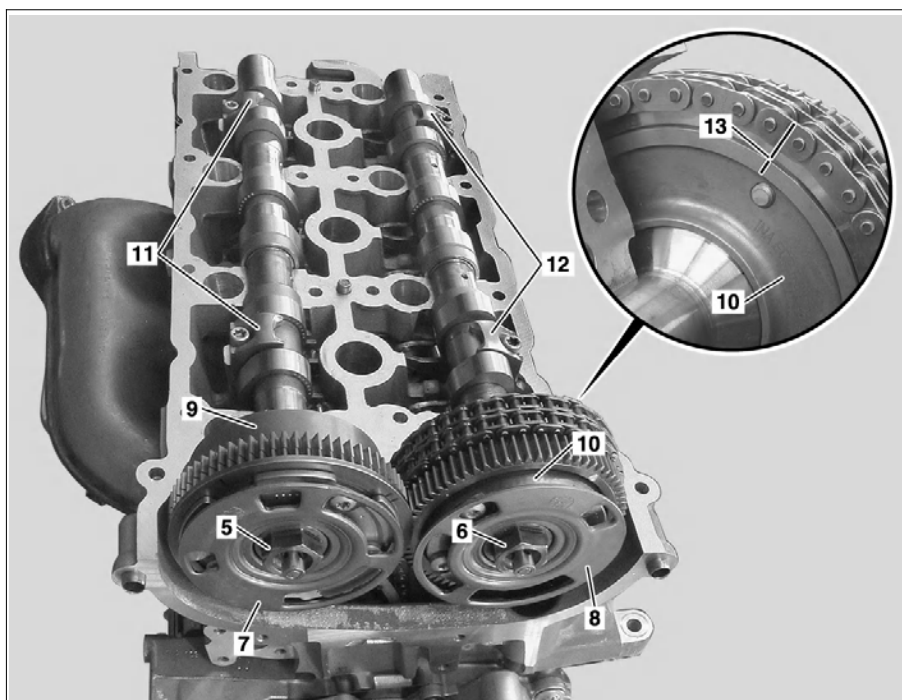


Shown on the right cylinder head

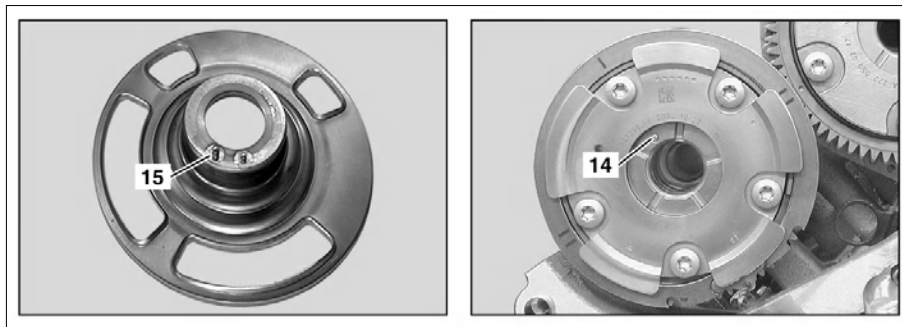
- 5 Center valve of exhaust camshaft
- 6 Center valve of intake camshaft
- 7 Pulse wheel of exhaust camshaft
- 8 Pulse wheel for intake camshaft
- 9 Camshaft adjuster of exhaust camshaft
- 10 Camshaft adjuster for intake camshaft
- 11 Auxiliary bearing cap of exhaust camshaft
- 12 Auxiliary bearing cap of intake camshaft
- 13 Color coding



P05.20-2165-06

Shown on camshaft adjuster of exhaust camshaft

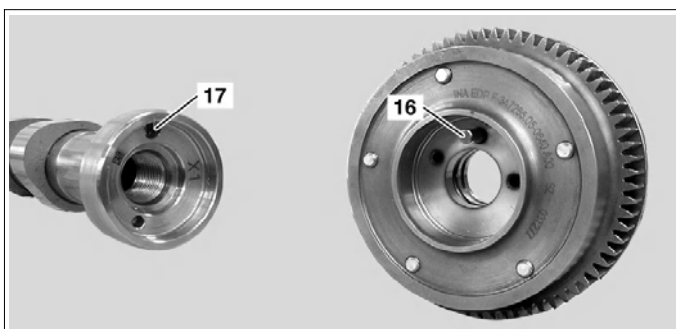
- 14 Bore in camshaft adjuster
- 15 Dowel pin in pulse wheel



P05.20-2167-04

Shown on camshaft adjuster of exhaust camshaft

- 16 Dowel pin in camshaft adjuster
- 17 Fitted bore for the intake, exhaust camshaft



P05.20-2166-10

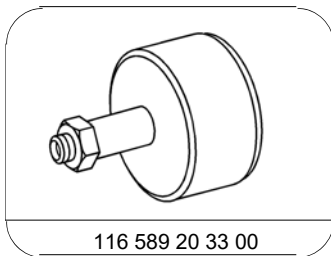
☒ ☒	Remove/install		
1	Remove air filter housing		AR09.10-P-1150TS
2	Remove front covers from cylinder heads	Right front cover Left front cover	AR01.30-P-5700TT AR01.30-P-5700TS
3	Remove centrifuge		AR01.20-P-2100TS
4	Turn engine at crankshaft in direction of engine rotation to 40° after ignition TDC and check position of camshafts		AR05.20-P-6010-01VB  *001589650900
5	Lock gear backlash compensation for camshaft adjusters (9) at the exhaust camshafts	ⓘ The tooth flanks are held against each other by spring pressure and should not be skewed, otherwise the camshaft adjuster (9) will be irreparably damaged	AR05.20-P-7201-05VA

6	Loosen center valves (5, 6)	<p><b>i</b> Observe loosening direction. Counterhold the camshafts when loosening the center valves (5, 6). Do not unscrew center valves (5, 6).</p> <p><b>Nm</b></p>	<p>AR05.20-P-7201-06VA</p> <p>*BA05.20-P-1009-02A</p>
7	Remove cylinder head covers	<p>Right cylinder head cover Model 211 except 211.057/ 257, 219 except 219.357 Model 211.057/ 257, 219.357</p> <p>Left cylinder head cover Model 211 except 211.057/ 257, 219 except 219.357 Model 211.057/ 257, 219.357</p>	<p>AR01.20-P-5014TT</p> <p>AR01.20-P-5014TY</p> <p>AR01.20-P-5014TS</p> <p>AR01.20-P-5014TX</p>
8	Remove center valves (5) on the exhaust camshafts and take out pulse wheels (7)	<p><b>⚠</b> Check on pulse wheel (7) whether dowel pin (15) or pin has been sheared off. Remove sheared off pins or dowel pins (15) from the camshaft adjuster (9).</p> <p><b>⚠ Installation:</b> Always replace pulse wheel (7). When tightening center valve (5), there is a risk that the dowel pin (15) and the pin on the pulse wheel (7) get sheared off. Wet center valve (5) before assembly on the contact surface to the pulse wheel (7) with engine oil.</p> <p><b>i Installation:</b> Align dowel pin (15) on pulse wheel (7) with bore (14) in the camshaft adjuster (9).</p>	
9	Counterhold exhaust camshafts at the rear using a suitable tool and detach the camshaft adjuster (9) to the front from the exhaust camshafts	<p><b>i Installation:</b> The contact surfaces on the camshaft and camshaft adjuster (9) must be wet with engine oil before assembling the camshaft adjuster (9).</p> <p><b>i Installation:</b> Align dowel pin (16) in the camshaft adjuster (9) with bore (17) in the exhaust camshaft.</p>	
10	Remove auxiliary bearing cap (11) on the exhaust camshafts and take out the exhaust camshafts	<p><b>Nm</b></p>	<p>*BA05.20-P-1010-02A</p>
11	Mark timing chain relative to camshaft adjusters (10) of the intake camshafts using color codes (13)	<p><b>i</b> Engine positioned at 40° crankshaft angle after ignition TDC.</p> <p><b>i Installation:</b> Check position of the intake camshaft using the color coding (13).</p>	
12	Remove chain tensioner	<p>M24 × 1.5 M22 × 1.5</p> <p><b>i</b> 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.</p> <p><b>i Installation: Install new chain tensioner with thread of M22 × 1.5.</b> The previously installed chain tensioner must not be reinstalled because during removal, its pressure pin is pressed into the end position. The thrust pin latch prevents this return stroke. This would overstretch the timing chain on reinstalling.</p>	<p>AR05.10-P-7800TS</p> <p>AR05.10-P-7800VB</p>
13	Remove tensioning rail bolt	<p><b>i Installation:</b> Apply sealant to tensioning rail bolts.</p> <p><b>☒</b></p> <p><b>☒</b></p> <p>Loctite 5970 sealant</p>	<p>AR01.30-P-5800-04V</p> <p>*116589013400</p> <p>*116589203300</p> <p>*BR00.45-Z-1013-01A</p>
14	Pull tensioning rail upward and out of engine		
15	Remove center valves (6) on intake camshafts and remove pulse wheels (8)	<p><b>⚠</b> Check on pulse wheel (8) whether dowel pin (15) or pin has been sheared off. Remove sheared off pins or dowel pins (15) from the camshaft adjuster (10).</p> <p><b>⚠ Installation:</b> Always replace pulse wheel (8). When tightening center valve (6), there is a risk that the dowel pin (15) and the pin on the pulse wheel (8) get sheared off. Wet center valve (6) before assembly on the contact surface to the pulse wheel (8) with engine oil.</p> <p><b>i Installation:</b> Align dowel pin (15) on pulse wheel (8) with bore (14) in the camshaft adjuster (10).</p>	

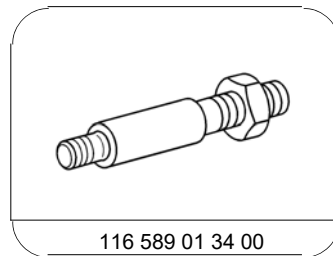
16	Pull out camshaft adjuster (10) from intake camshafts towards the front	<p><b>i</b> <b>Installation:</b> The contact surfaces on camshaft and camshaft adjuster (10) must be wet with engine oil before assembling the camshaft adjuster (10).</p> <p><b>i</b> <b>Installation:</b> Align camshaft adjuster (10) according to color coding (13) provided at the timing chain and at the camshaft adjuster (10). Align dowel pin (16) in the camshaft adjuster (10) with bore (17) in the intake camshaft.</p>	
17	Remove auxiliary bearing cap (12) on the intake camshafts and take out the intake camshafts	Nm	*BA05.20-P-1010-02A
18	Install in the reverse order		
19	<p><b>Risk of accident</b> caused by vehicle starting off by itself when engine is running. <b>Risk of injury</b> caused by contusions and burns during starting procedure or when working near the engine as it is running</p> <p>Conduct engine test run and check engine for leaks while it is running</p>	<p>Secure vehicle to prevent it from moving by itself.</p> <p>Wear closed and snug-fitting work clothes.</p> <p>Do not touch hot or rotating parts.</p>	AS00.00-Z-0005-01A

**Nm** Camshaft, camshaft adjustment

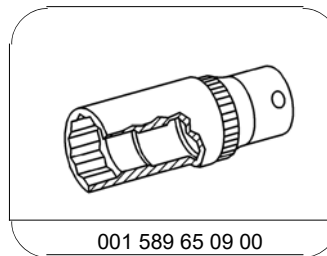
Number	Designation		Engine	Engine
			272	273
BA05.20-P-1009-02A	Center valve for pulse wheel/ camshaft adjuster to camshaft	Nm	145	145
BA05.20-P-1010-02A	Bolt, auxiliary bearing cap to cylinder head	Stage 1	Nm 8	8
		Stage 2	∠° -	-



Impact extractor



Threaded stud



Wrench socket

**Repair materials**

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