

MODEL AS-FS Liquids

AIRCRAFT QUALIFIED LIQUID FLOW SWITCH



FCI's Flow Switch Applications

- Liquid cooling systems
- Fuel transfer
- Lubricating oils
- Hydraulic fluids
- Ground and in-flight refueling

FCI's Flow Switch

FCI flow switches for commercial and military aircraft applications provide a unique set of performance features unavailable in other flow sensing technologies. FCI's thermal mass flow switches monitor liquid mass flow directly and do not require pressure and temperature corrections necessary with volumetric flow sensing. Developed from FCI's proven, high performance aircraft qualified flow switch designs, the Model AS-FS provides a commercial off-the-shelf (COTS) liquid flow switch to meet faster delivery lead-times and at reduced cost compared to fully customized products.

The wetted portion of the probe is hermetically sealed, and made of all welded 316L stainless steel parts. The element construction provides corrosion resistance and can withstand up to 2000 psi [138 bar] line pressures. It is available with a threaded or flanged mounting and can be provided with a variety of military electrical connectors.

The electronics are hermetically (welded) or sealed in an integral enclosure. Power input is 19-32 VDC per MIL-STD-704. Standard outputs include an open collector, (sink) and/or a filtered, buffered op-amp (source) (<1VDC [low flow] or >17 VDC [high flow]). Electronic hysteresis is included to prevent undesired switching when flow rates are in the vicinity of the set point. Because the flow induced heat dissipation effect is a logarithm function, FCI mass flow switches can perform over a remarkably wide flow range with exceptional low-flow sensitivity.

FCI's Flow Switch Features

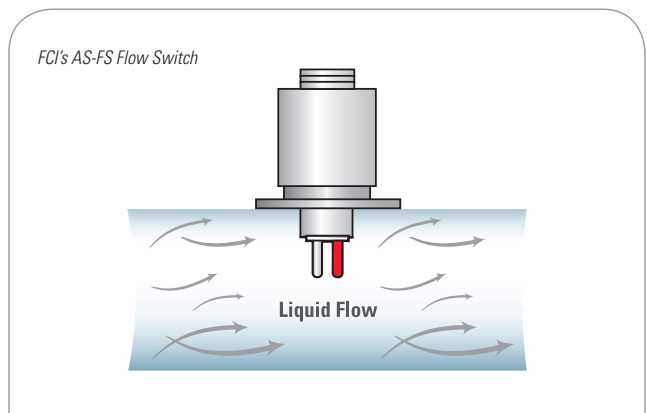
- No moving parts, no routine maintenance
- Small, compact and lightweight
- Simple installation
- Low flow sensitivity
- Wide turndown range; 100:1 or more
- Lowest pressure drop
- Extreme temperature, pressure and vibration service
- Highest reliability, 100,000 hours MTBF
- Corrosion, abrasion and fouling resistant

FCI's Thermal Dispersion Flow Sensing Technology Advantage

FCI flow sensors have established an unmatched record of superior performance and reliability in the toughest applications. FCI's unique Thermal Dispersion Technology (TDT) provides exceptional reliability and repeatability for monitoring flow rate in liquids and gases.

The sensing element contains two thermowell-protected Resistance Temperature Detectors (platinum RTDs). When the flow element is installed in the pipe or duct, the reference RTD measures the temperature of the surrounding fluid, while the active RTD is heated by an adjacent heater to a temperature that is warmer than the surrounding fluid. The temperature difference between the two RTDs (highest at no flow) is read. Flow cools the heated RTD and reduces the temperature difference between the active and reference RTDs. Higher flow results in a small temperature difference and low flow produces a larger temperature difference between the RTDs.

The element RTDs are connected to a bridge circuit that senses the changing temperature difference and switches the signal output when a critical flow rate is reached. This provides a repeatable flow switch point in harsh application conditions without moving parts in the switch.



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Model AS-FS Liquid Flow Switch Specifications

- **Service:** Flow monitoring of liquids
- **Material:** Wetted parts 316 stainless steel, all welded construction
- **Electronics Enclosure:** Hermetically sealed units; 316 stainless steel
- **Electrical Connection:** D38999 or compatible
- **Process Connection:** Flanged with O-ring seal
- **Insertion Length:** Per customer requirement
- **Output Options**

Sourcing

Flow Signal: Source 240 mA at 28 Vdc

No Flow Signal: Source 0 Vdc

Flow Signal: Source 0 Vdc

No Flow Signal: Source 240 mA at 28 Vdc

Open Collector

Flow Signal: Closed, sinking up to 100 mA at <0.5 Vdc

No Flow Signal: Open, leakage <10µa at 30 Vdc

Flow Signal: Open, leakage <10µa at 30 Vdc

No Flow Signal: Closed, sinking up to 100 mA at <0.5 Vdc

- **Electrical Power Input:** 28 VDC nominal per MIL-STD-704
- **Power Consumption:** 3 watt maximum

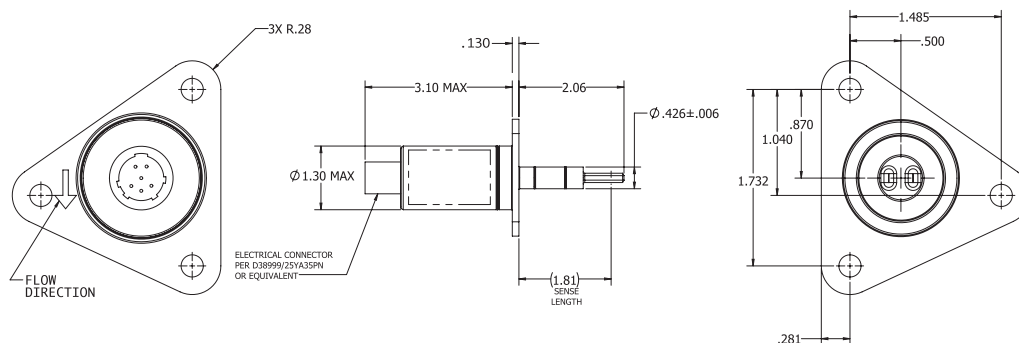
- **Weight:** 8 oz. [227 g] maximum
- **Operating Pressure:** Standard up to 2000 psig [138 bar(g)]; higher pressures available by request, contact FCI
- **Switch Point Adjustment**
Factory set at customer specified switch point within flow range listed:

Flow Range

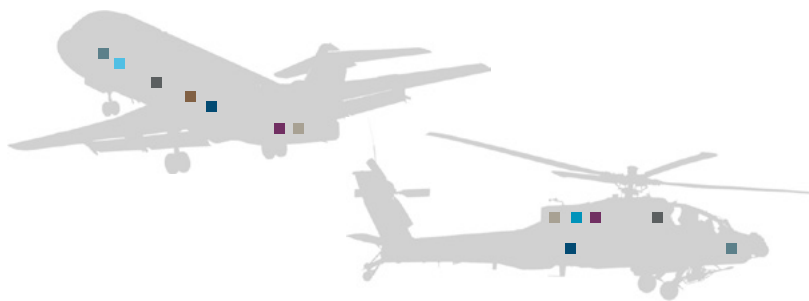
Process Fluid	Switch Point Range
Fuel, Hydraulic Fluid, Coolant	0.01 SFPS to 10 SFPS [0,003 MPS to 3 MPS]

- **Operating Temperature Range**
Flow Element: -65 °F to 350 °F [-54 °C to 175 °C] *Specify actual requirement*
Electronics: -40 °F to 257 °F [-40 °C to 125 °C]
- **Repeatability:** ±2% of full signal range
- **Time Response:** 5 to 15 seconds typical, depending on fluid type and switch point
- **EMI and Lightning Protection:** MIL-STD-461 and RTCA/DO-160
- **Qualifications:** MIL-STD-810 and RTCA/DO-160
- **Quality Systems Approval:** ISO 9001, AS9100

Model AS-FS Liquid Flow Switch Drawing



Aircraft System Applications



- Liquid Cooling Systems
- Fuel Tanks and Refueling Systems
- Generators
- Engine Fuel Controls
- Airframe Mounted Pod System
- Radar and Electronic Accessory Cooling
- Auxiliary Power Unit (APU)
- Potable and Gray Water



Visit FCI online at www.FCIAerospace.com | FCI is ISO 9001 and AS9100 Certified

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