



# REDHAWK ENERGY

## Switch Boost™ 24V

### Application

A railway power switch application requires an AC or DC power source that can provide a high initial current to meet the in-rush/break-away current demand of the switch or hydraulic motor. This momentary inrush is followed by a lower level current for a longer duration as the switch throws. Finally, a small rise in current towards the end of the operation usually occurs as the switch drives home.

Batteries have long been used for railway power switch applications. Batteries provide an “instantaneous” and generally “reliable” source of power for operating a railway switch when called upon. However, the batteries often used in these applications do not always provide the desired (or even expected) service life and reliability.

### All-New Switch Boost™ 24V System

Our innovative Switch Boost™ 24V System utilizes either an ELDC Ultracapacitor or Hybrid Ultracapacitor module to provide enhanced power for 24V railway power switches. Taking advantage of the high current and exceptional cycling capability of ultracapacitors and hybrid ultracapacitors, our Switch Boost™ Systems can dramatically improve the performance, life and reliability of railway power switches, compared to **battery-only** systems.

Our Switch Boost™ 24V System can be provided as a module-only system or completely integrated system with dc-dc converter, built-in safety & security and plug & play integration for rapid field deployment.



#### Module-Only

\*Group 31 Tall  
13”L x 6.8”D x 10.88”H



#### Integrated System

#UCS-2406-EIC  
25.5”W x 25.25”H x 10.25”D  
68 lbs

### Integrated System Features:

#### NEMA 1 Rated Enclosure

Electrical components are internally mounted for operator safety.

#### Front Mounted Analog Meter

Ability to safely monitor ultracapacitor voltage condition without needing to open the cabinet door.

#### Discharge Circuitry

Ability to safely discharge ultracapacitor for service and maintenance.

#### Front Mounted On/Off Switch

Allows operator to discharge the ultracapacitor module(s) down to a safe voltage for module maintenance, troubleshooting or replacement.

#### Overcurrent & Backfeed Protection

Added safety for operation and maintenance by limiting allowable current.

#### 12 to 24V DC-DC Converter (250W)

For charging ultracapacitor from 12V DC source.

# Switch Boost™ 24V

## Ultracapacitor Technology

### ELDC Ultracapacitors

Ultracapacitors, also known as Supercapacitors or Electric Double Layer Capacitors (ELDC) are a relatively new energy storage device with capabilities that are a cross between a capacitor and a battery. The fundamental difference between an Ultracapacitor and a battery relates to how energy is stored in the device. In a battery, the energy is stored in **electrochemical form** where reactions inside the cell release their charge to create a usable electric current. An Ultracapacitor works on a different principal. Ultracapacitors store energy in **electrostatic form** where an electric field is created when opposite charges are held separated from each other. Once the field reaches its maximum voltage the Ultracapacitor is charged. When a conductive path is established, electric current flows and the device begins to discharge.

### Hybrid Ultracapacitors

Hybrid Ultracapacitors (HCAP) combined with Lithium Ion are an emerging technology for energy storage. HCAPs can replace traditional batteries and offer a more reliable, cost-efficient solution for 24V railway power switches. The hybrid technology provides a source of short duration **power** and **energy** for long duration backup. HCAPs are an environmentally friendly power source which do not contain heavy metals (RoHS Compliant), is non-flammable, and poses no risk of explosion or thermal runaway.

## Technology Advantages



### Short Duration High Power

Ultracapacitors are well suited for short duration high power demands.



### Exceptional Charge Efficiency

An Ultracapacitor is up to 98%+ efficient on charging throughout its life. By comparison, the charge acceptance efficiency of lead acid batteries is typically in the 70% to 85% range and is based on state of charge, charge rates and plate construction. Charge efficiency also decreases as the battery ages.



### Rapid Recharge Time

Ultracapacitors can be recharged extremely fast - from seconds to just a few minutes. Comparatively lead acid batteries take between 4 and 7 hours with a “sufficient” charging source to recharge from 10% SOC to 100% SOC.



### Wide Operating Temperature Range

Ultracapacitors are capable of delivering energy down to **-30°C** with minimal impact on performance and efficiency. While batteries may struggle to perform as temperatures dip below 0°C, Ultracapacitors will be negligibly impacted even under the coldest conditions. Full Temperature Range: -40°C to 70°C\*.



### Cycle Life

Ultracapacitors have a substantially longer cycle life than lead-acid batteries, capable of providing years of trouble-free service before needing replacement.

\*Specifications subject to change

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RH - Switch Boost™ 24V Systems

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