



Valtek Spring Cylinder Linear Actuators



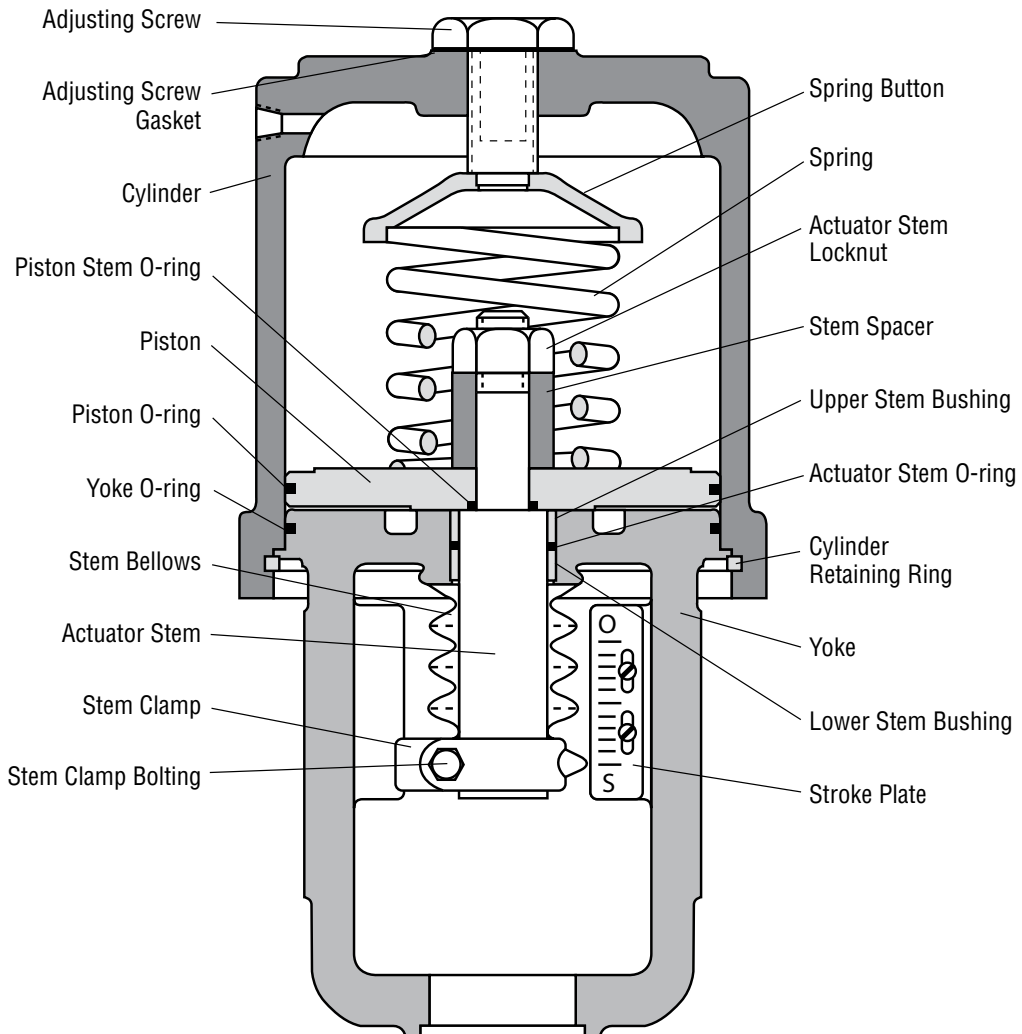
Experience In Motion



Valtek Spring Cylinder Linear Actuator

Flowserve spring cylinder linear actuators are powerful, compact, high-performance pneumatic actuators that provide solid throttling or on-off operation for automatic control valves. The positioner supplies air to both sides of the piston, providing stiff, precise movement and high-

frequency response and quick stroke speeds. The robust, flexible design allows a wide range of accessories, quick maintenance in a small lightweight package. A selection of high thrust springs provide reliable fail-safe operation.





Features and Benefits

Important features and advantages of the Flowserve Valtek spring cylinder linear actuator include:

| Features | Advantages |
|--------------------------------------|---|
| Multiple Positioners and Controllers | A variety of positioner/controller options makes the spring cylinder actuator ideal for a variety of control requirements. |
| High Frequency Response | Double-acting configuration responds quickly to signal changes. |
| Dynamic Positioning Accuracy | Supply pressure is modulated to both sides of piston for stiff, precise actuator operation; small air volume between the piston and the bottom of the cylinder provides powerful pneumatic stiffness, allowing a high pressure drop—without plug slamming. |
| Low Air Consumption | Cylinder design uses less supply air than comparable diaphragm actuators. |
| High Thrust Capability | 150 psi (10.3 Bar) operating pressure allows substantially higher thrust capabilities than comparable diaphragm actuators. Higher thrust allows tighter valve shutoff. |
| Longer Stroke | Longer strokes provide better process control. Size 25 spring cylinder linear actuators have a 1½-inch (38 mm) stroke, in contrast to a ¾-inch (19 mm) stroke on a comparable linear diaphragm actuator. Larger actuators have similar comparisons; stroke lengths are available up to 24 inches. |
| Fail-Safe Spring | Internal spring provides fail-safe operation in the event of air system failure. Spring bench set is not required. |
| Compact and Light-weight | For easier installation and maintenance, spring cylinder linear actuators are substantially lighter and more compact than comparable linear diaphragm actuators. |
| Simple Maintenance | Periodic maintenance is easy to perform since the spring cylinder actuator only requires the removal of two parts to access all internal parts. |
| Durable Components | High-quality materials require little maintenance. There is no diaphragm to rupture. |
| Wide Range of Sizes | Standard actuator sizes 25, 50 and 100 will handle thrust requirements for over 95 percent of process applications; larger sizes through size 600 are available for special applications. |
| Fewer Parts | Spring cylinder linear actuators have one-third the number of parts as diaphragm linear actuators; wear parts cost 10 percent of those for diaphragms, and less inventory is required to maintain actuators. |
| Field Reversible | Failure mode is easily reversed without additional parts. Reduces inventory costs. |
| No Pressure Regulator Required | Cylinder actuators easily handle air supplies up to 150 psi (10.3 Bar) without a pressure regulator and can be operated with as little as 30 psi (2.1 Bar)*. |

* Operating pressure on some sizes is limited because of valve sizes.

VL Series

The VL series is the standard set of actuators for Valtek control valves, providing precise control and reliable performance. With decades of experience and reliability, VL actuators have been known to be in service for over 30 years.

Providing maximum thrust from a compact lightweight package, the VL cylinder has set the industry standard for two generations.

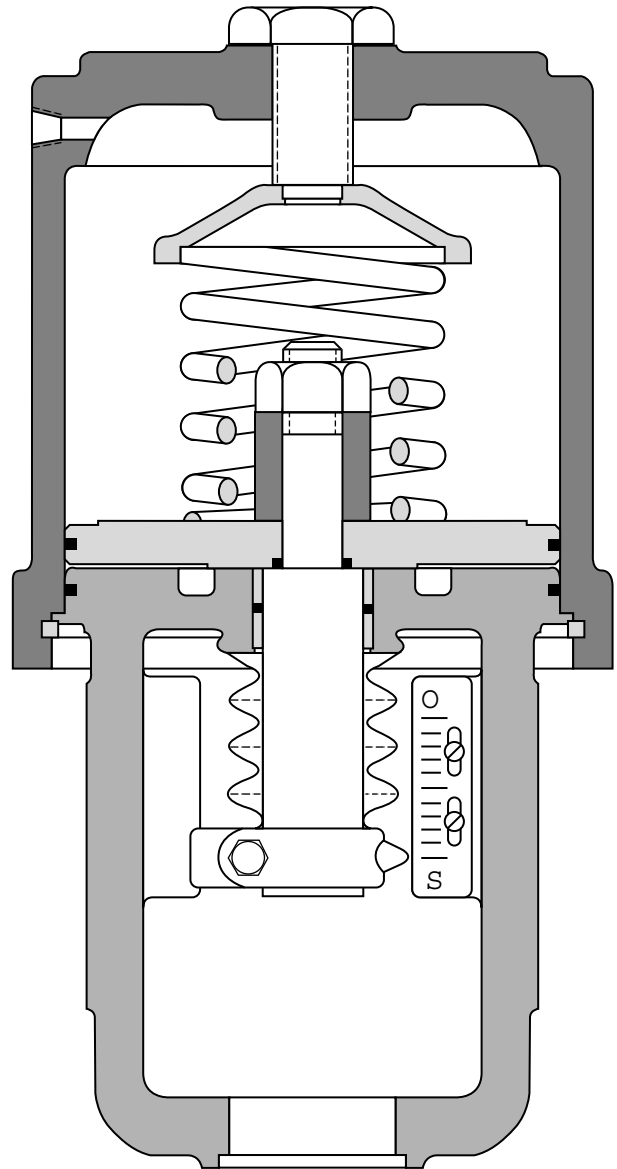
Features and Benefits

| Feature | Advantage |
|-------------------------|--|
| Wide Range of Options | A variety of options and accessories allow the VL cylinder to fit into almost any application requiring high thrust and low maintenance. |
| Compact and Lightweight | Using Aluminum cylinder construction, the VL cylinder is exceptionally compact and lightweight. |
| Simple Maintenance | Periodic maintenance is easy to perform. VL spring cylinder actuators only requires the removal of two parts to access all internal parts. |
| Simple Parts | Using standard O-rings for both static and dynamic seals, the VL cylinder actuator soft goods are lower cost and easier to find. |

Materials of Construction

| Part | Material |
|-------------------------|----------------------------------|
| Yoke | Phosphated, Painted Ductile Iron |
| Yoke Clamp | Stainless Steel |
| Yoke Clamp Bolts | Zinc Plated Steel |
| Stem Clamp* | Phosphated, Painted Ductile Iron |
| Cylinder Retaining Ring | Zinc Plated Steel |
| Actuator Stem | 416 Stainless Steel |
| Stem Spacer | Aluminum |
| Actuator Stem Lock Nut | Zinc Plated Steel |
| O-Rings | Buna-N |
| Spring | Alloy Steel |
| Spring Button | Painted Steel |
| Adjusting Screw | Zinc Plated Steel |
| Piston | Anodized Aluminum |
| Bushings | Bronze, Oilite |
| Cylinder | Painted Anodized Aluminum |

*Stainless Steel material on 25 and 50 square inch



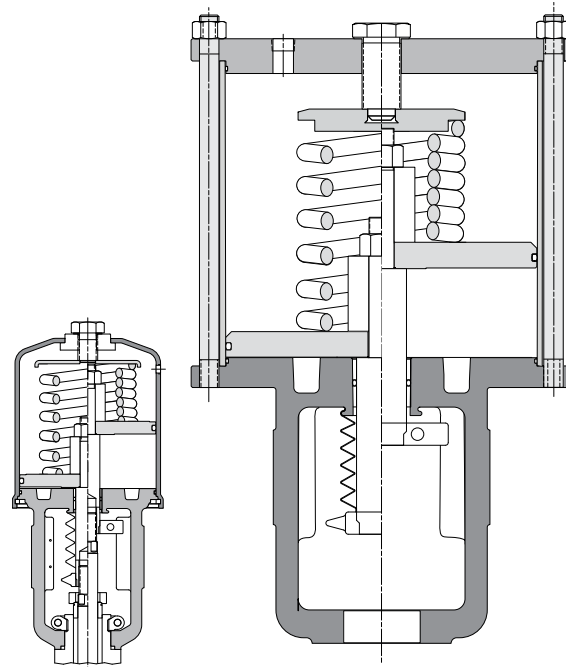
VL-C Series

For applications where aluminum materials are not acceptable, Flowserve offers the compact, lightweight and high thrust of the VL-C carbon steel spring cylinder linear actuator. Offering identical springs and all the advantages of VL actuators, the VL-C actuator replaces all aluminum parts with carbon steel.

Offered in two styles, the size 25 and 50 square inch actuators use deep drawn cylinders while the size 100, 150, 200, 300 and 400 offers tie rod construction.

Materials of Construction

| Part | Material | |
|-------------------------|-----------------------------------|----------------------------------|
| | Size 25 and 50 | Size 100 and Larger |
| Yoke | Phosphated, Painted Ductile Iron | Phosphated, Painted Ductile Iron |
| Yoke Clamp | Stainless Steel | Stainless Steel |
| Yoke Clamp Bolts | Zinc Plated Steel | Zinc Plated Steel |
| Stem Clamp* | Stainless Steel | Phosphated, Painted Ductile Iron |
| Cylinder Retaining Ring | Zinc Plated Steel | — |
| Tie Rods and Nuts | — | Carbon Steel |
| Actuator Stem | 416 Stainless Steel | 416 Stainless Steel |
| Stem Spacer | Carbon Steel | Carbon Steel |
| Actuator Stem Lock Nut | Zinc Plated Steel | Zinc Plated Steel |
| O-Rings | Buna-N | Buna-N |
| Quad Seals | — | Buna-N |
| Spring | Alloy Steel | Alloy Steel |
| Spring Button | Carbon Steel | Carbon Steel |
| Adjusting Screw | Zinc Plated Steel | Zinc Plated Steel |
| Piston | Carbon Steel | Carbon Steel |
| Bushings | Bronze, Oilite | Bronze, Oilite |
| Cylinder | Zinc Plated, Painted Carbon Steel | Painted Carbon Steel |
| End Cap | — | Painted Carbon Steel |



Features and Benefits

| Feature | Advantage |
|---------------------------|---|
| Carbon Steel Construction | Replaces all aluminum parts with carbon steel. |
| Compact and lightweight | Using Aluminum cylinder construction, the VL cylinder is exceptionally compact and lightweight. |
| Simple maintenance | Periodic maintenance is easy to perform. VL-C spring cylinder actuator sizes 25 and 50 only requires the removal of two parts to access all internal parts. |
| Simple Parts | Using standard O-rings for both static and dynamic seals, the VL cylinder actuator soft goods are lower cost and easier to find. |

VL-UHC Series

For applications where ultra high cycle (UHC) life is needed, Flowserve offers the exceptionally long cycle of the VL-UHC series actuators. By replacing or modifying several parts used in the standard VL series actuator, the VL-UHC gains cycle lives previously thought unattainable.

Features and Benefits

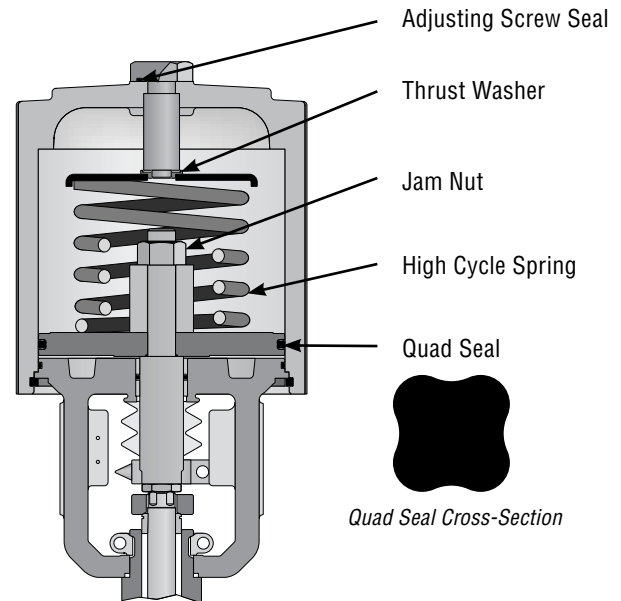
| Feature | Advantage |
|---------------------------------|---|
| Life Cycles | Expected life cycles of up to 2 million cycles! |
| Dynamic Quad Seals | All dynamic seals are quad seal design. This provides better lubrication and much longer life. |
| Plug Stem Jam Nut | Providing better alignment of the actuator stem and plug stem, the jam nut lengthens the life span of the bushings. |
| Same Simple Maintenance | Periodic maintenance is easy to perform. VL-UHC spring cylinder actuator only requires the removal of two parts to access all internal parts. |
| Recessed Adjusting Screw O-ring | Providing better alignment and sure sealing, the recessed O-ring adjusting screw seal lengthens the life of the actuator. |
| Thrust Bearing for the Spring | Thrust bearings prevent windup on the spring, lowering the stresses in the spring and giving it longer life. |
| Special Springs | Special springs with stronger materials and better finishes provide exceptionally long life spans. |

Expected Life Cycles

| Actuator Size | Standard Design ¹ | UHC Design ² |
|-----------------|------------------------------|-------------------------|
| 25, Standard | 500,000 | 2,000,000 |
| 25, Dual Spring | 300,000 | 2,000,000 |
| 50, Standard | 300,000 | 2,000,000 |
| 50, Extended | 300,000 | 2,000,000 |
| 50, Dual Spring | 300,000 | 2,000,000 |
| 100, Standard | 300,000 | 2,000,000 |
| 100, Heavy Duty | 150,000 | 2,000,000 |
| 100, Dual | 150,000 | 2,000,000 |
| 200, Standard | 300,000 | 2,000,000 |
| 200, Heavy Duty | 150,000 | 2,000,000 |
| 200, Dual | 150,000 | 2,000,000 |

1) Soft Goods should be replaced every 100,000 cycles

2) Soft goods should be replaced every 500,000 cycles



Materials of Construction

| Part | Material |
|-------------------------|----------------------------------|
| Yoke | Phosphated, Painted Ductile Iron |
| Yoke Clamp | Stainless Steel |
| Yoke Clamp Bolts | Zinc Plated Steel |
| Stem Clamp* | Phosphated, Painted Ductile Iron |
| Cylinder Retaining Ring | Zinc Plated Steel |
| Actuator Stem | 416 Stainless Steel |
| Stem Spacer | Aluminum |
| Actuator Stem Lock Nut | Zinc Plated Steel |
| O-Rings | Buna-N |
| Quad Seals | Buna-N |
| Spring | Alloy Steel |
| Spring Button | Painted Steel |
| Adjusting Screw | Zinc Plated Steel |
| Piston | Anodized Aluminum |
| Bushings | Bronze, Oilite |
| Jam Nut | Zinc Plated Steel |
| Thrust Bearing | Delrin |
| Cylinder | Painted Anodized Aluminum |

*Stainless Steel material on 25 and 50 square inch

**Size 50 and Larger

VL-ES Series

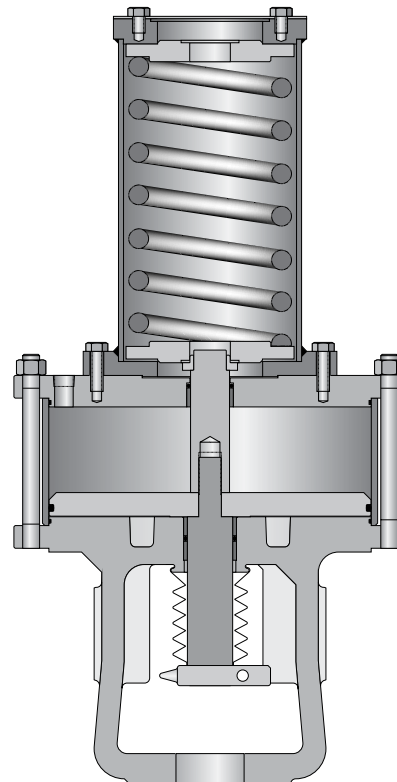
Materials of Construction

| Part | Material |
|------------------------|----------------------------------|
| Yoke | Phosphated, Painted Ductile Iron |
| Yoke Clamp | Stainless Steel |
| Yoke Clamp Bolts | Zinc Plated Steel |
| Stem Clamp* | Phosphated, Painted Ductile Iron |
| Tie Rods and Nuts | Carbon Steel |
| Actuator Stem | 416 Stainless Steel |
| Spring Connecting Rod | 416 Stainless Steel |
| Actuator Stem Lock Nut | Zinc Plated Steel |
| O-Rings | Buna-N |
| Quad Seals | Buna-N |
| Spring | Alloy Steel |
| Spring Housing | Painted Carbon Steel |
| Spring Buttons | Carbon Steel |
| Spring Cap Bolting | Zinc Plated Steel |
| Piston | Anodized Aluminum |
| Bushings | Bronze, Oilite |
| Thrust Bearing | Delrin |
| Cylinder | Painted Carbon Steel |
| End Cap | Painted Carbon Steel |

Features and Benefits

| Feature | Advantage |
|-------------------------------|---|
| Life Cycles | Expected life cycles of up to 2 million cycles! |
| Dynamic Quad Seals | All dynamic seals are quad seal design. This provides better lubrication and much longer life. |
| Plug Stem Jam Nut | Providing better alignment of the actuator stem and plug stem, the jam nut lengthens the life span of the bushings. |
| Same Simple Maintenance | Periodic maintenance is easy to perform. VL-UHC spring cylinder actuator only requires the removal of two parts to access all internal parts. |
| Thrust Bearing for the Spring | Thrust bearings prevent windup on the spring, lowering the stresses in the spring and giving it longer life. |
| Special Springs | Special springs with stronger materials and better finishes provide exceptionally long life spans. |

For applications where longer strokes or unusually high spring thrusts are required, Flowserve offers the VL-ES series actuators. Using many of the same design concepts as the VL-C, the VL-ES offers external spring cans. This allows for extra long springs which provide longer stroke lengths and extra force.





Common Positioners and Control Software



Logix 3000 Series Digital Positioners



XL and Beta Series Analog Positioners



SoftTools Diagnostic and Preventative Maintenance Software



Logix 500 Series Digital Positioners



Auxiliary Equipment

Positioners

- XL pneumatic or electro-pneumatic positioner
- Beta pneumatic or electro-pneumatic positioner
- Logix 500 digital positioner series
 - HART
- Logix 3000 digital positioner series
 - HART
 - FOUNDATION Fieldbus
- StarPac digital flow measurement and control series

Air Filters A variety of air filters are available.

PosPac Position transmitter feeds back a 4-20 mA signal on position.

Flow Booster For faster stroke times.

Limit Switches

Solenoids

Optional Configurations

Many optional configurations are available. Among the most common are:

- Failsafe external volume tank systems
- Failsafe lock up systems
- Solenoid override systems

Table I: Typical Actuator Stroking Times

| Actuator Size | Time for Maximum Stroke (seconds)* | | Stroke | |
|---------------|------------------------------------|---------------|--------|-----|
| | 0.25" Tubing | 0.375" Tubing | in. | mm |
| 25 | 1.2 | 1.0 | 1.5 | 38 |
| 50 | 3.8 | 3.0 | 3 | 76 |
| 100 | 11.5 | 9.0 | 4 | 102 |
| 200 | — | 15.4 | 4 | 102 |
| 300 | — | 24.1 | 4 | 102 |

Actuation pressure: 60 psi (4.1 Bar)

* Stroking time only

Table II: Actuator Stiffness

| Percent Stroke | Stiffness (lb/in) | Stiffness (N/mm) |
|----------------|-------------------|------------------|
| 100 | 3441 | 603 |
| 75 | 4588 | 803 |
| 50 | 6882 | 1205 |
| 25 | 13763 | 2410 |
| 10 | 34408 | 6026 |
| 5 | 68816 | 12052 |

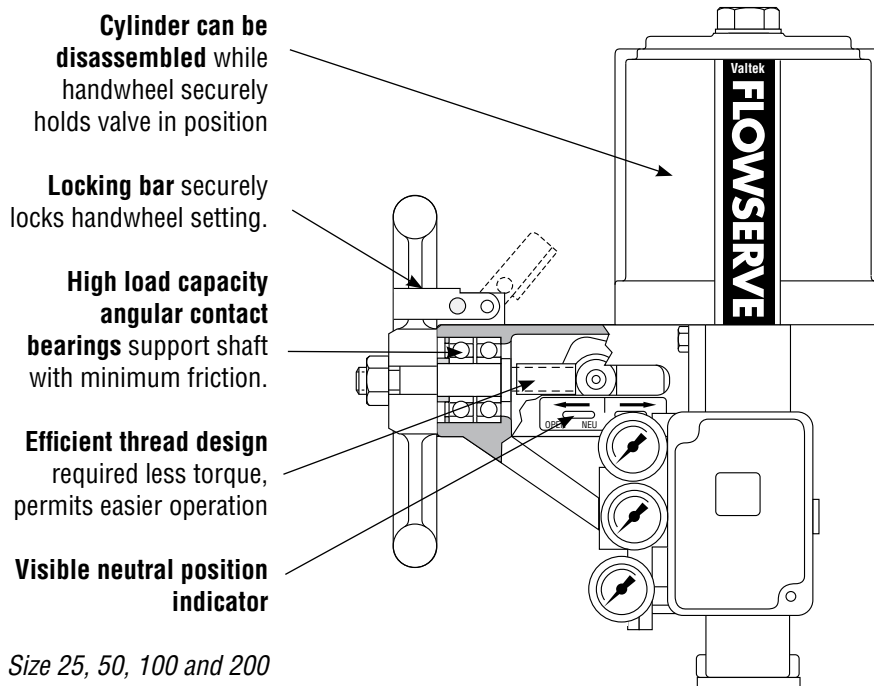
Note: 25 square inch actuator with 150 psi air supply and 1.5" stroke



Continuously Connected Handwheels

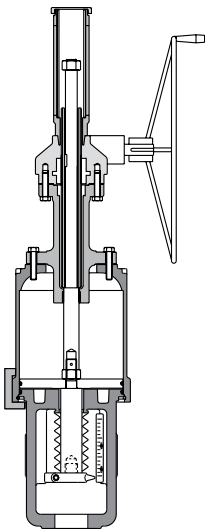
Continuously connected handwheels are highly versatile. They can be used to retract or extend the stem and act as either a high or low-limit stop. The simplified design makes it easy to place the handwheel in a neutral position for automatic operation of the actuator.

Side-Mounted Handwheel

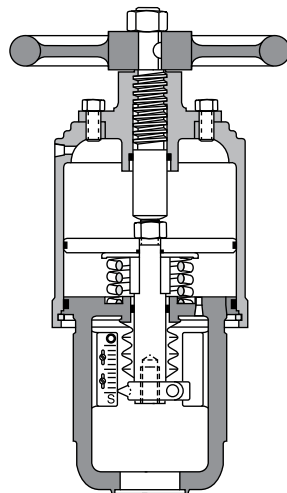




Top-Mounted Handwheel



Push-Only Handwheel



Side-mounted auxiliary handwheel on a size 25 Linear Actuator.



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