Model DDX Type A (VdS) Single Interlock Preaction/Dry System

4” (100mm), 6” (150mm)

Features

- Externally resettable clapper
- One main drain
- 8-26 psi (0.6 - 1.8 bar) pneumatic supervisory pressure

Product Description

The Reliable Model DDX Type A (VdS) Single Interlock Preaction/ Dry System is designed for water sensitive areas that require the maximum protection from inadvertent water flow into the sprinkler system piping, while at the same time providing automatic operation as a dry pipe system in the event of power disruption to the detection/release system.

The Type A trim includes a normally-closed solenoid valve as the primary release mechanism and a combination normally-open solenoid valve/Model LP actuator as a secondary release mechanism. Under normal conditions, the primary release solenoid remains closed until activated by a listed or approved detection and release system at which time water flows into the system. Also under normal conditions, the second solenoid is energized and held in the closed position by the detection and release system.

In the event of failure of the detection and release system, the primary solenoid remains closed, however, the second solenoid de-energizes to the open position, and the system converts to a low-pressure dry pipe system. In this case, loss of pneumatic pressure in the system results in operation of the Model DDX valve.

If pneumatic pressure in the system is lost during normal conditions (for example, if the system piping is ruptured or a a sprinkler is accidentally opened) the secondary solenoid which is being held closed by the detection and release system prevents the loss of hydraulic pressure holding the Model DDX valve closed. A supervisory pressure switch will signal the loss of pneumatic pressure and water is not allowed into the system.

General Information

At the heart of the Reliable Model DDX Type A (VdS) Single Interlock Preaction/Dry 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.

Note: Pressure gauges and pressure switches shown for reference only and are not provided with system.

The Reliable Model DDX Type A (VdS) Single Interlock Preaction/ Dry System trim provides all of the necessary equipment for connections to the Model DDX Deluge Valve pushrod chamber inlet and outlet ports, a 2” (50 mm) main drain on 4” (100 mm) and 6” (150 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).

Model DDX Type A (VdS) Pipe Technical Data **Table A**

Valve Size	End Connection	Rated Working Pressure	Approvals
4” (100mm)	Groove/Groove	232 psi (16 bar)	VdS
	Flange/Groove		
	Flange/Flange		
6” (150mm)	Groove/Groove		
	Flange/Groove		
	Flange/Flange		

Notes:
1. Grooved ends per ANSI/AWWA C606.
2. Flanged ends per ASME B 16.5 or ISO7005-2 PN16 (specify).

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. 2. 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 holds the clapper closed against normal supply pressure surges.

When the detection system operates (preaction mode) or when a fire sprinkler opens (dry pipe mode), 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 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 A Preaction/Dry Pipe 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).

Reliable Model DDX Deluge Valve with associated Type A Preaction/ Dry Pipe Trim sizes 4” (100 mm) and 6” (150 mm) are rated for use at a minimum water supply pressure of 20 psi (1.4 bar) and a maximum water supply pressure of 300 psi (20.7 bar) for 4” (100mm) and 6” (150mm) valve sizes. Water supplied to the inlet of the valve and to the pushrod chamber must be maintained between 40°F (4°C) and 140°F(60°C).

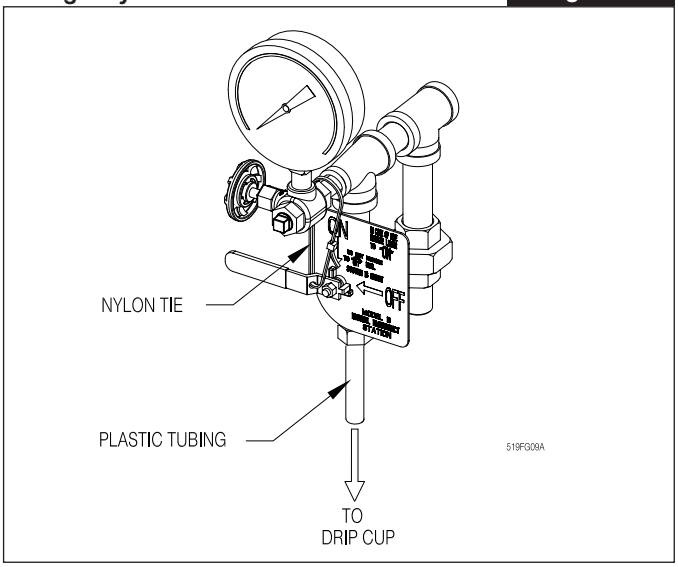
Pressurizing Line Connection

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.

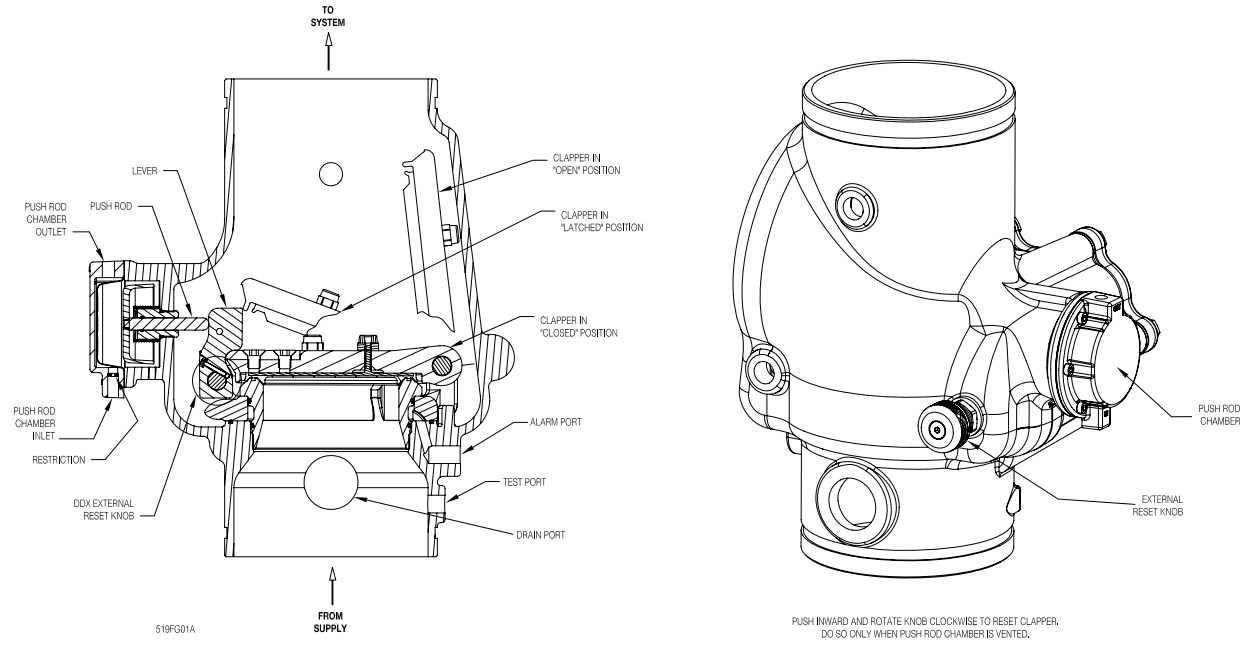
This connection must be made on the supply side of the water supply control valve. This can be accomplished by using a tapped connection directly below or next to the main water supply control valve using a welded outlet or the appropriate mechanical fittings. A grooved-end outlet coupling is one way 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.

Model B Hydraulic Manual Emergency Station **Figure 1**



Valve Body Components **Figure 2**



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 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.

Note: 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 A Preaction/Dry Pipe System must be VdS approved.

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 40ºF (4ºC).

Note: Heat Tracing is not permitted.

Pendent sprinklers, other than dry pendents, used on preaction systems shall be installed on return bends where permitted by NFPA 13.

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

System Air/ Nitrogen Pressure Requirements

The system trim includes gauges to read the pneumatic and water pressures of the Type A Preaction/Dry Pipe System . Table B 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. See Reliable Bulletin 251 and 254 for complete information on air and nitrogen regulating equipment.

System Pneumatic Pressure **Table B**

Maximum Water Pressure psi (bar)	Minimum Air/Nitrogen Pressure psi (bar)
20 (1.4)	8 (0.6)[2]
30 (2.1)	10 (0.7)[2]
50 (3.4)	12 (0.8)[2]
75 (5.2)	13 (0.9)
100 (6.9)	15 (1.0)
125 (8.6)	16 (1.1)
150 (10.3)	17 (1.2)
175 (12.1)	18 (1.2)
200 (13.8)	19 (1.3)
225 (15.5)	21 (1.4)
250 (17.2)	22 (1.5)
275 (19.0)	23 (1.6)
300 (20.7)	24 (1.7)

Notes:
1. Pneumatic pressure less than the minimum specified will result in inadvertent operation of the system.
2. Pneumatic pressure higher than the minimum specified may result in delayed operation of the system.
Caution! Where the maximum water pressure is 20 psi (1.4 bar), 30 psi (2.1 bar) or 50 psi (3.4 bar) the maximum pneumatic pressure cannot exceed the 10 psi (.7 bar) 14 psi (1 bar) and 16 psi (1.1 bar) respectively. This may prohibit the use of a tank-less air compressor (see note 4).
3. The use of a listed pressure maintenance device such as the Reliable Model A or Model DD in conjunction with a tank-mounted air compressor or nitrogen generator incorporating a tank is highly recommended, even for single systems. (This is an NFPA 13 requirement for multiple systems fed from a common source.)
4. Where a tank-less compressor is used, the “start/on” setting of the pressure switch shall not be less than the minimum pneumatic pressure in the table. The “stop/off” pressure will be determined by the required differential of the compressor pressure switch.
5. During set-up, higher pneumatic pressure may temporarily be required to set the Model LP Actuator. Following set-up, lower the pneumatic pressure of the system to be in accordance with the table.
6. In no case should the pneumatic pressure exceed 30 psi (2.1 bar) to prevent damage to the actuator diaphragm.

LP Dry Pilot Actuator Characteristics **Table C**

Maximum Water Pressure psi (bar)	Nominal Trip Point psi (bar)
20 (1.4)	5 (0.36)
30 (2.1)	5 (0.36)
50 (3.4)	7 (0.51)
75 (5.2)	9 (0.63)
100 (6.9)	10 (0.72)
125 (8.6)	11 (0.78)
150 (10.3)	12 (0.83)
175 (12.1)	13 (0.9)
200 (13.8)	13 (0.9)
225 (15.5)	14 (1)
250 (17.2)	14 (1)
275 (19.0)	14 (1)
300 (20.7)	14 (1)

Note:
1. The Dry Pilot Actuator differential should be used as the “Dry Valve Differential” for valves using the Reliable Model LP Dry Pilot Actuator. Actual trip points may vary ± 2 psi due to the design of the actuator.

System Electrical Requirements

The solenoid valves and detection devices for Type A Preaction/ Dry Pipe System s may be operated and supervised by a listed Releasing/ Control Panel.

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.

Model DDX Type A (VdS) Single Interlock Preaction/Dry System Engineering Specifications

General Description

Provide and install a preaction/dry pipe system utilizing a [4" (100 mm)][6" (150 mm)], VdS Certified, hydraulically operated, differential latching clapper-type valve with Type A trim. Deluge Valve construction shall be of lightweight, ductile iron construction with a screw in stainless steel seat and clapper assembly. Seat shall have O-ring seals to separate water and pneumatic pressure from the intermediate chamber.

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 to be groove both ends, flanged both ends, or flanged inlet by grooved outlet. Grooves to be per ANSI/AWWA C606. Flanges to be per either ASME B16.5 or ISO 7005. Valve trim shall consist 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 2" main drain. Primary releasing mechanism (for preaction mode) shall be a two-way, normally closed pilot operated solenoid valve listed or approved for its intended use. Secondary releasing mechanism (for dry pipe mode) shall be a two-way normally open pilot operated solenoid valve listed or approved for its intended use, in front of and in series with, a pneumatic actuator.
- The primary solenoid valve (normally closed, energize to open) shall be Buschjost-Norgren 8241200.9101.02400. Secondary solenoid valve (normally open, energize to close) shall be Buschjost-Norgren 8241201.9101.02400.
- 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 26 psi (0.6 to 1.8 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.

System shall be a Reliable Type A Preaction/Dry Pipe System, Bulletin 754.

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 listed or approved automatic pressure maintenance device for each system 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 (0.34 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 preaction system piping, and be capable of restoring normal air pressure in the system within the time limits specified by NFPA 13. Preaction system shall only require between 8 and 24 psi (0.6 to 1.7 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.

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. System shall require between 8 and 24 psi (0.6 to 1.7 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.

System Electrical Requirements

All releasing and detection devices of the Model DDX Type A (VdS) Single Interlock Preaction/Dry System must be operated and supervised by a listed or approved Releasing Control Panel. An emergency manual pull station should be provided near the sprinkler riser to facilitate setup of the system.

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.

Technical Data

Reliable Model DDX Type A (VdS) Single Interlock Preaction/Dry System, with associated trim, size 4" (100 mm) and 6" (150 mm) are rated for use at minimum water supply pressure of 20 psi (1.4 bar) and maximum supply pressure of 232 psi (16.0 bar) for 4" (100mm) and 6" (150mm) valve sizes. Water supplied to the inlet of the valve and to the pushrod chamber must be maintained between 40°F (4°C) and 140°F (60°C).

Model DDX Deluge Valve

1. Rated working pressure:300 psi (20.7 bar)
2. Trim connections: NPT threaded per ANSI B 2.1
3. End connections:
   - Grooved Inlet and Outlet
   - Flanged Inlet and Grooved Outlet
   - Flanged Inlet and Outlet

Note: Grooved ends per ANSI/AWWA C606; Flanged ends per ASME B16.5 or ISO 7005.

4. Valve color: Red
5. Face to Face dimensions

Table D

Valve Size	End Connection	End to End
4" (100mm)	Groove/ Groove	14" (356mm)
	Flange/ Groove	16" (406mm)
	Flange/ Flange	16" (406mm)
6" (150mm)	Groove/ Groove	16" (406mm)
	Flange/ Groove	19" (483mm)
	Flange/ Flange	19" (483mm)

6. Valve Shipping Weight

Table E

Valve Size:	End Connection:	Weight:
4" (100mm)	Groove/ Groove	64 lbs (29 kg)
	Flange/ Groove	79 lbs (36 kg)
	Flange/ Flange	92 lbs (42 kg)
6" (150mm)	Groove/ Groove	95 lbs (43 kg)
	Flange/ Groove	122 lbs (56 kg)
	Flange/ Flange	138 lbs (69 kg)

7. Trim Shipping Weight

Table F

Trim Configuration	4" (100 mm) & 6" (150 mm)
Type A Preaction/Dry Pipe	55 lbs (25 kg)

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

Table G

Valve Size:	Equivalent Length:		Cv
	C = 120	C = 100	
4" (100mm)	14 ft (4.3 m)	10 ft (3.0 m)	469
6" (150mm)	29.4 ft (9.0 m)	20.9 ft (6.4 m)	886

9. Installation position: Vertical

Trim Descriptions

The Type A Preaction/Dry Pipe Trim for the Reliable Model DDX Deluge Valve is arranged for rapid, easy, and compoact attachment, and serves as connection points to Reliable Model C Mechanical Alarms and other devices.

The Type A Preaction/Dry Pipe trim 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).

Reset Procedure

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. Verify all water has drained form the alarm line. Verify that condensate drain on back of deluge valve is closed.
6. With the Model B Manual Emergency Station open, push in and rotate the Deluge Valve's external reset knob counterclockwise (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. Open the primary solenoid valve by operating a detector or an electric manual emergency station.
10. While water is flowing through the primary solenoid valve, cause the solenoid to close.
11. Open the secondary solenoid valve by dropping power to the panel or the solenoid. Note that the Model LP Dry Pilot Actuator should also be open since there is no pneumatic pressure on the system.
12. 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. 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.
13. 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.
14. 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.
15. Verify that the pushrod chamber supply valve is open. The pushrod chamber supply valve must remain open when the Deluge Valve has been reset, to maintain water pressure in the pushrod chamber.
16. 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. Inspect the bleed hole on the underside of the pushrod chamber for air or water leakage.
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.
5. Dry pilot trim — Inspect air pressure for conformance to Table B.
6. Releasing devices — Check 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. Verify all water has drained from the alarm line.
8. Deluge valve operational test — Open the Model B Manual Emergency Station. **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.

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.
4. Operation of the detection 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 4" valves
- 70 ft-lbs. (95 N-m) for 6" 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.
    - 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.
    - 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 and air/nitrogen supply to the 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 ¼ to ½ 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 ¼" globe valve, followed by the ¾"x¼" 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 6881604000 for 4" (100mm) valve size and Reliable P/N 6881606000 for the 6" (150mm) 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. 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 Preaction Alarm Valve Station Type A."

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:

1. Disable detection system and air/nitrogen supply to the system.
2. 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.
3. Remove the trim at the unions nearest to the pushrod chamber cover.
4. Take the pushrod chamber cover off by removing the six retaining screws.
5. 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.
6. Reassemble the six retaining screws with an installation torque of 15 foot-pounds in a star pattern.
7. Set up the Model DDX Deluge Valve as per the section "Reset Procedure."

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

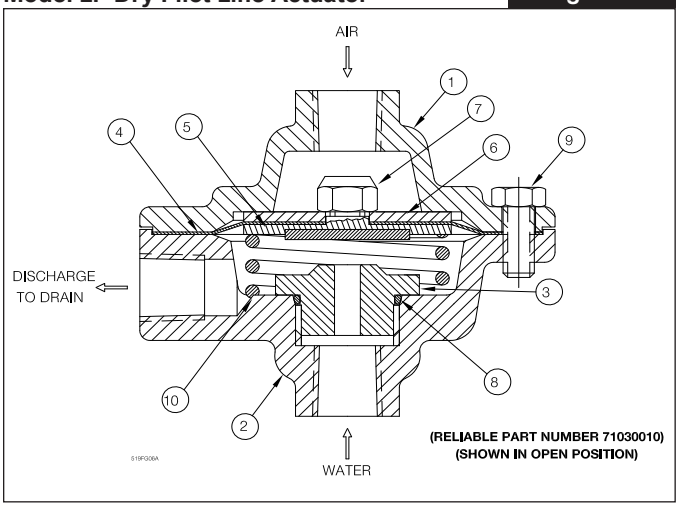
If water constantly flows through the Model LP Dry Pilot Actuator, or if the actuator will not set up, the actuator may need to be serviced or replaced.

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 13 ft-lbs. on the six bolts in a cross-tightening pattern.
7. Reinstall the actuator and set up the system following the section "Reset Procedure."

Model LP Dry Pilot Line Actuator Parts List (P/N 71030010) — **Table H**

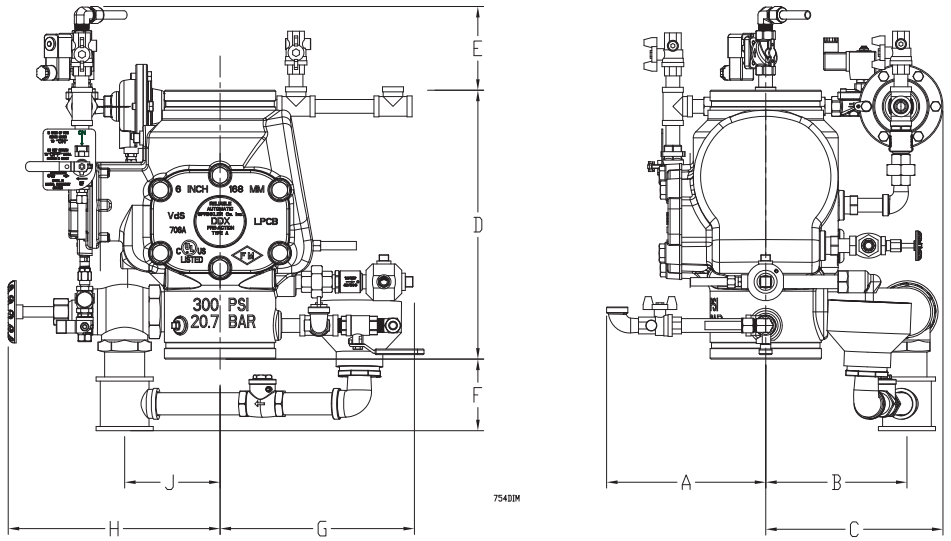
Item No.	Description
1	Lower Housing
2	Upper Housing
3	Seat
4	Diaphragm
5	Facing Plate Assembly
6	Diaphragm Washer
7	Facing Plate Nut
8	Seat O-Ring
9	Bolt
10	Compression Spring

Model LP Dry Pilot Line Actuator — **Figure 3**



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

Figure 4



Note: Dimension C is to the back edge of the lower drain trim or back edge of the upper release trim depending on valve size, and references the maximum projection of the valve trim.

Valve Dimensions (refer to Figure 4)

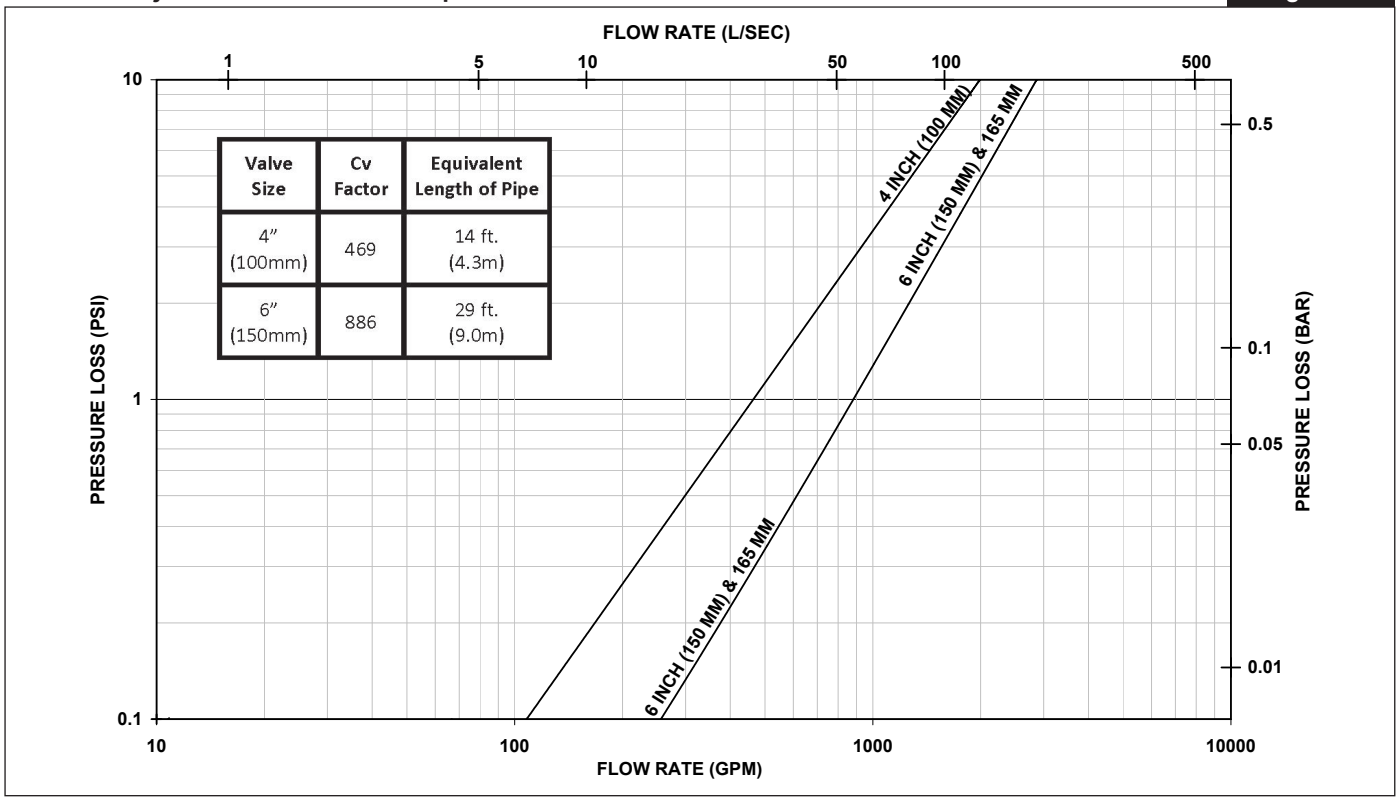
Table I

Nominal Pipe Size	Installation Dimensions in Inches (mm)									
	A	B	C	D(1)	D(2)	E	F	G	H	J
4” (100 mm)	9-1/2 (241)	7-3/4 (197)	9-3/4 (248)	14 (356)	16 (406)	5 (127)	5 (127)	11-5/8 (295)	12-3/4 (324)	5-3/4 (146)
6” (150 mm)	9-1/2 (241)	8-1/2 (215)	10-1/2 (267)	16 (406)	19 (483)	5 (127)	4-1/2 (114)	12-1/4 (311)	12-3/4 (324)	5-3/4 (146)

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 6; also reference Bulletin 519).

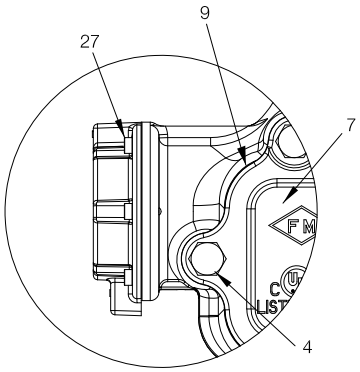
Model DDX Hydraulic Friction Loss Graph

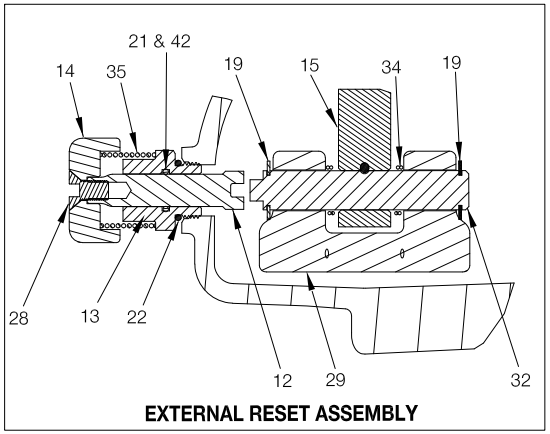
Figure 5



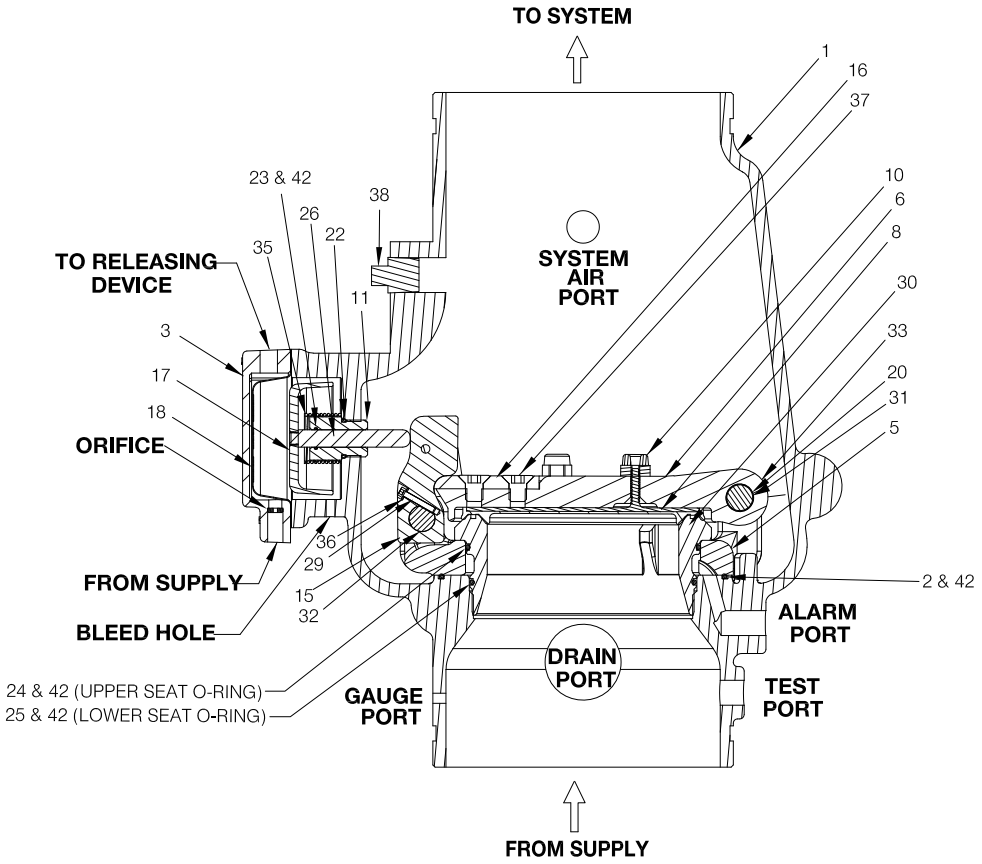
MODEL DDX VALVE WITH STAINLESS STEEL SCREW-IN SEAT

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)





519FG12B



Model DDX (Screw-In Seat Configuration) Deluge Valves Parts List (Refer to Fig. 6) **Table J**

Item No.	Part No. 4" (100mm)	Part No. 6" (150mm)	Part Description	QTY.	Material
1	91006005	91006007	Valve Body Groove/Groove	1	Ductile Iron 65-45-12
	91006045	91006067	Valve Body Flange/Groove		
	91006035	91006037	Valve Body Flange/Flange		
2	N/A	N/A	O-ring (Mounting Ring)	1	Buna-N
3	71040416		Pushrod Cover Assembly	1	Ductile Iron 65-45-12 & Brass C360000
4	N/A	N/A	Hex Bolt ½"-13 x 1¼"	6	Zinc Plated Steel
	95606107	N/A	Hex Bolt ½"-13 x 1½"	6	
	N/A	91106006	Hex Bolt ⅝"-11 x 1¾"	6	
	N/A	N/A	Hex Bolt ⅝"-11 x 2"	8	
5	91306014	91306016	Mounting Ring	1	Stainless Steel CF8 or CF8M
6	91916014	91916016	Clapper	1	Stainless Steel CF8 or CF8M
7	92116064	92116066	Access Cover	1	Ductile Iron 65-45-12
8	93416014	93416016	Seal Assembly	1	Stainless Steel 304 & EPDM
9	93706004	93706006	Access Cover Gasket	1	Buna-N or Neoprene
10	93722000	N/A	Bumpstop Assembly	1	Stainless Steel UNS S31600 & EPDM
	N/A	93722000		2	
	N/A	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	94506004	94506016	Lever	1	Stainless Steel UNS S17400
16	95006412	95006410	Striker	1	Aluminum Bronze C95400
17	95106006		Piston	1	Stainless Steel CF8M
18	95276006		Diaphragm	1	EPDM & Polyester
19	N/A	N/A	Retaining Ring, ⅜" Shaft, Lever Pin	2	Stainless Steel 15-7 or 17-7
	95306267	N/A	Retaining Ring, ½" Shaft, Lever Pin		
	N/A	95306269	Retaining Ring, ⅝" Shaft, Lever Pin		
	N/A	N/A	Retaining Ring, ¾" Shaft, Lever Pin		
20	N/A	N/A	Retaining Ring, ⅜" Shaft, Hinge Pin	2	Stainless Steel 15-7 or 17-7
	95306267	95306267	Retaining Ring, ½" Shaft, Hinge Pin		
	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	95406409	95436126	O-Ring, Upper Seat	1	Buna-N
25	95406420	95446226	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	N/A	N/A	Socket Head Screw #6-32 x ½"	1	Stainless Steel 18-8
	95606130	95606130	Socket Head Screw #10-32 x 1"		Stainless Steel UNS S31600
30	96016014	96016016	Seat	1	Stainless Steel CF8M
31	N/A	N/A	Hinge Pin	1	Stainless Steel UNS S30400
	96216086	96216086			Stainless Steel UNS S21800
32	N/A	N/A	Lever Pin	1	Stainless Steel UNS S17400
	96216044	96216047			Stainless Steel UNS S21800
33	96906904	96906904	Clapper Spacer	2	Teflon or Acetal
34	N/A	N/A	Lever Spring	1	Stainless Steel UNS S30400
	96406004	96406005			Stainless Steel UNS S31600
35	96406906		Piston/ Reset Spring	2	Stainless Steel UNS S31600
36	N/A	N/A	Spring Lock Washer, #6	1	Stainless Steel 18-8
	96906111	96906111	Spring Lock Washer, #10		Stainless Steel UNS S31600

Ordering Information

Specify:

Model DDX Type A (VdS) Single Interlock Preaction/Dry System

- Size
  - 4" (100mm)
  - 6" (150mm)
- End Configuration
  - Grooved both ends
  - Flanged both ends
  - Flanged inlet, Grooved outlet
- Trim Assembly
  - Loose Parts
  - Segmentally Assembled
  - Fully Assembled no Control Valve
  - Fully Assembled with Control Valve

Note: Pressure switches (low air and flow alarm) and pressure gauges are not included with trim and must be ordered separately.

Service Kits

Service kits are available for routine servicing of the valve (reference Figure 6). 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 Gen DDX Deluge Valve Service Kit: PN 6501200R07
6" Early Gen DDX Deluge Valve Service Kit: PN 6501200R08

P/N 9999970527