

TROUBLESHOOTING THE ALTERNATOR

Charging System Diagnosis

The following general information has been assembled as a guide for charging system diagnosis. Refer to the appropriate Original Equipment Manufacturer's service manual for specific information pertaining to charging system diagnostic procedures and safety precautions for your vehicle.

Bench Testing

If an alternator test bench is available, follow the procedures found in the bench tester's instruction manual to conduct an alternator performance test. This test will determine if the alternator output is within its performance specification, preventing unnecessary alternator replacement.

If the alternator output is within specification during bench testing, resolve problems in the remainder of the vehicle's charging circuit and other electrical circuits that may affect charging circuit performance. Refer to the vehicle manufacturer's service manual for the procedures necessary to identify and correct additional charging circuit problems.

If the test bench results show the alternator output to be out of specification, replace the alternator. Follow the vehicle manufacturer's recommended procedures to inspect the remainder of the charging circuit and other electrical circuits that may affect charging circuit performance.

NOTE: If the alternator being tested has an internal regulator, and the bench test identifies the regulator as defective, it may be possible to replace the internal regulator and return the alternator to service. If the regulator is replaced and the alternator returned to service, follow the vehicle manufacturer's recommended procedures to inspect the remainder of the charging system and other electrical circuits that may affect charging circuit performance.

Whether or not a test bench was used to determine the condition of the alternator, the following Helpful Tips have been assembled to help isolate conditions that may affect charging circuit performance.

Helpful Tips

1. What is the condition of the battery?

- A visual inspection and a performance test of the battery must always be performed before inspecting the charging system. The battery must be fully charged (12.6 volts) and the battery cables, terminals and case in good clean condition. (refer to Battery Visual Inspection and Performance Testing).

2. Does a charge lamp, amperage (amp) gauge or voltmeter indicate a charging system problem?

Charge Lamp:

- Ignition ON engine not running
The charge lamp should illuminate.
- Ignition ON engine running
The charge lamp should illuminate briefly then turn OFF.
- Weak Battery
A weak battery can cause the charge lamp to illuminate during high amperage draw.
- Low Idle
A low idle can cause the charge lamp to illuminate dimly.



- Poor Wiring
Corroded, broken, loose or frayed wires/connections could cause the charge lamp to illuminate during idle.
- Open Charge Lamp
Some charging systems will not properly operate if the charge lamp bulb fails.

Amp Gauge:

- Ignition ON engine not running
The amp gauge should read zero or slightly below.
- Ignition ON engine running
The amp meter should display a current output above zero. It will display a different level of charge depending on what electrical circuits are operating. A negative charge indicates the battery is discharging quicker than the charging system can supply current.
- Wires and connectors
Corroded, broken, loose or frayed wires/connections could cause zero or erratic readings on the gauge.

Voltmeter:

- Ignition ON and engine not running
Gauge readings should be between 12.0 and 12.6 volts with the ignition ON and the engine not running. A readings below 12 volts could indicate insufficient charging, low battery, corroded, broken, loose or frayed wires/connections.
- Ignition ON and engine running
Gauge readings should be between 13.0 and 14.2 volts with the ignition ON and the engine running. A reading exceeding 14.2 volts could indicate a bad battery, failed regulator or poor wire connections. A reading below 13.2 volts could indicate a failed alternator or corroded, broken, loose or frayed wires/connections.

3. Are any fuses open?

- Check the fuses in all the fuse box(s). An open fuse indicates circuit problem(s) which may have an affect on the charging circuit. Check the owners manual or the manufacturer's service manual for the location of each fuse box.

4. Is the fuseable link(s) open?

- There may be several fuseable links controlling battery voltage to the vehicle's electrical circuits. If a fusible link is open, supply voltage will be completely lost to all electrical systems or to the electric circuit(s) that the open fuseable link controls. Check the owners manual or the manufacturer's service manual for the location of each fuseable link.

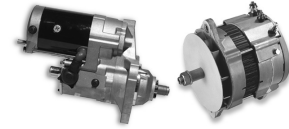
5. Is the alternator's drive belt tension within specification?

Too loose

- If the drive belt is too loose, it will slip around the pulley causing the alternator to charge irregularly or not at all.

Too tight

- If the drive belt is too tight, internal bearing damage will cause premature alternator failure.



6. Is the alternator's drive belt in good condition and the proper size?

Worn or too narrow

- If the alternator's drive belt is worn or too narrow, it will slip around the pulley causing the alternator to charge irregularly or not at all.

New drive belt

- A "new" alternator drive belt is a belt that has been used for less than 5 minutes. Once an alternator drive belt has been used for longer than 5 minutes, it is considered a "used" belt. It is important to check and adjust the belt's tension to specification after the initial 5 minutes of operation.

7. Has the vehicle been modified or additional equipment installed after it left the factory?

Accessories

- Non factory accessories such as phones, computer outlets, televisions, refrigerators, stereo equipment or lights can overburden alternator performance and cause premature failure.

Improper accessory installation

- Improper accessory installation procedures can cause charging problems. Some of these problems may include poor ground points, loose connections or improper wiring.

8. Has any work been performed on the vehicle?

Electrical ground points

- Check the ground circuits between the battery and engine and also from the vehicle body to the frame for high resistance. Many times when a vehicle has been repaired, the ground point(s) are disturbed or not re-secured properly.

Multiple electrical grounds

- With multiple ground vehicles, each electrical circuit is assigned to one or more ground points. If a circuit is activated while another electrical system is being operated, feedback from the controlled circuit due to a poor ground associated with the controlled circuit may be the cause.