

[*] ESSENTIAL THAT THE ORDER IS NOTED THEN EACH PART RETURNED IN SAME ORDER

1: Remove entire cylinder head and associated parts and electrical components labelling everything. Starter motor, Alternator, Power Steering.

2: Undo all the bell housing bolts by removing the access port also jamming the fly wheel.

3: Undo all the engine mountings making sure that you have a stout engine hoist.

4: Once the engine is out of the vehicle connect it onto a suitable engine holder or very stout bench so can you start to remove the necessary components.

Engine Components Removal

1: Remove the sump and intermediate section of the engine making sure that you have drained all the oil, there will be some left so have enough rags to mop this up.

2: Now it's time to start removing the components within the sump oil strainer, oil pump [if in sump] Start to undo each Con rod cap making a note of the con rod it's come off [marking each with a number*] Once you have all 5 con rod caps of remove and retrieve the bearing shells.

3: Remove the bearing caps from the crank shaft again making a note of where each cap comes from [marking each with a number*] again retrieving each bearing shell, gently lift out the crank and place it somewhere safe [cranks are easily damaged so wrap it in a cloth.]

4: With a wooden dowel gently tap the bottom of each piston to remove it from the block [**DO NOT** use metal, the alloy piston will be damaged and they are expensive] Again make sure you note which bore the piston was removed from [*] Checking the top of the bore to see if there is a large lip if there is then the engine may need to go the engine shop to be re-bored

5: Once all 5 pistons and crank, oil pump, strainer are out it's time to clean everything thoroughly with a good quality engine cleaner [**NOT** washing up liquid or your engine will rust.] it's best to do this outside because the cleaning agents have a very strong vapour also you will need suitable containers to dispose of the used chemicals.

6: Remove each set of piston rings from the pistons making a note of where each ring goes as there is a specific order[*]. After removing the piston rings gently clean any debris out of the ring slots with a broke bit of ring, checking for cracks or chips in the piston.

7: With a suitable honing tool on an electric drill start making a criss cross pattern in the bore following the instructions supplied with the hone tool. A good clean and honed bore is essential [4] using liberal amounts of oil.

8: After the engine block has been cleaned, dried, inspected for damage, wear and is found to be satisfactory turn the block upside down [gasket face downwards] Clean out all the remaining debris from the oil ways on the crank bearing carriers making sure you aren't simply pushing the debris inside [most engine failures can be taken back to the cleaning then oiling process] Using compressed air to clean away any debris from oil ways. Using a liberal amount of oil [3 in 1 or engine oil [**NOT WD40, AEROSOL**] oil each bearing holder, hopefully you will start to see oil seeping from around the oil ways in the engine block, gasket face to finally clean all the oil galley ways.

PISTON RING REPLACEMENT

[2]

9: Refit each set of piston rings in the same order they were removed. Piston rings are easily snapped so be careful and only expand the enough to slip each one back into its slot oiling each as you go. Once you have refitted the rings to each piston get the ring compressor slide it over the piston and rings then gently close it up to compress the rings [You cannot refit a piston without a compressor] Slide the con rod back into the bore [*] then with a soft dowel gently tap each piston back into the bore releasing the ring compressor do this for all 5 pistons.

10: Oil the bearing housing on each con rod and apply a bearing shell, you may find an notch on the bearing housing and a lump on the shell these must be matched, refit all 5 bearing shell halves. Oil each bearing shell housing on the main bearings and refit the bearing shell again noting any notches and corresponding lumps on the shells. Lower the crank onto the bearing shells making sure none are disturbed again with liberal oil and making sure each con rod bearing shell is located on the crank, then fit any bearing designed to take out run out [sideways movement] again liberal oiling is essential. Refitting new crank oil seals with a suitable sized socket making sure not to roll the lip on the seals again with liberal oil

11: Refit each main bearing cap make sure the bearing shells do not move, using new bolts, torque up to [*]

STAGE 1: 20Nm

STAGE II: Tighten through 90 degrees

12: Refit each big end bearing cap making sure each bearing shell doesnt move, using new bolts, torque up to [*]

AT TIME OF WRITING TORQUE FIGURE WAS MISSING

13: Check that the engine rotates by hand if not then something is fouling and you will have to go back some steps.

14: Refit intermediate section, using new bolts for 10mm, torque to:

STAGE 1 M10 BOLTS 20Nm

STAGE II M10 BOLTS 45Nm

STAGE III M8 BOLTS 24Nm

STAGE IV M7 BOLTS 17Nm

STAGE V M10 BOLTS Tighten through 90 degrees

15: Refit oil strainer pick up using a new seal, torque to 17Nm

16: Refit the sump torque to 17Nm

17: Turn the engine back over reinstall the cylinder head using a new gasket and new bolts. Torque to:

Cylinder head upper to lower section 17Nm

Cylinder head lower section to block

STAGE 1 20Nm

STAGE II 60Nm

STAGE III Tighten through 130 degrees

Finally refit the remaining components and refit into the vehicle then start the engine up.

