

Bulletin BPI 05-10

Subject: Source voltage

Vehicle Involved: All Vehicles

Condition: Low source Voltage causing components to malfunction

Repair Procedure: Check battery voltage and terminal condition. Perform a voltage drop test between battery terminal and Battery cable connection. Do a visual scan for damaged wiring and loose or corroded connections.

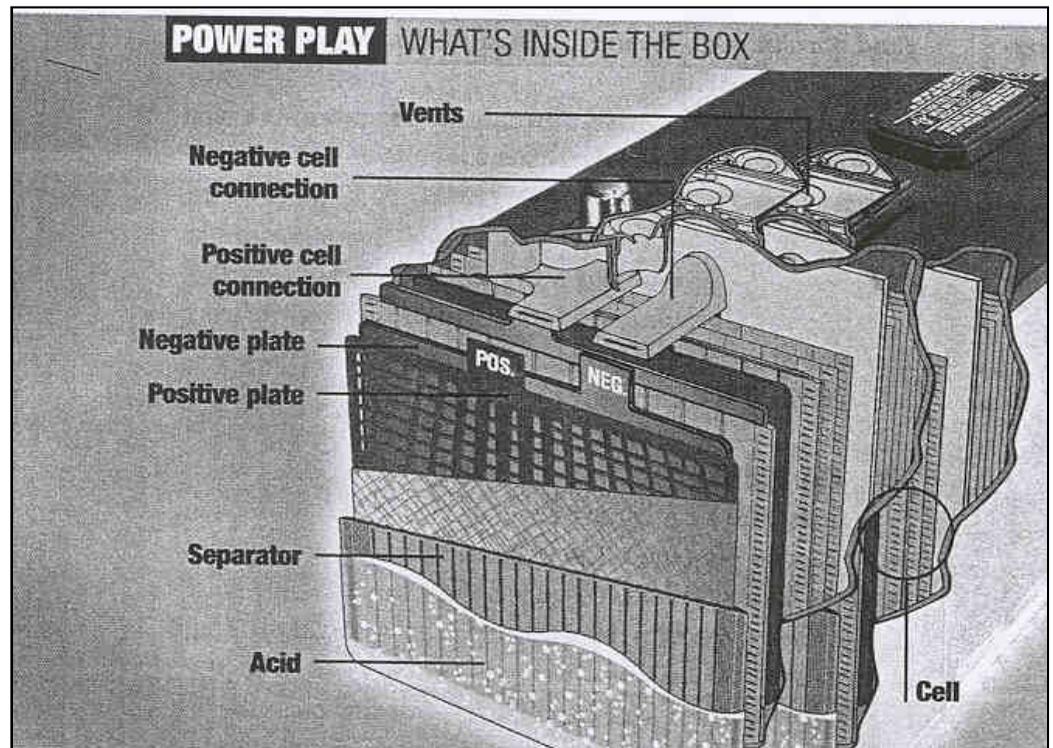
Modern electrical/electronic systems, including ABS systems, require a specific minimum voltage to be provided, anything less initiates a problem. Bad connections and corroded wires create resistance. Resistance prevents source voltage from reaching a component. The cells in a car battery generate electricity with a chemical reaction between a lead plate and a lead dioxide plate that are bathed in acid. When a circuit connects the plates, the lead / acid reaction drives the electrons off the lead plate, and they flow along the circuit towards the lead dioxide plate. The reaction also creates a sulfate residue that coats the plate.

As long as the circuit exists, the reaction will continue and electrons will flow until the surface of the plate is completely coated. Recharging the battery will reverse the reaction, removing the sulfate coating from the plate so the process can be repeated. The chemical reaction in each cell generates just over 2 volts. With 6 cells connected in series, total voltage will be about 12.6 DC volts. The plate area size and number of plates per cell will determine current amps that a battery can deliver.

The rate at which the current can flow (amps per hour) is a function of the speed of the chemical reaction and the resistance in the circuit connecting the plates.

When resistance is low, the reaction happens faster so current flows faster. However, even with a very low-resistance connection, the chemical reaction slows down in cold temperatures.

When current flows out of the battery, voltage pressure drops. With a high resistance load such as a light bulb, current flow is slow and the voltage drop is small. A low – resistance load, such as a starter motor, will allow a high current drop, sort of like opening a bigger valve on a tank of pressurized air.



With any electrical or electronics problem the first thing to confirm is battery condition. At 70 degrees with everything turned off, a healthy and fully charged car battery will produce 12.6 volts. It can deliver

just over 12 volts at 50 amps for about 1 hour and still be capable of being fully charged and providing an ABS module with its minimum voltage requirement of 10.8 volts, which keeps your ABS system from disabling itself.

A load tester is the best tool to use as a final test, but if you don't have one, and the engine has good compression you can use the starter. With the fuel system disabled so the engine won't start connect a DVOM across the battery terminals and operate the starter for no more than 10 seconds. If the temperature is 70 degrees or higher and cranking voltage remains above 9.6 volts the battery is OK. At 30 degrees the voltage should be 9.1 volts or better. If cranking voltage is low charge the battery and try again. If cranking voltage is still low replace the battery.