

## **FUEL-18, Oxygen Sensor General Information, Testing, and Replacement**

### **General Information**

For 944s which are equipped with oxygen sensors (not all are), the O2 sensor measures the oxygen content in the exhaust and provides an output feedback signal so the DME will know if the mixture is too rich or too lean. The DME then adjusts the amount of fuel to correct the mixture. The O2 sensor is also known as a Lambda sensor.

When the DME is operating based on the feedback signal from the O2 sensor, this is referred to as Closed Loop operation. If the O2 sensor is faulty or is disconnected, the DME computer operates in Open Loop mode. In this case, the DME simply proves the fuel by determining the amount of air flow into the engine and selecting the appropriate amount of fuel from a set of preset fuel maps. On 944s which do not have O2 sensors (many ROW cars), the DME operates in Open Loop mode from preset fuel maps.

For O2 sensors to operate correctly, they must be heated up to normal exhaust system temperature. There were two types of O2 sensors used on 944s. Early 944s used a single-wire O2 sensor which is simply heated by the engines exhaust up to normal operating temperature. The single wire provides output signal to the DME. Since it takes some time for the O2 sensor to get heated up, the DME operates in Open Loop until it reaches normal temperature.

Later 944s use a three-wire O2 sensor (called a heated sensor) where there is one signal wire and two wire to provide power to the sensor to heat it up more rapidly. This reduces the amount of time that the DME operates in Open Loop before the sensor provides a good output signal.

Generally, heated O2 sensors last about 60,000 miles and non-heated (single wire) sensors last about 30,000 miles. Porsche recommends replacing the O2 sensor every 60,000 miles but, does not differentiate between heated and non-heated sensors.

### **Symptoms of a Bad O2 Sensor**

The following are some of the symptoms you might see if your O2 sensor is failing or has already failed:

- Engine surges or hesitates
- Strong smell of gas from the exhaust
- Poor fuel economy
- Failed emissions due to high CO or high HC levels
- Catalytic converter (if equipped) becomes prematurely clogged

### **Testing the O2 Sensor**

1. Start the car and run until engine is at normal operating temperature.
2. Disconnect the O2 sensor and connect a voltmeter to the sensor plug.
3. Run the engine at approximately 2500 rpm.
4. Introduce propane into the intake to enrich the mixture until the engine rpm drops by 200 rpm. You may be able to create the same affect by disconnecting the vacuum line to the fuel pressure regulator. However, you'll have to plug the vacuum line to prevent a vacuum leak to the intake manifold.
5. If the voltmeter reading rapidly rises to greater than 0.9 VDC the O2 is correctly indicating a rich mixture. If the voltmeter response is sluggish or the voltage remains below 0.8 VDC, the sensor should be replaced.
6. Secure the propane addition.
7. While continuing to run the engine at 2500 rpm, disconnect a vacuum line from the intake to cause a lean mixture.
8. If the voltmeter indication rapidly drops to less than 0.2 VDC, the O2 sensor is properly reading a lean mixture. If the voltmeter indication responds sluggishly or remains above 0.2 VDC, replace the sensor.

### Sensor Replacement

## Factory O<sub>2</sub> Sensor Part Numbers

Porsche P/N	BOSCH short P/N	Model	Year	Wires	Heated
	BOSCH long P/N				Replace
944 606 133 00	11031	944	1983 to 1985.0 [49 States]	1	No
	0 258 001 031				30,000 mi
944 606 135 00	13001	924S, 944 83-88, 944S (California models)	1983 to 1988 [California]	3	Yes
	0 258 003 001				60,000 mi
944 606 135 02	13011	924S, 944 85.5-89, 944S, 944S2, 968	1985.5 to 1988 [49 States]	3	Yes
		944	1989 on		
	0 258 003 011	944S & 944S2	All		60,000 mi
		968	All		
951 606 135 00	13012	944Turbo (951)	All	3	Yes
	0 258 003 012				60,000

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BOSCH "short" part numbers are used for ordering.

BOSCH "long" part numbers are what is actually stamped into the sensor.

## BOSCH "Universal Replacement" Part Numbers

BOSCH short P/N	Description	Wires	Heated
BOSCH long P/N			Replace
11027	Universal Replacement without connector 924 80-82, 924 Turbo 80-82, 928 80-82, 944 83-85.1	1	No
0 258 001 027			30,000 mi
13913	Universal Replacement without Connector (must be spliced to factory connectors) 924S, 944 85.5-89, 944S, 944S2, 944 Turbo, 968	3	Yes
0 258 003 913			60,000 mi
15735	Universal Replacement with Connector Kit (replaces stock connectors) 924S, 944 85.5-89, 944S, 944S2, 944 Turbo, 968	3	Yes
0 258 005 735			60,000 mi

### Tools

- Appropriate Size Open End Wrench (most take a 15/16" or 24mm)
- Crimp Type Wire Connectors
- Wire Connectors

### General Installation Tips

If you are replacing the O<sub>2</sub> Sensor with a universal replacement sensor, you'll have to splice the factory connector plug onto the new sensor. Or if you've order a sensor kit which comes with connectors, you'll have to install the connectors which come with the kit onto the new sensor wires. DO NOT solder the connectors onto the wires. They must be crimped on for the O<sub>2</sub> sensor to work correctly. For the sensor to work correctly, it must draw clean air down to the sensor through the air gaps in the stranded wire. If you solder the wires, the solder will fill the air gaps in the wire and the sensor will not work correctly.

Do not use any silicon based chemicals that could become exposed to the O<sub>2</sub> sensor. Silicon will contaminate the sensor and it will quit working. Many RTV sealants,

gasoline additives, and anti-seize compounds contain silicon so, check the label before you use it.

### **Replacement**

1. First locate and disconnect the O<sub>2</sub> connector plug. It will be a round connector plug at the back of the engine (unless it's been previously replaced with a universal sensor with plug kit). If necessary locate the sensor first and trace the wire up to the connector plug.
2. After you've unplugged the sensor, locate the sensor and remove it using the appropriate size open ended wrench (or O<sub>2</sub> sensor socket if you happen to have one).
3. If you are installing a universal sensor, you can find detailed instructions for installing the universal sensor [here](#).
4. Install the new sensor and tighten.
5. Plug in the new sensor.

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