

Holden Commodore VN - VS



V8 304ci engine

Partial Kit – fitting guide

Congratulations on the purchase of a Raptor Supercharger system for your Holden 304. The system will give you years of enjoyment and performance providing you pay attention to detail while installing the system and employ a good servicing standard. Abuse of your product will shorten its working life and may lead to other component damage of your vehicle.

The items in picture are what you received when you purchased this partial kit



SUPPORTS up to 440rwhp – depending on engine build, intercooling, tuning etc

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 your risk
- 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 10 HOURS ON AVERAGE FOR FULL KIT INSTALL – IT'S NOT A RACE. ACCURACY/ATTENTION TO DETAIL IS MORE IMPORTANT THAN HOW QUICKLY YOU COMPLETED!!
- 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

Parts included in this partial kit for 304 V8

1. Mounting bracket with idler
2. Raptor VL30 or optional VLBX30 supercharger – air cooled fitted with 61mm pulley
3. Supercharger cooling fan kit – including a universal mounting bracket, hose, electrics
4. Drive belt
5. 32 mm BOV calibrated for use (you will need another identical valve) if setting up an intercooler
6. Mounting bracket bolts and spacers and screws to secure supercharger to its bracket
7. Air filter
8. Silicon adaptor hose and one bend 83mm

Performance Expectations and limits of the kit (stages 1 and 2)

1. 8-11psi boost measured at the supercharger outlet. If you fit a restrictive intercooler and only have 6psi manifold pressure – do not call us for a solution, the solution is to make a better system
2. Fit the largest possible air filter and 3.25" inlet is the minimum size
3. Warranty – 6 months, we don't have control over the final assembled product on your car, maintain contact during your build for best outcome and no damage to the supercharger.
This will reduce the problems you might make for yourself during your build and if you need to make a warranty claim
4. **You MUST only use the 32mm BOV provided with the kit, no exceptions. Must use 2 for intercooled setups. One on the hot side and one on the cold side – to eliminate compressor surge**

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Fitment guide – only a guide, not the definitive fitting instruction set

How your supercharger is shipped

As in the picture below the supercharger is mounted to the bracket with 4 x 10mm bolts, when SC is installed in the position (yes you can remove the 4 screws and rotate the charger on the bracket) on the engine and rotated into desired position add the extra 4 screws.

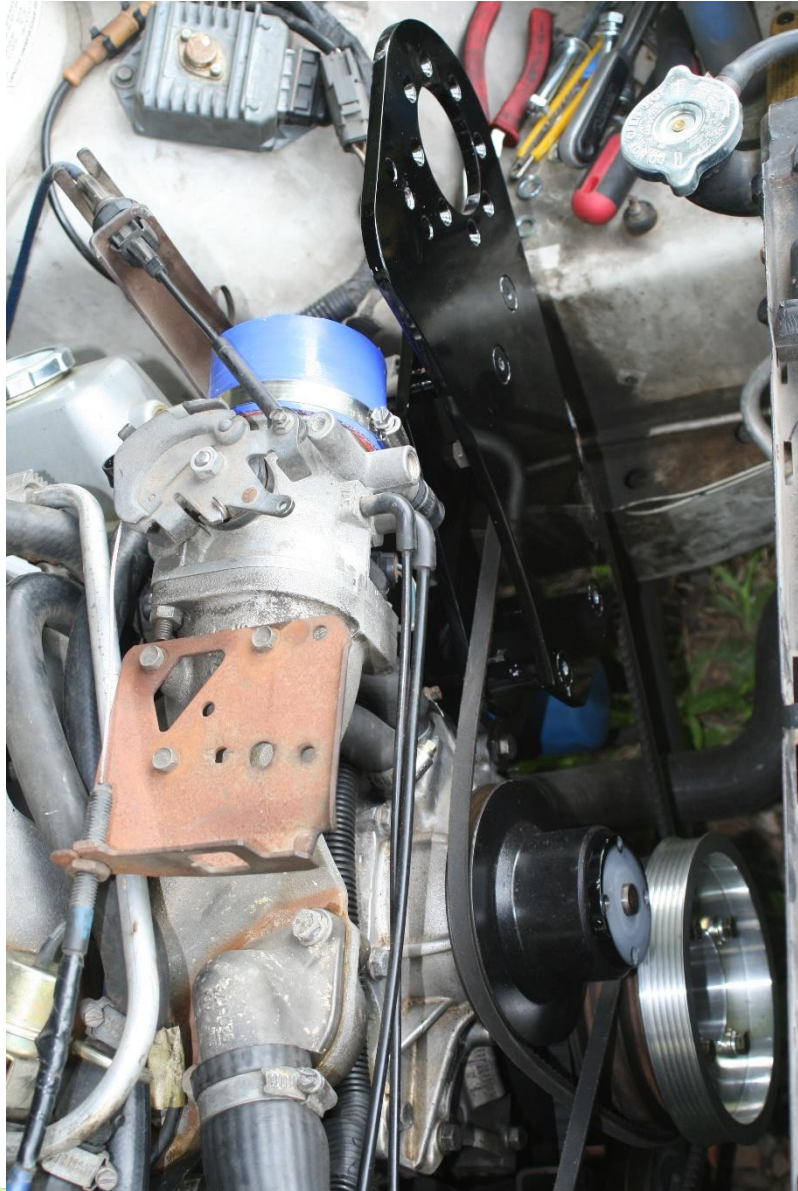
The supercharger pulley is stamped with a number – the size of its operating diameter



Mounting the supercharger to the engine

1. Fit the alloy crank pulley into the OEM pulley – CLEAN the inside of the crank pulley very thoroughly before attempting to slide in the alloy pulley
2. Fit supercharger bracket to engine using bolts, spacers
3. Fit the supercharger to the bracket and install the belt. **DO NOT USE ANY LOCKING COMPOUND ON THE 8 mounting screws or any of the other bolts**
4. Fit the fan engine fan spacer, bolts are provided





Setting up the plumbing into and out of the SC

You are making these items -

The 3.25 to 3.5" intake (the bigger the better, your choice) can wrap over and around the charger towards the front of the motor – see example in picture – get air filter as far away from the hot engine and radiator as possible

USE THE LARGEST AIR FILTER POSSIBLE

DO NOT SUCK IN HOT AIR FROM OVER THE HEADERS – this over heats the supercharger and lowers system efficiency a LOT. It results in less oxygen and less power than what can otherwise be achieved – and the excess heat coming into the compressor will shorten the life of the supercharger – a lot



Engine breather can be connected in this manner, we suggest using a catch can "in line" to prevent crankcase vapours entering the supercharger. The 304 is known for producing quite a lot of crankcase vapours and oil blow by – making a catch can mandatory

AIR OUT/BOOST SIDE

The supercharger outlet is 2.5"/63mm and the 304 throttle body is 3"/75mm – various silicon pieces needed

You will need to create a few pieces, an example of how you can mount the BOV is shown below

The supplied BOV is calibrated ready for use – do not adjust it



Supercharger cooling system

This part is essential/critical to the successful long term operation of your supercharger

The fan unit must be installed in a COOL AIR LOCATION – **definitely not in the engine bay** or near any hot parts, cool air is needed for the SC transmission.

Ideally mount the cooling fan kit between the front bumper and the A/C radiator, you also want it up where its not going to get wet.

Picture of the SC cooling fan kit – bracket, fuses, wiring, relay, air supply hose and air supply hose adaptor (to outlet of fan shown below) are all included. Take care to not misplace the very small four 3mm screws that are for mounting the fan to the bracket.

Correct installation of this cooling fan is essential to maintain your supercharger warranty

You must fit 35 amp 12 volt supply (switched with a 30 – 40 amp relay) – high starting current

Includes: Fan, Power controller, mounting bracket, speed controller, power wires, hose and hose adaptor



For road use operate fan at 60% of max speed, for track work, operate fan at 100% speed

FAN Wiring guide

PIN NUMBERS ARE NOTED ON THE UNDERSIDE OF RELAY

There should be a note in this fitting guide as to where the fuse adaptor plugs in to your fuse box – this will give you your KEY ON power supply and signal wire to the relay (pin 86)

Your Relay needs an earth, so you run the PIN 85 wire to Earth (battery or body)

Your relay needs a Power feed direct from battery – battery direct to PIN 30 (red wire coming from relay)

Your RED fan power wire from blue fan controller connects to this pin (as the 2 pin female plug on the end) connects to PIN 87A (blue wire coming from relay)

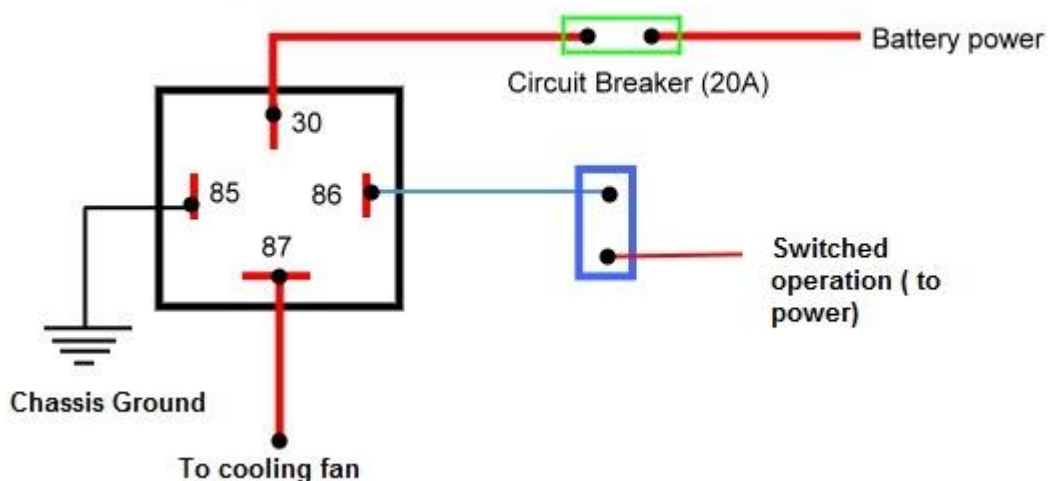
Your Black fan earth wire should ideally go to chassis or even back to the battery

Now you can plug that two wire female into the blue fan controller

Then you take the fan speed controller with its 3 wire plug (but is 5 pins wide if I recall) and plug it directly into the blue fan controller also, and insulate it and keep it nearby to fan controller – adjust it for 60% of maximum speed once its all going

Then, plug the motor and its wide connection plug directly into the blue fan controller as well

If you have all that completed correctly, your fan will start and run when the key is turned on



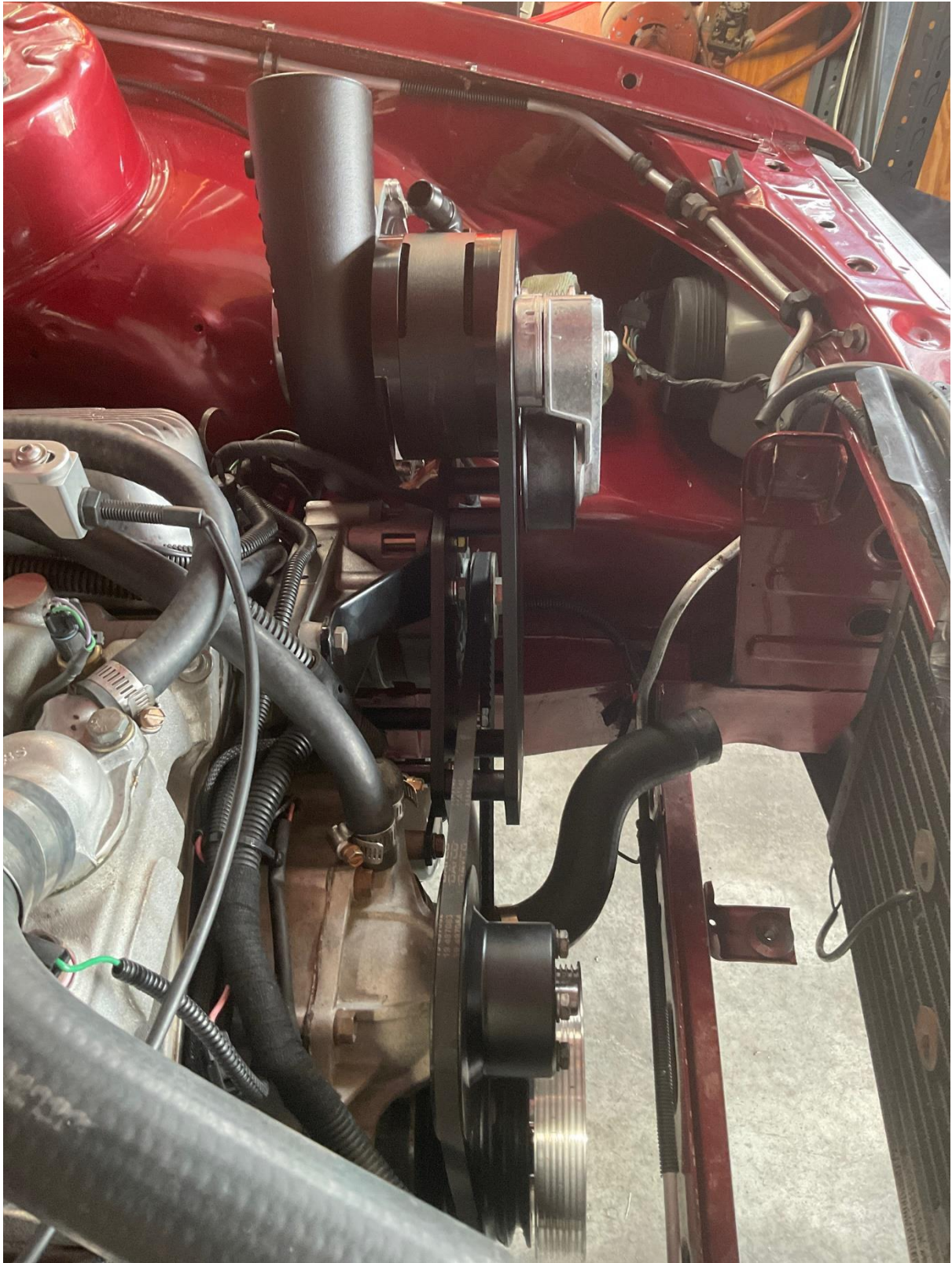
304R install pics

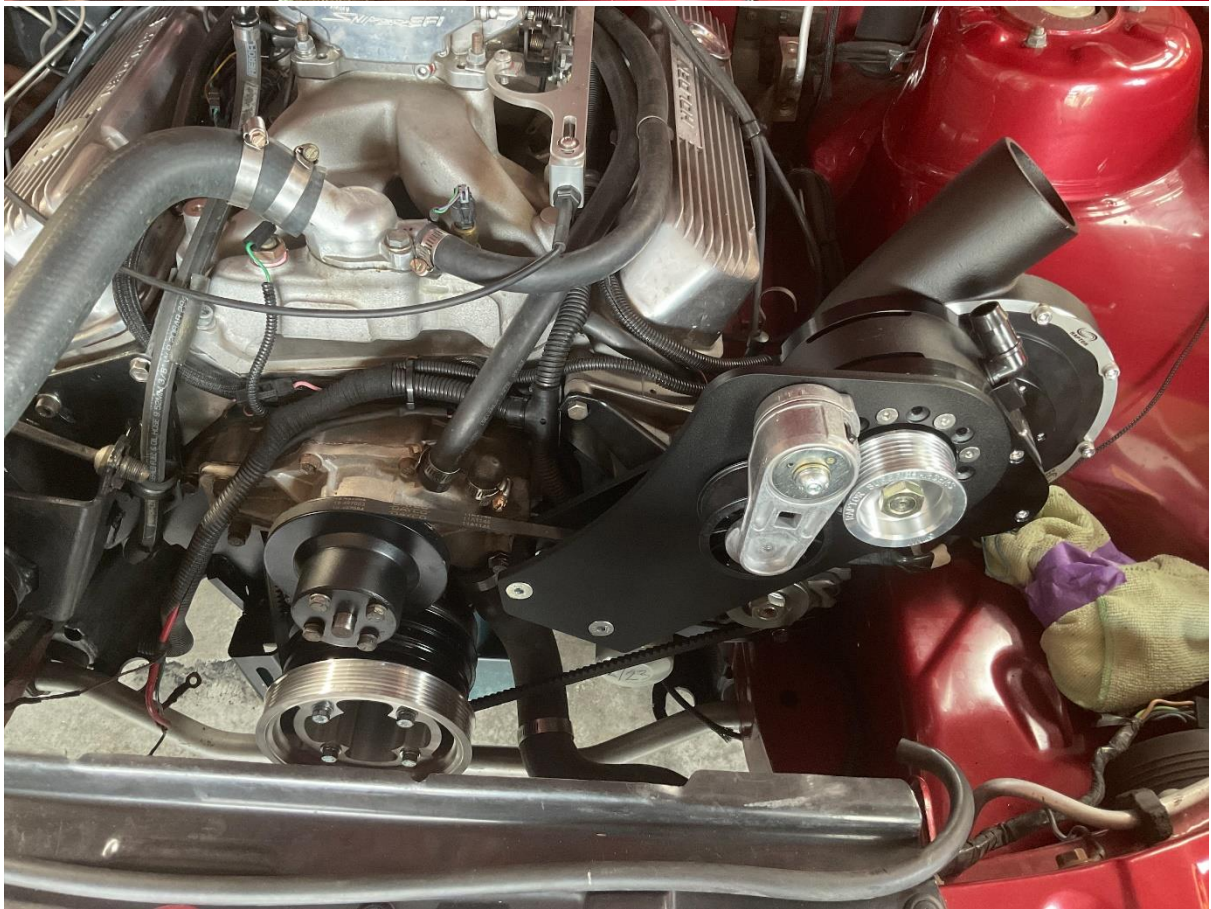
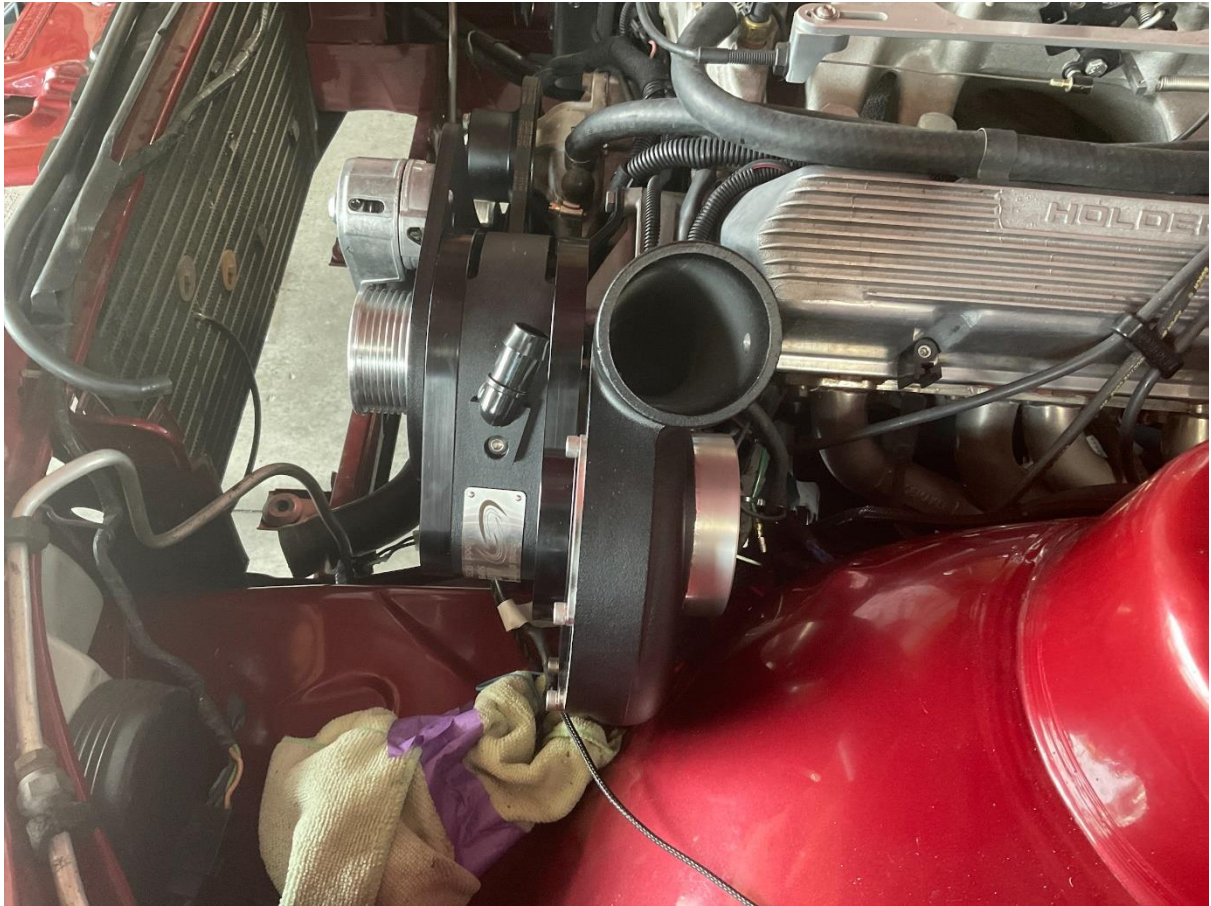
7 Rib belt and pulleys

NOTE: There are 2 blanking stainless set screws for the compressor housing tapped holes that will end up behind the transmission of the SC – once you have determined the position of the compressor cover for your custom installation

Apply Loctite RED/GREEN/BLUE to the set screws and screw in until flush – you must do this otherwise you will have a BOOST LEAK to atmosphere







Intercooler/s

IDEALLY USE WATER INJECTION FROM AEM OR OTHER REPUTABLE COMPANY, leave Air to Air intercooling as last option for these low boost systems

It must be a vertical flow type, we did a lot of research years ago and it is essential to go vertical flow, cross flow reduce pressure dramatically

This picture is an example of a vertical flow cooler. Select a cooler with 3" inlet/outlet.

Under no circumstances use a normal cross flow cooler, terrible restriction/loss of boost and no supercharger warranty will be granted.

A manufacturer of vertical flow intercoolers is Treadstone Performance USA



[Intercoolers \(treadstoneperformance.com\)](http://treadstoneperformance.com)

Example of Water methanol injection kit by AEM – Stage 2. AEM 30-3300



BOVS

STRICTLY ONLY USE THE GREDDY TYPE S OR FV BOVs with this supercharger – otherwise supercharger transmission can be damaged and **WARRANTY WILL BE VOIDED**

For INTERCOOLER SETUP's 2 x BOV must be installed, with springs set to 2.0Kg seat pressure, one on hot side and one on cold side of intercooler system.

See examples of these valves below



PARTS YOU NEED TO SOURCE ADDITIONALLY:

Fuel injectors – 40lb plus

Air ducting into supercharger – 3.25” or larger

Air ducting from SC to throttle body – some various sizes needed

BOV Mount

2 BAR Map sensor

Engine breather hoses

You would option to go with a MAFLESS tune

High flow fuel pump around 300lph+

If going intercooled review that section of this document, a lot extra piping and hosing needed – and associated boost pressure LOSS

We recommend a high end water injection system to be a great way to cool down the air charge if you want to

Charge temperature will be around 85 Celsius with the supplied pulley – so the water/meth or intercooling will be of significant benefit if applied properly

Budget items for fuel systems

KEMSO fuel pump 325lph, find these on Ebay – typically around \$60 – proven to work very well



For fuel injectors, a 60lb/650cc Seimens injector is more than enough and easy to source for a decent price OR the white 36lb BOSCH for those with stock, cam and heads



Exhaust suggestions

High flow header and a MINIMUM of a single 3" catalyst with 100cpi followed up with 3.0" catback with very straight through system (glass pack mufflers etc). Ideally one catalyst per cylinder back with 100 cpi is the best solution

Other 304 related suggestions

The valve train components – valve springs, collets and retainers on the stock engines are extremely frail, junk parts, replace these items or risk dropping a valve after supercharging.

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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

OLD COMPLETE KIT FITTING GUIDE

This has been added to help customers doing a more or less standard installation on VN – VS models

It's a bit mixed up, but take your time and you may find helpful info

- Remove all engine covers
- Remove air box and associated plumbing from vehicle.

- Remove injectors and fit the new supplied items, check each injector has 4 slots (white injectors only) and only use the top slots when refitting the injector clips. This will position the injectors lower into the manifold for proper sealing on the 36lb units. If you have been supplied with 42lb injectors just remove old injectors and install the new injectors.

- Remove sparkplugs and fit supplied plugs. Check gap is .9mm

- Next task is to fit spacer (THIS STEP NOT FOR VT V8) behind the fan as shown in image. The installation of this piece can seem impossible however the follow information will help. Loosen all belts before beginning this task.

Remove fan cowl screws

Remove 4 bolts holding fan hub and remove cowl, fan and fan hub from vehicle completely taking care to not damage radiator

Remove fan from hub

Install the new longer bolts (supplied) into the fan flange

Refit engine fan to alloy hub insert respective bolts and tighten properly

You should now have the new bolts through 4 bolt steel flange ready to re-install cowl, fan and fan hub back into vehicle in one operation.

STOP THIS TASK and put the completed assembly to one side, the parts will only be refitted AFTER brackets and crank pulley have been fitted. While these parts are not fitted to vehicle it makes it very easy to fit the brackets



- Fitting additional alloy crank pulley to original pulley assembly. The new piece fits to front of original pulley after you remove the 4 bolts from front of pulley that currently hold pulley assembly together. CLEAN inside original pulley assembly to remove debris that may prevent alloy piece from seating properly. Take the alloy pulley and fit to front of original crank pulley assembly using the 4 supplied bolts and tighten properly.



- The cruise module moves to a new location in front left hand corner of engine bay. The cruise control output cable is looped around the spring tower in order to get control of the excess length. Fasten to body to prevent movement of cruise unit.

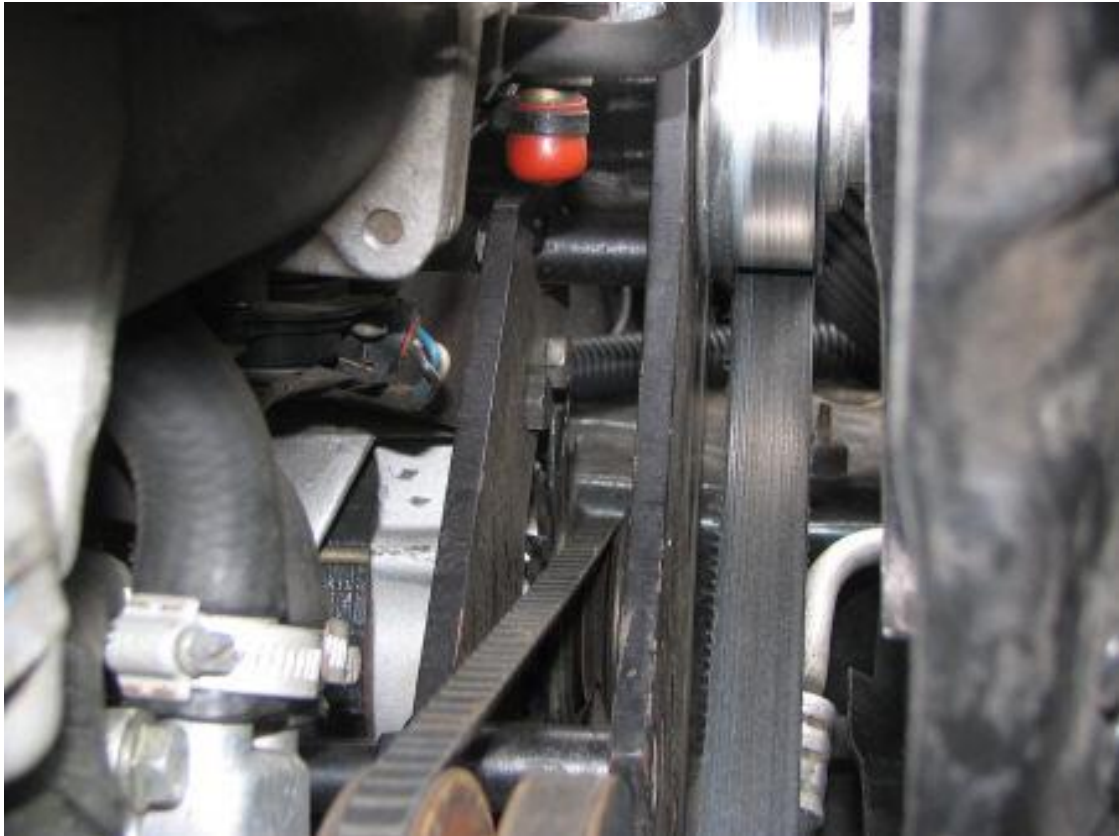




- Moving the igniter module. The image below shows the ignitor assembly in a new position against spring tower and inner guard, the ignitor module takes the place of the cruise control assembly. Remove ignitor from current position and refit using single fastener to this new position, the threaded hole is original to car. EXTREMELY important, the earth wire end must be ULTRA clean and bolt fastened very securely or vehicle WILL NOT START. In the instance vehicle cannot be started then double check this connection for clean and tight fit.



- Fitting bracket/s to engine with complete SC assembly. Firstly disassemble the entire SC mounting bracket itself noting what goes where. There are 2 bolts in the alternator bracket which will need to be removed but no need to remove alternator, be sure belt is loose and that adjuster screw is tight, this will hold alternator in place while inner mount bracket is being fitted. There are spacers and bolts to mount this inner plate. Take care to reinstall earth wires on same bolts that they are originally fitted too. The auto tensioner unit will need to be removed from outer bracket plate to allow fitment of charger to bracket, refit prior to fitting SC drive belt.



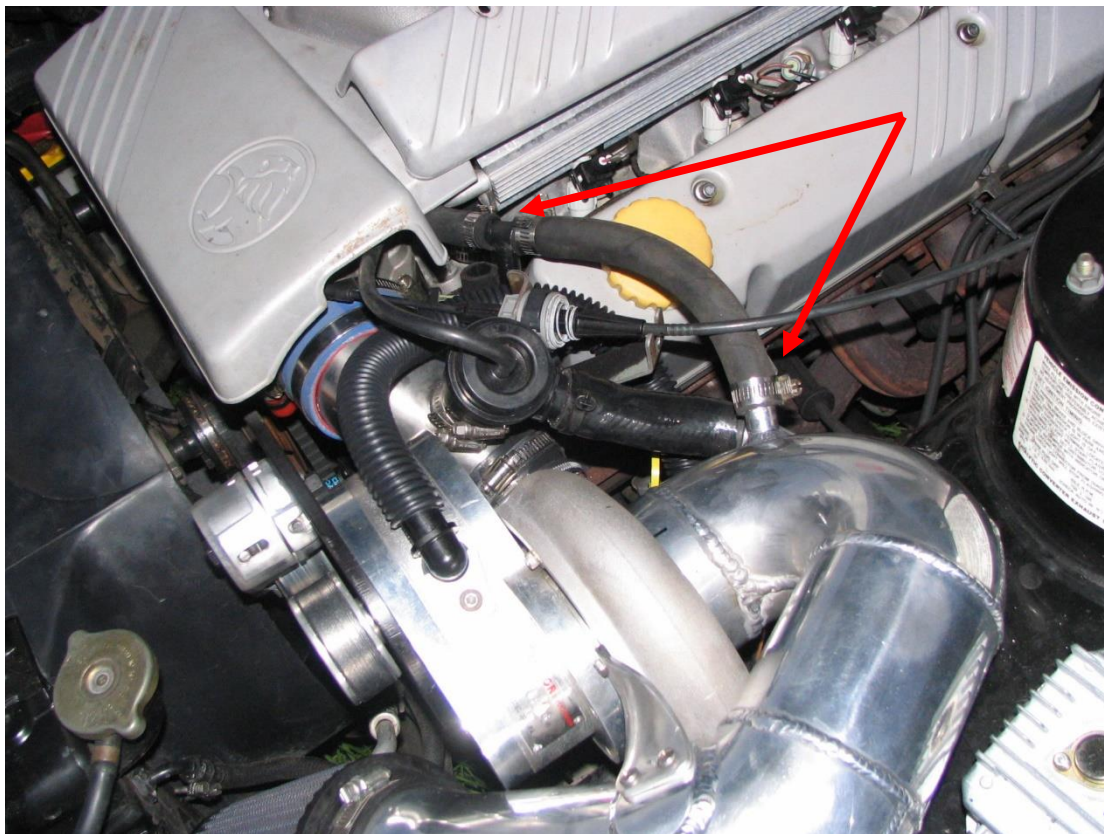
- Fit short aluminium section and 75mm silicone hose joint to throttle body of engine, also fit 63mm section of straight silicone hosing and all necessary hose clamps to supercharger outlet, these can (not an absolute must) all be joined together as bracket/supercharger is fitted to engine. If car is fitted with cruise control then the support post for throttle cables will be found to be partially in the way of the alloy piece you are trying to fit, if this is the case then remove support post from engine and grind away a decent amount of material until clearance for the alloy pressure pipe is obtained, sorry we don't have an image of this. Then refit support post and check for clearance.
- Now take second bracket with supercharger attached and carefully fit fasteners and spacers so the bracket is firmly bolted to the plate already fitted to engine. Tighten all bolts securely with appropriate tools. We will not replace damaged allen head bolts for you. See image below for correct orientation of supercharger on its mounting bracket. The top of bracket is pretty much horizontal, blower mounts tipped down just below horizontal. Mounting screws are supplied.



- Now refit all the engine fan and shroud assembly
 - Refit all engine drive belts and tension as per standard specification
 - Fit supercharger belt and check tension range on tension indicator
-
- Crank case ventilation lines. The breather outlet on front of passenger side tappet cover can be removed from cover by gently twisting and turning it out with a set of multigrips, once it has been removed refit the part with outlet facing vertically up.
 - Also remove breather line from throttle body and blank with blanking plug as shown (red plug) in image. Plug supplied will be black rubber plug with hose clamp fitted to it ready for installation.



- Locate the 2 lengths of 16mm tubing, the longest piece runs from drivers side breather let across to near the passenger side out let, fit T section to connect both and then use shortest section to connect from T section to 16mm pipe on supercharger intake pipe. The red arrows show T connector and breather inlet on supercharger intake, no hose clamps are necessary for any part of this breather hose network.



- Adjust and tighten all the hoses and tubing between supercharger outlet and throttle body.
- Locate the Bosch CBV and fit to discharge port on alloy pipe section between supercharger outlet and throttle body. There will also be a section of 25mm hose then to connect CBV outlet to 25mm tube on supercharger intake pipe, fit hose clamps and tighten.
- Now take vacuum line which is already fitted to CBV with T attached and connect into line shown in image. The vacuum outlet is located on front of throttle body.



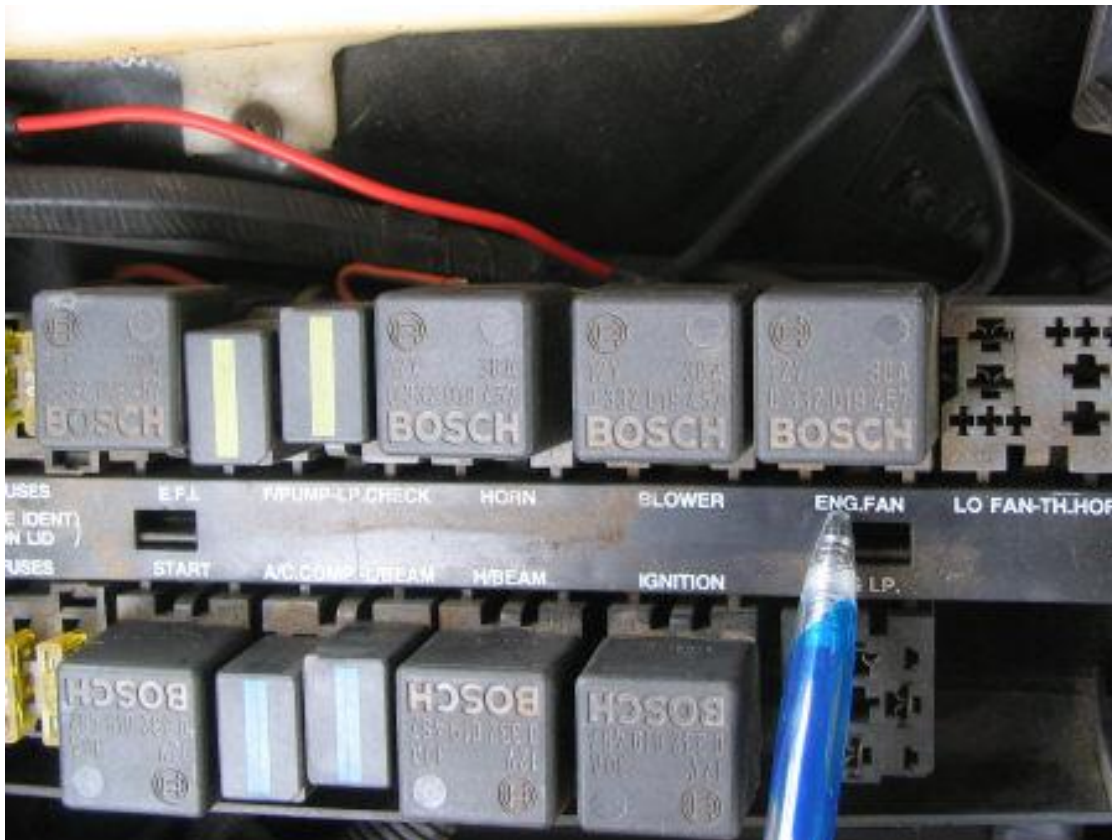
- The boost gauge connection can also be Teed into that same line as actuates the CBV
- Now locate the K&N airfilter and fit to supercharger intake pipe work as shown, slide filter into place and tighten clamp, make sure filter is not rubbing on anything.



- Mounting the cooling fan unit is easy; there are several large zip ties which you will use to tie fan unit into place at front of vehicle. Ideally unit will be located in a place that is protected from water spray and stones/insects. Zip tie unit into position as shown (mounted horizontally in image), do not tighten the zip ties excessively and deform the fan case.



- Powering the fan unit, any 12V key switched and fused power supply is fine, the power draw is 12W max or 1 amp. See image below for a location that has a key switch 12V power supply that you can tap into.



- Most important now is to run hosing from fan unit to supercharger connection port. The hose is fitted to fan unit by pushing hose 20mm into large hole in fan unit body, at supercharger end the hose is pushed onto the right angle plastic fittings on charger body. Choose the shortest possible route and avoid passing close by hot exhaust manifolds etc. If hose has to pass near to a hot exhaust manifold then use the supplied silver heat reflective tape to protect hose at that higher temp point. A single wrap of the self adhesive tape is sufficient to protect hose and wrap well either side of area being potentially affected by heat.

- Fitment of MAP (NOT RELEVANT TO VT) sensor, MAP sensor is located on engine bay firewall on passenger side. Unplug the stock MAP sensor from location shown and install the newly supplied item, item has been modified to plug directly into the original plug. Modification of the MAP involved removal of very small protrusions in each pin hole (3 pin holes), these have been removed so the stock plug will go in without problem. The vacuum line which connects to MAF is also suitable as a signal line for a boost gauge, see T section directly below biro can feed a compound boost gauge.

FOR VT 5.0/5.7 SIMPLY FIT AIFLOW METER TO SUPERCHARGER INTAKE, THEN FIT AIRFILTER TO THAT.



- Start vehicle and be ready to immediately to shut it down, all sounds other than a loud whistle from the supercharger should be immediately traced and inspected for cause.

THE END