Reliable®

Model DDX Deluge System

Wet Pilot Line, Dry Pilot Line, and Electric Release Trims

Features

- Straight through design, low friction loss
- Mechanical valve with latching clapper
- Intermediate chamber built into seat
- Three releasing trim options

Product Description

The Reliable Model DDX is a hydraulic piston (pushrod) operated mechanical type deluge valve. The valve will operate upon activation of detection devices on a wet-pilot line, dry-pilot line, or electrical detection system.

When the side chamber of the Reliable Model DDX Deluge Valve is pressurized, hydraulic supply pressure acts on the pushrod assembly and simultaneously on the underside of the clapper. The resultant force of the supply pressure acting on the pushrod is multiplied by the mechanical advantage of the lever and holds clapper closed against normal supply pressure surges.

When a releasing device is opened, the pushrod chamber pressure falls instantaneously. When the hydraulic pressure in the pushrod chamber approaches approximately one-third of the supply pressure, the upward force of the supply pressure acting beneath the clapper overcomes the lever-applied force thereby opening the clapper. Once the clapper has opened, the lever acts as a latch, preventing the clapper from returning to the closed position. Water from the supply flows through the Model DDX Deluge Valve into the system piping. Water also flows through the alarm outlet to any attached alarm devices. After system shutdown, the Model DDX Deluge Valve may be reset externally using the reset knob at the rear of the valve. The external reset feature of the Model DDX Deluge Valve provides a means for placing the fire protection system into service without having to remove the face plate of the valve.

Important! Reliable valves must be handled, stored, and installed in accordance with the guidelines in Caution Sheet 336 and this bulletin. Failure to follow these instructions may result in unintended operation or nonoperation of the fire protection system.

Model DDX Deluge System
(Image is subject to change)

Additional information regarding the setup, inspection, testing, and maintenance of Model DDX valves and systems can be found in Technical Bulletin 520.

Model DDX Valve Listings and Approvals — **Table A**

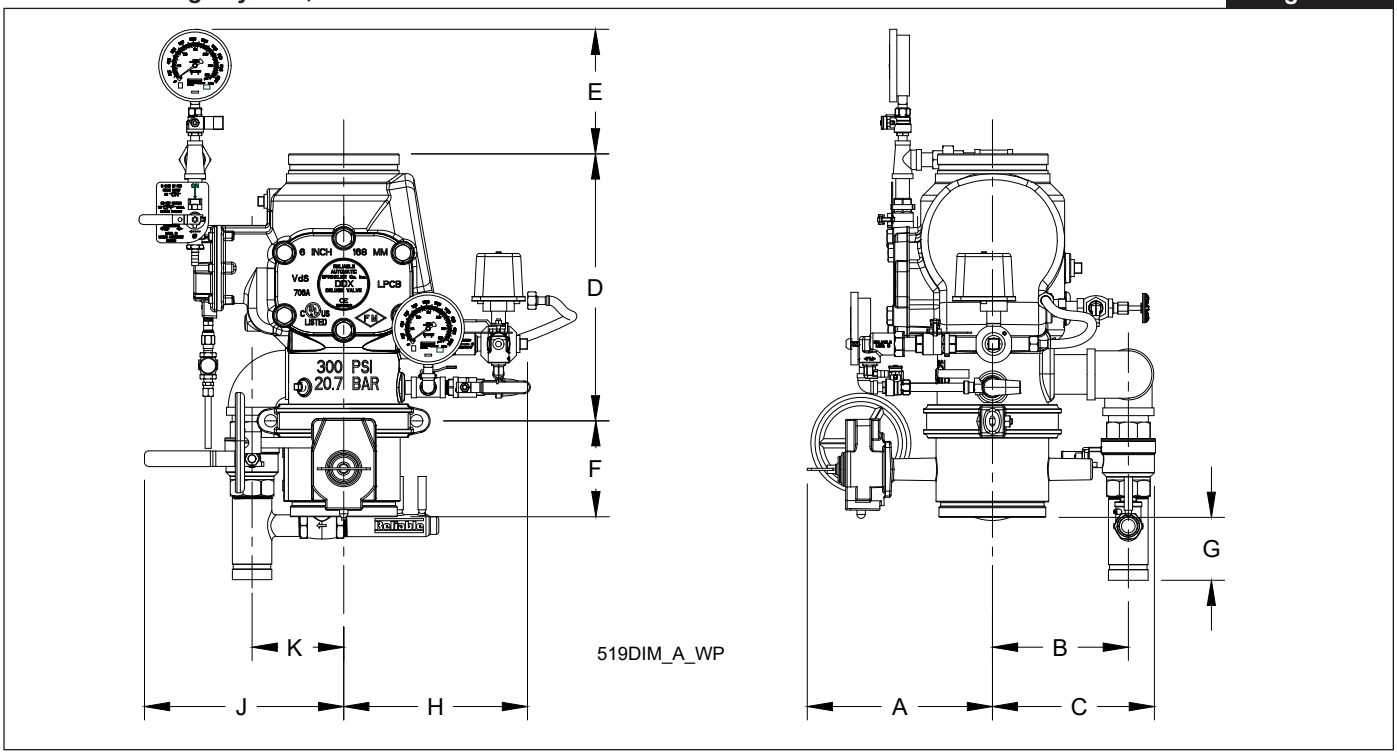
Valve Size	End Connection[1]	Pressure Rating [2][3]	Listings & Approvals
2” (50mm), 2-1/2” (65mm), 76mm, & 3” (80mm)	Groove/Groove	250 psi (17,2 bar)	cULus, FM, VdS
4” (100mm)	Groove/Groove	300 psi (20,7 bar)	cULus, FM, VdS, LPCB
	Flange/Groove		
	Flange/Flange		
6” (150mm)	Groove/Groove		
	Flange/Groove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

Notes:
1. Grooved ends per ANSI/AWWA C606; flanged ends per ASME B16.5 Class 150 or ISO 7005-2 PN16 (specify).
2. For electric release, when fitted with 300 psi (20.7 bar) solenoid valve.
3. Valves are intended to be installed on systems where the pressure does not exceed the working capabilities of the end configurations.

Model DDX Deluge System, Wet Pilot Line Release Trim

Wet-pilot lines are a hydraulic detection/release system that can be used in conditioned (i.e. freeze protected) areas. The wet-pilot line is an extension of the hydraulically pressurized pushrod chamber on the Model DDX Deluge Valve. Closed sprinklers or fixed-temperature-release pilot line detectors (PLD) are installed throughout the protected area on small diameter piping that contains water under pressure. Upon activation of a pilot line sprinkler or pilot line detector, hydraulic pressure is released from the pilot line and the pushrod chamber. The release of hydraulic pressure from the pushrod chamber causes the Model DDX Deluge Valve to open and flow water from open discharge devices attached to the system. Alarm devices are activated upon the flow of water into the sprinkler system piping. It is important to note that the length and height of wet-pilot lines is limited by the available system water pressure (refer to Figure 4 on page 6).

Model DDX Deluge System, Wet Pilot Line Release Trim **Figure 1**



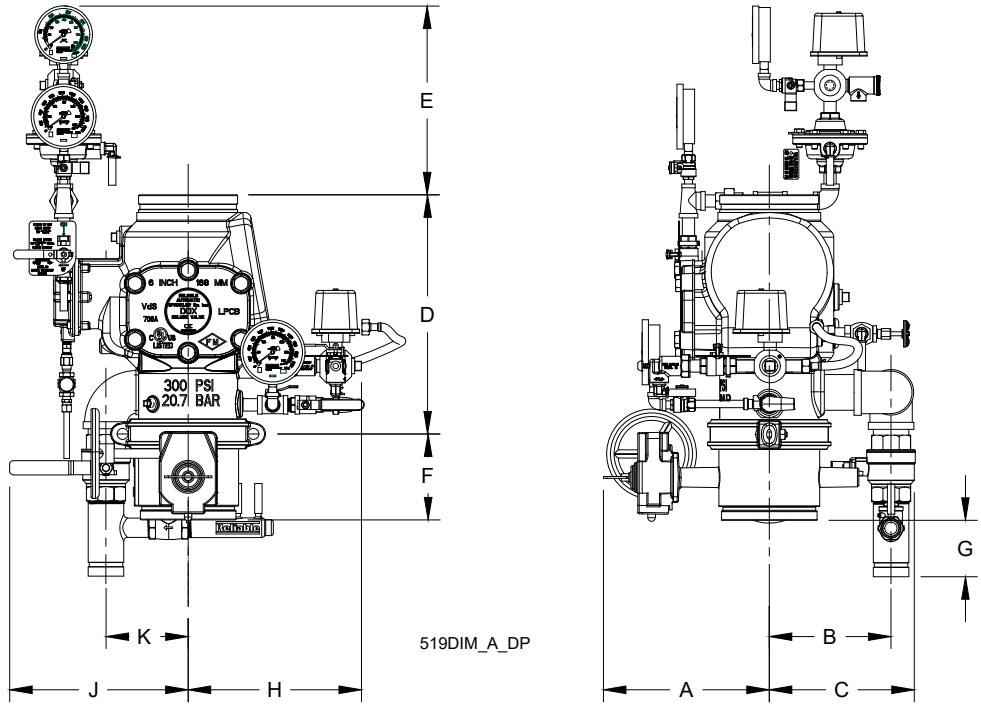
Model DDX Deluge System, Wet Pilot Line Release Trim **Table B**

Nominal Pipe Size	Installation Dimensions in Inches (mm)										
	A	B	C	D(1)	D(2)	E	F(3)	G	H	J	K
2" (50mm)	8-1/2 (216)	7-3/4 (197)	9-1/8 (232)	12-1/2 (318)	NA	8-3/8 (213)	3-7/8 (98)	1-1/2 (38)	10 (254)	9-1/2 (241)	4 (102)
2-1/2" (65 mm), 3" (80 mm) & 76 mm	8-1/2 (216)	7-3/4 (197)	9-1/8 (232)	12-1/2 (318)	NA	8-3/8 (213)	3-7/8 (98)	1-3/8 (35)	9-7/8 (251)	9-1/2 (241)	3-7/8 (99)
4" (100 mm)	9-3/4 (248)	7-5/8 (194)	9-1/4 (235)	14 (356)	16 (406)	7-1/4 (184)	4-9/16 (116)	5-1/4 (133)	11 (279)	11-7/8 (301)	5-1/2 (140)
6" (150 mm) & 165 mm	11-1/8 (283)	8-1/8 (206)	9-3/4 (248)	16 (406)	19 (483)	6-7/8 (175)	5-7/8 (149)	3-3/4 (95)	11 (279)	12 (305)	5-1/2 (140)
8" (200 mm)	12-5/8 (321)	9 (229)	10-5/8 (270)	19-3/8 (492)	21-1/4 (540)	3-3/4 (95)	5-1/4 (134)	4-1/8 (105)	12-5/8 (306)	12 (305)	5-1/2 (140)

Notes:
1. End to end take out of Model DDX valve with grooved inlet.
2. End to end take out of Model DDX valve with flanged inlet where available (see page 1).
3. Not applicable to 76mm or 165mm systems, or systems using a flanged inlet Model DDX valve.

Dry pilot lines are a pneumatic detection/release system that can be used in unconditioned areas or areas where the height/distance limits of a wet pilot line are exceeded. The dry pilot line is connected to the Model A Dry Pilot actuator which isolates pneumatic pressure from the water pressure in the hydraulically pressurized pushrod chamber on the Model DDX Deluge Valve. Closed sprinklers or fixed-temperature-release pilot line detectors (PLD) are installed throughout the protected area on small diameter piping that contains pressurized air or nitrogen. The pneumatic pressure required to maintain the Model LP Dry-Pilot Actuator in the closed position is specified in Table H on page 6. Upon activation of a pilot line sprinkler or pilot line detector, pneumatic pressure is released from the pilot line causing the Model LP Pneumatic Actuator to open and release hydraulic pressure from the pushrod chamber. The release of hydraulic pressure from the pushrod chamber causes the Model DDX Deluge Valve to open and flow water from open discharge devices attached to the system. Alarm devices are activated upon the flow of water into the sprinkler system piping.

Model DDX Deluge System, Dry Pilot Line Release Trim **Figure 2**



Model DDX Deluge System, Dry Pilot Line Release Trim **Table C**

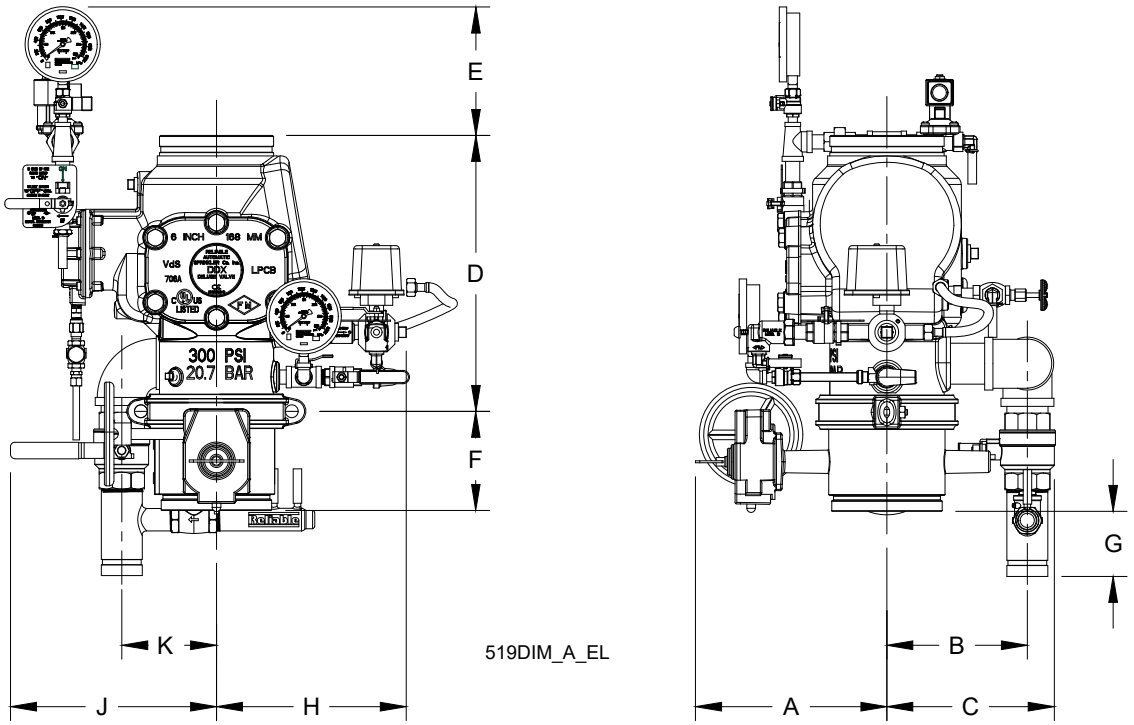
Nominal Pipe Size Inches (mm)	Installation Dimensions in Inches (mm)										
	A	B	C	D(1)	D(2)	E	F(3)	G	H	J	K
2” (50)	8-1/2 (216)	7-3/4 (197)	9-1/8 (232)	12-1/2 (318)	NA	13-3/4 (349)	3-7/8 (98)	1-1/2 (38)	10 (254)	9-1/2 (241)	4 (102)
2-1/2” (65), 3” (80), & 76mm	8-1/2 (216)	7-3/4 (197)	9-1/8 (232)	12-1/2 (318)	NA	13-3/4 (349)	3-7/8 (98)	1-3/8 (35)	9-7/8 (251)	9-1/2 (241)	3-7/8 (98)
4” (100)	9-3/4 (248)	7-5/8 (194)	9-1/4 (235)	14 (356)	16 (406)	12-1/2 (318)	4-9/16 (116)	5-1/4 (133)	11 (279)	11-7/8 (301)	5-1/2 (140)
6” (150) & 165mm	11-1/8 (283)	8-1/8 (206)	9-3/4 (248)	16 (406)	19 (483)	12-1/8 (308)	5-7/8 (149)	3-3/4 (95)	11 (279)	12 (305)	5-1/2 (140)
8” (200)	12-5/8 (321)	9 (229)	10-5/8 (270)	19-3/8 (492)	21-1/4 (540)	9 (229)	5-1/4 (134)	4-1/8 (105)	12-5/8 (321)	12 (305)	5-1/2 (140)

Notes:
1. End to end take out of Model DDX valve with grooved inlet.
2. End to end take out of Model DDX valve with flanged inlet where available (see page 1).
3. Not applicable to 76mm or 165mm systems, or systems using a flanged inlet Model DDX valve.

Model DDX Deluge System, Electric Release Trim

Where system actuation by means of an approved electrical detection and release system is desired, the electric release trim is used. The normally closed solenoid valve in the release trim maintains hydraulic pressure in the pushrod chamber. Upon receipt of a signal from the electric detection system, the release control panel energizes the solenoid valve causing it to open. The release of hydraulic pressure from the pushrod chamber causes the Model DDX Deluge Valve to open and flow water from open discharge devices attached to the system. Alarm devices are activated upon the flow of water into the sprinkler system piping.

Model DDX Deluge System, Electric Release Trim **Figure 3**



Model DDX Deluge System, Electric Release Trim **Table D**

Nominal Pipe Size Inches (mm)	Installation Dimensions in Inches (mm)										
	A	B	C	D[1]	D[2]	E	F[3]	G	H	J	K
2" (50)	8-1/2 (216)	7-3/4 (197)	9-1/8 (232)	12-1/2 (318)	NA	8-3/8 (213)	3-7/8 (98)	1-1/2 (38)	10 (254)	9-1/2 (241)	4 (102)
2-1/2" (65), 3" (80), & 76mm	8-1/2 (216)	7-3/4 (197)	9-1/8 (232)	12-1/2 (318)	NA	8-3/8 (213)	3-7/8 (98)	1-3/8 (35)	9-7/8 (251)	9-1/2 (241)	3-7/8 (99)
4" (100)	9-3/4 (248)	7-5/8 (194)	9-1/4 (235)	14 (356)	16 (406)	7-1/4 (184)	4-9/16 (116)	5-1/4 (133)	11 (279)	11-7/8 (301)	5-1/2 (140)
6" (150) & 165mm	11-1/8 (283)	8-1/8 (206)	9-3/4 (248)	16 (406)	19 (483)	6-7/8 (175)	5-7/8 (149)	3-3/4 (95)	11 (279)	12 (305)	5-1/2 (140)
8" (200)	12-5/8 (321)	9 (229)	10-5/8 (270)	19-3/8 (492)	21-1/4 (540)	3-3/4 (95)	5-1/4 (134)	4-1/8 (105)	12-5/8 (306)	12 (305)	5-1/2 (140)

Notes:
1. End to end take out of Model DDX valve with grooved inlet.
2. End to end take out of Model DDX valve with flanged inlet where available (see page 1).
3. Not applicable to 76mm or 165mm systems, or systems using a flanged inlet Model DDX valve.

Technical Data

Materials

Please refer to Assembly Drawings.

Valve Details — **Table E**

Valve Size	End Connection	End to End	Weight (Approx.)	Color
2" (50mm), 2½" (65mm), 76mm & 3" (80mm)	Groove/ Groove	12½" (318mm)	34 lbs (15 kg)	Red
4" (100mm)	Groove/ Groove	14" (356mm)	64 lbs (29 kg	
	Flange/ Groove	16" (406mm)	79 lbs (36 kg)	
	Flange/ Flange	16" (406mm)	92 lbs (42 kg)	
6" (150mm)	Groove/ Groove	16" (406mm)	95 lbs (43 kg)	
	Flange/ Groove	19" (483mm)	122 lbs (56 kg)	
	Flange/ Flange	19" (483mm)	138 lbs (69 kg)	
165mm	Groove/Groove	16" (406mm)	95lbs (43kg)	
8" (200mm)	Groove/ Groove	$19^{3}/_{8}$" (492mm)	148 lbs (67 kg)	
	Flange/ Flange	21¼" (540mm)	197 lbs (90 kg)	

Trim Shipping Weight (Approx.) — **Table F**

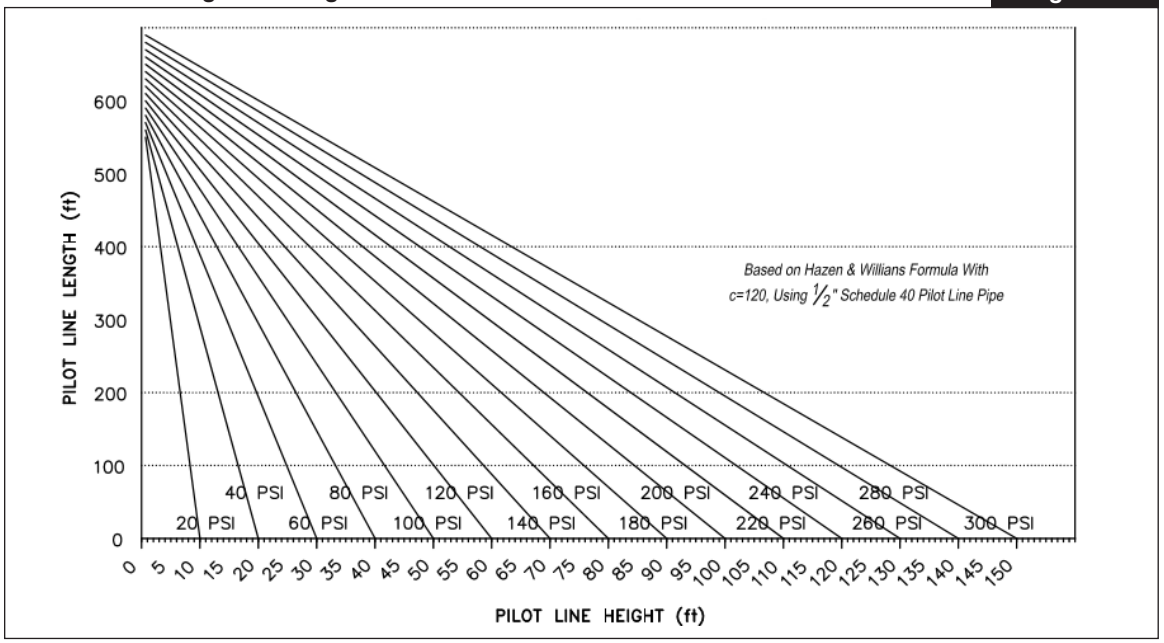
Trim Configuration	2" (50 mm), 2½" (65 mm), 3" (80 mm), & 76 mm	4" (100 mm), 6" (150 mm), 8" (200 mm), & 165 mm
Wet Pilot Line Release	31 lbs (14 kg)	37 lbs (17 kg)
Dry Pilot Line Release	39 lbs (18 kg)	50 lbs (23 kg)
Electric Actuation Line Release	33 lbs (15 kg)	38 lbs (17 kg)

Friction Loss — **Table G**

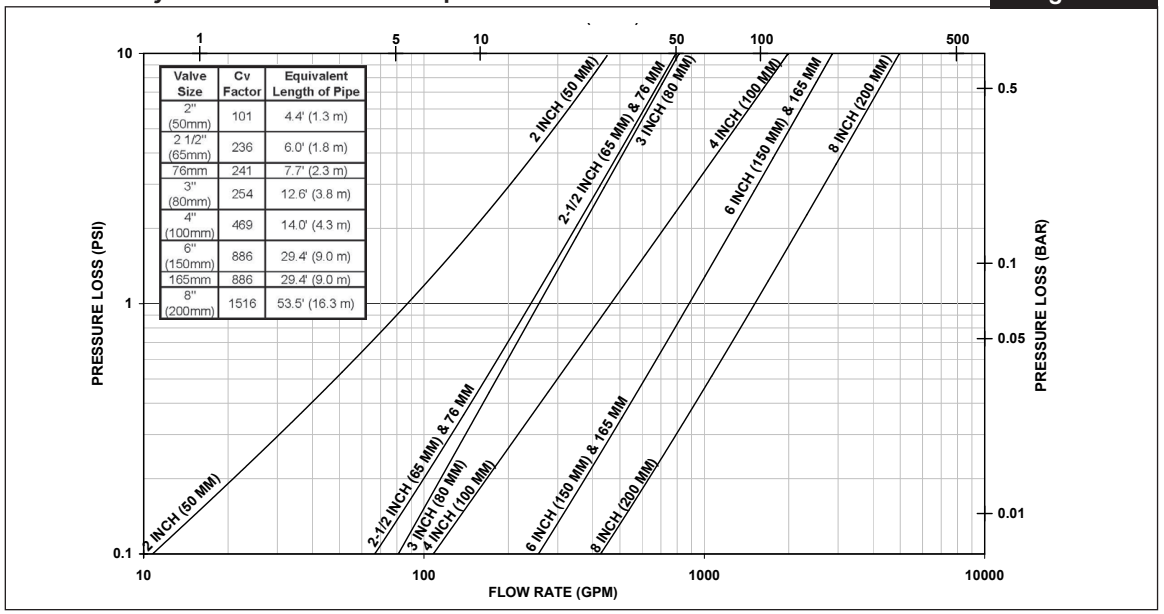
Valve Size	Equivalent Length*		Cv (gpm to create 1 psi pressure loss)
	C = 120	C = 100	
2" (50mm)	4.4 ft (1,3 m)	3.1 ft (1,0 m)	101
2½" (65mm)	6.0 ft (1,8 m)	4.3 ft (1,3 m)	236
76mm	7.7 ft (2,3 m)	5.5 ft (1,7 m)	241
3" (80mm)	12.6 ft (3,8 m)	9.0 ft (2,7 m)	254
4" (100mm)	14 ft (4,3 m)	10 ft (3,0 m)	469
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

***Note:** Expressed in equivalent length of Schedule 40 pipe, based on Hazen & Williams formula.

Wet Pilot Line Height vs. Length — **Figure 4**



Model DDX Hydraulic Friction Loss Graph — **Figure 5**



Valve Size	Cv Factor	Equivalent Length of Pipe
2" (50mm)	101	4.4' (1.3 m)
2 1/2" (65mm)	236	6.0' (1.8 m)
76mm	241	7.7' (2.3 m)
3" (80mm)	254	12.6' (3.8 m)
4" (100mm)	469	14.0' (4.3 m)
6" (150mm)	886	29.4' (9.0 m)
165mm	886	29.4' (9.0 m)
8" (200mm)	1516	53.5' (16.3 m)

System Pneumatic Pressure — **Table H**

Water Pressure psi (bar)	Pneumatic Pressure psi (bar)
Maximum	Not Less Than
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)

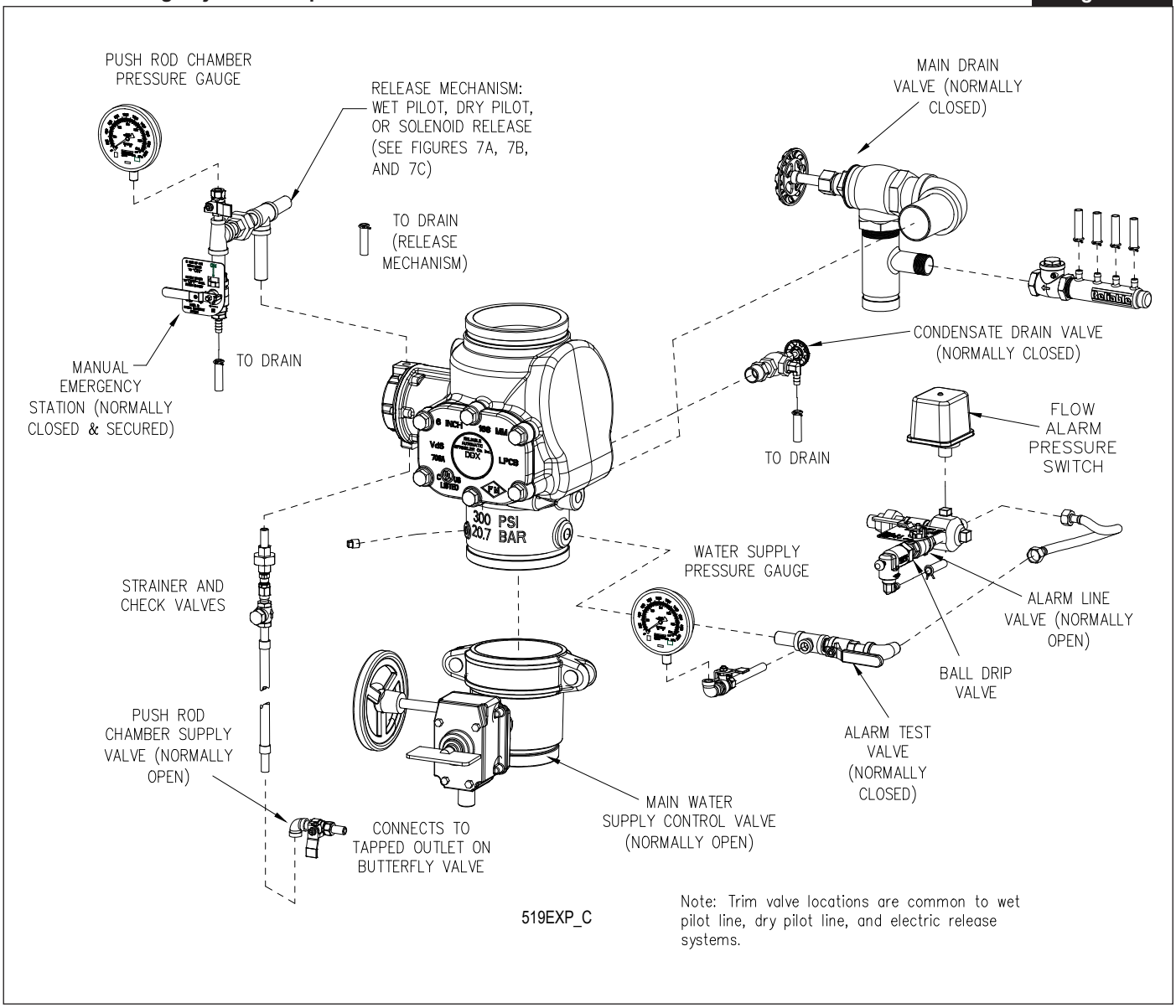
Notes:

1. 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 supervisory air or nitrogen pressure indicated; however, pressure must never be less than the minimum specified in the table above.
3. Air maintenance devices that maintain a constant pressure are strongly recommended; however, if a tank-less compressor is used, the “compressor on” setting of the pressure switch must never be lower than the minimum pressure in the table above.

Installation

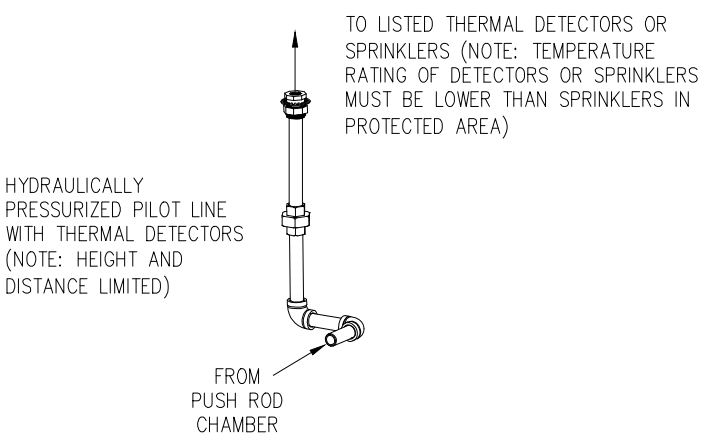
1. The Model DDX valve shall be installed, maintained, and tested in accordance with NFPA13, "Standard for the Installation of Sprinkler Systems," as well as the requirements of any authorities having jurisdiction. Failure to follow installation instructions may void the warranty and/or listing of the system.
2. The Model DDX valve must only be installed in the vertical position with water moving up and through the valve.
3. Verify compatibility of the Model DDX materials with the water supply and the environment where the valve will be installed prior to installation.
4. The Model DDX valve must be installed in a location where the temperature is maintained at a minimum of 40°F (4°C). Heat tracing of the valve and/or trim is not permitted.
5. The Model DDX valve must not be installed in a location where the ambient and/or the water temperature exceeds 140°F (60°C).
6. Unauthorized revisions to the trim arrangement of the valve may void the warranty and/or listing of the system.
7. Design and installation of detection and release systems, when required, must be performed in accordance with applicable NFPA standards and the authority having jurisdiction.
8. Drains should be piped to a location that will avoid damage to property and/or injury to personnel.
9. Whenever ambient temperature conditions are high, the water temperature in the Model DDX-LP Deluge Valve System 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 6503050001; ordered separately) can be installed to limit pushrod chamber hydraulic pressure.
10. Please refer to Technical Bulletin 520 for additional information on the setup, inspection, testing, and maintenance of Model DDX systems.

Model DDX Deluge System Components **Figure 6**



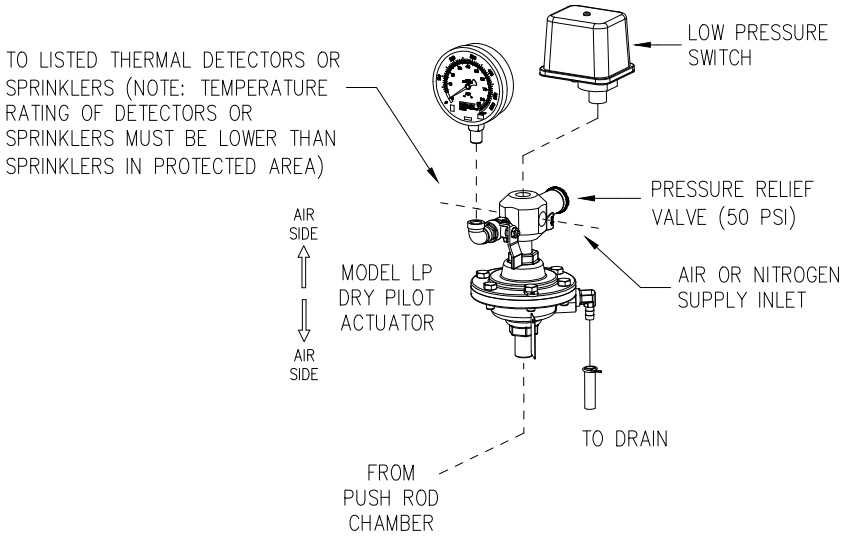
Wet Pilot Line Actuation

Figure 7A



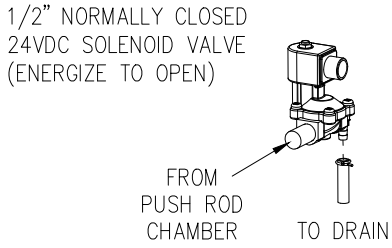
Dry Pilot Line Actuation

Figure 7B



Electric (Solenoid) Actuation

Figure 7C



STANDARD SOLENOID VALVE:
PARKER-HANNIFIN MODEL 73218BN4UNLVNOC111C2
RATED WORKING PRESSURE 175 PSI (12.1 BAR)
VOLTAGE: 24VDC POWER: 10 WATTS
CURRENT: 0.41 AMPS HOLDING
COIL ENCLOSURE: NEMA 4X
PIPE SIZE: 1/2" NPT FEMALE
Cv FACTOR: 4.0

ALTERNATE SOLENOID VALVE:
PARKER-HANNIFIN MODEL 73212BN4TNLVNOC322C2
RATED WORKING PRESSURE 300 PSI (20.7 BAR)
VOLTAGE: 24VDC POWER: 22 WATTS
CURRENT: 0.83 AMPS HOLDING
COIL ENCLOSURE: NEMA 4X
PIPE SIZE: 1/2" NPT FEMALE
Cv FACTOR: 2.8

Listings and Approvals

(Only when used with Reliable Trim Sets)
1. Listed by Underwriters Laboratories, Inc. and UL certified for Canada.
2. Certified by FM Approvals (FM).
3. Loss Prevention Certification Board (LPCB) [4" (100mm), 6" (150mm), and 8" (200mm) sizes only]
4. VdS Schadenverhütung GmbH (VdS)

Guarantee

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

Ordering Information

Specify:

Valve Model: DDX Deluge System

Valve Size: [2" (50mm)] [2-1/2" (65mm)] [76mm] [3" (80mm)] [4" (100mm)] [6" (150mm)] [165mm] [8" (200mm)]

End Connection Configuration (see Table A): [Groove/Groove] [Flange/Groove] [Flange/Flange]

Note: 2", 2-1/2", 3", and 76mm valves are available only with grooved ends.

Operational Trim: [Wet-Pilot Release] [Dry-Pilot Release] [Electric Release 175psi (12,1 bar)] [Electric Release 300psi (20,7 bar)]

Trim Configuration: [Loose Trim] [Segmentally Assembled Trim] [Fully Assembled Trim w/o Water Supply Control Valve] [Fully Assembled w/ Water Supply Control Valve]

Water Pressure Gauges: 0-300 psi (20,7 bar) or 0-600 psi (41,4 bar)

Optional Equipment

Pushrod Chamber Pressure Relief Kit: P/N 6503050001

Streamline™ Flexible Drain Hose: Please see Technical Bulletin 442

Service Kits

Service kits are available for routine servicing of the valve (reference Assembly Drawings on website). Service kits for the Model DDX Deluge Valve include the following components:

- Clapper Seal Assembly (item 8)
- Cover Gasket (item 9)
- Bumpstop(s) (item 10)
- Push rod chamber diaphragm (item 18)
- Grease (item 42)

2", 2-1/2", and 3" Model DDX Service Kit: PN 6501200R03
4" Model DDX Service Kit: PN 6501200R04
6" Model DDX Service Kit: PN 6501200R05
8" Model DDX Service Kit: PN 6501200R06

5 P/N 9999970442