



# The Effects of Low Voltage ATC Operation

Models Affected: All ATC models

Tech Tip  
TT-941

## Subject:

The BHS Automatic Transfer Carriage (ATC) can convert any existing pallet truck into an efficient, portable battery changer. To avoid damage to the ATC's electrical components, it is important to verify that the pallet jack being converted has an adequate battery. The amp hour capacity of the battery must be sufficient to accomplish the required changes per day. The discharge level of the battery must also be monitored and the battery must be charged as needed.



## Description:

Electrical power is the product of the applied voltage and the current (power = voltage x current). For the ATC, electrical power (work) is the hydraulic pump or vacuum pump motor turning, or the magnetic field created as well as other smaller actions such as solenoid valves or relays operating. Based on the equation, to generate the same power with less voltage when the battery nears its discharged state, the electrical circuit is forced to draw more current. This additional current results in the creation of excess heat which can be detrimental to the electrical components of the ATC.

**Wiring and connections** - The heat produced by the higher current increases the resistance of the wiring. To overcome the higher resistance more current is required, which in turn creates more heat and the cycle continues. If the system continues to operate in this manner, wire insulation can be melted, connections can be damaged, and shorts can occur.

**Switches and relays** - The increased current and resulting heat can exceed the rated capacity of the switch, melting internal parts, resulting in failure. Relay contacts can be burnt or welded closed, also resulting in failure.

**Motors** - The increased current can cause damage to brushes and armatures reducing the serviceable life of the motor.

**Magnets** - Lower applied voltage causes a weaker magnetic field resulting in less pulling power. The increased current and heat can also damage internal wiring culminating in permanent loss of field. The magnet's connector may also be damaged (melted) by the excessive heat, requiring complete magnet replacement.

## Recommendation:

For best results and maximum service life of the unit, the battery powering the ATC must be properly maintained and charged, whether the ATC is permanently mounted to one pallet jack, used with forkpockets on multiple pallet jacks, or is a remote unit with a self contained battery.

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