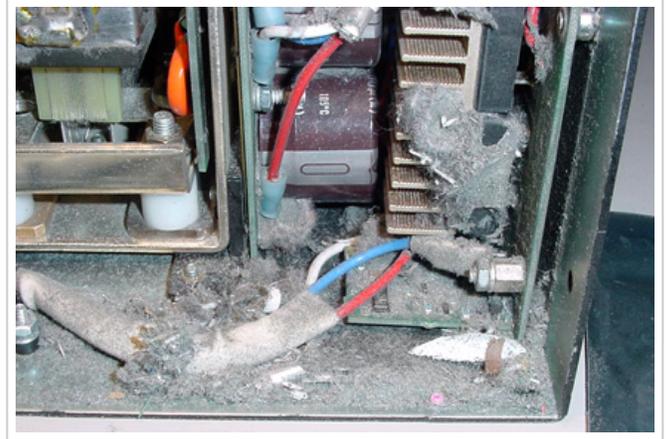


Thursday, February 2, 2012

## Advantages of Conduction-Cooled Power Supplies

Most mid- to high-power supplies use fans to help dissipate the internal heat that is generated as a result of imperfect AC to DC conversion efficiencies. Since fans are electromechanical devices, they reduce the system's MTBF and add to the required maintenance expenses.

Attached is a photo of a power supply that operated for many years at a postal depot where mail is handled and sorted automatically. As can be seen (after the fan was removed) paper fragments and airborne dust contaminants were pulled into the supply by the fan and eventually caused a blown fuse.



As might be expected, the proper maintenance program for any fan-cooled power supply calls for the periodic inspections of the supply, with the fan removed, and the replacement of the fan with a new one.

A new breed of conduction-cooled power supplies has been developed that do not depend on fans for cooling. Instead, the required cooling is accomplished by conducting the internal heat loads to an external metal structure or enclosure, which act as a large heat sink surface.



The second attached photo shows [TDK-Lambda's new CPFE1000F series](http://www.us.tdk-lambda.com/lp/products/cpfe-series.htm), which are conduction-cooled, 1,000 watt AC-DC power supplies. (A 500 watt version is also available.) All heat is conducted to the supply's aluminum plate, which is designed to easily mount to a metal enclosure or cold plate for cooling. More details and specifications for these power supplies are at this web link: <http://www.us.tdk-lambda.com/lp/products/cpfe-series.htm>

In some applications, these conduction-cooled devices are mounted to liquid cooled cold plates that are made of metal with internal serpentine channels through which a liquid circulates while removing the unwanted heat. The net result is that the system operates with a substantial reduction in audible noise, reduced maintenance costs (no dust build-up and fan wear-out), and an enhanced MTBF.

Recently, I visited a Television Broadcasting Station that consumes about 100 kilowatts of power. At this location, in separate areas, was a traditional fan-cooled system as well as the latest generation system, which uses conduction-cooled power supplies and RF amplifiers that are cooled via liquid flow cold plates. During the operation of the traditional system with fan cooling, the audible noise was so loud that personnel within 100 feet of the system had to wear hearing protection devices. By comparison, in the other area where the new system with liquid cooling was operating, the noise level was so low (similar to an office environment) that no hearing protection was required.

Posted by [Power Guy](#)