

TROUBLESHOOTING THE STARTER

Starter System Diagnosis

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

Bench Testing

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

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

If the test bench results show the starter's performance to be out of specification, replace the starter. Continue to inspect the remainder of the starting system. Refer to the appropriate vehicle manufacturer's service manual for the procedures and circuit schematics necessary to identify and correct additional starting circuit problems.

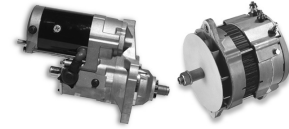
NOTE: If the starter solenoid is part of the starter assembly being tested, and the bench test identifies the solenoid as defective, it may be possible to replace the solenoid only and return the starter to service. If the solenoid is replaced and the starter is returned to service, refer to the appropriate vehicle manufacturer's service manual for the procedures and circuit schematics necessary to identify and correct additional starting circuit problems and other electrical circuits that may affect starting circuit performance.

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

Helpful Tips

1. Does the starter turn the engine too slowly?

- The battery must be fully charged (12.6 volts) and the battery cables and terminals in good condition (refer to Battery Visual Inspection and Performance Testing).
- Advanced engine timing will produce combustion forces working against engine rotation. These forces will be transmitted to the starter during starter engagement, reducing the starter's performance capability.
- Excessive engine oil viscosity, particularly in cold weather environments when the oil's viscosity is greatly affected, will reduce the ability of the engine to rotate. This increase in engine drag will be transmitted to the starter during starter engagement, reducing the starter's performance capability.
- Engine modifications change the operating characteristics of the engine. If modifications are performed, a chance of additional forces acting against the starter will be introduced. The starter should be replaced with one meeting the new operating characteristics of the engine.



2. Does the starter fail to crank the engine?

- The starter is designed to turn at a specified RPM. If the battery connections or cables are corroded or dirty, this will cause the starter to turn slower than the specified RPM. Be sure that all battery connections and cables are clean and secured properly.

3. Does the starter turn without turning the engine?

- The flywheel or flexplate transfers the rotational energy of the starter to the engine. If the starter is turning but not the engine, check all the teeth on the flywheel/flexplate to see if they are excessively worn, damaged or missing. Inspecting the flywheel/flexplate teeth can be performed through the starter mounting port if an inspection plate is not available. Check all the teeth on the flywheel/flexplate.
- A failed starter drive assembly could produce similar symptoms as a damaged flywheel/flexplate. If the starter pinion meshes properly with the flywheel/starter and does not rotate, the starter should be inspected for mechanical wear or damage.
- The starter maybe installed upside down. Check the installation instructions.

4. Does the starting system click when activated?

- If clicking is heard when activating the starter control circuit and the starter does not turn, the solenoid may not be receiving the voltage necessary to be activated fully. Check the starter control circuit wiring for damaged, loose, dirty or corroded connections.
- If the solenoid is receiving proper voltage, the solenoid may have burnt contacts. Follow the vehicle manufacturer's recommended procedures and safety precautions to inspect the solenoid.
- Check battery voltage. Recharge or replace if necessary.

5. Is there a clattering noise when trying to start the engine?

- Clattering may be associated with physical damage to the flywheel/flexplate. Inspect the flywheel/flexplate completely for cracks, dents, roundness balance etc.
- An inoperable starter solenoid or a damaged starter may also cause clattering. Follow the vehicle manufacturer's recommended procedures and safety precautions to inspect the solenoid and starter.
- The battery must be fully charged (12.6 volts) as per the battery manufactures recommendations and the battery cables and terminals in good, clean condition (refer to Battery Visual Inspection and Performance Testing).