



ERV

Electronic Relief Valves

Electronic Relief Valves (ERV)

ERV

Electronic relief system

Consider the safety rating, productivity value and cost savings of electronic relief valves – the relief valve whose standard blowdown and set pressure is accurate to 1/10% of 1 psi. ValvTechnologies' ERV is the perfect combination of zero-leakage isolation valve plus the electronic controls needed to monitor and regulate system pressures in a safety valve environment and within ASME Code Section I "V" Stamp requirements where critical over-pressure protection is paramount. ValvTechnologies' ERV is the benchmark.

- 2 1/2" x 4" and larger
- ASME / ANSI class up to 4500
- ASME Section I capacity certified
- Integral isolation valve available
- Easily adapted to existing controls
- Repeatable tight shut-off
- Accurate to 1/10% of 1 psi
- High-precision reliability
- Low-maintenance requirements
- Accurate blow downs = major cost savings
- Seat out of flow path when open
- Various standard control packages



Protection of conventional and nuclear main steam safety relief systems

ERV Control Box

ValvTechnologies' ERV control box delivers reliable automation in light-weight, compact packages, optimizing overall productivity in the distribution of power to flow control devices. With state-of-the-art improvements, the ERV control boxes integrates better environmental performance, simplified wiring and control, set point programmability and fault indication.

- Enclosure: NEMA 4X, stainless steel
- Auto/manual function: automatic + DCS auto
- DCS function: dry contact
- Fault indication available
- Pressure transmitter: 4-20mA
- Calibrated by PLC interface
- Actuation / cycle counter



Applications

ValvTechnologies' ERV valves are built specifically for main steam safety relief systems.

- Protection of the spring loaded main steam safety valves
- ASME Code Section I V stamped with capacity certification for supercritical applications

ERV Series

Z Series ERV - Premium Package

Standard with a control box, complete fast-acting actuation package, longer diffuser discharge piping which minimizes noise and maximizes flow.

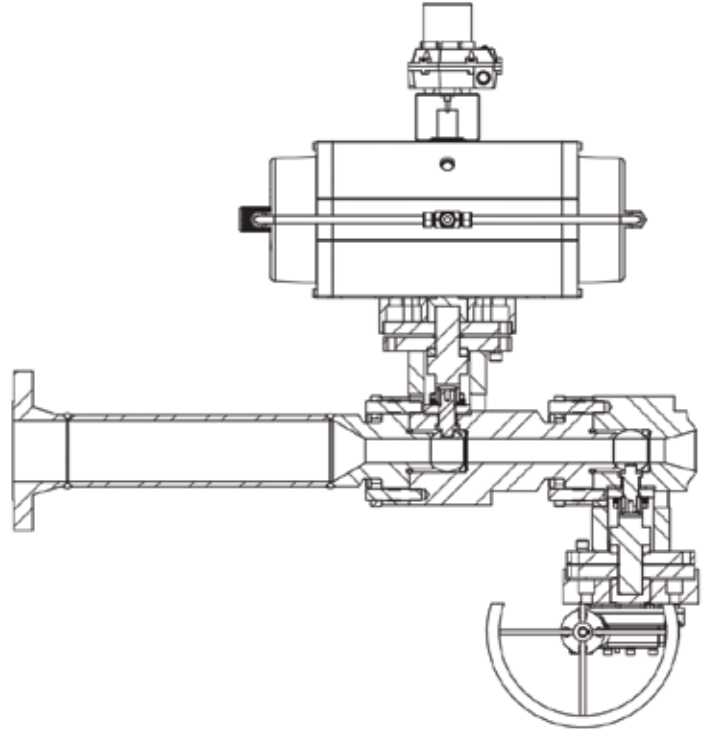
Set points - The set points of the "Z" series ERV are $\pm 0.1\%$ accuracy. This accuracy results in less steam loss during an actuation/cycle and better protection of the drum and superheat conventional safety valves.

Safety - The take off point for the signal will typically be from the drum or superheater. This live steam point must then be cooled to prevent overheating of the pressure transmitter. To ensure safe maintenance and operations, ValvTechnologies has designed a system which consists of a coiled P22 piped siphon which is then welded to a Monel diaphragm seal. The outlet of the Monel diaphragm seal is then connected to the miniature cooling tower and the piezoresistive transmitter. As the diaphragm seal is a pressure boundary the transmitter may be removed without breaking into the pressure boundary.

Diffuser outlet - The diffuser must be piped to a discharge drip pan for reliable and safe operation. Hard piping to a header or silencer is strictly forbidden.

Controls - The standard control unit, in addition to lights, push buttons and selector switch, will also have a programmable controller to allow easy adjustments of blow-down. It also includes an actuation/cycle counter and a local pressure indication display.

Optional isolation valve - Combination valve package for non-ASME Code Section I V stamped applications for two valves in one assembly eliminating a critical weld during installation. ASME Code Section I V stamped applications require a minimum of two ERVs for redundancy purposes.



ValvTechnologies' ERV is the benchmark when extra safety assurance is required

R Series ERV - Economical Package

Standard product with a shorter diffuser discharge, without the fast-acting actuation package and control box. As with the Z Series, the discharge must be piped to a drip pan for safe reliable operation.

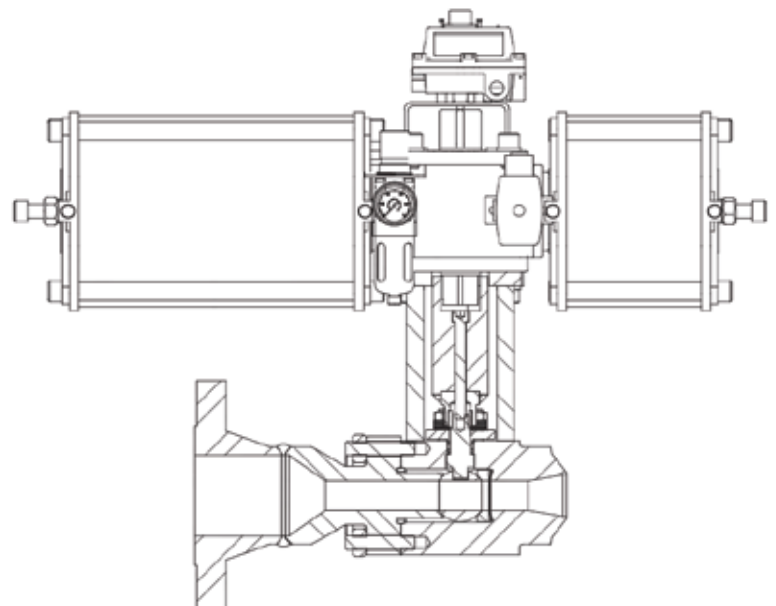
Set point - Accurate to 0.25% with pressure transducer that customer connects to a pressure sensing line. The line requires an isolation device.

Standard actuation - High temperature pneumatic actuator with solenoids and limit switch that contains relevant terminals.

Terminal box - for connections from the control room.

Optional - Siphon and control box.

Optional isolation valve - See explanation above.



Standard ERV Packages

ValvTechnologies' zero-leakage ERV valves are commonly supplied with the following items:

- ValvTechnologies' zero-leakage, V Series valve
- Actuator - options include:
 - Air
 - Spring
 - Hydraulic
 - D.C. electric
 - A.C. electric
 - Fail-safe last position
 - Fail-safe (pneumatic tank or spring return)
- Pressure transducer
- Weatherproof control box
- DCS signal input

Additional options are also available, including:

- Remote panel
- Lockable switch
- Drip pans / exhaust pans
- Voltages
- Silencers
- Heaters



The Benefits of a ValvTechnologies' ERV Solution

ValvTechnologies' zero-leakage ERV valves are the premier solution where isolation is required for main steam safety relief systems, providing increased safety and reliability.

| Features | Benefits |
|--|---|
| Tight shut-off | As a standard, ValvTechnologies meets zero leakage requirements on low-pressure air and high-pressure water |
| High spring load | ValvTechnologies' very high spring load not only assures contact between the ball and seat, but at all positions from open to close |
| Accuracy to 1/10% of 1 PSI | Pinpointed opening pressure |
| High-precision reliability | Consistent reliable operation |
| Low maintenance requirements | Low cost-of-ownership |
| Accurate blow-downs | Major cost savings |
| Seat out-of-flow path when open | Unimpeded flow path with no impingement |
| Easily adapted to existing controls | Potential cost-saving when adaptable to existing controls |
| Various standard control packages | Highly customizable |
| Integral isolation valves available | Two valves in one for easy installation |
| Full pressure protection | Maximizes over pressure protection |
| Easily adjusted high and low set points | Ease if installation set up |
| Secondary pressure signals can be taken from the boiler nozzle or any other source - customer's choice | Installation flexibility |
| Multiple signals can be prioritized | Operational flexibility |
| Standard controls can be adapted to customer requirements | Installation flexibility |
| DCS signal interfaces available as dry and wet contacts | User-friendly adaptability |



V Series Metal Seated Ball Valves

1. Integral metal seat

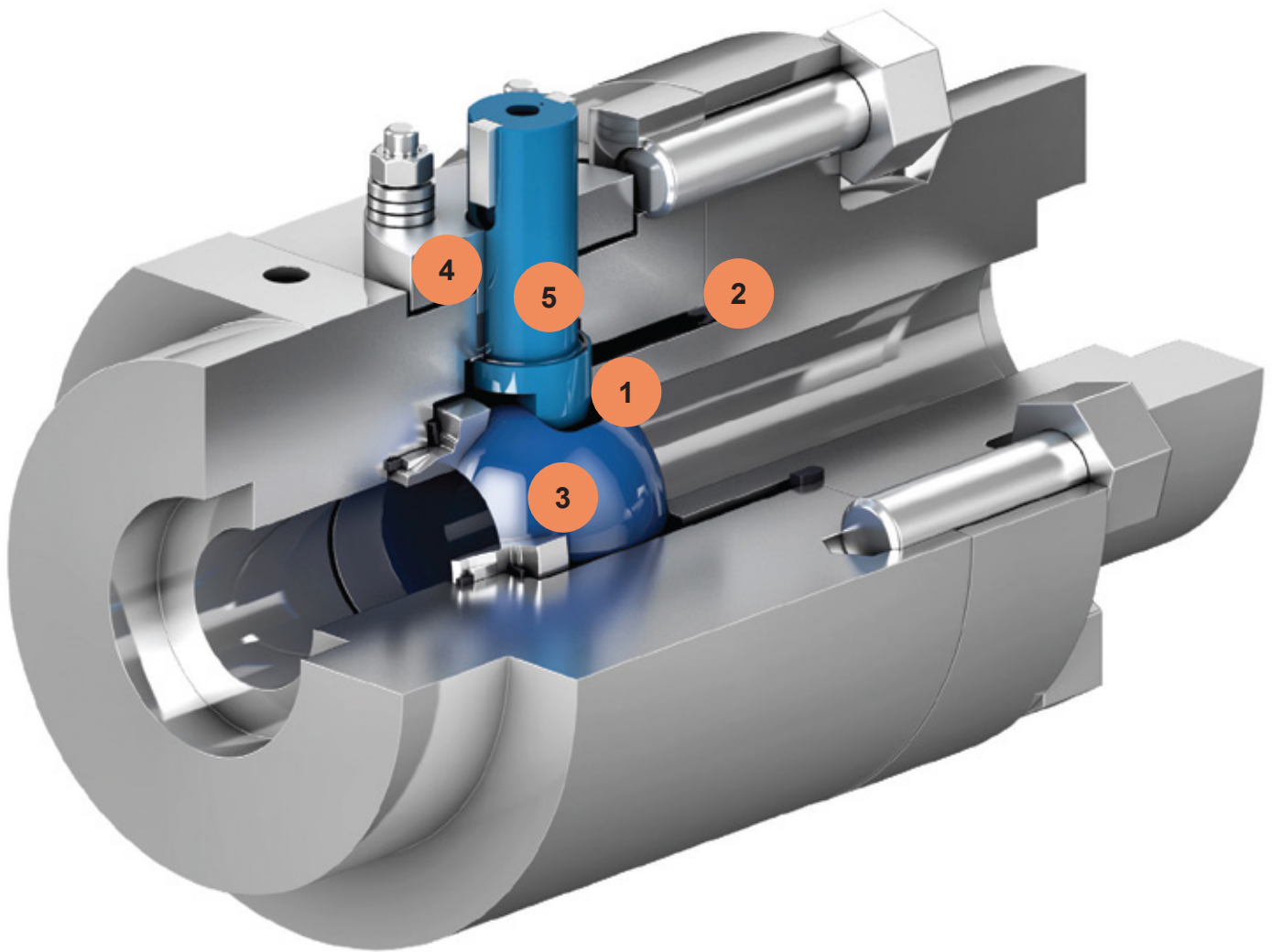
With our patented HVOF RiTech® coating technology, the integral seat in ValvTechnologies' valves is resistant to the attack of abrasive and corrosive production applications.

2. Body seal ring

ValvTechnologies employs a field-proven seal ring technology to ensure sealing under all operating conditions, up to 1400°F. The body seal ring is loaded at a pressure higher than 20,000 psi. In addition, valves sized 3" and above contain a secondary Grafoil® seal to further guarantee reliability.

3. Patented coating process

The sealing surfaces are overlaid with tungsten or chromium carbide using our HVOF RiTech® coating process. These surfaces have a hardness of 68 - 72 Rc to provide uninterrupted operation in the most severe conditions with zero-leakage.



4. Live-loaded gland area

The V Series' sealing design features a four stud, live-loaded assembly designed for heavy industrial applications. The sealing material is high purity Grafoil® surrounded by stainless steel wire mesh anti-extrusion rings. The six Belleville® springs (per stud) provide constant load pressure through extreme thermal shocks and prevent wear leaks in high-cycle service.

5. Blow-out proof stem

ValvTechnologies' design utilizes a one-piece, hard-coated, blow-out proof stem that is inserted through the inside of the body cavity eliminating the possibility of blow-out through the gland area. There are no pins, collars or other devices used to retain the stem in the valve body.

Power Product Four-Year Warranty

Electronic relief valve, main steam relief applications

ValvTechnologies' mission is to provide zero-leakage isolation valves and process solutions for severe service applications.

Our Promise | Absolute Zero-leakage

The ValvTechnologies ERV for use in main steam relief system is a vital contributor toward the safe and reliable operation of a power plant. It is not to be used as a start up / sky vent. Utilizing this product in that capacity voids any warranty, expressed or implied.

Seller warrants the equipment of its own manufacture to be free of defects in material and workmanship. The equipment must be installed utilizing manufacturer's recommended installation instructions, incorporating industry guidelines, and proper use of the equipment for its intended safety function during normal plant operations, for a period of four years from date of shipment from Seller's plant. Seller's obligation under this warranty shall be strictly limited, at Seller's option, to: (i) furnishing replacement parts for, or repairing without charge to Purchaser, F.O.B. Houston, Texas; or (ii) repair, without charge to Purchaser, at costs comparable to Seller's normal manufacturing costs, those parts proven defective; or (iii) in discharge of Seller's maximum liability herewith, refunding all monies paid by Purchaser to Seller for the product and, at discretion of Seller, having the product transportation charges relative to corrective work, defective parts or replacement parts shall be born by Purchaser. Purchaser shall give Seller immediate notice upon discovery of any defect.

The undertaking of unauthorized repairs or replacement by Purchaser or its agents or any alteration in material or design of the Seller's product, components or parts thereof by any party other than a ValvTechnologies authorized representative shall void all obligations of Seller regarding the product and any associated warranty herein stated or implied and shall relieve Seller of all responsibility herewith.

Finished materials and accessories purchased from other manufacturers, whether attached to manufactured product of the Seller or not, are warranted only to the extent of manufacturer's warranty to Seller. Warranty responsibility for the entire valve and actuator assembly shall be assumed by the company selecting and/or mounting an operating device on a bare stem valve. Seller has the sole discretion to determine if an automated bare stem valve shall be within Seller's warranty obligation. Further, the full or partial removal, tampering or alteration of the actuation system, parts or components by any party other than a ValvTechnologies' authorized representative shall void all obligations of Seller regarding the product and any associated warranty herein stated or implied.

Seller's sole liability shall be exclusively as set forth herein, and Seller shall not be liable for any incidental or consequential damages due to its breach of any warranty herein contained, or otherwise. Without limitation to the foregoing, in no event shall Seller be liable for the loss of use of the product, or for the loss of use of any other product, process, plant, equipment, or facilities of the Purchaser or the end-user whether partially or wholly due to defects in material and/or design of Seller's product; and in no event shall Seller be liable for removal of appurtenances or incidentals such as connections, pipe work and similar items of obstruction or for any cost brought about by the necessity of removing the product from its point of installation.

Seller makes no warranty of any kind whatsoever, express or implied, other than as specifically stated herein; and there are no warranties of merchantability and/or fitness for a particular purpose which exceed the obligations and warranties specifically stated herein.

Parts furnished without charge as replacements for original parts under warranty are warranted for that period of time during which the original parts warranty is effective.

FOUR-YEAR, ZERO-LEAKAGE GUARANTEE



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