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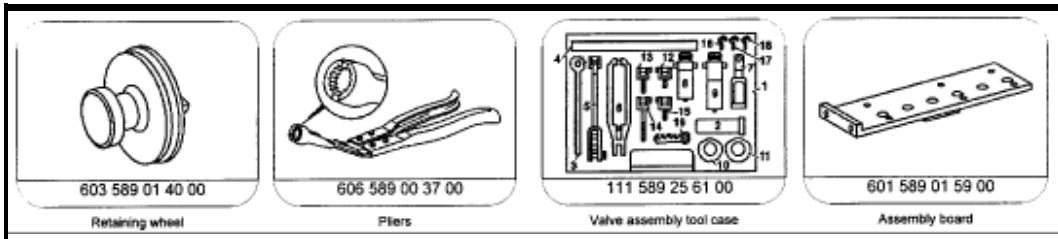
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### Service and Repair

Removing and installing valve springs and valve stem seals

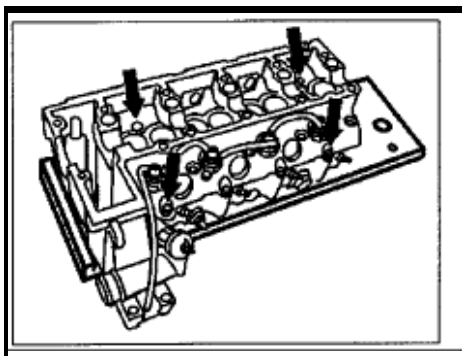


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If cylinder head removed:

Refer to [Cylinder Head Assembly](#), Service and Repair for procedure to remove cylinder head from engine [See: Cylinder Head Assembly\Service and Repair](#)

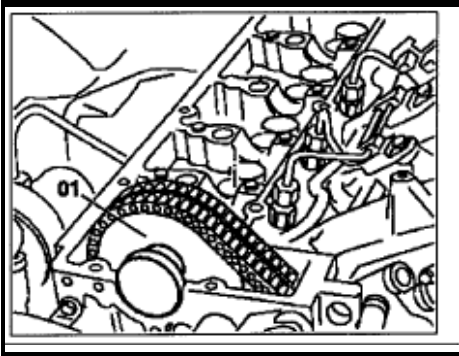


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1.1 Bolt cylinder head to assembly board 601 589 01 59 00 with four [cylinder head bolts](#) (arrows).

**NOTE:** Only if cylinder head removed.



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**If cylinder head installed:**

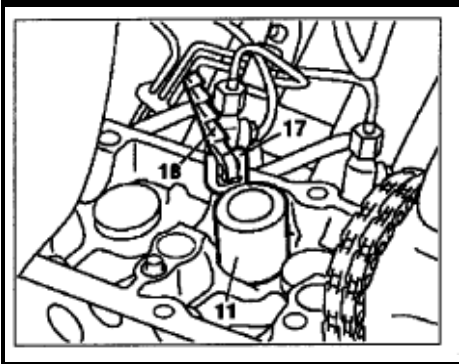
Refer to [Camshaft](#), Service and Repair for procedure to remove camshaft from cylinder head [See: Camshaft\Service and Repair](#)  
Position [piston](#) of the relevant cylinder to TDC using TDC detector.

Insert retaining lock for [crankshaft](#)/starter ring gear. Refer to Engine. [Cylinder Block Assembly](#), Crankshaft, Service and Repair for installation [See: Crankshaft\Service and Repair](#)

Connect cylinder leak tester and pressurize cylinder chamber of the relevant cylinder to about **5 bar**

Remove bucket tappet at the relevant cylinder.

1.2 Insert retaining wheel (01).

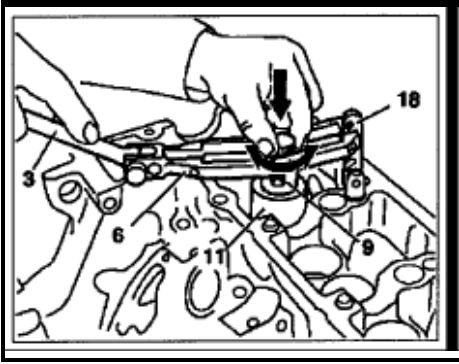


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2. Insert matching guide bush (11) into bucket tappet bore, screw detent with pivot bearing with suitable retaining fork (17) into thread of [camshaft bearing](#) cap and align.

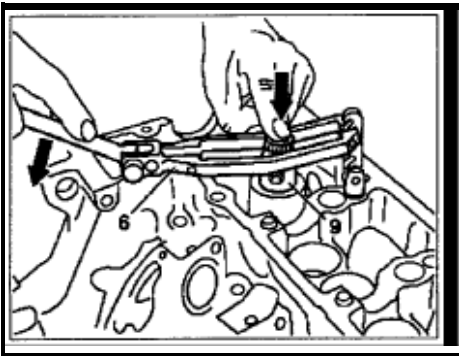
**Note:** Do not use the threads of the cylinder head cover as the cylinder head cover is attached with self-tapping bolts.



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3. Assemble thrust fork (6) with lever handle (3).
4. Insert assembly cartridge (9) into the guide bush (11). Attach thrust fork (6) to the mating bearing (18) and position at the mounting pins of the assembly cartridge (9).
5. Apply slight pressure to thrust fork (6) and to knurled screw and at the same time slowly rotate the knurled screw of the assembly cartridge (9) (arrow) until the inner locating drift with its tips is felt to engage between the valve collets.

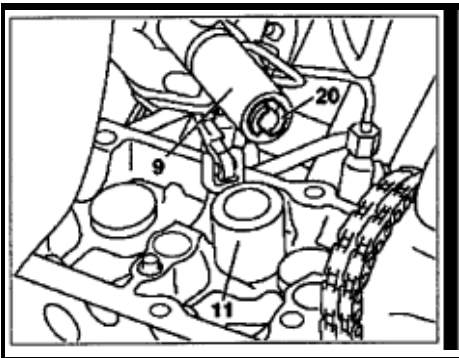


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6. Apply slight pressure with your thumb to the knurled screw of the assembly cartridge (9) and press thrust fork (6) down as far as the stop (use extension if necessary). The valve collets are removed automatically.
7. Slacken thrust fork (6) and take off.
8. Take out assembly cartridge (9) with the removed valve collets.

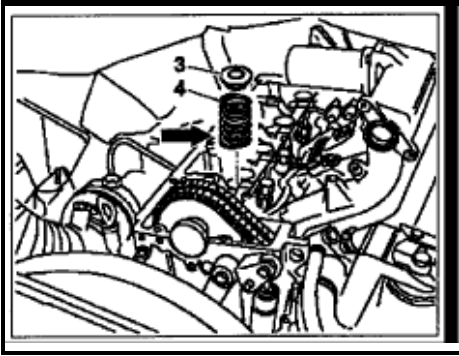
The valve collets can remain in the assembly cartridge until installed but all the [valve springs](#) or valves should be removed, e.g. if cylinder head removed it is then possible to take the valve collets out of the assembly cartridge by pulling out the knurled screw.



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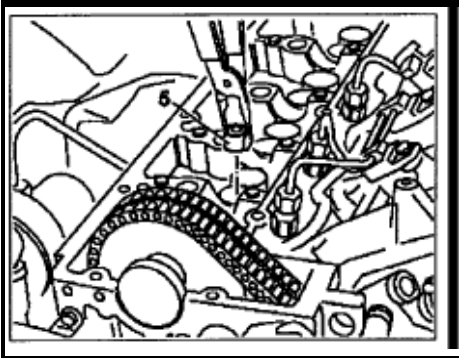
9. Check whether the valve collets are in the assembly cartridge (9) and repeat steps 4 to 7, if necessary.
10. Take out guide bush (11).



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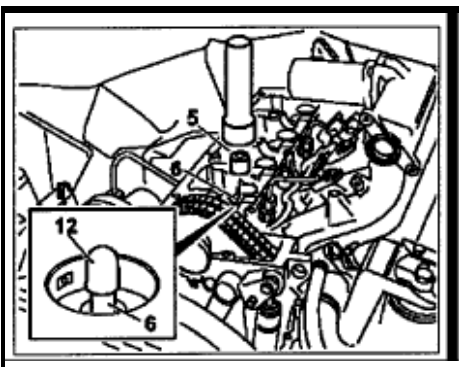
11. Remove top valve spring retainer (3) and valve spring (4).



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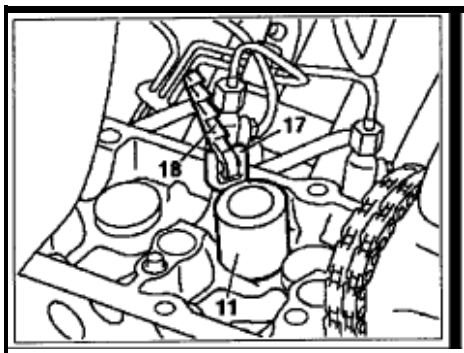
12. Use pliers to pull valve stem seal(5) off the valve stem.
13. Take out bottom valve spring retainer, inspect for pitting, replace if necessary and re- insert. Inspect valve stem for pitting, remove if necessary.



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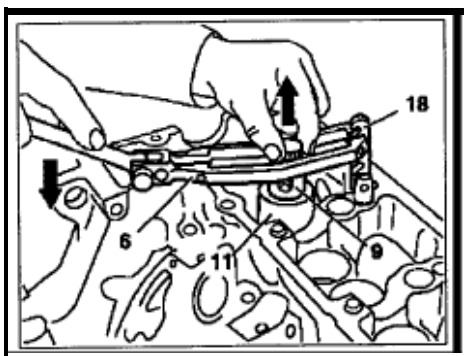
14. Fit protective cap (12) (contained in parts supplied) onto the valve stem (6) and oil well.
15. Insert new valve stem seal (5) into assembly drift and press onto valve stem (6) as far as the stop.
16. Take off protective cap (12).



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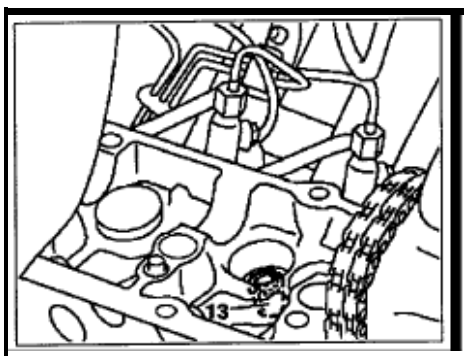
17. Insert **valve spring** and top valve spring retainer.
18. Insert guide bush (11) into the cylinder head.



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19. Insert assembly cartridge (9) with valve collets inside into the guide bush (11), attach thrust fork (6) to mating bearing (18) and position with slight pressure onto the two mounting bolts of the assembly cartridge (9).
20. Press down thrust fork (6) (arrow). Pull the knurled screw of the assembly cartridge (9) up (arrow), this releases the pressure on the thrust fork (the valve collets are thus installed).



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21. Check whether the valve collets (9) are correctly inserted; repeat steps 2 to 8 and 17 to 19, if necessary.
22. Detach all the special tools from the cylinder head.

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