

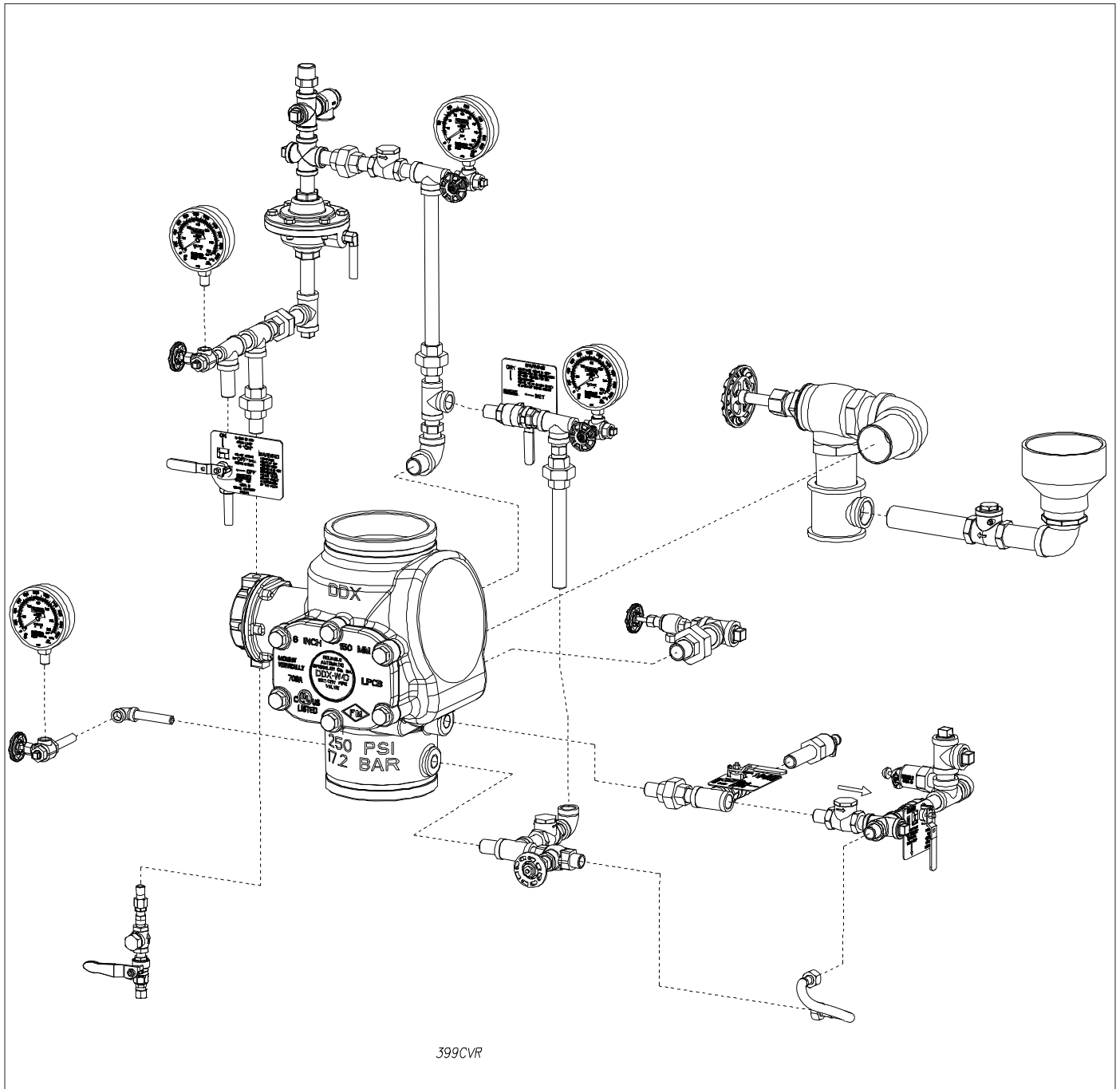
Reliable®

Model DDX-W/D Wet/ Dry Pipe Valve System 100mm (4"), 150mm (6") & 165mm Sizes

Bulletin 399 Rev. A

Instructions for Installation, Operation, Care and Maintenance

- 0,7 to 1,8 Bar (10 to 26 PSI)
- Pneumatic Pressure
- Externally Resettable Clapper
- One Main Drain
- No Priming Water Requirement



General Description

The Reliable Model DDX-W/D Dry Pipe Valve is a hydraulically operated latch-type valve (see Fig. 1) designed for use as a primary control valve in a low pressure dry pipe valve system, or an alarm valve in a wet system. The trim set used with the Model DDX-W/D Wet/ Dry Pipe Valve contains the Reliable Model LP Dry Valve Actuator releasing device, which is used in the Dry Pipe configuration. This allows the system's air or nitrogen pressure requirement to be considerably less than the available water supply pressure (see Table A). The following benefits are a direct result of lower air pressure requirements:

1. In reduced temperature area systems, lower air pressure decreases the possibility of ice plugs, which could impede or prevent the flow of water to sprinkler heads in the event of a fire.
2. Lower air pressure (volume) will enable smaller capacity, lower cost dehydration equipment when it is required.
3. Lower air or nitrogen pressure can reduce water delivery time when the system actuates, and in some cases, may eliminate the need for an accelerator.
4. Lower pressure requirements make the use of dry nitrogen gas, instead of air, practical even on larger systems. Resulting benefits include a lower than air dew point, which minimizes ice plugging of system lines, and enhances "user friendliness" during installation and operation.
5. System maintenance is simplified since priming water is not required and the Model DDX-W/D Valve can be reset externally without cover removal. This is accomplished by turning the external reset knob at the rear on the Model DDX-W/D Valve (see Fig. 1). This feature provides a significant system-restoration time advantage.

The Model DDX-W/D Wet/ Dry Valve's trim set (see Fig. 2) provides all of the necessary equipment for connections to the pushrod chamber's inlet and outlet ports, the 50mm (2") main drain, alarm devices, air supply, water supply, and required pressure gauges. This trim set is available in individual parts, in time-saving, segmentally assembled kit forms, or fully assembled to the Model DDX-W/D Wet/Dry Valve.

All the sizes of the Model DDX-W/D Wet/Dry Valve trim sets may be equipped with the optional Reliable Model B1 Accelerator, trim kit P/N 6516000003, (see Figs. 2 & 3). This device acts as an exhaustor, when used in the Dry Pipe configuration, which will hasten the operation of the Model LP Dry Valve Actuator and minimize the water delivery time for the entire system.

System Operation

Dry Pipe Configuration:

The Reliable Model DDX-W/D Wet/Dry Valve is shown in both the 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 push-

rod chamber's inlet restriction. The resultant force due to the supply pressure acting on the pushrod is multiplied by mechanical advantage of the lever and is more than sufficient to hold the clapper closed against normal supply pressure surges.

When a sprinkler operates, there will be a loss of air or nitrogen pressure in the sprinkler system's piping which will cause the Model LP Dry Valve Actuator to open. The opening of this device allows a releasing discharge of water from the pushrod chamber's outlet connection. Since the pressure cannot be replenished through the inlet restriction as rapidly as it is vented, 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 Wet/Dry Valve into the system piping. Water also flows through the Wet/Dry Valve's alarm outlet to the alarm devices.

After system shutdown, resetting the Model DDX-W/D Wet/Dry Valve is quite simple. Doing so only requires turning the reset knob at the rear of the valve (see Fig. 1). The external reset feature of the Model DDX-W/D Wet/Dry 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.

In the event that water builds up inside the valve due to condensate from the air supply or water left inside from valve system testing, a drain is available for venting. After closing the main supply valve, a small valve over the drain cup 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 Hydraulic Manual Emergency Release Station (see Fig. 4) is also included in the Model DDX-W/D Wet/Dry Valve trim set. 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, as shown in Fig. 4, 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 temperatures conditions are high, the water temperature in the Model DDX-W/D Wet/Dry Valve's pushrod chamber could possibly increase, thereby increasing the pressure in the chamber to values exceed-

ing 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 12,1 bar (175 PSI)

Wet Pipe Configuration:

When the Reliable Model DDX-W/D Valve is used in the wet pipe configuration, the side chamber inlet is closed and the Model B Hydraulic Manual Emergency Station is turned to the ON position. This allows the pushrod in the Model DDX-W/D Wet/Dry Valve's pushrod chamber to move away from the lever. When the system piping is full of water, the differential caused by the alarm intermediate chamber will cause the clapper to remain in the closed position, not requiring the latch to keep the clapper in the closed position. When a sprinkler operates, there will be a loss of water pressure in the system piping and above the clapper. This pressure drop will continue until the differential ratio of the valve is reached, and the clapper will move to the open position.

Once the clapper has opened, the lever acts as a latch, preventing the clapper from closing. This allows water to flow through the Wet/Dry Valve to the sprinkler system. Water also flows through the Wet/Dry Valve's alarm outlet to the alarm devices.

After shutdown, resetting the Model DDX-W/D Wet/Dry Valve is quite simple. Doing so only requires turning the reset knob at the rear of the valve (see Fig. 1). The external reset feature of the Model DDX-W/D Wet/Dry 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.

Hydrostatic Testing of DDX Valves and DDX Systems

As required by NFPA 13, fire sprinkler systems with working pressures up to and including 10,3 bar (150 psi) are to be hydrostatically tested at a water pressure of 13,8 bar (200 psi) and maintain that pressure without loss for two hours. Fire sprinkler systems with working pressures above 10,3 bar (150 psi) are required to be hydrostatically tested at 3,4 bar (50 psi) above the system working pressure and maintain that pressure without loss for two hours. 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 note 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 does not need to 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 reference 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 pump settings, underground construction work, or an improper venting of trapped air in the water supply piping.

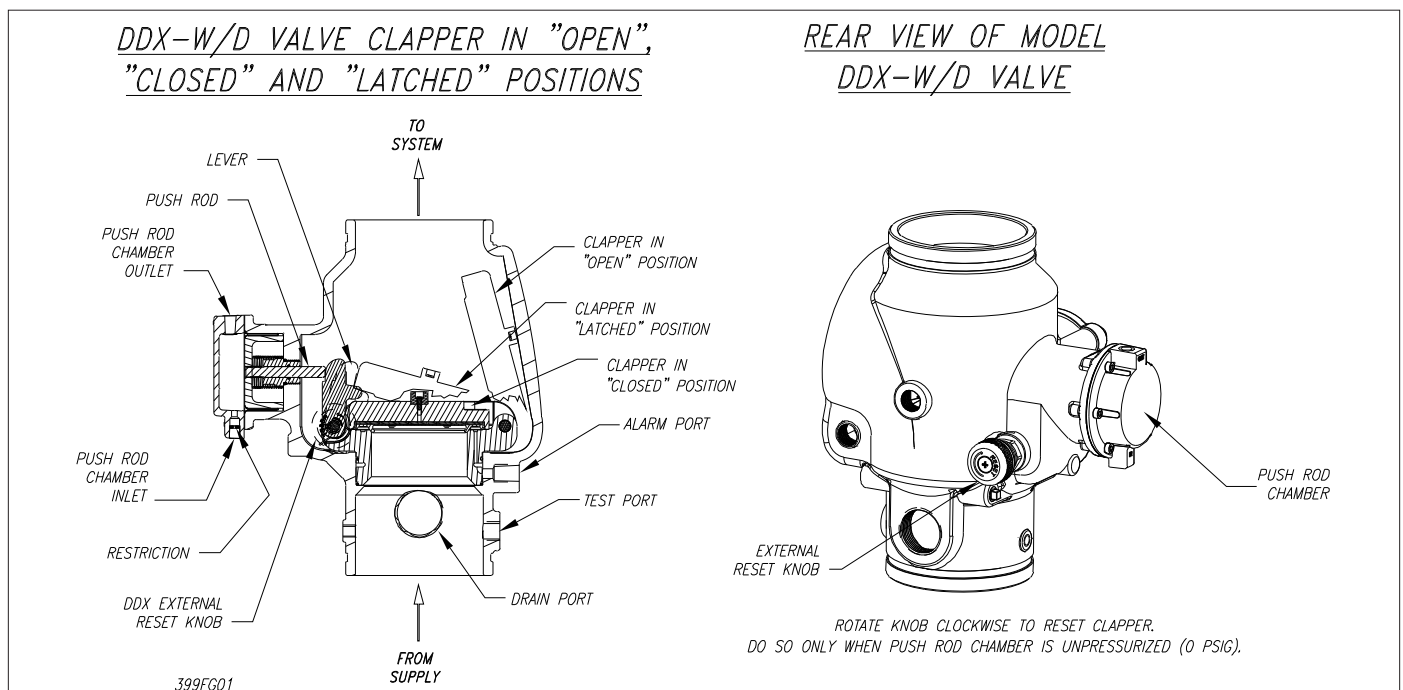
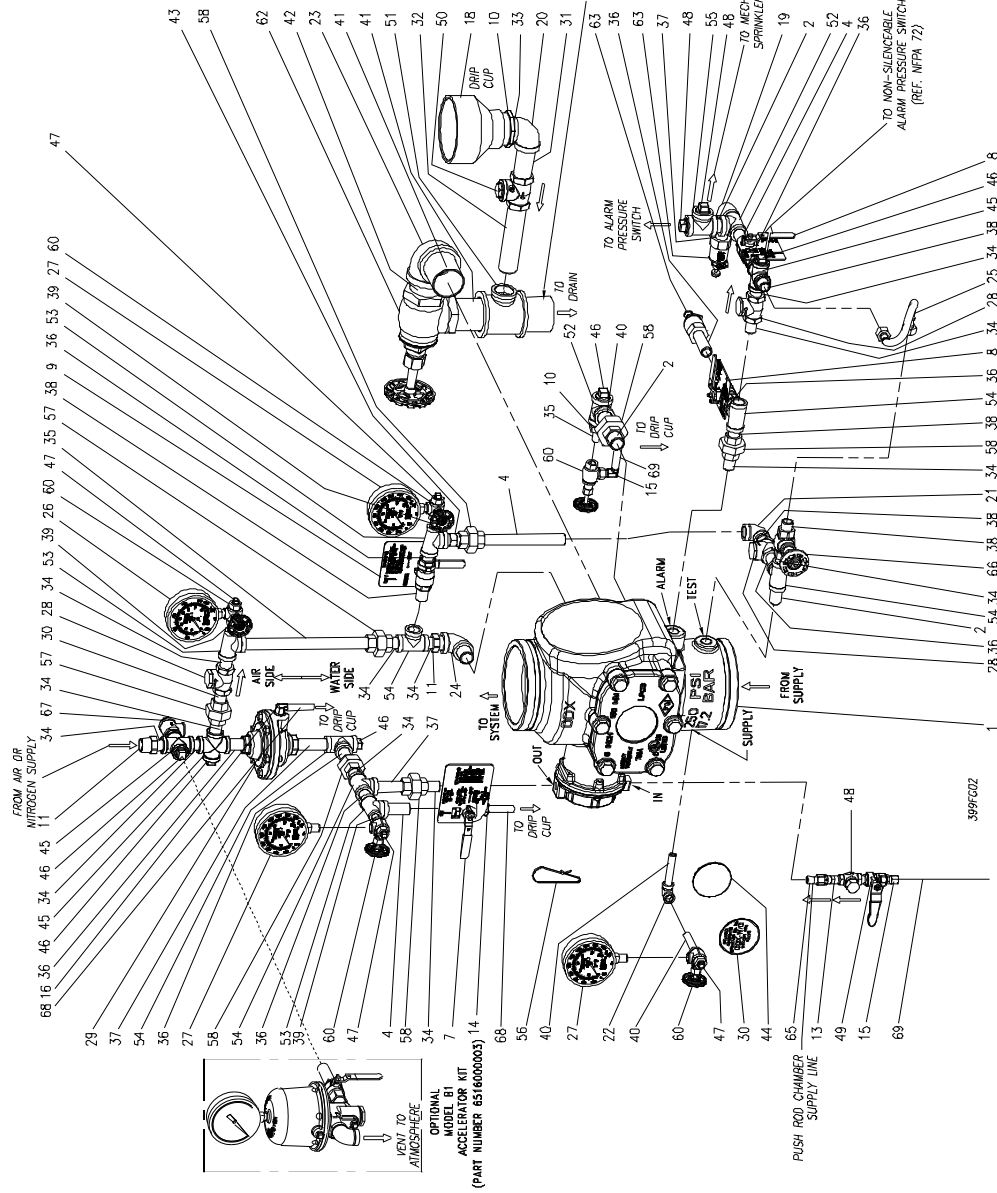


Fig. 1

MODEL DDX-W/D WET/DRY PIPE VALVE TRIM



- AVAILABLE TRIM CONFIGURATIONS:**
- 1) INDIVIDUAL PARTS (MODEL DDX-LP DRY PIPE VALVE SOLD SEPARATELY)
 - 2) SEGMENTALLY ASSEMBLED (MODEL DDX-LP DRY PIPE VALVE SOLD SEPARATELY)
 - 3) FULLY ASSEMBLED TO MODEL DDX-LP DRY PIPE VALVE WITHOUT CONTROL VALVE

ALL STEEL COMPONENTS OF THE TRIM ASSEMBLIES ARE GALVANIZED

Fig. 2.

Model DDX Wet/Dry Valve System Parts List (Refer to Fig. 2)

Item No.	Part No.	Description	Qty.
1	6103060031	Assembly, Model DDX W/D Valve, 6"	1
	6103040033	Assembly, Model DDX W/D Valve, 4"	
	6103060032	Assembly, Model DDX W/D Valve, 165mm	
2	98543279	Nipple, 3/4" X Close (For 4" Ass'y Only)	2
		Nipple, 3/4" x Close For 6" & 165mm Ass'y Only	3
3	98543228	Nipple, 1/2" x 4-1/2" (For 4" Ass'y Only)	1
	98543211	Nipple, 1/2" x 6-1/2" (For 6" & 165mm Ass'y Only)	
4	98543210	Nipple, 1/2" x 2-1/2" (For 4" Ass'y Only)	2
		Nipple, 1/2" x 2-1/2" (For 6" & 165mm Ass'y Only)	3
5	98543207	Nipple, 1/2" x 4" (For 4" Ass'y Only)	1
6	98543232	Nipple, 3/4" x 2" (For 4" Ass'y Only)	2
		Nipple, 3/4" x 2" (For 6" & 165mm Ass'y Only)	1
7	78653005	Assembly, Manual Emergency Station	1
8	78653004	Assembly, Valve Caution Station, 1/2"	2
9	78653030	Assembly, Wet/Dry Valve	1
10	98048015	Bushing, Reducer, 2" Spigot x 1" NPTF, PVC	1
11	98048022	Bushing, Reducer, 3/4" x 1/2"	2
12	98048025	Bushing, Reducer, 3/4" x 1/4"	1
13	96816902	Check Valve, 1/4" In Line	1
14	92056810	Connector, 3/8" I.D. Tube x 1/2" NPT	1
15	92056702	Connector, 3/8" Tubing x 1/4" NPT	1
16	92056704	Connector, Elbow, 3/8" I.D. Tube x 1/2" NPT	1
17	92056705	Connector, Elbow, 3/8" I.D. Tube x 1/4" NPT	1
18	98050004	Drain Cup, PVC	1
19	98174400	Elbow, Street, 1/2"	1
20	98174403	Elbow, 1"	1
21	98174401	Elbow, 1/2"	1
22	98174404	Elbow, 1/4"	1
23	98174405	Elbow, 2"	1
24	98174402	Elbow, 3/4"	1
25	96920912	Flex Line, 12"	1
26	98248000	Gauge, Air Pressure (0-80 Psi)	1
27	98248001	Gauge, Water Pressure (0-300 Psi)	3
28	98840181	Horiz. Swing Check Valve, 1/2" NPT	3
29	71030010	Model LP Pilot Line Actuator	1
30	94616926	Nameplate, Wet/Dry Valve	1

Item No.	Part No.	Description	Qty.
31	98543222	Nipple, 1" x 3-1/2"	1
32	98543266	Nipple, 1" x 6"	1
33	98543213	Nipple, 1" x Close	1
34	98543223	Nipple, 1/2" x 1-1/2"	13
35	98543252	Nipple, 1/2" x 10-1/2"	1
36	98543209	Nipple, 1/2" x 2"	8
37	98543230	Nipple, 1/2" x 3"	3
38	98543212	Nipple, 1/2" x Close	5
39	98543226	Nipple, 1/4" x 1-1/2"	4
40	98543220	Nipple, 1/4" x 3"	2
41	98543208	Nipple, 2" x 3"	2
42	98543238	Nipple, 2" x Close	1
43	98580013	Orifice, Restricting, 7/32 Dia., 1/2 NPT	1
44	99080002	Pad-adhesive	1
45	98750003	Pipe Cross, 1/2"	3
46	98604406	Plug, Sq. Hd., 1/2"	4
47	98614403	Plug, Sq. Hd., 1/4"	4
48	98614401	Plug, Sq. Hd., 3/4"	3
49	98727607	Strainer, 1/4"	1
50	98840145	Swing Check Valve, 1" NPT	1
51	96606627	Tee, 2 x 2 x 1	1
52	96606603	Tee, 1/2 x 1/2 x 3/4	1
53	98761649	Tee, 1/2 x 1/4 x 1/2	3
54	98761651	Tee, 1/2"	5
55	96606601	Tee, 3/4"	2
56	89141112	Tie, Retaining	9
57	98815204	Union, "O" Ring Seal, 1/2"	2
58	98815200	Union, 1/2"	4
59	98815202	Union, 3/4"	1
60	98840160	Valve, 3-way, 1/4"	4
61	98840101	Valve, Angle, 1/4"	1
62	98840100	Valve, Angle, 2"	1
63	78653100	Valve, Ball Drip, 1/2"	2
64	98840117	Valve, Ball, 1/4" NPTF x 1/4" NPTM	1
65	98840187	Valve, Check, 1/4" NPTF x 1/4" NPTM	1
66	98840171	Valve, Globe, 1/2"	1
67	98840195	Valve, Relief, 1/2", 33 PSI	1
68	96686756	Tubing, Pvc, 3/8 I.D. x 6 Ft.	1
69	98768008	Copper Tubing, 3/8", Swagelok	30"

RELIABLE MODEL B1 ACCELERATOR KIT (P/N 6516000003)

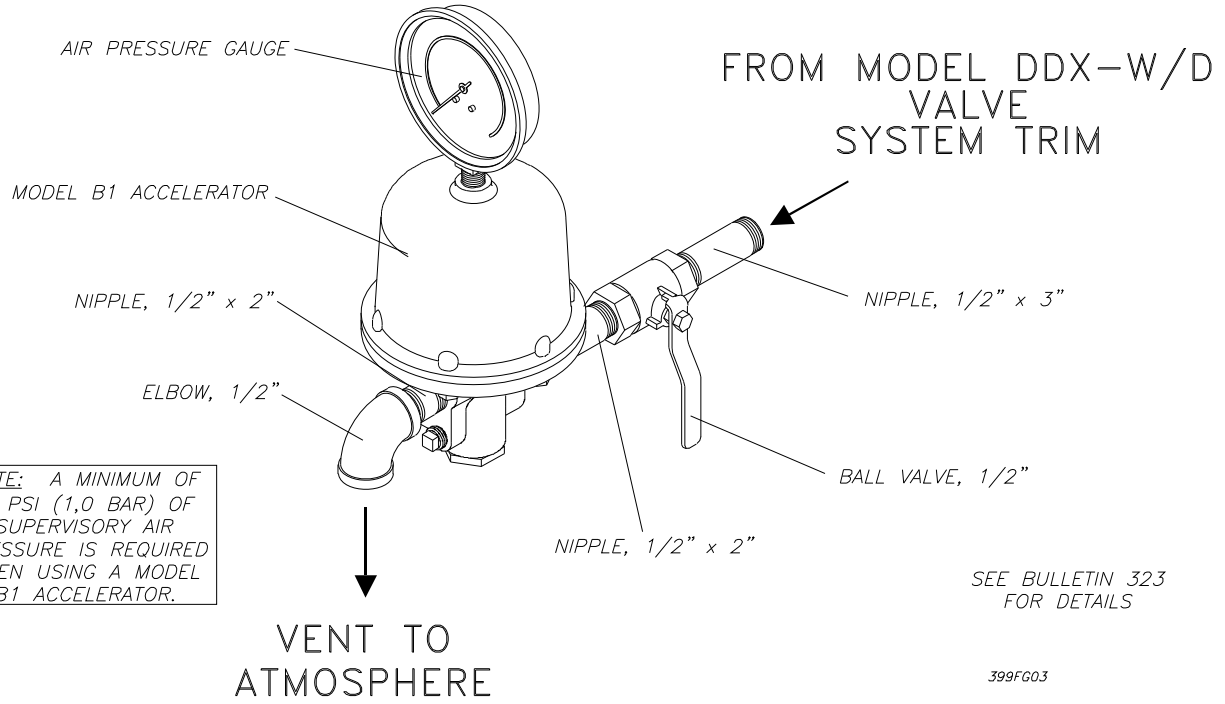


Fig. 3

MODEL B HYDRAULIC MANUAL EMERGENCY STATION

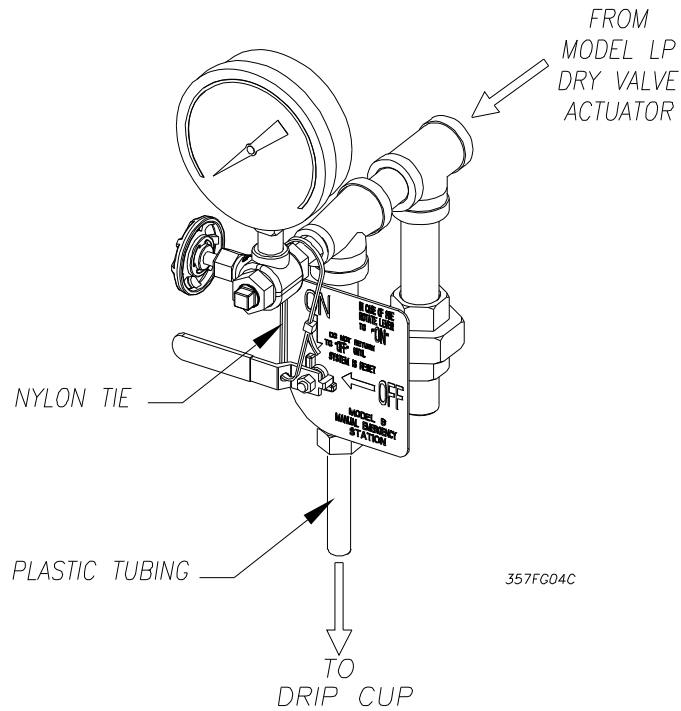


Fig. 4

System Limitations:

Due to the design of the valve, there are certain limitations as to which systems this valve is allowed to be installed. These limitations include minimum sprinkler head k-factor rating and maximum height of the system piping above the clapper of the valve. The specific values for the valves can be found in Table A and Figures 5 and 6. **Note:** Failure to follow these limitations could result in a nonoperational valve

Sprinkler Limitation: 80K minimum*

*Pressure is in bar

Sprinkler System Piping Limitation: The piping allowed above the clapper of the Model DDX-W/D Valve is limited by the ratio of the valve in the wet configuration. If the system piping is too high, the hydrostatic head pressure above the clapper could prevent the clapper from opening in the wet configuration. The maximum height of system piping above the clapper is shown in Table A

Table A	Maximum Piping Height (m)	
	System Pressure (bar)	100mm (4")
1.4	1.4	2.9
2.0	3.5	5.7
3.0	6.9	10.3
4.0	10.3	14.8
5.0	13.7	19.3
6.0	17.1	23.9
7.0	20.5	28.4
8.0	23.9	32.9
9.0	27.3	37.5
10.0	30.7	42.0
11.0	34.1	46.5
12.0	37.5	51.1
13.0	40.9	55.6
14.0	44.3	60.1
15.0	47.7	64.7
16.0	51.1	69.2
17.0	54.5	73.7
17.2	55.3	74.8

Pressurizing Line Connection

The water supply for the pushrod chamber must be provided by connection of its inlet pressurizing line to the water supply piping. Pressurizing lines for multiple Model DDX-W/D Wet/Dry Valve pushrod chambers must never be manifolded together, having only one single tap on the water supply piping. Each Model DDX-W/D Wet/Dry Valve must have its own pushrod chamber pressurizing connection. This connection must be made on the supply side of

the main water supply control valve. This can be accomplished by:

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

Caution: Reliable’s DDX-W/D 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 DDX-W/D Wet/Dry Valve System Engineering Specifications

General Description

Wet/Dry Valve shall consist of a lightweight, ductile iron construction with “drop-in” bronze seat, and clapper assembly utilizing an intermediate chamber design. Clapper facing shall be pressure-actuated, providing a limited compression seat for the sealing force between the clapper rubber facing and the valve seat. Pushrod chamber shall be of a piston/pushrod design with a diaphragm seal and have a 6.35mm (1/4”) vent hole for air/water leakage indication. Valve end connections shall be grooved outlets per ANSI/AWWA C606. Pneumatic actuator trim shall consist of all galvanized and brass trim, including associated pressure gauges, main drain valve, emergency release valve and a low pressure pneumatic actuator valve. Dry pipe configuration air pressure shall only require between 0,7 and 1,8 bar (10 to 26 psi) for proper setting of the pneumatic actuator in accordance with the manufacturer’s instructions. Wet/Dry Valve shall be of the straight through design to minimize friction loss, and be capable of being reset without having to remove the valve cover plate through the use of an external reset knob. Dry pipe configured Wet/Dry valve shall operate through the operation of the pneumatic actuator valve as a result of the loss of system air pressure caused by sprinkler activation. Wet pipe configured valve shall operate directly from the loss of system pressure resulting from sprinkler activation. 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 0,7 and 1,8 bar (10 to 26 psi) supervisory pressure for proper setting in accordance with the manufacturer’s instructions. Low-pressure actuator shall be Reliable Model LP Dry Valve Actuator.

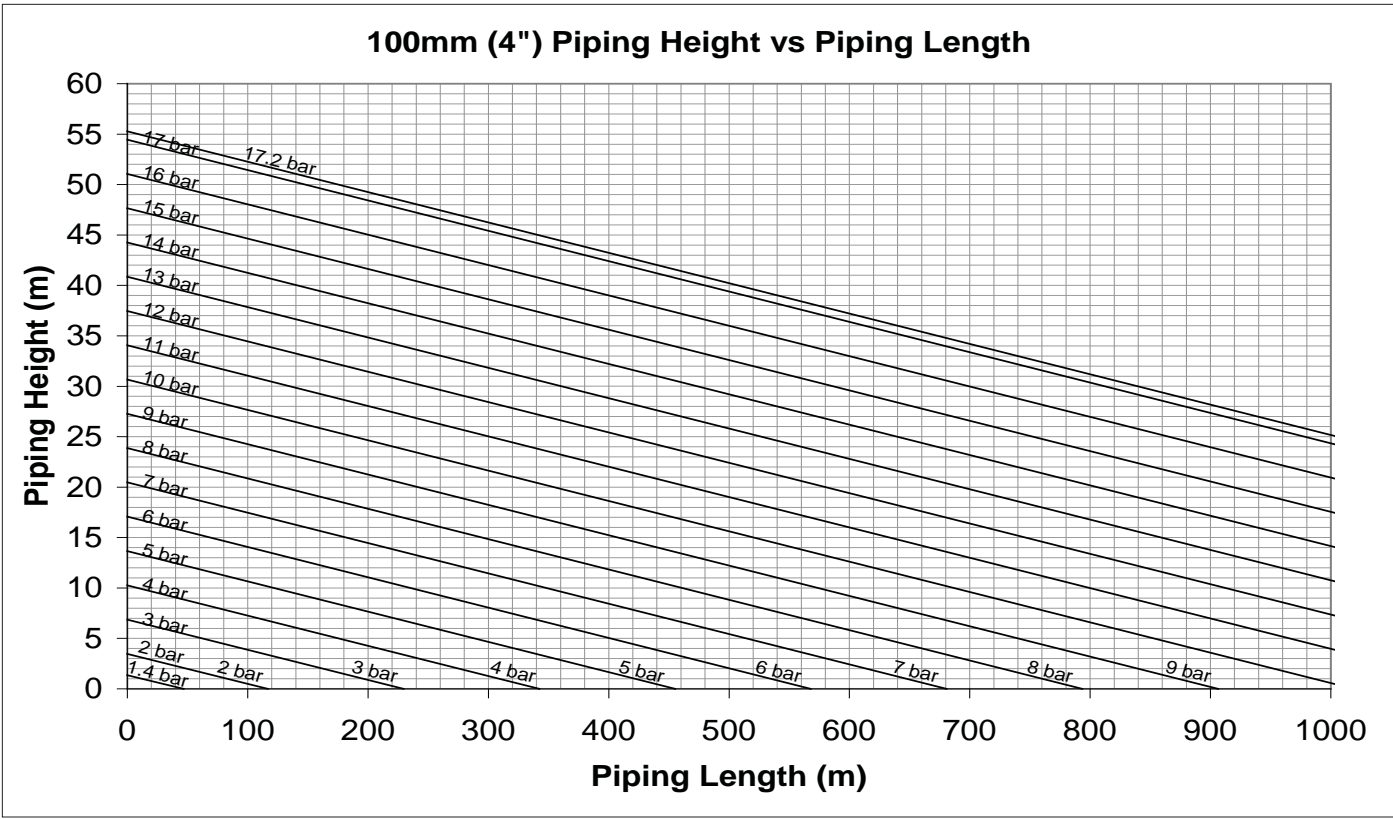


Fig. 5

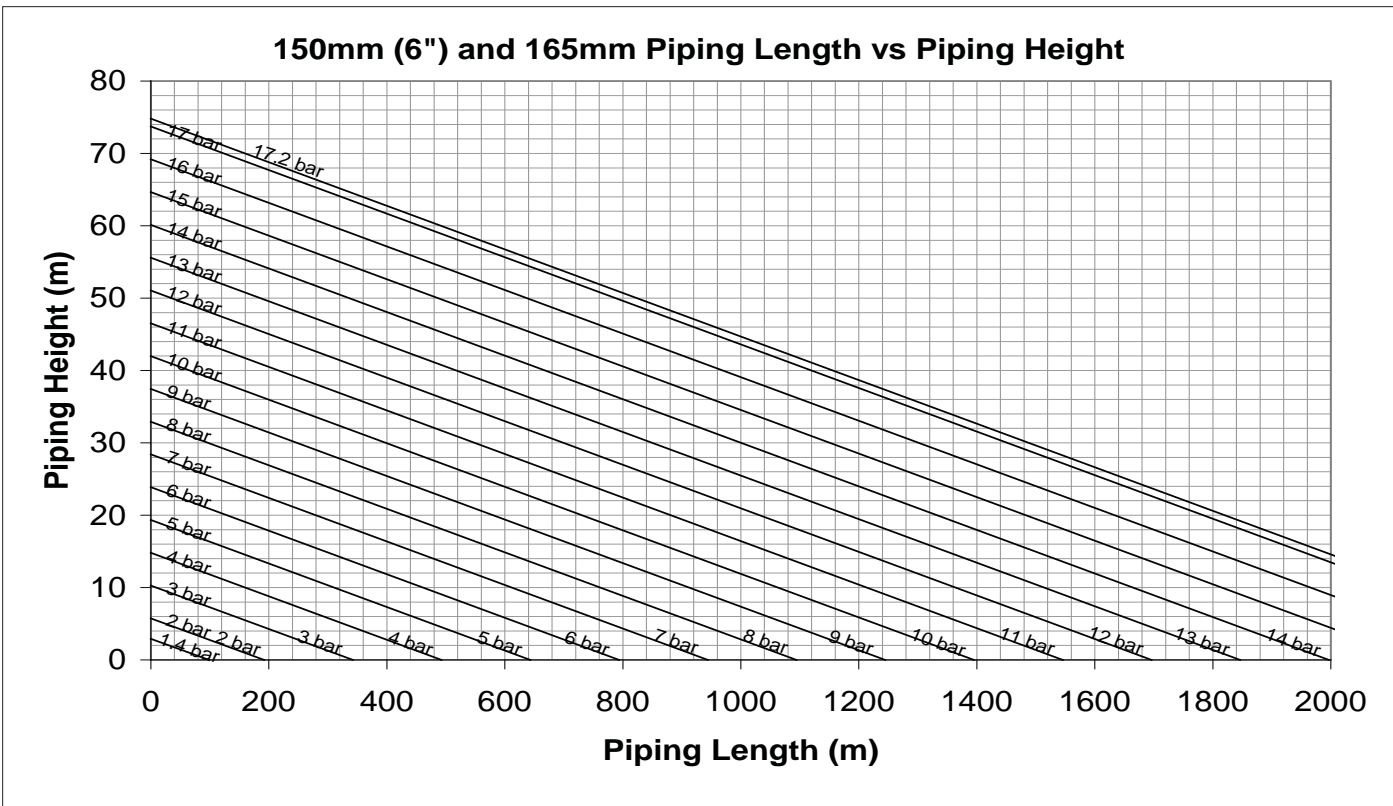


Fig. 6

Wet/Dry valve system shall have a rated working pressure of 17,2 bar (250 psi). Wet/Dry valve system shall be Reliable [100mm (4")][150mm (6")][165mm] Model DDX-W/D.

Pneumatic Pressure Supply Options

Owner's Air Supply

Dry pipe configured valve system air pressure shall only require between 0,7 and 1,8 bar (10 to 26 psi) for proper setting of the pneumatic actuator in accordance with the manufacturer's instructions. 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 and brass parts, including a strainer and a field adjustable air pressure regulator, and have a working pressure rating of 12,1 bar (175 psi). The pressure regulator shall have an adjustable outlet pressure range of 0,34 to 3,4 bar (5 to 50 psi). Pressure maintenance device shall be Reliable Model A2.

Compressed Air Supply

Air supply shall be provided by an automatic tank mounted air compressor sized for the capacity (volume) of the dry pipe configured system piping, and be capable of restoring normal air pressure in the system within 30 minutes. Dry pipe configured valve system air pressure shall only require between 0,7 and 1,8 bar (10 to 26 psi) for proper setting of the 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 regardless of pressure fluctuations in the compressed air (or nitrogen) source. The pressure maintenance device shall consist of galvanized trim and brass parts, including a strainer and field adjustable air pressure regulator, and have a working pressure rating of 12,1 bar (175 psi). the pressure regulator shall have an adjustable outlet pressure range of 0,34 to 3,4 bar (5 to 50 psi). Pressure maintenance device shall be Reliable Model A2.

Nitrogen

Nitrogen cylinders provided by an approved source shall provide the nitrogen supply. The nitrogen cylinder pressure shall be regulated and supervised through the use of a nitrogen regulating device and low pressure trim kit. This device shall consist of a brass, single stage pressure regulator, equipped with high pressure inlet a low pressure outlet gauges, and 6.35mm (1/4") copper connection tubing with galvanized 3/4" x 1/4" reducer bushing. Optional: Low-pressure trim kit shall be included to monitor the regulated nitrogen supply pressure to provide a low-pressure supervisory alarm. 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 A2 pressure maintenance device.

Optional System Accessories

System Control Valve

Wet/Dry system control valve shall be a slow close, [cULus Listed][FM Approved] indicating butterfly type valve with a pre-wired supervisory tamper switch assembly. The valve shall have a rated working pressure of 20.7 bar (300 psi). System control valve shall be a [100mm (4")][150mm (6")][165mm] Nibco GD-4765-8N Butterfly Valve.

Accelerator

For system capacities greater than 1892 l (500 gal), 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 dry pipe configured valve system. Minimum normal air pressure shall be 1,0 bar (15 psi) to ensure proper accelerator operation. Accelerator shall be [cULus Listed][FM Approved] for use with the specific dry pipe valve system. Accelerator shall be capable of adjusting for small fluctuations in system air pressure without causing operation. The accelerator shall contain an integral Accelo-Check (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 to 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.

Waterflow Alarm Pressure Switch

Alarm pressure switch shall be provided to indicate water flow and provide a water flow alarm. Pressure switch 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 2.5A @ 6/12/24 VDC. The pressure switch shall have a maximum service pressure rating of 17,2 bar (250 psi) and shall be factory adjusted to operate at a pressure of 0,27 to 0,55 bar (4 to 8 psi) with an adjustment up to 1,3 bar (20 psi). switch shall be provided with a 1/2" NPT male pressure connection. Waterflow alarm pressure switch shall be System Sensor EPS10-2

High/Low Air Pressure Switch

A pressure supervisory alarm switch to monitor the reliability of the compressed air supply shall provide both a high and low-pressure supervisory alarm. Pressure switch 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 10.0A @125/250 VAC and 2.5A @ 6/12/24 VDC. The pressure switch shall have a maximum service pressure rating of 17,2 bar (250 psi) and an adjustable range of 0,7 to 6,9 bar (10 to 100 psi), factory set to respond at 3,5 bar (50 psi) rising pressure and 2,1 bar (30 psi) decreasing pressure. Switch shall be provided with a 1/2" NPT male pressure connection. High/Low pressure switch shall be System Sensor EPS40-2.

Technical Data

Reliable Model DDX-W/D Wet/Dry Valves, with associated trim, sizes 100mm (4"), 150mm (6") and 165mm, are rated for use at a minimum water supply pressure of 1,4 bar (20 psi) and a maximum water supply pressure of 17,2 bar (250 psi). Water supplied to the inlet of the valve and the pushrod chamber must be maintained between 4°C (40°F) and 60°C (140°F).

The following list of technical bulletins pertains to valves and devices that may be used in this Wet/Dry Valve system:

Deluge/Dry Pipe Valve	Reliable 510/511
Mechanical Sprinkler Alarm	Reliable 612/613
Pressure Maintenance Device	Reliable 250/251
Nitrogen Regulating Device	Reliable 253
Model B1 Accelerator Trim Kit	Reliable 323
Hydraulic Emergency Station (Model A)	Reliable 506
Low Air Pressure Switch	System Sensor A05-0177
Waterflow Pressure Alarm Switch	System Sensor A05-0176

Model DDX-W/D Wet/Dry Valve Description

- Rated working pressure:
Valve & System - 250 psi (17,2 bar)
- Factory tested to a hydrostatic pressure of 500 psi (34,5 bar). (Valve only)
- End and trim connections:
 - ANSI/AWWA C606 grooved inlet and outlet

Groove Dimensions				
Valve Size	Outlet Diameter	Groove Diameter	Groove Width	Outlet Face to Groove
100mm (4")	114mm (4.500")	110mm (4.334")	10mm (3/8")	16mm (5/8")
165mm	165mm (6.500")	161mm (6.330")		
150mm (6")	168mm (6.625")	164mm (6.455")		

- Threaded openings Per ANSI B 2.1
 - Valve exterior's color: Grey (All Sizes)
- Face to face dimensions:
 - 4"(100 mm)—14" (355 mm)
 - 6"(150 mm) & 165 mm—16" (406 mm)

- Shipping weight:

Valve Size	Weight
100mm (4")	29 kg (64 lbs)
150mm (6") & 165mm	43 kg (95 lbs)

- Friction loss (Expressed in equivalent length of Schedule 40 pipe, based on Hazen & Williams formula with C=120 and a flow velocity of 15ft/sec (4.6m/sec)):

Valve Size	Equivalent Length
100mm (4")	4.27 m (14')
150mm (6") & 165mm	9 m (29.4')

- Installation position: Vertical

System Air/Nitrogen Pressure Requirements

The system trim includes gauges to read the pneumatic and water pressures of the model DDX-LP Dry Valve Actuator. Table B specifies the air or nitrogen pressure level to be applied to the Actuator. Optional Reliable Model A2 Pressure Maintenance Device (see Reliable Bulletins 250 & 251) automatically provides a safeguard against pressure leaks in the sprinkler piping, and properly restrict the flow of makeup air.

When the optional Model B1 Accelerator is used, a Model A-2 Pressure Maintenance Device and a tank-mounted air compressor are required (see Fig. 8). Also, when a Model B1 Accelerator is used, to expedite water delivery time, the pneumatic pressure must be not less than 1,0 bar (15 psi).

Table B

Water Pressure bar (psi)	Pneumatic Pressure to be Pumped into Sprinkler System, bar (psi)		
	Maximum	Not Less Than	Not More Than
1,4 (20)	0,7 (10)	1,0 (14)	
3,4 (50)	0,8 (12)	1,1 (16)	
5,2 (75)	0,9 (13)	1,2 (17)	
6,9 (100)	1,0 (15)	1,3 (19)	
8,6 (125)	1,1 (16)	1,4 (20)	
10,3 (150)	1,2 (17)	1,5 (21)	
12,0 (175)	1,3 (18)	1,5 (22)	
13,8 (200)	1,3 (19)	1,6 (23)	
15,5 (225)	1,5 (21)	1,7 (25)	
17,2 (250)	1,5 (22)	1,8 (26)	

Note: During system set-up, a higher pneumatic pressure may be required in order to properly set the Model LP Dry Valve Actuator. The dew point of the air must be maintained below the lowest ambient temperature to which the dry configured system will be exposed. Otherwise, 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. Also, 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 supply of air should be taken from the area of the 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'S "Installation Guidelines for Refrigerated Storage" may need to be 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 dew-point of nitrogen compressed to 1,4 bar (20 psig) pressure is -43.3°C (-46°F), and -46.7°C (-52°F) when compressed to 0,7 bar (10 psig). High-pressure nitrogen cylinders are described in Table C. the calculated nitrogen supply in kg (lbs) to pressurize various system capacities to 0,7 bar (10 psi) at different freezer temperatures is shown in Table D.

Table C

Cylinder Size	“Q”	“S”	“K”	“T”
Nitrogen Weight kg (lbs)	2.50 (5.50)	4.66 (10.28)	7.50 (16.51)	9.98 (22.01)
Nitrogen Volume m³ (ft³)	2.2 (76)	4.0 (142)	6.5 (228)	8.6 (304)
Pressurized at bar (psi)*	151.7 (2200)	151.7 (2200)	151.7 (2200)	182.0 (2460)

Note: Initial pressure and thus nitrogen weight and volume can vary slightly. Check with your local supplier.

Table D

System Capacity L (Gal)	Freezer Temperature, °C (°F)					Approx. Fill Time (min)*
	-6.7° (20°)	-18° (0°)	-29° (-20°)	-40° (- 40°)	-51° (-60°)	
946 (250)	0.86 (1.90)	0.86 (1.90)	0.90 (2.00)	0.95 (2.10)	1.00 (2.20)	1
1891 (500)	1.65 (3.64)	1.72 (3.80)	1.81 (4.00)	1.91 (4.20)	2.00 (4.40)	2
2840 (750)	2.50 (5.50)	2.60 (5.70)	2.72 (6.00)	2.86 (6.30)	3.00 (6.60)	3
3785 (1000)	3.30 (7.30)	3.44 (7.60)	3.62 (8.00)	3.78 (8.33)	4.00 (8.80)	4

Note: to obtain required nitrogen supply [kg (lbs)] for 1,0 bar (15 psi) or 1,5 bar (22 psi), multiply the tabulated values by a factor of 1.5 or 2.2 respectively.

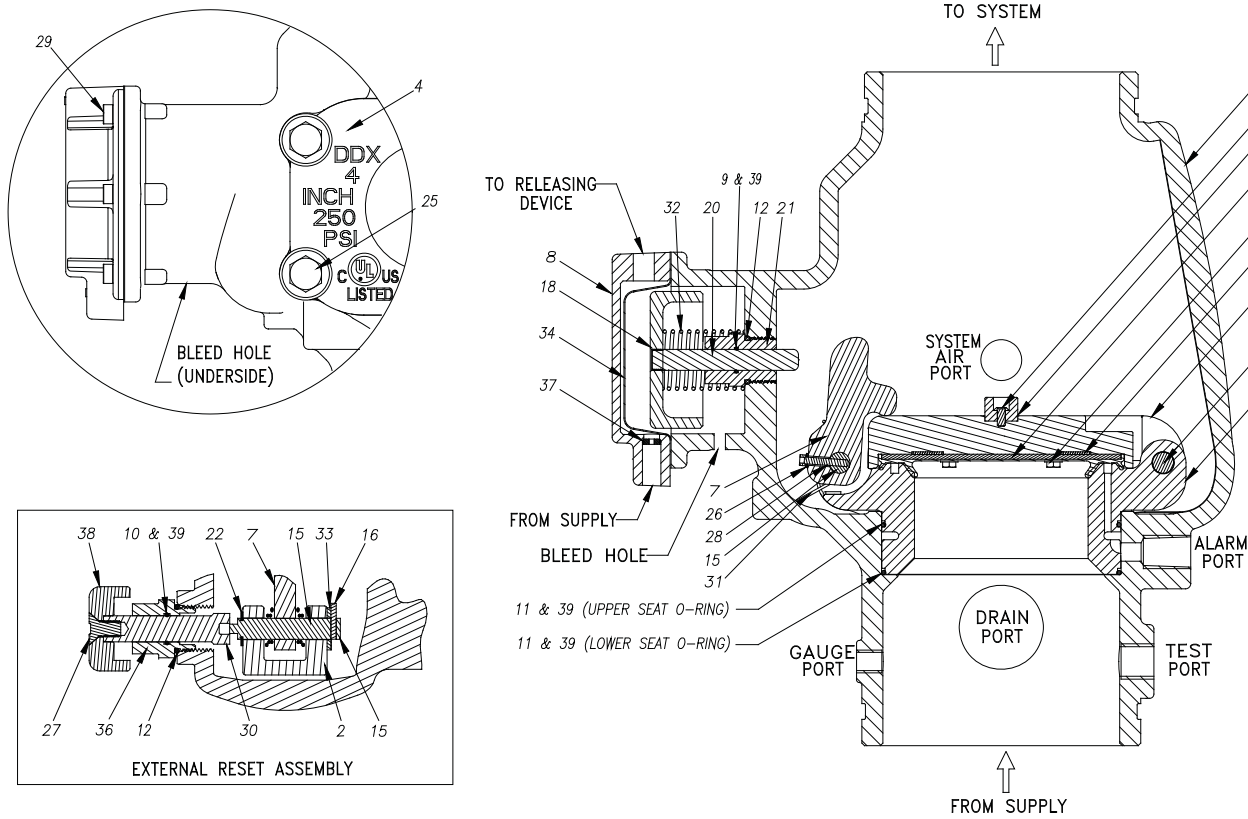
(1 bar = 100 kPa)

* When filling with the Reliable Model A-2 Pressure Maintenance Device having the bypass valve open.

Maintenance

Reliable Model DDX-W/D 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. Particular attention should be given to rubber components in the Model B1 Accelerator, Model LP Dry Valve Actuator, and the Model DDX-W/D Valve.

MODEL DDX-W/D DELUGE VALVE [4"(100MM), 6"(150MM) & 165 MM]



399FG07A

Fig. 7

Item No.	Part Number			Description	No. Req'd
	4"(100mm) Valve	6"(150mm) Valve	165mm Valve		
1	91006005	91006007	91006027	Valve Body	1
2	96016004	96016006	96016006	Seat	1
3	91916004	91916006	91916006	Clapper	1
4	92116064	92116066	92116065	Cover	1
5	93416004	93416006	93416006	Seal Faceplate Subassembly	1
6	93706004	93706006	93706006	Gasket, Cover (Not Shown)	1
7	94506004	94506006	94506006	Lever	1
8		92126006		Cover, Pushrod	1
9		95406407		O-ring (014)	1
10		95406007		O-ring (114)	1
11		95406016		O-ring (161)	2
12		95406024		O-ring (912)	2
13	93706001	N/A	N/A	Gasket, Clapper, 4"	1
	N/A	93706002	93706002	Gasket, Clapper, 6"	1
14	96216086	95406409	95406409	Hinge Pin, Clapper	1
15		96216046		Pin, Lever	1
16		95606131		Threaded Stud, #10-32 x 3/4"	1
17		96216066		Pin, Locking, Seat (Not Shown)	2
18		95106006		Piston	1
19		95200038		Plug, Socket, Ø3/8"-18 NPT (Not Shown)	2
20		95506006		Pushrod	1
21		93916006		Pushrod Guide	1
22		95306267		Ring, Retaining (2 Assembled to Item #14)	3

Item No.	Part Number			Description	No. Req'd
	4"(100mm) Valve	6"(150mm) Valve	165mm Valve		
23		95606128		Screw, Button Head, #10-32 x 3/8"	1
24		95606129		Screw, Hex Washer Head, #10-32 x 3/8"	4
25	95606107	N/A	N/A	Screw, Hex Cap, Ø1/2"-13 x 1-1/2"	6
26	N/A	91106006	91106006	Screw, Hex Cap, Ø5/8"-11 x 1-3/4"	6
26	96906111	91106006	91106006	Spring Lock Washer, #10	1
27		95606127		Screw, C'sunk Cap Head, Ø3/8"-16 x 3/4"	1
28		95606130		Screw, Socket Head, #10-32 x 1"	1
29		95606114		Screw, Socket Head, Ø1/4"-20 x 5/8"	6
30		93916067		Shaft, Reset	1
31		96406004		Spring, Lever	1
32		96406906		Spring	1
33		96906904		Teflon Washer, Ø 1/2" (2 Assembled to Item No.14)	3
34		95276006		Diaphragm	1
35		92306006		Disc, Bumper	1
36		94106066		Housing, Reset	1
37		94206406		Inlet, Orifice	1
38		94356005		Knob, Reset	1
39		85000050		O-ring Grease, DuPont™ Krytox® GPL-201	1

Resetting the Model DDX-W/D Valve System

Resetting to Dry Configuration

Refer to Figs. 2, 7 and 8.

1. Rotate the wet/dry conversion valve, valve K (Fig. 8) to the "DRY" position.
2. Verify that the valve has tripped, if the valve has not tripped, trip the valve by opening the condensate drain, valve E (Fig. 8).
3. After valve has tripped, close the main valve controlling water supply (Fig. 8).
4. Close off the air/nitrogen supply to the sprinkler system, in necessary.
5. Close the pushrod chamber supply valve; valve A (Fig. 8), in necessary.
6. Open the main drain valve, valve B (Fig. 8) and drain the system.
7. Open all drain valves and vents at low points throughout the system, closing them when the flow of water has stopped. **Note:** The above steps accomplish the relieving of pressure in the pushrod chamber of the Wet/Dry valve.
8. With valve F (fig. 8) open, push in the plunger of the ball drip valve, valve G (Fig. 8), to force the ball from the seat, and drain any water from the alarm line.
9. With the Model B Hydraulic Manual Emergency Station, valve D (Fig. 8), open, rotate the Model DDX-W/D's reset knob (#38 Fig. 7) clockwise until you hear the distinct noise, indicating that the clapper has closed. **Note:** The reset knob can only rotate when the pushrod chamber is vented through the Model B Hydraulic Manual Emergency Station, valve D (Fig. 8)
10. Inspect and replace any portion of the sprinkler system subjected to fire conditions.
11. Open Valve A (Fig. 8) and allow water to fill the Wet/Dry valve's pushrod chamber.
12. Bleed all air from the actuation piping by allowing a steady stream of water to flow through the Model B Hydraulic Manual Emergency Station, valve D (Fig. 8). After all trapped air is released, close valve D (Fig. 8). Water should still be coming out of the Model LP Dry Valve Actuator (Fig. 8).
13. Close valve F and valve L (Fig. 8). Rapidly apply compressed air or nitrogen into the Model LP Dry Valve Actuator and the system until the system conforms to Table B levels, as indicated on the air pressure gauge (Fig. 8). The Model LP Dry Valve Actuator will close during this pressurizing process and the water will stop flowing into the drip cup. **Note:** It may be necessary to temporarily close the main drain, valve B (Fig. 8) in order to build sufficient air pressure to "set up" the Model LP Dry Valve Actuator. Once the Model LP Dry Valve Actuator is "set up", the main drain valve, valve B (Fig. 8) should be reopened and the remaining procedure followed. At this point, the pressure gauge which indicates pushrod chamber pressure (Fig. 8) will equalize to the available water supply pressure. **Note:** It may be necessary to isolate the system pressure gauge (Fig. 8) in the air supply

line to the Model LP Dry Valve Actuator during set up by closing the 3-way valve (#60, Fig. 2). During set up, pressure fluctuations can occur that are potentially damaging to the gauge. Once the Model LP Dry Valve Actuator is reset accordingly, the air pressure gauge's 3-way valve (#60, Fig. 2) may be reopened.

14. If it is being used, reset the Model B1 Accelerator per Reliable Bulletin 323. **Note:** The Model B1 Accelerator requires a minimum of 1.0 bar (15 psi) for proper operation.
15. Open valve F and valve L (Fig. 8). Slightly open the main valve controlling water supply (Fig. 8) to the Model DDX-W/D Wet/Dry Valve, closing drain valve B (Fig. 8) when water flows. Observe if water leaks through the ball drip valve, valve G (Fig. 8) into the drip cup, H (Fig. 8) If not leak occurs, the Wet/Dry Valve's clapper is sealed. Open slowly, and verify that the main valve controlling water supply is fully open and properly monitored.
16. Verify that valve A, valve F and valve L (Fig. 8) are open.
17. Verify that the Wet/Dry conversion valve, valve K (Fig. 8) is in the "DRY" position. If not, start over from the beginning.
18. Secure the handle of the Model B Hydraulic Emergency Station, valve D (Fig. 8), in the "OFF" position with a nylon tie (#56, Fig. 2).

Resetting to Wet Configuration

Refer to Figs. 2, 7 and 8

1. Close the main valve controlling water supply (Fig. 8).
2. Close the pushrod chamber supply valve, valve A (Fig. 8)
3. Open the Model B Hydraulic Manual Emergency Station, valve D (Fig. 8). **Note:** Valve should trip and relieve the pressure under the clapper when this step is taken.
4. Rotate the Wet/Dry conversion valve; valve K (Fig. 8) to the "WET" position.
5. Open the "Inspector's Test" valve of the sprinkler system piping to purge the air from the system.
6. Close valve F and valve L (Fig. 8)
7. Slightly open the main valve controlling water supply to the Model DDX-W/D Wet/ Dry Valve to fill the sprinkler system with water.
8. Once water has begun flowing from the "Inspector's Test" valve, close the "Inspector's Test" valve. **Note:** The system should now be full of water.
9. Close the main valve controlling water supply (Fig. 8) to the Model DDX W/D Wet/Dry valve. Open the main drain valve B (Fig. 8).
10. Open valve F and valve L (Fig. 8). Slightly open the main valve controlling water supply (Fig. 8) to the Model DDX-W/D Wet/Dry Valve, closing drain valve B (Fig. 8) when water flows. Observe if water leaks through the ball drip valve, valve G (Fig. 8) into the drip cup, H (Fig.8) If no leak occurs, the Wet/Dry Valve's clapper is sealed. Open slowly, and verify

that the main valve controlling water supply is fully open and properly monitored.

11. Verify that valve A (Fig. 8) is closed and valve F (Fig. 8) is open.
12. Verify that the Wet/Dry conversion valve, valve K (Fig. 8) is in the "WET" position.
13. Secure the handle of the Model B Hydraulic Emergency Station, valve D (Fig. 8), in the "ON" position with a nylon tie (#56, Fig. 2).

Inspection and Testing

For Dry Configuration:

Refer to Figs. 2, 7 and 8

1. **Water Supply** - be sure the valves controlling water supply to the Wet/Dry Valve are fully open and properly monitored.
2. **Wet/Dry conversion valve K (Fig. 8)** – check that valve K (Fig. 8) is in the "DRY" position.
3. **Alarm line** – be sure that valve F and valve L (Fig. 8) are open and remain in this position.
4. **Other trimming valves** – check that valve A (Fig. 8) is open as well as all of the pressure gauges 3-way valves. Valves D, E and J (Fig. 8) should all be closed.
5. **Ball drip valve G (Fig. 8)** – make sure valve F and valve L (Fig. 8) are open. Push on plunger to be sure the ball check is off its seat. If no water appears, the Wet/Dry Valves water seat is tight. Inspect the bleed hole (Fig. 7) on the underside of the pushrod chamber for leakage.
6. **System pneumatic Pressure** – check air pressure gauge (Fig. 8) and water supply pressure gauge (Fig. 8) for conformance to Table B.
7. **Model LP Dry Valve Actuator (Fig. 8)** – Verify that the outlet is not leaking water. Check the air pressure gauge (Fig. 8) for proper pressure setting. Verify that the tubing line from the Actuator is not pinched or crushed, which could prevent proper operation of the Wet/Dry Valve.
8. **Testing alarms** – make sure valve F and valve L (Fig. 8) are open. Open valve J (Fig. 8) permitting water from the supply side to flow to the electric sprinkler alarm switch and to the mechanical sprinkler alarm (water motor). After testing, close the valve securely. Push in on the plunger of the ball drip valve G (Fig. 8) until all of the water has drained from the alarm line.
9. **Operational test** – Open the Model B Hydraulic Manual Emergency Station, valve D (Fig. 8). **Note: An operational test will require the Wet/Dry Valve to open and flow water into the sprinkler system. Resetting of the valve will be required, see the "Resetting the Model DDX-W/D Valve System" section in this bulletin.**
10. Secure Model B Hydraulic Manual Emergency Station; valve D (Fig. 8), in the "OFF" position with a nylon tie (#56, Fig. 2) after the Wet/Dry Valve is reset in the Dry Configuration.

For Wet Configuration:

Refer to Figs. 2, 7 and 8

1. **Water Supply** - be sure the valves controlling water

supply to the Wet/Dry Valve are fully open and properly monitored.

2. **Wet/Dry conversion valve K (Fig. 8)** – check that valve K (Fig. 8) is in the "WET" position.
3. **Alarm line** – be sure that valve F and valve L (Fig. 8) are open and remain in this position.
4. **Other trimming valves** – check that valve D (Fig. 8) is open as well as all of the pressure gauges 3-way valves are open. Valves A, E and J (Fig. 8) should all be closed.
5. **Ball drip valve G (Fig. 8)** – make sure valve F and valve L (Fig. 8) are open. Push on plunger to be sure the ball check is off its seat. If no water appears, the Wet/Dry Valves water seat is tight. Inspect the bleed hole (Fig. 7) on the underside of the pushrod chamber for leakage.
6. **Model LP Dry Valve Actuator (Fig. 8)** – Verify that the outlet is not leaking water.
7. **Testing alarms** – make sure valve F and valve L (Fig. 8) are open. Open valve J (Fig. 8) permitting water from the supply side to flow to the electric sprinkler alarm switch and to the mechanical sprinkler alarm (water motor). After testing, close the valve securely. Push in on the plunger of the ball drip valve G (Fig. 8) until all of the water has drained from the alarm line.
8. **Operational test** – Open valve E (Fig. 8) to bleed pressure from above the clapper. **Note: An operational test will require the Wet/Dry Valve to open and flow water into the sprinkler system. Resetting of the valve will be required, see the "Resetting the Model DDX-W/D Valve System" section in this bulletin.**
9. Secure Model B Hydraulic Manual Emergency Station; valve D (Fig. 8), in the "ON" position with a nylon tie (#56, Fig. 2) after the Wet/Dry Valve is reset in the Wet Configuration.

Testing Model DDX-W/D Wet/Dry Valve Without Flowing Water

For Dry Configuration Only

Refer to Fig. 8

1. Close the main valve controlling water supply to the Wet/Dry Valve.
2. Verify that valve A is open, allowing water to enter the pushrod chamber.
3. Close off the air/nitrogen supply to the sprinkler system.
4. Decrease the pneumatic pressure in the system by opening the condensate drain valve, valve E, until the Model LP Dry Valve Actuator operates. This will be indicated by a sudden drop of water pressure on the Wet/Dry Valve's gauges. The operation of the Actuator will vent off the pushrod chamber of the Wet/Dry Valve and cause the valve's clapper to open.
5. To reset the system, close the condensate drain, valve E and proceed according to the directions listed in the "Resetting the Model DDX-W/D Wet/Dry Valve System" section in this bulletin.

Draining Excess/Condensate Water From System

For Dry Configuration Only

Refer to Fig. 8

1. Close the main valve controlling water supply to Wet/Dry Valve. Also close valve A and open main drain valve, valve B.
2. Open condensate drain valve E until water has stopped draining. Close valve E when the flow of water (if any) has stopped. **Note:** Be sure not to keep valve E open for an extended period of time because that will cause enough air to bleed off thereby actuating the Model LP Dry Valve Actuator (see Table B for pneumatic pressure values required to maintain the Model LP Dry Valve Actuator in the closed position for a given supply pressure). If the Actuator does happen to actuate, proceed according to the directions listed in the "Resetting the Model DDX-W/D Wet/Dry Valve System" section in this bulletin.
3. Close the main drain valve, valve B. If system contains pressurized air or nitrogen, allow pneumatic pressure to come back up to specification according to Table B. Open valve A first, and then open the main valve controlling water supply to the Wet/Dry Valve.

Maintenance Procedures – Model DDX-W/D

Wet/Dry Valve

Refer to Figs. 2, 7, & 8.

1. Mechanical sprinkler alarm (water motor–not shown) 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. Leakage out of the ball drip valve G (Fig. 8).

a. Water leakage due to a water column above the Wet/Dry Valve's clapper:

This condition can be caused by leakage past the system side of the Model DDX-W/D Wet/Dry Valve's seal faceplate subassembly (#5, Fig. 7). Be sure that this surface is free of any type of debris. To eliminate leakage due to a water column, refer to the section in this bulletin marked "Draining Excess/Condensate Water From System". If the problem continues proceed to the following section.

b. Leakage, air or water from the ball drip valve, G (Fig. 8):

If system air is leaking out the ball drip valve, the problem is either damage to the airside of the Model DDX-W/D Wet/Dry Valve's seal faceplate subassembly (#5, Fig. 7), seat (#2, Fig. 7), or the upper seat O-ring (#11, Fig. 7). If supply water is leaking out the ball drip valve the problem could be caused by damage to the Model DDX-W/D Wet/Dry Valve's seal faceplate subassembly (#5, Fig. 7), seat (#2, Fig. 7), or lower seat O-ring (#11, Fig. 7). The following section provides instructions to correct both conditions:

A) For Dry Configuration: Shut down the valve controlling the water supply to the Wet/Dry Valve and open the main drain valve B (Fig. 8). Open the water column drain valve E (Fig. 8). Close the push rod chamber supply valve A (Fig. 8) and open the Model B Hydraulic Manual Emergency Station D (Fig. 8).

For Wet Configuration: Trip the valve by opening the condensate drain to reduce the pressure on the top side of the clapper. Once the Wet/Dry Valve has tripped, shut down the main valve controlling water supply (Fig. 8) to the Wet/Dry Valve. Open the main drain valve; valve B (Fig. 8) and drain the water from the system.

B) Remove the Wet/Dry Valve's front (handhold) cover (#4, Fig. 7) and inspect the seat (#2, Fig. 7), clapper (#3, Fig. 7), and seal faceplate subassembly (#5, Fig. 7) for damage. If inspection indicates damage to the clapper (#3, Fig. 7) or seal faceplate subassembly (#5, Fig. 7) only, then the clapper subassembly can be removed as follows:

At the rear of the valve, disconnect the water column drain trim section at the $\frac{3}{4}$ " union (#59, Fig. 2). Remove the retaining ring (handhold cover side) from the clapper hinge pin (#14, Fig. 7) and push this pin through the water column drain line and remove the clapper subassembly. Remove the four retaining screws (#24, Fig. 7) holding the seal faceplate subassembly (#5, Fig. 7). Inspect the clapper (#3, Fig. 7) visually before re-installing. Apply a small amount of silicone-based lubricant to the four retaining screws. Install a new seal faceplate subassembly. Torque the retaining screws to approximately 40 inch-pounds and reassemble. If the seat (#2, Fig. 7) is damaged or it is suspected that the leakage is through the lower O-ring (#11, Fig. 7), the seat-clapper subassembly is easily removed as a unit as follows:

Using a $\frac{5}{16}$ " Allen wrench, remove the two $\frac{3}{8}$ " NPT pipe plugs (#19, (not shown) Fig. 7) located on the side of the Model DDX-W/D Wet/Dry Valve. The seat-clapper subassembly is retained by two locking pins (#17, (not shown) Fig. 7). The centers of these pins have a $\frac{1}{4}$ "-20 threaded hole. Remove the two locking pins by engaging them with a $\frac{1}{4}$ "-20 screw or threaded rod and pulling them out (the two locking pins are not threaded, so turning them with the attached $\frac{1}{4}$ "-20 screw or threaded rod is not recommended. A proven method is to use $\frac{1}{4}$ "-20 threaded rod with a locknut on the unassembled end. Grab hold of the locknut with pliers or vice-grips and tap the pliers or vice-grips in the direction away from the Wet/Dry Valve. Doing so should pull the locking pins out of the Wet/Dry Valve.). With the clapper (#3, Fig. 7) in the closed position (not latched), dislodge the seat-clapper subassembly from the Valves body by inserting two slotted screwdrivers under the lever and clapper mounting ears and pry up until the seat-clapper subassembly is free of its bore. Reach into the valve and grasp the seat-clapper subassembly from the sides. Lift up and rotate the seat-

clapper subassembly through 90 degrees about the centerline axis of the Model DDX-W/D Wet/Dry Valve so that the lever side of the seat-clapper subassembly faces the outlet of the Wet/Dry Valve. Rotate the seat-clapper subassembly around the centerline of the Wet/Dry Valve until the top of the clapper faces the handhold opening and then pull it out clapper hinge-pin side first. Visually examine all components of the seat-clapper subassembly replacing any component that appears damaged. New O-rings (#11, Fig. 7) should always be used for reassembly.

Reassembly:

It is likely that the lower seat O-ring (#11, Fig. 7) has remained at the bottom of the Wet/Dry Valve body's bore. Discard this O-ring and clean the bore. Lubricate the bore with O-ring grease and place the lower seat O-ring on the step at the bottom of the bore, verifying that it is in full contact with the bore. Lubricate the bottom step and upper seat O-ring (#11, Fig. 7) of the refurbished seat-clapper subassembly. Insert the seat-clapper subassembly into the handhold opening of the Wet/Dry Valve lever-first, rotating it until the lever side faces the outlet of the Dry Pipe Valve. Rotate the seat-clapper subassembly until the lever (#7, Fig. 7) faces the push rod (#20, Fig. 7), then drop the seat-clapper subassembly into the Wet/Dry Valve's bore. Verify that the seat-clapper subassembly is in the fully down position and check to see that the lever lines up with the push rod. Adjust if necessary. Clean and lubricate the two locking pins (#17, (not shown) Fig. 7) with O-ring lubricant and drive them into the Wet/Dry Valve body. Then reinstall the 3/8" NPT pipe plugs (#19, (not shown) Fig. 7). Reassemble the handhold cover and set up the Model DDX-W/D Wet/Dry Valve as per the section "Resetting Model DDX-W/D Dry Valve System"

3. Leakage out of the push rod chamber vent hole:

A small bleed hole is located on the underside of the push rod chamber (see Fig. 7). If there is air or water leakage coming out of this hole, do the following:

a) For Dry Configuration: Shut down the valve controlling water supply to the Wet/Dry Valve. Relieve the inlet pressure by opening the main drain valve B (Fig. 8). Close the valve A (Fig. 8) that supplies water to the push rod chamber, and open the Model B Hydraulic Manual Emergency Station, valve D (Fig. 8). Bleed air out of system piping by opening the condensate drain valve E (Fig. 8).

For Wet Configuration: Trip the valve by opening the condensate drain to reduce the pressure on the top side of the clapper. Once the Wet/Dry Valve has tripped, shut down the main valve controlling water supply (Fig. 8) to the Wet/Dry Valve. Open the main drain valve; valve B (Fig. 8) and drain the water from the system.

b) Remove the trim at the unions nearest to the push rod chamber cover (#8, Fig. 7).

c) Take the push rod chamber cover (#8, Fig. 7) off by removing the six retaining screws (#29, Fig. 7).

CONDITION ONE (Water coming out of the bleed hole):

For Dry Configuration:

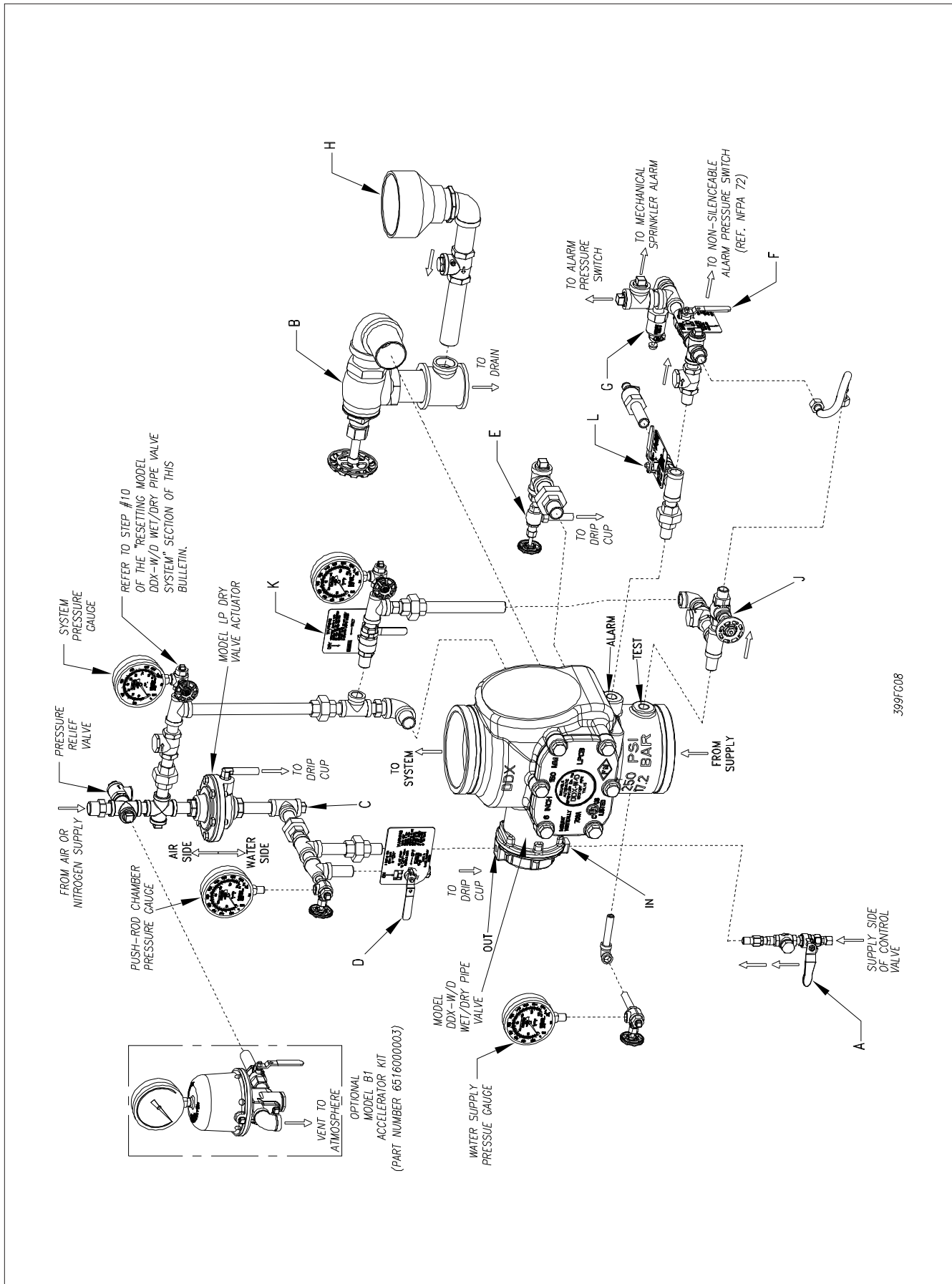
Water coming out of the bleed hole is caused by a leaking diaphragm (#34, Fig. 7). Visually inspect the pushrod chamber cover (#8, Fig. 7) and piston (#18, Fig. 7) to determine what could have damaged the diaphragm and correct. Install a new diaphragm. **NOTE: The diaphragm has two different surfaces; it is not bi-directional. It 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 reassemble the six retaining screws (#29, Fig. 7) with an installation torque of 15 foot-pounds. Setup the Model DDX-W/D Wet/Dry Valve as per the section "Resetting Model DDX-W/D Wet/Dry Valve System."

For Wet Configuration:

Water coming out of the bleed hole is caused by a defective O-ring assembled to the push rod guide (#21, Fig. 7). Remove the piston-push rod subassembly, pushrod spring (#32, Fig. 7), and pushrod guide (#21, Fig. 7). Verify by hand turning, that the push rod cannot be unscrewed from the piston. Replace all O-rings and the pushrod guide. The correct installation torque for the pushrod guide is 35 inch-pounds. **CAUTION: Do not over tighten the push rod guide.** Reassemble the components that were initially removed. Re-install the diaphragm (#34, Fig. 7) if it appears to be in good shape, otherwise, replace it also. **NOTE: The diaphragm has two different surfaces; it is not bi-directional. It 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 reassemble the six retaining screws (#29, Fig. 7) with an installation torque of 15 foot-pounds. Setup the Model DDX-W/D Wet/Dry Valve as per the section "Resetting Model DDX-W/D Wet/Dry Valve System."

CONDITION TWO (System Air coming out of the bleed hole):

System air coming out of the bleed hole is caused by a defective O-ring assembled to the push rod guide (#21, Fig. 7). Remove the piston-push rod subassembly, pushrod spring (#32, Fig. 7), and pushrod guide (#21, Fig. 7). Verify by hand turning, that the push rod cannot be unscrewed from the piston. Replace all O-rings and the pushrod guide. The correct installation torque for the pushrod guide is 35 inch-pounds. **CAUTION: Do not over tighten the push rod guide.** Reassemble the components that were initially removed. Re-install the diaphragm (#34, Fig. 7) if it appears to be in good shape, otherwise, replace it also. **NOTE: The diaphragm has two different surfaces; it is not bi-directional. It 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 reassemble the six retaining screws (#29, Fig. 7) with an installation torque of 15 foot-pounds. Setup the Model DDX-W/D Wet/Dry Valve as per the section "Resetting Model DDX-W/D Wet/Dry Valve System."



399FC08

Fig. 8.

MODEL LP DRY VALVE ACTUATOR

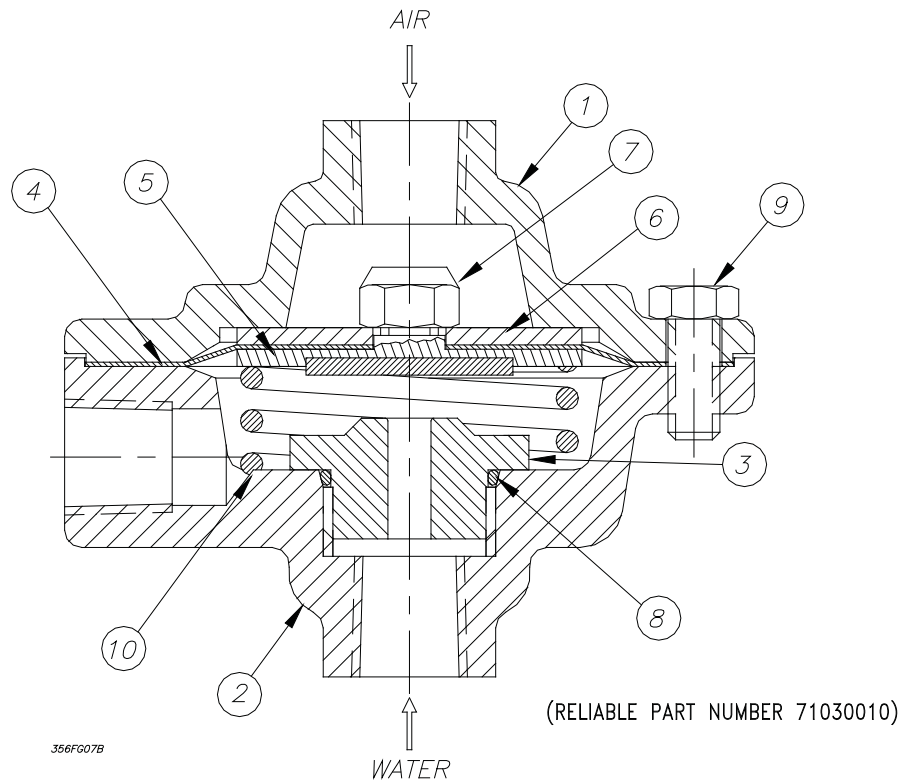


Fig. 9

Model LP Dry Valve Actuator Parts List P/N 71030010

Item No.	Part No.	Description	Qty. Required
1	94106936	Lower Housing	1
2	94106935	Upper Housing	1
3	96006905	Seat	1
4	92206311	Diaphragm	1
5	95106911	Facing Plate Assembly	1
6	96906311	Diaphragm Washer	1
7	94906406	Facing Plate Nut	1
8	95406901	Seat O-Ring	1
9	95606305	Bolt	6
10	96406902	Compression Spring	1

Maintenance – Model LP Dry Valve Actuator

Refer to Figs. 6 and 7

If water constantly flows through the Model LP Dry Valve Actuator and into the drain, there is a leak in the seal of the Actuator's seat.

1. Close the main valve controlling water supply (Fig. 6) to the Wet/Dry Valve and close off the air/nitrogen supply to the sprinkler system. Close valve A (Fig. 6).
2. Drop pressure in the system by opening the ¼" angle valve, valve E (Fig. 6.), and remove the Actuator from the system.
3. Remove all six bolts (#9, Fig. 7) holding the Actuator together. Clean or replace the facing plate assembly (#5, Fig. 7) and seat (#3, Fig. 7).
4. Reassemble the Actuator, using a torque of 8 ft-lbs on the facing plate nut (#7, Fig. 7) and 12 ft-lbs on the six bolts (#9, Fig. 7). Use a cross-tightening pattern. Reinstall the Actuator. Set up the Model DDX-W/D Wet/Dry Valve as per the section "Resetting Model DDX-W/D Wet/Dry Valve System."

Patents

U.S. Patent Number 6,068,057 for a Dry Pipe Valve Arrangement

Ordering Information

Specify:

- **Valve Size & Model** – 100mm (4") Model DDX-W/D Wet/Dry Valve (P/N 6103040033), 150mm (6") Model DDX-W/D Wet/Dry Valve (P/N 6103060031), 165mm Model DDX-W/D Wet/Dry Valve (P/N 6103060032)
- **Trim** – The trim set is available in individual parts, in time saving segmentally assembled kit forms, or fully assembled to the Model DDX-W/D Wet/Dry Valve

Trim Configurations	Trim Part Numbers		
	For 100mm (4") Valve	For 150mm (6") Valve	For 165mm Valve
Fully Assembled to DDX-WD Valve w/o Control Valve	6505040410	6505060410	6505065410
Segmentally Assembled (DDX-W/D Valve Sold Separately)	6502070030		
Individual Parts (DDX-W/D Valve Sold Separately)	6502070020		

Note: For Metric installations, a 2" NPT x R2, ISO 7/1xClose Nipple (Reliable P/N 98543401) is sold separately as an adapter for the single drain outlet of the trim(s)

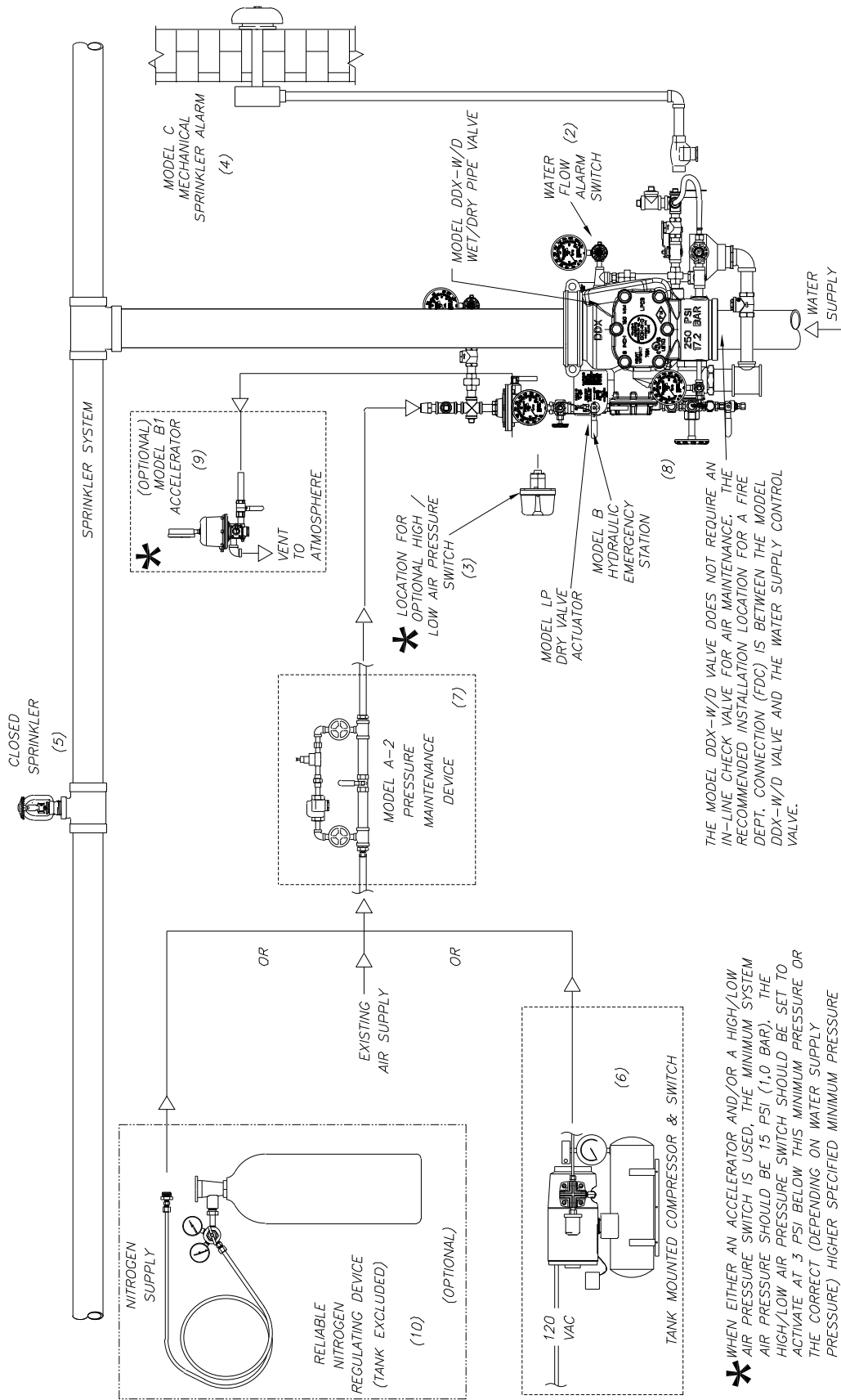
- **Additional Equipment (Refer to Fig. 8)**

Item	Component Part		Mfgr.	Description	Bulletin
1	Water Supply Control Valve		Select	OS&Y Valve, 100mm (4"), 150mm (6") or 165mm	-
				Butterfly Valve, 100mm (4"), 150mm (6") or 165mm	-
	Tamper Switch	(Optional) for OS&Y Valve	C	Mod. OSY2	A05-0196
		(Optional) for Butterfly Valve		Mod. PIBV2	A05-0197
2	Water Flow Pressure Switch		C	Mod. EPS10-2 (DPDT)	A05-0176
			B	Mod. J54-A-8295 (DPDT)	SPR-02
3	Low Air Pressure Alarm Switch		C	Mod. ESP40-2 (DPDT)	A05-0177
4	Mechanical Alarm (Optional)		A	Mod. C	612/613
5	Sprinklers		A	Closed Type	110,117,131,136, etc.
6	Air Compressor (Optional)		D	Tank Mounted	F30
7	Pressure Maintenance Device		A	Mod. A-2	250/251
8	Wet/Dry Valve System		A	Ref. Parts in this Bulletin	399
9	Model B1 Accelerator Kit (Optional)		A	Ref. Parts in this Bulletin	323/399
10	Nitrogen Regulating Device (Optional)		A	Regulator with Optional Low Pressure Switch Kit	253

System Equipment Manufacturers

- (A) The Reliable Automatic Sprinkler Co., Inc.
 (B) United Electric Controls Company
 (C) System Sensor, Division of Pittway Corp.
 (D) Gast Manufacturing Corp.

MODEL DDX-W/D WET/DRY PIPE VALVE SYSTEM COMPONENTS



THE MODEL DDX-W/D VALVE DOES NOT REQUIRE AN IN-LINE CHECK VALVE FOR AIR MAINTENANCE. THE RECOMMENDED INSTALLATION LOCATION FOR A FIRE DEPT. CONNECTION (FDC) IS BETWEEN THE MODEL DDX-W/D VALVE AND THE WATER SUPPLY CONTROL VALVE.

✱ WHEN EITHER AN ACCELERATOR AND/OR A HIGH/LOW AIR PRESSURE SWITCH IS USED, THE MINIMUM SYSTEM AIR PRESSURE SHOULD BE 15 PSI (1.0 BAR). THE HIGH/LOW AIR PRESSURE SWITCH SHOULD BE SET TO ACTIVATE AT 3 PSI BELOW THIS MINIMUM PRESSURE OR THE CORRECT (DEPENDS ON WATER SUPPLY PRESSURE) HIGHER, SPECIFIED MINIMUM PRESSURE VALUE AS GIVEN BY TABLE A.

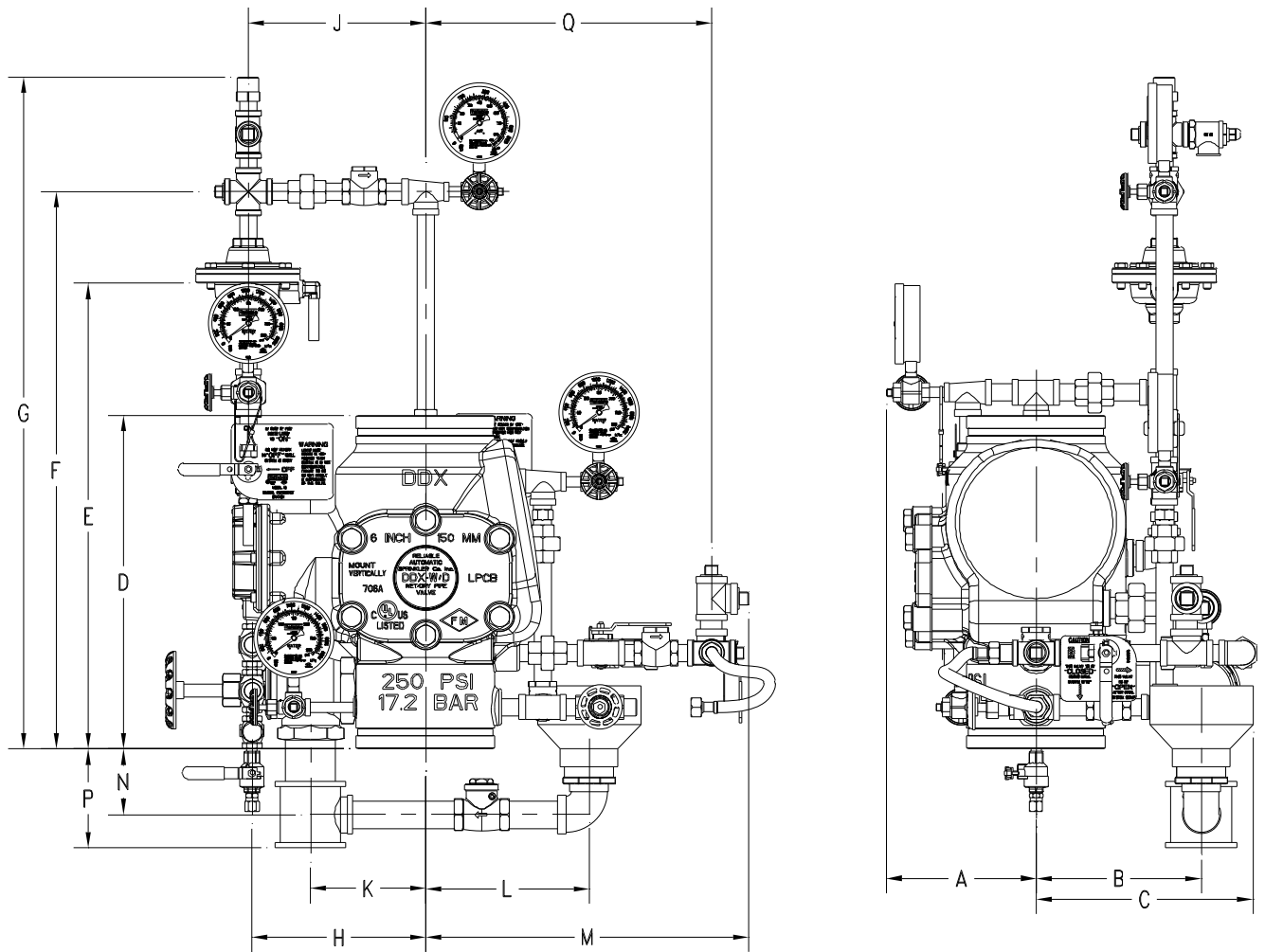
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Fig. 10

Installation Dimensions

Installation Dimensions in mm (inches)																
Valve	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
100mm (4")	133 (5¼)	171 (6¾)	241 (9½)	355 (14)	603 (23¾)	651 (25 5/8)	1003 (39½)	216 (8½)	311 (12¼)	140 (5½)	216 (8½)	343 (15¼)	64 (2½)	159 (6¼)	133 (5¼)	305 (13¼)
150mm (6") & 165mm	159 (6¼)	197 (7¾)	267 (10½)	406 (16)	629 (24¾)	702 (27 5/8)	1048 (41½)	216 (8½)	311 (12¼)	140 (5½)	216 (8½)	343 (16¾)	83 (3¼)	222 (8¾)	127 (5)	318 (14¾)

TRIM SHOWN FULLY ASSEMBLED WITHOUT CONTROL VALVE



399BKP

Reliable...For Complete Protection

Reliable offers a wide selection of sprinkler components. Following are some of the many precision-made Reliable products that guard life and property from fire around the clock.

- Automatic sprinklers
- Flush automatic sprinklers
- Recessed automatic sprinklers
- Concealed automatic sprinklers
- Adjustable automatic sprinklers
- Dry automatic sprinklers
- Intermediate level sprinklers
- Open sprinklers
- Spray nozzles
- Alarm valves
- Retarding chambers
- Dry pipe valves
- Accelerators for dry pipe valves
- Mechanical sprinkler alarms
- Electrical sprinkler alarm switches
- Water flow detectors
- Deluge valves
- Detector check valves
- Check valves
- Electrical system
- Sprinkler emergency cabinets
- Sprinkler wrenches
- Sprinkler escutcheons and guards
- Inspectors test connections
- Sight drains
- Ball drips and drum drips
- Control valve seals
- Air maintenance devices
- Air compressors
- Pressure gauges
- Identification signs
- Fire department connection

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. Products manufactured and distributed by Reliable have been protecting life and property for over 90 years, and are installed and serviced by the most highly qualified and reputable sprinkler contractors located throughout the United States, Canada and foreign countries.

Manufactured by

Reliable[®]

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