



HOLDEN COMMODORE VT-VY V8
5.7L GEN 3 (1999-2004)

**VORTECH POWER STEER DRIVE
SUPERCHARGER KIT
INSTALLATION MANUAL**

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INTRODUCTION

Congratulations on selecting the best performing and best backed automotive supercharger available today. Before beginning installation, please read this instruction booklet thoroughly.

CAPA Supercharger Systems are a performance improving device. This product is intended for use on healthy and well maintained engines. Installation on a worn-out or damaged engine is not recommended and may result in failure of the engine and or the supercharger. **CAPA IS NOT RESPONSIBLE FOR ANY DAMAGES RESULTING FROM THE USE OF THIS KIT.**

For best performance and durability please take note of the following key points:

1. Use minimum of 96-98 RON unleaded fuel.
2. The engine must have stock compression ratio.
3. If the motor has been modified in any way, check with CAPA prior to installation.
4. Change your engine oil and oil filter. Refill with the best synthetic oil available.
5. Check that all components of the ignition system are in top condition.
6. Cold Starts - Never race your engine when your engine is cold. Allow water temperature to rise up to operating range before driving above 2500 r.p.m. Engine damage may result in high r.p.m. and boost conditions when cold.
7. Always listen for signs of deterioration (pinging) and discontinue hard use (no boost) until the problem is resolved.
8. Change Engine oil and oil filter every 5,000km. **OVER FILL OIL BY 0.5 LITRE WHEN KIT IS FITTED.**
9. Always use an air filter.
10. Never strike the supercharger pulley with a hammer or other tools. **Evidence of such force will void warranty.**
11. Re-tension belt after 500-600km, if not sooner. The belt will stretch during initial break-in period. Tighten belt only enough to stop slippage (the belt must still have some flex), over tension of the belt is the cause of input bearing failure.
12. Disconnect PCV hose at tappet cover before filling engine with oil. Failing to do so will result in engine damage.
13. Never over-rev supercharger. Internal step up on a Vortech V-3 Supercharger is 1.0 to 3.60. Impeller speed must not exceed 50,000r.p.m (**Sealed Vortech**).

Impeller speed calculated as below:

Vortech V-2 / V-3 Supercharger

$$\frac{\text{Crank Pulley Diameter}}{\text{Supercharger Pulley Diameter}} \times 3.60 \times \text{Engine RPM} = \text{Impeller Speed}$$

14. Never hold RPM on Rev Cut as this will cause damage to the engine by detonation.

NOTE: The reason for grooved belts to move over one or more grooves or come off completely is always due to an alignment problem. Misalignment can also be caused by over-tightening of the belt - which may damage the drive system.

GLOSSARY

COMPRESSOR HOUSING

The housing, which makes up the enclosure portion of the compressor. Also referred to as the volute, scroll or snail.

COMPRESSOR SURGE

The phenomenon that occurs when the pressure ratio is too high for a given flow, or impeller speed. All centrifugal compressors can experience it. In automotive use it is most often found during decelerations when the engine speed is still high and the throttle is closed.

DETONATION

The uncontrolled rapid expansion or explosion of the air/fuel mixture in the combustion chamber.

GAUGE PRESSURE

The measure of pressure above atmospheric pressure.

IMPELLER

The bladed wheel inside the compressor housing that accelerates the air.

INDUCER

The air inlet portion of the compressor.

NATURALLY ASPIRATED

An engine without a supercharger.

PRESSURE, BOOST

The difference in pressure between barometric and intake manifold absolute pressure on a supercharged engine (read as gauge pressure).

PRESSURE, ABSOLUTE

The sum of gauge pressure and atmospheric pressure. One standard atmosphere = 29.92 in. of mercury (Hg) = 14.696 lbs./in.² (psi)

PRESSURE RATIO

Manifold absolute pressure divided by standard barometric pressure.

$$P.R. = \frac{\text{gauge pressure} + \text{atmospheric pressure}}{\text{absolute pressure}}$$

STOICHIOMETRIC

The correct chemical mixture of air and fuel to yield complete combustion.

KITS PARTS LIST

Part no.	Description and Size	Quantity	Checked
1.	Power Steering Pulley (Multi-rib)	1	
2.	1" x 3/8 NC Power Steering Pulley Retainer bolt	1	
3.	Vortech supercharger with 3.7" 8rib pulley Machined 4mm	1	
4.	Vortech supercharger mount Bracket	1	
5.	1/4 x 3/8 cap bolts and spring an flat washers	5	
6.	Supercharger Bracket Spacer - 70mm in length Tapered	1	
7.	Shim kit - Bracket and Idler pulley	10	
8.	Vortech tensioner plate Ass.	1	
9.	LS1 Aluminium Idler Pulley 64mm	1	
10.	Thin Head Bolts M12 x 20	2	
11.	M12 x 16 Bolt	1	
12.	Supercharger Belt 8pk 990	1	
13.	Larger Engine Idler pulley ribbed	1	
14.	Engine Belt 6pk1980	1	
15.	Assorted plastic ties	10	
16.	M10 x 110mm bolt, spring and flat washer	3	
17.	Spacer washers - Power steer to bracket spacers	2	
18.	Intake tube 1000mm x 90mm	1	
19.	3" 90° Rubber bend with Alum inserts - Inlet	1	
20.	84 -108mm Clamps	3	
21.	CAPA Air Filter	1	
22.	Air Filter Cover and screw pack	1	
23.	Alum. discharge tube with blow of valve Grommet 125mm and Air Temperature sensor	1	
24.	3" 90° Bend - special cut - Discharge tube to S/C outlet	1	
25.	4" 90° Bend - special cut - Discharge tube to T/ Body	1	
26.	65 - 89mm Clamps	1	
27.	Blow off Valve	1	
28.	2000 mm x 4mm vacuum hose	1	
29.	1200mm x 25mm blow off hose	1	
30.	PCV Breather Fitting	1	
31.	BOV sock and tie	1	
32.	Plastic ties Large	6	
33.	550mm x 20mm Conduit - Radiator over flow hose	1	
34.	150mm x 20mm Conduit - Power steering hose	1	
35.	Large Bolt head Self-Tapping (Computer re-location)	2	

Parts List continued on Next Page...

KITS PARTS LIST, CONTINUED

Part no.	Description and Size	Quantity	Checked
36.	T - Piece 4mm	2	
37.	1000mm insulation - Air/Con Pipe.	1	
38.	PCV Cap and clamp - small	1	
39.	1000mm 10mm PCV hose	1	
40.	4mm hose and 2 clamps 300mm - M.A.P sensor outlet	1	
41.	500 mm - 2 core wire and conduit - temp sensor extension wire	1	
42.	150mm wire shrink wrap	1	
43.	Premium Unleaded & Synthetic Oil Only stickers	1	
44.	Precaution Air inlet low sticker	1	
45.	VY On PCV 3/8 T-piece and Extra Hose	1	
46.	Fuel Line, Silver Stick Insulation	1	
47.	Large Throttle Body Bend Clamp	1	
LS1 Oil Feed & Drain Supplementary Parts:			
	Oil Feed Line and Fittings	1	
	500mm ½" Oil Drain Hose and Conduit	1	
	Oil Drain Clamps MH6	2	
	Sump Oil Drain Fitting	1	
	Rotor Broch Tool and Cutter	1	
LS1 Sealed Vortech Supplementary Parts			
	Reservoir bottle with cap.	1	
	Bottle mount bracket	1	
	Bottle Mount Bolts 1/4 x 1/2 " NC	2	
	¼" oil supply/breather hose 1200mm	1	
	Assorted Cable ties	5	

Important before beginning installation, verify that all parts are included in the kit - report any shortages or damaged parts immediately.

PREPARATION & PART REMOVAL

NOTE: Fitment of this kit requires the removal of the factory power steering pulley. You will need a special tool for this (we use a power steering removal tool manufactured by ABW, part number 70832). This tool is available from most automotive tool suppliers.

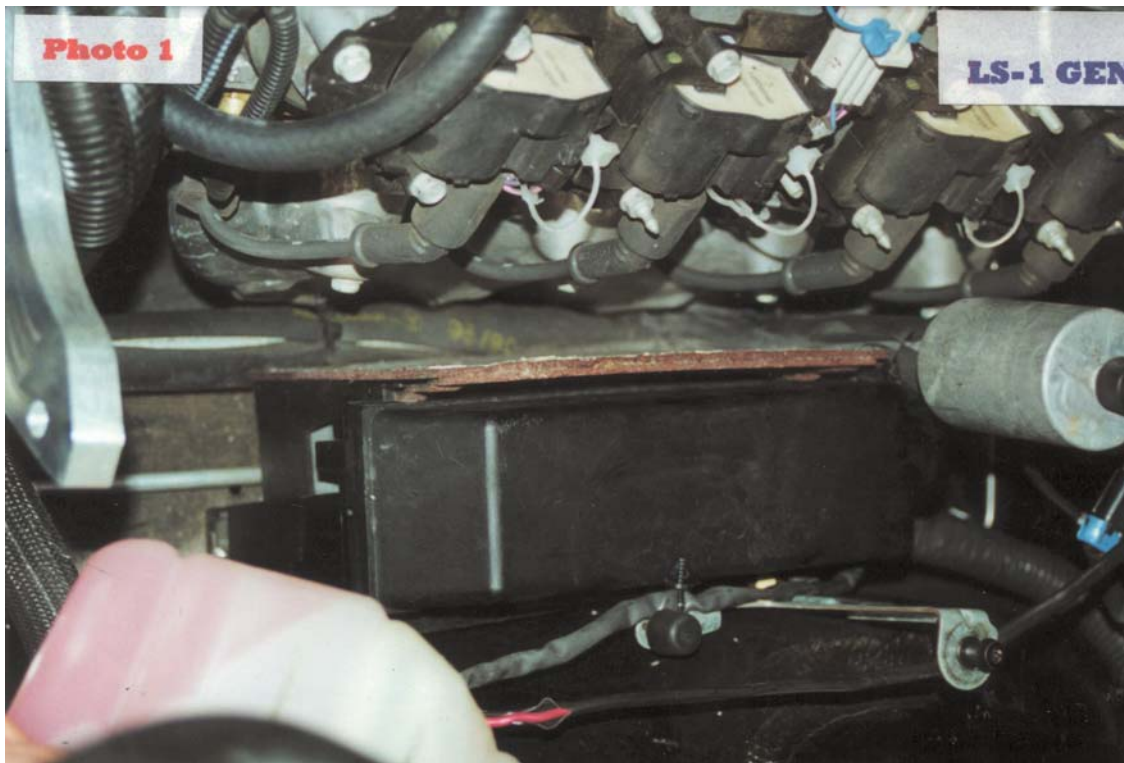
1. Drain and refill engine oil (**over filling by 0.5 Litre**)
2. Replace Engine Oil filter
3. Remove Air box and intake ducting.
4. Remove Engine Cover.
5. Remove Radiator reservoir from mounts and swing forwards
6. Remove Radiator top cover.
7. Remove Radiator cooling fan assembly.
8. Remove front Bumper assembly.
9. Disconnect and remove left-hand headlight.
10. Remove engine belt.
11. Remove Tensioner pulley.
12. Remove Power Steering Pulley - **with correct tool.**
13. Remove Power steering securing bolts.
14. Remove Washer Bottle.

SPECIAL TOOLS

- dyno or use of
- accurate air fuel ratio meter
- boost gauge
- long straight edge
- power steering pulley remover

INSTALLATION

1. With computer and box removed from mounting. Fit insulation supplied to Air Conditioning tube. Bend tube slightly towards engine to make room for computer box to be located back towards firewall. Trim bolts back on reservoir bracket. Refit computer box with new bolts supplied. Refit computer and lid. **(See Photo 1.)**
2. Trim Computer box heat shield and slip back into position. **(See Photo 1.)**
3. On engine tensioner assembly. Replace ribbed idler pulley situated near top radiator hose with replacement pulley in kit.



VORTECH OIL DRAIN AND FEED SUPPLIMENT

INSTRUCTIONS

1. To provide an oil drain for the supercharger, it is necessary to make a hole in the side of the sump. Locate and centre punch where the hole is to go. **(See pic)** (Needs to be high enough to clear bottom of sump and across enough to miss internal wall in sump. Drill 1/8" pilot hole at centre location.



This area is situated on the passenger's side of the sump, up on a diagonal from the front edge of the steering rack.

(Note faint line markings on sump. This indicates floor of sump as well internal cross brace)

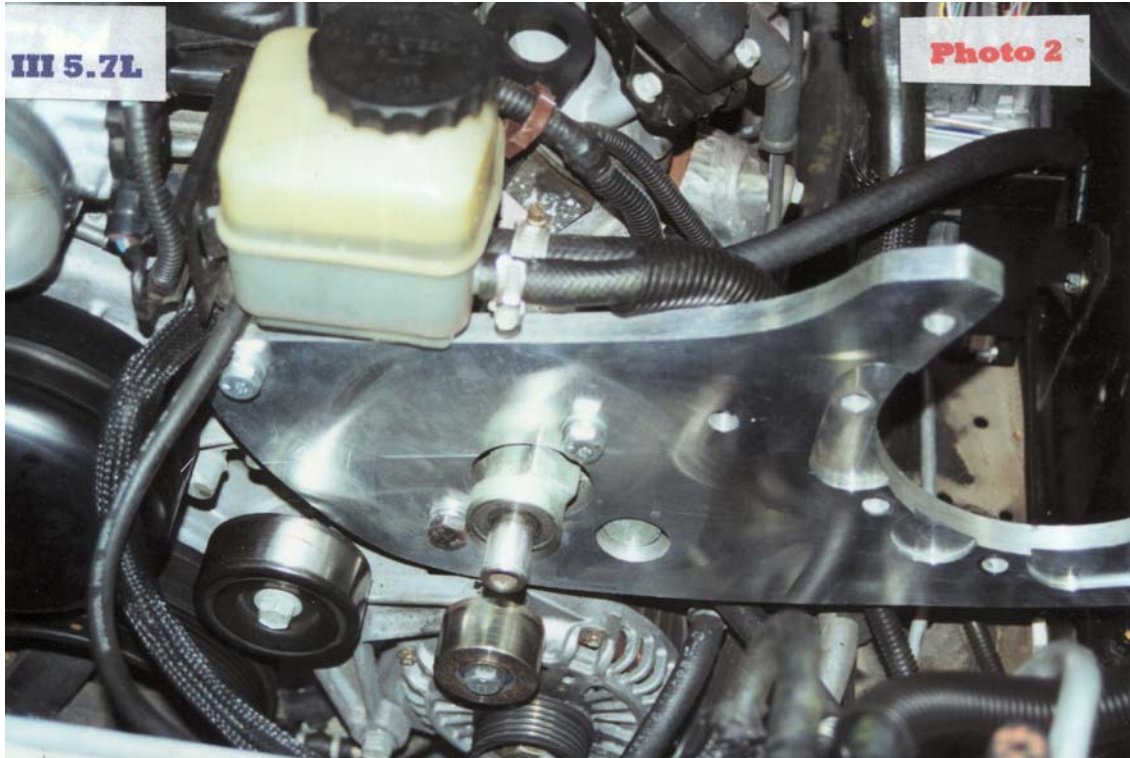
Using the 9/16" Rota-broach supplied to drill a hole in the sump. Break through the pan easily so that the cut out piece does not go into the sump. Once hole is cut, tap the hole with a 3/8"NPT tap until the fitting can be started. Ensure the flutes of the tap are packed with grease to hold metal fillings. Thoroughly clean threaded area, cleaning into the sump, ensuring all metal filings have been removed. Fit the 3/8" NPT hex nipple in new hole formed, ensuring a generous amount of Loctite is used to ensure a seal is formed. Screw elbow fitting to this with final position of the fitting pointing towards where the supercharger is situated

2. Remove the two bolts holding the small casting located above the oil filter. **(See Pic)**



Drill through the existing hole in the casting neck with a 8.5mm drill bit and tap 1/8" NPT. Clean thoroughly to remove all metal fillings. Install the supplied 1/8" NPT to #4 straight fitting so it will point forward and away from the exhaust when installed on the vehicle. Attach oil feed line to the now oil feed line once back on the engine routing the hose along base of engine, utilizing clamps supplied to prevent hose from kinking, abrasion etc up to where the supercharger is situated.

4. With steel spacer supplied. Fit bracket to power steering pump and cylinder head. Fit two washers supplied on the bolts affixing power steering pump to cylinder head, between bracket and power steering pump to space bracket out. Nip bolts up. Check clearance on inside bolt and spacer, so bracket does not deflect when bolt is tensioned. Tension all three bolts. **(See Photo 2.)**
5. Fit conduit over power steering hose to protect it over top of bracket. **(See Photo 2.)**



6. Fit the Power steering pulley supplied. Warm pulley. Apply a smear of grease on power steering shaft. As the power steering pulley is pulled on, measure that the power steering pulley is in line with the other three pulleys. Fit retaining bolt supplied. **(See Photo 3.)**



7. Fit new belt back on vehicle in the same fashion as the original belt

Note: Belt will be tight to get on and the tensioner fully sprung, make the water pump the last to slide over.

8. Position supercharger in bracket. Do not fit washers on second to top bracket bolt as tensioner will hit on bolt head.

Note: Sealed Superchargers - Please Refer & complete **sealed supercharger instructions** before fitting tensioner plate assembly.

9. Fit tensioner assembly to supercharger unit. Shim pulley as required. Fit supercharger belt and tension. Tension by using ½ Breaker bar placed in square cut out. Tension and tighten bolts. Check pulley alignment. **(See Photo 14)**

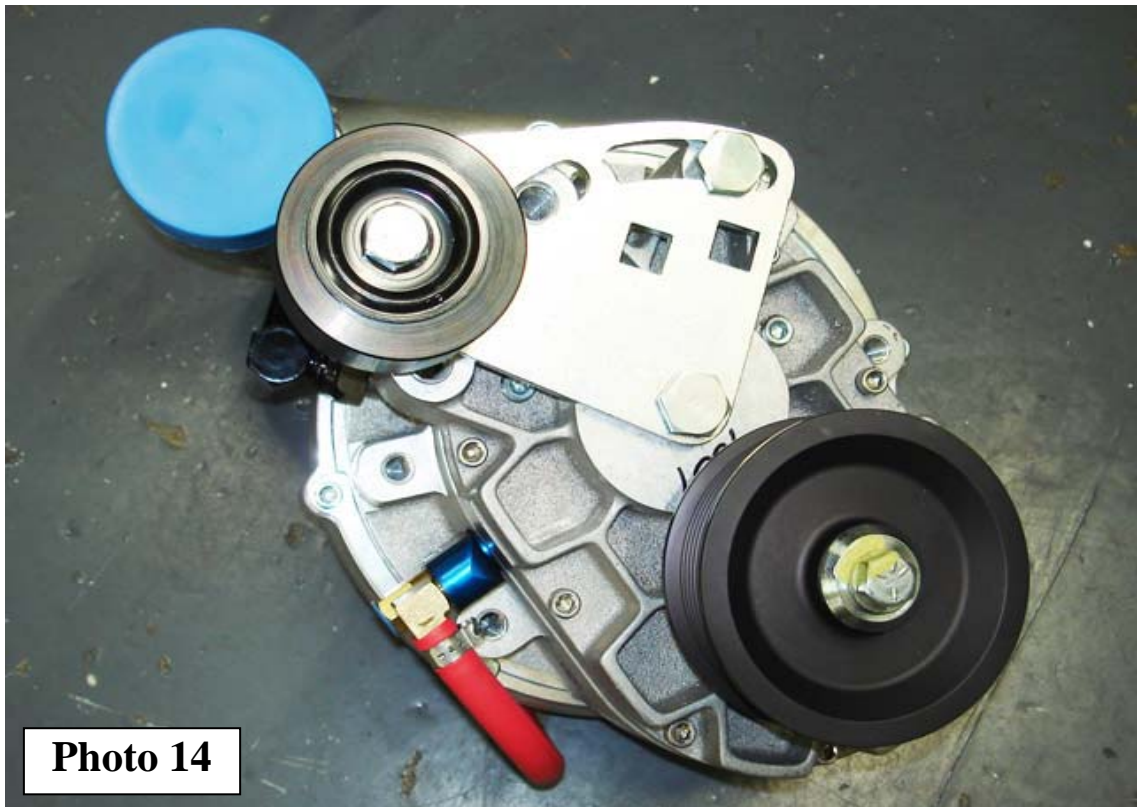


Photo 14

10. Refit cooling fan assembly

11. Fit the 90° 3" hose to the Supercharger outlet. Position Aluminium tube so that the blow-off valve grommet is facing forward towards the fans. Using CRC or Teflon spray, fit the 4" 90° to the throttle body and then clamp in position on Aluminium tube. **(See Photo 5.)**



12. Connect the blow-off valve to the Aluminium tube. Connect Blow-off valve to 25mm Blow-off tube supplied. **(See Photo 5.)** Route the pipe along the front, fit sock to tube, slide hose down towards chassis rail to quieten blow-off valve noise. **(See Photo 11.)**

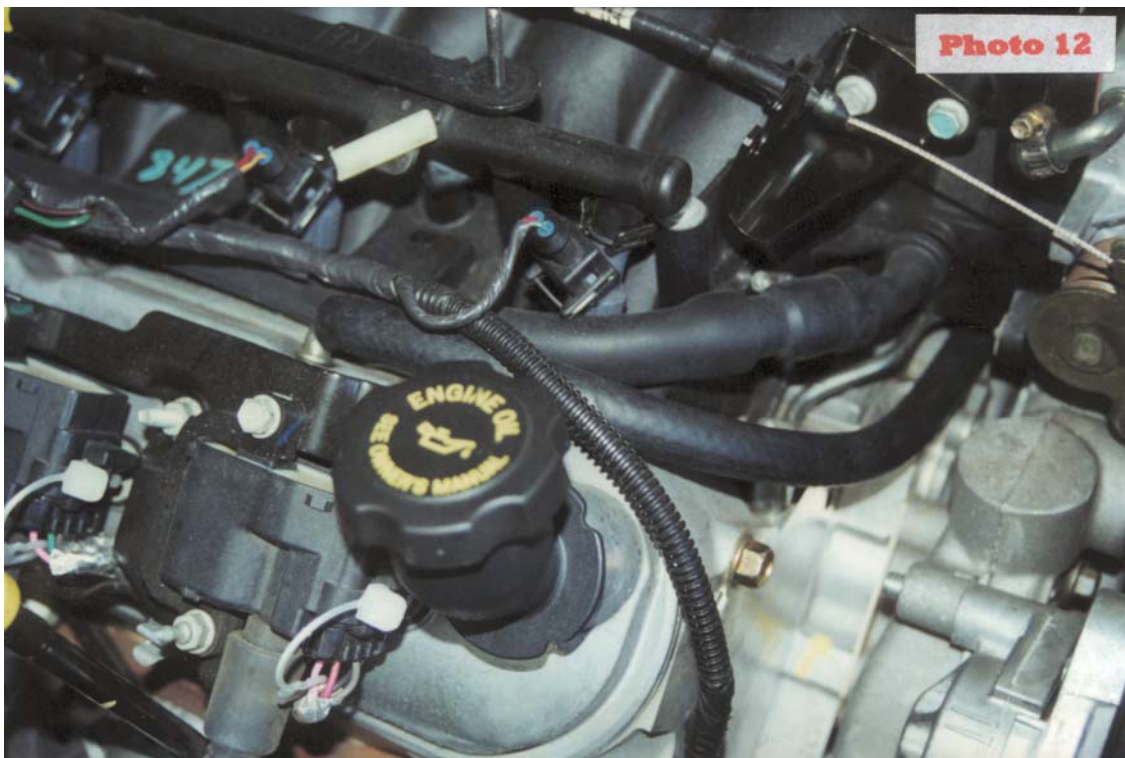


13. Disconnect the PCV breather hose from the throttle body. Using the plug and cap provided, cap off throttle body PCV outlet. **(See Photo 5.)**
14. Run PCV hose from tappet cover to intake pipe. Connect to PCV/BOV return sleeve. **VY on link tappet cover breather to t-piece and hose supplied from PCV under manifold. (See Photo 11&12.)**



WARNING: If PCV is not rerouted, boost will pressurise the sump and damage engine.

WARNING: Remove PCV hose at tappet cover when filling engine with oil. Oil may drain into PCV hose and damage engine.



15. Cut loom and extend air temperature sensor wires (**some models only**). Do not mix wires up. Connect to new sensor in aluminium discharge pipe near the throttle body. Plastic-tie wires where ever possible and conduit.

16. With left-hand headlight removed fit intake angle. Long end of angle in towards the intake duct, short end to Air filter. Fit clamp and tighten. Fit intake duct through to supercharger. (Fits in corner under blinker) Fit air filter element to other end of rubber 90 degree and tighten clamp. **(See Photo 6.) The tube will fit snugly through the head light cavity, under the headlight. Spray the Intake tube with CRC, then slide head light into position. This will ensure that intake does not grab and pull, making it hard to refit headlight.**



PRECAUTION: The air filter is mounted in this position to ensure that it collects the cold air without being effected from engine bay temperature. You will notice that its position is lower on the car than original mounting position. Take this into consideration when attempting water crossings in extreme conditions the possibility exists of WATER ENTERING THE INTAKE. ENSURE ALL DRIVERS ARE AWARE OF THIS POSSIBILITY AND TAKE NECESSARY PRECAUTIONS

17. Fit air intake tube alongside blower and inner guard. Connect to rear of supercharger. Before Fitting, and tightening clamp, check position that PCV hose fittings will enter facing towards supercharger intake. With intake secured to rear of supercharger in the correct position, fit PCV and hoses to PCV Return Sleeve. **(See Photo 11.)**

NOTE: For water injection kit instructions, go to Water Injection Supplement. (Optional).



18. Re-fit front bumper
19. Fit wheel arch cover, fits to the front and bottom of wheel arch and meets up to the bottom of the bumper bar screw up into position.

NOTE: The cover boxes in the air filter. Stops water and dirt being flicked off by wheel.

20. Stick Fuel Line shield over fuel lines on driver's side chassis rail ensuring it is a tight fit. Secure with screws supplied and a bead of silicon
Test fuel pump system to ensure it maintains adequate flow and pressure at top boost, do this test with hot fuel and headlights on high beam.
21. Remove 4mm hose from rear of manifold on driver's side, near MAP Sensor (Hose that carries vacuum to heater assembly in cabin). Run vacuum hose from manifold to blow off valve assembly, Ensure all hose and clamp fittings are tight to ensure they will not blow off under boost. **CAUTION: Do not fit T-Piece after one way valve.**
22. Modify and fit engine cover back on motor (**See photo 10**). Allow relief for supercharger discharge. Re Fit Radiator surge tank.



23. Drain fuel tank and refill with Premium or Optimax 98 fuel.
24. Start engine and check that belts are running true and re ensure that all fittings are secured correctly.
25. Review 'Breaking In' procedure.

Sealed Vortech Supplementary Instructions

1. Mount supplied bracket to passenger side horn bracket behind strut tower with original horn bracket bolt (*See photo 13*).



2. Fit reservoir bottle to mount bracket with 1/4NC bolts supplied.
3. Connect oil line to fitting in the bottom of the bottle and clamp
4. Route the oil line along top of PCM cover to supercharger cable tie where necessary.

NOTE: After the final check list in the supercharger kit manual and initial vehicle start-up has taken place check oil breather/feed line for leaks

V-2 Sealed Supercharger Oil Fill Instructions

NOTE: Some oil is already installed in the supercharger unit, Take care not to spill oil during installation.

- Fit supercharger unit to bracket on car per instructions.



- Highlighted Section Signifies which bung is relevant to your application. Disregard other bungs as they are not used.
- Fit oil reservoir bottle in designated position as shown in manual.
- Fit oil line to fitting in bottle, taking care not to spill any oil and attach clamp.
- Remove oil level check bung in supercharger lid and add about 50cc of oil to reservoir bottle, this will fill hose with oil.
- Leave to stand for 10 mins to let oil drain through the hose and into unit.
- Check oil level at bung and repeat if necessary, until oil is level with hole.
- Replace bung in supercharger lid.
- Fit lid to oil reservoir bottle.
- Check Oil level at bung every 60 days And Replace every 12 months.

NOTE: Sealed Supercharger uses special oil. Only use oil supplied by CAPA.

WATER INJECTION (OPTIONAL)

Water injection is available and has its benefits.

1. Maintaining a cooler intake charge due to the evaporation of water.
2. Reducing heat soak at blower and inlet manifold.
3. Added protection for detonation on extremely hot days.

INJECTOR UPGRADE (OPTIONAL)

1. With tuning, the larger injectors will yield more power.

FUEL PUMP UPGRADE (OPTIONAL)

1. With larger injectors and tuning, in some cases the original pump cannot supply enough fuel. A high output pump will then be required.

BREAKING IN

Run motor at idle and fast idle for 5 to 10 minutes, do not rev up motor, then stop motor allow blower to cool for 10 minutes, then drive at no boost for approximately 10 minutes, not exceeding 3,000rpm, then allow blower to cool. Drive vehicle not exceeding 3,500rpm at no boost for approximately 100 to 150kms. This will ensure that the bearings and drive belt are run in before loading up the system by boosting. Always warm the motor - blower, before using boost. This will help in the life longevity of both the motor and blower. **Before driving, review the Final Check List. This procedure is very important and must be carried out to the letter.** Dyno tuning may only be done after this procedure is completed.

Do not dyno run car until the 100-150km has been driven.

GENERAL NOTES

It is the installer's responsibility to dyno the car to check that all systems are working correctly, especially maximum fuel delivery and to check for any presence of detonation.

Check boost on dyno and that advertised boost is not exceeded and rpm occurs at designated rpm.

Have injectors cleaned and flowed. A must on used injectors, peace of mind on new injectors.

Make sure that all fuel hoses are in excellent condition, or replace. Check that all clamps are tight and that there are no fuel leaks.

The blower will have a sweet high pitched whirring noise from the belt drive. As the blower goes through its running in time, the noise will slowly dissipate.



PRECAUTION: If the blower ever gets louder or starts to make an erratic noise or a noise through the intake tube, such as a air hissing noise, disconnect the blower belt and call CAPA for assistance and advice.

PRECAUTION: When replacing engine oil ensure that PCV breather hose is removed from the tappet cover. Failure in doing so WILL cause engine damage!

FINAL CHECKLIST

1. Carefully review the entire installation. Check oil and fuel lines near moving parts and the exhaust system to ensure that these lines are safe, secure and not twisted or kinked. All wires and hoses should be firmly secured with clamps or wire ties.
2. Check all fluid levels. Your vehicle should be filled with premium fuel before any driving. It is important that you performed an oil and filter change. If you did not do so before, it should be performed now before proceeding further.
3. Start engine and idle for a few minutes. Check your timing. You want to run as much timing as possible while avoiding detonation. It is better to lean on the side of less timing and no detonation!
4. Shut off your engine and check for fluid leakage, signs of rubbing parts, and other potential problems. Pay particular attention to fuel leaks, check by using CRC spray any vacuum leaks at base of injector.
5. Check nothing is near any hot spots.
6. Your vehicle should display a significant increase in performance when you step into the throttle, with no detonation, yet should maintain its previous driveability during daily driving. If this is not so, review your installation, then contact CAPA assistance.
7. For best performance and reliability, **always use premium or higher grade fuel** and listen for signs of detonation. Back off throttle should detonation occur. With a properly installed supercharger and appropriate timing, detonation should not be an issue.
8. Never race your engine when your engine is cold. Allow the water temperature to climb into operating range for several minutes before driving above 2,500r.p.m. to ensure adequate oil lubrication.
9. Please review the maintenance and warranty sections within this owner's manual.
10. Please take special note, operation of vehicle without all sub assemblies completed and properly installed may cause failure of major components.
11. After road test or first hard drive, check belts are okay and running properly in their grooves. Check the tension of belt and retension if necessary.
12. **Re dyno after 2,000km's**
13. **Vortech Sealed Unit Only:** Check supercharger oil level at every engine oil change/service interval. To check oil level ensure engine is at operating temp. Start engine and bring revs up to 3000rpm and hold for 15secs oil should start to rise into oil reservoir.

WARNING

1. DO NOT ATTEMPT TO OPERATE VEHICLE UNTIL ALL COMPONENTS ARE INSTALLED AND COMPLETE. SUPERCHARGER KITS EXTRUDE A HUGE AMOUNT OF HORSEPOWER FROM A STOCK ENGINE THEY ARE NOT INTENDED FOR CONTINUOUS OR EXTREME PERIODS OF MAXIMUM POWER OUTPUT. IT IS NOT OUR INTENTION TO CREATE RACE PROVEN HORSEPOWER BUT LEISURE ENDURING SYSTEMS.
2. WARRANTY POLICY FOR 6 MONTHS, UNLIMITED KILOMETRES COVERS FAULTY COMPONENTS PROVIDED IN SUPERCHARGER KIT. POLICY DOES NOT INCLUDE LABOUR TO REPLACE FAULTY PARTS.
3. THE RESPONSIBILITY OF ADR COMPLIANCE AND INSURANCE FOR THIS KIT FITTED TO A VEHICLE THAT IS ROAD REGISTERED AND DRIVEN IS THE RESPONSIBILITY OF THE VEHICLE OWNER.
4. RESPONSIBILITY FOR CORRECT FITMENT OF THE KIT IS THE REponsABILITY OF THE FITTER.
5. DAMAGES TO VEHICLE OR SURROUNDS IS THE RESPONSIBILITY OF THE VEHICLE OWNER. PROVIDED THE KIT FITMENT IS CORRECT, ACCORDING TO THIS MANUAL.

GET OUT THERE & ENJOY...

