



Units A-C Gun Cotton Place, Factory Road, Sandycroft, Deeside, Flintshire, CH5 2RE, UK
Email : sales@automotivecomp.com Website : www.automotivecomp.com
Tel: 01244 539196 Fax: 01244 539529

ENGINE FITTING NOTES

These notes are to be used in conjunction with the manufacturer's workshop manuals.

Engine Installation – All Engines

The condition of ancillary components must be checked and found to be in new or first class condition before fitting. Worn or incorrectly adjusted components could cause serious damage and/or poor performance and may invalidate warranty.

Manifolds

Manifolds must be clean and crack-free; sealing faces must be straight and all traces of old gaskets and sealing compounds removed.

Cooling System

Cooling system including heat exchangers, hoses, thermostats and water pumps must be in first class condition. Drive belts, correctly tensioned and idlers set as per manufacturer's directions. Anti-freeze or inhibitors to manufacturer's specification must be used at all times. Overheating through blocked heat exchangers or coolant loss is the main cause of engine failure or damage.

Lubrication System

New filters of the correct type and quality must be fitted. All coolers and pipes must be flushed and inspected for contamination. Any debris left behind from the old engine failure or old deposited sludge will be remobilized and destroy the bearings, and precision machined surfaces within new engine. Pressure gauges and warning switches must be tested for function and accuracy.

Fuel and Air System

All fuel and air filters must be renewed; sediment traps and pipe work cleaned or renewed. Oil bath type filters must be completely stripped and serviced. Air filter systems must be reassembled, leak free to avoid damage to the new engine through ingestion of dust or particles. Exhaust systems must be checked for blockage or damage throughout the whole system.

GENERAL

Sealants and Gaskets.

The correct sealants must be used as directed by the manufacturer. Excessive sealants applied to joints will squeeze out and possibly block oil or water passageways. General purpose RTV type sealants must not be used under any circumstances as generally these products are not long term oil or solvent resistant and will degrade. Blocked oil pump strainers and engine damage are commonplace occurrences when excessive or incorrect sealants are applied.

Carburettors/Distributors

For older type petrol engines carburettors must be the correct type for the engine, and in perfect condition. Distributors must be set up with new contact breakers and condensers if fitted. Timing and mixture settings must be set to manufacturer's data, and re-checked at 500 miles. Distributor mechanical and vacuum advance curves must be verified and checked against manufacturer's data.

MODERN PETROL ENGINES

Fuel injectors must be flow and pattern tested if any doubt exists with regard to their condition. Electronic control systems must be re-set back to base adaptive values, and any historic faults logged corrected. Closed loop control systems with Lambda sensors must be tested for correct function. New sensors must be refitted if the old engine failure resulted in coolant or oil reaching the exhaust system. The electronic system must be re-checked at 500 miles for logged faults, and these corrected.

DIESEL ENGINES

Mechanical systems. Fuel injection timing is highly critical and must be set up and verified with the correct tools and data. Over advanced timing will often result in louder than normal combustion noise and black smoke under load. This condition is highly damaging, and results in excessive mechanical and thermal loading of the engine. Retarded timing often results in a softer than normal combustion noise, more difficult starting, and raised exhaust temperatures. Injectors must be tested for correct spray pattern and opening pressures.

Turbo chargers must be checked over for mechanical damage, and the boost pressure checked with a gauge

ELECTRONIC SYSTEMS

Set up to manufacturer's specifications and rectify any historic logged faults. Re-check the electronic system at 500 miles for any faults logged and rectify.

LPG SYSTEMS

Where LPG systems are fitted it is essential that the whole system is serviced and calibrated correctly. Running in (as detailed in the commissioning section) must be on petrol only on a dual fuel vehicle. The mixture setting must be tested and verified under all RPM and engine load conditions to avoid excessive combustion temperatures which occur especially with lean or weak mixture conditions.

ENGINE COMMISSIONING AND RUNNING IN

The initial start up and first few seconds of running have significant bearing on the long term life expectancy of the new engine. Following the recommendations below will give the new engine the best start.

1. Ensure that all connections to the engine are correct and oil and coolant levels are on maximum. Fill the oil filter manually with clean fresh oil and install.
2. With spark plugs and/or injectors removed, and injection / ignition systems disabled, crank the engine until oil pressure is attained. Re-fit the spark plugs / injectors and prepare to start up.
3. Start the engine and run at a fast idle speed of around 2000 RPM, checking constantly that the temperature and pressures are satisfactory and no leaks can be found. Should adjustments need to be made, stop the engine.
Avoiding idling in the early life of the engine is especially important for flat tappet type camshafts such as fitted to the Rover V8. Low speeds can under certain circumstances cause early failure of the camshaft lobes due to lack of splash lubrication and/or breakdown of the oil film due to new surface finishes and boundary oil film conditions.
4. Once the engine has warmed up and levels re-checked, it is important to drive the vehicle and load the engine as soon as possible.

Running In

There is never a more important period in the life of your engine than between zero and 500 miles (800 km). Too little load will not give the piston rings especially, sufficient pressure to bed in fully, and excessive load could cause abnormal wear or even damage as all the new surfaces wear and polish themselves together. The use of a mineral based running in oil during the first 1500 miles is vital to allow proper bedding in. Do not put a synthetic based oil into a new engine. Current oil technology is such that you risk never achieving proper bedding in. Cylinder bore polishing may occur. This condition occurs due to a lack of bedding in and the result is a lack of a micro textured surface finish which holds oil. Piston rings running on a polished bore cannot conduct heat effectively, resulting in overheated pistons and consequent failure or seizure.

Running in should be a pleasurable experience. Following the guidelines below will achieve a satisfactory result:

Driving the vehicle during running in

- Avoid idling for long periods – switch off engine instead
- Check oil and coolant levels regularly
- Check for leakage or looseness of pipes and hoses – rectify any problem immediately
- Pay close attention to dashboard gauges, and monitor engine for any abnormal behaviour. Report any concerns as soon as possible.

On the Road:

- Avoid prolonged high speed running, or operating at one fixed speed. Use the gears – Sport Mode if fitted for automatics is recommended.
- Avoid labouring the engine, that is: too high a gear, placing the engine under heavy load at low RPM. Change to a lower gear, for long or steep hills.
- Use the acceleration of the vehicle – running in requires brief periods of moderate load and RPM – running in should not be tedious!

During the first 100 miles the following procedure repeated 4-5 times will really help the vital piston ring to cylinder bedding-in process. The procedure involves rapid acceleration and slowing down without brakes, so make sure you are in a suitable and safe location to perform the procedure:

Drive in second or third gear and from 1500 – 2000 RPM, accelerate at full throttle to just under maximum red line RPM. Lift off the throttle fully and allow engine braking to slow the vehicle back down to 1500 RPM.

After either 10 hours of operation or 500 miles, drain the oil and change the filter. Refill with the manufacturer's recommended oil. However, avoid fully synthetic oils at this stage, as engine bedding still continues over several thousand miles.

At this time, engines which require cylinder head re-torque procedures and/or valve clearance adjustments should have this performed to manufacturer's specifications.

After the first 500 miles it would still be wise to continue the running in philosophy. Only after the first 4000 – 5000 miles should you consider a fully synthetic oil.

NOTES: