

Reliable®

**Model DDX
Double Interlock
Preaction System – Type F**
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

- Available with 175 psi (12.1 bar) or 300 psi (20.7 bar) Rated Solenoid Valve
- Externally Resettable Clapper
- One Main Drain
- 8 - 24 PSI (0.6 - 1.7 bar) System Pressure
- Electric / Pneumatic Actuation



Image subject to change.

General

The Reliable Model DDX Type F 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 F double interlock trim package includes a normally closed solenoid valve (175 psi (12.1 bar) or 300 psi (20.7 bar) rated) and the Model LP Dry Pilot Actuator arranged in series as releasing devices. The sprinkler system is pressurized with air or nitrogen (see note 1 below) that keeps the Model LP Dry Pilot Line Actuator closed. Two events must coexist in order to operate the Type F Double Interlock Preaction System: (a) the normally closed solenoid valve must be energized open by a listed releasing control panel when a fire detection device or manual pull station is operated, and (b) the Model LP Dry Pilot Actuator must open due to venting of pneumatic pressure from the system.

In the event that the system piping is ruptured, or a sprinkler head is accidentally opened, the Model LP Dry Pilot Line Actuator will open and a low system air pressure alarm will sound. The Model DDX Deluge Valve, however, will not be released to flow water since the detection system has not activated.

Conversely, in the event of a false alarm from the detection system, the Model DDX Deluge Valve will not release water provided air pressure in the system is maintained and the Model LP Dry Pilot Actuator has not opened. The requirement for both detector operation and loss of system pressure before the Model DDX Type F Double Interlock Preaction system releases water assures maximum protection against inadvertent water flow. Type F Double Interlock Preaction systems are primarily used to protect refrigerated areas where accidental water release can result in frozen pipes, ice blockage, and/or substantial property damage.

At the heart of the Reliable Type F 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 F 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 F Double Interlock Preaction Trims may be equipped with the optional Reliable Model B1 Accelerator, trim kit P/N 651600003. This device acts as an exhaustor which will hasten the operation of the Model LP Dry Pilot Actuator and minimize water delivery time for the system.

Listings & Approvals:

(Only when used with Reliable Trim Sets.)

1. Reliable Type F 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 F 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

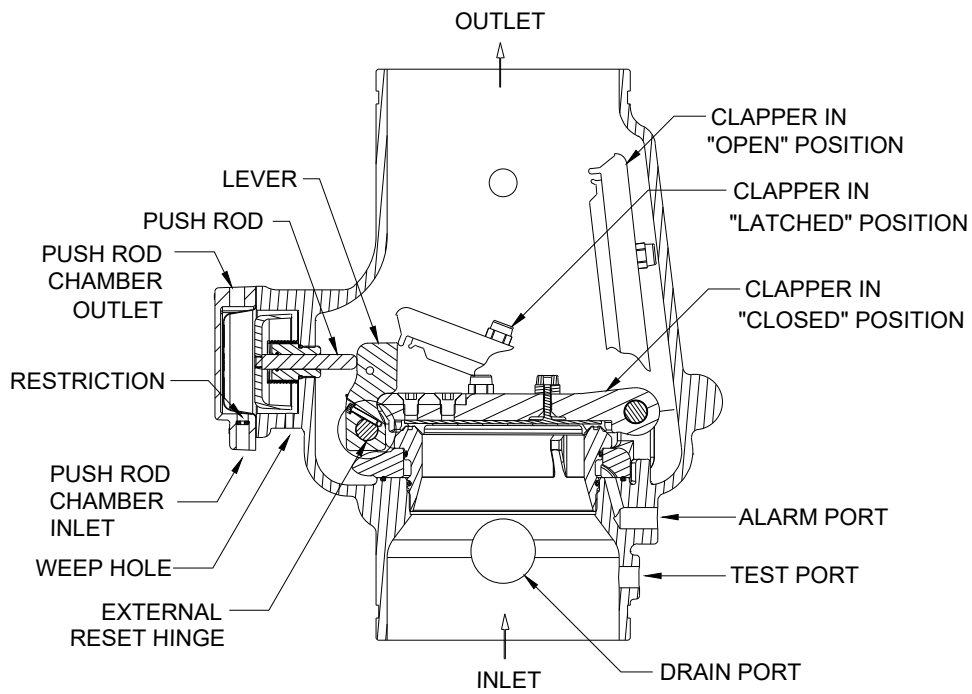
When set correctly for service, the Model DDX Deluge Valve is hydraulically established to separate the supply water from the sprinkler system piping. The Reliable Model DDX Deluge Valve is shown in both closed and open positions in Fig. 1. In the closed position, the supply pressure acts on the underside 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.

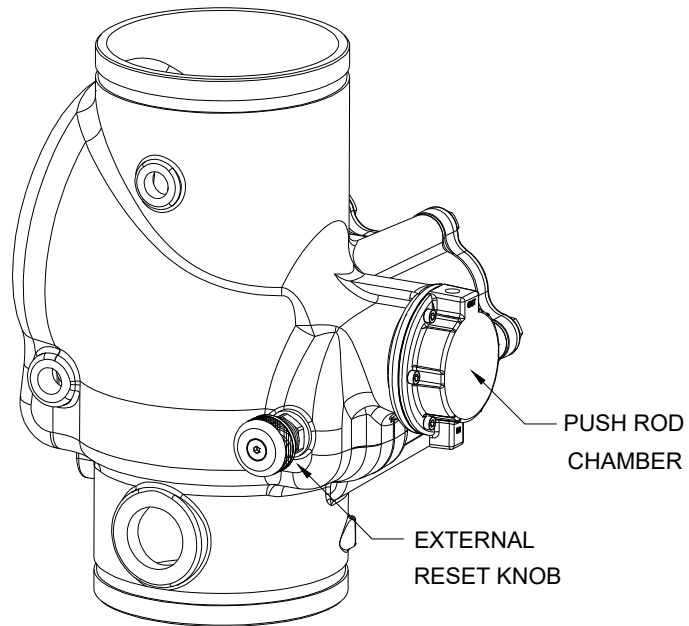
Resetting the clapper of the Model DDX Deluge Valve is accomplished using the convenient external reset knob on the rear of the valve. The external reset feature of the Model DDX Deluge Valve provides a means for simple, economical system testing, which is one essential facet of a good maintenance program.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



MODEL DDX VALVE: SECTION VIEW

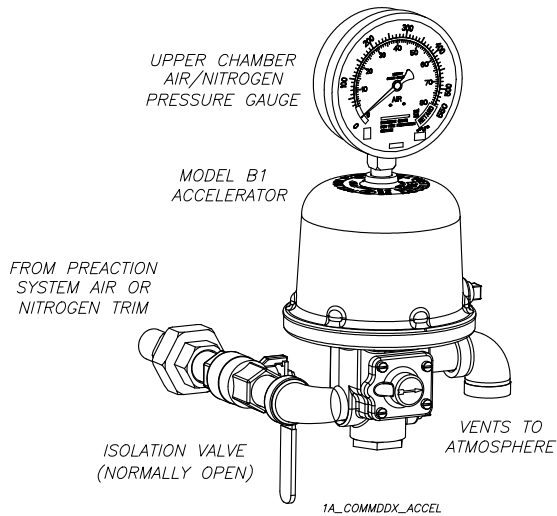
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MODEL DDX VALVE: REAR VIEW

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

Fig. 1



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

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 F 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 Deulge 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.

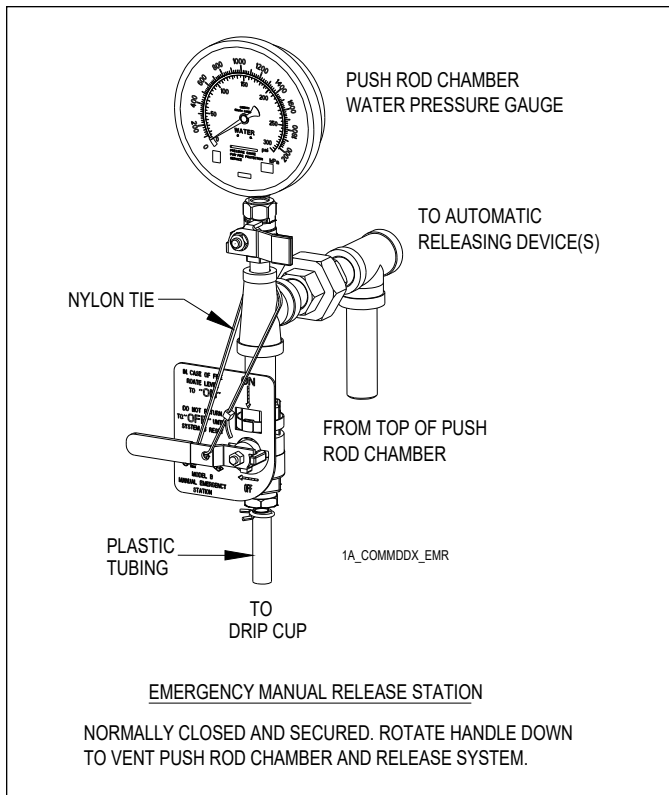


Fig. 3

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, electric releasing control equipment, fire detection devices, manual pull stations, and signaling devices which are utilized with the Type F 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.

The solenoid valve must be operated and the system supervised by a listed releasing control panel.

System Air/ Nitrogen Pressure Requirements

The system trim includes gauges to read the pneumatic and water pressures of the Type F 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 LP 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).

Valve Trip Time Information

The Model LP actuator that operates the Model DDX Type F Double Interlock Preaction 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.

System Electrical Requirements & Low Air/Nitrogen Pressure Supervision

The solenoid valve and detection devices for Type F Double Interlock Preaction Systems may be operated and supervised by the Potter PFC-4410-RC Releasing/ Control Panel. The double interlock function is achieved by the operation of the Model LP Dry Pilot Actuator (due to sprinkler operation) in combination with single interlock operation. Refer to Bulletin 700 "Special Hazards & Special Systems" for additional installation information.

A Potter pressure switch, Model PS25-2 pressure switch, is provided with the Type F 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.

Note: In order for the solenoid valve to maintain a warranty it must remain sealed as it came from the factory. If there are concerns about the valve's internal components, immediate replacement is recommended.

Double Interlock Preaction System

Electric/Pneumatic Release Trim (Type F)

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 F pneumatic/electric 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. Electrical releasing device shall be two-way, normally-closed, pilot operated solenoid valve [cULus Listed] [FM Approved] for its intended use, and a low-pressure pneumatic actuator.
- The solenoid valve shall be constructed of a brass body with stainless steel sleeve tube, springs, stop and plunger, and with ½" female NPT end connections. Solenoid valve shall have a maximum working pressure of [175 psi (12.1 bar)] [300 psi (20.7 bar)] and maximum ambient temperature rating of 150°F (66°C). Power consumption of integrated coil shall be limited to [10 watts (175 psi (12.1 bar) Rated)] [22watts (300 psi (20.7 bar) Rated)] and require 24 VDC from a releasing/control panel listed for such service. Solenoid valve shall be a Parker-Hannifin ½" normally-closed solenoid valve, [Model 73218BN4UNLVNOC111C2 (175 psi (12.1 bar) Rated)] [Model 73212BN4TNLVNOC322C2 (300 psi (20.7 bar) Rated)].
- The low-pressure pneumatic actuator shall be of cast iron construction utilizing a diaphragm and compression spring

design to separate the pushrod chamber water pressure from the system piping's pneumatic supervisory pressure. The low-pressure actuator shall only require between 8 and 28 psi (0.6 to 1.9 bar) supervisory pressure for proper setting in accordance with the manufacturer's instructions. Low-pressure pneumatic actuator shall be Reliable Model LP Dry Pilot 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.

Systems shall be a Reliable Model DDX Type F Double Interlock System, Bulletin 751.

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 100 psi (0.34 to 6.8 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 (0.34 to 5.2 bar). Pressure maintenance device shall be Reliable Model A or Reliable Model B.

(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 1/4" copper connection tubing with galvanized 3/4" x 1/4" 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

Precision 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 [2 1/2" (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's deluge valve, a supplemental electric detection system shall be provided [Insert applicable product specification].

Releasing/Control Panel

A [cULus Listed] [FM Approved] releasing/control panel shall be used to operate the preaction system. The releasing/control panel shall be a conventional, microprocessor-controlled panel containing two initiating device circuits, and waterflow and supervisory inputs. Output circuits shall include alarm, waterflow, supervisory, and releasing circuits. The releasing/control panel shall be capable of providing any of the following desired modes of operation: single hazard, two zone; single hazard, cross-zoned; dual hazard, combined release; and dual hazard, split release (two area). Type F double interlock system shall require the single hazard mode of operation. Releasing/control panel shall be equipped with a local tone alarm to announce loss of AC power; system trouble, circuit trouble, and low auxiliary DC power supply.

Panel shall be [cULus Listed] [FM Approved] and be capable of providing power for compatible detectors and auxiliary devices used. Audible alarms shall be able to be silenced at releasing panel. Auxiliary DC power supply shall consist of (2) 12-volt lead acid batteries of the same ampere-hour rating, providing [60 hours – cULus Listed] [90 hours – FM Approved]. Dry contacts shall be provided for remote annunciation of alarm, trouble, and supervisory panel signals. Main power supply to be a dedicated 120 VAC / 60 Hz circuit.

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.

System Electrical Requirements

All releasing and detection devices in Reliable's Model DDX Type F Double Interlock Preaction System are operated and supervised by the PFC-4410-RC Releasing Control Panel. An emergency manual pull station should be provided near the sprinkler riser to facilitate setup of the system.

The power supply, the standby emergency power supply, battery charger, and the rectifier circuitry are all contained within the Potter PFC-4410-RC Releasing Control Panel. Batteries that provide ninety hours of standby power are required for Factory Mutual Approved systems.

The solenoid valve is operated and supervised by the Potter PFC-4410-RC Releasing Control Panel. The Potter PFC-4410-RC Releasing Control Panel can utilize either 120VAC or 220VAC.

Caution: Repairs or disassembly of the solenoid valve should only be done by a trained technician. An improperly repaired or partially assembled solenoid valve could result in failure of the valve to operate.

Standard Solenoid Valve Specifications:

Parker-Hannifin Model 73218BN4UNLVN0C111C2

Rated working pressure: 175 psi (12.1 bar)

Voltage: 24 VDC

Power: 10 Watts

Current: 0.41 Amps Holding

Enclosure Coil: NEMA 4X

Pipe Size: 1/2" NPT Female

Cv Factor: 4.0

Alternate Solenoid Valve Specifications:

Parker-Hannifin Model 73212BN4TNLVN0C322C2

Rated working pressure: 300 psi (20.7 bar)

Voltage: 24 VDC

Power: 22 Watts

Current: 0.83 Amps Holding

Enclosure Coil: NEMA 4X

Pipe Size: 1/2" NPT Female

Cv Factor: 2.8

Technical Data

The Reliable Model DDX Type F 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
Releasing/Control Panel	Potter #5403550
Model B1 Accelerator Trim Kit	Reliable 323
Low Air Pressure Supervisory Switch	Potter 5401564
Waterflow Pressure Alarm Switch	Potter 5400928

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 SCass 150	6" (150mm)	9½" (241mm)	7/8" (22mm)	11" (279mm)	15/16" (24mm)	8
ISO 7005-2 PN16	6" (150mm)	9¾" (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)	11½" (295mm)	29/32" (23mm)	13½" (343mm)	1" (25.4mm)	12

3. 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

4. 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	19¾" (492mm)
	Flange/ Flange	21¼" (540mm)

5. 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)

6. 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 F Double Interlock	50 lbs (23 kg)	55 lbs (25 kg)



MODEL DDX HYDRAULIC FRICTION LOSS GRAPH

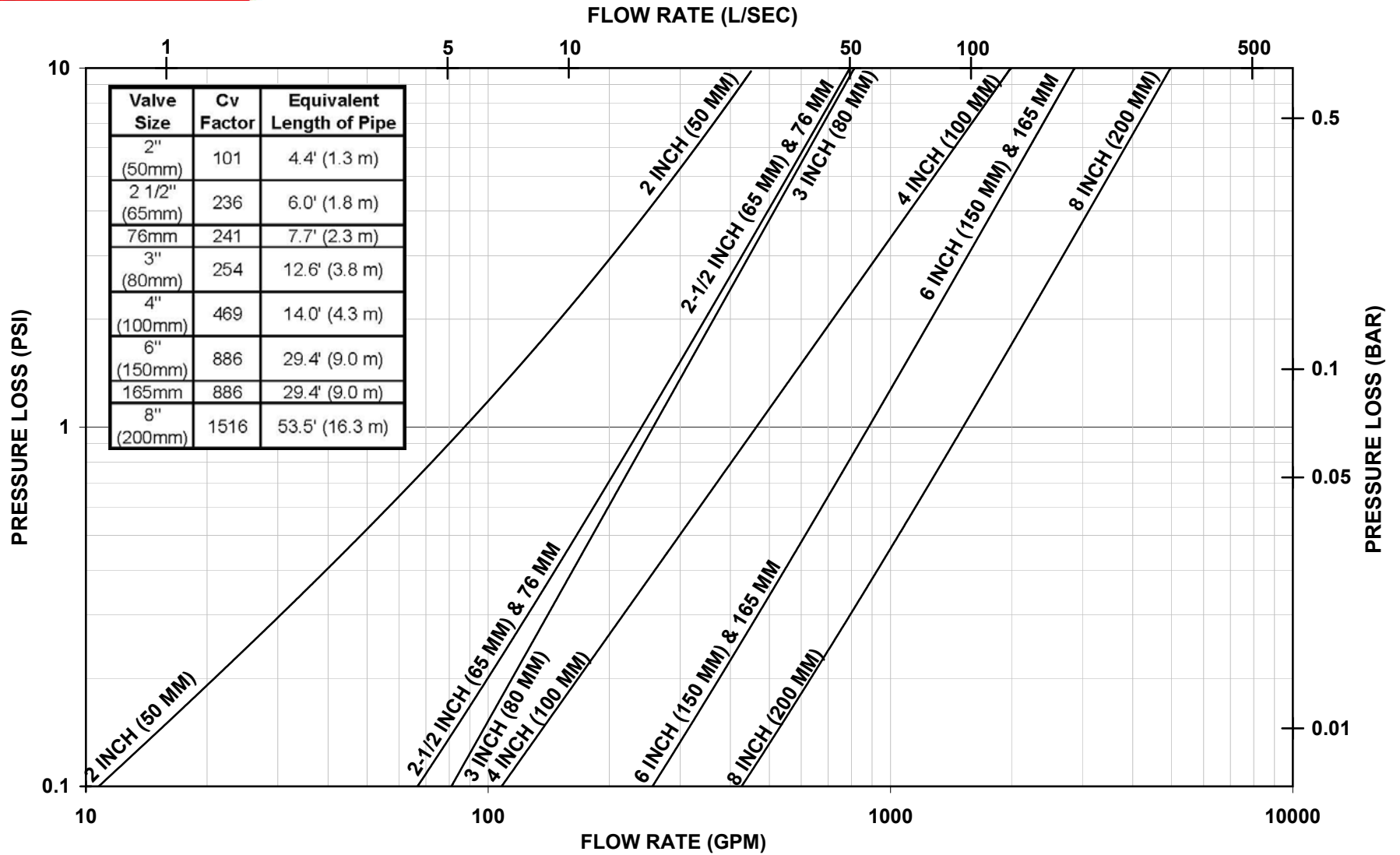


Fig. 4

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 F 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 F 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 F 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. Purge all air from the actuation piping: Open the solenoid valve by operating a detector or an electric manual emergency station. Note that the Model LP Dry Pilot Actuator should also be open since there is no pneumatic pressure on the system.
10. While water is flowing through the solenoid valve AND the actuator, cause the actuator to close first by applying air or nitrogen pressure to the system.
11. Open the air or nitrogen supply quick fill valve to restore supervisory pressure in the sprinkler system and close the dry pilot actuator. Allow the pressure to build to the level specified in Table A, then set the pneumatic supply to automatic operation. **(Note:** To build supervisory air pressure in the sprinkler system, it may be necessary to temporarily close the main drain valve and

the alarm line valve until air pressure has built up to the recommended level.)

12. After the Model LP Dry Pilot Actuator has been set, close the solenoid valve by resetting the release control panel. (All detectors and manual pull stations must be in a normal state before the panel can be reset.)

Note: It is important that the piping between the solenoid valve and the dry pilot actuator is filled with water and not air. This is accomplished by closing the dry pilot actuator FIRST while water is flowing through the device and closing the solenoid valve only AFTER the actuator is completely set.

13. 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.

14. 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.

15. 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., solenoid valve 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 electrical 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.

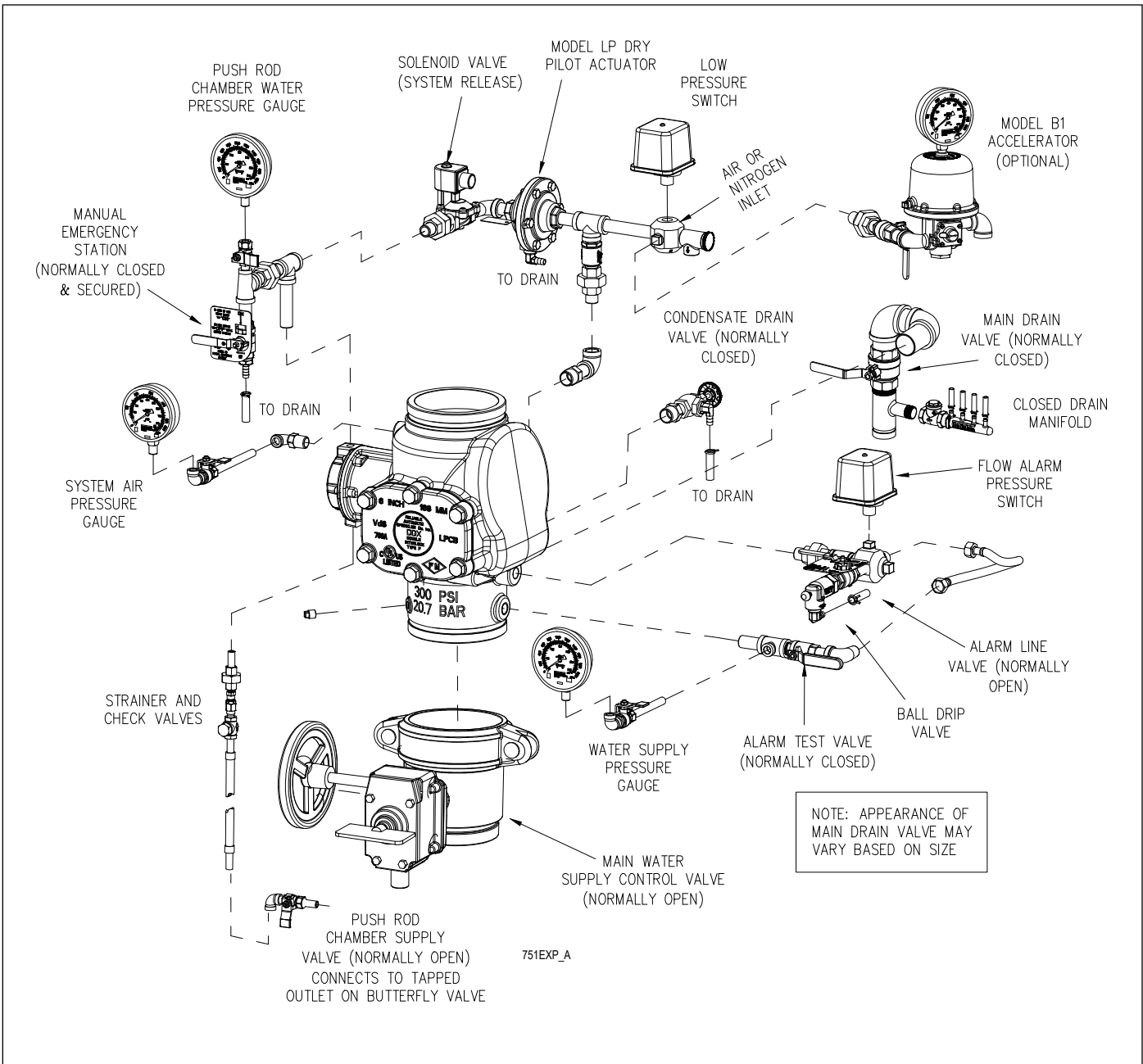


Fig. 5

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 electrical 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), 2 $\frac{1}{2}$ " (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 F Double Interlock Praction System."

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 F Double Interlock Preaction 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.

Maintenance – Model LP 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 halves 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 F Double Interlock Preaction Systems."

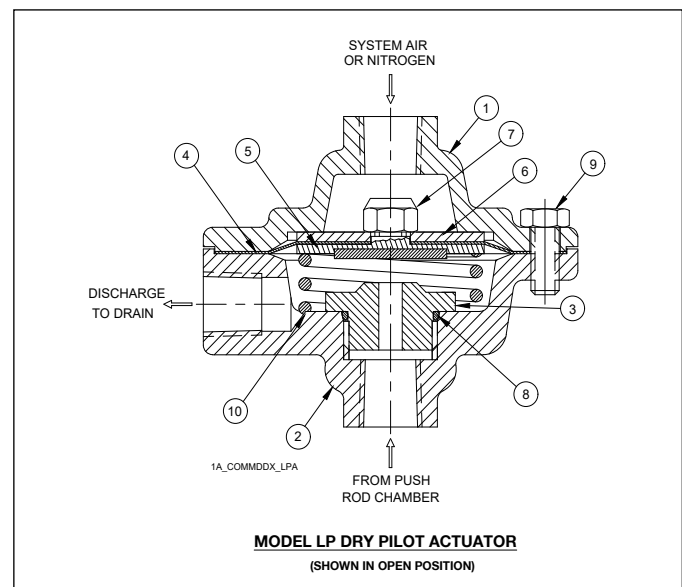


Fig. 6

Model LP Dry Pilot Line Actuator Parts List P/N 71030010

Item No.	Description
1	Lower Housing
2	Upper Housing
3	Seat
4	Diaphragm
5	Facing Plate Assembly
6	Diaphragm Washer
7	Facing Plate Nut
8	Seat O-Ring
9	Bolt
10	Compression Spring

Note: Parts list provided for information only. Available only as an assembly; individual parts are not available.

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)

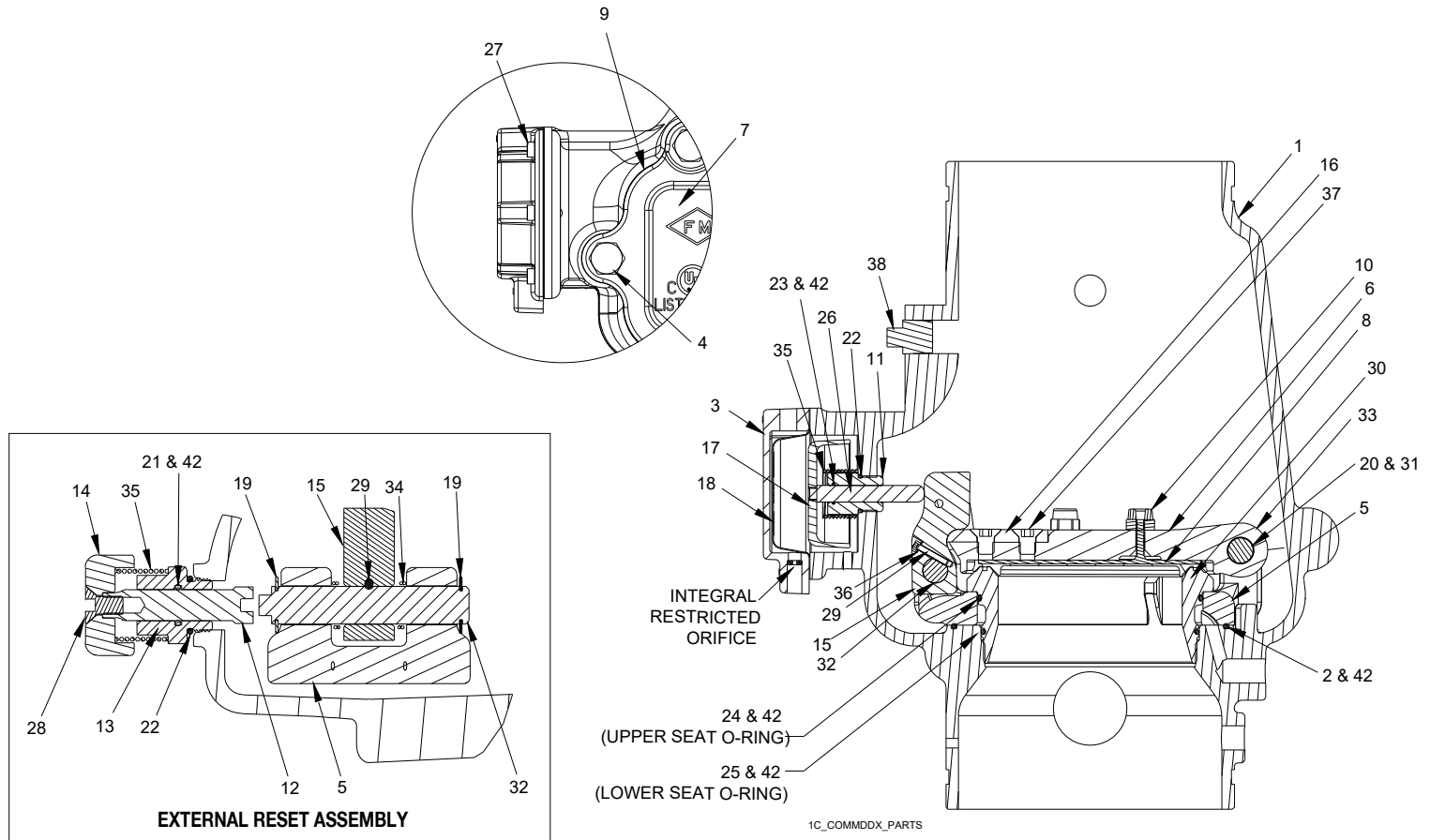


Fig. 7

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		Hex Bolt ½"-13 x 1¼"	6	Zinc Plated Steel	
	N/A			95606107	N/A	N/A	N/A		Hex Bolt ½"-13 x 1½"	6		
	N/A			N/A	91106006	N/A	N/A		Hex Bolt ⅝"-11 x 1¼"	6		
	N/A			N/A	N/A	95606110	N/A		Hex Bolt ⅝"-11 x 2"	8		
5	91306013			91306014	91306016	91306018	N/A		Mounting Ring	1	Stainless Steel CF8 or CF8M	
6	91916003			91916014	91916016	91916008	N/A		Clapper	1	Stainless Steel CF8 or CF8M	
7	92116063			92116064	92116065	92116066	92116068	N/A		Access Cover	1	Ductile Iron 65-45-12
8	93416003			93416014	93416016	93416008	N/A		Seal Assembly	1	Stainless Steel 304 & EPDM	
9	93706003			93706004	93706006	93706008	N/A		Access Cover Gasket	1	Buna-N or Neoprene	
10	93722000			93722000	N/A	N/A	N/A		Bumpstop Assembly	1	Stainless Steel UNS S31600 & EPDM	
	N/A			N/A	93722000	N/A	N/A			2		
	N/A			N/A	N/A	93722000	N/A			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	N/A		Lever	1	Stainless Steel UNS S17400	
16	95006412			94006412	95006410	95006410	N/A		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		Retaining Ring, ⅜" Shaft, Lever Pin	2	Stainless Steel 15-7 or 17-7	
	N/A			95306267	N/A	N/A	N/A		Retaining Ring, ½" Shaft, Lever Pin			
	N/A			N/A	95306269	N/A	N/A		Retaining Ring, ⅝" Shaft, Lever Pin			
	N/A			N/A	N/A	95316408	N/A		Retaining Ring, ¾" Shaft, Lever Pin			
20	95306268			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		Retaining Ring, ½" Shaft, Hinge Pin			
	N/A			N/A	N/A	95316408	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	N/A		O-Ring, Upper Seat	1	Buna-N	
25	95406411			95406420	95446226	95406412	N/A		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		Socket Head Screw #6-32 x ½"	1	Stainless Steel 18-8	
	N/A			95606130	95606130	95606130	N/A		Socket Head Screw #10-32 x 1"		Stainless Steel UNS S31600	
30	96016003			96016014	96016016	96016008	N/A		Seat	1	Stainless Steel CF8M	
31	96206003			N/A	N/A	N/A	N/A		Hinge Pin	1	Stainless Steel UNS S30400	
	N/A			96216086	96216086	96206008	N/A				Stainless Steel UNS S21800	
32	96216003			N/A	N/A	N/A	N/A		Lever Pin	1	Stainless Steel UNS S17400	
	N/A			96216044	96216047	96216008	N/A				Stainless Steel UNS S21800	
33	96310003			96906904	96906904	96310008	N/A		Clapper Spacer	2	Teflon or Acetal	
34	96406003			N/A	N/A	N/A	N/A		Lever Spring	1	Stainless Steel UNS S30400	
	N/A			96406004	96406005	96406008	N/A				Stainless Steel UNS S31600	
35	96406906								Piston/ Reset Spring	2	Stainless Steel UNS S31600	
36	96906112			N/A	N/A	N/A	N/A		Spring Lock Washer, #6	1	Stainless Steel 18-8	
	N/A			96906111	96906111	96906111	N/A		Spring Lock Washer, #10		Stainless Steel UNS S31600	

Ordering Information

Specify:

Model DDX Type F Double Interlock Preaction System

- **Size**
- **End Configuration**
- **Trim Assembly**
 - Loose Trim
 - Segmentally Assembled
 - Fully Assembled no Control Valve
 - Fully Assembled with Control Valve
- **Optional 300 psi (20,7 bar) solenoid 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

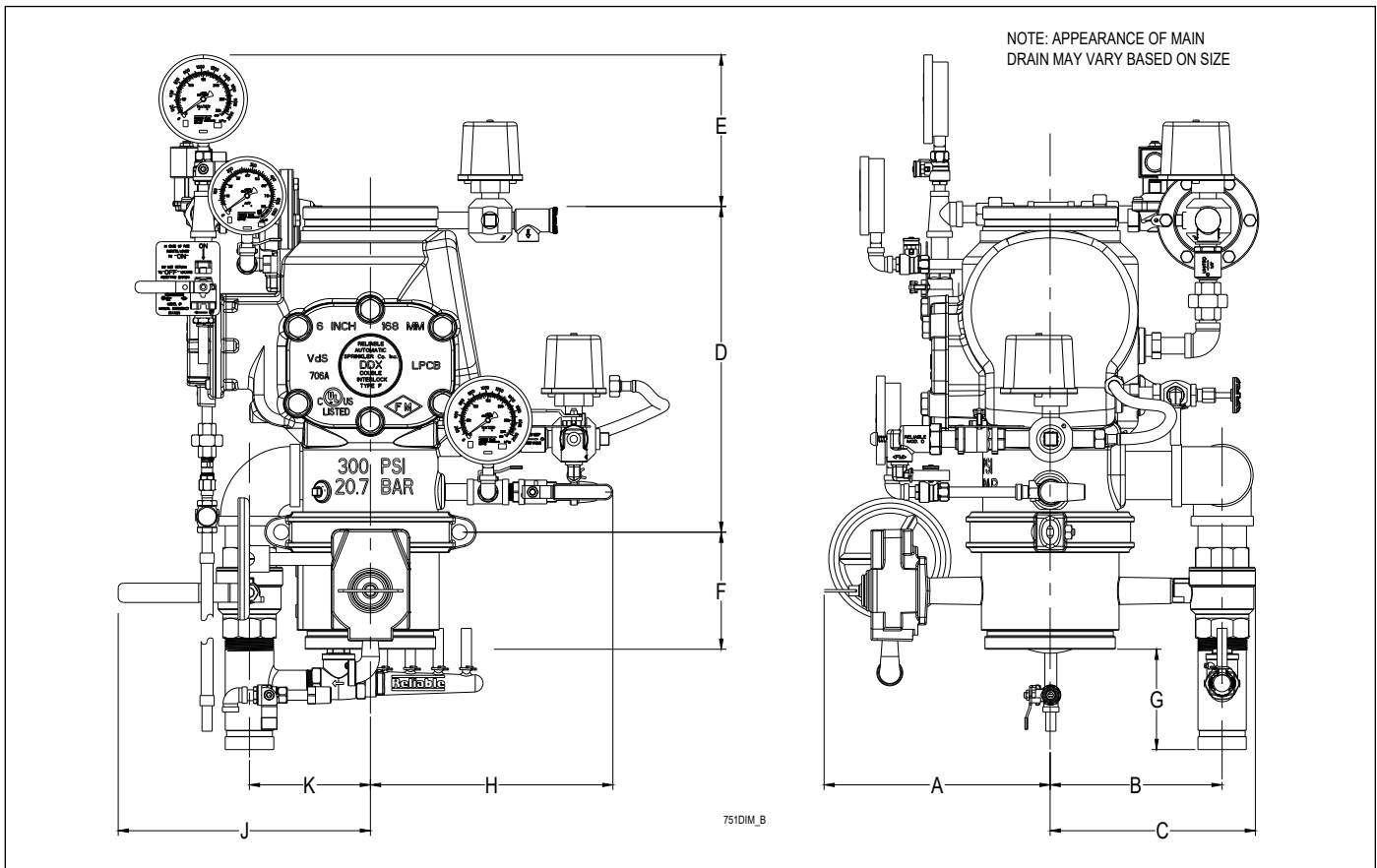


Fig. 9

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)	8-1/8 (206)	9-3/4 (248)	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)	9 (229)	10-5/8 (270)	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)	7-3/4 (197)	9-1/8 (232)	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)	7-3/4 (197)	9-1/8 (232)	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)	7-5/8 (194)	9-1/4 (235)	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 9; 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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