



Starting and Charging Voltmeter Test

Meets NATEF Task: (A6-A-7) Demonstrate the proper use of a (DMM) during diagnosis of electrical circuit problems: source voltage, voltage drop, current flow, and resistance. (P-1)

Name _____ Date _____ Time on Task _____

Make/Model/Year _____ VIN _____ Evaluation: 4 3 2 1

Connect the voltmeter red lead to the positive (+) post of the battery, and the black lead to the negative (-) post of the battery. Set the scale of the voltmeter to read battery voltage. Turn the headlights on for 1 minute to remove the surface charge. Turn off the headlights and read the voltmeter.

Step #1 - **Battery Voltage:** 12.6 volts or higher = 100% charged
 12.4 volts = 75% charged
 12.2 volts = 50% charged
 12.0 volts = 25% charged

Battery Voltage _____ **OK** _____ **NOT OK** _____

Step #2 - **Cranking Voltage:** Disable the ignition or hold the accelerator to the floor on a fuel injection system to prevent the engine from starting. While cranking the engine with the ignition key, observe the voltmeter. The voltage should be above 9.6 volts.

Cranking Voltage _____ **OK** _____ **NOT OK** _____

If at or below 9.6 volts, there is a possible problem with:

- a. defective (or dirty) battery cables and connections.
- b. defective (or discharged) battery (under load).
- c. defective starter, solenoid or relay.

Step #3 - **Charging Voltage:** Reconnect the coil wire and start the engine. With the engine running at approximately 2,000 RPM (fast idle), the voltage should be 13.5-15 volts (or a minimum 1/2 volt higher than battery voltage and a maximum of 2 volts higher than battery voltage).

Charging Voltage _____ **OK** _____ **NOT OK** _____

If over 15 volts, there is a possible defective voltage regulator or connections. If under 13.5 volts (or under 1/2 volt over battery voltage), there is a possible problem with:

- a. loose drive belt.
- b. defective generator.
- c. defective voltage regulator.
- d. dirty or defective wiring connections.