Welcome

Technical Services Team
APAC-ME

2016-2017

tyco
Fire Protection Products

Sprinkler Systems Valves

tyco
Fire Protection Products

Sprinkler Systems
Alarm Valves







Topics

Types of Systems

- Wet Alarm Valve
- Dry Alarm Valve
- Deluge Alarm Valves
- Pre-action Alarm Valves

Questions

Section 1.0

Wet Alarm Valve

Wet Pipe Sprinkler Systems

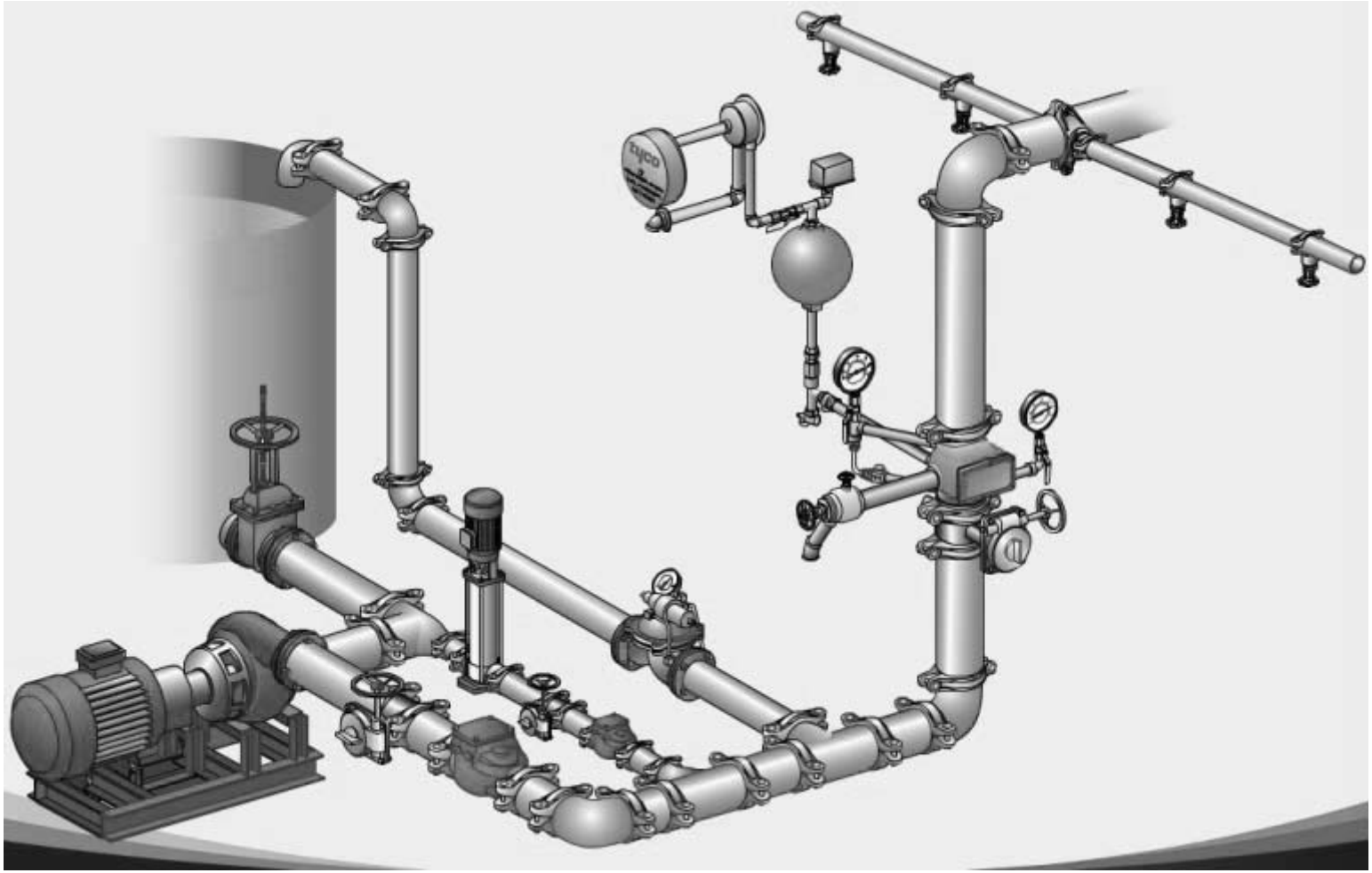
NFPA 13

- A sprinkler system employing automatic sprinklers attached to a piping system containing water and connected to a water supply so that water discharges immediately from sprinklers opened by heat from a fire.

EN 12845

- installation in which the pipework is always charged with water

Wet Pipe Sprinkler System

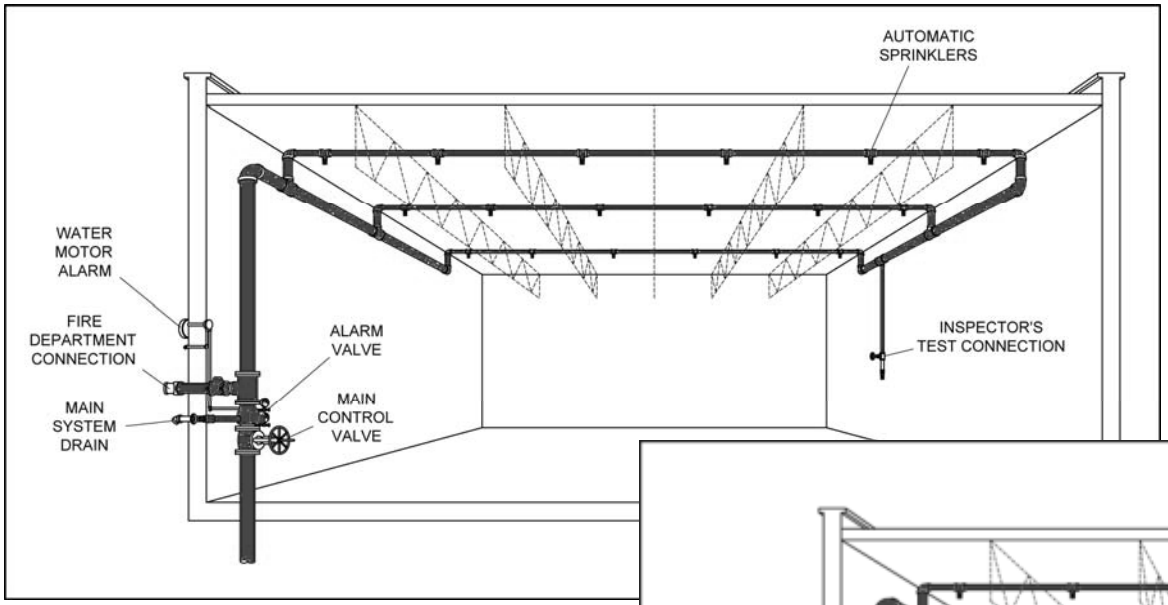


AV-1 300 Wet Alarm Valve

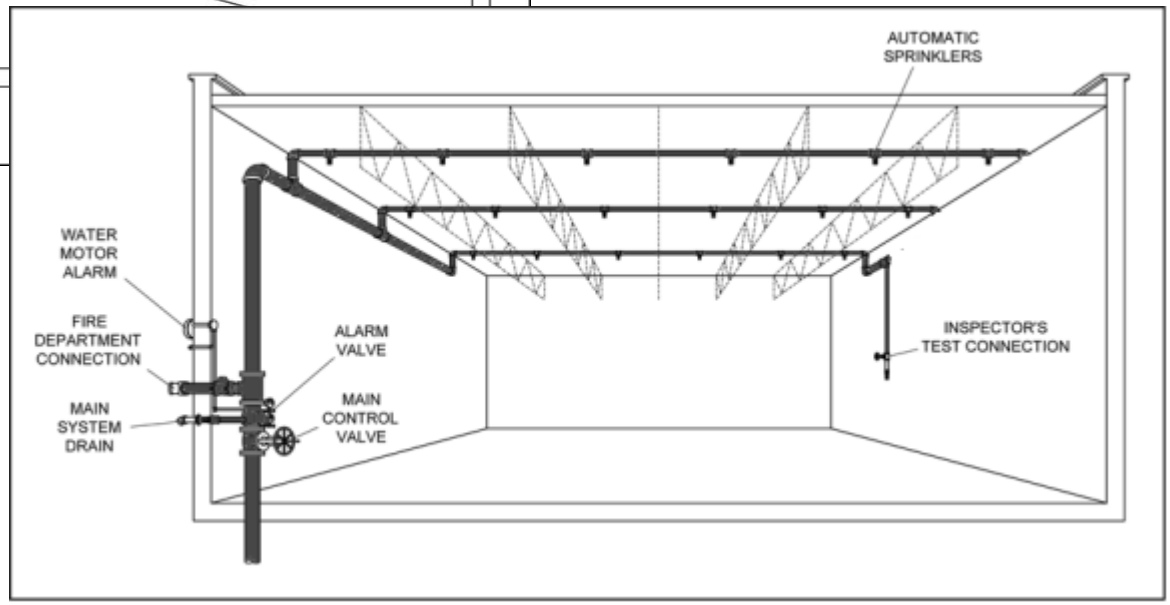
- Sprinklers act as heat detector and point of water distribution
- Used in areas not subject to freezing (4°C or higher)
- Used to detect waterflow via waterflow detection devices
- Used to verify water supply is available via pressure gauges and indicator type main control valves



Wet Pipe Sprinkler Systems Typical Arrangements

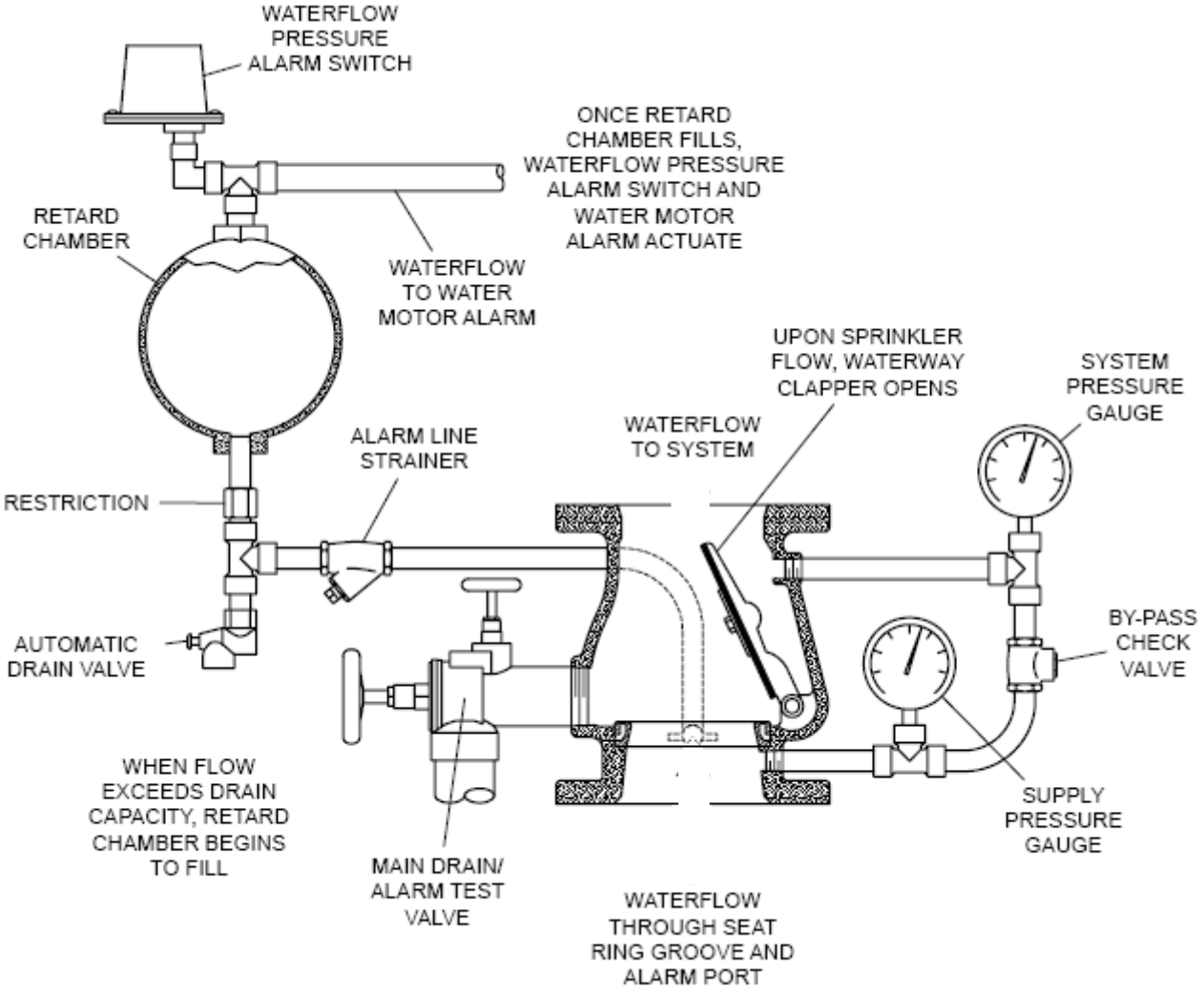


Gridded system

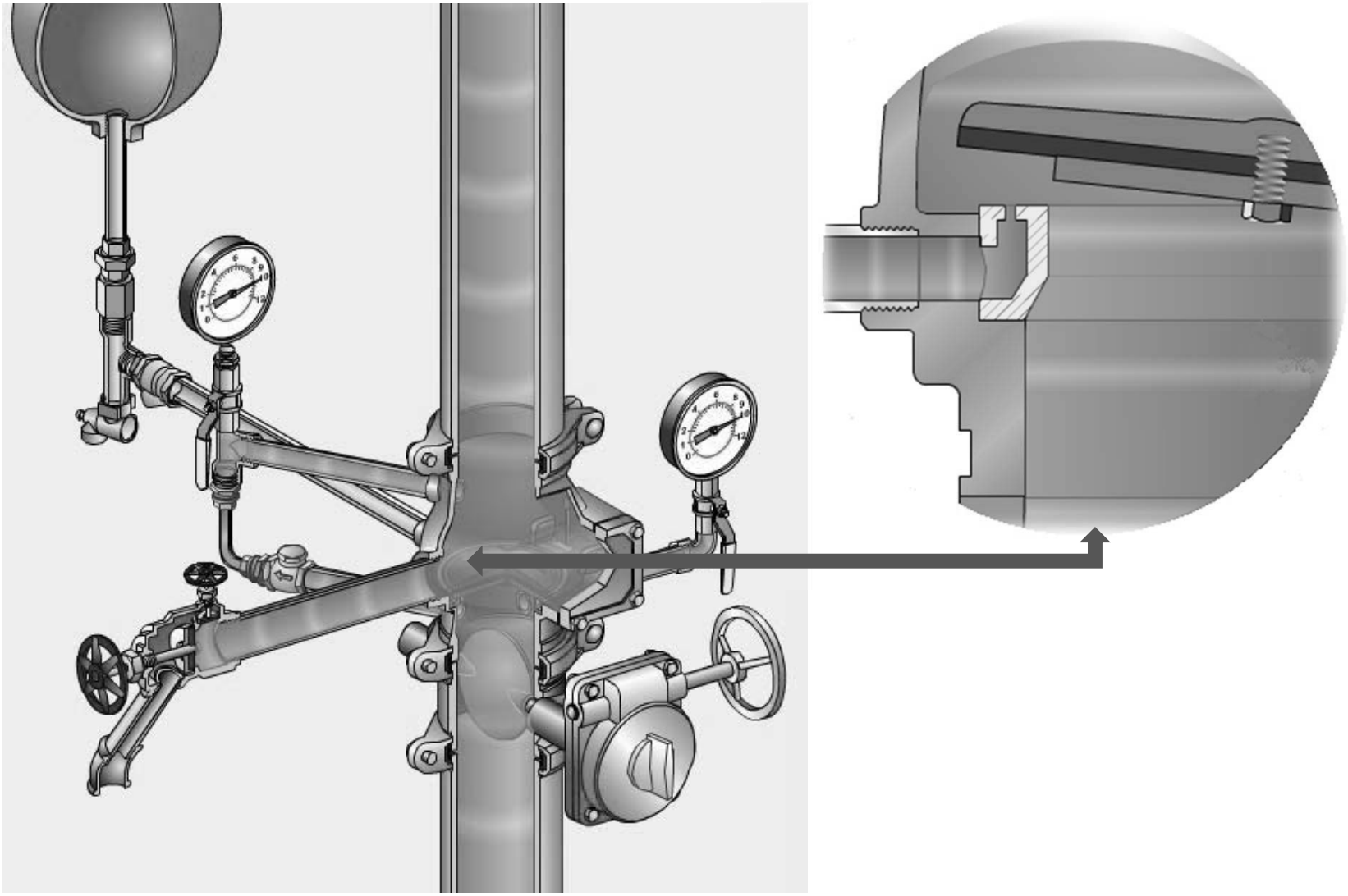


Tree system

Operation AV-1 300



AV-1 300 Alarm Port

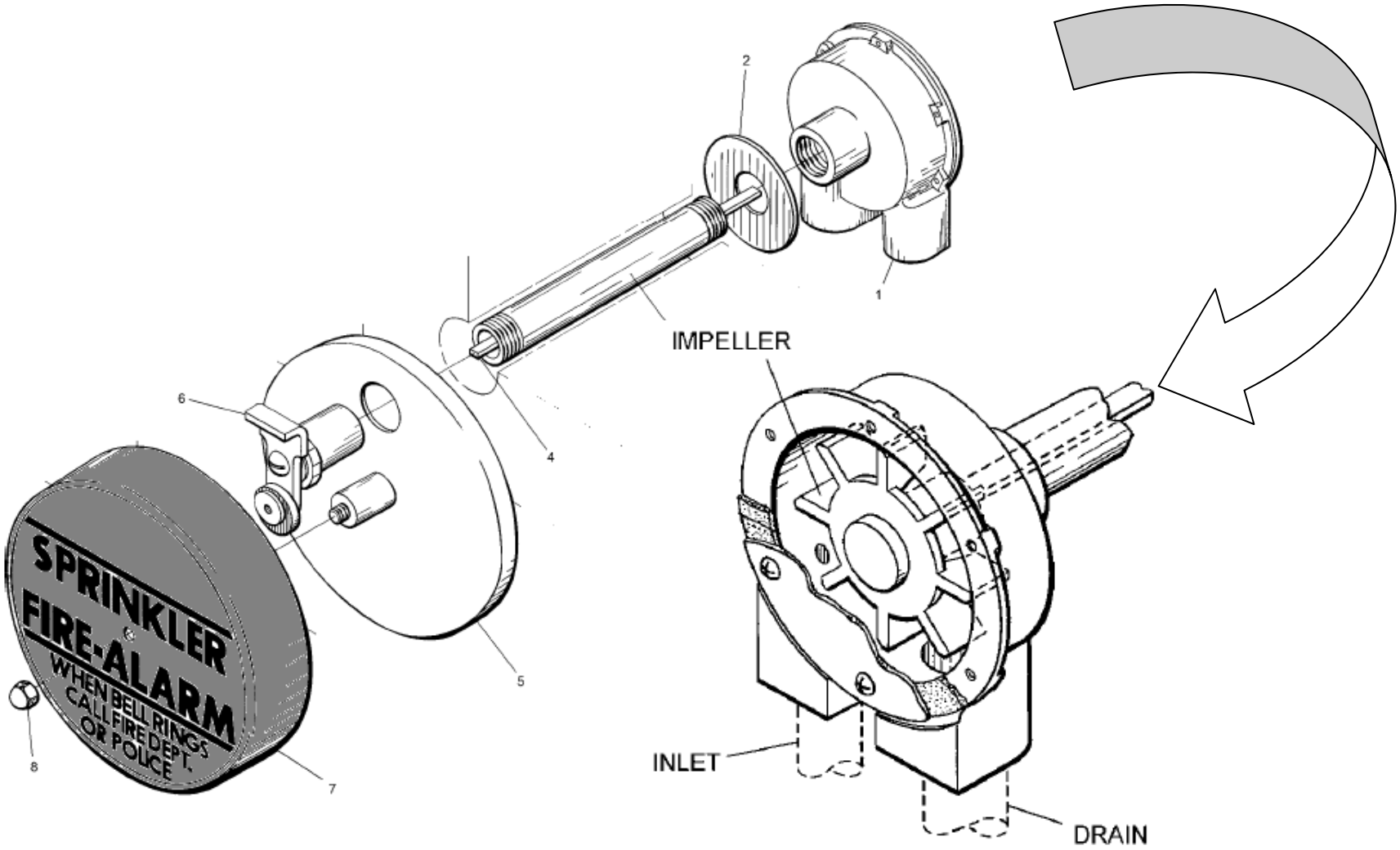


Water Motor Alarm – Model WMA-1 (TFP921)



- Hydraulically Operated
- Working Water Pressure Range;
  - 7 to 300 psi (0,5 to 20,7 bar)
- Can accommodate a wall thickness range of 2 to 18 inches (50 to 450 mm).
- single Water Motor Alarm may be connected to the alarm lines from a maximum of three separate fire protection systems according UL. Not applicable according TFP922 (EC)

WMA-1 Water Motor Alarm



System Gauges

Types:

- Air
  - 0 - 80 psi retard to 250 psi

    (0 – 5.5 bar retard to 12 bar)
- Water
  - 0 - 300 psi (0 – 20 bar)

Test Standard

- UL 393 - Indicating Pressure Gauges for Fire-Protection Service



Accuracy water:

- 0 - 75 psi (0 – 5 bar)
  - ±3% or ± 9 psi (± 0.6 bar)
- 75 – 225 psi (5 – 15 bar)
  - ±2% or ± 6 psi (± 0.4 bar)
- 225 – 300 psi (15 – 21 bar)
  - ±3% or ± 9 psi (± 0.6 bar)

Accuracy air:

- 0 - 250 psi (0 – 12 bar)
  - ±3% or ± 7.5 psi (± 0.5 bar)

Inspection and Maintenance of Gauges

According NFPA:

- Gauges on wet pipe sprinkler systems shall be inspected monthly to ensure that they are in good condition and that normal water supply pressure is being maintained.
- Gauges on dry, preaction, and deluge systems shall be inspected weekly to ensure that normal air and water pressures are being maintained.
- Where air pressure supervision is connected to a constantly attended location, gauges shall be visually inspected monthly.
- Gauges shall be tested every 5 years by comparison with a calibrated gauge. Gauges not accurate to within 3% of the full scale shall be recalibrated or replaced.

According EN:

- Weekly procedure
- Checks;
  The following should be monitored and recorded:
  the values of all water and air pressure gauges on each section, main pipelines and pressure vessels;

Wet Pipe Sprinkler Systems Accessories



System Control Valves



Pressure Gauges



Electrical Switches

System Control Valves



Butterfly Valves



Non-rising stem gate Valves



Post Indicator Valves



Wall Post Valves



OS&Y Valves

Wet Pipe Sprinkler Systems
Electrical Components



Tamper Switches



Flow Switches



Pressure Switches



Electric Bells

Availability

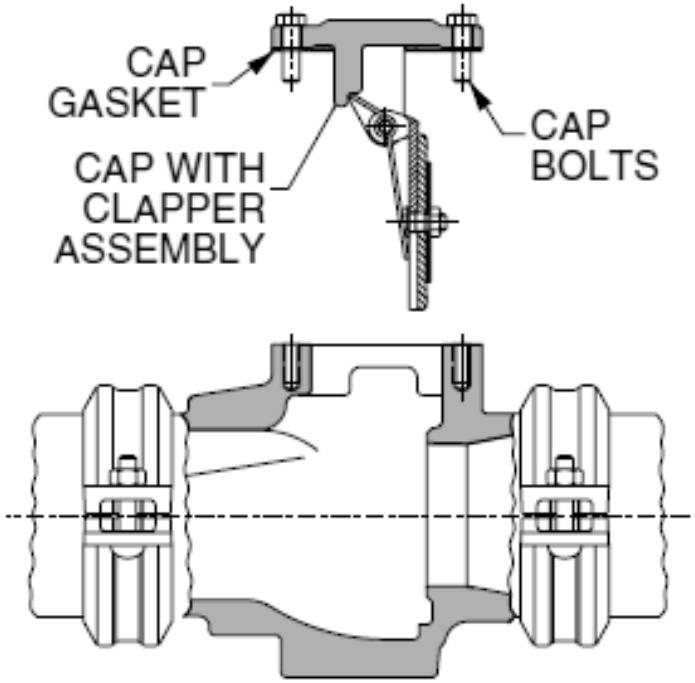
Nominal Valve Size	Groove x Groove	Flange x Groove	Flange x Flange
DN65 76,1 mm	10,0 Kg	12,7 Kg	N/A
DN100 114,3 mm	17,2 Kg	21,3 Kg	25,9 Kg
DN150 165,1 mm	26,3 Kg	31,8 Kg	38,1 Kg
DN150 168,3 mm	26,3 Kg	31,8 Kg	38,1 Kg
DN200 219,1 mm	46,3 Kg	54,4 Kg	67,6 Kg

TABLE A
AVAILABLE VALVE END CONNECTIONS AND WEIGHTS

TFP910 AV-1 300, Alarm Check Valves, 300 psi 2½,4,6,and 8 Inch

TFP990 AV-1-300, Alarm Check Valves, 300 psi – 2½,4,6,and 8 Inch (EC)

CV-1FR Check Valve





Section 2.0

Dry alarm Valve

Dry Pipe Sprinkler Systems

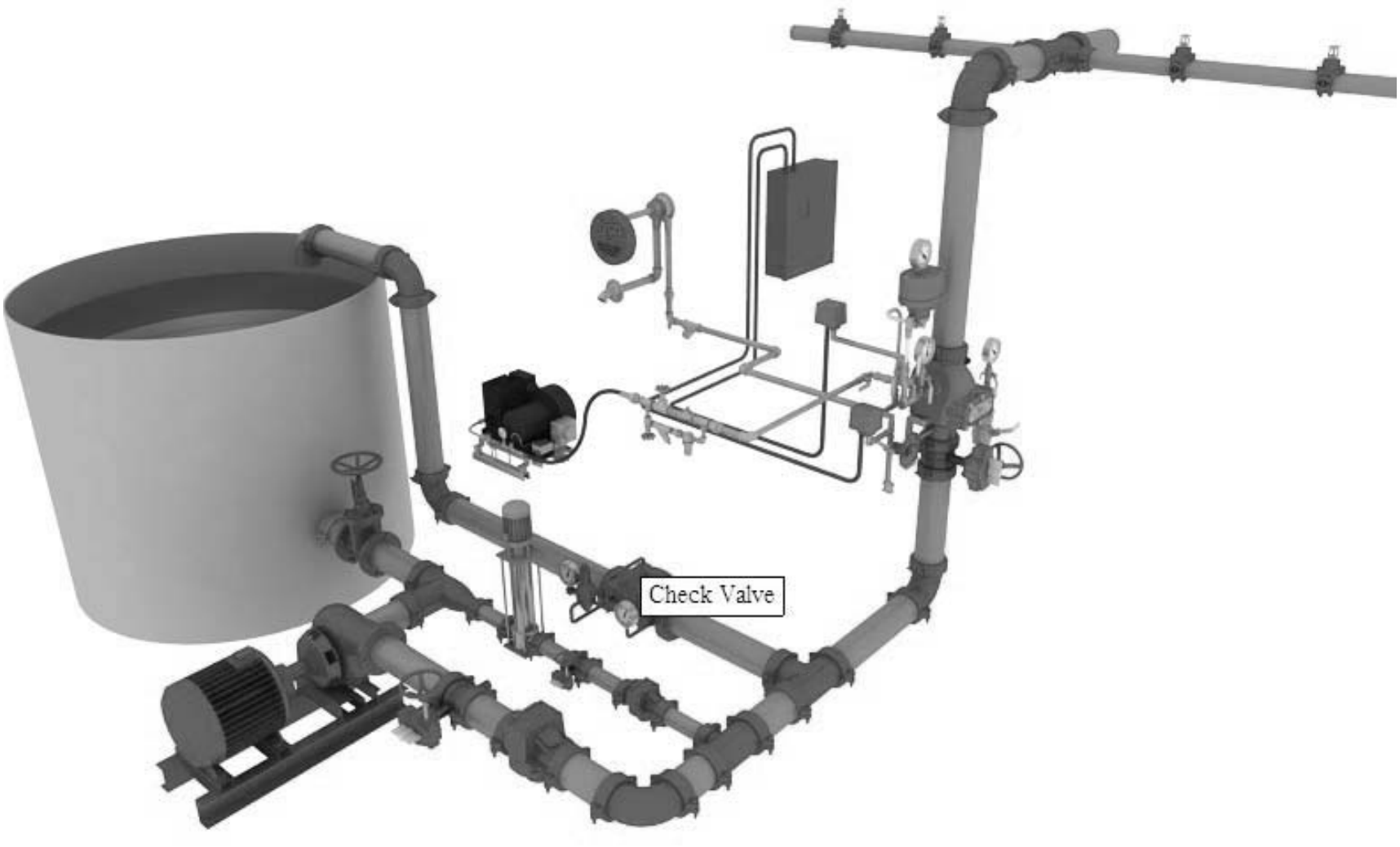
NFPA 13

- A sprinkler system employing automatic sprinklers that are attached to a piping system containing air or nitrogen under pressure, the release of which (as from the opening of a sprinkler) permits the water pressure to open a valve known as a dry pipe valve, and the water then flows into the piping system and out the opened sprinklers.

EN 12845

- Installation, dry (pipe) - Installation in which the pipework is charged with air or inert gas under pressure

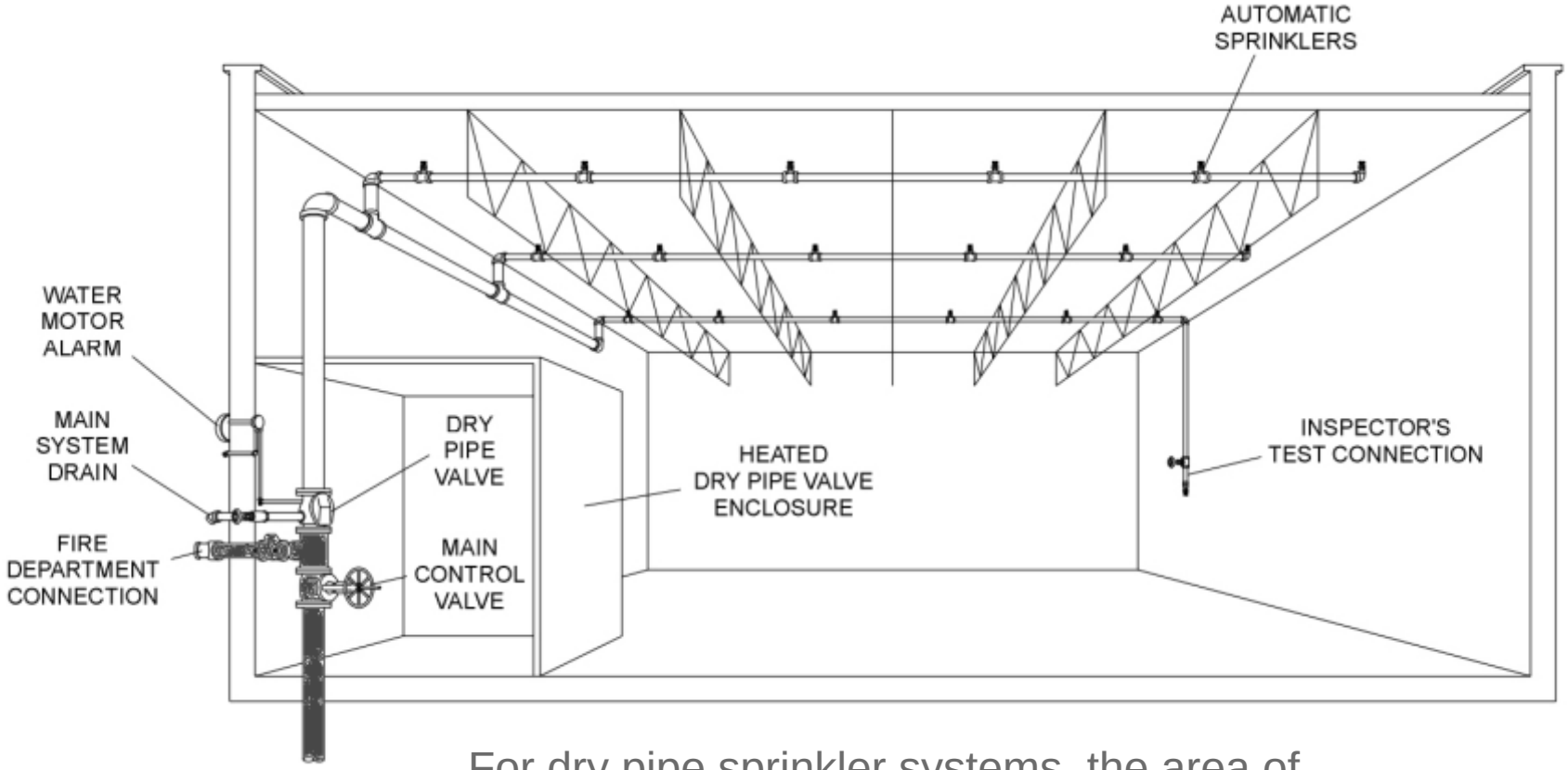
Dry Pipe Sprinkler System



DPV-1 Dry Pipe Alarm Valve

- Sprinklers act as heat detector and point of water distribution.
- Used in areas subject to freezing (4°C or below)
- Used to detect waterflow via waterflow detection devices.
- Used to verify water supply is available via pressure gauges and indicator type main control valves.

Dry Pipe Sprinkler Systems Typical Arrangement



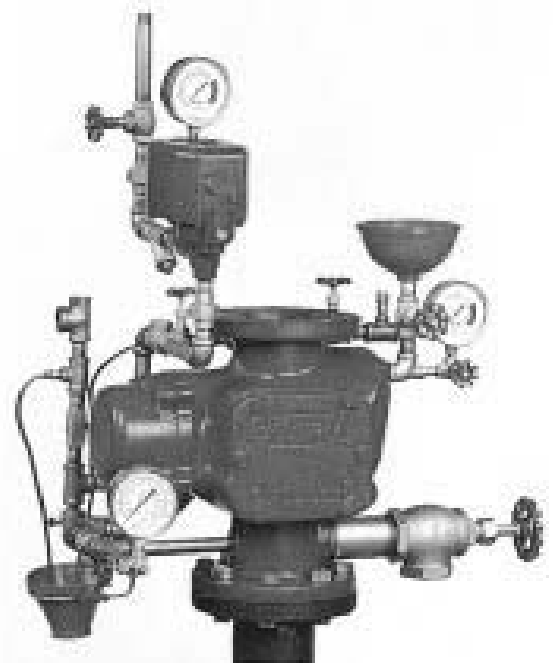
For dry pipe sprinkler systems, the area of sprinkler operation must be increased 30% in general.

Traditional Dry Valves



Differential Dry Valve

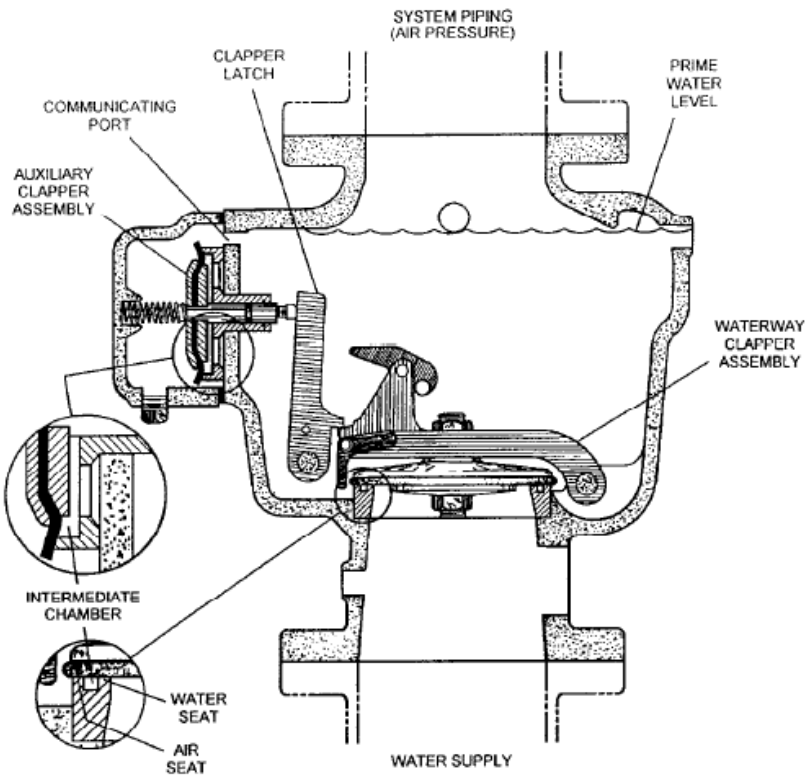
(F3061)

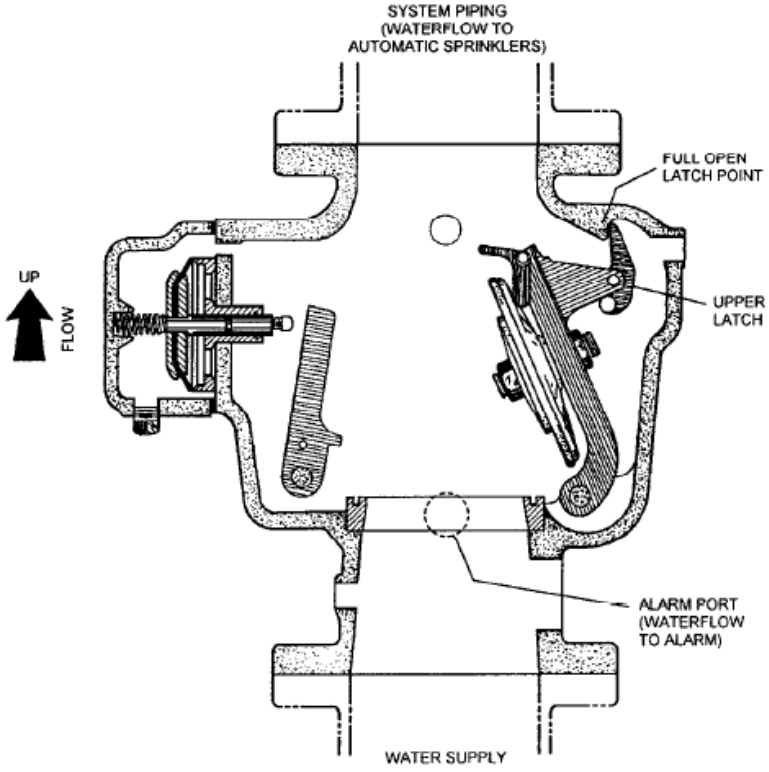


Mechanical Latching Dry Pipe Valve

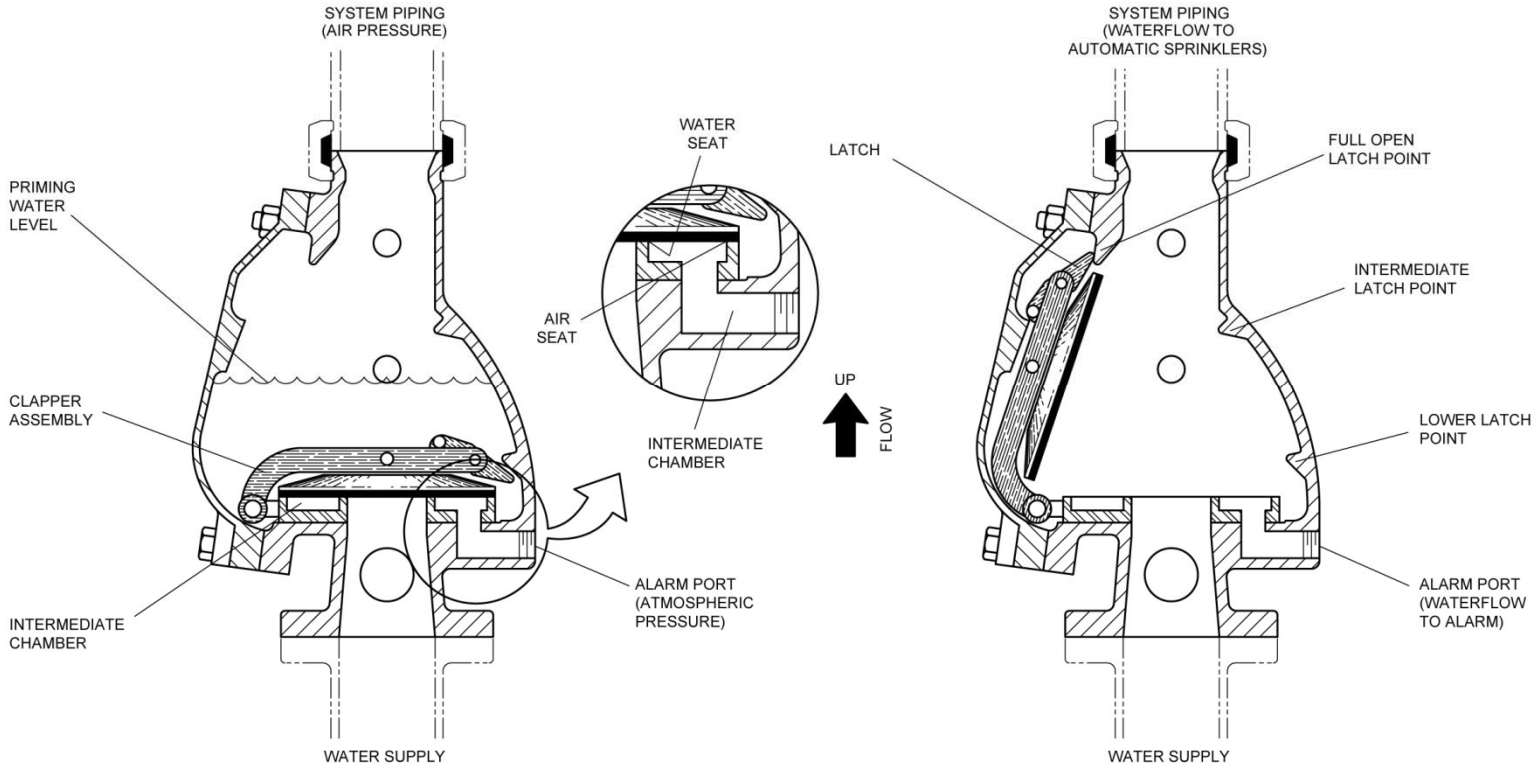
(F302)

Mechanical Latching– Set & Tripped (F302)



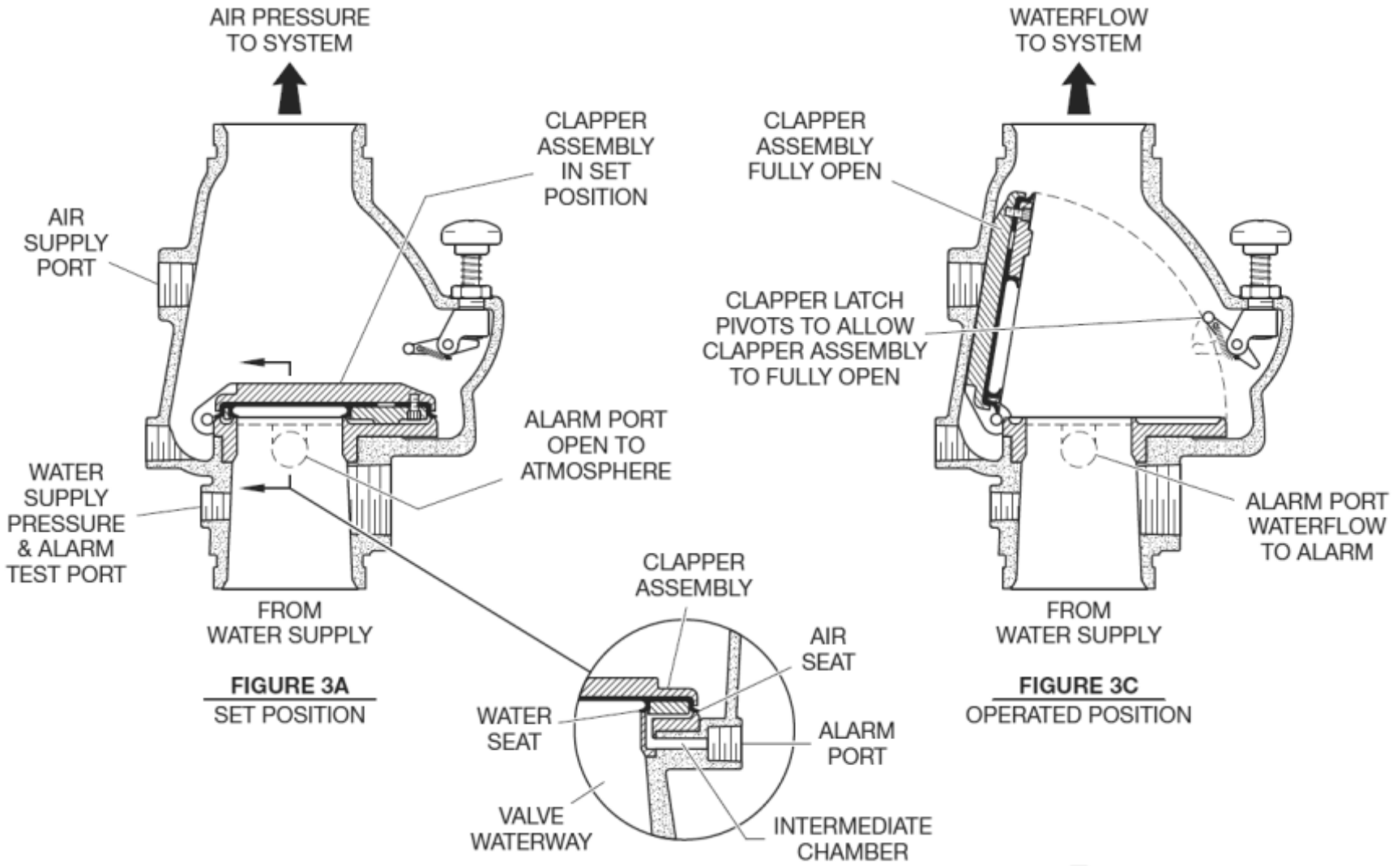


Differential Style – Set & Tripped (F3061)



NOMINALLY 1 PART AIR TO 6 PARTS WATER (6:1 DIFFERENTIAL)

Differential Style – Set & Tripped (DPV-1)



Dry Pipe Sprinkler System Accelerator - Model ACC-1

tyco / Fire & Building Products

Technical Services: Tel: (800) 381-9312 / Fax: (800) 791-5500

Model ACC-1 Dry Pipe Valve Accelerator External Resetting Quick Opening Device For Dry Pipe Valves

General Description

The Model ACC-1 Accelerator is a quick opening device intended for attachment to the Tyco Fire & Building Products, 2-1/2, 3, 4 or 6 inch Model DPV-1 Dry Pipe Valve. The Model ACC-1 Accelerator reduces the time for valve operation following the operation of one or more automatic sprinklers.

The Model ACC-1 Accelerator automatically adjusts to both small and slow changes in system pressure, but trips when there is a rapid and steady drop in pressure (as in the case of a sprinkler operation). Upon tripping, the Accelerator transmits system air pressure to the intermediate chamber of the Model DPV-1 Dry Pipe Valve. This neutralizes the differential pressure holding the Model DPV-1 Dry Pipe Valve closed and permits it to open.

The Model ACC-1 Accelerator has a unique, positive action, internal anti-flood device and a ball float which combine to prevent water and water borne debris from entering the more sensitive operating areas of the accelerator. The anti-flood device seals and latches immediately upon operation of the Model ACC-1 Accelerator without waiting for a pressure build-up in the intermediate chamber of the dry pipe valve. The latching feature keeps the anti-flood device sealed, even while the system is being drained. The ball float seals the pilot chamber inlet port if there is an inadvertent trip of the dry pipe valve, due for example, to an air compressor failure combined with a slow loss in system air pressure due to a leak.

The Model ACC-1 Dry Pipe Valve Accelerator is a direct replacement for the Central Model B, Gem Model F311, and Star Model S430. Contact the Technical Services Department for information concerning the use of the ACC-1 for use with dry pipe valves other than the Model DPV-1.

WARNING

The Model ACC-1 Dry Pipe Valve Accelerator described herein must be installed and maintained in compliance with this document, as well as with the applicable standards of the National Fire Protection Association, in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the performance of this device.

The owner is responsible for maintaining their fire protection system and devices in proper operating condition. The installing contractor or sprinkler manufacturer should be contacted with any questions.



Technical Data

Approvals
UL and ULC Listed. FM and LPCB Approved.

Maximum Working Water Pressure
250 psi (17,2 bar)

Maximum Working Air Pressure
70 psi (4,8 bar)

Pressure Decay For Trip
1 psi/min (0,07 bar/min)

Physical Characteristics
Body components constructed of alodine coated aluminum alloy with austenitic series stainless steel internal components. Seals are EPDM and silicone.

Design Data

The connection to the system piping, Figure 4, must be located so that drain back water will not flow into the Accelerator piping and it must be located at a point above the maximum expected level of the drain back/condensate water.

If the connection is made to the riser, it must be located at least two feet above the level of the dry pipe valve. Connections to a feed or cross main must be made either to the side or top of the main.

NOTES

Failure to follow the above instructions can result in accidental tripping due to closure of the ball float.

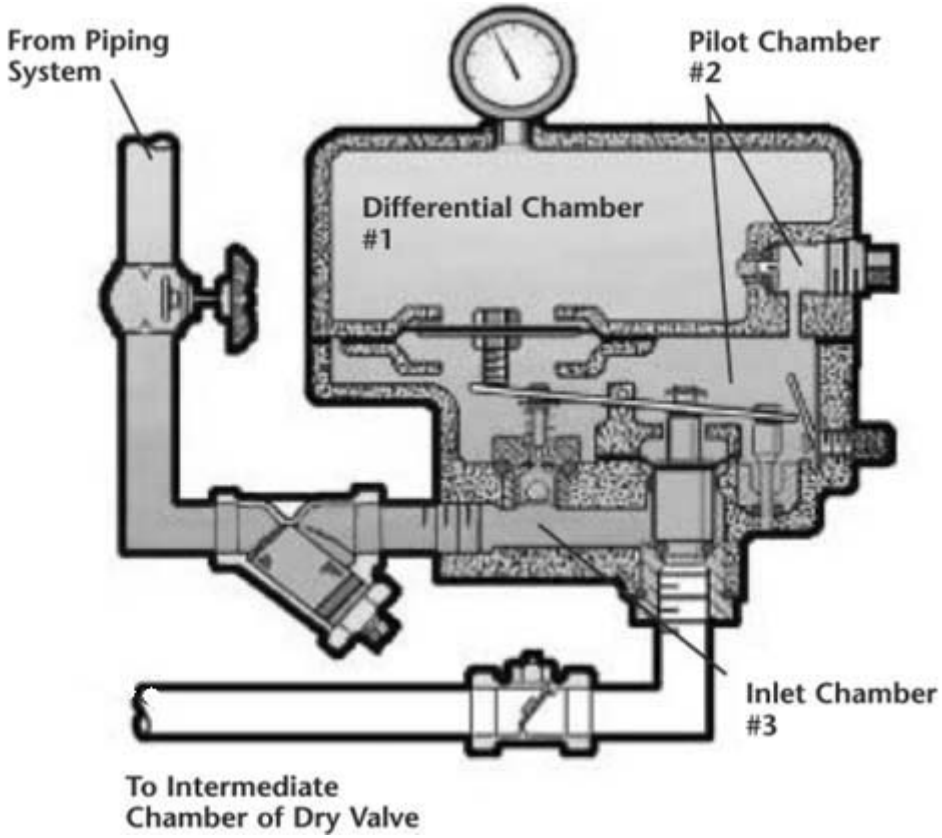
Quick operation of the Accelerator does not ensure that the fire protection system will meet the water delivery time requirement of the authority having jurisdiction (following opening of the Inspector's Test Connection). The sprinkler system designer needs to be aware that water delivery time is primarily determined by the configuration and volume of the piping network, system air pressure at time of Accelerator trip, and water supply characteristics.

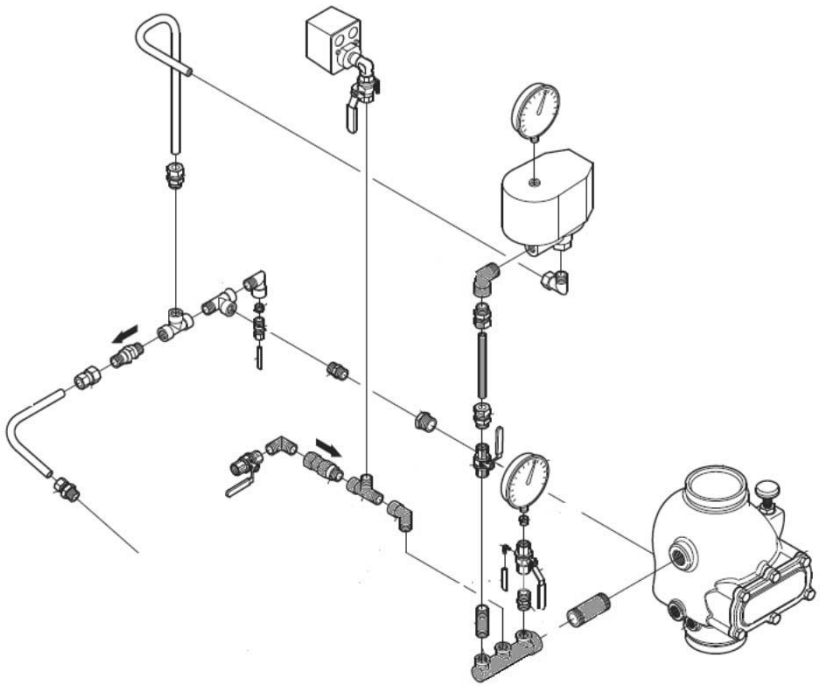
Page 1 of 10 MARCH 2011 TFP1112



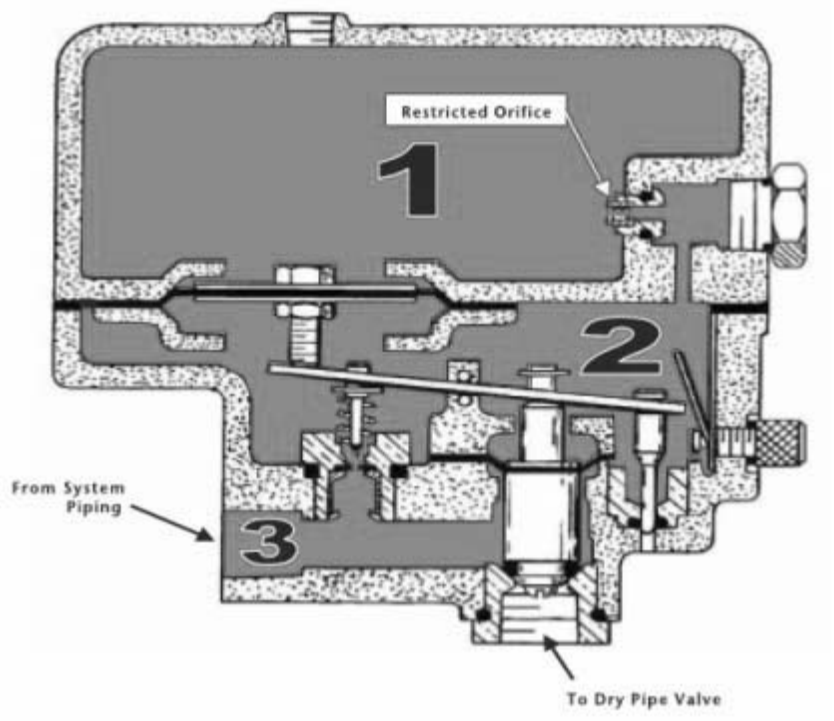
Sensitivity up to 10.600 L (10,6 m3)

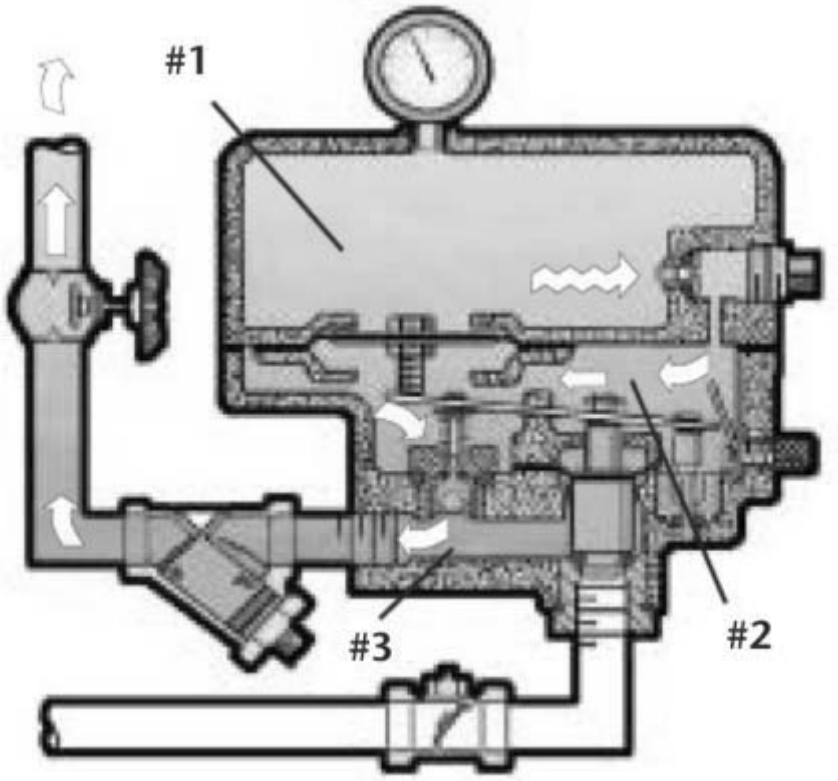
Set Position



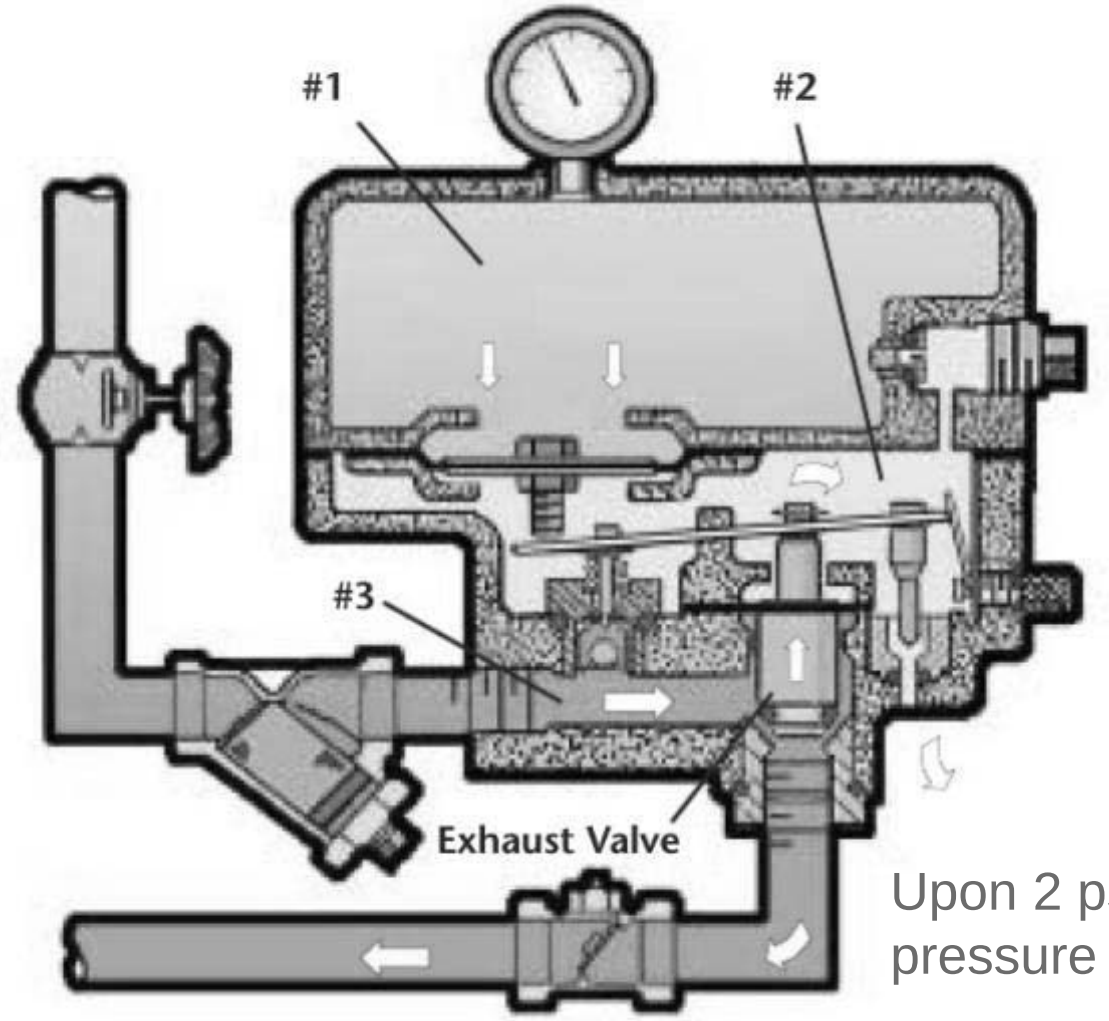


Air Movement upon Sprinkler Activation





Activation of the Accelerator



Upon 2 psi (0,14 bar) differential pressure (1 & 2) the ACC-1 trips

System air pressure requirements

Water Supply Pressure, bar	System Air Pressure Range, bar
1,4	0,7
4,1	1,0 - 1,6
5,5	1,4 - 1,9
6,9	1,7 - 2,3
8,3	2,1 - 2,6
10,0	2,4 - 3,0
11,4	2,8 - 3,3
12,8	3,1 - 3,7
14,1	3,4 - 4,0
15,5	3,8 - 4,3
16,0	4,1 - 4,6

TABLE B
SYSTEM AIR PRESSURE REQUIREMENTS

Pressure (bar)	Minimum (sec.)	Maximum (sec.)
1,4	24	160
1,7	18	116
2,1	15	92
2,8	10	60
3,5	8	48
4,1	6	36

TABLE C
ACCELERATOR DIFFERENTIAL CHAMBER FILL TIMES TO 0,7 BAR

Availability

Available Sizes and End Connections				
End Connection	Nominal Valve Size			
	2-1/2 Inch (DN65)	3 Inch (DN80)	4 Inch (DN100)	6 Inch (DN150)
Flange x Flange	N/A	N/A	•	•
Flange x Groove	N/A	N/A	•	•
Groove x Groove	•	•	•	•
• = Available N/A = Not Available				

TFP1020 DPV-1, Dry Pipe Valve, 250 psi 2-1/2,3,4, and 6 Inch

TFP1090 DPV-1, Dry Pipe Valve, 16 bar – 4 and 6 Inch (EC)

Section 3.0

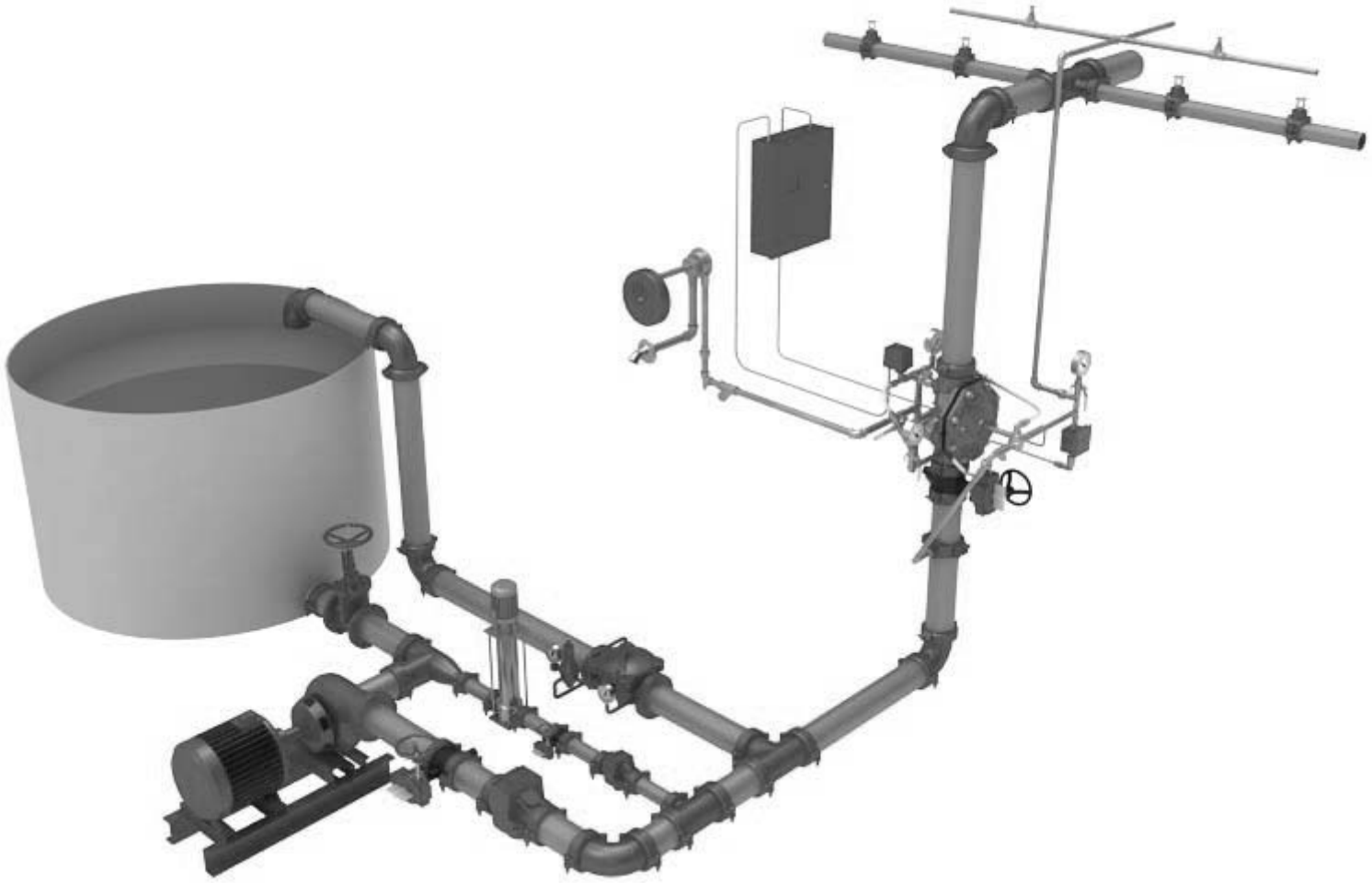
Deluge Valve

Deluge Sprinkler Systems

NFPA 13

- A sprinkler system employing open sprinklers or nozzles that are attached to a piping system that is connected to a water supply through a valve that is opened by the operation of a detection system installed in the same areas as the sprinklers or the nozzles. When this valve opens, water flows into the piping system and discharges from all sprinklers or nozzles attached thereto.

Deluge Sprinkler System



Traditional Deluge Valves

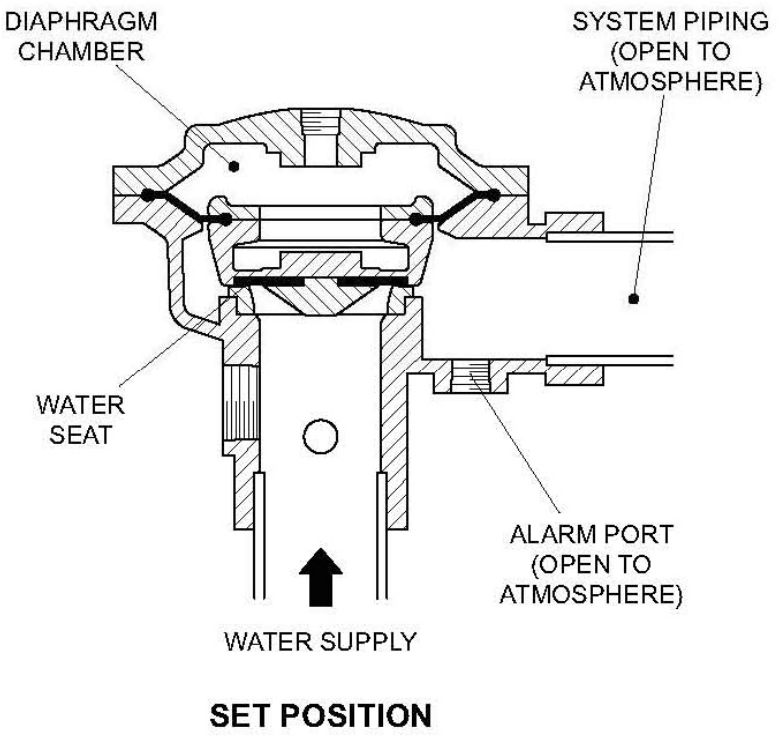


Diaphragm Style Deluge Valve

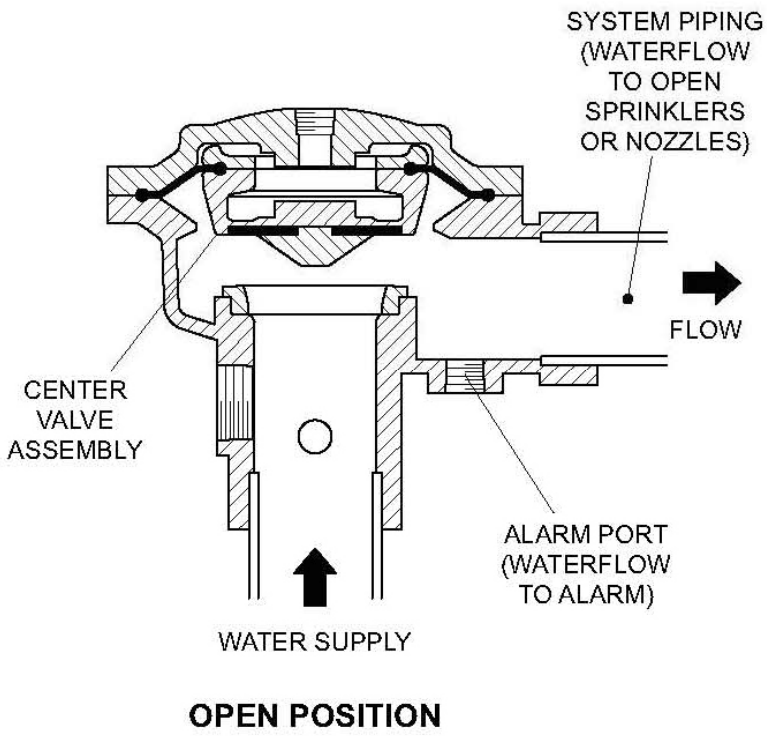


Mechanical Latching Deluge Valve

Model DV-3

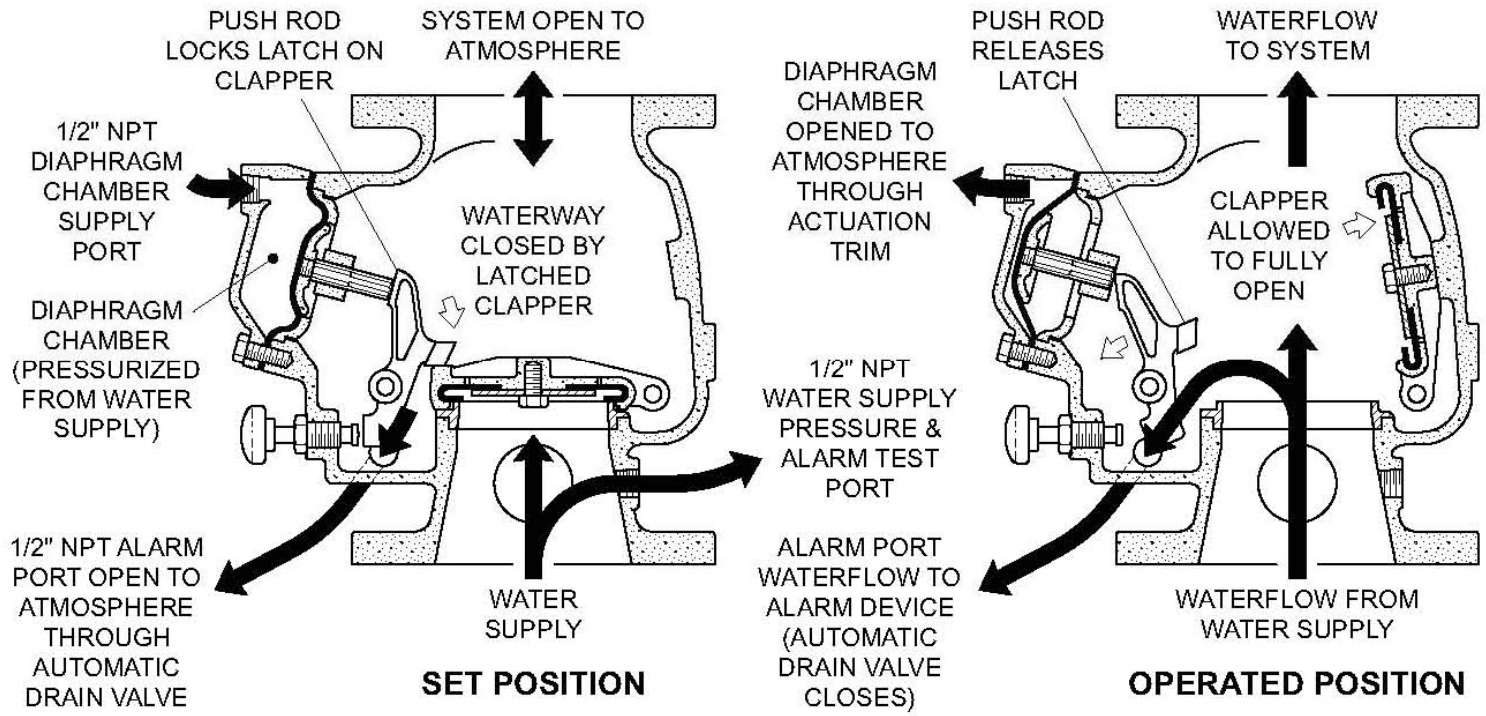


SET POSITION



OPEN POSITION

Model DV-1


PUSH ROD LOCKS LATCH ON CLAPPER
SYSTEM OPEN TO ATMOSPHERE
1/2" NPT DIAPHRAGM CHAMBER SUPPLY PORT
WATERWAY CLOSED BY LATCHED CLAPPER
DIAPHRAGM CHAMBER (PRESSURIZED FROM WATER SUPPLY)
1/2" NPT ALARM PORT OPEN TO ATMOSPHERE THROUGH AUTOMATIC DRAIN VALVE
WATER SUPPLY
SET POSITION
DIAPHRAGM CHAMBER OPENED TO ATMOSPHERE THROUGH ACTUATION TRIM
PUSH ROD RELEASES LATCH
WATERFLOW TO SYSTEM
CLAPPER ALLOWED TO FULLY OPEN
1/2" NPT WATER SUPPLY PRESSURE & ALARM TEST PORT
ALARM PORT WATERFLOW TO ALARM DEVICE (AUTOMATIC DRAIN VALVE CLOSES)
WATERFLOW FROM WATER SUPPLY
OPERATED POSITION

Deluge Valve – DV5

Special hazards where there are easily ignitable and fast burning substances which promote rapid fire development (class A or B fires), or areas requiring exposure protection from nearby sources of heat to prevent a potentially severe fire.

- Manufacturing, flammable liquid storage and handling, aircraft hangars, chemical plants, electrical transformers, oil refineries,
- System uses open sprinklers or nozzles
- Separate detection line;
  - Wet Pilot Actuation
  - Dry Pilot Actuation
  - Electrical Actuation



Deluge Valve Actuation

Dry Pilot Actuation:

- “Dry Pilot Release” is useful for areas subject to freezing conditions and areas with explosive atmospheres, wherein electric release is not desirable, due to the potential for inadvertent explosions.

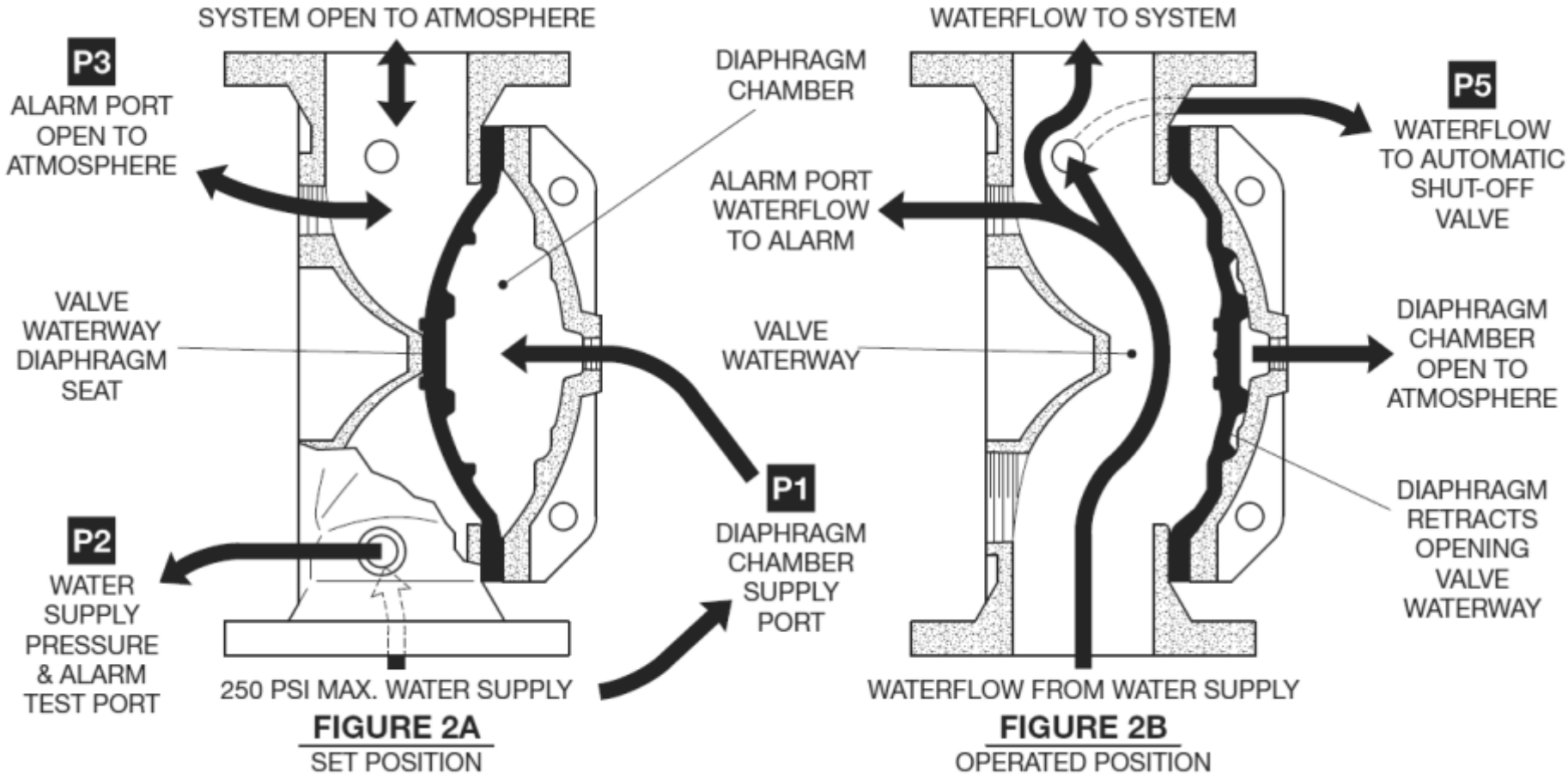
Electric Actuation:

- “Electric Release” is useful in areas requiring rate of temperature rise fire detection or areas where it is more economical to install electrical connections instead of pilot lines.

Wet Pilot Actuation:

- “Wet Pilot Release” is limited to areas not subject to freezing.

DV5 Operation



Systems Accessories Deluge Systems



Dry Pilot Actuator



Manual Control Station

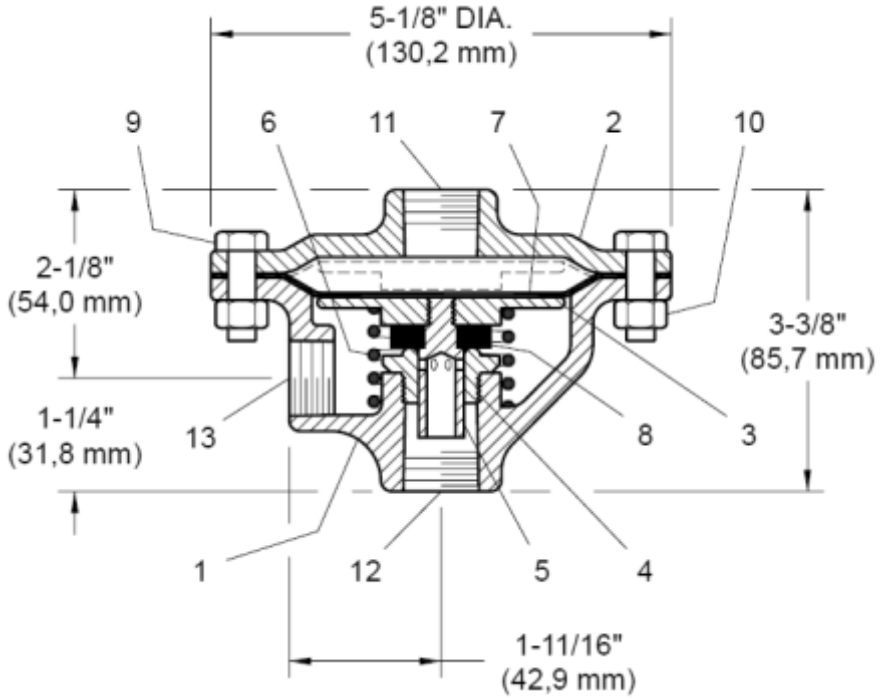


Automatic Shut off valve

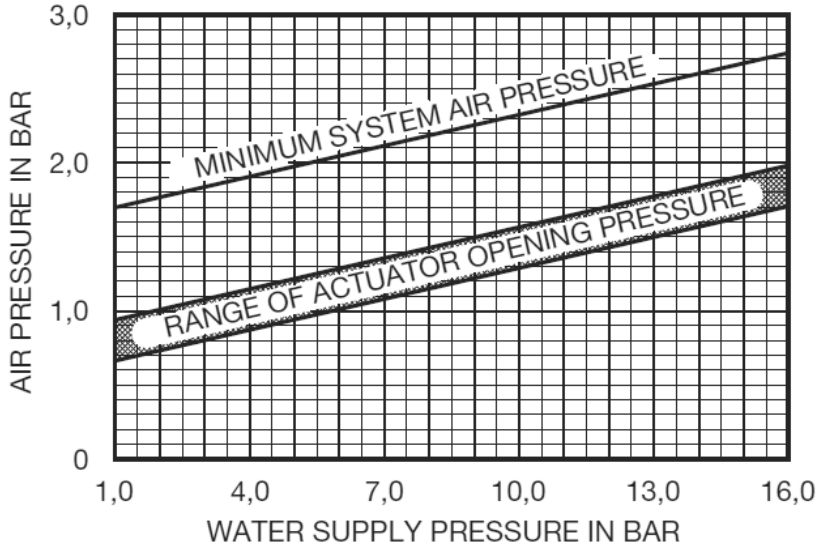


Solenoid Valves

Dry Pilot Actuator – Model DP-1







Datasheet: TFP1380

Manual Control Station – Model MC-1



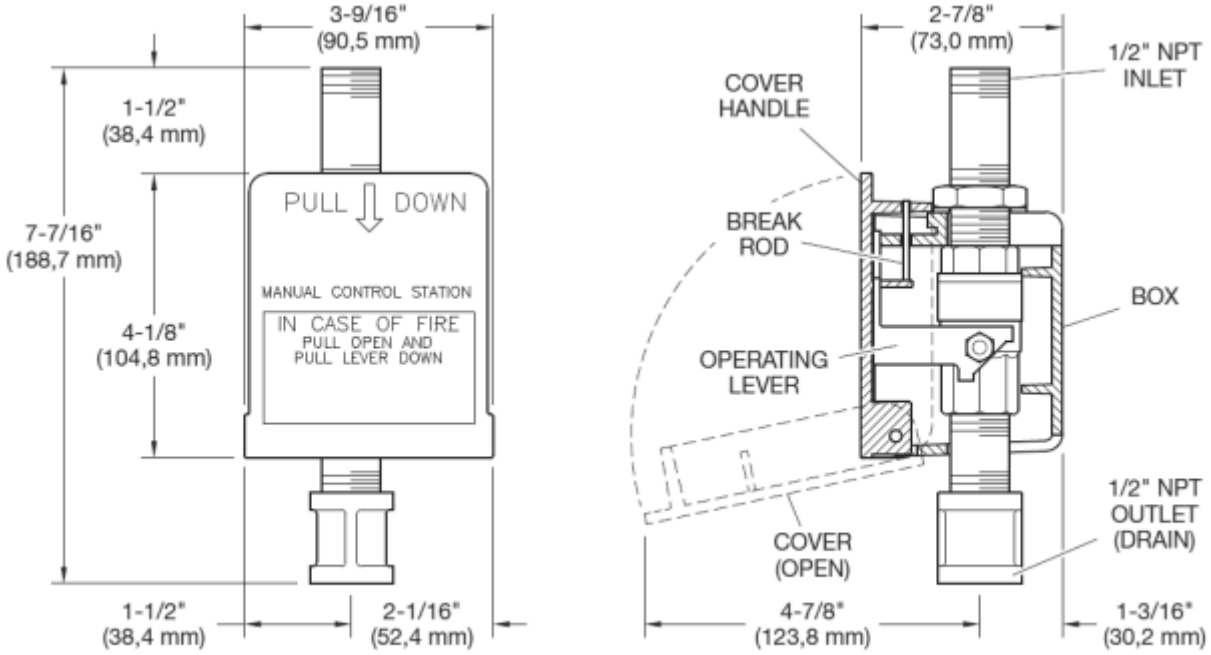


FIGURE 1
MODEL MC-1 MANUAL CONTROL STATION

Datasheet: TFP1382

Automatic Shut Off Valve ASV-1

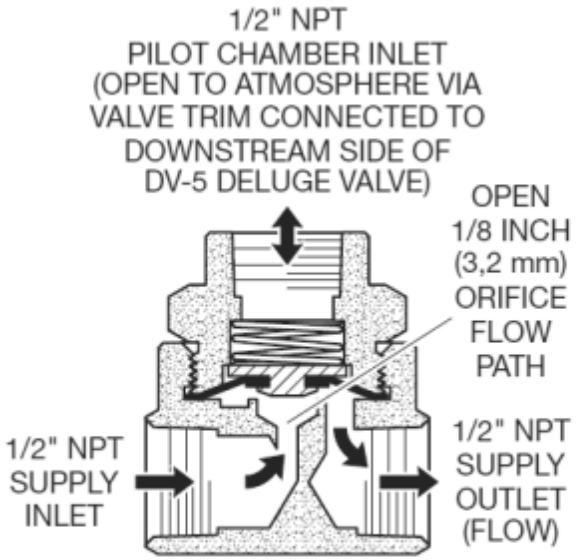


FIGURE 2A
OPEN POSITION

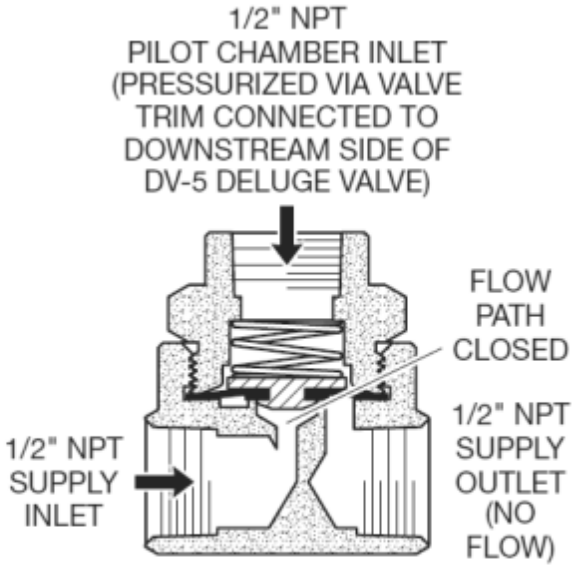


FIGURE 2B
CLOSED POSITION



Datasheet: TFP1384

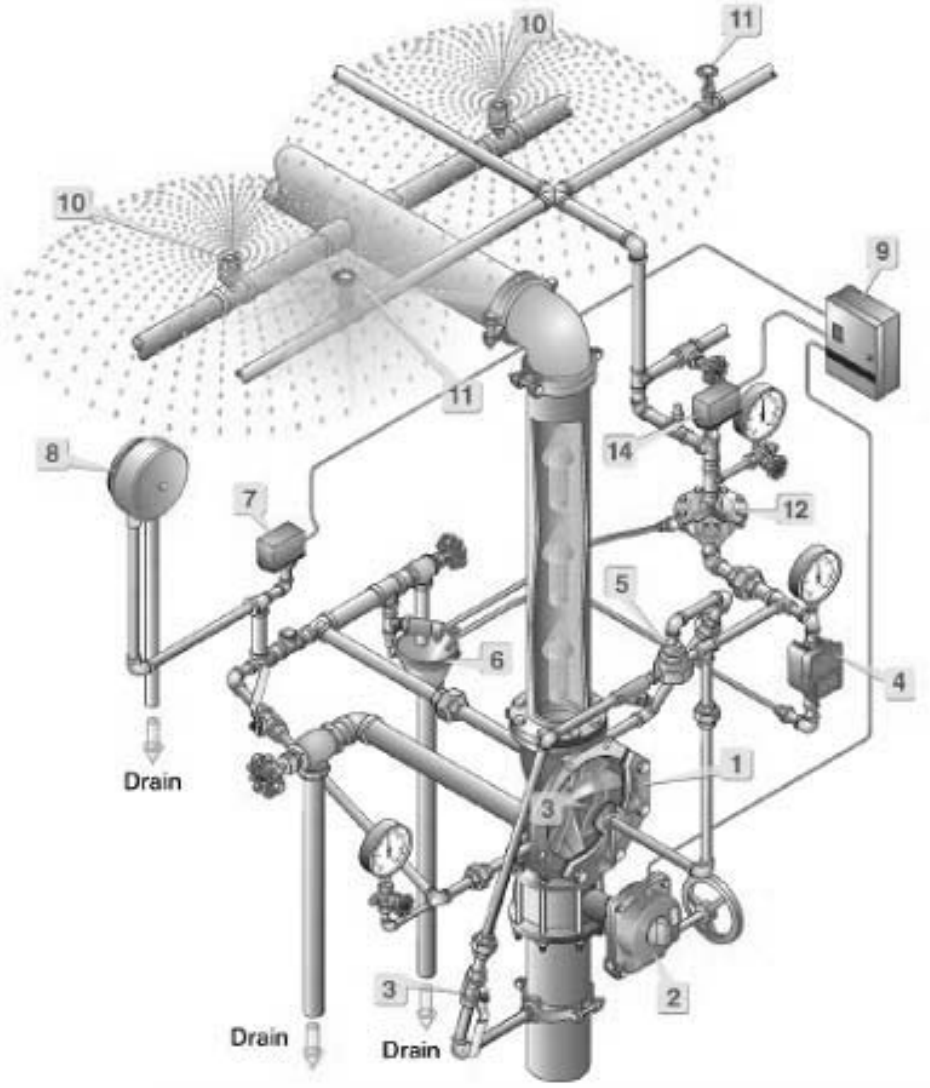
Solenoid Valve

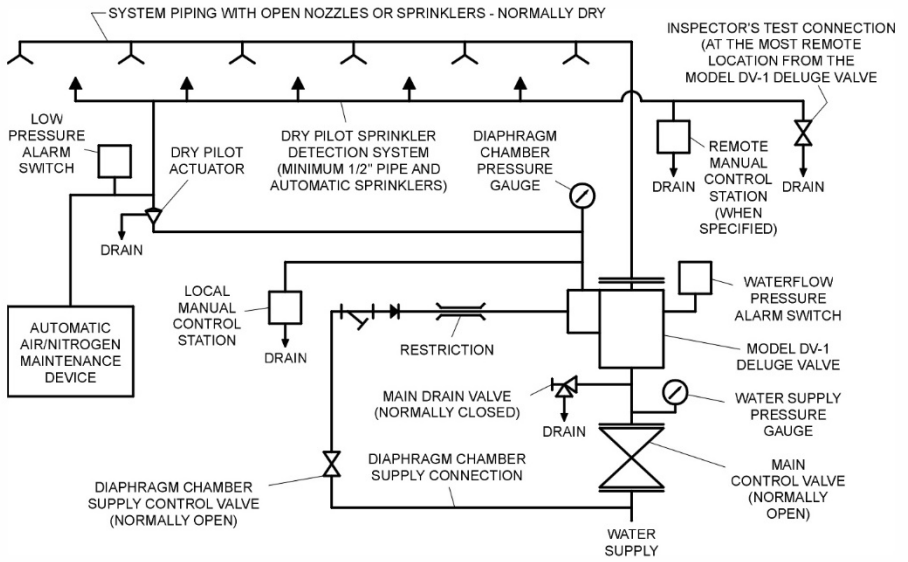
ENCLOSURE TYPE (NEMA RATINGS)	VOLTAGE	WORKING WATER PRESSURE PSI (BAR)	WATTS	AC VOLT-AMPS		DC AMPS	CATALOG	P/N
				INRUSH [a]	HOLDING [b]			
ORDINARY LOCATION (2, 4, and 4X)	120 VAC, 60 Hz 110 VAC, 50 Hz	20-175 (1,4-12,1)	10	31	16	–	73218BN4UNLVN0C111P3	52-287-1-110
	24 VDC	20-175 (1,4-12,1)	10	–	–	0.41	73218BN4UNLVN0C111C2	52-287-1-024
	24 VDC	20-250 (1,4-17,2)	22	–	–	0.83	73212BN4TNLVN0C322C2	52-287-1-124
	48 VDC	20-175 (1,4-12,1)	10	–	–	0.21	73218BN4UNLVN0C111C4	52-287-1-048
	125 VDC	20-175 (1,4-12,1)	11	–	–	0.08	73218BN4UNLVN0C1113N	52-287-1-125
	250 VDC	20-175 (1,4-12,1)	10	–	–	0.04	73218BN4UNLVN0C111N9	52-287-1-015
HAZARDOUS LOCATION (4, 4X, 7, and 9)	110/120 VAC	20-175 (1,4-12,1)	10	31	16	–	73218BN4UNLVN0H111P3	52-287-1-210
	24 VDC	20-175 (1,4-12,1)	10	–	–	0.41	73218BN4UNLVN0H111C2	52-287-1-224
	125 VDC	20-175 (1,4-12,1)	11	–	–	0.08	73218BN4UNLVN0H1113N	52-287-1-225
	250 VDC	20-175 (1,4-12,1)	10	–	–	0.04	73218BN4UNLVN0H111N9	52-287-1-215



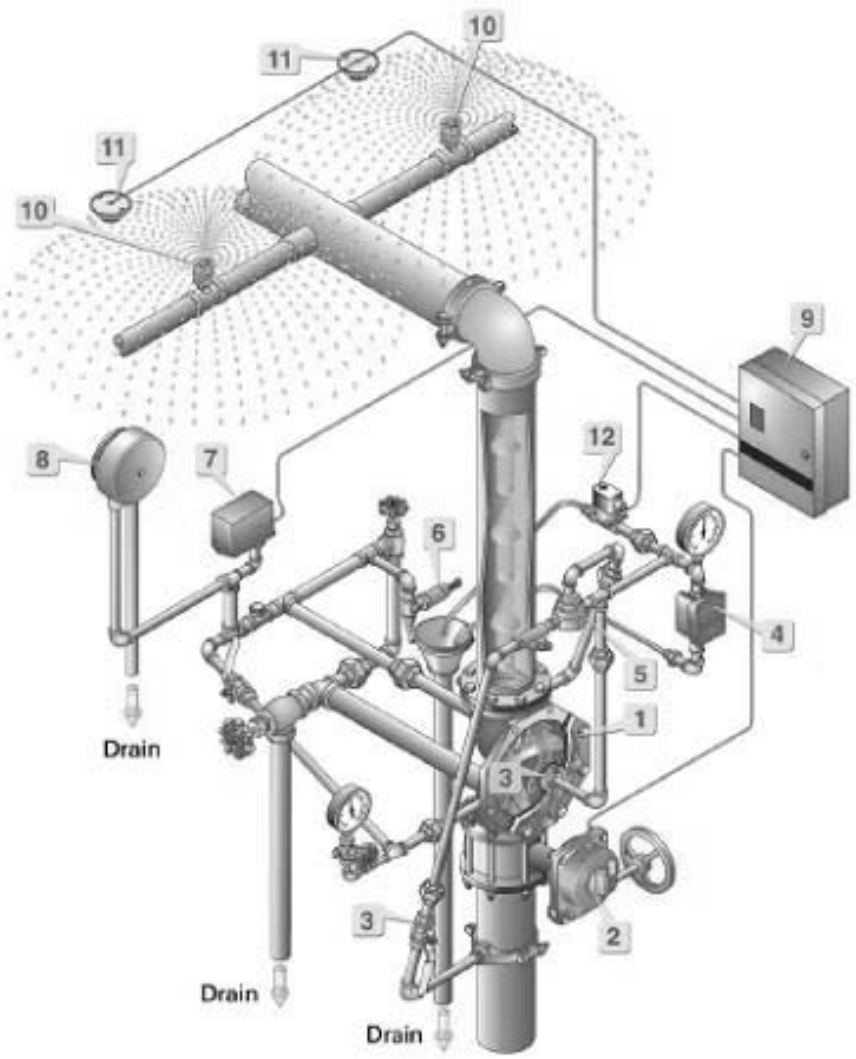
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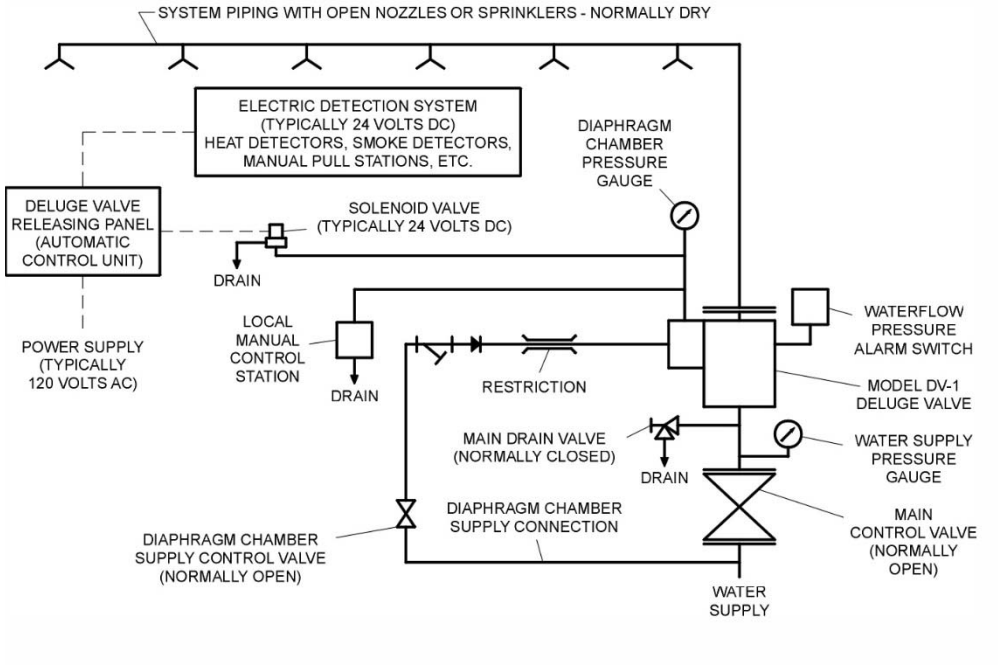
Deluge System – Dry Pilot Actuation



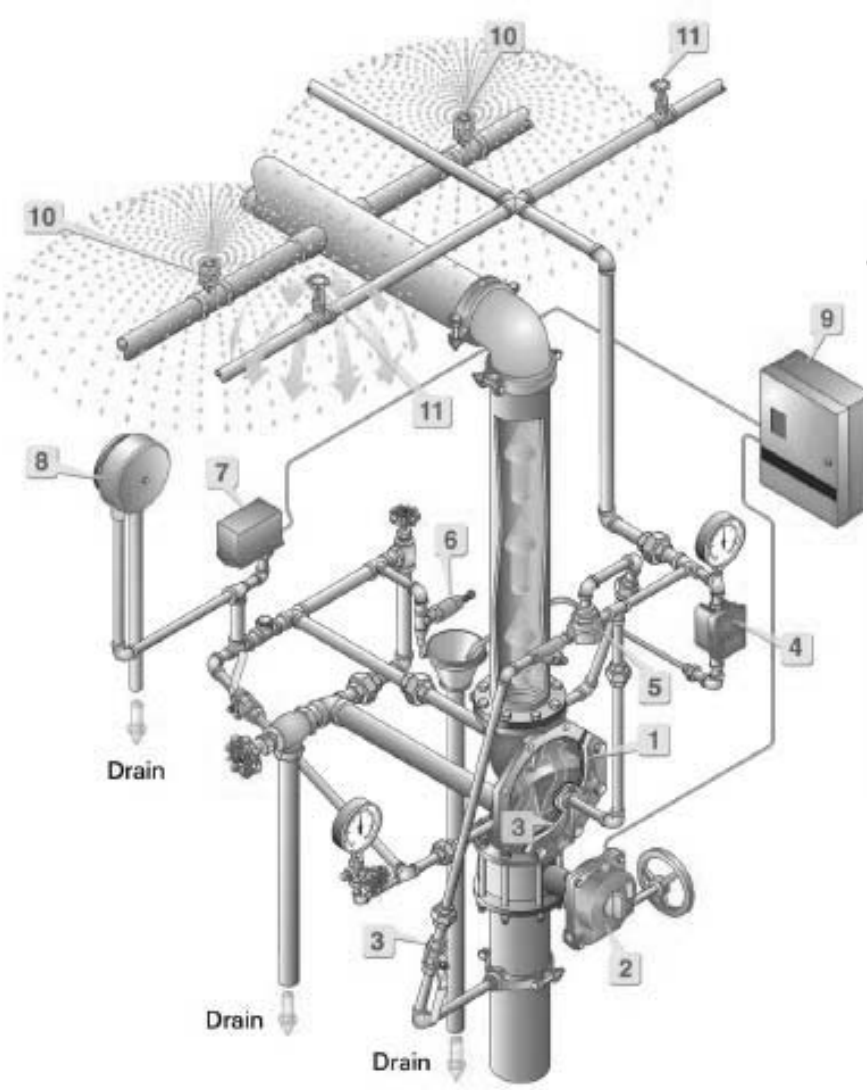


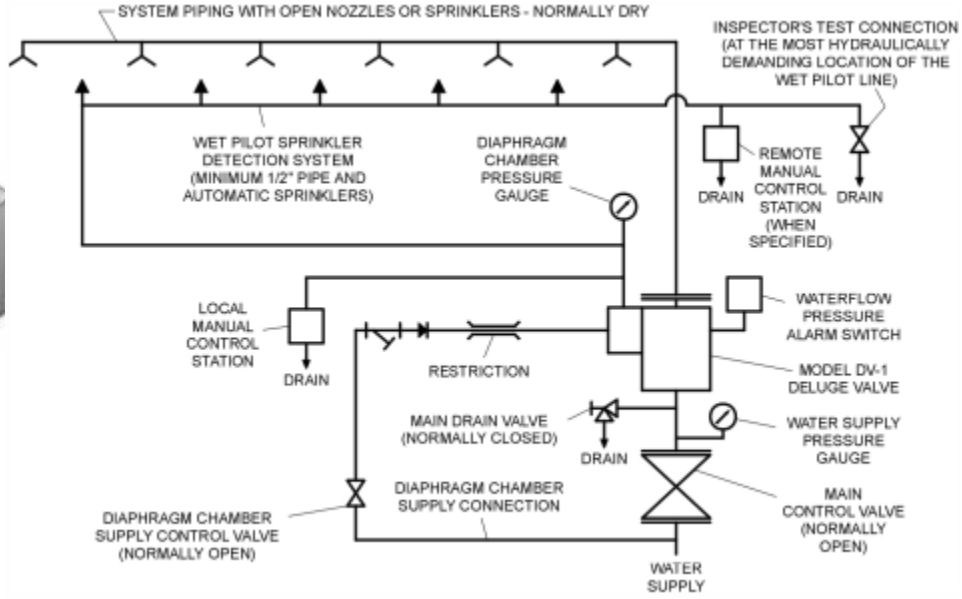
Deluge System – Electric Actuation





Deluge System – Wet Pilot Actuation





Availability

End Connections Available and Weights							
End Connection		**Nominal Valve Size**					
Inlet	Outlet	1-1/2 Inch (DN40)	2 Inch (DN50)	3 Inch (DN80)	4 Inch (DN100)	6 Inch (DN150)	8 Inch (DN200)
Thread	Thread	9 lbs. (4,1 Kg)	12 lbs. (5,4 Kg)	N/A	N/A	N/A	N/A
Groove	Groove*	8 lbs. (3,6 Kg)	10 lbs. (4,5 Kg)	31 lbs. (14,1 Kg)	61 lbs. (27,7 Kg)	99 lbs. (44,9 Kg)	150 lbs. (68,1 Kg)
Flange	Groove*	N/A	N/A	39 lbs. (17,7 Kg)	74 lbs. (33,6 Kg)	107 lbs. (48,5 Kg)	170 lbs. (77,8 Kg)
Flange	Flange	N/A	N/A	47 lbs. (21,3 Kg)	80 lbs. (36,3 Kg)	115 lbs. (52,3 Kg)	190 lbs. (87,5 Kg)

*The Grooved Outlet is recommended for use in Preaction Systems to accommodate the use of a Groove x Groove Riser Check Valve. Refer to Technical Data Sheet TFP1410, TFP1415, TFP1420, TFP1460, or TFP1465 as applicable.

DV-5 with Remote-Resetting (TFP1331)

UL Listed and VdS Approved (without main drain)



DV-5 with Remote-Resetting, Pressure-Reducing (TFP1332)

UL Listed



- Pressure-reducing function maintains pre-set outlet pressure.
- Remote-resetting feature provides the ability to reset the Deluge Valve from one or more locations.

Section 4.0

Deluge Valve
Preaction

Preaction Sprinkler Systems

NFPA 13

- A sprinkler system employing automatic sprinklers that are attached to a piping system that contains air that might or might not be under pressure, with a supplemental detection system installed in the same areas as the sprinklers.

EN12845

- one of two types of dry, or alternate in dry mode, installation in which the alarm valve can be opened by an independent fire detection system in the protected area

Alternate installation,

installation in which the pipework is selectively charged with either water or air/inert gas according to ambient temperature conditions

DV5 Preaction Sprinkler System

Any portion of a building where it is desirable to have pre-warning of a fire so that the fire may be attempted to be extinguished by hand or some other means, to prevent water damage. (single interlocks); Computer Rooms, Libraries, Documentation Centers, Archives.

Any portion of a building where flooding or inadvertent discharge of water is considered undesirable (double interlocks); Freezers, Critical Document Storage, Valuable Archives

System uses closed sprinkler heads (Upright)

Low air or nitrogen pressure in system (0.55 – 0.83 bar)

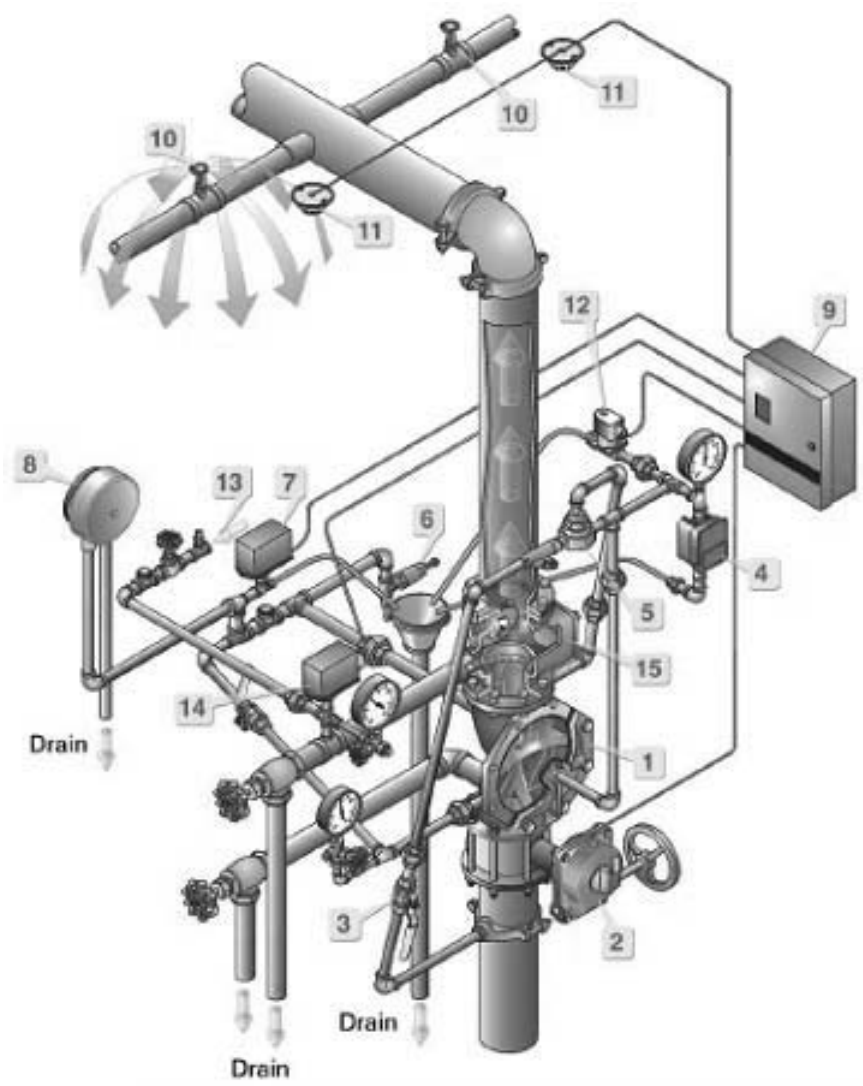
Types;

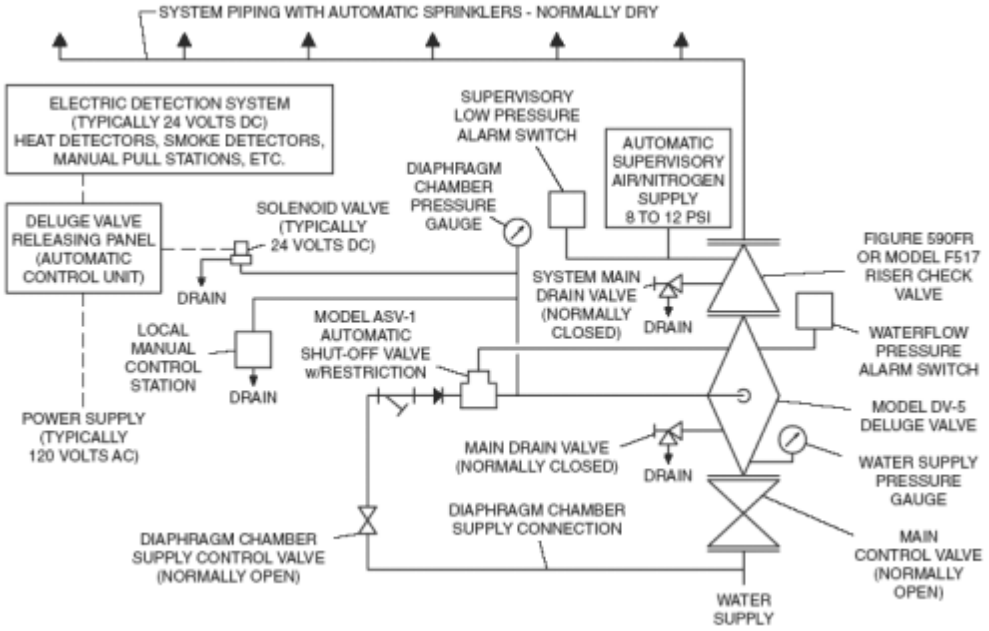
- Single Interlock (NFPA/FM)
- Double Interlock (NFPA/FM)
- Non Interlock (NFPA)
- Preaction Model A (EN12845) or Model B (EN12845)

Single Interlock – Key Elements

- One event (supplemental detection) must occur before water enters the system riser.
- May be used in areas subject to freezing.
- May be used to prevent the accidental discharge of water that could occur with damage to the sprinklers or pipe.
- Single Interlock Preaction Systems may be calculated as a wet pipe system (i.e., no design are penalty). The low supervisory air pressure permits the piping to essentially fill with water.

Preaction Single Interlock – Electric Act.

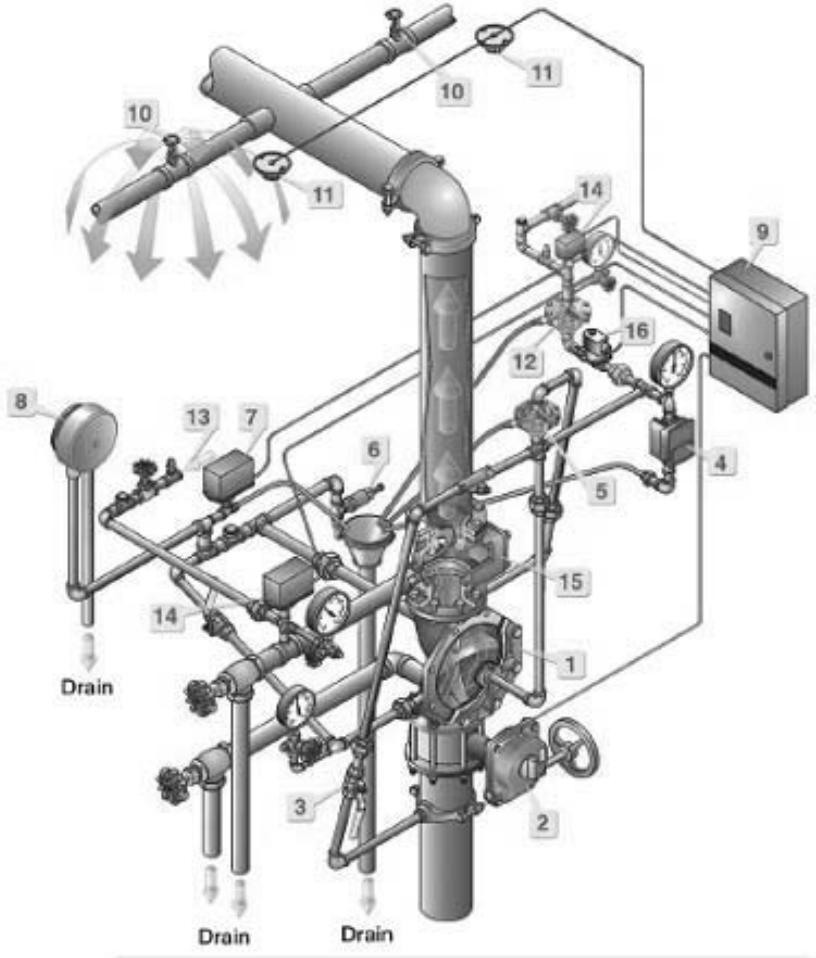


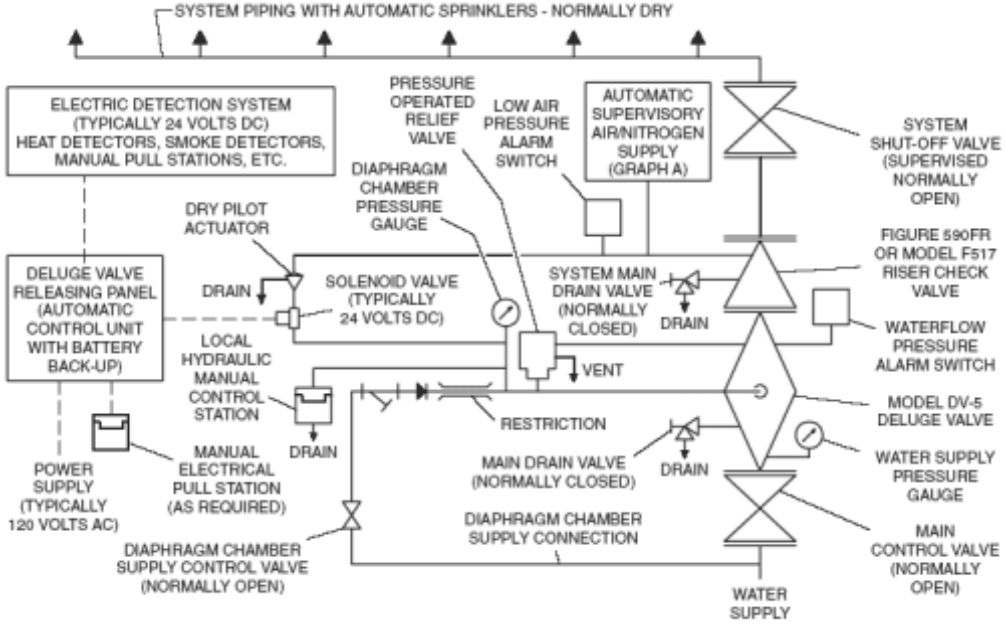


Double Interlock – Key Elements

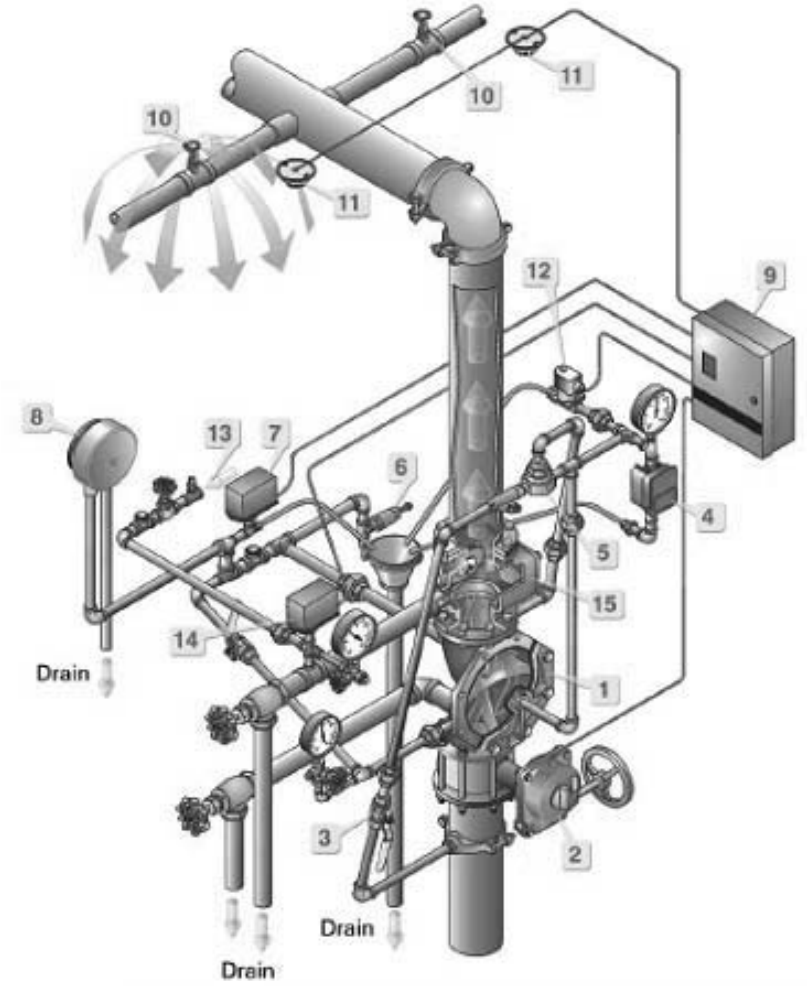
- Two events (supplemental detection & sprinkler operation) must occur before water enters the system riser.
- May be used in areas subject to freezing.
- May be used to prevent the accidental discharge of water that could occur with damage to the sprinklers or pipe or inadvertent operation of the supplemental detection.
- Double Interlock Preaction Systems are calculated as a dry pipe system (i.e., 30% design area penalty & system volume limitations).

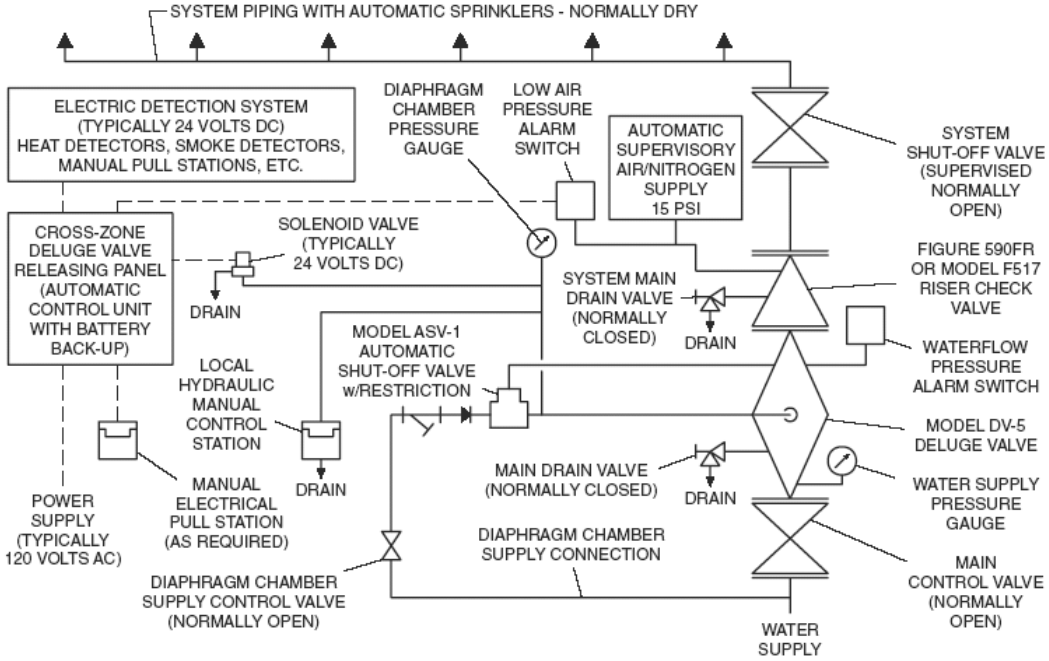
Preaction Double Interlock – El/Pneum. Act.





Preaction Double Interlock – El/El Act.





Systems Accessories Preaction Systems



Dry Pilot Actuator



Manual Control Station



Automatic Shut off valve



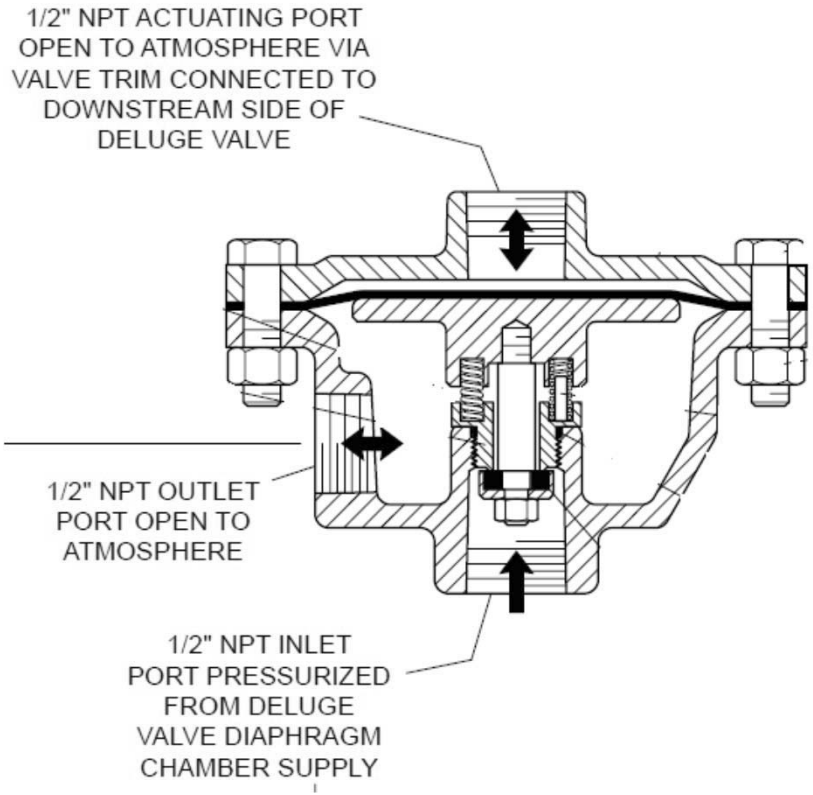
Solenoid Valves



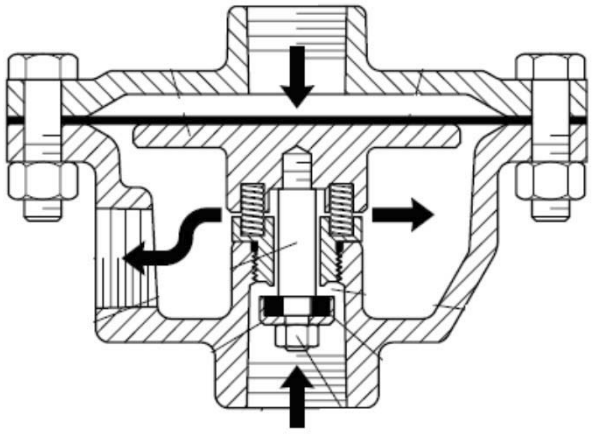
Fail-Safe Valve

Fail-Safe Valve

Set Condition

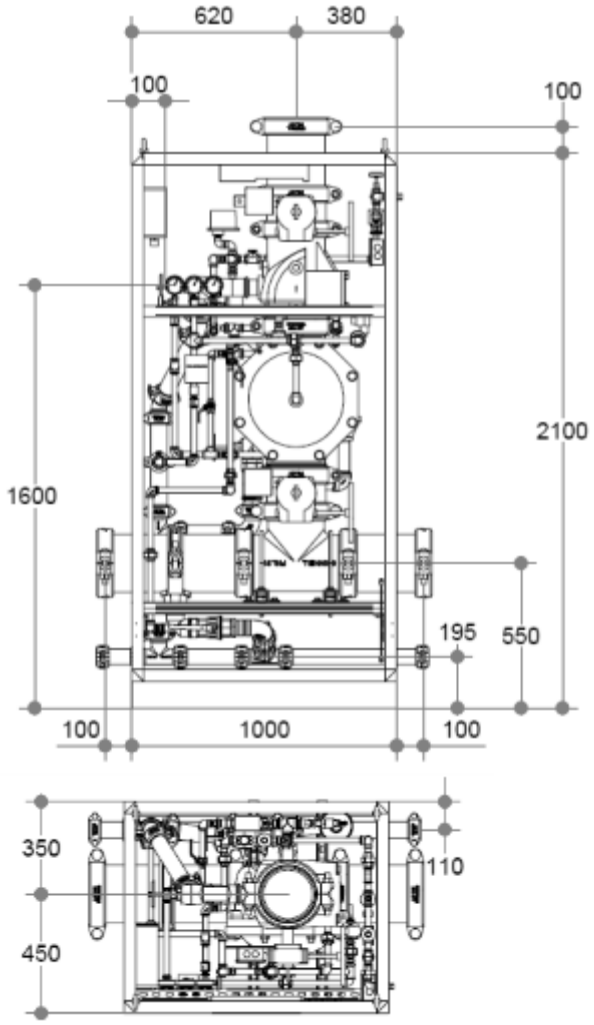


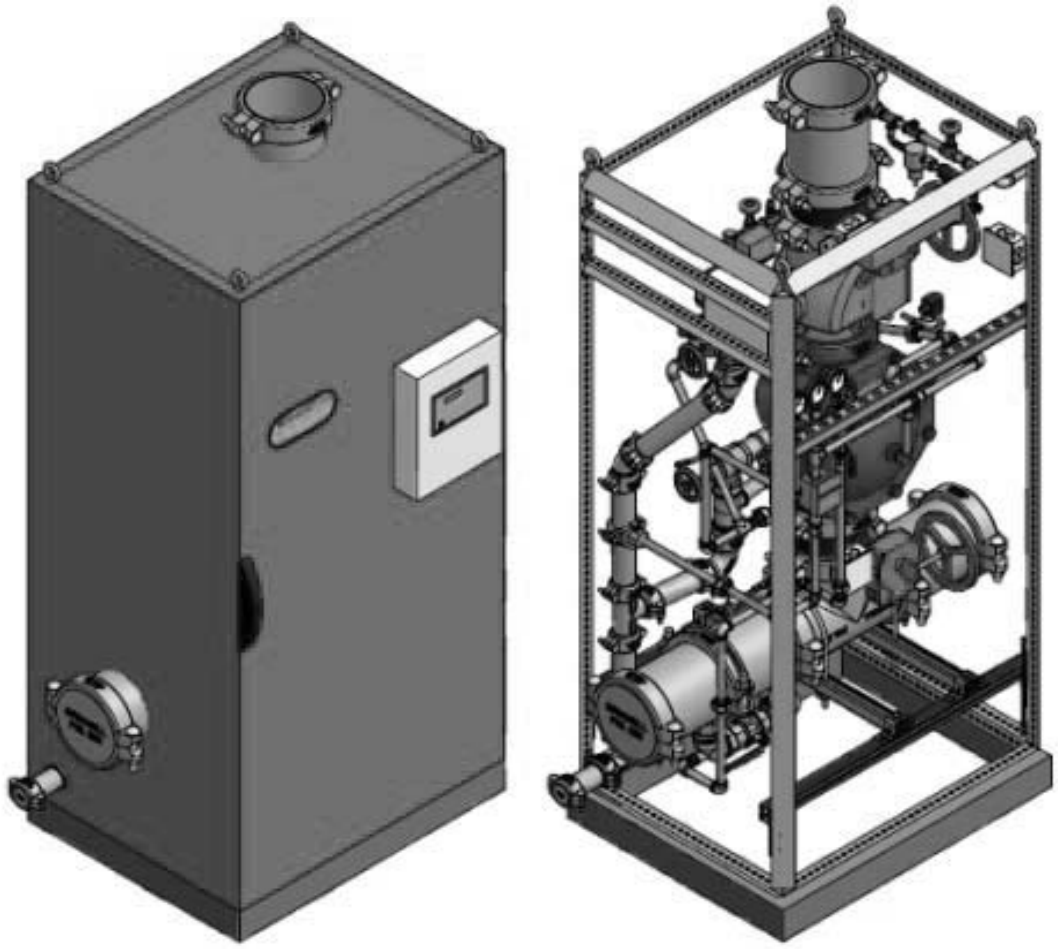
Actuated Condition



No Replacement Parts

Cabinets/Assemblies





Section 5.0

Questions



Thank You

tyco
Fire Protection Products