

## Vacuum Leaks and Injector rebuild on 07 x150 base:

I finally resolved the rest of the vacuum leaks (“VL’s”), some of which were documented in another thread. This is meant to be a summary of repairs for those searching for this continuing problem on early year X150s. Of course, mine is base, but most of this applies to any 4.2.

1. First thing is measuring the problem. My VL's displayed at idle with codes P0174, common on Jaguars. Digging in, a P0174 is triggered by Long Term Fuel Trim (LTFT) being greater than 20%. Normal is 0%. Won't waste time on why, but my Car Scanner Pro (a Droid app combined with a cheap OBD Bluetooth plugin) had live data collection, so I was immediately able to measure in real time my LTFT between 13-20% on Bank 2, and above 6% on Bank 1. Valuable when live testing isolated parts of vacuum lines. Pic below.

This allowed me to experiment with leak points while watching the real time data on a graph. Another point: If you have vacuum leaks, replacing the MAF or O2 Sensors will not fix the problem. Save diagnosing sensors until after the VL is fixed and you can measure them for their voltage and current values. They're probably OK.

2. You must use a smoke machine. You simply cannot find many of them without this tool. There are cheap ones on Amazon. They cost about 1/2 hour of a Jag tech's time. Just use them. Another point about smoke machines is that you really need to get good pressure on the engine to see small leaks. Many people use a rubber glove to cover the opening of the throttle body (or the intake tube) when pressurizing. This works, but nowhere near good enough to strongly pressurize the engine with smoke -- the pressure just blows out past it. I bought a 3" black rubber pipe cover at Home Depot (PlumbQuick PQC-103). This with a good tight hose clamp blocked off the TB opening so I could really pressurize the engine.

3. Buy a good O-ring kit on Amazon. One of those with about 20 different sizes., for \$10-20. And use a torque wrench on everything you do.

Here's what I found, in rough order:

- Dipstick oring and Oil filler oring. The dipstick oring I replaced from the kit, the oil filler tube I bought new for \$25 or so. This was with low-pressure smoke.
- EGR valve metal gaskets, both the top on side metal ones. Low pressure smoke showed steady leak.
- Replaced the orings on the Part Load hose and the Full Load hose. Took 15 minutes to match the orings from the kit. Of course, confirmed that these hoses weren't cracked. No leak visible, but why not, since I had the orings and it was a quick fix.
- Blocked off the vacuum ports on the TB, one to the AIR system switch, the other to the Purge Valve and on to the fuel vapor system. Pic below. Tested each with then engine running. The AIR vacuum line, a weird thin hose set that crumbled at a touch, dropped the LTFT from 18% down to 13% when I blocked it off. So, replaced the line. Note -- there are at least two types of this vacuum line. Get the one that has four port connectors on it. The other vacuum port to the purge valve tested fine.

At this point, I realized I needed better pressure, and blocked off the TB intake.

- As good smoke pressure increased, I got a blast of it out of the middle injector on Bank 2. So, I bought an injector rebuild kit, not expensive. Make sure the lower injector oring is Vitron, though both the upper and lower can be. Used the service manual to pull the fuel rail and replaced all the injector orings and intake filters. About 2 hours. Did all of them, since I had to pull the fuel rail anyway for the one.

Note on the fuel rail: I didn't have a fuel connector special tool. So, with battery disconnected and wearing safety glasses, of course, I pulled out the rail with injectors still attached, piled a stack of paper towels in the right location, and pulled one of the rearward injectors out to drain the pressured gas into the towels. Worked fine. Take the usual safety precautions with gas, of course.

- There's a pic of the injector below. Looks like the last tech didn't use a very thin wipe of silicone grease when installing the injector and tore the lower oring. (Note: there is a debate on silicone grease vs. O2 sensors. Some use a dab of oil if they are concerned. But use some lube.) Previous owner spent big bucks at his Jag dealer chasing the P0174 caused by this oring. It was missed by his Jag techs, but they did take the opportunity to replace his fuel pump, fuel filter and two injectors.
- OK, injectors. The rebuild is simple. First, do one at a time from removal from rail to reinsertion. Two orings, the base cap and the internal filter. Spray out and backflush with throttle body cleaner or carb cleaner. Rebuild vids are out there. Note I could not ultrasonically clean or test the injectors due to circumstances, but I will sched that for another day. Worked fine when installed. If you can remove them for a couple of days, have them fully cleaned before you rebuild them. Here in South Florida, basic testing, cleaning and rebuild are about \$25 for each injector. The internal filters were rotted away in many of the injectors, so be prepared to replace them. I suspect most injector replacements could be solved with a rebuild.

There was a FoMoCo PN on the injectors (they're actually Denso's) of 6R83-AD. I used it to find a good website that has rebuilt parts, plus the most important PN cross references to other brands, at <https://www.injectorplanet.com/collections/jaguar-fuel-injectors/products/denso-04806r83ad> These things are stupidly expensive, and good alternatives can be found for much better prices than Jaguar.

- I cleaned out the injector sockets with paper towels soaked in carb cleaner. Plenty of crud in the sockets. Quick thin wipe of silicone grease on the various orings, then reinsert in fuel rail. Injector mount clip in place. When complete, insert fuel rails in injector sockets. With clean sockets and greased rings, everything should slide easily in place. Torque the rail, since that and the injector clips are all that's holding everything in. Very easy.

- ALSO: 14 year old injector plugs are delicate. One of mine had been previously abused. I'll pick up a replacement and solder it in later. All of the electrical connectors are fragile. I gave them all a quick shot of contact cleaner when I put them back.
- Finally, high pressure smoke revealed that the two orings on the crankcase ventilation valves were leaking. Fixed from kit.

Hope this helps.

Panthera

Pics:

Vacuum Leak Isolation:



Live testing isolated vacuum systems. Covered, engine running. Set baseline, plugged in each, recorded changes

Upper left is evap system. No leaks.

Next, to right, is vacuum to AIR system. Vacuum line rotted, replaced. Caused about 5% of LTFT failure.

Injector Damage:



Damaged lower oring from poor installation. Major cause of Vacuum Leak. Caused the rest of the LTFT error coding.