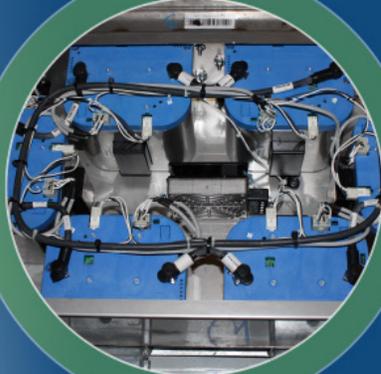


# RICHARDSON ELECTRONICS' ULTRA3000® PATENTED TECHNOLOGY

Energy Storage and Power Delivery for Wind Turbine Pitch System



Ultracapacitor-based energy storage solutions have significantly enhanced reliability in electric pitch control systems. Ultracapacitors, unlike batteries, have the ability to deliver quick bursts of power in a short time frame, an ideal function for emergency pitching in a wind turbine generator (WTG).

The **ULTRA3000®** Pitch Energy Modules (Patented Technology) is a direct one-to-one replacement for the GE\* batteries and chargers and can be installed with no modifications to the battery box. Our Pitch Energy Module (PEM) communicates directly with the GE controller and reports all necessary diagnostic information back to the controller.

We have designed our PEM with owners and installers alike in mind, by eliminating the need for modifications of the wiring harness, installation of additional brackets, or the need to relocate existing components. This greatly reduces installation time, reduces labor costs, and decreases downtime. With over 1 million charge-discharge cycles, our Ultracapacitor Pitch Energy Modules can provide 15 plus years of reliable operation without maintenance.

## Features

- Estimated lifetime of 15+ years
- Drop-in replacement for batteries on 20 and 30 Nm pitch systems
- Wide operating temperature from -40 to 65°C
- No hazardous chemicals
- Millions of operational hours in GE 30Nm pitch systems
- 5000+ operational modules in the field

## Benefits

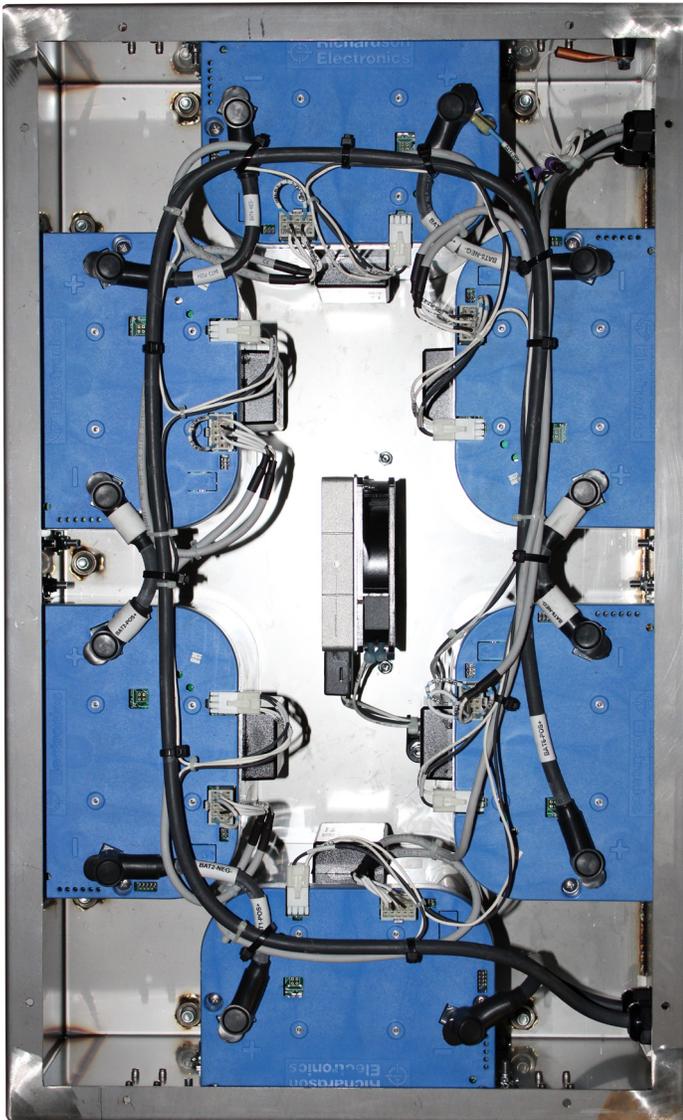
- Easy installation - no modifications necessary
- Improved turbine reliability
- No loss of batteries or power supplies due to motor regeneration
- Reduced O&M cost
- Designed, assembled, tested, and supported in the USA



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Richardson Electronics has been an industry-leader in providing high-quality products and outstanding engineering support for over 75 years. Our extensive global distribution network and world-class partners provide our customers with innovative technologies, products and services.



## Primary Contacts

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