FS2000 Flow Switch and LS2000 Level Switch

Two-Wire, or Alarm with SPDT Relay

FCI's NuTec FS2000 flow and LS2000 level insertion switches represent the first thermal switches designed with 2-wire (loop power) 4-20 mA. Using 24 Vdc input power, this design allows for retrofitting existing failure prone mechanical float and paddle switches without wiring modifications. An alarm with SPDT relay and input power of 100-240 Vac, 24 Vdc or 24 Vac is also available.

Product Features

- Proven technology at an economical price from the #1 thermal dispersion flow, level and temperature instrumentation supplier in the world
- Rugged and reliable construction with no moving parts design
- 304/305 stainless steel or 316L stainless steel all welded wetted parts
- 2-wire design with 24 Vdc replaces existing mechanical devices
- Alarm with SPDT relay available
- Rated for installation in hazardous locations
- Global agency approvals

Industries

- Chemical
- Food and Beverage
- Mining
- Oil and Gas
- Pharmaceutical
- Pulp and Paper
- Water and Wastewater
- Power and Energy
- Steel

Flow Applications

- Pump protection
- Seal leak detection
- Lubricant
- Chemical injection
- HVAC monitoring

Level Applications

- Tank level
- Sump level
- Foam interface
- Overflow detection
- Sludge interface

Specifications

Flow Setpoint Range:

- **Water:** 0.15 - 1.5 fps [0.045- 0.45 mps]
- **Hydrocarbons:** 0.15 - 2.0 fps [0.045 - 0.60 mps]
- **Air/Gas:** 0.5 - 100 sfps [0.15 - 30 nmps]

Flow Repeatability: ±1% of setpoint range.

Flow Response Time: 0.5 to 2.5 seconds.

Level Accuracy:

- **Top Mount:** ±1/4 inch [±6 mm] from element tip.
- **Side Mount:** ±1/8 inch [±3 mm] from center line of element tip.

Level Response Time:

- **Dry to Wet:** Less than 2 seconds
- **Wet to Dry:** Less than 5 seconds
- **Wet to Wet (Interface):** Less than 10 seconds

Enclosure:

- **For 2 Wire (Loop Power):** Aluminum NEMA Type 4X [IP66] and hazardous locations Groups C and D.
- **For Alarm Relay:** Aluminum NEMA Type 4X [IP66] and hazardous locations Groups B, C, D, E, F, G.

Agency Approvals: FM, CSA, Cenelec, ATEX, and CE Mark.

Flow Element

Materials of Construction: 304/305 stainless steel or 316L all welded stainless steel.

Process Connections:

- **For 304/305 stainless steel:** 1/4 inch male NPT
- **For 316L stainless steel:** 3/4 inch male NPT

Insertion Lengths:

- **For 304/305 stainless steel:** 0.98 inch [25 mm], 2.23 inch [57 mm] or 3.8 inch [152 mm]
- **For 316L stainless steel:** 1.2 inch [31 mm] or 6 inch [152 mm]; customer specified lengths optional.

Operating Temperature: -40° to +250°F [-40° to +121°C]

Operating Pressure: 500 psig maximum [35 bar(g)]

Control Circuit

Operating Temperature: 0° to 140°F [-18° to +60°C]

Input Power:

- **2-Wire Loop Power:** 22.5 to 33 Vdc. Power consumption is 0.5 watts maximum.
- **Low Voltage:** 22.5 to 26.5 Vdc/21.5 to 26.5 Vac.
- **High Voltage:** 100 to 240 Vac. Power consumption is 5 watts maximim.

Signal Output:

- **2-Wire Loop Power*:** Alarm indicator responds to change in current draw between 14 mA and 18 mA.
- **Low or High Voltage*:** Alarm indicator is a 6 amp relay, 28 Vdc/240 Vdc resistive.

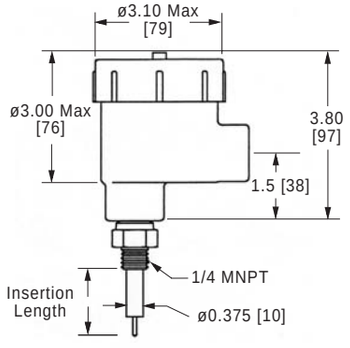
* Secondary alarm indicator is an open collector circuit (250 mA maximum).

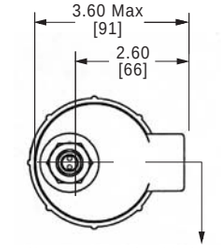
Theory of Operation: Thermal Dispersion

FCI's unique Thermal Dispersion technology provides exceptionally accurate, reliable and repeatable flow and no flow detection. The typical sensing element contains two resistance temperature detectors (platinum RTDs). One RTD is heated and the other RTD senses the process temperature. The temperature difference between the two RTDs is related to the process medium. Higher flow rates or denser media cause increased cooling of the heated RTD and a reduction in the temperature difference.

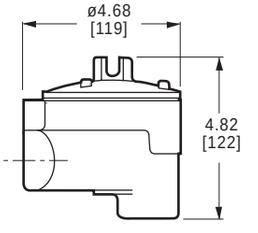
The temperature difference is greatest in a no flow condition and decreases as flow increases, cooling the heated RTD. Changes in media directly affect the extent to which heat dissipates and, in turn, the magnitude of the temperature differential between the RTDs. An electronic control circuit converts the RTD temperature difference into a DC signal that is used to drive an adjustable-setpoint relay alarm circuit.

304/ 305 Stainless Steel with 2-Wire

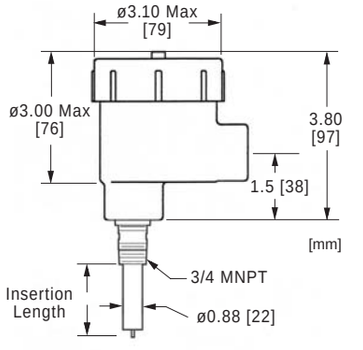




-1/2 FNPT Port for 304/305
-3/4 FNPT Port for 316L
Optional Connector Available



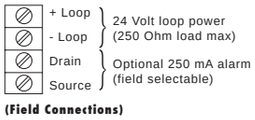
316L Stainless Steel, All Welded with 2-Wire



Enclosure for 304/305 or 316L Stainless Steel with Alarm Relay

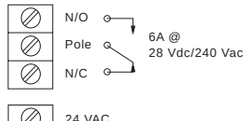
Wiring Diagrams

Loop Power



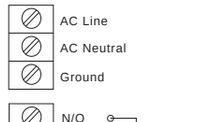
(Field Connections)

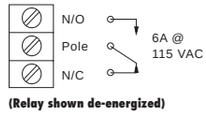
Low Voltage



(Relay shown de-energized)

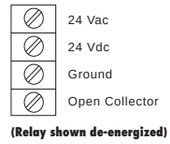
High Voltage





(Relay shown de-energized)

Bottom board



(Relay shown de-energized)

Top board

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FCI is ISO 9001 certified/conformance to AS9000

Doc. No. 02MK011500D