

Telephone:  
Fax:  
VAT Registration No.:

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<b>Name:</b>	Sickdog	<b>Manufacturer:</b>	BNV
<b>Address:</b>	Somewhere in Lithuania	<b>Model:</b>	vezimas e38
		<b>Year:</b>	1999
		<b>Registration:</b>	
<b>Tel - Private:</b>	fuck knows	<b>Mileage:</b>	unknown (huge)
<b>Tel - Business:</b>	same as above	<b>Job number:</b>	1 (mission impossible)
<b>Tel - Mobile:</b>	same as above	<b>Date:</b>	23.08.2011

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## Special tools

### Special tools

- Flywheel timing pin - except X5 - BMW No.11 2 300.
- Flywheel timing pin - X5 - BMW No.11 5 180.
- Camshaft alignment tools - RH bank - BMW Nos.11 2 441/445.
- Camshaft alignment tools - LH bank - BMW Nos.11 2 442/446.
- Camshaft alignment tools - RH/LH bank - BMW Nos.11 2 443/444.
- Timing chain pre-tensioning tools - BMW No.11 4 230/11 7 380.
- Vibration damper hub holding tool - BMW No.11 2 450.
- Camshaft sensor gear adjusting tool - RH bank - BMW No.11 6 451.
- Camshaft sensor gear adjusting tool - LH bank - BMW No.11 6 452.
- VANOS unit adjusting tool - BMW No.11 6 440.
- Secondary tensioner locking tool - BMW No.11 3 310.

## General precautions

### General precautions

- Disconnect battery earth lead.
- Remove spark plugs to ease turning engine.
- Turn engine in normal direction of rotation (unless otherwise stated).
- Observe tightening torques.
- If fitted: Mark position of crankshaft position (CKP) sensor before removal.
- Do NOT turn crankshaft via camshaft or other sprockets.
- Do NOT turn crankshaft or camshaft with timing chain removed.

## Valve timing procedures

### Valve timing procedures

- Removal/installation of timing chain requires:
- Sump removal.

**NOTE: Refer to Technical Data module for tightening torques.**

- Engine at TDC on No.1 cylinder.
- Insert flywheel timing pin [1]. Tool No.11 2 300 - 5 & 7 Series/Tool No.11 5 180 - X5.
- Ensure No.1 cylinder camshaft lobes are facing [2].
- Install camshaft alignment tools [3].

**NOTE: Ensure camshaft lobes positioned as shown.**

- Camshaft rotation can be prevented using spanner at position shown [4].
- Secondary tensioners can be locked with tool [5].

**NOTE: Camshaft nuts/screws have LH threads.**

- Install camshaft sprockets complete with chains. DO NOT tighten bolts [6] & [7].
- Adjust VANOS units as follows:
- Unlock secondary tensioner [5].
- Install chain pre-tensioning tool [8].
- Screw in adjusting screw until in contact with guide rail. DO NOT tighten screw.
- LH bank: Connect multimeter to VANOS unit contact pin and to screw on oil line on cylinder head [9]. Set multimeter to acoustic continuity test.
- Using torque wrench set to 40 Nm and adjusting tool turn VANOS unit anti-clockwise towards left-hand stop [9] , until acoustic signal can be heard.
- Tighten bolt of each camshaft sprocket [6] (LH thread). Tightening torque: 15 Nm. Slacken bolts 90°.
- RH bank: Repeat adjustment of VANOS unit [9]. Use multimeter.
- Tighten bolt of each camshaft sprocket [7] (LH thread). Tightening torque: 15 Nm. Slacken bolts 90°.
- Pre-load timing chain with tools to 0,7 Nm [8].
- LH bank: Reset VANOS unit [9]. Use multimeter.
- Tighten bolt of each camshaft sprocket [6] (LH thread). Tightening torque: Inlet - 110 Nm. Exhaust - 125 Nm.
- RH bank: Reset VANOS unit [9]. Use multimeter.
- Tighten bolt of each camshaft sprocket [7] (LH thread). Tightening torque: Inlet - 110 Nm. Exhaust - 125 Nm.
- Install sensor gear [10] to inlet camshafts as follows:
- Fit sensor gear nut (DO NOT tighten).
- Align bores on RH/LH sensor gear in position as shown and lock with tools [11].
- Tighten sensor gear nut [10] (LH thread). Tightening torque: 40 Nm.
- Drain and install timing chain tensioner [12].

**NOTE: Bolts for crankshaft damper/hub MUST only be used once.**

