

Pressure Reducing Control Valve

FDV-R-PN2

The FDV-R-PN2 Pressure reducing valve is an automatic hydraulic control service valve, designed to operate in fixed fire protection system.

The FDV-R-PN2 pilot controlled hydraulic valve is activated by line pressure. The pilot valve has a spring-loaded membrane which is sensitive to downstream pressure. The pilot's spring is pre-set to a desired reduced pressure. The pilot valve maintains a constant downstream pressure by gradually opening or closing of the main valve, reducing the inlet water pressure to a pre-set desired outlet pressure. The outlet pressure is maintained constant, regardless of fluctuations in flow rate and changes in main pipeline pressure.

Designed for vertical or horizontal installation, the line pressure operated FDV-R-PN2 Pressure reducing valve features a direct elastomeric diaphragm seal, with no balancing spring or internal metallic wet components in the valve body. The hydrodynamic pattern design, ensures high flow rates with minimum head loss.



MARKETS



TECHNICAL DATA

FLUID:

Water, Brackish water, Sea water, Foam

SIZE RANGE:

FDV-R valve (globe) - 40mm to 400mm (1½" to 16")

FDV-Ra valve (angled) - 50mm to 200mm (2" to 8")

AVAILABLE CONNECTIONS ENDS:

Flange*Flange, Groove*Groove, Thread*Thread

PRESSURE NOMINAL: 250 psi (17.2 bar)

REGULATION RATIO: 5:1

SENSITIVITY: 1.45 psi (0.1 Bar)

ADVANTAGES

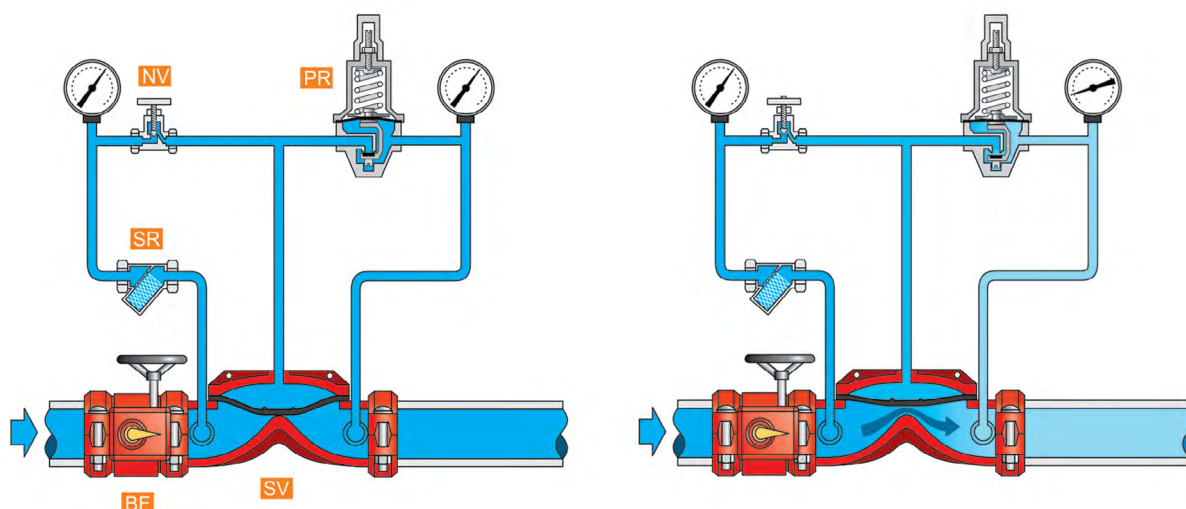
- Only three parts: body, diaphragm & cover plate, no wet metal spring inside the control chamber
- Low maintenance cost: the valve is serviced in-line and only one replaceable part - the long-life elastomeric diaphragm
- Conforms with inspection, Testing and Maintenance Standard of water-based Fire Protection Systems, NFPA 25
- Reduces inlet pressure to a predetermined fixed and constant outlet pressure, regardless of fluctuations or changes in main pipeline pressure and flow rate

CHARACTERISTICS

- Hydro-dynamic pattern design ensures high flowrates with minimum head loss
- Simple and reliable design
- Quick respond to downstream pressure changes
- Pressure reducing to a predetermined set of outlet pressure

TECHNICAL DATA





PR - PRPV – Pressure Reducing
Pilot Valve
NV - Needle valve
SR - strainer

SV - FDV-R service valve
BF - Butterfly valve

SET Position:

When a fire protection system is in a SET position, there is no flow at the system's piping and the water pressure is at the FDV-R-PN2 Pilot's SET pressure.

The FDV-R-PN2 valve's control chamber is pressurized by the inlet flow, calibrated by the Needle valve **[NV]** forcing the diaphragm against its seat maintaining the valve close.

OPERATION

The FDV-R's control chamber is pressurized by a calibrated inlet flow passing through a needle valve **[NV]**, and de-pressurized by the PRPV pressure reducing pilot valve **[PR]**.

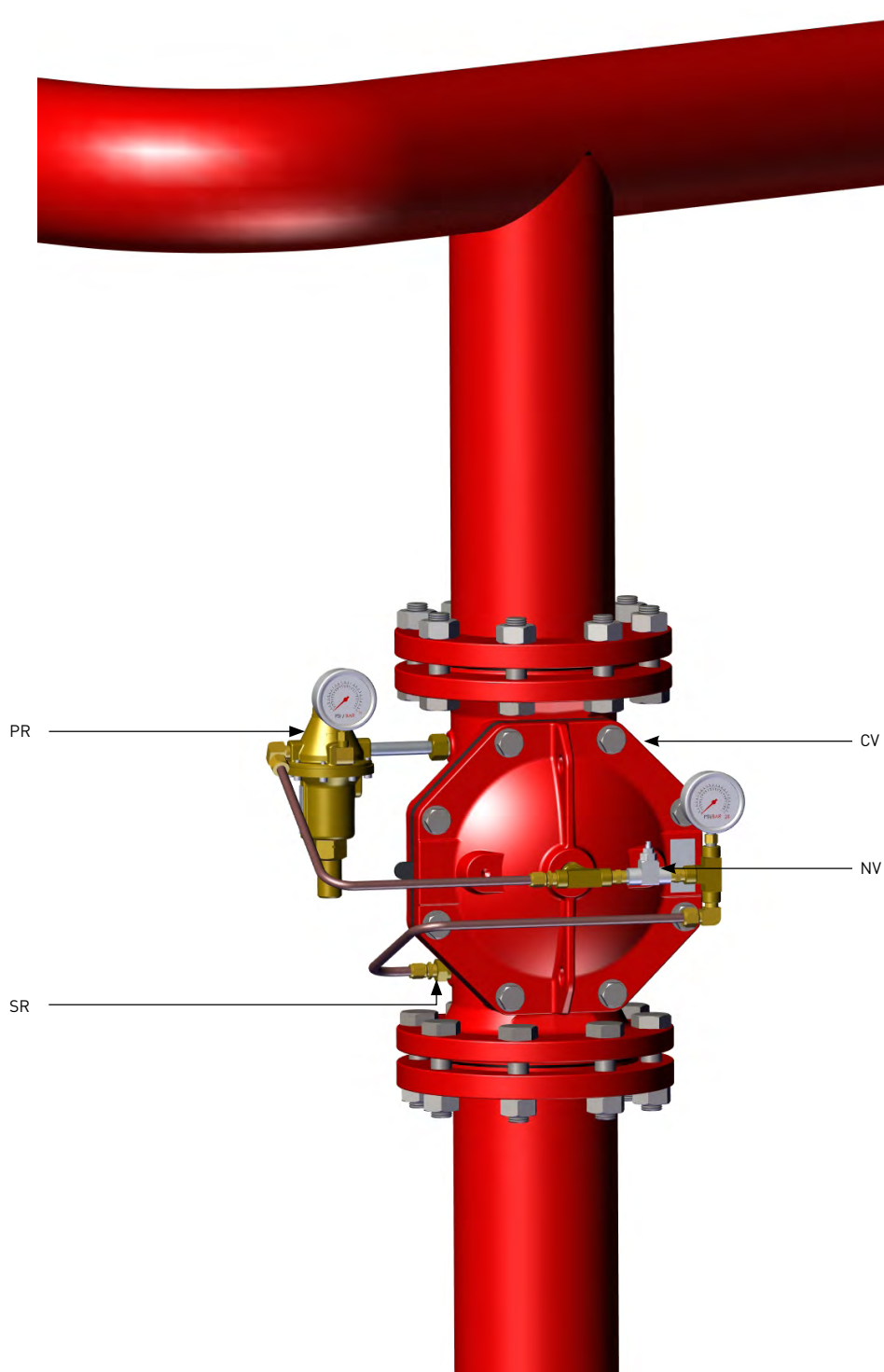
The pilot's drain flow volume is controlled by the downstream pressure passing through a sense pipe and manipulating the pilot's diaphragm and the seal mechanism.

Any change at the downstream pressure reflects the ratio between the volume of the control chamber's inlet and outlet flows. Consequently, the FDV-R valve's diaphragm position changes, maintaining the downstream at the pilot's set pressure.



FDV-R- PN2

Typical installation



PR - PRPV – Pressure Reducing Pilot Valve

NV - Needle valve

SR - Strainer

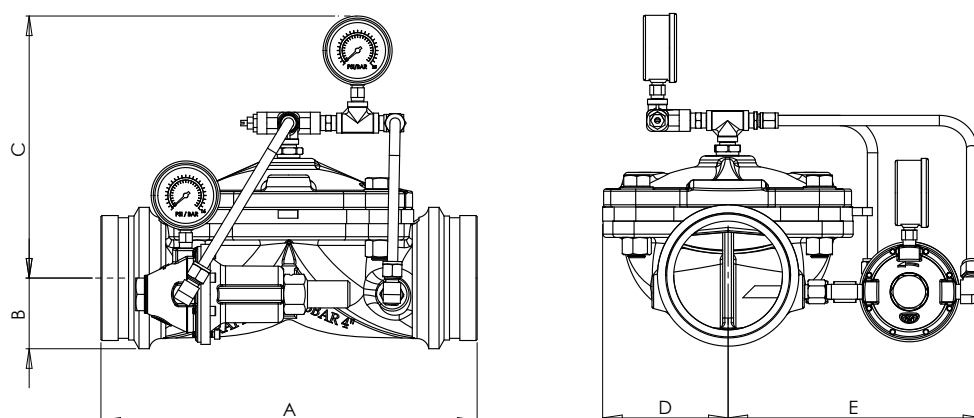
CV - FDV-R Control Valve

BF - Butterfly valve

Dimension Table

Size	1.5"-2"		3"		4"		6"		8"		10"	
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
A	190	7.5	283	11.1	305	12	470	18.5	406	16	635	25
B	57.5	2.3	100	3.9	109	4.3	160	6.3	142	5.6	198	7.8
C	268.5	10.6	306	12.0	177	7.0	308	12.1	195	7.7	317	12.5
D	111.5	4.4	111	4.4	115	4.5	177	7.0	150	5.9	233	9.2
E	166	6.5	182	7.2	261	10.3	304	13.4	307	12.1	237	10.7
Kg/lb	10.4	22.9	19.3	42.5	25.6	56.4	50.2	110.7	67.6	149	109.5	241.4

Note: In addition to the valve diameters shown at the table, all FP applications based on FDV-R valves can be supplied also in the following diameters: 10" ; 12" ; 14" ; 16"



Factory Standard

MAIN VALVE:

BODY & COVER

- Ductile iron
- Cast Steel WCB
- Stainless Steel CF8
- Stainless Steel CF8M
- Nickel Aluminum Bronze

ELASTOMERS:

- NR, fabric reinforced Natural Rubber
- EPDM, fabric reinforced
- NBR, fabric reinforced Nitrile Rubber

COATING:

- Base layer – high built Epoxy FBE
Top layer – electrostatic Polyester powder RAL 3000
- Rilsan Polyamide based (Nylon 11)
Internal – vitreous Enamel
External – Epoxy/Polyester powder RAL 3000

TRIM

PIPING & TUBING:

- Stainless Steel 316
- Copper/Brass
- Cupro-Nickel
- Monel®

FITTINGS:

- Stainless Steel 316
- Brass
- Super Duplex
- Cupro-Nickel
- Monel®

ACCESSORIES:

- Stainless steel CF8M / 316
- Brass
- Nickel Aluminum Bronze
- SMO-245
- Monel®

PLEASE SPECIFY

- Working Media
- Ambiental conditions
- Min/Max operating flow
- Min/Max operating pressure
- Downstream set pressure
- Additional accessories needed

For more detailed technical information, please refer to chapter Engineering Data.

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FDV-R Basic Valves

Basic Valves

General Description

The FDV-R type is a globe pattern valve featuring direct elastomeric diaphragm seal with no balancing spring or inside metallic moving wet components. The valve is designed for vertical or horizontal installation.

Solid and simple construction, with hydro-dynamically engineered inner streamlined flow passage, makes it the basic valve for large selection of fire protection applications.

A wide selection of cast metals, coatings, diaphragms and fasteners, enables its usage in harsh environment and flow media. The FDV valve is suitable for on-shore as well as off-shore installations and can operate with fresh water, brackish water, foam and seawater.

7 optional trim ports provide an easy and flexible trim piping and tubing connection.



MARKETS



Marine



P.O.G.



Airports



Industry



Storage



Tunnel



Residential



Commercial

TECHNICAL DATA

FLUID:

Water, Brackish water, Sea water, Foam

SIZE RANGE:

40mm to 250mm (1½" to 10")

AVAILABLE CONNECTIONS ENDS:

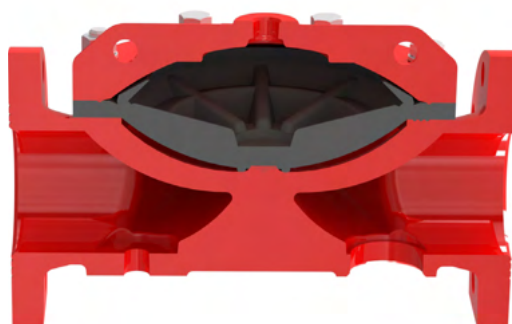
Flange*Flange, Groove*Groove,
Flange*Groove, Groove*Flange, Thread*Thread

PRESSURE NOMINAL:

250 psi (17.2 bar)

ADVANTAGES

- Simple and robust construction
- No inside metallic moving wet components
- 4 side, and 3 cover ports enable easy trim and accessories connection
- Durable material and coatings enables long lasting usage in rough conditions including foam, off shore and seawater
- Large valve sizes and connection ends selection
- Diaphragm original design enables gradual and precise valve opening or closing
- Maintenance free between the NFPA 25 five years checks
- Stands fully in most strict fire protection design and operation demands



TECHNICAL DATA

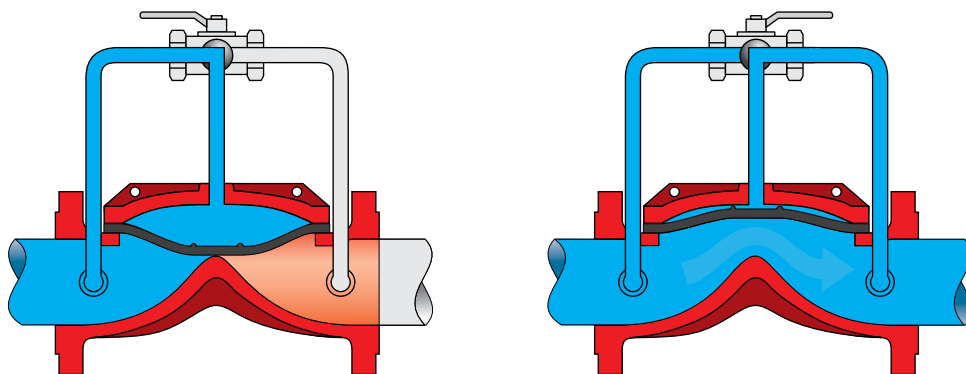


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ON-Off Operation

The FDV-R is a normally open valve with a very low breaking through pressure of less than 5 psi. When the valve's control chamber becomes pressurized, the force applied on the upper diaphragm surface, pushes it against the valves seat and holds the valve close. The diaphragm's springiness compensates for the low area/force ratio as the valve need to close although the downstream pressure nearly equalizes the upstream.

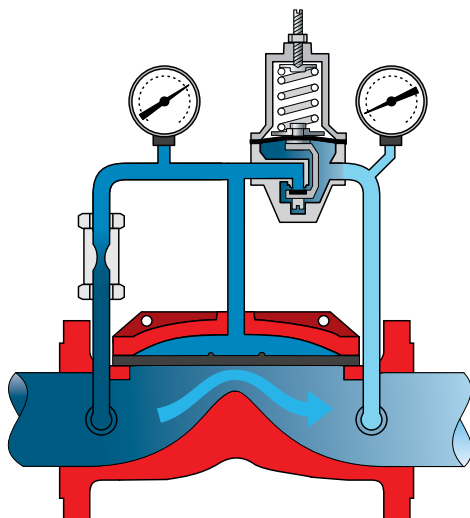
When the valve's control chamber is drained and de-pressurizes, the force applied by the line pressure, raises the diaphragm from its seat, pushes it into the control chamber space and drains the residual water out. By that, water passage obstruction clears and the valves fully opens. This demonstrate a typical On-Off operation: a pressurized control chamber causes the valve to close while a drainage of this space combined with the valve's internal pressure, causes it to fully open.



Modulating Operation

Manipulating the control chamber pressure using suitable pilot valves, enables the control of the upstream pressure, downstream pressure and valve's rate of flow.

A change in the control chamber's pressure and as a result, the chamber's water volume, will place the diaphragm at a position that would narrow or enlarge the water passage cross area. Controlled diaphragm moves can be used to regulate gradually valve's flow in regard of line pressure deviation, as demonstrated in the schema below.



FDV-R

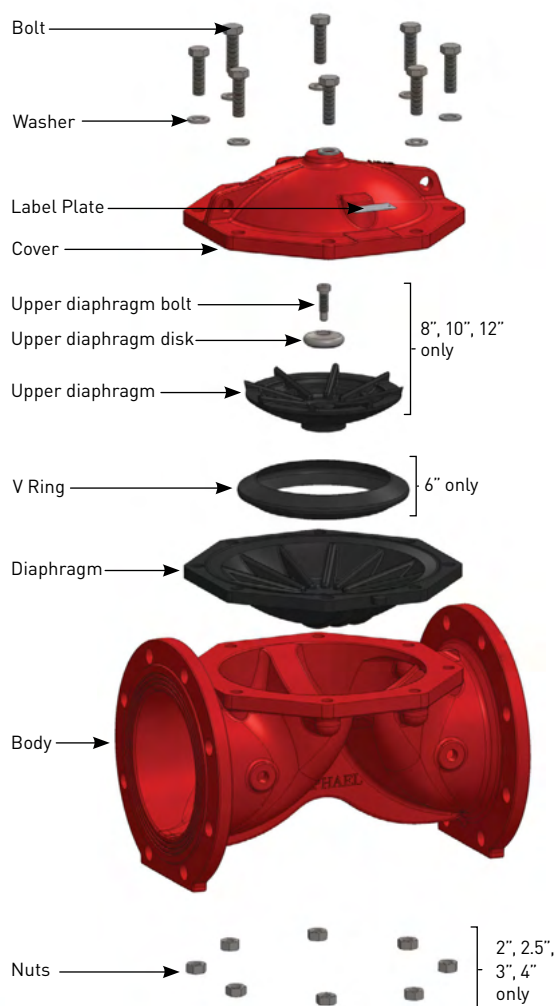
FDV-R optional Patterns

Valve	Diam. End. Conn.	1.5" DN40	2" DN50	2.5" DN65	3" DN80	4" DN100	6" DN150	8" DN200	10" DN250	12" DN300	14" DN350	16" DN400
FDV-R Globe	TH-TH											
	GR-GR											
	FL-FL											

Available Options

Construction Materials& Coatings

Body & Cover	
Ductile Iron	ASTM A-536
Stainless Steel	ASTM A743, CF8M
Stainless Steel	ASTM A743, CF8
Cast Steel	ASTM A-216 Grade WCB
Nickel Aluminum Bronze	ASTM B148 UNS C95800
Diaphragm	
NR	Nylon fabric reinforced Natural Rubber
EPDM	Nylon fabric reinforced EPDM
NBR	Nylon fabric reinforced Nitrile rubber
Fasteners	
Stainless Steel 304	ASTM F593
Stainless steel 316	ASTM F593
Galvanized steel	ASTM F2329
Nickel Alloys	Monel 400; Cupro-nickel
Coating	
Internal-FBE Phenolic Epoxy+Polyester	External-FBE Phenolic Epoxy+Polyester
Internal-Vitreous Enamel	External-FBE Phenolic Epoxy+Polyester
Internal-Rilsan (Nylon 11)	External-Rilsan (Nylon 11)



Valves Construction and Applications

FDV-R	Water	Brackish Water	Sea Water	Foam
Body & Cover	Ductile Iron	Stainless Steel CF8M	Ni.AL.Br	Stainless Steel CF8
Fasteners	Galvanized Steel	Stainless Steel 316	Nickel Bronze alloys	Stainless Steel 304
Diaphragm	Natural Rubber	EPDM	EPDM	EPDM
Coating	Rilsan	Uncoated	Uncoated	Uncoated

FDV valves flow factor

NOMINAL DIAMETER		FLOW FACTOR	
INCH	MM	Kv	Cv
1.5	DN40	40	46.4
2	DN50	70	81.2
2.5	DN65	100	116
3	DN80	170	197
4	DN100	290	336.4
6	DN150	490	568.4
8	DN200	790	916.4
10	DN250	1400	1624
12	DN300	1800	2088
14	DN350	1850	2146
16	DN400	2000	2320

Kv = Valve flow coefficient (m³/h) / (bar)

Cv = Valve flow coefficient (gpm) / (psi)

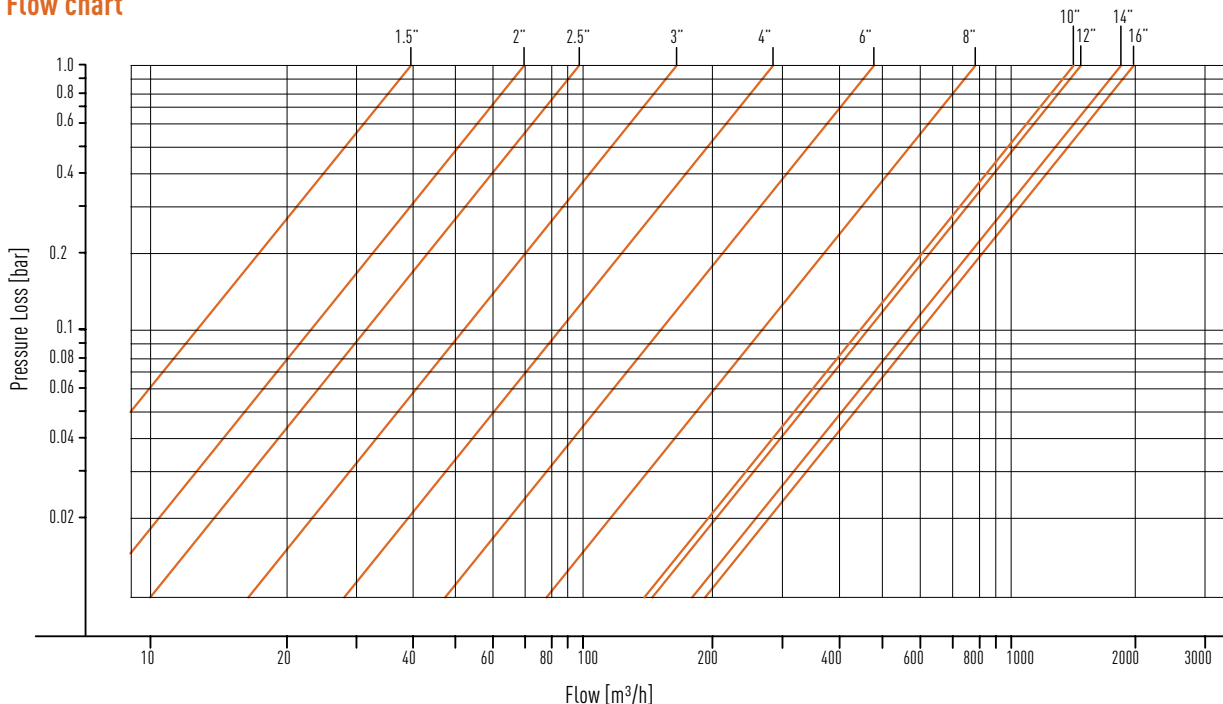
Cv = 1.16 Kv ; Kv = 0.862 Cv

Q = Flow rate in m³/h or gpm

Δp = Head loss across the valve in bar or psi

Q = Kv √Δp

Flow chart

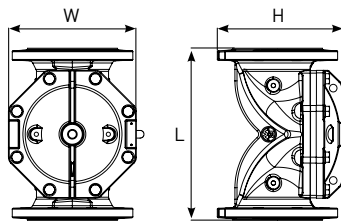


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FDV-R

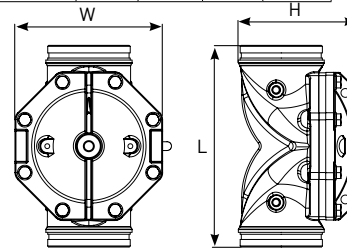
FDV-R FL-FL

SIZE (in)	L	H	W	Kg (lb)
DN 50 (2")	190 (7.5)	159 (6.3)	165 (6.5)	7.9 (17.4)
DN 65 (2.5")	216 (8.5)	173 (6.8)	185 (7.3)	9.3 (20.5)
DN 80 (3")	283 (11.1)	200 (7.8)	200 (7.8)	17.5 (35.6)
DN 100 (4")	305 (12.0)	220 (8.6)	230 (9.0)	26 (57.3)
DN 150 (6")	460 (16.0)	295 (11.6)	300 (11.8)	46 (101.4)
DN 200 (8")	470 (18.5)	383 (15.0)	354 (13.9)	67.5 (148.8)
DN 250 (10")	635 (25)	430 (16.9)	464 (18.3)	111 (244.7)
DN 300 (12")	749 (29.5)	474 (18.6)	480 (18.9)	151 (332.9)
DN 350 (14")	749 (29.5)	520 (20.5)	520 (20.5)	177 (390.2)
DN 400 (16")	860 (33.9)	711 (28.0)	616 (24.2)	327 (720.9)



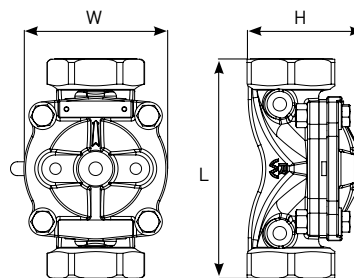
FDV-R GR-GR

SIZE (in)	L	H	W	Kg (lb)
DN 40 (1.5")	159 (6.3)	80 (3.1)	96 (3.8)	1.5 (3.3)
DN 50 (2")	190 (7.5)	96 (3.8)	125 (4.9)	3.0 (6.6)
DN 65 (2.5")	225 (8.9)	114 (4.5)	140 (5.5)	4.7 (10.4)
DN 80 (3")	290 (11.4)	140 (5.5)	200 (7.9)	10.8 (20.3)
DN 100 (4")	346 (13.6)	346 (13.6)	230 (9.0)	18.0 (36.7)
DN 150 (6")	412 (16.2)	2a39 (9.4)	302 (11.9)	33 (72.7)
DN 200 (8")	470 (18.5)	350 (13.8)	354 (13.9)	51 (112.4)



FDV-R TH-TH

SIZE (in)	L	H	W	Kg (lb)
DN 40 (1.5")	159 (6.3)	80 (3.1)	96 (3.8)	2.0 (4.4)
DN 50 (2")	190 (7.5)	196 (7.7)	125 (4.9)	3.5 (7.7)
DN 65 (2.5")	225 (8.9)	110 (4.3)	140 (5.5)	5 (11)
DN 80 (3")	290 (11.4)	138 (5.4)	200 (7.9)	24.2 (20.3)
DN 100 (4")	346 (13.6)	220 (8.7)	230 (9.0)	16.5 (36.4)



Port Description

Port Description	DN50 2"	DN65 2.5"	DN80 3"	DN100 4"	DN150 6"	DN200 8"	DN250 10"	DN300 12"	DN350 14"	DN400 16"
Diaphragm Chamber Supply	1/4"	1/4"	1/4"	1/4"	1/2"	1/2"	1/2"	1/2"	3/4"	3/4"
Upstream & Downstream side ports	1/4"	1/4"	1/4"	1/4"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"