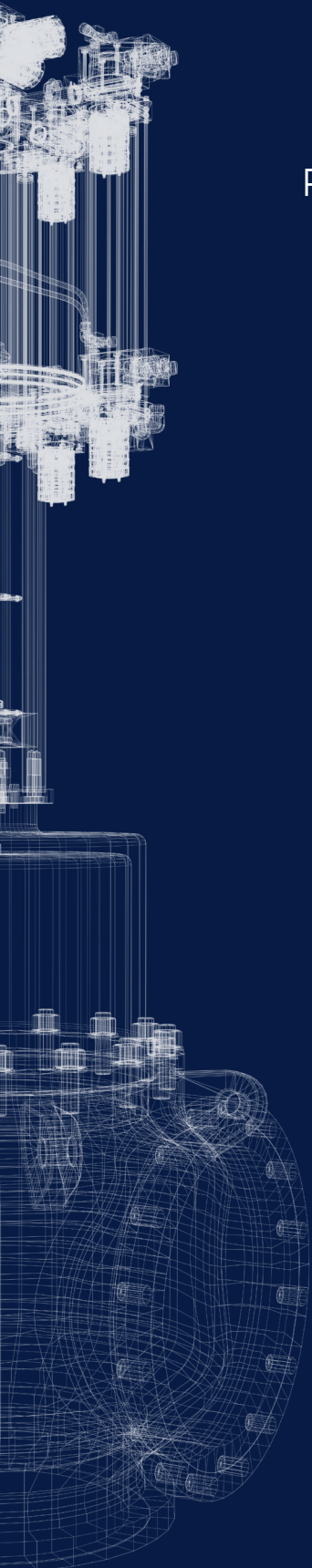


Advanced Anti-Surge Control Valve

Precision Control for Reliable LNG Compressor Protection



It all flows from expertise.



Importance of Anti-Surge control in LNG compressor

LNG compressors play a critical role in gas liquefaction and transportation. These compressors operate under high-pressure conditions, and any sudden reduction in flow or pressure fluctuations can lead to compressor surge—a severe aerodynamic instability that can cause:

Mechanical Damage: Repeated surging leads to excessive vibrations, bearing failures, and impeller damage.

Operational Disruptions: Surge events force shutdowns, leading to costly downtime in LNG processing.

Reduced Efficiency: Frequent surges reduce compressor lifespan and efficiency, increasing maintenance costs.



Anti-Surge Control valves are essential in preventing compressor surge by:

- Rapidly opening to recycle gas and maintain stable flow.
- Ensuring precise flow modulation to prevent pressure spikes.
- Protecting compressors from damage and unplanned shutdowns.

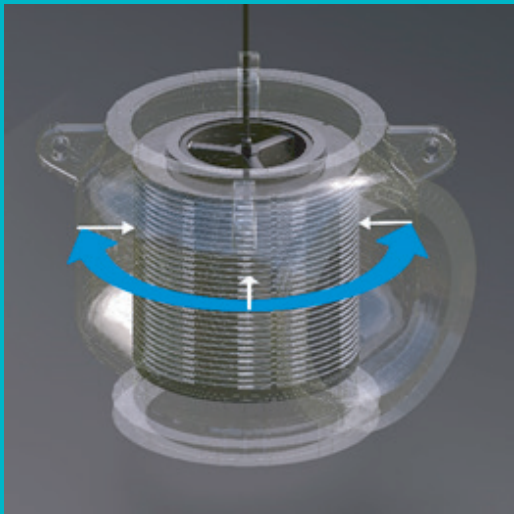
A well-designed Anti-Surge Control Valve ensures reliable LNG production, minimises downtime, and enhances overall process efficiency.

How Severn's Anti-Surge Control Valve Optimises Performance & Prevents Surge Damage

Severn have for many years been utilised to identify and provide solutions to difficult anti-surge problems on valves supplied for this acknowledged Critical Service application.

The company has successfully developed a 'selection criteria' mechanism that raises the valve specification to a higher level, than that normally utilised in many standard control valve specifications.

Severn's Anti-Surge Control Valve is engineered to deliver fast, precise, and reliable control in LNG compressor applications, ensuring maximum protection against surge events. Here's how it optimises performance:



High Flow Capacity & Optimised Flow Path

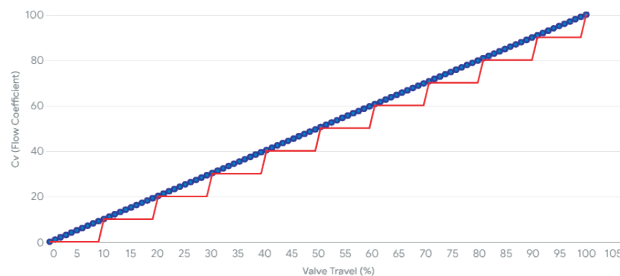
Severn's valves feature a high Cv design to deliver maximum gas flow when needed. Our enhanced capacity bodies—with larger gallery areas—ensure optimal trim selection and sufficient flow area, minimising velocity-related noise and vibration.

This design approach reduces pressure drop and turbulence, enhancing compressor stability and overall system performance.

An extended trim travel length

Accurate control is critical in anti-surge applications. Extended trim travel length enhances valves controllability, reducing issues like overshoot, dead-band, and hysteresis caused by rapid Cv changes. Optimal performance requires seamless synergy between high-speed actuators and precision valve trims—ensuring compressor protection and process stability.

Severn's trims utilise small overlapping passages to ensure smooth valve performance. The ability to utilise the extended valve travel means that the process can be accurately controlled, to eliminate step changes required by alternative designs to achieve the significant changes in trim area. Severn's design provides increased accuracy often required by Anti-Surge Control Valves.



Severn trims ———
Other trims ———

Fast Response, High Precision Actuation

Severn's spring-less piston actuators deliver rapid response and low dwell time—meeting stringent compressor OEM specs for re-cycle valves. With reduced air volume and optional local volume tanks, they offer lower air consumption than diaphragm actuators. High stiffness and low-friction materials ensure excellent positioning accuracy and minimal stiction across the full stroke. Our solutions have consistently met major demanding Anti-Surge specs.

A double-acting, low swept volume pneumatic piston actuator ensures valve rigidity and minimises dwell and stroke times during trips or rapid signal changes.

We recommend a spring-less actuator to further reduce venting air volume. 'Air fail open' action is achieved via a nearby supplementary air tank—delivering faster, more reliable performance.



Anti-Surge Actuator



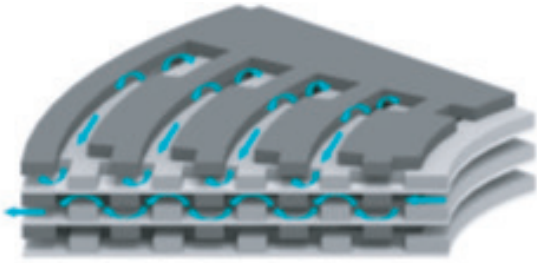
Optimised Instrumentation for Peak Performance

Field experience proves that the right **instrumentation package** is critical to valve performance. Severn's recommended configurations deliver the ideal balance of **positional accuracy and speed**, tailored to meet compressor specs.

The key lies in **fine-tuning** instrumentation to the specific valve—ensuring seamless integration and **optimal performance** under all operating conditions.



Smart Positioner



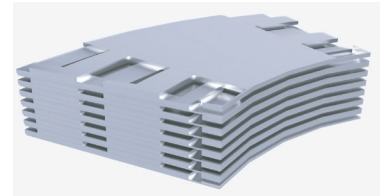
Engineered Trims for Pressure Control

Severn's trims offer multi-stage pressure reduction, minimising not just noise but also flow-induced vibration. This staged approach protects against trim fatigue and prevents damage to piping and accessories, ensuring long-term reliability in severe service conditions.

Multi-Labyrinth Trim (MLT Disk) Stack

Designed for severe service applications, MLT trims offer a high number of pressure letdown stages. The tortuous flow path and controlled expansion design reduce internal velocities, minimising noise, vibration, and erosion.

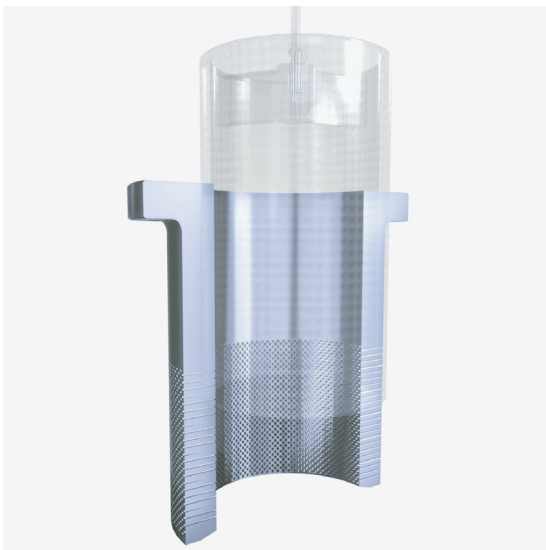
- Built from precision laser-cut disks, vacuum brazed into a solid stack.
- Creates multi-directional, expanding flow paths with right-angle turns.
- Enables up to 64 pressure reduction stages within the same body size.
- Maintains velocity control at all stages, reducing kinetic energy.



Concentric Cage (CC) Trim

Designed for **medium to high pressure** applications, the CC Trim offers robust, multi-stage pressure letdown with reduced erosion, noise, and vibration.

- 1CC to 4CC options with drilled-hole cages.
- Up to 9 pressure reduction stages.
- 90° impingement flow path for controlled letdown.
- Customisable in various material combinations to meet project specs.

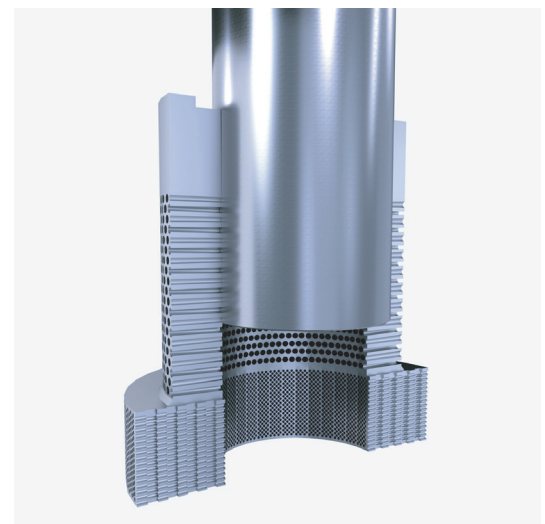


Vari stage trim

Designed to handle high pressure drops at low openings and deliver maximum flow capacity at wider openings, Severn's Vari stage trims adapt to demanding application profiles.

Configurable options:

- 1CC/2CC for medium pressure drops or MLT + 1CC for extreme conditions (e.g., startup).
- Balances performance across the valve stroke for stable, efficient control.
- This trim delivers significantly enhanced performance in critical applications.



Superior Seat Sealing for Compressor Efficiency

Tight shutoff is essential—**seat leakage means lost gas, lost energy, and lost revenue.** Severn's valves are engineered for **high-integrity sealing**, ensuring lasting performance.

- **High-powered piston actuators** deliver precise, consistent seating force—far beyond what diaphragm actuators can achieve.
- Optimised seating load (PLI) prevents leakage caused by deformation or thermal shifts.
- Proven performance across applications, delivering leakage classes from FCI 70.2 Class IV to VI.
- Backed by extensive factory testing and field experience.



Proven Reliability in LNG Applications

- Field-tested in major LNG plants, demonstrating superior durability and minimal maintenance.
- Engineered for continuous, long-term operation with low lifecycle costs.
- By combining speed, precision, and durability, Severn's Anti-Surge Control Valve safeguards LNG compressors, reduces operational risks, and enhances overall system efficiency.

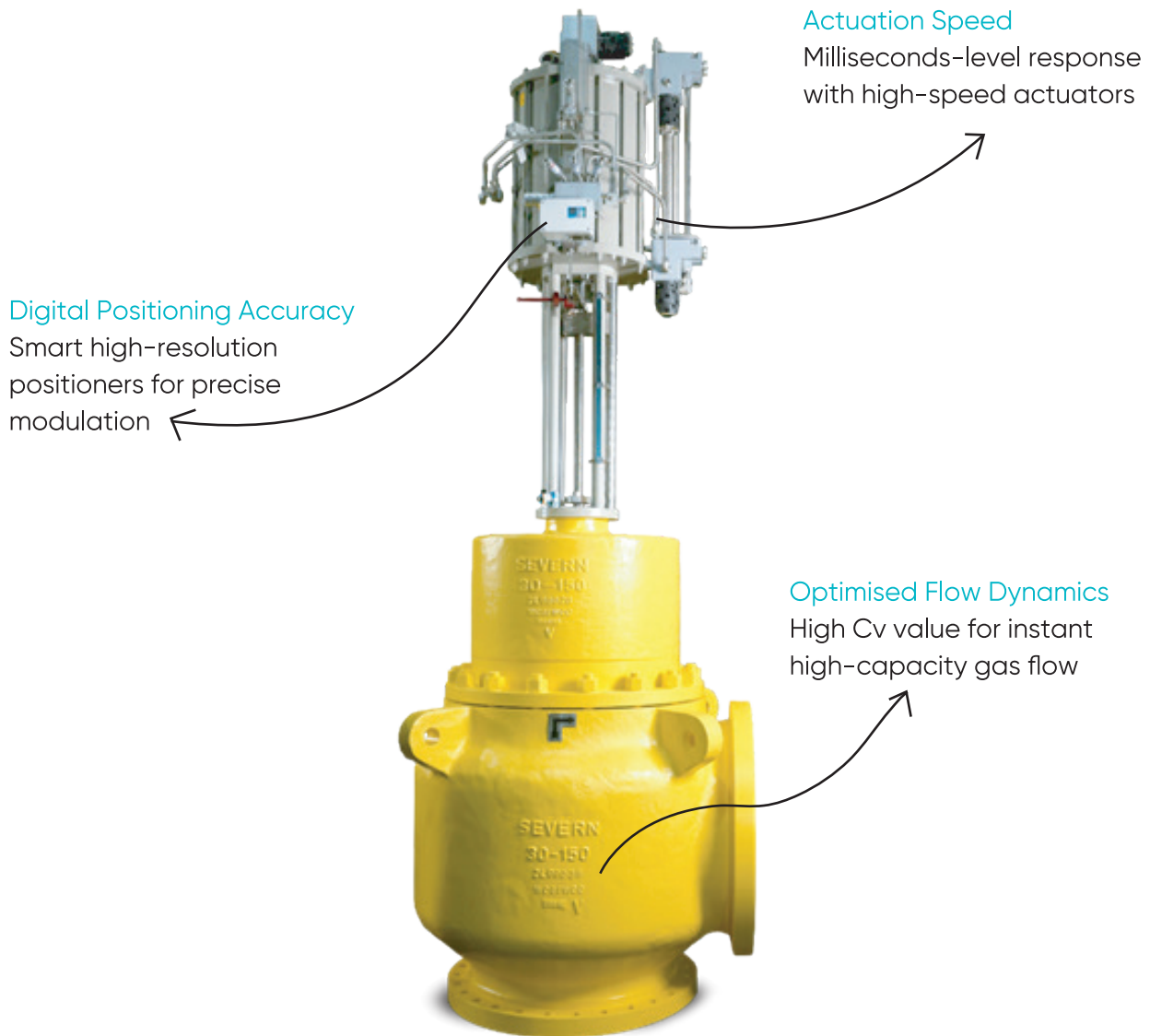


Why to Choose Severn Anti-Surge Valves?

Faster Response Time Compared to Traditional Solutions

Severn's Anti-Surge Control Valve is designed for ultra-fast operation, significantly outperforming traditional control valves in LNG compressor surge protection.

Severn can achieve all Anti-Surge specifications without concession!



Why LNG Operators Trust Severn?

- Proven track record in LNG projects.
- Designed for high-speed, high-precision performance.
- Reliable operation under extreme conditions.

Maintenance Advantages & Cost Savings

- Longer Service Life – Built for extended operational cycles.
- Reduced Downtime – Lower risk of failure means less costly, unplanned maintenance.
- Lower Total Cost of Ownership – Robust design and longer maintenance intervals lead to significant cost savings over time.

Get in touch

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