Double interlock, Electric-Electric Actuated, Remote Reset, Pressure Reducing

FPS-DCE1

The Pre-action system is a fire protection (FP) combined system, consisting of a controlled FDV deluge valve and a riser check valve installed downstream. The pressurized automatic sprinkler pipeline maintains the riser check valve in a closed position. The section between the downstream side of the closed deluge valve and the check valve clapper functions as the "intermediate chamber," where the water pressure switch and the acoustic alarm are connected.

In double-interlock pre-action systems, such as the FPS-DCE1 described here, full system activation depends on the occurrence of two independent, fire-related events: one caused by heat exposure and the other by fire detection. The activation of the FPS-DCE1 system requires two electrical signals.

In the event of a fire, heat causes one or more automatic sprinklers to open, resulting in a drop in pressure within the sprinkler pipeline. This pressure drop activates the air pressure switch, which sends a signal to the main control board. This constitutes the first actuation event.

When one or more Electric detectors are triggered, they send an electrical signal to the main control board, constituting the second actuation event. Only when both actuation events have occurred does the control board energize the solenoid valve, thereby opening the FDV deluge valve and allowing water to flow into the sprinkler pipeline.

The FPS-DCE1 system is capable to reduce the upstream pressure to a set downstream pressure and maintain it in a steady level. The pressure reducing pilot responses to any downstream pressure changes caused by consumption flow rate changes and keeps a stable set pressure.

MARKETS

Commercial | Industry | Storage

Airports | Residential

TECHNICAL DATA

FLUID:
Water

PNEUMATICS:

Air, Nitrogen

SIZE RANGE:
50 mm to 250 mm (2" to 10")

AVAILABLE CONNECTIONS ENDS:
Flange*Flange, Groove*Groove, Flange*Groove, Groove* Flange

PRESSURE NOMINAL:
250 psi (17.2 bar)

APPROVALS

ADVANTAGES

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

CHARACTERISTICS

- Hydro-dynamic pattern design ensures high flowrates with minimum head loss.
- The system trips open automatically only after two actuation events:
  The first: A drop in air pressure in the sprinkler pipeline, which activates the air-pressure switch.
  The second: One or more electric sensors are triggered and send an electrical signal to the main control board.

The FPS-DCE1 resets to the standby closed position by de-energizing the solenoid coil through the main control panel and replacing all opened sprinklers, allowing the downstream pipeline to be re-pressurized.

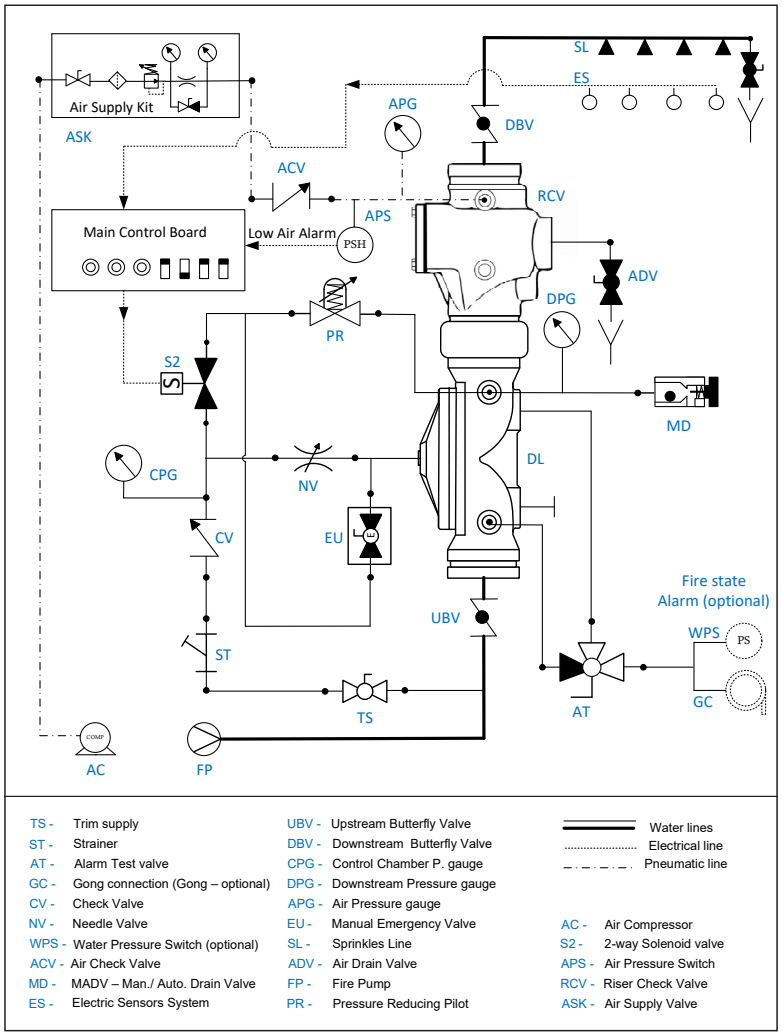
A pressure-reducing pilot provides full control over the downstream pressure and maintains a stable setpoint across a wide pressure range.

The FDV-DCE1 resets to the standby closed position by de-energizing the alarm-system solenoid coil through the main control panel.

Schematic drawing:

FPS-DCE1

Set position



OPERATION

SET POSITION

Pressurized water is retained in the deluge valve control chamber by the check valve (CV), the closed solenoid valve (S2), and the closed emergency valve (EU), keeping the deluge valve closed. Air pressure in the downstream spray pipeline keeps the riser check valve closed.

FIRE SITUATION

When heat activates one or more sprinklers, they open and release air, causing the pipeline to depressurize. This triggers the low-air-pressure switch (APS), which closes its internal contacts and sends a signal to the main control board, recognized as the first actuation event.

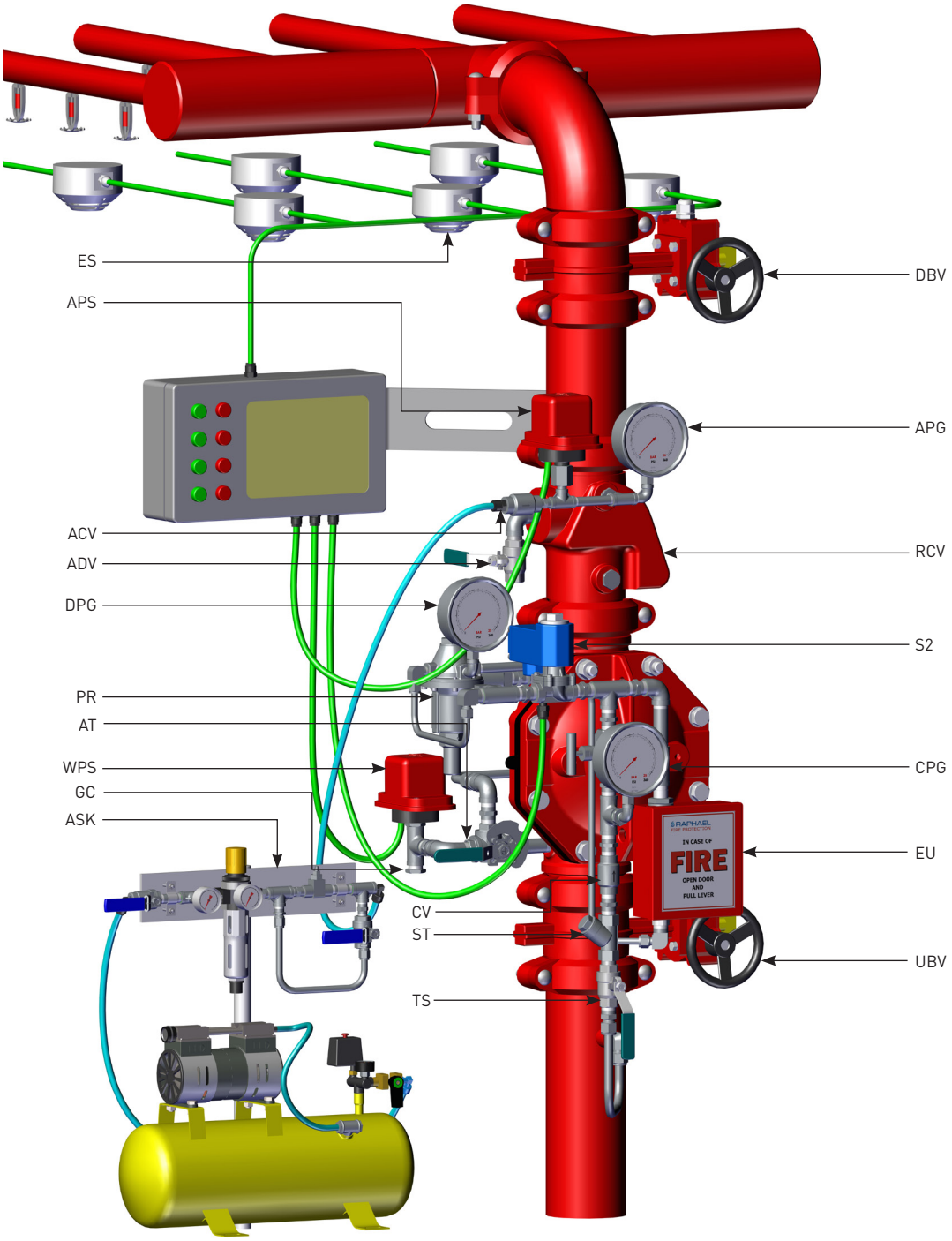
If the electric detection system senses heat, it sends a signal to the main control board, recognized as the second actuation event. The control board then energizes the solenoid valve (S2), which drains the deluge valve control chamber through the pressure-reducing pilot to the downstream side. As a result, the deluge valve opens and admits water through the now-open riser check valve into the sprinkler pipeline. All alarms are activated, including the water-pressure switch (WPS) and the water motor gong.

RESET POSITION

When the control board de-energizes the solenoid valve (S2), upstream flow through the trim supply valve and the needle valve re-pressurizes the deluge valve control chamber, closing the valve. All opened sprinklers must be replaced. Before re-pressurizing the spray pipeline with air, it must be completely drained by opening the air-drain valve (ADV).

Typical installation

FPS-DCE1



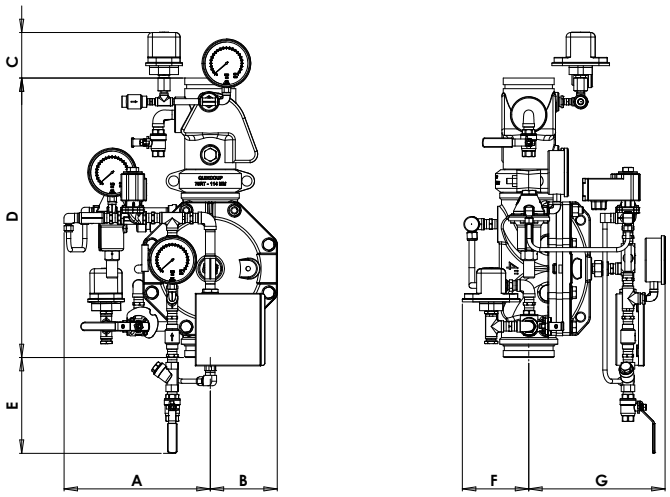
DBV - Downstream Butterfly Valve
UBV - Upstream Butterfly Valve
CPG - Control Chamber Pressure Gauge
DPG - Downstream Pressure Gauge
APG - Air Pressure Gauge
ES - Electric Sensors system
ASK - Air Supply Kit

ACV - Air Check Valve
ADV - Air Drain Valve
S2 - Solenoid 2 way
PR - Pressure Reducing Pilot Valve
PSA - Pressure Supply Arrestor
EU - Emergency Unit
CV - Check Valve
ST - "Y" Strainer

TS - Trim Supply
NV - Needle Valve
AT - Alarms Test Valve
GC - Gong Connection
HAV - Hydraulic Actuator Valve
WPS - Water Pressure Switch
APS - Air Pressure Switch (optional)
RCV - Riser Check Valve

Parametric drawing:

FPS-DCE1



Dimensions Table

Size	2"		3"		4"		6"		8"		10"	
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
A	242	9.5	199	7.8	298	11.7	315	12.4	245	9.6	394	15.5
B	212	8.3	241	9.5	150	5.9	176	6.9	232	9.1	307	12
C	120	4.7	120	4.7	116	4.5	114	4.5	122	4.8	132	5.2
D	392	15.4	523	20.5	629	24.7	736	28.9	897	35.3	1200	47.2
E	295	11.6	300	11.8	190	7.5	157	6.2	105	4.1	N/A	N/A
F	108	4.2	159	6.2	145	5.7	146	5.7	157	6.1	216	8.5
G	276	10.8	276	10.8	310	12.2	347	13.6	380	14.9	503	19.8
Kg/lb	17.5	38.5	32	70.5	51.8	114	80.6	178	130	287	186	410

Factory Standard

MAIN VALVE

BODY & COVER

- Ductile iron
- Cast Steel WCB
- Stainless Steel CF8
- Stainless Steel CF8M

RISKER CHECK VALVE:

- Ductile Iron

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

FITTINGS:

- Stainless Steel 316
- Brass

ACCESSORIES:

- Stainless steel CF8M
- Brass

PLEASE SPECIFY

- Working Media
- Ambiental conditions
- Min/Max operating flow
- Min/Max operating pressure
- Downstream set pressure
- System installation orientation
- Valve ends and standard
- Deluge valve material and coating
- Trim materials
- Solenoid Voltage
- Solenoid Protection
- Installation orientation
- Additional accessories needed:
  - Water motor Alarm (Gong)
  - Water pressure switch
  - Low air pressure switch

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