



Troubleshooting guide

Lambda Sensors

Lambda sensors play a vital role in reducing exhaust emissions and fuel consumption, as well as optimising engine performance, but how can you tell if they need replacing? Alan Povey, technical expert at DENSO helps you diagnose the most common faults.

Initial Visual Inspection

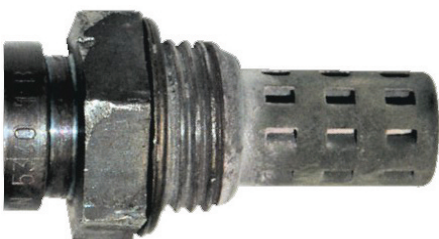
- Check the sensor's connector and lead wire for damage. Damage of any kind will affect the sensor signal.
- Check the sensor's protection sleeve for signs of damage that could indicate a dent or crack inside. It is important that the sensor element is intact in order to work correctly.
- Check that the sensor's connector is clean, intact and water-tight; and that there are no signs of grease, lubricants or chemicals on it. These can affect the sensor's delicate output signals, which are highly sensitive to contamination.

Problem Signs

Whenever a lambda sensor is found to be contaminated, it must be replaced. After replacement however, always check the function of the catalytic converter. Contamination can also damage the converter by reducing its capacity.

Another type of contamination (not shown here) is rich fuel contamination, where the appearance of the sensor is excessive dark brown or black soot. This is due to incorrect, rich, air/fuel mixture, and can be caused by a damaged sensor heater or a faulty fuel system. In these circumstances, check the fuel system and measure the exhaust gas. Also check the lambda sensor heater control, and the sensor heater, in case of a heated sensor (3 or more wires). Repair the defect or replace the sensor.

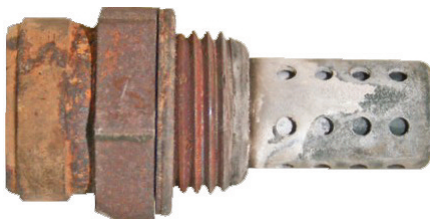
Normal



Sensor is free of any residue, and is dull in colour.

Cause: Clean engine burning as a result of proper preventative engine maintenance.

Antifreeze contamination

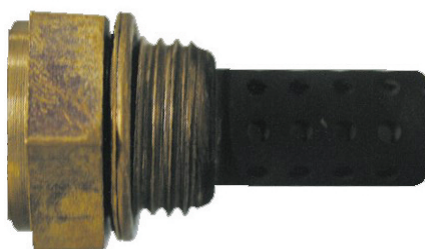


Excessive grainy white-grey colour, sometimes greenish deposits.

Cause: Contamination due to the presence of coolant fluid in the engine cylinders.

Solution: Check the engine coolant system, especially the head gasket, for leakage and repair if required. Replace the sensor.

Oil contamination

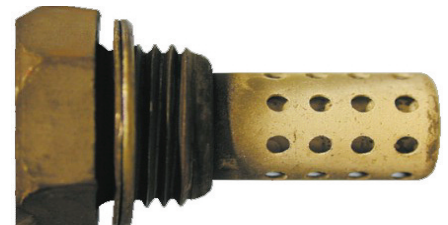


Excessive dark grey / black deposits.

Cause: Contamination due to excessive oil consumption.

Solution: Check the engine for oil leakage or wear, and repair if required.

Additive contamination

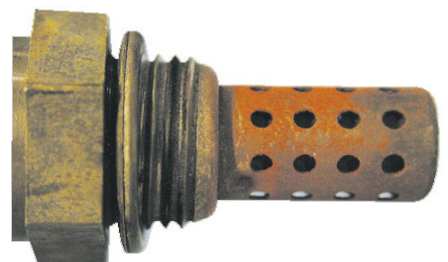


Excessive red or white deposits.

Cause: Contamination due to use of excessive or harmful additives. Certain ingredients of fuel additives can contaminate the Sensor element. When burned in the engine, they cause fumes that will contaminate and/or clog the sensor element.

Solution: Clean the engine and/or fuel system to remove the additives. Replace the sensor.

Lead contamination



Shiny, dark grey deposits.

Cause: Contamination due to use of leaded fuel. Lead attacks the platinum which is present both on the sensor element and in the catalyst.

Solution: Remove the leaded fuel from the vehicle, and refill with lead-free fuel. Replace the sensor.



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