

# Starting System

## Starter Test

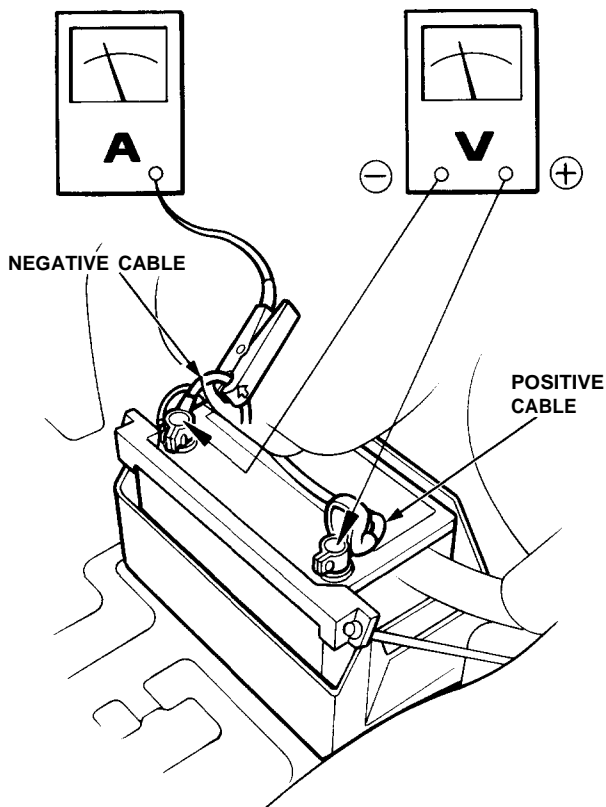
NOTE: The air temperature must be between 59 and 100°F (15 and 38°C) before testing.

### Recommended Procedure:

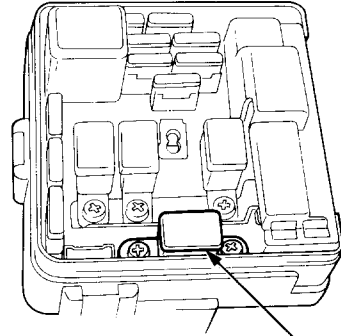
- Use a starter system tester.
- Connect and operate the equipment in accordance with manufacturer's instructions.

### Alternate Procedure:

- Use the following equipment:
  - Ammeter, 0-400 A
  - Voltmeter, 0-20 V (accurate within 0.1 volt)
  - Tachometer, 0-1,200 rpm
- Hook up voltmeter and ammeter as shown.



1. Disconnect the No. 13 (30 A) fuse from the engine compartment fuse/relay box.



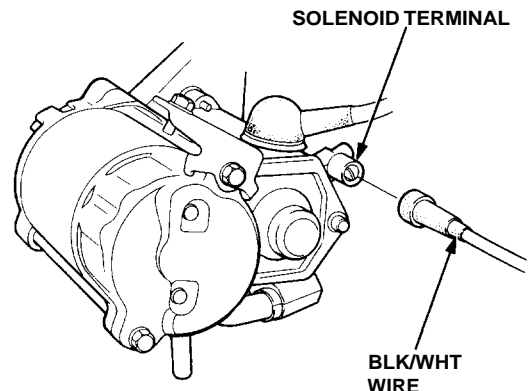
No. 13 (30 A)  
FUSE

2. Check the starter engagement:

Depress the clutch pedal all the way (M/T) or shift to **P** or **N** position (A/T), and turn the ignition switch to "Start (III)". The starter should crank the engine.

NOTE: On cars equipped with manual transmission, the engine will not crank unless the clutch pedal is fully depressed.

- If the starter still does not crank the engine, check the battery, battery positive cable, ground and the wire connections for looseness or corrosion.
- Test again.  
If the starter still does not crank the engine, bypass the ignition switch circuit as follows: Unplug the connector (BLK/WHT wire) from the starter. Connect a jumper wire from the battery positive (+) terminal to the solenoid terminal. The starter should crank the engine.





— If the starter still does not crank the engine, remove the starter and diagnose its internal problems.

— If the starter cranks the engine, check for an open in the BLK/WHT wire and connectors between the starter and ignition switch. Check the ignition switch.

On cars with automatic transmission, check the A/T gear position switch (neutral position switch) and connector.

On cars with manual transmission, check the starter cut relay, clutch interlock switch and connectors.

NOTE: Check the No. 29 (50 A) fuse and the starter cut relay, and inspect the security alarm system.

3. Check for wear or damage:  
The starter should crank the engine smoothly and steadily.

If the starter engages, but cranks the engine erratically, remove the starter motor. Inspect the starter, drive gear and flywheel ring gear for damage.

Check the drive gear overrunning clutch for binding or slipping when the armature is rotated with the drive gear held. Replace the gears if damaged.

4. Check cranking voltage and current draw:  
Voltage should be no less than 8.5 volts.  
Current should be no more than 350 amperes.

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

- Low battery.
- Open circuit in starter armature commutator segments.
- Starter armature dragging.
- Shorted armature winding.
- Excessive drag in engine.

5. Check cranking rpm:  
Engine speed during cranking should be above 100 rpm.

If speed is too low, check for:

- Loose battery or starter terminals.
- Excessively worn starter brushes.
- Open circuit in commutator segments.
- Dirty or damaged helical spline or drive gear.
- Defective drive gear overrunning clutch.

6. Check the starter disengagement:  
Depress the clutch pedal all the way (M/T) or shift to **P** or **N** position (A/T), turn the ignition switch to "Start (III)", and release to ON (II).  
The starter drive gear should disengage from the flywheel ring gear.

If the drive gear hangs up on the flywheel ring gear, check:

- Solenoid plunger and switch for malfunction.
- Drive gear assembly for dirt or damaged overrunning clutch.