

LIQUID FLOW TRANSMITTER AND SWITCH

FSW-9000 Series



- ✓ High Reliability—
No Moving Parts
- ✓ 4 to 20 mA,
PNP/NPN (Transistor),
or Relay Output
- ✓ Excellent Low
Flow Sensitivity

The FSW-9000 Series is a flow switch monitor that measures the velocity of the flow. It is ideal for use in measurement and control liquid applications. The FSW-9000 Series provides two output options: a 4 to 20 mA analog output and a PNP/NPN output. For the 4 to 20 mA output, the electronics module converts the signal from the probe to a 4 to 20 mA analog output, which can be used to indicate flow rate. For the PNP/NPN output, the measured flow rate is compared to the setpoint value selected by the user and the switch changes state once the setpoint value has been achieved.

The FSW-9000 Series microprocessor based electronics and unique self-calibration program gives the flow switch superior temperature compensation, a fast response time (adjustable from 3 to 10 seconds) and increased long term switch point stability. Even in the event of a power failure, the calibration program will store values for maximum and minimum flows for up to 10 years.

A chain of 8 LEDs gives the user a visual indication of the flow rate as well as setpoint status, and one di-chromatic LED indicates switch point status. In addition, if there is a problem with the unit, the 8 LEDs will flash continuously providing troubleshooting information.

The conical shape of the sensor's tip means that the probe can be installed at almost any angle in the pipe and that if the probe is misaligned, accuracy will not be affected. The sensing element and connection of the FSW-9000



FSW-9212
shown smaller
than actual size.

Series are made with 316 SS and the standard enclosure is glass-filled nylon. The FSW-9000 Series can be made with a great variety of process connections such as threaded, flange, or sanitary and is also available in an aluminum enclosure for hazardous environments. Intrinsic safety barriers required for explosion proof areas.

Measuring Ranges for FSW-9000 Series

The FSW-9000 Series nominal measuring range is 0.04 to 2.0 m/s. The switch can be set to trip at any value in this range. To calculate the velocity for your application, use the following simple formula:

$$V = \frac{1.27 \times Q}{D^2}$$

Q = Flow rate in meters per second

D = Pipe internal diameter in meters

V = Fluid velocity in meters per second

Please note that the 4 to 20 mA option is scaled over 0 to 2.0 m/s

The FSW-90-R is very similar to the FSW-9212 Series with one main difference: The sensor is separate from the electronics and it does not have an enclosed housing. This gives the FSW-90-R Series the ability to be installed in very small pipes and be remotely controlled by the FSCN-91 relay. The FSW-90-R Series is the ideal solution when there is not a lot of space to install even a compact unit or when there is a need for a mounted relay. In addition, the conical shape of the sensor's tip allows the probe to be installed at almost any angle in the pipe, and if it is misaligned, accuracy will not be affected. The FSW-90-R is made with 316 SS. FSCN-91 relay can operate with DC or AC supply voltage and provides an analog 4 to 20 mA and SPDT output. The FSCN-91 enclosure is made with ABS and can be mounted on a DIN rail or by using 2 fixing screws.

SPECIFICATIONS

Accuracy: ±5% of setpoint
Repeatability: ±1% of setpoint
Power Supply: FSW-90-R: 85 to 240 Vac, 50/60 Hz or 24 Vdc ±10%; FSW-9000: 24 Vdc ±10%
Temperature Range:
Process: -20 to 80°C (-4 to 176°F) (Sanitary option to 284°F for CIP)
Operating: -20 to 60°C (-4 to 140°F)
Maximum Pressure: 300 bar (4351 psi)
Protection Class: NEMA-4 (IP65)
Wetted Materials: 316 Stainless Steel
Enclosure Material: Glass filled nylon standard; aluminum head optional
Process Connection: ½ to 1½ NPT, Tri-Grip™ (Tri-Clamp® compatible), or flange

Output: FSW-90-R + FSCN-90: relay (SPDT) and 4 to 20 mA; FSW-9000: transistor NPN/PNP (400 mA) and 4 to 20 mA
Switch Point Adjustment: Potentiometer
Bargraph: 8 LED
Switch Point Status:
Red LED: No flow
Green LED: Flow
Response Time: 3 to 10 sec nominal
Maximum Start-Up Delay: 12 seconds
Switching Range: 0.04 m/s to 2 m/s (water)
Dimensions:
Nylon Head: 89 H x 64 mm D (3.5 x 2.5")
Aluminum Head: 89 H x 108 mm D (3.5 x 4.25")



Probe Diameter: 16 mm (0.625")
Insertion Length: 1½, 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-9212	Complete transmitter	¾ NPT	Glass filled nylon, ½ NPT conduit, cable gland, and 2 m (6.5') cable	51 mm (2")
FSW-91-R	Flow sensor (FSCN-90 electronics sold separately)	½ NPT	None	51 mm (2")
FSCN-91	FSW-91-R electronics, 24 Vdc power			
FSCN-92	FSW-91-R electronics, 85 to 240 Vac power			

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-9(*)(**)(***)	Complete transmitter, specify connection (*), enclosure (**), and insertion length (***)
FSW-9(*)-R	Flow sensor, specify connection (*); (FSCN-90 electronics sold separately)

Options

Ordering Suffix	Description
Process Connection (*)	
1	½ NPT thread
2	¾ NPT thread
3	1 NPT thread
5	1.5" Tri-Grip™ (inches only)
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 (1½")
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-9212, Vac powered switch, and 70A-1, alarm.
 FSW-9123, transmitter with ½ NPT thread, aluminum die cast enclosure with ½ NPT conduit, 75 mm (3") insertion length.

