



DELUGE VALVE, EXTERNAL RESETTING

MODEL F470 MULTIMATIC® — 4 and 6 INCH (100 and 150 mm)

GENERAL DESCRIPTION

The 4 and 6 inch (100 and 150 mm), Model F470 External Resetting Multi-matic Deluge Valves are differential latch type valves designed for fire protection system service. They are used as "automatic water control valves" in deluge, preaction, and special types of fire protection systems such as foam-water and double interlock. The F470 Valves also provide for actuation of fire alarms upon system operation.

The external resetting feature of the F470 Valve provides for easy resetting of a deluge or preaction system, without having to open a valve handhole cover to manually reposition a clapper and latch mechanism. Simply depressing a plunger at the left side of the F470 Valve allows the clapper and latch to reset.

Operation of an F470 Valve is provided by an actuation (detection) system that is separate from the normally dry system piping. Trim configuration options for automatic operation of the F470 include wet pilot actuation, dry pilot actuation, and electric actuation. Trim arrangements also provide for local emergency (manual) release of the F470 Valves.

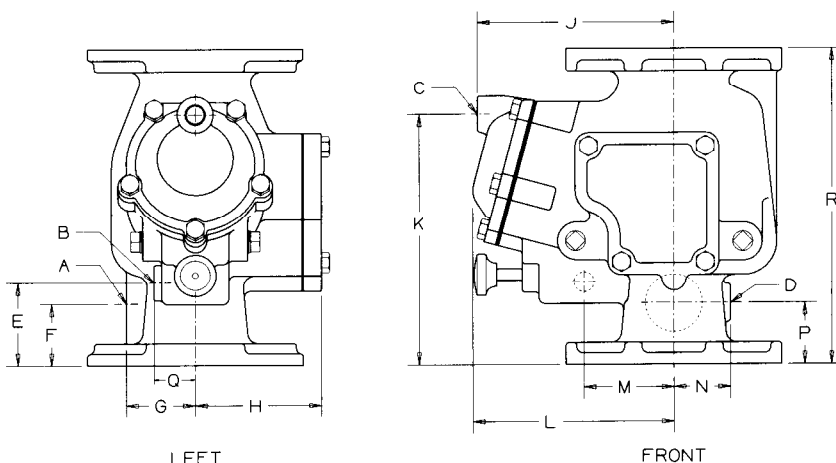
APPROVALS AND STANDARDS

The 4 and 6 inch (100 and 150 mm), Model F470 External Resetting Multi-matic Deluge Valves are listed by Underwriters Laboratories Inc. and Underwriters' Laboratories of Canada. The F470 Valves are also approved by Factory Mutual Research Corporation and the Scientific Services Laboratories (Australia).

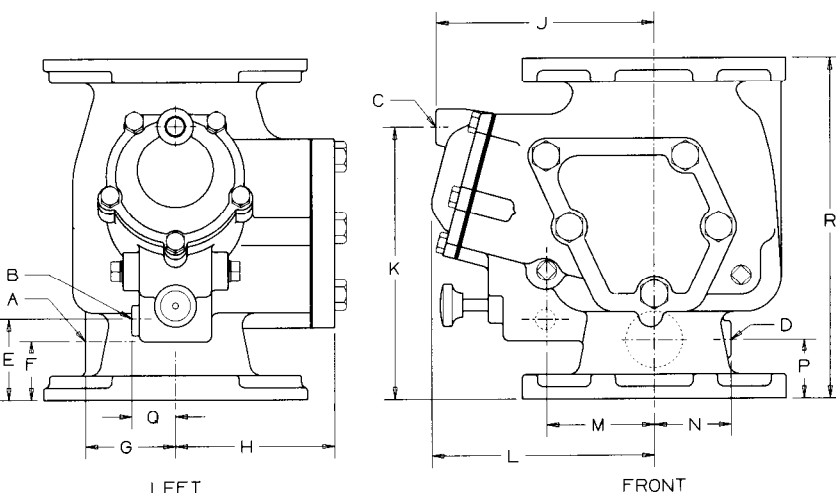
The Model F470 Deluge Valves with either wet or dry pilot actuation and galvanized trim are approved by the Loss Prevention Council (United Kingdom).

Inquiries concerning approval by the Verband der Schadeversicherer should be directed to Grinnell Sales & Distribution, Kopersteden 1, NL-7547 TJ Enschede, Netherlands, Tel. 31-534-283-434 / Fax. 31-534-283-377.

The Model F470 Multimatic Deluge



4 Inch (100 mm) Valve



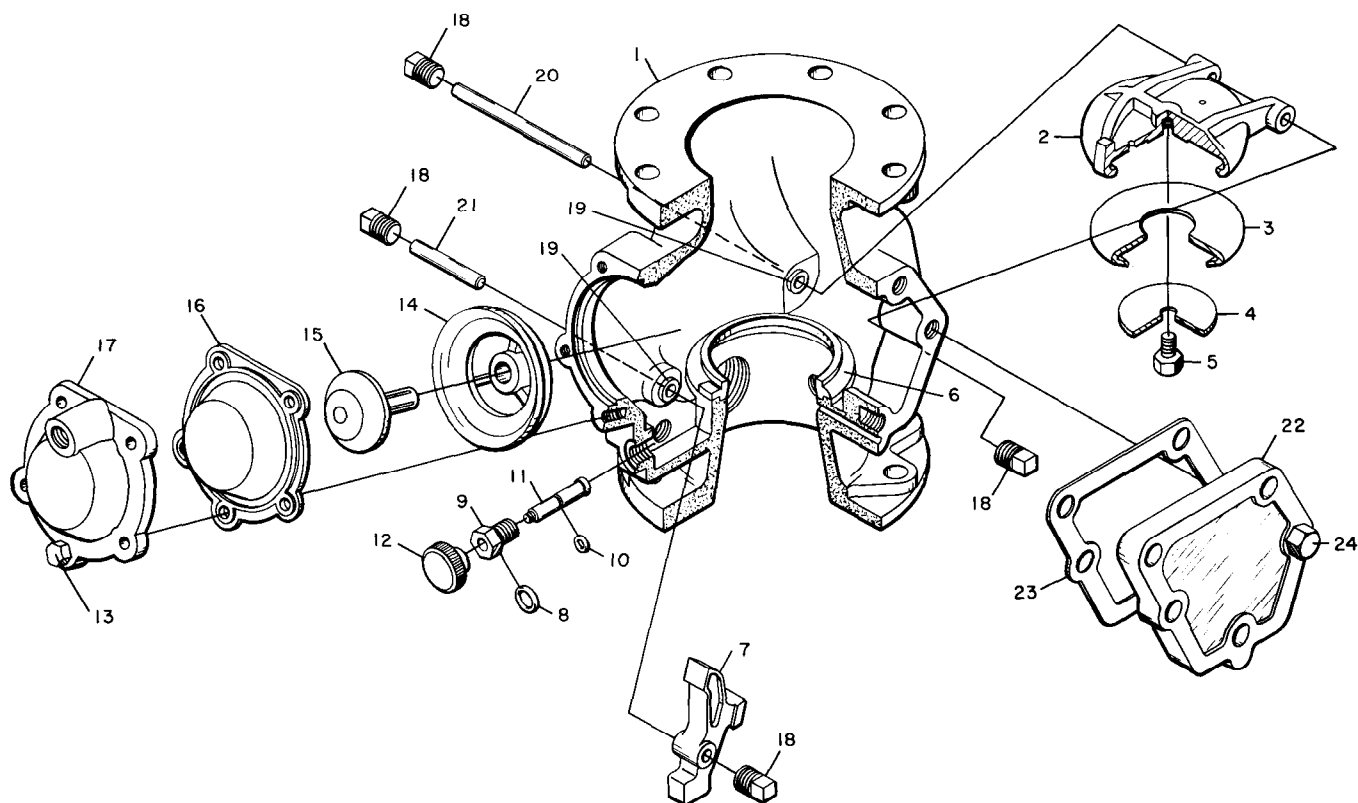
6 Inch (150 mm) Valve

Nominal Dimensions in Inches and (mm)

VALVE SIZE	A	B	C	D	E	F	G	H
4 (100)	2" NPT	1/2" NPT	1/2" NPT	1/2" NPT	3.44 (87,4)	2.56 (65,0)	2.73 (69,3)	5.25 (133,4)
6 (150)	2" NPT	1/2" NPT	1/2" NPT	1/2" NPT	3.40 (86,4)	2.45 (62,2)	3.69 (93,7)	6.63 (168,4)

VALVE SIZE	J	K	L	M	N	P	Q	R
4 (100)	8.00 (203,2)	10.50 (266,7)	8.50 (215,9)	3.75 (95,3)	2.37 (60,2)	2.56 (65,0)	1.72 (43,7)	13.25 (336,6)
6 (150)	8.87 (225,3)	11.50 (292,1)	9.18 (233,2)	4.54 (115,3)	3.20 (81,3)	2.45 (62,2)	1.82 (46,2)	14.25 (362,0)

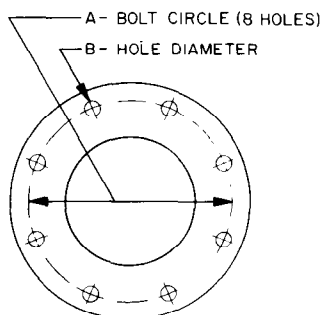
FIGURE A
MODEL F470 EXTERNAL RESETTING MULTIMATIC DELUGE VALVES
— DIMENSIONS AND PORT LOCATIONS —



- | | | | | |
|-----------------------------|-----------------------|--------------------------------------|-------------------------------|---|
| 1 - Body | 7 - Clapper Latch | 13 - Diaphragm Cover Bolt, (5 req'd) | 17 - Diaphragm Housing | 22 - Handhole Cover |
| 2 - Clapper | 8 - O-Ring, # 3-908 | 1/2" - 13 UNC x 1" | 18 - 1/2" Pipe Plug (4 req'd) | 23 - Handhole Cover Gasket |
| 3 - Clapper Facing | 9 - Reset Bushing | 14 - Diaphragm Retainer | 19 - Bearing (4 req'd) | 24 - Handhole Cover Bolt, (1/2" - 13 UNC x 1-1/2" 4 req'd for 4" valve) (3/4" - 11 UNC x 1-1/2" 5 req'd for 6" valve) |
| 4 - Clapper Facing Retainer | 10 - O-Ring, # 2-109* | 15 - Flange & Push Rod Assembly | 20 - Clapper Hinge Pin | |
| 5 - Clapper Bolt | 11 - Reset Plunger | 16 - Diaphragm | 21 - Latch Hinge Pin | |
| 6 - Seat Ring | 12 - Reset Knob | | | |

* Lubricated with Dow Corning FS3452 Fluorosilicone Grease.

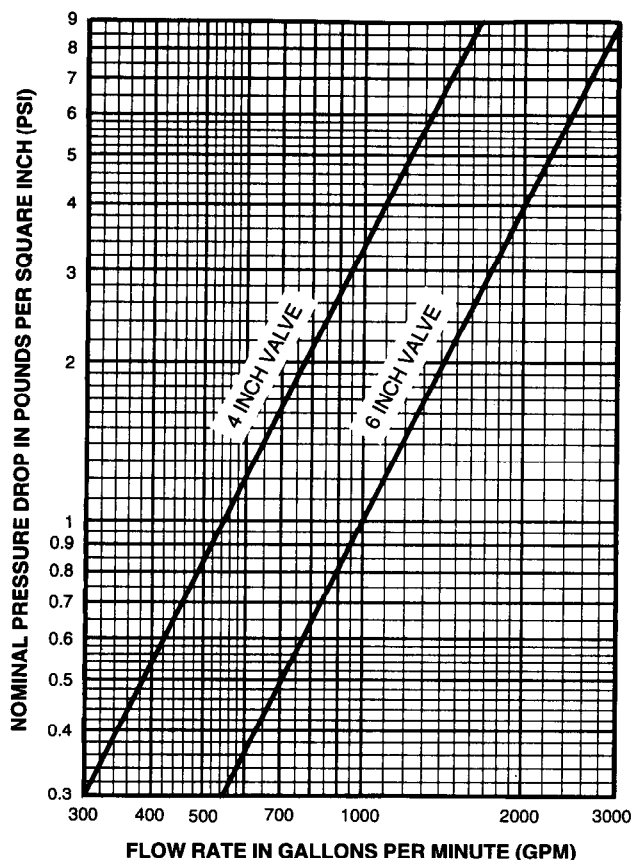
FIGURE B
MODEL F470 EXTERNAL RESETTING MULTIMATIC DELUGE VALVE
— ASSEMBLY —



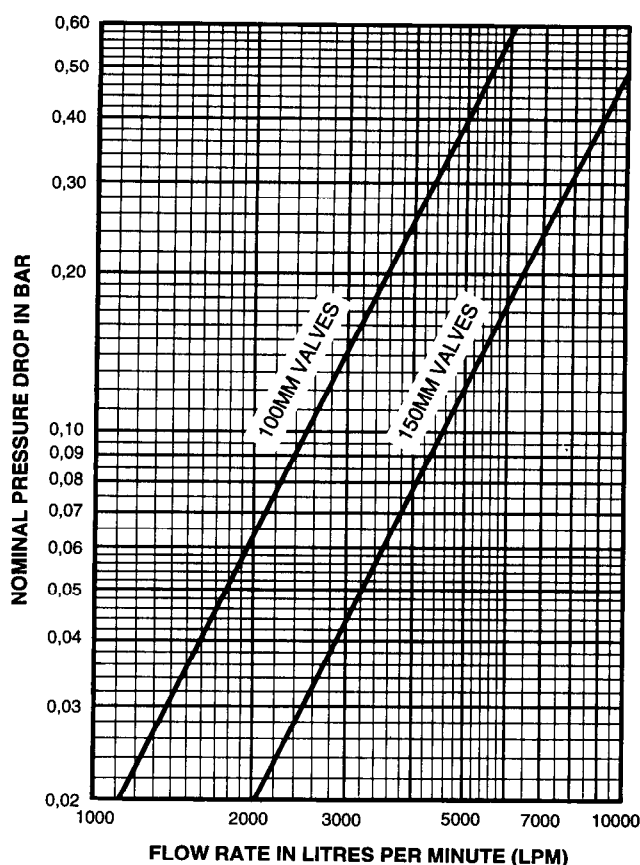
	Nominal Dimensions in Inches and (MM)			
	4" (100 mm) Valve Size		6" (150 mm) Valve Size	
	A	B	A	B
ANSI B16.1 (CLASS 125)	7.50 (190,5)	0.75 (19,0)	9.50 (241,3)	0.88 (22,2)
AS 2129 (TABLE E)	7.00 (178,0)	0.71 (18,0)	9.25 (235,0)	0.87 (22,0)
ISO 2084 (PN10)†	7.09 (180,0)	0.71 (18,0)	9.45 (240,0)	0.87 (22,0)
JIS B 2210 (10K)	6.89 (175,0)	0.75 (19,0)	9.45 (240,0)	0.91 (23,0)

†Same drilling as for BS 4504 Section 3.2 (PN10) and DIN 2532 (PN10).

TABLE A
DIMENSIONAL SPECIFICATIONS FOR SELECTION OF FLANGE DRILLING



GRAPH A-1



GRAPH A-2

GRAPHS A-1 and A-2
NOMINAL PRESSURE LOSS VERSUS FLOW

Valves are accepted by the City of New York under MEA 38-92-M.

WARNING

The Model F470 Multitomatic Deluge Valves described herein must be installed and maintained in compliance with this document, as well as with the applicable standards of the National Fire Protection Association, in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the integrity of these devices.

The owner is responsible for maintaining their fire protection system and devices in proper operating condition. The installing contractor or manufacturer should be contacted relative to any questions.

TECHNICAL DATA

Deluge Valve:

The 4 and 6 inch (100 and 150 mm), Model F470 External Resetting Multitomatic Deluge Valves are rated for use

at a maximum service pressure of 175 psi (12.1 bar). The Valve dimensions are shown in Figure A, and all of the ports are NPT threaded per ANSI Standard B1.20.1. Flanged inlet and outlet connections are available drilled per ANSI, AS, ISO, and JIS specification options indicated in Table A. When the flange drilling is provided to AS, ISO, or JIS specifications, the label located on the Handhole Cover indicates the specification to which the flange drilling has been provided.

The F470 Valve is to be installed vertically, as shown in Figure A. Exterior surfaces of the F470 Valve are painted red, and the year of manufacture is indicated on the Handhole Cover.

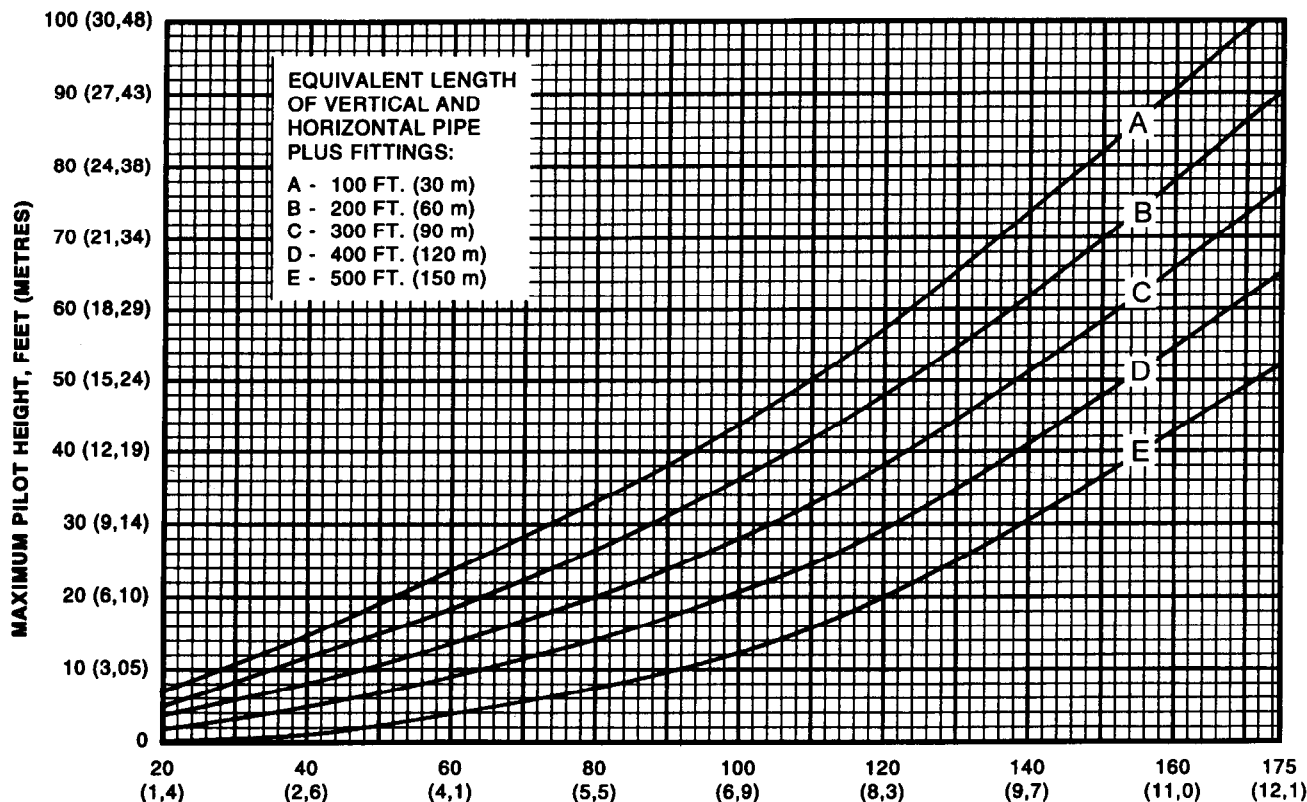
Components of the F470 Valve are shown in Figure B. The Body, Handhole Cover, and Diaphragm Cover are ductile iron per ASTM A536 (UNS F33100). The Handhole Cover Gasket is neoprene, and the Clapper Facing, Diaphragm, and O-Rings are EPDM. The Seat Ring, Clapper, Diaphragm Retainer, and the Flange of the Flange & Push Rod Assembly are bronze per ASTM B62 (UNS C83600). The Clapper Latch is aluminum bronze per ASTM B148 (UNS C956200), the

Reset Bushing is brass per ASTM B16 (UNS C36000), and the Bearings are bronze per ASTM B438, Grade 1, Type II. The Clapper Facing Retainer, Clapper Bolt, Reset Plunger, Clapper Hinge Pin, Latch Hinge Pin, and the Push Rod of the Flange & Push Rod Assembly are fabricated from austenitic stainless steel. The Reset Knob is phenolic, and the Handhole Cover Bolts, Diaphragm Cover Bolts, and Pipe Plugs are carbon steel.

The nominal pressure losses versus flow are shown in Graphs A-1 and A-2. The approximate friction losses, based on the Hazen and Williams formula and expressed in equivalent length of Schedule 40 pipe with $C = 120$, is 12 feet for the 4 inch (100 mm) valve size and 30 feet for the 6 inch (150 mm) valve size. The equivalent length of pipe has been calculated on the basis of the flow rates typically used with each size valve.

Valve Trim:

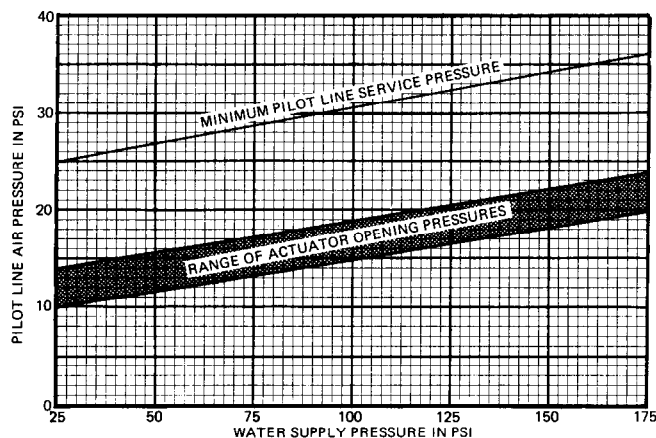
The Wet Pilot Actuation Trim, Dry Pilot Actuation Trim, or Electric Actuation Trim illustrated in Figure F-1 form a part of the laboratory listings and ap-



NOTE: IF THE SUPPLY PRESSURE IS VARIABLE, ASSUME MINIMUM EXPECTED VALUE.

SUPPLY PRESSURE, PSI (BAR)

**GRAPH B
WET PILOT LINE DESIGN CRITERIA**



**GRAPH C
DRY PILOT LINE PRESSURE REQUIREMENTS**

Wet Pilot Actuation

(Figure F-1, Items 1 through 35)

The Wet Pilot Actuation Trim provides for connection of a detection system consisting of wet pilot sprinklers (heat detectors) and manual control stations interconnected with minimum 1/2 inch (15 mm) Schedule 40 steel pipe. The pilot line is connected to the "Wet Pilot Detection" connection shown in Figure F-1. Nominal installation dimensions for the Wet Pilot Actuation Trim are shown in Figure D.

Wet pilot sprinklers are to be minimum 1/2 inch (15 mm) orifice listed or approved automatic sprinklers. Manual Control Stations are to be either the Model F180 or F184 described in Technical Data Sheet TD121.

The maximum height of a wet pilot line above the F470 Valve must not exceed the limitations given in Graph B as a function of the minimum water supply pressure to the F470 Valve and the length of the pilot line to the most remote pilot sprinkler.

Provision must be made for installing a 1/2 inch (15mm) orifice, Inspector's Test Connection at the most hydraulically demanding location of a wet pilot line (usually adjacent to the highest and most remote wet pilot sprinkler or manual control station).

proval of the F470 Valves and are necessary for their proper operation. Each package of trim includes the following items:

- Water Supply Pressure Gauge
- Diaphragm Chamber Pressure Gauge
- Diaphragm Chamber Connections
- Actuation Devices (as applicable)
- Main Drain Valve
- Alarm Test Valve

- Alarm Control Valve
- Automatic Drain Valve
- Dry Pilot Line Pressure Gauge (as applicable)

To ease field assembly of the trim arrangements, the appropriate components required for Wet Pilot Actuation, Dry Pilot Actuation, or Electric Actuation are factory assembled as shown in Figure F-2.

To determine the most hydraulically demanding location of a wet pilot line, when the choice between two or more locations is not readily apparent, determine for each location the elevation above the F470 Valve and the equivalent length of fittings plus horizontal pipe from the F470 Valve to the location. Then, using Graph B, determine the minimum system supply pressure required for the elevation and equivalent length of pipe at each location. Interpolate between the equivalent length plots as necessary. The location requiring the highest system supply pressure is the most hydraulically demanding location for the wet pilot line. (Reference: In no case should the required system supply pressure exceed the actual available minimum expected system supply pressure.)

Operation of a pilot sprinkler or opening of a manual control station results in a rapid pressure drop in the Diaphragm Chamber of the F470 Valve, and the force differential applied through the Clapper Latch which holds the Clapper down in the set position is reduced to below the valve trip point.

NOTES

Wet Pilot Lines must be maintained at a minimum temperature of 40°F/4°C.

It is recommended that internally galvanized pipe and cast iron fittings be used for wet pilot lines.

Dry Pilot Actuation (Figure F-1, Items 1 through 35 plus Items D1 through D14)

The Dry Pilot Actuation Trim provides for installation of a detection system consisting of dry pilot sprinklers (heat detectors) and manual control stations interconnected with minimum 1/2 inch (15 mm) steel pipe. The pilot line, which is to be pressurized with air or nitrogen, is connected to the "Dry Pilot Detection" connection shown in Figure F. Provision must be made for a 1/2 inch (15 mm) orifice, Inspector's Test Connection at the most remote location from the F470 Valve. Nominal installation dimensions for Dry Pilot Actuation Trim are shown in Figure E.

The Dry Pilot Actuation Trim is provided with a listed and approved Model B-1 Dry Pilot Actuator, which is described in Technical Data Sheet TD117W. The Actuator is rated for use at a maximum pilot service pressure of 50 psi (3,4 bar) and a maximum water supply service pressure of 175 psi (12,1 bar).

Operation of a pilot sprinkler or opening of a manual control station, releases pneumatic pressure from the pilot line. In turn, the Dry Pilot Actuator opens resulting in a rapid pressure drop in the Diaphragm Chamber of the F470 Valve, and the force differential

applied through the Clapper Latch which holds the Clapper down in the set position is reduced to below the valve trip point.

Dry pilot sprinklers are to be minimum 1/2 inch (15 mm) orifice listed or approved automatic sprinklers. Manual Control Stations are to be either the Model F180 or F184 described in Technical Data Sheet TD121.

Graph C shows the "minimum pilot line service pressure" as a function of the water supply pressure. The pressure in the dry pilot actuation system must be automatically maintained using one of the following maintenance devices, as appropriate.

- Model F324 Air Maintenance Device (pressure reducing type), refer to Technical Data Sheet TD111.
- Model F326 Air Maintenance Device (compressor control type), refer to Technical Data Sheet TD112.
- Model F328 Nitrogen Maintenance Device (high pressure reducing type), refer to Technical Data Sheet TD113.

NOTES

The dewpoint of the pilot line air pressure must be maintained below the lowest ambient temperature to which the dry pilot actuation system will be exposed. Accumulation of water in the pilot line connection to the Actuator will lower the air pressure at which the Actuator will open and possibly prevent proper operation. Also, introduction of moisture into the pilot lines exposed to freezing temperatures can create an ice buildup which could prevent proper operation of the Actuator.

An air dryer must be installed where the moisture content of the air supply is not properly controlled at less than the required value. The desiccant dryer with mounting accessories described in Technical Data Sheet TD135 is suitable for use with a maximum inlet pressure of 150 psi (10,3 bar) and for drying system air down to a dewpoint of less than -20°F/-29°C at a pressure of 45 psi (3,1 bar).

It is recommended that an F328 Nitrogen Maintenance Device be utilized in dry pilot actuation system applications where the dewpoint must be maintained below -20°F/-29°C. See Technical Data Sheet TD113.

It is recommended that internally galvanized pipe and cast iron fittings be used for dry pilot lines.

Supervision of the pressure in the dry pilot actuation system and/or alarm

which separately indicates operation of the detection system is recommended and may be required by the authority having jurisdiction. A dual setting low pressure alarm switch, such as the unit described in Technical Data Sheet TD210, is suitable for the service. The recommended pressure settings are as follows:

- Low pressure alarm setting at approximately 6 psi (0,4 bar) below the minimum pilot line service pressure requirement shown in Graph C.
- Fire alarm setting at approximately 15 psi (1,0 bar) below the minimum pilot line service pressure requirement shown in Graph C.

The Pressure Relief Valve (Ref. Item D5 - Fig. F-1) is factory set to relieve at a pressure of approximately 45 psi (3,1 bar); however, it may be field adjusted to a lower pressure, if required.

Electric Actuation Trim (Figure F-1, Items 1 through 35 plus Items E1 through E5)

The Electric Actuation Trim is required for electric operation of the F470 Valve by a detection system consisting of electrical devices such as heat sensitive thermostats, smoke detectors, and/or electric manual pull stations. Information on the various types of Solenoid Valves that may be used with this trim package is given in Technical Data Sheet TD119. A listed and approved, 24VDC Solenoid Valve for non-hazardous locations is supplied as standard. Nominal installation dimensions for the Electric Actuation Trim are shown in Figure D.

NOTE

Approval by Factory Mutual is contingent on the use of an FM Approved 24VDC Solenoid Valve. FM only approves solenoid valves for use in non-hazardous locations.

The Electric Actuation Trim is only to be used in conjunction with an electric deluge valve releasing panel (automatic control unit) that is listed or approved (as appropriate) for fire protection system releasing service. In addition, the deluge valve releasing panel is only to be operated by listed or approved (as appropriate) fire detectors.

Operation of an electrical device such as a heat sensitive thermostat, smoke detector, or electrical manual control station signals the deluge valve releasing panel to energize the Solenoid Valve. In turn, the energized Solenoid Valve opens resulting in a rapid pressure drop in the Diaphragm Chamber of the F470 Valve, and the force differ-

ential applied through the Clapper Latch which holds the Clapper down in the set position is reduced to below the valve trip point.

NOTE

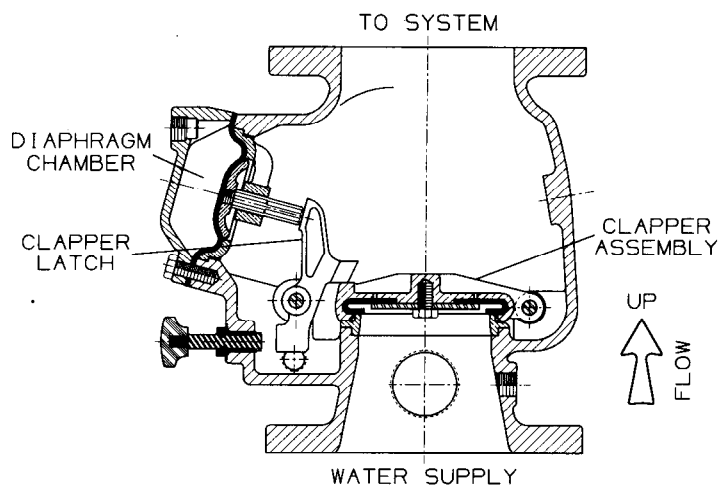
Consult with the Authority Having Jurisdiction regarding installation criteria pertaining to electric actuation circuitry.

OPERATING PRINCIPLES

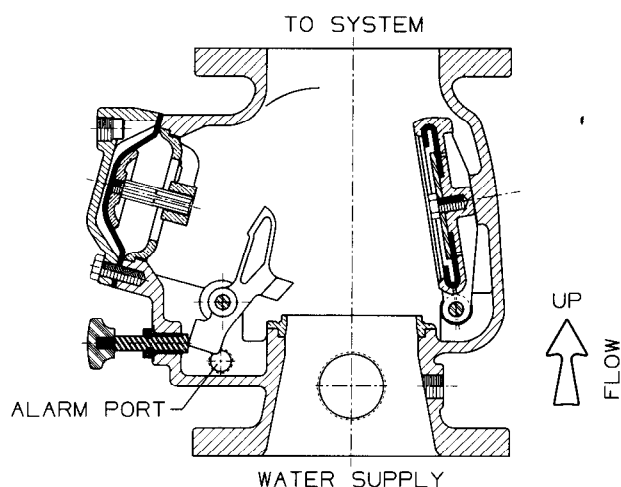
The Model F470 Multimatic Deluge Valve is a differential latch type valve which depends upon water pressure in the Diaphragm Chamber (Ref. Figure C-1) to hold the Clapper closed against the water supply pressure. The nominal trip ratio is 2.5 to 1, i.e., the F470 Valve operates (opens) when the pressure in the Diaphragm Chamber is reduced to approximately 40 percent of the water supply pressure.

When the F470 Valve is set for service, the Diaphragm Chamber is pressurized through the trim connections from the inlet side of the system's main control valve, for example an O.S.&Y. gate valve or butterfly valve (Ref. Figure G-1, G-2, or G-3). Opening of an actuation device, for example the solenoid valve in the Electric Actuation Trim (Ref. Fig. G-3), releases water from the Diaphragm Chamber faster than it can be replenished through the 1/8 inch (3,2mm) Restriction in the Diaphragm Chamber Supply Connection. This results in a rapid pressure drop in the Diaphragm Chamber and the force differential applied through the Clapper Latch to hold the Clapper down in the set position is reduced to below the valve trip point. The water supply pressure then forces the Clapper open permitting water to flow into the system piping, as well as through the Alarm Port to actuate the system alarms (Ref. Figure C-2).

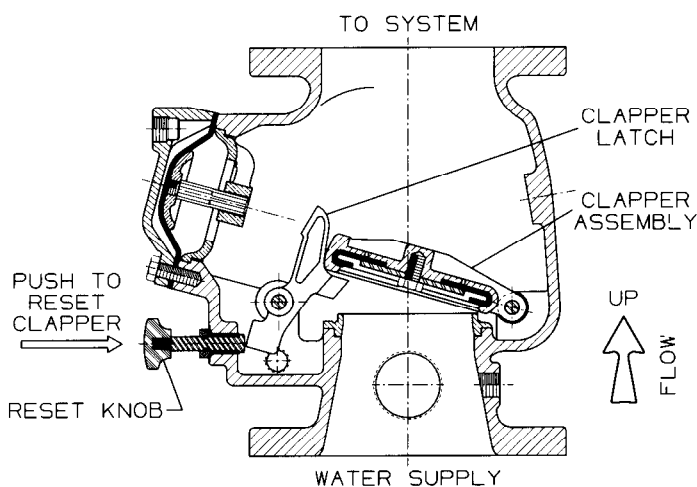
When the system main control valve is closed to stop waterflow into the system, the Clapper will be prevented from resetting by the Clapper Latch until the Rest Knob is pushed inward (Ref. Figure C-3). Pushing the Reset Knob inward will temporarily reposition the Clapper Latch away from the waterway and allows the Clapper to drop into the seated position.



— Set Position —
Figure C-1

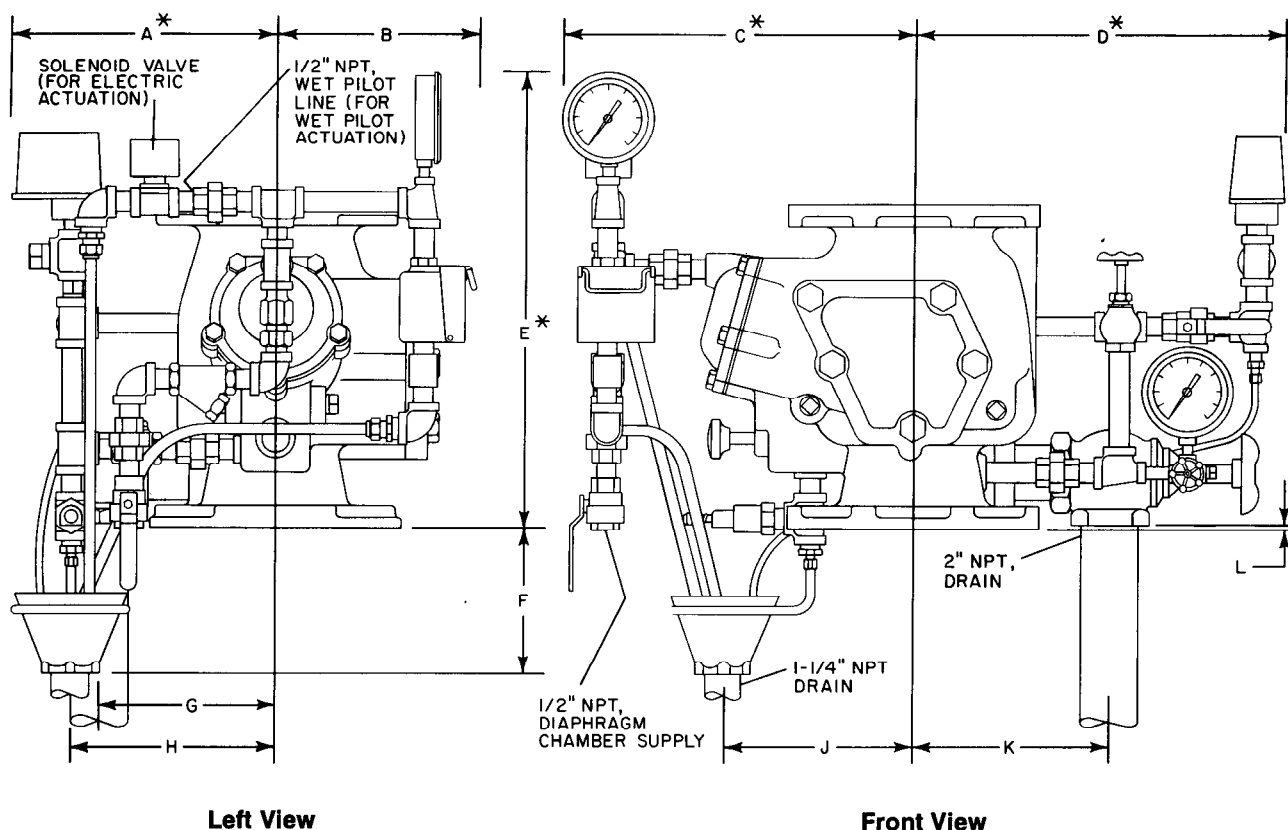


— Open Position (Flowing) —
Figure C-2



— Open Position (No Flow) —
Figure C-3

FIGURE C
MODEL F470 EXTERNAL RESETTING MULTIMATIC DELUGE VALVE
— SET AND OPEN POSITIONS —



Nominal Installation Dimensions in Inches and (MM)											
VALVE SIZE	A	B	C	D	E	F	G	H	J	K	L
4 (100)	12.00 (304,8)	8.69 (220,7)	14.25 (362,0)	13.69 (347,7)	19.00 (482,6)	5.44 (138,2)	6.69 (169,9)	8.75 (222,3)	7.75 (196,9)	6.31 (160,3)	0.25 (6,4)
6 (150)	12.00 (304,8)	8.69 (220,7)	15.12 (384,0)	14.50 (368,3)	20.00 (508,0)	5.50 (139,7)	7.62 (193,5)	8.88 (225,6)	8.56 (217,4)	6.31 (160,3)	0.12 (3,0)

FIGURE D
NOMINAL INSTALLATION DIMENSIONS FOR
WET PILOT ACTUATION TRIM OR ELECTRIC ACTUATION TRIM

* MINIMUM CLEARANCE, ADDITIONAL 2" (50mm) RECOMMENDED

INSTALLATION

NOTES

Proper operation of the Model F470 Multimatic Deluge Valves depends upon their trim being installed in accordance with the instructions given in this Technical Data Sheet. Failure to follow the appropriate trim diagram may prevent the F470 Valve from functioning properly, as well as void listings, approvals, and the manufacturer's warranties.

The F470 Valve must be installed in a readily visible and accessible location.

The F470 Valve, associated trim, and wet pilot lines must be maintained at a minimum temperature of 40°F/4°C.

Heat tracing of the F470 Valve or its associated trim is not permitted. Heat

tracing can result in the formation of hardened mineral deposits which are capable of preventing proper operation.

The Model F470 Multimatic Deluge Valve is to be installed in accordance with the following criteria:

- 1a. Flange mounting fasteners are to be tightened uniformly using a cross-draw sequence. Fastener specifications are to be as required by the authority having jurisdiction. Tightening torques are to be as indicated below.

Valve Size	Fastener Size	Torque Ft. Lbs. (Nm)
4"	5/8" (M16)	40-50 (54-68)
6"	3/4" (M20)	50-65 (68-81)

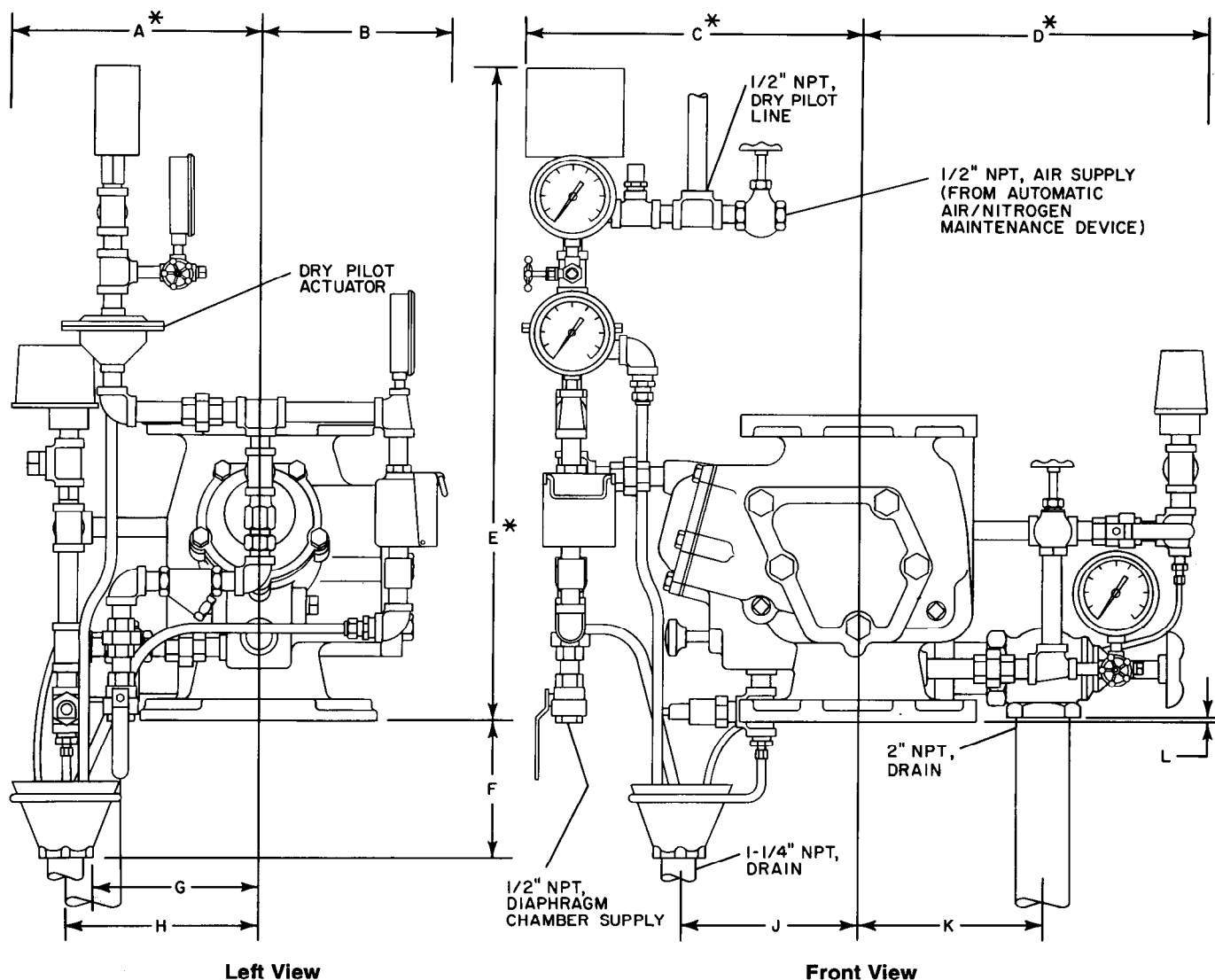
- 1b. All nipples, fittings, and devices must be clean and free of scale and burrs before installation. Use pipe

thread sealant sparingly on male pipe threads only.

NOTE

It is recommended that internally galvanized pipe and cast iron fittings be used for wet or dry pilot lines.

2. The F470 Valve must be trimmed in accordance with Figures F-1 & F-2.
3. Care must be taken to make sure that check valves, strainers, globe valves, etc. are installed with the flow arrows in the proper direction.
4. Drain tubing to the drip funnel must be installed with smooth bends that will not restrict flow.
5. The main drain and drip funnel drain may be interconnected provided a check valve is located at least 12



Nominal Installation Dimensions in Inches and (MM)											
VALVE SIZE	A	B	C	D	E	F	G	H	J	K	L
4 (100)	12.00 (304,8)	8.69 (220,7)	14.56 (369,8)	13.69 (347,7)	30.12 (765,0)	5.44 (138,2)	6.69 (169,9)	8.75 (222,3)	7.75 (196,9)	6.31 (160,3)	0.25 (6,4)
6 (150)	12.00 (304,8)	8.69 (220,7)	15.44 (392,2)	14.50 (368,3)	31.12 (790,4)	5.50 (139,7)	7.62 (193,5)	8.88 (225,6)	8.56 (217,4)	6.31 (160,3)	0.12 (3,0)

FIGURE E
NOMINAL INSTALLATION DIMENSIONS FOR
DRY PILOT ACTUATION TRIM

* MINIMUM CLEARANCE, ADDITIONAL 2" (50mm) RECOMMENDED

6. Suitable provision must be made for disposal of drain water. Drainage water must be directed such that it will not cause accidental damage to property or danger to persons.
7. Connect the Diaphragm Chamber Supply Control Valve to the inlet side of the system's main control valve in order to facilitate setting of the F470 Valve (Ref. G-1, G-2, or G-3).
8. An Inspector's Test Connection, as described in the Technical Data section, must be provided for Wet or Dry Pilot Actuation systems.
9. An Air Maintenance Device, as described in the Technical Data Section, must be provided for Dry Pilot Actuation.
10. A desiccant dryer, when specified for Dry Pilot Actuation, is to be installed between a drip leg and the Air Maintenance Device.
11. The Low Pressure Alarm Switch for Dry Pilot Actuation is to be adjusted as follows:
 - Low pressure alarm setting at approximately 6 psi (0,4 bar) below the minimum pilot line service pressure requirement shown in Graph C.
 - Fire alarm setting at approximately 15 psi (1,0 bar) below the minimum pilot line service pressure requirement shown in Graph C.

12. Unused pressure alarm switch connections must be plugged.
13. The Pressure Relief Valve provided with the Dry Pilot Actuation Trim is factory set to relieve at a pressure of approximately 45 psi (3,1 bar), which can typically be used for a maximum normal dry pilot actuation system pressure of 40 psi (2,8 bar). The Pressure Relief Valve may be reset; however, it must be reset to relieve at a pressure which is in accordance with the requirements of the authority having jurisdiction.

To reset the Pressure Relief Valve, first loosen the jam nut and then adjust the cap accordingly — clockwise for a higher pressure setting or counterclockwise for a lower pressure setting. After verifying the desired pressure setting, tighten the jam nut.

14. Conduit and electrical connections are to be made in accordance with the requirements of the authority having jurisdiction and/or the National Electric Code.

VALVE SETTING PROCEDURE

Steps 1 through 12 are to be performed when initially setting the Model F470 Multimatic Deluge Valve; after an operational test of the fire protection system; or, after system operation due to a fire.

1. Close the Diaphragm Chamber Supply Control Valve.
2. Close the Main Control Valve, and if the system is equipped with Dry Pilot Actuation, close the Air Supply Control Valve (Ref. Figure F-1).
3. Open the Main Drain Valve and all auxiliary drains in the system. Close the auxiliary drain valves after water ceases to discharge. Leave the Main Drain Valve open.
4. Depress the plunger of the Automatic Drain Valve to verify that it is open and that the F470 Valve is completely drained.
5. Push the Reset Knob inward to allow the Clapper to reseat.

Under normal circumstances, the re-seating of the Clapper can be heard; however, during an annual operation test procedure, for example, due to minimal flow through a partially opened main control valve, the Clapper may not latch open as shown in Figure C-3. In which case the reseat-

ing sound of the Clapper will not be heard.

Also under normal circumstances, water pressure in the riser will have exerted sufficient force on the Diaphragm so as to have emptied most of the water from the Diaphragm Chamber which, in turn, will ease the pushing of the Reset Knob by eliminating the resistive force produced by a water filled Diaphragm Chamber. Therefore, should water remain in the Diaphragm Chamber, the Reset Plunger will need to be depressed with added force to push the remaining water out of the Diaphragm Chamber and through an open actuation device (e.g., a Dry Pilot Actuator or Solenoid Valve).

NOTE

If the Reset Knob can not be depressed sufficiently to allow the Clapper to reseat, operate (open) the Manual Control Station and then once again push the Reset Knob with sufficient force to push the water out of the Diaphragm Chamber through the Manual Control Station drain.

6. Clean the Strainer in the Diaphragm Chamber Supply connection by removing the clean-out plug and strainer basket. The Strainer may be flushed out by momentarily opening the Diaphragm Chamber Supply Control Valve.
7. Open the Alarm Control Valve (Fig. F-1), if it was closed to silence local alarms.

It is recommended that the Alarm Control Valve be wire sealed in the open position with a No. 16 twisted wire, the ends of which are secured by a lead seal. The wire seal should be looped through the hole in the handle and tightly twisted around the pipe nipple adjacent to the handle.

8. Reset the actuation system.

Manual Actuation — Push the operating lever up; however, do not close the hinged cover at this time.

Wet Pilot Actuation — Replace operated pilot sprinklers and/or reset the manual control stations.

Dry Pilot Actuation — Replace operated pilot sprinklers and/or reset the manual control stations. Re-establish dry pilot pneumatic pressure.

Electric Actuation — Reset the electric detection system in accordance with the manufacturer's instructions to de-energize the solenoid valve.

NOTE

In order to prevent the possibility

of a subsequent operation of an overheated solder type pilot sprinkler, any solder type pilot sprinklers which were possibly exposed to a temperature greater than their maximum rated ambient must be replaced.

9. Open the Diaphragm Chamber Supply Control Valve and allow time for full pressure to build up in the Diaphragm Chamber.
10. Operate (open) the Manual Control Station to vent trapped air from the Diaphragm Chamber. If necessary, first open the hinged cover, and then fully pull down on the operating lever. SLOWLY close the operating lever, by pushing it up, after aerated water ceases to discharge from the Manual Control Station drain tubing. Close the hinged cover and insert a new break rod in the small hole through the top of the enclosing box.

If wet pilot actuation is being used, crack open the Inspector's Test Connection and any other vent valves, to relieve trapped air. After the discharge of air has stopped, close the vent valves and the Inspector's Test Connection.

11. Inspect drain connections from the Manual Control Station, Solenoid Valve, Dry Pilot Actuator, and Alarm Devices, as applicable. Any leaks must be corrected before proceeding to the next step.
12. Slowly open the Main Control Valve. Close the Main Drain Valve as soon as water discharges from the drain connection. Observe the Automatic Drain Valve for leaks. If there are leaks, determine/correct the cause of the leakage problem. If there are no leaks, the F470 Valve is ready to be placed in service and the Main Control Valve must then be fully opened.

NOTE

After setting a fire protection system, notify the proper authorities and advise those responsible for monitoring proprietary and/or central station alarms.

- | | |
|--|---|
| 1 - 300 lb. Water Pressure Gauge (2 req'd) | 31 - 1/2" x 5" Nipple (2 req'd) |
| 2 - 1/4" Gauge Test Valve | 32 - 1/2" x 7-1/2" Nipple |
| 3 - Model F180 Manual Control Station | 33 - 1/2" x 10-1/2" Nipple for 4" valve, 1/2" x 12" Nipple for 6" valve |
| 4 - 2" Angle Valve | 34 - 1/4" x 1-1/2" Nipple |
| 5 - 1/2" Ball Valve (2 req'd) | 35 - 2 x 3" Nipple (2 req'd) |
| 6 - 1/2" Swing Check Valve | |
| 7 - 1/2" Spring Loaded Check Valve | |
| 8 - Priming Supply Restriction | D1 - Model B-1 Dry Pilot Actuator |
| 9 - 1/2" Y-Strainer | D2 - 250 lb. Air Pressure Gauge |
| 10 - Model F793 Automatic Drain Valve | D3 - 1/4" Gauge Test Valve |
| 11 - Drip Funnel Support Plug | D4 - 1/2" Globe Valve |
| 12 - Drip Funnel Support | D5 - 1/4" Pressure Relief Valve |
| 13 - Drip Funnel | D6 - 1/4" Plug |
| 14 - 3/32" Vent Fitting | D7 - 1/2" Tube Connector |
| 15 - 1/2" Angle Valve | D8 - 1/2" Tube, 30" long |
| 16 - 1/4" Tube, 30" long | D9 - 1/2" 90° Elbow (2 req'd) |
| 17 - 1/2" Tube Connector | D10 - 1/2" x 1/2" x 1/4" Tee (2 req'd) |
| 18 - 1/2" Tube, 24" long | D11 - 1/2" Tee (2 req'd) |
| 19 - 1/4" Plug | D12 - 1/4" x 1-1/2" Nipple |
| 20 - 1/2" Plug | D13 - 1/2" x 1-1/2" Nipple (7 req'd) |
| 21 - 3/4" Plug | D14 - 1/2" x 3" Nipple |
| 22 - 1/2" Union (5 req'd) | |
| 23 - 1/2" 90° Elbow (3 req'd) | E1 - 1/2" 90° Elbow |
| 24 - 1/2" Tee (6 req'd) | E2 - 1/2" Tube Connector |
| 25 - 1/2" x 1/4" x 1/2" Tee (3 req'd) | E3 - 1/2" Tube, 24" long |
| 26 - 1/2" x 1/2" x 3/4" Tee | E4 - 1/2" x 1-1/2" Nipple (2 req'd) |
| 27 - 2" 90° Elbow | E5 - 24VDC Solenoid Valve |
| 28 - 1/2" x 1-1/2" Nipple (17 req'd) | |
| 29 - 1/2" x 3" Nipple | |
| 30 - 1/2" x 4" Nipple | |

NOTES:

1. **Wet Pilot Actuation Trim** consists of Items 1 through 35.
2. **Dry Pilot Actuation Trim** consists of Items 1 through 35 plus Items D1 through D14.
3. **Electric Actuation Trim** consists of Items 1 through 35 plus Items E1 through E5.
4. The nipples utilized in the trim arrangements are Schedule 40 steel per ASTM A53 or A135 and they are threaded per ANSI B1.20.1. The fittings are either malleable iron per ANSI B16.3 or cast iron per ANSI B16.4.

"Standard order" trim is provided with black nipples and fittings; however, galvanized nipples and fittings are available on "special order".

VALVE TRIM BILLS OF MATERIALS

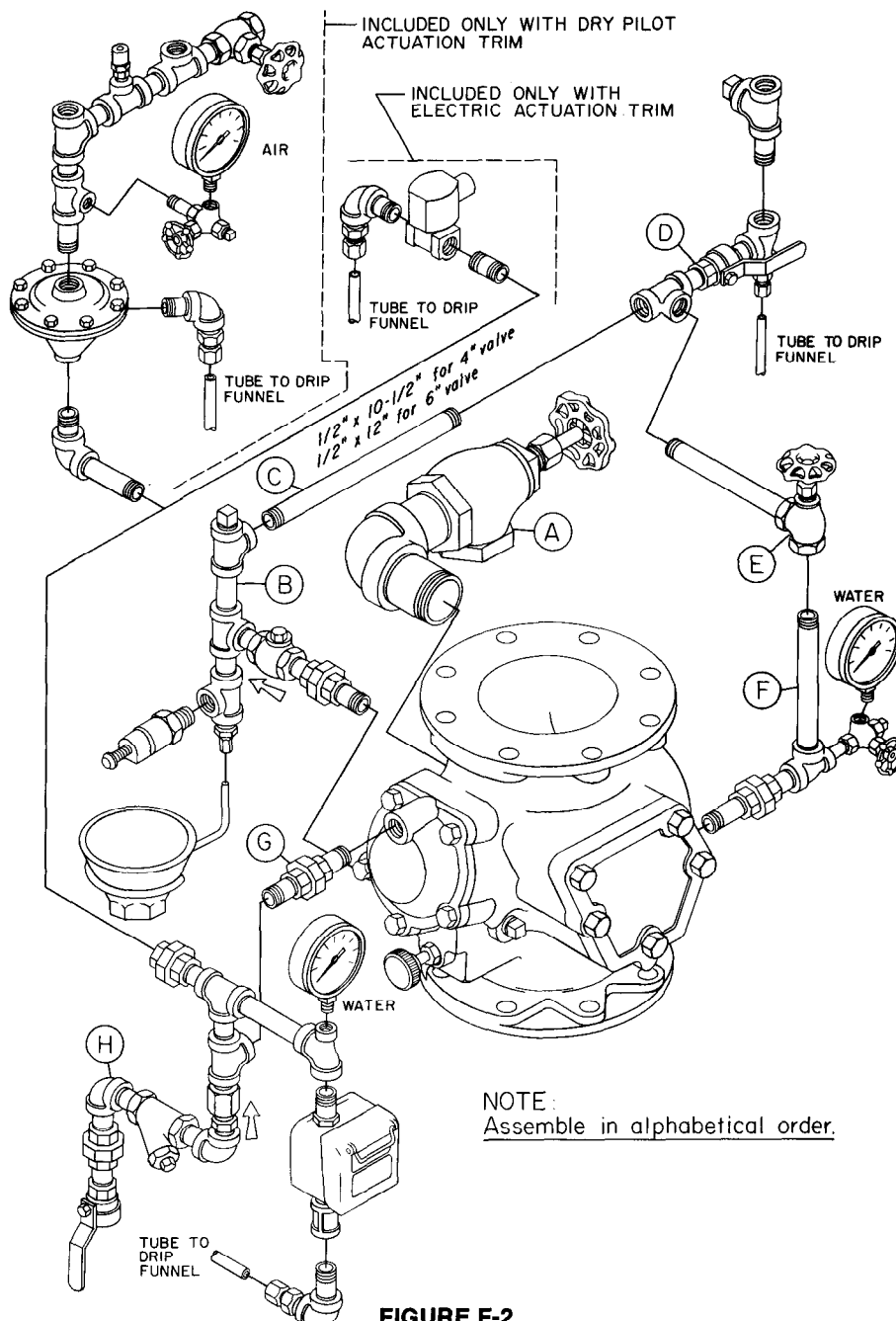


FIGURE F-2
"STANDARD ORDER" FACTORY ASSEMBLED VALVE TRIM

CARE AND MAINTENANCE

The following procedures and inspections should be performed as indicated, in addition to any specific requirements of the NFPA, and any impairment must be immediately corrected. It is also recommended that fire protection systems be inspected by a qualified Inspection Service.

NOTES

The operational test procedure, waterflow pressure alarm test procedure, and low pressure alarm test procedure will result in operation of the associated alarms. Consequently, notification must first be given to the

owner and the fire department, central station, or other signal station to which the alarms are connected.

Before closing a fire protection system main control valve for maintenance work on the fire protection system which it controls, permission to shut down the effected fire protection systems must first be obtained from the proper authorities and all personnel who may be affected by this decision must be notified.

Annual Operation Test Procedure

Proper operation of the F470 Valve (i.e., opening of the F470 Valve as

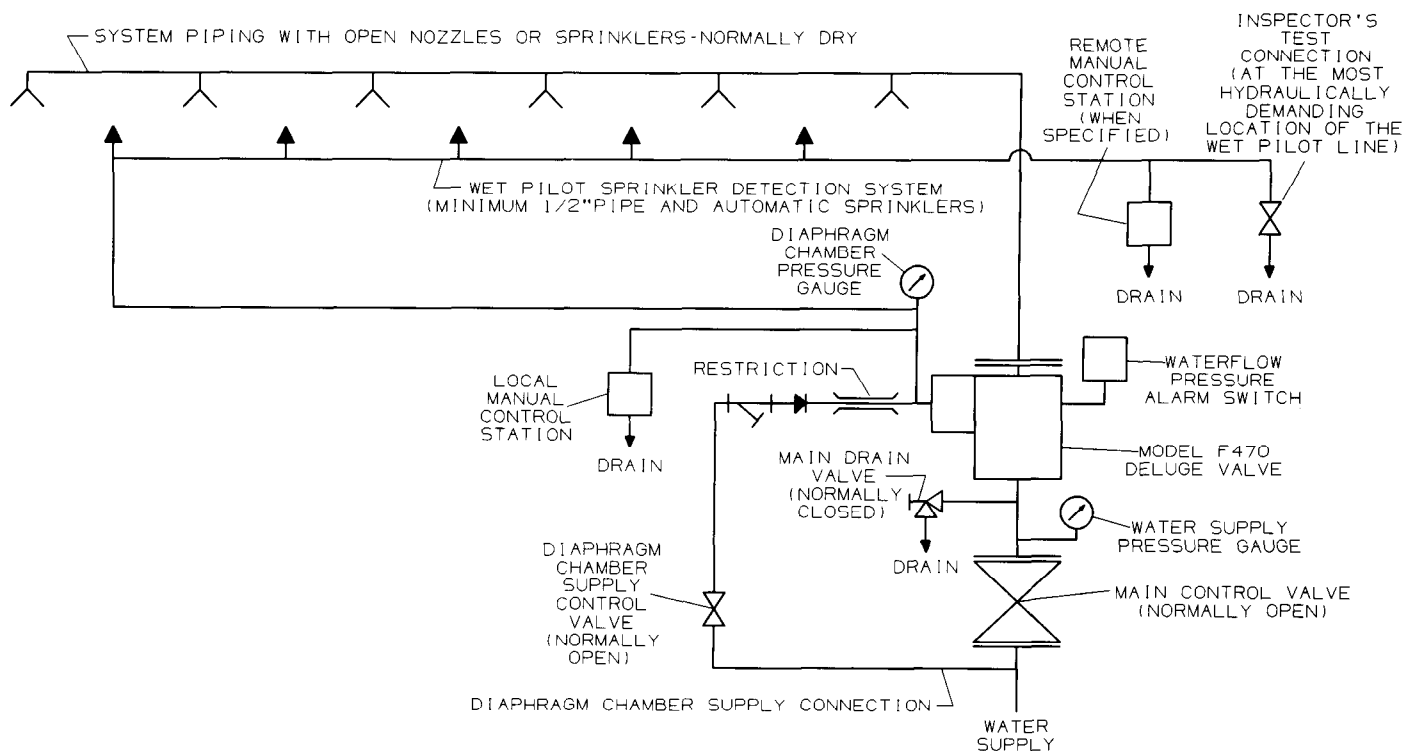


FIGURE G-1
DELUGE VALVE SYSTEM SCHEMATIC
— WET PILOT ACTUATION—

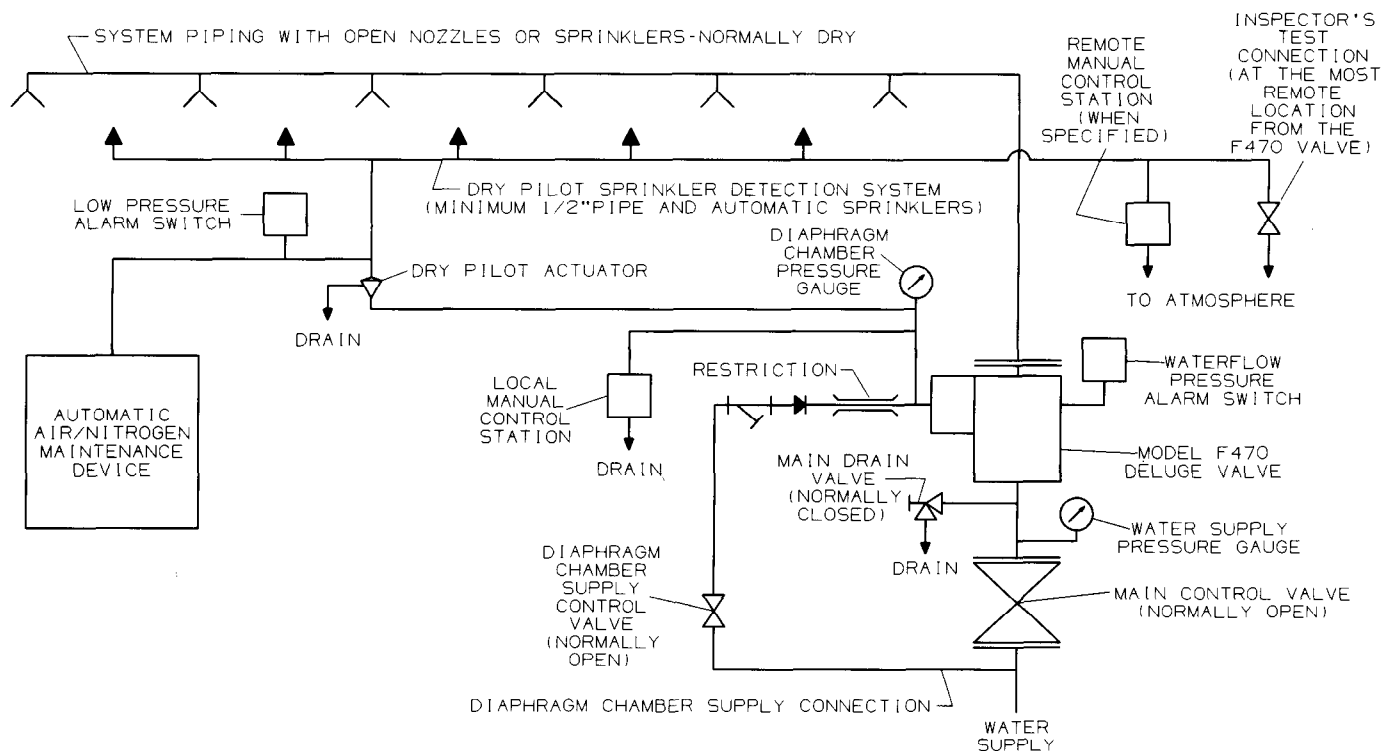


FIGURE G-2
DELUGE VALVE SYSTEM SCHEMATIC
— DRY PILOT ACTUATION—

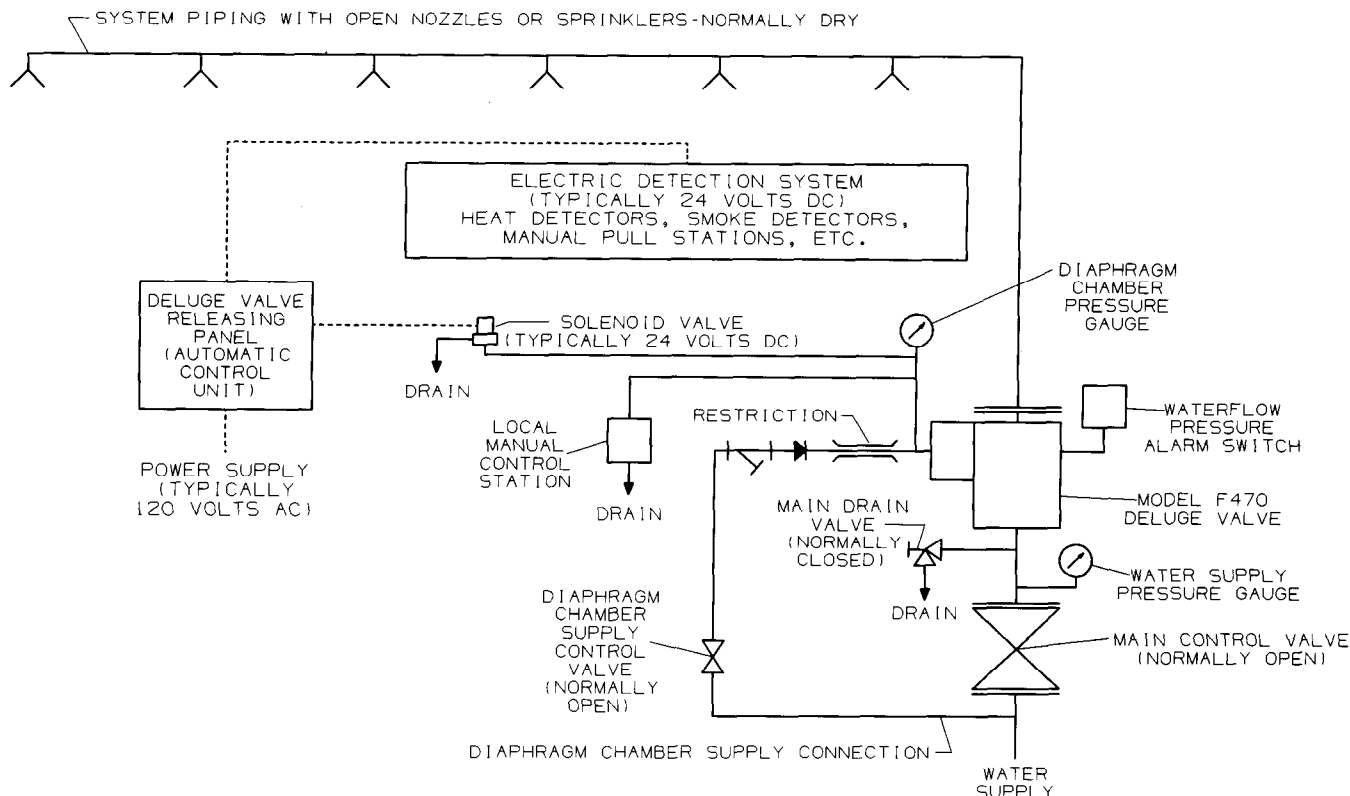


FIGURE G-3
DELUGE VALVE SYSTEM SCHEMATIC
— ELECTRIC ACTUATION—

during a fire condition) should be verified at least once a year as follows:

1. If water must be prevented from flowing beyond the riser, perform the following steps.
 - a. Close the Main Control Valve.
 - b. Open the Main Drain Valve.
 - c. Open the Main Control Valve one turn beyond the position at which water just begins to flow from the Main Drain Valve.
 - d. Close the Main Drain Valve.
2. Determine the type of actuation/detection system, and operate the F470 Valve accordingly.

NOTE

Be prepared to quickly perform Steps 3, 4, and 5, if water must be prevented from flowing beyond the riser.

Wet Pilot Actuation — Open the Inspector's Test Connection.

Dry Pilot Actuation — Open the Inspector's Test Connection.

Electric Actuation — Test the deluge releasing panel (automatic con-

trol unit) in accordance with the manufacturer's instructions to energize the solenoid valve.

3. Verify that the F470 Valve has tripped, as indicated by the flow of water into the system.
4. Close the Diaphragm Chamber Supply Control Valve.
5. Close the system's Main Control Valve.
6. Reset the F470 Deluge Valve in accordance with the Valve Setting Procedure.

Five Year Internal Valve Inspection

Once every five years during the annual operational test procedure and prior to the F470 Valve being reset, the internal parts of the F470 Valve should be cleaned and then inspected for wear and damage. Make certain that the two 1/8 inch (3,2mm) diameter pressure equalizing vents in the top of the Clapper are open. Special consideration should be given to the condition of the Diaphragm and the Clapper Facing. The Diaphragm and/or Clapper Facing should be replaced if there

are any signs of deterioration due to age or chemicals in the water.

NOTE

If the water supply contains chemicals which tend to attack an EPDM type rubber or the five year inspection indicates a build-up of debris within the valve which could affect its proper operation, then the frequency of the internal valve inspection procedure should be increased as appropriate.

Worn or damaged parts must be replaced and the F470 Valve must be reassembled in accordance with Figure B. The Cap Screws securing the Diaphragm and Handhole Covers should be uniformly tightened using a cross-draw sequence.

Quarterly Solenoid Valve Test Procedure For Electric Actuation

Proper operation of the Solenoid Valve for electric actuation should be verified at least quarterly as follows:

1. Close the Main Control Valve.
2. Open the Main Drain Valve.
3. Test the automatic control unit (del-

uge releasing panel) in accordance with the manufacturer's instructions to energize the solenoid valve.

4. Verify that the flow of water from the Solenoid Valve drain connection increases to a full flow.
5. Verify that the Diaphragm Chamber pressure has decreased to below 25% of the water supply pressure.
6. Reset the electric detection system in accordance with the manufacturer's instructions to de-energize the solenoid valve. Check the Solenoid Valve drain for leaks. Any leaks must be corrected before proceeding to the next step.
7. Slowly open the Main Control Valve. Close the Main Drain Valve as soon as water discharges from the drain connection. Observe the Automatic Drain Valve for leaks. If there are leaks, determine/correct the cause of the leakage problem. If there are no leaks, the F470 Valve is ready to be placed in service and the Main Control Valve must then be fully opened.

Quarterly Dry Pilot Actuator Test Procedure For Dry Pilot Actuation

Proper operation of the Dry Pilot Actuator for dry pilot actuation should be verified at least quarterly as follows:

1. Close the Main Control Valve.
2. Open the Main Drain Valve.
3. Open the Inspector's Test Connection on the Dry Pilot Line.
4. Verify that the flow of water from the Dry Pilot Actuator drain connection increases to a full flow.
5. Verify that the Diaphragm Chamber pressure has decreased to below 25% of the water supply pressure.
6. Close the Inspector's Test Connection and allow the dry pilot line pressure to re-establish. Check the Dry Pilot Actuator drain for leaks. Any leaks must be corrected before proceeding to the next step.
7. Slowly open the Main Control Valve. Close the Main Drain Valve as soon as water discharges from the drain connection. Observe the Automatic Drain Valve for leaks. If there are leaks, determine/correct the cause of the leakage problem. If there are no leaks, the F470 Valve is ready to be placed in service and the Main Control Valve must then be fully opened.

Quarterly Waterflow Alarm Test Procedure

Testing of the system waterflow alarms should be performed quarterly. To test the waterflow alarm, open the Alarm Test Valve, which will allow a flow of water to the Pressure Alarm Switch and/or Water Motor Alarm. Upon satisfactory completion of the test, close the Alarm Test Valve.

Quarterly Low Pressure Alarm Test Procedure And Condensate Drain Procedure For Dry Pilot Actuation

For Dry Pilot Actuation, testing of the Low Pressure Alarm Switch and drainage of the pilot line condensate should be performed quarterly as follows.

1. Close the Diaphragm Chamber Supply Control Valve.
2. Close the Main Control Valve.
3. Open the Main Drain Valve.
4. Drain the dry pilot line condensate as follows.
 - a. Close the Gauge Test Valve located below the Dry Pilot Line Pressure Gauge.
 - b. Remove the 1/4" Plug from the Gauge Test Valve.
 - c. Crack Open the Gauge Test Valve and allow all condensate, if any, to drain out.
 - d. Close the Gauge Test Valve, replace the Plug, and then open the Gauge Test Valve.
5. Open the Inspector's Test Connection, and slowly relieve pneumatic pressure. Verify that the Low pressure Alarm Switch is operational and that the low pressure set points are as follows:
 - Low pressure alarm setting at approximately 6 psi (0,4 bar) below the minimum pilot line service pressure requirement shown in Graph C.
 - Fire alarm setting at approximately 15 psi (1,0 bar) below the minimum pilot line service pressure requirement shown in Graph C.
6. Close the Inspector's Test Connection, and allow the Dry Pilot Line to automatically repressurize.
7. Open the Diaphragm Chamber Supply Control Valve.
8. Slowly open the Main Control Valve. Close the Main Drain Valve as soon as water discharges from the drain

connection. Observe the Automatic Drain Valve for leaks. If there are leaks, determine/correct the cause of the leakage problem. If there are no leaks, fully open the Main Control Valve.

WARRANTY

Seller warrants for a period of one year from the date of shipment (warranty period) that the products furnished hereunder will be free from defects in material and workmanship.

For further details on Warranty, see Price List.

ORDERING PROCEDURE

All orders for Model F470 Multimatic Deluge Valves, trim, accessories, and replacement parts must include the description and Product Symbol Number (PSN), where applicable.

Valves:

Unless otherwise specified, the F470 Valves will be provided with ANSI flange drilling.

Specify: (specify size) Model F470 External Resetting Multimatic Deluge Valve with (specify abbreviation — refer to Table A, Page 2) flange drilling, PSN (specify).

ANSI

4" (100 mm) PSN 52-470-1-013
6" (150 mm) PSN 52-470-1-015

ISO

4" (100 mm) PSN 52-470-4-113
6" (150 mm) PSN 52-470-4-115

AS

4" (100 mm) PSN 52-470-4-313
6" (150 mm) PSN 52-470-4-315

JIS

4" (100 mm) PSN 52-470-4-713
6" (150 mm) PSN 52-470-4-715

Trim:

Unless otherwise specified, all trim arrangements are provided factory assembled as shown in Figure F-2. Unassembled trim packages as shown in Figure F-1 can be provided on "special order". Product Symbol Numbers (PSN) need not be specified when ordering unassembled trim.

"Standard Order"

Factory Assembled Black Trim:

Specify: Factory assembled black (specify type trim) for use with the Model F470 Multimatic External Resetting Deluge Valve, PSN (specify).

Wet Pilot Actuation Trim	PSN 52-470-1-101
Dry Pilot Actuation Trim	PSN 52-470-1-102
Electric Actuation Trim With 24VDC Solenoid Valve	PSN 52-470-1-103

"Special Order"

Factory Assembled Galvanized Trim:

Specify: Factory assembled galvanized (specify type trim) for use with the Model F470 Multimatic External Resetting Deluge Valve, PSN (specify).

Wet Pilot Actuation Trim	PSN 52-470-2-101
Dry Pilot Actuation Trim	PSN 52-470-2-102
Electric Actuation Trim With 24VDC Solenoid Valve	PSN 52-470-2-103

"Special Order" Electric Actuation Trim With Separately Ordered Solenoid Valve:

Specify: (Specify Factory assembled or Unassembled), (specify black or galvanized) Electric Actuation Trim With Separately Ordered Solenoid Valve for use with the Model F470 Multimatic External Resetting Deluge Valve.

When ordering "Electric Actuation Trim With Separately Ordered Solenoid Valve", refer to Technical Data Sheet TD119 for information on separately ordered, UL Listed Solenoid Valves that may be suitable for use in hazardous locations or that have voltage ratings other than 24VDC.

NOTE

Factory Mutual Approval for electric actuation of the F470 Valve is contingent on the use of the FM Approved 24VDC Solenoid Valve provided with the "Standard Order" Electric Actuation Trim, PSN 52-470-1-103 or PSN 52-470-2-103.

Accessories:

Refer to the following Technical Data Sheets (TD), as applicable.

Pressure Alarm Switch	TD213
Low Pressure Alarm Switch	TD210
Model F324 Air Maintenance Device	TD111
Model F326 Air Maintenance Device	TD112
Model F328 Nitrogen Maintenance Device	TD113
Desiccant Dryer	TD135
Model F180 or F184 Manual Control Stations	TD121

Valve Replacement Parts Kit:

The Valve Replacement Parts Kit contains a Clapper Facing, Diaphragm, and Handhole Cover Gasket. It is recommended to have these parts readily available when servicing the Model F470 Multimatic Deluge Valve.

Specify: Valve Replacement Parts Kit for use with (specify size) inch Model F470 Multimatic External Resetting Deluge Valve.

4" (100 mm)	PSN 92-470-1-101
6" (150 mm)	PSN 92-470-1-102

Replacement Valve Parts (Fig. B):

Specify: (description) for use with (specify size) Model F470 Multimatic External Resetting Deluge Valve, PSN (specify).

4 inch (100 mm) Valve	
2 - Clapper	PSN 92-470-1-006
3 - Clapper Facing	PSN 92-470-1-009
4 - Clapper Facing Retainer	PSN 92-470-1-004
5 - Clapper Bolt	PSN 62-634-1-109
7 - Clapper Latch	PSN 92-470-1-005
8 - O-Ring	PSN 62-578-1-306
9 - Reset Bushing	PSN 92-470-1-052
10 - O-Ring	PSN 62-578-1-307
11 - Reset Plunger	PSN 92-470-1-053
12 - Reset Knob	PSN 62-470-1-001
13 - Diaphragm Cover Bolt	PSN 62-039-1-207
14 - Diaphragm Retainer	PSN 92-470-1-049
15 - Flange & Push Rod Assembly	PSN 92-470-1-040
16 - Diaphragm	PSN 92-470-1-031
17 - Diaphragm Cover	PSN 92-470-1-029
20 - Clapper Hinge Pin	PSN 92-470-1-038
21 - Latch Hinge Pin	PSN 92-470-1-023
22 - Handhole Cover	PSN 92-470-1-002
23 - Handhole Cover Gasket	PSN 92-470-1-008
24 - Handhole Cover Bolt	PSN 62-039-1-208
- Fluorosilicone Grease 1.5 grams	PSN 92-302-1-641
57 grams	PSN 92-302-1-642

6 inch (150 mm) Valve

2 - Clapper	PSN 92-470-1-025
3 - Clapper Facing	PSN 92-470-1-032
4 - Clapper Facing Retainer	PSN 92-470-1-026
5 - Clapper Bolt	PSN 62-634-1-109
7 - Clapper Latch	PSN 92-470-1-030
8 - O-Ring	PSN 62-578-1-306

9 - Reset Bushing	PSN 92-470-1-052
10 - O-Ring	PSN 62-578-1-307
11 - Reset Plunger	PSN 92-470-1-053
12 - Reset Knob	PSN 62-470-1-001
13 - Diaphragm Cover Bolt	PSN 62-039-1-207
14 - Diaphragm Retainer	PSN 92-470-1-049
15 - Flange & Push Rod Assembly	PSN 92-470-1-040
16 - Diaphragm	PSN 92-470-1-031
17 - Diaphragm Cover	PSN 92-470-1-029
20 - Clapper Hinge Pin	PSN 92-470-1-039
21 - Latch Hinge Pin	PSN 92-470-1-023
22 - Handhole Cover	PSN 92-470-1-021
23 - Handhole Cover Gasket	PSN 92-470-1-033
24 - Handhole Cover Bolt	PSN 62-634-1-407
- Fluorosilicone Grease 1.5 grams	PSN 92-302-1-641
57 grams	PSN 92-302-1-642

Replacement Trim Parts (Fig. F):

Specify: (description) for use with Model F470 External Resetting Multimatic Deluge Valve, PSN (specify).

1 - 300 lb. Water Pressure Gauge	PSN 92-343-1-005
2 - 1/4" Gauge Test Valve	PSN 46-005-1-002
3 - F180 Manual Control Station	PSN 52-289-1-001
4 - 2" Angle Valve	PSN 46-048-1-009
5 - 1/2" Ball Valve	PSN 46-050-1-004
6 - 1/2" Swing Check Valve	PSN 46-049-1-004
7 - 1/2" Spring Loaded Check Valve	PSN 92-322-1-002
8 - Priming Supply Restriction	PSN 92-020-1-009
9 - 1/2" Y-Strainer	PSN 52-353-1-005
10 - F793 Automatic Drain Valve	PSN 52-793-1-004
11 - Drip Funnel Support Plug	PSN 92-211-1-005
12 - Drip Funnel Support	PSN 92-211-1-003
13 - Drip Funnel	PSN 92-343-1-007
14 - 3/32" Vent Fitting	PSN 92-032-1-002
15 - 1/2" Angle Valve	PSN 46-048-1-004
D1 - B-1 Dry Pilot Actuator	PSN 52-280-1-001
D2 - 250 lb. Air Pressure Gauge	PSN 92-343-1-012
D3 - 1/4" Gauge Test Valve	PSN 46-005-1-002
D4 - 1/2" Globe Valve	PSN 46-047-1-004
D5 - 1/4" Pressure Relief Valve	PSN 92-343-1-020
E5 - 24VDC Solenoid Valve	PSN 52-287-1-024

WEIGHTS

The following are the nominal weights for the valves and trim:

4" Model F470 Multimatic Deluge Valve	77 lbs. (35 kg)
6" Model F470 Multimatic Deluge Valve	111 lbs. (49 kg)
Wet Pilot Actuation Trim	28 lbs. (13 kg)
Dry Pilot Actuation Trim	41 lbs. (18 kg)
Electric Actuation Trim With 24VDC Solenoid Valve ..	33 lbs. (15 kg)

