

HOW TO – REPLACE CAM FOLLOWER ON 2005.5-2008 AUDI A4 (B7)

ACKNOWLEDGEMENT: I would like to thank BJ McGee for posting the original photos and providing the step-by-step instructions on how to replace the cam follower. I used photos posted by him quite extensively in this document and the process as a general guide with some notations. You can find the source following this link, <http://picasaweb.google.com/BJ.McGee/AudiA4FSICamFollowerInstall#> . I also used Bentley repair manual for some information, specifically for component locations, torque specifications and general precautions. Particularly, I pulled the procedure on relieving the pressure in the fuel pump from that repair manual.

DISCLAIMER: Please use this document as a general guide for replacing the cam follower. I take no responsibility for any damage that this procedure may cause to you or your vehicle and its components. Should you have any questions, you can reach me by email, illegitimus@yahoo.com or by PM on <http://www.audizine.com> to "illegitimus".

Before proceeding, the pressure has to be reduced in the high pressure fuel lines. To do so, follow the below steps:

- open the fuse box located on the driver's side of the dash, at the door hinge: pry the fuse box cover with a flathead screwdriver;
- fuse - **28** - from the Fuel Pump (FP) Control Module J538 must be removed before opening fuel system. Otherwise, the fuel pump will be activated by the drivers door contact switch;
 - By removing fuse - **28** - , the voltage supply to "terminal 30" for the Fuel Pump (FP) Control Module J538 is interrupted.

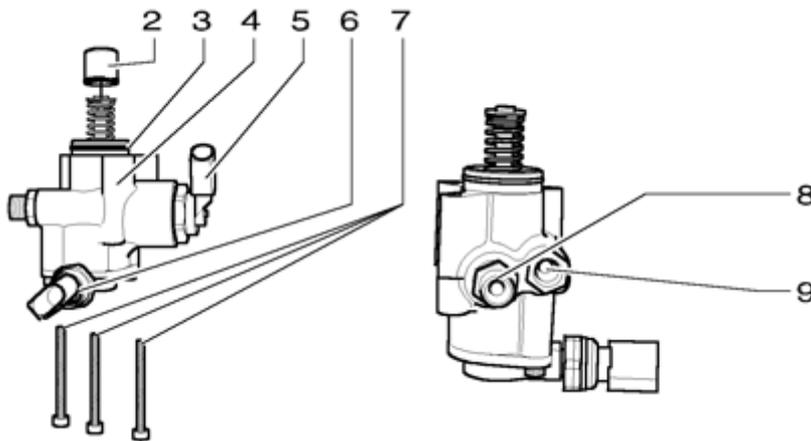
CAUTION!

- **The fuel injection system is divided into a high pressure section (maximum approximately 110 bar) and a low pressure system (approximately 6 bar).**
- **Before opening high pressure parts, e.g. removing high pressure pump, fuel rail, fuel injectors, fuel pipes or Fuel Pressure Sensor G247, fuel pressure in high pressure area must be reduced to a residual pressure of approximately 6 bar. The procedure for this is as follows.**

- High fuel pressure, reducing:

- Remove electrical connector - **2** - from Fuel Pressure Regulator Valve N276
- Allow engine to idle approximately 10 seconds.
- By removing the electrical connector from the Fuel Pressure Regulator Valve N276 in idle, the fuel pressure is reduced from approximately 50 bar to approximately 6 bar.
- The decreasing fuel pressure can be decreased if a Vehicle Diagnosis and Service Syst. VAS 5052 is connected and engine control module is selected. And select display group 140 under "Read measured value block" function.

Following is the picture of the fuel pump assembly from the Bentley manual. I only noted the important components that you really care about in the procedure:



2 – Sleeve (cam follower); when replacing it, it is suggested that it sits at the lowest position on the cam lobe; if necessary, rotate the cam shaft to accommodate;

3 – O-ring (rubber); needs to be replaced with the cam follower (NOTE: you'll notice that the original will be flattened in the groove of the fuel pump; by not replacing it the seal won't be tight);

4 – Yours truly, fuel pump;

5 – Fuel pressure regulator valve N276;

6 – Low fuel pressure sensor G410;

7 – Bolts for high pressure pump (Torque spec – 9 Nm; NOTE: I strongly suggest you use a low-range torque wrench on these; do not over-tighten them as they are brittle);

8 – Connection for fuel return line; that's where the banjo bolt goes (Torque spec – 17Nm but according to Bentley, it is 25Nm; I went with the former);

9 – Fuel supply line to fuel rail (Torque spec – 25Nm; again, according to Bentley, it is 30Nm) NOTE: because you really have no way of using a readily available torque wrench on that fitting you need to feel-torque it by hand to the position it was in originally. I know, it is not correct but you have to visually mark the position of the fitting ahead of time to be somewhat sure);

PROCEDURE:

1. Remove the plastic engine cover. The HPFP is located on the far right side of the engine as seen in this photo:



2. Remove the plastic clip holding the flexible low pressure fuel line from the mount on the engine. Then open the clip and slide it along the hose and remove it from the hose.





3. Using a 10mm wrench carefully remove the bolt holding the bracket. Be careful not to drop the bolt and the washer as they come undone. I suggest you use a wrench in one hand and hold the bolt with the other hand. Remove the bracket.





4. Remove the PCV return plastic hose. The round clips on the end of the hose require you to squeeze the ridged portion at each end, and then carefully wiggle the hose out of the fitting.

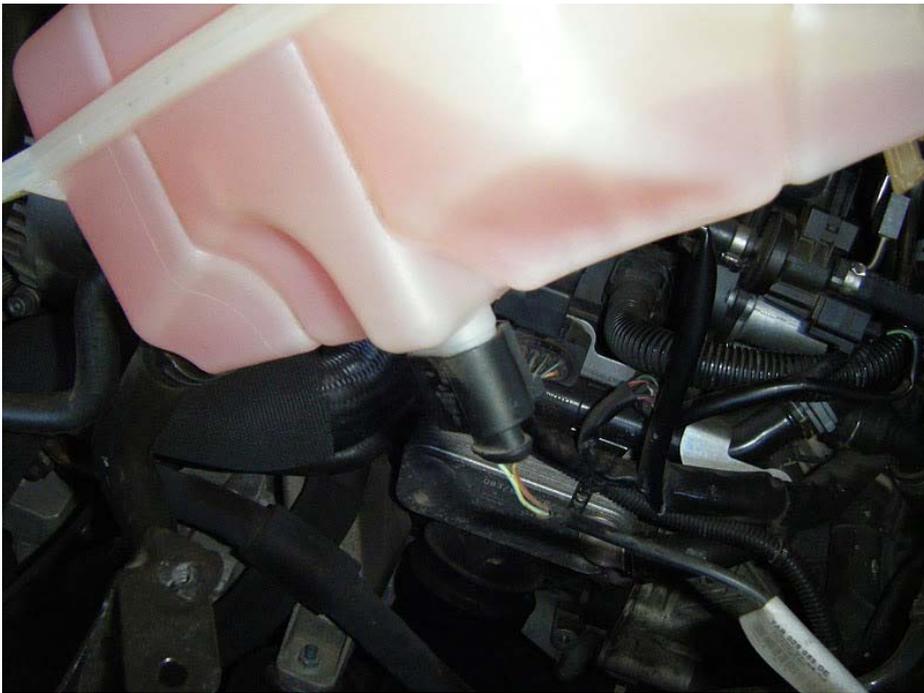


5. Remove the electrical connector from the low pressure fuel sensor G410. These connectors are very easy to work with if you use them properly. They only have a single release on them, but can be tricky. What you need to do is pushing the connector on tighter, and then gently pressing on the release lever while pulling the connector. **NOTE: you were supposed to remove the electrical connector from the fuel pressure regulator valve N276 prior to the procedure to relieve the pressure in the pump!**

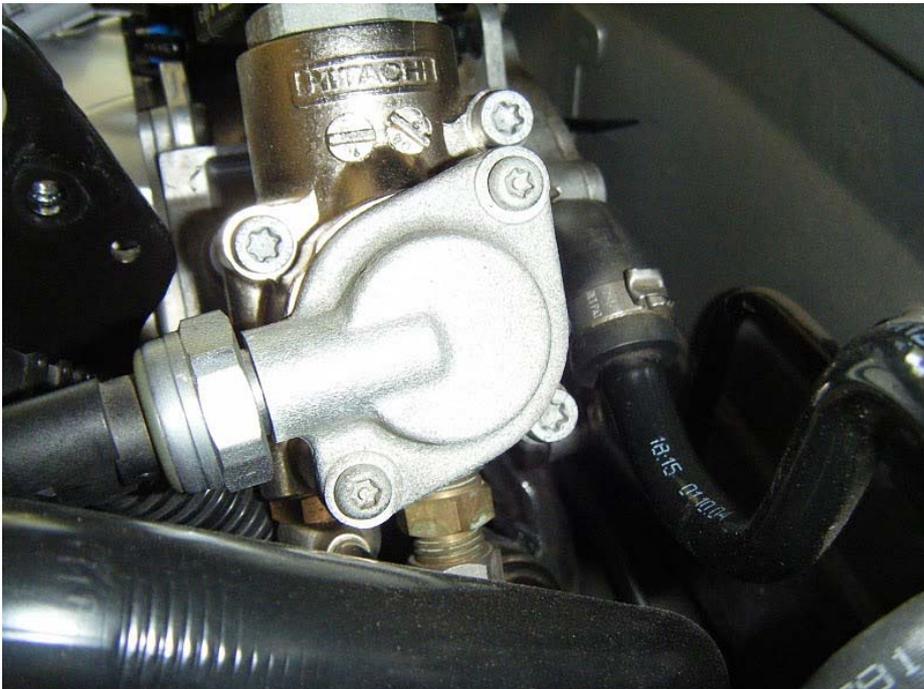


6. Now, to the coolant expansion tank. Disconnect the electric connector from the bottom of the tank. The connector is the same type as those you just disconnected from the fuel pump. The technique of removing it is identical.
7. Remove the one Phillips screw that is holding the coolant expansion reservoir. The back tabs of the reservoir are inserted in the metal brackets of the firewall. To completely remove the reservoir, you need to carefully raise the end, which was held in by the screw you just removed and then carefully work the tabs out of the holding brackets. The tabs are "L" shaped and can break off. You can peek under the reservoir while raising the tank to get an idea how to get the tabs out. **Pay attention to the coolant lines and don't stretch or bend them!**





8. Remove the fuel relief valve from the side of the pump. To do it, simply twist off the plastic cap and use a 17mm open or closed wrench to undo the valve fitting. Have some work rags handy as some fuel will pour out. The reason you need to take it out is to gain access to one of the T30 torx bolts that hold the pump in place. Below, is a photo of the top view of the pump with relief valve removed, which exposed the bottom torx bolt and allowed access to it.



A sample setup to be used to remove the torx screws holding the pump pictured in the photo below. I used something very similar. **Do not remove the torx bolts just yet!**



This shows the input banjo bolt fitting on the left, and the output compression fitting of the line to the fuel rail on the right. Note the complete lack of access for the banjo bolt.



9. First, remove the high pressure line. Make sure to stuff a paper towel/work rag underneath the fitting to catch any fuel spray and drips. Use a 17mm open wrench. Suggestion: use a short wrench so that you can easily maneuver it under the coolant line, electrical wires and hoses. The fitting isn't too tight so the force applied to twist it is minimal.



The fitting is off and the line is out of the pump fitting:



10. Now, using 12-point 8mm torx bit remove the banjo bolt from the pump



To remove the banjo bolt you need to reach from the bottom like in the photo below:



Here's a setup used on the ratchet to reach the banjo bolt by the person who took the photos. Once again, I used something very similar.



In the setup pictured above the person used a 10" 1/2" drive extension with a 3/8" to 1/2" adapter and a 1/2" to 3/8" adapter. Overall length is equal to a 12" 3/8" drive extension. Plus/minus an inch or so would suffice.

NOTE: Part number for the banjo bolt if it needs replacing: WHT-000-285-C and it was \$11.34 from the Audi dealer.

11. Once both the banjo bolt and the high pressure line fitting are off you can proceed with removing the T30 torx bolts that hold the pump to the engine.

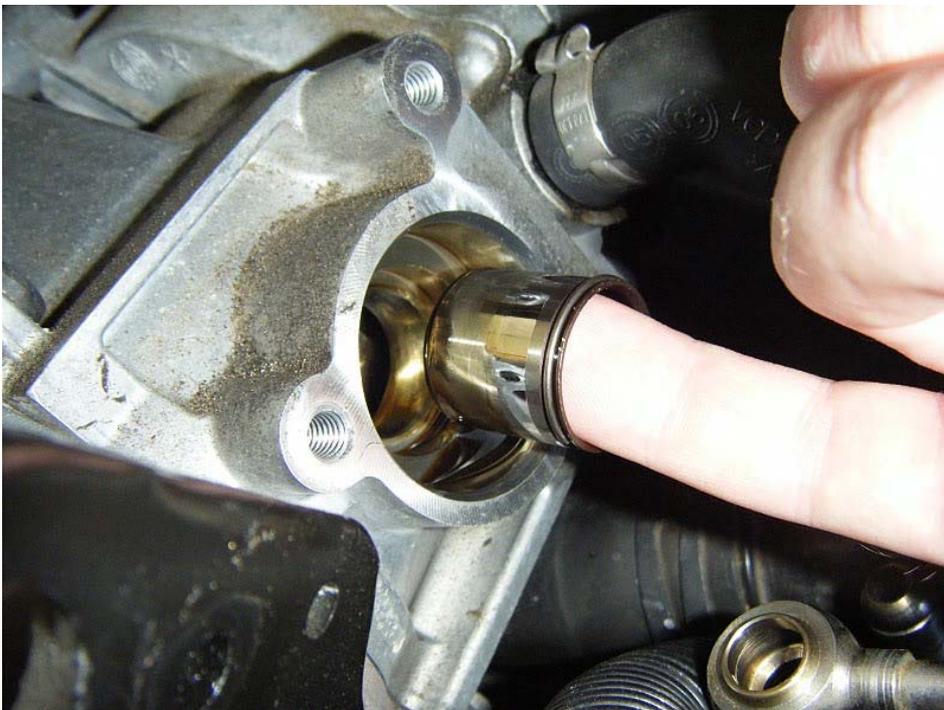
Three torx bolts removed:



12. After all of the bolts removed the pump is still sitting snugly on the valve cover. That's because of the banjo fitting. Hold the pump and pull on the banjo line away from the pump.
13. Carefully remove the pump. At this point in the project you will need steady hands, and a strong grip. You do not want to drop the pump or the cam follower. What seems like very minor damage to these pieces can cause extremely accelerated wear. While removing the pump the follower should stay in the opening in the head. Take care to watch and see if the follower is coming out with the pump. If it does, that is ok, just make sure it doesn't fall off inside the engine bay. A chip or nick in the follower means you get to buy a new one, if you haven't already.



14. If the cam follower is still in the valve cover, carefully remove it with your finger.



The cam lobe can be seen in the following picture. In this particular case there's hardly any wear on the surface of the lobe.



15. Cover the valve cover opening with a clean cloth or paper towel to prevent any dirt from getting inside.



New and old cam followers side by side

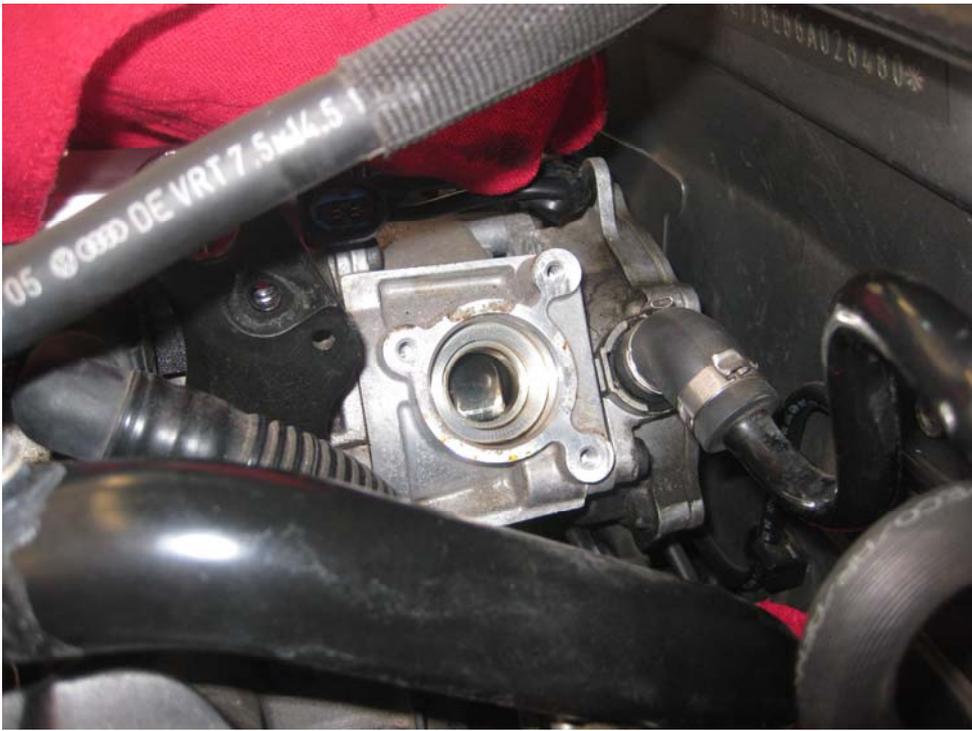


Here're my awkward twins:



Shall I say that the original cam follower was nearly shot!? I am glad I did replace it. My car has 58k miles on the clock, bone stock and regularly driven in 70/30 city/highway environment. Another 2k miles or less and my cam and the fuel pump would have been ruined! New cam follower is bathing in oil next to the old one. You are advised to lubricate the new follower in oil for ease of installation and function.

The cam lobe, although exhibiting some light nicks and scratches, seems to be ok and pretty smooth to the touch.



Here is a snapshot of the fuel pump.



16. Per Bentley manual it is recommended that you replace the round fuel pump seal. The following photo shows the seal to be replaced. Audi part number for the seal is 06E 127 248. It costs \$9.68 from my dealer.



17. Time to put a new cam follower in place. Audi part number for the cam follower (sleeve) is 06D 109 309 C. It cost me \$43.20 from dealer. Carefully place the new follower into the pump opening.



18. Place the three torx bolts into the pump and set the pump in place to be secured. Once the pump is fully seated and all three bolts are in finger-tight, use a torque wrench to tighten them evenly to 10Nm or 7.4lb-ft. The bolts are quite long; over-tightening them could stress them and cause a failure that would put the pump on quite a bind. If you are unsure about what torque the bolts are in, remove them one at a time and re-torque them to make sure.



19. Tighten the 12pt banjo bolt to 17Nm or 12.5lb-ft.
20. Tighten the compression fitting on the fuel pump outlet to 25Nm or 18.4lb-ft. Since you will be using an open-ended 17mm wrench you used to undo it make sure not over-tighten it by feel.
21. Reconnect the electrical connectors to the low pressure fuel sensor (bottom) and the high pressure fuel regulator N276.
22. Reinstall the coolant reservoir. **Do not forget to connect the coolant sensor at the bottom of the reservoir.**
23. Snap the ribbed plastic hose of the vacuum system to the PCV valve and the intake opening.
24. Reinstall the engine cover bracket and the fuel support line plastic clip.
25. Reinstall fuse 28 for fuel pump control module.
26. Start the car and let it idle for a bit and check for leaks. You might experience that the car won't crank right away or will with some hesitation. That's because the fuel will take a bit extra time to get pumped through to the pump.
27. Take the car for a quick spin, park, pop the hood and again check for any leaks or unusual sounds.

Here's a picture of all the tools the original poster of the photos used in the procedure



Here's a picture of the tools I ended up using



NOTES: