Use case
Material handling

Supercapacitor modules help transform modern material handling

Automation is a key trend in today's material handling industry. When something is to be shipped, it needs to be retrieved quickly, inexpensively, and efficiently. Facilitites increasingly are upgrading and building distribution warehouses with automated systems. These modern warehouses are comparable to a metropolitan street grid, crisscrossed with automated pathways for various pallets. Up until now, most of these automated vehicles were powered by batteries.

Batteries can be problematic in material handling applications. They can store a lot of energy but are generally limited in how they can discharge without effecting lifetime. For material handling applications, a lithium-ion battery is expected to have less than 10,000 full cycle lifespan. This means they incur relatively higher maintenance costs due to the need for frequent replacement. Batteries are heavier, and they contain hazardous materials that require special disposal after replacement. Alternatively, supercapacitors can be fully charged within seconds or minutes, and they efficiently deliver their entire charge just as quickly, operating over a wide temperature range.

A popular trend is food or meal delivery services. These services require the product to stay frozen until it's delivered. With supercapacitors, pallet shuttling services can retrieve products from freezers without drastically impacting their performance. Unlike batteries, supercapacitors do not require as much derating while working in low temperatures. Eaton supercapacitors are lightweight and can operate over a wide operating temperature range of -40 °C to +65 °C.

In material handling, energy is primarily drained by lifting the material or during initial acceleration. When the equipment returns to the floor level position or decelerates, the recapturable kinetic energy is often lost. However, since supercapacitors recharge during the transfer times of material handling, they take only seconds or minutes to regain the kinetic energy used to store or retrieve.

Customizable sizing is desired to meet a wide spectrum of applications by either delivering power over a set amount of time or planning to move heavy materials over a defined distance. Supercapacitor modules are modular in nature, providing easy sizing for both situations. They are passive electronic components that have no moving parts and no hazardous materials offering lifetimes of up to 20 years given the millions of charge/discharge cycles and require no maintenance.

Eaton supercapacitors cover a wide range of working voltages and capacitances. The XVM-16 module is rated at 16.2 V and 65 F with the capability of providing 3.0 kW peak power and the XLR-48 module is rated at 48.6 V and 166 F with the capability to provide 118 kW of peak power. Both can be wired in series and/or parallel to meet power requirements.

Eaton supplies individual supercapacitors or compact modules for energy storage needs. Supercapacitor modules help modern warehouses run consistently and reliably without maintenance downtime or replacement part costs.

Powering Pallet Movers

Recognizing these benefits, one of the largest global material handling companies has integrated the XVM-16 module with three in series and integrated into a 48 V distribution system. Depending on the individual system and project, additional strings of modules are simply paralleled to meet heavier weights or longer distances than standard systems, providing easy scalability. Similarly, the XLR-48 module has been selected for larger pallet mover systems with the same scalability offered by the XVM-16 strings.

Eaton
Electronics Division
1000 Eaton Boulevard
Cleveland, OH 44122
United States
Eaton.com/electronics

www.eaton.com/supercapacitors

Powering Business Worldwide

Printed in USA
Publication No. 10871 BU-MC19007
January 2019

Follow us on social media to get the latest product and support information.