Fuel Pump Testing and Replacement Procedures (aka Follow this now and NEVER post a failure "Whine")

by Dave Forgie

This DIY contains two parts: 1) Fuel pump testing and 2) Fuel pump replacement

NOTE: The author takes **NO** responsibility for the safety of these procedures. The user should take all necessary precautions to prevent explosions or contact of unprotected skin with gasoline. Wear suitable protective gear including vapour canister face masks and elbow length fuel resistant gloves and use non-sparking tools and lights. If you are not comfortable with these precautions, the job is best done by a professional.

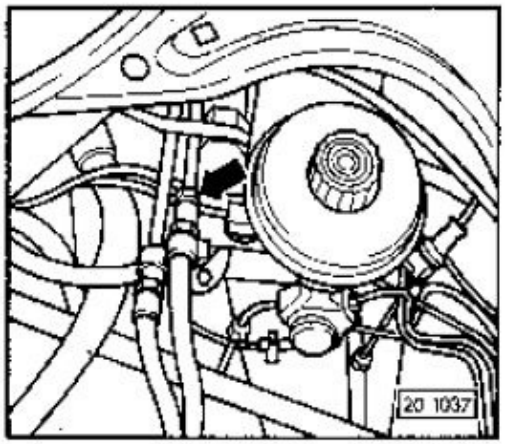
1) **Fuel Pump Testing:**

Quick fuel pump function test - for those that might be needing one. Posted by: UrS4boy on 2005-10-27 08:16:03

If you have starting problems and don't know whether its the cam position sensor or the fuel pump, you can at least confirm that it is or isn't the fuel pump. Sean Douglas (quattro20v) and I used this technique to test our fuel pumps for delivery rates before we developed the fuel pump relay procedure in July/Aug 2004.

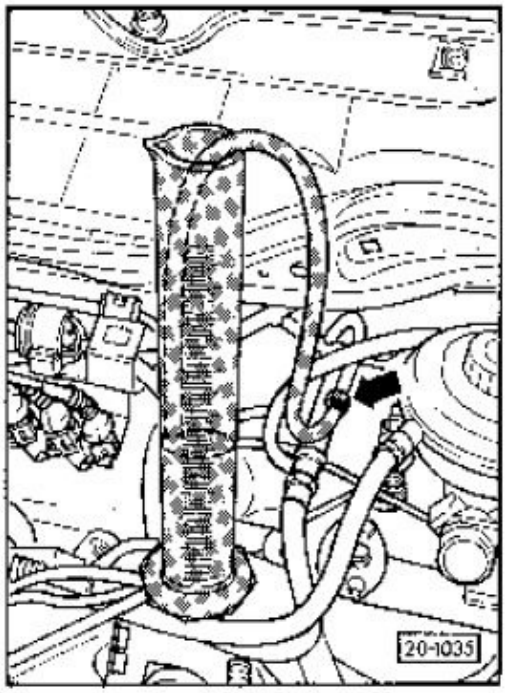
To test the fuel pump, you need a long length of wire with a spade connector at one end, an aligator clip on the other end and switch somewhere in the middle - but closer to the spade connector end. Once you have that, you need to open up (break) the inlet connection to the fuel rail (hard piping and braided hose on the driver's side (left hand drive cars)). There may be some residual pressure so only do this when the engine is cold (not a problem if you can't get it started). You need to get a four foot long hose over the connection from the fuel pump. Sean had kept a connector from an old fuel filter so we attached that to the fuel line and then put a hose on that fitting. Either way, you need to get a hose on the connection and be able to run the hose OUTSIDE OF THE CAR to, say, by the front wheel. Place the hose in a gas-compatible container. A 2 L measure cup or graduated cylinder works well.

With the test fuel line in place, pull the fuel pump fuse, No. 17, from the left hand side dash end fuse panel. Stick the spade end of the wire in the right hand side (rear-most) female fuse connector. With the switch in the off position, connect the alligator clip end of the wire to the + post on the right hand cowl side of the engine compartment. With the hose firmly in place in the measuring receptacle, turn the switch on for 15 seconds. Then turn it off. At 12v, the fuel pump should have delivered about 675 mL of fuel in that time (Reference - Pg C20-18 in the Bentley). If you got less, or none, your fuel pump is bad or weak and you need to replace the pump. SEE DIAGRAM ON NEXT PAGE

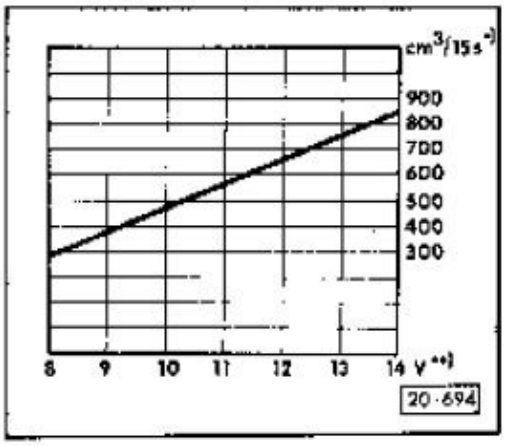


Checking feed rate

◀ - Unscrew supply pipe (upper pipe) -arrow-.



◀ - Attach hose to supply pipe and hold in measuring glass.



- Operate remote control V.A.G 1348/3 A for 15 seconds (hold down button).

◀ - Compare measured quantity with specified values for minimum feed rate in graph.

* Minimum feed rate measured at return pipe is cm³/15 sec.

** Voltage at fuel pump with engine stopped and pump running (approx. 2 V below battery voltage).

2) Fuel Pump Replacement

Here is the fuel pump in its home, a plastic basket in the trunk. Getting there and getting it out requires a few steps.

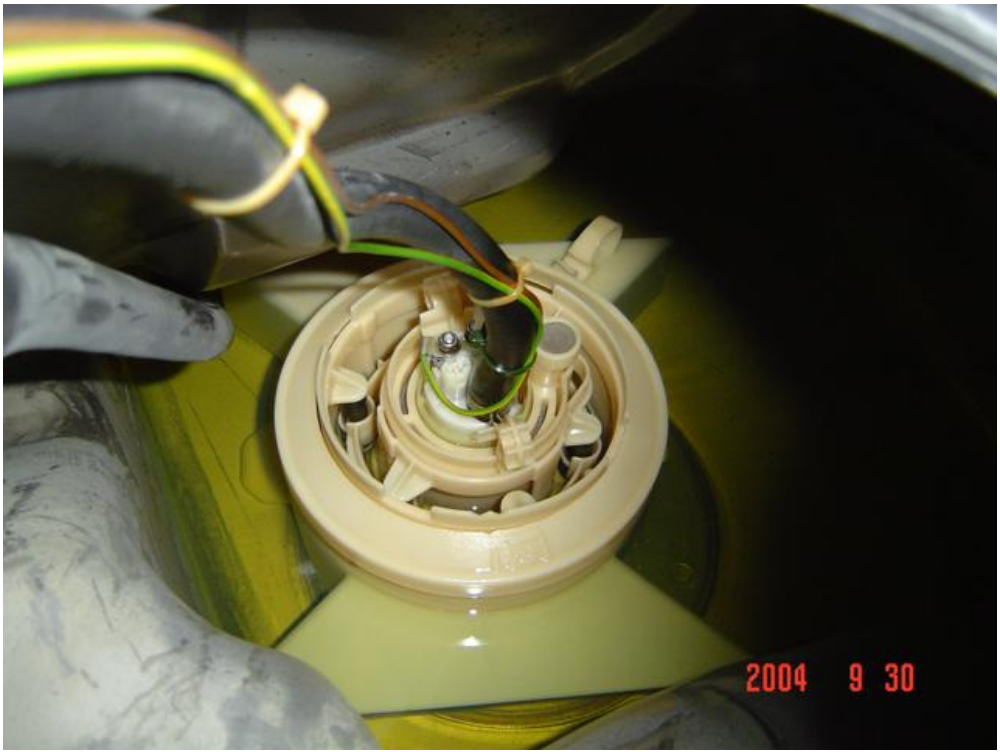


Photo courtesy of Bob Myers of Chips-Ur-S.com

If you don't heed my advice and replace your fuel pump if it is the original and you have over 100,000 miles on your S-car, PLEASE don't post to the forum that your fuel pump failed. Of course it did. There was no doubt that it would fail. When was the question and you didn't take matters into your own hands. Don't whine about it to the list. (Please).

Here is the procedure (Note: all the usual YMMV, caveats, no responsibility for errors or omissions, etc. Use your head. Don't smoke, Wear sunscreen. Floss, etc.):

1. Obtain a new fuel pump (PN 8A0906091G) and a new fuel filter (complete with two new copper crush washers). The replacement fuel pumps are either Siemens-VDO (typical OEM supplier), Bosch (sometimes the OEM supplier) or Pierburg (a reasonably reputable aftermarket supplier). Sources of these fuel pumps include, S-cars.org, SJM Autotechnik, Blaufuernuegen, the Parts Connection, FAP99, Arizona Autohauz, Bimmerparts, VM Autohaus, etc. and the dealerships.

2. If the car is still running, get the fuel level down until the 15 L "Reserve" warning light comes on, and then some. Otherwise, siphon the tank as dry as possible (save the fuel) or use the fuel pump testing technique to run the pump and draw down the fuel level (be careful, use proper container, don’t smoke, etc)

3. Run the engine and pull Fuse No. 17 (in the drivers side dash end panel) while it is running. That should help to empty the fuel lines.

4. Change the fuel filter. Crack open the two connections slowly. Drain whatever fuel comes out into something safe (I used a plastic container). Use the new copper crush washers when installing the new filter.

5. Empty your trunk, including the carpet on the hump (leave the main bottom carpet in - you will be living in here for a few hours). OR, if you want, remove the bottom carpet and the panel above the spare. Then remove the spare. This creates a space for you to sit right in the trunk. Either way, with the carpet off the hump, you will then be looking at this:

6. Remove the three screws in the cover plate and remove the cover plate:

7. Disconnect the wire connections (NOTE: FUSE 17 should still be out of the fuse panel)..

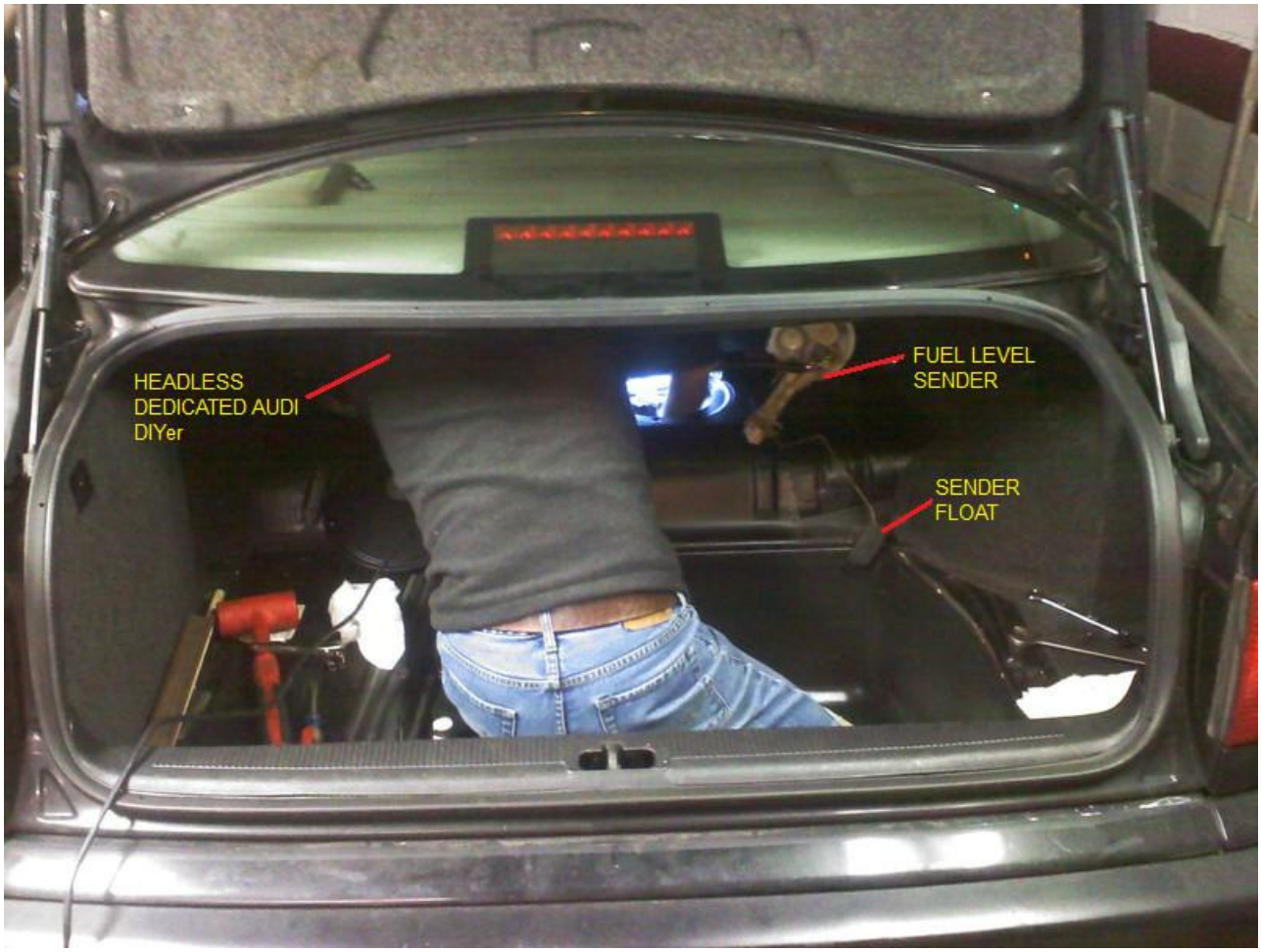
8. Remove the retaining ring. Either use the correct VAG tool or a piece of wood and a rubber or plastic mallet. DO NOT USE METAL THINGS. They may cause a spark and you may burn yourself to death (not pretty). If this scares you, stop and let a trained mechanic do the job.

9. Disconnect the fuel banjo line. You need two wrenches to do this: one to hold the fitting and one to turn the banjo nut (anti-clockwise). IF you HAVEN'T followed the procedures above, the lines will still be pressurized and you will get fuel in your face. IF you have followed the above procedures, you still might get some dripping. Blot these up ASAP and get the cloths or papertowels out of the car ASAP.

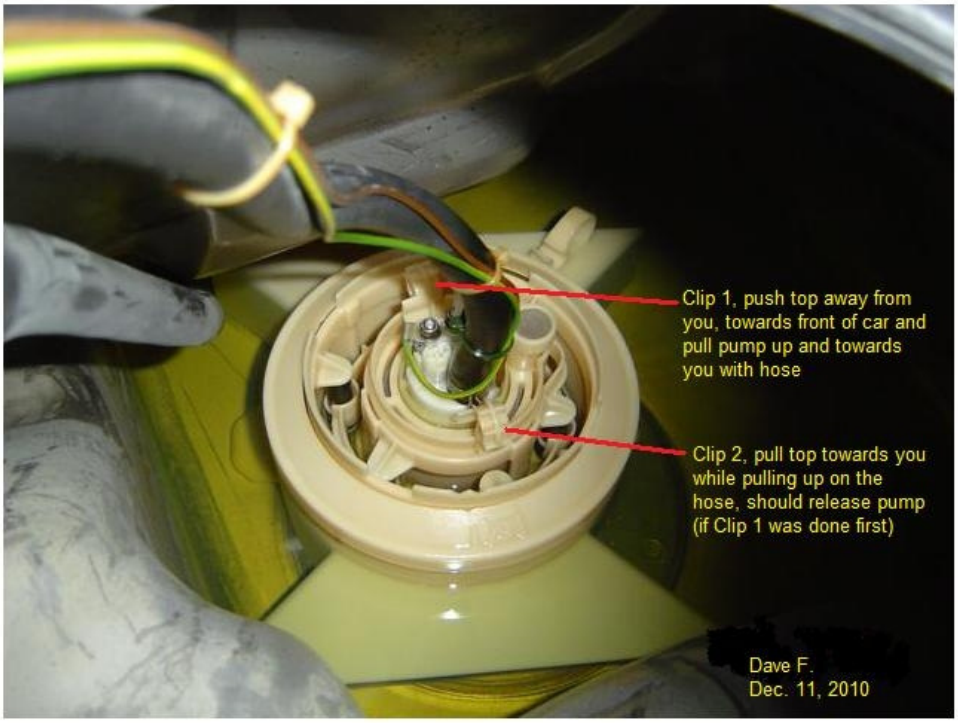
10. Pull the fuel level sender assembly out. PAY CAREFUL ATTENTION as to the orientation of everything: The upper plastic plate, the hoses, the wires, etc. You need to be able to get this back in without hanging the fuel level float up in either the fuel hoses or the wires to the fuel pump. Here is the sender coming out (note the banjo fitting tucked out of the way):

NOTE: There is no reason to remove any of the hoses or wires connected to the fuel level sender at this point. Just be careful with the sender as you pull it out. Remember to check the orientation of everything so you don't re-install it incorrectly later.

11. Lay the sender assembly down, carefully (don't bend the float arm) close by. This could be on the hump, either side of the opening. This photo shows it to the right of the opening. Note that the dedicated DIYer is working in the empty spare tire well (as noted as an option in Point 5):

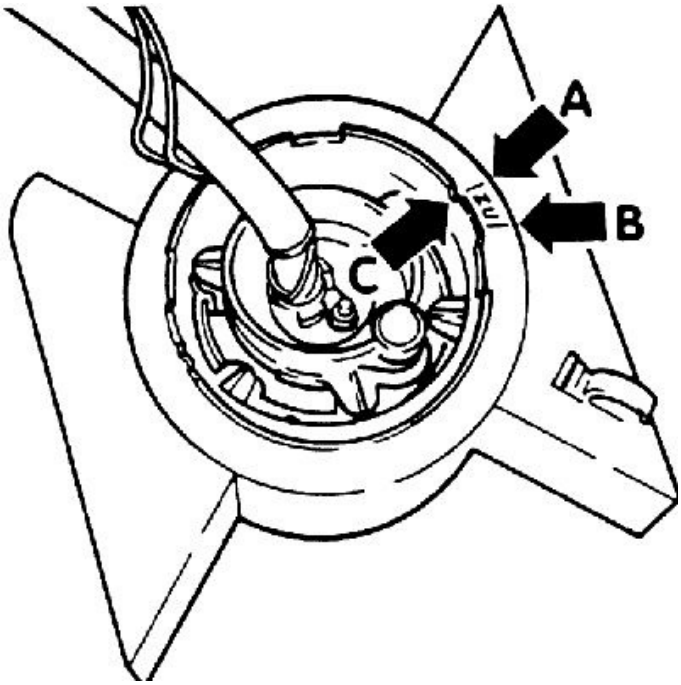


12. Remove the fuel pump or basket from the tank. To remove the fuel pump, wearing appropriate fuel-resistant elbow gloves, reach in, to the fuel tank and either use the VAG tool to loosen (anti-clockwise) the fuel pump retaining basket OR unclip the fuel pump from the basket. Remember how everything is oriented. See photo. There are two clips one at 5 o'clock and one at 11 o'clock. You can only get one arm in the hole so do one clip at a time, eg. back and then front, lifting/twisting the fuel pump a bit, and then the other clip. Here is a photo with hints to remove the pump from the basket:



(Unlabeled base photo courtesy of Bob Meyers of Chips-Ur-S.com)

If you want to remove the basket (e.g. to clean it out, or to replace it with a 60mm diameter basket during a Bosch 005 or 044 installation) it is a little more involved. To do remove the entire basket, you need to rotate the basket about 15 mm in an anticlockwise direction (i.e. from C at B to C at A) as shown here:

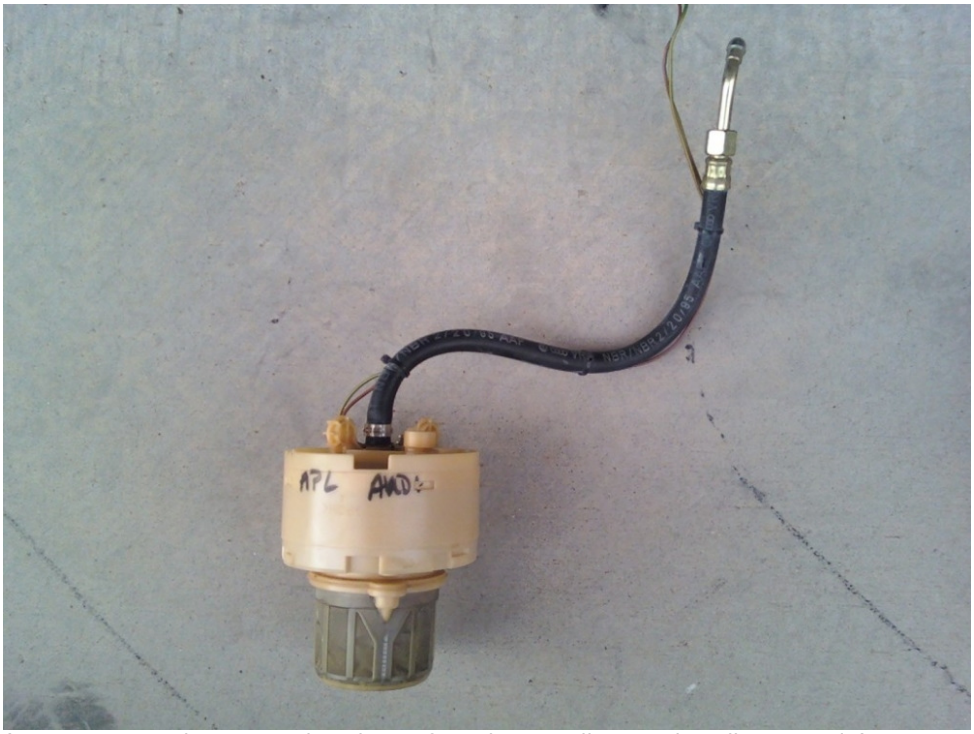


There is a special tool to do this, the 3214. These allowed the pump to remain in the basket while the basket is removed. The only

one I have ever seen was made of plastic by Matra (see photo below). However, they were weak and so prone to breakage Samstag Sales stopped selling them.

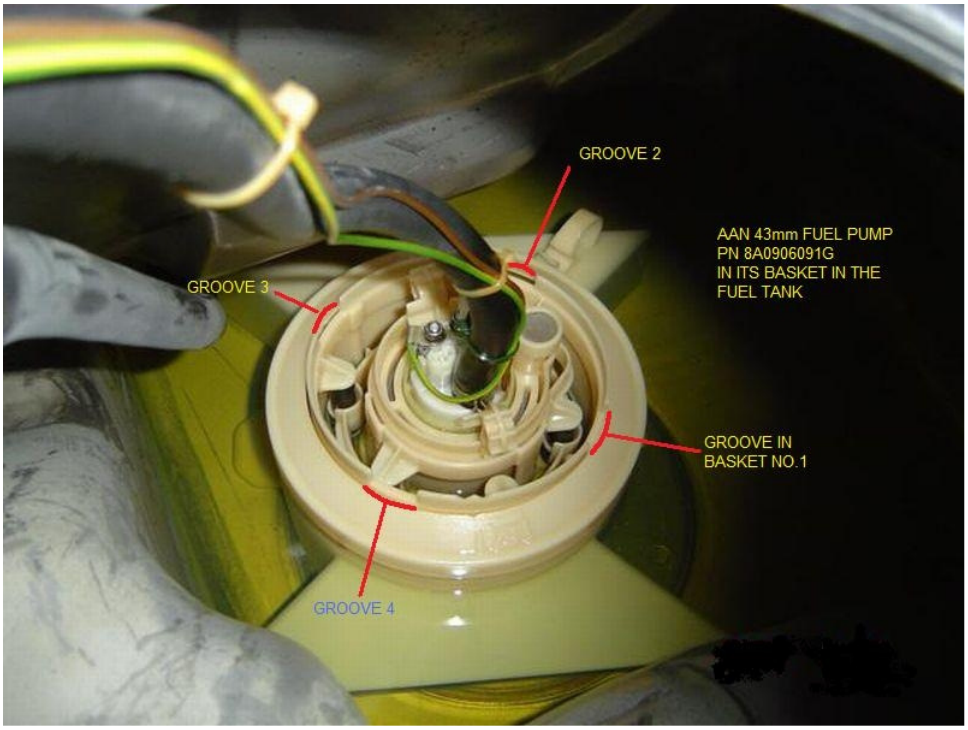
This photo from SJM Autotechnik shows how the 3214 fits into the edge of the basket (photo obviously taken AFTER basket removal) (ref: http://www.sjmautotechnik.com/trouble_shooting/fuelpump.htm#early200)

If you did use a 3214 to get the pump and basket out, the assembly would look like this:



(I am not sure where I got this photo, if you know, tell me and I will give credit)

If you don't have a working 3214 and you need the basket out, you can *try* using the ends of a set of pliers in two of the four grooves in the edge basket to turn it anticlockwise.



(Unlabeled base photo courtesy of Bob Meyers of Chips-Ur-S.com)

Or you can fabricate something to fit in the grooves and give you enough purchase to turn the basket (they don't want to turn having been there so long). I have seen "tools" made of wood. This morning I saw this one on the S2 forum posted by "Trankelstein": piece of plastic plumbing pipe with enough diameter (4" dia?) to clear the basket (pump out), four bolts to fit into the four grooves and a bolt across the top for a handle so you can twist the tool and the basket. I thought it was very clever. YMMV.

Photo Courtesy of "Trankelstein" of Stockholm, Sweden.

13. Disconnect all the fuel pump wires and hoses and install them on the new fuel pump. The Bosch fuel pump will require cutting off the existing ring terminals and crimping on the Bosch clip-in connectors (actually a better system). If there is a "safety" plug in the pump inlet (to keep it clean before installation), REMOVE IT. Install any filters that were on the old pump and/or came with the new pump.

14. Reinstall the fuel pump in the basket (it should "click" in. Install the basket (clockwise) IF you removed it.

15. Reinstall the sender unit making sure that all the wires and hoses are not going to hang up the wire sender arm.

16. Reinstall the banjo fitting. Use a new crush washer(s).

17. Reinstall the retaining ring.

18. Reinstall the wiring connections on the top plate (if removed).

19. Reinstall Fuse 17.

20. Start the car (it will take a bit of cranking time to fill the fuel lines again, don't panic).

21. If everything works, then reinstall the cover plate, etc. If there are problems, you will need to go back in and re-check your steps.

22. Enjoy some peace of mind

Dave Forgie, aka the Librarian – Revised Sept 19, 2011
93 CF, RS2'd, MRC Stg 3, TDS-1, Apikol FMIC, Eibach/Bilstein, Big Blacks, relayed FP