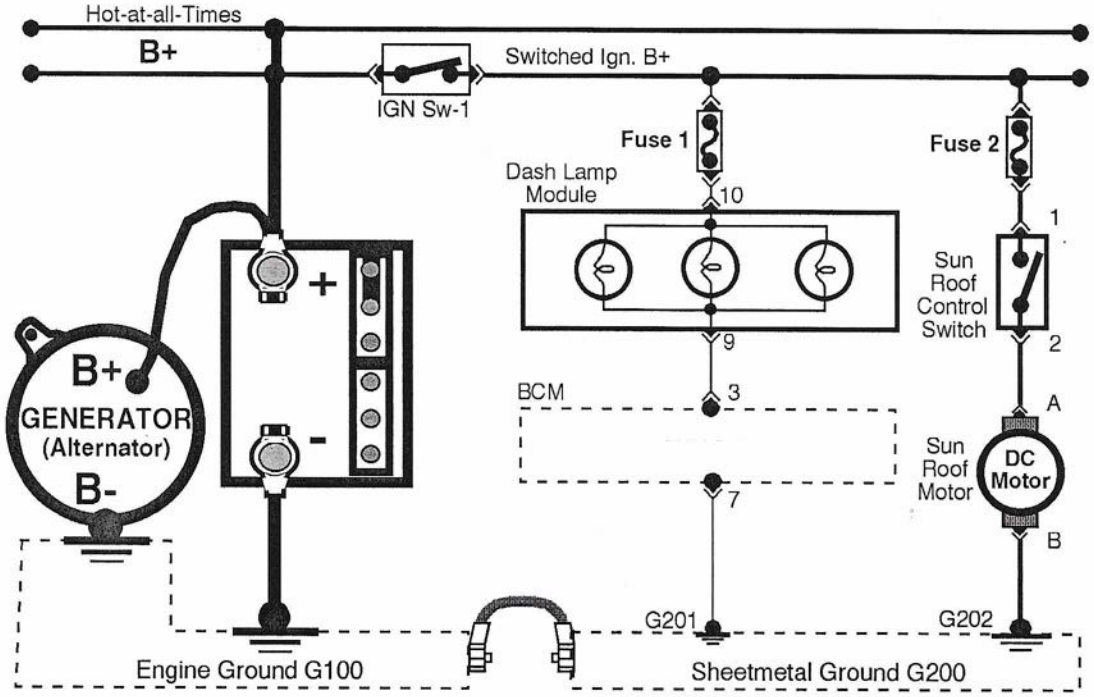
Vehicle Electrical System's *Achilles Heel*

Introduction:
What is an "***Achilles Heel***." It is a term used to define a weakness or vulnerable point despite overall strength and reliability. The term comes from Greek mythology where Achilles was a powerful warrior whose only weakness was his heel on one foot which led to his eventual downfall. As an infant, his mother dipped him in a magical river to make him immortal except for the heel of one foot that didn't get dipped. During an epic battle, an arrow struck him in the heel of his one unprotected foot and he bled to death. Thus the term, *Achilles Heel,* can refer to a weak point in a well designed electrical system that will cause a catastrophic failure of the electrical system when it fails to do its job. Many vehicle electrical systems have this *Achilles Heel* and many techs don't even know it's there. Read on!



Take a few minutes to look over this Schemation. On the left is the generator and battery combined to power the electrical system through all modes of vehicle operation; Park, Crank, Run and Shut-down. The B+ rail (positive side) runs along the top of the schemation. The B- circuit (negative side) or "ground circuit" runs along the bottom of the schemation. Creating this Schemation diagram using pages from a shop manual would create needless complexity trying to assemble this circuit that may not reveal the *Achilles Heel* in the circuit.

CUSTOMER COMPLAINT . . . .
"Sun roof opens slower than it used to!"

The tech confirms the sun roof opens slowly and also notices the dash lights dim when the sun roof is engaged. The tech correctly grounds the DMM to the negative (-BATT) terminal before testing the ground circuit. This way, voltage readings testing the ground circuit are most valid.

Step 1. Measure the voltage at DC Motor Pin A.
Result: Steady DC voltage of about 12.5-13.0 volts.
Step 2. Measure the voltage at DC Motor Pin B
Result: 2-3 volts = Vd problem in ground circuit.

Step 3. Measure the ground voltage on the sheetmetal G200. (Probe tip to sheetmetal)
Result: 2-3 volts found indicating the sheetmetal is not sufficiently grounded (or connected) back to B-. Tracing the sheetmetal back to "ground" reveals the electrical system's "*Achilles Heel*," a corroded ground wire strap connected between sheetmetal (G200) and the Engine Block (G100).

Final Vd Test: Measure the voltage drop between G100 and G200 which is the same as directly across the ground strap. A good ground strap Vd should be 0.10V or less. If more, do this!

CLEAN BOTH ENDS OF THE GROUND STRAP WIRE AND CONFIRM BOTH MOUNTING BOLT SURFACES ARE CLEAN AND BOLTS TIGHT.

Many techs are not aware of the ground strap's presence, it's importance, or how much it can adversely affect a vehicle's overall electrical system performace. A Ground Strap is the ***Achilles Heel*** of a vehicle's electrical system.

Several Weird Electrical Problems?
Check The Ground Strap FIRST!

Figure 08-2026 Vehicle Electrical System's Achellie's Heel