Typical Level Applications for Thermal Dispersion Switches

Thermal Dispersion switches are well suited to detect interface of air / liquid, liquid / liquid, air / foam, emulsion layers or liquid / solid or granular solids. This example illustrates the Thermal Dispersion switches being used to detect the oil layer in an oil / water separator. A second switch is used to detect the rise of the sand layer in the separator.

The sensor head employs two temperature sensors with a constant low power heating source physically attached to one of the sensors (see Fig. 1). This creates a temperature differential (ΔT) between sensors which varies depending on the surrounding product’s ability to disperse heat. The amount of heat dispersed is relative to the product’s thermal conductivity and therefore can detect liquid interfaces and flow rate changes that other technologies cannot differentiate. Compensation for process temperature changes is made automatically and does not affect calibration.

The Thermal Dispersion switch electronics after the latest technology including constant current sensor/heater excitation, precision signal amplification and highly reliable and repeatable switch point operation. Field calibration is accomplished by simply adjusting a potentiometer to the desired set-point.

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Addition advantages to Thermal Dispersion level switches is the ability to operate in viscous, hot fluids such as crude oil or molasses. Slurries with high particulate content and sump level detection are additional applications ideally suited for Thermal Dispersion technology.

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**K-TEK THERMAL DISPERSION SWITCHES FOR FLOW / LEVEL / TEMPERATURE APPLICATIONS**

**Gas Flow**
- Designed to 3A requirements

**Chemical Feed**
- Simple, reliable, cost effective
- Type 316L Stainless Steel, welded (std)
- Verifies positive seal flow or detects

**Temperature Range**
- -50°F to +350°F / -45°C to 117°C

**Liquid Flow**
- Pharmaceutical
- Bearing Lubrication
- Pressures to 10,000 PSIG / 690bar
- Full Vacuum to 10,000 PSIG (690bar)
- Hastelloy C-276
- Any Specific Gravity
- Turns off pumps, heaters, 316L Stainless Steel, (std), wetted parts
- One Switch for Gas or Liquid Flow, Liquid Level, Interface Level,

**Exotic alloys for corrosive applications**
- Type 316L Stainless Steel
- Alloy 20

**Energy Management**
- Tank Car Loading
- Energy Management
- Temperature Range -320°F to +900°F / -195°C to 482°C

**PUMP RELATED APPLICATIONS**
- Pump Protection — Automatically shut-off to save flow
- Bearing Lubrication — Design for lubricant flow
- Seal Leakage —色泽:+ba+e+ri+di+on+to+is+mi+on+to+an+e+na+on+to+on+the+e+n+ti+n+o+ne+o+ne+o+ne+e+le
- Energy Management — Pump shut-off to save loss of product to conserve energy
- Chemical Feed — Indicates interior flow of chemical and potential danger to Plant personnel
- Metering Pumps — Causes loss of product flow occurring in measurement

**FLOW VERIFICATION / INDICATION**

**MISCELLANEOUS APPLICATIONS**
- Control Room — Elevator levels when gauges or valves are energized
- Pump Air — Detects loss of flow for process or safety
- Safety Shower — Indicates safety shower in use and potential danger to Plant personnel
- Analyzer/Gas Chromatograph — Monitors composition sample from process
- Spray Nozzles — Indicates nozzle is blocked or proper spray equipment
- Relief Valve/Rupture Disc — Elevator or fluid or leakage of valve or rupture discs

**Typical Flow Applications for Thermal Dispersion Switches**

**IX SERIES IN-LINE FLOW / TEMPERATURE SWITCH**
- Response time from 1 second
- Type 316L Stainless Steel, welded parts
- Expansion proof

**IM SERIES LOW-COST IN LINE FLOW / TEMPERATURE SWITCH**
- Response time from 1 second
- Type 316L Stainless Steel, welded parts
- Expansion proof

**TS SERIES - SANITARY FLOW / LEVEL / TEMPERATURE SWITCH**
- Response time from 1 second
- Type 316L Stainless Steel, welded parts
- Expansion proof
- Pressure to 150 PSI / 10bar

**TX SERIES - STANDARD FLOW / LEVEL / TEMPERATURE SWITCH**
- Response time from 1 second
- Type 316L Stainless Steel, welded parts
- Expansion proof

**Conversions**

- F.P.S. (Feet per Second)
- Flow Rate

**Flow Multiplier**
- Multiplier

**Liquid**
- Flow Rate

**Gas**
- Flow Rate

**Conversion Chart**

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**INSTRUMENT RANGEABILITY: TX, TS & IQ SERIES**

**INSTRUMENT RANGEABILITY: IX & IM SERIES**

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**Gas Multiplier**

<table>
<thead>
<tr>
<th>LINE SIZE</th>
<th>Gas Multiplier</th>
<th>Gas Multiplier</th>
<th>Gas Multiplier</th>
<th>Gas Multiplier</th>
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<tbody>
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<td>0.00287</td>
<td>0.00310</td>
<td>0.00343</td>
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<td>0.434</td>
<td>0.519</td>
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<tr>
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<td>0.434</td>
<td>0.565</td>
<td>0.602</td>
</tr>
</tbody>
</table>

**Test Conditions:** 60°F, 14.7PSIA, SCH. 40 LINE

**Example 2:** 10 G.P.M. in 3” line = 10 x 0.0434 = 0.434 F.P.S.