



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

**VORTECH CRANK 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. 8-Rib Manual Tensioners - 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.<sup>2</sup> (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
	Crank Pulley 8rib	1	
	Balancer Assembly.	1	
	Crank pulley bolts 3/8 x 3" NF Spring and flat washer	6	
	Balancer Locking Pin Kit	1	
	Supercharger assembly	1	
	Supercharger mount Bracket	1	
	Supercharger Bracket Spacer - 70mm in length Tapered	1	
	Shim kit - Bracket and Idler pulley	10	
	Larger Idler pulley ribbed - engine belt idler assembly	1	
	M10 x 110mm bolt, spring and flat washer	3	
	Spacer washers - Power steer to bracket spacers	2	
	Intake tube 1000mm x 3.5"	1	
	84 -108mm Clamps	3	
	CAPA Air Filter Element 3.5"	1	
	Filter Mount Tube 3.5"	1	
	4" 90° Bend - special cut - Discharge tube to T/ Body	1	
	65 - 89mm Clamps	3	
	Blow-off Valve	1	
	2000 mm x 4mm vacuum hose	1	
	Bov Filter	1	
	Metal Intake Joiner Tube with PCV fitting fitted	1	
	M6 x 16mm Bolts / Flat washers & Nyloc Nuts	2	
	Plastic ties assorted	10	
	550mm x 20mm Conduit - Radiator over flow hose	1	
	150mm x 20mm Conduit - Power steering hose	1	
	Large Bolt head self-tappers (Computer re-location)	2	
	T - Piece 4mm	2	
	1000mm 3/4" silver insulation - Air/Con Pipe.	1	
	PCV Cap and clamp - small	1	
	1300mm 10mm PCV hose	1	
	500 mm - 2 core wire and conduit - temperature sensor extension wire	1	
	er150mm wire shrink wrap	1	
	Precaution Air inlet low sticker	1	
	1 1/4 x 3/8 cap bolts and spring washers	5	
	Vortech Supercharger pulley assembly 3.47" 8rib	1	
	Vortech tensioner plate	1	
	M12 x 15mm bolts	1	
	M12 x 15mm bolt thin head	2	

**Parts List continued on Next Page...**

## KITS PARTS LIST, CONTINUED

Part no. Description and Size	Quantity	Checked
Double bearing idler (Supercharger belt)	1	
Idler Pulley spacer 14mm	1	
M12 x 65mm bolt, nut, flat, spring washer	1	
Supercharger belt 8pk 1615	1	
Supercharger 90 Degree oil drain fitted to supercharger	1	
Assorted plastic ties	10	
Vortech Supercharger w/ forward curved outlet	1	
Oil feed kit and fittings	1	
600mm ½" oil drain hose	1	
45 Degree sump drain fitting	1	
Air Assist Kit Fitted To Supercharger	1	
VY Onwards - PCV T-piece and Breather Hose	1	

**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 1 Litre) ( **Use 5W-40 Synthetic Oil** ) - Replace filter
2. Remove Air box and intake ducting.
3. Remove Engine Cover.
4. Remove Radiator reservoir from mounts and swing forwards
5. Remove Radiator top cover.
6. Remove Radiator cooling fan assembly.
7. Remove front Bumper assembly.
8. Disconnect and remove left-hand headlight.
9. Remove engine belt.
10. Remove Tensioner pulley.
11. Remove top alternator bolt.
12. Remove Computer module and mount box.
13. Remove Power Steering Pulley - **with correct tool.**
14. Remove Power steering securing bolts.
15. Remove Washer Bottle.

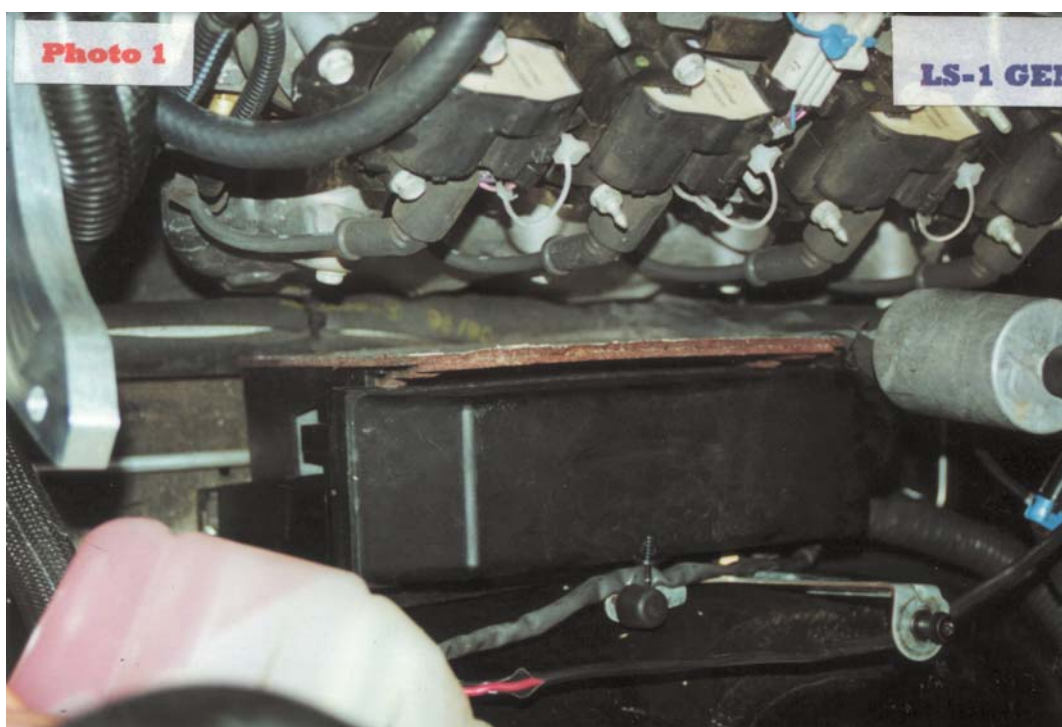
**NOTE:** This kit is recommended to be used with a complete exhaust including 4-1 headers.

## SPECIAL TOOLS

- 90 deg reverse drill
- lathe or use off
- die grinder
- dyno or use of
- accurate air fuel ratio meter
- boost gauge
- fuel pressure gauge
- fuel return gauge
- long straight edge
- power steering pulley remover

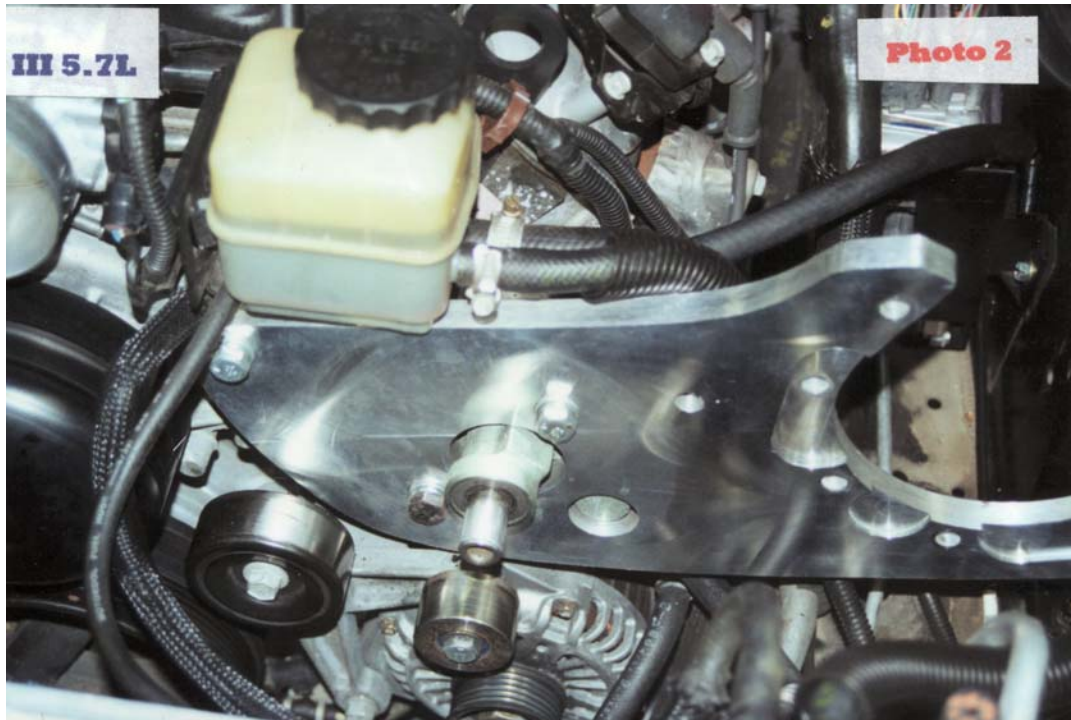
## INSTALLATION

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. 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. With top alternator bolt removed, fit new idler pulley for engine belt. Shim as required. **(See Photo 2.)**
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 Original Power steering pulley back.
7. Remove original balancer with appropriate tool. Fit balancer supplied and drill for locking pin supplied re fit new balancer bolt and fit supercharger drive pulley and spacer with the 6 bolts supplied.
8. Remove bolt from engine belt idler between crank and alternator pulleys refit with extra idler and longer bolt supplied. Once supercharger is in place ensure that the belt tracks properly on this idler shim as required.
9. Refit cooling fan assembly
10. Replace original top engine belt tensioner idler pulley with larger one supplied.
11. Fit new belt back on vehicle in the same fashion as the original belt. Later, ensure pulleys and belt tracks properly.

**NOTE:** Belt will be tight to get on and the tensioner fully sprung.



12. 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

13. Remove the two bolts holding the small casting located above the oil filter. **(See Pic)**
14. 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.



15. Fit supercharger to bracket.
16. Fit Vortech belt tensioner assembly to supercharger. Shim pulley as required. Fit ribbed belt and tension. Check pulley alignment. (Ribbed belt must be able to be turned 90 degrees with 2 fingers, check after run in)



**PRECAUTION:** Do not over tension belt, as bracket and blower heat up the belt will tighten up and may cause damage to supercharger.

17. 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.)**

**NOTE:** Re-tighten clamps on discharge pipe once tubes are hot. Re-tighten within 100kms hot.

18. Connect the blow-off valve to the black tube. **(See Photo 5).** (Use plastic ties to secure tube where required.) **Note:** If maf-less run bov hose to atmosphere and attach BOV sock with tie to end of hose. **(See Photo 11 on next page.)**
19. Disconnect the PCV breather hose from the throttle body. Using the plug and cap provided, cap off throttle body PCV outlet. **(See Photo 5.)**

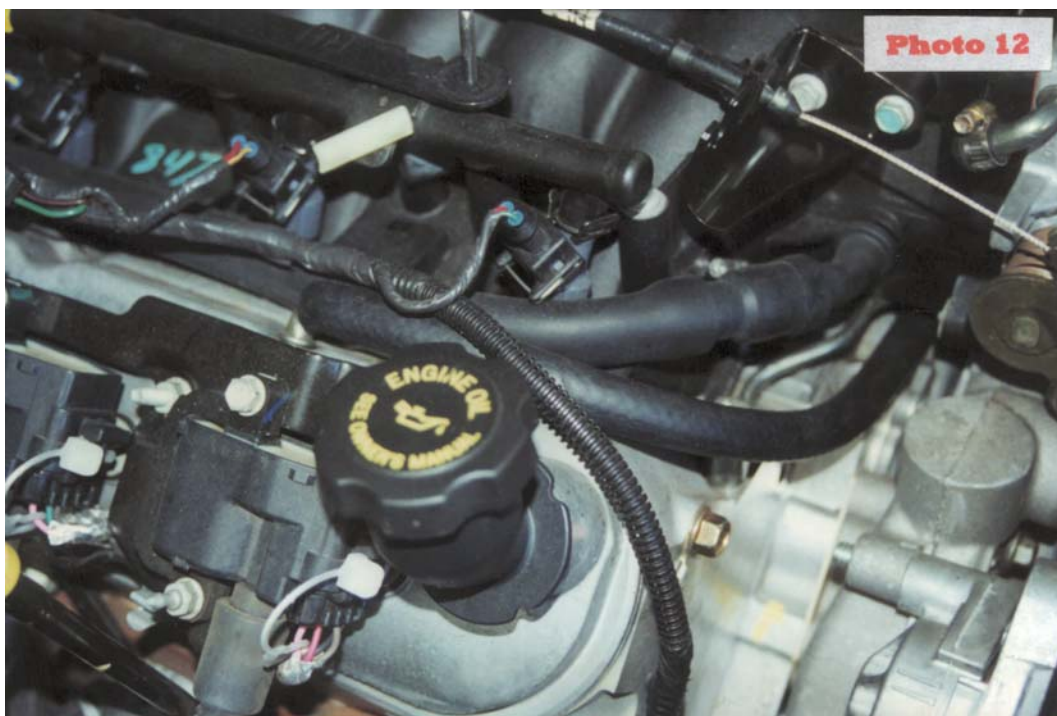


20. Run PCV hose from tappet cover to intake pipe. Connecting to plastic 90 degree angle in inlet adaptor tube of supercharger. **VY on link tappet cover breather to t-piece and hose supplied from pcv under manifold. (See Photo 11&12.)**

**NOTE:** Route Blow off hose in position and connect after fitting inlet hose into position.



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



21. Cut loom and extend air temperature sensor switch wires. Do not mix wires up. Connect to new sensor in i/cooler pipe. Plastic-tie wires where-ever possible and conduit.
22. Drill a 4" hole in inner guard to fit air filter mount through fit pinch weld to body. Drill holes for the 2 6mm bolts supplied to fix the mount tube. Clamp air filter to bottom side and intake duct to top side and to inlet of supercharger.



**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

23. Fit air intake tube alongside blower and inner guard. Joining the two intake tubes together with adaptor pipe supplied. Connect to rear of supercharger. Before fitting and tightening clamp, check position that PCV fitting faces towards supercharger. With intake secured to rear of supercharger in the correct position, fit PCV and Blow-off fittings/hoses. (**See Photo 11 on previous page.**)
24. Fit water injection kit.

**NOTE:** For water injection kit instructions, go to Water Injection Supplement.

25. Re-fit front bumper
26. 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.

27. Drain fuel tank and refill with Premium or Optimax fuel.
28. Re-connect the battery.
29. Start engine and check that belts are running true and re ensure that all fittings are secured correctly.
30. Review 'Breaking In' procedure.



## WATER INJECTION

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.

## 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**

## 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 12 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...**

