



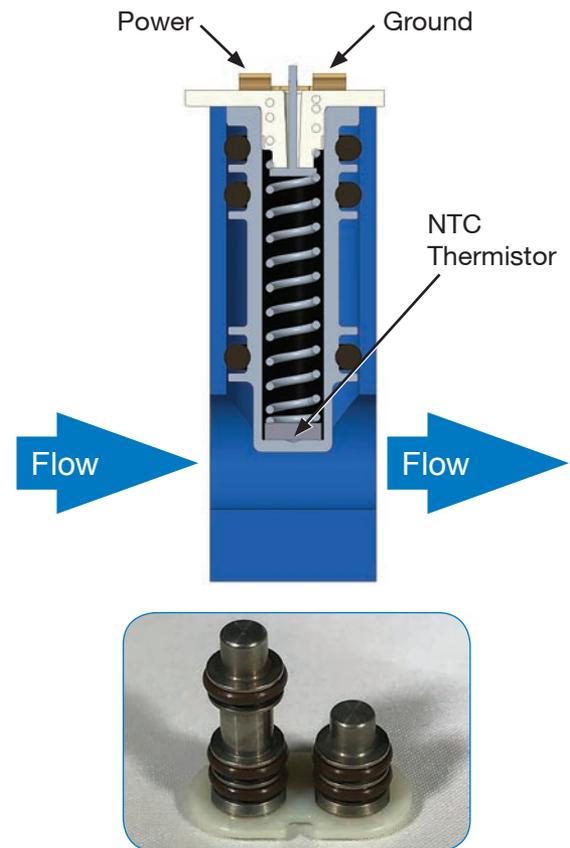
# Application Spotlight

## Flow Detection / Flow Restriction

### NTC Thermistors Used for Flow Detection

\* By utilizing the properties of thermal dissipation, NTC-based sensors can be utilized to determine rate of flow and if flow interruption occurs

- NTC Thermistors are excellent devices to help determine changes in thermal dissipation of a sensed media. By using the self heating characteristics, the NTC Thermistor can be heated to a point somewhere above ambient conditions. The amount of power needed to reach this temperature is proportional to the dissipation of the media being sensed.
- A simplified convection equation  $dq = h dA (T_{fluid} - T_{Sensor})$  explains the heat transfer mechanism. The value of h is related to the Reynolds number of the fluid, which varies with velocity. It should be noted that the differential temperature of the fluid to the sensor impacts the heat transfer. All of this is related to the ability of the sensor to dissipate the heat generated in the NTC.
- Using the NTC in a pulsed mode allows the circuit to determine the initial temperature of the fluid at time=zero. By controlling the amount of power provided and measuring either current or voltage drop at the end of the power cycle, one can determine the rate of flow through a fixed orifice, such as a pipe or passageway.
- In applications that require metered flow, detection of flow obstructions can set an alarm to a system or operator that maintenance to the system is required.



### Applications

- Chemical Sprayers
- Fluid Flow in Processing
- Leak Detection Systems

### AAS Advantage

- Amphenol's NTC Thermistors provide a high rate of change in resistance over small temperature changes. This allows a larger signal-to-noise ratio when evaluating changes in self heated thermal dissipation.
- Mechanical packaging of the element to protect it from harsh chemicals and environments requires expertise in designing systems and provide excellent thermal performance. Amphenol's design experts will work with you to develop a system to meet your needs.

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