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 ±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

1755 La Costa Meadows Drive, San Marcos, California 92078 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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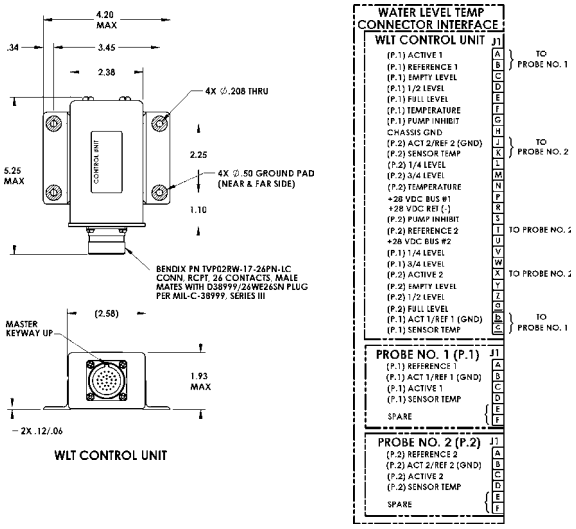
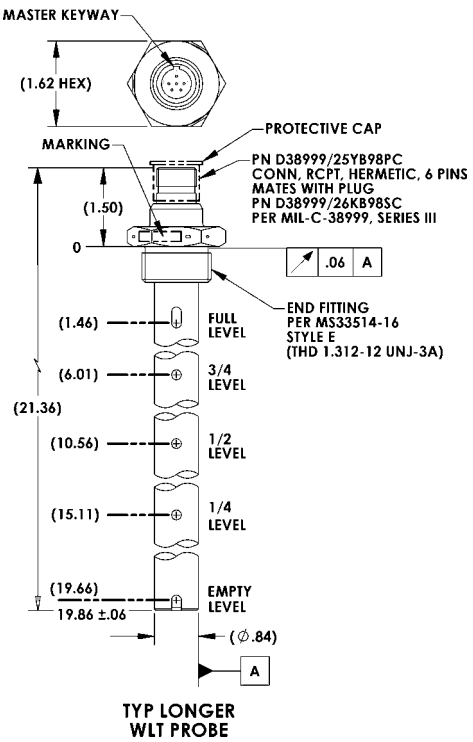
Multipoint Liquid Level Switch Series: Model AS-MLLS

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: ± 0.25 inch of sensing point
Temperature: ± 1% full scale
Repeatability:
Liquid Level: ± 1% full scale
Temperature: ± 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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Application Data Sheet (ADS)

Aerospace & Military Products

Temperature, Flow, Liquid Level & Pressure Sensors

Send completed form: SAVE | EMAIL | Print & FAX

* *Required information*

NOTE: If EMAIL button does not work in your system, please SAVE this form and email to AerospaceADS@fluidcomponents.com with the PDF as an attachment

Customer Information

Date: _____

*** Company Name:** _____

* Address: _____

_____

* City: _____ State: _____ * ZIP/Postal Code: _____

Country: _____ ☐ Commercial ☐ Military

*** Technical Contact:** _____

* Phone: _____ Fax: _____

* Email: _____

Procurement Contact: _____

Phone: _____ Fax: _____

Email: _____

Application Information

Sensor type: ☐ Temperature ☐ Pressure ☐ Flow ☐ Level/Interface ☐ Other: _____

Mounting connection: ☐ Thread ☐ Flange Description _____

Input Power: ☐ 28 Vdc ☐ 110 Vac, 60 cycle ☐ Other: _____

Alarm Output: ☐ Open drain buffer ☐ Analog Output Only ☐ Other: _____

Application Sketch

☐ **Sending sketch via email**

Process Conditions

Primary process media (at sensor location): _____

☐ Gas ☐ Liquid

Temperature - specify units: ☐ °F ☐ °C ☐ Other: _____

Minimum: _____ Nominal: _____ Maximum: _____

Pressure - specify units; ☐ psig ☐ psia ☐ bar(g) ☐ atm ☐ Other: _____

Minimum: _____ Nominal: _____ Maximum: _____

Secondary process media (flow or level): _____

☐ Gas ☐ Liquid

Temperature - specify units: ☐ °F ☐ °C ☐ Other: _____

Minimum: _____ Nominal: _____ Maximum: _____

Pressure - specify units; ☐ psig ☐ psia ☐ bar(g) ☐ atm ☐ Other: _____

Minimum: _____ Nominal: _____ Maximum: _____

Interface description (specify interface state; foam, sediment, slurry): _____

Calibration Conditions *(Customer must specify calibration media)*

Temperature/Pressure Applications

Temperature/Pressure range:

☐ As entered for the primary media in Process Conditions section above

☐ As entered for the secondary media in Process Conditions section above

☐ Other _____

Alarm set point: No. 1 _____
No. 2 _____
No. 3 _____

Analog output signal: ☐ Not required
☐ 0-5 Vdc
☐ 4-20 mA
☐ Other _____

For temperature applications only

Element type: ☐ RTD
☐ Thermistor
☐ Thermocouple

Flow Sensor Applications

Duct inside diameter: _____ ☐ Inch ☐ mm

Pipe orientation: ☐ Horizontal ☐ Vertical

Sensing element mounting: ☐ Side ☐ Top

Flow direction: ☐ Right to left ☐ Left to right
☐ Top to bottom ☐ Bottom to top

Flow rate: Min. _____ Max. _____

Nominal flow rate: _____

Flow units: _____

Alarm set point: No. 1 _____
No. 2 _____
No. 3 _____

Signal output: ☐ 0-5 Vdc ☐ 4-20 mA

Media: ☐ Air ☐ Fuel
☐ Hydraulic fluid ☐ Coolant

Description: _____

_____

Level/Interface Applications

Sensing element mounting: ☐ Side ☐ Top ☐ Bottom

Level or interface rate-of-change (at sensing element): _____

☐ Inch/sec ☐ mm/sec
☐ Inch/hr ☐ mm/hr

Alarm set point elevation distance from mounting connection:
No. 1 _____
No. 2 _____
No. 3 _____
No. 4 _____
No. 5 _____

Analog output signal:

☐ Stepped ☐ Continuous
☐ 0-5 Vdc ☐ 4-20 mA
☐ Not required
☐ Other _____