

Single Interlock Preaction System with 502 Deluge Valve Electric Release Trim

General Description

The Single Interlock Supervised Preaction System is generally used to protect water sensitive areas such as computer rooms, storage areas, libraries, archives, banks, etc., to avoid water damage due to damaged sprinklers or damaged sprinkler piping. Preaction System is also effectively used to have Pre-alarm of a possible fire condition and allows time to extinguish fire by hand held fire extinguishing equipment, prior to water discharge through sprinkler heads. It uses an automatic sprinkler with supplemental detection system. In the event when fire cannot be extinguished by hand held fire extinguishing equipment, the increase in temperature will open one or more sprinkler heads to discharge water.

In normal condition, preaction system does not contain water in the sprinkler piping. The sprinkler piping contains air pressure for the purpose of supervising its leak tightness. As per NFPA, the preaction system employing more than 20 automatic sprinklers is to have the sprinkler piping automatically supervised.

The electric detection system in single interlock preaction system will respond to a fire faster than the automatic sprinkler. When fire is detected through electric system, the primary water control deluge valve opens, allowing water flow into the sprinkler piping in readiness for possible subsequent opening of one or more sprinklers.



Technical Details

Nominal Size	DN 50, 80, 100, 150, 200
Deluge Valve	Fig 502 - UL Listed
Check Valve	Model - CH
Sprinkler Alarm	UL Listed (optional)
Release Panel	UL Listed (optional)
Water Flow Switch	UL Listed
Solenoid Valve	24V DC, UL Listed
Automatic Air Supervisor	Oil-Less Risermount Compressor (optional)
Air Pressure Maintenance Device	PMD-1 (optional)
Manual System Shutoff Valve	UL Listed, Butterfly Valve - Standard supply (Gate valve optional)
Maximum Working Pressure	17.2 bar (250 psi)
System End Connection	Flanged (standard supply) Grooved (optional supply)
Approval	UL Listed

System Operation

The Electric Actuated, Supervised Single Interlock Preaction System utilizes automatic sprinklers and an additional electric detection system. Electric detection system utilizes 24V.DC heat detectors or smoke detectors. When one electric detector senses the presence of fire, the releasing control panel activates fire alarm devices and latches solenoid valve in open position. If two detectors are cross zoned, then operation of the two detectors will be required to activate the fire alarm device and latch open the solenoid valve. Opening of solenoid valve will drain the water from deluge valve diaphragm chamber, thereby reducing the diaphragm chamber pressure and actuation of the deluge valve, allowing the water flow in the sprinkler system.

The water flow will also produce water pressure in the alarm trim of deluge valve. This may actuate the pressure switch if additionally provided to control the shut down of equipment such as computers or start up of the second alarm devices. The flow of water converts the dry system into the wet system at this stage. The water discharge will start only when one or more automatic sprinkler open due to increase in temperature. In normal condition the integrity of system is automatically supervised by the automatic air supervisory means. Air or nitrogen at 18 PSI (1.26 Bar) pressure is maintained in the sprinkler system up to the downstream of the riser check valve.

The supervisory low alarm switch is set at 6 PSI (0.42 Bar). The decreasing pressure will give trouble annunciation due to the loss of pressure, due to abnormal leakage in the sprinkler system piping as a result of the damaged sprinkler or broken pipeline. This will not open the deluge valve. The air pressure is for supervisory alarm only.



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The automatic supervisory air supply can be maintained through factory set air compressor. The compressor is compact and can be riser mounted or floor mounted. The supervisory air can be maintained with the tank mounted compressor and air maintenance device.

If continuous plant air supply or regulated Nitrogen source is available, then air maintenance device shall be used to maintain the supervisory air supply.

The major benefits of this system as compared to the conventional wet/dry pipe sprinkler system are:

1. A fire alarm sounds prior to operation of a sprinkler, which may enable to extinguishing of the fire by hand held means, before operation of any sprinkler head. This can eliminate water damage.
2. Whenever integrity of the piping or sprinkler is disturbed, no water flows, only trouble annunciation alarm signals. This will avoid water damage to valuable property.
3. Early fire alarm is provided by electric detection system, without the delay of water delivery time.

Installation & Commissioning

The preaction system valves, panel, indicators must be installed in a readily visible and accessible location. The system valves and accessory shall not be installed in an area having temperature less than 4°C (40°F). Heat tracing to system valve and accessory is not permissible. The system must be installed and operated carefully by a trained person, having good knowledge of equipment. All system piping must be flushed thoroughly before commissioning.

After initial successful tests, an authorized person must be trained to perform inspection, testing and maintenance of the system.

Note:

The system may have arrangement of electric detectors in a cross-zoned array. The arrangement will prevent false activation of one detector, causing water to flow into the sprinkler piping. Few approving authorities do not permit cross zoning, hence system designer must design the system as per Local Authority having Jurisdiction. The system to be hydraulically calculated as a wet pipe system.

It is strongly recommended that Detection System must be designed to operate sooner than the automatic sprinkler heads.

Inspection & Maintenance

Inspection and testing is to be carried out only by an authorized and trained personnel. DO NOT TURN OFF the water supply or close any valve to make repair(s) or test the valve, without placing a roving fire patrol in the area covered by the system. Also inform the local security personal and central alarm station, so that there is no false alarm signal. It is recommended to carry out physical inspection of the system at least twice a week. The inspection should verify that no damage has taken place to any components and check for following normal condition of the system.

Recommended Sequence of Installation

In planning the installation, consideration must also be given to the disposal of relatively large quantities of water that may be associated with draining of the system or performing flow test.

1. Install the Deluge Valve on Riser.
2. Install the Riser Check Valve above Deluge Valve as shown in installation drawing.
3. On completion of system piping, install all the trims as per trim drawing. Care must be taken to ensure that Check Valves, Strainers, Valves etc. are installed with the flow arrows in the proper direction.
4. Connect all drain piping as shown in the drawing.
5. All unused opening on valve or trim parts must be plugged.
6. Connect air supply line.
7. Connect all electrical to control panel as per wiring drawing.
8. Make sure that all the nut bolts, fittings are screwed properly.
9. Follow the valve resetting and test procedure.

Resetting Procedure

1. Close the upstream side stop valve of the Deluge Valve.
2. Open drain valves and allow water to drain (if water flow was establish) & close drain valve when water flow has ceased.
3. Check all release devices are closed. Inspect the release devices if system was subject to fire condition.
4. Open the priming line so that the diaphragm chamber reads the system water pressure. Open the manual release station partly to vent the air & then close it.
5. Open the upstream side of stop valve to read the Deluge Valve Inlet water supply pressure. The Deluge Valve is set.
6. Open the air supply line and check the pressure is maintained up to 18 PSI (1.26 Bar) and Control Panel is kept on.
7. Check all the trim parts for possible leak.

Normal Condition

1. All main valves are open and sealed with tamper proof seal.
2. All drain valves are in closed condition.
3. No leak or drip is detected from drip valve.
4. All water gauge of deluge valve, should show the required pressure.
5. No leak in any trim or other piping.
6. Release panel is on and no abnormal indication are seen.

Caution

Procedure outlined below will result in operation of associated alarm. Concerned authorities to be informed about the tests before conducting the tests.



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Water Flow Alarm Test

Open the sprinkler alarm gong test valve, the water will flow through sprinkler alarm and/or water flow switch. On satisfactory observation close the alarm test valve.

Solenoid Valve Test

1. Close the inlet valve of Deluge Valve and open main Drain Valve.
2. Activate the solenoid valve through zone-1 or zone-2 of Releasing Panel and observe water flow at solenoid Valve outlet.
3. De-activate the solenoid valve by deactivating zone-1 or zone-2 (initiating zone) of Releasing Panel and reset the panel if required.
4. Reset the system as resetting procedure.

Air Supervisory Low Pressure Alarm Test

Release air pressure gradually through valve provided on check valve. When air pressure drops to 6 PSI (0.42 Bar), the supervisory low pressure alarm must be observed. Close the valve & observe that air pressure has been established to 18 PSI (1.26 Bar), the supervisory air pressure alarm must come to normal condition. If required reset the release panel.

Annual Operation Test

Testing valve operation without causing water supply to the deluge valve.

1. Close the main system valve controlling water supply to the deluge valve.
2. Open the main drain valve provided on deluge inlet side and allow water to drain. When water flow from drain valve has stopped crack open the main system valve and close the main drain valve partly allowing the water pressure at inlet of deluge valve to raise up to 1.4 Kg. / Sq. Cm. (20 PSI) and no more pressure is rising.
3. Actuate the solenoid valve from control panel as per instruction of control panel manufacturer. Deluge valve must open and water flow must be noticed through drip valve and through solenoid valve. Close the main supply control valve immediately and allow water to drain from drain valve.
4. When water flow has stopped, reset the deluge valve as per resetting procedure.

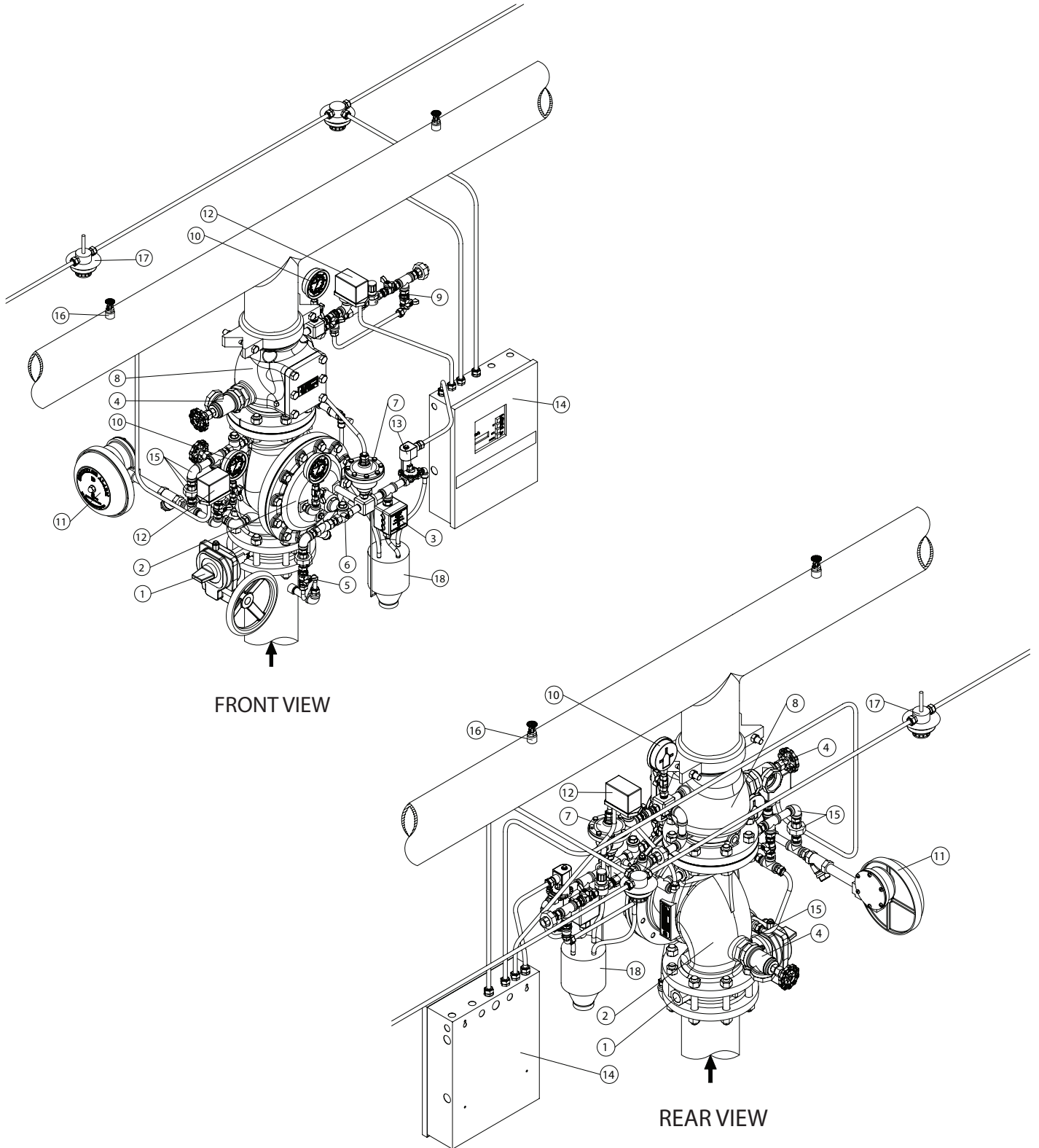
Caution

The steps 2 & 3 must be performed very quickly to prevent water flow to riser.

Caution

The system must be inspected, tested and maintained as instructed above, in addition to the requirement of NFPA or as per requirement of authority having jurisdiction. The owner is responsible for the inspection, testing and maintenance of the system and devices.

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Part List

Item	Description	Qty.				
		DN50	DN 80	DN 100	DN150	DN 200
1	Butterfly valve wafer type, gear operated with tamper switch	1	1	1	1	1
2	Deluge Valve Flange End DN50 (2")	1	-	-	-	-
2	Deluge Valve Flange End DN 80 (3")	-	1	-	-	-
2	Deluge Valve Flange End DN 100 (4")	-	-	1	-	-
2	Deluge Valve Flange End DN 150 (6")	-	-	-	1	-
2	Deluge Valve Flange End DN 200 (8")	-	-	-	-	1
3	Emergency Release Station 1/2"	1	1	1	1	1
4	Angle Valve 1 1/4"	2	2	-	-	-
4	Angle Valve 2"	-	-	2	2	2
5	Priming Valve 1/2"	1	1	1	1	1
6	Restricted Check Valve 1/2"	1	1	1	1	1
7	Anti Reset valve (ARV-1) 1/2"	1	1	1	1	1
8	Check Valve - Flanged x Grooved DN50 (2")	1	-	-	-	-
8	Check Valve - Flanged x Grooved DN80 (3")	-	1	-	-	-
8	Check Valve - Flanged x Grooved DN100 (4")	-	-	1	-	-
8	Check Valve - Flanged x Grooved DN150 (6")	-	-	-	1	-
8	Check Valve - Flanged x Grooved DN200 (8")	-	-	-	-	1
9	Pressure Maintenance Device (PMD-1 1/2") *	1	1	1	1	1
10	Pressure Gauge 0 - 20.7 bar (0 - 300 psi) UL Listed	3	3	3	3	3
11	Sprinkler Alarm (Gong Bell) *	1	1	1	1	1
12	Pressure Switch	2	2	2	2	2
13	Solenoid Valve	1	1	1	1	1
14	DV Releasing Panel *	1	1	1	1	1
15	Trim Fittings	1	1	1	1	1
16	Automatic Sprinkler **	-	-	-	-	-
17	Heat Detector/Smoke Detector **	-	-	-	-	-
18	Splash Proof Funnel	1	1	1	1	1

* Optional Supply

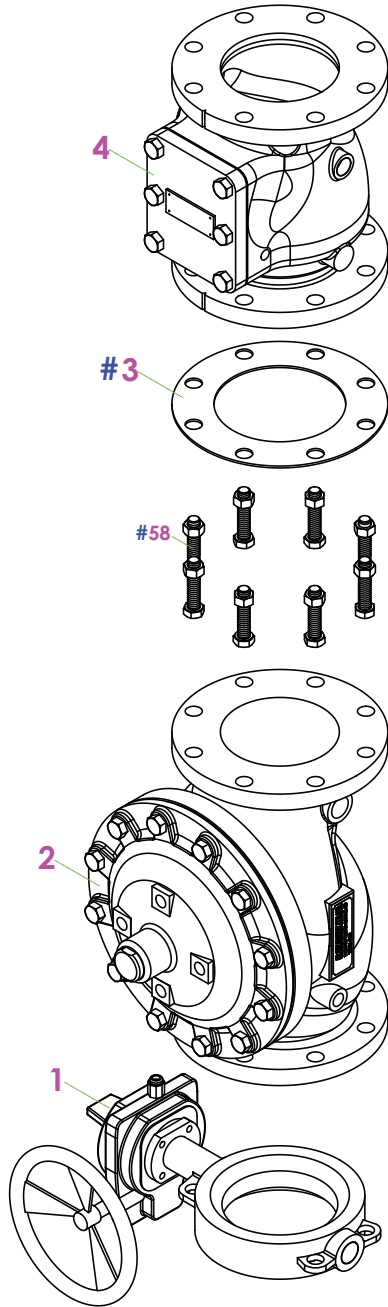
** To be ordered separately

Notes:

- Deluge Valve End Connection (optional - G x G)
- Check Valve End Connection (optional - G x G / F x F)
- Butterfly Valve End Connection (optional - G x G)
- Optional Trim Supply - Semi Assembled
- Shapes of Fittings/Valves may change

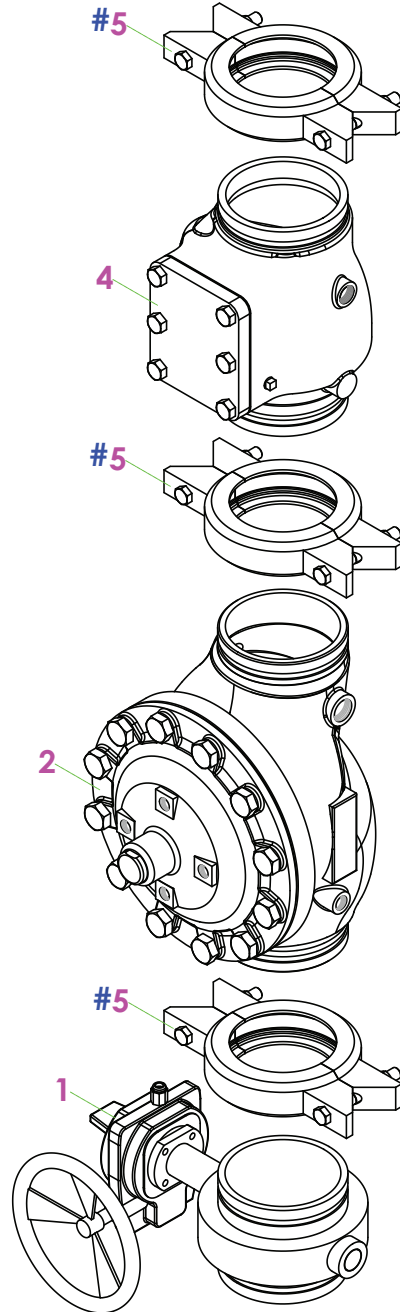


Single Interlock Preaction System with 502 Deluge Valve
Electric Release Trim



OPTION - 1

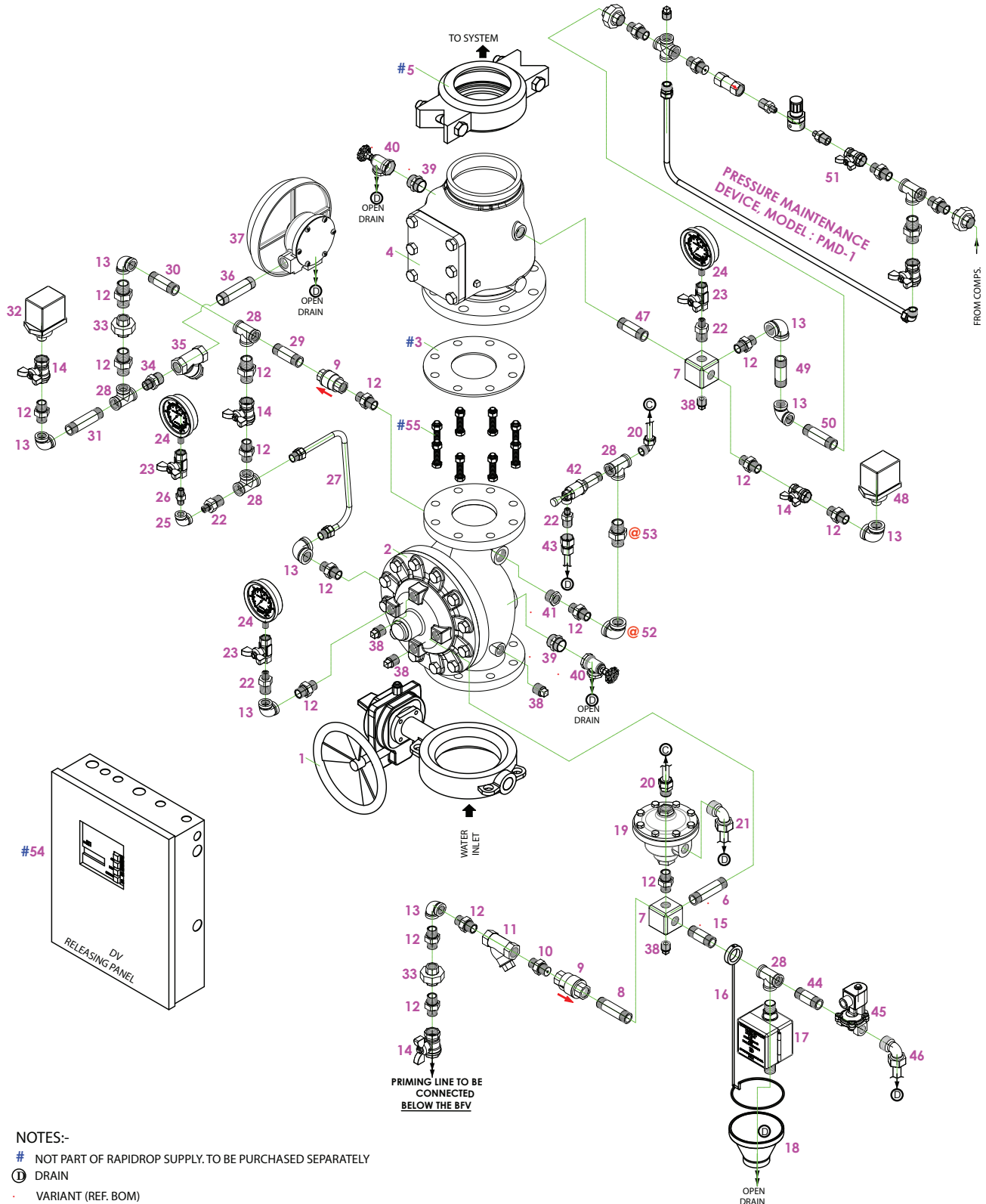
Deluge Valve – F x F
Check Valve – F x F
Butterfly Valve – Wafer Type



OPTION - 2

Deluge Valve – G x G
Check Valve – G x G
Butterfly Valve – G x G

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NOTES:-

- # NOT PART OF RAPIDROP SUPPLY. TO BE PURCHASED SEPARATELY
- Ⓛ DRAIN
- VARIANT (REF. BOM)



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Part List

Item No.	Description	Size	Qty.				
			DN50	DN 80	DN 100	DN150	DN 200
1	Butterfly valve wafer type, gear operated with tamper switch		1	1	1	1	1
2	Deluge Valve Flange End DN50 (2")		1	1	1	1	1
3	Full Face Gasket #		1	1	1	1	1
4	Check Valve - F x G		1	1	1	1	1
5	Rigid Coupling #		1	1	1	1	1
6	Pipe Nipple	1/2" x 100mm	1	-	-	-	-
6	Pipe Nipple	1/2" x 110mm	-	1	-	-	-
6	Pipe Nipple	1/2" x 115mm	-	-	1	-	-
6	Pipe Nipple	1/2" x 120mm	-	-	-	1	1
7	5 Way Manifold	1/2"	2	2	2	2	2
8	Pipe Nipple	1/2" x 60mm	1	1	1	1	1
9	Check Valve	1/2"	2	2	2	2	2
10	Orifice Nipple	1/2"	1	1	1	1	1
11	Y Type Strainer	1/2"	1	1	1	1	1
12	Hex Nipple	1/2"	16	16	16	16	16
13	Elbow	1/2"	8	8	8	8	8
14	Ball Valve	1/2"	4	4	4	4	4
15	Pipe Nipple	1/2" x 60mm	1	1	-	-	-
15	Pipe Nipple	1/2" x 70mm	-	-	1	1	1
16	Funnel Holder	-	1	1	1	1	1
17	Emergency Release Station	1/2"	1	1	1	1	1
18	Funnel	-	1	1	1	1	1
19	Anti Reset Valve (ARV-1)	1/2"	1	1	1	1	1
20	ARV-1 Tubing Assembly	1/2"	1	1	1	1	1
21	ARV-1 Drain Tubing Assembly	1/2"	1	1	1	1	1
22	Reducing Hex Nipple	1/4" x 1/2"	4	4	4	4	4
23	Ball Valve	1/4"	3	3	3	3	3
24	Pressure Gauge	0-300 psi UL Listed	3	3	3	3	3
25	Elbow	1/4"	1	1	1	1	1
26	Hex Nipple	1/4"	1	1	1	1	1
27	Test Alarm Line Assembly	1/2"	1	1	1	1	1
28	Tee	1/2"	5	5	5	5	5

Not part of Rapidrop supply. To be purchased separately



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Part List

Item No.	Description	Size	Qty.				
			DN50	DN 80	DN 100	DN150	DN 200
29	Pipe Nipple	1/2" x 60mm	1	1	1	1	1
30	Pipe Nipple	1/2" x 70mm	1	1	1	1	1
31	Pipe Nipple	1/2" x 80mm	1	1	1	1	1
32	Pressure Switch (Water)	1/2" UL Listed	1	1	1	1	1
33	Union	1/2"	2	2	2	2	2
34	Reducing Hex Nipple	3/4" x 1/2"	1	1	1	1	1
35	Y Type Strainer	3/4"	1	1	1	1	1
36	Pipe Nipple	3/4" x 95mm	1	1	1	1	1
37	Sprinkler Alarm (Gong Bell)		1	1	1	1	1
38	SQ. Plug	1/2"	5	5	5	5	5
39	Hex Nipple	1 1/4"	2	2	-	-	-
39	Hex Nipple	2"	-	-	2	2	2
40	Angle Valve	1 1/4"	2	2	-	-	-
40	Angle Valve	2"	-	-	2	2	2
41	Reducing Bush Outside Head	3/4" x 1/2"	1	-	-	-	-
41	Reducing Bush Outside Head	1" x 1/2"	-	1	1	1	1
42	Drip Valve	1/2"	1	1	1	1	1
43	Drip Drain Line Assembly	1/2"	1	1	1	1	1
44	Pipe Nipple	1/2" x 60mm	1	1	1	1	1
45	Solenoid Valve	1/2" UL Listed	1	1	1	1	1
46	SOV Draine Line Assembly	1/2"	1	1	1	1	1
47	Pipe Nipple	1/2" x 80mm	1	1	1	1	1
48	Pressure Switch (Air)	1/2" UL Listed	1	1	1	1	1
49	Pipe Nipple	1/2" 60mm	1	1	1	1	1
50	Pipe Nipple	1/2" 60mm	1	1	1	1	1
51	Pressure Maintenance Device	1/2" PMD-1	1	1	1	1	1
52	Elbow	1/2"	1	1	-	-	-
53	Hex Nipple	1/2"	1	1	-	-	-
54	DV Electric Release Panel #	Potter UL Listed	1	1	1	1	1
55	Nut and Bolt Assembly #	M16 x 65mm Long	4	-	-	-	-
55	Nut and Bolt Assembly #	M16 x 80mm Long	-	4	8	-	-
55	Nut and Bolt Assembly #	M20 x 90mm Long	-	-	-	8	8

Not part of Rapidrop supply. To be purchased separately