

# 10 - MAINTENANCE

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**SERVICE SCHEDULE**

The following section describes, in order, the service schedule procedure. Where required, instructions are given for carrying out each service procedure, or a cross reference is given, where the procedure can be found in this manual.

Intervals are shown in Kms x 1000/Miles x 1000 or months. For example 10/6 where 10 represents 10,000 kilometers and 6 represents 6,000 miles or 6 months

**Check seat belts - 20/12**

Check condition and security of seats, seat belt mountings, seat belts, buckles and operation of inertia seat belts.

**Check operation of foot brake and clutch - 20/12**

If pedal feels 'spongy' bleed system. *See BRAKES, Repair, Brake System Bleed (ABS)* *See BRAKES, Repair, brake system bleed* or *See CLUTCH, Repair, bleed hydraulic system*

Check all hoses and pipes for security, fractures and leaks. Fit new hoses and pipes as necessary.

**Check operation of lamps - 20/12**

Check operation of all lamps, horns and warning indicators.

**Check operation of wipers - 20/12**

Check operation of front/rear screen wipers and washers and condition of wiper blades.

**Check security and operation of park brake - 10/6**

The park brake should be fully operational on third notch of ratchet.

**Check/adjust headlamp alignment - 20/12**

Check/adjust headlamp and auxiliary alignment. *See ELECTRICAL, Repair, Headlamp alignment*

**Check headlamp levelling system - 20/12**

Check system for correct operation.

**Check/adjust front wheel alignment - 20/12**

Use recognised wheel alignment equipment to perform this check and adjustment. *See STEERING, Adjustment, front wheel alignment*

**Remove wheels, check tyres - 10/6**

Check tyres (including spare) for compliance with manufacturers' specification.

Check visually for cuts, lumps, bulges, uneven tread wear and tread depth. Check road wheels for damage.

Check/adjust tyre pressures.

**Inspect brake pads for wear, calipers for leaks and condition - 10/6**

Check thickness of brake pads, fit new pads if minimum thickness is less than 3,0 mm. Check brake pads for oil contamination. If new brake pads required. *See BRAKES, Repair, front brake pads* or *See BRAKES, Repair, rear brake pads*



**WARNING:** When renewing brake pads, it is essential that only genuine components with correct grade of lining are used.

Always fit new pads as complete axle sets, NEVER individually or as a single wheel set. Serious consequences could result from out of balance braking due to mixing of linings.

**Refit road wheels - 10/6**

Fit road wheels in original hub position. Secure in position with wheel nuts, do not fully tighten wheel nuts at this stage, lower vehicle and finally tighten wheel nuts to correct torque.

Alloy wheels: **125 Nm.**

Steel wheels: **110 Nm.**

Check operation of doors, bonnet and tailgate locks - 20/12

Lubricate all hinges, door check mechanisms, bonnet catches and fuel filler flap - 10/6

### UNDER BONNET MAINTENANCE

Check cooling/heater systems - 20/12

Check cooling/heater systems for leaks and hoses for security and condition.

Cooling system hoses should be changed at first signs of deterioration.

Check brake servo hose for security and condition - 20/12

Check condition of heater plug wiring for fraying, chafing and deterioration - diesel only - 20/12

Check ignition wiring - 20/12

Check ignition wiring and high tension leads for fraying, chafing and deterioration.

Clean distributor cap - 20/12

The electronic ignition employs a Lucas 35DLM8 distributor.

Internal operating parts of distributor are pre-set at factory and do not normally require resetting. Adjustments should only be made if unit is known to be faulty or damaged. Distributor maintenance consists of following items.

1. Clean outer surfaces of distributor cap to remove dirt, grease etc.
2. Unclip cap, check cap for cracks.
3. Wipe inside cap with lint free cloth.
4. Check rotor arm, cap and flash shield tracking.

**DO NOT DISTURB** clear plastic insulating cover (flash shield) which protects magnetic pick-up module.

Lubricate distributor rotor spindle - 40/24

Apply a spot of clean engine oil into rotor spindle after rotor arm has been removed.

Clean/adjust - 10/6, renew - 20/12 spark plugs

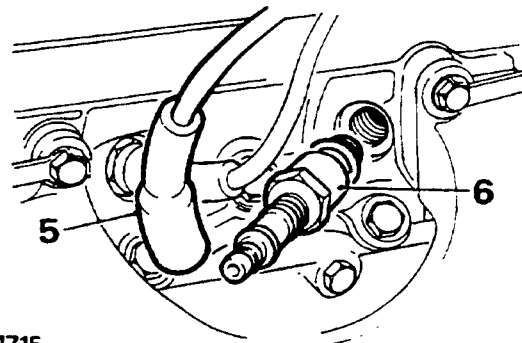
Spark plugs

Clean, adjust and renew

1. Take great care when fitting spark plugs not to cross-thread plug, otherwise costly damage to cylinder head will result.
2. Clean or replace spark plugs as applicable.
3. It is essential that correct type of spark plugs are fitted.
4. Incorrect grade of plugs may lead to piston overheating and engine failure.

Remove

5. Disconnect the battery negative lead. Remove H.T. leads from spark plugs.
6. Remove plugs and washers.

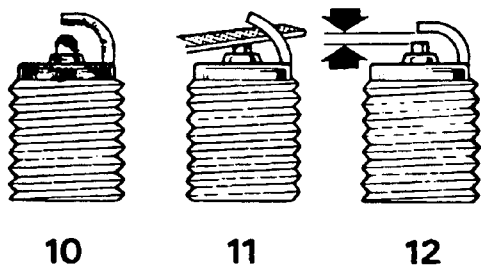


RR2171E



**Clean spark plugs**

7. Fit plug into 14 mm adaptor of approved spark plug cleaning equipment. Wobble plug in adaptor with circular motion for three or four seconds only with abrasive blast in operation. Important: Excessive abrasive blasting will lead to severe erosion of insulator nose. Continue to wobble plug in adaptor with air only, blasting plug for a minimum of 30 seconds: this will remove abrasive grit from plug cavity.
8. Wire-brush plug threads; open gap slightly, and vigorously file electrode sparking surfaces using a point file. This operation is important to ensure correct plug operation by squaring electrode sparking surfaces.
9. Set electrode gap to recommended clearance.
10. Shows dirty plug.
11. Filing plug electrodes.
12. Clean plug, set to correct gap: 0.84 to 0.96mm.

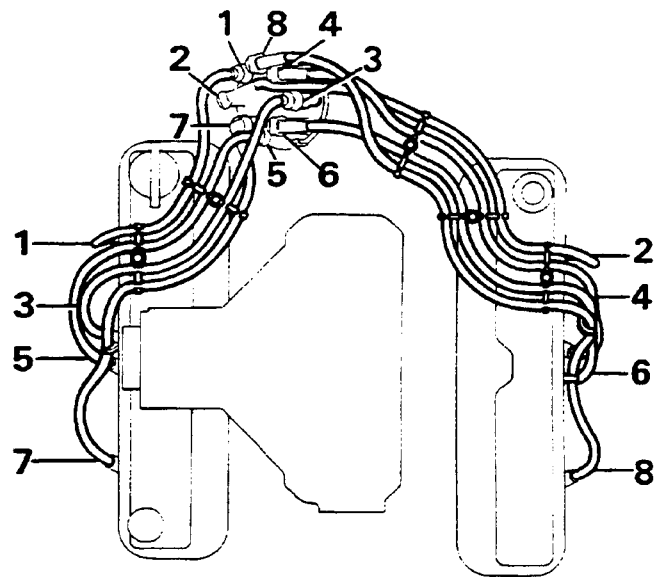


RR740M

13. Test plugs in accordance with plug cleaning machine manufacturer's recommendations.
14. Satisfactory plugs can be refitted.
15. When pushing leads onto plugs, ensure that shrouds are firmly seated.

**Fitting H.T. leads**

16. Ensure replacement H.T. leads are correctly refitted as illustrated. Failure to observe this instruction may result in cross-firing between two closely fitted leads which are consecutive in firing order.



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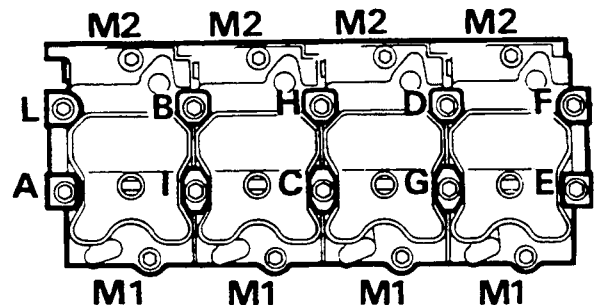
**Retorque cylinder heads-diesel**

First 40,000Km (24,000 miles) service



**NOTE:** These instructions must be carried out at the first 40,000 km (24,000 miles) service.

1. Centre bolts: without slackening bolts, start with bolt A, tighten each bolt in sequence shown through 10 - 15°.
2. Side bolts: Without slackening bolts check that torque of each bolt is 85 - 90 Nm. (First M1 then M2).



RR3804M

**Check diesel injectors for correct spray pattern - 40/24**

**Check/adjust valve clearances, - diesel - 40/24**

**Remove rocker cover**

Remove centre retaining bolts and remove rocker covers for each cylinder, taking care not to lose seals from top of rocker cover.

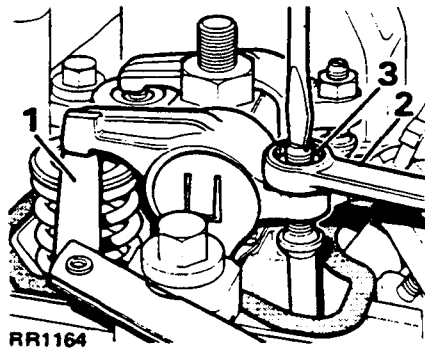
**Tappet adjustment - Fig. RR1164**

Tappet clearance engine cold:  
Inlet and exhaust 0,30 mm.

**Check and adjust tappets**

Turn engine over until number 1 valve (counting from front of engine) is fully open.

Using a 0,30 mm feeler gauge (1) check clearance between valve tip and rocker pad of number 7 valve.



RR1164

Adjust clearance by slackening lock nut (2) and turning adjusting screw (3) clockwise to reduce clearance and anti-clockwise to increase clearance. Recheck clearance after tightening lock nut.

Continue to check and adjust remaining tappets in following sequence:

- With No.1 valve fully open adjust No.7 valve.
- With No.8 valve fully open adjust No.2 valve.
- With No.5 valve fully open adjust No.3 valve.
- With No.4 valve fully open adjust No.6 valve.
- With No.7 valve fully open adjust No.1 valve.
- With No.2 valve fully open adjust No.8 valve.
- With No.3 valve fully open adjust No.5 valve.
- With No.6 valve fully open adjust No.4 valve.

**Refitting rocker covers**

Clean rocker cover gasket seating face.

Inspect rocker cover gaskets, renew if damaged.

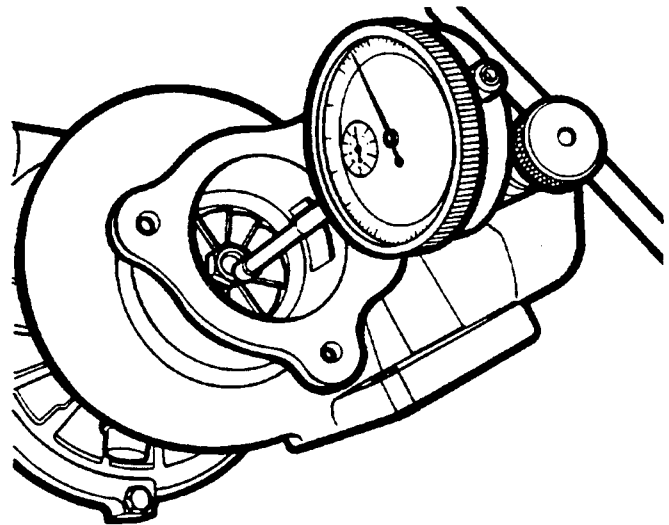
Position rocker cover with oil filler cap on No.1 cylinder, and rocker cover with breather pipe to No.3 cylinder

Check that collars and seals are located on top of rocker covers. Fit rocker covers and tighten retaining bolts.

**Check turbocharger impellor shaft axial and radial clearances - diesel - 100/60**

**Axial clearance**

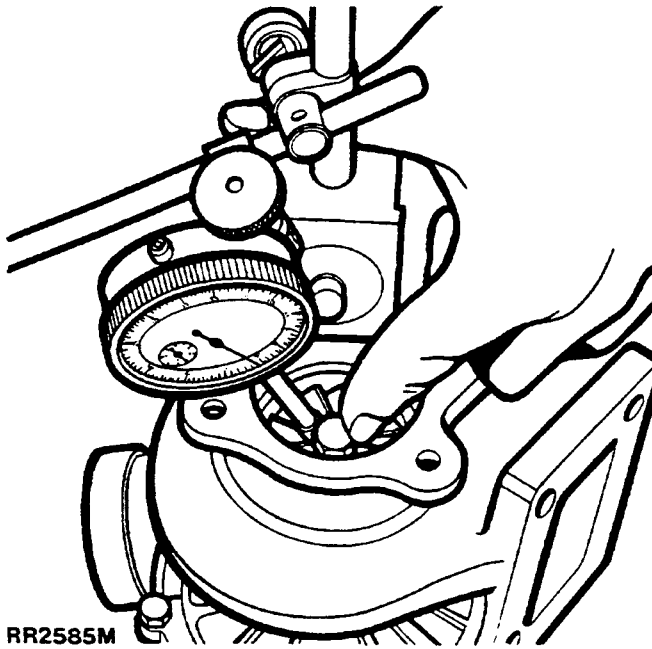
Use a dial test gauge as shown in RR2584M. Set gauge to zero on turbine wheel. By moving shaft in a linear motion the axial clearance may be established. Maximum axial clearance is 0,15 mm.



RR2584M

**Radial clearance**

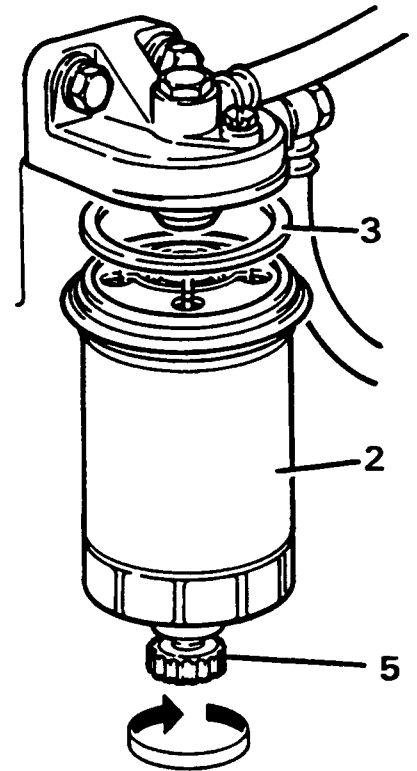
Use a dial test gauge as shown in RR2585M. Push turbine wheel to the extreme side position and set dial test gauge to zero. Check side clearance of turbine shaft by observing total radial movement. Maximum radial clearance is 0,42 mm.



RR2585M

**Renew fuel filter element**

1. Clean area around filter, place a container beneath.
2. Unscrew filter, a quantity of fuel will be released, and discard filter. A hexagon on base of filter allows use of a spanner.



RR3700M

**Renew fuel filter element - diesel - 10/6**

**Drain off water and sediment**



**CAUTION:** It is essential that any water and sediment in fuel filter is drained off, as water in fuel can result in damage to injection pump.

1. Hold a small receptacle beneath drain cock. Unscrew the drain cock half a turn, (item 5 RR3700M).
2. Drain off water and sediment.
3. Tighten the drain cock immediately fuel starts to flow from drain cock.



**NOTE:** Any delay in tightening drain cock when fuel starts to flow could possibly mean bleeding fuel system.

3. Wet seal of new filter with fuel.
4. Screw new filter into position, tighten using a spanner.
5. Ensure that drain cock at bottom of filter is securely tightened.

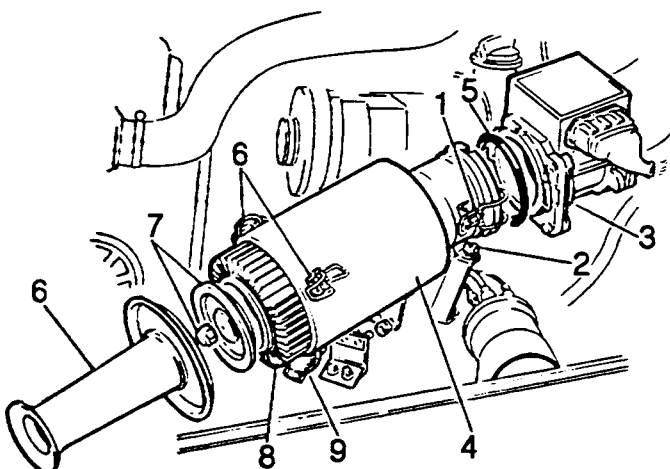
**Check positive crankcase ventilation (pcv) system for leaks and hoses for security and condition - V8 - 20/12**

## Renew air cleaner element - 20/12

## Air cleaner element - V8

## Remove

1. Release two clips securing air cleaner to airflow sensor.
2. Release two nuts and bolts securing air cleaner to mounting bracket.
3. Detach airflow sensor from air cleaner, place carefully to one side.
4. Detach air cleaner from centre mounting bracket and withdraw from engine compartment.
5. Remove large 'O' ring from outlet tube of air cleaner, inspect and fit a new 'O' ring if necessary.
6. Unclip three catches and remove inlet tube.
7. Remove nut and end plate securing air cleaner element.
8. Withdraw air cleaner element and discard.
9. Inspect dump valve for condition, check it is clear of obstructions.



RR1854E

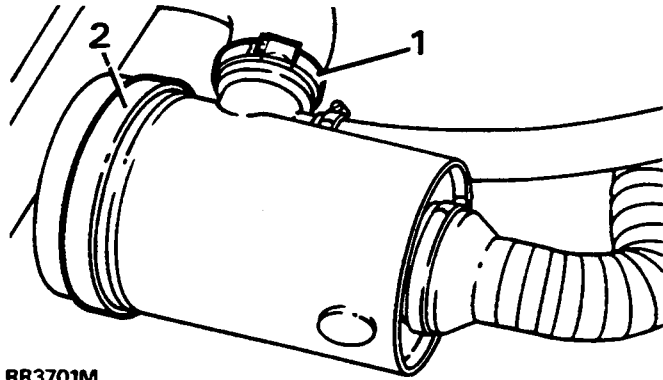
## Refit

10. Fit new element, secure in position.
11. Refit inlet tube to air cleaner canister.
12. Refit air cleaner to mounting bracket, tighten two nuts and bolts.
13. Clip air flow sensor to air cleaner.

## Renew air cleaner element - diesel - 20/12

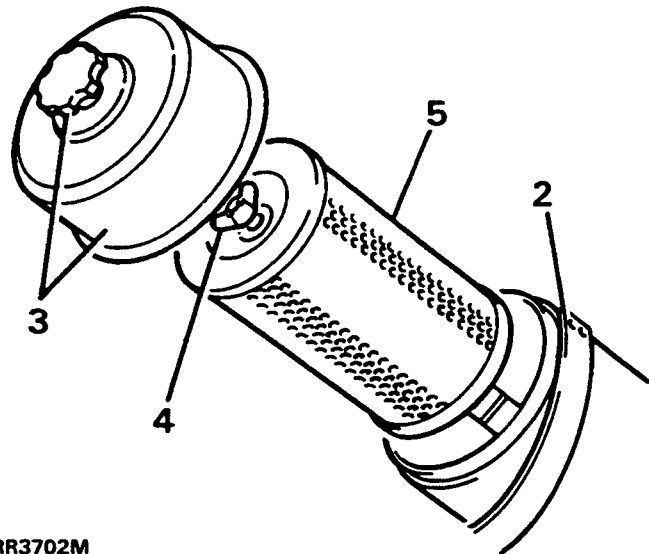
## Remove

1. Disconnect hose from air cleaner.
2. Release retaining strap, lift up air cleaner assembly.



RR3701M

3. Unscrew knob, remove end cover from air cleaner casing.
4. Remove wing nut.
5. Remove element, wipe clean casing and cover.



RR3702M

## Refit

6. Fit new element, secure in position.
7. Reverse removal procedure

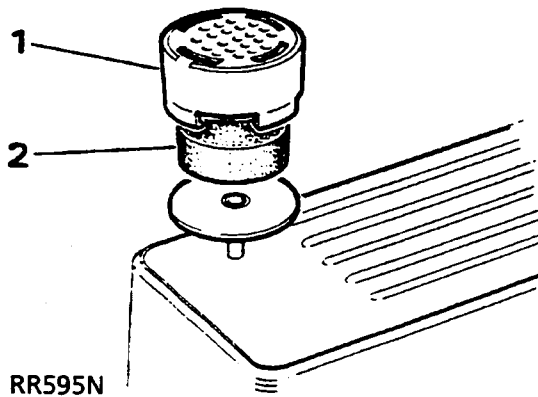


**Check air cleaner dump valve clean or renew - 20/12**

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

**Renew engine crankcase intake filter - V8 - 40/24**

1. Pry filter holder upwards to release it from rocker cover.
2. Discard sponge filter.

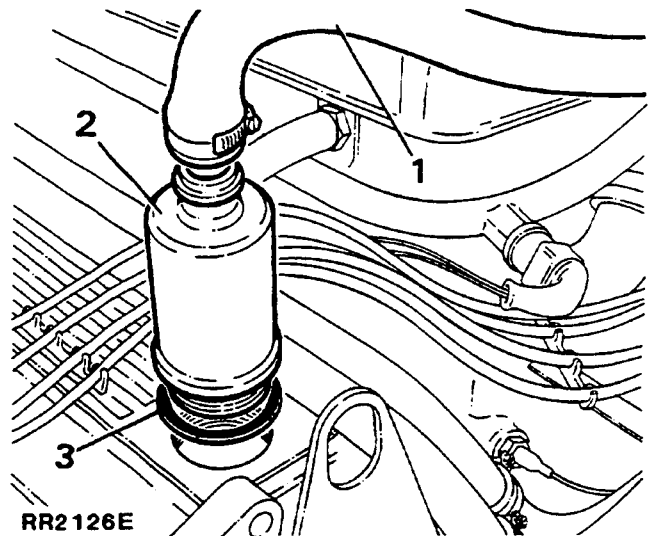


**Fit new filter**

1. Insert new filter into plastic body.
2. Push filter holder onto rocker cover until it clips firmly into place.

**Clean engine breather filter - V8 - 20/12**

1. Release hose clamp and pull hose off canister.
2. Unscrew canister and remove it from rocker cover.
3. Remove large 'O' ring from threaded end of canister.
4. Visually inspect condition of wire screen within canister, if in poor condition fit new assembly, if in acceptable condition clean screen as follows:
5. Immerse canister in small amount of solvent and allow solvent to dissolve and loosen any debris.
6. Remove canister from solvent and dry in still air.



**WARNING:** Do not use compressed air line to remove remaining solvent or debris in canister, this could cause fire or personal injury.

**Refitting breather/filter**

7. Fit new 'O' ring.
8. Screw canister into rocker cover, hand tight only.
9. Refit hose, tighten clamp securely.

**Clean plenum chamber ventilation passageway - V8 - 40/24**

Cleaning plenum chamber ventilation passageway can be carried out without removing plenum chamber from ram housing.

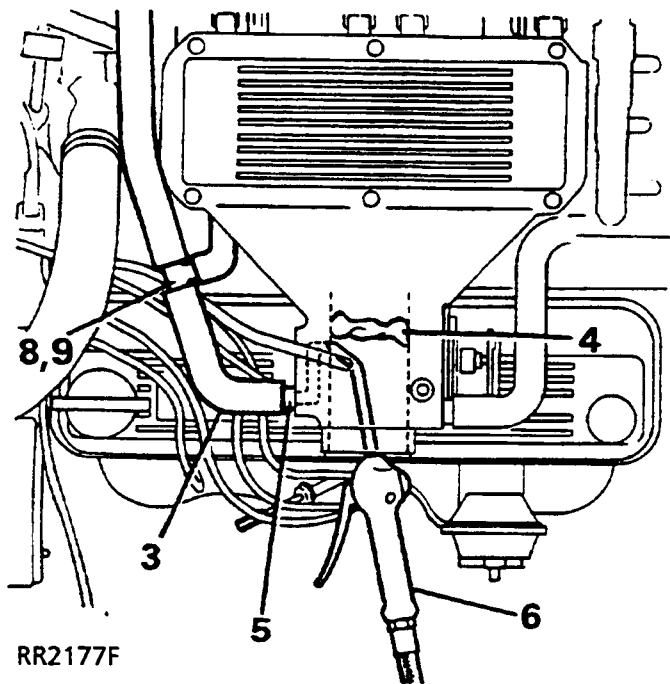
**CAUTION:** Care must be taken to prevent debris from passageway passing beyond throttle butterfly disc.

**WARNING:** Safety glasses must be worn when performing this operation. Ensure that debris is not blown into atmosphere which could be harmful to other persons close by.

1. Disconnect the battery negative lead.
2. Release hose clamp and remove hose from plenum chamber inlet.



3. Remove crankcase ventilation hose from side of plenum chamber.
4. Insert a piece of lint free cloth down throttle butterfly bore to prevent debris passing throttle butterfly.
5. Place a cloth over tube protruding from side of plenum from which ventilation hose was removed to prevent debris from passageway being blown into atmosphere.



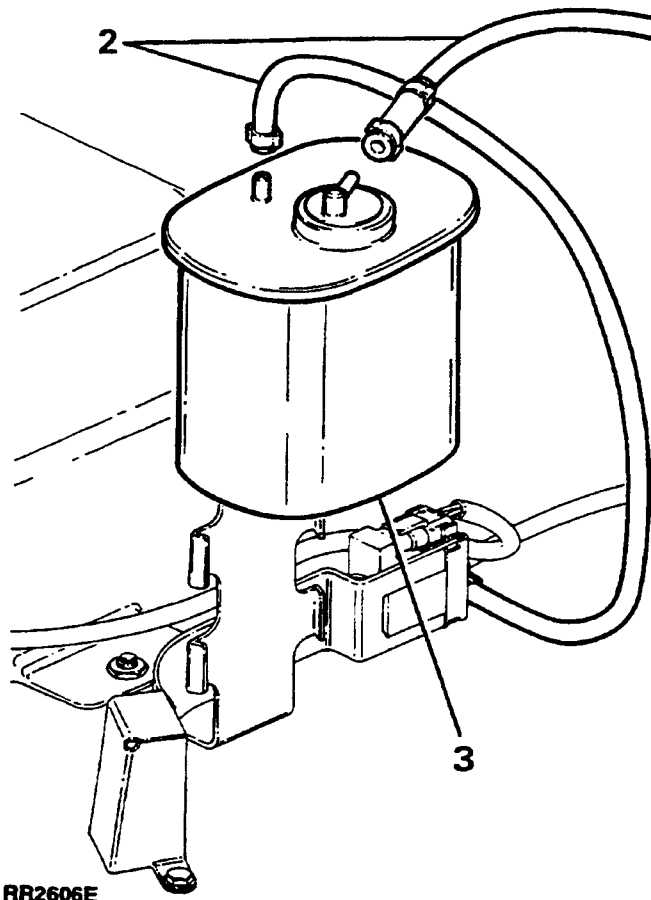
6. Use a compressed air line with a slim bent nozzle to enable passageway to be cleaned out from within throttle butterfly bore.
7. Any remaining matter can be dislodged using soft bent wire or pipe cleaner. Finally blow out passageway again to remove remaining debris.
8. Remove small 'T' piece between crankcase ventilation hoses and check it is free from blockages, clean as necessary.
9. Refit 'T' piece and hoses, tighten hose clamps securely.

### Renew charcoal canister - V8 - 80/48

#### Charcoal canister

##### Remove

1. Disconnect the battery negative lead.
2. Disconnect both purge lines.
3. Release canister from mounting bracket.



RR2606E

##### Refit

4. Reverse removal procedure, ensuring canister is securely located in mounting bracket and both purge lines are fitted correctly to canister.



**WARNING: DO NOT** use compressed air to clean charcoal canister or to clear a blockage in evaporative system. Explosive gas present in a fully saturated canister may be ignited by heat generated when compressed air passes through canister.



Check condition - adjust - renew drive belts - V8 - 10/6



**WARNING:** Disconnect battery negative terminal before adjusting drive belts to avoid possibility of vehicle being started.

**Compressor drive belt**

Belt must be tight with not more than 4 to 6mm total deflection when checked by hand midway between pulleys on longest run.

Where belt has stretched beyond limits, a noisy whine or knock will often be evident during operating, adjust as follows:

1. Loosen idler pulley securing bolt.
2. Adjust position of idler pulley until correct tension is obtained.
3. Tighten securing bolt and recheck belt tension.

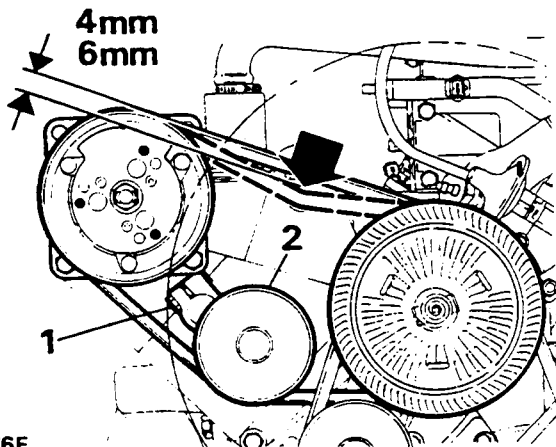
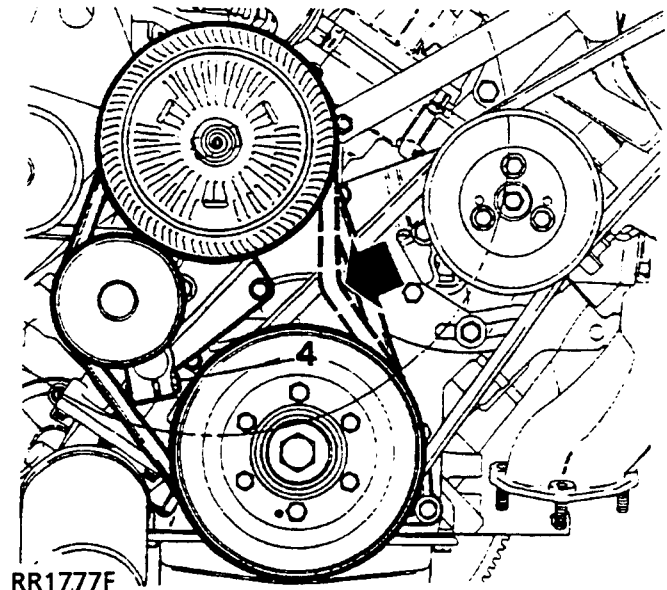
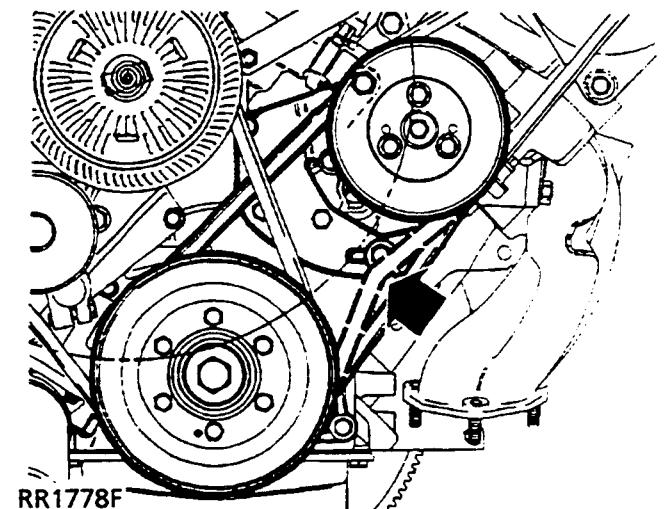


Illustration A



RR1777F

Illustration B



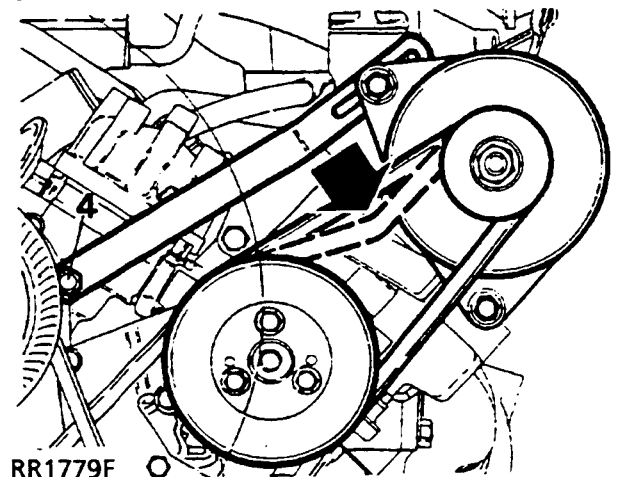
RR1778F

RR1776E

Check driving belts, adjust or fit new belts as necessary.

4. Examine following belts for wear and condition, fit new belts if necessary:
  - (A) Crankshaft-Idler pulley-Water Pump
  - (B) Crankshaft-Steering Pump
  - (C) Steering Pump-Alternator

Illustration C



RR1779F

1. Each belt should be sufficiently tight to drive appropriate auxiliary without undue load on bearings.
2. Loosen bolts securing unit to its mounting bracket.
3. Loosen appropriate pivot bolt or idler pulley and fixing at adjustment link where applicable.
4. Pivot unit inwards or outwards as necessary and adjust until correct belt tension is obtained.



**CAUTION:** When tensioning power steering pump drive belt **DO NOT** use pump casing as a point of leverage. Failure to comply may result in damage to pump casing and distortion to seal face causing fluid leakage.

5. Belt deflection should be approximately 4 to 6mm at points denoted by bold arrows.
6. Tighten all unit adjusting bolts. Check adjustment again.



**CAUTION:** When fitting a new drive belt, tension belt as described above. Reconnect battery and start and run engine for 3 to 5 minutes at fast idle, after which time belt must be re-checked, re-tension belt if necessary.

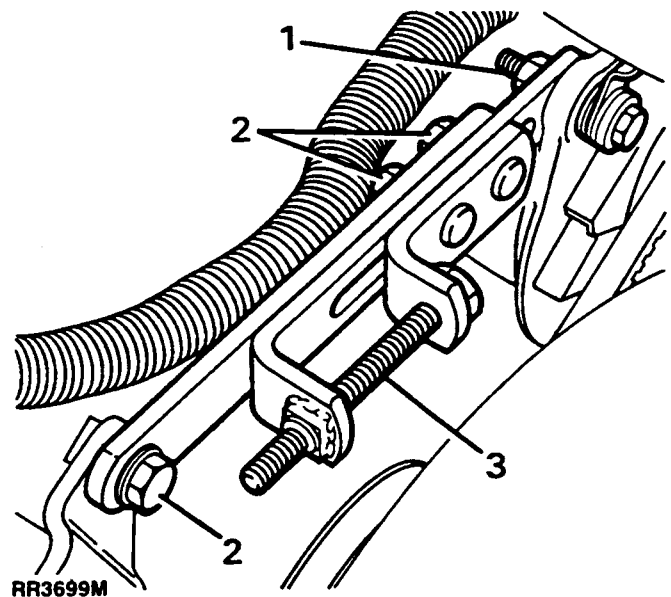
**Alternator drive belt/power steering belt - vehicles after VIN 602813**

#### Adjust



**NOTE:** A positive drive tensioner is fitted to these vehicles to provide greater accuracy when setting power steering and alternator drive belts. The tensioner eliminates the need to lever both power steering pump and alternator when adjusting belt tension.

1. Loosen alternator pivot bolt and bolt securing alternator to tensioner.
2. Loosen two tensioner nuts and bolt securing tensioner to water pump bracket.
3. Rotate tensioner lead screw anti-clockwise, remove drive belt.
4. Loosen power steering pump adjuster bolt and pump pivot nuts.
5. Remove power steering belt.



6. Ensure pump is free to rotate on its mounting, **DO NOT** lever pump, further loosen fixings if necessary.
7. Check both drive belts, renew if necessary.
8. Fit power steering and alternator drive belts.
9. Rotate tensioner lead screw clockwise until alternator belt is tensioned to specified figure, see table.
10. Check steering belt is tensioned to specified figure.
11. Tighten all fixings on tensioner, steering pump and alternator.
12. Run engine at fast idle speed for 3 to 5 minutes if a new belt has been fitted. Repeat above steps 1 to 6 and 9 to 11 without removing belts.
13. Adjust position of top radiator hose to give 20 to 30 mm clearance between hose and alternator fan guard.

#### Belt tension

#### Fitting alternator or steering belt

Tension or retension belts to:

Alternator	Steering
110 - 120 lbf	85 - 105 lbf
470 - 500 N	380 - 465 N

Refitting used belts

90 - 95 lbf	75 - 95 lbf
400 - 420 N	335 - 420 N



**Check drive belts diesel - adjust or renew**

**Right-hand steering - Fig. RR1162**

**Left-hand steering - Fig. RR1163**



**WARNING: Disconnect battery to prevent any possibility of starter motor being operated.**

The procedure for checking and adjusting all drive belts is similar.

1. Alternator
2. Air conditioning compressor (option),
3. Power steering pump

Examine all belts for wear and renew if necessary.



**NOTE: Any marks on outside of air conditioning drive belt, caused by belt slipper bracket, can be ignored.**

Using a recognised drive belt tensioning gauge, check tension of each drive belt, at mid-point between pulleys on longest side of belt.

Adjust belt tensions as follows:-

'V' type drive belts:-

12,7mm wide belts ..... 45N ..... 95 lbf

Poly 'V' drive belts:-

Power steering pump ..... 40N ..... 90 lbf

Alternator/water pump ..... 49N ..... 110 lbf

**"In field" Tensioning - No gauge available**

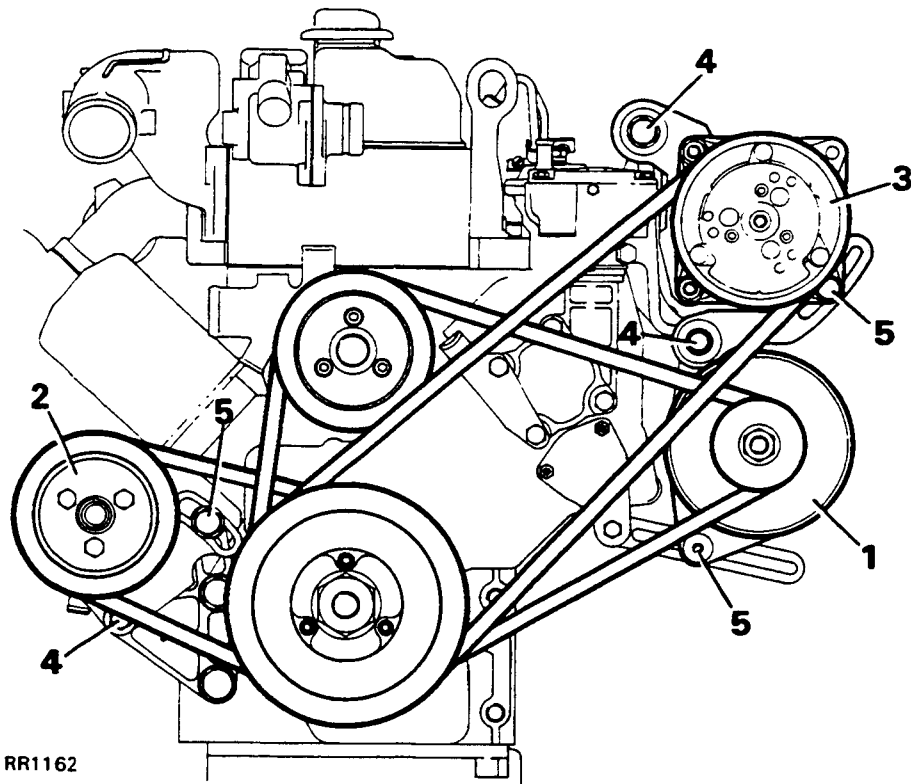
Use normal hand pressure to check deflection, tension belt to give a deflection of 0,5 mm per 25 mm of belt run between belt centres.

If any of drive belts require adjustment, slacken applicable pivot bolt (4) and adjusting bracket nut and screw (5), pull driven unit away from engine until belt is tight. Tighten adjusting bracket, tighten pivot bolt. Check belt tension and readjust if necessary.

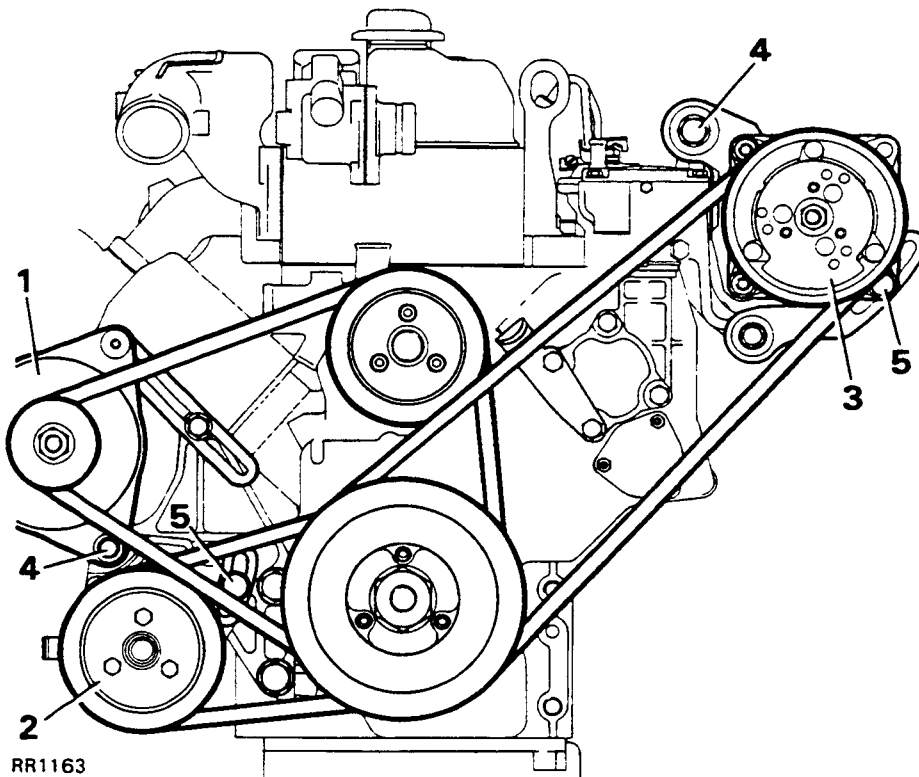


**CAUTION: When fitting a new drive belt, tension belt as described above.**

**Reconnect battery, start engine and run for 3 to 5 minutes at fast idle, after which time belt must be re-checked. Retension belt if necessary.**



Right hand steering



Left hand steering



**Check throttle and automatic transmission cable operation - 20/12**

**Check/top up automatic transmission fluid level - 10/6 (not 40/24)**



**NOTE:** Transmission fluid level is checked when fluid is cold with engine idling in neutral.

1. Ensure vehicle is on level ground.
2. Check fluid level registers between MAX and MIN marking on dipstick.

**Check/top up engine oil - V8 - 10/6 then each 20/12 after**

1. Ensure vehicle is on level ground. Allow oil to drain back into sump.
2. Remove dipstick, wipe clean, reinsert to full depth.
3. Remove dipstick, check oil level.
4. Add oil as necessary.

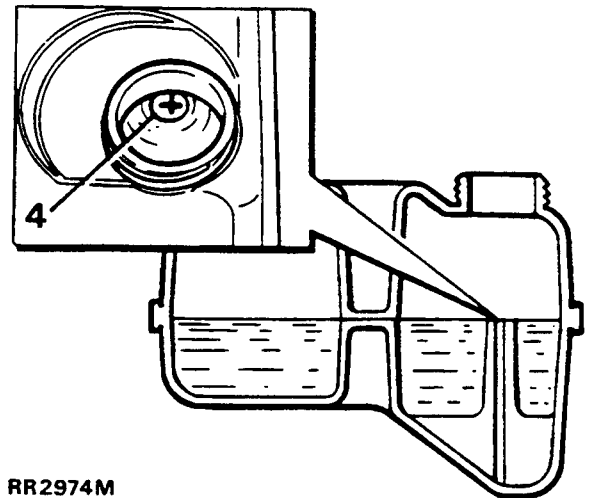
**Check/top up cooling system - 10/6**

1. To prevent corrosion of aluminium alloy engine parts it is imperative that cooling system is filled with a solution of water and phosphate free anti-freeze, winter or summer. Never fill or top up with plain water.



**WARNING:** Do not remove filler cap when engine is hot because cooling system is pressurised and personal scalding could result.

2. When removing filler cap, turn cap slowly anti-clockwise, pause and allow all pressure to escape.
3. Continue to turn until cap is removed.
4. When engine is cold, expansion tank coolant should be level with top of indicator post, visible inside tank through filler hole.
5. If necessary, top up cooling system with premixed coolant. Use soft water whenever possible, if local water supply is hard, rainwater should be used.



RR2974M

6. When replacing filler cap it is important that it is tightened down fully. Failure to tighten filler cap properly may result in water loss, with possible damage to engine

The cooling system should be drained and flushed at 2 year intervals or at onset of second winter. Refer to Coolant Requirements. **See COOLING SYSTEM, Adjustment, Coolant Requirements**

**Top up power steering fluid reservoir - 10/6**

1. Remove fluid reservoir cap. Check that fluid is up to high mark on dipstick.

**Top up clutch and brake reservoirs - 10/6**

Brake fluid absorbs water and in time boiling point of fluid will be lowered sufficiently to cause fluid to be vapourised by heat generated when vehicle brakes are applied.

This will result in loss of braking efficiency or in extreme cases brake failure. Therefore, all fluid in brake system should be changed at service intervals quoted in recommended maintenance schedules.


Fluid should also be changed before touring in mountainous areas if not changed in previous nine months.

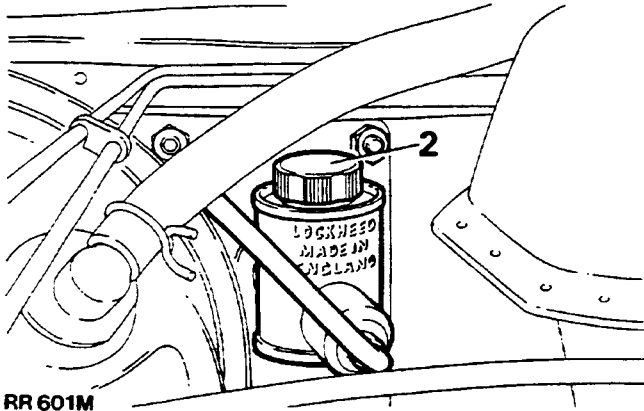
Care must be taken always to observe following points:

- (a) At all times use recommended brake fluid.
- (b) Never leave fluid in unsealed containers as it absorbs moisture quickly and can be dangerous if used in braking system in this condition.
- (c) Fluid drained from system or used for bleeding should be discarded.
- (d) The necessity for absolute cleanliness throughout cannot be over emphasised.

### Check/top up clutch fluid reservoir

1. Park vehicle on level ground.
2. Remove cap, if necessary top up to bottom of filler neck using correct fluid. *See LUBRICANTS, FLUIDS AND CAPACITIES, Information, Recommended lubricants and fluids - All climates and conditions*

 **WARNING:** Clean reservoir body and filler cap before removing cap. Use only fluid from a sealed container.

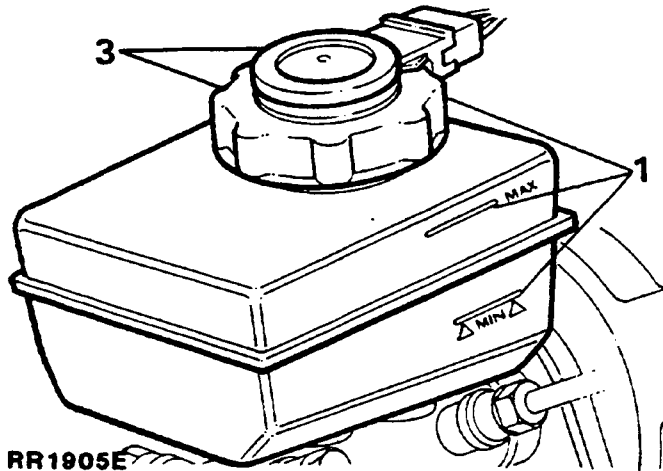


### Check/top up brake fluid reservoir - Lucas Girling master cylinder

1. Visually check brake fluid level against 'MIN' and 'MAX' level markings.
2. If necessary top up using correct grade of fluid. *See LUBRICANTS, FLUIDS AND CAPACITIES, Information, Recommended lubricants and fluids - All climates and conditions DO NOT OVERFILL*
3. Release cap with combined fluid level switch by rotating anti-clockwise. Withdraw cap and switch, top up reservoir.



**CAUTION:** Brake fluid can damage paintwork. If spillage occurs, wash affected area **IMMEDIATELY** with a large quantity of water.



### Check/top up ABS brake fluid reservoir

1. Park vehicle on level ground.
2. Turn ignition ON, to activate hydraulic pump. If pump does not activate depress brake pedal several times until it is heard to operate.
3. When pump stops, check that level is between 'MIN' and 'MAX' marks.
4. If level is below 'MIN' mark on reservoir, top-up using correct fluid. *See LUBRICANTS, FLUIDS AND CAPACITIES, Information, Recommended lubricants and fluids - All climates and conditions*



**WARNING:** Clean reservoir body and filler cap before removing cap. Use only fluid from a sealed container.

### Check/top up washer reservoir - 10/6

Top up washer reservoir to within 25 mm of bottom of filler neck. Use a screen washer solvent/anti-freeze solution to assist removing mud, flies and road film and protect against freezing.

### Lubricate accelerator control linkages and pedal pivot - 20/12



Check ignition timing - 10/6

Check/adjust ignition timing. See *ELECTRICAL, Adjustment, ignition timing*

Check engine idle speed - diesel - 20/12

Check/adjust engine cold idle speed, visually check for excessive exhaust smoke.

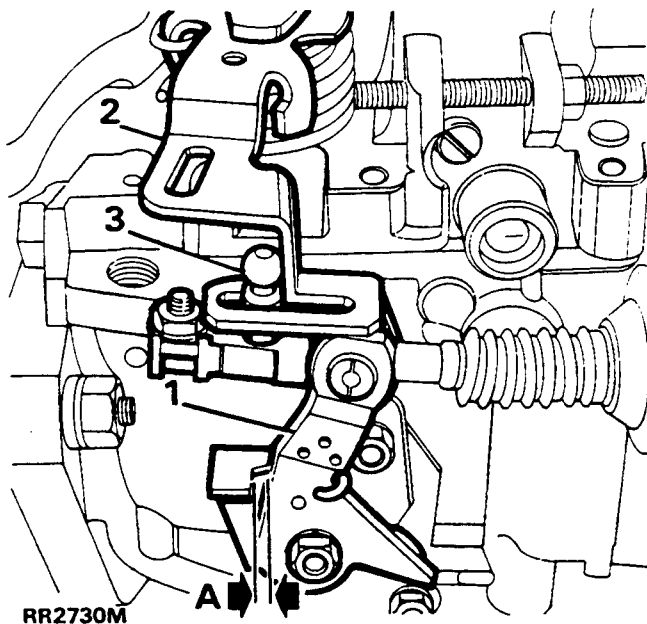
Check - adjust fast idle setting.



**NOTE:** It is important that these checks are carried-out when engine is warm - coolant above 40°C.

**Fast idle adjustment**

1. Dimension 'A' should be 4.5 mm. Adjust lever inserting a 4.5 mm distance piece into gap to hold this dimension.
2. Move accelerator lever to achieve engine speed 1000 to 1100 rev/min (no load).
3. Release and move lever stop until it rests against stop tab on accelerator lever. Retighten lever stop. Remove distance piece.



Check/adjust steering box - 60/36

Check steering box for fluid leaks.

Check that there is no backlash in steering box in straight ahead position. Adjust steering box if necessary. See *STEERING, Adjustment, Power steering box*

Clean battery connections - 20/12

Remove battery terminals, clean and coat with petroleum jelly.



**WARNING:** Hydrogen and oxygen gases are produced during normal battery operation. This gas mixture can explode if flames or sparks are brought near battery. When charging or using battery in an enclosed space, always provide ventilation and shield your eyes.

**Batteries contain sulphuric acid. Avoid contact with skin, eyes, or clothing. Wear eye protection to protect against acid splashes. If acid contacts skin, eyes, or clothing, flush immediately with water for fifteen minutes. If acid is swallowed, drink large quantities of milk or water. SEEK MEDICAL AID IMMEDIATELY.**

A low maintenance battery is installed in vehicle. Dependent upon climate conditions electrolyte levels should be checked as follows:

Temperate climates every three years.  
Hot climates every year.

The exterior of battery should be occasionally wiped clean to remove any dirt or grease.

Periodically remove battery terminals to clean and coat with petroleum jelly.



**NOTE:** If a new battery is fitted to vehicle it should be same type as fitted to vehicle when new. Alternative batteries may vary in size and terminal positions and this could be a possible fire hazard if terminals or leads come into contact with battery clamp assembly. When fitting a new battery ensure that terminals and leads are clear of battery clamp assembly.



### Check intercooler - diesel - 20/12

Visually check intercooler for external obstructions

### Clean intercooler element - diesel - 80/48

## UNDER VEHICLE MAINTENANCE

This section covers renewal of lubricating oils for vehicle major units and other components requiring lubrication, as detailed in Service Schedule. Refer to Section 09 for Capacities and Recommended Lubricants.

Vehicles operating under severe conditions of dust, sand, mud and water should have oils changed and lubrication carried out at more frequent intervals than is recommended in maintenance schedules.

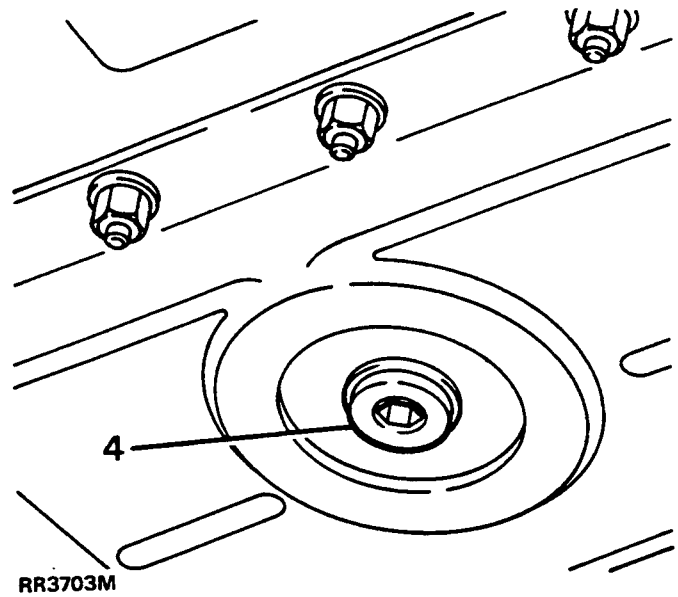
Draining of used oil should take place when oil is warm. Always clean drain and filler-level plugs before removing. Disconnect vehicle battery to prevent engine being started and vehicle being moved inadvertently, while oil changing is taking place. Allow oil to drain completely, except where blown sand or dirt can enter drain holes. In these conditions clean and refit drain plugs immediately main bulk of oil has drained.

Always refill with oil of make and specification recommended in lubrication charts and from sealed containers.

### Renew engine oil and filter - diesel - 10/6

#### Draining oil

1. Before changing oil ensure that vehicle is level on either ramp or ground.
2. Run engine to warm oil, switch off ignition and disconnect battery.
3. Place drain tray of at least 7 litres under drain plug.

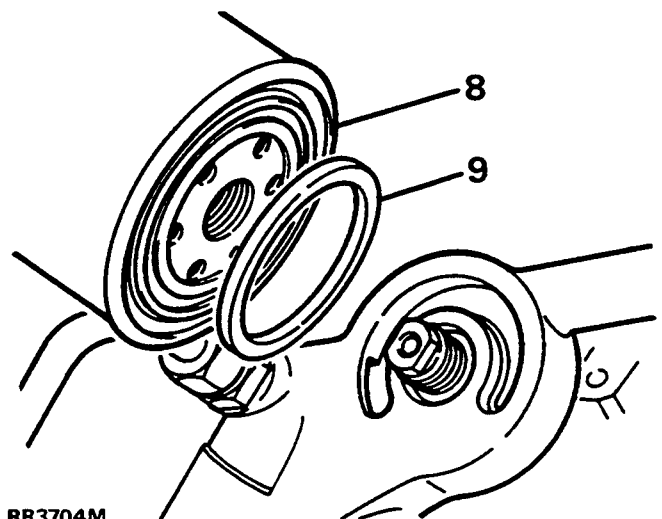


RR3703M

4. Remove drain plug from sump. Allow oil to drain completely.
5. Fit new sealing washer, replace plug. Tighten to **79 Nm**.

#### Fit new oil filter

6. Loosen clip and disconnect air intake hose from turbo-charger.
7. Clean area around filter, place a container beneath engine.
8. Unscrew oil filter cartridge and discard.



RR3704M



9. Coat seal of new oil filter with engine oil.
10. Screw new filter into position, using hand force only.
11. Refit air intake hose to turbo-charger, tighten clip.
12. Fill engine with correct quantity of new oil, check level.
13. Run engine at idle and check for leaks.



**CAUTION:** Serious damage to the turbocharger will result if engine is run above idling speed before oil pressure is restored.

14. Stop engine, wait a few minutes, check oil level and top-up if necessary.

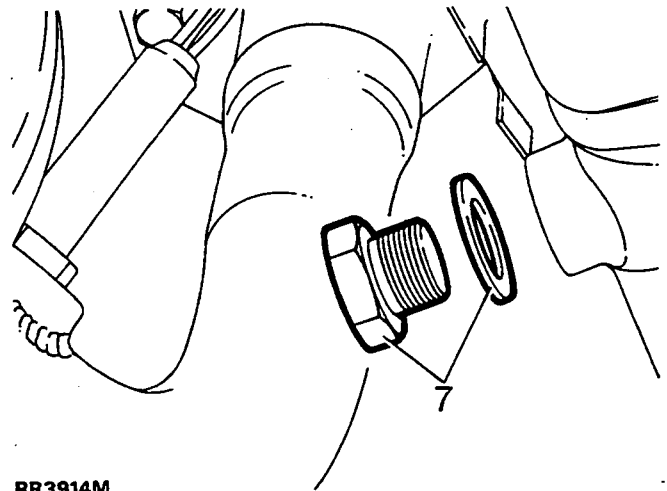
**Renew engine oil and filter - V8 - 20/12**

1. Before changing oil ensure that vehicle is level on either ramp or ground.
2. Run engine to warm oil; switch off ignition and disconnect battery.
3. Remove engine undertray if fitted. See **CHASSIS AND BODY, Repair, engine undertray** Place an oil tray under engine.

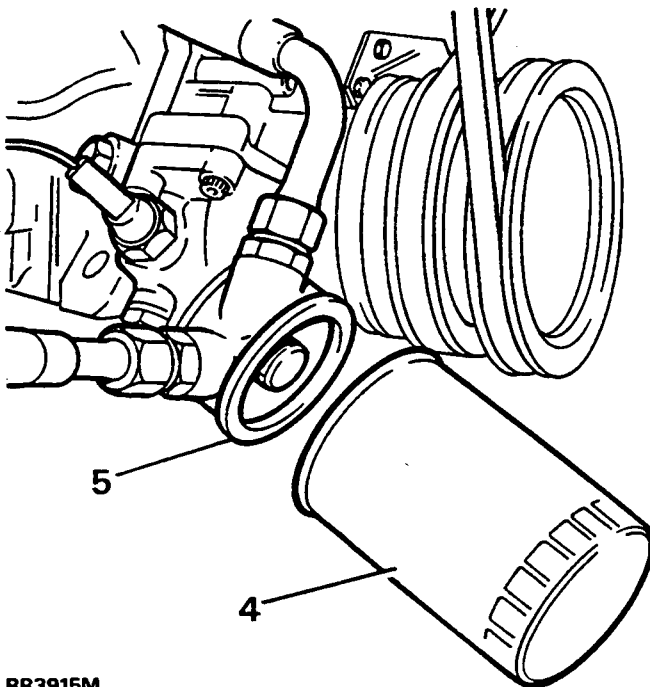


**CAUTION:** To prevent an airlock occurring after removing filter, fill new filter with oil and fit immediately after removing old filter. If airlock does occur fill oil pump with petroleum jelly. See **ENGINE, Overhaul, Remove and Overhaul oil pump**

4. Unscrew filter anti-clockwise.
5. Clean oil cooler adaptor mating face and coat rubber washer of new filter with clean engine oil. Fill filter with new engine oil. Screw filter on clockwise until rubber sealing ring touches machined face, tighten a further half turn by hand only. **DO NOT** overtighten.
6. Place oil tray under drain plug.
7. Remove drain plug from sump. Allow oil to drain completely. Fit new copper washer. Refit plug, tighten to **45 Nm**.



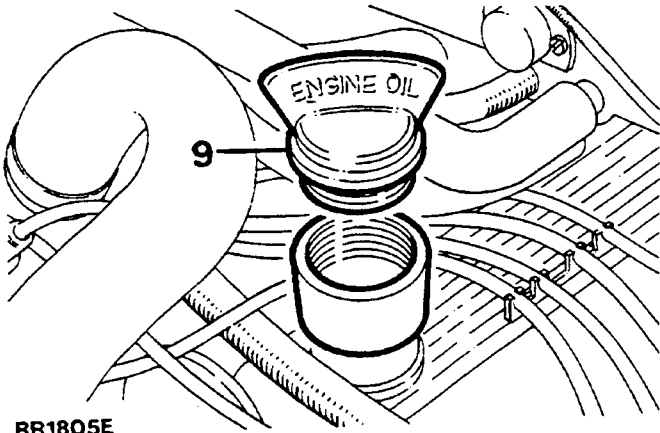
RR3914M



RR3915M

## Refill sump with oil

8. Check that drain plug is tight.
9. Clean outside of oil filler cap, remove it from extension filler neck and clean inside.

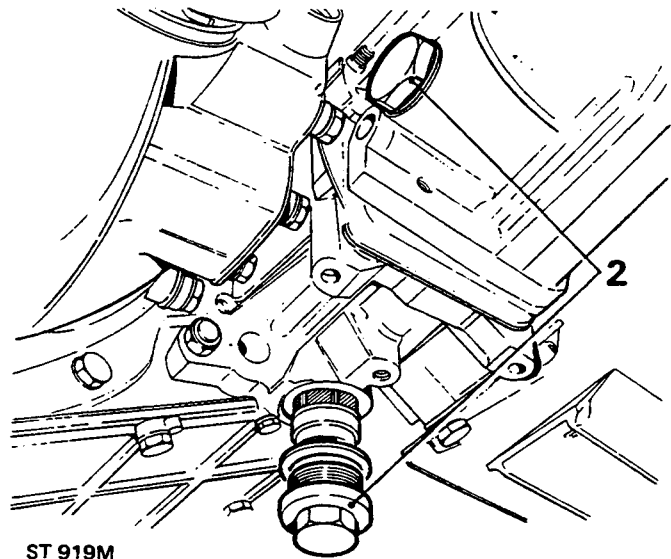


RR1805E

10. Pour in correct quantity of new oil of correct grade from a sealed container to high mark on dipstick and firmly replace filler cap. **DO NOT FILL ABOVE 'HIGH' MARK.** Reconnect battery.
11. Run engine and check for leaks from filter. Stop engine, allow oil to run back into sump for a few minutes, check oil level again and top up if necessary.

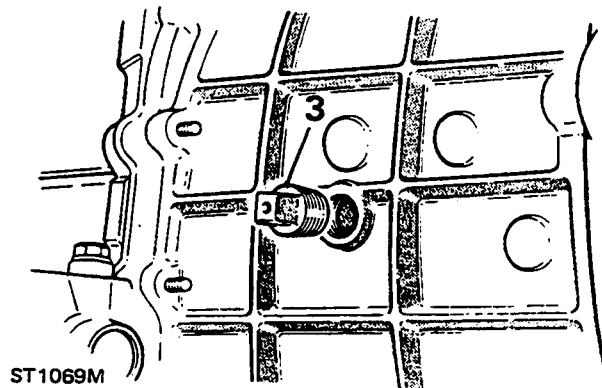
## Renew manual gearbox oil - 40/24

1. Place vehicle on ramp or level ground. Place suitable container to drain gearbox oil. Disconnect battery.
2. Remove gearbox and extension case drain plugs and allow oil to drain completely. Wash extension case filter in kerosene and refit plugs with new washers. Tighten extension case plug to 75 Nm, gearbox plug to 45 Nm.



ST 919M

3. Remove oil filler level plug and inject new oil into the gearbox until it runs out of filler hole. Fit and tighten plug to 30 Nm.



ST1069M

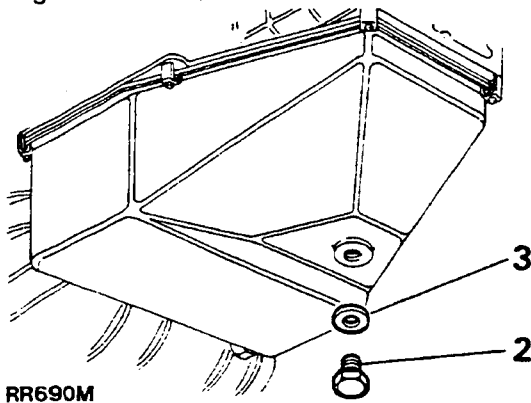


**Check/top up manual gearbox oil - 10/6**

1. Place vehicle on ramp or level ground.
2. Remove oil filler level plug. If necessary, inject new oil into the gearbox until it runs out of filler hole. Fit and tighten plug to **30 Nm**.

**Renew automatic gearbox fluid and oil screen - 40/24**

1. Place vehicle on either ramp or level ground. Place suitable container to drain gearbox fluid. Disconnect battery.
2. Remove gearbox dipstick, located at rear of right hand rocker cover, to aid oil drainage. Release plug from bottom of sump and allow fluid to drain completely.
3. Refit plug using a new sealing washer and tighten to **10 Nm**

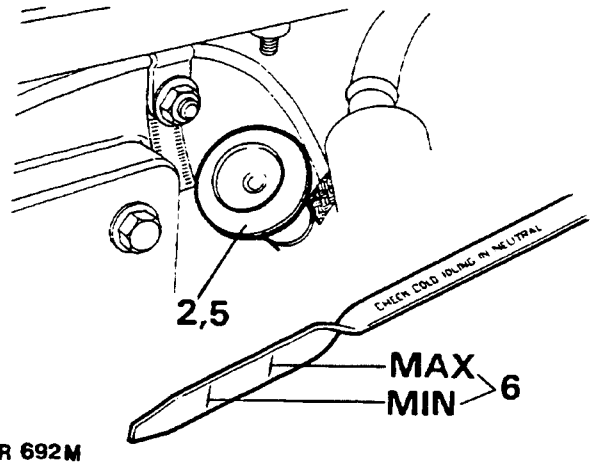


**Refill ZF automatic gearbox and check fluid level.**



**NOTE:** The fluid level must be checked when fluid is cold and engine idling in neutral gear.

4. Ensure vehicle is on level ground.
5. Refill or top-up with correct quantity and grade of fluid. **See LUBRICANTS, FLUIDS AND CAPACITIES, Information, Recommended lubricants and fluids**
6. Reconnect battery, start and run engine. Check fluid level, this must be between two markings on the dipstick.



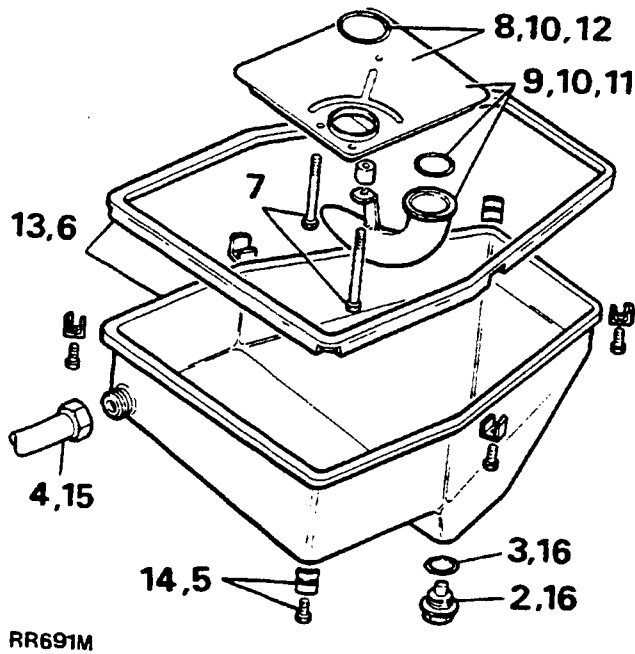
**Oil screen replacement ZF automatic gearbox**

**Remove**

1. Place vehicle on ramp or over pit, disconnect battery lead.
2. Drain gearbox using a suitable container.
3. Discard sealing ring.
4. Remove filler/level tube from oil pan.
5. Remove six retaining plates and bolts.
6. Remove oil pan, discard gasket.
7. Using TX27 Torx bit remove three screws securing oil screen.
8. Remove oil screen, discard 'O' rings.
9. Separate oil screen from suction tube, discard 'O' ring and oil screen.

**Refit**

10. Fit two new 'O' rings to oil screen using a light grease to ease assembly.
11. Fit suction tube to oil screen.



12. Fit oil screen to control unit, fit and tighten three bolts to **8 Nm**.
13. Refit oil pan using new gasket.
14. Secure using six retaining plates and bolts (two straight and corner plates), tighten to **8 Nm**.
15. Reconnect oil level/filler tube.
16. Fit oil pan plug and new seal.
17. Reconnect the battery negative lead.
18. Fill gearbox with correct oil through filler/level tube located within engine bay. See **LUBRICANTS, FLUIDS AND CAPACITIES, Information, Recommended lubricants and fluids**
19. Check oil level while engine is running at idle with neutral selected.

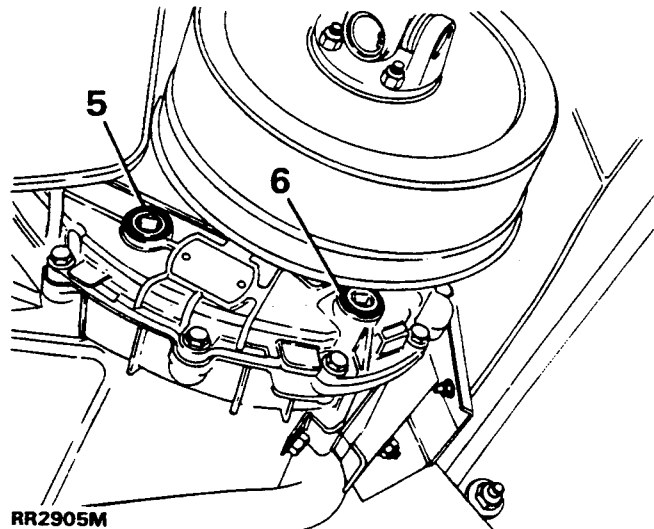
#### Renew transfer gearbox oil - 40/24

1. Before renewing oil ensure that vehicle is level, either on a ramp or on ground.
2. Disconnect the battery negative lead.
3. Clean immediate area around filler/level and drain plugs.



**WARNING:** When draining gearbox care should be taken to ensure that oil is not hot as personal scalding could result.

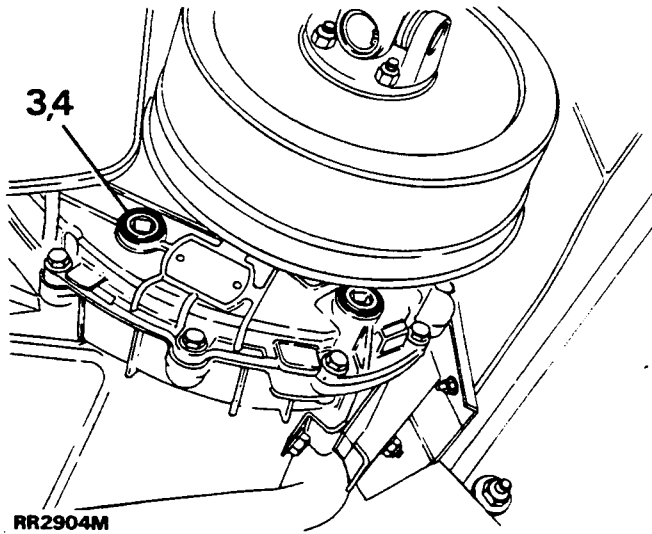
4. Place a container under gearbox to drain oil into.
5. Remove filler/level plug to vent gearbox and assist draining.
6. Remove drain plug and allow oil to drain.



7. Thoroughly clean drain plug threads prior to applying fresh 'Hylomar' sealant. Fit and tighten plug to **25 Nm**.
8. Fill gearbox with correct quantity and grade of oil until oil seeps from filler/level hole. Wipe away any surplus oil.
9. Thoroughly clean filler/level plug threads prior to applying fresh 'Hylomar' sealant. Fit and tighten plug to **25 Nm**.
10. Reconnect battery.

#### Check/top up transfer gearbox oil - 10/6

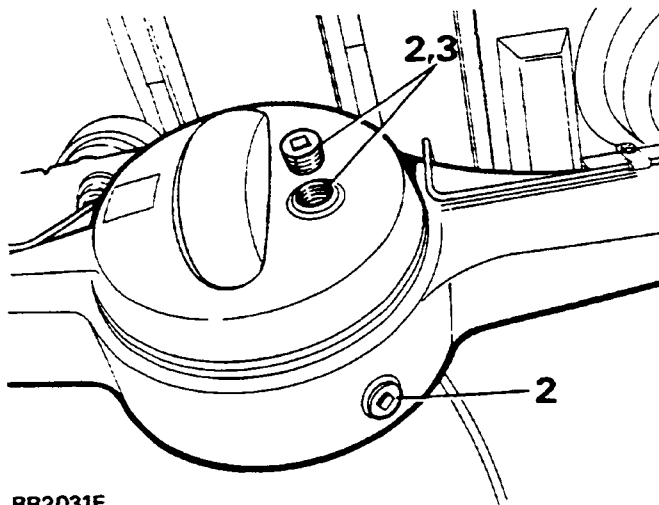
1. Before topping up oil ensure that vehicle is level, either on a ramp or on ground.
2. Disconnect the battery negative lead.
3. Clean immediate area around filler/level plug.
4. Remove plug and fill gearbox with recommended grade of oil, until oil starts to seep from filler/level hole.
5. Clean any previously applied sealant from filler/level plug.
6. Apply Hylomar sealant to threads of plug and refit plug. Tighten to **25 Nm**.



7. Wipe away any surplus oil.
8. Reconnect battery.

**Renew front axle oil - 40/24**

1. Vehicle must be level. Place container under axle to be drained.
2. Using a 13 mm square drive spanner, remove drain and filler/level plugs from axle. Allow oil to drain completely. Clean and refit drain plug.
3. Inject new oil of recommended make and grade until it reaches level hole. Clean and refit filler/level plug and wipe away surplus oil.

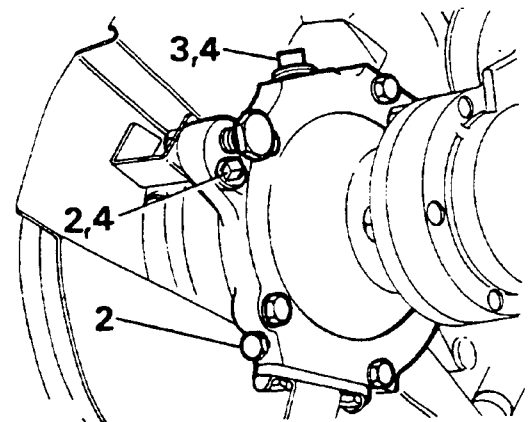


**Check/top up front axle oil - 10/6**

1. Vehicle must be level.
2. Using a 13 mm square drive spanner, remove filler/level plug from axle.
3. If necessary inject new oil of recommended make and grade until it reaches level hole. Clean and refit filler/level plug and wipe away surplus oil.

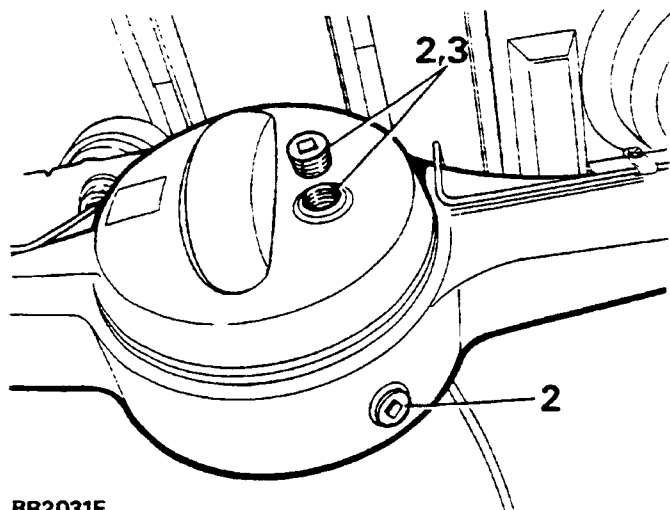
**Renew swivel pin housing oil - 40/24**

1. Vehicle must be level. Place container under swivel to be drained.
2. Remove drain and level plugs, allow oil to drain completely, clean and refit drain plug.
3. Remove filler plug and inject recommended make and grade of oil it reaches level hole.
4. Clean and refit level and filler plugs, wipe away any surplus oil.



**Renew rear axle oil - 40/24**

1. Vehicle must be level. Place container under axle to be drained.
2. Using a 13 mm square drive spanner, remove drain and filler/level plugs from axle. Allow oil to drain completely. Clean and refit drain plug.
3. Inject new oil of recommended make and grade until it reaches level hole. Clean and refit filler/level plug and wipe away surplus oil.



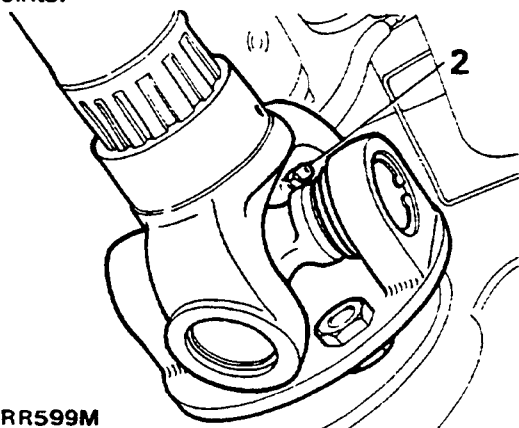
RR2031E

### Check/top up rear axle oil - 10/6

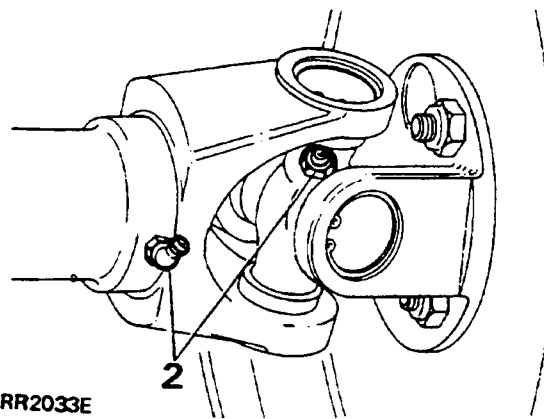
1. Vehicle must be level.
2. Using a 13 mm square drive spanner, remove filler/level plug from axle.
3. If necessary inject new oil of recommended make and grade until it reaches level hole. Clean and refit filler/level plug and wipe away surplus oil.

### Lubricate propeller shaft sliding - 40/24, and universal joints - 20/12

1. Clean all grease nipples on front and rear propeller shafts.
2. Using a low pressure hand grease gun, apply recommended grease, to grease nipples at front and rear propeller shaft universal and sliding joints.



RR599M



RR2033E

### Lubricate parkbrake mechanical linkage - 20/12

Check visually brake, fuel, clutch pipes/unions for chafing leaks and corrosion - 20/12

Check exhaust system for leaks, security and damage - 20/12

Check for fluid leaks from power steering and suspension systems, hydraulic pipes and unions for chafing and corrosion - 10/6

Check/tighten steering unit and steering rod ball joint fixings, check condition of ball joints and dust covers - 20/12

Ball joints are lubricated for their normal life during manufacture and require no further lubrication. This applies ONLY if rubber boot has not been dislodged or damaged. Joints should be checked at specified mileage intervals but more frequently if vehicle is used under arduous conditions.

1. Check for wear in joints by moving ball joint up and down vigorously. If free movement is apparent fit a new joint assembly.



**Check tightness of propeller shaft coupling bolts - 20/12**

Tighten propellor shaft nuts to **47 Nm**.

**Ensure front and rear axle breathers are free from obstruction - 20/12**

**Check/tighten front and rear axle suspension link fixings, check condition of mounting rubbers - 20/12**

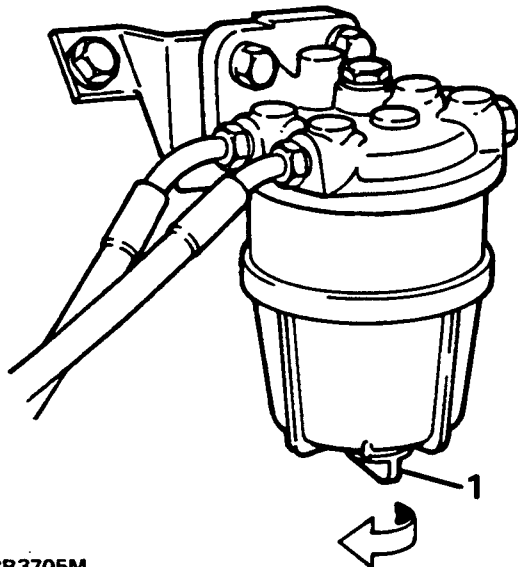
**Clean fuel sedimenter - diesel - 10/6**

**Fuel sedimenter**

The sedimenter is attached to left-hand side of chassis frame near fuel tank. It increases the working life of the fuel filter by removing larger droplets of water and larger particles of foreign matter from fuel.

**Drain off water**

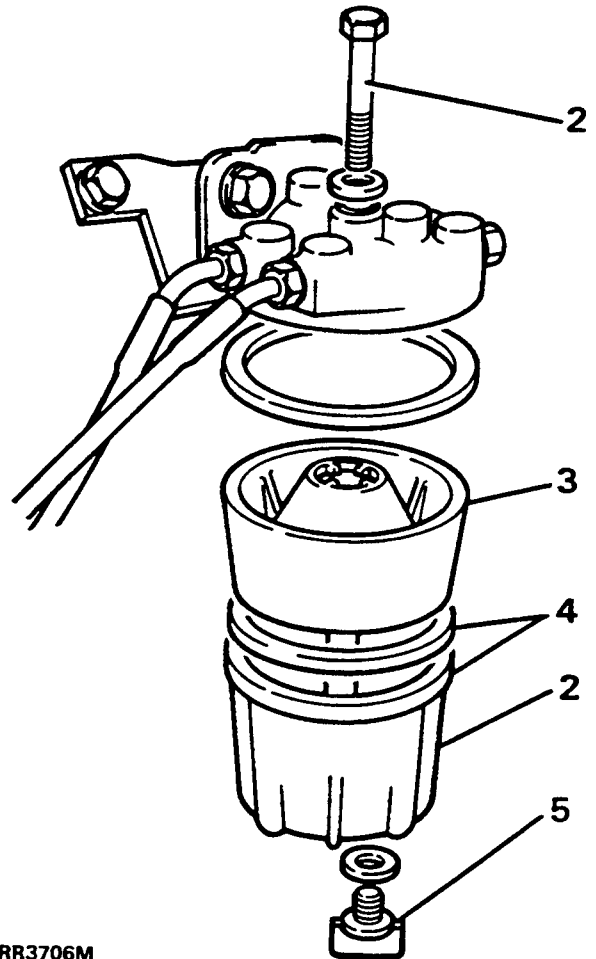
1. Loosen drain plug, allow water to run out. Tighten plug immediately pure diesel fuel starts to flow.



RR3705M

**Clean element**

1. Disconnect fuel inlet pipe from sedimenter and raise pipe above level of fuel tank. Support in this position to prevent fuel draining from tank.
2. Support sedimenter bowl, loosen bolt on top of unit and remove bowl.
3. Remove sedimenter element, clean all parts in kerosene.



RR3706M

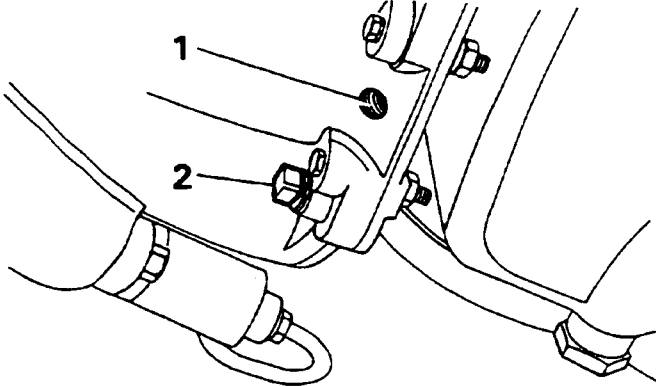
4. Fit new seals, reassemble sedimenter.
5. Loosen drain plug, when pure diesel fuel runs out, tighten plug.
6. Start engine and check sedimenter for leaks.



### Check for oil leaks from engine and transmission - 20/12

### Drain flywheel housing if drain plug is fitted - 20/12

1. The flywheel housing can be completely sealed to exclude mud and water by fitting a plug into flywheel/converter housing drain hole.
2. The plug should only be fitted when vehicle is used for wading or very muddy work.
3. If plug is fitted, it must be removed periodically to check for oil seepage due to faulty seals.



RR105M

### Check/tighten fuel tank fixings - 20/12

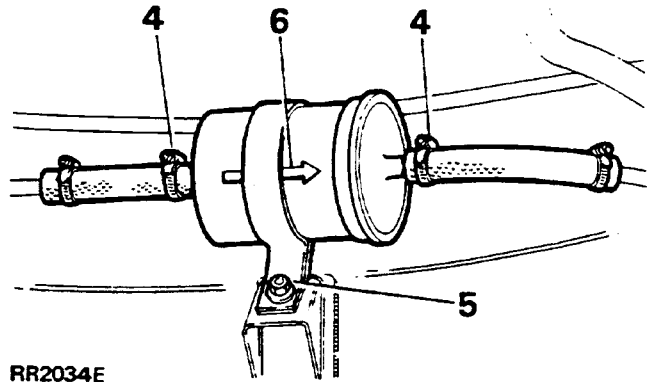
### Renew fuel filter - V8 - 80/48

**WARNING:** Ensure that fuel handling precautions given in Section 01 - Introduction regarding fuel handling are strictly adhered to when carrying out following instructions. See *INTRODUCTION, Information, fuel handling precautions*

**WARNING:** The spilling of fuel is unavoidable during this operation. Ensure that all necessary precautions are taken to prevent fire and explosion.

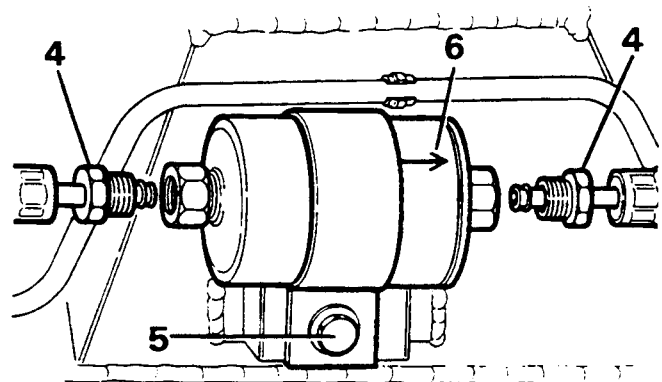
1. Depressurise fuel system. See *FUEL SYSTEM, Repair, depressurising fuel system*
2. The fuel line filter is located on right hand chassis side member forward of fuel tank filler neck. Access to filter is gained through right hand rear wheel arch.

3. Thoroughly clean area around hose connections to prevent ingress of foreign matter into fuel system. 1991 models - clamp inlet and outlet hoses to prevent fuel spillage when disconnecting hoses.
4. Pre 1991 - loosen two hose clamps nearest filter, remove hoses from filter canister. Plug hoses to prevent ingress of dirt.



RR2034E

4. 1991 onwards - loosen two fuel unions and remove hoses from filter canister.



RR2966E

5. Release securing bolt and bracket, remove filter from chassis side member.

### Fit new filter

6. Fit a new filter observing direction of flow arrow on canister.
7. Fit inlet and outlet hoses. 1991 models - Tighten unions to **30 Nm**.
8. Refit fuel pump relay. Reconnect battery and recode radio.
9. Start engine and inspect hose connections for fuel leaks.



**ABS vehicles - check road wheel speed sensor electrical harness for damage - 10/6**

**Renew oxygen sensors - 80/48**

*See EMISSION CONTROL, Repair, Lambda (oxygen) sensor*

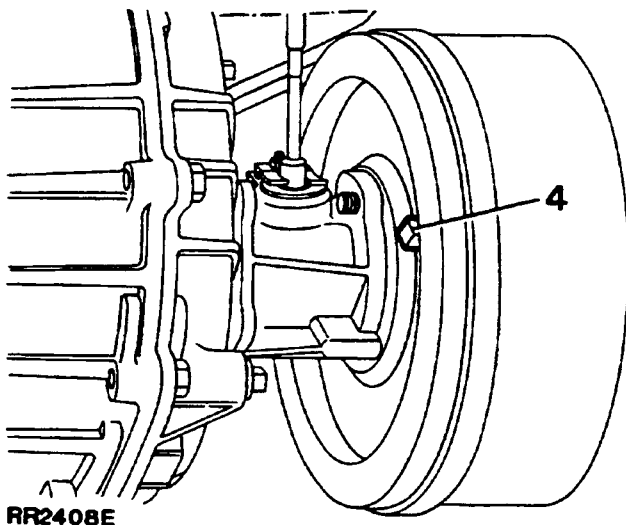
**Renew catalytic converters, - 160/100**

*See MANIFOLD AND EXHAUST SYSTEM, Repair, Exhaust system complete*

**Adjust park brake if required - 20/12**

The park brake should be fully operational on third notch of ratchet. Readjust if necessary. The park brake lever acts on a brake drum at rear of transfer box.

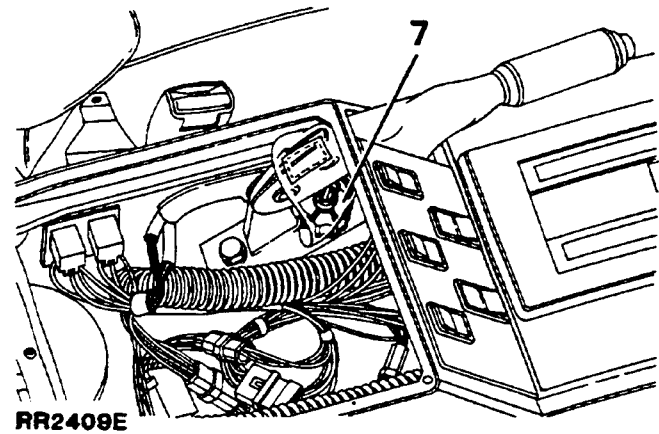
1. Park vehicle on level ground and select 'P' in automatic gearbox or 1st in manual gearbox. Disconnect the battery negative lead.
2. Chock road wheels.
3. Fully release park brake lever, ensure cable is not pre-loading brake.
4. From underneath vehicle, rotate adjuster on brake back plate clockwise until brake drum will not rotate.



5. Back off adjuster until drum is free to rotate.
6. Release four screws and remove glove box liner.
7. Rotate adjustment thumbwheel below park brake lever until park brake is fully operational on third notch of ratchet.



**NOTE: The park brake adjustment thumbwheel must only be used for initial setting and to compensate for cable stretch, it must not be used to take up brake shoe wear, which MUST be adjusted at brake drum.**



8. Operate park brake to settle brake shoes, recheck park brake is fully operational on third notch of ratchet. Readjust as necessary.



**CAUTION: DO NOT over adjust park brake, drum must be free to rotate when parking brake is released, otherwise serious damage will result.**

9. Refit glove box liner.
10. Reconnect battery and remove wheel chocks.

**Carry out road or roller test - 10/6**

Check following items:

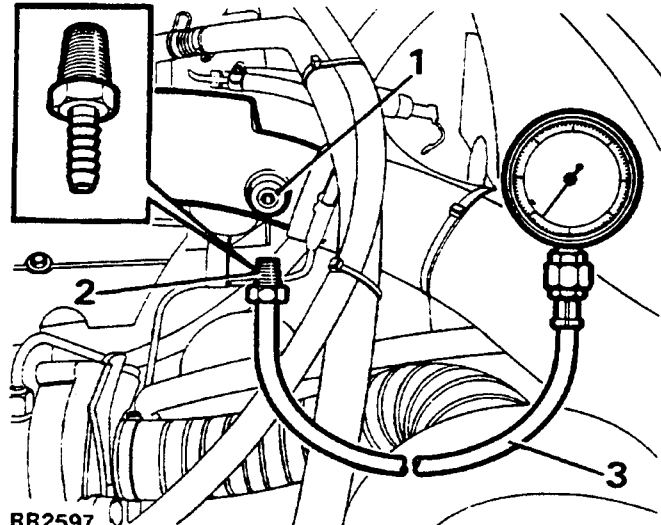
1. Inhibitor switch only operates in P and N.
2. Engine for excessive noise.
3. Clutch for slip, judder or spin.
4. Automatic gear selection/shift speeds.
5. Gear selection/noise - high/low range.
6. Steering for abnormal noise/effort.
7. Steering for free play.
8. All instruments, gauges and warning indicators.
9. Heater and air conditioning systems.
10. Heated rear screen.
11. Shock absorbers - ride irregularities.
12. Foot brake, on emergency stop, pulling to one side, binding, pedal effort.
13. Parkbrake efficiency.
14. Seat reclining and latching.
15. Fully extend seat belt, check operation of retraction and latching. Inertia belts lock when snatched or vehicle on slope.
16. Road wheel balance.
17. Transmission for vibrations.
18. Body noises, squeaks and rattles.
19. Excessive exhaust smoke.
20. Engine idle speed.
21. Endorse service record.
22. Report any unusual features of vehicle condition and additional work required.

**Check turbocharger boost pressure - 40/24**

Service tools:

**LRT-12-012 Pressure test adaptor**

1. Remove the grub screw, located in the inlet manifold.



RR2597

2. Insert adaptor (18G.1116-1) into the grub screw orifice.
3. Attach a suitable pressure gauge, with sufficient length of tube to reach from the inlet manifold to the cab of the vehicle.
4. Drive the vehicle in 3rd gear at 3800 rev/min to give a satisfactory reading of 0,9 kg/cm.



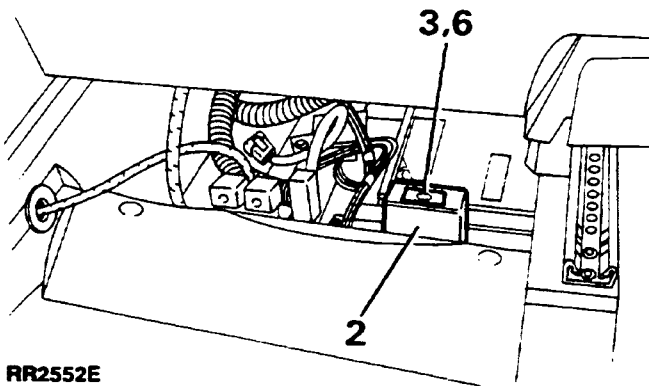
**Reset emission maintenance reminder - USA models**

The emission maintenance reminder is designed to activate at 52,500 and 105,000 miles respectively and will illuminate a 'Service Engine' red warning light in instrument binnacle.

The emission maintenance reminder must be reset after required maintenance has been carried out and a new tamperproof label fitted by a Range Rover of North America dealer. This Emission maintenance reminder is part of Emission Control System, - see Emission maintenance reminder.

**Reset**

1. The control unit is located under rear of right hand front seat.
2. Identify control unit and remove from plug.
3. Remove tamperproof label to reveal access hole for resetting.



RR2552E

4. Place a thin metallic probe into access hole and momentarily electrically short between reset pins inside unit.

**RECOMMENDED SERVICE ITEMS**

At 6,000 mile (10,000 km) intervals clean sunroof drain tubes, clean and lubricate guide rails and slides.

At 12,000 mile (20,000 km) intervals or every 12 months clean sunroof drain tubes and channels.

At 18,000 mile (20,000 km) intervals or every 18 months, whichever is the sooner, the hydraulic brake fluid should be completely renewed. **See BRAKES, Repair, Brake system bleed**

At 36,000 mile (60,000 km) intervals or every 3 years, whichever is the sooner, all hydraulic brake fluid, seals, brake servo filter and flexible hoses should be renewed.

All working surfaces of the master cylinder and caliper cylinders should be examined and renewed where necessary.

A.B.S. vehicles only - renew hydraulic brake fluid and flexible hoses; examine the working surfaces of the caliper cylinders and renew the seals or cylinders where necessary.

At two yearly intervals or at the onset of the second winter, the cooling system should be drained, flushed and refilled with the required water and anti-freeze solution.

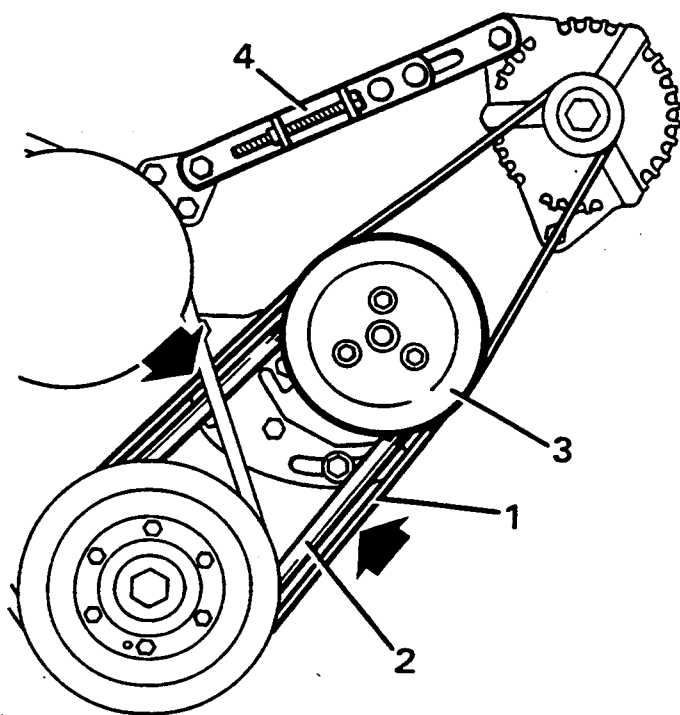
The battery electrolyte level should be checked and topped up, if required, every three years in temperate climates and once a year in high ambient temperatures.

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

A.B.S. vehicles used extensively in arduous off-road conditions - check the rear wheel road speed sensor for abrasive wear at 1000 mile (1600 km) intervals.

## 1993 MODEL YEAR MAINTENANCE

## Alternator and steering pump drive belts.



RR3909M

1. Alternator drive belt
2. Steering pump drive belt
3. Steering pump and guide pulley
4. Alternator drive belt tensioner

A new alternator drive belt is used, driven from the crankshaft pulley. A guide pulley on the power steering pump guides the belt in this area. Alternator and power steering belts have individual adjustment, but PAS belt must be adjusted before alternator belt.

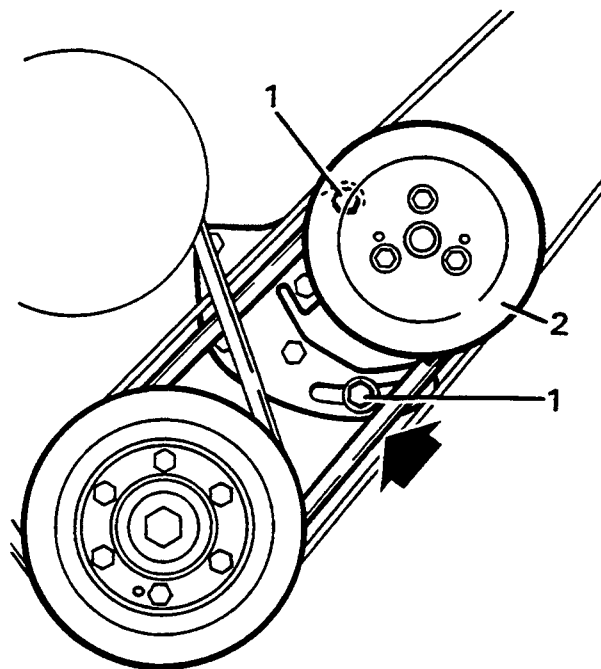
## Steering pump drive belt -10/6

## Adjust



**NOTE:** Loosen alternator drive belt to facilitate accurate adjustment of the PAS drive belt.

1. Loosen steering pump adjuster bolt and pivot nuts.
2. Ensure pump is free to rotate on mounting. **DO NOT** lever pump, loosen fixings further if necessary.



RR3910M

3. Carefully lever against pump bracket to tension belt. On left hand drive models, where access is restricted, a lever with one end cranked at 5° to 10°, may be fed down between water pump and distributor. Place lever against steering pump bracket, carefully levering from water pump/front cover.



**CAUTION: DO NOT lever against steering pump casing. Damage to casing may result in oil leaks.**

4. Check tension using a recognised belt tensioning gauge.

Belt tension using a Clavis gauge:  
- 142 - 152 Hz.

When checked with normal hand pressure at the mid-point of the longest span, the belt should deflect 0,5 mm per 25 mm of belt run between pulley centres.

5. Tighten steering pump fixings.
6. Recheck belt tension.
7. Adjust alternator belt.



**CAUTION:** When fitting a new drive belt, tension belt as described above. Reconnect battery and start and run engine for 3 to 5 minutes at fast idle, after which time belt must be re-checked, re-tension belt if necessary.



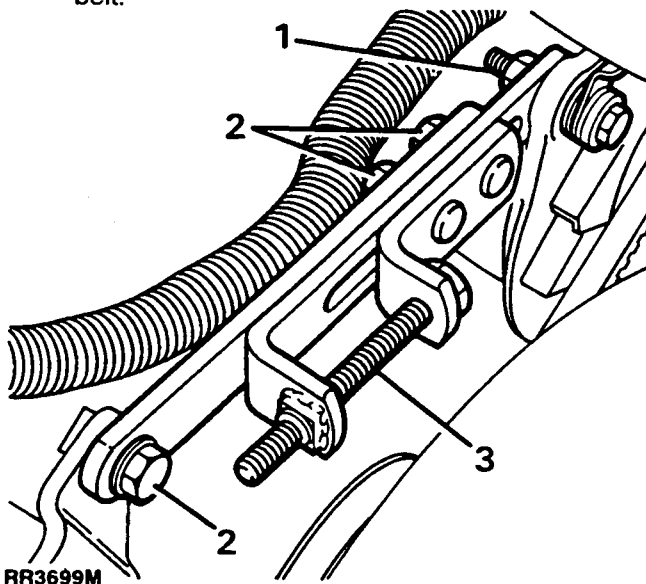
Alternator drive belt - 10/6

Adjust



**NOTE:** The steering pump pulley is used as a guide pulley for the alternator belt. Adjust steering belt before adjusting alternator belt.

1. Loosen alternator pivot bolt and bolt securing alternator to tensioner.
2. Loosen two tensioner nuts and bolt securing tensioner to water pump bracket.
3. Rotate tensioner lead screw clockwise to tension belt.



4. Check tension using a recognised belt tensioning gauge applied midway between crank and slider pulley.

Belt tension using a Clavis gauge:  
- 152 - 158 Hz.

When checked with normal hand pressure at the mid-point of the longest span, the belt should deflect 0,5 mm per 25 mm of belt run between pulley centres.

5. Tighten alternator fixings.
6. Recheck belt tension.



**CAUTION:** When fitting a new drive belt, tension belt as described above. Reconnect battery and start and run engine for 3 to 5 minutes at fast idle, after which time belt must be re-checked, re-tension belt if necessary.

**AIR SUSPENSION MAINTENANCE**

Depressurise air suspension system - 40/24. *See AIR SUSPENSION, Repair, depressurise system*

Renew compressor inlet filter - 40/24. *See AIR SUSPENSION, Repair, compressor inlet filter*

Remove air compressor drain plug - 40/24. *See AIR SUSPENSION, Repair, air reservoir - drain*

Repressurise air suspension system - 40/24.

Check air harness pipes for security and damage - 20/12.

Check air springs for security and damage - 20/12.

Check shock absorbers, height sensors and harness assemblies for leakage and damage - 20/12.

**200Tdi ENGINES**

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 - 200Tdi engines**

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**

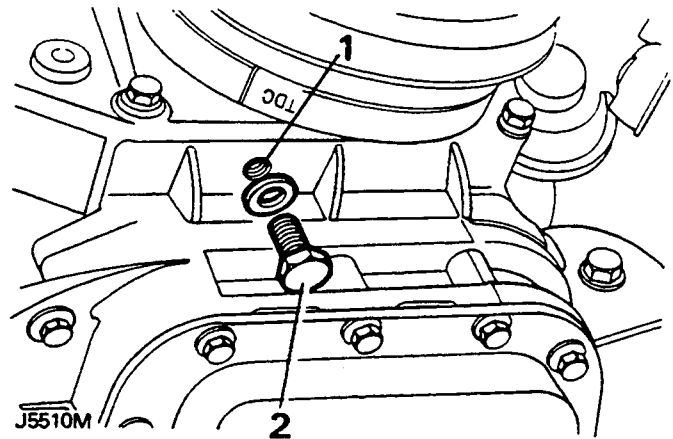
When the vehicle is used in dusty or field conditions or deep wading, frequent attention to the air cleaner may be required.

**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.

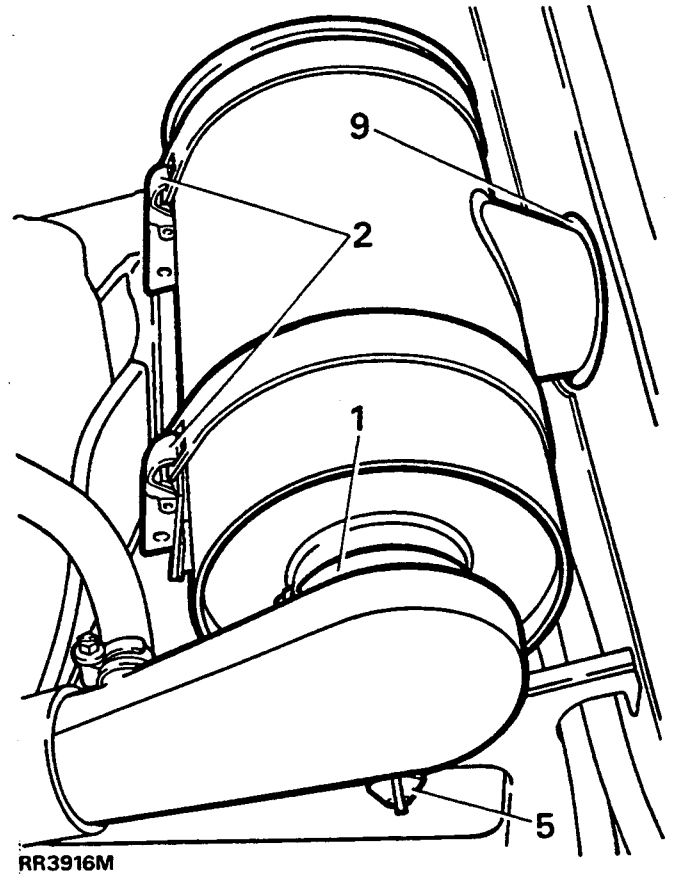
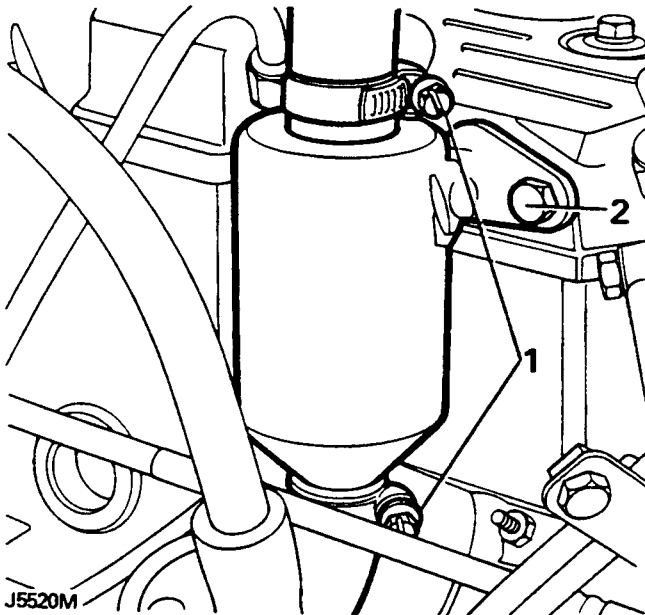


4. When not in use, store drain plug in vehicle tool kit.



**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.

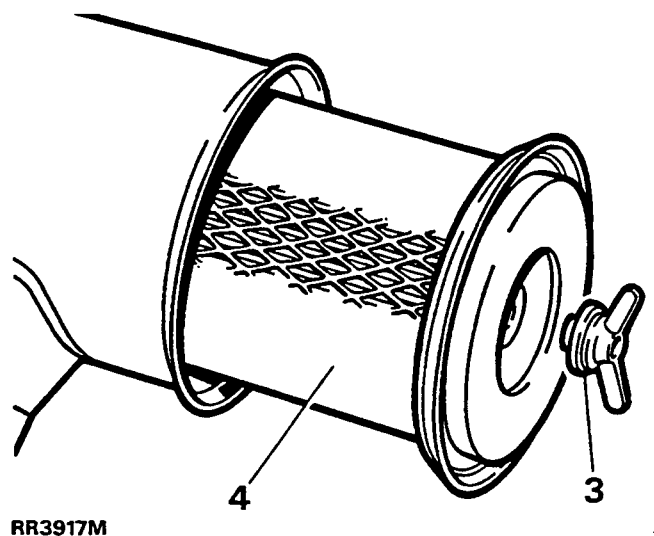
3. Unscrew wing nut at end of case.
4. Remove filter element from main body.



**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.





### 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.**

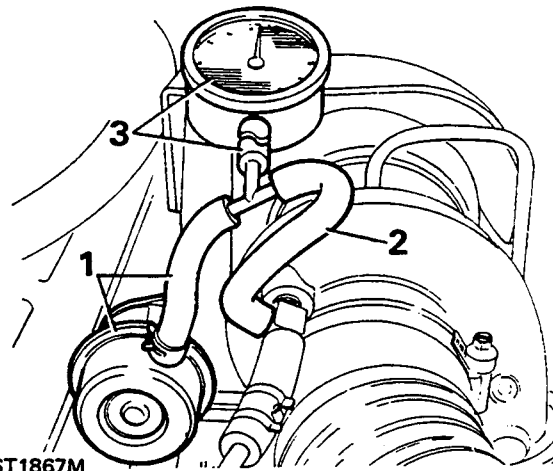
11. Tighten clip. Secure air cleaner with the two over-centre clips.

### 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.).

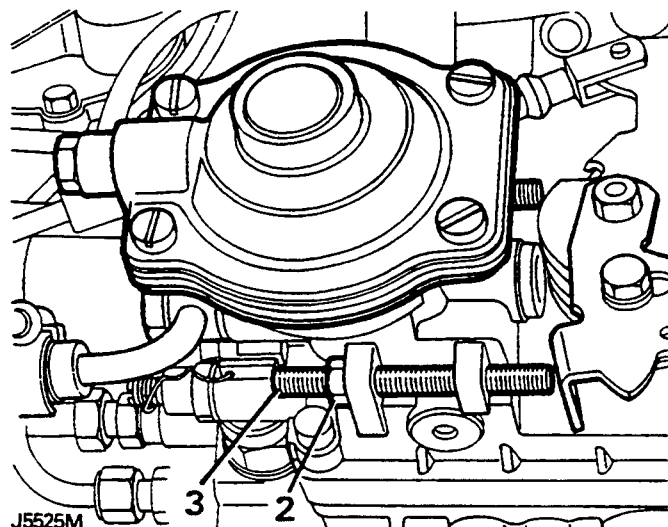


### Engine slow running - 20/12

1. Using a suitable tachometer, check engine slow running speed is  $720 \pm 20$  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.**

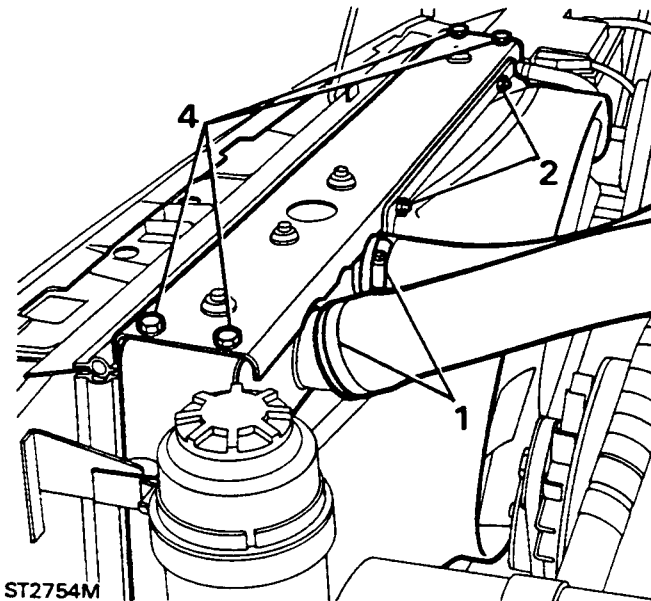




**Intercooler element clean - 80/48**

**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" proprietary 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**

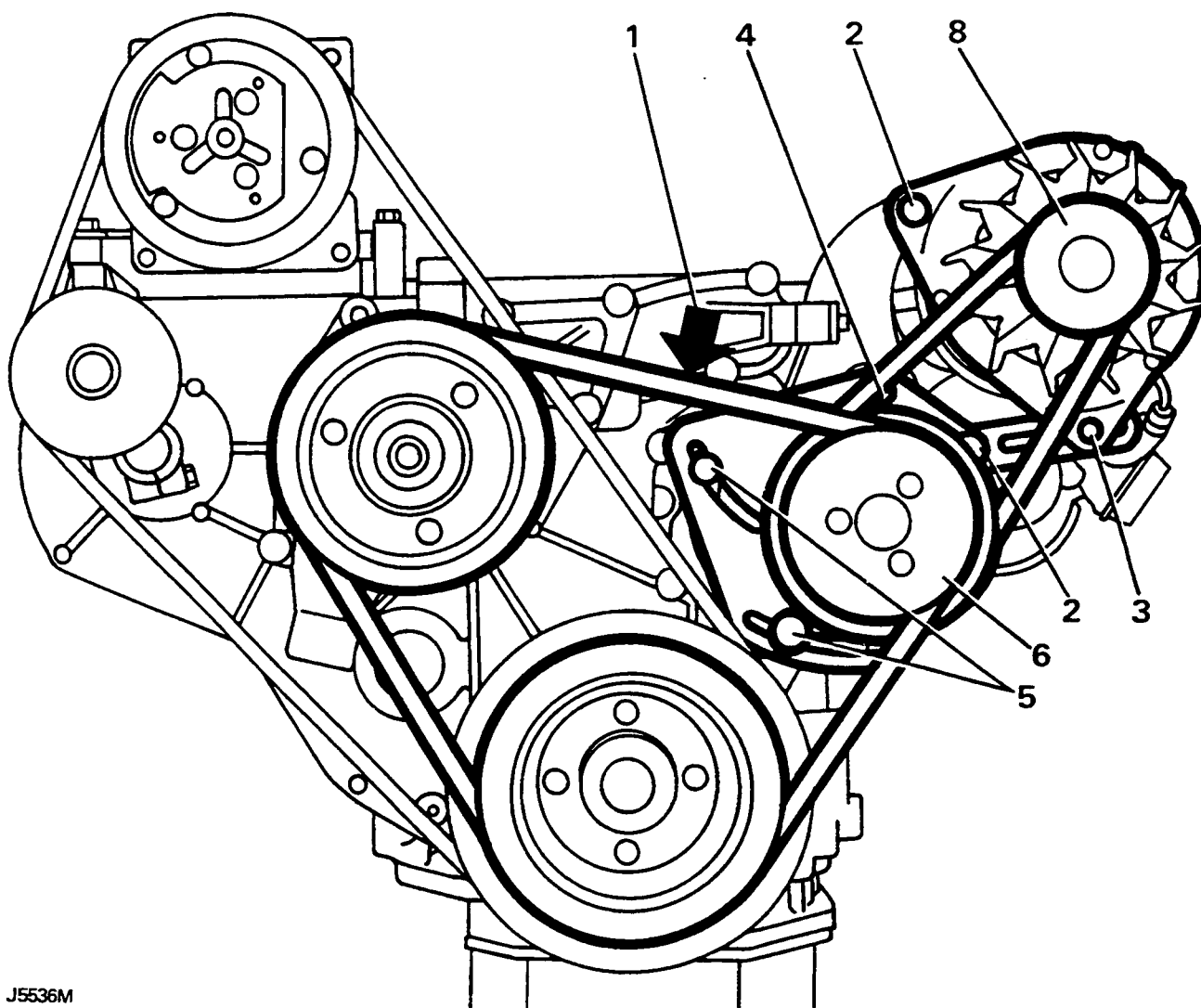
Before each belt is checked for correct tension, it must be inspected for damage or wear and replaced as necessary. The drive pulleys must also be inspected for dirt and grit trapped in the "V" grooves and cleaned if necessary to prevent damage to the belts. Whenever a new belt is fitted, it must be 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 propriety 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: Steering pump drivebelt (V8 only)**  
355 to 400 Nm (80 to 90 lbf)
- C: Air conditioning pump drivebelt**  
355 to 400 Nm (80 to 90 lbf)
- D: 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.



J5536M

**Water pump/power steering drivebelt****Check**

1. Check belt tension at point shown.

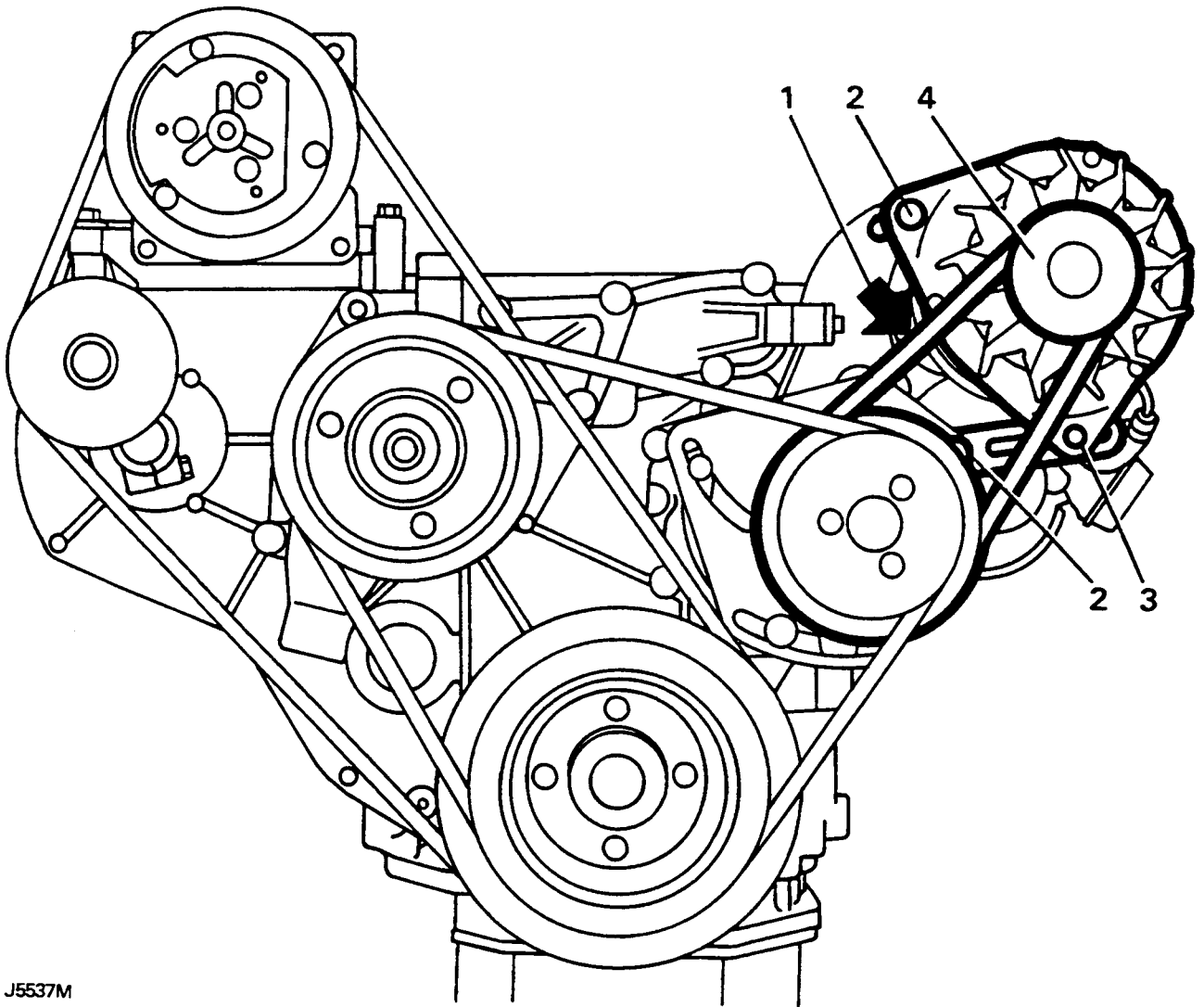
**Adjust**

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 to "200Tdi Alternator Drivebelt: Check and adjust". See **SECTION 10, Maintenance, Under Bonnet Maintenance**



J5537M

**A.C. Generator drivebelt**

**Check**

1. Check belt tension at point shown.

**Adjust**

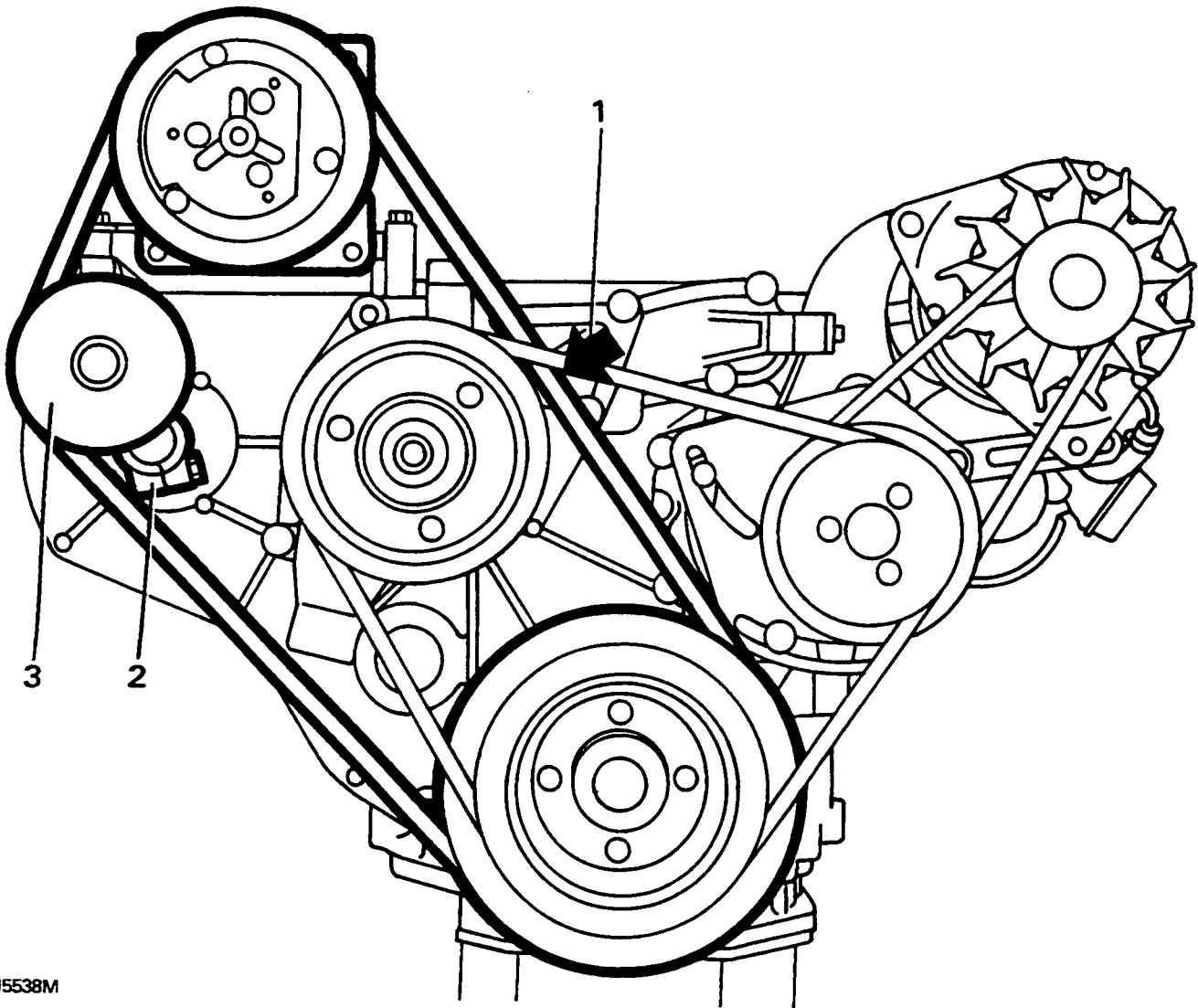
2. Slacken front and rear A.C. generator mounting bolts and adjustment link bolt at power steering pump plate.
3. Slacken adjustment link clamp bolt at A.C. generator.

4. Move A.C. generator to correct drivebelt tension.



**NOTE: DO NOT lever against the A.C. generator slip ring end or the stator to move the A.C. generator.**

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



J5538M

### 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.



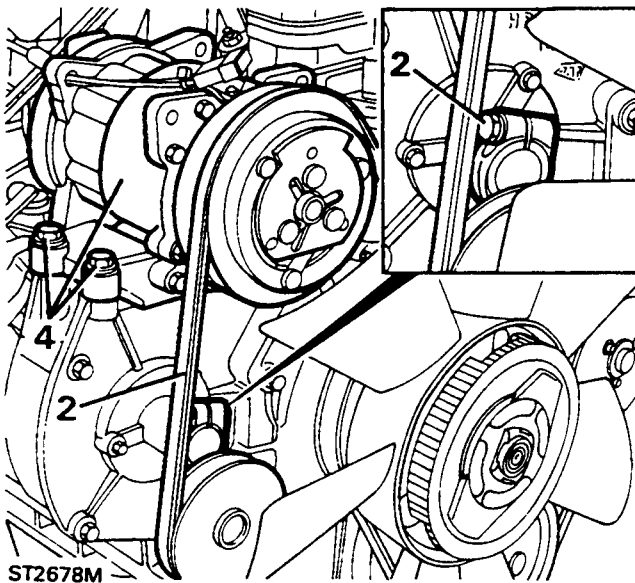
**Renew camshaft drive belt - 100/60**

**Special tools:-**

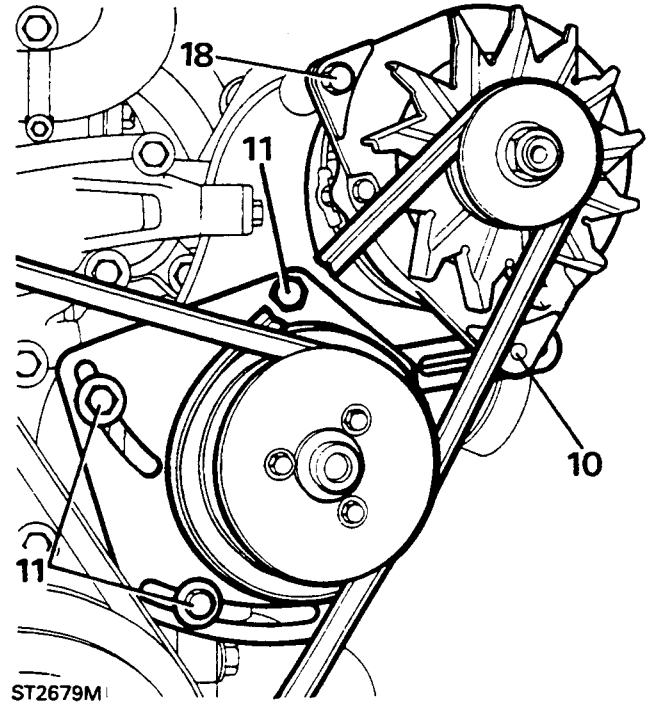
Crankshaft damper restrainer	LST 127
Injection pump timing pin (part of LST 129)	LST 129/2
Flywheel timing pin	LST 128

**Air conditioning models - to gain access.**

1. Disconnect the 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.



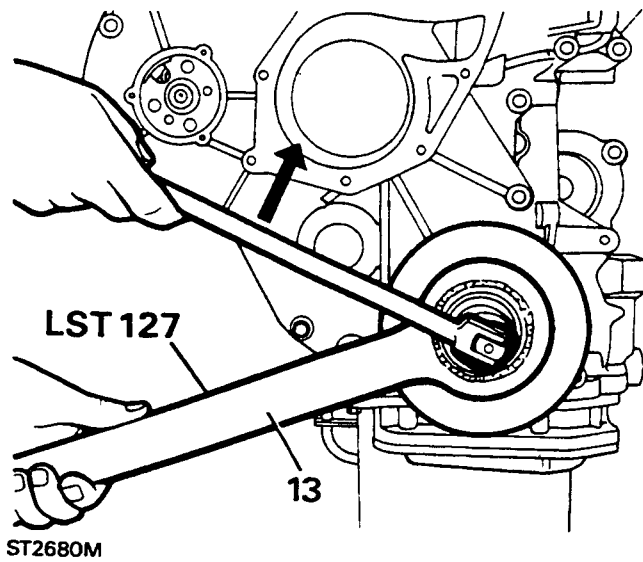
7. Disconnect intercooler to manifold hose at the manifold.
8. Remove top hose.
9. Remove two nuts securing fan cowl to top of radiator and lift-out cowl.
10. Loosen alternator belt adjustment bolt.
11. Loosen PAS pump belt adjustment bolts and remove both belts.



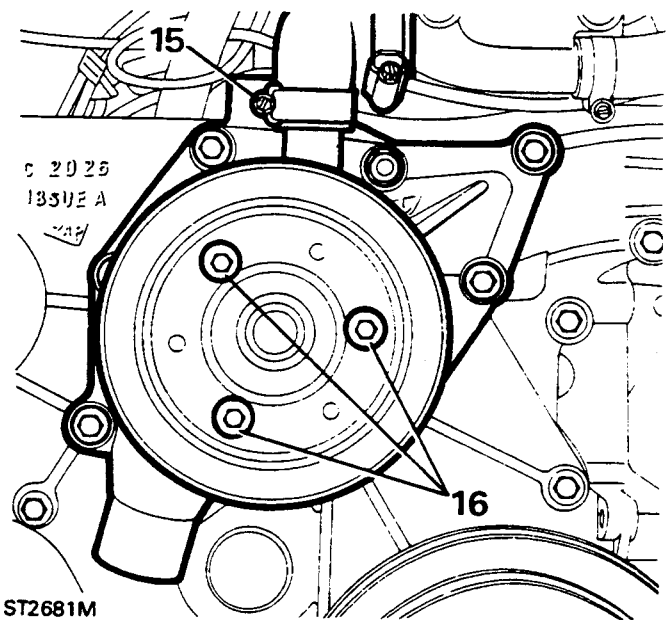
12. Remove four screws. Remove the crankshaft pulley from damper.
13. Restrain damper with special tool LST 127. Using a 30 mm socket, remove damper retaining bolt and spacer. Since this bolt is retained with Loctite and tightened to a very high torque considerable effort will be required to release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

**All models - to gain access**

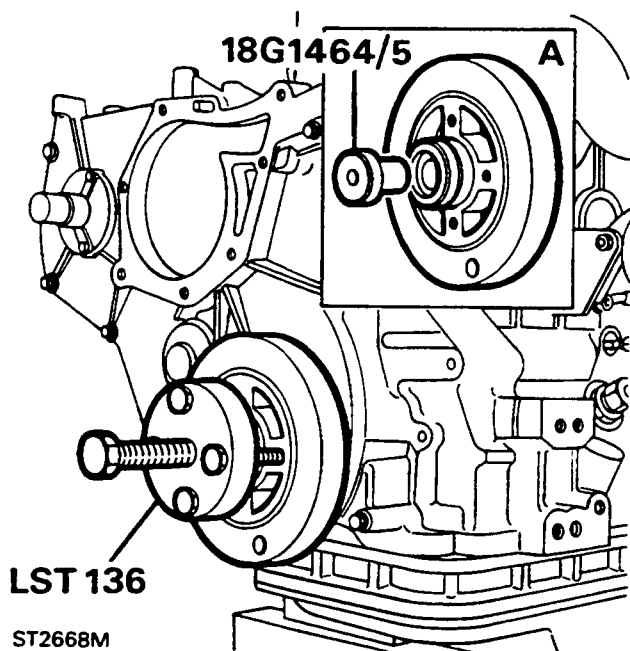
5. Disconnect battery and drain cooling system by removing bottom hose from radiator and allowing coolant to drain into a suitable container.
6. Remove viscous coupling and fan assembly, noting that coupling is secured to water pump shaft with a left hand thread.



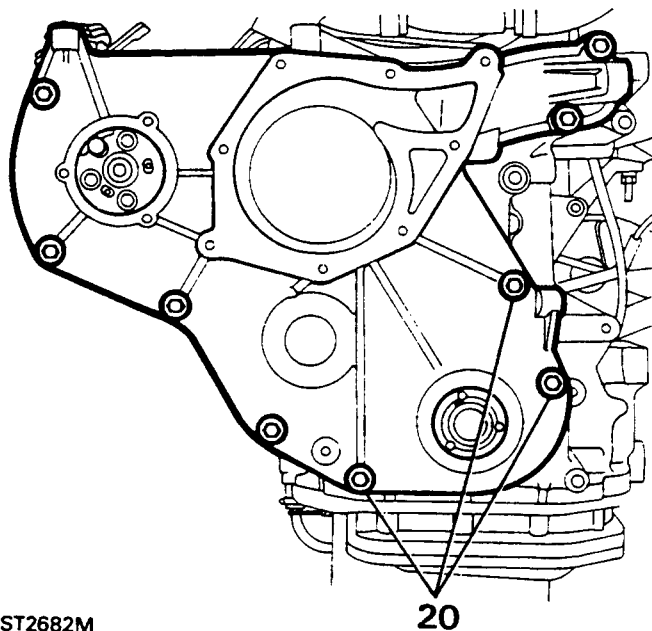
14. Since damper is also retained with loctite, use special tool LST 136 to withdraw it from the crankshaft.



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.



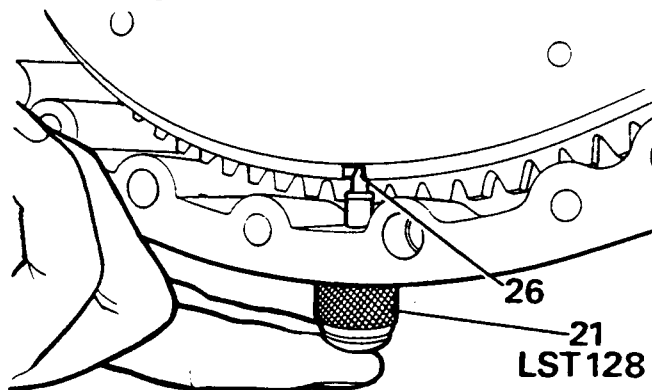
15. Disconnect bottom and by-pass hoses from water pump.  
 16. Remove three screws to remove water pump pulley. Remove seven bolts to remove water pump.





**To renew the drive belt**

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



ST2683M

22. Temporarily 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.

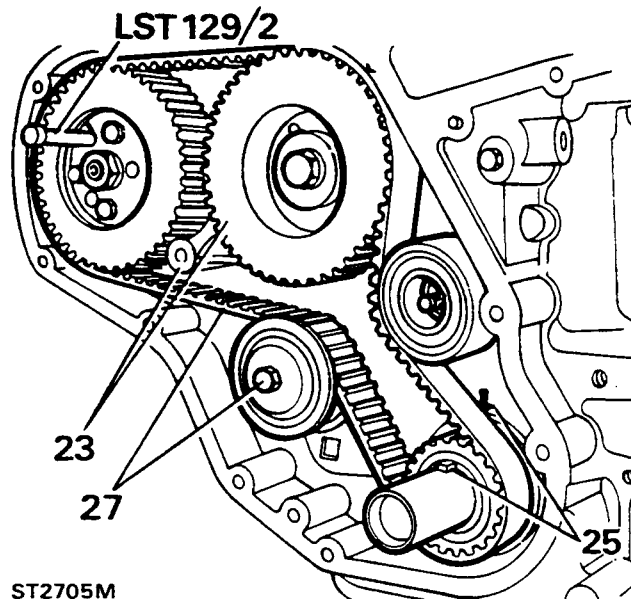
When a belt is handled, it must not be bent at an acute angle or an arc of less than 25 mm (1 in) in diameter, as damage may be caused to the glass fibre reinforcement and premature failure could result.

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.

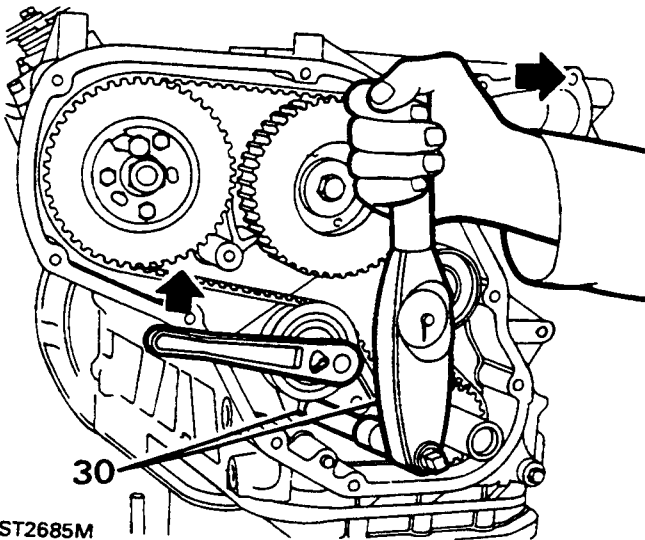
To remove a belt always use clean hands, or a recommended tool - NEVER use a lever.



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.

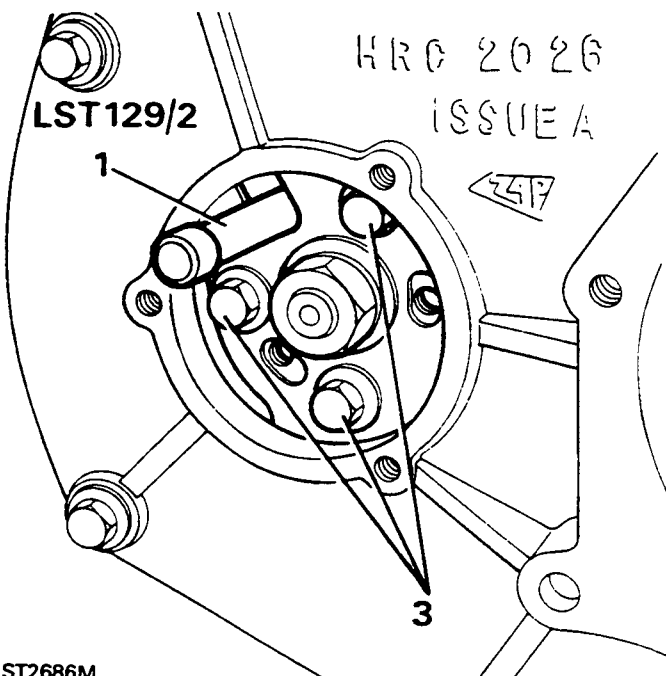




ST2685M

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.

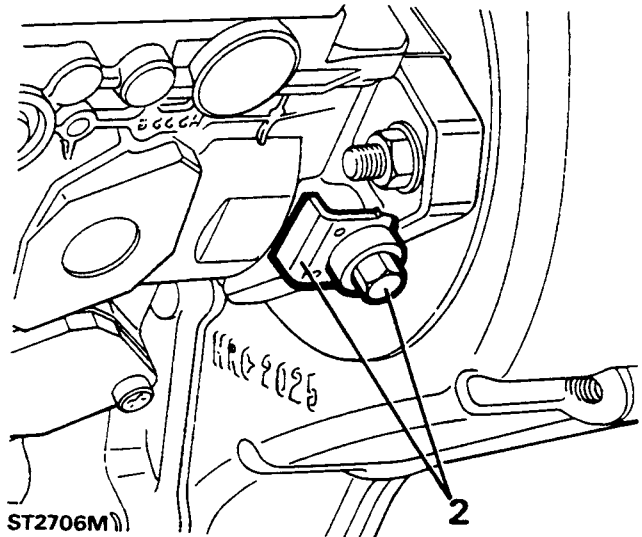
**CAUTION:** The double tensioning procedure is vital otherwise the belt could fail resulting in serious damage to the engine.



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**.