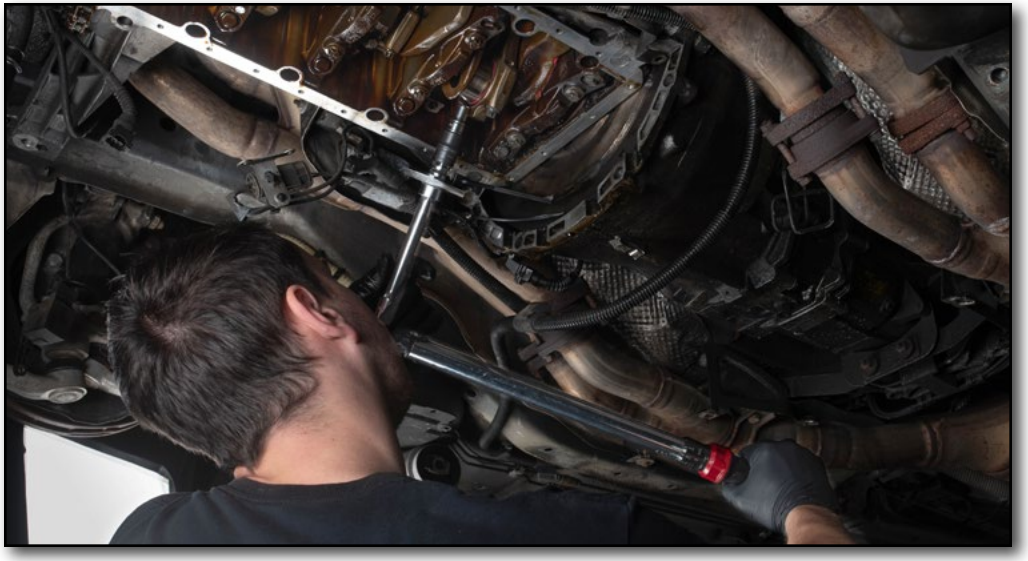
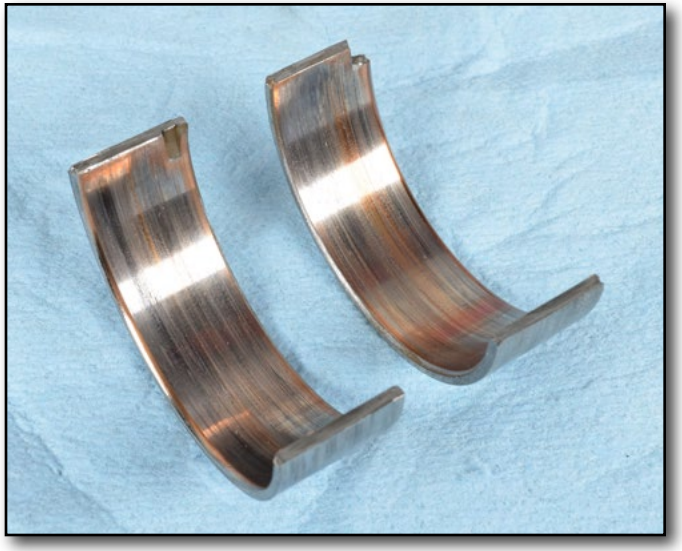
BMW S62 WPC Treated Rod Bearing Kit Installation Instructions - ES3175234

Skill Level
3 - Advanced

Advanced Skills & Experience Required





INTRODUCTION

BMW S62 Connecting Rod Bearing Replacement

The S62 engine is triumph of BMW engineering and technology. Unfortunately it is also known to suffer from premature rod bearing wear which, if left untreated, can lead to engine failure. There are several factors which contribute to this issue including the bearing material composition, and lack of routine maintenance.

Our kit includes all of the gaskets and seals you'll need, as well as WPC treated genuine BMW upper and lower bearing shells. What is WPC, you ask? WPC is a surface treatment that reduces friction and adds strength, two improvements which greatly benefit internal engine components. Ultra-fine particles are fired at the bearing surface at very high speeds, like shot-peening, but ***much*** smaller. The parts come out smoother and stronger due to thermal discharge. The two largest enemies of any high-performance engine are heat and friction, and the WPC treatment will help to reduce both of them.

The photo on the right shows the bearings we removed from an E39 M5 with just over 200,000 miles. It was pretty clear to us during disassembly that the engine had not been maintained very well. The oil was very dirty with particulates coating nearly every surface. The engine came to us with a rod knock, and you've probably guessed that cylinder #8 was the culprit, but we'll get more into that later on.

Replacing the rod bearings in your S62 can be a tough job, even if you have some "wrench time" under your belt, but we're here to help! We've taken the guesswork out of this job and put together the perfect kit for you, and we'll walk you through the entire procedure step by step. Thank you for looking to ECS Tuning for all of your performance and repair needs, we appreciate your business!

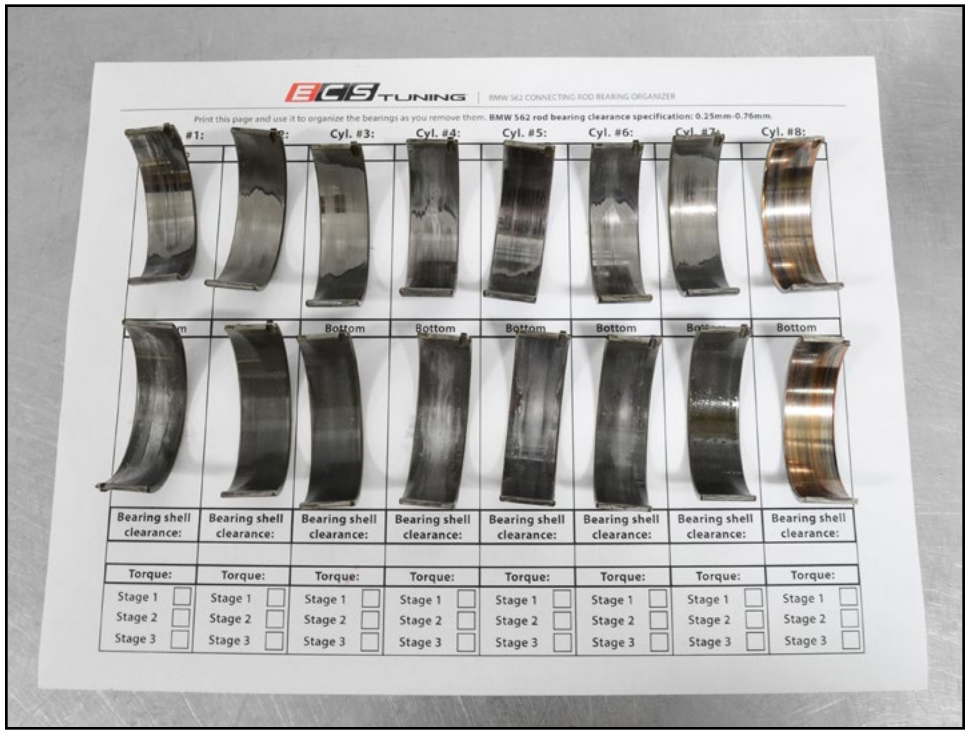


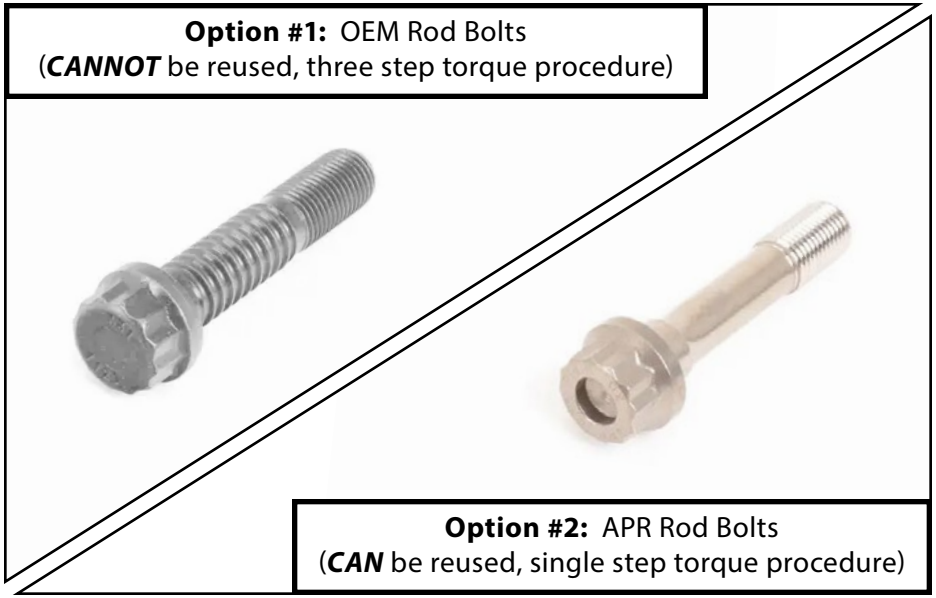
TABLE OF CONTENTS

KIT CONTENTS

NOTE:
- Upper shells are marked w/**BLUE** paint
- Lower shells are marked w/**RED** paint

WPC Treated Rod Bearing Shells **(QTY 16)**

Option #1: OEM Rod Bolts
(***CANNOT*** be reused, three step torque procedure)



Option #2: APR Rod Bolts
(***CAN*** be reused, single step torque procedure)

Rod Bolts **(QTY 16)**

Oil Service Kit* **(QTY 1)**
*Includes two extra liters of oil not shown in the photo

Lower Oil Sump Gasket **(QTY 1)**

Upper Oil Sump Gasket **(QTY 1)**

Assembly Lube **(QTY 1)**

REQUIRED TOOLS

Note: The tools required for each step will be listed by the step number throughout these instructions.

Standard Automotive Tools

- Protecta-Sockets (for lug nuts) ..... ES#2221243
- **⅜" Drive Ratchet** ..... ES#2765902
- **⅜" Drive Torque Wrench** ..... ES#2221245
- **⅜" Drive Deep and Shallow Sockets** ..... ES#2763772
- **⅜" Drive Extensions** ..... ES#2804822
- **Hydraulic Floor Jack** ..... ES#2834951
- **Torx Drivers and Sockets** ..... ES#11417/8
- **½" Drive Deep and Shallow Sockets** ..... ES#2839106
- **½" Drive Ratchet**
- **½" Drive Extensions**
- **½" Drive Torque Wrench** ..... ES#2221244
- **½" Drive Breaker Bar** ..... ES#2776653
- Bench Mounted Vise
- Crows Foot Wrenches
- **Hook and Pick Tool Set** ..... ES#2778980

Required For This Install

- **¼" Drive Ratchet** ..... ES#2823235
- **¼" Drive Deep and Shallow Sockets** ..... ES#2823235
- **¼" Drive Extensions** ..... ES#2823235
- Plier and Cutter Set ..... ES#2804496
- **Flat and Phillips Screwdrivers** ..... ES#2225921
- **Jack Stands** ..... ES#2763355
- Ball Pein Hammers
- Pry Bar Set ..... ES#1899378
- Electric/Cordless Drill
- Wire Strippers/Crimpers
- Drill Bits
- Punch and Chisel Set
- **Hex Bit (Allen) Wrenches and Sockets** ..... ES#11420
- Thread Repair Tools ..... ES#1306824
- **Open/Boxed End Wrench Set** ..... ES#2765907

Available On Our Website

Specialty Tools

- **Schwaben Engine Support Bar** ..... ES#2804773
- **Schwaben External Torx Socket Set** ..... ES#2777804
- **Schwaben Stubby Socket Driver Set** ..... ES#3103367

SHOP SUPPLIES AND MATERIALS

Standard Shop Supply Recommendations: We recommend that you have a standard inventory of automotive shop supplies before beginning this or any automotive repair procedure. The following list outlines the basic shop supplies that we like to keep on hand. Shop supplies with a hyperlink are available on our website.

- Hand Cleaner/Degreaser - Click Here
- Pig Mats - for protecting your garage floor and work area from spills and stains - Click Here
- Spray detailer - for rapid cleaning of anything that comes into contact with your paint such as brake fluid - Click Here
- Micro Fiber Towels - for cleaning the paint on your car - Click Here
- Latex Gloves - for the extra oily and dirty jobs - Click Here
- Medium and High Strength Loctite Thread lock compound - to prevent bolts from backing out - Click Here
- Anti-Seize Compound - to prevent seizing, galling, and corrosion of fasteners - Click Here
- Aerosol Brake/Parts Cleaner - for cleaning and degreasing parts
- Shop Rags - used for wiping hands, tools, and parts
- Penetrating oil - for helping to free rusted or stuck bolts and nuts
- Mechanics wire - for securing components out of the way
- Silicone spray lube - for rubber components such as exhaust hangers
- Paint Marker - for marking installation positions or bolts during a torquing sequence
- Plastic Wire Ties/Zip Ties - for routing and securing wiring harnesses or vacuum hoses
- Electrical tape - for wrapping wiring harnesses or temporary securing of small components

INSTALLATION NOTES

- **RH** refers to the ***passenger side*** of the vehicle.
- **LH** refers to the ***driver side*** of the vehicle.
- Always use the proper torque specifications.
- If applicable to this installation, torque specifications will be listed throughout the document and at the end as well.
- Please read all of these instructions and familiarize yourself with the complete process **BEFORE** you begin.

GENERAL PREPARATION AND SAFETY INFORMATION

ECS Tuning cares about your health and safety, please read the following safety information. This information pertains to automotive service in general, and while it may not pertain to every job you do, please remember and share these important safety tips.

- Park your car in a safe, well lit, level area.
- Shut the engine off and remove the key from the ignition switch.
- Make sure any remote start devices are properly disabled.
- **ALWAYS** wear safety glasses.
- Make sure the parking brake is applied until the vehicle is safely lifted and supported.
- Whether lifting a vehicle using an automotive lift or a hydraulic jack, be sure and utilize the factory specified lift points.
- Lifting a vehicle in an incorrect location can cause damage to the suspension/running gear.
- **ALWAYS** support the vehicle with jack stands.
- **ALWAYS** read and follow all safety information and warnings for the equipment you are using.

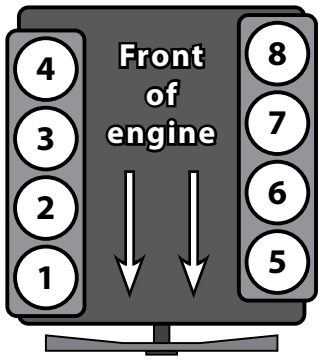
NEVER get underneath a vehicle that is supported only by a jack, and ALWAYS make sure that the vehicle is securely supported on jack stands.

PROJECT OVERVIEW

For your convenience we've included a bearing organizer sheet on the next page for you to print off. This will help you to keep track of your bearing shells, observe wear patterns, and you can use the check boxes along the bottom to record your progress as you torque the rod bolts.

We've also included the engine cylinder number illustration below for quick reference.

Now let's get to it!



BMW S62 CONNECTING ROD BEARING ORGANIZER

Print this page and use it to organize the bearings as you remove them. **BMW S62 rod bearing clearance specification: 0.25mm-0.76mm.**

Cyl. #1:	Cyl. #2:	Cyl. #3:	Cyl. #4:	Cyl. #5:	Cyl. #6:	Cyl. #7:	Cyl. #8:
Top	Top	Top	Top	Top	Top	Top	Top
Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Bearing shell clearance:	Bearing shell clearance:	Bearing shell clearance:	Bearing shell clearance:	Bearing shell clearance:	Bearing shell cle	Bearing shell ce:	Bearing shell clearance:
							0.25mm
Torque:	Torque:	Torque:	Torque:	Torque:	Torque:	Torque:	Torque:
5 Nm ☐	5 Nm ☐	5 Nm ☐	5 Nm ☑	5 Nm ☐	5 Nm ☐	5 Nm ☐	5 Nm ☐
20 Nm ☐	20 Nm ☐	20 Nm ☐	20 Nm ☑	20 N		20 Nm ☐	20 Nm ☐
65° ☐	65° ☐	65° ☐	65° ☑	65°		65° ☐	65° ☐

Place your bearing shells **HERE**

Write down your measurements **HERE**

Check off these boxes as you torque the rod bearing cap bolts

Print this page and use it to organize the bearings as you remove them. **BMW S62 rod bearing clearance specification: 0.025mm-0.067mm**.

Cyl. #1:	Cyl. #2:	Cyl. #3:	Cyl. #4:	Cyl. #5:	Cyl. #6:	Cyl. #7:	Cyl. #8:
Top	Top	Top	Top	Top	Top	Top	Top
Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Bearing shell clearance:	Bearing shell clearance:	Bearing shell clearance:	Bearing shell clearance:	Bearing shell clearance:	Bearing shell clearance:	Bearing shell clearance:	Bearing shell clearance:
Torque:	Torque:	Torque:	Torque:	Torque:	Torque:	Torque:	Torque:
5 Nm ☐	5 Nm ☐	5 Nm ☐	5 Nm ☐	5 Nm ☐	5 Nm ☐	5 Nm ☐	5 Nm ☐
20 Nm ☐	20 Nm ☐	20 Nm ☐	20 Nm ☐	20 Nm ☐	20 Nm ☐	20 Nm ☐	20 Nm ☐
65° ☐	65° ☐	65° ☐	65° ☐	65° ☐	65° ☐	65° ☐	65° ☐

DISASSEMBLY PROCEDURE

Step 1: 10mm Socket & Ratchet

Disconnect the negative (-) battery cable.

Step 2: Flat Blade Screwdriver

Remove the air boxes and inlet tubes (highlighted in **GREEN**).

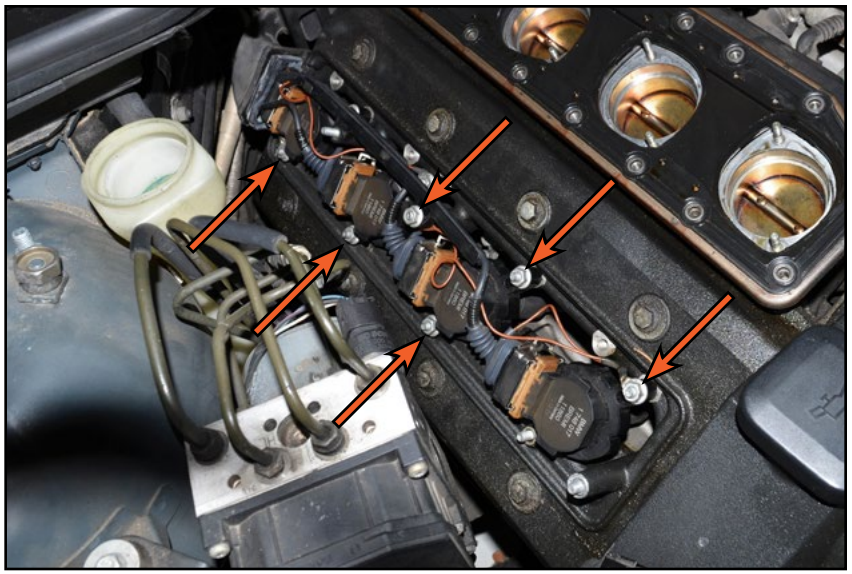
DISASSEMBLY PROCEDURE

Step 3: 10mm Socket & Ratchet

Remove the two bolts which secure the coil pack covers to the valve covers. Remove both coil pack covers and set them aside.

Step 4: 10mm Socket & Ratchet

Disconnect all of the coil packs, then remove the nuts which secure them to the valve cover. Remove the coil packs from the engine.



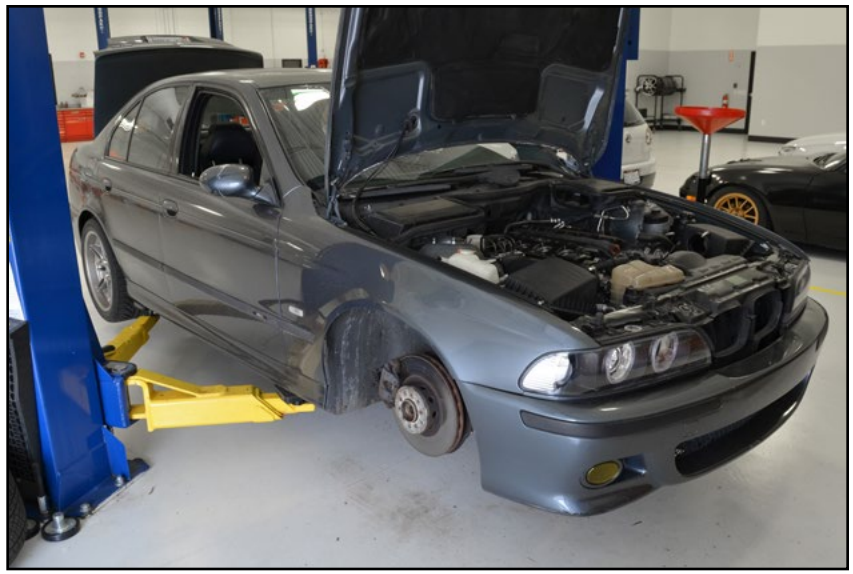
TECH TIP

We highly recommend leaving the spark plugs in the engine at this time. This should make it easier to remove the oil pump sprocket later on in this procedure.

DISASSEMBLY PROCEDURE

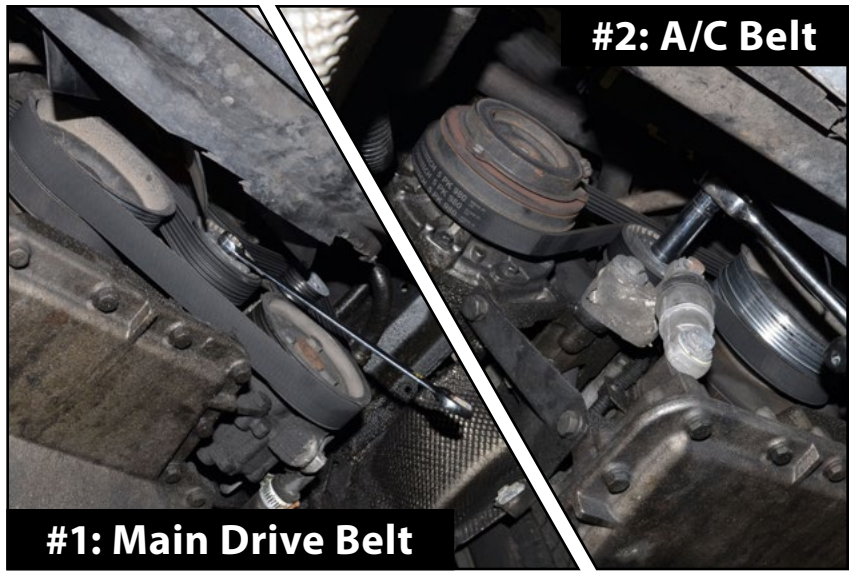
Step 5:

Safely lift and support the vehicle, then remove the front wheels. If you haven't done so yet, now is a good time to start draining the oil from the engine.



Step 6: 13mm Socket & Ratchet, 13mm Wrench

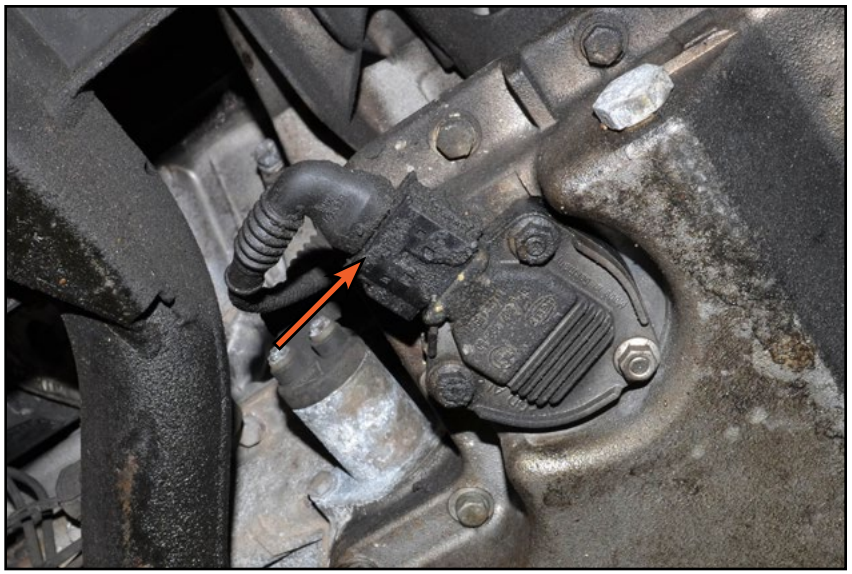
Remove both drive belts from the engine. The main belt can't be completely removed without removing the fan, it can be left hanging in place.



DISASSEMBLY PROCEDURE

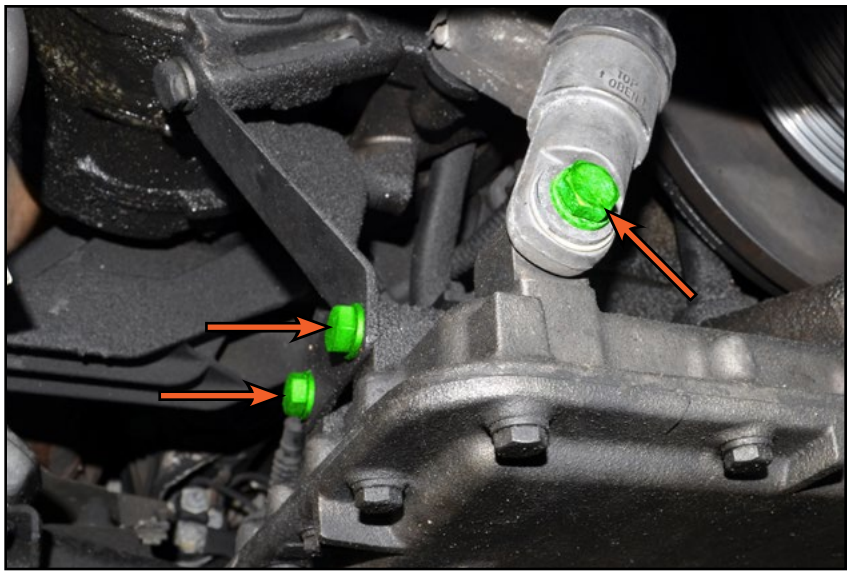
Step 7:

Disconnect the oil level sensor.



Step 8: 13mm Socket & Ratchet

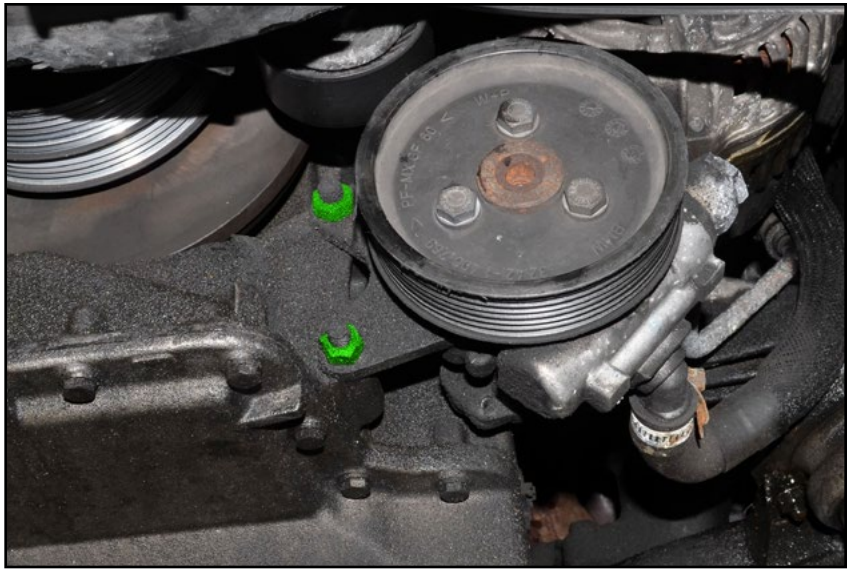
Remove the bolts (highlighted in **GREEN**) from the A/C compressor support bracket and the A/C belt tensioner.



DISASSEMBLY PROCEDURE

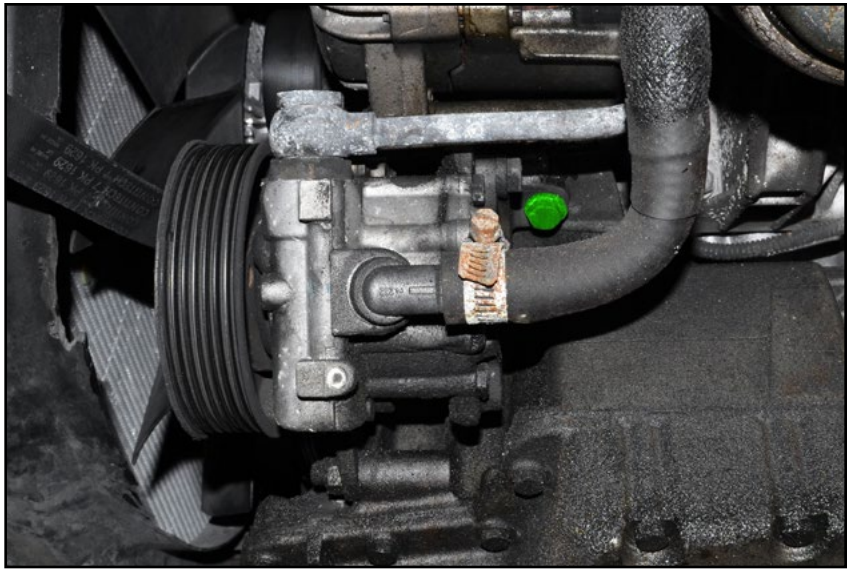
Step 9: 13mm Socket & Ratchet

Remove the two nuts (highlighted in **GREEN**) which secure the power steering pump to the front of the upper sump.



Step 10: 13mm Socket & Ratchet

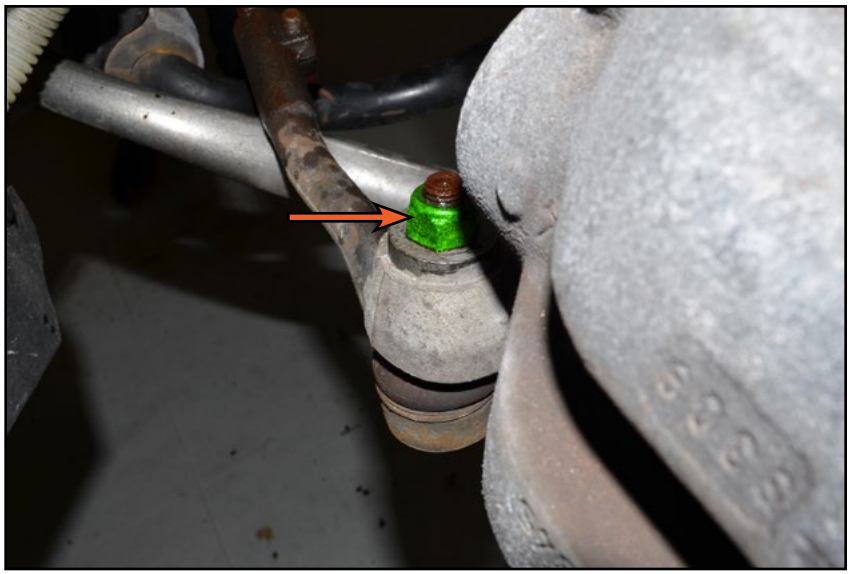
Remove the bolt (highlighted in **GREEN**) which secures the power steering pump to the engine.



DISASSEMBLY PROCEDURE

Step 11: 19mm Socket & Impact

Remove the outer tie rod end from the spindles (nut highlighted in **GREEN**).



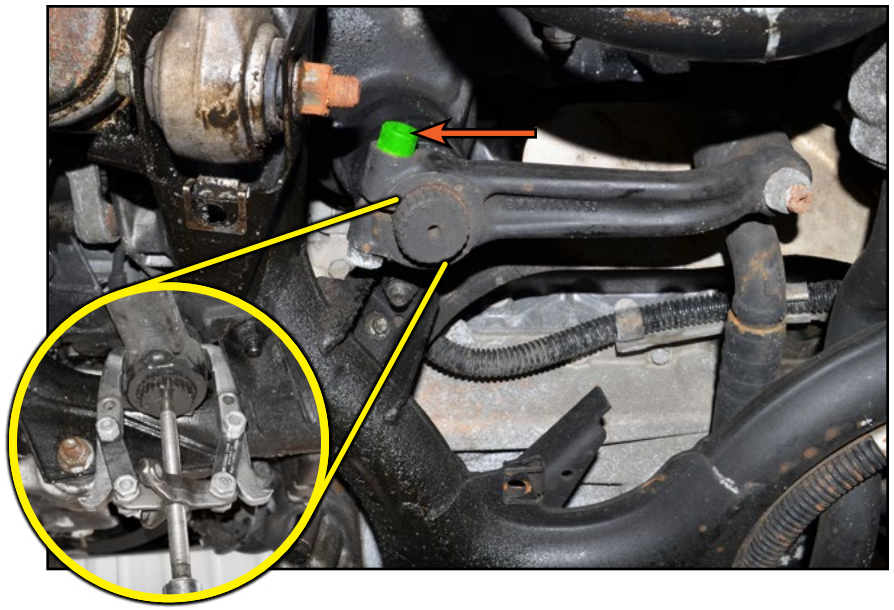
Step 12: 15mm Socket & Ratchet, 15mm Wrench

Remove the idler arm by counter-holding the bolt and loosening the nut (highlighted in **GREEN**).

DISASSEMBLY PROCEDURE

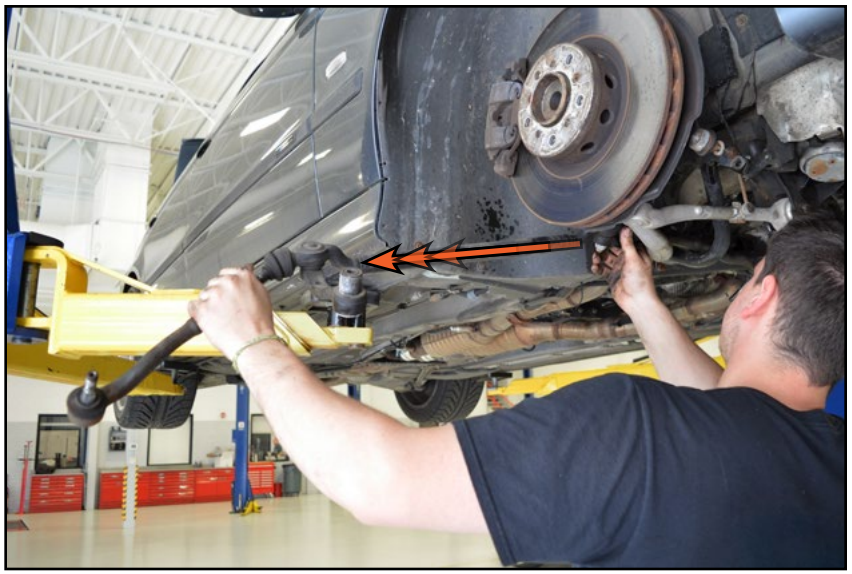
Step 13: 8mm Hex (Allen) Socket & Ratchet

Remove the bolt (highlighted in **GREEN**) which secures the pitman arm to the steering gear box, then use a suitable puller to remove the arm. Note the location of the alignment mark on the steering gear box shaft, this will be important when you reassemble the vehicle later on.



Step 14:

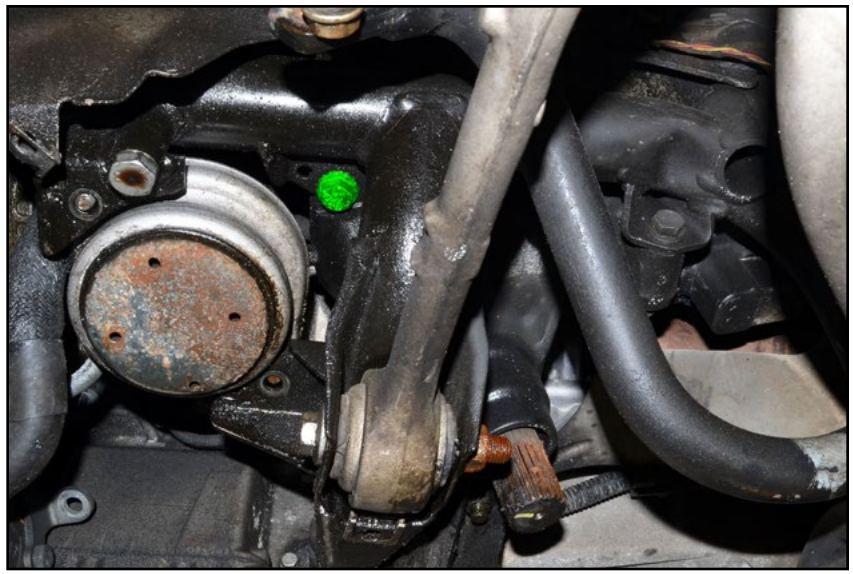
Slide the steering linkage assembly as one unit through either side of the vehicle.



DISASSEMBLY PROCEDURE

Step 15: 15mm Socket & Ratchet, 15mm Wrench

There are four bolts which secure the steering gear box to the subframe. Working from the LH side of the vehicle, begin by counter-holding the frontmost bolt (highlighted in **GREEN**) while you loosen the nut (not shown).



Step 16: 15mm Socket & Ratchet, 15mm Wrench

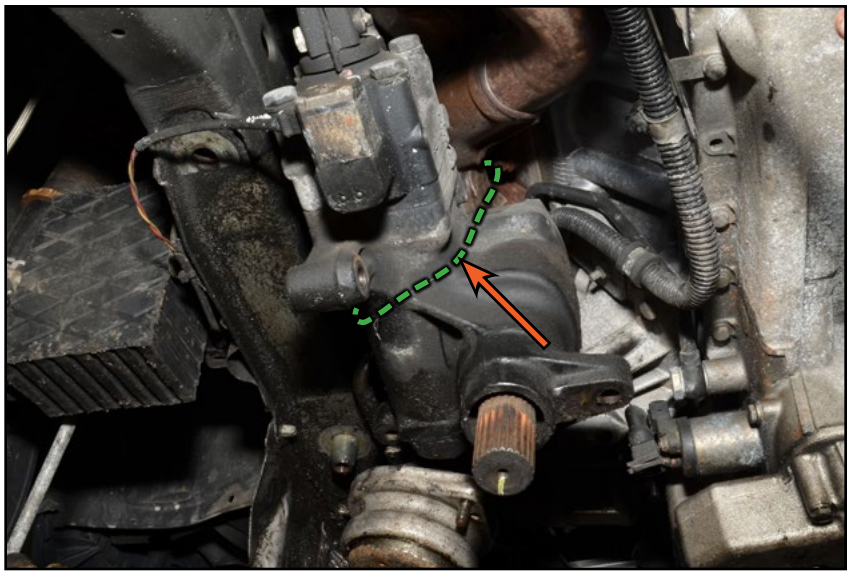
Working from below the vehicle, counter-hold the bolts shown in the photo and loosen the nuts (highlighted in **GREEN**).

DISASSEMBLY PROCEDURE

Step 17:

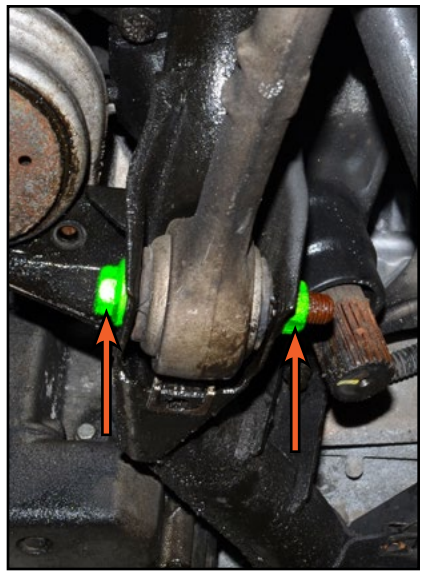
Use mechanic's wire or zip-ties to secure the steering gear box to the engine.

The photo on the right shows what we did (with the subframe removed for better visibility). We were able to route our wire up and through the exhaust manifold (represented by a dotted **GREEN** line in the photo), then tie it off.



Step 18: 10mm Wrench, 16mm Wrench, 18mm Socket & Ratchet

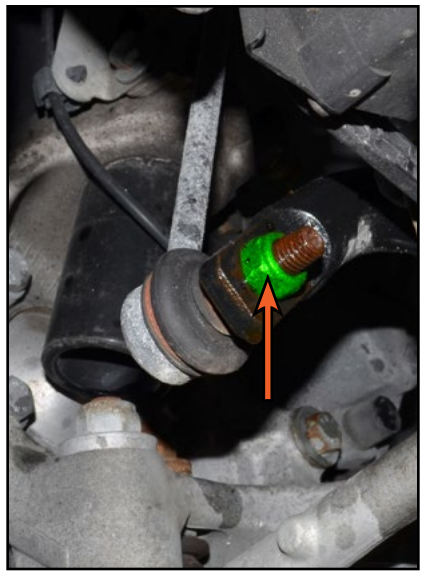
Disconnect the arm from the headlight leveling sensor (arrow in the LH photo), then remove the inner bolt on the lower control arm (highlighted in **GREEN** in the RH photo).

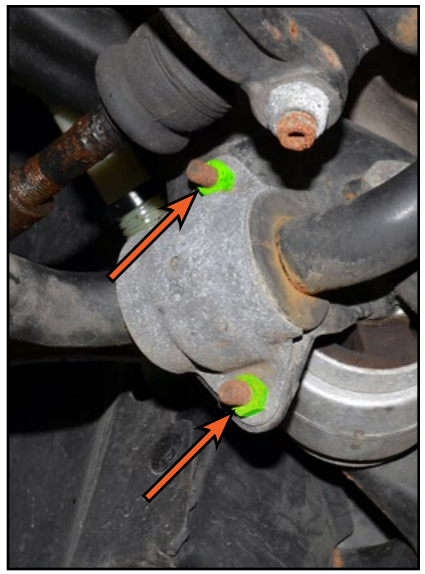


DISASSEMBLY PROCEDURE

Step 19: 16mm Socket & Impact, 13mm Socket & Ratchet

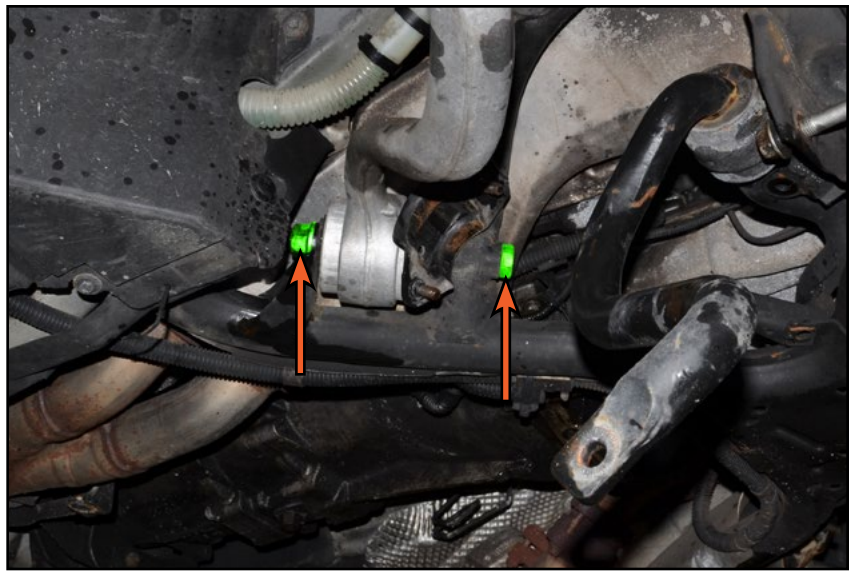
Remove the sway bar end links from the sway bar (highlighted in **GREEN** in the LH photo), then remove the bolts from both sway bar brackets (highlighted in **GREEN** in the RH photo). Swing the sway bar out of the way for better access to the thrust arm bolts.





Step 20: 21mm Wrench, 21mm Socket & Ratchet

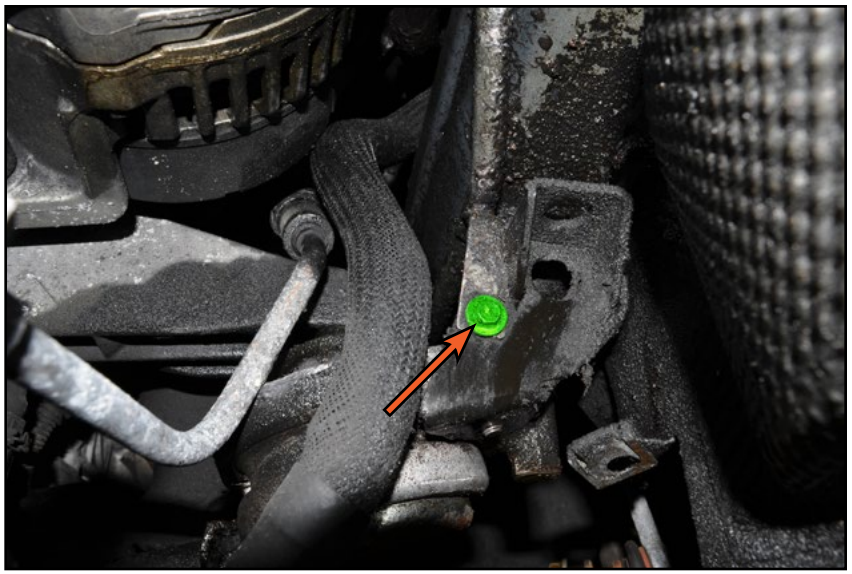
Counter-hold the thrust arm bolt and loosen the nut (highlighted in **GREEN**). Do this to remove both thrust arm bolts. Swing the control arms and thrust arms out of the way, but leave them connected to the spindles (not shown).



DISASSEMBLY PROCEDURE

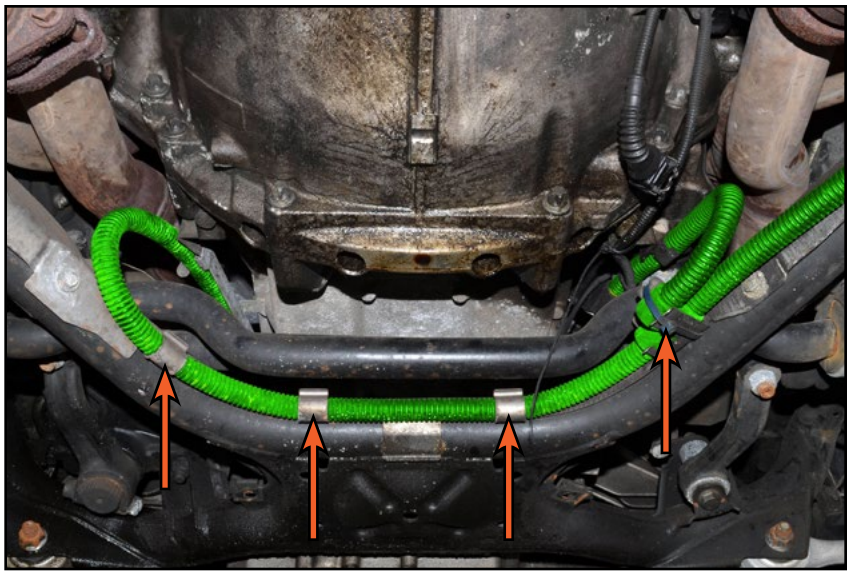
Step 21: 8mm Socket & Ratchet

Remove the small bolt (highlighted in **GREEN**) which secures the hard line to the subframe (located near the LH engine mount).



Step 22:

Release the wiring harness (highlighted in **GREEN**) from the clips along the rear of the subframe.



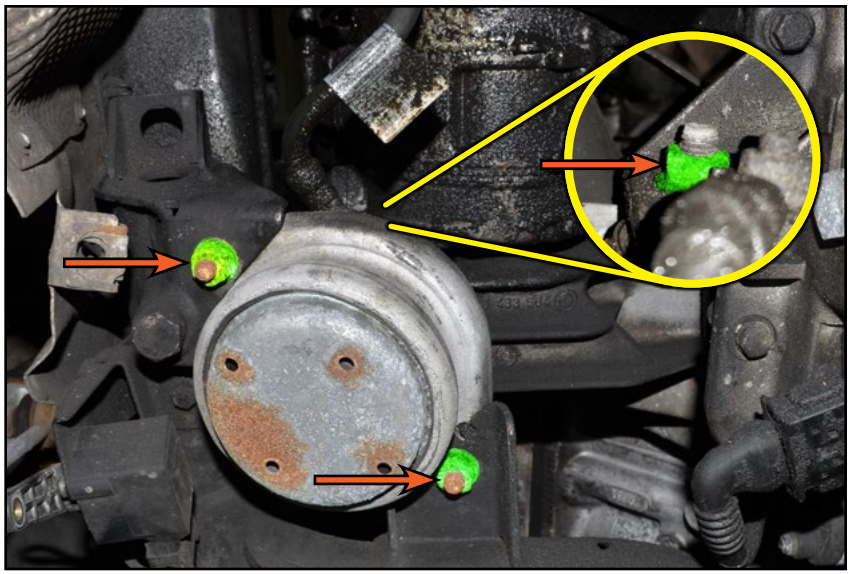
DISASSEMBLY PROCEDURE

Step 23: Schwaben Engine Support Bar

Support the engine from above. There are factory lift points on the LH front and RH rear corners of the engine, we used two of our engine support bars for a bit of added safety.

Step 24: 13mm Socket & Ratchet

Remove all three nuts (highlighted in **GREEN**) from each engine mount (1x on the top, 2x on the bottom). Lift the engine an inch or two, then remove the mounts from the subframe (not shown).

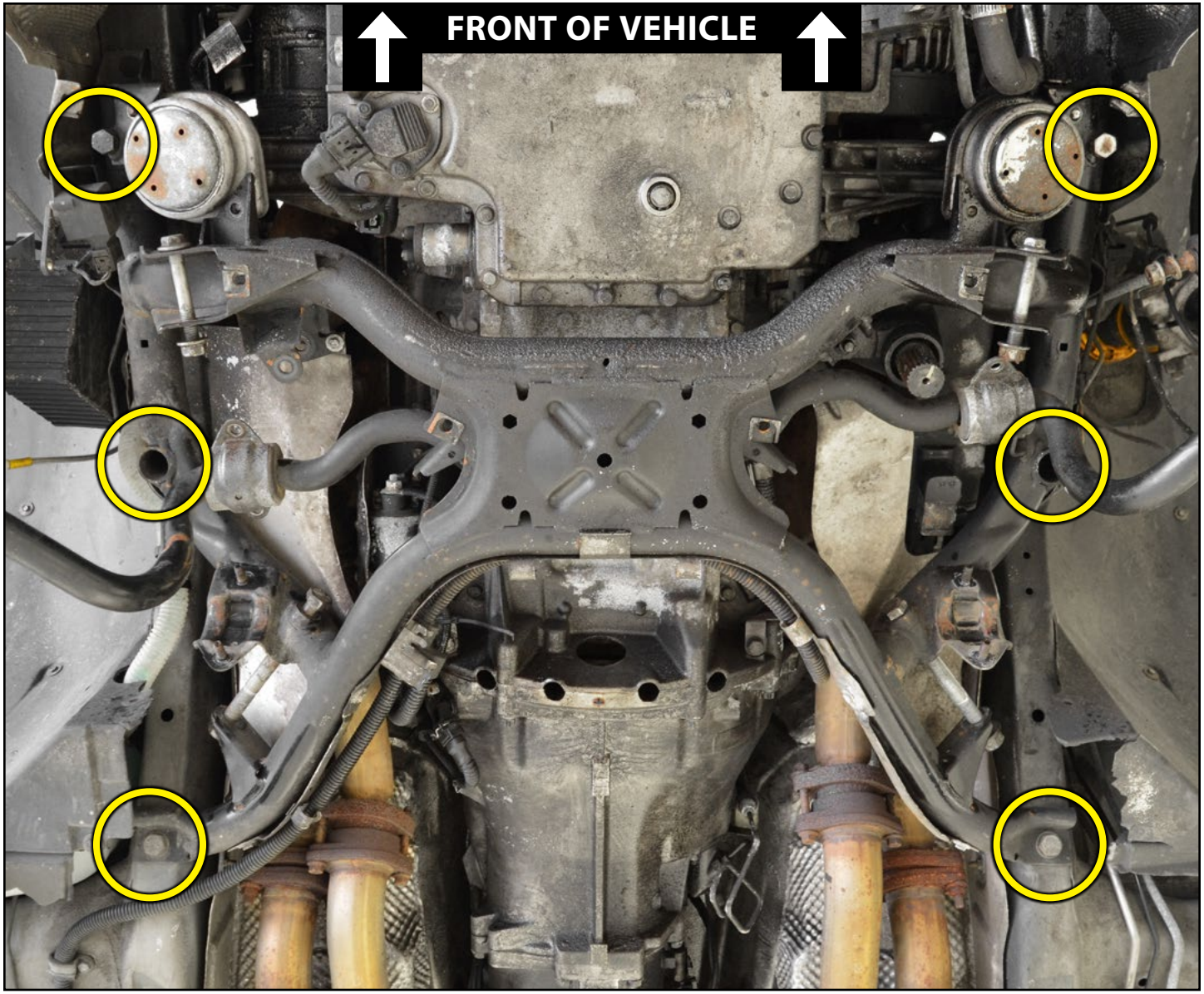


CAUTION: From this point forward the engine will only be supported by the engine support bar above.

DISASSEMBLY PROCEDURE

Step 25:

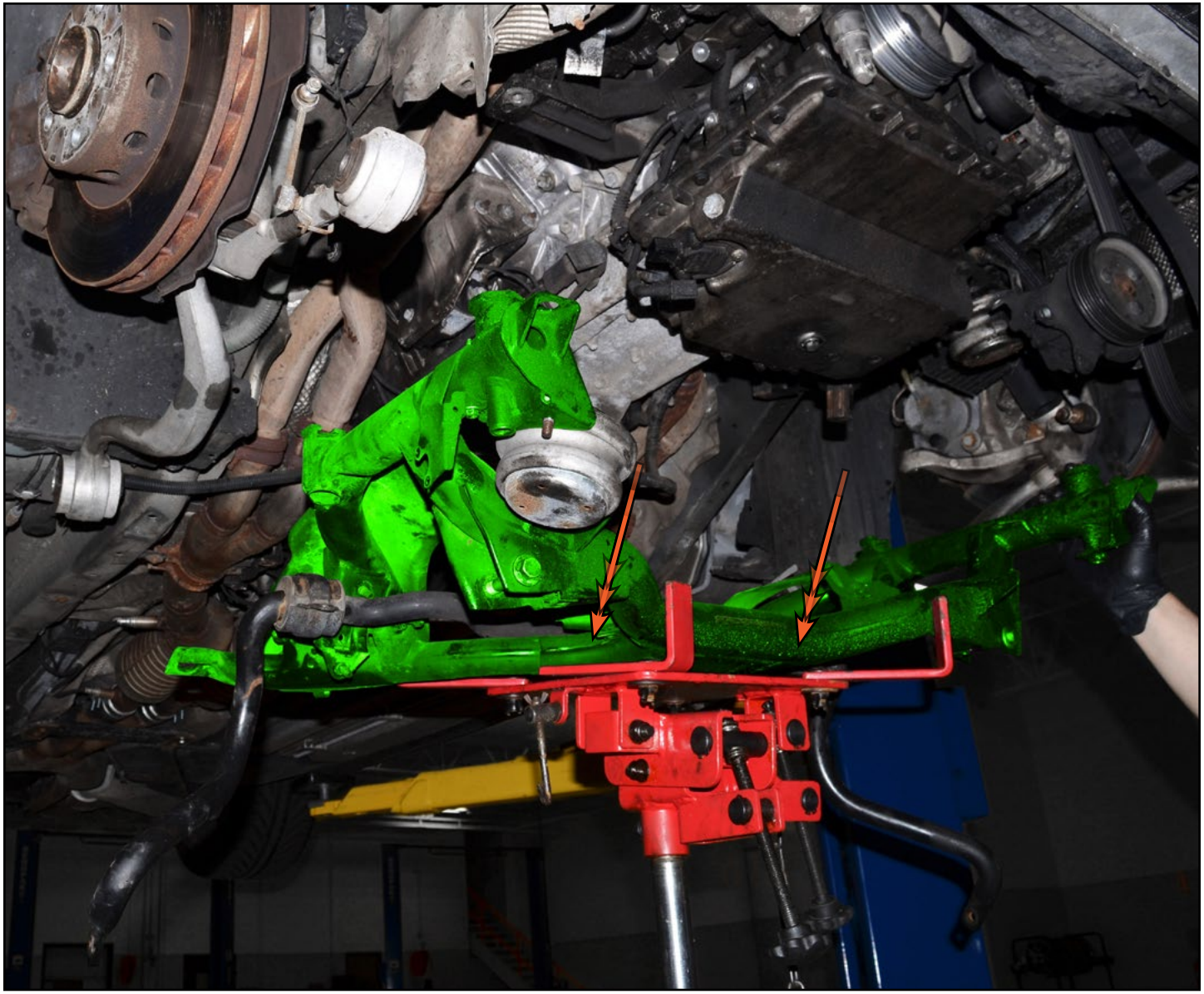
Support the subframe from below. Locate and remove the six 18mm bolts which secure the subframe to the chassis (circled in **YELLOW** in the photo).



DISASSEMBLY PROCEDURE

Step 26:

Carefully lower the subframe (highlighted in **GREEN**) and set it aside. You may need to pull the subframe rearward slightly while lowering it in order to clear various components.

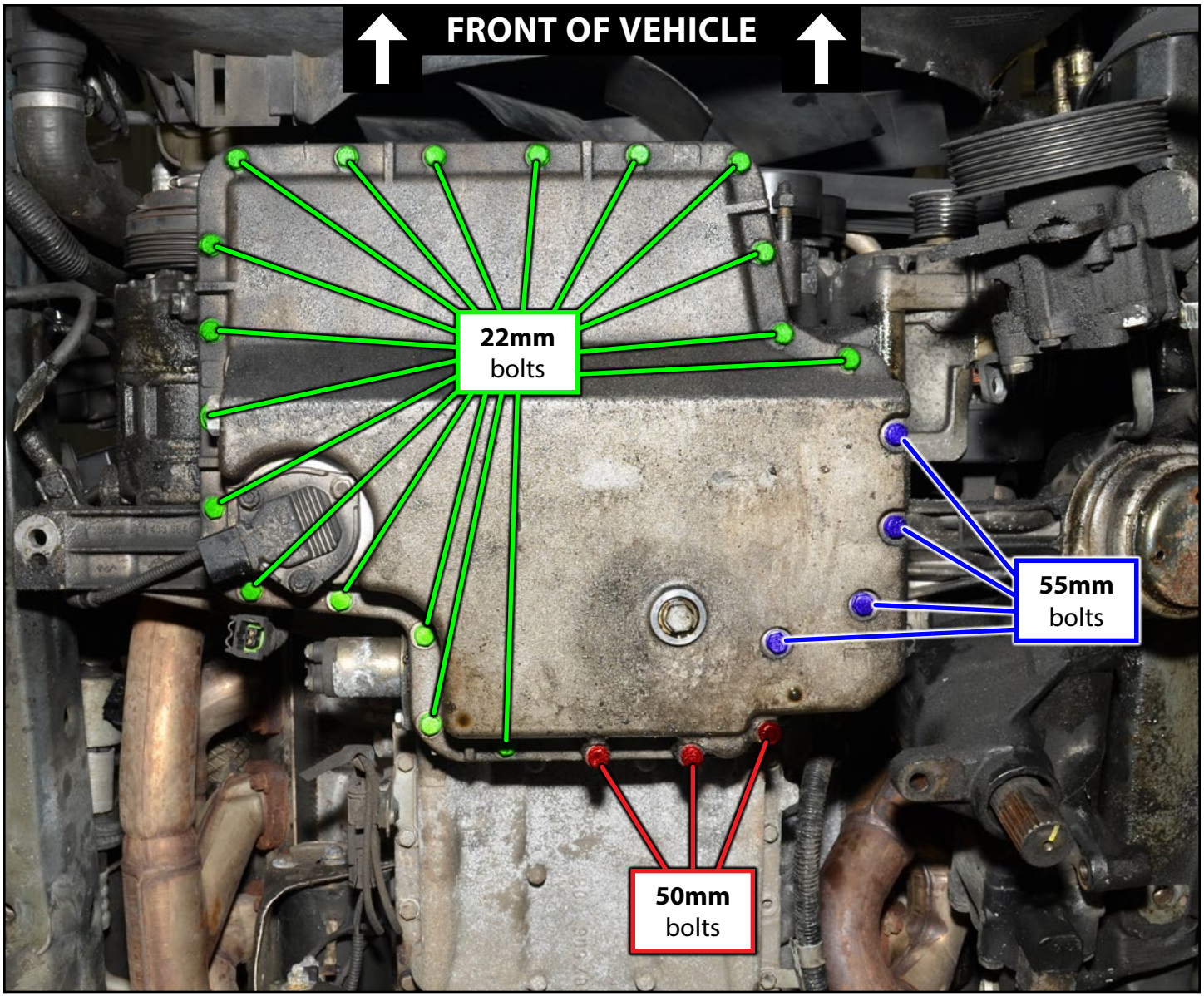


DISASSEMBLY PROCEDURE

Step 27:

There are 25x 10mm bolts which secure the lower sump to the upper sump.

Note the three different bolt lengths which are called out in the photo on the right, we would advise that you refer back to this photo later on when you are reinstalling the lower sump to ensure that all bolts are installed into the correct locations.



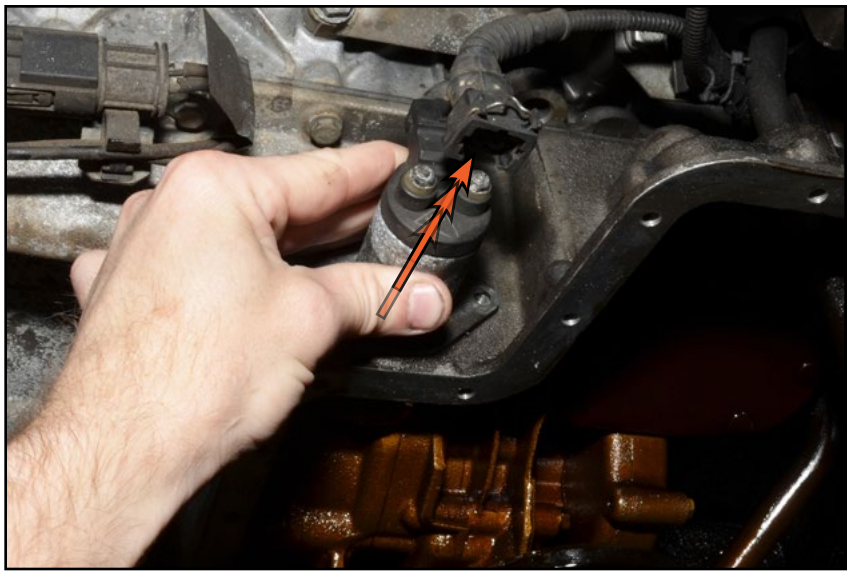
DISASSEMBLY PROCEDURE

Step 28: 10mm Socket & Ratchet

TECH TIP

This step will make quite a mess, it would be wise to be prepared to catch the oil with a drip pan ***BEFORE*** you remove the valves.

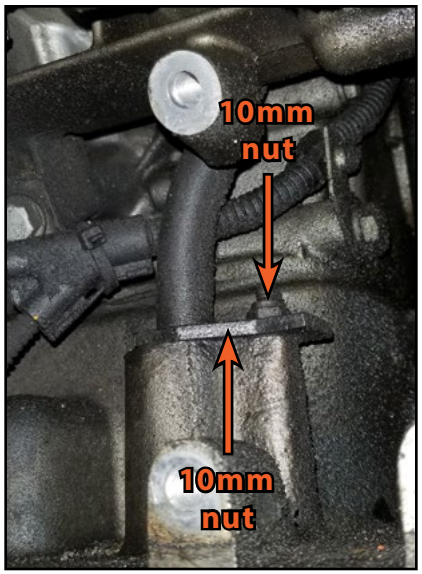
Remove the two bolts which secure each oil changeover valve to the upper sump. Firmly grasp one of the valves and pull it out of the sump. These valves can be a little difficult to pull out, so you may need to gently pry on the mounting flange with a screwdriver. Be very careful here to not damage the sump or the valve during removal.

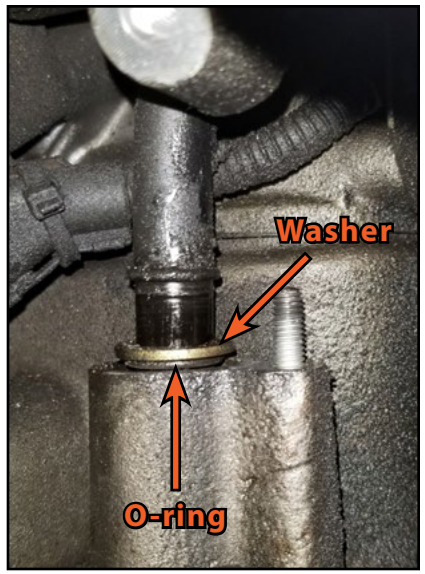


DISASSEMBLY PROCEDURE

Step 29: 10mm Socket & Ratchet

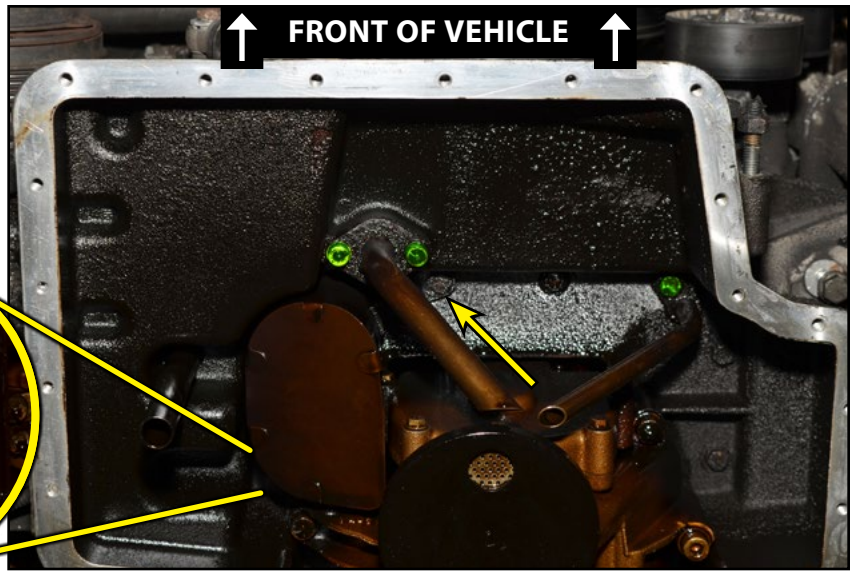
Remove the nut which secures the oil dipstick to the top of the upper sump. Note the locations of the clamping plate, washer and o-ring for when you reassemble the vehicle later on.





Step 30: 5mm Allen Socket, 10mm Socket & Ratchet

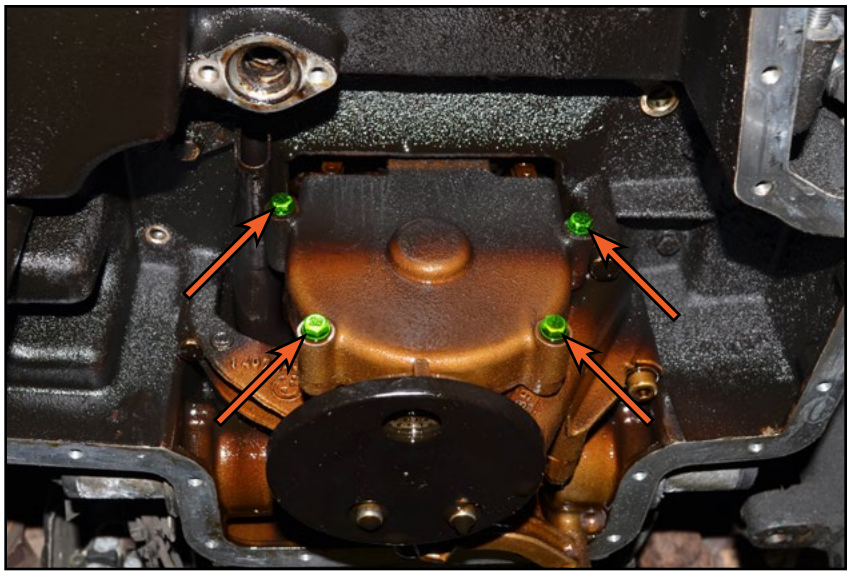
Remove the three bolts (highlighted in **GREEN**) which secure the two oil tubes to the upper sump. Remove the two bolts which secure the impact plate to the upper sump (reference the **YELLOW** arrows and the inset photo).



DISASSEMBLY PROCEDURE

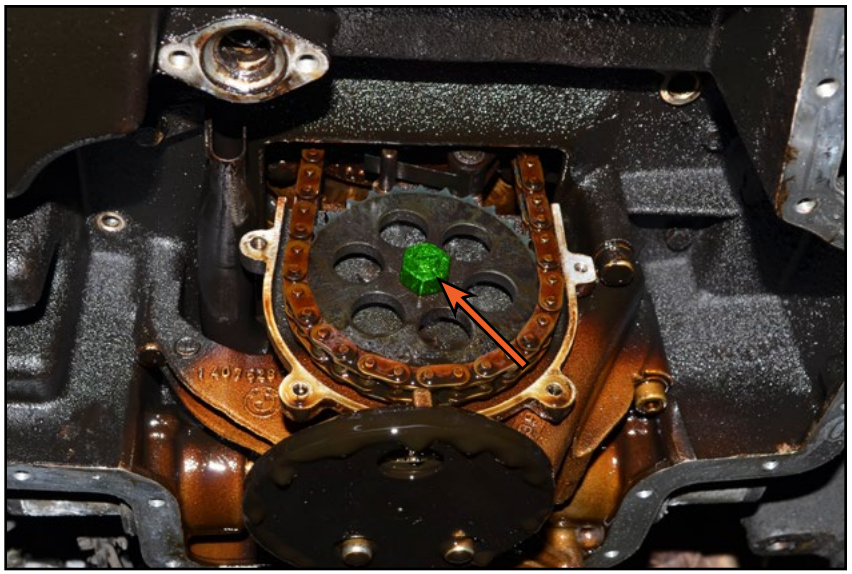
Step 31: 8mm Socket & Ratchet

Remove the four bolts (highlighted in **GREEN** in the LH photo) which secure the oil pump chain guard.



Step 32: 16mm Socket & Ratchet

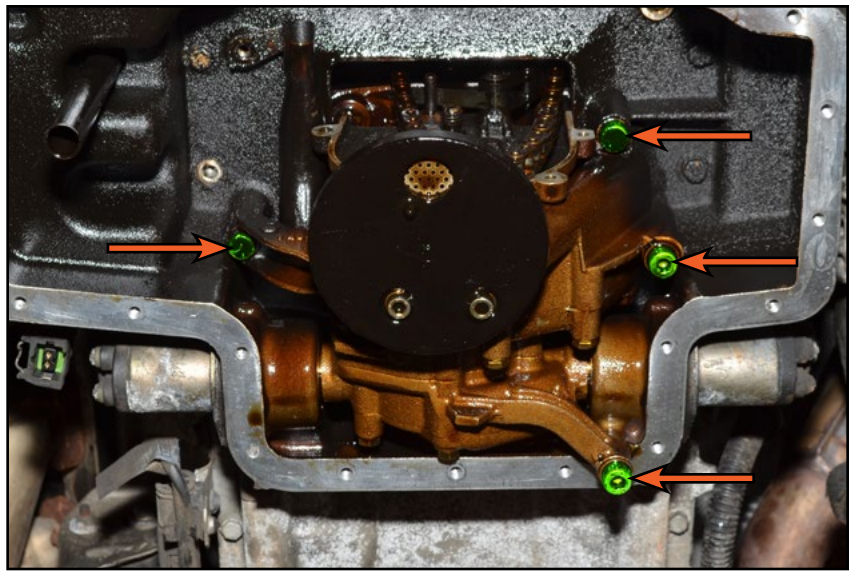
Counter-hold the oil pump sprocket and remove the nut (highlighted in **GREEN** in the RH photo) which secures the sprocket to the pump shaft. This nut is standard thread, **it is NOT LH thread**.



DISASSEMBLY PROCEDURE

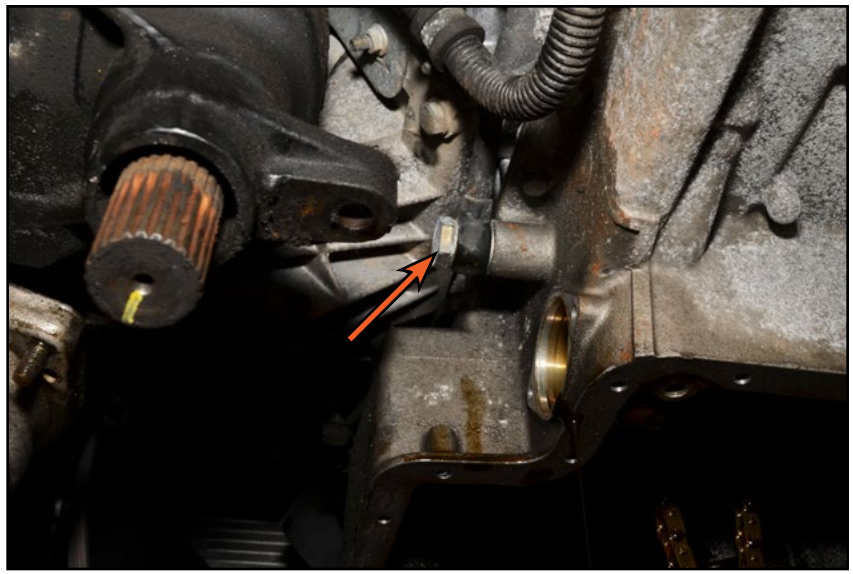
Step 33: 6mm Allen

Remove the oil pump bolts (highlighted in **GREEN**) then lower the oil pump and set it aside. We would recommend a thorough inspection of the oil pump chain and tensioner, as you can see below our tensioner guide came out in pieces.



Step 34:

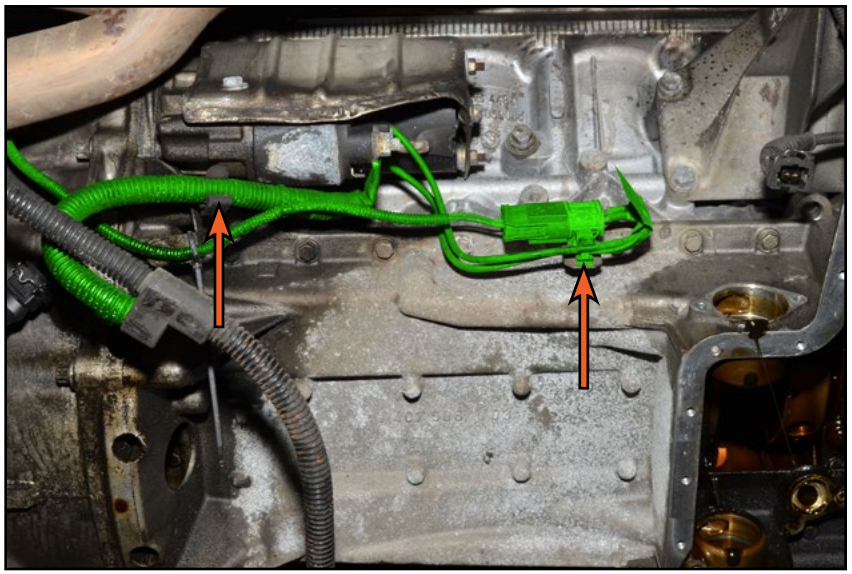
Remove the banjo bolt from the LH side of the upper sump.

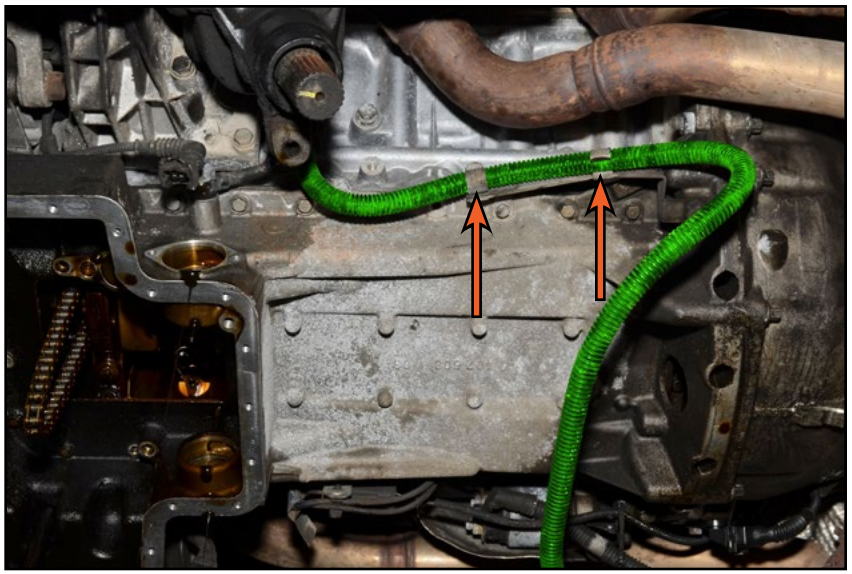


DISASSEMBLY PROCEDURE

Step 35:

Release the wiring harnesses (highlighted in **GREEN**) from the upper sump.



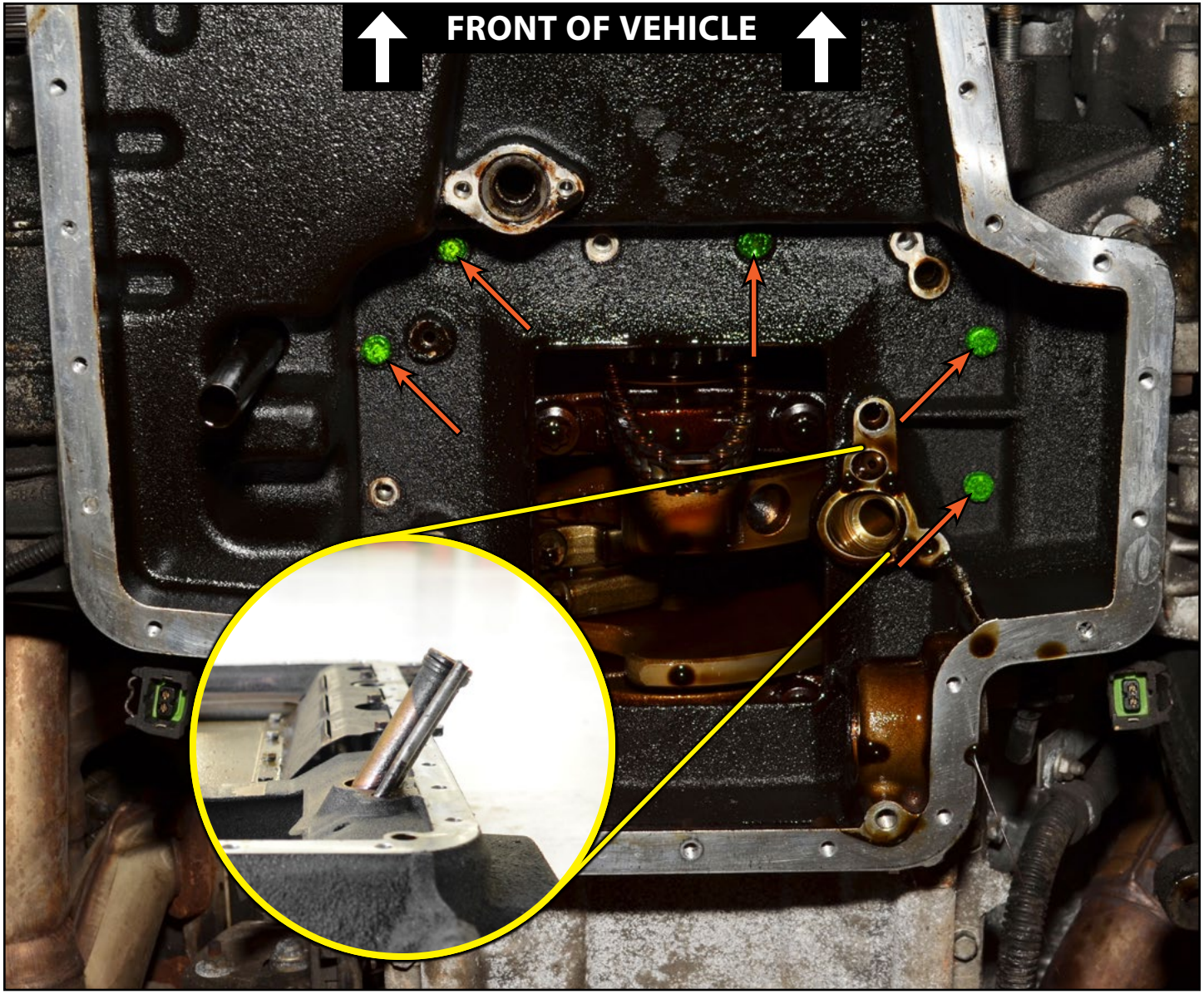


DISASSEMBLY PROCEDURE

Step 36:

Remove the 5x 10mm bolts (highlighted in **GREEN**) from the upper sump.

Note the location and orientation of the two oil tubes in the upper sump (reference the inset photo). These tubes can easily be damaged while removing the upper sump. When it comes time to remove the upper sump from the engine block you will need to pull it downward and toward the RH side of the vehicle at the same time to keep from bending these tubes.

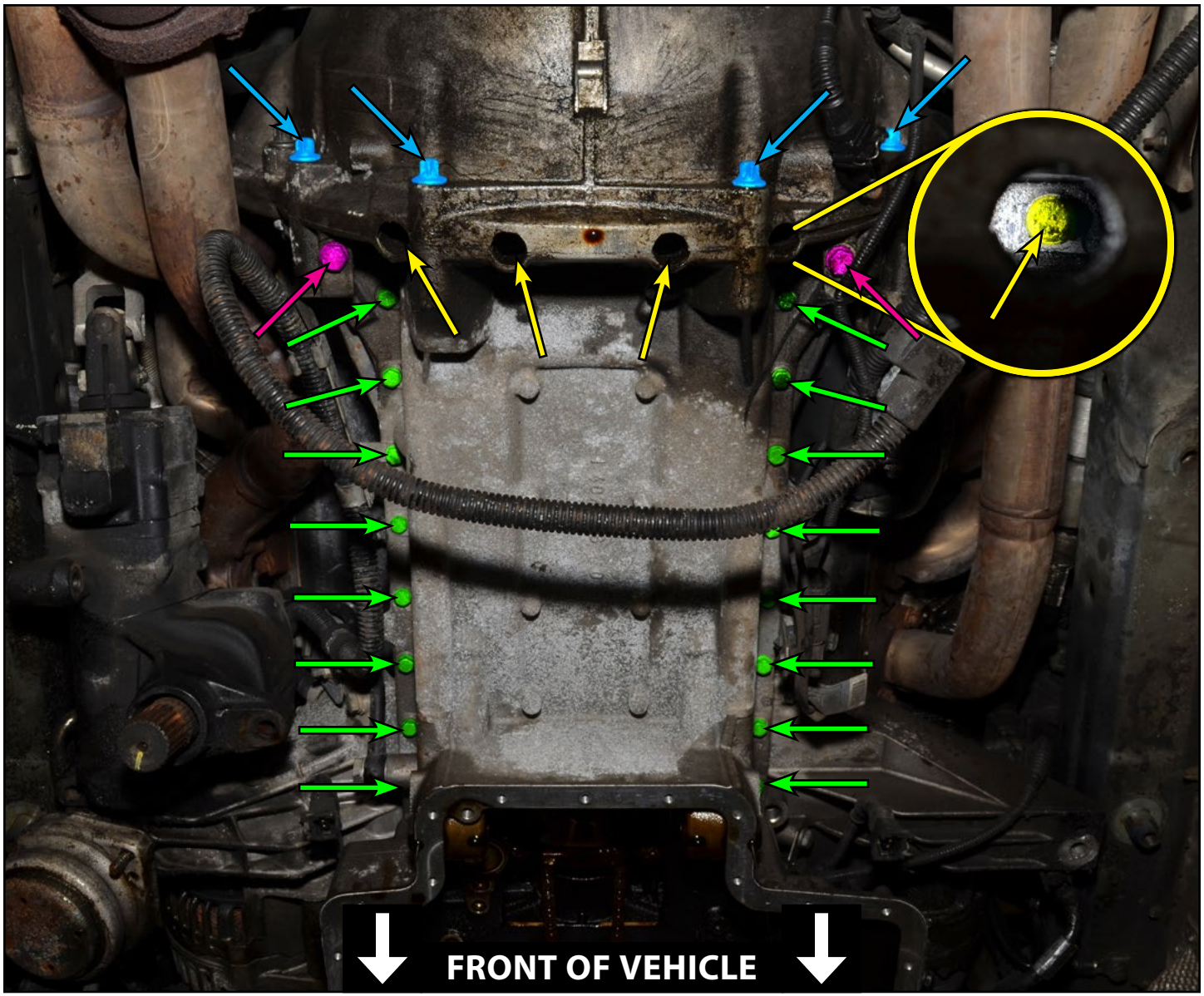


DISASSEMBLY PROCEDURE

Step 37:

Now it's time to remove the rest of the upper sump bolts. We started with the four bell housing bolts (**CYAN**), then the two 13mm wiring harness clip bolts (**MAGENTA**), then the 16x 10mm bolts (**GREEN**). Don't forget the four additional 10mm bolts which are hidden inside the bell housing (**YELLOW**).

Remove the upper sump from the engine, don't forget that you need to pull it downward and toward the RH side of the vehicle at the same time to keep from bending the oil tubes.

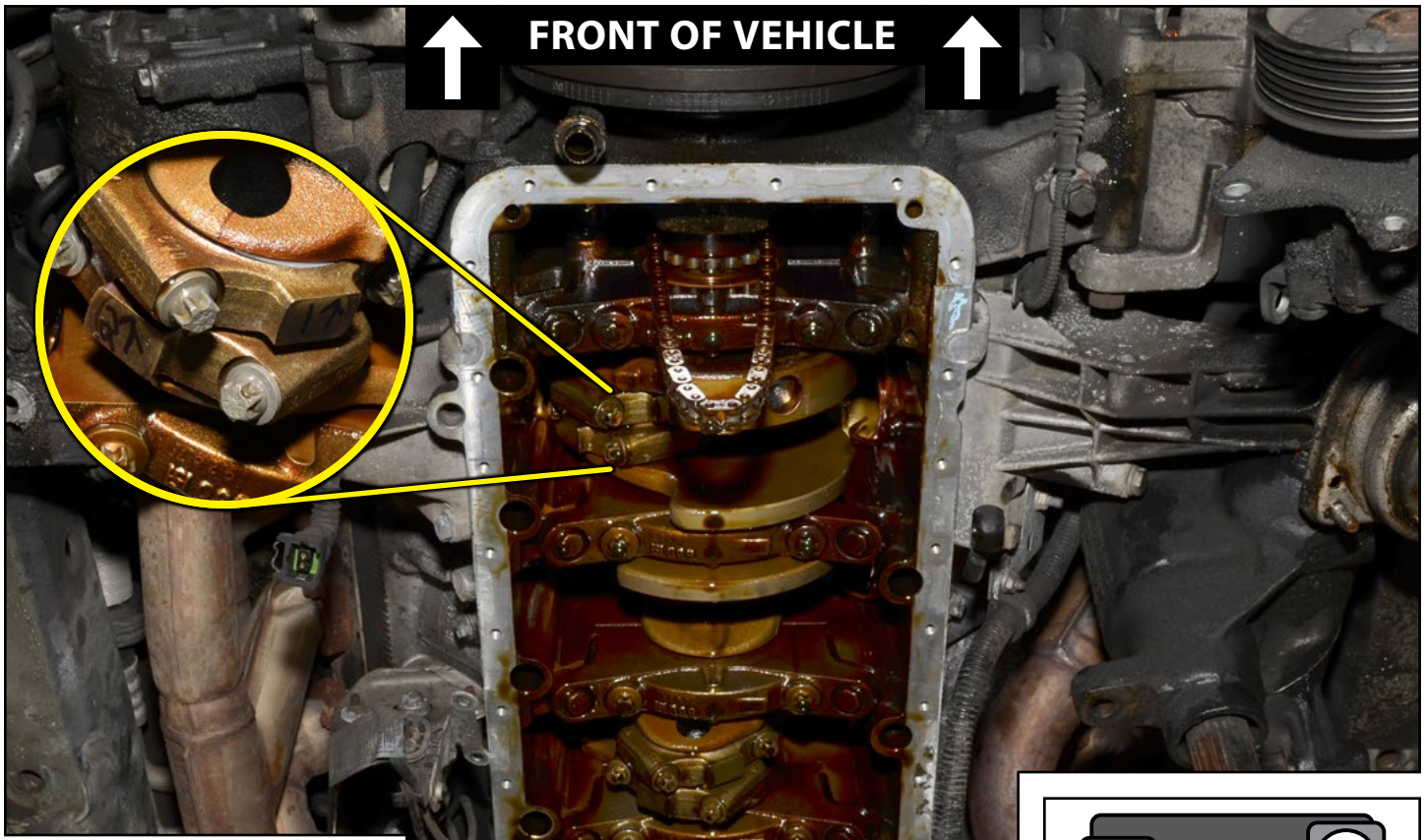


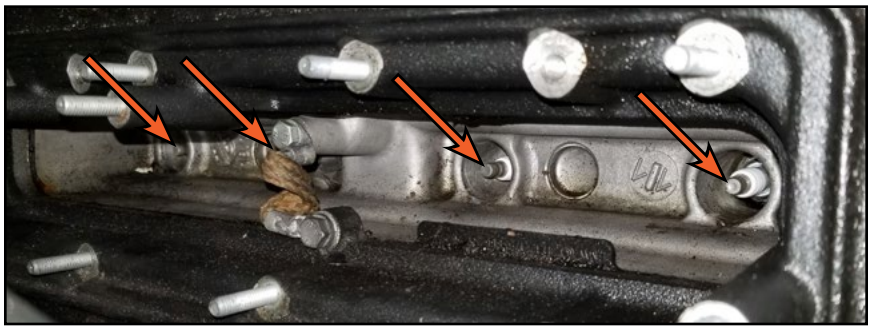
DISASSEMBLY PROCEDURE

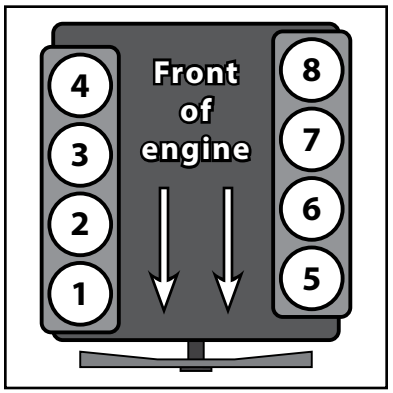
Step 38:

Now is a good time to remove all of the spark plugs (LH photo below).

We strongly recommend that you start by replacing bearings in whichever rods are located closest to BDC (bottom dead center), then rotating the engine clockwise (as viewed from the front of the engine looking at the crank pulley) and working on the next pair of rods which come to BDC. Doing so will allow you to replace all of the bearings while only rotating the engine over one full rotation. It's also helpful to mark the cylinder number and direction on the cap with a marker (inset photo).



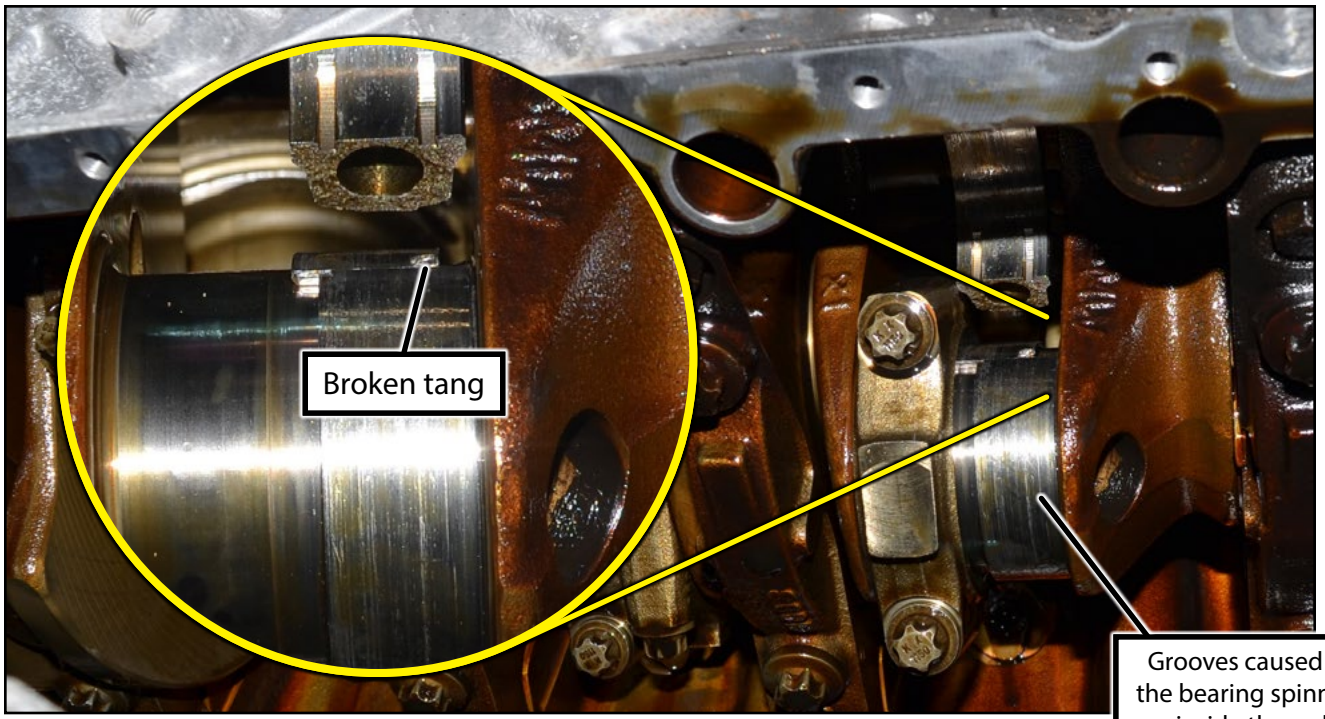


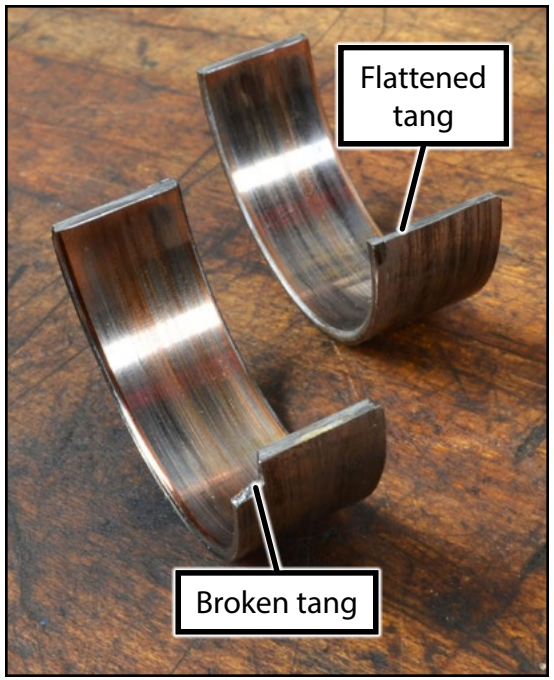


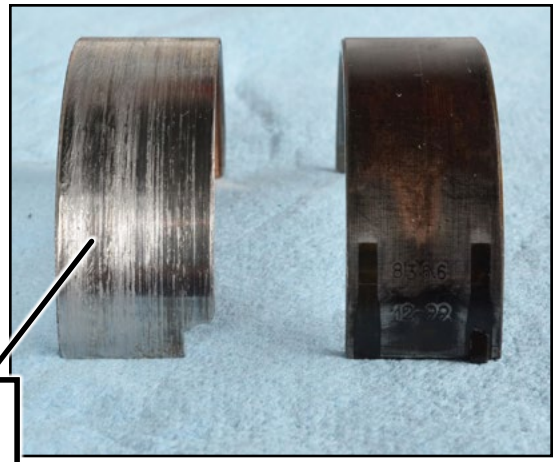
DISASSEMBLY PROCEDURE

Step 39:

The photos on this page show you the exact moment when our day came to a grinding halt (***get it??***). It turns out that the rod knock we could hear was coming from a spun rod bearing on cylinder #8. Look closely in the photos and you can see that the locating tang is broken off of one shell, and ground down flat on the other. If your bearings have spun our advice to you is ***STOP*** now and take your engine to a machine shop. We have access to expensive measurement tools in our shop, the average DIYer will not. We were able to determine that the crank journal was still within spec, and the rod bearing bore was still round, so we decided to install new bearings. We recognize that the life expectancy of this engine might be rather short due to the bearing having spun, but the customer was willing to take the risk.







INSTALLING THE NEW CONNECTING ROD BEARINGS

Step 1:

STOP

We strongly recommend that you read this entire section (Pages 34-37) ***before*** starting to replace any of the bearings. We're going to review replacing the bearing shells, using Plastigage® to check bearing clearance, coating the bearing surfaces with assembly lube, and finally reassembly and torque specifications.

STOP

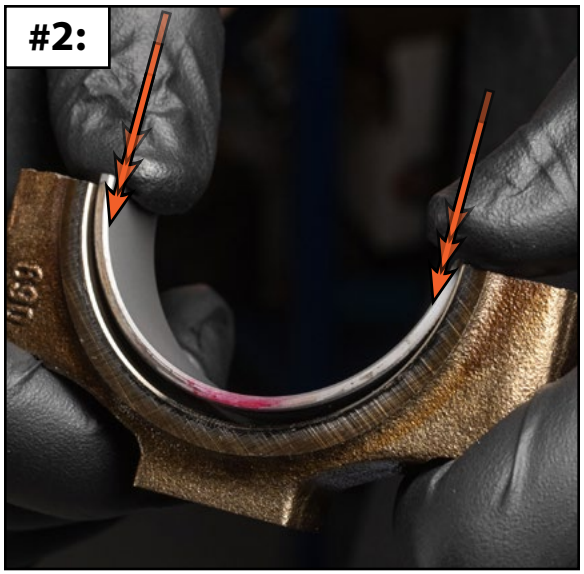
Remove the rod bearing cap from the rod, then remove and inspect the bearing shells. Thoroughly clean the rods and caps before installing the new bearing shells, they should be dry and free of oil before proceeding.

Place the new lower bearing shell (marked w/**RED** paint) into the cap, and place the new upper bearing shell (marked w/**BLUE** paint) into the connecting rod. Be sure to align the locating tang (highlighted in **GREEN** in **photo #1**) with the grooves in the cap and the connecting rod. Push the bearing shells until they are fully seated, and are sitting flush on each side (**photos #2 & #3**).

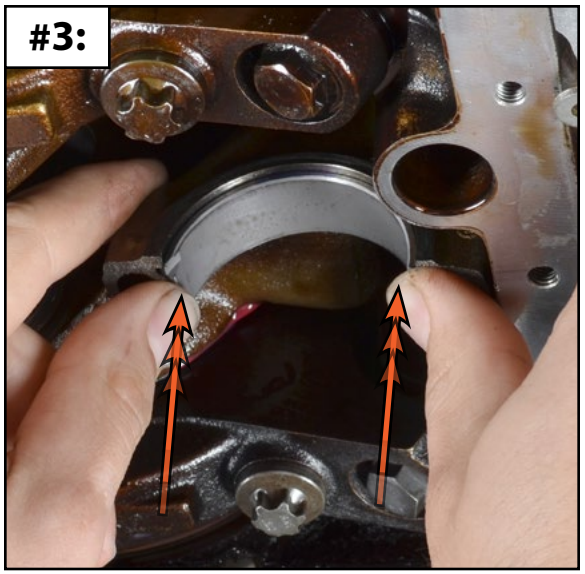
Repeat this procedure on all of the rod bearings, and use our S62 bearing organizer sheet to keep everything in order.

#1:

#2:



#3:



INSTALLING THE NEW CONNECTING ROD BEARINGS

Step 2:

Now it's time to check the bearing clearance. The easiest way to do this at home is with Plastigage®.

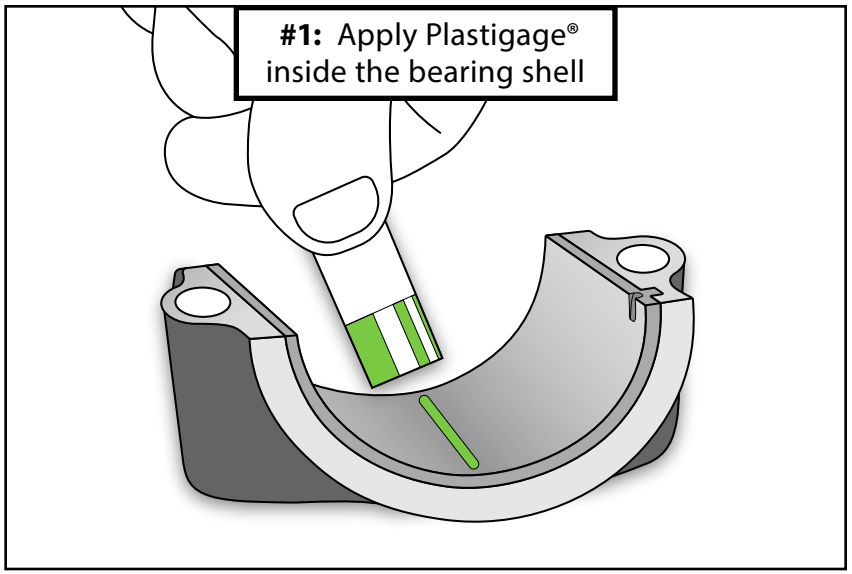
Cut a short length (¼"-½") of **GREEN** Plastigage® and place it inside the bearing cap (**photo #1**). It's important to note that the bearing shells and crankshaft must be completely dry and free of any oil for accurate Plastigage® readings.

If you are using OE rod bolts:

- Use the ***OLD*** rod bolts to install the connecting rod cap into place (**photo #2**).
- Be careful to install the bearing cap into place without sliding it around on the crank journal, this could smear the Plastigage® and throw off your bearing clearance measurement.

If you are using ARP rod bolts:

- Use the ***NEW*** ARP rod bolts to install the connecting rod cap into place (not shown).
- Be careful to install the bearing cap into place without sliding it around on the crank journal, this could smear the Plastigage® and throw off your bearing clearance measurement.



INSTALLING THE NEW CONNECTING ROD BEARINGS

Step 3:

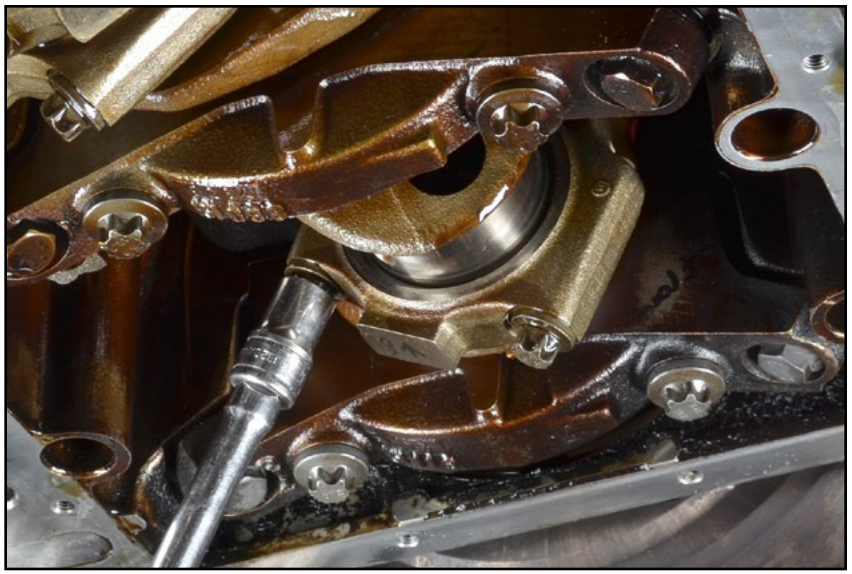
Please reference the rod bolt torque specs listed below. Take your time in this step, work on one rod at a time, and use the check boxes on our bearing organizer sheet (Page 9) to mark down each rod bolt as you torque them to spec.

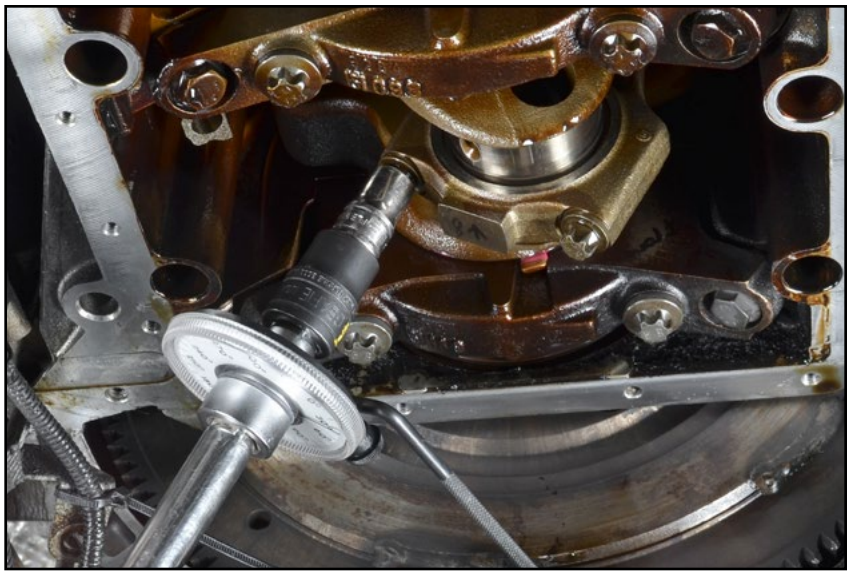
If you are using OE rod bolts:

1. Initial torque 5 Nm
2. Setting torque 20 Nm
3. Additional turn 65°

If you are using ARP rod bolts:

1. Initial torque 20 Ft-lbs
2. Final torque 50 Ft-lbs





INSTALLING THE NEW CONNECTING ROD BEARINGS

Step 4:

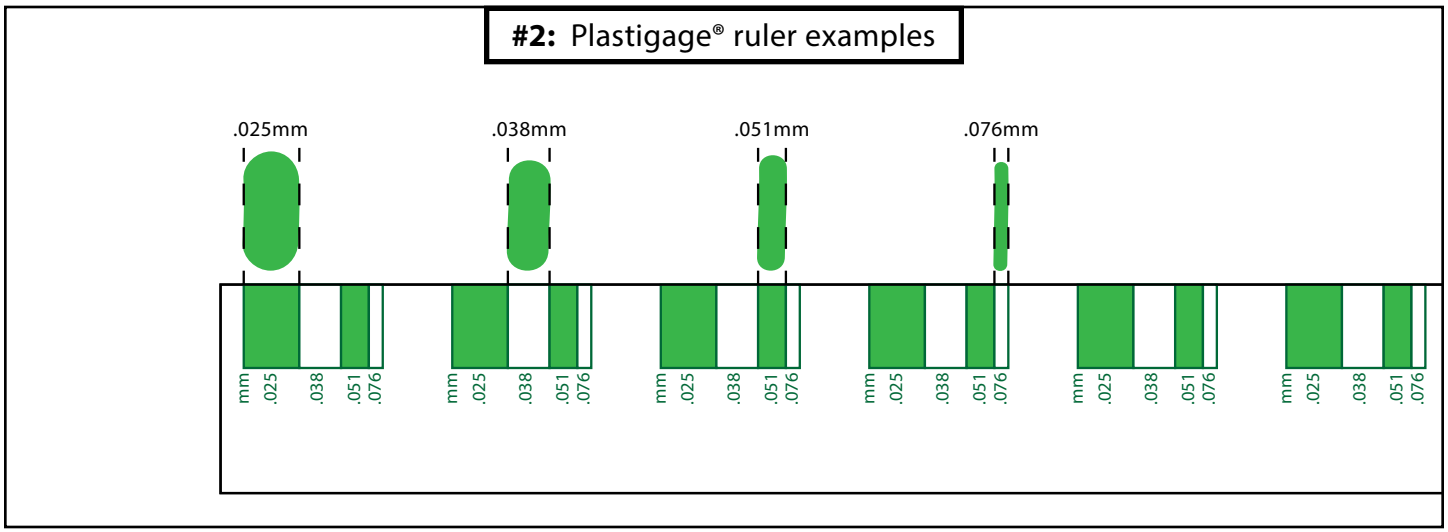
Remove the bearing cap and inspect the now compressed Plastigage® on the crank journal (**photo #1**). Use the ruler on the Plastigage® packet to measure the width, this will tell you what the bearing clearance is (**photo #2**).

The BMW S62 rod bearing clearance specification is:

- ***0.029 - 0.067mm***

If your bearing clearance does not fall within that specification, we would strongly recommend that you ***STOP*** now and take your engine to a machine shop.

#1: Remove the bearing cap and measure the Plastigage®



#2: Plastigage® ruler examples

INSTALLING THE NEW CONNECTING ROD BEARINGS

Step 5:

All Plastigage® should now be gently removed from the bearing and crank journal. Coat the inside of the bearing shells with assembly lube (we're referring to the surfaces which ride up against the crank journal, not the surfaces which sit inside the connecting rod or the connecting rod cap).

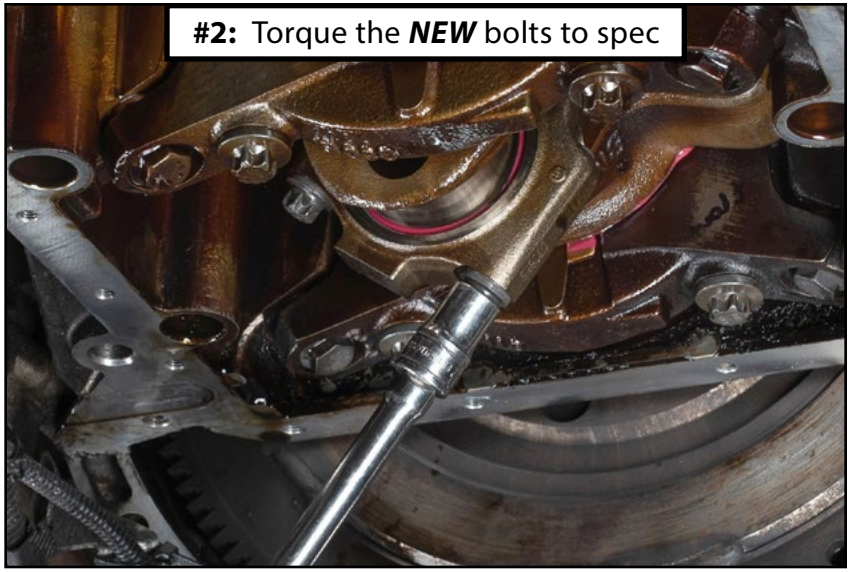
If you are using OE rod bolts:

- Discard the old rod bolts.
- Install the bearing caps with the ***NEW*** bolts (**photo #1**).
- Torque the rod bolts to spec (reference Page 36).
- Repeat this procedure on all rods bearings (**photo #2**).

If you are using ARP rod bolts:

- DO NOT discard the ARP rod bolts, they are reusable.
- Install the bearing caps with the ***NEW*** ARP rod bolts (not shown).
- Torque the rod bolts to spec (reference Page 36).

#1: Coat the bearings with assembly lube, install the caps with the ***NEW*** bolts



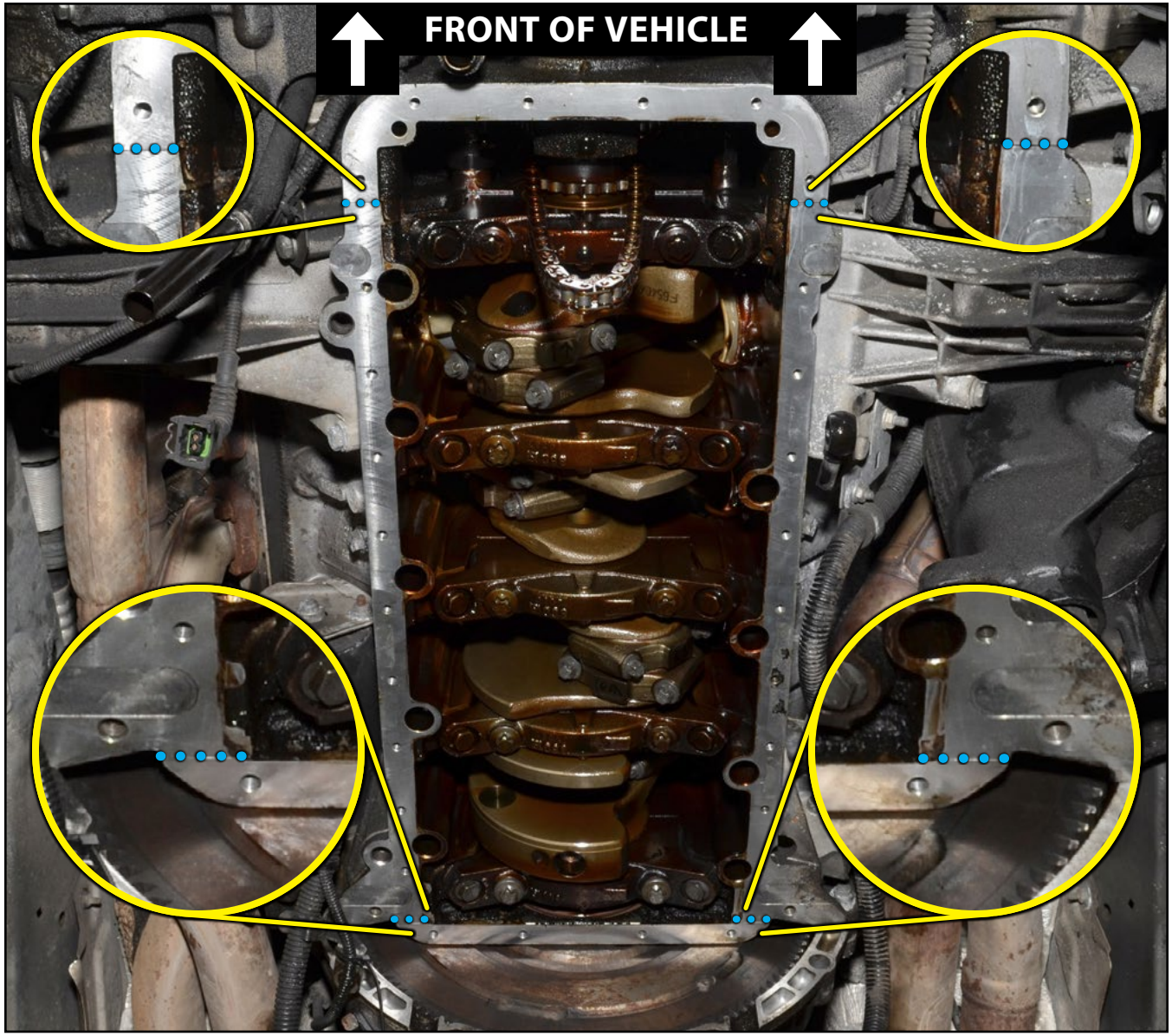
#2: Torque the ***NEW*** bolts to spec

REASSEMBLY PROCEDURE

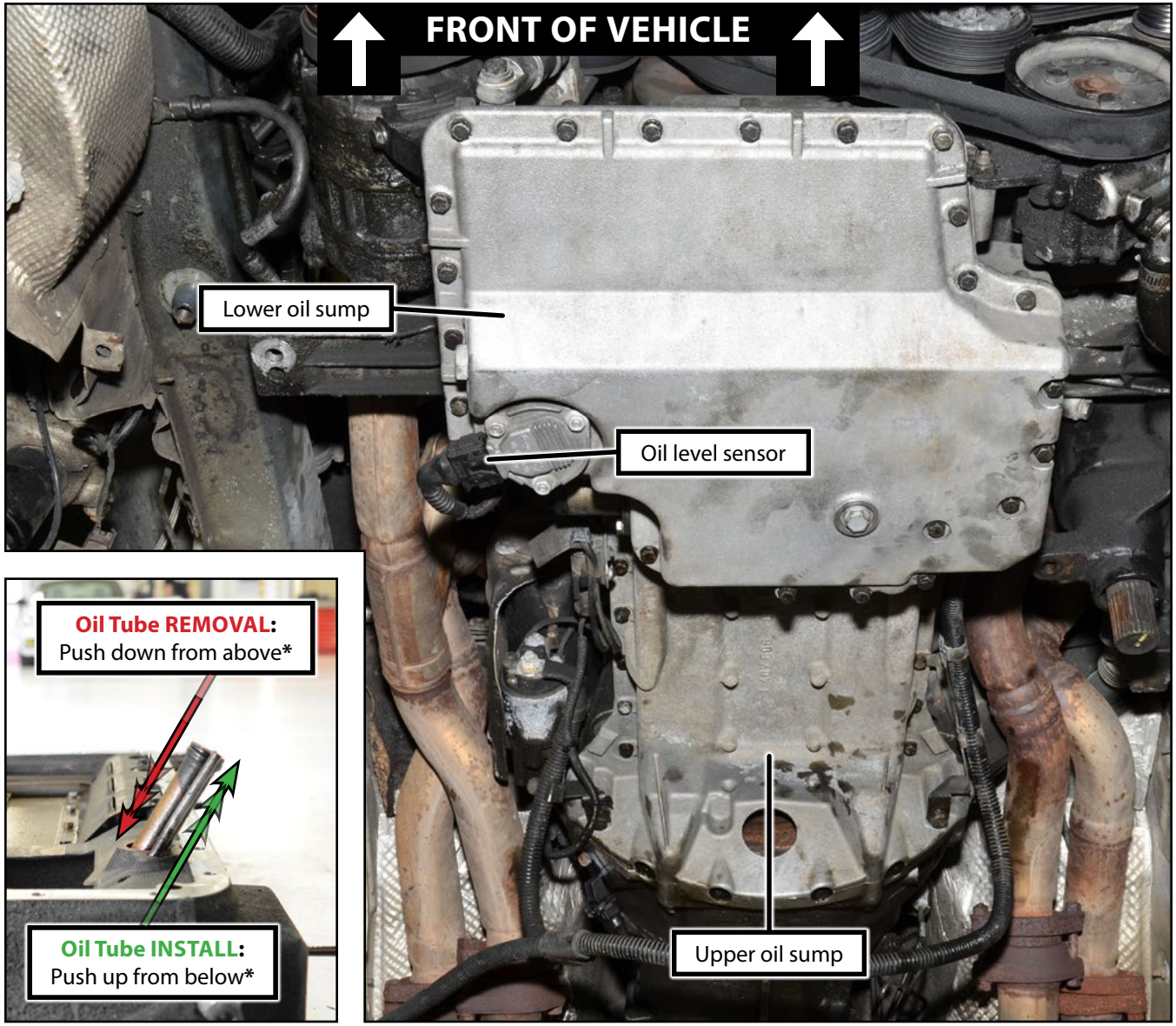
Step 1:

Now it's time to start reassembling the engine. Thoroughly clean the gasket surfaces on the engine block and oil sump (shown in the main photo on the right), we would suggest using a plastic scraper and brake cleaner for this. These are precision machined surfaces, ***we don't want to risk damaging them with a metal scraper.***

It's very important that you remember to apply a small amount of black RTV silicone over the gaps where the timing cover and the rear cover mate up against the engine block as shown (represented by **CYAN** dotted lines in the inset photos). These areas are especially prone to leaks if not properly cleaned and prepped before installing the new upper sump gasket.

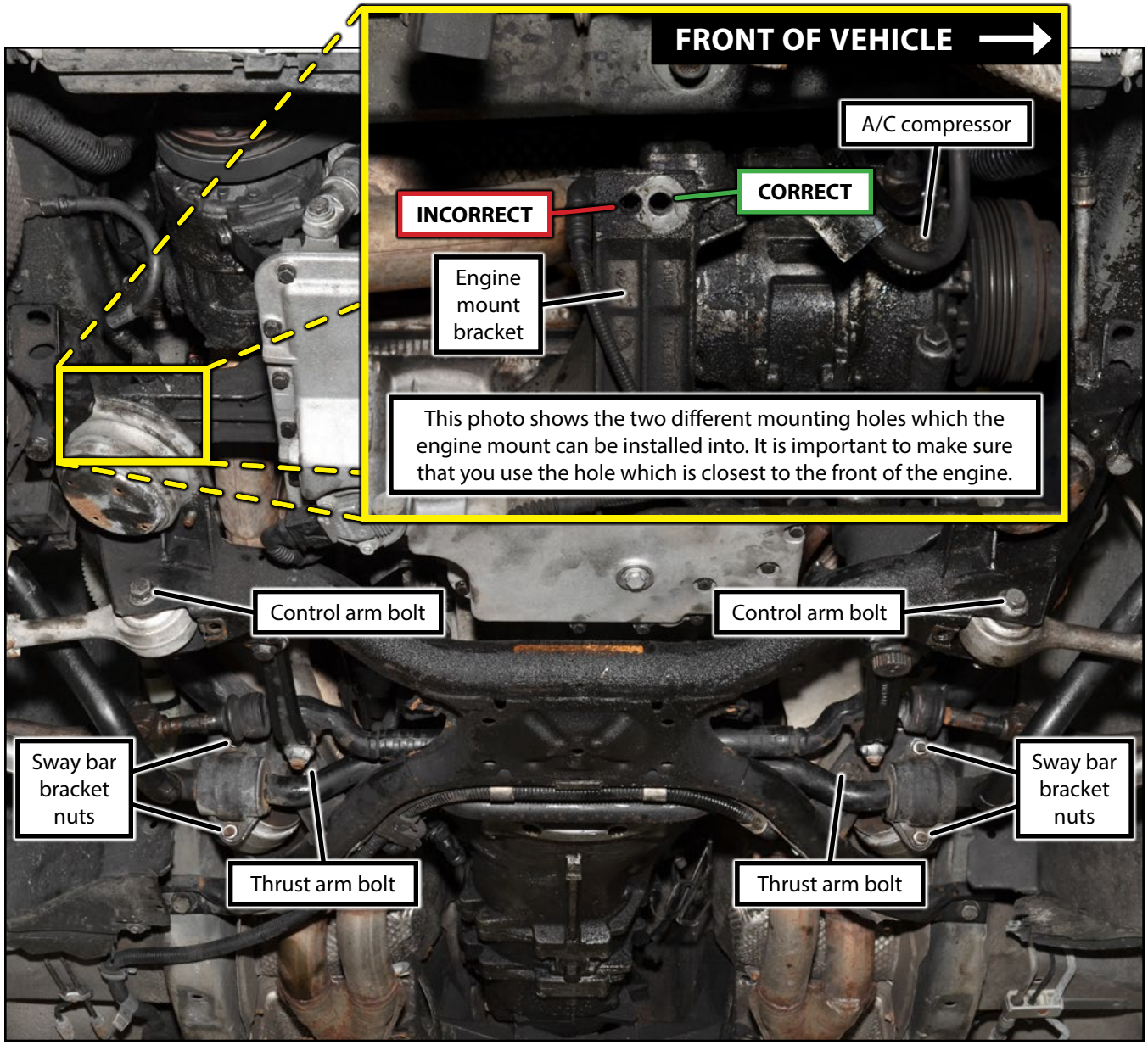


- ☐ Reinstall the upper sump.
  - M6 8.8 screws: **10 Nm**
  - M6 10.9 screws: **12 Nm**
  - M8 8.8 screws: **22 Nm**
- ☐ Reinstall the oil pump.
  - M8 screws: **21 Nm**
- ☐ Reinstall the oil pump sprocket.
  - M10 nut: **25 Nm**
- ☐ Reinstall the oil pump cover.
  - M6 screws: **10 Nm**
- ☐ Reinstall the oil tubes.
  - M6 screws: **10 Nm**
- ☐ Reinstall the oil dipstick tube.
- ☐ Reinstall the oil changeover valves.
- ☐ Reinstall the lower sump.
  - M6 8.8 screws: **10 Nm**
  - M8 8.8 screws: **22 Nm**
- ☐ Reconnect the banjo fitting on the LH side of the upper sump.
- ☐ Reconnect the oil level sensor.

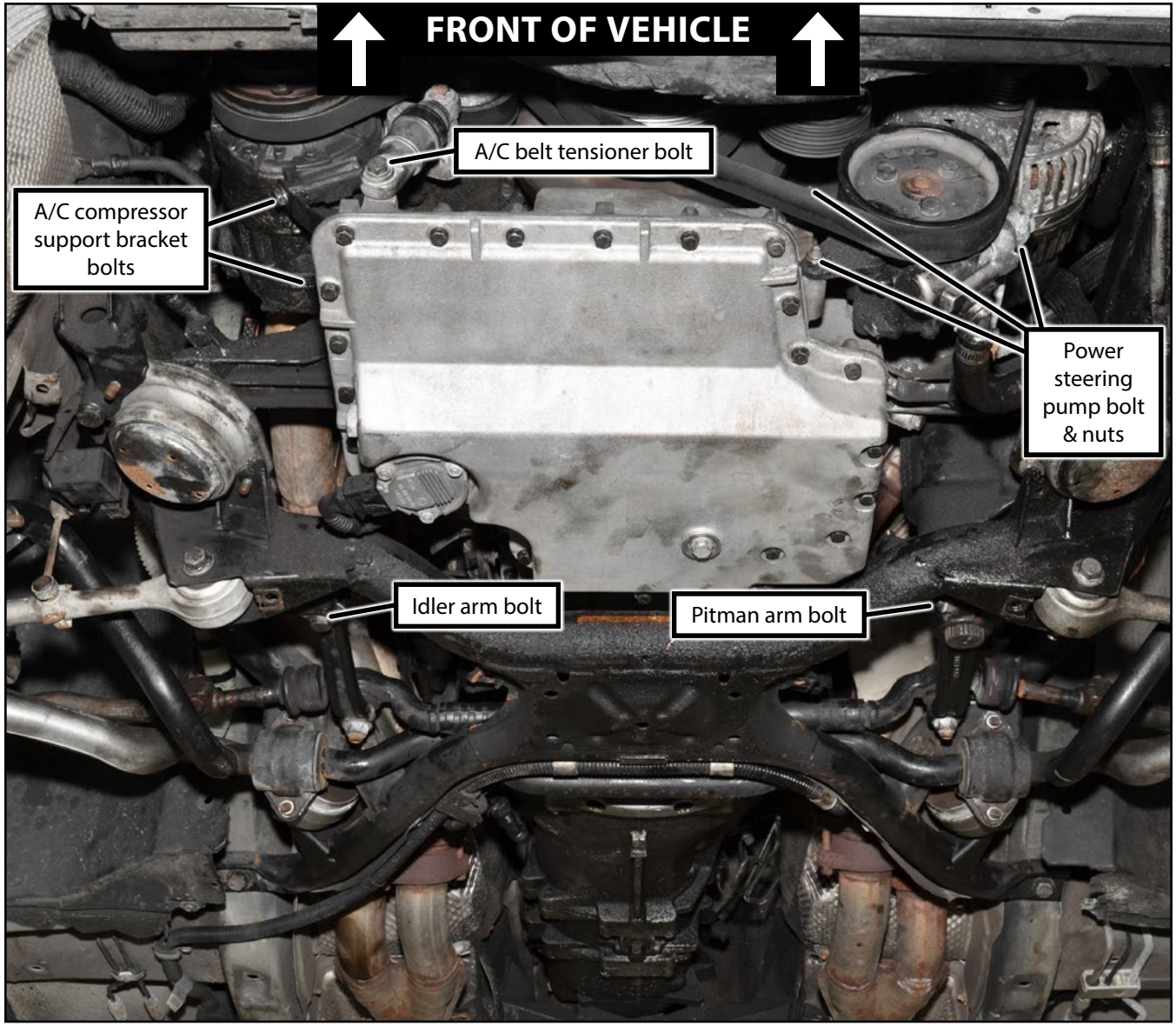


*The oil tubes can only be removed/replaced with the upper sump removed from the engine block. Improper installation can damage the o-ring seals which can lead to oil leaks.

- [ ] Reattach the wiring harnesses to the upper sump.
- [ ] Reinstall the front subframe.
  - 18mm bolts: **77 Nm**
- [ ] Reinstall the engine mounts.
  - M8 nuts: **22 Nm**
  - M10 nuts: **47 Nm**
- [ ] Remove the engine support bar.
- [ ] Reattach the wiring harnesses to the subframe.
- [ ] Reattach the hard line to the subframe (8mm bolt near the LH engine mount).
- [ ] Reinstall the thrust arms.
  - **127 Nm (set @ ride height)**
- [ ] Reinstall the lower control arms.
  - **78 Nm (set @ ride height)**
- [ ] Reinstall the sway bar.
  - Bracket nuts: **21 Nm**
  - End link nuts: **65 Nm**
- [ ] Reinstall the steering gear.
  - 13mm nuts & bolts: **62 Nm**



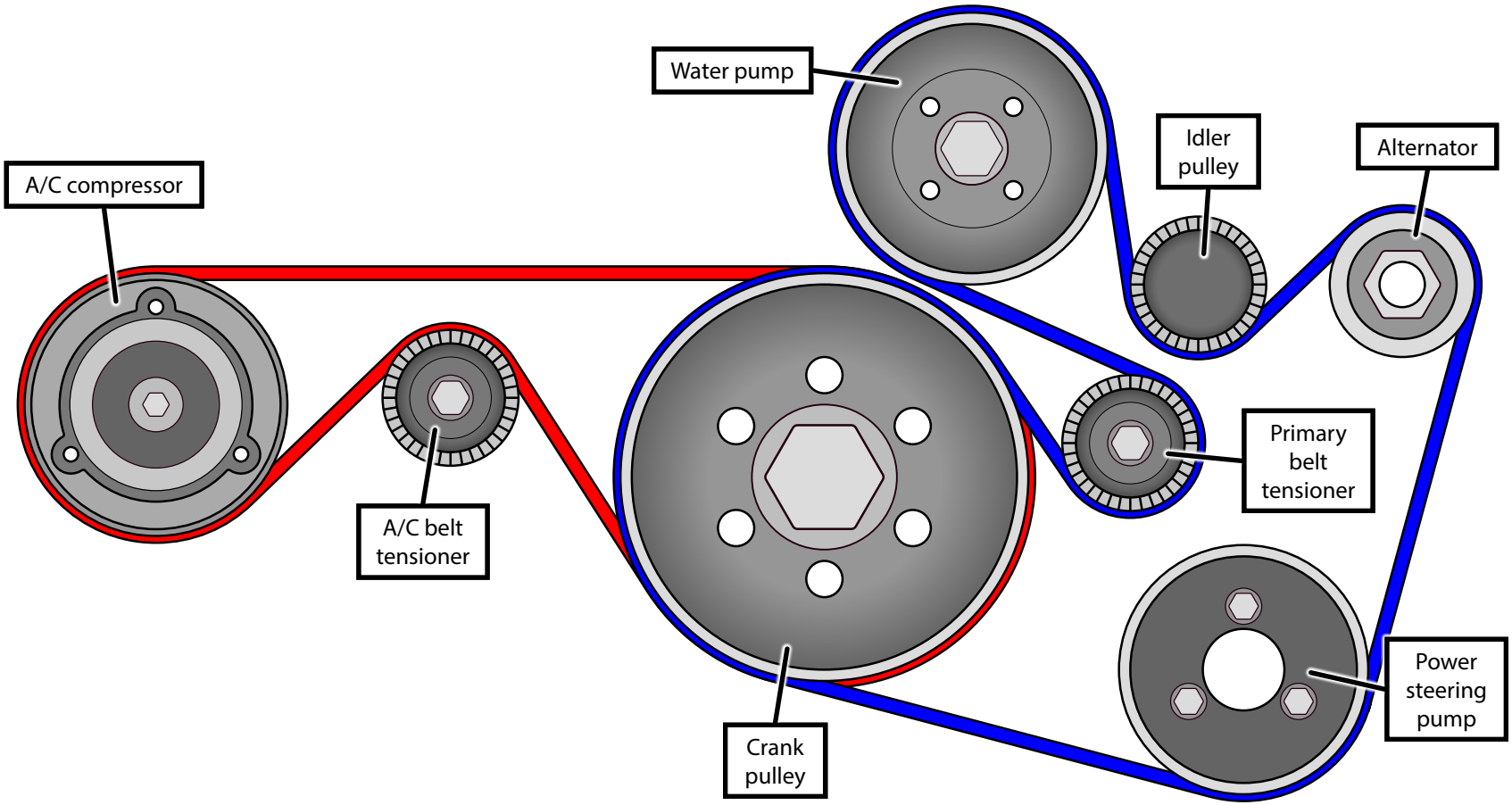
- ☐ Reinstall the steering gear.
  - 13mm bolts & nuts: **62 Nm**
- ☐ Slide the steering linkage assembly into place.
- ☐ Reinstall the pitman arm.
  - 8mm hex (Allen) bolt: **61 Nm**
- ☐ Reinstall the idler arm.
  - 15mm bolt & nut: **62 Nm**
- ☐ Reinstall the outer tie rod ends.
  - 19mm nuts: **65 Nm**
- ☐ Reinstall the power steering pump.
  - 13mm bolt & nuts: **25 Nm**
- ☐ Reinstall the A/C compressor support bracket & A/C belt tensioner.



REASSEMBLY PROCEDURE

Step 5:

Reinstall both drive belts. We've included belt routing diagrams for both belts below for your convenience.



- [ ] Reinstall the spark plugs.
- [ ] Reinstall the coil packs, **but leave the electrical connectors detached for now**.
- [ ] Remove the fuel pump fuse.
- [ ] Reinstall the air boxes and inlet tubes.
- [ ] Reconnect the negative battery terminal.
- [ ] Fill the engine with oil to capacity.
- [ ] Turn the ignition switch to “Crank” and let the engine turn over 5-10 seconds. This will allow the oil pressure to build without the engine needing to run.
- [ ] Reconnect the coil pack electrical connectors, reinstall the coil pack covers, reinstall the fuel pump fuse.
- [ ] Start the engine and listen for knocks.
- [ ] Turn off the engine and check the oil level. Top off as needed.
- [ ] Change the oil after 500 miles.

Congratulations, your installation is complete!

Your S62 WPC Treated Rod Bearing Kit installation is complete!

These instructions are provided as a courtesy by ECS Tuning

Proper service and repair procedures are vital to the safe, reliable operation of all motor vehicles as well as the personal safety of those performing the repairs. Standard safety procedures and precautions (including use of safety goggles and proper tools and equipment) should be followed at all times to eliminate the possibility of personal injury or improper service which could damage the vehicle or compromise its safety.

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