



TOYOTA HILUX 05 – 15

V6 4.0 LITER – STAGE 1 & 2 POWERCORE KITS

270 - 320 ENGINE KW

Supercharger system install instructions for DO IT YOURSELF

(We don't know your abilities, your choice to 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 increased 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 and the life of your vehicle.



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 5-9 HOURS ON AVERAGE FOR FULL KIT INSTALL – IT'S NOT A RACE. ACCURACY/ATTENTION TO DETAIL IS all that is important
- Fit a NEW FUEL FILTER before installing the supercharger kit (if vehicle is not new)
- 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 from insufficient fuel flow. Genuine part number 2330031120

Service the rear differential with high specification synthetic oil

Basic specifications:

Intercooler Water system capacity – approx 4.0 liters. Use a corrosion inhibitor in the coolant mix and if in a cold climate then add antifreeze also. USE ONLY GREEN colour corrosion inhibitors.

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1. Preparation for SC install

The first steps are to remove the convoluted air intake pipe, the engine cover and the engine air filter system from the engine



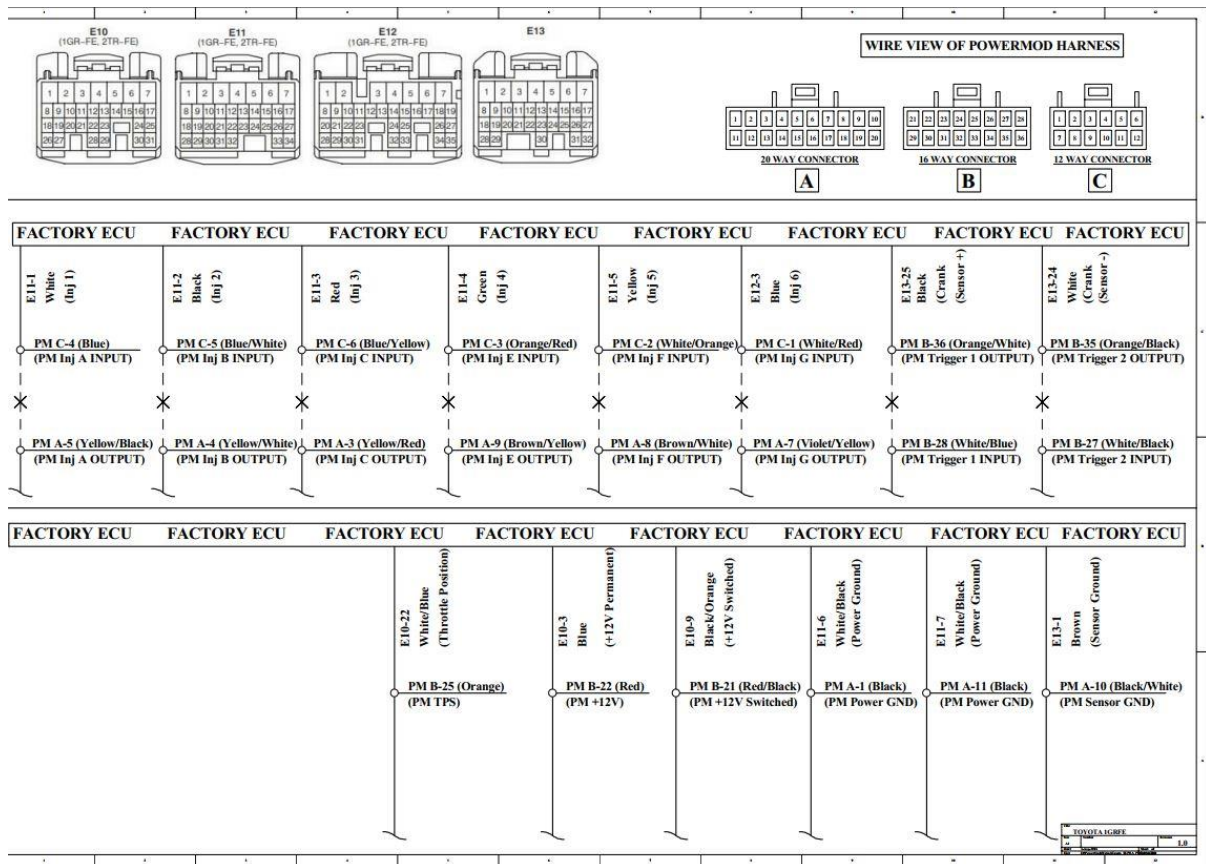
Remove the air filter box, the tube to the inner guard area on the drivers side, then remove the air flow meter from the air filter box assembly. Next, unbolt the entire air filter assembly, disconnect the hose from the fuel pressure regulator which is typically attached at the back, disconnect the airflow meter wiring and any wiring mounts.

If you are installing a premium system and replacing fuel injectors – first thoroughly pressure clean the entire engine, especially around dipstick tube base and where possible around fuel injectors. Then blow dry with compressed air and run engine, make sure it runs well before installation of SC. Do not spray water directly at any of the idler bearings of the engine belt system or into an open throttle body

2.ECU/ PIGGYBACK



Wiring diagram for the POWERMOD PIGGYBACK - (this section will be deleted once ECU remapping is possible for 2003 – 2004 models of Prado). EXPAND THIS VIEW to 200% and you will be able to clearly read this wiring diagram



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 tit, 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.



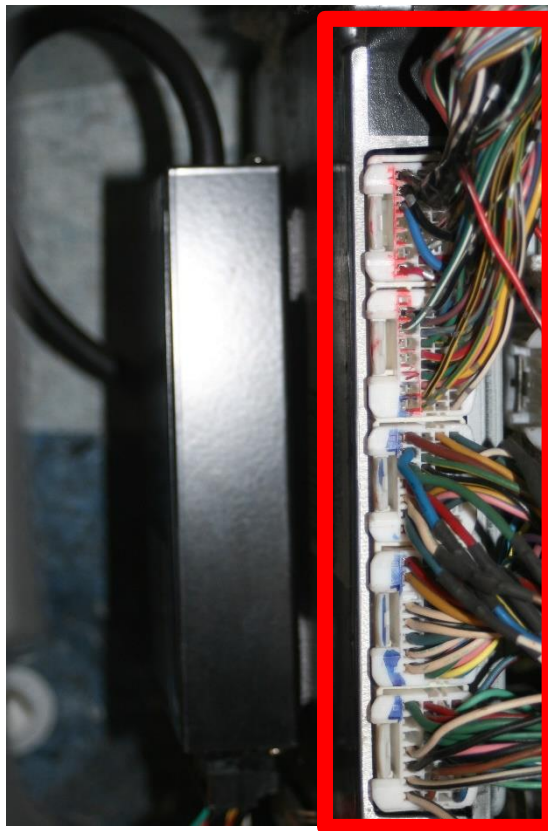
NOW START THE ENGINE AND MAKE SURE IT RUNS AT IDLE

IF YOU PASS THIS TEST CONTINUE ON WITH INSTALLING THE KIT

The piggyback is typically supplied with the correct tune installed – dyno test to be sure vehicle is operating safely

This section relates to ECU remapping/remapped ECU

First task – remove the ECU from behind the glove box and mail this or courier to Raptor for programming, it has 5 WHITE plugs to remove and 4 or so 10mm nuts which affix it to the vehicle. The black box on the side is not a Toyota part. Located vertically. If you are swapping ECU – refer to back of this document for how to swap ECU's. The more luxury spec of Prado's have a lot of trim items to remove around the glove box area in order to access the ECU



The address to send your ECU to for installation of the tune:

ZUCE Automotive Technologies

75 Flinders Parade

North Lakes QLD 4509

If you swap ECU's entirely, there is a page much later in this document relating to that procedure

3. Fuel injectors and sparkplugs

Begin by installing the supplied sparkplugs and fuel injectors

No information will be supplied re sparkplug installation



FLAMMABLE LIQUIDS and strong odours

Installation of the fuel injectors – be careful to not drop parts into the engine intake

The main mistake installers make here is improper seating of the lower injector seals, they are often not installed square and flat, can turn during installation and will cause engine to misfire and run poorly



REPLACE THE FUEL FILTER (BESIDE ENGINE) – with OEM or RYCO Z683

4. Installing supercharger hardware

The first step is to remove the engine belt



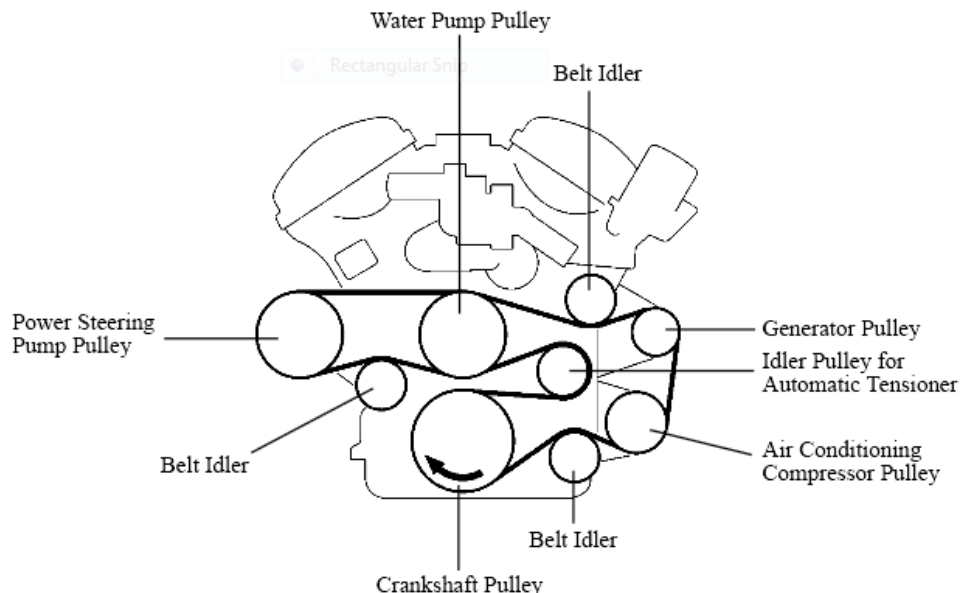
The auto tensioner spring is very strong, you could suffer personal injury from this device

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, starting by going over the engine fan first.

○ 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.



Remove engine oil dipstick – to be refitted later

Using an 8mm thread tap, clean all 3 of the threads along the side of the drivers side cylinder head, clean with compressed air, otherwise bolts may bind in the head before being able to be tightened

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, just tighten enough so you can still move the bracket up and down if needed when fitting the alloy stay bracket to cylinder head.

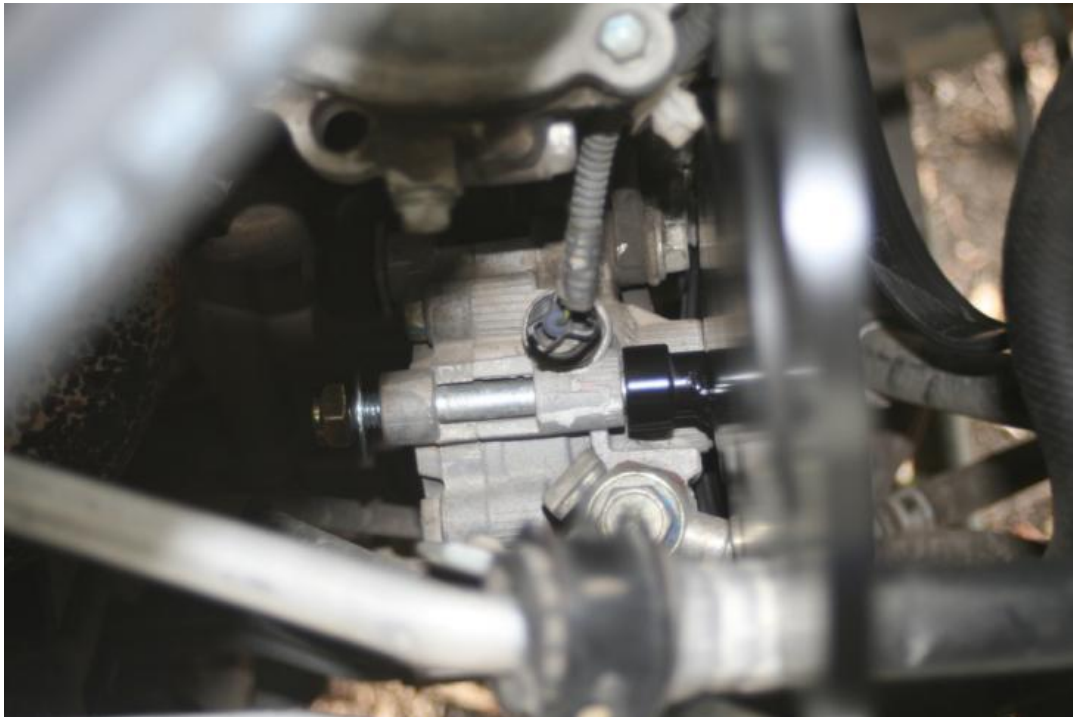
Remove engine oil dipstick – to be refitted later, after the brackets have been fitted, and definitely before the supercharger is fitted to the bracket. Clean the base of the dipstick thoroughly before you remove it, dirt accumulates around the base, this dirt will drop straight into the engine oil if not first cleaned/removed.

THERE ARE TWO BRACKET TYPES – YOUR BRACKET COMES PREASSEMBLED – just loosen some of the fasteners. All brackets mount at the PS pump and at the cylinder head in the same locations. The only difference is the alloy mount bracket that bolts to the cylinder head

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, this is done THROUGH the power steering pulley.

See following pictures, 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, just tighten enough so you can still move the bracket up and down if needed when fitting the alloy stay bracket to cylinder head.

5. Fitting brackets to engine



Now fit the alloy bracket with its 2 bolts into the cylinder head and 1 button head through the bracket as shown. FOR the SNORKEL COMPAT KIT the upper button head goes through the bracket as shown, while the lower button head is much longer and passes through the bottom idler pulley, the bracket and finally into the alloy bracket. The upper idler has its own separate bolt.

Tighten the bolts in the following order:

Tighten button heads with allen key

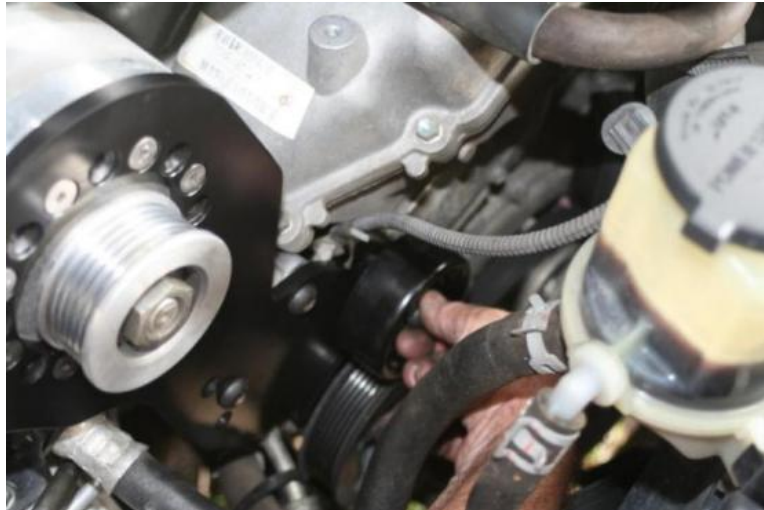
Tighten the bolt through power steering pump, firm but not too tight otherwise the mount on the power steering pump can be severely damaged. You access this bolt through the slots in the power steering pulley.

Tighten the 2 x 8mm bolts into the cylinder head, nice and firm but not overly tight.

The entire bracket should now be securely fastened to the engine ready for the supercharger and other parts to be fitted.



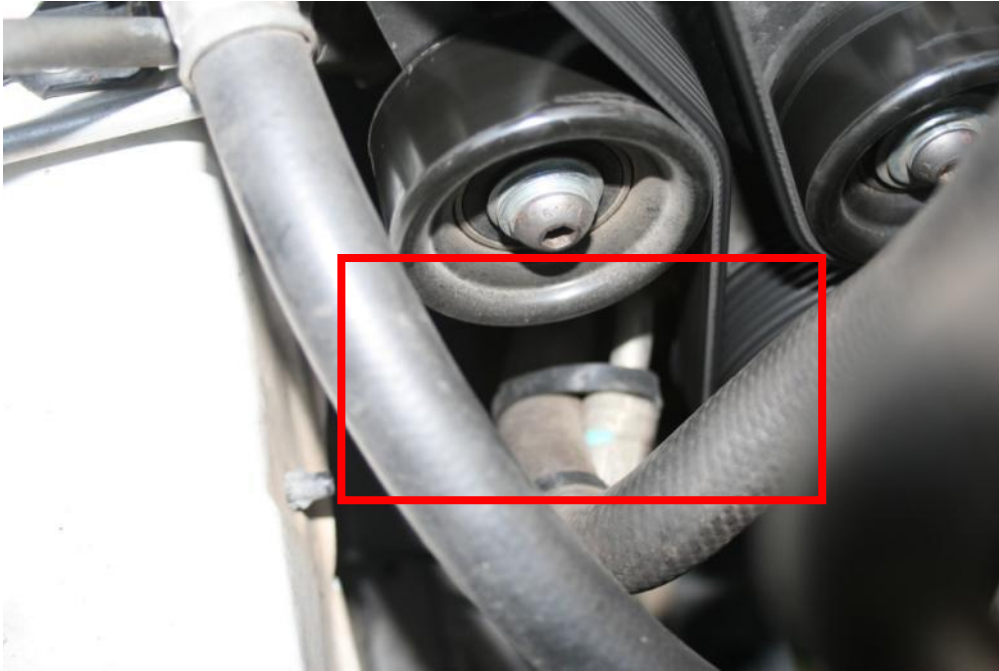
Fit the idlers to the bracket and tighten the button heads as tight as you can possibly do them. The image below shows the idlers being fitted to their respective positions. The upper idler should be fitted to the hole nearest to the middle of the plate, do not use the upper most hole. The 2 holes are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



You need to cut this tab from the dipstick tube – so that it is compatible with the supplied bracket – see image below



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 of the provided HEAVY DUTY 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 near horizontal as shown in the image below, tighten screws firmly and never use any locking compounds at all, if overtightened the stainless screws will be damaged. If screws are too tight you may not be able to remove them at a later time.



Belt installation and routing

Now the 7PK2655 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 auto tensioner pulley.



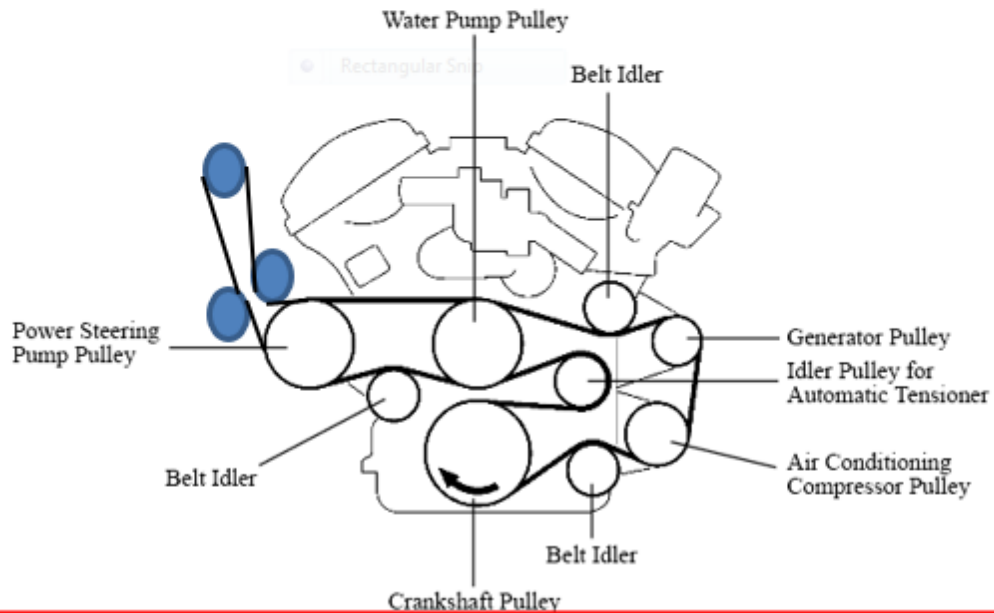
Auto tensioners are extremely dangerous – make sure socket is properly engaged and keep fingers out of pinch areas when releasing the auto tensioner.

The diagram on next page shows the routing of the belt after supercharger is fitted

○ 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. Always fit the silicon hoses with the RAPTOR LOGO's facing up, this is because the hoses have been cut to fit correctly and the logos facing up ensures you have them the correct way

MAF position shown below – GIVE THE SENSOR A CLEAN before installation into the new MAF position

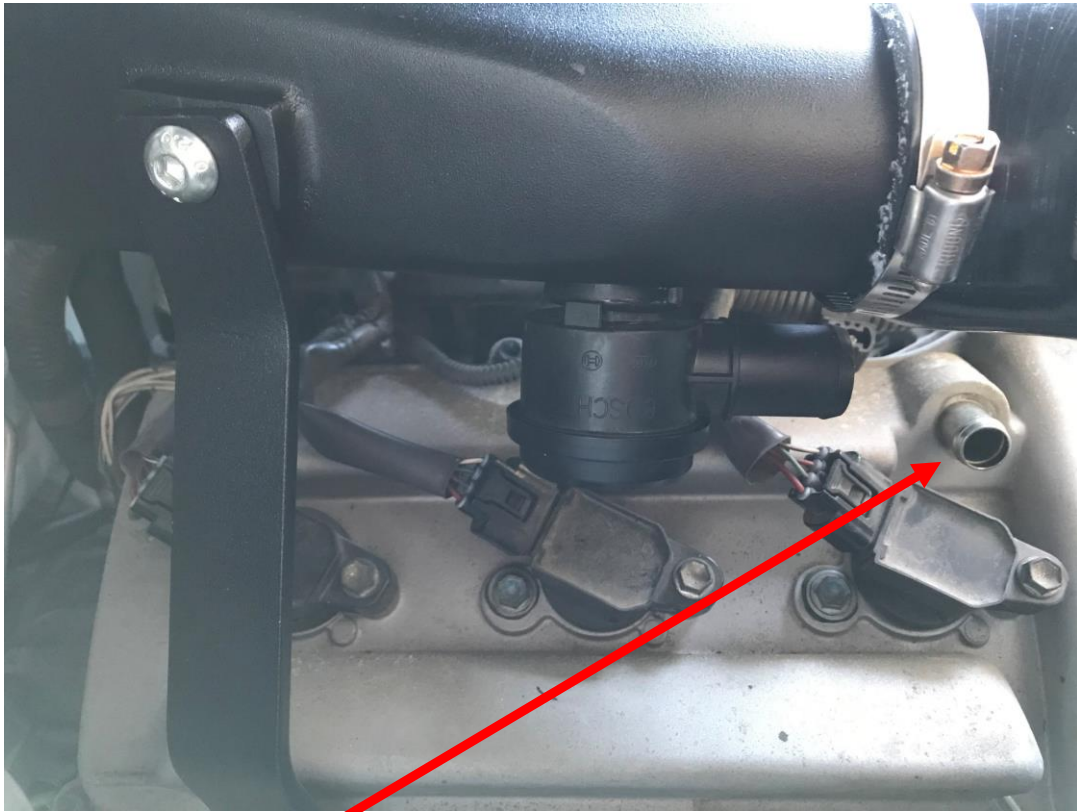
The GFB BOV is always preinstalled and the box it was in is supplied, as it contains the service tool for the BOV and sticker

AIR FLOW METER ASSEMBLY – is installed with the internal honeycomb air straightener facing towards the intercooler, a 90 degree pieces attached to the throttle body, then the MAF inserts into the other end and using the 2.5" to 3" silicone adaptor fit to the intercooler outlet. The airflow meter sensor is simply unscrewed from its mount in the original airbox and reinstalled using the supplied screws into the new MAF body. Reconnect wiring/plug to air flow meter. Tighten all clamps.



Intercooler stay bracket – example, below

Breather



Engine breather. In the image above you can see the engine breather hose directly 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.

Connecting the breather hose can be one of the last jobs of the installation -

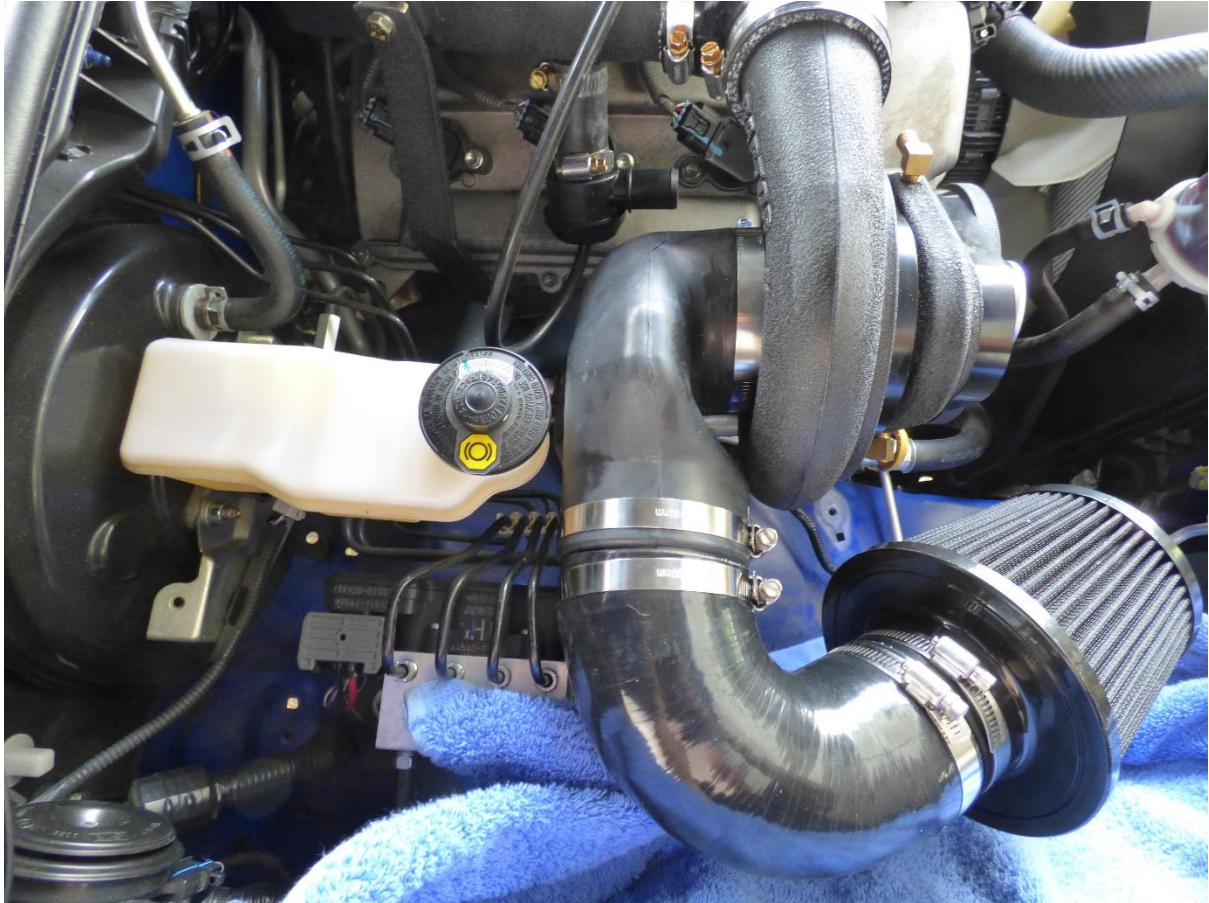
BOV

BOV vacuum hose connection – you are supplied with an 8-4-8 nylon tee to install at this position as the vacuum source for the BOV – see below. You may have to use silicon lube to get this tee to insert into the OEM hose.



AIR INTAKE

Air Intake assembly – You have been supplied with a intake and POD filter assembly with a hose clamp to attach it to the supercharger intake – with similarity to the image below



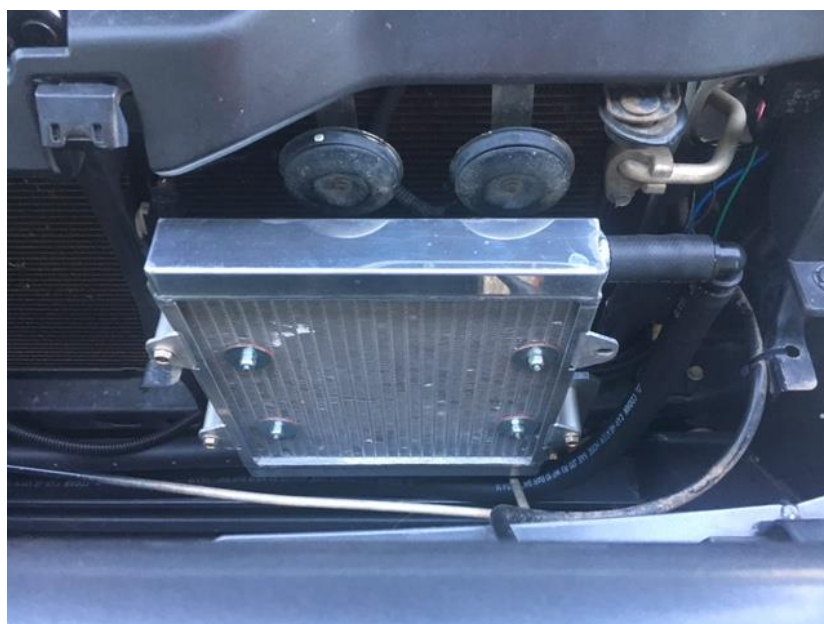
Next – fit your air filter to the intake pipe – tighten the clamp and **DO NOT OIL THIS FILTER EVER**. Next locate your orange/grey foam filter, this is to be oiled with foam filter oil before fitting, then simply slip it over the entire filter. This is critical to be done correctly. This will stop ALL dust in any conditions but will **NOT** filter out water in wet conditions such as water crossings

Intercooler radiator, reservoir and pump

- IF VEHICLE IS AUTOMATIC, THE TRANSMISSION OIL COOLER WILL NEED TO BE RELOCATED TO THE DRIVERS SIDE BEFORE YOU CAN FIT THE INTERCOOLER RADIATOR

Intercooler water system and pump – Remove the grill. Install pump in position as shown. Install radiator as shown in pictures. Fan at the back of the I/C radiator . Wire so fan is on when key is turned to “ON”

There are three intermediate spacers and bolts to mount the PWR radiator to the vehicle in the position shown in the second image



Fit reservoir anywhere within reason and easily accessible – so you can check the level often and easily

The reservoir is configuration, you can move the hose inlet/outlet to many different positions. The capacity is 1 liter and can be mounted anywhere you can find a spot for it.



Fitting the intercooler hosing and connections to the water cooled supercharger

The longest 19mm (2100mm) hose connects from the REAR of the intercooler to the top fitting on radiator. This is the hot water return

The shortest 19mm (1800mm) connects from FRONT of intercooler to the pump discharge. This is cold water supply to the intercooler.

The pump suction will need a small length of 19mm hose cut to connect from bottom of radiator to pump suction/intake. This is a cold water line.

The hoses will pass through a hole in the radiator panel that is covered with black foam from the factory.

Hose clamp all hoses, simply push the hose onto the fittings once you have cut the hoses to a NEAT length and tighten the provided clamps

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



The longer 3/8" hose connects from fitting on lower side of RESERVOIR to poly tee fitting at the electric pump suction port

There should also be a hose 3/8" from the other fitting on the supercharger transmission which returns to the TOP fitting on the water reservoir. Cut hose to fit.

Pump/Fan Wiring

Pump wiring – wiring is provided, we suggest a qualified auto electrician connect the pump and fan to a key switched 12V power supply. Power required for both items is approx 10 amps.

The kit contains a 35 amp relay, piggyback fuse to suit Toyota MICRO BLADE fuse type.

Fuel pressure regulator reference line

See image below – all kit levels feature this



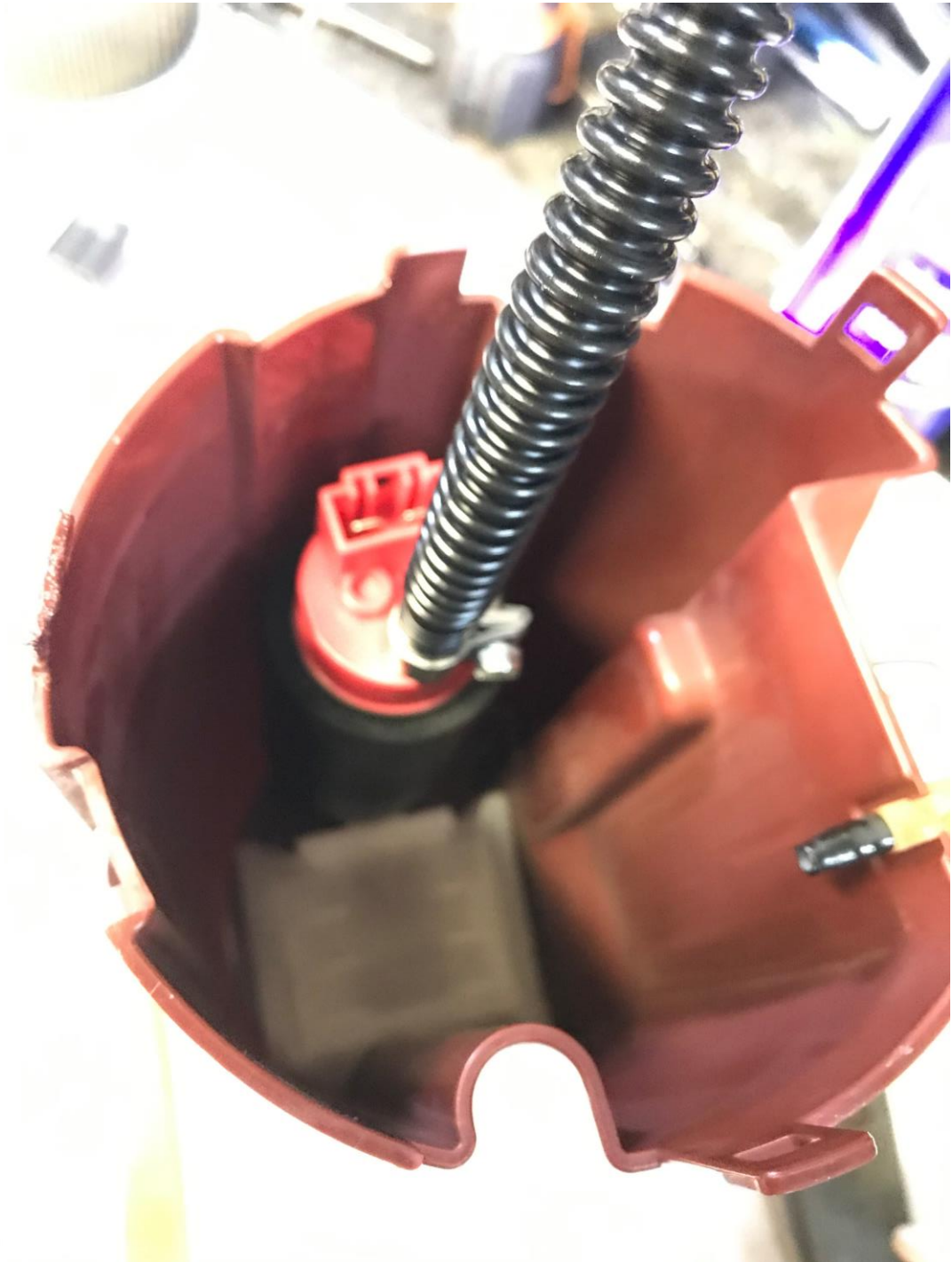


FUEL PUMP PICTORIAL GUIDE

HILUX – SHOW BELOW

(suit WALBRO, KEMSO, AEROMOTIVE or similar upgrade (255 - 320 lph pumps). WARNING, purchase a new fuel pump assembly retaining nut Toyota: **PART NO. 77144 0K010** before you begin work







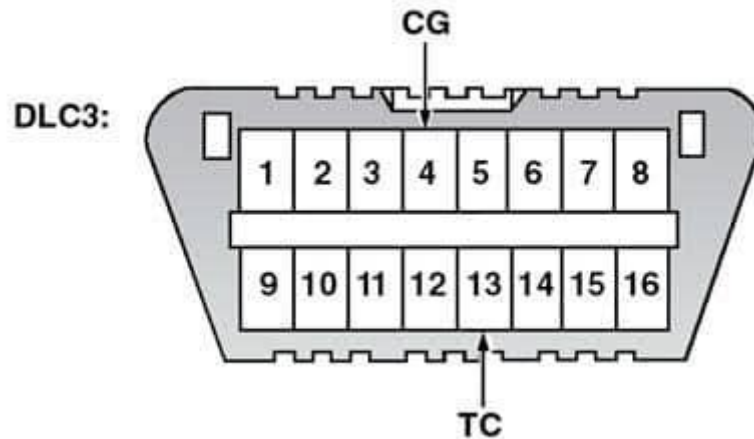


ECU SWAP

If the kit has been supplied with a preprogrammed ECU to directly swap into the vehicle – follow this guide on marrying the replacement ECU correctly to the vehicle

You need a paper clip or a piece of electrical wire for the bridging

Bridge these 2 pins for 30 mins – the GREEN CRUISE CONTROL LIGHT IN THE UPPER RIGHT HAND SIDE OF THE DASH WILL FLASH ON/OFF for the entire 30 mins. After 30mins, turn key off, remove the bridging wire, turn key on for 60 seconds then start the vehicle. The engine should start, may stall once, then restart and it will run as it should



Exhaust system advice

To see the advertised power figure for any/all variants of the Raptor supercharger system it is essential to upgrade the exhaust

Headers should be used, long tube is best

Cats, should be 2.5" 200cpi high flow type

Cat back should be ideally 3.0"

Complete exhaust systems are sold by Hurricane exhausts – example below



THE FULLY INSTALLED SYSTEM - PRADO 120 Manual (2007) model











Before fitting the fan, check its rotation. Fan should be mounted on the back of the radiator with fan fitted as a PULLER configuration. There are instructions with the fan on how to reverse its rotation and to reverse the fan blade itself





Suggested service scheduling

We may have missed some items – follow your Toyota handbook for all other servicing points/schedules

Item	Product	Frequency	
Engine oil service	5/40, 10/40 Syn	6000km	
Intercooler fluid	Green antifreeze	Weekly check	
Sparkplugs	As supplied	Every 50 000k	
Engine belt	7PK2655	Once a year	
Auto trans fluid	LV/WS Toyota	50 000km	
Fuel	98 octane only	ALWAYS	
Fuel filter	Gen Toyota	15000km	
Engine water level	Toyota PINK fluid	Weekly check	
Differential oil	85/140 LSD oil SYN	Every 50 000km	

Email: raptorsc@westnet.com.au

Ph: 0409 897 081

International: +61409897081

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 (standard engine) 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 at the time the supercharger kit is fitted.

YOU MUST DYNO TEST/TUNE THE VEHICLE AND CHECK IT IS SAFE FOR OPERATION – THE FINAL TEST RESULTS must be forwarded to Raptor SC by email to maintain your system warranty.
raptorsc@westnet.com.au

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.