

OIL LEVEL SENSOR DOCUMENTATION

Purpose

This document is to cover the operation, diagnosis, and repair of most oil level sensors (commonly found on Lexus/Camry automobiles). It is likely that the information within can apply to other vehicle manufacturers as well. The cost of these sensors are astronomical (\$430 U.S.) and the components that carry the functionality are easily sourced and cheaply purchased (\$0.50 U.S.). It is the intent of this document to help in the repair of an existing unit in order to save the user the cost of replacement.

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Figures



Figure 1. Oil Level Sensor Location

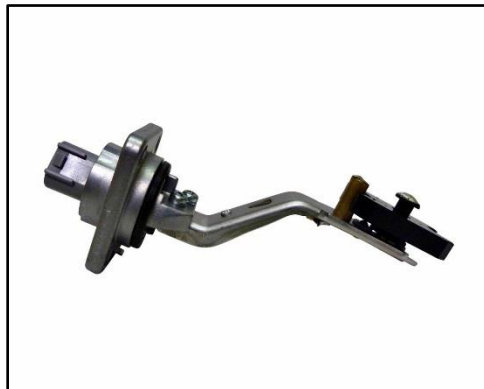


Figure 2. Oil Level Sensor

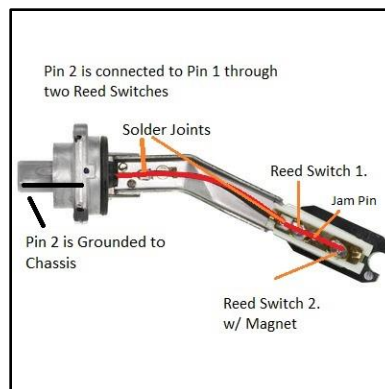


Figure 3. Oil Level Sensor Connection Diagram

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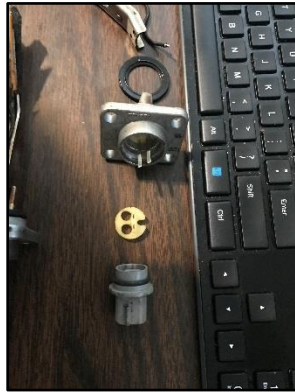


Figure 4. Oil Level Sensor Assembly

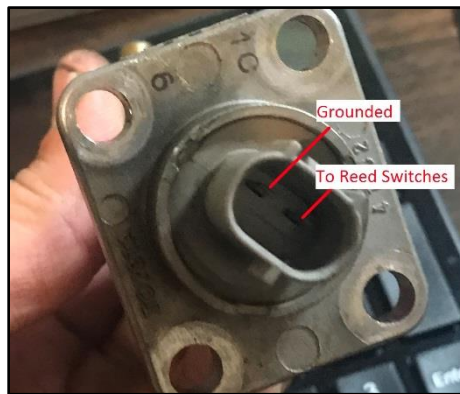


Figure 5. Oil Level Sensor Connector



Figure 6. Oil Level Sensor Connector

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Figure 7. Reed Switch System

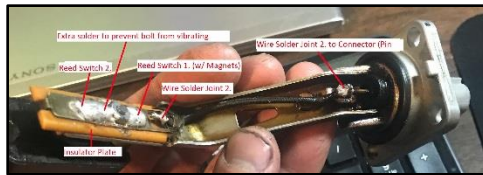


Figure 8. Sensor Top with Switch and Solder Joint Locations



Figure 9. Sensor Bottom with Solder Joint Locations

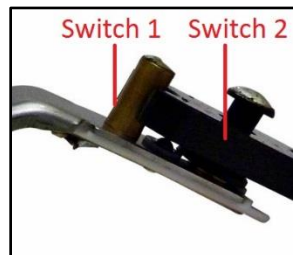


Figure 10. Reed Switches Bottom View

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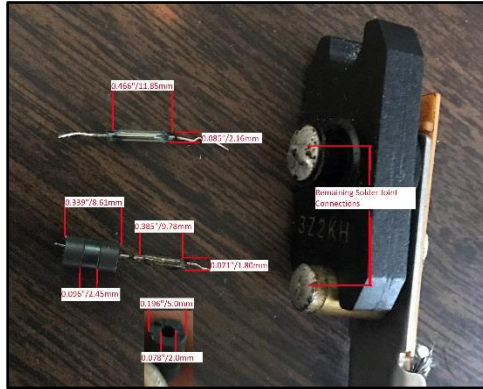


Figure 11. Reed Switch Measurements



Figure 12. Grommet Dimensions for Read Switch 1.

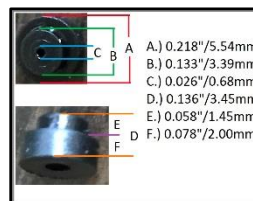


Figure 13. Grommet Dimensions for Read Switch 2.

Location

See Figure 1. for the oil level sensor location on a 2000 Lexus ES300. The sensor is behind the access panel on the passenger side front tire. Remove the tire then the two 10mm bolts on the panel to make it available.

There are four 10mm bolts to remove the sensor as well as the connector.

Operation

The first step is to test the sensor. The way the sensor works is with pins (See Figure 3.). Pin 1 connects to Pin 2 through two reed switches connected in parallel. Switch 1 is always on because it is housed in 3 magnets (See Figure 11.) which connects Pin 1 and 2. Once the magnetics reach their curie temperature (131°F/55°C) due to the motor oil heating up when the motor is running, the reed switch turns off. This removes the connection from Pin 1 to Pin 2. When this connection is lost Switch 2 begins working to provide the connection.

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The second reed switch (Switch 2) is surrounded by a float that has a little magnetism in it (See Figure 2.) The magnetism doesn't leave when heated in the oil and when the float is near the top of the pillar the reed switch it turns on. This regains a connection between Pin 1 and 2 and lets the computer know there is enough oil in the pan.

Repair

Connector Housing

The connector housing (see Figure 5.) can become damaged and to fix it you have to remove the old housing. To do this you have to pull the old connector from the sensor housing. This can be done with a pair of small needle nose pliers or a screw driver to leverage it out. Also a screw turned into a hole in the connector and pulled out can work. Once this is done (Figure 6.) a new one can be placed back. Note there is a spacer before the housing and an o-ring on the housing itself. See Figure 4. for the housing configuration.

Reed Switches

In order to replace the reed switches they have to be removed from their respective containers. The first step is to remove the second solder joint on the wire connecting Pin 1 to the switch buss (See Figure 8.) Switch 1. This will allow the buss plate to be removed later, along with the insulator landing.

After removing the wire solder the jam pin (See Figure 3.) has to be ground off with a grinder. It is very soft and takes very little to remove it. I tried using an aluminum rivet to replace but broke the plastic isolator ring when pressing it. A bolt (little bigger than a 3/32 (2.4mm) was used) with the nut tightened and soldered to keep from vibrating loose was used instead (see Figure 8.)

Once the jam pin is removed, a small screw driver was used to push the pin out of the hole. This will allow the switch buss to be removed once the reed switches have been de-soldered. The oil from the pan may need to be removed first.

Remove the oil from the solder on Reed Switch 1 and 2 using a wire brush on the top and bottom. Then remove the solder from the top and bottom of the reed switches. After removing the solder from the bottom of Switch 1 (see Figure 7.) there is a little circular plate about a ¼" in diameter that can be removed as well. It is soldered around the rim as well to keep it in place, and once removed Reed Switch 1. can be removed from the metal housing.

Reed Switch 2 is also has a circular plate soldered down as well. Once this has been removed the plastic isolator, float, rubber collet housing and ultimately Reed Switch 2 can be removed from the sensor.

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Parts

1. Reed Switch 1
 - a. Type - Glass Tube
 - b. Tube Diameter - 0.071"/1.80mm
 - c. Tube Length – 0.394"/10mm
 - d. Overall Length – 1.25"/31.76mm

2. Reed Switch 2
 - a. Type - Glass Tube
 - b. Tube Diameter - 0.086"/2.20mm
 - c. Tube Length – 0.471"/12mm
 - d. Overall Length – 1.25"/31.76mm

3. Grommet For Reed Switch 1 – See Figure 12.
 - a. Diameter - 0.098"/2.5mm
 - b. Length – 0.134"/3.4mm

4. Grommet For Reed Switch 2 – See Figure 13.
 - a. Diameter
 - i. Outer ring– 0.20"/5.32mm
 - b. Height
 - i. Lower Larger Ring
 - ii. Higher Smaller Ring