

Pressure/Vacuum Relief Valves

(Breather Valves and Conservation Vents)



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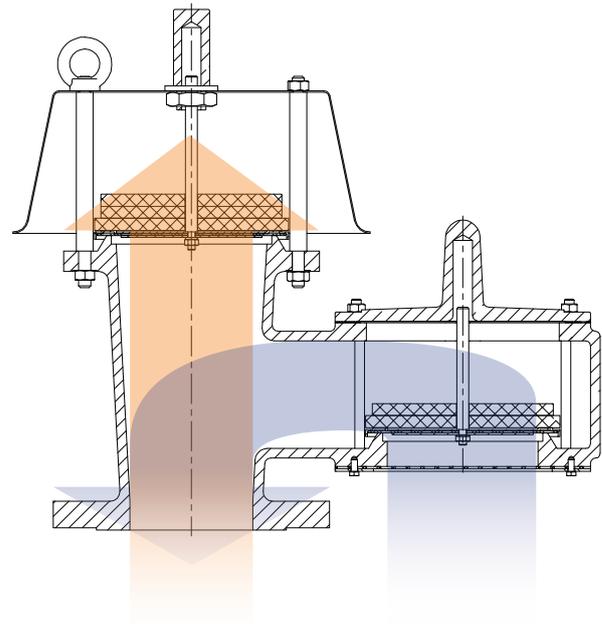


Protecting People, Property and our Planet.

Direct acting Pressure/Vacuum Relief Valves are low pressure devices specifically designed to protect tanks, process systems and equipment from excessive pressure and vacuum.

In addition to providing a primary layer of protection for tanks and process systems, Pressure/Vacuum Relief Valves also minimise emission losses of gases or vapours, thus protecting the environment and providing significant financial savings.

Pressure and Vacuum Relief Valves are also commonly known as breather valves or conservation vents.



Principle of operation

Elmac Pressure/Vacuum Relief Valves have weight-loaded or spring-loaded pallets. Flow through the valve is controlled by the weight of the pallet or the spring force acting on the pallet to keep the device closed.

Once the pressure or vacuum in the tank reaches the pallet closing force, the pallet will start to lift off the seat and allow flow through the valve.

Due to their air-cushioned sealing technology, Elmac valves prevent emission losses until very close to the set pressure and prevents air intake until very close to the set vacuum.

The geometry of the valves has been developed in order to optimise overall performance in terms of high flow capacity, set pressure, sealing and re-sealing.

The modular nature of Elmac's valves means they can be tailored to meet specific customers requirements: whether

this is pressure or vacuum protection only; or vapours and gases either piped away or vented to atmosphere.

A weatherhood protects the pressure vent port and a mesh screen is fitted to prevent intrusion of foreign matter into the valve.

Elmac expertise

Elmac has been manufacturing protection equipment since 1948, and brings enhanced levels of flame and explosion protection to a diverse range of applications.

Elmac offers considerable technical leadership and using test facilities along with Computational Fluid Dynamics capabilities, employs research teams renowned for developing solutions for the most challenging of industrial applications.

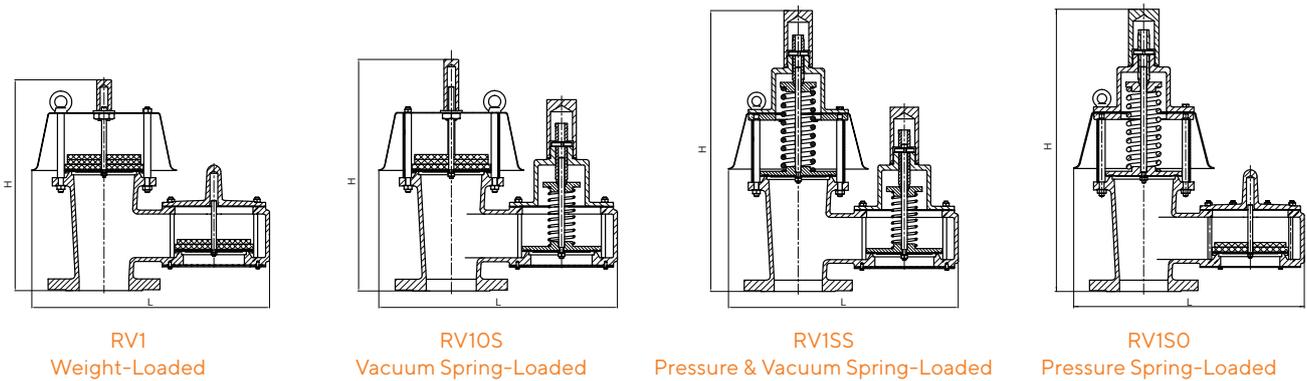
Features and benefits

- Pressure/Vacuum Relief Valves provide high flow capacity from a compact valve size
- Wide range of pressure and vacuum settings to provide maximum tank protection whilst ensuring minimum gas loss
- Designed and manufactured to API Std 2000:2014/ EN ISO 28300:2016
- Superior sealing meets the stringent demands of emission control regulations
- Exceeds seat leakage requirements of API Std 2000:2014 or EN ISO 28300:2016
- No measurable leakage below 90% of the set pressures, less than 1 SCFH (0.03 m³/h) at 90% of the set pressure
- Low leakage minimises evaporation loss
- Economic savings due to reduced product loss
- Alternative connection types available on request
- Proximity switches available on request
- Valve sizing service provides optimum valve performance and cost effective technical specification
- Elmac technical support

Pressure & Vacuum to Atmosphere

General arrangements

Series RV1 Valves which are vented to atmosphere, are designed to protect your tank from damage created by over-pressure or excessive vacuum. Costly product evaporation losses due to normal tank 'breathing' are greatly reduced.



Features and benefits

- Designed and tested according to API2000
- Sizes available from 2" to 12" nominal bore
- Standard materials include carbon steel and stainless steel. Other material types are available on request
- Vented to atmosphere
- Modular construction
- The inlet and outlet flanges are in accordance with ANSI 150LB RF. Other specifications are available on request
- FEP diaphragms effectively prevent the seat and pallet from sticking
- Valves can be specially supplied with a flame arrester, inlet pipe or lining

Setting Pressures

| | Units | RV1 | RV10S | RV1SS | RV1SO |
|--------------|----------|---------------|---------------|---------------|---------------|
| Set Pressure | mbar (g) | 2 ~ 69 | 2 ~ 69 | 69 ~ 1034 | 69 ~ 1034 |
| | psi (g) | 0.03 ~ 1.0 | 0.03 ~ 1.0 | 1.0 ~ 15.0 | 1.0 ~ 15.0 |
| Set Vacuum | mbar (g) | -2 ~ -43 | -43 ~ -480 | -43 ~ -480 | -2 ~ -43 |
| | psi (g) | -0.03 ~ -0.62 | -0.62 ~ -6.96 | -0.62 ~ -6.96 | -0.03 ~ -0.62 |

Dimensions

| Nominal Bore | | L | W* | H _{RV1, RV10S} | H _{RV1SS, RV1SO} | M |
|--------------|-----|------|-----|-------------------------|---------------------------|------------|
| Inch | mm | mm | mm | mm | mm | Approx. kg |
| 2" | 50 | 336 | 215 | 340 | 530 | 15 |
| 3" | 80 | 429 | 270 | 376 | 563 | 28 |
| 4" | 100 | 487 | 296 | 435 | 601 | 55 |
| 6" | 150 | 651 | 395 | 545 | 755 | 108 |
| 8" | 200 | 803 | 496 | 628 | 859 | 174 |
| 10" | 250 | 935 | 596 | 732 | 980 | 241 |
| 12" | 300 | 1112 | 676 | 842 | 1130 | 340 |

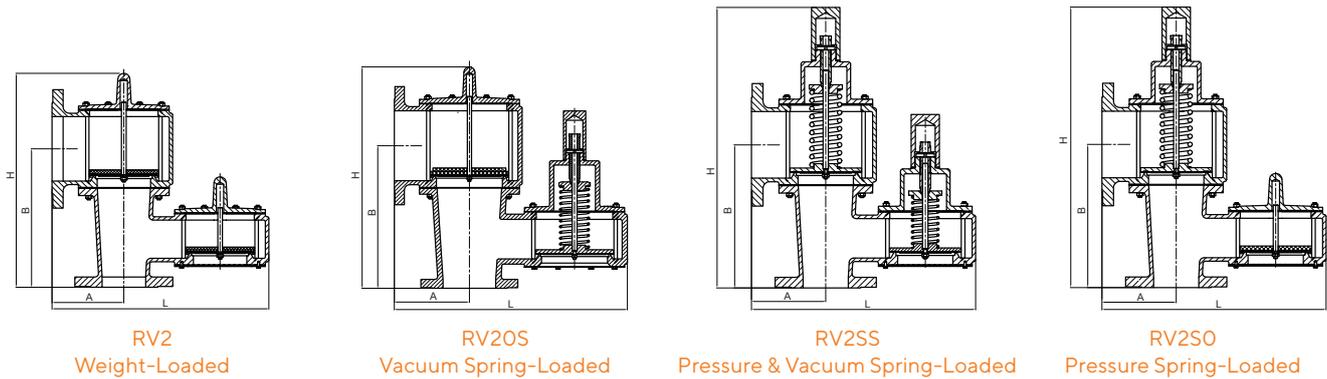
W* indicates width, which is not marked in figures.

M: Weight is approximate for Series RV1 Valves. Does not include pallet weights.

Pressure & Vacuum to Piped Away (Closed Line)

General arrangements

Series RV2 Valves are used for pressure and vacuum relief where vapours must be piped away (Closed Line). Special pallets with air-cushion sealing virtually eliminate the intake of air and the escape of vapours during normal breathing, thus reducing the loss of product.



Features and benefits

- Designed and tested according to API2000
- Sizes available from 2" to 12" nominal bore
- Standard materials include carbon steel and stainless steel. Other material types are available on request
- Pressure vents to pipeline, vacuum vents from atmosphere, vacuum side flanged ends available on request
- Modular construction
- The inlet and outlet flanges are in accordance with ANSI 150LB RF. Other specifications are available on request
- FEP diaphragms effectively prevent the seat and pallet from sticking
- Valves can be specially supplied with a flame arrester, inlet pipe or lining

Setting Pressures

| | Units | RV2 | RV20S | RV2SS | RV2SO |
|--------------|----------|---------------|---------------|---------------|---------------|
| Set Pressure | mbar (g) | 2 ~ 69 | 2 ~ 69 | 69 ~ 1034 | 69 ~ 1034 |
| | psi (g) | 0.03 ~ 1.0 | 0.03 ~ 1.0 | 1.0 ~ 15.0 | 1.0 ~ 15.0 |
| Set Vacuum | mbar (g) | -2 ~ -43 | -43 ~ -480 | -43 ~ -480 | -2 ~ -43 |
| | psi (g) | -0.03 ~ -0.62 | -0.62 ~ -6.96 | -0.62 ~ -6.96 | -0.03 ~ -0.62 |

Dimensions

| Inlet x Outlet Bore | | L | W* | H _{RV2, RV20S} | H _{RV2SS, RV2SO} | A | B | M |
|---------------------|-----------|------|-----|-------------------------|---------------------------|-----|-----|------------|
| Inch | mm | mm | mm | mm | mm | mm | mm | Approx. kg |
| 2" x 3" | 50 x 80 | 371 | 190 | 344 | 517 | 140 | 227 | 34 |
| 3" x 4" | 80 x 100 | 461 | 229 | 404 | 564 | 156 | 264 | 58 |
| 4" x 6" | 100 x 150 | 507 | 279 | 504 | 639 | 168 | 326 | 85 |
| 6" x 8" | 150 x 200 | 671 | 343 | 643 | 829 | 216 | 414 | 160 |
| 8" x 10" | 200 x 250 | 826 | 406 | 750 | 940 | 273 | 472 | 249 |
| 10" x 12" | 250 x 300 | 955 | 483 | 881 | 1088 | 320 | 544 | 344 |
| 12" x 14" | 300 x 350 | 1141 | 533 | 986 | 1237 | 381 | 619 | 493 |

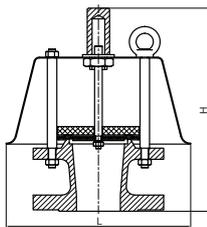
W* indicates width, which is not marked in figures.

M: Weight is approximate for Series RV2 Valves. Does not include pallet weights.

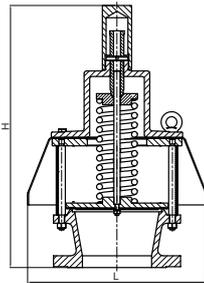
Pressure-only Relief Valves

General arrangements

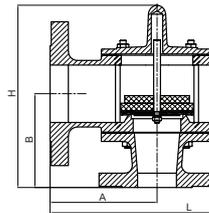
Series PR1 and PR2 Valves are for use where pressure relief is required. The vapours relieved can be either vented to atmosphere or piped away. In order to avoid tank damage, spring or weight-loaded pallets can be selected for different set pressures.



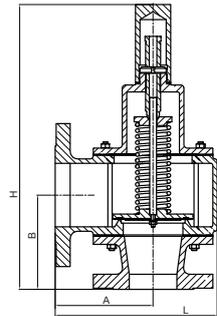
PR1
Weight-Loaded



PR1S
Spring-Loaded



PR2
Weight-Loaded



PR2S
Spring-Loaded

Features and benefits

- Designed and tested according to API2000
- Sizes available from 2" to 12" nominal bore
- Standard materials include carbon steel and stainless steel. Other material types are available on request
- Vented to atmosphere or piped away
- Modular construction
- The inlet and outlet flanges are in accordance with ANSI 150LB RF. Other specifications are available on request
- FEP diaphragms effectively prevent the seat and pallet from sticking
- Valves can be specially supplied with a flame arrester, inlet pipe or lining

Setting Pressures

| | Units | PR1 | PR1S | PR2 | PR2S |
|--------------|----------|------------|------------|------------|------------|
| Set Pressure | mbar (g) | 2 ~ 69 | 69 ~ 1034 | 2 ~ 69 | 69 ~ 1034 |
| | psi (g) | 0.03 ~ 1.0 | 1.0 ~ 15.0 | 0.03 ~ 1.0 | 1.0 ~ 15.0 |

Dimensions

| Inlet (x Outlet) Bore | | L _{PR1} | L _{PR2} | H _{PR1} | H _{PR1S} | H _{PR2} | H _{PR2S} | A | B | W* _{PR1} | W* _{PR2} | M _{PR1} | M _{PR2} |
|-----------------------|-------------|------------------|------------------|------------------|-------------------|------------------|-------------------|-----|-----|-------------------|-------------------|------------------|------------------|
| Inch | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | Approx. kg | Approx. kg |
| 2" (x 3") | 50 (x 80) | 215 | 220 | 240 | 430 | 242 | 415 | 140 | 125 | 215 | 190 | 10 | 30 |
| 3" (x 4") | 80 (x 100) | 270 | 258 | 267 | 453 | 291 | 452 | 156 | 151 | 270 | 229 | 17 | 34 |
| 4" (x 6") | 100 (x 150) | 296 | 282 | 304 | 470 | 369 | 504 | 168 | 192 | 296 | 279 | 26 | 50 |
| 6" (x 8") | 150 (x 200) | 395 | 368 | 370 | 580 | 467 | 653 | 216 | 238 | 395 | 343 | 45 | 90 |
| 8" (x 10") | 200 (x 250) | 500 | 458 | 421 | 652 | 542 | 732 | 273 | 264 | 496 | 406 | 74 | 147 |
| 10" (x 12") | 250 (x 300) | 600 | 529 | 495 | 743 | 643 | 851 | 320 | 306 | 596 | 483 | 106 | 204 |
| 12" (x 14") | 300 (x 350) | 685 | 629 | 557 | 835 | 701 | 952 | 381 | 334 | 676 | 553 | 149 | 292 |

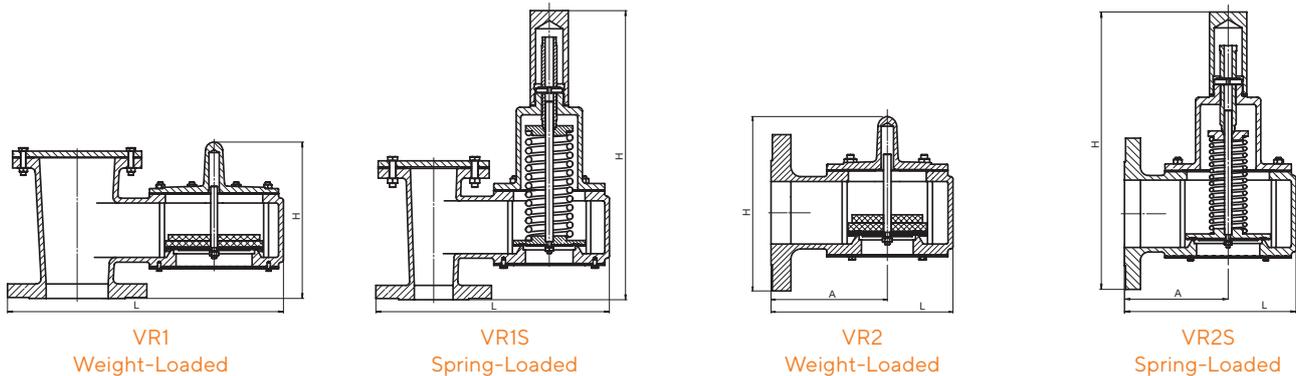
W* indicates width, which is not marked in figures.

M: Weight is approximate for Series PR1 and PR2 Valves. Does not include pallet weights.

Vacuum-only Relief Valves

General arrangements

Series VR1 and VR2 Valves are for use where vacuum relief is required. Intake relief is from the atmosphere and achieved by using a spring or weight-loaded pallet to achieve the required set pressure. Can be installed on top of the tank with bottom flanged valve or on the side walls of the tank with side flanged valves.



Features and benefits

- Designed and tested according to API2000
- Sizes available from 2" to 12" nominal bore for the VR1 Series, or 3" to 14" for the VR2 Series
- Standard materials include carbon steel and stainless steel. Other material types are available on request
- Can be installed on top of the tank with bottom flanged valve, or on the side walls of the tank with side flanged valves
- Modular construction
- The inlet and outlet flanges are in accordance with ANSI 150LB RF. Other specifications are available on request
- FEP diaphragms effectively prevent the seat and pallet from sticking
- Valves can be specially supplied with a flame arrester, inlet pipe or lining

Setting Pressures

| | Units | VR1 | VR1S | VR2 | VR2S |
|------------|----------|---------------|---------------|---------------|---------------|
| Set Vacuum | mbar (g) | -2 ~ -43 | -43 ~ -480 | -2 ~ -43 | -43 ~ -480 |
| | psi (g) | -0.03 ~ -0.62 | -0.62 ~ -6.96 | -0.03 ~ -0.62 | -0.62 ~ -6.96 |

Dimensions

| Nominal Bore | | L _{VR1} | L _{VR2} | H _{VR1} | H _{VR1S} | H _{VR2} | H _{VR2S} | A | W* _{VR1} | W* _{VR2} | M _{VR1} | M _{VR2} |
|--------------|-----|------------------|------------------|------------------|-------------------|------------------|-------------------|-----|-------------------|-------------------|------------------|------------------|
| Inch | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | Approx. kg | Approx. kg |
| 2" | 50 | 307 | - | 210 | 383 | - | - | - | 158 | - | 18 | - |
| 3" | 80 | 400 | 220 | 237 | 397 | 212 | 385 | 140 | 204 | 190 | 32 | 12 |
| 4" | 100 | 454 | 258 | 259 | 394 | 255 | 415 | 156 | 228 | 229 | 46 | 20 |
| 6" | 150 | 599 | 282 | 329 | 515 | 317 | 453 | 168 | 304 | 279 | 87 | 35 |
| 8" | 200 | 729 | 368 | 385 | 575 | 400 | 586 | 216 | 368 | 343 | 137 | 68 |
| 10" | 250 | 838 | 456 | 468 | 675 | 481 | 671 | 273 | 418 | 406 | 191 | 105 |
| 12" | 300 | 1002 | 529 | 519 | 770 | 579 | 786 | 320 | 496 | 483 | 285 | 150 |
| 14" | 350 | - | 629 | - | - | 634 | 885 | 381 | - | 533 | - | 210 |

W* indicates width, which is not marked in figures. M: Weight is approximate for Series PR1 and PR2 Valves. Does not include pallet weights.

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