

LIQUID FLOW TRANSMITTER AND SWITCH

FSW-9000 Series

\$654

Complete Transmitter



- ✓ **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



FSW-9212, \$654,
shown smaller
than actual size.

connection of the FSW-9000 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)

Max 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

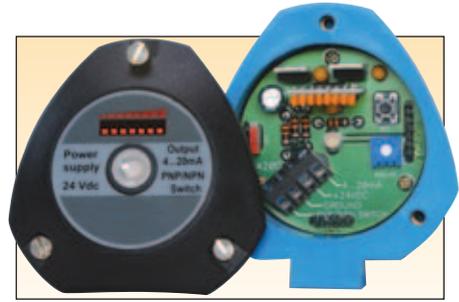
Max Start-Up Delay: 12 seconds

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)

AVAILABLE FOR FAST DELIVERY!

To Order (Specify Model Number)

Model No.	Price	Description	Process Connection	Enclosure	Insertion Length
FSW-9212	\$654	Complete transmitter	½ NPT	Glass filled nylon, ½ NPT conduit, cable gland, and 2 m (6.5') cable	51 mm (2")
FSW-91-R	330	Flow sensor (FSCN-90 electronics sold separately)	½ NPT	None	51 mm (2")
FSCN-91	402	FSW-91-R electronics, 24 Vdc power			
FSCN-92	414	FSW-91-R electronics, 85 to 240 Vac power			

Accessories

Model No.	Price	Description
70A-1	\$20	Continuous tone alarm
TX4-100	35	4 conductor wire, 30.5 m (100') spool
U24Y175	169	24 Vdc power supply

Recommended Reference Book:
Boiler Control Systems Engineering,
FW-346, \$99.
See Section Y for Additional Books.



Build to Order Models

Model No.	Price	Description
FSW-9(*)(**)(***)	\$630	Complete transmitter, specify connection (*), enclosure (**), and insertion length (***)
FSW-9(*)-R	330	Flow sensor, specify connection (*); (FSCN-90 electronics sold separately)

Options

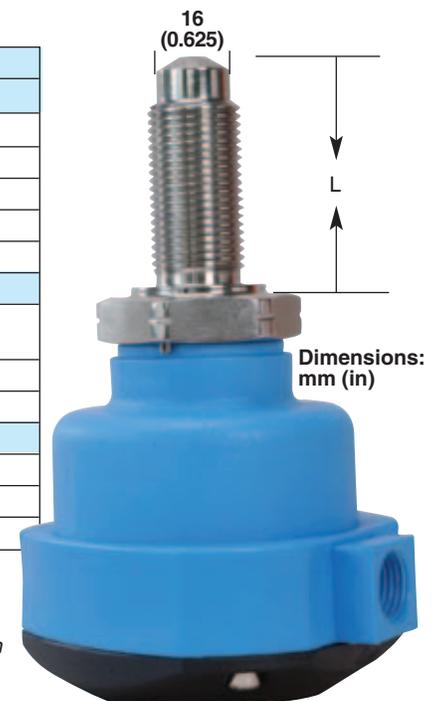
Ordering Suffix	Add'l Price	Description
Process Connection (*)		
1	N/C	½ NPT thread
2	N/C	¾ NPT thread
3	N/C	1 NPT thread
5	\$150	1.5" Tri-Grip™ (inches only)
6	300	2" ANSI flange, 15016 316 SS
Enclosure (**)		
1	\$24	Glass filled nylon with ½ NPT conduit, cable gland, and 2 m (6.5') cable
2	84	Aluminum die cast with ½ NPT conduit
3	90	Aluminum die cast with cable gland
Insertion Length (***)		
1	N/C	35 mm (1⅜")
2	N/C	50 mm (2")
3	N/C	75 mm (3")

Comes complete with operator's manual.

To order ECTFE/ETFE element coating add suffix **"-ETFE"** to model number and **\$180** to price.

Ordering Examples: FSW-9212, Vac powered switch, and 70A-1, alarm, \$654 + 20 = **\$674.**

FSW-9123, transmitter with ½ NPT thread, aluminum die cast enclosure with ½ NPT conduit, 75 mm (3") insertion length, \$630 + 84 = **\$714.**



omega.co.uk®

Your One-Stop Source for Process Measurement and Control!

Freephone 0800 488 488 | International +44(0) 161 777 6622 | Fax +44(0) 161 777 6622 | Sales@omega.co.uk

www.omega.co.uk



UNITED STATES

www.omega.com

1-800-TC-OMEGA
Stamford, CT.

CANADA

www.omega.ca

Laval(Quebec)
1-800-TC-OMEGA

GERMANY

www.omega.de

Deckenfronn, Germany
0800-8266342

UNITED KINGDOM

www.omega.co.uk

Manchester, England
0800-488-488
+44-(0)161-777-6611

FRANCE

www.omega.fr

0800-466-342

BENELUX

www.omega.nl

0800-099-33-44



More than 100,000 Products Available!

• Temperature

Calibrators, Connectors, General Test and Measurement Instruments, Handheld Instruments for Temperature Measurement, Ice Point References, Indicating Labels, Crayons, Cements and Lacquers, Infrared Temperature Measurement Instruments, Recorders, Relative Humidity Measurement Instruments, PT100 Probes, PT100 Elements, Temperature & Process Meters, Timers and Counters, Temperature and Process Controllers and Power Switching Devices, Thermistor Elements, Probes and Assemblies, Thermocouples, Thermowells and Head and Well Assemblies, Transmitters, Thermocouple Wire, RTD Probes

• Flow and Level

Air Velocity Indicators, Doppler Flowmeters, Level Measurement, Magnetic Flowmeters, Mass Flowmeters, Pitot Tubes, Pumps, Rotameters, Turbine and Paddle Wheel Flowmeters, Ultrasonic Flowmeters, Valves, Variable Area Flowmeters, Vortex Shedding Flowmeters

• pH and Conductivity

Conductivity Instrumentation, Dissolved Oxygen Instrumentation, Environmental Instrumentation, pH Electrodes and Instruments, Water and Soil Analysis Instrumentation

• Data Acquisition

Communication Products and Converters, Data Acquisition and Analysis Software, Data Loggers Plug-in Cards, Signal Conditioners, USB, RS232, RS485, Ethernet and Parallel Port Data Acquisition Systems, Wireless Transmitters and Receivers

• Pressure, Strain and Force

Displacement Transducers, Dynamic Measurement Force Sensors, Instrumentation for Pressure and Strain Measurements, Load Cells, Pressure Gauges, Pressure Reference Section, Pressure Switches, Pressure Transducers, Proximity Transducers, Regulators, Pressure Transmitters, Strain Gauges, Torque Transducers, Valves

• Heaters

Band Heaters, Cartridge Heaters, Circulation Heaters, Comfort Heaters, Controllers, Meters and Switching Devices, Flexible Heaters, General Test and Measurement Instruments, Heater Hook-up Wire, Heating Cable Systems, Immersion Heaters, Process Air and Duct, Heaters, Radiant Heaters, Strip Heaters, Tubular Heaters