

# FCI Aerospace Division

## Multipoint Liquid Level Switch Series: Model AS-MLLS

### Aerospace and Military Applications



### FCI'S Thermal Dispersion Technology Advantage

FCI has 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 stepped indication of liquid level/interface elevation in vessels and tanks.

The typical multi-point liquid level sensing element contains two linear Resistance Temperature Detector arrays (Platinum RTDs) protected by a rugged stilling well. The active sensing element consists of a number of discrete Resistance Temperature Detectors located at various predetermined points along the length of a sensing element. The other sensing element is a continuous linear RTD that is used as the reference temperature sensor. When the liquid level element is installed in the process, the reference RTD continuously measures the temperature of the surrounding fluid, while the multi-point active RTD is heated by an adjacent heater to a temperature that is higher than the surrounding fluid. The temperature difference between the two sensing elements is related to the number of discrete RTDs immersed in the process fluid.

A microprocessor-based electronic control circuit supplies heater current to the heated sensing element and converts the sensing element temperature difference into a progressive series of switched output signals. The process temperature may also be sensed and compared to a predetermined set point. This temperature set point may be used for controlling a heater or pump. Built In Test (BIT) is provided to assure the highest reliability in Aerospace's and Military's most difficult applications.

### Multipoint Liquid Level Switch Applications

- » Potable Water Vessels
- » Fuel Tanks
- » Hydraulic Fluid Reservoirs
- » Refrigerant Height Sensors
- » Lubricant Fluid Supply Tanks

### FCI Multipoint Liquid Level Switch

FCI provides liquid level transmitters for military/aerospace applications with a unique set of performance features unavailable in other liquid level sensing instrumentation. FCI's thermal mass liquid level transmitters measure liquid level directly and do not require the pressure and temperature corrections necessary with other liquid level measurement methods. The liquid level transmitter system typically consists of a liquid level element that is inserted into the customer's process and a control unit that is mounted remotely. Integrally mounted electronics are available as an option. The wetted portion of the liquid level element may be hermetically sealed and made of Stainless Steel parts joined by gas tungsten arc weld or nickel braze, with optional titanium or alloy construction, or it may be constructed of plastics compatible with the liquid to be measured. The liquid level element construction provides excellent corrosion resistance that can withstand up to 2000 psig in vessel pressure. The liquid level element is available with either a flanged or threaded mounting to connect with the process vessel. Electrical connection is made with pigtail flying leads, or a variety of commercial or military connectors. The measurement depth may be 40" or greater as specified by the customer.

The electronics are mounted in an environmentally sealed enclosure with a gasket under the cover. Power input is 22-29VDC per MIL-STD-704. The electronics provide a constant power to the active RTD and heater. The temperature difference ( $\Delta T$ ) between the active and reference RTDs is proportional to the height of the liquid level. The relationship between the  $\Delta T$  and the liquid level is processed by the electronics and converted into a 0-5 VDC, 4-20 milliamp, or switched-to-ground array output. Special (nonlinear) analog outputs are also available. Because the  $\Delta T$  is directly related to liquid level, FCI multipoint liquid level switches provide remarkably accurate outputs, with repeatability of  $\pm 1\%$  full scale. Each multipoint liquid level switch is factory calibrated at FCI's on-site calibration laboratory to provide the greatest accuracy for the customer's services. FCI's design team is available to assure that the multipoint liquid level switch is effectively applied to the customer's service requirements.

### FCI's Multipoint Liquid Level Switch Features

- » No moving parts
- » High reliability
- » Light weight
- » Rugged construction
- » Multi-point level sensing
- » Process temperature output
- » Simple installation
- » Durable sensor solution
- » Optional control circuit
- » Real time temperature compensation
- » Maintenance free
- » Multiple output signal

Visit FCI Aerospace Division on the Web: [www.fluidcomponents.com](http://www.fluidcomponents.com)

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### Specifications

**Service:** Multi-point measurement of liquid level.

**Material:** Level Element: 316 Stainless Steel mounting fitting, PVC stilling well structure and Kapton Polyimide Platinum RTD elements. All 316 Stainless Steel Liquid Level Element with braze or all welded construction optionally available.

**Control Unit Enclosure:** Aluminum Alloy painted lusterless black per MIL-C-83286. Integral control unit enclosure optionally available.

**Electrical Connection:** Liquid Level Element: Connector on flying lead or element-mounted connector.  
Control Unit Enclosure: Connector.

**Process Connection:** Threaded fitting per MS33514-16 Style 3 (1.312-12 UNJ-3A) or mounting flange available per customer requirement.

**Sensing Level Depth:** Up to 40+ inches as specified by customer.

**Signal Output:** Discrete ground/open switched array.  
Stepped 4-20 milliamp output optionally available.

**Power Input:** 28VDC nominal per MIL-STD-704.  
7.5 Watts maximum.

**Liquid Level Elements per System:** 1 or 2

**Weight:** Liquid Level Element: 1.0 to 2.0 lb., depending on length; Remote Control Unit Enclosure: 1.0 lb.

**Proof Pressure:** Up to 300 psig for PVC stilling well and Kapton Polyimide RTD design option of level sensor. Up to 2000 psig as required by application, with all welded 316 Stainless Steel construction.

**Operating Temperature:** Level Element: -65 to +158°F (PVC/Kapton Polyimide Design), -65 to +650°F (316 Stainless Steel Design); Control Unit: -40 to +131°F

**Calibration:** Output calibrated to customer specified levels in actual process media.

**Accuracy:** Liquid Level:  $\pm 0.25$  inch of sensing point  
Temperature:  $\pm 1\%$  full scale

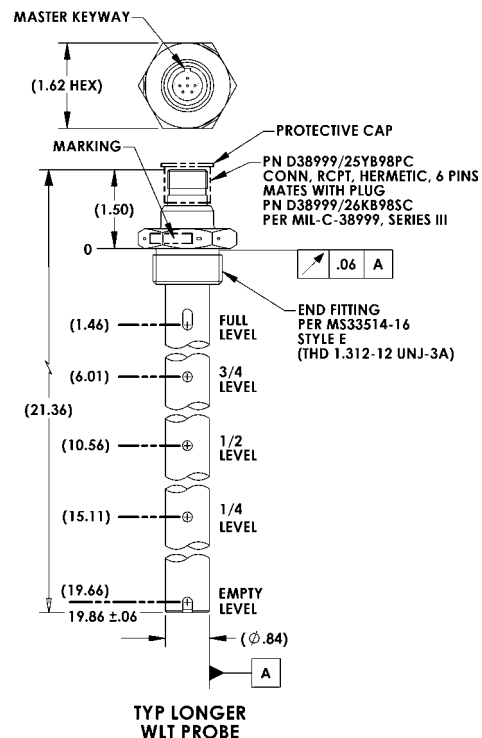
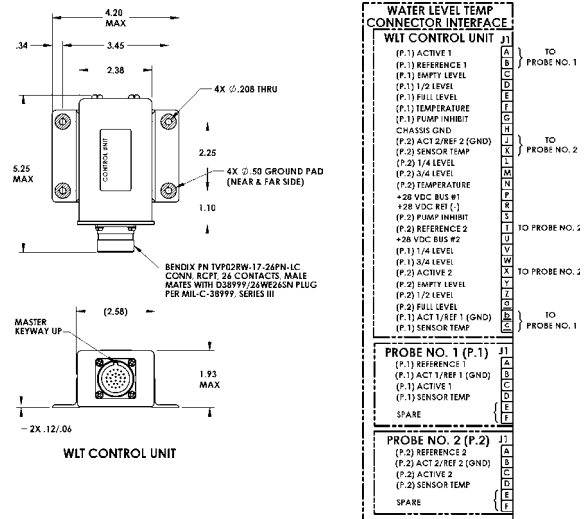
**Repeatability:**  
Liquid Level:  $\pm 1\%$  full scale  
Temperature:  $\pm 1\%$  full scale

**Typical Time Response Constants:**  
Dry to Wet 5 seconds  
Wet to Dry: 60 seconds

**Options:** All welded 316 Stainless Steel construction  
Integral Control Electronics  
Process Mounting Flange  
Calibration and/or material certificates

**Qualifications:** MIL-STD-810 and RTCA/DO-160

**Qualify Systems Approval:** ISO 9001, AS 9000



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