BMW 6 cylinder dual vanos piston seal repair fix process instructions

by **x8rltd** on May 23, 2014

Intro: BMW 6 cylinder dual vanos piston seal repair fix process instructions

If you drive a BMW 6 cylinder vehicle 1993-2006 your Vanos (variable valve timing unit) is most likely failing. The seals ?tted to the pistons within the Vanos unit wear prematurely. These seals are constructed of poor quality Buna rubber which is not suited to the elevated temperatures of their location; this leads to the seals failing and ultimately the Vanos unit failing.

Symptoms of this failure include: overall loss of power and torque particularly in the lower RPM range, loss of power with air conditioning on, louder idle, increased fuel consumption and difficult cold weather starts and even stalls. BMW does not provide replacement seals, they do provide complete rebuilt units at vast expense but these again are ?tted with the same poor quality Buna rubber seals.

By installing our improved design Viton seals and PTFE rings you will restore your Vanos unit to full health. Our seals are specifically designed for the environment in which they are fitted, well suited to the vast temperature range of the Vanos unit, constructed from improved materials designed to last.

Our seals and piston rings have undergone extensive testing and will not deteriorate over time like the OEM part, designed to last the lifetime of your vehicle.

Our product will restore your Vanos unit resolving the common symptoms which occur with failure noted above.

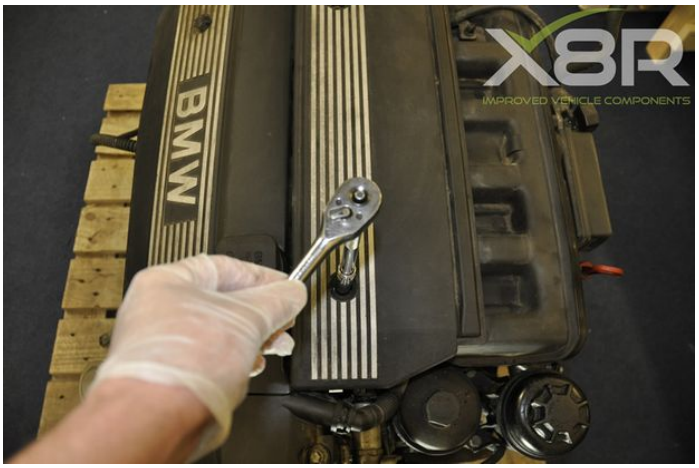
Compatible with BMW 6-cylinder engines M52TU, M56, and M54

For more info please visit our website.

Step 1: Remove engine covers

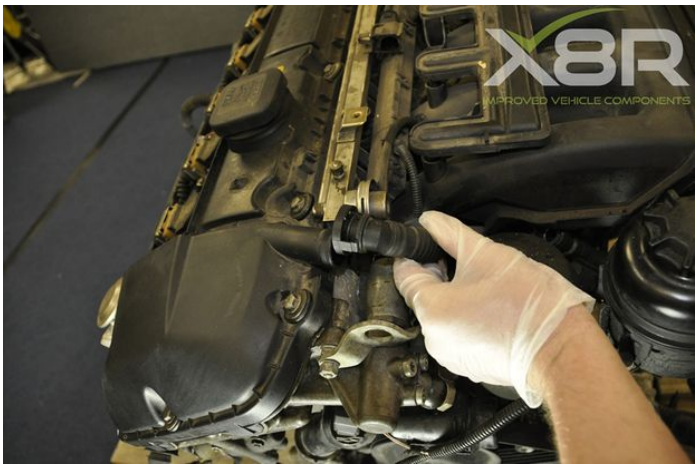
Repair can be carried out in situe on vehicle, instructions show engine on bench for demonstration purposes only.

- Ensure vehicle is cold and not hot from running when beginning repair.
- Remove cooling fan, cooling fan shroud and cabin filter housing.
- Remove 2x engine covers, pry off 2x caps on each cover, remove 2x 10mm nuts on each cover. Remove Right cover, unscrew oil filler cap remove Left cover and replace oil filler cap.



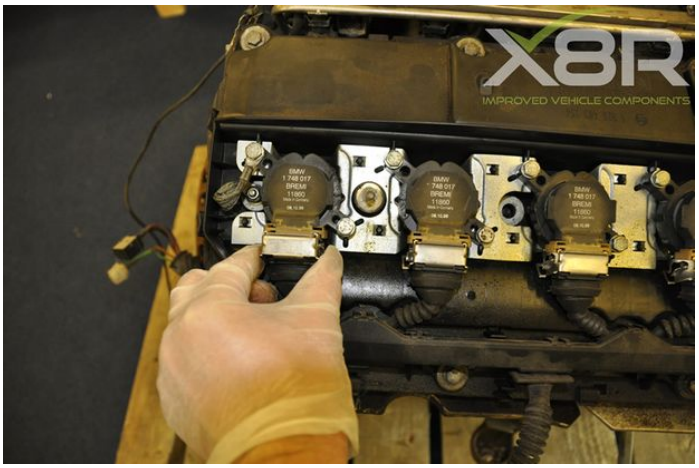
Step 2: Remove valve cover vent hose

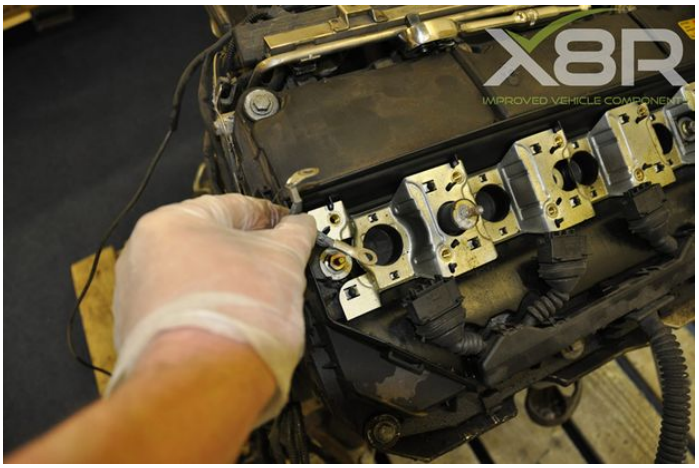
- Remove valve cover vent hose press in connector top and bottom and wiggle gently loose, the hose from this connector is likely to be very brittle, do not put pressure on the hose; sudden release of the connector will snap the hose, take extreme care.

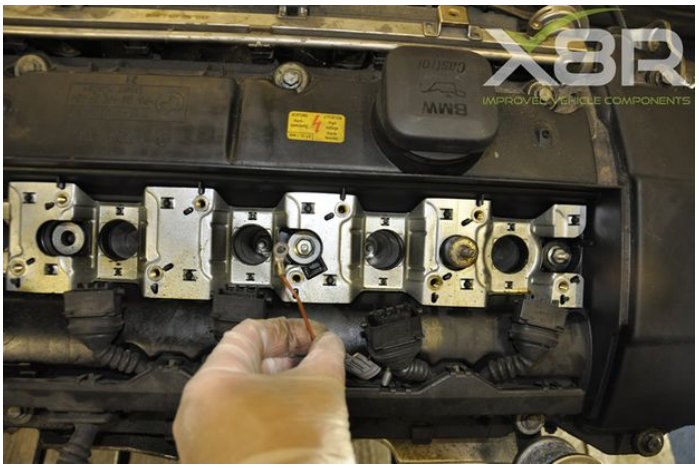


Step 3: Remove coil harness

- Remove ignition harness, on each coil pull up connectors metal lock mechanism and pull off connector
- Remove coil earth straps at cylinders 1 and 6 using 8mm socket.
- Remove coil harness earth strap located between coil 2&3 using 8mm socket
- Remove coil harness from valve cover, pry on clips and move out of way

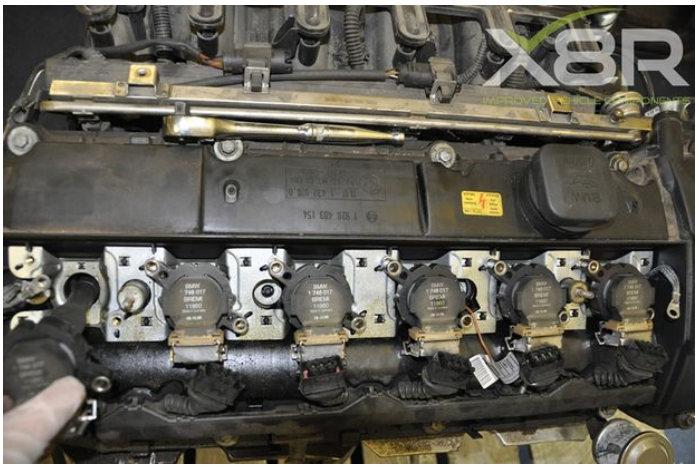






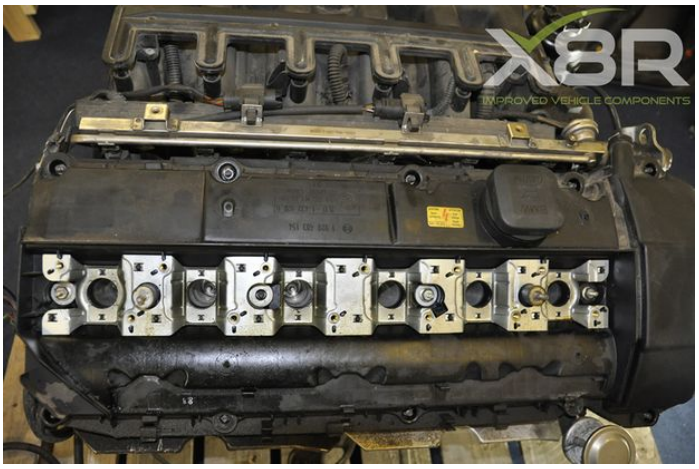
Step 4: Remove coils

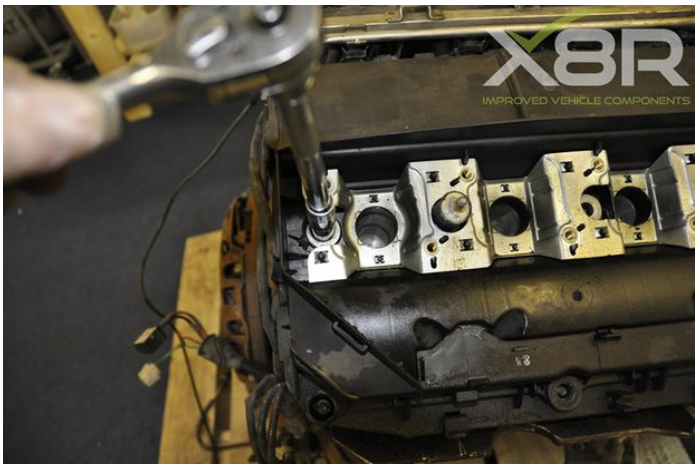
- Remove coils unscrew two bolts on each coil using 10mm socket (each bolt has a washer) Lift out coil taking note of cylinder number for each for reinstallation.
- Remove secondary air valve hose, pre-cat sensor cables and all electrical connectors from exhaust side which prevent valve cover removal.



Step 5: Remove valve cover

- Remove all 11x valve cover bolts using 10mm socket, each bolt has a grommet and washer make sure these are kept safe. Remove 4x central valve cover bolts using 10mm socket.
- Remove valve cover from engine. Insert a large blade or scraper between valve cover gasket and engine head and lever the cover gently loose, on the corner sections of the front of the valve cover RTV sealant will have been used to seal this section, using scraper lever between gasket and engine head to break sealant.


X8R
IMPROVED VEHICLE COMPONENTS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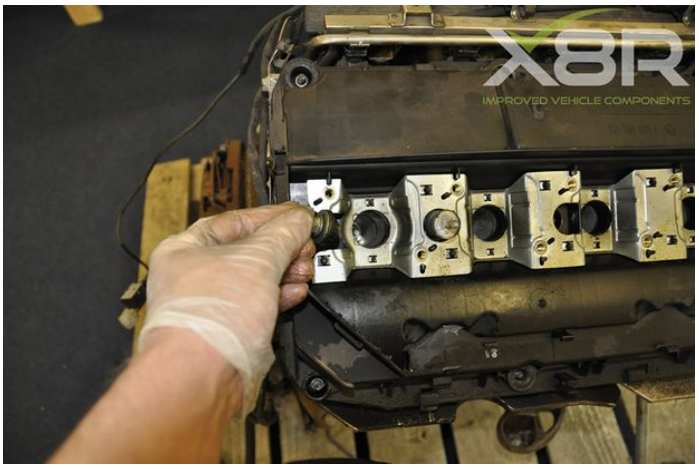
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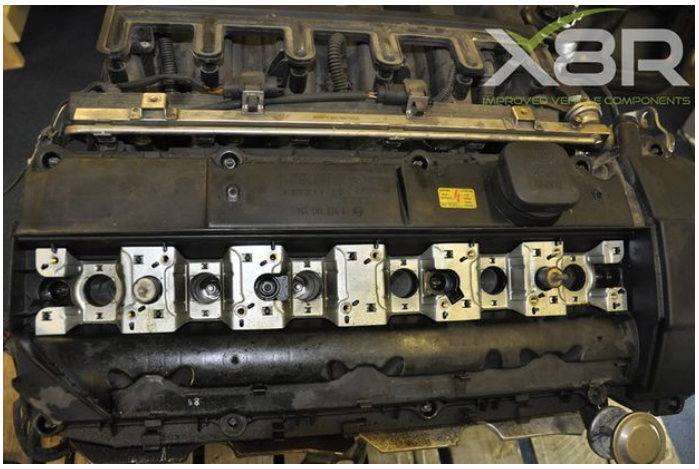
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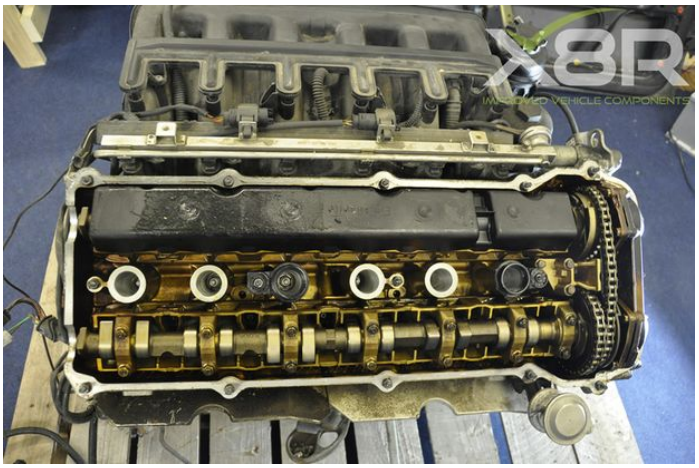
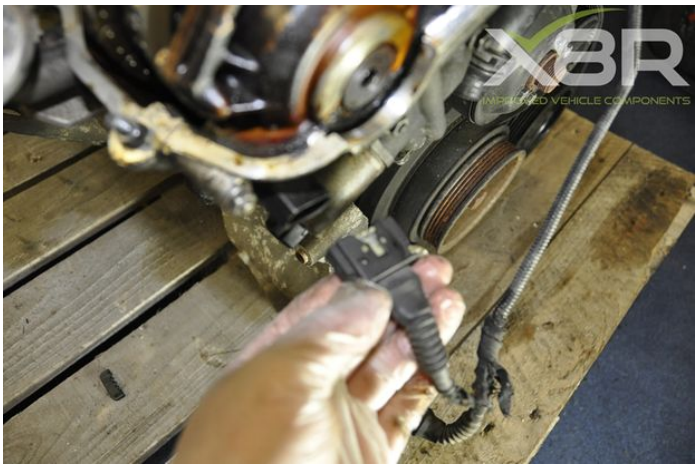
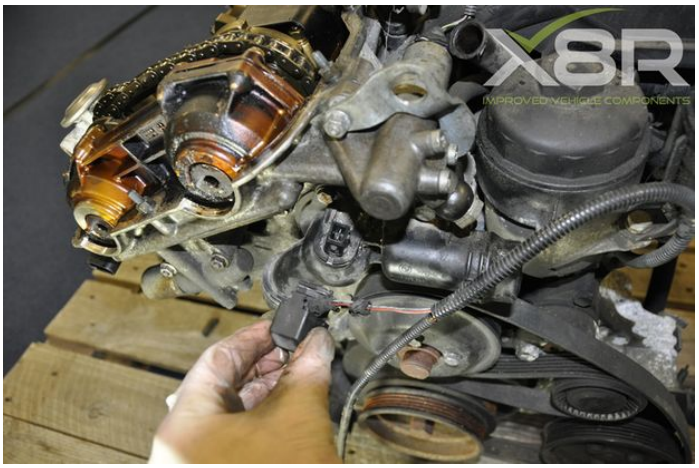


Step 6: Remove vanos electrical connectors

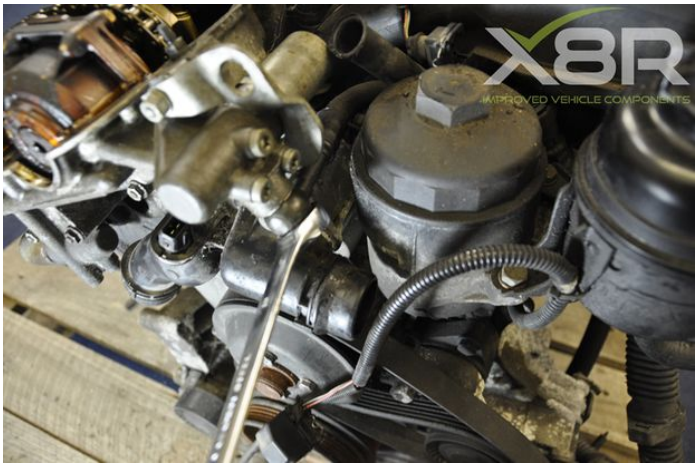
- Remove camshaft position sensor and exhaust solenoid connectors, push in sides and wiggle loose
- Remove intake solenoid connector and thermostat connector press in metal clips and lift off connectors.





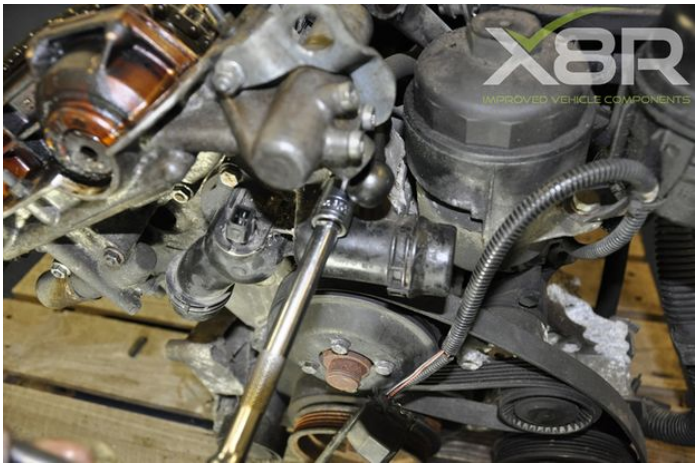
Step 7: Remove oil hose

- Remove oil hose and bolt using 19mm spanner (image 8) retain the two washers (each side of the hose).



Step 8: Remove engine lift bracket

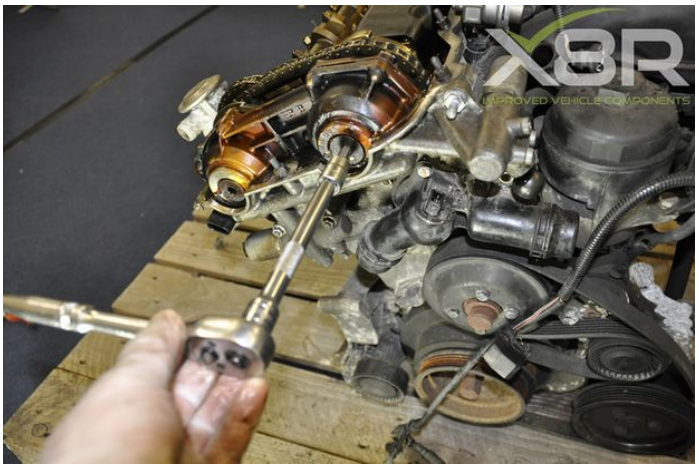
- Remove engine lift bracket from Vanos unit using 11mm socket top bolt and 13mm socket bottom bolt. Rotate bracket bottom to top then remove

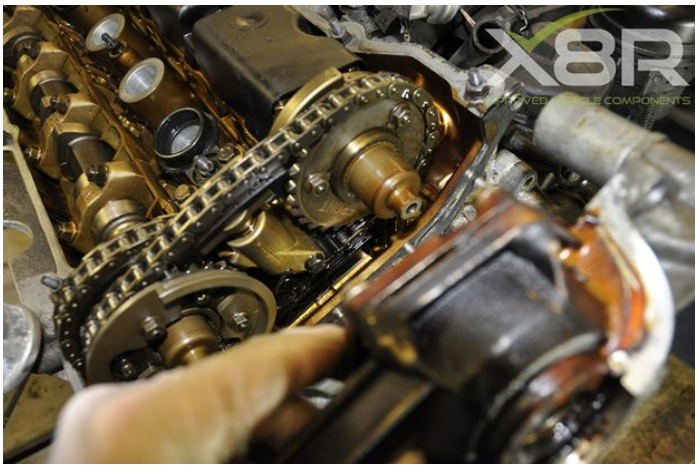


Step 9: Remove vanos unit

- Remove x2 Vanos cylinder cover bolts using 8mm Alan key socket, oil will leak once bolts are removed have a container ready to catch oil, clean up any spills. Remove x2 orange plastic Vanos piston caps with long nose pliers.
- Remove Vanos piston shaft bolts x2 using T30 Torx. IMPORTANT these bolts are Left hand thread, remove by unscrewing clockwise. These bolts are very delicate unscrew the correct way with care. If the bolt does break continue with removal, the screw can be unthreaded later.

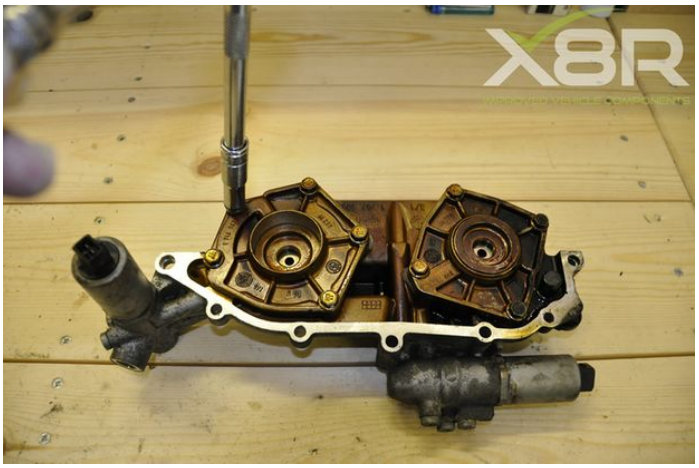
- Remove 6x Vanos mounting bolts, on the lower front half of the Vanos unit using 10mm socket. Remove Vanos Right top mounting bolt with 13mm socket. Pull Vanos unit forwards and remove; make sure Vanos gasket is also removed from head. Take care to collect any spilling oil. Tilt Vanos unit in to container to remove all oil from unit.





Step 10: Remove vanos cover

- Position the Vanos unit on work bench as shown in image.
- Remove Vanos cover removing 9x 10mm bolts, right hand size as orientated has a spring behind the piston which will force the cover off as removing, press down on cylinder cover when removing to aid removal of bolts. Remove pistons and spring making note of which piston corresponds to which cylinder. Drain and clean away oil from pistons and cylinders.
- To diagnose Vanos failure you can slide the pistons in and out of their respective cylinder, you should notice a very loose fit. Inspect cylinders for any damage, they should be very smooth.



Step 11: Remove vanos seals

- Remove OEM seals from both pistons, each piston will have two grooves; in each groove will be 2 seals, 4 seals in total on each piston. Remove these carefully using a sharp blade. Once removed the piston should have no seals or seal remnants in the piston, clean grooves. Take this complete stage slowly making sure not to damage the piston.




Step 12: Install new seals

- Take a piston and install our large Viton o-ring in the bigger groove and our smaller Viton O-ring in the smaller groove, repeat this for the other piston. At this stage both pistons now have two 0-rings installed 1 big (top), 1 small (bottom). Make sure Orings are seated correctly and are not twisted.

- Take PTFE rings from our kit x2 big, x2 small and soak in warm water for 3 minutes, take out and dry.
  Stretch large PTFE ring over piston and in to large groove (top) this will take a little force, stretch evenly and take care not to bend or damage. Once in groove the ring should seat nicely twist the ring (it should move when twisting) within the groove and check that ring is seated correctly. Repeat process for smaller ring in bottom groove, replicate process with second piston.


Step 13: Resize seals

- The piston seals will now need resizing. Coat the inside of the left hand cylinder of the Vanos unit with engine oil, cover all of surface, coat left hand cylinder piston with oil making sure top larger seal has a good layer of oil, insert large end of piston in to left hand cylinder at a 60 degree angle then rotate piston to correct orientation, if seal binds keep removing and reinserting piston until piston ring resizes correctly. Insert piston fully in to cylinder and leave for 5 minutes so seals can resize correctly then remove.

- Apply layer of oil to left cylinder cover and to bottom seal of piston. Insert piston in to cylinder cover (gasket side) at an angle, rotate to correct orientation you will find some of seal protrudes preventing piston orientating correctly in cylinder, push in protruding seal and gently orientate until piston seats correctly. Insert piston fully in to cylinder cover and leave piston seal to reshape for 5 minutes.

- Repeat this process for the Right hand piston in the Right hand cylinder and cylinder cover.
- Re oil pistons and cylinders, install pistons fully in to correct side cylinder cover, insert piston spring Right hand side cylinder, refit cylinder covers with piston in situe. Tighten 9x bolts gently ensuring piston spring orientates correctly, carry out this process slowly, pressure will be needed on right hand cylinder to compress spring whilst tightening bolts. Bolts should be tightened to 10 Nm in a cross pattern. Check pistons have seated correctly by pushing in to cylinder this will require a little force. The Vanos unit can now be remounted to the vehicle.

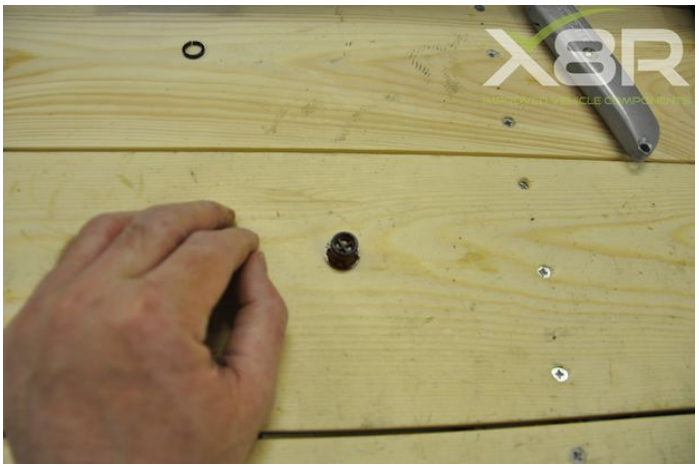





Step 14: Replace seals on Vanos piston caps

- Cut old seals from x2 Vanos piston caps and replace with the 2 small seals from our kit.






Step 15: Important to remember for refitting

Follow these instructions in reverse for refitting remembering the following:

- Always fit a new Vanos gasket making sure remnants of old gasket are removed and the mating surfaces are clean.
- When mounting Vanos unit to engine head fully insert intake piston of Vanos to aid fitting.
- When reattaching Vanos oil hose remember the two washers either side.
- Always fit a new valve cover gasket making sure remnants of old one are removed and the mating surfaces are clean.
- Place a thin coat of the RTV sealant included at the Vanos/ head contact points and at the half moon corners, you will see residue of old sealant in the required locations, make sure mating surfaces are clean and free from old sealant. Allow sealant to set for 2-3 minutes before refitting cover.

Step 16: Important torque settings

Vanos mounting bolts 8 Nm, Vanos piston shaft bolts 8 Nm (Remember left hand thread!), Vanos cylinder front bolts 50 Nm, Engine lift brackets 10 Nm, Valve cover bolts 8Nm, Coil bolts 10Nm.

Step 17: Driving after install

- Check and replenish engine oil as necessary before starting vehicle.
- Drive vehicle let vehicle stand and cool then recheck oil, replenish as necessary.
- On starting the vehicle after install the engine may run a little irregular at idle temporarily due to trapped air in Vanos unit.
- Around 250 miles of about town driving is needed to fully settle the Vanos seals and see big gains, however some improvements will be noticed immediately.