



FORD FALCON BA-BF V8
5.4L 4V (2002-2008)

**VORTECH ENGINE BELT DRIVE
SUPERCHARGER KIT
INSTALLATION MANUAL**

For any further technical information contact:

Centrifugal Air Pumps Australia Pty Ltd
20 Verrall Cres, Berri SA 5343, Australia
Email sales@capadrift.com.au
Phone 08 8582 3499 (Intl. +61 8 8582 3499)

INTRODUCTION

Congratulations on selecting the best performing and best backed automotive supercharger available today. Before beginning this 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 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 oil and oil filter every 5,000km. **OVER FILL OIL BY 1 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. Retention belt after 500-600km, if not sooner, because the belt will stretch during initial brake 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. 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

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

NOTE: The reason for grooved belts to move over one or more grooves or come off completely is always due to an alignment problem. Mis-alignment, 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

	Quantity	Checked
SUPERCHARGER ASSEMBLY		
Vortech V-2 Sealed, CCR, Special Outlet, inc 180cc Lubricant	1	
Supercharger Pulley 3.8" 5-6psi Pulley to SC Space 2.5mm	—	
Supercharger Pulley 3.6" 8-9psi Pulley to SC Space 2.5mm	—	
Supercharger Pulley, 3.33" Intercooled 8-9psi Space 2.5mm	—	
Supercharger Surge Oil Bottle & Fittings	1	
Oil Bottle Bracket plus 6mm self tapper bolt	1	
250mm Blue Oil Feed Line	1	
11-13 Clamps	2	
MOUNT / DRIVE SYSTEM		
Supercharger / Engine Belt, 6PK3032	1	
Supercharger Bracket	1	
Supercharger Idler Bracket	1	
Supercharger Brace A, 3.8" & 3.6" Pulley Only	—	
Supercharger Brace B, 3.3" Pulley Only	—	
1 ¼ x 3/8 Allen Key Bolts, Spring & Flat Washers	5	
M12 x 50mm Bolt, Flat & Spring Washer	1	
M8 x 35mm Bolt, Spring & Flat Washer (Support Bracket)	1	
5mm Spacer (Support Bracket)	1	
140mm x 8mm Bolt & Flat Washer	3	
Spacer One , Flat Machined Spacer, 67mm x 18mm	1	
Spacer Two , 74mm x 18mm, 8.5mm Hole	1	
Spacer Three , 2 piece, 78.5mm inc. 48mm Double Bearing Idler	1	
63.7mm Idler (Alternator Idler Plate Assembly) 3.6" & 3.3" Pulley Only	—	
48mm Idler (Alternator Idler Plate Assembly) 3.8" Pulley Only	—	
M10x65 Bolt, Nut, Spring & Flat Washer	1	
Idler Bearing Spacer (Bolt to Bearings)	1	
25mm OD x 10.5mm Idler Spacer (Idler Spacer)	1	
1.75mm Flat Washer, 10mm Ø (Idler Spacer)	1	
0.8mm Shim, 10mm Ø (Idler Spacer)	1	
Dust Cover Washer	1	
60mm x 8mm Bolt, Flat & Spring Washer (Idler Bearing Support Bracket to Alternator)	1	
2.5mm x 8mm Hole Spacer (Idler Mount Plate to Alternator Spacer)	1	
AIR DISCHARGE		
3" 90° Rubber Bend	1	
3" Rubber Joiner 70mm Long	1	
3" Steel Inlet Pipe	1	
38-89 Hose Clamps	3	
Bypass Valve, Sock and Tie	1	
500mm Bypass Valve Tube	1	
1000mm 4mm Vacuum Hose	1	
Brass T Piece	1	
Plastic Ties, Large	6	

Parts List continued on Next Page...

KITS PARTS LIST, CONTINUED

	Quantity	Checked
AIR INLET		
<i>Non Intercooled System Only</i> , 500mm 3.5" Convuluted Tube	—	
<i>Intercooled System Only</i> , 1000mm x 3.5" Convuluted Tube	—	
K&N Filter	1	
3.5" Filter Adapter	1	
HS12 Clamp	1	
HS80 Clamps	4	
PCV SYSTEM		
1000mm x 10mm Hose	1	
PCV Breather Fitting (Screw in plastic)	1	
One Way Valve, PCV Type Low Pressure	1	
8-22 Clamp	1	
400mm Breather Hose Flared One End		
FRONT ENGINE LOOM MODIFICATION		
Loom Relocation Bracket	1	
M8 Nut & Spring Washer (Loom Relocation Bracket)	1	
RADIATOR HOSE MODIFICATION		
Bottom Radiator Hose Angle (Short 90°)	1	
Radiator Hose Joiner (69mm x 44mm)	1	
33-57 Hose Clamps	3	
Bottom Hose Support Bracket	1	
39mm Rubber Lined D-Saddle (Radiator Hose Support)	1	
M6 x 20mm Bolt, Spring, Nut & Flat Washer	1	
MISC		
Premium Unleaded Fuel Sticker	1	
Synthetic Oil Sticker	1	
Low Air Filter Precaution Sticker	1	

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

FUEL SYSTEM ENHANCEMENT

NOTE: If kit is modified in the future with the understanding that it violates supercharger warranty, these are the recommended fuel system changes.

- Option 1: 4-5psi Tune with Flash Tuner. **Optional** 2 bar map / tune.
- Option 2: 6psi 36# Injectors, Tune with Flash Tuner. **Optional** 2 bar map / tune.
- Option 3: 7psi 42# Injectors, Tune with Flash Tuner. **Optional** 2 bar map / tune.
- Option 4: 8psi 42# Injectors, Mini T-Rex Fuel Pump with Flash Tuner. **Optional** 2 bar map / tune.
- Option 5: 9psi 42# Injectors, T-Rex Fuel Pump, Vortech FMU, Flash Tuner. **Optional** 2 bar map / tune.
- Option 6: 10psi 42# Injectors, Bosch 044 Fuel Pump, Vortech FMU, Flash Tuner. **Optional** 2 bar map / tune.
- Option 7: 10psi+ 42# / 60# Injectors, Bosch 044 Fuel Pump, Vortech FMU.
Optional 2 bar map / tune. Fuel Cell & Bosch 413 Fuel Pump

PREPARATION & PART REMOVAL

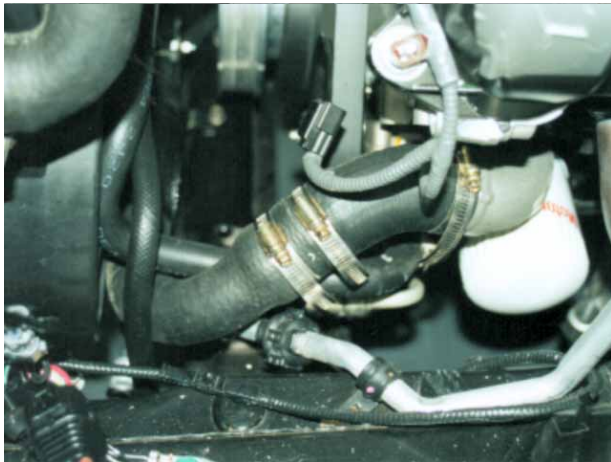
1. Disconnect Battery
2. Remove Engine Cover
3. Remove Air Cleaner & Box
4. Remove Air Box Mount Bracket (Drill Rivets)
5. Remove Spark Plugs
6. Drain Cooling System (Keep Fluid)
7. Remove Cooling Fans
8. Remove Radiator Hose Support Bracket
9. Remove Bottom Radiator Hose
10. Remove Original Engine Belt
11. Remove Front Grille
12. Remove Front Bumper
13. Remove Passenger Side Headlight

SPECIAL TOOLS

- dyno or use of
- accurate air fuel ratio meter
- boost gauge
- fuel pressure gauge
- fuel return gauge
- long straight edge

INSTALLATION

1. Check Spark Plugs, replace with NGK BPR6EF, gapped to 1mm if required.
2. With radiator hose removed fit right angle hose and join with joiner supplied to original hose, route the hose down and under the crankshaft pulley, using clamp and bracket provided, fit straight bracket to hold the hose behind the crossmember. Remove original hose support bracket. Secure hose to bracket with saddle supplied. Ensure belt or crankshaft pulley have ample clearance. **(See Photos 1a & 1b)**



Photos 1a & 1b: Radiator Hose Location and Fitment

NOTE: Refill and Purge engine coolant system, check for leaks. See Task 19.

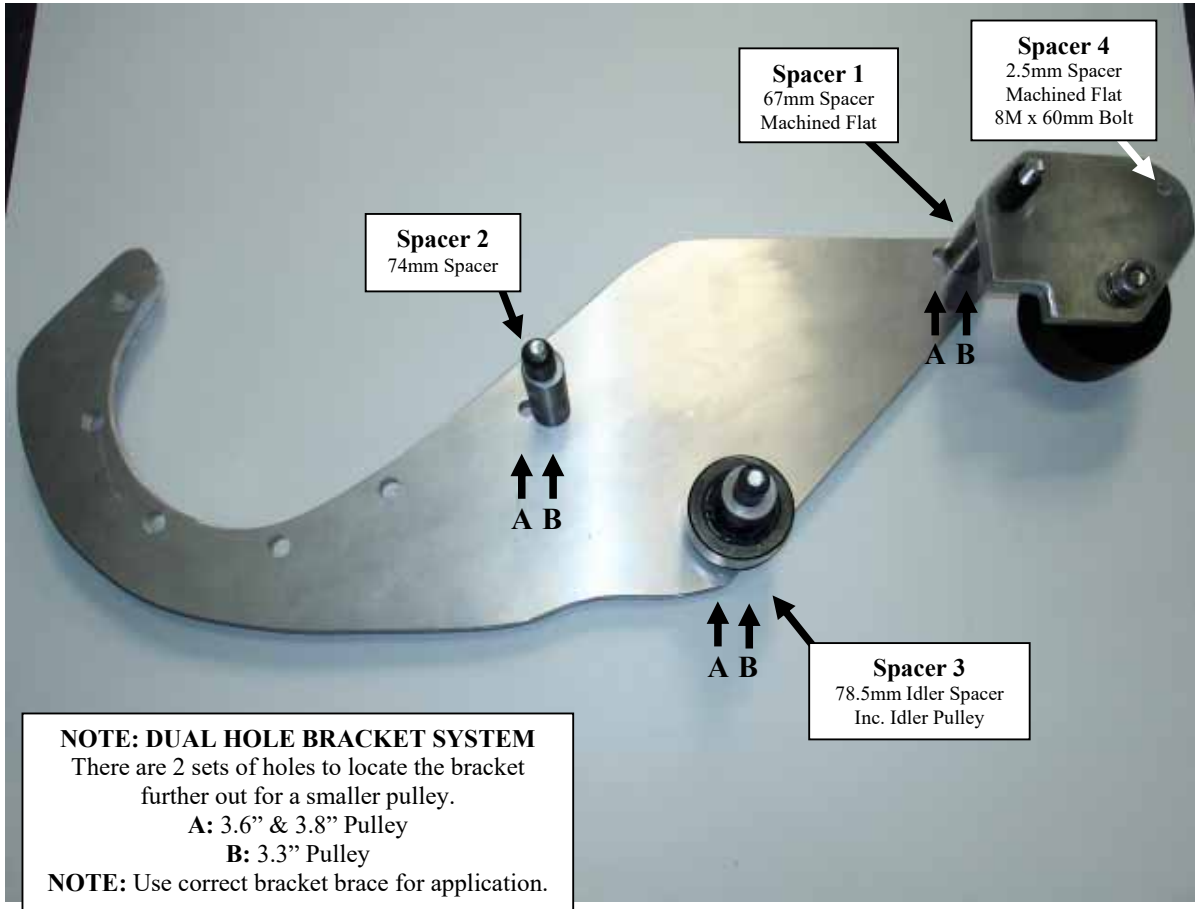


Photo 2: Bracket, Idlers and Bolt Location.



Photo 3: Bracket Mounting

3. Remove the three bolts on the front cover of the engine, that co-inside with the bracket fitment and secure with M8 x 140mm bolts provided.

Spacer 1: 67mm Top Spacer near Idler

Spacer 2: 74mm Top Near Supercharger hole

Spacer 3: 78.5mm Bottom middle hole Inc. Idler Pulley

Spacer 4: 2.5mm Between Support Bracket and Alternator

4. With spacers and bolts mentioned above, secure bracket to front of engine (nip bolts up don't tension). Fit supercharger to bracket and proceed to task 5.

NOTE: Position scroll on supercharger, by loosening tabs and rotating housing, this may already be done for you. Ensure this is done before supercharger is put in place.

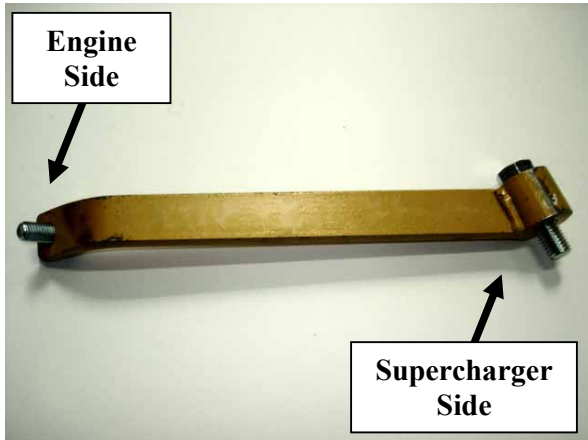


Photo 4: Supercharger Support Bracket

5. With supercharger in bracket, fit this support bracket supplied, mount to supercharger and mount to engine. Tension bracket and brace assembly.

Brace A & Brace B

Choose correct brace for pulley size used.

Brace A 3.6 & 3.8" Pulley.

Brace B 3.3" Pulley.



Photo 5: Idler Pulley & Mounting Plate Assy

6. Mount idler pulley and mounting plate assembly as per photo.



Photo 6: Spacer Post Position

7. Ensure that spacer post is positioned correctly so belt doesn't rub against it (See Photo 6). This should be done after belt is in position and tensioned.



Photo 7: Wiring Loom Bracket

8. Secure holding tab to tappet cover bolt and secure wiring loom as shown to ensure they don't come into contact with belt and pulley. Make a decision whether you wish to extend wires or remove insulation tape to lengthen plug loom to suit. Ensure plug and loom are not stretched by loom being too short.



9. Check blower pulley is running true with crank - shaft pulley. With a long straight edge, ensure the blower lines up with the crankshaft pulley. Check that the blower is on the same vertical tilt angle as the crankshaft pulley, you can use a fishing line with a weight on the end of it to check this. Position the car so that the vertical tilt line is square with the crankshaft pulley. Check this against the blower pulley to make sure that the blower and bracket are at the same vertical tilt angle. Check against other pulleys if possible just for your own reference that you are measuring vertical. Check the measurement from straight edge to the first pulley groove on the crankshaft pulley, it must be the same on the blower pulley. Take this into consideration when adjusting the idler pulleys as well. Re check alignment after tightening all bolts.

NOTE: If unsure call for assistance, this is important. If you don't get this right, the belt will move on the idler pulley when you rev up the motor underload above 3500rpm.

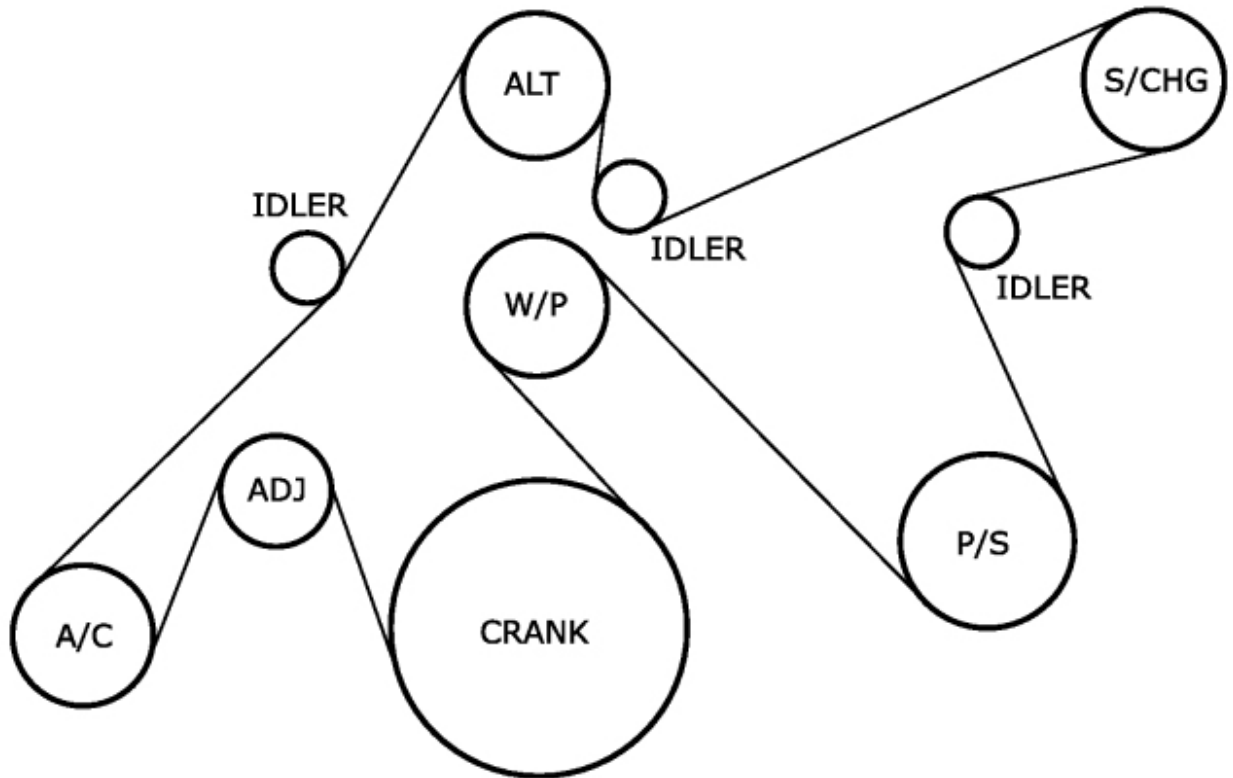


Diagram 1: Belt Layout

10.To recheck that all pulleys lines up later, wind the motor over, then start the motor. Let idle and check. Then rev up motor to check if the belts walk off the pulleys. **Do this task at the end of the fitment tasks. Continue checking the belt during breaking in procedure and complete the rev up test at the end of the breaking in procedure. Before road test review the final checklist.**



Photo 9: Supercharger Reservoir Location

11.With supercharger in position connect supercharger oil reservoir in position as shown in photo using self tapping screws supplied.



Photo 10: Discharge Pipe Fitment

12. Fit Discharge pipe with rubber joiner and angle supplied. Use clamps supplied to secure. Ensure 90 degree rubber angle at throttle body is fitted to throttle body with short end to throttle body. Rubber hose should not contact computer bracket.



Photo 11: Blowoff Valve Fitment

13. Fit blowoff valve in pipe, route blowoff valve 1 inch hose down towards chassis rail to muffle noise. Use sock and tie supplied on end. (notice fitment of oil reservoir). *The sock reduces blow-off valve noise on deceleration/idle, when valve is open.*

Source vacuum/boost reference from line going to std. fuel regulator, using T-piece and 4mm hose supplied for Blow of valve. Clamp all ends with fittings supplied.



Photo 12: Intake Pipe Location

14. Fit intake pipe to supercharger and route down under headlight and secure to ensure bumper bar supports filter (photo shows intercooler piping, non-intercooled routed in the same fashion). Fit Low Air Filter Caution Sticker near service sticker on windscreen.

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

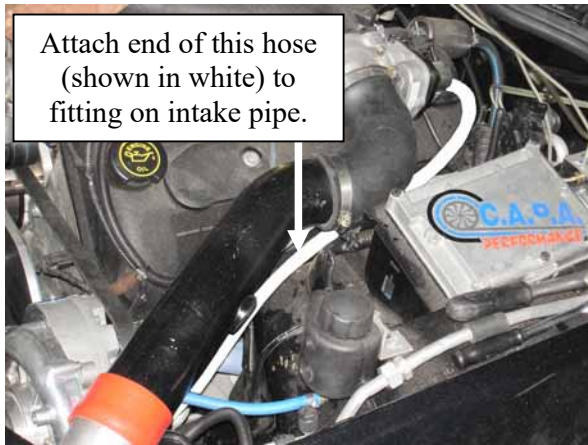


Photo 13: PCV Breather Hose Routing



Photo 14: PCV Valve Mounting

15.Fit PCV breather fitting into intake hose, then secure PCV hose with clamp provided. After fitting to supercharger trim to correct length. Use plastic fitting supplied to attach hose to intake pipe.

16.Using one way valve provided, fit to pcv valve on drivers side rear of tappet cover. Cut plastic hose and push one way valve into plastic hose, will lock in. This will stop boost pressurising sump.

17.With air filter in correct position, refit headlight, bumper bar and grille.

18.Drain fuel tank and refill with Premium or Optimax fuel.

19.Refill engine coolant system. Also changing engine oil and filter with a good quality engine Oil. Start engine, let idle for 10 minutes, purge cooling system and seal. Checking for any water/oil/vacuum/power steering leaks

20.Load flash tuner program onto vehicle. Review fuel system ordered with kit and fit appropriate parts.

21.While engine is running check that belts are running true and re ensure that all fittings are secured correctly and no leaks are present.

22.Fit Premium Unleaded Sticker to Inside of fuel cap. Fit Synthetic Oil Only Sticker to Oil Filter.

23.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 installers 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.

ENSURE ENGINE OIL IS OVER-FILLED BY 1 LITRE MORE THAN OE SPECS..

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. It may be sensible to have the original engine belt available to fit back on the engine if this was ever to happen.

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...

