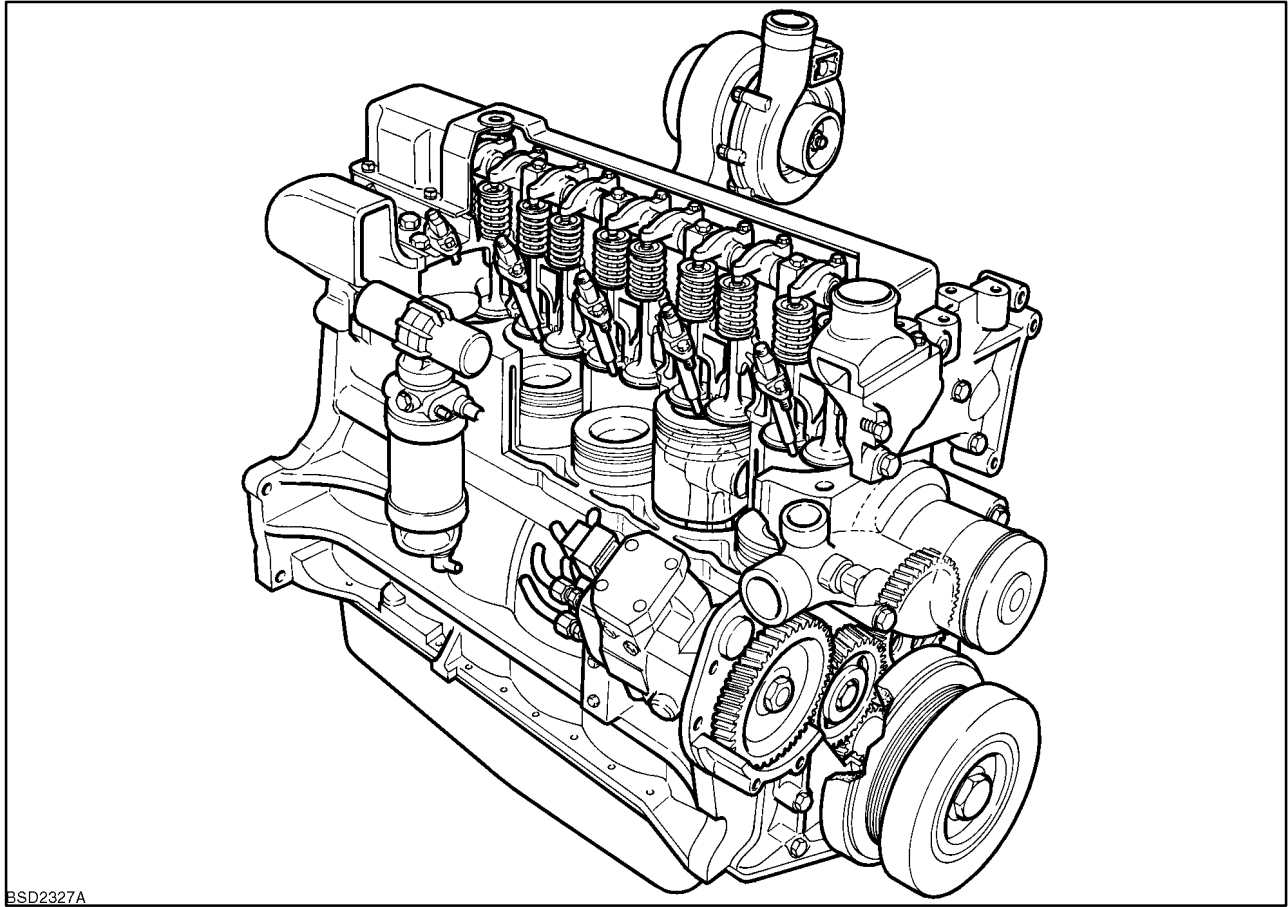


DESCRIPTION AND OPERATION



BSD2327A

1

The CNH 7.5 Litre engine is a 6-cylinder turbocharged and aftercooled unit, having a bore of 4.4" (111.8 mm) and a stroke of 5.0" (127 mm) which generates a displacement of 456 in³.

The engine uses a mechanical or electronically controlled rotary injection pump depending on model and has been designed to meet current emission regulations and must only be serviced by an authorised service agent. For a detailed Description and Operation of the fuel system reference must be made to the Fuel System Chapter in this Section of the manual.

All engines feature cross flow cylinder heads, with the inlet and exhaust manifolds on opposite sides of the cylinder head. The fuel and air combustion process, takes place in the specially designed bowl in the crown of the pistons.

CYLINDER BLOCK ASSEMBLY

The cylinder block is an alloy cast iron with deep cylinder skirts, and water jackets for cooling the cylinders. The cylinder bores are machined integral with the cylinder block, during the manufacturing process. The block incorporates hydraulic tappets which do not require adjustment unless engine is being re-assembled.

Cylinders are in line and vertical and numbered 1 to 6 from the front to the rear of the engine. They can be bored oversize for the fitment of sleeves, which are available in service.

The oil pan is the reservoir for the engine oil lubrication system and a cast iron front cover on the front of the engine covers the timing gear assembly.

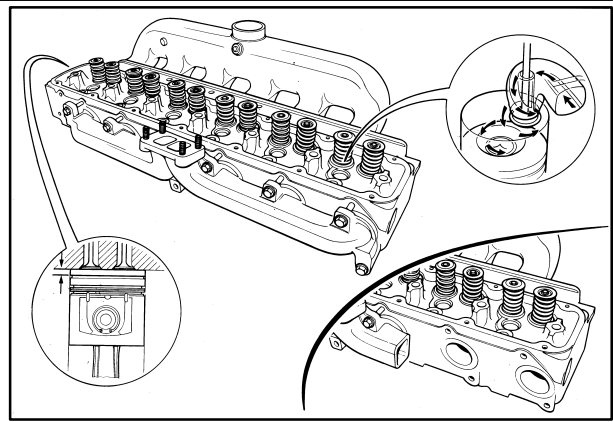
CYLINDER HEAD ASSEMBLY

The cylinder head incorporates an inlet and exhaust valve per cylinder with the valve rocker arm shaft assembly bolted to the cylinder block through the cylinder head. Cylinder head retaining bolts are evenly spaced with a six point pattern around each cylinder, this ensures an even clamping load across the cylinder head area.

The intake and exhaust manifolds are bolted to the head, the intake manifold is mounted on the right hand side of the engine, with the diesel injectors mounted outside the rocker cover. The exhaust manifold is mounted on the left hand side of the engine. Water outlet connections and thermostats being attached to the front of the cylinder block.

Valve guides are integral in the cylinder head, and valves with oversize stems are available in service. Special replaceable sintered iron valve seats are pressed into each valve port during manufacture and oversize valve seats also available in service.

All valves are fitted with positive valve rotators and valve stem oil seals. Valve clearance is maintained by adjustment of the self locking adjusting screw, mounted in each of the rocker arms.

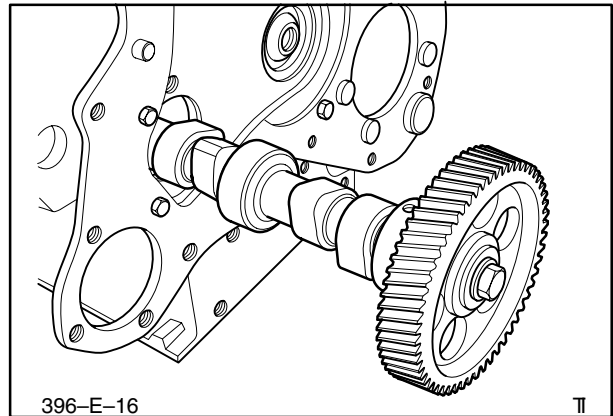


CAMSHAFT ASSEMBLY

The camshaft runs in 5 replaceable bearings. The camshaft drive gear is in mesh with and driven by the camshaft idler gear which is driven by the crankshaft timing gear.

Camshaft end thrust is controlled by a thrust plate bolted to the block, and located between the camshaft gear and the front camshaft journal.

A helical gear is mounted on the rear of the camshaft, and drives the engine oil lubrication pump mounted forward of the flywheel.



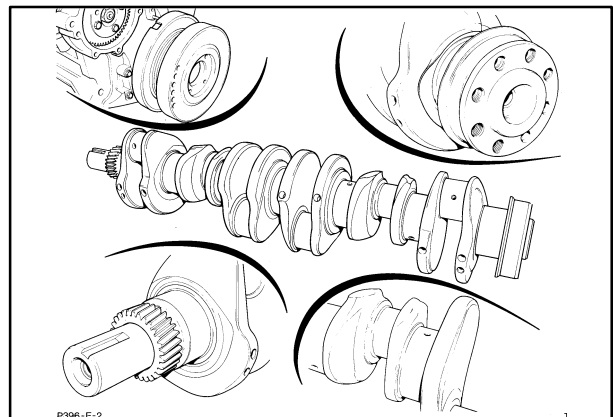
CRANKSHAFT ASSEMBLY

The crankshaft is supported in the cylinder block by 7 main bearings.

The crankshaft is manufactured from steel with machined finished crank webs

End thrust is controlled by a thrust bearing incorporated in the fifth main bearing of the crankshaft.

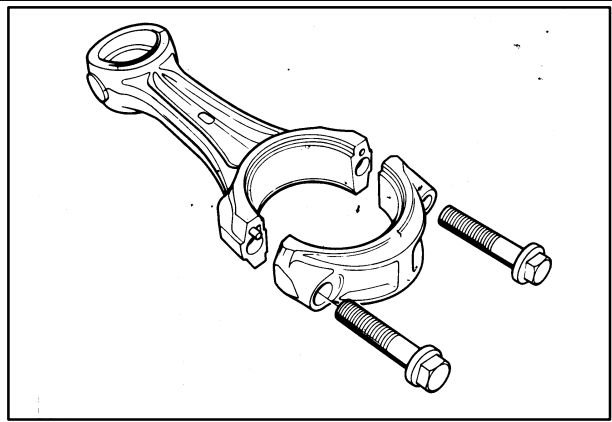
An external damper is fitted to the crankshaft pulley to ensure smooth running operation. Front and rear crankshaft oil sealing is effected by cassette type seals that are designed for long and durable service life.



CONNECTING RODS

Connecting rods “Teepee” (wedge) shaped at the small end have been designed to reduce the reciprocating weight at the piston end. The connecting rods are of a heavy beam construction and are assembled as a matched set to each engine.

They are retained in position by the connecting rod big end cap and secured by two bolts per rod. The small end of the connecting rod is fitted with a replaceable bronze bushing, through which the free floating piston pin is fitted. The steel pin being held in place within the piston by two snap rings.

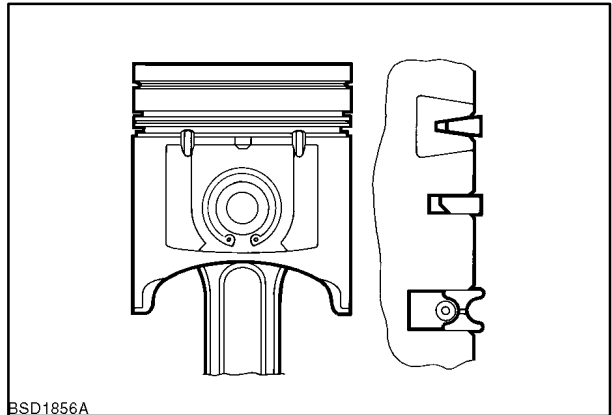


5

PISTONS

Pistons are constructed of an aluminium silicon alloy with an iron insert for the top ring. The combustion chamber being recessed into the piston crowns.

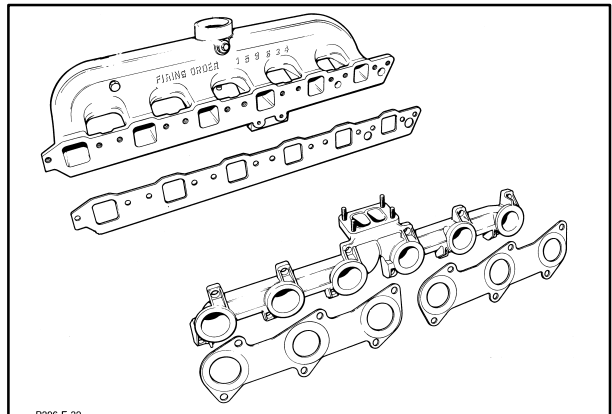
Each piston has two compression rings and one oil control ring, to reduce friction and increase positive sealing. All rings are located above the piston pin.



6

MANIFOLDS

The cross flow design aluminium intake, and cast iron exhaust manifolds, are on opposite sides of the cylinder head. This is designed to maintain balanced heat distribution within the cylinder head. The configuration of the manifolds also ensures minimum heat transfer to the intake manifold.

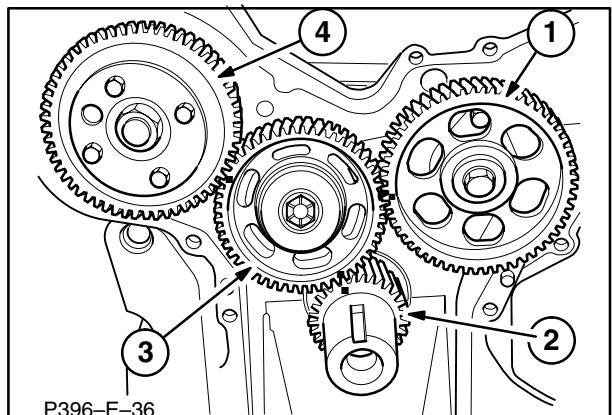


7

TIMING GEARS

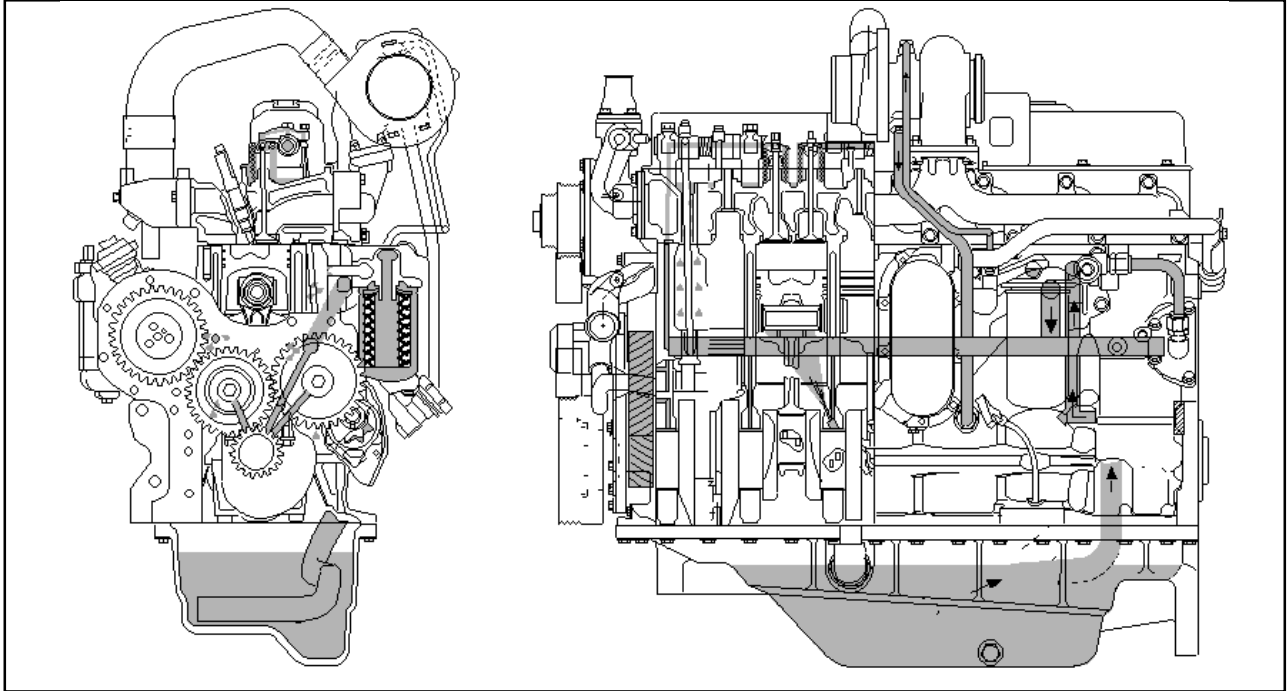
The crankshaft timing gear is heated and press fitted on to the front of the crankshaft, to a high degree of accuracy during manufacturing. This enables precise timing being maintained during the life of the engine. The crankshaft gear (2) drives the idler gear (3) which is attached to the front of the cylinder block. The idler gear then drives the camshaft gear (1) and the injection pump gear (4).

The camshaft gear is bolted to the front of the camshaft, and is keyed to maintain position of the gear on the camshaft.



8

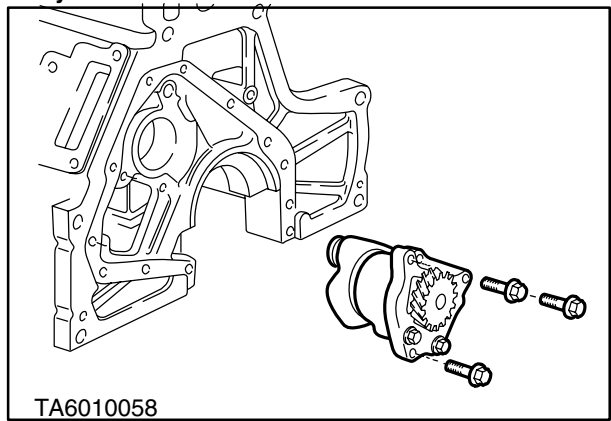
LUBRICATION SYSTEM



1

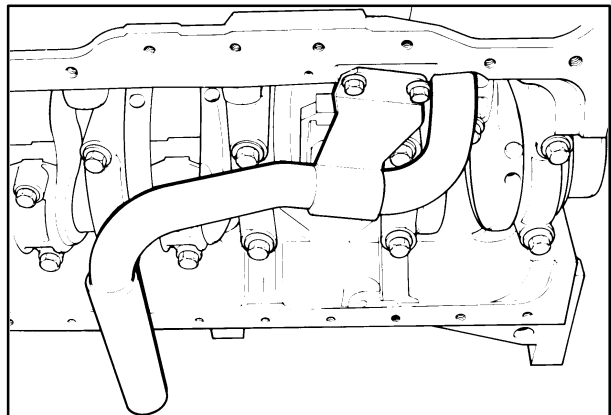
Engine Lubrication System

Lubrication of the engine, Figure 1, is maintained by a rotor type oil pump mounted in the rear of the engine block, forward of the flywheel on the left hand side of the engine.



2

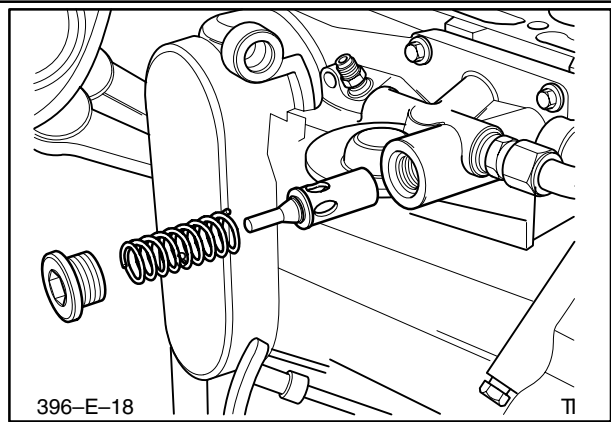
The oil pump is driven from the rear of the camshaft and draws oil from the engine oil pan through a tube and screen assembly.



3

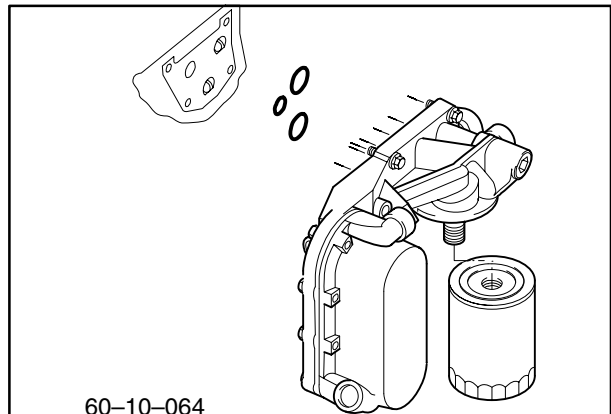
SECTION 10 – ENGINE – CHAPTER 1

A spring loaded relief valve is integral with the dummy oil filter head mounted on the left hand side of the engine block and prevents over pressurisation of the system.



4

The spin on type oil filter is mounted next to the oil cooler.



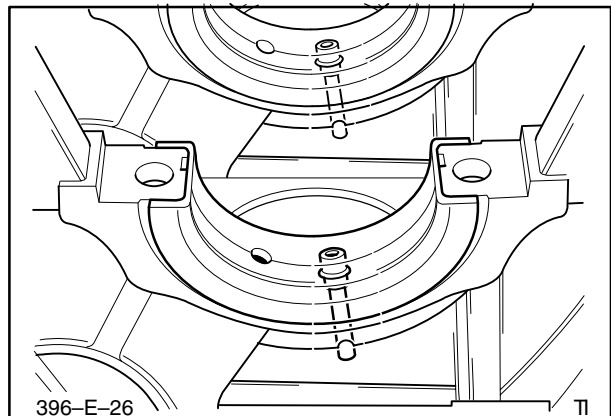
5

Oil flows from the filter to the main oil gallery, which runs the length of the cylinder block and also intersects the camshaft follower chamber.

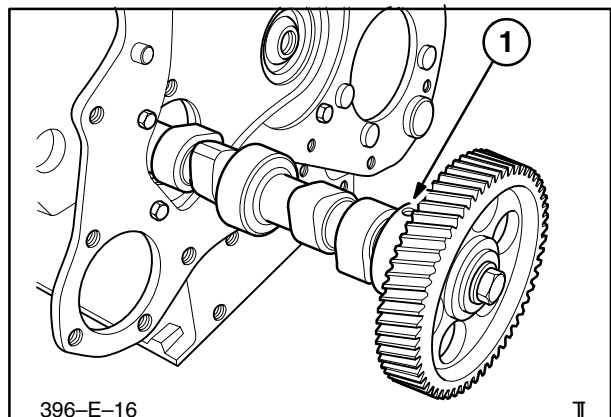
The main gallery supplies oil to the crankshaft main bearings, connecting rods and both big and small ends. The underside of the pistons and pins, are lubricated by oil pressure jets mounted adjacent to each main journal housing.

The camshaft drive gear bushing is pressure lubricated through a drilled passage from the front main bearing. The gear has small oil passages machined on both sides allowing excess oil to escape.

An intermittent flow of oil is directed to the valve rocker arm shaft assembly via a drilled passage in the cylinder block. This is located vertically above No.1 camshaft bearing (1) and aligns to a hole in the cylinder head. The rotation of the camshaft allows a controlled intermediate flow of lubrication.



6



7

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