DRESSER Masoneilan

Putting You In Control

Camflex® II
Universal Control Valve

35002 Series
Camflex® II

Universal Control Valve

INTEGRATED SMART ENGINEERED BEST FIT SOLUTIONS

EXPERIENCE,
KNOWLEDGE,
TECHNOLOGY.

The World's Best Performing Eccentric Plug Control Valve

Camflex® II Eccentric Plug Rotary Control Valve

Simply Reliable

The Masoneilan® Camflex control valve is based on an elegant design – one which is uncomplicated yet attentive to all the right details. Designed as an integrated system of valve, actuator and positioner, the Camflex is designed to minimize friction, eliminate drive train slop and to mitigate component wear. These design objectives are accomplished via standard and simplified design architecture ensuring that the Camflex reliably performs the basic functions of shutoff, throttling and emission control over an extended lifetime. As a result, the Camflex design elevates overall product integrity and reduces risk of component failure or process upset. This is not an automated valve pieced together in a valve automation shop. Process plant owner/operators have no better control valve choice than the Camflex in driving results on key business metrics:

- Maximizing Process Up-time
- Improving Asset Utilization
- Optimizing Control Performance

Broadly Capable

With built-in reliability the Camflex product design provides a standard platform with enormous versatility and breadth of application. With Camflex, Masoneilan created the eccentric plug, a true rotary globe control valve, that packages the best features of a globe style valve within rotary valve architecture. But we didn't stop there. High-end features such as the extension bonnet, hardened trim, and high performance low emission packing are all standard features, providing exceptional long-term reliability. In fact, Camflex outperforms other control valves in many severely erosive applications where abrasive solids would tear apart other types of valves. Optional constructions, such as the patented DVD™ (Differential Velocity Device) noise reduction trim, alloy constructions and cryogenic extension bonnet allow Camflex to be custom tailored to fit particular application needs. All of this combines to provide industry best life-cycle cost, from purchase through installation and start-up through operation and maintenance.

- Standard Platform
- Globe Valve Performance
- Variety of Customized Configurations

Reliable Long-Term Shutoff

With its eccentric rotating valve plug, Camflex® eliminates two common valve shortcomings: excessive seal ring friction inherent in ball valves and high actuator forces required for tight shut off of either conventional globe valves or butterfly valves.

Because of its unique seating action, the Camflex plug makes no contact with the seat until it rotates into its full closed position. Once seating occurs, continued shaft rotation causes the plug arm to flex, forcing the plug into deeper contact with the seat ensuring consistent tight shut off.

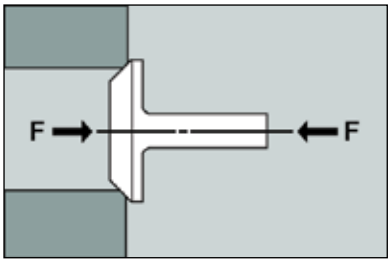
This reliable seating method eliminates wear from rubbing contact and the tight shutoff performance greatly reduces the possibility of clearance flow induced wear or erosion. Camflex seating mechanics and resulting long term reliable shutoff offer the following benefits:

- No Rubbing – No Wear, No Friction
- Improving Uptime by Extending Time Between Maintenance
- Preventing Unplanned Outages and Loss Production

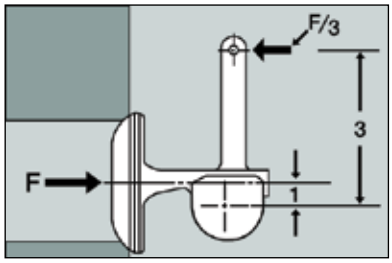
The eccentric plug action of the Camflex combined with a long actuation lever provides a 3:1 force multiplication. Only one-third the force required to stroke a conventional single seated globe valve is required for the Camflex actuator to stroke against a given pressure drop.

- Smaller Actuator Size
- Faster Speed of Response
- Improved Control Performance

The Camflex plug makes no contact with the seat until it rotates into its full closed position.



Conventional Valve Design
1:1 Ratio of Forces Requires Large Actuator



The Camflex Principle
3:1 Multiplication of Forces

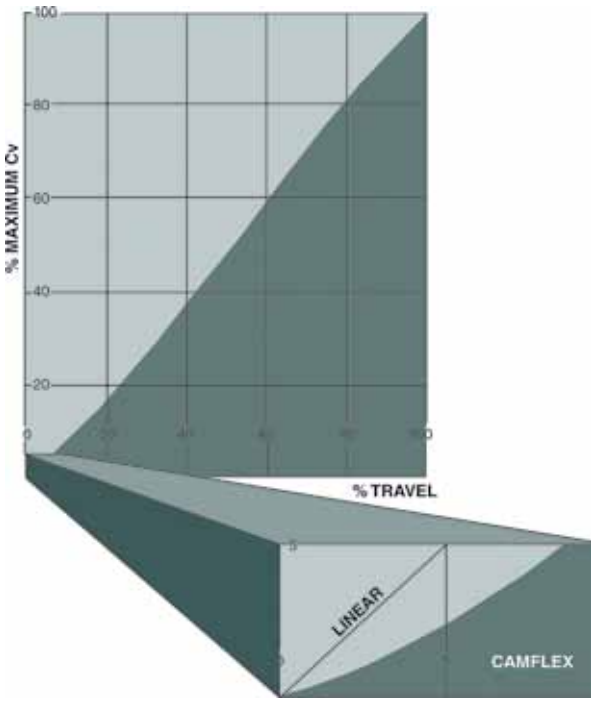
Absolute Reliability

Simple Geometry

The essentially linear flow characteristics of the Camflex® valve is established by the spherical geometry of the eccentric rotating plug.

While the major portion of the flow curve is linear, there is a slight modification as the plug approaches the seat. As the plug cams into the seat, the rate of change in flow is reduced gradually until the plug actually contacts the seat.

- Stable Operation Over a Wide Range
- C_V Ratio of 100:1
- Improved Control at Start-Up (Low Flow/High Control ΔP)



Reliable Control

Combining the features and control accuracy of Camflex valves with Masoneilan's best in class digital valve positioning technology takes your control accuracy to new heights. The Masoneilan SVI® II AP (HART) or FVP (Foundation™ Fieldbus) positioners share state of the art features to optimize control performance.

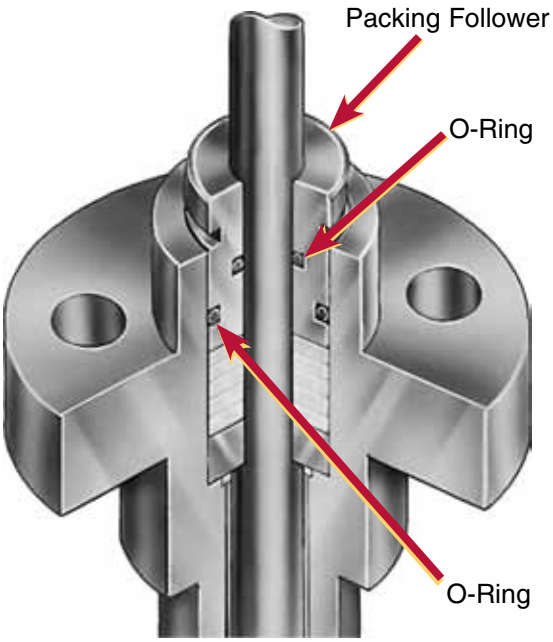
- Directly Connected Valve Shaft Provides Reliable Mechanics
- Patented Non-Contacting Stem Feedback Ensures Long Term Positioning Reliability
- Patented Control Algorithm Provides Best in Class Speed and Accuracy (Qualified for Compressor Anti-Surge and Emergency Applications)

SVI® II AP

Standard Environmental Packing System

Why pay extra to comply with current environmental emissions requirements? Unlike other control valves which often require expensive specialized packing systems to satisfy low emission requirements, Camflex comes standard with Masoneilan's EF® Seal technology.

- Satisfies Global Low Emissions Standards Requirements
- Standard at No Extra Cost
- Simple and Reliable with Long Life



Broad Applicability

Unlike ball valves which typically only offer one trim size (C_V rating) per valve size, Camflex® is offered with full area and at least two reduced capacity options per size. In most cases, changing the C_V rating requires a simple change of the seat ring only.

- C_V Change in Globe Valves Requires Replacement of Multiple, Often Expensive Parts
- Camflex is Available in 1" Thru 16" Sizes From C_V of 0.5 to C_V of 3650
- Optimized Trim Selection Improves Control Performance and Durability

Versatile

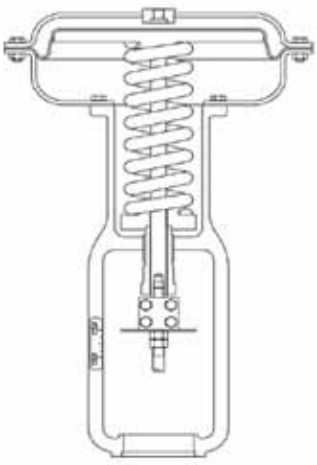
The Camflex easily adapts to a variety of applications, providing an efficient solution at competitive prices. Standard Camflex parts are available off-the-shelf, offering product enhancements which are typically options on many alternative products. Unique features, such as the standard extended bonnet, allows for operation within a wide temperature range.

Field Proven

Over 800,000 Camflex valves have been successfully installed and operated in a variety of process industries and applications. Today's Camflex continues to provide legendary dependability through a field proven concept that remains the standard of excellence for all eccentric plug rotary control valves.

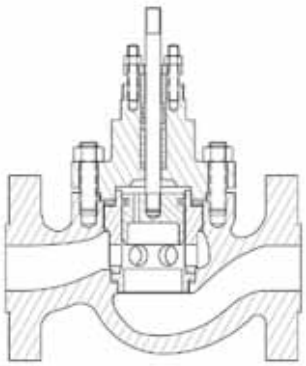
World Class

The Camflex valve continues to be manufactured to the highest standards, using precise techniques, quality craftsmanship, state-of-the-art technology, unmatched industry knowledge, and over 125 years of process control experience.

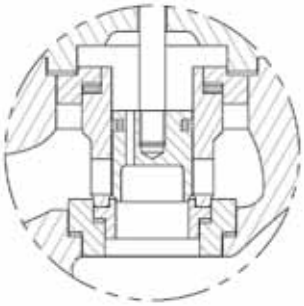


Typical Globe Valve

- Spring-Diaphragm Actuator Provides Smooth Control
- Open Actuator Linkage
  - Exposed to environment
  - Contaminant's can affect performance
- Positioner Mounting Uses Complex Linkage
  - Increased risk of lost motion, adjustment errors
  - Performance is installation dependent
- Sliding Stem Reduces Packing Durability
  - Increased wear
  - Higher friction
  - Contaminant's can be dragged through packing
  - Expensive optional systems required for low-emission compliance



- Gasketed Pressure Boundary Joint
  - Risk of leakage
  - Multiple gaskets & shims depending on trim size – Qty. 3 to 5
- Linear Seating Motion
- 1:1 Ratio of Unbalance Force
  - Large unbalanced area requires balance seals which limit tight shut off
  - Larger required actuator slows dynamic performance
- Cage Guiding
  - Guide surface in flow stream
  - Fluid contaminant's can damage guiding surfaces
  - Not trash tolerant



- Typical 50:1 Cv Ratio or Turndown
- Typical Total Parts: 88
- Typical Weight Comparison (2" size): 133 lbs (59 kg)
  - Even in small sizes, other valve styles often require use of lifting devices during installation and removal

Camflex® II Universal Control Valve

✓	**Spring-Diaphragm Actuator with Rolling Diaphragm (Constant Area) Provides Superior Linear Control**
✓	**Fully Enclosed Actuator Linkage** - Protected from environment
✓	**Direct, Linkageless Positioner Mounting** - Positioner directly connected to valve shaft - No lost motion - Consistent long term performance across all installations
✓	**Rotary Shaft Motion Provides Increased Packing Life** - Low wear - Low friction - Rotating motion prevents contaminant's from being dragged through packing - Standard EF® Seal low emission packing system
✓	**No Gasketed Joints / No Gaskets / No Shims**
	Linear Seating Motion Due to Cam Action of Plug
✓	**3:1 Force Amplification Reduces Unbalance Force** - Lower force reduces required actuator size - Smaller actuator volume area improves dynamic performance for faster system response
✓	**Heavy Triple Guiding** - Guide surfaces out of flow stream - Fluid contaminant's do not impinge on guides - Trash tolerant
✓	**100:1 Cv Ratio or Turndown** - Improves control range, especially at low openings
✓	**Total Parts: 72**
✓	**Weight Comparison (2" size): 45 lbs (20 kg)** - Camflex's lower weight makes handling a breeze and the low profile allows installation into tight areas with low overhead room

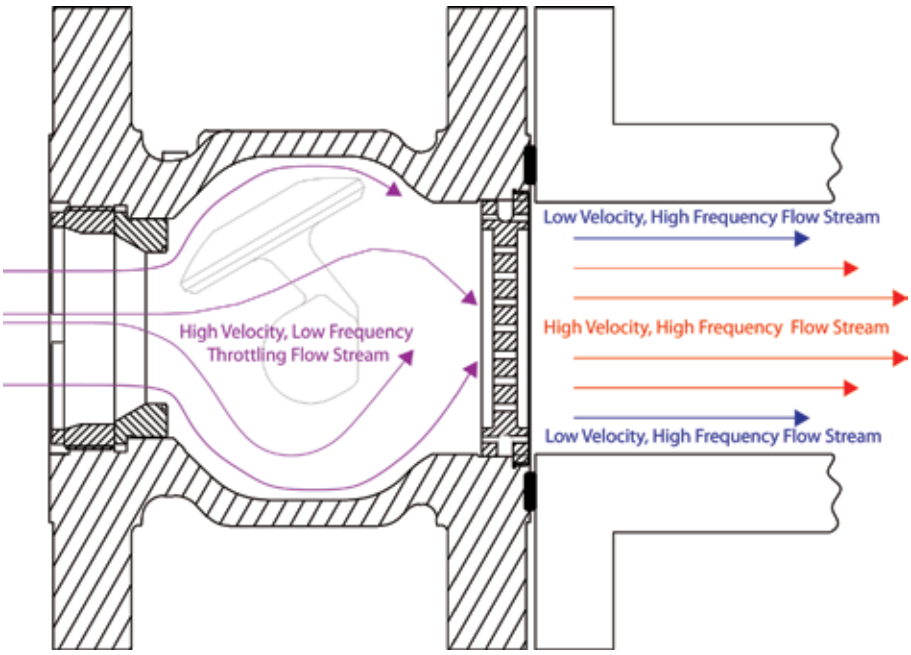
Simply The Best

Superior Capability

Camflex® is available with Masoneilan's patented DVD™ (Differential Velocity Device) noise reduction trim. This highly efficient, yet economical low noise solution applies a concept from turbo-fan jet technology. The DVD device utilizes larger diameter outer holes to create a lower velocity annular flow stream around the flow area perimeter. This lower velocity flow stream reduces noise transmission from the higher velocity inner flow, resulting in lower external noise levels.

- Simple Construction
- Efficient Noise Abatement
- Easy to Retrofit

Camflex with DVD Low Noise Element



Flow Streams

Reduced Downstream
Pipe Wall Noise Levels
Achieved By Valve Outlet
Flow Stream Conditioning

Severe Service Capability in a Standardized Valve Package

Not all control applications involve easy-to-handle or non-hazardous fluids. Extremely high or low temperatures can pose challenges for many valve designs, as can corrosive or erosive fluid streams. Camflex® provides cost effective solutions to all of these challenges.

Standard Camflex handles temperatures up to 750° F (400° C) using low- friction TFE packing. Competing designs require graphite packing above 450° F (232° C), greatly increasing stem friction and reducing control accuracy.

- **Optional Cryogenic Extended Bonnet** option is ideal for use in applications to -320°F (-212° C).
- **Steam Jacket** construction to maintain minimum flowing temperature.
- **Hardened Trim** handles mildly abrasive applications with ease.
- **Ceramic Trim** option handles more severe erosive applications.
- **Alloy Construction** for highly corrosive services.

By combining a rugged, standardized platform with a broad range of material and construction options, Camflex provides exceptional long term performance in a broad set of applications.

Utility[1] Service	General[2] Service	TSO[3]	High[4] Temp	Low[5] Temp	Erosive	Corrosive	Flashing	Noise
Standard	Standard	Optional Soft Seat	Optional	Optional	Optional Ceramic	Optional Alloy Materials	Optional Trim	Optional DVD Trim

Segment Served by Camflex

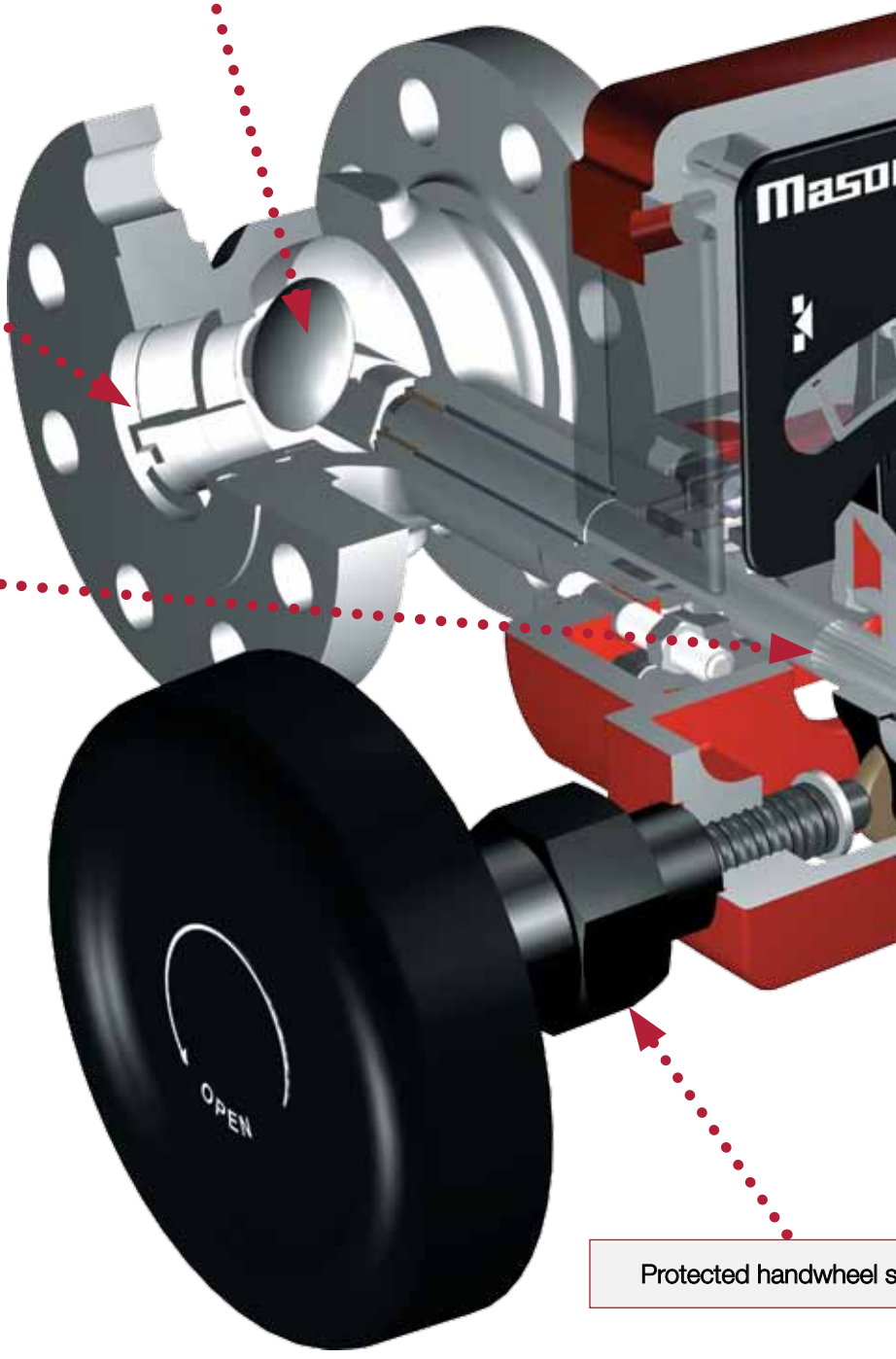
Notes:
1. Water, steam to 100° F (38° C), other non-corrosive/erosive fluids at temperatures <300° F (149° C)
2. Pressure to 250 psi (17.2 bar), temperature to 450° F (232° C)
3. Tight Shutoff: ANSI Class V for reciprocating or Class VI or better for rotary
4. Temperature above 750° F (400° C)
5. Temperature below -250° F (-157° C)

Camflex® II Eccentric Plug Rotary

Eccentric rotating, self-aligning plug for a reliable tight shut-off

Total enclosure

ANSI Class 600 construction with many trim configurations to handle temperatures ranging from -200° C (-320° F) to +400° C (+750° F) and standard ANSI Class IV leakage



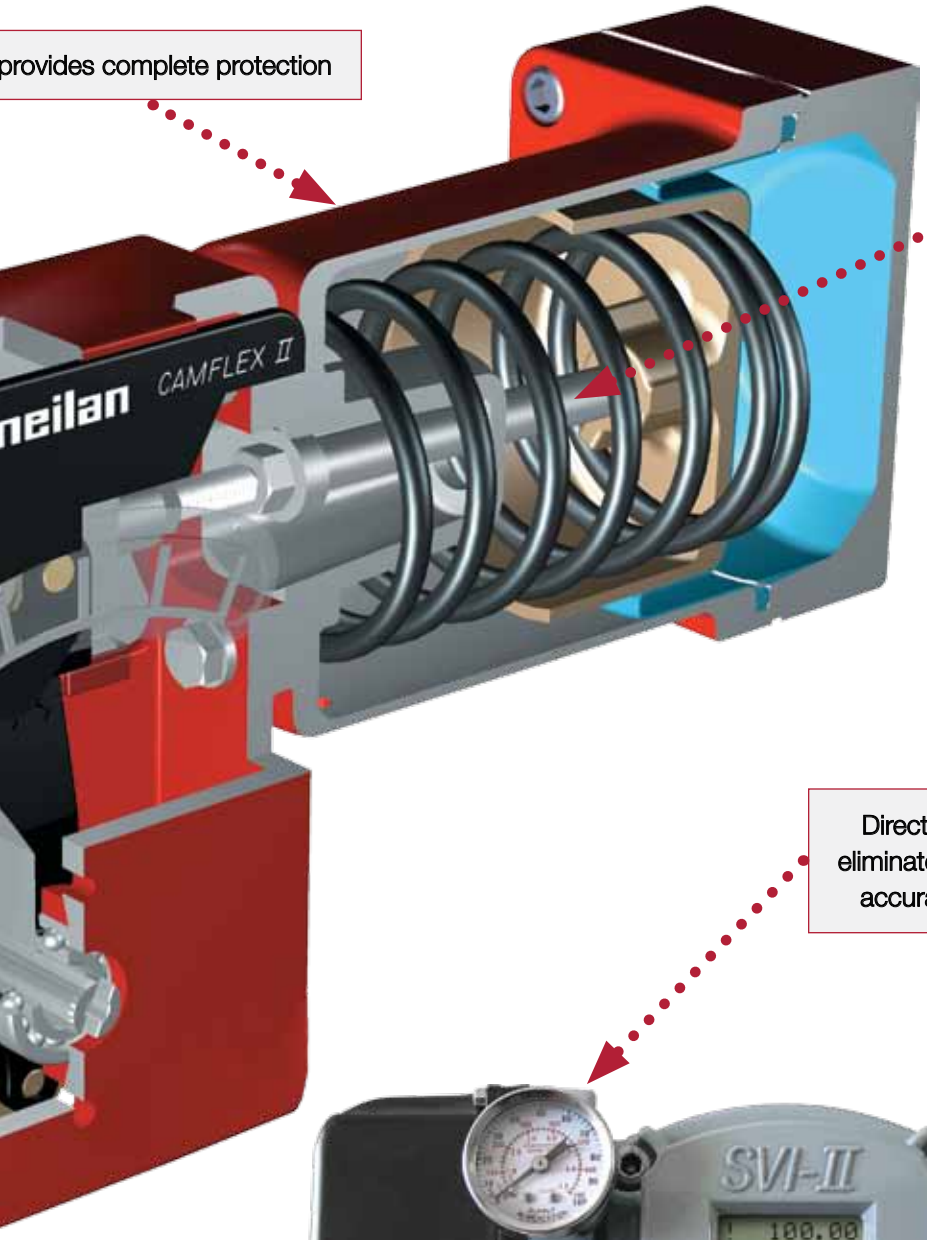
Rugged construction with a splined plug shaft and a triple bearing system minimizes backlash and provides exceptional support and guiding

Protected handwheel s

Control Valve

provides complete protection

Increased actuator power for more positive seating



Direct mounted positioner eliminates all linkage for better accuracy and repeatability

SVI® II AP
Advanced Performance
digital valve positioner

haft

Nothing in the Marketplace Compares to Camflex

It has been said that imitation is the most sincere form of flattery. As the first, and industry leading eccentric plug control valve, Camflex has been the standard many competitors have tried to copy, but none have successfully duplicated.

Camflex is the only product that effectively combines broad application range, superior control performance, simplicity and long term reliability.

Specifications	Masoneilan Camflex	Competitor A	Competitor B	Competitor C
Body Sizes	1" - 16" DN25 - DN400	1" - 8" DN25 - DN200	1" - 10" DN25 - DN250	1" - 12" DN25 - DN300
Body Ratings (ANSI Class)	150, 300 & 600	150, 300 & 600	150, 300 & 600	150, 300
End Connections	Threaded, Flanged, Flangeless	Flanged, Flangeless	Flanged, Flangeless	Flanged, Flangeless
Body Materials	Carbon Steel Stainless Steel Alloy 20 Hastelloy Uranus B6	Carbon Steel Stainless Steel Hastelloy	Carbon Steel Stainless Steel	Carbon Steel Stainless Steel
Bonnet Type	Integral	Integral	Separate	Integral
Face to Face	ISA S75.08.02 (IEC 60534-3-2)	ISA S75.08.02 (IEC 60534-3-2)	ISA S75.08.02 (IEC 60534-3-2) ANSI B16.10	ISA S75.08.02 (IEC 60534-3-2)
Weight lbs (kg) 2" (DN50) Flanged 2" (DN50) Flangeless	 54 (24) 45 (20)	 81 (37)	 82 (37.2) 70 (32)	 49 (22) 40 (18)
Overall Height	15" (381 mm)	22" (558 mm)	24" (610 mm)	16" (406 mm)
No. of Body Gaskets	0	0	2	0
Plug to Shaft Connection	Long Spline	Sleeved Taper Pin	Long Spline	Square Shaft Connection
Rotation	50°	90°	90°	90°
Stellite Trim Standard Available Option	 Yes Yes	 No Yes	 Yes Yes	 No Yes
Low Noise Trim	Yes	No	Yes	No
Reduced Trim Options	0.6 / 0.4 / 0.2	0.4	0.5	0.7 / 0.4
Guide Bushings	440C, Stellite, Alloy 25	PTFE, 440C, Stellite	Stellite	440C
Low Emission Stem Seal Standard Available Option	 Yes Yes	 No Yes	 No Yes	 No Yes

Often Copied,
But Never Duplicated

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About Dresser, Inc.

Dresser, Inc. is one of the leading providers of reliable, highly engineered infrastructure products for the global energy industry. Dresser's highly regarded portfolio of brands includes Wayne® payment and fueling systems; Waukesha® natural gas-powered engines and generator sets, Masoneilan® control valves, Consolidated® pressure relief valves, and Roots® blowers and compressors. With locations worldwide, Dresser, Inc. serves customers in more than 100 countries. www.dresser.com.

About Dresser Masoneilan

Dresser Masoneilan, headquartered in Houston, Texas, has been the leading global partner in process control valves and solutions for more than 100 years. A business segment of Dresser, Inc., the company delivers customized products, services and diagnostic solutions for oil and gas, process and power generation applications. www.dresser.com

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