

# TECH TIP

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| Group:       | O-GENERAL     |
| Bulletin No: | TT-16-012     |
| Issue Date:  | 10-11-2016    |
| Reference:   | HMM-161011-B1 |

## CHARGING SYSTEM DIAGNOSTIC PROCEDURE

**SUBJECT VEHICLES:** 2017MY and earlier Conventional Trucks

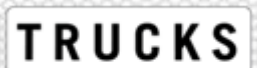
**Note:** This tech tip is provided as technical information and is not authorization for a warrantable repair.

### *DESCRIPTION OF CONDITION*

The majority of alternators replaced for a battery or charging system concern are found to be free of defect. This Tech Tip outlines the proper steps to diagnose a customer concern of a charging system issue.

### *INSPECTION PROCEDURE*

1. Before the function of the alternator and charging system circuits can be inspected, the batteries **MUST** be fully charged and in good condition. It is recommended that a battery tester be used to verify battery condition and state of charge. The vehicle must crank and run without the assistance of a battery charger or jump pack before charging system diagnostics can be performed. Discharged batteries will result in incorrect diagnosis.



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2. With the vehicle ignition off, connect a multimeter set to DC volts across the battery terminals. A fully charged set of batteries will show an open circuit voltage of 12.6 volts. If voltage reading is less than 12.4 volts, refer to step 1.



3. With the batteries fully charged, start the vehicle and allow the engine to idle. Depending on electrical load, battery voltage on a normally functioning system will be between 13.5 and 14.5 volts. If proper voltage reading is present, proceed to step 7. If incorrect voltage is present, continue to step 4.



**TRUCKS**

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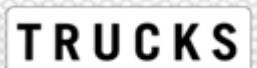


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4. Perform a voltage drop test of the alternator positive circuit by connecting the multimeter leads to the battery positive terminal first and then the B+ terminal of the alternator. With the vehicle running, multimeter reading must be **LESS** than 0.5 volts. A higher voltage reading indicates a poor connection or faulty wire. Repair as necessary. Continue to step 5.

**WARNING:** Use caution to not short the multimeter lead between the alternator B+ and ground.



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5. Perform a voltage drop test of the alternator negative circuit by connecting the multimeter leads to the battery negative terminal first and then the case of the alternator. With the vehicle running, multimeter reading must be **LESS** than 0.5 volts. A higher voltage reading indicates a poor connection or faulty ground wire. Repair as necessary. Continue to step 6.



6. After the positive and negative charging circuits have been verified, again check for battery voltage between 13.5 and 14.5 volts with the vehicle running. If voltage is incorrect, replace the alternator. If running voltage is correct, continue to step 7.



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7. The vehicle's charging system is functioning properly. Discharged batteries may be caused by a parasitic drain from a vehicle accessory or overhead light that was left on. Turn off the ignition and all accessories, close the vehicle doors, and allow the vehicle to remain undisturbed for at least 10 minutes. The multimeter will be connected between the negative battery terminals and the vehicle ground wire at the location shown to the right.



8. With the multimeter set to measure Amps, connect the leads to the vehicle as shown and disconnect the negative battery cable, leaving the multimeter to be the connection between the battery and the negative cable. Note the level of parasitic drain indicated on the multimeter.

**NOTICE:** If the meter reads zero, the ammeter fuse inside the meter has failed and will need to be replaced.



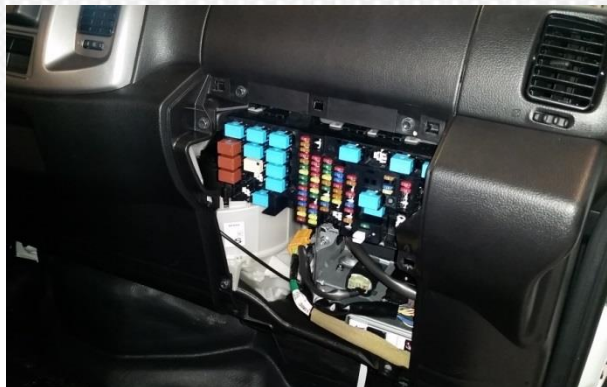
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9. If the amount of parasitic drain exceeds 0.050 amps or 50 milliamps, it will be necessary to isolate the source of this drain by removing vehicle fuses and disconnecting vehicle accessories. Repair the affected component and repeat step 8.

If parasitic drain is within specification and battery voltage is normal with the vehicle running, no repairs should be made.



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