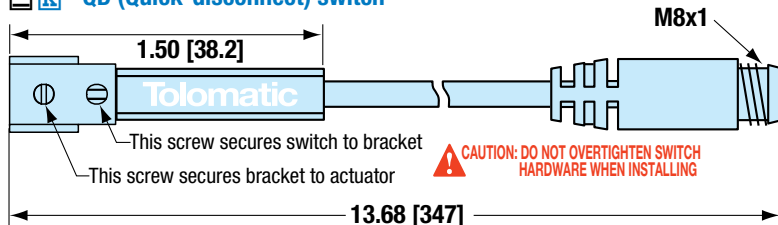


### SWITCH DIMENSIONS

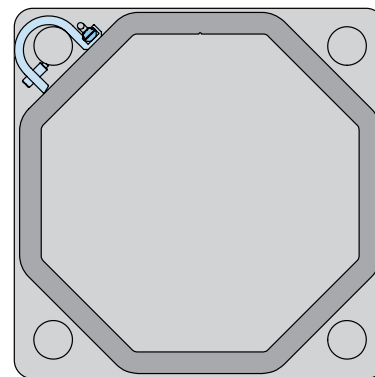
☐ **Y** - direct connect



☐ **K** - QD (Quick-disconnect) switch



### SWITCH MOUNTING



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

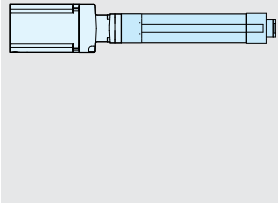
# APPLICATION DATA WORKSHEET

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

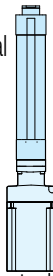
## ORIENTATION

☐ RSX

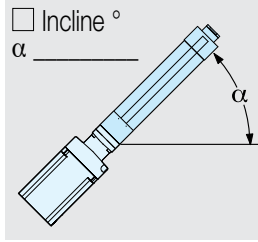
☐ Horizontal



☐ Vertical



☐ Incline °  
 $\alpha$



☐ Load supported by actuator OR ☐ Load supported by other mechanism

## MOVE PROFILE

### EXTEND

Move Distance \_\_\_\_\_

☐ inch  
(US Standard)

☐ millimeters  
(Metric)

Move Time \_\_\_\_\_ sec

Max. Speed \_\_\_\_\_

☐ in/sec

☐ mm/sec

Dwell Time After Move \_\_\_\_\_ sec

### RETRACT

Move Distance \_\_\_\_\_

☐ inch

☐ millimeters

Move Time \_\_\_\_\_ sec

Max. Speed \_\_\_\_\_

☐ in/sec

☐ mm/sec

Dwell Time After Move \_\_\_\_\_ sec

## NO. OF CYCLES

☐ per minute

☐ per hour

## HOLD POSITION?

☐ Required

☐ Not Required

☐ After Move

☐ During Power Loss

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

### EXTEND

#### LOAD

☐ lb.

(U.S. Standard)

☐ kg.

(Metric)

### RETRACT

#### LOAD

☐ lb.

(U.S. Standard)

☐ kg.

(Metric)

#### FORCE

☐ lbf.

(U.S. Standard)

☐ N

(Metric)

#### FORCE

☐ lbf.

(U.S. Standard)

☐ N

(Metric)

## STROKE LENGTH

☐ inch  
(US Standard)

☐ millimeters  
(Metric)

## PRECISION

Repeatability \_\_\_\_\_

☐ inch

☐ millimeters

## OPERATING ENVIRONMENT

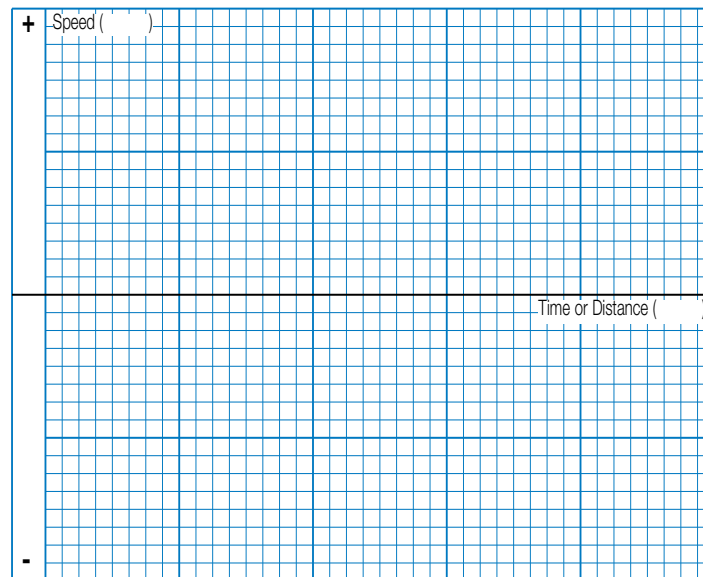
Temperature, Contamination, Water, etc.



**FREE:**  
On-line  
sizing and  
selection at  
sizeit.  
tolomatic  
.com

Or Call 1-800-328-2174 for  
Excellent Customer Service  
& Technical Support

## 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.

## CONTACT INFORMATION

Name, Phone, Email  
Co. Name, Etc.



**USE THE TOLOMATIC SIZING AND SELECTION SOFTWARE AVAILABLE ON-LINE AT [www.tolomatic.com](http://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.

**FAX 1-763-478-8080**

**EMAIL [help@tolomatic.com](mailto:help@tolomatic.com)**

# RSX Extreme Force, Hydraulic Class Electric Actuator

## 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 LUBRICATION INTERVAL

Evaluate the recommended lubrication interval with respect to the application motion profile. See page RSX\_7 for complete lubrication information.

### 7 TEMPERATURE CONSIDERATIONS

If the application's ambient temperature lies outside of the standard range (see page RSX\_8), contact Tolomatic.

### 8 SELECT A MOTOR-ACTUATOR CONFIGURATION

Select an inline or a reverse-parallel motor configuration.

### 9 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.

### 10 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.

### 11 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.

### 12 SELECT ACTUATOR MOUNTING

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

### 13 SELECT ROD END OPTIONS

Rod end options include: CLV clevis rod end.



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



**ACTUATOR  
SIZING**

**FREE:**  
On-line  
sizing and  
selection at  
sizeit.  
tolomatic  
.com

Or Call 1-800-328-2174 for  
Excellent Customer Service  
& Technical Support



# RSX Extreme Force, Hydraulic Class Electric Actuator

## Ordering

ACTUATOR												OPTIONS											
RSX	096	RN	12	SM	450	RP1	HT1	FFG	CLV	XR	10	KK	2	YM									

### MODEL & MOUNTING

RSX Rod-Style Actuator,

### SIZE

<b>080, 096</b>
<b>096P</b> Press Model

### NUT/SCREW

SIZE	CODE	LEAD (mm/rev)
<b>080</b>	RN	10
<b>096</b>	RN	12

### STROKE LENGTH

SM \_\_\_ Enter desired stroke length in millimeters  
Minimum Stroke: 75mm (2.95 in)

SIZE	MAX. STROKE	
	mm	*TRR
<b>080</b>	890	820
<b>096</b>	800	725
<b>096P</b>	450	—
	in	in
<b>080</b>	35.03	32.28
<b>096</b>	31.49	28.54
<b>096P</b>	17.71	—

TRR = Trunnion Option

### 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

### 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)  
For RP motor mounting only:  
PCD\* Clevis Mount

\*Not available for RSX096P

### 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 yes	RY RK	After code enter quantity desired	5 meters (16.4 feet)
		Closed	no yes	NY NK		
SOLID STATE	PNP	Open	no yes	TY TK		
		Closed	no yes	KY KK		
	NPN	Open	no yes	PY PK		
		Closed	no yes	HY HK		

### YOUR MOTOR HERE

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

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

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



# 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.



## 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.

## Also Consider These Other Tolomatic Products:

### Electric Products

Rod & Guided Rod Style Actuators, High Force Actuators, Screw & Belt Drive Rodless Actuators, Motors, Drives and Controllers

"Foldout" Brochure #9900-9074



### Pneumatic Products

Rodless Cylinders: Band Cylinders, Cable Cylinders, Magnetically Coupled Cylinders/Slides; Guided Rod Cylinder Slides

"Foldout" Brochure #9900-9075



### Power Transmission Products

Gearboxes: Float-A-Shaft®, Slide-Rite®; Caliper Disc Brakes; Planetary Roller Screws

"Foldout" Brochure #9900-9076

# Tolomatic<sup>TM</sup>

EXCELLENCE IN MOTION

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

### USA

#### Tolomatic Inc.

3800 County Road 116  
Hamel, MN 55340, USA

**Phone:** (763) 478-8000

**Fax:** (763) 478-8080

Toll-Free: **1-800-328-2174**

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

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

### CHINA

#### Tolomatic Automation Products (Suzhou) Co. Ltd.

(ServoWeld® inquiries only)

No. 60 Chuangye Street, Building 2  
Huqiu District, SND Suzhou  
Jiangsu 215011 - P.R. China

**Phone:** +86 (512) 6750-8506

**Fax:** +86 (512) 6750-8507

[ServoWeldChina@tolomatic.com](mailto:ServoWeldChina@tolomatic.com)

### EUROPE

#### Tolomatic Europe GmbH

Elisabethenstr. 20  
65428 Rüsselsheim  
Germany

**Phone:** +49 6142 17604-0

[help@tolomatic.eu](mailto:help@tolomatic.eu)

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