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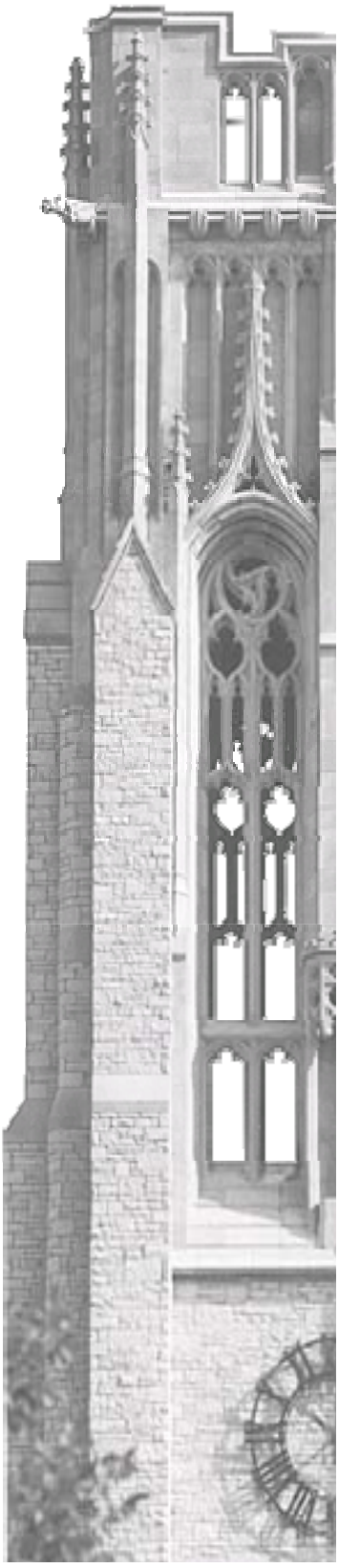
Integrated System for Measuring and Equalizing Cell Voltages in Large Batteries



Large rechargeable battery packs contain numerous cells that are connected in series. When certain types of these large battery packs, such as, lithium-ion batteries, are recharged, monitoring of various cell characteristics is necessary in order to provide improved functional life and safe operating conditions. In many recharging systems, an electronic battery management system (BMS) is employed to measure and/or control the voltage, temperature, and charge differences between cells. The BMS may include an electronic control unit (ECU) to control the various parameter measurements and make charge operation determinations. The BMS may also include an equalizer circuit (EQU) which is used to adjust, or equalize, each of the cell voltages individually relative to the other cell voltages in the battery pack. Most EQUs operate by using a small bleed resistor for each cell to reduce its voltage until all cell voltages equal the lowest one in the pack. Slight differences between the cells can produce large imbalances in the cell voltages after several charge/discharge cycles. This can greatly reduce the charge capacity of the pack since charging is limited by the maximum and discharge is limited by the minimum cell voltage. A common problem with these BMS systems is that the ECU and the EQU must have separate wiring harnesses that connect to the cells, even though the connection points are identical. Therefore, a new battery pack management system has been developed that utilizes a single EQU circuit that can be switched to target a cell via relays in what is called "targeted equalization." These individual circuits are combined to produce a system that equalizes the cells much faster, is relatively simple, and is more reliable than previous systems.

The University of Toledo is seeking a company interested in utilizing this integrated system for measuring and equalizing cell voltages in large batteries.

Application:
Any battery pack with a plurality of cells interconnected in a series

Advantages:
1. Prevents overcharge
2. Cost effective
3. Requires half the number of normal wires
4. Quick to achieve equalization

This invention is patent pending

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