



## Water Motor Alarm Model S450

### GENERAL DESCRIPTION

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The Model S450 Water Motor Alarm is a hydraulically operated outdoor alarm designed for use with fire protection system waterflow detection valves. It is lightweight yet rugged, and it can be used in conjunction with Star alarm check, dry pipe, deluge, and preaction valves to sound a local alarm.

The Water Motor Alarm is suitable for mounting to any type of rigid wall and can accommodate a wall thickness range of 2 to 18 inches (50 to 450 mm). It is provided with a listed and approved Model WM-1 Y-Strainer for use in the alarm line.

The S450 utilizes a high energy efficient, lightweight, impeller design which can produce a very high sound pressure level. The Gong, Gong Mount, and Water Motor Housing are fabricated from corrosion resistant aluminum alloys. The polymer drive bearings do not require lubrication, and the Gong is closely fitted to the Gong Mount to eliminate the need for a separate cover.

#### WARNING

*The Model S450 Water Motor Alarm 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 this device.*

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

### TECHNICAL DATA

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#### Approvals

UL and ULC Listed. FM and LPCB Approved.

#### Working Water Pressure Range

7 to 175 psi (0.5 to 12.1 bar)

#### Nozzle K-Factor

0.7 GPM/psi<sup>1/2</sup> (10.1 LPM/bar<sup>1/2</sup>)

#### Y-Strainer

3/4 inch, cast iron, 20 mesh screen

#### Trim Components

Galvanized steel nipples and cast iron fittings



#5405

### OPERATION

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Upon operation of the alarm check, dry pipe, deluge, or preaction valve to which the Model S450 Water Motor Alarm is connected, water will flow to the Water Motor and through the Inlet Nozzle. As water flows through the Inlet Nozzle, a high velocity jet is formed which impinges on the Impeller, causing the Impeller and the Striker to rotate. With each rotation, the free swinging Striker Ring hits the Gong and sounds the alarm. The spent water is then drained through the 1 inch outlet.

The alarm will sound as long as water is flowing into the system, and may be silenced by closing the alarm control valve provided in the trim of the waterflow detection valve. Water in the alarm line will automatically drain back through the orifice which is also provided in the trim of the waterflow detection valve.

The Water Motor Alarm does not have to be reset after an operation. However, if the alarm was silenced during operation, the alarm control valve must be reopened after the fire protection system is restored to service.

### DESIGN CRITERIA

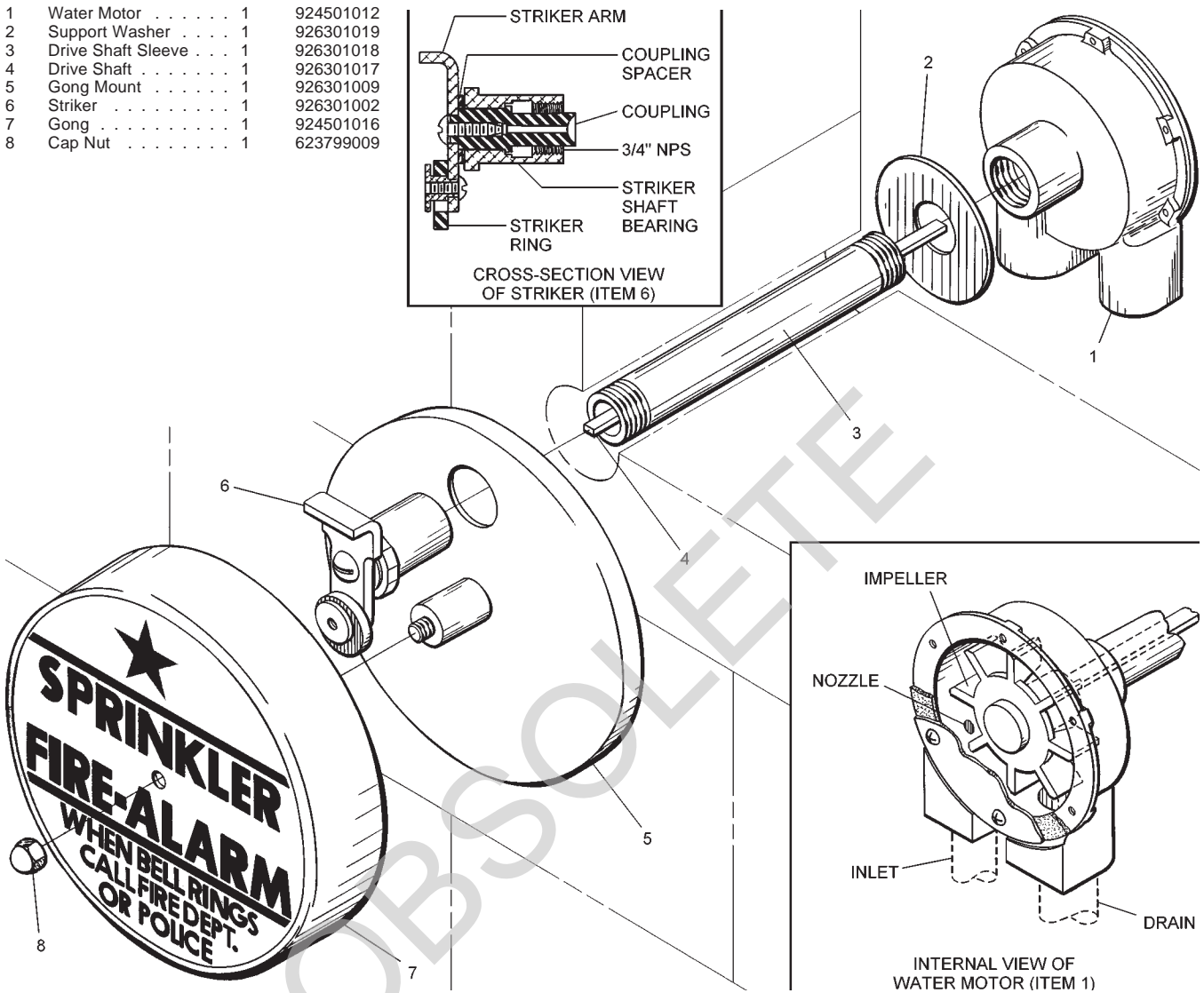
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The Model S450 Water Motor Alarm must be used in accordance with the following design criteria:

1. The Y-Strainer is to be located at the "alarm outlet" of the waterflow detection valve trim.
2. The Water Motor Alarm must only be mounted to a rigid wall surface, which will not permit the Striker/Gong Mount to loosen and fall out of alignment.
3. In order to obtain the highest possible sound level, the Water Motor Alarm should be located as close as possible to the waterflow detecting valve. However, any distance and elevation may be used provided that the minimum desired residual pressure, ref. Figure 3, is provided at the Inlet to the Water Motor.
4. The alarm line piping from the alarm outlet of the waterflow detection valve trim to the Water Motor Alarm must be 3/4 inch size throughout and it must be galvanized steel, brass, or other suitable corrosion resistant material.
5. The alarm line piping must be positioned such that it can be drained back to the water flow detection valve trim.
6. The Clean-Out Sump Plug is to be located vertically below the Inlet to the Water Motor.
7. Piping from the Water Motor Drain must be a minimum

**NO. DESCRIPTION . . . . . QTY. PART**

|   |                              |   |           |
|---|------------------------------|---|-----------|
| 1 | Water Motor . . . . .        | 1 | 924501012 |
| 2 | Support Washer . . . . .     | 1 | 926301019 |
| 3 | Drive Shaft Sleeve . . . . . | 1 | 926301018 |
| 4 | Drive Shaft . . . . .        | 1 | 926301017 |
| 5 | Gong Mount . . . . .         | 1 | 926301009 |
| 6 | Striker . . . . .            | 1 | 926301002 |
| 7 | Gong . . . . .               | 1 | 924501016 |
| 8 | Cap Nut . . . . .            | 1 | 623799009 |



**FIGURE 1  
MODEL S450 WATER MOTOR ALARM**

of 1 inch in size throughout and directed to an open drain, in order to ensure proper drainage for obtaining the maximum sound pressure level.

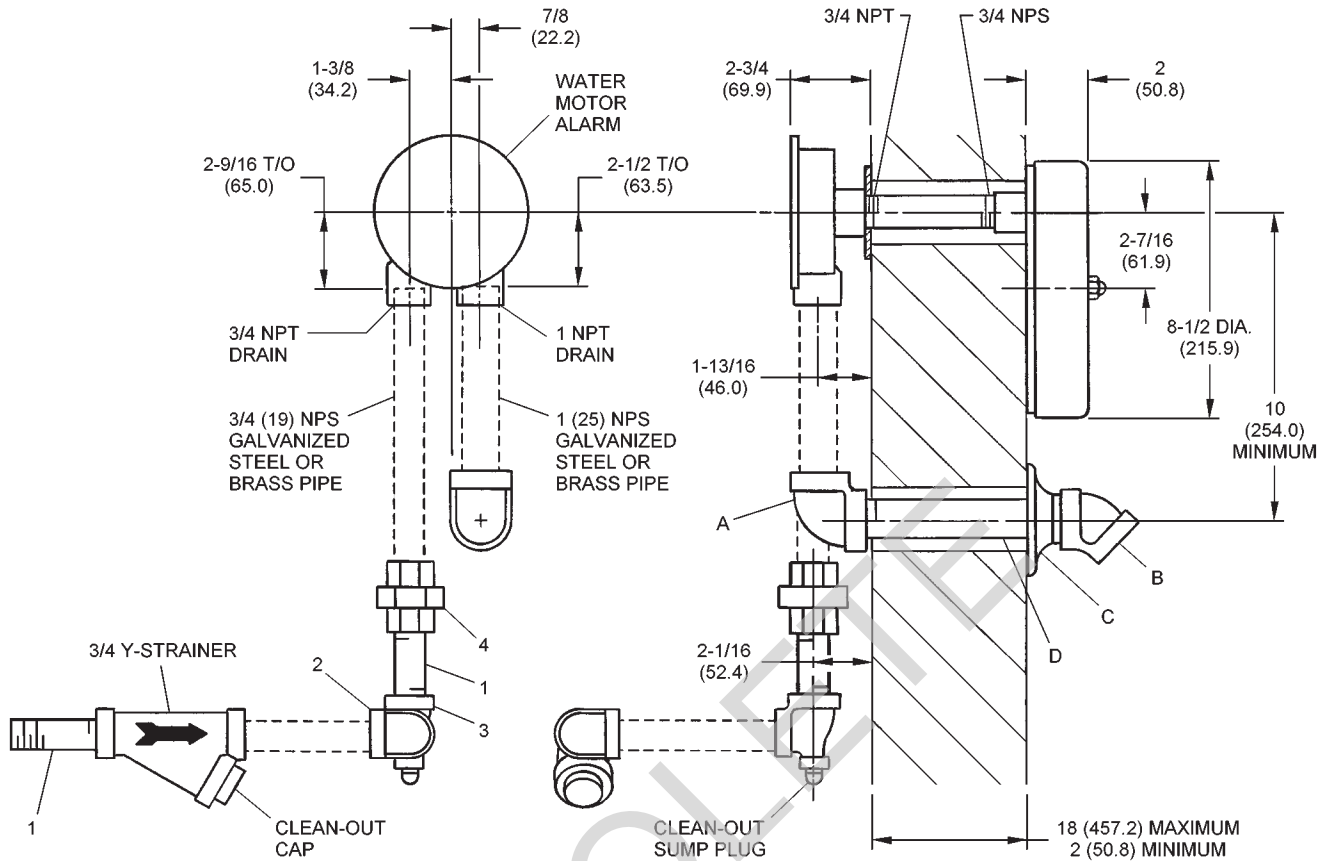
**NOTE**

*The Water Motor Alarm Drain may be connected to the main drain of a water flow detection valve if a non-spring loaded swing type check valve is installed in a horizontal portion of the water motor alarm drain piping (before its connection to the main drain). The 1 inch #460491006 swing check valve is suitable for this purpose.*

- 8. In order to minimize the staining which can be created by drain water, it is recommended that the drain piping from the Water Motor be galvanized steel, brass, or other suitable corrosion resistant material.
- 9. Drain water must be directed such that there will be no

accidental damage to property or danger to persons when the alarm is operating or thereafter.

- 10. The alarm line drain (at the waterflow detection valve) must be maintained at a minimum temperature of 40°F/4°C.
- 11. A single Water Motor Alarm may be connected to the alarm lines from a maximum of three separate fire protection systems. However, when two or three alarm lines are interconnected, each alarm line must be provided with a 3/4 inch #522711001 Model WM-1 Y-Strainer and a 3/4 inch #524031005 Check Valve with 3/32 inch orifice. The strainers must be located at the "alarm outlet" in the trim of each of the waterflow detection valves. The check valves must be located between each strainer and the interconnection with the alarm line from another system.



**NOTES:**

1. All installation dimensions are shown at nominal value.
2. All dimensions are in inches and (mm).
3. Pipe shown in dotted lines is not included with the S450.
4. All trim components are galvanized.

**STANDARD INLET TRIM**

| NO. | DESCRIPTION . . . . .                         | QTY. |
|-----|---|------|
| 1   | 3/4" x 3" Nipple . . . . .                    | 2    |
| 2   | 3/4" 90° Elbow . . . . .                      | 1    |
| 3   | 3/4" x 1/4" x 3/4" Tee w/ 1/4" Plug . . . . . | 1    |
| 4   | 3/4" Union . . . . .                          | 1    |

**OPTIONAL DRAIN TRIM**

| NO. | DESCRIPTION . . . . .             | QTY. |
|-----|-----------------------------------|------|
| A   | 1" 90° Elbow . . . . .            | 1    |
| B   | 1" 45° Elbow . . . . .            | 1    |
| C   | Wall Plate . . . . .              | 1    |
| D   | 1" x 1' - 6" Pipe, T.O.E. . . . . | 1    |

**FIGURE 2  
TYPICAL INSTALLATION OF MODEL S450 WATER MOTOR ALARM**

**INSTALLATION**

The Model S450 Water Motor Alarm must be installed in accordance with the following instructions:

1. Mark the through-wall locations for the centerlines of the Sleeve and Drain Outlet. The Drain Outlet must be located at least 10 inches (250 mm) below the Sleeve per Figure 2.
2. Make 1-1/2 inch (38 mm) diameter holes straight through the wall at both locations.
3. Cut the non-threaded end of the Sleeve to a length equal to that of the wall thickness plus 0 to 1/8 inch (0 to 3 mm). Thread the cut end to 3/4 inch NPT per ANSI B1.20.1.
4. Cut the Drive Shaft to a length equal to the wall thickness plus 1-7/8 to 2 inches (47 to 51 mm). File off all burrs from the cut end of the shaft.

5. Install the alarm line piping up to and including the union half, Item 4 - Fig. 2.

**NOTE**

*Use pipe thread sealant sparingly on male threads only.*

6. Prior to initiating installation of the Water Motor Alarm, mount the Drain Trim (less the Wall Plate and 45° Elbow), as well as the balance of alarm line piping (including other union half) to the Water Motor.
7. Tighten the NPT threaded end of the Sleeve into the Body hand tight plus 1/8 turn.
8. Slip the Support Washer over the Sleeve and place the assembly in position against the wall.
9. Tighten the 3/4 inch Union. Install the Wall Plate and tighten the 45° Elbow.

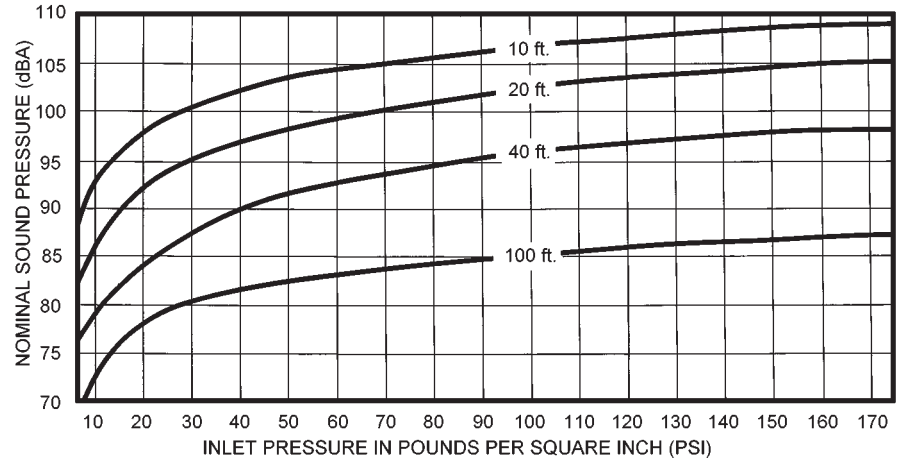
**NOTE**

*Apply pressure against the outside edge of the Water Motor Body and verify that the Body and Support Washer sit square*

**NOTES:**

1. Test performed with background sound pressure level of 55 dBA.
2. Model S450 Water Motor Alarm was mounted 10 feet (3 m) above ground level on 8 inch (200 mm) thick concrete block wall.

**FIGURE 3  
TYPICAL SOUND PRESSURE  
LEVELS IN FRONT OF  
MODEL S450  
WATER MOTOR ALARM**



- against the wall. If not, adjust the alarm line and/or drain piping to suit.
10. From the outside wall, place the Drive Shaft through the Sleeve and insert it into the mating recess in the Impeller until the outside edge of the Drive Shaft is flush with the wall.
  11. Hold the Gong Mount in position against the wall, engage the Coupling with the Drive Shaft and then carefully thread the Striker Shaft Bearing onto the Sleeve. Tighten the Shaft Bearing with a torque of 15 to 20 ft. lbs. (20 to 27 Nm), using a crescent wrench on the 1-1/2 inch (38 mm) hex end.
  12. Spin the Striker by hand and verify that it spins freely (without any sign of binding). If not, make the necessary adjustments.
  13. Install the gong and tighten the Cap Nut with a torque of 10 to 15 ft. lbs. (14 to 20 Nm). The identification sign lettering must be orientated horizontally,
  14. Test the Water Motor Alarm by opening the alarm test valve in the trim of the water flow detection valve. The alarm must be clear and steady. If not, make the necessary adjustments.

**NOTE**

*Testing of the Water Motor Alarm may result in operation of other associated alarms. Consequently, notification must be given to the owner and the fire department, central control station, or other signal station to which the alarms are connected.*

**MAINTENANCE AND SERVICE**

The Model S450 Water Motor Alarm does not require any regularly scheduled maintenance. Rotating parts do not require lubrication. It is recommended, however, that fire alarms be periodically operated, i.e., inspected, to verify that they generate a clear and steady sound. Any impairment must be immediately corrected.

The inspection should be made quarterly or more frequently, as may be necessary in the case of locations subject to vandalism. The Y-Strainer and Sump are to be

cleaned out after each operation of the Water Motor Alarm and after the alarm line piping has been drained.

**NOTES**

*Testing of the Water Motor Alarm may result in operation of other associated alarms. Consequently, notification must be given to the owner and the fire department, central control station, or other signal station to which the alarms are connected.*

*If the alarm was silenced during operation, the alarm control valve must be reopened immediately after the fire protection system is restored to service.*

It is recommended that automatic sprinkler systems be inspected by a qualified Inspection Service.

**ORDERING PROCEDURE**

Please Specify:

1. Model S450 Water Motor Alarm with Model WM-1 Y-Strainer and Standard Inlet Trim (#5405)
2. Model S450 Water Motor Alarm Optional Drain Trim, as necessary (#5407)

Refer to Price List for complete listing of Part Numbers with respect to replacement parts, etc.

**AVAILABILITY AND SERVICE**

Star Sprinkler Inc. products and devices are available worldwide through a network of independent distributors. Please contact Star Sprinkler Inc. for information and the name and address of the Star distributor in your area.

**LIMITED WARRANTY**

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

For further details on Warranty, contact Star Sprinkler Inc.

