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 high capacity industrial actuators that can be an ideal choice for replacing hydraulic cylinders. These high force electric actuators are available for forces up to 66,000 lbf (294 kN). Designed for 100% duty cycle, rugged service and long life. The RSX utilizes planetary roller screws and ball screws for long lasting consistent performance. Additionally, the RSX uses Tolomatic's 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:	2.2 kN *(500 lbf)*	35 kN *(7,943 lbf)*	58 kN *(13,039 lbf)*	294 kN *(66,000 lbf)*	4.2 kN *(950 lbf)*	35.8 kN *(8,044 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)*	1,500 mm *(59 in)*	914 mm *(36 in)*	457 mm *(18 in)*
Screw/Nut Type	Solid & Ball	Ball & Roller	Solid, Ball & Roller	Ball & 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

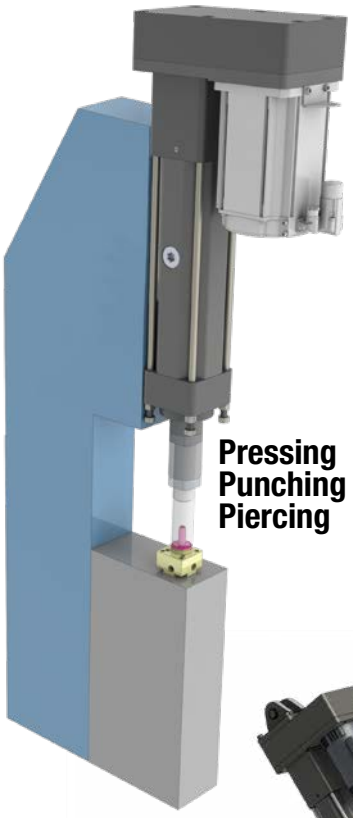
(Not all models deliver maximum values listed, i.e.: Maximum thrust may not be available with maximum speed)

RSX Extreme Force, Hydraulic Class Electric Actuator

Applications

Volumetric pumps
Injection molding

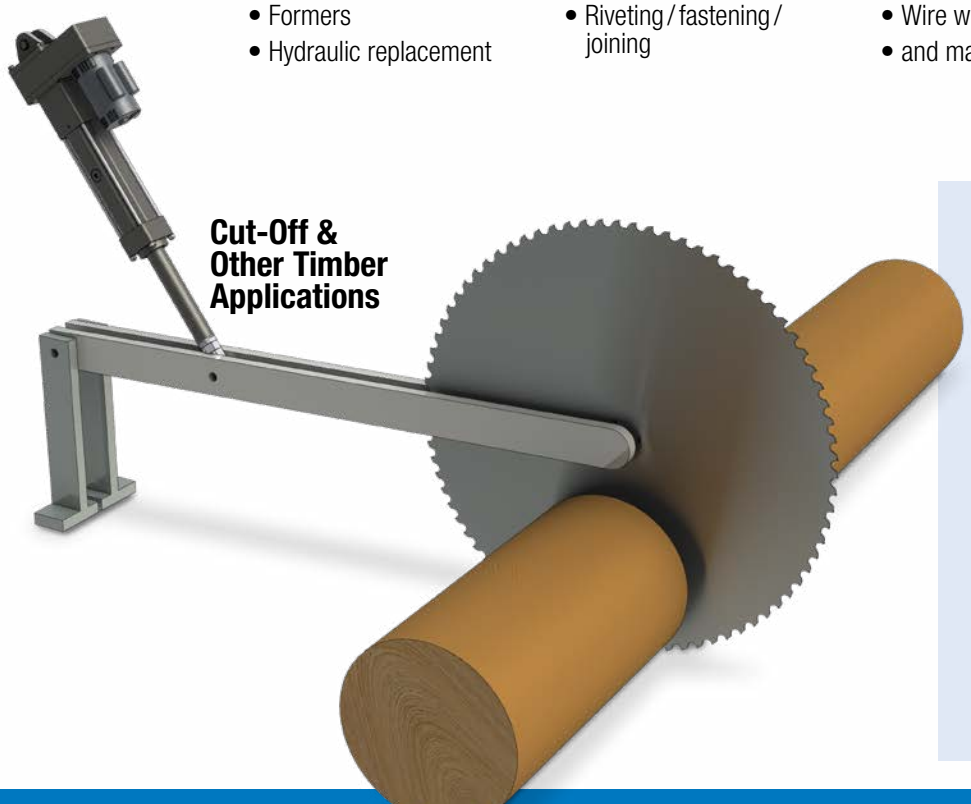
Motion simulators



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

CONTENTS

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 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

For increased water ingress protection and scraper on thrust rod

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.*
Ball Nut	± 0.102mm/300mm	*± 0.004"/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

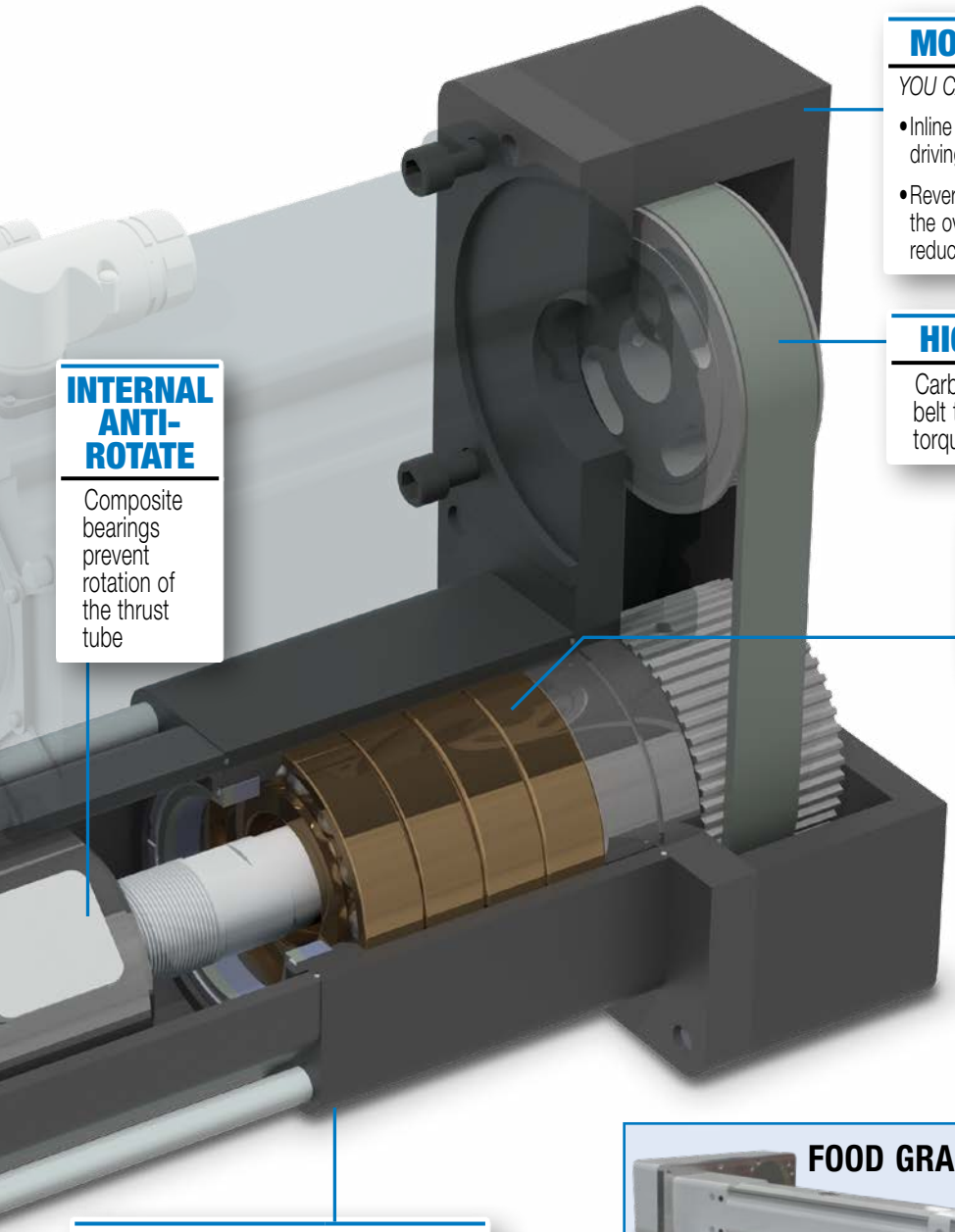
Bumpers protect the screw and nut assembly from damage at both ends of stroke

ADVANCED SCREW TECHNOLOGY

- Precision ground planetary roller screws provide the highest force and life ratings available
- Ball screw option also available

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

INTERNAL ANTI-ROTATE

Composite bearings prevent rotation of the thrust tube

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

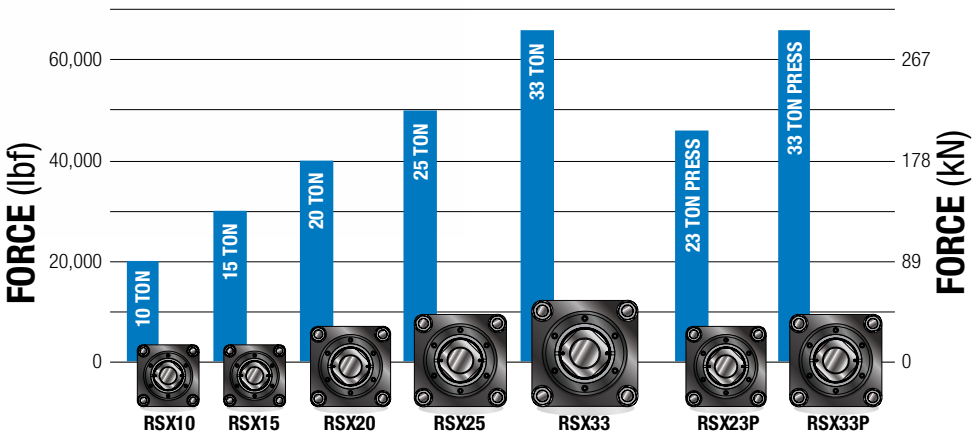
- For extended high duty cycle/ high force performance (pg. 7)

FOOD GRADE RSX

See page 11 for details

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 prevent contaminants from entering the interior of the actuator.



RSX PRESS MODEL

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

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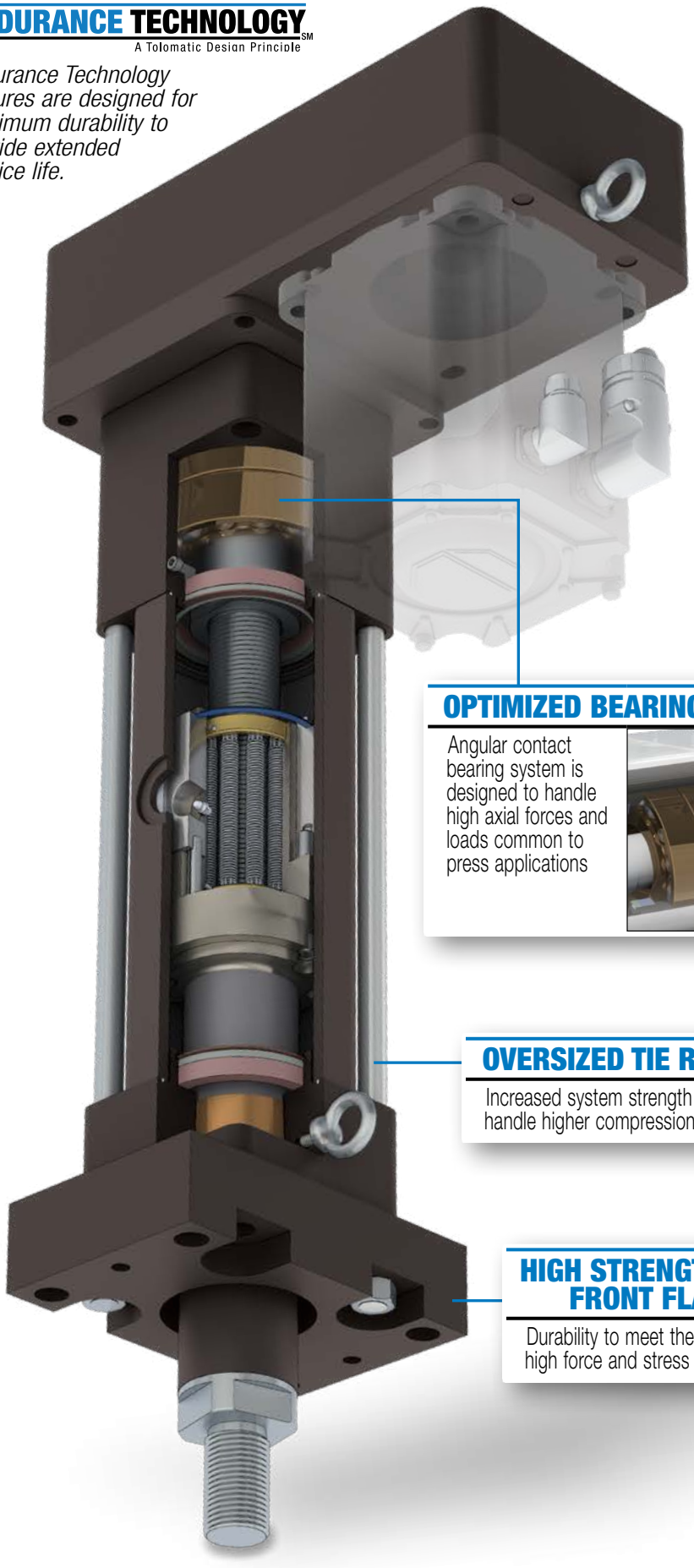
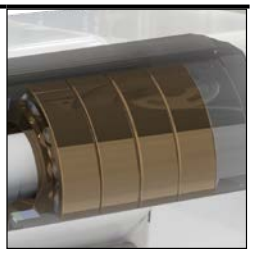
Endurance Technology features are designed for maximum durability to provide extended service life.

The RSX23P & RSX33P press actuators expand the compression force capability to 23 & 33 tons (46,000 & 66,000 lbf) making them well suited for applications such as pressing, riveting, clinching and many others. These press models have the same features as 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 higher compression forces

HIGH STRENGTH STEEL FRONT FLANGE

Durability to meet the demands of high force and stress applications

RSX OIL COOLED OPTION

Tolomatic™
EXCELLENCE IN MOTION
…MAXIMUM DURABILITY

RSX ACTUATORS

- An ideal choice for replacing hydraulic cylinders
- Available for all RSX sizes
- 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.

ENDURANCE TECHNOLOGY℠
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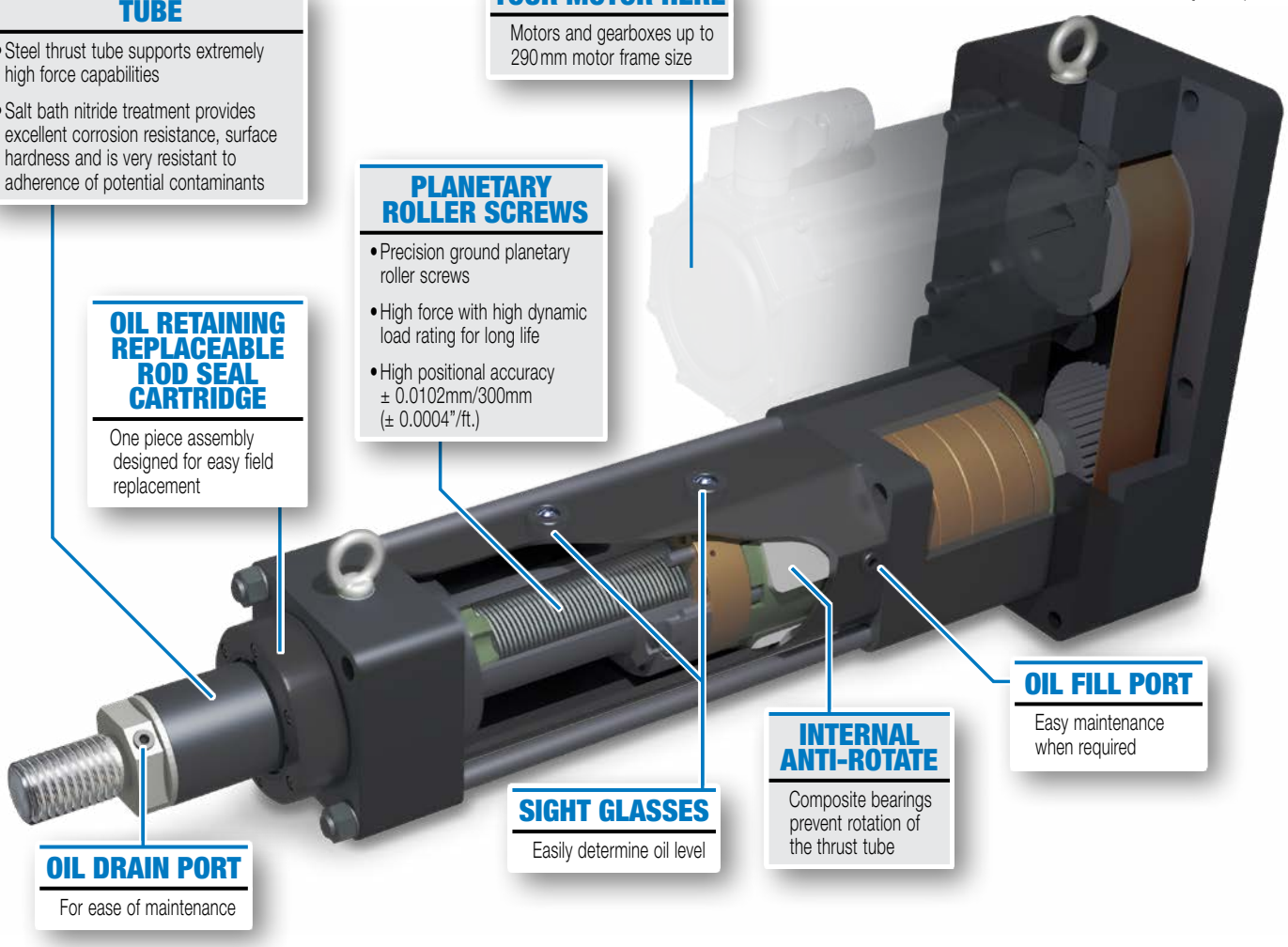


TUBE

- 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

YOUR MOTOR HERE

Motors and gearboxes up to 290 mm motor frame size

PLANETARY ROLLER SCREWS

- Precision ground planetary roller screws
- High force with high dynamic load rating for long life
- High positional accuracy ± 0.0102mm/300mm (± 0.0004"/ft.)

OIL RETAINING REPLACEABLE ROD SEAL CARTRIDGE

One piece assembly designed for easy field replacement

OIL FILL PORT

Easy maintenance when required

INTERNAL ANTI-ROTATE

Composite bearings prevent rotation of the thrust tube

SIGHT GLASSES

Easily determine oil level

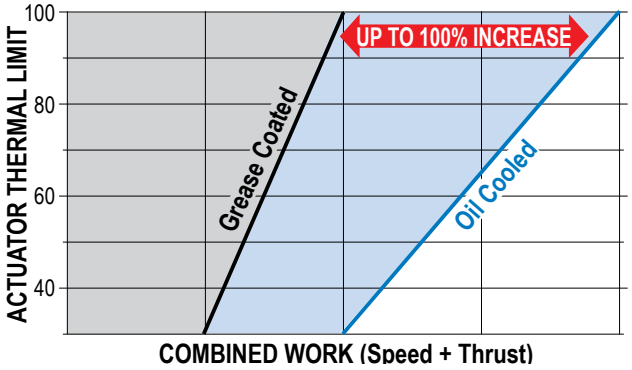
OIL DRAIN PORT

For ease of maintenance

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



Please contact Tolomatic for performance of other oil cooled RSX sizes

RSX Extreme Force, Hydraulic Class Electric Actuator

Specifications

RSX SIZE (TONNAGE RATING)	SCREW CODE	MIN. STROKE	MAX. STROKE		SCREW LEAD	LEAD ACCURACY	BACKLASH	MAX. FORCE	MAX. SPEED	DYNAMIC LOAD RATING	DYNAMIC TORQUE TO OVERCOME FRICTION
			STANDARD	EXTENDED*							
		in	in	in	turns/in	in/ft	in	lbf	in/sec	lbf	
10	BN01	–	37.8	59.1	1.00	0.0040	0.0150	20,000	25.0	22,500	55.0
10	BN02	–	37.8	59.1	2.00	0.0040	0.0150	20,000	11.0	37,420	55.0
10	RN12	3.0	37.8	50.0	2.12	0.0004	0.0012	20,000	30.0	58,921	55.0
15	BN01	–	37.8	59.1	1.00	0.0040	0.0150	30,000	25.0	22,500	55.0
15	BN02	–	37.8	59.1	2.00	0.0040	0.0150	30,000	11.0	37,420	55.0
15	RN12	3.0	37.8	50.0	2.12	0.0004	0.0012	30,000	30.0	60,541	55.0
20	RN12	3.0	37.8	50.0	2.12	0.0004	0.0012	40,000	30.0	60,541	55.0
25	RN10	3.0	26.0	48.0	2.54	0.0004	0.0012	50,000	20.0	99,519	75.0
33*	RN10	3.0	48.0	48.0	2.54	0.0004	0.0012	66,000	20.0	99,519	75.0
23P*	RN12	3.0	28.0	–	2.12	0.0004	0.0012	46,000**	30.0	60,541	55.0
33P*	RN10	3.0	26.0	39.0	2.54	0.0004	0.0012	66,000**	20.0	99,519	75.0
		mm	mm	mm	mm/rev	mm/300mm	mm	kN	mm/sec	kN	
10	BN01	–	960	1500	25.4	0.102	0.381	89	640	100.09	6.21
10	BN02	–	960	1500	12.7	0.102	0.381	89	280	166.45	6.21
10	RN12	76.2	960	1270	12.0	0.010	0.030	89	760	262.09	6.21
15	BN01	–	960	1500	25.4	0.102	0.381	133	640	100.09	6.21
15	BN02	–	960	1500	12.7	0.102	0.381	133	280	166.45	6.21
15	RN12	76.2	960	1270	12.0	0.010	0.030	133	760	269.30	6.21
20	RN12	76.2	960	1270	12.0	0.010	0.030	178	760	269.30	6.21
25	RN10	76.2	660	1220	10.0	0.010	0.030	222	510	442.68	8.47
33*	RN10	76.2	1220	–	10.0	0.010	0.030	294	510	442.68	8.47
23P*	RN12	76.2	710	–	12.0	0.010	0.030	205**	760	269.30	6.21
33P*	RN10	76.2	660	990	10.0	0.010	0.030	294**	510	442.68	8.47

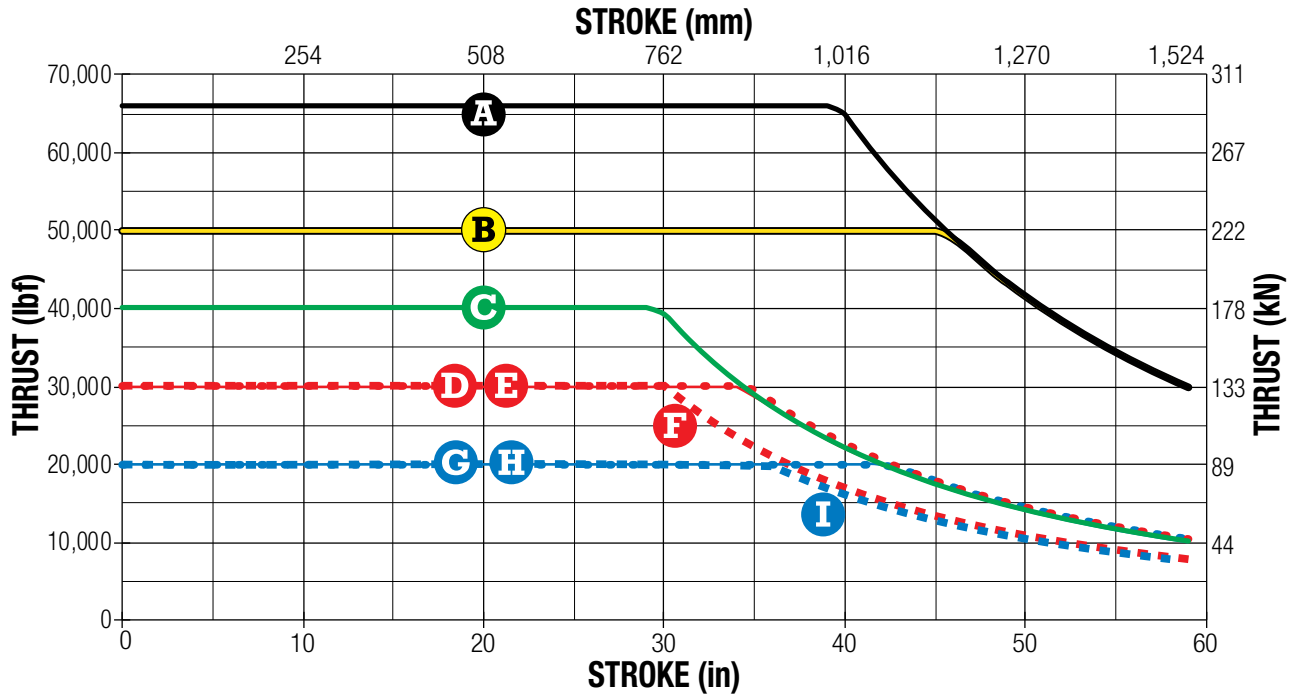
*Call Tolomatic for availability **Max force only available in compression (extend)

RSX SIZE (TONNAGE RATING)	SCREW CODE	INERTIA				WEIGHT			
		BASE ACTUATOR			PER UNIT	BASE ACTUATOR			PER UNIT
		$lb\text{-}in^2$			$lb\text{-}in^2$ per in	lb			lb per in
		LMI	RP1	RP2		LMI	RP1	RP2	
10	BN01	61.10	73.87	31.59	0.33	144.74	160.07	161.92	2.31
10	BN02	61.10	73.87	31.59	0.33	144.74	160.07	161.92	2.31
10	RN12	61.10	73.87	31.59	0.33	144.74	160.07	161.92	2.31
15	BN01	61.10	86.70	34.19	0.33	144.74	161.45	162.63	2.31
15	BN02	61.10	86.70	34.19	0.33	144.74	161.45	162.63	2.31
15	RN12	61.10	86.70	34.19	0.33	144.74	161.45	162.63	2.31
20	RN12	61.10	86.70	34.19	0.33	184.45	205.72	206.90	2.51
25	RN10	242.20	231.29	92.11	0.98	389.38	458.44	462.66	4.40
33*	RN10	*	*	*	*	*	*	*	*
23P*	RN12	61.10	86.70	34.19	0.33	184.45	205.72	206.90	2.51
33P*	RN10	242.20	231.29	92.11	0.98	389.38	458.44	462.66	4.40
		$kg\text{-}m^2 \times 10^{-4}$			$kg\text{-}m^2 \times 10^{-4}$ per mm	kg			kg per mm
10	BN01	178.7	216.2	92.4	0.04	65.65	72.61	73.45	0.04
10	BN02	178.7	216.2	92.4	0.04	65.65	72.61	73.45	0.04
10	RN12	178.7	216.2	92.4	0.04	65.65	72.61	73.45	0.04
15	BN01	178.7	253.7	100.5	0.04	65.65	73.23	73.77	0.04
15	BN02	178.7	253.7	100.5	0.04	65.65	73.23	73.77	0.04
15	RN12	178.7	253.7	100.5	0.04	65.65	73.23	73.77	0.04
20	RN12	178.7	253.7	100.5	0.04	83.67	93.31	93.85	0.04
25	RN10	708.8	676.8	269.6	0.11	176.62	207.95	209.86	0.08
33*	RN10	*	*	*	*	*	*	*	*
23P*	RN12	178.7	253.7	100.5	0.04	83.67	93.31	93.85	0.04
33P*	RN10	708.8	676.8	269.6	0.11	176.62	207.95	209.86	0.08

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.

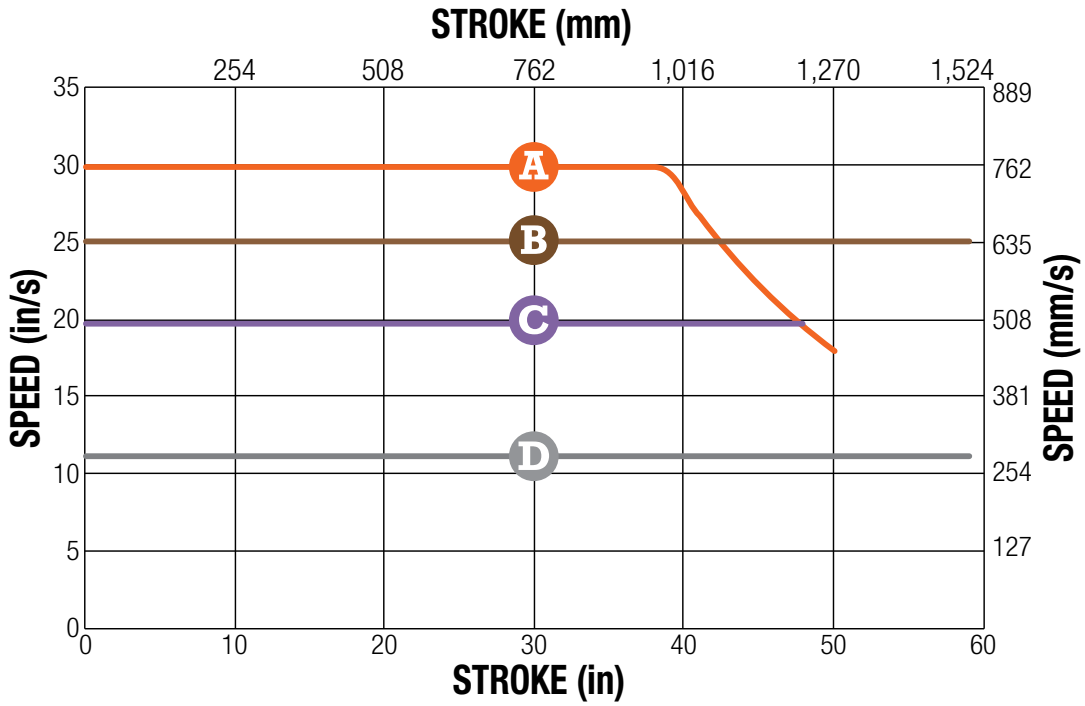
RSX Extreme Force, Hydraulic Class Electric Actuator

SIZE: ALL: SCREW BUCKLING LOAD



A — RSX33 & 33P RN10
B — RSX25 RN10
C — RSX20 RN12
D — RSX15 RN12
E — RSX15 BN02
F — RSX15 BN01
G — RSX10 RN12
H — RSX10 BN02
I — RSX10 BN01

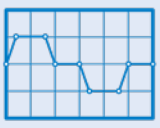
SIZE: ALL: CRITICAL SPEED CAPACITIES



A — RN12: RSX10, 15, 20, & 23P
B — BN01: RSX10 & 15
C — RN10: RSX25, 33, & 33P
D — BN02: RSX10 & 15

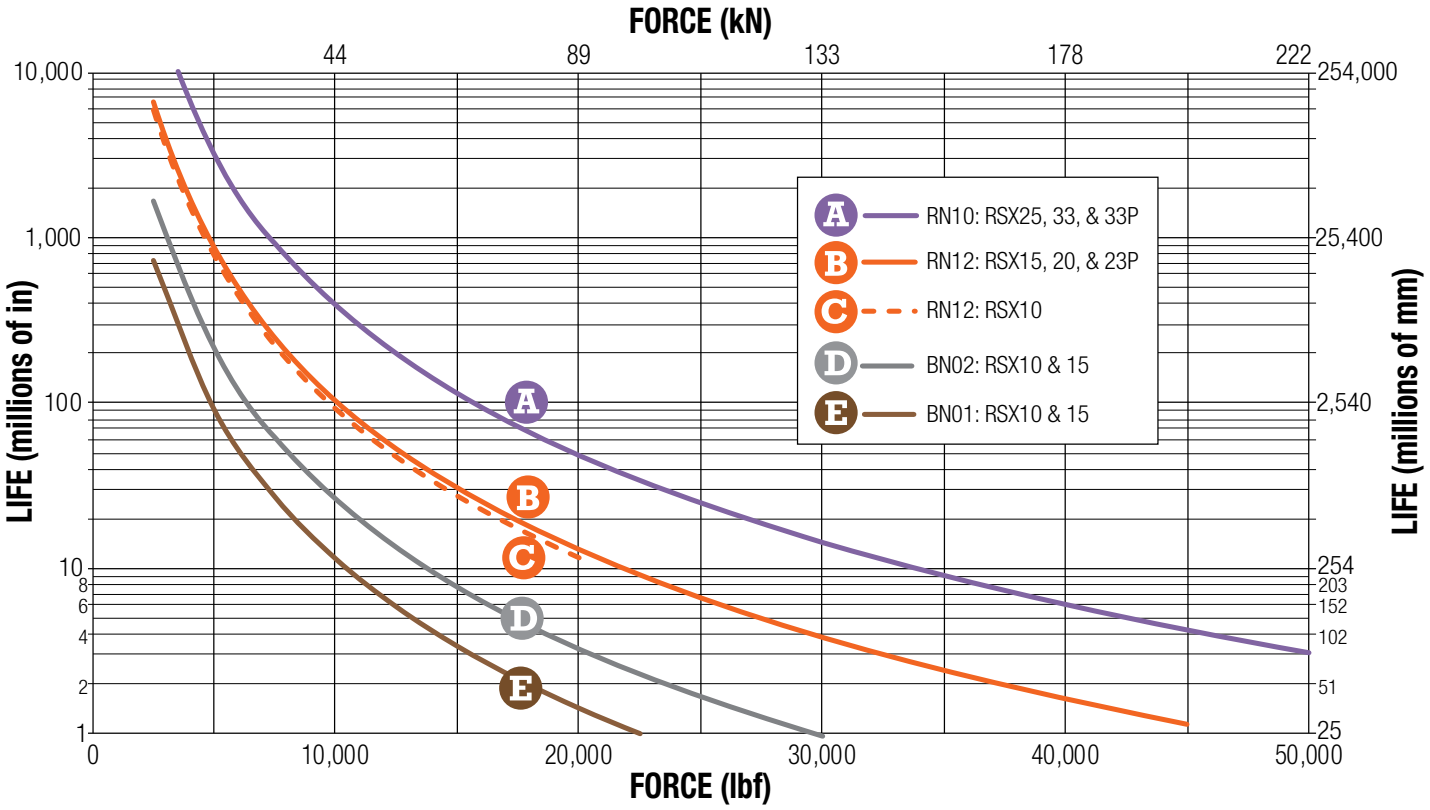
*NOTE: When using Trunnion Mount, (TRR) consider the stroke to be longer when determining Critical Speed and Buckling Load:

STROKE ADDER		
	mm	in
RSX10	72.4	2.85
RSX15	72.4	2.85
RSX20	0.0	0.00
RSX25	108.0	4.25



sizeit.tolomatic.com
for fast, accurate actuator selection

SIZE: **ALL: EXPECTED LIFE**



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)*
P_e = Equivalent load (lbf) or *(N)*
If load is constant across all movements then:
actual load = equivalent load
ℓ = 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:

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

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)*

RSX Press Model Expected Life:

In the event an RSX actuator is used in a press application, calculation of its L10 expected life is modified to consider only the press move, because in press (and similar) applications repeated high force cycles at the same position of the roller screw focus the stress in one area, which may limit the life of the device. For these cases the equivalent load value for the L10 calculation is replaced with the pressing force of the press move only:

The underlying formula that defines this value is:

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

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

C = Dynamic load rating (lbf) or *(N)*
P_p = Pressing Force (lbf) or *(N)*
ℓ = Screw lead (in/rev) *(mm/rev)*

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

Remove the access cover, and extend or retract the thrust rod for access to the internal grease zerk.

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 OIL Option refer to the RSX Manual, Oil Cooled Option section.

	RSX10, 15, 20, & 23P	RSX25, 33, & 33P
Quantity (g)	9.5 + (0.025 x Stroke^{mm})	12.0 + (0.027 x Stroke^{mm})
Quantity (oz)	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

FOOD GRADE RSX

The food grade RSX is a great option for the food & beverage processing environment.

Contact Tolomatic for lead time and application review.

316 SERIES STAINLESS STEEL

- Tie Rods, Motor Mounting Plate, Thrust Rod, Rod End, Re-Lubrication Port, and Fasteners

FOOD GRADE PAINT

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

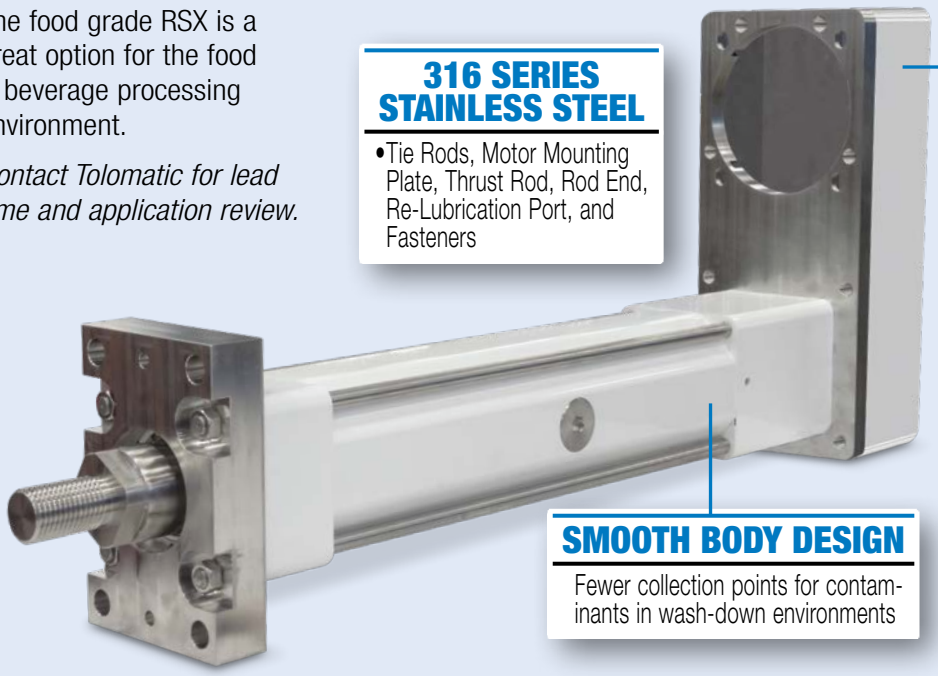


Photo shows non-standard FFGR with RP

SMOOTH BODY DESIGN

Fewer collection points for contaminants in wash-down environments

IP67 STANDARD

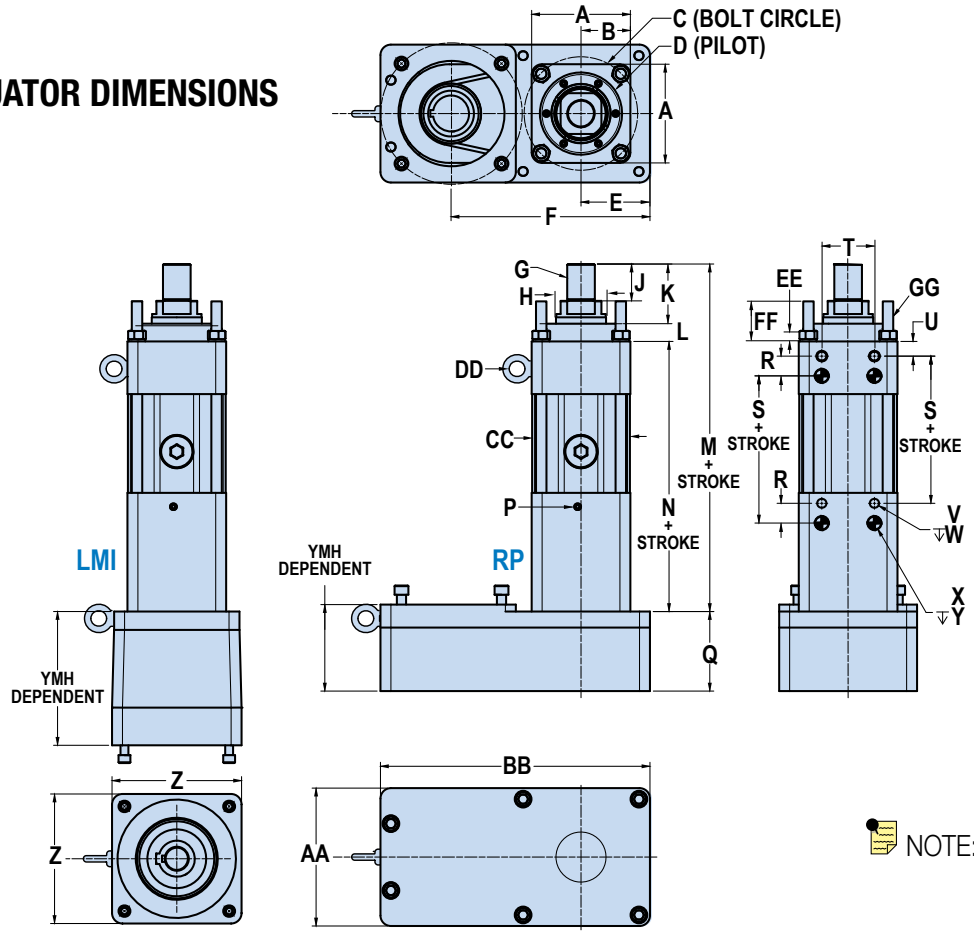
Static tested against ingress of dust and water for protection of internal components and long actuator life

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

SIZE: **ALL**

LMI & RP ACTUATOR DIMENSIONS



DIMENSIONS

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

NOTE: RSX33 Dimensions available on request

	10&15	20 & 23P	25 & 33P
A	150.0	190.5	220.0
B	75.0	95.3	110.0
C	171.0	200.0	250.0
D	125.00 (+0.00) (-0.03)	125.00 (+0.00) (-0.03)	175.0 (+0.00) (-0.03)
E	104.8	104.8	142.9
F	RP1		
	304.8	304.8	422.9
	RP2		
	302.3	302.3	424.5
G	STANDARD		
	M42 x 4.5-6g	M64 x 3.0-6g	M64 x 3.0-6g
Hø	76.093 / 76.149	76.093 / 76.149	101.488 / 101.549
THREAD LENGTH			
J	69.9	85.1	105.0
FULL RETRACT			
K	104.8	119.3	168.2
L	27.0	27.0	33.0
P	RC 1/8 -28 X 38.1 DP (Plugged)	RC 1/4 -19 X 38.1 DP (Plugged)	RC 1/4 -19 X 38.1 DP (Plugged)

	10&15	20 & 23P	25 & 33P
Q	138.1	138.1	183.9
R	30.0	40.0	40.0
T	80.0	80.0	115.0
U	22.3	20.0	35.0
V	M16 x 2.0-6H	M20 x 2.5-6H	M20 x 2.5-6H
W	↧16.0 (4)	↧20.0 (4)	↧20.0 (4)
X	20.013/ 20.025	20.013/ 20.038	20.013/ 20.033
Y	↧15.0 (4)	↧15.0 (4)	↧30.0 (4)
Z	190.5	190.5	285.8
AA	209.6	209.6	291.1
BB	425.5	425.5	584.2
CC	148.6	148.6	215.0
DD	25.0	35.0	35.0
EE	15.3	23.0	23.0
FF	54.2	72.1	76.2
GG	M16 x 1.5-6H	M24 x 3.0-6H	M24 x 3.0-6H

Dimensions in millimeters

	10&15	20 & 23P	25 & 33P
A	*5.91*	*7.50*	*8.66*
B	*2.95*	*3.75*	*4.33*
C	*6.73*	*7.87*	*9.84*
D	*4.921 (+0.000) (-0.001)*	*4.921 (+0.000) (-0.001)*	*6.89 (+0.000) (-0.001)*
E	*4.13*	*4.13*	*5.63*
F	RP1		
	12.00	*12.00*	*16.65*
	RP2		
	11.90	*11.90*	*16.71*
G	SR1 OPTION		
	1⅞-12 UN-2A	*2½-12 UN-2A*	*2½-8 UN-2A*
Hø	*2.9958/ 2.9980*	*2.9958/ 2.9980*	*3.9956/ 3.9980*
THREAD LENGTH			
J	*2.75*	*3.35*	*4.13*
FULL RETRACT			
K	*4.13*	*4.70*	*6.62*
L	*1.06*	*1.06*	*1.30*
P	RC 1/8 -28 X 38.1 DP (Plugged)	RC 1/4 -19 X 38.1 DP (Plugged)	RC 1/4 -19 X 38.1 DP (Plugged)

	10&15	20 & 23P	25 & 33P
Q	*5.44*	*5.44*	*7.24*
R	*1.18*	*1.57*	*1.57*
T	*3.15*	*3.15*	*4.53*
U	*0.88*	*0.79*	*1.38*
V	M16 x 2.0-6H	M20 x 2.5-6H	M20 x 2.5-6H
W	↧*.63(4)*	↧*.79 (4)*	↧*.79 (4)*
X	*Ø.7879/ Ø.7884*	*Ø.7879/ Ø.7889*	*Ø.7879/ Ø.7887*
Y	↧*.59 (4)*	↧*.59 (4)*	↧*1.18 (4)*
Z	*7.50*	*7.50*	*11.00*
AA	*8.25*	*8.25*	*11.25*
BB	*16.75*	*16.75*	*23.00*
CC	*5.85*	*5.85*	*8.46*
DD	*0.98*	*1.38*	*1.38*
EE	*0.60*	*0.91*	*0.91*
FF	*2.13*	*2.84*	*3.00*
GG	M16 x 1.5-6H	M24 x 3.0-6H	M24 x 3.0-6H

Dimensions in inches

	10&15			20 & 23P	25 & 33P
	BN01	**BN02**	**RN**	**RN**	**RN**
M	640.6	693.0	588.0	627.5	805.9
N	508.8	561.2	456.2	481.2	604.6
S	335.0	387.4	282.4	289.6	369.0

Dimensions in millimeters

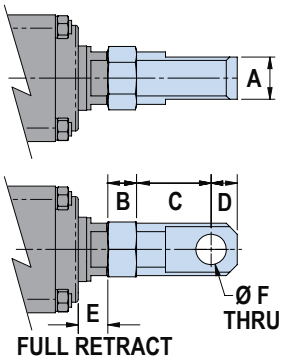
	10&15			20 & 23P	25 & 33P
	BN01	**BN02**	**RN**	**RN**	**RN**
M	*25.22*	*27.28*	*23.15*	*24.71*	*31.73*
N	*20.03*	*22.09*	*17.96*	*18.94*	*23.80*
S	*13.19*	*15.25*	*11.12*	*11.40*	*14.53*

Dimensions in inches

SIZE: **ALL**

DIMENSIONS

CLEVIS OPTION (CLV)



	10&15	20 & 23P	25 & 33P
A	50.00/ 49.59	60.00/ 59.26	60.00/ 59.26
B	34.0	51.0	51.0
C	88.3	137.0	137.0
D	31.0	45.0	45.0
E	35.0	30.7	63.2
F	36.06/ 36.00	45.06/ 45.00	45.06/ 45.00

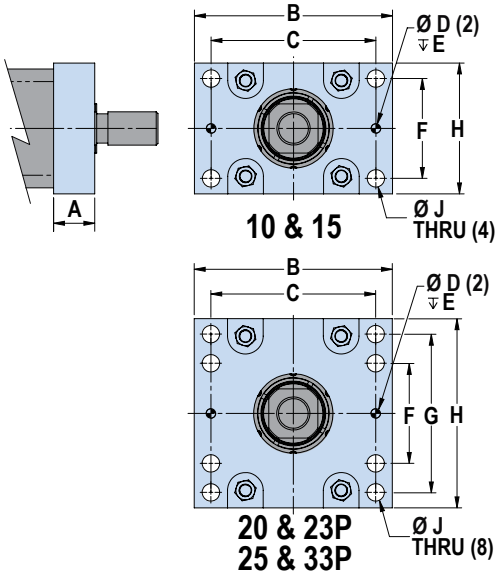
Dimensions in millimeters

	10&15	20 & 23P	25 & 33P
A	*1.575/ 1.559*	*2.362/ 2.333*	*2.362/ 2.333*
B	*1.34*	*2.01*	*2.01*
C	*2.95*	*3.48*	*5.39*
D	*1.22*	*1.77*	*1.77*
E	*1.38*	*1.21*	*2.49*
F	*1.420/ 1.417*	*1.774/ 1.772*	*1.774/ 1.772*

Dimensions in inches

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

FRONT FLANGE OPTION (FFG)



Size	FFG weight adder
10 & 15	26 lb (12 kg)
20 & 23P	54 lb (24 kg)
25 & 33P	82 lb (37 kg)

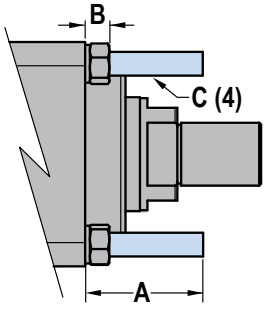
	10&15	20 & 23P	25 & 33P
A	62.0	86.0	85.0
B	250.0	300.0	360.0
C	208.0	255.0	300.0
D	12.025/ 12.013	16.030/ 16.000	20.033/ 20.013
E	12.0	16.0	20.0
F	126.0	55.0	65.0
G	–	165.0	190.0
H	165.0	210.0	245.0
J	22.0	22.0	26.2

Dimensions in millimeters

	10&15	20 & 23P	25 & 33P
A	*2.44*	*2.99*	*3.35*
B	*9.84*	*11.81*	*14.17*
C	*8.19*	*10.04*	*11.81*
D	*0.4734/ 0.4729*	*0.6310/ 0.6300*	*0.7887/ 0.7879*
E	*0.47*	*0.63*	*0.79*
F	*4.96*	*2.17*	*2.56*
G	–	*6.50*	*7.48*
H	*6.50*	*8.27*	*9.65*
J	*0.87*	*0.87*	*1.03*

Dimensions in inches

EXTENDED TIE ROD OPTION (XT)



		10&15	20 & 23P	25 & 33P
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	16.3	23.0	23.0
	in	*0.60*	*0.91*	*0.91*
C (4)		M16 x 1.5-6g	M24 x 3.0-6g	M24 x 3.0-6g

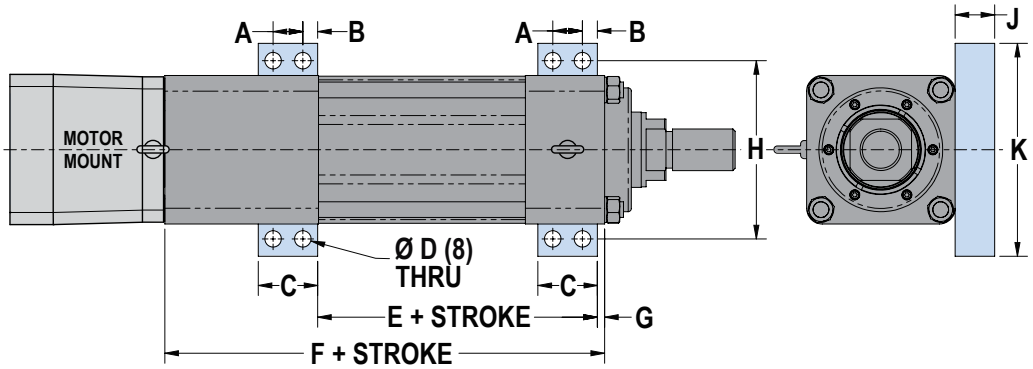
A = Customer Specified Length

RSX Extreme Force, Hydraulic Class Electric Actuator

SIZE: **ALL**

DIMENSIONS

MOUNTING PLATE OPTION (MP2) DIMENSIONS



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

		10&15	20 & 23P	25 & 33P
A		30.0	40.0	40.0
B		15.0	19.0	22.5
C		60.0	78.0	85.0
D		16.7	21.0	21.0
	RN	282.4	288.9	369.0
E	BN01	335.0	–	–
	BN02	387.4	–	–

		10&15	20 & 23P	25 & 33P
	RN	352.7	481.2	604.6
F	BN01	508.8	–	–
	BN02	561.2	–	–
G		7.3	1.0	12.5
H		180.0	230.0	260.0
J		40.0	45.0	45.0
K		215.0	270.0	305.0

Dimensions in millimeters

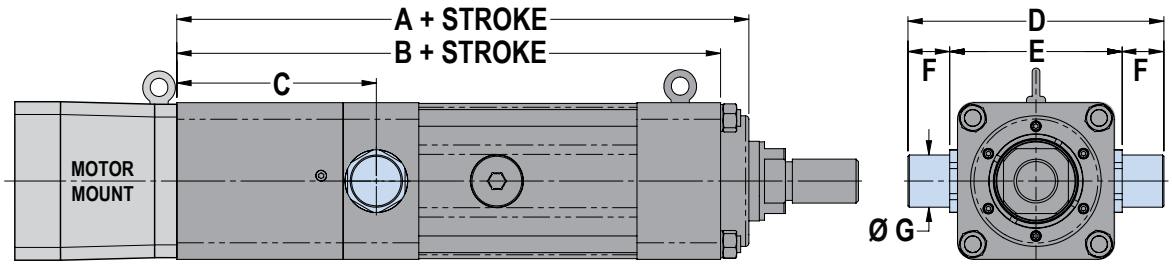
		10&15	20 & 23P	25 & 33P
A		*1.18*	*1.57*	*1.57*
B		*0.59*	*0.79*	*0.89*
C		*2.36*	*3.07*	*3.35*
D		*0.66*	*0.83*	*0.83*
	RN	*11.12*	*11.37*	*14.53*
E	BN01	*13.19*	–	–
	BN02	*15.25*	–	–

		10&15	20 & 23P	25 & 33P
	RN	*13.89*	*18.94*	*23.80*
F	BN01	*20.03*	–	–
	BN02	*22.09*	–	–
G		*0.29*	*0.04*	*0.49*
H		*7.09*	*9.06*	*10.24*
J		*1.57*	*1.77*	*1.77*
K		*8.46*	*10.60*	*12.01*

Dimensions in inches

TRUNNION OPTION (TRR) DIMENSIONS

NOTE: TRR option reduces max stroke:
RSX10 & 15 sizes by 3.3in (84mm)
RSX25 size by 4.3in (109mm)



		10&15	20 & 23P	25 & 33P
	RN	556.5	509.2	750.8
A	BN01	608.2	–	–
	BN02	660.6	–	–
	RN	529.5	482.1	713.7
B	BN01	581.2	–	–
	BN02	633.6	–	–

	10&15	20 & 23P	25 & 33P
C	199.9	76.0	268.1
D	245.0	364.2	340.0
E	165.0	264.2	240.0
F	40.0	50.0	50.0
G	49.98/ 49.94	59.97/ 59.92	62.97/ 62.92

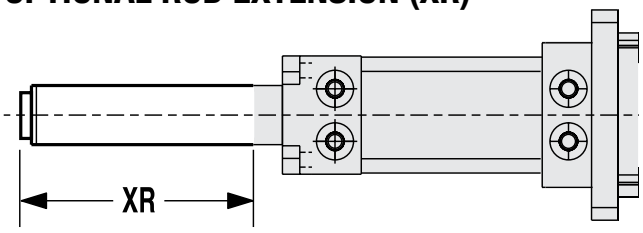
Dimensions in millimeters

		10&15	20 & 23P	25 & 33P
	RN	*21.91*	*20.05*	*29.56*
A	BN01	*23.94*	–	–
	BN02	*26.00*	–	–
	RN	*20.85*	*19.00*	*28.10*
B	BN01	*22.88*	–	–
	BN02	*24.90*	–	–

	10&15	20 & 23P	25 & 33P
C	*7.87*	*2.90*	*10.56*
D	*9.65*	*14.34*	*13.39*
E	*6.50*	*10.40*	*9.45*
F	*1.57*	*1.97*	*1.97*
G	*1.968/ 1.966*	*2.361/ 2.359*	*2.479/ 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 100mm (3.9in).

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.

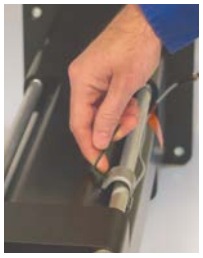
RoHS COMPLIANT CE

	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

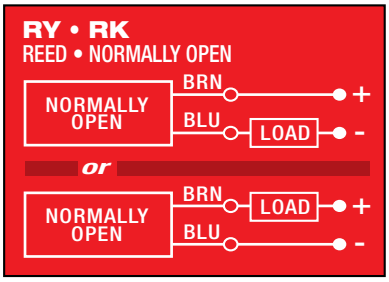
⚠ **WARNING: Do not exceed power rating (Watt = Voltage x Amperage). Permanent damage to sensor will occur.

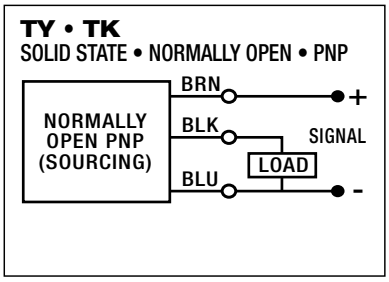
SWITCH INSTALLATION

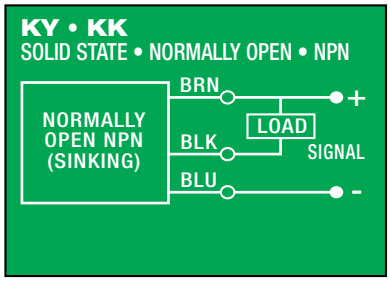


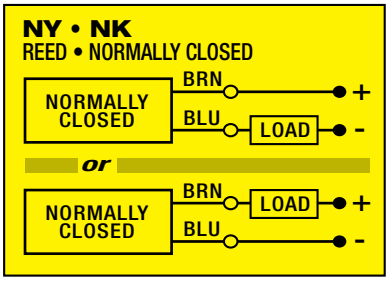
Place switch bracket onto any one of the four tie rods that run the length of the extruded tube. Insert the switch with set screw and the word "Tolomatic" facing up and slide into the mating slot on the bracket. Position the bracket with the switch to the exact location desired, with the bracket tight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

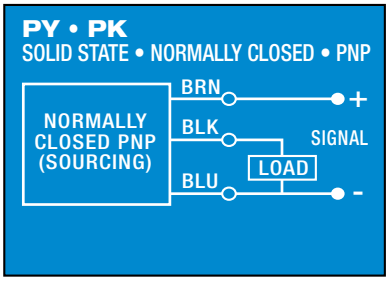
WIRING DIAGRAMS

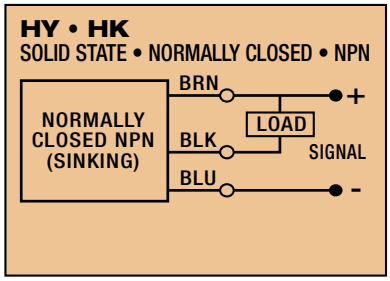


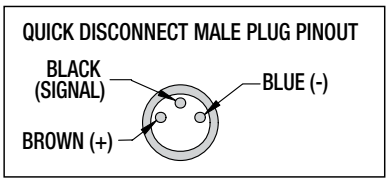


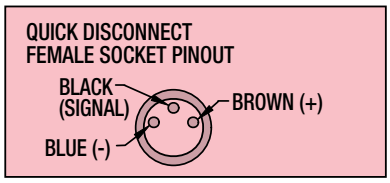






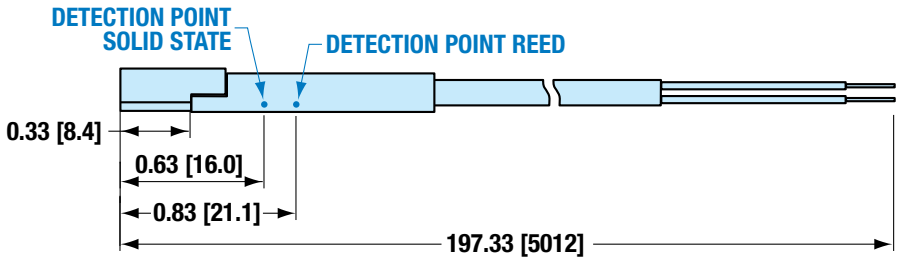




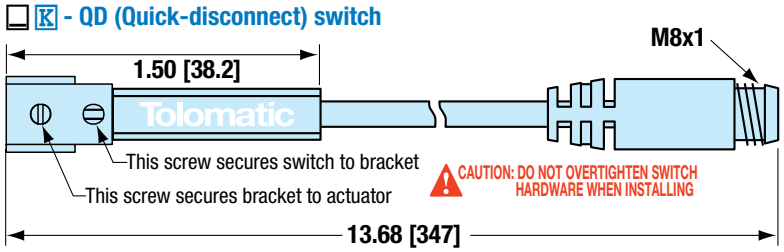


SWITCH DIMENSIONS

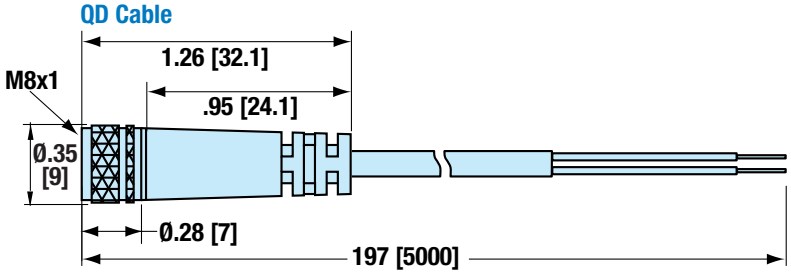
☐ Y - direct connect



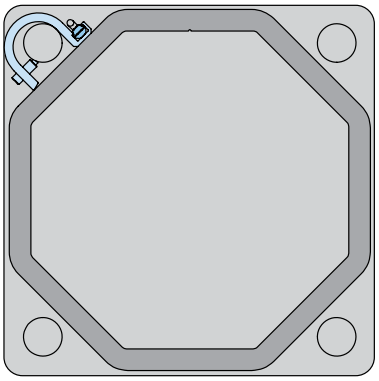
☐ K - QD (Quick-disconnect) switch



QD Cable



SWITCH MOUNTING



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

RSX Extreme Force, Hydraulic Class Electric Actuator

Application Data 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 ☐ Vertical-Motor End Up ☐ Angled ☐ Vertical-Motor End Down

Angle: _____ degrees

ACTUATOR REQUIREMENTS

Stroke Length: _____ ☐ inches ☐ millimeters

No. of Cycles: _____ ☐ per minute ☐ per hour

Actuator to Hold Position: ☐ required ☐ not required

If Hold Required: ☐ after move ☐ during power loss

Motor: ☐ Third Party Motor ☐ Tolomatic Motor

APPLICATION ENVIRONMENT

Ambient Temperature: _____ ☐ °F ☐ °C

Actuator Environment Description and Ingress Protection Requirements:

MOTION & FORCES

Extend

Move Distance: _____ ☐ in ☐ mm

Move Time: _____ seconds

Max. Speed: _____ ☐ in/s ☐ mm/s

Dwell Time After Move: _____ seconds

Retract

Move Distance: _____ ☐ in ☐ mm

Move Time: _____ seconds

Max. Speed: _____ ☐ in/s ☐ mm/s

Dwell Time After Move: _____ seconds

Load

Load: _____ ☐ lb ☐ kg

Supported by Actuator: _____ %

Moment Prevention: ☐ Guided/Supported

Center of Load:

D_X: _____ ☐ in ☐ mm

D_Y: _____ ☐ in ☐ mm

D_Z: _____ ☐ in ☐ mm

Assign to Moves: ☐ Extend ☐ Retract

Force

Force: _____ ☐ lb_f ☐ N

Force Direction: ☐ Toward ☐ Away

Direction of Applied Force: ☐ F_x ☐ F_y ☐ F_z

Center of Applied Force:

D_X: _____ ☐ in ☐ mm

D_Y: _____ ☐ in ☐ mm

D_Z: _____ ☐ in ☐ mm

Assign to Moves: ☐ Extend ☐ Retract

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_11 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_8), 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

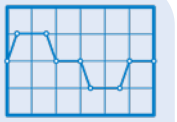
12 sensor choices include: reed, solid state PNP or NPN, all in normally open or normally closed, with flying leads or quick-disconnect couplers.

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.



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RSX Extreme Force, Hydraulic Class Electric Actuator

Ordering

ACTUATOR **OPTIONS**

RSX 15 RN12 SM4500 RP1 HT1 FFG OIL CLV XR10 KK2 YM___

MODEL & MOUNTING

RSX	Rod-Style Actuator

SIZE (TONNAGE RATING)

10, 15, 20, 25, 33†	
23P†, 33P†	Press Models

†Contact Tolomatic for ordering

NUT/SCREW

SIZE	CODES
10	RN12, BN01, BN02
15	RN12, BN01, BN02
20	RN12
23P†	RN12
25	RN10
33†	RN10
33P†	RN10

RN = Roller Nut/Screw
BN = Ball Nut/Screw
†Contact Tolomatic for ordering

STROKE LENGTH

SM___ Enter desired stroke length in millimeters

See page 8 for minimum and maximum stroke lengths available

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

Photo shows non-standard FFGR with RP

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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 RSX10

TRUNNION MOUNT

TRR Trunnion mount

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

IP67

IP67 Ingress protection and thrust rod scraper

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

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

NOTE: Brakes mounted on reverse parallel motor mounts (especially in vertically positioned actuators) will not prevent back driving of the screw and the load falling under gravity in the event of a timing belt failure. An inline motor mount with a fail-safe brake mounted directly to the actuator shaft or a special geared or thru-shaft reverse parallel construction should be considered if a brake is required in a safety critical application. Contact Tolomatic for alternate reverse parallel brake mounting options.

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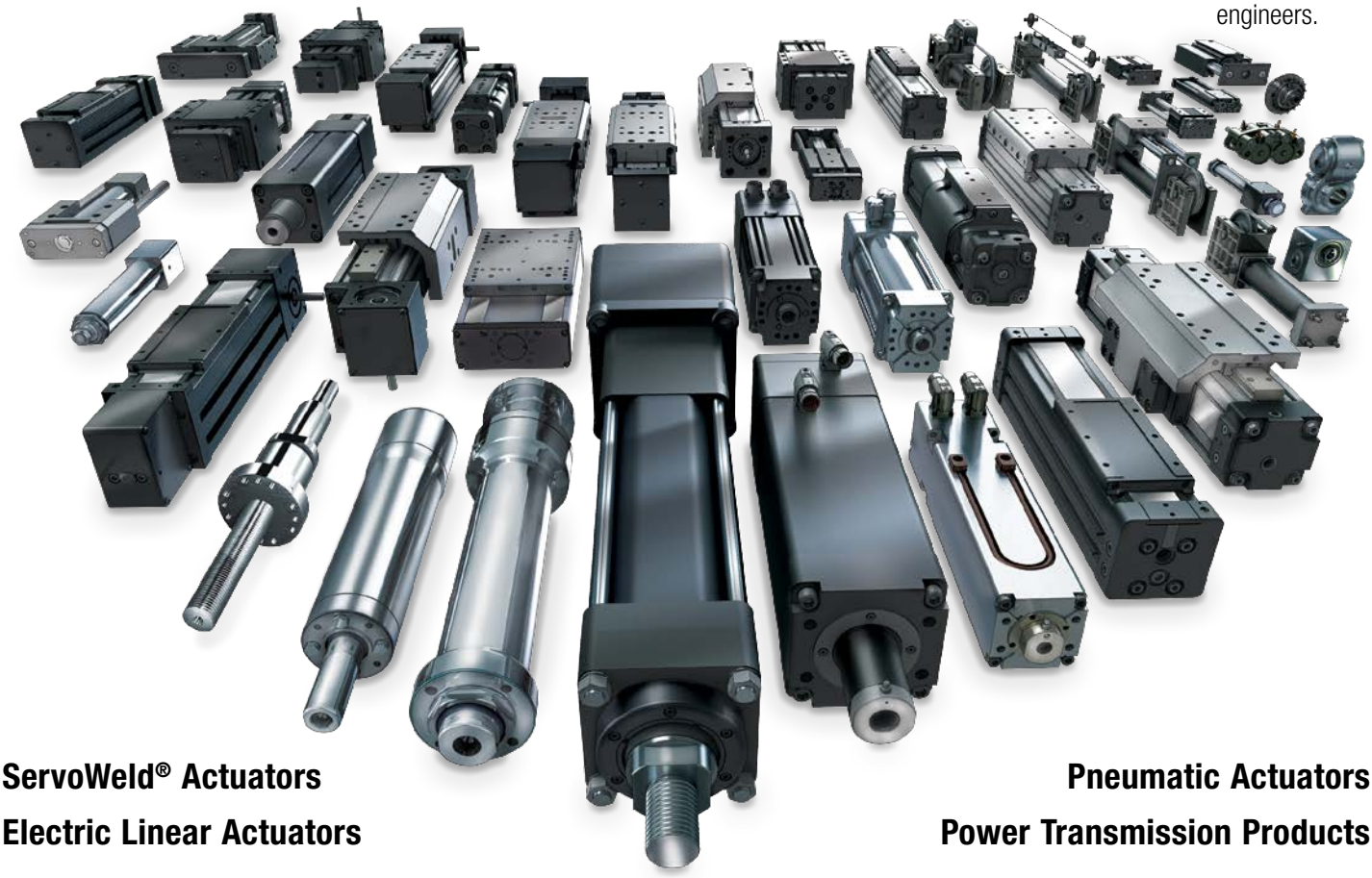

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