1 General information

How to use this Chapter

This Part of Chapter 2 describes the repair procedures that can reasonably be carried out on the engine while it remains in the vehicle. If the engine has been removed from the vehicle and is being disassembled in the procedure outlined in Part C, any preliminary dismantling procedures can be ignored.

Note that, while it may be possible physically to overhaul items such as the piston/ connecting rod assemblies while the engine is in the car, such tasks are not usually carried out as separate operations. Usually, several additional procedures are required (not to mention the cleaning of components and oil passages); for this reason, all such tasks are classed as major overhaul procedures, and are described in Part C of this Chapter.

Part C describes the removal of the engine/transmission from the car, and the full overhaul procedures that can then be carried out.

Engine description

General

The six-cylinder engine is a double overhead camshaft design, mounted in-line, with the transmission bolted to the rear end.

A timing chain drives the exhaust camshaft; the intake camshaft is driven by a second chain from the end of the exhaust camshaft. Hydraulic cam followers are fitted between the camshafts and the valves. Each camshaft is supported by seven bearings incorporated in bearing castings fitted to the cylinder head.

The crankshaft runs in seven main bearings of the usual shell-type. Endplay is controlled by thrust bearing shells on No. 6 main bearing.

The pistons are selected to be of matching weight, and incorporate fully floating wrist pins retained by circlips.

The oil pump is chain-driven from the front of the crankshaft.

VANOS variable camshaft timing control system

On 1993 and later models, a modified engine was introduced with a variable camshaft timing control system, known as VANOS. The VANOS system uses data supplied by the DME engine management system (see Chapter 4B), to adjust the timing of the intake camshaft via a hydraulic control system (using engine oil as the hydraulic fluid). The camshaft timing is varied according to engine speed, retarding the timing (opening the intake valves later) at low and high engine speeds to improve low-speed driveability and maximum power respectively. At medium engine speeds, the camshaft timing is advanced (opening the intake valves earlier) to increase mid-range torque and to improve exhaust emissions.

Repair operations possible with the engine in the vehicle

The following operations can be carried out without having to remove the engine from the vehicle:

A. Removal and installation of the cylinder head.

B. Removal and installation of the timing chain and sprockets.

C. Removal and installation of the camshafts.

D. Removal and installation of the oil pan.

E. Removal and installation of the connecting rod bearings, connecting rods, and pistons*.

F. Removal and installation of the oil pump.

G. Replacement of the engine/transmission mountings.

H. Removal and installation of the flywheel/driveplate.

* Although it is possible to remove these components with the engine in place, for reasons of access and cleanliness it is recommended that the engine be removed.