ALARM CHECK VALVE ASSEMBLY

MODEL: SD-ECO-AVA

TECHNICAL DATA :

Nominal Size	150 & 100 NB
End Connection	Flange x Flange
Rated Working Pressure	175 PSI
Range of Working Pressure	21 PSI TO 200 PSI
Testing Pressure	350 PSI
Mounting	Vertical
Material	Grey Cast Iron
Flange Connection	ANSI B16.5 #150 ANSI B16.1 #125
Flange Facing	Flat Face
Frictional Loss in Terms of Equivalent Length of Pipe (C-120)	150 NB - 40ft 100 NB - 40ft
Max. Flow Rate	150 NB - 790 gpm 100 NB - 550 gpm
Non Actuating Flow Rate	Below 4 gpm
Weight	150 NB - 37 Kg 100 NB - 20 Kg
Finish	Red Enamel
Ordering Information	Specify Size of valve, Flange Connection, Trim Details and Pipe OD

PRODUCT DESCRIPTION

The SHIELD alarm check valve features a grooved seat alarm port, an external by-pass, and removable hand hole cover which hinged to a clapper assembly, it has both flanged inlet and outlet, the valve may be installed vertically on a wet pipe sprinkler system, which is used to lock water pressure fluctuations into the sprinkler system during providing the capability of initiating the required fire alarm through a water motor alarm or an electric pressure switch, which may use at constant pressure or variable pressure water supplies.

Wet Alarm Valves are designed to hold back water pressure in the piping system until the sprinkler is activated, to be used in wet pipe sprinkler installations in buildings not subject to freezing temperatures. Alarm Valve includes trim packages valves, gauges, pressure switch, fittings and nipples to provide retard chamber connection, drain connections and alarm test bybass.

RETARD CHAMBER

This is a valve accessory which may be used for variable pressure wet systems where mechanical motor alarms or pressure switches are used. In situations where excessive water pressure surges occur the retarding chamber is needed to collect excess water from the alarm valve and feed water back into the main drain, before activating the alarm.

Retard chamber with galvanized steel pipes and pipe fittings

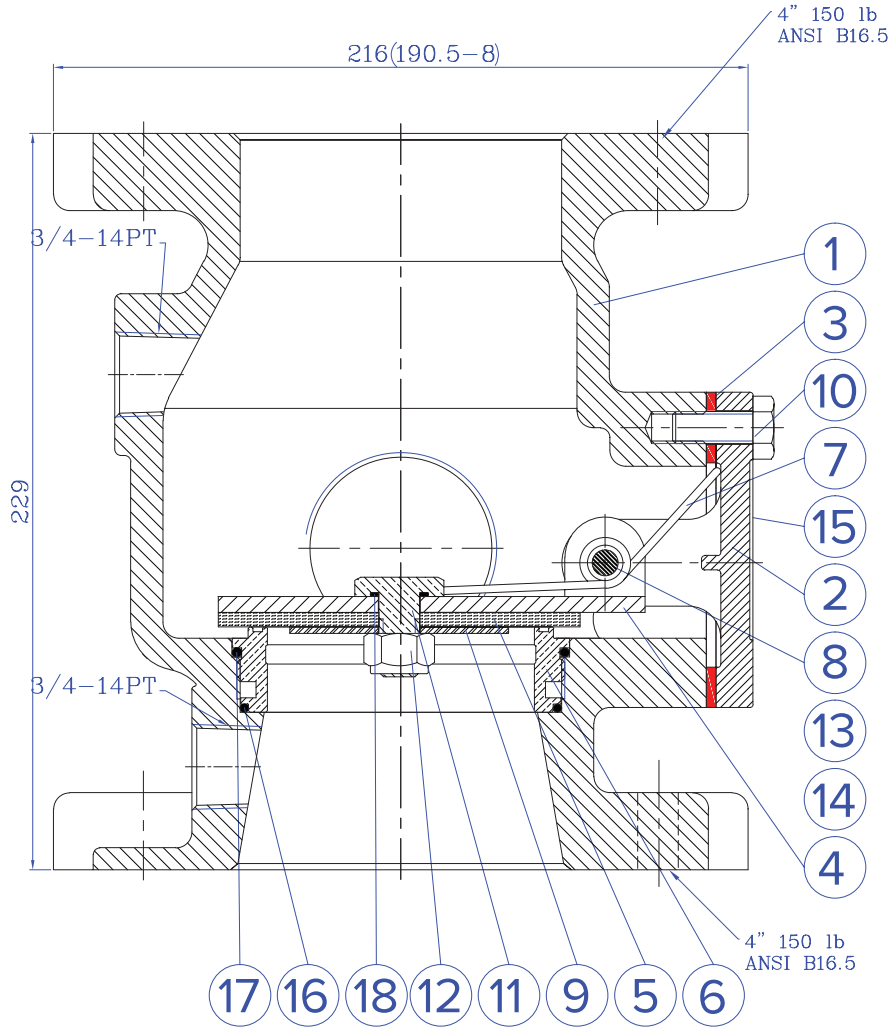
Inlet Connection	½" NPT female
Outlet Connection	¾" NPT female
Rated Working Pressure	175 psig
Hydrostatic Test Pressure	350 psig
Material	Aluminium Alloy

WATER MOTOR ALARM GONG

This is a hydraulically driven mechanical gong that automatically sounds a continuous alarm when the sprinkler system activates.

Inlet Connection	½" NPT female
Outlet Connection	¾" NPT female
Rated Working Pressure	175 psig
Hydrostatic Test Pressure	350 psig
Material	Aluminium Alloy

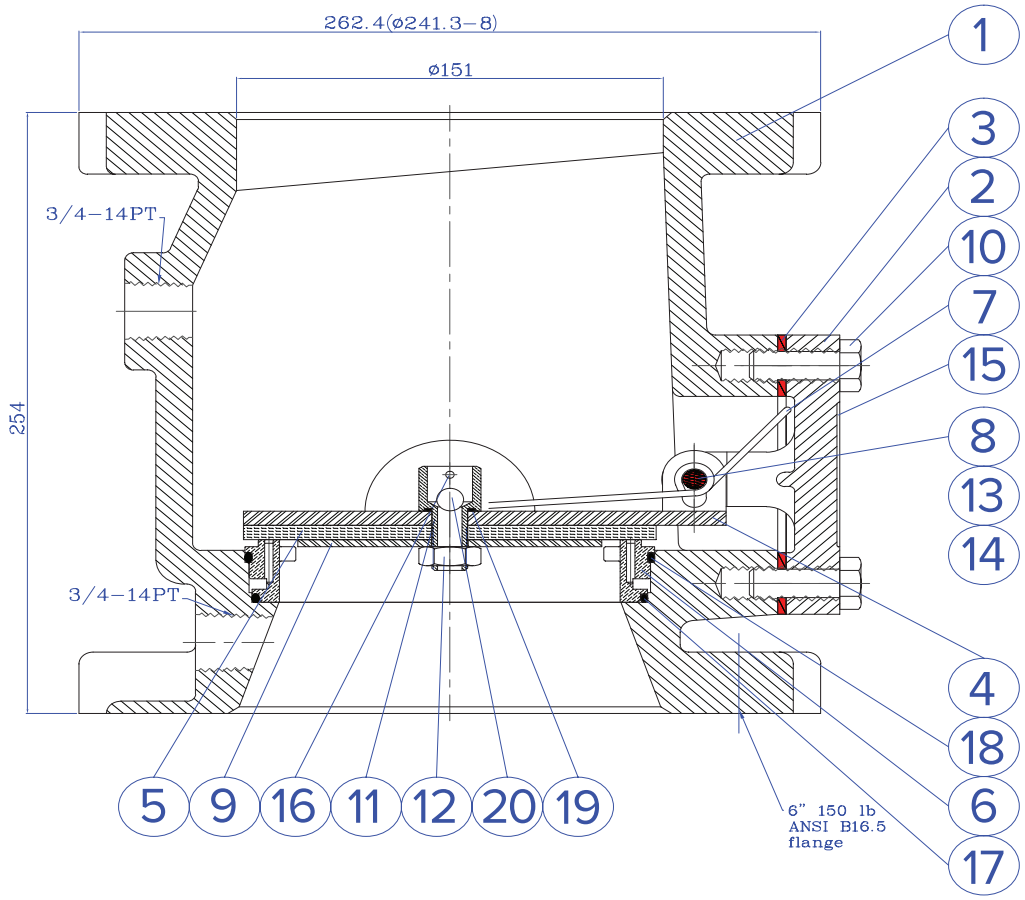
PART LIST - ALARM VALVE (DN100)



No.	Part Name	Material	Standard
1	Body	Grey Cast Iron	ASTM A126 Class A
2	Cover	Grey Cast Iron	ASTM A126 Class A
3	Gasket	Asbestos	5072S
4	Clapper	Stainless Steel	ASTM A276 S30400
5	Seat Seal	Synthetic Rubber	#E701N
6	Seat Ring	Cast Bronze	ASTM B548 C83600
7	Torsion Spring	Stainless Steel	ASTM A276 S30400
8	Hinge Pin	Stainless Steel	ASTM A276 S30400
9	Clamp Ring	Stainless Steel	ASTM A276 S30400

No.	Part Name	Material	Standard
10	Bolt	Mild Steel	ASTM A126 Class A
11	Clapper Bolt	Brass Rod	ASTM A126 Class A
12	Nut	Stainless Steel	5072S
13	Bearing	Brass Rod	ASTM A276 S30400
14	E Snap	Stainless Steel	#E701N
15	Name Plate	Aluminum Strip	ASTM B548 C83600
16	O-Ring G95 (d94.4*W3.1)	Synthetic Rubber	ASTM A276 S30400
17	O-Ring (d98*W3.5)	Synthetic Rubber	ASTM A276 S30400
18	O-Ring P12 (d11.8*W2.4)	Synthetic Rubber	ASTM A276 S30400

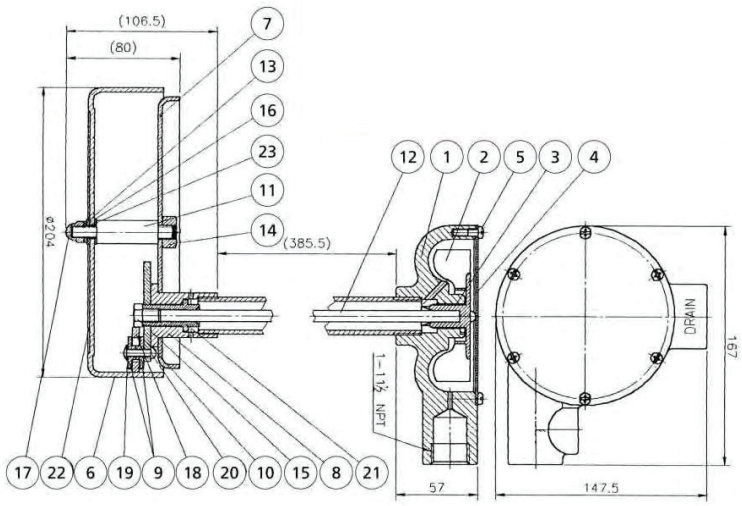
PART LIST - ALARM VALVE (DN150)



No.	Part Name	Material	Standard
1	Body	Grey Cast Iron	ASTM A126 Class A
2	Cover	Grey Cast Iron	ASTM A126 Class A
3	Gasket	Asbestos	5072S
4	Clapper	Stainless Steel	ASTM A276 S30400
5	Seat Seal	Synthetic Rubber	#E701N
6	Seat Ring	Cast Bronze	ASTM B548 C83600
7	Torsion Spring	Stainless Steel	ASTM A276 S30400
8	Hinge Pin	Stainless Steel	ASTM A276 S30400
9	Clamp Ring	Stainless Steel	ASTM A276 S30400
10	Bolt	Mild Steel	ASTM A283 Grade D

No.	Part Name	Material	Standard
11	Clapper Bolt	Brass Rod	ASTM B16 C36000
12	Nut	Brass Rod	ASTM B16 C36000
13	Bearing	Brass Rod	ASTM B16 C36000
14	E Snap	Stainless Steel	ASTM A276 S30400
15	Name Plate	Aluminum Strip	ASTM B209 5052
16	Set Pin (Ø3.2*20L)	Stainless Steel	ASTM A276 S30400
17	O Ring G135 (d134.4*W3.1)	Synthetic Rubber	NBR
18	O Ring (d136.4*W3.5)	Synthetic Rubber	NBR
19	O Ring P12 (d11.8*W2.4)	Synthetic Rubber	NBR
20	Ball (SØ⅜)	Stainless Steel	ASTM A276 S30400

PART LIST - ALARM GONG

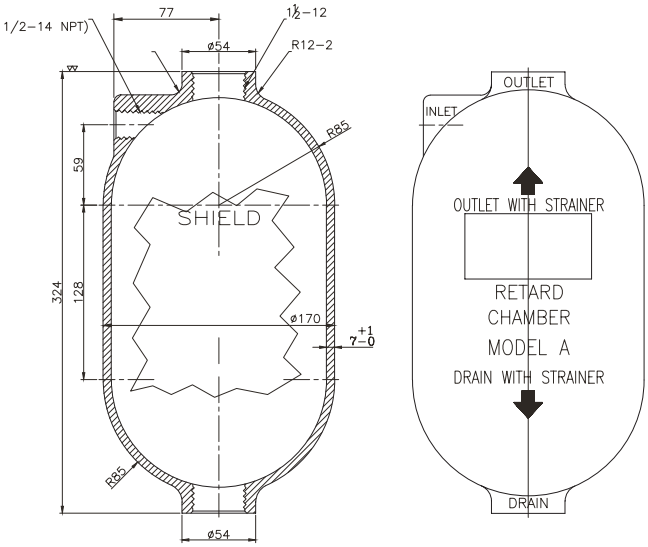


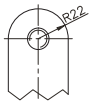
No.	Part Name	Material	Standard
1	Body	Aluminum Alloy	ASTM B26 356.0 T6
2	Impeller	Polyoxymethylene (POM	
3	Retainer	Polyoxymethylene (POM	
4	Clapper	Aluminum Alloy	ASTM B209 6061 T6
5	Cover	Mild Steel	ASTM A283D
6	Matching Screw	Aluminum Alloy	ASTM B209 6061 T6
7	Gong Shell	Aluminum Alloy	ASTM B26 356.0 T6
8	Socket	Aluminum Alloy	ASTM B211 6061 T6
9	Hub	Polyoxymethylene (POM	
10	Flat Bar	Mild Steel	ASTM A283D
11	Spindle	Aluminum Alloy	ASTM B211 6061 T6

No.	Part Name	Material	Standard
12	Drive Shaft	STN Steel	ASTM A313 S30400
13	Washer	Mild Steel	ASTM A283D
14	Nut	Aluminium Alloy	ASTM B211 6061 T6
15	Bolt	Mild Steel	ASTM A283D
16	Washer	Plastic	PE
17	Acorn Nut	Mild Steel	ASTM A283D
18	Striker	Bakelite	– –
19	Washer	Mild Steel	ASTM A283D
20	Spindle	Mild Steel	ASTM A283D
21	Spindle	Polyoxymethylene (POM)	
22	Label	– –	– –
23	Bushing	Plastic	PE

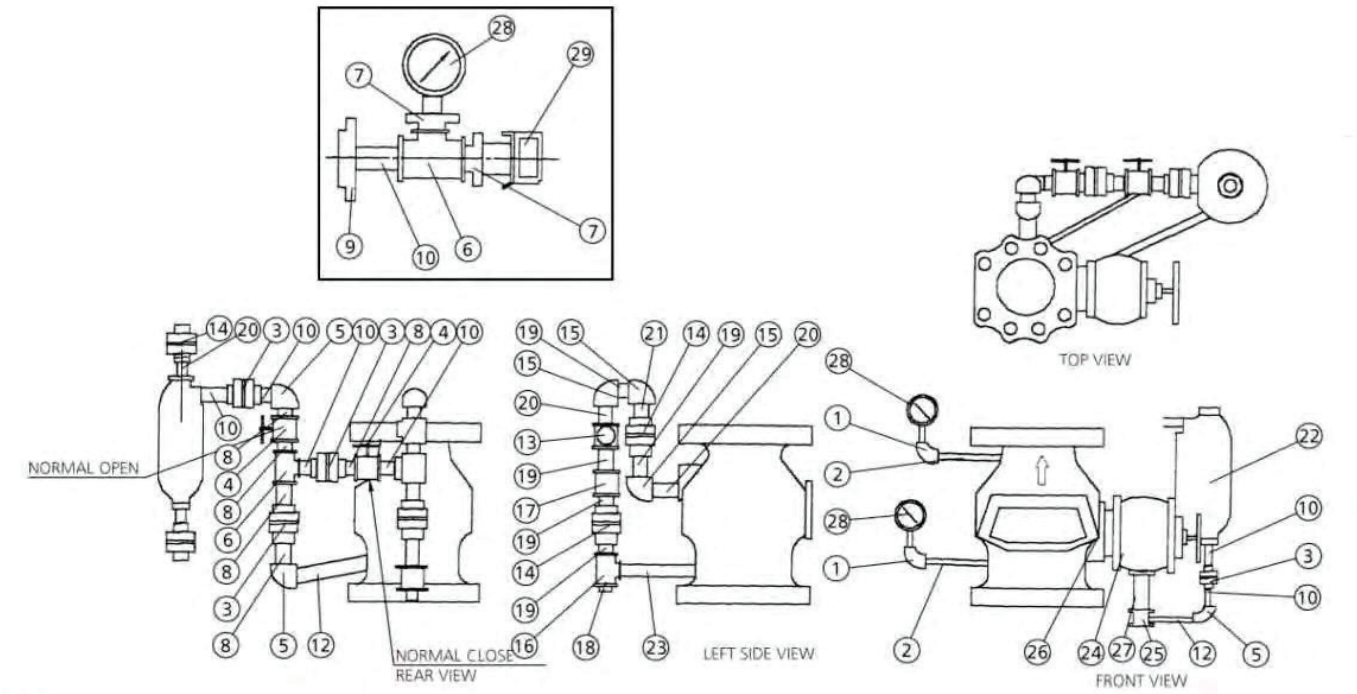
PART LIST - RETARD CHAMBER

No.	Part Name	Material	Standard
1	Body	Cast Iron	ASTM A48





ALARM CHECK VALVE ASSEMBLY



No.	Part Name	Qty.
1	¼" Elbow	2
2	½" 10cm Nipple	2
3	½" Union	4
4	½" Gate Valve	2
5	½" Elbow	3
6	½".½".½" Tee	2
7	½".¼" Bushing	2
8	½" 3cm Nipple	9
9	¾".½" Bushing	1
10	½" 5cm Nipple	6

No.	Part Name	Qty.
11	Water Motor Gong	1
12	½" 18cm Nipple	2
13	¾" Swing Check Valve	1
14	¾" Union	3
15	¾" Union	3
16	¾".¾".¾" Tee	1
17	¾".¾".¾" Tee	1
18	¾" Plug	1
19	¾" 3cm Nipple	6
20	¾" 5cm Nipple	3

No.	Part Name	Qty.
21	¾" 6cm Nipple	1
22	Retard Chamber	1
23	¾" 15cm Nipple	1
24	2" Angle Valve	1
25	2".2".½" Tee	1
26	2" 6cm Nipple	1
27	2" 15cm Nipple	1
28	Pressure Gauge	3
29	Pressure Switch	1

GENERAL

Alarm Check Valve is a waterflow alarm device designed for vertical installation in the main supply to a wet pipe sprinkler system. When a flow of water from the system equals or exceeds that of a single sprinkler, the valve is to actuate a fire alarm.

The alarm may be accomplished in two ways:

- Mechanically by means of a water motor alarm and/or
- A water-pressure-actuated alarm switch (Range 1-10 pressure control) connected to an electrically operated signaling device such as bell or light.

The valve seat is tinned. Only the listed components such as retard chamber, water motor gong (alarm), drain valve and pressure gauges will be used as explained below.

DESCRIPTION / OPERATION

Alarm Check Valve has a grooved tinned bronze seat ring and external by-pass. Bolts used for flanges are carbon steel bolts with 60,000 psi tensile strength, per ASTM A307-91. The Retard Chamber, Water Motor Gong, Pressure Gauge, Drain Valve, Pressure Switch, are operated in a wet pipe sprinkler system like follows:

When the sprinkler system is placed in service, the water is allowed to flow into the system, until the system pressure and the supply pressure are equal. The system pressure, then, causes the rubber-faced clapper of the alarm valve to close tightly on the grooved seat ring. It will remain in this closed position as long as the pressure in the system is equal to or greater than the supply pressure.

In the variable pressure conditions, in service, the pressure on the system, most often, will be found to be greater than the water supply pressure. This condition exists because excess pressure from surges and fluctuations in the water supply is allowed to pass through the external checked by-pass to be trapped in the system above the alarm valve clapper. Normally, then, the clapper will remain in a closed position.

Sometimes, however, sudden surges of greater pressure may cause the clapper to open momentarily, then close. In such instances, when the clapper is open, there will be a limited flow of water through the seat ring opening and into the retard chamber. There, the water can accumulate then drain away without causing a false alarm.

When a sprinkler operates, the resulting water flow relieves the system pressure. The greater supply pressure, then, causes the alarm valve clapper to open, thereby permitting an unobstructed flow of water into the system. At the same time, water flows through the seat ring openings and via alarm line connections into the retard chamber. But now, with the system operating, the clapper remains in an open position and the volume of water flowing through the alarm line is such that the retard chamber drain cannot keep up with the incoming flow. The chamber quickly fills and the water flow continues on to sound the water motor alarm and/or operate the pressure actuated electric alarm switch.

CAUTION

All sprinkler systems contain a certain amount of confined air. It is possible that a pressure surge could compress this air and allow the alarm valve clapper to move off the seat ring. Under some conditions, this could cause false alarm. It is recommended, therefore, that the installer bleed off the confined air and fill the system with water to the fullest extent possible.

CONSTANT PRESSURE

Under normal conditions, the system and the supply pressure will be the same. And since the pressure is constant, there is no need to consider surges and fluctuation. Therefore, a retard chamber is not provided. When a sprinkler operates, the system pressure drops allowing the alarm valve clapper to open. At the same time that water enters the system, it also flows through the seat ring openings and then via the alarm line connections directly to operate the alarm devices.

INSTALLATION

The inlet and outlet of the alarm valve are provided with standard flanges. The water flow of sprinkler system should be cleaned off any dirt and foreign matters such as sands and stones. Check the clapper for room of operation before connecting the alarm valve to the flanged water supply piping.

WARNING

The installation direction must be correct. The arrow direction indicates the direction of water flow, reverse installation is not allowed.

Please follow the below steps to install the by-pass and retard chamber. After installation of alarm valve is completed, please actuate the system in the following order:

1. Close the system control valve
2. Close the alarm control valve.
3. Open the inspectors check valve.
4. Slowly open the system control valve.

WARNING

Be sure to open this valve partially at the start of water flow into the system. Do not fully open at this point; doing so may cause water hammer which could damage the piping and trap large volumes of air within the system.

5. Continue to fill the system until water discharge in stream from the test orifice of the check valve.
6. Close the inspectors check valve.
7. Turn the system control valve to wide open and watch the pressure gauges.

NOTE
The system is full when the reading of the pressure gauges in both sides are same.

8. Conduct main drain valve test to make sure that the water supply is sufficient.
9. Open the alarm control valve.
10. Conduct alarm device test.
11. Seal, lock and secure the system control valve, and the system is now ready for service.
12. If alarms connect to a central station or fire department, notify them that the system is ready for service.

Please contact the manufacturer or his authorized representative for any other unspecified problems which may require some field adjustment.

MAINTENANCE

The maintenance of alarm valves shall be conducted in accordance with requirements described in NFPA 25.

Alarm Valves and its related equipment should be examined periodically to ensure proper operation and trouble free service. Several areas to be routinely inspected are:

CLAPPER FACING

The rubber clapper facing should be checked for wear or damage, and to determine that it is free of dirt and other foreign substance. If found to be worn or damaged (e.g., foreign matters imbedded in the surface), the facing should be replaced. If it is dirty, it should be cleaned, but compounds which could damage the rubber facing must never be used.

SEAT RING

The seat ring should be checked for nicks and for stones, dirt or other foreign matters lodged in the groove or holes. It should be cleaned thoroughly. If the seat ring is found to be severely damaged, the complete alarm valve assembly should be replaced or returned to CHANG DER for possible reconditioning.

BY-PASS CHECK VALVE

The ¾" check valve in the external by-pass should be checked for clapper and seat condition.

RETARD CHAMBER

The outlet plug and drain plug assemblies should be checked for obstructions. The screens should be cleaned thoroughly.

ALARM LINE STRAINER

The ¾" strainer in the alarm line of the constant pressure trim setup should be checked and cleaned thoroughly.
All controlling valves which are normally closed when the alarm valve is in the set position should be checked to be sure that they are fully close and not leaking.

OPERATION INSTRUCTION FOR WATER FLOW ALARM CHECK VALVE SYSTEM

The maintenance of alarm valves shall be conducted in accordance with requirements described in NFPA 25.

1. **TEST BY DELUGE VALVE**
   When open the deluge valve, the alarm valve clapper (main valve seat) open, water supply ½" pipe through top (upper) of retard chamber, as retard chamber filled, water supply to water motor and alarm gong, the alarm rings. The retard chamber have not diaphragm, is an open condition, the retard chamber function is to delay the alarm rings and to avoid any miss rings.
2. **WHEN TEST**
   Open the 2" drain valve, 2" pipe is keep continue draining, supply water will not flow to retard chamber, as above, the clapper open, water flow to alarm gong and alarm rings.
3. **WHEN ONLY TEST THE ALARM GONG**
   ½" gate valve open, water supply to alarm gong, to check if the gong function is in good conditions.
4. **IN NORMAL TIME (ON LINE/ON SERVICE)**
   2" drain valve is normally closed, 2" drain pipe hold open, ½" gate valve normally open, ½" gate valve normally closed.

THE ACTUAL CONDITION AND FUNCTION FOR MAIN PARTS

1. **RETARD CHAMBER**
   The retard chamber role is a delaying device, which make delay for some seconds, for its function, when a fire pump actuating, the alarm system main valve will open and start to supply water, the pressured water will continuing flow into the retard chamber, which make delay some seconds for alarm rings, to avoid for wrong alarm occurs
2. **WATER MOTOR & ALARM GONG**
   The pressured water flow into the water motor, drive to the alarm gong by shaft, strike the striker, make the gong ringing.
3. **PRESSURE SWITCH**
   The pressure switch is normally closed, when subject to a pressured water, the pressure switch actuate to send a signal, it plays the signal start or stop
4. **WHEN ON FIRE**
   When a fire occurs, the deluge valve start operating, the alarm valve open and supply the pressured water into retard chamber and water motor and gong, make the gong rings.