






# Chapter 1

## Routine maintenance and servicing

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### Degrees of difficulty

Easy, suitable for novice with little experience		Fairly easy, suitable for beginner with some experience		Fairly difficult, suitable for competent DIY mechanics		Difficult, suitable for experienced DIY mechanics		Very difficult, suitable for expert DIY or professional	
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### Specifications

<b>Capacities</b>	
Automatic lubrication fluid, drain and refill	2.5 litres
<b>Cooling system</b>	
Viva Saturn/Van	1.6 litres
BX (non-Turbo)	1.8 litres
BX (Turbo)	2.2 litres
Engine oil, drain and refill (including filter)	5.0 litres
<b>Fuel tank</b>	
Viva Saturn	40 litres
C10 Champ Van	47 litres
BX (up to early 1995 except Turbo and Turbo models)	50 litres
BX (T20 non-Turbo)	50 litres
BX (from early 1995, and all Turbo models)	55 litres
Manual transmission oil (note 10-benders/handbooks)	2.0 to 2.2 litres
Vacuum pump (Viva models)	40 cc

<b>Cooling</b>	
Antifreeze content:	
for protection down to -15°C (5°F)	35%
for protection down to -30°C (-22°F)	55%

<b>Brakes</b>	
Minimum rear brake shoe lining thickness	1.0 mm

<b>Vacuum pump (Viva models)</b>	
Drivetrain tension	Approx 5.0 mm deflection midway between pulleys

**Engine****Idle speed**

<b>Auto diesel injection pump</b>	
C10	885 ± 35 rpm
8K	775 ± 35 rpm
75A	758 rpm

**Brush injection pump**

Automatic transmission	885 ± 35 rpm
Manual transmission	775 ± 35 rpm
Oil filter type	Champion F140

**Air filter**

8K models up to mid-1987 (round type)	Champion W110
8K models from mid-1987 (square type)	Champion W643
Via (Saloon/C10-Via)	Champion W110

**Fuel filter type**

<b>8K models and C10 Van</b>	
Plate-steel	Champion L150
Brush	Champion L150
<b>Via (Saloon)</b>	
Plate-steel	Champion L150 or L157
Brush	Champion L150

**Tyres**

Pressures - bar (bar/psi)	Front	Rear
<b>Via</b>		
140 (20-13 tyre)	2.0 (30)	2.0 (30)
160 (20-15 tyre)	2.2 (32)	2.0 (30)
<b>8K</b>		
Saloon	2.1 (30)	2.1 (30)
Deluxe	2.2 (32)	2.2 (32)

**Torque reversal settings**

Fuel filter through-bolt	10	7
Rear fuel nut (V16)	150	140

**Maintenance schedule**

The maintenance schedules below are basically those recommended by us for vehicles driven daily. Servicing intervals are determined by mileage or time elapsed - this is because fluids and systems deteriorate with age as well as with use. Follow the time intervals if the appropriate mileage is not covered within the specified period.

Vehicles operating under extreme conditions may need more frequent maintenance. "Adverse conditions" include climate extremes, full-time towing or bad work, driving on unmade roads, and a high proportion of short journeys. The use of inferior fuel such as may be found in some foreign countries can cause early degradation

of the engine oil. Consult a dealer for full guidelines.

Some of the procedures, where indicated, are described in detail in the relevant main manual for the vehicle. Refer to Haynes Manual No. 888 for 8K models and No. 850 for Via models. Note that Manual No. 850, also covers the C10-Via.

## At weekly intervals, or before a long journey

- Check battery (Section 3)
- Check brake fluid level, investigate any sudden loss of fluid (Section 4)
- Check coolant level (Section 5)
- Check engine oil level (Section 6)
- Check the operation of lights, wipers and horn (Section 7)
- Check tyre pressure and condition (including speed) (Section 8)
- Check washer fluid level(s) (Section 9)

## Every 6 000 miles (10 000 km) or 6 months, whichever comes first

**Note:** On pre-1989 models, the mileage intervals were at 5000 miles (7500 km). The time intervals, however, are the same.

- Check handbrake adjustment (Section 10)
- Check hydraulic circuit (Section 11)
- Check hydraulic system fluid level (BX models), (Section 12)
- Check the steering gear and driveshaft components (Section 13)
- Clean oil filler cap (where applicable), (Section 14)
- Drain water from fuel filter (Section 15)
- Examine exhaust system for corrosion and leakage (Section 16)
- Renew the engine oil and filter (Section 17)
- Check brake disc pads for wear (refer to the relevant main manual)
- Check brake discs for wear (refer to the relevant main manual)
- Check front wheel alignment (refer to the relevant main manual)
- Check the automatic transmission fluid level (refer to the relevant main manual)
- Lubricate all controls, linkages, door locks and hinges (refer to the relevant main manual)

## Every 12 000 miles (20 000 km) or 12 months, whichever comes first

**Note:** On pre-1989 models, the mileage intervals were at 10 000 miles (15 000 km). The time intervals, however, are the same.

Along with the work specified in the previous schedule, where applicable ...

- Check driveshaft tension (Section 18)
- Check idling speed (Section 19)
- Check vacuum pump (Viva models) (Section 20)

- Inspect rear brake shoes (Viva models) (Section 21)
- Lubricate clutch pedal and cable (Section 22)
- Renew fuel filter (before winter, regardless of mileage) (Section 23)
- Check clutch adjustment (refer to the relevant main manual)
- Check wheel bearings (refer to the relevant main manual)
- Check seat belts and anchorages (refer to the relevant main manual)

## Every 18 000 miles (30 000 km) or 18 months, whichever comes first

**Note:** On pre-1989 models, the mileage intervals were at 15 000 miles (22 500 km). The time intervals, however, are the same.

Along with the work specified in previous schedules, where applicable ...

- Clean the hydraulic system filter (BX models) (refer to the main manual)

## Every 24 000 miles (40 000 km) or 2 years, whichever comes first

**Note:** On pre-1989 models, the mileage intervals were at 20 000 miles (30 000 km). The time intervals, however, are the same.

Along with the work specified in previous schedules, where applicable ...

- Renew air cleaner element (refer to Chapter 4)
- Renew automatic transmission fluid (if applicable) (refer to the relevant main manual)

## Every 30 000 miles (45 000 km) or 2 years, whichever comes first

Along with the work specified in previous schedules, where applicable ...

- Renew coolant (Section 24)
- Renew brake fluid (Viva models) (refer to the relevant main manual)

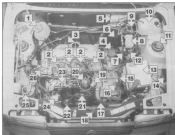
## Every 36 000 miles (60 000 km)

- Renew hydraulic system fluid (BX models) (refer to the main manual)
- Check transmission fluid level (manual transmission models) (Section 25)

## Every 48 000 miles (80 000 km)

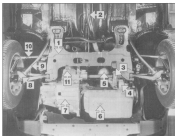
- Renew timing belt (refer to Chapter 3)

Underbody view of a Vauxhall (air cleaner removed)



- 1 Coolant filter cap and expansion tank
- 2 Injection
- 3 Accelerator cable
- 4 Brake vacuum pump
- 5 Piston
- 6 Slave unit
- 7 Speedometer cable
- 8 Brake fluid reservoir
- 9 Washer pump
- 10 Washer reservoir
- 11 Front suspension upper mounting
- 12 Brake master cylinder
- 13 Battery
- 14 Heater plug relay
- 15 Clutch cable
- 16 Reversing light switch
- 17 Fan belt
- 18 Radiator
- 19 Fan belt drive unit
- 20 Engine oil dipstick and filler cap
- 21 Water filter
- 22 Oil filter
- 23 Injection pump (Bosch)
- 24 Alternator
- 25 Fuel filter
- 26 Right hand engine mounting

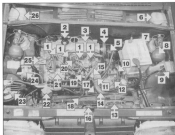
Front underbody view of a Vauxhall



- 1 Subframe
- 2 Exhaust pipe
- 3 Right hand driveshaft support bracket
- 4 Lower engine mounting
- 5 Exhaust separator
- 6 Engine oil drain plug
- 7 Transmission
- 8 Peak control arm
- 9 Drive shaft
- 10 Track rod
- 11 First drive shaft plug

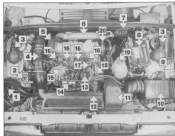
Underneath view of a 66L diesel (air cleaner removed)

- 1 Injectors
- 2 Oil filler cap and ventilation hose
- 3 Muffler cover
- 4 HP pump/distributor
- 5 HP pump
- 6 Water reservoir
- 7 Battery
- 8 Front suspension hydraulic unit
- 9 Master plug relay
- 10 Clutch cable
- 11 Thermostat cover
- 12 Reversing temp switch
- 13 Radiator
- 14 Top hose
- 15 Fuel inlet thermal unit
- 16 Manual lock
- 17 Starter motor
- 18 Accelerator cable
- 19 Engine oil dipstick
- 20 Diagnostic socket
- 21 Injection pump (Pinto diesel)
- 22 Coolant filter cap
- 23 Hydraulic system reservoir
- 24 Fuel filter
- 25 Right hand engine mounting
- 26 Water reservoir



Underneath view of a BX Turbo model - intercooler removed for clarity

- 1 LHM fluid reservoir
- 2 Fuel filter
- 3 Suspension units
- 4 Air cleaner to turbo housing
- 5 Turbo to intercooler housing
- 6 Inlet manifold
- 7 Brake pipe unions
- 8 Battery
- 9 ABB control block
- 10 Air cleaner
- 11 Air intake
- 12 Intercooler air inlet duct
- 13 Engine oil filler/dipstick
- 14 Cold start accelerator
- 15 Flapless limiter
- 16 Fuel injectors
- 17 Combustion ventilation of trap
- 18 Thermostat housing
- 19 Expansion tank cap
- 20 Hydraulic pump drive pulley



# Maintenance procedures

## 1 Introduction

1 This Chapter is designed to help the home mechanic maintain their vehicle for safety, economy, long life and peak performance.

2 The Chapter contains a master maintenance schedule, followed by Sections dealing specifically with each task in the schedule. Visual checks, adjustments, component renewal and other helpful hints are included. Refer to the accompanying illustrations of the engine compartment and the underside of the vehicle for the locations of the various components.

3 Servicing your vehicle according to the mileage/time maintenance schedule and the following Sections will provide a planned maintenance programme, which should result in a long and reliable service life. This is a comprehensive plan; as maintaining some items but not others at the specified service intervals, will not produce the same results.

4 As you service your vehicle, you will discover that many of the procedures can - and should - be grouped together, because of the particular procedure being performed, or because of the proximity of two otherwise-unrelated components to one another. For example, if the vehicle is raised for any reason, the exhaust can be inspected at the same time

as the suspension and steering components.

5 The first step in this maintenance programme is to prepare yourself before the actual work begins. Read through all the Sections relevant to the work to be carried out, then make a list and gather all the parts and tools required. If a problem is encountered, seek advice from a parts specialist, or a dealer service department.

## 2 Intensive maintenance

1 & 2, from the time the vehicle is new, routine maintenance schedule is followed closely. frequent checks made of fuel levels and high wear items, as recommended, the engine will be kept in relatively good running condition. The need for additional work will be limited.

3 It is possible that there will be times when the engine is running poorly due to the lack of regular maintenance. This is even more likely if a used vehicle, which has not received regular and frequent maintenance checks, is bought. In such cases, additional work may need to be carried out, outside of the regular maintenance intervals.

4 If engine wear is suspected, a compression test (refer to Chapter 25) will provide valuable information regarding the overall performance of the main internal components. Such a test can be used as a basis to decide on the extent

of the work to be carried out. If, for example, a compression test indicates serious internal engine wear, conventional maintenance as described in this Chapter will not greatly improve the performance of the engine. It may also prove a waste of time and money, unless extensive overhaul work is carried out first.

5 The following series of operations are those most often required to improve the performance of a generally performing engine.

### Primary operations

- 1 Clean, inspect and test the battery
- 2 Check all the engine-related fluids
- 3 Check the condition and tension of the drivebelts
- 4 Check the condition of the oil filter, and renew if necessary
- 5 Check the fuel filter
- 6 Check the condition of all hoses, and check for fuel leaks
- 7 Check the idle speed, anti-stall and mixture settings, as applicable

8 If the above operations do not prove fully effective, carry out the following secondary operations:

### Secondary operations

All items listed under "Primary operations", plus the following:

- 1 Check the clamping system
- 2 Check the preheating system
- 3 Check the fuel system

# Weekly or before a long journey

## 3 Battery fluid - check



**Warning:** Read the "Safety First" section in the front of this manual, before checking the battery.

- 1 Make sure that the battery tray is in good condition and that the clamps are tight (see illustration).
- 2 Corrosion on the tray, retaining clamp and the battery terminals, can be removed with a solution of water mixed with baking soda. Thoroughly rinse all cleaned areas with clean water. Any metal parts of the tray damaged by corrosion should be covered with a zinc-based primer, then painted (see Haynes hint).
- 3 Approximately every three months and definitely before the winter months, check the charge condition of the battery (and if applicable, the electrolyte levels).



3.1 Checking the security and condition of the battery clamps

## 4 Brake fluid - check



**Warning:** Brake hydraulic fluid can harm your eyes and damage painted surfaces, so use extreme caution when handling and pouring it. Do not use fluid that has been standing open for some time, as it absorbs moisture from the air that can cause a dangerous loss of braking effectiveness.

- 1 On Vaux models the braking system is similar to that for petrol engine models, but there is insufficient vacuum for a vacuum servo unit. A vacuum pump, belt-driven from the camshaft, is therefore employed. The vacuum servo unit and master cylinder are located on the left-hand side of the bulkhead (see illustration). A cross-tube mounted inside the passenger compartment links the brake pedal to the vacuum servo unit.
- 2 On BA models the braking system is virtually identical to that on petrol-engined models.
- 3 If the reservoir requires repeated topping-up this indicates a fluid leak somewhere in the system, that should be investigated immediately.



The fluid level in the master cylinder will drop slightly as the brake linings wear down, but the fluid level must never be allowed to drop below the "MIN" mark.

- 4 If a leak is suspected, the car should not be driven until the braking system has been checked. Note late any signs where brakes are concerned.



4.1 Brake master cylinder on Vaux models

## 5 Coolant level - check



**Warning:** Wait until the engine is cold before starting this procedure.

- 1 With the engine cold, depress the filler cap and turn it anti-clockwise to remove it (see illustration).
- 2 Check that on Vaux models the coolant is up to the four plate inside through the filler neck. On BA models withdraw the black plastic tube from the radiator filler neck and check that the coolant level is on the upper limit of the "threaded" section.
- 3 If necessary top-up the system with the recommended coolant then refit the filler cap.

## 6 Engine oil level - check

- 1 The vehicle must be parked on level ground and the engine must have been stopped for approximately 10 minutes to allow all oil circulation to return to the sump.

- 2 Withdraw the dipstick, wipe its tube, wipe the end with a piece of clean rag, reinsert it fully and then withdraw it again. Read the oil level on the end of the dipstick; it should be between the two cut-outs that represent the maximum and minimum oil levels (see illustration).

- 3 It is not strictly necessary to top-up the engine oil until it reaches the minimum cut-out, but on no account allow the level to fall any lower. The amount of oil needed to top-up from minimum to maximum is 1 litre for 1.7 models and approximately 1.5 litres for 1.8 models.

- 4 When topping-up is necessary, use clean engine oil of the specified type, preferably of the same make and grade as that already in the engine. Top-up by removing the filler cap from the filler cover or the filler tube as



Applying petroleum jelly to the battery clamps



6.1 Filling the radiator on BA models



**6.24** Withdrawing the engine oil dipstick (XJ6 J model)



**6.25** ...and topping up the engine oil (XJ model)

applicable (see Illustrations). Allow time for the oil to run down to the sump before rechecking the level on the dipstick. Refill the filler cap and dipstick on completion.

6 All engines use some oil, depending on the degree of wear and the pattern of use. Oil which is not being lost through external leaks is entering the cylinders and being burnt, however, the ideal engine is not so prone to the problem as its petrol counterpart, since there is no hot vacuum to suck oil past piston rings and into the sump.



**7** Lights, wipers and horn - check

1 Check the operation of all external lights. Use the reflection from a garage door or storehouse window, to check brake and reverse lamps. Make sure that all direction indicators are working, including when hazard warning switch is on. Replace bulbs and fuses as necessary.



**6.26** Minimum and maximum level cut-outs on the two types of dipstick

- 1 Turn on the wipers and check that the glass is cleaned without smearing. Replace wiper blades, if the rubbers are worn or damaged.
- 2 Baudet the horn (during suitable hours). If it does not work, check the fuse, the wiring connections and the self-connections.



**8** Tyre pressure and condition - check

- 1 It is very important that all tyres are in good condition and at the correct pressure. Consult your owner's Handbook for tyre pressure recommendations.
- 2 Having a tyre failure at any speed is highly dangerous. Tyre wear is influenced by driving style. Hard-braking and acceleration, or fast cornering, will all produce more rapid tyre wear. As a general rule, the front tyres wear out faster than the rears. Interchanging the tyres from front to rear ("rotating" the tyres) may result in more even wear. However, if this is completely effective you may have the expense of replacing four tyres at once!
- 3 Remove any nails or stones embedded in the tread before they penetrate the tyre to cause deflation. If removal of a nail does reveal that the tyre has been punctured, call the nail so that its point of penetration is marked. Then immediately change the wheel and have the tyre repaired, or replaced by a tyre dealer.
- 4 Regularly check the tyres for damage to the fabric, cuts or bulges, especially in the sidewalls. Periodically remove the wheels and clean any dirt or mud from the inside and outside surfaces. Examine the wheel rims for signs of rusting, corrosion or other damage. Light alloy wheels are easily damaged by



**6.28** Removing the filter cap ...

"kerfing" whilst parking. Steel wheels may also become dented or buckled. A new wheel is very often the only way to ensure serious damage.

- 5 Spare tyres should be balanced when they are fitted, but it may become necessary to re-balance them as they wear, or if the balance weights fitted to the wheel rim, should fall off.
- 6 Unbalanced tyres will wear more quickly, as will the steering and suspension components. Unbalanced wheels cause vibration, particularly at a certain speed (typically around 50 mph). If this vibration is only felt through the steering, it is likely that just the front wheels will need balancing. If however, the vibration is felt through the whole car, the rear wheels must also need balancing. Wheel balancing should be carried out by a tyre dealer or garage.
- 7 Check the security of the roadwheels. Ensure that all the bolts are tightened to their correct torques.



**9** Washer fluid level - check

Ensure that the washer fluid is always topped-up after use. Modern concentrates additives will only prevent the fluid from freezing during winter months, but also reduces smearing, noticeable during night time driving at any time of year.

Clean the washer jets with a pin, if they become blocked. Ensure that the jets are directed toward the windscreen and not over the rail, to the vehicle behind.



## 6 000 miles or 6 months service



10.4 Handbrake adjustment nut (1) and locknut (2) on Van models  
(There should be clearance at point arrowed)

### 10 Handbrake - adjustment

#### Van models

- 1 Check the front wheels then jack up the rear of the vehicle and support on axle stands (see "Jacking and vehicle support").
- 2 Fully depress the footbrake pedal several times.
- 3 Apply the handbrake lever to the third notch. Turn each rear wheel separately and check that there is a slight resistance to movement, indicating that the brake shoes are just touching the drums.
- 4 If necessary adjust the cable with the handbrake lever off on the third notch. On

Van models loosen the locknut on the primary cable, turn the adjustment nut as required, then tighten the locknut (see illustration). On Saloon models turn the outer cable adjusters where they emerge from the vehicle floor. Check that there is equal resistance to both rear wheels.

- 5 Apply the handbrake lever to the 8th notch and check that both rear wheels are locked.
- 6 Lower the vehicle to the ground.

#### FX models

7 Handbrake adjustment on these models is automatic. The adjustment takes place when the handbrake travel reaches 12 to 18 notches.

- 8 If a new cable is being fitted, refer to the main manual, for details.



10.5 LHM fluid level indicator located on the reservoir



10.6 Filter cap removed from the hydraulic fluid reservoir

(Fluid level indicator location is arrowed)

### 11 Hydraulic circuit - check

1 On Van models the braking system is similar to that for petrol engine models, but there is insufficient vacuum for a vacuum servo unit. A vacuum pump, belt-driven from the camshaft, is therefore employed. The vacuum servo unit and master cylinder are located on the left-hand side of the bulkhead. A cross-tube mounted inside the passenger compartment links the brake pedal to the vacuum servo unit.

2 On 800 models the braking system is virtually identical to that on petrol engine models.

- 3 Check the hydraulic circuit pipes and hoses, for leaks, corrosion and damage. Pay particular attention to the areas around the connections. Replacement details can be found in the relevant main manual.
- 4 Ensure that all retaining clips are secure.

### 12 Hydraulic system fluid (FX models) - check

1 The hydraulic fluid reservoir is located on the left-hand side of the bulkhead. It has a fluid level indicator built into it for easy checking. With the engine idling, open the bonnet and check that the yellow indicator fluid is between the two red rings (see illustration). The ground clearance level, inside the vehicle, should be fully upwards in the maximum height position.

2 The difference between the maximum and minimum levels is approximately 5-10 litres.

3 The fluid level indicator is only accurate after the vehicle has stood at its maximum ride height.

4 If topping-up is necessary, first clean the filler cap and the surrounding area, then remove the cap (see illustration).

5 Using genuine green LHM fluid, top-up the reservoir until the indicator fluid reaches the upper red mark. Then fit the cap and bottom off the engine.

6 In an emergency, automatic transmission fluid for 800 engine oil, i.e. SAE 15W/50, may be used. However the system must be completely drained and replaced with new LHM fluid at the earliest opportunity. Do not use oils that could damage the rubber components of the system.

7 Refer to the main manual for details on fluid removal.



14.1 Oil filter cap, 2 breather (BX model)

### 13 Steering gear and driveshaft - check

1 Check all wheel and ball joints for signs of excessive wear and replace worn or failing components.

2 Ensure that the steering gear gaiters, driveshaft gaiters and balljoint rubbers show no signs of damage.

3 Check the fraying of all rods and bolts on the steering gear and related components.

4 Replacement details, along with torque specifications can be found in the relevant main manual.

### 14 Oil filter cap (where applicable) - clean

**Note:** This procedure is only applicable to models with the cap fitted to the valve cover.

1 Pull the oil filter cap from the top of the valve cover that houses the cap and disconnect the pressure ventilation hose (see illustration).

2 Clean the wire mesh filter in paraffin and allow to dry. If it is blocked with sludge, however, renew the cap completely.

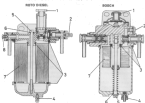
3 Refit the hose to the filter cap and fit the cap to the valve cover.

### 15 Water in fuel filter - drain

1 Position a small container beneath the filter.  
2 Loosen the bleed screw on the bottom of the filter and allow any water to drain into the container. When fitted, also loosen the air bleed screw on the filter head or inlet union bolt (see illustration).

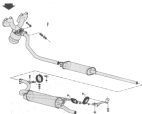
3 Tighten the lower bleed screw when fuel free of water flows. Retighten the air bleed screw when fitted.

4 Fit the fuel injection system as described in Chapter 4.



15.2 Cross section of the fuel filters

- |                      |                     |
|----------------------|---------------------|
| 1 Plunger plunger    | 6 Through bolt      |
| 2 Fuel bleed screw   | 7 Through bolt seal |
| 3 Seat               | 8 Gasket/sealment   |
| 4 Filter bleed screw | 5 Air bleed screw   |



15.3 Exhaust system for Vaux models



16.5 Central exhaust mounting hangers



17.6 Unscrewing the oil filter with a strap wrench



17.8 Tighten the oil filter by hand only



17.7 Topping-up the engine oil (Plex)

Proprietary gaskets and bungs are available for the repair of leaks and splits. They work well in the short term, but renewal of the section concerned will probably prove more satisfactory in the long run.

Check the rubber mountings for deterioration, and renew them if necessary (see Illustration).

### 17 Engine oil and filter - removal

1 The engine oil should be replaced when hot (i.e. just after a run) with the vehicle parked on level ground.

2 Position a drain pan of adequate capacity beneath the sump. Wipe clean around the drain plug then unscrew it using a hexagon key and allow the oil to drain. The oil may be very hot, take precautions to avoid scalding.

3 Remove the oil filter cap and allow thermal to drain for at least 10 minutes.

4 Check and, if necessary, renew the drain plug washer then wipe the sump, left the drain plug and tighten it.

5 Position the drain pan beneath the oil filter on the front of the cylinder block. Using a strap wrench, unscrew the filter and remove it (see Illustration). If a strap wrench is not available a screwdriver can be driven through the filter and used as a lever to remove it.

6 Wipe clean the filter seal on the cylinder block or oil cooler (as applicable). Insert a little clean engine oil on the sealing ring of the new oil filter then screw on the filter until it just touches the seat. Hand tighten the oil filter by a further two-thirds of a turn (see Illustration). Do not use any tools to tighten the filter.

7 Fill the engine with the correct grade and quantity of oil (see Illustration).

8 Start the engine and allow it to idle. Check that the oil pressure warning light goes out and also check that there is no oil leakage from the oil filter.

9 Switch off the engine and recheck the oil level.

10 Put the old oil into a sealed container and dispose of it safely. Do not pour old engine oil down a drain. Contact your local authority for further details.

### 18 Exhaust system - examination

1 Inspect the exhaust system periodically for leaks, corrosion and damage, and check the security and condition of the mountings (see Illustration). Small leaks are more easily detected if an assistant temporarily blocks the tailpipe with a coat of cloth whilst the engine is idling.

Plex

## 12 000 miles or 12 months service



15.2 Checking tension of alternator drivebelt



15.3A Alternator pivot bolt



15.3B Alternator adjustment rod(s) and adjustment bolt(s)

15.5 Drivebelt run - later models with air conditioning  
Arrow shows tension checking point

## Checking

- 1 To ensure maximum life from either the alternator, or the vacuum pump if applicable, the drivebelts need to be at the correct tension.
- 2 Refer to Section 25, for details on adjustment to the vacuum pump drivebelt.
- 3 There should be approximately 8.0 mm deflection on the alternator drivebelt, when moderate thumb pressure is applied midway between the pulleys (see Illustrations).
- 4 Check the condition of the belt. If the belt is

cracked, frayed or found to be slipping, it needs to be replaced.

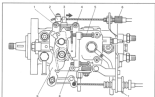
5 To remove the belt, loosen the pivot bolt and adjustment rod(s) (see Illustrations).

6 Loosen the adjustment bolt to release the tension. The drivebelt can now be removed from the pulleys.

7 Refitting is a reversal of removal.

## Adjusting

8 To adjust the tension, first check that the belt is correctly fitted over the pulleys. With the alternator mountings loose, tighten the adjustment bolt to tension the belt. As mentioned previously the belt should be able to move by approximately 8.0 mm, with moderate thumb pressure midway between the pulleys. Tighten the mounting bolts to the correct torque.



15.4 Bosch injection pump

- 1 Fuel lift adjustment screw
- 2 Cable end stop
- 3 Fuel lift lever
- 4 Telling adjustment screw
- 5 Anti-sail adjustment screw

- 6 Fuel lift cable adjustment lever
- 7 Accelerator cable adjustment lever
- 8 Engine maximum speed adjustment screw
- 9 Accelerator lever
- 10 Shut



15.4 Idle speed adjustment screw (removed) on the Motor-driven injection pump

### Later models with air conditioning

3 During 1988, the three-pulley drivebelt system previously used was replaced by a five-pulley system, as shown (see illustration). 10 With the new system, drivebelt tension is adjusted by movement of the bottom idler wheel. Tension is checked at the longest belt run, i.e. between the alternator and compressor pulleys.

### 18 Idle speed - checking and adjustment

#### Checking

1 The usual type of tachometer (see mounted), which works from ignition system pulses, cannot be used on diesel engines. A diagnostic socket is provided for use of a Crutchfield test equipment, but this will not normally be available to the home mechanic. It is a meter that adjusts the idle speed 'by ear' to satisfactory, one of the following alternatives may be used:

- Purchase or hire an appropriate tachometer
- Delegation of the job to a Crutchfield dealer or other specialist
- Timing light (strictly operated by a specialist engine-tying at the desired speed). If the timing light is pointed at a mark on the crankshaft pulley, the mark will appear stationary when the two engines are running at the same speed (or multiples of that speed). The pulley will be rotating at half the crankshaft speed but this will not affect the adjustment, in practice it was found impossible to use this method on the crankshaft pulley due to the acute clearing angle.
- Before making adjustments warm up the engine to normal operating temperature.
- Check that the engine idles at the specified speed.

#### Adjustment

6 If adjustment is necessary on the Peise diesel pump, loosen the locknut on the fast idle lever

then turn the adjustment screw as required and retighten the locknut (see illustration).

5 If adjustment is necessary on the Bosch pump, first loosen the locknut and unscrew the anti-idle adjustment screw until it touches the accelerator lever. Loosen the locknut and turn the idle speed adjustment screw as required then retighten the locknut (see illustration).

6 Adjust the anti-idle adjustment screw as described in Chapter 4.

7 Stop the engine and disconnect the instrument as appropriate.

### 20 Vacuum pump (Viva models) - check

#### Oil level

1 With the vehicle on level ground, unscrew the fillerhead plug and check that the oil level is up to the bottom of the hole (see illustration). If not, top-up with the correct grade of oil then refill and tighten the plug.

#### Sealed bell

2 Depress the drivebelt midway between the pulleys. If the deflection is not as given in the Specifications, loosen the pivot and adjustment bolts, reposition the vacuum pump, then tighten the bolts.

### 21 Rear brake shoes - inspection, removal and refitting

#### Viva models

##### Inspection

- Jack up the rear of the car and support on axle stands. Check the front wheels. Remove the rear wheel.
- Press the dust cap from the centre of the drum.
- Unscrew the hub nut, remove the washer and withdraw the brake drum. If difficulty is experienced due to the drum being excessively worn, insert a screwdriver through a wheel bolt

hole and prise the spring tensioner washer from the automatic adjustment lever (see illustration).

4 Examine the shoes for oil contamination or wear. If any shoe (or shoes), need replacing, only replace in complete sets.

#### Removal

- Press the rubber plug from the rear of the backplate then insert a screwdriver and withdraw the handbrake lever so that the cable can be disconnected.
- Note the position of the top and bottom return springs. Using a pair of pliers, withdraw them from the brake shoes.
- Using pliers, depress the anti-rattle spring caps, turn them through 90° and remove them, together with the springs. Extract the pins from the rear of the backplate.
- Withdraw the brake shoes from the backplate.
- Disengage the shod and detach the self-adjusting levers from the leading shoe.

#### Refitting

- Refitting is a reversal of removal, but before fitting the return springs, adjust the self-adjusting mechanism to set the brake shoes to slightly less than the internal diameter of the brake drum (see illustration).
- Before refitting the drum, ensure that the bearings and the space between them are greased.
- Push the drum on the stub axle, followed by the washer and a new hub nut.
- Tighten the hub nut to the specified torque then lock the collar into the stub axle groove using a round-ended drift.
- Tap the dust cap into position.
- Push the rear wheel and lower the car to the ground. Apply the footbrake pedal several times to reset the automatic adjuster.



21.10 Rear brake shoes on Volvo models

- Leading shoe
- Trailing shoe
- Upper return spring
- Lower return spring
- Anti-rattle springs
- Handbrake cable (disconnected to show refitting)
- Self-adjusting mechanism
- Handbrake lever
- Drum



18.1 View of vacuum pump with oil level check point showing fillerhead plug (arrowed)



21.3 Method of releasing the brake shoes on Viva models

### 23 Clutch pedal and cable - lubrication



- 1 Lubricate the clutch pedal pivot with grease.
- 2 Also grease the operating rods and/or cable ends where they connect with the operating levers.
- 3 Removal of the air filter will enable easier access to the clutch cable at the transmission end.

### 24 Fuel filter - removal and refitting



**Notes:** Although not essential, it is always beneficial to change the fuel filter just before winter, regardless of mileage.

#### Except C18 Van models

##### Removal

- 1 This job may be carried out leaving the filter head in situ. However, due to limited access and the possibility of spilling fuel over the engine, it is recommended that the filter head is removed, together with the cartridge.
- 2 Unscrew the union bolts and disconnect the fuel and outlet fuel lines from the filter head (see illustration). Recover the union washers.

- 3 Unbolt the filter head from the bracket and withdraw it, together with the cartridge (see illustration).

- 4 With the assembly in a container to catch spilled fuel, unscrew the through-bolt. On the Photo-disc filter this will release the end cap and enable the cartridge and seals to be removed (see illustrations). On the Bosch filter remove the chamber followed by the endnut and seals. The Puffco filter fitted to some models is similar to the Bosch filter.

##### Refitting

- 5 Clean the filter head and end cap or chamber.
- 6 Locate the new seals in position then fit the new cartridge or element using a reverse of the removal procedure.
- 7 Finally prime the fuel injection system as described in Chapter 5.

#### C18 Van models

**Note:** If the fuel is allowed to seep out of the fuel filter housing onto the engine, it will find its way into the clutch (manual transmission models) and possibly damage the rings.

##### Removal

- 1 On C18 Van models from early 1985, the fuel filter is modified. The modern housing filter base is no longer fitted. The fuel filter is released in a housing on the cylinder head, above the thermostat and cylinder head coolant outlet housing. The new housing has a water detector and a water drain plug in its

base. There is an external hand-pulling bulb, and a double valve return system.

- 2 To remove the filter, first drain the housing by loosening the drain plug. A plastic tube should be attached to the drain plug, so that the fuel can be directed into a suitable container (see illustration).

- 3 With the fuel drained, unscrew the cover bolts, remove the cover and lift out the filter.

##### Refitting

- 4 If the filter is to be refitted, check the seating rubber (before reversing the removal procedure). Removal of the water detector is straightforward (see illustration).



23.1 Inlet (1) and outlet (2) unions on the Bosch fuel filter



23.2 Removing the Photo-disc filter head and cartridge



23.4A Unscrew the through bolt....



23.4B ... and remove the Photo-disc filter cartridge



23.5 Draining the fuel from the fuel filter housing



05.118 Unscrew the cover bolts.....



05.119 ... remove the cover ...



05.120 ... and remove the filter



05.121 Checking the sealing rubber



05.122 Disconnecting the rubber plug ...



05.123 ... and removing the water detector (arrowed)

## 30 000 miles or 2 years service



24.12 Expansion tank and filler cap on V6a models



**Notes** The coolant should be removed at the first 12 000 miles (20 000 km) from new, or then when the engine is renewed. This is necessary to flush out corrosion elements that can build up in high levels during the early life of the engine. Thereafter remove as described in the maintenance schedule.

### Draining

- 1 Allow the engine to cool for at least 15 minutes after switching off.



24.14A Bleed screws (arrowed) on the thermostat housing



24.14B Bleed screws (arrowed) on the radiator (V6a models)

- 2 Depress the filler cap and slowly turn it anti-clockwise until it can be removed. If the engine is hot cover the cap with a thick cloth before removing it as a precaution against scalding (see *Illustration*).

- 3 Position a container beneath the left-hand side of the radiator then unscrew the drain plug and allow the coolant to drain.



- 4 When the radiator is completely drained, refit the drain plug, pipe or hose then drain the block by unscrewing the drain plug located on the rear of the engine at the flywheel end. Refit the drain plug on completion.

### Flushing

- 5 If the coolant is contaminated with rust and scale the complete system should be flushed as follows.

- 6 Drain the system as described in the previous section.

- 7 Remove the thermostat as described in Chapter 3.

- 8 If not already done, disconnect the bottom hose from the radiator.

- 9 Insert a garden hose into the thermostat housing so that the water runs through the engine in the reverse direction to normal flow and comes out of the bottom hose. Continue until the water emerges clear.

- 10 Run the water through the radiator in the normal direction of flow by inserting the garden hose in the top hose. In severe cases of contamination it may be helpful to remove the radiator and reverse-flush it.

- 11 Chemical decalcifiers or flushing agents should only be used as a last resort, in which case follow the instructions given by the

manufacturers.

- 12 When flushing is complete, refit the thermostat and reconnect the hoses.

### Filling

- 13 Make sure that the drain plugs are removed and that all hoses are in good condition and their clips tight.

- 14 Loosen or remove the bleed screws located on the thermostat housing cover, on the radiator on V6 models and, on V6a models only, the expansion tank return pipe (see *Illustration*).

- 15 Fill slowly with coolant through the filler neck and at the same time keep a finger on the bleed screw holes. When coolant flows at air bubbles emerge, refit and tighten the bleed screws.

- 16 Top up the radiator or expansion tank until it is below the filler cap housing. There will remain air in the system which must be purged as follows.

- 17 Start the engine and run at a fast idle speed for several minutes. Stop the engine.

- 18 Top up the coolant level as follows. On V6a models lay up to the level plate valve through the filler neck. On V6 models withdraw the black plastic tube from the radiator filler neck and note the coolant level on the "bleed-off" section (see *Illustration*). The bottom of the tube indicates the minimum level and the upper limit of the "bleed-off" section indicates the maximum level. Top up to the maximum level, then refit the tube.

- 19 Fit the filler cap.

- 20 Start the engine and run to normal operating temperature (indicated by the electric cooling/fan) cutting it then out after a few minutes.

- 21 Stop the engine and allow to cool for at least 1 hour.

- 22 Recheck the coolant level as described in paragraph 18 and top-up as necessary.



24.14C Bleed screws (arrowed) on the expansion tank return pipe (V6a models)



24.16 Fitting the coolant level tube on V6a models



## 36 000 miles service

### 25 Transmission fluid level (manual transmission models) - check



#### Pre-1987 models

**Notes:** There is no oil level plug on pre-1987 models. The only way of making sure the level is correct is to drain and refill the transmission. Having done this, it makes sense to use Jax oil for refilling.

1 Jack up the front of the vehicle and support on axle stands (see 'Jacking and vehicle support'). Check the rear wheels.

2 Two drain plugs are provided on early models - one for the transmission and one for

the differential (see *Illustration*). On later models the transmission drain plug is deleted and it is important not to confuse the starter gear shaft clamping screw with a drain plug.

3 Unscrew the drain plug(s) and drain the oil into a suitable container. On competition cars and lighters the drain plug(s).

4 There is no provision for a level plug so the correct quantity of oil must be measured before refilling the transmission through the filler plug hole.

5 Lower the vehicle to the ground.

#### 1987-on models

6 On models built from 1987, an oil filler level plug is fitted in the transmission and cover. Access is gained through the left-hand wheel

arch (see *Illustration*). The vehicle should be parked on level ground for this check.

7 Having gained access to the oil level plug, clean around the plug before removing it. Check the oil level: with the vehicle level, the oil level must be up to the bottom of the plug hole.

8 Top-up if necessary with the specified oil (see *Illustration*). Add the oil slowly: the oil level is correct when the oil just begins to flow from the plug hole. Allow a few minutes for the oil level to stabilise, then refit and tighten the filler level plug. Check for leaks if regular topping-up is required.



35.2 Differential drain plug (removed)



35.4 Manual transmission filler level plug (removed) in end cover



35.6 Topping-up the transmission oil

## 48 000 miles service

### 26 Timing belt - check



**SAFARI HINT** If the timing belt breaks in service, extensive damage may be caused to the engine. Removal of or before the specified interval is strongly recommended.