STAR ONLINE PUBLICATION

Case Number: S2408000066

Release Date: June 2024

Symptom/Vehicle Issue: Drained Battery, Low System Voltage, Battery Not Charging, High System Voltage

Customer Complaint/Technician Observation: The customer may complain of one of the above concerns. The technician may or may not have Diagnostic Trouble Codes (DTCs).

Discussion:

- **Electronic Voltage Regulation (EVR) Charging systems using a standard Alternator directly controlled by the Powertrain Control Module (PCM).**
- **The IBS is an important component of the Smart Charging control strategy. The Smart Charging control functions differently than the traditional EVR systems that do not utilize an Intelligent Battery Sensor (IBS). When the IBS is reporting little to no electrical demand on the Battery, particularly at idle, it is common for the PCM to suspend charging, reducing the load on the engine. This in turn helps with emissions and fuel economy. Because of this strategy it is not uncommon for the voltage at the Alternator stud to be equal to, or close to Battery voltage at idle.**

1. Inspect & check all electrical connections to the alternator.
   a. The 2-way connector holding field control circuit & alternator sense voltage circuit.
   b. Unplug & plug-in the 2-way connector for field & sense circuit. Verify the connection is tight & check for any bent pins in alternator connector or damage to female terminals in connector.
   c. Check Alternator B+ Stud connection to be sure nut is securing positive cable terminal properly (i.e., nut is clamping terminal & connection is tight).
   d. Check for any fuse between the alternator B+ stud & at the Power Distribution Center (PDC) terminal to make sure it is not open.
   e. Be sure to follow Service Library (SL) sections on ALTERNATOR CONTROL CIRCUIT DIAGNOSTIC & ALTERNATOR SENSE CIRCUIT DIAGNOSTIC testing along with the applicable DTC diagnostic tests that may have been set as active or stored.
2. Check/verify all grounds in the charging system circuit

Contact STAR Center, or your Technical Assistance Center Via TechConnect, eCONTACT or Service Library entry if no solution is found.

a. Check tightness of mounting bolts securing alternator to engine block. Alternator is a case grounded component, clean and secure all connections.
b. Check main ground from engine to chassis; connection should be clean and tight.
c. Check battery ground cable connections are tight, perform voltage drop test to any suspect locations as needed.
d. Loosen the alternator mounting bolts, without removing alternator, and then re-tighten to torque specifications in service manual.
e. After all steps above are complete, re-start engine & check charging system operation.

3. Verify that the Smart Charging System is not the reason for alternator low voltage displayed.
   a. Alternator charging can be low during engine idle operation because of the Smart Charge strategy.
   b. Refer to service manual section System Operation - Smart Charging System.
   c. Refer to Star Case S2008000031 Rev A for low charging voltage & Smart Charge Mode Voltage Range diagram & mode descriptions.
   d. The alternator has no internal regulator; thus, has no smart circuitry. All alternator control signals come from Engine Control Module (ECM).
4. If after following the Service Library (SL) DTC diagnostics and or the above checks it has been determined that a replacement alternator is needed, return the alternator with bolts for further analysis.