

Reliable®

**Model DDX
Double Interlock
Preaction System – Type PL**
2" (50 mm), 2½" (65 mm), 3" (80 mm),
76 mm, 4" (100 mm), 6" (150 mm),
165 mm & 8" (200 mm)

Technical Specifications and Instructions for Installation, Operation, and Maintenance

- Completely Mechanical Operation
- Externally Resettable Clapper
- One Main Drain
- 8 - 24 PSI (0.6 - 1.7 bar) System Pressure
- Pneumatic/Pneumatic Actuation



Model DDX Type PL Double Interlock Preaction

General

The Reliable Model DDX Type PL Double Interlock Preaction System is designed for water sensitive areas that require the maximum protection from inadvertent water flow into the sprinkler system piping. A refrigerated area is an example of this type of water sensitive environment.

The Type PL Double Interlock trim package includes the dual chamber Model LPDI Dry Pilot Actuator as the releasing device. Both the sprinkler system and the dry pilot line are pressurized with air or nitrogen (see note below) which keeps the Model LPDI Dry Pilot Actuator closed. Two events must coexist in order to operate the Type PL Double Interlock System: (a) one or more dry pilot detectors must activate and release pneumatic pressure from the dry pilot line, and (b) one or more fire sprinklers must activate and release pneumatic pressure from the system. The loss of pressure in both chambers (or zones) of the Model LPDI Dry Pilot actuator will allow the device to open and release the deluge valve.

In the event that the system piping is ruptured, or a fire sprinkler is accidentally opened, the system (upper) chamber of the Model LPDI Dry Pilot Actuator will lose pressure and a low pressure alarm will sound. The Model DDX Deluge Valve, however, will not be released to flow water since the dry pilot line detection system has not activated.

Conversely, in the event of a false alarm from the dry pilot line detection system, the dry pilot (lower) chamber of the Model LPDI Dry Pilot Actuator will lose pressure and a low pressure alarm will sound. The Model DDX Deluge Valve, however, will not release water since the system (upper) chamber of the Model LPDI Dry Pilot Actuator is still pressurized. The requirement for both dry pilot line operation and loss of system pressure before the Model DDX Type PL Double Interlock Preaction system releases water assures maximum protection against inadvertent water flow. The elimination of an electrical detection system makes the Type PL system ideal for locations prone to power failures, and/or locations where electrical detection is not desirable such as high hazard explosive environments.

At the heart of the Reliable Type PL Double Interlock Preaction System is the Model DDX Deluge Valve. This deluge valve is a hydraulically operated, straight-through-design, differential latching clapper-type (see Fig. 1). System maintenance is simplified since the deluge valve can be reset externally without removing the cover plate. This feature provides a significant system-restoration time advantage. The Model DDX Deluge Valve has an intermediate chamber and thereby does not require an in-line air check valve. Subsequently, the deluge valve only requires a single drain connection.

The Reliable Model DDX Type PL Double Interlock Preaction System trim set provides all of the necessary equipment for connections to the Model DDX Deluge Valve pushrod chamber inlet and outlet ports, a 1¼" (30 mm) main drain on 2" (50 mm), 2½" (65 mm), 76 mm and 3" (80 mm) valve sizes or a 2" (50 mm) main drain on 4" (100 mm), 165 mm, 6" (150 mm) and 8" (200 mm) valve sizes, alarm devices, air supply, and required pressure gauges. This trim set is available in individual (loose) parts, in time-saving, segmented assembled kit forms or fully assembled to the Model DDX Deluge Valve (with or without a control valve).

All sizes of Type PL Double Interlock Preaction Trims may be equipped with the optional Reliable Model B1 Accelerator, trim kit P/N 6516000003. This device acts as an exhauster which will hasten the operation of the Model LPDI Dry Pilot Actuator and minimize water delivery time for the system.

Listings & Approvals:

(Only when used with Reliable Trim Sets.)

1. Reliable Type PL Double Interlock Preaction Systems 2" (50 mm), 2½" (65 mm), 76 mm and 3" (80 mm), 4" (100 mm), 165 mm, 6" (150 mm) and 8" (200 mm) are Factory Mutual Approved Refrigerated Area Sprinkler Systems for use in refrigerated rooms or buildings. Refrigerated area sprinkler systems are FM Approved as complete systems. Systems are FM Approved for use with thermal detectors and Class A detector wiring only.
2. Factory Mutual Approved for applications where FM Global Data Sheets allow the use of double-interlock preaction systems.
3. Reliable Type PL Double Interlock Preaction Systems 2" (50 mm), 2½" (65 mm), 76 mm, 3" (80 mm), 4" (100 mm), 165 mm, 6" (150 mm) and 8" (200 mm) are Underwriters Laboratories, Inc. Listed and UL certified for Canada (cULus) in the Special System Water Control Valve-Double Interlock Type (VLJH) category.

Note: Wherever the word "air" is used in this bulletin as a reference to the pneumatic pressure source it shall also mean "air or nitrogen."

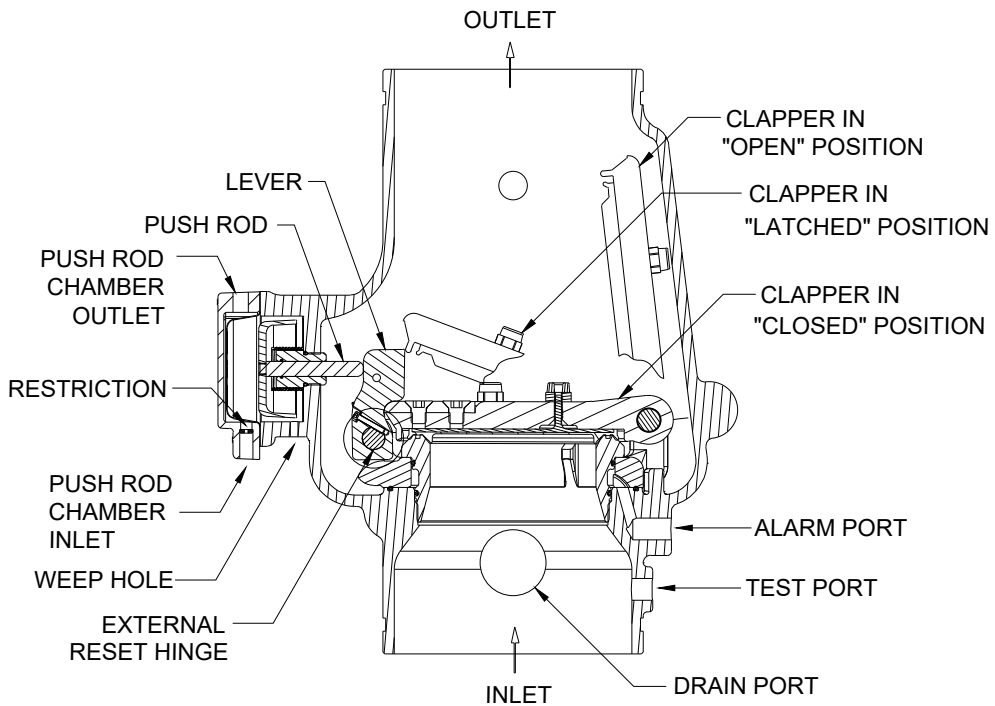
System Operation

When set correctly for service, the Model DDX Deluge Valve is hydraulically established to separate the supply water from the sprinkler system piping. The Reliable Model DDX Deluge Valve is shown in both closed and open positions in Fig. 1. In the closed position, the supply pressure acts on the underside of the clapper and also on the pushrod through the pushrod chamber inlet restriction. The resultant force due to the supply pressure acting on the pushrod is multiplied by the mechanical advantage of the lever and is more than sufficient to hold the clapper closed against normal supply pressure surges.

When the detection system is activated and a fire sprinkler opens, the Model DDX Deluge Valve pushrod chamber will be vented to atmosphere through the chamber outlet. Since the pressure can not 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 supply pressure acting beneath the clapper overcomes the lever applied force, thereby opening the clapper.

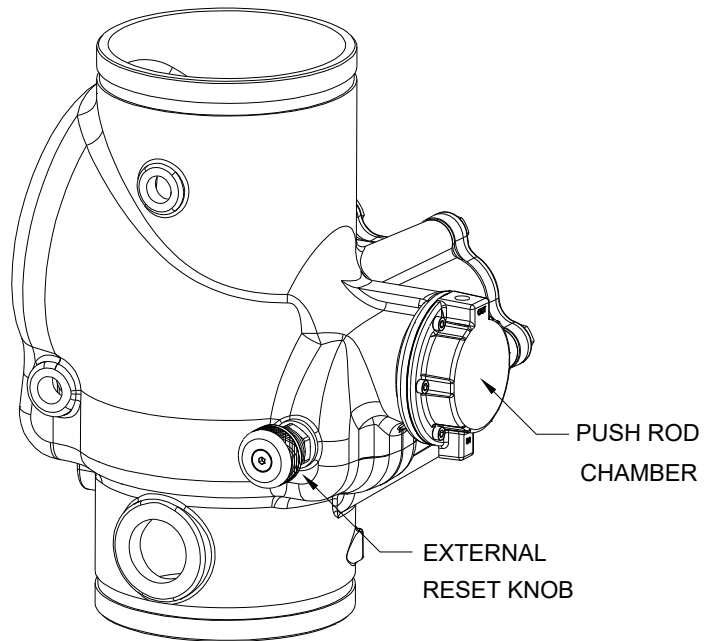
Once the clapper has opened, the lever acts as a latch, preventing the clapper from returning to the closed position. Water from the supply flows through the Deluge Valve into the sprinkler system piping. Water also flows through the alarm outlet to the alarm devices.

Resetting the clapper of the Model DDX Deluge Valve is accomplished using the convenient external reset knob on the rear of the valve. The external reset feature of the Model DDX Deluge Valve provides a means for simple, economical system testing, which is one essential facet of a good maintenance program. The external



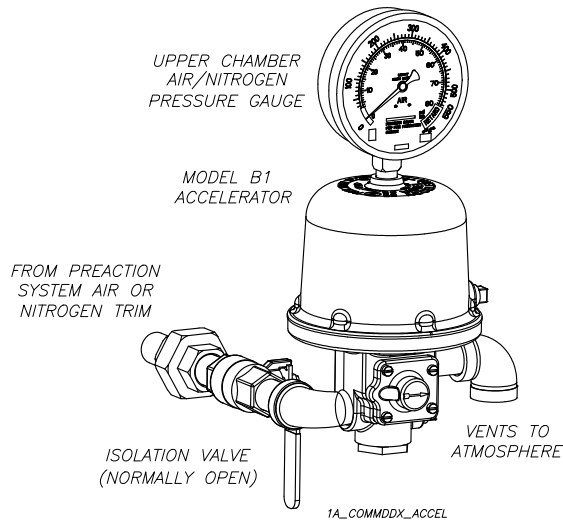
MODEL DDX VALVE: SECTION VIEW

1C_COMMDDX_1



MODEL DDX VALVE: REAR VIEW

TO RESET: PUSH INWARD AND ROTATE KNOB CLOCKWISE (AS VIEWED FROM REAR)
 TO RESET CLAPPER. NOTE: PUSH ROD CHAMBER MUST BE VENTED TO DRAIN.



RELIABLE MODEL B1 ACCELERATOR KIT

NOTES:

1. A MINIMUM OF 15 PSI (1,0 BAR) OF SUPERVISORY PRESSURE IS REQUIRED WHEN USING A MODEL B1 ACCELERATOR.
2. SEE TECHNICAL BULLETIN 323 FOR ADDITIONAL DETAILS.
3. IF ORDERED SEPARATELY, USE PN 6501200019.

Fig. 2

reset feature does not, however, eliminate another important facet of good maintenance, namely, periodic cleaning and inspection of the internal valve parts.

A valve body drain is provided in the event that water builds up due to condensate from the air supply system or water left inside from system testing. After closing the main supply valve, the condensate drain can be opened slightly until the water inside the valve body and the main pipe column has drained. See the section titled "Draining Excess/Condensate Water from System" in this bulletin for the detailed procedure.

The Model B Manual Emergency Station is included in the Reliable Type PL Double Interlock Preaction System trim sets. It consists of an aluminum nameplate mechanically attached to a ball valve. The valve handle in its OFF position is guarded against accidental turning to the ON position (and system discharge) by a nylon cable tie provided with each trim kit. The cable tie is inserted after the system has been restored for operation. The nylon cable tie is designed to allow, in case of an emergency, forceful turning of the valve handle to the ON position. As an alternative to the Model B Hydraulic Manual Emergency Station, the Model A Hydraulic Manual Emergency Pull Box (see Reliable Bulletin 506) is also available and can be provided as an option.

Whenever ambient temperature conditions are high, the water temperature in the Model DDX Deluge Valve pushrod chamber could possibly increase, thereby increasing the pressure in the chamber to values exceeding the rated pressure of the system. In an indoor installation where standard room temperatures are exceeded, a pressure relief kit may be needed. Pressure relief kit, P/N 6503050001, can be installed into the pushrod chamber's releasing line to limit the pressure to 250 psi (17.2 bar).

Pressurizing Line Connection

The water supply for the pushrod chamber must be provided through a dedicated connection to the water supply piping. Pressurizing lines for multiple Model DDX Deluge Valve pushrod chambers must never be manifolded together. Each Model DDX Deluge Valve must have its own pushrod chamber pressurizing line connection.

This connection must be made on the supply side of the water supply control valve. This can be accomplished by:

- Using a tapped connection directly below or next to the main water supply control valve using a welded outlet or the appropriate mechanical fittings. A grooved-end outlet coupling is one way to achieve this; or
- Using a water supply control valve that has an available threaded (NPT) supply-side tap design to allow for a direct water supply connection to the Model DDX Deluge Valve's pushrod chamber.

Caution: Reliable's DDX valve is designed with an inlet restriction built into the pushrod chamber. It is important not to introduce additional restrictions into the direct water supply connection or the discharge from the pushrod chamber by installing additional valves or improperly installing the copper lines used in the trim of the valve.

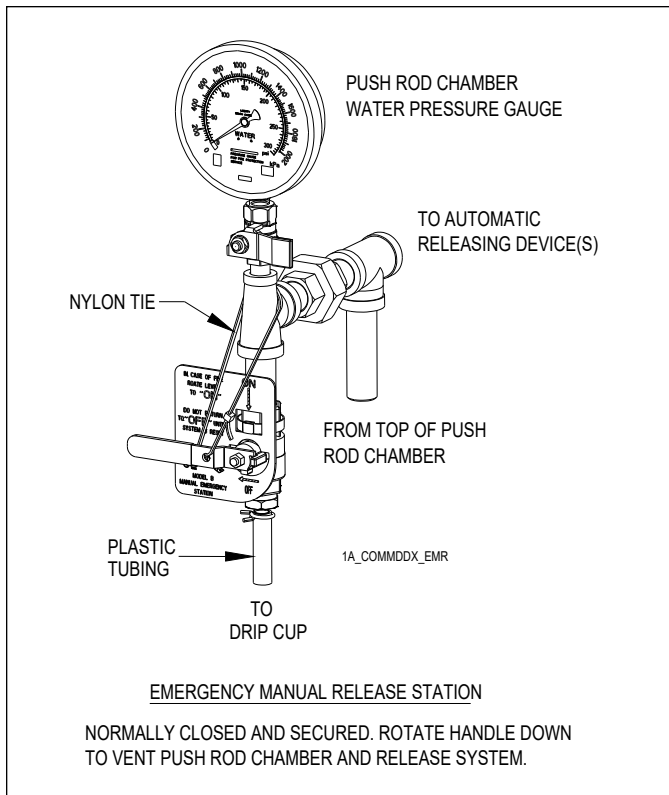


Fig. 3

Hydrostatic Testing of DDX Valves and DDX Systems

As required by NFPA 13, fire sprinkler systems with working pressures up to and including 150 psi are to be hydrostatically tested at a water pressure of 200 psi. Fire sprinkler systems with working pressures above 150 psi are required to be hydrostatically tested at 50 psi above the system working pressure. In addition to the hydrostatic tests described above, dry pipe and double interlock preaction systems require an additional low pressure air test.

In some cases, hydrostatic testing (in accordance with the NFPA 13 requirements noted above) will result in pressures that exceed the working pressure of the valve and trim kit for the two-hour test period. **The valve and applicable trim kit have been tested, approved and listed under these conditions and as such, hydrostatic testing in accordance with NFPA 13 is acceptable. In addition, the clapper can remain in the closed position and the trim kit need not be isolated, as each has been designed to withstand hydrostatic testing as required by NFPA 13.**

Hydrostatically testing the valve and trim to pressures higher than their rating is limited to the hydrostatic test as referenced by NFPA 13. It does not address the occurrence(s) of a “water hammer” effect, which can indeed damage the valve. A “water hammer” in the water supply piping of the valve can create pressures in excess of the rated pressure and should be avoided by all necessary means. This condition may be created from improper fire pump settings, underground construction work, or an improper venting of trapped air in the water supply piping.

System Design Considerations

The automatic sprinklers, releasing devices, fire detection devices, manual pull stations, and signaling devices which are utilized with the Type PL Double Interlock Preaction System must be UL or ULC Listed or FM Approved, as applicable.

Factory Mutual requires that detection devices in refrigerated areas be of the fixed temperature type. In addition, they must have a temperature rating lower than that of the sprinklers and preferably as low as possible for the given ambient conditions.

The Deluge Valve and all interconnecting piping must be located in a readily visible and accessible location and in an area that can be maintained above 40°F (4°C). **Note: Heat Tracing is not permitted.**

Pendent sprinklers, other than dry pendants, used on preaction systems shall be installed on return bends per NFPA 13.

System Air/ Nitrogen Pressure Requirements

The system trim includes gauges to read the pneumatic and water pressures of the Type PL Double Interlock Preaction System. Table A specifies the air or nitrogen pressure to be constantly applied to the system. A properly designed pneumatic supply system automatically regulates pressure, provides a safeguard against small pressure leaks in the sprinkler piping, and properly restricts the flow of makeup air or nitrogen from the source.

When the optional Reliable Model B1 Accelerator is used to expedite water delivery time, the pneumatic pressure must not be less than 15 psi (1.0 bar). See Reliable Bulletin 251 and 254 for complete information on air and nitrogen regulating equipment.

Table A

Water Pressure psi (bar)	System Air or Nitrogen Pressure psi (bar)
Maximum	Not Less Than
20 (1.4)	8 (0.6)
30 (2.1)	10 (0.7)
50 (3.4)	12 (.8)
75 (5.2)	13 (.9)
100 (6.9)	15 (1.)
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:

- Supervisory air or nitrogen pressure should not exceed 30 psi (2.1 bar). Excess pressure may result in damage to the actuator.
- 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.
- Air maintenance devices that maintain a constant pressure are 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.

Note: During system set-up, a higher pneumatic pressure may be required in order to properly set the Model LPDI Dry Pilot Actuator. The dew point of the air supply must be maintained below the lowest ambient temperature to which the preaction system will be exposed. Accumulation of water (condensate) on the air side of the Actuator can lower the air pressure at which the Actuator opens, and possibly prevent proper system operation. Introduction of moisture into the system piping exposed to freezing temperatures can create ice blockage which could prevent proper system operation. As a minimum, the air supply of air should be taken from the area of lowest temperature within the protected area. The air supply system must be carefully designed to prevent plugging by frost deposits. Special requirements, such as those in FME&R "Installation Guidelines for Refrigerated Storage" may need incorporated.

Nitrogen used in refrigerated area systems minimizes a possibility of ice build up and blockage inside the system piping that could inhibit proper system operation. The dewpoint of nitrogen compressed to 20 psig (1.4 bar) pressure is -46°F (-43.3°C) and -52°F (-46.7°C) when compressed to 10 psig (0.7 bar). High pressure nitrogen cylinders can typically be rented from a local source, with rental fees varying by supplier and cylinder sizes. The calculated nitrogen supply in lbs (kgs) to pressurize various system capacities to 10 psi (0.7 bar) at different freezer temperatures is shown in Table B.

Table B

System Capacity Gal. (L)	Freezer Temperature, °F (°C)					Approx. Fill Time (min*)
	20 (-6.7)	0 (-18)	-20 (-29)	-40 (-40)	-60 (-51)	
250 (946)	1.90 (0.86)	1.90 (0.86)	2.00 (0.91)	2.10 (0.95)	2.20 (1.00)	1
500 (1893)	3.64 (1.65)	2.80 (1.27)	4.00 (1.81)	4.20 (1.91)	4.40 (2.00)	2
750 (2839)	5.50 (2.49)	5.70 (2.59)	6.00 (2.72)	6.30 (2.86)	6.60 (2.99)	3
1000 (3785)	7.30 (3.31)	7.60 (3.45)	8.00 (3.63)	8.33 (3.78)	8.80 (3.99)	4

Note: To obtain required nitrogen supply (lbs.) for 15 psi (1.0 bar) or 22 psi (1.5 bar), multiply the tabulated values by a factor of 1.5 or 2.2 respectively.

(1 bar = 100kPa)

* When filled with the Reliable Model A Pressure Maintenance Device bypass valve open.

Whenever multiple systems are supplied by a common air or nitrogen source, each system must have its own pressure maintenance device for individual maintenance of pressure (NFPA 13, 7.2.6.5).

Low Air/Nitrogen Pressure Supervision

The double interlock function of the Type PL system is achieved by operation of the dual chamber Model LPDI Dry Pilot Actuator due to (a) loss of pressure in the dry pilot line resulting from detector operation and (b) loss of pressure in the system resulting from sprinkler operation.

A Potter pressure switch, Model PS25-2 pressure switch, is provided with the Type PL Double Interlock Preaction System trim for low air pressure supervision. This will provide a supervisory signal for identifying a low air pressure supply condition at 4 to 8 psi (0.3 to 0.4 bar) decreasing pressure.

For systems utilizing air or nitrogen pressure below 15 PSI, it may be necessary to replace the PS25-2 low pressure switch with an PS10-2 switch.

Double Interlock Preaction System Pneumatic/Pneumatic Release Trim (Type PL) Engineering Specifications General Description

Preaction system shall be a double Interlock preaction system utilizing a [2" (50 mm)][2½" (65 mm)][76 mm][3" (80 mm)][4" (100 mm)][165 mm][6" (150 mm)][8" (200 mm)] [cULus Listed] [FM Approved] hydraulically operated, differential latching clapper-type valve with pneumatic/electric release preaction trim. Deluge Valve construction shall be of lightweight, ductile iron construction with a screw in stainless steel seat and clapper assembly. Stainless steel or Bronze seat shall have O-ring seals to resist leakage and corrosion. Clapper facing shall be pressure actuated, providing a limited compression seat for the sealing force between the clapper rubber facing and the valve seat. Deluge valve shall have an external reset knob for resetting the clapper without requiring the removal of the valve face plate. Pushrod chamber design shall consist of a stainless steel piston/ pushrod and spring assembly with diaphragm seal secured to the casting through a pushrod guide constructed of a synthetic engineering plastic to resist corrosion. Casting shall have a bleeder hole located on the pushrod chamber for air/water leakage indication. Trip ratio shall be approximately a 3:1 force differential. Deluge valve shall be of the straight through design to minimize friction loss. Inlet restriction orifice shall be factory installed into the inlet port of the deluge valve pushrod cover plate and not be a separate part of the deluge valve trim. End connection style to be [2" (50 mm)][2½" (65 mm)][76 mm] [3" (80 mm)][4" (100 mm)] [165 mm][6" (150 mm)][8" (200mm)] grooved, per ANSI/AWWA C606 or flanged per ASME B16.5 or ISO 7005. Deluge valve shall have a rated working pressure of 250 psi (17.2 bar) for 2" (50mm), 2½" (65mm), 3" (80mm), 76mm and 8" (200mm) valve sizes and 300 psi (20.7 bar) for 4" (100mm), 6" (150mm) and 165mm valve sizes. Deluge valve to be [2" (50 mm)][2½" (65 mm)][76 mm] [3" (80 mm)][4" (100 mm)][165 mm][6" (150 mm)][8" (200mm)] Reliable Model DDX Deluge Valve (Bulletin 519). Valve trim shall be Type PL pneumatic/pneumatic release trim consisting of the following components:

- Hydraulic trim shall be galvanized and brass components, specifically Listed/Approved with the deluge valve, including an emergency release valve and 1¼ or 2" main drain. Releasing device shall be a dual chamber low pressure dry pilot actuator.
- The low-pressure pneumatic double interlock actuator shall be of stainless steel construction utilizing two diaphragm and compression spring design to separate the push-rod chamber water pressure from the system piping's pneumatic supervisory pressure and the pilot line pneumatic pressure. The low-pressure actuator shall only require between 8 and 28 psi (0,6 to 1,9 bar) supervisory pressure and pilot line pressure for proper setting in accordance with the manufacturer's instructions. Low-pressure pneumatic actuator shall be Reli-able Model LPDI Double Interlock Actuator.

- The low air supervisory pressure switch to indicate loss of air pressure in system piping shall be [cULus Listed] [FM Approved] and of the bellows-activated type enclosed in a weatherproof, 4x, NEMA 4-rated enclosure incorporating tamper-resistant screws. There shall be two sets of SPDT (Form C) contacts rated at 10.0 A @ 125/250 VAC and 2.5 A @ 6/12/24 VDC. The pressure switch shall have a maximum service pressure rating of 250 psi (17.2 bar). Switch shall be provided with a ½" NPT male pressure connection. Low air supervisory pressure switch shall be Potter PS25-2.

System shall be a Reliable Double Interlock Type PL Preaction System, Bulletin 752.

Supervisory Air Supply Options

Note: See Reliable Bulletin 251 and 254 for complete information on air and nitrogen regulating equipment.

Owner's Air Supply

Supervisory air supply shall be provided by an owner supplied air system in conjunction with a [cULus Listed] [FM Approved] automatic pressure maintenance device, capable of maintaining a constant system pressure regardless of pressure fluctuations in the compressed air source. The pressure maintenance device shall consist of galvanized trim and brass parts, including a strainer and a field adjustable air pressure regulator, and have a working pressure rating of 175 psi (12.1 bar). The pressure regulator shall have an adjustable outlet pressure range of 5 to 75 psi (0.3 to 5.2 bar). Pressure maintenance device shall be Reliable Model A.

Compressed Air Supply

Supervisory air supply shall be provided by an automatic air compressor sized for the capacity of the double interlock preaction system piping, and be capable of restoring normal air pressure in the system within the time limits specified by NFPA 13. Double interlock preaction system shall only require between 8 and 28 psi (0.6 to 1.9 bar) supervisory pressure for proper setting of the low pressure pneumatic actuator in accordance with the manufacturer's instructions. Air supply shall be equipped with an automatic pressure maintenance device capable of maintaining a constant system pressure. The pressure maintenance device shall consist of galvanized trim and brass parts, including a strainer and a field adjustable air pressure regulator or pressure switch, and have a working pressure rating of 175 psi (12.1 bar). The pressure regulator shall have an adjustable outlet pressure range of 5 to 75 psi (0.3 to 5.2 bar). Pressure maintenance device shall be Reliable Model A. (**Note:** For small systems with air compressors having a capacity less than 5.5 cfm @ 10 psi, a pressure maintenance device is not required per NFPA 13. Consideration should be given, however, to the impact of a direct air supply on the overall performance of the system.)

Nitrogen

Nitrogen cylinders provided by an approved source shall provide the nitrogen supply. Double interlock preaction system shall only require between 8 and 28 psi (0.6 to 1.9 bar) supervisory pressure for proper setting of the low pressure pneumatic actuator in accordance with the manufacturer's instructions. The nitrogen cylinder pressure shall be regulated and supervised through the use of nitrogen regulating device and low-pressure trim kit. This device shall consist of a brass, single stage pressure regulator, equipped with high pressure inlet and low pressure outlet gauges, and ¼" copper connection tubing with galvanized ¾" x ¼" reducer bushing. This kit shall include a low-pressure switch with associated galvanized connection trim. Assembly shall be a Reliable Nitrogen Regulating Device. This device is to be used in conjunction with the Reliable Model A Pressure Maintenance Device.

Optional System Accessories

System Control Valve

Preaction system control valve shall be a slow close, [cULus Listed] indicating butterfly type valve with a pre-wired supervisory tamper switch assembly. The valve shall be rated for a working pressure of [300 psi (17.2 bar)]. System control valve shall be for a [2" (50 mm)] Reliable RBVG Butterfly Valve or [2½" (65 mm)][3" (80 mm)][4" (100 mm)][6" (150 mm)][8" (200 mm)] - Reliable BFG-300 Butterfly Valve.

Detection System

To initiate actuation of the preaction system deluge valve, a supplemental detection system utilizing Reliable F1-FTR Dry Pilot Line Detectors (Reliable Bulletin 180) shall be provided.

Accelerator

For system capacities in accordance with NFPA 13, an accelerator with associated galvanized trim kit shall be provided to exhaust air pressure from the pneumatic actuator trim piping in order to hasten operation of the double interlock preaction system. Minimum pneumatic pressure shall be 15 psi (1.0 bar) to ensure proper accelerator operation. Accelerator shall be [cULus Listed] [FM Approved] for use with the double interlock preaction trim. Accelerator shall be capable of adjusting for small fluctuations in system air pressure without causing operation. The accelerator shall contain an integral anti-flooding assembly to prevent entry of water and debris into critical internal areas during operation. Accelerator body and dome to be of cast aluminum and epoxy coated inside and out. Diaphragm construction shall consist of Dupont Fairprene BN 5049 with stainless steel filter assembly. Trim kit shall consist of all galvanized and brass parts, including an isolating ball valve. Accelerator and trim kit shall be Reliable Model B1 Accelerator Trim Kit.

Technical Data

The Reliable Model DDX Type PL Double Interlock System is rated for a minimum water supply pressure of 20 psi (1.4 bar). When fitted with the optional 300 psi (20.7 bar) solenoid, the 2", 2-1/2", 3", and 8" sizes are rated for a maximum pressure of 250 psi (17.2 bar), and the 4" and 6" sizes are rated for a maximum pressure of 300 psi (20.7 bar). Water temperature must be maintained between 40°F and 140°F (4°C and 60°C).

The following list of technical bulletins pertains to valves and devices that may be used in this preaction system:

Deluge Valve	Reliable 519
Hydraulic Emergency Station (Model A)	Reliable 506
Mechanical Sprinkler Alarm	Reliable 612/613
Pressure Maintenance Device	Reliable 251
Nitrogen Regulating Device	Reliable 254
Model B1 Accelerator Trim Kit	Reliable 323
Low Air Pressure Supervisory Switch	Potter 5401564
Waterflow Pressure Alarm Switch	Potter 5400928
F1-FTR Pilot Line Detectors	Reliable 180

Model DDX Deluge Valve Description

- Rated working pressure:
Valve - 250 psi (17.2 bar) for 2" (50mm), 2½" (65mm), 3" (80mm), 76mm and 8" (200mm) valve sizes and 300 psi (20.7 bar) for 4" (100mm), 6" (150mm) and 165mm valve sizes.
- End and trim connections:
 - ANSI/AWWA C606 grooved inlet and outlet

Nominal Pipe Size	Outlet Diameter	Groove Diameter	Groove Width	Outlet Face to Groove
2" (50 mm)	2.375" (60mm)	2.250" (57mm)	11/32" (9.0mm)	5/8" (16mm)
2½" (65 mm)	2.875" (73mm)	2.720" (69mm)	11/32" (9.0mm)	5/8" (16mm)
76 mm	3.000" (76mm)	2.845" (72mm)	11/32" (9.0mm)	5/8" (16mm)
3" (80 mm)	3.500" (89mm)	3.344" (85mm)	11/32" (9.0mm)	5/8" (16mm)
4" (100 mm)	4.500" (114mm)	4.334" (110mm)	3/8" (9.5mm)	5/8" (16mm)
165 mm	6.500" (165mm)	6.330" (161mm)	3/8" (9.5mm)	5/8" (16mm)
6" (150 mm)	6.625" (168mm)	6.455" (164mm)	3/8" (9.5mm)	5/8" (16mm)
8" (200 mm)	8.625" (219mm)	8.441" (214mm)	7/16" (11mm)	3/4" (19mm)

- Threaded openings Per ANSI B 2.1

- Flange Dimensions

Flange Type:	Nominal Pipe Size	Bolt Circle Diameter	Bolt Hole Diameter	Flange Outside Diameter	Flange Thickness	Number of Bolts
ASME B16.5 Class 150	4" (100mm)	7½" (191mm)	¾" (19mm)	9" (229mm)	15/16" (24mm)	8
ISO 7005-2 PN16	4" (100mm)	7¾" (180mm)	¾" (19mm)	9" (229mm)	15/16" (24mm)	8
ASME B16.5 SClass 150	6" (150mm)	9½" (241mm)	7/8" (22mm)	11" (279mm)	15/16" (24mm)	8
ISO 7005-2 PN16	6" (150mm)	9 7/16" (240mm)	29/32" (23mm)	11" (279mm)	15/16" (24mm)	8
ASME B16.5 Class 150	8" (200mm)	11¾" (298mm)	7/8" (22mm)	13½" (343mm)	1" (25.4mm)	8
ISO 7005-2 PN16	8" (200mm)	11 15/16" (295mm)	29/32" (23mm)	13½" (343mm)	1" (25.4mm)	12

- Valve Color:

Valve Size	Color
2" (50 mm)	Black or Red
2½" (65 mm)	Black or Red
76 mm	Red
3" (80 mm)	Black or Red
4" (100 mm)	Black or Red
165 mm	Red
6" (150 mm)	Black or Red
8" (200 mm)	Black or Red

- Face to face dimensions:

Valve Size:	End Connection:	End to End:
2" (50mm), 2½" (65mm), 76mm & 3" (80mm)	Groove/ Groove	12½" (318mm)
4" (100mm)	Groove/ Groove	14" (356mm)
	Flange/ Groove	16" (406mm)
	Flange/ Flange	16" (406mm)
6" (150mm) & 165mm	Groove/ Groove	16" (406mm)
	Flange/ Groove	19" (483mm)
	Flange/ Flange	19" (483mm)
8" (200mm)	Groove/ Groove	19 3/8" (492mm)
	Flange/ Flange	21¼" (540mm)

- Valve Shipping Weight:

Valve Size:	End Connection:	Weight:
2" (50mm), 2½" (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:

Trim Configuration	2" (50 mm), 2½" (65 mm), 3" (80 mm) & 76 mm	4" (100 mm), 6" (150 mm), 8" (200 mm) & 165 mm
Type PL Double Interlock	49 lbs (22.2 kg)	59 lbs (25.4 kg)

7. Friction loss (Expressed in equivalent length of Schedule 40 pipe, based on Hazen & Williams formula:

Valve Size:	Equivalent Length:		Cv
	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

8. Installation position: Vertical

Trim Descriptions

The Type PL Double Interlock Preaction Trims for the Reliable Model DDX Deluge Valve are arranged for rapid, easy, and compact attachment, and serve as connection points to Reliable Model C Mechanical Alarms and other devices.

The Double Interlock Type PL Preaction System trim configurations can be ordered as individual parts, in time-saving segmentally assembled kit forms, or fully assembled to the Model DDX Deluge Valve (with or without a control valve).

Resetting Model DDX Type PL Double Interlock Preaction System

1. Close the valve controlling water supply to the Deluge Valve and close the air or nitrogen supply to the sprinkler system.
2. Close the pushrod chamber supply valve.
3. Open main drain valve and drain system.
4. Open all drain valves and vents at low points throughout the system, closing them when flow of water has stopped. Open the Model B Manual Emergency Station to relieve pressure in the pushrod chamber of the Deluge Valve.
5. With the alarm line valve open, push in the plunger of ball drip valve, forcing the ball from its seat, and drain the alarm line.
6. With the Model B Manual Emergency Station open, push in and rotate the Deluge Valve's external reset knob counter-clockwise (when facing the valve), until you hear a distinct noise indicating that the clapper has reset. Note: The reset knob can be rotated only while pressure in the pushrod chamber is vented to atmospheric conditions (0 psig).
7. Inspect and replace any portion of the detection system and/or sprinkler system subjected to fire conditions.
8. Open the pushrod chamber supply valve and allow water to fill the pushrod chamber. Close the Model B Manual Emergency Station.
9. With all pneumatic pressure relieved from the system and dry pilot line, the Model LPDI actuator will be open. Allow water to flow through the actuator to purge all air from the release line.
10. While water is flowing through the actuator, cause the actuator to close by applying air or nitrogen pressure to the dry pilot line. Allow the pressure to build to the level specified in Table A, then set the dry pilot line pneumatic supply to automatic operation.

11. Open the air or nitrogen supply quick fill valve to restore pressure in the sprinkler system. Allow the pressure to build to the level specified in Table A, then set the system pneumatic supply to automatic operation. (Note: To build supervisory pressure in the sprinkler system, it may be necessary to temporarily close the main drain valve and the alarm line valve until pressure has built to the recommended level.)

12. Open the alarm line valve. Verify the main drain valve is open. Slightly open the main valve controlling water supply to the Model DDX Deluge Valve, closing the main drain valve when water flows. Observe if water leaks through the ball drip valve. If no leak occurs, the Deluge Valve clapper is sealed. Slowly open the main valve controlling water supply until fully open and verify that it is properly monitored.

13. Verify that the pushrod chamber supply valve and alarm line valve are open. The pushrod chamber supply valve must remain open when the Deluge Valve has been reset, to maintain water pressure in the pushrod chamber.

14. Verify that the Model B Manual Emergency Station is secured in the OFF position with the appropriate nylon tie.

Inspection and Testing

1. Water supply — Confirm that valves controlling water supply to the Deluge Valve are opened fully and properly monitored.
 2. Alarm line — Confirm that the alarm line valve is open and remains in this position.
 3. Other trim valves — Confirm that the pushrod chamber supply valve is open, as well as all pressure gauge valves. The main drain valve, condensate drain valve, and alarm test valve should be closed.
 4. Ball drip valve — Push in on the plunger to be sure ball check is off its seat. If no water appears, the Deluge Valve water seat is tight. Inspect the bleed hole on the underside of the pushrod chamber for leakage.
 5. Dry pilot trim — Inspect air pressure for conformance to Table A.
 6. Releasing device — Check outlet of the releasing device (i.e., dry pilot actuator and hydraulic manual emergency station) for leakage. Also verify that tubing drain lines from releasing devices are not pinched or crushed which could prevent proper releasing of the Deluge Valve.
 7. Testing alarms — Open the alarm test valve permitting water from the supply to flow to the electric sprinkler alarm switch and to the mechanical sprinkler alarm (water motor). After testing, close this valve securely. Push in on the plunger of ball drip valve until all water has drained from the alarm line.
 8. Operational test — Open the Model B Manual Emergency Station. Alternatively, operate the dry pilot detection system and deplete pneumatic pressure from the sprinkler system.
- Note:** AN OPERATIONAL TEST WILL CAUSE THE DELUGE VALVE TO OPEN AND FLOW WATER INTO THE SPRINKLER SYSTEM.
9. Secure the Model B Manual Emergency Station in the OFF position with nylon tie after Deluge Valve is reset.



MODEL DDX HYDRAULIC FRICTION LOSS GRAPH

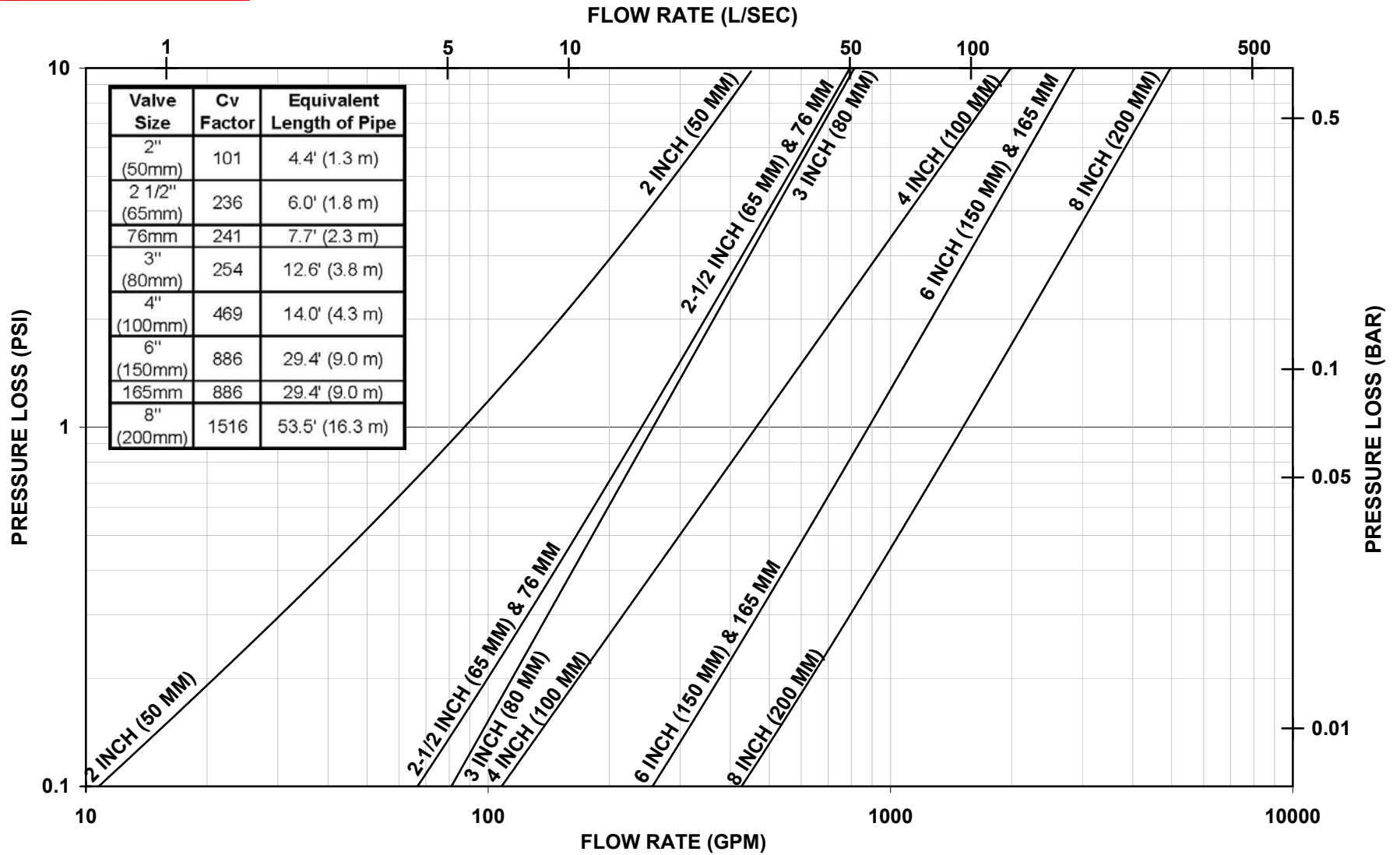


Fig. 4

Testing Detection System Without Operating Deluge Valve

1. Close the valve controlling water supply to the deluge valve and open the main drain valve.
2. Verify that valve supplying hydraulic pressure to the piston/pushrod chamber is open, allowing water to enter the pushrod chamber.
3. Operate the dry pilot detection system and deplete pneumatic pressure from the sprinkler system.
4. Operation of the detection combined with loss of pneumatic pressure must result in a sudden drop of water pressure in the pushrod chamber, as indicated by the pressure gauge on the hydraulic release trim.
5. Reset the valve per the reset instructions.

Maintenance

The owner is responsible for maintaining the fire protection system in proper operating condition. Any system maintenance or testing that involves placing a control valve or detection/control system out of service may eliminate the fire protection that is provided by the fire protection system.

The Reliable Model DDX valve and associated equipment 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. System components shall be tested, operated, cleaned, and inspected at least annually, and parts replaced as required. 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 or operation of the assembly.

If face plate is removed during maintenance, torque face plate bolts to the following values during re-installation:

- 35 ft-lbs. (47 N-m) for 2" through 4" valves
- 70 ft-lbs. (95 N-m) for 6"-8" valves

Troubleshooting

1. Mechanical sprinkler alarm not operating: This is most likely caused by a clogged screen in the strainer of the water motor. Proceed as follows: Remove plug from the strainer. Remove and clean the screen. Replace the screen and the plug, and then tighten securely (Ref. Bulletin 613).
2. Water leaking from Ball Drip. This can be caused by either a water column on top of the clapper or a supply water leakage.
 - a. Leakage due to water column. This condition is caused by leakage past the clapper seal assembly. Be sure the clapper seal and seat are free of any type of debris or damage. If necessary, follow steps below to replace the seal assembly and/or seat.
 - b. Supply water leakage. This condition is caused by leakage past the lower seat O-ring. Follow steps below for inspection and/or replacement of lower seat O-ring

Repair Procedures - Model DDX Deluge Valve

The following section provides instructions to correct both conditions:

1. Disable detection system.
2. Shut down the valve controlling the water supply to the Deluge Valve and open the main drain valve. Open the condensate drain valve. Close the pushrod chamber supply valve and open the Model B Manual Emergency Station.
3. Remove the Deluge Valve front (handhold) cover and inspect the seat, clapper, and seal assembly for damage. If inspection indicates damage to the seal assembly, replace as follows:
4. Remove the bumpstop nuts and remove the seal assembly. Install a new seal assembly and thread the bumpstop nuts onto the threaded studs of the seal assembly. Tighten finger tight plus $\frac{1}{4}$ to $\frac{1}{2}$ turn.
5. If inspection indicates damage to the clapper, proceed to step 6.
6. At the rear of the valve, disconnect the condensate drain trim section starting with the elbow connector. Then remove the $\frac{1}{4}$ " globe valve, followed by the $\frac{3}{4}$ "x $\frac{1}{4}$ " reducing bushing. Remove the retaining rings from the clapper hinge pin, push the hinge through the condensate drain opening and remove the clapper subassembly. Install a new clapper subassembly in the reverse order making sure the clapper spacers are in their proper position.
7. If the seat is damaged, or it is suspected that the leakage is through the seat O-rings, proceed to step 8.
8. Using Reliable P/N 6881603000 Seat Wrench for 2" (50mm), 2½" (65mm), 76mm and 3" (80mm) valve sizes, Reliable P/N 6881604000 for 4" (100mm) valve size, Reliable P/N 6881606000 for the 6" (150mm) and 165mm valve sizes or Reliable P/N 6881608000 Seat Wrench for 8" (200mm) valve size, remove the seat by unscrewing. This will loosen the seat-clapper-mounting ring subassembly. Reach into the valve and grasp the seat and remove it from the valve. Then remove the clapper-mounting ring subassembly from the valve. Visually examine all components of the seat-clapper-mounting ring subassembly and replace any component that appears damaged. New O-rings should always be used for reassembly.
9. Reassembly: clean the bore of the valve body. Lubricate the bore with O-ring grease. Lubricate and install the O-rings onto the seat. Lubricate and install the mounting ring O-ring into the body (8" (200mm) valve size only). Insert the clapper-mounting-ring subassembly into the handhold opening of the Deluge Valve using caution to not damage or dislodge the mounting ring O-ring (8" (200mm) valve size only). Align the mounting ring so that the Lever is near the pushrod and the mounting ring "ears" are between the tabs of the valve body. Insert the seat into the valve body and through the clapper-mounting ring subassembly. Start to tread the seat into the body by hand, then tighten the seat with the seat wrench until it bottoms out on the mounting ring. Verify that the seat-clapper-mounting ring subassembly is in the fully down position between the tabs of the body, and check to see that the lever lines up with the pushrod. Reassemble the handhold cover and set up the Model DDX Deluge Valve as per the section "Resetting Model DDX Type PL Double Interlock Preaction System."

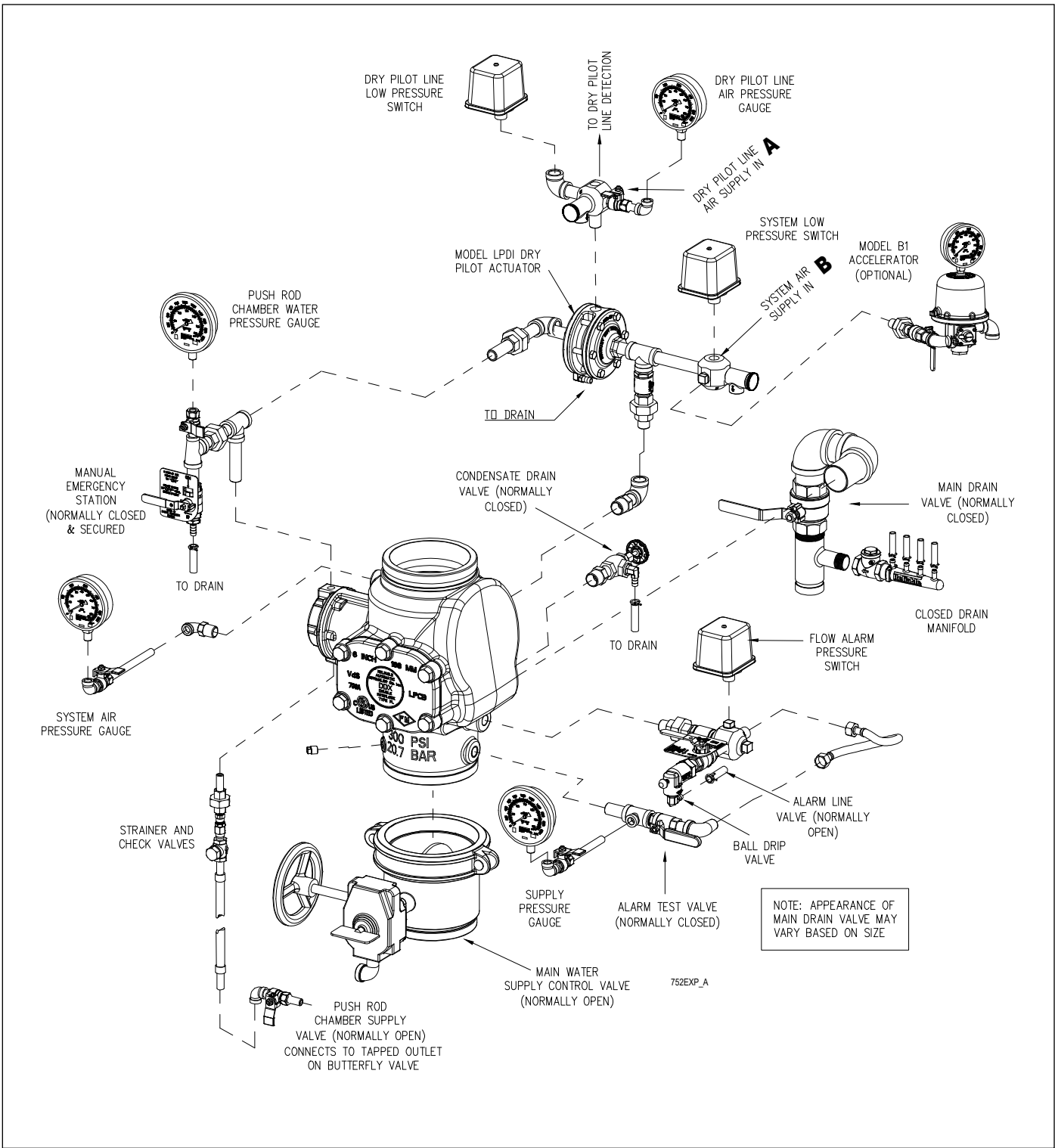


Fig. 5

Pushrod Chamber Maintenance - Model DDX Deluge Valve

A small bleed hole is located on the underside of the pushrod chamber. Water leakage from the bleed hole can be caused by a ruptured pushrod diaphragm:

- a) Disable detection system.
- b) Shut down the valve controlling water supply to the Deluge Valve. Relieve the inlet pressure by opening the main drain valve. Close the pushrod chamber supply valve and open the Model B Manual Emergency Station.
- c) Remove the trim at the unions nearest to the pushrod chamber cover.
- d) Take the pushrod chamber cover off by removing the six retaining screws.
- e) Visually inspect the pushrod chamber cover and piston to determine what could have damaged the diaphragm and then correct. Install a new diaphragm.
Note: The diaphragm has two different surfaces; it is not bi-directional and will fail if installed backwards. Roll the diaphragm so that the smooth surface (the pressure side) conforms to the inside of the pushrod chamber cover and the fabric side engages the pushrod.
- f) Reassemble the six retaining screws with an installation torque of 15 foot-pounds in a star pattern.
- g) Set up the Model DDX Deluge Valve as per the section "Resetting Model DDX Type PL Double Interlock Praction System."

Draining Excess/Condensate 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.
5. Close Condensate Drain Valve.
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.

Ordering Information

Specify:

Model DDX Type PL Double Interlock Praction System

- **Size**
- **End Configuration**
- **Trim Assembly**
 - Loose Trim
 - Segmentally Assembled
 - Fully Assembled no Control Valve
 - Fully Assembled with Control Valve

Service Kits

Service kits are available for routine servicing of the valve (reference Figure 7). 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

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

Note: Early generation 4" and 6" Model DDX valves utilize a drop-in brass clapper. Service kits for early Model DDX valves are as follows:

4" Early generation DDX Deluge Valve Service Kit: PN 6501200R07

6" Early generation DDX Deluge Valve Service Kit: PN 6501200R08

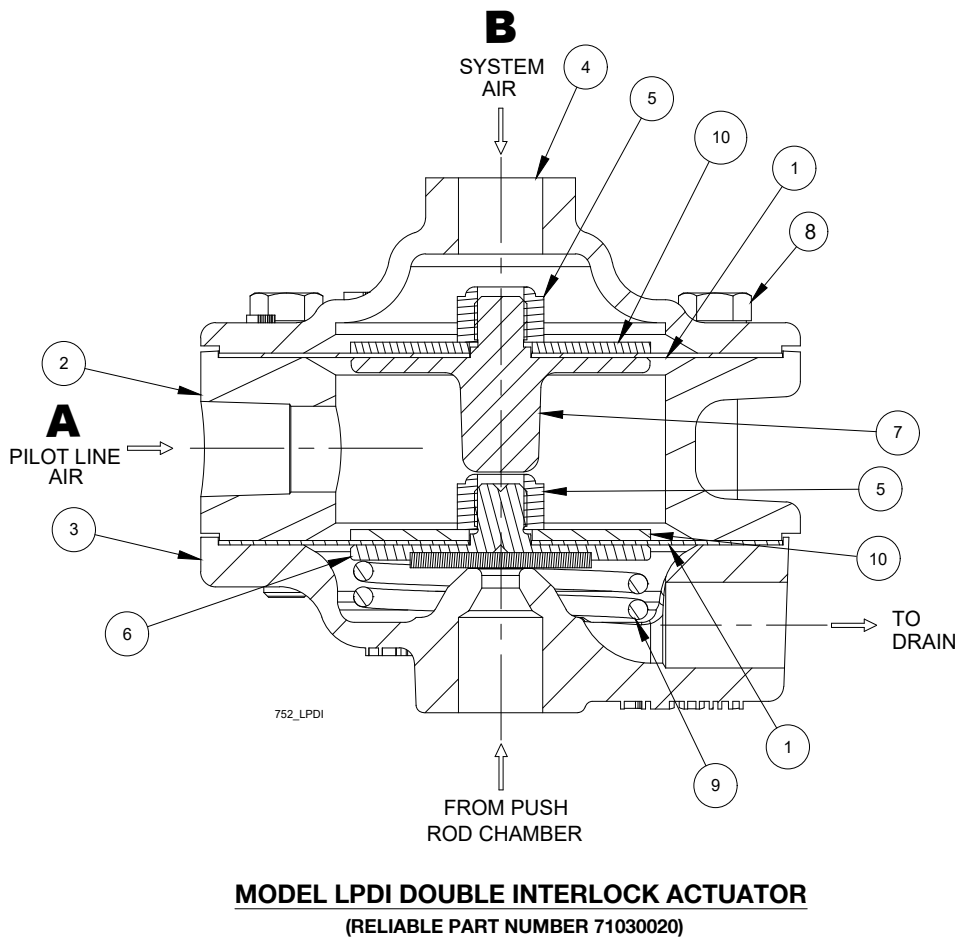


Fig. 6

Model LPDI Dry Pilot Line Actuator Parts List

Item No.	Part No.	Description	Qty. Required
1	92206312	Diaphragm	2
2	94106943	Middle Housing	1
3	94126937	Upper Housing	1
4	94126938	Lower Housing	1
5	94906406	Facing Plate Nut	2
6	95106912	Facing Plate Assembly	1
7	95106916	Upper Facing Plate	1
8	95606305	Bolt	6
9	96406902	Compression Spring	1
10	96906311	Diaphragm Washer	2

Maintenance – Model LPDI Dry Pilot Line Actuator

If water constantly flows through the Model LP Dry Pilot Actuator, or if the actuator will not set up, the diaphragm/seal assembly may need replaced.

1. Close the main valve controlling water supply to the system, and close the air or nitrogen supply to the system.
2. Remove air or nitrogen pressure from the system.
3. Remove the actuator from the trim at the nearest convenient points.
4. Remove six bolts holding the actuator housings together.
5. Clean and inspect all interior surfaces. Replace the diaphragm/seal assembly.
6. Reassemble the actuator using a torque of 12 ft-lbs. on the six bolts in a cross-tightening pattern.
7. Reinstall the actuator and set up the system following the section "Resetting Model DDX Type PL Double Interlock Praction Systems."

MODEL DDX VALVE WITH STAINLESS STEEL SCREW-IN SEAT

IMPORTANT NOTE: Early generation 4" and 6" DDX valves may incorporate a brass drop-in seat. Prior to ordering replacement parts, confirm the presence of a stainless steel screw-in seat or brass drop-in seat. For replacement parts for valves with brass drop-in seat, please contact Reliable Sprinkler Company Technical Services (techserv@reliablesprinkler.com)

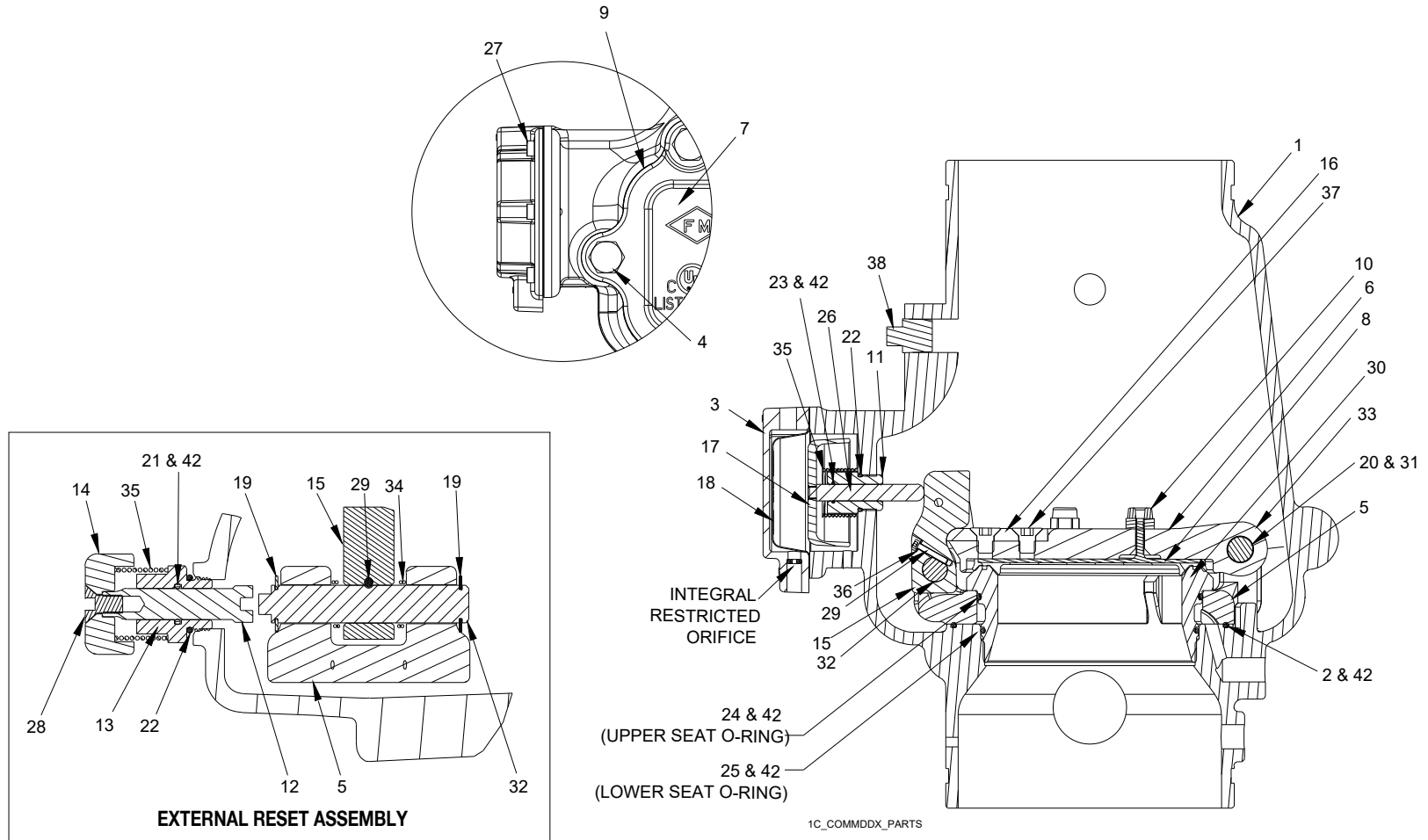


Fig. 7

Model DDX (Screw-In Seat Configuration) Deluge Valves Parts List (Refer to Fig. 7)

Item No.	Part No.								Part Description	QTY.	Material
	2" (50mm)	2½" (65mm)	76mm	3" (80mm)	4" (100mm)	165mm	6" (150mm)	8" (200mm)			
1	91006011	91006012	91006023	91006013	91006005	91006027	91006007	91006028	Valve Body Groove/Groove	1	Ductile Iron 65-45-12
	N/A	N/A	N/A	N/A	91006045	N/A	91006067	N/A	Valve Body Flange/Groove		
	N/A	N/A	N/A	N/A	91006035	N/A	91006037	91006039	Valve Body Flange/Flange		
2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	95406414	O-ring (Mounting Ring)	1	Buna-N
3	71040416								Pushrod Cover Assembly	1	Ductile Iron 65-45-12 & Brass C360000
4	91106123			N/A	N/A	N/A	N/A	N/A	Hex Bolt ½"-13 x 1¼"	6	Zinc Plated Steel
	N/A			95606107	N/A	N/A	N/A	N/A	Hex Bolt ½"-13 x 1½"	6	
	N/A			N/A	91106006	N/A	N/A	N/A	Hex Bolt ⅝"-11 x 1¼"	6	
	N/A			N/A	N/A	95606110	N/A	N/A	Hex Bolt ⅝"-11 x 2"	8	
5	91306013			91306014	91306016	91306018	91306018	Mounting Ring	1	Stainless Steel CF8 or CF8M	
6	91916003			91916014	91916016	91916008	91916008	Clapper	1	Stainless Steel CF8 or CF8M	
7	92116063			92116064	92116065	92116066	92116068	Access Cover	1	Ductile Iron 65-45-12	
8	93416003			93416014	93416016	93416008	93416008	Seal Assembly	1	Stainless Steel 304 & EPDM	
9	93706003			93706004	93706006	93706008	93706008	Access Cover Gasket	1	Buna-N or Neoprene	
10	93722000			93722000	N/A	N/A	N/A	N/A	Bumpstop Assembly	1	Stainless Steel UNS S31600 & EPDM
	N/A			N/A	93722000	N/A	N/A	N/A		2	
	N/A			N/A	N/A	93722000	93722000	93722000		3	
11	93916006								Pushrod Guide	1	Acetal
12	93916066								Reset Shaft	1	Brass UNS C36000
13	94106066								Reset Housing	1	Brass UNS C36000
14	94356006								Reset Knob	1	Aluminum 6061
15	94506003			94506004	94506016	94506008	94506008	Lever	1	Stainless Steel UNS S17400	
16	95006412			94006412	95006410	95006410	95006410	Striker	1	Aluminum Bronze C95400	
17	95106006								Piston	1	Stainless Steel CF8M
18	95276006								Diaphragm	1	EPDM & Polyester
19	95306267			N/A	N/A	N/A	N/A	N/A	Retaining Ring, ⅜" Shaft, Lever Pin	2	Stainless Steel 15-7 or 17-7
	N/A			95306267	N/A	N/A	N/A	N/A	Retaining Ring, ½" Shaft, Lever Pin		
	N/A			N/A	95306269	N/A	N/A	N/A	Retaining Ring, ⅝" Shaft, Lever Pin		
	N/A			N/A	N/A	95316408	N/A	N/A	Retaining Ring, ¾" Shaft, Lever Pin		
20	95306268			N/A	N/A	N/A	N/A	N/A	Retaining Ring, ⅜" Shaft, Hinge Pin	2	Stainless Steel 15-7 or 17-7
	N/A			95306267	95306267	N/A	N/A	N/A	Retaining Ring, ½" Shaft, Hinge Pin		
	N/A			N/A	N/A	95316408	N/A	N/A	Retaining Ring, ¾" Shaft, Hinge Pin		
21	95406007								O-Ring, Reset Housing ID	1	Buna-N
22	95406024								O-Ring, Reset Housing & Pushrod Guide OD	2	Buna-N
23	95406407								O-Ring, Pushrod Guide ID	1	Buna-N
24	95406410			95406409	95436126	95406413	95406413	O-Ring, Upper Seat	1	Buna-N	
25	95406411			95406420	95446226	95406412	95406412	O-Ring, Lower Seat	1	Buna-N	
26	95506006								Pushrod	1	Stainless Steel UNS S30300
27	95606114								Socket Head Screw, ¼"-20 x ⅝"	6	Steel
28	95606127								Flat Head Socket Cap Screw ⅜"-16 x ¾"	1	Steel
29	95606133			N/A	N/A	N/A	N/A	N/A	Socket Head Screw #6-32 x ½"	1	Stainless Steel 18-8
	N/A			95606130	95606130	95606130	95606130	95606130	Socket Head Screw #10-32 x 1"		Stainless Steel UNS S31600
30	96016003			96016014	96016016	96016008	96016008	Seat	1	Stainless Steel CF8M	
31	96206003			N/A	N/A	N/A	N/A	N/A	Hinge Pin	1	Stainless Steel UNS S30400
	N/A			96216086	96216068	96206008	96206008	96206008			Stainless Steel UNS S21800
32	96216003			N/A	N/A	N/A	N/A	N/A	Lever Pin	1	Stainless Steel UNS S17400
	N/A			96216044	96216047	96216008	96216008	96216008			Stainless Steel UNS S21800
33	96310003			96906904	96906904	96310008	96310008	Clapper Spacer	2	Teflon or Acetal	
34	96406003			N/A	N/A	N/A	N/A	N/A	Lever Spring	1	Stainless Steel UNS S30400
	N/A			96406004	96406005	96406008	96406008	96406008			Stainless Steel UNS S31600
35	96406906								Piston/ Reset Spring	2	Stainless Steel UNS S31600
36	96906112			N/A	N/A	N/A	N/A	N/A	Spring Lock Washer, #6	1	Stainless Steel 18-8
	N/A			96906111	96906111	96906111	96906111	96906111	Spring Lock Washer, #10		Stainless Steel UNS S31600

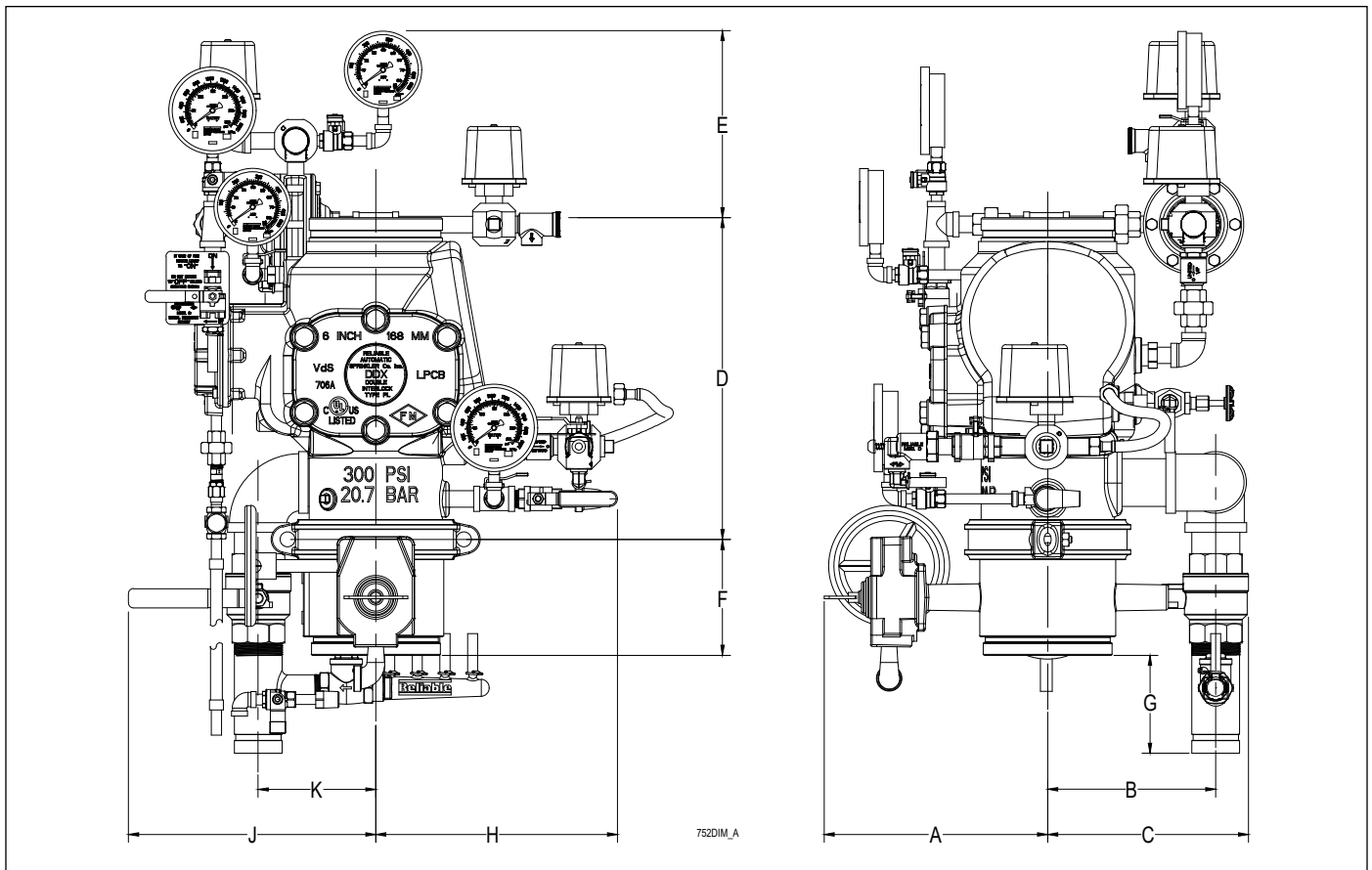


Fig. 9

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	10-1/4 (260)	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	10-1/4 (260)	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)	9 (229)	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)	8-3/4 (222)	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)	11-1/2 (292)	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 8; also reference Bulletin 519).
3. Not applicable to 76mm or 165mm systems, or systems using a flanged inlet Model DDX valve.

The equipment presented in this bulletin is to be installed in accordance with the latest published Standards of the National Fire Protection Association, Factory Mutual Research Corporation, or other similar organizations and also with the provisions of governmental codes or ordinances whenever applicable.

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