Set basic position of camshafts

ENGINE  272 in MODEL 203, 209
ENGINE  273 in MODEL 209

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

Modification notes

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>14.9.07</td>
<td>Use the Torx screwdriver bit T60 to counterhold camshafts, added</td>
</tr>
<tr>
<td>26.11.07</td>
<td>Installation note on install new chain tensioner, added</td>
</tr>
</tbody>
</table>

Remove/install
1. Switch off ignition
2. Remove air filter housing
3. Remove front covers from cylinder heads
   - Left cylinder head
   - Right cylinder head
4. Remove centrifuge
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
6. Lock gear backlash compensation for camshaft adjusters (13, 14)
7. Detach center valves (5, 6, 7)
   - Observe loosening direction.
8. Remove cylinder head covers
   - Left cylinder head cover
   - Right cylinder head cover
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".
11. Remove auxiliary bearing cap (17) and exhaust camshaft (1)
    - Installation: Align pulse wheels (9, 10) dowel pin (18) to fitted bores (20) in camshaft adjusters (13, 14).
12. Remove chain tensioner
    - Installation: The installation sequence of the chain tensioner must be followed to ensure correct functioning.
    - M24x1.5
    - M22x1.5
13. Remove tensioning rail bolt (23)
    - Installation: Apply sealant to tensioning rail bolts (23) before assembly.
    - LociE sealant 5970
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).
**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.

**Installation:** Align dowel pin (18) for pulse wheel (11) with fitted bore (20) in camshaft adjuster (15).

16. Remove timing chain from camshaft adjuster (15) and detach camshaft adjuster (15) forwards from intake camshaft (3).

17. Remove timing chain from camshaft adjuster (16) and turn camshaft adjuster (16) in basic position.

18. Install in the reverse order.

19. **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.

Conduct engine test run and check engine for leaks.

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**Camshaft, camshaft adjustment**

<table>
<thead>
<tr>
<th>Number</th>
<th>Designation</th>
<th>Engine 272</th>
<th>Engine 273</th>
</tr>
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<tbody>
<tr>
<td>BA05.20-P-1009-02A</td>
<td>Center valve for pulse wheel/ camshaft adjuster to camshaft</td>
<td>Nm 145</td>
<td>145</td>
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<tr>
<td>BA05.20-P-1010-02A</td>
<td>Bolt, auxiliary bearing cap to cylinder head</td>
<td>Nm 8</td>
<td>8</td>
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**Repair materials**

<table>
<thead>
<tr>
<th>Number</th>
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<tbody>
<tr>
<td>BR00.45-Z-1013-01A</td>
<td>Loctite sealant 5970</td>
<td>003 989 98 20</td>
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