

Special tools

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- High-pressure fuel pump sprocket puller - No.09331-4A000.

General precautions

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- Disconnect battery earth lead.
- Remove glow 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

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- Removal/installation of timing chain(s) requires:
 - Sump removal.
- Engine at TDC on No.1 cylinder.
- Reset tensioners before carrying out engine repairs [1], [2] & [3] :
 - Compress tensioner plunger [4].
 - Retain in position with 2,5 mm wire clip [5].
- Centre timing chain installation:
 - Remove blanking plug from LH side of cylinder block.
 - Lock LH balancer shaft using suitable 8 mm locking pin [6].

NOTE: Insert locking pin to a minimum depth of 60 mm.

- Ensure crankshaft sprocket timing marks aligned [7].
- Ensure high-pressure pump sprocket timing mark for centre chain aligned at 11 o'clock position [8].
- Align coloured chain links with timing mark on each sprocket [7], [8] & [9].
- Upper timing chain installation:
 - Ensure timing mark on each camshaft sprocket aligned at 12 o'clock position [10] & [11].

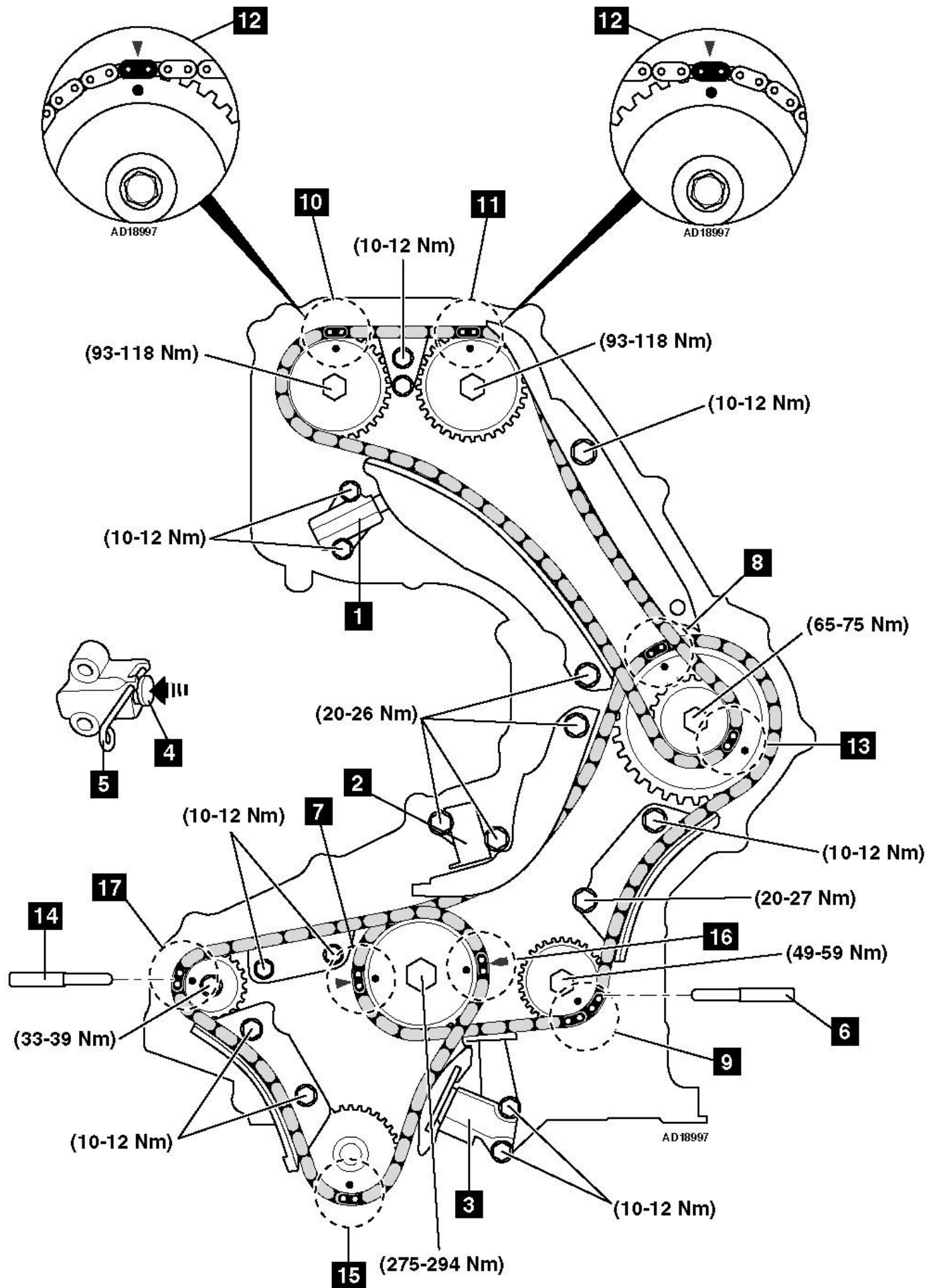
NOTE: Ensure timing mark on each camshaft sprocket also aligned with timing marks on cylinder head [12].

- Ensure high-pressure pump sprocket timing mark for upper chain aligned at 4 o'clock position [13].
- Align coloured chain links with timing mark on each sprocket [10], [11] & [13].

- Lower timing chain installation:
 - Remove blanking plug from RH side of cylinder block.
 - Lock RH balancer shaft using suitable 8 mm locking pin [14].

NOTE: Insert locking pin to a minimum depth of 60 mm.

- Ensure oil pump sprocket timing mark at 6 o'clock position [15].
 - Ensure crankshaft sprocket timing marks aligned [16].
 - Align coloured chain links with timing mark on each sprocket [15], [16] & [17].
- Remove 2,5 mm wire clip from chain tensioners after repairs [5].
 - Tighten crankshaft pulley bolt to 275-294 Nm.
 - Remove balancer shaft locking pins [6] & [14].
 - Refit cylinder block blanking plugs.



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