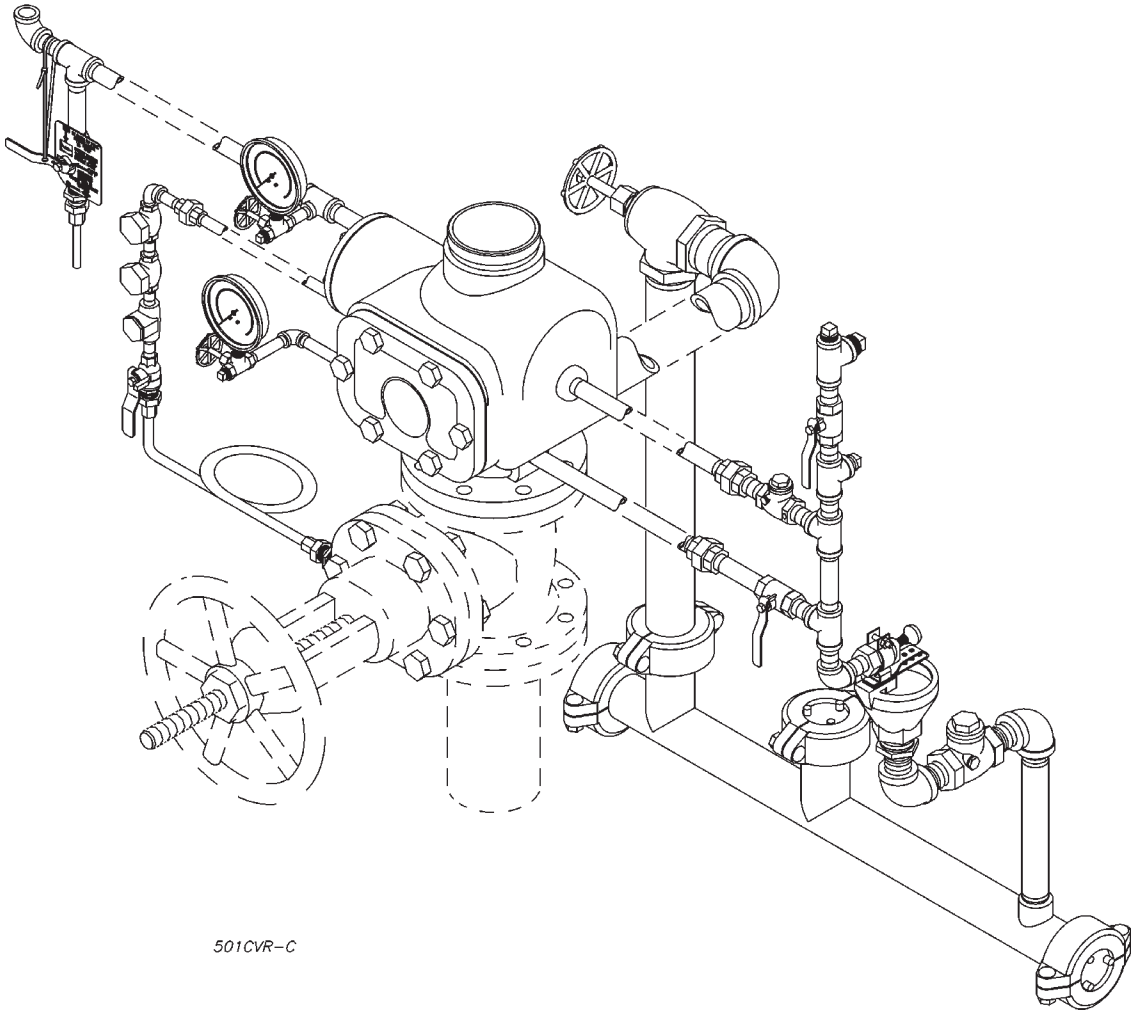
Bulletin 501 Rev. X

Reliable®

Model BX Deluge Valve

Instructions for Installation, Operation, Care and Maintenance

4″ (100mm) and 6″ (150mm) Sizes Wet Pilot Line and Dry Pilot Line Electric Actuation



The Reliable Automatic Sprinkler Co., Inc., 103 Fairview Park Drive, Elmsford, New York 10523

General

The Reliable Model BX Deluge Valves are hydraulically operated differential type valves designed for use as primary control valves in deluge, preaction or special types of fire protection systems. The Model BX may be reset externally.

The Wet Pilot Trim set is used with every Model BX Deluge Valve. This trim set is connected to the push rod chamber outlet and provides the 2″ main drain, the alarm test, the supply pressure gauge and the push rod chamber supply connections. It is needed when wet pilot line detectors (Model PLD) or hydraulic manual emergency stations/pull boxes (Model A & B) are used for releasing.

Two alternate actuation trim sets, the Dry Pilot or the Electric Actuation, are available when dry pilot sprinklers and devices or solenoid valves are used for releasing. Actuation by solenoid valves enables a full range of electrical detectors to be used for a remote sensing.

Listings & Approvals:

Only when used with Reliable's Trim Set.

1. Listed by Underwriters Laboratories, Inc. and Certified by UL for Canada (cULus)
2. Factory Mutual Research (FM)
3. NYC MEA 258-93-E
4. Scientific Services Laboratory (SSL, Australia)

Valve Operation

The Reliable Model BX Deluge Valves are shown in both closed and open positions in Figure 1. In the closed position, the supply pressure acts on the underside of the clapper and on the push rod through the push rod chamber restriction.

The pressure force acting on the push rod when multiplied by the lever is sufficient to hold the clapper in the closed position against the supply pressure.

When a fire is detected, the push rod chamber is vented to the atmosphere through the push rod chamber outlet. Since the pressure cannot be replenished through the restriction as rapidly as it is vented through the outlet, the push rod chamber pressure falls instantaneously. When the push rod chamber pressure reaches about one–half the supply pressure, the upward force of the supply pressure acting on the clapper is greater than the downward force of the lever and the clapper opens.

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 system piping. Water also flows through the deluge valve alarm outlet to the alarm devices.

Model BX Deluge Valve

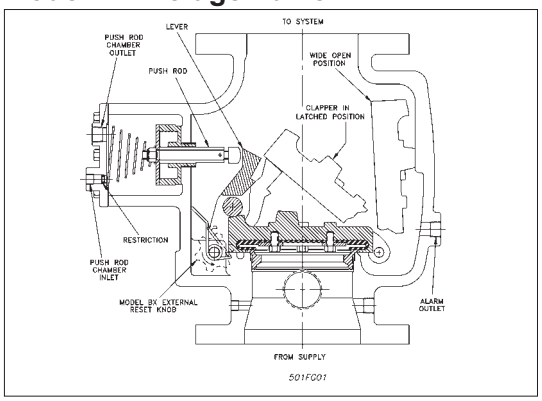


Figure 1 - Clapper In Closed - Latched Open - Wide Open Position

After system shutdown, the Reliable Model BX Deluge Valve can be easily reset, without special tools, by simply removing the cover, restoring the clapper and lever to their set positions and reinstalling the cover. However, resetting the Model BX Deluge Valve only requires hand turning the reset knob in the clockwise direction when pressure in the push rod chamber is reduced to atmospheric condition. The external reset feature of the Model BX 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 a second facet of good maintenance: removing the cover for periodic cleaning and inspection of internal valve parts.

Whenever ambient temperature conditions can substantially raise the temperature of the water in the release line and pushrod chamber, the pressure in the pushrod chamber and release line can exceed 175 psi. A pressure relief kit, P/N 6503050000, can be installed in the release line to limit the pressure to 175 psi.

Valve Description

1. Rated working pressure 175 psi (12,1 bar).
2. Factory hydrostatic test pressure 350 psi (24,1 bar).
3. End and trim connections – three valve connection styles are available:
   a. American Standard flanged inlet and outlet:
      - Flanges mate with ANSI B 16.1 (125 lb.) flange

ANSI Flange Dimensions in Inches					
Valve Size	Bolt Circle Diameter	Bolt Hole Diameter	Flange Outside Diameter	Flange Thickness	No. Bolts
4	7½	¾	9	15/16	8
6	9½	⅞	11	1	8

      - Threaded openings per ANSI B 2.1
      - Reliable's standard trim sets are compatible with American Standard flanged valves
      - Color — Black

   b. American Standard flanged inlet and grooved outlet:
      - Inlet flange mates with ANSI B 16.1 (125 lb.) flange
      - Outlet groove dimensions per ANSI/AWWA C606

Groove Dimensions in Inches (mm)				
Valve Size	Outlet Diameter	Groove Diameter	Groove Width	Outlet Face to Groove
4 (100)	4½ (114)	4.334 (110)	¾ (10)	⅝ (16)
6 (150)	6⅝ (168)	6.455 (164)	⅜ (10)	⅝ (16)

      - Threaded openings per ANSI B 2.1
      - Reliable's standard trim sets are compatible with American Standard flanged and grooved valves
      - Color — Black

   c. Metric flanged inlet and outlet:
      - Flanges mate with DN 1092-2, NF-E-29-282 and BS 4504 PN 16 flanges
      - Threaded openings per ISO 7/1 R

Metric Flange Dimensions in Millimeters					
Valve Size	Bolt Circle Diameter	Bolt Hole Diameter	Flange Outside Diameter	Flange Thickness	No. Bolts
100	180	18.3	229	23.8	8
150	241	22.2	279	25.4	8

- Reliable's standard trim sets may be used with metric valves providing trim is assembled carefully and extra thread sealant is applied to connections between valves and trim
- Color — Red

4. Face to face dimension:
   - The 4″ (100 mm) valve — 14″ (355 mm)
   - The 6″ (150 mm) valve — 16″ (406 mm)
5. Friction loss: Expressed in equivalent length of Sch. 40 pipe, based on Hazen Williams formula with C = 120 and a flow velocity of 15 ft/s (4.6m/s).

Valve Size	Equivalent Length
4″ (100 mm)	15′ (4.57 m)
6″ (150 mm)	19′ (5.79 m)

6. Installation position: Vertical

Valve Installation

When a deluge valve is installed on top of an OS&Y gate valve, use two stud bolts and 4 nuts to connect the bottom flange of the deluge valve to the top flange of the OS&Y gate valve.

Deluge Valve	Stud Bolt	
Size	Diameter	Length
4″ (100mm)	⅝″ (16mm)	3″ (76mm)
6″ (150mm)	¾″ (19mm)	3½″ (89mm)

Insert the two stud bolts in the top flange holes of the OS&Y gate valve closest to its stem and thread on 2 nuts. Place gasket and deluge valve in position. Push stud bolts through deluge valve flange and attach 2 remaining nuts. Complete bolting with uniform tightening.

Trim Description

The trim sets for Reliable Model BX Deluge Valves are arranged for rapid, easy and compact attachment and serve as connection points to Reliable's alarms and other devices.

The trim sets are:

Wet Pilot Trim

Dry Pilot Trim

Electric Actuation Trim

The Wet Pilot Trim set (Fig.2) is used with every Model BX Deluge Valve. This trim set is connected to the push rod chamber outlet and provides 2″ main drain, alarm test, supply pressure gauge and push rod chamber supply connections. It is needed when wet pilot line detectors (Model PLD) or the hydraulic manual emergency stations/pull boxes (Model A & B) are used for releasing. Included in the trim are a push rod chamber pressure gauge, a ball valve for manual emergency operation of the deluge valve, and a connection for the releasing device.

The Dry Pilot Trim set is used when Model PLD dry pilot line detectors are used as the fire detection means. The Dry Pilot Trim set includes the dry pilot actuator, air and water pressure gauges, low air pressure warning switch, air pressure relief valve and the connections for the air supply and pilot sprinkler lines. The Model A Dry Pilot Actuator is fully described in Bulletin 504.

The Electric Actuation Trim set is required when a solenoid valve is used for actuation.

All trims can be ordered either as individual part trims or in time–saving preassembled kit forms.

The Drain Manifold trim is available as an option on all trims (Figure 3).

The Model B Hydraulic Manual Emergency Station (Figure 4) is a standard item of all trim sets. However, the Model A Hydraulic Manual Emergency Pull Box (Bulletin 506) is available and can be provided as an option.

Model PLD fixed temperature pilot line detectors and spacing requirements are described in Bulletin 180.

Wet Pilot Trim

Wet pilot line operation is the simplest method of deluge valve actuation. The trim is a basic one and is required on all Reliable Model BX Deluge Valves regardless of application. Shown in Figure 2, it contains components required on all installations, such as 2" main drain, alarm test, supply and push rod chamber pressure gauges and push rod chamber connections. The wet pilot line consists of a line of closed detectors (Model PLD) located over the area to be protected. This line contains water under pressure and is connected to the outlet of the push rod chamber of the deluge valve. When one of the pilot line detectors actuates, the push rod chamber is vented and the deluge valve operates. The deluge valve can also be operated manually by opening the ball valve of the hydraulic manual emergency station or the optional Model A Hydraulic Manual Emergency Pull Box (see Reliable Bulletin 506).

The wet pilot line is only a detection system and does not contribute to controlling the fire. Its installation is subject to the following restrictions:

a) It is not to be installed in an area subject to freezing.

b) It is not to be installed in an area where temperatures in excess of 150°F (65°C) are anticipated.

c) NFPA 72 or the authority having jurisdiction should be consulted for spacing and elevation requirements.

Table 1 specifies the maximum wet pilot line height for use with Model BX Deluge Valves. Refer to the appendix of Bulletin 707 for combination height and distance limitations.

Table 1

Average Service Pressure at Valve – PSI (kg/sq. cm)		Maximum Height of Wet Pilot Line Above Valve–Ft. (Meters)			
		4″		6″	
20	(1.41)	7.7	(2.3)	10.8	(3.3)
40	(2.81)	18.4	(5.6)	21.5	(6.6)
60	(4.22)	27.8	(8.5)	32.3	(9.8)
80	(5.62)	37.0	(11.3)	43.1	(13.1)
100	(7.03)	44.6	(13.6)	50.8	(15.5)
120	(8.44)	52.4	(15.9)	58.5	(17.8)
140	(9.84)	66.2	(20.2)	75.5	(23.0)
160	(11.25)	78.5	(23.9)	81.6	(24.9)
175	(12.30)	84.6	(25.8)	84.7	(25.8)

In locations with high ambient temperature or high thermal radiation, the deluge valve may require cooling, protection or relocation to eliminate thermal over pressurization of the push rod chamber and actuation devices.

Deluge Valves have 6 tapped openings for trim connections. Each opening is marked on the valve to indicate its use. The recommended trim installation is as follows (Figure 2):

1. Install Nipple (21) for 6″ and 100mm valve, or nipple (22) for 150mm valve, or nipple (23) for 4″ valve in tapped opening marked "TEST".

2. Install Nipple (20) in tapped opening marked “ALARM” and connect balance of this trim line. Check Valve (9) must be installed as indicated in Figure 2 to allow flow from the deluge valve to alarm devices.
3. Install ¼″ Nipple (24) in tapped opening marked “SUPPLY” and connect balance of this trim line.
4. Install ½″ Nipple (21) in tapped opening marked “OUT” and connect balance of this trim line.
5. Install ¼″ Nipple (26) in tapped opening marked “IN” and connect balance of this trim line. Item 16 must be connected to the inlet of the control valve for each deluge valve as shown.
6. Install 2″ Nipple (27) in tapped drain opening and connect balance of this trim line.

Deluge Valve Wet Pilot Trim Parts List

(P/N 6503001000 Individual Parts Trim, P/N 6503001001 Preassembled Trim)

Item No.	Part Number	Description	No. Req'd
1	71010471	Assembly, Drip Cup — 1¼″	1
2	78653000	Model B Manual Emergency Station	1
3	98727607	Strainer – ¼″	1
4	98840109	Valve, Ball – ½″	2
5	98840110	Valve, Ball – ¼″	1
6	98815204	Union, “0”–Ring Seal – ½″	2
7	98815201	Union – ¼″	1
8	78653100	Valve, Ball Drip – ½″	1
9	98840181	Valve, Horiz. Check – ½″	1
10	98840193	Valve, Spring Check – ¼″	2
11	98840100	Valve, Angle – 2″	1
12	98840160	Valve, Gauge, 3–Way – ¼″	2
13	98248001	Gauge, Pressure, Water	2
14	98614403	Plug – ¼″	2
15	98604406	Plug – ½″	2
16	98048000	Bushing, Reducer – ½″ x ¼″	2
17	92056702	Connector – ⅜″ x ¼″ NPT	3
18	96686724	Tubing, Copper – ⅜″ O.D. x 4 ft.	1
19	96686725	Tubing, Copper – ⅜″ O.D. x 5 ft.	1
20	98543223	Nipple – ½″ x 1½ ″ Lg.	9

Item No.	Part Number	Description	No. Req'd
21	98543230	Nipple – ½″ x 3″ Lg.	4
22	98543216	Nipple – ½″ x 3½″ Lg.	4
23	98543210	Nipple – ½″ x 2½″ Lg.	1
24	98543241	Nipple – ¼″ x 5″ Lg.	1
25	98543244	Nipple – ¼″ x 2″ Lg.	1
26	98543226	Nipple – ¼″ x 1½″ Lg.	6
27	98543262	Nipple – 2″ x 3½″ Lg.	1
28	98543238	Nipple – 2″ x Close	1
29	98761651	Tee – ½″	4
30	96606603	Tee – ½″ x ½″ x ¾″	1
31	96606607	Tee – ½″ x ½″ x ¼″	1
32	98174401	Elbow – ½″	2
33	98174404	Elbow – ¼″	1
34	98174405	Elbow – 2″	1
35	98614401	Plug – ¾″	1
36	99100101	Strap, Retaining	1
37	89141112	Tie, Retaining	3
38	98174408	Elbow, Street - ¼″	1

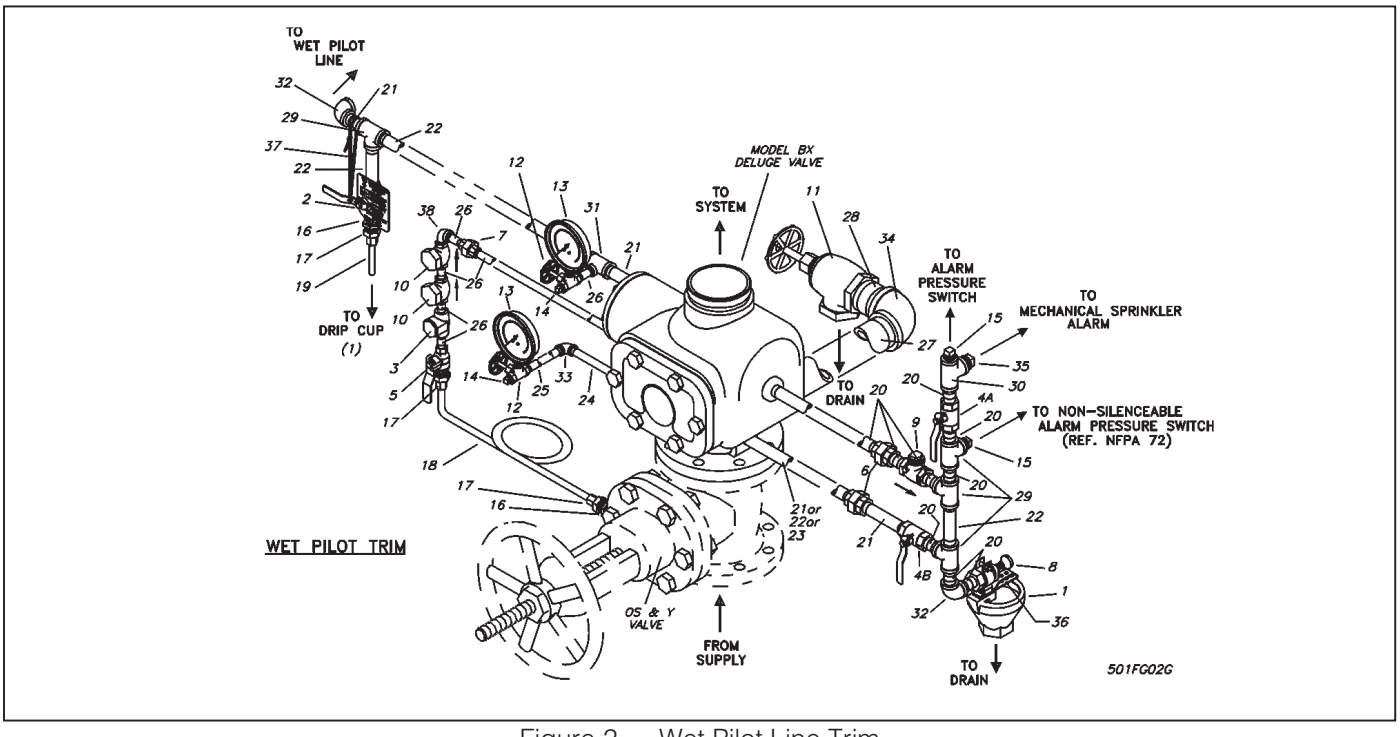


Figure 2 — Wet Pilot Line Trim

Dry Pilot Trim

Dry pilot line operation is used in areas which are subject to freezing conditions or to obtain installed sprinkler heights and pipe lengths greater than allowed for wet pilot line trim. Dry pilot operation uses a pilot line of Model PLD detectors or closed sprinklers containing air under pressure located in the area to be protected. This pressurized line is connected to a dry pilot line actuator. The Model A Dry Pilot Actuator is fully described in Bulletin 504. The dry pilot line actuator functions very much like a miniature dry pipe valve. In areas where moisture laden air could cause freezing or other problems in the dry pilot line, the use of a cylinder of dry compressed gas such as nitrogen is suggested. Approved gas handling regulators and connections are then recommended.

When one of the detectors actuates, the air pressure is reduced, thus opening the dry pilot line actuator, which releases the deluge valve.

NFPA 72 or the Authority Having Jurisdiction should be consulted for spacing and elevation requirements of pilot line detectors.

The dry pilot trim (Fig.5) includes gauges to read both the air and water pressure, a low air pressure warning switch, an air relief valve, the dry pilot line actuator and connections for the dry pilot line of detectors. Refer to Figure 5 for installation of the dry pilot trim. Connect air supply to air inlet side of the dry pilot line actuator as shown in Figure 5. Table 2 specifies the air pressure to be used in a dry pilot line. The level of air pressure is adjusted by removing the cap nut on the end of the Relief Valve (5) and turning the now exposed slotted adjusting screw clockwise to increase pressure or counterclockwise to reduce it. Replace the cap nut after the correct pressure setting has been made at 5 psi above the maximum pilot line pressure required by Table 2. An appropriate automatic air maintenance device must be used to safeguard against valve tripping due to air pressure leaks in the dry pilot line. See Bulletin 250 and 251 for Air Maintenance Device information. Install Dry Pilot Line as required. Wire the Low Air Pressure Switch (3) to an annunciating device or control panel. The pressure switch is factory set to close a circuit at 25 psi.

Dry Pilot Trim Parts List

(P/N 6503001100 Individual Parts Trim)
(P/N 6503001101 Preassembled Trim)

Item No.	Part Number	Description	No. Req'd
1	98248000	Gauge, Pressure, Air	1
2	71030000	Actuator, Dry Pilot Line	1
3	98728800	Switch, Pressure, ⅜″ (25 psi)	1
4	98840109	Valve, Ball – ½″	1
5	98840190	Valve, Relief –½″ (40 psi)	1
6	98840160	Valve, Gauge, 3–Way – ¼″	1
7	98614403	Plug – ¼″	1
8	98604406	Plug – ½″	1
9	98761651	Tee – ½″	3
10	96606609	Tee – ½″ x ½″ x ⅜″	1
11	96606607	Tee – ½″ x ½″ x ¼″	1
12	98048022	Bushing, Reducer – ¾″ x ½″	1
13	98048000	Bushing, Reducer – ½″ x ¼″	1
14	92056702	Connector – ⅜″ Tubing x ¼″ NPT	1
15	96686724	Tubing, Copper – ⅜″ O.D. x 4 ft.	1
16	98543223	Nipple – ½″ x 1½″ Lg.	10
17	98543209	Nipple – ½″ x 2″ Lg.	1
18	98543229	Nipple – ⅜″ x 2½″ Lg.	1
19	98543226	Nipple – ¼″ x 1½″ Lg.	1
20	98815204	Union, O–Ring Seal – ½″	2

Table 2

Water Pressure, psi (bar)	Pneumatic Pressure to be Pumped into Dry Pilot Line, psi (bar)	
Maximum	Not Less Than	Not More Than
20 (1,4)	10 (0,7)	20 (1,4)
50 (3,4)	15 (1,0)	25 (1,7)
75 (5,1)	20 (1,4)	30 (2,1)
100 (6,9)	25 (1,7)	35 (2,4)
125 (8,6)	30 (2,1)	40 (2,8)
150 (10,3)	35 (2,4)	45 (3,1)
175 (12,1)	40 (2,8)	50 (3,5)

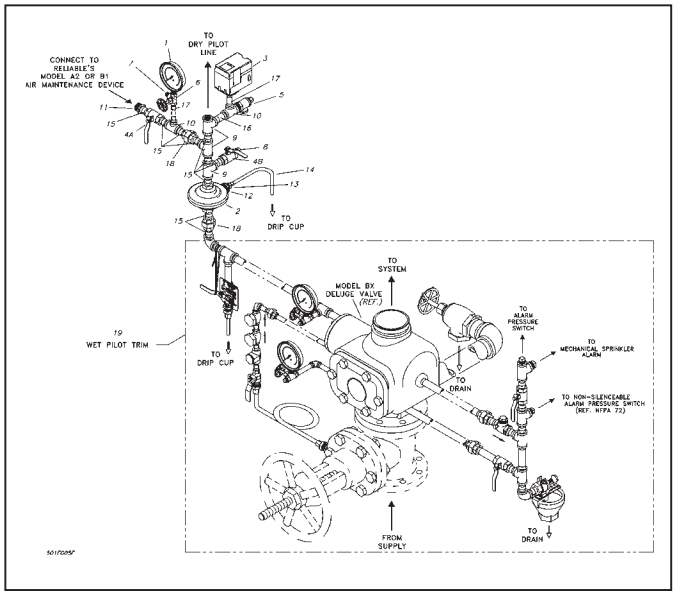


Figure 5 — Dry Pilot Trim

Electric Actuation Trim

This trim (Figure 6) uses Solenoid Valve (1), attached to the wet pilot trim for releasing the deluge valve. Details on the electrical portion of this trim can be found in Reliable Bulletins 707 and 708, which describe Supertrol deluge and preaction systems.

Electric Actuation Trim Parts List

(P/N 6503001500 Individual Parts Trim)
(P/N 6503001501 Preassembled Trim)

Item No.	Part Number	Description	No. Req'd
1	687102000	Valve, Solenoid	1
2	98543223	Nipple – ½″ x 1½″ Lg.	1
3	98048000	Bushing, Reducer – ½″ x ¼″	1
4	92056702	Connector – ⅜″ Tubing x ¼″ NPT	1
5	96686726	Tubing, Copper – ⅜″ O.D. x 6 ft.	1
6	6503001000	Wet Pilot Trim, Loose	1
	6503001001	Wet Pilot Trim, Preassembled	

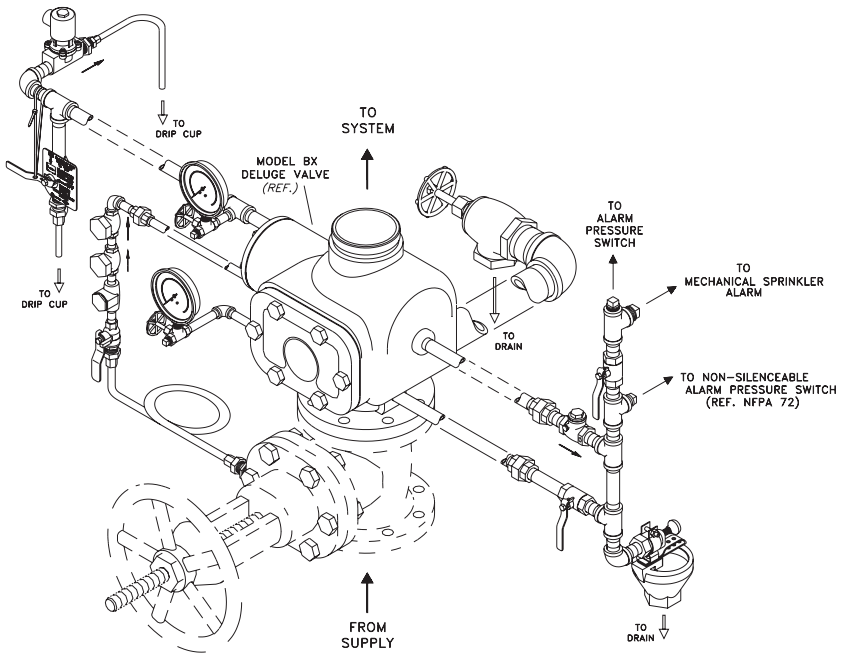


Figure 6 — Electric Actuation Trim

Optional Drain Manifold Trim

To facilitate an efficient drain system, the optional Drain Manifold Trim (Figure 3) is offered with all trim sets, providing a single 2″ (50mm) drain outlet with grooved end connections for easy installation and maintenance.

Drain Manifold Trim Parts List

(P/N 6501180300 Individual Parts Trim)

Item No.	Part Number	Description	No. Req'd
1	91004200	Manifold, S/A, 2″ Drain	1
2	7207080800	Coupling – 2″	4
3	7235080000	Cap – 2″ Coupling	2
4	98523222	Nipple – 1″ Close	3
5	98523261	Nipple – 1″ x 3″ Lg.	1
6	98164404	Elbow – 1″	2
7	98840145	Valve, Check – 1″	1
8	98048013	Bushing, Reducer – 1¼″ x 1″	1
9	95191114	Pipe – 2″ Grv. & Thd. x 11¼″ Lg.	1

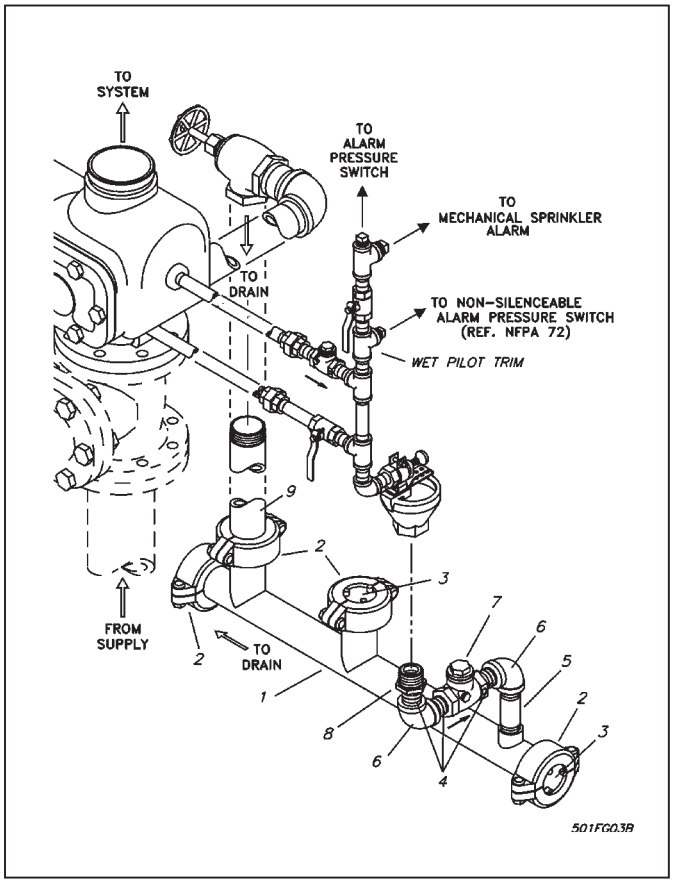


Figure 3 —
Optional Drain Manifold

Hydraulic Manual Emergency Station

Standard equipment for all trim sets is the Model B Hydraulic Manual Emergency Station. The Model A Hydraulic Manual Emergency Pull Box is available as an option (see Bulletin 504).

The Model B Station 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 the Wet Pilot Trim kit. The cable tie is inserted as shown in Figure 4 after 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 ON position.

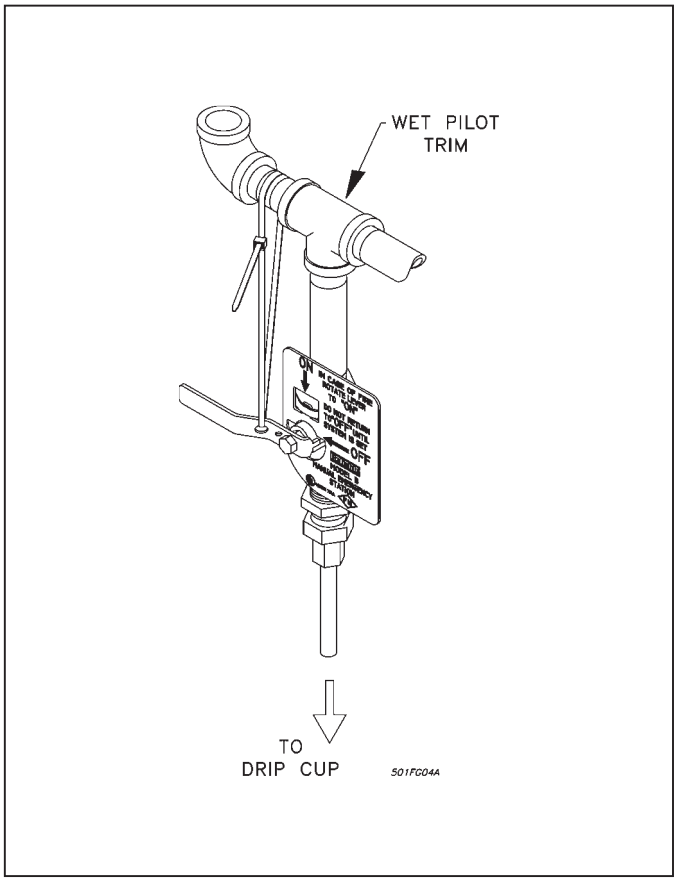


Figure 4 —
Model B Hydraulic Manual Emergency Station

Maintenance

Reliable Deluge Valves and associated equipment shall periodically be given a thorough inspection and test. NFPA 25 provides minimum requirements for inspection, testing and maintenance. The deluge valve should be tested, operated, cleaned and inspected at least annually and parts replaced as required.

Preassembled Trim Kits

All trims are also available in time–saving preassembled kit forms (see Figures 7 and Figure 8 for the wet pilot and dry pilot trims).

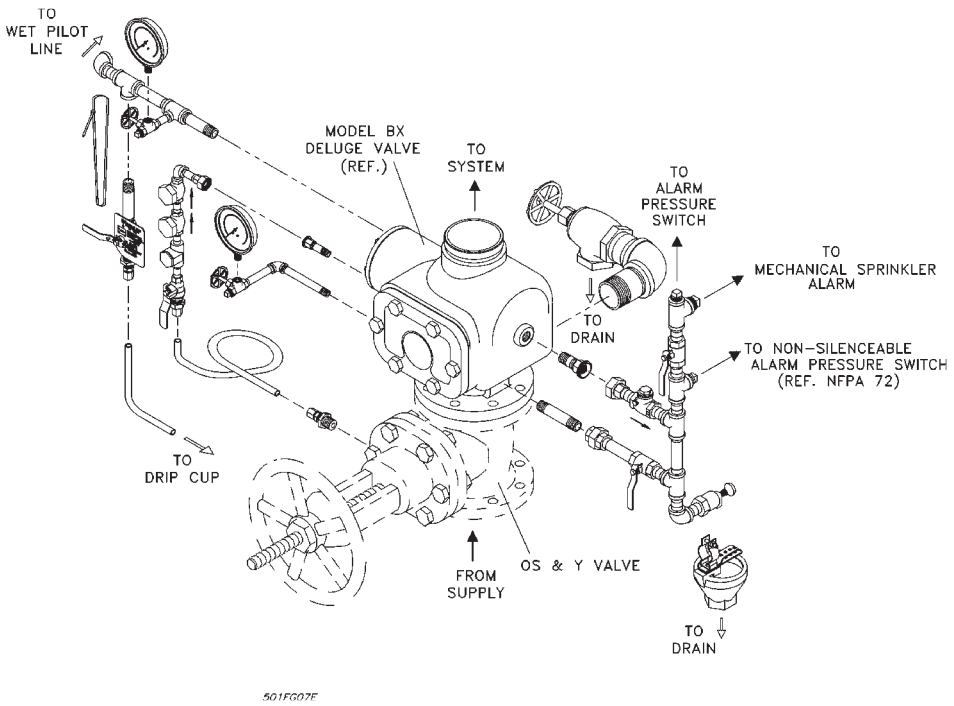


Figure 7 —
Wet Pilot Trim, Preassembled

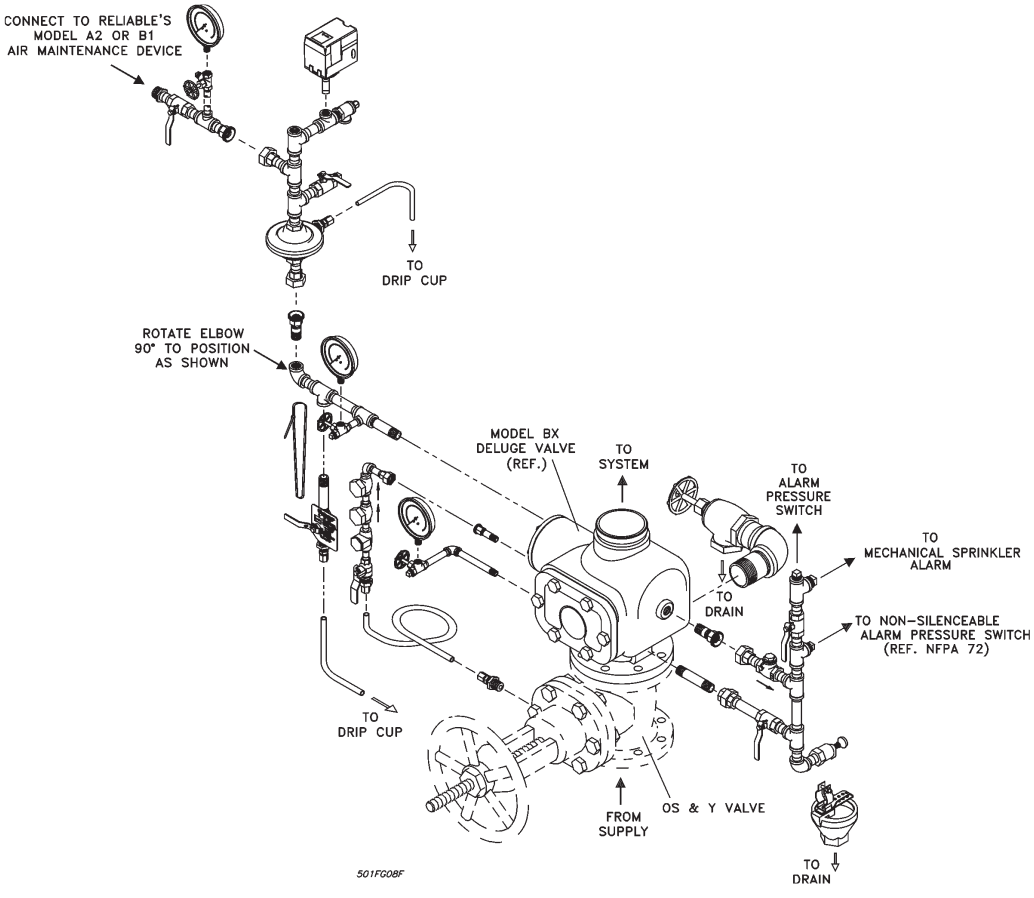


Figure 8 —
Dry Pilot Trim, Preassembled

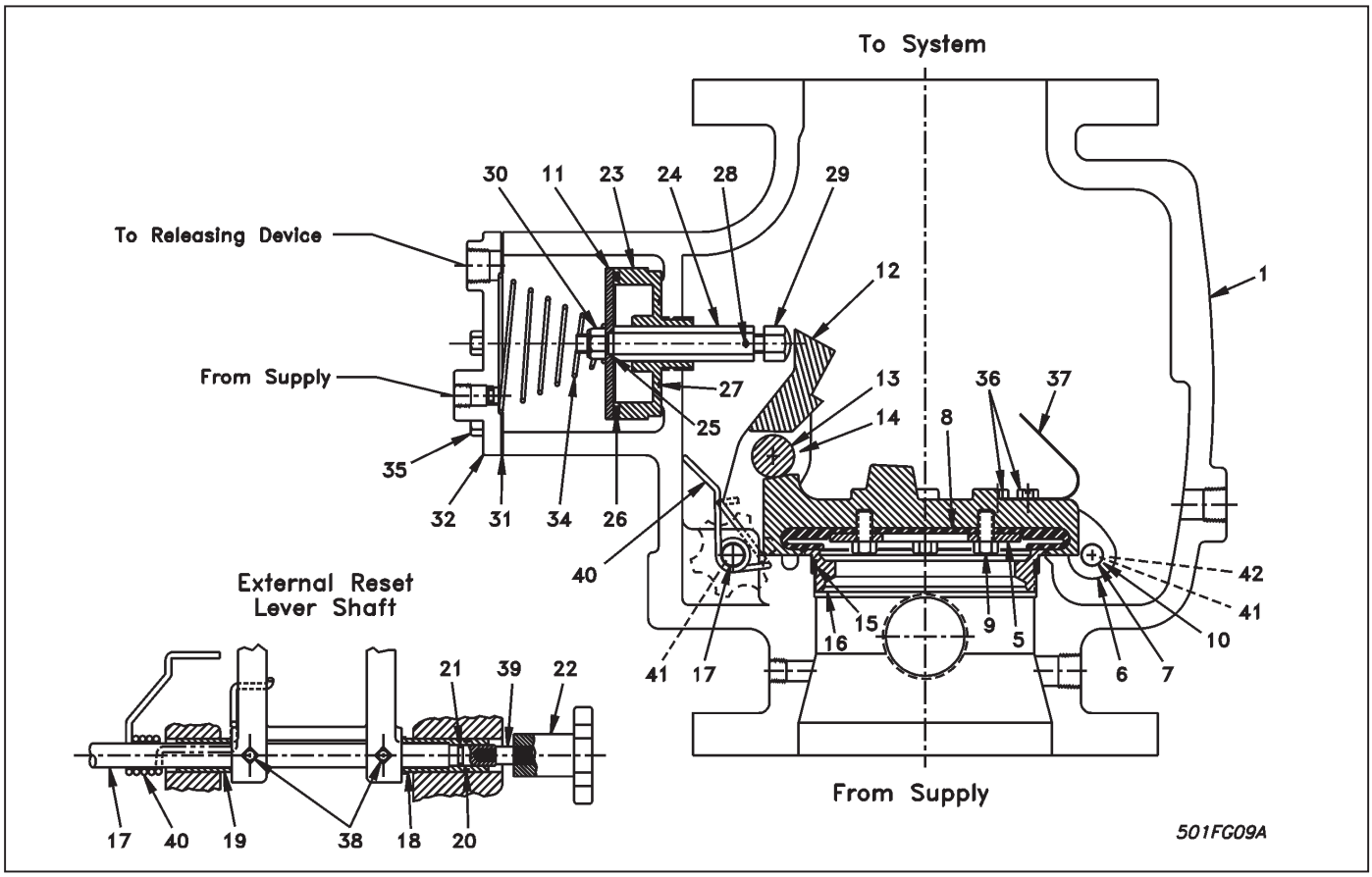


Figure 9

Model BX, 4″ (100mm) & 6″ (150mm) Deluge Valve Parts List

Model	Item	4″ Deluge Valve	6″ Deluge Valve	Description	No. Req'd
BX	1	91006424	91006426	Body, Flanged	1
BX	1	91006434	91006436	Body, Flanged & Grooved	1
BX	1	91006454	91006456	Body, Metric	1
BX	2	92106424	92106426	Cover, Body	1
BX	3	93706404	93706406	Gasket, Cover	1
BX	4	91106126	91106406	Bolts, Cover	6
BX	5	95306404	95306406	Clamping Ring, Clapper	1
BX	6	91906424	91906426	Clapper	1
BX	7	96206404	96206426	Shaft, Clapper	1
BX	8	93406404	93406406	Rubber Facing, Clapper	1
BX	9	95606404	95606406	Screw, Clamping Ring	4
BX	10	90506406	90506426	Bearing, Clapper Shaft	2
BX	11	95106406	95106406	Plate, Disc	1
BX	13	95006408	95006407	Pin, Lever	1
BX	14	95006408	95006407	Pin Lever, "E"-Ring	2
BX	15	95406404	95436126	"O"-Ring, Seat	1
BX	16	96016404	96016406	Seat	1
BX	17	96216424	96216426	Shaft, Lever	1
BX	18	91406426	91406426	Bearing, Lever Shaft	1
BX	19	90506406	90506406	Bearing, Lever Shaft	1
BX	20	95406426	95406426	"O"-Ring, Lever Shaft Bearing	1
BX	21	95406425	95406425	"O"-Ring, Lever Shaft	1

Model	Item	4″ Deluge Valve	6″ Deluge Valve	Description	N o. Req'd
BX	22	94356426	94356426	Knob, Reset	1
BX	23	93916406	93916406	Guide, Push-Rod	1
BX	24	95506404	95506406	Push-Rod	1
BX	25	95406407	95406407	"O"-Ring, Push-Rod	1
BX	26	95406408	95406408	"O"-Ring, Push-Rod Guide	1
BX	27	95406406	95406406	"O"-Ring, Push-Rod	1
BX	28	95016206	95016206	Pin, Push-Rod	1
BX	29	95616406	9516406	Screw, Drive	1
BX	30	94906406	94906406	Nut, Drive	1
BX	31	93716406	93716406	Gasket, Push-Rod Cover	1
BX	32	71040419	71040419	S/A, Push-Rod Cover	1
BX	32	71040418	71040418	S/A, Push-Rod Cover, Metric	1
BX	34	96406406	96406406	Spring, Push-Rod	1
BX	35	95606305	95606305	Bolt, Push-Rod Cover	6
BX	36	95606424	95606424	Screw, Spring	2
BX	37	96406426	96406426	Spring	1
BX	38	95606426	95606426	Screw, Lever	2
BX	39	96506602	96506602	Stud, Threaded	1
BX	40	96406427	96406427	Spring, Lever	1
BX	42	98614402	98614401	Plug, Pipe	1

Resetting Deluge Valve

Refer to Figures 2, 5 & 9.

1. Close the valve controlling water supply to the deluge valve and close valve (5, Fig.2)
2. Open Main Drain Valve (11, Fig. 2) and drain system.
3. Open all drain valves and vents at low points throughout the system, closing them when flow of water has stopped. Open Valve (2, Fig. 2) or (4B, Fig. 5).
4. Push in the plunger of Ball Drip Valve (8, Fig. 2), forcing the ball from its seat to verify there is atmospheric pressure inside the main valve chamber.
5. For inspection and resetting, remove Body Cover (2, Fig. 9) and raise Clapper (6, Fig. 9) to wide open position. Thoroughly clean the body seat surface making certain it is free from scale, dirt, lint, etc. NEVER APPLY GREASE, COMPOUND, SHELLAC OR ANY OILY SUBSTANCES TO SEAT OR RUBBER FACING. For resetting only, rotate Knob (22, Fig. 9 & 10) clockwise, until you hear a distinct noise indicating the clapper has reset, and then proceed to step 9.
6. Clean Rubber Facing (8, Fig. 9) by hand, making certain that it is free from scale, dirt, lint, etc.
7. Push Lever (12, Fig. 9) to the left and lower the clapper onto the seat.
8. Replace Gasket (3, Fig. 9) and the body cover and uniformly tighten Cover Bolts (4, Fig. 9).
9. Inspect and replace any portion of the detection system subjected to fire conditions.
10. Open Valve (5, Fig. 2) and allow water to fill the push rod chamber. Close Valve (2, Fig. 2) or (4B, Fig. 5).
11. Bleed all air from the actuation piping.
    A. Wet Pilot Trim—bleed the entire wet pilot line until all air is removed.
    B. Dry Pilot Trim—allow water to flow through the pilot line actuator, then rapidly apply air pressure into the dry pilot line until it conforms to Table 2, as indicated on the Air Pressure Gauge (1, Fig. 5).
    C. Electric Actuation—open the solenoid valve by operating a detector or an electric manual emergency station. While water is flowing through the solenoid valve, cause it to close. Refer to Bulletin 708, "Supertrol Electrical Systems" for details.
12. Check that Valve (2, Fig. 2) and (4B, Fig. 2) are closed. Open slightly the valve controlling water supply to the deluge valve, closing Main Drain Valve (11, Fig. 2) when water flows. Observe if water leaks through Ball Drip Valve (8, Fig. 2), into Drip Cup (9, Fig. 2). If no leak occurs the water seat is tight. Open slowly but fully the valve controlling water supply to the deluge valve and seal in the open position.
13. Valve (5, Fig. 2) must remain open when the deluge valve has been reset, to maintain water pressure in the push rod chamber.

Inspection and Testing

Refer to Figures 2 & 5.

1. Water supply—be sure the valves controlling water supply to the deluge valve are open fully and sealed in this position.
2. Alarm line—be sure that Valve (4A, Fig. 2) is opened and sealed in this position.
3. Other trimming valves—check that Valve (5, Fig. 2) is opened and Valves (2, 4B, Fig.2), and (4B, Fig. 5) are 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—check gauge pressure for conformance to Table 2.
6. Releasing device—check outlet of the releasing device (i.e., the dry pilot line actuator, solenoid valve or the hydraulic manual emergency station) for leakage. Also verify that tubing drain lines from releasing devices are not pinched or crushed which could prevent proper releasing of the deluge valve.
7. Testing alarms—open Valve (4B, Fig. 2) permitting water from the supply to flow to the electric sprinkler alarm switch and to the mechanical sprinkler alarm (water motor). After testing, close this valve securely. Push in on the plunger of Valve (8, Fig. 2) until all of the water has drained from the alarm line.
8. Operation test—Open the Model B Manual Emergency Station (2, Fig. 2).
   Note: Operation of this valve will release the deluge valve.
9 Seal Model B Station in the off position with Tie (38, Fig 2), after deluge valve is reset.

Testing Detection System Without Operating Deluge Valve

1. Close the valve controlling water supply to deluge valve and open 2″ (50mm) Drain Valve (11, Fig. 2).
2. Verify that Valve (5, Fig. 2) is open, allowing water to enter the push-rod chamber.
3. Operate detection system—
   A. Wet Pilot Trim—open Model B Emergency Station (2, Fig. 2)
   B. Dry Pilot Trim—remove the plug and open Valve (4B, Fig. 5)
   C. Electric Actuation—refer to Bulletin 708
4. Operation of the detection system must result in a sudden drop of water pressure in the push rod chamber.
5. Reset detection system—reverse operations performed in Step "3" above and then proceed according to Step "10" for resetting the deluge valve.
6. Open slightly the valve controlling water supply to the deluge valve, closing Drain Valve (11, Fig. 2) when water flows. Open slowly but fully the valve controlling the water supply to the deluge valve, and seal in the open position.
7. Verify that Valve (5, Fig. 2) is open.
8. Check ball drip valve for leakage. There should be none.
9. Verify that the Model B Emergency Station (2, Fig. 2) is sealed in the OFF position with the appropriate Tie (37, Fig. 2).

Maintenance Procedures

Refer to Figures 2, 5 & 9.

1. Mechanical sprinkler alarm (water motor–not shown) not operating: this is most likely caused by a clogged screen in the strainer (not shown). Proceed as follows: remove plug from the strainer. Remove and clean the screen. Replace the screen and the plug, then tighten securely (Ref. Bulletin 613).

2. Steady water flow into the drip cup. This condition is caused by water leaking past Clapper Rubber Facing (8, Fig. 9) ; Seat "O"-Ring (15, Fig. 9); Push-Rod "O"-Rings (25 and 27, Fig. 9) or Push-Rod Guide "O"-Ring(26, Fig. 9). To locate and correct the trouble, proceed as follows:
   a. Carry out steps 1 through 5 of Resetting Deluge Valve instructions.
   b. Remove Body Cover (2, Fig. 9) and open Valve (5, Fig 2). Look for leakage coming from around Push-Rod (24, Fig. 9) or Push-Rod Guide (23, Fig. 9). If leakage is coming from the push rod chamber, proceed as follows:
      1. Close Valve (5, Fig. 2) and open Valve (2, Fig. 2) and allow the push-rod chamber to drain.
      2. Remove Push-Rod Cover (32, Fig. 9), Spring (34, Fig. 9) and Push-Rod (24, Fig. 9). Inspect and clean Disc Plate (11, Fig. 9) and Push-Rod Guide "O" Ring (26, Fig. 9). Replace the "O"-Ring, if required, and reassemble the unit.
      3. If leakage still occurs, replace "O"-Rings (25 & 27, Fig. 9). Proceed as follows: Remove Push-Rod Cover (32), Spring (34) and Push-Rod (24); unscrew Pus- Rod Guide (32) from Body (1) and Nut (30) from Push-Rod (24). Lubricate and replace "O"-Rings (25 & 27) and reassemble.
   c. If leakage is not coming from the push-rod, clean and inspect Seat (16) and Clapper Facing (8). If it is necessary to replace the facing, proceed as follows:
      1. Remove Clapper Shaft (7) and Clapper (6). Remove Clamping Screws (9) and Clamping Ring (5). Grasp the edge of Clapper Rubber Facing (8) and pull it free of the clapper.
      2. Inspect and clean all four clapper vent holes.
      3. Assemble the new facing onto the clapper and reassemble the deluge valve.
      4. Carry out Steps 8 through 13 of Resetting Deluge Valve instructions.

To replace seat "O"-Rings—

1. Using the Seat Wrench, Part Number 97504600 or 97502400, unscrew the seat. Use care to avoid damage to the seat surface.
2. Remove "O"-Ring (15, Fig. 9). Thoroughly clean the "O" Ring grooves and sealing surfaces. Inspect for damage or foreign material.
3. Apply a light coat of lubricant to the new "O"-Rings and install them in the proper grooves. Use care to avoid stretching, twisting or other damage to the "O"-Rings.
4. After checking that "O"-Rings are correctly installed, carefully reinstall the seat and tighten securely with the wrench.

Model BX Deluge Valve Lever Removal and Replacement

Refer to Figure 9.

Should it be necessary to remove Lever (12), from the assembly, proceed as follows after steps 1 though 4 of the Resetting Deluge Valve Section:

1. Remove Cover (2), Clapper Shaft (7) and Clapper Sub-Assembly (6).
2. Unscrew Reset Knob (22) from the shaft.
3. With a small ¼ wrench, remove Lever Screws (38) from Lever (12).
4. Push Lever Shaft (17) though cover opening of the valve, while holding Lever (12) and Spring (40).
5. Remove Lever (12) and Spring (40)

To replace the lever:

6. Start Lever Screws (38), into the lever by 1 or 2 threads.
7. Lubricate Lever Shaft "O"-Ring (21).
8. Reverse removal procedure above.

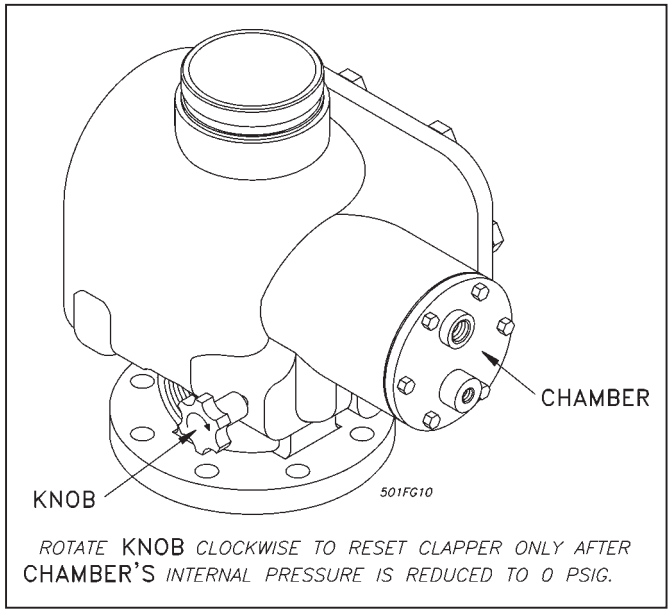
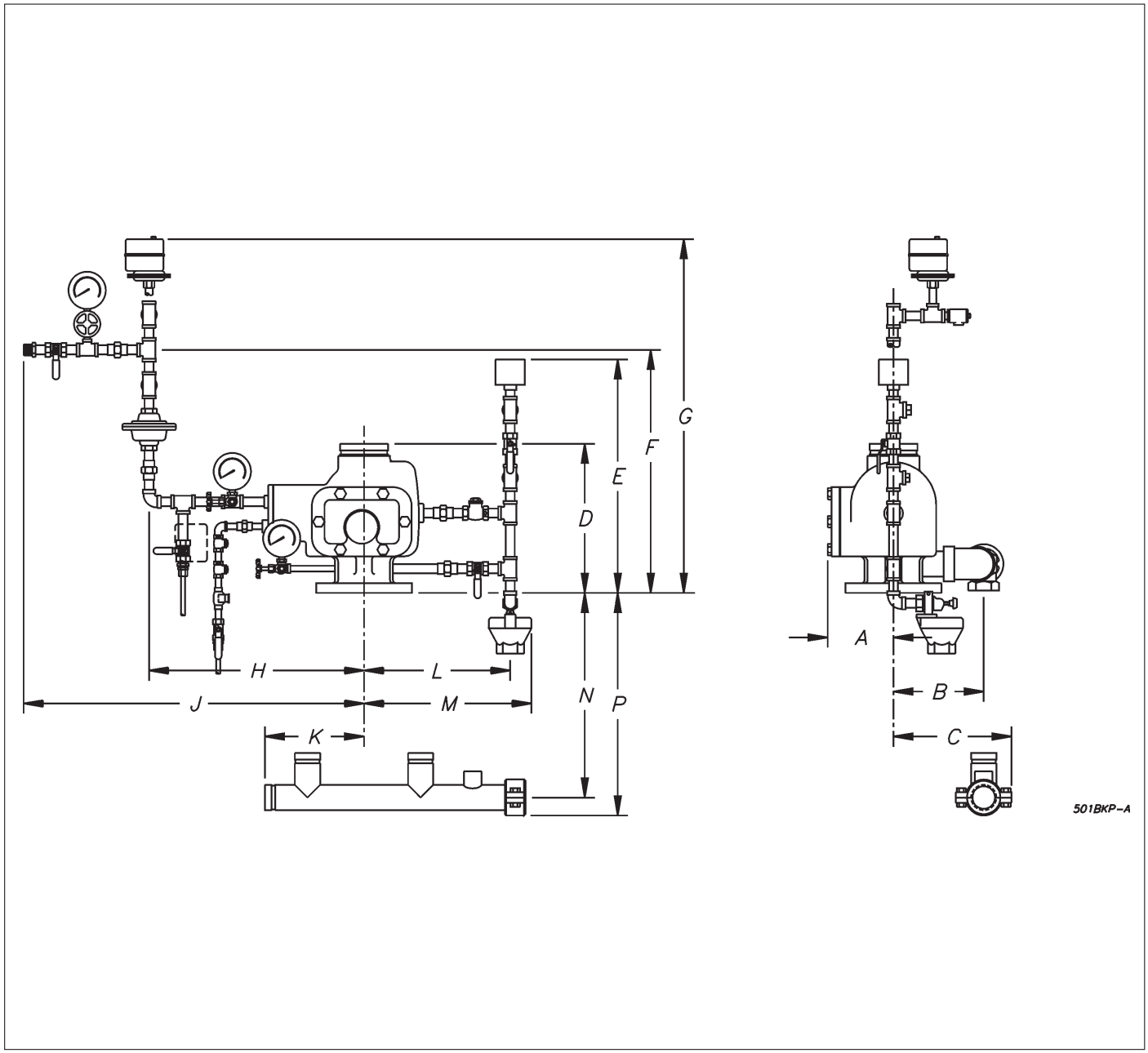


Figure 10 —
Model BX Deluge Valve, External Reset Feature

Installation Dimensions in Inches (mm)														
Valve	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**J**	**K**	**L**	**M**	**N**	**P**
4 (100)	5¾ (146)	8 (203)	10 (254)	14 (356)	19⅞ (486)	21 (533)	31½ (800)	20⅛ (511)	30⅛ (765)	10¼ (260)	12½ (378)	14½ (378)	14⅞ (378)	16½ (419)
6 (150)	7 (178)	9 (229)	11¼ (286)	16 (406)	18 (457)	23 (457)	33½ (851)	21⅝ (549)	31⅝ (803)	10¼ (260)	13 (381)	15 (381)	14⅞ (378)	16½ (419



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