






# Chapter 1

## Routine maintenance and servicing

### Contents

Air cleaner filter element renewal	24	Handbrake adjustment	19
Automatic transmission fluid level check	13	Headlamp aim check	31
Automatic transmission fluid renewal	33	Hinge and lock lubrication	21
Auxiliary drivebelt check and renewal	9	Hose and fluid leak check	8
Battery check	4	Idle speed and mixture adjustments	11
Brake fluid renewal	30	Ignition system check	9
Brake pad, caliper and disc check	17	Introduction	2
Carburettor fuel inlet filter cleaning	26	Manual transmission oil level check	27
Clutch adjustment check	28	Rear brake shoe, wheel cylinder and drum check	29
Coolant renewal	32	Rear wheel bearing adjustment	18
Driveshaft CV joint and gaiter check	20	Road test	23
Electrical system check	14	Roadwheel bolt tightness check	16
Engine oil and filter renewal	6	Spark plug renewal	7
Exhaust system check	22	Tyre checks	5
Fluid level checks	3	Vauxhall Astra/Belmont maintenance schedule	1
Fuel filter renewal - fuel injection models	25	Wiper blade check	15
Fuel pump filter cleaning - carburettor models	12		

### Degrees of difficulty

<b>Easy</b> , suitable for novice with little experience		<b>Fairly easy</b> , suitable for beginner with some experience		<b>Fairly difficult</b> , suitable for competent DIY mechanic		<b>Difficult</b> , suitable for experienced DIY mechanic		<b>Very difficult</b> , suitable for expert DIY or professional	
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## 1 Vauxhall Astra/Belmont maintenance schedule

The maintenance intervals in this manual are provided with the assumption that you, not the dealer, will be carrying out the work. These are the minimum maintenance intervals recommended by the manufacturer for vehicles driven daily. If you wish to keep your vehicle in peak condition at all times, you may wish to perform some of these procedures more often. We encourage frequent maintenance, because it enhances the efficiency, performance and resale value of your

vehicle. If the vehicle is driven in dusty areas, used to tow a trailer, or driven frequently at slow speeds (idling in traffic) or on short journeys, more frequent maintenance intervals are recommended.

When the vehicle is new, it should be serviced by a factory-authorised dealer service department, in order to preserve the factory warranty.

## 1.2 Maintenance schedule

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### Every 250 miles (400 km) or weekly

- ☐ See Weekly checks

### Every 9000 miles (15 000 km) or 6 months, whichever comes first

- ☐ Renew the engine oil and filter - early (pre-1987) models (Section 6)

### Every 9000 miles (15 000 km) or 12 months, whichever comes first

- ☐ Renew the engine oil and filter - later (1987-on) models (Section 6)
- ☐ Renew the spark plugs (Section 7)
- ☐ Check and adjust the valve clearances - 1.2 litre models (Chapter 2A)
- ☐ Check all underbonnet and underbody components, pipes and hoses for leaks (Section 8)
- ☐ Check the condition of the auxiliary drivebelt, and renew if necessary (Section 9)
- ☐ Check the ignition system components and renew the contact breaker points (Section 10)
- ☐ Check idle speed and mixture adjustments (Section 11)
- ☐ Clean the fuel pump filter (carburettor models) (Section 12)
- ☐ Check the throttle cable adjustment (Chapter 4A or 4B)
- ☐ Check the automatic transmission fluid level (Section 13)
- ☐ Check the operation of the horn, all lights, and the wipers and washers (Section 14)
- ☐ Check the condition of the wiper blades (Section 15)
- ☐ Check the tightness of the roadwheel bolts (Section 16)
- ☐ Check the condition of the front, and rear (where fitted) brake pads (renew if necessary), and the calipers and discs (Section 17)
- ☐ Check the rear wheel bearings adjustment (Section 18)
- ☐ Check the handbrake adjustment (Section 19)
- ☐ Check the driveshaft CV joints and gaiters for condition (Section 20)
- ☐ Lubricate locks and hinges (Section 21)
- ☐ Check the exhaust system for condition and security (Section 22)
- ☐ Road test the vehicle (Section 23)

### Every 18 000 miles (30 000 km) or 12 months, whichever comes first

*In addition to all the items listed previously, carry out the following:*

- ☐ Renew the air cleaner filter element (Section 24)
- ☐ Renew the fuel filter (fuel injection models) (Section 25)
- ☐ Clean the carburettor fuel inlet filter (Section 26)
- ☐ Check the manual transmission oil level (Section 27)
- ☐ Check the clutch adjustment (Section 28)
- ☐ Check the condition of the rear brake shoes (renew if necessary), wheel cylinders and drums (Section 29)
- ☐ Renew the brake fluid (Section 30)
- ☐ Check the headlamp alignment (Section 31)

### Every 2 years (regardless of mileage)

*In addition to all the relevant items listed previously, carry out the following:*

- ☐ Renew the coolant (Section 32)

### Every 36 000 miles (60 000 km) or 4 years, whichever comes first

*In addition to all the relevant items listed previously, carry out the following:*

- ☐ Renew the automatic transmission fluid (Section 33)
- ☐ Renew the camshaft toothed belt -  
1.3, 1.4, 1.6, 1.8 and 2.0 litre 8-valve engines (Chapter 2B),  
2.0 litre 16-valve engines (Chapter 2C)

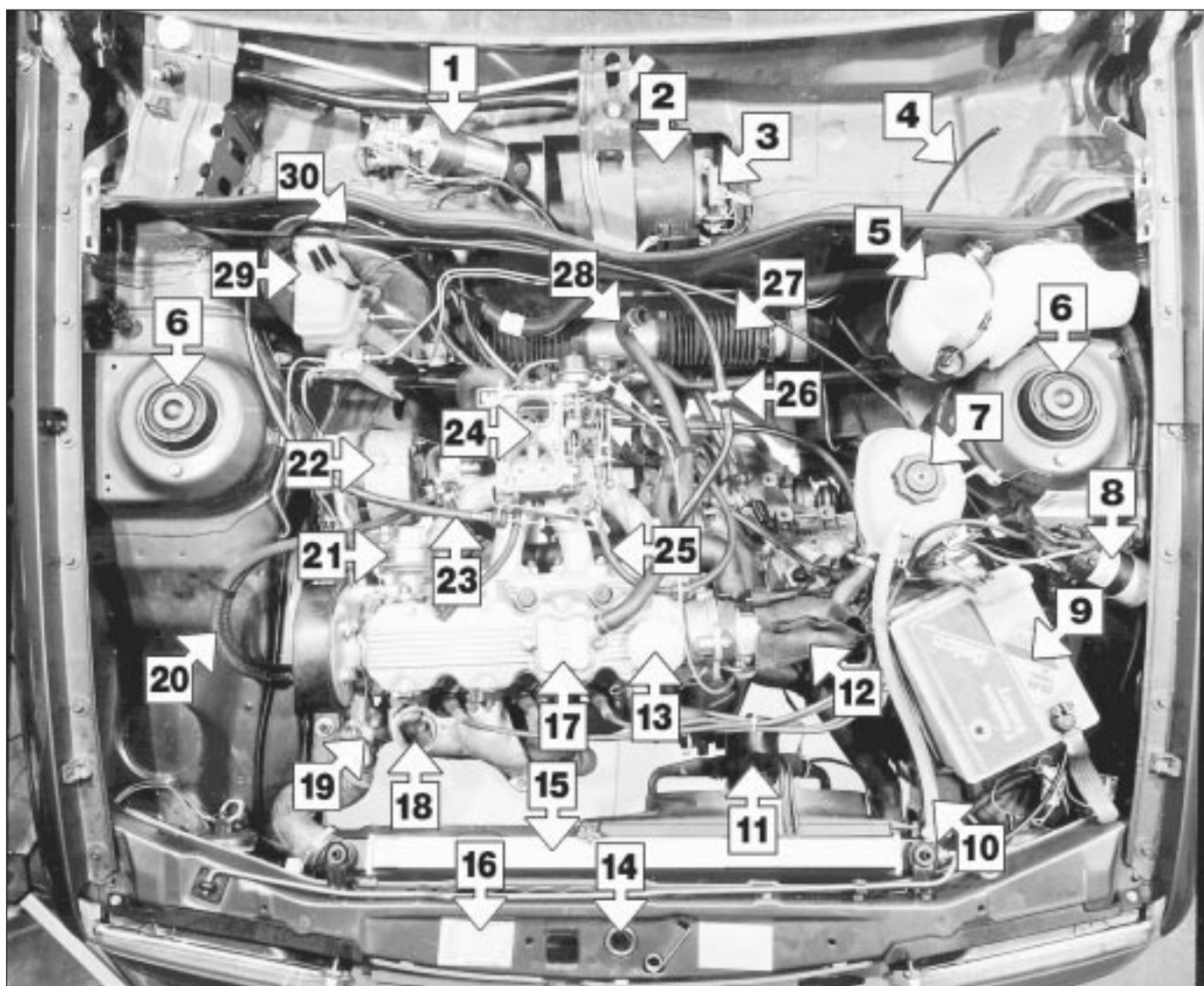
### Every 54 000 miles (90 000 km) or 3 years, whichever comes first

*In addition to all the relevant items listed previously, carry out the following:*

- ☐ Renew the braking system seals and hose (Chapter 9)

Underbonnet view of an early 1.6 litre model (air cleaner removed for clarity)

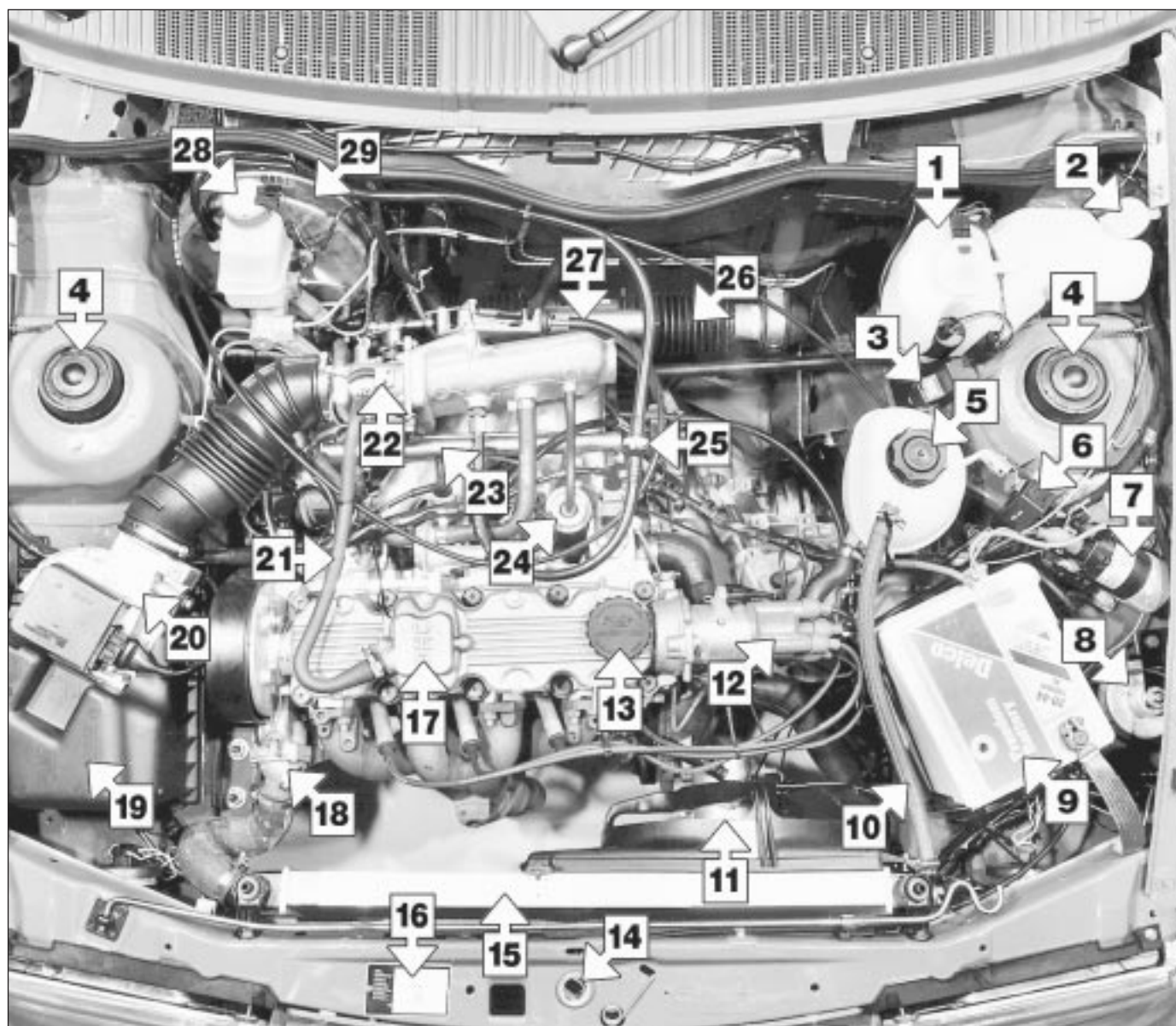
- |                                |                                |                              |
|--------------------------------|--------------------------------|------------------------------|
| 1 Wiper motor                  | 11 Radiator cooling fan        | 21 Fuel pump                 |
| 2 Heater blower motor          | 12 Distributor cover           | 22 Alternator                |
| 3 Heater blower motor resistor | 13 Engine oil filler           | 23 Accelerator cable         |
| 4 Windscreen washer tube       | 14 Bonnet catch                | 24 Carburettor               |
| 5 Screen washer reservoir      | 15 Radiator                    | 25 Choke cable               |
| 6 Suspension turrets           | 16 VIN plate                   | 26 Servo non-return valve    |
| 7 Coolant expansion tank       | 17 Engine breather             | 27 Steering rack bellows     |
| 8 Ignition coil                | 18 Air cleaner hot air pick-up | 28 Air cleaner breather hose |
| 9 Battery                      | 19 Thermostat housing          | 29 Brake fluid reservoir     |
| 10 Coolant hose                | 20 Fuel hoses                  | 30 Brake servo               |



## 1.4 Maintenance - component location

Underbonnet view of an early 1.8 litre model

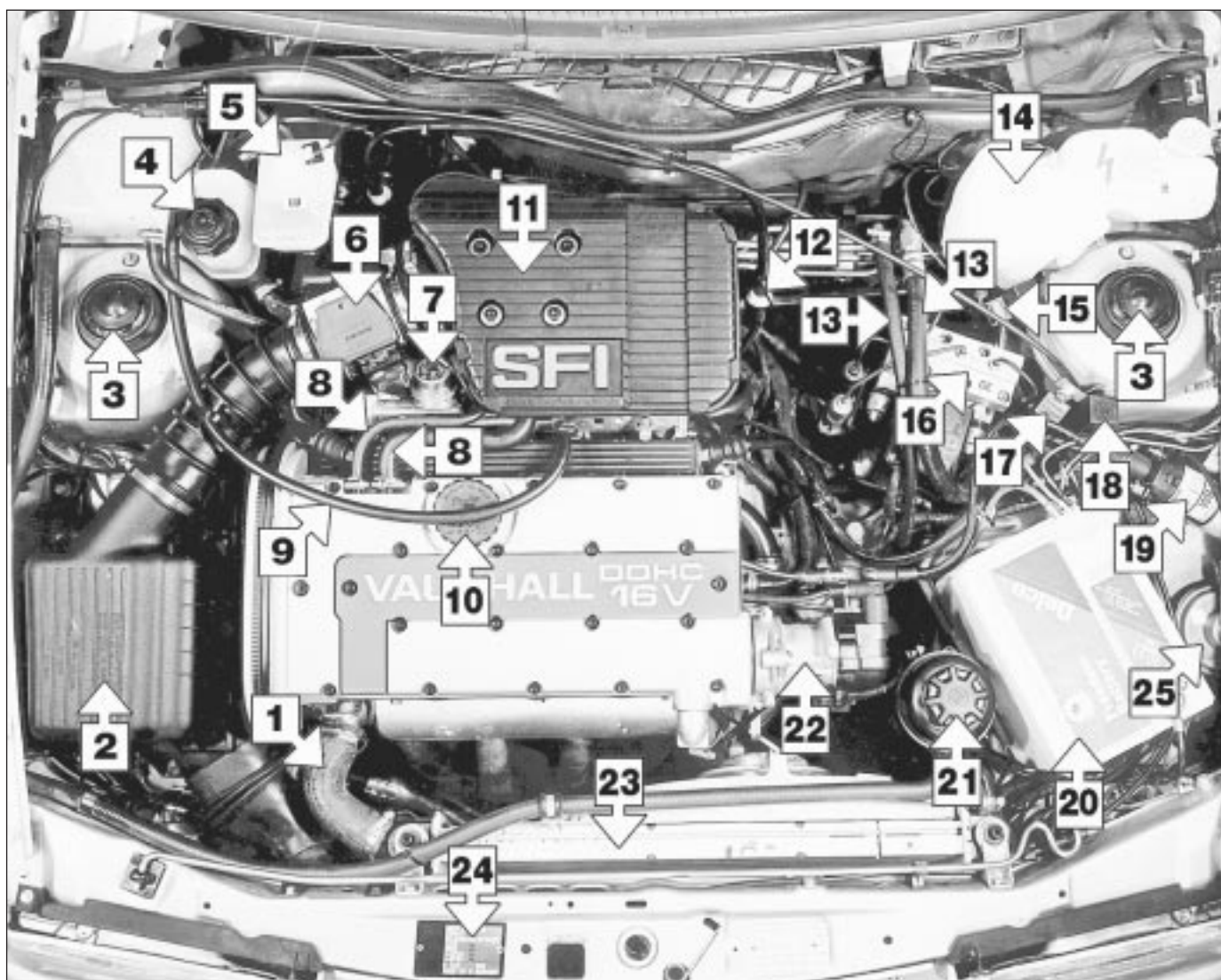
- |   |                       |                            |
|---|-----------------------|----------------------------|
| 1 Screen washer reservoir               | 11 Radiator fan       | 21 Breather hose           |
| 2 Headlamp washer filler cap            | 12 Distributor        | 22 Throttle valve housing  |
| 3 Headlamp washer relay and fuse        | 13 Engine oil filler  | 23 Fuel rail               |
| 4 Suspension turrets                    | 14 Bonnet catch       | 24 Fuel pressure regulator |
| 5 Coolant expansion tank filler         | 15 Radiator           | 25 Servo non return valve  |
| 6 Control relay (fuel injection system) | 16 VIN plate          | 26 Steering rack bellows   |
| 7 Ignition coil                         | 17 Engine breather    | 27 Accelerator cable       |
| 8 Horn                                  | 18 Thermostat housing | 28 Brake fluid reservoir   |
| 9 Battery                               | 19 Air cleaner        | 29 Brake servo             |
| 10 Coolant hose                         | 20 Airflow meter      |                            |





## Underbonnet view of a 2.0 litre 16-valve model

- |                           |                                 |                                   |
|---------------------------|---------------------------------|-----------------------------------|
| 1 Radiator top hose       | 10 Engine oil filler cap        | 18 Fuel injection control relay   |
| 2 Air cleaner             | 11 Pre-volume chamber           | 19 Ignition coil                  |
| 3 Suspension turrets      | 12 Brake servo non-return valve | 20 Battery                        |
| 4 Coolant filler cap      | 13 Power steering hoses         | 21 Power steering fluid reservoir |
| 5 Brake fluid reservoir   | 14 Windscreen washer reservoir  | 22 Distributor                    |
| 6 Air mass meter          | 15 Headlamp washer relay        | 23 Radiator                       |
| 7 Fuel pressure regulator | 16 ABS hydraulic unit           | 24 Vehicle identification plate   |
| 8 Breather hoses          | 17 ABS surge arrester relay     | 25 Horn                           |
| 9 Throttle cable          |                                 |                                   |



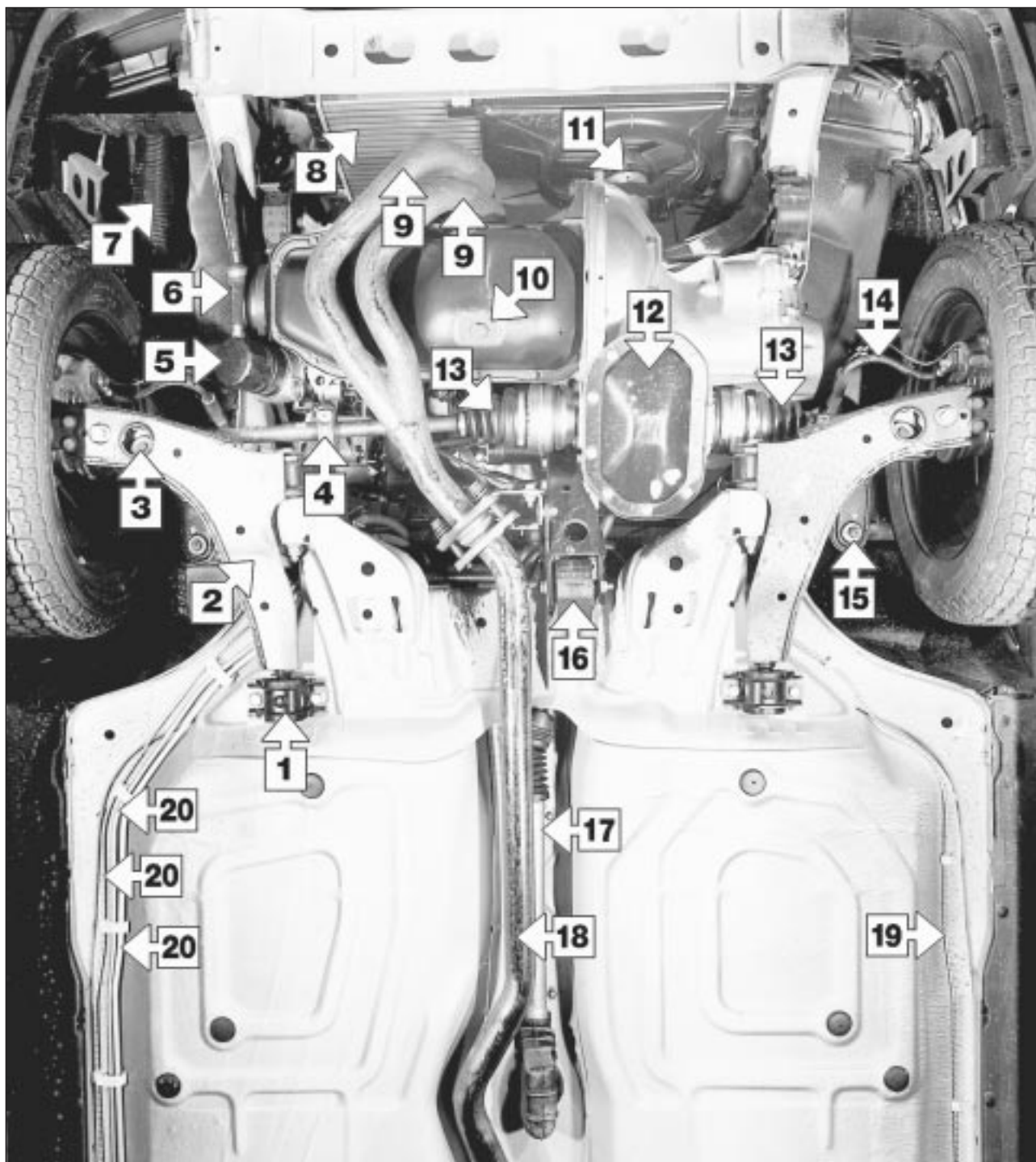
## 1.6 Maintenance - component location

Front underbody view of a 1.8 litre model - other models similar

- 1 Control arm rear bush
- 2 Control arm
- 3 Anti-roll bar link
- 4 Driveshaft damper weight
- 5 Engine oil filter
- 6 Oil cooler hose
- 7 Air induction trunking

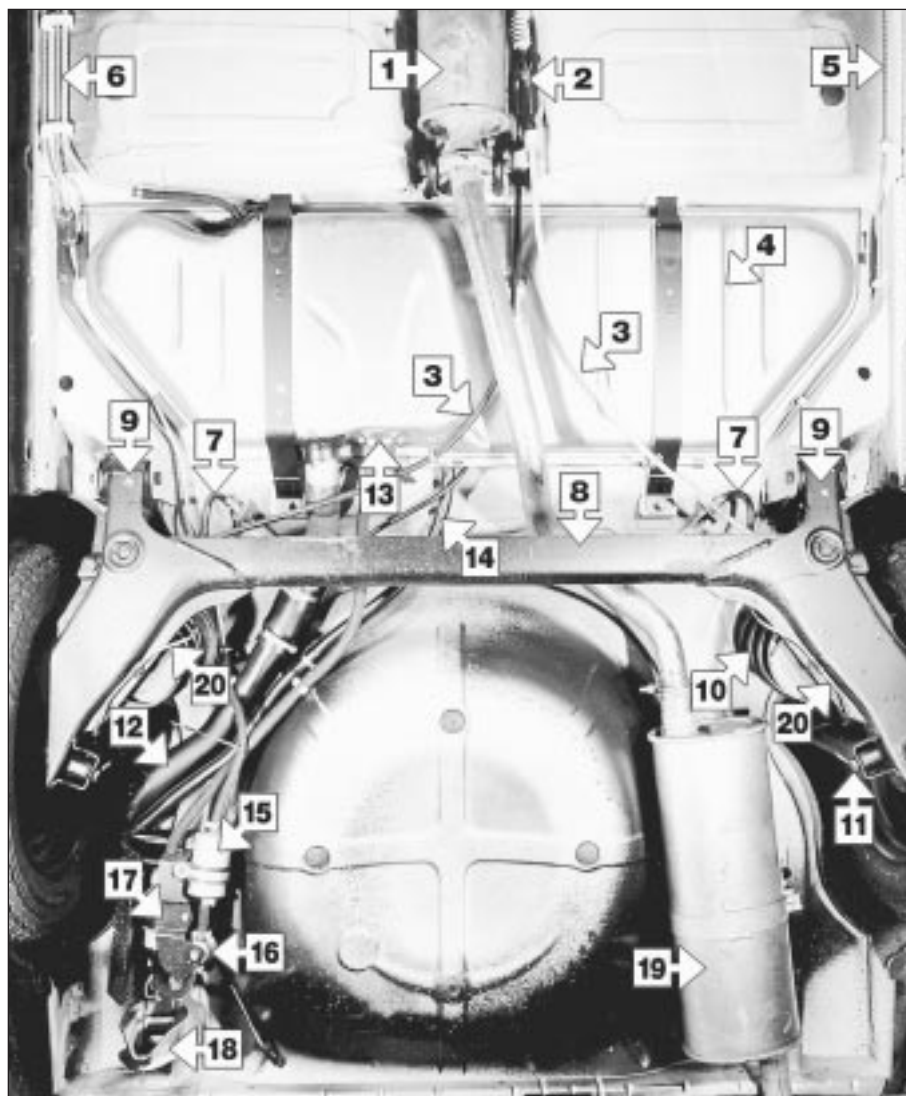
- 8 Radiator
- 9 Exhaust downpipes
- 10 Sump drain plug
- 11 Radiator fan
- 12 Gearbox sump
- 13 Driveshaft bellows
- 14 Brake hose

- 15 Steering balljoint attachment
- 16 Engine/transmission rear mounting
- 17 Gearchange tube
- 18 Exhaust pipe
- 19 Brake pipe
- 20 Brake and fuel pipes



Rear underbody view of a 1.8 litre model - other models similar

- 1 Centre silencer
  - 2 Handbrake adjuster
  - 3 Handbrake cables
  - 4 Fuel tank
  - 5 Brake pipe
  - 6 Brake and fuel pipes
  - 7 Brake hoses
  - 8 Axle beam
  - 9 Axle mountings
  - 10 Spring
  - 11 Shock absorber mounting
  - 12 Fuel filler pipe
  - 13 Fuel gauge sender/fuel tank outlet
  - 14 Fuel tank breather
  - 15 Fuel filter\*
  - 16 Fuel pressure regulator\*
  - 17 Fuel pump\*
  - 18 Towing eye
  - 19 Rear silencer
  - 20 Rear brake pipes
- \*Fuel injection models only



## 2 Introduction

### General information

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

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

Servicing of your vehicle in accordance with 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, so maintaining some

items but not others at the specified service intervals, will not produce the same results.

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 close 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.

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 together all the parts and tools required. If a problem is encountered, seek advice from a parts specialist, or a dealer service department.

### Intensive maintenance

If, from the time the vehicle is new, the routine maintenance schedule is followed closely, and frequent checks are made of fluid

levels and high-wear items, as suggested throughout this manual, the engine will be kept in relatively good running condition, and the need for additional work will be minimised.

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 purchased. In such cases, additional work may need to be carried out, outside of the regular maintenance intervals.

If engine wear is suspected, a compression test (Chapter 2) 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, and may prove a waste of time and money, unless extensive overhaul work (Chapter 2) is carried out first.



## 1.8 Maintenance procedures

The following series of operations are those most often required to improve the performance of a generally poor-running engine:

### Primary operations

- a) Clean, inspect and test the battery (Section 4).
- b) Check all the engine-related fluids (Section 3).
- c) Check the condition and tension of the auxiliary drivebelt (Section 9).

- d) Renew the spark plugs (Section 7).
- e) Inspect the ignition system components (Section 10).
- f) Inspect the ignition HT leads (Section 10).
- g) Check the condition of the air filter, and renew if necessary (Section 24).
- h) Check the condition of all hoses, and check for fluid leaks (Section 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:

- a) Check the charging system (Chapter 5A).
- b) Check the fuel system (Chapter 4A or 4B).
- c) Renew the air filter (Section 24).
- d) Renew the distributor cap and rotor arm (Section 10).
- e) Renew the ignition HT leads (Section 10).

## Every 250 miles or weekly

### 3 Fluid level checks

See "Weekly checks"

### 4 Battery check

See "Weekly checks"

### 5 Tyre checks

See "Weekly checks"

## Every 9000 miles

### 6 Engine oil and filter renewal

1 Frequent oil and filter changes are the most important preventative maintenance procedures which can be undertaken by the DIY owner. As engine oil ages, it becomes diluted and contaminated, which leads to premature engine wear.

2 Before starting this procedure, gather together all the necessary tools and materials. Also make sure that you have plenty of clean rags and newspapers handy, to mop up any spills. Ideally, the engine oil should be warm, as it will drain more easily, and more built-up sludge will be removed with it. Take care not to touch the exhaust or any other hot parts of the engine when working under the vehicle. To avoid any possibility of scalding, and to protect yourself from possible skin irritants and other harmful contaminants in used engine oils, it is advisable to wear gloves when carrying out this work. Access to the underside of the vehicle will be greatly improved if it can be raised on a lift, driven

onto ramps, or jacked up and supported on axle stands (see "Jacking and Vehicle Support"). Whichever method is chosen, make sure that the vehicle remains level, or if it is at an angle, that the drain plug is at the lowest point. The drain plug is located at the rear of the sump.

3 Remove the oil filler cap from the camshaft cover (twist it through a quarter-turn anti-clockwise and withdraw it).

4 Using a spanner, or preferably a socket and bar, slacken the drain plug about half a turn (see illustration). Position the draining container under the drain plug, then remove the plug completely. If possible, try to keep the plug pressed into the sump while unscrewing it by hand the last couple of turns. As the plug releases from the threads, move it away sharply, so that the stream of oil from the sump runs into the container, not up your sleeve!

5 Allow some time for the oil to drain, noting that it may be necessary to reposition the container as the oil flow slows to a trickle.

6 After all the oil has drained, wipe the drain plug and the sealing washer with a clean rag. Examine the condition of the sealing washer,

and renew it if it shows signs of scoring or other damage which may prevent an oil-tight seal. Clean the area around the drain plug opening, and refit the plug complete with the washer. Tighten the plug securely, preferably to the specified torque, using a torque wrench.

7 The oil filter is located at the right-hand end of the engine.

8 Move the container into position under the oil filter.

9 Use an oil filter removal tool to slacken the filter initially, then unscrew it by hand the rest of the way (see illustration). Empty the oil from the old filter into the container.

10 Use a clean rag to remove all oil, dirt and sludge from the filter sealing area on the engine. Check the old filter to make sure that the rubber sealing ring has not stuck to the engine. If it has, carefully remove it.

11 Apply a light coating of clean engine oil to the sealing ring on the new filter, then screw the filter into position on the engine. Tighten the filter firmly by hand only - **do not** use any tools.

12 Remove the old oil and all tools from under the vehicle then, if applicable, lower the vehicle to the ground.

13 Fill the engine through the filler hole in the camshaft cover, using the correct grade and type of oil (refer to Section 3 for details of topping-up). Pour in half the specified quantity of oil first, then wait a few minutes for the oil to drain into the sump. Continue to add oil, a small quantity at a time, until the level is up to the lower mark on the dipstick. Adding a further 1.0 litre (approx.) will bring the level up to the upper mark on the dipstick.

14 Start the engine and run it for a few minutes, while checking for leaks around the oil filter seal and the sump drain plug. Note that there may be a delay of a few seconds before the low oil pressure warning light goes out when



6.4 Removing the sump drain plug



6.9 Using an oil filter removal tool to unscrew the oil filter



the engine is first started, as the oil circulates through the new oil filter and the engine oil galleries before the pressure builds up.

**15** Stop the engine, and wait a few minutes for the oil to settle in the sump once more. With the new oil circulated and the filter now completely full, recheck the level on the dipstick, and add more oil as necessary.

**16** Dispose of the used engine oil safely, with reference to "General repair procedures".



**Note:** It is antisocial and illegal to dump oil down the drain. To find the location of your local oil recycling bank, call this number free.

## 7 Spark plug renewal

**1** The correct functioning of the spark plugs is vital for the correct running and efficiency of the engine. It is essential that the plugs fitted are appropriate for the engine, the suitable type being specified at the end of this Chapter. If the correct type of plug is used and the engine is in good condition, the spark plugs should not need attention between scheduled renewal intervals, except for adjustment of their gaps. Spark plug cleaning is rarely necessary, and should not be attempted unless specialised equipment is available, as damage can easily be caused to the firing ends.

**2** To remove the plugs, first open the bonnet. On 1.2 litre models remove the air cleaner as described in Chapter 4A. On 2.0 litre 16-valve engines undo the retaining screws and remove the spark plug lead cover from the engine.

**3** Mark the HT leads 1 to 4, to correspond to the cylinder the lead serves (No 1 cylinder is nearest the timing belt end of the engine). Pull the HT leads from the plugs by gripping the end connectors, not the leads, otherwise the lead connections may be fractured.



**7.10b** Measuring a spark plug electrode gap using a wire gauge



**7.5** Removing a spark plug - 1.6 litre engine shown

**4** It is advisable to remove any dirt from the spark plug recesses using a clean brush, vacuum cleaner or compressed air, before removing the plugs, to prevent the dirt dropping into the cylinders.

**5** Unscrew the plugs using a spark plug spanner, a suitable box spanner, or a deep socket and extension bar (see illustration). Keep the socket in alignment with the spark plugs, otherwise if it is forcibly moved to either side, the porcelain top of the spark plug may be broken off. As each plug is removed, examine it as follows.

**6** Examination of the spark plugs will give a good indication of the condition of the engine. If the insulator nose of the spark plug is clean and white, with no deposits, this is indicative of a weak mixture or too hot a plug (a hot plug transfers heat away from the electrode slowly, while a cold plug transfers heat away quickly).

**7** If the tip and insulator nose are covered with hard black-looking deposits, then this is indicative that the idle mixture is too rich. Should the plug be black and oily, then it is likely that the engine is fairly worn, as well as the mixture being too rich.

**8** If the insulator nose is covered with light-tan to greyish-brown deposits, then the mixture is correct and it is likely that the engine is in good condition.

**9** The spark plug gap is of considerable importance as, if it is too large or too small, the size of the spark and its efficiency will be seriously impaired. For the best results, the spark plug gap should be set in accordance with the Specifications at the end of this Chapter.



**7.11** Adjusting a spark plug electrode gap using a special tool



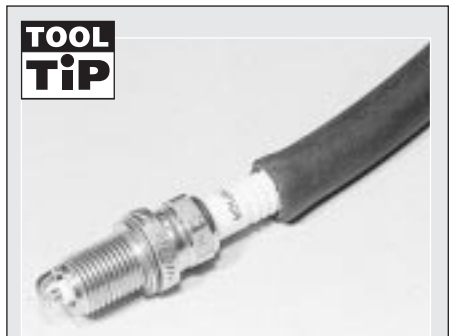
**7.10a** Measuring a spark plug electrode gap using a feeler blade

**10** To set the spark plug gap, measure the gap between the electrodes with a feeler blade, and then bend open, or close, the outer plug electrode until the correct gap is achieved (see illustrations). The centre electrode should never be bent, as this may crack the insulation and cause plug failure, if nothing worse.

**11** Special spark plug electrode gap adjusting tools are available from most motor accessory shops (see illustration).

**12** Before fitting the new spark plugs, check that the threaded connector sleeves on the top of the plug are tight, and that the plug exterior surfaces and threads are clean.

**13** Screw in the spark plugs by hand where possible, then tighten them to the specified torque. Take extra care to enter the plug threads correctly, as the cylinder head is of light alloy construction.



**It is very often difficult to insert spark plugs into their holes without cross-threading them. To avoid this, fit a short length of 5/16-inch internal diameter hose over the end of the spark plug. The flexible hose acts as a universal joint to help align the plug with the plug hole. Should the plug begin to cross-thread, the hose will slip on the spark plug, preventing thread damage to the aluminium cylinder head.**

**14** Reconnect the HT leads in their correct order. On 1.2 litre models refit the air cleaner (Chapter 4A) and on 2.0 litre 16-valve models, refit the spark plug lead cover.

## 8 Hose and fluid leak check

1 Visually inspect the engine joint faces, gaskets and seals for any signs of water or oil leaks. Pay particular attention to the areas around the camshaft cover, cylinder head, oil filter and sump joint faces. Bear in mind that, over a period of time, some very slight seepage from these areas is to be expected; what you are really looking for is any indication of a serious leak. Should a leak be found, renew the offending gasket or oil seal by referring to the appropriate Chapters in this manual.

2 Also check the security and condition of all the engine-related pipes and hoses. Ensure that all cable-ties or securing clips are in place, and in good condition. Clips which are broken or missing can lead to chafing of the hoses pipes or wiring, which could cause more serious problems in the future.

3 Carefully check the radiator hoses and heater hoses along their entire length. Renew any hose which is cracked, swollen or deteriorated. Cracks will show up better if the hose is squeezed. Pay close attention to the hose clips that secure the hoses to the cooling system components. Hose clips can pinch and puncture hoses, resulting in cooling system leaks. If wire-type hose clips are used, it may be a good idea to replace them with screw-type clips.

4 Inspect all the cooling system components (hoses, joint faces etc.) for leaks. Where any problems of this nature are found on system components, renew the component or gasket with reference to Chapter 3.

**HAYNES**  
**HINT**



*A leak in the cooling system will usually show up as white- or rust-coloured deposits on the area adjoining the leak.*

5 Where applicable, inspect the automatic transmission fluid cooler hoses for leaks or deterioration.

6 With the vehicle raised, inspect the petrol tank and filler neck for punctures, cracks and other damage. The connection between the filler neck and tank is especially critical. Sometimes, a rubber filler neck or connecting hose will leak due to loose retaining clamps or deteriorated rubber.

7 Carefully check all rubber hoses and metal fuel lines leading away from the petrol tank. Check for loose connections, deteriorated hoses, crimped lines and other damage. Pay particular attention to the vent pipes and hoses, which often loop up around the filler neck and can become blocked or crimped. Follow the lines to the front of the vehicle, carefully inspecting them all the way. Renew damaged sections as necessary.

8 From within the engine compartment, check the security of all fuel hose attachments and pipe unions, and inspect the fuel hoses and vacuum hoses for kinks, chafing and deterioration.

9 Where applicable, check the condition of the power steering fluid hoses and pipes.

## 9 Auxiliary drivebelt check and renewal

### Alternator drivebelt

#### Checking and adjustment

1 Correct tensioning of the auxiliary drivebelt will ensure that it has a long life. Beware, however, of overtightening, as this can cause excessive wear in the alternator.

2 The belt should be inspected along its entire length, and if it is found to be worn, frayed or cracked, it should be renewed as a precaution against breakage in service. It is advisable to carry a spare drivebelt of the correct type in the vehicle at all times.

3 Although special tools are available for measuring the belt tension, a good approximation can be achieved if the belt is tensioned so that there is approximately 13 mm of free movement under firm thumb pressure at the mid-point of the longest run between pulleys. If in doubt, err on the slack side, as an excessively-tight belt may cause damage to the alternator or other components.

4 If adjustment is required, loosen the alternator upper mounting nut and bolt - use two spanners, one to counterhold the bolt. Lever the alternator away from the engine using a wooden lever at the mounting bracket until the correct tension is achieved, then tighten the bolt securing the adjuster bracket, and the alternator mounting nuts and bolts. On no account lever at the free end of the alternator, as serious internal damage could be caused to the alternator.

#### Removal, renewal and refitting

5 To remove the belt, simply loosen the mounting nuts and bolts, and the bolt securing the adjuster bracket, as described previously, and slacken the belt sufficiently to slip it from the pulleys. On models with power steering it will first be necessary to remove the power steering pump drivebelt as described below.

6 Refit the belt, and tension it as described previously. Note that when a new belt has been fitted it will probably stretch slightly to

start with and the tension should be rechecked, and if necessary adjusted, after about 5 minutes running.

### Power steering pump drivebelt

#### Checking and adjustment

7 Refer to the information given in paragraphs 1 to 3, noting that there should be approximately 8 mm of free movement in the belt.

8 If adjustment is required, slacken the adjuster bolt locknut (situated on the base of the pump) and rotate the adjuster nut as necessary to tension the belt. Once the belt tension is correct, securely tighten the locknut.

#### Removal, renewal and refitting

9 To remove the belt, simply loosen the locknut and fully slacken the adjuster nut sufficiently to slip the drivebelt from the pulleys.

10 Refit the belt, and tension it as described previously. Note that when a new belt has been fitted it will probably stretch slightly to start with and the tension should be rechecked, and if necessary adjusted, after about 5 minutes running.

### Alternator/power steering pump drivebelt - later 1.6 litre models

#### Checking and adjustment

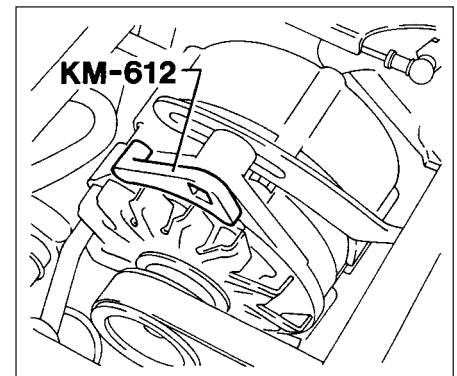
11 From March 1987 onwards, a single drivebelt is used for the alternator and power steering pump on 1.6 litre engines. The drivebelt is of the ribbed type and runs at a higher tension than the previous (V) belt.

12 To set the tension accurately, make up or obtain an adapter as shown (see illustration).

13 Slacken the alternator pivot and adjusting strap bolts and fit the adapter. Using a torque wrench apply a load of 55 Nm (40 lbf ft) for a new belt, or 50 Nm (37 lbf ft) for an old belt. Keep the tension applied and securely tighten the alternator bolts.

#### Removal, renewal and refitting

14 To remove the belt, simply loosen the alternator pivot and strap bolts and slip the drivebelt from the pulleys.



**9.12 Adapter KM-612 used for setting drivebelt tension on later 1.6 litre models**

15 Refit the belt, and tension it as described previously. Note that when a new belt has been fitted it will probably stretch slightly to start with and the tension should be rechecked, and if necessary adjusted, after about 5 minutes running.

## 10 Ignition system check



### Models with contact breaker ignition system

1 Renew the contact breaker points and adjust the gap and dwell angle as described in Chapter 5B. After adjustment put one or two drops of engine oil into the centre of the cam recess where appropriate and smear the surfaces of the cam itself with petroleum jelly. Do not over-lubricate as any excess could get onto the contact point surfaces and cause ignition difficulties.

2 The spark plug (HT) leads should also be checked.

3 Ensure that the leads are numbered before removing them, if not make identification marks to avoid confusion when refitting. Pull the leads from the plugs by gripping the end fitting, not the lead, otherwise the lead connection may be fractured.

4 Check inside the end fitting for signs of corrosion, which will look like a white crusty powder. Push the end fitting back onto the spark plug ensuring that it is a tight fit on the plug. If not, remove the lead again and use pliers to carefully crimp the metal connector inside the end fitting until it fits securely on the end of the spark plug.

5 Using a clean rag, wipe the entire length of the lead to remove any built-up dirt and grease. Once the lead is clean, check for burns, cracks and other damage. Do not bend the lead excessively or pull the lead lengthwise - the conductor inside might break.

6 Disconnect the other end of the lead from the distributor cap. Again, pull only on the end fitting. Check for corrosion and a tight fit in the same manner as the spark plug end. If an ohmmeter is available, check the resistance of the lead by connecting the meter between the spark plug end of the lead and the segment inside the distributor cap. Refit the lead securely on completion.

7 Check the remaining leads one at a time, in the same way.

8 If new spark plug (HT) leads are required, purchase a set for your specific car and engine.

9 Remove the distributor cap, wipe it clean and carefully inspect it inside and out for signs of cracks, carbon tracks (tracking) and worn, burned or loose contacts; check that the cap's carbon brush is unworn, free to move against spring pressure and making good contact with the rotor arm. Also inspect the cap seal for signs of wear or damage and



10.9a Remove the distributor cap . . .

renew if necessary. Remove and inspect the rotor arm (see illustrations). It is common practice to renew the cap and rotor arm whenever new spark plug (HT) leads are fitted. When fitting a new cap, remove the leads from the old cap one at a time and fit them to the new cap in the exact same location - do not simultaneously remove all the leads from the old cap or firing order confusion may occur. On refitting ensure that the arm is securely pressed onto the shaft and the cap is securely fitted.

10 Even with the ignition system in first class condition, some engines may still occasionally experience poor starting attributable to damp ignition components. To disperse moisture a moisture dispersant aerosol can be very effective.

### Models with an electronic ignition system



**Warning:** Voltages produced by an electronic ignition system are considerably higher than those produced by conventional

ignition systems. Extreme care must be taken when working on the system with the ignition switched on. Persons with surgically-implemented cardiac pacemaker devices should keep well clear of the ignition circuits, components and test equipment.

11 Check the condition of the HT leads and distributor components as described above in paragraphs 3 to 10.

12 Check the ignition timing (Chapter 5C).

## 11 Idle speed and mixture adjustments



1 Before checking the idle speed and mixture setting, always check first the following.

- Check that the ignition timing is accurate (Chapter 5B or 5C).
- Check that the spark plugs are in good condition and correctly gapped (Section 25).
- Check that the accelerator cable and, on carburettor models, the choke cable



10.9b . . . and pull off the rotor arm from the distributor shaft (1.6 litre model shown)

(where fitted) is correctly adjusted (see relevant Part of Chapter 4).

- Check that the crankcase breather hoses are secure with no leaks or kinks (Chapter 2).
- Check that the air cleaner filter element is clean (Section 31).
- Check that the exhaust system is in good condition (see relevant Part of Chapter 4).
- If the engine is running very roughly, check the compression pressures as described in Chapter 2.

2 Take the car on a journey of sufficient length to warm it up to normal operating temperature. Proceed as described under the relevant sub-heading.

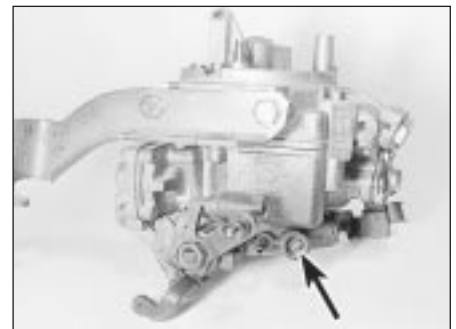
**Note:** Adjustment should be completed within two minutes of return, without stopping the engine. If this cannot be achieved, or if the radiator electric cooling fan operates, wait for the cooling fan to stop and clear any excess fuel from the inlet manifold by racing the engine two or three times to between 2000 and 3000 rpm, then allow it to idle again.

### Carburettor models

3 Connect a tachometer in accordance with the manufacturer's instructions.

4 If the idle speed is outside the specified tolerance (see Specifications), turn the adjustment screw as necessary (see illustrations). This will not alter the CO content of the exhaust gas to any extent.

5 If an exhaust gas analyser is available, check the exhaust gas CO content as follows.



11.4a Idle speed adjustment screw (arrowed) - 32TL carburettor





11.4b Idle speed adjustment screw (arrowed) - 2E3 carburettor



11.4c Adjusting the idle speed - Varajet carburettor



11.4d Idle speed adjusting screw (A) - 1B1 carburettor

6 Remove the tamperproof cap (where fitted) from the mixture adjustment screw. Satisfy yourself that you are not breaking any local or national laws by so doing.

7 With the engine at normal operating temperature, check the CO content of the exhaust gas. If it is outside the permitted tolerance, turn the mixture adjusting screw as necessary to correct it (see illustrations).

8 When the adjustments are correct, fit a new tamperproof cap to the screw and disconnect the tachometer. **Note:** On 32TL and Varajet II carburettors, if it proves difficult to adjust the idle speed and/or mixture setting then it is likely that the base idle speed is incorrect. Setting of this requires the use of an accurate vacuum gauge and should therefore be entrusted to a Vauxhall/Opel dealer.

## Fuel-injected models

### 1.8 litre models

9 With the engine at normal operating temperature, connect a tachometer in accordance with its manufacturer's instructions.

10 Allow the engine to idle, and compare the idle speed with that given in the Specifications. If adjustment is necessary, slacken the locknut and turn the idle speed adjusting screw until the specified speed is obtained. The adjusting screw is situated on the throttle valve housing. Tighten the locknut on completion.

11 If an exhaust gas analyser is available, check the mixture (CO level) as follows.

12 With the engine idling at the specified speed, read the CO level and compare it with that specified.

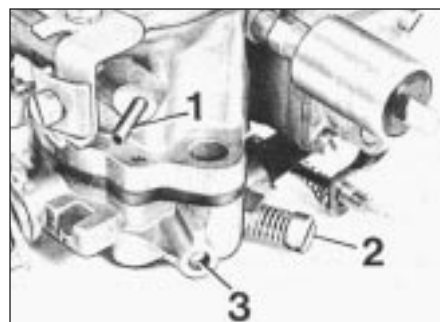
13 If adjustment is necessary, remove the tamperproof cap from the mixture adjusting screw on the airflow sensor (see illustration). Turn the screw clockwise to enrich the mixture, and anti-clockwise to weaken it.

14 On completion, re-adjust the idle speed if necessary. Note that failure to bring the CO level within the specified range indicates a fault in the injection system, or a worn engine.

### 2.0 litre models

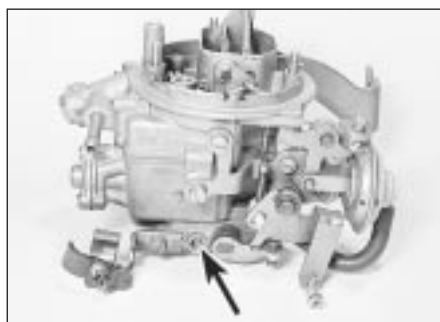
15 On all models the idle speed is automatically controlled by the electronic control unit and is not adjustable. If it is found to be incorrect then a fault is present in the fuel injection/ignition system (Chapter 4B).

16 On models without a catalytic converter, the mixture (CO level) can be adjusted as described above in paragraphs 9 and 11 to 14. On 16-valve models the adjusting screw is on the air mass meter (see illustration).



11.4e Idle adjustment points - 35PDSI carburettor

- 1 Distributor vacuum take-off
- 2 Idle speed adjustment screw
- 3 Mixture (CO level) adjustment screw



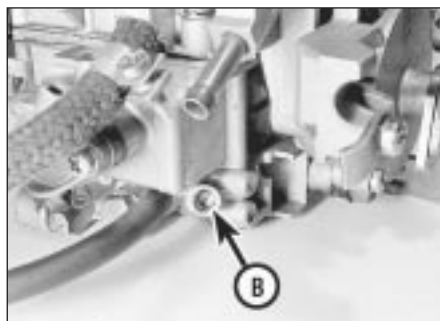
11.7a Mixture (CO) adjustment screw - 32TL carburettor



11.7b Mixture (CO) adjustment screw cap (arrowed) 2E3 carburettor



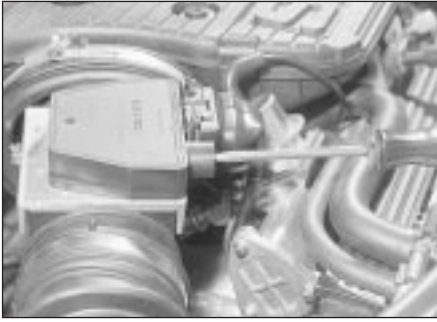
11.7c Adjusting the mixture (CO) setting - Varajet carburettor



11.7d Mixture (CO) adjustment screw (B) - 1B1 carburettor



11.13 On 1.8 litre fuel-injected models the mixture adjustment screw is located under the cap on the airflow sensor



11.16 Adjusting the mixture (CO) setting - 2.0 litre 16-valve models

17 On models fitted with a catalytic converter, the mixture (CO level) is also automatically controlled by the electronic control unit and is not adjustable. If it is found to be incorrect then a fault is present in the fuel injection/ignition system (Chapter 4B).

#### 1.4 and 1.6 litre models

18 On 1.4 and 1.6 litre models both the idle speed and mixture CO content are automatically controlled by the control unit and cannot be manually adjusted (See Chapter 4B). If necessary, they can be checked by if they are found to be incorrect then a fault is present in the fuel injection/ignition system.

#### 12 Fuel pump filter cleaning - carburettor models



**Warning:** Before carrying out the following operation refer to the precautions given in Safety first! and follow them implicitly.

*Petrol is a highly dangerous and volatile liquid and the precautions necessary when handling it cannot be overstressed*

**Note:** On some models the fuel pump may be a sealed unit, in which case this procedure is not necessary.

1 Place a wad of rag underneath the fuel pump to catch the fuel which will be spilt during the following operation.

2 Undo the retaining screw and remove the end cover from the fuel pump. Recover the rubber seal (see illustration).



12.2 Removing the fuel pump cover, filter and rubber seal - carburettor models

3 Remove the filter from the cover and wash it fresh fuel to remove any debris from it. Inspect the filter for signs of clogging or splitting and renew it if necessary.

4 Locate the filter in the cover and fit the rubber seal.

5 Refit the cover to the pump and securely tighten its retaining screw.

6 Start the engine and check for signs of fuel leakage.

#### 13 Automatic transmission fluid level check

1 To check the fluid level, the vehicle must be parked on level ground. Apply the handbrake.

2 If the transmission fluid is cold (ie, if the engine is cold), the level check must be completed with the engine idling, within one minute of the engine being started.

3 With the engine idling, fully depress the brake pedal, and move the gear selector lever smoothly through all positions, finishing in position "P".

4 With the engine still idling, withdraw the transmission fluid level dipstick (located at the left-hand side of the engine compartment, next to the engine oil level dipstick). Pull up the lever on the top of the dipstick to release it from the tube. Wipe the dipstick clean with a lint-free rag, re-insert it and withdraw it again.

5 If the transmission fluid was cold at the beginning of the procedure, the fluid level should be on the "MAX" mark on the side of the dipstick marked "+20°C". Note that 0.4 litres of fluid is required to raise the level from the "MIN" to the "MAX" mark.

6 If the transmission fluid was at operating temperature at the beginning of the procedure (ie, if the vehicle had been driven for at least 12 miles/20 km), the fluid level should be between the "MIN" and "MAX" marks on the side of the dipstick marked "+94°C". Note that 0.2 litres of fluid is required to raise the level from the "MIN" to the "MAX" mark.

7 If topping-up is necessary, stop the engine, and top-up with the specified type of fluid through the transmission dipstick tube.

8 Re-check the level, and refit the dipstick on completion.

#### 14 Electrical system check

1 Check the operation of all the electrical equipment, ie lights, direction indicators, horn, etc. Refer to the appropriate sections of Chapter 12 for details if any of the circuits are found to be inoperative.

2 Note that stop-light switch adjustment is described in Chapter 9.

3 Check all accessible wiring connectors, harnesses and retaining clips for security, and for signs of chafing or damage. Rectify any faults found.

#### 15 Wiper blade check

Check the condition of the wiper blades. If they are cracked, or show any signs of deterioration, or if they fail to clean the glass effectively, renew the blades. Ideally, the wiper blades should be renewed annually as a matter of course.

To remove a wiper blade, pull the arm away from the glass until it locks. Swivel the blade through 90°, then squeeze the locking clip, and detach the blade from the arm. When fitting the new blade, make sure that the blade locks securely into the arm, and that the blade is orientated correctly.

#### 16 Roadwheel bolt tightness check

Using a torque wrench on each wheel bolt in turn, ensure that the bolts are tightened to the specified torque.

#### 17 Brake pad, caliper and disc check

##### Front brakes

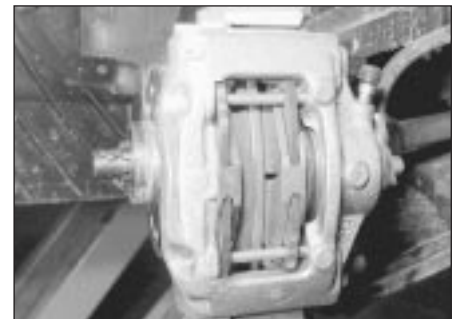
1 Apply the handbrake, then jack up the front of the vehicle and support securely on axle stands; remove the roadwheels (see "Jacking and Vehicle Support").

2 For a quick check, the thickness of friction material remaining on each pad can be measured through the slot in the front of the caliper body (see illustration). If any pad is worn to the minimum thickness or less, all four pads must be renewed (see Chapter 9).

3 For a complete check, the brake pads should be removed and cleaned. This will allow the operation of the caliper to be checked, and the condition of the brake disc itself to be fully examined on both sides (see Chapter 9).

##### Rear brakes

4 Chock the front wheels, then jack up the rear of the vehicle and support securely on axle stands; remove the roadwheels (see "Jacking and Vehicle Support"). Inspect the pads as described in paragraphs 2 and 3.



17.2 The thickness of the brake pads are visible through the caliper aperture

## 18 Rear wheel bearing adjustment

Refer to Chapter 10, Section 9.

## 19 Handbrake adjustment

### Rear drum brake models

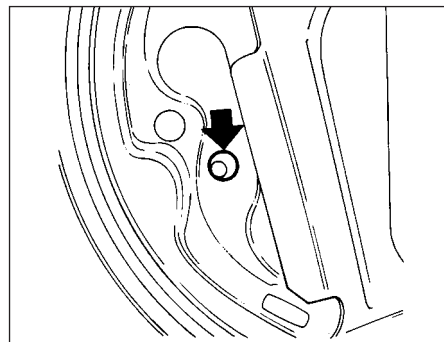
1 Normal adjustment of the handbrake takes place automatically due to the self-adjusting mechanism of the rear brakes. To compensate for cable stretch, or after a new cable has been fitted or the adjustment has otherwise been disturbed, proceed as follows.

2 Chock the front wheels, release the handbrake and raise and support the rear of the vehicle so that the rear wheels are clear of the ground.

3 Tighten the nut on the handbrake cable yoke until the rear wheels start to become stiff to turn, then back it off until they are free again (see illustration).

4 Check that the handbrake starts to take effect at the second notch of lever movement, and is fully applied by the fourth or fifth notch.

5 A further check may be made by removing the plug in the brake backplate (see illustration). When adjustment is correct, the pin on the handbrake operating lever is clear



19.5 Check the handbrake lever pin (arrowed) is correctly positioned as described in text



19.11a On models with rear disc brakes the handbrake shoe adjuster wheel is accessible through the hole in the disc . . .



19.3 Handbrake cable adjusting nut (arrowed) on yoke - rear drum brake models

of the shoe web by approximately 3 mm with the handbrake released.

6 When adjustment is correct, apply a smear of grease to the threads of the cable end fitting to prevent corrosion. Lower the vehicle, apply the handbrake and remove the wheel chocks.

### Rear disc brake models

7 Before checking handbrake adjustment, drive for approximately 300 metres at low speed with the handbrake lightly applied. This will clean off any rust or glaze from the drums and shoes.

8 Chock the front wheels and engage a gear. Slacken the rear wheel bolts. Raise and support the rear of the vehicle and remove the rear wheels.

9 Release the handbrake, then reapply it by two notches.

10 Slacken off the adjuster nut on the handbrake cable yoke (located to the left of the silencer) until it is at the end of its travel. If a silencer heat shield is fitted, access will be improved by removing it.

11 Turn a brake disc to bring the adjuster hole (the large unthreaded hole) into line with the adjuster at the bottom of the brake shoes. Using a screwdriver through the hole, turn the adjuster wheel until the shoes are against the disc, then back it off again until the disc is just free to turn without the shoes dragging (see illustrations).



19.11b . . . and can be adjusted using a suitable screwdriver

12 Repeat the operation on the other brake.

13 Tighten the cable adjuster nut until the shoes start to drag again. This should happen on both sides.

14 Release and fully reapply the handbrake a couple of times. Check that the discs turn freely when the control is fully released, and that the brake is fully applied at the sixth notch.

15 Refit the exhaust heat shield if it was removed. Refit the wheels, lower the vehicle and tighten the wheel bolts.

## 20 Driveshaft CV joint and gaiter check

Refer to Chapter 8, Section 5.

## 21 Hinge and lock lubrication

Lubricate the hinges of the bonnet, doors and tailgate with a light general-purpose oil. Similarly, lubricate all latches, locks and lock strikers. At the same time, check the security and operation of all the locks, adjusting them if necessary (see Chapter 11).

Lightly lubricate the bonnet release mechanism and cable with a suitable grease.

## 22 Exhaust system check

1 With the engine cold (at least an hour after the vehicle has been driven), check the complete exhaust system from the engine to the end of the tailpipe. The exhaust system is most easily checked with the vehicle raised on a hoist, or suitably supported on axle stands (see "Jacking and Vehicle Support"), so that the exhaust components are readily visible and accessible.

2 Check the exhaust pipes and connections for evidence of leaks, severe corrosion and damage. Make sure that all brackets and mountings are in good condition, and that all relevant nuts and bolts are tight. Leakage at any of the joints or in other parts of the system will usually show up as a black sooty stain in the vicinity of the leak. Reputable exhaust repair systems can be used for effective repairs to exhaust pipes and silencer boxes, including ends and bends. Check for an MOT-approved permanent exhaust repair.

3 Rattles and other noises can often be traced to the exhaust system, especially the brackets and mountings. Try to move the pipes and silencers. If the components are able to come into contact with the body or suspension parts, secure the system with new mountings. Otherwise separate the joints (if possible) and twist the pipes as necessary to provide additional clearance.



## 23 Road test

**Instruments and electrical equipment**

- 1 Check the operation of all instruments and electrical equipment.
- 2 Make sure that all instruments read correctly, and switch on all electrical equipment in turn, to check that it functions properly.

**Steering and suspension**

- 3 Check for any abnormalities in the steering, suspension, handling or road "feel".
- 4 Drive the vehicle, and check that there are no unusual vibrations or noises.
- 5 Check that the steering feels positive, with no excessive "sloppiness", or roughness, and check for any suspension noises when cornering and driving over bumps.

**Drivetrain**

- 6 Check the performance of the engine, clutch (where applicable), gearbox/transmission and driveshafts.

7 Listen for any unusual noises from the engine, clutch and gearbox/transmission.

8 Make sure that the engine runs smoothly when idling, and that there is no hesitation when accelerating.

9 Check that, where applicable, the clutch action is smooth and progressive, that the drive is taken up smoothly, and that the pedal travel is not excessive. Also listen for any noises when the clutch pedal is depressed.

10 On manual gearbox models, check that all gears can be engaged smoothly without noise, and that the gear lever action is not abnormally vague or "notchy".

11 On automatic transmission models, make sure that all gearchanges occur smoothly, without snatching, and without an increase in engine speed between changes. Check that all the gear positions can be selected with the vehicle at rest. If any problems are found, they should be referred to a Vauxhall/Opel dealer.

12 Listen for a metallic clicking sound from the front of the vehicle, as the vehicle is driven slowly in a circle with the steering on full-lock. Carry out this check in both directions. If a clicking noise is heard, this indicates wear in a driveshaft joint, in which case renew the joint if necessary.

**Check the operation and performance of the braking system**

13 Make sure that the vehicle does not pull to one side when braking, and that the wheels do not lock prematurely when braking hard.

14 Check that there is no vibration through the steering when braking.

15 Check that the handbrake operates correctly without excessive movement of the lever, and that it holds the vehicle stationary on a slope.

16 Test the operation of the brake servo unit as follows. With the engine off, depress the footbrake four or five times to exhaust the vacuum. Hold the brake pedal depressed, then start the engine. As the engine starts, there should be a noticeable "give" in the brake pedal as vacuum builds up. Allow the engine to run for at least two minutes, and then switch it off. If the brake pedal is depressed now, it should be possible to detect a hiss from the servo as the pedal is depressed. After about four or five applications, no further hissing should be heard, and the pedal should feel considerably harder.

## Every 18 000 miles

## 24 Air cleaner filter element renewal

**Carburettor models**

1 To remove the air cleaner element, remove the air cleaner cover. This is secured by a centre nut or bolt, or by three screws. Additionally, release the spring clips around the edge of the cover or, if spring clips are not fitted, carefully prise around the lower edge of the cover with your fingers to release the retaining lugs (see illustrations).

2 With the cover removed, lift out the element (see illustrations).

3 Wipe inside the air cleaner, being careful not to introduce dirt into the carburettor throat. It is preferable to remove the air cleaner completely. Remember to clean the inside of the air cleaner cover.

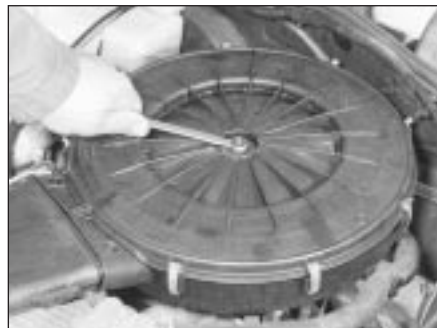
4 Fit the new element, then refit and secure the cover. Observe any cover-to-body alignment lugs or slots.

**Fuel injection models****1.4 and 1.6 litre models**

5 Refer to paragraphs 1 to 4.

**1.8 and 2.0 litre 8-valve models**

6 The air cleaner on these models is contained within the airflow sensor housing.



24.1a On carburettor models, undo the retaining nut (on some models the lid will be retained by screws) . . .



24.1b . . . and release the retaining clips . . .



24.2a . . . then lift off the air cleaner lid . . .



24.2b . . . and withdraw the filter element



24.7 On 1.8 and 2.0 litre 8-valve models, disconnect the airflow sensor wiring connector . . .



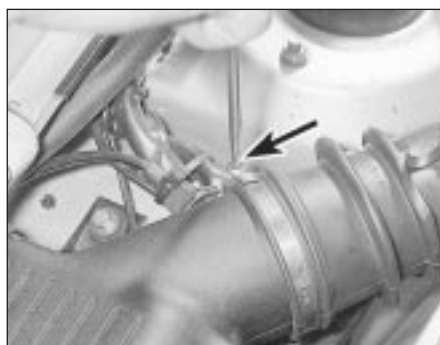
24.8a . . . then release the retaining clips . . .



24.8b . . . and remove the air cleaner housing cover, complete with the filter element



24.9 On fitting, ensure the element is correctly seated in the cover groove



24.10 Disconnecting the trunking from the air cleaner - 2.0 litre 16-valve models



24.13 Fitting a new air cleaner element - 2.0 litre 16-valve models

7 Release the locking clip, and disconnect the plug from the airflow sensor (see illustration). Disconnect the air trunking.

8 Release the spring clips, and lift off the air cleaner cover with airflow sensor attached. The element will probably come away with the cover (see illustrations). Do not drop or jar the airflow sensor.

9 Wipe clean the inside of the air cleaner and fit a new element to the cover, engaging the element seal in the cover recess (see illustration). Refit and secure the cover, then reconnect the airflow sensor plug. Refit the air trunking.

#### 2.0 litre 16-valve models

10 Disconnect the trunking which connects

the air cleaner to the mass meter (see illustration).

11 Release the four spring clips which secure the air cleaner lid. Remove the lid.

12 Remove the element and wipe clean the inside of the filter housing and lid.

13 Fit a new element, sealing lip uppermost (see illustration). Refit and secure the lid and trunking.

#### 25 Fuel filter renewal - fuel injection models



**Warning:** Before carrying out the following operation refer to the precautions given in *Safety first!* and follow them implicitly.

*Petrol is a highly dangerous and volatile liquid and the precautions necessary when handling it cannot be overstressed.*

1 The fuel filter is located under the rear of the vehicle. Chock the front wheels, jack up the rear of the vehicle, and support securely on axle stands (see "Jacking and Vehicle Support").

2 Disconnect the battery negative lead and position a suitable container below the fuel filter, to catch spilt fuel.

3 Slacken the retaining clips and, bearing in mind the information given in Chapter 4B on depressurising the fuel system, disconnect both hoses. To minimise fuel loss clamp the hoses either side of the filter or be prepared to

plug the hose ends as they are disconnected (see illustration).

4 Loosen the clamp bolt, and withdraw the filter from its clamp. Note the orientation of the fuel flow direction indicator on the filter. This will be in the form of an arrow which points in the direction of the fuel flow, or the filter will have AUS (out) stamped on its outlet side (see illustration).

5 Recover the mounting rubber from the old filter, and transfer it to the new filter.

6 Fit the new filter making sure its fuel flow direction indicator is facing the right way.

7 Reconnect the hose and securely tighten their retaining clips.

8 Start the engine and check the disturbed hose connections for signs of leakage.



25.3 Fuel filter showing mounting and hose connections



25.4 Fuel filter directional marking

## 26 Carburettor fuel inlet filter cleaning



**Warning:** Before carrying out the following operation refer to the precautions given in *Safety first!* and follow them implicitly. Petrol is a highly dangerous and volatile liquid and the precautions necessary when handling it cannot be overstressed.

Referring to the relevant Section of Chapter 4A, remove the filter, wash it fresh fuel to remove any debris from it. Inspect the filter for signs of clogging or splitting and renew it if necessary. Refit the filter and reconnect the fuel hose.

## 27 Manual transmission oil level check

- 1 Ensure that the vehicle is standing on level ground and the handbrake applied.
- 2 Working underneath the vehicle, unscrew the transmission oil level plug (see illustration). The level plug is located beside the driveshaft inner CV joint; on 1.2, 1.3, 1.4 and later 1.6 litre models the plug is on the left-hand side of the transmission, and on all other models it is on the right-hand side.
- 3 The oil level should be up to the lower edge of the level plug hole.
- 4 If necessary, top-up with oil through the breather/filler orifice in the gear selector cover. Unscrew the breather/filler plug, and top-up with the specified grade of oil, until oil just begins to run from the level plug hole. A funnel may be helpful, to avoid spillage (see illustrations). Do not overfill - if too much oil is added, wait until the excess has run out of the level plug hole. Refit the level plug and the breather/filler plug on completion.

## 28 Clutch adjustment check

Refer to Chapter 6

## 29 Rear brake shoe, wheel cylinder and drum check

- 1 Chock the front wheels, then jack up the rear of the vehicle, and support it securely on axle stands (see *"Jacking and Vehicle Support"*).
- 2 For a quick check, the thickness of friction material remaining on one of the brake shoes can be observed through the hole in the brake backplate which is exposed by prising out the sealing grommet (see illustration). If a rod of the same diameter as the specified minimum friction material thickness is placed against the shoe friction material, the amount of wear can be assessed. A torch or inspection light



27.2 Removing the manual transmission level plug - early 1.6 litre model shown

will probably be required. If the friction material on any shoe is worn down to the specified minimum thickness or less, all four shoes must be renewed as a set.

- 3 For a comprehensive check, the brake drum should be removed and cleaned. This will allow the wheel cylinders to be checked, and the condition of the brake drum itself to be fully examined (see Chapter 9).

## 30 Brake fluid renewal



**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. Excess moisture can cause a dangerous loss of braking effectiveness.

- 1 The procedure is similar to that for the bleeding of the hydraulic system as described in Chapter 9, except that the brake fluid reservoir should be emptied by siphoning, using a clean poultry baster or similar before starting, and allowance should be made for the old fluid to be expelled when bleeding a section of the circuit.
- 2 Working as described in Chapter 9, open the first bleed screw in the sequence and pump the brake pedal gently until nearly all the old fluid has been emptied from the master cylinder reservoir. Top-up to the 'MAX'



29.2 Removing the sealing grommet from the inspection hole in the rear brake backplate



27.4a To top up, unscrew the breather/filler plug from the top of the transmission . . .



27.4b . . . then top up via the breather/filler plug orifice

level with new fluid and continue pumping until only the new fluid remains in the reservoir and new fluid can be seen emerging from the bleed screw. Tighten the screw and top the reservoir level up to the 'MAX' level line.



**Old hydraulic fluid is invariably much darker in colour than the new, making it easy to distinguish the two.**

- 3 Work through all the remaining bleed screws in sequence until new fluid can be seen at all of them. Be careful to keep the master cylinder reservoir topped up to above the 'MIN' level at all times or air may enter the system and greatly increase the length of the task.
- 4 When the operation is complete, check that all bleed screws are securely tightened and that their dust caps are refitted. Wash off all traces of spilt fluid and recheck the master cylinder reservoir fluid level.
- 5 Check the operation of the brakes before taking the car on the road.

## 31 Headlamp aim check

Accurate adjustment of the headlight beam is only possible using optical beam-setting equipment, and this work should therefore be carried out by a Vauxhall/Opel dealer or service station with the necessary facilities.

Basic adjustments can be carried out in an emergency, and further details are given in Chapter 12.



## Every 2 Years

### 32 Coolant renewal



#### Cooling system draining



**Warning:** Wait until the engine is cold before starting this procedure. Do not allow antifreeze to come in contact with your skin or painted surfaces of the vehicle. Rinse off spills immediately with plenty of water. Never leave antifreeze lying around in an open container or in a puddle in the driveway or on the garage floor. Children and pets are attracted by its sweet smell. Antifreeze is fatal if ingested.

1 To drain the cooling system, remove the expansion tank filler cap. Turn the cap anti-clockwise until it reaches the first stop. Wait until any pressure remaining in the system is released then push the cap down, turn it anti-clockwise to the second stop and lift off.

2 Position a suitable container beneath the radiator bottom hose union.

3 Slacken the hose clip and ease the hose from the radiator stub. If the hose joint has not been disturbed for some time, it will be necessary to gently manipulate the hose to break the joint. Do not use excessive force, or the radiator stub could be damaged. Allow the coolant to drain into the container.

4 As no cylinder block drain plug is fitted and the radiator bottom hose union may be situated halfway up the radiator, this may not fully drain the cooling system.

5 If the coolant has been drained for a reason other than renewal, then provided it is clean and less than two years old, it can be re-used.

6 Reconnect the hose and securely tighten its retaining clip on completion of draining.

#### Cooling system flushing

7 If coolant renewal has been neglected, or if the antifreeze mixture has become diluted, then in time, the cooling system may gradually lose efficiency, as the coolant passages become restricted due to rust, scale deposits, and other sediment.

8 The cooling system efficiency can be restored by flushing the system clean.

9 The radiator should be flushed independently of the engine to avoid unnecessary contamination.

#### Radiator flushing

10 To flush the radiator, drain the cooling system then proceed as follows.

11 Slacken the retaining clips and disconnect the top and bottom hoses from the radiator.

12 Insert a garden hose into the radiator top inlet. Direct a flow of clean water through the radiator, and continue flushing until clean water emerges from the radiator bottom outlet.

13 If after a reasonable period, the water still does not run clear, the radiator can be flushed



**32.19a** On 1.2 litre models, bleed the cooling system through the cylinder head heater hose outlet

with a good proprietary cleaning agent. It is important that the manufacturers instructions are followed carefully. If the contamination is particularly bad, insert the hose in the radiator bottom outlet, and flush the radiator in reverse.

#### Engine flushing

14 To flush the engine, remove the thermostat as described in Chapter 3, then temporarily refit the thermostat cover.

15 With the top and bottom hoses disconnected from the radiator, insert a garden hose into the radiator top hose. Direct a clean flow of water through the engine, and continue flushing until clean water emerges from the radiator bottom hose.

16 On completion of flushing, refit the thermostat and reconnect the hoses with reference to Chapter 3.

#### Cooling system filling

17 Before attempting to fill the cooling system, make sure that all hoses and clips are in good condition, and that the clips are tight. Note that an antifreeze mixture must be used all year round, to prevent corrosion of the engine components (see following sub-Section). Also check that the radiator and cylinder block drain plugs are in place and tight.

18 Remove the expansion tank filler cap.

19 On 1.2 litre models, disconnect the heater hose from the cylinder head, on 1.3, 1.4 and later 1.6 litre engines models, disconnect the wire and unscrew the coolant temperature sender from the inlet manifold. On early 1.6, and all 1.8 and 2.0 litre models, unscrew the bleed screw which is situated in the thermostat housing cover (where no bleed screw is fitted, unscrew the temperature sender unit) (see illustrations).

20 Fill the system by slowly pouring the coolant into the expansion tank to prevent airlocks from forming.

21 If the coolant is being renewed, begin by pouring in a couple of litres of water, followed by the correct quantity of antifreeze, then top-up with more water.

22 When coolant free of air bubbles emerges from the orifice, reconnect the heater hose (1.2 litre models) or refit the coolant temperature



**32.19b** On 1.3 litre models, unscrew temperature gauge sender unit from the manifold to bleed the cooling system

sender/bleed screw (as applicable) and tighten it securely (all other models).

23 Top-up the coolant level to the "KALT" (or "COLD") mark on the expansion tank, then refit the expansion tank cap.

24 Start the engine and run it until it reaches normal operating temperature, then stop the engine and allow it to cool.

25 Check for leaks, particularly around disturbed components. Check the coolant level in the expansion tank, and top-up if necessary. Note that the system must be cold before an accurate level is indicated in the expansion tank. If the expansion tank cap is removed while the engine is still warm, cover the cap with a thick cloth, and unscrew the cap slowly to gradually relieve the system pressure (a hissing sound will normally be heard). Wait until any pressure remaining in the system is released, then continue to turn the cap until it can be removed.

#### Antifreeze mixture

26 The antifreeze should always be renewed at the specified intervals. This is necessary not only to maintain the antifreeze properties, but also to prevent corrosion which would otherwise occur as the corrosion inhibitors become progressively less effective.

27 Always use an ethylene-glycol based antifreeze which is suitable for use in mixed metal cooling systems. The quantity of antifreeze and levels of protection are indicated in the Specifications.

28 Before adding antifreeze the cooling system should be completely drained, preferably flushed, and all hoses checked for condition and security.

29 After filling with antifreeze, a label should be attached to the expansion tank stating the type and concentration of antifreeze used and the date installed. Any subsequent topping up should be made with the same type and concentration of antifreeze.

30 Do not use engine antifreeze in the screen washer system, as it will cause damage to the vehicle paintwork. A proprietary screen should be added to the washer system in the recommended quantities.

## Every 36 000 miles

### 33 Automatic transmission fluid renewal



- 1 Allow the transmission to cool down before draining, as the fluid can be very hot indeed.
- 2 Remove all the fluid pan screws except one which should be unscrewed through several turns.
- 3 Release the fluid pan from its gasket and as the end of the pan tilts downwards, catch the

fluid in a suitable container.

- 4 Remove the remaining screw and the pan. Peel off the gasket (where fitted) or remove all traces of sealant (as applicable).

- 5 Pull the filter mesh from its securing clips and recover its sealing ring. Clean the filter in a high flash-point solvent and allow it to dry. If the filter is clogged or split it must be renewed.

- 6 Fit a new O-ring and refit the filter securely.

- 7 Ensure that the fluid pan and transmission

mating surfaces are clean and dry and bolt on the fluid pan using a new gasket. Where no gasket is fitted, apply a bead of sealant about 5.0 mm thick to clean surfaces. The fluid pan which is fitted with a gasket can be identified by the strengthening ribs on the pan flanges. The pan for use with silicone sealant has plain flanges.

- 8 Fill the transmission with the specified quantity of fluid and then check the level as described in Section 13.

## Specifications

### Cooling system

Antifreeze mixtures:

Protection down to -15°C .....	28% antifreeze
Protection down to -30°C .....	50% antifreeze

**Note:** Refer to antifreeze manufacturer for latest recommendation

### Fuel system

Idle speed:

Carburettor models:	
Manual transmission .....	900 to 950 rpm
Automatic transmission .....	800 to 850 rpm

Fuel-injected models:

1.4 litre models .....	830 to 990 rpm*
1.6 litre models .....	720 to 880 rpm*

1.8 litre models:

Early (pre 1987) models:

Manual transmission .....	900 to 950 rpm
Automatic transmission .....	800 to 850 rpm

Later (1987 onwards) models

2.0 litre models .....	720 to 780 rpm*
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Idle mixture CO content:

Carburettor models .....	1.0 to 1.5%
Fuel-injected models .....	Less than 1.0%**

\*Not adjustable - controlled by ECU

\*\*On all 1.4 and 1.6 litre fuel injection models, and 2.0 litre models with a catalytic converter the exhaust gas CO content is regulated by the control unit and is not adjustable

### Ignition system

Spark plugs:

Type:

1.2 litre models .....	Champion RL82YCC or RL82YC
1.3, 1.4, 1.6 and 1.8 litre models .....	Champion RN9YCC or RN9YC
2.0 litre models:	
8-valve models .....	Champion RN9YCC or RN9YC
16-valve models .....	Champion RC9MCC

Electrode gap:

RL82YCC, RN9YCC and RC9MCC plugs .....	0.8 mm
RL82YC and RN9YC plugs .....	0.7 mm

\*The spark plug gap quoted is that recommended by Champion for their specified plugs listed above. If spark plugs of any other type are to be fitted, refer to their manufacturer's spark plug gap recommendations.

HT leads .....

Champion type not available

### Braking system

Brake pad minimum thickness (including backing plate) .....	7.0 mm
Rear brake shoe minimum friction material-to-rivet head depth .....	0.5 mm

### Torque wrench settings

	Nm	lbf ft
Sump drain plug .....	45	33
Spark plugs .....	20	15
Roadwheel bolts .....	90	66