

Ultracapacitor Energy-Storage Solutions for AGV Applications



Battery Challenges

Modern AGVs and AMRs operate in high-cycle, high-throughput environments where robots are constantly accelerating, stopping, and repositioning. While batteries provide energy storage, they are not optimized for these dynamic duty cycles. Long charging times, limited cycle life, and performance degradation under peak loads can lead to downtime, increased maintenance, short battery life, and oversized battery systems.

The Ultracapacitor Advantage

Ultracapacitors store energy electrostatically, enabling fundamentally different performance characteristics than batteries. They deliver high power instantly, recharge in seconds, and operate over hundreds of thousands to millions of cycles without significant degradation. In AGV systems, this enables continuous operation through opportunity charging, improved efficiency through regenerative energy capture, and reduced system stress. The result is higher uptime, smaller energy-storage systems, and a lower total cost of ownership.

Lithium-Ion Battery Solutions	Ultracapacitor Solutions
Slow recharge time	Rapid recharge time
3- to 5-year life	10+-year life
Significant downtime for charging	Operable 24/7
Heavy	Lightweight
Charge temperature range: 0°C to +45°C Discharge temperature range: -20°C to +60°C	Temperature range: -40°C to +65°C

Proven Tecate Group AGV Ultracapacitor Solutions

A High-Speed Sortation System

The Problem: Excessive battery weight limited the goods this system could carry. They also had to contend with long battery recharge times and short battery life.

The Solution: The solution was a compact, lightweight ultracapacitor module. The sortation rack system keeps the module continuously charged for 24/7 operation. The module has been in use for more than 10 years, exceeding the 10-year design life of the ultracapacitor module.



An Automated Storage System

The Problem: Excessive battery weight limited the goods this system could carry. They also had to contend with narrow battery temperature ranges, long battery recharge times, and short battery life.

The Solution: The solution was a 63V compact, lightweight ultracapacitor module. Its wide operating temperature range gives it flexibility to be used in different operating environments. It was designed for a 10-year life span and has been in use for 5 years with no issues.

A High-Density Pallet Shuttle System

The Problem: Batteries did not perform well in this high-shock/high-vibration environment. Battery cold performance is often insufficient for cold warehouses, and long battery recharge times and short battery life span further limit the usefulness of batteries in these types of systems.

The Solution: The solution was a ruggedized ultracapacitor module designed to survive a high-shock/high-vibration environment. This high-power solution has operated down to -40°C across its 10+ years of life.



Talk to Tecate Group to evaluate ultracapacitors for your next AGV design!

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