ELECTRONIC FLOW SWITCHES

Features

• No Moving Parts
• Operates in Liquids, Gases and Slurries
• Can Detect Increase or Decrease of Flow
• 316L Stainless Steel Sensor
• Low Cost, Designed for Industrial OEM and End Users

Applications

• Low Flow Shut Down of Pumps
• Flow Indication/Verification
• Pump or Valve Seal Leakage
• Bearing Lubrication Flow Sensor
• HVAC Flow Monitor
• Safety Shower Flow Switch

FM Series

The FM series is designed to provide an extremely reliable flow switch at a very cost effective price. This series replaces the standard explosion proof enclosure utilized in our FX series with a general purpose enclosure.

The principle of operation measures a temperature differential between a heated and a reference temperature sensor (see figure 1). The differential varies as flow across the sensor changes. This allows the flow switch to detect the increase or decrease of flow of virtually all liquids, gases and slurries. Flow ranges are shown on the next page of this brochure in the set-point range chart. A conversion chart is also provided to covert volumetric flow to velocity.

Part Number/Order Entry Specification

<table>
<thead>
<tr>
<th>Process Connection</th>
<th>Power Input</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>½&quot; MNPT</td>
<td>12 VDC (+30%, -10%)</td>
<td>S HIGH FLOW OPTION- CLEAN LIQUIDS/GASES, 1” MNPT ONLY</td>
</tr>
<tr>
<td>¾” MNPT</td>
<td>117 VAC (90-135 VAC)</td>
<td>C 0 1 1.2” PROBE</td>
</tr>
<tr>
<td>1” MNPT</td>
<td>24 VDC or VAC (+ 10%)</td>
<td>D 0 2 1.8” PROBE</td>
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</table>
Optional Calibrator

**Flow Switch Calibrator Model MC-5**

- Displays mV output which is proportional to flow
- Induces signal to electronics for setting specified switch point
- Allows periodic switch point verification

This tool is not needed for a vast majority of users. It is useful when a user has large quantity of units and requires periodic verification of switch point calibrations.

This easy to use hand held, self powered instrument can be used in conjunction with all single or dual switch point circuit boards. By simply plugging this instrument into the circuit board, the user can interrogate all functions of the flow switch.

**Flow Switch Applications**

- Pump Protection: Automatic shut down on low or no flow
- Bearing Lubrication: Detects loss of lubricant flow
- Seal Leakage: Verifies positive seal flow or detects excessive leakage indicating maintenance requirement
- Chemical Feed and Metering Pumps: Indicates low or no flow of chemical additives to process
- Safety Shower/Eye Wash Station: Automatic annunciation of potential danger to plant personnel
- Analyzer/ Gas Chromatographs: Confirms continuous sample flow to instruments
- Control Rooms: Verifies flow when fans, pumps or valves are energized
- Purge Air: Detects loss of flow for process or plant safety
- Spray Nozzles: Detects nozzle blockage in coating applications
- Relief Valve/Rupture Disks: Alarms on flow or leakage of safety relief valves or rupture disks
- Chiller Lines: Automatic shut down of chillers on low or no flow
- Heater Burnout Prevention: Heater shutdown on loss of flow to prevent overheating of elements
- Tank Car Loading: Senses dry line or phase change from liquid to nitrogen gas flow
- Drain Line Sensor: Capable of detecting flow in partially filled lines
- Agitation Monitor: Positive indication of agitation in tanks
### Flow Switch Set-Point Range

<table>
<thead>
<tr>
<th>VELOCITY</th>
<th>FPS (Feet Per Second)</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>WATER/AQUEOUS</td>
<td></td>
</tr>
<tr>
<td>HYDROCARBON</td>
<td></td>
</tr>
<tr>
<td>AIR/GAS</td>
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</tbody>
</table>

### Conversion Table

Volumetric (GPM or CFM) to Velocity (Feet per Second - FPS)

<table>
<thead>
<tr>
<th>Line Size</th>
<th>Liquid Multiplier</th>
<th>Air Multiplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/8”</td>
<td>5.65</td>
<td>42.19</td>
</tr>
<tr>
<td>1/4”</td>
<td>3.08</td>
<td>23.06</td>
</tr>
<tr>
<td>3/8”</td>
<td>1.68</td>
<td>12.57</td>
</tr>
<tr>
<td>1/2”</td>
<td>1.06</td>
<td>7.91</td>
</tr>
<tr>
<td>3/4”</td>
<td>0.602</td>
<td>4.50</td>
</tr>
<tr>
<td>1”</td>
<td>0.371</td>
<td>2.78</td>
</tr>
<tr>
<td>1.25”</td>
<td>0.215</td>
<td>1.61</td>
</tr>
<tr>
<td>1.5”</td>
<td>0.158</td>
<td>1.18</td>
</tr>
<tr>
<td>2”</td>
<td>0.096</td>
<td>0.716</td>
</tr>
<tr>
<td>2.5”</td>
<td>0.067</td>
<td>0.502</td>
</tr>
<tr>
<td>3”</td>
<td>0.064</td>
<td>0.325</td>
</tr>
<tr>
<td>3.5”</td>
<td>0.0434</td>
<td>0.243</td>
</tr>
<tr>
<td>4”</td>
<td>0.0307</td>
<td>0.188</td>
</tr>
<tr>
<td>5”</td>
<td>0.0208</td>
<td>0.120</td>
</tr>
<tr>
<td>6”</td>
<td>0.0143</td>
<td>0.083</td>
</tr>
</tbody>
</table>

#### Examples:
1) 100 CFM in 3” Line = 100 x .325 = 32.5 FPS
2) 10 GPM in 3” Line = 10 x .0434 = .434 FPS

### Specifications

**Sensor Head**
- Material of Construction: 316L Stainless Steel Standard
- Operating Temperature: -50 to +250F (-46 to +121C)
- Operating Pressure: Vacuum to 4000 PSIG (275 Bar)
- Response Time: From 3 Seconds
- Repeatability: ± 0.5% of Range at Constant Conditions
- Process Connection: ¾” MNPT, 1” MNPT, Option ½”MNPT
- Probe Length: 1.8”, 1.2” Option Customer Specified

**Electronics**
- Housing: Powder Coated General Purpose
- Temperature: -50 to +150F (-46 to +65C)
- Power Input: 90-135 VAC, 50/60 Hz, 4 Watts Option 12 VDC, 24 VDC/VAC
- Relay Output: SPDT 2 Amps Resistive
- Electrical Connection: 1” FNPT
- Shipping Weight: 4 lbs

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