REMY POWER PRODUCTS

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REMY TECHNICAL SERVICE BULLETIN

In this Remy Technical Service Bulletin, we provide diagnostic procedures that can be used for troubleshooting non-PCM-controlled electrical systems.

Batteries are perishable devices that eventually wear out as they deteriorate and become incapable of performing their job. In addition, new and/or good batteries may become discharged for various reasons. Because of this, a battery check should be the starting point for diagnosing all electrical system problems.

Diagnostic and troubleshooting procedures for vehicles without computer-controlled charging systems

GM applications pre-2004 (4 pin regulators only)

It's not uncommon for an alternator to be replaced because it's believed to be faulty or ran its normal life cycle—only to discover later that the root cause of the problem didn't reside with the alternator at all.

High or unwanted resistance is one contributing factor that leads to charging system problems. High resistance is often caused by one of these four main issues:

- Loose connections
- Corrosion in the cables or wiring
- Improperly sized wiring or cables
- Improperly crimped connection

While a technician may regularly do a visual inspection of cables and connections, this inspection doesn't show what is going on inside of them. This is why voltage drop testing is the only sure method of determining if there is an adequate current delivery path. (For voltage drop procedures, refer to the December 2015 *Remy Technical Service Bulletin.)*

Follow these steps to ensure proper diagnostics of the charging system.

1. **Perform a visual inspection under the hood.** Look at the belt tension and condition. Next, verify all electrical connections, main cables and plugs are clean and tight. Finally, make sure the alternator is mounted properly.
2. **Record battery base voltage.** With a voltmeter connected to the battery and the engine off, record a "base" voltage reading. (Your battery should have a minimum of 12.4 volts.) If the reading is less than 12.4 volts, charge and retest.

3. **Test the electrical loads.** Once the voltage reading is between 12.4 and 12.6 volts, start the engine and hold at about 1500 RPM. Turn on all possible electrical loads:
   - Headlamps on high beam
   - Blower motor on high speed
   - Any other accessories that require electrical power
4. **Measure the voltage at the alternator.** Place the black lead of the voltmeter on the case of the alternator and the red lead of the voltmeter on the alternator B+.
   - If the reading is 12.6 volts or less, proceed to step 6.
   - If reading is 13.8 to 14.8 volts, then the alternator is working as designed.

5. **Measure the voltage at the battery.** Place the black lead of the voltmeter on the negative battery terminal and the red lead of the voltmeter on the positive battery terminal.
   - If the reading is 12.6 volts or less, proceed to step 6.
   - If reading is 13.8 to 14.8 volts, then the alternator is working as designed.

   Note: The primary emphasis in the next steps is to determine root cause of no output.

6. **With the engine off, take a set of known good jumper cables and connect one red clamp to battery positive and the other red clamp to the alternator B+ terminal.** Next, connect one black clamp to battery negative and the other black clamp to alternator ground/case. Pay special attention not to ground positive clamp once connected to battery positive.
7. **With the engine running, repeat steps 4 & 5.** If the voltage reading is 13.8 - 14.8 volts, then the alternator is functioning normally. The issue, then, lies either in the positive or negative pathway. The jumper cables have bypassed the issue and the root cause still needs to be identified. If the voltage remains 12.6 or lower proceed to step 10.
8. **With voltmeter still connected to the battery and the engine running, remove the red clamp from the alternator B+ terminal.** If the voltage remains the same, then this part of the circuit is good. If the voltage drops back down, the positive circuit needs repaired or replaced. Pay special attention not to ground positive clamp once removed from the alternator B+. A voltage drop may be due to high resistance in the main positive cable that is caused by loose connection, corroded connections, fusible link, bus fuse or open circuit.
9. **With voltmeter still connected to the battery and the engine running, remove the black clamp from the alternator ground/case.** If the voltage remains the same, then this part of the circuit is good. If the voltage drops back down, the negative ground circuit needs repaired or replaced. A voltage drop may be due to high resistance in the main negative cable that is caused by loose connection, poor body ground or corroded connections.
10. **Begin diagnosis of the regulator control circuit by verifying that the regulator "L" terminal is receiving correct voltage.** The L terminal is the input signal to the regulator and also acts as an output by grounding the lamp circuit (charge indicator lamp bulb).

- With the ignition off, unplug the voltage regulator connector.
- Connect a test lamp (LED test lamp will not work) to B+ and probe the regulator L terminal (see photo for L terminal location).
- Putting a 12 volts reference to the L with resistance (test lamp) is to mimic lamp light circuit.
- Next with Key On Engine Running (KOER) and voltmeter still connected to battery, take a reading:
  - If 12.6 volts or less: Alternator needs replaced.
  - If 13.8 to 14.8 volts after connecting the test light: Alternator is working as designed and the root cause lies with the control circuit. Possible reasons for a control circuit failure include:
    - Internal instrument cluster failure
    - Battery/charge indicator lamp bulb
    - Instrument panel/gauge fuse blown
    - Corrosion at relay center or fuse block

If the voltage reading remains 12.4 volts or less after conducting the above tests, then the alternator needs replaced.

Tip to remember: It is a best practice to perform a voltage drop test before and after replacing the battery, starter or alternator.