

# System Diagnosis

Proper vehicle diagnosis requires a plan before you start

*Following a set procedure to base your troubleshooting on will help you find the root cause of a problem and prevent unnecessary repeat repairs .*

**STEP ONE:** Understand the Customer's Concern

Information collection beyond the basics.

Questions asked MUST be related To the system you will be working on and the customer complaint

**STEP TWO:** Check for Technical Service Bulletins

Every vehicle that comes into the shop for a repair (not necessary for routine maintenance) should be checked for TSB's , This can save you hours of troubleshooting.

**STEP THREE:** Conduct a Systematic Diagnosis

*This step will be different for every system*

Follow the troubleshooting steps for the system you are working on.

Make sure to check EVERY component of the system and that they are in proper working order.

Document your diagnosis including tests and results.

**STEP FOUR:** Complete and Confirm the Repair

Make sure you have taken care of the customers concerns.

Try to duplicate the conditions that were present when the vehicle failed

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# Starting System Troubleshooting Chart

<b>Symptom</b>	<b>Possible Cause</b>	<b>Corrective Action</b>
<b>Engine will not crank</b>	<b>Dead battery</b>	<b>Check battery state of charge. Recharge if possible. Replace if necessary</b>
	<b>Melted fusible link</b>	<b>Replace fusible link</b>
	<b>Loose connections</b>	<b>Clean and tighten connections</b>
	<b>Key switch or start switch contacts in poor condition</b>	<b>Replace switch as necessary</b>
	<b>Solenoid hold-in coil open. Pull-in coil open or shorted.</b>	<b>Replace starter</b>
	<b>Solenoid contacts worn away</b>	<b>Replace starter</b>
	<b>Mechanical problem in engine</b>	<b>Check engine</b>

# Starting System Troubleshooting Chart

Symptom	Possible Cause	Corrective Action
Engine cranks too slowly to start	Weak battery	Check battery. Recharge if possible. Replace if necessary
	Loose or corroded connections	Clean and tighten connections
	Faulty starter	Test starter, Replace if necessary
Starter spins, but engine will not crank	Faulty over-running clutch	Check over-running clutch, replace starter if necessary
	Damaged or worn starter pinion gear or engine ring gear.	Check gears for damage or wear. Replace starter or ring gear

# Starting System inspection check list

Begin with a thorough visual inspection of system and components

## **System tests:**

### **Battery**

- Load test
- Confirm charging system operation

### **System cables & wires**

- Make sure all connections are clean and tight
- Check wires for fraying, insulation damage, and other physical damage

### **Voltage drop test**

- Check voltage drop on the complete circuit
- If problem is detected check positive side and negative side separately to isolate problem

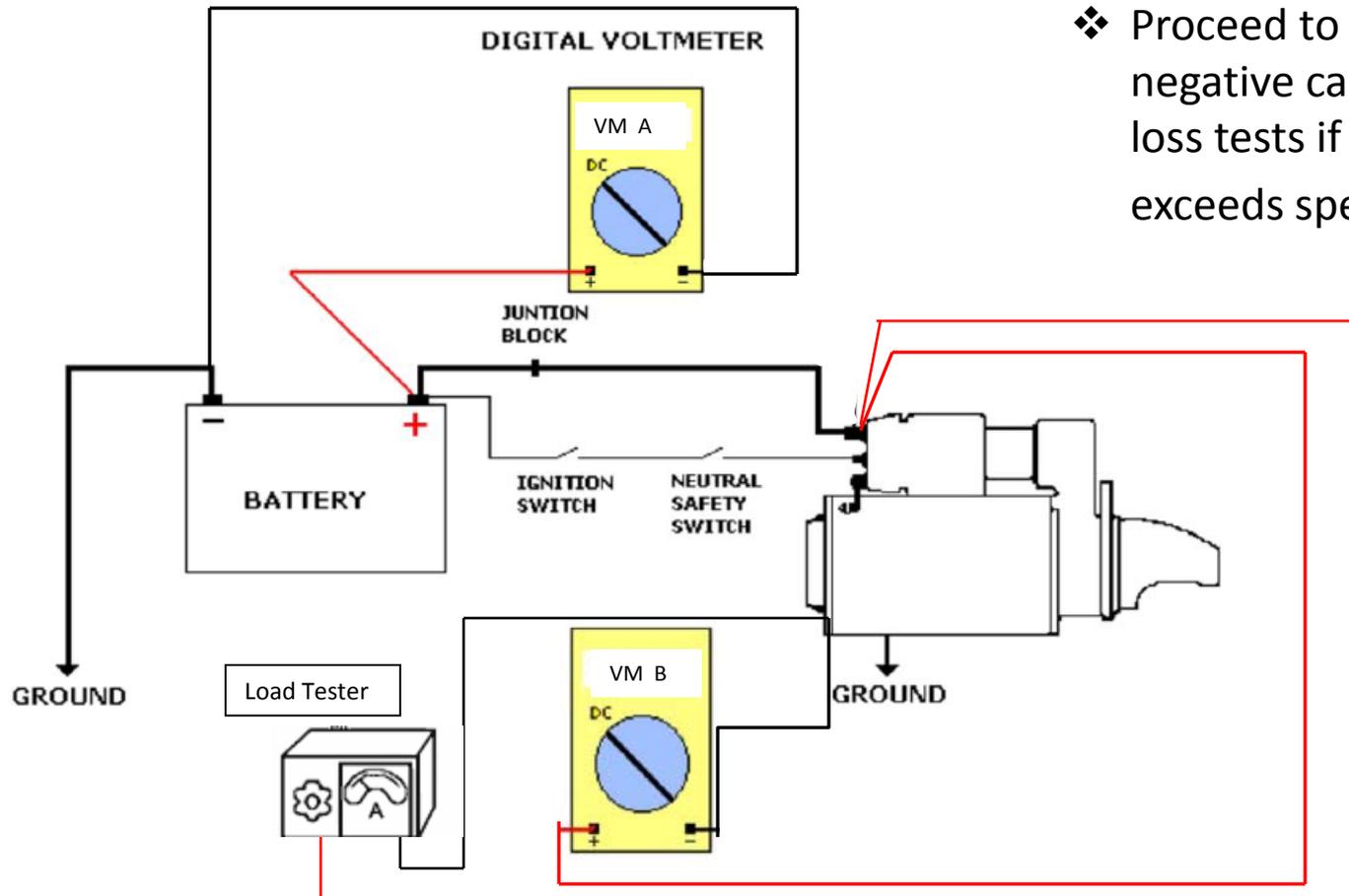
### **Check voltage at “KS” terminal on starter with ignition switch in the start position**

- Typically 11.4 volt minimum (check vehicle service manual for correct specification)

# System voltage drop test

Diagram shows a carbon pile tester.

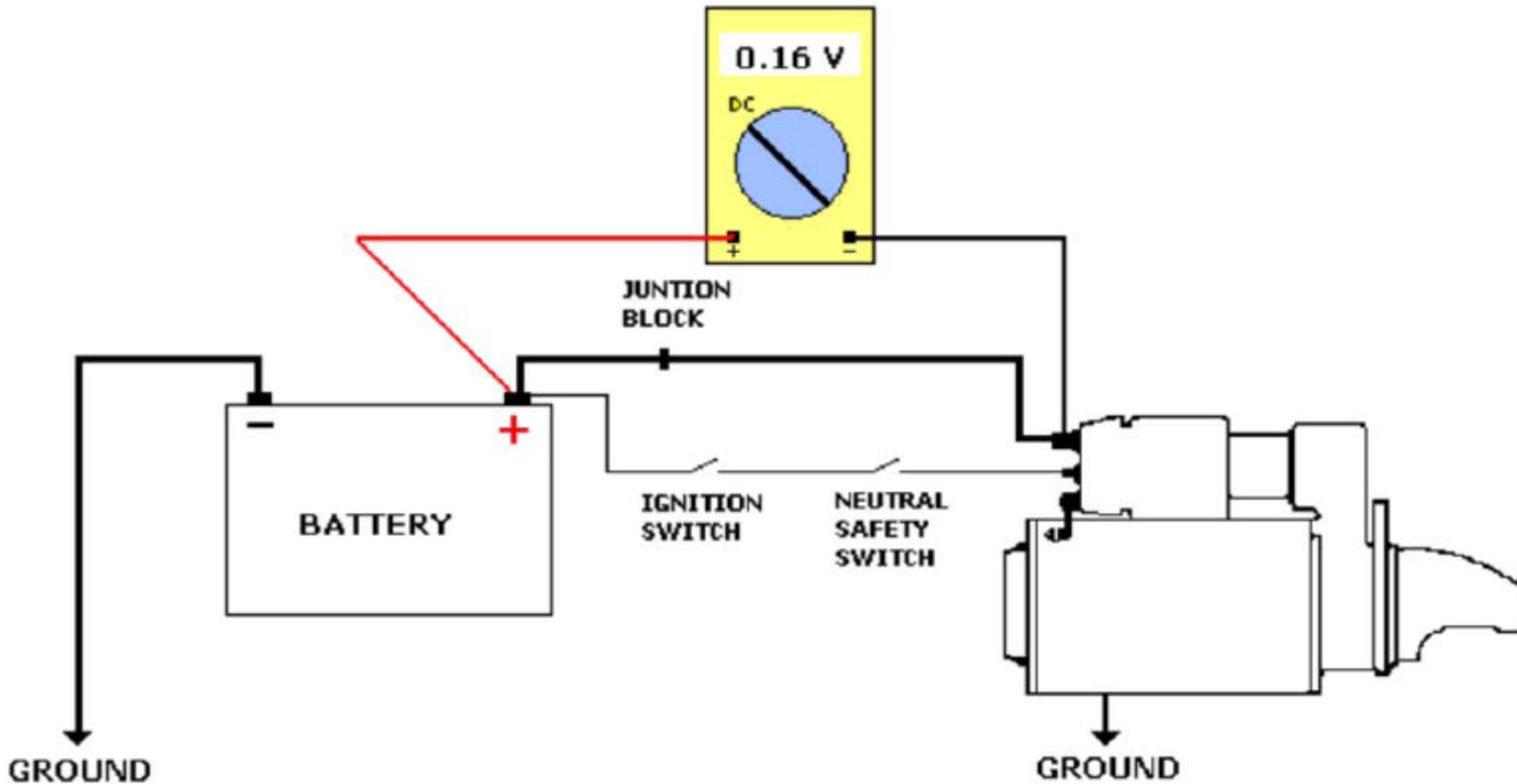
Test can be done with electronic system tester, follow instruction included with tool.



Subtract (-) VM B from VM A. Loss not to exceed 0.5V.

- ❖ Proceed to positive & negative cable. Voltage loss tests if total loss exceeds specs.

# Positive side voltage drop test

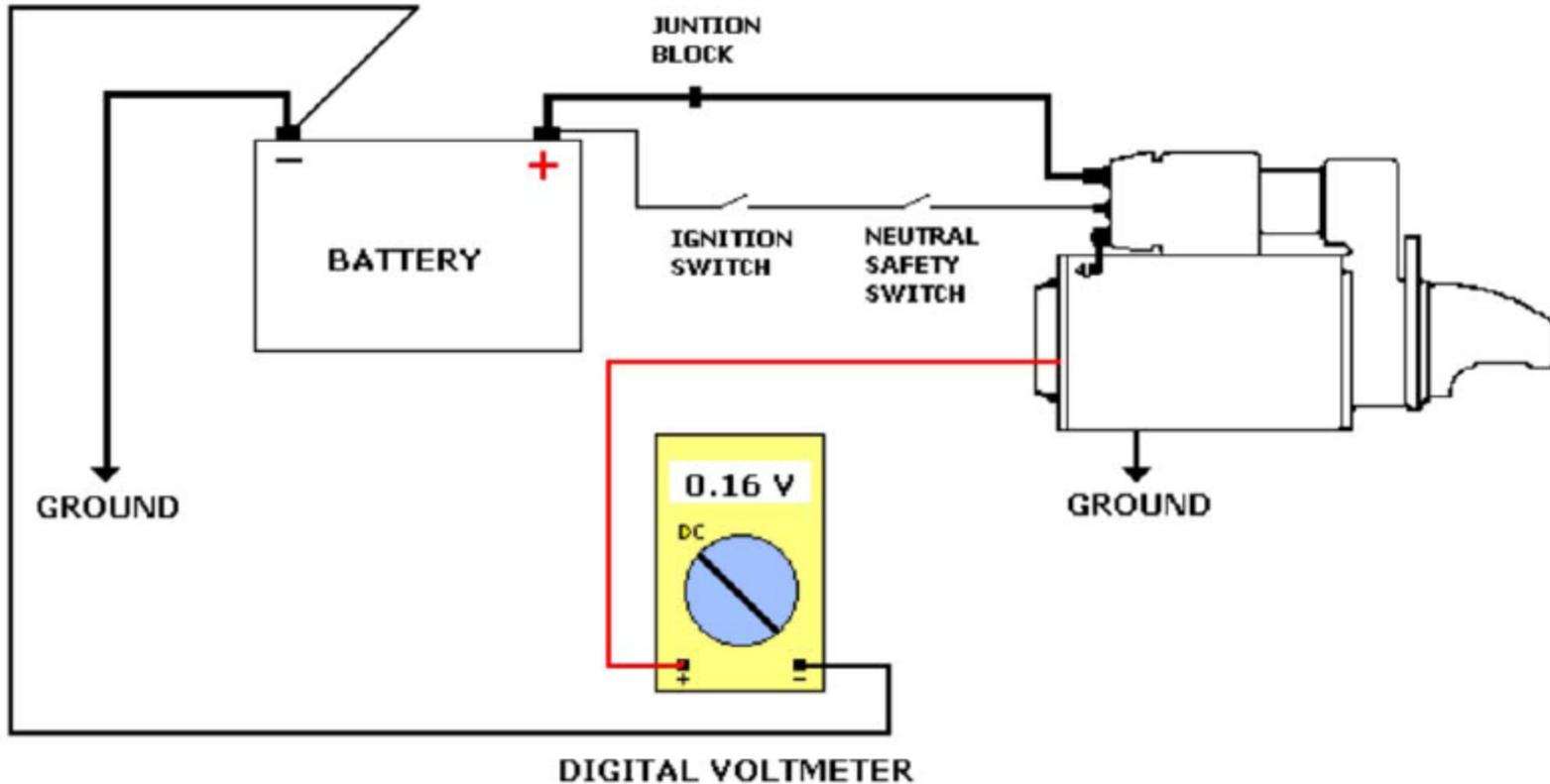


Test can be performed with:

- Electronic tester
- Carbon pile load tester
- Cranking engine (If cranking engine)

- 1) Disable the fuel or ignition system to keep the engine from starting during the test
- 2) DO NOT crank the engine for longer than 10 seconds at a time
- 3) Wait a minimum of 60 seconds before cranking engine again to cool the starter

# Ground side voltage drop test



Test can be performed with:

- Electronic tester
- Carbon pile load tester
- Cranking engine (If cranking engine)

1) Disable the fuel or ignition system to keep the engine from starting during the test

2) DO NOT crank the engine for longer than 10 seconds at a time

3) Wait a minimum of 60 seconds before cranking engine again to cool the starter



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