11 31 505 Adjusting camshaft timing (N14)

Special tools required:

![Warning Symbol]  

Important!
Modified procedure for timing adjustment.
The timing is not determined at firing TDC of cylinder no. 1.
All pistons are in the 90° position.
Check locking of adjustment units.
To open the central bolt at the camshaft, grip hexagon on rear of camshaft.
Risk of damage!

Necessary preliminary tasks:
- Remove cylinder head cover.

![Information Symbol]  

Important!
Danger of mixing up special tool bore.
Balance hole and special tool bore can be mixed up; all pistons must be in the 90° position.
If necessary, determine by means of spark plug bore.

Rotate crankshaft at central bolt.

Slide in special tool 11 9 590 in direction of arrow and block crankshaft.
Important!
Risk of damage! to chain drive.
To open central bolt, mount special tool 11 9 551 on camshaft.
If the setting gauges cannot be positioned, grip the camshaft with an open-end wrench to release the central bolt.

Release chain tensioner (have a cleaning cloth ready).

Tightening torque: 11 31 4AZ.

To open central bolts (3), mount special tool 11 9 551 on camshafts.

Release central bolts (3).
Tightening torque: 11 36 2AZ.
To open central bolts (3), mount special tool 11 9 551 on camshafts.

Release central bolts (3).

Tightening torque: 11 36 1AZ.

The designations for the inlet camshaft (IN) and exhaust camshaft (EX) point upwards.

Both camshafts (inlet and exhaust) have three machined surfaces to enable special tool 11 9 551 to be mounted.

The fourth surface is not machined and is crescent-shaped - it must point downwards.

Note:
Picture shows
Position of exhaust camshaft (1) points at an angle to the right in a lower inward direction.

**Note:**
Picture shows sprocket wheel removed.

Position of inlet camshaft (1) points at an angle to the left in an upper inward direction.

**Note:**
Picture shows VANOS adjustment unit removed.

Screw special tool 11 9 340 into cylinder head.

Pretension timing chain with special tool 00 9 250 to 0.6 Nm.
Secure central bolt (1) with special tool 00 9 120 or an electronic torque wrench.

Tightening torque: 11 36 1AZ.

Secure central bolt (1) with special tool 00 9 120 or an electronic torque wrench.

Tightening torque: 11 36 2AZ.

Remove all special tools.

Assemble engine.

### 11 31 Camshaft

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<th>Type</th>
<th>Thread</th>
<th>Tightening specifications</th>
<th>Dimension</th>
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<td>Guide rail, crankcase</td>
<td>N14 M8x1.25</td>
<td>Replace sealing ring</td>
<td>24 Nm</td>
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<tr>
<td>Guide rail to cylinder head</td>
<td>N14 M8</td>
<td>Replace sealing ring</td>
<td>20 Nm</td>
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<tr>
<td>Line to cylinder head</td>
<td>N14 M6x20</td>
<td>Replace sealing ring</td>
<td>8 Nm</td>
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<tr>
<td>Chain tensioner to cylinder head</td>
<td>N14 M22 x 1.5</td>
<td>Do not retighten the chain tensioner. Replace sealing ring</td>
<td>65 Nm</td>
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<tr>
<td>Camshaft Control</td>
<td>Type</td>
<td>Thread</td>
<td>Tightening Specification</td>
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<tr>
<td>1AZ VANOS to inlet camshafts</td>
<td>N14</td>
<td>M10x52</td>
<td>Replace screw</td>
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<td>Jointing torque</td>
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<td>Torque angle</td>
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<td>2AZ Sprocket wheel to exhaust camshafts</td>
<td>N14</td>
<td>M10x30</td>
<td>Replace screw</td>
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<td>Jointing torque</td>
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<tr>
<td></td>
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<td>Torque angle</td>
</tr>
<tr>
<td>3AZ Non-return valve VANOS to cylinder head</td>
<td>N14</td>
<td>M14 x 1.5</td>
<td>Replace sealing ring</td>
</tr>
<tr>
<td>4AZ Solenoid valve holder to crankcase</td>
<td>N14</td>
<td>M6x16</td>
<td></td>
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