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Author & Automotive Expert James D. Halderman

What's new with Jim?

Everything is organized for you!

I am pleased to announce that my webmaster and other members of my team have been working hard to make my website better and faster. The major achievements include:

· The Halderman website has been moved to its own server. This means that the site loads faster and pages can be accessed faster.

· Animations and videos are now not only under each Halderman textbook but are also placed under the "download" section and sorted by the ASE tasks. This makes it faster and easier to see what is available for each ASE sub-content area.

Many who have used the site since it has been moved to its own server remark that it is "blazingly fast" now. Try it yourself for FREE. Send an email to my website manager and ask for a free trial. Write to glen@jameshalderman.com

"The James Halderman website is a great resource for automotive Instructors. It has all your needs in one place to make your job easier"!
Steven Webb
Automotive Instructor

Where's Jim?

Due to many events being canceled, Jim does not have any travel plans until the fall.

Keep up with me at:
www.jameshalderman.com
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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.

1995 - 2021
Lug Nut Torque Values
Cars, Light Trucks, SUVs, and Vans

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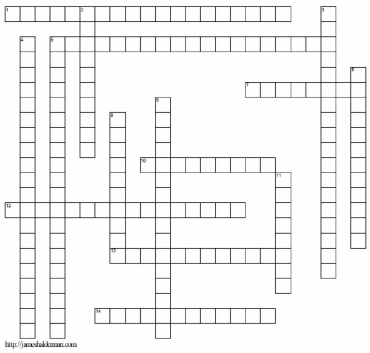
Make	Model	Year(s)	Torque (ft-lbs)
Acura	MDX	2007-13	94
Acura	NSX	2017-21	125
Acura	RL/RLX	2005-20	94
Acura	SLX	1996-99	87
Acura	TL	2009-14	94
Acura	TLX	2021	94
Acura	ZDX	2007-13	94
Acura	All Other Car Models	1995-21	80
Acura	All Other Light Truck, SUV & Van Models	2001-21	80
Make	Model	Year(s)	Torque (ft-lbs)
Alfa Romeo	Giulia	2017-21	89

Wide-Band Oxygen Sensors
Chapter 25



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ACROSS

1 Another name for the ambient side electrode is the _____ _____ _____.
5 The ___ _____ _____ is exposed to ambient air.
7 Above the Nernst cell is another zirconia layer with two electrodes, which is called the _____ _____.
10 Another name for the thimble design oxygen sensor is the _____.
12 In a conventional zirconia oxygen sensor, a bias or _____ _____ can be applied to the two platinum electrodes and then oxygen ions can be forced (pumped) from the ambient reference air side to the exhaust side of the sensor.
13 Fast heating is called _____ _____.
14 A typical zirconia oxygen sensor has the sensing element in the shape of a thimble and is often referred to as a _____ _____.

DOWN

2 Another name for a conventional oxygen sensor is a _____ _____.
3 The typical single cell wide-band oxygen sensor, usually called an _____ _____ _____, can be made using the cup or planar design.
4 The _____ _____ _____ is exposed to the exhaust stream.
5 The _____ _____ _____ is exposed to the outside air.
6 A conventional oxygen sensor can be constructed using a _____ _____ instead of the thimble-type design.
8 The _____ _____ is exposed to the exhaust gases.
9 A typical _____ _____ wide-band oxygen sensor looks similar to a conventional four-wire zirconia oxygen sensor.
11 A _____ _____ planar-type wide-band oxygen sensor is made like a conventional planar OZS.

Auto Trivia

This is the front of a _____
a. 1961 Dodge
b. 1956 Chevrolet
c. 1955 Chevrolet
d. 1954 Packard

**Answer at the bottom*

FAQ

How Long Can Oxygenated Fuel Be Stored Before All of the Oxygen Escapes?

The oxygen in oxygenated fuels, such as E10 and E85, is not in a gaseous state like the CO_2 in soft drinks. The oxygen is part of the molecule of ethanol or other oxygenates and does not bubble out of the fuel. Oxygenated fuels, like any fuel, have a shelf life of about 90 days.

Sample ASE certification-type question

The owner of a vehicle equipped with a gasoline direct injection (GDI) system complains that the engine hesitates during acceleration, especially when the engine is cold. What is the most likely cause?
a. A dirty air filter
b. A partially clogged fuel filter

c. Excessive fuel pump pressure
d. Carbon deposits on the intake valves

Answer/Explanation
The correct answer is d. The most likely cause of the problem is due to carbon deposits on the backside of the intake valves, which is a common occurrence on engine equipped with gasoline direct injection (GDI) systems. Answer a is not correct because even though a clogged air filter could cause a drivability problem, it is not the most likely to cause a hesitation when cold only. Answer b is not correct because while a clogged fuel filter could cause a problem especially at high engine speeds and loads, it is not likely to be the cause of a hesitation when cold. Answer c is not correct because excessive fuel pressure will tend to richen the air-fuel mixture, which would tend to help eliminate or reduce a hesitation.

Tech Tip

Catalytic Converters Are Murdered

Catalytic converters start a chemical reaction, but do not enter into the chemical reaction. Therefore, catalytic converters do not wear out and they do not die of old age. If a catalytic converter is found to be defective (non-functioning or clogged), look for the root cause. Remember this:
“Catalytic converters do not commit suicide—they’re murdered.”
Items that should be checked when a defective catalytic converter is discovered include all components of the ignition and fuel systems. Excessive unburned fuel can cause the catalytic converter to overheat and fail. The oxygen sensor must be working and fluctuating from 0.5 to 5 Hz (times per second) to provide the necessary air-fuel mixture variations for maximum catalytic converter efficiency.

Case Study

The High Idle Toyota

The owner of a Toyota Camry complained that the engine would idle at over 1,200 RPM compared with a normal 600 to 700 RPM. The vehicle would also not accelerate. Using a scan tool, a check for DTCs showed one code: P2101— “TAC motor circuit low.” Checking service information led to the inspection of the electronic throttle control (ETC) throttle body assembly. With the ignition key out of the ignition and the inlet air duct off the throttle body, the technician used a screwdriver to see if the throttle plate worked.

· Normal operation—The throttle plate should move and spring back quickly to the default position.

· Abnormal operation—If the throttle plate stays where it is moved or does not return to the default position, there is a fault with the throttle body assembly.
The technician replaced the throttle body assembly with an updated version and proper engine
operation was restored. The technician disassembled the old throttle body and found it was corroded inside due to moisture entering the unit through the vent hose.

Summary:

• **Complain**t—Customer stated that the engine would idle at over 1,200 RPM.
• **Cause**—A stored P2101 DTC was stored indicating a fault with the throttle body assembly.
• **Correction**—The throttle body was replaced with an improved version that placed the vent tube in a different position to help avoid water getting into the assembly.

Straight Talk

Reader Has Concerns About Electric Vehicles

From the July 28 Wheels Section of the Dayton Daily News

Wheels:

Tom B. asks:

"I am reading more and more about new electric cars and pickup trucks being introduced by General Motors and Ford. I have several questions.

1. I don't want a car that might leave me stuck at the side of the road when the battery dies. What do you do when the car runs out of battery power?

2. Where can they be charged? I see gasoline stations everywhere, but I don't see electric vehicle charging stations.

3. I understand that they can be charged at home, but how much will my electric bill increase?"

Halderman:

Thanks for asking and these are commonly asked questions. The current generation of electric cars have come a long way from the early first generation that were introduced about ten years ago. In 2012, there was the Nissan Leaf, a great small car that had a lot of room for passengers with a fold-down rear seat for extra carrying capacity. The battery was air cooled and the car had a range of about 70 miles. For a normal commute of 40 miles a day, the car needed to be recharged almost daily. The Tesla Model S was new at that time and had a much longer range of over 200 miles. Today, most electric cars, SUVs and trucks have a range of 200 -300 miles, which is about the range of most gasoline-powered vehicles.

1. Regarding "running out of battery charge" question, electric vehicles have a display that shows the miles remaining and also usually the percentage of battery capacity which is similar to a gas gauge. People who drive gasoline powered vehicles run out of gas too, and while this is possible, most owners of electric vehicles learn when to recharge based on where they drive.

2. Most owners of electric vehicles charge at home overnight so they wake up the next morning with a" full tank." If traveling, most electric vehicles display the location of the charging stations along the route. There are also smart phone apps such as "Plug Share" that show all available charging stations.
3. Charging at home is the best way, but this involves some up-front expenses. For example, while it is possible to charge from a conventional 120-volt outlet, it would take a long time to charge an electric vehicle. The better method is to ask an electrician to install a 220-volt outlet (NEMA 14-50 outlet is recommend) and a 50-ampere circuit. Most experts recommend the use of a charging station that plugs into the outlet and has the standard SAE J1772 plug that is used by almost all electric vehicles. The cost of the electricity to charge at home is about $10 for 250-mile range or about a third of the price of gasoline needed to travel 250 miles. Therefore, the cost of having the electrical service installed and the charging station, are quickly recovered by the reduction in the cost of "fuel."

Have an automotive question? Get a straight answer by writing to Jim at jim@jameshalderman.com

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Answer To This Month's Trivia:
B. 1956 Chevrolet

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