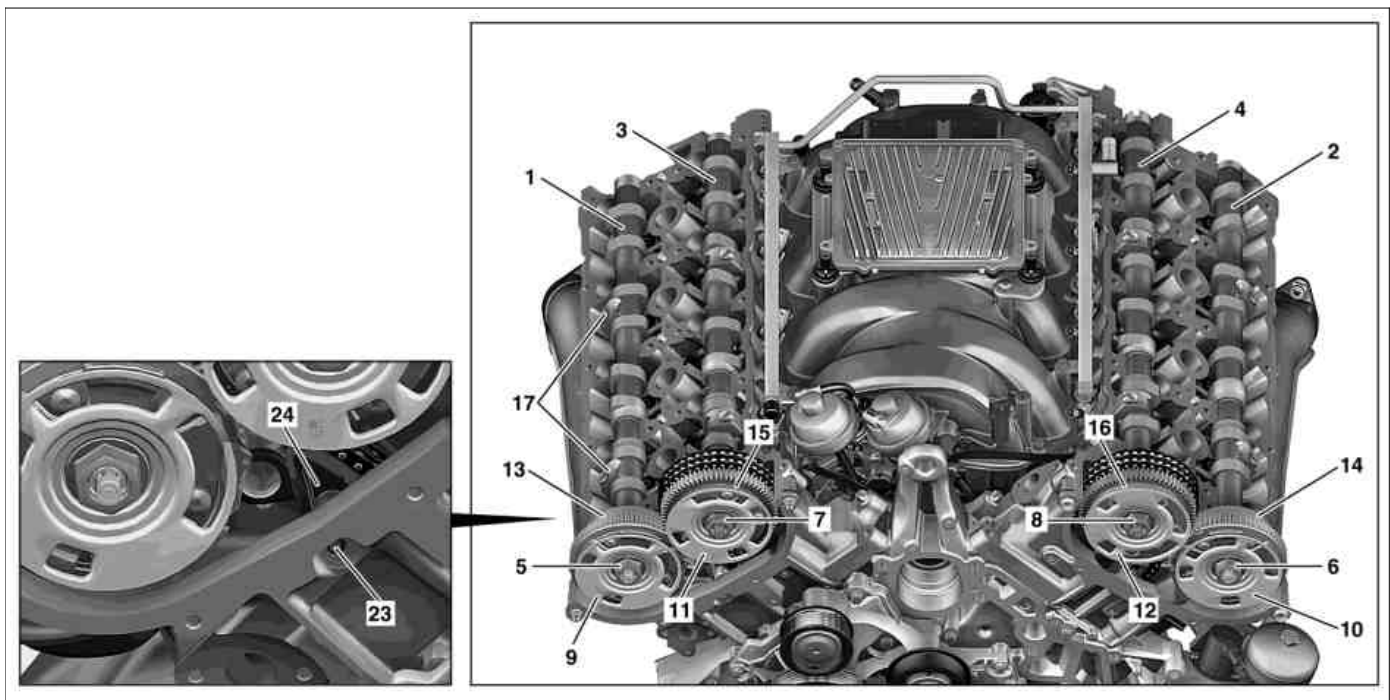


ENGINE 272 in MODEL 203, 209

ENGINE 273 in MODEL 209



P05.20-2233-09

- 1, 2 Exhaust camshaft
 3, 4 Intake camshaft
 5, 6 Center valve of exhaust camshaft
 7, 8 Center valve of intake camshaft
 9, 10 Pulse wheel of exhaust camshaft

- 11, 12 Pulse wheel for intake camshaft
 13, 14 Camshaft adjuster of exhaust camshaft
 15, 16 Camshaft adjuster for intake camshaft

- 17 Auxiliary bearing cap of exhaust camshaft
 23 Tensioning rail bolts
 24 Tensioning rail

Shown on camshaft adjuster of exhaust camshaft

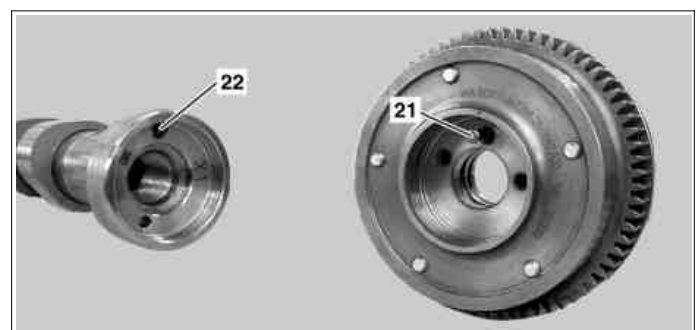
- 13 Camshaft adjuster of exhaust camshaft
 15 Camshaft adjuster for intake camshaft
 18 Dowel pin
 19 Pin
 20 Bore in camshaft adjuster



P05.20-2234-04

Shown on camshaft adjuster of exhaust camshaft

- 21 Dowel pin in camshaft adjuster
 22 Bore in camshaft



P05.20-2235-10


Modification notes

14.9.07	Use the Torx screwdriver bit T60 to counterhold camshafts, added		AR05.20-P-7201-06VA
26.11.07	Installation note on install new chain tensioner, added	Step 12	



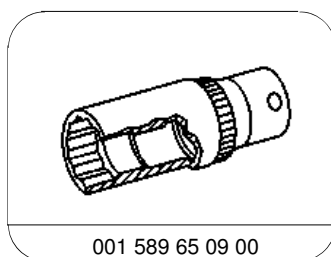
Remove/install

1	Switch off ignition		
2	Remove air filter housing		AR09.10-P-1150QB
3	Remove front covers from cylinder heads	Left cylinder head Right cylinder head	AR01.30-P-5700QC AR01.30-P-5700QB
4	Remove centrifuge		AR01.20-P-2100QB
5	Rotate engine at center bolt on crankshaft in direction of rotation of engine to a 40° crank angle after ignition TDC and then check position of camshafts		AR05.20-P-6010-01VB
			*001589650900
6	Lock gear backlash compensation for camshaft adjusters (13, 14)		AR05.20-P-7201-05VA
7	Detach center valves (5, 6, 7)	Observe loosening direction. 	AR05.20-P-7201-06VA *BA05.20-P-1009-02A *272589001000
8	Remove cylinder head covers	Left cylinder head cover Right cylinder head cover	AR01.20-P-5014QB AR01.20-P-5014QC
9	Remove center valves (5, 6) of camshaft adjuster (13, 14) and remove pulse wheel (9, 10)	Check dowel pins (18) and pins (19). If a dowel pin (18) or pin (19) is sheared off, this must be removed from camshaft adjuster (13, 14). Installation: Always replace pulse wheels (9, 10). When tightening central valve (5, 6) there is the risk of a dowel pin (18) or pin (19) shearing off at pulse wheels (9, 10). Lubricate center valves (5, 6) before assembly on pulse wheels contact surfaces (9, 10). Installation: Align pulse wheels (9, 10) dowel pin (18) to fitted bores (20) in camshaft adjusters (13, 14).	
10	Counterhold exhaust camshafts (1, 2) at the rear and pull off camshaft adjusters (13, 14) from the exhaust camshafts (1, 2) towards the front	 Installation: Before assembly of camshaft adjusters (13, 14) lubricate contact surfaces on exhaust camshaft (1, 2) and camshaft adjusters (13, 14). Align dowel pins (21) in camshaft adjusters (13, 14) to fitted holes (22) in exhaust camshafts (1, 2) and install camshaft adjusters (13, 14) in their basic position: See "Check basic position of camshafts".	*272589001000 AR05.20-P-6010-01VB
11	Remove auxiliary bearing cap (17) and exhaust camshaft (1)		*BA05.20-P-1010-02A
12	Remove chain tensioner	Installation: The installation sequence of the chain tensioner must be followed to ensure correct functioning. M24×1.5 M22×1.5 In case of engine 272, both chain tensioners can be removed whereby for engine 273 only chain tensioner with thread M22×1.5 is installed. Installation: Install new chain tensioner with thread of M22 ×1.5. The previously installed chain tensioner must not be reinstalled because during removal, its pressure pin is pressed into the end position. The pressure pin latch prevents this return stroke. This would overstretch the timing chain on reinstalling.	AR05.10-P-7800QB AR05.10-P-7800QC
13	Remove tensioning rail bolt (23)	Installation: Apply sealant to tensioning rail bolts (23) before assembly. Loctite sealant 5970	AR01.30-P-5800-04V *116589203300 *116589013400 *BR00.45-Z-1013-01A
14	Pull tensioning rail (24) up and out of timing case		
15	Remove center valve (7) on camshaft adjuster (15) and pulse wheel (11)	Check dowel pin (18) and pin (19). If a dowel pin (18) or pin (19) is sheared off then this must be removed from camshaft adjuster (15).	

		<p>ⓘ Installation: Always replace pulse wheel (11). When tightening center valve (7) there is a risk that dowel pin (18) or pin (19) may shear off at pulse wheel (11). Lubricate center valve (7) at contact surface to pulse wheel (11) before assembly.</p> <p>ⓘ Installation: Align dowel pin (18) for pulse wheel (11) with fitted bore (20) in camshaft adjuster (15).</p>	
16	Remove timing chain from camshaft adjuster (15) and detach camshaft adjuster (15) forwards from intake camshaft (3)	<p>ⓘ Installation: Lubricate contact surfaces on intake camshaft (3) and camshaft adjuster (15) before assembling camshaft adjuster (15). Align dowel pin (21) in camshaft adjuster (15) to fitted bore (22) in intake camshaft (3) and install camshaft adjuster (15) in its basic position:</p> <p>See "Check basic position of camshafts".</p>	AR05.20-P-6010-01VB
17	Remove timing chain from camshaft adjuster (16) and turn camshaft adjuster (16) in basic position	See "Check basic position of camshafts".	AR05.20-P-6010-01VB
18	Install in the reverse order		
	Checking		
⚠ Danger!	Risk of accident caused by vehicle starting off by itself when engine is running. Risk of injury caused by contusions and burns during starting procedure or when working near the engine as it is running	Secure vehicle to prevent it from moving by itself. Wear closed and snug-fitting work clothes. Do not touch hot or rotating parts.	AS00.00-Z-0005-01A
19	Conduct engine test run and check engine for leaks		

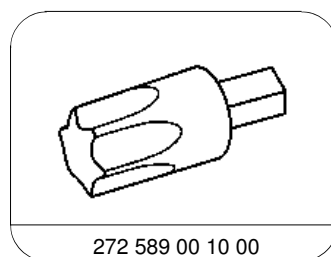
Camshaft, camshaft adjustment

Number	Designation		Engine	Engine
			272	273
BA05.20-P-1009-02A	Center valve for pulse wheel/ camshaft adjuster to camshaft	Nm	145	145
BA05.20-P-1010-02A	Bolt, auxiliary bearing cap to cylinder head	Nm	8	8



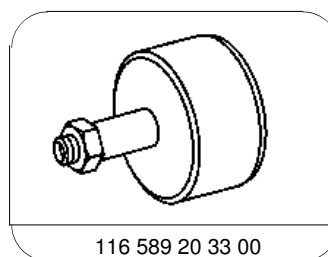
001 589 65 09 00

Wrench socket



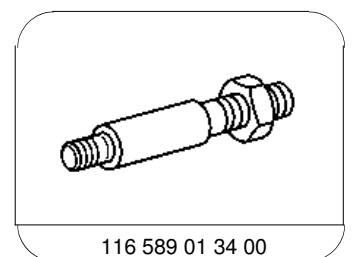
272 589 00 10 00

Torx screwdriver bit T60



116 589 20 33 00

Impact extractor



116 589 01 34 00

Threaded stud

Repair materials

Number	Designation	Order number
BR00.45-Z-1013-01A	Loctite sealant 5970	A 003 989 98 20