

### Service Diagnosis

Trouble	Cause	Repair
Starter does not operate when the starter switch is turned	<p>Switch on lights for this test:</p> <p>a. If lights do not burn: Loose cables or poor ground connections. Battery is run down</p> <p>b. If lights go out when turning starter switch: Insufficient current due to loose connections or corroded terminals</p> <p>c. If lights suddenly go dim when turning the starter switch: Battery run down or old</p> <p>d. If lights stay bright when turning starter switch: Connect jumper lead between terminals 30 and 50 at starter. If the starter operates, there is an open circuit in the cable to the starter switch, or to the battery or the switch is defective</p> <p>e. If lights stay bright and the plunger in the solenoid switch is pulled when pressing starter button: Disconnect the battery cable from terminal 30 at the starter and connect it to the terminal stud of the connector strap. If the starter operates, the contacts of the solenoid switch are worn or dirty</p>	<p>a. Check battery cables and connections. Test voltage of battery and charge if necessary</p> <p>b. Clean battery terminals and cable clamps, clean and tighten connections between battery, starter and ground</p> <p>c. Charge battery, or replace</p> <p>d. Eliminate open circuits, replace defective parts</p> <p>e. Replace solenoid switch</p>
Starter does not operate when battery cable is directly connected with terminal stud of connector strap Sluggish or slow action of the starter	<p>a. Brushes sticking</p> <p>b. Brushes worn</p> <p>c. Weak spring tension Brushes do not make contact</p> <p>d. Commutator dirty</p> <p>e. Commutator rough, pitted or burned</p> <p>f. Armature or field coils defective</p>	<p>a. Clean brushes and guides of brush holders</p> <p>b. Replace brushes</p> <p>c. Replace springs</p> <p>d. Clean commutator</p> <p>e. Overhaul starter</p> <p>f. Overhaul starter</p>
Starter can be heard operating, but cranks engine erratically or not at all Drive pinion does not disengage	<p>a. Battery run down</p> <p>b. Insufficient current flow due to loose or corroded connections</p> <p>c. brushes sticking</p> <p>d. Brushes worn</p> <p>e. Commutator dirty</p> <p>f. Commutator rough, pitted or burned</p> <p>g. Armature or field coils defective</p>	<p>a. Charge battery</p> <p>b. Clean battery terminals and cable clamps, tighten connections</p> <p>c. Clean brushes and guides of brush holders</p> <p>d. Replace brushes</p> <p>e. Clean commutator</p> <p>f. Overhaul starter</p> <p>g. Overhaul starter</p>
Starter can be heard operating, but cranks engine erratically or not at all	<p>a. Drive pinion defective</p> <p>b. Flywheel ring gear defective</p>	<p>a. Replace drive pinion</p> <p>b. Rework ring gear or replace flywheel</p>
Drive pinion does not disengage	<p>a. Drive pinion or spline shaft dirty</p> <p>b. Solenoid switch defective</p>	<p>a. Immediately shut off engine to prevent further damage to starter Overhaul starter</p> <p>b. Replace solenoid switch</p>