Pneumatically Actuated, Remote Reset, Economic Deluge Valve

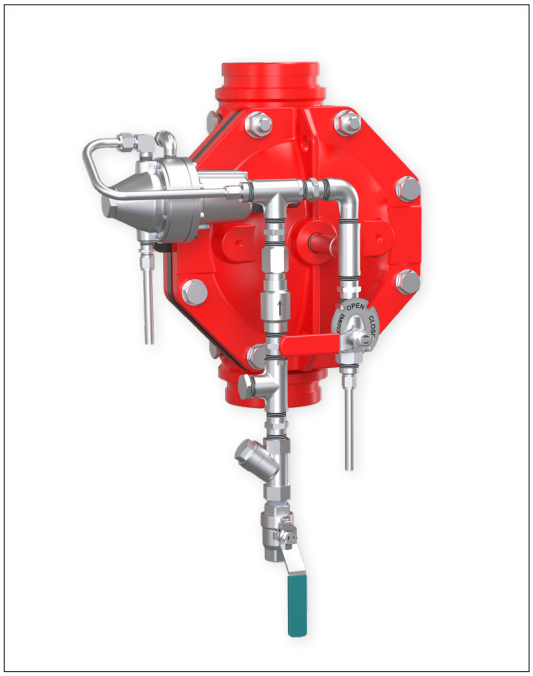
FDV-AP1

The FDV-AP1 fire protection system is based on Raphael's FDV deluge valve and is equipped with a pneumatically actuated control trim. The FDV is a fire protection control valve designed for deluge sprinkler systems, specifically intended for installation in hazardous environments. It is suitable for both vertical and horizontal installations and features a globe-pattern, line-pressure-operated design with a direct elastomeric diaphragm seal. The valve contains no balancing spring and no internal metallic components in the wetted area. Its hydrodynamic flow path ensures high flow rates with minimal head loss.

The FDV-AP1 deluge system is pneumatically actuated and can be reset remotely. When the Dry Pilot Detection Line, which is pressurized with air, is exposed to a predetermined temperature, the automatic fire sprinklers open (shatter), venting the air pressure from the detection line. The resulting pressure drop actuates the pneumatic operator, which in turn commands the deluge valve to open.

The system incorporates an emergency manual valve, allowing operation bypassing the fire detection system.

The system is suitable for use with automatic sprinklers on the dry pilot pipeline and with open nozzles on the main spraying pipelines.



MARKETS

Commercial · Industry · Marine · Storage · Residential · Airport · P.O.G.

TECHNICAL DATA

FLUID:
Water, Brackish water, Sea water, Foam

PNEUMATICS:
Air, Nitrogen

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)

MIN. PNEUMATIC PRESSURE:
16 psi (1.1 bar)

APPROVALS

ADVANTAGES

- Consists of only three parts: body, diaphragm, and cover plate – no wet metal spring inside the control chamber.
- Full-bore, unobstructed design.
- Simple manual reset to standby position without draining or opening the valve, and without closing the OS&Y or other valves in the system.
- Low maintenance cost: serviced in-line with only one replaceable part – the long-life elastomeric diaphragm.
- Conforms to the Inspection, Testing, and Maintenance Standard for Water-Based Fire Protection Systems (NFPA 25).

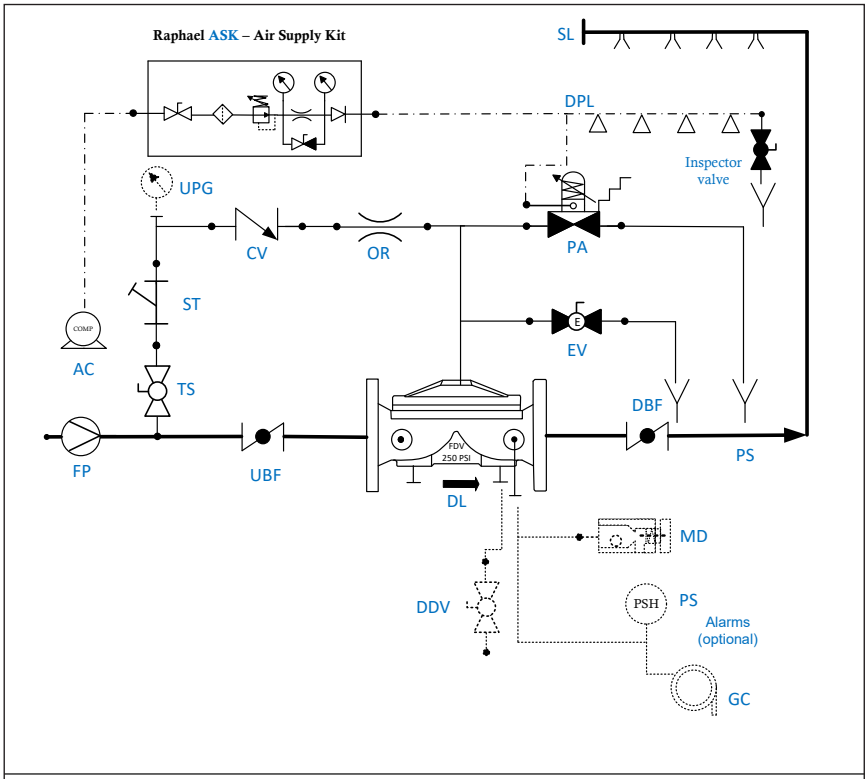
CHARACTERISTICS

- Hydrodynamic pattern design ensures high flow rates with minimum head loss.
- The valve trips open automatically upon a gradual release of water pressure from its control chamber. The trip is actuated by the pneumatic pressure release of the Dry Pilot Line, caused by its exposure to flame heat.
- Soft closing, upon pressurization of the valve's control chamber - by line pressure or another independent water source - prevents surges.

The FDV-AP1 resets to the stand-by closed position by pressurizing the Dry Pilot Line.

Schematic drawing: FDV-AP1

Set position



TS -	Trim supply	SL -	Sprinkles Line		Water lines
ST -	Strainer	FP -	Fire Pump		Pneumatic lines
AT -	Alarm Test valve	DPL -	Dry Pilot Line		Optional
CV -	Check Valve	AC -	Air Compressor		
OR	Orifice				
DL -	Deluge Valve	**OPTIONAL**			
UBV -	Upstream Butterfly Valve	PS -	Pressure Switch		
DBV -	Downstream Butterfly Valve	MD -	MADV – Manual / Automtic Drain Valve		
PA -	2-Way Pneumatic Actuator	GC -	Gong connection		
EV -	Emergency Valve	UPG -	Upstream Pressure gauge		
PC -	Pressure gauge Connection	DDV -	Downstream Drain Valve		

OPERATION

SET position

Pressurized water in the valve's control chamber is trapped by the check valve (CV), the closed pneumatic actuator PAV-2 (PA), and the closed emergency valve (EV).

The air pressure accumulated in the dry pilot detection (DPL) line keeps the pneumatic actuator in the closed position, thereby maintaining the deluge valve closed.

FIRE situation

When one or more of the dry pilot detection line (DPL) automatic sprinklers are exposed to the predetermined temperature and shatter open, the detection line depressurizes, causing the pneumatic actuator (PA) to open.

The opening of the pneumatic actuator drains the deluge valve's control chamber. Consequently, the FDV deluge valve opens, allowing water to flow into the spray sprinkler line.

RESET position

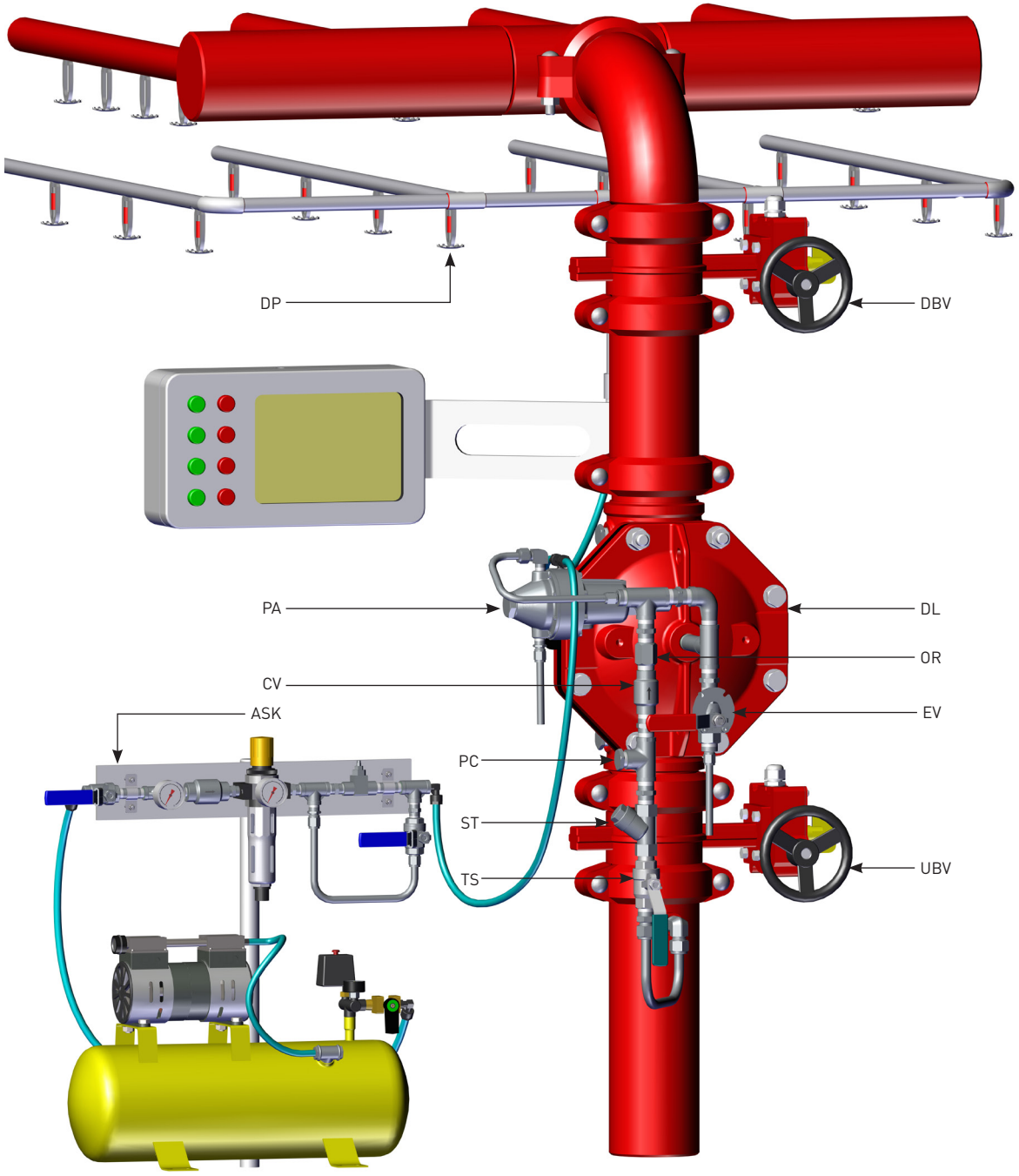
System reset requires replacing all shattered-open automatic fire sprinklers in the dry pilot detection line. The detection line is then re-pressurized to its set pressure.

The restored air pressure closes the pneumatic actuator (PA), which in turn closes the FDV deluge valve.

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FDV-AP1

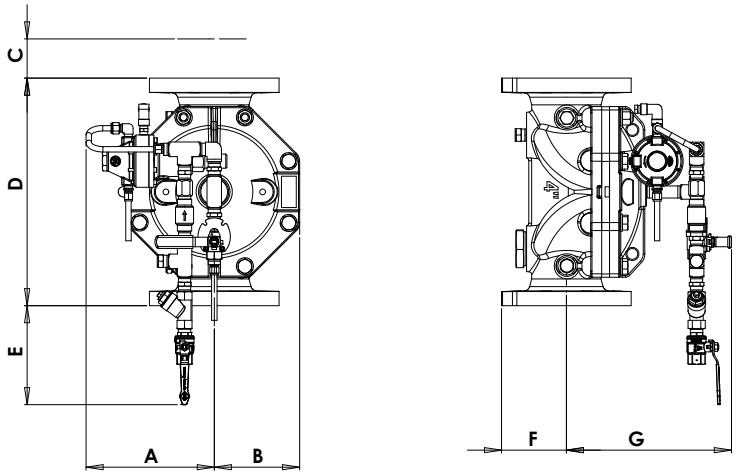
Typical installation



UBV - Upstream Butterfly Valve
DBV - Downstream Butterfly Valve
DL - FDV Deluge valve
TS - Trim supply valve
ST - "Y" strainer
CV - Check valve
PC - Pressure gauge Connection
OR - Orifice
EV - Emergency Valve
PA - PAV-2 Pneumatic Actuator
DP - Dry Pilot Line
ASK - Air Supply Kit

Parametric drawing:

FDV-AP1



Dimensions Table

Size	1½"		2"		3"		4"		6"		8"		10"	
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
A	194	7.6	200	7.8	180	7	225	8.8	253	9.9	305	12	324	12.7
B	58	2.2	70	2.7	116	4.5	148	5.8	177	6.9	231	9	308	12.1
C	45	1.8	42	1.6	21	0.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D	204	8.0	220	8.6	324	12.7	400	15.7	464	18.2	570	22.4	766	30.1
E	273	10.7	263	10.3	211	8.3	173	6.8	141	5.5	88	3.5	N/A	N/A
F	52	2	58	2.2	100	3.9	114	4.5	142	5.6	172	6.8	203	8
G	232	9.1	246	9.6	276	10.8	290	11.4	357	14.	363	14.3	453	17.8
Kg/lb	9.2	20.2	11	24	28.2	62.2	44	97	54.6	120	100	220	228	502

Factory Standard

MAIN VALVE

BODY & COVER

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

ELASTOMERS:

- NBR, 3-layered reinforced Natural Rubber
- EPDM, 3-layered reinforced

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
- Cupro-Nickel
- Monel®

PLEASE SPECIFY

- Working Media
- Ambiental conditions
- Min/Max operating flow
- Min/Max operating pressure
- Pneumatic Working pressure
- System installation orientation
- Deluge valve ends and standard.
- Deluge valve material and coating.
- Trim materials
- Additional accessories needed:
  Pressure gauge
  Pressure switch
  Drain valve (manual or automatic)
  Gong

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

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