# Battery System Redesign

ATC Mobility has changed the design of its battery system to improve reliability for its wheelchair accessible truck and SUV conversions.

## GM Electrical System Redesign

With GM's 2019 electrical system redesign, several critical changes were implemented:

- Battery Relocation: The battery was moved to the firewall, with main fuses directly mounted on it.
- Keyless Entry Systems: An increase in keyless entry systems led to a programming change where remote start would not function if the key fob was inside the vehicle, affecting power supply management.

## Identifying the Issues

With these changes, we identified several potential issues:

- Battery Wear: The small backup batteries, originally intended for emergency use, were wearing out prematurely.
- Alternator Capacity: GM's increased alternator capacity masked battery degradation, leaving users unaware of a dead backup battery unless specifically tested.
- Reliability Concerns: This diminished the reliability of the backup system during emergencies.

## Implementing a More Reliable System

To enhance reliability and decrease the risk of outages and malfunctions, we decided to utilize the vehicle's primary battery, eliminating the smaller backup battery. Key improvements included:

- Battery Placement: The new firewall location of the battery is further from potential engine fire areas.
- Enhanced Wiring Protection: We enclosed our wiring in a fire sleeve and wrapped the battery in fire-protective material, providing users time to exit the vehicle safely.
- Independent Fuse System: Our system has its own fuse off the battery, ensuring power availability for the conversion even if an engine issue blows the OEM fuse.

**Solid State System**

We addressed another critical issue related to contactor failure:

- Voltage Drop Issues: A deteriorating backup battery caused voltage drops, leading to increased current draw by pump motors, generating more heat, and reducing motor lifespan. This also caused mechanical contactors to fail, often fusing their contacts together.
- Solution: To resolve this, we developed a custom solid-state relay capable of operating within our required current range and reversing DC power supply polarity. This relay passed all testing and is now in production, ensuring improved reliability and performance.

**Increased Importance for Wheelchair Users**

These advancements are particularly important for our customers who rely on truck and SUV conversions for wheelchair accessibility. Ensuring the reliability and functionality of the backup battery system directly impacts customer safety and independence, and ATC Mobility continually strives to provide the most dependable and safe mobility solutions.