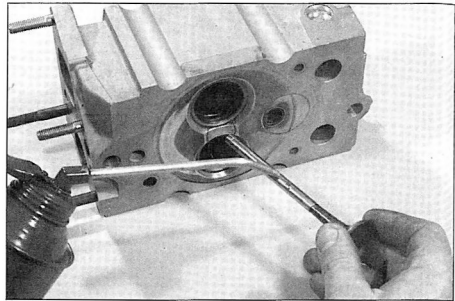


7.13 Checking the valve spring free length



8.2 Lubricate the valve stems and insert the valves into their guides

Any significant difference in the readings obtained indicates wear of the valve stem. Should any of these conditions be apparent, the valve(s) must be renewed. If the valves are in satisfactory condition, or if new valves are being fitted, they should be ground (lapped) into their respective seats to ensure a smooth gas-tight seal.

11 Valve grinding is carried out as follows. Place the cylinder head upside-down on a bench, with a block of wood at each end to give clearance for the valve stems.

12 Smear a trace of coarse carborundum paste on the seat face, and press a suction grinding tool onto the valve head. With a semi-rotary action, grind the valve head to its seat, lifting the valve occasionally to redistribute the grinding paste. When a dull-matt even surface is produced on both the valve seat and the valve, wipe off the paste and repeat the process with fine carborundum paste. A light spring placed under the valve head will greatly ease this operation. When a smooth unbroken ring of light grey matt finish is produced on both the valve and seat, the grinding operation is complete. Be sure to

remove all traces of grinding paste, using paraffin or a suitable solvent, before reassembly of the cylinder head.

Valve components

13 Examine the valve springs for signs of damage and discoloration, and also measure their free length using vernier calipers or a steel rule (see illustration) or by comparing the existing spring with a new component, where free length dimensions are not given.

14 Stand each spring on a flat surface, and check it for squareness. If any of the springs are damaged, distorted or have lost their tension, obtain a complete new set of springs. It is normal to renew the springs as a matter of course during a major overhaul.

8 Cylinder head - reassembly

1 On the 2.3 litre engine, if the swirl chambers have been removed, refit them to their original locations.

2 Lubricate the valve stems with clean engine oil and insert the valves into their original locations (see illustration). If new valves are being fitted, insert them into the locations to which they have been ground.

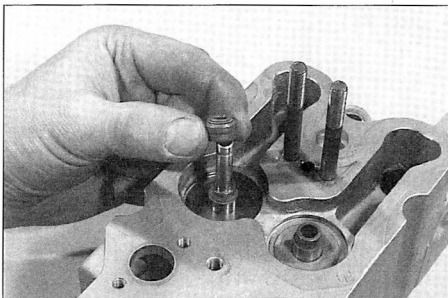
3 Lubricate the valve stem oil seals then fit them by pushing into position in the cylinder head using a suitable socket or special tool (see illustrations). Ensure that the seals are fully engaged with the valve guide.

4 Where applicable, locate the spring seat on the guide, followed by the spring and cap.

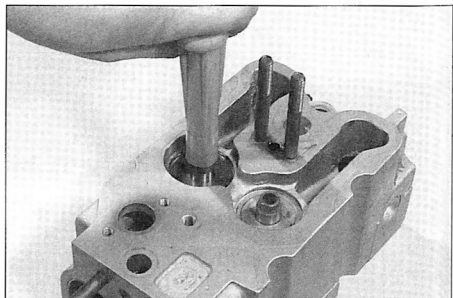
5 Compress the valve spring, and locate the split collets in the recess in the valve stem. Release the compressor, then repeat the procedure on the remaining valves. Use a little grease to hold the collets in place.

6 With all the valves installed, place the cylinder head on blocks so that there is clearance below the valves and, using a hammer and interposed block of wood, tap the end of each valve stem to settle the components.

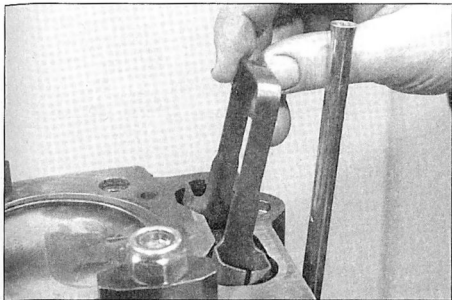
7 The previously removed components can now be refitted with reference to Section 8.



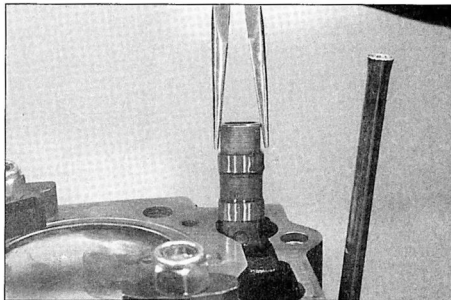
8.3a Locate the valve stem oil seals over the valve and guide . . .



8.3b . . . and push them fully home using a socket or fitting tool



9.2 Extract the anti-rotation brackets from the tappet chest - 2.5 litre engine



9.4 Using pliers, withdraw the hydraulic tappets - 2.5 litre engine

9 Camshaft and tappets (2.5 litre engine) - removal, inspection and refitting



camshaft sprocket, undo the camshaft thrust plate retaining bolts (see illustration).

6 Withdraw the camshaft from the front of the engine, taking care not to nick the bearing with the sharp edges of the cam lobes (see illustration).

Inspection

7 Examine the camshaft bearing surfaces and cam lobes for wear ridges, pitting or scoring. Renew the camshaft if evident.

8 Examine the camshaft bearing surfaces in the cylinder block. If deep scoring or other damage is evident, the bearings should be renewed by an engine reconditioning specialist.

9 Measure the cam lobe height and camshaft bearing journal diameters using a micrometer and compare the figures obtained with those given in the Specifications. Renew the camshaft or camshaft bearings if the figures obtained are outside the permitted tolerance.

10 Inspect the tappets for scoring, pitting and wear ridges. If any tappet shows signs of wear all eight should be renewed as a set.

Refitting

11 Set the engine to the TDC position for No 1 cylinder as described in Chapter 2E, Section 3.

12 Thoroughly lubricate the camshaft journals and bearings with clean engine oil and insert the camshaft into the cylinder block.

13 As the camshaft gear engages with the injection pump and vacuum pump gears, make sure that the timing marks on the gears are aligned. Refer to Chapter 2E, Section 15, for further information on the alignment of the timing marks.

14 Refit the camshaft thrust plate retaining bolts and tighten them to the specified torque.

15 Lubricate the tappet bores and refit the tappets to their original locations.

16 Refit the anti-rotation brackets and push them firmly into position so their tops are below the cylinder block face.

17 Refit the timing cover and cylinder heads as described in Part E of this Chapter.

Removal

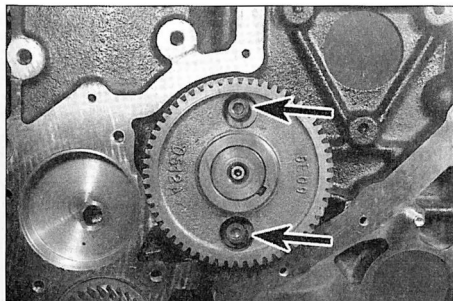
1 Remove the timing cover and cylinder heads as described in Part E of this Chapter.

2 Extract the anti-rotation brackets from the tappet chest (see illustration).

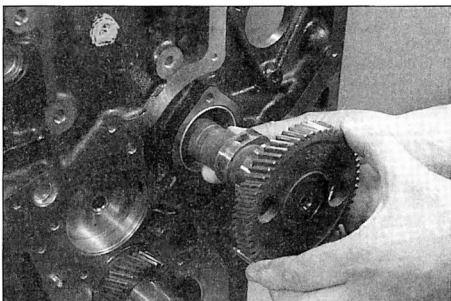
3 Obtain eight clean plastic containers or alternatively divide a larger container into compartments and fill the containers with clean engine oil. The container(s) must be deep enough to allow the tappets to remain upright and be completely submerged in the oil. Number the containers one to eight.

4 Using pointed-nose pliers, carefully withdraw the tappets using a slight twisting action and place it in its correct numbered container (see illustration).

5 Working through the two holes in the



9.5 Undo the camshaft thrust plate retaining bolts (arrowed) - 2.5 litre engine



9.6 Withdraw the camshaft - 2.5 litre engine