



Technology Choices for Telematics Back-up Batteries

Emergency back-up batteries for automotive (consumer) Telematics systems must be capable of providing instantaneous high power, have an operating temperature range of -40°C to $+85^{\circ}\text{C}$, be safe for use within the passenger compartment of a vehicle, and have a shelf life of up to 10 years.

These parameters narrow the choice of battery chemistry to a non-rechargeable lithium solution.

Safety

Liquid cathode systems are based on sulfur compounds that are both toxic and corrosive. If one of these cells leaks or vents, releasing the electrolyte into the passenger compartment - then breathing will rapidly become a challenge.

The electrolyte in solid cathode systems, such as lithium-manganese dioxide, is neither toxic nor corrosive. It is however flammable, but providing the cell does not vent no electrolyte will be expelled from inside the cell. This is achieved through the use of a “shut-down” separator between the cathode and anode that closes the cell down in the event of a short circuit. This type of system cannot be used in liquid cathode systems.

“Commodity” cells (such as 2/3A size), which are usually crimp-sealed, should not be used in Telematics systems. Industrial-type cells are hermetically sealed, thus preventing venting or leakage that may occur with less rugged cells.

Sealed-lead acid (SLA) rechargeable batteries have been considered for Telematics back-up; however, these present disadvantages including added weight and volume, high temperature flaws, and the complexity of a charging circuit with temperature compensation. A typical 12-volt SLA battery weighing 1.1 kilograms with a volume of 432 CC's is nearly five times heavier and three times larger than a 12-volt lithium battery weighing 232 grams with a volume of 132 CC's.

Long Shelf Life

In order to guarantee safety, back-up batteries must have a long shelf life, preferably up to 10 years. Lithium-manganese dioxide cells have long had a reputation of providing a 10-year shelf life and operating life – as they are the batteries of choice for long-life smoke detectors and many high-reliability military applications.

Summary

In order to ensure that the Telematics unit, in the event of an accident, can notify emergency services, it is essential that a back-up battery be fitted. It is also vital that that battery should operate under all conditions and should pose no risk to driver and passengers. The choice of battery technology is critical, and all the indications are that the only choice is a non-rechargeable lithium-manganese dioxide battery.

