Testing the Charging System

• Be sure to follow safety precautions to protect the vehicle and yourself

• Exhaust Hoses and Fender covers are often neglected
Make sure the battery is O.K.

- Load test the battery to know if it is reliable

If the battery is not fully charged:
1. It may not pass the load test
2. It may cause the starter to pull too many amps
3. It will prevent you from ensuring the alternator is not Over-Charging the battery
   (Battery must get to full charge before it can over-charge)
Amp probe set for Battery Load Test
Test the Starting System

- Check for cranking voltage (over 10 volts)
- Check for cranking Amps
- Check for cranking R.P.M.
Amp probe set for Starting and Charging Test
Test for Undercharging

1. Accurately measure volts at the battery (use an accurate volt meter)
2. Run vehicle at 2,500 R.P.M.
3. Turn on ALL electric loads (Headlamps on high beam, A/C on MAX, Blower motor high speed, Rear window defogger Flashers, etc.)
4. Battery volts should maintain about 14 volts (Less than 8 amps means battery is close to full charge)
5. Less than 8 amps and under 13.8 V means Under-Charge
Test for Undercharging

If charging system can operate ALL electrical loads
AND
Maintain 13.8 volts at the battery (engine around 2,000 RPM)
The charging system is functioning normally.

IF volts are slightly low with less than 8 amps going into the battery, the system is Under-Charging

Less than 13.5V @ 2,000 RPM = Under-Charging
Maximum Alternator Output

- To measure the maximum output in amps
  1. Hook directly to generator output
  2. Run engine at 2,500 RPM
  3. Load system voltage with carbon pile to get maximum amp output
  4. Generator should produce to within 10% of rated output.
If you can not hook to alternator

• You can measure output to the battery

1. Hook to the battery
2. Run engine @ 2500 rpm
3. All vehicle accessories turned OFF
4. Use a carbon pile to cause maximum amps to flow through battery tester
5. Record amps and add 10 – 15 amps
   (10 – 15 amps is about what the fuel pump, ignition and injectors will use)
Always check for A/C volts

1. Run engine at 2,500 RPM
2. Turn on ALL loads
3. Measure A/C volts at battery
4. Should be below 500 mV (0.5 Volts)
It is best to use a Lab Scope

- To accurately check for bad or leaking diodes:
  1. Run Engine at 2,500 RPM
  2. Turn on ALL electrical loads
  3. Hook lab scope to battery
  4. Place on A/C volts at about .5 volts per division
  5. Adjust time scale to view at least 8 diode humps
  6. Practice to recognize good and bad patterns
Test voltage regulator accuracy (Over-Charging)

1. Zero the amp probe
2. Hook around ALL positive, or ALL negative battery cables
3. Run engine with all electric loads OFF
4. Accurately measure battery voltage
5. When less than 8 amps are entering the battery voltage should be more than 13.8 volts and less than 14.8 volts (changes with temperature)
This shows normal charging system
less than 8 amps means battery is done charging
voltage is not too high or low
This shows an overcharge high volts with battery still charging
Undercharging system
Low volts less than 8 amps charging battery