

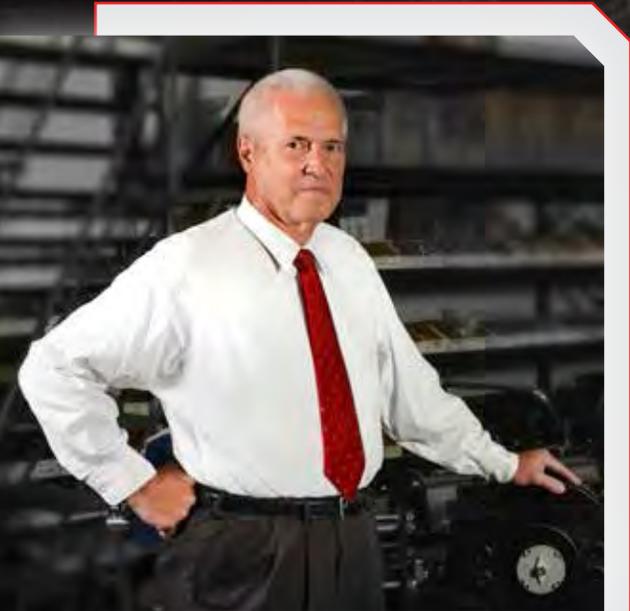
# Pneumatic Actuators

Crafted without compromise, to make your life easier



**The Leader in Actuator Technology**

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Early in his career, the founder of QTRCO, Ed Holtgraver, was responsible for field service of a large valve company. He saw customers lose production due to products that would have worked better if attention to detail had been applied during the design phase.

When founding QTRCO, Ed's intent was to design and build actuators that simply did not encounter field service issues. From a very rugged mechanical design to the elimination of normal failure modes—sliding parts, side load forces and numerous seals—QTRCO actuators have evolved into exactly what Ed had in mind back in 1996.

Our actuators consistently demonstrate the ability to take on the most extreme applications and last for incredibly long periods of time. QTRCO customers report years of service with **no failures** and maintaining operations with no loss in production time.



**CRAFTED WITHOUT COMPROMISE,  
TO MAKE YOUR LIFE EASIER**



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# Built to Last

Due to our belief that actuators should not fail - all QTRCO actuators feature robust designs and premium materials



MATERIALS OF CONSTRUCTION		
	F Series - Flat Yoke™	Q Series - Rack & Gear™
Mechanism	CF8 Stainless Steel or Ductile Iron	CF8 Stainless Steel
Housing	CF8 Stainless Steel or Ductile Iron	CF8M Stainless Steel or Ductile Iron
Cylinders	304 Stainless Steel Optional: Amalga Composite or Aluminum	316 Stainless Steel Optional: Amalga Composite or Aluminum
Pistons	CF8 Stainless Steel or Ductile Iron	CF8M Stainless Steel
Springs	Powder Coated Chrome-Silicon Steel, Optional: Stainless Steel	
Seals	BUNA Optional: Viton, Silicon	

Throughout our history, user's need for replacement parts has been practically non-existent. The unique simplicity and reduced friction of our designs see to this, and our warranty is a testament to the commitment we have to our customers.

## WARRANTY:

QTRCO will during the period of 3 years from the date of original invoice, repair or replace (at QTRCO's sole option) any QTRCO actuator that fails in service regardless of the number of cycles, provided always that the actuator was installed correctly, properly maintained/serviced and applied as per the original user application specifications. The actuator must be returned to QTRCO within the 3 year warranty period at the sender's cost. The warranty does not apply to any freight or other charges.

FS250SR



QD03SR & QS03SR

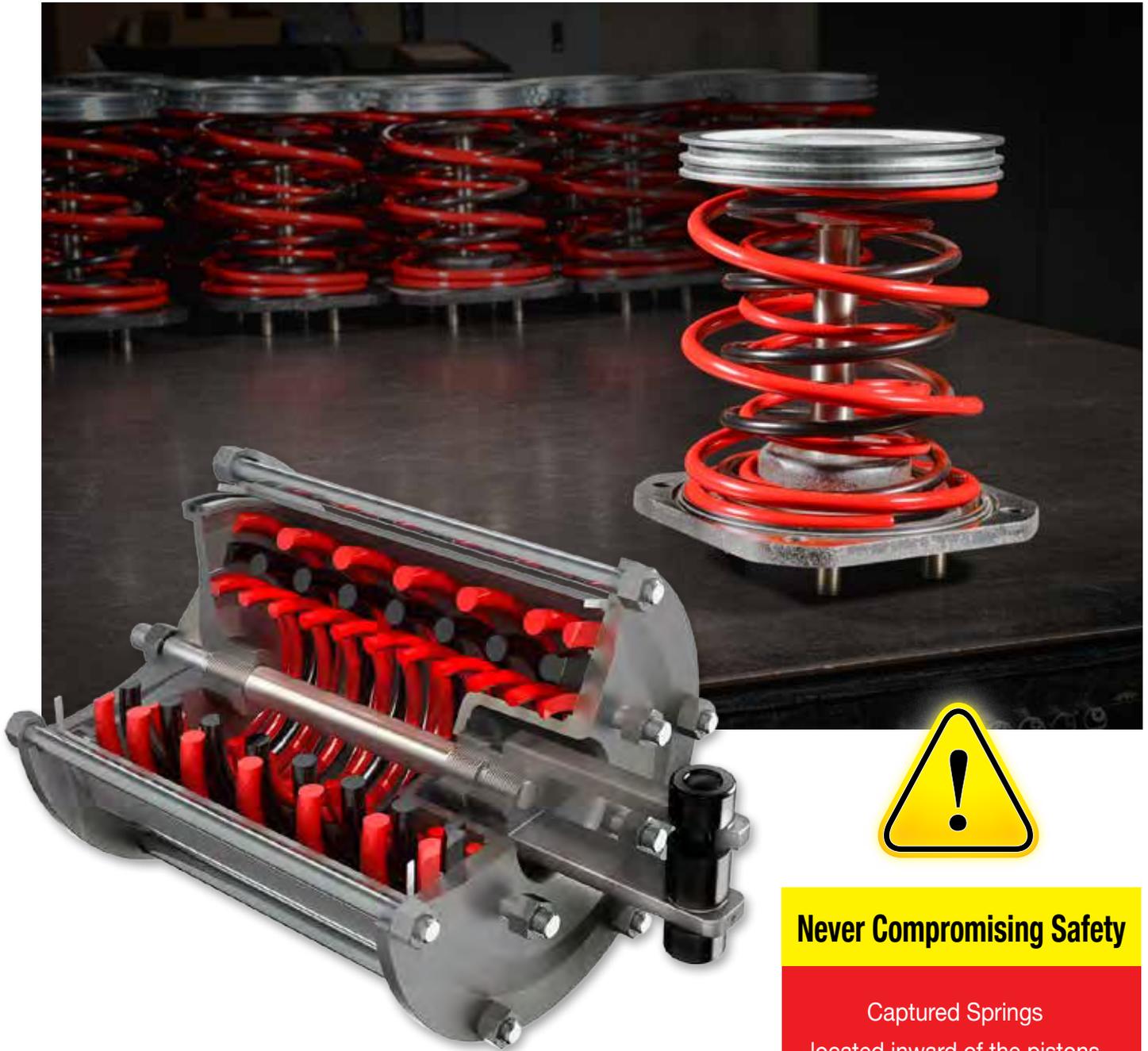


QD05SR & QS05SR



QD14SR & QS14SR





We feel strongly that our actuators shouldn't cause injury to anyone. Thus, we have made safety an integral part of our actuator design, specifically the springs, which can cause serious harm to personnel or damage other equipment if not captured. All QTRCO springs are captured and contained within the force module even if the end cap and cylinder are removed.

### Never Compromising Safety

Captured Springs located inward of the pistons safely provide access for on-the-valve replacement of contaminant damaged piston seals.

## Ease of Maintenance

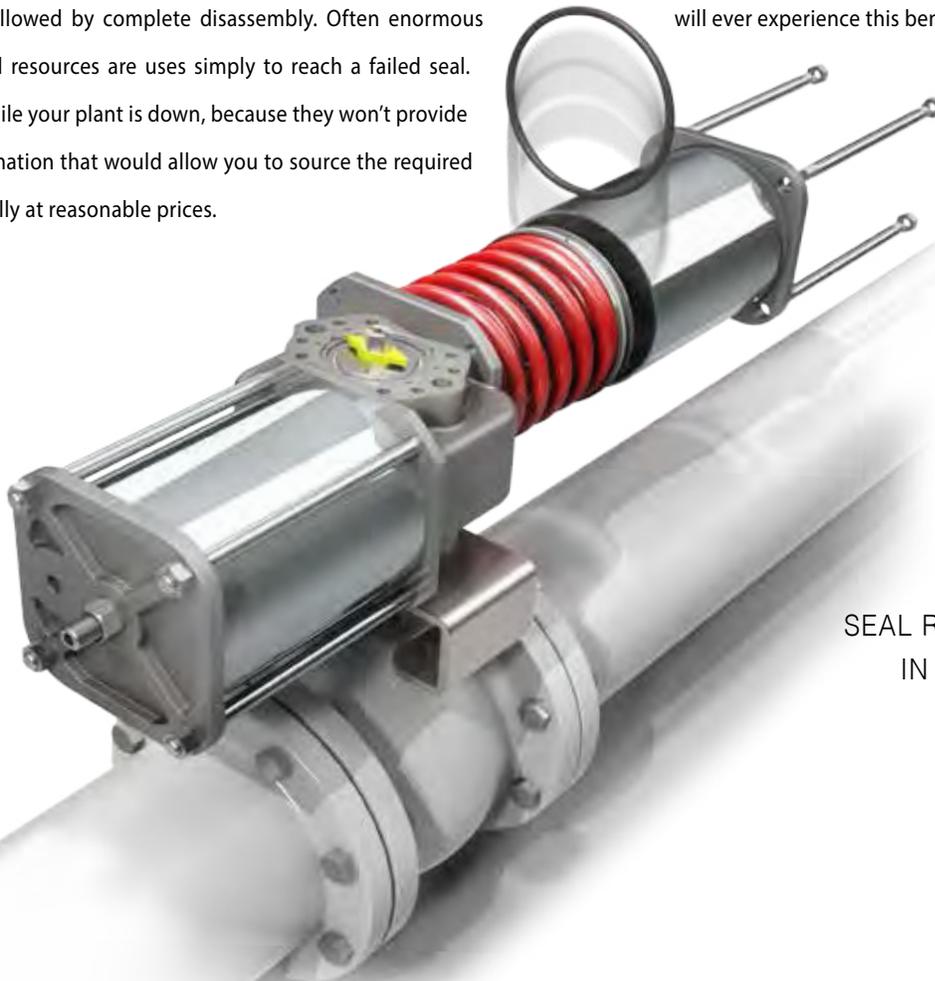
Our business model is to provide outstanding actuators, not to profit from your problems and our product failures.

Ease of maintenance is difficult to discuss because it infers that you may actually need to maintain a QTRCO actuator, which is unlikely. However, you do maintain our competitors' actuators, either by replacement or repair. We have witnessed users with many actuators having a near assembly line operation set up just for actuator repair. If you never need to repair the actuator, you save labor, equipment and most of all downtime.

When repairing most actuators, you need to purchase proprietary seals from the original supplier at an outrageous price and wait for delivery, then begin by removing the actuator from the valve using a team of specially trained technicians, perhaps using rented cranes, followed by complete disassembly. Often enormous effort and resources are used simply to reach a failed seal. All the while your plant is down, because they won't provide the information that would allow you to source the required parts locally at reasonable prices.

By contrast, seal and cylinder damage with any QTRCO actuator can be resolved while the actuator remains on the valve. After removing the air supply lines, the end cap and cylinder are readily removed from the actuator and the non-proprietary piston seal is then easily replaced. The stainless steel cylinder resists scratching but if it is damaged, it too is independently replaceable. In fact, with our spring return actuators, the cylinder can just be turned end for end and reinstalled as the cylinder length provides for an entirely new sealing surface.

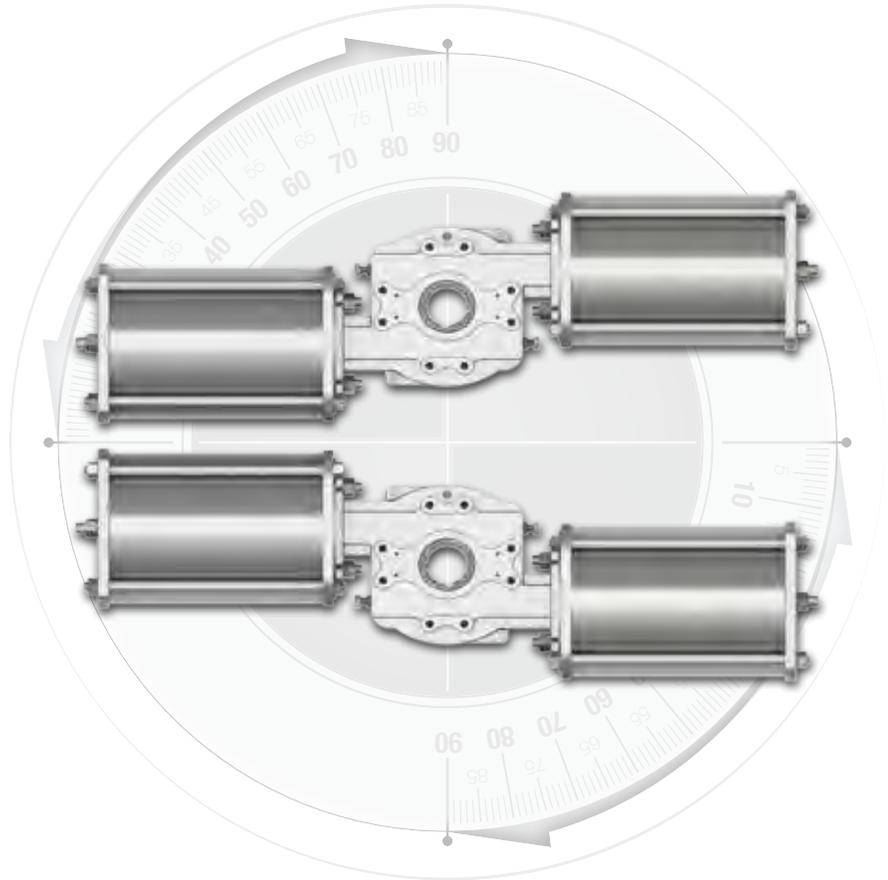
Of course we make spare seal kits available, but we are just as happy to provide you with the seal identification to enable you to source it locally. But, the best thing is that seal failure is so rare it is unlikely you will ever experience this benefit.



**IF NECESSARY...**  
SEAL REPLACEMENT IS DONE  
IN PLACE, ON-THE-VALVE

## ACTION REVERSAL: SIMPLY TURN THE ACTUATOR OVER!

Both sides of the Q Series and F Series actuators are identical in all aspects. Unlike other actuators that require disassembly for action reversal, QTRCO actuators require only that you turn them top side down. Q-Series actuators have a female double-square drive and the F-Series have two key ways located 90-degrees apart to readily accommodate action reversal.



## SPRING RETURN

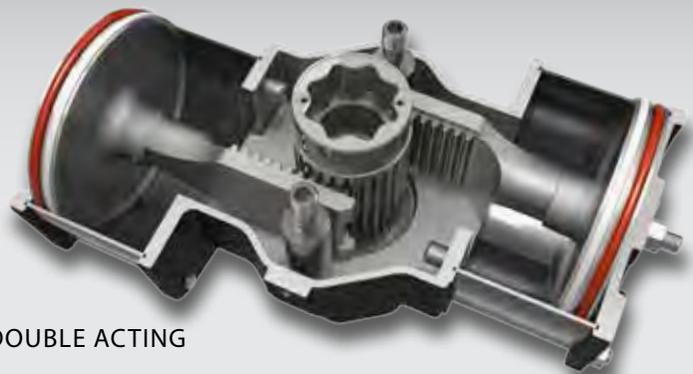
Pressure to the end cap ports pushes the pistons inward causing the desired rotation, when pressure is removed the springs push outward on the pistons and cause rotation to the fail position.



**FS250** SPRING RETURN  
SHOWN IN FAIL CLOCK WISE

## DOUBLE ACTING

Pressure on the end cap ports pushes the pistons inward and cause the desired rotation, pressure on the base plate ports (F series) or the body (Q series) push outward on the pistons and cause opposite rotation.



**QD10** DOUBLE ACTING



## Q SERIES - RACK & GEAR™

### DOUBLE ACTING

Torques to 21,000 in-lb (2,373 Nm)

Pressure to 150 psig (10.3 bar)

### SPRING RETURN (SINGLE ACTING)

Torques to 7,500 in-lb (847.5 Nm)

Pressures to 150 psig (10.3 bar)

Temperatures from -60°F to +400°F (-51°C to +204°C)

90° Rotation (±5° at each end of travel)



### Patented Rack & Gear™ Mechanism

Offset cylinders align the piston axis with the pinion gear pitch circle diameter, eliminating the cantilever forces inherent in rack and pinion type actuators. Low friction rollers maintain correct engagement of the stainless steel gearing for absolutely exceptional cycle life.

The reduced friction enables outstanding throttling control as demonstrated in numerous 'typical diaphragm actuator' applications where corrosion or high vibration dictated a better solution.

### Bi-Directional Travel Stops

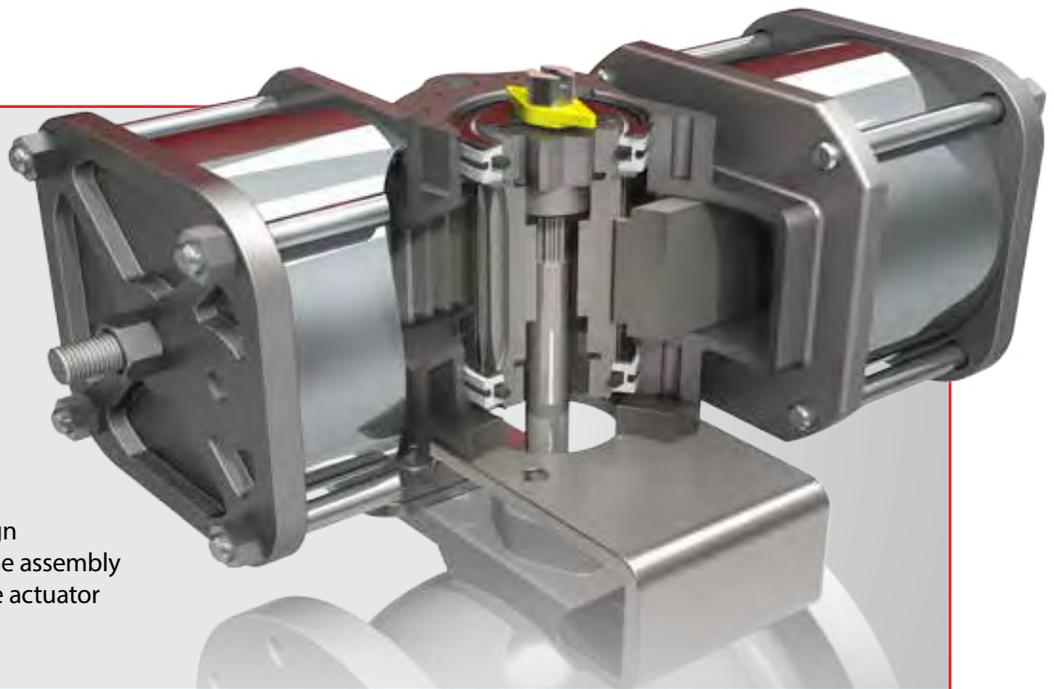
QS actuators feature bi-directional travel stops which allow a minimum of 5 degrees of over travel in each direction. The stops act on the piston motion and impart no side loading on the shaft.

### Non-Pressurized Shaft Seals Cannot Fail

QS series spring return actuators apply no pressure to the shaft seals, eliminating a common cause of rack & pinion actuator failure.

### Pressure Balanced Shafts

While QS Series Double Acting actuators pressurize the shaft seals on the return stroke, we use a pressure balanced shaft design that is not subject to the high "pistonning" forces seen in typical rack & pinion actuators. Unbalanced shafts lead to higher friction, torque loss, and early failure.



### An excellent substitute for diaphragm actuators

- Vibration & Corrosion Proof
- Proven Throttling Capabilities
- Compact Size
- Zero Side Loading of Valve Stem
- Low Fill Volume

Our revolutionary "Close Mount" design reduces the size, weight and cost of the assembly by passing the valve stem through the actuator shaft with no valve modifications.



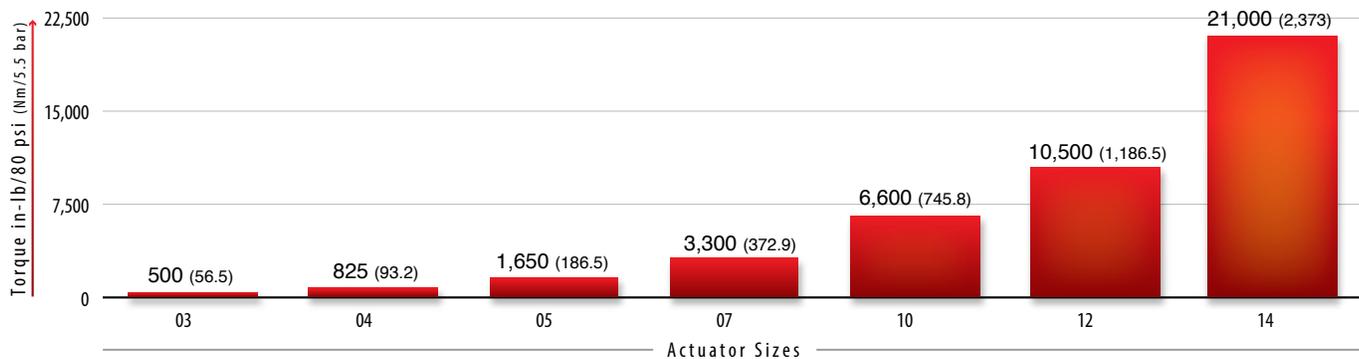
**Anywhere you need a better actuator**

- High Cycle
- High Speed
- High Temperature
- High Vibration
- Throttling
- Corrosive Environments

**ISO 5211 DOUBLE SQUARE DRIVE & ADAPTERS TO FIT ALL VALVE TYPES**

Identical Mounting patterns and shaft drive exist on both sides. NAMUR accessories may be moved to opposite side.

**Q Series – RACK & GEAR™**





## **F SERIES - FLAT YOKE™**

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### **DOUBLE ACTING & SPRING RETURN (SINGLE ACTING)**

Torques to 500,000 in-lb (56,500 Nm)

Pressure to suit size

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Temperatures from -60°F to +400°F (-51°C to +204°C)

90° Rotation ( $\pm 5^\circ$  at each end of travel)

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#### **Patented Flat Yoke™ Mechanism With Quad Body Slots**

A unique slotted body concept absorbs 100% of the yoke mechanism's side loading forces leaving the piston rod completely free of bending stresses while allowing termination of the rod at the yoke, and the addition of a weight and force balancing second force module diagonally offset from the first. The balanced weight makes lifting and handling of the actuators safer and easier, while reducing valve neck stress caused by unbalanced scotch yoke actuators. Internally, the balanced forces assure less friction loss and less wear as there is no net force applied to the shaft bushings.

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#### **Higher Torques**

By incorporating the patented Flat Yoke™ mechanism, higher torque outputs are offered in a weight and force balanced design.

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#### **Inherently Canted Yoke**

The longer yoke arms of the Flat Yoke design allow the advantageous canted yoke torque curve simply by choosing a different travel stop setting. This provides substantially more spring end torque without having to purchase a special actuator. As standard, Flat Yoke actuator travel stops are set to provide a 5 degree canted effect.



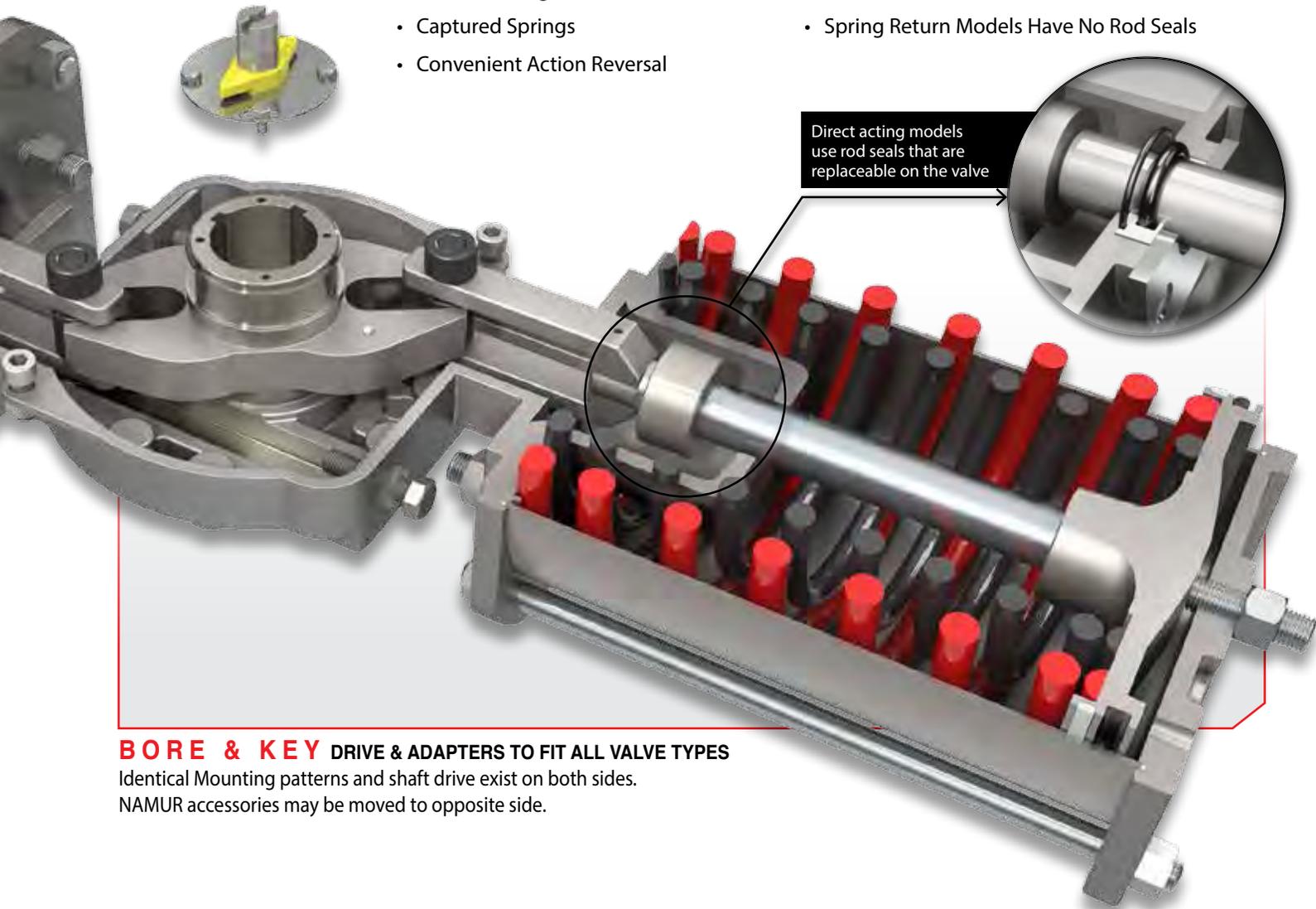
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#### **Bi-Directional Travel Stops**

FS actuators feature bi-directional travel stops which allow a minimum of 5 degrees of over travel in each direction. The stops act on the piston motion and impart no side loading on the shaft as occurs with rack & pinion and scotch yoke designs.

**A proven upgrade to your ordinary scotch yoke actuator**

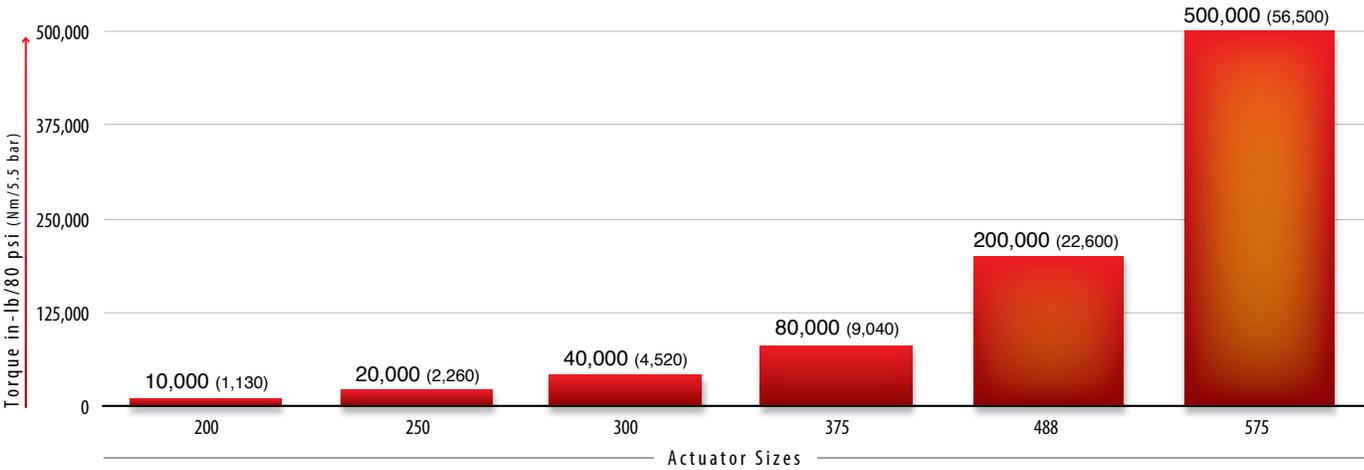
- Balanced Weight & Force Distribution
- Captured Springs
- Convenient Action Reversal
- Stainless Steel Construction
- Spring Return Models Have No Rod Seals



**BORE & KEY DRIVE & ADAPTERS TO FIT ALL VALVE TYPES**

Identical Mounting patterns and shaft drive exist on both sides.  
NAMUR accessories may be moved to opposite side.

**F Series – FLAT YOKE™**



**L SERIES - FULLY AUTOMATED LINEAR**  
**FAIL UP, FAIL DOWN OR DOUBLE ACTING**

Pressures to 150 psig (10.3 bar) | Temperatures from -60°F to +400°F (-51°C to +204°C)  
 Strokes to 24" (610 mm)



**Linear Actuation**

Using captured springs and the linear components of our rotary actuators provides a safe, long lasting, low friction, stainless steel substitute for diaphragm types in a smaller package for resistance to corrosion and vibration.

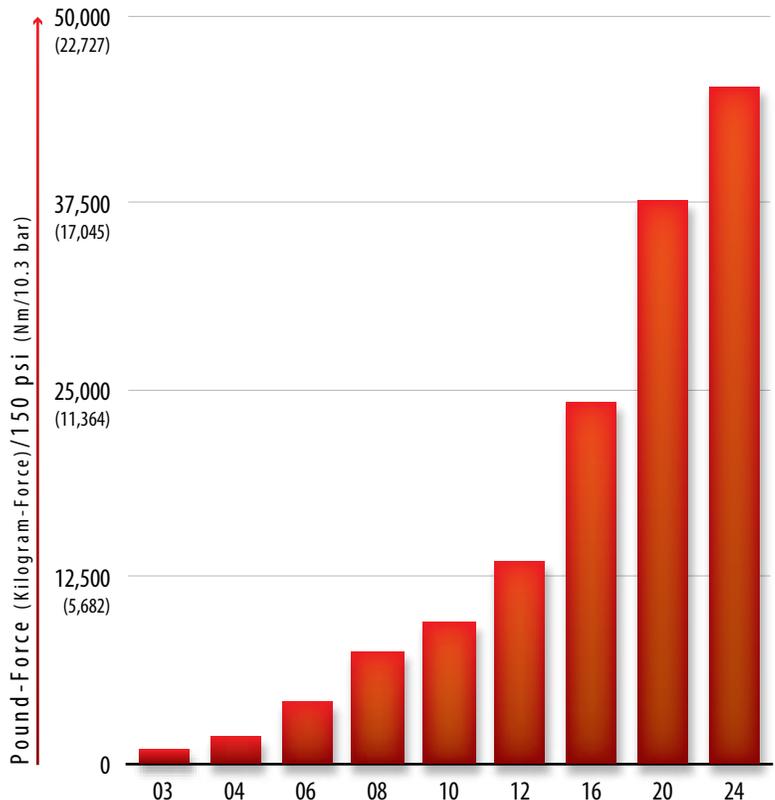
**Double Acting, Fail Up or Down Options and Partial Stroke Testing**

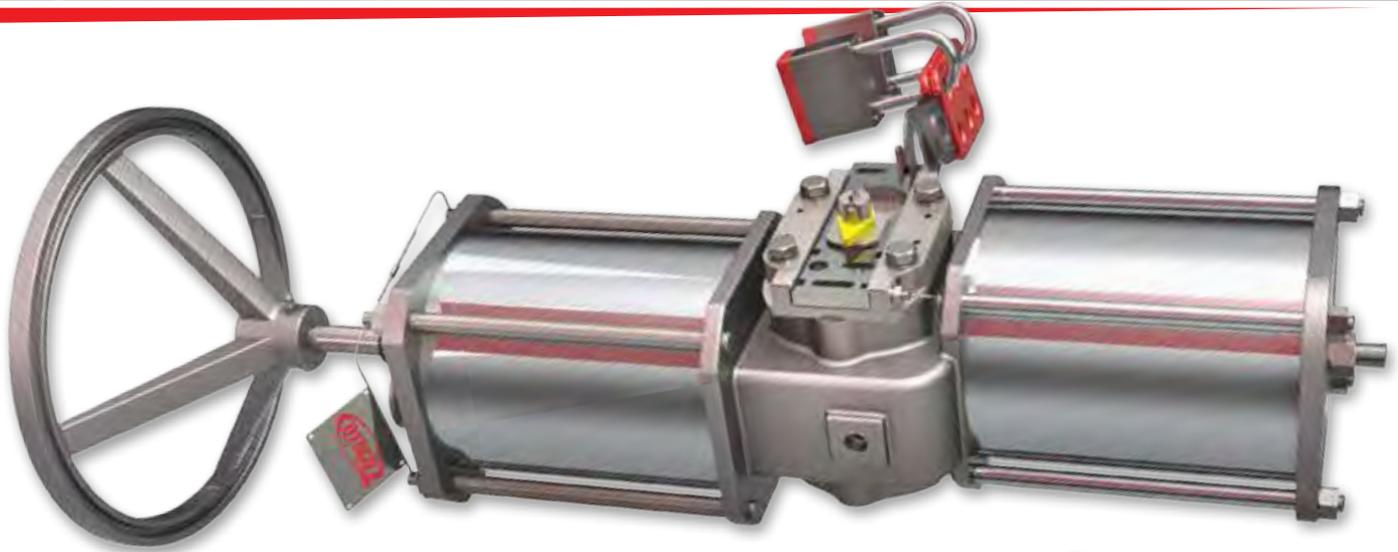
Can be mounted to globe, gate, diaphragm, or any other type of linear action valve.

**Piston Diameters from 2 to 24 inches (5 to 61mm)**

DA strokes unlimited, SR strokes to 24" (61mm).

**LS Series – LINEAR**





## Accessories that complete the assembly...

### Jackscrew Manual Override

The jackscrew is a simple low cost manual override that can be fitted on any Q Series Rack & Gear™ actuator.

### NAMUR Accessory Mounting

Full NAMUR accessory mounting capability is retained as shown here with the QTRCO produced NAMUR cast bracket.

### TMLO Lock Out - Tag Out (Q Series)

Whether double acting or spring return, the Q series actuators can be locked in the open or closed position, as specified using this simple but effective top mounted lock out (TMLO). Incorporating a simple lock out - tag out device for multiple padlocks enables confirmation that all workers have completed their tasks and are out of harms way before the actuator is once again able to cause valve motion. Padlocks may be used to secure the slide in the engaged or disengaged position to prevent unauthorized use.

### TMX Mechanical PSTD (Q Series)

A top mounted hard travel stop that is manually engaged by the operator. Unlike other mechanical partial stroke testing devices (PSTDs) the TMX Solution does not require a special actuator or coupler.

The TMX is for users who desire the lowest possible cost partial stroke testing device. The simple mechanical approach is lockable for assurance against unauthorized engagement. Engaging the top mounted slide limits the actuator rotation to a standard 15° or user specified value. Padlocks may be used to secure the slide in the engaged or disengaged position to prevent unauthorized use.



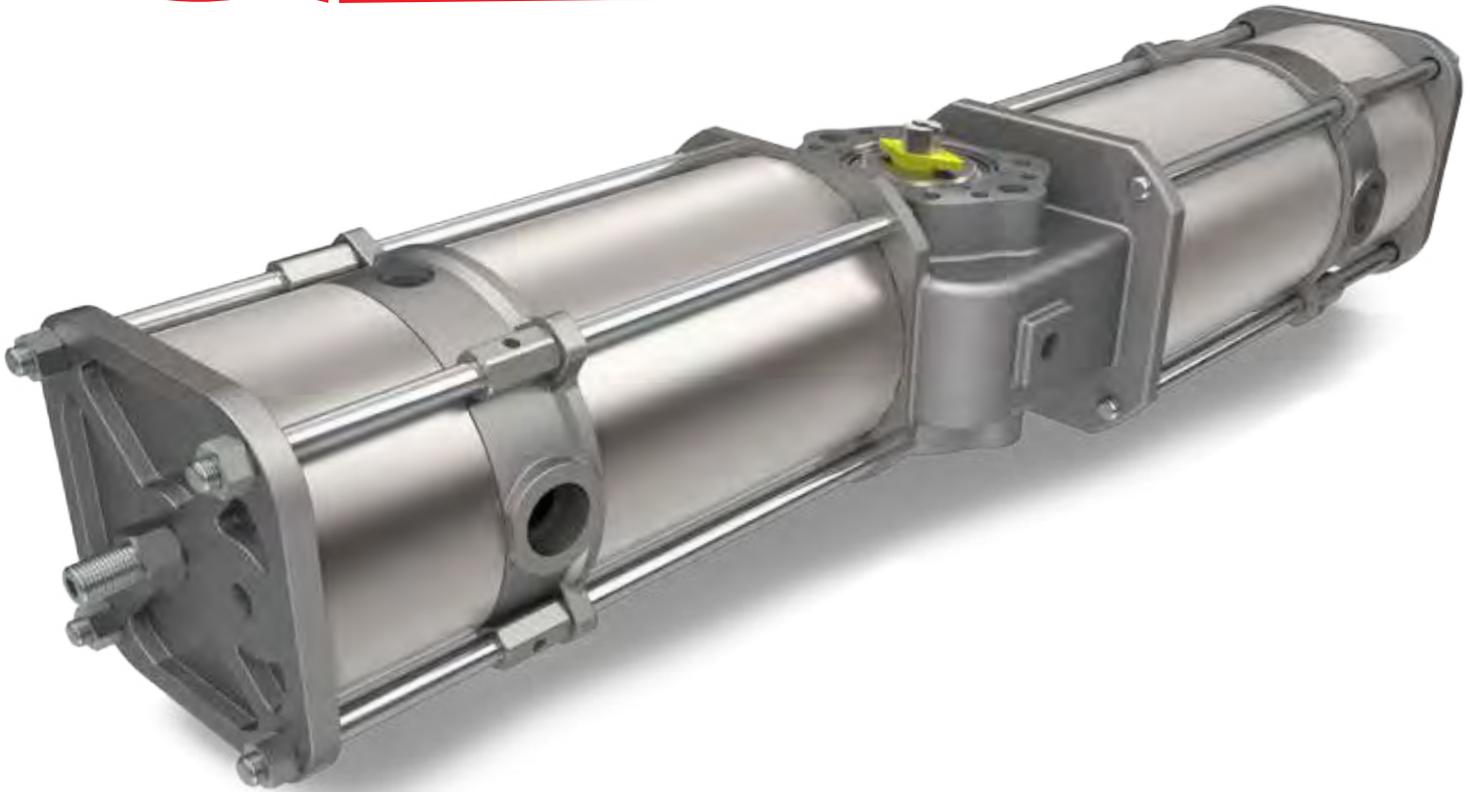
UNIVERSAL MOUNTING PLATES



NAMUR BRACKETS



LOCK OUTS



## XRCISER™ PSTD

### PARTIAL STROKE TESTING DEVICE

Begin with any QTRCO actuator, add tandem pistons to serve as pneumatically engaged travel stops, and controls as appropriate for your application.

The standard QTRCO actuator uses a travel stop screw in the end cap to limit outward travel of the actuator piston, and therefore valve travel. In the XRCISER™ configuration the pneumatically engaged tandem pistons become the outward travel stop. By confirming tandem piston pressure and position; spurious valve travel is prevented during the partial stroke cycle.

The XRCISER™ Partial Stroke Testing Device is an available option on all QTRCO actuators offering capabilities unmatched by any other PSTD such as: remote operation, assurance against over travel, compatible with small, medium and large size actuators, zero detrimental affect on actuator speed or function, custom PSTD stroke amount, 100% of actuator's output torque, diagnostics and redundancies.

**Crafted without compromise,  
to make your life easier**

### BENEFITS:

- No spurious valve travel
- Full actuator torque output every cycle – including partial stroke test
- Full emergency operation capability
- Local, remote or fully automated control options
- Optional diagnostic data collection
- Inherent actuator seal and solenoid valve redundancies
- Verification testing of solenoid valves
- Unlimited number and frequency of worry free partial stroke test cycles
- Reduced operator training



XRCISER™ PARTIAL STROKE TESTING DEVICE... **How does it work?**



**1. Normal Service**

Primary pistons are pressurized and the valve is in the full travel position



**2. Tandem Pistons Pressurized**

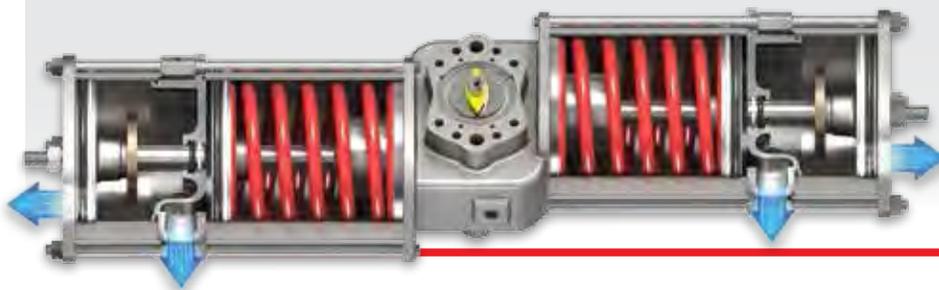
readiness is confirmed by proximity and pressure switches, the valve remains in the full travel position



**3. Partial Stroke Test**

pressure is exhausted from primary pistons and the springs push the primary piston outward, the pressurized tandem piston limits the travel to 15° (or customer specified amount), then actuator returns to normal service

**The XRCISER™ Never Compromises Safety**



**Emergency Shutdown**

if in the midst of testing an emergency occurs, exhausting primary and tandem piston pressure allows immediate full valve closure



## AMAZINGLY RELIABLE

Based on a patented low friction design our actuators were introduced to the market in 1998. Since then hundreds of users have found them to outperform and outlast competitors actuators.

One user has over 1,000 double acting Rack & Gear™ actuators installed as long as sixteen years in a challenging offshore application with no failures to date. Another with over 300 installed spring return actuators—many from 1999—jokes that, “we’ll get one to fail someday;” and still another chose our Rack & Gear™ actuators to replace corroding rack & pinion actuators back in the year 2000. All three continue to specify QTRCO Rack & Gear™ actuators for their applications based on the actuator performance record as well as the exceptional response of our organization.



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