THERMAL DISPERSION FLOW SWITCHES

FSW-6000/ 7000 Series

1 YEAR WARRANTY RoHS

FSW-6212 shown smaller than actual size.

- **Simple to Install and Low Cost**
- **No Moving Parts-Maintenance Free Reliability**
- **Optimal Temperature Compensation—Unaffected by Temperature Gradient**
- **Can Operate in Temperatures up to 120°C (248°F) with Sanitary Option**
- **300 Bar (4300 psi) Maximum Working Pressure**
- **Chain of 8 LEDs-Integrated Flow Rate/ Setpoint Indication**
- **Can Be Used as a Level Switch**

The FSW-6000/7000 Series are thermal flow switch monitors designed to monitor flow status and also used to detect level of liquids, air and gas. A chain of 8 LEDs gives the user a visual indication of the flow rate. In addition, there is also a dichromatic LED, which shows the switch point status of the unit. The sensing element and connection of the FSW-6000/7000 Series are made with 316 SS and can be coated with ECTFE/ETFE as an option. The standard enclosure is glass-filled nylon and is also available in an aluminum enclosure for hazardous environments. The FSW-6000/7000 Series can be made with a great variety of process connections such as threaded, flange, or sanitary.

The FSW-6000/7000 Series line of thermal flow switch monitors is based on the principle of thermal dispersion. A typical configuration uses two platinum Resistance Temperature Detectors (RTDs) set within the tip of the sensor. One RTD is heated a few degrees above the temperature of the medium and the other RTD is used as a reference, sensing the actual process temperature. The second RTD also monitors the temperature of the medium, as any changes in temperature must be compensated for in the first RTD. As the process medium flows over the tip of the sensor it disperses some of the heat from the first RTD. The temperature change between the two RTD's signals the probe's electronics and the switch changes state once the setpoint has reached.

The FSW-6000/7000 Series may be installed in a pipe or tank using the thread or connection provided. Use only the hexagon when tightening to achieve a seal, do not use the body. The body should be rotated after tightening to leave the cable gland in suitable orientation.

The FSW-6000/7000 Series is not affected by its fixing position so it may be installed at any angle around the pipe. However, it is recommended that with horizontal pipe runs the sensor should be installed on the side, into the middle of the pipe. In vertical pipes, the FSW-6000/7000 Series should be installed when there is flow in an upward direction against gravity. Care should be taken when installing the sensor that the probe extends clear of the pipe's internal wall and is fully immersed into the flow. In pipes with smaller diameters, some care should also be taken so that the sensor is not screwed too far into the line.

SPECIFICATIONS

Accuracy: ±10% of setpoint
Repeatability: ±1% of setpoint
Power Supply:
FSW-6000: 85 to 240 Vac (50/60 Hz)
FSW-7000: 24 Vdc ±10%

Temperature Range:

Process: -20 to 80°C (-4 to176°F [sanitary option to 120°C (248°F) for CIP]
Operating: -20 to 60°C (-4 to140°F)
Maximum Pressure: 300 bar (4351 psi)
Protection Class: NEMA 4 (IP65)
Wetted Materials: 316 SS
Enclosure Material: Glass filled nylon standard or aluminum die cast option
Process Connection: ½ to 1½ NPT, Tri-Grip™, or flange (others available, consult Flow Engineering Department)
Output: 250 Vac SPDT 5 A relay
Switch Point Adjustment: Potentiometer

Bargraph:

Green LED: Flow rate above setpoint
Yellow LED: Flow is at above setpoint
Red LED: Flow is below setpoint

Switch Point Status:

Red LED: No flow
Green LED: Flow
Response Time: 1 to 10 seconds
Maximum Start up Delay: 12 seconds
Switching Range: 3 cm/s to 3 m/s (0.09 to 9.84 ft/sec) (liquid), 5 cm/sec to 15 m/sec (0.16 to 49 ft/sec) (gas)

Dimensions:

Nylon Head: 88 Dia x 80 mm H (3.5 x 2.5" H)
Aluminum Head: 88 Dia x 108 mm H (3.5 x 4.25")
Insertion Length: 1⅜, 2 and 3" standard, for other lengths consult Flow Engineering
Weight: Approx 680 g (1.5 lb)

To Order

Model No.	Description	Process Connection	Enclosure	Insertion Length
FSW-6212	Thermal dispersion flow switch, 85 to 240 Vac power	¾ NPT	Glass filled nylon, ½ NPT conduit, cable gland, and 2 m (6.5') cable	51 mm (2") for 1 to 4" pipe
FSW-7112	Thermal dispersion flow switch, 24 Vdc power	½ NPT	Glass filled nylon, ½ NPT conduit, cable gland, and 2 m (6.5') cable	51 mm (2") for 1 to 4" pipe
FSW-7111	Thermal dispersion flow switch, 24 Vdc power	½ NPT	Glass filled nylon, ½ NPT conduit, cable gland, and 2 m (6.5') cable	35 mm (1⅜") for ½ to 1" pipe

Accessories

Model No.	Description
70A-1	Continuous tone alarm
TX4-100	4-conductor wire, 30.5 m (100') spool
U24Y175	24 Vdc power supply

Build to Order Models

Model No.	Description
FSW-6(*)(**)(***)	Flow switch, 85 to 240 Vac power; specify connection (*), enclosure (**) and insertion length (***)
FSW-7(*)(**)(***)	Flow switch, 24 Vdc power; specify connection (*), enclosure (**) and insertion length (***)

Options

Ordering Suffix	Description
Process Connection (*)	
1	½ NPT thread
2	¾ NPT thread
3	1 NPT thread
5	1.5" Tri-Grip™
6	2" ANSI flange, 15016 316 SS
Enclosure (**)	
1	Glass filled nylon with ½ NPT conduit, cable gland, and 2 m (6.5') cable
2	Aluminum die cast with ½ NPT conduit
3	Aluminum die cast with cable gland
Insertion Length (***)	
1	35 mm (1⅜")
2	50 mm (2")
3	75 mm (3")

Comes complete with operator's manual.
*To order ECTFE/ETFE element coating, add suffix **"-ETFE"** to model number for additional cost.*
***Ordering Examples: FSW-6212,** flow switch, 85 to 240 Vac power, ¾ NPT fitting, glass filled nylon, 51 mm (2") insertion length, and **70A-1,** alarm.*
***FSW-7113,** flow switch, 24 Vdc power, ½ NPT fitting, glass filled nylon, 75 mm (3") insertion length.*

FSW-6000 flow switches are available with 1.5" Tri-Grip™ (Tri-Clamp® compatible) connection for sanitary applications.