BMW Mini Cooper S R53 R52 Eaton Supercharger Oil Service Kit JCW Off Car Kit Install Instructions Fitting Guide

by x8rltd

Symptoms of fault

This is a preventative service kit to avoid future failure of the supercharger components.

The fault

Scheduled servicing of the supercharger is important to keep in the best condition and to prevent failure.

The R53 and R52 Mini Cooper S models are fitted with an Eaton supercharger. The supercharger is lubricated and partially cooled by oil located in two reservoirs within the supercharger housing.

BMW / Mini do not offer a change of this oil / service of this part as part of the service schedule. However other manufacturers vehicles utilising the same supercharger recommend servicing at 40,000 miles.

It is not uncommon for the seals to weep on the supercharger allowing oil to escape.

Most enthusiasts therefore recommend servicing every 40,000 miles to keep this oil fresh and topped up- preventing failure of the supercharger components. These superchargers are one of the most expensive components on the vehicle and used units can provide their own issues.

The solution

Service your vehicles supercharger using our comprehensive kit, prevent failure of the unit.

Our comprehensive kit includes all the parts you will need to carry out a full service of the supercharger off of the vehicle. This is the very best way to ensure a full service and complete exchange of the oil.

Our parts (developed by working on these vehicles), coupled with our thorough install pictorial and video instructions allow you to carry out this service, providing the ultimate reassurance.

We recommend removing the supercharger from the vehicle to service, we believe this is the most thorough way, all our components included here allow you to do this replacing all consumables, gaskets and parts which will likely need replacing along the way.

We recommend refilling the supercharger off of the vehicle through the drain plugs, we don't advocate removing any of the casting of the supercharger as we feel this is more likely to introduce contaminates.

Our comprehensive kit includes the following:

210ml turbine oil. Made by Shell to MIL-PRF- 23699G and DEF-STAN91-101 standards. Matching and exceeding Eaton requirements. Enough to fully refill both reservoirs on the supercharger.

Green supercharger to air tube gasket (Vitor Reinz) equivalent to 11610020836. Failure of the seal and subsequent air leaks are common and this leads to rough running and a lack of power.

Viton O Rings (best material for environment fitted) to replace the often perished seals on the supercharger drain plugs.

Bypass valve pipe, ASH branded (select if purchasing for auto or manual so we send correct pipe) Equivalent to

17511524538 or 17517541463. Supplied with x2 Stainless steel slim hose clamps to replace OEM hose clips which are not easy to reuse (11651521321). Note our hose clamps have a band thickness of 0.7mm. Where this isn't considered it makes the hose very difficult to fit.

Three slim stainless-steel hose clamps to replace OEM clips which are difficult to reuse on both ends of the airbox to throttle body valve intake hose. X1 to replace the clip on the main intake duct (to replace 13721491752) these hose clamps need to be slim line to fit the mounting recess correctly.

Large supercharger inlet horn gasket (Elring) to replace 17511520044. Enabling removal of the supercharger inlet horn to clean / inspect the rotor.

A pair of Viton O-rings (the best material for the fitting environment) equivalent to 11517509186 to replace O-rings on the water pump. To replace flange to block O-ring and water pump to flange O-ring.

Viton O-ring seal to replace seal on the crank position sensor (equivalent to 12147514983) This is normally leaking on these vehicles and it is the best time access wise to replace this when removing the supercharger.

60ml syringe with long filler pipe to insert oil in to supercharger drain holes.

3/16 AF long arm Allen key (not found in most socket sets) to remove supercharger drain plugs, metric sizes will not fit and will cause damage.

Dipstick crankcase bung plug, to prevent coolant entering the crank case when removing the water pump.

Replacement throttle body gasket, essential to replace when removing the throttle body unit to service the supercharger. Equivalent to 13547509045.

Bolts and washers included to screw in to the front frame to allow the radiator to be safely removed. Check out our instructions to see how crucial these are.

Replacement dip stick tube O-ring, this should be replaced when removing the tube to access the supercharger. Equivalent to 11437513891.

Vehicles affected

BMW MINI Cooper S R53 2000- 2006 (Inc JCW models)

BMW MINI Cooper S Convertible R52 2002-2008

You will receive

X1 Bottle 210ml turbine oil. Made by Shell to MIL-PRF- 23699G and DEF-STAN91-101.

X2 Viton O Rings for supercharger drain plugs.

X1 Green supercharger to air tube gasket (Vitor Reinz) equivalent to 11610020836.

X1 Bypass valve pipe (ASH) equivalent to 17511524538 or 17517541463. With X2 slim Stainless steel hose clamps (to replace 11651521321)

X3 Slim stainless steel hose clamps to replace 13721491752.

X1 Large inlet horn gasket (Elring) to replace 17511520044.

X2 Viton O-rings to replace 11517509186 on water pump and water pump flange.

X1 Viton O-ring to replace seal on the crank position sensor 12147514983.

X1 60ml syringe with long filler pipe.

X1 3/16 AF long arm Allen key.

X1 Dipstick crank case bung plug.

X1 Throttle body gasket equivalent to 13547509045.

X2 Bolts and washers for radiator removal.

X1 Dip stick tube O-ring. Equivalent to 11437513891.

Step 1: Remove Front Wheels

To carry out the most comprehensive service of the supercharger we recommend removing the supercharger completely. You can opt to service in situ, this instruction guide is directed at complete removal. For ease of access and for the additional time it takes vs accessibility issues we recommend removing the drivers side (UK) wheel, arch liner and the front bumper. You can opt to service in front end service mode but this isn't out approach.

Remove wheel:

Loosen wheel nuts and jack the vehicle, check out our BMW Mini jack point pads on our website. Safely support the vehicle.

Remove nuts and remove wheel

Torque for refitting:

M12 thread: 88.5 ft/lb 120nm
M14 thread : 103 ft/lb 140nm (Generally fitted from July 06 on-wards)


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Step 2: Remove Splash Shield

Locate the splash shield underneath the front of the engine.

At the rear of the shield are two Philips head screws one on each side of the shield. Loosen these to remove from the sub-frame.

To remove the front edge remove the 3x 10mm bolts, these can be hidden behind the lip of the front bumper.

Slide the splash shield rearwards and out of position.


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Step 3: Remove Arch Liner

Remove x2 Philip head screws at the top of the liner, locations shown by Yellow arrows.

Remove 8x expansion grommets. (location shown by Red arrows) Unscrew the center section of the grommet using a Philips head screw driver, once this section is loosened and protruding out (around 10mm) pry the grommet out. If the whole grommet moves when loosening with the screwdriver hold the outer section still to loosen the center section.

Take care to remove the grommet at the bottom right edge of the liner and the wheel arch plastic.

Pull the arch gently out of position.


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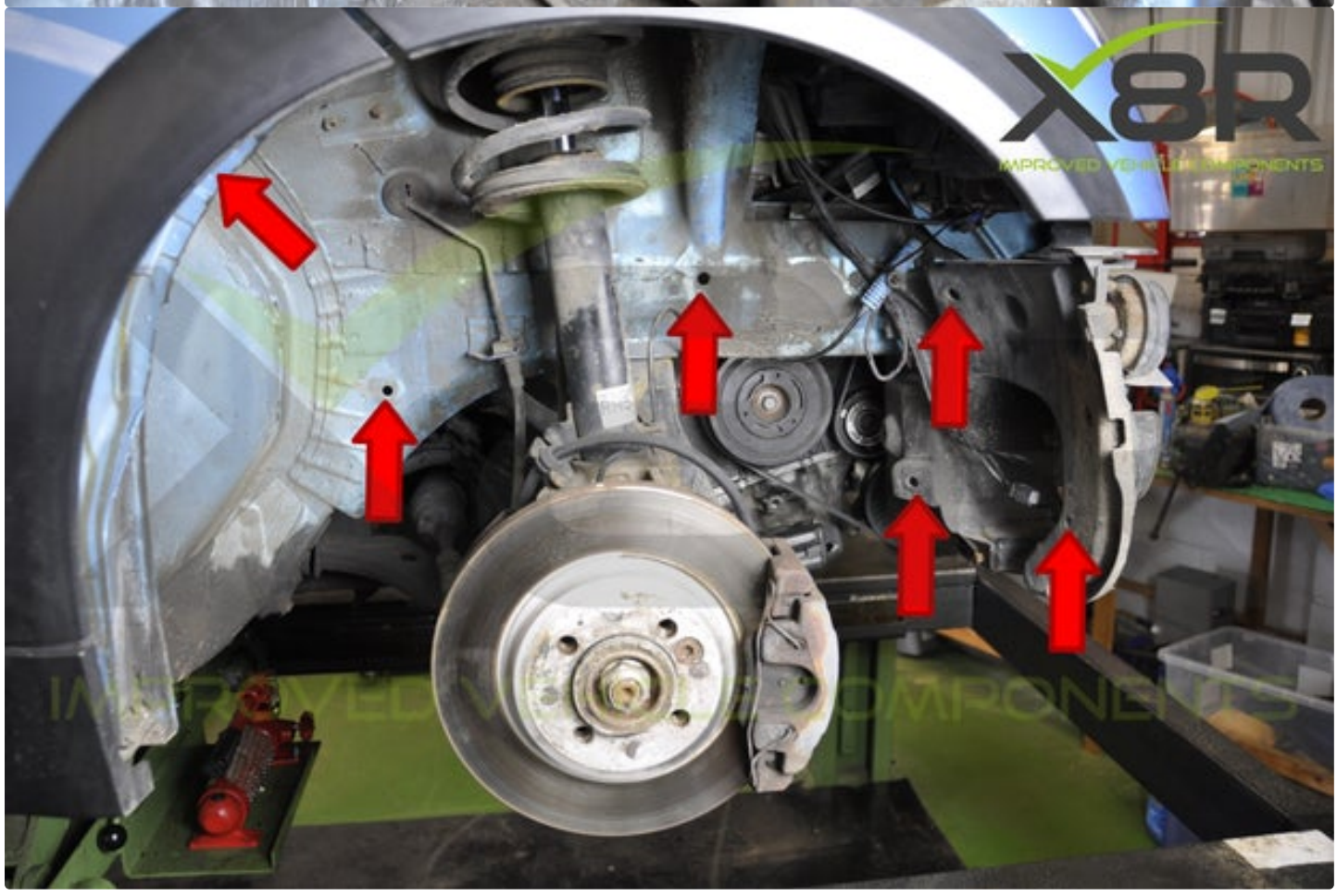
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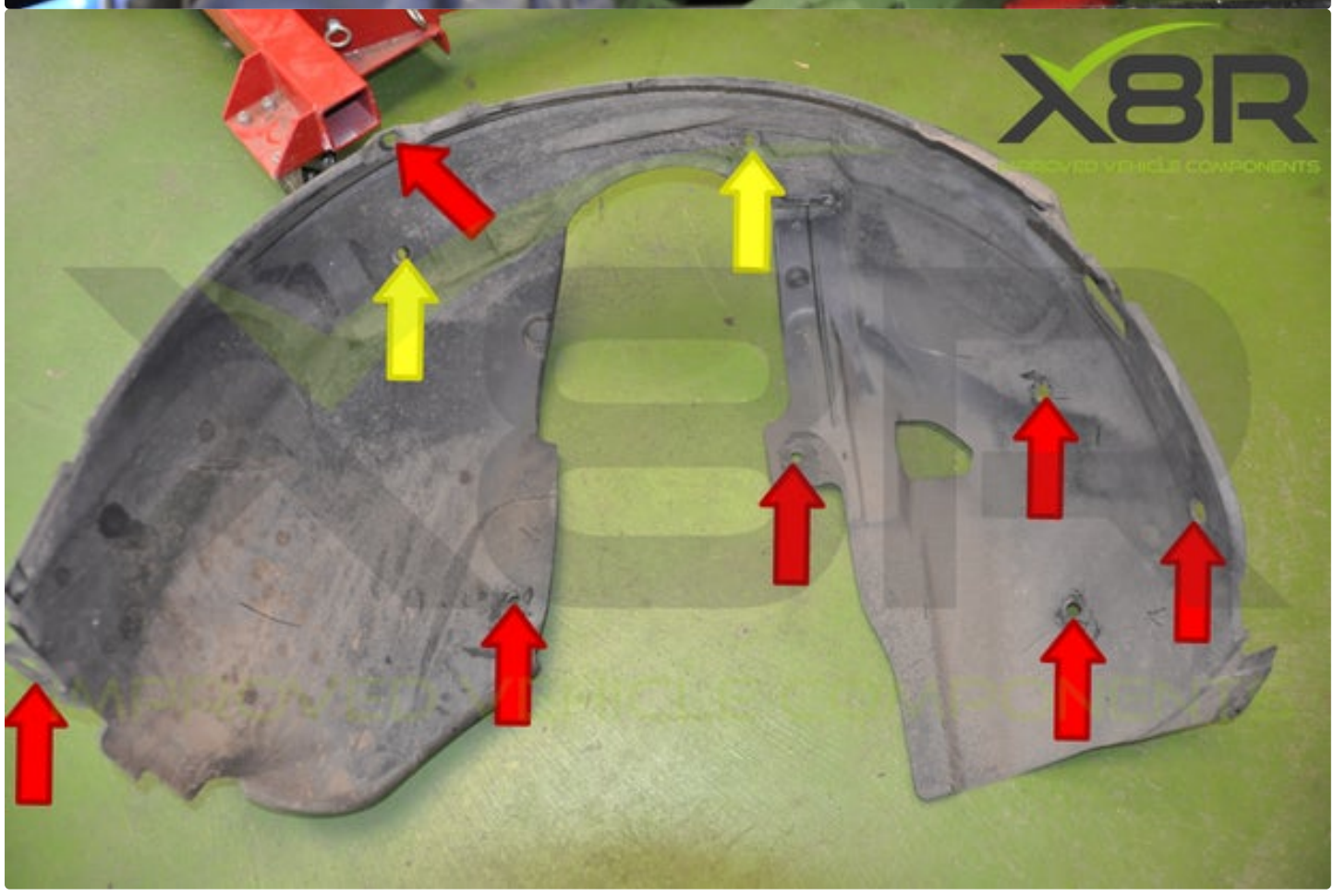
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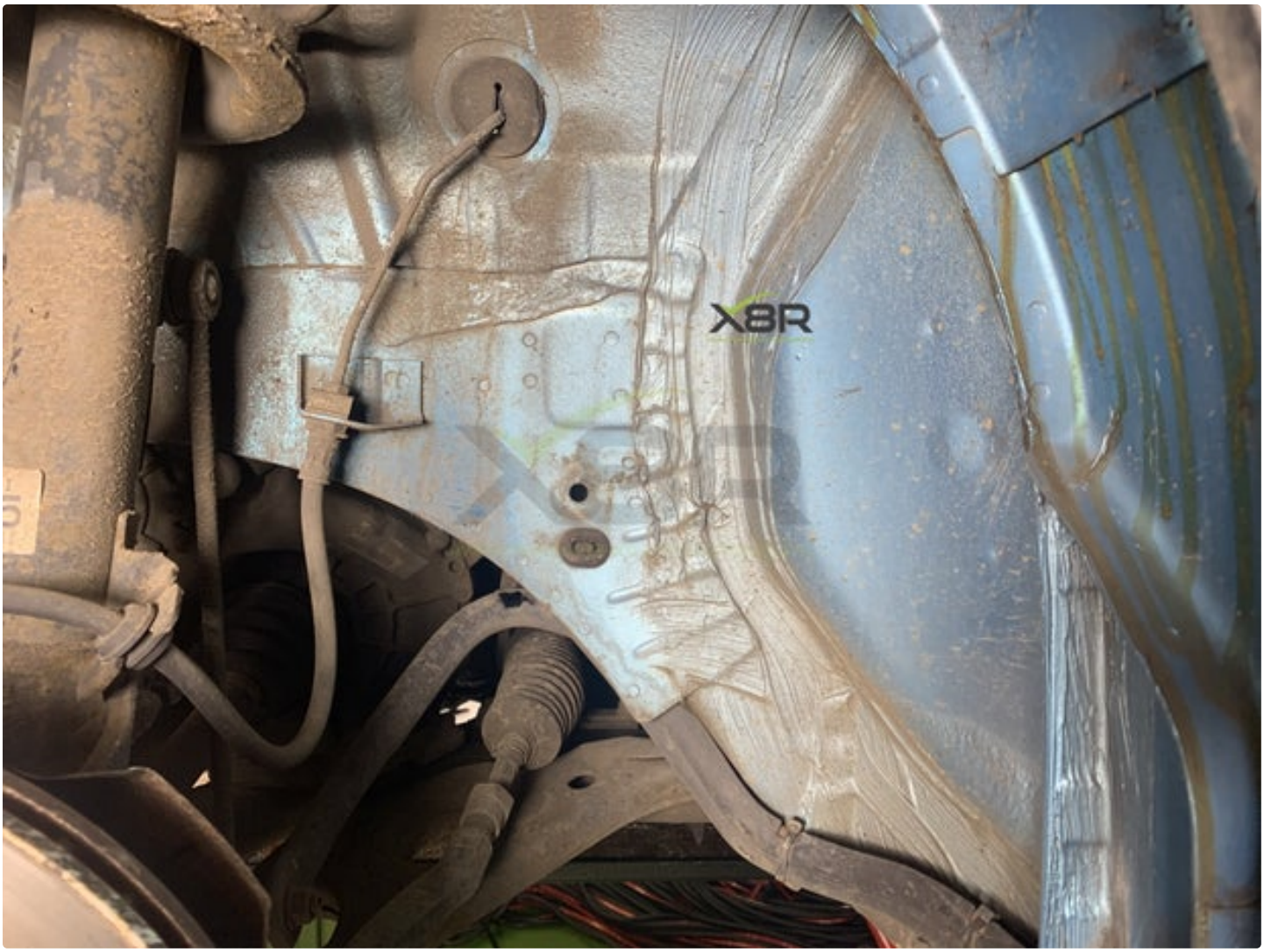

Step 4: Remove Bulbs

If fog lights are fitted to the vehicle. Locate the rear of these lights, hold the bulb housing and turn anti-clockwise to release.

Release indicator bulbs. Looking down at the front bumper from above you will see the access holes either side of the radiator for the indicator bulbs. Hold the bulb housing and rotate anti-clockwise to release.


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Step 5: Remove Front Bumper

Remove x2 10mm bolts on each side of the bumper.

Remove the x2 T30 Torx bolts securing the front of the bumper.

Carefully pull the front bumper forward, as you do twist and remove the side lights from the bumper. As you move the bumper further forward remove the outside air temperature sensor from its holder.

You can then fully remove the bumper, set aside and cover to prevent any damage to the paintwork.


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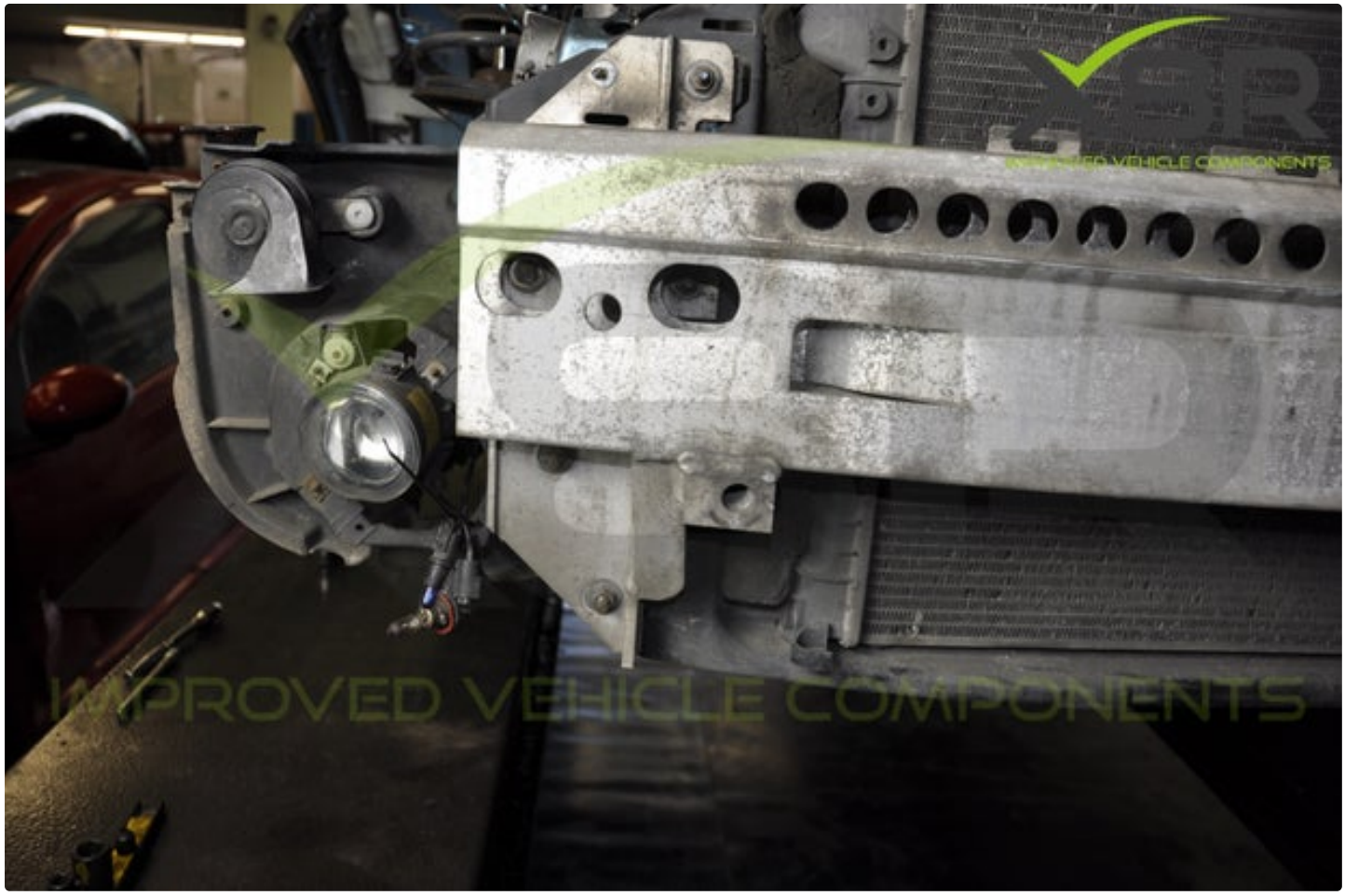
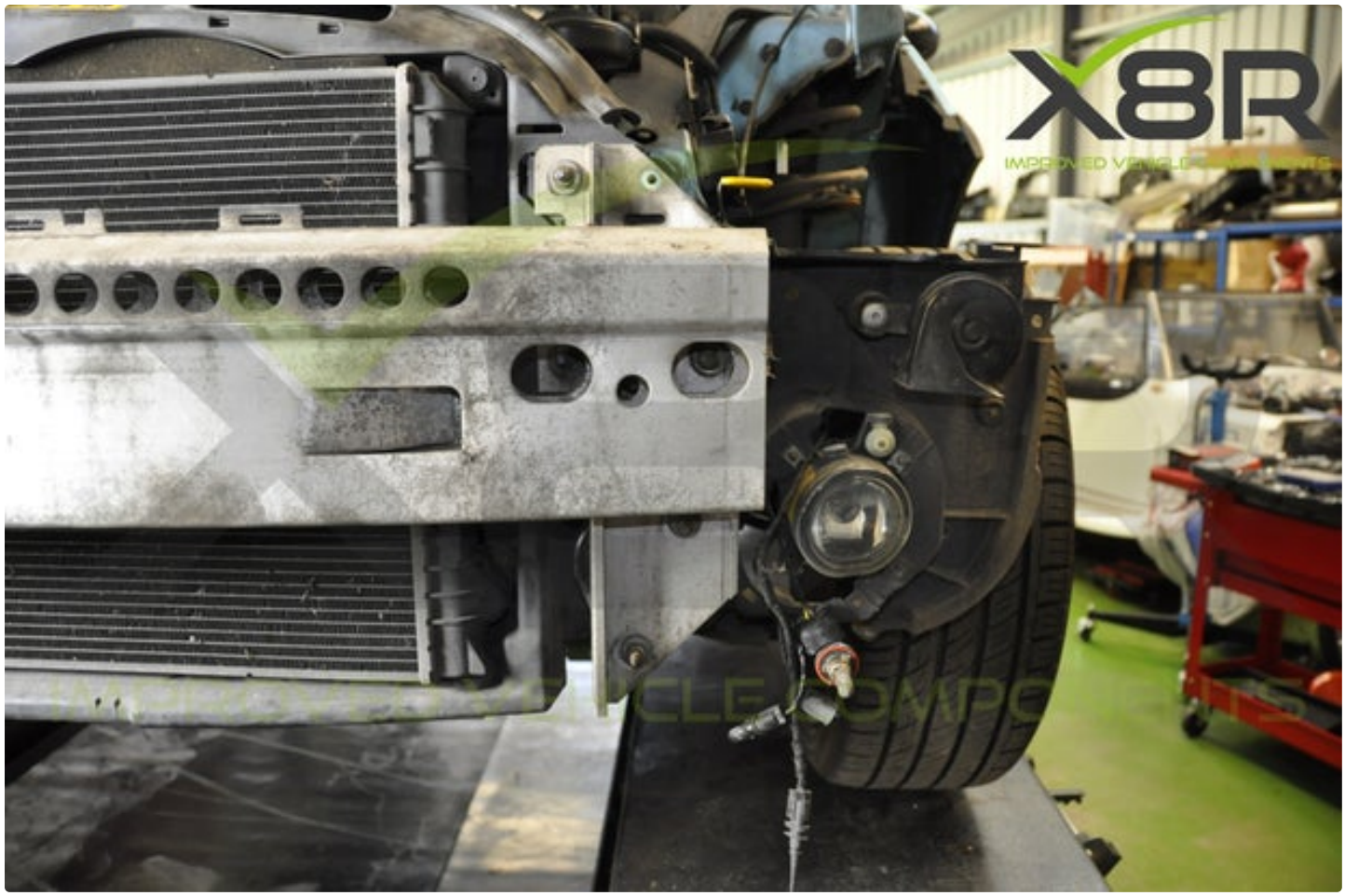
Step 6: Remove Bumper Carrier

Remove 8x 13mm nuts and 2x 13mm bolts and remove the carrier.

Torque for reinstall: 16 ft-lb 22Nm.





Step 7: Remove Crush Tubes

Remove the two 18mm bolts retaining each crush tube to the sub-frame.

Remove the two 10mm bolts to release the tubes from the plastic radiator frame.

Pull the crush tubes forward and remove. If stiff rock them side to side or strike with a mallet to release.

Torque settings for reinstall:

When reinstalling, install these loosely with the bolts until the bumper carrier is fitted, as movement will be needed, then the bolts can be full torqued.

Crush tube to front sub-frame (M12 x 1.5 x 85mm) 74 ft-lb 100 Nm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Step 8: Remove Radiator

Using a flat bladed screw driver pry off the OEM hose clip on the intake hose and release the hose. For reinstall please use our stainless steel hose clamp.

Remove the 8mm bolt retaining the upper radiator hose and release hose.

Screw our x2 bolts and washers into the holes in the frame shown. One each side. Screw in so that not too much stress is put on the thread- screw in past thread. These bolts will allow you to slide the radiator frame forward so that you can access the hoses.

Remove the 10mm bolt retaining the radiator fan electrical connector bracket, remove bracket and pull loose the connector. (on A/C vehicles this will also release the A/C port)

On vehicles fitted with A/C: Remove x2 10mm nuts holding the A/C condenser.

Unplug electrical connector to horns on both sides of the vehicle and remove all wiring in way of removing radiator.

Slide the radiator forwards on the bolts to allow access to the bottom hose.

To drain the coolant you need to remove this lower hose. Place a drain pan under the hose, use "Mole" grips to release the hose clamp and remove the hose to drain down. Remove the cap on the coolant tank and open the vent (plastic screw on plastic section) on the upper radiator hose to drain quicker.

Using "Mole" grips release hose clamp on upper radiator hose and release hose.

Slide radiator forward and remove.

Reinstall:

You will need 6 Liters or approx 1.5 gallons of fluid to re-fill the system.

A 50/50 mixture of antifreeze and distilled water is required.

BMW coolant (part number 82140031133) should be used or a suitable match.

Fill the expansion tank to the fill line.

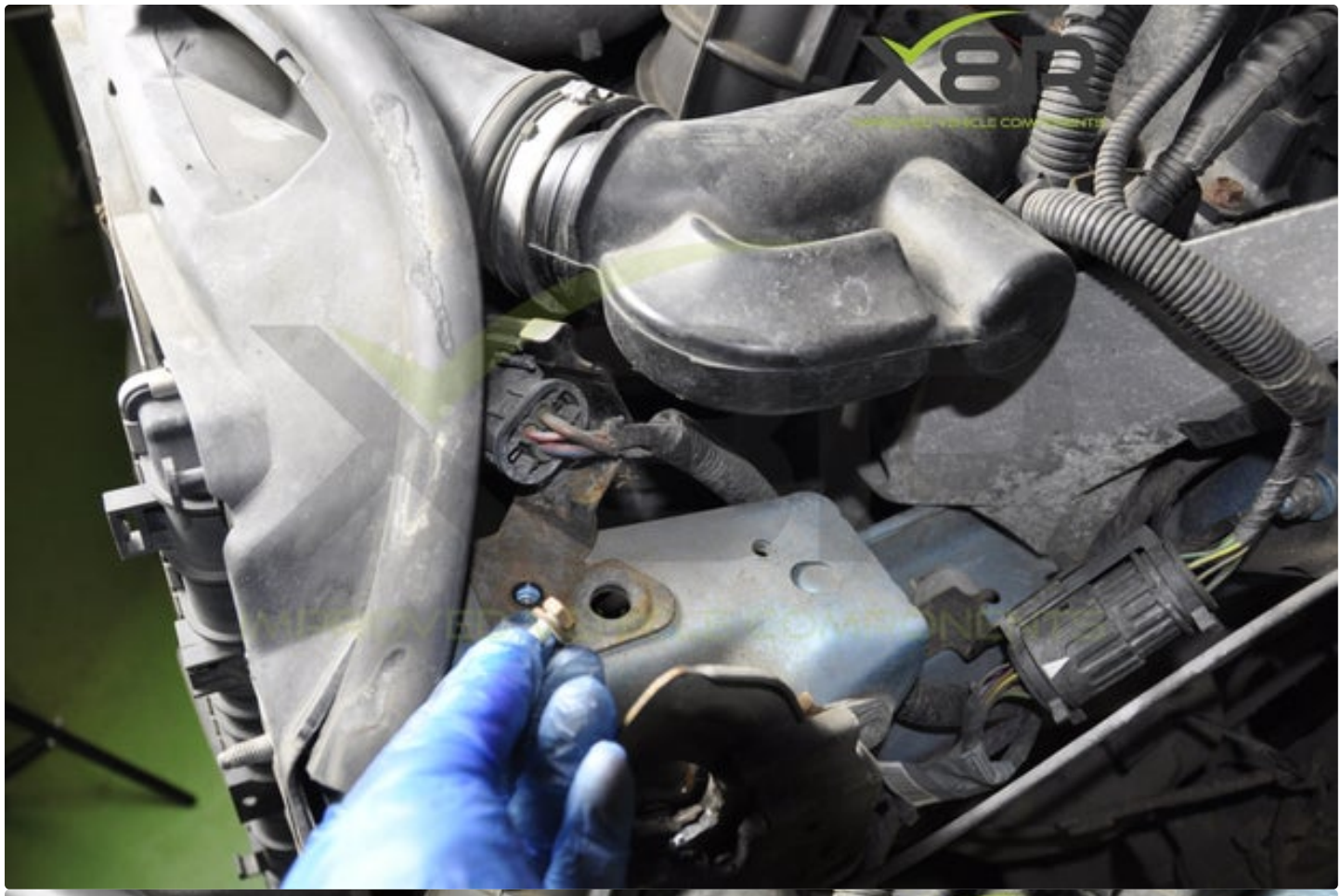
Loosen the bleed screw on the upper hose and fill the expansion tank until fluid comes out of the bleed screw.

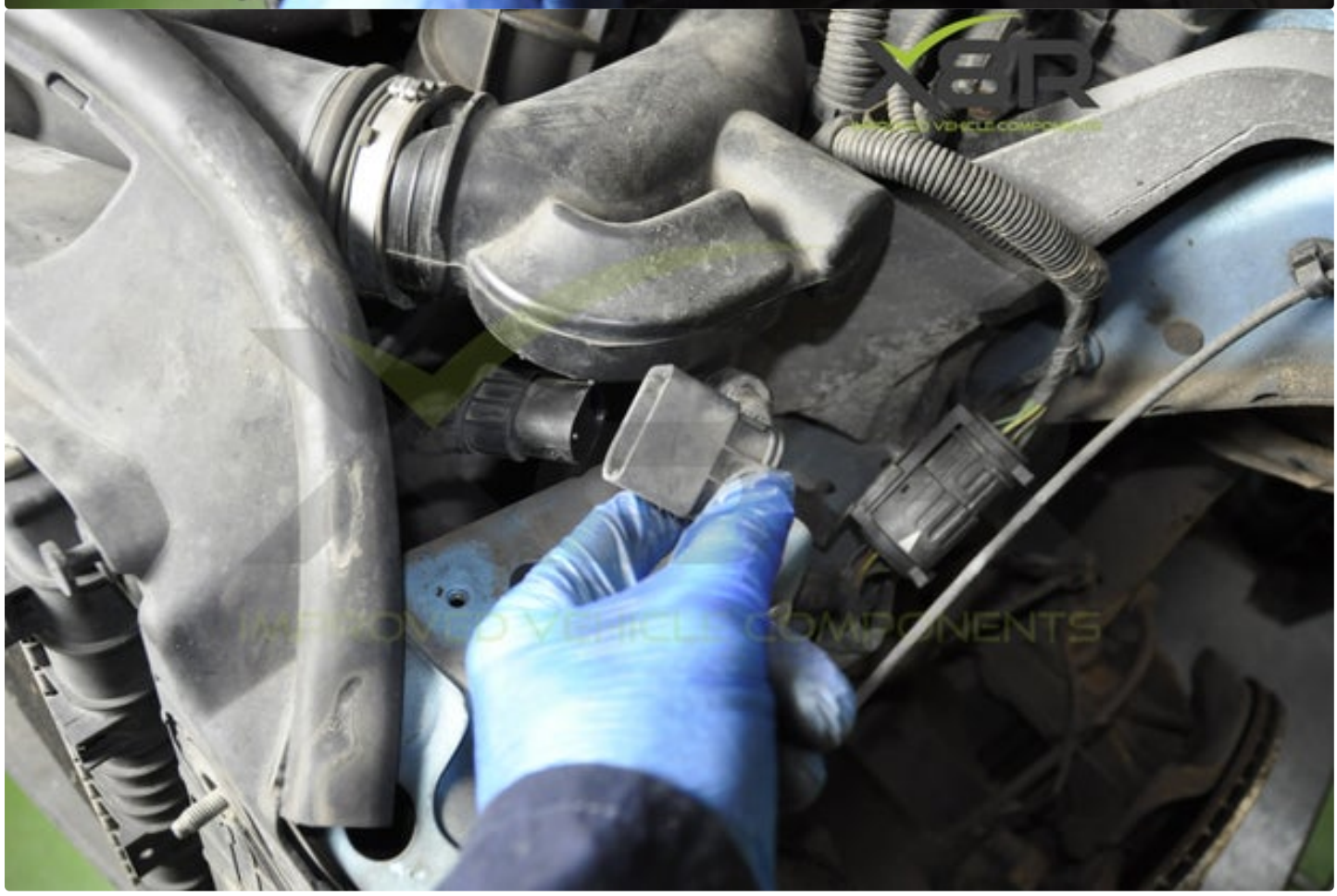
Start the engine, warm up engine and keep an eye on the coolant level in the expansion tank.

Turn on the heater to full power. Fill expansion tank until coolant comes out of the bleed screw (catch any escaping fluid) tighten the bleed screw.

Run the engine until up to operating temperature, switch off and let cool down. Top up coolant level to mark in expansion tank if required.

Recheck levels periodically.



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ENGINE OIL
SEE OWNER'S MANUAL

Step 9: Remove Intercooler

Using a T30 Torx removing the 4x screws retaining the plastic cover. Note orientation for reinstall and also that the rear screws are longer than the front. Lift off the cover.

The rubber bellows connect the inter-cooler to the intake, make sure to inspect these when removing, any rips or holes will cause loss of boost. (The part numbers for these are 17517639959 and 17517639960)

On each bellow there are two clamps. Use a T30 Torx to remove clamps on both sides and lift the upper clamps off.

Using a 8mm socket remove one bolt from each of the inter-cooler retaining brackets and swivel out of position to allow remove of the inter-cooler.

Lift the inter-cooler out of position and locate the lower clamps for reinstall (note these lower clamps are threaded to receive the T30 torx scews, ensure these are refitted in the lower position for reinstall)

Before reinstall clean up the Plenums as well as you can, remove any excess oil. It is also an opportune time to inspect the injectors, fuel rail and wiring that is usually hidden.

Reinstall- Torque T30 Torx clamp screws to approx 7 ft lbs. 9.5Nm or until sealed.


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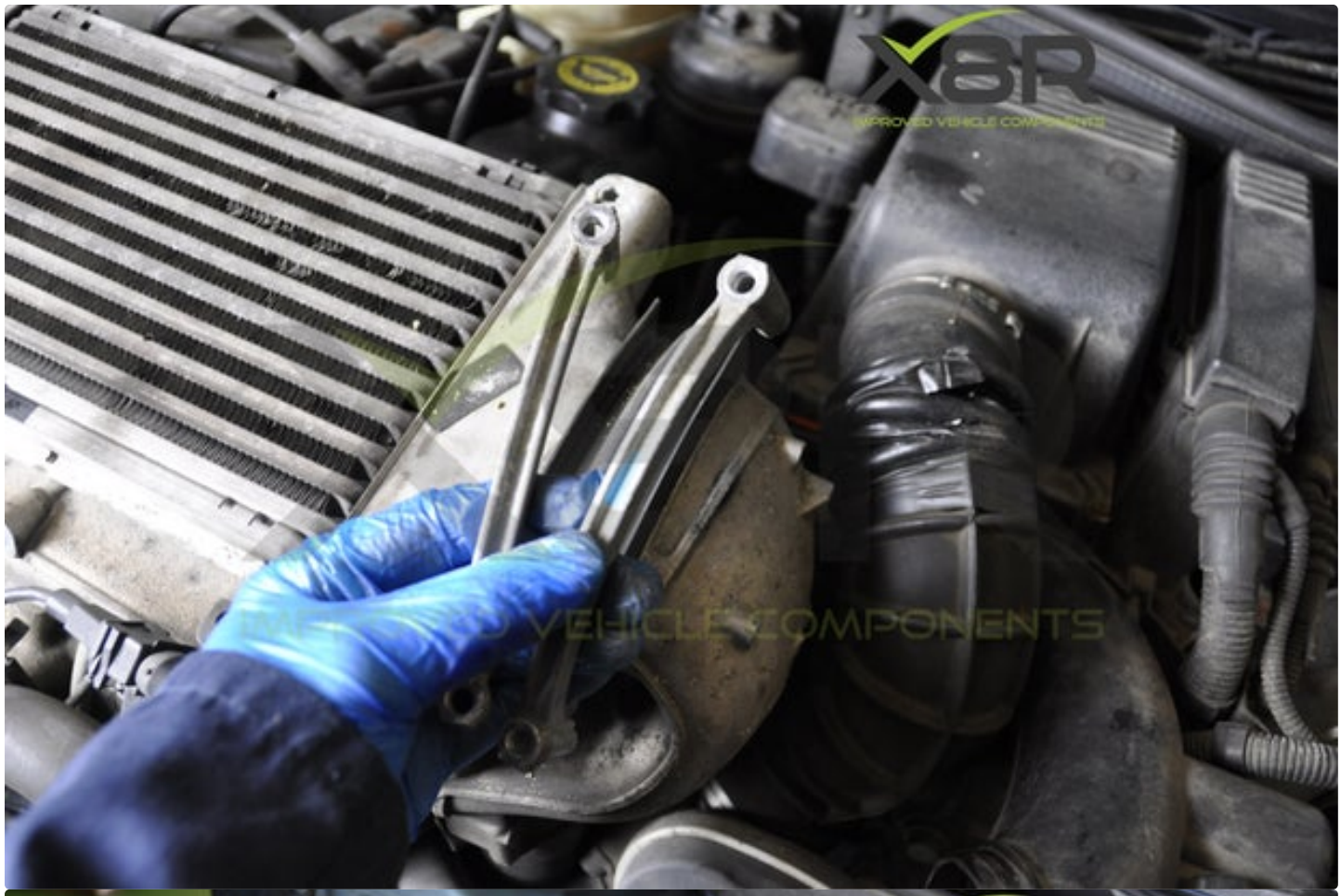
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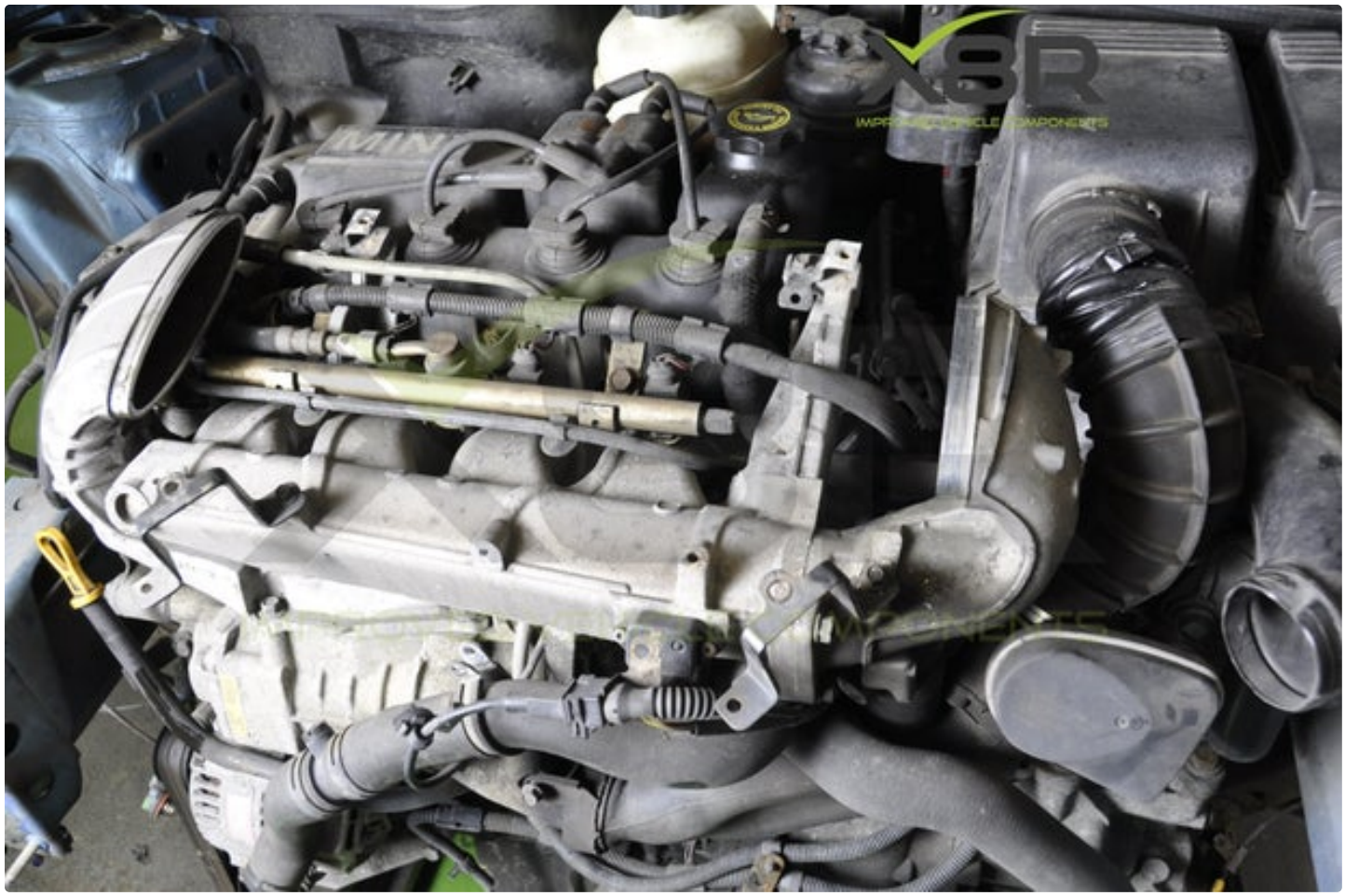
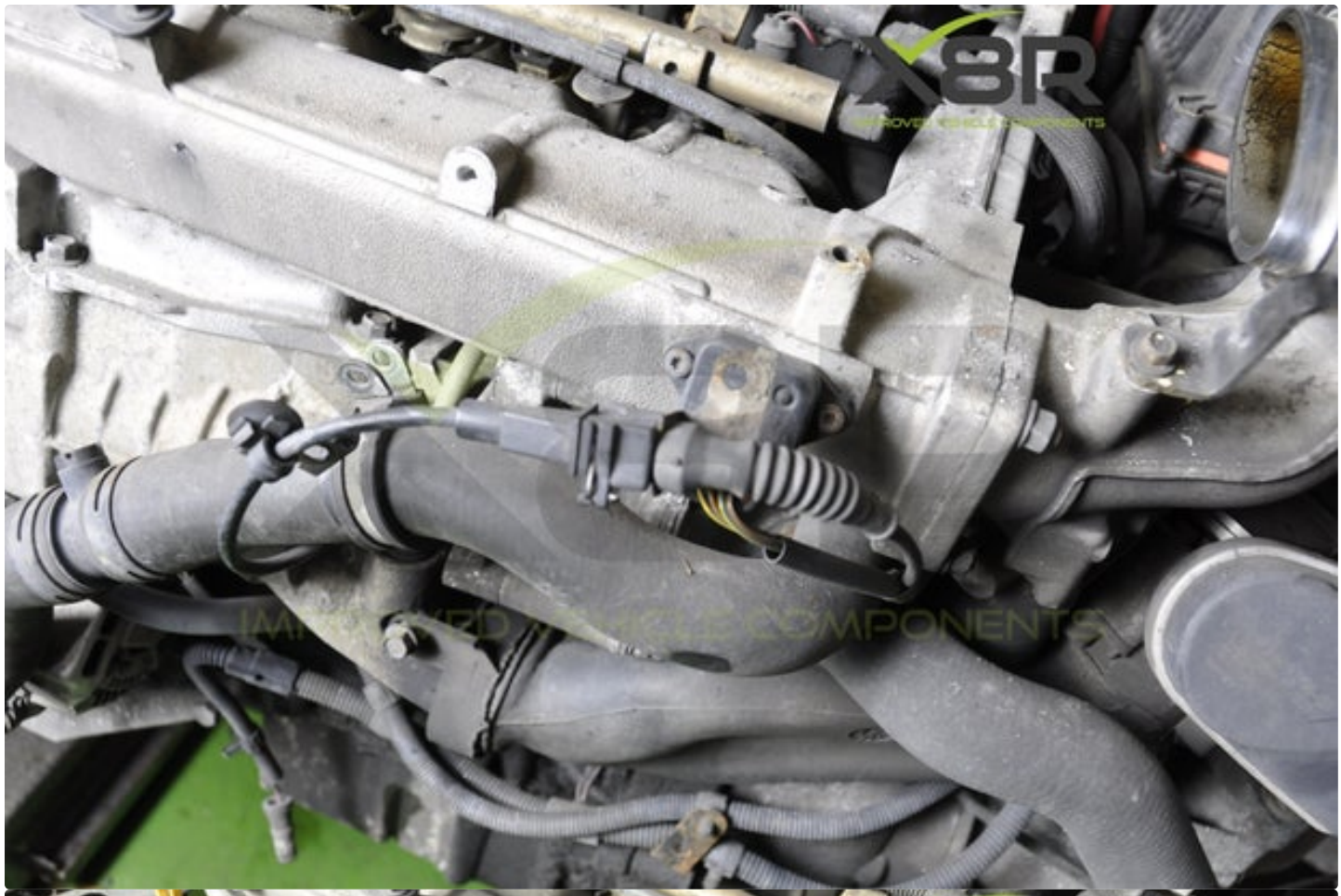


Step 10: Remove Connector

Disconnect electrical connector shown. Prise the metal clip to release the connector and pull loose.

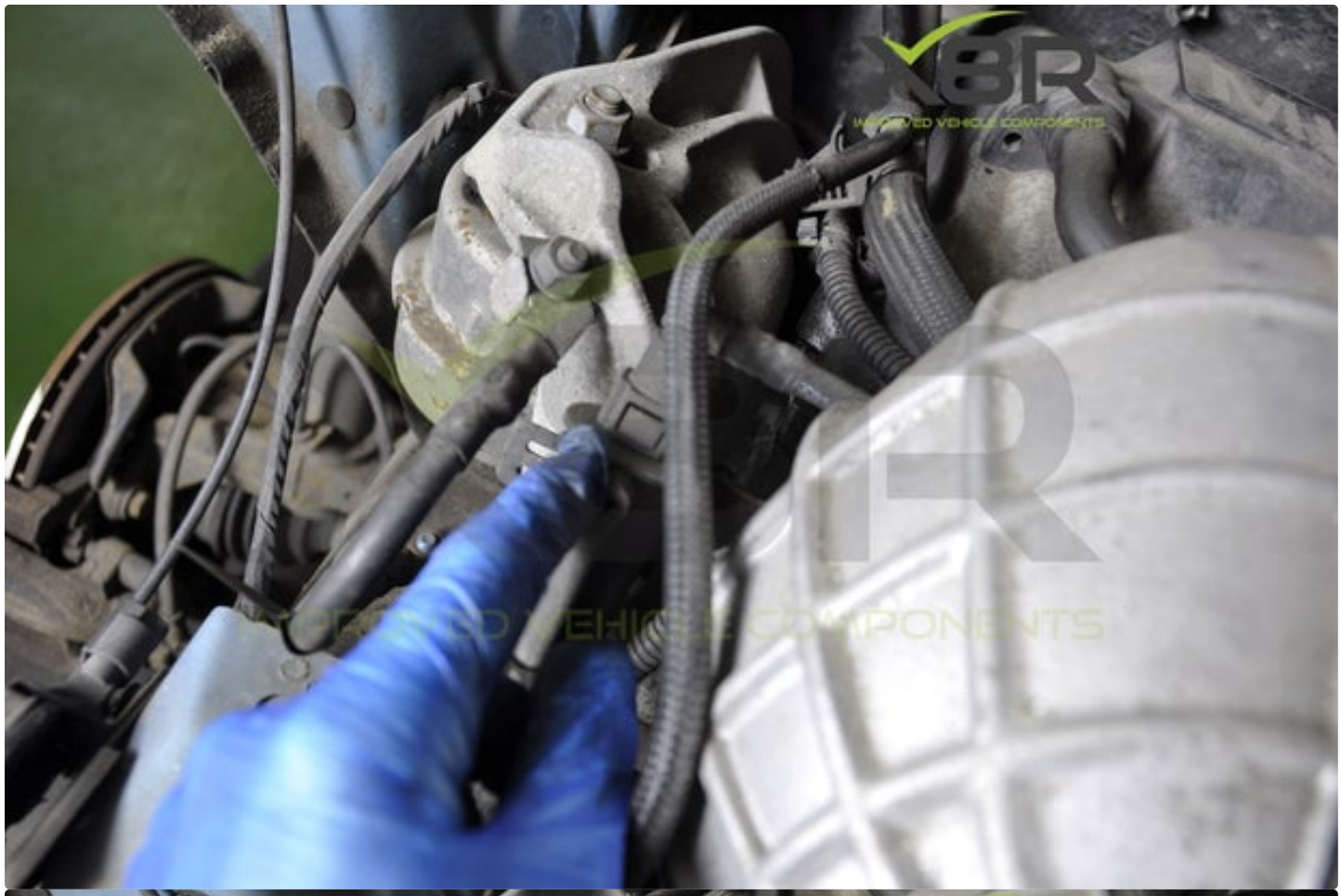


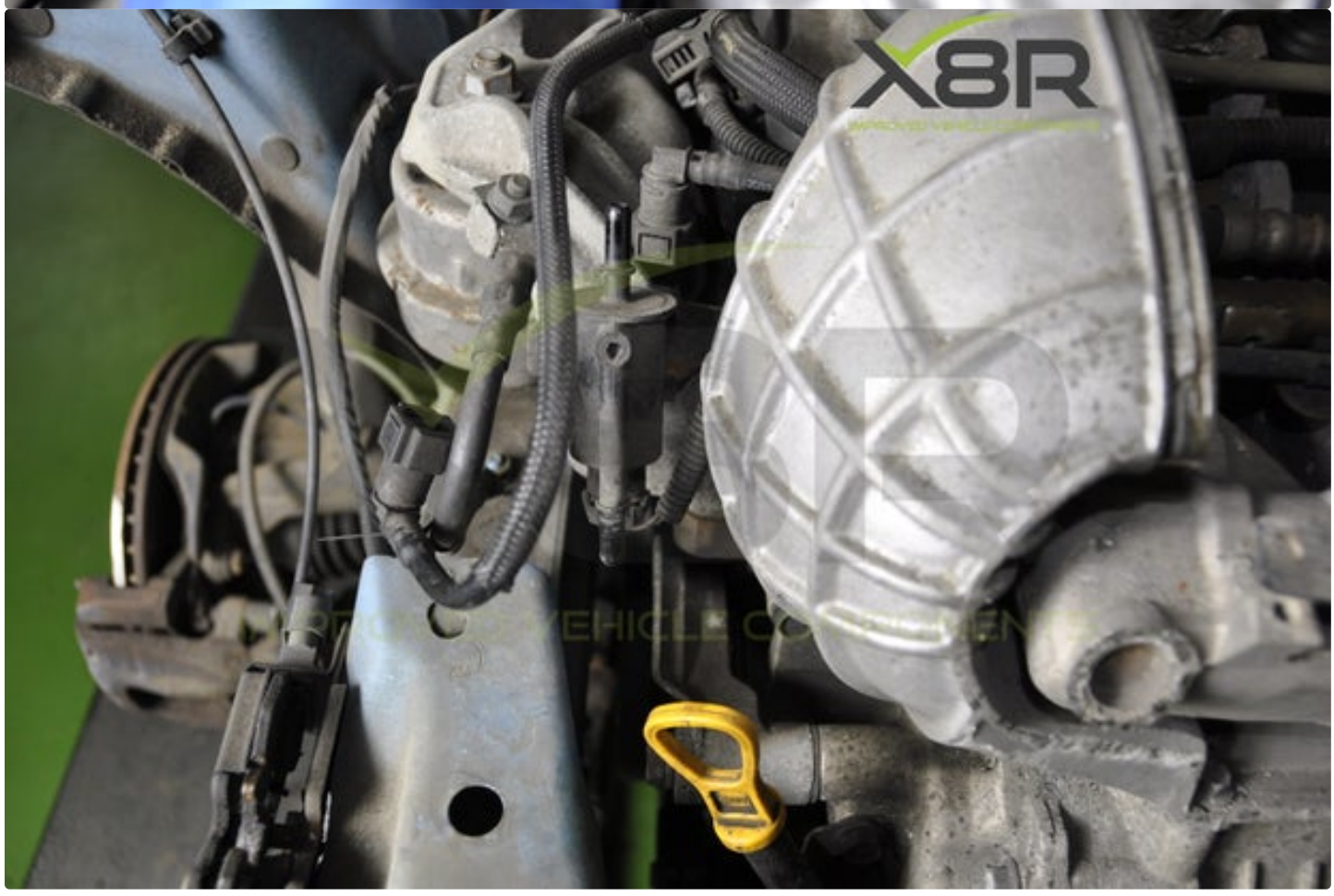
Step 11: Remove Fuel Tank Vent Valve

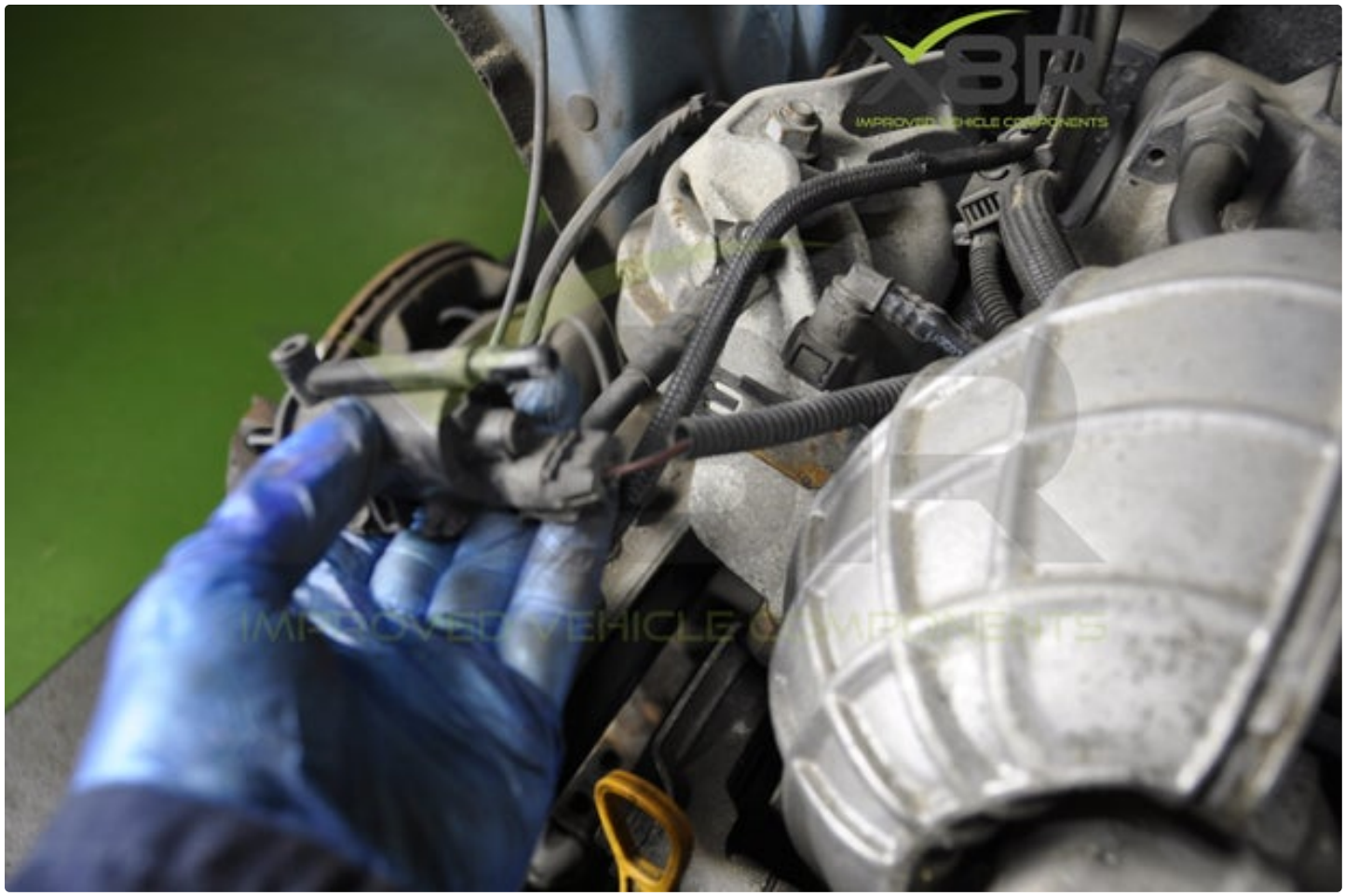
Squeeze and pull off the top and bottom connectors.

Push the tab on the mounting bracket inward and slide the valve off.

Pull the tab on the electrical connector and pull to remove.







Step 12: Remove Serpentine Belt

To remove the belt you will need a suitable belt tensioner tool.

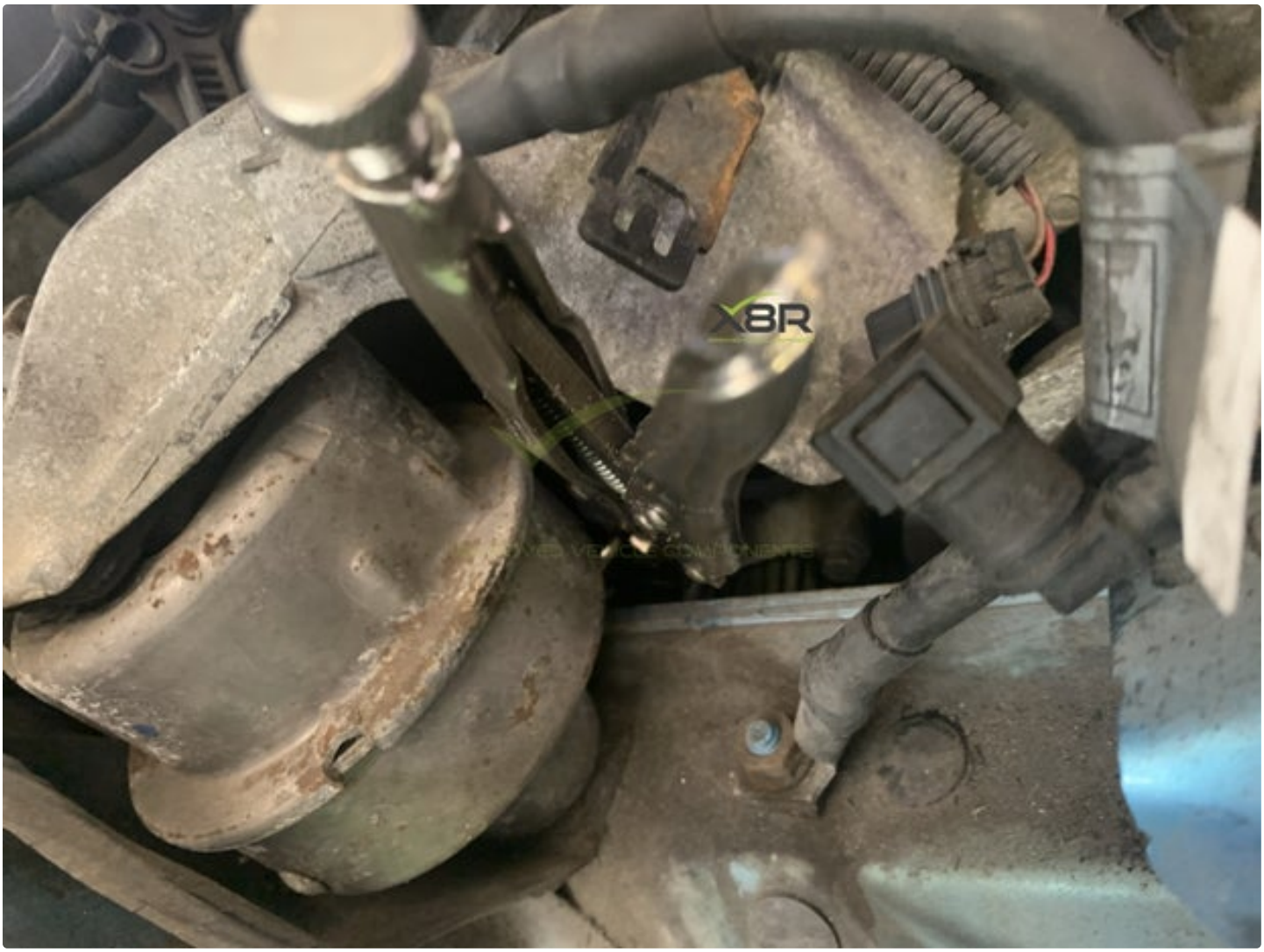
The pins on the tensioner tool fit into the two holes on the tensioner arm. The fulcrum point is the half moon section that protrudes on the V joint of the tool, this rotates on the upper tensioner bolt.

Locate the tool as above, rotate the tool under tension until the second hole protrudes from the tensioner arm. Once it appears place the locking pin (that came with the tool) through the hole. You can then release the tool and remove the belt.

Reinstall-

We highly recommend always fitting a new belt. Route the belt as shown on the pulleys. Check to make sure the belt is correctly seated on all pulleys and that the ribbed side is against the crankshaft pulley.

Insert tool, rotate tool and release pin and gently tension belt. Check all is seated correctly.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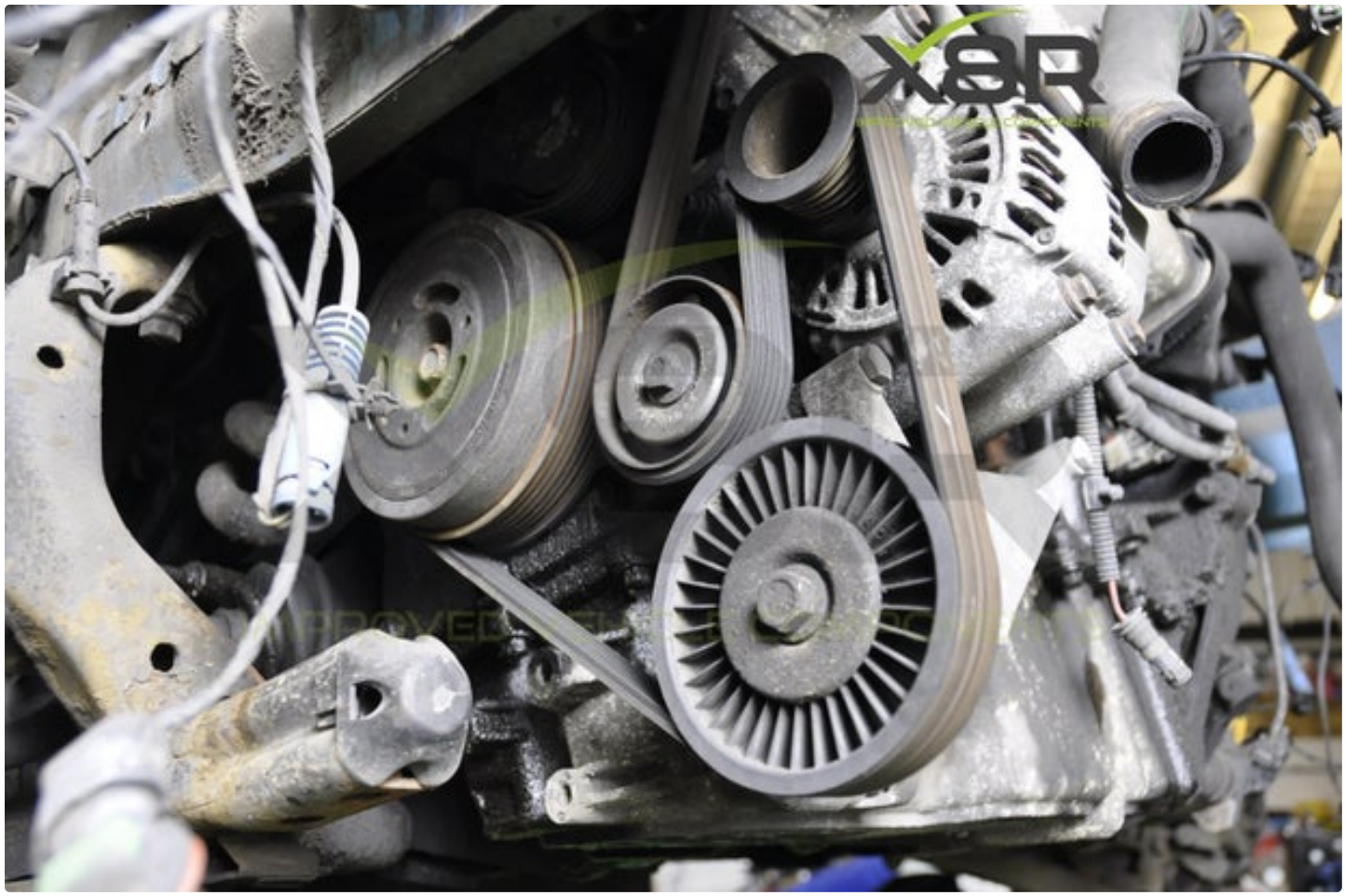

Step 13: Remove Belt Tensioner Bracket Bolt

Use a 16mm spanner to remove the belt tensioner bracket bolt from the supercharger.

For reassembly:

Torque to 33ft-lbs 44nm


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Step 14: Remove Dipstick Tube

Using a 13mm socket remove the two bolts retaining the dipstick tube to the engine.

On the lower section of the dipstick tube there are two holes which two plastic plugs push in to that retain wires in place. Pull these loose to remove tube and remember to reattach when refitting the tube.

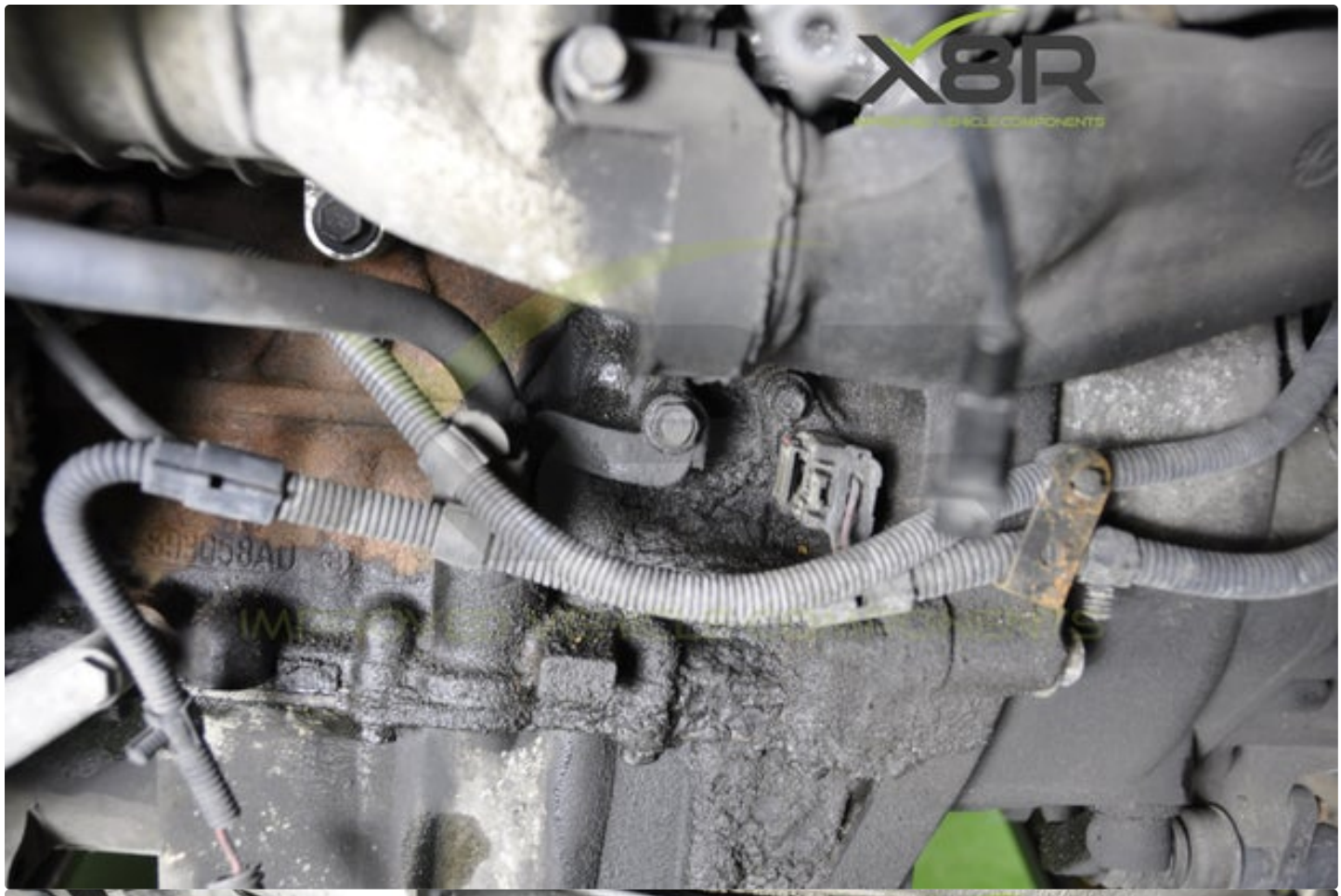
Wiggle out of position and remove the dipstick tube.

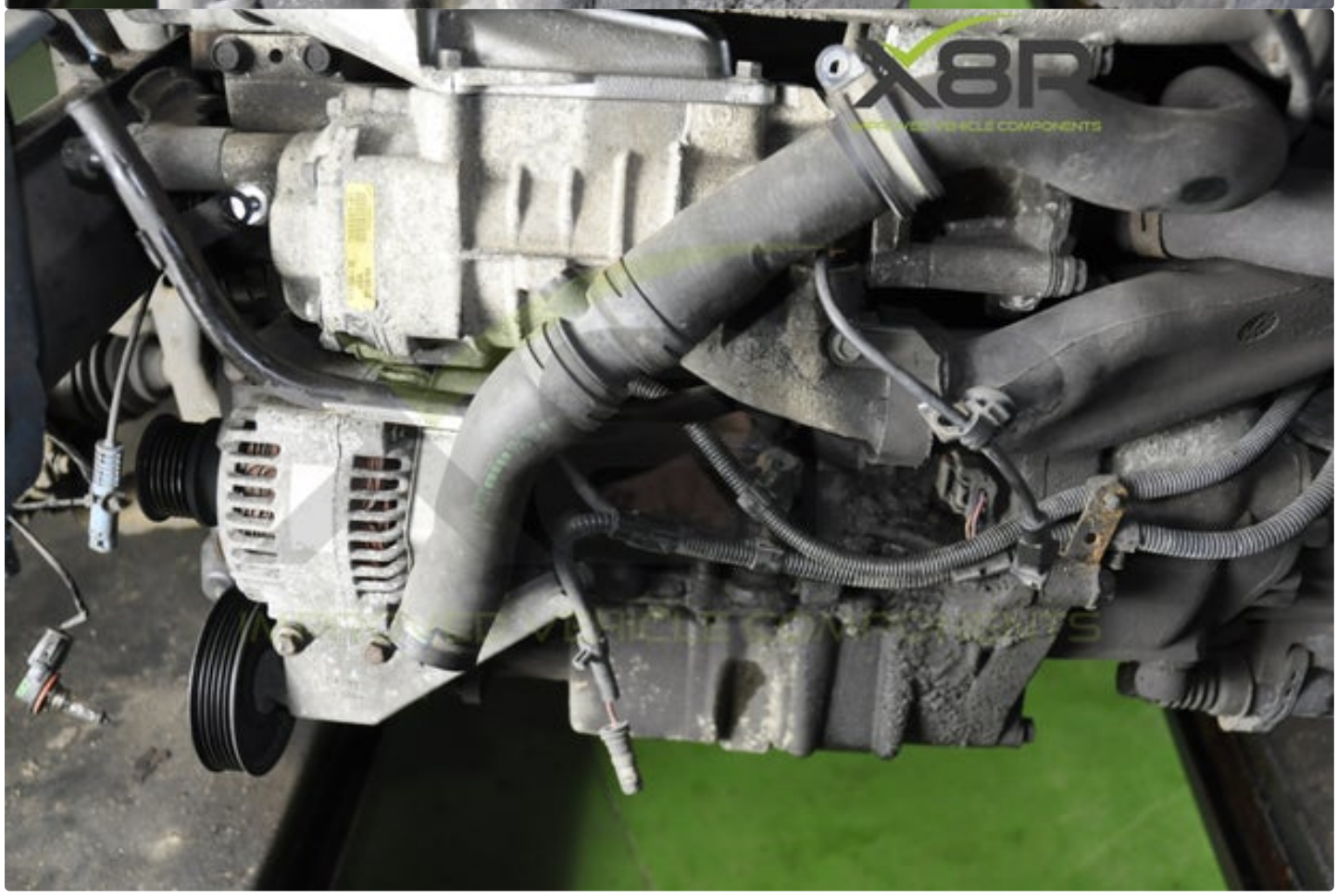
Plug the hole where the tube entered the crankcase with our bung. When the water pump is removed later on fluid will flow so this will prevent it entering the crankcase.

Reinstall:

Remove the old O-ring and fit our new O-ring (Blue in colour) to the base of the dipstick tube. Locating in the same recess as the old O-ring. Lubricate lightly with oil and push back in to position.

Remember the two holes on the lower section of the tube, push fit back in to these the plastic wire retainers.



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Step 15: Remove Throttle Body

Using a flat-bladed screwdriver release the two hose clamps on each end of the airbox to throttle body hose.

Once released you can move this hose outwards and you can see the small tube connected to the rear of this hose. Using "Mole" grips release the hose clip and pull the tube loose.

Remove air box to throttle body hose. For reinstall use our stainless steel hose clamps.

Squeeze the tab and pull back and remove the electrical connector on the throttle body.

Using a 10mm socket remove the x4 bolts retaining the throttle body, note the bracket retained by two of the bolts, take care to refasten this upon reinstall.

Pull the throttle body upwards to allows access to the hose, using "Mole" grips release the hose clamp and remove the hose. Remove the throttle body.

Clean up the throttle body and check the valve is free to move / not sticking.

Clean up the mounting face and as much of the intake tube as is possible.

For reinstall:

Replace the seal on the base of the throttle body (part number 13547509045) we are working to source these for our kit.

When refastening the throttle body bolts be sure to refasten the bracket secured to two of the bolts.

Torque:

Throttle body bolts 7ft lbs 9.5Nm

When refitting the air box to throttle body hose use our stainless steel hose clamps and remember to reattach the small hose on the reverse of this hose.


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Step 16: Remove Supercharger Air Supply Tube

Using a flat bladed screwdriver prise off the two hose clamps on the short rubber hose to the supply tube. For reinstall use our replacement hose and stainless steel hose clamps.

Using a 10mm socket remove the bolt retaining the supply tube to the supercharger.

There are two hard plastic tubes connecting to the Red collets on the supply tube. Push in the collets and pull the tubes free at the same time.

Reinstall-

Clean as much of the inside of the supply tube as you can. Replace the Green seal between the supply tube and the supercharger with our new seal. Lubricate this seal and the new short rubber hose to ease install.

Remember to push fit the solid tubes in to their collets.

Fit our new supply tube, fitted with x2 hose clamps.

Torque:

Bolt to supercharger 7ft lbs 9.5Nm


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Step 17: Remove Alternator

Press the tab on the connector and release the electrical plug from the alternator.

Using a 10mm socket remove the nut retaining the 12v lead to the alternator. Wrap a glove or towel around this lead and locate out of the way to prevent sparking.

Using a 10mm socket remove the three mounting bolts and remove the alternator.

Reinstall-

Torque mounting bolts- 18 ft/lbs 25Nm


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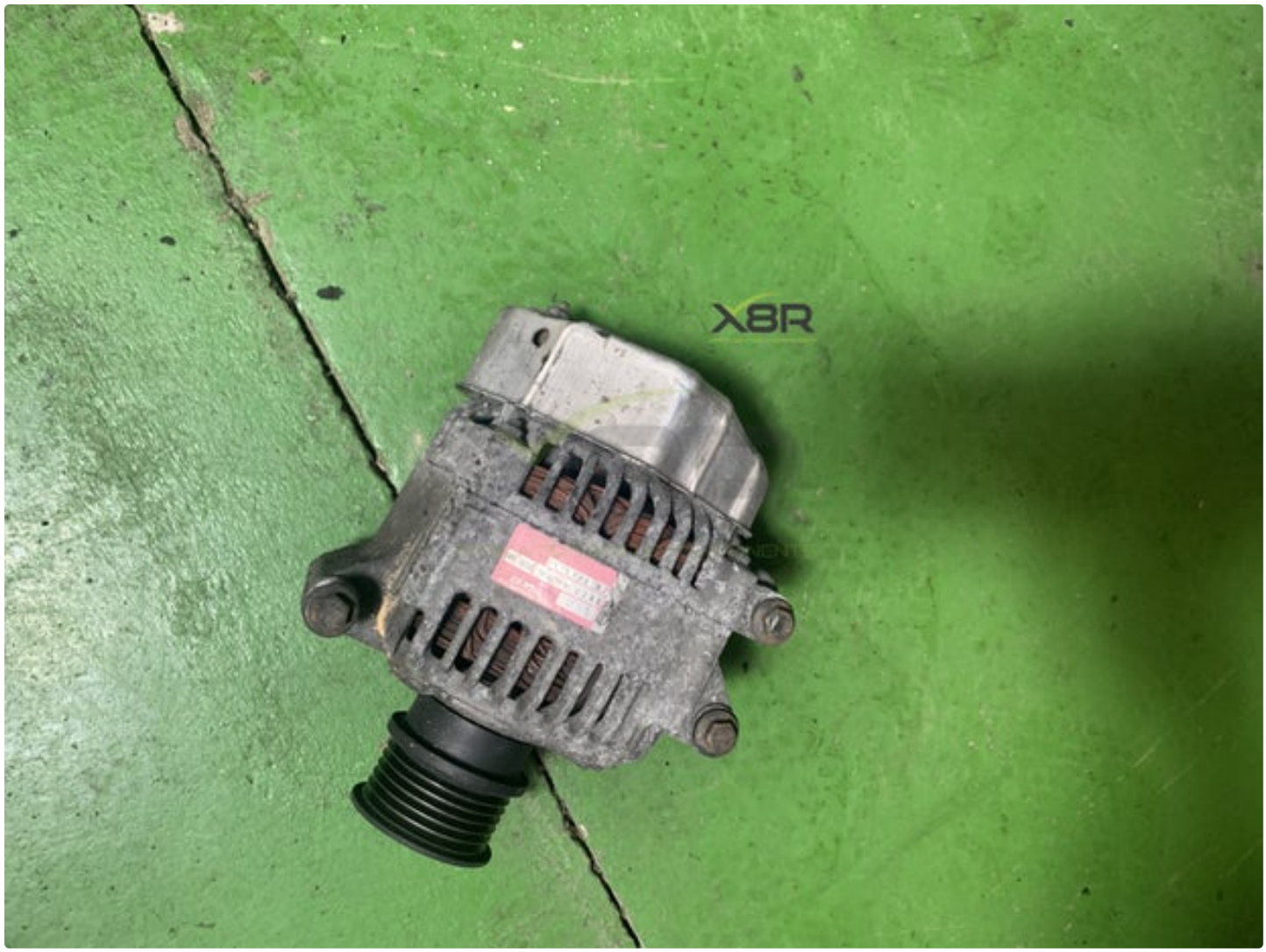
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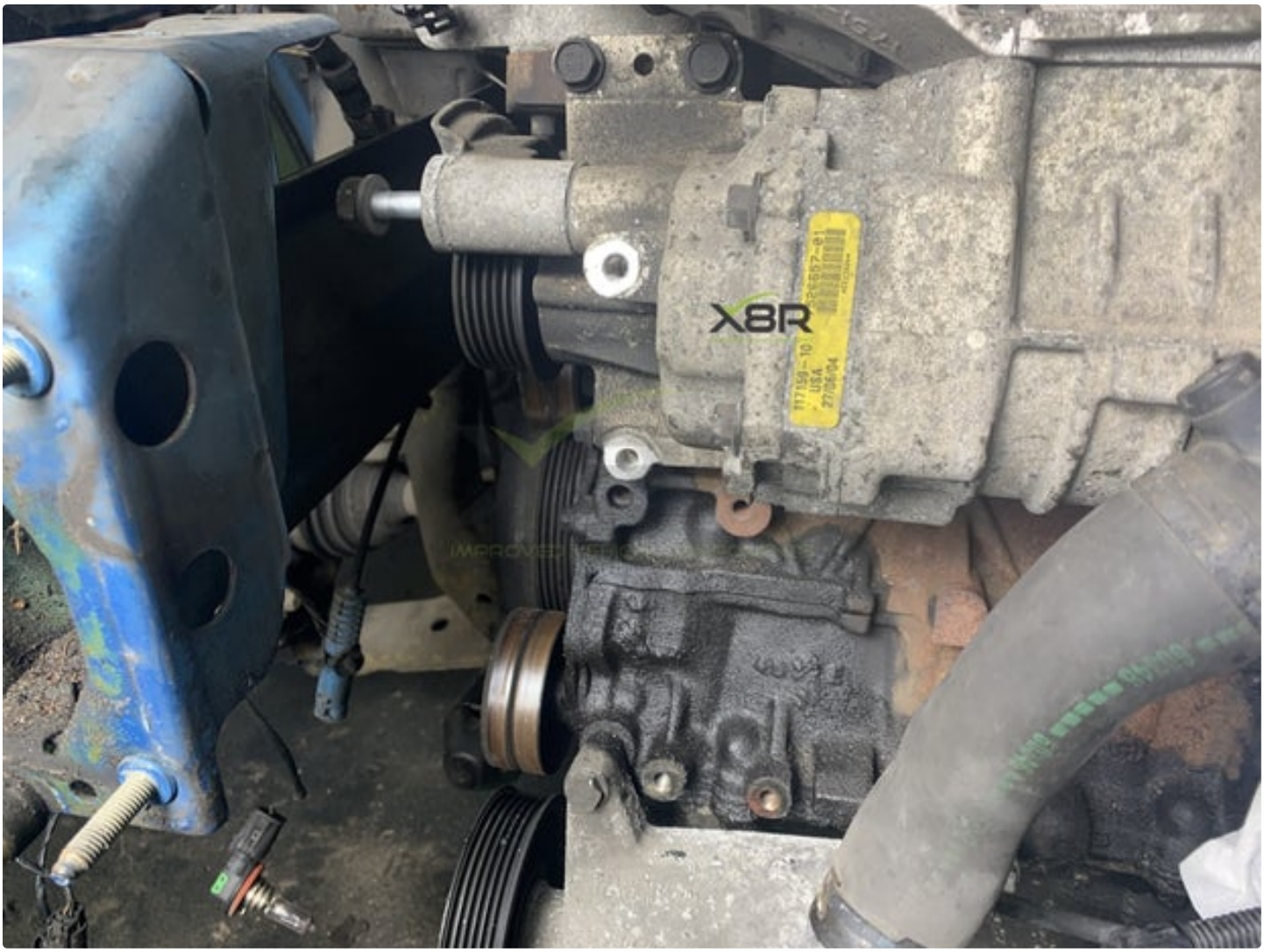


Step 18: Remove Water Pump

Using a 13mm socket remove the 4x bolts retaining the water pump to the supercharger.

Using a 8mm socket remove the bolts holding the bracket that the water pump sits in to the block.

Pull the water pump away from the supercharger and block, coolant will be released, ensure hole in crankcase from dipstick tube is bunged and catch fluid as best you can.

Clean up mating face on block.

Reinstall-

Replace O-rings on the water pump. Replace flange to block O-ring and water pump to flange O-ring. Use the two largest Black O-rings included in our kit.

Torque-

Water pump to supercharger bolts 18ft lbs 25Nm.
Water pump bracket to block bolts 9 ft lbs 12Nm.

Step 19: Remove Supercharger

Push down on the Red collet and pull away the solid plastic hose.

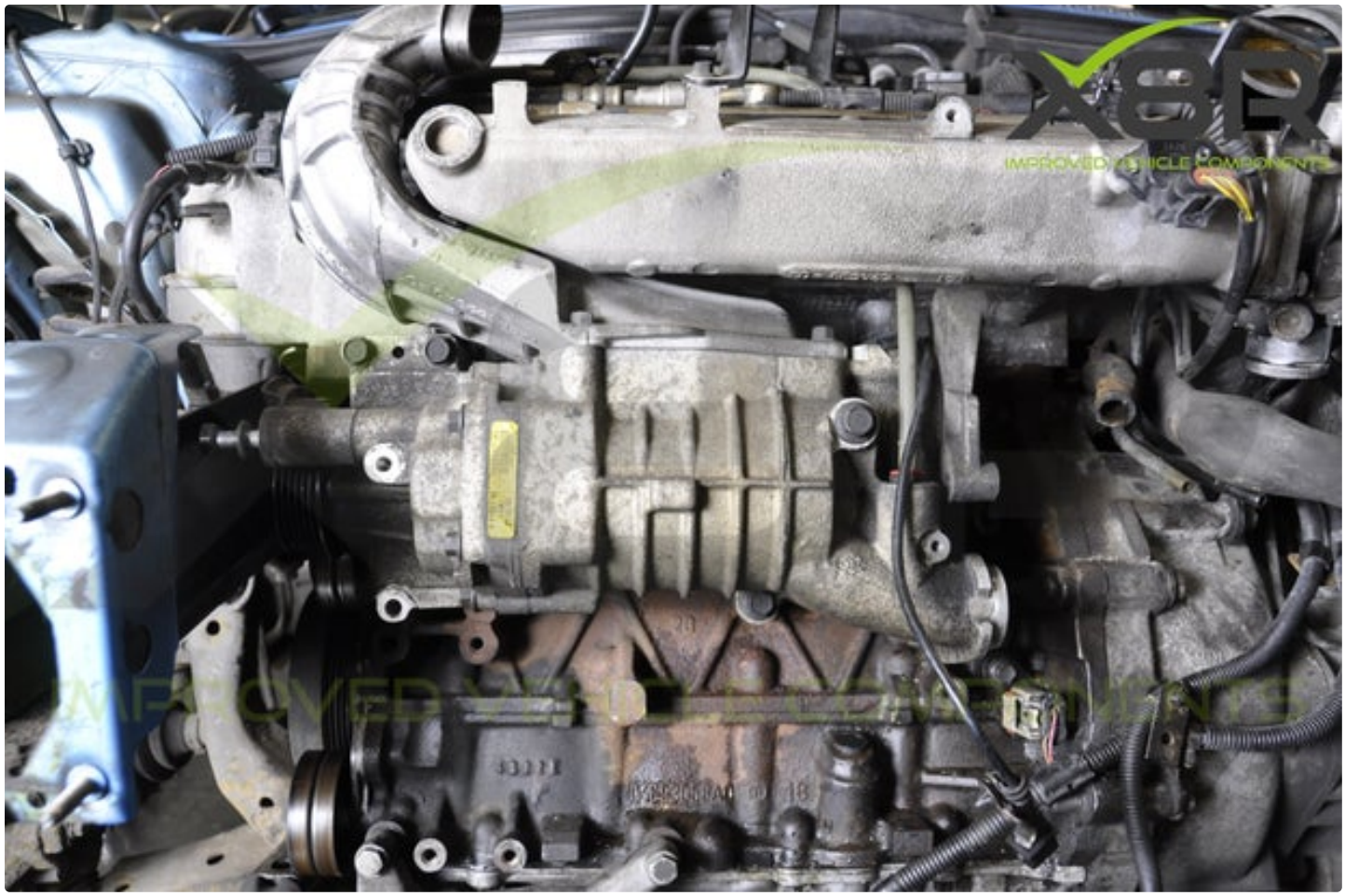
Using a 13mm socket remove the x4 bolts retaining the supercharger. The bolts are differing lengths so please note locations.

Pull the supercharger and air plenum away from the block.

Reinstall:

Torque-

Bolts: 33 ft-lb. 45Nm

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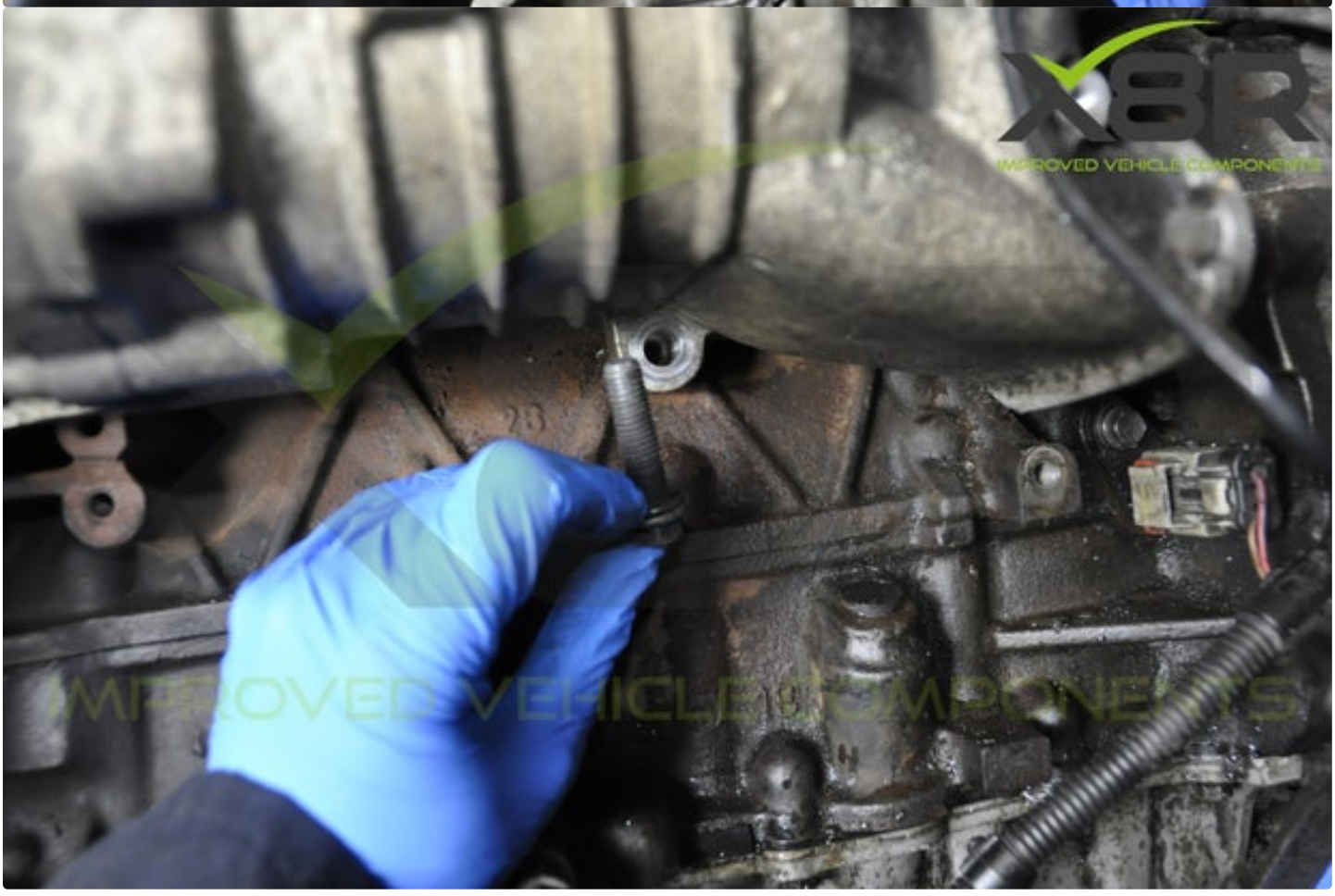
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Step 20: Replace Crank Sensor Oring

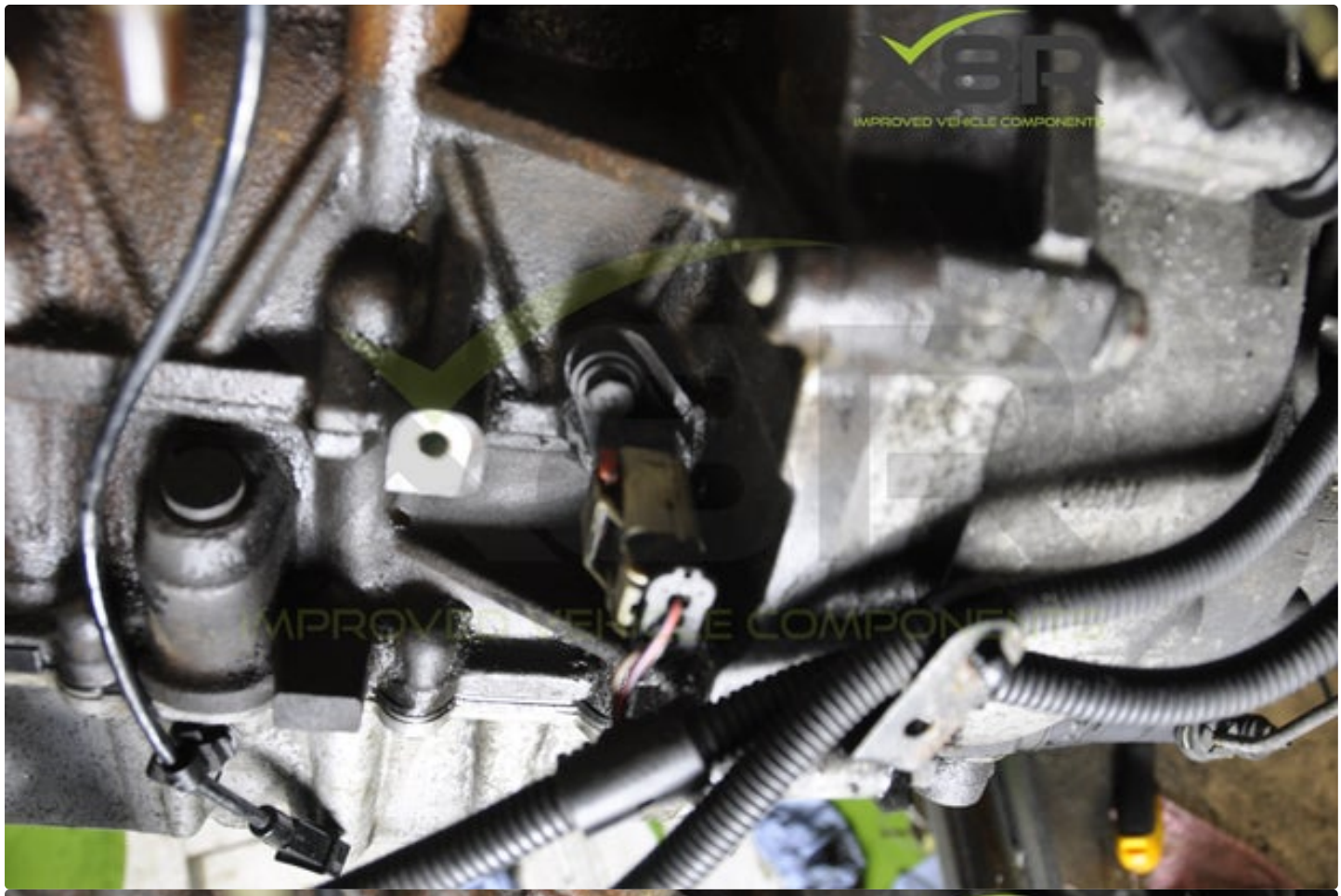
Push up the Red tab on the electronic connector, squeeze the rear of the connect and pull loose.

Using a 10mm socket remove the screw.

Pull the sensor away and clean up the mating surfaces.

Locate the old O-ring on the sensor noting the recess it sits in. Remove O-ring and replace with our new O-ring (the smallest single Black O-ring in our kit)

Lubricate the O-ring with engine oil and reinstall sensor.

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Step 21: Service Supercharger

Use our 3/16 Allen Key to remove the plug shown. Ensure the tool is seated well and apply heat to ease removal of this plug.

Once free tip up the supercharger and drain out all of the oil. Do this in a well ventilated area with appropriate PPE. Inspect the oil for any metal shards or signs of failure.

Fill the port with our new oil with our syringe, this side will take approx 145ml of oil. Tip the supercharger on its side as it is mounted on the vehicle, the unit is full when it is level with the bottom of the plug hole and a small amount dribbles out.

Remove the old O-ring and fit our replacement O-ring to the drain plug and re fit the drain plug.

Repeat this process for the Left side plug as shown. This side takes approx 40ml of oil but again tip supercharger on its side as on vehicle, the unit is full when it is level with the bottom of the plug hole and a small amount dribbles out.

Using a 10mm socket remove the x4 bolts retaining the inlet horn to the supercharger. Remove horn and clean / inspect the rotor. Reinstall: fit our new gasket and torque bolts to 18 ft-lbs 24Nm.

This completes the service, reinstalled is the reverse, each step here includes guidance notes and torque settings for re-install so these instructions can be followed in reverse.


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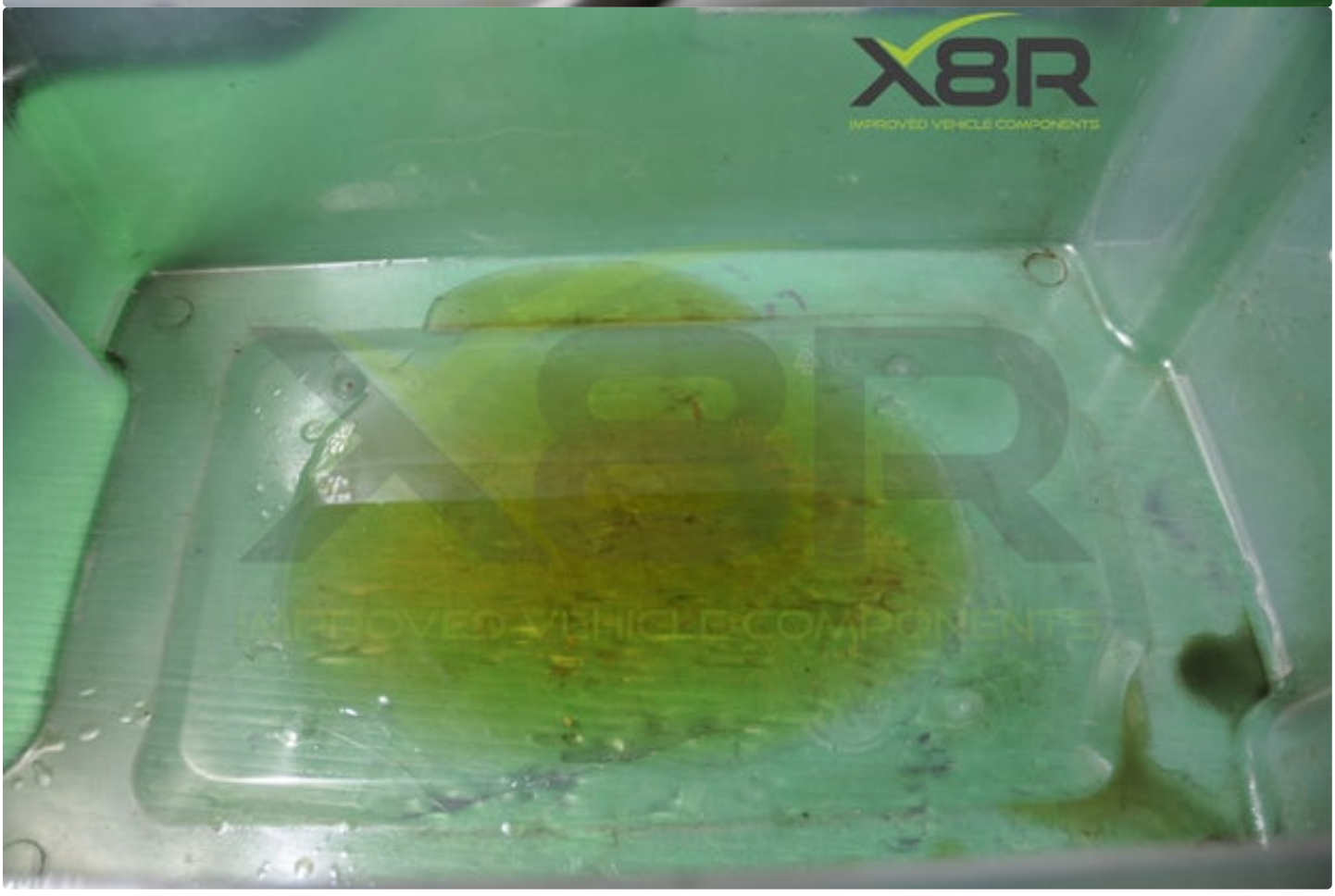
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