

Please give credit where credit is due! This DIY was completed ENTIRELY by the hardest working VW Vortex moderator on the site!! Gary Thompson, Ph.D. - vortex ID [VGRT6](#), email address vgrt6@yahoo.com. Please make sure to say thanks to Gary, and if you ever see him at a bar, buy em a beer. These DIY's are more complete than anything Bentley has ever written!!

REPLACING OXYGEN SENSORS

The following outlines the procedure for replacing oxygen sensors (pre-cat on OBDI cars and both pre- and post-cat on OBDII cars). The procedure was based on a 99.5 Jetta GLS VR6 (MKIV), however, it should be similar on other models and years. Please do these procedures at your own risk and be ready to make small adjustments while doing them. Also, please be observant while removing parts so that they go back together correctly.

If you are replacing an oxygen sensor because of a diagnostic trouble code (DTC) and are not sure what sensor the code is referring to, Bank1-Sensor1 is the pre-cat sensor and Bank1-Sensor2 is the post-cat sensor on an OBDII car.

For a MKIV car with a 12v VR6 engine, the part #s for the pre- and post-cat oxygen sensors are 021-906-262-B and 06A-906-262-Q (replaces 021-906-262-C), respectively. If you have another model/engine, you'll need to obtain the appropriate sensors for your car. Please verify the part #s with your parts supplier before ordering any parts. I am not responsible if you purchase the wrong parts for your particular car.

I purchased the above oxygen sensors from <http://www.1stvwparts.com>. The pre-cat sensor ('B') was \$28.99 and the post-cat sensor ('Q') was \$15.86 (all prices were quoted online on 8/20/03).

Finally, the time required to replace the oxygen sensors is varied and depends mostly on how long it takes to loosen or 'wake up' the threads on the old sensors. If the old sensors come out relatively easily (not likely if they've seen a lot of miles), you should be able to replace both sensors in an hour or so. Most likely, it will take some extra time to remove the old sensors - I'd plan on spending at least one hour per sensor. If you plan on replacing both sensors, you can try and save some time by performing the steps for loosening the threads (steps 15 through 17) on both 'old' sensors at the same time.

STEPS:

1. The replacement of the oxygen sensors requires that the front end of the car (at least) be raised, either on ramps, on jack stands or on a lift. If you have ramps or access to a lift (lucky!), use them appropriately (much simpler, faster and safer than placing the car on stands) and proceed to step 5. If you do not have ramps or access to a lift, but have experience jacking your car up and placing it on stands, do this as you normally would and proceed to step 5. If not, you can consider using the method I used below.

WARNING: DO NOT ATTEMPT TO PUT YOUR CAR ON STANDS IF YOU ARE NOT COMFORTABLE DOING SO. IF NOT DONE CORRECTLY, THE CAR MAY FALL, POSSIBLY

CAUSING SERIOUS INJURY OR DEATH. ONLY WORK NEAR OR UNDERNEATH A CAR THAT HAS BEEN PROPERLY SUPPORTED ... DO THE FOLLOWING PROCEDURE AT YOUR OWN RISK!!!

2. Jack the car up using the pinch rails near the edge of the underside of the car. The pinch rail is indicated by the yellow arrow in the picture below and is the place used by the stock VW jack for raising the car. Make sure that the jack cup is centered on the jack point on the rail (indicated by the small indent on the lower side valence just above the yellow arrow). It is a good idea to place a thin piece of wood or hard rubber between the jack cup and pinch rail to help distribute the load and protect the underside of the vehicle from being marred. If you look closely at the picture, you should be able to see the jack on the far side of the car underneath the pinch rail. Note the 6" x 6" piece of plywood sitting on top of the jack cup.



3. The jackstands should be placed directly below the major frame rails of the car, indicated by the red arrow in the picture above. Make sure that the stands are placed towards the very front of the frame rails - this is where they are strongest. If you place the stands too far back from the front edge, you run the risk of crushing the frame rail. Don't get too close to the curved front edge of the rail, however, as there is a risk of the jack stand slipping and the car falling. I placed the jackstands just below the small hole in the bottom of the frame rail (see picture above for approximate location of stands relative to the front of the frame rail). This seemed to me to be the best compromise between safety and rail strength. Again, it is a good idea to place a protective barrier between the jack stand and the frame rail - I used a double-thick piece of regular cardboard.

4. Slowly lower the raised side of the car onto the jack stand. Repeat the above procedure (steps 2 and 3) on the other side of the car.

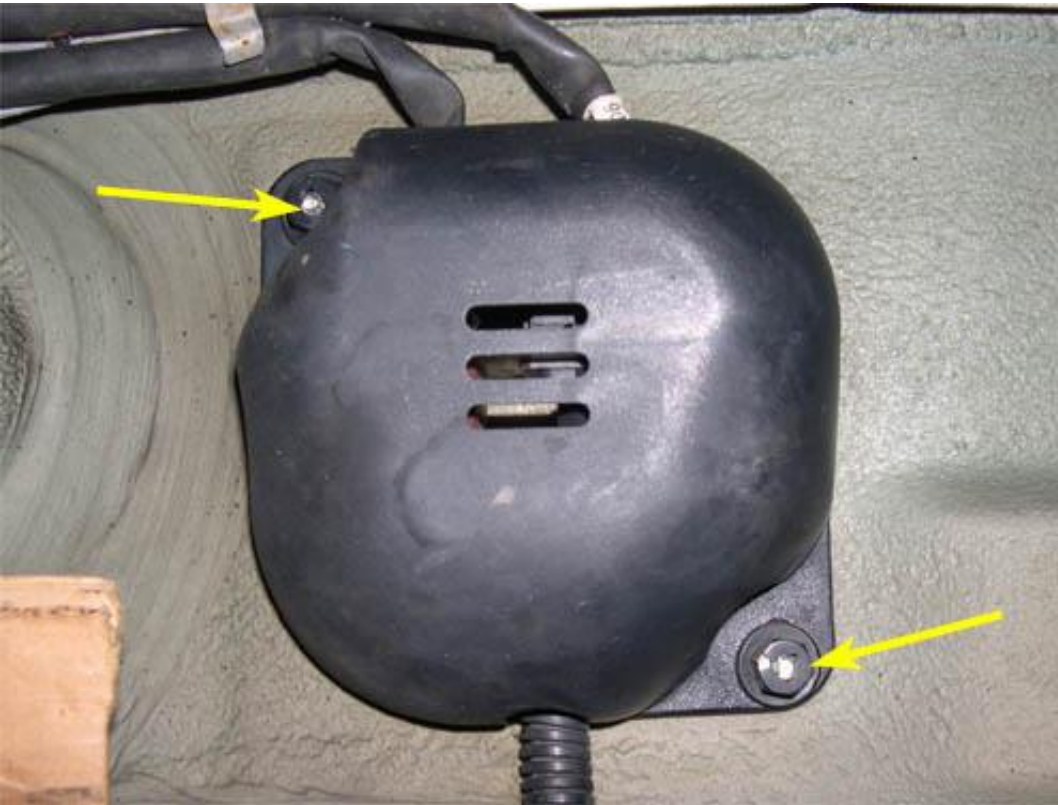
WARNING: MAKE SURE THE CAR IS WELL-SUPPORTED BY THE JACK STANDS BEFORE DOING ANY WORK NEAR OR UNDERNEATH THE CAR!!!

5. The location of the catalytic converter (the oxygen sensors are usually threaded into it) is indicated by the white arrow in the picture above. Similarly, the location of the plastic box that houses the oxygen sensor lead harness connectors is indicated by the green arrow in the picture above.

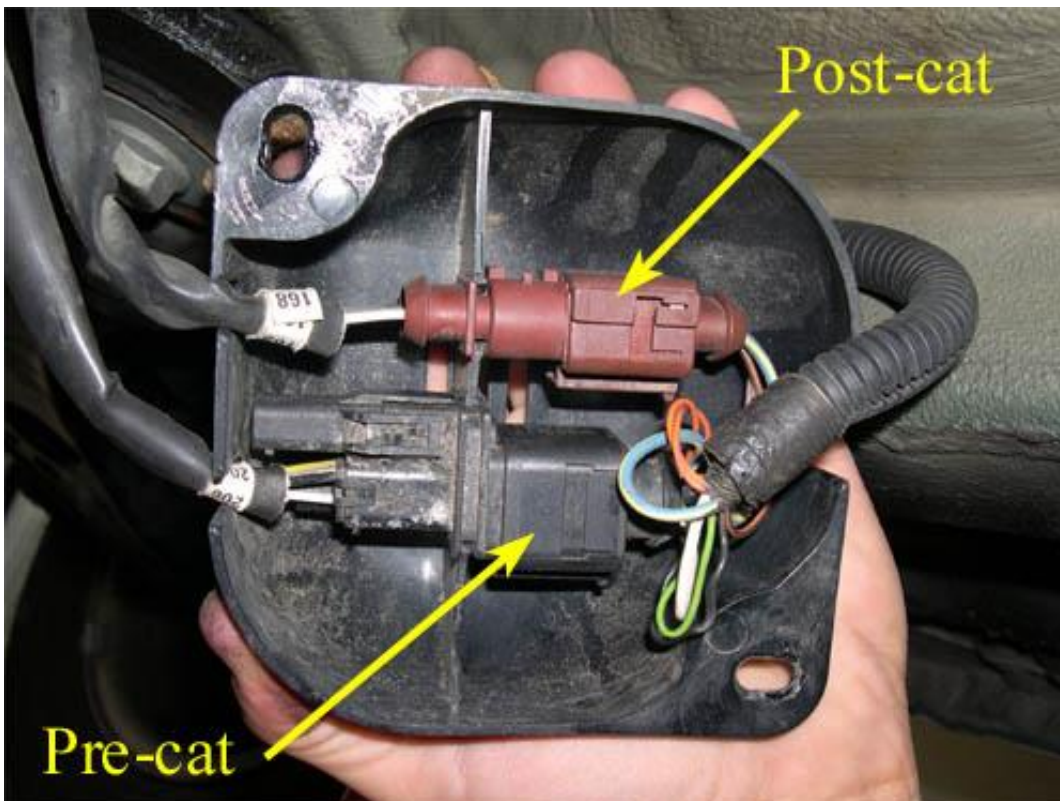
6. Slide under the car and locate the black plastic box that houses the oxygen sensor lead harness connectors, shown in the picture below. It is located just to the inside of the main frame rail and along side the catalytic converter.



7. Remove the two (2) 10mm plastic nuts (indicated by the yellow arrows in the picture below) that secure the box to the underside of the car.



8. The picture below shows the sensor lead harness connectors inside the black plastic box. The harness connectors are attached to the box by tabs on either side of each harness connector. Slide the appropriate harness connector(s) off of the tabs to disconnect it from the box (this can be difficult to do - the fit is very tight). Note that the harness connector for the pre-cat oxygen sensor (6-wire) is larger than that of the post-cat oxygen sensor (4-wire).



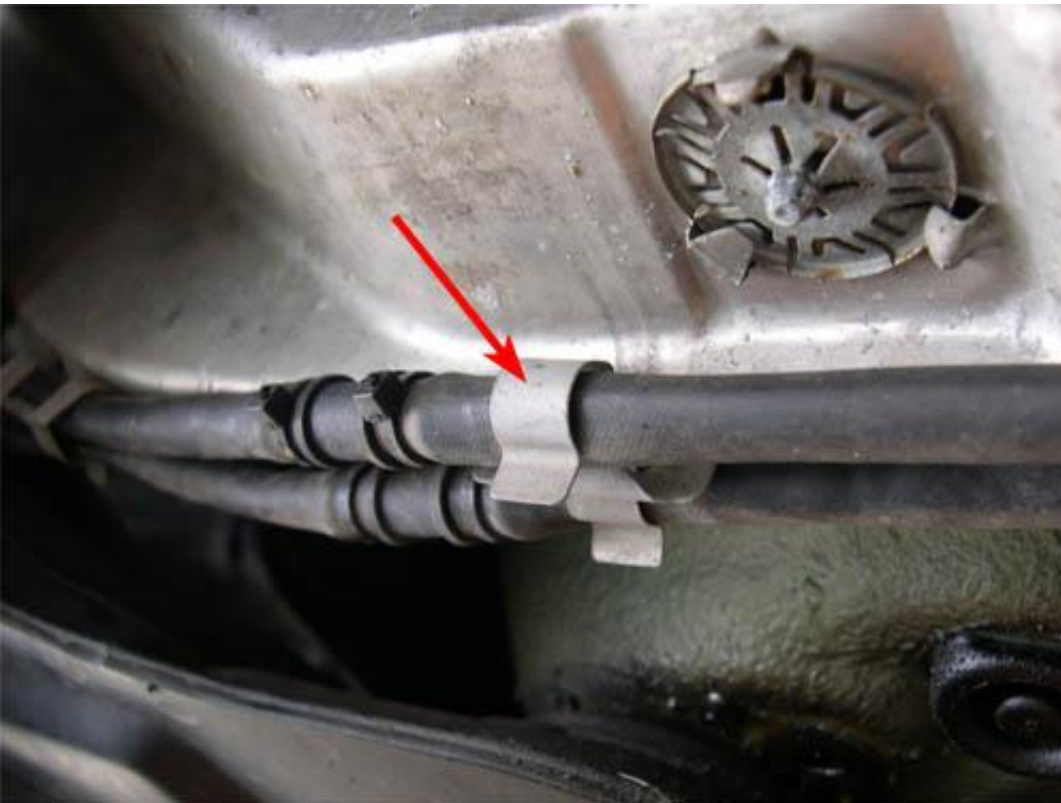
9. Separate the appropriate harness connector(s) by pulling up slightly on the retaining tab (indicated by the yellow arrow in picture below) with a screwdriver or other small, thin tool and sliding the two halves apart.



10. Remove the protective heat shield from around the sensor leads by unsnapping the snaps indicated by the yellow arrows in the picture below (there are approximately 4-5 snaps).



11. Remove the appropriate sensor lead(s) from the retaining clips on the underside of the car. One of the clips is indicated by the red arrow in the picture below.



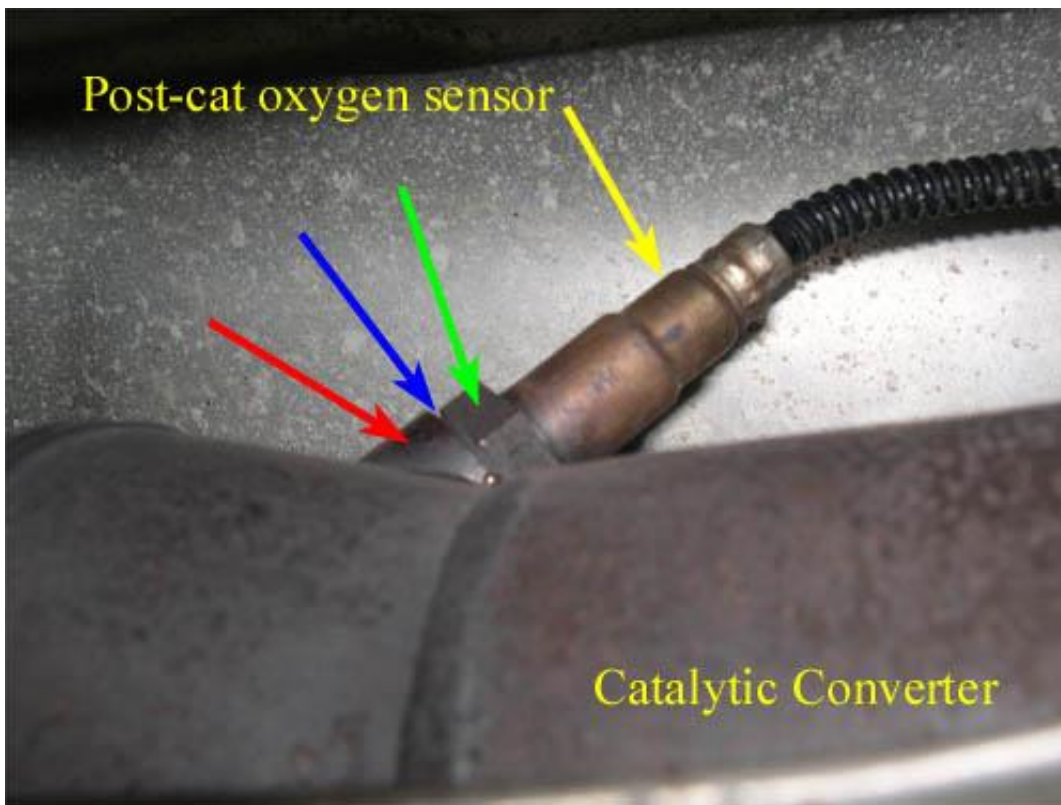
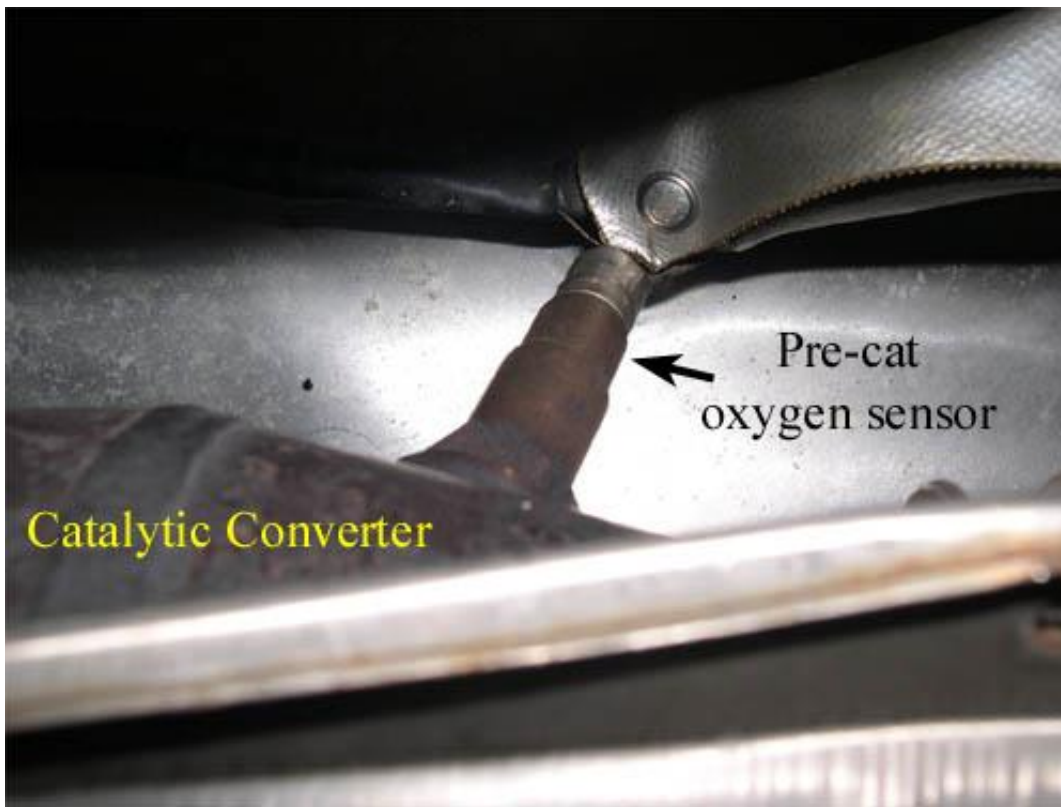
12. Now comes the fun part - removing the old sensors from the threaded bungs on the catalytic converter. The removal of the old sensors is often difficult due to the fact that the threads on the

sensor seize inside the bung and are difficult to loosen or 'wake up'. This is especially true for sensors that have seen a lot of miles and seems to occur even when anti-seize is used on the threads prior to installation. The following steps will describe one way to loosen the threads on the old sensors. I'm sure there are other methods of loosening the threads on the old sensors. If you know of a way that works, go ahead and give it a try. If you've never done this before or have no idea where to begin (other than straining to turn the old sensors and possibly hurting yourself), give the following method a try.

13. The loosening of the threads on the old oxygen sensors is much easier if you use the three items shown in the picture below. These items are a can of penetrating lubricant (PB Blaster, which is shown in the picture, is excellent), a small butane torch or other concentrated high heat source and a hammer. It is not necessary to use all three items to loosen the old threads, but using the three together in repeated sequence can greatly reduce the time and effort needed to get the old sensors out.



14. Locate the oxygen sensor(s) on the catalytic converter. If you have an OBDII car, there should be two sensors. The pre-cat sensor is closest to the front of the car and the post-cat sensor is closest to the rear. The sensors should be located either on the sides or on top of the catalytic converter. The removal of the sensors is much easier if they are on the side of the cat. Unfortunately, the sensors on my MKIV VR6 are on top of the cat (not sure if this is normal or not). There is very little space up around the converter, making them even harder to remove. The pre- and post-cat oxygen sensors on my MKIV VR6 catalytic converter can be seen in the pictures below (the protective heat shield should already be removed from the sensors leads - the pics were taken out of sequence. Sorry.)



15. Begin loosening the threads by spraying the PB Blaster or other penetrating lubricant into the crack between the sensor and the bung, as indicated by the blue arrow in the picture above. Spray enough lubricant to surround the threads, but not too much or it may start to drip into the catalytic converter. It doesn't matter if the old sensor becomes saturated with the lubricant, but it's probably best to keep as much as possible from actually collecting inside the catalytic converter. As long as you don't go crazy spraying the lubricant, you shouldn't have to worry too much. Give the lubricant a

few minutes to do it's job.

WARNING: PLEASE BE EXTREMELY CAREFUL WHEN USING AN OPEN-FLAME SOURCE NEAR OR UNDERNEATH THE CAR!!! THERE IS NO POINT IN HAVING WORKING OXYGEN SENSORS IF THE REST OF THE CAR IS A BIG PILE OF ASH, METAL AND MELTED PLASTIC!

ATTENTION: IT IS A WISE IDEA TO TEST THE FLAMMABILITY OF THE PENETRATING LUBRICANT BEFORE PERFORMING THE NEXT STEP!!!

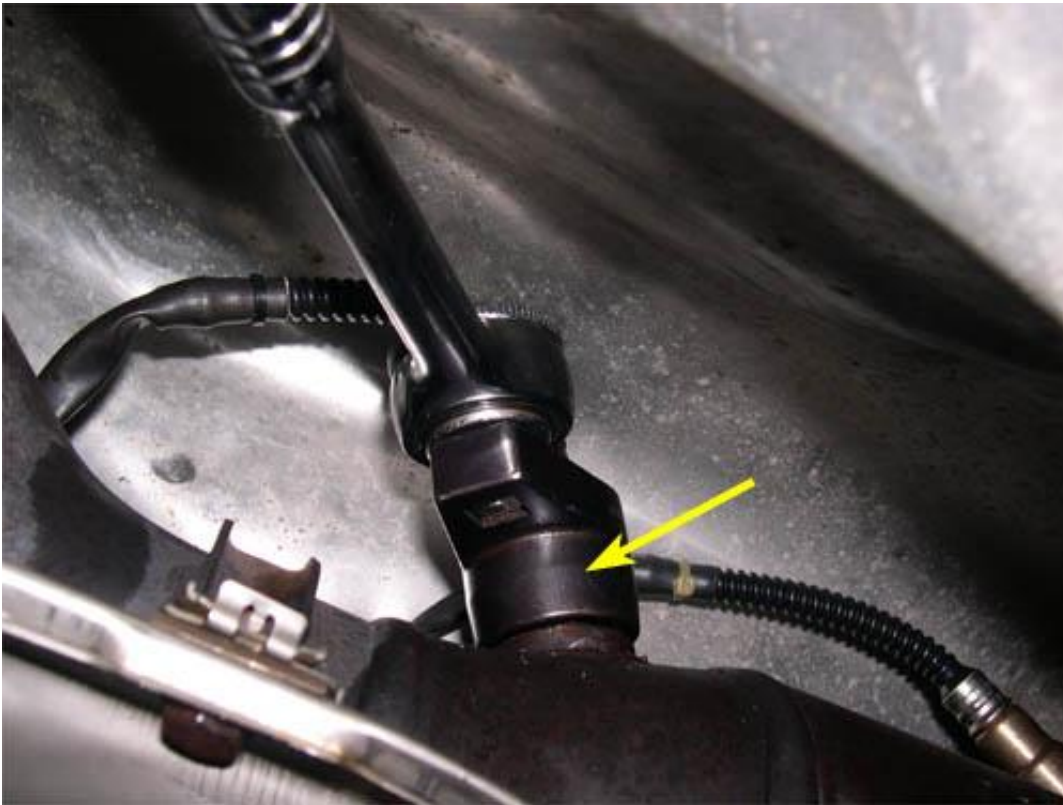
16. Next, heat the bung on the catalytic converter with the torch for a minute or two. The bung is indicated by the red arrow in the picture above. The heat will cause the bung hole (please keep you comments to yourself 🤐) to expand, making it easier to remove the sensor. Try and only heat the bung and not the sensor itself, so that the sensor threads do not expand too (the sensor will get hotter due to conduction, but not nearly as hot as if the torch were directed at it intentionally).

WARNING: IF THE TORCH OR OTHER CONCENTRATED HEAT SOURCE IGNITES THE PENETRATING LUBRICANT (THIS DID NOT OCCUR WITH PB BLASTER), THEN STOP IMMEDIATELY!!!

17. Finally, lightly hit the nut area (not sure what to call it) of the sensor (indicated by the green arrow in the picture above) with the hammer a few times to help loosen the threads. Ten or so hits should be good. Don't do all the hits in the same place, but instead spread them around the circumference of the sensor.

CAUTION: IF YOU USED A TORCH OR OTHER CONCENTRATED HEAT SOURCE TO HEAT UP THE BUNG, BE CAREFUL NOT TO BURN YOURSELF WHEN PERFORMING THE NEXT STEP. THE AREA WILL BE VERY HOT!!!

18. Using an oxygen sensor wrench (yellow arrow in the picture below) in conjunction with a socket wrench, attempt to remove the oxygen sensor from the bung by turning it counter-clockwise. If you do not have an oxygen sensor wrench, you can also use an open-ended 22mm wrench to do this. As a last resort, use an adjustable wrench. If you do, be careful that the wrench does not slip. You may have to apply some significant torque to get the threads to finally break free - please be careful not to hurt yourself. If the sensor does not turn, you can actually try tightening it slightly (turn it clockwise). Supposedly, this is an old mechanic's trick for breaking threads. Then try and loosen the sensor again.



19. If the sensor still does not break free after all that, repeat steps 15 through 18 until it does. It may take a couple of cycles (it took 3-4 for my sensors) to finally get the sensor out.

20. The picture below shows a new post-cat sensor along side the one I removed from my car. Surprising, the old one doesn't look too bad considering it was in use for 137k miles. The sensor actually still worked fine - I only replaced it as part of preventative maintenance and because it was so cheap. The same applies to the pre-cat sensor I removed from my car.



21. Before installing a new sensor in the bung on the catalytic converter, make sure to apply some anti-seize to the threads of the new sensor. If you purchase an OEM VW sensor, it should come with anti-seize on it already. If your sensor didn't come with the anti-seize already applied, purchase some which is safe for oxygen sensors (silicone-free) and apply a little to the sensor threads. Be careful not to get any near or in the holes on the end of the sensor. This could potentially damage the new sensor.

22. Using a paper towel or thin rag, wipe out the threads of the bung to remove any excess penetrating lubricant and then thread the new sensor into the bung. Tighten the sensor to 37 ft-lb (50 Nm). I didn't use a torque wrench to tighten the sensor - I just made it medium tight by feel.

23. If you are replacing both sensors on an OBDII car, remove and replace the 'other' sensor by following steps 15 through 22.

24. If you have finished removing and replacing sensors, secure the sensor leads, reinstall the protective heat shield, reconnect the harness connectors and reinstall the black plastic box that houses the harness connectors by following steps 7 through 11 in reverse.

25. If the car was raised during the above procedure, lower the car using the appropriate steps for the lifting method used.

26. Since the learned long term fuel trim values in the ECM memory depend in part on the condition of the oxygen sensors, it is a good idea to reset the values if you changed the pre-cat oxygen sensor (the post-cat sensor only monitors catalytic converter efficiency - it has nothing to do with fuel trim / engine control). To reset the fuel trim values, either disconnect the (-) battery terminal for approximately 15 minutes and then reconnect it (remember to have your radio code handy) or erase fault codes in the engine module (even if there are none) using a VAG-COM. The car may

drive crappy for a little while since all the fuel trim values are now zero and other learned parameters have also been erased. These values and parameters should return to normal relatively quickly and the car should run normally after that occurs.