

Oil Pan Gasket + Rod Bearing Replacement

2004 Jaguar X – Type 3.0

135,000 miles

3/11/2017

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I. List of Tools

- Jack/Jack Stands
- STD drill with assorted drill bits
- 7/8" hole saw bit w. arbor bit
- STD Metric sockets and wrenches
- STD Ratchets + torque wrench + ratchet extensions
- Extension tube/pipe to fit over ratchet for belt detensioning
- Push rod special tool (3/8"-24 by 4" long bolt/rod)
- Hammer/mallet + metal drift
- Micrometer/Caliper
- Zip ties or binder clips
- Scotch bright pads
- Cutting wheel
- Wire brush/wheel
- Razor blades
- Brakeparts cleaner (3-4 cans)
- Air duster (2 cans)
- Liquid wrench
- Engine Assembly lube
- Black RTV sealant
- Clean Gloves + lint free cloths
- Safety goggles

II. List of Parts

| Qty | Total \$ | PN | Store | Description |
|---------------|------------------|-------------|------------|---|
| 1 | \$ 24.99 | OS30697R | Autozone | Felpro/Oil Pan Gasket |
| 1 | \$ 4.19 | PH3600 | Autozone | Fram/Oil Filter |
| 1 | \$ 46.99 | 64395A | Autozone | Sealed Power/Rod Bearing Set (Standard) |
| 1 | \$ 47.78 | N/A | Autozone | Castrol Edge engine oil 5W-30, 5+1 qts |
| 1 | \$ 4.99 | See Store | Autozone | Oil pan drain plug |
| 3 | \$ 31.56 | F3LY-6214-A | Ford Parts | Connecting Rod bolts (3 sets of 4) |
| 1 | \$ 15.00 | XR85094 | Jaguar | Oil Pick-up Tube O-ring |
| NA | \$ 50.00 | NA | Various | Splash shield clips, RTV, assembly lube, hole saw bit, scotch brite, brake parts cleaner, misc. parts/tools |
| Total: | \$ 225.50 | | | |

Alternate Parts

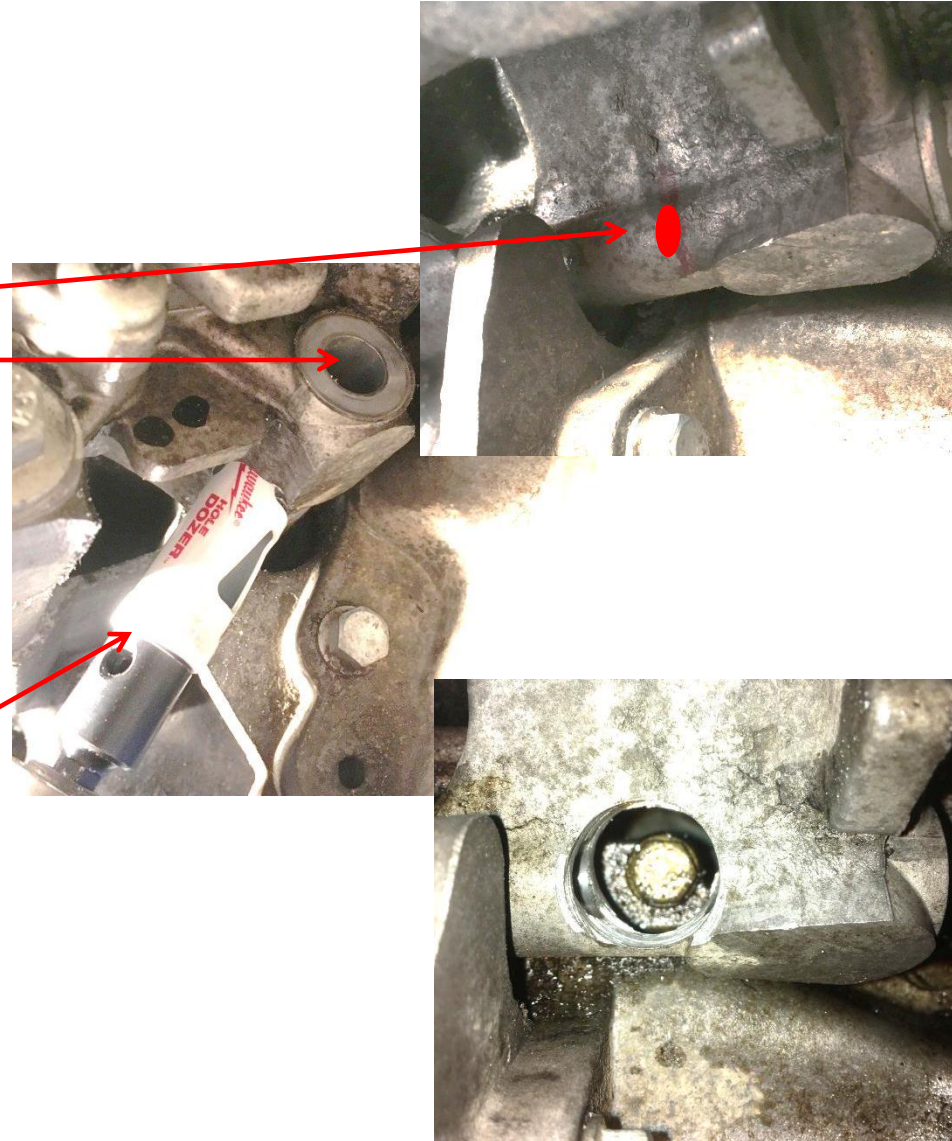
| Qty | Total \$ | PN | Store | Description |
|-----|-----------|---------|--------|--|
| 12 | \$ 204.00 | XR85342 | Jaguar | Connecting Rod bolts (12) (BUY FROM FORD!) |

Notes: The connecting rod bolts are exactly the same as in a 2004 Lincoln LS 3.0 Engine (and clearly much cheaper!). I bought 1 from Jaguar just to make sure they were the same.

I'm sure Ford has the oil pickup tube O-ring as well but I could not find a PN for it.

III. Oil Pan Removal

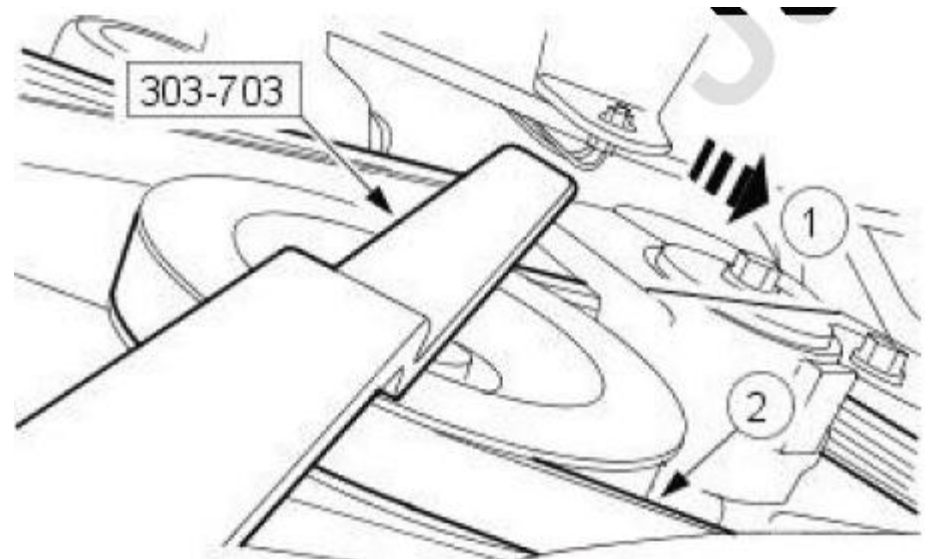
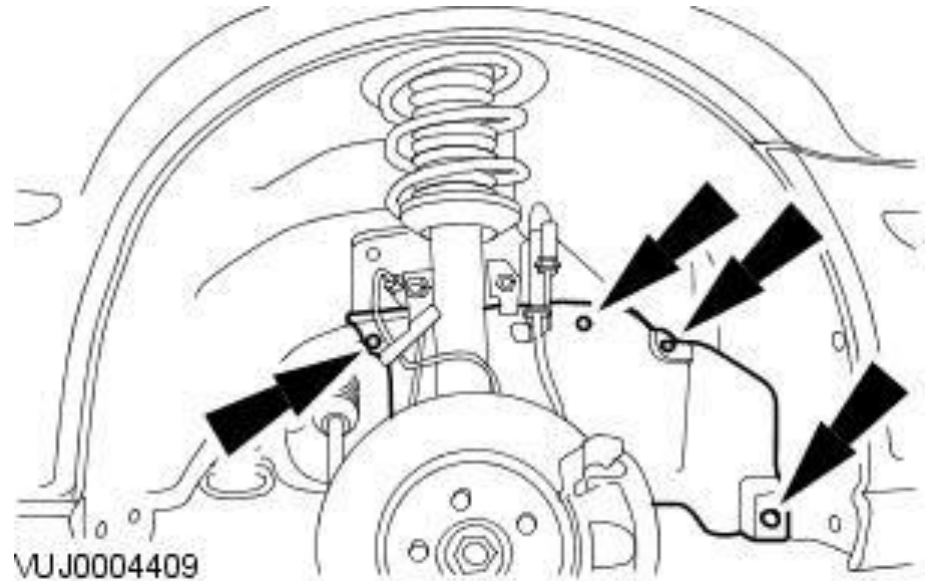
- Loosen right front wheel lug nuts
- Jack car and install stands
- Spray some liquid wrench on exhaust elbow nuts for later
- Mark drill spot on Transfer Case
- Remove TC to Transmission bolt
- Begin drilling through TC
 - Start with a small bit, then a larger one to open up the hole (No need to drill all the way through with the smaller bits)
 - Use the 7/8" hole saw and arbor bit after the smaller 2 bits
 - Once the hole saw is settled, remove the arbor bit to prevent damage to the hidden oil pan bolt
 - After the hole saw goes all the way through, use the air can to blow away debris and clean the area



Notes: Jack the car high enough to easily work underneath. Ensure good lighting. Make sure you are drilling straight up and parallel to the other oil pan bolts.

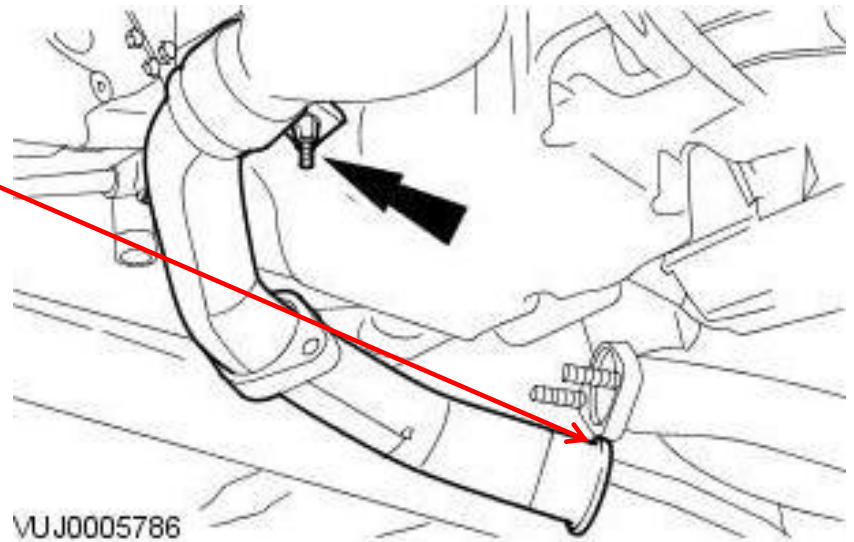
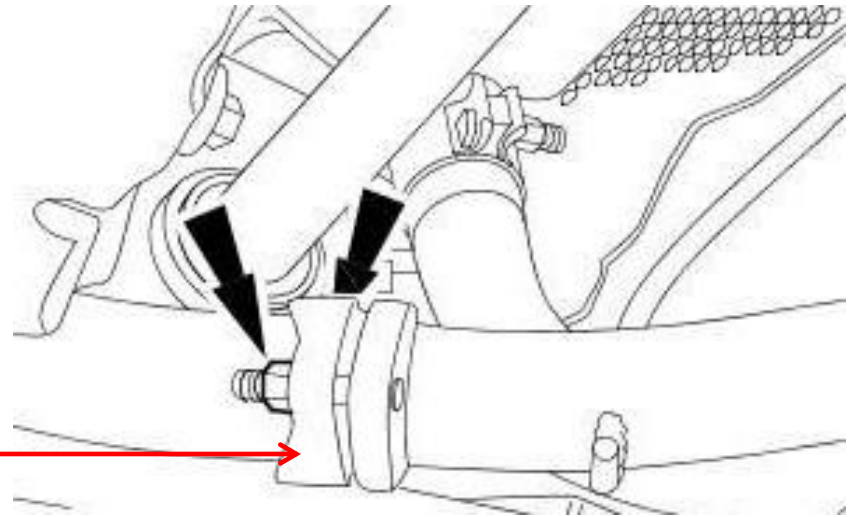
III. Oil Pan Removal

- Drain engine oil
- Remove front right wheel and splash shield
- Using a ratchet and extension tube, rotate the belt tensioner counter-clockwise
- Detach the serpentine belt



III. Oil Pan Removal

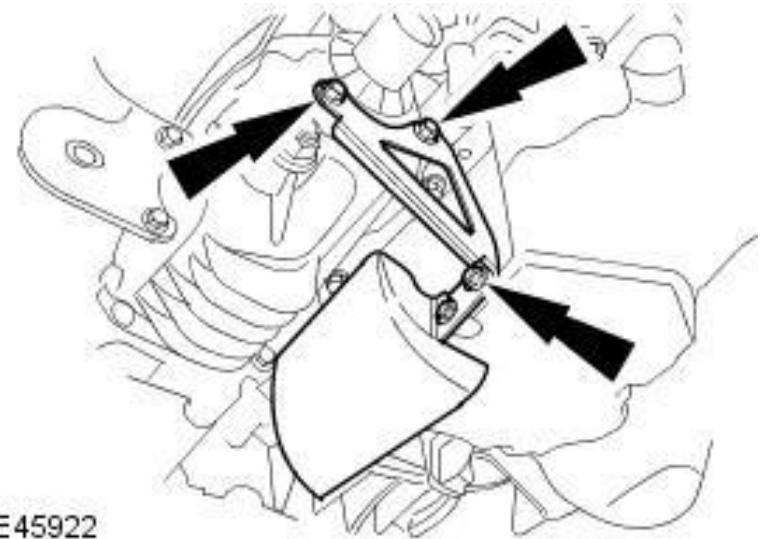
- Remove front exhaust elbow
 - Start by removing the rear 2 nuts (the upper one can be reached from the wheel well using ratchet extensions)
 - Separate the flange from the studs by pounding it with a hammer and drift
 - Once the flange moves back, separate/pry the 2 pipes
 - Once the rear is separated, remove the front nut and loosen the connection by rotating the elbow, then slide it off



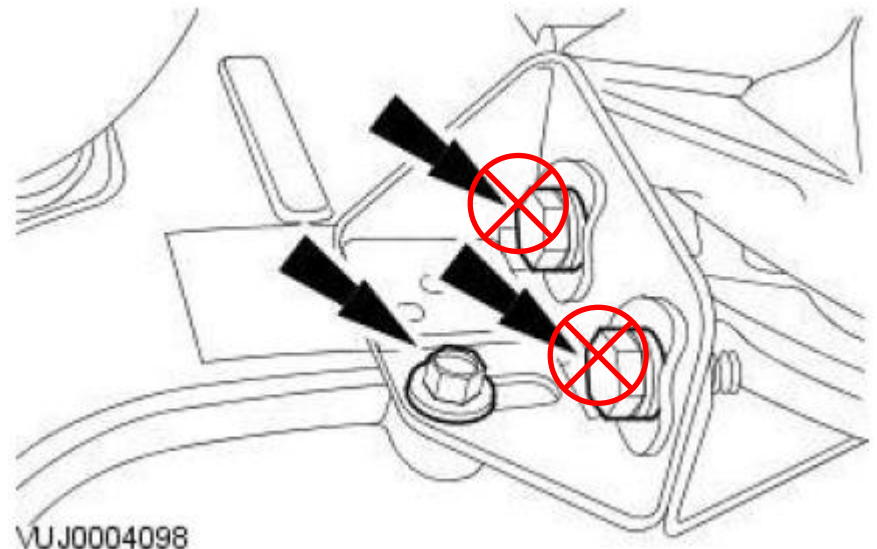
Notes: Try to use a steel brush/wheel to clean the area where the flange will slide on. I ended up cutting off the ends of the studs to slide the flange off. Cut about ¼" off the studs.

III. Oil Pan Removal

- Remove the TC support bracket

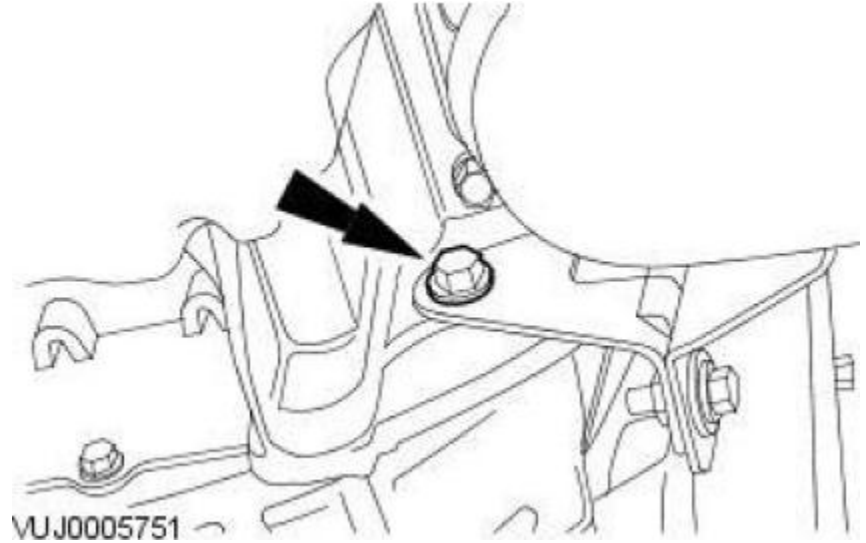


- Remove the CAT to bracket retaining bolt ONLY (unnecessary to separate the bracket)



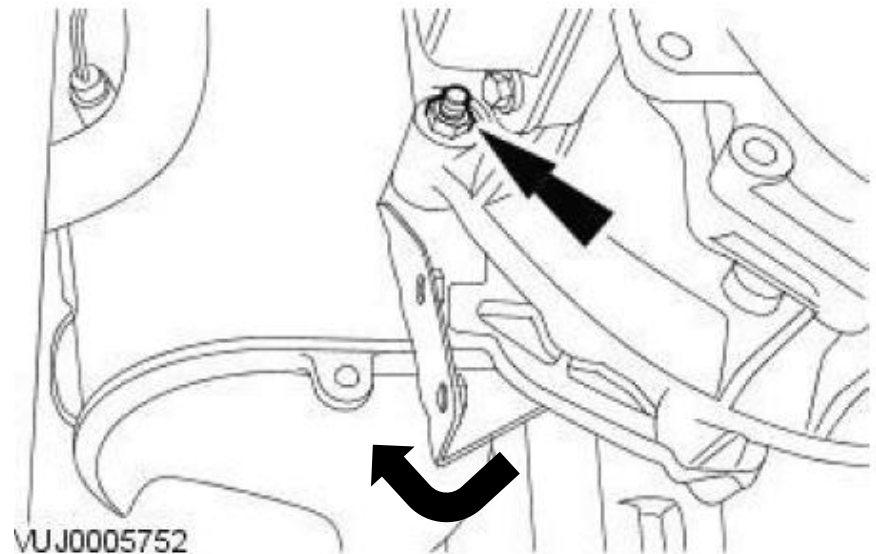
III. Oil Pan Removal

- Remove the sump to transmission securing bolt



- Slacken but do not remove the upper CAT retaining bracket support bolt

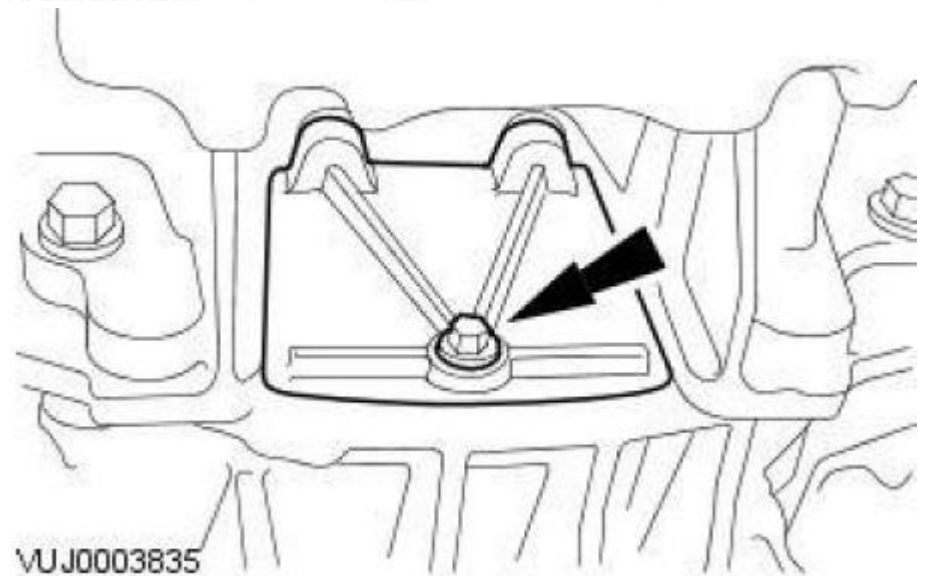
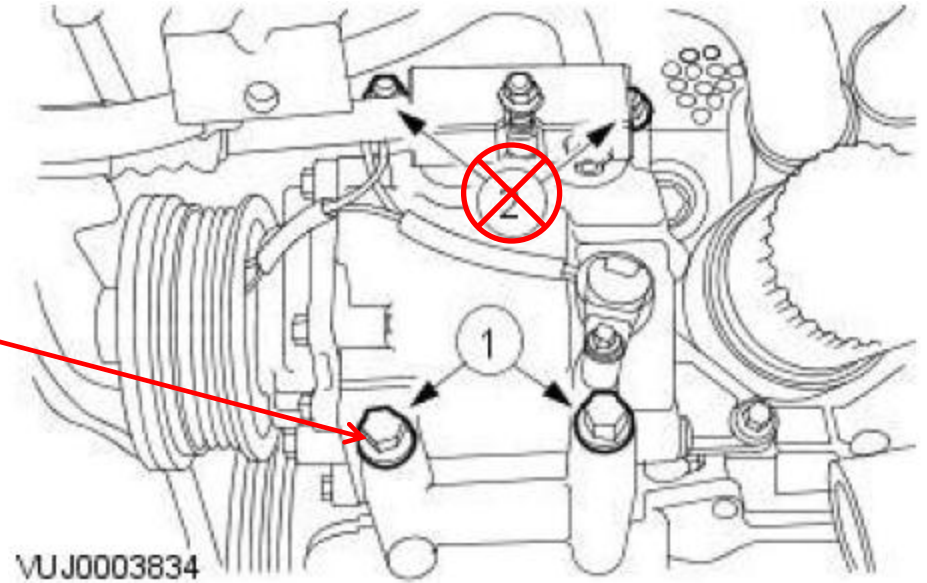
- Swing the bracket toward the front of the vehicle



Notes: The graphic shows the CAT bracket with 2 bolts already removed, you do not need to remove these 2 bolts, and you do not need to separate the 2 parts of the bracket.

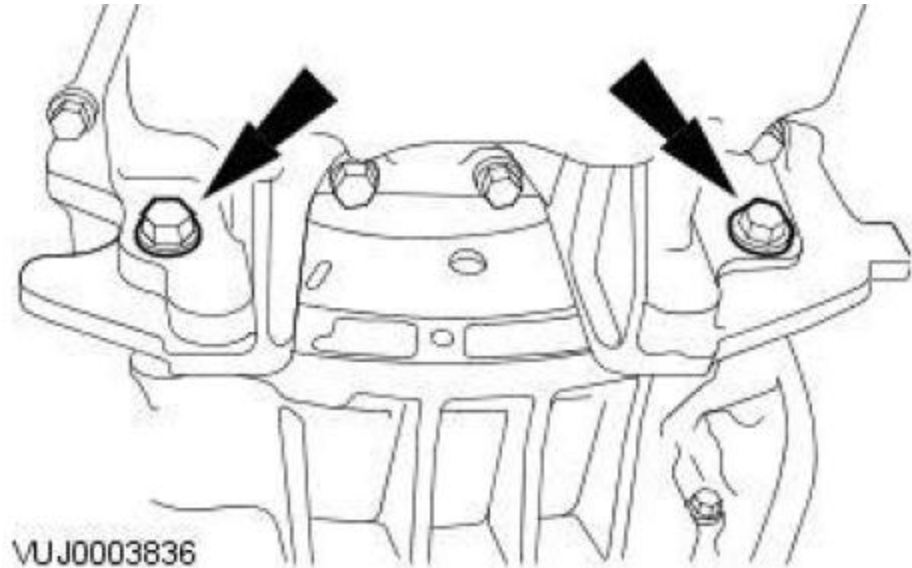
III. Oil Pan Removal

- Remove the AC compressor lower retaining bolts
- No need to loosen the upper AC bolts
- Remove the access cover

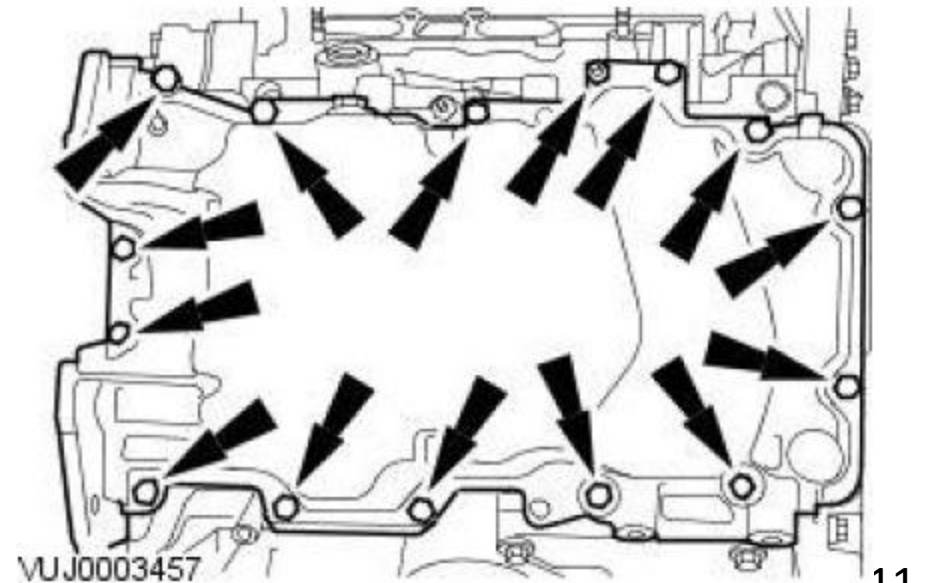


III. Oil Pan Removal

- Remove the 2 retaining bolts



- Remove the 15 oil pan bolts



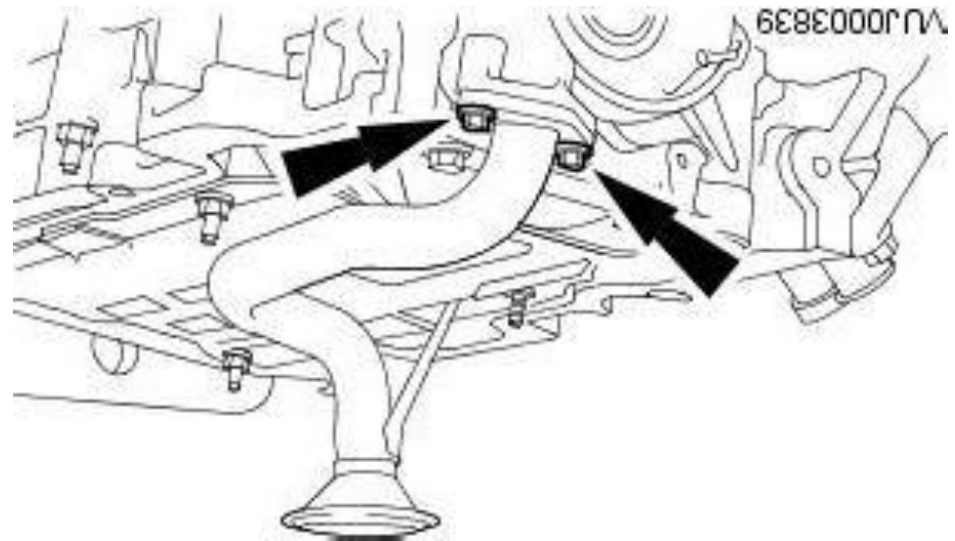
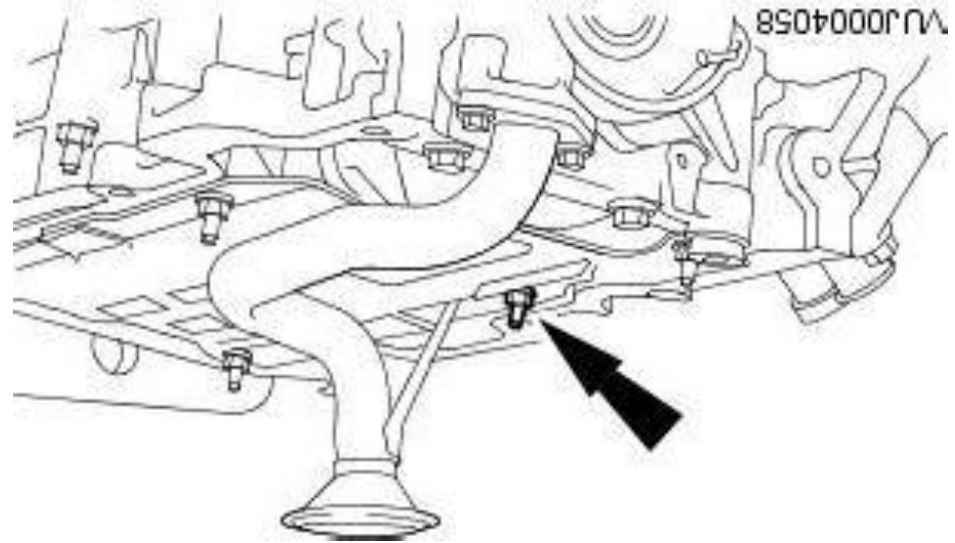
III. Oil Pan Removal

- Drop the oil pan as far as it can go to gain access to the oil tube nut/bolts
- I ended up cutting off this useless nub on the corner of the pan. I'm not sure if it made a difference in the end.



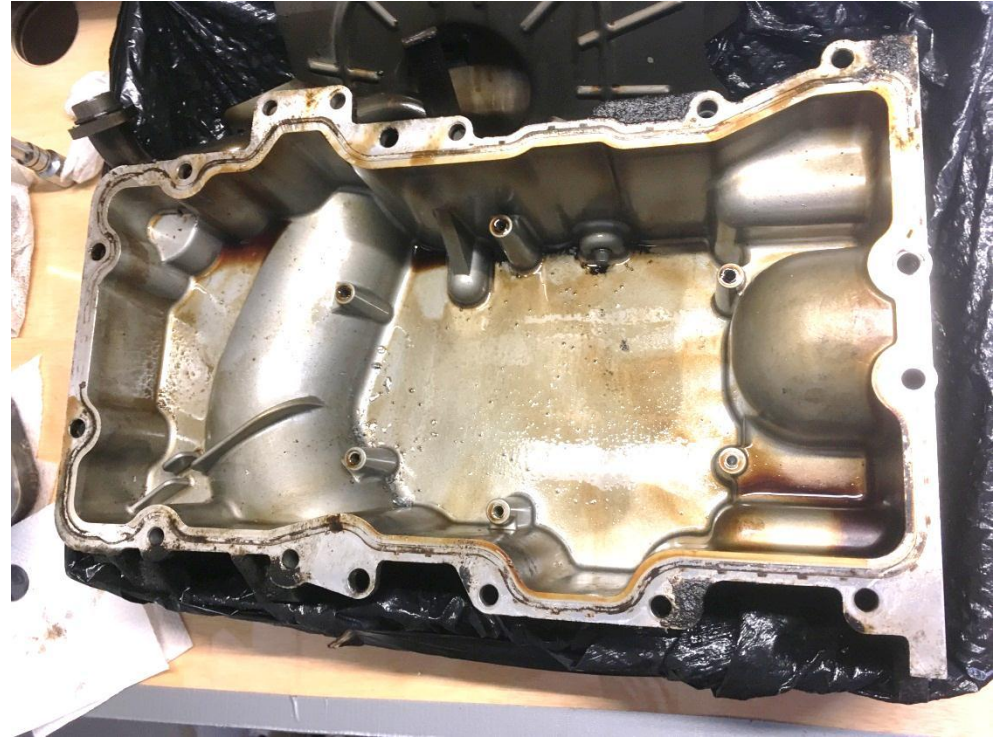
III. Oil Pan Removal

- Remove the 1 oil tube support bracket nut
- Remove the 2 oil tube bolts
- BE SURE THE WRENCH/SOCKET IS FULLY ENGAGED TO NOT STRIP THE NUT/BOLTS
- Push down on the oil tube to separate it from the oil pump



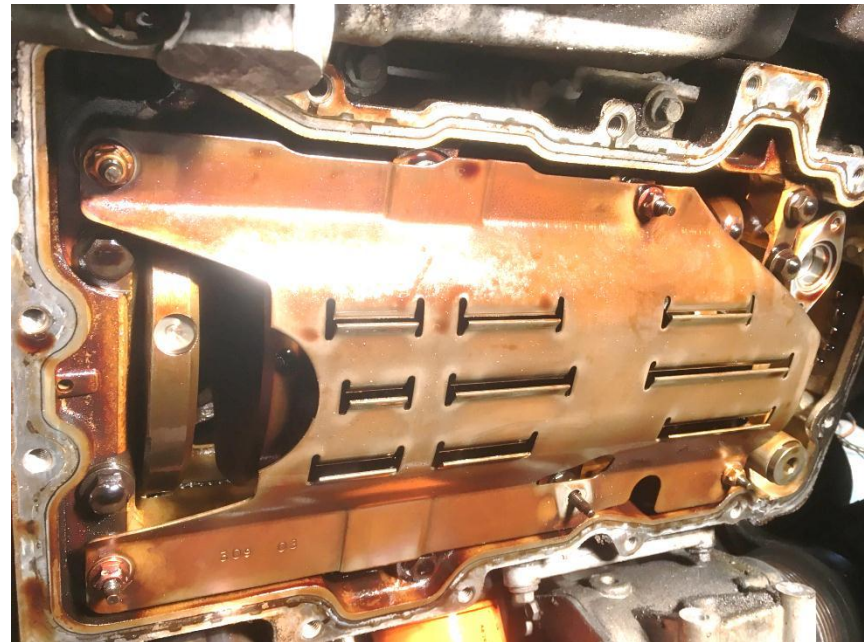
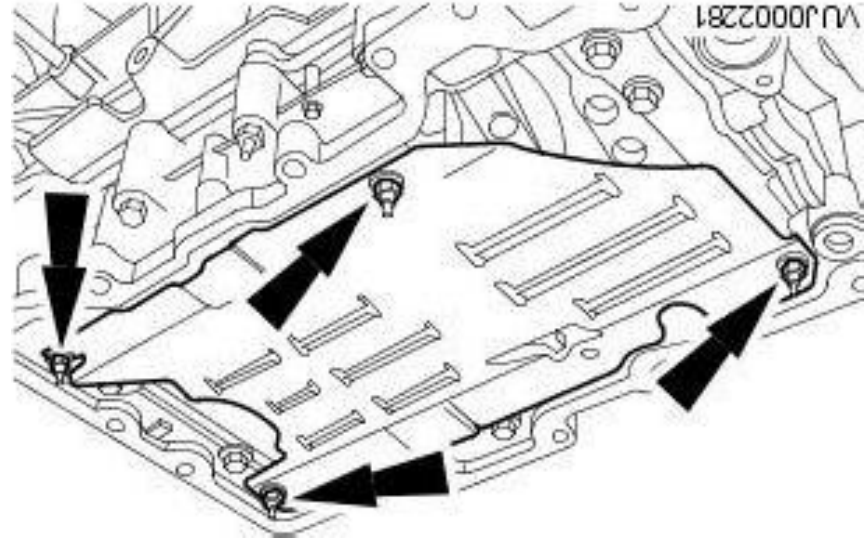
III. Oil Pan Removal

- Be sure the oil tube is lowered in the pan and out of the way
- Rotate and lower the oil pan - It may take a few minutes to figure out, but it should come out fairly easily
- Remember the positions used to remove it – they will come handy when reinstalling!
- Remove and discard the oil pan gasket



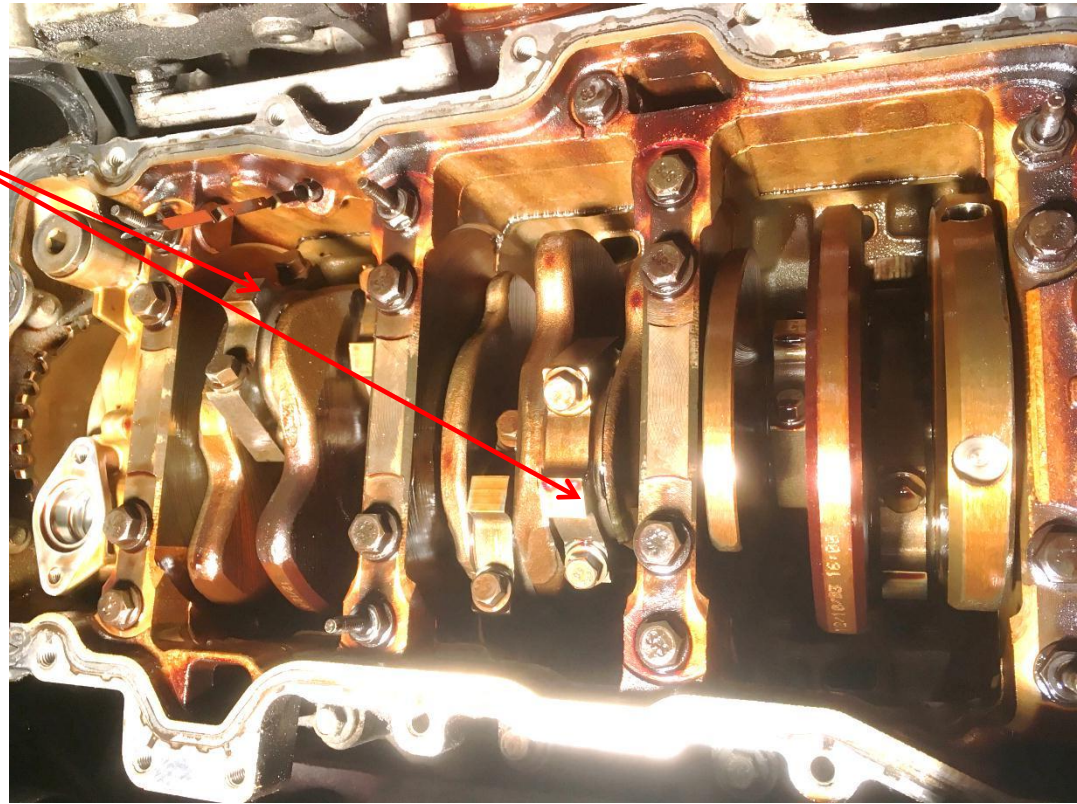
IV. Rod Bearing Replacement

- REMOVE THE FRONT 3 SPARK PLUGS FOR EASIER CRANKSHAFT ROTATION
- Remove the 4 oil pan baffle nuts
- Remove the baffle
- Remove the oil dip stick



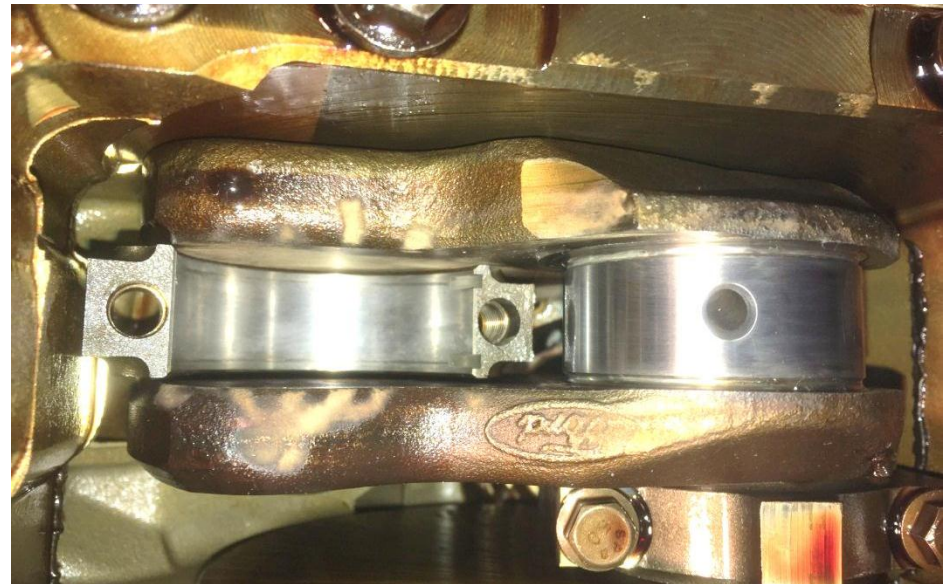
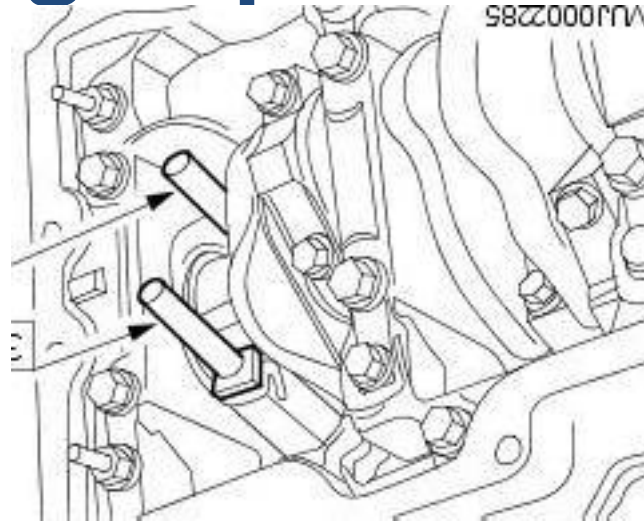
IV. Rod Bearing Replacement

- Facing the front of the engine, rotate the crankshaft clockwise so that you can work 2 rods at a time
- Starting with the first rod, remove and discard the connecting bolts
- Remove the rod cap
- Remove/inspect/discard the lower bearing
- Note: the rod caps must be reassembled in the same position to ensure the mating surfaces are flush with the rod (the markings on the side of the rod and caps should be facing the front of the car)



IV. Rod Bearing Replacement

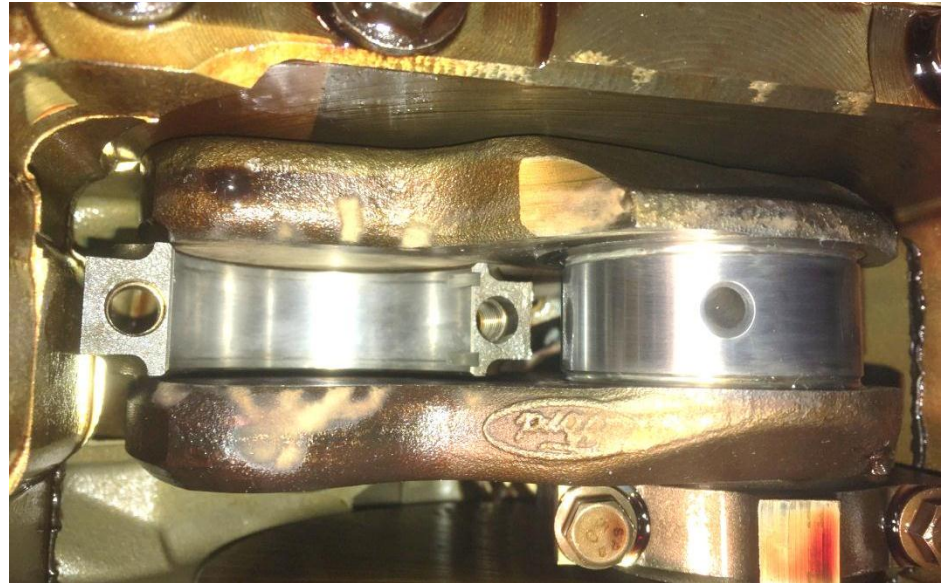
- Install the special tools and push the rod/piston up, remove the tools and swing the rod away from the crankshaft journal, then pull the rod/piston down for easier access
- Remove/inspect/discard the upper bearing
- SEE SECTION VI FOR BEARING INSPECTION



Notes: The special tools are just basically long rods with the same thread as the connecting rod bolts. I would wrap them in electrical tape so they don't knock into and damage the crankshaft journals. You can push the piston up and down with your fingers but the rods make it easier.

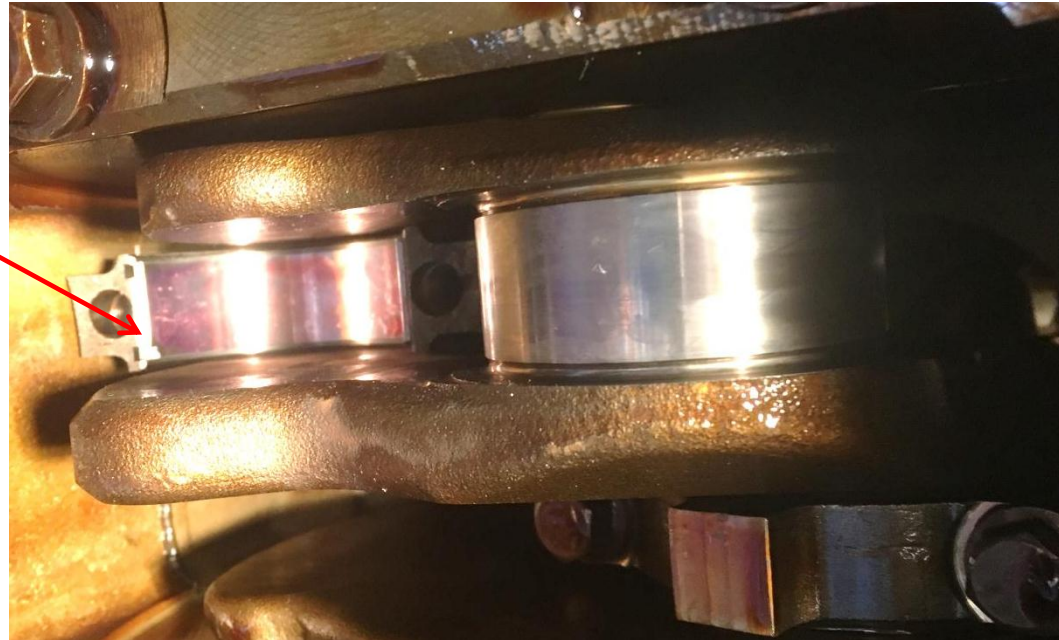
IV. Rod Bearing Replacement

- Cut a long piece of scotch brite to the width of the journal
- Using the scotch brite strip and some brake cleaner, clean the crankshaft journals, upper rod bearing surface, and lower rod cap bearing surface
- Be sure not to bang the upper rod into the crankshaft journals!
- Wipe the surfaces with a lint free cloth
- Use an air can to blast away any debris from the surfaces
- SEE SECTION VI FOR JOURNAL INSPECTION



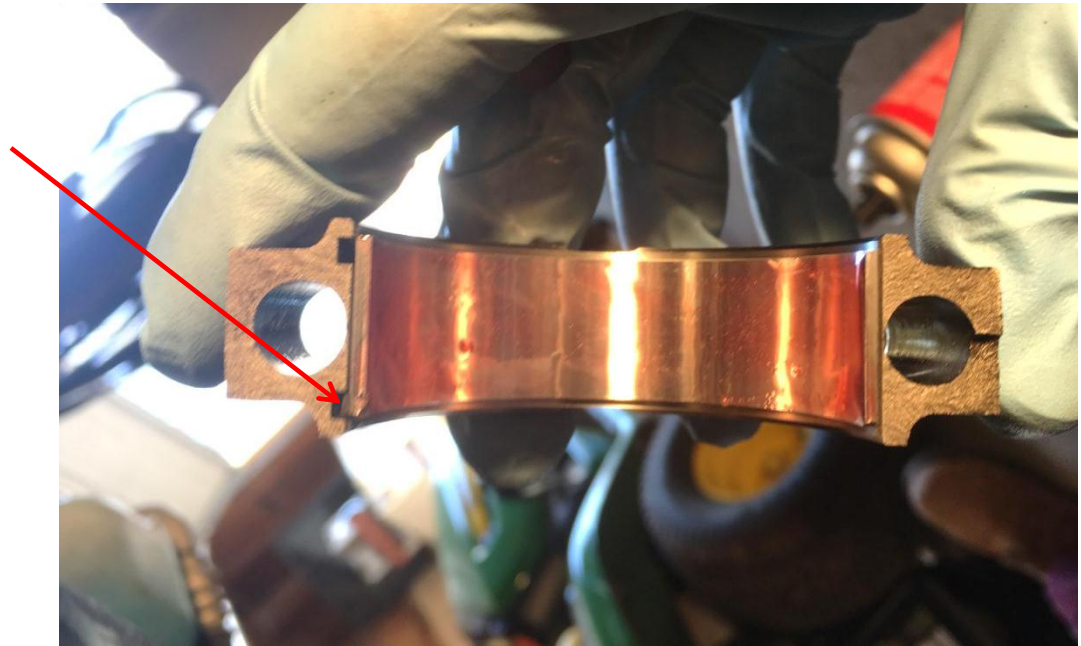
IV. Rod Bearing Replacement

- Apply engine assembly lube to the INNER bearing surface
- Install the new bearing to the upper rod surface (be sure the notch on the bearing lines up with the notch in the rod)
- Make sure the bearing is seated flush and secure
- Push the rod/piston back up and swing it back towards the crankshaft journal
- Install the special tools
- GENTLY pull the rod/piston down onto the journal
- Remove the special tools



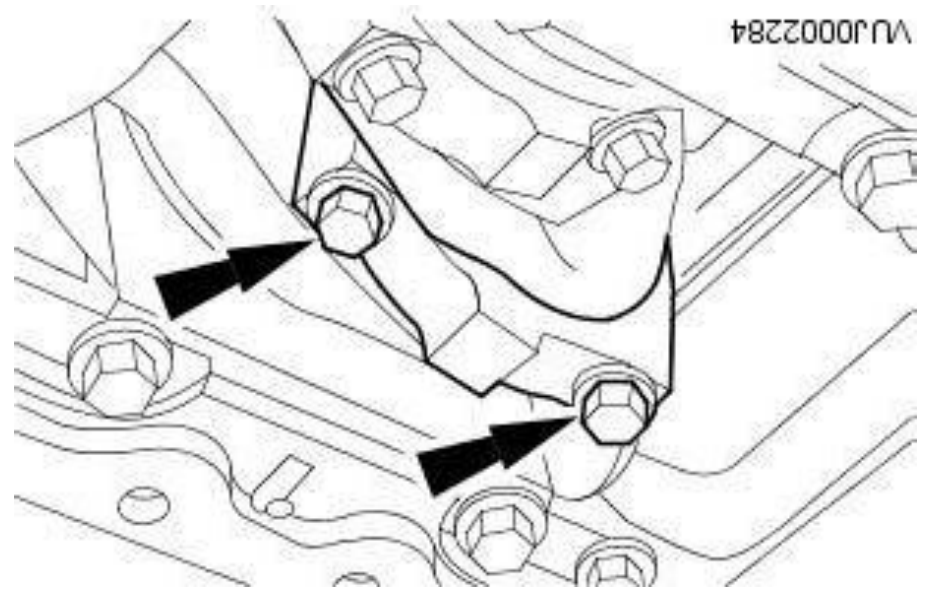
IV. Rod Bearing Replacement

- Apply engine assembly lube to the INNER bearing surface
 - Install the new bearing to the rod cap (once again, make sure the bearing notch is located correctly and the bearing is flush and seated correctly)
 - Install the rod cap in the same position it was removed (markings facing front of vehicle)
 - Make sure the rod cap mating surfaces are flush
 - Hand tighten the 2 new rod bolts
-
- **BE SURE TO USE CLEAN GLOVES WHEN APPLYING ASSEMBLY LUBE!! ANY DEBRIS FOUND ON THE INNER BEARING SURFACES SHOULD BE REMOVED!!**



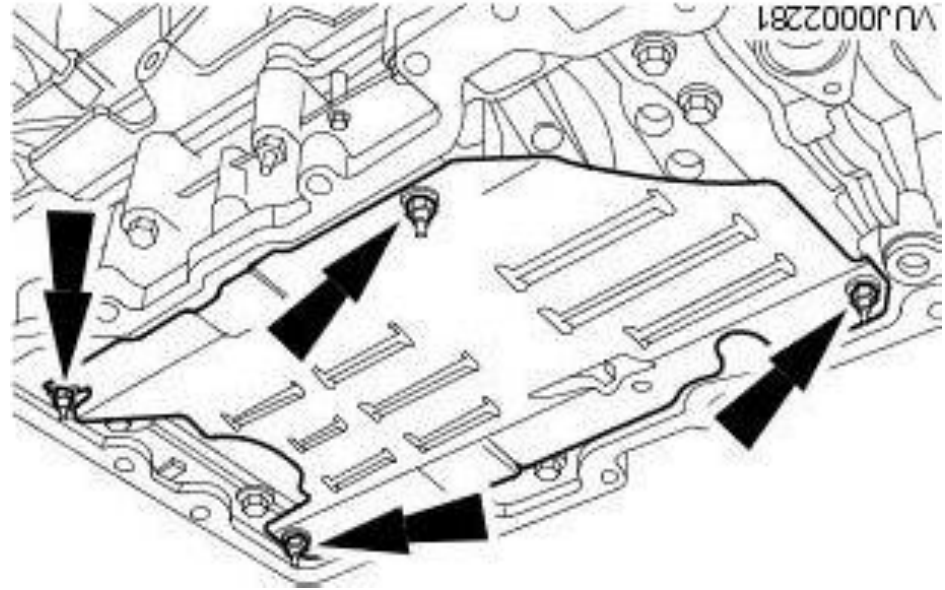
IV. Rod Bearing Replacement

- Tighten the rod bolts in this sequence:
 - Stage 1: 23 Nm
 - Stage 2: 43 Nm
 - Stage 3: 105°
- Repeat this process for the 2nd rod
- Once tightened, rotate the crankshaft clockwise to gain access to the next 2 rods
- Repeat the entire process for the next 2 rods
- Finally, rotate the crankshaft again for the final 2 rods
- Once all bearings have been replaced and tightened, rotate the crankshaft to check for normal operation



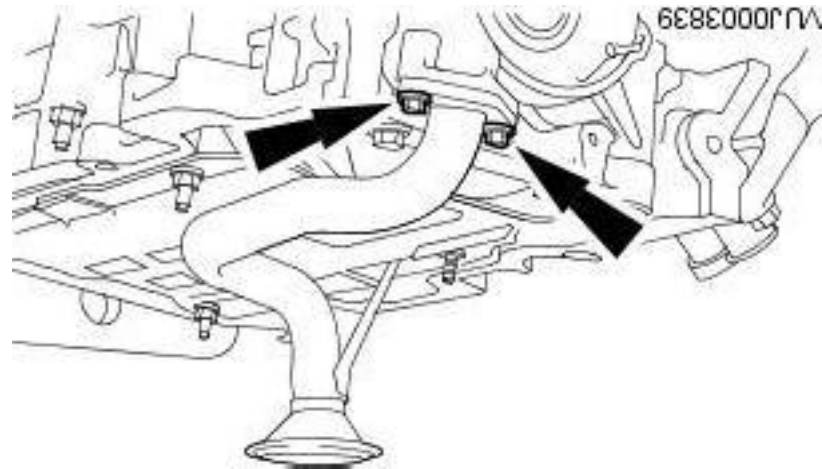
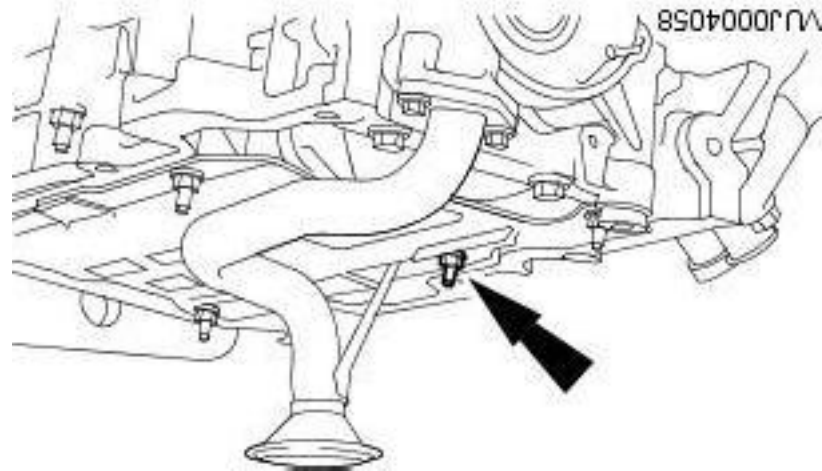
V. Oil Pan and Gasket Reinstall

- SEE SECTION VI FOR CLEANING PROCEDURES
- Reinstall the oil pan baffle using this tightening sequence:
 - Stage 1: 5 Nm
 - Stage 2: 45°
- Using Zip ties or binder clips, secure the new oil pan gasket to the oil pan (pick locations that will be easy to remove the zip ties later on – the ones shown were not great!)



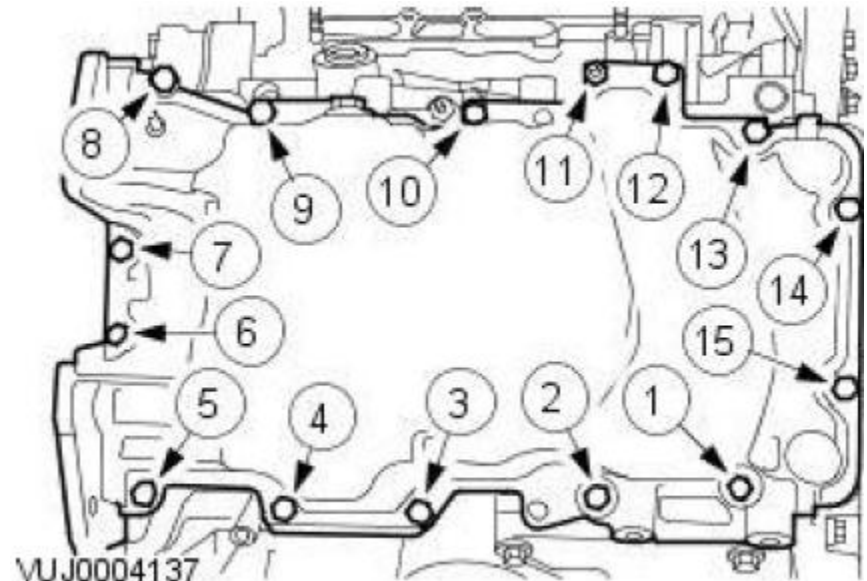
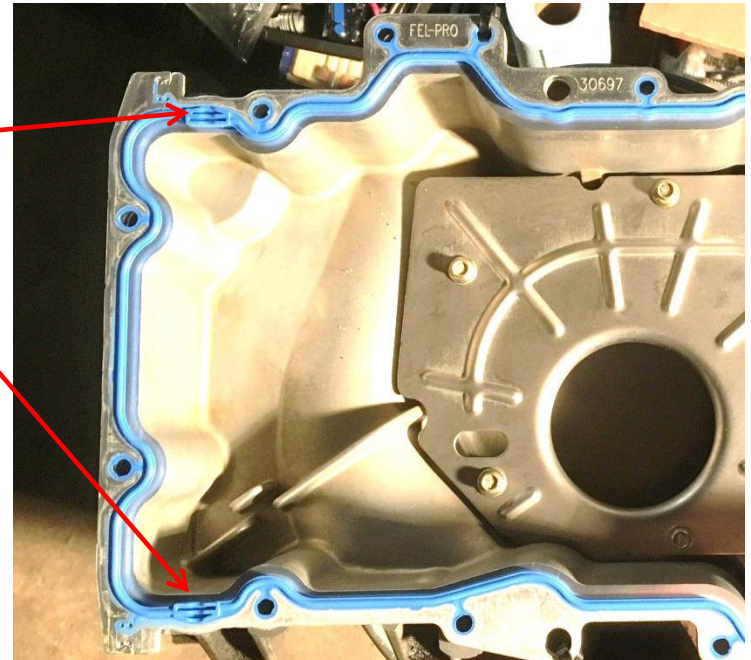
V. Oil Pan and Gasket Reinstall

- Install new O-ring onto the oil pickup tube
- Position the oil pickup tube into the oil pan
- Place the oil pan back into position so that it sits a few inches below the engine block (make sure the oil pickup tube is out of the way when repositioning the oil pan, but also make sure the pickup is seated in the round opening at the bottom of the pan)
- Reinstall the oil pickup tube, making sure it is seated snug into the oil pump (this will take some time, and some careful fingering)
- Be careful not to drop the nut/bolts into the oil pan!
- Tighten the nut to 5 Nm + 45°
- Tighten the bolts to 10 Nm
- Torqueing to spec will be tough, but you want to make sure at least the bolts are tight enough so there is no loss of oil pressure, but not too tight to break the bolt



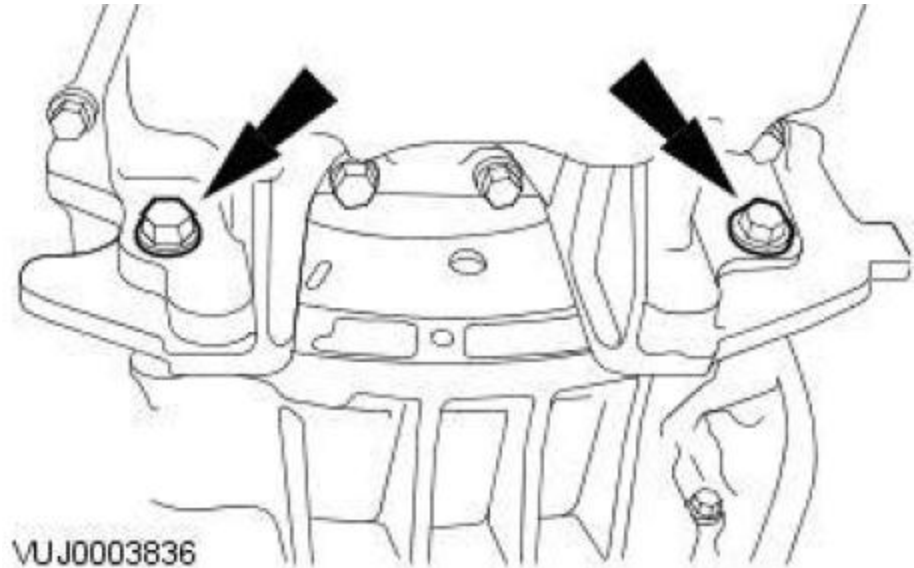
V. Oil Pan and Gasket Reinstall

- With the pickup tube installed, and the oil pan still hanging, apply 10mm of RTV to the 2 locations on the new gasket
- Reinstall the oil pan and hand tighten 3-4 bolts into place
- Remove the zip ties/clips
- Complete the tightening sequence shown, making sure the gasket remains in place
- Note that bolts 1 and 2 are longer than the rest
- Tighten to 25 Nm

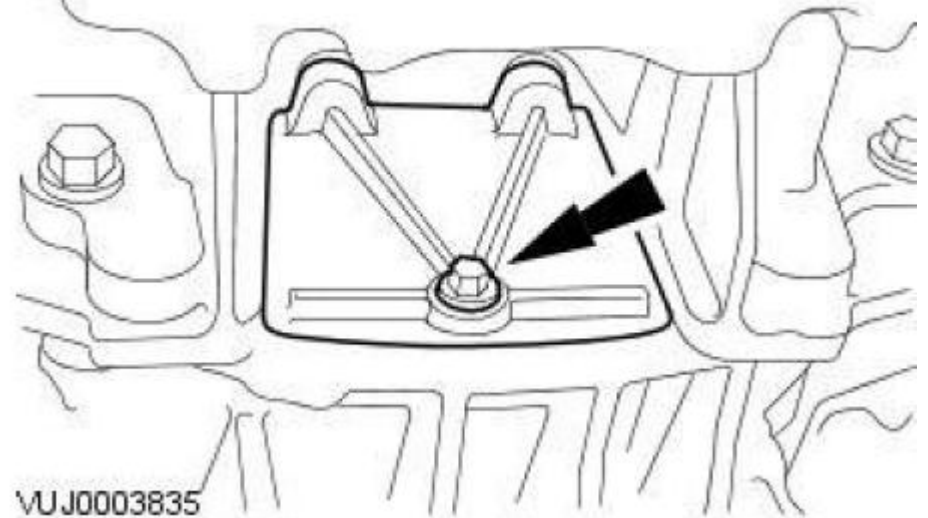


V. Oil Pan and Gasket Reinstall

- Tighten to 45 Nm

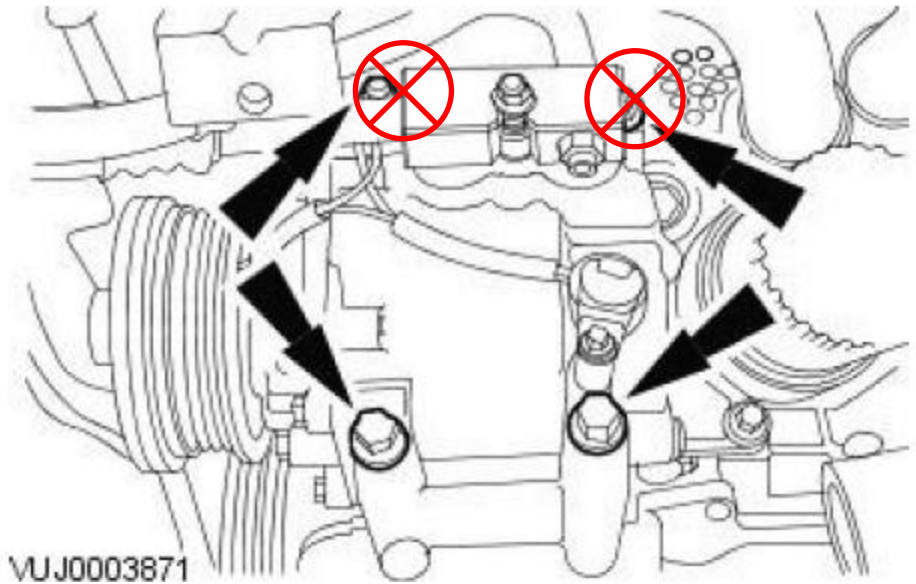


- Tighten to 10 Nm

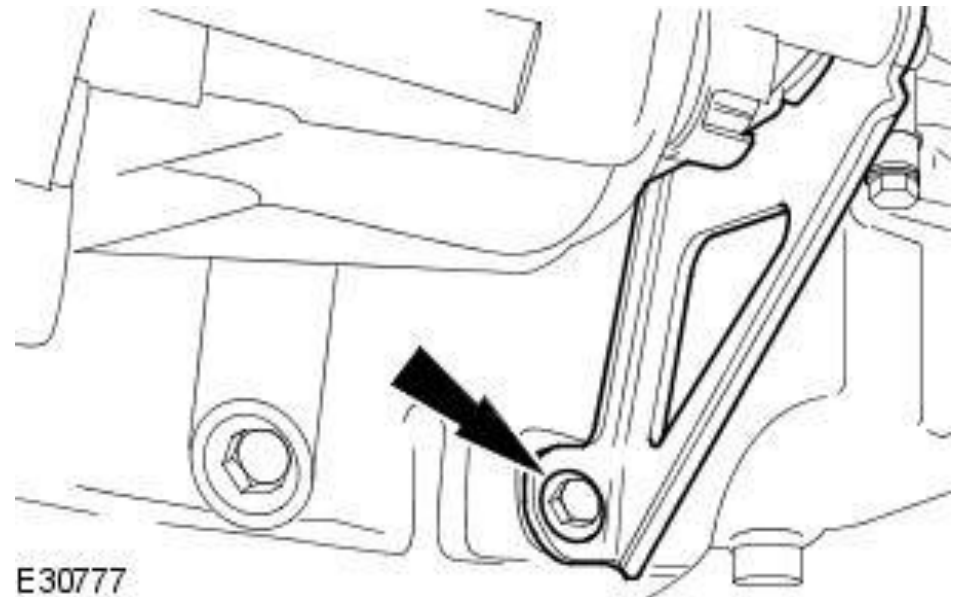


V. Oil Pan and Gasket Reinstall

- Tighten to 25 Nm

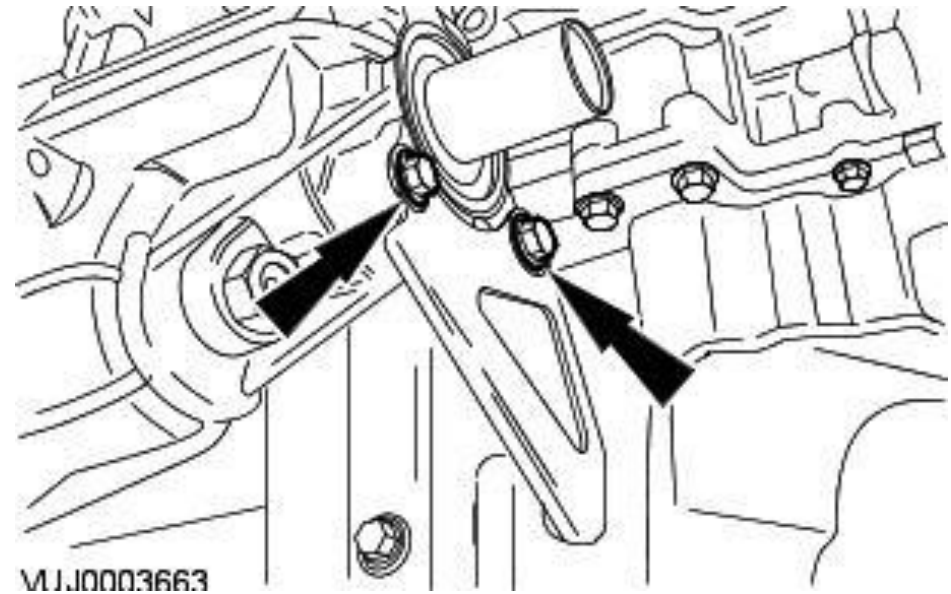


- Tighten to 47 Nm

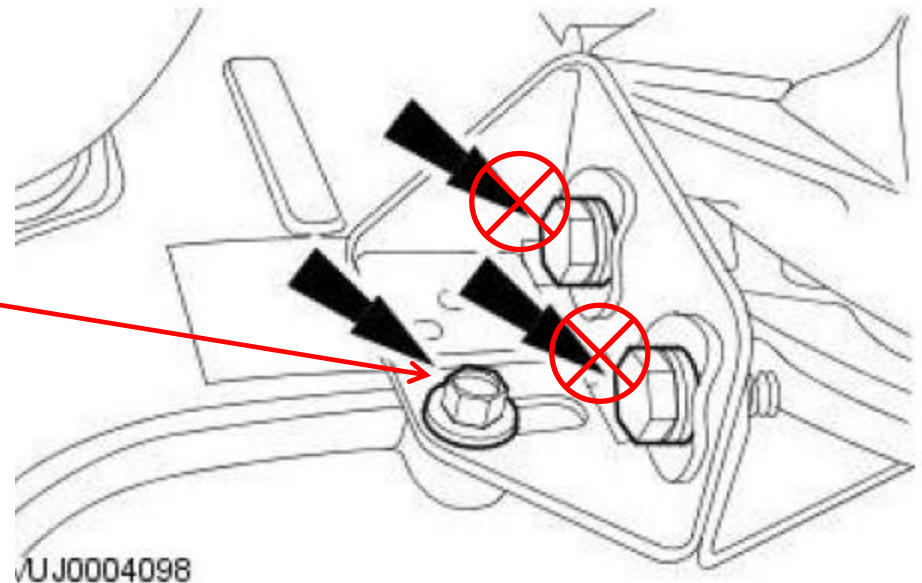


V. Oil Pan and Gasket Reinstall

- Tighten to 25 Nm

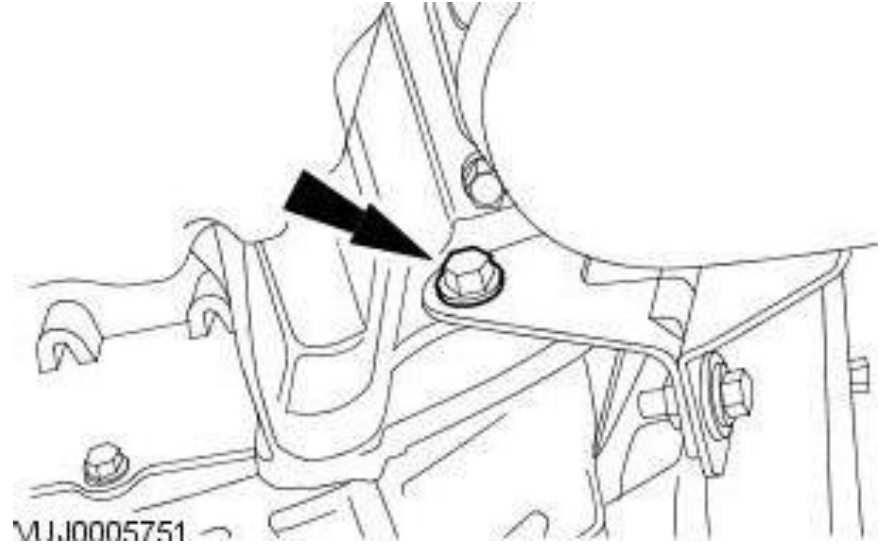


- Tighten to 25 Nm

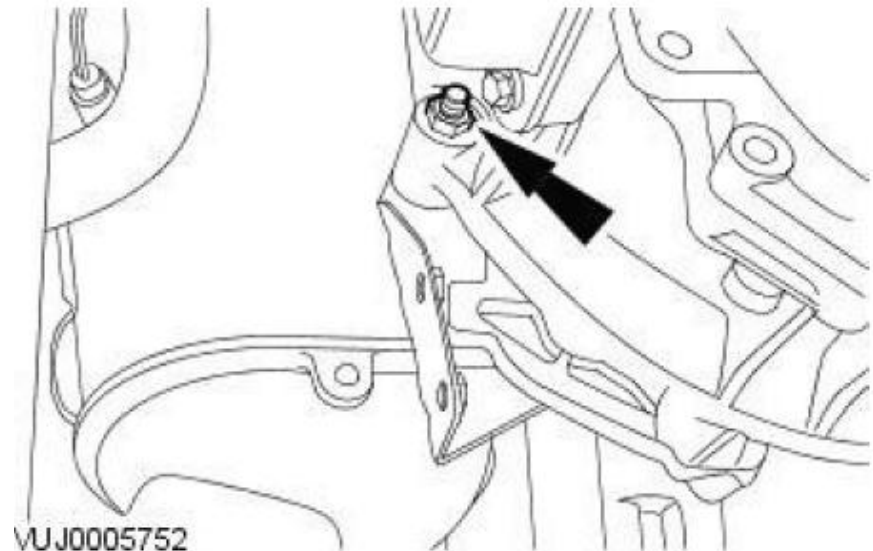


V. Oil Pan and Gasket Reinstall

- Tighten to 45 Nm

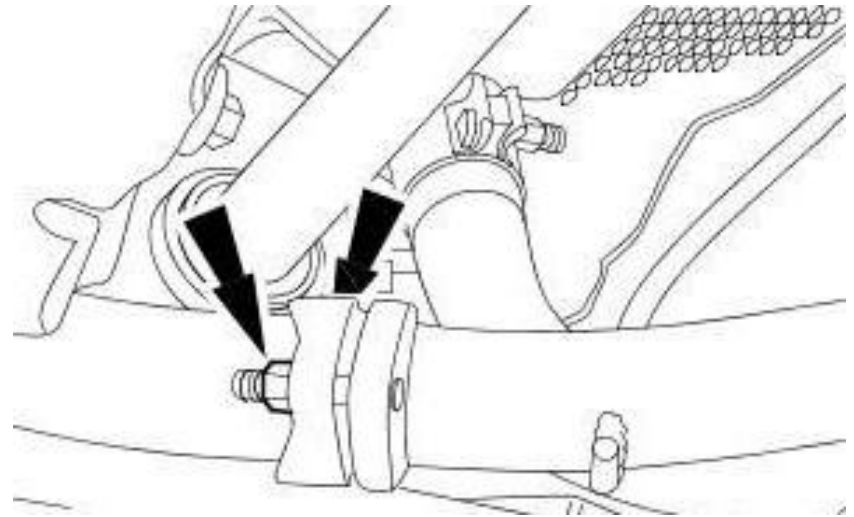


- Tighten to 25 Nm

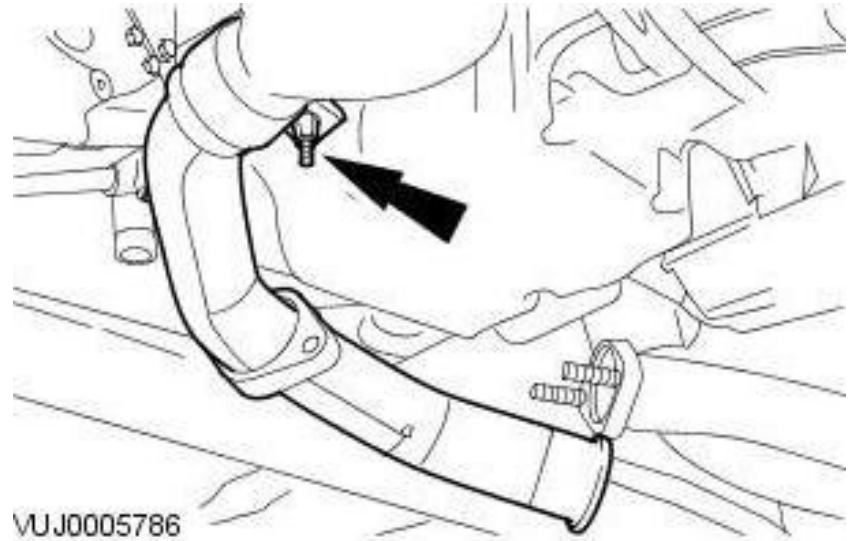


V. Oil Pan and Gasket Reinstall

- Tighten to 55 Nm

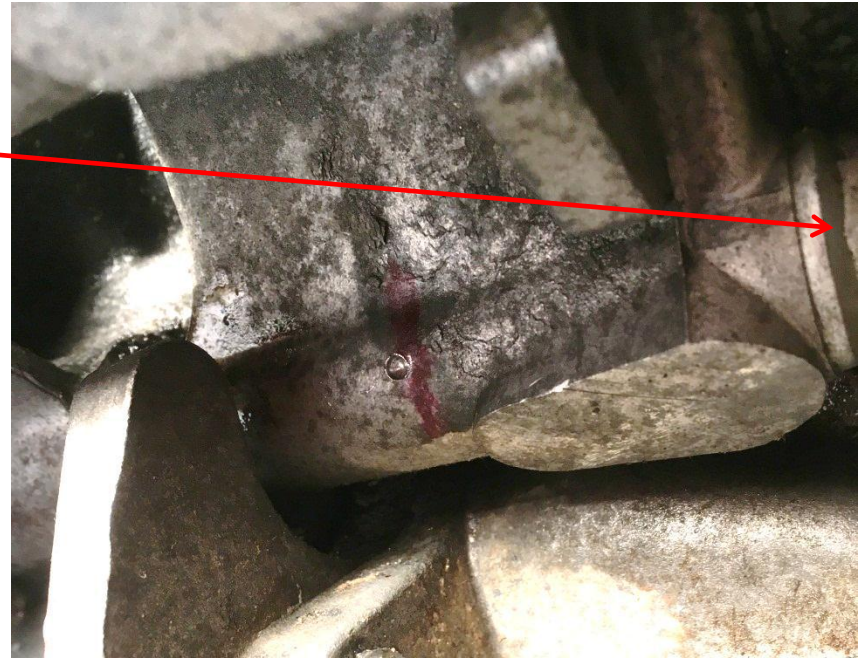


- Tighten to 55 Nm



V. Oil Pan and Gasket Reinstall

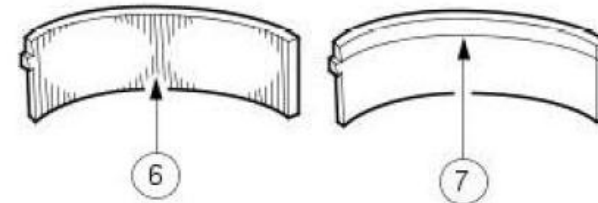
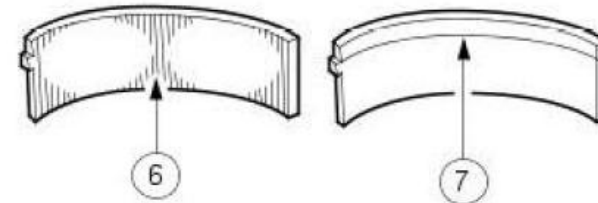
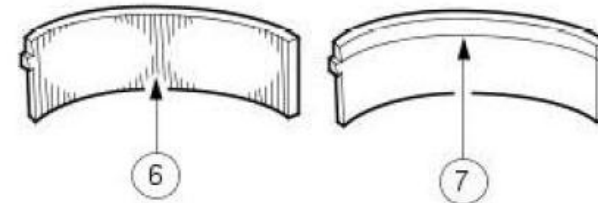
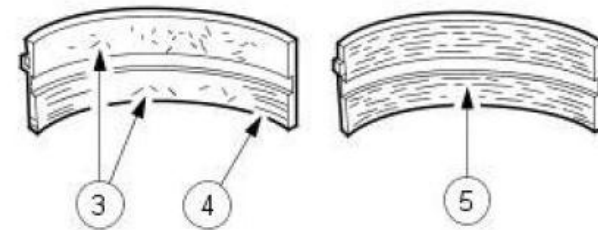
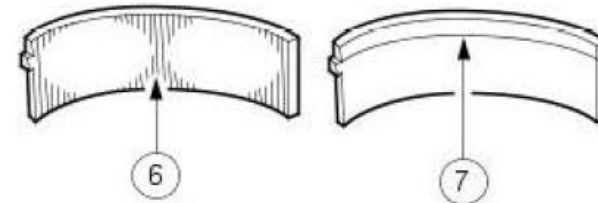
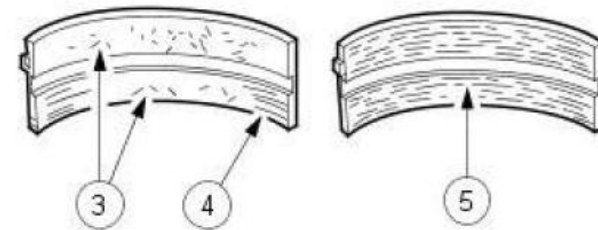
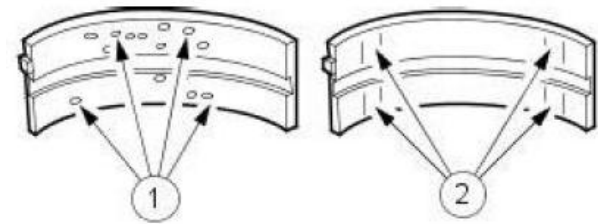
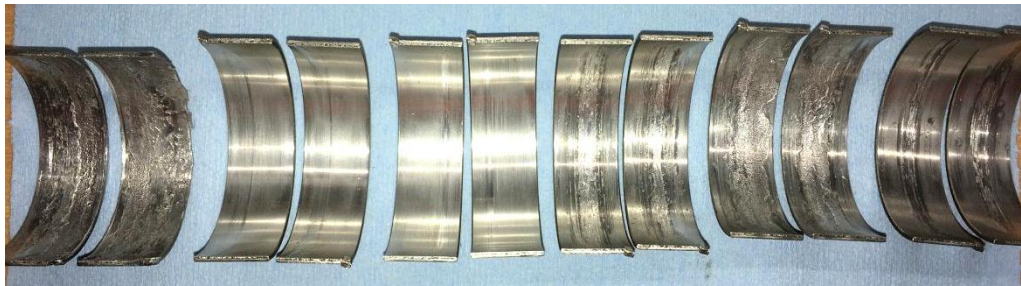
- Tighten to 80 Nm
- Reattach the serpentine belt
- Reinstall the front right wheel and splash shield
- Reinstall the 3 front spark plugs
- Install oil drain plug and filter
- Install oil dip stick
- Add oil
- Start engine and test for normal operation



VI. Inspection and Cleaning Procedures

- Bearing Inspection:

1. Cratering - fatigue failure
2. Spot polishing - incorrect seating.
3. Imbedded dirt engine oil.
4. Scratching - dirty engine oil.
5. Base exposed - poor lubrication.
6. Both edges worn - journal damaged.
7. One edge worn - journal tapered or bearing not seated.



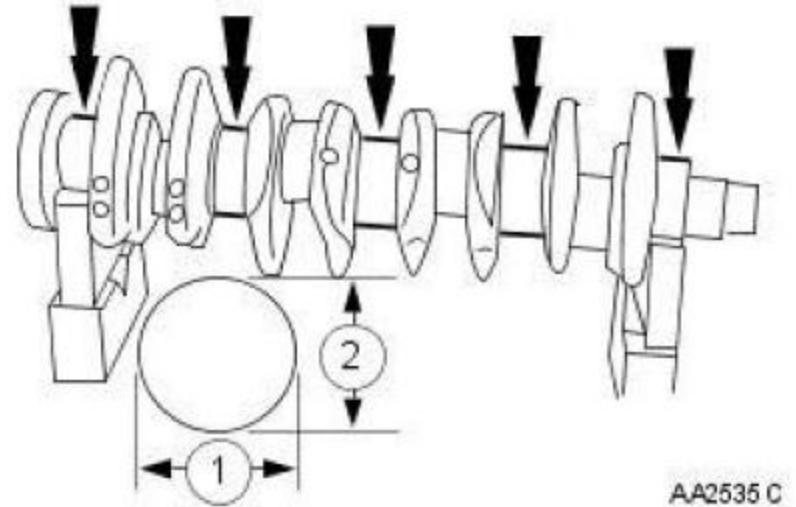
- Specs:

- Nominal Length = 0.709"
- Max wall thickness = 0.0591"



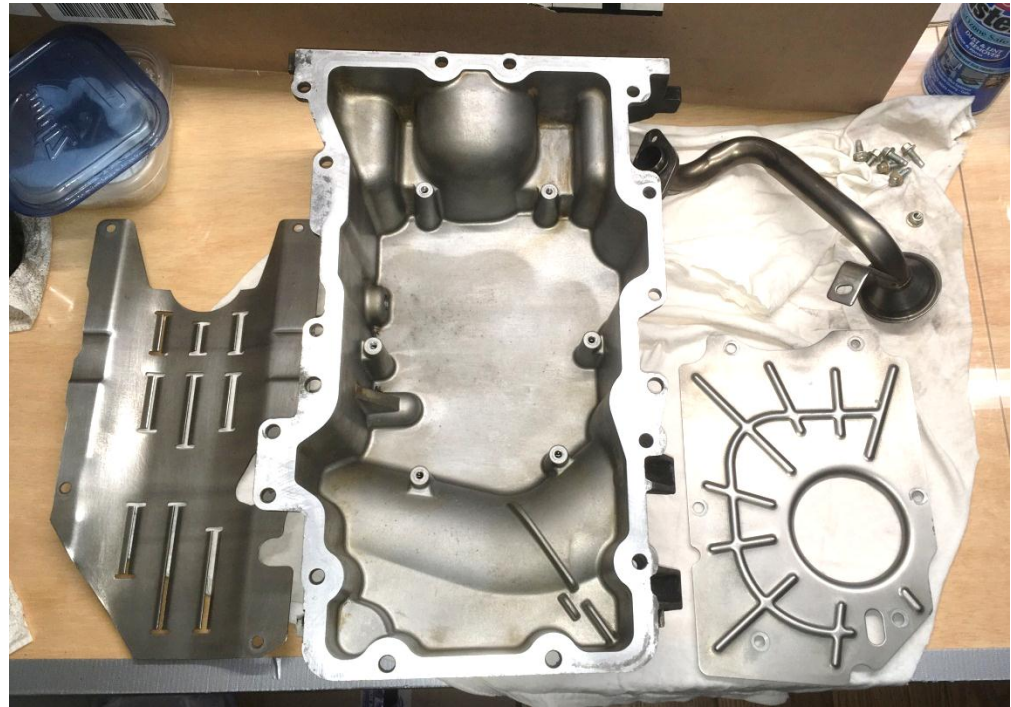
VI. Inspection and Cleaning Procedures

- Crankshaft Journal Diameter:
 - Measure the journal diameter once, then again, offset by 90° in order to determine any eccentricity which may be present
 - Measure the journal at 2 different positions to determine any conicity which may be present
- Specs:
 - Min = 1.9674"
 - Max = 1.9681"



VI. Inspection and Cleaning Procedures

- Remove the lower baffle attached to the oil pan
- Clean the oil pan, lower baffle, upper baffle, and oil pickup tube
- Use a combination of brake parts cleaner, hot water, dish soap, and scotch brite
- Be sure to remove all metal fragments from the oil pickup tube screen
- Using a razor blade, ensure the oil pan mating surface is free of gunk and RTV residue
- DO NOT scratch the oil pan mating surface



VI. Inspection and Cleaning Procedures

- Clean the engine block oil pan mating surface with a razor blade, brake cleaner, and scotch brite
- Clean the oil pickup tube mating surface
- Clean the oil pan bolts, baffle nuts, and oil pickup tube nut/bolts



VII. References

- Jaguar X – Type workshop manual
www.jagdocs.com
- *04 X-Type oil pan gasket FAQ*
<http://www.jaguarforums.com/forum/x-type-x400-14/04-x-type-oil-pan-gasket-faq-11221/>