

FCI Aerospace Division

Liquid Level Switch Series: Model AS-LLS

Aerospace and Military Applications



FCI'S Thermal Dispersion Technology Advantage

FCI's liquid level sensors detect changes in process condition by monitoring the difference in temperature between a heated temperature sensor and an unheated temperature sensor. The change in temperature difference is a direct indication of the presence or absence of liquid level at the sensor element. This unique method of detection provides the highest reliability for harsh aerospace, military and marine applications with no moving parts in a compact, lightweight, rugged sensor element. This is the FCI Thermal Dispersion Technical (TDT) Advantage.

In liquid level sensing applications the temperature difference between the heated and unheated Resistance Temperature Detectors (RTD) is small, when the element is submerged. When the sensing element is uncovered, the heated RTD quickly warms, while the unheated RTD remains the temperature of the process fluid. This rapid increase in temperature difference is detected as a "dry" signal by the controller electronics, and the output from the electronics indicate the change. Once the element is again submerged, the process is reversed; and the heated RTD is quickly cooled, while the unheated RTD remains the temperature of the process fluid. This rapid decrease in temperature difference is detected as a "wet" signal by the electronics, and the output from the controller indicates the return to the covered condition. This technique may be used in any wet/dry or interface application, because the temperature difference between the heated and unheated RTDs is always different when the element is in contact with immiscible fluids.

FCI Liquid Level Element Applications

- » Remote Oil Level Sensor (ROLS)
- » Automation of Sight Gauge Level Detection
- » Hydraulic Reservoirs
- » Fuel Level Detection
- » Collection Sumps
- » Coolant Reservoirs
- » Oil/Water Interface Detection

FCI Liquid Level Switches

FCI liquid level switches for military/aerospace applications provide a unique set of performance features unavailable in other level sensing technologies. FCI's unique Thermal Dispersion Technology (TDT) provides no moving part dependability and repeatability for monitoring the presence or absence of liquid at critical level elevations in reservoirs, vessels and gearboxes. The wetted portion of the probe is hermetically sealed, made of Stainless Steel parts joined by gas tungsten arc weld or nickel braze, with optional titanium or alloy construction available. The element construction provides excellent corrosion resistance that can withstand up to 2000 psig line pressures. It is available with a threaded or flanged mounting and can be provided with a variety of military electrical connectors. The customer specifies the insertion length to position the element at the necessary elevation in his vessel.

The electronics are either hermetically (welded) or environmentally (gasket) sealed in an integral or remote enclosure per customer specifications. Power input is 22-29V per MIL-STD-704. Signal output can be customer specified as an open collector output, and/or a filtered and buffered op amp output of <1VDC (low flow) or > 17 VDC (high flow). The electronics can be configured for special output signals to match customer requirements including relays or digital outputs. An electrical hysteresis is included to prevent sporadic switching when flow rates are in the vicinity of the set point. Because the liquid level induced heat dissipation effect is proportional to fluid cooling capability. The FCI liquid level switch may be set to detect interface between liquids as well as gas/liquid interfaces. In addition, the temperature compensation feature of the liquid level switch provides repeatability in applications with changing temperatures. The customer specified set point may be factory set at FCI's on-site calibration laboratory to provide the greatest accuracy for the customer's requirement.

FCI's Liquid Level Element Features

- » No Moving Parts
- » Gas/Liquid Detection
- » Liquid/Liquid Interface Detection
- » Simple Installation
- » Single and Multipoint Sensing
- » Simultaneous Liquid Level and Temperature Indication
- » Extreme Temperature, Pressure and Vibration Service
- » High Reliability and Maintenance Free
- » Corrosion, Abrasion and Fouling Resistant
- » Rugged, Lightweight, Compact Design

Visit FCI Aerospace Division on the Web: www.fluidcomponents.com

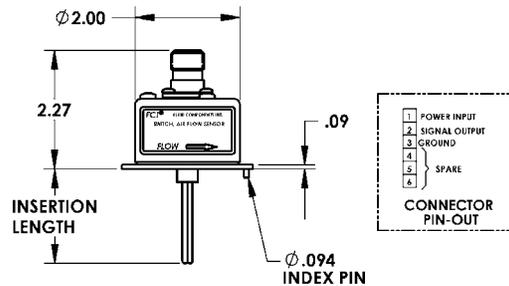
1755 La Costa Meadows Drive, San Marcos, California 92069 USA Phone 760-744-6950 800-854-1993 Fax 760-736-6250
European Office: Persephonestraat 3-01 5047 TT Tilburg The Netherlands Phone 31-13-5159989 Fax 31-13-5799036

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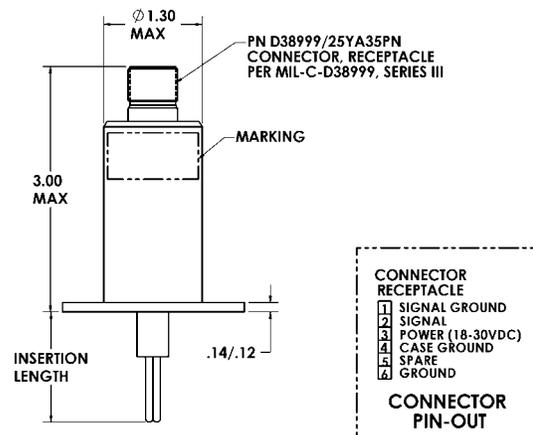
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Specifications

- Service:** Liquid Level Switch for liquid/gas and liquid/liquid interfaces.
- Material:** Wetted parts 316 stainless steel with nickel braze per AMS 4777; or all welded construction; passivation finish per QQ-P-35; special alloys including titanium available.
- Electronics enclosure:** Environmentally sealed units-electroless nickel plated aluminum with o-ring seal; Hermetically sealed units- 316 stainless steel.
- Electrical Connection:** Military connector or flying lead.
- Process Connection:** Flanged or threaded.
- Insertion Length:** Per customer requirement.
- Signal Output Options:** Op Amp totem pole output:
 Wet Signal: Source 2 mA at 17 VDC minimum; Dry Signal: Sink 2 mA at 1 VDC maximum
 Open collector output: Wet signal: Closed, Sinking up to 100 mA at less than 1 VDC; Dry signal: open, leakage <10 μ a at 28 VDC.
- Electrical Power Input:** 28VDC nominal per MIL-STD-704.
- Power Consumption:** 50 to 85 mA depending on type of output signal(s).
- Weight:** Typical 0.35 to 0.45 lb.
- Proof Pressure:** Up to 2000 psig as required by application.
- Switch Point Adjustment:** Factory set at customer specified switch point.
- Operating Temperature:**
 Liquid Level Element: -65 to +500°F (Specify actual requirement)
 Electronics: -40 to 160°F (higher temperatures optionally available).
- Repeatability:** $\pm 1/8$ " of liquid level elevation
- Time Response:** 1 second or greater depending on switch point setting.
- EMI and Lightning Protection:** MIL-STD-462 and RTCA/DO-160
- Options:** Temperature switch output.
 Calibration and/or material certificates.
- Qualification:** MIL-STD-810 and RTCA/DO-160.
- Quality Systems Approval:** ISO 9001, AS9000



Typical Environmentally Sealed Liquid Level Switch



Typical Hermetically Sealed Liquid Level Switch



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