

Preventing Cooling Tower Dry-Running Pump Issues With Dual-Function Thermal Flow Switches

Oil/Gas Refineries, Chemical Plants, Electric Power Plants, Food/Bev and More

San Marcos, CA — Engineers responsible for cooling high-temperature industrial environments safely to avoid emergency shutdowns, repairs and downtime will find the dependable [FLT93 Series Flow Switch](#) from [Fluid Components International \(FCI\)](#) provides a reliable early warning alert in the event of cooling tower pump dry-running conditions, which can lead to emergency shutdowns, service interruptions, pump failures and unplanned costly maintenance.



The high temperature, high pressure distillation process environments encountered in crude oil refining process plants, for example, require the continuous cooling of the separation equipment with large cooling towers. To dissipate heat, these towers require the pumping of water-based coolants for air evaporative cooling or employ various other coolant fluids.

Cooling towers draw hot air into the cooling tower and/or move air with large fans across and around equipment. Their water-based coolant is typically recycled and pumped multiple times and is treated with a variety of corrosion inhibiting chemicals that protect both the cooling system and the equipment that is being cooled. In addition to use in petrochemical plants, such cooling towers are also used in electric power generation plants and other industrial processes including the production of chemicals, food/beverage and more.

No matter the type of active cooling tower system in use at a plant, they all have several things in common. One of them, however, is essential for safety and throughput. Pumps are required to move the water and/or coolant fluid into the cooling tower. If a pump fails to move or replace the fluid into the cooling system or fails to recycle the fluid into the system, then equipment cooling is affected or disrupted. Similar to the way a leaky car radiator stops functioning, the driver (or in this case the plant control system or operator) sees the temperature gage climbing fast: It's time to pull over now and turn off the engine to avoid damage.

The dual alarm FLT93 Series Flow Switch from FCI reliably monitors the flow and temperature of liquids, gases, slurries and more. It is ideal for pump wet/dry detection, where sudden, unexpected reductions in media flow rates can leave pumps vulnerable to over-heating conditions that shutdown process lines and require trouble-shooting, fixes and more. This SIL2 rated instrument is designed for heavy-duty, potentially hazardous process industry environments and comes with a comprehensive list of global safety approvals.

Featuring a no moving parts design, the FLT93 Switch offers a highly robust scheme for pump protection with its dual alarm capability. With Alarm 1, the switch will detect a low flow situation anywhere between 0.01 and 3 feet per second FPS (0.003 to 0.9 meters per second MPS). This low flow alarm can be regarded as a pre-warning signal for the control system or operator. The system or operator can then decide to keep the pump running or to shut it down.

If an Alarm 2 occurs because the feed line to the pump is running dry, this condition would be an emergency signal to shut down the pump immediately because the bearings now see gas instead of a liquid as a heat transfer media. In such situations, the temperature of the bearings can rise extremely fast. Using a flow switch prevents permanent damage to the pump's bearings that will require an overhaul of the pump before more damage occurs.

This dual-function instrument indicates both flow and temperature, and/or level sensing in a single device, The FLT93 Switch is a multipurpose component. Dual 6A relay outputs are standard and are assignable to flow, level or temperature. The FLT93 Switch can be specified in either insertion or inline styles for pipe or tube installation.

Ideal for rugged industrial applications, the FLT93 Switch is hydrostatically proof pressure tested to 3500 psig [240 bar (g)] at 70°F (21°C). De-rated with temperature, the maximum operation service recommended is 2350 psig [162 bar (g)] at 500°F (260°C). Higher ratings are available with special construction and test certification. Agency approvals include FM, FMc, ATEX, IECEx, SIL2, Inmetro, EAC/TR CU, EMSA EQM-Ex, CSA, CRN and CE/PED/LVD.

With superior dependability, FCI's versatile FLT93 Switches are ideal for applications in many demanding process industries. They are also used extensively with or without SIL2 certification in a wide variety of applications in the food/beverage, mining/milling, pulp/paper, pharmaceutical, water/wastewater treatment and more.

FCI is the only thermal manufacturer providing built-in temperature compensation to ensure set point accuracy for process temperatures that vary up to $\pm 100^{\circ}\text{F}$. The FLT93 is easily field-configured, providing unparalleled flexibility, accuracy and stability for all multiple process sensing and switching requirements.

FCI solves flow and level measurement applications with advanced thermal dispersion technologies. With 60 years' experience and the largest installed base of thermal flow meters, flow switches and level switches, count on FCI to know your application and have the solutions.