Series 25
Pneumatic Scotch Yoke Actuator
Double Acting and Spring Return

Leading the Industry with Innovation by Design
Scotch Yoke Actuator, Quality and Performance you can count on!

In a few short years since the company was formed, DeVal Flow Controls has emerged as a leader in the actuator market. Leading the industry with innovation by design has become the trademark of all DeVal® products. From its unique universal shaft adapter concept to its scotch yoke design with its unique spring design, DeVal® is fast becoming the standard for valve actuation and automation in the oil, gas, water and wastewater, industrial, mining and power industries around the world. DeVal Flow Controls offers a wide range of pneumatic, hydraulic and electric DelTorq® actuators. Our designs are proven performers in the harshest and most challenging environments. The DeVal® and DelTorq® brand means performance, quality, and reliability you can count on.

Most DelTorq® actuators are designed to mount directly to ball, butterfly, and non lubricated plug valves, or any quarter-turn rotating mechanism. On valves where direct mounting is not possible, pre-engineered mounting is available for close mounting. All actuators are manufactured in a modern plant equipped with state-of-the-art facilities under a robust quality assurance program complying with ISO 9001-2000.

DeVal® Valves and DelTorq® Pneumatic Actuators and accessories are marketed and sold worldwide by an experienced team of domestic and international representatives. Our sales offices work closely with the representatives to ensure that our customers’ expectations are met and exceeded. A network of authorized distributors stock DeVal® and DelTorq® products for immediate delivery to the oil, gas and industrial markets.

Certifications:
The scotch-yoke mechanism produces torque that closely matches the required torque characteristic of most quarter-turn valves. As per the characteristic of the valve, the scotch-yoke produces its highest torque at the start and the end of each stroke, providing maximum torque at opening & closing of the valve.

As the piston moves, the length of the moment arm is changing constantly. Because the effective moment arm is longest at the start and the end of the stroke (L2), the starting torque (torque output at the start and the end of a stroke) approaches nearly twice the magnitude of the minimum torque (L1) (torque output at the shortest moment arm length). Thus, scotch yoke mechanism torque output allows the use of a smaller piston, shorter moment arm and lower operating pressures than many other mechanisms.

Classification:
Design Features

1. **Ductile Iron Housing** provides better strength with water ingress protection meeting IP 67 grade.

2. **Hard Chrome Plated, Honed Finished Cylinder Bore** increases seal life.

3. **Hard Chrome Plated Steel Piston Rod** provides strength and corrosion resistance for enduring high cycle applications.

4. **Heat Treated Stainless Steel Thrust Pin** transfers piston force to the steel yoke for efficient transmission of torque.

5. **Guide Bands And Piston Quad Seals** ensure low-friction piston guidance during operation to protect cylinder walls from potential scoring and provide continuous cylinder wiping action.

6. **Spring Return Actuators** pre-piped with stainless steel tubing to provide air to both pistons with one single connection.

7. **Compact Design** utilizing a unique two piston design.

8. **Unique “Safe Spring Cartridge” Design** allows the actuator to be safely assembled and disassembled in the field without the need for special tools. A double acting actuator can be converted to spring return unit by simply changing the cylinder and installing corresponding size of spring cartridge assembly. A spring return can be converted to a double acting actuator by removing the spring cartridge.

9. **ISO 5211 Mounting Pattern** provides easy valve / actuator mounting using international standards.

10. **Top Cover Drilled To Namur Standards** Namur drive slot in shaft on top of yoke enables accessory driven components to maintain a compact assembly.

11. **Bi-directional Travel Stop** located in the main housing to provide adjustment in open and closed direction ±5°.

12. **Phosphor Bronze Piston Rod Bushing** provides low-friction support. Precise alignment of the piston rod increases efficiency and provides extended actuator life and efficient torque transmission.

13 & 14. **High Strength Yoke** The yoke is a very critical part of the scotch yoke actuator. This part is most often where the life of the actuator is controlled. The yoke converts the linear force to torque. On 250 yoke arm DelTorq™ uses 17-4 Ph stainless steel as standard for this critical part. Unique hollow yoke design permits the use of a universal adapter for direct mounting to quarter turn valves.

New Features for Demanding Applications:

**Model 250 & 350:**

15. **Aluminum Bronze Roller** provides low friction and high strength and increases efficiency and life cycle of actuator.

**Model 500:**

16. **Chrome Plated Guide Bar** and guide block connection bearing with guide bar support the transverse force and ensure proper support of the piston to give high cycle life and smooth operation.

17. **Ductile Iron Guide Block** with bearing ensures proper lubrication to pin & guide bar, provides low friction and increases efficiency of the actuator.

18. **Corrosion Protection** All casting components are coated on all surfaces through a process of liquid passivation based on trivalent chromium to achieve excellent corrosion resistance.
Fail-Safe Operation:
Each DelTorq® actuator is capable of fail-safe operation using either stored compressed gas (air) or a mechanical spring.

Optional Accessories
**Series 83 DelMonitor:**
This valve position monitor mounts directly to the top of the actuator with a special compact bracket. The standard highly visible indicator shows valve position locally, and the internal switches indicate valve position to a remote location. Standard switches are two single poles double throw (SPDT). Micro switches are rated at 10 amps, 125 or 250 VAC, 220 VDC. The housing is rated to IP65/IP67.

**Trims:**
Trim options for these actuators include seals for high and low temperature applications. The actuator is designed to resist affects of environmental conditions.

**Series 85 3-Way and 4-Way Solenoid Valve:**
Series 85 solenoid valves are 3-way or 4-way, 5 ported position piloted spool type single or dual solenoid valves designed for air or gas service. Valves are made of rugged anodized aluminum. A built-in manual override allows manual operation when desired or during an electrical power outage. All valves are supplied with all necessary hardware for a direct mount installation.

**Optional Three Coat Offshore Protective Coating System:**
The basic three-coat offshore protective coating is a Zinc based coat applied to an actuator that has been sand blasted to specifications. A tie coat is then applied. The valve is then finished and protected with a light gray polyurethane topcoat. This offshore protective coating is applied at the factory using newly machined castings. 100% of the actuator surface including the area under the tag is coated leaving no area for corrosion to start.

**Series 87 Positioner:**
The Series 87 positioner offers a diverse mix of positioners and feedback for direct mounting to all DelTorq® actuators. Available in pneumatic and electropneumatic designs with low air consumption and high accuracy for use on single or double acting actuators. Quality design and product performance are coupled with competitive pricing and excellent service to provide a cost effective approach to accurate control and position feedback.

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**How to Order DelTorq Pneumatic Scotch Yoke Actuators**

<table>
<thead>
<tr>
<th>Series</th>
<th>Size</th>
<th>Operation</th>
<th>Trim / Other Variables / Specials</th>
</tr>
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<tbody>
<tr>
<td>25</td>
<td>Yoke Arm</td>
<td>Pressure Connection</td>
<td>Spring Pressure Rating</td>
</tr>
<tr>
<td>250</td>
<td>2.5”</td>
<td>SR = Spring Return</td>
<td>000 = For DA actuators</td>
</tr>
<tr>
<td>350</td>
<td>3.5”</td>
<td>DA = Double Acting</td>
<td>045 = Rated for 2.8 BAR</td>
</tr>
<tr>
<td>500</td>
<td>5.0”</td>
<td>08 = 8” Ø</td>
<td>060 = Rated for 4 BAR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>010 = 10” Ø</td>
<td>080 = Rated for 5.5 BAR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12 = 12” Ø</td>
<td>100 = Rated for 7.5 BAR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14 = 14” Ø</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>15 = 15” Ø</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>16 = 16” Ø</td>
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</tr>
</tbody>
</table>

**Available insert option only for 2.5” yoke arm**

**Available cylinder sizes against corresponding yoke arm**

<table>
<thead>
<tr>
<th>Series</th>
<th>Yoke Arm</th>
<th>Cylinder Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>2.5”</td>
<td>6”, 7”, 8”, 10”</td>
</tr>
<tr>
<td>25</td>
<td>3.5”</td>
<td>10”, 12”, 14”</td>
</tr>
<tr>
<td>25</td>
<td>5.0”</td>
<td>12”, 14”, 15”, 16”</td>
</tr>
</tbody>
</table>

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