Troubleshooting

NOTE: The air temperature must be between 15 and 38°C (59 and 100°F) before testing.

Recommended Procedure:

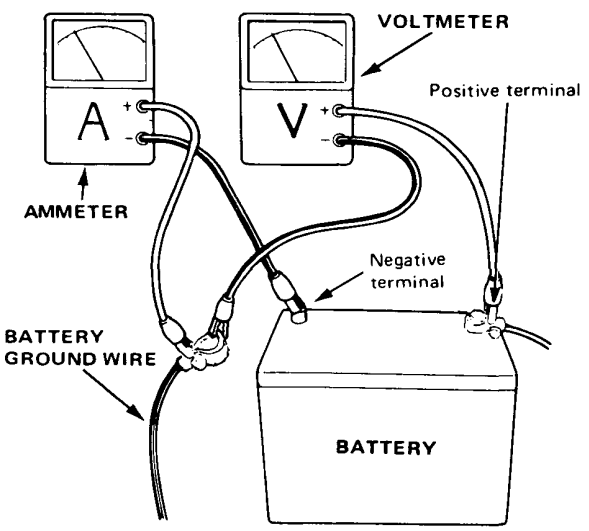
Use a starter system tester.
Connect and operate the equipment in accordance with manufacturer's instructions.
Test and troubleshoot as described starting with step 2.

Alternate Procedure:

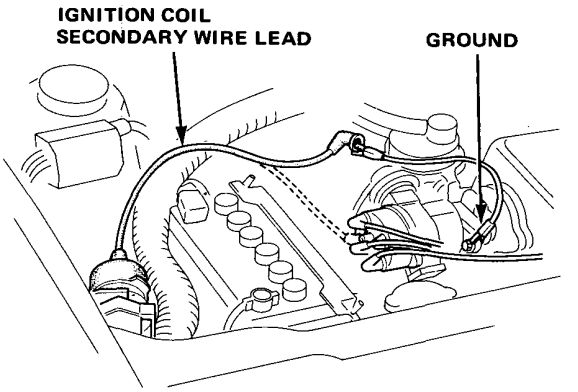
Use the following equipment:

- Ammeter, 0–400A
- Voltmeter, 0–20 volts (accurate within 0.1 volt)
- Tachometer 0–1200 min^{-1} (rpm)

1. Hook up voltmeter and ammeter as shown.



2. Disconnect ignition coil secondary wire from distributor, and ground it.



3. Check starter engagement.
Turn ignition switch to III. Starter should crank engine.

- If starter does not crank engine, bypass ignition switch circuit as follows: unplug connector (black/white wire) from starter. Connect jumper wire from battery positive (+) terminal to solenoid terminal. Starter should crank engine.

– If starter still does not crank engine, check battery, battery positive cable and ground, and cable connections for looseness or corrosion.
If starter still does not crank the engine, remove starter and diagnose internal problems (pages 28-12 through 28-21).

– If starter cranks engine, check for open wire in the black/white wire circuit between the starter and ignition switch, and connectors. Check ignition switch. On Automatic, check NEUTRAL/BACK-UP switch and connectors.

4. Check for wear or damage.
Starter should crank engine smoothly and steadily.

- If starter engages, but cranks engine erratically, remove starter motor. Inspect starter, drive gear and flywheel ring gear for damage. Check drive gear overrunning clutch for binding or slipping when armature is rotated with drive gear held. Replace gears if damaged. See pages 28-2 to 7.

5. Check cranking voltage and current draw.

Voltage should be no less than specified volts as below.

0.8 kw and 1.4 kw: 8 volts
1.0 kw: 8.5 volts.

Current should be no greater than specified amperes as below.

0.8 kw: 200 amperes
1.0 kw: 230 amperes
1.4 kw: 350 amperes

If voltage is too low, or current draw too high, check for:

- Battery fully charged (page 27-5).
- Open circuit in starter armature commutator segments (page 28-18).
- Starter armature dragging.
- Shorted armature winding (see page 28-16).
- Excessive drag in engine.

6. Check cranking rpm.

Engine speed during cranking should be approximately 400 min^{-1} (rpm).

If cranking rpm is too low, check for:

- Loose battery or starter terminals.
- Excessively worn starter brushes (see page 28-19).
- Open circuit in commutator segments (see page 28-18).
- Dirty or damaged helical spline on drive gear.
- Defective drive gear overrunning clutch (see page 28-19).

7. Check starter disengagement:

Turn ignition switch to III and release to II.

Starter drive gear should disengage from flywheel.

If drive gear hangs up on flywheel, check:

- Starter solenoid plunger and switch for malfunction.
- Drive gear assembly for dirty or damaged overrunning clutch (see page 28-19).