

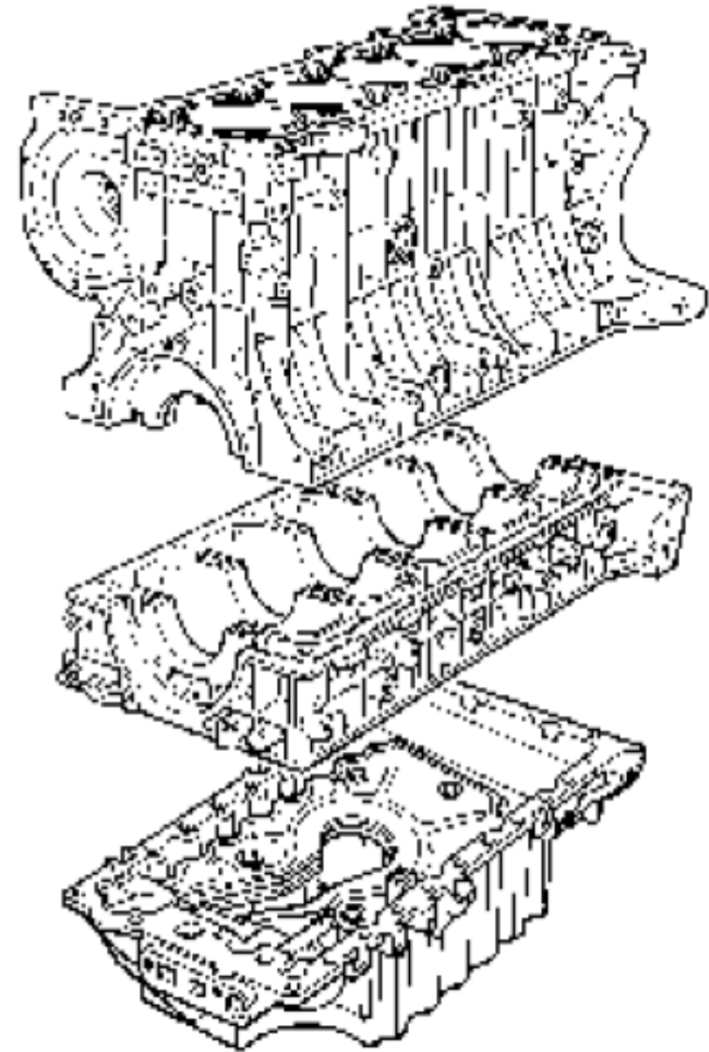
# **Automotive Workshop AUTO 109**

## **Engine Block**

**Athanasίου Charalambos**

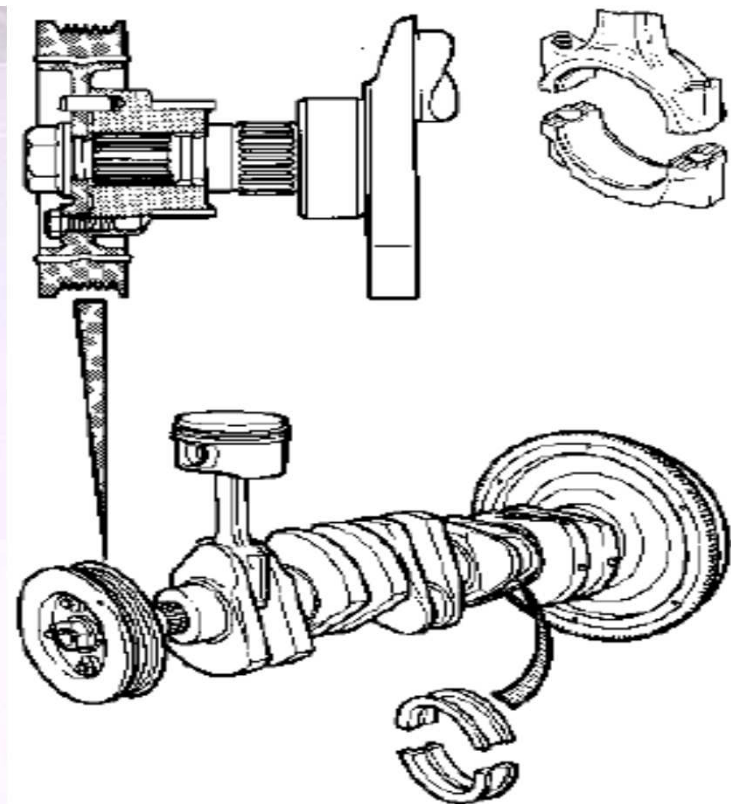
The cylinder block is divided into two or three components cylinder block, intermediate section (if any) and oil pan. The mating flange between the cylinder block and intermediate section is in the crankshaft center line.

The cylinder block has cast iron cylinder sleeves cast into the cylinder block which are not replaceable. The number of main bearing seats dependent on the number of cylinders of the engine. Normally their number is one more than the number of cylinders. There are cast oilways in the cylinder block that distribute oil to the main bearings and big ends via the crankshaft.



The crankshaft has main bearings depending on the number of cylinders, of which the one of them is a thrust bearing.

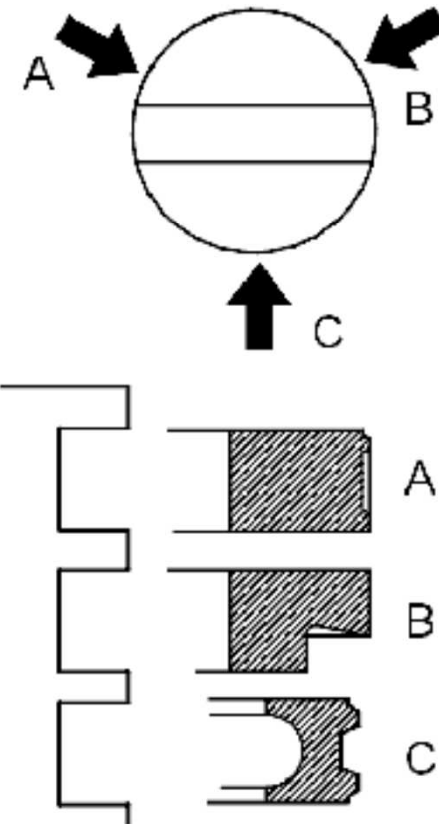
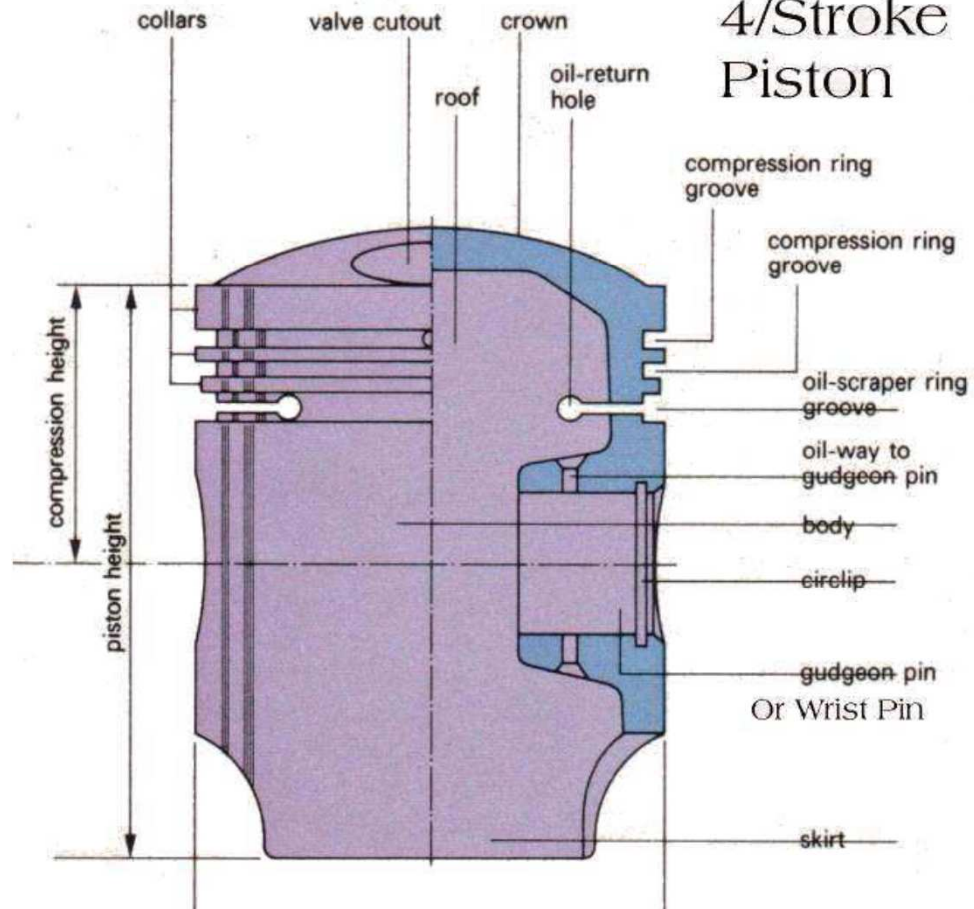
The connecting rods are usually forged and the sawtooth joint between connecting rod and cap locates the cap exactly. The lower end or “big end” of the connecting rod turns on the crankshaft pin.



Crankshafts are either forged or cast. Forged crankshafts give maximum strength and also contribute to a low noise level. Cast crankshafts are used on low power output engines.

The usual form of piston for internal combustion engines is an inverted bucket shape, machined to a close (but free sliding) fit in the cylinder barrel. Gas tightness is secured by means of flexible “piston rings” fitting closely in grooves turned in the upper part of the piston. The pressure of the gasses is transmitted to the upper end of the connecting rod through the “gudgeon pin” on which the “small end” of the connecting rod is free to swing.

### 4/Stroke Piston



It is important that the upper and middle piston rings are installed the right way up.

The lower ring can be installed either way up.

-A. Compression ring (upper ring)

This is marked with text or a circle. The mark should be facing up!  
It can be difficult to see the text, and a magnifying glass is usually required.

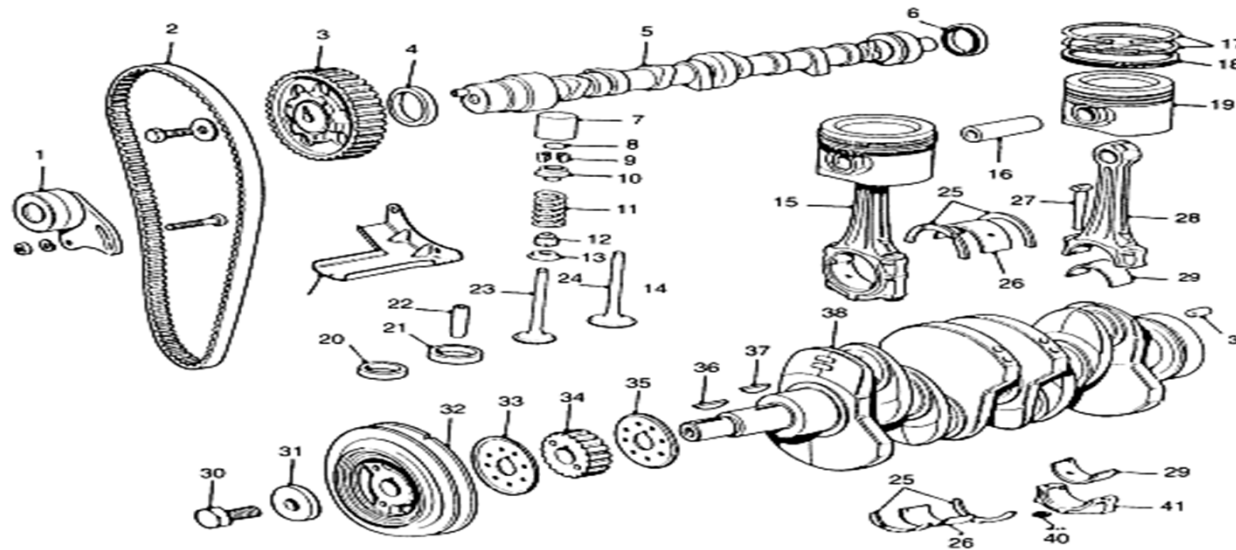
-B. Compression ring (middle ring)

The groove should be facing down and the text up on this ring.  
This groove is used to scrape oil back to the oil pan.

-C. Oil control ring (lower ring)

This ring is usually not marked and can be installed either way up.

# ENGINE COMPONENTS



- 1 - Timing belt tensioner
- 2 - Timing belt
- 3 - Camshaft gear
- 4 - Camshaft front oil seal
- 5 - Camshaft
- 6 - Camshaft rear oil seal
- 7 - Tappet
- 8 - Shim
- 9 - Cotters
- 10 - Cup
- 11 - Spring
- 12 - Valve stem seal
- 13 - Seat
- 14 - Deflector
- 15 - Connecting rod and piston - LH
- 16 - Gudgeon pin
- 17 - Compression rings
- 18 - Oil control ring
- 19 - Piston
- 20 - Exhaust valve seat insert
- 21 - Inlet valve seat insert
- 22 - Valve guide
- 23 - Exhaust valve
- 24 - Inlet valve
- 25 - Crankshaft washers

- 26 - Main bearing shell
- 27 - Connecting rod bolt
- 28 - Connecting rod - RH
- 29 - Big-end bearing shell
- 30 - Pulley bolt
- 31 - Washer
- 32 - Crankshaft pulley
- 33 - Gear flange
- 34 - Crankshaft gear
- 35 - Gear flange
- 36 - Pulley and gear key
- 37 - Oil pump key
- 38 - Crankshaft
- 39 - Flywheel dowel
- 40 - Connecting rod nut
- 41 - Connecting rod cap