

A compact high-performance valve system for firing and purging oil-fired burners and igniters.

Need a reliable, cost-effective solution for firing and purging oil burners and igniters? Engineered Valves Group has the answer. Our Trifecta valve systems offer a number of advantages over conventional valves, and work with all types of burners and igniters - including steam, air, or mechanically atomized.



The Skotch Trifecta is a complete valve system that provides oil shutoff, purging and atomizing in a single valve.

The result is elimination of performance problems and a device that offers continuous, reliable, trouble free service in your most important applications.

Strings of separate valves and packaged multiple valve systems are commonly used with oil burners and igniters. Problems inherent in such systems include the possibility of out-of-sequence operation, atomizing media contamination, leakage, or flame out. Additionally, multiple valve packages require more space and may be costly to install and maintain. Burner management logic may be more complex, increasing the cost of the system.

The Skotch Trifecta is a valve system with all components housed within a single valve body. Conventional systems require at least three valves and actuators to accomplish what we provide with a single valve system. We perform all key functions including fuel sequencing, atomizing and purging of the down stream piping. They are designed to comply with NFPA and IRI guidelines. This unique arrangement has been proven in years of trouble free service on installations worldwide.

Engineered Valves Group offers a complete line of Skotch valves for every application. In retrofits, each model can be configured to match the valve operating logic of existing burner management systems. These valve systems are compatible with any type fuel oil. We have installations utilizing #2, Bunker C, Crude, and waste oils.

When incorporating appropriate options/accessories, models T1003, T1006, and T506 are Factory Mutual approved for use as a "combination oil safety shut off, atomizing, and purge valve."

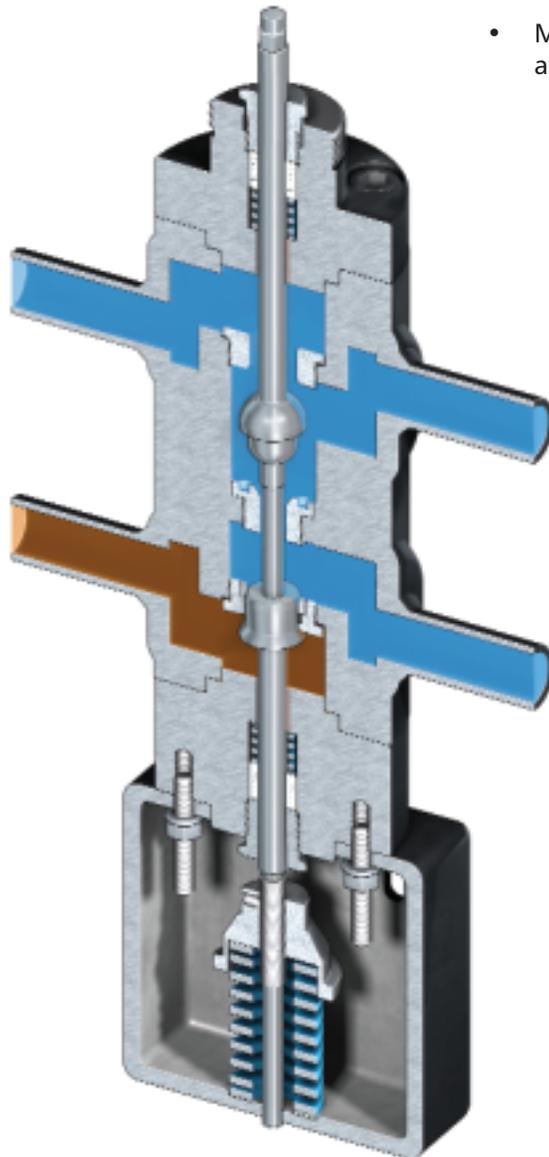


FM Approved for valves which fail in the closed position and incorporate appropriate options.

The Skotch Trifecta Valve Systems

offer these proven benefits:

- Designed to comply with NFPA and IRI guidelines
- Purge sequence is an integral part of oil valve closure, allowing almost instantaneous switching from firing to purge modes
- Prevents out-of-sequence operation, eliminating contamination of the atomizing or purging media
- Only four piping connections required to install
- Class VI soft seat and metal-to-metal back up seat on the oil side
- Simplified design – no precision adjustments required
- Flexibility in designs to accommodate either retrofits or new installations
- Compact unit takes less space
- Quick and easy installation reduces time and labor cost
- Unit can be completely disassembled in-line for ease of maintenance
- Oil valve over travel allows positive proof of closure
- Models that fail close and contain appropriate accessories are Factory Mutual approved



Skotch Valve shown in the purge (or scavenge) mode.

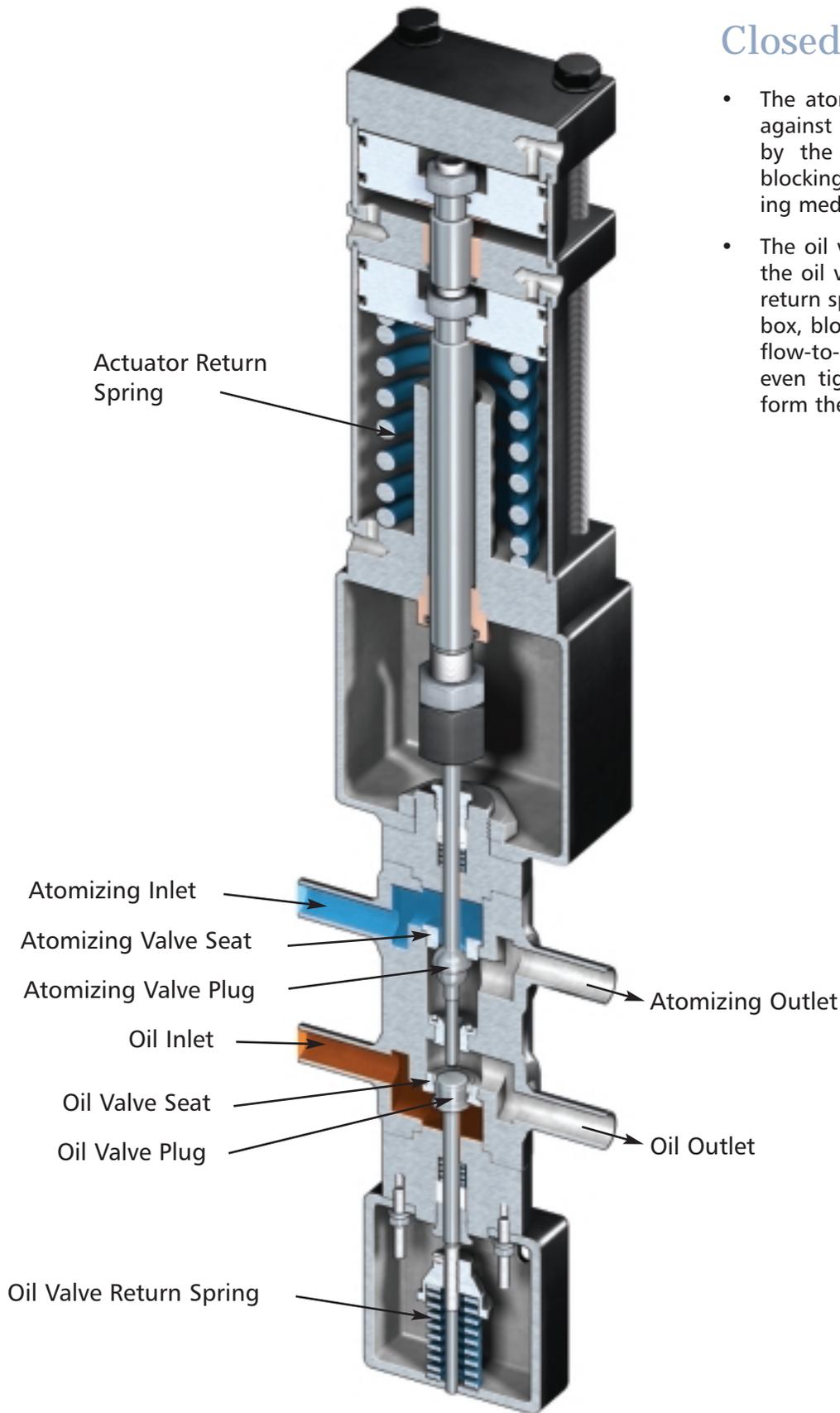


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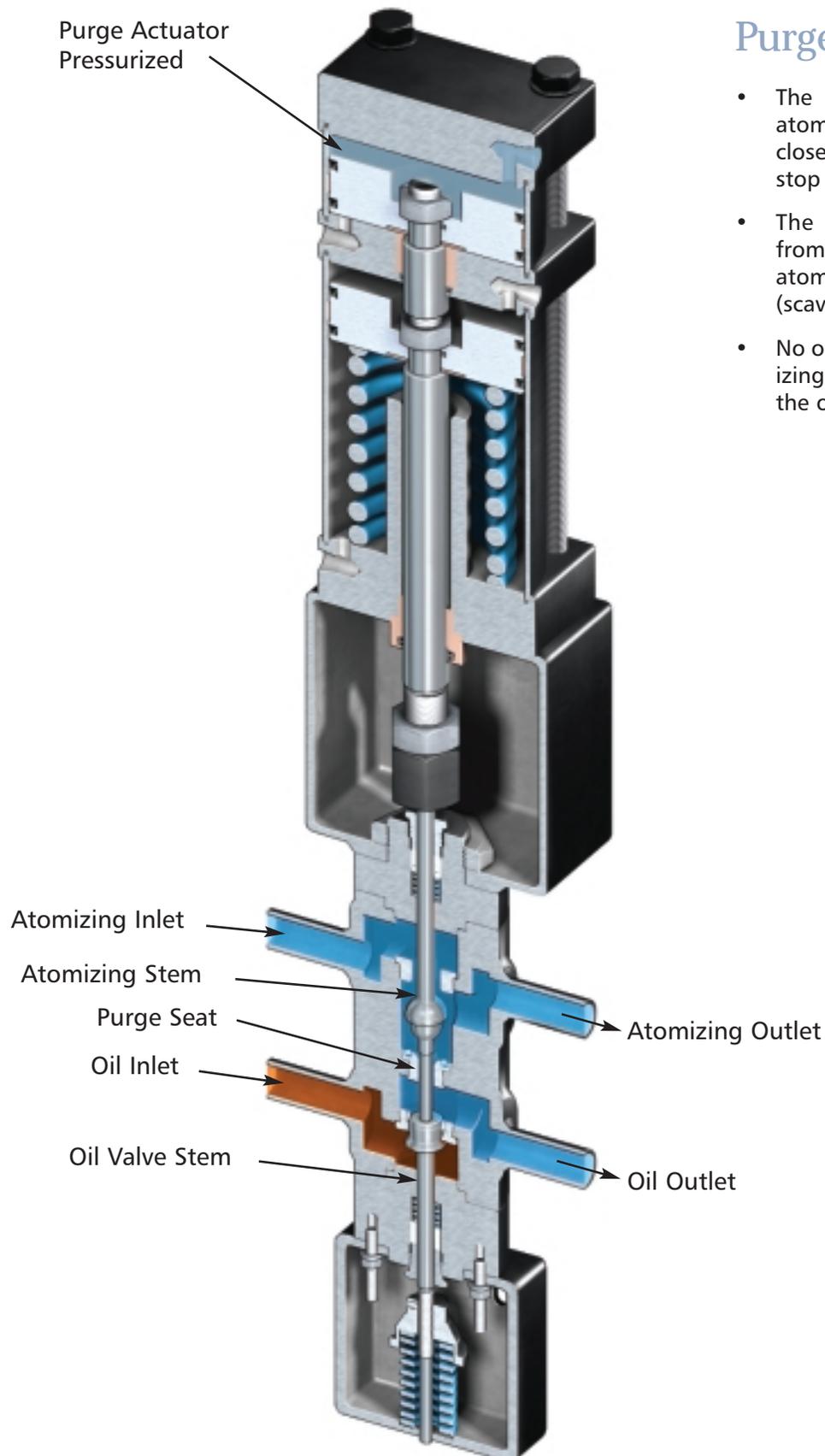
Operating Sequence for the T1000 and T500

Closed Position

- The atomizing valve plug is held against the atomizing valve seat by the actuator return spring, blocking the flow of the atomizing media.
- The oil valve plug is held against the oil valve seat by the oil valve return spring located in the lower box, blocking the flow of oil. The flow-to-close plug valve is seated even tighter by the oil pressure from the oil inlet.



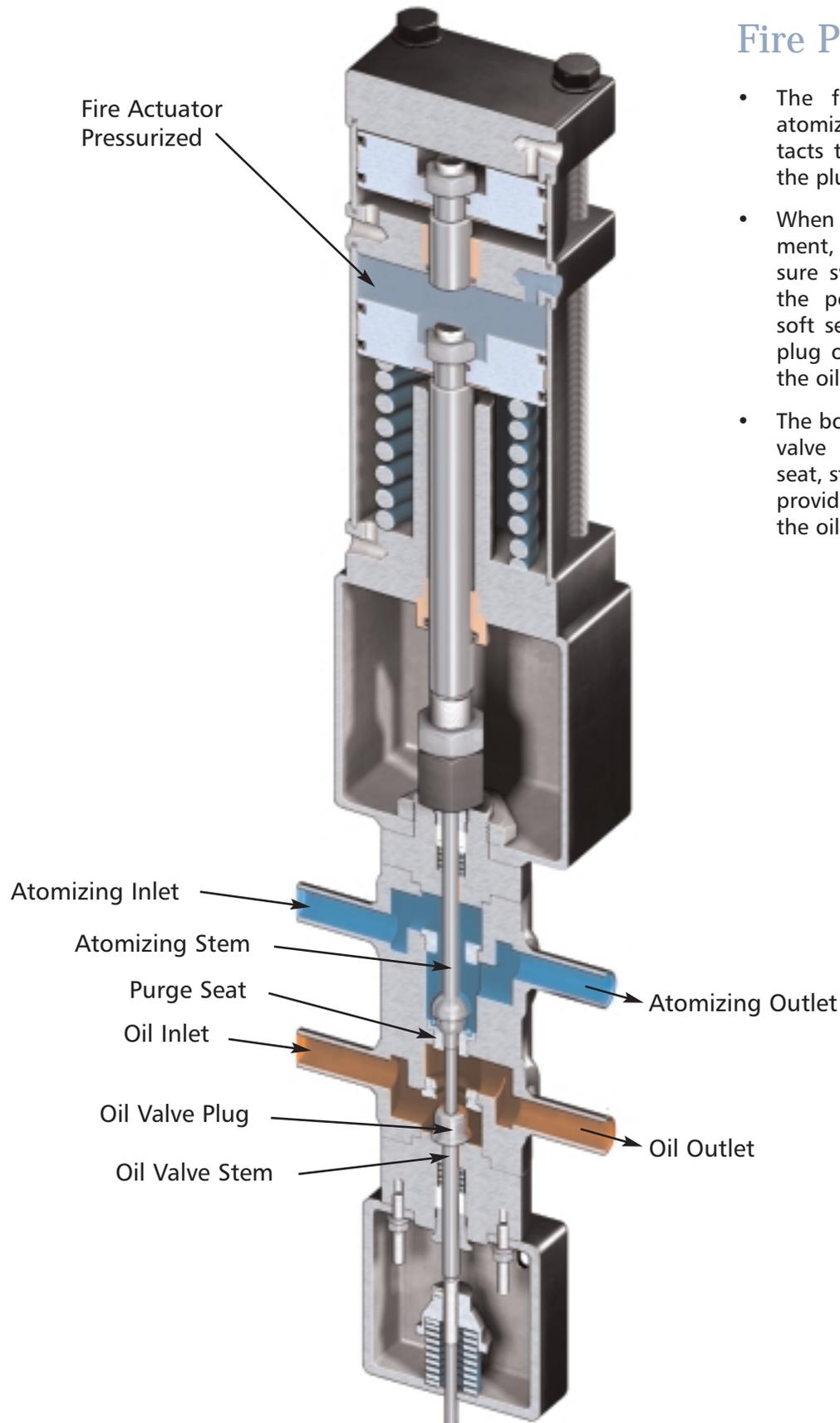
Operating Sequence for the T1000 and T500



Purge Position

- The purge actuator pushes the atomizing stem down from the closed position to a mechanical stop position.
- The atomizing medium flows from the atomizing inlet to the atomizing outlet and oil outlet (scavenge/purge).
- No oil flow occurs since the atomizing stem has not yet contacted the oil valve stem.

Operating Sequence for the T1000 and T500



Fire Position

- The fire actuator pushes the atomizing stem down and contacts the oil valve stem, pushing the plug out of its oil seat ring.
- When the oil stem begins movement, the oil valve proof of closure switch deactivates, prior to the port actually opening. The soft seal is still made. When the plug of the oil valve stem clears the oil soft seal, oil flow begins.
- The bottom side of the atomizing valve plug seats on the purge seat, stopping the purge flow and provides solid separation between the oil and atomizing medium.

Principles of Operation

Closed

- The atomizing valve plug is held against the atomizing valve seat by the actuator return spring, blocking the flow of the atomizing media. (Figure 1)
- The oil valve plug is held against the oil valve seat by the oil valve return spring located in the lower box, blocking the flow of oil. The flow to close plug valve is seated even tighter by the oil pressure from the oil inlet. (Figure 1)
- The oil valve plug and seat consist of two independent seals. A soft seal provides the required overtravel for positive proof of closure indication and class VI shutoff. A flow-to-close metal to metal seal provides a backup to the soft seal for further safety and Class IV shutoff. (Figure 1)

Purge (Scavenge)

- The purge actuator pushes the atomizing stem down from the closed position. (Figure 2)
- The atomizing medium flows from the atomizing inlet through the open atomizing valve seat to the atomizing outlet. It also passes through the open purge seat to the oil outlet providing a full purge from the center of the valve out.
- The purge flow purges the valve and downstream piping of residual fuel during burner shutdown. It can also be used for downstream warm up when used before light off.
- There is no oil flow since the oil valve stem is still fully seated in the oil valve seat. The oil valve proof of closure switch provides positive indication of oil valve closure.

Fire

- The fire actuator pushes the atomizing stem down. The atomizing stem contacts the oil valve stem, pushing the plug out of its oil seat ring.
- The bottom side of the atomizing valve plug seats on the purge seat, stopping the purge flow. When the plug of the oil valve stem clears the oil soft seat, oil flow begins. (Figure 3)
- When the oil stem begins movement, the oil valve proof of closure switch deactivates, prior to the port actually opening. The soft seal is still made.
- The full force of the fire actuator pushes the atomizing valve plug against the purge seat, providing solid separation between the oil and atomizing medium.

Figure 1



Figure 2

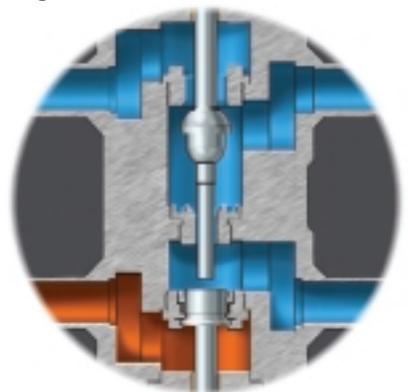
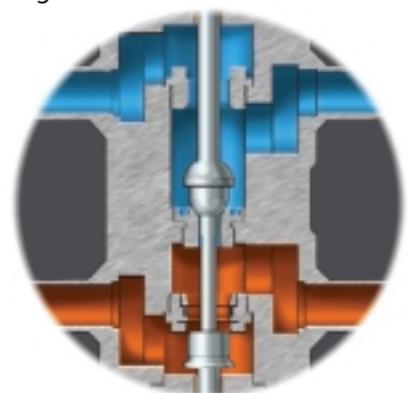
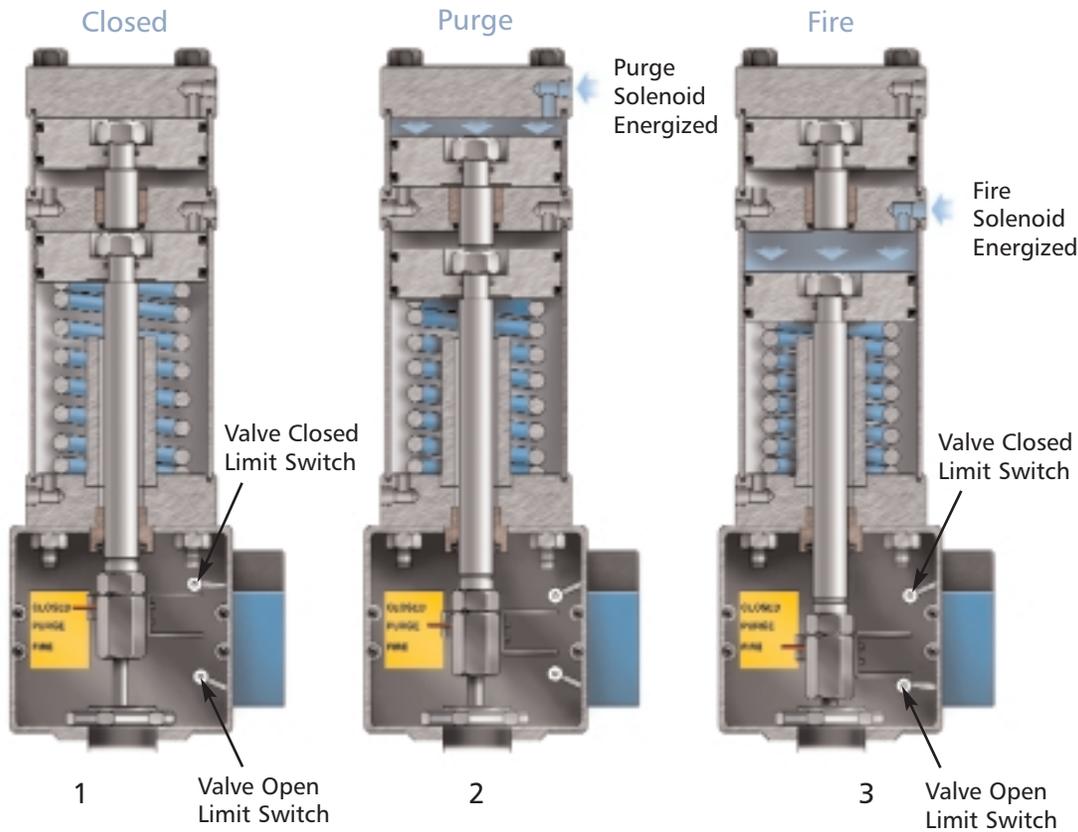


Figure 3



FM Approved for valves which fail in the closed position and incorporate appropriate options.

Pneumatic Actuation/ Limit Switches



Actuation

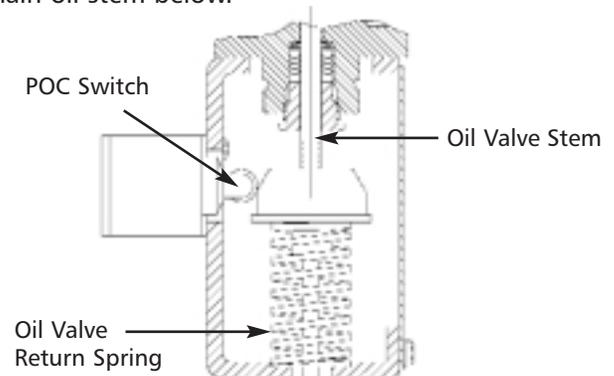
The T505/T506, T1005/T1006, and T2005/T2006 valves use a spring-return tandem cylinder for electropneumatic operation with an air supply of 70 to 120 PSI as follows:

- Pressurizing the upper cylinder (Position 2) strokes the Trifecta valve 1/4" to the purge position. No adjustment is needed to achieve proper purging.
- Pressurizing the lower cylinder (Position 3) strokes the valve until the purge plug contacts the purge seat, putting the system in the fire position.
- Exhausting both cylinders (Position 1) allows the actuator spring to return the valve to the closed position. Two pilot solenoid valves control cylinder pressurization.
- Model T505/T1005/T2005 uses dual-coil momentary contact solenoids for energize-to-trip, fail- in-last-position operation.
- Model T506/T1006/T2006 uses single-coil, spring return maintained contact solenoids for de-energize to trip, failed-closed operation, and is Factory Mutual approved, when incorporating appropriate accessories.

Valve Limit Switches

1. Position (1) shows valve in closed position. Valve closed limit switch is activated.
2. Position (2) shows valve in purge position. Neither the valve closed limit switch or valve open limit switch are activated.
3. Position (3) shows valve in fire position. Valve open limit switch is activated.

Note: Additionally, Oil "Proof of Closure (POC)" switch is indicated from oil valve stem and would be activated while in position (1). See section of main oil stem below.



Custom Engineered Solutions

Specialty Components

ITT Industries, Engineered Valves Group has been an industry leader in providing customized solutions to meet the changing requirements of our customers. Since Skotch Trifecta systems are custom built for each project, we are able to accommodate most non-standard requests.

Oil valve rack systems

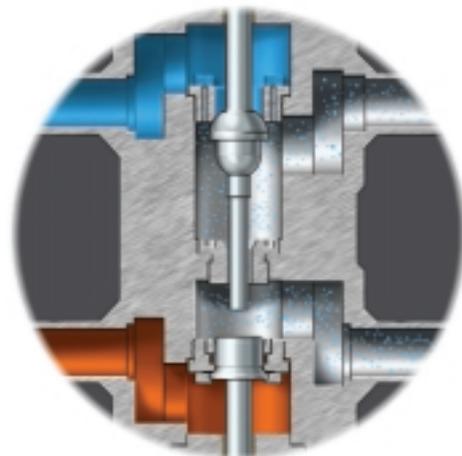
Oil valve rack systems provide greater savings in installation time and money. The Skotch valve system is attached to the free-standing rack such that the height can be adjusted in the field. The base is drilled for bolt mounting or welding to decking. Engineered Valves Group can provide strainers, manual stuf-off valves, gauges, check valves, and recirculation valves as required. As a result the full system can be hydrotested and all welds verified at the factory.

In addition to rack systems, Engineered Valves Group can provide specialty materials to suit your specific needs. Specialty components such as proximity switches, feedback position transmitters and components utilized in corrosive and hazardous conditions are also available.



Cooling Steam Option

A cooling steam option provides drilled orifices in the atomizing seat ring providing a constant cooling steam (or air) flow requirement while a burner is not in service. While the valve is closed a small amount of atomizing media flows through the atomizing and oil outlets, as shown in the view to the right. Our patented cooling steam option was a result of a custom-engineered design that removed the need for an extra valve and/or operator interface.



Please consult our factory for your custom-engineered design application.