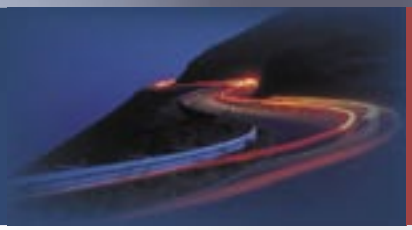
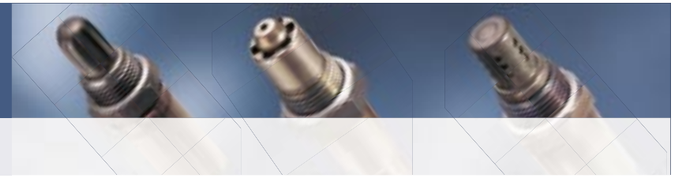
Technical and Sales Information



Oxygen Sensors

BOSCH
Invented for life

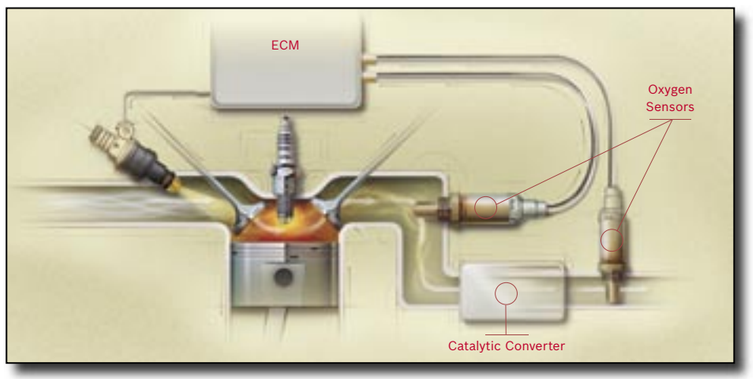


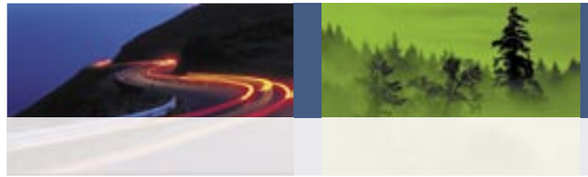
This booklet is intended for your use as a sales and technical training reference. It answers many questions most commonly asked by:

- Automotive parts sales professionals
- Automotive service and repair professionals
- DIY (do-it-yourself) customers
- DIFM (do-it-for-me) customers

Please review the answers to these questions on the pages that follow. Becoming knowledgeable about the features and benefits of Bosch Oxygen Sensors will be your final assurance that each oxygen sensor leaving the shelf is going to give every customer what they want...best-in-class performance and maximum service life. Above all, look forward to higher customer satisfaction when you sell Bosch Oxygen Sensors.

Commonly Asked Questions **Answer**





Bosch Oxygen Sensors

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Question 1

What do oxygen sensors do, and where are they located on my customer's vehicle?

Answer

Based on the oxygen content of the exhaust gas, the oxygen sensor located upstream of the catalytic converter sends a signal to the engine control unit (ECM), which adjusts the air/fuel mixture to the optimal level. Almost all petrol powered vehicles newer than 1986 have at least one oxygen sensor. Many newer vehicles have at least two sensors, including possibly one which is downstream of the catalytic converter. This sensor's signal is used by the ECM to determine if the catalytic converter is functioning properly.

Oxygen sensors are found in the vehicle's exhaust system, but the exact location will vary depending on the year and model of the vehicle. Therefore, to accurately pinpoint oxygen sensor location, use your standard reference source or the owner's guide for that particular vehicle.

Question 2

Why should worn-out oxygen sensors be replaced?

Answer

Replacing a worn-out* oxygen sensor will improve fuel economy, improve your customer's overall vehicle performance, drastically reduce exhaust emissions, and help to prevent premature failure of the expensive catalytic converter. This is why checking for, and replacing, worn-out oxygen sensors is an important part of regular vehicle maintenance.

A worn-out oxygen sensor:	Replacing a worn-out oxygen sensor:
Wastes fuel	Saves money in fuel costs
Can cause engine performance problems, such as surging and hesitating	Improves engine performance
Is a major cause of excessive harmful exhaust emissions	Reduces air pollution
Accelerates catalytic converter damage	Prevents premature failure of the expensive catalytic converter

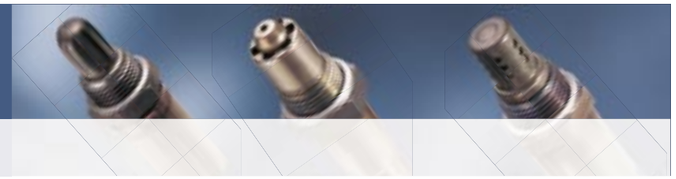
Question 3

When should oxygen sensors be replaced?

Answer

"Recommended Check/Replace Intervals" can be located in the Technical Data section in the Bosch Oxygen Sensor catalogue. The check/replace interval is not the only factor in determining whether an oxygen sensor may need to be replaced. If your customer's vehicle shows signs of increased fuel consumption, poor engine performance, or excessive emissions, the oxygen sensor should be tested. If the "Check Engine" light on the vehicle is illuminated, retrieving the code stored will help you determine whether a new oxygen sensor is required. Remember that deterioration of the oxygen sensor generally occurs over time, so your customer will not see instant failure. The ability of modern management systems to "adapt" can easily cover a faulty oxygen sensor. A faulty oxygen sensor can result in a rich "shift" of the vehicles fuel map. This results in the vehicle being rich accross the entire driving range.

*Oxygen sensors with 1- or 2- wires typically wear out after 50,000-80,000 Kms, while 3- or 4- wire sensors typically wear out after 100,000 Kms.



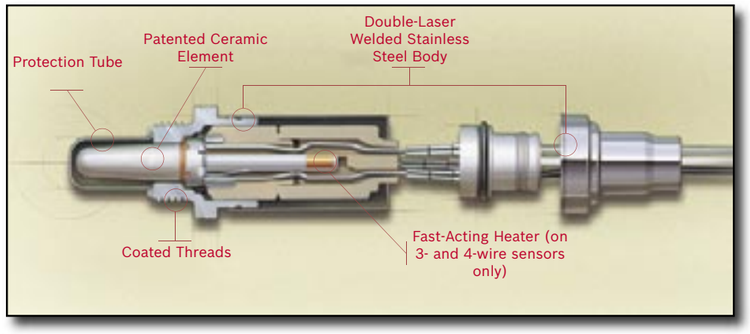
Question 4

What features and benefits make Bosch Oxygen Sensors stand out from all the others?

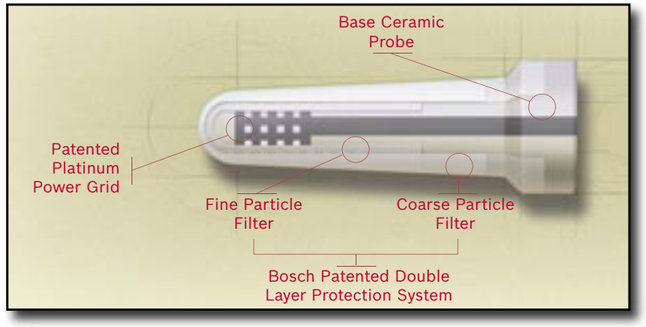
Answer

- All Bosch Oxygen Sensors feature the most advanced ceramic technology for unparalleled quality and performance (see detail below).
- Each Bosch Oxygen Sensor is function tested in 1000˚C heat to ensure 100% accurate sensor performance.
- All Bosch Oxygen Sensors are laser welded and totally submersible to seal tight and protect against contamination for long life.

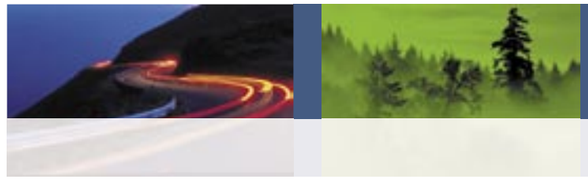
Thimble Style Heated Oxygen Sensor



Thimble Style Oxygen Sensor Ceramic



1. Tough base ceramic probe combines zirconium and yttrium to resist cracking.
2. Patented Platinum Power Grid for maximum service life.
3. Patented double layer protection system for optimized sensing performance.
4. World's only double laser-welded, submersible sensor to prevent failure from water splash and other contaminants.



Bosch Oxygen Sensors

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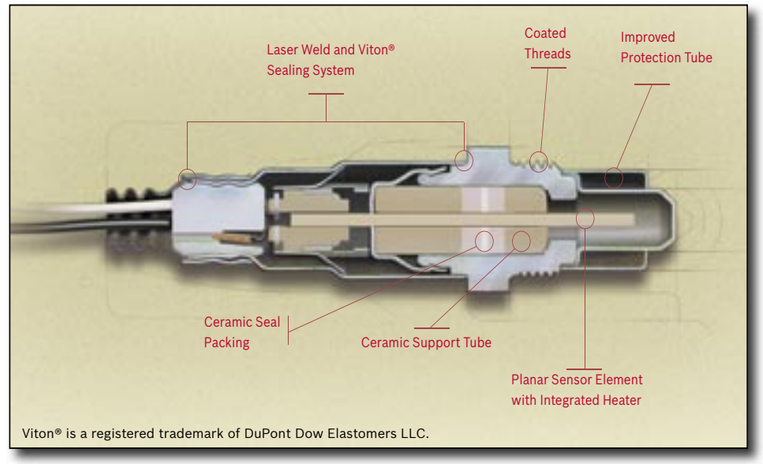
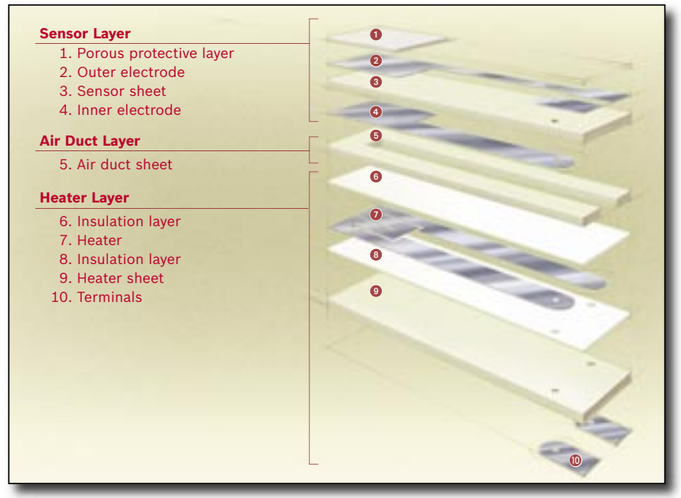
Planar Style Heated Oxygen Sensor

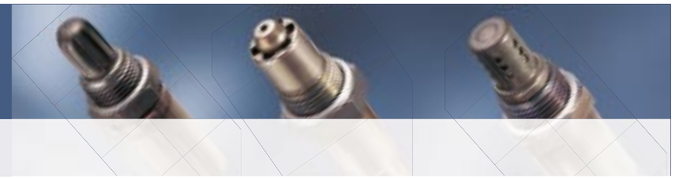


Viton® is a registered trademark of DuPont Dow Elastomers LLC.

Planar Style Oxygen Sensor Ceramic



1. Planar sensor element with integrated heater requires less power to activate, and reaches operating temperature more quickly than a thimble element, reducing harmful emissions during the critical cold start phase.
2. Improved protection tube design provides increased thermal resistance for long life.
3. Sintered, one-piece ceramic element is highly stable, resisting damage due to vibration, for precise performance over a long service life.
4. Submersible, with double laser weld and Viton® sealing system to prevent failure from water splash and other contaminants.



Question 5

Is a replacement Bosch Oxygen Sensor comparable to the high-quality, original equipment sensor that it is replacing?

Answer

Yes! Every Bosch Oxygen Sensor sold in the aftermarket meets or exceeds original equipment specifications, and frequently the Bosch replacement sensor is an improvement over the original equipment sensor that came on the vehicle. As a matter of fact, Bosch invented the automotive oxygen sensor and today is the world's largest producer of oxygen sensors with over 350 million units manufactured since 1976. In addition to the aftermarket, Bosch currently supplies oxygen sensors to 38 original equipment manufacturers worldwide, including Ford, Holden, Mitsubishi and Toyota.

From our state-of-the art manufacturing facilities in the USA and Germany, through our rigorous research and development and quality control programs, to our in-house emissions test labs, you and your customers can count on Bosch Oxygen Sensors for superior performance and maximum service life.

Question 6

Can a thimble-type sensor be replaced with a planar-type sensor, or vice versa?

Answer

Extensive vehicle testing by Bosch has demonstrated that there are somes cases when a planar sensor can be substituted for an OE thimble sensor. In other cases, such a substitution could cause problems. Always follow Bosch Oxygen Sensor catalog recommendations to determine the correct replacement sensor(s) for your customer's vehicle.

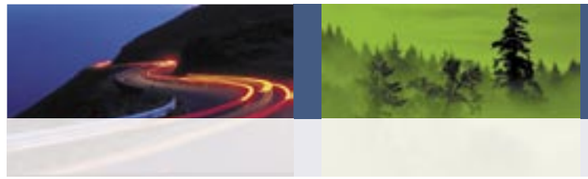
To date, there are no known cases where a thimble sensor can be substitued for an OE planar sensor.

Question 7

Should I recommend Bosch Direct Fit Oxygen Sensors with OEM connectors or Bosch Universal Oxygen Sensors?

Answer

Sensors with OEM connectors are the easiest to install, but sometimes cost more than universal sensors. On the other hand, since numerous unique oxygen sensors are required to cover all vehicles on the road, it may take more time to get the sensor with connector that is needed. Your recommendation should depend on whether your customer would rather save time or money. That's why it's a good idea to offer both choices and let your customer make the final decision.



Bosch Oxygen Sensors

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Question 8

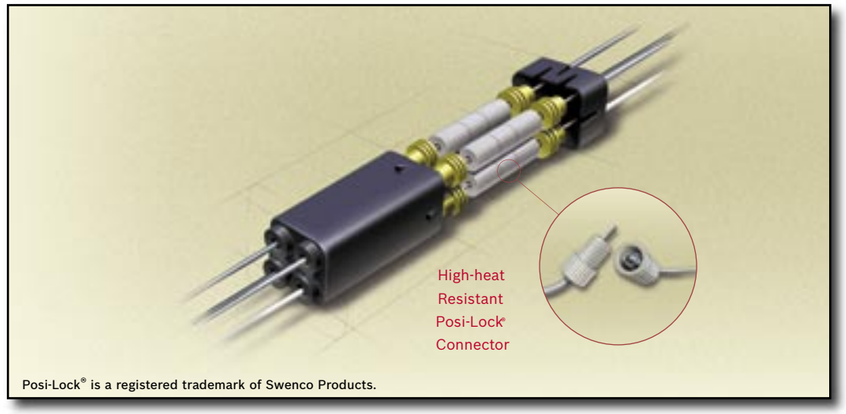
Are Bosch Universal Heated Oxygen Sensors easy to install?

Answer

Yes! Bosch Universal Heated Oxygen Sensors feature a revolutionary patented connection system featuring specially engineered, high heat resistant Posi-Lock® Connectors which can be unscrewed and reconnected in case of a wiring mistake. Each Bosch Universal Sensor is manufactured with a 600mm sensor wire to allow maximum replacement of worn wire on the OEM sensor being replaced.

Most importantly, no special tools are required to install Bosch Universal Sensors and all sensors include user-friendly instructions.

Diagram 3 – Bosch Patented Universal Sensor Connection System



Posi-Lock® is a registered trademark of Swenco Products.

Question 9

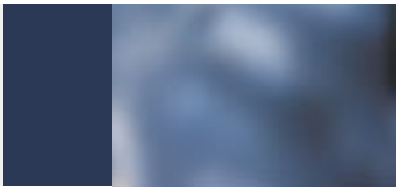
How is Bosch leading the way in oxygen sensor technology?

Answer

As the inventor of automotive oxygen sensors, Bosch continues to develop new technologies for the next generation of vehicles - including planar wide-band sensors.

The Bosch planar wideband sensor has additional ceramic and printed circuit layers. Rather than switching from a low to a high voltage as the exhaust gas changes from a lean mixture to a rich mixture, the wideband sensor provides a signal to the engine control unit (ECM) that's virtually proportional to the amount of oxygen in the exhaust stream. This allows the ECM to precisely control the air-fuel ratio to maintain the optimum performance level.

Bosch Oxygen Sensors



The most advanced ceramic technology for best-in-class performance and maximum service life

Even though oxygen sensors have been standard equipment on most vehicles since 1986, most people don't know much about their service requirements. This booklet is designed to help you explain the benefits of checking and replacing oxygen sensors to your customers.

With this information, you will be able to sell and install Bosch Oxygen Sensors with pride, knowing you are providing your customers with the highest quality sensors available.

BOSCH
Invented for life

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