CYLINDER HEAD

To Remove Cylinder Head

1. Drain cooling system.

2. Remove all parts connecting to the cylinder head, i.e. fuel injection pipes, inlet and exhaust manifold, etc. including the rocker cover, atomisers and washers.

3. Remove the nuts from the two studs locating the rocker arm shaft 'A', Fig. 1.

   See also 'Alternative Rocker Shaft Location' (Fig. 1).

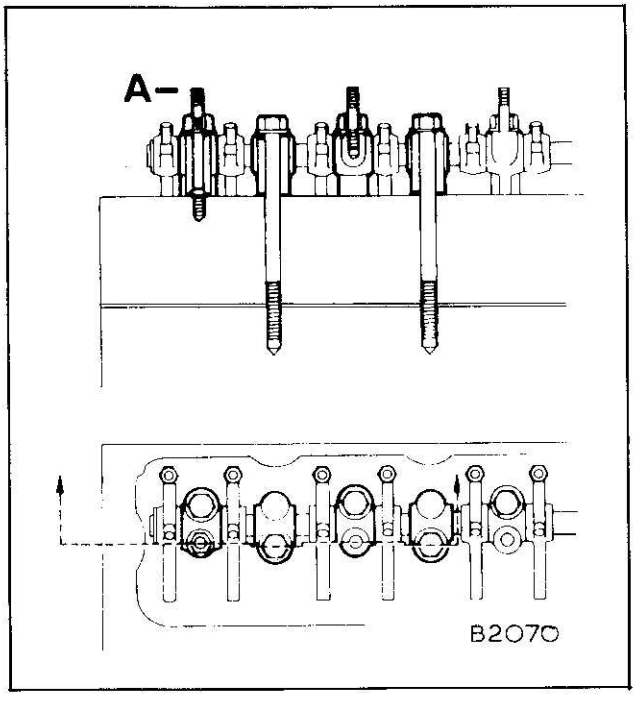


Fig. 1

4. Remove cylinder head securing setscrews in reverse order to tightening sequence (See Fig. 13).

5. Remove the rocker arm assembly and push rods.

6. Remove cylinder head.

Alternative Rocker Shaft Location

The alternative method of location is by means of a taper pin as illustrated in Fig. 2.

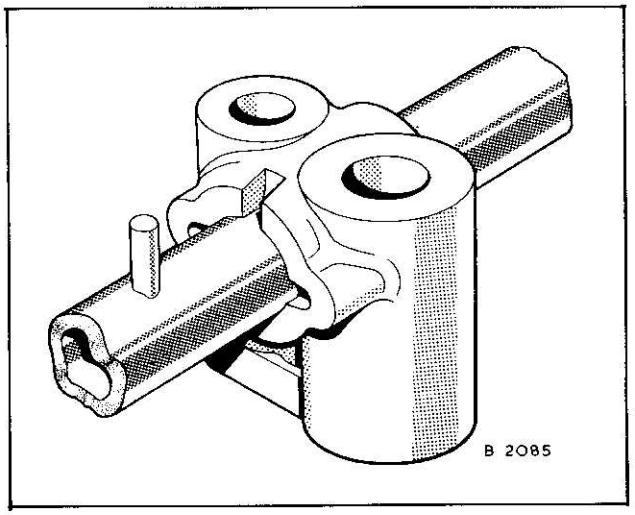


Fig. 2

Cylinder Head Inspection

1. Remove valves, Fig. 3, if valves are to be refitted, they should be suitably marked for re-assembly in their original positions. Note oil deflectors fitted on inlet valves only.

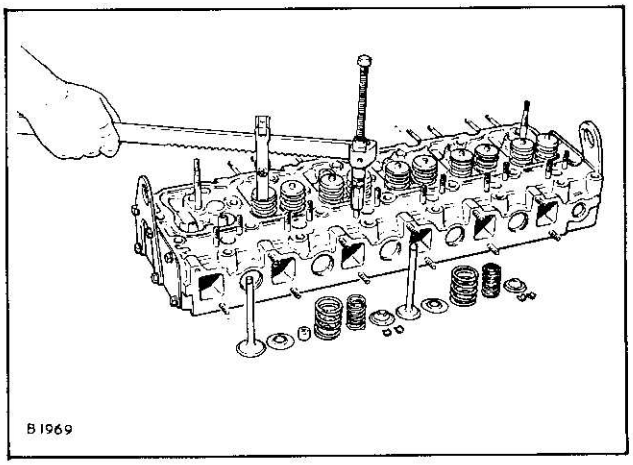


Fig. 3

2. Thoroughly clean the cylinder head and all respective parts. Examine for wear, cracks or damage and rectify or renew:

   a) All joint faces

   b) Combusion chamber inserts

   c) Valves and valve seats

   d) Valve to guide wear

   e) Valve springs

   f) Rocker arm bushes and shaft.

   See dimensions and wear limits.

3. Check cylinder head surface for distortion, Fig. 4. If distortion of A and B exceeds 0,1 mm (0.004 in) and that of C, D, E and F, 0,25 mm (0.010 in) the head should be renewed.

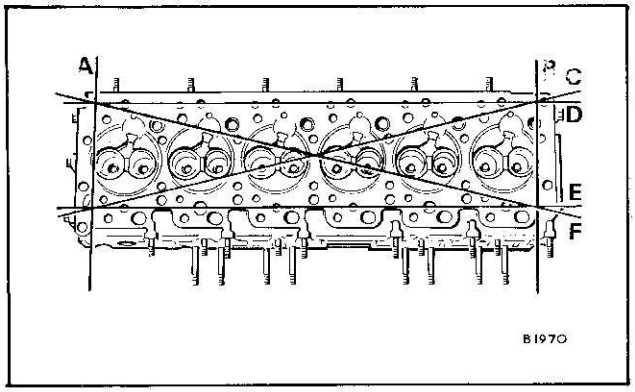


Fig. 4

To Renew Combusion Chamber Inserts

1. To remove the combusion chamber inserts, tap out through the atomiser bores using a suitable mandrel, Fig. 5.

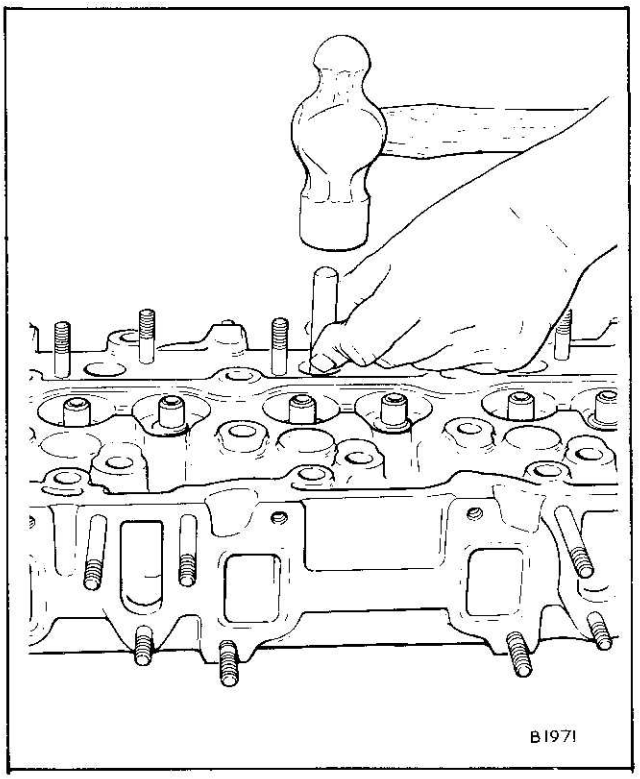


Fig. 5

2. To replace, locate a new insert with an expansion plug, Fig. 6, loosely fitted, in the recess provided.

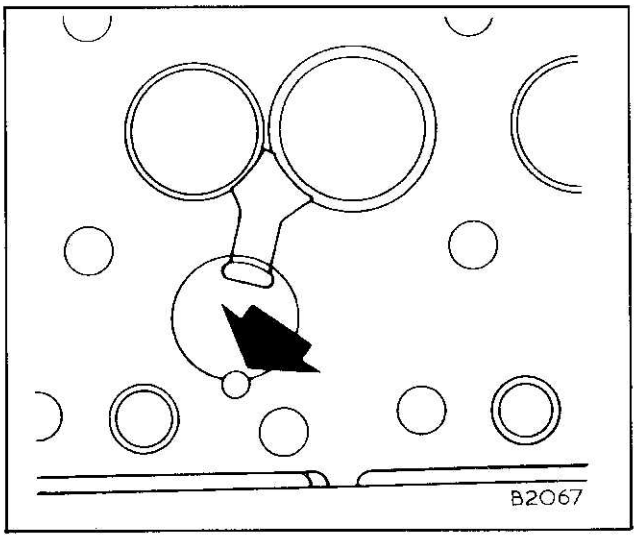


Fig. 6

3. Check the height of the insert in relation to the cylinder head face, Fig. 7.

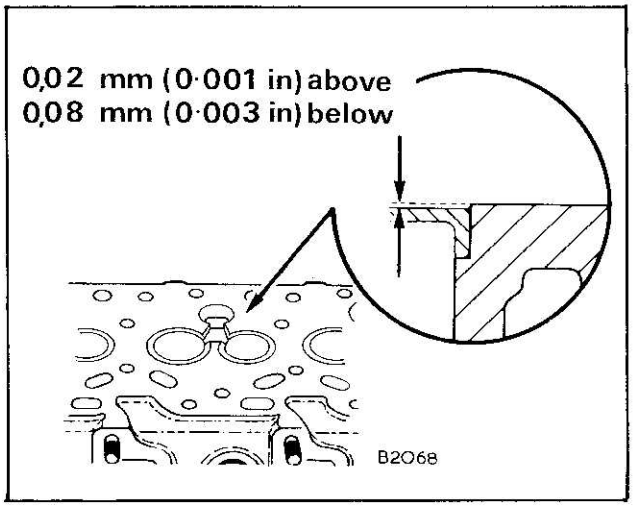


Fig. 7

4. Secure the insert by expanding the expansion plug with a suitable tool and hammer, Fig. 8.

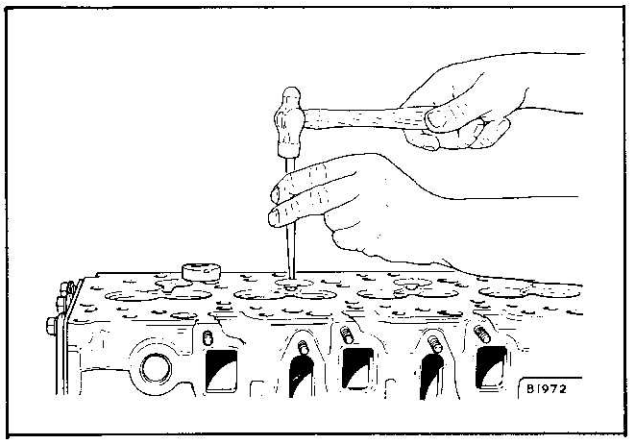


Fig. 8

To Renew Valve Guides

1. Using a suitable press, press out the old guide from the bottom deck.

2. Press a new guide into the cylinder head from the top deck, using a press, the valve guide removing tool and the spacer adaptor.

   The valve guides should protrude above the valve recess in the cylinder head by 16,5 mm (0.65 in), Fig. 9.

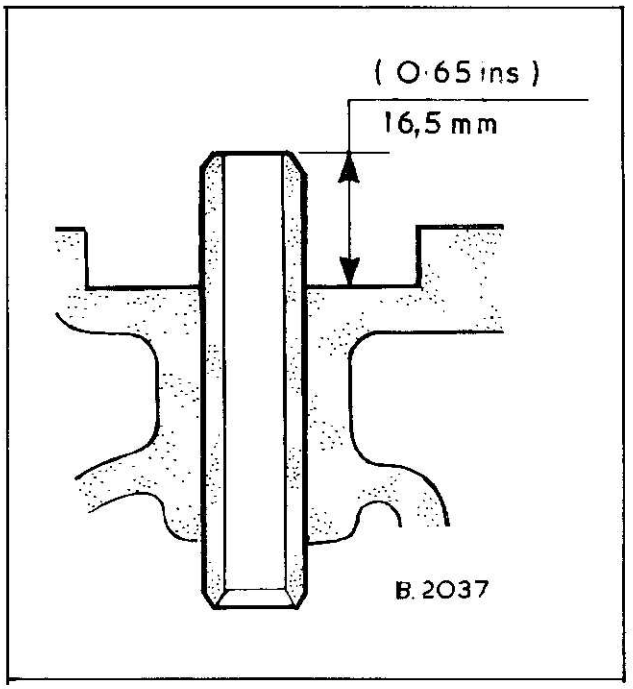


Fig. 9

Refacing Valves and Seats

When cutting or grinding, remove the least amount of metal to clean the faces. Lap the valves lightly to their seats.

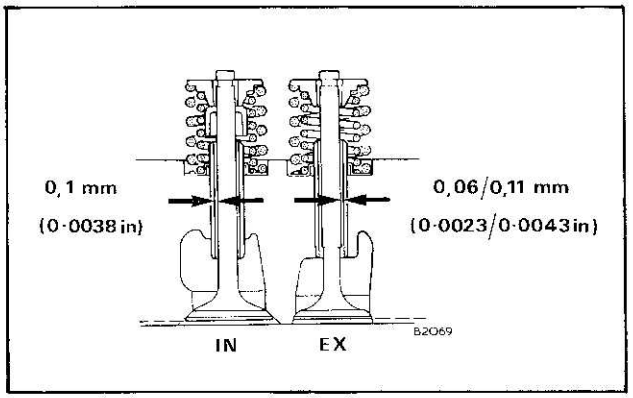


Fig. 10

The included valve face and seat angle is

90° – Inlet
120° – Outlet

Valve Springs

The inner and outer springs are the same for both inlet and exhaust valves.

New springs should be fitted at every major overhaul.

Inspect springs for damage and squareness. Check the load required to reach the indicated length, Fig. 11.

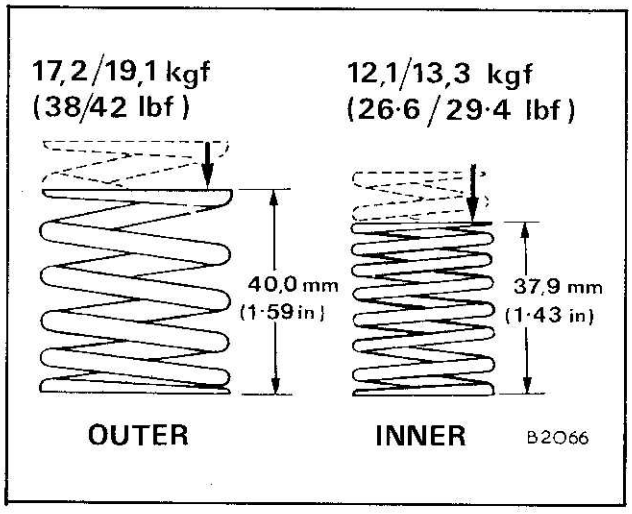


Fig. 11

Rocker Levers

Rocker lever bushes are replaceable.

Remove the old bush with a suitable mandrel and press in the new bush to the position shown in Fig. 12. Ream out to the size specified in 'Data'.

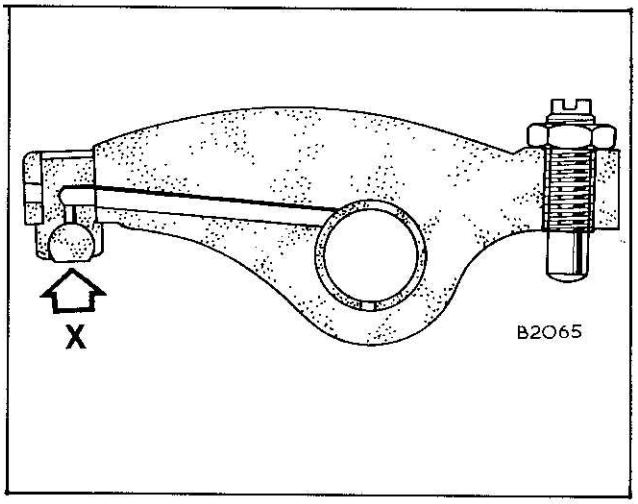


Fig. 12

Rocker Shaft Assembly

When dismantling, note the order of assembly.

The lubrication of the rocker shaft is by way of the front end bracket and an oilway in the cylinder head and cylinder block which feeds oil intermittently from the No 1 camshaft journal.

The rocker shaft is prevented from turning by the two end studs locating the two end brackets, or alternatively by taper pin. See Fig. 2.

To release or remove the rocker assembly it is necessary to DRAIN THE ENGINE COOLANT before releasing all the cylinder head securing setscrews by 1½ flats of the setscrews in the opposite sequence of tightening.

This prevents head distortion.

Remove the nuts from the two end brackets and then the eleven long setscrews.

To Refit the Cylinder Head

Position the cylinder head gasket with the mark 'TOP' uppermost, locating the gasket over the dowels in the cylinder block.

Fit the cylinder head over the dowel locations.

Fit the push rods and rocker shaft assembly. Ensure correct location.

Fit the eleven longest cylinder head securing setscrews through the rocker brackets followed by the remaining setscrews.

Check that all the push rods are properly located before tightening down the cylinder head securing setscrews to the torque given in 'Data' and in the correct sequence as in Fig. 13.

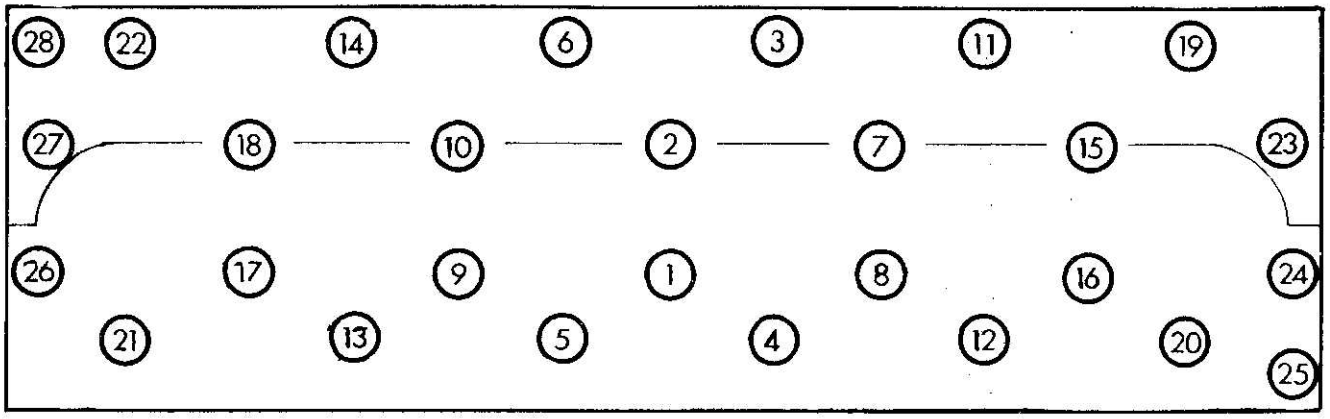


Fig. 13

Fit the two nuts over the end rocker bracket locating nuts.

Check that each rocker arm centre is offset from the valve stem centre by 1,0 mm (0.040 in), Fig. 14.

Ensure that the tappet ball-heads are in the correct position, the flat of the ball to the valve tip, Fig. 15, and see 'X', Fig. 12.

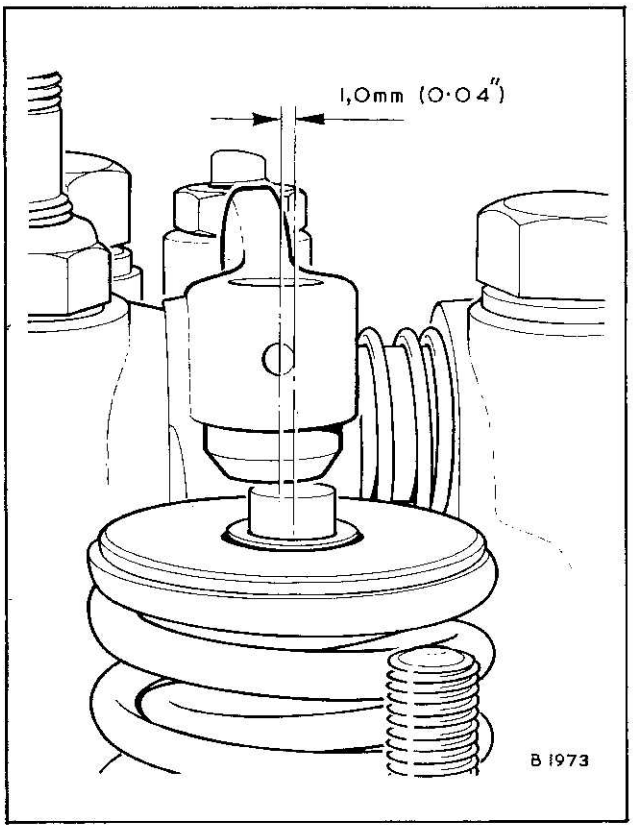


Fig. 14

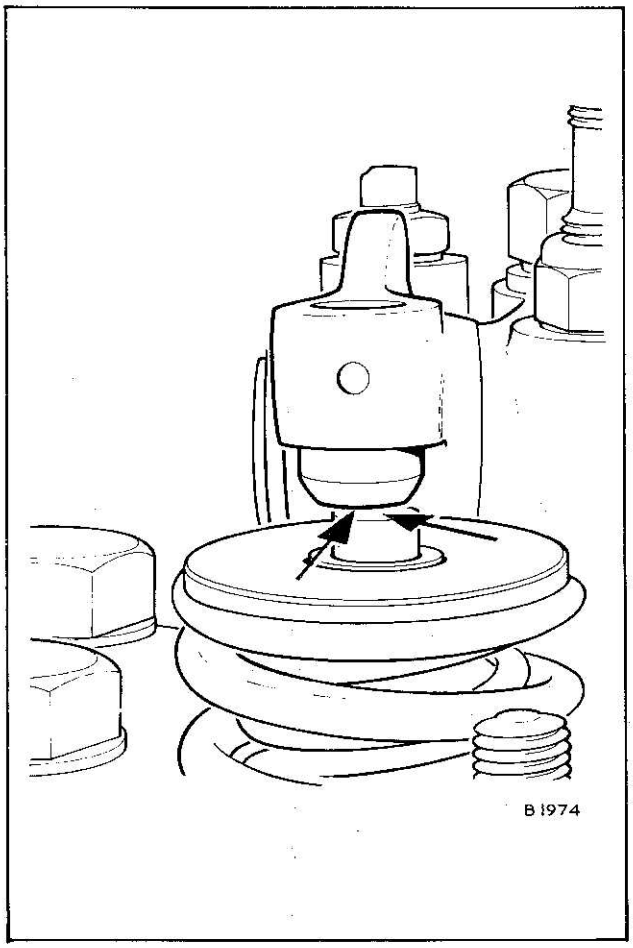


Fig. 15

Adjust the valve tip clearance to 0,30 mm (0.012 in) for the inlet valves and 0,41 mm (0.016 in) for the exhaust valves as detailed below.

Check that the engine is in a correct running condition and run the engine until thoroughly warmed through, shut the engine down and re-torque the cylinder head securing setscrews.

When the engine is cold re-adjust the valve tip clearances.

Adjusting Valve Tip Clearances

With valves rocking on No 6 cylinder, set clearances on No 1.

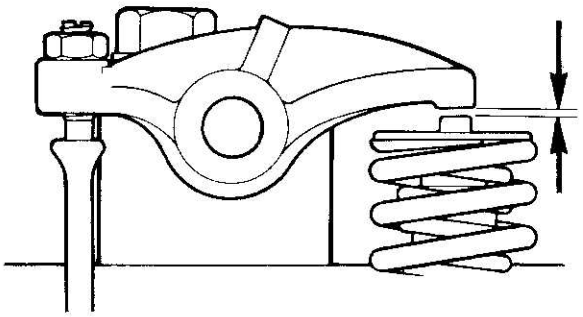
With valves rocking on No 2 cylinder, set clearances on No 5.

With valves rocking on No 4 cylinder, set clearances on No 3.

With valves rocking on No 1 cylinder, set clearances on No 6.

With valves rocking on No 5 cylinder, set clearances on No 2.

With valves rocking on No 3 cylinder, set clearances on No 4.



Inlet 0,30 mm (0.012 in) cold
Exhaust 0,41 mm (0.016 in) cold

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Fig. 16