

Model AS-FS



Aircraft Qualified Flow Sensor / Switch



FCI's Flow Sensor / Switch Applications

- Liquid Cooling Systems
- Fuel Tank Inerting Systems
- PACK Air Systems
- Bleed Air Systems
- Fuel Transfer
- Lubricating Oils
- Hydraulic Fluids
- Ground and In-flight Refueling

FCI's Flow Sensor / 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 mass flow directly in gas or liquid, and do not require pressure and temperature corrections necessary with volumetric flow sensing. 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 either hermetically (welded) or environmentally (gasket) sealed in an integral or remote enclosure per customer specifications. 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]). Different outputs available with special order, contact FCI with your requirements. 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. In addition, the temperature compensation feature of the flow switch provides repeatability of $\pm 2\%$ of full flow range. The customer specified set point is factory set in FCI's on-site calibration laboratory to provide the greatest accuracy for the customer's requirement.

FCI's Flow Sensor / Switch Features

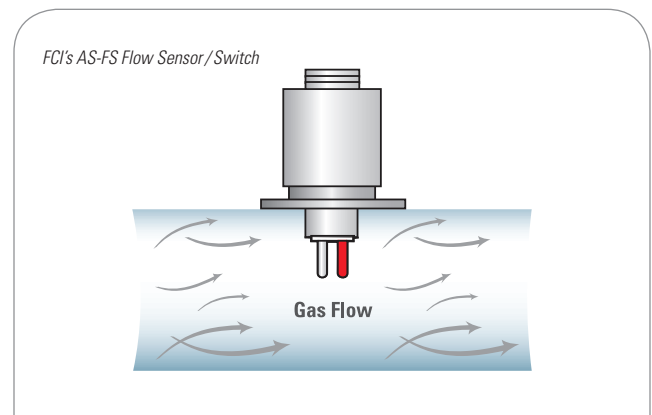
- No Moving Parts, No Routine Maintenance
- Small, Compact and Lightweight
- Simple Installation
- Low Flow Sensitivity
- Wide Turndown Range; 100:1 or More
- Lowest Pressure Drop
- Extreme Temperature, Pressure and Vibration Service
- Highest Reliability, 100,000 hours MTBF
- Corrosion, Abrasion and 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 Flow Switch Specifications

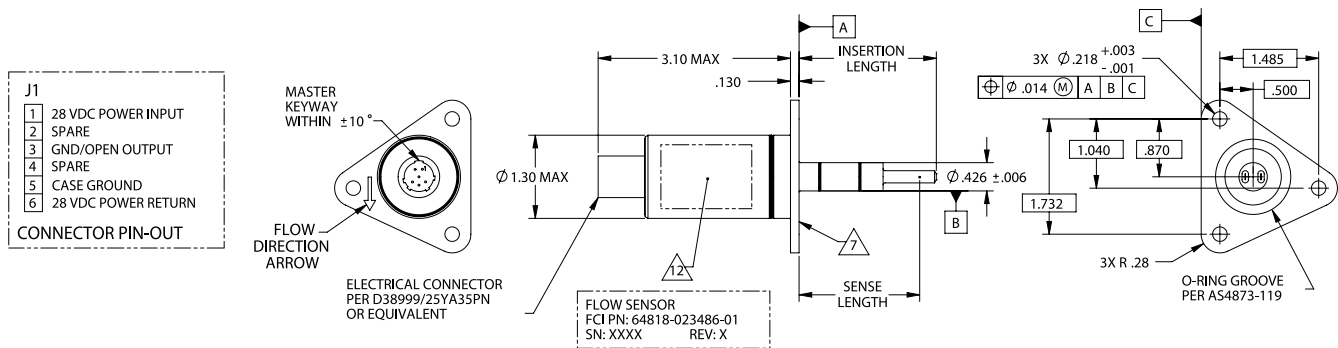
- **Service:** Flow monitoring of liquid or gas
- **Material:** Wetted parts 316 stainless steel, all welded construction
- **Electronics Enclosure:** Hermetically sealed units; 316 stainless steel
- **Electrical Connection:** D38999 or compatible
- **Process Connection:** Flanged with O-ring seal
- **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

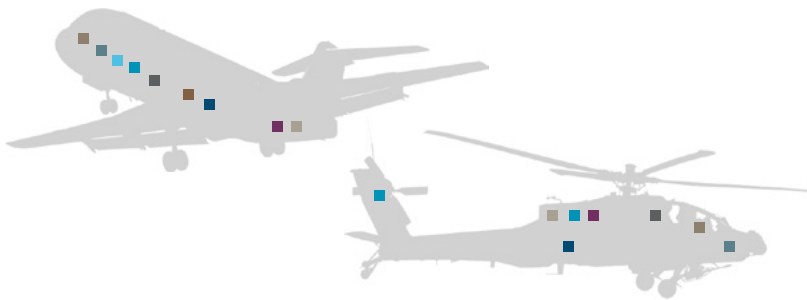
Process Fluid	Switch Point Range
Air	0.25 SFPS to 1,000 SFPS [0.07 MPS to 305 MPS]
Fuel, Hydraulic Fluid, Coolant	0.01 SFPS to 10 SFPS [0.003 MPS to 3 MPS]
Water	0.01 SFPS to 5 SFPS [0.003 MPS to 1.5 MPS]

- **Operating Temperature Range**
Flow Element: -65°F to 500°F [-54°C to 260°C] *Specify actual requirement*
Electronics: -40°F to 257°F [-40°C to 125°C]
- **Repeatability:** ±2% of full signal range
- **Time Response:** 1 to 10 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 Flow Switch Drawing – Standard Product



Aircraft System Applications



- Environmental Control (ECS), Air Management Systems (AMS) Control and Health Monitoring
- Onboard Inert Gas/Oxygen Generating System (OBIGGS/FTIS)
- Gearbox Level and Temperature Detection
- 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



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FCI World Headquarters

1755 La Costa Meadows Drive | San Marcos, California 92078 USA | Phone: 760-744-6950 Toll Free (US): 800-854-1993 Fax: 760-736-6250

FCI Europe

Persephonestraat 3-01 | 5047 TT Tilburg, The Netherlands | Phone: 31-13-5159989 Fax: 31-13-5799036

FCI Measurement and Control Technology (Beijing) Co., LTD | www.fluidcomponents.cn

Room 107, Xianfeng Building II, No.7 Kaituo Road, Shangdi IT Industry Base, Haidian District | Beijing 100085, P. R. China
Phone: 86-10-82782381 Fax: 86-10-58851152