2.0 TFSI Inlet Manifold Removal, Valve Cleaning & Injector Replacement (Transverse Engine)
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Included in this ‘How To’ guide:
A) Manifold Removal Procedure
B) Cylinder Valve Cleaning
C) Injector Removal, Assembly & Replacement
D) RS4 Valve Installation

Parts Required:

Tools & Materials
A decent socket set
T10133 Injector removal tool (Laser equivalent tool ‘Part No.5069’)
I used a copy of Elsawin, and it was invaluable throughout this process
A) Manifold Removal Procedure
Intake manifold: Assembly Overview

1 - 10 Nm
2 - Hose clamp
3 - 3 Nm
4 - Head bolts, 10 Nm
5 - Shutter (Replace)
6 - Intake manifold
7 - Coupling rod
8 - Intake manifold flap motor -V157- with intake manifold flap potentiometer -G336
9 - 7 Nm
10 - to active carbon reservoir
11 - Flexible tube
12 - Solenoid valve 1 for active carbon filter -N80
13 - Flexible tube
14 - Double non-return valve
15 - Intake manifold support
16 - 25 Nm
17 - 10 Nm
18 - Bonded rubber bush
19 - Throttle valve control mechanism -J338
20 - 7 Nm
21 - Oil seal (Replace if damaged)
22 - 5 Nm
23 - Intake air temperature sender -G42
24 - 10 Nm

1) Jack the car up and safely support with an axle stand on both sides of the car. Remove the engine under tray (Torx bolts)

2) Disconnect fuel pressure sensor on top of fuel pump (start the car and let idle for 10-15 seconds to lower fuel pressure from pump and rail). I also used the bleed valve on the fuel pump to double check all the pressure had been removed, you’ll need to put some rag under it to collect any fuel that is released.

3) Safely disconnect the battery (to avoid the fuel pump automatically activating when the driver’s door is opened) Remove the engine cover/air filter assembly if you have a standard air intake
4) Remove the DV intake return hose

Loosen the bolts and clamps (see arrows), and remove the air pipe with the hose pulling downwards. This is a bit tight, so I found removing the entire DV assembly (inc. hose) made it easier to get the charge pipe down between the engine and the fans. (To remove the DV you will need to undo the DV bracket screw, and use a set of grips to release the spring clip on the charge pipe hose connection and remove the DV assembly and rubber hose).

5) Remove throttle body inlet hose
6) Unplug the air intake temperature sensor and the throttle body switches.

7) Loosen the four bolts of the throttle valve control unit (item 19 in the assembly overview at the start of the guide), and remove it. This is quite fiddly, I managed to access the rear bolts using a small hinged mechanics (dentist style) mirror to see behind the throttle body.
8) Disconnect sensor on the intake manifold flap motor control unit.

**WARNING**
Fuel supply pipes are pressurised. Wear safety goggles and appropriate clothing to avoid injury and contact with skin. Before loosening hose connections, wrap a cloth around the connection. Then eliminate the pressure by carefully separating the pipe. **YOU WILL GET FUEL SPILLAGE!**

9) Disconnect the two hoses from the solid metal pipes on the top of the manifold, put some rag under the connections as you will get a bit of fuel loss (I put a bolt in the fuel feed line to prevent any unwanted fuel spillage).
10) Disconnect the solid pipe and rubber hose from the bottom of the fuel pump. (I didn’t find I needed to remove the fuel pump).

11) Remove 1 T-30 screw located left of throttle body that holds the coolant line harness to the manifold. Doing this will make it easier to release the dip stick guide assembly.

12) Remove the dip stick. Unscrew the dip stick assembly and solid pipe fixing bolt from the manifold using a 4mm socket. This will allow you to release the securing of the dip stick guide assembly and get some movement on it to wiggle it off (getting this off will need some perseverance as it is fiddly and a little tight to get your hands in to get adequate grip on it, but it does come off eventually).
13) Once the dip stick guide assembly is out of the way you can access the manifold support fixings. (Use a long socketshaft to reach the lower manifold support bolt. Unplug the fuel pressure sender switch on the underside of the manifold.
14) Disconnect the plug from the active carbon filter solenoid valve on the right side of the inlet manifold.

15) Remove the compression clip on the hose and pull the purge valve out. You’ll need to replace the clip with a new one; I brought a jubilee clip to put back in its place.

16) Disconnect the two vacuum hoses from the cylinder head cover and the PCV head cover connection (see arrows below). Disconnect the other end of the PCV vacuum hose and remove it, noting the routing of the hose for re-installation.

17) Loosen all of the bolts on the manifold (5 no. bolts on the upper fixings and 2 no. bolts at the bottom with 2 no. nuts on the lower out side edges, that fix to guide threads installed into the head).

Using a small ¼” drive T-30 Torx socket, remove:

- the 5 upper bolts fastening the intake manifold to the cylinder head.
- Two additional lower bolts are accessible just above and to the left and right of the Throttle Control Module. An additional two M6 nuts are located on the underside
Completely remove all of the nuts and bolts (I used a bit of cardboard to safely secure and identify each of the nuts and bolts, using two M6 bolts to temporarily fix the nuts to the card).

18) Now you are ready to remove the manifold. Put some old cardboard or rags towels on the floor under the car if you would be concerned with spilling fuel, I would suggest putting some rag or paper towel underneath the inlet manifold, as when I removed my manifold I lost some remaining fuel (from the fuel rail) down the front of the head/engine. (The fuel will evaporate but it will stop the majority of the fuel going over the engine and floor). Gently guide the intake manifold / fuel rail assembly off the cylinder head on the studs. Be prepared for the remaining fuel in the fuel rail to drain as you remove the intake manifold / fuel rail assembly. (I found that it needed a decent firm tug at either end of the manifold to release it).

ENSURE THERE IS NO NEARBY SOURCE OF FLAME OR SPARK!!
There is a possibility that some or all of the injectors will come out of their fitted location and remain fixed to the manifold fuel rail. (When I removed mine all of the injectors stayed in place).

Fully removed intake:

That’s It! The manifold is now removed. (Replacement is the reverse of the removal process).
B) Cylinder Valve Cleaning
Wear protective mask and gloves at all times. The Carb cleaner is very strong and harmful to inhale and touch!! Use caution and common sense.
1) Put tape and rag over your injectors to prevent contamination from the cleaner fluid (unless you’ve decided to remove the injectors before the cleaning then just block up the open injector holes with rag).

The Carb cleaner works very well. It does most of the work for you. You just have to be patient mopping up the carbon liquid it creates in your intake ports.

2) Remove the 4 intake inserts and soak in Carb cleaner. Use rag/small scraper/wire brushes if necessary to scrape off the excessive amounts of carbon.
3) Use rags to wipe away the loose carbon. Keep applying cleaner to areas that have the most build-up. (Once I’d cleaned them I used a bit of metal polish to bring them up looking good, before spraying a little more Carb cleaner on the remove any polish residue). The picture on the right above shows two inserts; the insert on the right is after soaking, and the insert on the left is after polishing and re-cleaning.
4) Hand turn the engine (clockwise) with a socket & wrench using the crank bolt on cambelt side of the engine (access from beneath the car) so it closes off valves on the intake side, to allow the cleaning of the valves without the residue and dirty Carb cleaner to fall into the
cylinder (TIP: If you remove the spark plugs it will make it a lot easier to rotate the engine by hand).

5) Once the valves are in their closed position, spray Carb cleaner onto each pair of valves. Let it soak for 10 minutes or so then scrape with wire bottle brushes/cheap firm tooth brush to loosen carbon.

6) Use rags to soak up Carb cleaner from each valve port. Use picks/sacrificial screwdrivers (blunted end to prevent damage) to move rags between the front and back of valves thoroughly cleaning all sides and “mopping” up the dirty cleaner. Keep repeating until the valves are shiny silver.

7) Use a vacuum cleaner to suck out the carbon bits. Use a compressed air can to assist with cleaning. Be careful not get bits of carbon in your eyes.

After shot:
C) Injector Removal, Assembly & Replacement

1) Unplug the 4no. electrical connectors from the injectors

2) Gently grasp injector and remove from the cylinder head. If the injector will not remove easily (which mine didn’t), you will have to use an FSI Fuel Injector Removal and Installation tool set T10133 to facilitate safe removal of the fuel injector. (I purchased the Laser equivalent tool ‘Part No.5069’ for approx. £100 (cost as at Feb 2013) If the injector will not remove easily, you will need to bend up the two little tabs that retain the metal support ring. Many times these tabs will break during this process (all 4 of mine snapped). Ensure no debris enters the intake port.

3) Remove the metal support ring from the injectors
4) Using the slide hammer from the kit T10133/3 and puller T10133/2, guide the puller into the groove on the fuel injector, and slide hammer the injector out of the cylinder head (no need to be heavy handed it doesn’t take much to release the injector).

5) Using a pipe brush (I got one for a couple of quid from my local hardware store), clean out the fuel injector bores in the cylinder head to ensure a clean surface for the Teflon injector seal. Clean the brush with brake parts or carburetor cleaner between cylinders. I also used a cotton wool bud to get out any remaining bits where the injector seats.
Injector Assembly
Injector: parts
1 - Radial compensator (replace if damaged)
2 - Replace the combustion chamber seal (Teflon).
   When fitting, the seal must not be lubricated
   with any lubricant whatsoever.
3 - Injector seal groove
4 - Support washer (replace)
5 - O-ring (replace, moisten slightly with clean engine
   oil when re-fitting injector)
6 - Pressure rings

Instruction for Item No.2:
Carefully remove the teflon ring using a suitable
   tool (e.g., cut it open using a razor blade or score with
   a small screwdriver and remove by pulling
   forward). When doing so, be careful not to damage the
   groove or the peripheral reinforcement at the
   bottom. Note: If the groove is damaged, the injector
   must be replaced. Carefully clean the injector around
   the seal (arrowed). Carefully remove the
   sediments (cinders) from the end of the injector.
   Carefully cut the seal with a knife. Clean the seal
   groove.

Put a new Teflon seal (1) on the mounting cone
   tool (T10133/5) and fit onto the injector (2).
Move the Teflon seal with the mounting bush (T10133/6) towards the mounting cone (T10133/5) until the Teflon seal fits into the groove on the seal. Do not use any type of lubricant when doing so.

Note: The Teflon seal expands when inserted into the injector. The ring should then be unstretched once it is on. This is done in two steps. The procedure is described below:

Stage 1 of calibrating (resetting) the Teflon ring is done with the calibration bushing (T10133/7).

Move the calibration tool (T10133/7) case over the injection nozzle to a complete stop, once in place rotate the tool left and right, exerting light pressure.

Stage 2 of calibrating (resetting) the Teflon ring is done with the calibration bushing (T10133/8).

Using tool T10133/8 follow the same procedure as above.

What these two stages do is ‘reset’ the Teflon seal back to its original size.

Remove the calibrating sleeve (T10133/8), turning it again in the opposite direction.

Replace the O-ring of the injector and the support washer.
Replace the support ring (1) on the injector, and fit the radial compensator (2) onto the support ring. Note: Do not apply grease or oil to the Teflon seal of the injector. When mounting the injector, there must be no oil or cleaning products in the cylinder head openings. Re-fit the injector(s).

Put a light film of engine oil on the blue injector fuel rail seal (I did this once mine were fitted into the cylinder head).

MAKE SURE NO OILS OR GREASE CONTAMINATES THE WHITE TEFLOM COMBUSTION CHAMBER SEAL IF ITS BEING APPLIED TO THE BLUE SEAL BEFORE THE INJECTOR IS FITTED.
Using T10133/9 assembly tool, guide the fuel injector into the bore in the cylinder head. Make sure the ridge at the base of the electrical connector portion of the fuel injector seats into the register in the cylinder head.

Note: You should NOT be able to rotate the fuel injector more than 5 degrees if seated properly.

Re-attach the electrical connectors for the fuel injectors as pictured.
D) RS4 Valve Installation
I decided to fit the RS4 fuel regulating valve whilst the manifold was off and access was improved, this is located on the underside of the inlet manifold.

To allow the removal of the valve I loosened off the solid pipe fixing and the rubber support that holds the solid pipe to the under side of the inlet manifold. Then it’s a 17mm socket or spanner to remove the valve itself. As its hard to get a socket/torque wrench in the tight space I would recommend getting a pen and marking a line across the existing valve and the fuel rail, so that when the new RS4 version is fitted you have an idea the orientation that the valve should be and how much thread is left showing once tightened (as the valve bodies and threads are the exact same size).