HERZ Flanged Pressure Reducing Valve

Data sheet for **HVPRVF** Issue 1019

Introduction

The HVPRVF is an automatic, pilot controlled, pressure reducing valve utilising the upstream and downstream pressures.

The valve reduces the upstream pressure to a constant, predetermined downstream pressure regardless of fluctuations in upstream pressure and flowrate.

Should the downstream pressure exceed the predetermined pressure, for example if the flow is isolated, the valve closes automatically.

Design

The HVPRVF has the capability to regulate to near zero flow, as a standard feature on all sizes, eliminating the need for special low flow devices or bypasses.

The valve has an internal floating shaft, reducing friction and eliminating the need for additional stem seals.

The guided disc has a resilient facing for improved isolation and resistance to erosions.

During valve closure, the rate slows as the disc approaches the closed position minimising the effects of 'water hammer' or pressure surge.

The body and cover are made from ductile iron for increased mechanical strength.

How it works

The pilot valves and connecting pipework are assembled to the valve connecting the upstream and downstream ports of the valve.

There are two restrictors in the circuit;

a a nozzle or needle valve set at a fixed position.

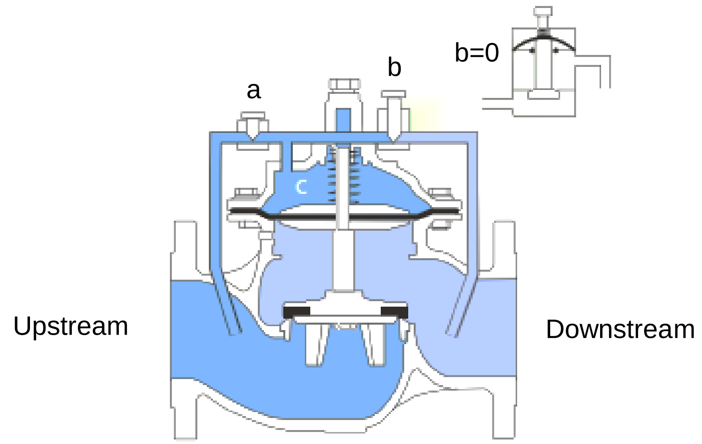
b a modulating pilot valve with a variable flow path from complete closure (b) = 0 to full open when (b) > (a).

The volume of water in the control chamber (c) is determined by the relative flow orifices in (a) and (b), or by the opening of (b) as (a) is fixed.

Valve Closed

Pilot valve (b) senses a downstream pressure higher than the set pressure and fully closes passage (b).

Since modulating pilot valve (b) is now closed the flow from the upstream side flows through (a) into the upper part of the control valve chamber (c), forcing the diaphragm to close the valve.



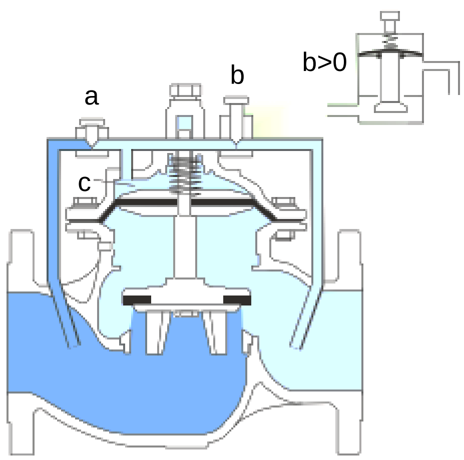
Valve closed

Valve Open

Pilot valve (b) senses a downstream pressure lower than the set point and fully opens passage (b), larger than (a).

All the water from the upstream flows through (a) and (b), directly to the downstream, allowing the water from the upper control chamber (c) to partially drain until the pressure in the chamber equals the downstream pressure.

Pressure in the upper part of the control chamber is decreased and the upstream water pressure forces the disc to rise opening the valve.



Valve closed

Valve Regulating

The pilot valve is set to the required downstream set pressure.

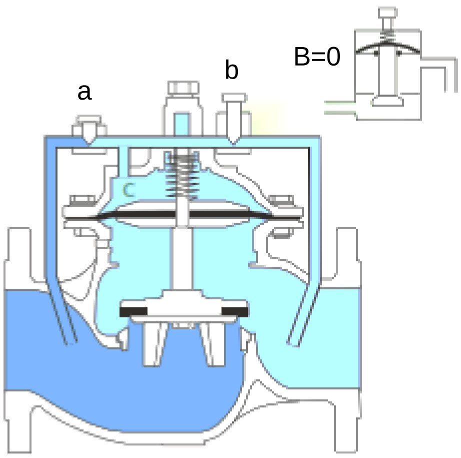
Pilot valve (b) senses when the downstream pressure reaches the set pressure causing the passage (b) to equal passage (a) b = a.

Now water that flows through the control pipework passes from (a), through (b) and into the downstream port.

The water in the upper part of the control chamber (c) is now constant, keeping the diaphragm and disc in a fixed position.

Any change in the downstream pressure will change the b = a balance.

This change adds or drains water from the upper part of the control chamber (c), thus opening or closing the main valve until it reaches the balance regulating position again when b = a.

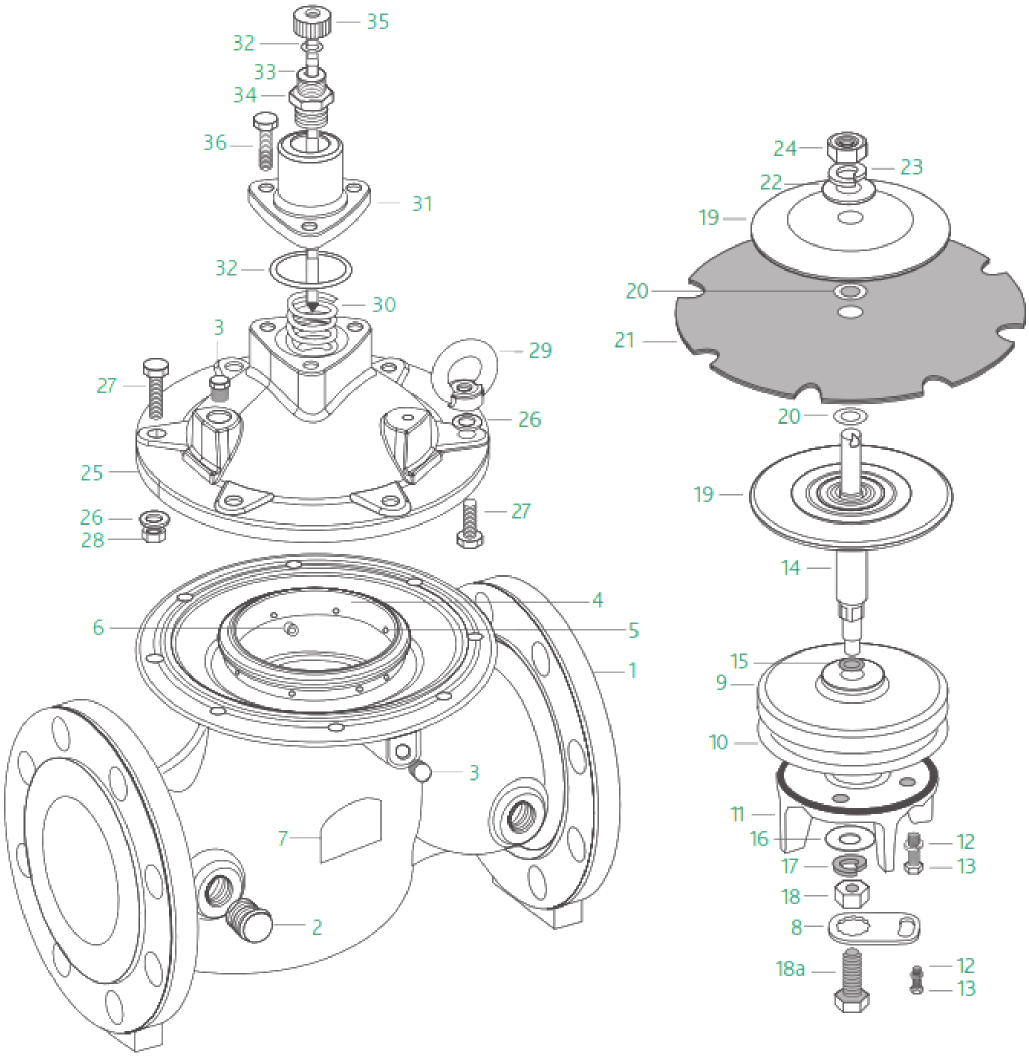


Valve regulating

The 2-way control system provides sensitive, accurate and constant modulation of the main control valve.

The main control valve does not full open preventing total draining of the upper part of the control chamber (c).

Components Basic Valve



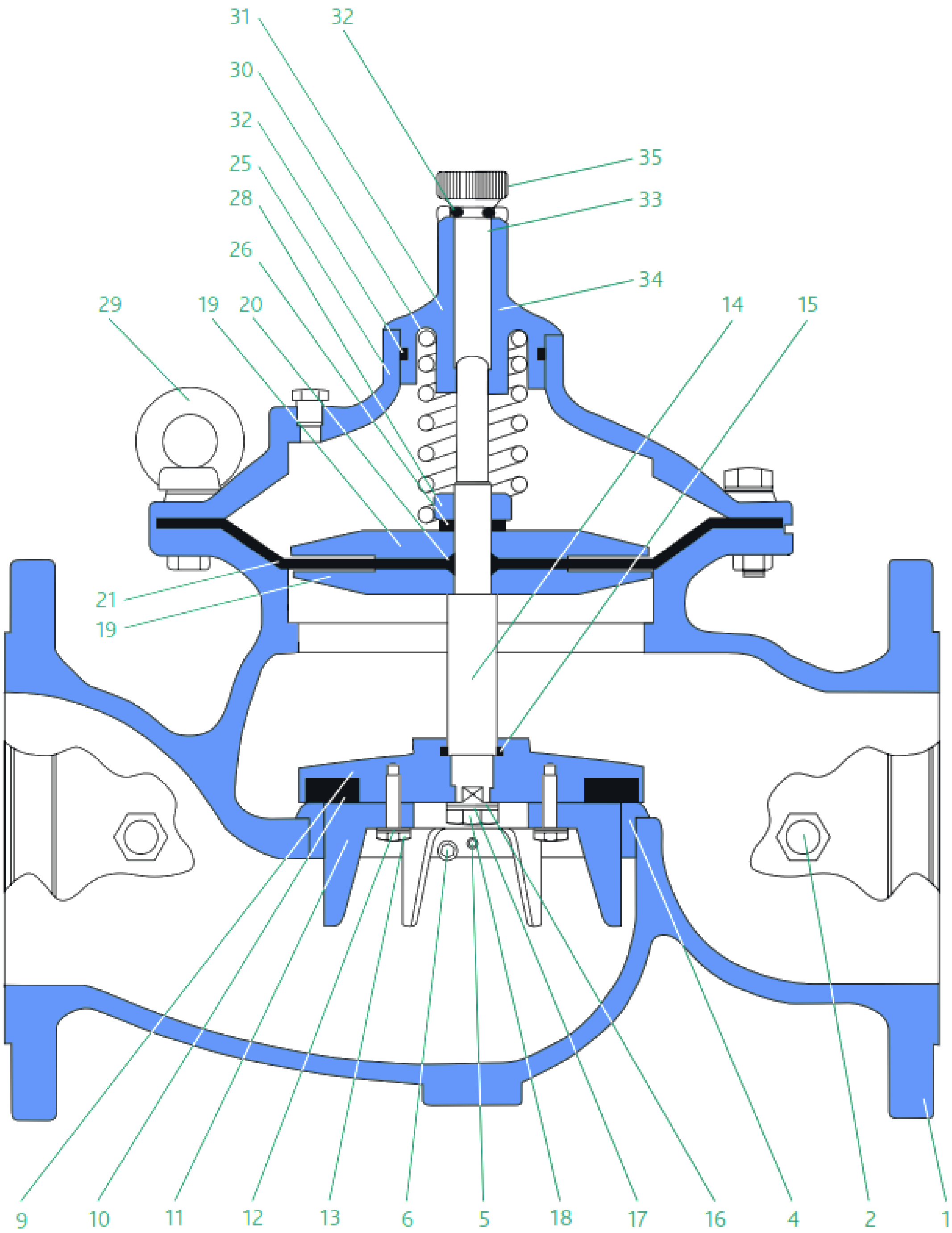
Item	Component	Material	Item	Component	Material	Item	Component	Material
1	Body	Ductile iron	13	Bolt	316 stainless	24	Nut	316 stainless
2	Plug	Brass	14	Stem	303 stainless	25	Cover	Ductile iron
3	Plug	Brass	15	O ring	Rubber	26***	Washer	Stainless steel
4	Body seat	Stainless steel	16	Washer	316 stainless	27***	Bolt	Stainless steel
5	Seat locking bolt	304 stainless	17	Spring washer	316 stainless	28***	Nut	Stainless steel
6	Seat locking bolt	304 stainless	18**	Nut	316 stainless	29	Lifting nut	Steel
7	Nameplate	Aluminium	18a*	Bolt	316 stainless	30	Spring	302 Stainless
8*	Bolt locking plate	Stainless steel	19	Diaphragm disc	Ductile iron	31	Guide cover	Brass/bronze
9	Disc	Ductile iron	20	O ring	Ductile iron	32	O ring	Rubber
10	Disc facing	Rubber	21	Diaphragm	Rubber	33	O ring	Rubber
11	Disc guide	Bronze + SS	22	Washer	316 stainless	34	Adapter	Brass
12	Spring washer	316 stainless	23	Spring washer	316 stainless	35	Air release	Brass
						36	Cover bolts	steel

*DN50 & DN150 sizes

**DN80 & DN100 sizes

***DN50 to DN200 sizes

Components Basic Valve

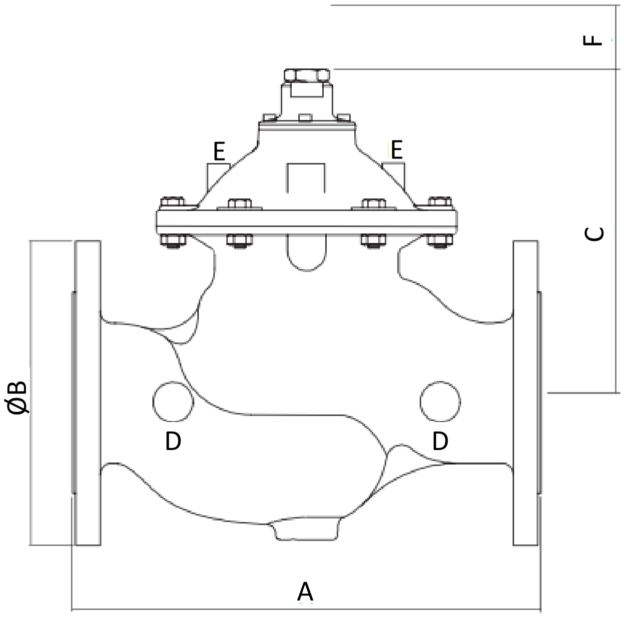


Item numbers as exploded view.

Technical Data

Max inlet pressure:	16 bar
Max working temperature:	85˚C
Medium:	potable water
Flanged PN16:	BS EN 1092-2
Face to Face:	BS EN 558 series 1

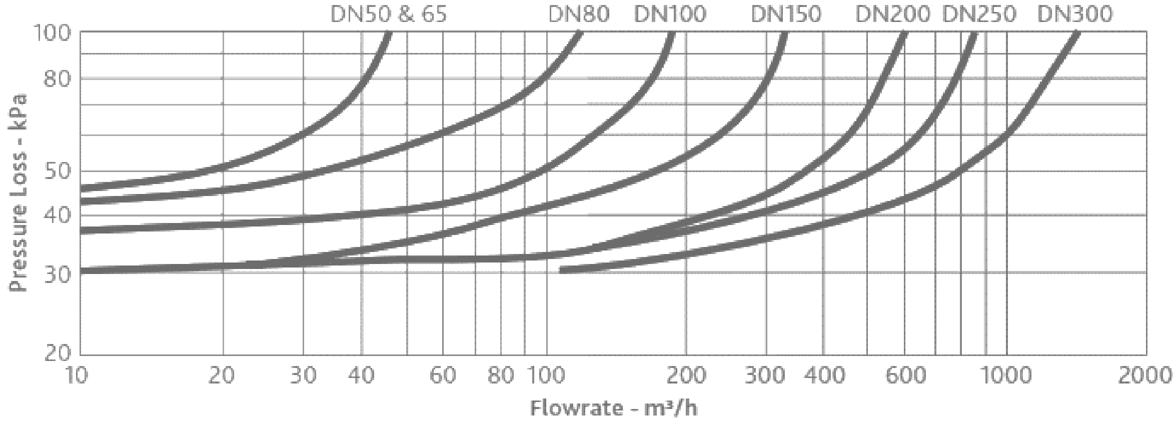
Dimensions Basic Valve



Code	DN	A	B	C	D NPT	E NPT	F*
HVPRVF-07	65	292	185	185	½”	¼”	140
HVPRVF-08	80	310	200	230	½”	¼”	170
HVPRVF-09	100	350	220	240	½”	¼”	180
HVPRVF-11	150	480	285	330	½”	¼” & ½”	230
HVPRVF-12	200	600	345	390	½”	½”	300
HVPRVF-13	250	730	410	5520	½”	½”	390
HVPRVF-14	300	850	460	635	½”	½”	450

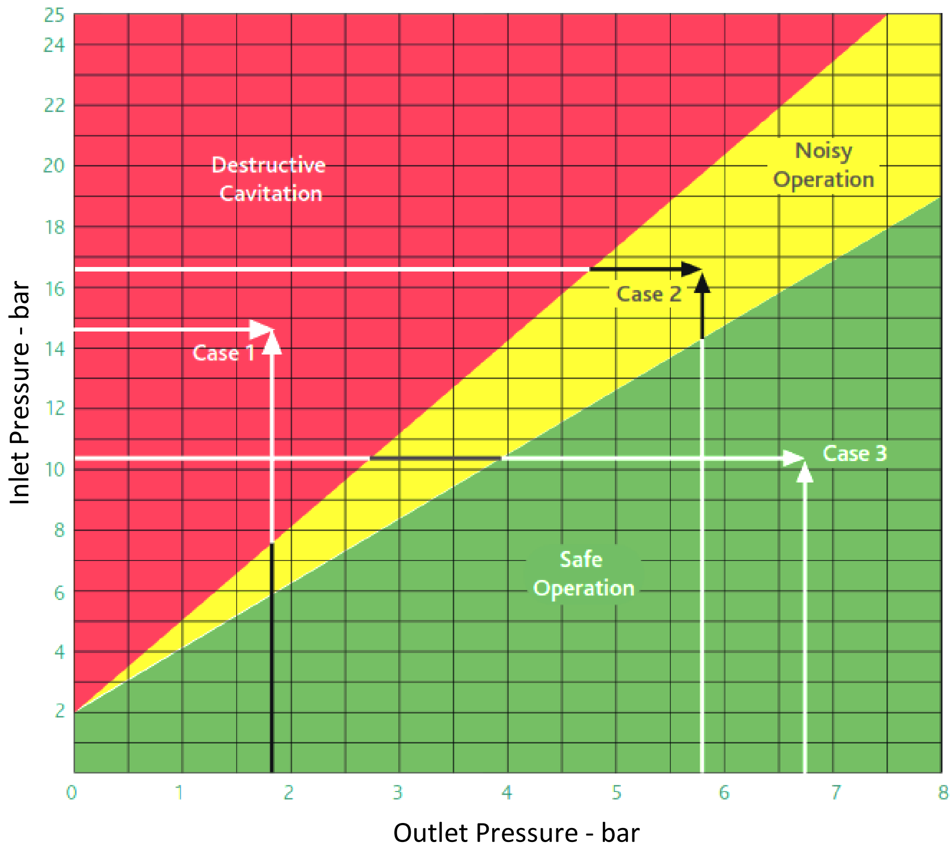
NOTE: * Minimum space required for maintenance and to allow for the pilot valve, pipework and fittings, which can exceed the width and height of the valve. The dimensions above are for the basic valve and should only be used as the starting point when estimating the required space.

Hydraulic Characteristics



Characteristics	Units	DN50	DN65	DN80	DN100	DN150	DN200	DN250	DN300
Max. recommended flowrate for continuous operation Flow velocity = 5.5m/s	m^3/h	40	40	90	160	350	480	970	1400
Min. recommended flowrate	m^3/h	<1	<1	<1	<1	<1	<1	<1	<1
Kv	m^3/h	43	43	103	167	407	676	1160	1600
Control chamber volume	L	0.1	0.1	0.3	0.7	1.5	4.3	9.7	18.6
Weight	Kg	12	13	22	37	80	157	245	405

Cavitation Data



Cavitation

Pressure reducing valves have the capability to significantly reduce a varying inlet pressure to a much lower and constant outlet pressure.

However, depending upon the inlet pressure the required pressure loss to achieve the required outlet pressure can create noise, vibration and in extreme cases cavitation.

Depending upon the level of cavitation, noise can be generated along with vibration and possible cavitation damage to the valve body and down stream pipework.

The chart above sets out the safe limits for operating the HVPRVF pressure reducing valve.

<u>How to use the chart</u>

- Determine the maximum dynamic pressure that may be applied in the inlet port of the valve.
- Draw a horizontal line from the pressure scale at the left side of the chart.
- Determine the required outlet pressure.
- Draw a vertical line from the pressure scale at the bottom of the chart.
- The intersection of these two lines determines the cavitation characteristic of the valve when operating.
- When the intersection falls into the RED zone - Case 1, the valve may be damaged in a fairly short time and choked flow may occur. The valve should not be used under these conditions.
- When the intersection falls into the YELLOW zone - Case 2, the valve may generate noise that exceeds 80 db and some vibration may be present. The valve can be used in this zone but with caution.
- When the intersection falls into the GREEN zone - Case 3, the valve will perform safely and quietly.

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