Model TF Vane Type Waterflow Switch APAC and EMEA Only

TFP2111 JANUARY 2024

Important: Refer to technical data sheet *TFP2300* for warnings pertaining to regulatory and health information.

Scan the QR code or enter the URL in a web browser to access the most up-to-date electronic version of this document. Data rates may apply.

docs.jci.com.tycofire/tfp2111

NOTICE

The TYCO Model TF Vane Type Waterflow Switch described herein must be installed and maintained in compliance with this document, in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the performance of the related devices.

The owner is responsible for maintaining their fire protection system and devices in proper operating condition. Contact the installing contractor or product manufacturer with any questions.

General description

The TYCO Model TF Vane Type Waterflow Switch detects a waterflow condition in a wet sprinkler system.

The switch assembly contains single-pole, double-throw (SPDT) contacts, and an adjustable pneumatic vane. The switch activates when a flow rate that exceeds the flow sensitivity of the switch occurs. The flow condition must exist for a longer period than the retard delay setting of the vane for the switch to operate. For information about the retard delay time ranges, see Retard delay times.



The switch assembly options include two arrangements:

- Saddle-mount: See Table 1 and Table 2.
- Thread-mount: See Table 3.

The standard saddle-mount switch is available in a 2 in. to 10 in. size range, and the thread-mount (NPT) switch is available in a 1 in. to 2 in. range. The adjustable retard delay range is 0 seconds to 90 seconds. An immediate activation thread-mount switch is also available.

The cover incorporates a tamper resistant screw that requires a special tamper resistant key for removal. One key is supplied with each device.

Models

The switch is available in two model types:

- Standard: For non-hazardous locations.
- Explosion-proof: For hazardous locations.

Note: The explosion-proof models are only available in the saddle-mount assembly option.

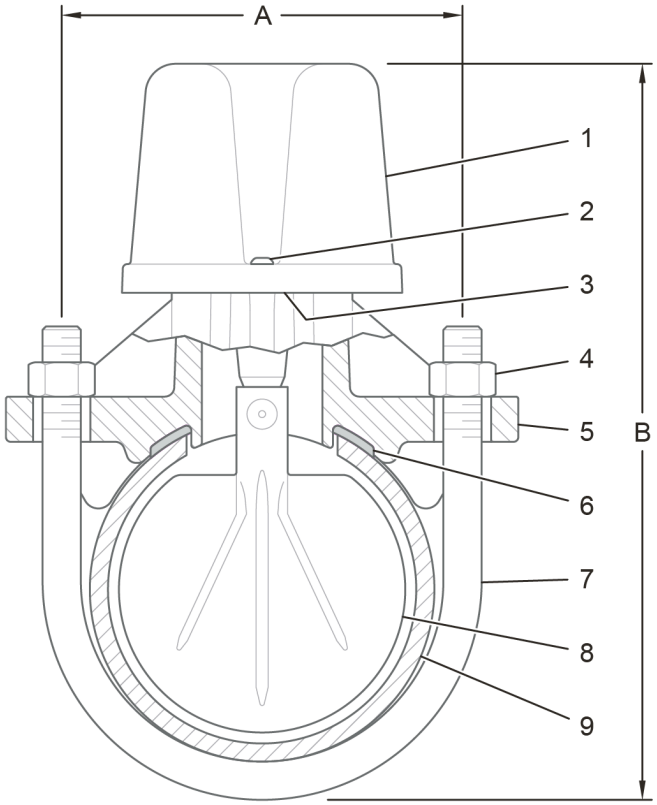
For specific information about the models, see Table 1, Table 2, and Table 3. For approvals information , see Table 4 and Table 5.

1467 Elmwood Avenue, Cranston, RI 02910 | Telephone +1-401-781-8220 www.johnsoncontrols.com

© 2024 Johnson Controls. All rights reserved. All specifications and other information shown were current as of document revision and are subject to change without notice.

Assembly

Figure 1: Saddle-mount waterflow switch standard models, components and dimensions

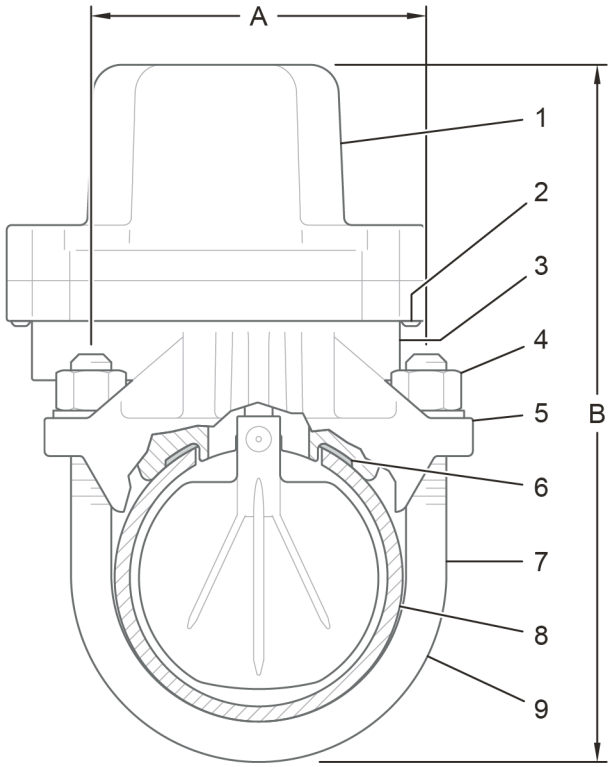


Callout	Description
1	Cover
2	Tamper resistant cover screw
3	Conduit connection
4	Hex nut with flat washer
5	Saddle
6	Saddle pipe gasket
7	U-bolt
8	Vane
9	Pipe[1]

1 The pipe is not included.

Callout	Dimension
A	See Table 1
B	See Table 1

Figure 2: Saddle-mount waterflow switch explosion-proof models, components and dimensions

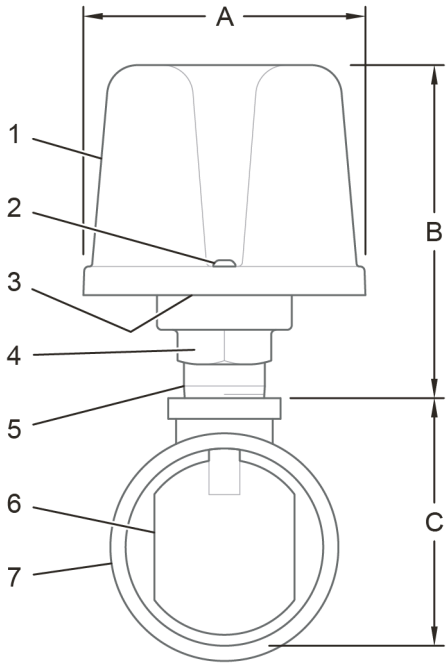


Callout	Description
1	Cover
2	Tamper resistant cover screw
3	Conduit connection
4	Hex nut with flat washer
5	Saddle
6	Saddle pipe gasket
7	U-bolt
8	Vane
9	Pipe[1]

1 The pipe is not included.

Callout	Dimension
A	See Table 2
B	See Table 2

Figure 3: Thread-mount waterflow switch, components and dimensions



Callout	Description
1	Cover
2	Tamper resistant cover screw
3	Conduit connection
4	Wrench hex
5	Thread connection, ¾ in. NPT
6	Vane
7	Fitting[1]

1 The fitting is not included.

Callout	Dimension
A	See Table 3
B	See Table 3
C	See Table 3

Technical data

Approvals

See Table 4 and Table 5.

Maximum service pressure

450 psi (31 bar)

Note: The TF-100 model, explosion-proof models (-EX suffix), and -T models are rated to 300 psi (20,7 bar).

Flow sensitivity range for signal

4 gpm to 10 gpm (15 L/min to 37 L/min)

Contact ratings

- 8 A at 125/250 VAC
- 3 A at 24 VDC
- 2.5 A at 30 VDC

Operating temperature range

32°F to +120°F (0°C to +49°C)

Pressure connection

See Table 1, Table 2, and Table 3.

Maximum surge

18 ft/s (5.5 m/s)

Hazardous environment classification

- Ex II 2 G EX db IIB T6 Gb
- Ex II 2 D EX tb IIIC T80°C Db
- IP-66

Compatible pipe

See Table 1, Table 2, and Table 3.

Retard delay times

Saddle-mount switches

Adjustable range: 0 s to 90 s

For more information, see Table 1 and Table 2.

Thread-mount switches

Immediate activation and an adjustable range are available:

- 0 s - immediate activation
- 0 s to 90 s - adjustable range

For more information, see Table 3.

Note: Adust the retard delay with the retard delay adjustment wheel shown in Figure 9.

Table 1: Saddle-mount waterflow switch standard models, specifications and installation dimensions

Model[1]	Nominal pipe size in. (mm)	Nominal pipe size OD in. (mm)	Pipe wall thickness		Dimensions		Hole size in. (mm)	Bolt torque lb-ft (N·m)	Retard delay time (s)	Contacts
			Schedule 10 in. (mm)	Schedule 40 in. (mm)	A in. (mm)	B in. (mm)				
TF020	2 (DN50)	2.375 (60,3)	0.109 (2,77)	0.154 (3,91)	3.307 (84)	7.402 (188)	1.260 +0.079	29.5-36.9 (40-50)	0-90	2 sets SPDT
TF025	2.5 (DN65)	2.875 (76,1)	0.12 (3,05)	0.203 (5,16)	3.622 (92)	7.874 (200)	1.260 +0.079	29.5-36.9 (40-50)	0-90	
TF030	3 (DN80)	3.5 (88,9)	0.12 (3,05)	0.216 (5,49)	4.094 (104)	8.661 (220)	2.008 +0.079	51.6-70.1 (70-95)	0-90	
TF040	4 (DN100)	4.5 (114,3)	0.12 (3,05)	0.237 (6,02)	5.236 (133)	9.645 (245)	2.008 +0.079	51.6-70.1 (70-95)	0-90	
TF050	5 (DN125)	5.563 (141,3)	0.134 (3,40)	0.258 (6,55)	6.299 (160)	10.709 (272)	2.008 +0.079	51.6-70.1 (70-95)	0-90	
TF060	6 (DN150)	6.625 (168,3)	0.134 (3,40)	0.280 (7,11)	7.362 (187)	11.732 (298)	2.008 +0.079	51.6-70.1 (70-95)	0-90	
TF080	8 (DN200)	8.625 (219,1)	0.148 (3,76)	0.322 (8,18)	9.449 (240)	13.780 (350)	2.008 +0.079	51.6-70.1 (70-95)	0-90	
TF100	10 (DN250)	10.750 (273,0)	0.165 (4,19)	0.365 (9,27)	11.890 (302)	15.945 (405)	2.008 +0.079	51.6-70.1 (70-95)	0-90	

1 All models models use Schedule 10/40 DIN/BS1387 pipe.

Table 2: Saddle-mount waterflow switch explosion-proof models, specifications and installation dimensions

Model[1, 2]	Nominal pipe size in. (mm)	Nominal pipe size OD in. (mm)	Pipe wall thickness		Dimensions		Hole size in. (mm)	Bolt torque lb-ft (N·m)	Retard delay time (s)	Contacts
			Schedule 10 in. (mm)	Schedule 40 in. (mm)	A in. (mm)	B in. (mm)				
TF020-EX	2 (DN50)	2.375 (60,3)	0.109 (2,77)	0.154 (3,91)	3.307 (84)	7.71 (196)	1.26 (32)	35-45 (45-60)	0-90	2 sets SPDT
TF025-EX	2.5 (DN65)	2.875 (76,1)	0.12 (3,05)	0.203 (5,16)	3.622 (92)	8.19 (208)	1.26 (32)	35-45 (45-60)		
TF030-EX	3 (DN80)	3.5 (88,9)	0.12 (3,05)	0.216 (5,49)	4.094 (104)	8.97 (228)	2.008 (51)	35-45 (45-60)		
TF040-EX	4 (DN100)	4.5 (114,3)	0.12 (3,05)	0.237 (6,02)	5.236 (133)	9.92 (252)	2.008 (51)	55-70 (70-95)		
TF050-EX	5 (DN125)	5.563 (141,3)	0.134 (3,40)	0.258 (6,55)	6.299 (160)	10.91 (277)	2.008 (51)	55-70 (70-95)		
TF060-EX	6 (DN150)	6.625 (168,3)	0.134 (3,40)	0.28 (7,11)	7.362 (187)	12.01 (305)	2.008 (51)	55-70 (70-95)		
TF080-EX	8 (DN200)	8.625 (219,1)	0.148 (3,76)	0.322 (8,18)	9.449 (240)	13.98 (355)	2.008 (51)	55-70 (70-95)		

1 Model suffixes: -EX = Explosion-proof.
2 All models use Schedule 10/40 DIN/BS1387 pipe.

Table 3: Thread-mount waterflow switch models, specifications and installation dimensions

Model[1, 2]	Nominal pipe size[3] in. (mm)	Fitting size[4] in. (mm)	Mounting dimensions			Retard delay time (s)	Contacts
			A in. (mm)	B in. (mm)	C in. (mm)		
TF010	1 (DN25)	1 x 1 x 1 (DN25 x DN25 x DN25)	3.67 (93,2)	4.33 (110)	2.12 (53,8)	0-90	2 sets SPDT
TF012	1 ¼ (DN32)	1 ¼ x 1 ¼ x 1 (DN32 x DN32 x DN25)	3.67 (93,2)	4.33 (110)	2.46 (62,5)	0-90	
TF015	1 ½ (DN40)	1 ½ x 1 ½ x 1 (DN40 x DN40 x DN25)	3.67 (93,2)	4.33 (110)	2.71 (68,8)	0-90	
TF021	2 (DN50)	2 x 2 x 1 (DN50 x DN50 x DN25)	3.67 (93,2)	4.33 (110)	3.22 (81,8)	0-90	
TF010-T	1 (DN25)	1 x 1 x 1 (DN25 x DN25 x DN25)	3.67 (93,2)	4.33 (110)	2.126 (54)	0 – Immediate activation	1 set SPDT
TF012-T	1 ¼ (DN32)	1 ¼ x 1 ¼ x 1 (DN32 x DN32 x DN25)	3.67 (93,2)	4.33 (110)	2.72 (69)		
TF015-T	1 ½ (DN40)	1 ½ x 1 ½ x 1 (DN40 x DN40 x DN25)	3.67 (93,2)	4.33 (110)	3.22 (82)		
TF020-T	2 (DN50)	2 x 2 x 1 (DN50 x DN50 x DN25)	3.67 (93,2)	4.33 (110)	2.44 (62,5)		

1 Model suffixes: -T = These models do not feature an automatic retard to prevent false alarms.
2 Each switch includes a set of four vanes to accommodate the range of fitting sizes.
3 Sizes shown are fitting run pipe size.
4 Fitting size designations adhere to run x run x branch outlet convention.

Table 4: Saddle-mount waterflow switch approvals

Model	Agency approval			
	UL/ULC	FM	ATEX	Eex
TF020	●	●		
TF025	●	●		
TF030	●	●		
TF040	●	●		
TF050	●	●		
TF060	●	●		
TF080	●	●		
TF100	●			
TF020-EX[1]	●	●	●	●
TF025-EX[1]	●	●	●	●
TF030-EX[1]	●	●	●	●
TF040-EX[1]	●	●	●	●
TF050-EX[1]	●	●	●	●
TF060-EX[1]	●	●	●	●
TF080-EX[1]	●	●	●	●

1 Each explosion-proof model is certified as follows:
- Explosion-proof or hazardous location certified according to EN IEC 60079-0:2018, EN 60079-1:2014, CSA22.2 No.14-18, and UL508 (18th edition).
- Not certified according to UL Category UGYX.

Table 5: Thread-mount waterflow switch approvals

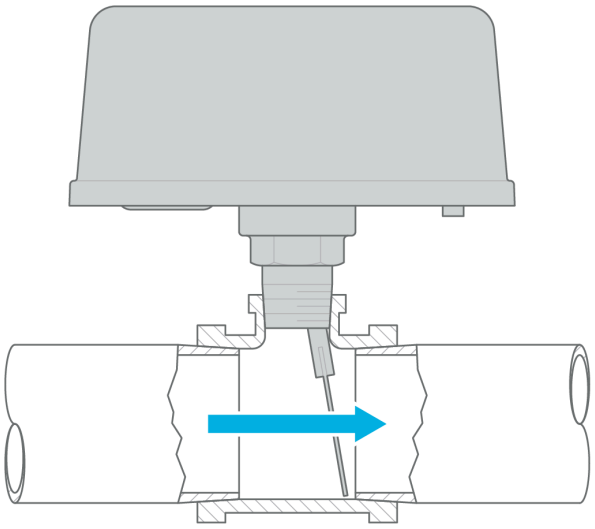
Models	Agency approval	
	UL/ULC	FM
TF010	●	●
TF012	●	●
TF015	●	●
TF021	●	●
TF010-T	●	
TF012-T	●	
TF015-T	●	
TF020-T	●	

Operation

Waterflow in the pipe/fitting deflects the vane as shown Figure 4. The vane deflection triggers a switch featuring a retard that can be set to a specific time delay. This setting is called the retard delay.

The switch contains a pneumatically controlled mechanical delay mechanism. The delay mechanism resets if the waterflow stops before the entire time of the delay timer has elapsed.

Figure 4: Waterflow switch operation



Installation

The TYCO Model TF Vane Type Waterflow Switch must be installed according to the instructions in this section.

Installation guidelines

General guidelines

When installing a switch, observe the following guidelines:

- The saddle-mount and thread-mount switches must be installed vertically or horizontally.

  Note: For horizontal installation, the switch should be installed on top of the pipe.

- The saddle-mount and thread-mount switches should not be installed within 6 in. (15 cm) of a fitting that changes direction of the waterflow or within 24 in. (60 cm) of a valve or drain.
- For information about the switch dimensions, see the following figures:
  - Saddle-mount standard models: Figure 1
  - Saddle-mount explosion-proof models: Figure 2
  - Thread-mount models: Figure 3

Saddle-mount explosion-proof switches specific conditions of use

When installing an explosion-proof saddle-mount switch, observe the following guidelines:

- The threaded holes must be installed with suitably certified cable glands, stopping plug, or conduit fitting for the final installation.

  Note: Before application, separate ATEX certified EX db IIB Gb or/and Ex tb IIIC Db IP66 cable gland or plug should be incorporated.

- The final installation must comply with the Canadian Electrical Code (CEC), Part 1 or National Electrical Code (NEC) as applicable.
- The switch connects to a process system containing non-flammable or non-combustible fluid. If the temperature of process media is greater than 140°F (60°C), the heat conduction from the process media to the switch should be considered. Thermal insulation should be used to ensure that the maximum surface temperature of the flameproof enclosure is not greater than 176°F (80°C).
- The mechanical property class of fasteners which are relevant to the flameproof joint should be at least Grade 8.8 with a minimum yield stress 92.8 ksi (640 MPa).
- The flameproof joints are not intended to be repaired.

Installing the saddle-mount switch

Before you begin:
The saddle-mount switch must be installed according to the instructions in this section.

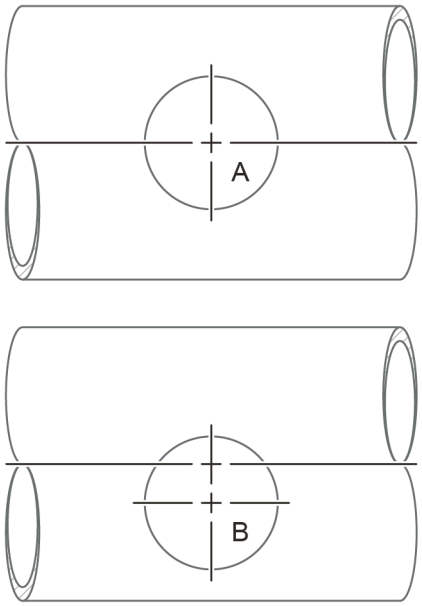
To install the saddle-mount switch, complete the following steps:

1. Install the saddle-mount switch in in a location where there is adequate clearance for installation or removal.
2. Drain the system, and drill a hole in the pipe according to the dimensions in Table 1 or Table 2 as applicable. Use a hole saw in a slow speed drill to make the cut.

   ⓘ **Note:** The hole should be perpendicular to the center of the pipe as shown in Figure 5.
3. Remove all burrs and sharp edges from the hole. Clean and remove all scale and foreign matter from the inside of the pipe for a distance equal to the diameter of the pipe on either side of the hole. Clean the outside of the pipe around the hole to remove any dirt, metal chips, or cutting lubricant.
4. Roll the pneumatic vane into the hole in the opposite direction of the waterflow as shown in Figure 6; do not bend or crease it. Seat the gasket against the saddle and mount the vane into the pipe. Insert the vane so the arrow on the saddle points in the direction of the waterflow. The bushing should fit inside the hole in the pipe as shown in Figure 6.
5. Install the U-bolt and tighten the nuts alternatively to ensure a uniform seal. For torque value information, see Table 1 and Table 2.
6. Check that the vane does not rub or bind in any way. If the vane rubs, remove the detector and correct the issue before re-installing.

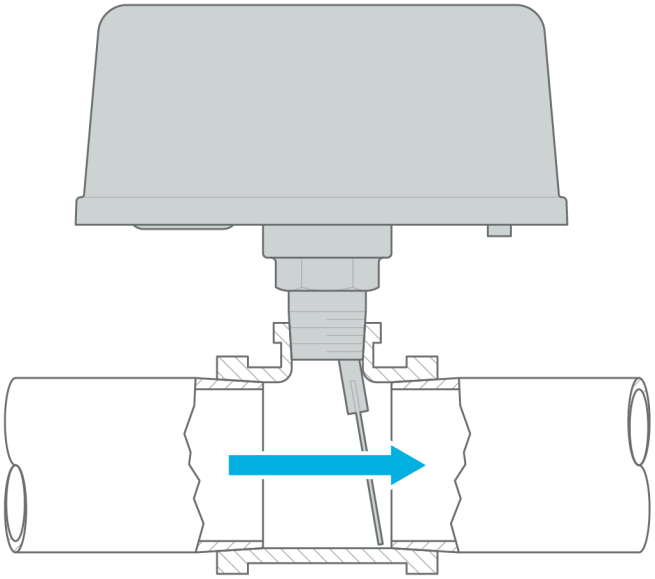
   ⓘ **Note:** If removing the detector, hold the vane and start to curl it. While curling the vane, slowly pull it out of the pipe. Do not pull out the vane only by the saddle.

Figure 5: Mounting hole location



Callout	Description
A	Correct location
B	Incorrect location

Figure 6: Vane insertion in opposite direction of waterflow



Installing the thread-mount switch

Before you begin:
The thread-mount switch must be installed according to the instructions in this section.

To install the thread-mount switch, complete the following steps:

1. Install the switch in a location where there is adequate clearance for installation or removal.
2. Select the correct vane according to the pipe size.
3. Screw a 1 in. NPT fitting into the piping.

   Note: When using TEFLON tape, do not use more than three wraps of tape on the threads.
4. Verify that the vane does not rub or bind in any way. If the vane rubs, remove the detector and correct the issue before re-installing.

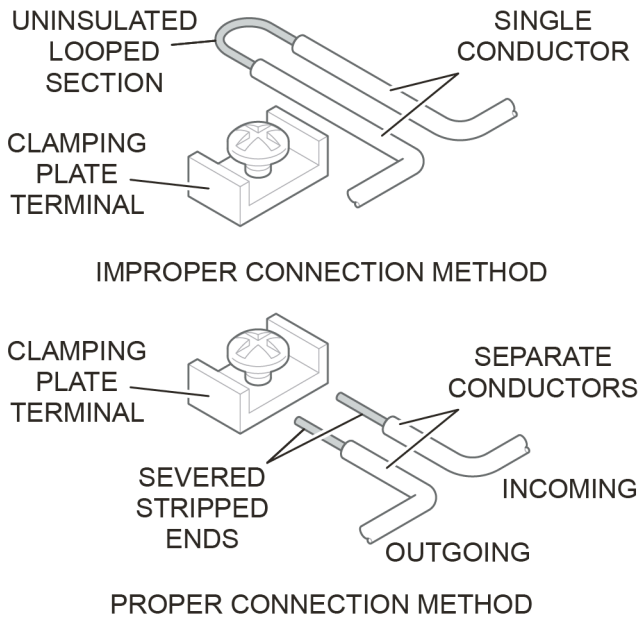
Wiring the switch

Before you begin:

- The switch must be wired according to the instructions in this section.
- The installation must comply with local electrical codes.
- Do not remove the cover for an extended period of time.

Note: An uninsulated section of a single conductor is not permitted to be looped around the terminal and serve as two separate connections. The wire must be severed to serve as two separate connections, thereby providing supervision of the connection in the event that the wire becomes dislodged from the terminal.

Figure 7: Correct wiring practice



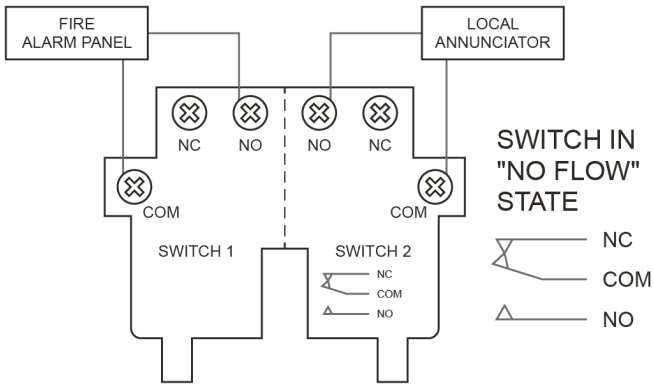
To wire the switch, complete the following steps:

1. Remove the tamper resistant cover screw with the special tamper resistant key.
2. Route the wiring through an agency approved conduit connector and attach the connector to the switch.

   Note: If a second conduit entry is required, remove the knockout plug. To remove the knockout plug, place a screwdriver on the inside edge of the knockout. Do not place the screwdriver in the center.
3. Connect the wiring to the appropriate terminals according to the correct wiring practice as shown in Figure 7, and the required configuration as described in Figure 8.

   Note: A ground screw is provided with each switch. When grounding is required, clamp the grounding wire between two conduit entrance holes with the ground screw.

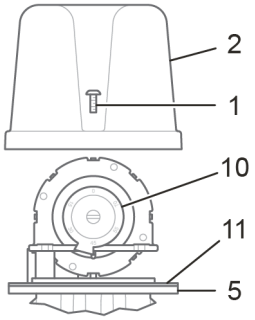
Figure 8: Typical wiring connections



Adjusting the retard delay setting

About this task:
The switch retard delay setting may be adjusted in the field from the default setting in order to change the retard delay. Figure 9 shows the location of the retard adjustment wheel for adjusting the retard delay.

Figure 9: Waterflow switch retard delay adjustment wheel



Callout	Description
1	Tamper resistant cover screw
2	Cover
5	Saddle or thread connection
10	Retard delay adjustment wheel
11	Cover gasket

1. Rotate the retard adjustment wheel as follows to adjust the retard delay:
   - Clockwise to increase the retard delay
   - Anti-clockwise to decrease the retard delay

   ⓘ **Note:** The retard delay should be set at the minimum delay required to prevent false alarms.
2. Re-test the switch to ensure the retard delay is accurate.

Care and maintenance

The TYCO Model TF Vane Type Waterflow Switch must be maintained and serviced in accordance with this section, in addition to any specific requirements of the NFPA, and any impairment must be immediately corrected. The inspection procedure must be performed as described.

Before closing a fire protection system control valve for inspection or maintenance work on the fire protection system that it controls, permission to shut down the affected fire protection system must first be obtained from the proper authorities and all personnel who may be affected by this action must be notified. After placing a fire protection system in service, notify the proper authorities and advise those responsible for monitoring proprietary and/or central station alarms.

The owner is responsible for the inspection, testing, and maintenance of their fire protection system and devices in compliance with this document, as well as with the applicable standards of the NATIONAL FIRE PROTECTION ASSOCIATION such as NFPA 25, in addition to the standards of any authority having jurisdiction (AHJ). Contact the installing contractor or product manufacturer with any questions.

It is recommended that automatic sprinkler systems be inspected, tested, and maintained by a qualified inspection service.

Inspecting the switch

About this task:
The inspection procedure must be performed as specified, in addition to any specific requirements of the NFPA, and any impairment must be immediately corrected.

Test the switch periodically after installation in accordance with applicable NFPA codes and standards, and the authority having jurisdiction (AHJ). A quarterly schedule is recommended.

Inspect the switch for leaks monthly. If a leak is found, replace the switch.

Limited Warranty

For warranty terms and conditions, visit http://www.tyco-fire.com.

Ordering Procedure

Contact your local distributor for availability. When placing an order, indicate the full product name, and part number (PN).

Saddle-mount waterflow switch

Specify: Model, Saddle-mount waterflow switch, quantity, PN. See Table 6.

Table 6: Saddle-mount waterflow switch models part numbers

Model	Nominal pipe size in. (mm)	Part number
TF020	2 (DN50)	600020
TF025	2 ½ (DN65)	600025
TF030	3 (DN80)	600030
TF040	4 (DN100)	600040
TF050	5 (DN125)	600050
TF060	6 (DN150)	600060
TF080	8 (DN200)	600080
TF100	10 (DN250)	600100
TF020-EX	2 (DN50)	605020
TF025-EX	2 ½ (DN65)	605025
TF030-EX	3 (DN80)	605030
TF040-EX	4 (DN100)	605040
TF050-EX	5 (DN125)	605050
TF060-EX	6 (DN125)	605060
TF080-EX	8 (DN200)	605080

Note: Each model has an adjustable 0 seconds to 90 seconds range retard delay.

Thread-mount waterflow switch

Specify: Model, Thread-mount waterflow switch, quantity, PN. See Table 7 and Table 8.

Table 7: Immediate activation thread-mount waterflow switch models part numbers

Model	Nominal pipe size in. (mm)	Part number
TF010-T	1 (DN25)	603010
TF012-T	1 ¼ (DN32)	603012
TF015-T	1 ½ (DN40)	603015
TF020-T	2 (DN50)	603020

Note: Each model has an immediate activation or 0 second retard delay.

Table 8: Adjustable activation thread-mount waterflow switch models part numbers

Model	Nominal pipe size in. (mm)	Part number
TF010	1 (DN25)	600010
TF012	1 ¼ (DN32)	600012
TF015	1 ½ (DN40)	600015
TF021	2 (DN50)	600021

Note: Each model has an adjustable 0 seconds to 90 seconds range retard delay.

NATIONAL FIRE PROTECTION ASSOCIATION and NFPA are registered trademarks of National Fire Protection Association; TEFLON is a trademark of The Chemours Company FC, LLC