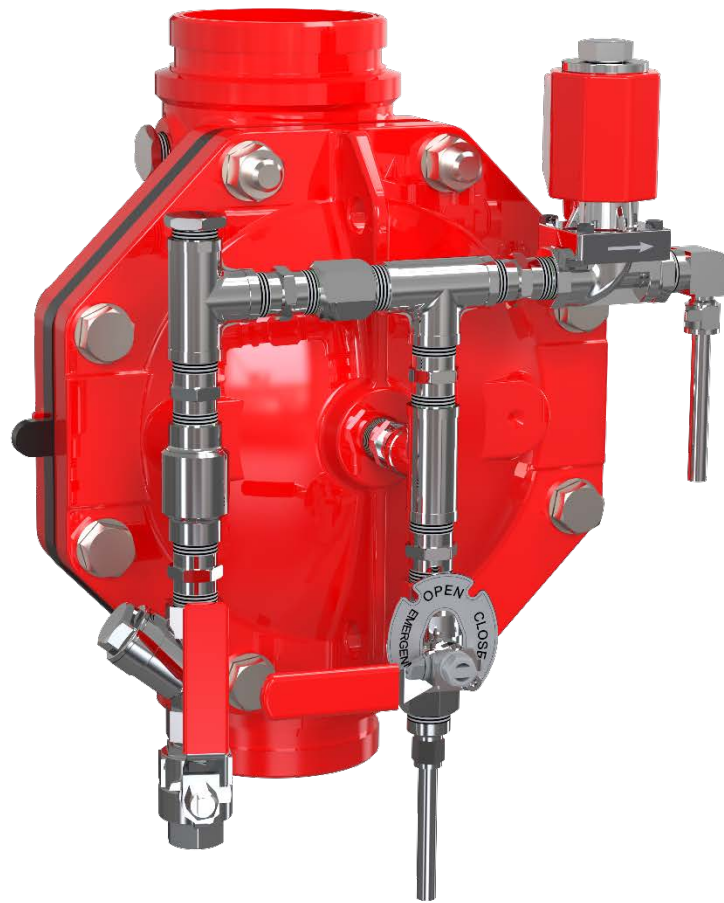

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FDV-AE1 –Electrical Actuated with Remote Reset Deluge Valve

Description

This deluge system is based on the Raphael's FDV valve, equipped with an Electrical actuated control trim. The FDV valve installed, have a range of optional materials and coating to fulfill operation condition needed, but the system function principle stays unchanged: in fire situation, an electrical detection system trips the valve's control trim through the solenoid and consequently, pressurized water trapped in the FDV's control chamber are drained, and the valve opens.

Opening the emergency overcomes all terms and opens the deluge valve immediately. This system is suitable for water spray pipelines with open nozzles.

Operation (reference – figure 1)

SET position:

Water is supplied by the Trim pressure supply valve (7), “Y” strainer (5), Check valve (4), flows through orifice (9) and fills the FDV’s control chamber. Pressurized water in the valve’s control chamber is trapped by the check-valve (4), by the closed solenoid valve (8) and by the closed emergency valve (10), maintaining the deluge valve in its closed position.

FIRE situation:

When one or more of the electric fume/heat sensors is tripped, it energizes the 2-way solenoid (8) through the control panel. When tripped, this solenoid drains the FDV’s control chamber to the atmosphere. This drain overcomes the entering orifice flow into the deluge control chamber and causes the FDV valve to open and admits water into the spray sprinklers pipeline.

Opening the Emergency valve (10), bypasses all terms, drains the FDV control chamber and opens the valve immediately.

RESET position.

When the solenoid is de-energized through the main control panel, the upstream pressure flows through the orifice (9) into the FDV valve’s control chamber, pressurizes it and closes the FDV deluge valve. The valve closes and the water flow to the spray pipeline.

It is recommended to drain the sprinklers pipeline by opening the drain ball valve connected to the FDV’s downstream drain port (if equipped).

FDV-AE1 –Electrical Actuated with Remote Reset Deluge Valve

Parts list

- | | |
|------------------------------|------------------------------|
| 1. – FDV deluge valve | 6. – Plug for alarm devices |
| 2. – Plug for drain valve | 7. – Trim supply valve |
| 3. – Plug for Pressure gauge | 8. – Solenoid (2 way) |
| 4. – Check Valve | 9. – Emergency valve (2 way) |
| 5. – “Y” Strainer | |

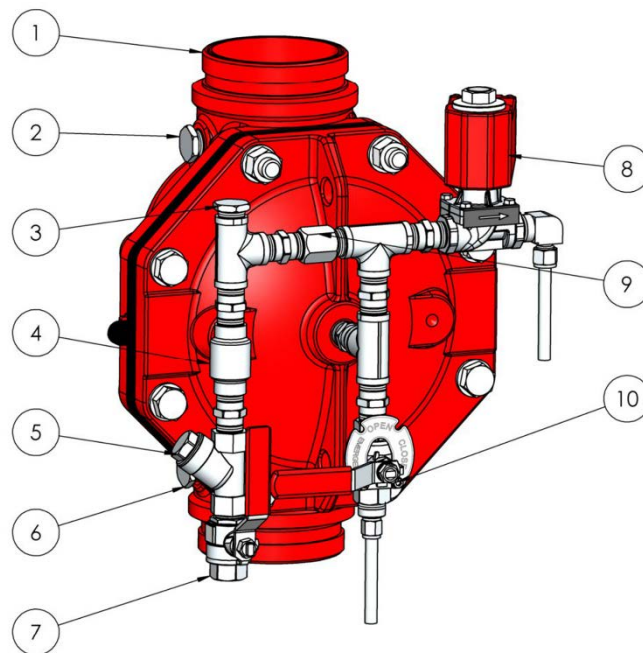


Figure 1

Installation (reference – figure 1)

The system is supplied pre-assembled and factory pre-adjusted. Any change carried out to the system's trim components order, pipe and tubes length or ports for axillary connection sizes, will affect the system operation and therefore, prohibited.

1. The system cannot be installed at a location where it might be subjected to freezing temperatures.
2. Sufficient room around the system location should be kept, to enable assembly/disassembly and maintenance work.
3. It should be considered that water will be drained during regular maintenance on a routine basis, during periodical tests procedures and when operating in fire situation. Therefore, a drainage plan should be considered.
4. The system described is to be mounted vertically only. Systems with identical operation but for horizontal installation are marked with a prefix "H", e.g. HFDV-AE1.
5. The downstream pipe connected to the FDV valve at a vertical and horizontal mount system, is to be supported firmly to prevent the pipeline's weight from being loaded on the system's valve.
6. Any use of pipe/thread reduction-fittings installed at open ports designated for axillary components, (like water motor alarm, trim pressure supply, FDV valve's drains), is prohibited.
7. All connections to water supply, should be done in accordance with figure 2 page 5:
 - (6) – Trim pressure supply connection – ½" NPT fitting & Tubes.
8. The FDV valve should be installed with the flow arrow marked on the valve's body, in the proper direction.
9. Alarm devices like Pressure switch or water motor alarm (gong) need to be connected to the designated AP port.
10. Downstream Pressure gauge needs to be connected at the designated PP port.
11. Drain valve (Manual or automatic) Needs to be installed at the DP port or at the upper ½" back side port.

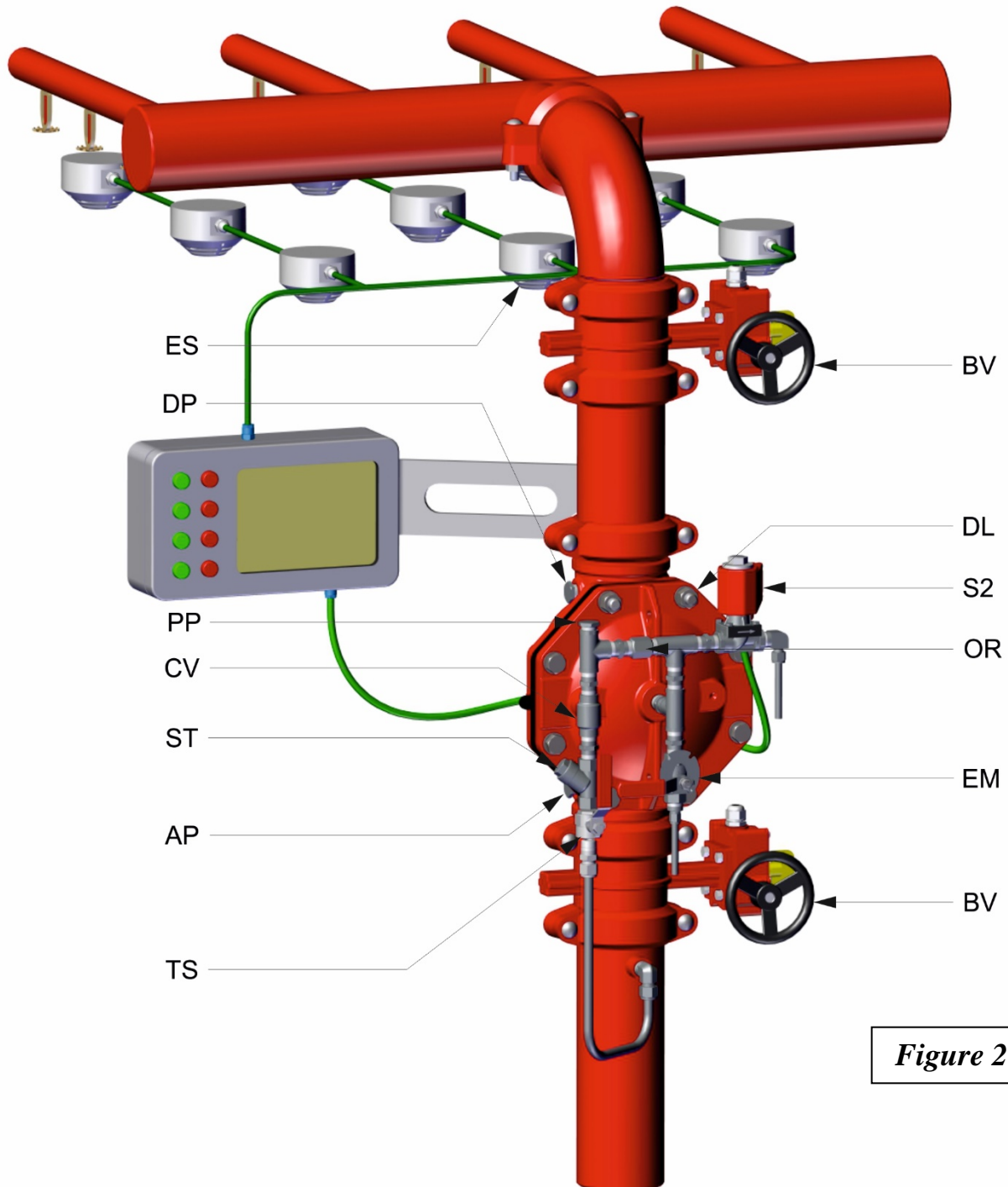


Figure 2

ES – Electric Sensors
 PP – PG Plug (downstream)
 CV – Check Valve
 ST – Strainer
 AP – Alarms Plug (Gong & PS)
 TS – Trim Supply

PV – Butterfly Valve
 DL – FDV Deluge Valve
 S2 – 2-way Solenoid
 OR – Orifice
 EM – Emergency valve
 DP – Drain Port

Commissioning the system - phase 1. (Reference Drawing - figure 2)

Filling and pressurizing the system.

The procedure described should be carried out after system installation completion and a comprehensive inspection.

1. Make sure the lower Butterfly valve (**BF**) is fully closed.
2. Make sure the solenoid (**S2**) is de-energized.
3. Make sure the trim pressure supply valve (**TS**) is Closed.
4. Emergency valve (**EM**) is fully closed.
5. Make sure the FDV's downstream drain valve if equipped at (**DP**) or at the back side ½" plugged port, is open.
6. Open the trim pressure supply valve (**TS**).
7. Gradually open the lower Butterfly valve (**BF**) and make sure the downstream drain valve at the Drain Port (**DP**) is not dripping. A dripping might indicate a FDV valve sealing issue.
8. Close the Downstream drain valve at (**DP**).
9. Turn On the electric detection system.

The system is ready for the **Fire situation simulation**.

Commissioning the system - phase 2. (Reference Drawing - figure 2)

Fire Situation Simulation

The procedure described, should be carried out after the system was pressurized and a comprehensive leakage inspection was commissioned.

By energizing the solenoid, one can simulate a fire situation and cause the system to response by opening the FDV deluge valve.

1. Fully close the upper butterfly valve (**BF**) - Downstream separation valve.
2. Open the downstream drain valve installed at (**DP**) or at the back side of the deluge valve.
3. Energize the solenoid through the main control panel. Trapped water will drain out of the FDV's control chamber and the valve will open. Water supposed to flow out the drain valve installed at (**DP**) or at the back side of the deluge valve.
4. If ok, perform the procedure described under Commissioning the system - phase 3.

Commissioning the system - phase 3. (Reference Drawing - figure 2)

Resetting & placing in service

The procedure described, should be carried out after any periodic operational test simulated or real fire situation.

1. De-energize the solenoid. The FDV valve should close.
2. Close the lower upstream butterfly valve (**BF**)
3. Close the trim pressure supply valve (**TS**).
4. Clean the trim strainer (**ST**). Re-assemble the strainer.
5. Open the trim pressure supply valve.
6. lower upstream butterfly valve (**BF**). The FDV valve should remain closed.
7. Open the downstream drain valve at (**DP**) and drain the spray sprinkles pipeline. At drainage end, close this valve.

System is in **SET** state and placed in service.

Maintenance (Reference Drawing - figure 2)

Prior to any stoppage of the fire protection system, a fire patrol should be placed in the area covered by the interrupted system.

Prior to generating any test procedures, turning on false alarms or turning off the alarm system, the local safety personal and the close central fire station must be notified.

Quarterly test & inspection

1. Verify that the upstream OS&Y or Butterfly valve (**BV**) and the Trim pressure supply valve (**TS**) are in fully open position. The downstream drain valve, if equipped is fully close.
2. Make sure that the required supply water pressures are applied to the deluge Valve inlet and trim. Observe the inlet gauge (if equipped).
3. Observe the FDV valve for external damage and observe the piping and hose connections for leakage or damage.
4. Open the downstream drain valve, if equipped and check for dripping and leakage. A constant dripping may indicate a FDV valve sealing failure. If ok, close this valve.

Annual maintenance procedure

1. Conduct the quarterly inspection.
2. Perform the procedure described in chapter - **Commissioning the system - phase 2.** - Fire Situation Simulation.
Check and confirm the system's proper operation.
3. Follow the procedure described in chapter - **Commissioning the system - phase 3. - Resetting & placing in service.** Check and confirm the system's proper operation.

Every 5 years inspection procedure

This major inspection procedure includes the removal of the trim, the dismantling of the FDV's valve cover and a performance of a comprehensive internal part examination. Then, the relevant trim accessories should be maintained, referring their maintenance instruction. After the completion, the Annual maintenance procedure is to be conducted.

1. Close the lower upstream Butterfly valve (**BV**) and the trim pressure supply valve (**TS**).
2. Open the drain valves at (**AP & DP**). Drain the FDV's control chamber using the Emergency valve (**EM**).
3. Turn off or disconnect all relevant electrical circuits.
4. Release all relevant tubes fitting nuts.
5. Remove the front trim by turning the entire piping counterclockwise.
6. Remove all the FDV's cover bolts. The cover will hang on its studs. Release both nuts and remove the cover carefully.
7. Observe the internals of the valve and cover for excessive scale residuals, foreign particles, damaged coating (rust, cracks, or peeling).
8. Worn or damaged parts should be replaced. Consult Raphael's local representative or the service department for any maintenance or part replacement issue.
9. Replace the Diaphragm. The identification tongue should point to the valve's stamped flow direction arrow side.
10. Reinstall the valve's cover: use the Anti-seize paste tube supplied in the maintenance kit for bolts and nuts lubrication. Tight them in accordance with "Bolt's torque moments table".
11. Reinstall the trim carefully: avoid causing twists or dents on bent tubes and do not overtight the compression fitting's nuts.
12. When the system is fully reassembled, perform the "**Commissioning the system - phase 1** - Filling and pressurizing the system" procedure.
13. Perform the "*Annual maintenance procedure*".

Bolt's Torque Moments Table

Valve size	Torque Lb/ft
1.5"	22
2"	29
2.5"	36
3"	54
4"	65
6"	72
8"	87

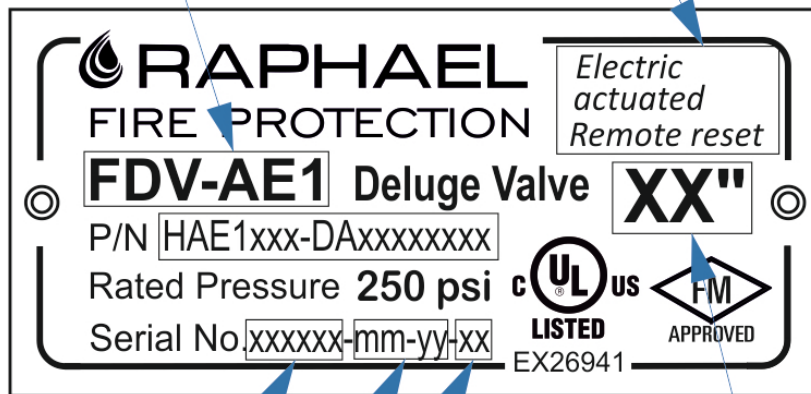
The equivalent pipe length for FDV deluge valves:

Valve size	Equivalent length value Ft (m)
1.5"	15 (4.6)
2"	28 (8.5)
3"	37 (11.2)
4"	48 (14.6)
6"	73 (22.2)
8"	103 (31.4)

Marking

Type of actuation & Reset

Type of system



Work order

Month year

Number in batch

Valve diameter

Electric actuated with Remote Reset
FDV deluge valve, Type: **FDV-AE1**

