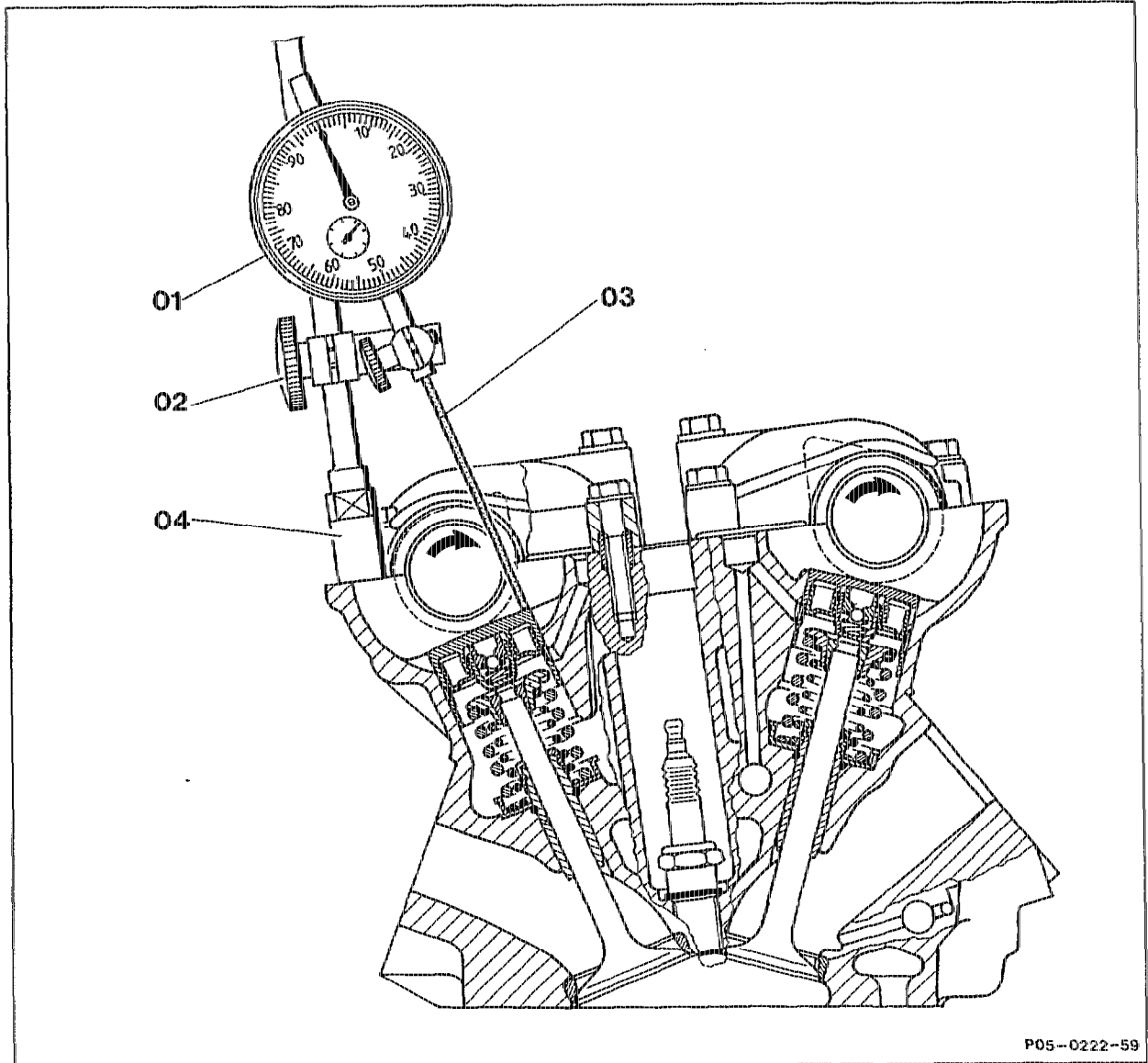


05-2150 Checking timing of camshafts

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

Operation no. of operation texts and work units or standard texts
and flat rates
05-6010, 6020



P05-0222-59

Camshaft code numbers check (step 1).

Checking timing of inlet camshafts

Position inlet camshaft of cylinder No. 1 or No. 6
so that only the base circles are resting against
the bucket tappets (step 2).

Dial gauge holder (02)	install with threaded sleeve (04) at cylinder 1 or 6, special tool 363 589 02 21 00 (step 3).
Dial gauge (01)	install in dial gauge holder (02) with tracer pin (03) on left side of camshafts to be checked (step 4).
Preload of 3 mm and angular position of 90° of tracer pin to bucket tappet	set (step 5).
Crankshaft	rotate with wrench socket in direction of rotation of engine, special tool 001 589 65 09 00.

At 2 mm valve lift, the reading on vibration damper must agree with the reading in table "Inlet valve opens".

Testing timing of exhaust camshafts

Position exhaust camshaft of cylinder No. 1 or No. 6 so that only the base circles are resting against the bucket tappets (Step 7).

Dial gauge holder (02) 363 589 02 21 00 with threaded sleeve (04)	install at cylinder No. 1 or No. 6 (step 8).
Dial gauge (01) with tracer pin (03)	install at cylinder No. 1 on left side at cylinder No. 6 on right side of camshaft to be tested.
Preload of 3 mm and angular position of 90° of tracer pin (03) to bucket tappet	set (step 9).
Crankshaft	crank with wrench socket 001 589 65 09 00 in direction of rotation of engine.

At 2 mm valve lift, the reading on vibration damper must agree with the reading in table "Exhaust valve opens"

Timing in crank angle degrees (°CA) at 2 mm valve lift¹⁾ with new timing chain

Engine	Code numbers of camshafts ²⁾				Inlet valve ³⁾		Exhaust valve	
	Inlet camshaft		Exhaust camshaft		opens ATDC	closes ABDC	opens BBDC	closes BTDC
	rt	lt	rt	lt				
119.960	58 59 ⁵⁾	56 57 ⁵⁾	62 ⁴⁾ 63 ⁵⁾	60 ⁴⁾ 61 ⁵⁾	25.0°	35.0°	13.0°	13.0°
119.970 972/974	74 75 ⁵⁾	72 73 ⁵⁾	78 ⁵⁾ 79 ⁵⁾	76 ⁵⁾ 77 ⁵⁾	30.0°	40.0°	13.0°	13.0°
119.971	82 83 ⁵⁾	80 81 ⁵⁾	86 87 ⁵⁾	84 85 ⁵⁾	30.0°	35.0°	8.0°	13.0°
119.970/ 972/974 ⁶⁾ / 980/982	98	96	02	00	33.0°	42.0°	10.0°	11.0°
119.971/ 975 ⁶⁾ / 981/985	90	88	94	92	30.0°	–	8.0°	–

1) Permissible variation: ± 2.0 °CA. Perform test only when cam ascending (in direction of rotation of engine).

2) Camshaft code number inscribed on camshaft bearing journal at front.

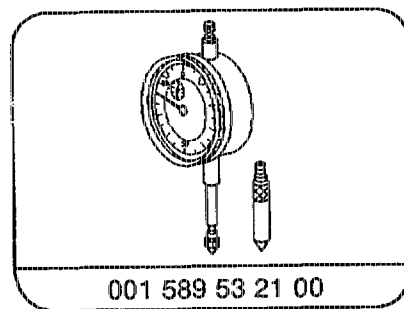
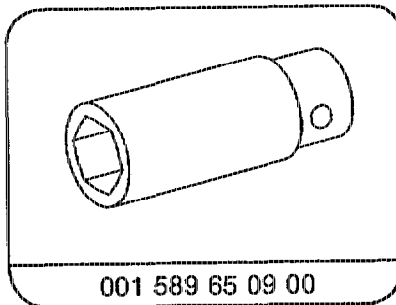
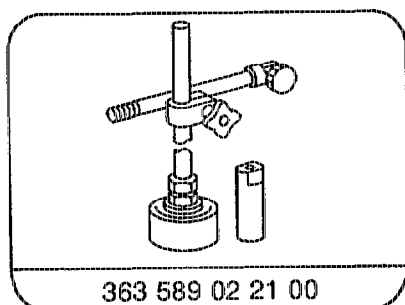
3) Camshaft adjuster retarded.

4) replaced by 78 or 76, respectively

5) Repair camshaft with 0.5 mm larger bearing diameter

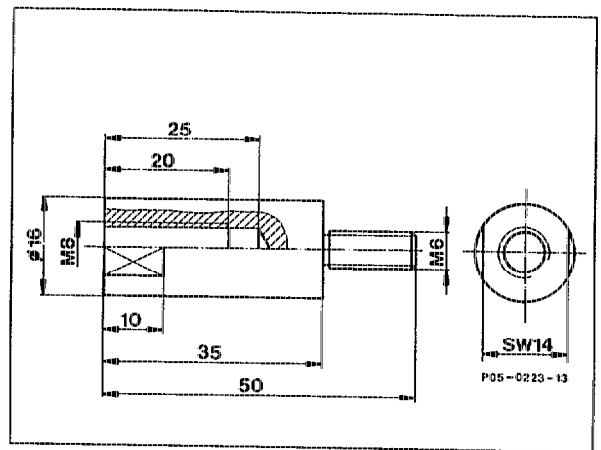
6) as of model year 1993

Special tools



Shop-made tool

Threaded sleeve (reduction M8 to M6) for attaching dial gauge holder 363 589 02 21 00 to cylinder head cover sealing surface.



Note

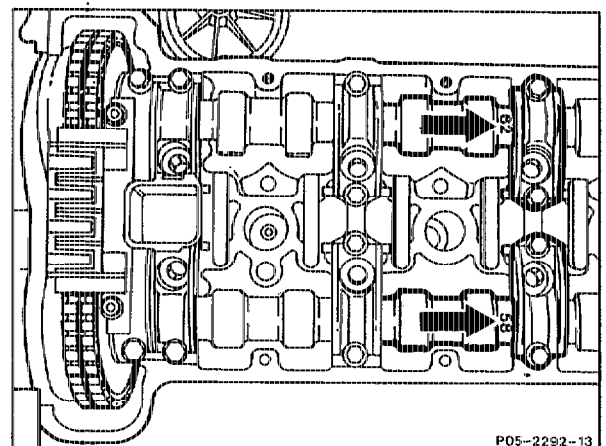
If performing installation work, it is sufficient to check the basic setting of the camshafts (see 05-2230).

The timing is measured with the hydraulic bucket tappets.

Check "inlet valve opens" at No. 1 and No. 6 cylinder with 2 mm valve lift and camshaft adjuster retarded.

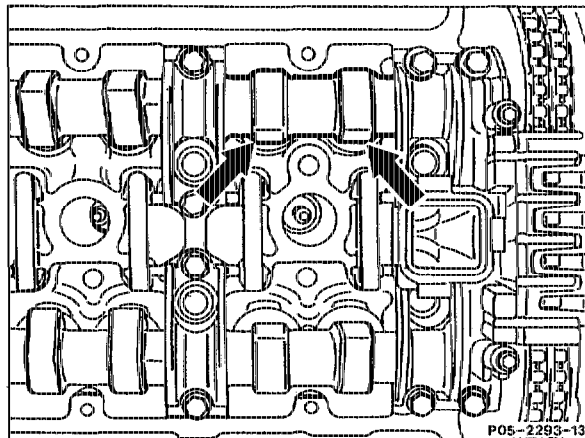
Check "exhaust valve closes" at No. 1 and No. 6 cylinder at 2 mm valve residual lift.

- 1 Check camshaft code numbers. The camshaft code numbers are inscribed on the 3rd camshaft bearing journal (fitted bearing) (arrows) and stamped on the camshaft flange from behind with coloured ink.

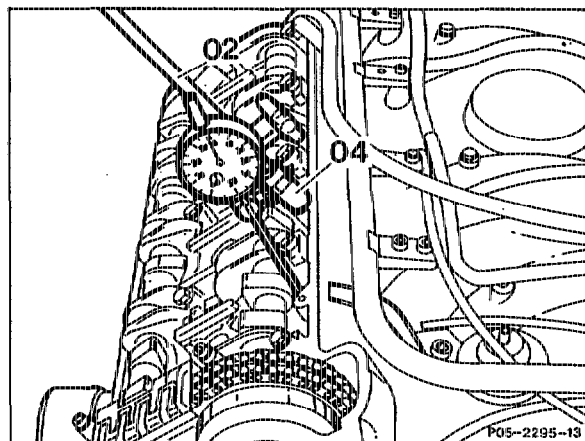


Checking timing of inlet camshafts

2 Rotate crankshaft in direction of rotation of engine until the lobes of the inlet cams to be tested are facing up (arrows) and only the base circles are resting against the bucket tappets.



3 Install dial gauge, special tool (02) 363 589 02 21 00 with threaded sleeve (04) at sealing surface of cylinder head cover at the camshaft to be tested.

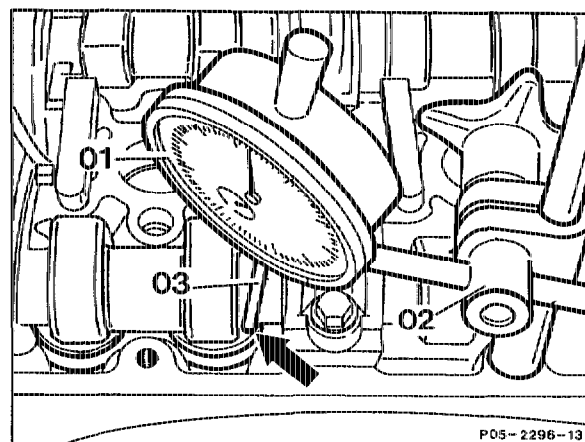


4 Clamp dial gauge (01) with tracer pin (03) (80 mm) in the dial gauge holder (02) so that the tracer pin (03) is resting vertically on the bucket tappet (arrow) with a preload of 3 mm (small pointer of dial gauge).

Note

Check freedom of movement of tracer pin (03).

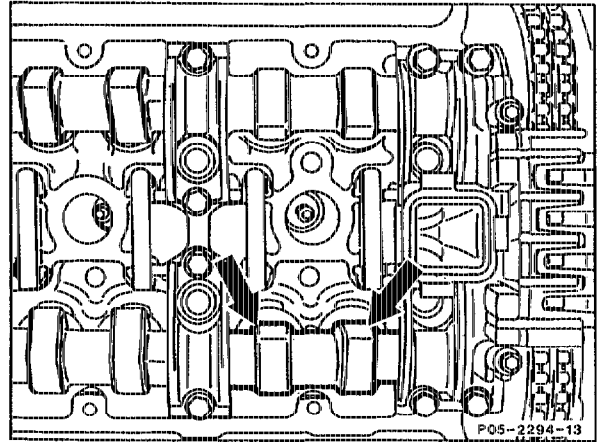
5 Turn scale of dial gauge until large pointer of gauge (01) is at "0".



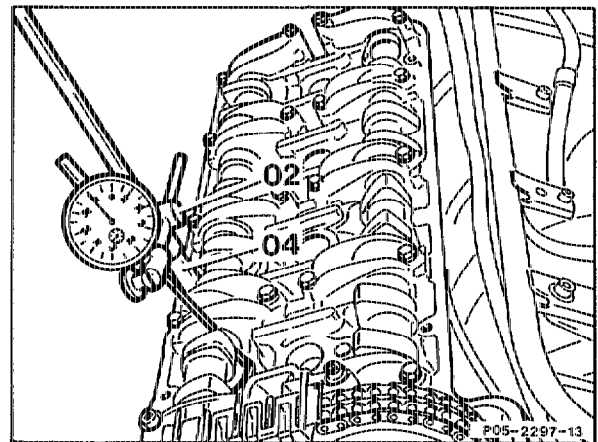
6 Rotate crankshaft in direction of rotation of engine with wrench socket, special tool 001 589 65 09 00 until the dial gauge indicates a valve lift of 2 mm. In this position, the reading obtained at the vibration damper must agree with the reading "inlet valve opens ATDC".

Testing timing of exhaust camshafts

7 Rotate crankshaft in direction of rotation of engine until the lobes of the inlet cams to be tested are facing up (arrows) and only the base circles are resting against the bucket tappets.



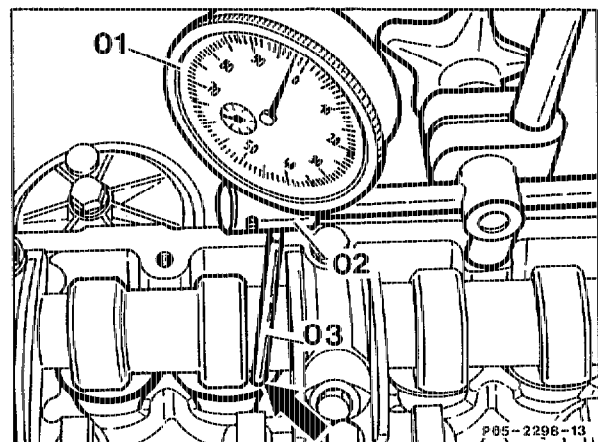
8 Install dial gauge, special tool (02) 363 589 02 21 00 with threaded sleeve (04) at sealing surface of cylinder head cover at the camshaft to be tested.



9 Clamp dial gauge (01) with tracer pin (03) (80 mm) in the dial gauge holder (02) so that the tracer pin (03) is resting vertically on the bucket tappet (arrow) with a preload of 3 mm (small pointer of dial gauge).

Note

Check freedom of movement of tracer pin (03).
Install tracer pin (03) at No. 6 cylinder on right of camshaft.



10 Turn scale of dial gauge until large pointer of gauge (01) is at "0".

11 Use wrench bit, special tool 001 589 65 09 00, to rotate crankshaft in direction of rotation of engine until dial gauge indicates a valve lift of 2 mm.

In this position, the reading obtained at the vibration damper must agree with the reading "exhaust valve closes BTDC".