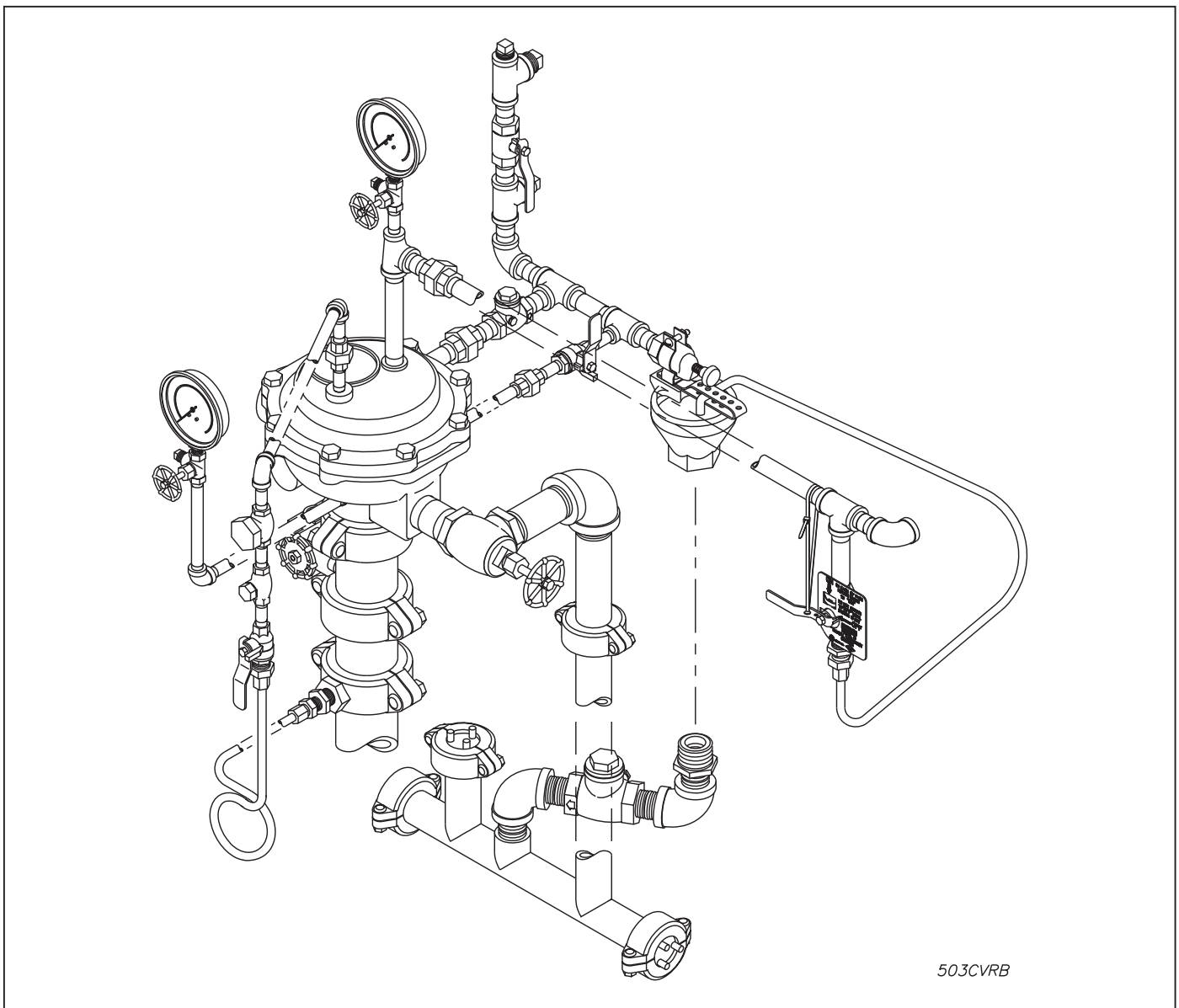




Model A Deluge Valve

Instructions for Installation, Operation, Care and Maintenance

2½" (65mm) Size
Wet Pilot Line
Dry Pilot Line
Electric Actuation



503CVRB

General

The Reliable Model A 2½" Deluge Valve is a hydraulically operated differential diaphragm type valve designed for use as the primary control valve in deluge, preaction or special types of fire systems.

The valve is easily reset by external hydraulic means which eliminates the need for removing the cover.

The Wet Pilot Trim set is used with every Model A Deluge Valve. This trim set provides the drain, the top chamber supply, the alarm, the alarm test, the gauge and the hydraulic manual emergency station/pull box connections. It is used when pilot line detectors are used for releasing.

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

Listings & Approvals

1. Listed by Underwriters Laboratories, Inc. (UL)
2. Listed by Underwriters Laboratories of Canada (ULC)
3. Scientific Services Laboratory of Australia (SSL)
4. Approved by Factory Mutual (FM)
5. Loss Prevention Council (LPC, UK).
6. N.Y.C. BS & A No. 587-75-SA.

Valve Operation

The Reliable Model A Deluge Valve is a quick opening, hydraulically operated, diaphragm actuated valve. It consists of three chambers, top (pressurized water), outlet (atmospheric dry) and inlet (pressurized water). The three chambers are isolated from each other by the diaphragm and piston and compression-limited seat seal. In the closed position (Figure 1), the supply pressure in the top chamber acts across the diaphragm and the piston, holding the piston on the seat against the inlet supply pressure. The diaphragm pressure area is greater than the seat pressure area, providing a force imbalance of about 3 to 1.

When a fire is detected, the top chamber is discharged to the atmosphere through the outlet port via an opened releasing device. The top chamber pressure cannot be replenished through the restricted inlet port, and the chamber pressure falls instantaneously. When the top chamber pressure reaches about ⅓ the supply pressure, the upward force of the supply pres-

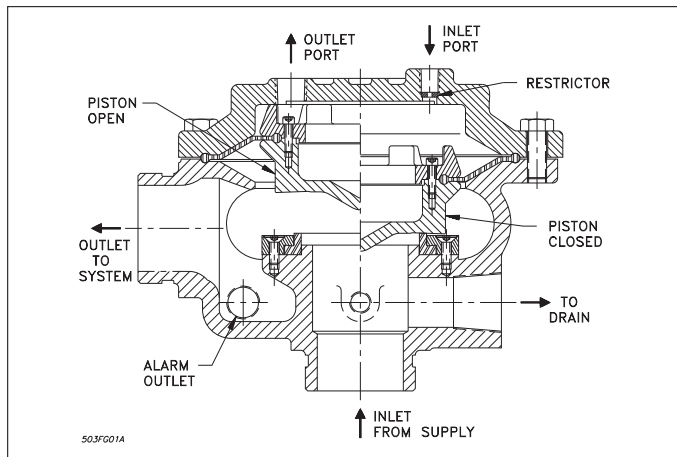


Figure 1 — Model A Deluge Valve
Open and Closed Positions

sure acting on the piston becomes greater than the downward force of the diaphragm and the piston moves up to the open position (Figure 1).

Once the piston has opened, water flows from the supply through the deluge valve into the piping system and the alarm outlet to the alarm devices. The valve maintains its open position until the open releasing device is closed.

CAUTION: THE RELEASING DEVICE MUST BE MAINTAINED OPEN TO PREVENT CLOSING OF THE MODEL A DELUGE VALVE.

After the system is shutdown and drained, the deluge valve is easily reset without special tools by restoring detection devices to the ready position and resetting the releasing device. Once the releasing device is closed and supply pressure is resupplied to the top chamber, the deluge valve will close. The external hydraulic reset feature of the Model A 2½" Deluge Valve provides a means for simple, economical system testing which is one essential facet of a good maintenance program. However, periodic cleaning and inspection of internal parts in accordance with NFPA 25 is required.

Technical Data

1. Rated working pressure of 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. 2½" American Standard taper pipe threads inlet and outlet per ANSI B2.1:
 - Threaded openings per ANSI B2.1.
 - Reliable's standard trim sets are compatible with American Standard taper pipe threads.
 - Color — Black.
 - b. 2½" Grooved inlet and outlet:

Groove Dimensions in Inches			
Outlet Diameter	Groove Diameter	Groove Width	Outlet Face to Groove
2 ⅞	2.720	⅝ ₁₆	⅝ ₈

- c. 2½" (65mm) Metric pipe threads inlet and outlet:
 - Threaded openings per ISO 7/1-Rp.
 - 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 — Blue.
4. Shipping Weight — 49 lbs. (22 kg).
5. Friction loss expressed in equivalent length of Sch. 40 pipe, based on Hazen-Williams formula with C=120. Equiv. Length = 17.1 ft. (5.21 m).
6. Installation position: Vertical.

Trim Description

The trim sets for the Reliable Model A Deluge Valve are arranged for rapid, easy and compact attachment and serve as connection points to Reliable Model C Mechanical Alarm and other devices.

The Model A Deluge Valve trim sets are:

- a) Wet Pilot Trim.
- b) Dry Pilot Trim.
- c) Electric Actuation Trim.

The Wet Pilot Trim set (Figure 2) is used with every Model A Deluge Valve, providing the 1¼" main drain, the alarm, the alarm test and the supply pressure gauge connections. Connected to the top chamber outlet, this trim set is used when pilot line detectors (Model PLD) and hydraulic manual emergency stations/pull boxes (Models A & B) are used for actuation. The set includes a gauge to read top chamber pressure, an indicating ball valve for manual operation of the deluge valve, and a connection for the actuation devices.

The Dry Pilot Trim set (Figure 3) is used when pilot line detectors and actuators are used as the releasing means. The set includes the dry pilot actuator, air pressure gauge, 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 (Figure 4) is required when a solenoid valve is used for releasing.

The Optional Drain Manifold Trim (Figure 5) is available to facilitate an efficient drain system for all lines that must discharge to an atmospheric drain. It provides a singular 1¼" drain outlet with grooved end connections for easy installation and maintenance.

The Model B Hydraulic Manual Emergency Station (Figure 6) is standard, consisting 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 2 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.

The Model A Hydraulic Manual Emergency Pull Box is available as an option (see Bulletin 506).

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

Preassembled Trim Kits (Figures 7 and 8) are also available for rapid and simple trim assembly.

Wet Pilot Trim

Wet pilot line operation is the simplest method of deluge valve actuation. The trim is a basic one that is required on all Reliable Model A Deluge Valves regardless of application. Shown in Figure 2, it contains components required on all installations, such as 1¼" main drain, alarm, alarm test and top chamber supply connections. The deluge valve has 6 tapped openings for the attachment of the trimmings. Each opening is marked on the valve to indicate its use. The wet pilot line consists of a line of closed sprinklers located over the area to be protected. This line contains water un-

der pressure and is connected to the outlet of the top chamber of the deluge valve. When one of the detectors actuates, the top chamber is vented and the deluge valve operates. The deluge valve can also be operated manually by opening the ball valve of the Model B 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. The releasing device must be continuously maintained in the open position when actuated, to prevent the deluge valve from reclosing.
- b. It is not to be installed in an area subject to freezing.
- c. It is not to be installed in an area where temperatures in excess of 150°F (65°C) are anticipated. In areas of high ambient temperature and/or high thermal radiation, the deluge valve may require protection, shading or relocation to prevent over pressurization of the top chamber and actuation devices.
- d. It is to be installed in accordance with the following table. See the appendix of Bulletin 700 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)	
20	(1.41)	7.7	(2.3)
40	(2.81)	12.3	(3.8)
60	(4.22)	21.6	(6.6)
80	(5.62)	30.8	(9.4)
100	(7.03)	43.1	(13.1)
120	(8.44)	53.9	(16.4)
140	(9.84)	67.8	(20.7)
160	(11.25)	80.1	(24.4)
175	(12.30)	92.4	(28.2)

- e. NFPA 72 or the authority having jurisdiction, should be consulted for pilot line detector spacing. The recommended trim installation is as follows (Figure 2):
 1. Install ¼" Nipple (28) in tapped opening marked "TEST".
 2. Install ½" Nipple (23) in tapped opening marked "ALARM" and connect balance of this trim line. Check Valve (6) must be installed as indicated in Figure 2 to allow flow from the deluge valve to alarm devices.
 3. Install ¼" Nipple (29) in tapped opening marked "SUPPLY" and connect balance of this trim line.
 4. Install ½" Nipple (25) in tapped opening marked "OUT" and connect balance of this trim line.
 5. Install ¼" Nipple (27) in tapped opening marked "IN" and connect balance of this trim line. Item 37 must be connected to the inlet of the individual control valve for each deluge valve as shown.
 6. Install 1¼" Nipple (31) in tapped drain opening and connect balance of this trim line.

Wet Pilot Trim Parts List

P/N 6503002000 Individual Parts Trim

P/N 6503002001 Preassembled Trim

Item	Part Number	Description	No. Req'd
1	78653000	Model B Manual Emergency Station	1
2	98248001	Gauge, Pressure, Water	2
3	98840160	Valve, Gauge, 3-Way - 1/4"	2
4	98840109	Valve, Ball - 1/2"	1
5	98840110	Valve, Ball - 1/4"	2
6	98840181	Valve, Horiz. Check - 1/2"	1
7	98840193	Valve, Check - 1/4"	1
8	98840106	Valve, Angle - 1 1/4"	1
9	78653100	Valve, Ball Drip - 1/2"	1
10	71010471	Assembly, Drip Cup - 1 1/4"	1
11	99100101	Strap, Retaining	1
12	98614403	Plug - 1/4"	2
13	98604406	Plug - 1/2"	2
14	98614401	Plug - 3/4"	1
15	98727607	Strainer - 1/4"	1
16	92056702	Connector - 3/8" x 1/4" NPT	3
17	96686707	Tubing, Copper - 3/8" O.D. x 2 ft.	1
18	98686708	Tubing, Copper - 3/8" O.D. x 3 ft.	1
19	98174401	Elbow - 1/2"	2
20	98174404	Elbow - 1/4"	3

Item	Part Number	Description	No. Req'd
21	98815204	Union, O-Ring Seal - 1/2"	2
22	98815201	Union - 1/4"	2
23	98543223	Nipple - 1/2" x 1 1/2" Lg.	9
24	98543209	Nipple - 1/2" x 2" Lg.	1
25	98543204	Nipple - 1/2" x 6" Lg.	2
26	98543216	Nipple - 1/2" x 3 1/2" Lg.	1
27	98543226	Nipple - 1/4" x 1 1/2" Lg.	7
28	98543225	Nipple - 1/4" x 2 1/2" Lg.	1
29	98543243	Nipple - 1/4" x 4" Lg.	2
30	98543241	Nipple - 1/4" x 5" Lg.	1
31	98543239	Nipple - 1/4" x 3" Lg.	1
32	98761651	Tee - 1/2"	3
33	96606603	Tee - 1/2" x 1/2" x 3/4"	1
34	96606607	Tee - 1/2" x 1/2" x 1/4"	1
35	98761649	Tee - 1/4" x 1/2" x 1/2"	1
36	89141112	Tie, Retaining	3
37	98048000	Bushing, Reducer, 1/2" x 1/4"	2
38	98543244	Nipple - 1/4" x 2" Lg.	1
39	98543210	Nipple - 1/2" x 2 1/2" Lg.	1

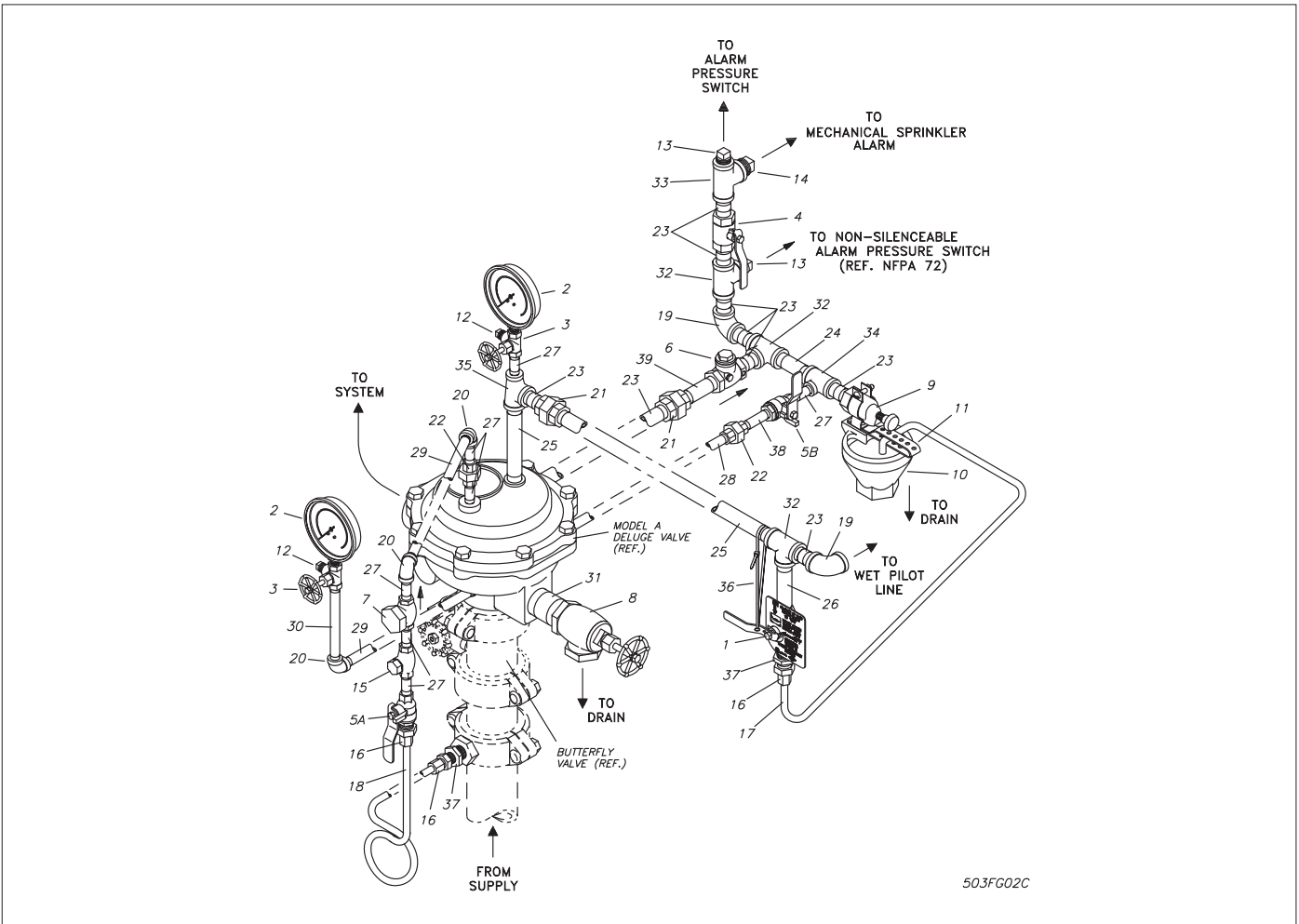


Figure 2 — Wet Pilot Line Trim

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 closed Model PLD fixed temperature detectors that contains 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 pilot line detector spacing requirements.

The Dry Pilot Trim includes a gauge to read the air pressure, a low air pressure warning switch, an air relief valve, the dry pilot line actuator and connections for the dry pilot line of sprinklers. Refer to Figure 3 for installation of the Dry Pilot Trim. Connect the air supply to the air inlet side of the dry pilot line actuator as shown in Figure 3. Table 2 specifies the air pressure to be used in a dry pilot line. The relieving pressure is adjusted by removing the cap nut on the top 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.

CAUTION: WHEN USING DEVICES OTHER THAN MODEL PLD DETECTORS FOR DRY PILOT LINE ACTUATION, THE DEVICE MUST CONTINUOUSLY MAINTAIN THE OPEN POSITION AFTER ACTUATION TO PREVENT

Table 2

Water Pressure (psi)	Air Pressure to be Pumped into Dry Pilot Line (psi)		
	Maximum	Not Less Than	Not More Than
20	10	20	
50	15	25	
75	20	30	
100	25	35	
125	30	40	
150	35	45	
175	40	50	

Dry Pilot Trim Parts List

P/N 6503002100 Individual Parts Trim
P/N 6503002101 Preassembled Trim

Item	Part Number	Description	No. Req'd
1	98248000	Gauge, Pressure, Air	1
2	71030000	Actuator, Dry Pilot Line	1
3	98728800	Switch, Pressure, $\frac{3}{8}$ " (25 psi)	1
4	98840109	Valve, Ball - $\frac{1}{2}$ "	2
5	98840190	Valve, Relief - $\frac{1}{2}$ " (40 psi)	1
6	98840160	Valve, Gauge, 3-Way - $\frac{1}{4}$ "	1
7	98614403	Plug - $\frac{1}{4}$ "	1
8	98604406	Plug - $\frac{1}{2}$ "	1
9	98761651	Tee - $\frac{1}{2}$ "	3
10	96606609	Tee - $\frac{1}{2}$ " x $\frac{1}{2}$ " x $\frac{3}{8}$ "	1
11	96606607	Tee - $\frac{1}{2}$ " x $\frac{1}{2}$ " x $\frac{1}{4}$ "	1
12	98048022	Bushing, Reducer - $\frac{3}{4}$ " x $\frac{1}{2}$ "	1
13	98048000	Bushing, Reducer - $\frac{1}{2}$ " x $\frac{1}{4}$ "	1
14	92056702	Connector - $\frac{3}{8}$ " Tubing x $\frac{1}{4}$ " NPT	1
15	96686707	Tubing, Copper - $\frac{3}{8}$ " O.D. x 2 ft.	1
16	98543223	Nipple - $\frac{1}{2}$ " x $1\frac{1}{2}$ " Lg.	10
17	98543209	Nipple - $\frac{1}{2}$ " x 2" Lg.	1
18	98543229	Nipple - $\frac{3}{8}$ " x $2\frac{1}{2}$ " Lg.	1
19	98543226	Nipple - $\frac{1}{4}$ " x $1\frac{1}{2}$ " Lg.	1
20	98815204	Union, O-Ring Seal - $\frac{1}{2}$ "	2

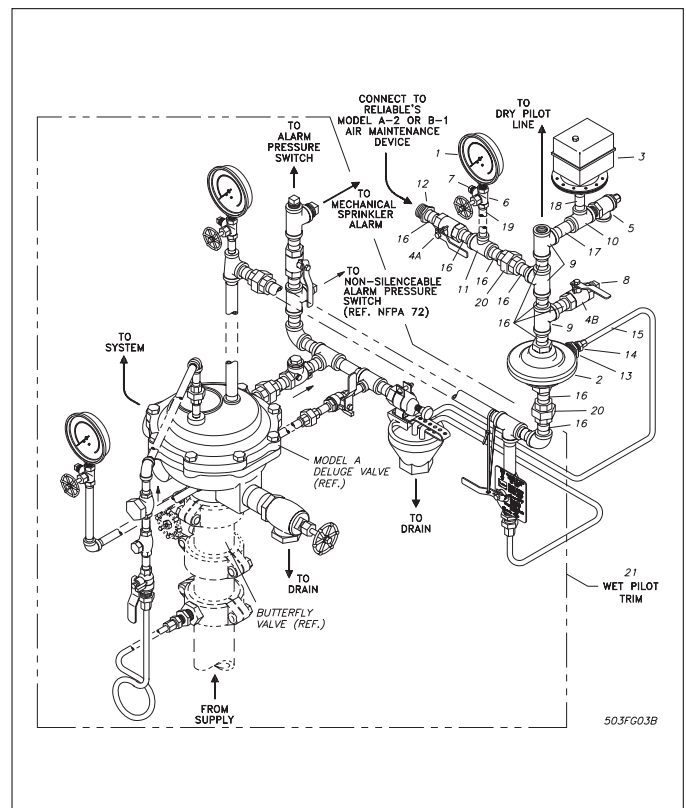


Figure 3 — Dry Pilot Line Trim

THE DRY PILOT ACTUATOR AND DELUGE VALVE FROM RECLOSING.

Electric Actuation Trim and Parts List

This trim (Figure 4) 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 Bulletin 700, which describe de-
 P/N 6503002500 — Individual Parts Trim
 P/N 6503002501 — Preassembled Trim

Item	Part Number	Description	No. Req'd
1	687102000	Valve, Solenoid	1
2	98543223	Nipple - 1/2" x 1 1/2" Lg.	1
3	98048000	Bushing, Reducer - 1/2" x 1/4"	1
4	92056702	Connector - 3/8" Tubing x 1/4" NPT	1
5	96686707	Tubing, Copper - 3/8" O.D. x 2 ft.	1

luge and preaction systems.

Optional Drain Manifold Trim and Parts List

To facilitate an efficient drain system, the optional Drain Manifold Trim (Figure 5) is offered with all trim sets, providing a single 1 1/4" drain outlet with grooved end connections for easy installation and maintenance.
 P/N 6501180302 - Individual Parts Trim

Item	Part Number	Description	No. Req'd
1	91004220	Manifold, S/A, 1 1/4" Drain	1
2	7203050500	Coupling - 1 1/4"	4
3	7235050000	Cap - 1 1/4" Coupling	2
4	98523222	Nipple - 1" Close	4
5	98523264	Nipple - 1 1/4" x 4" Lg.	1
6	98164407	Elbow - 1 1/4"	1
7	98164404	Elbow - 1"	2
8	98840145	Valve, Check - 1"	1
9	98048013	Bushing, Reducer - 1 1/4" x 1"	1
10	95190612	Pipe - 1 1/4" Grv. & Thd. x 6 3/4" Lg.	1

nance.

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 6 after the system has been restored for operation. The nylon cable tie is designed to allow, in case

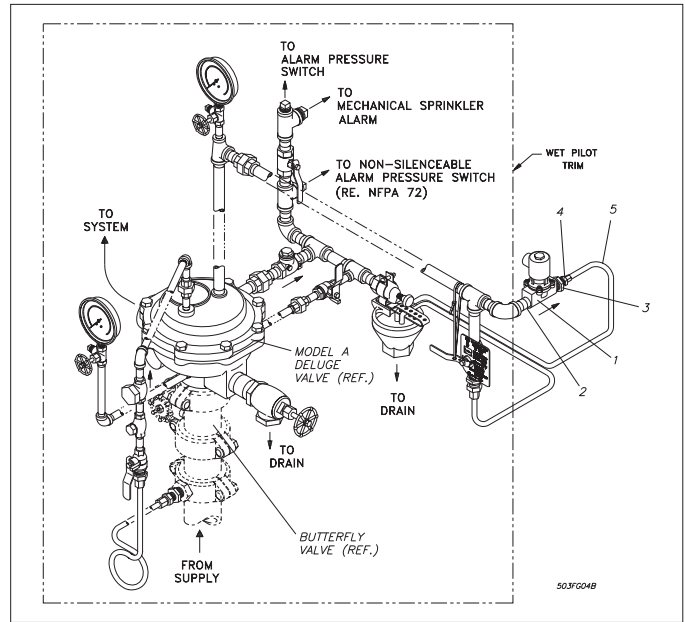


Figure 4 - Electric Actuation Trim

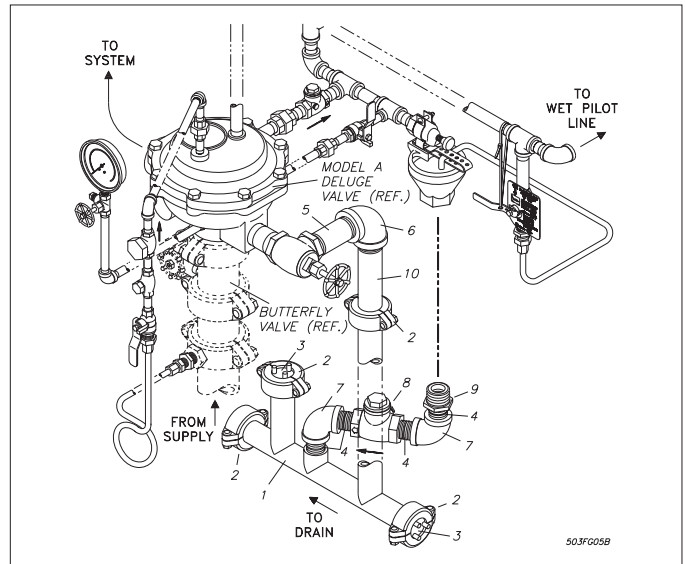


Figure 5 - Optional Manifold

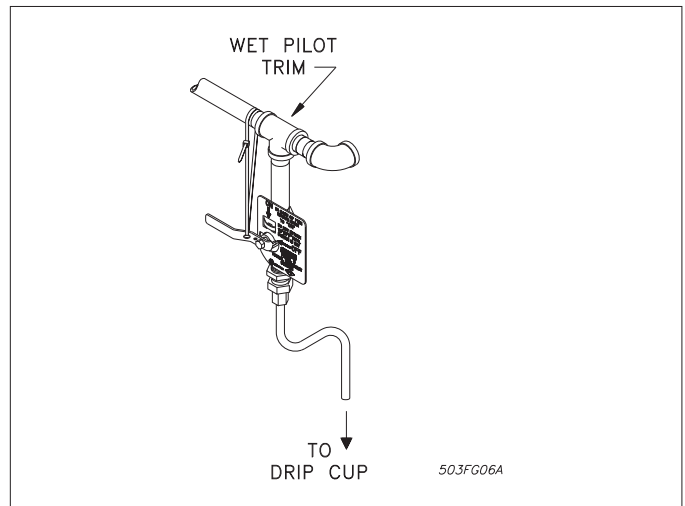


Figure 6 — Model B Hydraulic Manual Emergency Station

Preassembled Trim Kits

All trim kits are also available in a convenient preassembled form for rapid and simple trim assembly.

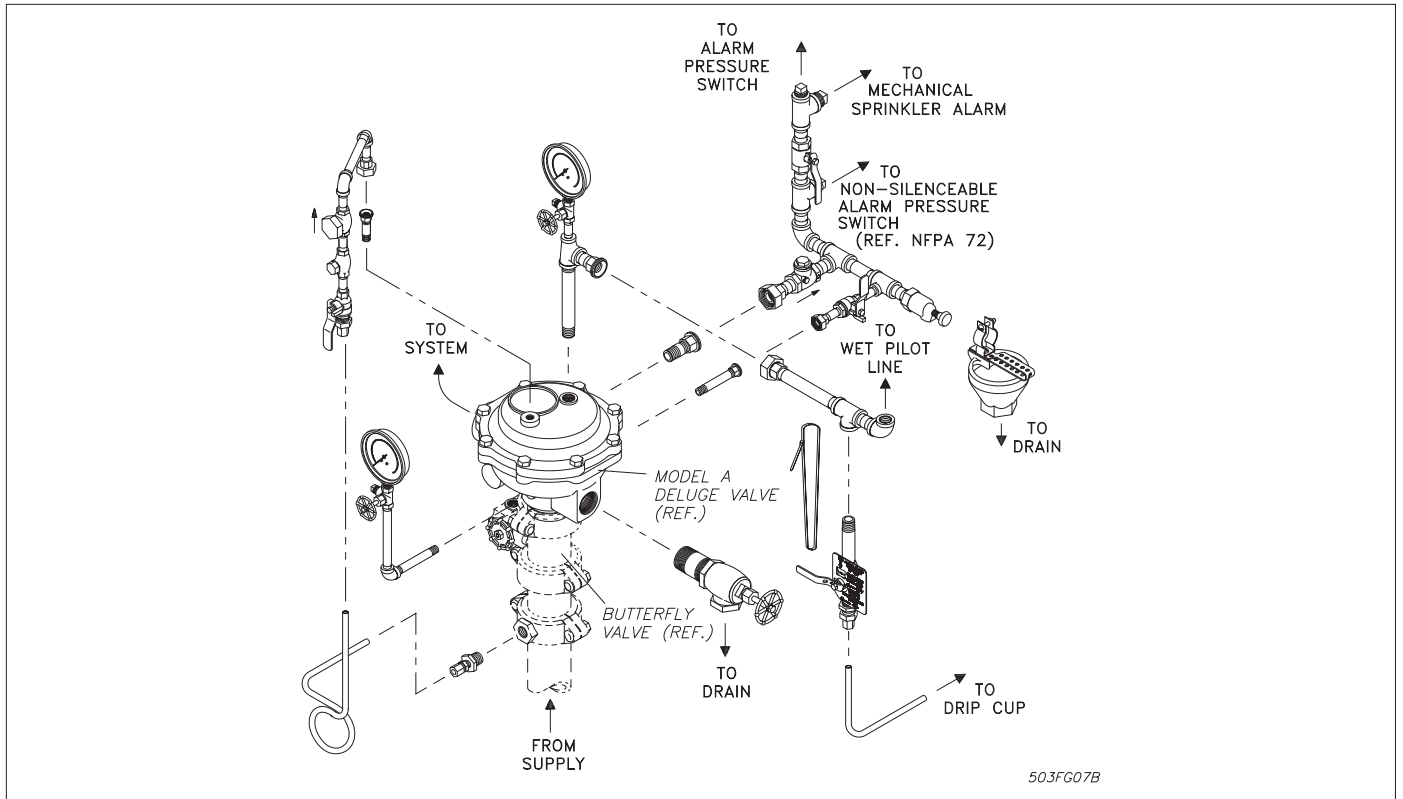


Figure 7 - Wet Pilot Line Trim, Preassembled

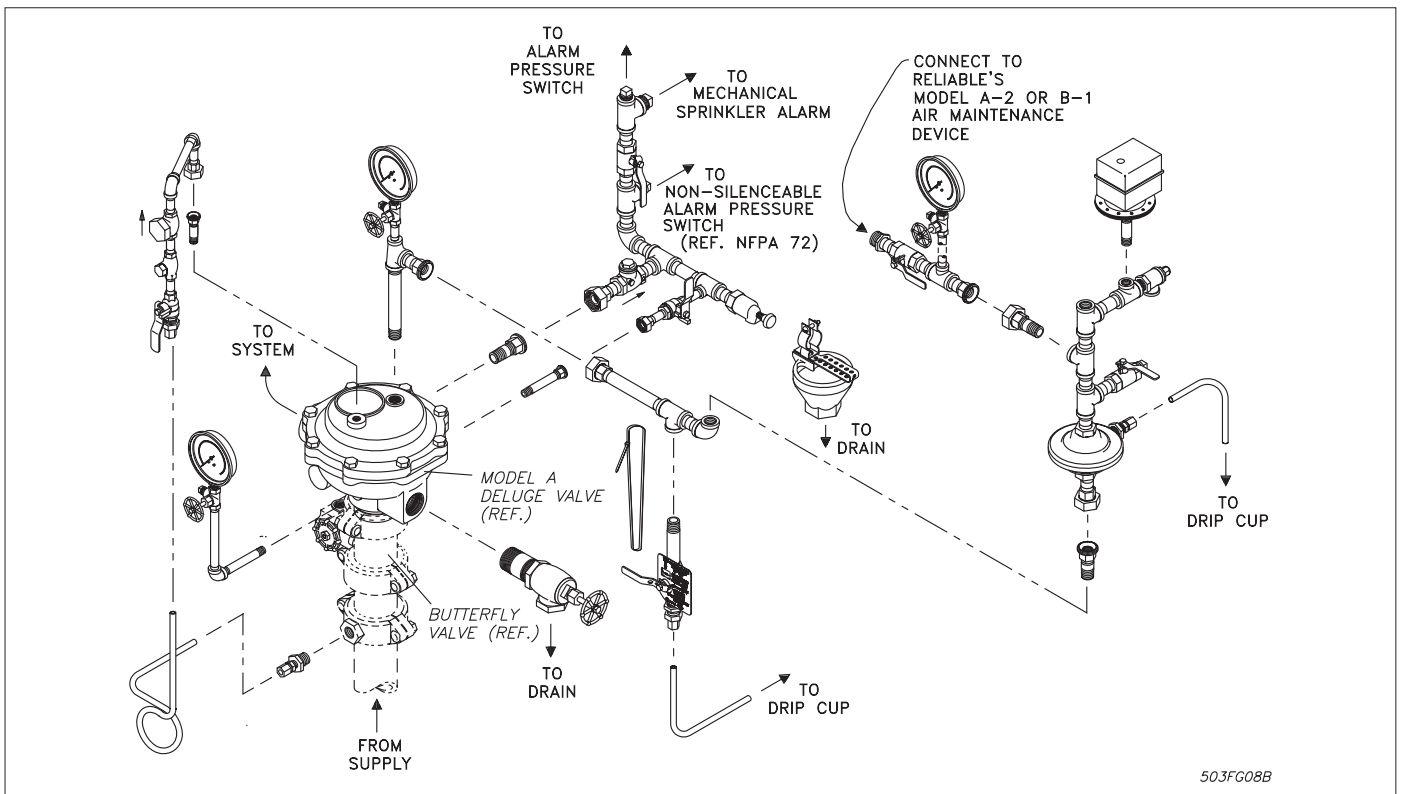


Figure 8 — Dry Pilot Trim, Preassembled

Resetting Deluge Valve

Refer to Figures 2 & 3

1. Close the valve controlling water supply to the deluge valve.
2. Open Main Drain Valve (8, 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. Close Valve (5A, Fig. 2) and (4A, Fig. 3). Open Valve (1, Fig. 2) and (4B, Fig. 3).
4. Push in the plunger of Ball Drip Valve (9, Fig. 2), forcing the ball from its seat to verify there is atmospheric pressure inside the main valve chamber.
5. Inspect and replace any portion of the detection system subjected to fire conditions.
6. Open Valve (5A, Fig. 2) and (4A, Fig. 3) and allow water to fill the chamber. Close Valve (1, Fig. 2) and (4B, Fig. 3).
7. 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 Air Pressure Gauge (1, Fig. 3).
 - 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 700, "Special Hazards & Special Systems" for details.
8. Check that Valve (5B, Fig. 2) is closed. Open slightly the valve controlling water supply to the deluge valve, closing Main Drain Valve (8, Fig. 2) when water flows. Observe if water leaks through Ball Drip Valve (9, Fig. 2) into Drip Cup (10, 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.
9. Valve (5A, Fig. 2) must remain open when the deluge valve has been reset, to maintain water pressure in the top chamber.

Inspection and Testing

Refer to Figures 2 & 3

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 Valve (4, Fig. 2) is opened and sealed in this position.
3. **Other trimming valves** — check that Valves (3, Fig. 2) are opened and Valves (1, 5B, Fig. 2) and (4B, Fig. 3) 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 leak-

age. 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 (5B, Fig. 2) permitting water from the supply to flow to the sprinkler alarms. After testing, close this valve securely. Push in on the plunger of Valve (9, Fig. 2) until all of the water has drained from the alarm line.
8. **Operation test**—Open the Model B Manual Emergency Station (1, Fig. 2).
Note: Operation test will cause the deluge valve to trip.
9. Seal Model B Station in the off (closed) position with Tie (36, 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 Drain Valve (8, Fig. 2).
2. Verify that Valve (5A, Fig. 2) is open, allowing water to enter the top chamber.
3. Operate detection system —
 - a. **Wet Pilot Trim**—open Valve (1, Fig. 2).
 - b. **Dry Pilot Trim**—remove the plug and open Valve (4B, Fig. 3).
 - c. **Electric Actuation**—refer to Bulletin 700.
4. Operation of the detection system must result in a sudden drop of water pressure in the top chamber.
5. Reset detection system—reverse operations performed in step 3 above.
6. Open slightly the valve controlling water supply to the deluge valve, closing Drain Valve (8, 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 (5A, Fig. 2) is open.
8. Check Ball Drip Valve (9, Fig. 2) for leakage. There should be none.
9. Verify that the Model B Emergency Station (1, Fig. 2) is sealed in the OFF position with the appropriate Tie (36, Fig. 2).

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.

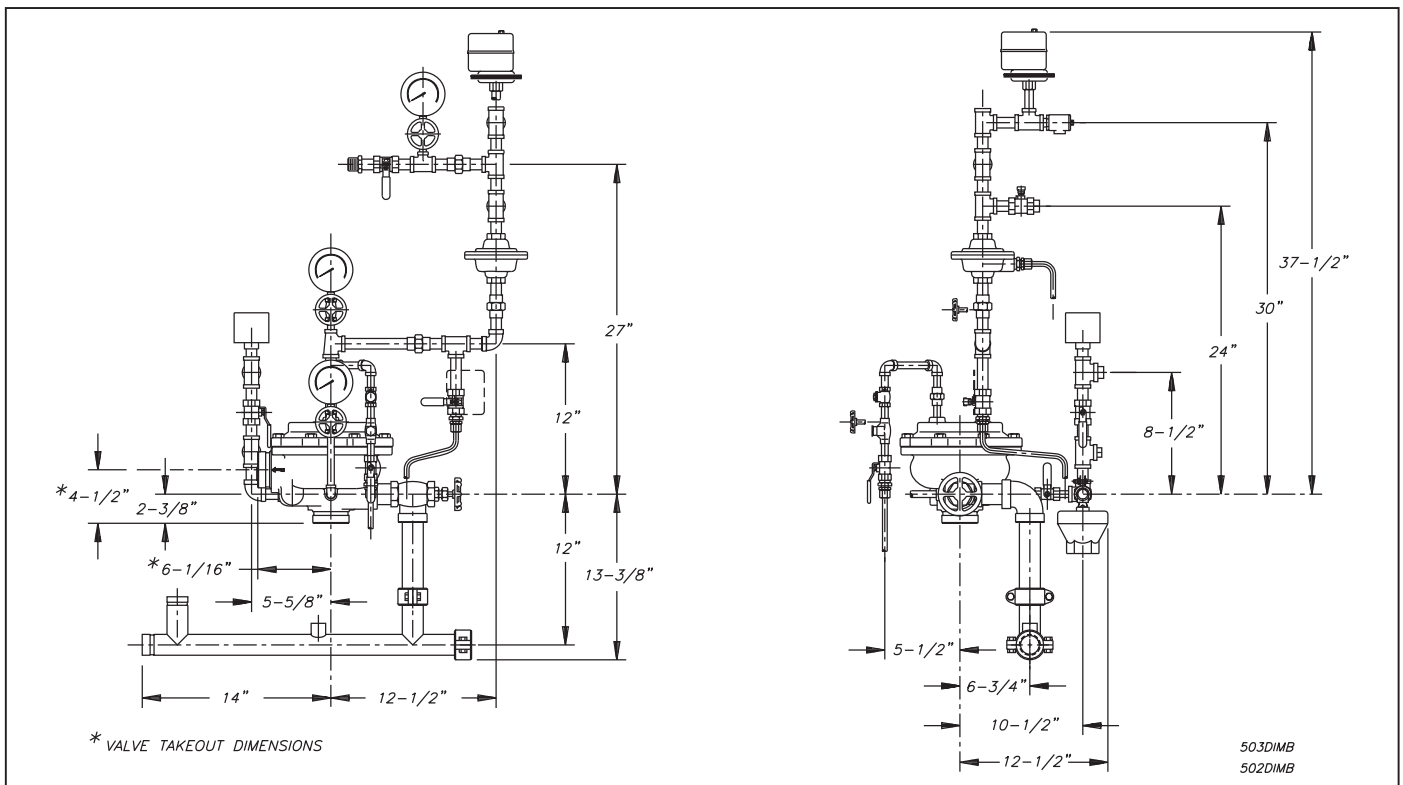
Maintenance Procedures

Refer to Figure 9, Unless otherwise noted.

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 Piston Seat Seal (9) or past Diaphragm (7). To locate and correct the trouble, proceed as follows:

- a. Carry out steps 1 through 4 of Resetting Deluge Valve instructions.
 - b. Assure the Alarm Test Valve (5B, Fig. 2) is tightly closed.
 - c. Open Valve (5A, Fig. 2) and close Valve (1, Fig.2) and (4B, Fig. 3). If water flows from the ball drip valve (9, Fig.2), the Diaphragm (7) is leaking and must be replaced. Proceed as follows:
 1. Close Valve (5A, Fig. 2) and open Valve (1, Fig. 2) or (4A, Fig. 3).
 2. Break the trim at the unions. Remove all 8 Cover Bolts (10).
 3. Lift the cover and partial trim from the valve body.
 4. Remove the assembled Piston (5) and Diaphragm (7).
 5. Remove 8 Screws (6) holding the Diaphragm Clamping Ring (8). Remove the Clamping Ring (8) and the Diaphragm (7).
 6. Install a new Diaphragm (7) with the cone shape facing away from the Piston (5) face. Install the Clamping Ring (8) and Screws (6) and alternately tighten the screws until the clamping ring is metal to metal tight to the piston.
 7. Install the assembled piston and the diaphragm in the body. Install the cover and align the diaphragm "O" ring end to fit the Body (1) and Cover (2) grooves.
 8. Install the 8 Cover Bolts (10), alternately tightening until the cover has metal to metal contact with the body.
 9. Reconnect the trim at the unions.
 10. Repeat paragraphs 2a, 2b and 2c above.
 - d. If no leakage was found in 2c above, then close Drain Valve (8, Fig. 2) and slightly open the valve controlling water supply pressure to the deluge valve. Wait 15 minutes, then push the plunger on the ball drip. If water flows from the ball drip, the Piston Seat Seal (9) is leaking and must be replaced. Proceed as follows:
 1. Remove the Cover (2) and Piston (5), following steps 2c (1 through 4) above.
 2. Remove 6 Screws (3) holding the Seat Seal Retainer Ring (4). Remove the Retainer Ring (4) and Seat Seal (9).
 3. Clean the seal cavity in the Valve Body (1) and Retainer Ring (4). Place the new Seal (9) in the Valve Body (1).
 4. Install the Retainer Ring (4) and Screws (3) and alternately tighten the screws until the retainer ring is in metal to metal contact with the valve body.
 5. Clean the Piston(5) face and reassemble the valve, following steps 2c (7 through 9) above.
 6. Repeat all leakage testing following steps 2a, 2b, 2c, and 2d above.
 - e. Test and reset the deluge valve in accordance with previous sections.
3. Pressure in top chamber increases to excessive levels. Either of two causes are possible:
 - a. Supply pressure surges or water hammer spikes become trapped in top chamber. Correct the source of the pressure surges.
 - b. Thermal exposure causes expansion of water and resulting pressure increase. Shade, cool or relocate the valve to eliminate the heat source.

Installation Measurements in Inches



2½" Deluge Valve Parts

Item No.	Part No.	Description	Material	No. Req'd
1	91006400	Body – American Standard Thread	Cast Gray Iron	1
	91006401	Body – Grooved	Cast Gray Iron	
	91006403	Body – Metric Standard Thread	Cast Gray Iron	
2	71040219	Cover Assy – American Standard Thread	Cast Gray Iron	1
	71040218	Cover Assy – Metric Standard Thread	Cast Gray Iron	
3	95616402	Soc. Flat Head Cap Screw	Stainless Steel	6
4	96016402	Retainer Ring	Cast Bronze	1
5	91916402	Piston	Cast Bronze	1
6	95606402	Soc. Head Cap Screw	Stainless Steel	8
7	92206402	Diaphragm	Buna-N	1
8	95316402	Clamping Ring	Cast Bronze	1
9	93406402	Rubber Seal	Buna-N	1
10	91106123	Cover Bolt	Steel	8

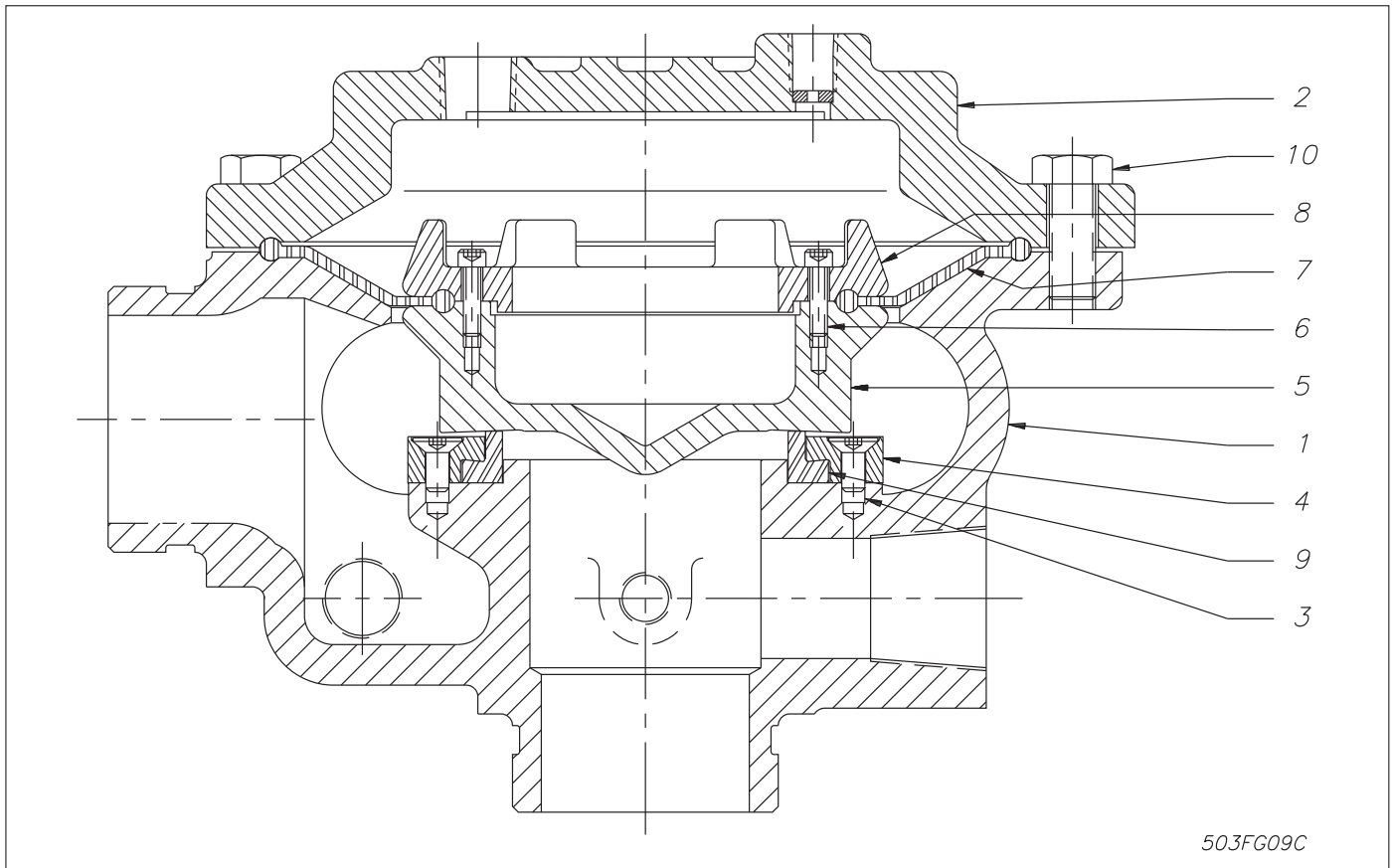


Figure 9

Note: Contact the installing contractor or Reliable if any difficulties are experienced. Should replacement parts be needed, use only Reliable supplied parts. When ordering specify part number, name, size, model and serial number of the unit.

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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