Press Release (7 May 2011)

Innovative battery technology providing unique features and benefits

CHEEVC, a start up company based in Scotland, has developed a software configurable battery which can be programmed to provide a variable DC voltage and current output at the battery terminals, a world first. CHEEVC's patented new technology provides controlled access to individual cells in the battery chain allowing them to be switched on or off under software control. Besides providing variable power control, this facility allows the implementation a range of new features previously not available within a battery.

The basic hardware enables the cells to be switched off or bypassed for short periods, so called "rest periods", during high rate charging and discharging cycles providing time for the chemical transformations in the cells to stabilise. This in turn reduces the stress on the cells which enables a longer cell cycle life to be achieved. At the same time, the round trip efficiency losses during the charge-discharge cycle are also reduced.

The rest periods also allow the cell voltage to be monitored in the open circuit condition enabling a more accurate estimation of the state of charge of the battery.

Implicit in the system is cyclic redundancy which provides immunity to single cell failures and also facilitates lossless cell balancing during both charging and discharging cycles thus enhancing the battery safety, increasing the reliability and extending the cycle life.

The electronics and associated software are applicable to any type of cell chemistry or cell construction.

Applications

The technology is suitable for traditional fixed voltage applications as well as a range of motor control applications ranging from power tools to electric vehicles.

The first application to demonstrate the technology is a battery for powering light electric vehicles, such as electric bikes, using 18650 type rechargeable cells, the type used in laptops as well as in the Tesla electric car. In addition to the new electronic capabilities, the battery features some innovative construction and thermal management techniques. Interconnections between the cells and the battery management printed circuit board are by means of ribbon bonding and the battery module is filled with a phase change material which equalises the temperature of the cells during operation and conducts the heat away.

Comments

Managing Director Ken Norton said that this new design extends the range of conventional battery management system (BMS) by providing dynamic control of the series cell chains which make up medium and high voltage batteries. Besides improving the battery lifetime, the ability to deliver variable battery power output under software control eliminates the need for inefficient and expensive DC-DC converters or lossy rheostats and regulators in these applications. We expect widespread interest in these new developments.

CHEEVC

CHEEVC is a research and development company founded in July 2010 by Ken Norton in Comrie in Scotland. Studies are under way to determine whether to invest in production facilities to manufacture these batteries or to subcontract the production.

Communications

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