

## DIAGNOSIS AND TESTING (Continued)

### Component Tests

#### Battery — Drain Testing

**⚠ WARNING:** Do not attempt this test on a lead-acid battery that has recently been recharged. Explosive gases may cause personal injury. Failure to follow these instructions may result in personal injury.

**⚠ CAUTION:** To prevent damage to the meter, do not crank the engine or operate accessories that draw more than 10A.

**NOTE:** No factory-equipped vehicle should have more than a 50 milliamps (mA) or 0.050 amp draw.

**NOTE:** Many electronic modules draw 10 mA (0.010 amp) or more continuously.

**NOTE:** Use an in-line ammeter between the negative battery post and its respective cable.

**NOTE:** Typically, a drain of approximately 1 amp can be attributed to an engine compartment lamp, glove compartment lamp, or an interior lamp staying on continually. Other component failures or wiring shorts are located by selectively pulling fuses to pinpoint the location of the current drain. When the current drain is found, the meter reading falls to an acceptable level. If the drain is still not located after checking all of the fuses, it is due to the generator.

**NOTE:** To accurately test the drain on a battery, an in-line ammeter must be used. Use of a test lamp or voltmeter is not an accurate method due to the number of electronic modules.

Check for current drains on the battery in excess of 50 mA (0.050 amp) with all of the electrical accessories off and the vehicle at rest for at least 40 minutes. Current drains can be tested with the following procedure:

1. Make sure the bussed electrical center (BEC) and smart junction box (SJB) are accessible without turning on the interior or the underhood lights.
2. Drive the vehicle at least 5 minutes and over 48 km/h (30 mph) to turn on and activate the vehicle systems.

3. Allow the vehicle to sit with the key off for at least 40 minutes to allow the modules to time out/power down.
4. Connect a fused (10A) jumper wire between the negative battery cable and the negative battery post to prevent the modules from resetting and to catch capacitive drains.
5. Disconnect the negative battery cable from the negative battery post without breaking the connection of the jumper wire.
6. **NOTE:** It is very important that continuity is not broken between the negative battery cable and the negative battery post when connecting the meter. If this happens, the entire procedure must be repeated.

Connect the battery tester between the negative battery cable and the post. The meter must be capable of reading milliamps and should have a 10 amp capability.

7. **NOTE:** If the meter settings need to be switched or the test leads need to be moved to another jack, the jumper wire must be reinstalled to avoid breaking continuity.  
Remove the jumper wire.
8. **NOTE:** Amperage draw varies from vehicle to vehicle depending on the equipment package. Compare to a similar vehicle for reference.  
**NOTE:** No factory-equipped vehicle should have more than a 50 mA (0.050 amp) draw.  
Note the amperage draw.
9. If the draw is found to be excessive, remove the fuses from the SJB 1 at a time and note the current reading. Do not reinstall the fuses until you have finished testing. To properly isolate each of the circuits, all of the fuses may need to be removed and install 1 fuse, note the amperage draw, then remove the fuse and install the next fuse, until all of the circuits are checked. When the current level drops to an acceptable level after removing a fuse, the circuit containing the excessive draw has been located.

## DIAGNOSIS AND TESTING (Continued)

10. If the current draw is still excessive, remove the fuses from the BEC 1 at a time and note the current drop. Do not reinstall the fuses until you have finished testing. To properly isolate each of the circuits, all of the fuses may need to be removed and install 1 fuse, note the amperage draw, then remove the fuse and install the next fuse, until all of the circuits are checked. When the current level drops to an acceptable level after removing a fuse, the circuit containing the excessive draw has been located.
11. Check the Wiring Diagrams for any circuits that run from the battery without passing through the BEC/SJB. If the current draw is still excessive, disconnect these circuits until the draw is found. Also, disconnect the generator electrical connections if the draw can not be located. The generator may be internally shorted, causing the current drain.

### Generator On-Vehicle Tests

**⚠ CAUTION:** To prevent damage to the generator, do not make the jumper wire connections except as directed.

**⚠ CAUTION:** Do not allow any metal object to come in contact with the housing and the internal diode cooling fins with the key in the ON or OFF positions. A short circuit may result and burn out the diodes.

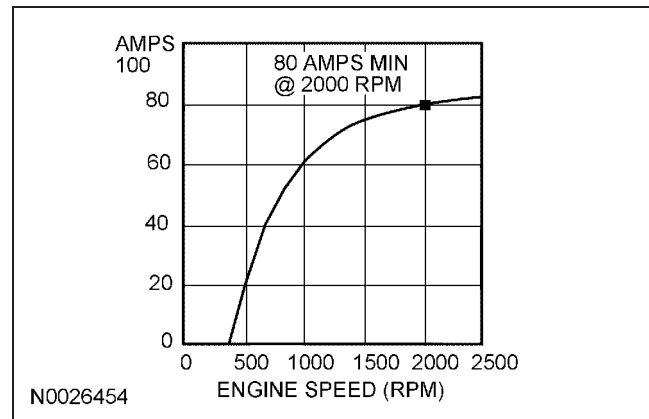
**NOTE:** Battery posts and cable clamps must be clean and tight for accurate meter indications.

**NOTE:** Refer to the battery tester manual for complete directions for testing the charging system.

1. Turn off all of the lamps and the electrical components.
2. Place the transmission in NEUTRAL and apply the parking brake.
3. Carry out the Load Test and No Load Test according to the following component tests:

### Generator On-Vehicle Tests — Load Test

1. Switch the tester to the ammeter function.
2. Connect the positive and negative leads of the tester to the corresponding battery terminals.
3. Connect the current probe to the generator B+ output terminal, circuit 2037 (RD).
4. With the engine running at approximately 2,000 rpm, adjust the tester load bank to determine the output of the generator. The generator output should be greater than the graph shown below. If not, refer back to the pinpoint test or GO to [Symptom Chart](#).



### Generator On-Vehicle Tests — No Load Test

1. Switch the tester to the voltmeter function.
2. Connect the voltmeter positive lead to the generator B+ output terminal, circuit 2037 (RD) and the negative lead to ground.
3. Turn all of the electrical accessories off.
4. With the engine running at approximately 2,000 rpm, check the generator output voltage. The voltage should be between 13.2 and 15.5 volts. If not, refer back to the pinpoint test or GO to [Symptom Chart](#).