EMP Stewart Components + Expansion Tank + Coolant Change + Tensioners DIY

After 2 years, I decided to do a complete coolant change. So I took the opportunity to replace my expansion tank as well since it was leaking a bit from the top part. Coincidentally, my water pump decided to fail too by making a "hiiissshhhiiiin" sound once warm, indicating worn bearings. Not wanting to throw a belt or something I chose to replace it with the high performance/flow water pump with stainless steel impeller & high durability bearings from EMP Stewart components. More expensive than the OEM pump but at least one less thing to worry about. Since I would have to remove the belt to access the WP, I grabbed the opportunity to replace both deflection pulleys from the tensioners. It was a good thinking because after I removed the belt I noticed a lot of free play in both tensioner pulleys, another indication of pending failure.

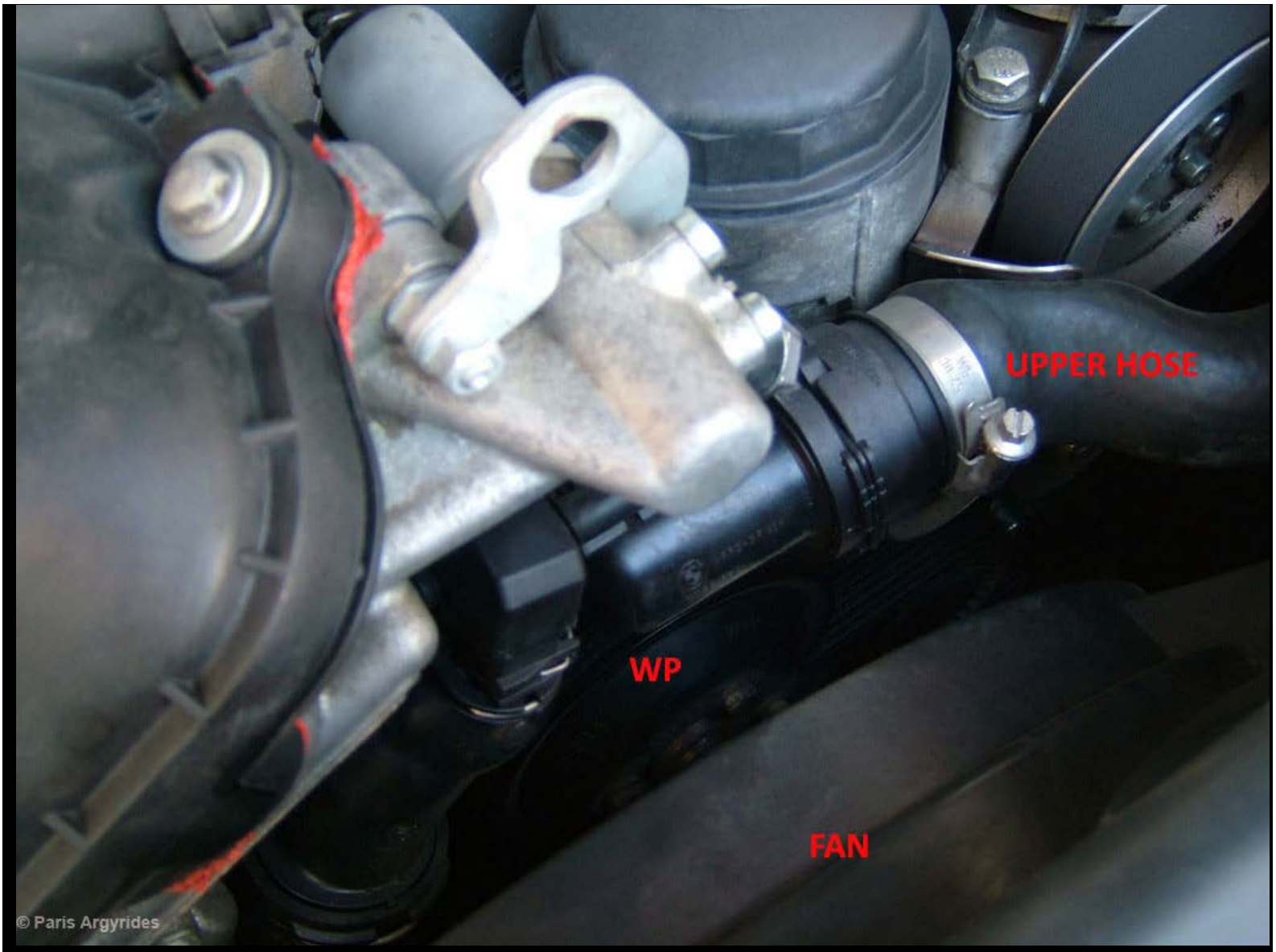
Considering that almost all of the affected components are either made from composite materials or aluminum, I followed the exact torque specs found in BMW TIS to avoid snapping things. You NEED a torque wrench from 10Nm and up.

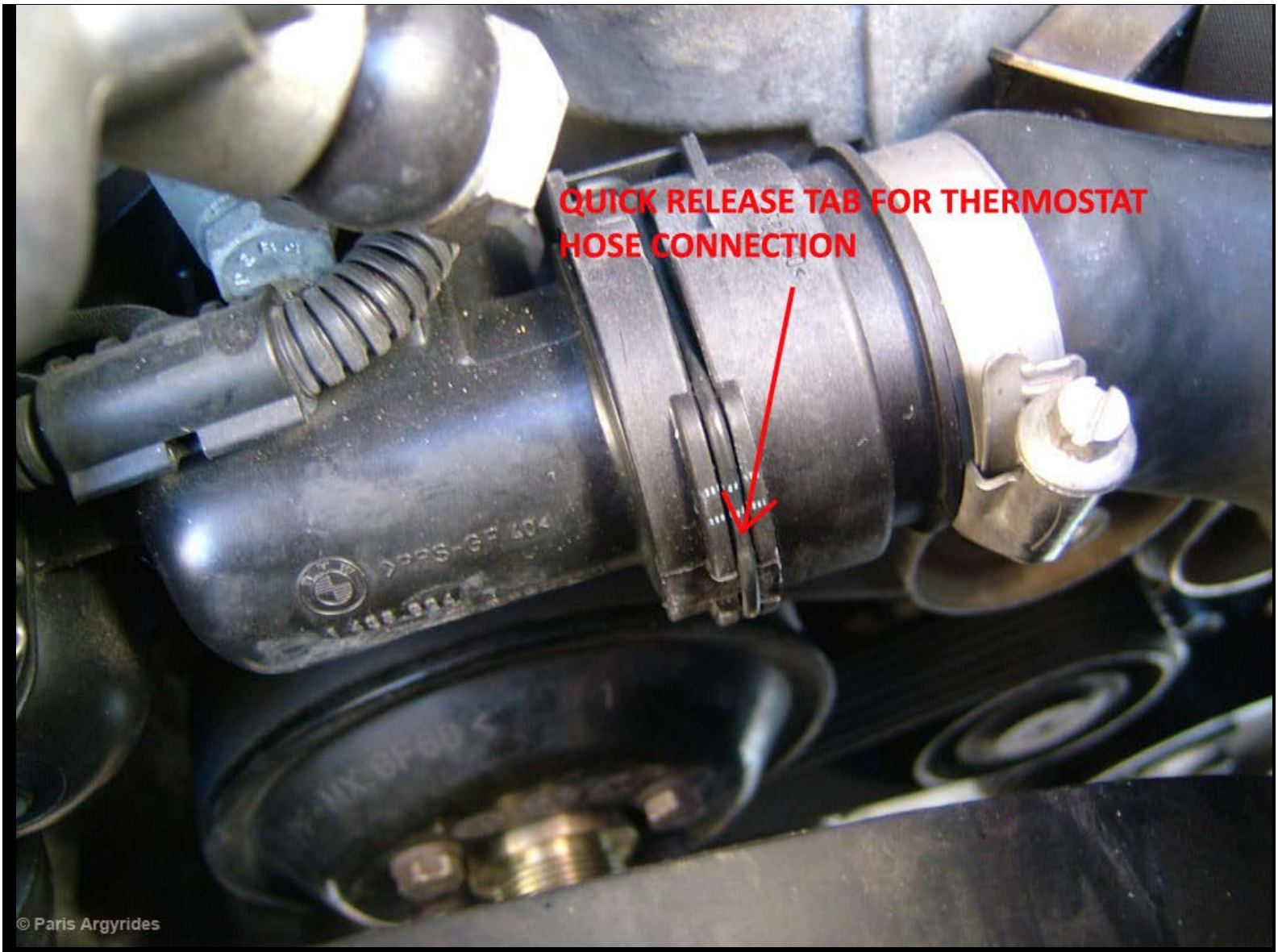
Torque Specs:
Drain Plug on Engine Block: 25Nm
Pulley on Water Pump bolts: 10Nm
Water Pump on Block nuts: 10Nm
Deflection Pulley on Tensioner: 35-40Nm (I could not find specs for the tensioner pulleys so I measured the approximate value with my torque wrench)

Part List:
EMP Stewart Components BMW E46 High Flow Water pump
4L OEM Coolant
4L Distilled Water
Bleeder Screw
Expansion Tank drain plug (blue)
Radiator plug (blue one, different for auto/manual transmissions)
Coolant Drain plug washer
Expansion Tank
(For exact part numbers go to http://bmwfans.info and enter last 7 digits of chassis number to get the correct part)

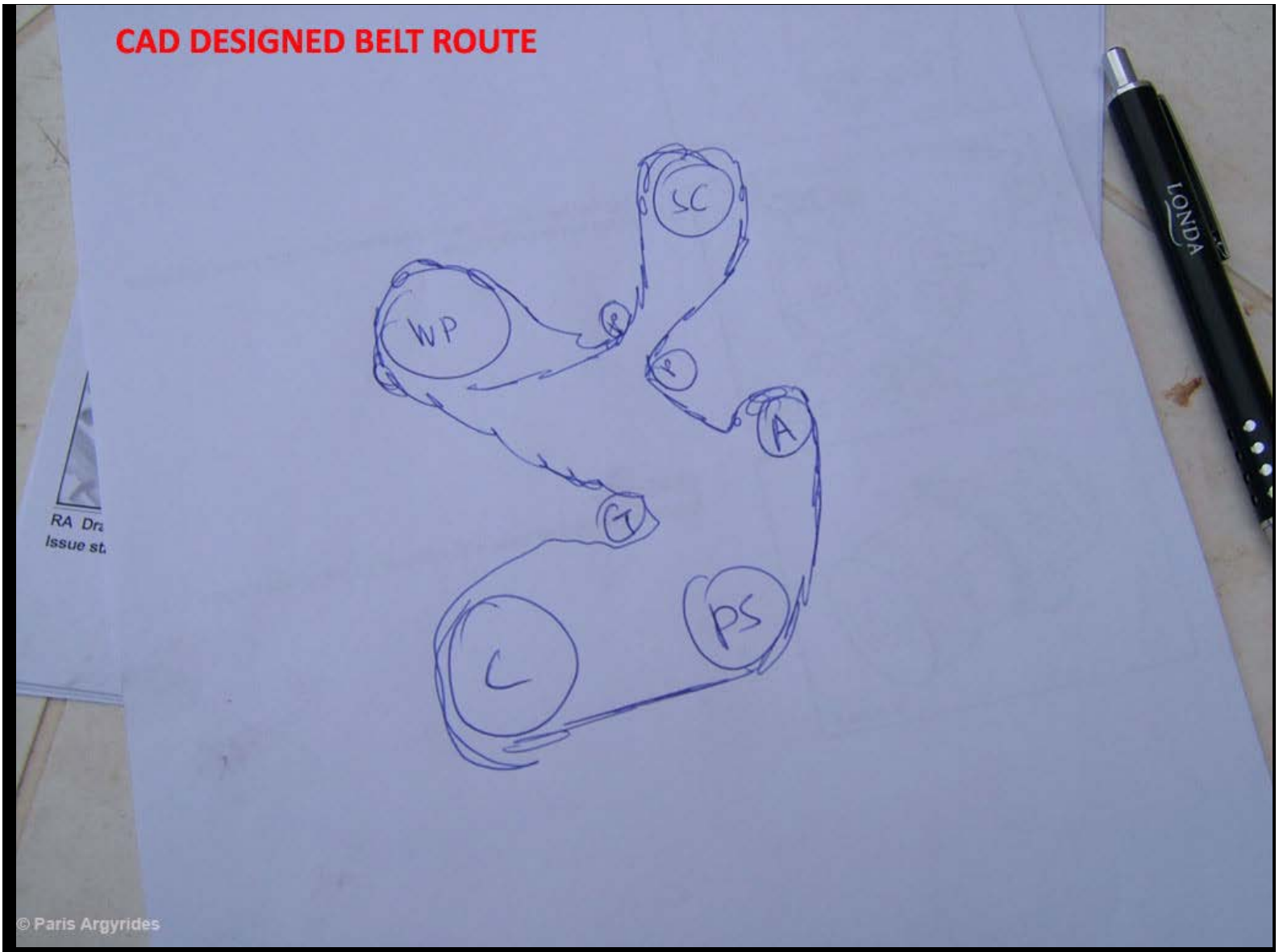
DIY:

If you want to replace the thermostat now it's a good chance! Also, remove the lower splash shield to access the components below. Use a set of ramps or jack stands - NEVER USE THE OEM JACK FOR SUCH WORK.


UPPER HOSE
WP
FAN
© Paris Argyrides



Belt diagram to remember the path!!! Not exactly CAD design but does the job:P



The new pump looks beefy and well designed

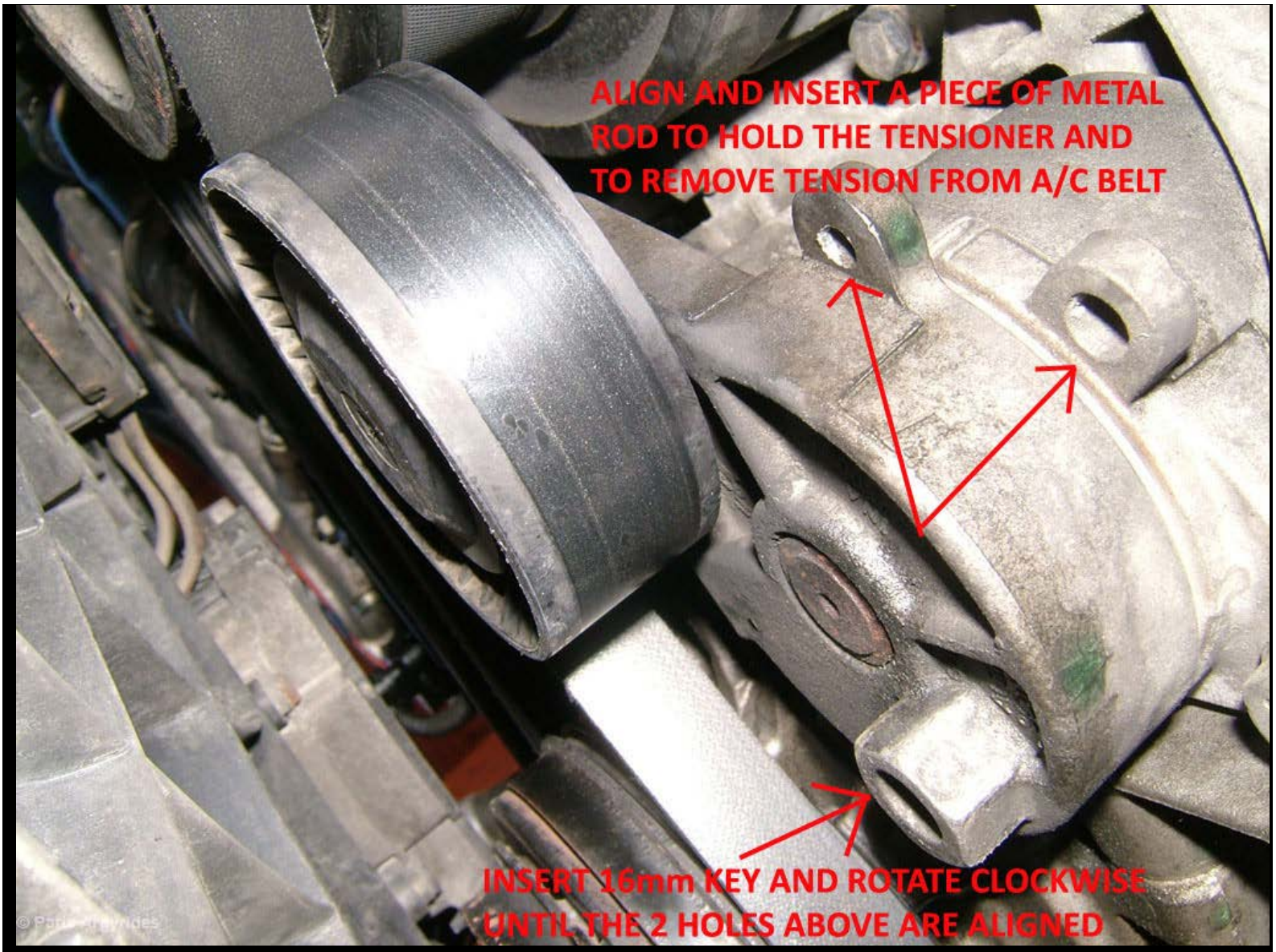
New expansion tank

Fan removal (Manual transmission). Remove air intake by popping the 3 push/lock pins. Remove the push/lock pin on the right side of the fan

Remove both plugs and the T25 torx screw on the left. Lift it and it's out of the way. 5 Minutes!!

To remove A/C Belt, insert a 16mm spanner on the illustrated bolt and rotate counter clock wise to compress the spring.

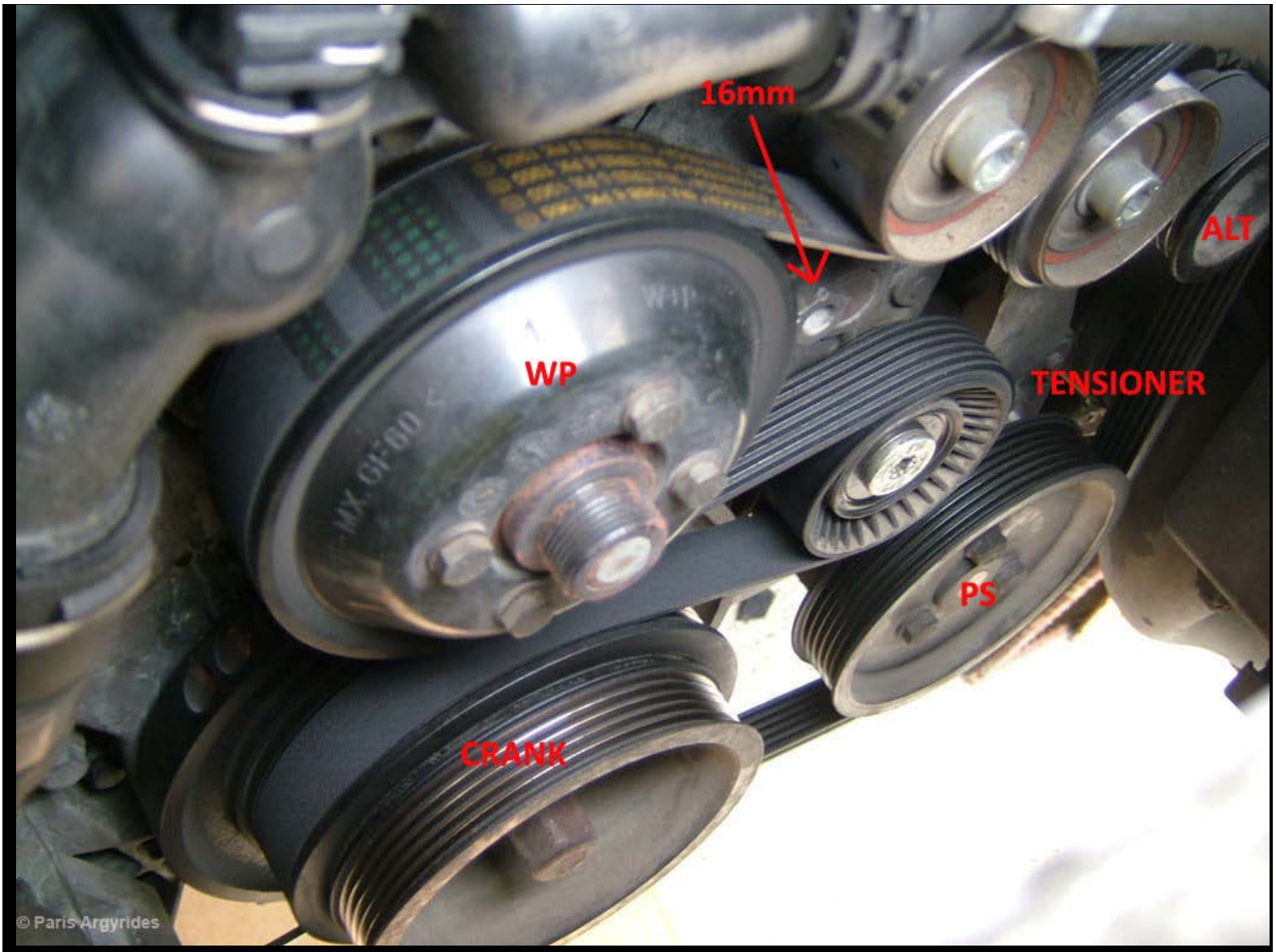
When the 2 holes shown below are aligned, insert a metal rod like an allen key to hold the spring compressed. Now remove the A/C belt



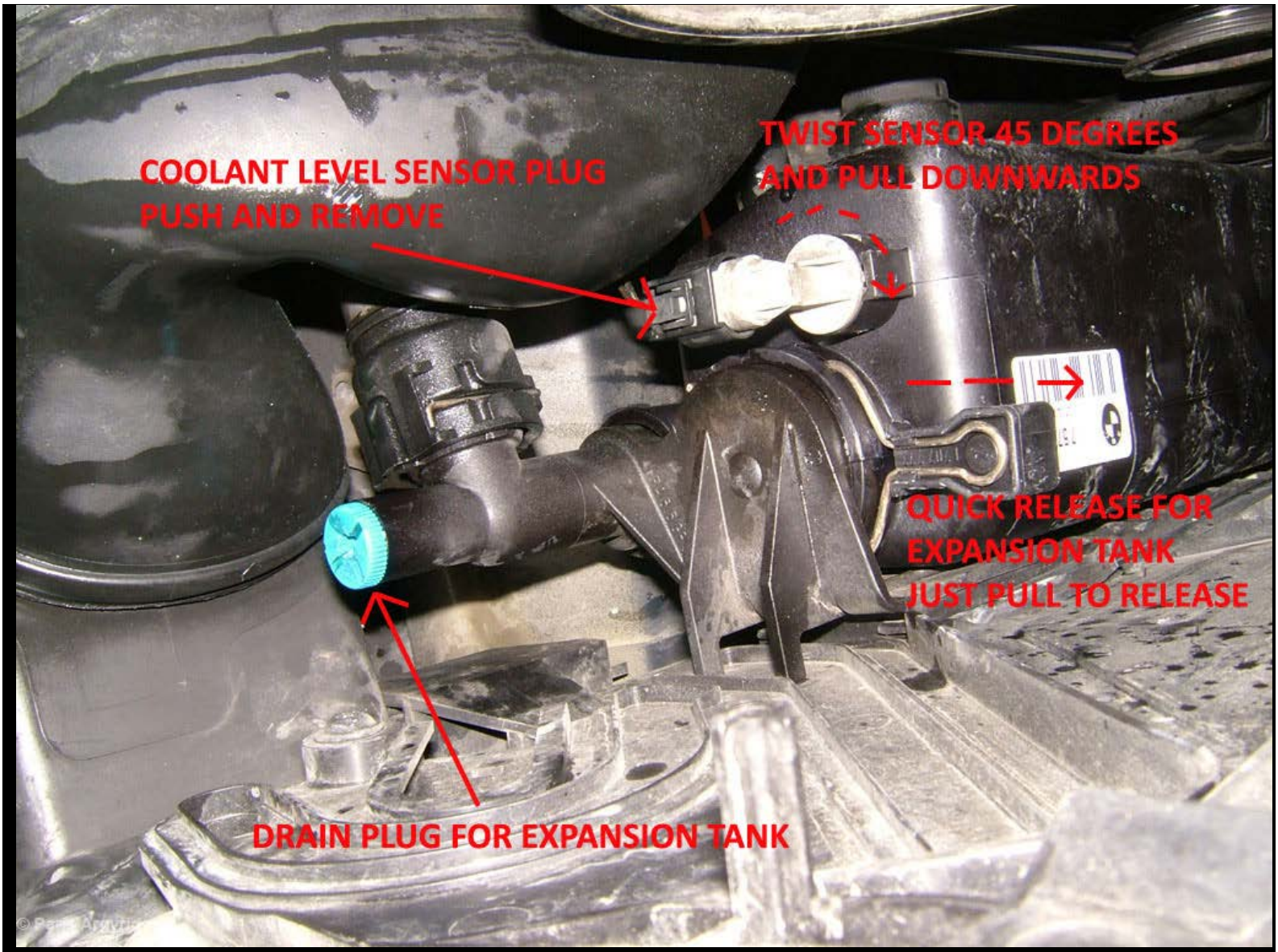
Pop the protection cap from the pulley and insert a T50 bit and remove the bolt. The pulley just drops. Replace it with new one and tight back to 35-40Nm. Re-install protection cap and you are done!

Remove airbox to allow access to the various hoses beneath. Remove 2x10mm bolts on the airbox, disconnect MAF plug and the clamp that holds it to the rest of the intake boot. You need to access the hose below that goes in the expansion tank.

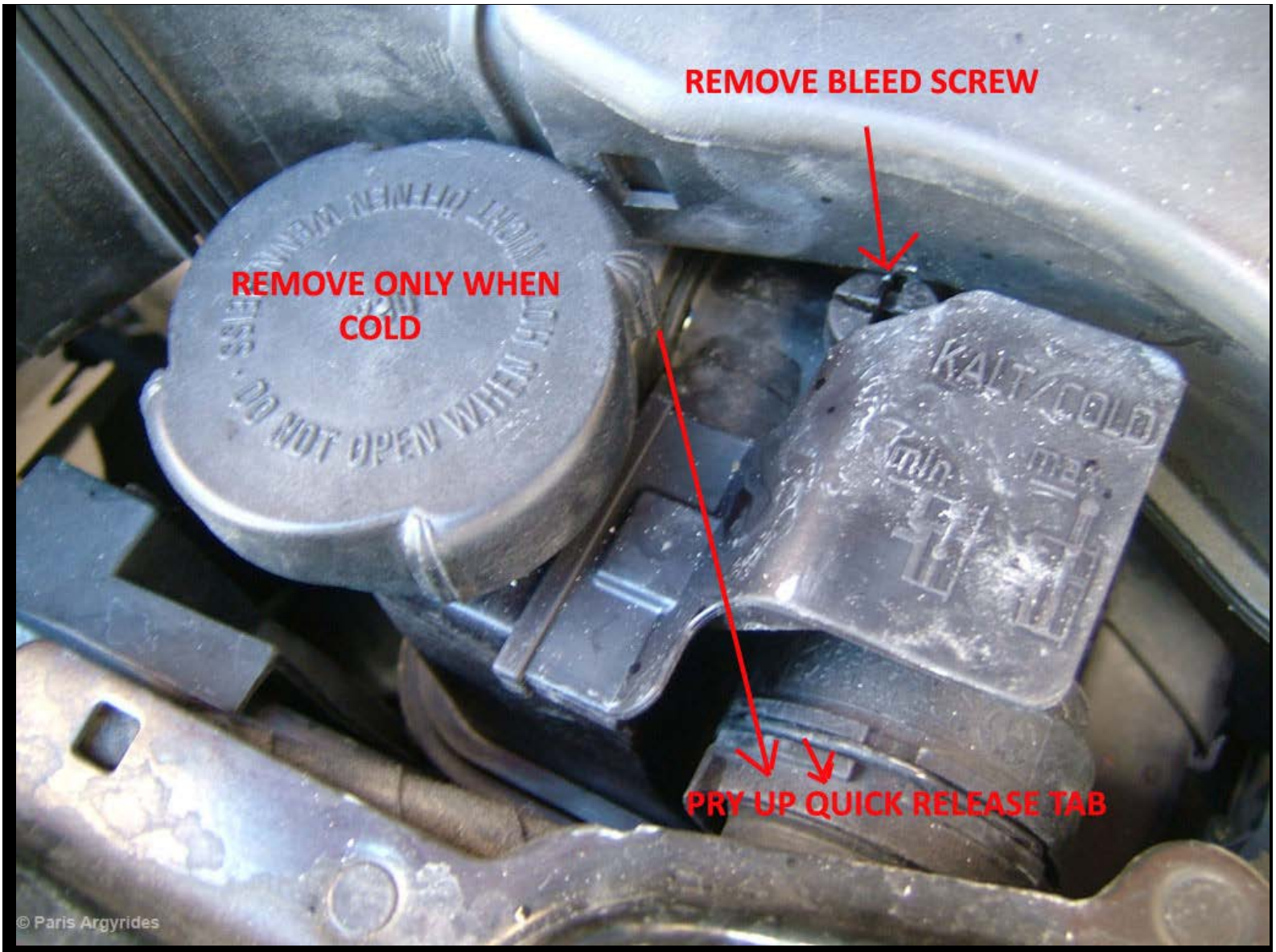
Time to remove the main engine belt and the tensioner. Again insert a 16mm key with a small extension to prevent ratchet touching the crank pulley and rotate clockwise to compress spring. Once compressed, slide engine belt out of the pulley and release the tensioner. Pop the protection cap from the tensioner, insert T50 bit and remove the deflection pulley, just like the A/C one. Install new one and tight back to 40Nm. Don't forget the protection cap.


16mm
ALT
WP
TENSIONER
PS
CRANK
© Paris Argyrides

Time to do the expansion tank now.
1. Let engine cool down
2. Remove expansion tank cap & bleeder screw
3. Go below car and remove expansion tank drain plug (blue) and let the coolant drain in a bucket. Do not allow pets in the area, coolant is sweet and if your dog drinks it, he will die.
4. Remove coolant level sensor. Unplug it and twist it 45 degrees for removal.
5. Remove expansion tank quick release spring

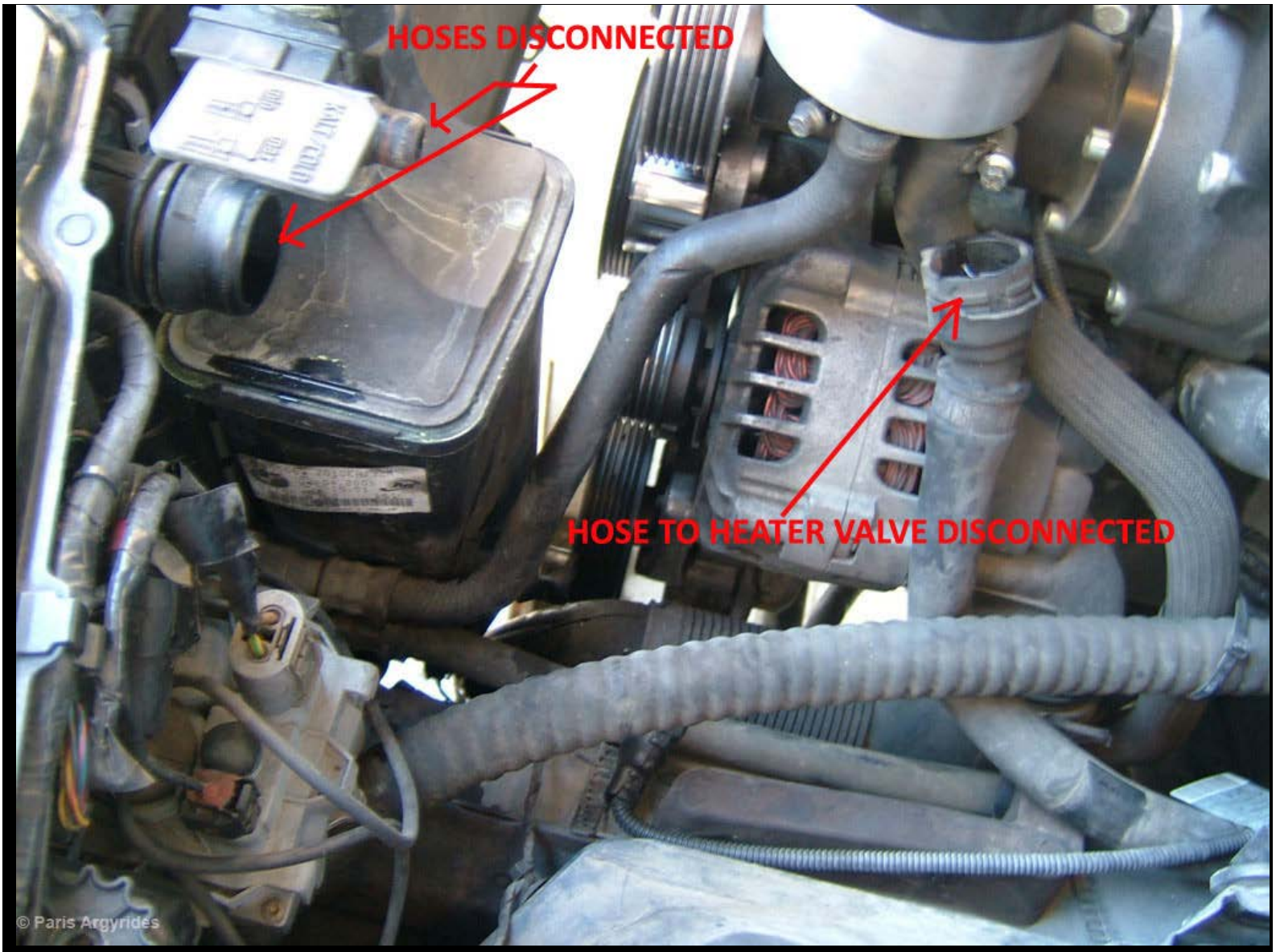


Remove plastic bleed screw, radiator cap and 2 quick release springs from upper radiator hose.



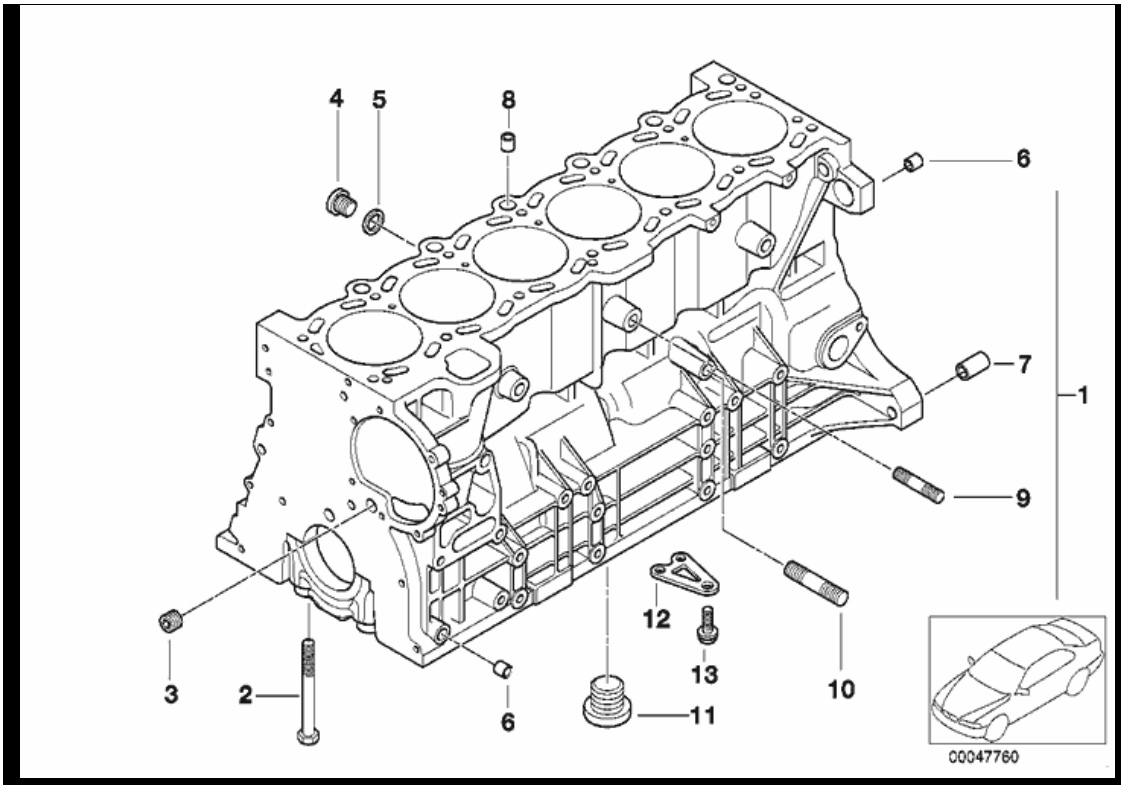
I had to spray some WD-40 on the hose to tank & radiator connection to soften the seals because they were almost glued in place. Let it soak for 5 minutes and job becomes much easier.

There's another hose that needs to disconnect and is the lower one from the heater valve. Lift quick release spring and wiggle the hose out of the tank. Stand on top of the tank, place both hands on the bottom of the tank and lift upwards shaking it a bit. I had to put some strength to get the tank out mainly because of the bottom connection being stuck. Remember to catch any coolant. Once the old tank is removed, I inserted the new one in place, lubricating its seals with undiluted coolant. Once in place re-install all the hoses, drain plugs, and connectors. One step completed at a time. The only thing left not in place was the bleed screw because I would add coolant later.



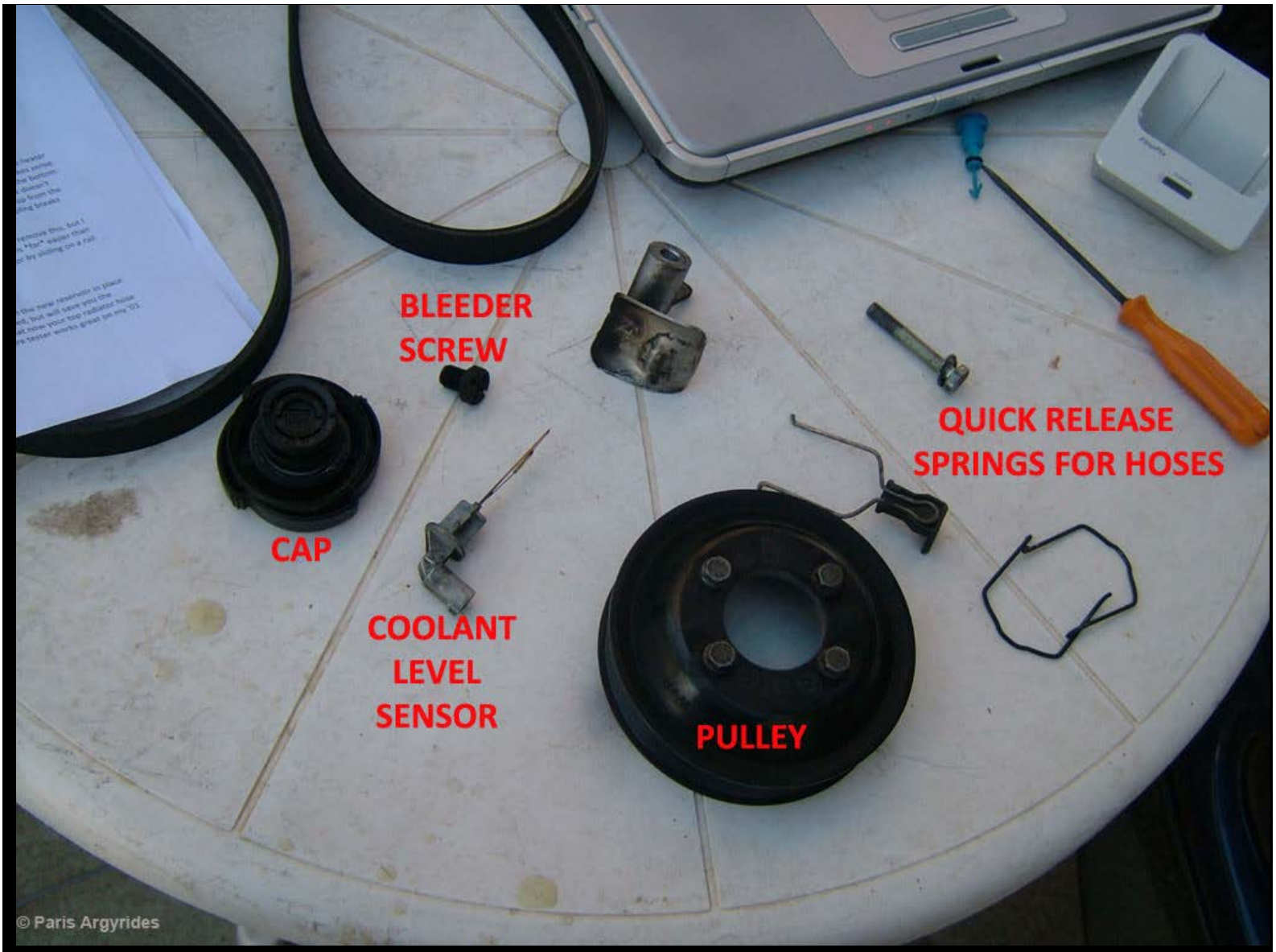
Next step was to drain the radiator from old coolant: Remove the small blue plastic screw and allow coolant to drain completely.

Draining coolant from engine block. Go below car and locate the drain plug. It's next to the ground strap behind the cat converter. You need a ratchet wrench with a u-joint and a couple of extensions. I couldn't take pictures because both my hands were occupied. The drain plug needs a little force to break free and once removed a lot of coolant will flow. It was that time that I discovered the taste of coolant too. It's part number 4 and washer part 5. Once coolant stops running, replace washer and re-install plug. Torque to 25Nm.

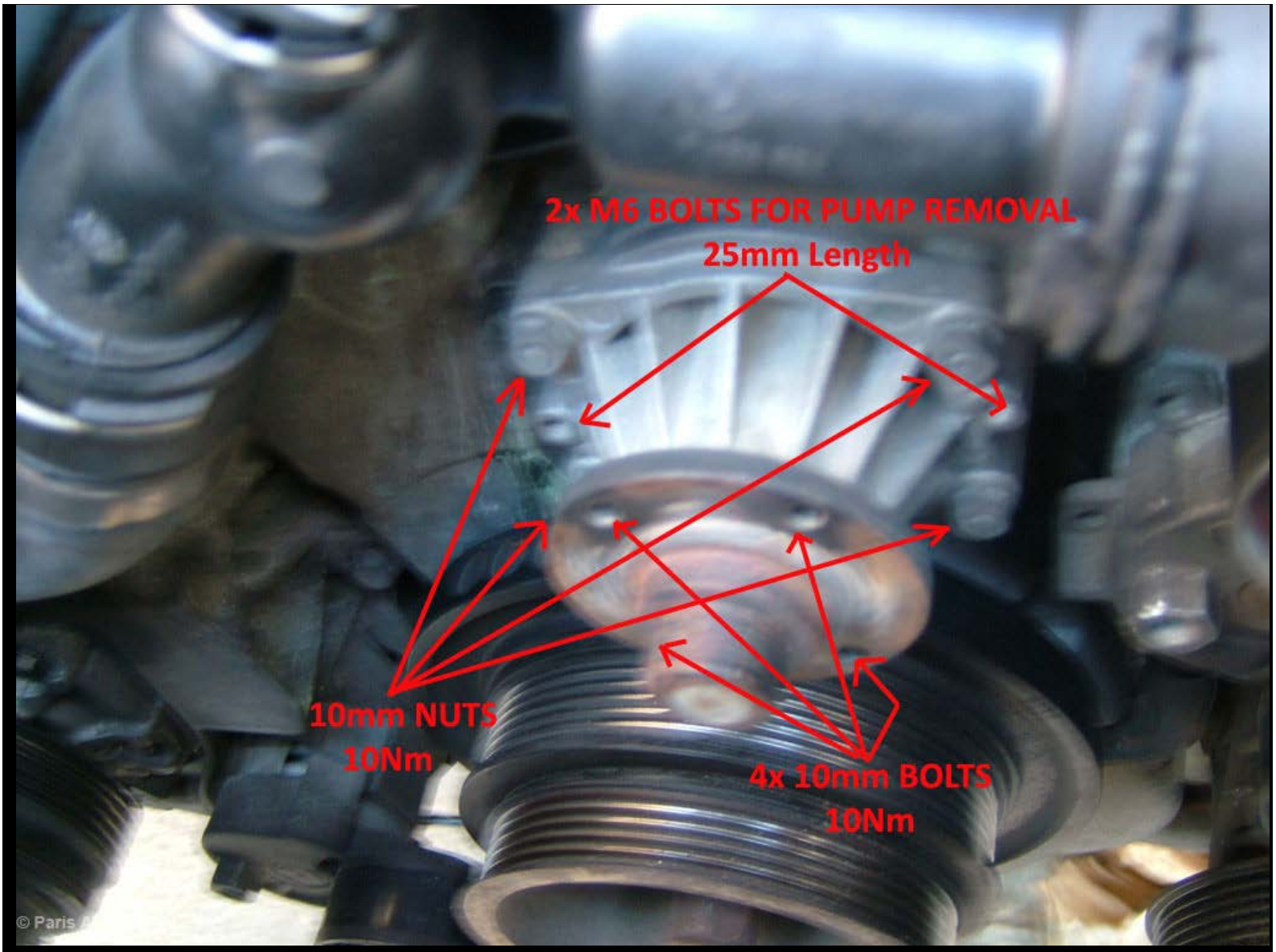


Engine drain plug with its washer

The final step is to remove the actual water pump. Locate the 4 bolts that hold the composite pulley on the water pump and remove them. The pulley just slides out. Don't drop it or hit it because it looks (and probably is) fragile.



To remove the exposed pump, remove the 4 nuts that hold it on the engine block. If it's stuck in place, thread 2x M6 bolts evenly on the water pump. Once they touch the engine block screw them evenly until they break the pump free. Pull the pump and collect any remaining coolant.

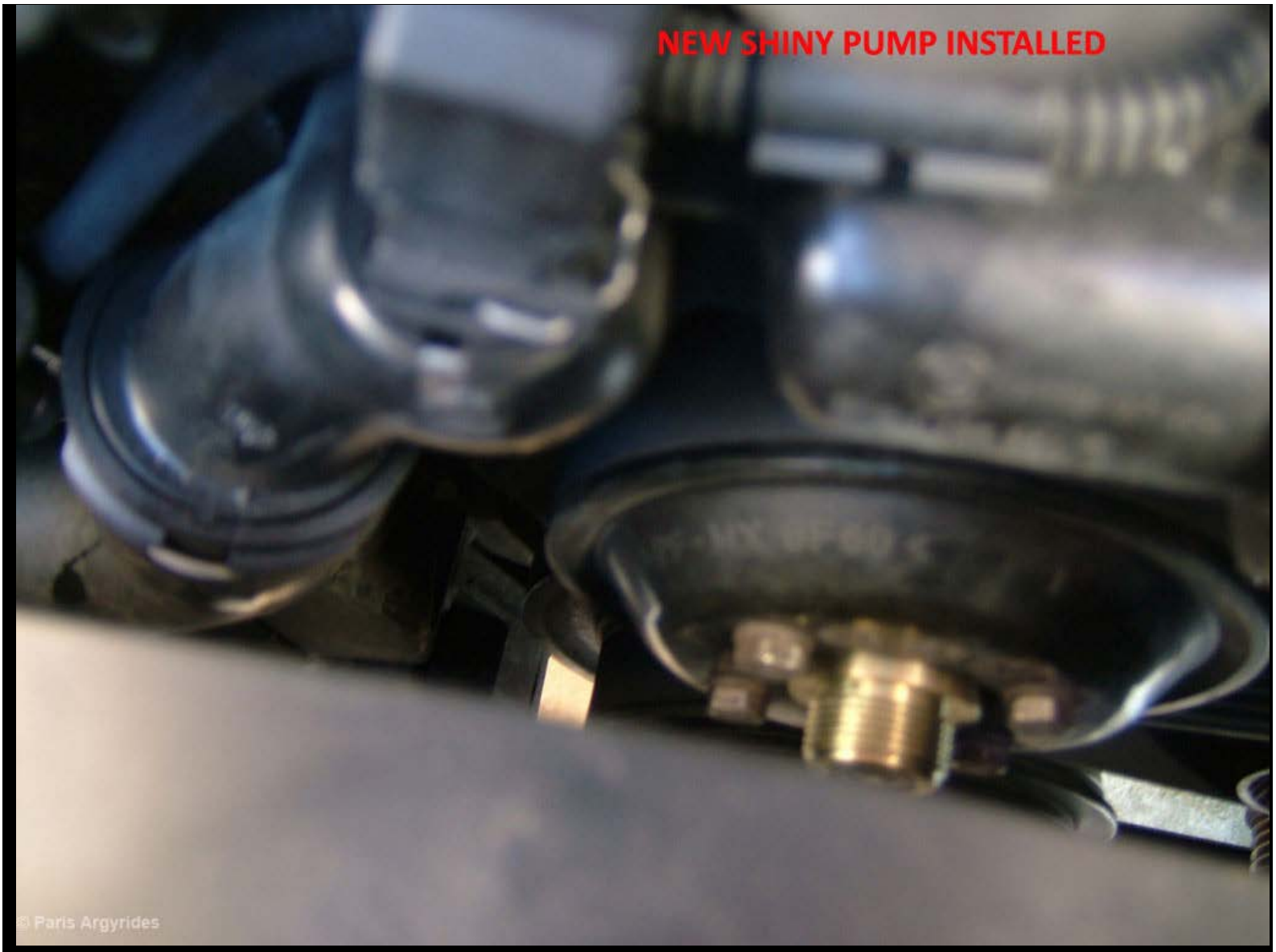


New (Left) Vs old (Right) pump. The OEM pump looks like a toy next to the Stewart one. I could spin the old pump hearing the shot bearings inside rattle. Lasted 80000km.

And that's it basically. Installation for the water pump is exactly the opposite of removal. Once installed, I re-inserted main engine belt, a/c belt, fan and airbox with MAF. I inspected everything in case I forgot to connect a part and started the coolant refill and vent process.

1. Mix 50/50 OEM coolant with distilled water (4L+4L) 8L total
3. Set ignition to ON (engine off) position, set the heater fan to lowest speed and temp setting to max (32 degrees) this will open the heater valve for proper bleeding.
2. Slowly pour mixed coolant inside expansion tank until bubble free fluid emerges from bleed plug. I needed around 7.5 Liters of coolant.
3. Screw bleed valve in place
4. Start engine and allow it to operate until warm (thermostat opens)
5. Watch for any leaks and also watch the temp gauge. If it goes beyond middle turn engine off and check for air pockets and re-bleed system.

End result:



Once everything is working properly, re-install lower splash cover and enjoy your car!
Total time: 5 hours.

Useful procedures from TIS:

Water Pump Replacement

Draining & Adding Coolant

Venting Cooling System

Addition:
My temp gauge seems to read a tad lower now with the new pump.


4
5
6
7
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