Diagnose the Starting System
Fender Covers!
You must have a strong battery to test the starter.
Test the Starter Circuit

- Cranking Voltage
- Cranking R. P. M.
- Cranking Amps
Move Amp Probe to measure all amps leaving battery
Turning off the fuel allows starter to crank long enough for an accurate diagnosis
If it is easy....
...use a remote starter
Record cranking Volts and cranking Amps
• Starter amp draw will be high until the starter motor reaches maximum RPM

• Cranking longer than 10 or 15 seconds will overheat the starter

• Starter motors that crank slowly lead to starter and battery problems
Listen for slow cranking
• Cranking voltage MUST stay above 10 volts

• Maximum Cranking Amps
  4 cylinder = 150 Amp
  6 cylinder = 200 Amp
  8 cylinder = 250 Amp

• These are ONLY approximate specifications and not valid on diesel engines.
Slow turning starters cause trouble

- Engines will be harder to start requiring longer cranking times
- Starters will tend to overheat
- Batteries will wear out sooner
- By carefully listening to many different engines, you will learn to identify slow cranking R.P.M.’s
- Scan Tool provides exact cranking R.P.M.
Volt Drop Starter Cables

• Resistance in the high amp starter (battery) cables will cause slow cranking

• Replacing a starter motor without checking volt drop may cause the new starter to fail

• High amp starter cables should have less than ½ volt drop.
Volt drop negative cable(s)

- starter motor housing
- negative battery terminal
Crank starter to read volt drop
Volt drop positive cable(s)
Hook to high amp cable
Diagnose Intermittent or No Crank

• Intermittent, or no starter motor operation may be caused by a defect in the starter control circuit

• Begin by understanding the system
This system has 2 starter control circuits.
Set-up for #1 control circuit.
Set-up for positive side of #2 control circuit.
Set-up for ground side of #2 control circuit.
Defects in control circuit #1, or control circuit #2, will cause intermittent or No Start.