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## Author & Automotive Expert James D. Halderman

### What's new with Jim?

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Super Links

**(A8) Related Resources**

<b>Conference PowerPoints</b> Teaching Advanced Engine Performance Gasoline Update No Code Diagnosis Sherlock Holmes Diagnosis Diagnosis from the Driver's Seat	<b>Part ID Worksheets</b> Engine Type Components Normal Combustion Stages Radiators Spline Phaser Thermostat Vane Phaser	<b>Service Information - Smartphones</b> Internal Combustion Engine ICE (Apple) Internal Combustion Engine ICE (Android) 4-Stroke Otto Engine VR (Android)
<b>Favroite Resources</b> Fuel Pressure Specifications Fuel Volume Injector Resistance Table	<b>Service Information - Downloads</b> Dash Warning Lights	<b>Case Studies</b> Click here - This link will open the Jim's Case Studies page into a new tab in your browser <b>Photo Resources</b> Click here - This link will open the Jim's A8 Photo Reference page into a new tab in your browser

### Chapter 18 – Gasoline Engine Operation, Parts, and Specifications (page 157)

PowerPoint	Puzzles	Task Sheets	Lesson Plan	Animations	Videos
Assignments	Quizzes	Super Links			

There are three different types of quizzes. Multiple Choice, Short Answer and Matching. All quizzes are in PDF format and may be downloaded below.

### Where's Jim?

Due to the Coronavirus, all events have been canceled and I have no travel plans for the fall.

Keep up with me at:

[www.jameshalderman.com](http://www.jameshalderman.com)

[Email Jim](#)

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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 oxygen sensors.

Multiple Choice A – with answer key

Multiple Choice B – with answer key

Short Answer

Matching

I am pleased to announce two new resources now posted on my [website](http://www.jameshalderman.com):

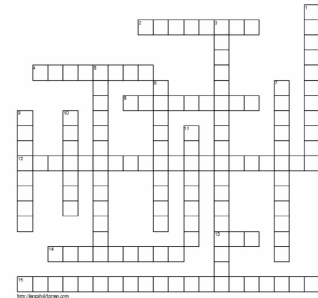
1. **“Super Links”** for each chapter- these are additional resources that the instructor can select from to enhance their lessons or download and place in their learning management system (LMS) to allow student access.
2. **Quizzes**- These include four quizzes for each chapter including the answer key!

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## Oxygen Sensors

Chapter 24



### ACROSS

- 2 The \_\_\_\_\_ numbers are determined from the signals by the oxygen sensor.
- 4 A \_\_\_\_\_ oxygen sensor is made of zirconium dioxide, an electrically conductive material capable of generating a small voltage in the presence of oxygen.
- 8 If an oxygen sensor reads low as a result of a factor besides a lean mixture, it is often called a \_\_\_\_\_ indication.
- 12 \_\_\_\_\_ is exposed to the exhaust stream.
- 13 The wrong type of \_\_\_\_\_ sealer on a valve cover gasket gives off harmful silica fumes during the curing process.
- 14 When the O2S reads high as a result of other factors besides a rich mixture, it is often called a \_\_\_\_\_ indication.
- 15 \_\_\_\_\_ is exposed to outside air and is the signal electrode.

### DOWN

- 1 Some vehicle manufacturers such as GM have the PCM supply 450 mV to the O2S signal wire, the voltage is called \_\_\_\_\_.
- 3 Another name for the signal electrode is the \_\_\_\_\_.
- 5 Automotive computer systems use a sensor in the exhaust system to measure the oxygen content of the exhaust, these sensors are called \_\_\_\_\_.
- 6 The checking and adjusting of the PCM is called \_\_\_\_\_ operation.
- 7 The fast heating, called \_\_\_\_\_, helps improve fuel economy and reduces cold-start exhaust emissions.
- 9 \_\_\_\_\_ oxygen sensors have been used since 1992 on some Hondas.
- 10 The \_\_\_\_\_ oxygen sensor does not produce a voltage but rather changes resistance due to the presence of oxygen in the exhaust.
- 11 When the PCM failure is determining the amount of fuel needed, it is called \_\_\_\_\_ operation.

## Auto Trivia

The tail lights are from a \_\_\_\_\_

- a. Buick
- b. Packard
- c. Dual-Ghia
- d. Chrysler

*\*Answer at the bottom*



## FAQ

### How Can an Electric Pump Work Inside a Gas Tank and Not Cause a Fire?

Even though fuel fills the entire pump, no burnable mixture exists inside the pump because there is no air and no danger of commutator brush arcing, igniting the fuel.

## Sample ASE certification-type question

A P0304 (misfire on cylinder 4 detected) is being diagnosed. Which fault is least likely to be the cause?

- a. Clogged EGR passages except for cylinder #4
- b. Cracked spark plug

- c. Loose gas cap
- d. Electrically open fuel injector

### Answer/Explanation

**The correct answer is c.** A loose gas cap will cause an EVAP diagnostic trouble code to set, but will not cause a misfire on one cylinder and is therefore the least likely cause of a P0300 DTC. Answer a is not correct because if all of the exhaust passages for the EGR were clogged, except for cylinder number four, all of the exhaust would flow into cylinder four and would likely cause a misfire. Answer b is not correct because a cracked spark plug could cause a misfire and cause a P0304 DTC to be set. Answer d is not correct because an electrically open fuel injector could cause a misfire and a P0304 DTC being set.

## Tech Tip

### Always Use A Spark Tester

A spark tester looks like a spark plug except it has a recessed center electrode and no side electrode. The tester commonly has an alligator clip attached to the shell so that it can be clamped on a good ground connection on the engine. A good ignition system should be able to cause a spark to jump this wide gap at atmospheric pressure. Without a spark tester, a technician might assume that the ignition system is okay, because it can spark across a normal, grounded spark plug. The voltage required to fire a standard spark plug when it is out of the engine and not under pressure is about 3,000 volts or less. An electronic ignition spark tester requires a minimum of 25,000 volts to jump the 3/4-inch gap. Therefore, never assume that the ignition system is okay because it fires a spark plug – always use a spark tester. Remember that an intermittent spark across a spark tester should be interpreted as a no-spark condition.



## Case Study

### Remote Start Does Not Work

#### 2006 Chevrolet HHR 2.2L

A customer came to the shop and stated that the “remote start is inoperative.” The service technician determined the following:

- MIL on
- Stored P0449 DTC (Code P0449 indicates that the evaporative control (EVAP) system vent valve solenoid is malfunctioning)
- No codes for remote start related functions.

The customer authorized fixing the EVAP issue. Cannister vent valve was full of contaminants.

The Replace cannister vent valve and fuel filler neck were replaced and the lines to the cannister cleared. After the DTC was cleared, the remote start worked as designed. Apparently, the remote start was disabled due to “P” code present.

#### Summary:

- **Complaint-** Remote start was inoperative
- **Cause-** A stored P code fault
- **Correction-** Repaired the root cause of the stored P code and cleared the code which restored remote start operation.



## Straight Talk

### Reader Has Question About Car Warranty

*From the October 31 Wheels Section of the Dayton Daily News*

#### Wheels:

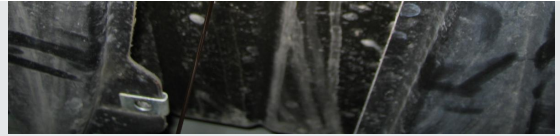
*R.J. writes by email:*

*"I opened my e mail today, found an email from a local dealership saying in order to*





*not void my cars warranty, I must take it to them. So, I called them to say sorry FTC says I do not need to take my car to them for any service. Oh, the female I was talking to told me OH NO SIR the FTC is wrong.*



*you must do it with us. I said no as long as I use the correct oil and filter, any shop can change it. So, what do you suggest I do, just say the hell with them or report it to the FTC?"*

**Halderman:**

Thanks for writing and you are correct and the dealer is not correct. According to the Magnuson Moss Warranty Act, the service operations and parts used do not need to be performed by the authorized dealer to maintain the warranty on the vehicle. If that is the requirement, then the service work has to be provided for free, which is done by several, usually European brands vehicle manufacturers. They include the routine service during the warranty period because they usually require vehicle-specific and expensive oil and they want to be sure that the vehicle is properly serviced to protect their engines the during the warranty period. Therefore, if the dealer does not offer to provide the service for free, then you can take it to any service facility you wish, but they should use oil that meets the factory specifications. If there is a warranty issue, it is up to the vehicle manufacturer to determine that it was the use of the oil or the oil filter that was not a factory part that was the cause of the failure. Proving that would be difficult in most cases in my opinion.

What to do? That is up to you, but if the statement was made in writing that your warranty will be canceled unless you have the oil changed at the dealer, then I would forward it to the State Attorney General and let that office handle it.

*Have an automotive question? Get a straight answer by writing to Jim at [jim@jameshalderman.com](mailto:jim@jameshalderman.com)*



**Answer To This Month's Trivia:  
C. Dual-Ghia**

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