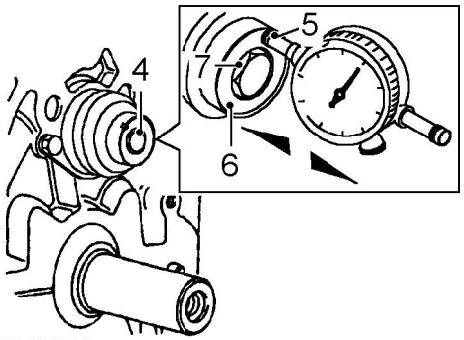
CAMSHAFT AND TAPPETS

Camshaft end-float - check

NOTE: this check is only applicable to camshafts fitted with thrust plate.

1. Remove rocker shaft assemblies.
2. Remove push rods and store in fitted order.
3. Remove timing chain and gears.



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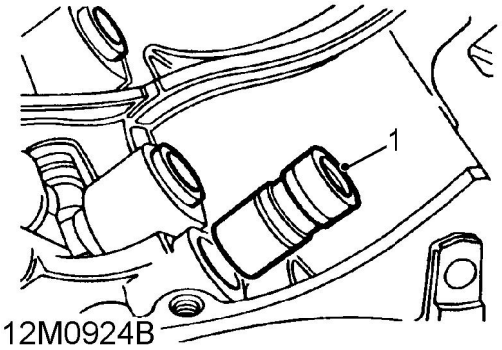
4. Temporarily fit camshaft gear bolt.
5. Attach a suitable DTI to front of cylinder block with stylus of gauge contacting end of camshaft.
6. Push camshaft rearwards and zero gauge.
7. Using camshaft gear bolt, pull camshaft forwards and note end-float reading on gauge. End-float = 0.05 to 0.35 mm (0.002 to 0.014 in)

8. if end-float is incorrect, fit a new thrust plate and re-check. If end-float is still incorrect, a new camshaft must be fitted.

Camshaft and tappets - remove



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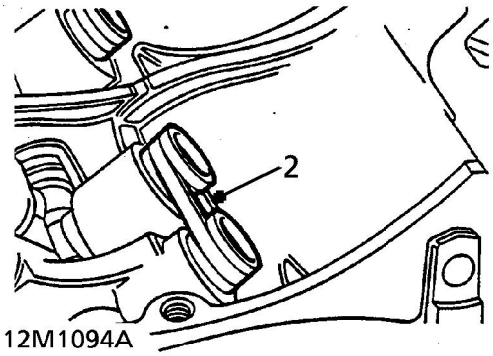
1. Remove tappets and retain with their respective push rods.

CAUTION: Store tappets upright to prevent oil loss.

NOTE: If tappets cannot be removed due to damaged camshaft contact area, proceed as follows:



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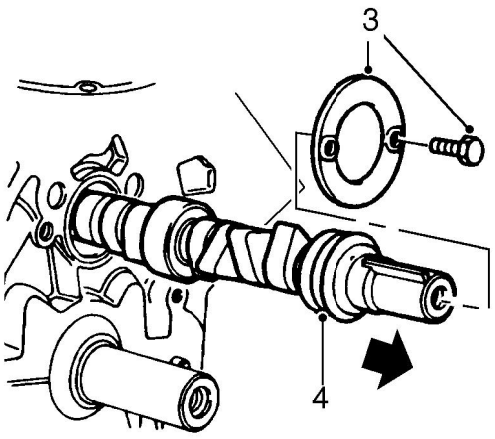
2. Lift tappets in pairs to the point where damaged face is about to enter tappet bore and fit rubber bands to retain tappets. Repeat until all tappets are retained clear of camshaft lobes. The tappets can then be withdrawn out the bottom of their bores when the sump and camshaft are removed.



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3. Remove 2 bolts securing camshaft thrust plate - if fitted to cylinder block, remove plate.
4. Withdraw camshaft, taking care not to damage bearings in cylinder block.

Camshaft and tappets - inspection

1. Throughly clean all components.
2. Inspect camshaft bearing journals and lobes for signs of wear, pitting, scoring and overheating.
3. Support camshaft front and rear bearings on vee blocks, and using a DTI, measure camshaft run-out on centre bearing. Maximum permitted run-out = 0.05 mm (0.002 in).
4. Inspect camshaft thrust plate - if fitted, for wear, replace plate if wear is evident.
5. Clean and inspect tappets. Check for an even, circular wear pattern on the camshaft contact area. If contact area is pitted or a square wear pattern has developed, tappet must be renewed.
6. Inspect tappet body for excessive wear or scoring. Replace tappet if scoring or deep wear patterns extend up to oil feed area. Clean and inspect tappet bores in engine block.
7. Ensure that tappets rotate freely in their respective bores.
8. Inspect push rod contact area of tappet, replace tappet if surface is rough or pitted.

Camshaft and tappets - refit

1. Lubricate camshaft journals with clean engine oil and carefully insert camshaft into cylinder block.
2. Fit camshaft thrust plate - if fitted, ensuring that it is correctly located in camshaft groove. Fit bolts and tighten to 25 Nm (18 lbf.ft).

NOTE: If camshaft or thrust plate has been replaced, it will be necessary to re-check camshaft end-float.

3. Immerse tappets in clean engine oil. Before fitting, pump the inner sleeve of tappet several times using a push rod, to prime tappet and reduce tappet noise when engine is first started.
4. Lubricate tappet bores with clean engine oil and fit tappets in removed order.

NOTE: Some tappet noise may be evident on initial start-up. If necessary, run the engine at 2500 rev/min for a few minutes until noise ceases.

5. Fit timing chain and gears.
6. Fit rocker shaft assemblies.

PISTONS, CONNECTING RODS, PISTON RINGS AND CYLINDER BORES

Pistons and connecting rods - remove

1. Remove cylinder head(s).
2. Remove big-end bearings.
3. Remove carbon ridge from top of each cylinder bore.
4. Suitably identify each piston to its respective cylinder bore.
5. Push connecting rod and piston assembly to top of cylinder bore and withdraw assembly.
6. Repeat above procedure for remaining pistons.

CAUTION: Big-end bearing shells must be replaced whenever they are removed.