

**“Auto/Truck Electrical-Electronics Troubleshooting Training
Webinar Video #001**

Clarifying A Major Electrical Misunderstanding



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Many technicians have a big electrical misunderstanding and don't realize it!

It causes a lot of confusion in *understanding* electrical training.

It causes a lot of *frustration* in *troubleshooting* electrical problems!

What is the misunderstanding?



**The misunderstanding occurs by mixing
VOLTAGE and *ELECTRON CURRENT*
together.**

Here is how I discovered this!



There is a *BIG* Difference between *Voltage* and *Electron Current*!

**They are not the same!
Don't mix them up!**

**It's either a "voltage" question
or it's an "electron current" question!
It's either one or the other.**

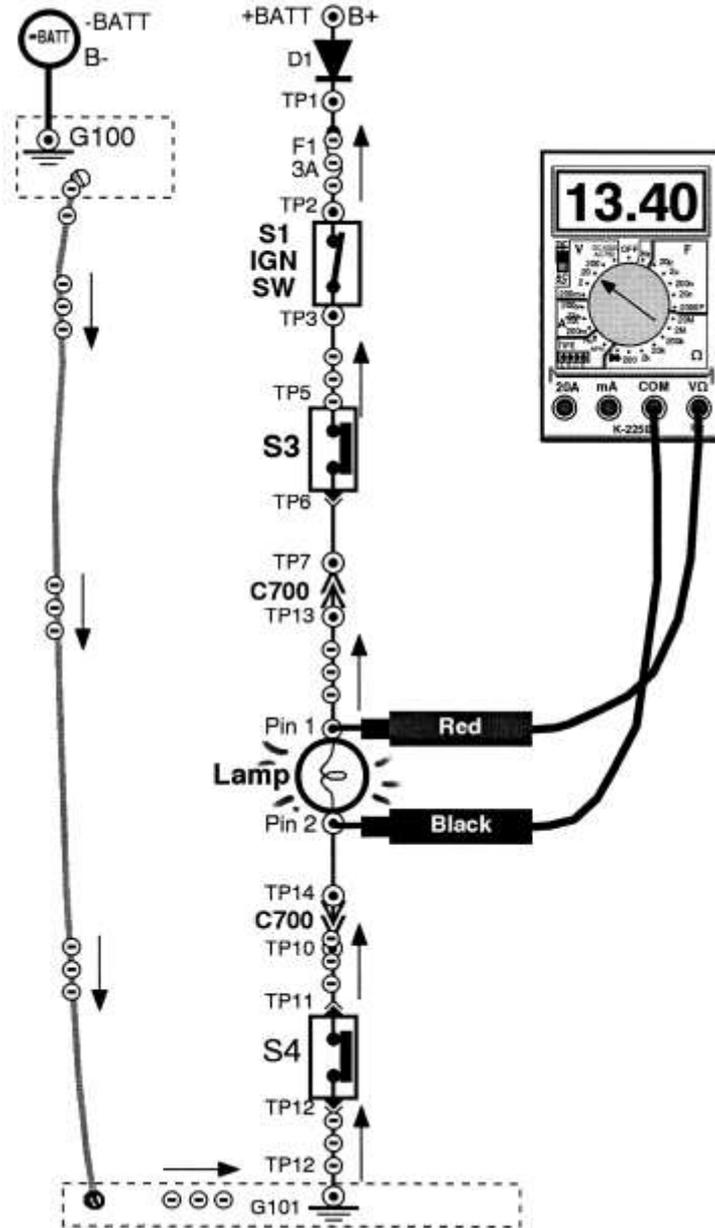


Let's clear this up this!
Voltage and ***Electron Current!***
are not the same thing!

Voltage is always ***stationary*** and measured in **volts**.

Voltage doesn't move.

A voltage drop in a circuit is not voltage moving.



**Measuring
Voltage
in Volts**



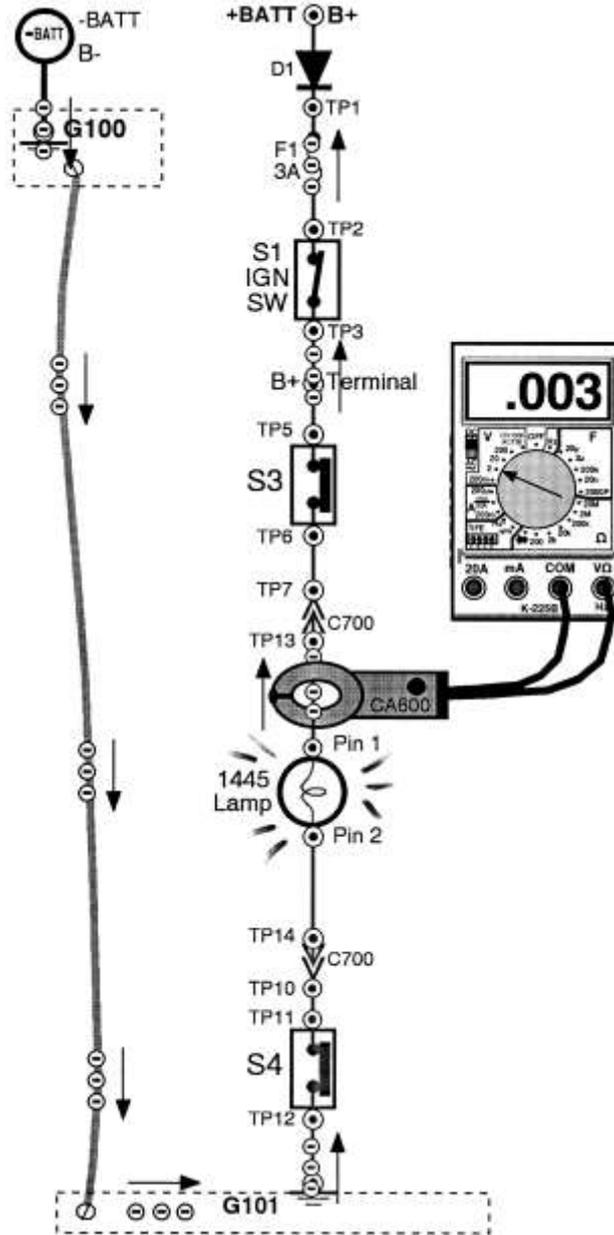
Let's clear this up this!
Voltage and ***Electron Current!***
are not the same thing!

It's reality! Electron Current *flows* (-) to (+).

Current is measured in **amps**.

Electron current is always moving and is never stationary.

Electron current flowing creates voltage drops.



Measuring Electron Current in Amps



**Voltage and electron current have different parts to play
in a circuit.**

They should be considered and measured separately.



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See the voltage first!

Then, see electron current flowing!



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**The Generator/Battery circuit is a good example of the
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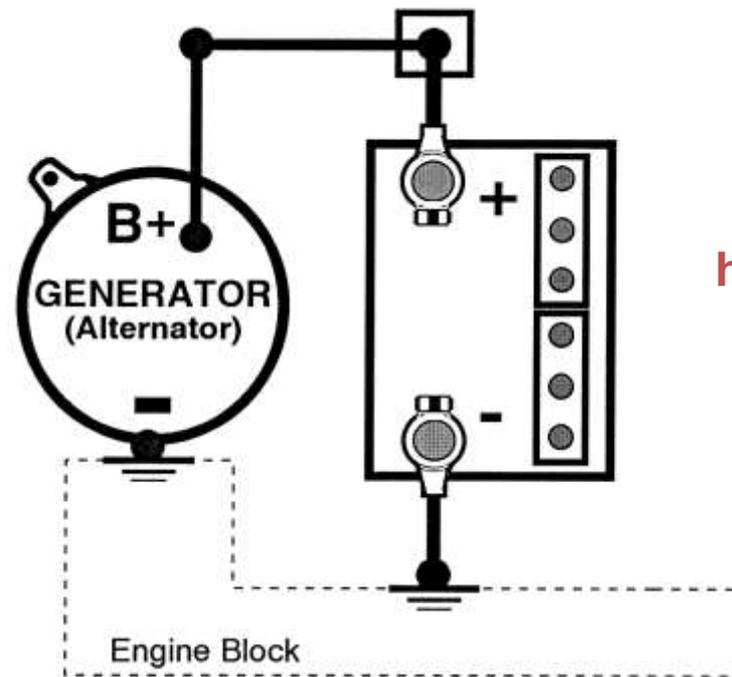
**The Generator/Battery circuit is a good example of the
confusion with voltage and current.**

**There are two modes of operation!
*Cranking and Charging***



Explain the *Voltage & Electron Current* relationship between a “Generator and a Battery”

1. Describe what happens while the engine is **CRANKING?**

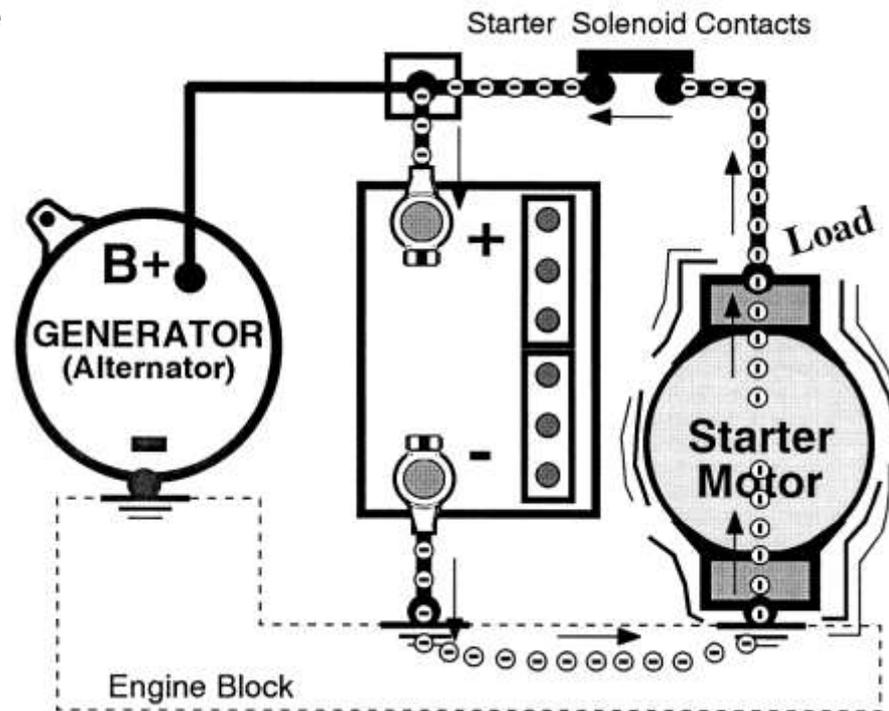


2. Describe what happens while the engine is **RUNNING?**



What goes on between a generator and a battery while Cranking the engine?

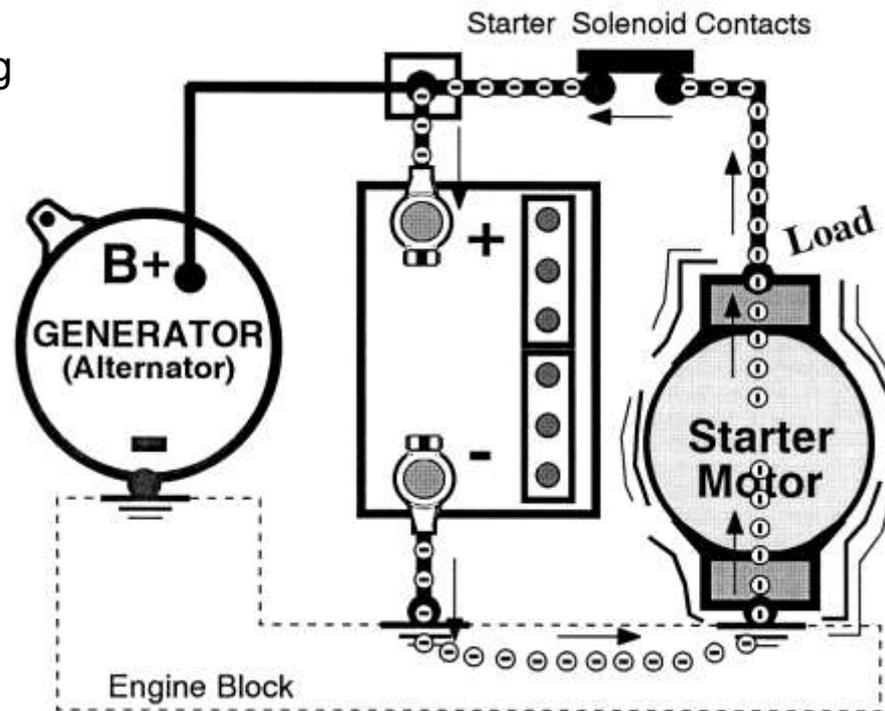
1. What is the voltage source in the cranking circuit?





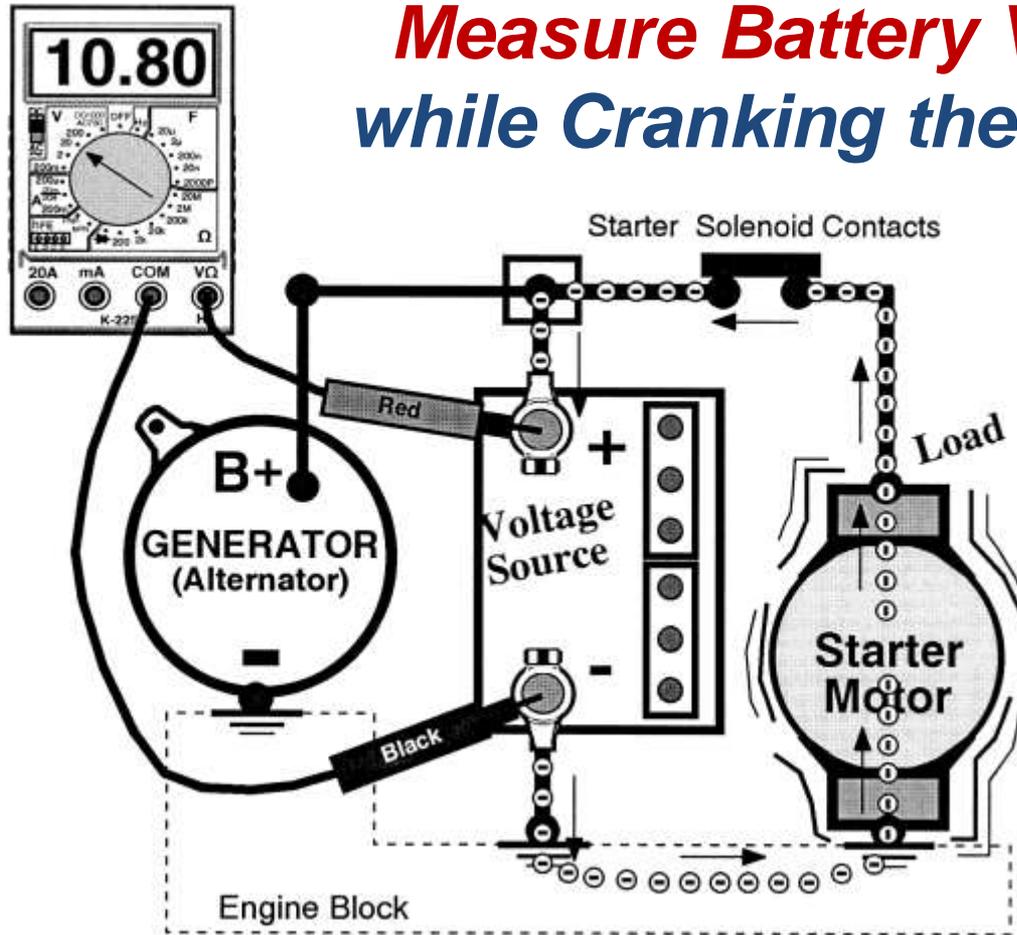
What goes on between a generator and a battery while Cranking the engine?

1. What is the voltage source in the cranking circuit?
2. Where is the circuit voltage measured?





Measure Battery Voltage while Cranking the Engine.

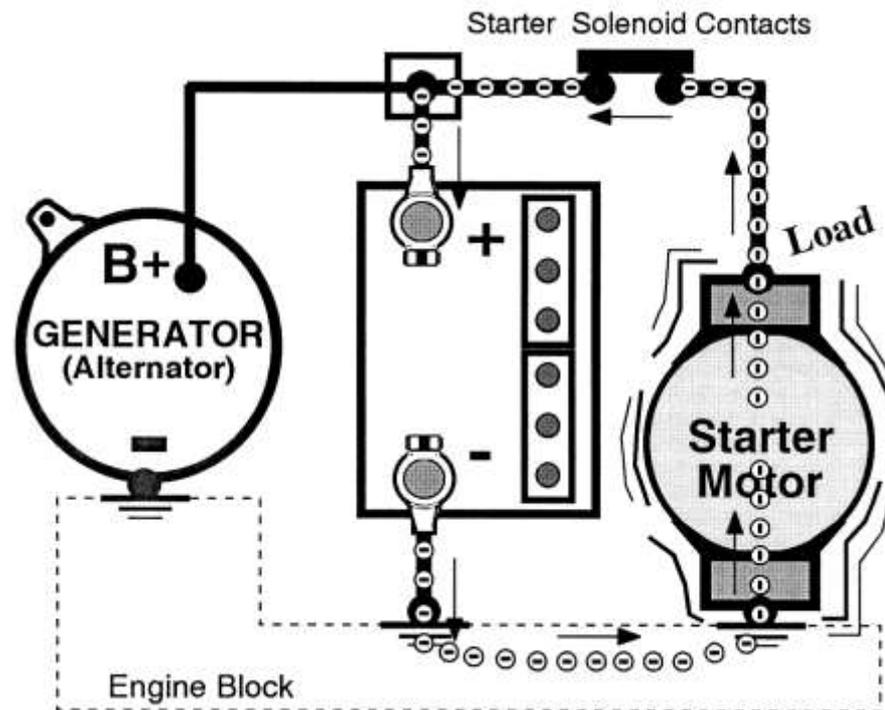


Any electron current while cranking is called cranking amps!



What goes on between a generator and a battery while Cranking the engine?

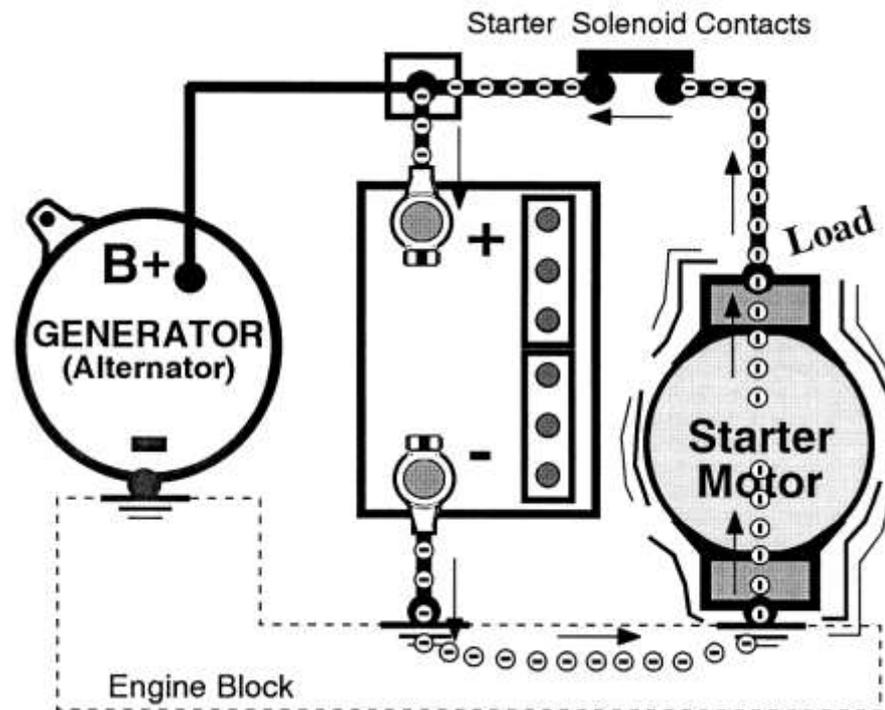
1. What is the voltage source in the cranking circuit?
2. Where is the circuit voltage measured?
3. **How does electron current flow between GEN and BATTERY?**





What goes on between a generator and a battery while Cranking the engine?

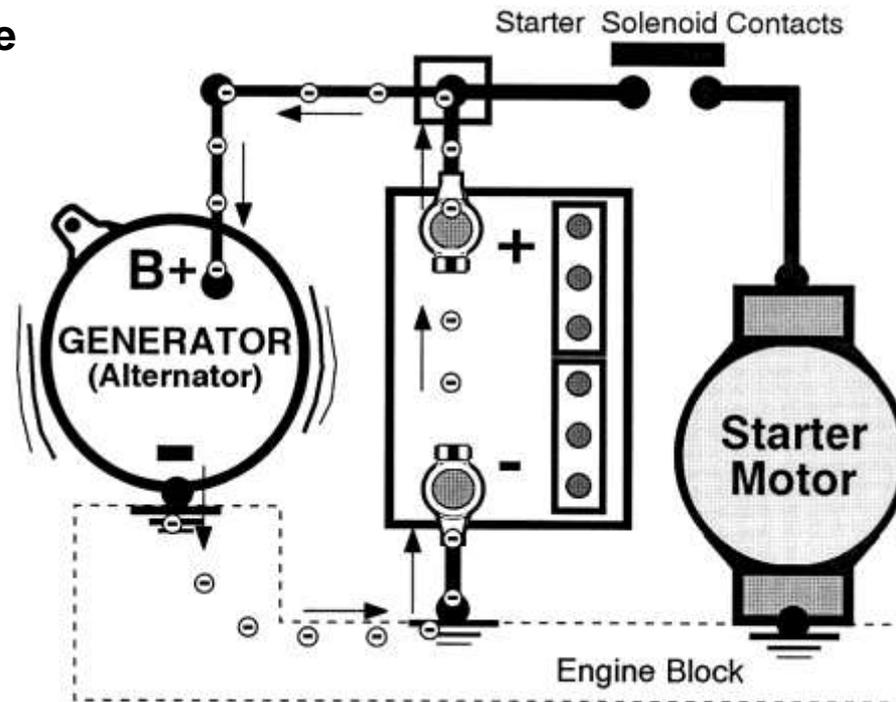
1. What is the voltage source in the cranking circuit?
2. Where is the circuit voltage measured?
3. How does electron current flow between the GEN and BATTERY?
4. **What does the Generator do?**





What goes on between a generator and a battery *during Engine RUN?*

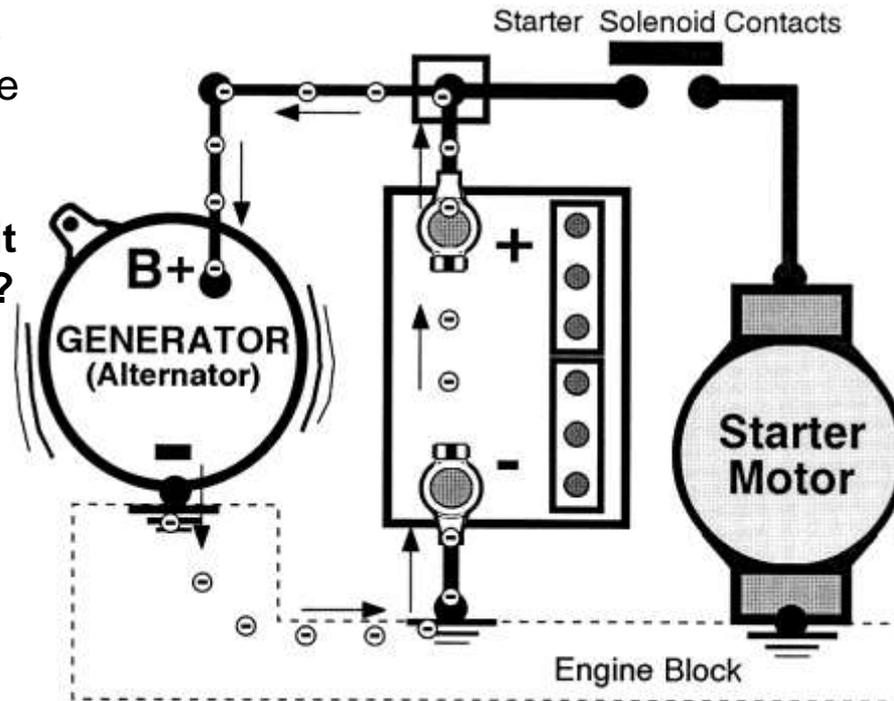
1. What is the voltage source during engine RUN?





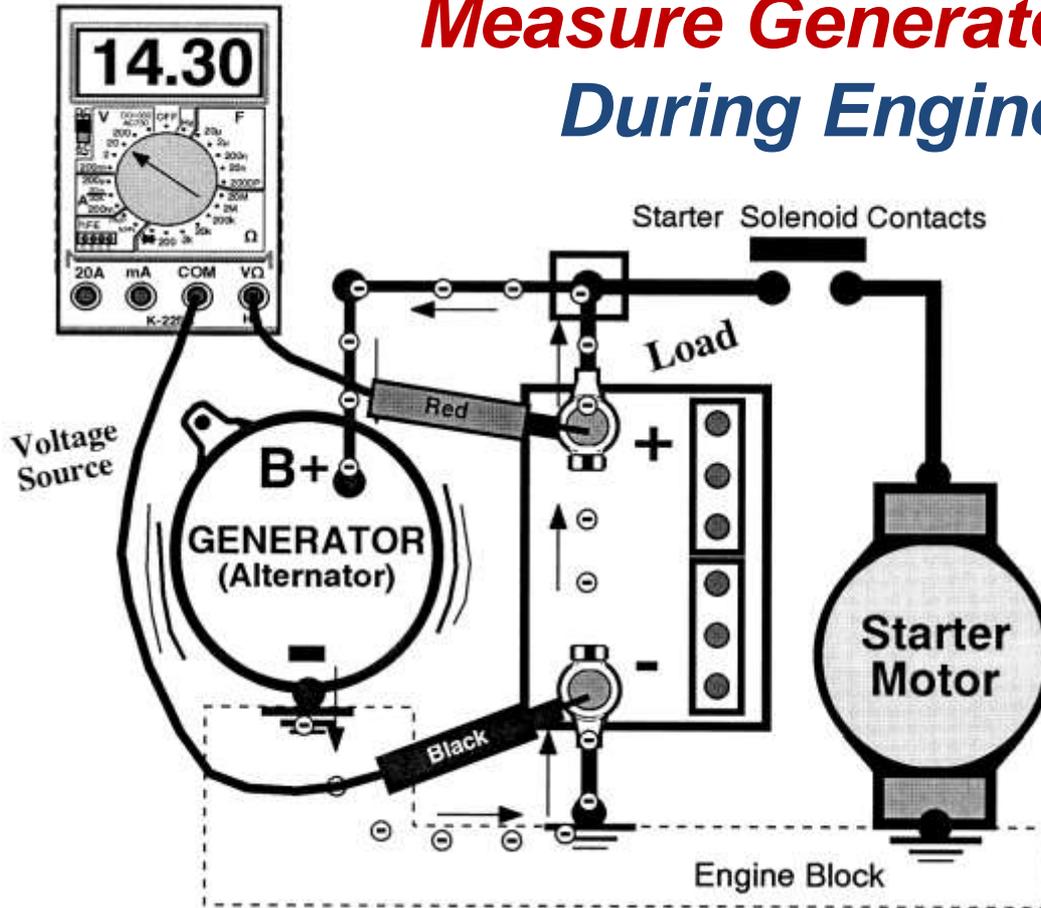
What goes on between a generator and a battery during Engine RUN?

1. What is the voltage source during engine RUN?
2. Where is the circuit voltage measured?





Measure Generator Voltage During Engine RUN

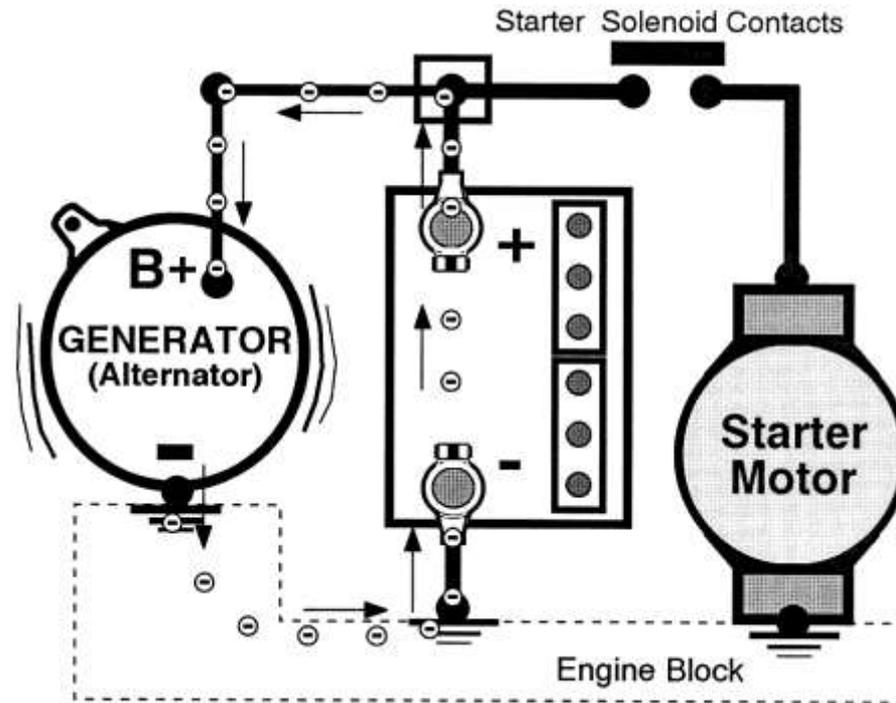


An electron current between GEN and BATTERY recharges the battery!



What goes on between a generator and a battery during Engine RUN?

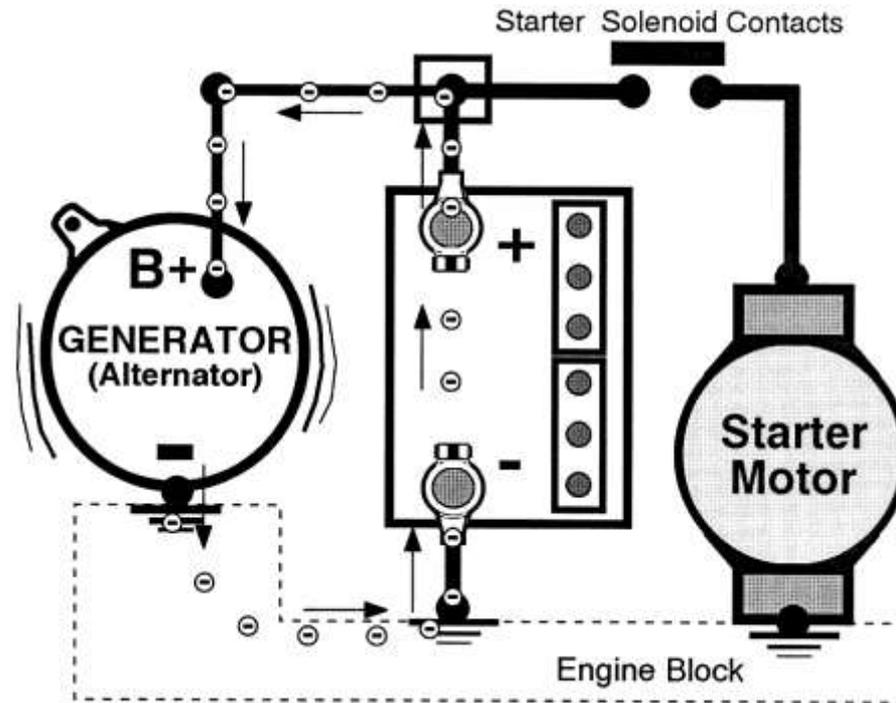
1. What is the voltage source during engine RUN?
2. Where is the circuit voltage measured?
3. Does electron current flow between the GEN and BATTERY?





What goes on between a generator and a battery during Engine RUN?

1. What is the voltage source during engine RUN?
2. Where is the circuit voltage measured?
3. Does electron current flow between the GEN and BATTERY?
4. What does the battery do?





The **Generator** *and the* **Battery** both have a voltage reading that is critical to vehicle operation.



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Battery Voltage is critical for Cranking!

(Not battery electron current)



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Generator Voltage is critical for Engine RUN!

(Not generator electron current)



The **Generator** *and the* **Battery** both have a voltage reading that is critical to vehicle operation.

Battery Voltage is critical for Cranking!

(Not battery electron current)

Generator Voltage is critical for Engine RUN!

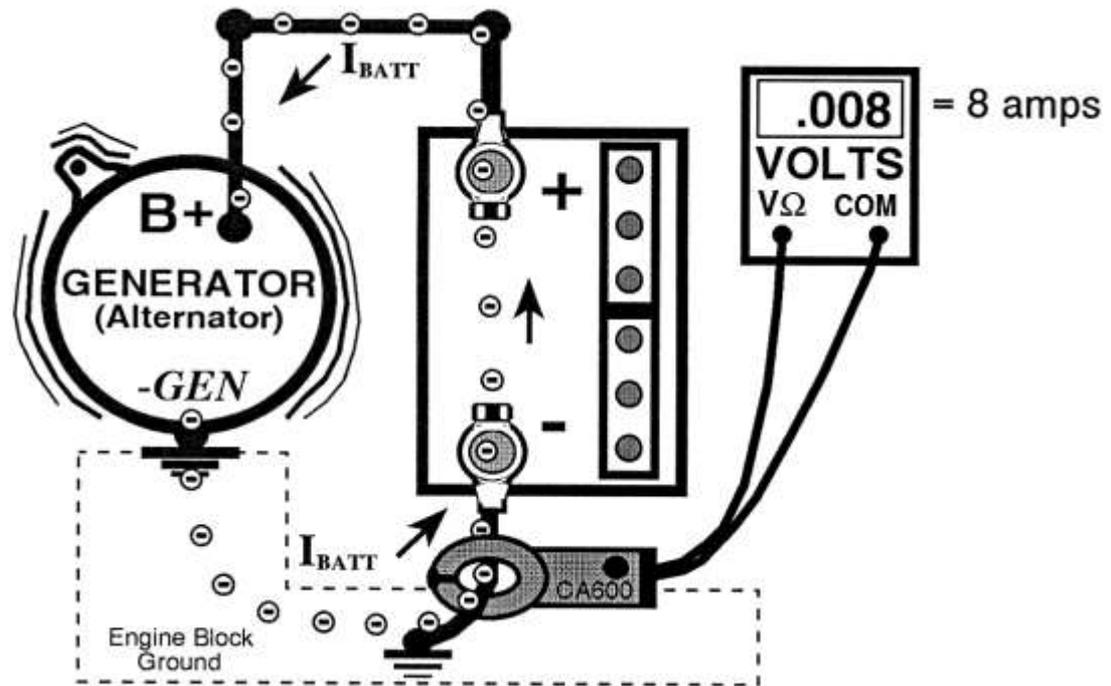
(Not generator electron current)

Why are voltage readings more important in circuits than current readings?



Engine RUN is the only time a generator and a battery exchange an electron current!

Should the ELECTRON CURRENT between the Generator and the Battery be measured?



If you don't have a current clamp - **GET ONE!**



Here's the bottom line of this Webinar!
***Voltage* & *Electron Current* are two different factors in an electrical-electronic circuit.**



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If you are **asking** an electrical question
ask about the voltage or ask about the electron current!

Voltage & Electron Current are separate questions.
Each requires a separate answer.



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**Here's the bottom line of this Webinar
if you are a teacher!**

***Voltage* & *Electron Current* are two different factors in an
electrical-electronic circuit.**

If you are **answering** an electrical question
specify that you are describing
either the **voltage** or the **electron current!**

REMEMBER!

It's either a "voltage" question
or it's an "electron current" question!
It's one or the other!

*(But don't mix them up and you won't
be confused!)*



This is a learning exercise for you!

Explain to another tech the difference of voltage and electron current between the generator & battery circuits.

Remember, voltage is one explanation.
Electron current is a separate story.



**Future Webinars by Vince Fischelli
on electrical & electronic circuit
troubleshooting are coming soon!**

Here's a preview!



Electrical-Electronic Circuit Troubleshooting *IS EASY* if . . .



Electrical-Electronic Circuit Troubleshooting *IS EASY* if . . .

. . . you know how, where and when to measure voltage . . .



Electrical-Electronic Circuit Troubleshooting *IS EASY* if . . .

- . . . you know how, where and when to measure voltage . . .
- . . . you know how, why and when to measure electron current . . .



Electrical-Electronic Circuit Troubleshooting *IS EASY* if . . .

- . . . you know how, where and when to measure voltage . . .
- . . . you know how, why and when to measure electron current . . .
- . . . you know when to measure resistance in a circuit with the correct type of ohmmeter . . .



Electrical-Electronic Circuit Troubleshooting *IS EASY* if . . .

- . . . you know how, where and when to measure voltage . . .
- . . . you know how, why and when to measure electron current . . .
- . . . you know when to measure resistance in a circuit with the correct type of ohmmeter . . .

Future webinars will explain what to do next if a reading is correct and what to do next if a reading is not correct, that is, it's too high or too low.



Future webinars in auto/truck Electrical-Electronics will be effective because they will . . .

Explain vehicle circuits and how they operate!

Explain how vehicle circuits fail (develop problems)!

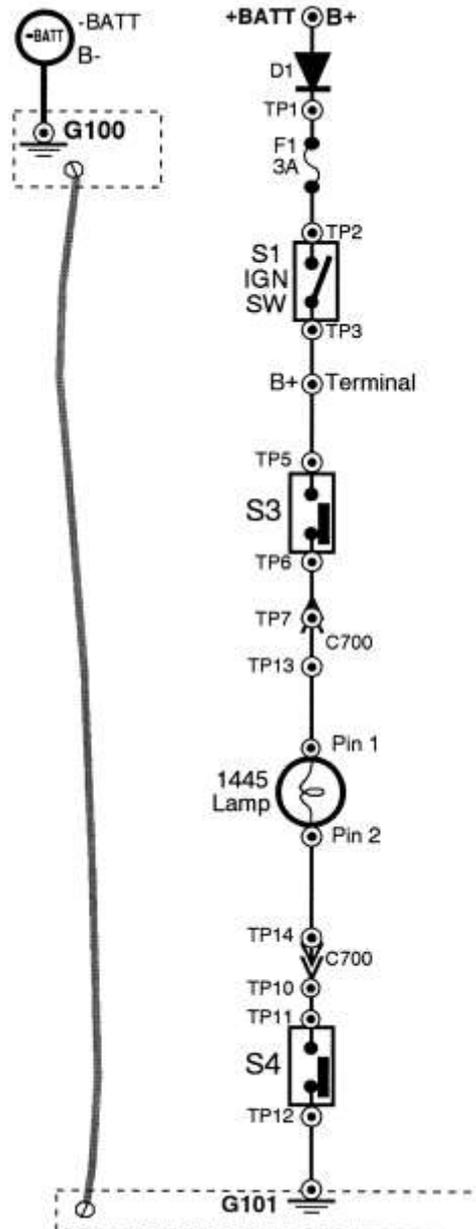
Provide correct voltage and electron current readings so you can fix the circuit problem!

Specify what to do next if a reading is good, or too low or too high!

Some highlights of what's coming



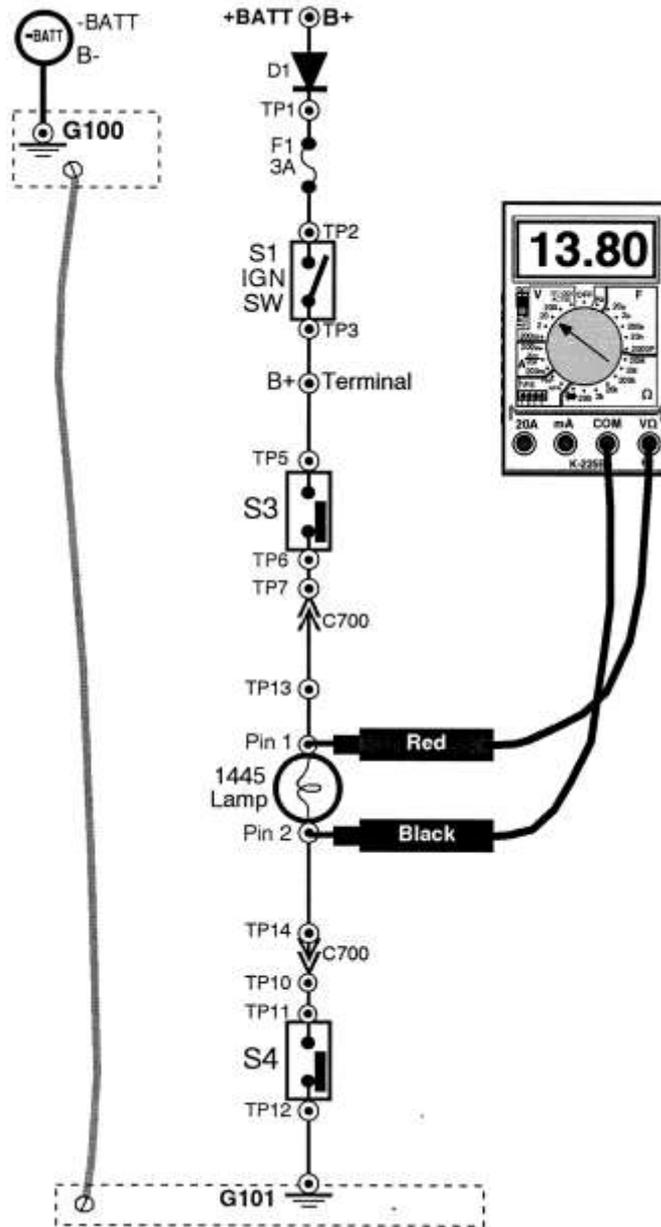
Webinars explain circuits and schematic diagrams from Vince's vast library of electric-electronic circuits and explain how they work, how they fail and how you fix'em . . . how you troubleshoot them.





Webinars explain how, when and where to measure voltage in circuits.

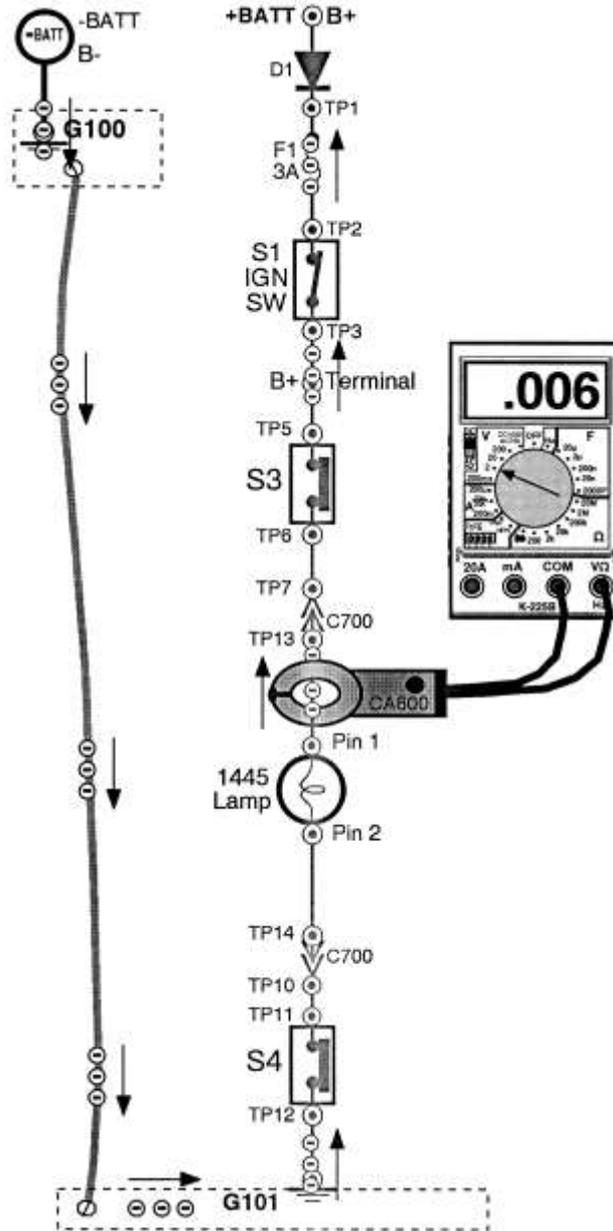
Webinars explain what to do next if the voltage reading is normal; if its too high or too low and what to do next.





Webinars explain why, how, when and where to measure electron current in circuits;

and tell you what to do next if the current reading is **normal**, is **too high** or is **too low** and what to do next.

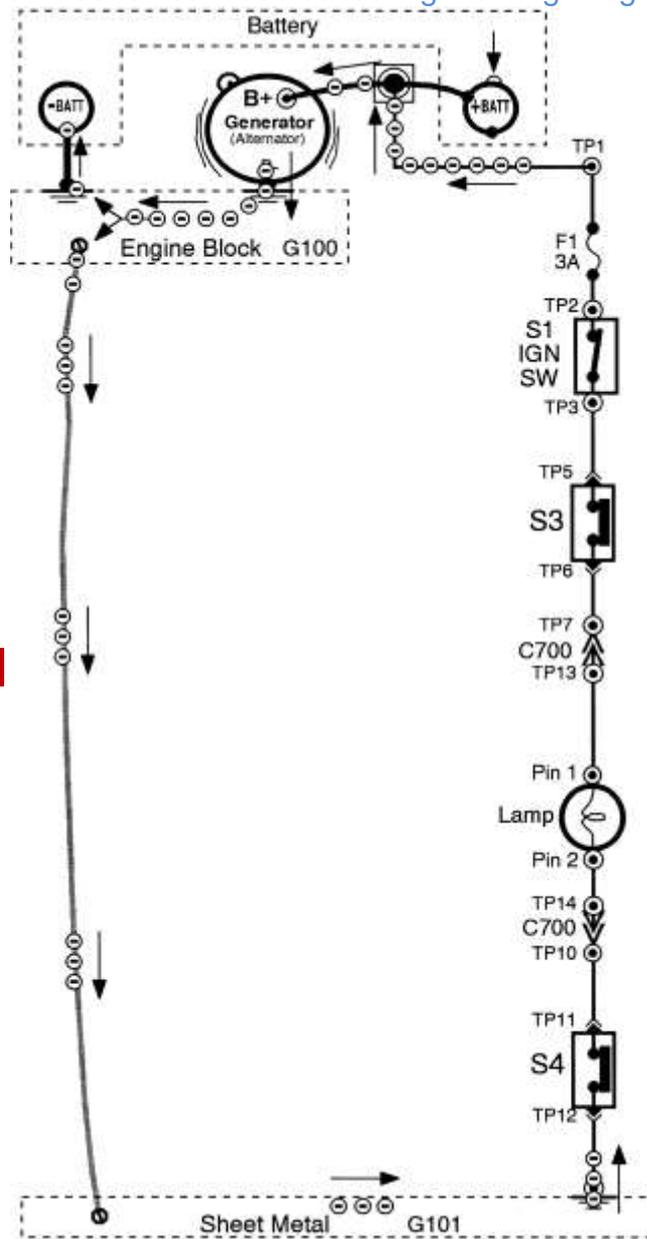


If you don't have a Current Clamp
GET ONE!



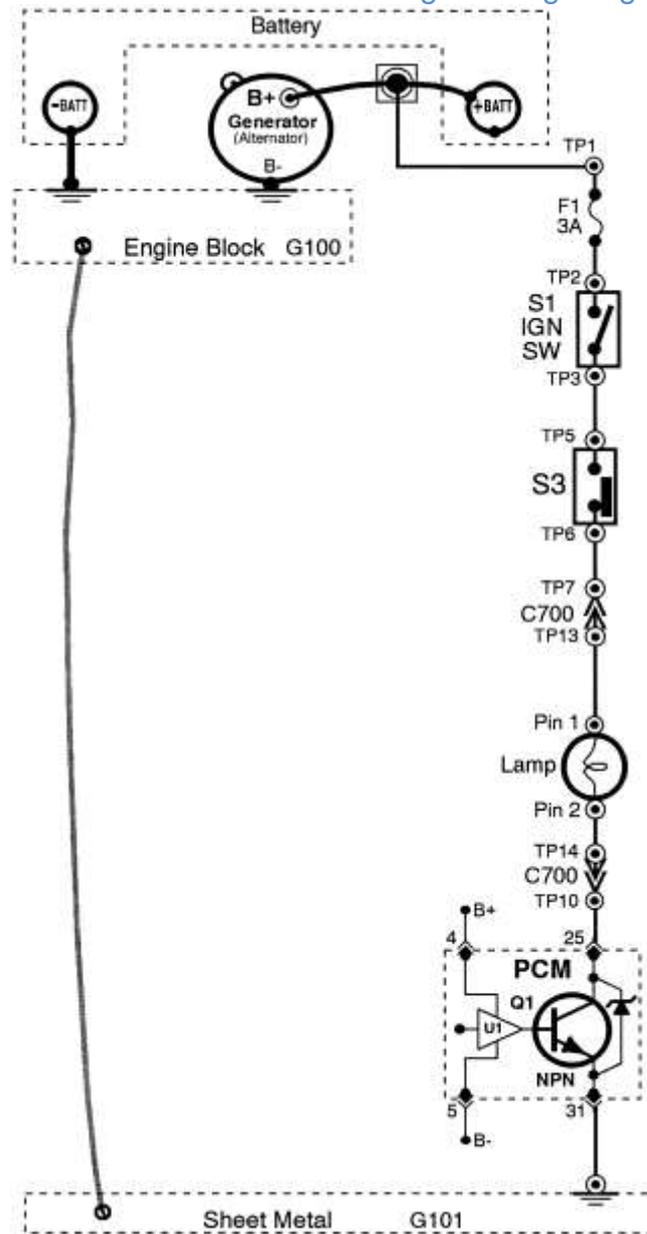
Webinars explain how circuits interface with a vehicle's primary electrical system and how that connection to power (B+) and ground (B-) affects an electrical circuit.

(You might be surprised!)





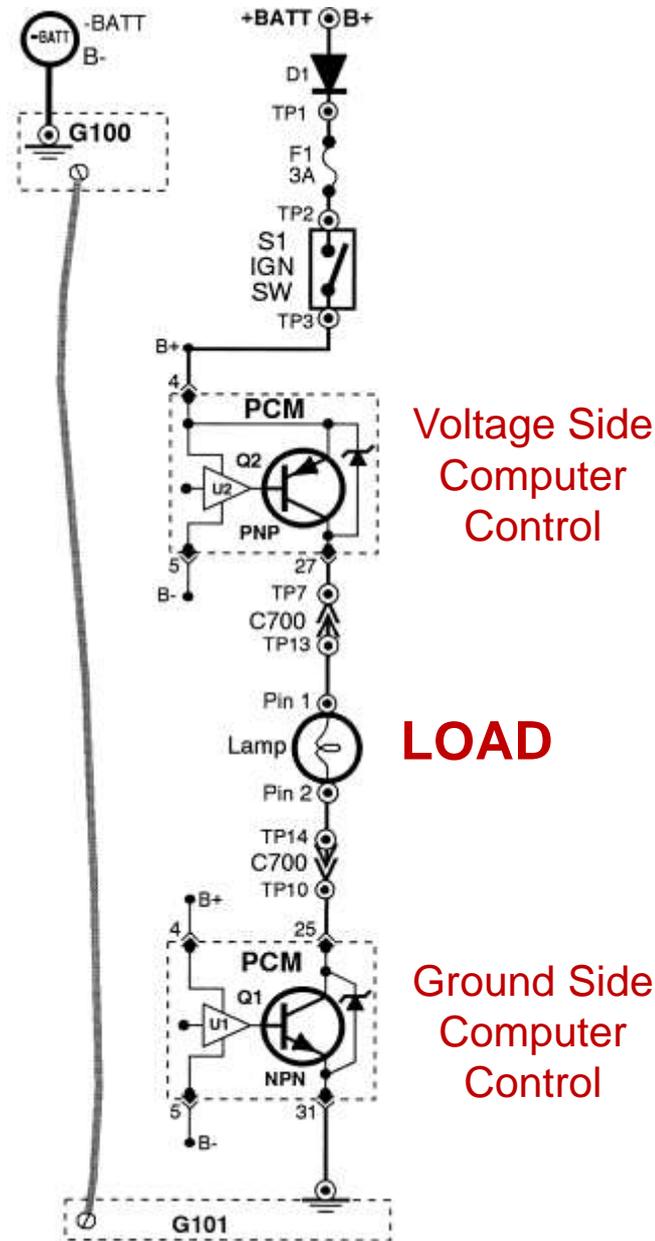
Webinars explain the intricacies of computer control of vehicle circuits and computer troubleshooting tips.



**Ground Side
PCM Control**



Webinars explain the intricacies of computer control when **two computers** are used to control a circuit.





The next Webinar (W002) is entitled.

**“The Anatomy of an Auto/Truck
Electrical-Electronic Circuit”**

Coming Soon!



Special Offer for Attending this Webinar

Purchase a *Hands-On* Electrical Trainer and get credit for the cost of this webinar.

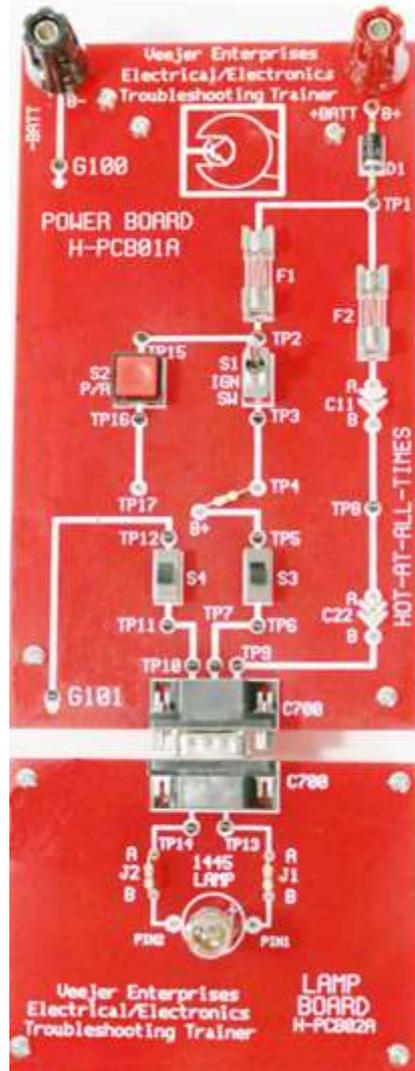
[CLICK HERE](https://www.veejer.com/hands-on-electrical-training)

(<https://www.veejer.com/hands-on-electrical-training>)

This Special Offer Expires in 30 Days
Applies to the first or next electrical trainer you purchase.

Place your order using our shopping cart and in the **COMMENTS** section (must do this) type in the words **W001 SPECIAL OFFER**.

We will subtract the cost of this webinar before your credit card is charged for the hands-on kit you order.



1st Hands-On Trainer - H-11A “The Starter Kit” Electrical Troubleshooting Trainer

The First Step in learning how to troubleshoot a vehicle electrical circuit. This circuit demonstrates with hands-on application how circuits work, how circuits fail and how to troubleshoot an electrical circuit to find the problem.

Contains 32 electrical problems for hands-on practice finding electrical problems in a circuit using a DMM. Easily insert electrical problems.

Power Board H-PCB01 (top)

Lamp Board H-PCB02 (bottom)

Power Supply H-PS01 (supplied with kit)

Call 972.276.9642 or visit our web site for more info! <http://www.veejer.com/handson.html>



H-111A “The Starter Kit” Electrical Troubleshooting Trainer



Workbook H-WB111A guides students through exercises with hands-on practice covering circuit operation and circuit testing methods with a DMM. Exercises include measuring circuit voltage, voltage drops and tracing voltage through the circuit.

32 Electrical problems are inserted on the bottom of the circuit boards following guide-lines in an Instructor Guide, H-IG111A. Troubleshooting is performed on the top of the circuit boards.

To see a demonstration of H-111A on You Tube type “vince H-111A” in search bar.



2nd Hands-On Trainer - H-113 “Troubleshooting DC Motor Circuits”



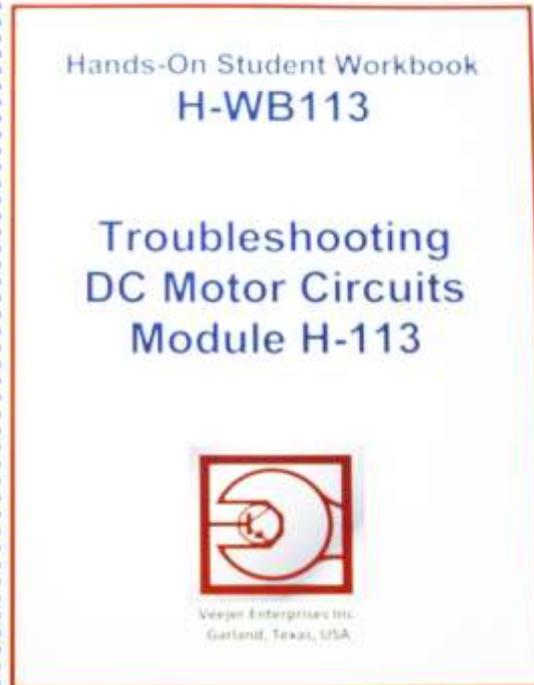
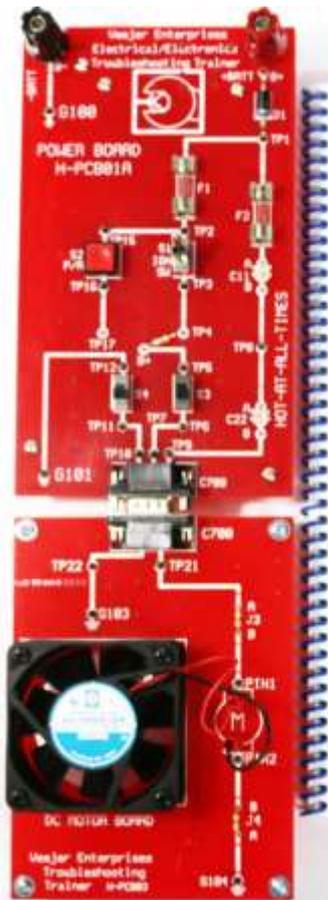
DC Motor Electrical Trainer H-113 includes circuit board H-PCB03 to demonstrate how DC Motor circuits work, how they fail and how to troubleshoot DC Motor circuits. Covers the new technology of Brushless DC Motors used as cooling fans, blower fans and fuel pumps. Also covers wire wound DC Motors used as blower fans and starter motors.

37 electrical problems allow **hands-on practice** finding all the ways electrical problems occur in DC Motor circuits using a DMM and Current Clamp. 5 advanced circuit problems contain multiple faults. One exercise shows students how to test the brushless DC Motor with a DMM's Diode Test.

Call 972.276.9642 or visit our web site for more info! <http://www.veejer.com/handson.html>



H-PCB03 Connected to the Power Board - H-113



The DC Motor Board is connected to the Power Board for live testing and troubleshooting.

Workbook **H-WB113** guides student through a series of hands-on exercises to measure circuit voltages and voltage drops to identify electrical problems at any place in a DC Motor circuit. Instructor Guide H-IG113 has all the answers.

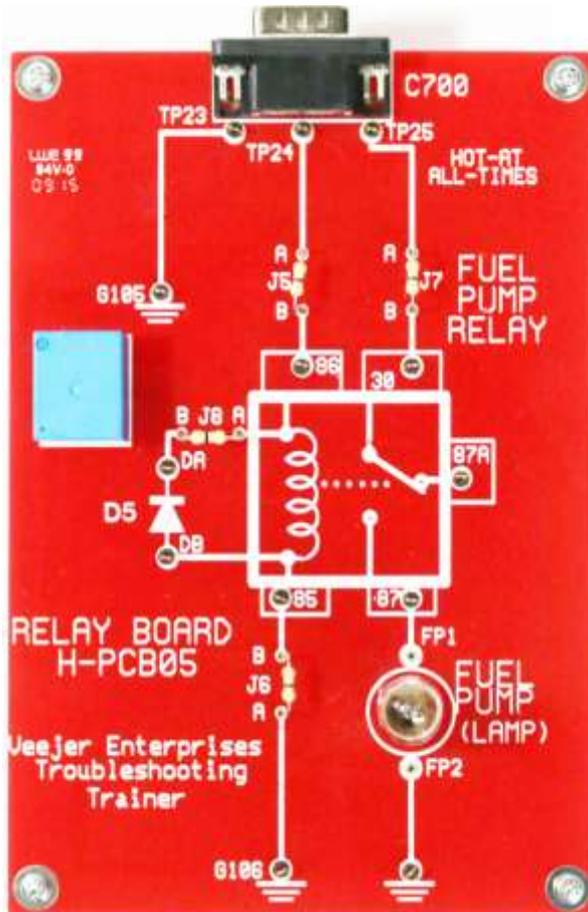
Electrical problems duplicate common DC Motor circuit failures that allow hands-on practice finding electrical problems using a DMM.

Power Board H-PCB01 (top)
DC Motor Board H-PCB03 (bottom)

To see a demonstration of H-113 on You Tube type “vince H-113” in search bar.



3rd Hands-On Trainer H-115 “Troubleshooting Relay Circuits”



Relay Circuit Electrical Trainer H-PCB05 demonstrates how relay circuits work, how they fail and how to troubleshoot relay circuits.

Troubleshooting relays involves two circuits that have to be tested in the proper sequence which is explained. This program also covers the electronics of spike suppression diodes and testing the spike suppression diode with a DMM.

To add realism to the 75 relay circuit troubleshooting problems the relay is called the Fuel Pump Relay and the lamp represents the Fuel Pump. The customer complaint for each problem revolves around a fuel pump circuit problem to connect students to the real world.

Call 972.276.9642 or visit our web site for more info! <http://www.veejer.com/handson.html>



H-PCB05 Connected to Power Board = H-115



Relay Circuit Trainer H-PCB05 connects to the Power Board to complete the relay circuit for live relay circuit testing and troubleshooting.

Workbook H-WB115 with over 100 pages guides the student through relay operation, testing relay circuits and explaining the types of problems that occur in relay circuits. Provides 75 electrical problems to allow **hands-on practice** finding problems in relay circuits using a DMM. Students learn how to test a spike suppression diode in the relay. Instructor Guide H-IG115 has all the answers.

Power Board H-PCB01 (top)

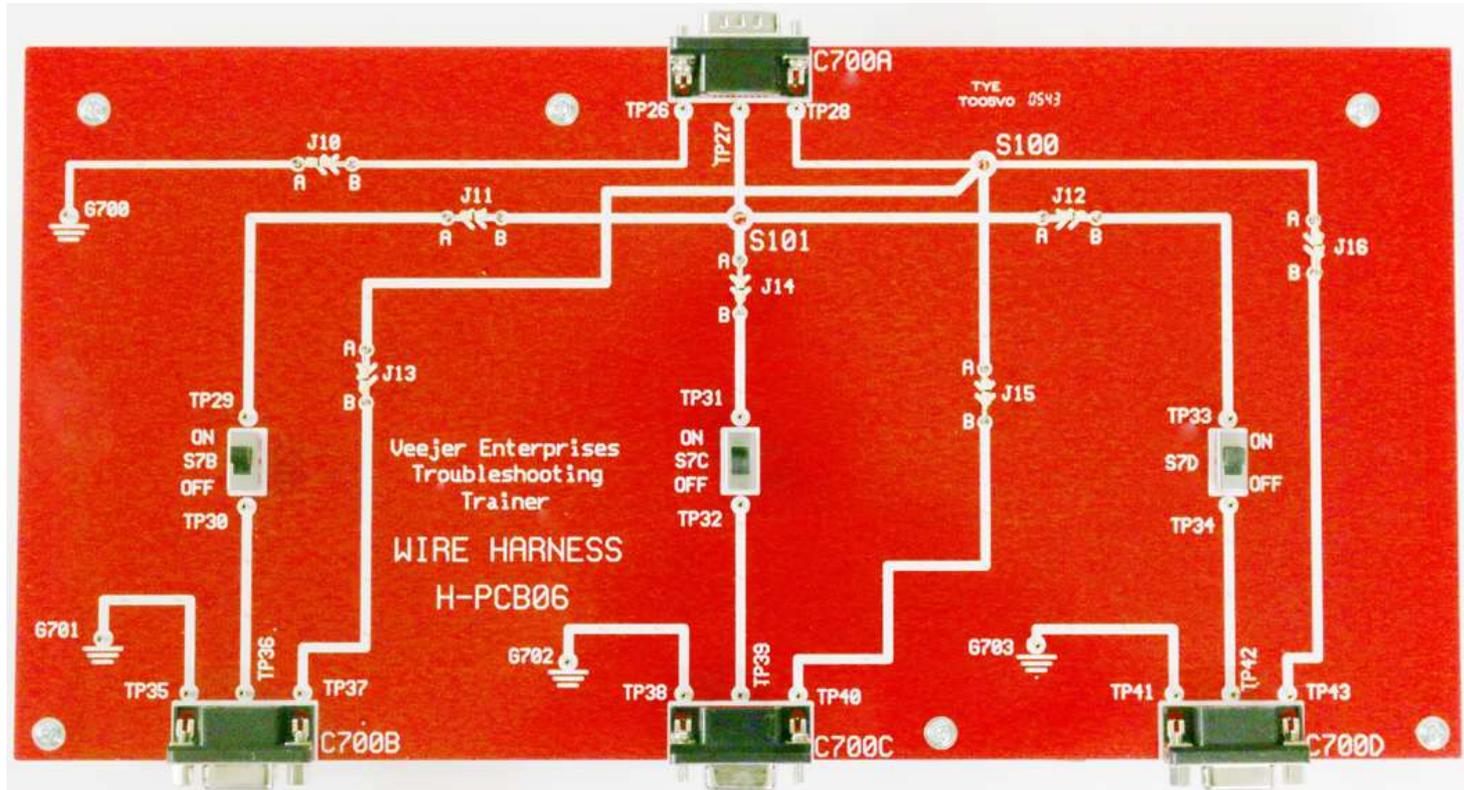
Relay Board H-PCB05 (bottom)

To see a demonstration of H-115 on You Tube type “vince H-115” in search bar.



4th Hands-On Trainer H-PCB06 “Wire Harness Troubleshooting”

Power Board Here



Lamp Board Here
(Master Brake Light)

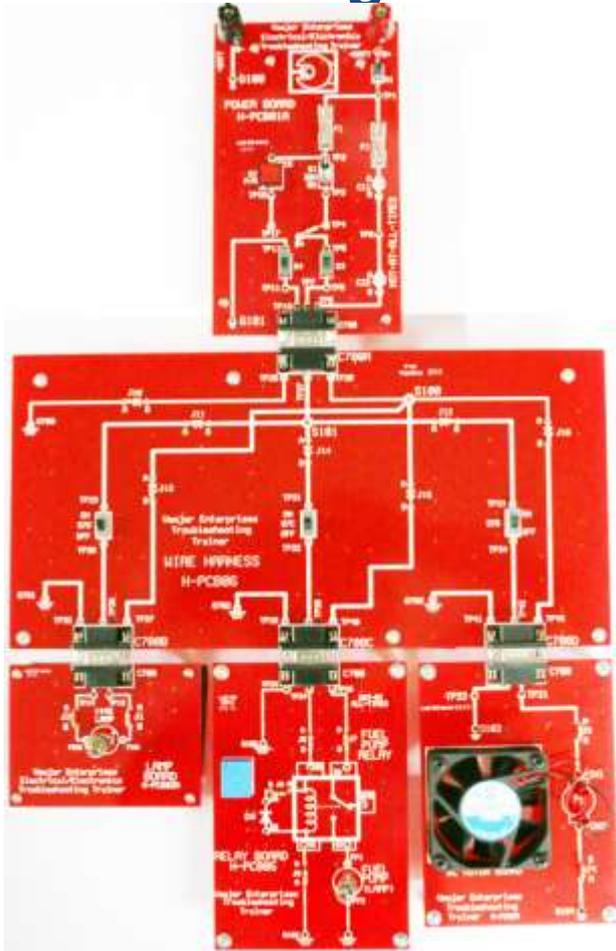
Relay Board Here
(Fuel Pump Circuit)

DC Motor Board Here
(Engine Cooling Fan)

Call 972.276.9642 or visit our web site for more info! <http://www.veejer.com/handson.html>



Creating a “Mini-Electrical System,” with H-116



Wire Harness Electrical Trainer H-PCB06 creates a mini-electrical system (The M.E.S.) to demonstrate how the wire harness connects all circuits together into an electrical system. Illustrates with hands-on how electrical problems affect individual circuits.

Provides 115 electrical problems to allow **hands-on** practice finding electrical problems related to a wire harness failure such as a broken wire or corroded connection.

“Mini-Electrical-System” (The M.E.S.)

Power Board H-PCB01 (top center)

Lamp Board H-PCB02 (bottom left)

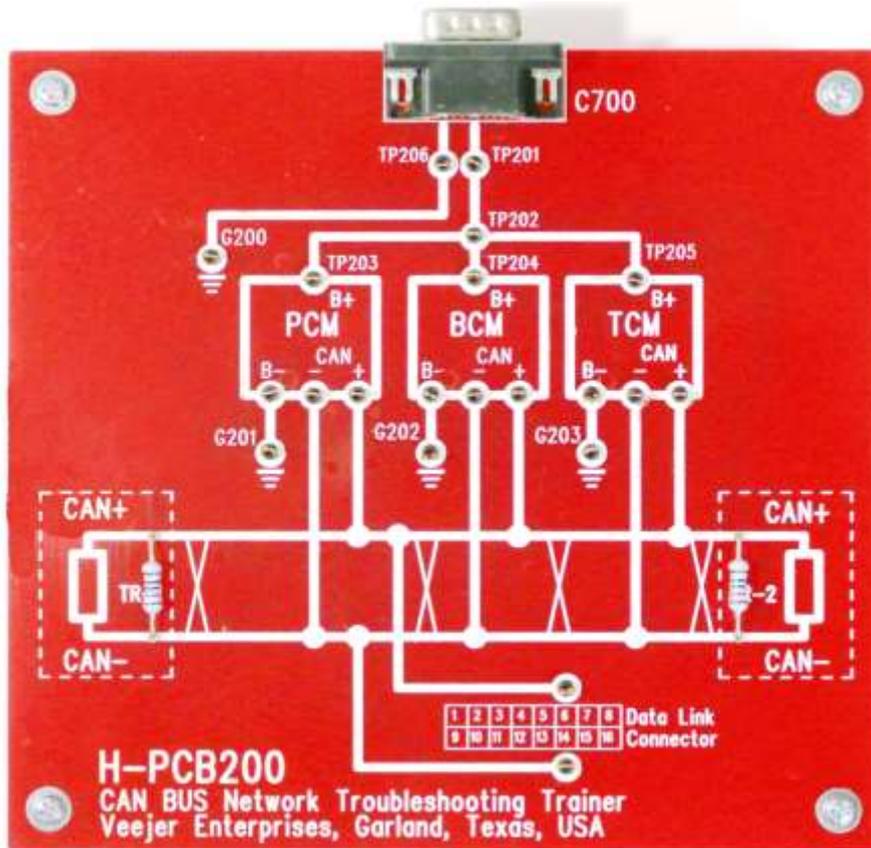
Relay Board H-PCB05 (bottom center)

DC Motor Board H-PCB03 (bottom right)

To see a demonstration of H-116 on You Tube type “vince H-116” in search bar.



5th Hands-On Trainer H-PCB06 “Wire Harness Troubleshooting”



There are two major areas technicians often overlook when attempting to repair CAN Bus system problems.

1. Problems in the network wiring that would exist when there is 60 ohms at DLC Pins 6 and 14.
2. Verify Nodes have good B+ voltage on all B+ pins and a good ground circuit on all B- pins.

These must be considered to repair many CAN Bus failures.

Call 972.276.9642 or visit our web site for more info! <http://www.veejer.com/handson.html>

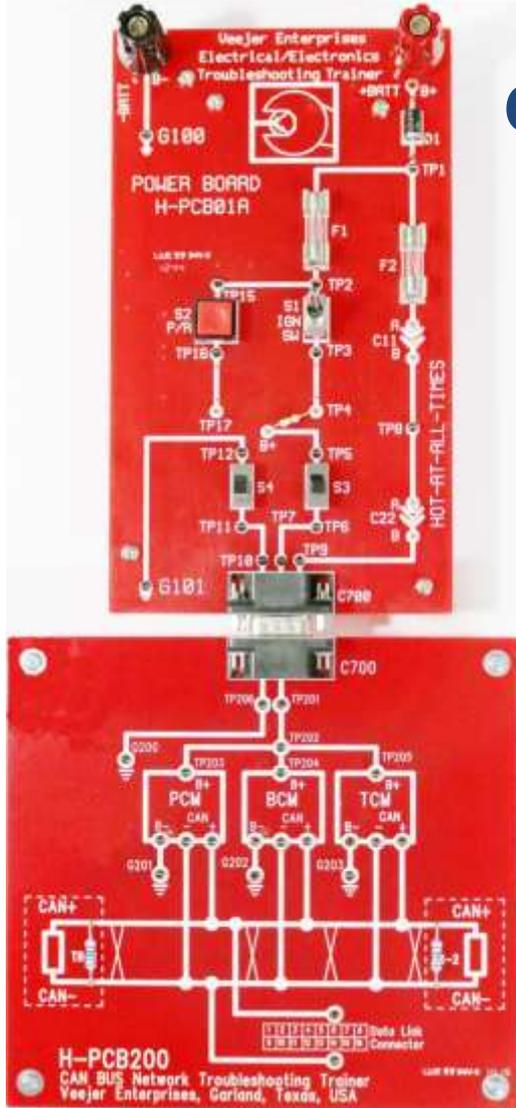


CAN Bus Troubleshooting - H-200

The CAN Bus Trainer is connected to the Power Board. A workbook, H-WB200, guides the student through troubleshooting the CAN Bus network to identify wiring problems even when Pins 6 and 14 indicate 60 ohms.

Troubleshooting training provides ample opportunity for students to understand CAN Bus issues. Practice live troubleshooting with 20 problems with broken wires in the 60 ohm network.

24 problems address when a node has low B+ or high B- connections preventing normal operation. CAN Bus trouble codes are used to describe each problem.



To see a demonstration of H-200 on You Tube type “vince H-200” in search bar.

Auto-Truck Electrical-Electronics Hands-On Troubleshooting Training Program
Veejer Enterprises Inc., Garland, Texas, USA



**Visit our NEW web site for more
information and to place an order
or call (972) 276-9642**

Home Page: <https://www.veejer.com/>

60 Lesson Electronics Course on-line:

Hands-On Circuit Board Electrical Trainers:

Books

“Vehicle Electrical Troubleshooting *SHORTCUTS*”

Electrical Flip-Chart ***FIRST THINGS FIRST-Pro***

To see live demonstrations on You Tube type “Vince Fischelli” in search bar.



Thanks for attending!