

Revolutionary
Electric Servo Actuators
for Process Control



EXLAR

Controlling Costs

Underperforming control valves and dampers will cost a typical process plant tens of thousands of dollars each year. The performance of these key devices is crucial to plant efficiency. Their direct impact on energy consumption, process downtime, recurring maintenance costs, and consistent product quality has significant influence on any facility's profitability.

Today, demands for accuracy and response in final element control have led many engineers to re-examine two fundamental issues. "Have there been any breakthrough designs in the electromechanical actuator field?" and "How do the benefits and costs of electric servo actuators compare to what might be gained by attempting further refinements to existing pneumatic or hydraulic actuation systems?" The challenge has been to find devices that deliver the benefits of electric servo actuation, yet maintain the robustness and moderate cost of traditional devices.

The Exlar electric servo actuator is a revolutionary design that meets this challenge, and promises valve manufacturers, OEM's and end users supreme performance, functionality and flexibility for all final control element applications.

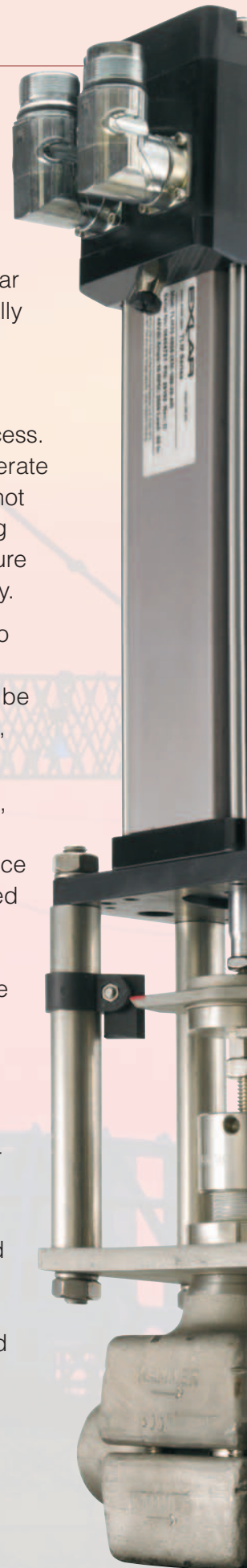
Conventional Electric Actuators vs Exlar

Traditional electric actuators use an electric motor and some form of gear reduction to move the valve. Typically for on-off control, some of these mechanical systems have been modified for use in full modulating control, with varying degrees of success. These electric actuators tend to operate relatively slowly, meaning they are not always suitable for rapidly changing process parameters such as pressure control on loads that change quickly.

Cost also has been an issue. Due to their multiple moving parts, conventional electric actuators can be prohibitively expensive to purchase, install and maintain.

Finally, in linear motion applications, traditional ball and acme screw electric actuators have severe service life limitations - especially when used for modulating control. Their basic design inherently limits their linear travel rates, making them unsuitable for many valve applications. And in higher load applications, their size becomes a handicap.

Exlar actuators incorporate a high performance brushless servo motor with a novel mechanism for converting the motor's rotary power and speed to a highly accurate and reliable linear or rotary motion. An high performance closed loop controller yields both the speed and





precise control unachievable by other electric actuators. These electric servo actuators were designed for use on full modulating valves and dampers.

Exlar Replacements for Pneumatic or Hydraulic Actuators

Pneumatic actuators rely on compressed gases for the force necessary to move a valve. This constant need for air makes pneumatic systems costly to operate. The separate sensors, positioners or controllers needed to get required accuracies add additional layers of installation and maintenance costs. Hydraulic actuators also consume exorbitant amounts of energy. They

subject personnel to high noise levels, can sometimes be a fire concern, and always are susceptible to hazardous leaks. Repair downtime can be very costly.

Compare all this to what's possible with Exlar actuators. Essential features such as low energy costs, integrated digital positioning, fast and accurate response, high thrust capability, and low maintenance costs combine to create valve and damper actuating solutions that are impossible to achieve with hydraulics or pneumatics. And with form factors similar to hydraulic cylinders, drop-in replacements often are possible.

Exlar Actuator Advantages

Actuator Technology	Stiffness & Position	Throttling Ability	Maintenance Cost	Initial Cost	Response to a Change in Command
Exlar Electric	Very High	High	Low	Moderate	Very Fast
Pneumatic	Low	Low	Moderate to High	Low to Moderate w/accessories	Slow
Hydraulic	High	High	High	High	Fast
Intermittent Electric	Very High	High	Moderate	High	Slow

Ultimate Electric Actuator Design

Exlar actuators have been used in the most strenuous military and industrial applications for years, but have been prohibitively expensive for process applications until now.

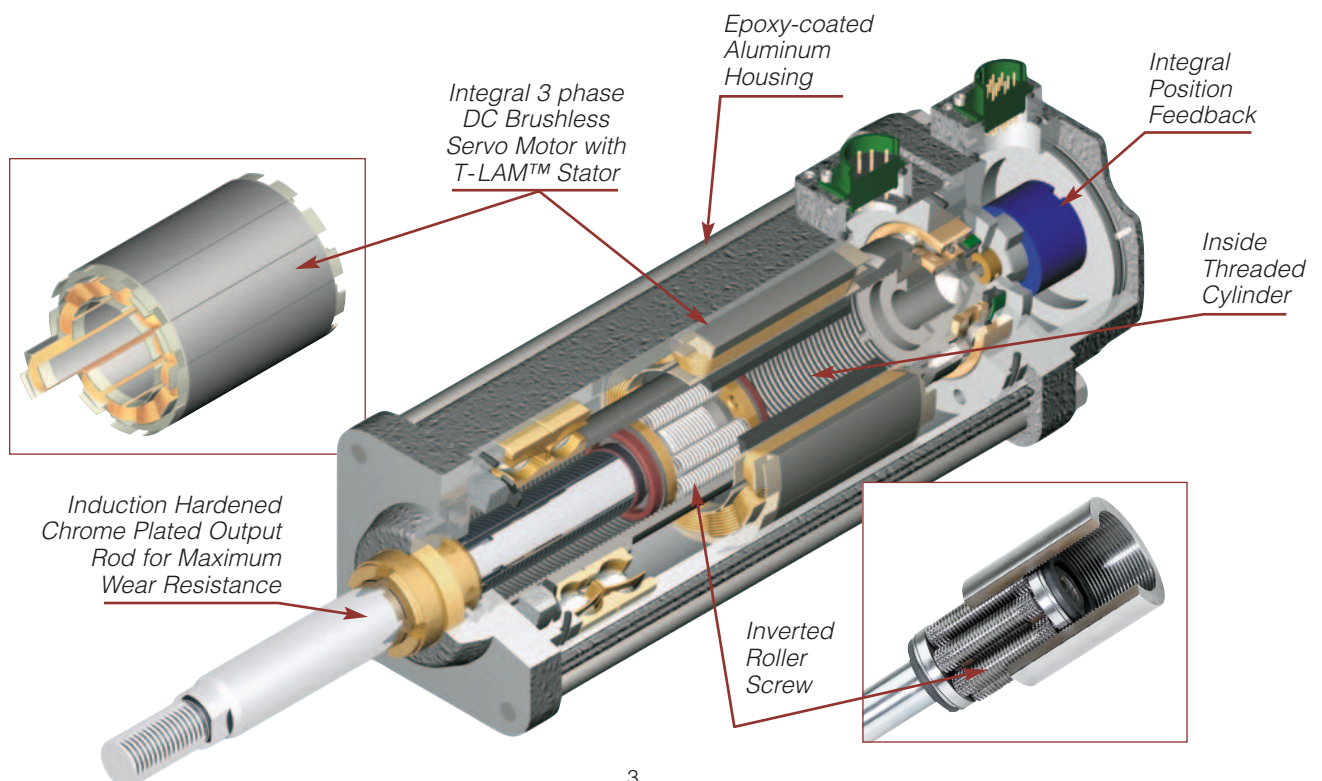
Our patented linear actuator is based on a unique design for integrating a robust and efficient threaded roller mechanism into the interior of a high power density, high performance brushless servo motor. Combined with a precise position feedback mechanism, the result is an all-electric actuator which is extremely compact, yet delivers superior performance for your final control element needs.

One of our unique differences from other electric actuators is in the roller screw's design for transmitting forces. Multiple threaded helical rollers are assembled in a planetary arrangement around a threaded shaft which converts the motor's rotary motion into linear movement of the shaft. The large number of mechanical interfaces combined with their

shape create a high contact surface area that allows high load carrying capabilities and high stiffness. This revolutionary design eliminates any concerns of thread wear in modulating valve applications.

Our other unique difference is Exlar's high performance brushless servo motor, which yields both speed and control unachievable by conventional motors. These highly efficient servo motors use a T-Lam segmented lamination stator technology that delivers high continuous torque in a very small package.

With the ability to carry heavy loads for thousands of hours in the most arduous conditions, Exlar actuators are the ideal choice for demanding, continuous modulation of final control elements.



Product Range

No matter what type of final control element, Exlar has an actuator that will provide the dynamic performance and long life required for good process control.



Tritex™ Series Linear Actuator

- Integrated servo motor, amplifier & controller
- 2 and 3 inch frame size
- 3 to 18 inch strokes available
- Up to 1250 lb thrust capacity



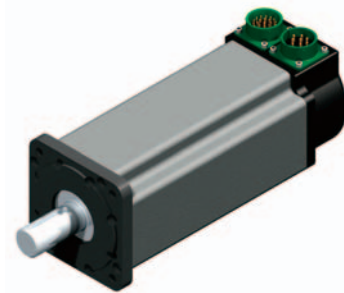
Tritex™ Series Rotary Actuator

- Integrated servo motor, controller and planetary gear reducer
- 60 and 90 mm frame size
- Up to 2078 lbf-in continuous torque



GS Series Linear Actuator

- For high torque and speed needs
- 2, 3, 4, 5 and 7 inch frame size
- 3 to 18 inch strokes
- Up to 12,000 lb max thrust capacity
- Optional explosion proof (EL Series)

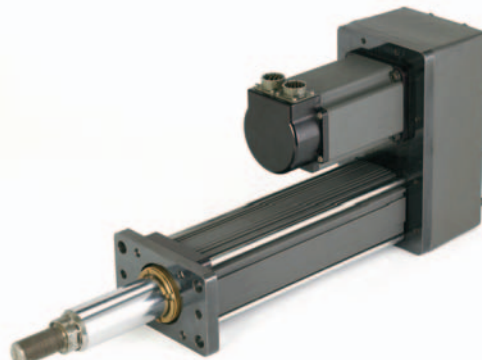


SLG Series Rotary Actuator

- Integrated brushless motor and planetary gear reducer
- 60, 90 and 115 mm frame size
- Up to 4696 lbf-in continuous torque
- Optional explosion proof (ER Series)

SV Series Positioner

- Digital positioning
- For GS, FT and SLG actuators
- Resolution up to 40,960 increments per inch of stroke



FT Series Linear Actuator

- For damper and gate control
- Utilize any NEMA or metric motor
- Up to 8 (2.4 m) foot stroke
- Capability to 40,000 lbs (177k N)

Tritex Linear Actuators

Our premier process control solution, the Tritex™ Series linear actuators, integrate a motor, actuator and digital positioner into one complete compact package. Rugged and reliable, the Tritex is a high speed high accuracy actuator that is suited for a wide range of demanding process control applications.

Fully programmable to follow an analog signal representing either position or force, the Tritex series is perfectly designed for sliding stem valve applications with thrust needs up to 1250 lbs. Highly accurate position feedback allows the Tritex to achieve combined repeatability and hysteresis as low as 0.25%.

The Tritex Series linear actuators offer extreme mechanical stiffness, making the actuator's position output resistant to non-linear or changing load conditions such as negative gradients. Exlar's Tritex is a superior solution for all of your critical valve control applications.

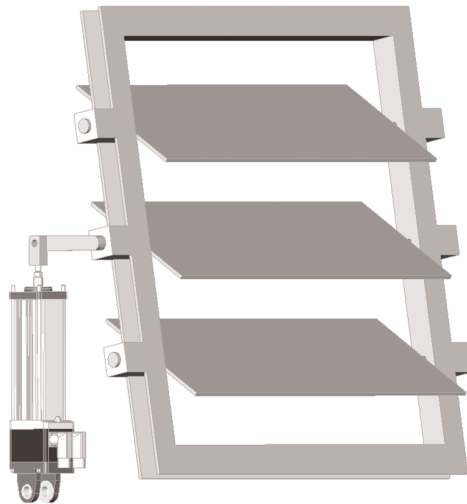


Product Features

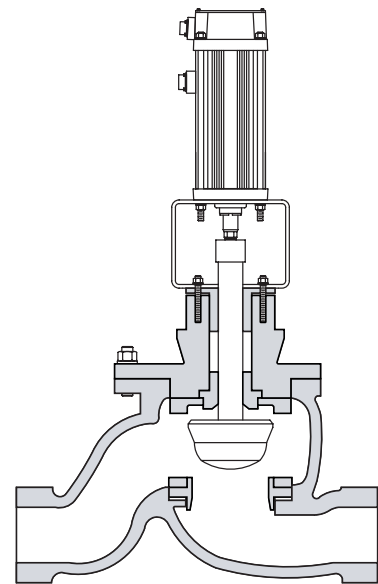
- 24 to 48 VDC Power
- 1250 lbf thrust capacity
- Stroke speed of 60 mSec (2 inch travel)
- IP54 sealing standard
- Fully programmable

Optional Features

- Handwheel
- Clevis mount
- Custom valve mount
- UPS Fail-safe
- Mechanical Spring Return
- Bellows
- Stainless Steel Housing
- High Temperature
- IP65 sealing



Tritex linear actuators are well suited for dampers and sliding stem valves.



Size	Frame Size in (mm)	Stroke in (mm) in (mm)	Max. Output Force lbf (N)	Max Speed in/sec (mm/sec)
TLM 20	2.25 (57)	3 to 18 (51 to 457)	578 (2,571)	22 (.8k)
TLM 30	3.125 (79)	3 to 18 (51 to 457)	1,250 (5,992)	16 (.6k)

Tritex Rotary Actuators

The Tritex™ Series rotary actuators are ideal for operating quarter-turn, full-turn or multi-turn valves or shaft driven dampers. Its unique design integrates a high power density, electrically operated brushless motor with a feedback mechanism, planetary gear reducer and controller into one compact package. Tritex can be set up to follow an analog signal representing torque, velocity, or position.

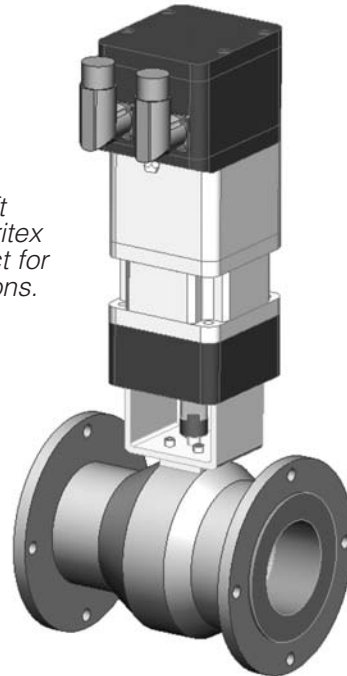
In shaft driven applications, Exlar's Tritex rotary actuators are directly coupled shaft-to-shaft. This eliminates the ungainly mechanisms usually necessary to convert the linear motion of pneumatic and hydraulic cylinders to rotational motion. Gear ratios of 4:1 to 100:1 allow the power of Tritex to be applied to a broad range of applications.

Product Features

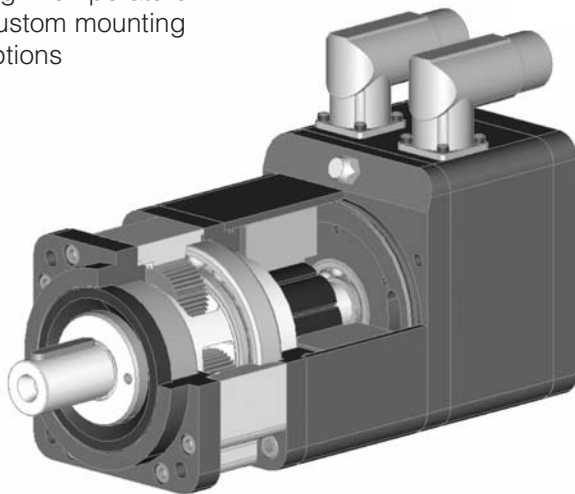
- Integrated brushless motor, planetary gearing and controller
- Integrated planetary gearing 4:1 to 100:1 ratios
- Up to 1700 rpm base speed
- Up to 2078 lbf-in output torque
- 24 to 48 VDC power
- Multiple standard and custom mounts available
- IP65 sealing standard

Optional Features

- Handwheel
- Stainless Steel Housing
- Explosion Proof Housing
- High Temperature
- Custom mounting options



Direct shaft-to-shaft couplings make the Tritex rotary actuators perfect for rotary valve applications.



Size	Frame Size in (mm)	Max Output Torque lbf-in (Nm)	Max Speed (RPM)
TRM060	2.36 (60)	603 (68.1)	3000
TRM090	3.54 (90)	2078 (234.8)	1700

GS Series Linear Actuators

For applications that need higher forces or faster stroke times than available with the Tritex actuator, the GS Series of actuators combined with the external SV Series Positioner is the perfect solution.

Product Features

- Stroke times to 40 in/sec (1018 mm/sec)
- Force rating range to 12,000 pounds/force (55,000 N)
- Stroke length range 3 -18 inches (75 - 450 mm)
- Typical life exceeding hundreds of millions of full-stroke operations
- End-to-end motion of 200 mSec on a 2 inch (50 mm) stroke valve

Options

- Handwheel
- UPS Fail-safe
- Mechanical Spring Return
- Explosion proof housing
- Stainless Steel Housing



Exlar Model	Nominal Frame Size	Max. Stroke in (mm)	Max. Output Force lbf (N)	Max Speed in/sec (mm/sec)
GS 20	2 (50)	12 (300)	578 (2,571)	33 (846.67)
GS 30	3 (75)	18 (450)	1,347 (5,992)	25 (635)
GS 40	4 (100)	18 (450)	3,966 (17,642)	25 (635)
GS 50	5 (130)	14 (450)	8544 (38,006)	40 (1016)
GS 60	7 (180)	10 (250)	15,457 (68,756)	40 (1016)

SLG Series Rotary Actuators

For applications that need higher torque than available with the Tritex actuator, the SLG Series of actuators combined with the external SV Series Positioner is the perfect solution.

Product Features

- Integrated brushless motor and planetary gear reducer
- Higher stiffness than bolt-on gearhead and motor
- 60,90 and 115 mm frame size
- Up to 4696 lbf-in output torque
- 4:1, 5:1, 10:1, 16:1, 20:1, 25:1, 40:1, 50:1 and 100:1 reduction ratios
- IP65 sealing

Options

- Handwheel
- UPS Fail-safe
- Stainless Steel Housing



Exlar Model	Nominal Frame Size	Max Output Torque lb-in (Nm)	Max Speed (RPM)
SLG60	60mm	603 (68.1)	5000
SLG90	90mm	2078 (234.8)	4000
SLG115	115mm	4696 (530.4)	3000

EL Series Explosion Proof Linear Actuator

EL Series linear actuators offer users all of the advantages of Exlar's patented inverted roller actuator GS design in a Class I div 1, Groups B,C or D package.

Product Features

- Explosion Proof Class 1 div 1 Groups B,C and D
- Stroke length range 3 - 6 inches
- Resolver Feedback
- 24VDC to 460VAC

Options

- UPS Fail-safe
- Mechanical Spring Return
- Custom Valve Mounts



Exlar Model	Nominal Frame Size	Max. Stroke in (mm)	Max. Output Force lbf (N)	Max Speed in/sec (mm/sec)
EL 30	3 (75)	6 (150.0)	885 (3,9362)	25 (635.0)

ER Series Explosion-Proof Motors and Planetary Gearmotors

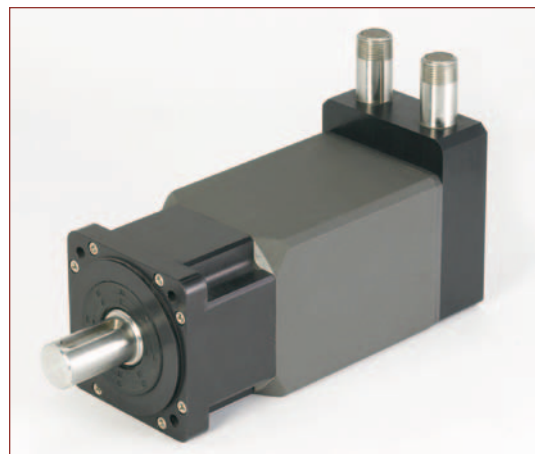
For hazardous duty environments, Exlar's ER series servo motor rotary actuators provide an excellent solution. The gearmotor comprises a brushless permanent magnet motor optimized for use with an integral planetary gear set. Through the uniform load sharing of several gears acting in concert, planetary gearheads provide a very compact, reliable solution providing high torque, low backlash and low maintenance for your rotary valve needs.

Product Features

- Integrated brushless motor and planetary gear reducer
- Higher stiffness than bolt-on gearhead and motor
- Explosion Proof Class 1 div 1 Groups B,C and D
- ATEX Zone 2 Category 3
- 115 mm frame size
- Up to 4696 lbf-in output torque
- 4:1, 5:1, 10:1, 16:1, 20:1, 25:1, 40:1, 50:1 and 100:1 reduction ratios
- 24VDC to 460VAC

Options

- UPS Fail-safe
- High Temperature
- Custom Valve Mount



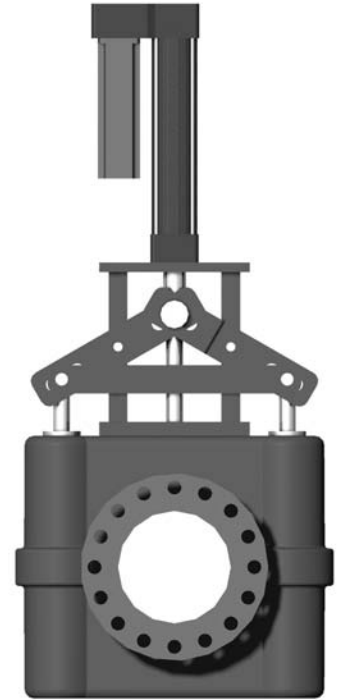
Exlar Model	Nominal Frame Size	Max Output Torque lb-in (Nm)	Max Speed (RPM)
ER115	115mm	4696 (530.4)	3000

FT Series Linear Actuators

The FT Series actuators are suited to operate very large valves, dampers and gates which require longer strokes and higher thrusts than available with the Tritex or GS Series actuators. The FT Series product offering consists of a roller screw thrust unit and a conventional NEMA or metric frame motor sized to deliver the force and speed needed to accomplish the application.

Product Features

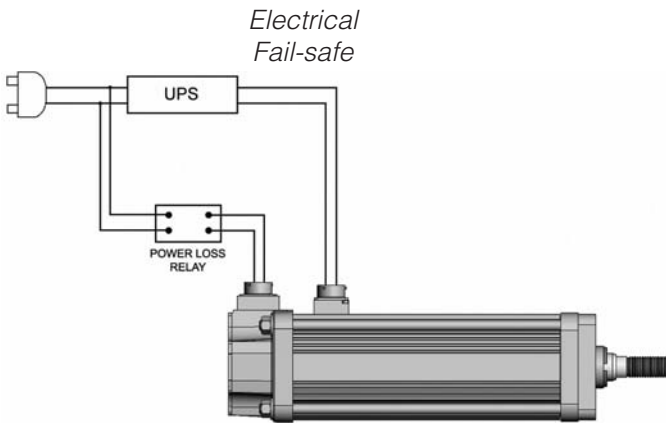
- Stroke lengths from 6 inches to 8 feet (150 mm to 2.5 m)
- Force rating up to 20,000 lbs (88,964 N) continuous, 40,000 lbs (177,929 N) peak
- Speed range up to 60 in/sec (1,524 mm/sec)
- Multiple motor mounting options
- Planetary roller screw drive
- Long life and high load capacity
- Shock resistance
- IP65 ratings optional



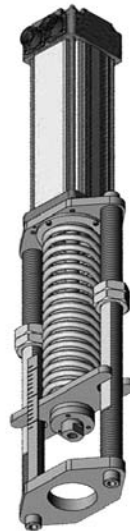
Pinch Valve

Exlar Model	Frame Size in (mm)	Gear Motor	Max Stroke in (mm)	Max. output Force lbf (N)	Max Speed in/sec (mm/sec)
FT35	3.5 (89)	SLG60	48 (1,219)	2000 (8,896)	60 (1,524)
FT60	6.0 (152)	SLG90	96 (2,438)	10,000 (44,482)	39 (991)
FT80	8.0 (203)	SLG115	96 (2,438)	20,000 (88,964)	35 (889)

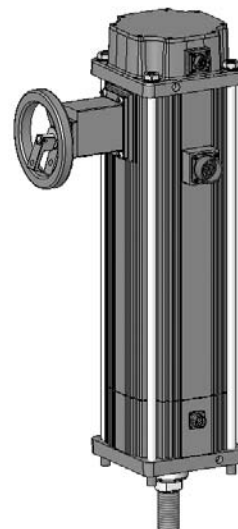
Actuator Accessories and Options



Mechanical Fail-safe



Manual Override



Front and Rear Clevis



Additional Options

- Bellows Rod Cover
- Rod Scrapers/Seals
- Adjustable Position Switches
- Absolute Feedback
- Adjustable Stroke Limiter



Exlar Corporation - Headquartered in suburban Minneapolis, Minnesota, serves a global customer base with an extensive standard product line and complete engineering support for custom actuator applications.

Exlar supports a large network of sales representatives in North America. To find your local dealer, visit our website at www.exlar.com or call our headquarters at 952-368-3434.

For assistance outside North America, please contact Exlar direct or one of our worldwide partners listed below.

The Exlar Worldwide Partner Network

North America

Exlar Corporation
952-368-3434
www.exlar.com

Australia/New Zealand

Applied Automation, Ltd.
61 7 3274 3411
appliedautomation@appliedautomation.com.au

Austria

KML Technologie
43 1 6415030 0
www.kml.at

Belgium

ATB Automation nv/sa.
32 2 334 99 99
www.atb-automation.be

Columbia

Control de Movimiento Ltda
623-1213 / 623-1224
ventas@controldemovimiento.com

Denmark

Delta Elektronik A/S
45 4371 8088
info@deltalelektronik.dk

Eastern Europe

TG Drives s.r.o.
420 545 234 935
chamrad@tgdrives.cz

France

Sobetra
33 1643 50050
sobetra2@wanadoo.fr

Germany

Exlar Europe GmbH
49 6103 8075288
Heinbach@exlar.de

Holland

Mijnsbergen B.V.
31 297 28 58 21
www.mijnsbergen.nl

India

Servo Controls
91-831-2481734
deepak@servocontrolsindia.com

Ireland

Pro2development, Ltd.
353 65 683 9369
fmcnullin@pro2dev.com

Italy

Servotechnica, srl
39 0362 492 1
www.servotecnica.it

Luxembourg

ATB Automation
32 2 334 9999
www.atb-automation.be

Sweden

Aratron AB
46 8 40 41 600
www.aratron.se

Switzerland

Servotronic SA
41 22 794 93 26
www.servotronic.ch

United Kingdom

Intelligent Motion Control, Ltd
44 1327 307600
www.inmoco.com

Venezuela

Digimex Sistemas C.A.
58 243 5511634
digimex@telcel.net.ve

EXLAR

Exlar Corporation
1470 Lake Drive West
Chanassen, MN 55317

PH: 952-368-3434
FAX: 952-368-4877

www.exlar.com