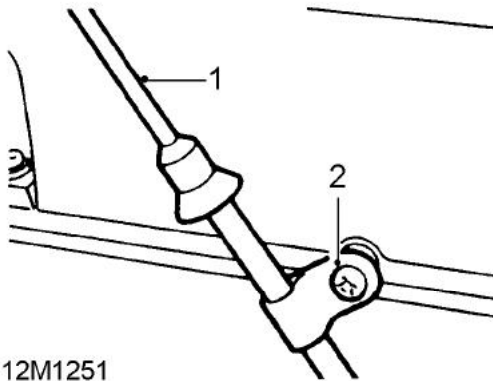


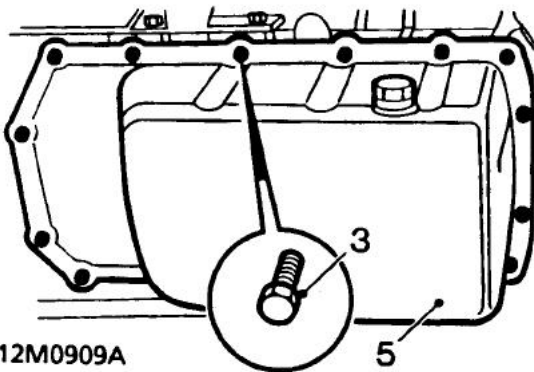
ENGINE

Sump - remove



12M1251

1. Remove dipstick.
2. Remove screw securing dipstick tube to LH rocker cover.



12M0909A

 **NOTE: Sump fitted to engines without suffix B engine numbers illustrated.**

3. Remove 16 bolts securing sump to cylinder block.

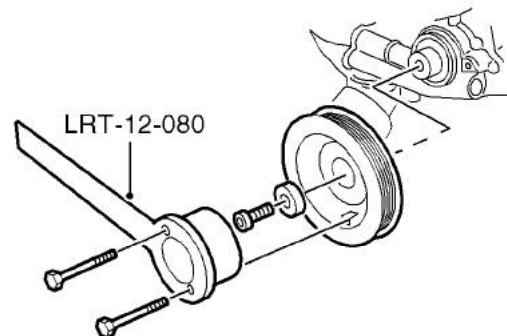
 **NOTE: Engine numbers with suffix B, 17 bolts are used to secure sump to cylinder block.**

4. Carefully release sump from cylinder block.

 **CAUTION: Take care not to damage sealing faces of cylinder block and sump.**

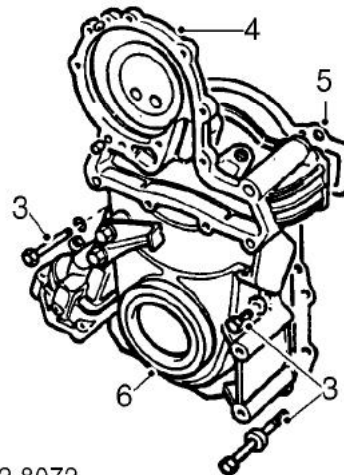
5. Remove sump.

Timing cover - remove - Engine numbers without suffix B



M12 4445A

1. Secure tool **LRT-12-080** to crankshaft pulley with 2 bolts.
2. Restrain crankshaft pulley using **LRT-12-080** remove crankshaft pulley bolt and collect spacer washer, remove crankshaft pulley.



M12 8072

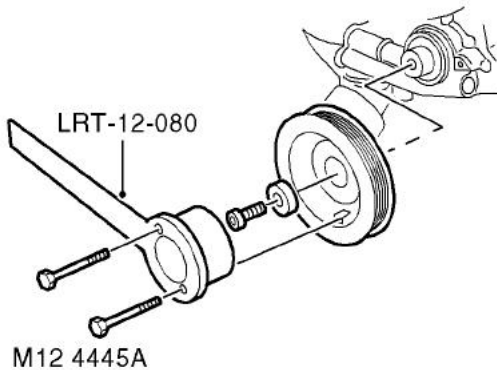
3. Remove bolts and nut securing timing cover to cylinder block.
4. Release and remove timing cover.
5. Remove and discard gasket.
6. Remove and discard oil seal from timing cover.



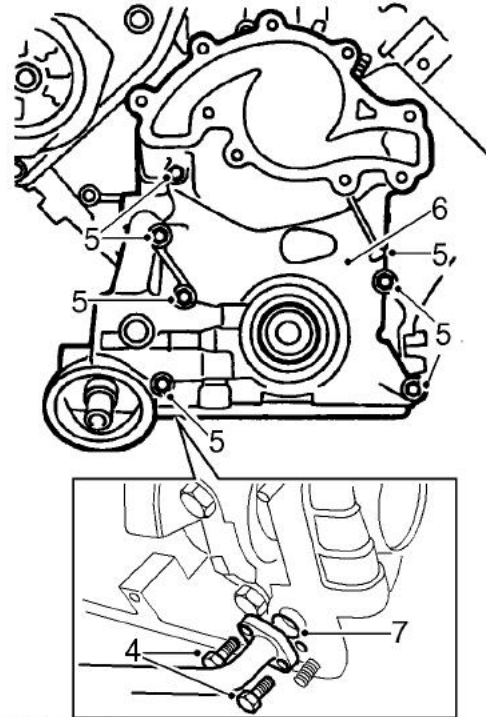
Timing cover - remove - Engine numbers with suffix B



NOTE: Timing cover, oil pump, oil pressure by-pass valve and oil pressure relief valve are only supplied as an assembly.



1. Secure tool **LRT-12-080** to crankshaft pulley with 2 bolts.
2. Restrain crankshaft pulley using **LRT-121-080** remove crankshaft pulley bolt and collect spacer washer; remove crankshaft pulley.
3. Remove sump.



4. Remove 2 bolts securing oil pick-up pipe to timing cover.
5. Noting their fitted position, progressively slacken then remove bolts securing timing cover to cylinder block.



CAUTION: Do not attempt to remove oil pump drive gear at this stage.

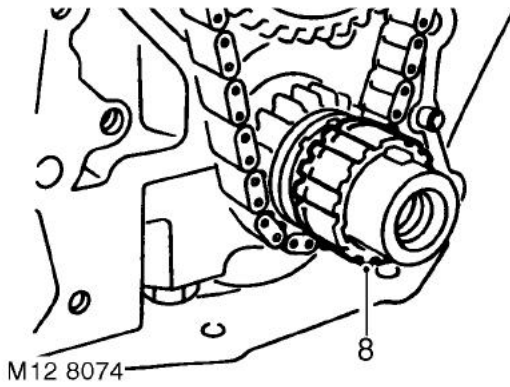
6. Release timing cover from oil pick-up pipe, remove cover.



NOTE: Dowel located.

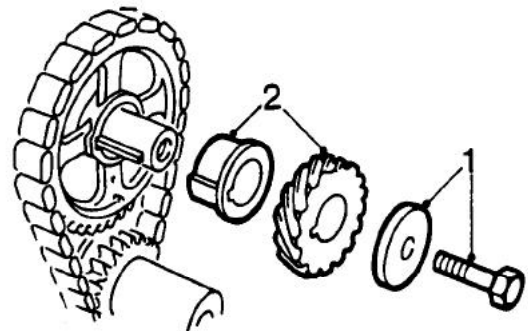
7. Remove and discard 'O' ring from oil pick-up pipe.

ENGINE

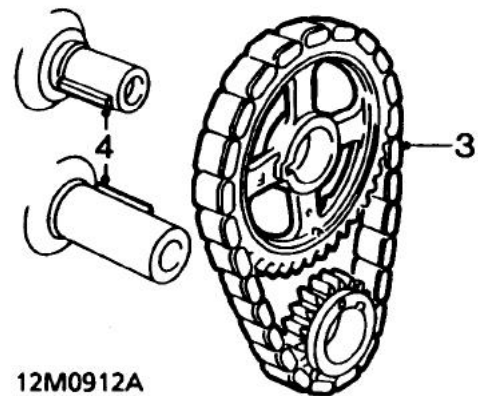


8. Remove oil pump drive gear.
9. Remove and discard gasket.
10. Remove and discard oil seal from timing cover.

Timing gears - remove



1. Restrain camshaft gear and remove bolt securing gear, collect washer.
2. Remove distributor drive gear - if fitted and spacer.



3. Remove timing chain and gears as an assembly.
4. Collect Woodruff keys from camshaft and crankshaft.

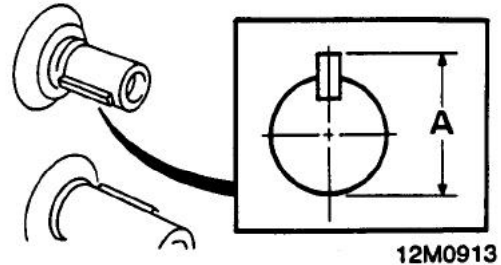


Timing chain and gears - inspection

1. Thoroughly clean all components.
2. Inspect distributor drive gear - if fitted for wear.
3. Inspect timing chain links and pins for wear.
4. Inspect timing chain gears for wear. Renew parts as necessary.

Timing gears - refit

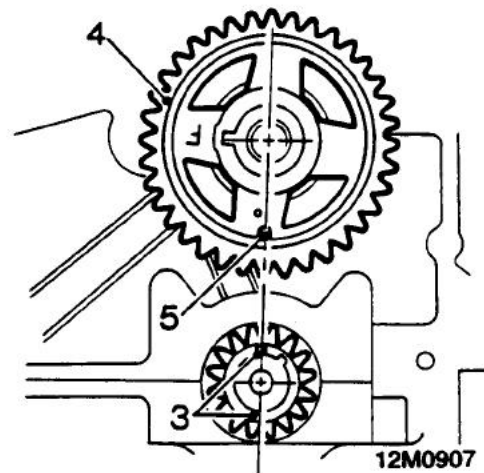
1. Clean gear locations on camshaft and crankshaft, fit Woodruff keys.



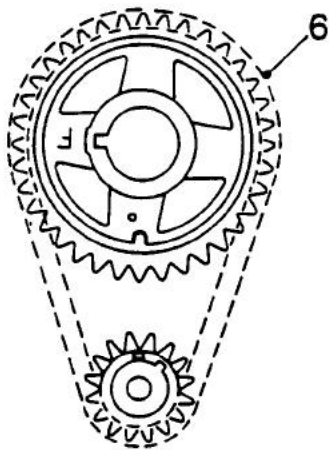
2. Check camshaft Woodruff key is fully engaged in keyway.



CAUTION: Space between Woodruff key and keyway acts as an oil feed. It is therefore most important that key is properly seated and parallel to axis of camshaft. Overall dimension 'A' must not exceed 30.15 mm (1.2 in).



3. Temporarily fit crankshaft gear, and if necessary turn crankshaft to bring timing mark on gear to the twelve o'clock position, remove gear.
4. Temporarily fit camshaft gear with marking 'F' facing forwards.
5. Turn camshaft until mark on camshaft gear is at the six o'clock position, remove gear without moving camshaft.

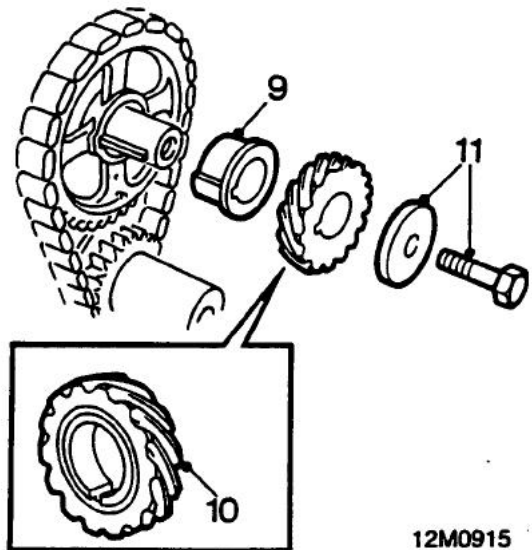


12M0914

6. Position timing gears on work surface with timing marks upwards and aligned.
7. Fit timing chain around gears, keeping timing marks aligned.
8. Fit gear and chain assembly.



NOTE: Timing marks and 'F' mark on camshaft gear must be facing forwards.



12M0915

9. Fit spacer to camshaft with flange facing forwards.
10. Fit distributor drive gear - if fitted to camshaft with grooved face towards camshaft gear.
11. Fit camshaft gear bolt and washer, restrain camshaft gear and tighten bolt to 50 Nm (37 lbf.ft).



Timing cover - refit - Engine numbers without suffix B

1. Clean sealant from threads of cover bolts.
2. Clean all traces of old gasket material from timing cover and mating face of cylinder block, ensure that bolt holes are clean and dry.

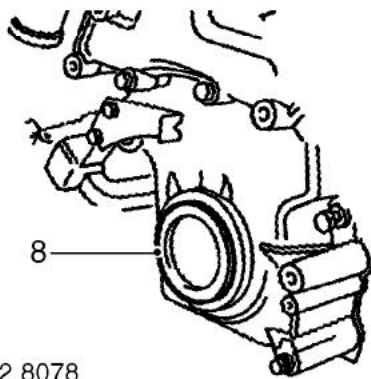


CAUTION: Use a plastic scraper.

3. Use a lint free cloth and thoroughly clean oil seal location in timing cover.
4. Position new gasket, fitted dry, to cylinder block.
5. Coat threads of timing cover bolts with sealant, Part number STC 50552.
6. Fit timing cover, fit bolts and nut and tighten progressively, by diagonal selection to 22 Nm (16 lbf.ft).
7. **Unwaxed oil seal only:** Lubricate new oil seal sealing surfaces with engine oil.



CAUTION: If replacement oil seal has a waxed coating, it must be fitted dry DO NOT lubricate oil seal or recess in timing cover.



M12 8078

8. Locate seal to timing cover and press seal in squarely until flush with front face of timing cover.
9. Fit crankshaft pulley.
10. Fit spacer washer to pulley bolt.
11. Fit bolt and using tool **LRT-12-080** restrain crankshaft pulley and tighten bolt to 270 Nm (200 lbf.ft).
12. Remove tool **LRT-12-080**.

Timing cover - refit - Engine numbers with suffix B



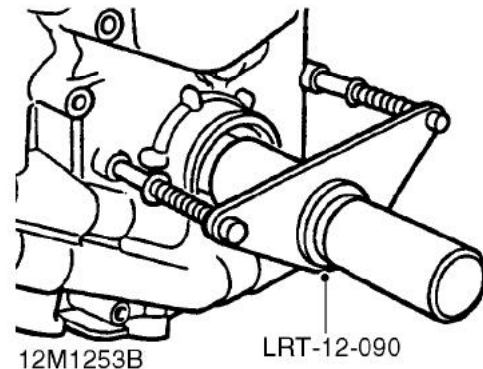
NOTE: Timing cover, oil pump, oil pressure by-pass valve and oil pressure relief valve are only supplied as an assembly.

1. Clean sealant from threads of timing cover bolts.
2. Clean all traces of gasket material from mating faces of timing cover and cylinder block, ensure that bolt holes are clean and dry.



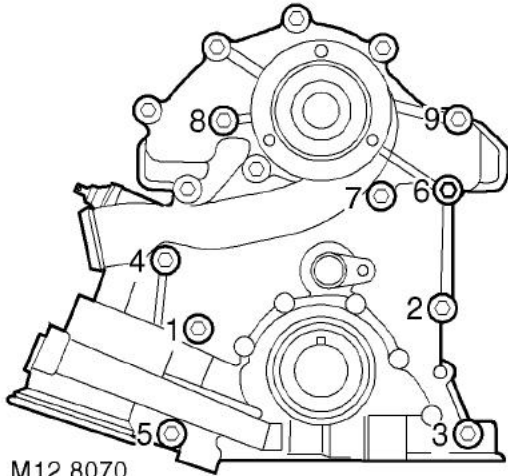
CAUTION: Use a plastic scraper.

3. Clean oil seal location in timing cover.
4. Position a new gasket, fitted dry, to timing cover locating dowels.
5. Position oil pump drive gear in timing cover with groove towards front of timing cover.
6. Lubricate a new 'O' ring with engine oil and fit to oil pick-up pipe.



7. Locate tool **LRT-12-090** on timing cover and oil pump drive gear.
8. Position timing cover to cylinder block and oil pick-up pipe and at the same time, rotate tool **LRT-12-090** until drive gear keyway is aligned with Woodruff key.
9. Fit timing cover.
10. Smear threads of timing cover bolts with sealant, Part number STC 50552.

ENGINE

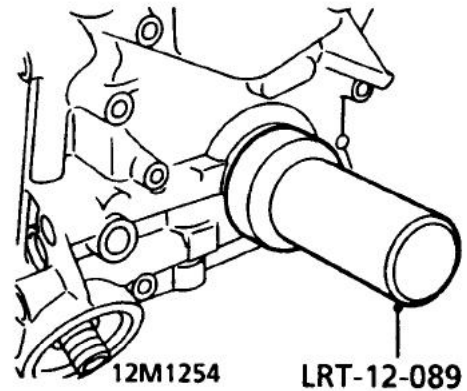


11. Fit timing cover bolts and using sequence shown, tighten to 22 Nm (16 lbf.ft).

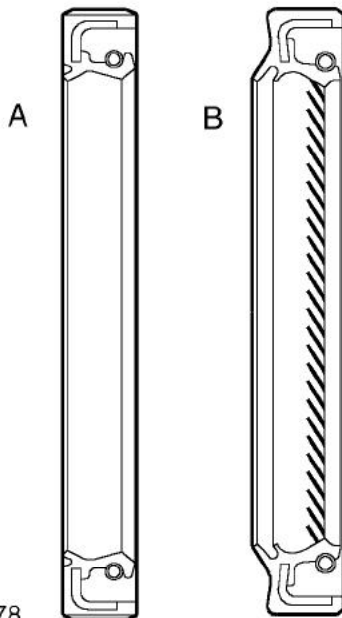


CAUTION: Ensure CMP sensor multiplug bracket - if fitted is secured by bolt. Do not fit coolant pump bolts at this stage.

12. Remove tool LRT-12-090.
13. Fit oil pick-up pipe bolts and tighten to 10 Nm (8 lbf.ft).



14. Fit timing cover oil seal using tool LRT-12-089.
15. Fit sump.
16. Fit crankshaft pulley, fit bolt and spacer washer.
17. Using tool LRT-12-080 to restrain crankshaft, tighten bolt to 270 Nm (200 lbf.ft).
18. Remove tool LRT-12-080.



- A- Early type seal
- B- Later type seal - use as replacement for all engines



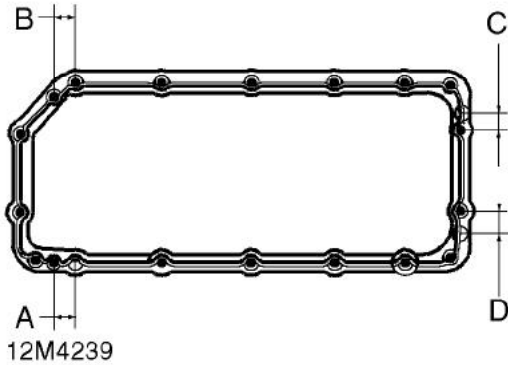
CAUTION: Replacement oil seal is pre-greased, DO NOT use any additional lubricant.



Sump - refit

1. Remove all traces of old sealant from mating faces of cylinder block and sump; ensure bolt holes are clean and dry.

CAUTION: Use a plastic scraper.



NOTE: Sump fitted to engines with suffix B engine numbers illustrated.

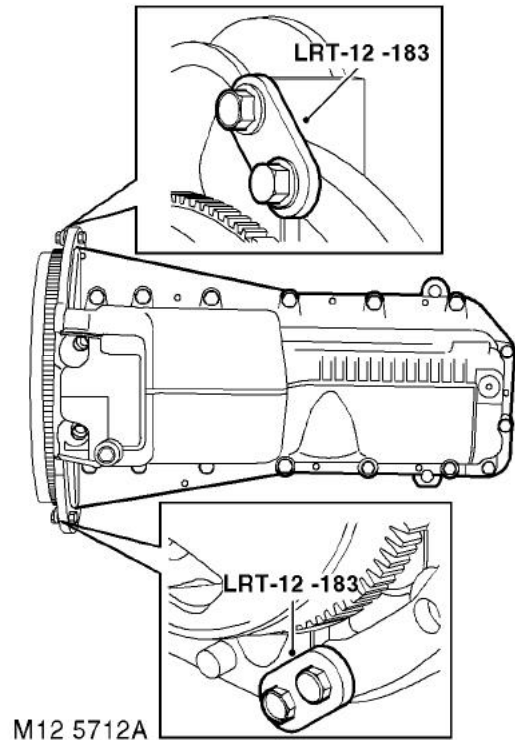


2. Clean mating faces with suitable solvent. Apply a bead of sealant, Part number STC 50550 to sump joint face as shown:
 Bead width - areas A, B, C and D = 12 mm (0.5 in)
 Bead width - remaining areas = 5 mm (0.20 in)
 Bead length - areas A and B = 32 mm (1.23 in)
 Bead length - areas C and D = 19 mm (0.75 in)

CAUTION: Do not spread sealant bead. Sump must be fitted immediately after applying sealant.

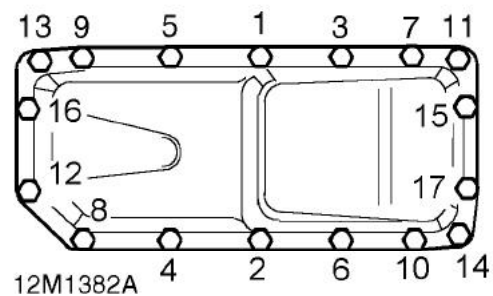


3. Fit sump, taking care not to damage sealant bead.



4. Noting that the two parts of the tool are 'handed', fit tool **LRT-12-183** to the engine backplate using slave bolts.
5. Secure the tool to the sump using the bolts which are part of the tool.

NOTE: The holes in the tool are larger than the diameter of the bolts in order to allow the sump to move as the sump bolts are tightened.



6. Fit sump bolts and using sequence shown, tighten progressively to 23 Nm (17 lbf.ft).

NOTE: Engine numbers without suffix B - use sequence numbers 1 to 8 and 10 to 16.

