

Job Summary

- Job difficulty – if you can be careful/patient with plastic parts and you know how to remove bolts this job is not that difficult. It also helps if you have small hands!
- The job does take some time to complete – I would guess 2.5hrs if you are not replacing the ac clutch and maybe 3.5 to 4hrs if you are.
- I completed this job at 180,000km as I heard a noise in the area in and around the tensioner. I did discuss the job with my local dealership and they suggested NOT replacing the alternator coupler nor the water pump coupler. They did however suggest replacing the AC clutch as they were aware of a few that had failed in and around that mileage.
- Upon removal, the belt looked to be well worn, the tensioner spun very freely and appears to have some lateral movement and the idler pulley spun very freely but seemed fine.
- The job involves keeping track of several bolts of various sizes and lengths. I grabbed some Ziplocs from the kitchen and used separate bags for each component removed.

Parts

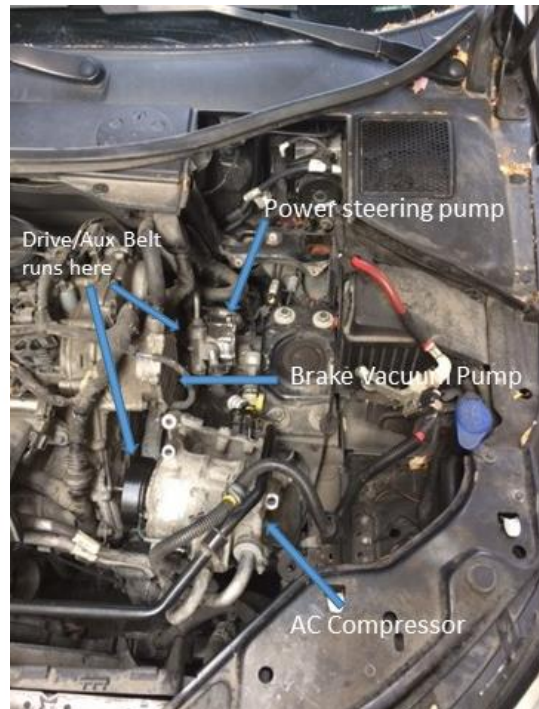
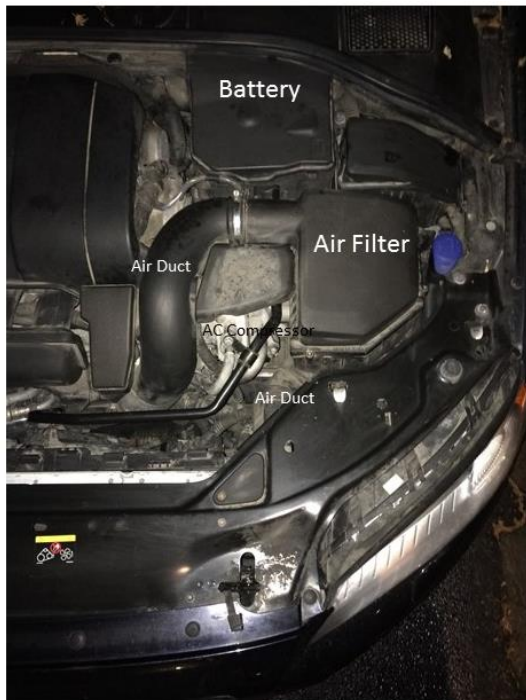
- Tensioner
- Idler pulley
- Water pump alignment pin
- AC clutch (optional)
- Excluded: alternator coupler, water pump coupler





Required Tools

- Sockets: 7mm, 8mm, 10mm, 13mm, and 14mm
- Flexhead ratchet 3/8"
- 3/8" Extensions small, medium and long
- 3/8" universal joint
- Impact wrench (optional)
- Lots of rubber gloves
- Pick or small flathead screwdriver
- Phillips screw driver
- Torx bits T25 and T40
- Feeler gauges that you don't mind bending (0.04mm is ideal) – only if you are replacing compressor clutch
- Torque wrench covering 5-50Nm (optional)
- Ziploc bags or other method of keeping tracks of nuts, bolts, screw



Step 1: Remove plastic air duct

- Loosen jubilee clip connecting pipe to air filter



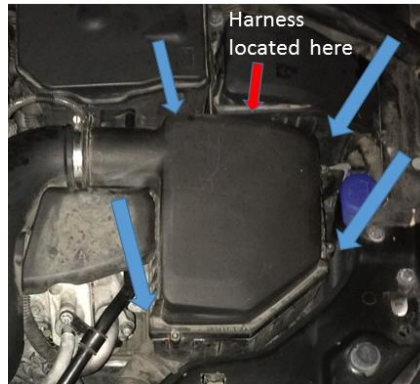
- Use extensions and 7mm socket to loosen jubilee clip in behind the radiator



- Carefully pull the pipe towards the driver's side twisting to help dislodge the pipe from its connection in behind the radiator. I had most success using more twisting and less pulling if that makes any sense. This part does require patience. Be cautious not to pull on any of the looser parts of the pipe as you manhandle it out. Set aside.

Step 2: Remove Air Filter and Housing

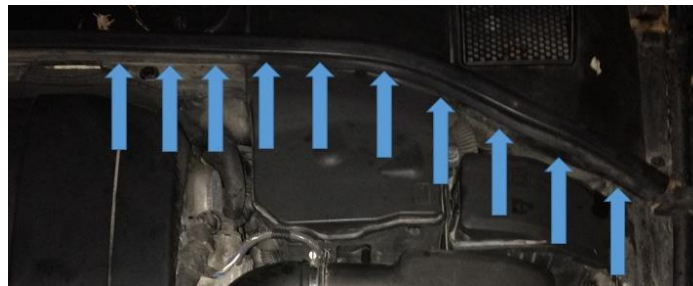
- Remove the 4 torx screws at each corner of the air filter cover



- Pull cover off and set it and the air filter aside
- Unplug cable harness on side of housing and detach from housing – you may need to cut the tie-wrap that holds it in place
- Pull the air filter base upwards while wiggling slightly to dislodge it from its two rubber mounts and remove it from the vehicle and set aside. Use your left hand to carefully pull the plastic duct out from near the radiator as you pull the base upwards.

Step 3: Remove Battery and support

- Remove the rubber weatherproofing band from the driver's side in past the battery compartment



- Remove the first half of the battery cover by carefully prying the two clips out of their mounts. Be careful: these break easily! Lift the panel upwards and out.



- Remove the second half of the battery cover: Gently turn the plastic Phillips connector 90deg counter clockwise and lift the side nearest the Phillips screw to pry out the cover (there are clips on the other side that hold the panel in place).



- VERIFY THAT YOU HAVE DOORS UNLOCKED AS WELL AS TRUNK/HATCH IF YOU WILL REQUIRE ACCESS FROM THIS POINT FORWARD!
- Disconnect the + and – terminals of the battery (2 x 10mm nuts)
- Disconnect the battery ?aeration? nozzle at back of battery



- Loosen the single screw at the base of the battery on the passenger facing side (10mm)



- Pull + and – cables aside and remove them completely from the casing by pulling the rubber grommets right out from the casing itself.

- Remove the front-facing plate of the battery casing to aid with battery removal. There are two clips on each site that need to be carefully pried off to remove.



Detach the hood latch cable from the case itself by pulling the rubber grommet out from the battery base.

- Remove the 4 bolts at the base of the battery casing(4 x 8mm)
- Remove the battery casing and set aside

Step 4: Relieve Tensioner tension

- Tensioner is loosened using 19" wrench. Push downwards with the spanner while pushing the setting pin into the hole. Use a 3mm hex key as a pin. When the pin slides in, ease off the tension on the wrench slowly and confirm that pin is set.

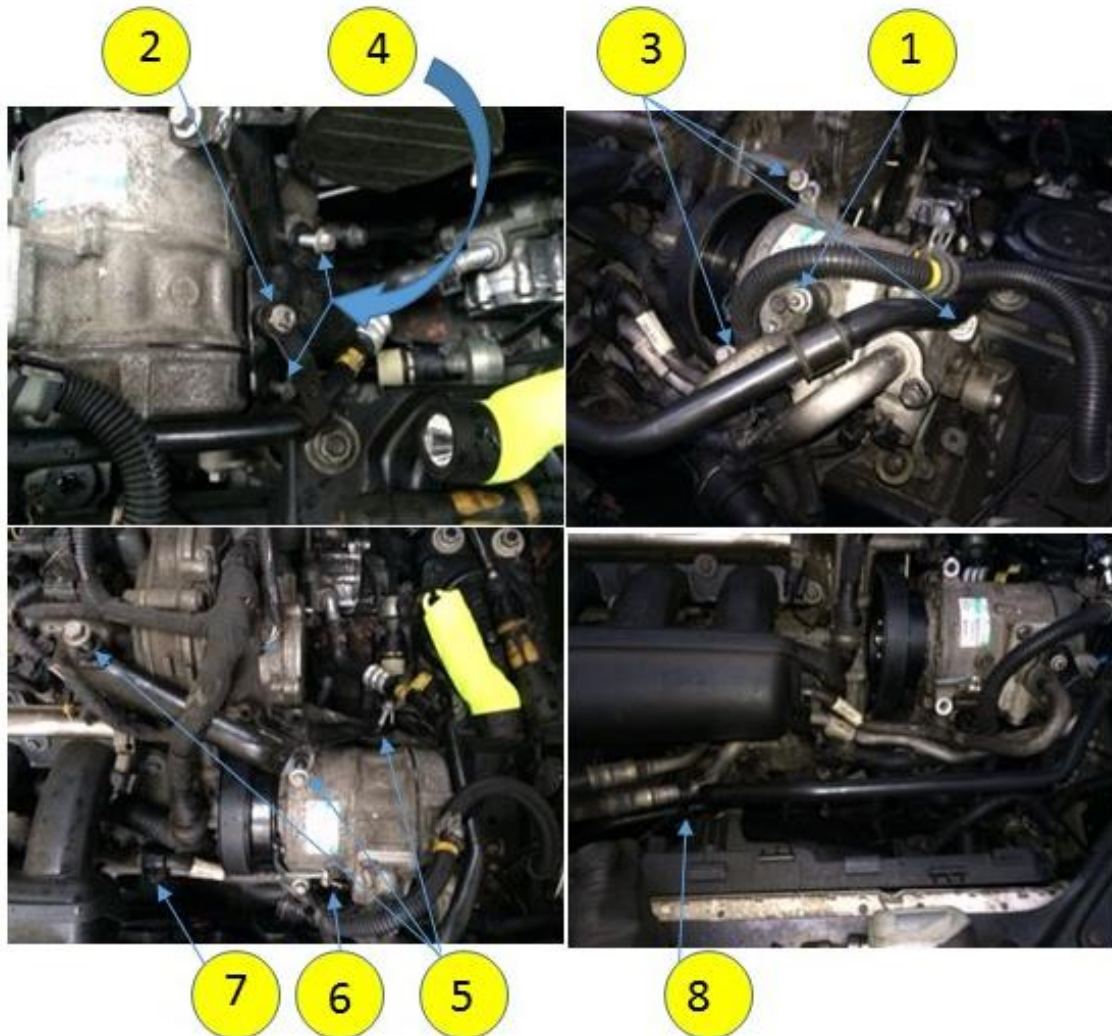


Step 5: Remove Idler Pulley

- Use a T40 torx and 3/8 ratchet to remove the idler pulley from its mount.



Step 6: Remove A/C clutch



- Loosen the M5 nut that holds the black rigid pipe in place on the top of compressor and turn the bracket 180 deg to get it out of the way (1)
- Loosen the M5 nut that holds the black rigid pipe clamp in place on the back side of the compressor and turn the bracket 180 deg to get it out of the way (2)
- Remove the three mounting bolts (10mm) (3)
Remove the black metal plate (3 x 10mm) (4)
- Remove the engine bracket (one bolt should already be removed) remaining bolts are 13mm (engine side) and 10mm (compressor side). (5)
- Remove the Phillips screw that connects the harness to the compressor. Disconnect the electrical connection to the electromagnetic clutch. The connector is difficult to reach. Sticking a small flat head screwdriver or pick into the connector housing should help dislodge it. (6)
- Remove the clamp that hold the two hoses to the engine (7)
- Release the plastic clamp further down near radiator that holds single pipe in place (8)

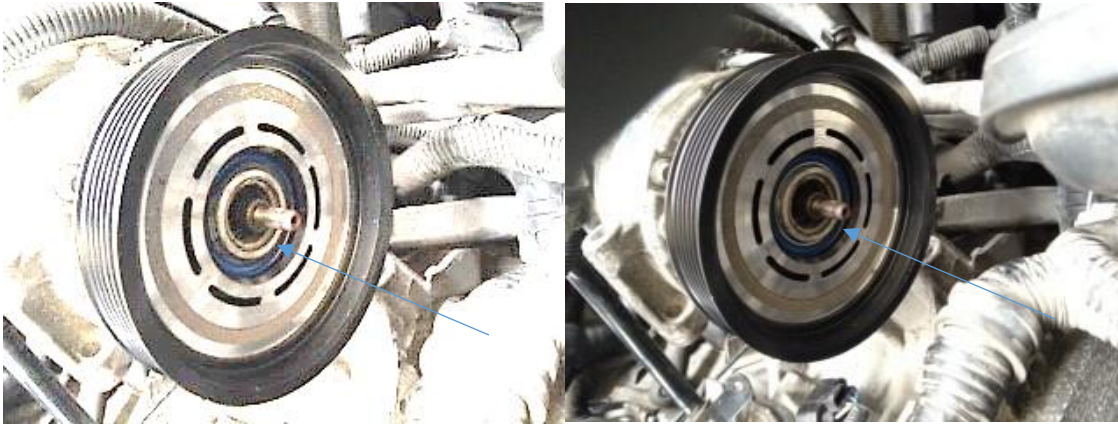
- Lift the cable harness and the black rigid metal pipe over the compressor to allow better movement of the compressor itself
- Take the belt out from behind the a/c clutch and the drive clutch (belt needs to be pulled towards the engine for the ac clutch and away from the engine for the drive clutch)
- Pull the compressor forward to gain sufficient access to the pulley face
- Use a counterhold to hold the clutch in place and (ideally) use an impact wrench and 14mm socket to remove the fastening nut. I did not have a clutch counterhold on hand so I inserted a nut and bolt into a steel rod and inserted the bolt into one of the three holes on the face of the clutch. I then leaned the rod on the socket to get some leverage. I was not able to get the bolt off with the impact tool shown in the pic. I had to take the “widow-maker” out.



- With the bolt removed you should be able to rock the clutch back and forth until it begins to yield. At that point you should be able to pull the clutch right off the spindle. Note that the pulley does not come off with the clutch face so you will need to tap/pry/lift the centre piece out by itself. REMOVE THE CLUTCH CAREFULLY TAKING NOTE OF HOW MANY SPACERS HAVE BEEN INCLUDED IN BEHIND IT. THEY ARE TINY! NOTE THAT SOME MAY COME OUT WITH THE CLUTCH AND SOME MAY REMAIN ON THE SPINDLE. Count them and take note of #.



- Remove the snap ring on the front face of the pulley using snap ring pliers, a couple of picks or a small pair of needle nose pliers. In the pics below you can see the snap ring present on the left and then the snap ring removed on the right (the new clutch is shown in the pic).



- With the snap ring removed some gentle taping on the back side of the pulley should eventually dislodge it and the bearing from the spindle.
- Remove the last snap ring to remove the electromagnetic component. You may use snap ring pliers, some picks, or a pair of needle nose pliers. I had no luck using my snap rings plyers for this ring and had to resort to using my angle needle nose pliers (see below). The lack of access and the angle did not allow me to use my 8" snap ring pliers. With the snap ring off, the component can be pulled right off.

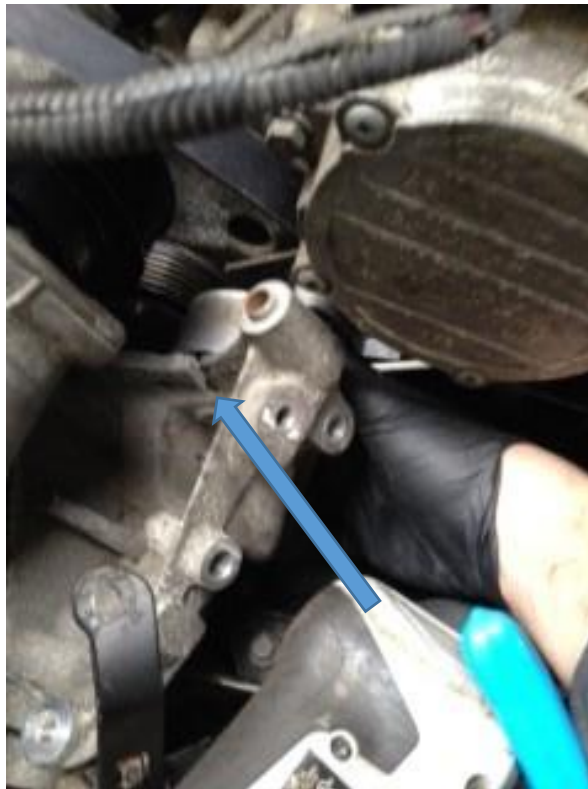


Step 7: Remove Tensioner

- Pulling the ac compressor forward will allow just enough access to the tensioner bolt just below it. Use a 10mm socket and ratchet to remove.



- Lift the tensioner slightly to dislodge the tension tab (see arrow below) from the ac mounting platform and rotate it towards back of engine bay and left to remove. Keep the bolt as the new tensioner does not come with a replacement!



Step 8: Move Power Steering Pump to Side

- Remove the black metal bracket to the left of the pump (2 x 10mm)
- Remove the two p/s pump mounting bolts on either side of the unit (2 x 10mm) – ratchet is placed over top of the right side bolt in pic on left and bolt is inserted but not tightened in centre of pic #2.



- Remove the high-pressure line retaining bolt to the right of the pump (finger is pointing to bolt in pic below)



- Remove the two bolts holding the vertical bracket in place in front of the pump – set bracket and bolts aside



- Remove the two small screws located on the face of the pulley (T25)



- Wiggle the pump while lifting it to pull it away from the engine block. You may need to press on the two plastic taps on front of pulley face to dislodge the pulley from the coupler behind it. Be cautious not to damage the pulley top face as you lift it and pull it away from engine. There is no need to create a huge amount of space here – just enough to slip the belt out sideways.
- Reach in behind the pulley and remove the alignment pin from the centre of the pulley – discard. Pin is being held by gloved hand in pic below.



- While holding the p/s pump pulley to maintain a gap with the engine block, slip the belt through the narrow opening between the coupling and the pulley to take the belt out from behind the p/s pulley. You can always cut the belt instead but it does help to fiddle with the belt you are taking out to practice to avoid nicking the one you put back in!

Step 9: Install the new AC Clutch

- Clean the threaded portion of the compressor spindle
- Install the electromagnetic device over the compressor spindle and turn it slightly until it holds in place. Ensure that the cable harness is facing the right direction. Plug the harness in and screw the retainer screw into the compressor body to affix the clutch wires. Use a tool to insert the larger snap-ring into the device and fit it snugly in place.



- Very lightly grease the bearing assembly and gently push it into place over top of the electromagnetic device. Take the second snap-ring and put it in place over top of the bearing assembly.
- Very lightly grease the notched part of the spindle. Insert the spacers onto the spindle. Use the same number of spacers as were previously installed. You will be measuring the gap later and may need more/less spacers.
- Insert the clutch onto the bearing assembly and press firmly into place.
- Verify the spacing by inserting a very thin L-shaped gap measuring gauge. Note that due to the recessed design of the clutch you will not be able to simply slip a standard feeler gauge in between the clutch and the bearing plate to measure gap. You need something that you can insert and then turn 90deg. Given that the tolerance is 0.4 to 0.8mm, use the 0.4mm measuring device to verify that the gap meets minimum spec. Insert the L in the space between the two radial rings and attempt to turn the device underneath the outside ring. If it fits snugly at various points you are probably good. If it does not fit, remove the clutch and insert another spacer. Use trial and error to get the gap as close as possible to 0.4mm but no less. Tighten the spindle nut to 24Nm using a counterhold and torque wrench.

Step 10: Loosely install belt around AC compressor, drive clutch, and power steering pulley

Step 11: Replace power steering pump alignment pin

- Reach behind the pulley and insert the replacement pin in the centre of the pulley. It should gently snap into place. Pull gently to verify that it has been properly inserted.

Step 12: Re-install the power steering pump

- While supporting the p/s pump and roughly aligning it with the coupler behind it, reach around the back of the power steering pulley and turn the black plastic coupler until the two plastic tabs align with the two holes on the pulley. Push the pulley inwards (towards the engine) until it is firmly in place. Insert and tighten the two T25 torx screws onto the pulley to affix it to the coupling.
- Insert and tighten the two 10mm mounting bolts to 24Nm to secure pump to engine. Note that there is a ?breather pipe? clamped to the frame just across from the RHS bolt. You may inadvertently displace it when you are gaining access to the bolt. Be sure to put it back in place. See pic below.



- Secure the high pressure hose to the mount using the M5 bolt and an 8mm spanner wrench (ideally a ratchet wrench) and tighten to 5Nm.
- Re-install the front bracket and tighten the two 10mm bolts to roughly 24Nm...good luck getting a torque wrench down there! A 10mm spanner will do the trick here but you will be much better off with a ratcheting spanner!
- Re-install the LHS bracket and tighten the two bolts to 24Nm.

Step 13: Install tensioner

- Place ac compressor on its three mount points but do not bolt in place
- Verify that the belt is correctly set in place on the power steering pump, the drive clutch and the ac compressor.
- Slip the tensioner in behind the ac compressor making sure that the tension tab is inserted into the notch on the back of the ac support bracket. The tensioner must be installed with the belt OVER the tensioner pulley. It may be necessary to move the compressor forward slightly to view the notch before putting the tensioner in place.
- Once the tensioner is in place, remove the ac compressor from its mounting points and pull it forward to expose the hole for the tensioner mounting bolt. You should be able to move it just enough to gain limited access to the bolt.
- Using a 10mm socket, a universal joint and an extension, tighten the bolt to 24Nm

- Place the ac compressor back on its mounting points. Do not release pressure on the tensioner yet.

Step 14: Install Idler Pulley

- Mount the idler pulley onto its mount using a torx 40 bit (24Nm).

Step 15: Re-install AC Compressor & Engine Bracket

- Place the ac compressor on its three mounting points
- Install the engine bracket (1 x 13mm bolt (50Nm) and 2 x 10mm bolt (24Nm)
- Install the black metal plate (3 x 10mm, 24Nm)
- Install the two remaining mounting bolts (10mm 24Nm)
- Do not reinstall the two M5 nuts which fasten the rigid black pipe in place yet

Step 16: Re-install the Battery and Case

- Re-install in reverse order

Step 17: Re-install the Air Filter Assembly

- Inspect area to make sure no tools have been stored in the space in and around the air filter
- Install the base but do not install the cover until after the next step

Step 18: Re-install the Plastic Hose

- Carefully place the hose back down in front of the engine. Use one hand to rotate the assembly and the other to firmly push the hose into place. Verify that the pipe is firmly attached **ALL THE WAY AROUND** at the bottom connection. *An air gap at this location could damage downstream components.*
- Press the ac pipes back into the clamp down near the radiator
- Re-install the black plastic clamp that holds the rigid ac hoses to the front of the engine
- Re-install the clamp and M5 nut on top of the compressor (10mm/5Nm)
- Re-install the clamp on the wire harness and the M5 nut on the rear of the compressor
- Tighten the jubilee clips at both ends of the plastic hose assembly

Step 19: Verify that all tools have been removed from the engine bay and start 'er up!