

Pistons and Connecting Rods

PISTONS AND CONNECTING RODS**To Remove Pistons and Connecting Rod Assemblies**

1. Remove the cylinder head.
2. Drain and remove the lubricating oil sump.
3. Remove the nuts from the big end bolts.
4. Remove the big end caps, bearing shells and bolts (Fig. 1).

Note: If the bearing shells removed are serviceable, refit them in their original positions.

5. Push pistons and connecting rods out of the top of the cylinders (Fig. 2).

Note: Keep each piston and connecting rod assembly separate, each to each as marked.

To Remove Pistons and Rings from Connecting Rods

1. Remove the rings from each piston.
2. Remove the circlips and withdraw the gudgeon pin. If the gudgeon pin is tight in the piston bore, warm the piston in clean liquid to a temperature of 38/49°C (100/120°F).

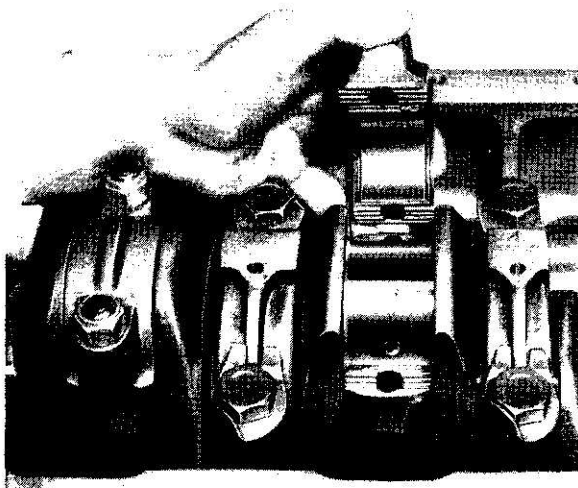


Fig. 1

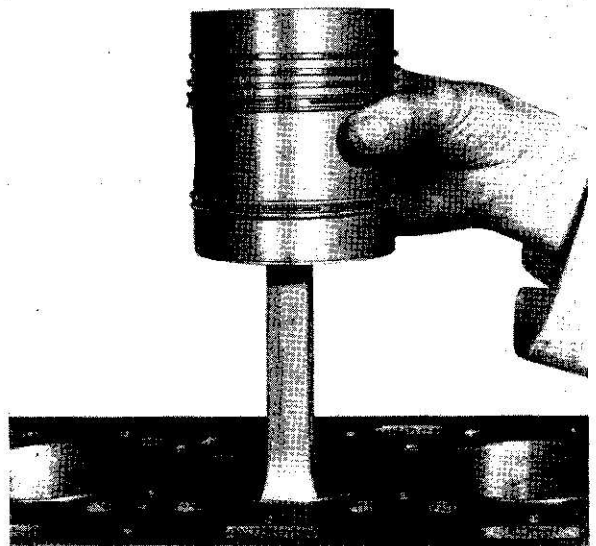


Fig. 2

Inspection

1. Examine the pistons for scoring and clean carbon from the ring grooves. Check the clearance of the new piston rings in their respective grooves and if, with a new ring fitted, the vertical groove clearance exceeds 0,20 mm (0.008 in) fit new piston.
2. Check the fitted gap of the rings in the unworn portion at top of cylinder bore. For details of ring gap dimensions see 'Data'. Ring gaps for conformable rings are with spring fitted.
3. Check the fit of the gudgeon pin in the piston bore and in the small end bush. The pin is a transition fit in the piston, i.e. within the limits of -0,004 mm (0.00015 in) to +0,006 mm (0.00025 in). For details of piston bore, gudgeon pin and small end bush bore diameters see 'Data'. When renewing a small end bush, ensure that the oil hole in the bush aligns with the hole in the connecting rod. Ream out to suit the gudgeon pin and check the connecting rod for parallelism, see 'Data'.
4. Examine the big end bearings for wear and scoring. Also examine the crankpins for wear and ovality. For crankshaft details see 'Data'.

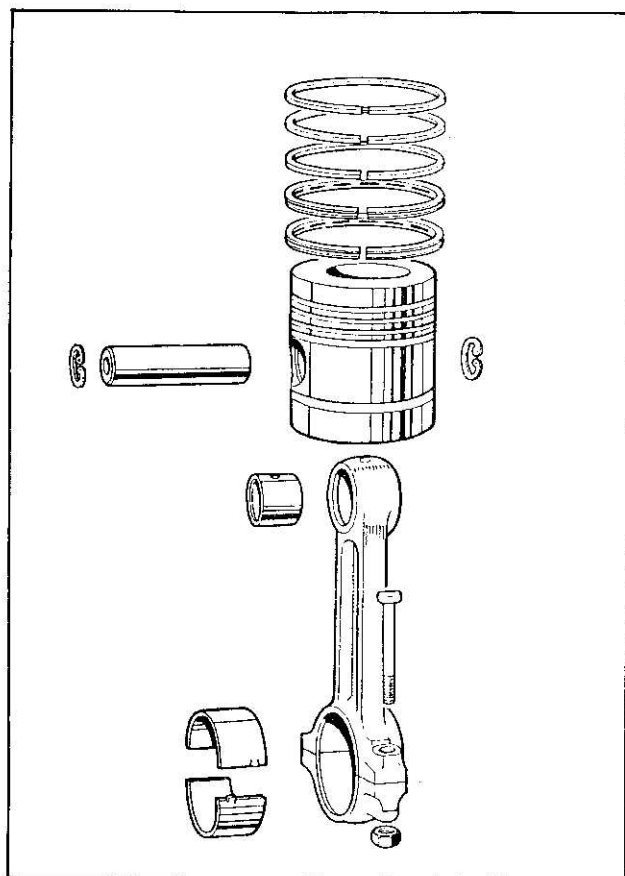


Fig. 3

To Assemble the Pistons to the Connecting Rods

If the original pistons are being used they must be assembled to the original connecting rods. For markings of pistons and connecting rods see Figs. 4 and 6.

1. The cavity in the piston crown is off-set towards one side of the piston. Place the piston on the connecting rod with the cavity towards the side of the rod which carries the rod and cap identification numbers. Insert the gudgeon pin and fit new circlips, warming the piston, if necessary.

2. Fit the rings in the following order:

Engines fitted with cast iron liners

Slotted scraper:
below the gudgeon pin.

Slotted scraper:
above the gudgeon pin.

Internally stepped compression:
third groove.

Internally stepped compression:
second groove.

Chromium plated compression:
top groove.

Engines fitted with chrome liners

Slotted scraper:
below the gudgeon pin.

Slotted scraper:
above the gudgeon pin.

Laminated compression:
third groove.

Internally stepped compression:
second groove.

Cast iron compression:
top groove.

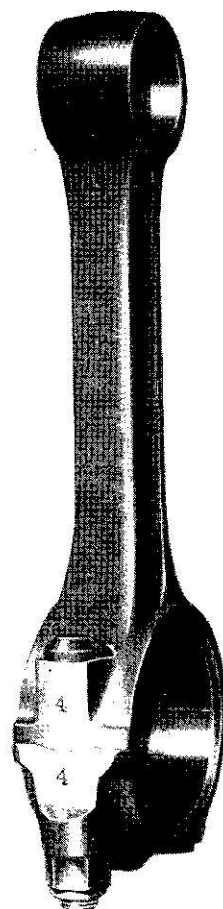
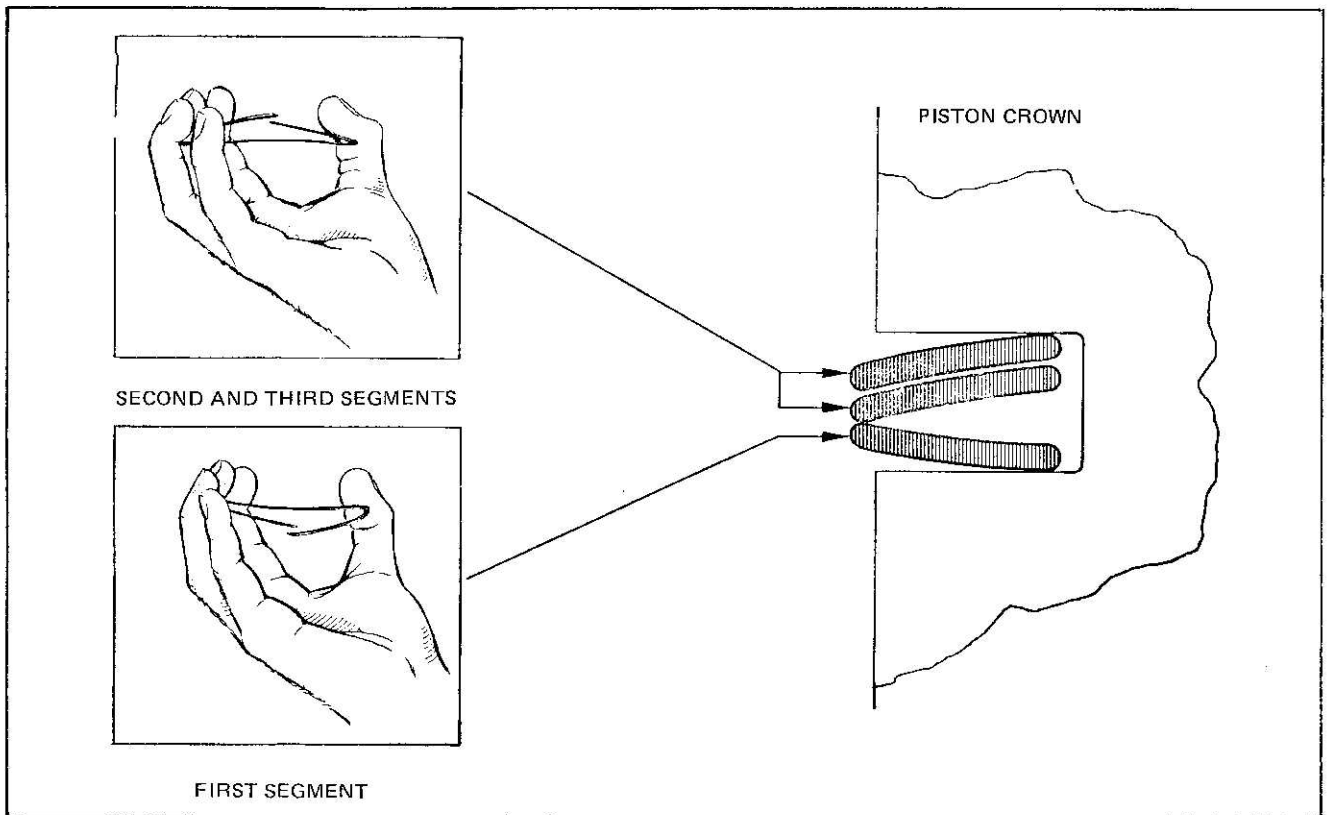


Fig. 4

Pistons and Connecting Rods



Note: When fitting internally stepped compression rings, ensure that the "step" is towards the piston crown. Never fit chromium plated rings to engines having chromium plated liners.

Fig. 5

If all the segments have been fitted in the groove correctly, they will be positioned as shown in the right hand illustration of Fig. 5.

Fit the laminated compression ring to the piston as follows: (Ensure piston is positioned with the crown uppermost.)

1. Fit the first segment to the piston so that when held horizontally between the thumb and fingers and radially compressed, the ring ends point downwards (Fig. 5). Place this ring on the bottom face of the groove and position over the gudgeon pin bore.
2. Fit the second segment on top of the first so that when held and compressed as described in (1) above, the ring ends point upwards (Fig. 5). Position the gap at 180° to that of the first segment.
3. The third segment should be fitted on top of the second, so that when held and compressed as described, the ring ends point upwards (Fig. 5). Position the gap immediately above that of the first segment.

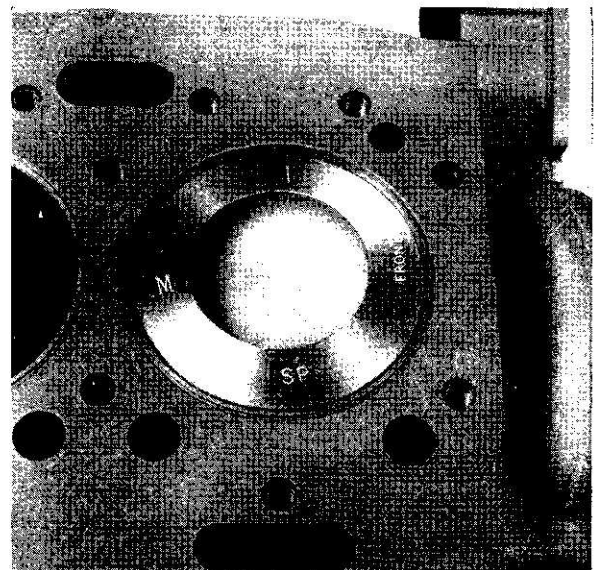


Fig. 6

Pistons and Connecting Rods**To Fit the Pistons and Connecting Rods to the Cylinder Bore**

1. Before fitting the piston and connecting rod assemblies to their respective cylinder bores, liberally coat each bore and piston with clean engine oil.
2. Using a ring guide (Fig. 7), insert the pistons and connecting rod into the top of their respective cylinder bores. The piston and rod number must relate to the cylinder into which it is being fitted and the rod identification number must be opposite to the camshaft. The word "Front" or arrow marked on the piston crown must be towards the front of the engine (Fig. 6).
3. Fit the bearing shells and cap with the numbers on the same side of the rod and cap (Fig. 4).
4. Refit the two connecting rod bolts so that the flat on the head of each bolt is located against the shoulder of the rod. Secure with two new nuts to correct torque.
5. Refit the lubricating oil sump.
6. Refit the cylinder head.

Fitting New Pistons

The piston height can be checked by means of a straight edge and feeler gauges.

Pistons fitted correctly should be 0,08/0,25 mm (0.003/0.010 in) above the top face of the cylinder block.

Note: Where engines have to conform to the smoke density regulation B.S.AU 141a:1971, then the piston height should be 0,41/0,61 mm (0.016/0.024 in) and the pistons topped accordingly.

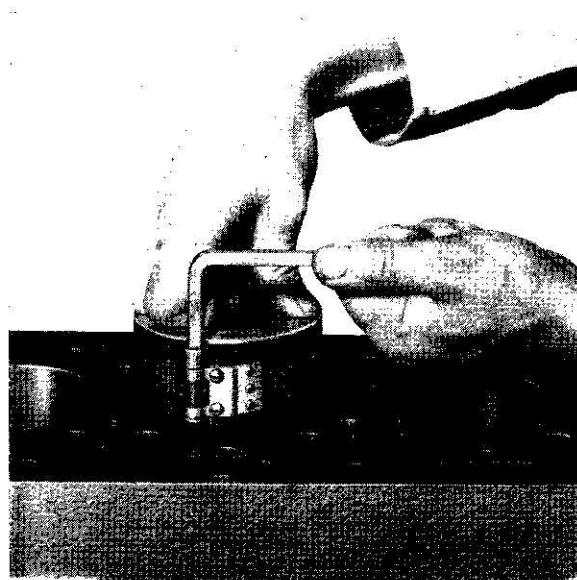


Fig. 7