Tolomatic™
EXCELLENCE *IN MOTION*

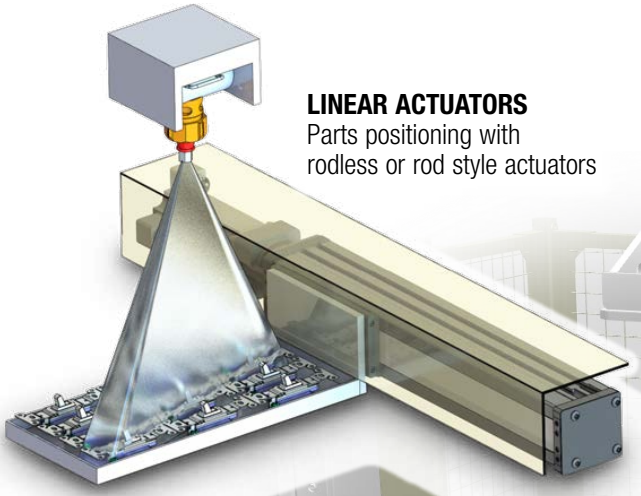
SOLUTIONS FOR ALL-ELECTRIC PROJECTION WELDING

Benefits of Full Electric Projection Welding Systems:

GREATER CONTROL
with real time force and position control

REDUCED DOWNTIME
with greatly reduced maintenance requirements compared to pneumatic or hydraulic solutions

INCREASED THROUGHPUT
with coordinated moves



LINEAR ACTUATORS
Parts positioning with rodless or rod style actuators

SERVOWELD™ PROJECTION Welding Actuators
High force precision during the collapse of the projections assures quality with high process control

SERVOPLACE™
Precision placement of nuts or studs

LINEAR SOLUTIONS MADE EASY

SERVOWELD™ PROJECTION

High Force Precision During the Collapse of Projections

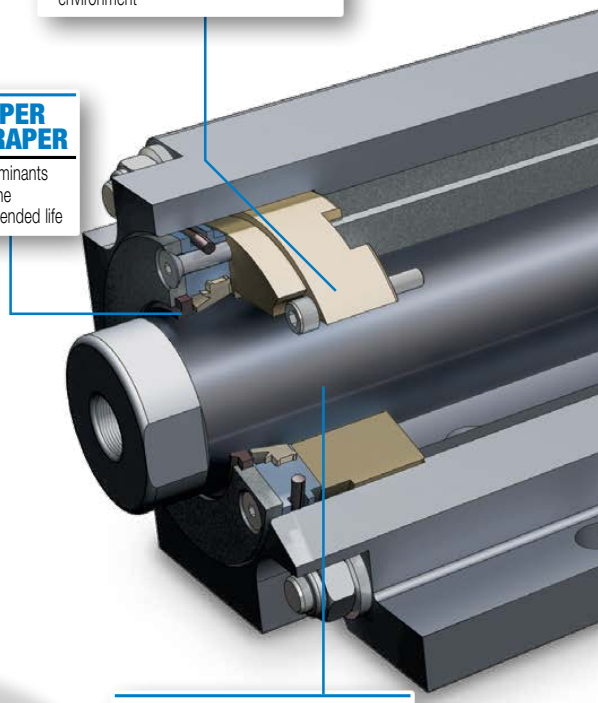
- Assures weld quality with high process control
- Perfect solution to your metal fabricating challenges
- Outstanding performance, durability and reliability, for over 20 million cycles

Tolomatic has solved the principle challenges of projection nut and stud welding by achieving a rapid follow-up stroke during projection collapse and minimizing weld force fluctuations. The ServoWeld™ Projection Welding Actuator produces nearly instantaneous stroke compensation to maintain optimal weld forces throughout the projection welding sequence. This is accomplished when the stored potential energy in the spring stack is converted to kinetic energy, driving the thrust tube, moving the electrode forward.

ENDURANCE TECHNOLOGYSM
A Tolomatic Design Principle

ROBUST BUSHINGS
- Large bushings provide additional side loading support for the thrust tube protecting the screw assembly
- Eliminates external guide on RSW chassis
- Protects guided mechanism in RSW environment

ROD WIPER WITH SCRAPER
Prevents contaminants from entering the actuator for extended life



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 weld slag, water and other potential contaminants
- Large diameter guided thrust tube

Advantages of ServoWeld™	Disadvantage of Pneumatic
20+ million welds	Frequent repair and maintenance
Soft touch	Greater tool wear due to impacts
High force control	Limited force control
High efficiency	Low efficiency

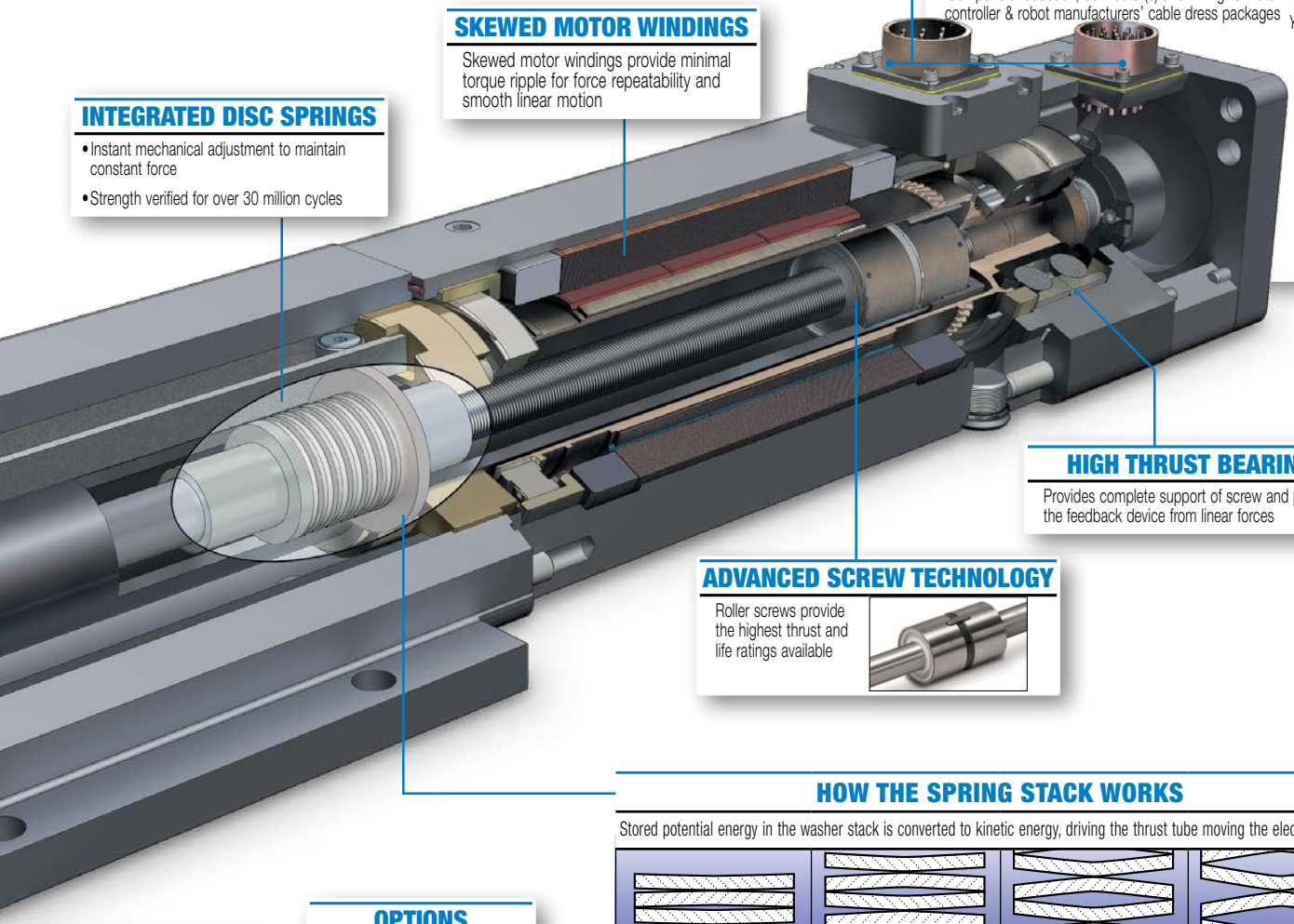
Tolomatic electric linear actuators (along with the encoder, servo motor & screw) make it possible to detect a misplaced workpiece without expensive external sensors.

PROJECTION / PEDESTAL WELDING FOR NUTS AND STUDS

Challenge	Solution	Benefits
• Achieving a rapid following stroke during the projection collapse	• Tolomatic actuator with integrated servo motor designed to provide rapid mechanical reaction to projection collapse that ensures weld forces are maintained throughout the projection weld sequence	• More consistent weld quality
• Minimizing weld force fluctuation		• Advanced motion control for high force
• Issues of cost of ownership with pneumatic cylinder systems		• Increased productivity

SPECIFICATIONS	
Max. Stroke:	6 in
	152 mm
Max. Force:	3300 lbf
	14.7 kN
Max. Speed:	23 in/sec
	584 mm/sec

Welding Actuators



DRIVE/CONTROLLER & ROBOT COMPATIBILITY

Compatible feedback, connector(s) and wiring to match the following drive/controller & robot manufacturers' cable dress packages

YOUR CHOICE:
+Allen Bradley
+Baldor
+Beckhoff
+Bosch-Rexroth
+Kollmorgen
+Lenze
+Nidec/Control Techniques
+Scheider Electric
+Siemens
+Stober
& more

SKEWED MOTOR WINDINGS

Skewed motor windings provide minimal torque ripple for force repeatability and smooth linear motion

INTEGRATED DISC SPRINGS

- Instant mechanical adjustment to maintain constant force
- Strength verified for over 30 million cycles

HIGH THRUST BEARING

Provides complete support of screw and protects the feedback device from linear forces

ADVANCED SCREW TECHNOLOGY

Roller screws provide the highest thrust and life ratings available

IP65

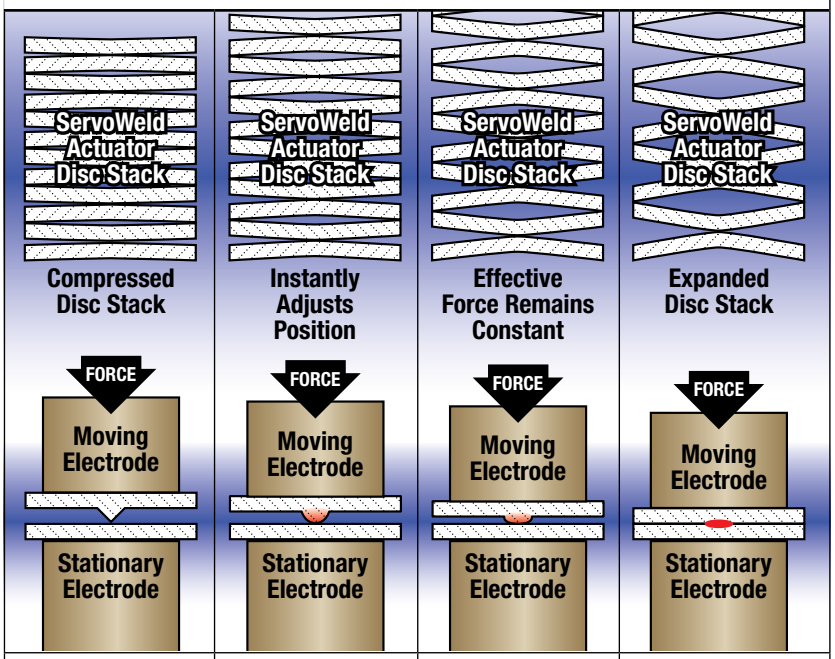
IP65 rating protects actuator from ingress of water, weld slag and other debris (static)

OPTIONS

- Brake – Spring held / 24V electrically released
- Water Cooling
- Rear Trunnion Mounting

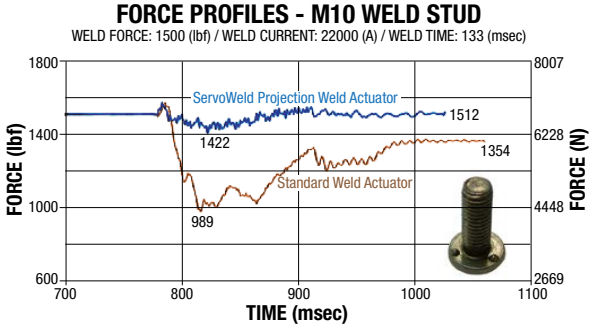
HOW THE SPRING STACK WORKS

Stored potential energy in the washer stack is converted to kinetic energy, driving the thrust tube moving the electrode forward.



ServoWeld™ positions electrode with proper force, compressing disc stack.	Electrodes are energized and projection begins to melt.	Projection collapses as weld occurs, disc stack expands, effective force remains constant	Weld nugget completely formed, electrodes are de-energized

FORCE PROFILES

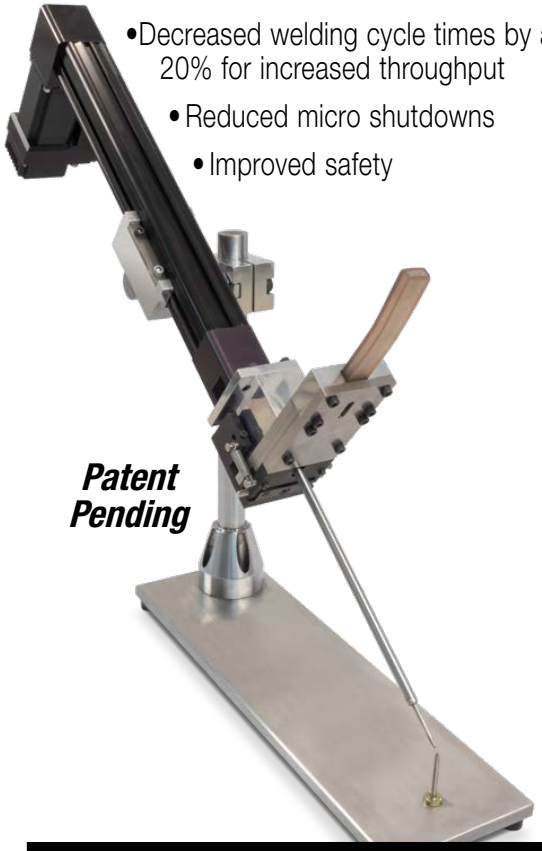


SERVOPLACE™ Precision Nut Placement Actuator

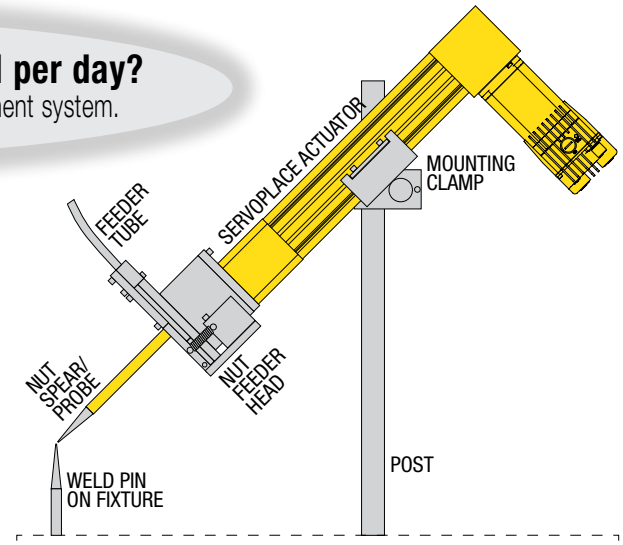
Precision fastener placement for projection and stud welding

Have you counted the number of nuts dropped per day?
They indicate the failure rate of your current pneumatic nut placement system.

- ServoPlace reduces missed nut placement to near zero, increasing productivity and component quality
- ROI within weeks
- Decreased welding cycle times by as much as 20% for increased throughput
- Reduced micro shutdowns
- Improved safety



Patent Pending



SERVOPLACE IN A TYPICAL NUT PLACEMENT SYSTEM

HOW IT WORKS

- High Speed Electric Rod-Style Actuator + ACSI Integrated Servo Motor/Drive/Controller
- Total package matched for optimal performance
- ServoPlace™ provides feedback to the weld cell controller to improve process control, minimize component wear and prevent damage
- No minimum or maximum install angle required. Accurate performance even when mounted vertically
- Adapts to your preferred nut placing head

Application Challenges with Pneumatic Cylinders	Advantages with ServoPlace™
Limited control and inconsistent air flow	Significant improvements in accuracy and repeatability with "smart" servo-electric motion control (accel, decel, velocity)
Time consuming setup and changeover with pneumatic flow controls	Simple setup and change-over with programmable electric system: pneumatic mode servo or through PLC via Ethernet plug and play
Dedicated units often required for various fastener sizes	Multiple size nuts can be placed by the same actuator with minimal programming
Inevitable leaks in pneumatic components reduce system performance and cause costly downtime	Longer life, consistent performance. Tested for millions of cycles with no maintenance required

ELECTRIC LINEAR ACTUATORS for Parts Positioning

Rodless or Rod Style Actuator Designs for Precision Placement of Workpieces

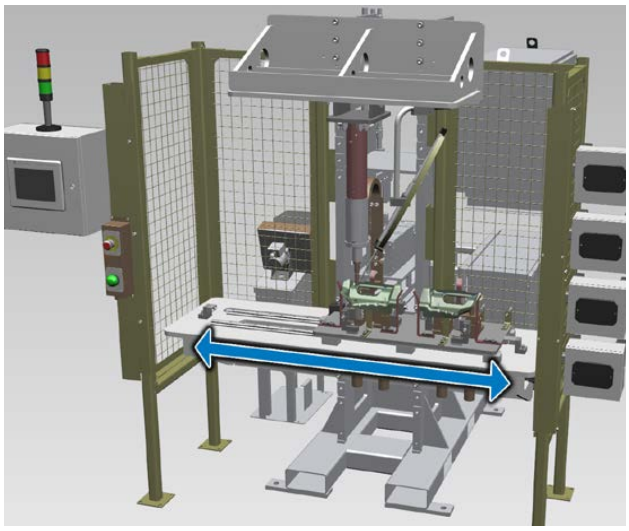


Figure 1: Projection weld actuator and ServoPlace actuator fixed and rodless linear actuators move parts into position.

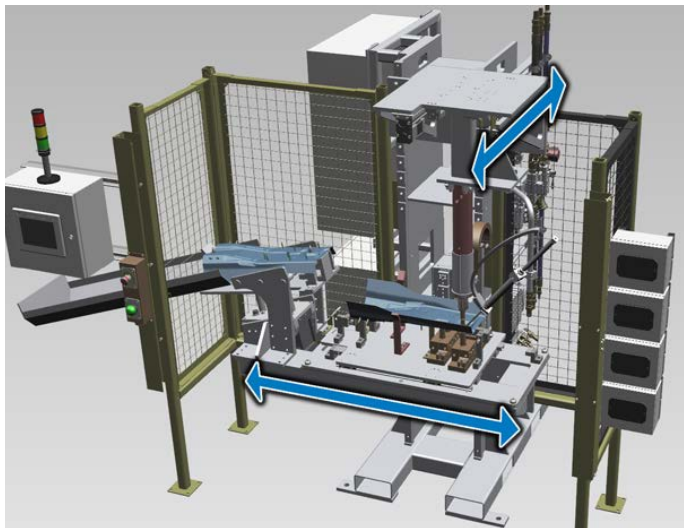


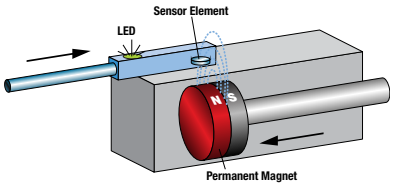
Figure 2: Part locked in fixed position and rodless linear actuators move Projection weld actuator and ServoPlace actuator into position.

X-Y POSITIONING OF WELD FIXTURE

Challenge	Solution	Benefits
• Poor position and speed control with pneumatic solution	• Tolomatic MX actuator to replace the pneumatic solution to provide the precision, repeatability and speed control needed to meet the application requirements	• Reduced maintenance and operating costs through higher quality product production (reduced scrap)
• Weld contamination		• Compatibility with various motor suppliers for easy start-up
• Poor technical support		

Advantages of using electric actuators for all axes including weld force and all fixture & parts positioning
Faster throughput with coordinated axes
Variations of air pressure have no effect
Instantaneous and continuous monitoring of position and force
Higher positional accuracy vs magnetic limit switches. (On or off within a margin as high as 1in [25mm])
24/7 reliability
Reduced maintenance

A Note About Limit Switches:
Hydraulic and pneumatic cylinders rely on magnetic switches to provide position information. The sensors get triggered on the stroke length above which there is enough magnetic intensity to trigger the sensor element. If magnet is strong, a longer section of the stroke will cause the sensor to trigger. It's not precise at all. If precision position feedback is required expensive linear sensors must be used.



Servo-motors integrate a very precise encoder or resolver. They provide tens of thousands of positions per screw turn. This translates in linear position information measured in microns.

Tolomatic™ ELECTRIC SOLUTIONS WITH PR

ROD STYLE SCREW DRIVE

ERD ECONOMICAL

SOLUTION FOR:
- Pneumatic cylinder replacement
- General automation

Models: ERD10, ERD15, ERD20

SPECIFICATIONS (UP TO):

MAX. STROKE	MAX. FORCE	MAX. SPEED
24 in	500 lbf	40 in/sec
609 mm	2.2 kN	1016 mm/sec

RSA INDUSTRIAL: ST/HT

SOLUTION FOR:
- Pneumatic & hydraulic replacement
- General automation

Models: ST: RSA12, RSA16, RSA24, RSA32, RSA50, RSA64;
HT: RSA24, RSA32, RSA50, RSA64;

SPECIFICATIONS (UP TO):

MAX. STROKE	MAX. FORCE	MAX. SPEED
60 in	13039 lbf	58 in/sec
1524 mm	58 kN	1473 mm/sec

RSX EXTREME FORCE

SOLUTION FOR:
- Hydraulic replacement
- Heavy duty applications

Models: RSX080, RSX096, RSX128

SPECIFICATIONS (UP TO):

MAX. STROKE	MAX. FORCE	MAX. SPEED
35 in	50000 lbf	29.9 in/sec
891 mm	222 kN	759 mm/sec

IMA COMPACT, INTEGRATED SERVO

SOLUTION FOR:
- Pneumatic & hydraulic replacement
- High performance applications

Models: IMA22, IMA33, IMA44, IMA55

SPECIFICATIONS (UP TO):

MAX. STROKE	MAX. FORCE	MAX. SPEED
18 in	6875 lbf	52.5 in/sec
457 mm	31 kN	1334 mm/sec

RODLESS BELT DRIVE ACTUATORS

MXB-N NO BEARING

SOLUTION FOR:
- Externally guided, supported loads

Models: MXB16N, MXB25N, MXB32N, MXB40N, MXB50N, MXB63N

SPECIFICATIONS (UP TO):

MAX. STROKE	MAX. FORCE	MAX. SPEED	MAX. LOAD
200 in	418 lbf	200 in/sec	NA
5080 mm	1.9 kN	5080 mm/sec	NA

MXB-S SOLID BEARING

SOLUTION FOR:
- Light to moderate loads & moments

Models: MXB16S, MXB25S, MXB32S, MXB40S, MXB50S, MXB63S

SPECIFICATIONS (UP TO):

MAX. STROKE	MAX. FORCE	MAX. SPEED	*MAX. LOAD
200 in	418 lbf	100 in/sec	520 lb
5080 mm	1.9 kN	2540 mm/sec	2313 N

*Auxiliary carrier option offers increased load and bending moment capacity

MXB-P PROFILED RAIL BEARING

SOLUTION FOR:
- Moderate to high loads and moments

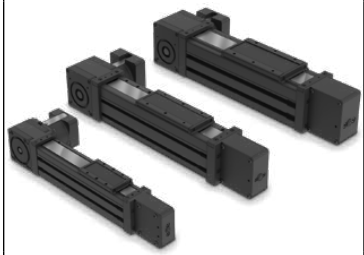
Models: MXB16P, MXB25P, MXB32P, MXB40P, MXB50P, MXB63P

SPECIFICATIONS (UP TO):

MAX. STROKE	MAX. FORCE	MAX. SPEED	*MAX. LOAD
200 in	418 lbf	150 in/sec	1292 lb
5080 mm	1.9 kN	3810 mm/sec	5745 N

*Auxiliary carrier option offers increased load and bending moment capacity

B3W INTERNAL V-WEDGE BEARING



SOLUTION FOR:
- Moderate to high loads and moments
- Stable, precision load guidance

Models: B3W10, B3W15, B3W20, B3W10D, B3W15D, B3W20D

SPECIFICATIONS (UP TO):

MAX. STROKE	MAX. FORCE	MAX. SPEED	*MAX. LOAD
207 in	325 lbf	200 in/sec	2008 lb
5258 mm	1.4 kN	5080 mm/sec	8932 N

*Dual 180° & auxiliary carrier options offer increased load and bending moment capacity

OVEN AUTOMOTIVE INDUSTRY PERFORMANCE

ACTUATORS

CSWX RESISTANCE SPOT WELDING

SOLUTION FOR:
- 7th axis robotic resistance spot welding
- Pedestal / projection welding

Models: CSW, CSWX

SPECIFICATIONS (UP TO):

MAX. STROKE	MAX. FORCE	MAX. SPEED
11.8 in	4047 lbf	27.5 in/sec
300 mm	18 kN	700 mm/sec

SWA/B RESISTANCE SPOT WELDING

SOLUTION FOR:
- 7th axis robotic resistance spot welding
- Pedestal / projection welding

Models: SWA, SWB, GSWA

SPECIFICATIONS (UP TO):

MAX. STROKE	MAX. FORCE	MAX. SPEED
18 in	5500 lbf	24 in/sec
457 mm	24.5 kN	610 mm/sec

GSWA RESISTANCE SPOT WELDING

SOLUTION FOR:
- 7th axis robotic resistance spot welding
- Pedestal / projection welding

Models: SWA, SWB, GSWA

SPECIFICATIONS (UP TO):

MAX. STROKE	MAX. FORCE	MAX. SPEED
18 in	5500 lbf	24 in/sec
457 mm	24.5 kN	610 mm/sec

ROLLER SCREWS

SOLUTION FOR:
- Merchant roller screws for installation in your actuators
- High performance applications

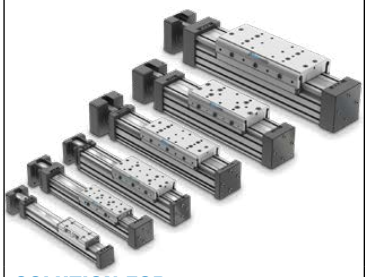
Models: 15.04, 15.05, 15.10, 20.04, 20.05, 20.10, 30.05, 30.10, 36.05, 36.10, 39.10, 48.12, 63.10

SPECIFICATIONS (UP TO):

MAX. STROKE	MAX. FORCE
40 in	50000 lbf
1036 mm	222 kN

RODLESS SCREW DRIVE ACTUATORS

MXE-S SOLID BEARING



SOLUTION FOR:
- Light to moderate loads & moments

Models: MXE16S, MXE25S, MXE32S, MXE40S, MXE50S, MXE63S

SPECIFICATIONS (UP TO):

MAX. STROKE	MAX. FORCE	MAX. SPEED	*MAX. LOAD
178 in	4300 lbf	60 in/sec	520 lb
4521 mm	19 kN	1524 mm/sec	2313 N

*Auxiliary carrier option offers increased load and bending moment capacity

MXE-P PROFILED RAIL BEARING

SOLUTION FOR:
- Moderate to high loads & moments

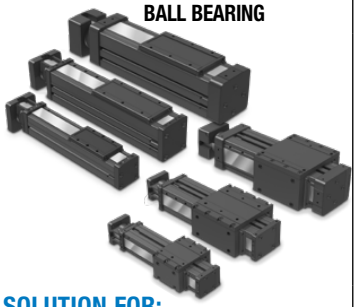
Models: MXE16P, MXE25P, MXE32P, MXE40P, MXE50P, MXE63P

SPECIFICATIONS (UP TO):

MAX. STROKE	MAX. FORCE	MAX. SPEED	*MAX. LOAD
178 in	4300 lbf	60 in/sec	1292 lb
4521 mm	19 kN	1524 mm/sec	5745 N

*Auxiliary carrier option offers increased load and bending moment capacity

B3S INTERNAL RE-CIRCULATING BALL BEARING



SOLUTION FOR:
- Moderate to high loads & moments
- Stable, precision load guidance

Models: B3S10, B3S15, B3S20, B3S10D, B3S15D, B3S20D

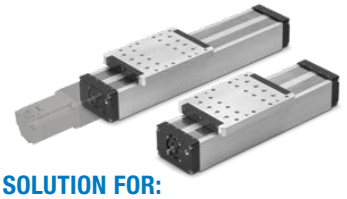
SPECIFICATIONS (UP TO):

MAX. STROKE	MAX. FORCE	MAX. SPEED	*MAX. LOAD
178 in	4300 lbf	60 in/sec	1292 lb
4521 mm	19 kN	1524 mm/sec	5745 N

*Dual 180° & auxiliary carrier options offer increased load and bending moment capacity

MODIFIED & CUSTOM

TRS TWIN PROFILE RAIL STAGE



SOLUTION FOR:
- High accuracy applications

Models: 100, 165

XYZ GANTRY SYSTEMS

SOLUTION FOR:
- High accuracy applications

The Tolomatic Difference Expect More From the Industry Leader:

INNOVATIVE PRODUCTS

Unique linear actuator solutions with Endurance Technology℠ 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.

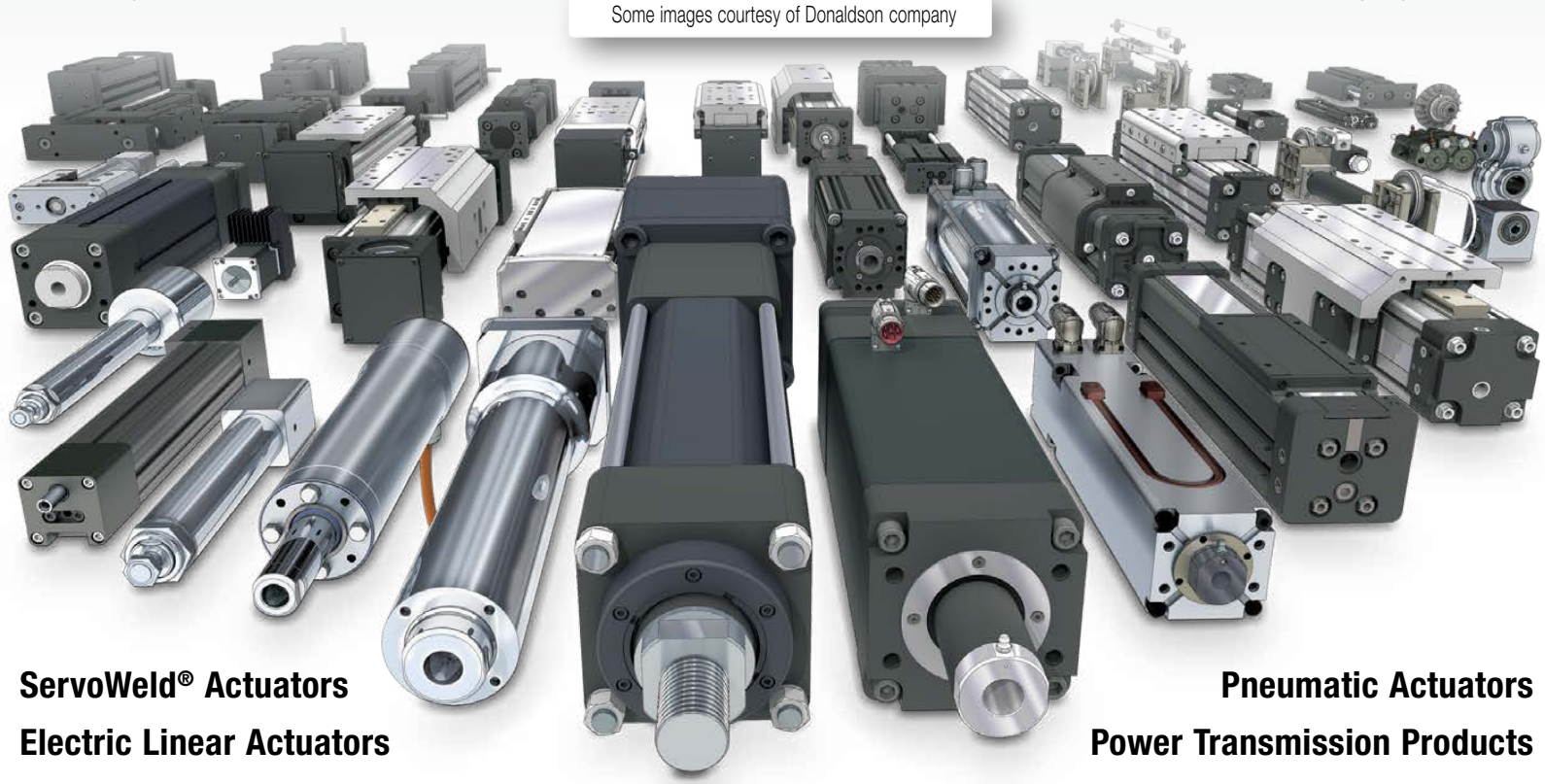
LIBRARY

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.

Some images courtesy of Donaldson company



ServoWeld® Actuators

Electric Linear Actuators

Pneumatic Actuators

Power Transmission Products

Tolomatic™

EXCELLENCE *IN MOTION*

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

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

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

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

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

Visit www.tolomatic.com for the most up-to-date technical information

202111010844

LITERATURE NUMBER: **9900-4076_00**