LincolnLog®

HIGH PRESSURE ANTI-CAVITATION CONTROL VALVE

Masoneilan®

RELIABLE SOLUTIONS

FOR SEVERE SERVICE APPLICATIONS

DRESSER

LincolnLog® Reliability

Long Term Reliability...

Masoneilan® offers over 120 years of innovation and control valve technology leadership to solve the most difficult process applications without compromise. Masoneilan, with 15 manufacturing facilities worldwide, supported by an integrated network of sales offices, provides the widest range of control valve solutions and services for virtually every process control application. Our breadth of product offerings includes general and severe service valves, actuators, pressure regulators, and digital field instrumentation and software. Our product offering coupled with our global network of Masoneilan Authorized Repair Centers (MARCs) allows us to service our customers as a single source global supplier of control valves and instrumentation.

...Under Extreme Conditions

Masoneilan's LincolnLog valve is the industry's leader for long-term reliability in high-pressure, liquid letdown, anti-cavitation control valve applications. Engineering knowledge and expertise in control valve applications has made Masoneilan the world's Flexible / Best Fit severe service solutions provider. Masoneilan's LincolnLog valve is the control valve solution of choice throughout the wide spectrum of severe service liquid flow applications.

Reliable Through Proven Performance

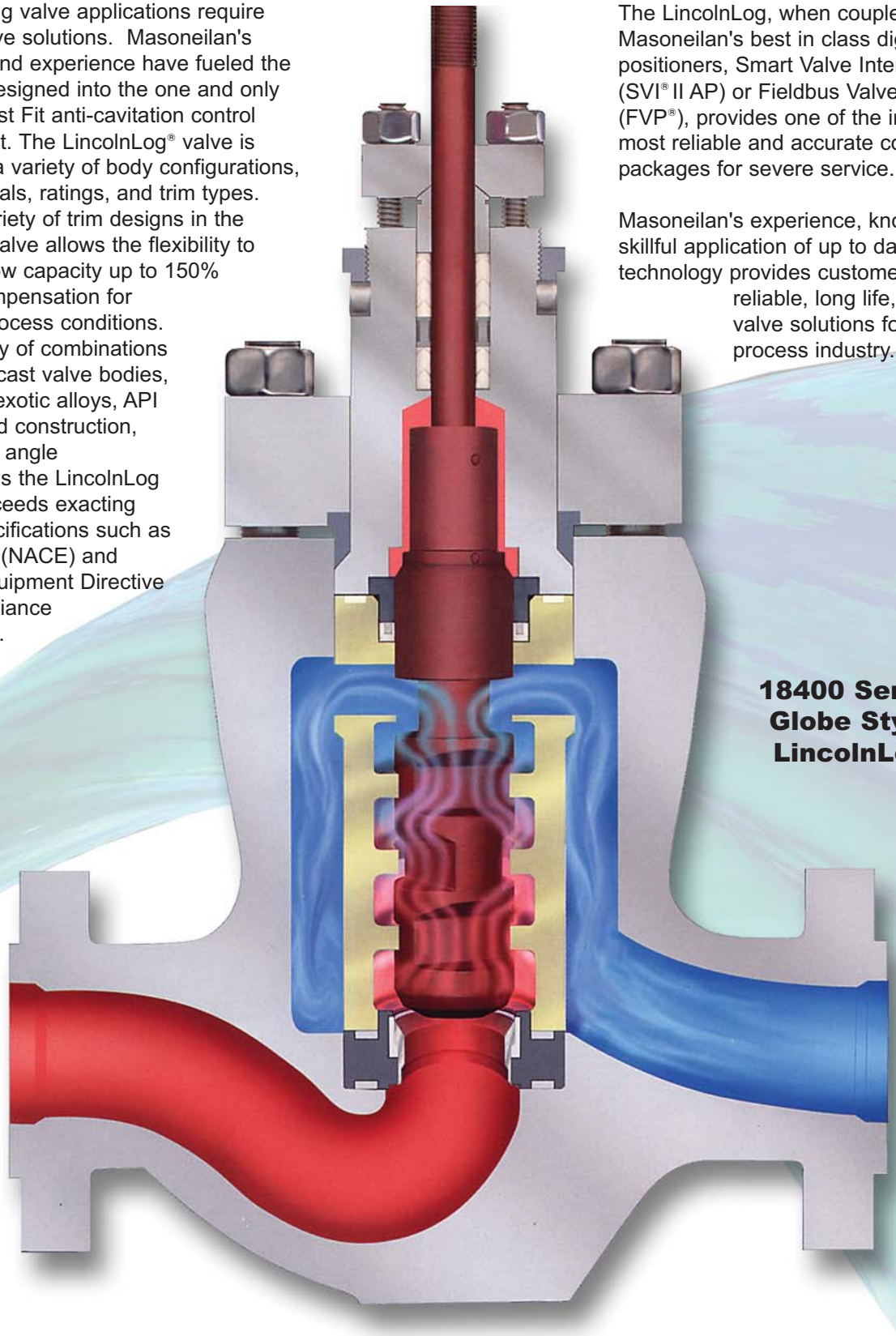
Masoneilan's LincolnLog design has over 20 years of proven field performance as the industry's Best Fit premier high-pressure liquid letdown solution. The Masoneilan LincolnLog is the process industry's most reliable and robust anti-cavitation control valve package with enhanced multi-stage and axial flow trim technology incorporated into a rugged valve design. Over the years Masoneilan's LincolnLog has successfully met the challenges of thousands of severe service applications around the globe.

Flexible / Best-Fit Solutions

Demanding valve applications require innovative solutions. Masoneilan's knowledge and experience have fueled the innovation designed into the one and only Flexible / Best Fit anti-cavitation control valve product. The LincolnLog® valve is available in a variety of body configurations, sizes, materials, ratings, and trim types. The wide variety of trim designs in the LincolnLog valve allows the flexibility to adjust the flow capacity up to 150% enabling compensation for change in process conditions. With a variety of combinations of forged or cast valve bodies, standard or exotic alloys, API or ANSI rated construction, and globe or angle configurations the LincolnLog meets or exceeds exacting industry specifications such as sour service (NACE) and Pressure Equipment Directive (PED) compliance performance.

The LincolnLog, when coupled with Masoneilan's best in class digital positioners, Smart Valve Interface (SVI® II AP) or Fieldbus Valve Positioner (FVP®), provides one of the industry's most reliable and accurate control valve packages for severe service.

Masoneilan's experience, knowledge and skillful application of up to date technology provides customers with reliable, long life, control valve solutions for the process industry.



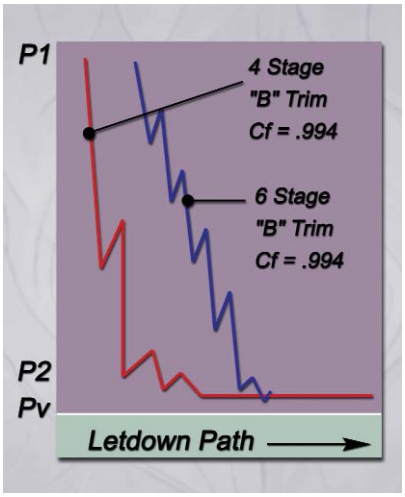
18400 Series Globe Style LincolnLog

Reliability In Performance

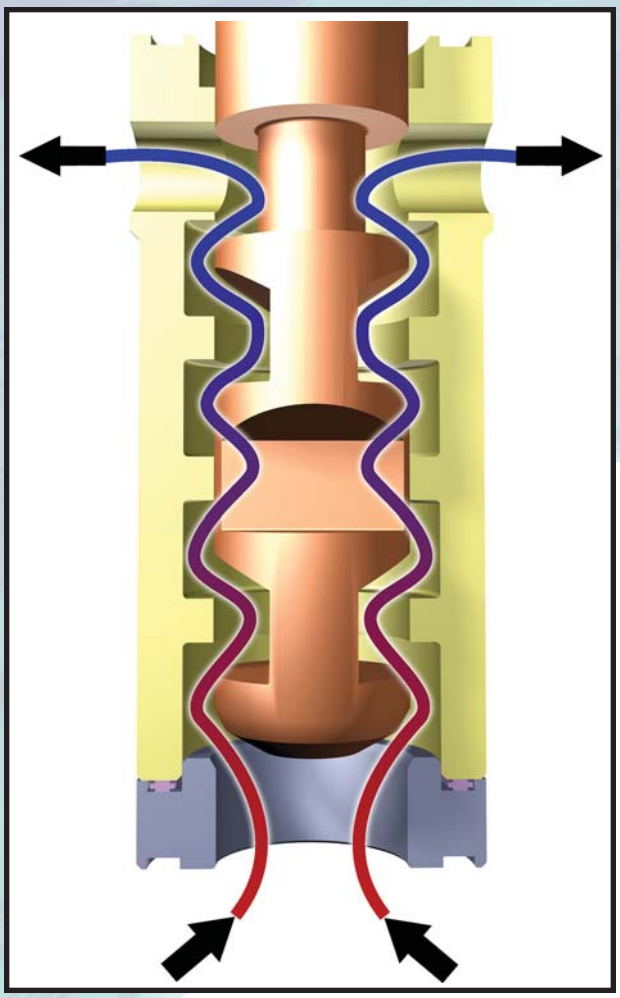
Reliable Valve Performance

The leading cause of poor control valve performance and premature failure in high pressure liquid letdown service is cavitation. Some liquid applications cavitate so severely that the valve may experience diminished performance or even mechanical failure within hours of commissioning. The multi-stage design of the LincolnLog® valve prevents cavitation by directing the fluid through a series of 3-dimensional, high impedance pressure reduction areas or stages. This highly tortuous flow path prevents cavitation by managing the pressure reduction and fluid velocity through each and every stage ensuring repeatable performance over the life of the valve.

The LincolnLog valve provides reliable, long-term performance in the most extreme applications such as inaccessible high pressure liquid letdown wellhead injection valves. The LincolnLog anti-cavitation control valves can be custom engineered with as many as 10-stages of pressure reduction for applications with extreme pressure drops in excess of 8000 psi (550 Bar). These valves are custom engineered with limited pressure drop per stage to allow for confident operation in remote locations such as offshore platforms. Furthermore, a flexible range of staging ratios is available to customize the pressure drop across stages that are more likely to cavitate.



Multi-Stage Trim Comparison - 4 & 6 Stage



Axial Flow Technology: 3-D Multi-Stage Pressure Reduction

Multi-stage, Axial Flow Technology

High trim velocity can intensify cavitation damage inside the control valve. This damage is common in many single stage valve designs, which take the full pressure drop across a single point within the trim. This point is typically the leading edge of the plug and seat where the highest velocity and consequently the most severe and excessive damage is experienced.

Similarly, many radial trim designs, such as drilled hole cages and stacked disks, often experience the same fate under extreme pressure drops. Unlike the axial flow design of the LincolnLog, radial designs throttle and control the pressure drop at the outlet of the inner most stage across the plug seating area. When a radial type valve is less than full open, the inner-most stages are oversized causing a short circuit in the pressure reduction, essentially becoming inactive and ineffective. In this case the full pressure reduction is taken across the inner most final stage and the leading and controlling edge of the plug.

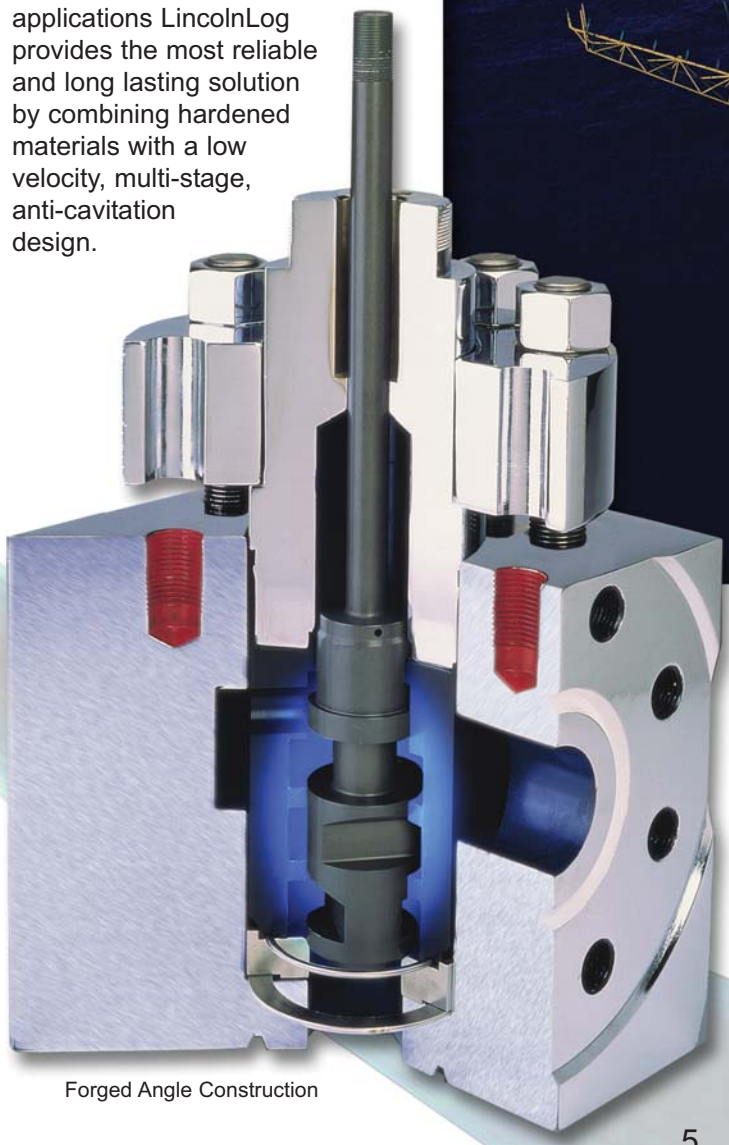
In contrast, the axial flow design of the LincolnLog provides reliable performance throughout the entire range of plug travel. By throttling at all stages in unison, the LincolnLog prevents short-circuiting of any pressure reduction stage, eliminating wear along the leading and controlling edge of the plug. The axial flow technology of the LincolnLog eliminates damage to any controlling surface (plug, cage or seat) because no one single stage is exposed to excessive velocity or the full pressure drop.

Reliability In Service Life

Reliable Installed Life

The LincolnLog® is repeatedly applied in some of the most severe liquid applications because of its robust design. Some of the most challenging control valve applications require the valve to prevent cavitation, while withstanding direct impingement from metal, sand, or other abrasive particles traveling within the process fluid.

For applications such as processing of reclaimed oil and wellhead choke valves, the LincolnLog reduces particle impact damage by minimizing the trim velocity via a high impedance tortuous flow path. Additionally, hardened materials such as 440C Stainless Steel and solid Tungsten Carbide have been successfully incorporated into the trim design to further withstand erosive attack. For these applications LincolnLog provides the most reliable and long lasting solution by combining hardened materials with a low velocity, multi-stage, anti-cavitation design.



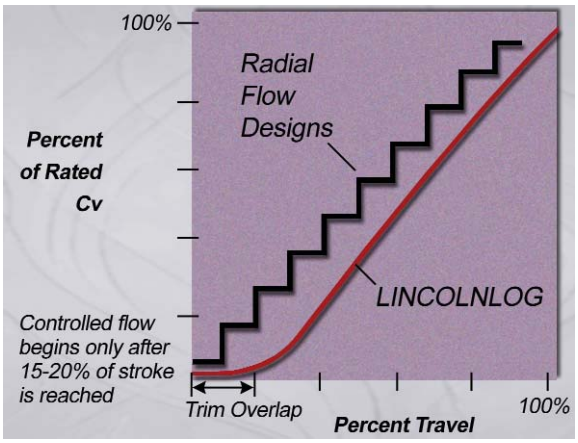
Forged Angle Construction

Vibration is also a cause of premature failure of valve trim parts, specifically the valve plug and stem. Vibration can be process induced or produced by the throttling effects of very high pressure liquid flow streams. Masoneilan has oversized the stem and guiding areas of the LincolnLog to help in overcoming premature failure due to vibration. The oversized stem is mated to the plug with a unique female and male coupling configuration which positively aligns the plug and stem. This eliminates fatigue failure due to vibration caused by trim misalignment. Secure guiding exists across the full length of the valve plug, as massive plug guides are present in each of the staged reduction areas.

Reliability In Control

Reliable Valve Control

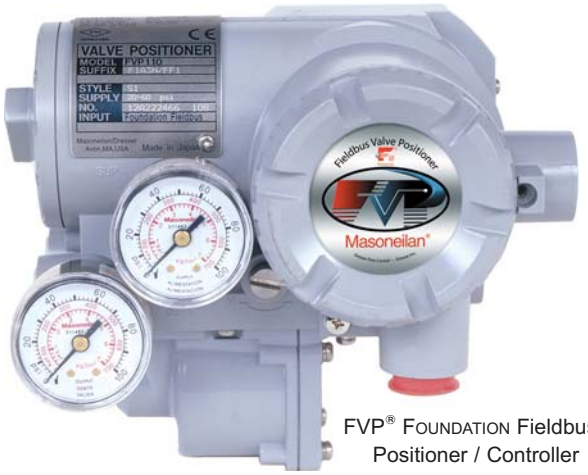
The axial flow technology of the LincolnLog® provides a smooth control characteristic across the entire range of operation. Each pressure reduction stage is throttled simultaneously across the plug, thus preventing a stair-stepped control response, which is commonly found in control valves with radial flow designs. The smooth and continuous throttling control is achieved by the notches or stages built into the plug. The unique notched design coupled with the staged liner/cage enables the LincolnLog to control process conditions over an extremely large range of operation; in some applications up to 150:1 turndown ratio.



Axial Flow Technology: Smooth Control Through Continuously Active Stages

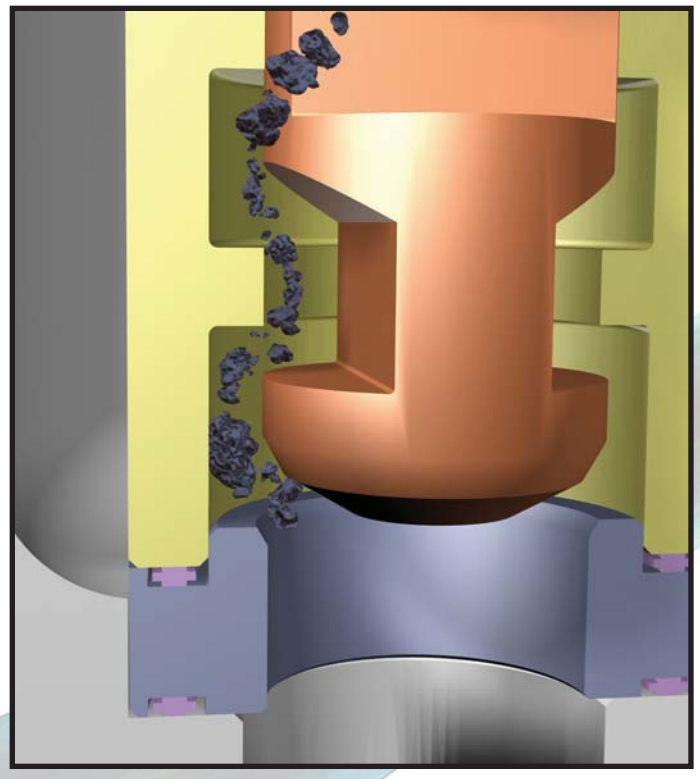
As an added feature, the enlarged flow passages of the axial flow design protect the trim from clogging with pipeline trash. This inherent "trash tolerant" feature provides the benefit of uninterrupted service and repeatable control, which sets LincolnLog apart from competition. Applications such as pump recirculation rely on this technology to ensure that continuous flow is passed through the pump preventing burn-out or overheating of this critical equipment. LincolnLog can be confidently applied in this service as flow will continue to recirculate with no risk of interruption resulting from blocked flow passages.

Masoneilan's smart instrumentation including the SVI®II AP (digital positioner) and the FVP® (FOUNDATION Fieldbus™ Positioner) allow for greater sensitivity and increased control accuracy. Masoneilan's digital positioners also increase the repeatability and reliability of the control valve assembly, allowing for the precise control enabled by 1/10,000th of an inch plug travel resolution.



FVP® FOUNDATION Fieldbus™ Positioner / Controller

The large flow passages of the LincolnLog trim dramatically reduce plugging and galling, which both have a dramatic negative affect on control. In fact, particles with a ½" diameter can and will physically pass through the trim of a 6" LincolnLog valve. The LincolnLog trim design eliminates the small flow passages that are used in drilled hole and stacked disks trim technologies, thus greatly enhancing control performance.


Trash Tolerance: Large Flow Passages to Prevent Clogging

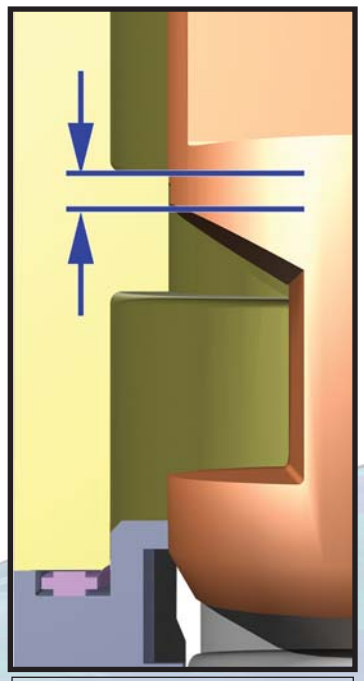
Reliability In Tight Shutoff

Reliable Tight Shutoff

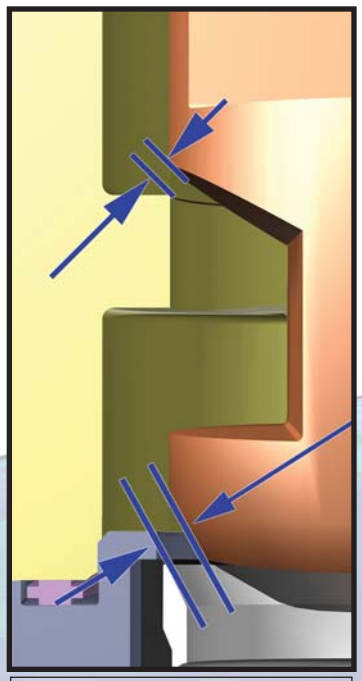
Many valve applications result in poor shutoff or excessive seat leakage after short-term use because the seating area also serves as the primary control element. Designs that throttle the flow near the seating surfaces often develop high fluid velocity and direct the pressure drop across the leading edge of the plug and seat. Once early signs of erosion or wire drawing develop on the seating area, quick deterioration of the valve shutoff performance follows as a result of the high pressure drop at this region.

The Masoneilan® LincolnLog® is designed to maintain long-term shutoff by separating the two functions of shutoff and control into separate areas within the trim. As a LincolnLog plug lifts off the seat, fluid begins to fill the initial plug chamber until the valve reaches approximately 15% open. After this point, the valve flow areas begin to open and the fluid is throttled using the remaining plug stages. Thus, the seating areas are never used for throttling at low flow, which commonly produce erosion damage in radial flow designs. This seat protection feature is critical for plant start-up valves, that are used to throttle a high upstream pressure to the near vacuum condition required for downstream deaerators or condensers.

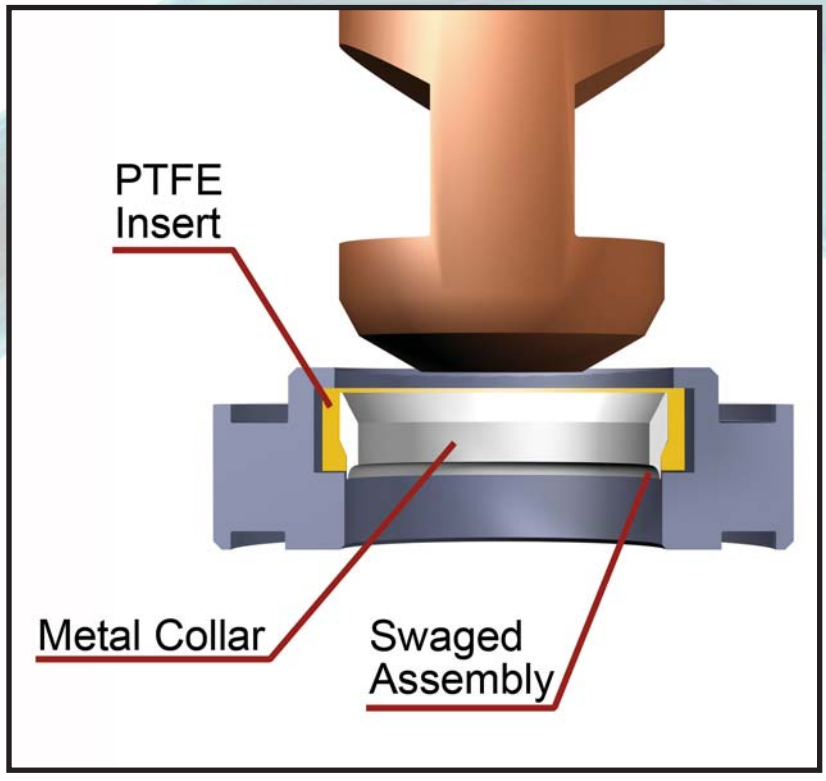
Seat is Protected



Trim overlap when the valve is in the closed position



Area of least resistance at seat in the open position



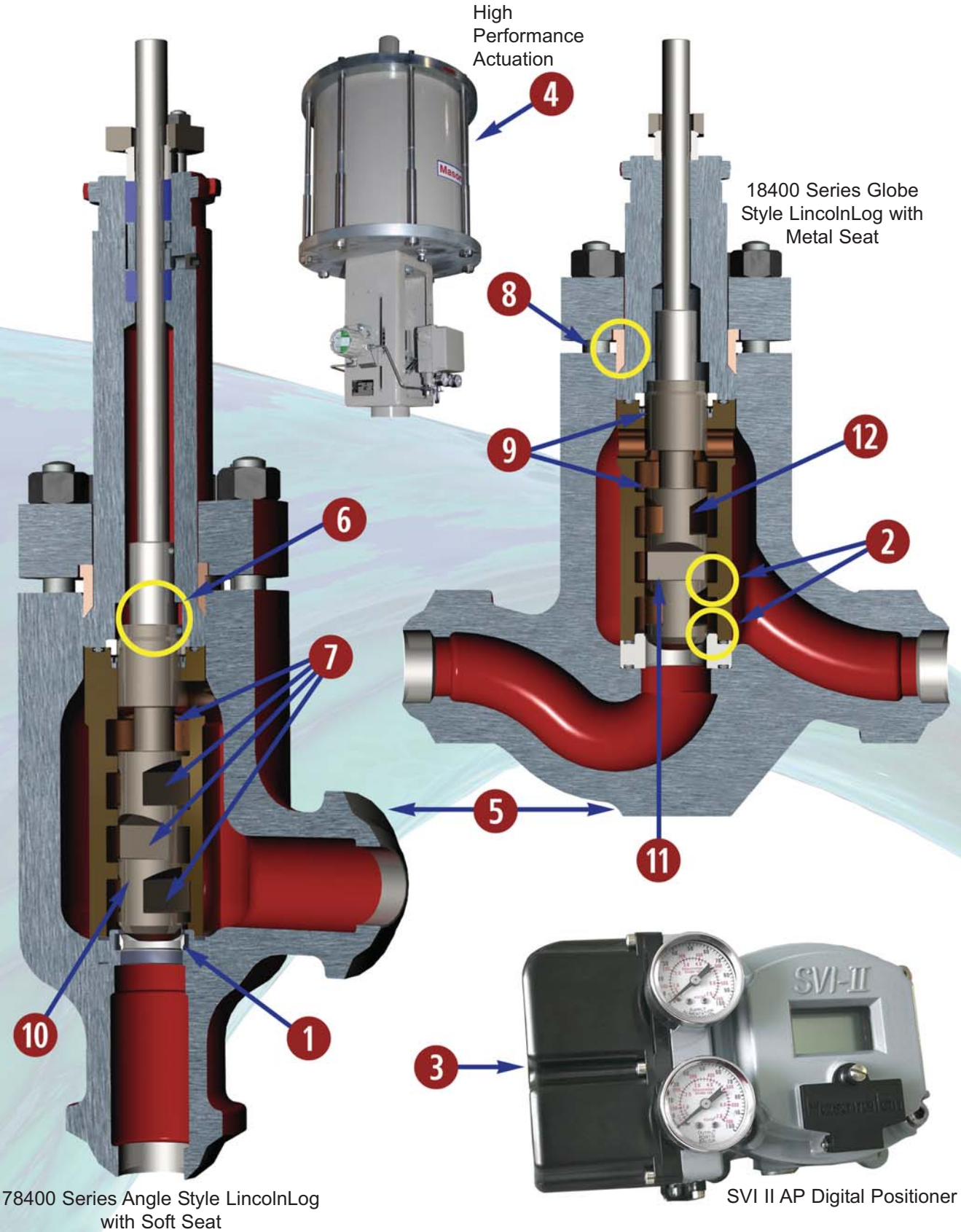
Protected Soft Seat: Class VI Shutoff Design

Tight Shutoff Designs

Shutoff performance consistent with ANSI/FCI Classes IV, V, and VI, as well as MSS-SP-61 are available with the LincolnLog. For temperatures below 450 °F (232 °C), Masoneilan offers a TFE inserted, soft seat design for ultimate tight shutoff. This soft seat is protected by a sliding metal collar that shields the TFE from direct exposure to the flow stream and erosive particles when the plug is off the seat.

Maintaining long-term shutoff is critical in high pressure liquid service, as high pressure differential leakage may lead to wire drawing, cavitation, or flashing damage to the valve, downstream piping, or equipment.

Features & Benefits



78400 Series Angle Style LincolnLog
with Soft Seat

SVI II AP Digital Positioner

Features & Benefits

	FEATURE	ADVANTAGE	END USER BENEFIT	
1	Protected Soft Seat	Long-term, Reliable Class VI Shutoff	Prevents Loss of Product	REVENUE ENHANCEMENT
2	Trim Overlap	Protects Seating Area From High Velocity Flow	Prevents Loss of Product	
3	SVI II AP Positioner	Optimized Control Performance	Precise Control	
4	High Performance Actuation	Trim Stability and Control Reliability	Repeatable Control	
5	Forged/Cast Angle & Globe Configurations	Flexible, Best Fit Installation	Ease of Installation	COST REDUCTION
6	Robust Plug/Stem Connection	Trim Durability	Longer Installed Trim Life	
7	Multi-stage Trim	Cavitation Elimination	Longer Installed Trim Life	
8	Compact Metal Seal Design	Reduces Bolting Torque Requirements	Ease of Maintenance	
9	Heavy Plug Guiding	Eliminates Vibration Induced Damage	Minimizes Downtime	RISK MITIGATION
10	High Resistance Tortuous Flow Path	Effective Flow Energy Management	Minimizes Valve Damage	
11	Axial Flow Technology	Trim Stability and Seat Protection	Reduces Trim Wear	
12	Large Flow Passages	Trash Tolerance	Minimizes Downtime	

Specifications

- **Flow Direction**

standard:	flow-to-open
optional:	flow-to-close

- **Body**

type:	cast or forged globe style cast or forged angle style
sizes:	1" to 12" (DN 25 to DN 200)
ratings:	ANSI Class 600 to 4500 (ISO PN 100 to 400) API 5000 & 10000
end connections:	RF, RTJ, socket weld, butt weld, threaded, print flanges (forgings)

- **Bonnet**

type:	bolted standard extension

- **Body and Bonnet**

materials:	carbon steel 316 stainless steel chrome-moly others

- **Trim**

plug type:	multi-step axial flow (3, 4, 6, 8 and 10 stages)
seat type:	quick change integral with plug liner (1” & 1.5” sizes) metal seat protected soft seat
guide:	heavy top guided, plus liner acts as additional guiding
CV ratio:	up to 150:1
flow characteristics:	modified linear

- **Actuator**

type:	spring-diaphragm spring-return cylinder double-acting cylinder electrohydraulic (such as REXA)
handwheel:	optional

- **Positioner**

type:	SVI II AP - HART FVP - Fieldbus others

Optional designs are also available, such as larger sizes, higher pressure ratings, special materials, or additional trim stages as required. Consult factory for design details and specifications.

LincolnLog

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