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LFD Accuflow™ Low Flow Vane-type Waterflow Detector with Solid State Time Retard

Specifications	
Contact Ratings:	0.6 A @ 125VAC; 2 A @ 30VDC
Triggering Threshold Bandwidth (Flow Rate):	3 gpm maximum
Static Pressure Rating:	450 PSI (Max)
Dimensions, Installed:	3.5"H x 3.0"W x 6.7"D
Operating Temperature Range:	32°F to 120°F (0°C to 49°C)
Compatible Pipe:	See Low Flow models listed below
Shipping Weight:	4 to 7 lb., according to size.
Enclosure Rating:	NEMA Type 4
Voltage Range:	8.4–35 V (DC–FWR); 108–132 VAC
Power Requirements:	300µA at 12 and 24 V (DC–FWR) or 400µA at 120 VAC
U. S. Patent Number:	6,084,521; 3,845,259

Panel Compatibility:

The LFD waterflow indicators may receive power and operate on a two-wire initiating zone of a fire alarm control panel. When determining compatibility of these devices, the standby operating voltage of the control panel must be between 8.5 and 35 volts. In the standby mode, the LFD draws a maximum current of 0.3mA. In alarm, the LFD acts as a short across the initiating zone (similar to a manual fire box). **For two wire conventional fire alarm control panels, not more than 5 waterflow indicators may be connected to a single initiating zone.** The maximum retard/reset time of the waterflow indicator plus the initiating zone shall not exceed 90 seconds.

For two wire addressable control panels, the number of waterflow indicators connected to the panel's signaling line circuit shall be limited only by the circuit's current capacity.

Important

Please Read Carefully And Save

This instruction manual contains important information about the installation and operation of waterflow detectors. Purchasers who install waterflow detectors for use by others must leave this manual or a copy of it with the user.

Read all instructions carefully before beginning. Follow only those instructions that apply to the model you are installing.

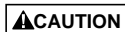


Use vane-type waterflow detectors in wet-pipe systems only. Do NOT use them in dry pipe, deluge, or preaction systems. The sudden inrush of water in such systems may break the vane or damage the mechanism. Do not use in potentially explosive atmospheres. Do not allow unused wires to remain exposed.

Principles Of Operation

Vane-type waterflow detectors mount to water-filled pipes in sprinkler systems. Waterflow in the pipe deflects a vane, which produces a switched output—usually after a specified delay. All waterflow detectors have a controlled delay mechanism. Delays do NOT accumulate; they reset if the flow of water stops before the entire delay has elapsed. All switches actuate when the water flow rate is 3 gallons per minute or greater. This System Sensor installation manual covers the following waterflow detectors for sprinkler/fire alarm applications.

Low Flow Models	Nominal Pipe O.D.	Nominal Wall Thickness
LFD20	2" (60.3mm)	3.9mm to 4.5mm
LFD25-73MM	2-1/2" (73.0mm)	4.8mm to 5.2mm
LFD25-76MM	2-1/2" (76.0mm)	4.3mm to 4.7mm
LFD30-2	3" (88.9mm)	5.0mm to 5.6mm
LFD40	4" (114.3mm)	5.4mm to 6.4mm



The LFD models are approved for use on stainless steel and brass pipe only.

Do NOT use any of the LFD models on any other pipe materials.

Do NOT install steel or iron pipe sections in copper piping for mounting a waterflow detector. Incompatibility between the dissimilar metals causes bimetallic corrosion.

Installation Guidelines

Before installing any waterflow alarm device, be thoroughly familiar with:

- NFPA 72: *National Fire Alarm Code*
- NFPA 13: *Installation of Sprinkler Systems*
- NFPA 25: *Inspection, Testing and Maintenance of Sprinkler Systems*
- NFPA 750: *Water Mist Fire Protection Systems*

Other applicable NFPA standards, local codes, and the requirements of the authority having jurisdiction

NOTE: Installation methods other than those listed in this installation manual may prevent the device from reporting the flow of water in the event the associated sprinkler system is activated by a fire. System Sensor is not responsible for devices that have been improperly installed, tested, or maintained.

1. Mount the detector where there is adequate clearance for installation and removal and a clear view of it for inspections. See Figure 1 for mounting dimensions.
2. Locate detector 6 to 7 ft. above the floor to protect from potential damage.
3. On horizontal runs, position the detector on the top or side of the pipe. Do not mount it upside down because condensation may collect in the housing and impair the operation of the detector. For vertical flow applications, mount the detector on pipe through which water flows upward. Otherwise, the unit may not operate properly.
4. Mount the detector at least 6 inches from a fitting that changes the direction of water flow and no less than 24 inches from a valve or drain.
5. Be sure the direction-of-flow arrow matches the direction of flow in the pipe.

Mounting Instructions

1. Drain the pipe.
2. Cut a hole at the desired location. Center the hole in the pipe, as shown in Figure 2, and be sure the hole is perpendicular to the center of the pipe. Before drilling, use a punch or scribe to mark the drill site to prevent the bit from slipping. If the hole is off center, the vane will bind against the inside wall of the pipe. Use a drill or hole saw to cut a hole of the proper diameter. See Table 1 for hole size.



When drilling the hole with a hole saw, make certain that the center of the cut does not remain in the pipe.

3. Remove burrs and sharp edges from the hole. Clean and remove all scale and foreign matter from the inside of the pipe for one diameter on each side of the hole to ensure free movement of the vane. Clean the outside of the pipe to remove dirt, metal chips, and cutting lubricant.

4. Seat the gasket against the saddle and mount the detector directly to the pipe. Carefully roll the vane opposite the direction of flow and insert it through the hole. Seat the saddle firmly against the pipe so that the locating boss goes into the hole.
5. Install the U-bolt, tightening the nuts alternately to ensure a uniform seal. See Table 2 for torque values.
6. Remove the metal cover with the tamper-proof wrench provided. Move the actuator lever back and forth to check for binding. If the vane binds, remove the detector and correct the cause before proceeding.

Pre-operation

Fill the sprinkler system and check for leaks around the waterflow detector. If it leaks, first check for the proper torque on the U-bolt nuts. If the leak persists, drain the system and remove the detector (refer to Maintenance). Check for dirt or foreign objects under the gasket, and make sure that the pipe surface is not dented. Reinstall the detector and check again for leaks. Do not proceed until all leaks have been stopped.

CAUTION

Be sure the direction-of-flow arrow points in the right direction or else water flow will go unreported. See Figure 9.

Wiring

WARNING

High Voltage. Electrocutation Hazard. Do not handle live AC wiring or work on a device to which AC power is applied. Doing so may result in injury or death.

1. All models have two wires and two sets of terminals.
 - Relay Wires (W1 & W2 designated on PCB):** These wires are connected to a latching normally open (as in No Flow) relay contact. They are isolated from all electronics. They will close and cause a short when water flows and the retard time elapses. They will remain shorted until waterflow stops. Once waterflow stops, these contacts will re-open.
 - Power Terminals (T2 designated on PCB):** This is a two screw terminal block. The Accuflow gets its power from these terminals. These terminals must have voltage present from the FACP or other suitable source of power before anything will work. If no power is present, the Accuflow will not provide proper alarm signals. These terminals will accept power in any polarity as well as AC-line power.
 - Aux Relay Terminals (T1 designated on PCB):** This is a THREE screw terminal block. These terminals are connected to a latching Form C relay. In no flow conditions, COM is connected to A. When flow is detected COM will disconnect from A and connect to B. This relay will latch in that state and reset after water stops flowing.
2. Adjust Dip Switch to desired time delay. See Figure 11. For Dip Switch location, see Figure 9.
3. When connected to a listed sprinkler/fire alarm control panel, the initiating circuit must be nonsilenceable.
4. A ground screw is provided with all waterflow detectors. When grounding is required, clamp wire with screw in hole located between conduit entrance holes. See Figure 10A, page 4.
5. If a second conduit entry is required, remove the knockout plug using a flat blade screwdriver as shown on Figure 10B, page 4. Strike sharply with a hammer to pierce the wall of the knockout plug. Move to an adjacent wall section and repeat until the plug falls out. Make sure that the waterflow detector is supported adequately during this operation to avoid injury.

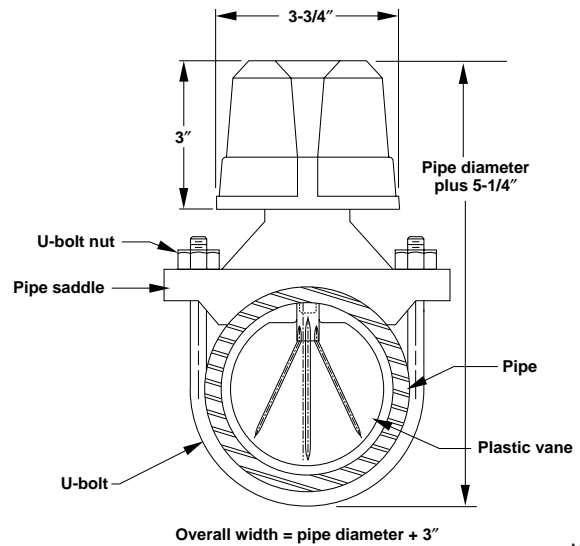
NOTE: Power terminals must be connected to FACP or other non-silenceable initiating circuit.

Operation Testing

Always notify a central station monitoring waterflow alarms before repairing, maintaining, or testing waterflow alarm devices.

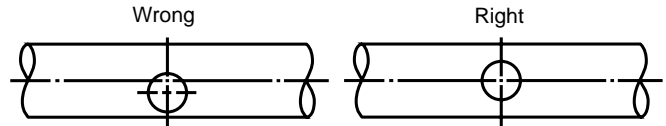
1. Replace the cover and tighten the tamper proof screws with the tamper proof wrench. Store the wrench in a secure place.
2. Open the inspector's test valve and time how long it takes for the detector to indicate a flow condition. The detector should remain activated until the inspector's test valve is closed. Air pockets in the sprinkler system may increase the apparent delay.

Figure 1. Mounting dimensions:



A78-1609-00

Figure 2. Mounting hole location:



A78-1496-07

Table 1:

LFD MODEL	Hole Size
20, 25-73mm, 25-76mm	1-1/4"
30-2, 40	2"

Table 2:

LFD MODEL	Torque
20, 25-73mm, 25-76mm	30 - 35 ft-lb
30-2, 40	55 - 60 ft-lb

Maintenance

To prevent accidental water damage, control valves should be shut tight and the system completely drained before waterflow detectors are removed or replaced.

Inspect detectors monthly for leaks and replace if a leak occurs. Test detectors at least monthly, as described under Operational Testing, to ensure proper operation. Test more often if required by the authority having jurisdiction.

Under normal conditions, System Sensor waterflow detectors should provide years of trouble-free service.

Do not repair or replace any other waterflow detector components. If any other part of the detector does not perform properly, replace the entire detector. Failure to follow this instruction may result in failure of the detector to report the flow of water.

To remove a detector:

1. Drain the pipe.
2. Turn off electrical power to the detector and disconnect the wiring.
3. Loosen the nuts and remove the U-bolts.
4. Gently lift the saddle far enough to get your fingers under it. Then, roll the vane so it will fit through the hole while continuing to lift the waterflow detector saddle.
5. Lift the detector clear of the pipe.

CAUTION

If a vane breaks in a pipe, find and remove it. If it is not removed, the vane may restrict the flow of water to all or part of the sprinkler system.

Figure 3. Wiring LFD to bell:

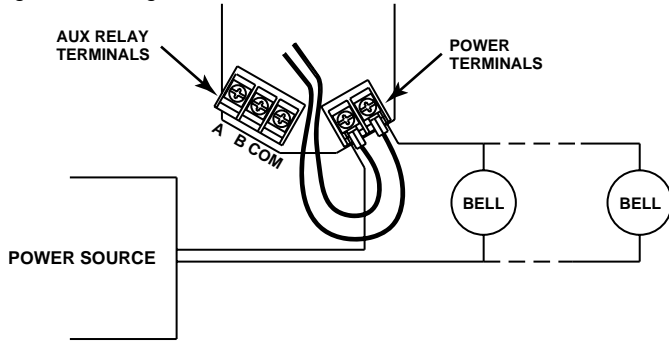


Figure 4. (4 Wire Addressable) Wiring the LFD to an addressable panel using an auxiliary power supply for power: Remove the Relay Wires from under the Power Terminals. Connect these wires to the Addressable Module.

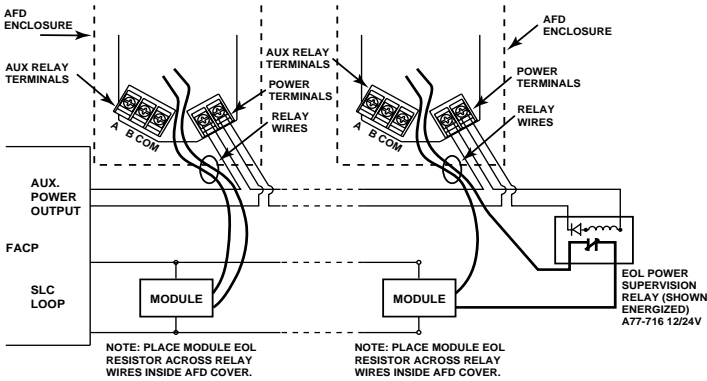
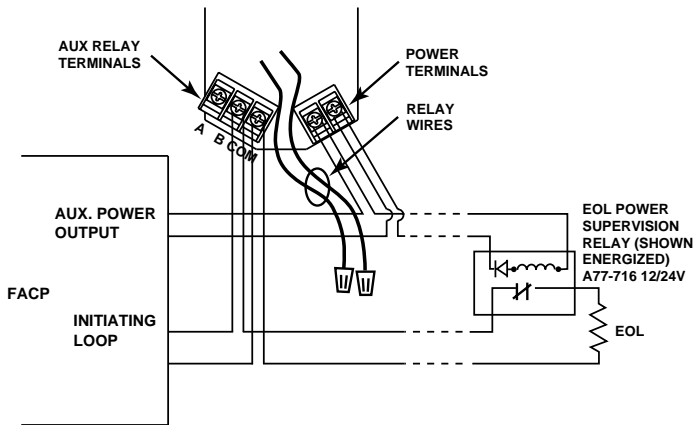
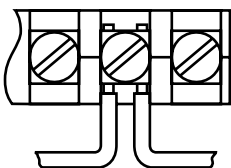


Figure 5. Wiring the LFD using 4 wires. (Aux. Power from Panel): Remove the Relay Wires from the Power Terminals. Cut off the spade lugs from the ends of the Relay Wires. Put wire nuts over ends of Relay Wires as shown. Use Aux. Relay Terminals to make connection to panel and next device as shown..



NOTE: To comply with NFPA code, never put more than two wires in a wire nut.



Break wire as shown for supervision of connection. DO NOT allow stripped wire leads to extend beyond switch housing. Do NOT loop wires.

Figure 6. Wiring the LFD to a panel:

Leave the Relay wires installed under the Power Terminals and connect the panel initiating loop wires as shown below.

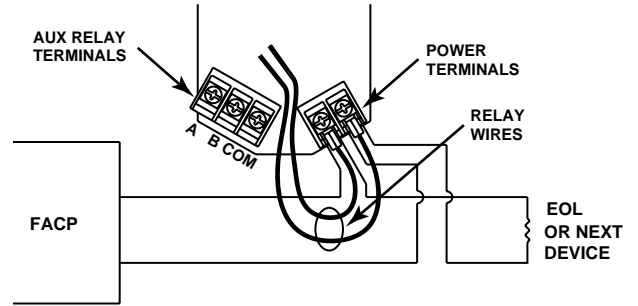


Figure 7. Wiring the LFD to a panel and other device:

Leave the Relay Wires installed under the Power Terminals and connect the panel initiating loop wires as shown below.

NOTE: The LFD requires power to operate, therefore connect the FACP initiating loop wires to the Power Terminals and Relay Wires as shown. If power should be interrupted before the panel, the batteries in the panel will maintain power to the LFD.

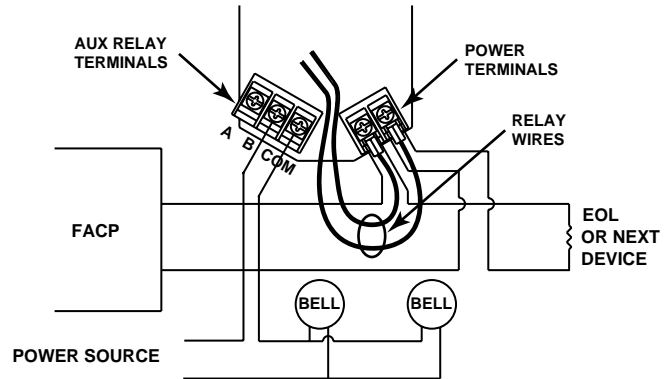
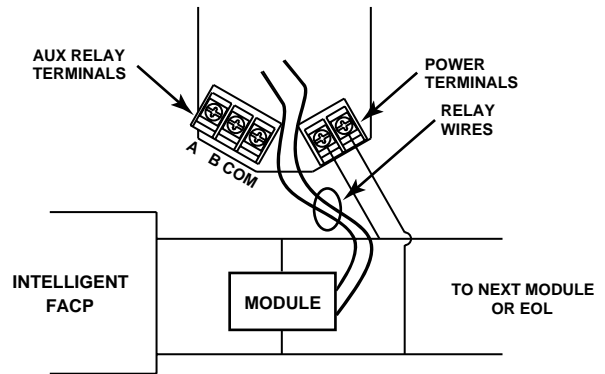


Figure 8. (2 Wire Addressable) Wiring the LFD to an addressable panel using the SLC loop wires for power:

Remove the Relay Wires from under the Power Terminals. Connect these wires to the Addressable Module.



CAUTION

Relay wires and power terminal wiring must be contained within either a common enclosure or enclosures within 20 feet of each other with wiring inside conduit.

Figure 9. Assembly diagram:

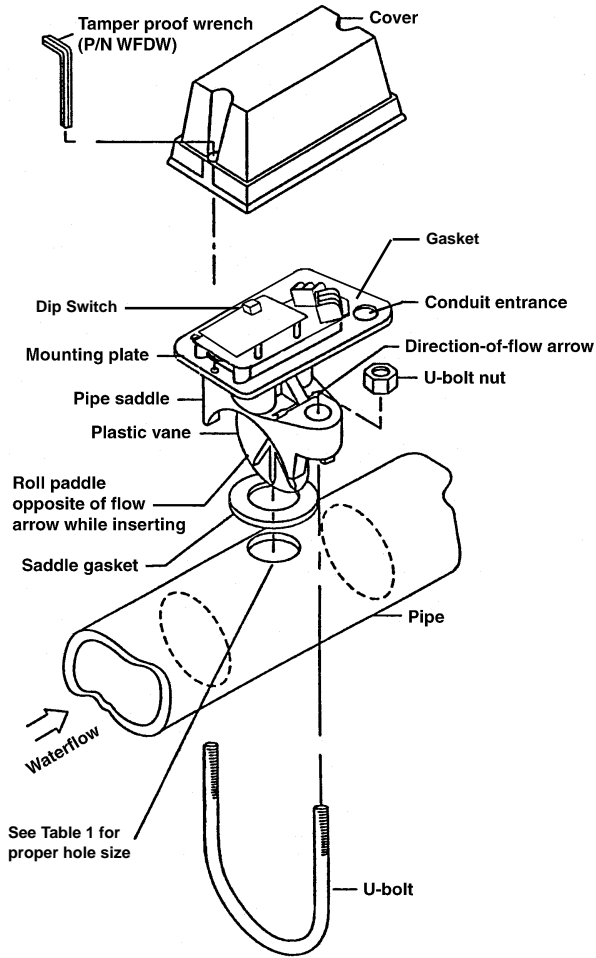
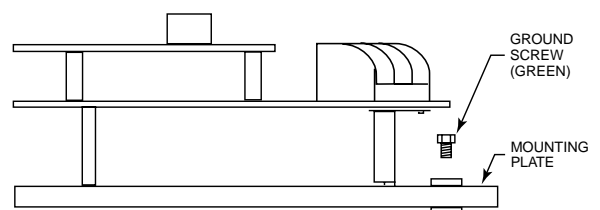
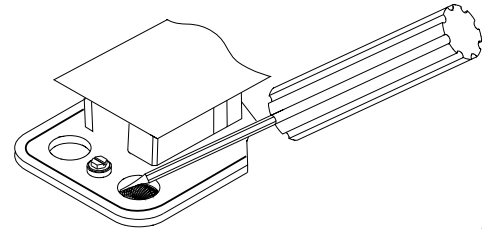


Figure 10A. Ground screw location:



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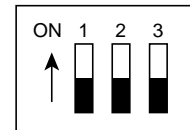
Figure 10B. Knockout plug removal:



A78-1914-04

Figure 11. Solid State Retard Timing Chart:

Time (sec)	Switch 1 (60 sec)	Switch 2 (30 sec)	Switch 3 (15 sec)
0	OFF	OFF	OFF
15	OFF	OFF	ON
30	OFF	ON	OFF
45	OFF	ON	ON
60	ON	OFF	OFF
75	ON	OFF	ON
90	ON	ON	OFF



CAUTION: Only use the above timer settings.
Timing must not exceed 90 seconds.

Please refer to insert for the Limitations of Fire Alarm Systems

⚠ WARNING

The Limitations of Waterflow Alarm Devices

1. Waterflow detectors may not work or operate properly if sprinkler piping being monitored is plugged with pipe scale, mud, stones or other foreign material. Sprinkler systems should be checked regularly for such blocking material, following the instructions of NFPA Standard 13 and NFPA 750.
2. Alarms generated by the activation of waterflow detectors may not be received by a central station if telephone or other communication lines to the detector are out of service, disabled, or open.
3. Vane-type waterflow detectors have a normal service life of 10-15 years. Hard water systems, however, may reduce waterflow detector service life to 4 or 5 years.
4. Waterflow detectors are not a substitute for insurance. Building owners should always insure property and lives being protected by sprinkler systems.
5. If valves controlling the water supply to a sprinkler system are closed, vane-type waterflow detectors will not work. All valves controlling a sprinkler water supply should be sealed or locked in the normally open position. The normally open position should be monitored by a sprinkler supervisory switch.

Three-Year Limited Warranty

System Sensor warrants its enclosed waterflow detector to be free from defects in materials and workmanship under normal use and service for a period of three years from date of manufacture. System Sensor makes no other express warranty for this waterflow detector. No agent, representative, dealer, or employee of the Company has the authority to increase or alter the obligations or limitations of this Warranty. The Company's obligation of this Warranty shall be limited to the repair or replacement of any part of the waterflow detector which is found to be defective in materials or workmanship under normal use and service during the three year period commencing with the date of manufacture. After phoning System Sensor's toll free number 800-SENSOR2 (736-7672) for a Return Authorization number, send defective units postage prepaid to: System Sensor,

Repair Department, RA # _____, 3825 Ohio Avenue, St. Charles, IL 60174. Please include a note describing the malfunction and suspected cause of failure. The Company shall not be obligated to repair or replace units which are found to be defective because of damage, unreasonable use, modifications, or alterations occurring after the date of manufacture. In no case shall the Company be liable for any consequential or incidental damages for breach of this or any other Warranty, expressed or implied whatsoever, even if the loss or damage is caused by the Company's negligence or fault. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This Warranty gives you specific legal rights, and you may also have other rights which vary from state to state.