GM Bonneville/Eighty Eight/LeSabre 1986–1999

STARTING SYSTEM

- TESTING
- REMOVAL & INSTALLATION
- SOLENOID REPLACEMENT

TESTING

Basic Check

WARNING
Never operate the starter motor than 30 seconds at a time without pausing to allow it to cool for at least two minutes. Overheating, caused by excessive cranking, will seriously damage the starter motor.

Basic starter testing can be done without tools. The problem is a bad battery and a defective starter cause the same symptoms. First test and charge the battery to confirm it is in good condition.

1. Place a voltmeter across the battery and try to start the car.

2. If starter makes no sounds and voltmeter doesn't move, check the wires from the ignition switch to the starter. Place the voltmeter on the starter wires and check for 12 volts at the little wire when the ignition is turned to START. The problem is most likely not the starter, but the solenoid, ignition switch, neutral safety switch or wiring to the starter.

3. If the starter clicks and the voltmeter moves very little, check the solenoid, battery cables and wire connections.

4. If the engine cranks very slow or seems to jam, the starter is the probably bad.

5. If the vehicle is hard to crank warm, but after given time to cool cranks easier, the starter is the most likely problem.

6. Before condemning the starter, always check the engine's mechanical condition. A good starter cannot crank a damaged engine, or an engine that has been extremely overheated, is low on oil, or has extremely thick and dirty oil.

No-Load Test

See Figure 1

1. Make the connections as shown in the accompanying figure.
2. Close the switch and compare the RPM, current and voltage readings with the following values:

3. 1987–95 vehicles with SD–250 starter: No-load test @ 10 volts – 45–75 amps, RPM at drive pinion – 8,600–13,000 rpm
4. 1987–95 vehicles with PG–250 starter: No-load test @ 10 volts – 60–90 amps, RPM at drive pinion – 2,880–3,200 rpm
5. 1996–99 vehicles with SD–255 starter: No-load test @ 10 volts – 45–70 amps, RPM at drive pinion – 8,600–13,000 rpm

Make disconnections only with the switch open. Use the test results as follows:

6. Rated current draw and no-load speed indicates normal condition of the starter motor.

7. Low free speed and high current draw indicates:

8. Too much friction. Tight, dirty, or worn bushings, bent armature shaft, allowing the armature to drag.

9. Shorted armature. This can be further checked on a growler after disassembly.

10. Grounded armature or fields. Check further after assembly.

11. Failure to operate with high current draw indicates:

12. A direct ground in the terminal or fields.


14. Failure to operate with low or no current draw indicates:

15. Open solenoid windings.

16. Open field circuit. This can be checked after disassembly by inspecting internal connections and tracing the circuit with a test lamp.

17. Open armature coils. Inspect the commutator for badly burned bar after disassembly.

18. Broken brush springs, worn brushes, high insulation between the commutator bars of other causes which would prevent good contact between the brushes and commutator.
19. Low no-load speed and low current draw indicates:

20. High internal resistance due to poor connections, defective leads, dirty commutator and causes listed under Step 6.

21. High free speed and high current drain usually indicate shorted fields. If shorted fields are suspected, replace the field and frame assembly. Also check for shorted armature using a growler.

REMOVAL & INSTALLATION

See Figures 2, 3, 4, 5, 6 and 7

1. Disconnect the negative battery cable.

2. Raise and support the vehicle safely.

3. If necessary for access, remove the splash shield.

4. If equipped, unfasten the flywheel inspection cover bolts and remove the cover.

5. Label and detach the electrical connectors from the starter.

Fig. Fig. 2: Unfasten the starter motor electrical connections. You may want to tag them first to avoid confusion
Fig. 3: Exploded view of the starter motor electrical connections

6. It may allow more room if you remove the right side cooling fan.

7. Remove the starter-to-engine bolts, then carefully lower the starter from the vehicle.

Fig. 4: The starter is attached to the engine with 2 mounting bolts (see arrows)
Fig. Fig. 5: Unfasten the front mounting bolt (1) and remove any necessary shims (2), noting their locations for installation.

Fig. Fig. 6: Unfasten the long starter mounting bolt, then remove the starter motor from the vehicle.

Before installing the starter motor, make sure the electrical terminals are secure by tightening the nuts next to the cap on the solenoid battery terminal and on the "S" terminal. If these terminals are not tight in the solenoid cap, the cap may be damaged during installation of the electrical connections and cause premature starter failure.
Fig. Fig. 7: Exploded view of the starter motor mounting – 1987–97 vehicles

To install:

Note the location of any shims so they may be replaced in the same positions upon installation.

8. Place the starter in position, then install the starter–to–engine bolts and tighten to 32 ft. lbs. (43 Nm).

9. Attach the electrical connectors to the starter, as tagged during removal. Tighten as follows:
   a. Tighten the nut on the solenoid battery terminal to 12 ft. lbs. (16 Nm).
   b. On the SD–250 and SD–255 models, tighten the nut on the "S" terminal to 22 inch lbs. (2.5 Nm).

10. If removed, install the flywheel inspection cover and secure with the retaining bolts. Tighten the flywheel cover bolts to 62 inch lbs. (7 Nm).

11. If removed, install the splash shield.

12. Carefully lower the vehicle.

13. Connect the negative battery cable.

SOLENOID REPLACEMENT

1. Remove the starter, as outlined earlier in this section.

2. Remove the screw from the field strap at the rear of the starter.

3. Remove the 2 bolts holding the solenoid to the starter.

4. Rotate the solenoid 90 degrees and remove it from the starter. Be aware that there is a large spring behind the solenoid.

To install:

5. Push solenoid and spring onto starter and rotate into position.

6. Install the mounting bolts and tighten to 60 inch lbs. (6.5 Nm).

7. Install screw to field strap and tighten the retaining screw to 75 inch lbs. (8.5 Nm).

8. Install the starter, as outlined earlier in this section.