Step 1 - Removing the Front Bumper Bar

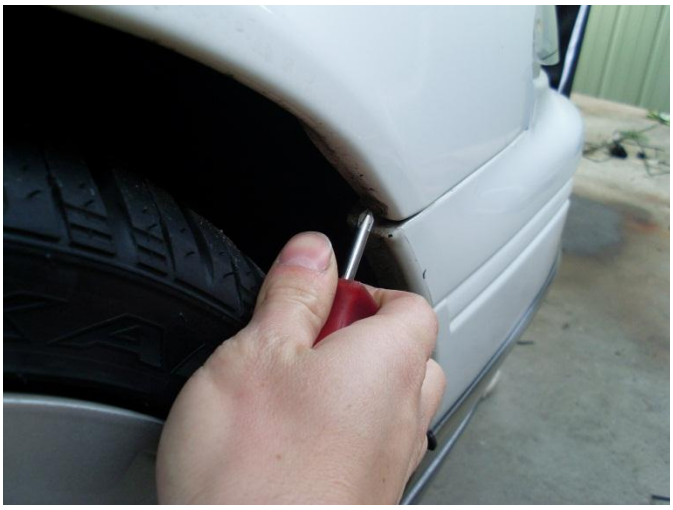
WARNING: Disconnect the negative battery terminal for safety reasons.

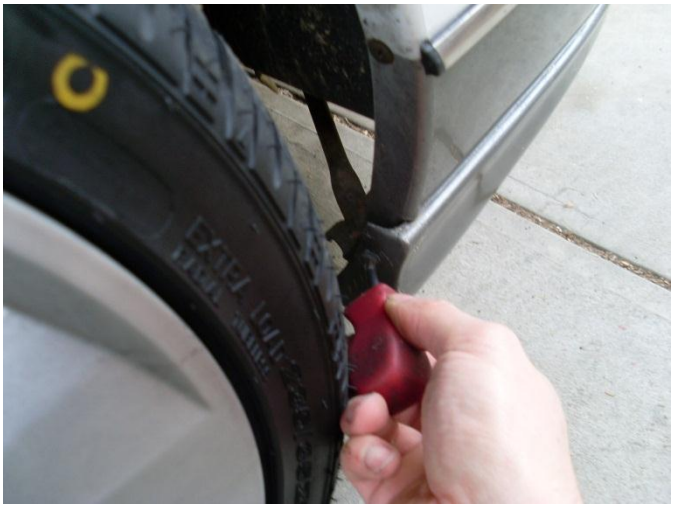
NOTE: Step 6 of this process requires that the core be allowed to set overnight and can be completed first, such that it can set while steps 1-5 are undertaken.

The VS Commodore's front bar is retained by a large number of screws. Most of the exterior screw locations are shown below while some are also hidden on the inside of the bumper.

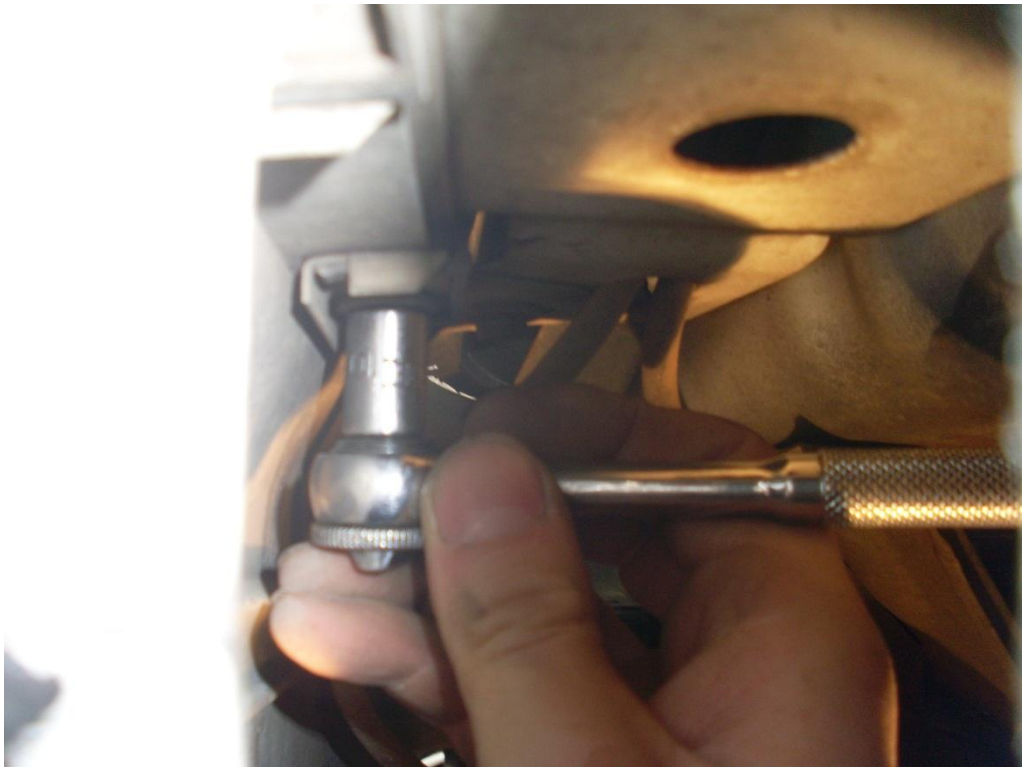
If your vehicle is fitted with 20 inch wheels and/or lowed, it may be helpful to jack up the vehicle and remove the front tyres for easier access to inner bolts.

Remove all the screws retaining the bar as shown in the following images.





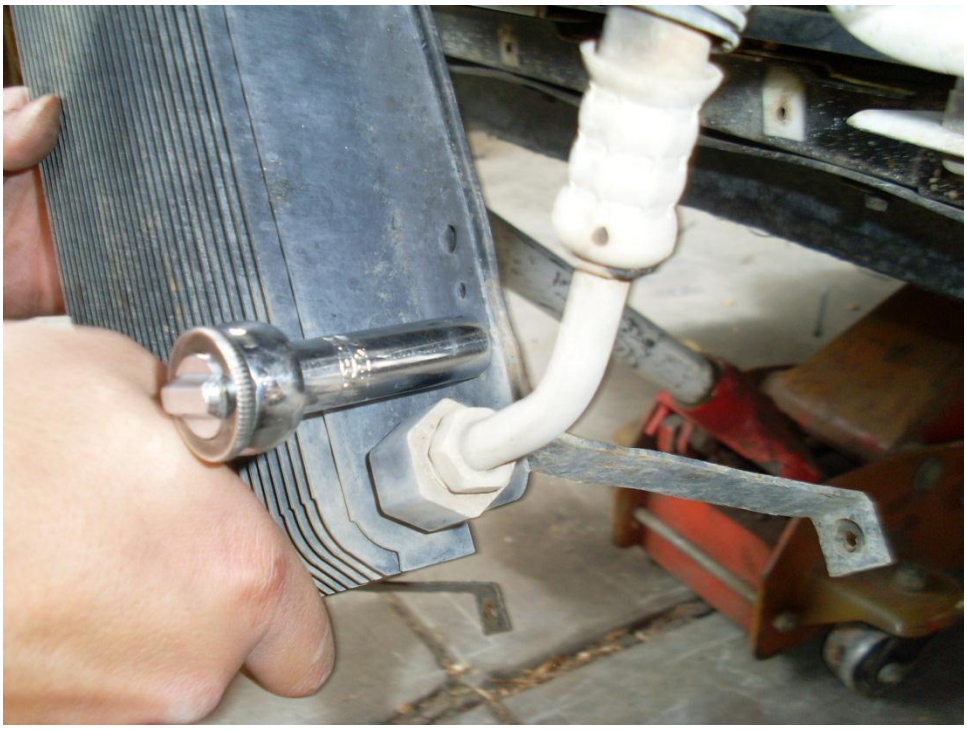
The following images show the screws on the inside of the bumper which need to be removed.

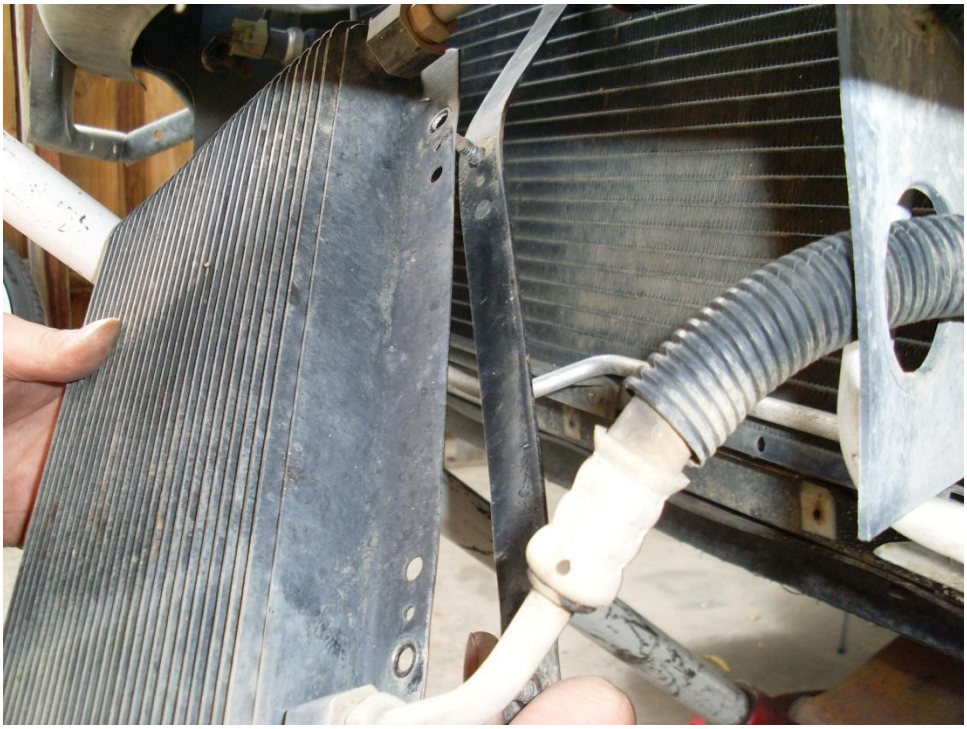


Step 2 – Relocating the Transmission cooler

Once the bar is removed, proceed by removing the transmission cooler which must be relocated onto the new front mount heat exchanger/radiator. Remove the 4 screws which fasten the brackets onto the top and bottom of the body work/chassis as shown below.

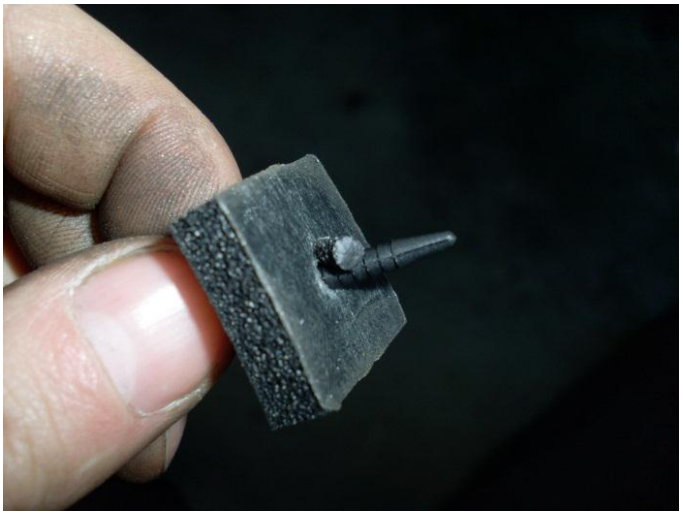
Remove the 2 brackets (top and bottom) behind the transmission cooler by undoing the nuts which retain the brackets as shown below. **NOTE: Keep the oil lines attached as the transmission cooler must not be completely removed in order to be relocated.**

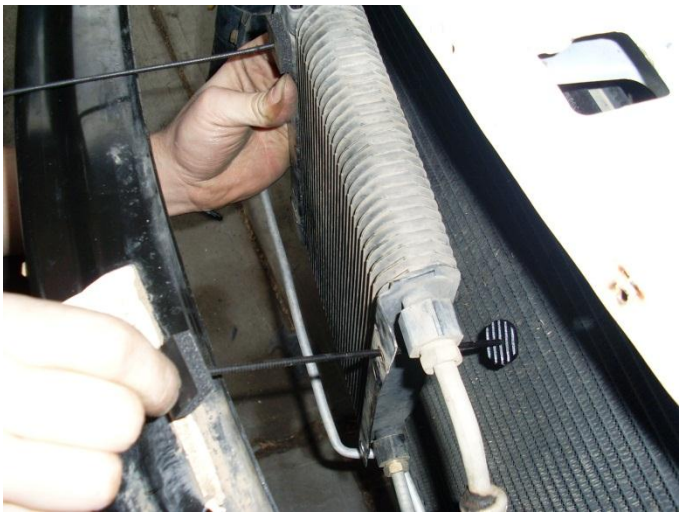


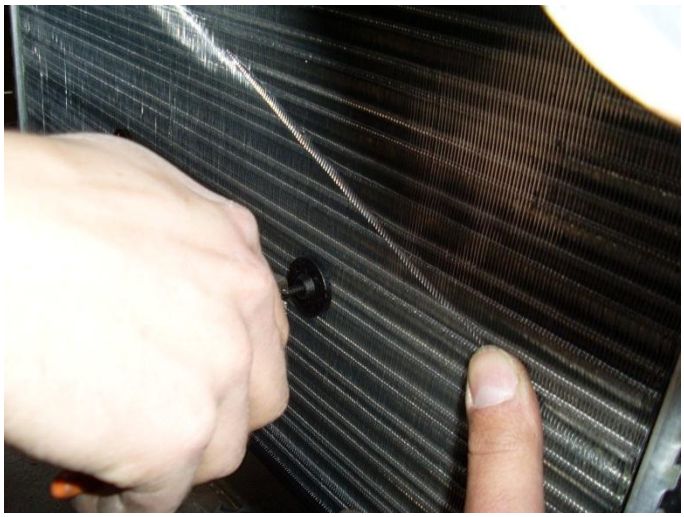


This panel must be cut off for extra clearance

The transmission cooler should be mounted onto the Large W2A Radiator core with the use of the Transmission cooler mounting kit which contains four nylon rods with locks and four rubber pads.
NOTE: The Trans cooler may also be mounted onto the condenser/radiator for a neater look.
The nylon rods should initially be inserted through the pads (which provides a backing) and then through the transmission cooler and radiator before the locks are inserted on top for support. The procedure is shown below.







The heat exchanger does not need to be bolted on at this stage and can simply be held up for this fitment. The fins may need to be slightly alleviated (with a thin screwdriver or similar) in order to easily slip the nylon rods through the heat exchanger. Trim the nylon rods back once the locks have been fitted.

Step 3 – Fitting the Front mount heat exchanger

The hole at the top of the radiator must be blocked off using the M20 plug provided. Be sure to use **Teflon tape** on all threads to prevent water leakage.

Orientation of the front mount radiator is such that the plug faces outwards on the passenger side of the vehicle.

Position the bracket with the LONGER flange onto the driver's side of the radiator and drill a hole into the bottom of the reo bar as shown. The brackets are of different sizes to offset the radiator in order to accommodate for the air-conditioning drier/receiver.

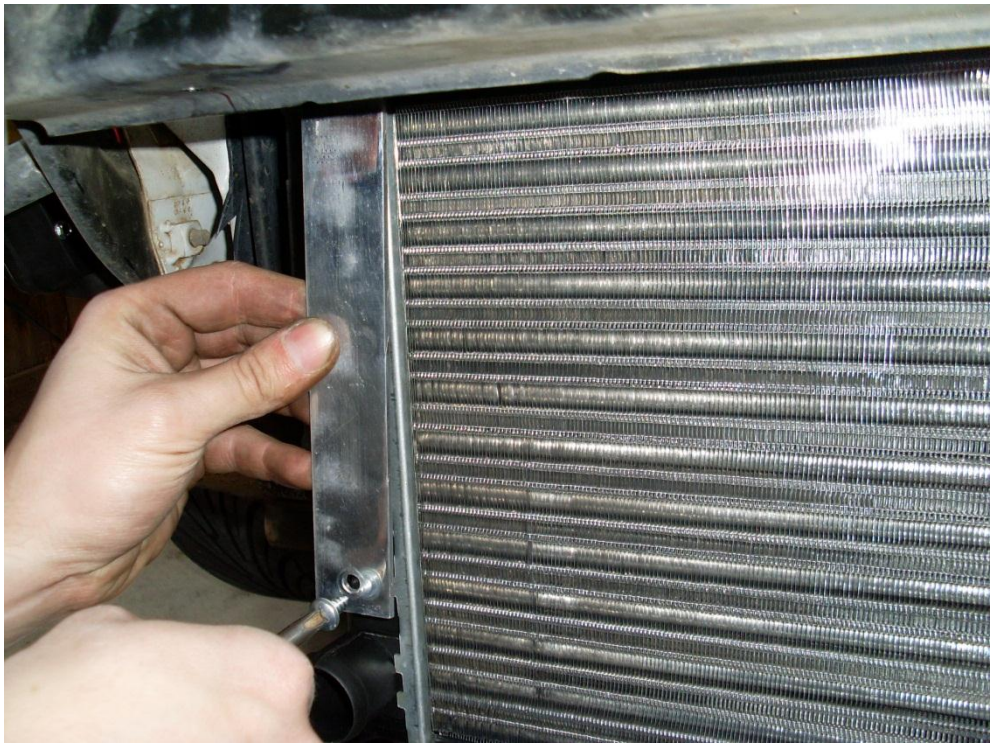
Once the hole is drilled, it is possible to place a mark (using a pencil) on the bracket to locate the position of the hole to be drilled into the bracket.

Repeat this process on the passenger side this time using the bracket with the SHORTER flange.

Once the brackets have been marked (shown in blue), begin drilling the holes.

The holes which are drilled will use the 5mm self-tapping screws to secure the bracket to the reo bar.

The pre-drilled hole on the bracket is used in conjunction with the pre-tapped radiator mounting holes. The 5mm button headed screws are used to secure the bracket onto the radiator. Repeat this process for both brackets/sides.

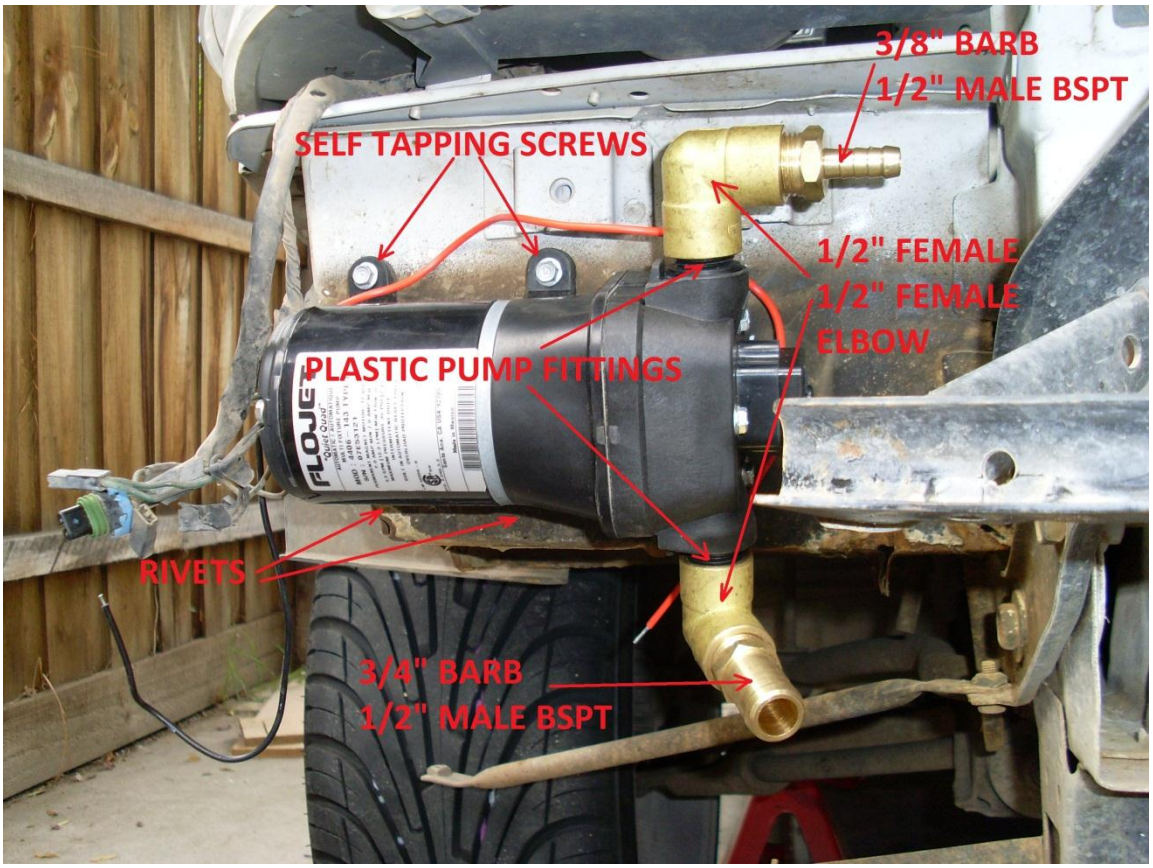


The brackets are mounted to the reo bar using the 5mm self-tapping screws provided. Using a socket wrench, screw them into the reo bar and through the bracket.

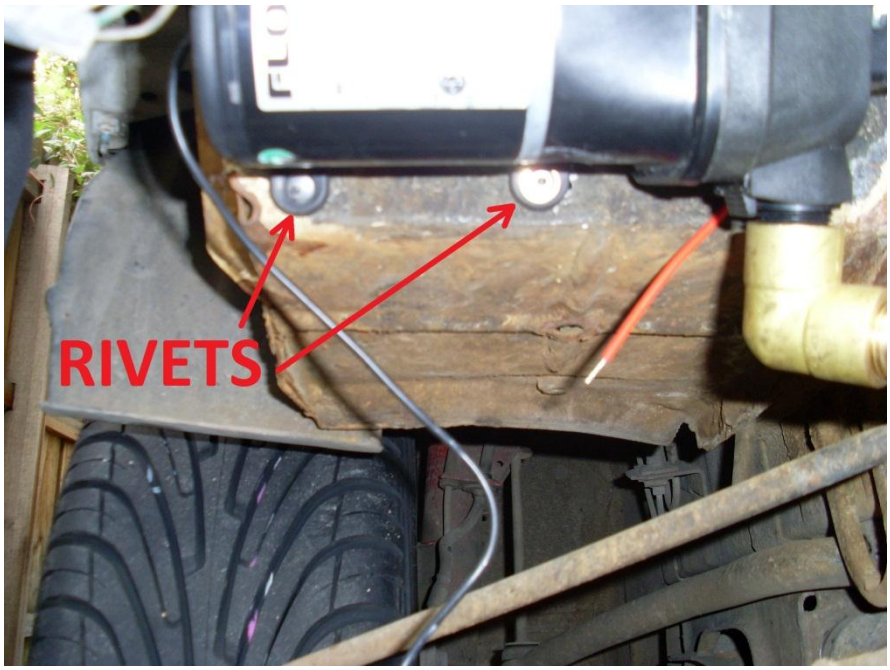
Step 4 – Fitting the water pump and radiator connections

Remove the secondary horns (where necessary) as shown below.

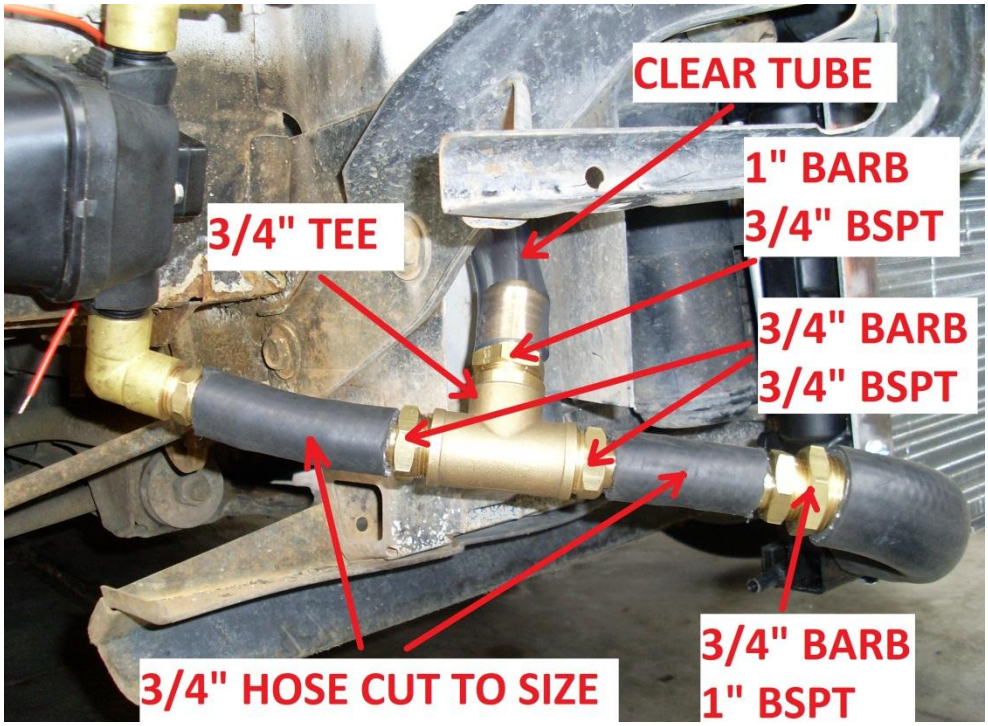
The image below shows the location of the pump and the fittings required. Be sure to use Teflon tape on all threads.



The top side of the pump should be fastened using the provided 5mm self-tapping screws. The bottom side must be secured using rivets, to prevent drilling through the battery behind the bodywork. The rivets are also provided.



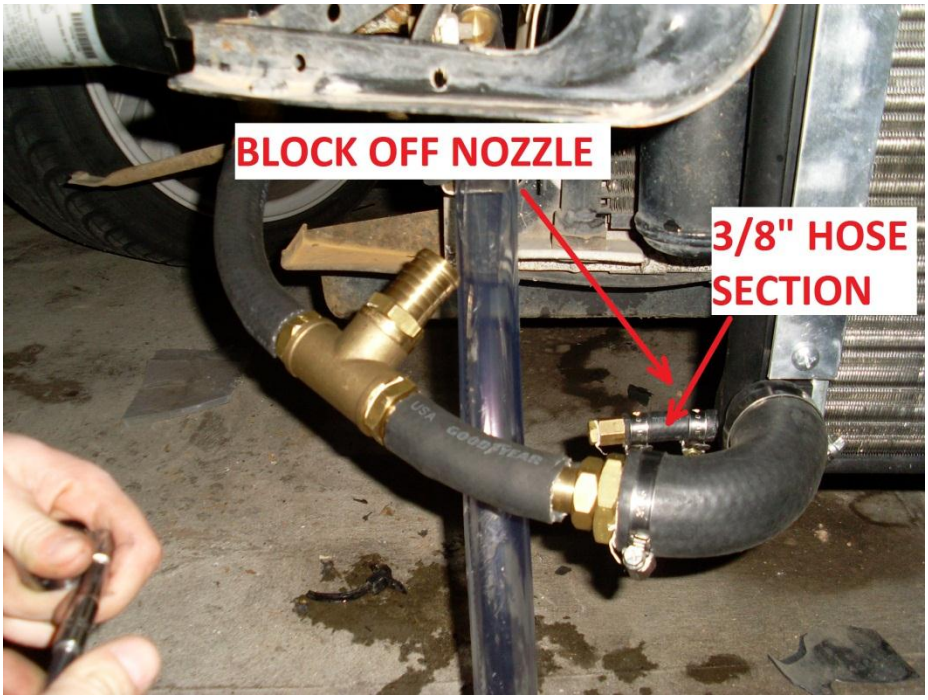
The image below shows the connections between the pump and the heat exchanger.
Note: The image shows the fitting on the rubber elbow made up of 2 pieces. The updated kit supplies a single ¾" barb 1" BSPT piece to replace the 2 fittings.



The clear tube is used as a filler tube/water level gauge and should be trimmed at the top to a suitable size. The end should be blocked off using the 1” end plug and secured using a hose clamp.

Create a block off for the nozzle on the radiator with the fittings shown below. Block the supplied 5/16” Barb with the 1/8” end plug plug (shown below) again using Teflon tape and secure both using a spanner and a shifter.

Now slip the 3/8” hose onto the barb and secure it with a 14-27MM hose clamp before slipping it over the nozzle as shown below.



Secure all the fittings using hose clamps as shown below.

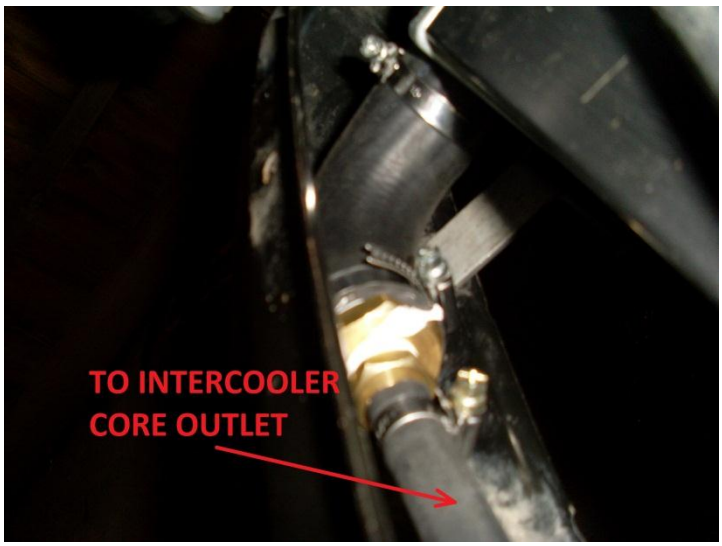
Cut a length of hose about 1 meter long and connect it to the top connection on the pump as shown below.

This hose will eventually feed to the intercooler core inlet (closest to front of car).

Construct the connection shown below with the supplied fittings

The location of this connection is on the top right side of the radiator which is hidden by the reo bar. The approximate location is indicated by the red arrow.

Secure the connection using hose clamps as shown below. Once again cut a 1 metre length of 3/8” hose and attach it as shown.

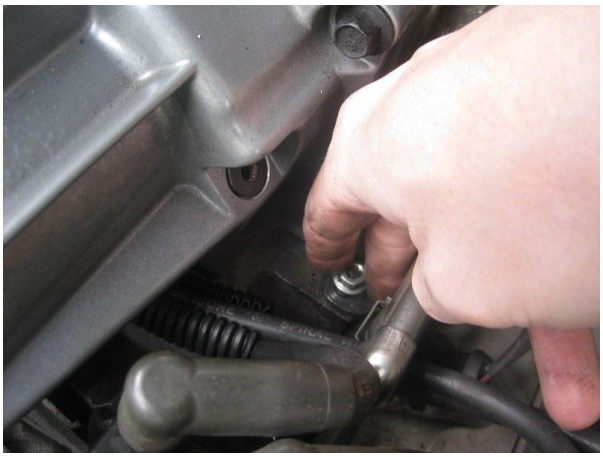


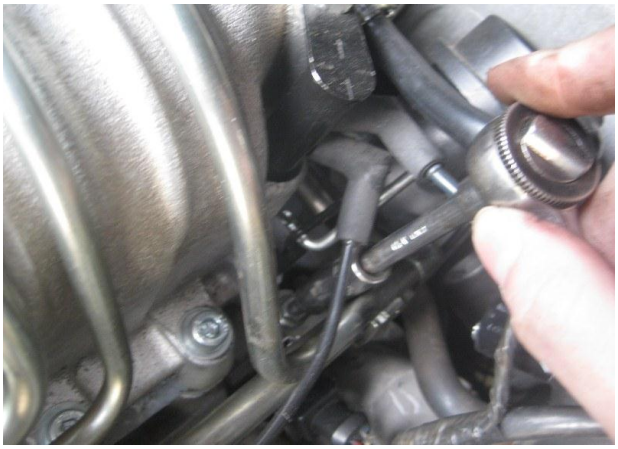
This hose will eventually connect to the intercooler core outlet (furthest to front of car).

Step 5 – Removing the supercharger

Start by removing the engine cover which is secured by 4 nuts on top of the cover. Using a socket wrench remove the nuts which will enable the cover to be simply lifted off. Also remove the rear bracket used to support the engine cover by turning the required nuts.

Proceed by removing the injector rails by unfastening all the injector rail bolts. There are 5 areas where the injector rail is fastened as shown below.





The support bracket for the alternator must then be removed by removing the bolts on the alternator and supercharger.

Removing injector cables

Unclasp the clips shown below in order to detach the cable from each injector. This can be done by pushing in the metal clip and simply pulling the plastic injector connection off.

Removing injector cable clips

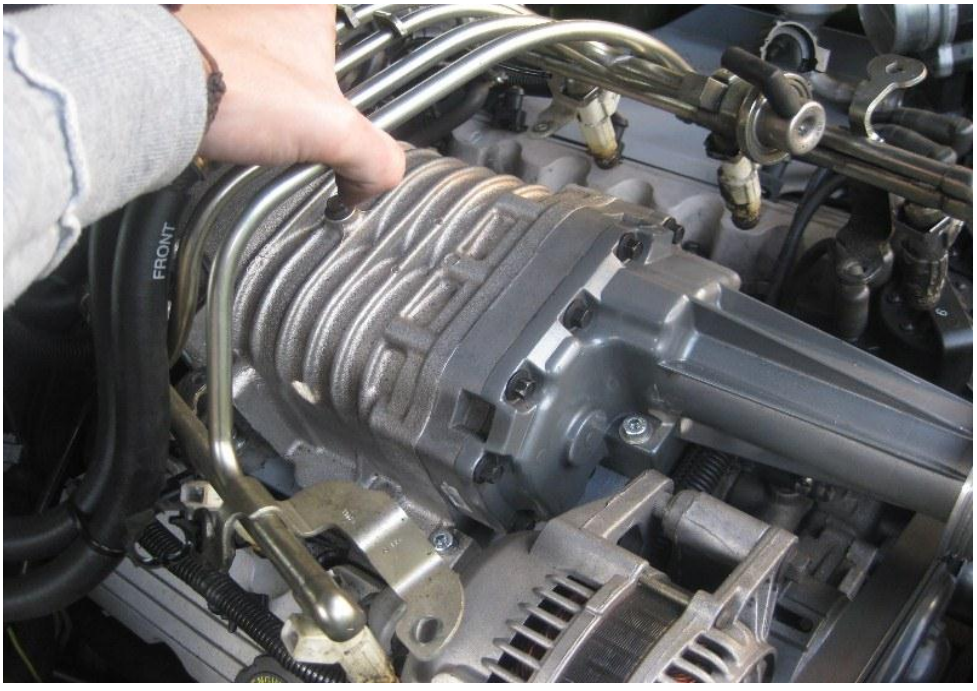
Also remove any plastic clip-on brackets by detaching them using a screwdriver, in order to release the cables from the injector rail.

There are 2 clips as such, with one on either side of the rail.

Lifting off injector rail

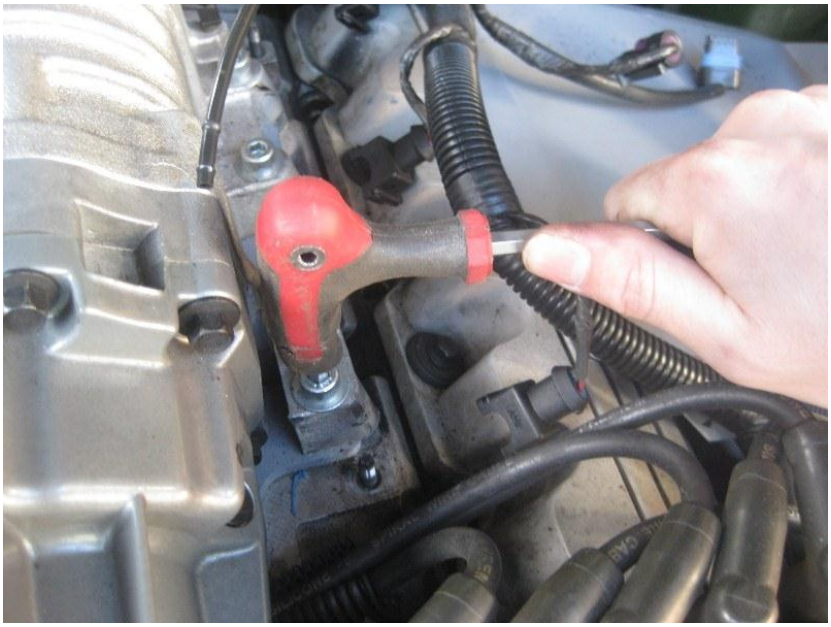
Carefully lift the injector rail off the supercharger ensuring each injector is released from the cylinder heads.

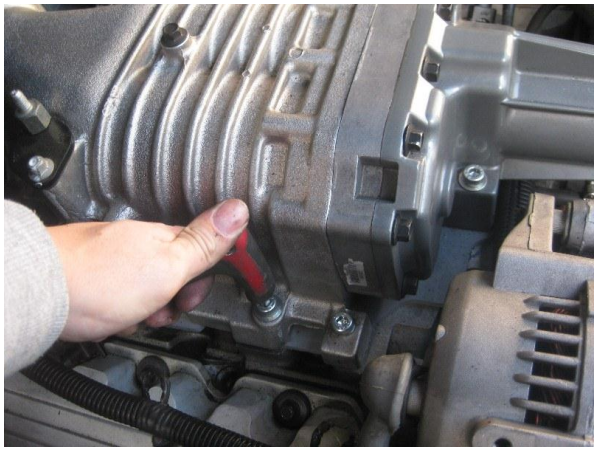
The injector rail need not be completely detached from the vehicle, as it can be maneuvered out of way whilst still being connected by the two black hoses.



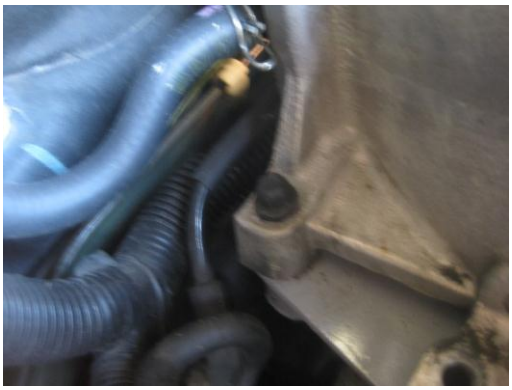
Removing supercharger bolts

Once the supercharger belt has been removed (by turning the 15mm nut on the end of the tensioner), proceed by removing all the bolts which fasten the supercharger onto the lower inlet manifold.
There are 10 bolts as such. Take notice of 2 bolts which are hidden at the back of the supercharger housing.



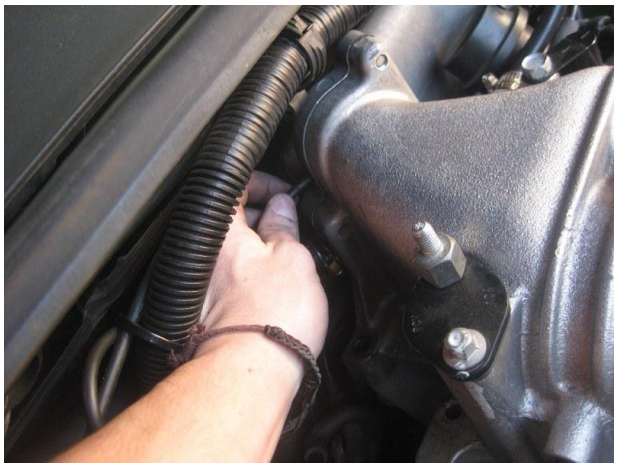


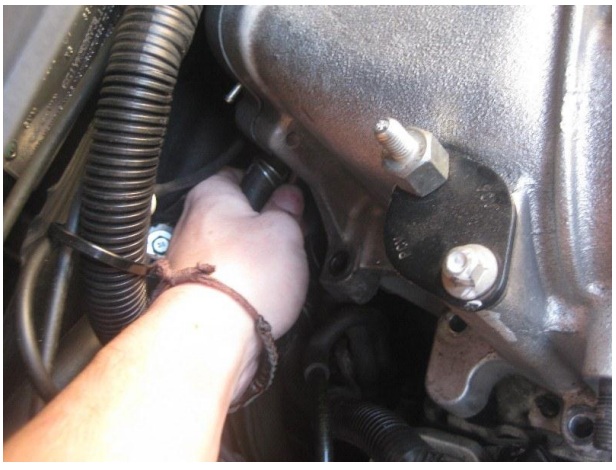
The following images show some of the hidden bolts at the back of the supercharger.



Disconnecting supercharger elbow hoses

Remove the 2 hoses which are connected to the elbow bend behind the supercharger.

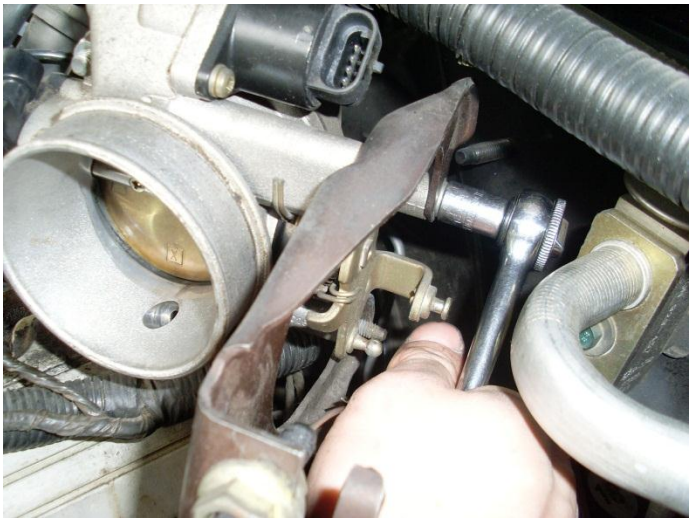


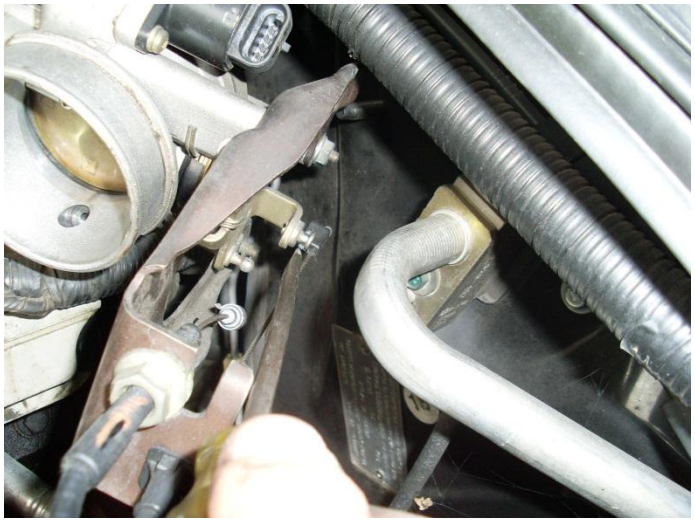


There is a small hose and a larger hose. The larger hose is attached by a clamp which can be removed by hand or using some vice grips.

Disconnecting the throttle cable

There are 3 nuts connecting the throttle cable bracket to the throttle body which must be removed. Proceed by unclipping the cables from the throttle linkage by carefully wedging a screw driver in between the clip to unclasp the plastic clips.





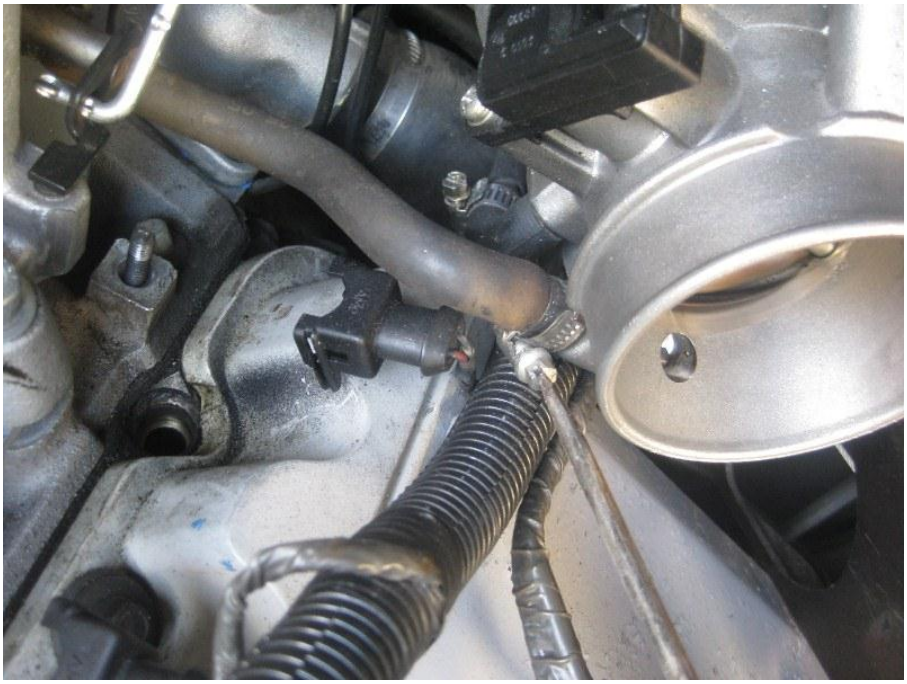
Removing sensors

Remove the plug from the throttle position sensor which is located on the left side of the throttle body.

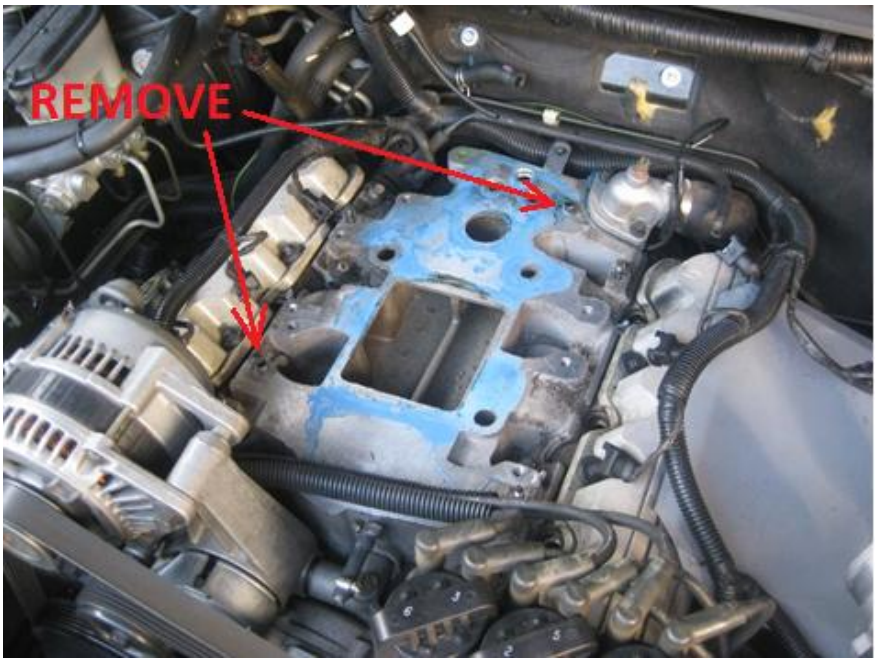
Also remove the plug from the idle air control valve located on the right side of the throttle body.

Disconnecting throttle body hoses

Remove the 2 hoses which are connected to the throttle body by loosening the hose clamps where necessary.

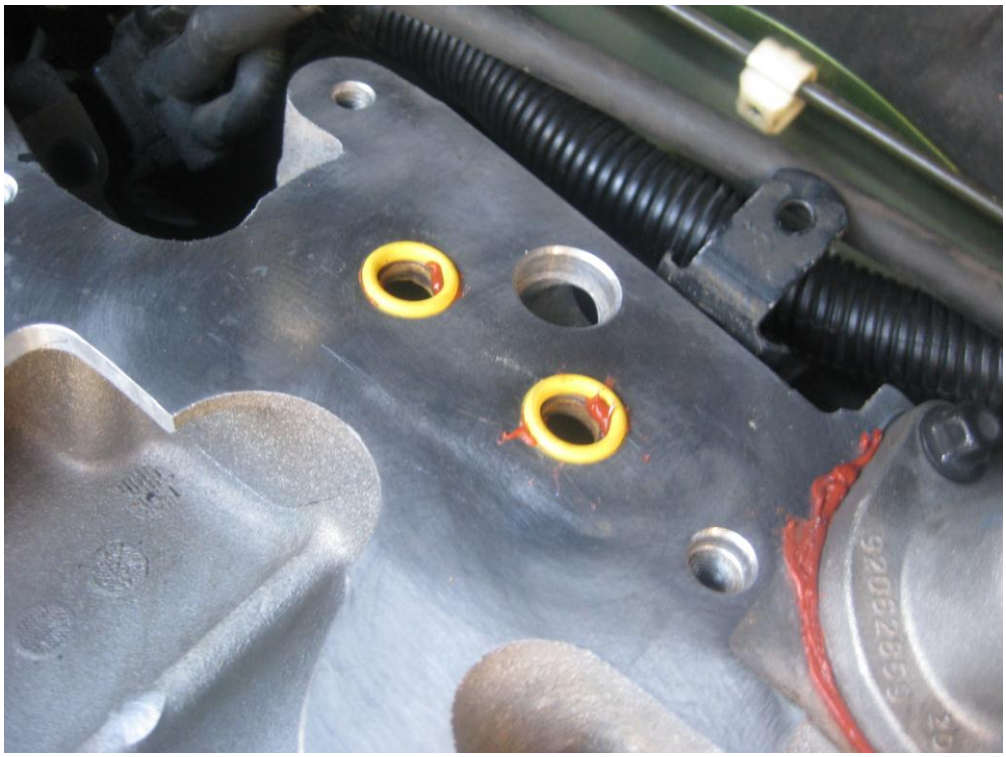


Once all bolts and hoses are removed, the supercharger is then free to be lifted off the car. Remove the small location tubes shown below using a pair of pliers.



Cleaning surfaces

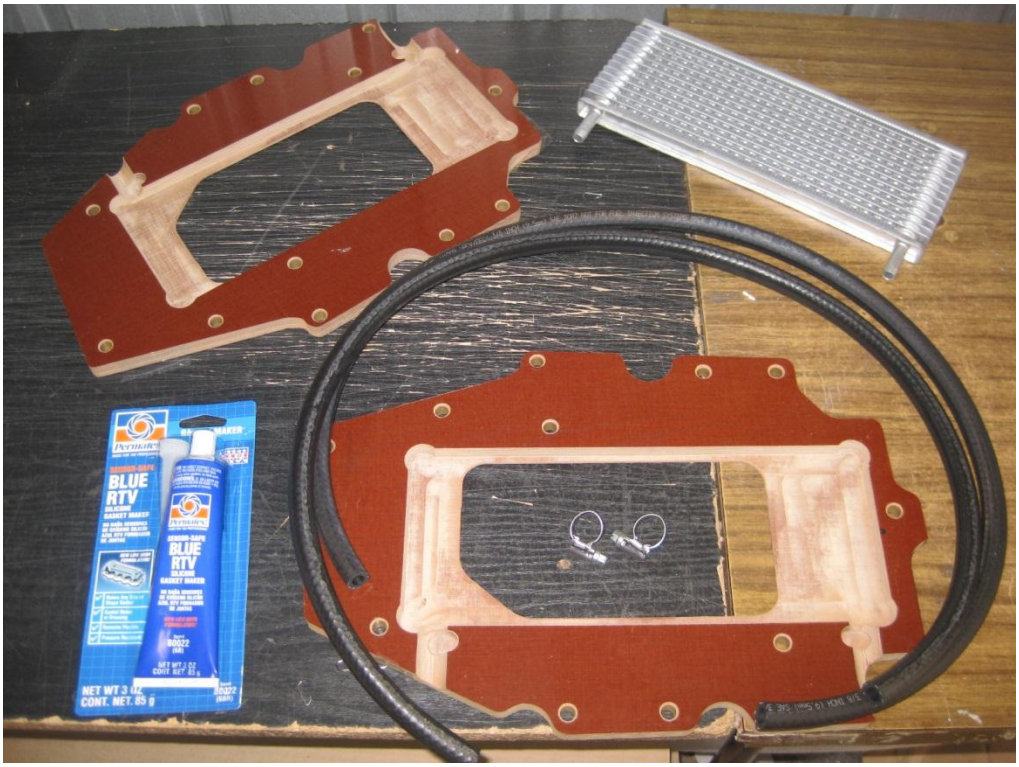
It is strongly recommended to clean the surface of the lower inlet manifold and supercharger before installing the intercooler plate on the vehicle. This can be done using a scraper (to remove old gasket) and a wire brush whilst ensuring all entries are covered to ensure no debris or contaminants enter the cylinder chambers.



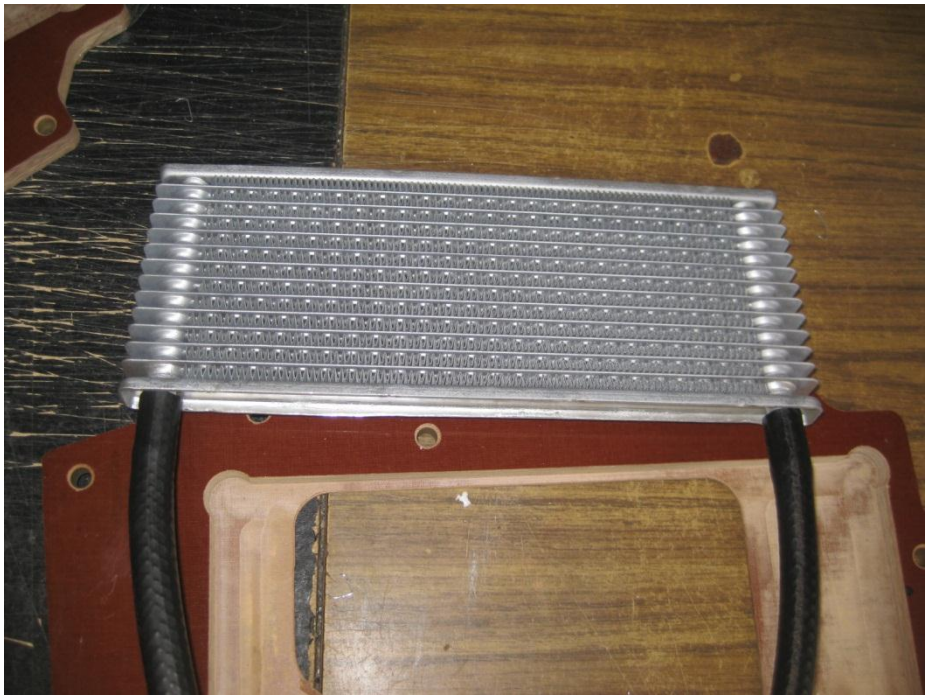
Step 6 - Assembling the intercooler core
Seal and/or replace O-rings on lower inlet manifold

WARNING: Extremely careful attention must be paid to the following steps of instructions to properly seal all areas. Failure to follow exact procedure may result in leaks which if improper sealing was executed WILL NOT be covered by warranty.

The shown parts are required for installation of the intercooler core.



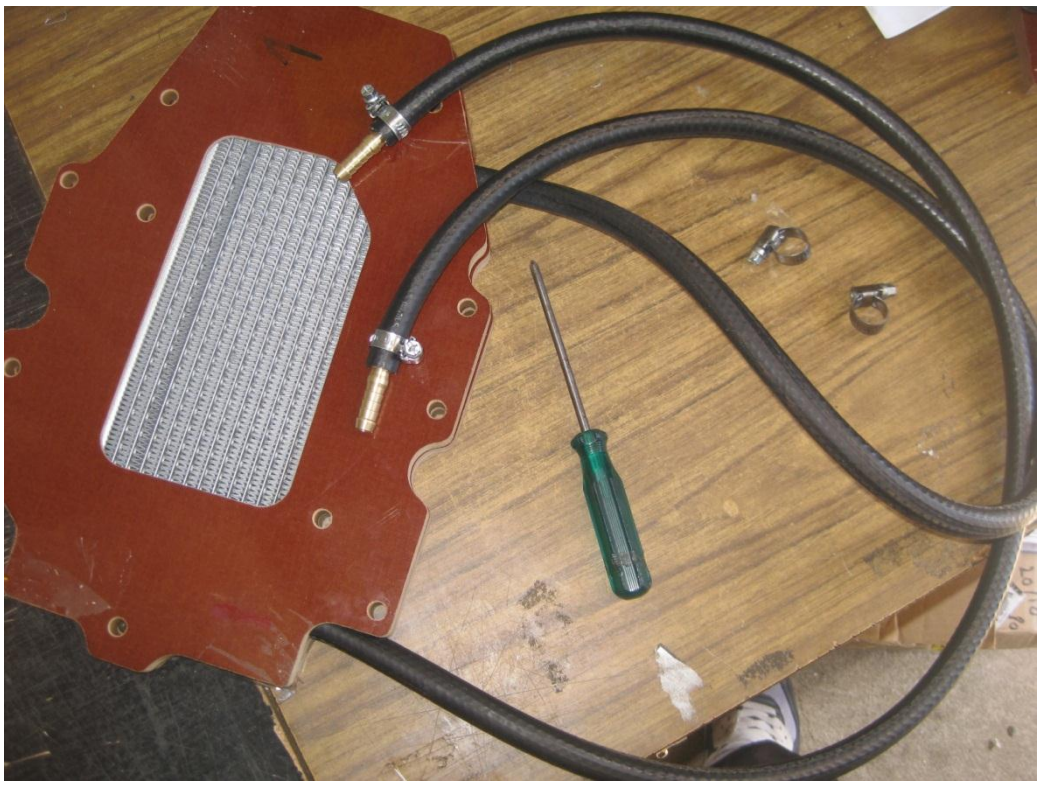
Start by connecting the 1 metre long hoses to the inlet and outlet of the small radiator.

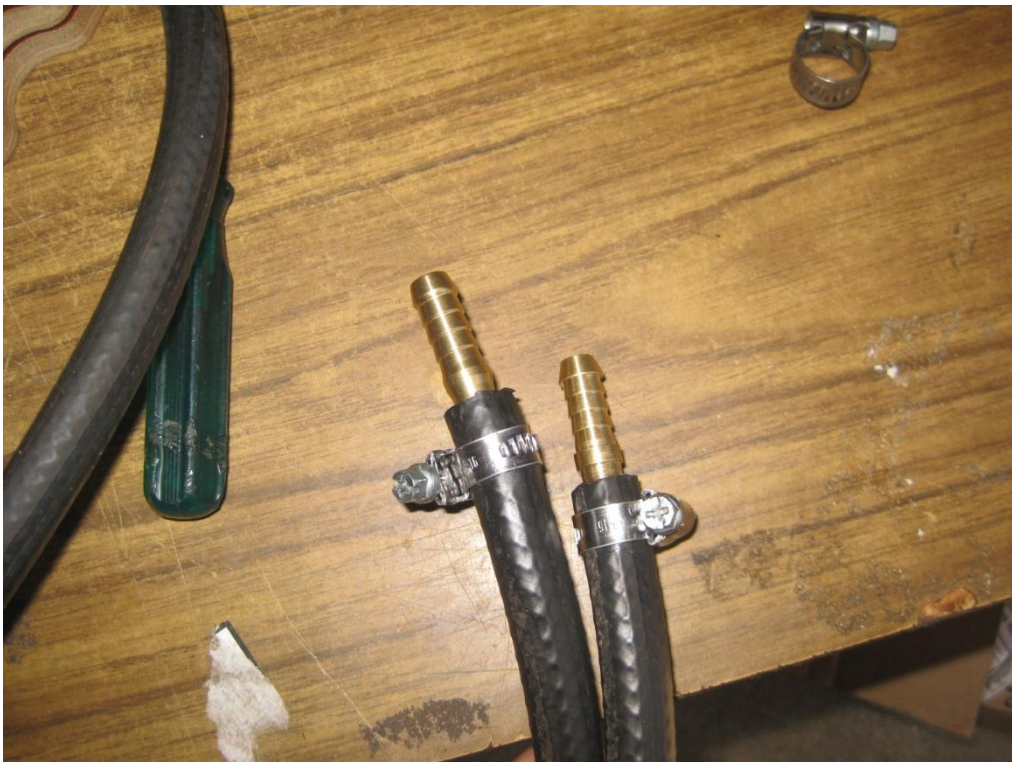


Being sure to use the special (smallest) hose clamps provided for this step, place one over the end of the first hose (keeping the hose clamp closed yet loose enough to slip over the radiator nozzle) and then slip the hose over the radiator inlet/outlet (it is not critical as to which hose goes on which side for now). Before tightening the hose clamp it may need to be manoeuvred such that it fits in between the two sides of the core with adequate clearance such that they can be easily closed.

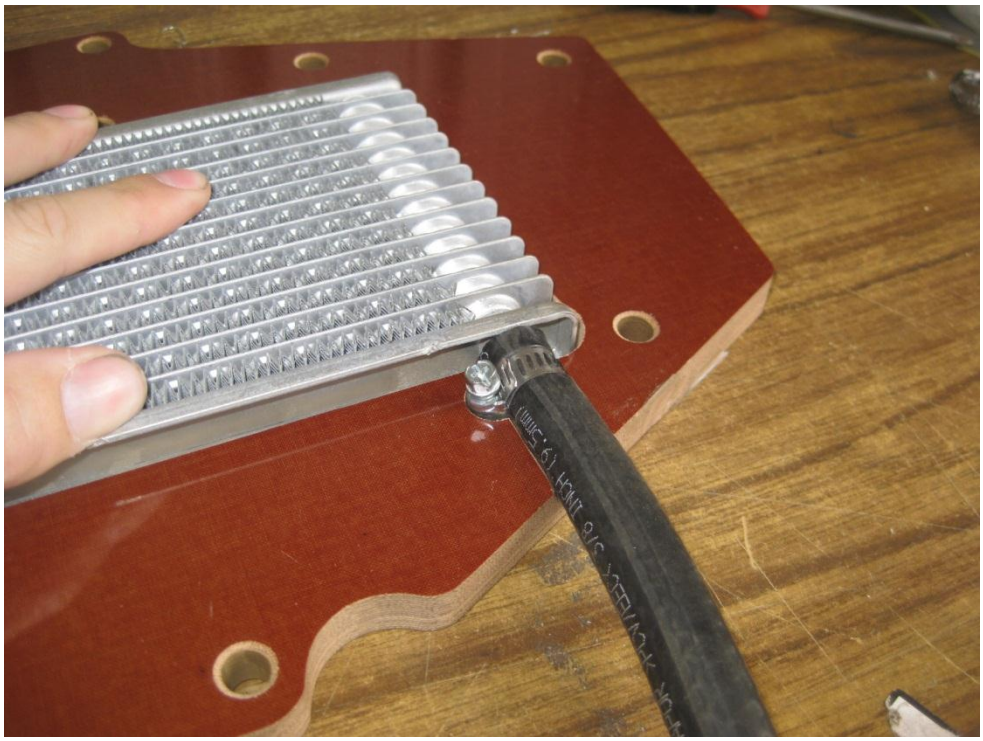
The two 1m long hoses going off the small radiator must be joined to longer hoses in order to reach the front mount radiator and pump.

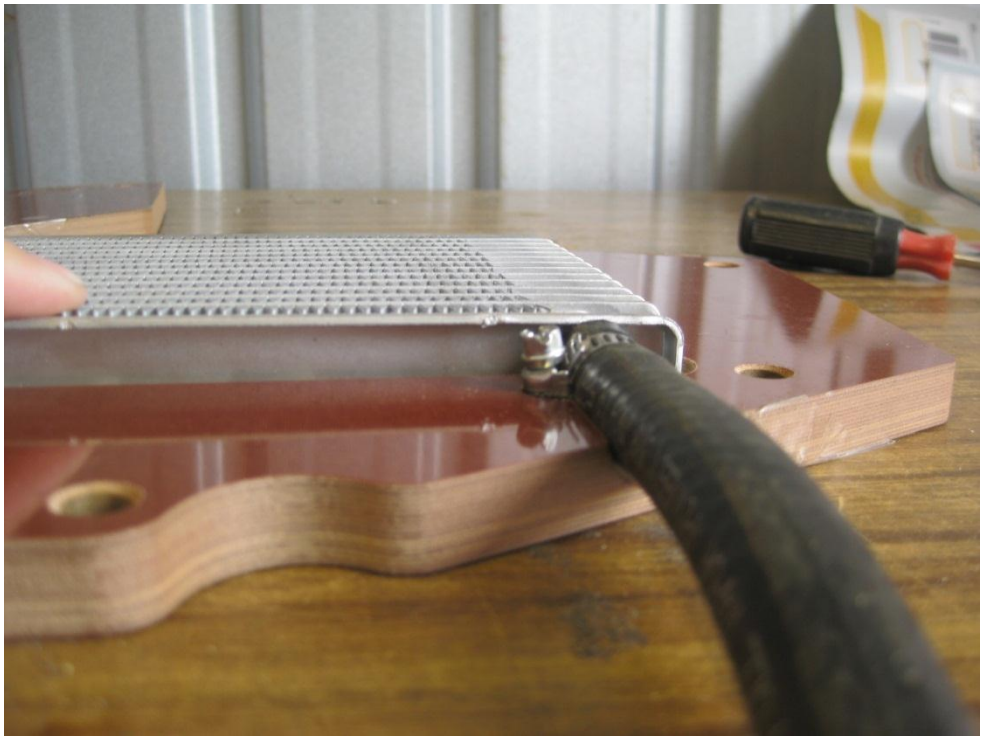
Attach the two double ended 3/8” barbs to the hoses and secure them with hose clamps as shown.



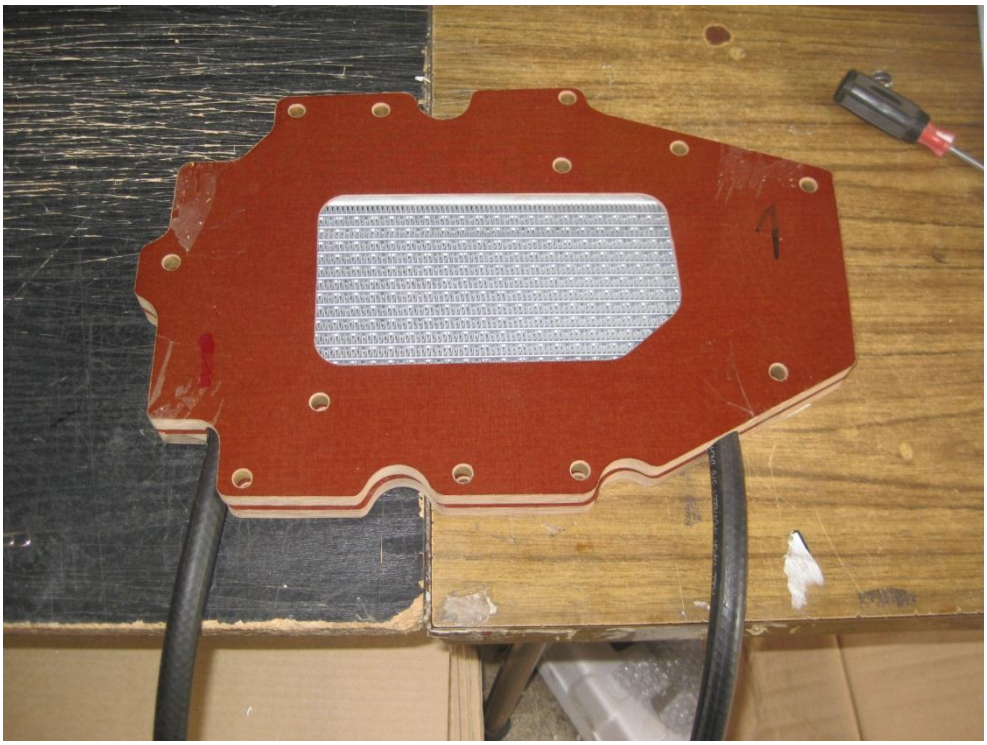


After careful positioning of the hose clamps tighten them securely using a small spanner making sure they sit perfectly in the machined space as shown below..

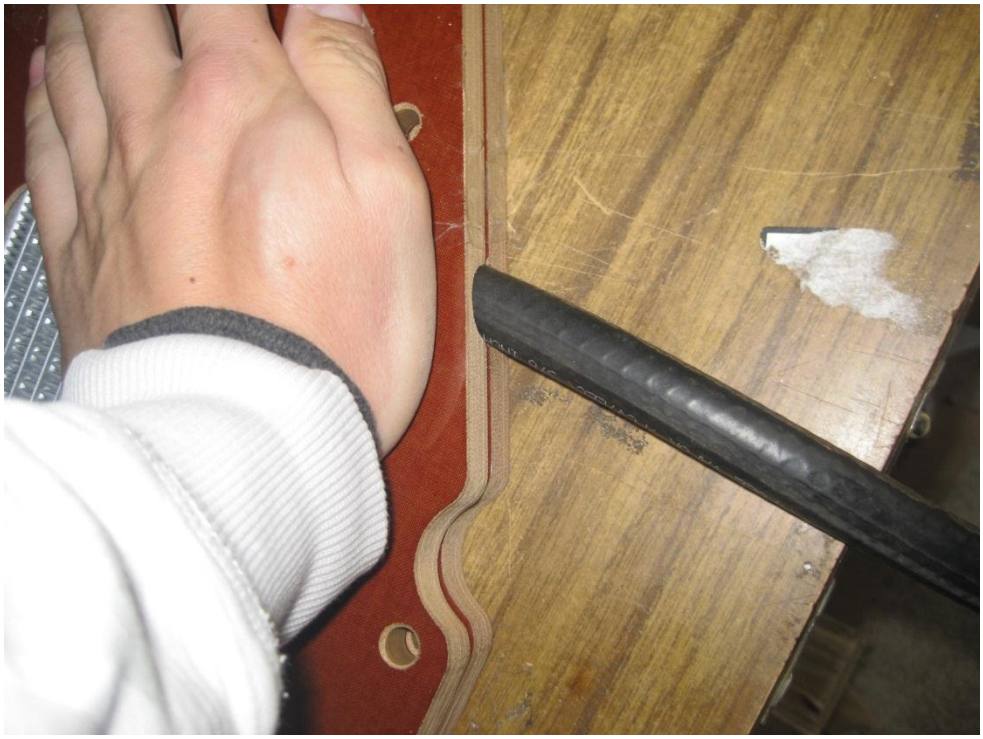




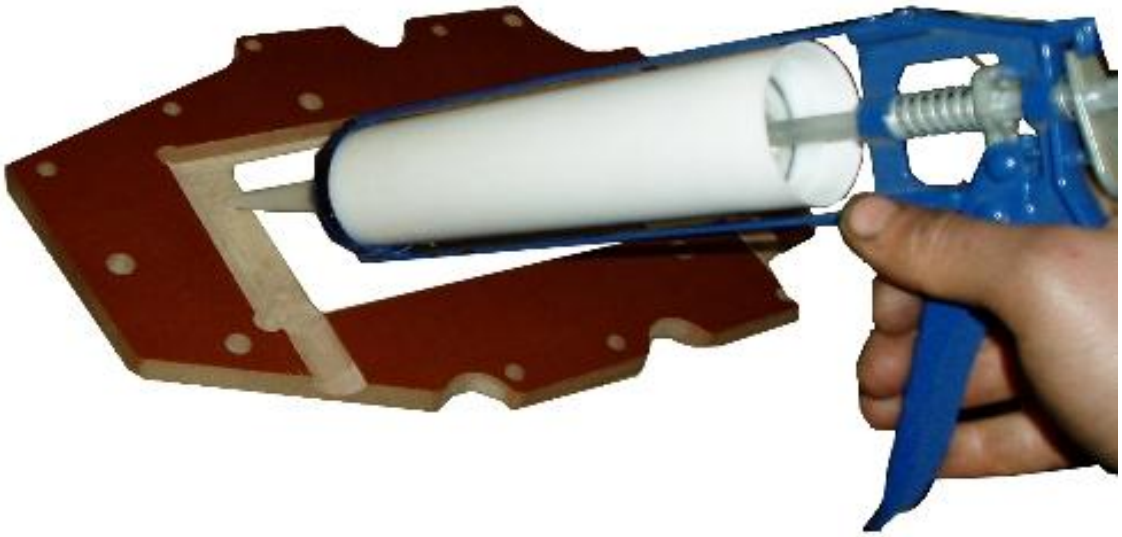
Do this for both nozzles of the radiator (inlet and outlet).



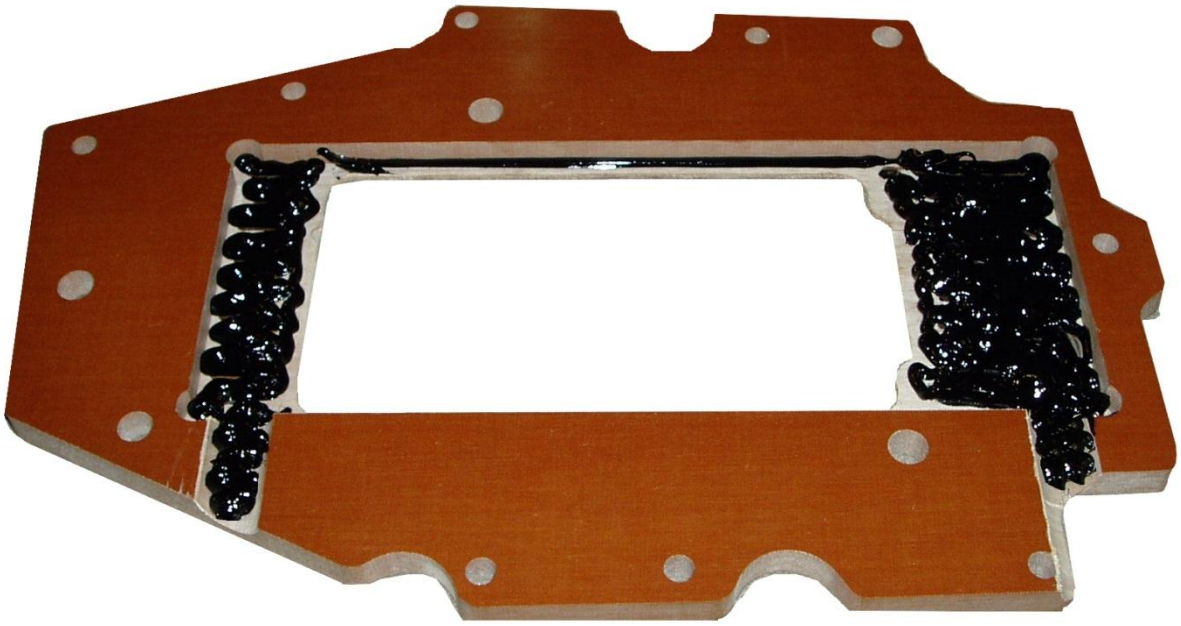
Be sure that the two inside faces of the core meet perfectly with no interference by the hose clamps. Adjust/rotate hose clamps where needed. Any potential leaks will lower the efficiency of the system. Once this has been achieved sealing can take place.



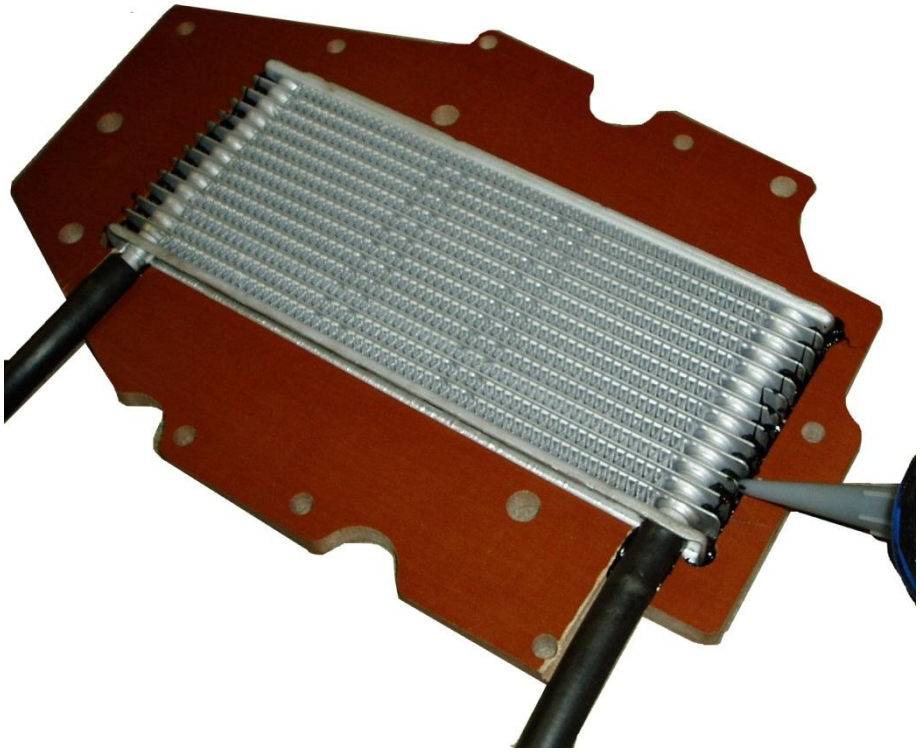
Begin applying sealant to the inner part of each core within the areas that the radiator sits in. Although the image below shows a silicone gun being used, simply applying the sealant from the tube provided is fine.



Applying a plentiful amount of sealant is important to prevent air from flowing around the radiator. Apply the sealant to BOTH HALVES of the core as shown below.



Place the radiator into place and apply more sealant to ALL outer edges as shown.

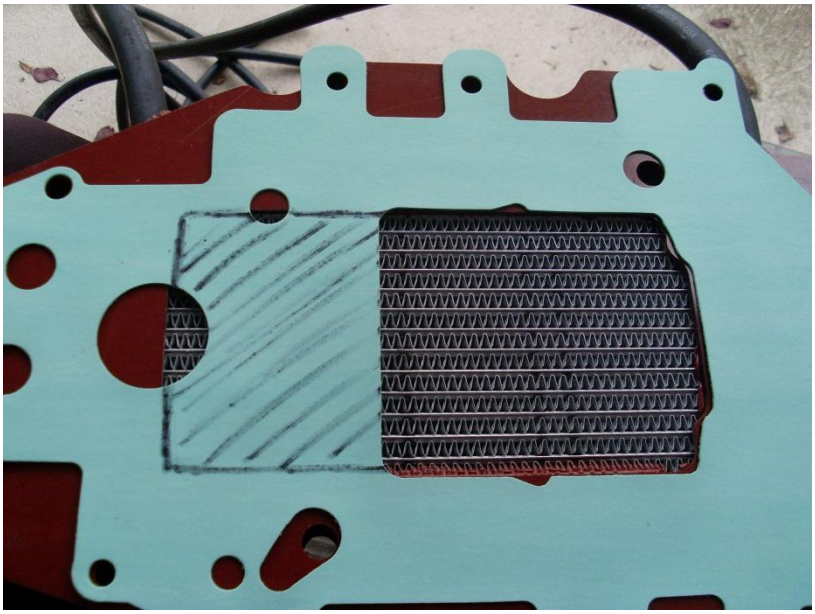


Now apply sealant to the mating surfaces of BOTH halves as shown below. Be sure to apply a full circle of sealant around the three port holes with the red asterisk.

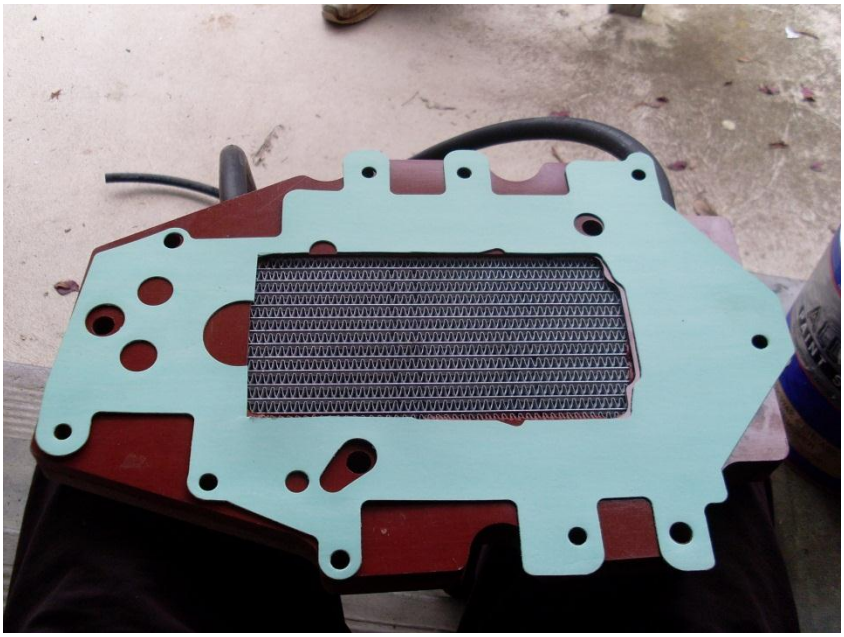
It is now time to join the two halves by fixing them with a few nuts and bolts as shown. Also firmly clamp the two halves together using G-clamps and allow to set overnight.

Step 7 – Fitting the intercooler core

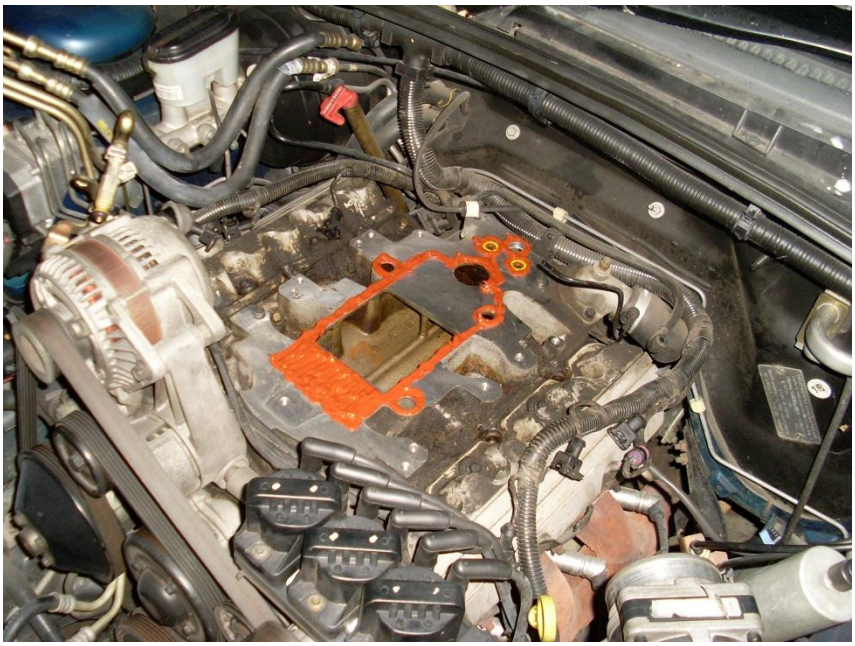
Place one gasket over the core and mark out the area required to be cut out, to prevent this section of the gasket from breaking off and falling into the inlet manifold.



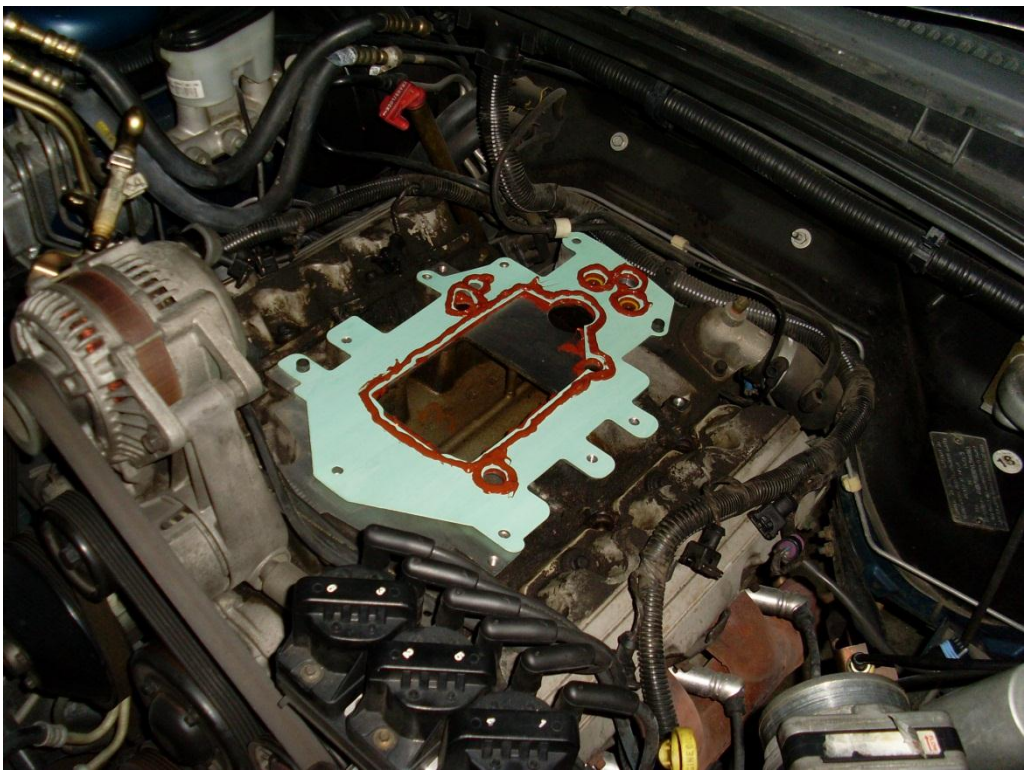
It is only necessary to cut the gasket which sits beneath the intercooler core. The other gasket can remain as is.



Now apply sealant to the inlet manifold as shown below. The amount of sealant used should not exceed the amount shown below but should be more than 4mm in width.

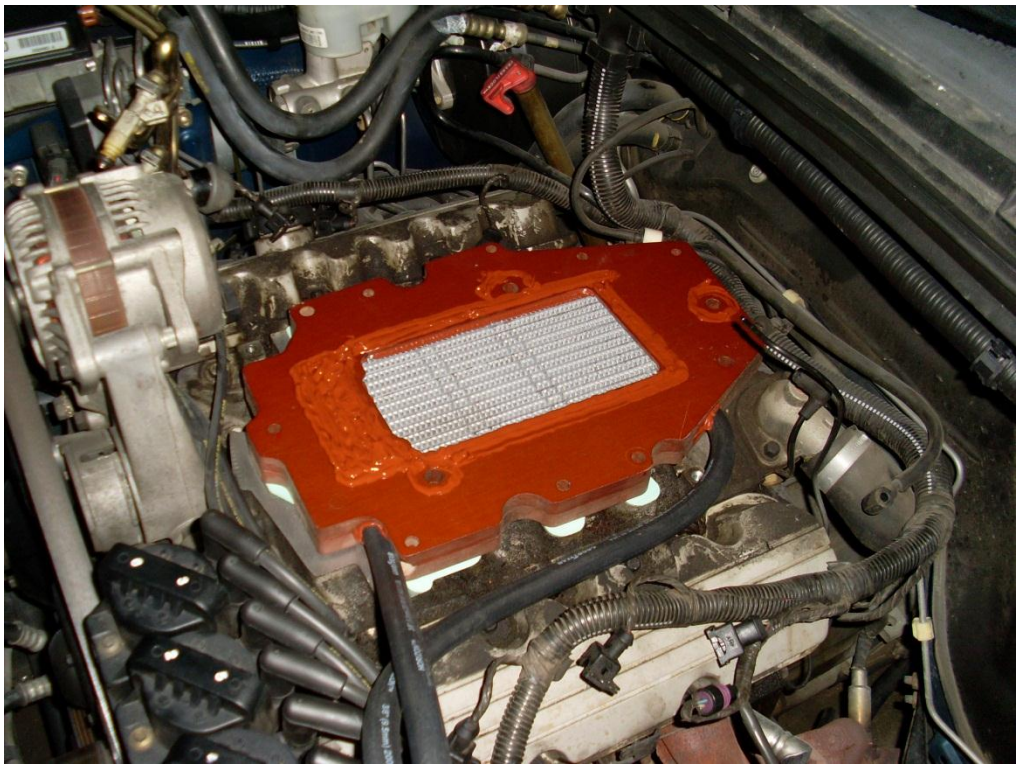


Proceed by placing the cut gasket onto the inlet manifold and apply sealant to the gasket.

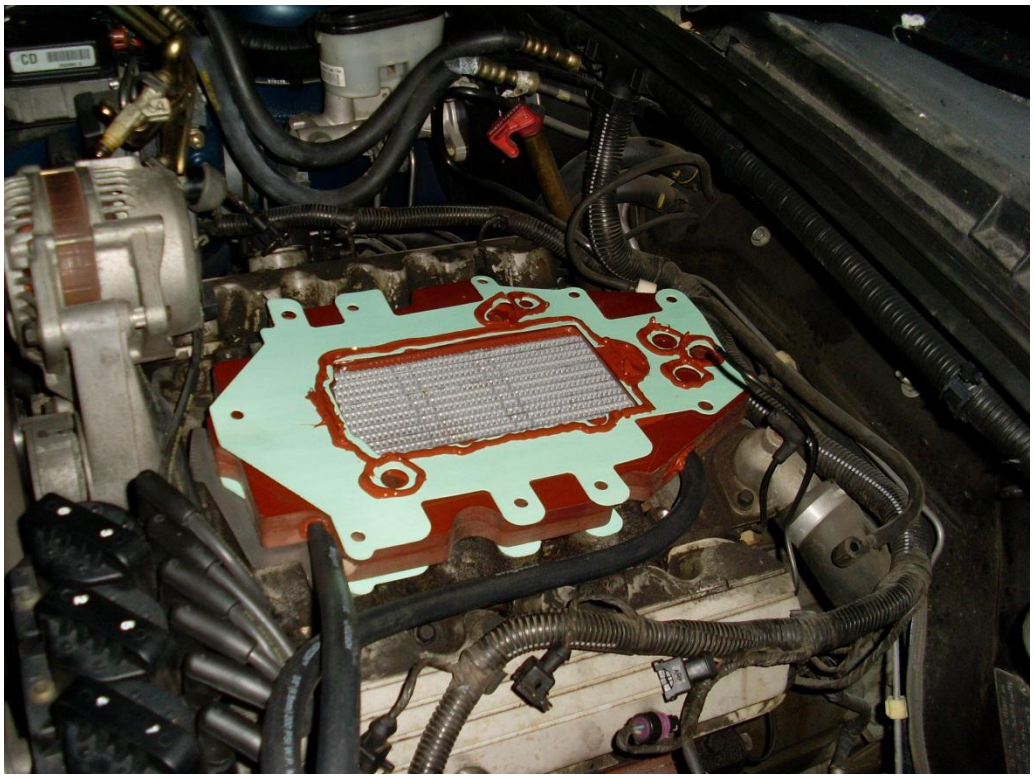


Place the assembled core onto the gasket keeping all holes centred using the bolts supplied. Attempt to screw the bolts into place through the core and adjust the core where needed.

Apply sealant to the top of the core as shown below

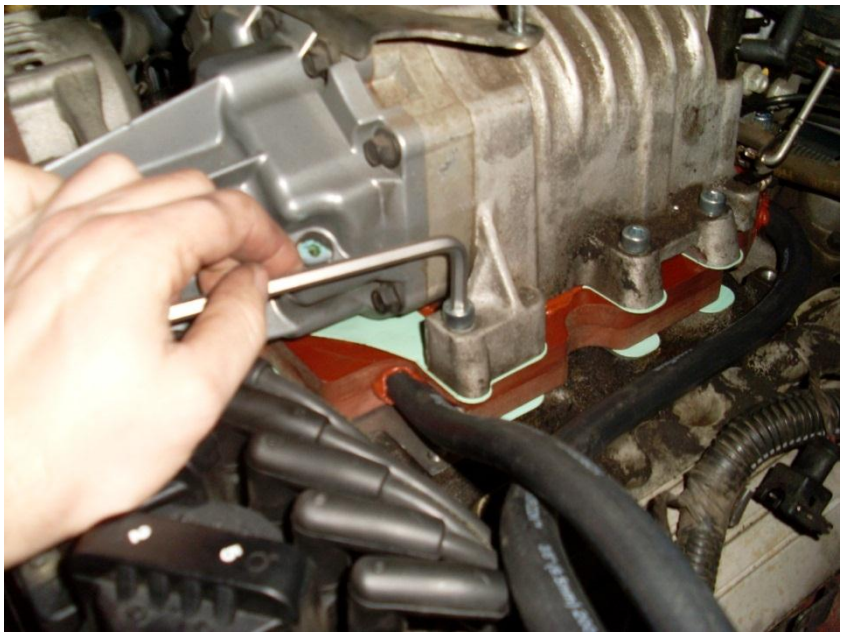


Place the second (unaltered) gasket onto the core and apply sealant to the gasket.



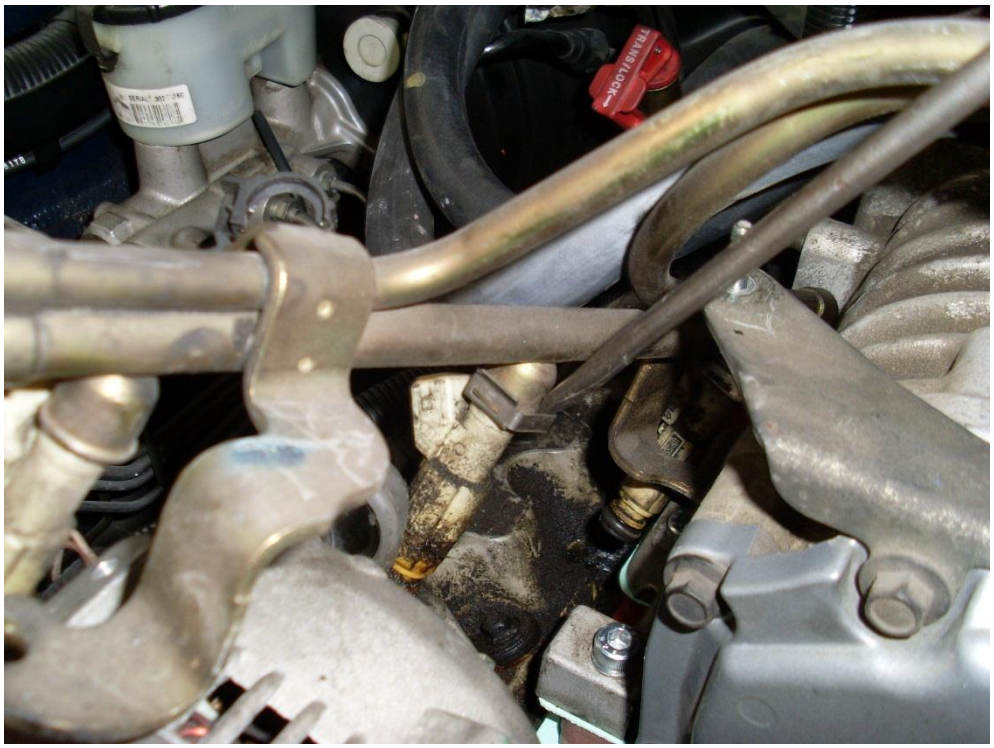
Place the supercharger over the core and locate all inlet manifold holes using the bolts provided. Adjust the supercharger by moving it around until all bolts screw into their respective holes.

Lightly tighten the bolts using an Allen key to progressively fasten each bolt. Using a TORQUE WRENCH initially torque the bolts to 10Nm before setting the torque wrench to 17Nm and further tightening the bolts. It is CRITICAL not to over tighten the supercharger bolts as the supercharger housing will deform and make contact with the supercharger rotors. Be sure to spin the supercharger pulley by hand to inspect for any rubbing. If rubbing occurs slightly loosen the bolts.

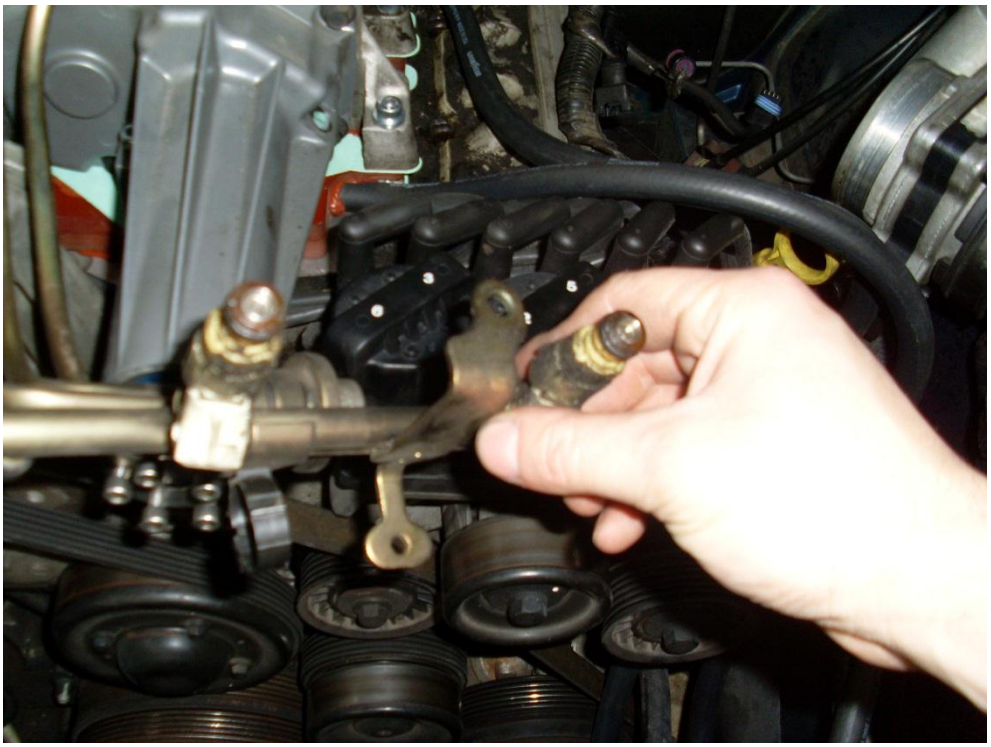


Step 8 – Fitting the Injector Rail extenders

Start by removing the existing studs from the manifold if it has not already been done. There are 4 studs as such. Remove the injectors from the rail by removing the metal clips.



Once the clips have been removed, the injector can be pulled out.



Injectors and extenders must clip in around the O-rings for a perfect fitment.

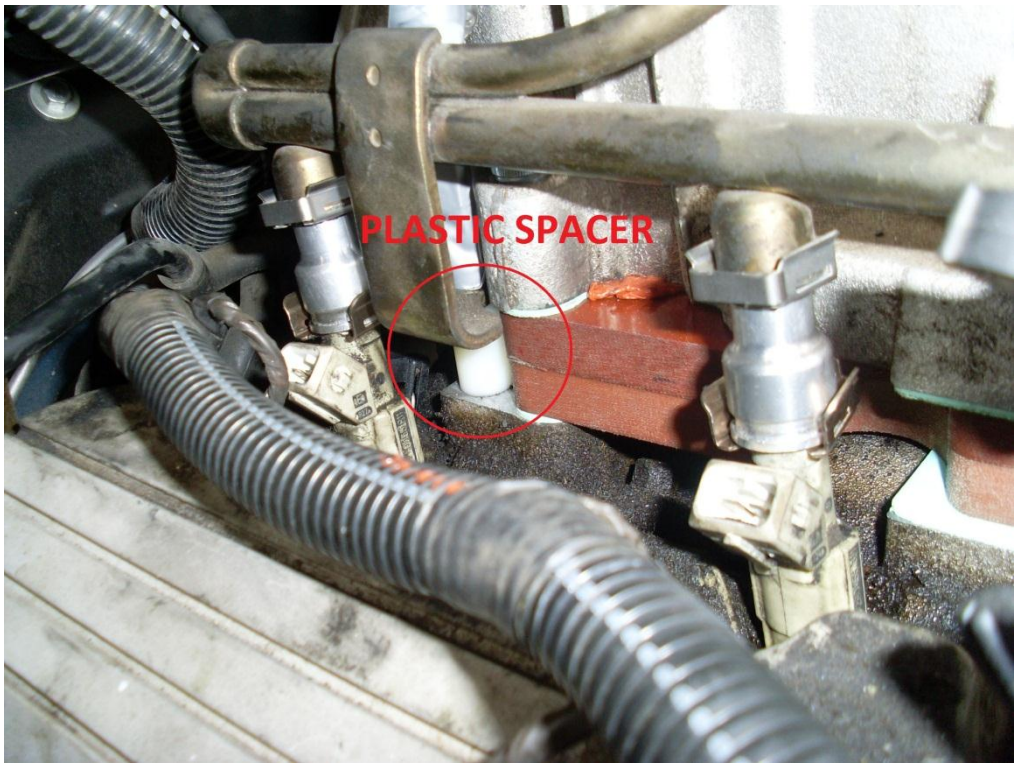
Refit metal clips and use extra clips as provided in order to assemble the injector and extender to the rail as shown in the images below.

Pop the injector and extender into the rail

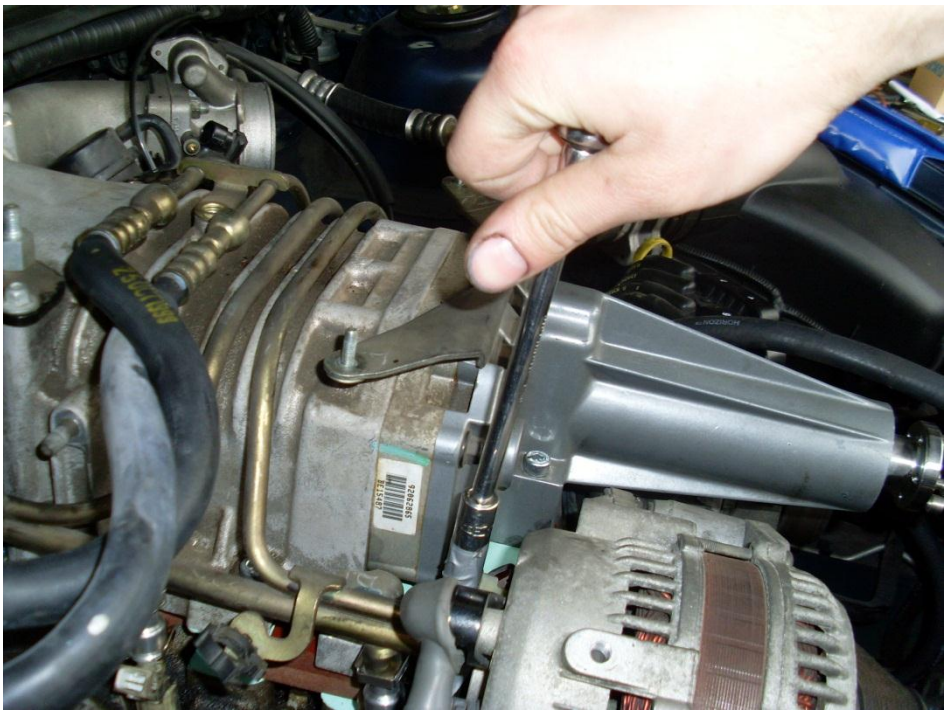
Slide the retaining clip into place and repeat this process for all six injectors

Pop the injectors into place

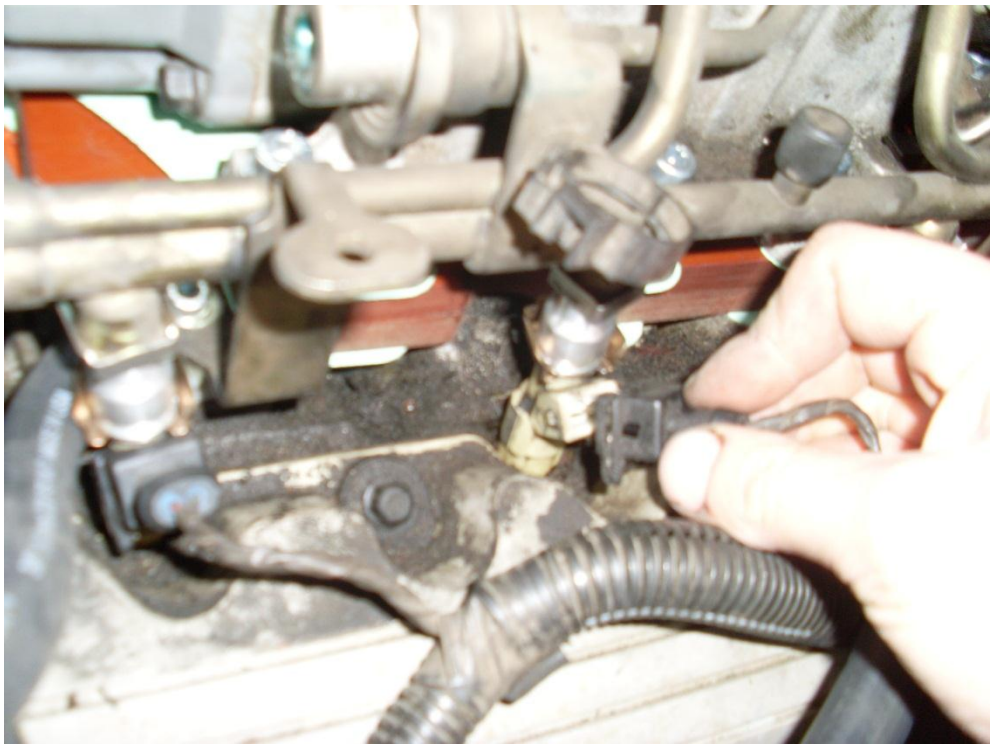
It is important to first connect the injectors into the cylinder heads ensuring all O-rings pop into place. Proceed by carefully wedging the hollow plastic spacers in between the manifold and the existing fuel rail brackets before placing the 4 bolts through the bracket holes and spacers and fastening them.



Fasten all bolts as shown

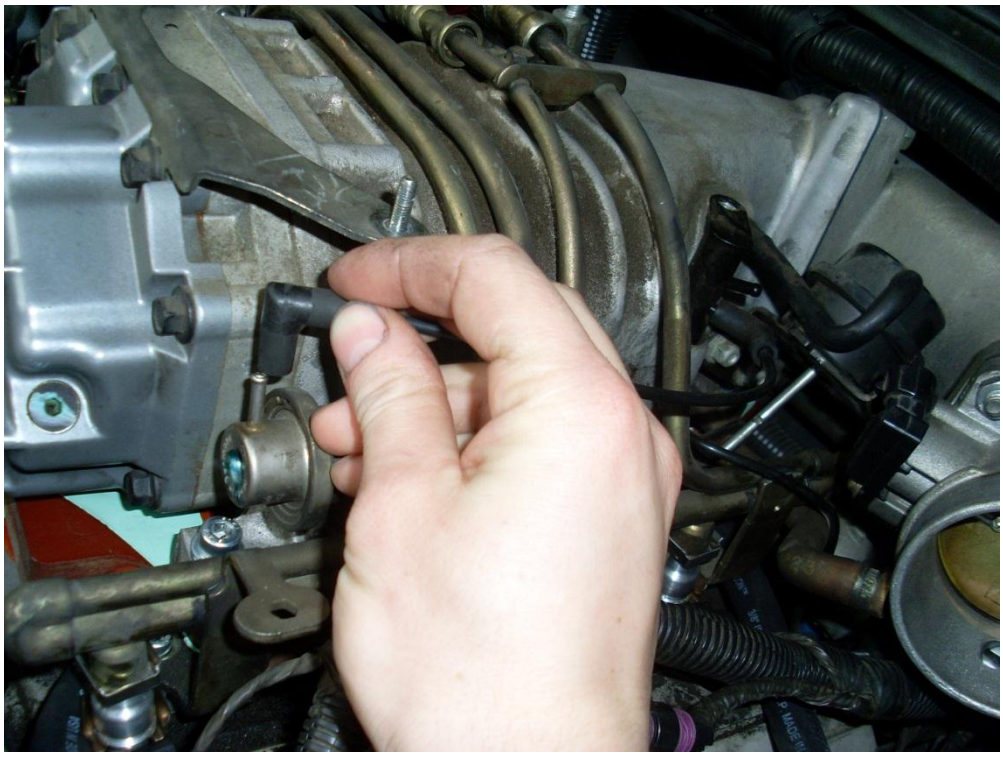


Refit all injector electric clips as shown



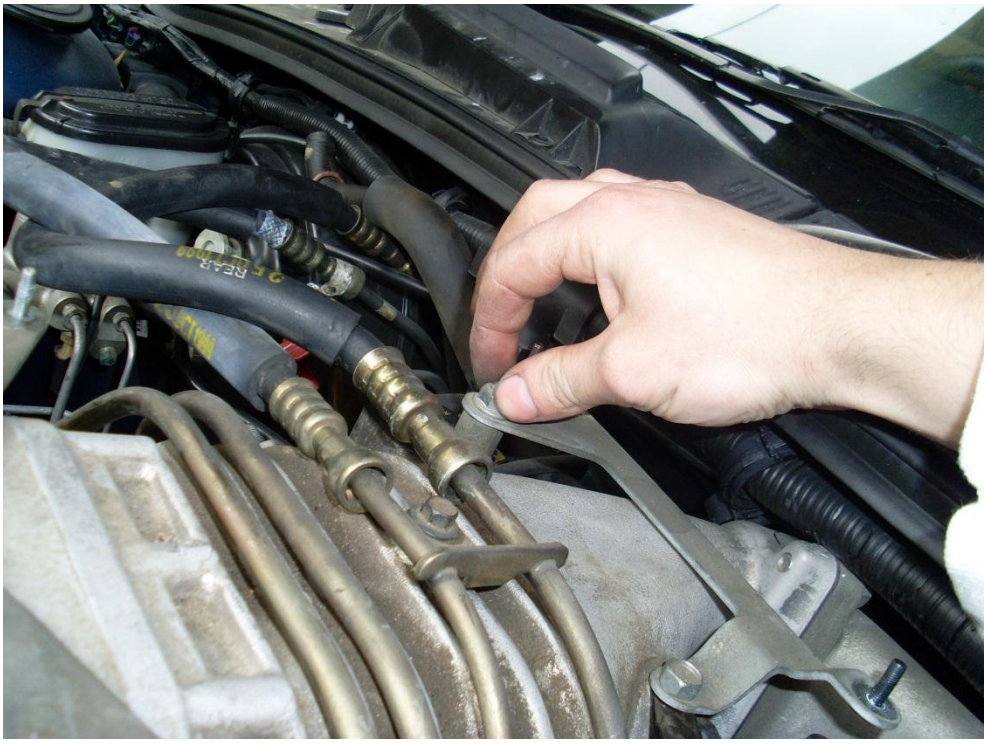
Step 9 – Refitting Components

Refit the shown vacuum lines

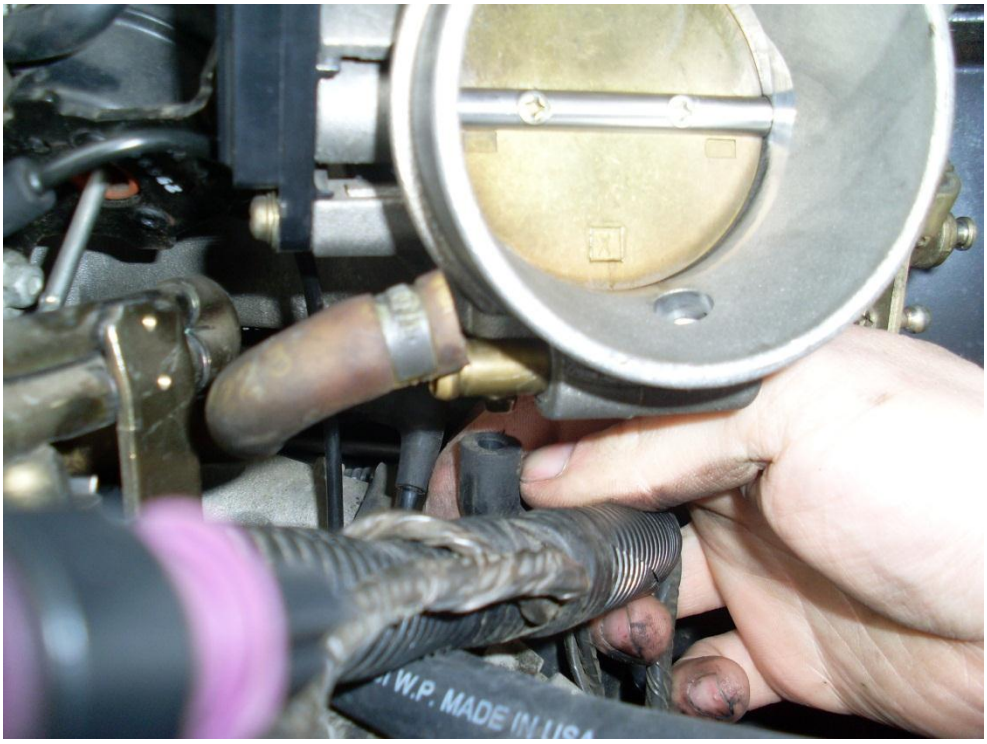


Be sure to BLOCK off the shown nozzle in the vacuum tree using the vacuum block-off plug provided

Reinstall the engine cover bracket as shown



Fit the throttle body vacuum hose as shown

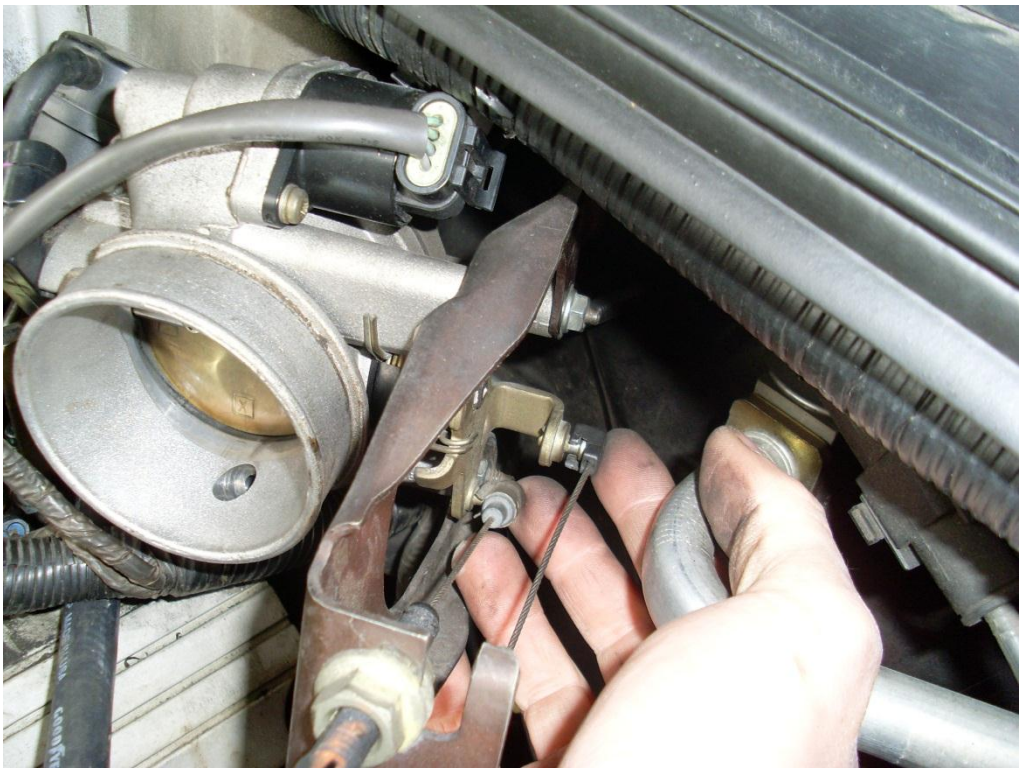


Fit the TPS clip on the throttle body

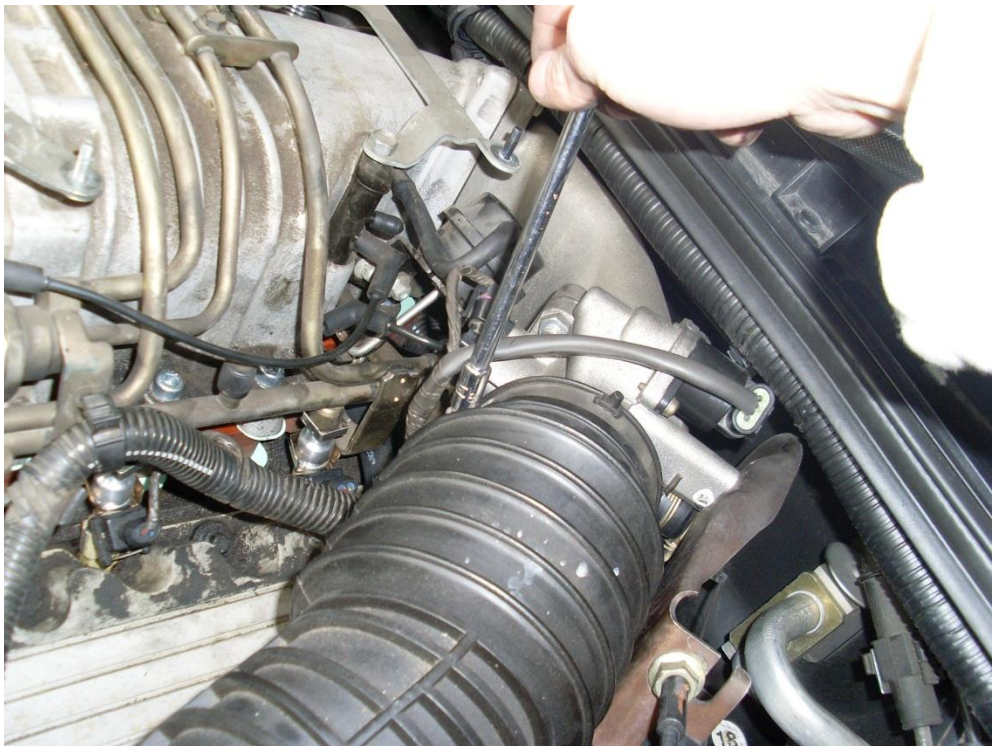
Also fit the IAC plug on the throttle body

Fit the throttle bracket and fasten the three nuts as shown

Fit the throttle and cruise control cables and clips as shown below



Fit and secure the intake hose by securing the two hose clamps as shown

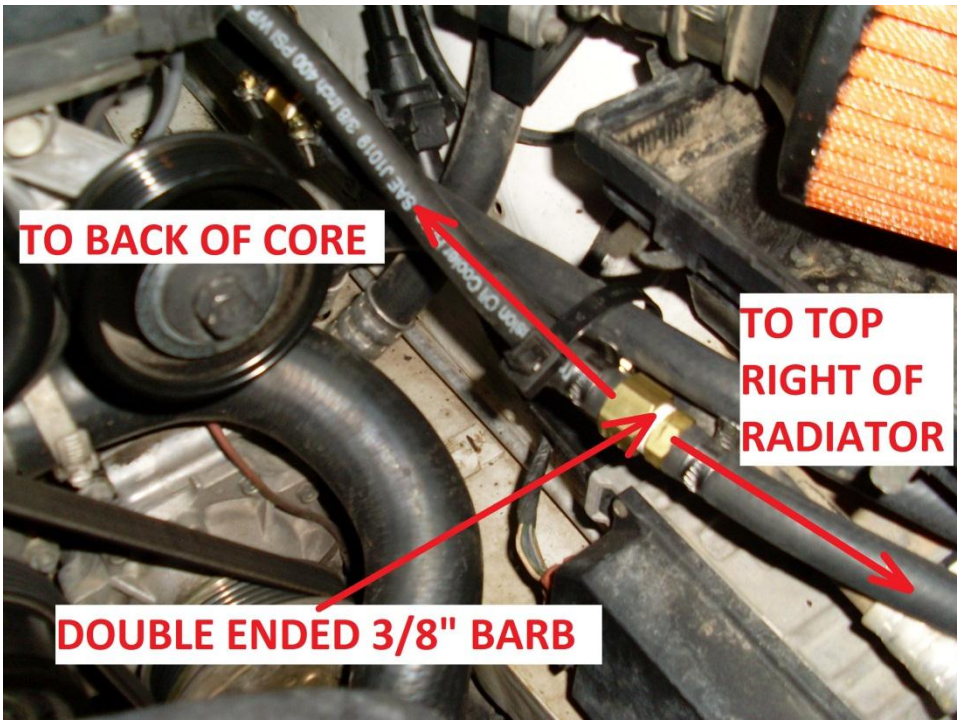


Fit all injector loom clips into the injector rail

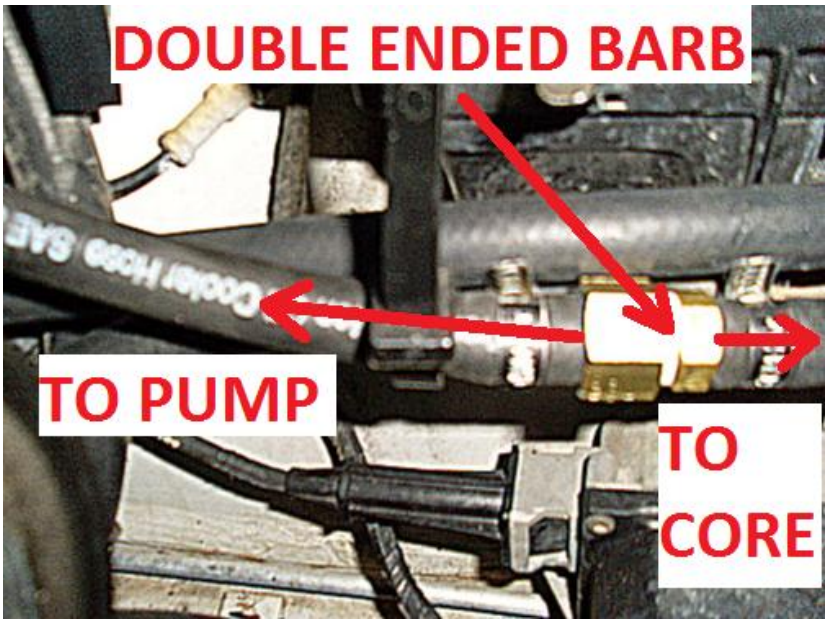
Fit the small vacuum hose to the back of the supercharger elbow

Fit the vacuum brake booster line as shown

Now simply connect the hose from the back side of the intercooler core to the hose from the top side of the radiator with the 3/8” double ended barb as shown. Be sure to secure the hose with zip ties avoiding all obstacles.



Now do the same on the pump side hose by connecting it to the hose from the front side of the intercooler core.



Step 10 – Wiring the water pump

Please note the following images were extracted from the VT Fitting instructions but convey the same information.

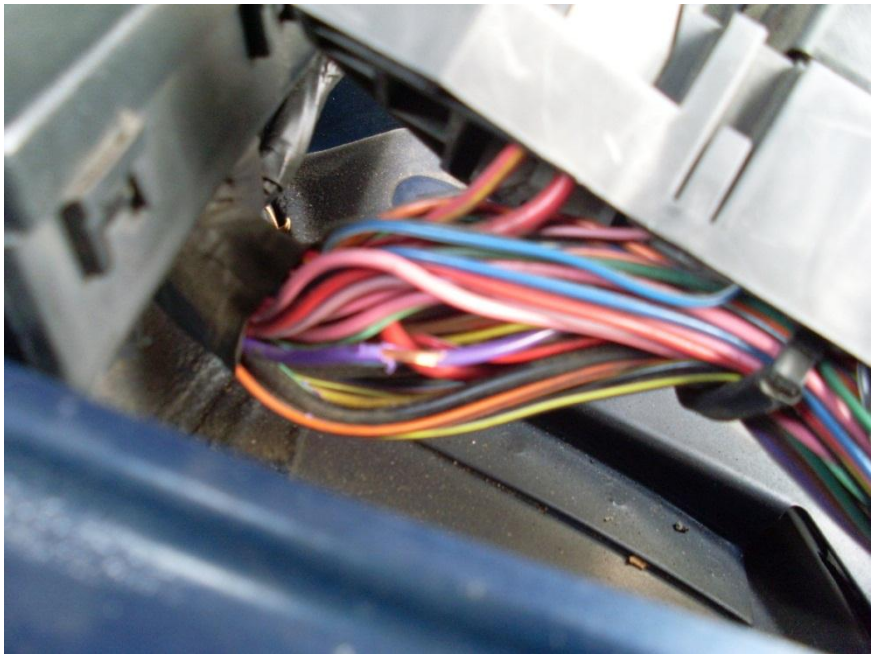
The water pump should be wired to the fuel pump cable under the fuses. The fuse box must be lifted. Start by opening the fuse box cover by unclipping it as shown below.

Remove the two bolts retaining the fuse box as shown

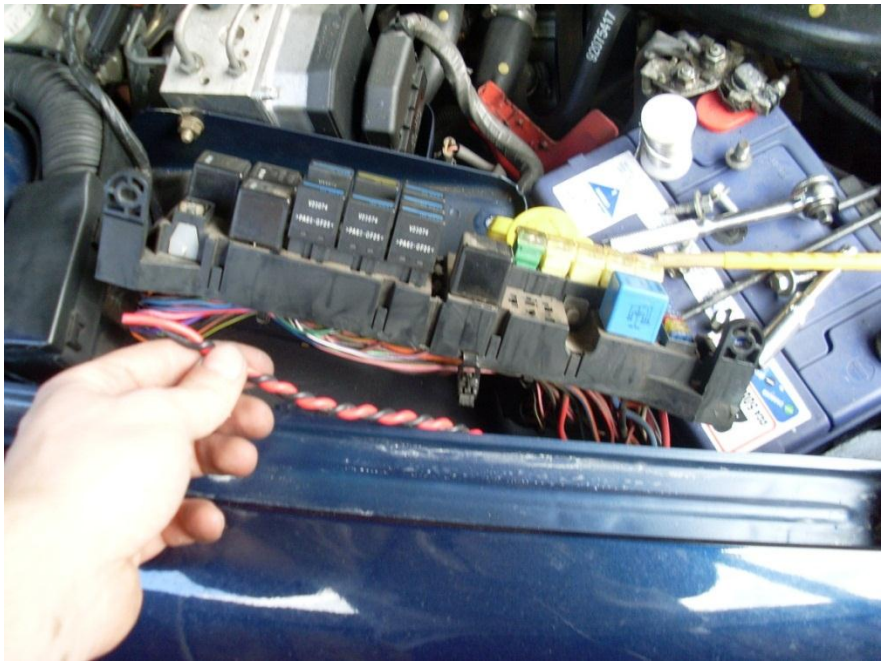
Also release the fuse box by unclipping it using a screwdriver as shown.

For extra room, remove the cruise control (shown below) by unfastening the 3 bolts which retain it.

Locate the fuel pump cable and remove some of the rubber lining as shown.
NOTE: NOT every vehicle's fuel pump cable is purple; therefore you may need to use a workshop/repair/wiring manual to locate the correct cable or if possible use the fuse diagram on the back of the fuse box cover (where applicable). A relay may also be added.



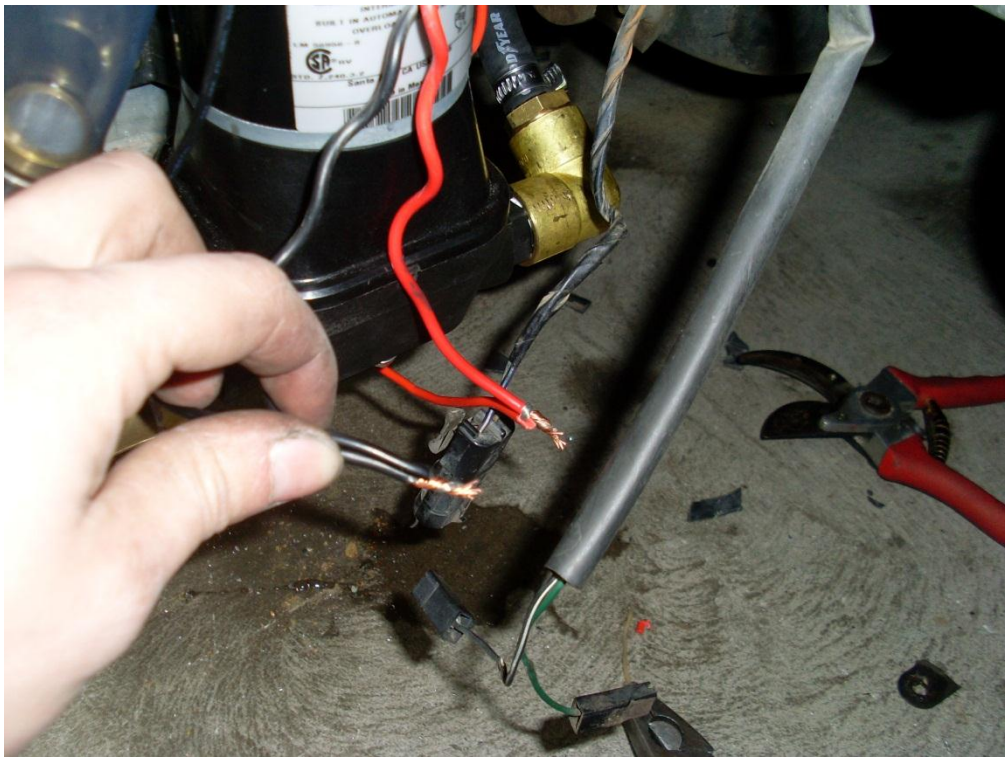
Use the two self-provided electrical wires and join the positive to the fuel pump wire. The other is negative and is simply used as a ground and can be grounded to the battery (shown later).



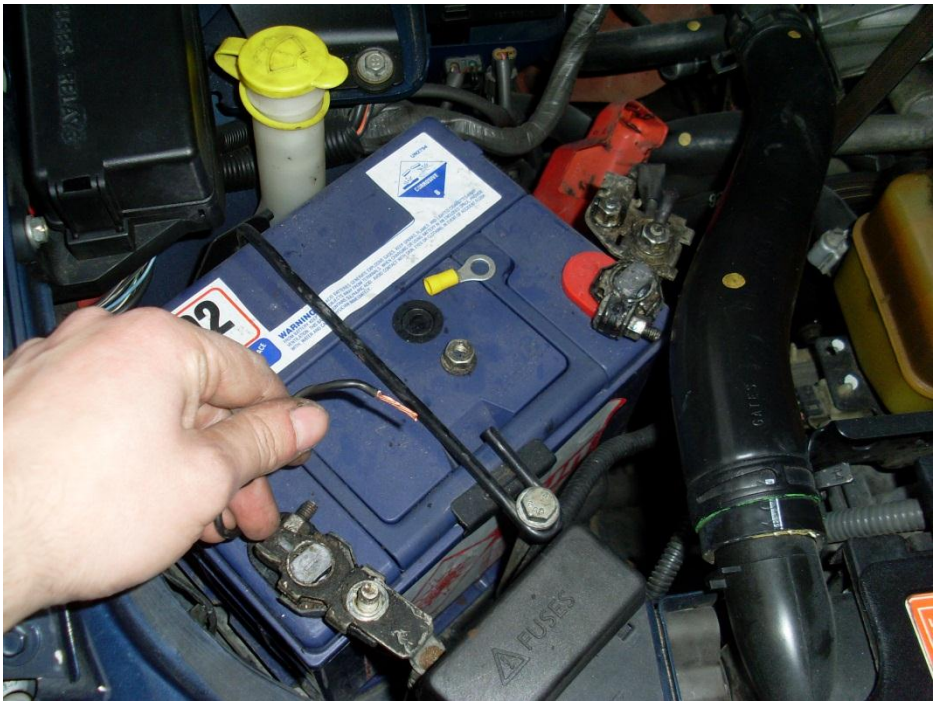
Solder the joined wires and insulate properly using electrical tape

Fit the fuse box and cruise control

Connect the positive wire to the positive wire on the pump. Connect the negative (ground) to the negative wire on the pump. Solder and insulate as shown.



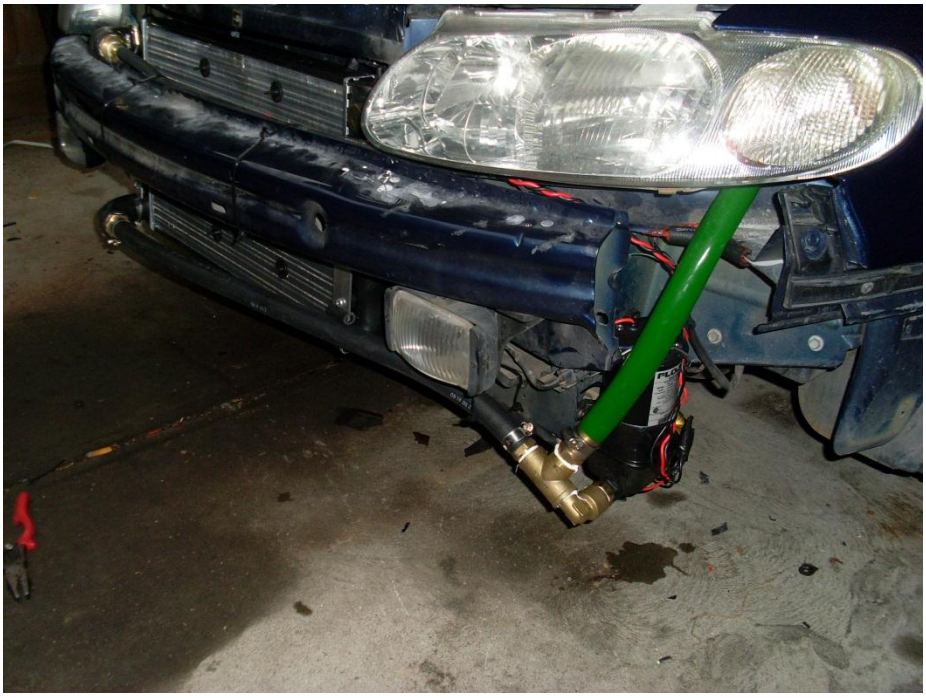
Ground the negative pump wire to the battery using an eyelet electrical connector.



Crimp the eyelet to the wire (using an electrical crimper) and fasten it using the nut on the negative battery as shown below.

Step 11 – Filling the system with coolant

Fill the system with coolant using the clear hose beside the air box. Prime the pump by switching it on while slowly pouring in the coolant in order to allow it to circulate through the system. This may take some time as all air bubbles need to escape through the top in order to fill the whole system. The capacity will vary depending on the lengths of hoses but generally between 3-4 litres can be required.



Step 12 – Modifying the bumper

For clearance issues, the bumper may need to be trimmed using a jigsaw or angle grinder. Test fit the bumper bar and using trial and error; locate the areas which need trimming. Refit the bumper and check all connections. This completes the installation procedure.