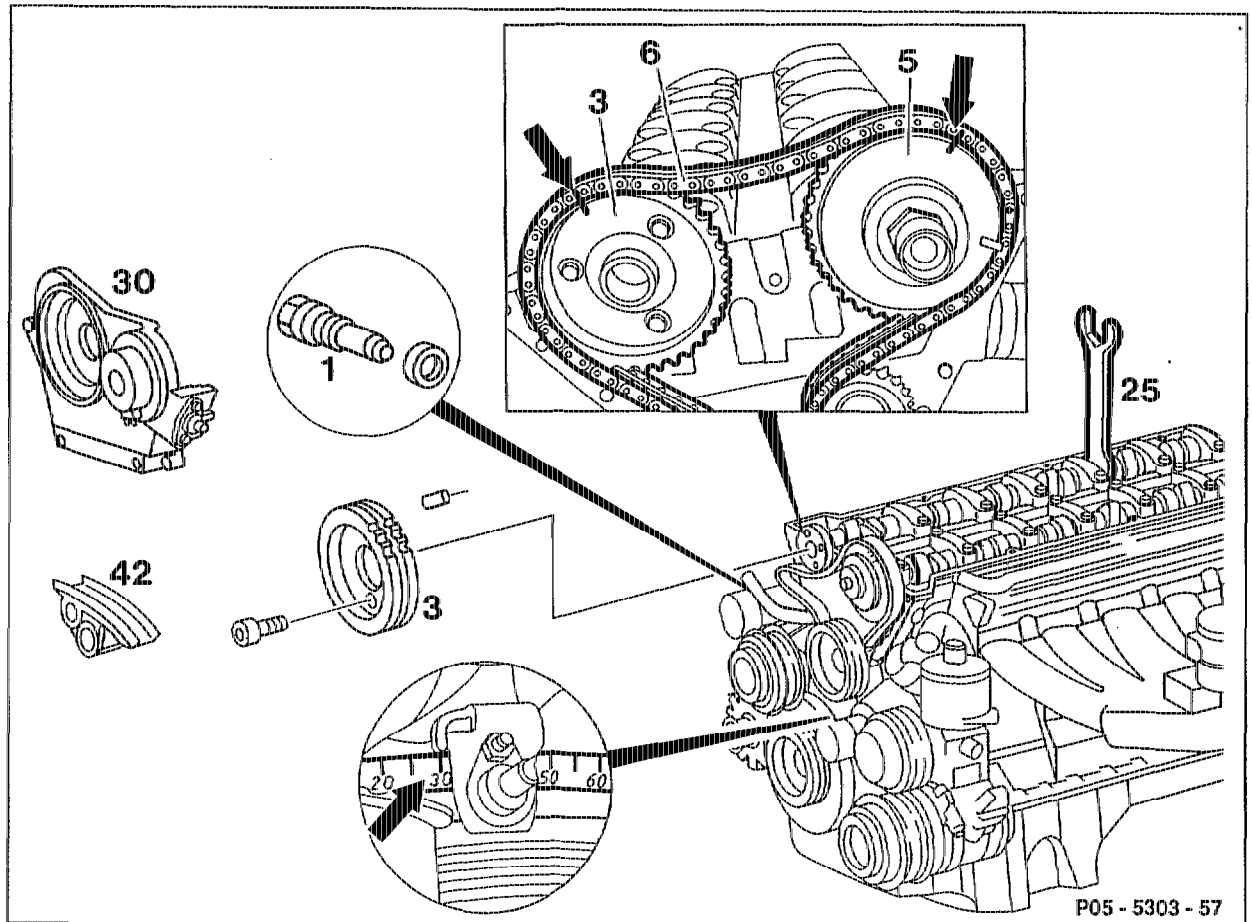


05-2200 Removing and installing camshafts

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

Removing camshafts



Shown on engine 104.98

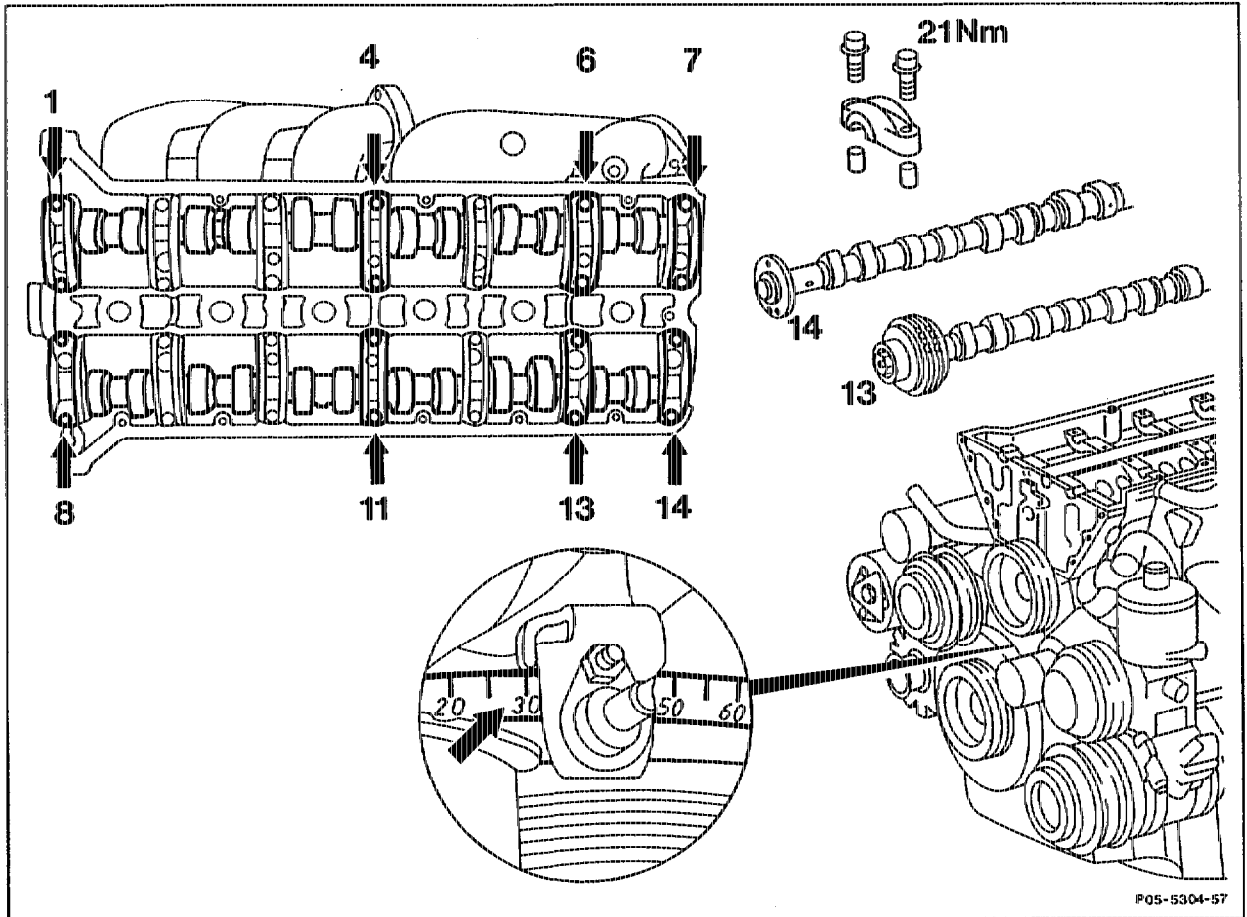
Crankshaft	rotate to 30° before ignition TDC of cylinder 1 (arrow).
Chain tensioner (1)	remove (05-3100).
Front cover (30) and top guide rail (42)	remove (01-2120).
Camshaft sprockets (3) and (5)	mark together with timing chain (6) (arrows).
Exhaust camshaft sprocket (3)	unbolt.
Timing chain (6)	lift off at inlet camshaft sprocket (5).

Note

At 30° before ignition TDC of cylinder 1 the camshafts can be rotated without the valves touching the piston crowns.

Camshafts

turn with wrench (25) 104 589 00 01 00 (WAF 27) or 104 589 01 01 00 (WAF 29) so that the lobes of the cams of cylinder 2 press on the middle of the bucket tappets.



Camshaft bearing caps (1), (4), (6) and (7) of exhaust camshaft (14) and bearing caps (8), (11), (13) and (14) of inlet camshaft (13)

unbolt (arrows).

Engine 104.98:

remove thrust washers of camshaft bearing caps (1) and (8), respectively (4) and (11), see (05-2210).

Bolts of remaining camshaft bearing caps

slacken in steps of one turn until counter-pressure is eliminated.

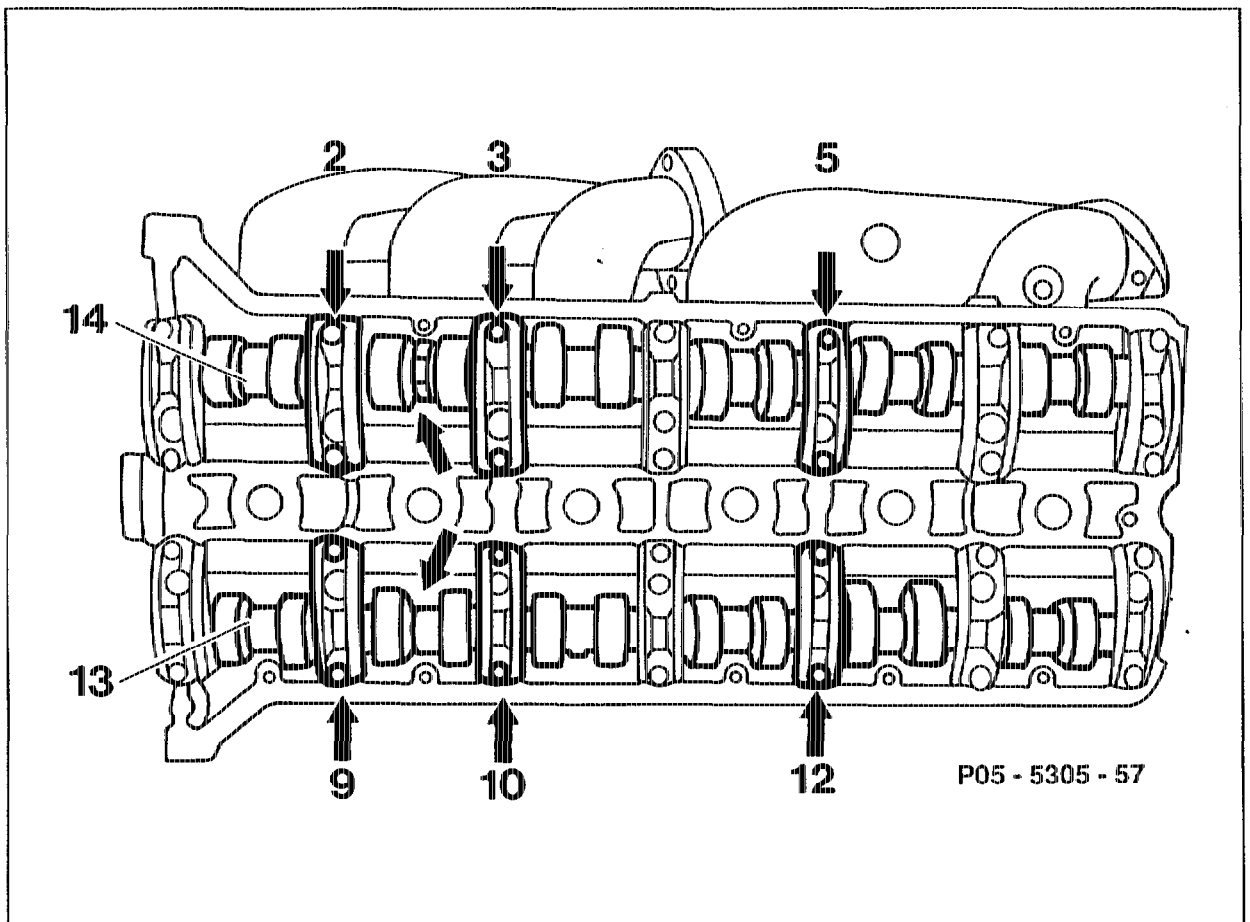


Camshafts (13) and (14) must not be twisted when slackening or bolting on the camshaft bearing caps.

Inlet camshaft (13) and exhaust camshaft (14) ...

take off.

Installing camshafts



Bucket tappets	check ease of movement.
All bearing points and bucket tappets	oil.
Inlet camshaft (13) and exhaust camshaft (14) ...	insert into bearing points at 30° BTDC of cylinder 1, align axially. The lobes of the cams must be facing down centred at cylinder 2 (arrows).
Camshaft bearing caps (2), (3) and (5) of exhaust camshaft (14) and bearing caps (9), (10) and (12) of inlet camshaft (13)	install.



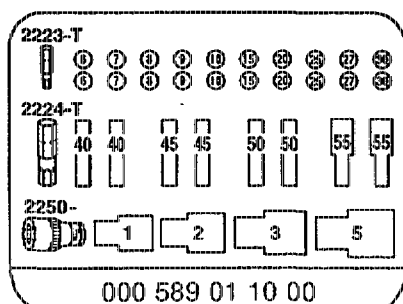
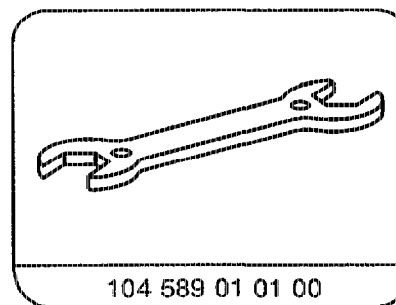
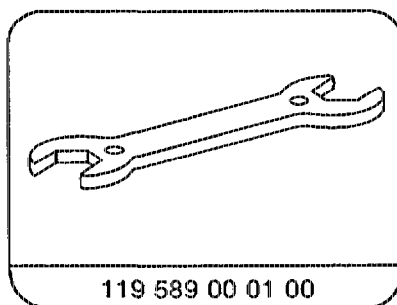
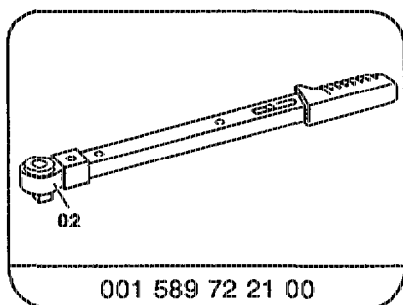
Since 01.93 the camshaft bearing caps are no longer fixed in position with dowel sleeves but bearing caps are centered automatically over the bearing points of the camshafts when the securing bolts are tightened as specified.

Bolts of camshaft bearing caps	screw on in steps each of one turn alternately, , tighten (21 Nm).
Camshafts	<p>⚠ Camshafts (13) and (14) must not be twisted when bolting on the camshaft bearing caps.</p> <p>hold with wrench (25) 119 589 00 01 00 or 104 589 01 01 00 when bolting on camshaft bearing caps so that the lobes of the cams at cylinder 2 are facing down centred (arrows).</p>
Engine 104.98:	install thrust washers of camshaft bearing caps 1 and 8, respectively 4 and 11, see (05-2210).
Remaining camshaft bearing caps	install, tighten (21 Nm).
Exhaust camshaft sprocket	install, bolt on.
Timing chain	fit onto camshaft sprockets; pay attention to coloured markings.
Front cover and top guide rail	Note If no coloured markings are provided, adjust to basic position of camshafts (05-2240). install (01-2120).
Chain tensioner	install (05-3100).
Basic position of camshafts	check (05-2230).

Tightening torques in Nm

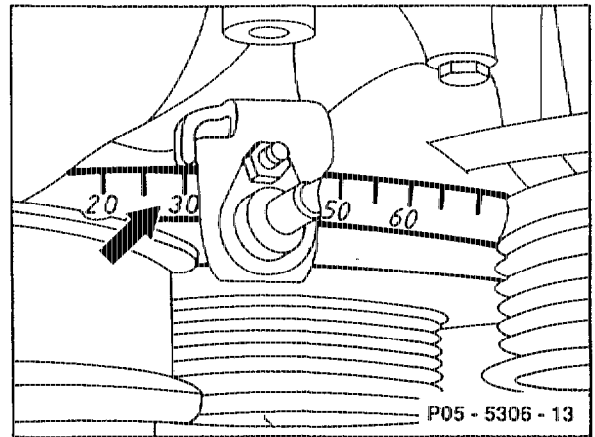
Camshaft sprocket or flanged shaft to camshaft	(see 05-2180)
Camshaft bearing caps to cylinder head	21

Special tools



Note

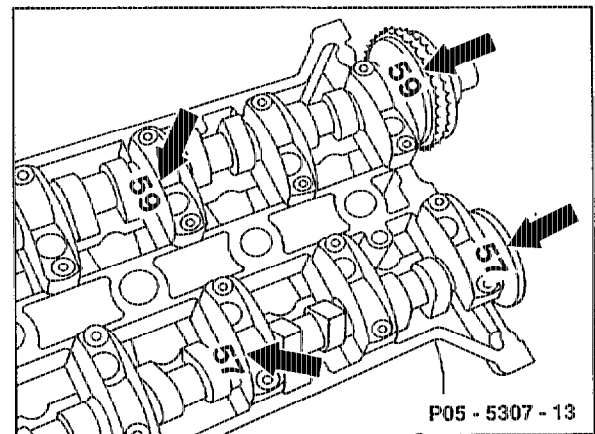
When the crankshaft is in the position 30° BTDC at cylinder 1 the camshafts can be rotated without the valves touching the piston crowns.



The camshaft code numbers are affixed in each case to the third camshaft bearing journal at the rear (arrows) (behind the camshaft bearing caps) or stamped with paint on the camshaft flanges (arrows).



The camshafts are sensitive to fracturing and must not be subjected to stresses when being removed and installed.



The camshaft bearing caps are identified with numbers (arrows).

The numbering (arrows) of the camshaft bearing caps are also cast in the cylinder heads.

The camshaft bearing caps must re-installed at the same point.

The inlet camshaft can be removed and installed with or without the camshaft sprocket.

