Electro-Pneumatically Actuated, Remote Reset Deluge Valve

FDV - DC1

The FDV-DC1 fire protection system is based on Raphael's FDV deluge valve and is equipped with both pneumatically and electrically actuated control trim. The installed FDV valve is available in a variety of optional materials and coatings, making it suitable for installations in hazardous environments.

The FDV-DC1 deluge system is pneumatically actuated and supports remote resetting.

In the event of a fire, when the pneumatic dry pilot detection line is exposed to heat from flames, one or more of its automatic fire sprinklers shatter, venting air pressure from both the dry pilot line and the pneumatic actuator. This pressure drop activates the pneumatic actuator, causing the deluge valve to open.

Alternatively, if an electrical detection sensor triggers the main control board, it activates a solenoid valve, which vents the dry pilot line, activates the pneumatic actuator and opens the deluge valve.

The system includes an emergency valve that allows manual activation by bypassing the fire detection systems and the solenoid valve. It is compatible with automatic sprinklers on the dry pilot line and open nozzles on the main spray pipelines.



MARKETS

Marine
Industry
Storage
P.O.G.
Airport

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)

APPROVALS

ADVANTAGES

- Ony three parts: body, diaphragm & cover plate. No wet metal spring inside the control chamber.
- Unobstructed full bore valve.
- Simple manual reset of the valve to standby position without closing OS & Y or other valves in the system.
- Open fail safe valve, maintained in standby closed position.
- Low maintenance cost: the valve is serviced in-line with only one replaceable part which is long life elastomeric diaphragm.
- Conforms with inspection, testing and maintenance standards of water based fire protection systems, NFPA 25.

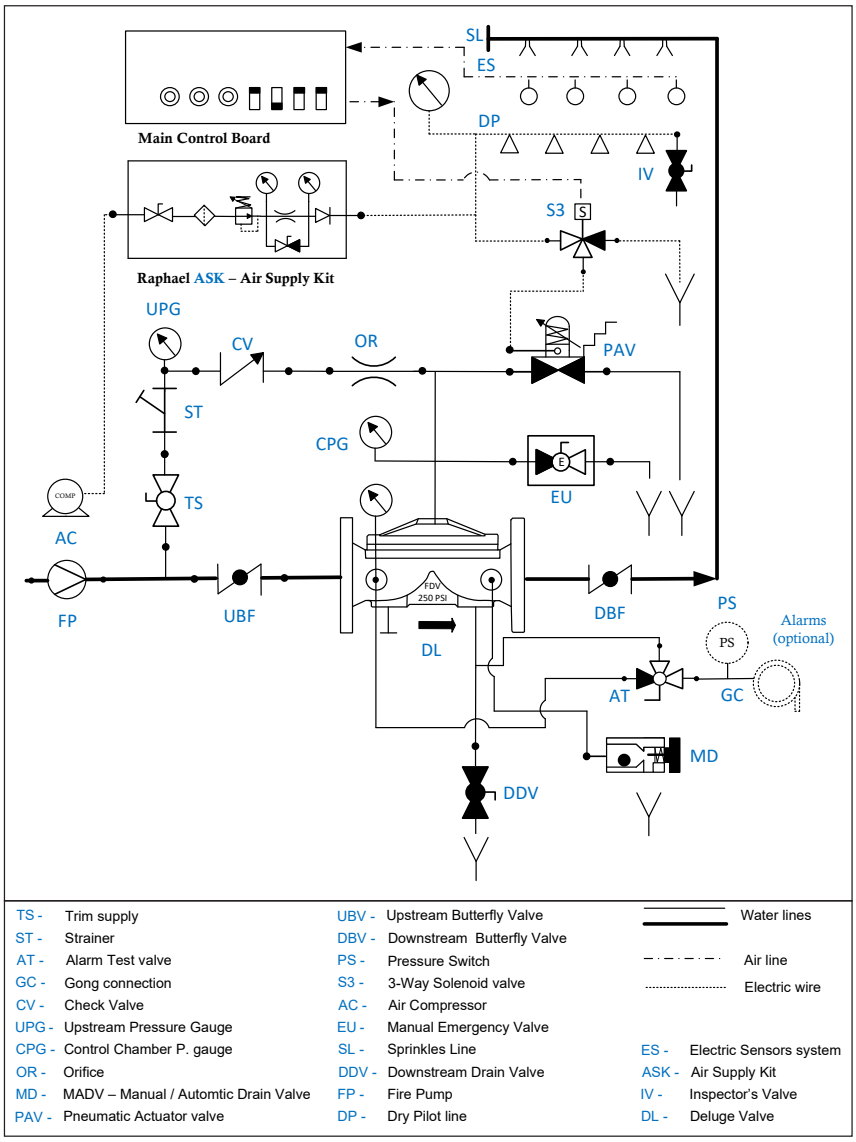
CHARACTERISTICS

- Hydro-dynamic 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 Dry Pilot Line's pneumatic pressure release due to its exposure to flame heat.
- Soft closing upon pressurization of the valve's control chamber, by line pressure or other independent water source, prevents surges.

The FDV-DC1 resets to stand-by close position by de-energizing the alarm system solenoid's coil through the main control panel or, pressurizing the Dry Pilot Line.

Schematic drawing: FDV-DC1

Set position



OPERATION

SET position

Pressurized water in the valve's control chamber is trapped by the check valve (CV), the closed pneumatic actuator (PAV), and the closed emergency valve (EU). The air pressure accumulated in the Dry Pilot detection line (DP) is conveyed to the actuator through a 3-way solenoid valve (S3), maintaining the Deluge valve (DL) closed.

FIRE situation

When some of the Dry pilot detection line's automatic sprinklers are subjected to the heat of fire flames and shatter open, the pilot line depressurizes, tripping open the Actuator (PAV). Alternatively, an electric detection system senses heat and triggers the main control board, which in turn energizes the 3-way solenoid valve (S3). The solenoid valve bypasses the Dry pilot detection line, depressurizes the actuator (PAV) control chamber and open it. The open actuator drains the FDV-DC1's control chamber and the Deluge valve opens.

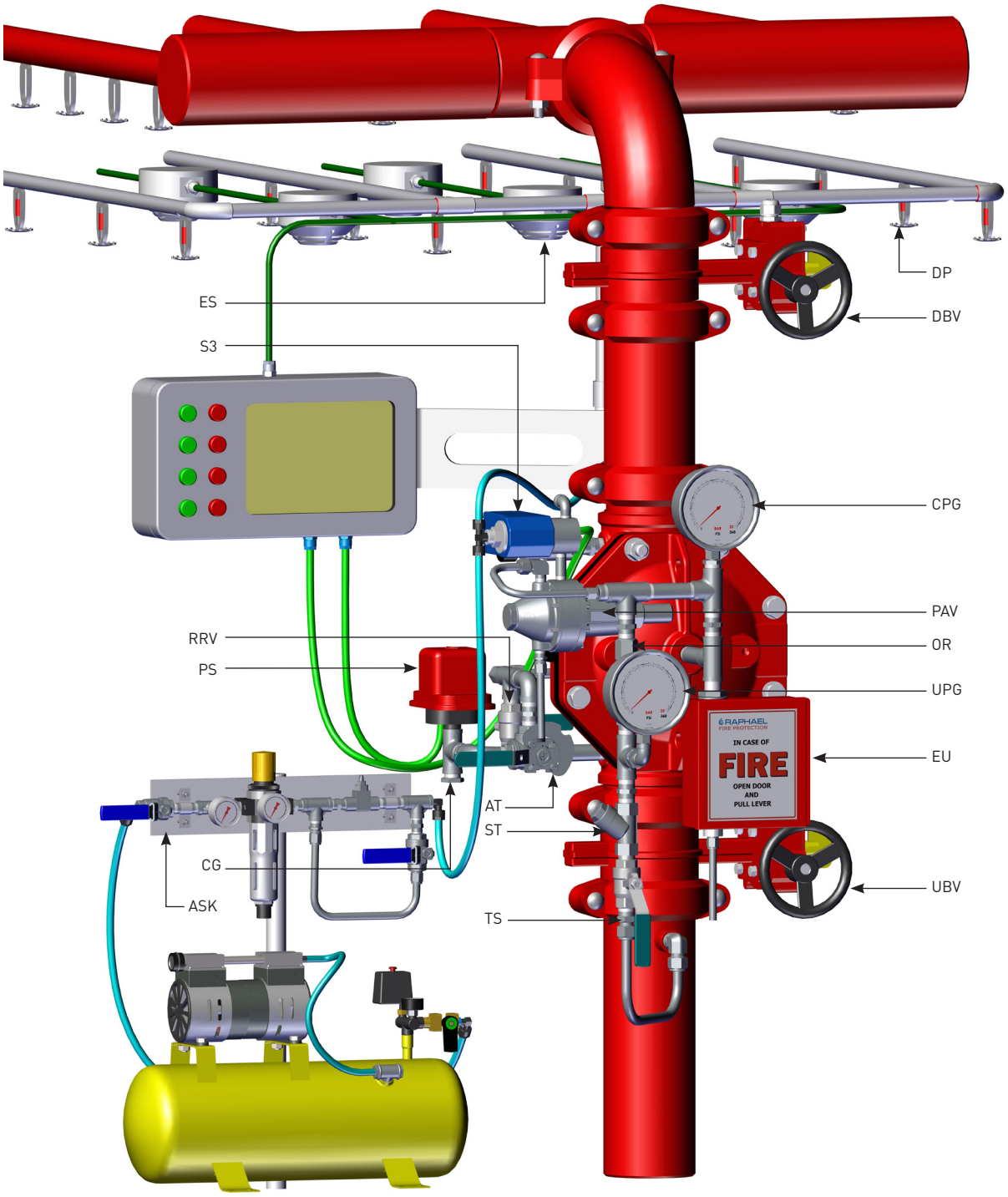
RESET position

The upstream butterfly valve must be closed. The system reset requires the replacement of all shattered-open fire sprinklers in the detection pilot line (DP). Alternatively, the electrical alarm system must be reset and the solenoid de-energized. After pressurizing the dry pilot line and by that – closing the pneumatic actuator, the upstream butterfly valve must open. The Deluge control chamber gets pressurized by the constant upstream pressure and the Deluge valve closes (DL).

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FDV - DC1

Typical installation



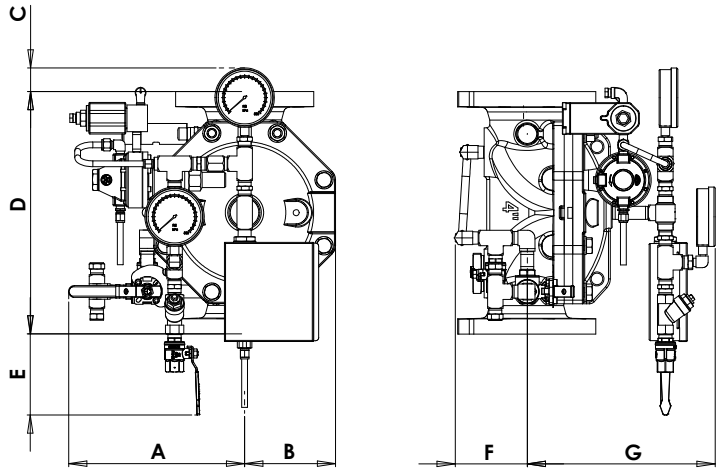
TS – Trim Supply
ST – Strainer
AT – Alarm Test valve
S3 – 3-way solenoid valve
CV – Check Valve
GC – Gong Connection

DP – Dry Pilot Line
DDV – Downstream Drain Valve
PS – Pressure Switch
PAV – Pneumatic Actuator Valve
OR – Orifice
ASK – Air Supply Kit

ES – Electric Sensors
UPG – Upstream Pressure Gauge
CPG – Control chamber Pressure Gauge
UBV – Upstream Butterfly Valve
DBV – Downstream Butterfly Valve

Parametric drawing:

FDV-DC1



Dimensions Table

Size	1.5"		2"		3"		4"		6"		8"		10"	
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
A	254	10	254	10	275	10.8	290	11.4	194	7.6	225	8.8	373	14.6
B	122	4.8	122	4.8	122	4.8	150	5.9	293	11.5	346	13.6	308	12.1
C	135	5.3	130	5.1	76	3	36	1.4	10	0.4	N/A	N/A	N/A	N/A
D	202	8	325	12.8	324	12.7	400	15.7	464	18.2	570	22.4	766	30.1
E	267	10.5	257	10.1	171	6.7	135	5.3	100	3.9	47	1.8	N/A	N/A
F	117	4.6	118	4.6	120	4.7	120	4.7	158	6.2	158	6.2	192	7.5
G	260	10.2	275	10.8	304	11.9	310	12.2	380	14.9	415	16.3	505	19.9
Kg/lb	12	26.4	13.8	30.4	31	68.3	46.7	103	57.7	127	103	227	232	511

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
- Pneumatic working pressure
- System installation orientation
- Deluge valve ends and standard
- Deluge valve material and coating
- Trim materials.
- Solenoid voltage
- Additional accessories

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

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