HINO TRUCKS™
A Toyota Group Company

Tech Tip No:	07 - 006
Group:	27 – Electrical System
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CHASSIS TECH TIPS

Subject: VOLTAGE DROP TEST

1. **RELEVANT MODELS:**
   All Hino Models (Cab over and Conventional)

2. **COMPLAINT:**
   Electrical failure

3. **CAUSE/CONDITION:**
   High resistance and poor connections

4. **CORRECTION:**
   Proper Diagnostics are critical in locating and repairing an electrical problem quickly and efficiently.
   One of the best tests to perform on any electrical circuit is a Voltage Drop Test.
   Below is a procedure to Voltage Drop Test a starter circuit.

Starter Voltage Drop Test

Voltage drops in the Starter circuit can be very difficult to find and cause you many hours of frustration. We hope that the following diagrams will help you troubleshoot the Starter system.

Some key points to remember are:

- Any added resistance to the starter circuit can result in **decreased** starter performance.
  For example, with a system drawing 200 amps during cranking, when we add 0.01ohms resistance to the starter circuit, we will reduce the voltage in the system by 2.0 volts. This degrades the starter's performance and life span.
- When performing voltage drops always have your positive lead of the multimeter on the connection closest to the battery.
- When performing voltage drop tests current must be flowing in the circuit.

This means the engine must be cranked.

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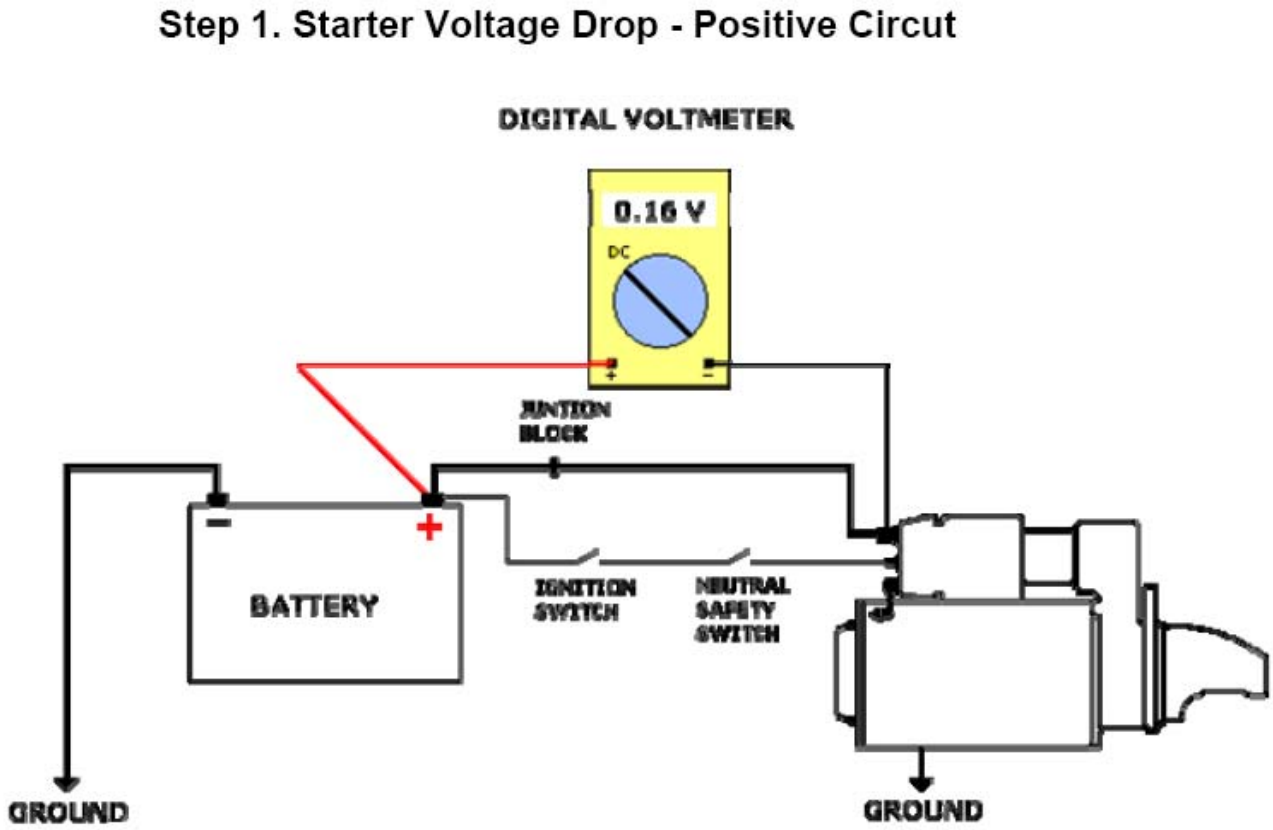

With positive lead of the multimeter touching the positive (+) battery post **(not the cable end)** crank engine while watching the voltmeter (wired as shown above).

Reading on voltmeter should be **less** than 0.2 volts.

If reading is more than 0.2 volts go to step 2.
In step 2 we will check the components of the positive (+) circuit.

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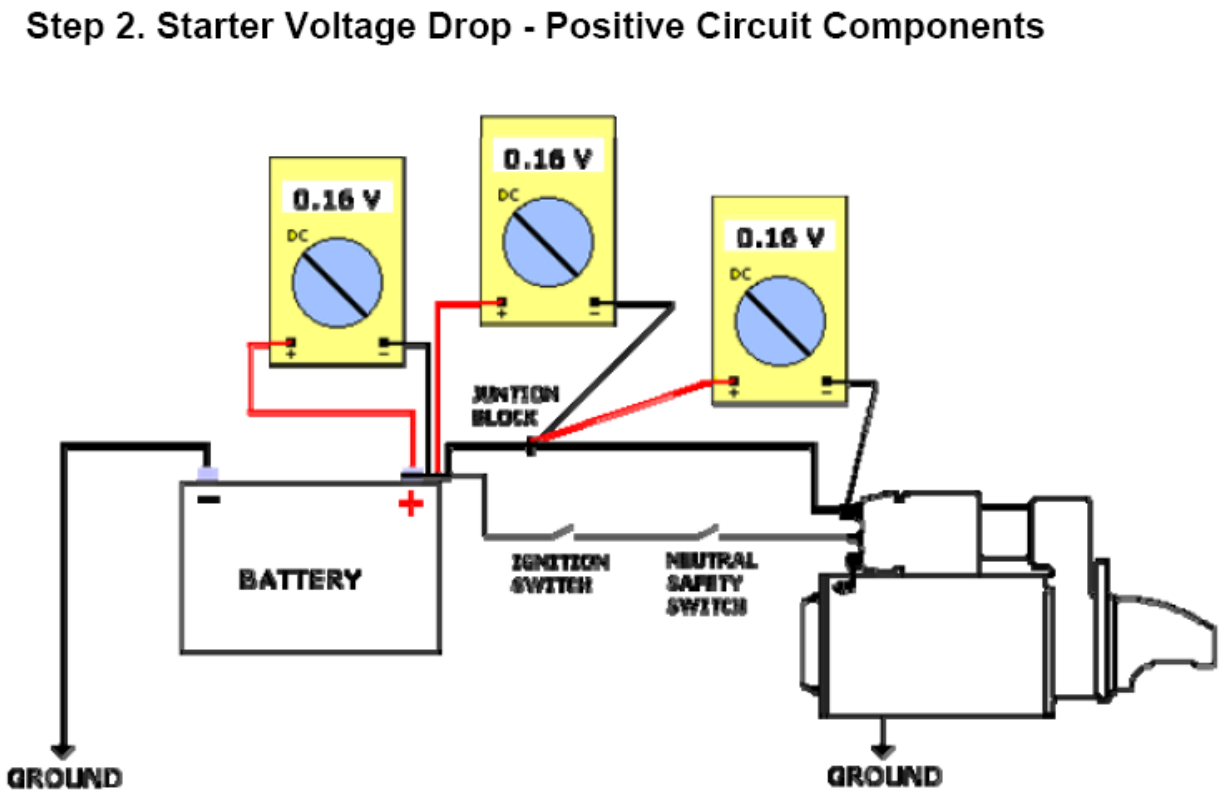

Connect (+) test lead to battery post, and (-) test lead to battery cable clamp. Then check for voltage drop at this connection.

Check each component and link in the circuit while cranking the engine. Those components with a voltmeter reading of greater than 0.2 volts should be repaired or replaced. Check the components or link to verify that the voltage drop is now 0.2 volts or less.

Check across every connection, cable and component.

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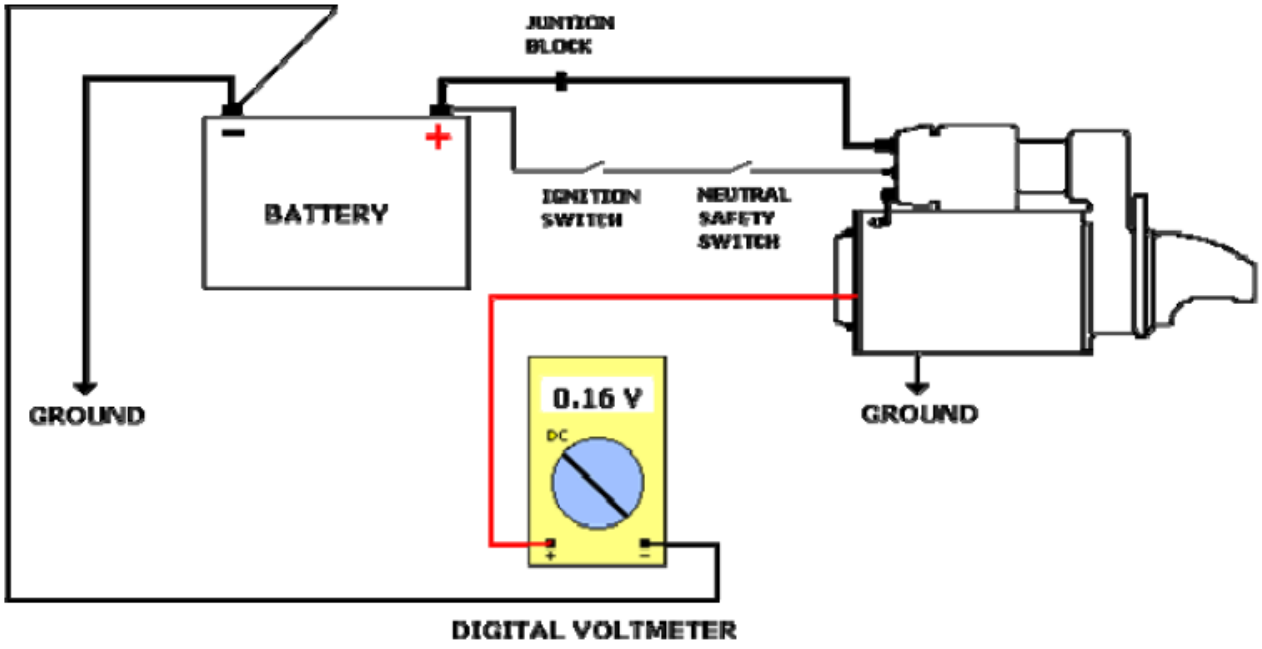
Step 3. Starter Voltage Drop - Ground Circuit



With negative lead of the multimeter touching the negative (-) battery post **(not the cable end)** crank engine while watching the voltmeter (wired as shown above). Reading on voltmeter should be **less** than 0.2 volts.

If reading is more than 0.2 volts check components in the ground circuit. Check components just like we did in step 2 but place the negative lead from multimeter to the connection closest to the negative battery post.

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On circuits that don't have a significant load like the starting circuit A load can be simulated to check the integrity of the wiring and connectors.

A headlight is a great way of adding a load to a circuit

When loading a circuit make sure that it is isolated from all components (Unplug the circuit were it originates and terminates)

One wire of the headlight can go to a known good 12 volt positive source. A good grounded wire can be connected to the wire of the circuit that is being tested at its origin. The negative wire of the test headlight can be connected to the wire of the circuit that is being tested at its termination.

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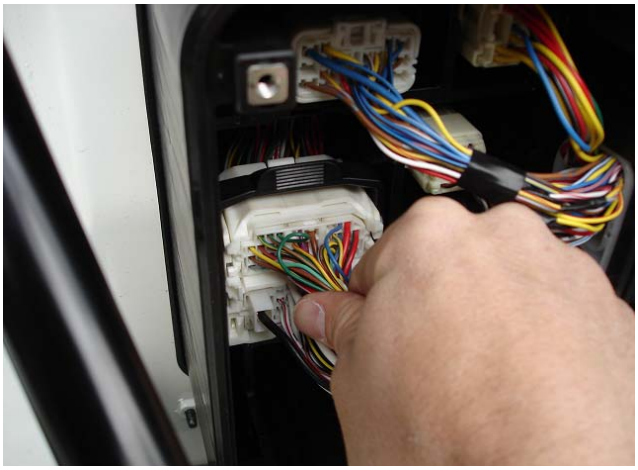
If the headlight is dim there is high resistance in that circuit. If the headlight doesn't light up at all there is an open in circuit



Check and wiggle the connectors and wiring to see if you can change the results at the test headlight

If the headlight now illuminates you have located the area where the circuit is in question.