FLT93 FlexSWITCH® Series

FLUID COMPONENTS INTERNATIONAL LLC

Nuclear Qualified

FLT Series – Nuclear Qualified

Nuclear Standards

In the early 1970s FCI pioneered the first thermal flow switch to meet the rigid requirements of IEEE 323 (environmental) and IEEE 344 (seismic) for safety related nuclear power plant application. This pioneering tradition continues with the FlexSWITCH as it represents the next generation of instruments qualified to the latest requirements on the nuclear power industry.

The FlexSWITCH has been tested to IEEE 323-1983 and IEEE 344-1987 making it fully qualified for Class 1E safety related nuclear power plant applications. FCI maintains a 10CFR50 Appendix B Quality Assurance Program and complies with 10CFR21 and ANSI-N45-2. Both the insertion and in-line sensor versions are qualified for a 40-year life at 150°F. The FLT93 sensor is qualified to radiation levels of $2x10^8$ rads. The FLT93 electronics are qualifed to $5x10^5$ rads for applications requiring an integral unit (sensor and electronics).

FCI Test Facility

On-site calibration laboratory traceable to NIST.

FlexSWITCH Features

Sensor

- No moving parts
- All stainless steel welded construction
- Low pressure loss
- Low flow sensitivity
- Easy installation, low cost

Electronics

- Real time temperature compensation
- Analog flow output signal (non-linear)
- Analog temperature output signal
- Calibration mode switch to simulate alarm set points
- Calibration mode potentiometer
- Dual alarm, each with SPDT relay
- Field selected single set point/DPDT relay option
- Field selected fail-safe configuration

Applications

Flow Switch

- Valve flow (PORV/SRV)
- Valve leakage (MSIV)
- Pump seal injection and leakage (RCP/Feedwater)
- Reactor Building Ventilation

Flow Rate (non-linear ouput) in addition to Flow Switch

- Ventilation supply and discharge
- Condenser offgas
- Air and liquid sample line
- Waste gas decay tank release
- Heat exchanger
- Filter throughput

Level Switch

- Steam drain and condensate pots
- Water – steam interface in lines
- Scram discharge
- Loop seals
- Oil reservoir
- Multi-point applications
  - Tanks (surge, resin, radwaste, boric acid, slurry)
  - Room/area flooding
  - Fuel pool
  - Sumps
- Three media applications
  - Air, oil and water

Special Applications

- Void formation and detection
- Drain line moisture presence
- Pump protection

Temperature (dedicated linear output with switched output selectable)

- Process (corresponding to flow/level measurement)
- Tank contents
- Area/room (normal operation/abnormal condition)

Specifications: FLT93S and FLT93F Insertion Flow Switch

Sensing Element Features

Process Connection: 1¼ inch MNPT. Other connections available.
Sensing Element Material: All wetted surfaces 316 stainless steel welded construction. Other material available upon request.

Operating Parameter

Temperature (sensor): Process Temperature: -40° to 250°F [-4° to 121°C].
Pressure: Process Pressure Rating: 2000 psig
Accuracy: ±5% of reading on flow

FLT93S Sensing/Flow Element Set Point Range

Water-based fluids:

- 0.01 to 0.5 sfps [0.003 to 0.15 smps], 0.75 watt heater power
- 0.01 to 3.0 sfps [0.003 to 0.09 smps], 3.0 watt heater power

Hydrocarbon-based liquids:

- 0.01 to 1.0 sfps [0.003 to 0.03 smps], 0.75 watt heater power
- 0.01 to 5.0 sfps [0.003 to 1.5 smps], 3.0 watt heater power

Gases:
0.25 to 120 sfps [0.076 to 37 smps], 0.75 watt heater power at standard conditions: 70°F [21.1°C], 14.7 psig [1.013 bar(g)]

Other fluids: Contact factory for approximate rangeability.

FLT93F Sensing/Flow Element Set Point Range

Hydrocarbon-based liquids:

- 0.01 to 0.5 sfps [0.003 to 0.15 smps], 0.25 watt heater power
- 0.01 to 1.5 sfps [0.003 to 0.46 smps], 0.6 watt heater power

Gases:
0.25 to 120 sfps [0.076 to 37 smps], 0.25 watt heater power at standard conditions: 70°F [21.1°C], 14.7 psig [1.013 bar(g)]

Other fluids: Contact factory for approximate rangeability.

Specifications: FLT93L In-line Flow Switch

Sensing Element Features

In-line Body (spool) lengths 3.375 inch [85.7 mm]
Process Connection:
Sensing Element Material: All wetted surfaces are 316 stainless steel all welded construction.

Sensing/Flow Element Range

- Water-based fluids: 0.015 to 50 cc/sec
- Motor Oil: 0.33 to 110 cc/sec
- Air: 0.6 to 20,000 cc/sec

Other fluids: Contact factory for approximate rangeability.

Operating Parameter

Temperature (spool piece): Process Temperature -40° to 250°F [-4° to 121°C].
Pressure (spool piece): Process Pressure Rating 2000 psig.
Accuracy: ±5% of reading on flow

Control Circuit Features

Input Power: Pre-configured to 120 Vac; 240 Vac; 50 to 60 Hz, 24 Vdc; or 24 Vac.
Relay Rating: Dual SPDT or single DPDT field configurable 6 Amp resistive at 115 Vac or 24 Vdc. Optional off-board relay configurations available.
Electrical Enclosure: NEMA 4 (carbon steel) or s4x (stainless steel).

Level

For level applications, the FLT93 can be configured to measure the level of the media or the interface of multiple media. The point level design can be provided as a single sensor point for low or high level applications or multiple sensor points mounted on a stand piipe to measure varying levels in the tanks, sumps, etc.

The electronics can be configured to provide an independent output in single or multiple media or designed to provide a 4-20mA step change where multiple sensors are used.

Temperature

For temperature applications, the FLT93 can be configured to indicate specified temperatures with the added feature of initiating on board relays for optimizing, enhancing, or protecting the process.

Locally Represented By:

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FCI is ISO 9001:2000 and AS9100 Certified

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