10 - MAINTENANCE

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200 TDi ENGINE

If the vehicle is operated on fuel with a high sulphur content (over 1%) the engine oil change intervals must not exceed 5000 km (3000 miles).

Camshaft drive belt

The engine timing gears are driven by a flexible rubber belt which must be renewed at intervals determined by the severity of operating conditions.
In reasonable, temperate climate operation, renew the belt every 100,000 km (60,000 miles) or every five years whichever occurs earlier.
In adverse operating conditions such as work in dusty atmospheres, high ambient temperatures and desert and tropical zones, renew the belt every 50,000 km (30,000 miles) or every two and a half years whichever occurs earlier.

CAUTION: If the drive belt is not renewed at the correct interval, it could fail, resulting in serious engine damage.

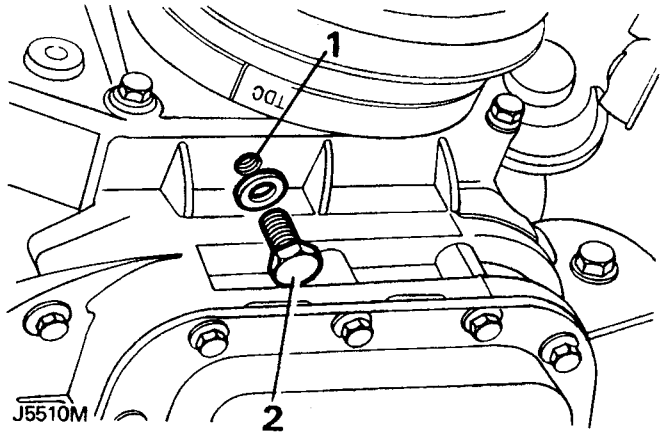
Air cleaner

When the vehicle is used in dusty or field conditions or deep wading, frequent attention to the air cleaner may be required.

Drain engine timing cover - 20/12

1. The timing cover can be completely sealed to exclude mud and water by fitting a plug.
2. The sealing plug should be fitted when vehicle is used for wading and very muddy work only.
3. Periodically remove plug to check for oil seepage.

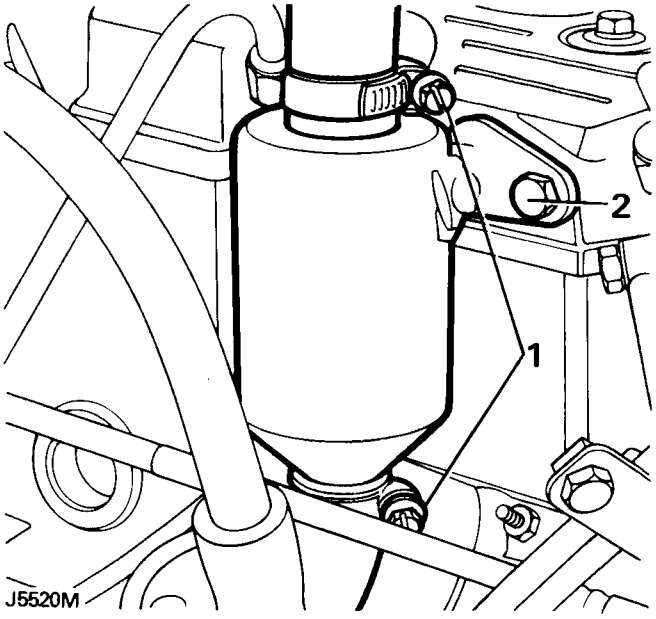
NOTE: There should no oil in the timing cover. If there is, the cause should be investigated as soon as possible. The timing belt will deteriorate if contaminated with oil.



4. When not in use, store drain plug in vehicle tool kit.

Clean cyclone engine breather cleaner - 20/12

1. Slacken hose clips securing hoses to cleaner body. Remove hoses.
2. Remove two bolts securing cleaner to rocker cover.

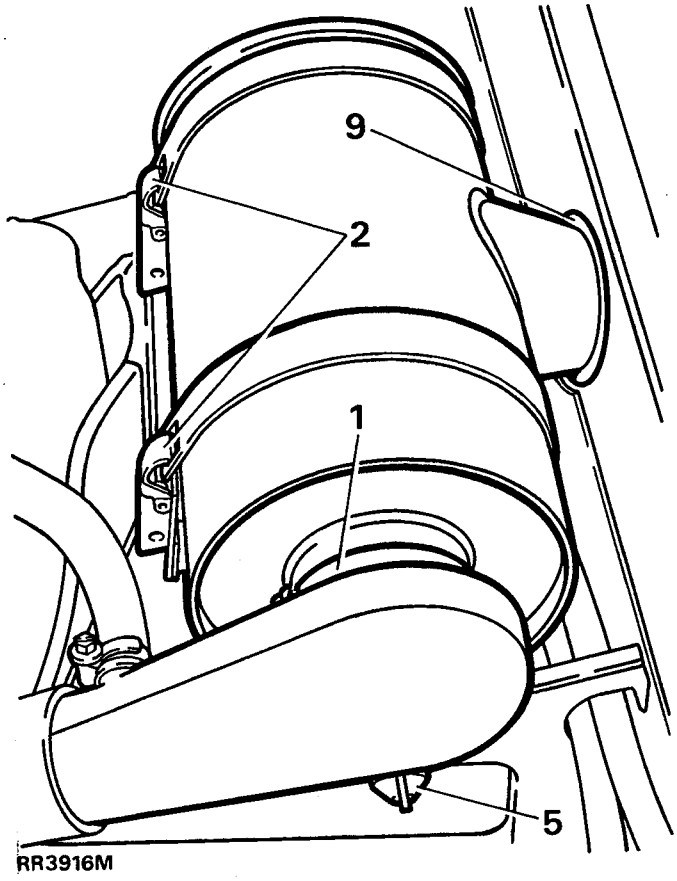


3. Remove cleaner from rocker cover, taking care not to tear sealing gasket.
4. Immerse cleaner in a small container of kerosene to dissolve oily deposits.
5. When cleaner is free of deposits, remove from solvent and dry completely.

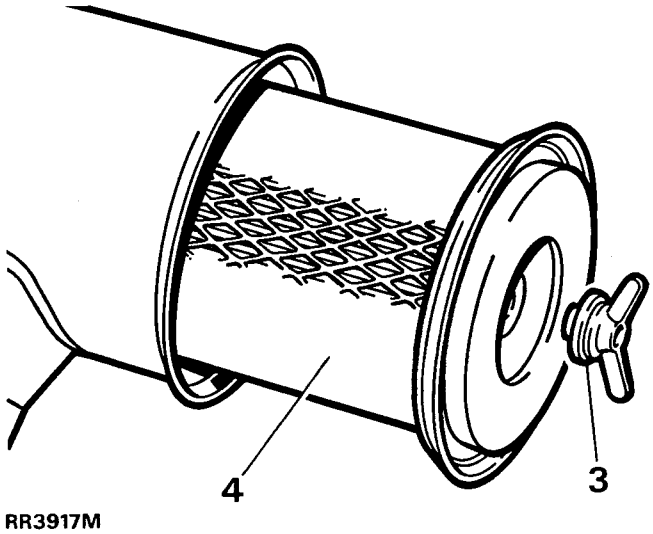
⚠ **CAUTION: The cleaner must be completely dry before it is refitted, otherwise overspeeding of the engine may result.**

Renew the air cleaner element - 20/12

1. Slacken clip and pull elbow from cleaner.
2. Release two over-centre clips securing air cleaner body. Pull cleaner away from its supports, easing inlet side of cleaner away from intake baffle plate.



3. Unscrew wing nut at end of case.
4. Remove filter element from main body.



Check air cleaner dump valve

5. Squeeze open dump valve, check interior is clean. Also check that rubber is flexible and in good condition.
6. If necessary, remove dump valve to clean the interior. Fit a new valve if original is in poor condition.

Refit the element

7. Fit a new element to air cleaner body.
8. Refit wing nut and tighten.
9. Fit cleaner assembly to vehicle, engaging intake in the baffle plate. Ensure 'O' ring is located in baffle plate.
10. Fit cleaner outlet elbow onto cleaner case.

△ **NOTE: A location cut out in cleaner case flange corresponds to a moulding on elbow.**

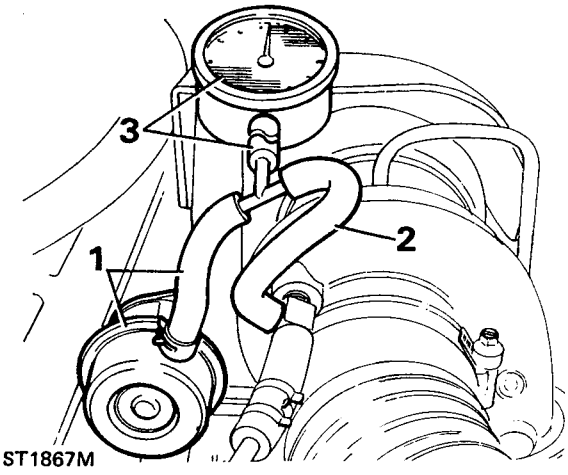
11. Tighten clip. Secure air cleaner with the two over-centre clips.

Check turbocharger boost pressure - 40/24

Maximum boost pressure
- 61 cm Hg (11.8 p.s.i.g.)

Minimum boost pressure
- 56 cm Hg (10.9 p.s.i.g.)

1. Disconnect, from turbocharger, hose to actuator. Insert into a suitable "T" piece.
2. Connect a short length of suitable hose to turbocharger and connect other end to "T" piece.
3. Connect a further length of hose to third leg of the "T" piece and other end to a pressure gauge capable of reading in excess of 61 cm Hg. The pressure gauge hose must be capable of reaching passenger compartment so that gauge may be observed.
4. To check maximum boost pressure, drive vehicle normally but in such a manner that full throttle can be maintained whilst climbing a hill with engine speed held steady between 2,500 and 3,000 r.p.m. The boost pressure should be between 56 to 61 cmHg (10.9 to 11.8 p.s.i.g.).

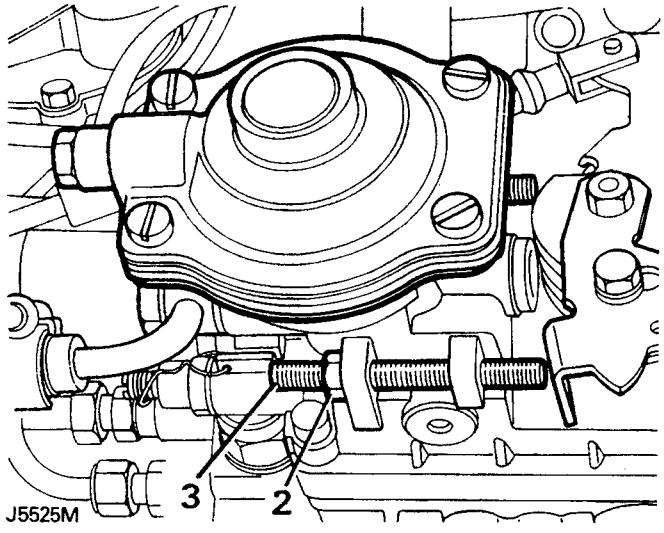


ST1867M

Engine slow running - 20/12

1. Using a suitable tachometer, check engine slow running speed is 720 ± 20 rev/min. The engine should be at normal operating temperature for this check. If tachometer is not available, adjust engine speed until slowest even running is achieved.
2. If adjustment is necessary, slacken locknut on injector pump.
3. Screw adjuster clockwise to increase engine speed or anticlockwise to decrease speed. Run engine at increased speed for a few seconds, check slow running speed again.
4. When correct speed has been achieved, hold adjuster screw steady while tightening locknut.

△ **NOTE: Slow running control is the only permitted adjustment in service. Any additional adjustments required must be entrusted to authorised Bosch agents.**

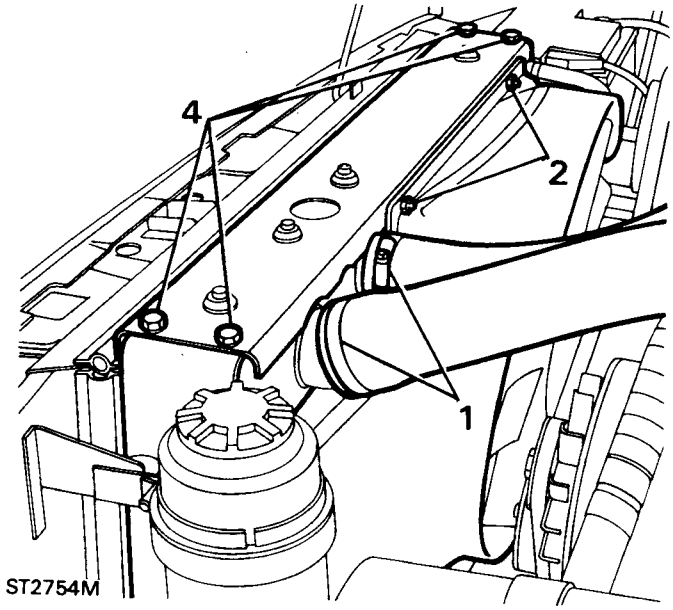


J5525M

Intercooler element clean - 80/48

Remove

1. Loosen upper and lower intercooler hose securing clips at element. Carefully pull hoses from inlet/outlet pipes.
2. Remove two nuts and washers securing fan cowl upper to radiator assembly.
3. Ease fan cowl upwards to disengage from fastening clips. Move cowl towards rear of vehicle, over fan blades.
4. Remove radiator assembly frame top by removing two bolts on either side and lifting top off element location dowels.
5. Lift intercooler element from support frame.



Flush

6. Flush element with ICI "GENKLENE" proprietry cleaner, following manufacturers instructions.
7. Dry element completely and check it for damage or deterioration. Renew the element if necessary.

Refit

8. Refit intercooler to support frame. Refit frame top, ensuring that the element dowels are correctly located in rubber seats.
9. Refit other components in reverse order.

Drive belts Check and adjust - 20/12
(Not 200Tdi camshaft belt)

General procedure

Before each belt is checked for correct tension, it must be inspected for damage or wear and replaced as necessary. The drive pulleys must also be inspected for dirt and grit trapped in the "V" grooves and cleaned if necessary to prevent damage to the belts.
Whenever a new belt is fitted, it must be tensioned and run at light load for 3 to 5 minutes before it is tensioned again. During light loading;
If the steering pump belt has been changed, leave the steering wheels in the straight ahead position.
If the air conditioning pump belt has been changed, leave the air conditioning switched off.
If the alternator belt has been changed, do not operate heavy consumption electrical components.
For all belts, do not speed the engine.

New drive belts should additionally be retightened after approximately 1,000 miles (1,500 km).

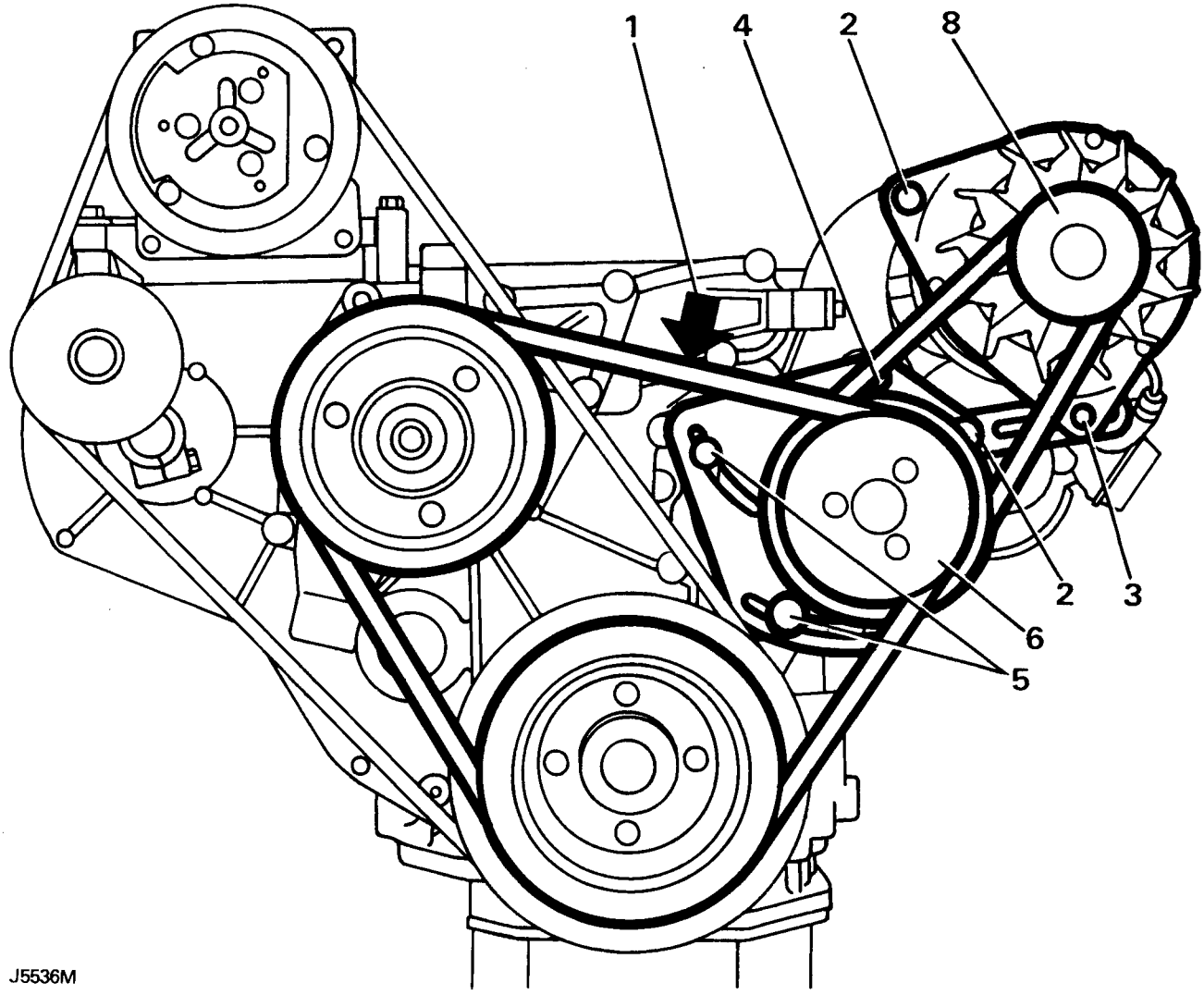
The tension of each belt must be checked at the points arrowed, midway between the belt centres, by a proprietry belt tension gauge. The belts should be tensioned, if necessary, to within the figures given for each belt.

A: Water pump drivebelt
355 to 400 Nm (80 to 90 lbf)

B: Air conditioning compressor drivebelt
355 to 400 Nm (80 to 90 lbf)

C: Alternator drivebelt
335 to 380 Nm (75 to 85 lbf)

In exceptional circumstances, where a belt tension gauge is not available, the belt tension may be checked at the points shown by measuring the deflection of the belt under normal hand pressure. There should be a deflection of 0,5 mm per 25 mm of belt run between belt centres. Adjust the belts if necessary. The belts should be retensioned in conjunction with a belt tension gauge as soon as possible.



Water pump/power steering drivebelt

Check

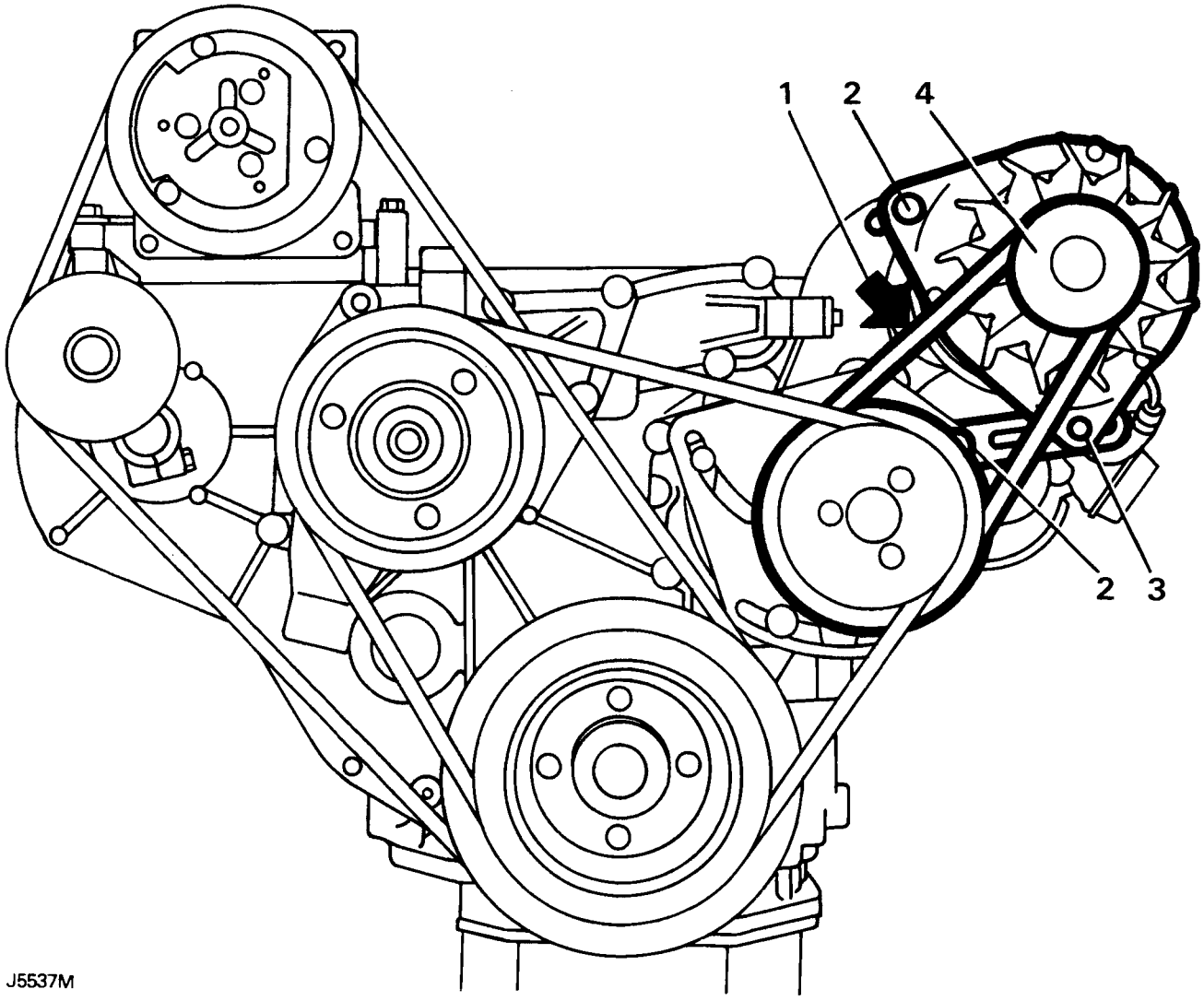
1. Check belt tension at point shown.

Adjust

2. Slacken front and rear alternator mounting bolts and adjustment link mounting bolt at power steering pump plate.
3. Slacken adjustment link clamp bolt at the alternator.
4. Slacken mounting bolt at power steering pump plate.
5. Slacken clamp bolts at power steering pump plate.
6. Move power steering pump in or out as required to correct belt tension.

△ **NOTE: DO NOT lever against the pump body to move it.**

7. Tighten clamp bolts and mounting bolt at power steering pump plate and re-check the belt tension. Slacken pump plate bolts and re-tension if necessary.
8. Adjust alternator drivebelt tension.



Alternator drivebelt

Check

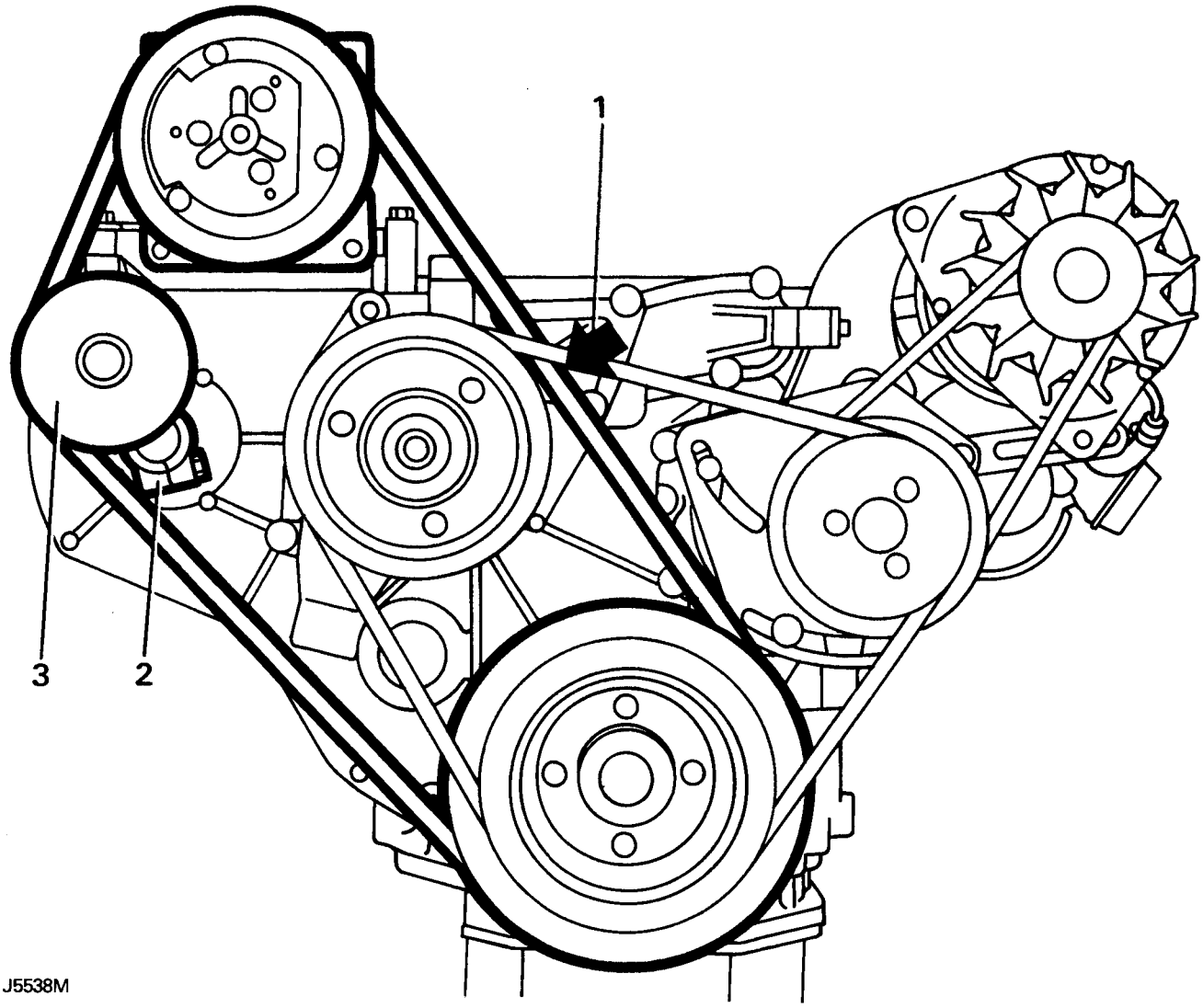
1. Check belt tension at point shown.

Adjust

2. Slacken front and rear alternator mounting bolts and adjustment link bolt at power steering pump plate.
3. Slacken adjustment link clamp bolt at alternator.
4. Move alternator to correct drivebelt tension.

△ **NOTE: DO NOT lever against the alternator slip ring end or the stator to move the alternator.**

5. Tighten adjustment link clamp bolt and re-check belt tension. If correct, tighten alternator mounting bolts.



Air conditioning compressor drivebelt

Check

1. Check belt tension at point shown.

Adjust

2. Slacken jockey wheel clamp bolt.
3. Move jockey wheel either in or out to correct the tension. Ensure that compressor mount bolts are tight.
4. Tighten clamp bolt and re-check tension. Adjust if necessary.

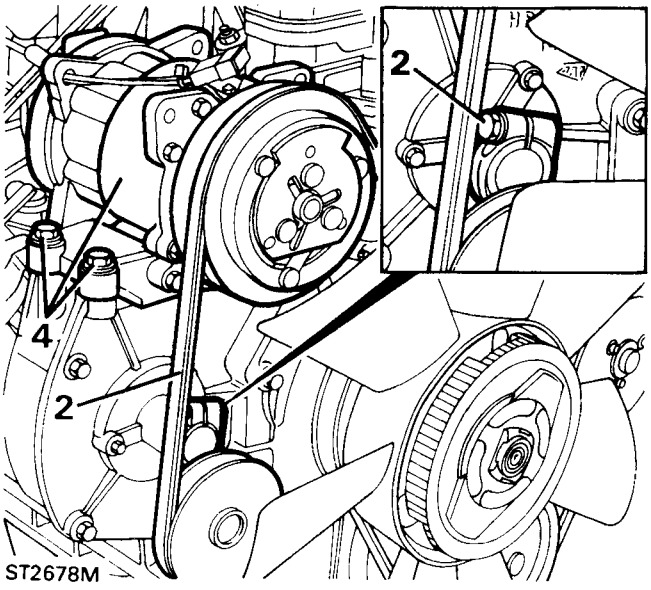
Renew camshaft drive belt - 100/60

Special tools:-

Crankshaft damper restrainer	LST 127
Injection pump timing pin (part of LST 129)	LST 129/2
Flywheel timing pin	LST 128

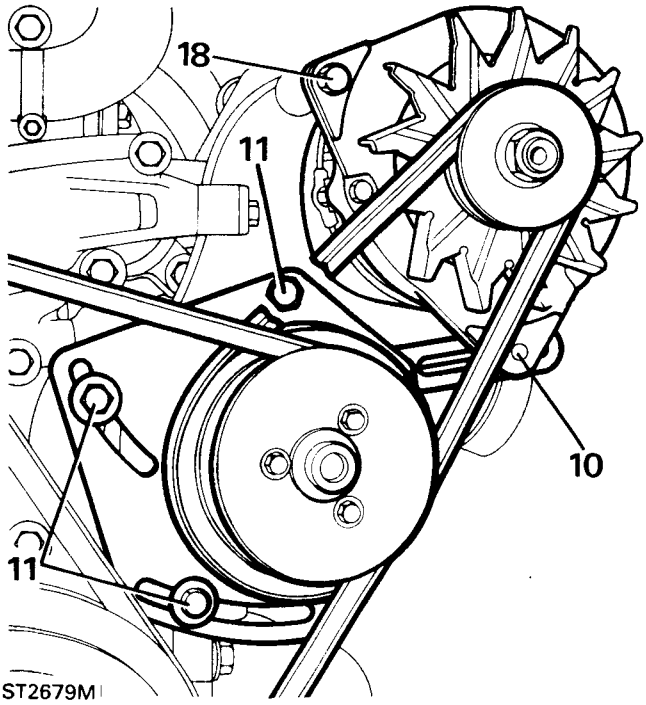
Air conditioning models - to gain access.

1. Disconnect battery negative lead.
2. Release compressor drive belt tensioning pulley. Remove belt from compressor pulley.
3. Disconnect the two electrical leads from thermostat housing sensor.
4. Remove the four bolts securing compressor to engine and move compressor aside taking care not to strain hoses.

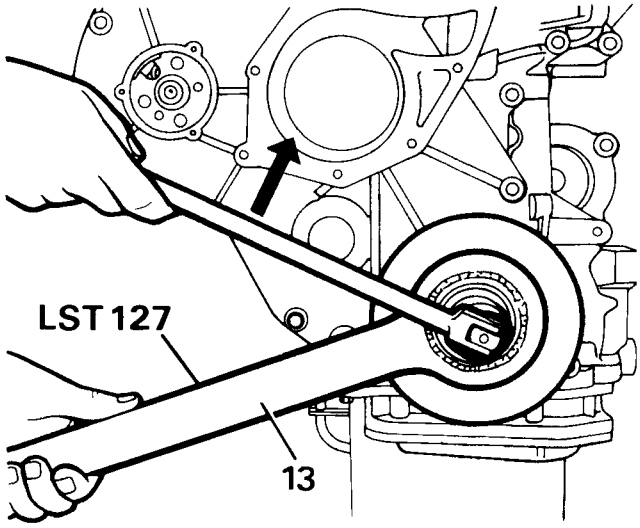


All models - to gain access

5. Disconnect battery and drain cooling system by removing bottom hose from radiator and allowing coolant to drain into a suitable container.
6. Remove viscous coupling and fan assembly, noting that coupling is secured to water pump shaft with a left hand thread.
7. Disconnect intercooler to manifold hose at the manifold.
8. Remove top hose.
9. Remove two nuts securing fan cowl to top of radiator and lift-out cowl.
10. Loosen alternator belt adjustment bolt.
11. Loosen PAS pump belt adjustment bolts and remove both belts.

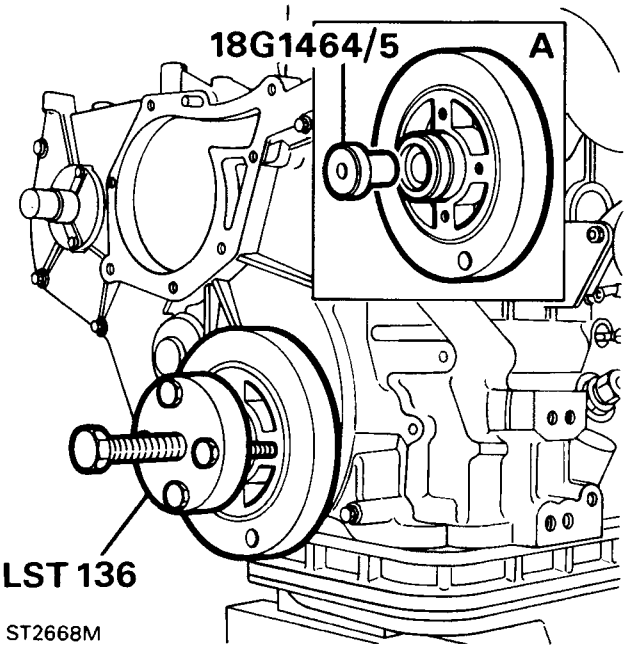


12. Remove four screws. Remove the crankshaft pulley from damper.
13. Restrain damper with special tool LST 127. Using a 30 mm socket, remove damper retaining bolt and spacer. Since this bolt is retained with Loctite and tightened to a very high torque considerable effort will be required to release it.



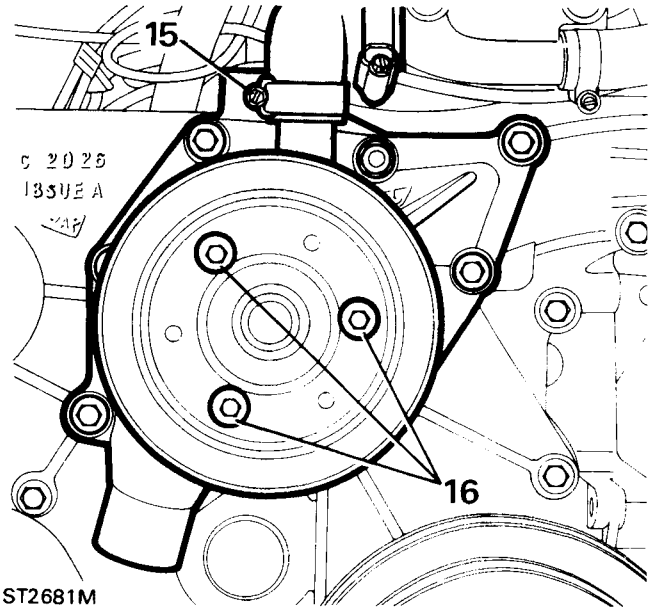
ST2680M

14. Since damper is also retained with loctite, use special tool LST 136 to withdraw it from the crankshaft.



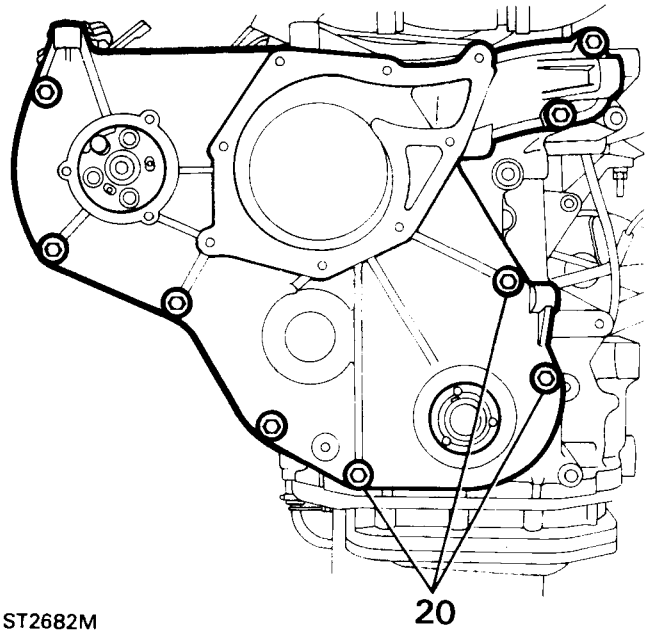
ST2668M

15. Disconnect bottom and by-pass hoses from water pump.
16. Remove three screws to remove water pump pulley. Remove seven bolts to remove water pump.



ST2681M

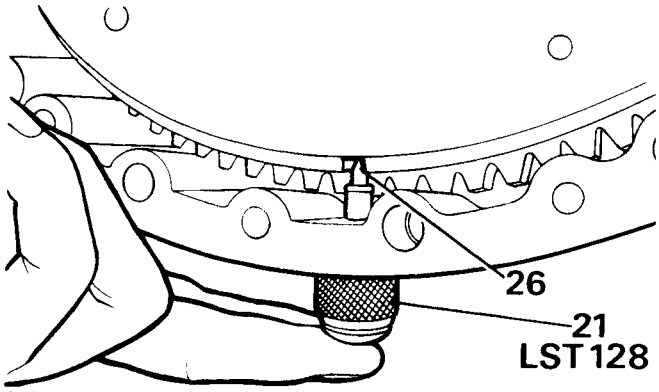
17. Remove air cleaner to turbo charger hose.
18. Withdraw pivot bolt, and remove the alternator. Similarly, remove PAS pump.
19. Remove five bolts to release common bracket.
20. Remove nine bolts and carefully remove cover plate from front cover.



ST2682M

To renew the drive belt

21. Screw body of flywheel timing pin into flywheel housing location.



ST2683M

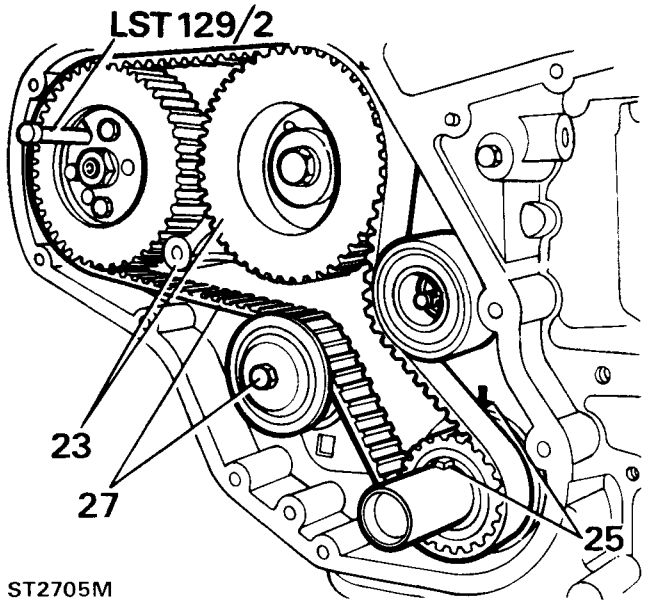
22. Temporally fit crankshaft damper, and with special service tool LST 127, turn crankshaft in a clockwise direction until following conditions are achieved:-
23. Timing dot on camshaft gear aligns with front cover web.
24. Injector pump timing pin LST 129/2 can be fully and easily inserted into pump hub hole.
25. Crankshaft key aligns with arrow on front cover.
26. Flywheel timing pin LST 128 can be inserted cleanly into appropriate slot in flywheel.

NOTE: That flywheel has two timing slots, one narrower than the other. The narrowest slot determines T.D.C for this direct injection engine. Provided that instructions 23 to 26 are achieved, correct slot in flywheel will be correctly positioned. Remove damper.

27. Remove single bolt and withdraw drive belt tensioning pulley assembly complete, from engine. Carefully remove drive belt.

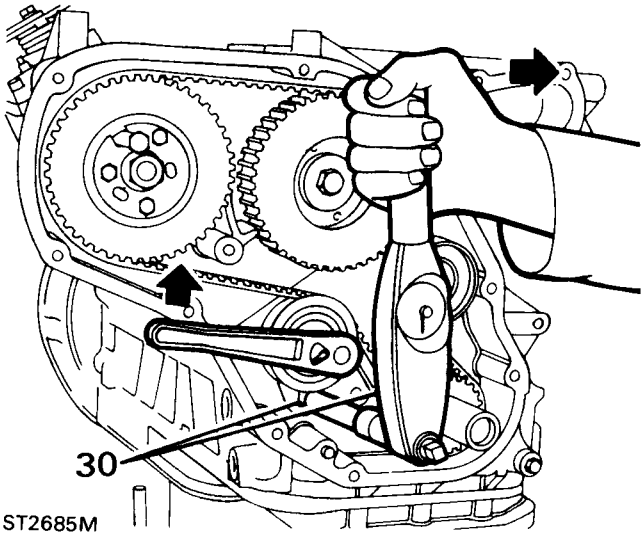
CAUTION: Before fitting a new drive belt, examine the gear wheels for wear and damage. Cleanliness and accuracy are vital when carrying out the following instructions. The gear wheels must be free from oil and grease. Drive belts which have not been stored and treated in the following manner should not be used.
Drive belts must be stored on edge on a clean flat surface and in such a manner that bends are not less than 50 mm (2 in) radius.

When a belt is handled, it must not be bent at an acute angle or an arc of less than 25 mm (1 in) in diameter, as damage may be caused to the glass fibre reinforcement and premature failure could result.
During use, a belt develops a wear pattern, therefore, if it has to be re-used, before removal, mark the direction of rotation, using soft chalk or a similar marker, and refit the belt so that it runs in the original direction.
Belts must be dry and FREE FROM ANY OIL OR OTHER CONTAMINATION.
Do not turn the crankshaft by applying leverage to the camshaft pulley or its retaining bolt.
To remove a belt always use clean hands, or a recommended tool - NEVER use a lever.



ST2705M

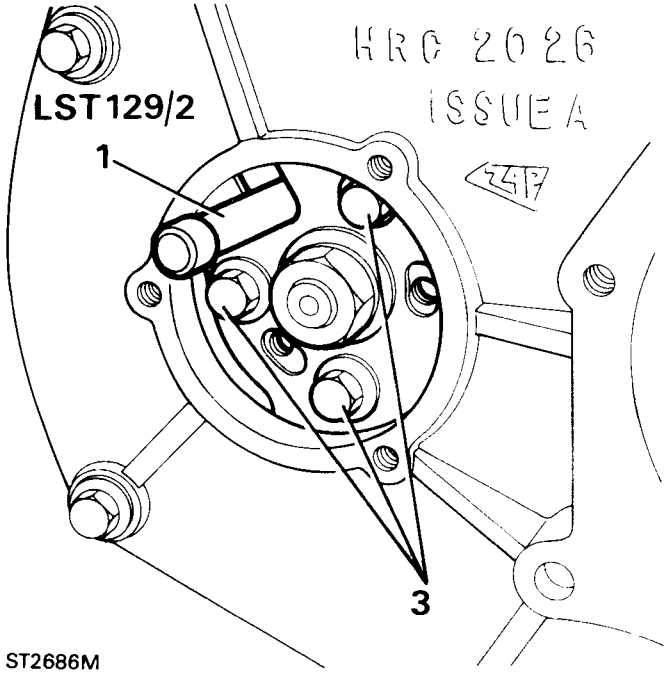
28. Slacken three bolts securing injector pump drive gear to hub. Without moving the gears, carefully feed the drive belt over gears keeping it tight on the drive side.
29. Fit tensioner assembly ensuring that round hole in pulley mounting plate locates over dowel in front cover.
30. Insert a 13 mm (0.5 in) square drive extension into hole in mounting plate and with a dial type torque wrench, held vertically, tension belt to 18 to 20 Nm (13 to 15 lbf.ft.). Tighten tensioner clamp bolt to ***45 Nm.*** Do not use a "break" type wrench.



ST2685M

31. Tighten three pump gear securing bolts to ***25 Nm.*** Remove timing pin from pump hub and check that flywheel timing pin is clear of slot. Temporarily fit damper and with special tool LST 127 rotate crankshaft two complete revolutions. Slacken tensioner clamp bolt and tension belt again as in instruction 30.

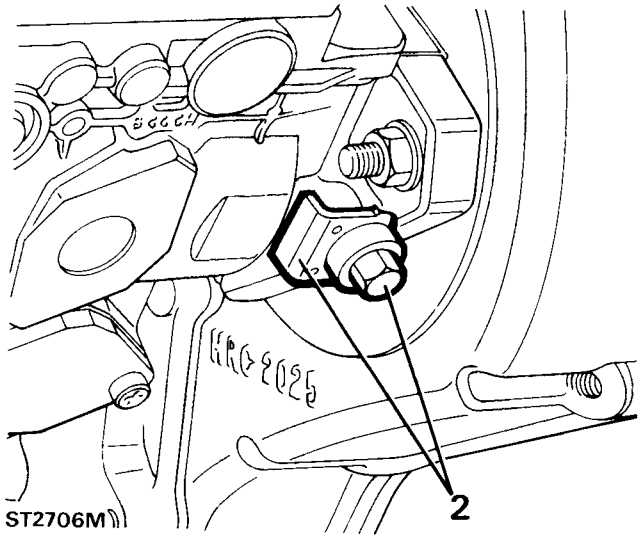
⚠ **CAUTION: The double tensioning procedure is vital otherwise the belt could fail resulting in serious damage to the engine.**



ST2686M

32. Turn crankshaft again, in a clockwise direction until all timing marks and pins align as in instructions 23 to 26. If timing pin cannot be inserted into pump hub, it will be necessary to adopt following procedure:-

(1) Turn crankshaft small amount necessary to enable timing pin to be inserted into the pump.
(2) Remove the keeper plate and lock the pump.



ST2706M

(3) Slacken three pump gear retaining bolts.
(4) Turn crankshaft to TDC.
(5) Check that timing pin is an easy fit in pump.
(6) Tighten pump gear securing bolts to ***25 Nm.***
(7) Unlock pump, fit keeper plate and tighten bolt. Remove timing pin from pump and timing pin tool from flywheel housing.

Reassemble

33. Clean front cover and cover plate mating faces. Fit a new gasket and secure with nine bolts. Tighten to ***25 Nm.***
34. Reassembling of the remaining components is mainly a reversal of the dismantling sequence. Fitting of these components is described in "Engine dismantle and overhaul" section 12. It is important that reference is made to this section at each stage of assembly to ensure that the correct procedure is followed. It is essential that the instructions concerning the fitting of the crankshaft damper are observed. **It is absolutely vital that the bolt is tightened to *340 Nm.***