



# **Toyota Hilux 05 – 13**

## **V6 4.0 liter – 5.7psi intercooled**

### **270 - 320 Engine Kw**

Supercharger system install instructions for DO IT YOURSELF

(we don't know your abilities, your choice of DIY or have it professionally fitted)

Congratulations on the purchase of a Raptor Supercharger system for your Hilux V6. The system will give you years of enjoyment and performance providing you pay attention to details while installing the system and employ a good servicing standard. Abuse of your product will shorten its working life

### **SAFETY INFORMATION**

- REMOVE THE KEY FROM THE IGNITION OF THE CAR –
- DISCONNECT BATTERY
- DO NOT SMOKE NEAR THE CAR.
- NO NAKED FLAMES OR OTHER IGNITION SOURCES.
- PRE-READ ALL INSTRUCTIONS BEFORE STARTING
- WEAR SUITABLE PPE FOR THIS TASK i.e. GLOVES, EYE PROTECTION
- ASSESS ANY OTHER POTENTIAL DANGERS AT YOU FITTING SITE BEFORE YOU BEGIN THE INSTALLATION - PUT PROTECTIVE MEASURES IN PLACE
- DO NOT DRINK ALCOHOL DURING THIS TASK
- ALLOW 4-5 HOURS ON AVERAGE FOR FULL KIT INSTALL – IT'S NOT A RACE. ACCURACY/ATTENTION TO DETAIL IS MORE IMPORTANT THAN SPEED!!
- Fit a NEW FUEL FILTER before installing the supercharger kit
- You WILL dyno check the vehicle for correct air fuel ratio before using at full power on road

Recommended actions:

Fit a new fuel filter the vehicle BEFORE you fit the supercharger kit, afterwards may be too late! Engine damage could occur

Service the rear differential with high specification 85/140 gear oil, the factory oil is too low a grade and if oil is not replaced the vehicle may suffer rear differential failure after a period as short as 6 months, such is the torque this supercharger kit can develop.

Basic specifications:

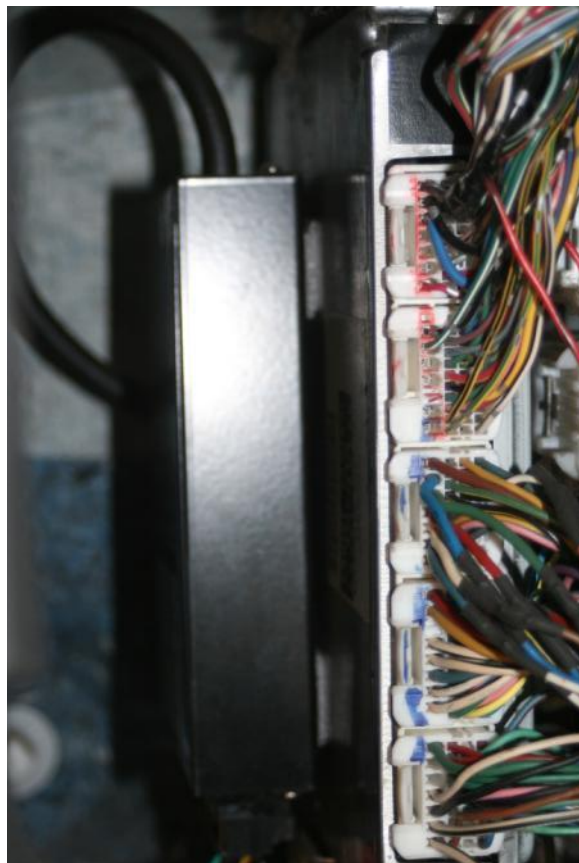
Intercooler Water system capacity – approx 3.5 liters. Use a corrosion inhibitor in the coolant mix and if in a cold climate then add antifreeze also

If you are installing a premium system and replacing fuel injectors – first thorough pressure clean the entire engine, especially around dipstick tube base and where possible around fuel injectors. Then run engine and make sure it runs well, dry the engine thoroughly.

- ➡ The very first job is to install the piggyback ECU. You will find the ECU behind the glove box lid, this is easily removed by first opening the lid a bit, then pull up to disconnect hinges followed by a twist to free the top of the lid.



- ➡ Installation of the ECU onto the side of the factory ECU, use the supplied VELCRO strips to stick the ECU on as shown in this image below



- ➡ Unplug the 5 plugs carefully, there is a little tab in the middle of each plug that has to be depressed to release the plug from the ECU. Now plug in your intermediate loom into the ECU plug sockets and then plug the factory plugs into the female sockets on the intermediate loom. Next thing is to now plug the 3 piggyback plugs into their sockets on the piggyback ECU
- ➡ Your next task is to connect the vacuum fitting on the back of the piggyback (visible in image above) to the vacuum source on the engine. This will mean passing the line through the fire wall. This line must be kept as short as possible for best engine response. The image below shows where the line will pass through the firewall on passenger side. Simply cut the tip off the rubber tip, lubricate the vacuum hose with silicon lubricant and slide hose through and connect to piggy back. You can also see the Tee installed to provide vacuum to the BOV on intercooler



- ➡ Connection to the vacuum source on the engine. See the image below, you will find the connection parts in your kit which will look similar, cut a small section out of the large hose and install the tee section.



NOW START THE ENGINE AND MAKE SURE IT RUNS AT IDLE

IF YOU PASS THIS TEST CONTINUE ON WITH INSTALLING THE KIT

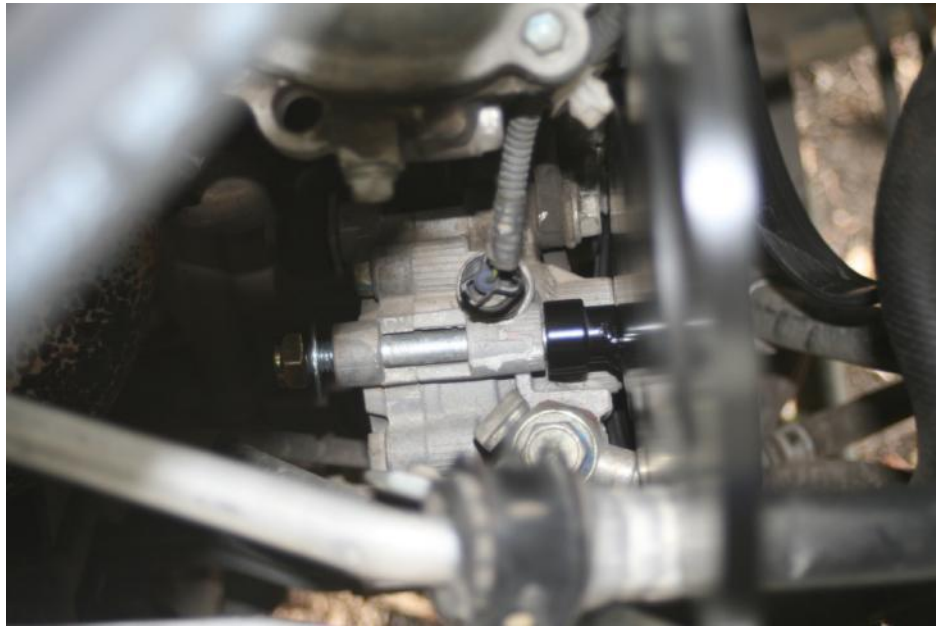
- ➡ Removal of existing air filter and air flow meter assembly, engine cover.

Remove the air filter cover and air filter, the tube to the inner guard area on the drivers side, then remove the air flow meter from the air filter assembly. Next, unbolt the entire air filter assembly, disconnect the vacuum hose attached at the back, disconnect the airflow meter wiring and any wiring mounts.

Remove fan belt from engine – 14mm socket and ratchet is needed, fit socket to the idler/automatic tensioner (see belt diagram below) and attempt to rotate the retaining bolt anticlockwise. This will take the tension from the belt and allow it to be slipped off an idler pulley for final removal. Belt has to come off over the fan before it will be entirely free of the engine – your new longer belt will be fitted in reverse order

- ➡ Fitment of supercharger to engine
- ➡ Remove engine oil dipstick – to be refitted later

Take the supercharger bracket and the single long bolt with nyloc nut, slide the bracket down behind the power steering pump pulley and install the long bolt into the mount on the top of the PS pump. See following picture, the bracket has a welded on spacer on the back of it. Fit bolt with nut and washer but do not tighten it just yet



Now fit the alloy bracket with its 2 bolts into the cylinder head and 2 button heads through the bracket as shown.

Tighten the bolts in the following order

1. Tighten button heads with allen key
2. Tighten the bolt through power steering pump, firm but not too tight otherwise the mount on the power steering pump can be severely damaged. You access this bolt through the slots in the power steering pulley.
3. Tighten the 2 bolts into the cylinder head, nice and firm but not overly tight.
4. The entire bracket should now be securely fastened to the engine ready for the supercharger and other parts to be fitted.

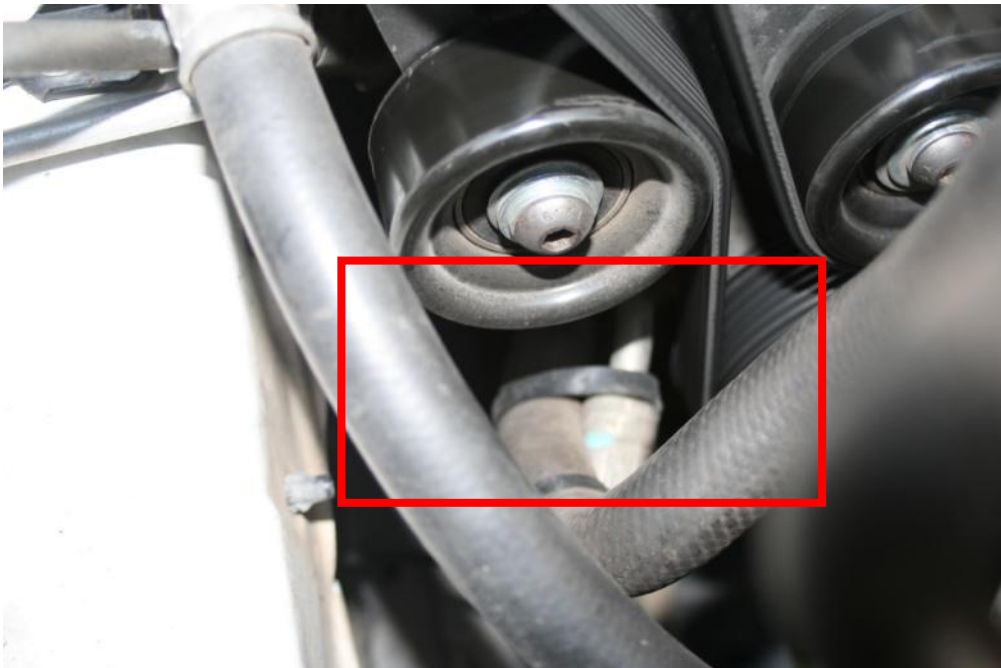


- ➡ Fit the idlers to the bracket and tighten the button heads as tight as you can possibly do them. The image below shows the idlers being fitted to their respective positions. The upper idler should be fitted to the hole nearest to the middle of the plate, do not use the upper most hole. The 2 holes are approx 20mm apart.
- ➡ Now refit the dipstick – modify as shown in this picture





- ➡ To the bottom left of the power steering pulley you can see a large zip tie, this is holding the power steering hose away from where the engine belt runs, IT IS CRITICAL that this hose is tied securely out of the way, double check and make certain it can never come free and rub on belt. Use as many zip ties as you need to have PERFECT peace of mind, if this hose rubs on the belt you will lose your power steering assistance.



➡ Fitting the supercharger to the bracket

Take the 8 stainless countersunk screws and fit the supercharger so the outlet is facing upwards vertically as shown in the image below, tighten screw firmly and never use any locking compounds at all. If screws are too tight you will not be able to remove them.

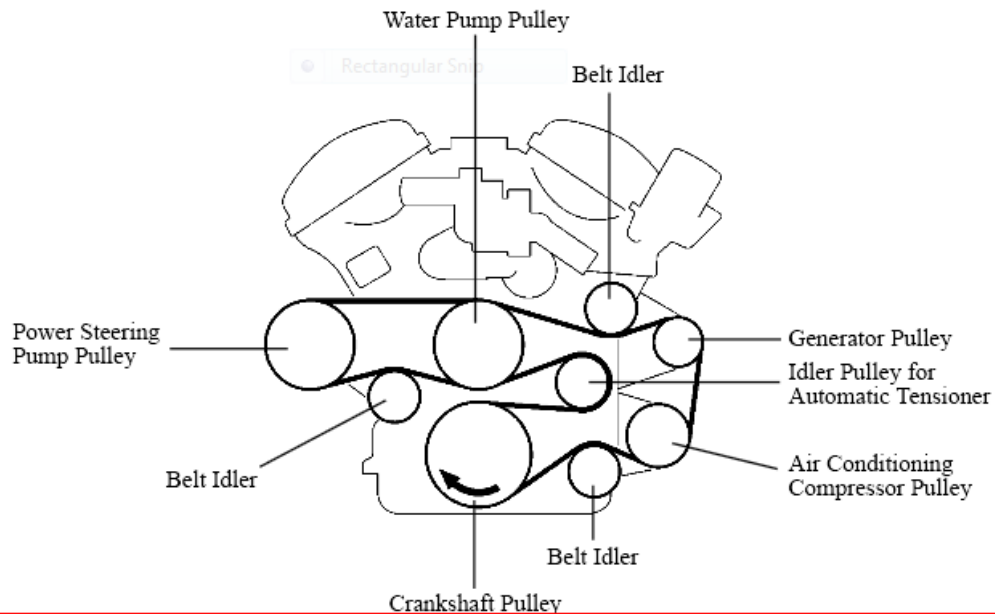


- ➡ Now the 7PK2865 drive belt can be fitted, take plenty of time to double check that belt is fitted correctly, you only get one chance to get it right, getting it wrong will result in immediate ruination of the belt, no replacement will be provided free of charge if you get it wrong. Follow the belt diagram below, but deviate between the 2 idlers out to the charger. You will need a 14mm socket to operate the autotensioner pulley. Auto tensioners are extremely dangerous – make sure socket is properly engaged and keep fingers out of pinch areas when releasing the auto tensioner.
- ➡ Now refit the engine oil dipstick and lock edge of its little bracket under the pinch bolt in the alloy bracket you bolted to the engine cylinder head. You will need to pull back the airconditioner hardline towards the inner mudguard about 30mm so there is room for dipstick to pass by the supercharger and to clear the air-conditioner line.

## ○ SERPENTINE BELT DRIVE SYSTEM

### 1. General

- ▶ Accessory components are driven by a serpentine belt consisting of a single V-ribbed belt. It reduces the overall engine length, weight and number of engine parts.
- ▶ An automatic tensioner eliminates the need for tension adjustment.



- ➡ **INSTALL INTERCOOLER and AIR FLOW METER.** The intercooler is supported one end by the AIR FLOW METER and the other end by a long metal bracket, this bracket bolts to intercooler as shown below and connects to another 8mm threaded hole on the cylinder head, see next image. **SPECIAL NOTE,** you must install an 8mm bolt into the hole on the intercooler which is closest to the center of the engine otherwise you will have a boost leak.



- ➡ **AIR FLOW METER ASSEMBLY** – is installed with the internal honeycomb air straightener facing towards the intercooler, a short piece of silicone and 2 hose clamps on the throttle body and the rubber 90 degree end from AFMA to the intercooler outlet. The airflow meter is simply unscrewed from its mount in the original airbox and reinstalled using the supplied screws into the new body. Reconnect wiring/plug to air flow meter. Tighten all clamps



➡ Fitting the AIR FLOW METER

First clean the airflow meter with some electronics cleaning fluid and blow dry with compressed air or wipe dry with a clean tissue until black sensor bulb is shiny clean all over. This is critical so that the tune supplied will work to its best on your vehicle

- ➡ Fitting the intercooler hot side air hosing. You have been supplied with silicon hoses as shown below and also an aluminium sleeve to allow you to join the 2 silicon pieces together



- ➡ Engine breather. In the image below you can see the engine breather hose direct below the intercooler towards the front, disconnect the hose entirely and reconnect using the short 16mm hose supplied in your kit. It connects from the breather outlet on cylinder head directly to the 16mm breather connection on the air delivery pipe into the supercharger.



- ➡ BOV vacuum hose connection – see section on ECU installation about where to Tee of for the BOV actuator hose. The BOV adjustment screw is preset and **MUST NEVER BE TOUCHED EVER** – DOING SO WILL VOID WARRANTY ON THE KIT TOTALLY AND COMPLETELY.

- ➡ Air filter assembly – You have been supplied with a polished alloy pipe, it has a slip on ORING sealed connection and a small support air that attaches to the supercharger itself. When installing the air to the charger use 1 washer only and gently tighten the 3/16” screw, don’t forget to tighten the ¼” screws in the connect to the air intake pipe.

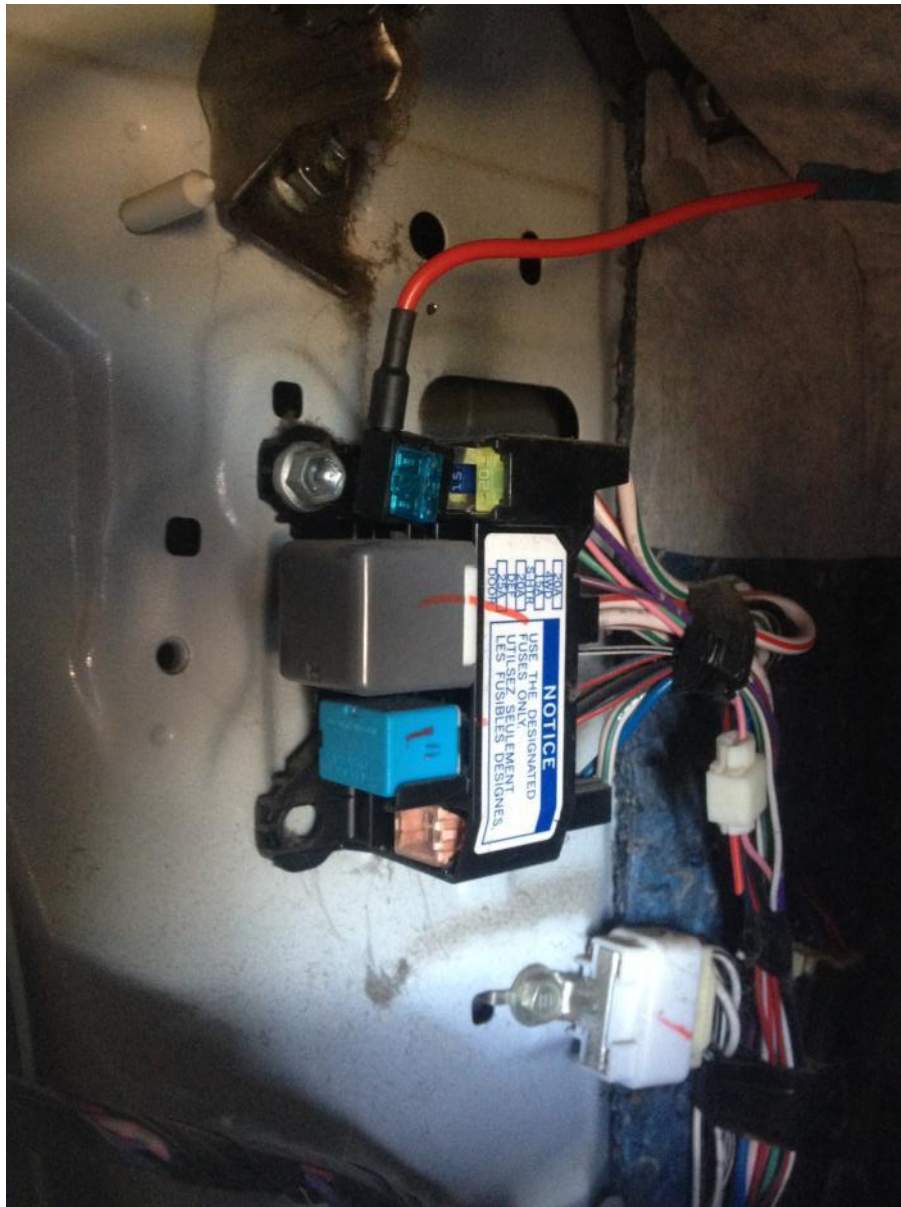


- ➡ Next – fit your airfilter to the intake pipe – tighten the clamp and DO NOT OIL THIS FILTER EVER. Next locate your orange foam filter, this is to be oiled with foam filter oil before fitting, then simply slip it over the entire filter. This is critical to be done correctly
- ➡ Intercooler water system and pump – The radiator and pump are one item, you simply remove the grill of the vehicle, 2 screws and 2 plastic retainers and grill is out. To release grill from bumper use a few firm hits with your hand on the inside at bottom of grill – it will pop out.
- ➡ The radiator – you simply just slide it straight in from the top, fit the bolts and its done. TAKE CARE TO NOT DAMAGE THE PUMP ASSEMBLY IN THIS PROCESS.
- ➡ The image below shows where the top bolt (grab a bolt from supplied 8mm bolts) that retains the radiator goes and next image will show where the bottom bolt is located, in this case you reuse a factory body bolt at bottom.



- ➡ Pump wiring – wiring is provided, we suggest a qualified auto electrician connect the pump to a key switched 12V power supply.
- ➡ If you want to do it yourself, simply connect the supply cabling to the pump and run the wiring back along the passenger side of the vehicle (following the vacuum line to ECU you

installed) and into area beside the glove box. Remove the 4WD fuse, install the supplied piggyback fuse assembly into fuse slot, then install the 4WD in the empty slot on back of the piggyback assembly. Then connect your red water pump wire to the red output wire and the black pump wire (earth) under a body bolt. See image below for where fuses are located near glove box – left side



➡ Fitting the intercooler hosing and connections to the water cooled supercharger

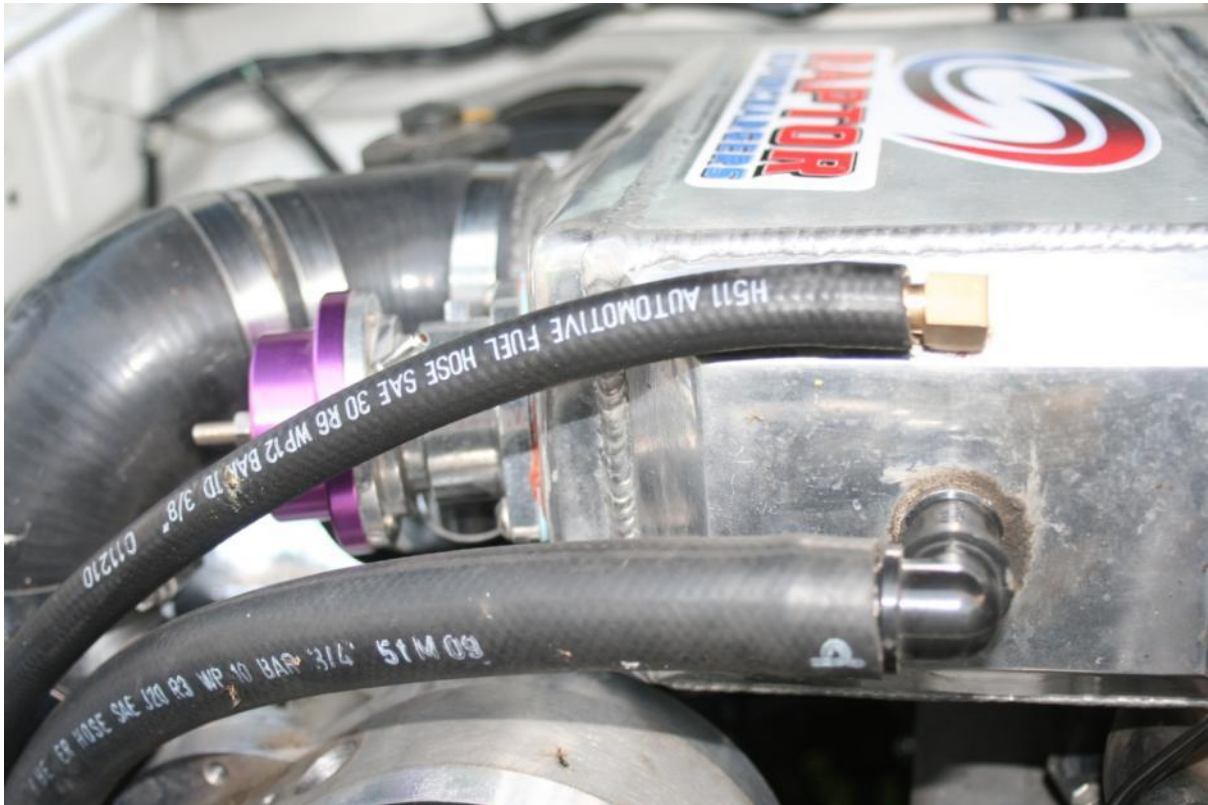
The longest 19mm (2100mm) hose connects from the back of the intercooler to the top fitting on radiator

The shortest 19mm (1800mm) connects from rear of intercooler to the pump outlet

The hoses will pass through a hole in the radiator panel that is covered with black foam from the factory. This is easy to find – (PHOTO NEEDED)

Hose clamps are not normally used, simply push the hose onto the fittings once you have cut the hoses to a NEAT length

The short 3/8" hose, one connects from brass fitting on intercooler to fitting on top side of supercharger transmission



The longer 3/8" hose connects from fitting on lower side of supercharger transmission to brass fitting on intercooler RADIATOR – as shown. Cut hoses to a neat fitting length. Again this can be push fitted on without clamps if you like.



Image below shows the water connections on the supercharger



## ADDITIONAL INFORMATION:

### The piggyback ECU tune

It has been known that the scanning machines of Aust Post can erase the ECU program, this will cause vehicle to run extremely poorly and/or not want to start. Raptor can email the piggyback software and the tune so you can reinstall the tune file and proceed with supercharging your Hilux.

### ABS Module (some SR5 models)

If your vehicle has an ABS module in the vicinity of the brake master cylinder you MAY need to unbolt it and move it back sufficiently to clear the supercharger intake pipe. Not all models of Hilux need the ABS module moved as there are 2 locations Toyota employed. If you need to move it, simply place it back further drill the 3 holes into the inner guard and bolt through. Done.

### SNORKLE

It is possible to manufacture yourself an intake system that will connect to the hole in the inner guard where a snorkel will connect to, be forewarned that drawing air in through a snorkel will limit supercharger performance. It would be best to have something where you switch or change something for snorkel operation and then to switch back to a more free flowing system.

### THE FULLY INSTALLED SYSTEM (air cooled charger shown)









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Fitment of kits and systems

No liability whatsoever (including liability in negligence) is accepted by Raptor Superchargers for the fitment of incorrect tuning or incorrect fitment of kits and systems. The onus is clearly with the fitter to ensure the kit supplied is correct for the particular system. Any damage to parts or consequential damage or cost resulting from the fitment of the incorrect parts or incorrect fitment of parts is totally the responsibility of the fitter

Fuel systems

All Raptor Supercharger systems are fashioned to give adequate fuel enrichment on unmodified vehicles. If vehicle engine is modified (ie extractors, air filter pod, fuel pumps, manifolds, etc) most kits will require additional enrichment not provided with kit/s. Raptor superchargers is in no way liable for engine damage arising due to incorrect tuning, un-maintained fuel systems and the like. A new fuel filter must always be fitted prior to driving your supercharged vehicle for the first time.

**YOU MUST DYNO TEST THE VEHICLE AND CHECK IT IS SAFE FOR OPERATION**

Insurance

Take care to inform your vehicle insurer of changes you are making/have made so that you retain your policy, also enquire with your state transport department regarding engineering certificates/mod plates that they may require for lawful motor vehicle operation. Companies like Shannon's insurance insure modified vehicles.

Lawful operation

It is your responsibility to make certain that your vehicle complies with the rules, regulations of your particular country, state or town.