

Reliable®

Model EX Low Pressure Dry Pipe Valve

Features

- Low air or nitrogen pressure, 8 to 28 psi (0.6 to 1.9 bar)
- Lightweight ductile iron body with compact trim
- External reset reduces setup and commissioning time
- Does not require priming water
- Available fully assembled, with or without control valve

Product Description

The Reliable Model EX Low Pressure Dry Pipe Valve is a hydraulically operated, mechanical latching clapper-type valve designed for use as a primary control valve in a dry pipe system. The pneumatic system pressure when using the Model EX valve can be set substantially less than conventional differential style dry valves. The following benefits are a direct result of lower pneumatic pressure:

- Smaller, less expensive pneumatic sources
- Improved water transit times following operation of valve, and in some cases, elimination of quick opening devices
- Low pressure makes the use of nitrogen more practical

In addition to these benefits, mechanical type dry pipe valves are less susceptible to accidental tripping than conventional differential dry pipe valves.

All sizes of the Model EX valve may be equipped with the Reliable Model B-1 Accelerator (P/N 6516000003; ordered separately). The accelerator operates as an exhaustor to hasten the operation of the dry pipe valve. Please refer to Reliable Technical Bulletin 323 for further information.



Model EX Dry Pipe Valve Listings and Approvals

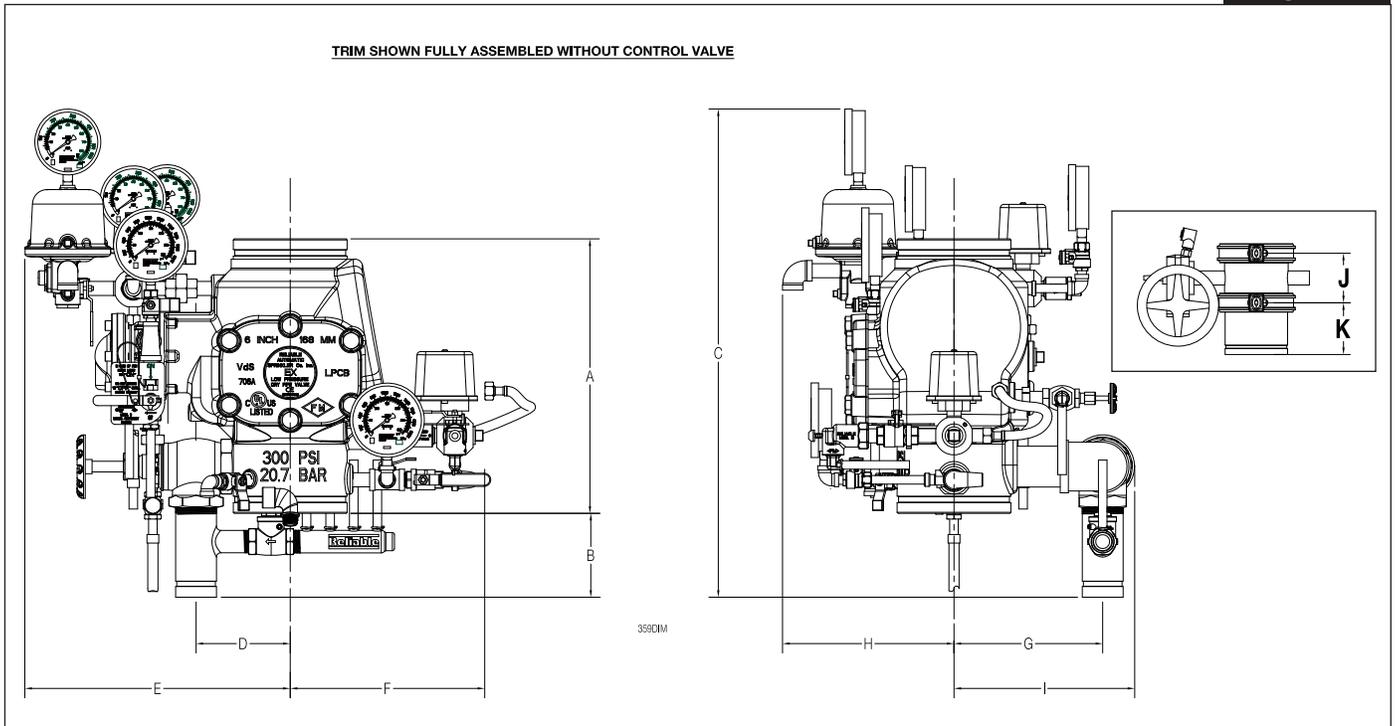
Table A

Valve Size	End Connection*	Pressure Rating	Listings & Approvals
2" (50mm), 2-1/2" (65mm), & 3" (80mm)	Groove/Groove	250 psi (17,2 bar)	cULus, FM, CE, VdS, LPCB, UKCA
76mm	Groove/Groove	250 psi (17,2 bar)	cULus, FM, LPCB, UKCA
4" (100mm)	Groove/Groove	300 psi (20,7 bar)	cULus, FM, CE, VdS, LPCB, UKCA
	Flange/Groove		
	Flange/Flange		
6" (150mm)	Groove/Groove	300 psi (20,7 bar)	cULus, FM, LPCB, UKCA
	Flange/Groove		
	Flange/Flange		
165mm	Groove/Groove	300 psi (20,7 bar)	cULus, FM, LPCB, UKCA
8" (200mm)	Groove/Groove	250 psi (17,2 bar)	cULus, FM, CE, VdS, LPCB, UKCA
	Flange/Flange		

*Note: Grooved ends per ANSI/AWWA C606; flanged ends per ASME B16.5 Class 150 or ISO 7005-2 PN16 (specify).

EX Valve Dimensions

Figure 1



Installation Dimensions in Inches (mm) (Refer to Figure 1)

Table B

Size	A	AF ⁽¹⁾	B	C	D	E	F	G	H	I	J ⁽²⁾	K ⁽²⁾
2" (50mm)	12-1/2 (318)	N/A	5-1/2 (140)	25-1/4 (641)	4-1/4 (108)	13 (330)	10-1/2 (267)	7 (178)	10 (254)	8-3/8 (213)	3-1/4 (83)	5-1/2 (140)
2-1/2" (65mm), 76mm, 3" (80mm)	12-1/2 (318)	N/A										
4" (100mm)	14 (356)	16 (406)	5-1/8 (130)	27 (686)	14-7/8 (378)	11-5/8 (295)	8 (203)	10 (254)		10 (254)	4-1/2 (114)	
6" (150mm), 165mm	16 (406)	19 (483)	4-7/8 (124)	28-1/2 (724)	5-1/2 (140)	15-1/2 (394)	12-1/4 (311)	8-5/8 (219)		10-1/2 (267)	5-1/4 (133)	
8" (200mm)	19-3/8 (492)	21-1/4 (540)	4-5/8 (117)			16-1/4 (413)	14-1/4 (362)	9-1/8 (232)		11-3/4 (298)	5-3/4 (146)	

Notes:

1. AF dimension is for Flange x Groove valves (4" & 6") or Flange x Flange valves (4", 6", and 8").
2. Not applicable to 76mm or 165mm systems, or systems using a flanged inlet Model DDX valve.

Valve Shipping Weight

Table C

Valve Size	End Connection	Weight
2" (50mm), 2 1/2" (65mm), 76mm & 3" (80mm)	Groove/ Groove	34 lbs (15 kg)
4" (100mm)	Groove/ Groove	64 lbs (29 kg)
	Flange/ Groove	79 lbs (36 kg)
	Flange/ Flange	92 lbs (42 kg)
6" (150mm) & 165mm	Groove/ Groove	95 lbs (43 kg)
	Flange/ Groove	122 lbs (56 kg)
	Flange/ Flange	138 lbs (69 kg)
8" (200mm)	Groove/ Groove	148 lbs (67 kg)
	Flange/ Flange	197 lbs (90 kg)

Trim Shipping Weight

Table D

Valve Size	Weight
2" (50mm), 2 1/2" (65mm), 76mm & 3" (80mm)	30 lbs (13.6 kg)
4" (100mm), 6" (150mm), 165mm & 8" (200mm)	34 lbs (15.5 kg)

Friction Loss

Table E

Valve Size	Equivalent Length		Cv
	C = 120	C = 100	
2" (50mm)	4.4 ft (1,3 m)	3.1 ft (1,0 m)	101
2 1/2" (65mm)	6.0 ft (1,8 m)	4.3 ft (1,3 m)	236
76mm	7.7 ft (2,3 m)	5.5 ft (1,7 m)	241
3" (80mm)	12.6 ft (3,8 m)	9.0 ft (2,7 m)	254
4" (100mm)	14 ft (4,3 m)	10 ft (3,0 m)	469
165mm	29.4 ft (9,0 m)	20.9 ft (6,4 m)	886
6" (150mm)	29.4 ft (9,0 m)	20.9 ft (6,4 m)	886
8" (200mm)	53.5 ft (16,3 m)	38.1 ft (11,6 m)	1516

Operation

The Reliable Model EX Low Pressure Dry Pipe Valve is shown in both the closed and open position in Figure 2. In the closed position, pneumatic pressure acts on the actuator preventing release of hydraulic pressure from the pushrod chamber. The supply water pressure acts simultaneously on the underside of the clapper and on the pushrod through the pushrod chamber restricted inlet. The resultant force on the pushrod is multiplied by the mechanical advantage of the lever and acts to hold the clapper closed against normal pressure surges in the water supply. When a sprinkler operates, the loss of pneumatic pressure in the sprinkler system causes the diaphragm and seal in the actuator to move away from the water seat allowing the release of water from the pushrod chamber. Since water cannot be replenished through the inlet restriction as rapidly as it is vented, the pushrod chamber pressure falls instantaneously. When the pushrod chamber pressure approaches approximately one-third of the supply pressure, the upward force of the water pressure acting beneath the clapper overcomes the force applied to the lever, opening the clapper. Water then flows through the Model EX Low Pressure Dry Pipe Valve into the system piping and into the alarm outlet activating the alarm device(s). Once the clapper has opened, the lever acts as a latch preventing the clapper from returning to the closed position.

Installation

The Model EX Low Pressure Dry Pipe Valve shall be installed in accordance with NFPA 13, "Standard for the Installation of Sprinkler Systems," as well as the requirements of any authorities having jurisdiction. The direction of flow shall be up through the assembly. Failure to follow installation instructions may void the warranty and/or listing of the valve. Verify compatibility of the Model EX Dry Pipe Valve materials with the water supply and the environment where the valve will be installed prior to installation.

The Model EX Dry Pipe Valve must be installed in a readily visible and accessible location where a minimum temperature of 40°F (4°C) or above must be maintained. Heat tracing of the Model EX Dry Pipe Valve and trim is not permitted. Heat tracing can result in the formation of hardened mineral deposits that can prevent proper operation of the dry pipe valve.

Whenever ambient temperature conditions are high, the water temperature in the Model EX Dry Pipe Valve pushrod chamber may rise, thereby increasing the pressure in the chamber to values exceeding the rated pressure of the system. Where normal temperature and pressure is exceeded, a pressure relief kit (P/N 6503050003; ordered separately) can be installed into the pushrod chamber release line to limit the pressure to 250 psi (17.2 bar).

The valve and trim kit has been tested, approved and listed in accordance with UL and FM standards. Hydrostatically testing the valve and trim to pressures higher than their rating is limited to the hydrostatic test as referenced by NFPA 13. The clapper can remain in the closed position and the trim kit need not be isolated.

Normal operation and hydrostatic testing does not address the occurrence of a water hammer which may damage the valve. A water hammer can create pressure more than the rated pressure of the equipment and should be avoided by all necessary means. Water hammer may occur from (but is not limited to) improper fire pump settings, underground construction work, or improper venting of trapped air in piping.

DO NOT use bleeder valves for testing of the low-pressure switch on the trim. Release of pneumatic pressure from the actuator trim will result in operation of the system.

Valve Trip Time Information

The actuator that operates the Model EX Low-Pressure Dry System has a variable differential trip ratio that limits the supervisory air/nitrogen pressure needed as the water supply pressure increases. The differential trip ratio is the ratio of the water supply pressure to the supervisory air/nitrogen pressure when the actuator fully opens. (Note: The actuator may partially open prior to reaching the differential trip ratio which could trip the valve; therefore, always provide the minimum supervisory pressure indicated in Table A of this bulletin, which includes an appropriate safety factor.)

For a valve without an accelerator, use the following differential trip ratio in valve trip time calculations:

Static Water Supply Pressure in psi (bar)	Differential Trip Ratio for Trip Time Calculations
100 (6.9)	10
175 (12.1)	14
250 (17.2)	18
300 (20.7)	21

For other static water pressures, the differential trip ratio may be calculated using the following equations:

- [psi] Differential Trip Ratio = 0.056 x Static Water Supply Pressure in PSI + 4
- [bar] Differential Trip Ratio = 0.811 x Static Water Supply Pressure in BAR + 4

For a valve with a Model B-1 mechanical accelerator, use a differential trip ratio of 0 and a time delay of 10 seconds for the valve to trip.

For a valve with an electronic accelerator, use a differential trip ratio of 0 and a time delay of 5 seconds for the valve to trip when the supervisory pressure is more than 15 psi, and 15 seconds when the supervisory pressure is 15 psi and less.

Section View of Model EX Dry Valve with Clapper in Open, Closed, and Latched Positions

Figure 2

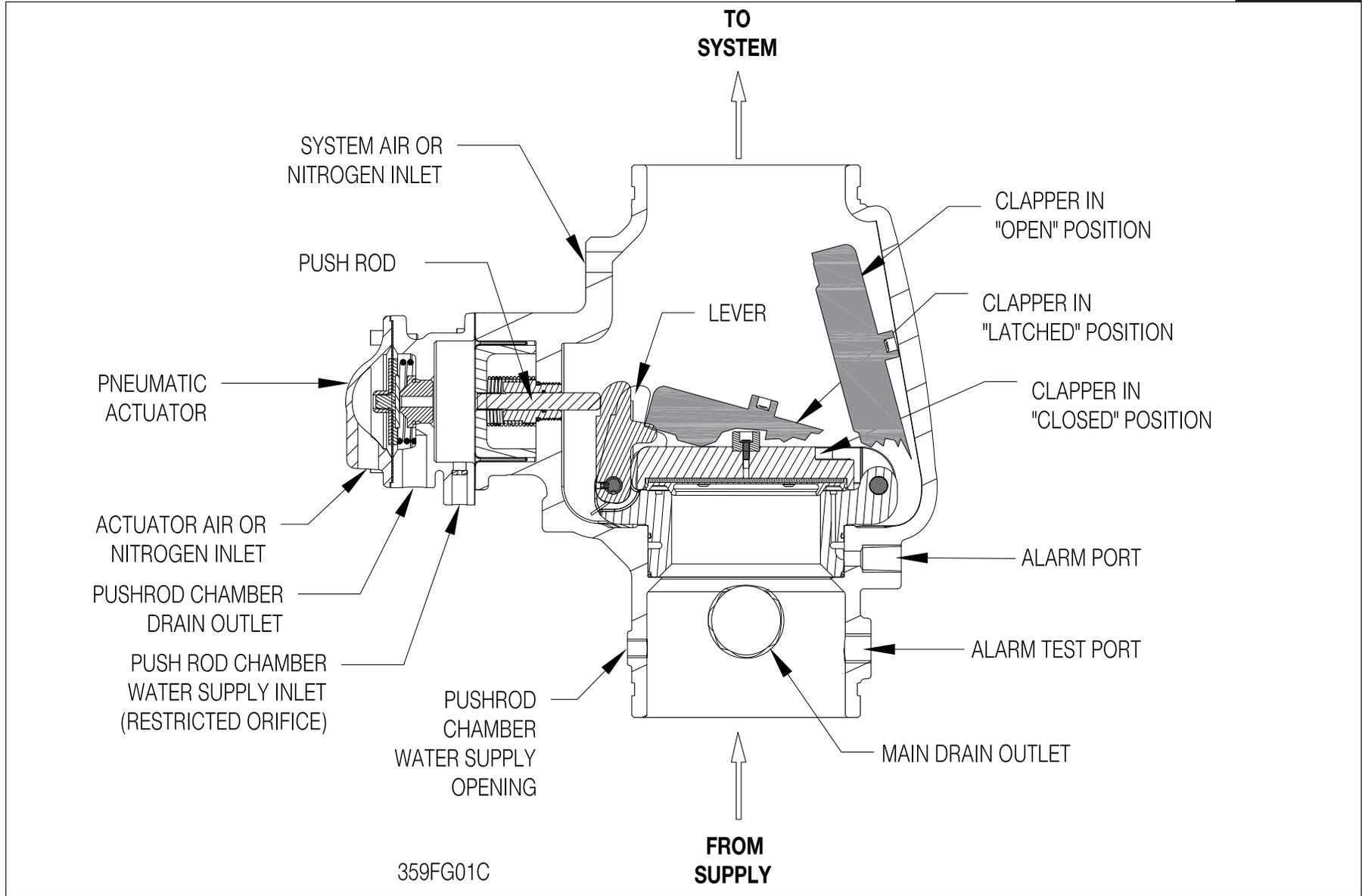
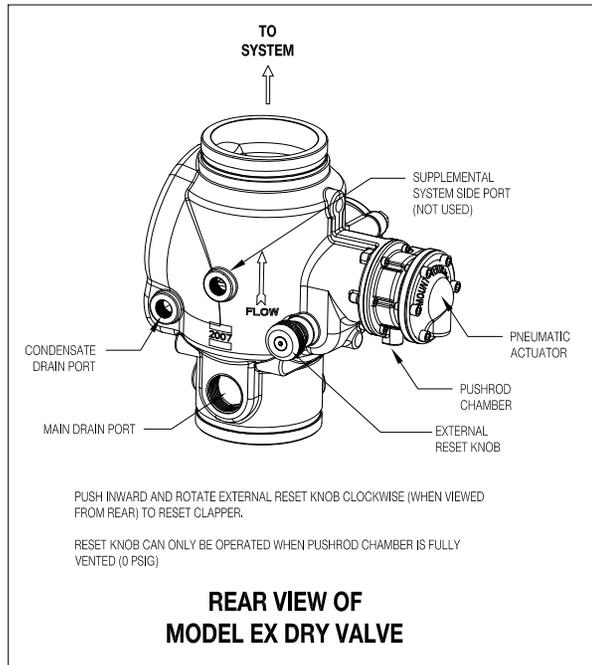
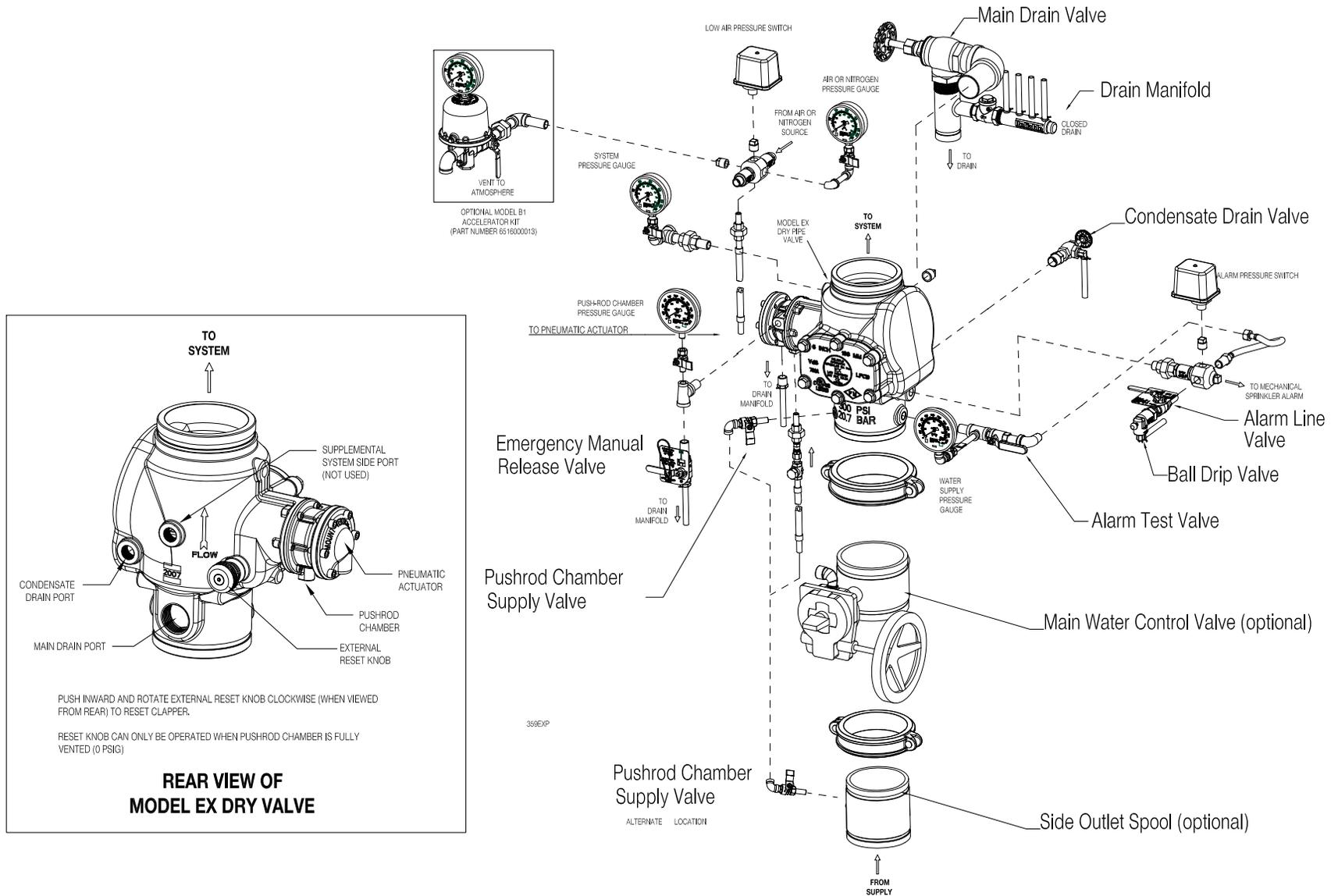


Figure 3

Model EX Valve Components



Model EX Dry Pipe Valve Setup Procedure

- This procedure should only be performed by persons who are experienced and trained in the installation and operation of water-based fire protection systems.
- The fire protection system served by the dry pipe valve will be out of service until the reset procedure is completed.
- Notify any necessary authorities having jurisdiction and other affected personnel prior to placing the fire protection system out of service.
- Failure to follow this reset procedure can cause failure of the dry pipe valve, resulting in serious personal injury and property damage.

Please contact Reliable Technical Services at 1-800-557-2726 with any questions regarding this reset procedure.

STEP 1



Close the Main Water Control Valve and close the Push Rod Chamber Supply Valve.

STEP 2



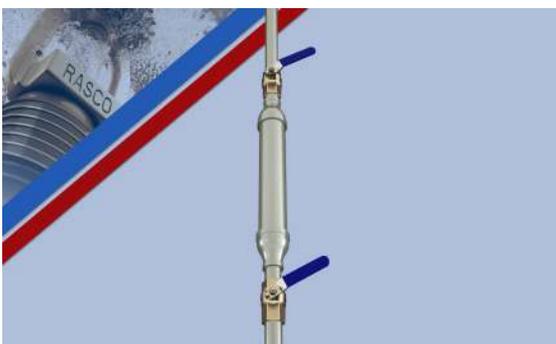
Close the valves supplying air or nitrogen to the system.

STEP 3



Open the Main Drain Valve and fully drain the system.

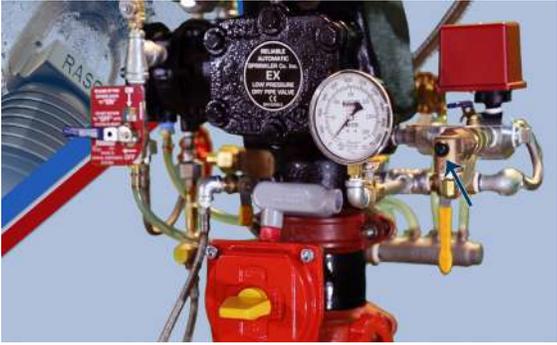
STEP 4



Open all drain valves and vents at low points throughout the system, closing them when the system is fully drained.

Note: If resetting the system as a result of fire, now is the time to inspect and replace any portion of the system subject to fire conditions.

STEP 5



Model EX Dry Pipe Valve Setup Procedure (cont.)

With Alarm Line Valve open, push in the plunger of the Ball Drip Valve until air and water release from the alarm line, then close the Alarm Line Valve.

STEP 6



Open the Emergency Manual Release Valve.

STEP 7



Push in and rotate the reset knob counterclockwise as viewed from the front of the EX valve until the clapper releases and has lowered into position.



STEP 8



Close the Main Drain Valve.

STEP 9



Open Air or Nitrogen Supply Valve and pressurize the system until the system air pressure gauge reaches the minimum pressure specified for your system. To find the minimum pressure for your system, refer to Table F. Then place the air or nitrogen source into automatic operation.

STEP 10



Model EX Dry Pipe Valve Setup Procedure (cont.)

Open the Push Rod Chamber Supply Valve. Keep in mind that a small amount of trapped air/water may discharge from the Emergency Manual Release line into the drain.

Note: If Push Rod Chamber Supply Valve is on the supply side of the Main Water Control Valve, skip ahead to the Alternate Set-up Instructions on the last page.

STEP 11



Open the Main Drain Valve approximately 2 turns.

STEP 12



With Emergency Manual Release Valve fully open and Main Drain Valve partially open, slowly open the Main Water Control Valve until water can just be heard running out of the main drain.

STEP 13



Slowly close the main drain, stopping when water begins to flow through the Emergency Manual Release drain line.

STEP 14



Once a steady stream of water is flowing through the Emergency Manual Release, close the Emergency Manual Release Valve.

STEP 15



Model EX Dry Pipe Valve Setup Procedure (cont.)

Slowly close the Main Drain Valve until it is fully closed.

STEP 16



If there is an accelerator on the system, reset it now per the manufacturer's instructions.

Note: The air or nitrogen supply system must be set to automatic operation in order for the accelerator to set up properly.

STEP 17



Open the Alarm Line Valve. Note that water may initially drain from the ball drip, but this will cease if the clapper is properly sealed.

STEP 18



Fully open the Main Water Control Valve. Verify that the main valve is fully open and properly monitored.

STEP 19



Secure the handle of the Emergency Manual Release Valve in the closed position with cable ties provided with trim. Verify that all valves are in the correct positions per page 10.

Model EX Dry Pipe Valve Setup Procedure (cont.)

Once a steady stream of water is flowing through the Emergency Manual Release Valve, close the Emergency Manual Release Valve.

Open the Main Drain Valve two turns. Then partially open Main Water Control Valve until water flows through the Main Drain.

Slowly open the Main Water Control Valve. Verify that the main valve is fully open and properly monitored.

Slowly close the Main Drain Valve until fully closed.

Secure the handle of the Emergency Manual Release Valve in the closed position with cable ties provided with trim. Verify that all of the valves are in the correct position per page 10.

STEP 11



STEP 12



STEP 13



STEP 14



STEP 15



Alternate Set-up Instructions: Push Rod Chamber Supply Valve below Main Water Control Valve

Alternate Set-up Instructions: Push Rod Chamber Supply Valve below Main Water Control Valve

After fully resetting the Reliable Model EX Dry Pipe Valve, confirm that all valves are in the correct position and properly monitored as required by NFPA 13:

- Main Water Control Valve: Open
- Push Rod Chamber Supply Valve: Open
- Accelerator Inlet Valve (if present): Open
- Air or Nitrogen Supply Valve: Open
- Alarm Line Valve: Open
- Alarm Test Valve: Closed
- Main Drain Valve: Closed
- Emergency Manual Release Valve: Closed (Secured)

Maintenance

The owner is responsible for maintaining the fire protection system in proper operating condition. Any system maintenance or testing that involves placing a system out of service may eliminate the fire protection that is provided by the fire protection system. Notify any required authorities having jurisdiction and implement appropriate precautions prior to proceeding.

The Reliable Model EX Low Pressure Dry Pipe Valve shall periodically be given a thorough inspection and test. NFPA 25, "Inspection, Testing and Maintenance of Water Based Fire Protection Systems," provides minimum maintenance requirements. Replace any components found to be corroded, damaged, worn or non-operable. Increase the frequency of inspections when the valve is exposed to corrosive conditions or chemicals that could impact materials and/or operation of the assembly.

Excess water may settle above the valve clapper following hydrostatic testing or system activation, or over time due to condensation. To remove excess water from the system:

1. Notify the owner and monitoring company that maintenance is being performed on the system.
2. Close the main water control valve.
3. Open the Main Drain Valve.
4. Open the Condensate Drain Valve until all water has drained. Close Condensate Drain Valve immediately when the flow of water has stopped. **Note:** DO NOT keep the Condensate Drain Valve open for an extended period as this may result in operation of the dry pipe valve.
5. Allow pneumatic pressure to return to normal pressure (refer to Table F).
6. Partially open the Main Water Control Valve.
7. Slowly close the Main Drain Valve.
8. Fully open the Main Water Control Valve.
9. Notify the owner and monitoring company that the system has been returned to service.

Supervisory Air or Nitrogen Pressure Requirements

Table F

Water Pressure psi (bar)	Supervisory Air or Nitrogen Pressure psi (bar)
Maximum	Minimum
20 (1.4)	8 (0.6)
30 (2.1)	10 (0.7)
50 (3.4)	12 (0.8)
75 (5.2)	13 (0.9)
100 (6.9)	15 (1.0)
125 (8.6)	16 (1.1)
150 (10.3)	17 (1.2)
175 (12.1)	18 (1.2)
200 (13.8)	19 (1.3)
225 (15.5)	21 (1.4)
250 (17.2)	22 (1.5)
275 (19.0)	23 (1.6)
300 (20.7)	24 (1.7)

Notes:

1. Supervisory air or nitrogen pressure should not exceed 30 psi (2.1 bar). Excess pressure may result in damage to the actuator.
2. Fastest valve operation is achieved with lower supervisory air or nitrogen pressure; however, the supervisory air or nitrogen pressure must be at least the minimum specified in Table F.
3. Air maintenance devices that maintain a constant pressure are recommended; however, if a tankless compressor is used, the "compressor on" setting of the pressure switch must comply with the minimum pressure in the table above.

Guarantee

For Reliable Automatic Sprinkler, Co., Inc. guarantee, terms, and conditions, visit www.reliablesprinkler.com.

Listings & Approvals

(Only when used with Reliable's Trim Sets.)

1. Listed by Underwriters Laboratories, Inc. and UL certified for Canada (cULus).
2. Certified by Factory Mutual Approvals (FM).
3. Loss Prevention Certification Board (LPCB)
4. VdS Schadenverhütung GmbH (VdS) (DN50, DN65, DN80, DN100, DN150, and DN200 sizes only).
5. EN Certificates (CE) per EN 12259-3:2000 + A1:2001 + A2:2005:
0786-CPR-40300 through 0786-CPR-40305
6. UKCA: 0832-UKCA-CPR-S5081 through 0832-UKCA-CPR-S5086

Ordering Information

Specify:

Valve Model EX Low Pressure Dry Pipe Valve

Size (See Table A)

End Connections (See Table A)

Standard Trim*

- Fully assembled with control valve⁽¹⁾
- Fully assembled with control valve and outlet spool piece⁽¹⁾⁽²⁾
- Fully assembled without control valve
- Segmentally assembled trim
- Loose trim (**Note:** Loose trim does not include low pressure switch [P/N 6990019313] and alarm switch [P/N 6990006382]; order separately)

Notes:

1. Not available for 76mm or 165mm systems, or systems using a flanged inlet Model DDX valve.
2. This trim assembly will include a spool piece with 1/4" outlet to accommodate push rod chamber supply piping.

Options

- Model B-1 Accelerator (P/N 6516000013)
- Pushrod Chamber Pressure Relief Kit (P/N 6503050001)

Service Kits

Service kits are available for routine servicing of the valve (reference assembly drawings on website). Service kits for the Model EX Dry Pipe Valve include the following components:

- Clapper Seal Assembly (item 8)
- Cover Gasket (item 9)
- Bumpstop(s) (item 10)
- Push rod chamber diaphragm (item 18)
- Pneumatic Actuator Diaphragm Assembly (items 41, 42, 43, and 44)
- Grease (item 50)

2", 2-1/2", & 3" Model EX Service Kit: PN 6501200R09

4" Model EX Service Kit: PN 6501200R10

6" Model EX Service Kit: PN 6501200R11

8" Model EX Service Kit: PN 6501200R12