

Author & Automotive Expert James D. Halderman



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What's new with Jim?



Welcome to the June edition of my newsletter. I hope everyone can get away during the long days of summer to spend quality time with family and friends. I am pleased because I now have my Mustang convertible out of storage and it is my daily driver for the summer. Interesting that while it spent the winter in a climatic controlled environment, the oil life monitor (OLM) kept track of the time it was in storage. Therefore, even though it had less than ten miles on the oil change, which was done in early November, the oil life showed just 47% when I took it out of the shop. Apparently, the oil life monitor keeps track of the time and flags an oil changed based on time as well as operating conditions and miles.

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Where's Jim?

June 26-28 - Ohio Technical College, presenting "Automotive Update - 2018"

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Puzzle of the month

Find this month's puzzle of the month at this [link](#) and test your students knowledge on transmissions.

Electrical Circuits And Ohm's Law
Chapter 4

ACROSS

3. _____ have horizontal connections in part of a complete circuit.
4. The _____ is the capacity to store energy from the power source to the load in a part of a complete circuit.
8. A _____ is a type of electrical load that occurs when the current flows in part of the circuit and it does not do any work.
10. _____ can be found in a parallel connection in a circuit.
11. Every _____ contains a power source.
12. The _____ of resistance which opposes electrical energy into heat, light, or motion, is part of a complete circuit.
14. A circuit that is an example of a _____.
15. Circuit that is a common household circuit has _____.

DOWN

1. A wire or component in a circuit that is not necessary to be there _____.
2. A _____ is a device that has electrical leads from a power source through a load and back to the power source.
4. _____, when electrical current flows through it, the electrical energy is converted into heat.
5. _____ occurs when the power side of a circuit is not properly connected to the power side of another circuit.
7. A device or component that is not necessary to be there in a circuit is called a _____.
9. The _____ of a circuit is the total resistance of that circuit.
12. In a circuit, light bulb is an example of a _____.

Auto Trivia

What make and model is shown here?



- a. Chevrolet Impala
- b. Dodge Dart
- c. Ford Falcon
- d. Oldsmobile Rocket 88

Answer at the bottom of this page!

FAQ

Why is Gold Used if Copper Has Lower Resistance?

Copper is used for most automotive electrical components and wiring because it has low resistance and is reasonably priced. The relative rating of metals and their resistance shows that silver has the lowest resistance.

Ranking

(The lower the number, the lower the resistance)

	<u>Metal</u>
1	Silver
2	Copper
3	Gold
4	Aluminum
5	Tungsten
6	Zinc
7	Brass (copper and zinc)
8	Platinum
9	Iron
10	Nickel
11	Tin
12	Steel

Gold is used in airbag connections and sensors because it does not corrode. Gold can be buried for hundreds of years and when dug up it is just as shiny as ever.

Sample ASE certification-type question

Question:

Technician A says a short to voltage may or may not blow a fuse and may or may not affect more than one circuit. Technician B says that a short to ground (grounded) will usually cause a decrease in circuit resistance and an increase in current flow causing the fuse to blow. Which technician is correct?

- a.. Technician A only
- b. Technician B only
- c. Both Technicians A and B
- d. Neither Technician A nor B

The correct answer is c. Both technicians are correct. Technician A is correct because a short to voltage will usually affect more than one circuit and depending on the resistance involved may or may not cause a fuse to blow. Technician B is correct because a short to ground involves a power side wire contacting ground, which reduces or eliminates the resistance in the circuit and will cause a fuse to blow. Answers a, b, d are not correct because both technicians are correct.

Tech Tip

Think of Money

Digital meter displays can often be confusing. The display for a battery measured as 12 1/2 volts would be 12.50 V, just as \$12.50 is 12 dollars and 50 cents. A 1/2 volt reading on a digital meter will be displayed as 0.50 V, just as \$0.50 is half of a dollar. It is more confusing when low values are displayed. For example, if a voltage reading is 0.063 volt, an autoranging meter will display 63 millivolts (63 mV), or 63/1,000 of a volt, or \$63 of \$1,000. (It takes 1,000 mV to equal 1 volt.) Think of millivolts as one-tenth of a cent, with 1 volt being \$1.00. Therefore, 630 millivolts are equal to \$0.63 of \$1.00 (630 tenths of a cent, or 63 cents). To avoid confusion, try to manually range the meter to read base units (whole volts). If the meter is ranged to base unit volts, 63 millivolts would be displayed as 0.063 or maybe just 0.06, depending on the display capabilities of the meter.

Straight Talk

From the May 26, Wheels section of Dayton Daily News

Reader Asks about the Life of Hybrid Electric Vehicle High-Voltage Batteries

Wheels:

Skip O. writes by email:

"Cars operated by batteries are much in the news, however, I have seen almost nothing about how long a battery for any given car will last, or it's replacement cost. We paid \$2,800 to replace a main battery, which was in its eleventh year, in a 2004 Honda Civic Hybrid. The replacement battery is only guaranteed for 3 years. It seems to me this is an area that needs more information and discussion. I enjoy your columns in the Dayton Daily News and always finding them very interesting. Keep them coming!"

Halderman:

Thanks for the kind words. The "high-voltage battery" is not just one large battery, but instead is made up of individual cells about 1 to 2 volts each all connected together to achieve the system voltage needs of the vehicle. For example, your Honda battery pack uses nickel metal hydride (NiMH) chemistry. The battery pack is manufactured by Panasonic EV Energy and weighs about 48 pounds. The battery pack, sometimes called the battery module, is constructed in a modular

form. The individual NiMH cells are the same size as standard D-cell flashlight batteries. Constructing the module from standard sized cells helps to ensure cost-effectiveness.

These cells, which are grouped together in sealed packages of six cells each, are positioned end-to-end. The arrangement is 6 cells across by 3 cells high by 7 cells deep, with the rearmost row being only 2 cells high, for a total of 120 cells. The cells each have a voltage of 1.2 volts and are connected in series for a battery module terminal voltage of 144 volts. The rated capacity of the battery module is 6.5 ampere hours (Ah), resulting in a storage capacity of about one kilowatt.



Some companies rebuild, the battery packs, which are sold to shops at a lower cost than what you paid. These reconditioned modules are electrically balanced throughout the entire battery pack, which takes a long time to achieve. While many hybrid electric and electric vehicles can operate for many years without a loss of capacity enough to affect performance, all batteries deteriorate over time. To help prevent this from happening without warning, ask your service technician to check the status and of the battery pack when it is in for service.

Have an automotive question? Please write to Jim with your questions at jim@jameshalderman.com

Trivia question answer: C, Ford Falcon.

Please let me know what you think of the newsletter. I would love to include any of your automotive news, trivia questions or any tech tips you might have. Send me your suggestions!

You can email me [here](#) or visit [my website](#). You can connect with me on Facebook, Twitter and LinkedIn too (links above).

Regards,
Jim Halderman

James D. Halderman writes automotive technology textbooks for [Pearson Education](#). He is an ASE-certified Master Technician with more than 20 years instructional experience.

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