

# Pressure/Vacuum Relief Valves

## (Breather Valves and Conservation Vents)



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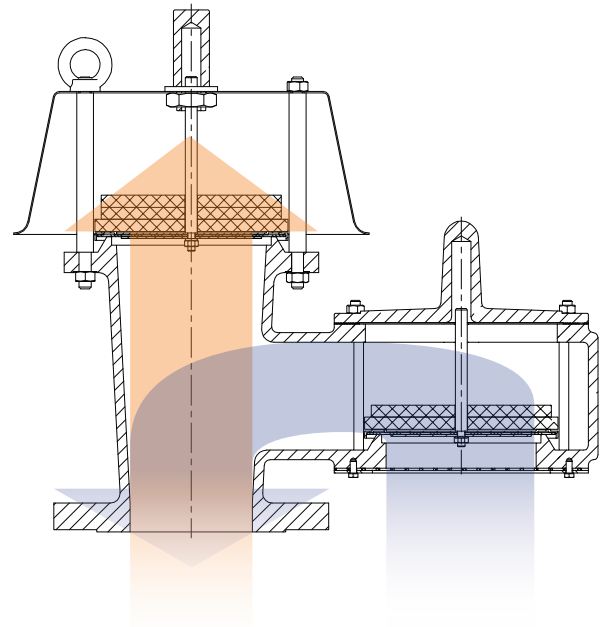


Protecting People, Property and our Planet

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, utilising a range of testing facilities and Computational Fluid Dynamics (CFD) studies, employs a Research & Development team who is renowned for providing solutions engineered for use in the most challenging of industrial applications.

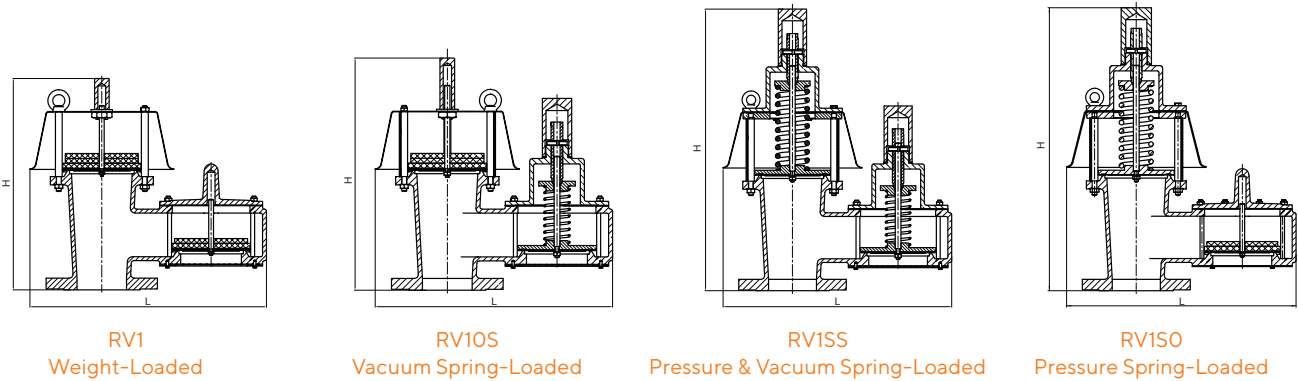
## Features and Benefits

- 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 m<sup>3</sup>/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 <sub>RV1, RV10S</sub>	H <sub>RV1SS, RV1SO</sub>	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

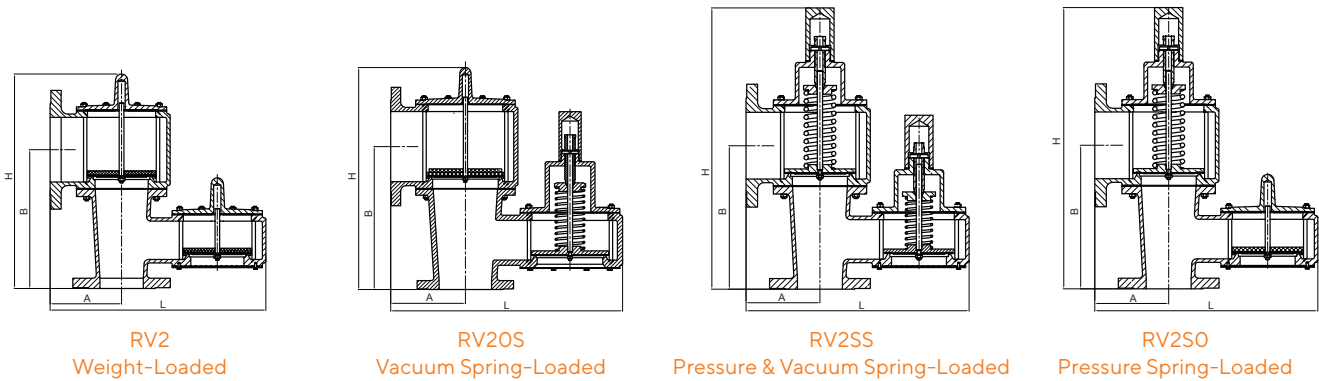
W\* indicates width, which is not marked in figures.

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 <sub>RV2, RV20S</sub>	H <sub>RV2SS, RV2SO</sub>	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

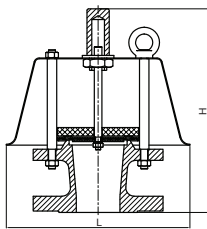
W\* indicates width, which is not marked in figures.

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

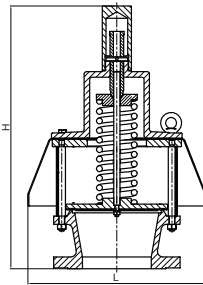
# Pressure-only Relief Valves

## General Arrangements

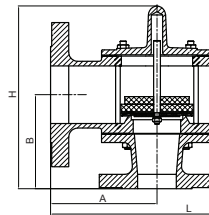
Series PR1 and PR2 Valves are for use where pressure relief is required. The vapours relieved can be either vented to atmosphere or piped away. In order to avoid tank damage, spring or weight-loaded pallets can be selected for different set pressures.



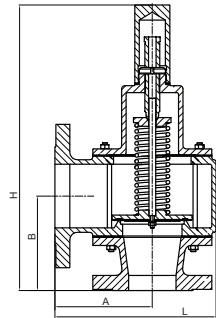
**PR1**  
Weight-Loaded



**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 <sub>PR1</sub>	L <sub>PR2</sub>	H <sub>PR1</sub>	H <sub>PR1S</sub>	H <sub>PR2</sub>	H <sub>PR2S</sub>	A	B	W* <sub>PR1</sub>	W* <sub>PR2</sub>	M <sub>PR1</sub>	M <sub>PR2</sub>
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

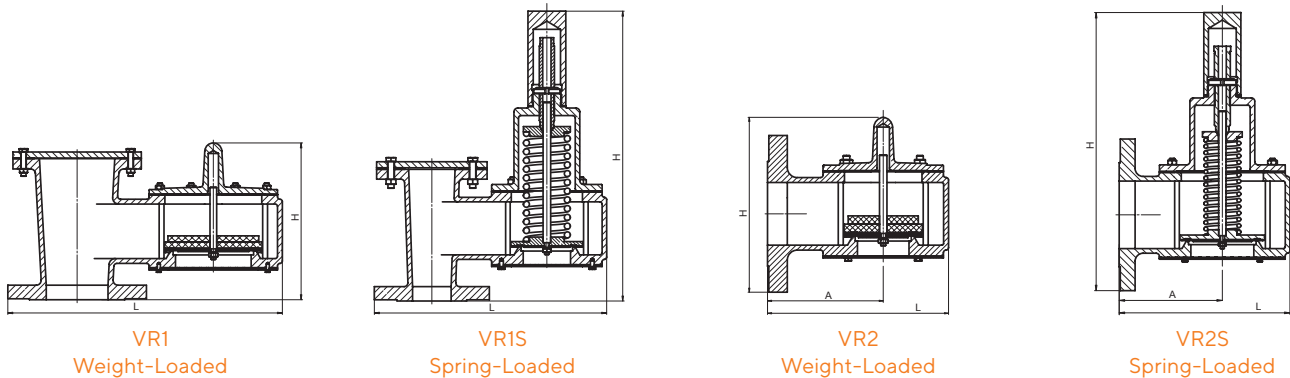
W\* indicates width, which is not marked in figures.

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 <sub>VR1</sub>	L <sub>VR2</sub>	H <sub>VR1</sub>	H <sub>VR1S</sub>	H <sub>VR2</sub>	H <sub>VR2S</sub>	A	W* <sub>VR1</sub>	W* <sub>VR2</sub>	M <sub>VR1</sub>	M <sub>VR2</sub>
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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