

## INSTALLATION AND MAINTENANCE INSTRUCTIONS



# WFDNFT Vane-type Waterflow Detectors

### SPECIFICATIONS

Contact Ratings:	Two sets of SPDT (Form C); 10 A @ 125/250 VAC ; 2.5 A @ 12/24 VDC
Triggering Threshold Bandwidth (Flow Rate):	4 - 10 GPM
Static Pressure Rating:	175 PSI (Max.)
Dimensions, Installed:	WFDNFT - 4 in H x 3 1/2 in W x 6 3/4 in D
Operating Temperature Range:	32°F to 150°F (0°C to 66°C)
Enclosure Rating:	WFDNFT - NEMA 4/IP54, as tested by Underwriters Laboratories, Inc. (UL)

The WFDNFT can be installed between 2x4 stud wall construction.

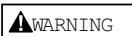
### IMPORTANT

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.



The model WFDNFT is a vane-type waterflow detector for use in wet-pipe fire sprinkler systems only. Vane-type waterflow detectors shall not be used as the sole initiating device in both deluge and preaction systems; waterflow detectors used in these types of systems may result in an unintended discharge caused by a surge, trapped air or a short retard time.



Installation must be performed by qualified personnel and in accordance with all national and local codes and ordinances.

Shock hazard: Disconnect power source before servicing. Serious injury or death could result.

Risk of explosion: Not for use in hazardous locations. Serious injury or death could result.

### PRINCIPLES OF OPERATION

Vane-type waterflow detectors mount to water filled pipes in fire sprinkler systems. Waterflow in the pipe deflects a vane. Deflection of the vane produces a switched output, usually after a specified delay.

All WFDNFT detectors have a pneumatically controlled mechanical delay mechanism. Delays do NOT accumulate; they reset if the flow of water stops or drops below minimum triggering flow rate before the entire delay has elapsed. All detectors will activate on a sustained flow of water of 10 gallons per minute (gpm) or greater downstream of the device.

### COMPATIBLE PIPE TEES/RISERS

The WFDNFT is supplied with 12 paddles. One paddle is provided for each size of tee. See Figure 1 and approximate tee depth chart. Each paddle has an indication that shows the pipe size and type of tee to be used.

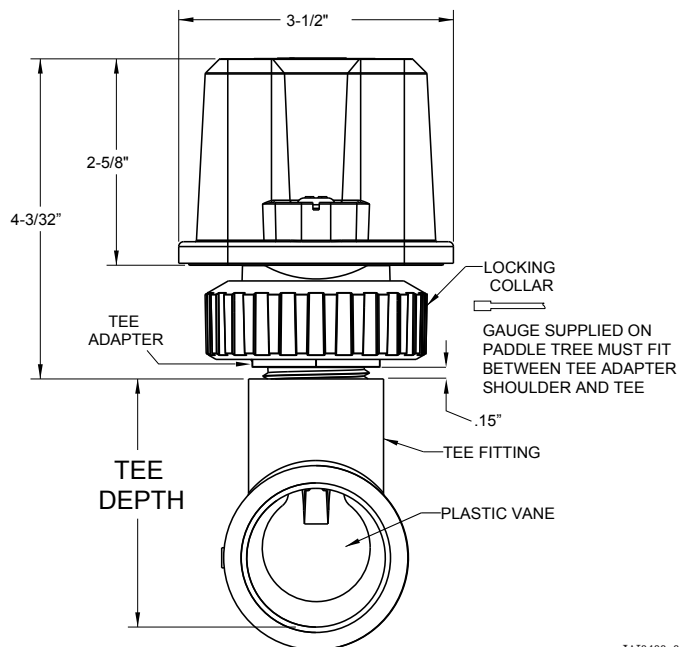
### INSTALLATION GUIDELINES

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

- NFPA 72: National Fire Alarm Code
- NFPA 13: Installation of Sprinkler Systems
- NFPA 13D: Standard for 1 and 2 Family Dwellings and Manufactured Homes
- NFPA 13R: Standard for Multi-family Dwellings

Also, follow other applicable NFPA standards, local codes and the requirements of the authority having jurisdiction. Failure to follow these directions may result in failure of

**FIGURE 1. MOUNTING DIMENSIONS AND APPROXIMATE TEE DEPTH REQUIREMENTS**



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### APPROXIMATE TEE DEPTH REQUIREMENTS

TEE SIZE	Steel/ Brass Threaded	Copper* Sweat	CPVC NIBCO	CPVC SPEARS w/Metal Band	CPVC SPEARS w/ Brass Insert	CPVC TYCO
1 X 1 X 1"	2 1/8"	1 3/4"	2 1/8" (1)	2 3/32" (1)	2 1/2" (2)	2 3/4" (3)
1 1/4 X 1 1/4 X 1"	2 1/2"	2 1/8"	N/A	N/A	N/A	N/A
1 1/2 X 1 1/2 X 1"	2 3/4"	2 1/4"	N/A	3" (4)	N/A	N/A
2 X 2 X 1"	3 1/4"	2 3/4"	N/A	N/A	N/A	N/A

- (1) Use paddle marked 1" CPVC; (2) Use paddle marked SPEARS 1" CPVC;
- (3) Use paddle marked TYCO 1" CPVC; (4) Use paddle marked 1 1/2" CPVC

This waterflow detector has been evaluated for use with UL Listed CPVC fittings manufactured by the following companies: Tyco, Nibco and Spears Manufacturing Company. The Model WFDNFT is required to be installed in accordance with the Listing limitations specified by the manufacturer of the tee fitting.

\*See UL Listing Limitations on page 4.

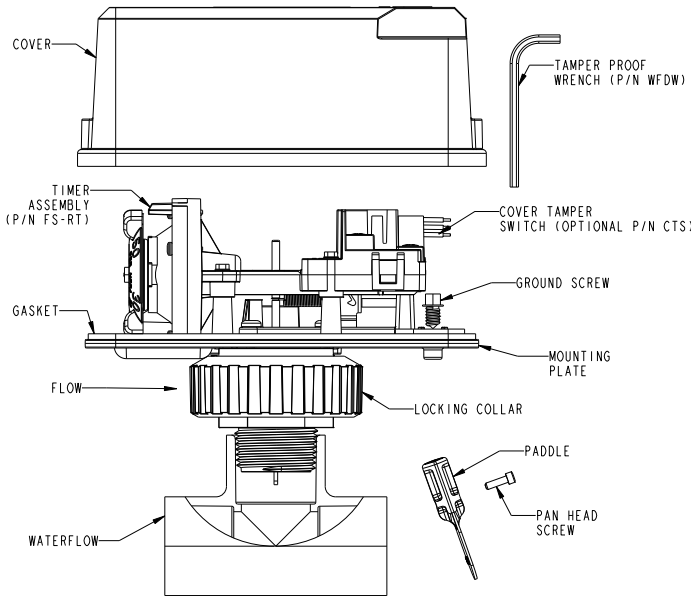
the device to report a waterflow condition. Safe Signal is not responsible for devices that have been improperly installed, tested or maintained.

1. Mount the detector where there is adequate clearance for installation and removal and a clear view of it for inspection. See Figure 1 for mounting dimensions.
2. Locate the detector 6 to 7 feet above the floor to protect from accidental damage.
3. On horizontal runs, position the detector on 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 detector on pipe where upflow conditions exist. Failure to do so may prevent unit from operating properly.

4. Mount detector at least 6 inches from a fitting which changes the direction of the waterflow, or no less than 24 inches from a valve or drain.
5. BE SURE DIRECTION-OF-FLOW ARROW AND DIRECTIONAL COVER MATCHES ACTUAL DIRECTION OF FLOW IN THE PIPE. See Figure 5.

**FIGURE 2. ASSEMBLY DIAGRAM**



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**MOUNTING INSTRUCTIONS**

1. The WFDNFT waterflow detector is designed to only the appropriate tee fitting. NOTE: The outlet branch of the tee must have a 1-inch NPT thread. DO NOT use a reducer to achieve the correct thread size. Failure to follow this instruction will result in failure of the detector to report a waterflow condition.
2. WFDNFT units are shipped without paddles mounted to the actuator. Select the correct size paddle for the type of tee being used. Align the hole on the stem of paddle with hole on the actuator lever. Fasten together using the supplied screw. See Figure 2. Use only the screw provided with the unit. Drive screw head through hole in paddle until it seats to the actuator lever surface. No washer is required.
3. Apply up to two turns of teflon tape to the 1" NPT thread to help prevent leaks. Install the adapter between one and two turns past hand tight. A 1" pipe plug combined with a 1" NPT tee can be used to tighten the adapter. Use the supplied gauge to verify a minimum of .15" clearance between the tee adapter shoulder and tee. The flat side of the gauge must be able to fit in the gap between the tee adapter and tee. See Figure 1.
4. Carefully roll the vane opposite the direction of flow and insert through tee. Insert the O-ring into the groove in the internal adapter under the locking collar. Hand tighten the locking collar to the tee adapter making sure the detector is aligned parallel to the pipe. When correctly installed, the detector must face in the proper direction of waterflow and be aligned with the pipe. The provided directional cover illustrates flow direction for the detector.
5. Remove the cover. Move the actuator lever back and forth to check for binding. If the vane binds, remove the detector and correct the problem before proceeding.

**CAUTION**

Avoid using a pipe wrench to tighten the locking collar. Over-torquing the locking collar may cause damage to the detector. If additional tightening past hand tight is required on the collar, use of a band wrench is recommended to protect collar surface, not to exceed hand tight plus 1 notch on collar.

Be sure the direction-of-flow arrow and directional cover point in the right direction, otherwise a waterflow condition will go unreported. See Figure 2 and Figure 5.



**PREOPERATION TESTING**

1. After all fittings have had the manufacturer's recommended curing time, fill the sprinkler system with water and check for leaks around the detector. If there is a leak, check to see that the fittings are tight. If the leak persists, drain the system and remove the detector (see removal instructions under Maintenance). Check for damage or cracked fittings. Reinstall the detector and check again for leaks. Do not proceed until all leaks have been stopped.
2. Connect an ohmmeter or continuity tester across (COM and B-NO) terminal switch contacts. The ohmmeter should show an open circuit, no continuity.
3. Deflect the actuator lever and hold it until the pneumatic delay shaft releases the switch buttons. The ohmmeter or continuity tester should show a short circuit after the delay has elapsed. If there is no delay, check the setting of the delay adjustment dial.

**FIELD WIRING**

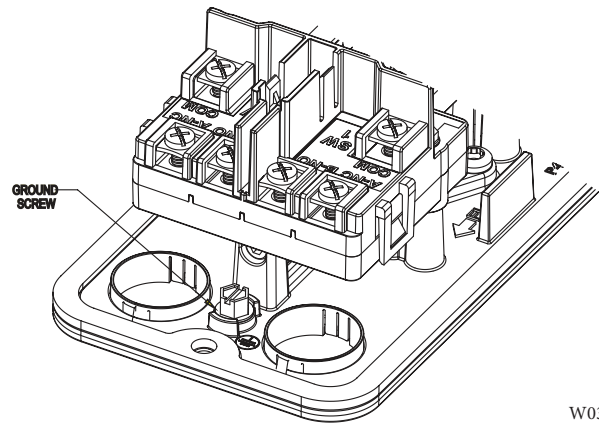
**WARNING**

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 severe injury or death.

When utilizing switches at voltages greater than 74VDC  or 49VAC  means to provide all-pole disconnection must be incorporated in the fixed wiring, such as a circuit breaker.

1. The WFDNFT has two SPDT switches. Switch contacts (COM and B-NO) are closed when water is flowing and open when water is not flowing. Connect the switches as shown in Figure 6 depending on the application.
2. When connected to a listed sprinkler/fire alarm control panel, the initiating circuit must be unable to be silenced.
3. A ground screw is provided with all units. When grounding is required, clamp wire with screw in hole located between conduit entrance holes. See Figure 3.
4. Use proper waterproof conduit fittings where required. Ensure both conduit entries are properly sealed to avoid debris entering the detector.

**FIGURE 3. GROUND SCREW**



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**MECHANICAL DELAY ADJUSTMENT**

The pneumatic delay is preset at approximately 30 seconds at the factory. To adjust the delay, turn the adjustment dial on the delay mechanism. Turn clockwise to increase the delay, counterclockwise to decrease the delay. Delay can be adjusted over a range from 0-90 seconds maximum. See Figure 4. As a point of reference when setting time delay in dark environments the notch in the dial indicates an approximate 30 second time delay and the larger of the three tabs indicates an approximate 60 second time delay.

NOTE: Set the delay to the minimum required to prevent false alarms due to flow surges.

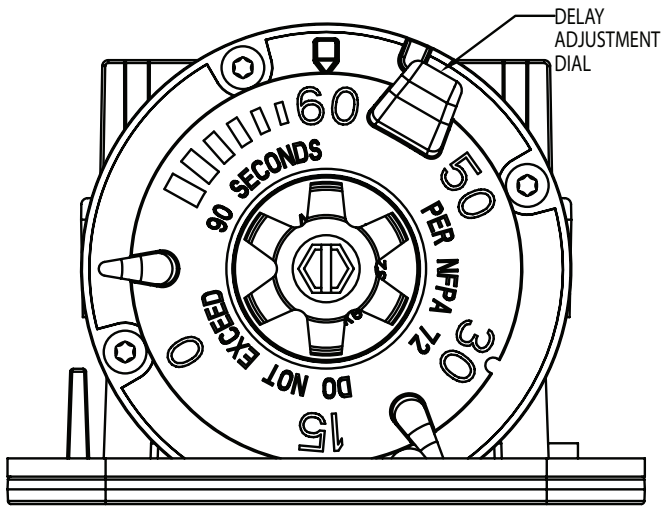
After extended service, parts of the detector may become worn reducing the time delay and causing false alarms. If this happens, increase the delay. If the delay is already at maximum, replace the mechanical delay assembly. Refer to Maintenance section for ordering replacement parts.

**OPERATIONAL TESTING**

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

1. Replace the cover and tighten the security 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 time delay.

**FIGURE 4. DELAY ADJUSTMENT DIAL**



NOTE: RETARD TIME MAY EXCEED 90 SECONDS. ADJUST AND VERIFY THAT TIME DOES NOT EXCEED 90 SECONDS. NUMBER ON DIAL IS APPROXIMATE TIME DELAY IN SECONDS

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**MAINTENANCE**

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

Inspect detectors in accordance with applicable NFPA codes and standards and/or the authority having jurisdiction for leaks and replace if leaks occur. Test detectors at least quarterly as described under Operational Testing to insure proper operation. Test more often if required by the authority having jurisdiction.

Under normal conditions Safe Signal waterflow detectors should provide years of trouble-free service. However, if the delay mechanism becomes faulty, a replacement kit is available. To replace the delay mechanisms, request Part No. FS-RT. Complete instructions are enclosed with replacement parts. The delay mechanism can be easily replaced without removing the detector from the pipe or draining the pipe. Refer to procedure below for removal of detector on pipe. Do not repair or replace any other waterflow detector components in the field. 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 a waterflow condition.

Proceed as follows to remove a detector.

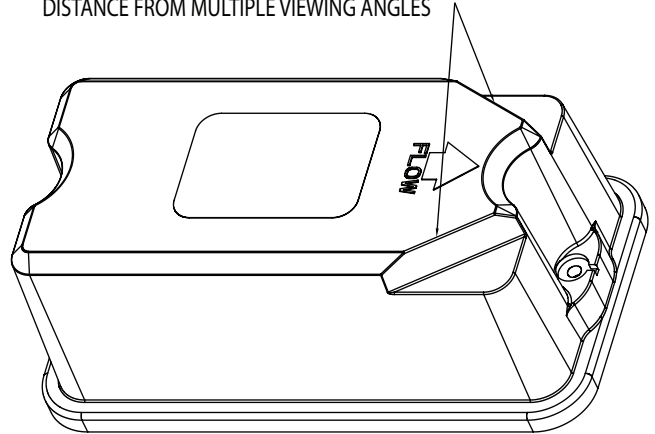
1. Drain the pipe.
2. Turn off electrical power to the detector
3. Remove the cover and disconnect the wiring.
3. Unscrew the locking collar.
4. Lift the detector clear of the pipe.

**CAUTION**

If a vane breaks off in a pipe, find and remove it. Failure to do so may restrict the proper flow of water to part of the sprinkler system.

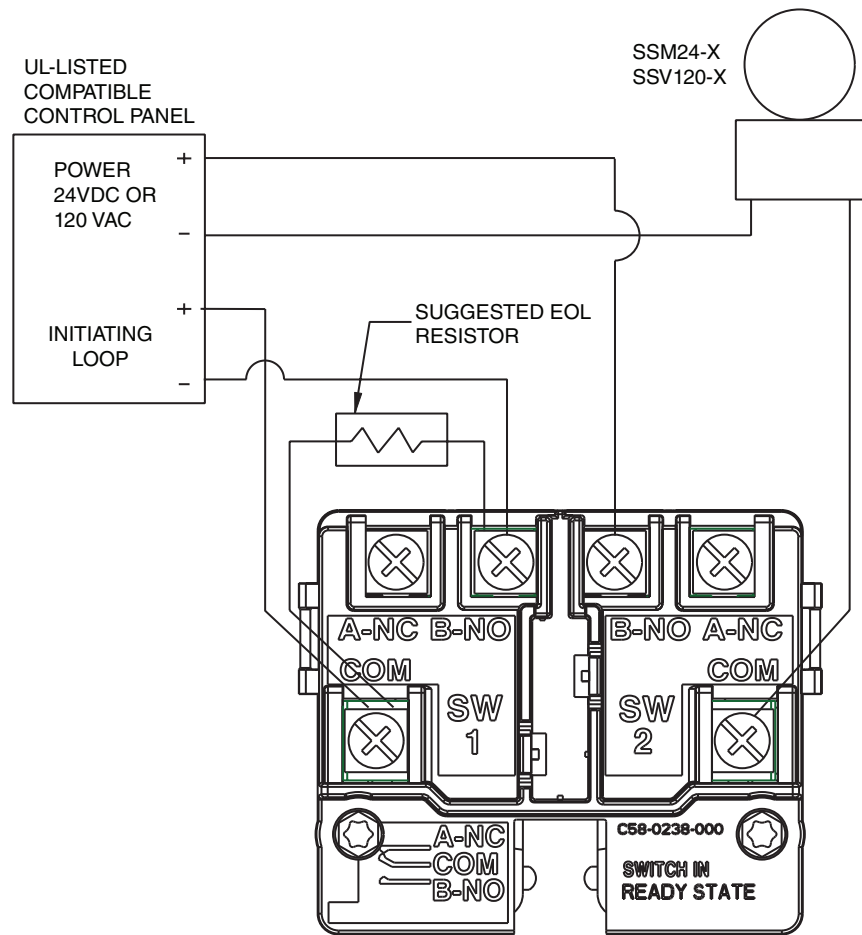
**FIGURE 5. DIRECTIONAL COVER**

NOTCHED COVER INDICATES FLOW DIRECTION AT A DISTANCE FROM MULTIPLE VIEWING ANGLES



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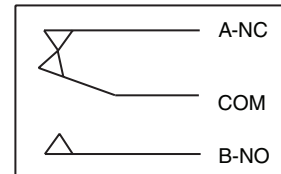
**FIGURE 6. FIELD WIRING**



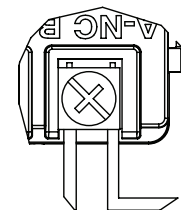
NOTE: COMMON AND B-NO CONNECTIONS WILL CLOSE WHEN VANE IS DEFECTED, I.E., WHEN WATER IS FLOWING. DUAL SWITCHES PERMIT APPLICATIONS TO BE COMBINED ON A SINGLE DETECTOR.

CONTACT RATINGS	
125 / 250 VAC	10 AMPS
24 VDC	2.5 AMPS

SCHEMATIC OF INDIVIDUAL SWITCH IN "NO WATERFLOW" CONDITION



BREAK WIRE AS SHOWN FOR SUPERVISION OF CONNECTION. DO NOT ALLOW STRIPPED WIRE LEADS TO EXTEND BEYOND SWITCH HOUSING. DO NOT LOOP WIRES.

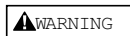


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**UL LISTING LIMITATIONS**

In accordance with the UL certification, the model WFDNFT has additional critical installation limitations when installed in sprinkler systems constructed of metallic pipe and fittings. The model WFDNFT must be installed in accordance with the limitations for BlazeMaster CPVC pipe and fittings, which limits the installation of the product to systems in Light Hazard occupancies as defined in ANS/NFPA 13<sup>R</sup>, Residential occupancies as defined in ANS/NFPA 13<sup>R</sup>, and Residential occupancies as defined in ANS/NFPA 13<sup>D</sup>. All Listing limitations of BlazeMaster CPVC pipe and fittings as outlined in BlazeMaster installation and design manuals

must be followed for model WFDNFT to be used in accordance with its Listing. These considerations include, but are not limited to: (1) Acceptable installation limitations (concealed, exposed, system risers); (2) Chemical compatibility; (3) Handling and storage; (4) Freeze protection and proximity to heat sources.



**THE LIMITATIONS OF WATERFLOW ALARM DEVICES**

- 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 in Chapter 5 of NFPA Standard 13A.
- 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.
- Vane-type waterflow detectors have a normal service life of 10-15 years. Hard water systems, however, may substantially reduce waterflow detector service life.
- Waterflow detectors are not a substitute for insurance. Building owners should always insure property and lives being protected by sprinkler systems.
- 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**

SAFE SIGNAL warrants that the equipment herein shall conform to said descriptions as to all affirmation of fact and shall be free from defects of manufacture, labeling, and packaging for a period of three (3) years from the invoice date to the original purchaser, provided that representative samples are returned to SAFE SIGNAL for inspection. Upon a determination by SAFE SIGNAL that a product is not as warranted, SAFE SIGNAL shall, at its exclusive option, replace or repair said defective product or parts thereof at its own expense except that Purchaser shall pay all

shipping, insurance, and similar charges incurred in connection with the replacement of the defective product or parts thereof. This Warranty is void in the case of abuse, misuse, abnormal usage, faulty installation, or repair by unauthorized persons, or if for any other reason SAFE SIGNAL determines that said product is not operating properly as a result of causes other than defective manufacture, labeling, or packaging.