Electric car: Tesla's use of PTC and CID protection in its lithium ion battery pack

Margery Conner - March 08, 2007

I'm familiar with the Tesla - a high-performance (0-60 in 4 secs) sportscar that just happens to be an electric vehicle — from an article in Wired magazine. So I knew that the car's designers relied on existing lithium ion technology rather than spending all their R&D cash trying for the Holy Grail of auto batteries.

What hadn't registered was that the car's battery pack relies on the self-same 18650 cells — all 6,800 of them — that power consumer cell phones and laptops. And sure enough, just like cell phone battery packs, each lithium ion cell in the Tesla has its own positive temperature coefficient (PTC) current limiting device acting as a fuse.

In addition, (and this is all from a white paper, "The Tesla Roadster Battery System") each cell has an internal current interrupt device (CID) that senses excessive internal pressure within the cell - if the pressure gets too high, the CID breaks and electrically disconnects the cell. High internal pressure within a cell is generally caused by over-temperature or other failures that then result in over-temperature, so over-pressure sensing can result in a sort of early-warning system for over-heating and consequent thermal runaway.

What is the makeup of this CID? I have no idea, but I'd sure like to find out.