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UNDERSTANDING FUEL TRIMS

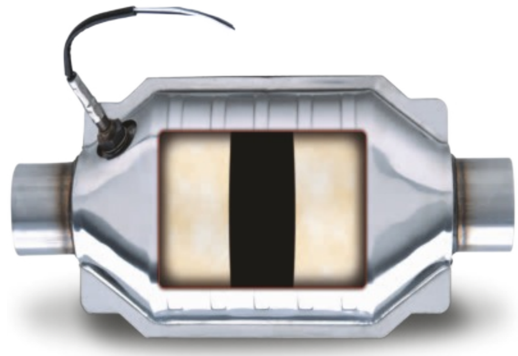
Save time *and* money

Use the simple step-by-step procedures outlined on the reverse side to eliminate "false" converter codes BEFORE replacing any catalytic converter.

Most Common causes of FALSE converter codes and REAL converter failure:

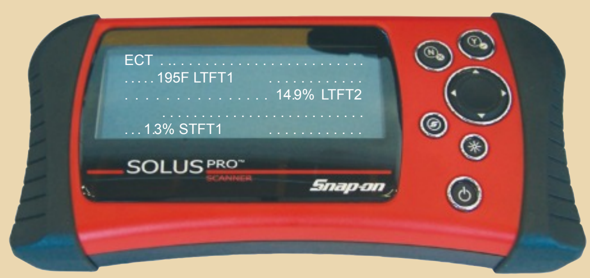
- Deteriorations of the Upstream Oxygen Sensor
- Carbon Deposits in the Combustion Chamber
- Malfunctioning Fuel Pressure Regulator
- Mass Air Sensor Problems
- Engine Oil Consumption
- Un-metered Air (Vacuum Leaks)
- Injector Problems

Let us show you how to NARROW IT DOWN!



You won't get the correct results without the right input.

CHECK THIS



- Coolant Temperature
- Closed Loop Status
- FUEL TRIMS

Make certain the ECU has control over the Fuel Injection First!

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When a vehicle is exhibiting one of these codes (or variations of these, such as P0421/P0431) you can prevent a lot of headaches if youll follow these simple steps.

First, if ANY other OBDII codes are present, address them first. Evaporative codes, Lean/Rich codes, Timing Control codes, etc... can all cause false catalyst codes when there is actually nothing wrong with the converter itself, so if any code other than the P0420/P0430 family of codes is present, start there!

That being said, before condemning any catalytic converter, whether the original converter on a vehicle with 250,000 miles, or one that has been replaced, a few simple steps with your scanner will help eliminate costly comebacks.

First, just to level the playing field, for the purposes of this test, hook your scanner up in OBD II GLOBAL MODE rather than the vehicle specific mode where you would input the VIN. This will ensure we are working with the same information scales. Be certain the vehicle is running at operating temperature, and the computer is in closed loop.

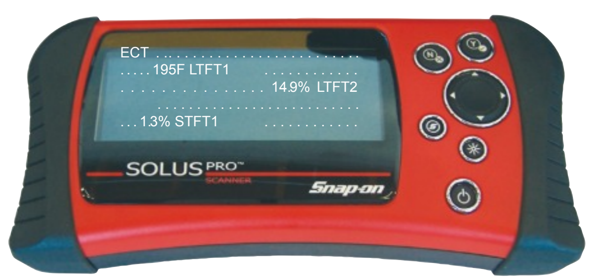
OBSERVE THE RULES OF 10%

Now, in live data, find the Long Term and Short Term Fuel Trim information. If you are unfamiliar with these, they are usually abbreviated LTFT 1, STFT 1, LTFT 2, STFT 2, etc....

Since we are hooked up in OBD II GLOBAL, the fuel trim data will be represented as a positive or negative number with ZERO being the center point. A fuel trim of 0% is perfect, but unrealistic, some amount of trim should always be expected, and even required for proper vehicle operation. The OBD II parameters for fuel trimming are generally 25% positive or negative before setting P0171, P0172, P0174 or P0175 codes, **but catalyst codes will be set long before the trim reaches those numbers.** For our purposes, we will use the rule of 10%.

When adding the long term trim to the short term trim, we are obtaining a very basic “total trim number”. This number should be close to zero, never exceeding 10% positive or negative, and ideally within 5%. For example, a LTFT of 3% and a STFT of 1% would give a total trim of 4% which is well within the normal range. Negative numbers can work in our favor as well, say the STFT is 4% and the LTFT is -2% the total trim number would be 2% which is near perfect. The same thing if the total trim number wound up in the negative, a number close to zero is fine, but 10% negative is out of limits for our purposes.

Now, there is *another* “rule of 10%” which can be an evil time waster. Besides the total trim value being well below the magic 10%, the spread between the long term and short term fuel trim values must be as well. As we said above, adding a negative number to a positive number can get you closer to zero which is a good thing, but if the spread is too large, we need to find out why. For example, LTFT is 7% and STFT is -7%, well that would give a total trim number of zero which is perfect, right? Not really.



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The spread between the numbers is a whopping 14% which vastly exceeds the “rule”. Yes it's true the total trim number is zero, but it's a bad way of getting there. It is an indication that the PCM is not in complete control of the fuel injection, it's scrambling to make up for an issue that is nearly out of its control. If the vehicle utilizes MAF, this condition STRONGLY suggests Mass Air Sensor issues. If the vehicle utilizes MAP, check the vacuum at the MAP sensor, etc. Of course there are other causes for this type of reading, but start with these common ones.

OK, let's say the numbers are all *well* within our 10% limits at idle (remember, that doesnt mean 9% is good, you just haven't observed the numbers exceeding 10% yet). Let's be certain there is not a fuel starvation issue here.

Now hold the engine RPMs up around 2500 for a minute and observe the trim data once more. *Hint: if the numbers don’t change, that would be very suspect.* Short term trim will usually be moving all the time, but if your Long term trim doesnt change between idle and 2500, it's time to start looking further. (This does not hold true for VW and Audi, their Long Term Fuel Trims generally will not change unless the vehicle is moving at a cruising speed). Now check your results. If the numbers are *well* within 10%, replace the converter along with the upstream oxygen sensor(s) and you should not encounter further problems.

Remember, oxygen sensors have a useful life of approximately 80,000 miles. Even if you went to the trouble of connecting a digital scope to the signal wire and observed the sensor crossing 450mv within the 200 millisecond parameter during a drive, what happens next week when the sensor exhibits a slowness to switch due to age and deterioration allowing the vehicle to run rich for too long a period, destroying the new converter? Who did you just do a favor for? **ALWAYS** replace the upstream oxygen sensor when replacing a converter unless you are certain the sensor has only a few miles on it.