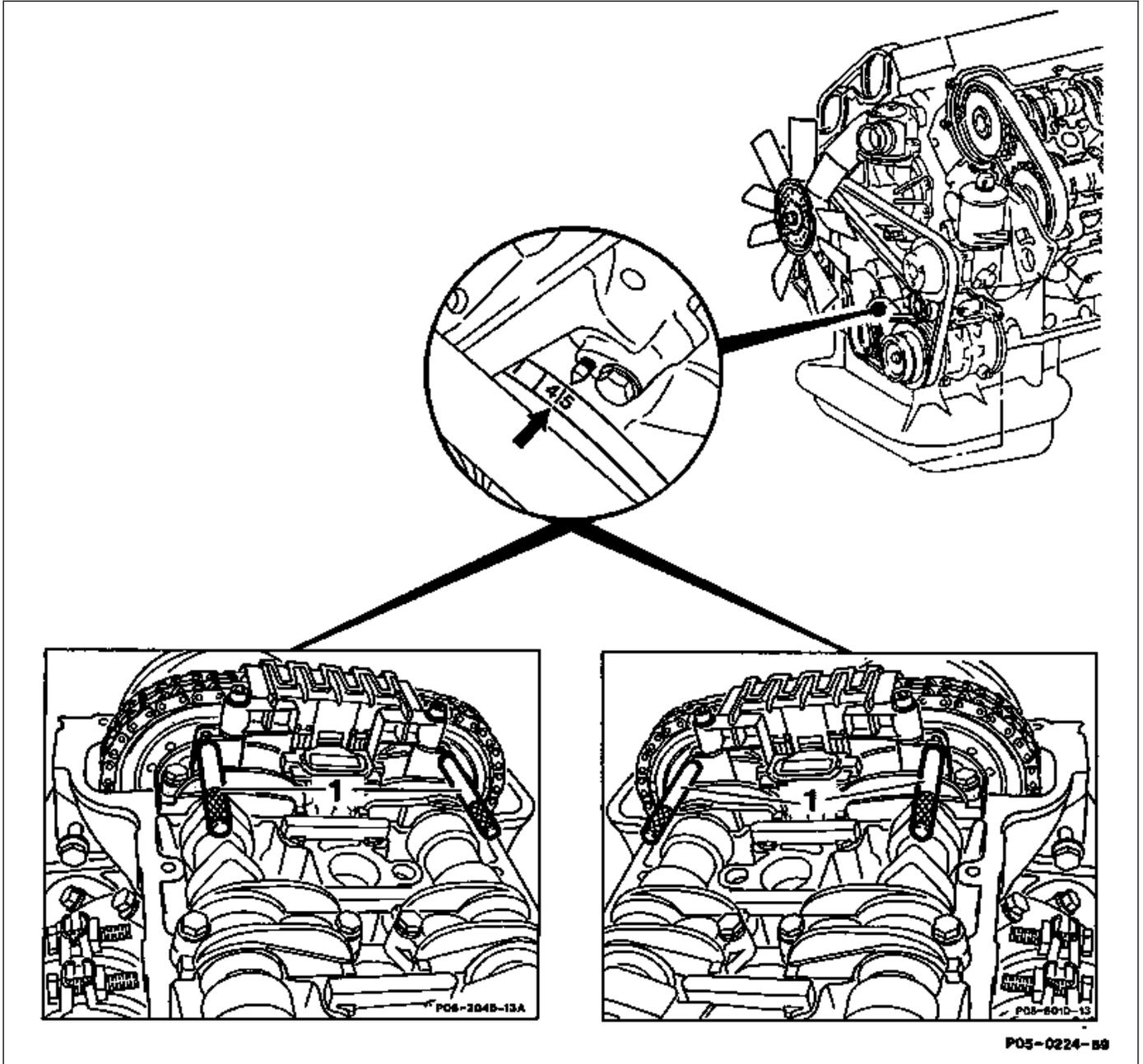


# 05-2230 Checking, adjusting basic setting of camshafts

Preceding work:  
Cylinder head covers removed (01-0500)



## Checking

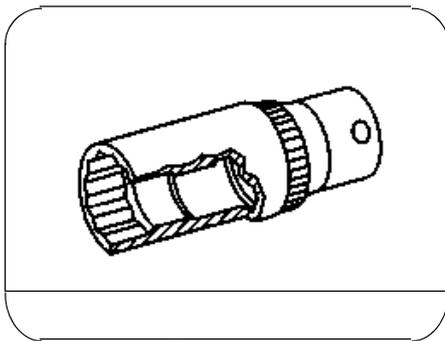
Engine..... rotate to 45° before ignition TDC with socket wrench, special tool 001 589 65 09 00 (step 1).  
It must be possible to pin the camshafts with the pins (1)..... special tool 111 589 03 15 00 (step 2).

## Adjusting (at 45° before TDC)

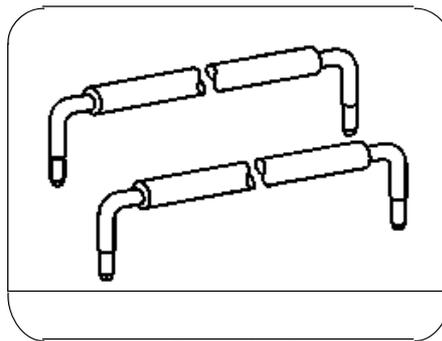
Guide rails (2)..... remove, install (05-3350).  
Chain tensioner..... remove, install (05-3100).

Camshafts, beginning at right exhaust camshaft.....	rotate with wrench in direction of rotation of engine, special tool 111 589 01 01 00 (step 5).
Camshafts, beginning at left exhaust camshaft.....	rotate into position with wrench, special tool 111 589 03 15 00 (step 6).
Timing chain.....	fit on.
Camshafts.....	pin with pins (1), beginning at left exhaust camshaft, special tool 111 589 03 15 00 (steps 6 to 9).

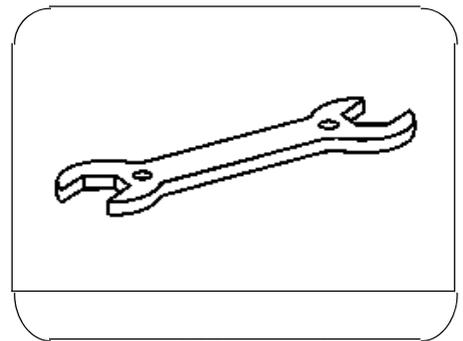
## Special tools



001 589 65 09 00



111 589 03 15 00



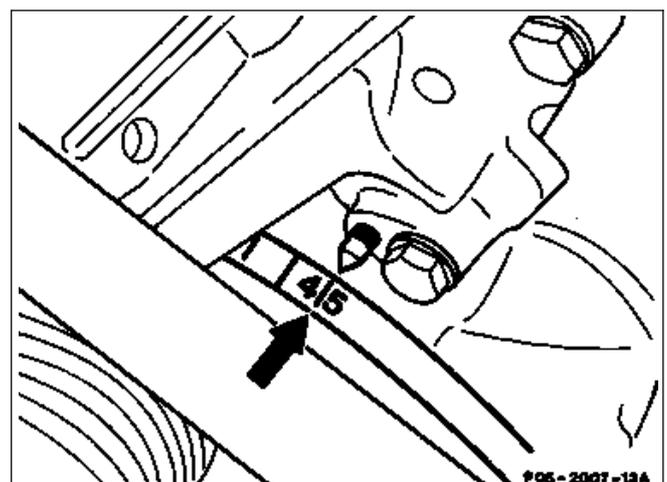
119 589 00 01 00

## Note

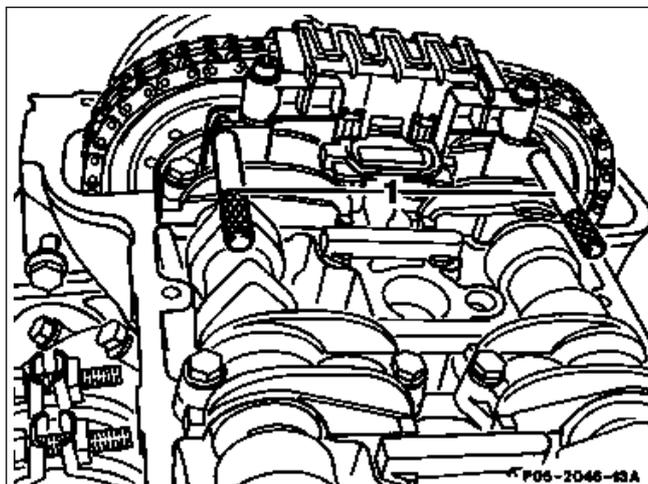
The 45° before TDC marking on the vibration damper is an assembly marking. The camshafts can be rotated in this position with the wrench 119 589 00 01 00 without the valves coming into contact with the piston.

## Checking

- 1 Position engine to 45° before ignition TDC at No. 1 cylinder by cranking engine at crankshaft in direction of rotation of engine using special tool 001 589 65 09 00.

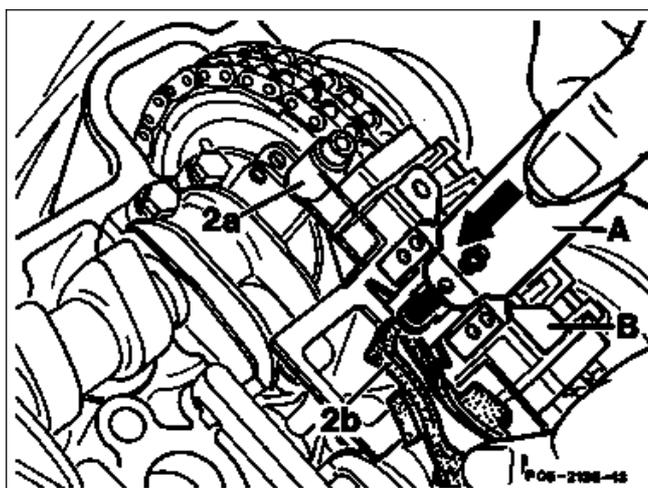


- 2 It must be possible to pin all 4 camshafts with the pins (1), special tool 111 589 03 15 00, through the 6.5 mm dia. holes in the first camshaft bearing caps.

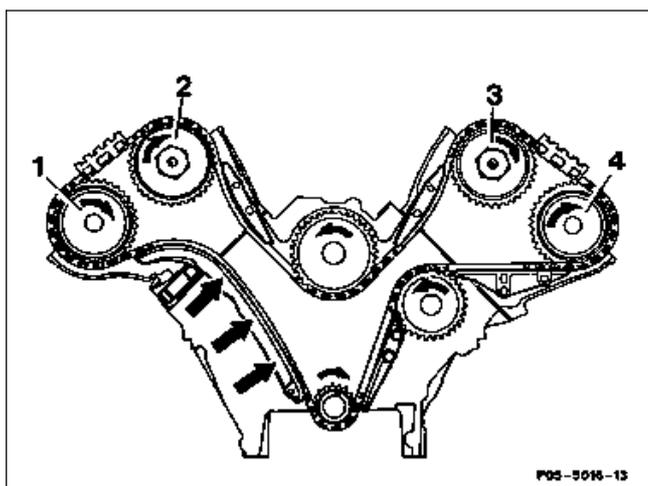


**Adjusting** (at 45° before TDC)

- 3 Remove, install top slide rail (2a) (05-3350).
- 4 Remove, install chain tensioner (05-3100).

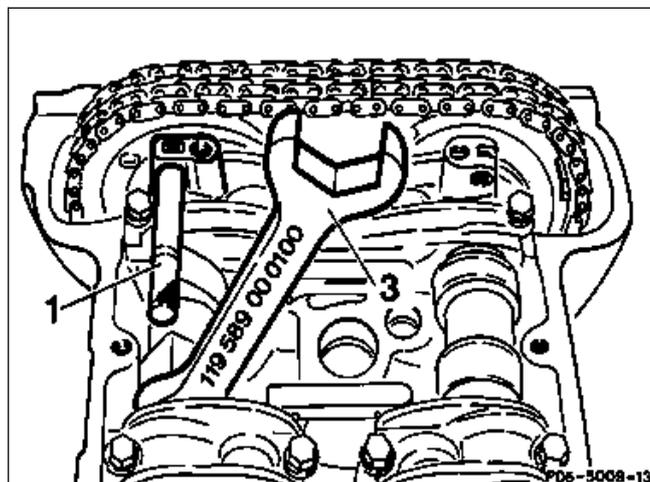


- 5 Rotate camshafts in direction of rotation of engine with wrench, special tool 119 589 00 01 00, beginning at right exhaust camshaft (1). To make it possible to start the adjustment at the left-hand exhaust camshaft (4), the slack section (arrows) of the timing chain (at chain tensioner) must be transferred by rotating the camshafts (1, 2, and 3).

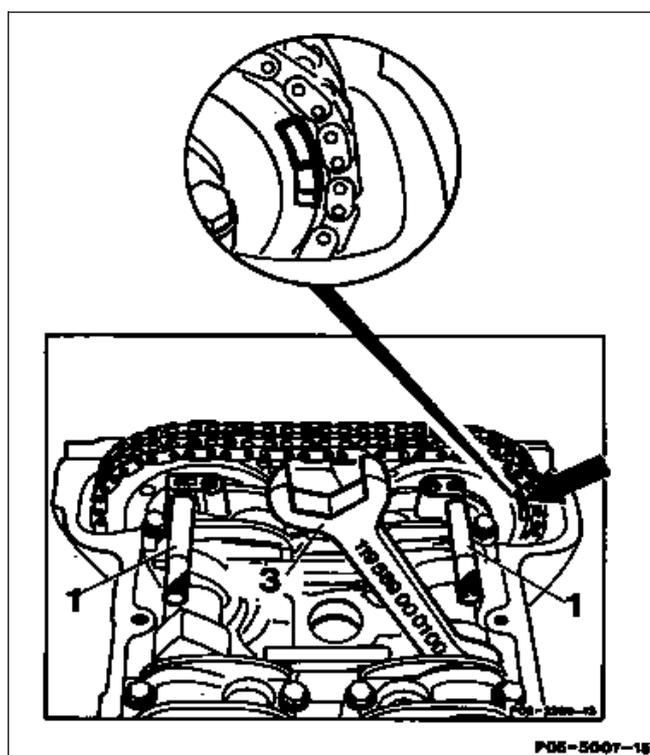


Engine 119.960

- 6 Rotate left-hand exhaust camshaft into position with wrench (3) 119 589 00 01 00.  
Fit timing chain onto exhaust camshaft timing gear and pin with pin (1) 111 589 03 15 00.



- 7 Rotate left-hand inlet camshaft into position with wrench (3). Fit timing chain onto inlet camshaft timing gear and pin with pin (1). Camshafts in "retarded" position (arrow).



- 8 Rotate right-hand inlet camshaft into position with wrench 119 589 00 01 00.  
Fit timing chain onto inlet camshaft timing gear and pin with pin 111 589 03 15 00.  
Camshafts in "retarded" position (arrow).

- 9 Rotate right-hand exhaust camshaft into position with wrench 119 589 00 01 00.  
Fit timing chain onto exhaust camshaft timing gear and pin with pin 111 589 03 15 00.

Installation is performed in the reverse order, beginning from step 4.