3-Way Electrically Actuated, Remote Reset, Deluge Valve

FDV-3W- DE1

The FDV-3W-DE1 fire protection system, which is equipped with an electrically actuated control trim, is based on Raphael's FDV deluge valve.

The FDV functions as a fire protection control valve for deluge sprinkler systems and is specifically designed 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 metallic components in the wetted area. Its hydrodynamic flow path ensures high flow rates with minimal head loss.

The FDV-3W-DE1 deluge system is electrically actuated and can be reset remotely.

An electric detection system activates a 3-way solenoid valve via a control panel, which in turn opens a 3-way actuator. As the actuator fully drains the deluge valve's control chamber, the valve delivers its full flow capacity with minimal head loss.

The deluge system includes an emergency manual valve that bypasses the fire detection system for manual operation. It is suitable for use with automatic sprinklers on the dry pilot line and with open nozzles on the main spray pipelines.



MARKETS

Marine · Storage · P.O.G. · Tunnels · Airports

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.

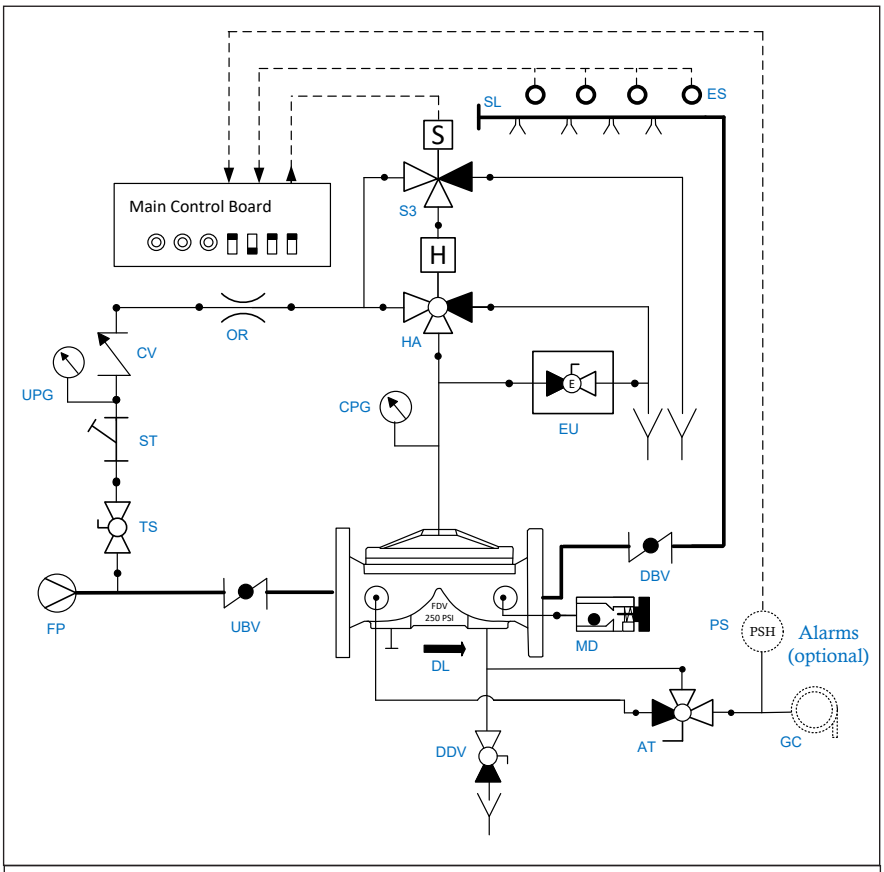
CHARACTERISTICS

- Hydrodynamic pattern design ensures high flow rates with minimal head loss.
- The valve trips open automatically upon a gradual release of water pressure from its control chamber. The trip is actuated by an electric signal transmitted from the main control panel to the valve's solenoid, in response to heat or flame detected by the sensor system.
- Soft closing upon re-pressurization of the valve's control chamber—by line pressure or another independent water source—prevents surges.
- The FDV-3W-DE1 three-way control principle ensures full valve opening with maximum flow rate and minimal head loss.

The FDV-3W-DE1 resets to the standby closed position when the solenoid coil is de-energized through the main control board.

Schematic drawing: FDV-3W-DE1

Set position



TS -	Trim supply	HA -	HAV-3 3-way hydraulic actuator		Water lines
ST -	Strainer	DBV -	Downstream Butterfly Valve		
AT -	Alarm Test valve	CPG -	Control Chamber P. gauge		Electrical line
GC -	Gong connection	UPG -	Upstream Pressure gauge		
CV -	Check Valve	S3 -	3-way Solenoid valve		
OR -	Orifice	EU -	Manual Emergency Valve		
PS -	Pressure Switch	SL -	Sprinkles Line		
DL -	Deluge Valve	DDV -	Downstream Drain Valve		
MD -	MADV – Manual / Automtic Drain Valve	FP -	Fire Pump		
ES -	Electric Sensors System	SL -	Sprinklers Line		
UBV -	Upstream Butterfly Valve				

OPERATION

SET position

Pressurized water in the valve's control chamber is trapped by the check valve (CV), the closed 3-way actuator HAV-3 (HA), and the closed emergency valve (EU), maintaining the FDV deluge valve in a closed state. The hydraulic actuator's control chamber is supplied by the 3-way solenoid (S3), which enables the upstream flow into the deluge valve's control chamber, keeping the valve closed.

FIRE situation

When an electric detection system (ES) senses flame heat, it triggers the main control panel, which in turn, transmits an electric signal commanding the 3-way solenoid valve (S3). When the solenoid valve is energized, it changes state and pressurizes the actuator's control chamber. The actuator (HA) changes state, blocking the upstream flow to the deluge control chamber and fully draining this space. Consequently, the FDV Deluge valve opens and allows water to flow into the spray sprinkler line (SL).

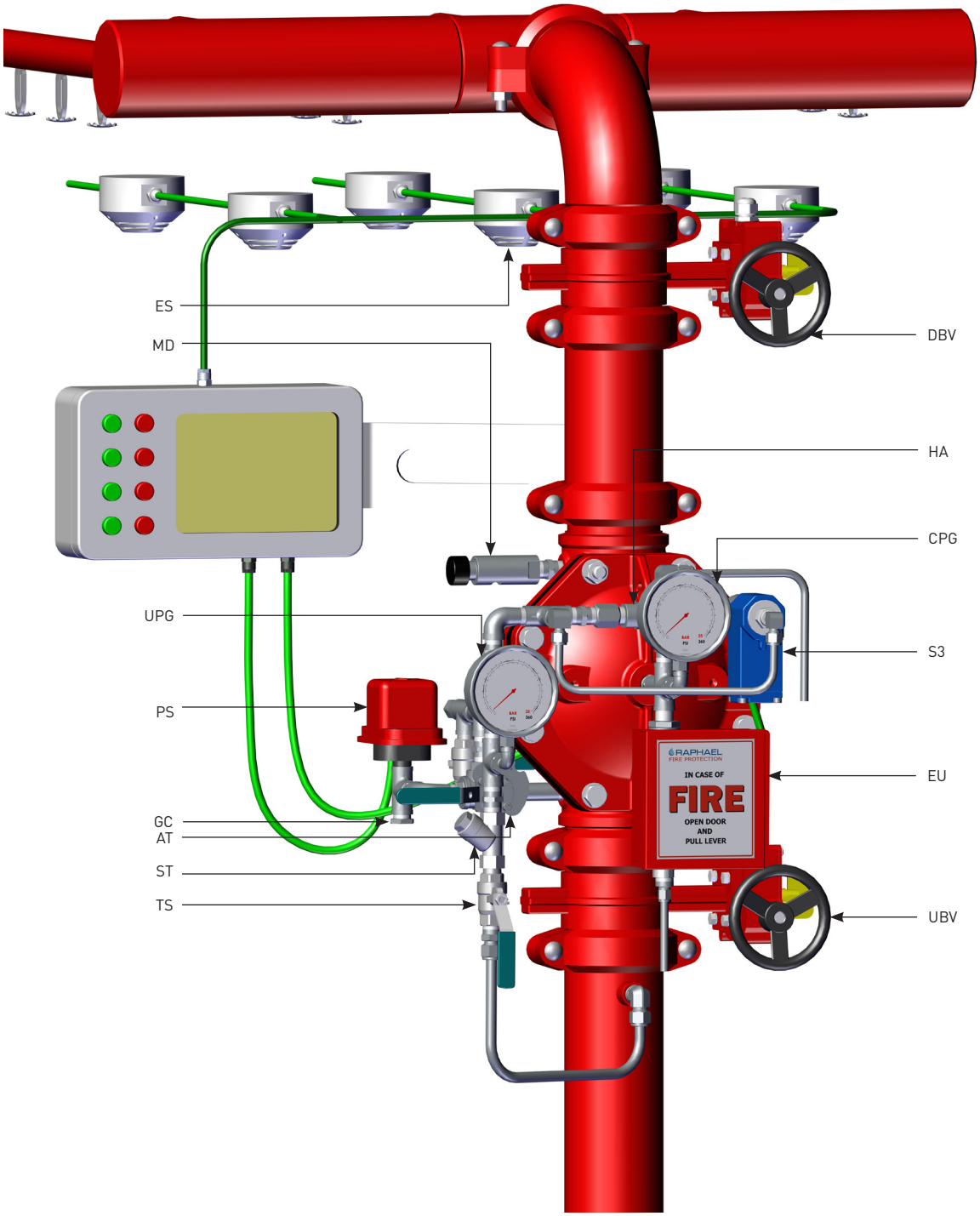
RESET position

When the electric signal from the main control board to the solenoid's coil is interrupted, the solenoid changes state and pressurizes the actuator (HA) control chamber, which in turn, changes state as well. The actuator enables the flow from the trim pressure supply valve (TS), through the orifice (OR), into the deluge control chamber, which subsequently closes. As a result, the sprinkler spray flow stops.

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FDV-3W- DE1

Typical installation



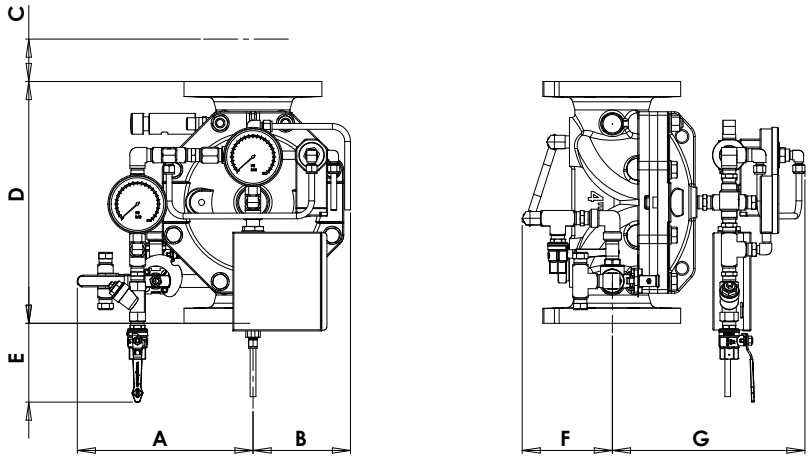
TS - Trim Supply
ST - "Y" Strainer
AT - Alarms Test Valve
GC - Pressure Gauge Connection
AL - Alarm Pressure Switch

DDV - Downstream Drain Valve
UPG - Upstream Pressure gauge
MD - Manual Automatic Drain Valve
ES - Electric Sensors system
DBV - Downstream Butterfly Valve

HA - HAV3 3-way Hydraulic actuator
CPG - Cont. chamber Pressure Gauge
S3 - 3-way Solenoid
EU - Emergency Unit
UBV - Upstream Butterfly Valve

FDV-3W-DE1

Parametric drawing:



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	255	10	263	10	297	11.7	290	11.4	316	12.4	340	13.4	373	14.7
B	161	6.3	161	6.3	161	6.3	161	6.3	176	6.9	231	9	308	12.1
C	35	1.3	27	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
D	202	8.0	325	8.6	324	12.7	400	15.7	464	18.2	570	22.4	766	30.1
E	230	9	218	8.5	166	6.5	130	5.1	98	3.8	44	1.7	N/A	N/A
F	127	5	127	5	128	5	148	5.8	150	5.9	172	6.8	203	8
G	240	9.4	254	10	283	11.1	319	12.5	387	15.2	421	16.5	210	8.3
Kg/lb	11.3	25	13	28.6	30	66	46	101	56	123	102	224	230	507

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
- System installation orientation
- Deluge valve ends and standard
- Deluge valve material and coating
- Trim materials
- Solenoid Voltage
- Solenoid Protection
- Additional accessories needed

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

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