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BMW 3-Series 320i & 320xi (12-14), 325i, 325xi, 330i & 330xi (06) & 328i & 328xi (07-14) Haynes Online Manual

8 Camshafts and followers - removal, inspection and installation

Note:

Numerous special tools are required to safely complete the following procedures. Ensure suitable tools are available prior to beginning work.

Removal

1 Remove the VANOS adjustment units (see [Section 7](#)).

Intake camshaft

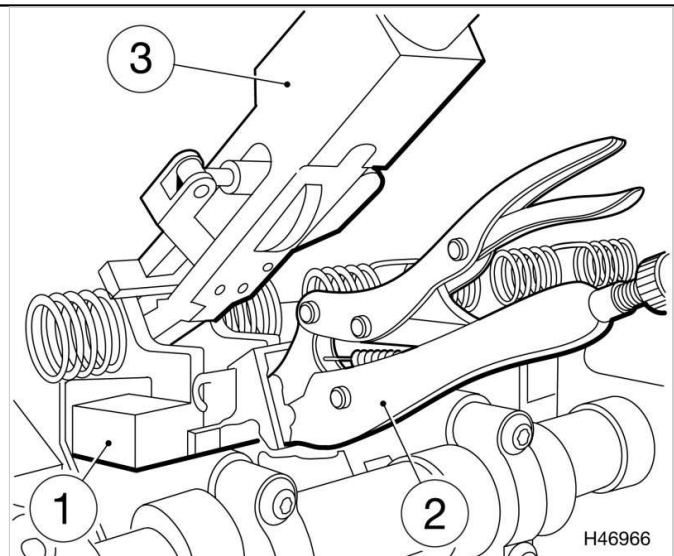
2 In order to remove the intake camshaft, it's necessary to remove the Valvetronic intermediate levers as follows:

3 Using a wrench on the hexagonal section, rotate the eccentric shaft so the lobes are providing minimum lift.

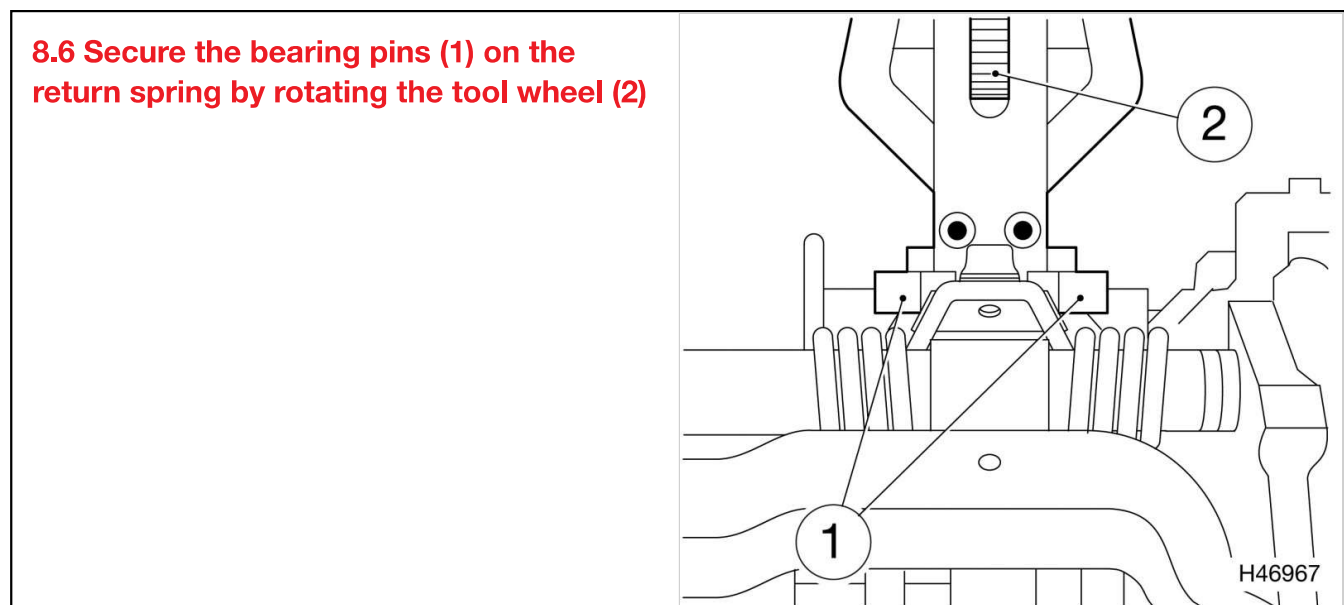
4 Remove the banjo bolt and remove the oil spray nozzle from cylinder No 3.

5 Secure BMW special tool No 11 4 270 to the guide block with locking pliers (see illustration) .

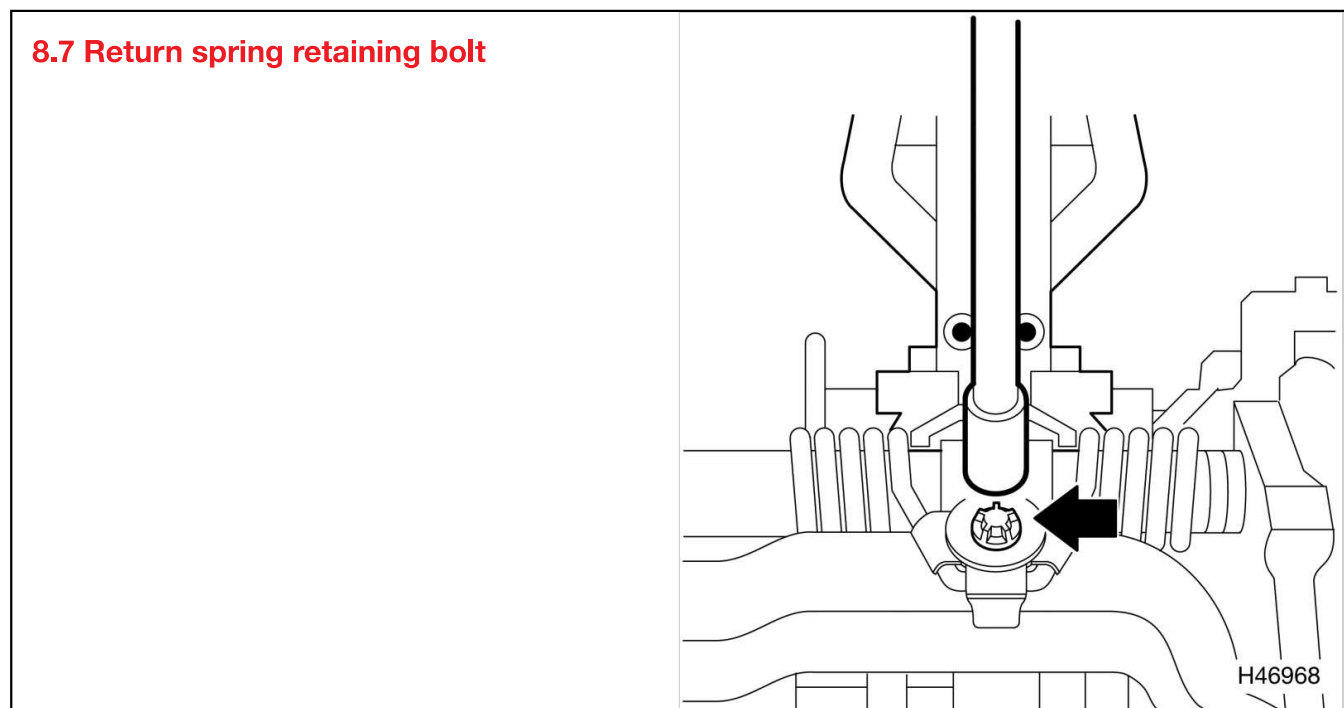
8.5 Secure the special tool (3) to the guide block (1) with locking pliers (2)



6 Secure the bearing pins on the return spring by rotating the knurled wheel on the special tool (see illustration)



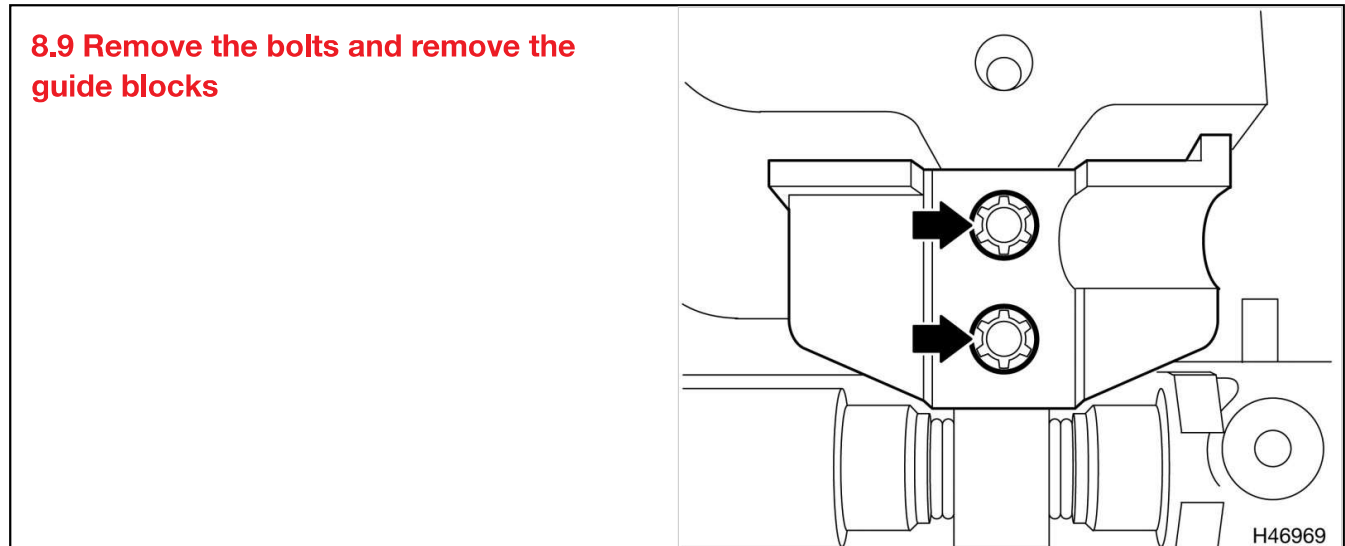
7 Lift the handle of the special tool as far as it will go to hold the intermediate lever return spring in place, then remove the bolt securing the return spring (see illustration) . Gradually release the spring tension by lowering the handle of the special tool. **Caution:** *Release the spring tension gradually as there is a risk of personal injury.*



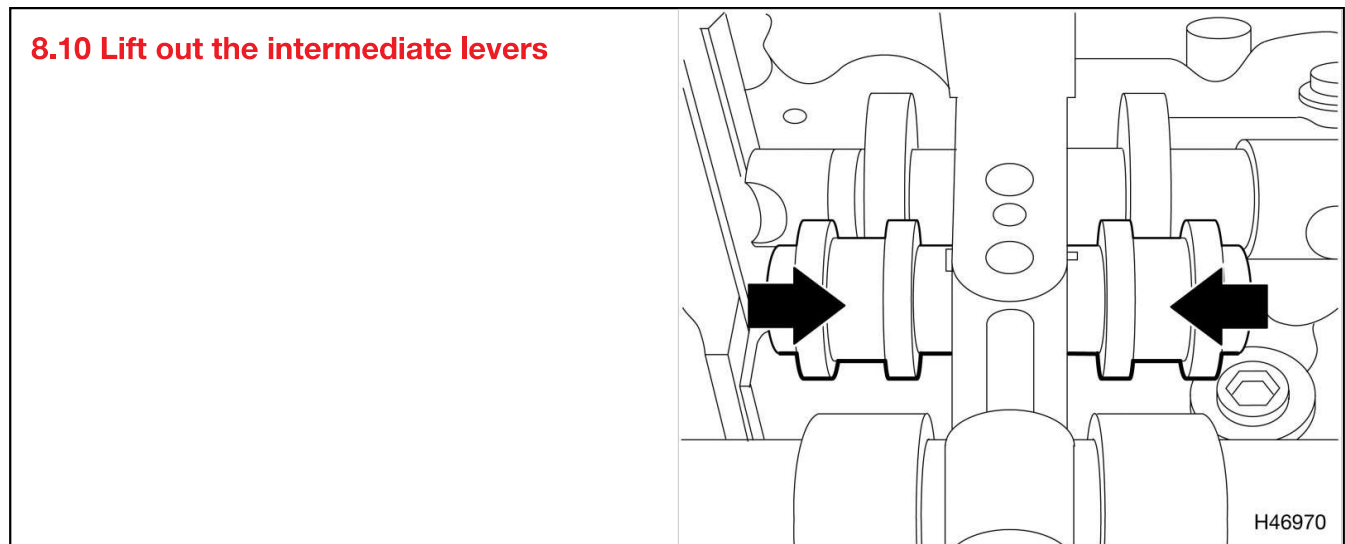
8 Force the coils apart and remove the return springs. Repeat this procedure on all the return springs. It's absolutely vital that the Valvetronic springs, lever and guide blocks, etc, are reinstalled to their original positions.

Lay out the components in order on a clean, dry surface, so they can be identified and reinstalled to their original positions.

9 Remove the mounting bolts and each guide block (see illustration) . Again, lay the guide blocks out on a clean surface in order (see Step 8). It is essential they are reinstalled in their original positions.

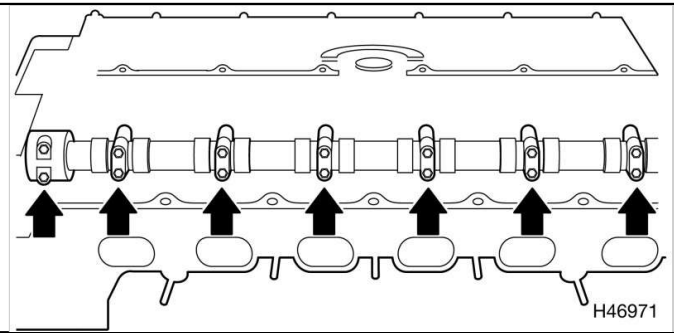


10 Lift out the intermediate levers (see illustration) . Again, lay the intermediate levers out on a clean surface in order (see Step 8). It's essential they are reinstalled to their original positions.



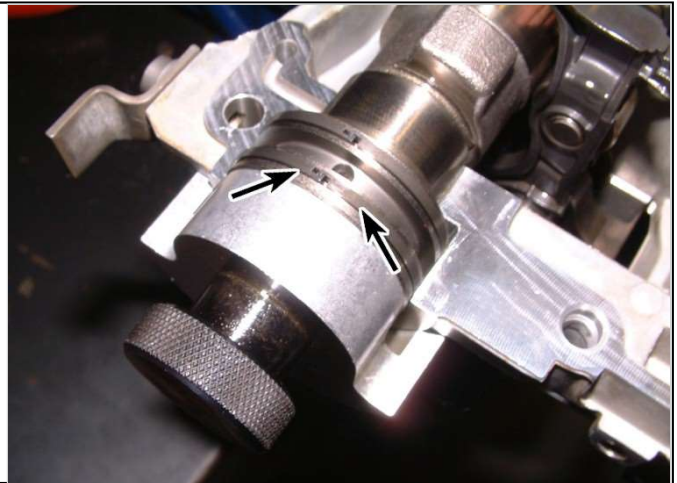
11 Gradually and evenly remove the retaining bolts, remove the bearing caps, and lift out the camshaft. Note that No 1 bearing cap incorporates a thrust washer. Lay the bearing caps out on a clean surface in order; it's essential they are reinstalled to their original positions (see illustration) .

8.11 Intake camshaft bearing caps



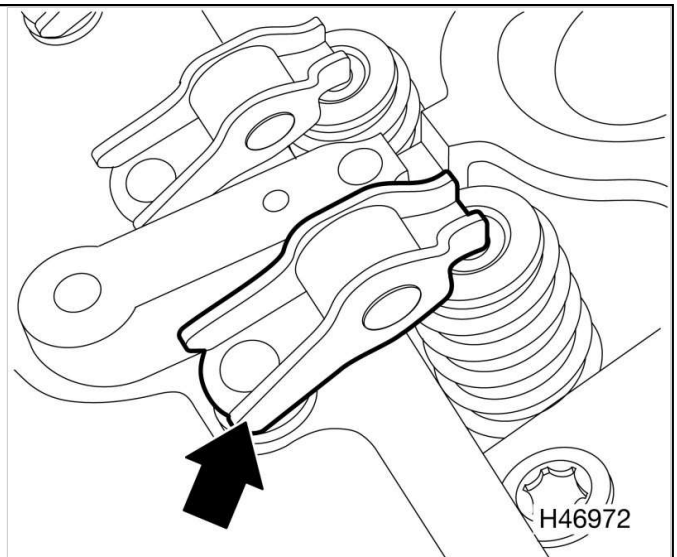
12 If required, remove the compression rings on the end of the camshaft, by pressing one end of the ring into the groove, pulling up the other ring, and unhooking it (see illustration) . Take care as the rings are easily broken.

8.12 Press down one end of the ring, and pull up the other end

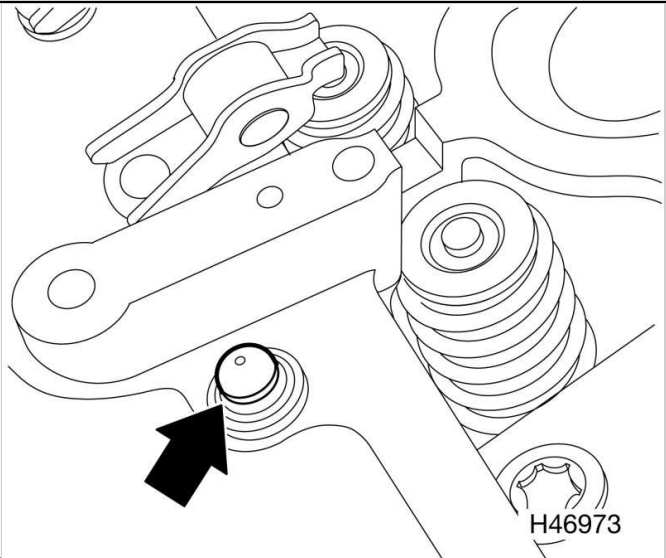


13 Lift the rocker arms from their locations, and lay them out on a clean surface. Pull the hydraulic adjusters out and lay them on a clean surface. It is absolutely essential that the components are reinstalled to their original locations (see illustrations) .

8.13a Remove the rocker arms . . .



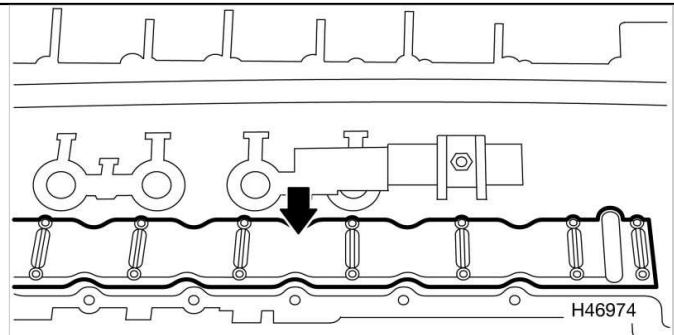
8.13b . . . followed by the hydraulic adjusters



Exhaust camshaft

14 Working from the outside inwards, gradually and evenly remove the bolts securing the upper and lower camshaft bearing castings (see illustration) . Lift out the castings and camshaft as an assembly.

8.14 Remove the bolts and remove the upper casting



15 Carefully separate the upper and lower castings, then remove the camshaft.

16 If required, remove the compression rings on the end of the camshaft, by pressing one end of the ring into the groove, pulling up the other ring, and unhooking it (see illustration 8.12) . Take care as the rings are easily broken.

17 Lift the rocker arms from their locations, and lay them out on a clean surface.

18 Pull the hydraulic adjusters out and lay them out on a clean surface. It's absolutely essential that the components are reinstalled in their original locations (see illustrations 8.13a and 8.13b) .

Inspection

19 Clean all the components, including the bearing surfaces in the bearing castings and bearing caps. Examine the components carefully for wear and damage. In particular, check the bearing and cam lobe surfaces of the

camshaft(s) for scoring and pitting. Examine the surfaces of the cam followers for signs of wear or damage. Replace components as necessary.

Installation

Intake camshaft

20 Install the hydraulic adjusters and rocker arms in their original positions.

21 Ensure the flywheel/driveplate is still locked in the TDC position.

22 Lubricate the camshaft bearing surfaces with clean engine oil.

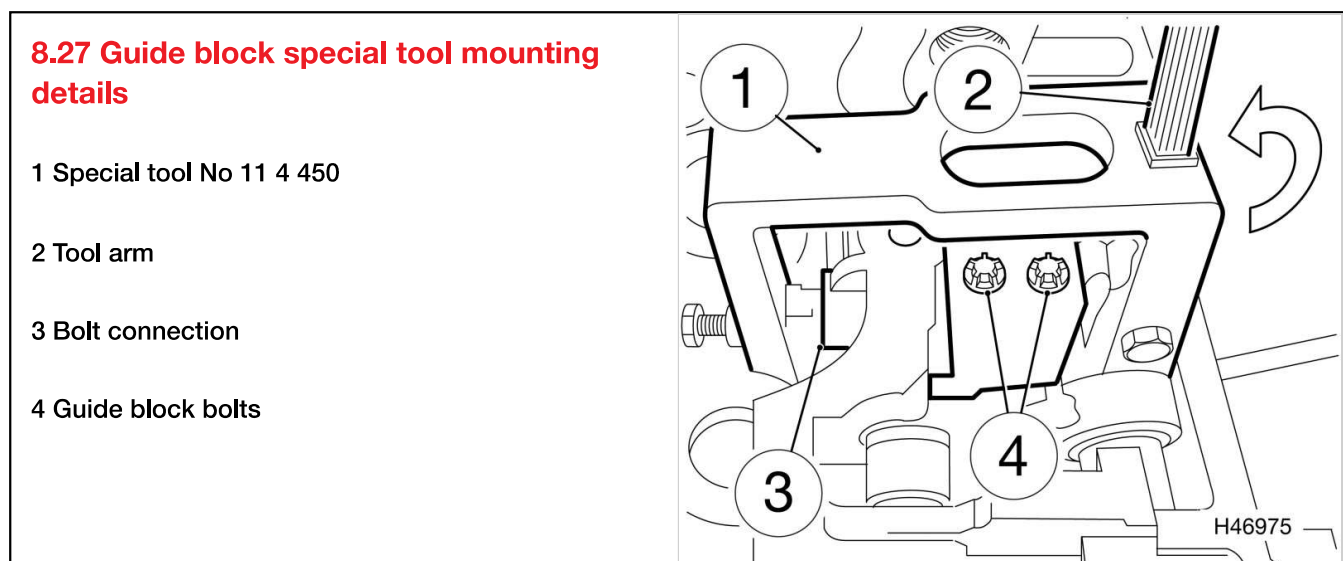
23 Install the camshaft so the lobes of No 1 cylinder are pointing upwards, and the part number on the camshaft is up. Install special tool No 11 4 821 on the camshaft (see Section 3).

24 Install the camshaft bearing caps to their original positions. Working evenly, tighten the retaining bolts to the specified torque.

25 Install the intermediate levers to their original positions.

26 Install the guide blocks to their original positions. Install the retaining bolts, tighten them by hand, then loosen them 90-degrees.

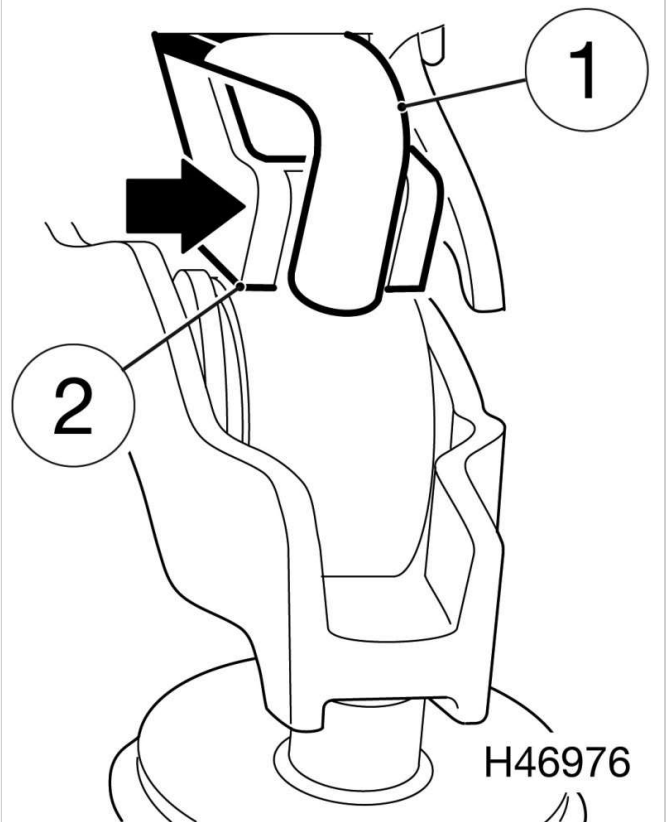
27 Attach special tool No 11 4 450 to the bolt connection of the Valvetronic eccentric shaft, and lift up the lever on the tool to tension the guide blocks (see illustration) . Tighten the block retaining bolts to their specified torque. Repeat this procedure on the remaining guide blocks. **Note:** *The guide block at cylinder No 3 can only be installed with one bolt until the return spring has been reinstalled later in the procedure.*



28 Install the return springs to their original locations. Ensure the springs engage correctly with the intermediate

levers (see illustration) .

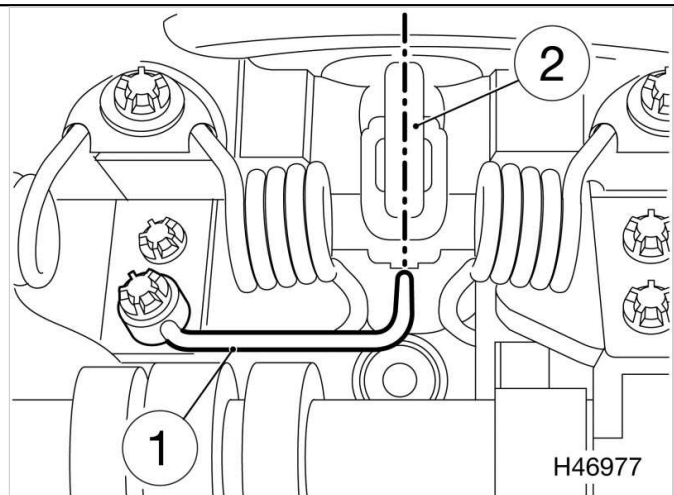
8.28 Check that the return spring (1) engages correctly with the intermediate lever (2)



29 Secure special tool No 11 4 270 to the guide block, then secure the bearing pins in the return spring coils, and pull up the tool arm to tension the spring. Install the spring retaining bolt, and tighten it to the specified torque (see illustration 8.5 and 8.6) . Repeat this procedure on the remaining return springs.

30 Install the oil spray nozzle for cylinder No 3, and tighten the bolt to the specified torque. Ensure the nozzle points exactly at the quadrant teeth (see illustration) .

8.30 The oil spray nozzle (1) should point exactly at the quadrant teeth (2)

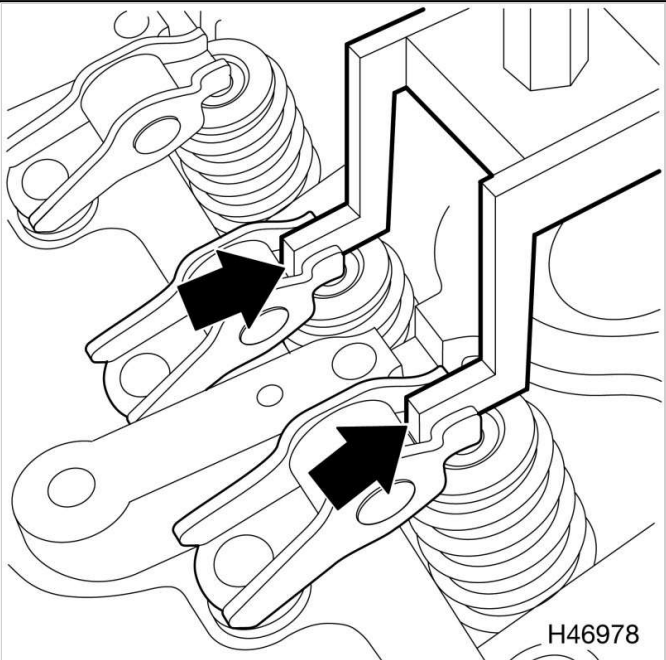


Exhaust camshaft

31 Install the hydraulic adjusters and rocker arms to their original positions.

32 The exhaust valves of cylinder No 2 must be slightly depressed prior to replacement of the camshaft and bearing castings. Attach special tool No 11 4 462 to the cylinder head using the two special bolts provided. Ensure the fingers of the tool contact the rocker arms above the valves (see illustration) .

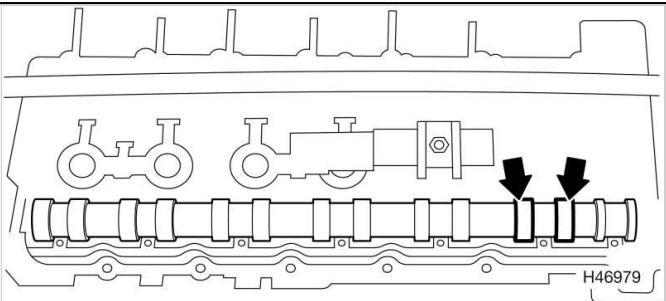
8.32 Ensure the fingers of the tool contact the rocker arms



33 Carefully compress the rocker arms/valves slightly by tightening the nut on the tool spindle.

34 Install the exhaust camshaft into the lower bearing casting. The lobes on the camshaft at cylinder No 1 must point upwards at an angle (see illustration) , and the part number on the camshaft must face upwards. Locate the casting/camshaft over the rocker arms.

8.34 Install the camshaft with the lobes at No 1 cylinder pointing upwards



35 Place the upper bearing casting over the camshaft. Insert the retaining bolts and tighten them to 72 in-lbs (8 Nm), then loosen all the retaining bolts 90-degrees.

36 The six milled surfaces along the length of the upper and lower bearing castings must be exactly aligned. Attach special tool No 11 4 461 to the milled surfaces as shown (see illustration) . Tighten the bolts finger-tight. **Note:** The bolts should be on the inside, except on cylinder No 2 where the bolt must be on the outside.

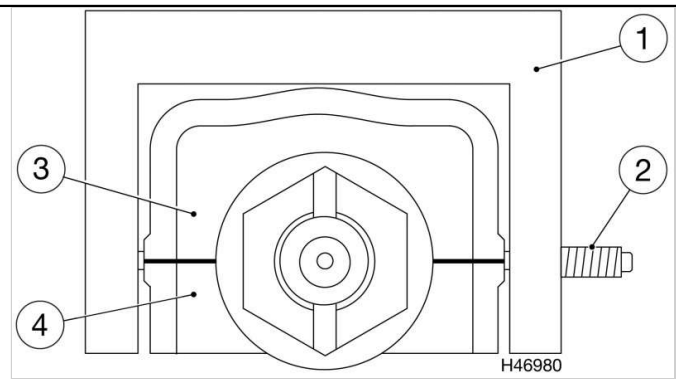
8.36 Bearing alignment special tool details

1 Special tool No 11 4 461

2 Aligning bolt

3 Upper casting

4 Lower casting



37 With the bearing castings securely clamped, tighten the casting retaining bolts gradually and evenly to the specified torque.

38 Remove the special tools clamping the castings, and the tool depressing the valves at No 2 cylinder.

Both camshafts

39 Install the VANOS adjustment units (see [Section 7](#)).

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