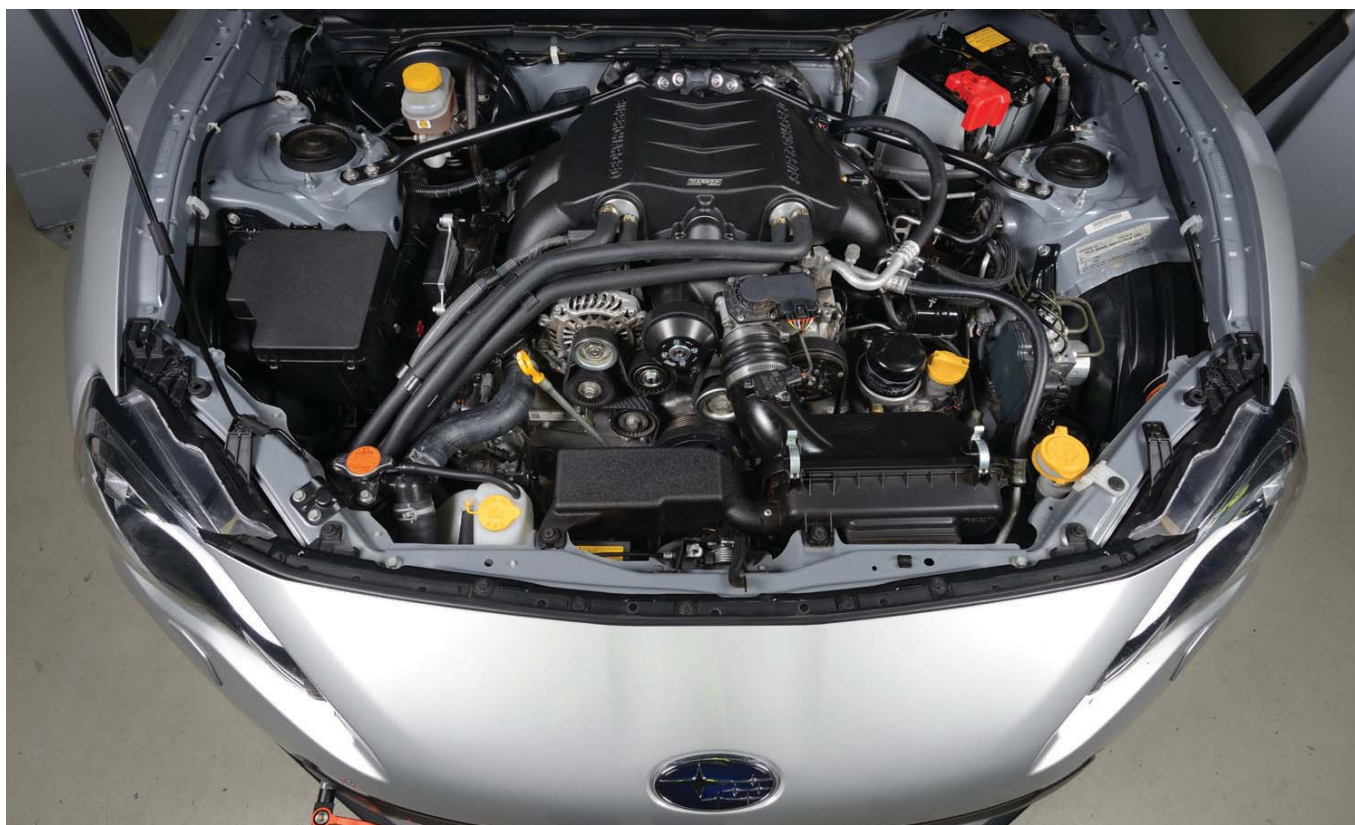




Installation Guide
Toyota 86/ Subaru BRZ
TVS1320 Supercharger Kit



TVS1320 INSTALLATION GUIDE

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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

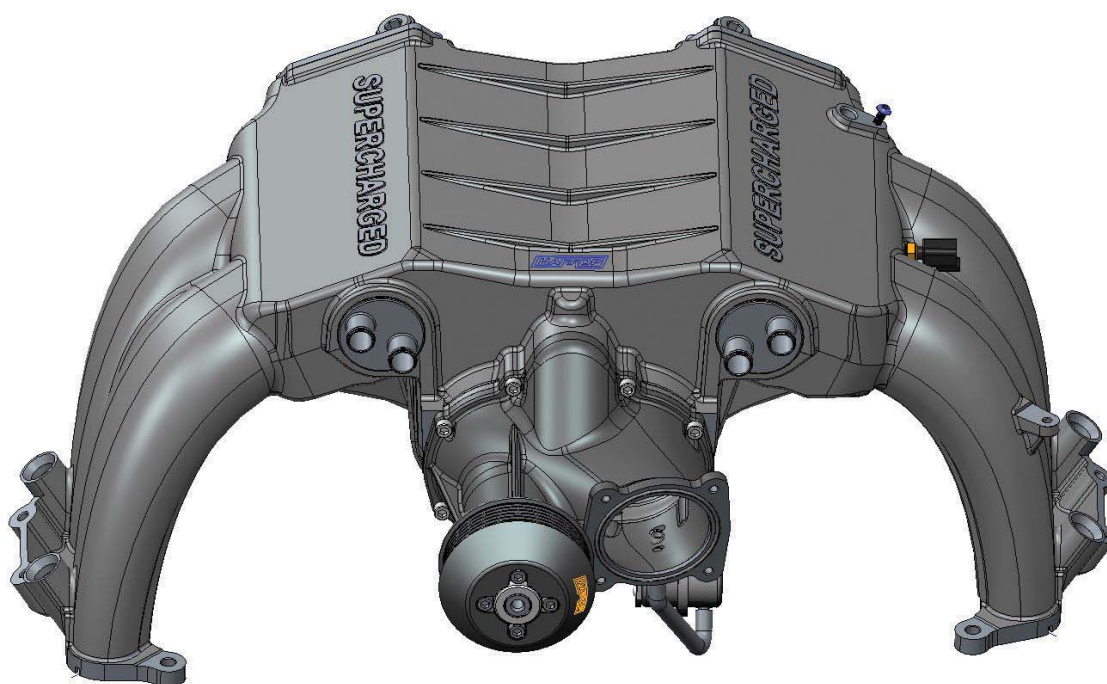


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ATTENTION: READ BEFORE PROCEEDING



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.

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QUICK START GUIDE FOR EXPERIENCED AUTOMOTIVE TECHNICIANS



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.

If you have purchased a complete kit (including ECUTEK cable, license and calibration) follow the steps below before starting the installation. This will ensure you receive the correct ROM file for your vehicle.

- i. Go to the ECUTEK website. www.ecutek.com/support/downloads
- ii. Go to the ECUTEK App downloader tab and follow the instructions for installing the drivers for the license key and vehicle interface and also the software specific for your license key
- iii. Once installed refer to the ProECU Programming guide located in ProECU help files
- iv. Follow the process to the step "Query ECU" on page 5 of the programming manual
- v. Once the ECU has been queried send the ECU Version to sales@harrop.com.au
- vi. You will then receive the correct versioned ROM for your supercharger installation

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

1. Ensure the vehicle is prepared with premium (98 RON) unleaded fuel

- 1.a. Disconnect the negative terminal of the battery.
- 1.b. Avoid standing the supercharger on its end, as the oil in the gear housing may migrate from the intended area.

2. Remove ancillaries (intake tube, air box, filter, covers, strut braces and belt)

- 2.a. Remove Inlet tube.
- 2.b. Remove Air box.
- 2.c. Remove MAF sensor from air box.
- 2.d. Remove covers from alternator and A/C compressor.
- 2.e. Use 14mm socket on tensioner and remove belt.
- 2.f. Remove strut braces.

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3. Sound tube removal

3.a. Remove sound tube assembly as shown below.

3.b. Install supplied blanking grommet to the hole left in the firewall. Drivers side (RHD) passenger side (LHD) inner foot well.



4. Remove intake manifold

4.a. Remove cover from the top of the manifold.

4.b. Disconnect the vacuum hoses from the rear of the intake manifold.

4.c. Disconnect wiring (MAP sensor, Throttle body).

4.d. Remove fuel rail covers and unbolt the ECU from the RH cover (this will sit beside the engine while you work).

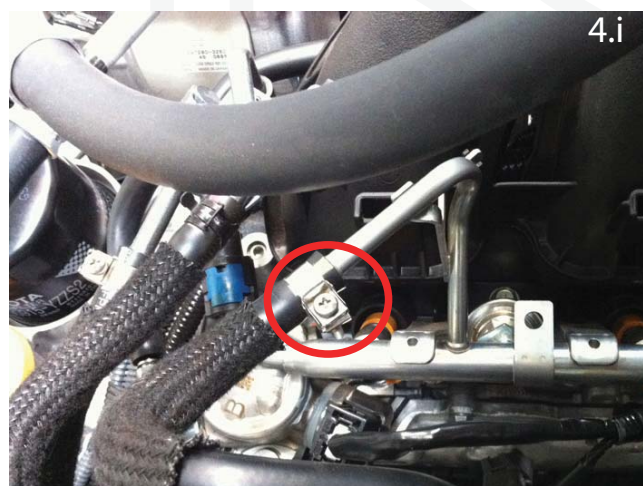
4.e. Remove port injector harnesses x 4 and unclip harness from fuel rail assembly.

4.f. Remove wiring harness from rear of intake manifold (EVAP solenoid).

4.g. Remove throttle body heater hoses (**Caution - do not remove when vehicle is hot, requires clamping while working**).

4.h. Remove the throttle body from inlet manifold.

4.i. Disconnect the fuel line (**Caution – use eye protection when disconnecting fuel system lines as they will contain fuel and may have some residual fuel pressure. Do not disconnect the fuel supply line immediately after running the vehicle or when the vehicle is hot**).



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4.j. Disconnect the fuel crossover pipe from both fuel rails.



4.k. Remove the fuel rail support bolt from the LH fuel rail.

4.l. Remove the EVAP purge hose from the fuel rail fitting.



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4.m. Remove 6 intake manifold bolts and remove intake manifold (picture of manifold from the underneath side shown for clarity of bolt locations). Note engine harnesses on RH rear and LH front need to be pushed aside to access bolt heads.

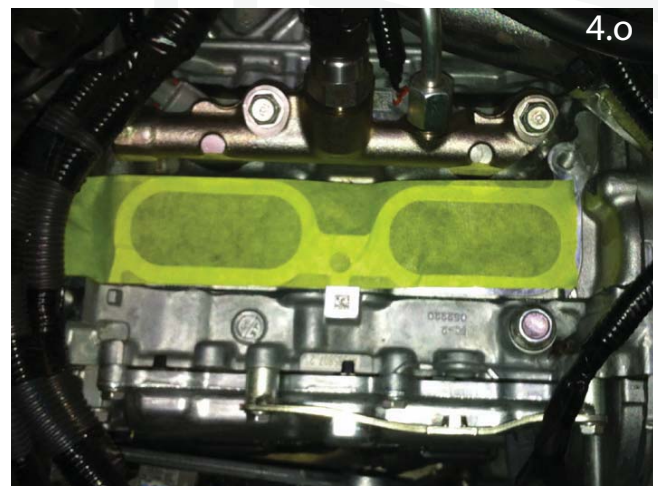


4.n. Unclip loom from LH rear lug on manifold.

4.o. Cover intake ports with tape while working on and around the engine bay.

4.p. Remove EVAP solenoid from underside of intake manifold.

4.q. Remove the MAP sensor from the manifold.



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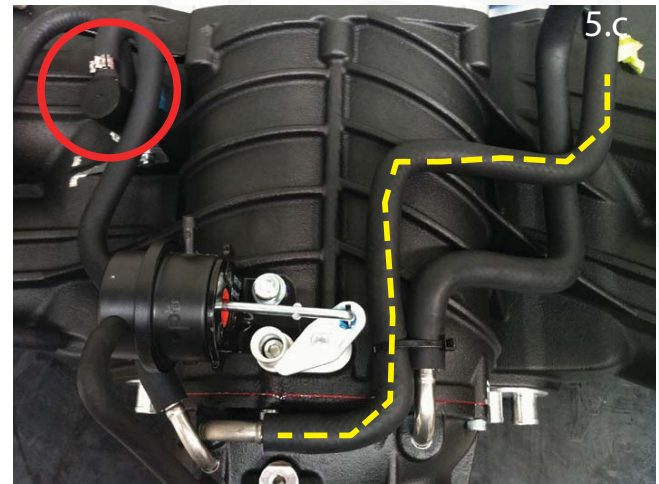
5. Supercharger Pre-installation

5.a. Install Throttle body heater blanking plugs.



5.b. Remove brake booster hard line if applicable (RHD). Note: If vehicle is auto and is fitted with a vacuum pump, skip this step.

5.c. Install EVAP solenoid to supercharger manifold using the original nut and connect lines as shown (use 14mm Cobra clamp).



Note: For vehicles fitted with a separate vacuum pump for the brake booster, fit the supplied cap and cobra clamp as shown and disregard hose marked in image 5.c.



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5.d. Install PCV breather line (under A/C compressor).



5.e. Move the grey loom and zip tie as shown. (remove connector from metal bracket to slip loom behind it).



5.f. Install supplied throttle, MAP, MAF loom and route as shown (connect the supplied loom to the standard connectors and zip tie IAT loom to breather hose behind A/C compressor, throttle).

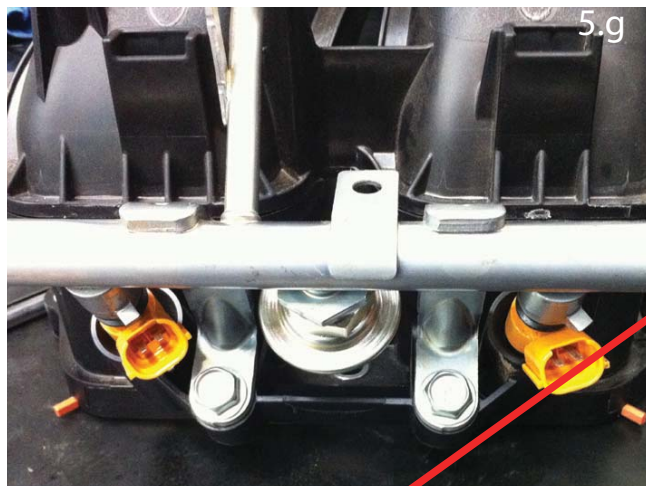


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5.g. Remove the fuel rail bolts x 4, fuel rails, fuel injectors and seals (be sure the injector seals are removed from the standard manifold as they sometime stick in the manifold when removing the injector, its easiest if these seals are removed from the injectors and installed into the SC manifold for assembly) from the standard manifold and reinstall on the supercharger manifold (fuel rail bolt torque 19N.m) Note injector keying, blue circles.



5.h. Install the MAP sensor into the supercharger manifold & secure using M5 screw provided.
5.i. Remove standard manifold rubber gaskets from standard manifold and install into supercharger manifold (ensure manifold faces are clean and avoid sliding the supercharger assembly on the seals after installation as this will damage the seals).



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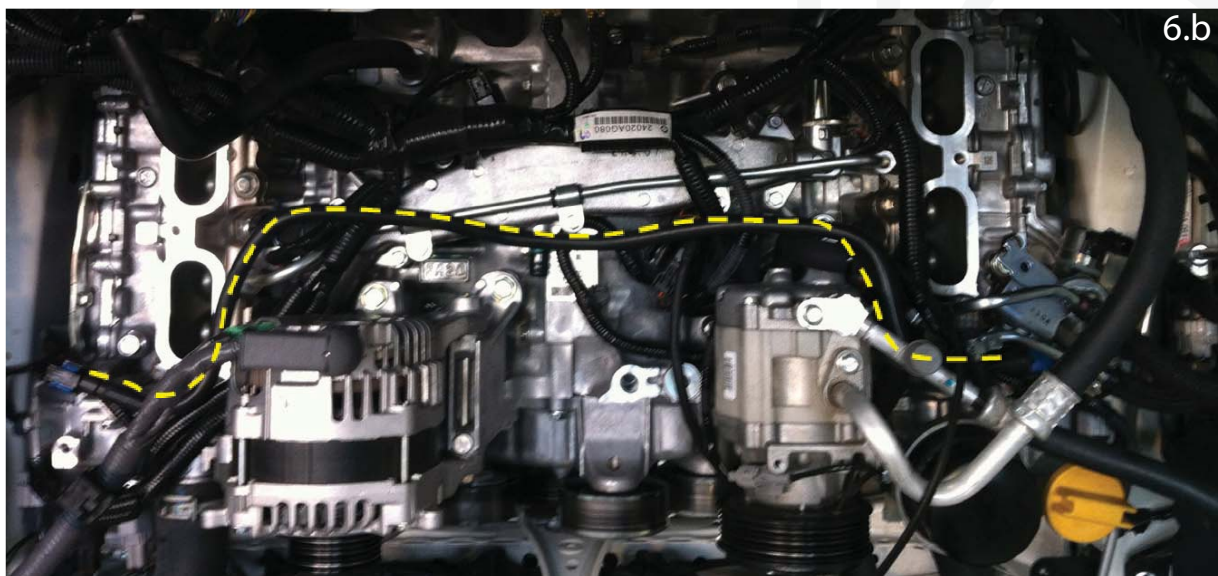


6. Supercharger installation

6.a. Ensure that the engine looms and hoses are clear from the intake ports / manifold face and the front center section of the engine. (Note: ensure main cross over loom is sitting flat as height between SC and loom is limited).

6.b. Install the fuel crossover pipe as shown.

6.c. Remove tape from the inlet engine ports. Inspect Supercharger manifold assembly including the ports to ensure there is no foreign objects or debris.



6.d. Using 2 people lower the supercharger manifold onto the engine. Avoid sliding the manifold across the heads as this may damage the manifold seals.

6.e. Once the manifold is in place it should sit flat on the heads with no rocking and there should be a small amount of movement front to back and side to side. Ensure that all wiring and hoses are clear and SC isn't sitting on the vacuum by-pass actuator.

6.f. Install the standard manifold bolts to the center bolt hole and then install the front and rear bolts.

6.g. Torque the manifold bolts to 10Nm in the sequence shown and then 25Nm in the sequence shown below.



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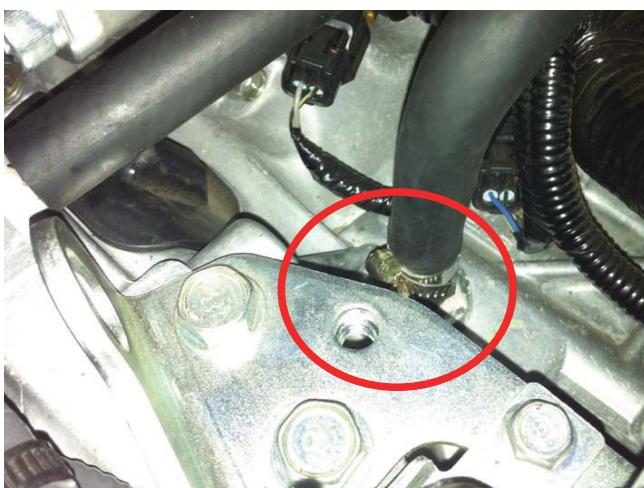


- 6.h. Connect the fuel crossover pipe to the fuel rail fittings on both fuel rails (ensure the fittings are straight when being connected as to not damage the internal O-rings in the fittings).
- 6.i. Connect the fuel supply line, fuel purge line from the EVAP solenoid and reinstall the fuel rail support bolt.



Connect the PCV vacuum line to the port on the engine block as shown (under the rear RH of the supercharger). Use the worm drive clamp supplied and secure (access to clamp is in east west plane and tightened by using a long screw driver or a ¼ drive socket with long extension from right side of vehicle).

- 6.j. Connect the brake booster line to the vacuum line attached to the supercharger manifold (under the rear of the supercharger, reuse existing clamp for booster side of hose, no clamp required on supercharger side).



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- 6.k. Connect the fuel injector plugs.
- 6.l. Connect EVAP solenoid.



- 6.m. Connect the MAP and IAT connectors to the sensors, run and clip loom as per image below.



- 6.n. Re install the fuel rail covers and the ECU on the RH cover.
- 6.o. Re install strut braces.

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7. Rear A/C line clearance

7.a. The rear A/C line will most likely be touching the manifold.

7.b. Using the supplied bending tools the lower aluminum section of the line near the firewall can be bent to the correct angle for clearance to both the manifold and strut brace.

7.c. Position the tool on the line as shown (ensure the tool does not contact the A/C fitting). Using a G clamp or similar, clamp the tool bending the line to the correct angle.



8. Throttle body installation

8.a. Remove 2 heater fittings from the throttle body.

8.b. Check that the SC manifold has an 'O' ring installed for the standard throttle body.



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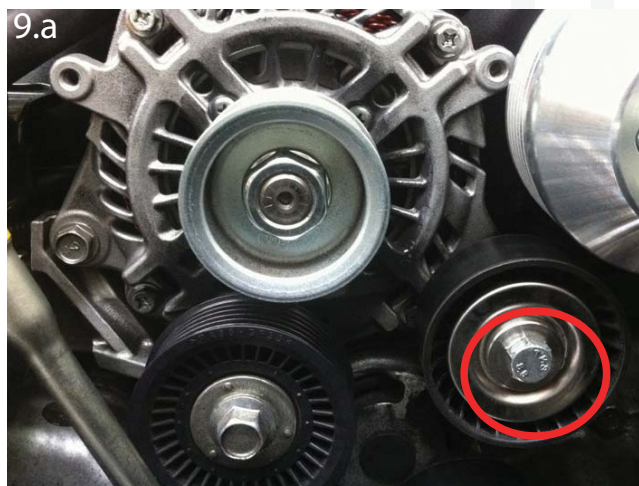


8.c. Install the throttle body to the supercharger manifold as shown using the standard bolts torque to 10Nm.



9. Idler and belt installation

9.a. Remove the bolt from the alternator as per image below and install the spacer, idler pulley, washer and new bolt as shown (torque to 25Nm).

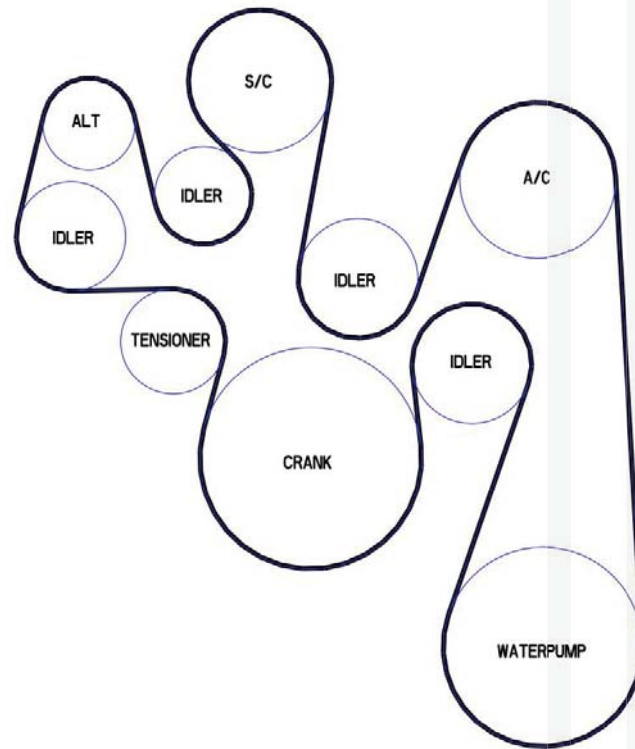


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9.b. Using a 14mm socket and bar on the belt tensioner install the supplied belt in the route as shown.



10. Air box installation

10.a. Install the filter into the standard front half air box.

10.b. Install the supplied clean air side air box and clip into position.

10.c. Install MAF sensor to the inlet tube as shown.

10.d. Install the rubber boot.

10.e. Install hose clamps as shown (it is easiest to fully unwind the hose clamps and install them after installing the boot).



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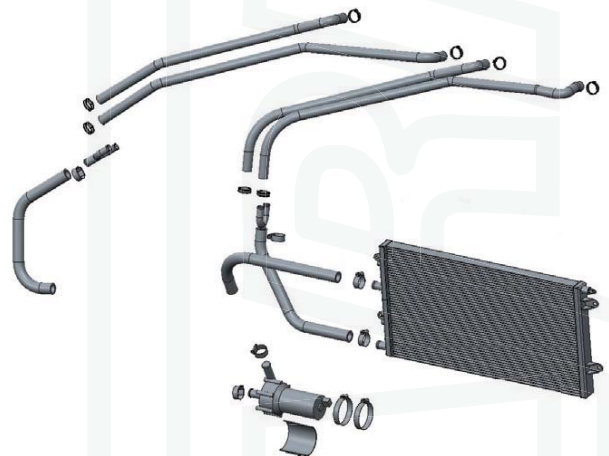
10.f. Connect the PCV breather line to the air box fitting as shown.

10.g. Connect the Throttle and MAF loom and zip tie and secure the throttle / MAF loom.



11. Intercooler system installation

11.a. Working from the engine bay connect 4 intercooler lines (2 sets, each hose is a different moulding) to the manifold using the 25mm cobra clamps and route the lines from the manifold down to the cavity behind the RH headlight. Install the 2 hose separator's in the positions shown below (separator closest to the fuse box has a clip over the alternator loom).



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11.b. Working from under the vehicle remove the 2 plastic under trays.

11.c. Remove the RH plastic side cover and cut a hole using the dimensions below to allow for the intercooler hose to run through it and re install.



11.d. Remove the 4 mounting bolts for the A/C condenser.

11.e. Install the intercooler heat exchanger as show and re install the 4 mounting bolts.



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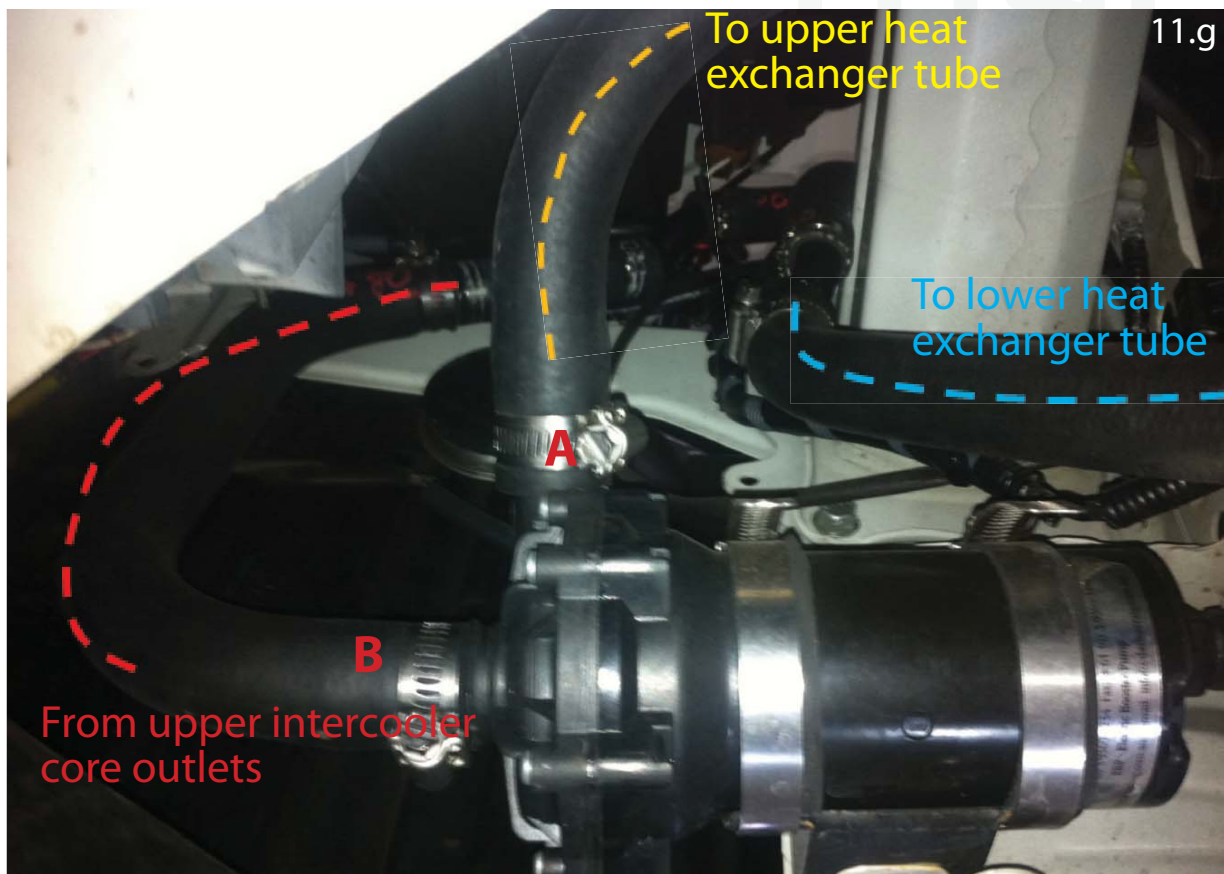
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11.f. Install the pump assembly as shown using the M8 bolt / washer.



11.g. Connect the pump outlet A from the pump to the top fitting in the heat exchanger, connect the line from the engine bay (closest to the rail) to the lower fitting on heat exchanger, connect the remaining line from the engine bay to the pump inlet B using the #12 hose clamps. (For correct hose selection refer to CAD image at the beginning of the intercooler installation section on page 20).



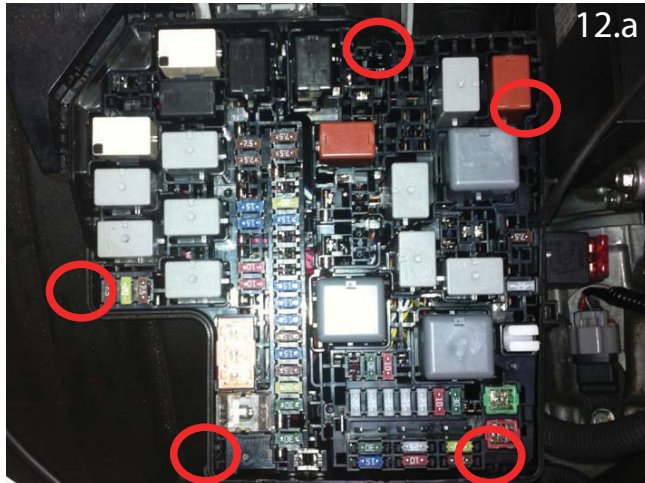
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12. Intercooler pump wiring

12.a. Remove the cover from the fuse box, un-clip and remove the side cover, un-clip the upper panel with the tabs and slide the upper panel up far enough to get to the M6 bolt on the front of the panel as shown (some assemblies require a little force to lift panel up).



12.b. Feed the red positive wire (intercooler pump loom) up from LH opening where the side cover has been removed and install to the positive terminal shown in previous image and reinstall upper panel. Route the piggyback control wire inside the fuse box and out the inside of the side panel opening.

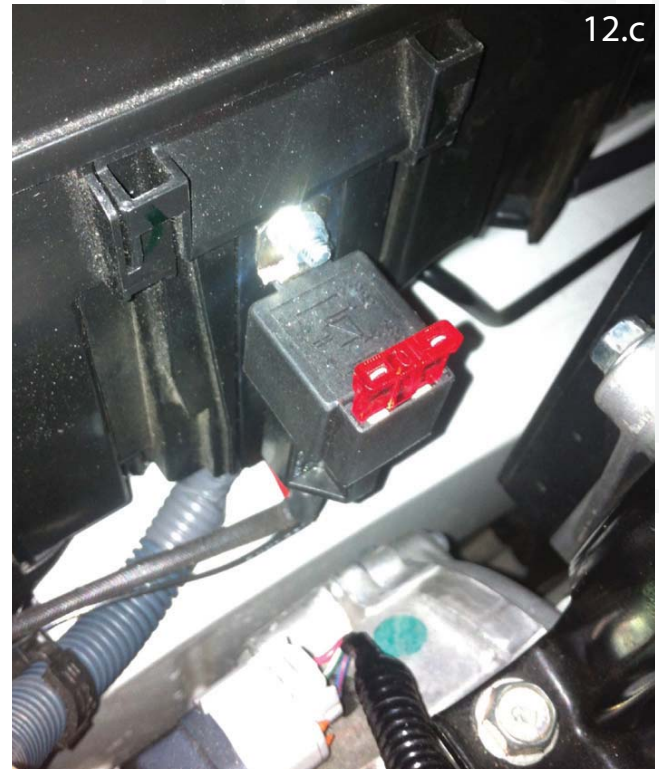


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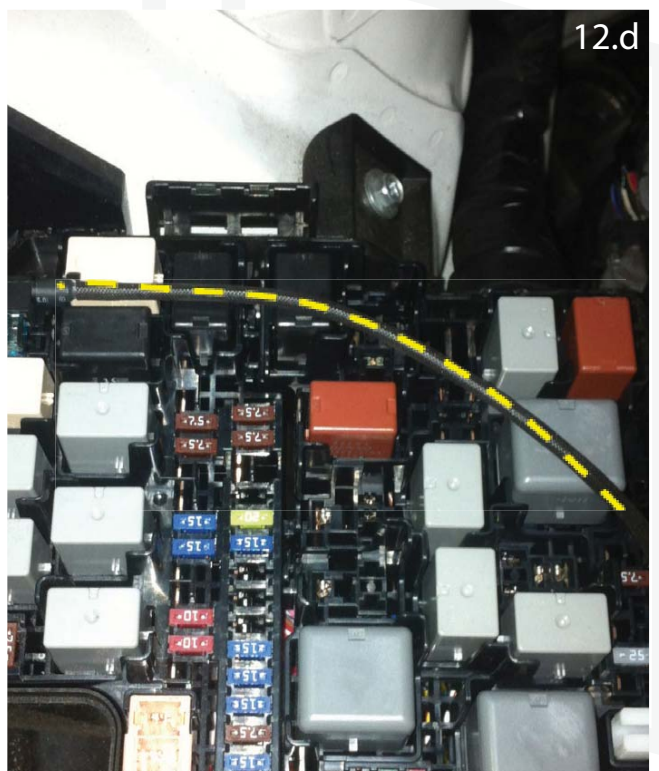
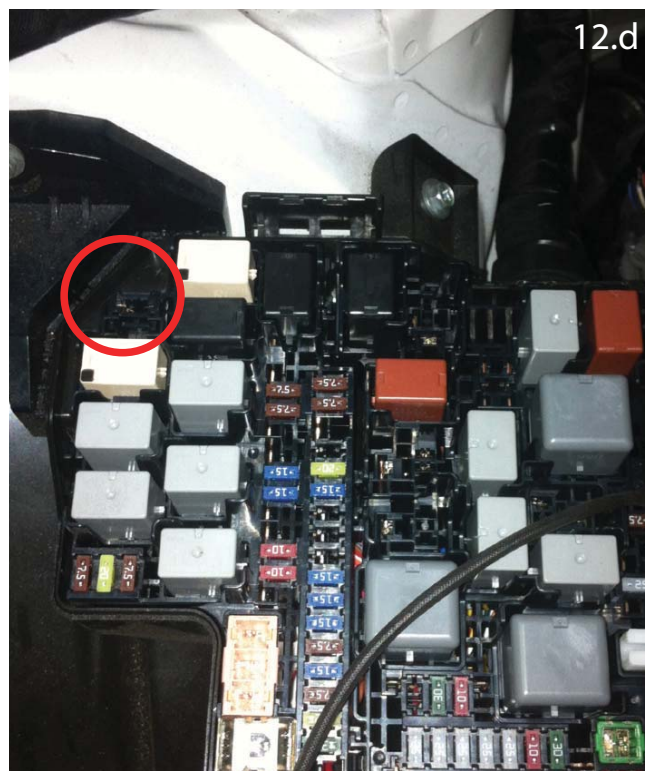
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12.c. Take small plastic panel from the side of the fuse box and drill a 6mm hole (in the center 45mm from the top) to mount the intercooler pump relay. Use the supplied M5 bolt and nut to attach the relay as shown. Reinstall the plastic panel.



12.d. Remove the fuse shown. Install the fuse connector into the fuse socket and route the wiring as shown and reinstall the fuse box cover.

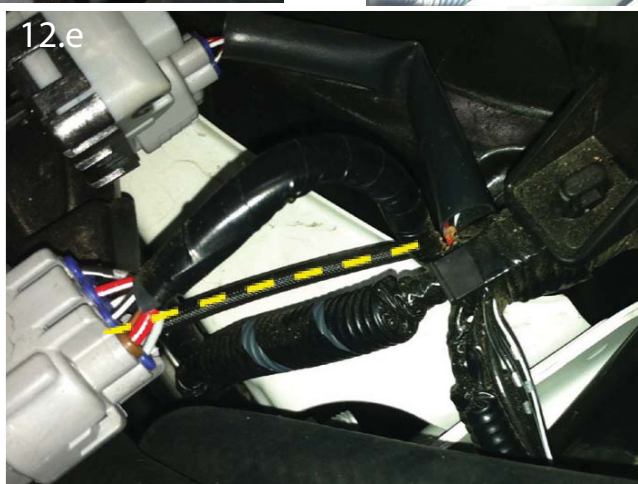
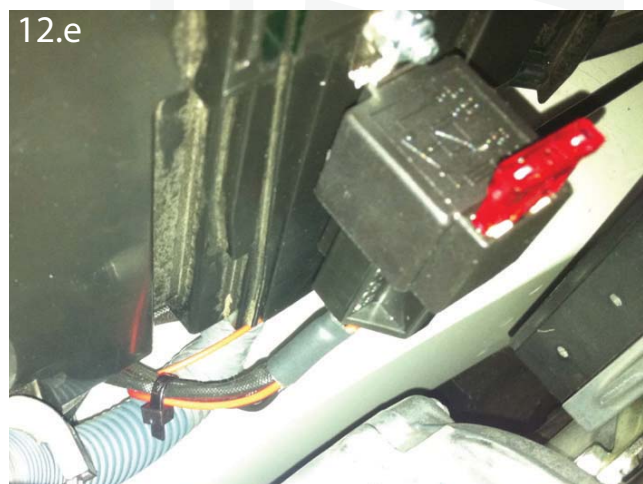
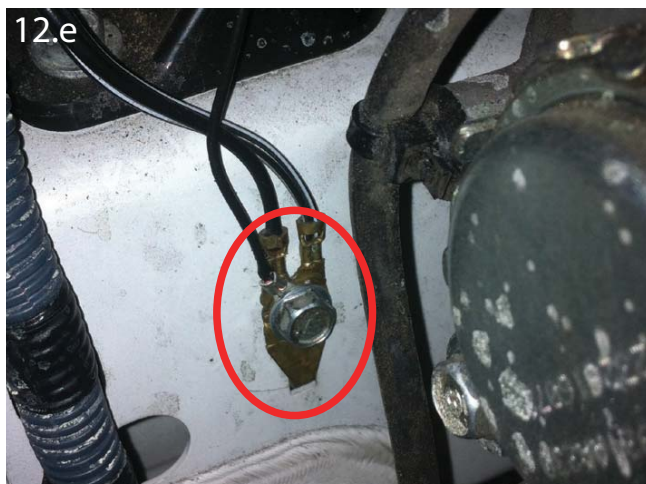


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12.e. Install the earth wire into the position as shown (inside RH rail). Ensure the earth and the pump loom is run under the fuse box. Feed the pump loom down towards the front between the head lamp and front chassis work as per image below.



12.f. Re connect the battery.

12.g. Do not run the intercooler pump for long periods without coolant in the system.

13. Intercooling system filling and bleeding

13.a. Remove plugs from the rear of the intercoolers.

13.b. 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.**



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- 13.c. The cooling system will hold approximately 2.5l of coolant when cold.
- 13.d. Once the coolant is visible in the LH intercooler loosen the bleed screw on the heat exchanger (top LH side) and allow the air to purge from the heat exchanger, tighten the bleed screw after that air has purged from the heat exchanger.
- 13.e. Once the LH intercooler is full, install the plug but do not seal this will allow you to fill the funnel in the RH tank and completely bleed the air from the system, fit and tighten plugs.
- 13.f. Once this process is complete you can turn the ignition to on and allow the pump to run. It may take a few cycles of the key to remove all the air from the system. Check system and top up until all air is bled.
- 13.g. Tighten both intercooler plugs.
- 13.h. Leave the ignition in the on position and check the system for leaks.
- 13.i. Re install the 2 plastic under trays.

14. Pre startup checks

- 14.a. Check engine coolant level.
- 14.b. Check engine oil level.
- 14.c. Replace spark plugs if required.

15. Calibration Installation

- 15.a. Read the information provided in the ProECU programming guide with regards to battery charge levels and power drain during an ECU flash.
- 15.b. Using the Harrop Engineering supplied Supercharger Calibration file follow the ECU programming steps in the ProECU programming guide.

16. Start engine

- 16.a. Start the engine. (The engine may run rough while the air purges from the fuel rails). Once it has run for about half a minute stop and check that there are no fuel leaks. Once you are certain that there are no leaks, start the engine again.
- 16.b. Allow the engine to reach operating temperature and check for any fluid leaks.
- 16.c. Check engine oil level.

17. Road test

- 17.a. Road test vehicle and check all connections for leaks.
- 17.b. When vehicle is cool remove a rear intercooler plug and check coolant level and top up if required.