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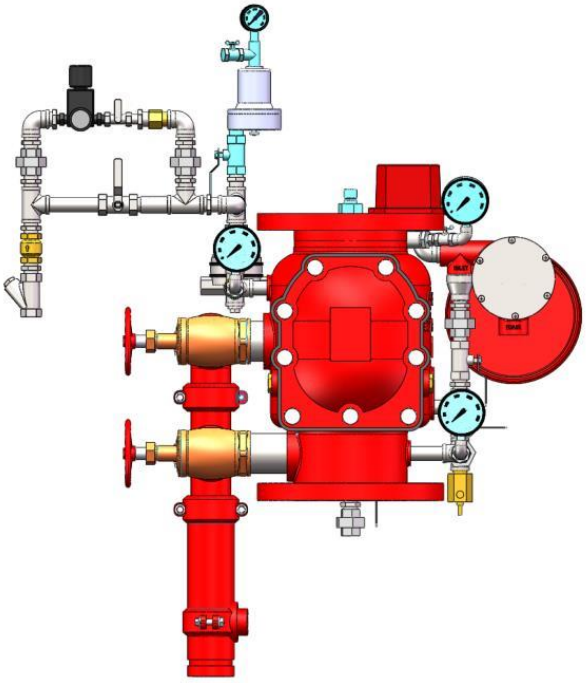
Rev. G

OPERATION & MAINTENANCE INSTRUCTION MANUAL
DRY PIPE VALVE

General

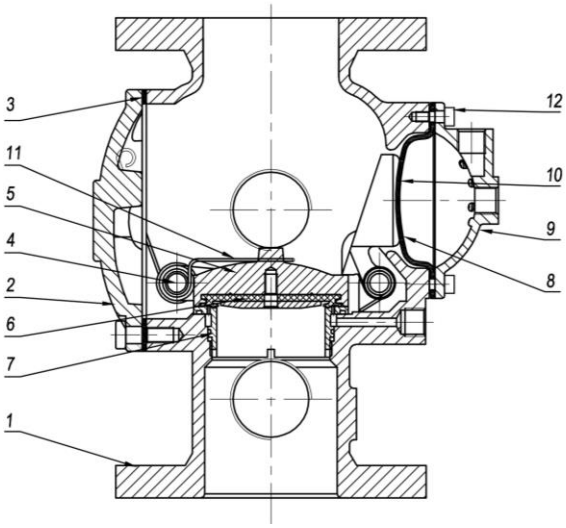
The dry pipe valve is a water flow control/alarm device designed for installation in the main supply to a dry pipe sprinkler system.



Size:	3 inch (DN80) 4inch(DN100) 6 inch(DN150) 8 inch(DN200)
Rated pressure:	300psi (2067 kPa)
Manufacturer test:	Hydrostatic test: 600psi (4134 kPa) Water seat: 600psi (4134 kPa) Air seat:100psi (690 kPa)
Multiple end type:	F2522-300, Groove by Groove F2512-300, Flange by Groove F2511-300, Flange by Flange

UL/ULC Listed, CE and FM Approved

Main Valve Material



No.	Part Name	Material	ASTM Specification
1	Body	Ductile Iron	A536 Grade 65-45-12
2	Cover	Ductile Iron	A536 Grade 65-45-12
3	Body/Cover Gasket	Rubber	D2000 EPDM
4	Hinge Pin	Stainless Steel	A276 Type 304
5	Clapper	Bronze	B148 C95500
6	Clapper Seal	Rubber	D2000 EPDM
7	Body Seat	Bronze	B62 C83600
8	Diaphragm	Rubber	Peroxide cured EPDM with fabric
9	Diaphragm Cover	Ductile Iron	A536 Grade 65-45-12
10	Latch	Bronze	B148 C95500
11	Spring	Stainless Steel	A276 Type 304
12	Bonnet Fasteners	Carbon Steel	A307 Grade B

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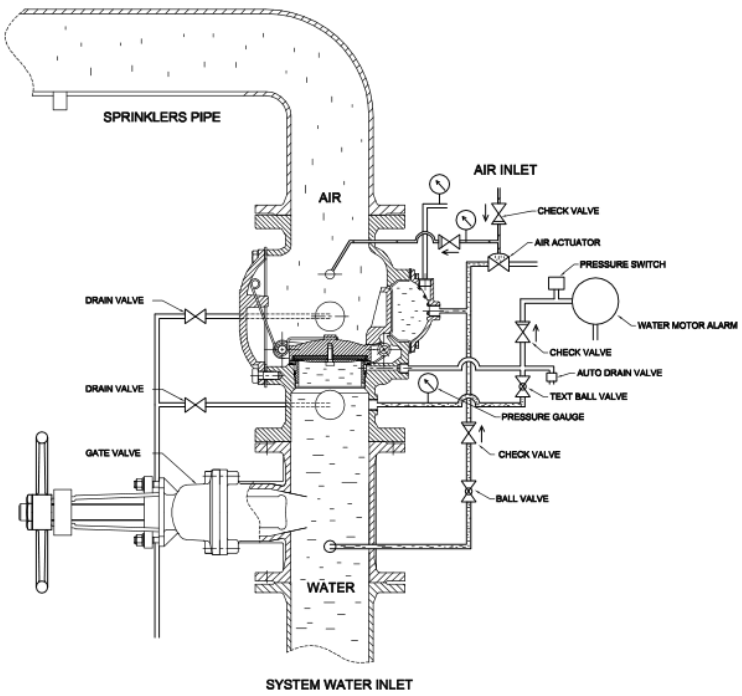
Operation

This model dry pipe valve is constructed with a clapper having a replaceable rubber face. The clapper makes contact with the valve seat ring which has access holes to the intermediate chamber of the valve. The clapper is contacted by the latch which is contacted by the diaphragm. In the set position, water supply pressure from upstream of the water supply control valve is maintained in the diaphragm chamber which holds the clapper in the closed/set position. The water is maintained in the diaphragm by one of the system release mechanisms (pneumatic, hydraulic or electric). Upon the detection of an appropriate actuating event of the sprinkler System the water supply pressure in the diaphragm chamber is released.

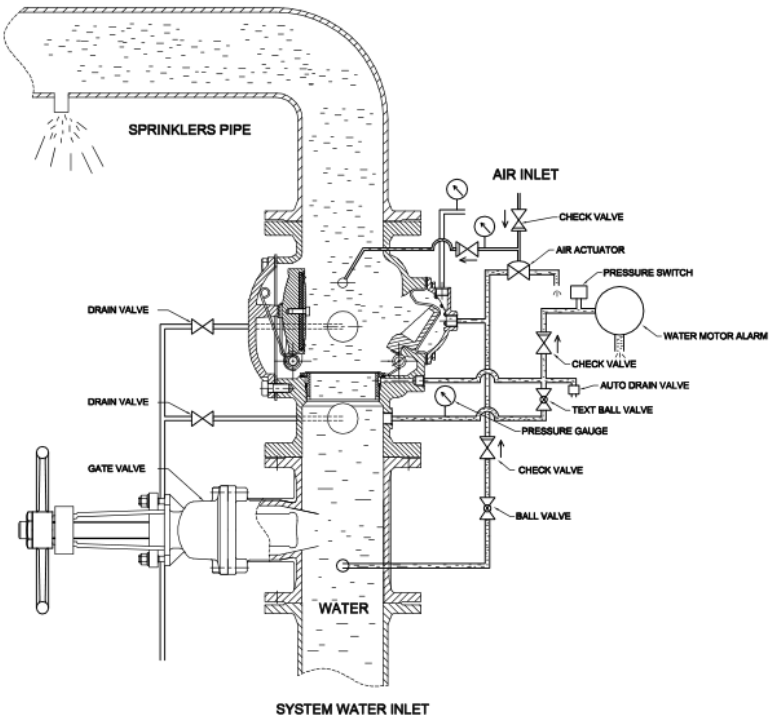
TRIM INSTALLATION DIAGRAM
Clapper in the closed/set position



This release allows the latch to move to its open position, permitting the clapper to pivot freely, thus allowing water into the system. Water will flow from all open sprinklers in the piping. Also, water enters the intermediate chamber of the valve through the holes in the seat ring. The water flows from the intermediate chamber to the alarm line thus activating the system alarms. These alarms will continue to sound until the flow of water is stopped. When the flow of water is stopped the spring assisted valve clapper returns to the closed position and the valve acts as an alarm check valve until the system is put back into service as a sprinkler System.

This model dry pipe valve Minimum operating pressure: 30 psi.

TRIM INSTALLATION DIAGRAM
Clapper in the open position



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Air Supply Requirements

Set the air pressure to the required system air pressure. It will be operate before the pressure drops about 5 psi / 34kPa after controlling the flow of air to the orifice is opened. Air pressure differing from the required system air pressure could reduce system operation response time.

TABLE 3-Air Pressure Settings

Water Pressure		Recommended Pressure	
psi	kPa	psi	kPa
30-140	21-966	15	103
141-250	967-1725	21	145
251-300	1726-2070	24	166

NOTE:

If the air pressure cannot seal Low-Pressure Actuator, increase the pressure appropriately.

Settings for Air Supervisory Pressure

Switches and Alarm Pressure Switches

Air supervisory pressure switches are required for sprinkler systems and must be set according to the following instructions.

Wire the air supervisory pressure switches to activate a low-pressure alarm signal. NOTE: In addition, the local authority having jurisdiction may require a high-pressure alarm. Contact the local authority having jurisdiction for this requirement. Set the air supervisory pressure switches to activate at 2-4 psi/ 14-28 kPa below the minimum air pressure required.

Wire the alarm pressure switch to activate a water flow alarm. Set the alarm pressure switch to activate on a pressure rise of 4-8 psi/ 28-55 kPa.

Packages

Dry Pipe Valve
Required Installation Pipeline
Water Pressure Gauge
Low-Pressure Actuator
Automatic Drain Valve
System Main Drain Valve
Air Pressure Maintenance Device
Limiting Inlet Pipe
Dry Accelerator
Water motor alarm (Optional/Sold Separately)
Air Supervisory Pressure Switch (Optional/Sold Separately)
Alarm Switch (Optional/Sold Separately)
Water flow Detectors (Optional/Sold Separately)

Installer Safety Instructions

WARNING

***the valve trim as specified by the Standard for the Installation of Sprinkler Systems, ANSI/NFPA 13.**

***An experienced, trained installer must install this product in accordance with all instructions. These instructions contain important information.**

*** Depressurize and drain the piping system before attempting to install, remove, adjust, or maintain any piping products.**

***Failure to follow these instructions can cause product failure, resulting in death or serious personal injury and property damage.**

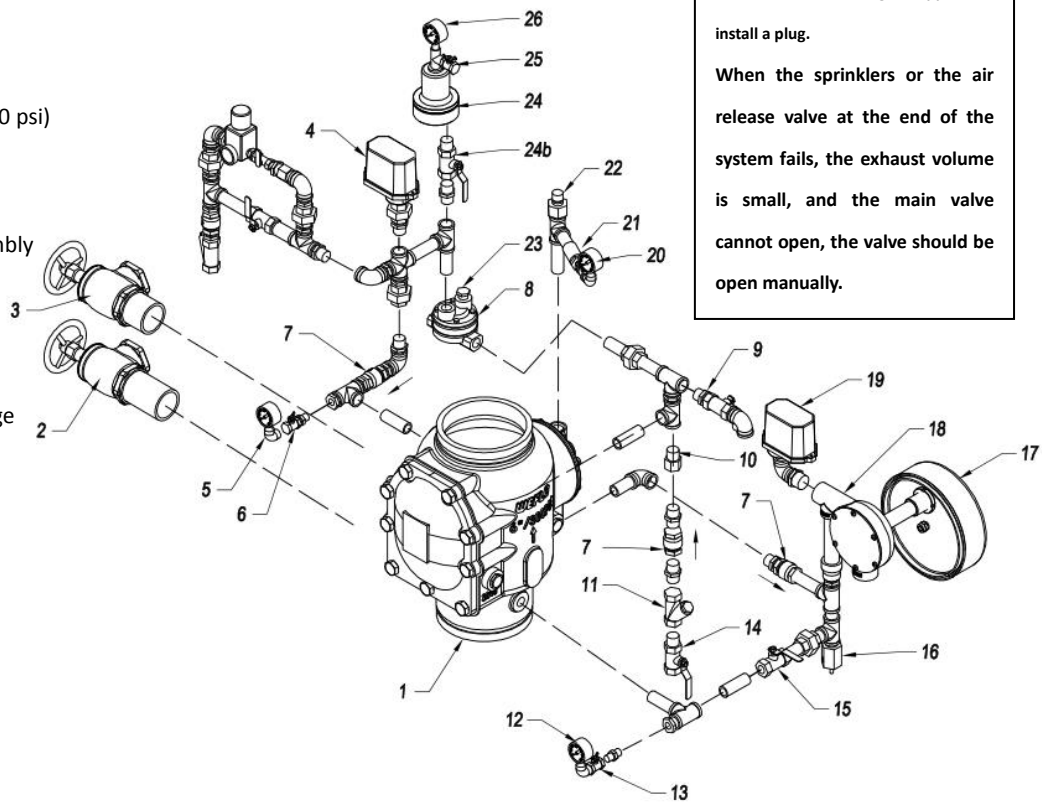
OPERATION & MAINTENANCE INSTRUCTION MANUAL
DRY PIPE VALVE

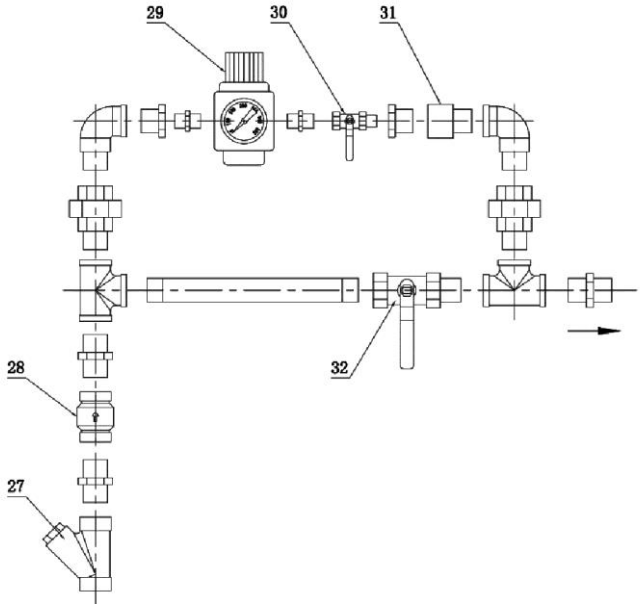
TRIM COMPONENTS

1. Dry Pipe Valve Assembly
2. Water Supply Main Drain Valve
3. System Main Drain Valve
4. Alarm Pressure Switch for Air
5. System Pressure Gauge (0-300 psi)
6. Gauge Valve
7. Check Valve
8. Low-Pressure Actuator Assembly
*9. Manual Opening
10. Restrictor
11. Strainer
12. Water Supply Pressure Gauge (0-300 psi)
13. Gauge Valve
14. Diaphragm-Charge-Line Ball Valve
15. Alarm Test Ball Valve (Normally Closed)
16. Automatic Drain Valve
17. Water Motor
18. Gong Alarm
19. Alarm Pressure Switch for Water
20. Diaphragm-Charge-Line Pressure Gauge (0-300 psi)
21. Gauge Valve
22. Auto Drain valve
23. 1/2 plug
24. Dry Accelerator
24b. Ball valve
25. Ball Valve
26. Air Pressure Gauge (0-0.4Mpa)
27. Strainer
28. Check Valve
29. Air Regulator
30. Slow Fill Ball Valve (Normally Open)
31. Restrictor
32. Fast Fill Ball Valve (Normally Closed)

***9 NOTE: If do not need "manual pull station" remove hexagon nipple and install a plug.**

When the sprinklers or the air release valve at the end of the system fails, the exhaust volume is small, and the main valve cannot open, the valve should be open manually.





Air Pressure Maintenance Device

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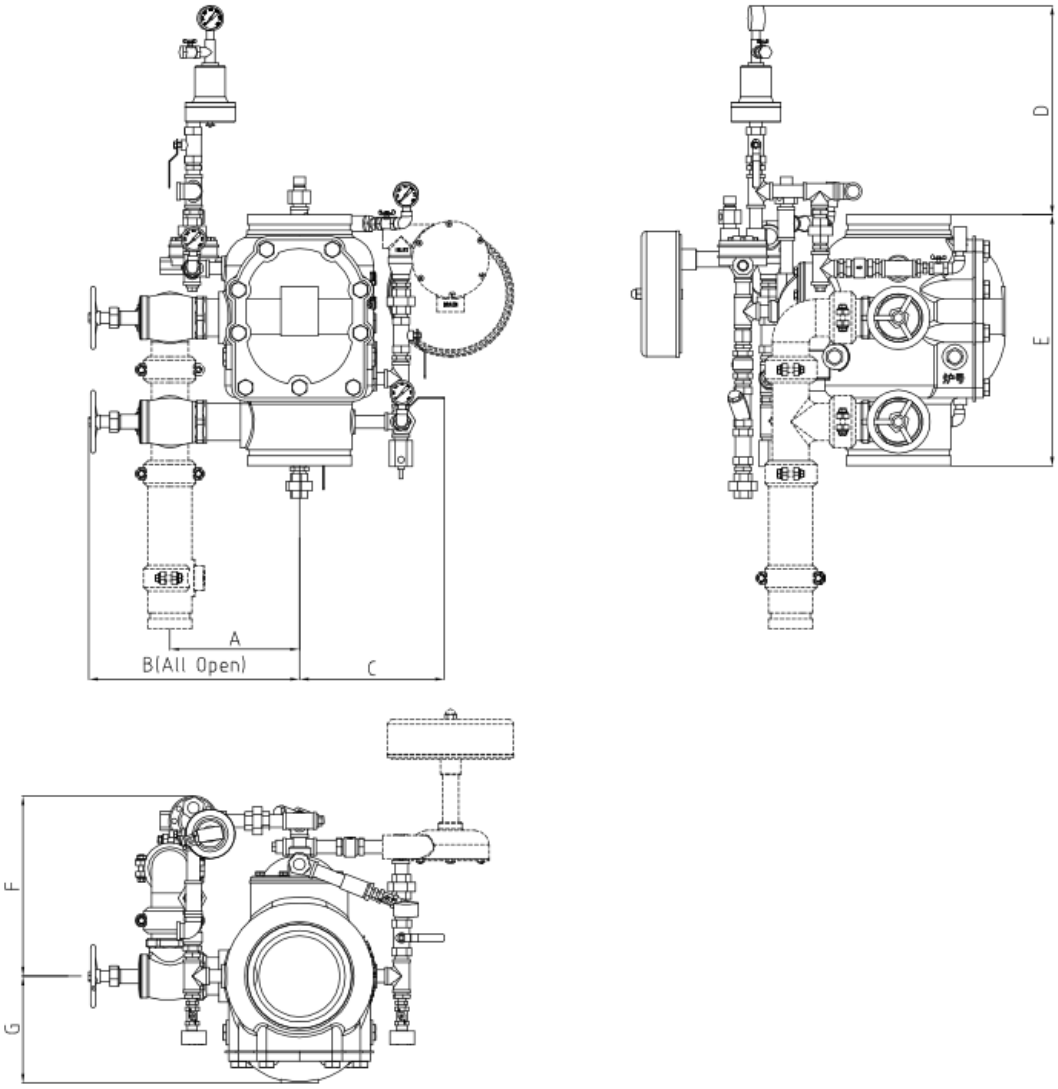
DRY PIPE VALVE

TRIM DIMENSIONS



	A	B	C	D	E			F	G
					FXF	FXG	GXG		
DN80	150	300	210	375	325	310	310	265	120
DN100	180	350	210	375	355	343	343	265	135
DN150	210	375	250	345	431	405	405	290	175
DN200	240	415	275	325	460	445	445	310	190

NOTES:

1. Components shown as dotted lines denote optional equipment.
2. The 3-inch/ 88.9-mm configurations contain 1 ¼-inch/31-mm drain valves. The 4-8 inch/ 114.3-219.1mm configurations contain 2-inch/ 50-mm drain valves.

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DRY PIPE VALVE

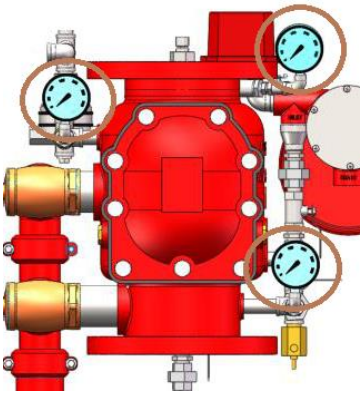
IMPORTANT INSTALLATION

1. Confirm that adequate space is available for valve, trim, and accessories.
2. Flush water supply piping. Before installing the Dry pipe Valve, flush the water supply piping thoroughly to remove all foreign material.
3. Protect system from freezing temperatures. Dry pipe Valve and supply piping MUST NOT be located in an area where the valve can be exposed to freezing temperatures or mechanical damage.
4. Supply air or nitrogen to the system. Air or nitrogen supply to the piping system must be clean, dry, and oil-free and must be regulated, restricted, and uninterrupted. Observe the system air pressure over a 24-hour period to confirm system integrity. If there is degradation in system air pressure, find and correct all leaks. NOTE: NFPA requires less than 1.5psi/10 kPa/0.1 bar leakage in 24 hours.
5. Valve must be installed in vertical position with the trim.
6. Ensure that all components are included in the shipment and that all necessary tools are available for installation. Verify that the provided trim drawing matches the system's requirements.
7. Remove all plastic caps and foam spacers from the valve.
8. Install the valve assembly into the riser.

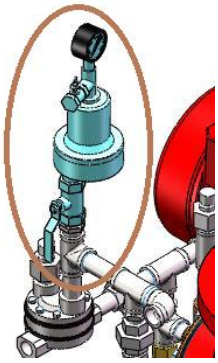
NOTE: The ball valve #14 must be connected to the front of the globe valve or butterfly valve.

9. Install the Pressure Gauge、Air Pressure Maintenance Device and other parts. For components shipped separate from the valve, apply a small amount of pipe joint compound or PTFE thread sealant tape to the external threads of all threaded connections. DO NOT get any tape, compound, or other foreign material into the openings of the threaded connections.

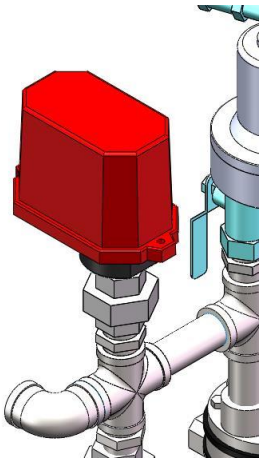
9a. Install the Pressure Gauge (5), (12) and (20)



9b. Install the Dry Accelerator (24)



9c.Install the Air supervisory pressure (4)
If need.

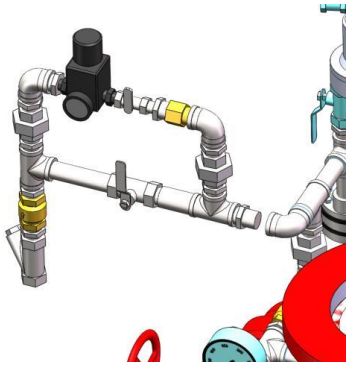


MAINTENANCE AND REPLACEMENT

DRY PIPE VALVE

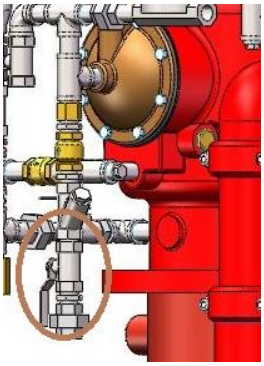
9d. Install the Air Pressure Maintenance Device.

(Adjust the angle according to the actual situation)



9e. Install the Water Motor Alarm (17,18), supervisory pressure (19) and Automatic Drain Valve(16).

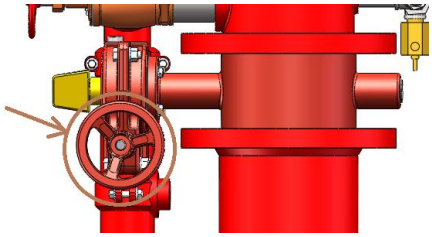
10. Install the Limiting Inlet Pipe.



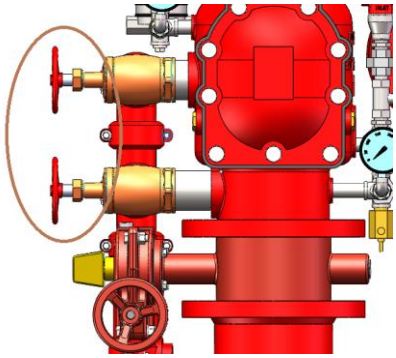
Setting Procedure

Step 1. Make sure the clapper at set position.

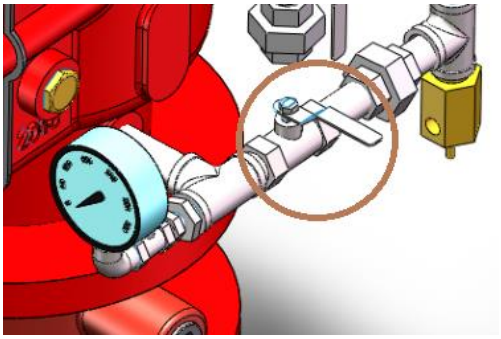
Step 2. Close the main water supply control valve to the sprinkler system (OS&Y, Wafer Butterfly or other), make sure it no leaks. All pressure gauge shows zero.



Step 3. Open the (2) drain valve and (3) drain valve, make sure there is no water in the valve. Then close both drain valves.



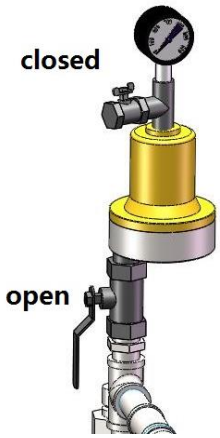
Step 4. Make sure the (15) Alarm Test Ball Valve was closed.



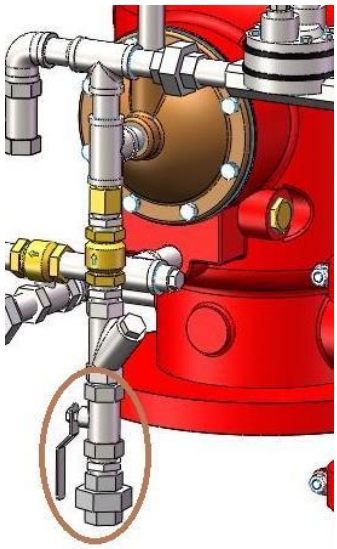
MAINTENANCE AND REPLACEMENT

DRY PIPE VALVE

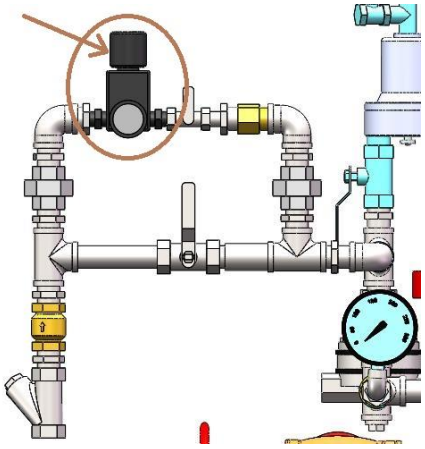
Step 5. Open the (24b) ball valve, make sure the (25) ball valve was closed.



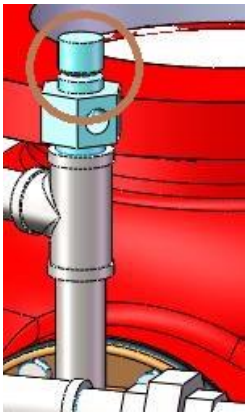
Step 6. Open the (14) Diaphragm-Charge-Line Ball Valve, Allow water to flow through the (22) auto drain valve and (8) low-pressure actuator.



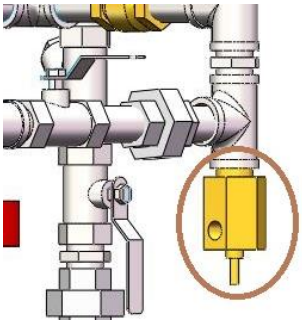
Step 7. Adjust the (29) Air Regulator of Air Pressure Maintenance Device make air pressure according to table 3. Open (32) Fast Fill Ball Valve until the pressure in the pipe close to the set point, close the (32) fast-fill ball valve and Open the (30)slow-fill ball valve.



Step 8. Pull up the (22) auto drain valve until there is no water leak from outlet. Check the (20) Diaphragm-Charge-Line Pressure Gauge, It shows the pressure of the water supply.



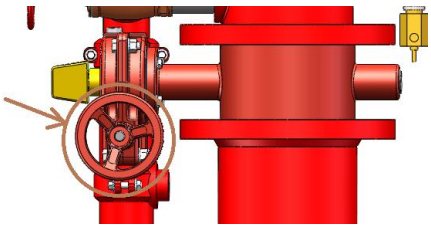
Step 9. Manually open the (16) drip check valve. Make sure there is no air/water leakage.



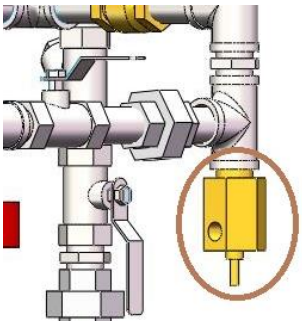
MAINTENANCE AND REPLACEMENT

DRY PIPE VALVE

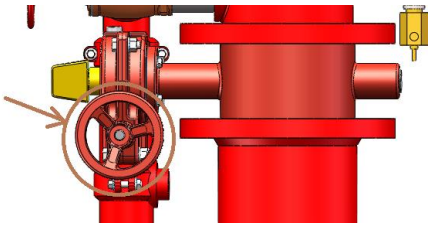
Step 10. Slowly open 1/3 of the main water supply control valve.



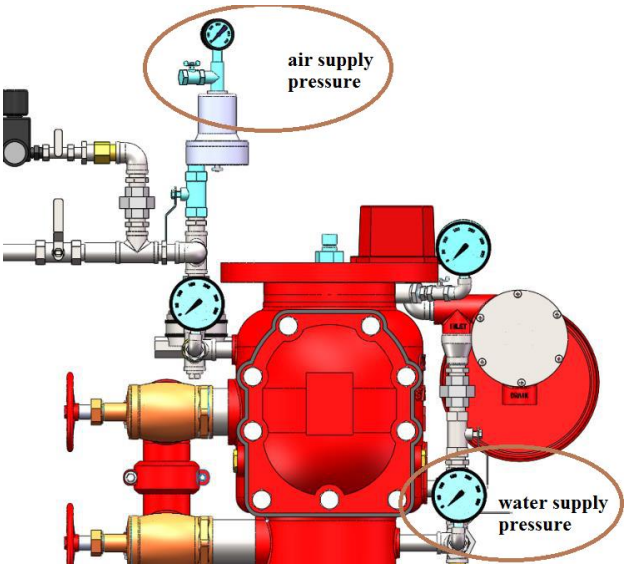
Step 11. Check the (16) drip check valve, no water and no air leaks.



Step 12. Open the main water supply control valve fully.



Step 13. Record water supply and air supply pressure.



Step 14. Confirm that all valves are in their normal operating positions.

Valve	Normal Operating Position
Water Supply Main Control Valve	Open
(2)Water Supply Main Drain Valve	Closed
(3)System Main Drain Valve	Closed
(14)Diaphragm-Charge-Line-Ball Valve	Open
(15)Alarm Test Ball Valve	Closed
(30)Slow-Fill Ball Valve	Open
(32) Fast Fill Ball Valve	Closed
(25)Ball Valve	Closed
(6), (13) and (21) Gauge Valve	Open
(9) manual opening	Closed

Step 15. Increase the air pressure value about 10% to ensure the stable pressure of the system.

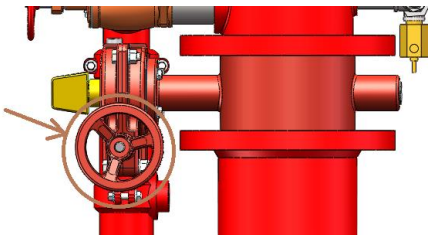
Setup completed.

MAINTENANCE AND REPLACEMENT

DRY PIPE VALVE

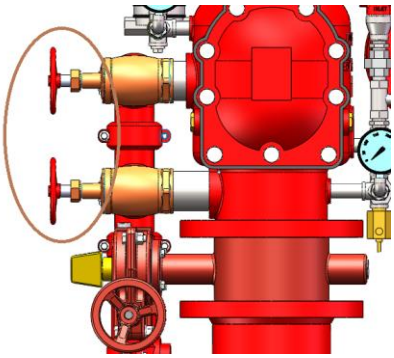
Reset setting

Step 1. Close the main water supply control valve to the sprinkler system (OS&Y, Wafer Butterfly or other), make sure it no leaks. All water pressure gauge shows zero. Close the (14) Diaphragm-Charge-Line Ball Valve,

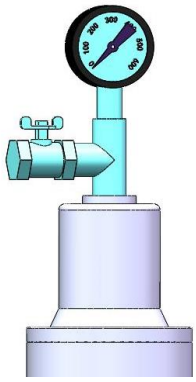


Step 2. Cut off air supply. Close the (30) slow-fill ball valve.

Step 3. Open the (2) drain valve and (3) drain valve, drain excess water from system, then close both drain valves.



Step 4. Open the (25) ball valve, The Air Pressure Gauge show 0 pressure, then closed.



Repeat **Setting Procedure** steps 6-15.

MAINTENANCE AND REPLACEMENT
DRY PIPE VALVE

Maintenance and replacement

WARNING:

1. Any system maintenance or inspection that involves placing a control valve "out-of-service" will eliminate the fire protection normally provided by the system.
2. Prior to proceeding, be certain to secure permission from all Authorities Having Jurisdiction and notify all personnel who may be affected during system shutdown.

STOP SYSTEM

A. Close the water supply main control valve to tale the system out of service.
B. Isolate any applicable air supply. Make sure close both ball valve (#30 and #31) of the Air Pressure Maintenance Device.
C. Close the #14 diaphragm charge line ball valve.
D. Open the #2 Water Supply Main Drain Valve.
E. Open the #3 System Main Drain Valve to drain any water that has accumulated and to release system air pressure.
F. Confirm that water is not flowing from the drain valve.
G. Open the #25 ball valve of Dry Accelerator.
H. Open the #9 Manual ball valve to remove pressure in the charge line. Verify that there is no pressure on the gauge.

REPLACE COVER PLATE GASKET

1.1 After all pressure is released from the system, loosen the cover plate bolts slowly. NOTE: DO NOT remove any cover plate bolts until all cover plate bolts are loosened.
1.2 Remove all cover plate bolts, along with the cover plate and cover plate gasket. Replace the cover plate gasket.
1.3 Insert cover plate bolts through the cover plate and cover plate gasket to ease alignment.
1.4 Align the cover plate/cover plate gasket to the valve. Ensure that the clapper spring's arms are rotated to their installed position. Tighten all cover plate bolts into the cover plate/valve body.

Reference cover plate bolts torque:

Valve Size	Reference torque /N.m
3 inch	70-90
4 inch	
6 inch	140-160
8 inch	

MAINTENANCE AND REPLACEMENT
DRY PIPE VALVE

REPLACE CLAPPER SEAL

2.1 Reference 1.1and 1.2. Open the bonnet.

2.2 Remove the clapper shaft bushings from the valve body. Remove and discard the clapper shaft bushing O-ring. Keep the clapper shaft bushings for re-installation.

2.3 Remove the clapper shaft and clapper spring.

2.4 Remove the clapper assembly from the valve body seat ring.

2.5 Remove the seal assembly bolt/O-ring from the clapper seal. Discard the O-ring.

2.6 Remove the seal-retaining ring. Save the seal-retaining ring for re-installation.

2.7 Carefully pry the old clapper seal, discard the clapper seal.

2.8 Remove any debris from the clapper. Inspect the clapper for damage that may affect the sealing capabilities of the new clapper seal. Contact UNIVAL if the clapper requires replacement.

2.9 Install the new clapper seal into the clapper carefully.

2.10 Place the seal-retaining ring onto the clapper seal. Install the new seal assembly bolt/O-ring seal through the seal-retaining ring and clapper.

Reference assembly bolt torque:

Valve Size	Reference torque /N.m
3 inch	12
4 inch	12
6 inch	20
8 inch	20

2.11 Check and clean the valve body seat ring.

2.12 Place a new clapper shaft bushing O-ring onto each clapper shaft bushing.

2.13 Install one clapper shaft bushings into the valve body until hand-tight.

2.14 Place the clapper assembly onto the valve body seat ring. Ensure that the holes in the clapper arms align with the holes in the valve body.

2.15 Insert the clapper shaft halfway into the valve body.

2.16 Install the clapper spring onto the clapper shaft. Ensure that the loop of the clapper spring is facing the clapper.

2.17 Finish inserting the clapper shaft through the clapper arm and valve body.

2.18 Install other clapper shaft bushings into the valve body until hand-tight.

2.19 Tighten the clapper shaft bushings until metal-to-metal contact occurs with the valve body. DO NOT exceed 15N.m of torque on the clapper shaft bushings.

2.20 Check the clapper for freedom of movement.

2.21 Make sure the clapper plate is reset and the latch is pressed on the clapper.

2.22 Repeat step 1.3 and 1.4.

Contact UNIVAL if replace the clapper assembly.

MAINTENANCE AND REPLACEMENT
DRY PIPE VALVE

REPLACE MAIN VALVE DIAPHRAGM

3.1 Break the unions that connect the trim to the diaphragm cover.

3.2 Remove the cap screws from the diaphragm cover. Remove and discard the diaphragm.

3.3 Clean the back of the valve body to remove any debris that may interfere with proper diaphragm seating.

3.4 Clean the inside of the diaphragm cover.

3.5 Insert diaphragm cover bolts through the cover and diaphragm.
Note, the concave surface of diaphragm is face to the cover.

3.6 Align the body bolt holes and tighten the bolts.
Reference diaphragm cover bolts torque:

Valve Size	Reference torque /N.m
3 inch	22-25
4 inch	
6 inch	25-28
8 inch	

3.7 Re-attach the trim at the unions that were loosened in step 3.1.

REPLACE LATCH

4.1 Reference 1.1and 1.2. Remove the cover plate.

4.2 Reference 3.1and 3.2. Remove the diaphragm and diaphragm cover.

4.3 Remove the latch shaft bushings from the valve body. Remove and discard the latch shaft bushing O-ring.

4.4 Remove the latch shaft. Note: As the latch shaft is being removed, the latch and latch spring will drop out of position. Discard the latch shaft and latch spring.

4.5 Install a new latch. Verify that the flat side of the latch shall face toward the diaphragm.

4.6 Insert the new latch shaft (supplied with the kit) through the valve body and into the first arm of the latch.

4.7 Install a new latch spring. Press the spring, short end on top, long end on bottom.

4.8 Continue to pass the latch shaft through the other arm of the latch and into the valve body.

4.9 Place a new latch shaft bushing O-ring (supplied with the kit) onto each latch shaft bushing.

4.10 Install the latch shaft bushings into the valve body until hand-tight.

4.11 Tighten the latch shaft bushings until metal-to-metal contact occurs with the valve body. DO NOT exceed 15N.m of torque on the latch shaft bushings.

REPLACE LOW-PRESSURE ACTUATOR DIAPHRAGM

5.1 Break the unions that connect the trim to the low-pressure actuator cover.

5.2 Using a marker, place a mark on the cover, seat and body. This mark will aid in aligning the cover and seat during re-assembly.

5.3 Remove the screws from the cover.

MAINTENANCE AND REPLACEMENT
DRY PIPE VALVE

5.4 Carefully detach cover from body. Take down upper diaphragm, seat, lower diaphragm and 2-spring. Discard the diaphragms.

5.5 Check and clean the actuator body seat ring. Contact UNIVAL if the actuator body requires replacement. 5.6 For ease of assembly, it is recommended to assemble the cover assembly first.

a) Turn the cover 180 degrees. Insert 4-bolts through the cover from bottom.

b) Install upper diaphragm.
Note 1. The center concave of diaphragm face to cover.
Note 2.Rotate the diaphragm so that the bolts can pass through the diaphragm holes.

c) Seat convex arc upward, place a tower spring, the big end is stuck in the seat groove.

d) Seat convex arc face to cover, and Insert seat through cover bolts.
Note, bolt holes come with error-proof angles.

e) Place a tower spring, the big end is stuck in the seat groove.

f) Install lower diaphragm.
Note 1. The center concave of diaphragm back to cover.
Note 2.Rotate the diaphragm so that the bolts can pass through the diaphragm holes.

5.7 Install cover assembly on to the body, and tighten the bolts. Reference torque 6N.m

5.8 Contact UNIVAL if the low-pressure actuator assembly requires replacement. When installing, note that the arrow on the body points in the direction of the water flow.

REPLACE DRY ACCELERATOR DIAPHRAGM ASSEMBLY

6.1 Close the isolation ball valve of the Dry Accelerator.

6.2 Open the ¼-turn vent ball valve of the Dry Accelerator. Confirm that the gauge on the accelerator reads 0 psi/ 0 Bar.

6.3 Remove the Dry Accelerator from the nipple above the isolation ball valve.

6.4 Using a marker, place a mark on the upper (opening/air chamber) and lower (closing chamber) housings. This mark will aid in aligning the upper and lower housings during re-assembly.

6.5 Remove the screws from cover.

6.6 Separate the lower housing from the upper housing.

6.7 Remove the screw from the seal assembly, and discard it.

6.8 Remove the diaphragm assembly and discard it.

6.9 Replace a new diaphragm assembly (provided with the kit).

6.10 Press down on the diaphragm assembly, install a new seal assembly (provided with the kit).

6.11 Appropriate thread locking agent can be applied to the screw.
Note: Use caution to prevent the diaphragm assembly from rotating during tightening of the seal assembly.

6.12 Align the bolt holes of the upper and lower housings. Insert a cap screw into each of the four holes. Fully tighten the four cap screws. Reference torque 5N.m

6.13 Install the Dry Accelerator back into the system trim.