Installation Guide
Holden VE/ E - Series & VF/ Gen-F
Front Drive / Front Inlet Supercharger

Issue 6: July 2020

FDFI INSTALLATION GUIDE

ENGINEERING PERFORMANCE SINCE 1955

For 60 years Harrop Engineering has been at the forefront of designing, developing and manufacturing precision performance components. Today our innovative and logical approach is applied to low volume automotive OEMs and the performance aftermarket through a dedicated team of 65 staff. Core performance products include Superchargers, Engine Components, Brakes, Differentials and we are also the exclusive Australian Distributor for Forgeline Motorsport Wheels & Lingenfelter Performance Parts.

Harrop are also the preferred supplier of Eaton Supercharger and Traction Control technology including dual branded product designed and manufactured in-house. There are currently over 4000 components in our portfolio and this is growing daily as we continually develop more Harrop Performance Products.

Our high profile car manufacturing customers include Holden, HSV, FPV, Roush and Lotus.

We also supply to race teams from categories including F1, NASCAR and V8 Supercars and an extensive range of drag, circuit and off-road competitors. Just as importantly, a large portion of our customers are performance enthusiasts and weekend warriors who are highly passionate about their ride.

Please take a moment to review the following pages and learn why Harrop is the first choice in Superchargers.

Thank you for choosing Harrop and enjoy your Harrop enhanced ride.

- Team HARROP

IMPORTANT INFORMATION

The owner and driver of the enhanced vehicle must be aware that fitment of a supercharger may affect:

- The vehicle's factory warranty.
- Insurance cover and associated liabilities.
- Compatibility with emission and roadworthy certification.
- The validity of a driver's license for a supercharged vehicle.
- The handling & braking capability of the vehicle due to increased engine power & torque
- The longevity of the engine and driveline components.
- The vehicle will need to use premium unleaded fuel only (98 RON).
- Coolant used in the intercooler system must adhere to Ford WSS-M97B44-D or GMW3420 specification mixed 50% concentrate with distilled or deionised water.

Warranty:

This supercharger is covered by a limited warranty on components and workmanship for a period of 36 months from the date of purchase, subject to Harrop terms and conditions.

Please refer to Harrop Engineering's full warranty terms and conditions and applicable warranty

registration forms which can be found at www.harrop.com.au.

This document is meant only as a guide, as any vehicle modification should be completed by a certified technician who has the relevant experience and equipment to be competent of a safe and effective supercharger installation.

The following notes will highlight most of the primary steps required during the installation of a FDFI supercharger kit onto a Holden VE & VF Commodore. Some images and instructions may be omitted or irrelevant due to variations between vehicle models and applications.

Please ensure the safe operation of all tools and equipment are adhered to in accordance with the vehicle and equipment manufacturers recommendation.

1. Ensure the vehicle is prepared with 98 octane premium unleaded fuel.

Note: Avoid inverting supercharger assembly or standing on end, as the oil in the gear housing may migrate from intended area.

2. Remove the intake filter, duct and air box completely and facia panel (if fitted).

3. Remove the standard intake manifold

3.a. Clean any dirt or debris around manifold to prevent it from entering the engine.

3.b. Unplug and unbolt the electronic throttle body from the manifold.

3.c. Unplug both sides of the fuel purge valve and PCV line (quick connect fittings, depress large yellow or white square pad).

3.d. Unplug the valley plate breather.

3.e. Unplug fuel line from manifold & the hard line at rear of engine/firewall.

3.f. Remove fuel purge solenoid valve and bracket.

3.g. Remove the brake booster line.

3.h. Unplug the MAP sensor.

3.i. Unscrew the manifold from the cylinder heads.

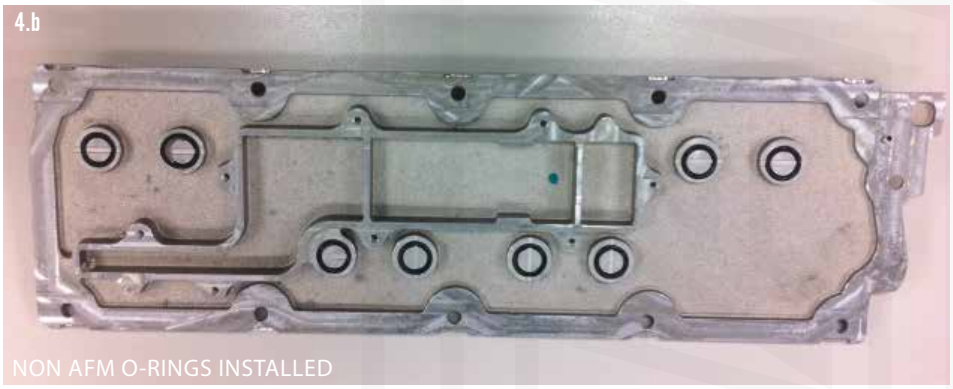
3.j. Ensure all wiring looms and hose are clear of manifold and remove the manifold.

3.k. Mask the inlet ports to ensure no foreign matter enters the engine, both sides.

4. Valley plate removal/installation

4.a. Disconnect the oil pressure sensor loom, if the vehicle is an AFM model then disconnect the AFM loom at the same time. The AFM connector will not be reconnected for this install as it will be deactivated in the tune, this loom can be cable tied to the oil pressure loom to ensure it will not get caught on anything during the assembly of the kit.

4.b. Remove the valley plate and the 8 seals from the underside of the valley plate and **fit these to the supplied valley plate if the vehicle was not fitted with AFM (Replace o-rings if worn). On all AFM models the 8 seals do not need to be transferred but a non AFM valley plate gasket must be used (not supplied), however available from Harrop.**



4.c. Transfer the oil pressure sender unit onto the new valley plate, use a suitable thread sealant to ensure no oil will leak passed the threads.

4.d. Reinstall the Harrop valley plate with the M8 button-head cap screws. Apply anti seize under the heads of the screws and torque to 18Nm from the center out.

4.e. Connect the oil sender loom.

5. Crank pinning installation (Highly recommended, kit available from Harrop)

5.a. Remove the starter motor and set aside.

5.b. Install GM flywheel tool to prevent the crank from turning while loosening and tightening the balancer bolt.

5.c. Remove fan assembly.

5.d. Using a 24mm socket loosen and remove the balancer bolt.

5.e. Install the drill guide and the M16x120 bolt supplied to the end of the crank.

5.f. Measure 40mm from the shoulder of the supplied 15/64 drill and mark with masking tape.

5.g. Drill into the crank through the hole in the drill guide that has a bush until the tape mark (40mm) reached the guide.

5.h. Loosen the drill guide and rotate it so the second hole lines up with the drilled hole. Use the back of the reamer to align these holes.

5.i. Tighten the bolt and use compressed air to clean the drilled hole.

5.j. Ream the hole using the supplied reamer to full depth (40mm).

5.k. Loosen and remove the drill guide and clean the hole using compressed air.

5.l. Apply Loctite (red) to the supplied crank dowel and tap it into the reamed hole.

5.m. Install the supplied GM crank bolt and torque it to 50 N/m + 140 degrees.

5.n. Remove GM flywheel holding tool.

5.o. Re install starter motor.

6. Manifold gasket installation

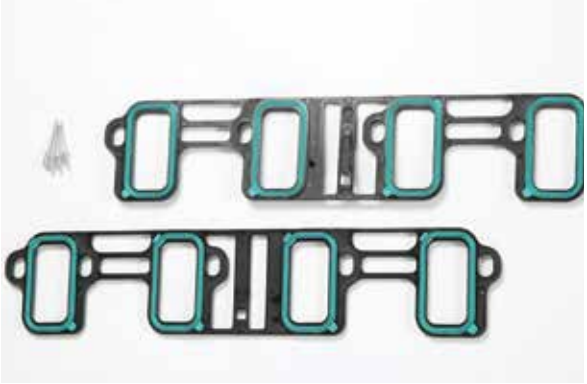
The Harrop FDFI supercharger is now supplied with insulating manifold gaskets that require securing to the manifold before starting the installation. To properly secure the gaskets to the supercharger manifold, follow the procedure below.

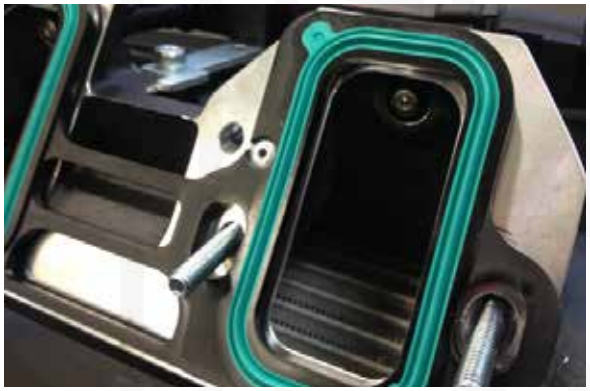
6.a. Check that you have all of the gasket components: 2x plastic gaskets and 4x pop rivets and a pop rivet gun (not supplied).

6.b. Carefully stand the supercharger and manifold assembly on its side and support securely without damaging any of the components. Place 1x gasket onto the manifold-head face and insert 2x pop rivets into the pre-drilled holes as shown.

6.c. Install the pop rivets ensuring that the gasket is pulled flat onto the manifold surface and the head of the pop rivet is recessed below the gasket face. Ensure that the pop rivet pins are collected and discarded so that they cannot accidentally enter the engine or supercharger manifold assembly.

6.d. Repeat step 6.b & 6.c for the other side of the manifold.





7. Test fit the supercharger assembly

7.a. Check that there is clearance to the;

Firewall, wiring loom, brake line etc. coolant bleed crossover pipe at the front, and the plug on the rear of the left cylinder head (Fitted to early model VE). It is sometimes necessary to file the edge off the coolant-bleed plug mounted on the rear of left cylinder head to clear the supercharger manifold casting, a 2mm x 45° chamfer is usually all that is required, and can be checked when placing the manifold.

7.b. Ensure that the supercharger assembly does not rock/pivot. If it does; ensure the manifold is not fouling on any components.

8. Fitting of supercharger assembly to engine

8.a. Transfer the MAP sensor from the standard manifold to the port on the right front of the supercharger manifold (or purchased 2 Bar sensor for MAFless tunes).

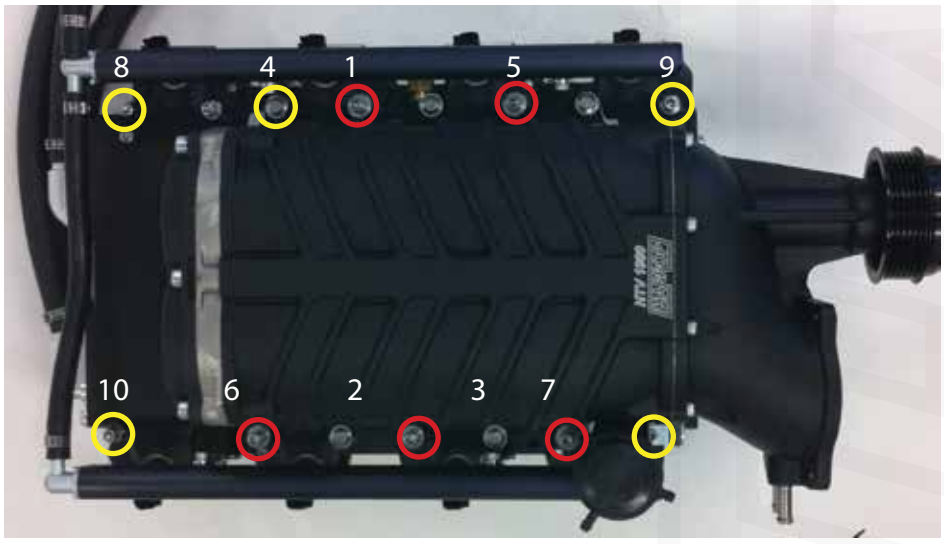
Note: The sensor will be retained by the bracket captured under the head of the right forward-most manifold bolt. If the vehicle is an "early" build that uses a MAP sensor with a Ø10 spigot, it will be necessary to utilize the reduction bush supplied (usually tied to the fuel rail. Insert with a coating of sealer e.g. Loctite 515/518).

8.b. Fit the original fuel injector retaining clips to the supercharger fuel rails, ensuring that they secure the injectors to the fuel-rails.

8.c. Remove the masking tape from the heads and install the supercharger assembly onto the engine. Inspect Supercharger manifold assembly including the ports to ensure there is no foreign objects or debris.

8.d. Install the M6x80mm intake manifold bolts (encircled yellow) and M6x100mm intake manifold bolts (encircled red), torque them in the sequence shown below in 2 stages.

Stage 1 – 6 N/m Stage 2 – 12 N/m



9. Supercharger manifold hose and electrical connections

9.a. Connect the MAP sensor on the RH side of the engine.

9.b. Remove the fuel purge valve off the standard bracket. Fit the valve to the new bracket and mount it onto the coil mounting bracket between 1st and 2nd coil on right hand side of engine.

9.c. Connect the existing loom connector to the valve.

9.d. Connect the front of the fuel purge valve with the hose fitted with the straight white quick connector and the other end to the underside of the supercharger front inlet.

9.e. Using the hose supplied with one 90 degree quick connector and the 45 degree quick connector, connect the 45 degree to the back of the purge valve and the other end to the fuel vent line at the firewall.


9.a


9.b

9.d

9.f. Route the PCV vacuum line (8.0mm x 700mm (cut length to size) with 90 degree quick connect) from the fitting on the rear of the LH valve cover (quick connect end) to the fitting on the underside of the supercharger snout.

EARLY MODELS: Do not support the quick connect fitting, remove 90 degree fitting from hose and push over fitting on the rear of the LH valve cover to the fitting on the underside of the supercharger snout.


9.f


9.f

9.g. Connect the supercharger fuel hose to the hard line on the vehicle located against the firewall.

9.h. Route the brake booster line along the fire wall and down in between the supercharger head unit and the fuel rail and connect into the RH side of the supercharger snout.

Note: It may be easier to connect the hose to the booster fitting, if the booster fitting is removed from the booster first. Some vehicles with bi-modal exhaust will require a "T" piece to be fitted in this hose.

9.i. Plug the injector loom back onto the injectors ensuring that the lock clips snap down.

10. Install the throttle body extension loom

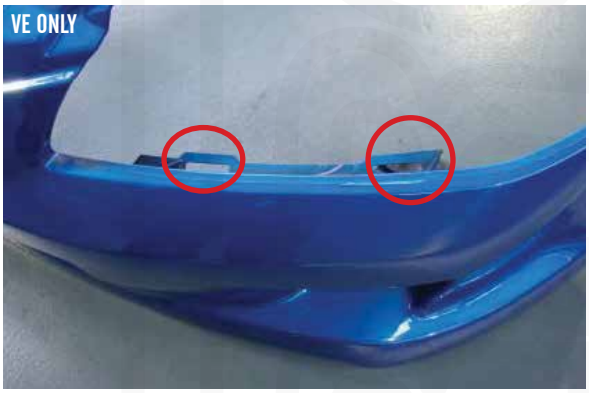
10.a. Plug the supplied throttle loom extension into the vehicle harness (under the snout of the supercharger)

10.b. Use the large cable ties provided to neatly tie looms and hoses under the supercharger snout to ensure that these will not move forward onto the drive pulleys.

Note: Throttle body installed with OTR assembly at later stage.

11. Prepare to mount the intercooler radiator by removing the front fascia

10mm hex screw each side and one push fit clip each side. It is advisable to remove both front wheels to make access easier.



These 10 mm hex head screws only need to be undone about 8 mm. Once they have been undone by this amount you need to push these back up. This action pushes the captive fixing nut back up out of its location just enough to permit the front bumper to drop by this amount. You should now be able to push the front bumper forward enough to release it from the key holes in the front fender.

These slots hidden just under both head lamps are the last remaining tabs that need to be freed for the bar to be removed. Note if the vehicle is fitted with driving lights or distance sensors these also need to be disconnected from the vehicle harness on the RH side of the car once the bar is free from the vehicle.

Remove upper fascia before removing 6x torx heads & 4x hex heads. Remove 4x screws from underside & 3x torx heads from both sides.

Mask up front guard & bar, then carefully unclip & remove bar with the help of an assistant.

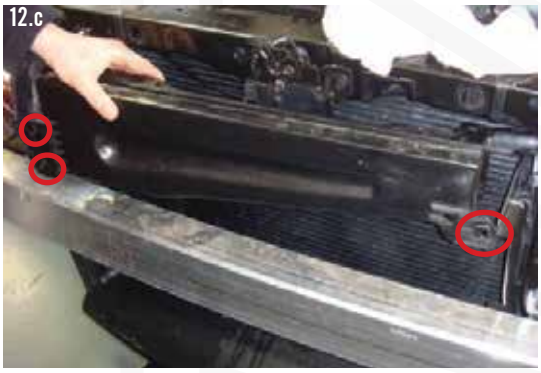
12. Windscreen washer reservoir removal and intercooler fitment

12.a. Remove the neck/cap fastener and extract the filler tube.

12.b. Remove the plastic crash pad. It is not necessary to remove the aluminium crash bar as the reservoir can be slid out from behind.

12.c. Remove the washer reservoir. Take care not to damage the washer pump or wiring loom, however both original (supply & breather) rubber tubes can be fully removed.

There are three screws that hold the washer reservoir fixed to the rear of the aluminium crash beam. Space to remove these is restrictive but if the top radiator mounts are removed as per next step some extra room can be gained by tilting the radiator/condenser and fan assembly towards the engine. Once the washer reservoir has been removed refit the screws to secure the side seals to the aluminium crash beam.



12.d. Remove the upper mounts for the radiator to expose the condenser fasteners and remove these only. This operation is not required for vehicles manufactured after **September 2011(MY12) & VF**.

To remove the upper radiator mounts, lift locking clip up until it stops against its internal catch. Using a small flat head screw driver depress the internal stop tab found on the LH side of the locking clip/plate and lift it out completely.

Using a larger flat screw driver, place it in the slot inside the top mount and lever the ratchet tab away far enough to unlock it and wiggle the mount upwards at the same time to fully release the radiator mounting pin.

12.e. Remove the radiator mounts holding the top of the radiator in two places.

12.f. Remove the 2 M6 bolts holding the upper radiator mounts.

12.g. Push the radiator back to release the upper radiator mounts.

12.h. Remove upper radiator mounts.

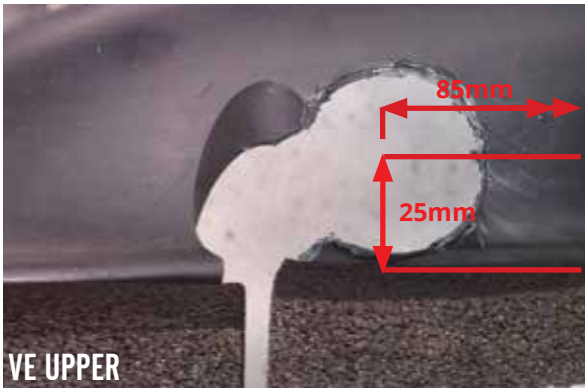
Now remove the fasteners that hold the condenser on to the radiator. **(PRE MY12 ONLY)**

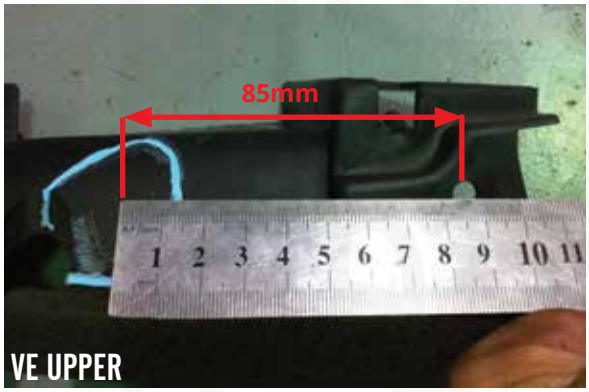
12.i. Mark the hood latch location for easy reassembly, then remove the hood latch.

12.j. Remove air duct to cut hole for lower outlet hose and upper inlet.

VE RH upper air seal, cut hole approximately 30mm in diameter and trim out to existing notch.

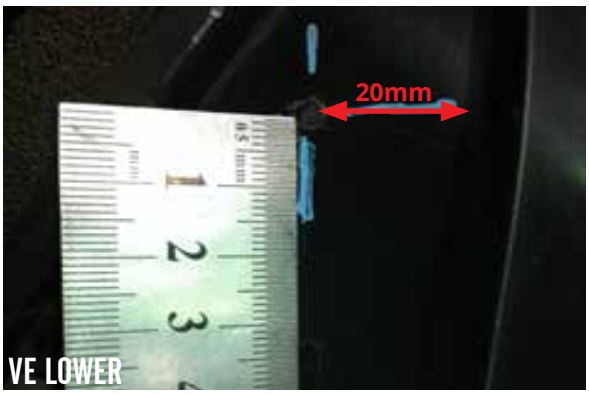
VF Upper uses existing washer reservoir hole.

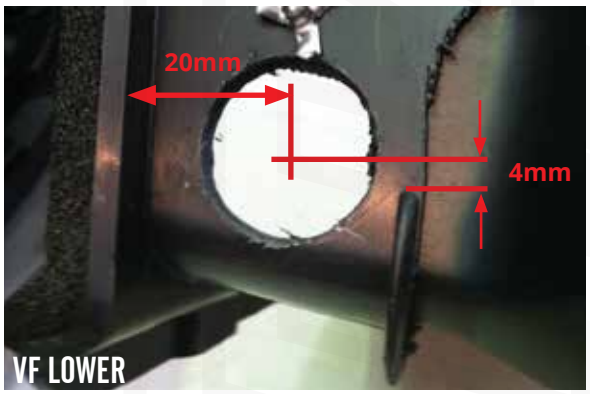




VE RH lower air duct, mark as image below and drill a 5mm hole, check alignment, adjust position if required and drill diameter 30mm hole through.

VF Models: The position for the lower hole in the air seal on the right hand side is approximately 20mm but may vary from SS to R8 variants, along with vehicle position.





12.k. **VE** PRE MY12 ONLY: Separate the condenser from the radiator by lifting the condenser upward to enable the lower intercooler heat exchanger holes to slip between the condenser locating pins and the engine radiator.

VE MY12 VEHICLES: Fit this intercooler adaptor kit to the intercooler bottom mounts & screw it to the lower condenser mounts.

12.l. Reattach & fasten the condenser to the engine radiator.

12.m. Fasten the heat exchanger upper mount by sandwiching between the front chassis structure and the hood latch.

VE MY12 & **VF** ONWARDS ONLY: Remove the lower condenser to radiator screws. Fit the front intercooler radiator to the bottom of the condenser mounts and then refit the bonnet catch.

13. Install the pump, the plumbing for the intercooler heat exchanger & the windscreen washer reservoir

13.a. Remove the washer motor and rubber grommet from the standard reservoir

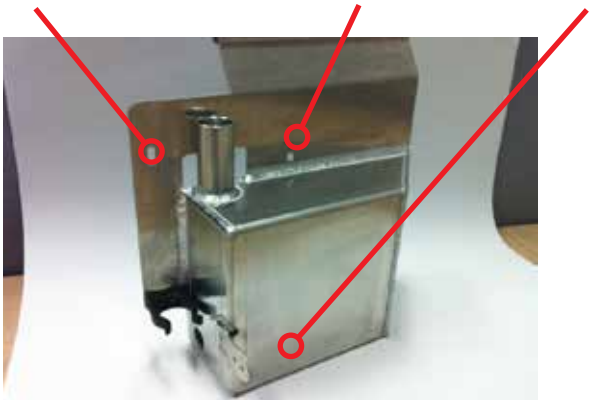
13.b. Install the rubber grommet in the supplied reservoir.

13.c. Shorten the washer filler tube by cutting it with a hacksaw as per the image below.

On sports wagon and selected LWB models you will be required to drill a second hole on the side face for the rear washer.

An extra loom extension, plastic clip and hardware is sold separately.

First mounting hole Secondary mounting hole Sports wagon washer mounting



13.d. Install the windscreen washer reservoir / intercooler pump assembly by latching the reservoir over the LH chassis rail and securing it with the 2,14 gauge self-taping screws supplied. The reservoir is best fed in from the bottom up. Once fitted install the washer pump into the rubber grommet and clip it back into the plastic clip.

13.e. Install the windscreen washer filler back into the vehicle and route the flexible hose into the top of the newly installed reservoir.

13.f. Using the washer pump extension loom provided, plug one end into the existing loom and the other on the pump, routing the loom across the top of the condenser with existing looms in the vehicle. Using cable ties provided clip the pump and washer loom and washer tube to existing vehicle harness across the front of the vehicle. The removal of head lamp may make this an easier task.

13.g. Using the washer extension hose provided, connect into the washer hose line at the front right hand corner of the vehicle where the original hose runs as per image below. Run the hose along the top of the condenser as per pump loom (existing join in washer hose).

13.h. Select the moulded 19mm hose with the short 90 degree end. Push on the straight section of the moulded hose to the outlet of the pump rotated so that the 90 degree end points in the same direction as the pump inlet. Slip on the worm drive clamp but do not tighten it as some rotational adjustment of the hose may be required.

13.i. Using the existing fuel purge mounting bracket screw mount the intercooler reservoir (ensure that the engine earths also mounted a little lower so the head does not prevent correct fitment).

13.j. Mount the pump to the bracket supplied with the two hose clamps but do not tighten them yet. Loosen the bolt located behind the front bumper cover accessories loom connector on the right front section of the rail just enough to slide the bracket in behind the plastics. In doing this ensures that the outlet hose is fed between the inner part of the rail and radiator up towards the engine just behind the belt tensioner.

13.k. Connect the 90 degree end of the pump outlet hose to the "Y" piece of the supercharger intercoolers using the Cobra clamp. Once this has been connected check and if need be adjust the pump rotation to ensure hose lines sit neatly between the rail and radiator.

13.l. Now tighten the worm clamp on the pump outlet, the 2 worm clamps holding the pump to the bracket and the pump mounting bracket bolt. Fit the 19mm diameter hose by 150mm long to the bottom intercooler connection and pump inlet with the 2 worm drive clamps supplied.

13.m. Using Cobra clamps connect the two 16mm diameter intercooler hoses from supercharger to the reservoir.

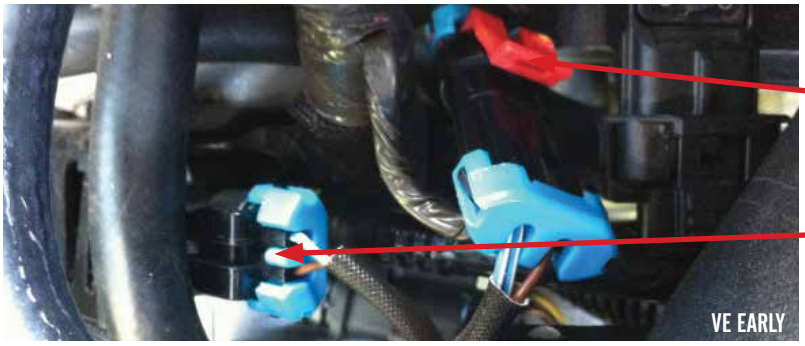
13.n. Fit the straight end of the 19mm diameter moulded hose with the longer 90 degree end to the bottom of the reservoir and the other end to the top of the front intercooler radiator.

13.o. **VE VEHICLES ONLY**: PUMP LOOM INSTALLATION

Start by disconnecting the battery for safety. Connect the positive wire to the positive feed on the fuse box. Run the pump loom down the right hand front side between the radiator overflow and the wheel liner.

Negative wire behind this bracket (Black). First place the star washer then the negative wire and then the nut.

Relay to be mounted to this bracket where available.



VE EARLY: One end connects to the existing vehicle harness (red lock tab) that used to be connected to the fuel purge solenoid valve.

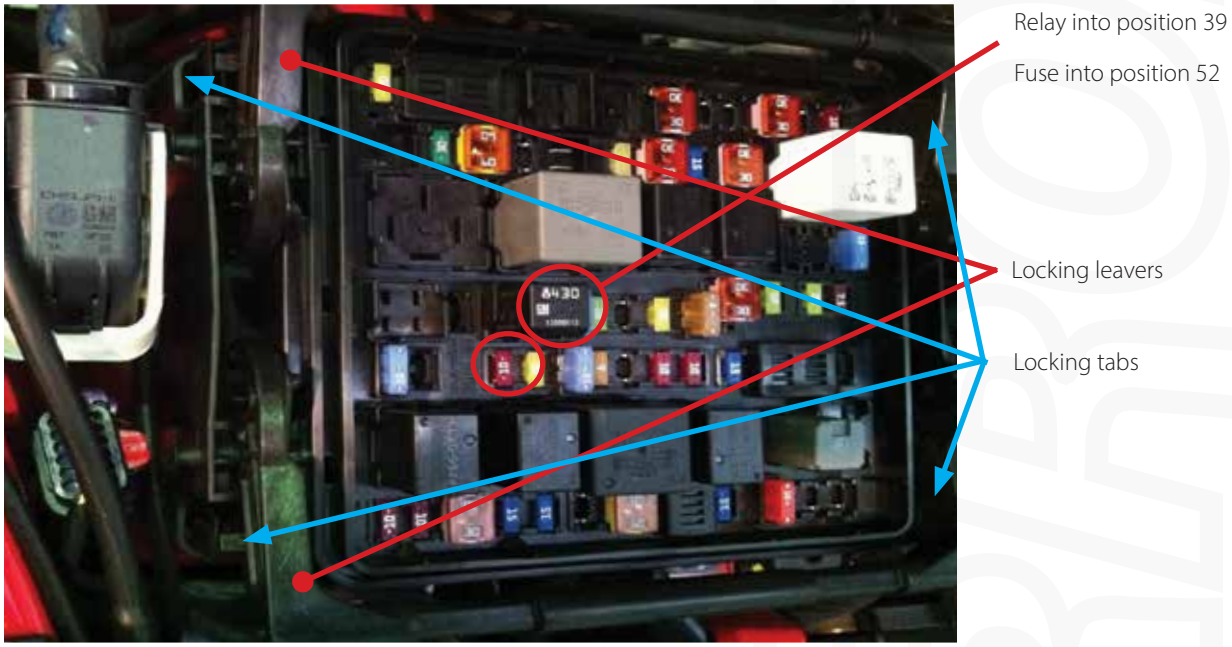
One end into the fuel purge solenoid valve.

VE LATE: Fit the black earth wire under the head of the bolt on the engine earth fitted under the ABS module.

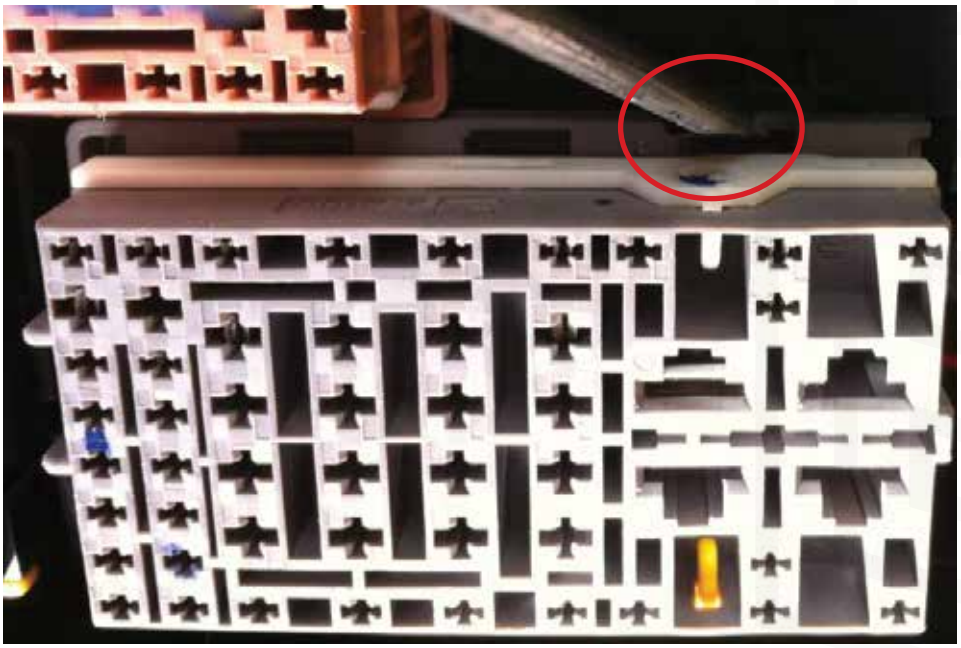
Connect the fuse into the F37-10A, (HVACIGN).

14. VF VEHICLES ONLY: PUMP LOOM INSTALATION

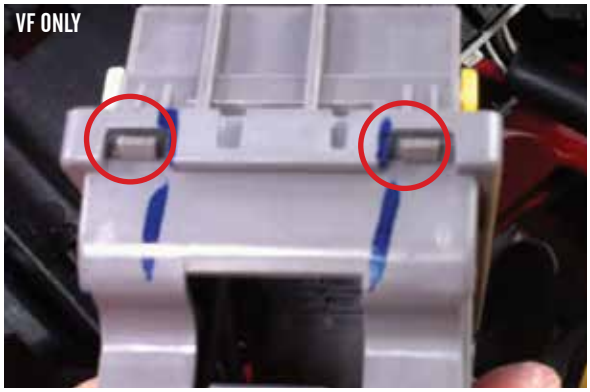
14.a. Start by disconnecting the battery for safety. Remove the fuse cover and insert the relay and fuse supplied in position shown, now remove the top half of the fuse panel. The fuse panel has 4 tabs on the sides that lock the levers in their locked position, remember to depress these before attempting to move the locking levers.

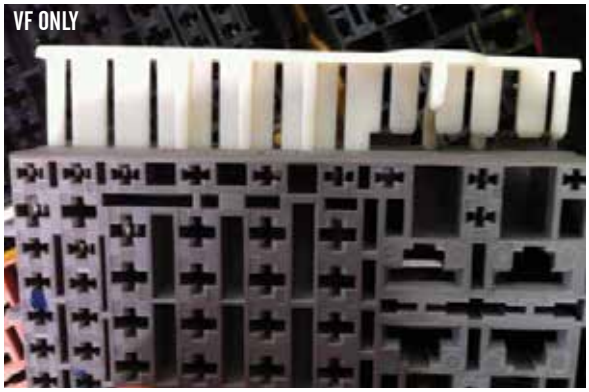


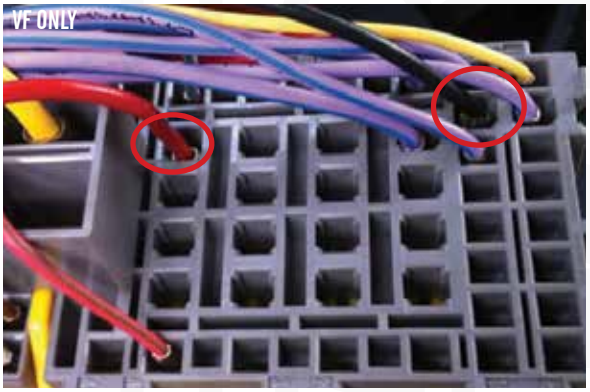
14.b. With the top half of the fuse panel lifted off, now remove the fuse panel loom connector. The one to remove is the front right connector. There are locking tabs on each side, apply a slight upward force to the rear of the connector and lever the tabs away to release each side singularly as per image below.



14.c. Once the loom connector has been released from the base, disassemble the connector. This is done by firstly removing the lower cover, there are locking tabs at the rear of the plug preventing it from sliding off. Now remove the left hand connector pin retainer by pushing the inner tab down and outward. Now insert the red and black loom connector pins into the rear positions as shown below.







14.d. Once the red wire connector has been inserted into the loom connector check to ensure that it has locked into position, once this is confirmed reassemble the whole fuse panel.

14.e. Connect the black wire to earth lug mounting point at the front of the fuse panel.

14.f. Feed the wire down the right hand front side between the radiator overflow, wheel liner and upper panel.

15. VE Radiator Brackets

15.a. Remove the two lower sections of the mounts and the 2 M6 bolts. Note: Retain the bolts to use with the OTR specific radiator brackets.

Use needle nose pliers to compress clips on the loom & push them through the lower section of radiator mount. There are 2 clips per mount.

15.b. Remove the fastener that holds the condenser on to the radiator on the RH & LH side of the car.

15.c. Push the radiator back towards the engine and install the RH VE OTR mount as shown below.

15.d. The OTR radiator bracket locates on the same mounting face as the standard radiator mount, fixing the radiator at condenser mount.

15.e. Use the existing screws from the standard radiator mount and the condenser to secure the new radiator bracket in place.

15.f. Remove the current screws securing the condenser to the radiator on the LH side and repeat the process to install the LH VE OTR mount.

One of the 2 plastic clips on the loom can now be pushed into the remaining hole on the radiator bracket to hold the loom in place.

16. VE MY12 & VF Radiator Brackets

16.a. Remove the two lower sections of the mounts.

Remove the 2 M6 bolts.

Use needle nose pliers to compress clips on the loom & push them through the lower section of radiator mount. There are 2 clips per mount.

Note: Retain the bolts to use with the OTR specific radiator bracket

16.b. Remove the torx screw securing the washer filler bracket to the front panel.

16.c. Remove the fan mounting screw from the rear LH of the radiator.

16.d. Position the LH radiator bracket as shown. Fit the screw back through the radiator bracket to secure the radiator bracket and fan.

The front of the bracket will slide in between the washer filler bracket and the radiator support panel. Insert the torx screw and tighten.

16.e. Place the RH OTR bracket onto the mounting face for the standard radiator mount, place the RH radiator bracket over the OTR bracket as shown below. Push the radiator bracket down on top of the radiator to hold it in place. Fasten using the standard M6 bolt.

16.f. Fit the LH OTR bracket onto the mounting face for the standard radiator mounts.

16.g. Place the centre OTR bracket onto the back of the bonnet latch M8 bolts.

16.h. Fasten using the two nylock M8 nuts supplied in the bracket kit.

(M8 bolts and washers supplied if required.)

17. Install the drive belt

Early Models (water pump outlet on drivers side):

17.a. Remove standard drive belt, power steering reservoir from bracket, standard bracket.

17.b. Fit new supplied power steering bracket, the power steering feed line (larger one) will need to be shortened by about 25mm as the reservoir is mounted further towards the left and the hose may kink if retained at standard length, refit power steering reservoir and install supplied supercharger idler bracket to LH side of pump as shown. Torque setting for 3 bolts is 18-20 N/m

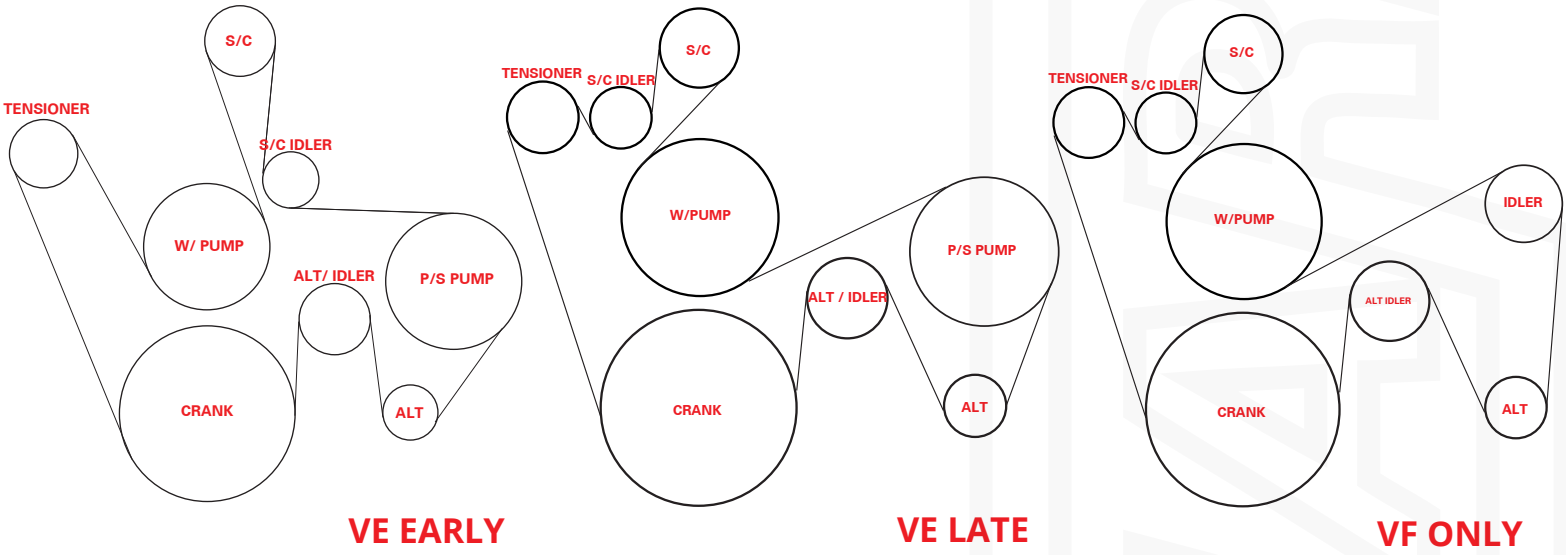
17.c. Install the supplied 6PK belt, routing as shown.

Late Models (water pump outlet on passenger side):

17.a. Remove the standard 6PK FEAD belt completely.

17.b. Install the supplied supercharger idler bracket as shown.

17.c. Install the supplied 6PK FEAD belt, routing as shown below



18. Assembly and Installation of the MAFless OTR

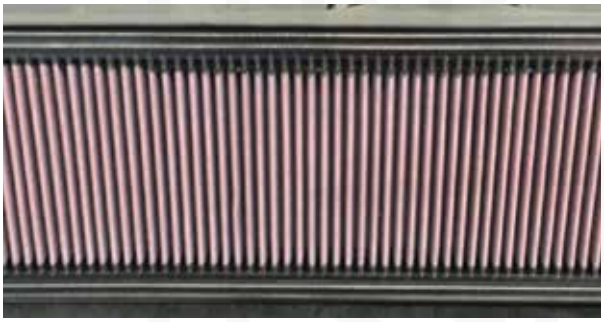
18.a. Cut away 490mm of rubber seal from the inside of the bonnet as shown.

18.b. Place boot over rear half of the OTR. Fasten with hose clamp #80 (117-140mm hose clamp).

18.c. Insert the duckbill drain and 2 grommets into the bottom front half of the OTR.

- VE Pre MY12 uses grommets with internal diameter 13mm.
- VF & VE MY12 uses grommets with internal diameter 20mm.

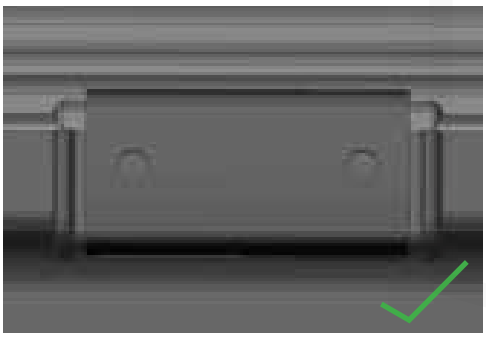
18.d. Place the filter into the rear of the OTR. **Note: The side of the filter with 3 steps should be placed into the back of the OTR.**



18.e. Place the front of the OTR over the rear of the OTR.

Secure the two halves of the OTR together with the 8 spring clips, ensure they are centred in the clip pockets.

(3 clips on the top, 3 on the bottom and 1 either side.)



18.f. Insert the 2 quick connect fittings into the hose provided. Overall length 590mm

(Use a silicon spray and or a heat gun to aid inserting the fittings into the hose.)

18.g. Connect supplied PVC hose to RH RC inlet and route in front of manifold as shown (cable tie as necessary).

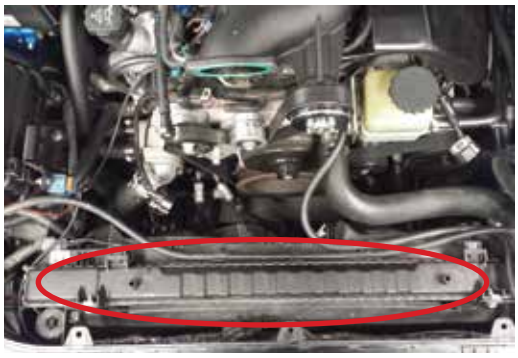
EARLY VEHICLES: Do not support the quick connect fitting, remove straight fitting and push hose over fitting at front of RH valve cover.

18.h. Remove throttle body yellow safety sticker and insert original throttle body seal into the groove on the supercharger snout.

18.i. Install the throttle body into the rubber boot at the back of the OTR. This option makes it easier to install, alternatively fit throttle body on supercharger and fit OTR with connection boot assembled to OTR. Fit a 91-114mm hose clamp to back of OTR/boot but do not tighten.

18.j. Fit the OTR. Slide the OTR into the space between the radiator and the front bar.

Note: Hold the looms back as you insert the OTR to avoid catching the OTR on the looms.



18.k. Align the grommet holes with the bosses on the radiator and gently push the OTR down until it is firmly seated on top of the radiator.

18.l. Screw the throttle body onto the supercharger using original bolts.

Note: Ensure throttle body O-ring is placed between throttle body and supercharger.

Connect the wiring harness to the throttle body. Tighten hose clamp on the back of the OTR/boot.

18.m. Connect the other end of the breather hose to the fitting in the back half of the OTR.

18.n. Push the 3 scrivets through the top half of the OTR into the previously fitted brackets or standard mounts to hold the OTR in position.

18.o. Fit & connect the MAF/ IAT loom (IAT sensor is located on LH side of supercharger manifold).

18.p. Check OTR is secure, all hose clamps are tight, hoses are free from moving parts and all looms are connected.

MAFless OTR install complete.

20. Fill the intercooler system and thoroughly purge the circuit of air

20.a. **Coolant to be used is GM6277M, mixed with distilled or deionised water in a 50% concentrate.**

Note: Filling with a noncompliant coolant will void warranty.

20.b. Do not run the intercooler pump dry, as it will fail and void its warranty.

20.c. It is imperative that the intercooler pump is primed and the radiator is free from air pockets.

20.d. As the system fills, release the air from the radiator via the bleed nipple at the radiator top.

20.e. Reconnect battery.

20.f. Without starting the engine, switch the ignition on and check for fuel and intercooler coolant leaks.

20.g. As the fuel pump will only operate for a few seconds without the engine running, it may be necessary to repeat the process.

20.h. Switch ignition on to run the intercooler pump for several minutes, ensuring there are no leaks & that air is purging from the system via the coolant reservoir.

20.i. A strong flow from the two inlet pipes into the coolant reservoir should be visible.

20.j. The coolant level should be full to the start point of the neck on the cap. The level will need to be monitored & replenished during the first few weeks of operation as some air will continue to purge from the system.

20.k. Install the supplied heater replacement hoses and top up radiator with owner manual specified coolant.

21. Refit the front bar and ancillary components after checking that there are no leaks. Ensure that the bonnet gaps line up correctly as the catch may not be in exactly the same spot, adjust if necessary. Fill the wind screen washer bottle with suitable fluid.

22. Check that the drive belt fitted is free from debris, oil and coolant reside. Clean if necessary.

23. Check all electrical, fuel, vacuum, duct, coolant and intercooler connections, for connectivity, fouling and leaks.

24. Load a tune into the vehicle's Power Control Module (PCM).

24.a. We strongly recommend tuning the vehicle on a dynamometer to ensure optimum performance and durability. The engine will probably operate at no-boost levels with the factory tune. Do not attempt to rev the engine into boost mode with the standard tune, as the PCM may enter "limp" mode.

25. Re-install any ancillary components that were removed during the supercharger installation.

26. When satisfied that there is no fuel or coolant leaks, start the engine and re-check for leaks, alignment or interference with moving parts, take specific care to check.

26.a. The fuel lines and injector rails for leaks.

26.b. The vacuum lines, including the brake booster line.

26.c. The drive belt alignment.

26.d. The intercooler coolant level.

26.e. After the engine has been at operating temperature, let it cool and re-check as above.

26.f. Repeat the above process until the system is secure, aligned and leak-free.