



# Holden Commodore VT – VY

## V8 5.7 Liter LS1 engine (stock stroke)

### Partial Kit 450 – 600rwhp

Congratulations on the purchase of a Raptor Supercharger system for your Holden LS1. 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 purchase this partial kit



## **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
- You only need about 1 hr to fit this kit
- 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 LS1

1. Mounting bracket with idlers
2. Raptor RCBX supercharger – air cooled fitted with 74mm pulley
3. Supercharger cooling fan kit – including a universal mounting bracket, hose, electrics
4. Drive belt – 6PK2035
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. 2 BAR MAP sensor
8. Air filter
9. Random pieces of 4" silicon and joiners to make up an intake pipe

### Performance Expectations and limits of the kit

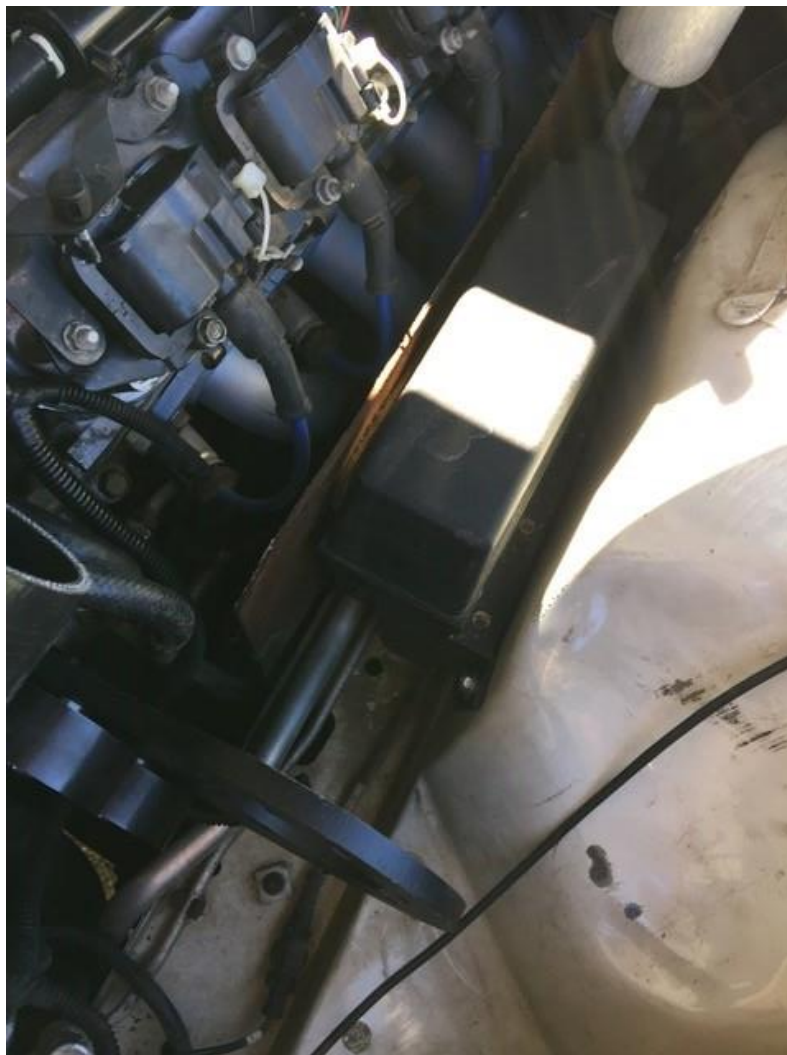
1. 9-10psi psi boost measured at the supercharger outlet. If you fit a restrictive intercooler and only have 6psi manifold pressure – do not call us for a solution.
2. Fit the largest possible filter, a 4" inlet is necessary
3. Warranty – 6 months, we don't have control over the final assembled product 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 or 2 for intercooled**
5. Supports up to 550rwhp easily on a well prepare engine with manual trans – 600rwhp is possible with decent camshaft and exhaust package – and of course a good tuner

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

1. Remove the original airbox, and associated plumbing
2. You are going to need to relocate the ECU so there is sufficient space for the air intake to the supercharger – picture below shows the factory location of the ECU
3. You need to relocate the Coolant header tank
4. You need to source some fuel injectors around the 60lb range
5. Your need to source a high flow fuel pump – 325lph or greater
6. Figure out who will tune your vehicle, a good reputation and experience is essential



ECU – Engine computer stock location – passenger side – locate it elsewhere

## How your supercharger is shipped

As in the picture below the supercharger is mounted to the bracket with 4 screws, 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.

You can also rotate the compressor housing a small amount clock wise, loosen the 6 allen headed cap screws a few turns, then you will find you can lightly tap the snail off its mount a fraction and then rotate it on its mounting flange. Be sure to tighten screws when complete, do not over tighten, stripped threads will ruin your day!!

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



## Mounting the supercharger to the engine

1. The supercharger bracket mounts on the two bolts of the power steering pump and another bolt located along further on the front of the motor
2. Remove the Power steering pump bolts and the other bolt
3. Slide the bracket with supercharger in behind the PS pump pulley, you need now to slip the short spacers in between the SC bracket and the PS pump body, install the longer allen headed cap screws and washers, then fit the other long spacer and bolt at the nose of the bracket, tighten all three fasteners securely – do not use locking compound.
4. Remove old engine belt, and fit the supplied belt – the belt comes off the top of the PS pulley, under the top idler, around the SC pulley, then over the top of the bottom idler and then down to crank pulley etc, the rest of the run is as per stock LS1 belt routing



## Setting up the plumbing into and out of the SC

The 4" or 100mm pipe can fit underneath the SC and then go towards the radiator panel direction

See picture on this page and following page for how it can be laid out

### AIR IN

Never use a filter mounted directly onto the SC sucking from above the exhaust manifold unless you are wanting low boost and low horsepower numbers – and maybe even other damage

In this image you see part of the OEM intake pipe being used



Once assembled with the pieces as in previous picture you can set up the assembly to run under the supercharger to a cooler air area





Engine breather can be connected in this manner, we suggest using a catch can "in line" to prevent crankcase vapours entering the supercharger.



## AIR OUT/BOOST SIDE

The supercharger outlet is 3"/76mm and the LS1 throttle body is 4"/100mm – various silicone pieces needed

You will likely need

1 x 4" to 3" reducing bend

2 x 3" 90 degree bend

1 x 3" BOV mount – these are available on Ebay



## 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)

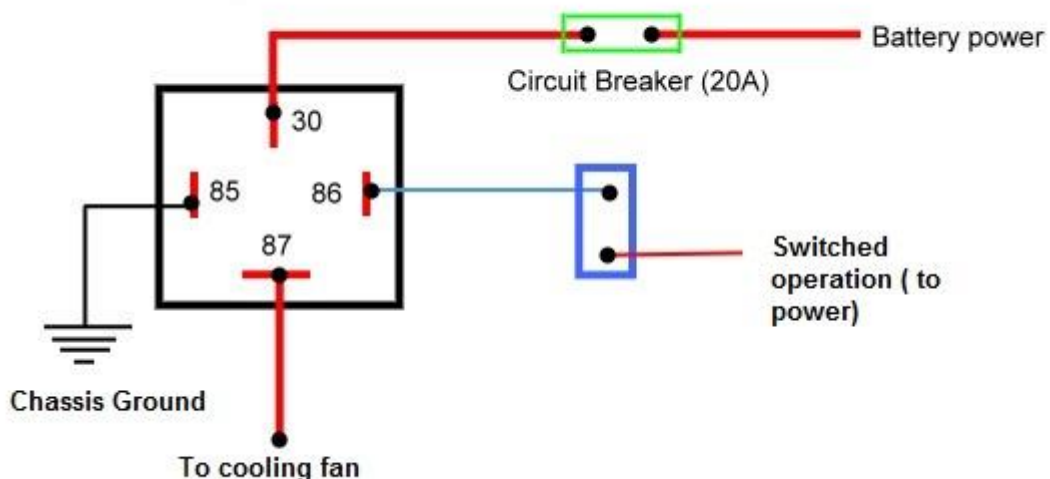
Your Black fan earth wire should ideally go to chassis or even back to the battery

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



### If an intercooler is added

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

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.**

If, you do install an intercooler and you are getting fluttering or choo choo sounds from the system, immediately check you have TWO BOV installed with 2.5kg springs – one hot side, one cold side. Compressor surge will absolutely destroy the supercharger transmission

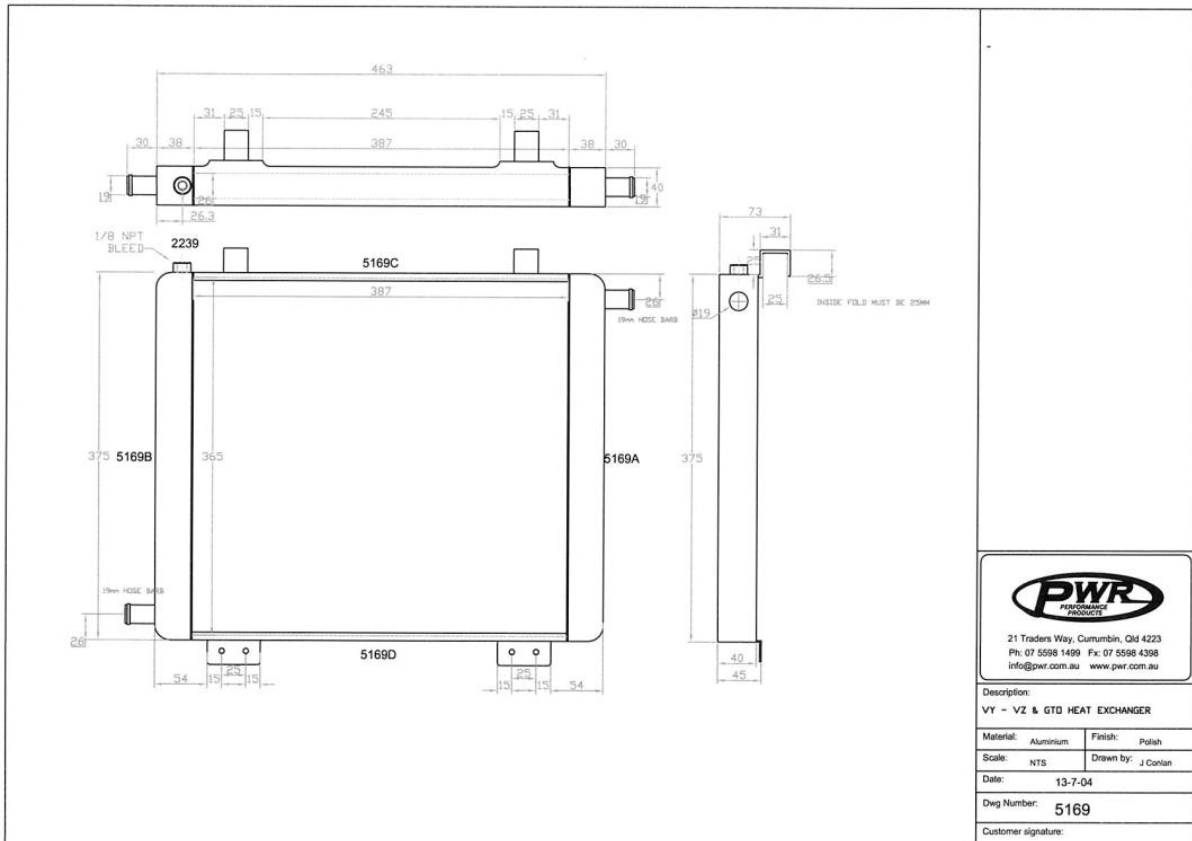
A manufacturer of vertical flow intercoolers is Treadstone Performance USA



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

## Water to Air intercooler

Can be considered. PWR have a complete WTA radiator 5169, all you need to do is organise the water intercooler part and pump/hoses



## Water injection

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



## Snow Performance kit



## 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. **Failure to follow this guidance will result in rapid failure of the supercharger internal drive belt.**

See examples of these valves below





## PARTS YOU NEED TO SOURCE ADDITIONALLY:

Fuel injectors – 650cc/60lb

Air ducting into supercharger – 4” or 100mm size

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

Additional BOV if intercooling

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 99celcius with the supplied pulley – so the water/meth or intercooling will be of significant benefit if applied properly

Budget items for fuel systems -  
WALBRO 460 pump is a good starting point



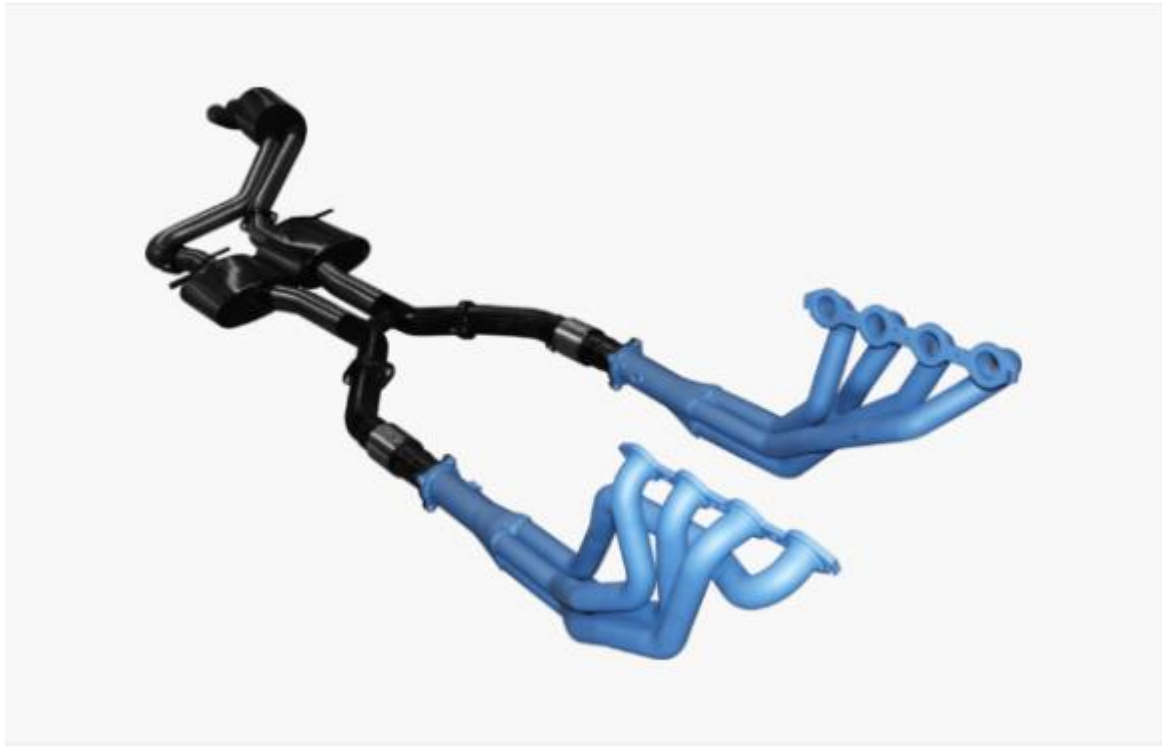
For fuel injectors, a 60lb/650cc Seimens injector is more than enough and easy to source for a decent price



## Exhaust system recommendations

You need to have a minimum of something like this MANTA system shown below

Supercharged engines have high gas flow rates and therefore need high flow exhaust to make the decent horsepower numbers



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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 BEFORE ANY FULL THROTTLE ROAD DRIVING**

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.