

Chapter 1 Part A: Routine maintenance and servicing – petrol engines

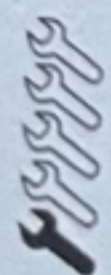
Contents

	Section number		Section number
Air conditioning drain hoses – check	19	General information	1
Air filter element – renewal	24	Handbrake – check and adjustment	7
Airbag system – check	9	Headlight beam alignment – check	10
Automatic transmission fluid – renewal	28	Hinges and locks – lubrication	18
Automatic transmission fluid level – check	14	Hoses and fluids – leak check	5
Auxiliary drivebelt – renewal	27	Manual transmission oil level – check	23
Auxiliary drivebelt condition – check	21	Pollen filter – renew	20
Brake fluid – renewal	29	Power steering fluid level – check	11
Brake pad wear – check	17	Regular maintenance	2
Coolant – renewal	25	Road test	12
Coolant antifreeze concentration – check	13	Seat belt condition – check	8
Driveshaft joints and gaiters – check	15	Service indicator – resetting	4
Engine oil and filter – renewal	3	Spark plugs – renewal	22
Exhaust system – check	16	Steering and suspension components – check	6
Fuel filter – renewal	26		

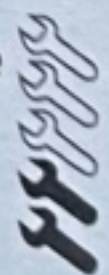


Degrees of difficulty

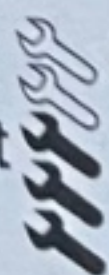
Easy, suitable for
novice with little
experience



Fairly easy, suitable
for beginner with
some experience



Fairly difficult,
suitable for competent
DIY mechanic



Difficult, suitable
for experienced DIY
mechanic



Very difficult,
suitable for expert
DIY or professional



1A•2 Servicing specifications – petrol engines

Lubricants and fluids

See end of Weekly checks on page 0•16

Capacities

Engine oil

All engines (drain and refill, with filter change)

4.0 litres

5.4 litres

1.0 litres

7.4 litres

Total from dry, including engine oil cooler

Between dipstick MAX and MIN markings.

Cooling system

Transmission

Manual:

Drain and refill.

1.5 litres

1.9 litres

Automatic:

Drain and refill.

3.5 litres

7.0 litres

Total from dry (including torque converter and cooler).

Braking system

System capacity.

0.9 litres

Power-assisted steering

System capacity.

1.3 litres

75.0 litres (16.5 gallons)

Fuel tank

Cooling system

Antifreeze mixture:*

50% antifreeze

55% antifreeze

Protection down to -37°C

Protection down to -45°C

* Note: Coolant from Saab dealers is premixed with water at the correct ratio.

Ignition system

Firing order.

1 – 3 – 4 – 2

Spark plugs:

2.0 litre engines

2.3 litre engines

Type

NGK BCPR6ES-11

NGK PFR 6H-10

Electrode gap

1.0 mm

1.0 mm

Brakes

Brake pad friction material minimum thickness

4.0 mm at time of service (acoustic warning at 3.0 mm)

Tyre pressures

Refer to the end of Weekly checks on page 0•16

Torque wrench settings

Automatic transmission drain plug.

Engine oil sump drain plug.

Manual transmission drain, level and filler plugs

Spark plugs

Wheel bolts.

Nm

40

25

50

28

110

lbf ft

30

18

37

21

81

The maintenance interval is provided with the assumption that you are carrying out the work to the minimum maintenance interval by the manufacturer for your vehicle. If you wish to keep your vehicle in the best condition at all times, you may wish to carry out these procedures more frequently. Frequent maintenance will improve the efficiency, performance and life of your vehicle.

Every 250 miles

☐ Refer to Weekly checks

Every 900 miles

☐ Engine oil and filter

Note: Frequent oil changes are recommended if the engine is used for short journeys.

annually if the engine is used for short journeys.

Every 1800 miles

☐ Service interval

☐ Hoses and belts

☐ Steering gear

(Section 10)

☐ Handbrake

☐ Seat belts

☐ Airbag

☐ Headlights

☐ Power windows

☐ Road tax

☐ Coolant

☐ Autom. transmission

☐ Driveshafts

☐ Exhaust

☐ Brakes

☐ Hinges

☐ Air conditioning

☐ Pollen filter

☐ Auxiliary lights

Maintenance schedule – petrol engines 1A•3

The maintenance intervals in this manual are provided with the assumption that you will be carrying out the work yourself. 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 dealer service department (or other workshop recognised by the vehicle manufacturer as providing the same standard of service) in order to preserve the warranty. The vehicle manufacturer may reject warranty claims if you are unable to prove that servicing has been carried out as and when specified,

using only original equipment parts or parts certified to be of equivalent quality.

All Saab models are equipped with a service interval display (or Saab Information Display – SID) on the fascia, which will indicate TIME FOR SERVICE when a service is due. However, Saab point out that, 'due to the relationship between time and mileage, some operating conditions will make annual service more suitable'.

Every 250 miles or weekly

- ☐ Refer to *Weekly checks*

Every 9000 miles

- ☐ Engine oil and filter – renewal (Section 3)

Note: Frequent oil and filter changes are good for the engine. We recommend changing the oil at the mileage specified here, or at least annually if the mileage covered is less.

Every 18 000 miles

- ☐ Service indicator – resetting (Section 4)
- ☐ Hoses and fluids – leak check (Section 5)
- ☐ Steering and suspension components – check (Section 6)
- ☐ Handbrake – check and adjustment (Section 7)
- ☐ Seat belt condition – check (Section 8)
- ☐ Airbag system – check (Section 9)
- ☐ Headlight beam alignment – check (Section 10)
- ☐ Power steering fluid level – check (Section 11)
- ☐ Road test (Section 12)
- ☐ Coolant antifreeze concentration – check (Section 13)
- ☐ Automatic transmission fluid level – check (Section 14)
- ☐ Driveshaft joints and gaiters – check (Section 15)
- ☐ Exhaust system – check (Section 16)
- ☐ Brake pad wear – check (Section 17)
- ☐ Hinges and locks – lubrication (Section 18)
- ☐ Air conditioning drain hoses – check (Section 19)
- ☐ Pollen filter – renew (Section 20)
- ☐ Auxiliary drivebelt condition – check (Section 21)

Every 36 000 miles

- ☐ Spark plugs – renewal (Section 22)
- ☐ Manual transmission oil level – check (Section 23)
- ☐ Air filter element – renewal (Section 24)

Every 3 years

- ☐ Coolant – renewal (Section 25)

Note: This work is not included in the Saab schedule, and should not be required if the recommended Saab antifreeze/inhibitor is used.

Every 72 000 miles

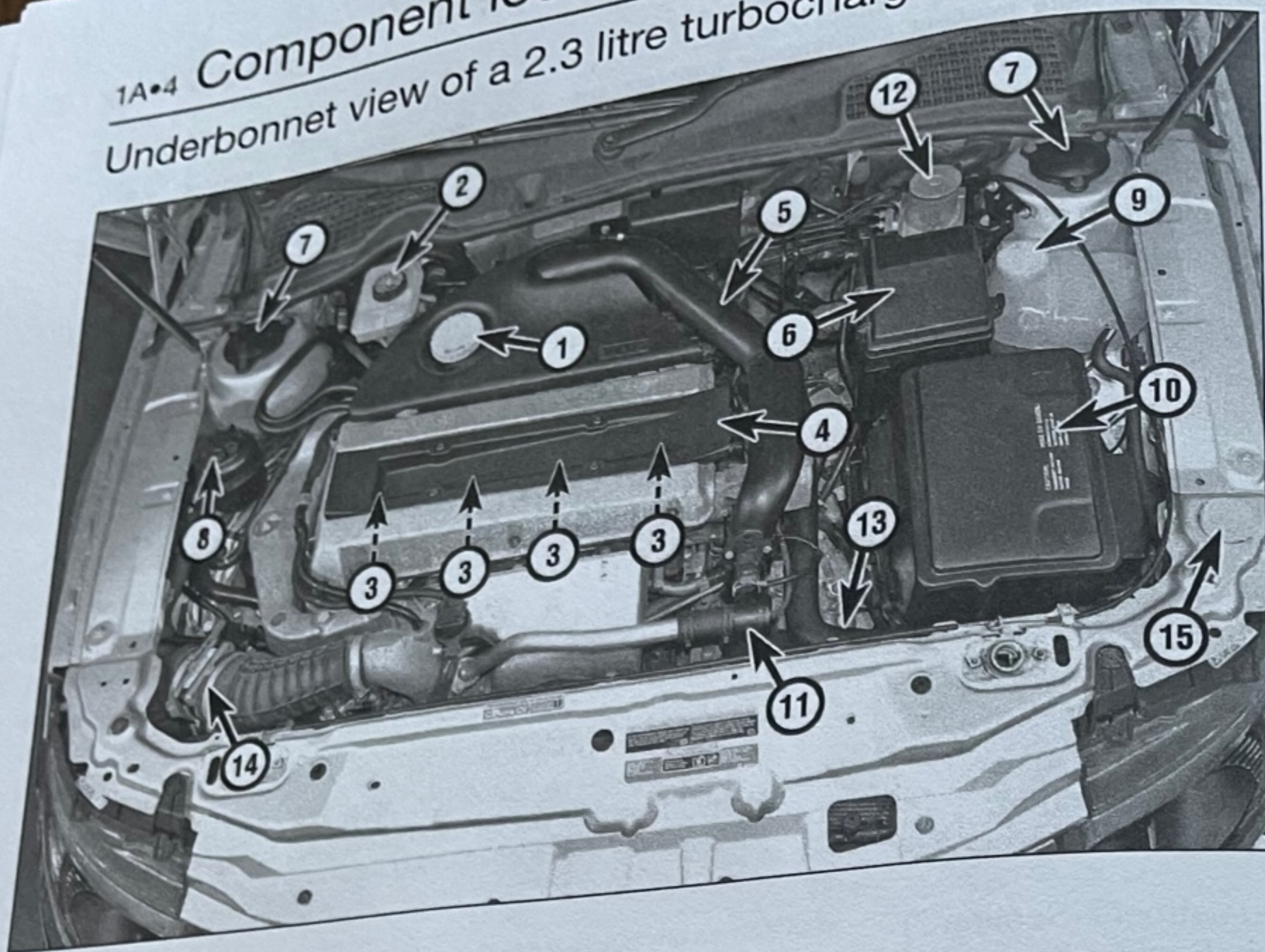
- ☐ Fuel filter – renewal (Section 26)
- ☐ Auxiliary drivebelt – renewal (Section 27)
- ☐ Automatic transmission fluid – renewal (Section 28)

Every 4 years

- ☐ Brake fluid – renewal (Section 29)

1A•4 Component locations – petrol engines

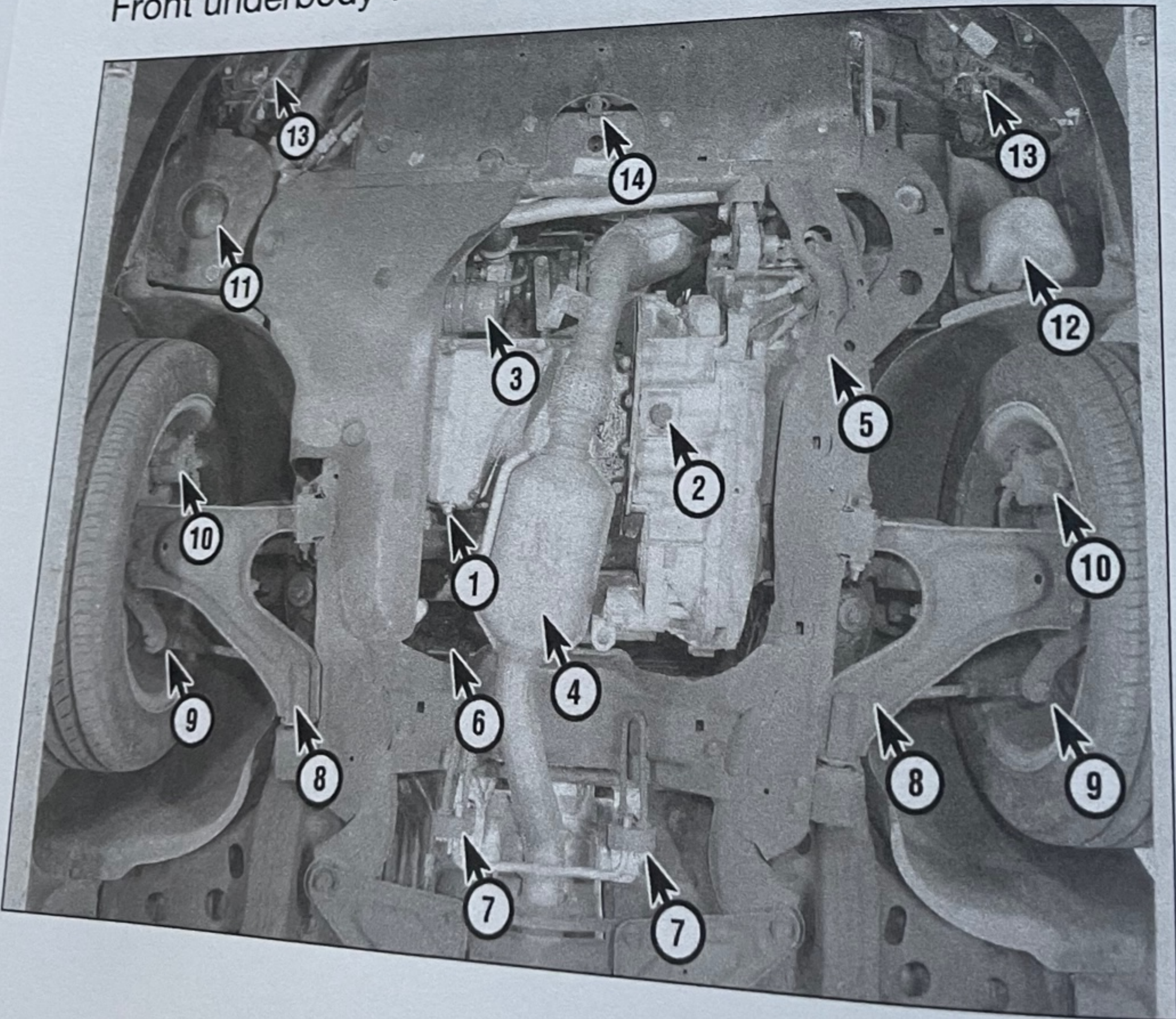
Underbonnet view of a 2.3 litre turbocharged petrol engine



- 1 Engine oil filler cap and dipstick
- 2 Hydraulic brake fluid reservoir
- 3 Spark plugs (hidden)
- 4 Ignition coil module
- 5 Turbocharger-to-engine air intake pipe
- 6 Engine compartment fusebox
- 7 Front suspension strut top mountings
- 8 Power steering fluid reservoir
- 9 Coolant expansion tank
- 10 Battery
- 11 Turbocharger control by-pass valve
- 12 ABS unit
- 13 Radiator top hose
- 14 Fuel injection system air-mass meter
- 15 Windscreen washer fluid reservoir filler cap

- 1 Rear suspension crossmember
- 2 Rear anti-roll bar
- 3 Rear suspension lower transverse link
- 4 Brake hydraulic flexible hoses
- 5 Handbrake cables
- 6 Fuel tank
- 7 Rear suspension trailing arms
- 8 Rear suspension strut/shock absorbers
- 9 Exhaust rear silencer and tailpipe

Front underbody view



- 1 Engine oil drain plug
- 2 Automatic transmission fluid drain plug
- 3 Engine oil filter
- 4 Exhaust front pipe
- 5 Front suspension/engine subframe
- 6 Steering gear
- 7 Exhaust mounting rubbers
- 8 Front suspension lower arms
- 9 Steering track rod ends
- 10 Front brake callipers
- 11 Air filter housing
- 12 Windscreen washer fluid reservoir
- 13 Front foglights
- 14 Front towing eye position

Maintenance

1 General information

1 This Chapter is designed to help the mechanic maintain his/her vehicle in good condition, economy, long life and performance.

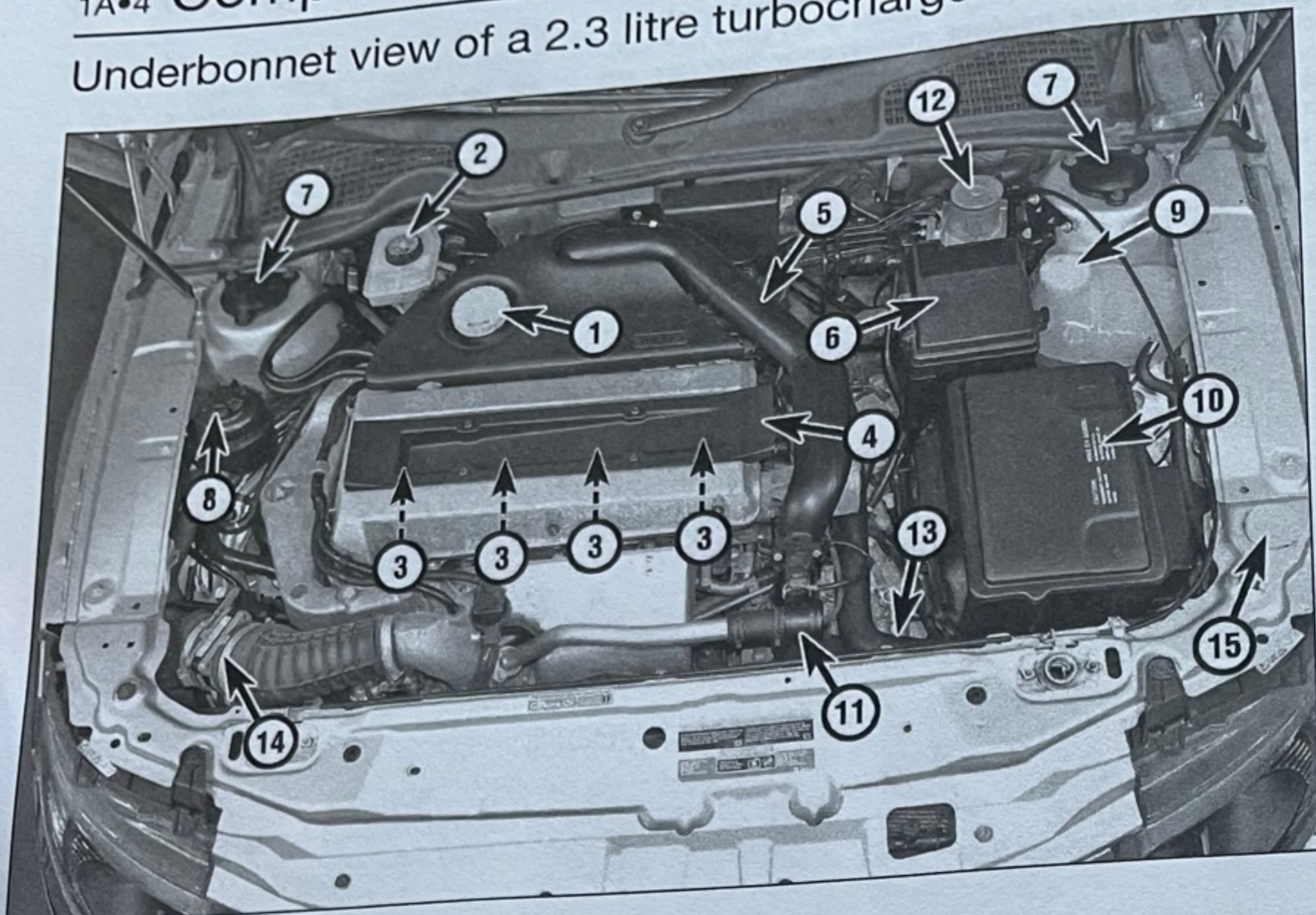
2 The Chapter contains a maintenance schedule, followed by specific instructions for each task. Visual checks, adjustments and other helpful items are included in the accompanying illustrations of the engine compartment and the underbody view for the locations of the various components.

3 Servicing your vehicle at the recommended intervals will not produce the following Sections of the maintenance program in a long and reliable manner. A comprehensive plan of maintenance items but not others will not produce the same results. As you service your vehicle, you may discover that many items are not as good as they should be – be grateful for the particular problem or because of the otherwise-unrelated nature of the problem. For example, if for any reason, the vehicle is not inspected at the scheduled intervals and steering components are not checked, the vehicle may be unsafe to drive.

1A•4 Component locations – petrol engines

1A•4 Component locations – petrol engine

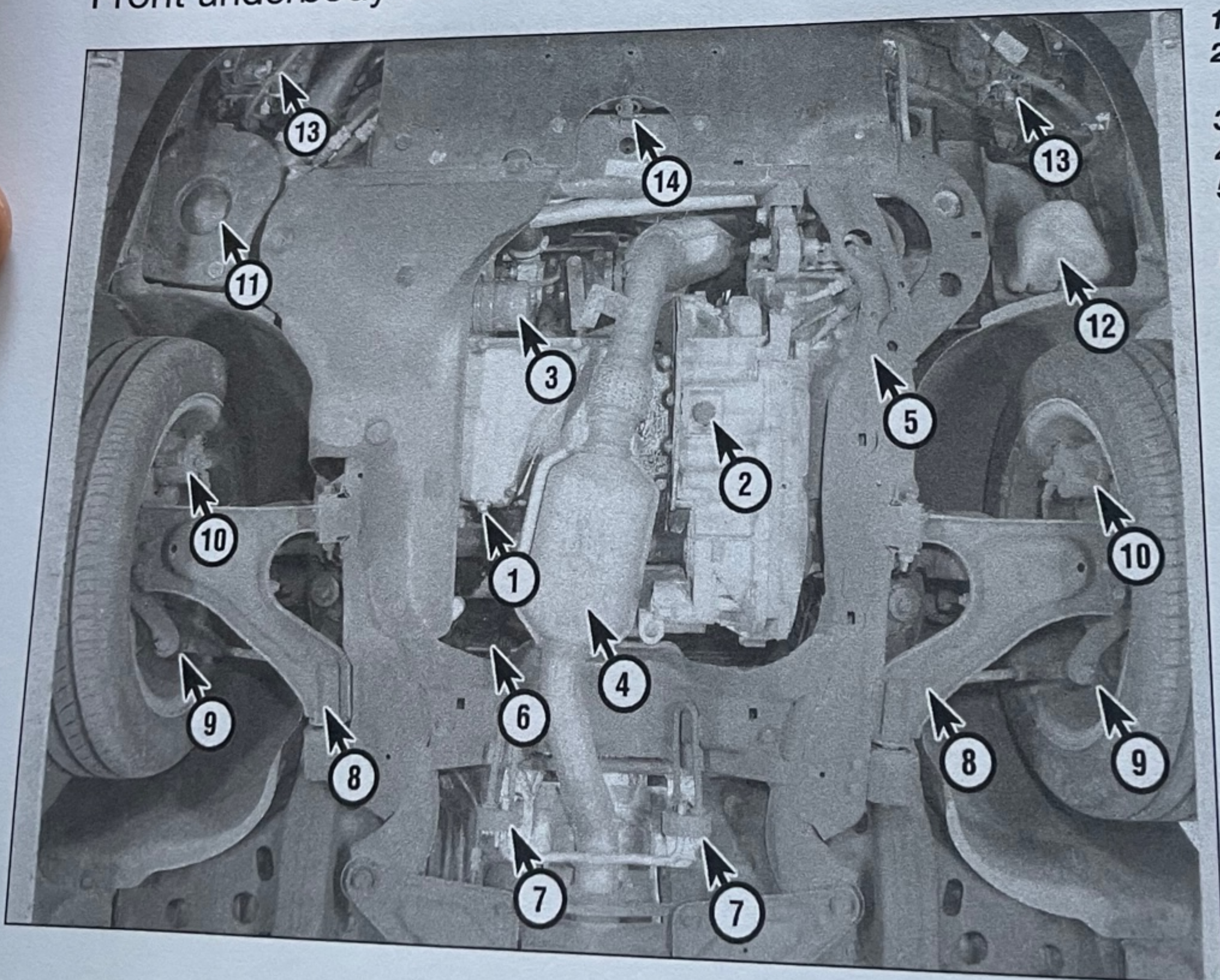
Underbonnet view of a 2.3 litre turbocharged petrol engine



- 1 Engine oil filler cap and dipstick
- 2 Hydraulic brake fluid reservoir
- 3 Spark plugs (hidden)
- 4 Ignition coil module
- 5 Turbocharger-to-engine air intake pipe
- 6 Engine compartment fusebox
- 7 Front suspension strut top mountings
- 8 Power steering fluid reservoir
- 9 Coolant expansion tank
- 10 Battery
- 11 Turbocharger control by-pass valve
- 12 ABS unit
- 13 Radiator top hose
- 14 Fuel injection system air-mass meter
- 15 Windscreen washer fluid reservoir filler cap

- 1 Rear suspension crossmember
- 2 Rear anti-roll bar
- 3 Rear suspension transverse link
- 4 Brake hydraulic hoses
- 5 Handbrake cable
- 6 Fuel tank
- 7 Rear suspension arms
- 8 Rear suspension shock absorbers
- 9 Exhaust rear tailpipe

Front underbody view



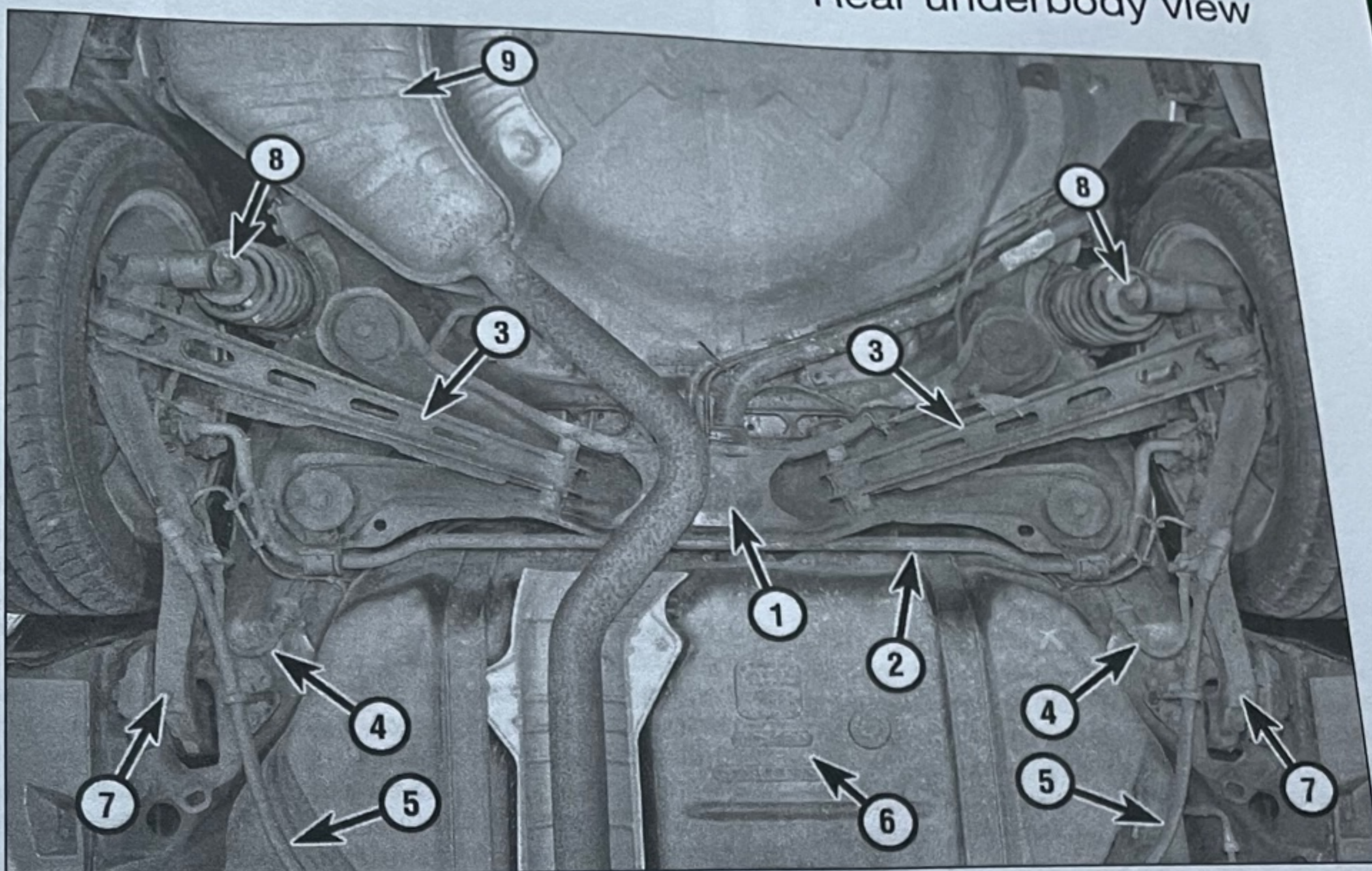
- 1 Engine oil drain plug
- 2 Automatic transmission fluid drain plug
- 3 Engine oil filter
- 4 Exhaust front pipe
- 5 Front suspension/engine subframe
- 6 Steering gear
- 7 Exhaust mounting rubbers
- 8 Front suspension lower arms
- 9 Steering track rod ends
- 10 Front brake calipers
- 11 Air filter housing
- 12 Windscreen washer fluid reservoir
- 13 Front foglights
- 14 Front towing eye position

Mainte

1 General

1 This Chapter mechanic m economy, lo
2 The Chap schedule, specifically Visual che and other the acco compart for the loc
3 Servic the mile the follo mainten in a lon compr items l interval
4 As disco and s of the or b other anot for a insp and

- 1 Rear suspension crossmember
- 2 Rear anti-roll bar
- 3 Rear suspension lower transverse link
- 4 Brake hydraulic flexible hoses
- 5 Handbrake cables
- 6 Fuel tank
- 7 Rear suspension trailing arms
- 8 Rear suspension strut/shock absorbers
- 9 Exhaust rear silencer and tailpipe



Maintenance procedures

1 General information

1 This Chapter is designed to help the home mechanic maintain his/her 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 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.

3 Servicing 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 the particular procedure being performed, 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 system could 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 together all the parts and tools required. If a problem is encountered, seek advice from a parts specialist, or a dealer service department.

2 Regular maintenance

1 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.

2 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.

3 If engine wear is suspected, a compression test (refer to Chapter 2A) 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 2C) is carried out first.

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

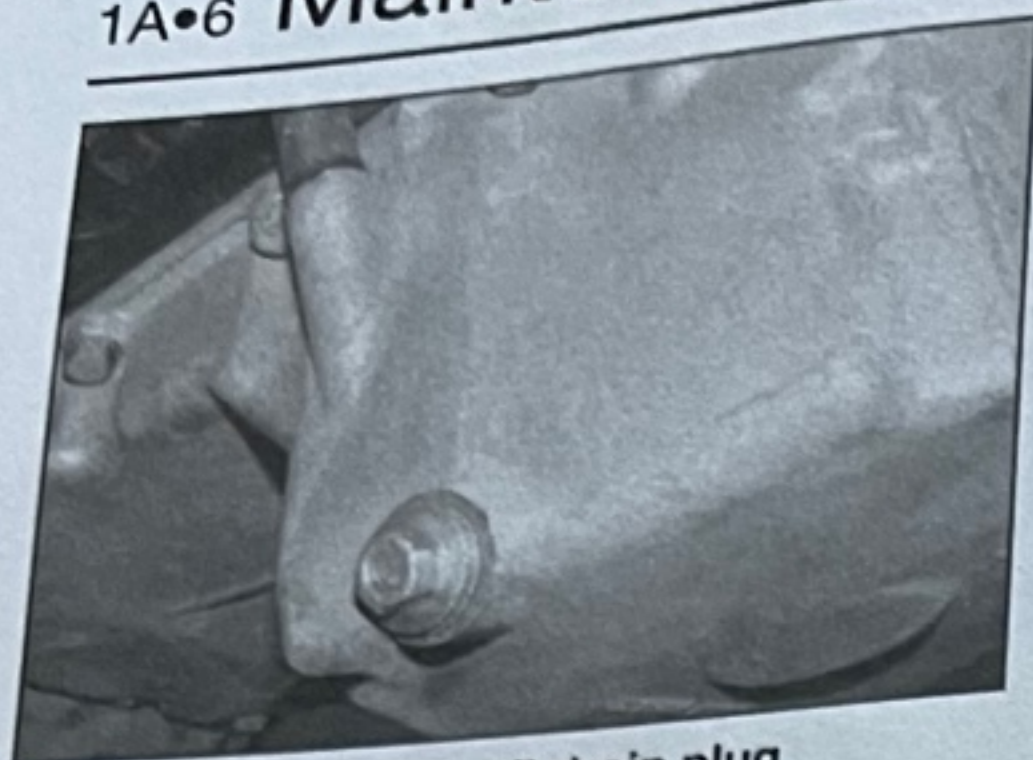
Primary operations

- a) Clean, inspect and test the battery ('Weekly checks' and Chapter 5A)
- b) Check all the engine-related fluids ('Weekly checks').
- c) Check the condition and tension of the auxiliary drivebelt (Section 21).
- d) Renew the spark plugs (Section 22).
- e) Check the condition of the air filter element, and renew if necessary (Section 2).
- f) Renew the fuel filter (Section 26).
- g) Check the condition of all hoses, and check for fluid leaks (Section 5).

Secondary operations

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

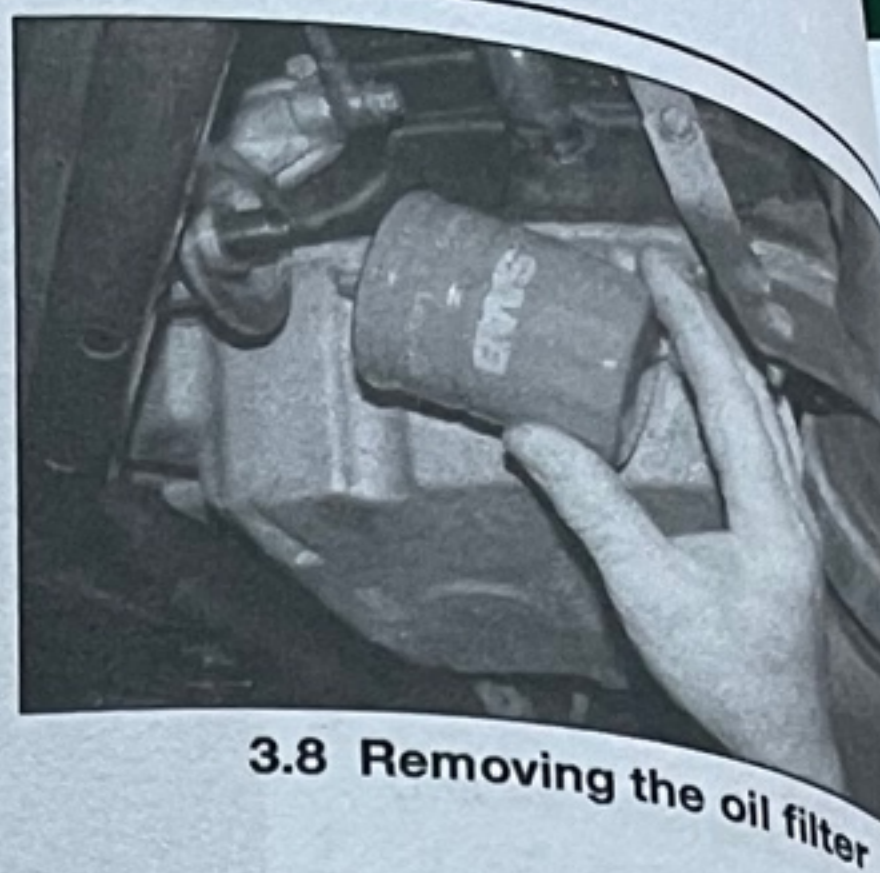
- a) Check the charging system (Chapter 5A).
- b) Check the ignition system (Chapter 5B).
- c) Check the fuel system (Chapter 4A).



3.4 Engine oil drain plug



3.6 Renew the oil sump drain plug washer if necessary



3.8 Removing the oil filter

Every 9000 miles

3 Engine oil and filter – renewal



1 Frequent oil changes are the most important preventative maintenance the DIY home mechanic can give the engine, because ageing oil 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 better, and more built-up sludge will be removed with it. Take care, however, 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.

3 Apply the handbrake, and then jack up the front of the vehicle and support it on axle stands (see *Jacking and vehicle support*).

4 The engine oil drain plug is located on the rear of the sump; slacken the plug about half a

turn. Position the draining container under the drain plug, then remove the plug completely – recover the sealing washer (see illustration).

5 Allow some time for the old 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 off the drain plug with a clean rag. Check the sealing washer for condition, and renew it if necessary (see illustration). Clean the area around the drain plug opening, and refit the plug. Tighten the plug to the specified torque.

7 Move the container into position under the oil filter, which is located at the front of the cylinder block and accessed from under the vehicle.

8 Using an oil filter removal tool or strap, 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, and discard the filter.

9 Use a clean rag to remove all oil, dirt and sludge from the filter sealing area on the mounting bracket.

10 Apply a light coating of clean engine oil to the sealing ring on the new filter, and then screw it into position on the engine. Tighten the filter firmly by hand only – **do not** use any tools. Wipe clean the filter and sump drain plug.

11 Remove the old oil and all tools, and lower the vehicle to the ground.

12 Remove the oil filler cap and withdraw the dipstick from the top of the filler tube. Fill the engine, using the correct grade and type of oil (see *Lubricants and fluids*). An oil can sprayer or funnel may help to reduce spillage. Pour in half the specified quantity of oil first, and then wait a few minutes for the oil to run to the sump. Continue adding oil a small quantity at a time until the level is up to the lower quantity mark on the dipstick. Adding a further 1.0 litre will bring the level up to the upper mark on the dipstick. Insert the dipstick, and refit the filler cap.

13 Start the engine and run it for a few minutes; check 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 oil pressure warning light goes out when the engine is first started, as the oil circulates through the engine oil galleries and the new oil filter, before the pressure builds-up.

14 Switch off 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 completely full, recheck the level on the dipstick, and add more oil as necessary.

15 Dispose of the used engine oil safely, in accordance with the guidance given in the Reference Section.

hoses along their entire length, which is cracked, swollen or of deterioration. Cracks in the hose is squeezed, the clips that secure the system components are overtightened can result in cooling problems of this components, refer with reference Hint).

Fuel system



Warning: Form the Ch...

3 Petrol leak unless the leak is easily visible once it comes in a hot engine before you of leakage.

leak from the vehicle over cold, with tend to sh...

seals and will be m...

warning-4 Check the fuel filter. Exa...

length for from the metal fu...

the met...

Also ch...

for sign...

5 To id...

and th...

raised (see J...

petro...

and...

the f...

Some...

hos...

det...

6 C...

fu...

Ch...

ho...

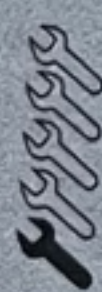
pa...

h...

n...

Every 18 000 miles

4 Service indicator – resetting



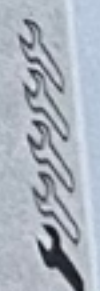
1 The facia-mounted SID (Saab Information Display) system incorporates a service interval indicator. When the distance covered between services approaches the next service, a visual message is displayed: 'Time for service. Contact service'. The service indicator is then manually reset to zero by

the technician, after the vehicle has been serviced. **Note:** The indicator is automatically reset after the message has been displayed 20 times.

2 To manually reset the service indicator, press and hold the CLEAR button on the SID panel for 8 seconds, you will hear two beeps in quick succession, and then release it. The SERVICE message will start to flash, this means the service interval is reset.

3 The indicator can be reset at any time by a technician, using the Saab diagnostic tool.

5 Hoses and fluids – leak check



Cooling system



Warning: Refer to the safety information given in 'Safety First!' and Chapter 3 before disturbing any of the cooling system components.

1 Carefully check the radiator and heater coolant

hoses along their entire length. Renew any hose which is cracked, swollen or which shows signs of deterioration. Cracks will show up better if the hose is squeezed. Pay close attention to the clips that secure the hoses to the cooling system components. Hose clips that have been overtightened can pinch and puncture hoses, resulting in cooling system leaks.

2 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 (see Haynes Hint).

Fuel system



Warning: Refer to the safety information given in 'Safety First!' and Chapter 4A before disturbing any of the fuel system components.

3 Petrol leaks can be difficult to pinpoint, unless the leakage is significant and hence easily visible. Fuel tends to evaporate quickly once it comes into contact with air, especially in a hot engine bay. Small drips can disappear before you get a chance to identify the point of leakage. If you suspect that there is a fuel leak from the area of the engine bay, leave the vehicle overnight then start the engine from cold, with the bonnet open. Metal components tend to shrink when they are cold, and rubber seals and hoses tend to harden, so any leaks will be more apparent whilst the engine is warming-up from a cold start.

4 Check all fuel lines at their connections to the fuel rail, fuel pressure regulator and fuel filter. Examine each rubber fuel hose along its length for splits or cracks. Check for leakage from the crimped joints between rubber and metal fuel lines. Examine the unions between the metal fuel lines and the fuel filter housing. Also check the area around the fuel injectors for signs of O-ring leakage.

5 To identify fuel leaks between the fuel tank and the engine bay, the vehicle should be raised and securely supported on axle stands (see *Jacking and vehicle support*). 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.

6 Carefully check all rubber hoses and metal fuel lines leading away from the petrol tank. Check for loose connections, deteriorated hoses, kinked 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 kinked, making tank filling difficult. Follow the fuel supply and return lines to the front of the vehicle, carefully inspecting them all the way for signs of damage or corrosion. Renew damaged sections as necessary.

Engine oil

7 Inspect the area 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 caused by gasket failure. Engine oil seeping from the base of the timing chain cover or the transmission bellhousing may be an indication of crankshaft or transmission input shaft oil seal failure. Should a leak be found, renew the failed gasket or oil seal by referring to the appropriate Chapters in this manual.

Automatic transmission fluid

8 Where applicable, check the hoses leading to the transmission fluid cooler which is integral with the radiator. Look for deterioration caused by corrosion and damage from grounding, or debris thrown up from the road surface. Automatic transmission fluid is thin oil and is usually red in colour.

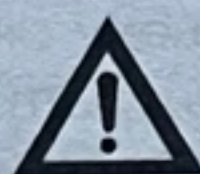
Power-assisted steering fluid

9 Examine the hose running between the fluid reservoir and the power steering pump, and the return hose running from the steering rack to the fluid reservoir. Also examine the high-pressure supply hose between the pump and the steering rack.

10 Check the condition of each hose carefully. Look for deterioration caused by corrosion and damage from grounding, or debris thrown up from the road surface.

11 Pay particular attention to crimped unions, and the area surrounding the hoses that are secured with adjustable worm drive clips. Like automatic transmission fluid, PAS fluid is thin oil, and is usually red in colour.

Air conditioning refrigerant



Warning: Refer to the safety information given in 'Safety First!' and Chapter 3, regarding the dangers of disturbing any of the air conditioning system components.

12 The air conditioning system is filled with a liquid refrigerant, which is retained under high pressure. If the air conditioning system is opened and depressurised without the aid of specialised equipment, the refrigerant will immediately turn into gas and escape into the atmosphere. If the liquid comes into contact with your skin, it can cause severe frostbite. In addition, the refrigerant contains substances which are environmentally damaging; for this reason, it should not be allowed to escape into the atmosphere in an uncontrolled fashion.

13 Any suspected air conditioning system leaks should be immediately referred to a Saab dealer or air conditioning specialist. Leakage will be shown up as a steady drop in the level of refrigerant in the system.

14 Note that water may drip from the condenser drain pipe, underneath the car, immediately after the air conditioning system has been in use. This is normal, and should not be cause for concern.

**HAYNES
Hint**



A leak in the cooling system will usually show up as white- or antifreeze-coloured, crusty deposits around the area of the leak.

Brake (and clutch) fluid



Warning: Refer to the safety information given in 'Safety First!' and Chapter 9, regarding the dangers of handling brake fluid.

15 With reference to Chapter 9, examine the area surrounding the brake pipe unions at the master cylinder for signs of leakage. Check the area around the base of fluid reservoir, for signs of leakage caused by seal failure. Also examine the brake pipe unions at the ABS hydraulic unit.

16 If fluid loss is evident, but the leak cannot be pinpointed in the engine bay, the brake calipers and underbody brake lines should be carefully checked with the vehicle raised and supported on axle stands (see *Jacking and vehicle support*). Leakage of fluid from the braking system is a serious fault that must be rectified immediately.

17 Brake/clutch hydraulic fluid is a toxic substance with a watery consistency. New fluid is almost colourless, but it becomes darker with age and use.

Unidentified fluid leaks

18 If there are signs that a fluid of some description is leaking from the vehicle, but you cannot identify the type of fluid or its origin, park the vehicle overnight and spread a large piece of card underneath it. Provided that the card is positioned in roughly the right location, even the smallest leak will show up on the card. Not only will this help you to pinpoint the exact location of the leak, it should be easier to identify the fluid by its colour. Bear in mind, though, that the leak may only be occurring when the engine is running.

Vacuum hoses

19 Although the braking system is hydraulically operated, the brake servo unit amplifies the effort applied at the brake pedal by the use of the vacuum in the intake manifold generated by the engine and supplied to the vacuum pump on automatic transmission models or an 'ejector' device on manual transmission models (refer to Chapter 9 for more information). Vacuum is produced

1A•8 Every 18 000 miles – petrol engines

servo by means of a large-bore hose. Any leaks that develop in this hose will reduce the effectiveness of the braking system, and may affect the running of the engine.

20 In addition, a number of the underbonnet components, particularly the emission control components, are driven by vacuum supplied from the intake manifold via narrow-bore hoses. A leak in a vacuum hose means that air is being drawn into the hose (rather than escaping from it) and this makes leakage very difficult to detect. One method is to use an old length of vacuum hose as a kind of stethoscope – hold one end close to your ear and use the other end to probe the area around the suspected leak. When the end of the hose is directly over a vacuum leak, a hissing sound will be heard clearly through the hose. Care must be taken to avoid contacting hot or moving components, as the engine must be running when testing in this manner. Renew any vacuum hoses that are found to be defective.

6 Steering and suspension components – check

Front suspension and steering

- 1 Raise the front of the vehicle, and securely support it on axle stands (see *Jacking and vehicle support*).
- 2 Visually inspect the balljoint dust covers and the steering rack-and-pinion gaiters for splits, chafing or deterioration. Any wear of these components will cause loss of lubricant, together with dirt and water entry, resulting in rapid deterioration of the balljoints or steering gear.
- 3 Check the power steering fluid hoses for chafing or deterioration, and the pipe and hose unions for fluid leaks. Also check for signs of fluid leakage under pressure from the steering gear rubber gaiters, which would indicate failed fluid seals within the steering gear.
- 4 Grasp the roadwheel at the 12 o'clock and 6 o'clock positions, and try to rock it (see *illustration*). Very slight free play may be felt, but if the movement is appreciable, further investigation is necessary to determine the source. Continue rocking the wheel while an assistant depresses the footbrake. If the



6.4 Check for wear in the hub bearings by grasping the wheel and trying to rock it

movement is now eliminated or significantly reduced, it is likely that the hub bearings are at fault. If the free play is still evident with the footbrake depressed, then there is wear in the suspension joints or mountings.

- 5 Now grasp the wheel at the 9 o'clock and 3 o'clock positions, and try to rock it as before. Any movement felt now may again be caused by wear in the hub bearings or the steering track rod balljoints. If the outer balljoint is worn, the visual movement will be obvious. If the inner joint is suspect, it can be felt by placing a hand over the rack-and-pinion rubber gaiter and gripping the track rod. If the wheel is now rocked, movement will be felt at the inner joint if wear has taken place.
- 6 Using a large screwdriver or flat bar, check for wear in the suspension mounting bushes by levering between the relevant suspension component and its attachment point. Some movement is to be expected, as the mountings are made of rubber, but excessive wear should be obvious. Also check the condition of any visible rubber bushes, looking for splits, cracks or contamination of the rubber.
- 7 With the car standing on its wheels, have an assistant turn the steering wheel back-and-forth, about an eighth of a turn each way. There should be very little, if any, lost movement between the steering wheel and roadwheels. If this is not the case, closely observe the joints and mountings previously described. In addition, check the steering column universal joints for wear, and also check the rack-and-pinion steering gear itself.
- 8 The front suspension mountings should be checked for tightness.

Rear suspension

- 9 Chock the front wheels, then jack up the rear of the vehicle and support securely on axle stands (see *Jacking and vehicle support*).
- 10 Working as described previously for the front suspension, check the rear hub bearings, the suspension bushes and the strut or shock absorber mountings (as applicable) for wear.
- 11 The rear suspension mountings should be checked for tightness.

Shock absorber

- 12 Check for any signs of fluid leakage around the shock absorber bodies, or from the rubber gaiters around the piston rods. Should any fluid be noticed, the shock absorber is defective internally, and should be renewed.
- Note:** Shock absorbers should always be renewed in pairs on the same axle.
- 13 The efficiency of the shock absorber may be checked by bouncing the vehicle at each corner. Generally speaking, the body will return to its normal position and stop after being depressed. If it rises and returns on a rebound, the shock absorber is probably suspect. Also examine the shock absorber upper and lower mountings for any signs of wear.

Removable towbar attachment

- 14 Where applicable, clean the coupling pin

then apply a little grease to the socket. Make sure that the removable towbar attachment fits easily to its mounting and locks correctly in position.

7 Handbrake – check and adjustment

- 1 Chock the front wheels, then jack up the rear of the vehicle and support on axle stands (see *Jacking and vehicle support*).
- 2 Fully release the handbrake lever.
- 3 Apply the lever to the 4th notch position and check that both rear wheels are locked when attempting to turn them by hand.
- 4 If adjustment is necessary, refer to Chapter 9.
- 5 Lower the vehicle to the ground.

8 Seat belt condition – check

- 1 Working on each seat belt in turn, carefully examine the seat belt webbing for cuts, or for any signs of serious fraying or deterioration. Pull the belt all the way out, and examine the full extent of the webbing.
- 2 Fasten and unfasten the belt, ensuring that the locking mechanism holds securely, and releases properly when intended. Check also that the retracting mechanism operates correctly when the belt is released.
- 3 Check the security of all seat belt mountings and attachments which are accessible, without removing any trim or other components, from inside the vehicle.
- 4 Check the function of the seat belt reminder lamp.

9 Airbag system – check

- 1 The following work can be carried out by the home mechanic, however if an electronic fault is apparent, it will be necessary to take the car to a Saab dealer, who will have the necessary diagnostic equipment to extract fault codes from the system.
- 2 Turn the ignition switch to the drive position (ignition warning lights on), and check that the SRS (Supplementary Restraint System) warning light is illuminated for 3 to 4 seconds. After this period the light should go out, indicating that the system has been checked and is functioning correctly.
- 3 If the warning light remains on or refuses to light, have the system checked by a Saab dealer.
- 4 Visually examine the steering wheel cover pad and the passenger airbag module for external damage. Also check the exterior front seats around the side airbag location. If damage is evident, consult a Saab dealer.
- 5 In the interests of safety, make sure



11.1 Power steering fluid reservoir



11.3 Fluid level marks on the dipstick

there are no loose items inside the car that could be thrown onto the airbag modules in the event of an accident.

10 Headlight beam alignment – check

Refer to Chapter 12 for details

11 Power steering fluid level – check

1 The power steering fluid reservoir is located on the right-hand side of the engine compartment, in front of the suspension turret (see illustration). The fluid level should be checked with the engine stopped and the front wheels pointing straight-ahead.

2 First wipe the filler cap and surrounding area of the reservoir. Unscrew the cap from the top of the reservoir, and wipe all fluid from the cap dipstick with a clean rag.

3 Screw on the cap completely again, then remove it and check the fluid level on the dipstick. When the engine is cold at an ambient temperature of 20°C, the fluid level should be between the upper (MAX) and lower (MIN) marks on the dipstick, preferably near the MAX mark (see illustration). If the engine is warm, the level can be slightly higher, but the level must never be allowed to be lower than the MIN mark.

4 Top-up the fluid level using the specified type of fluid (do not overfill the reservoir) (see illustration), then refit and tighten the filler cap.

12 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. Check the function of the heating, air conditioning and automatic climate control systems.

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, or when driving over bumps. Check that the power steering system operates correctly.

Drivetrain

6 Check the performance of the engine, clutch (manual transmission), transmission and driveshafts. Check that the turbo boost pressure needle moves up to the upper limit during sharp acceleration. The needle may occasionally enter the red zone for an instant, but if this happens frequently, or for extended periods, a problem may exist within the turbo boost control mechanism.

7 Listen for any unusual noises from the engine, clutch (manual transmission) and transmission.

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

9 On manual transmission models, check that the clutch action is smooth and progressive, that the drive is taken up smoothly, and that the pedal travel is correct. Also listen for any noises when the clutch pedal is depressed. Check that all gears can be engaged smoothly, without noise, and that the gear lever action is smooth and not abnormally vague or 'notchy'.

10 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 Saab dealer.

11 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, refer to Chapter 8.

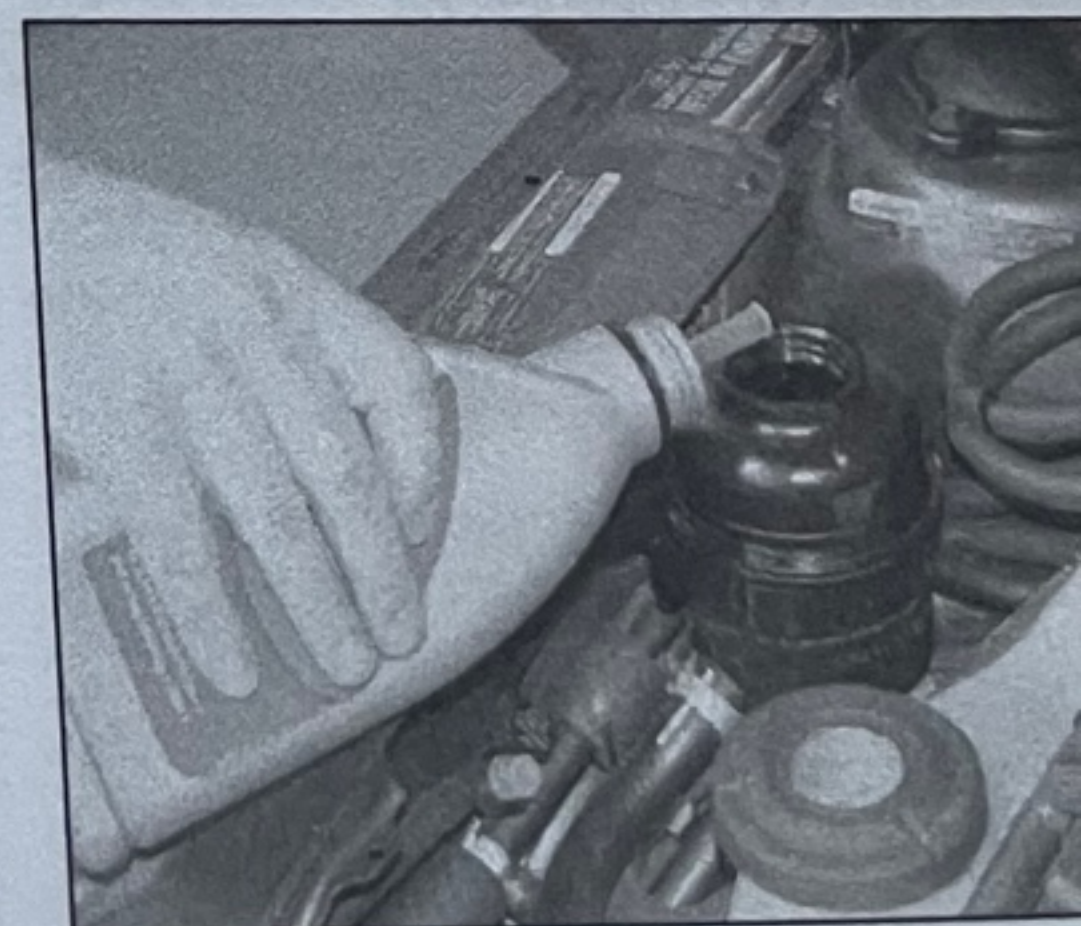
Braking system

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

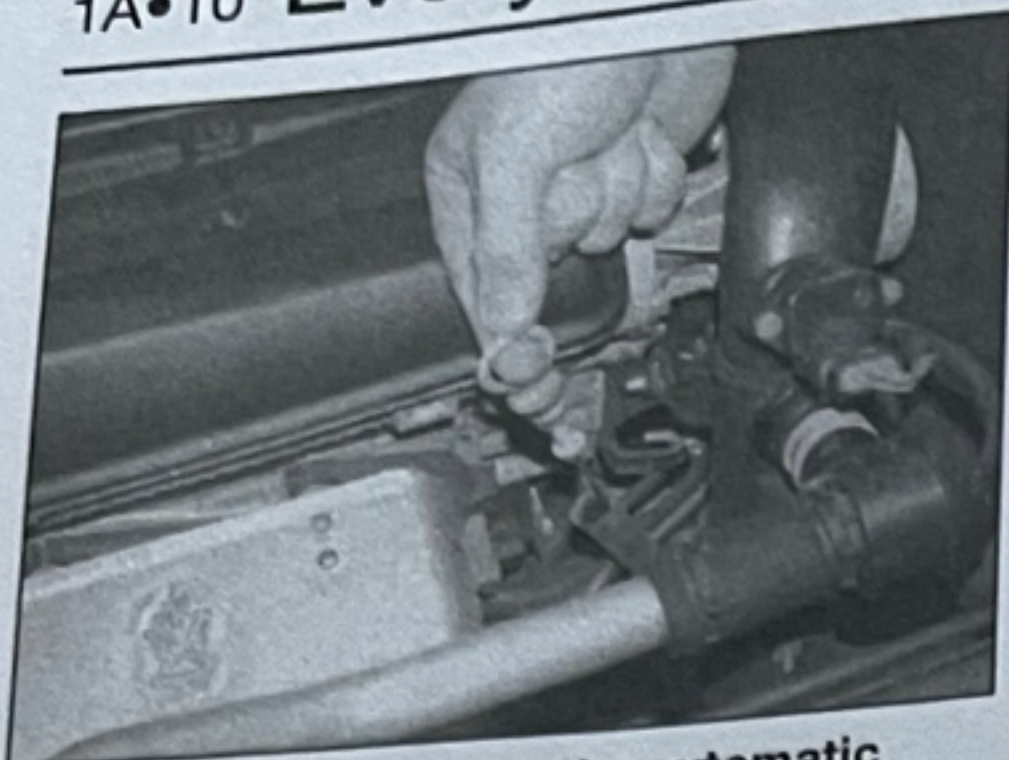
13 Check that there is no vibration through the steering when braking.

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

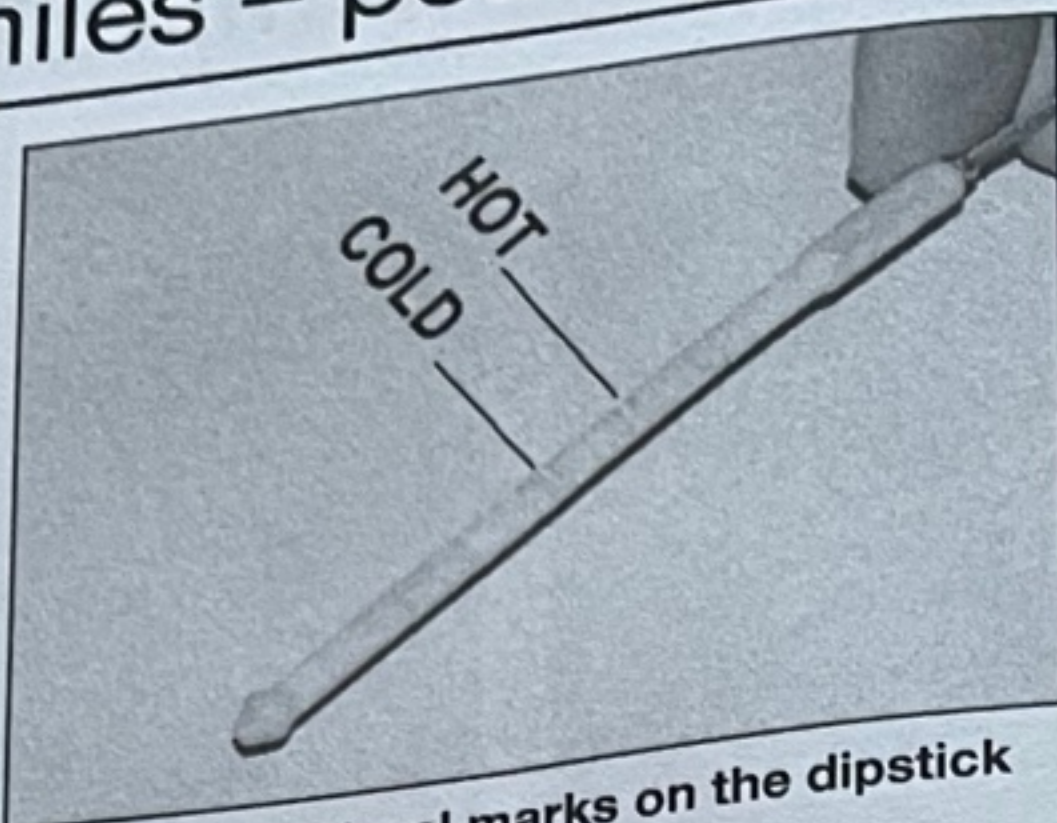
15 Test the operation of the brake servo unit as follows. With the engine off, depress the footbrake four or five times to exhaust the vacuum, and then start the engine while holding the brake pedal depressed. As the engine starts, there should be a noticeable 'give' in the brake pedal as vacuum builds-up.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



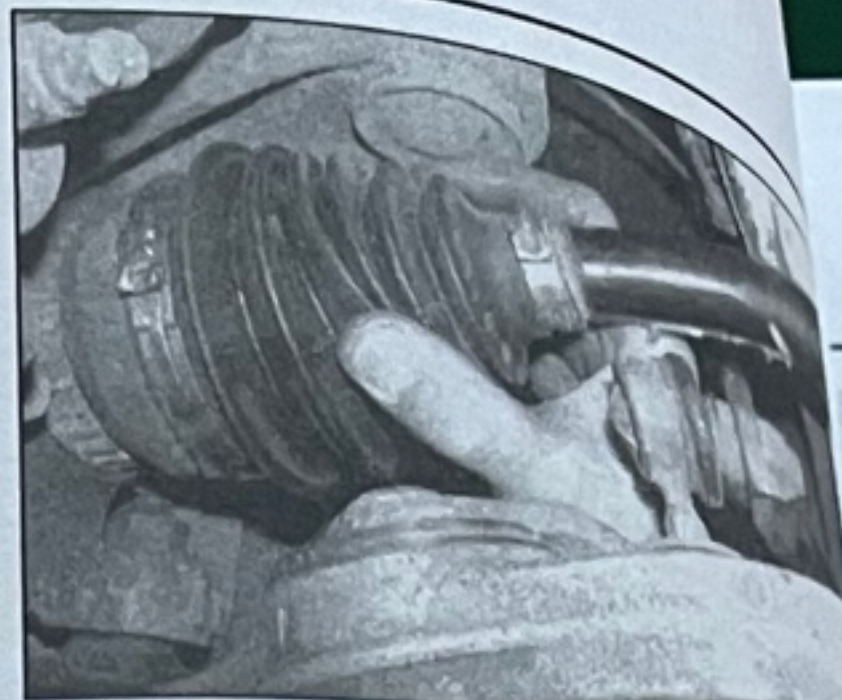
11.4 Topping-up the power steering level



14.3a Withdrawing the automatic transmission fluid level dipstick



14.3b Fluid level marks on the dipstick



15.2 Checking the condition of the driveshaft gaiters

13 Coolant antifreeze concentration – check



1 The cooling system should be filled with the recommended antifreeze and corrosion protection fluid. Over a period of time, the concentration of fluid may be reduced due to topping-up (this can be avoided by topping-up with the correct antifreeze mixture) or fluid loss. If loss of coolant has been evident, it is important to make the necessary repair before adding fresh fluid. The exact mixture of antifreeze-to-water which you should use depends on the weather conditions. The mixture should contain at least 40% antifreeze, but not more than 70%. Consult the mixture ratio chart on the antifreeze container before adding coolant. Use antifreeze that meets the vehicle manufacturer's specifications. Note that antifreeze coolant available from Saab dealers is premixed with water at the correct ratio.

2 With the engine **cold**, carefully remove the cap from the expansion tank. If the engine is not completely cold, place a cloth rag over the cap before removing it, and remove it slowly to allow any pressure to escape.

3 Antifreeze checkers are available from car accessory shops. Draw some coolant from the expansion tank and observe how many plastic balls are floating in the checker. Usually, 2 or 3 balls must be floating for the correct concentration of antifreeze, but follow the manufacturer's instructions.

4 If the concentration is incorrect, it will be necessary to either withdraw some coolant and add antifreeze, or alternatively drain the old coolant and add fresh coolant of the correct concentration.

14 Automatic transmission fluid level – check



1 The fluid level is checked using the dipstick located on the front of the transmission, on the left-hand side of the engine compartment, beneath the battery location.

2 With the engine idling, select D for approximately 15 seconds, then engage R and wait a further 15 seconds. Do this again in position P, and leave the engine idling.

3 Withdraw the dipstick from the tube, and wipe all the fluid from its end with a clean rag or paper towel. Insert the clean dipstick back into the tube as far as it will go, then withdraw it once more. Note the fluid level on the end of the dipstick – there are level marks for cold and hot fluid conditions (**see illustrations**). Use the hot marks if the engine has reached normal operating temperature.

4 If topping-up is necessary, add fluid as necessary through the dipstick tube. **Note:** Never overfill the transmission so that the fluid level is above the upper mark. Use a funnel with a fine mesh gauze, to avoid spillage and to ensure that no foreign matter enters the transmission. Note that the quantity of oil between the MIN and MAX marks is 0.4 litres.

5 After topping-up, take the car on a short run to distribute the fresh fluid, and then recheck the level again, topping-up if necessary.

6 Always maintain the fluid at the correct level. If the level is allowed to fall below the lower mark, fluid starvation may result, which could lead to severe transmission damage.

15 Driveshaft joints and gaiters – check



1 The driveshaft rubber gaiters are very important, because they prevent dirt, water and foreign material from entering and damaging the constant velocity (CV) joints. External contamination can cause the gaiter material to deteriorate prematurely, so it's a good idea to wash the gaiters with soap and water occasionally.

2 With the vehicle raised and securely supported on axle stands, turn the steering onto full-lock, and then slowly rotate each front wheel in turn. Inspect the condition of the outer constant velocity (CV) joint rubber gaiters, squeezing the gaiters to open out the folds (**see illustration**). Check for signs

of cracking, splits, or deterioration of rubber, which may allow the escape of grease, and lead to the ingress of water and grit into the joint. Also check the condition of the retaining clips. Repeat these checks on the inner CV joints. Any damage or deterioration is found, gaiters should be renewed as described in Chapter 8.

3 At the same time, check the condition of the outer CV joints themselves by first holding the driveshaft and attempting to rotate the wheels. Repeat this check on the inner joints, by holding the inner joint yoke and attempting to rotate the driveshaft.

4 Any appreciable movement in the joint indicates wear in the joint, wear in the driveshaft splines, or a loose driveshaft retaining nut.

16 Exhaust system – check

1 With the engine cold, check the complete exhaust system from its starting point at the engine to the end of the tailpipe. If necessary, raise the front and rear of the vehicle on support it on axle stands (**see Jacking and vehicle support**). Remove any engine undershields as necessary for full access to the exhaust system.

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.

3 Rattles and other noises can often be traced to the exhaust system, especially the brackets and rubber 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.

17 Brake pad wear check

Note: An acoustic warning device is fitted to the outer pad strip, which contacts the thickness of the friction material. This device warns the driver of excessive wear (see illustration).

1 To check the brake pads, the vehicle must be on axle stands (see Jacking and vehicle support).

2 For a quick check, the pads can be checked through the wheel arches (**see illustration**).

3 The view through the wheel arch must not be obstructed by the Specification.

4 For a comprehensive check, the wheels must be removed and the caliper can be examined.

5 If any pads are worn beyond the specified thickness, they must be renewed.

6 On completion, lower the vehicle.

18 Hinge lubrication

1 Work on the hinges.

2 Lightly oil the tailgate locks.

3 Check the operation of all the components.

17 Brake pad wear – check

Note: An acoustic wear warning device is fitted to the outer pad, consisting of a metal strip, which contacts the brake disc when the thickness of the friction material is less than 3.0 mm. This device causes a scraping noise that warns the driver that the pads are worn excessively (see illustration).

1 To check the brake pads, firmly apply the handbrake, and then jack up the front or rear of the vehicle (depending on brakes to be checked) and support it securely on axle stands (see *Jacking and vehicle support*).

2 For a quick check, the pad thickness can be checked through the gaps in the alloy wheels (see illustration). Measure the thickness of the pad lining excluding the backing plate. This must not be less than that indicated in the Specifications.

3 The view through the wheel gives an indication of the **outer** brake pad wear only. For a comprehensive check, remove the wheels, and then the brake pads should be removed and cleaned. The operation of the caliper can then also be checked, and the condition of the brake disc itself can be fully examined on both sides.

4 If any pad's friction material is worn to the specified thickness or less; *all four pads must be renewed as a set*. Refer to Chapter 9 for details.

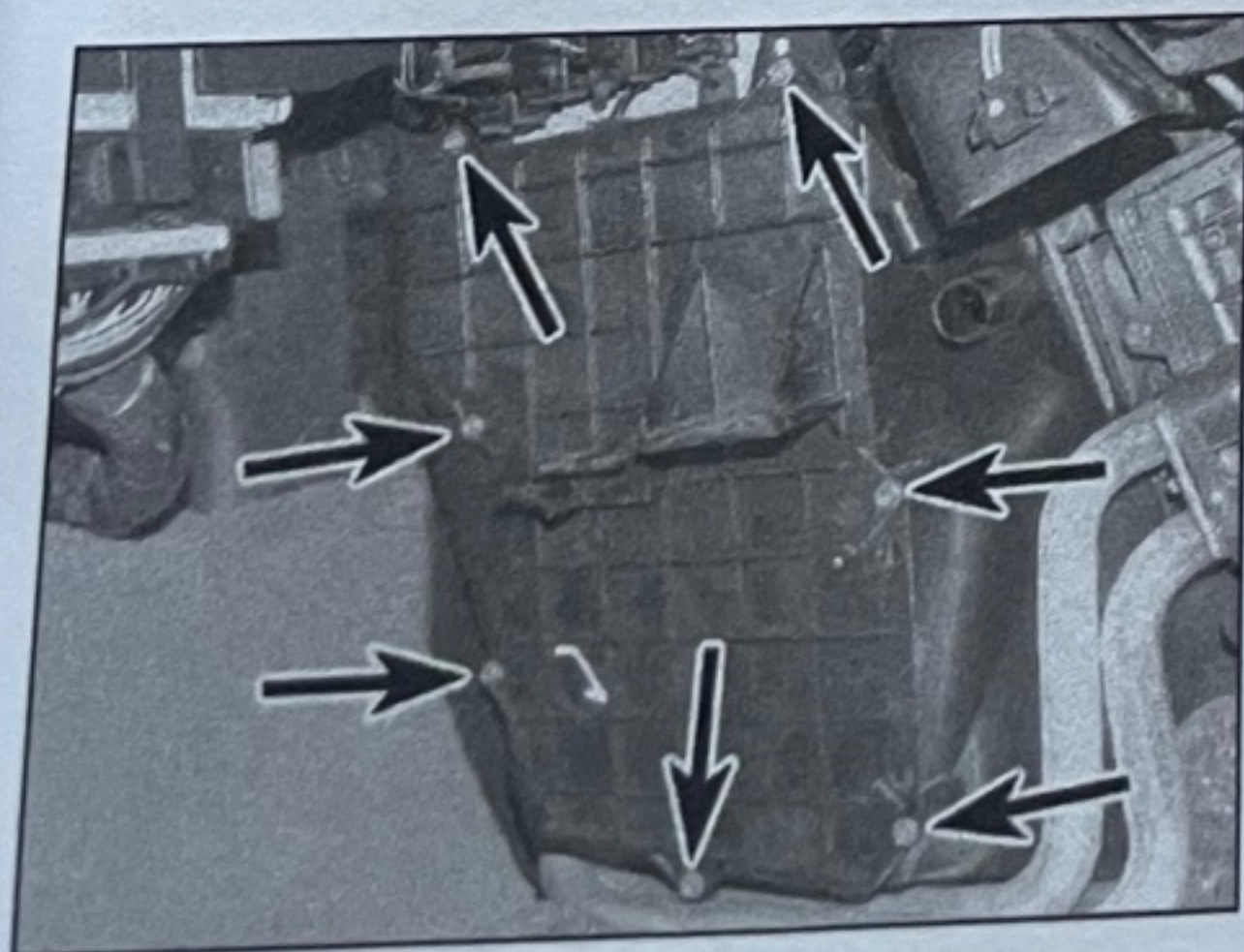
5 On completion, refit the roadwheels and lower the vehicle to the ground.

18 Hinges and locks – lubrication

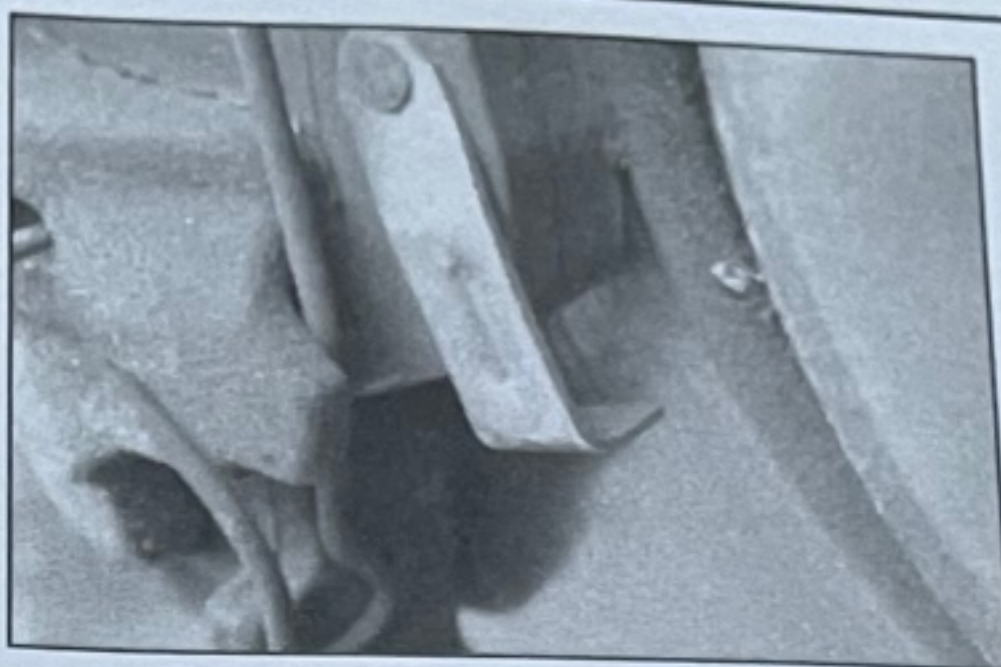
1 Work around the vehicle and lubricate the hinges of the bonnet, doors and boot lid or tailgate with a light machine oil.

2 Lightly lubricate the two bonnet release locks with a smear of grease.

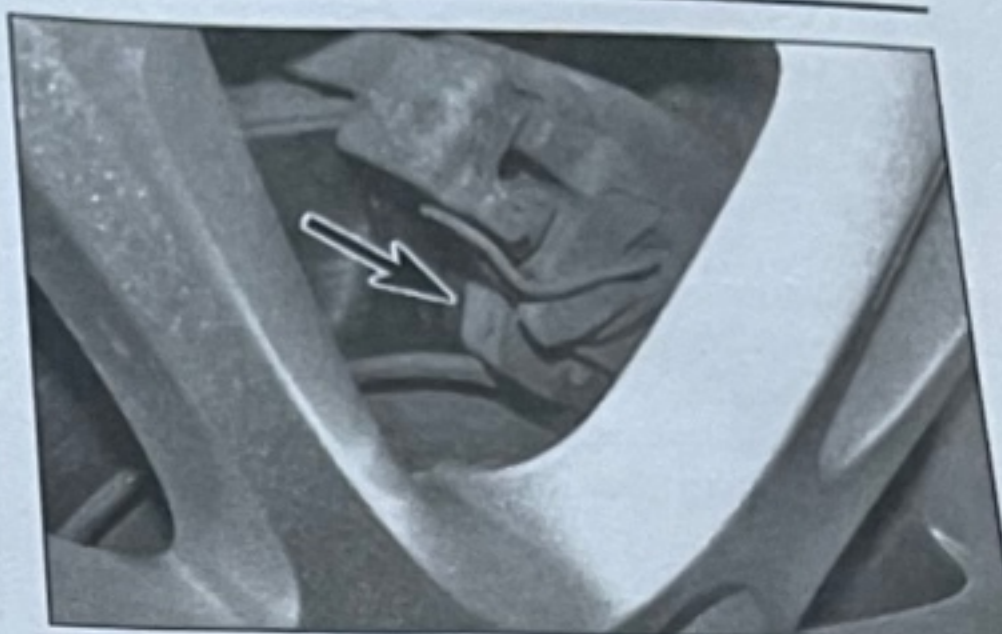
3 Check carefully the security and operation of all hinges, latches and locks. Check that the central locking system operates correctly.



20.3a Undo the screws ...



17.0 Acoustic wear warning device fitted to the outer front brake pad



17.2 The outer brake pad wear can be checked through the aperture in the wheel

4 Check the condition and operation of the bonnet and boot lid/tailgate struts, renewing them if either is leaking or no longer able to support the bonnet/boot lid/tailgate.

19 Air conditioning drain hoses – check

1 Working beneath the glovebox, remove the side trim from the filter housing.

2 Remove the sound insulation from both sides of the heater unit.

3 Fold down the carpet from both sides of the centre console, and remove the insulation from the passenger's side.

4 Loosen the clips and remove both drain hoses from the side of the heater unit.

5 Ideally, blow compressed air through the drain hoses to clear them, alternatively use a cloth rag. Also clear the spigots on the heater unit.

6 Refit the hoses using a reversal of the removal procedure.

20 Pollen filter – renew

1 Remove the glovebox as described in Chapter 11.

2 Remove the side trim/carpet from the centre console with reference to Chapter 11. At the same time, cut the plastic ties holding

the wiring harness to the cover, and the cooler hose to the glovebox.

3 Undo the screws and remove the cover from over the pollen filter (see illustrations).

4 Slide the pollen filter from the housing (see illustration). Note the arrows indicating the direction of airflow through the filter.

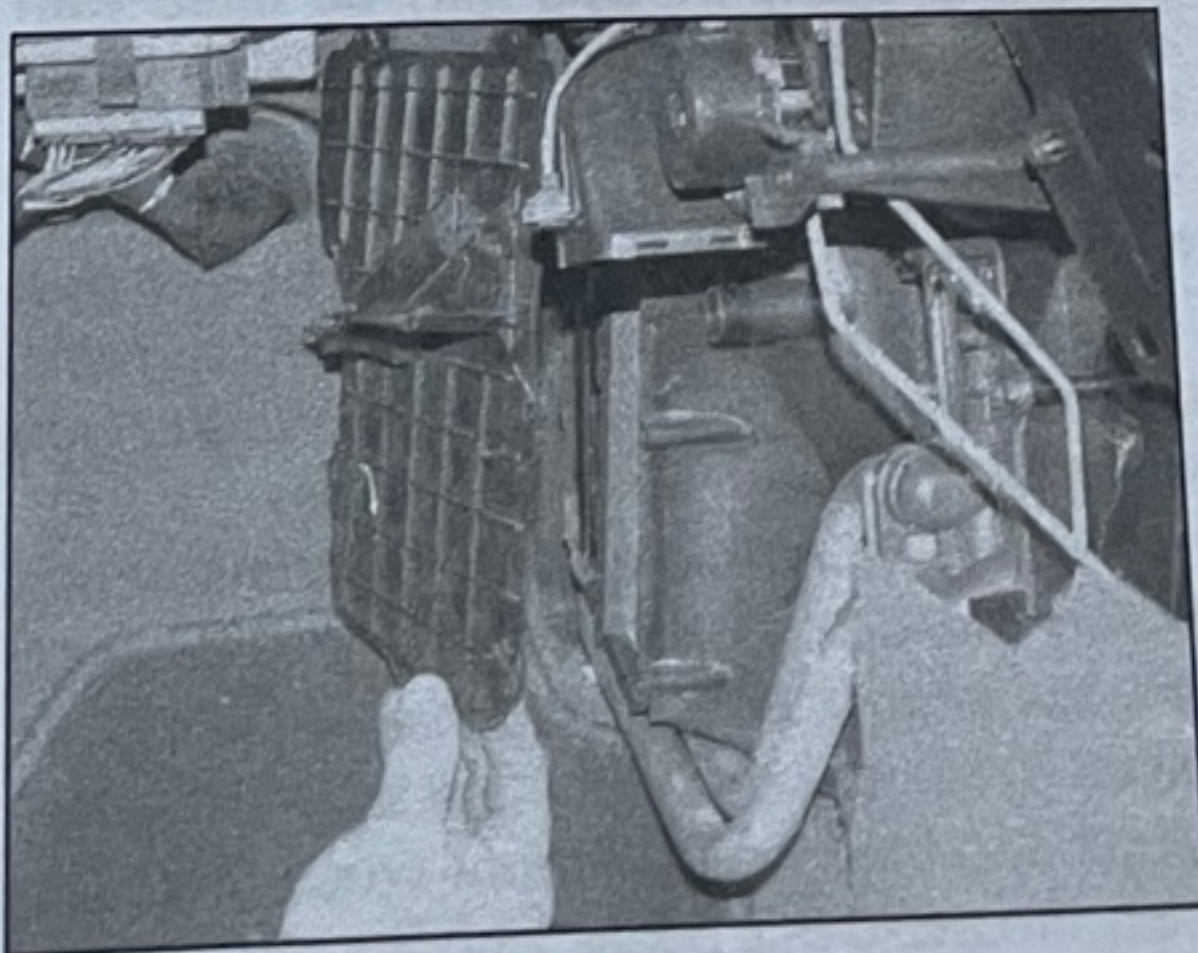
5 Check that a seal is fitted to the top of the filter; if not, obtain and fit one. On models which have had air conditioning fitted after original manufacture, break off the plastic lugs from the top of the filter.

6 Loosen the clips and disconnect the two drain hoses from each side of the heater unit. Ideally, blow compressed air through the hoses to clear any accumulated debris, alternatively, clear the hoses with a suitable brush. Also, clear the spigots on the heater unit.

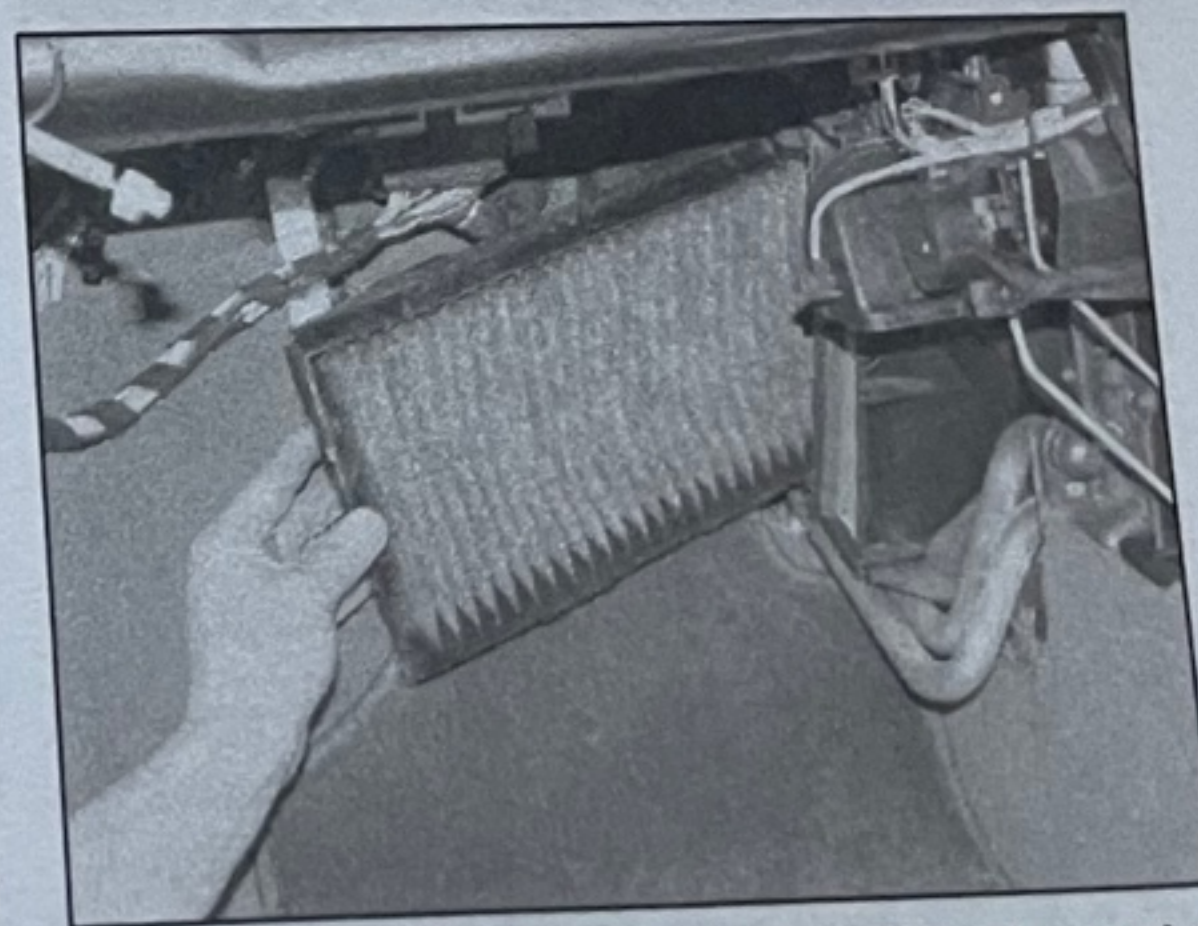
7 Refit the drain hoses and tighten the clips, then fit the new pollen filter using a reversal of the removal procedure.

21 Auxiliary drivebelt condition – check

1 A single, multi-grooved auxiliary drivebelt is used to transmit drive from the crankshaft pulley to the coolant pump, alternator, power steering pump and the air conditioning compressor (see illustration 28.6). The drivebelt is guided by two idler pulleys and is tensioned automatically by a spring-loaded tensioner pulley.



20.3b ... and remove the cover ...



20.4 ... then slide the pollen filter from the housing

1A•12 Every 18 000 miles – petrol engines

- 2 For better access to the drivebelt, apply the handbrake then jack up the front of the car and support it on axle stands (see *Jacking and vehicle support*). Remove the right-hand front roadwheel, and then remove the lower section of the plastic liner from under the right-hand wheel arch to expose the crankshaft pulley and drivebelt.
- 3 Check that the mark on top of the tensioner arm (right-hand rear of engine) is positioned

within the two marks on the fixed tensioner mounting bracket. If it is outside the rearmost mark, the belt has stretched excessively and should be renewed.

- 4 Depress the front section of drivebelt between the power steering pump and compressor pulleys, then release the belt and check that it returns to its tensioned position again, proving that the tensioner is operating correctly. If the tensioner does not operate

freely, it should be removed for examination and renewed if necessary.

5 Using a suitable socket and extension bar, fitted to the crankshaft pulley bolt, rotate the crankshaft so that the entire length of the drivebelt can be examined. Examine the drivebelt for cracks, splitting, fraying, or other damage. Check also for signs of glazing (burn patches) and for separation of the belt plies. Renew the belt if worn or damaged.

Every 36 000 miles

22 Spark plugs – renewal

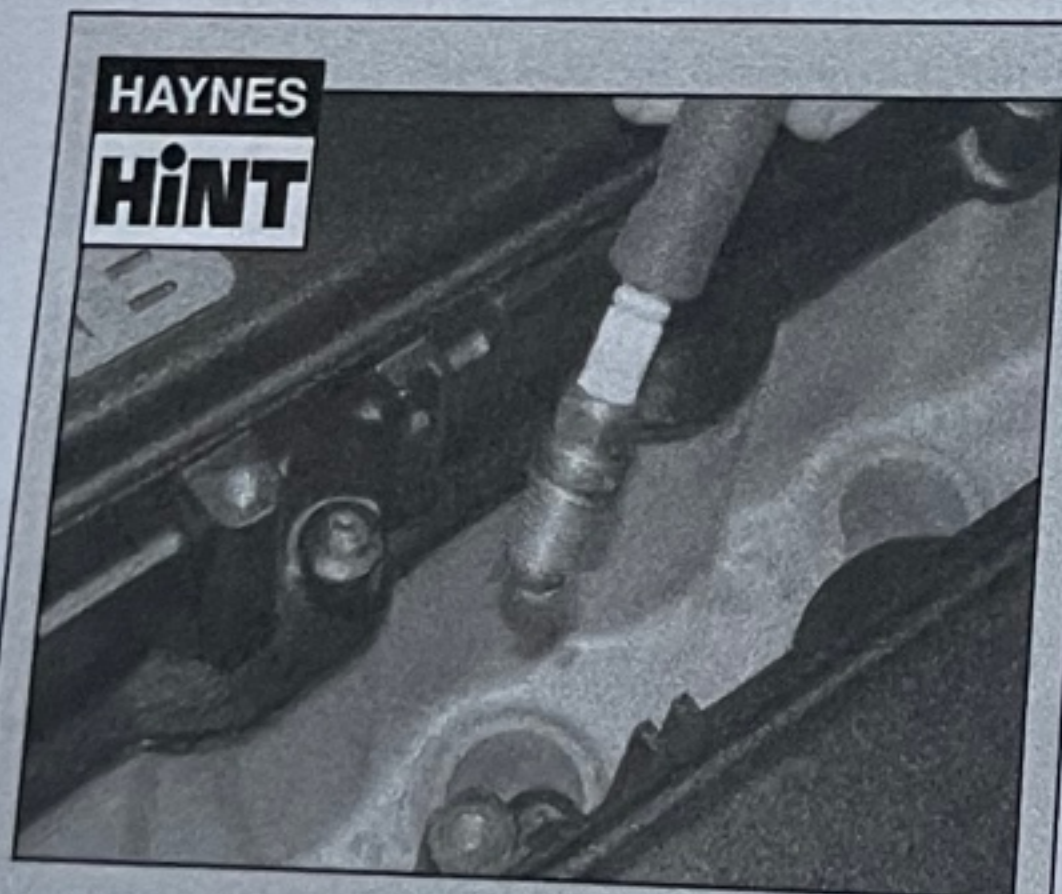
Note: The spark plugs should be renewed at 12 000 mile intervals on models with the 2.0 litre engine. On 2.3 litre engines, they should be renewed at 24 000 mile intervals.

- 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. If this type is used and the engine is in good condition, the spark plugs should not need attention between scheduled renewal intervals.

- 2 Remove the ignition discharge module as described in Chapter 5A.

Warning: When the ignition discharge module is removed, it must be kept in the upright position. If the module has been turned upside down for a length of time, leave it in the fitted position for a couple of hours before starting.

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



HAYNES HINT

It is very often difficult to insert spark plugs into their holes without cross-threading them. To avoid this possibility, fit a short length of hose over the end of the spark plug.

- 4 Unscrew the plugs using a spark plug spanner or a deep socket and extension bar. Keep the socket aligned with the spark plug – if it is forcibly moved to one side, the ceramic insulator may be broken off.

- 5 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, a cold plug transfers heat away quickly).

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

- 7 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.

- 8 The electrode 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. The gap should be set to the value given in the Specifications.

- 9 To set the gap, measure it with a feeler blade or wire gauge and then bend open, or closed, the outer plug electrode until the correct gap is achieved. The centre electrode should never be bent, as this will crack the insulator and cause plug failure, if nothing worse. If using feeler blades, the gap is correct when the appropriate-size blade is a firm sliding fit. Note that some models may be fitted with multi-electrode spark plugs – no attempt to adjust the electrode gap should be made on this type of spark plug.

- 10 Special spark plug electrode gap adjusting tools are available from most motor accessory shops, or from some spark plug manufacturers.

- 11 Before fitting the spark plugs, check that the threaded connector sleeves are tight, and that the plug exterior surfaces and threads are clean. It is very often difficult to insert spark plugs into their holes without cross-threading them. To avoid this possibility, fit a short length of hose over the end of the spark plug (see **Haynes Hint**).

- 12 Remove the rubber hose (if used), and tighten the plug to the specified torque (see Specifications) using the spark plug socket and a torque wrench. Refit the remaining plugs in the same way.

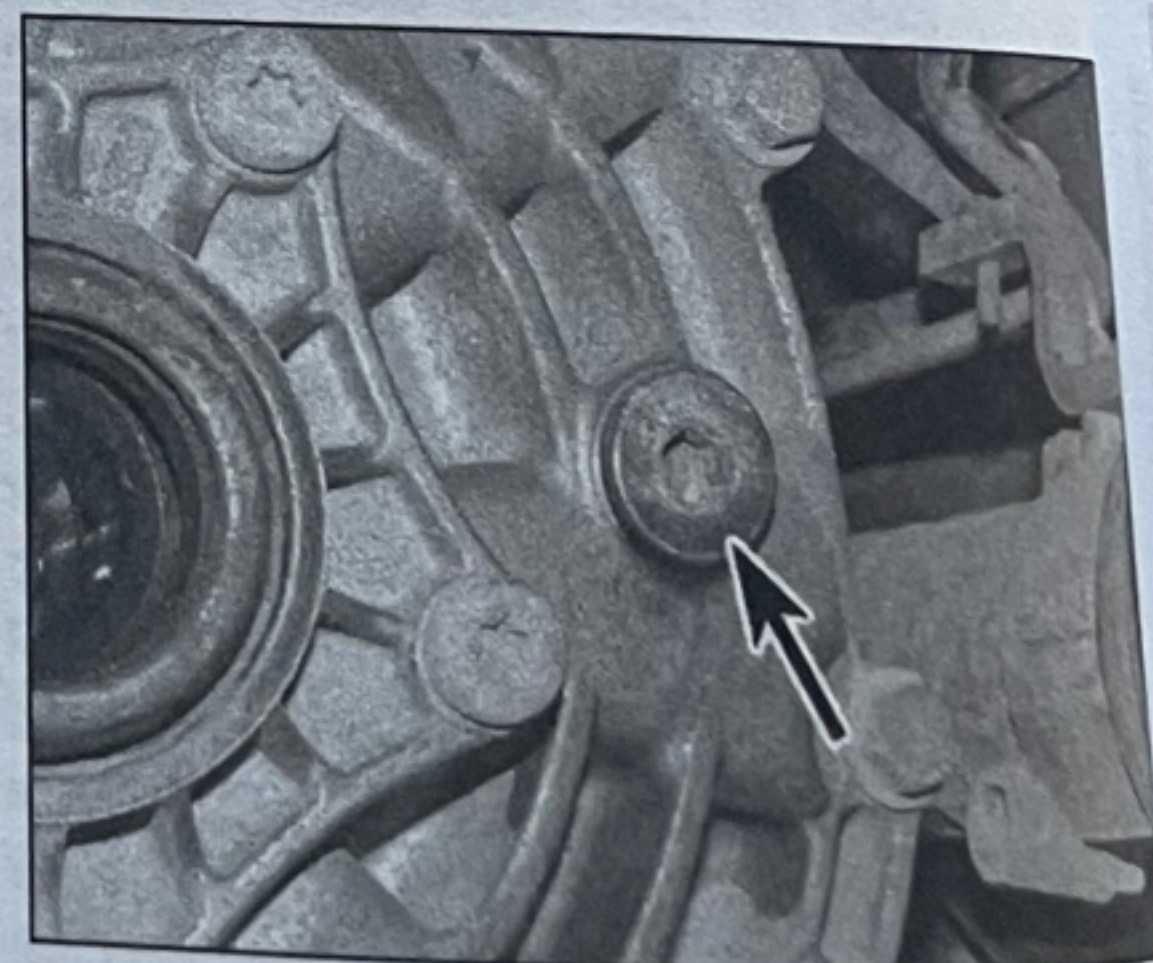
- 13 Refit the ignition discharge module with reference to Chapter 5A.

23 Manual transmission oil level – check

Note: A suitable Allen key will be required to unscrew the manual transmission filler and level plugs. This can be obtained from most motor factors, or from your Saab dealer.

- 1 Make sure that the car is parked on a level surface. Wipe clean the area around the level plug, which is located on the left hand side of the differential casing at the rear of the transmission, behind the left-hand driveshaft. Access to the plug can be gained from the engine compartment, or alternatively, apply the handbrake, then jack up the vehicle and support it on axle stands (see *Jacking and vehicle support*), but note that the vehicle must be level.

- 2 Unscrew the plug, using a suitable Allen key and wipe it clean (see illustration). The oil level should reach the lower edge of the level hole. A certain amount of oil will have gathered behind the level plug, and will trickle out when it is removed; this does not necessarily indicate that the level is correct.



23.2 Unscrew the transmission oil level plug, using an Allen key



23.3a The transmission oil level plug, located at the top of the differential casing

To ensure that a tight seal is made, until the initial trickle of oil has reached the length of clean wipe, insert a dipstick.

3 If the oil level is low, clean the area around the plug, and then add oil (see illustrations).

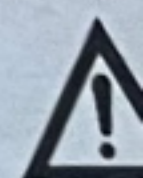
- 4 Add oil as necessary. The correct amount of oil can be seen when the oil has reached the hole (see illustration). After adding oil to the plug aperture.
- 5 When the level is correct, remove the filler plug (plug) to the side of the plug. Wipe off any excess oil.

24 Air filter – renewal

- 1 The air filter should be renewed at the following intervals:

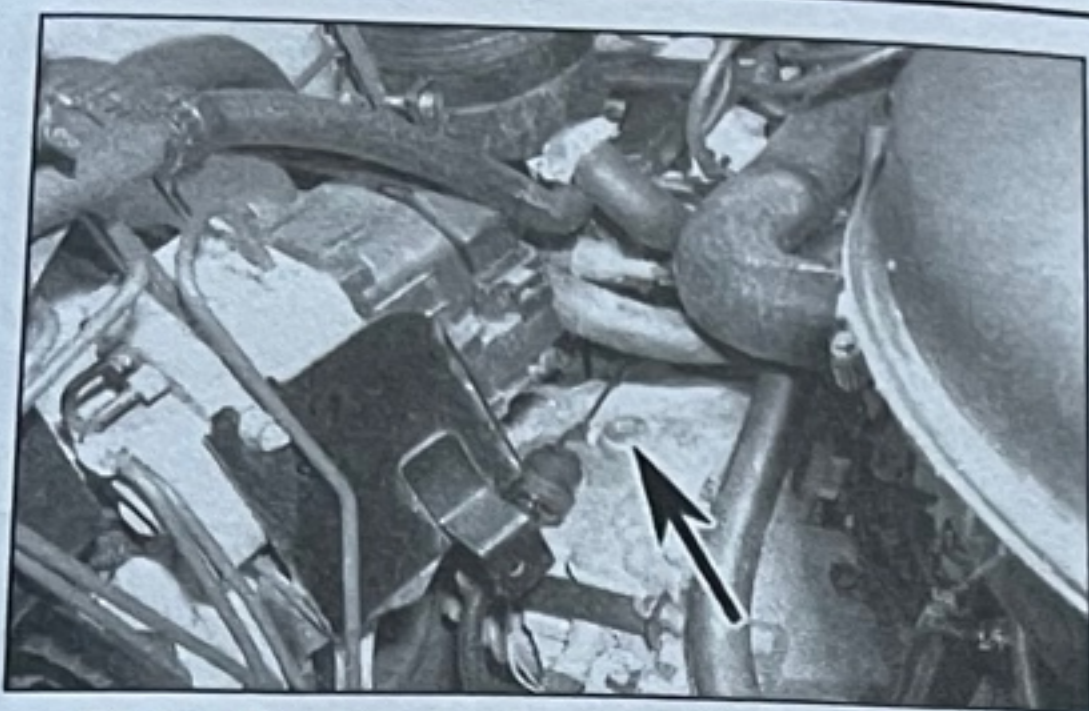
25 Coolant – renewal

Note: The scheduled coolant renewal interval should be used.

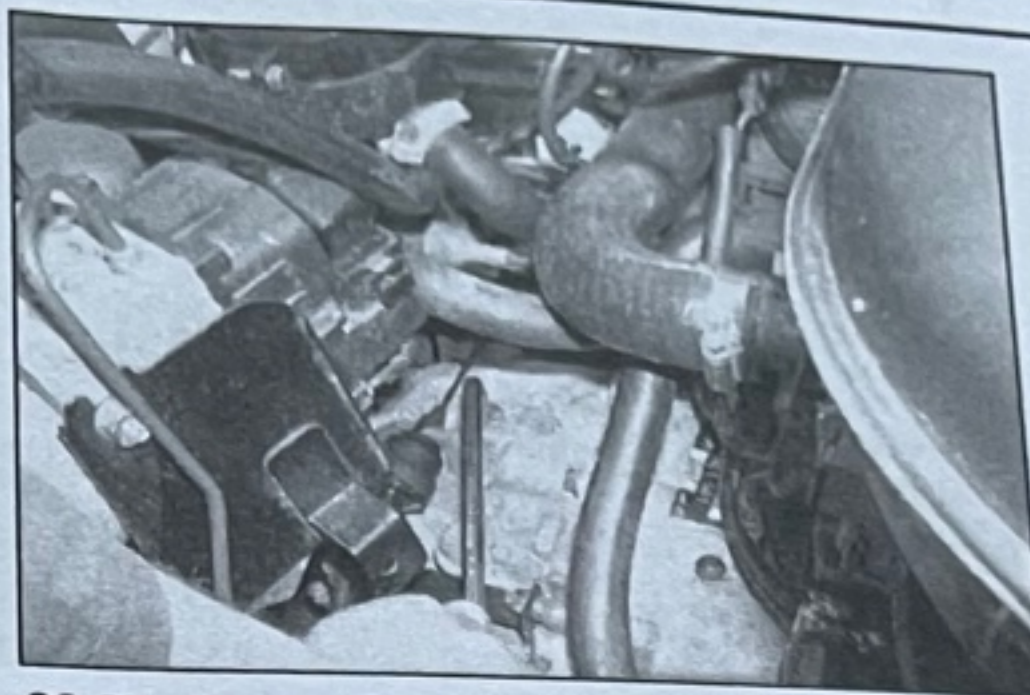


Flush the cooling system or leave it as is.

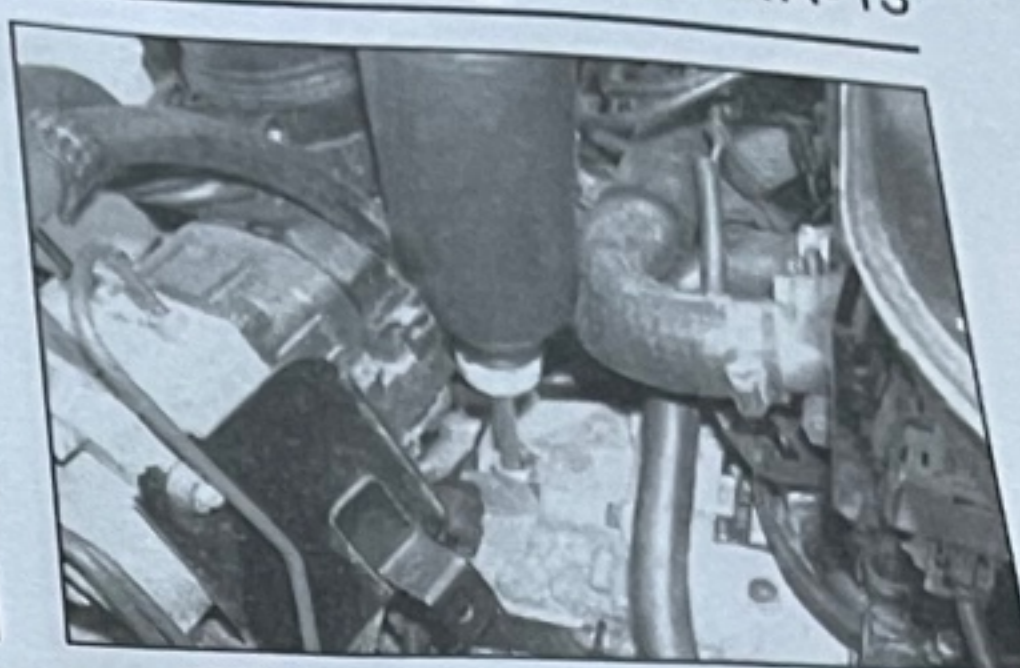
Every 36 000 miles – petrol engines 1A•13



23.3a The transmission oil filler plug is located at the top of the transmission casing



23.3b Unscrew the plug using an Allen key



23.4 Topping-up the transmission

To ensure that a true level is established, wait until the initial trickle has stopped, then use a length of clean wire, bent into a right angle, as a dipstick.

3 If the oil level requires topping-up, wipe clean the area around the filler plug, which is located on top of the transmission. Unscrew the plug, and wipe it clean (see illustrations).

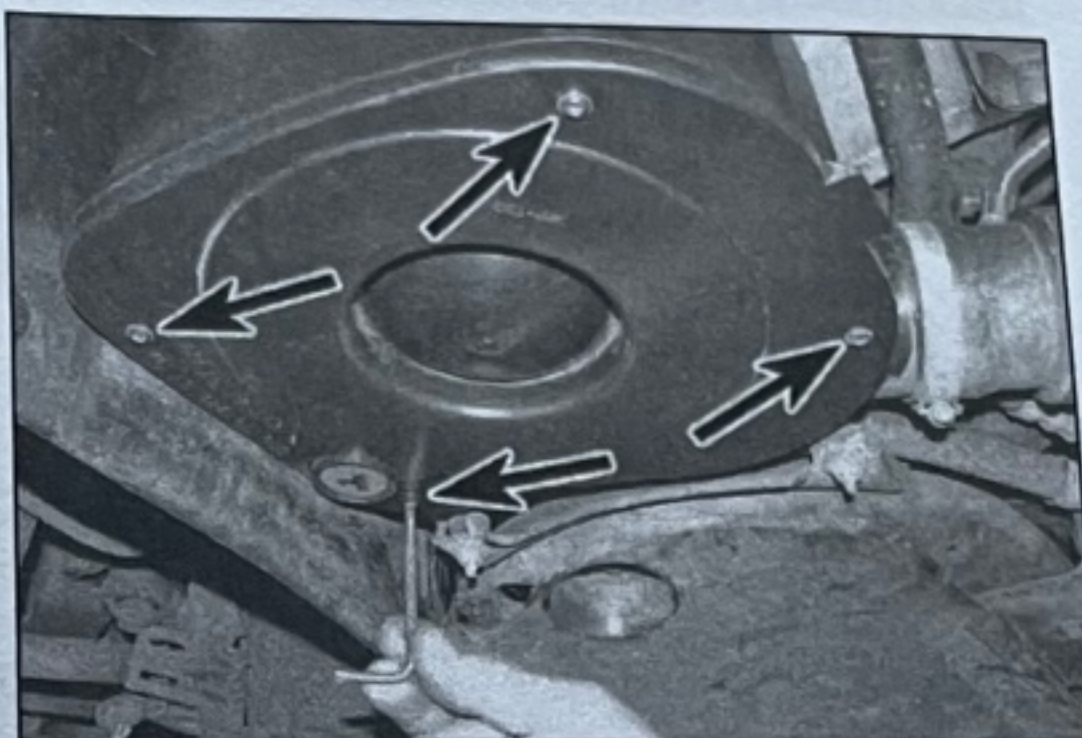
4 Add oil as necessary until a steady trickle of oil can be seen emerging from the level hole (see illustration). Use **only** the specified grade of oil. A funnel will be helpful when adding oil to the transmission through the filler plug aperture.

5 When the level is correct, refit and tighten the filler plug (and where necessary, the level plug) to the specified torque wrench setting. Wipe off any spilt oil.

24 Air filter element – renewal



1 The air cleaner is located beneath the



24.2a Undo the screws (arrowed) ...

front right-hand wing, behind the front bumper, and the air inlet is taken from the front of the car behind the radiator grille area. For improved access to the filter, apply the handbrake, then jack up the front of the vehicle and support it on axle stands (see *Jacking and vehicle support*), then undo the single screw and pull aside the front bumper/spoiler.

2 Undo the screws and remove the cover together with filter element from the bottom



24.2b ... then remove the cover and air filter element

of the air filter housing (see illustrations). Recover the O-ring seal.

3 Note how the element is fitted, then remove it from the cover.

4 Wipe clean the inner surfaces of the cover and main housing.

5 Locate the new element on the cover, and then fit the cover complete with O-ring seal to the bottom of the housing. Insert and tighten the screws.

6 Lower the vehicle to the ground.

Every 3 years

25 Coolant – renewal



Note: This work is not included in the Saab schedule, and should not be required if the recommended Saab antifreeze/inhibitor is used.

Warning: Do not allow antifreeze to come in contact with your skin or painted surfaces of the vehicle. Flush contaminated areas immediately with plenty of water. Don't store new coolant, or leave old coolant lying around, where it's accessible to children or pets – they're

attracted by its sweet smell. Ingestion of even a small amount of coolant can be fatal. Wipe up garage-floor and drip-pan spills immediately. Keep antifreeze containers covered, and repair cooling system leaks as soon as they're noticed.



Warning: Never remove the expansion tank filler cap when the engine is running, or has just been switched off, as the cooling system will be hot, and the consequent escaping steam and scalding coolant could cause serious injury.



Warning: Wait until the engine is cold before starting these procedures.

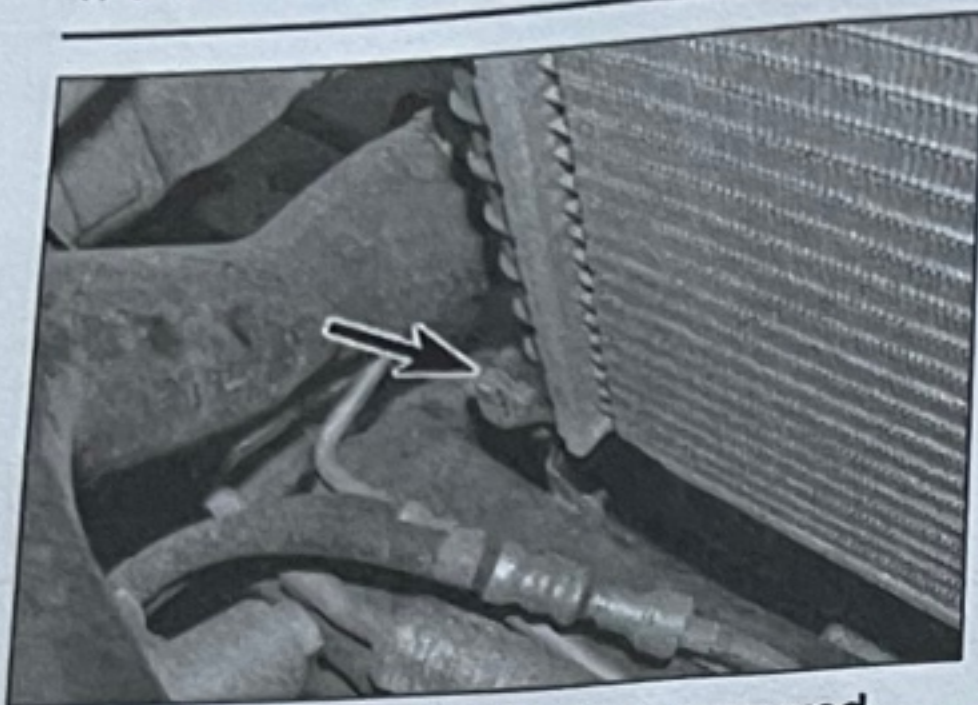
Cooling system draining

1 With the engine completely cold, remove the expansion tank filler cap. Turn the cap a clockwise, wait until any pressure remaining in the system is released, then unscrew it and let it off.

2 Where applicable, remove the engine under shield, and then position a suitable container beneath the left-hand side of the radiator.

3 Loosen the drain plug located at the left-hand lower mounting stub (see illustration), and allow the coolant to flow into the container. If necessary, attach a hose to the drain plug to direct the coolant to a container.

1A•14 Every 3 years – petrol engines



25.3 Radiator drain plug – arrowed

4 When the flow of coolant stops, tighten the drain plug and where necessary refit the undershield.

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, though this is not recommended.

Cooling system flushing

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

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

Radiator flushing

8 Disconnect the top and bottom hoses and any other relevant hoses from the radiator, with reference to Chapter 3.

9 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.

10 If after a reasonable period, the water still does not run clear, the radiator can be flushed with a good proprietary cleaning agent. It is important that the manufacturer's instructions are followed carefully. If the contamination is particularly bad, remove the radiator and insert the hose in the bottom outlet, and reverse-flush the radiator, then refit it.

Engine flushing

11 Remove the thermostat as described in Chapter 3, then temporarily refit the thermostat cover. If the radiator top hose has been disconnected, temporarily reconnect the hose.

12 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.

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

Cooling system filling

14 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.

15 Make sure that the air conditioning (A/C) or automatic climate control (ACC) is switched off. This is to prevent the air conditioning system starting the radiator cooling fan before the engine is at normal temperature when refilling the system.

16 Remove the expansion tank filler cap and slowly fill the system until the coolant level reaches the MAX mark on the side of the expansion tank.

17 Refit and tighten the expansion tank cap.

18 Start the engine and set the heater to full (then run the engine until it reaches normal operating temperature (until the cooling fan cuts in and out). Running the engine at various speeds will allow the engine to warm up quickly.

19 Stop the engine, and allow it to warm up, then recheck the coolant level with reference to *Weekly checks*. Top-up the level if necessary and refit the expansion tank filler cap. Refit the splash cover beneath the radiator.

Antifreeze mixture

20 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 that would otherwise occur as the corrosion inhibitors become progressively less effective.

21 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 given in the Specifications.

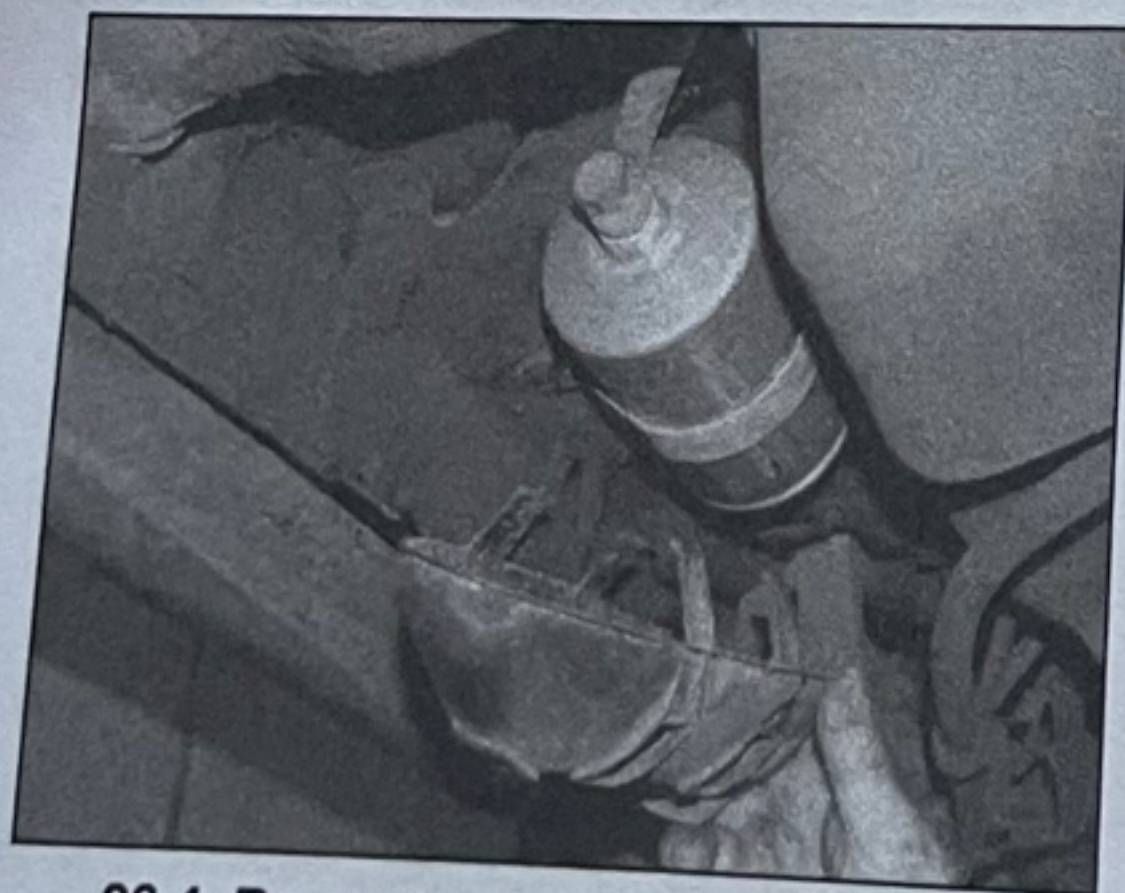
22 Before adding antifreeze, the cooling system should be completely drained, preferably flushed, and all hoses checked for condition and security.

23 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.

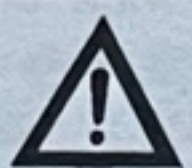
Caution: Do not use engine antifreeze in the windscreen/washer system as it will cause damage to the vehicle paintwork. A screenwash additive should be added to the washer system in the quantities stated on the bottle.

Every 72 000 miles

26 Fuel filter – renewal



26.4 Removing the fuel filter plastic guard



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

1 On all models, the fuel filter is mounted adjacent to the fuel tank underneath the rear of the car.

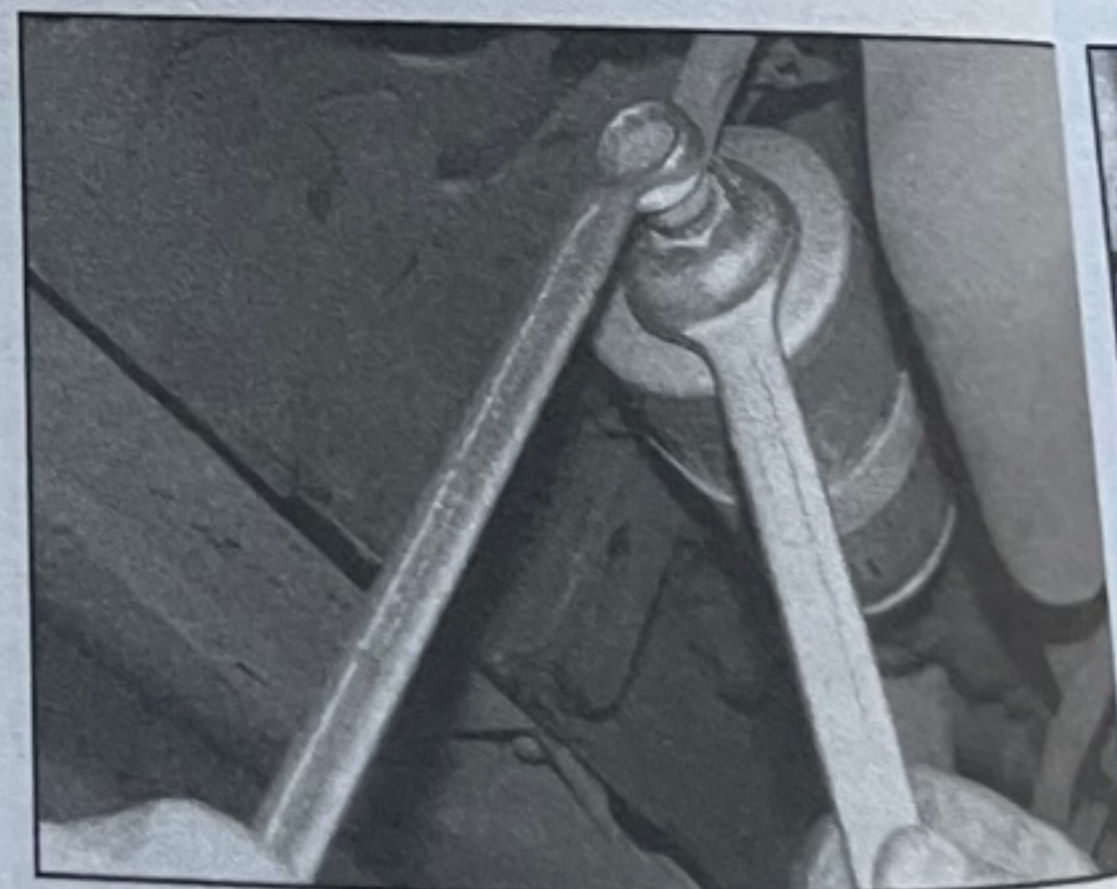
2 Depressurise the fuel system with reference to Chapter 4A.

3 Chock the front wheels, then jack up the rear of the car and support on axle stands (see *Jacking and vehicle support*).

4 Pull off the plastic guard where fitted, and then clean the areas around the fuel filter inlet and outlet unions (see illustration).

5 Position a small container or cloth rags beneath the filter to catch spilt fuel.

6 On filters with banjo coupling bolts unscrew the bolts from each end of the filter while holding the coupling with a further spanner. Recover the sealing washers (see illustrations).



26.6a Use two spanners to unscrew the banjo coupling bolts from each end of the fuel filter...

26.6b ... and recover the sealing washers

26.7c ... and fit the new filter

7 On filters with special tool use locking clips to hold the tool around the hose (see illustration at the other end).
8 Undo the filter (see illustration).
9 Remove the filter noting the direction of the filter flow. Withdraw the filter (see illustration).
10 Locate the new filter and then make sure the filter is the correct way round which leads to the engine (see illustration).
11 On

Every 72 000 miles – petrol engines 1A•15



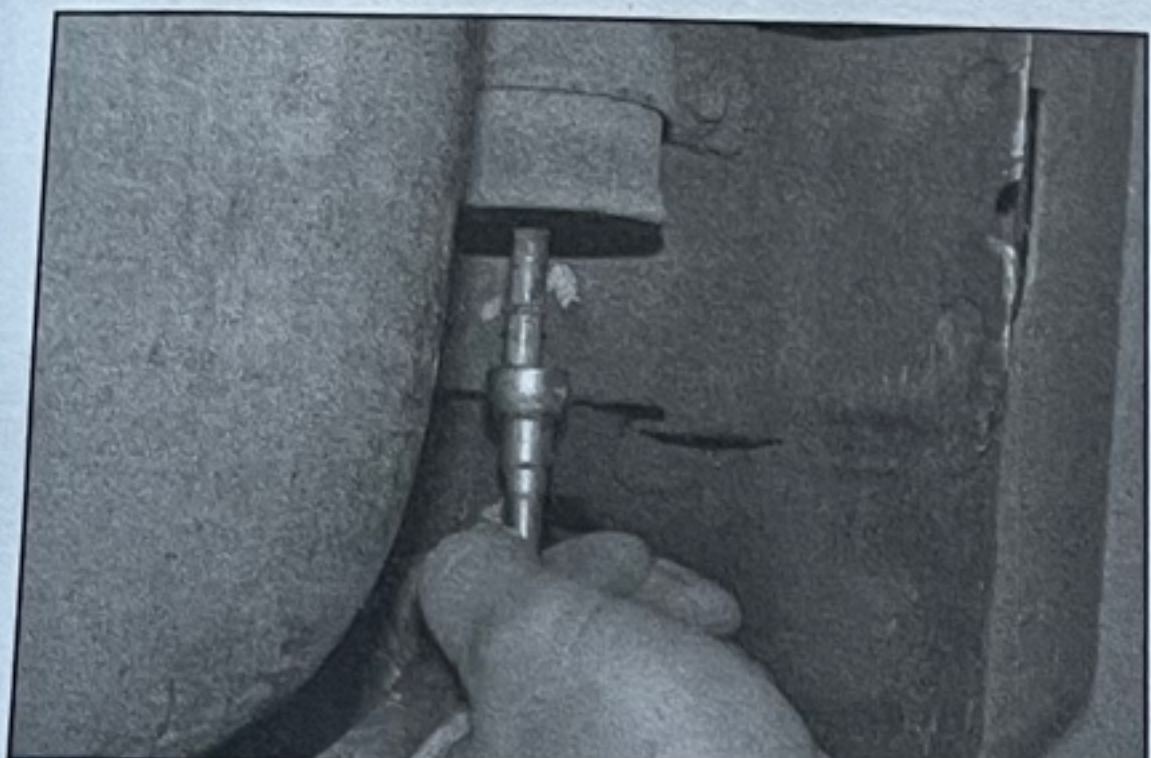
26.6b ... and recover the sealing washers



26.7a Fit special tool around filter outlet pipe ...



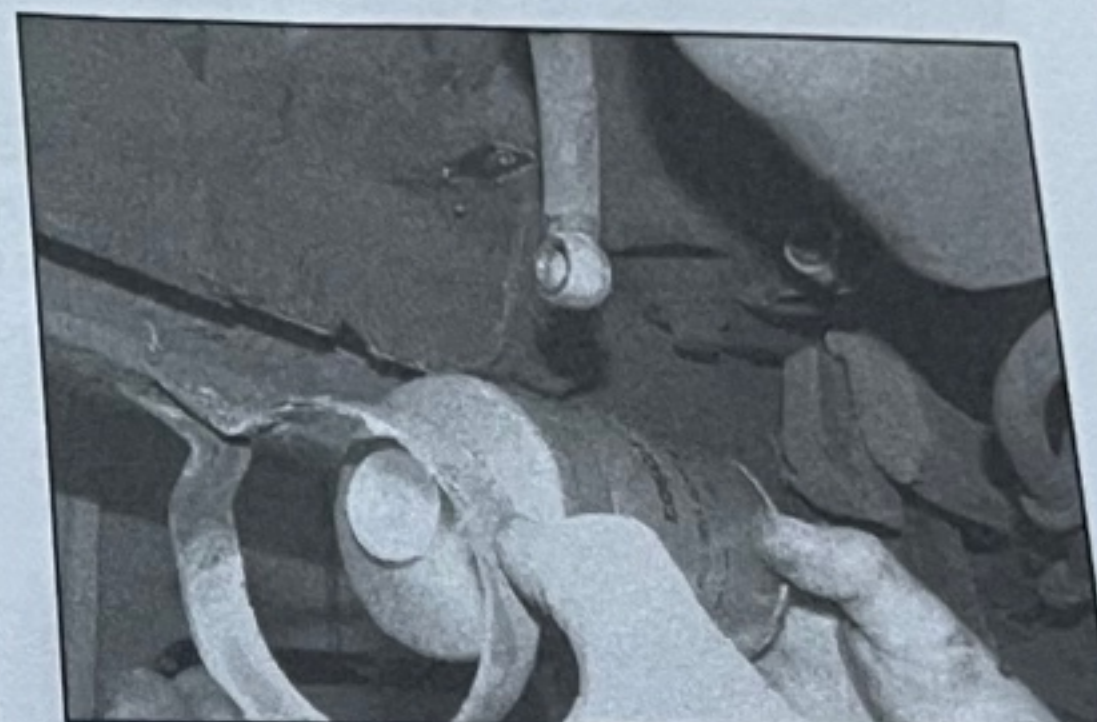
26.7b ... pull the tool into the fuel hose connection ...



26.7c ... and release the hose



26.8 Undo the retaining screw ...



26.9 ... and remove the fuel filter

7 On filters with push-on connections, a special tool will be required to release the locking clips inside the hose connections. Fit tool around the fuel filter outlet pipe and slide it along to release the locking clips inside the hose (see illustration). Repeat the procedure at the other side of the filter.

8 Undo the mounting clamp securing screw (see illustration).

9 Remove the filter from its mounting bracket, noting the direction of the arrow marked on the filter body, loosen the retaining clip and withdraw the filter from under the car (see illustration).

10 Locate the new filter in the retaining clip, and then fit and tighten the securing screw. Make sure that the direction of flow arrow on the filter body is pointing towards the outlet, which leads to the engine compartment (see illustration).

11 On filters with banjo coupling bolts,

check the condition of the sealing washers, and renew them if necessary. Refit the banjo couplings and hoses to each end of the filter, together with the sealing washers. Tighten the bolts securely, while holding the couplings with a second spanner.

12 On filters with push-on connections, refit the couplings/hoses to each end of the filter, press the hoses firmly onto the filter outlet and inlet pipes, making sure the retaining clips have secured correctly.

13 Wipe away any excess fuel, refit the plastic cover where fitted, then lower the car to the ground.

14 Start the engine, and check the filter hose connections for leaks.

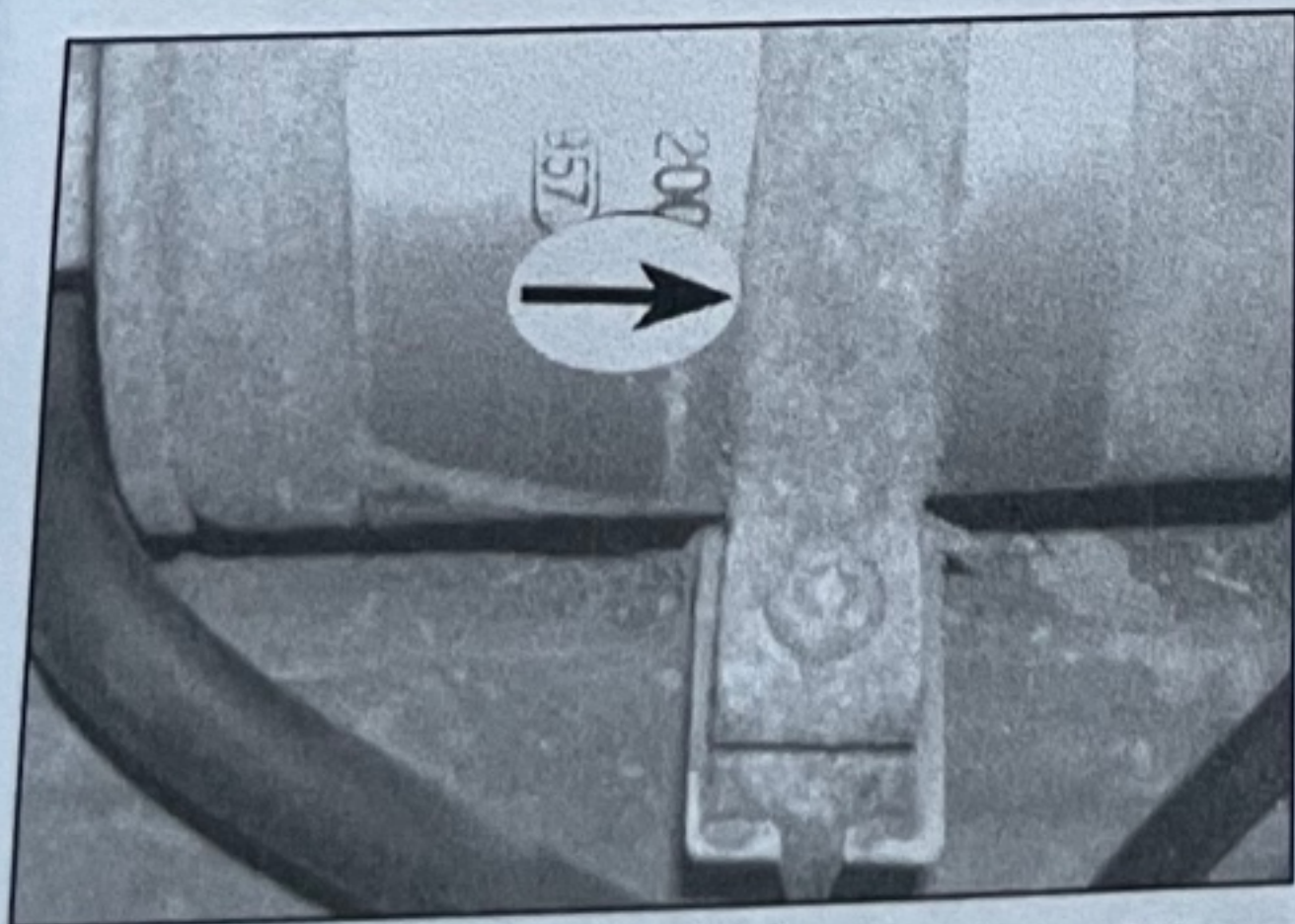
15 The old filter should be disposed of safely, bearing in mind that it will be highly inflammable.

27 Auxiliary drivebelt – renewal

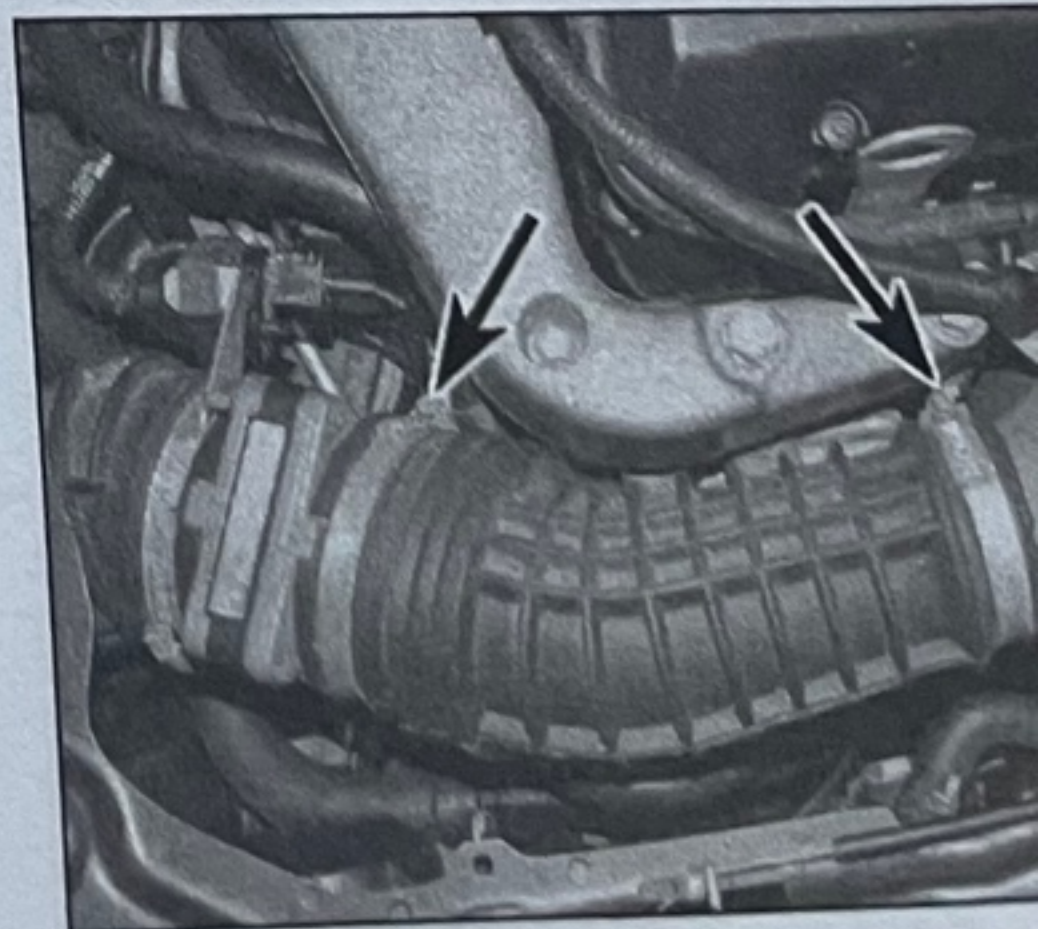
1 Apply the handbrake. Open the bonnet and unclip the engine upper cover panel (where fitted) from above the intake manifold, then slacken its two retaining clips and withdraw the mass airflow sensor's rubber intake hose; cover the sensor's intake to prevent the entry of dirt or other foreign matter into the intake tract (see illustration). Jack up the front of the car and support it on axle stands (see *Jacking and vehicle support*). Remove the right-hand front roadwheel, then

undo the retaining screws and withdraw the lower section of the plastic liner from under the right-hand wheel arch and the wheel arch liner itself as necessary to expose the crankshaft pulley and drivebelt. Unbolt the clip securing the power steering pipe to the subframe, immediately beneath the crankshaft pulley.

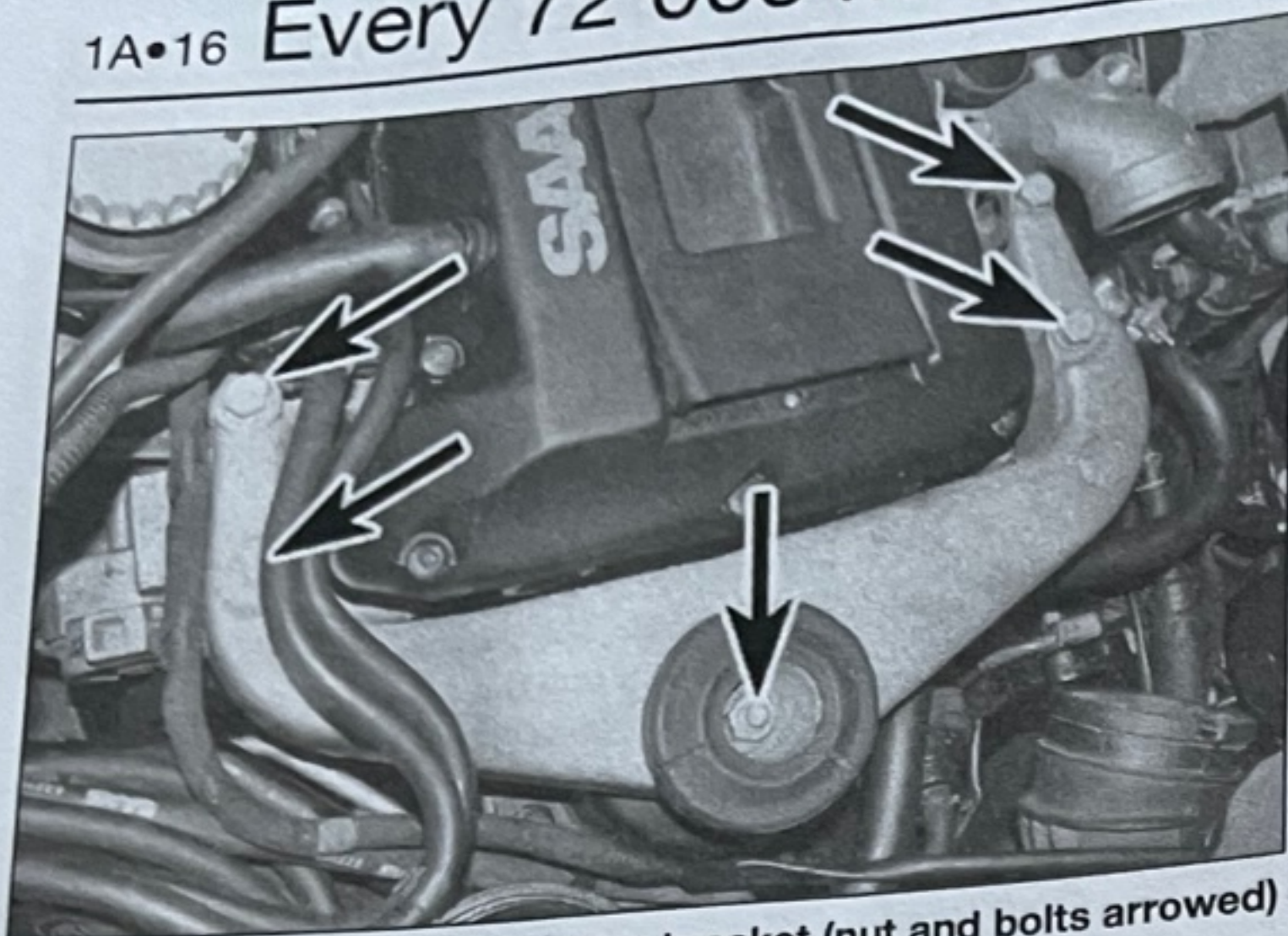
2 Position a trolley jack underneath the engine and raise the jack head until it is just taking the weight of the engine. Ensure that the jack head does not bear on the underside of the sump and place a block of wood between the sump and the jack head. Alternatively, position a lifting beam across the engine bay and support the engine by the lifting eyelet located at the right-hand side of the cylinder head. Undo the engine right-hand mounting bracket from the engine and remove the retaining nut from the top of the engine mounting (see illustration). Withdraw the engine mounting bracket.



26.10 Make sure that the direction of flow arrow on the filter body is pointing towards the engine compartment



27.1 Slacken the retaining screws () and withdraw the rubber intake hose



27.2 ... remove engine mounting bracket (nut and bolts arrowed) to reach auxiliary drivebelt and tensioner



27.3b ... and rotate tensioner against spring tension until hole in stop lug aligns with hole in inboard (fixed) part of tensioner

releasing the power steering hose from its retaining clip underneath.

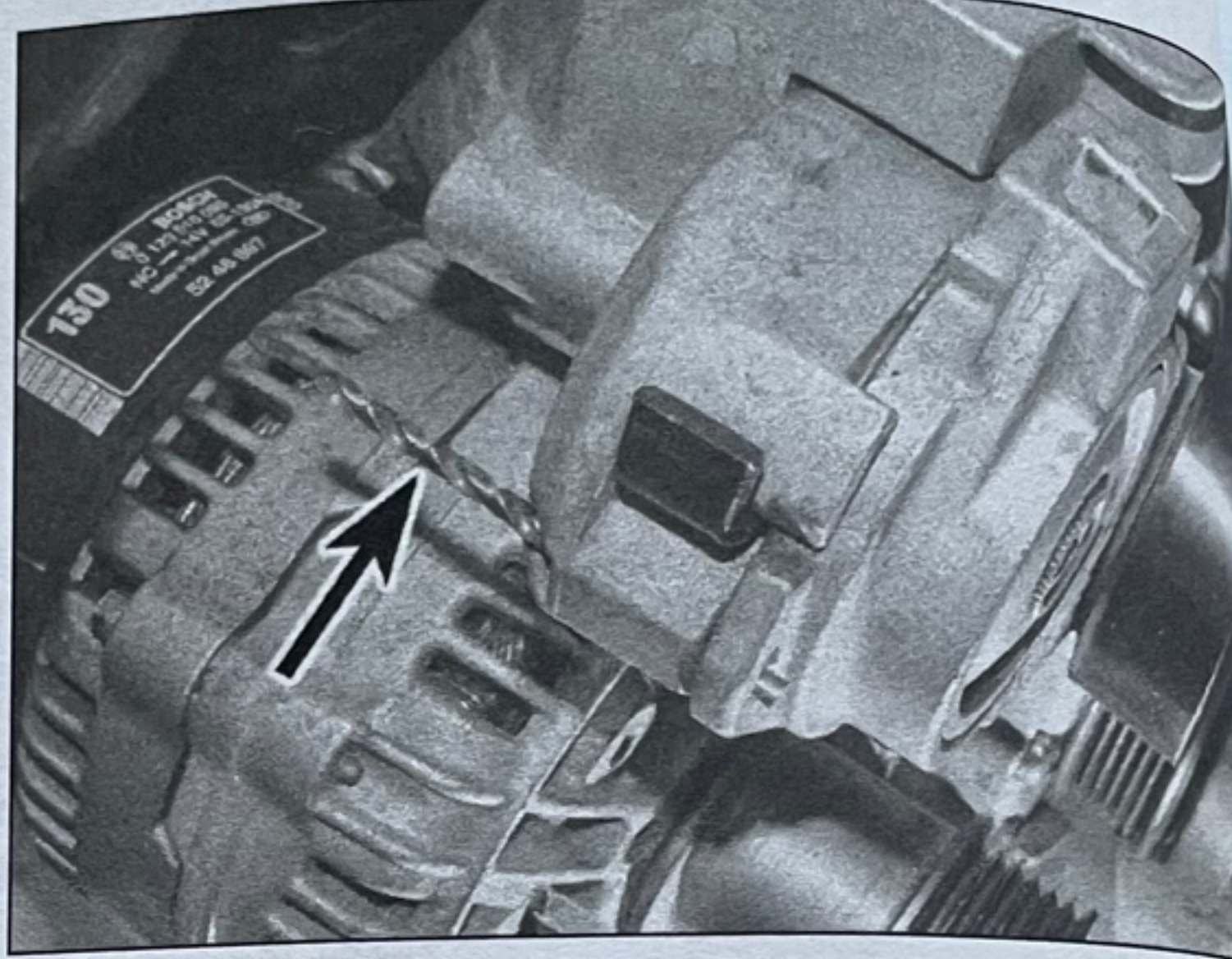
3 The tensioner pulley spring must now be compressed and locked in position. Insert a 1/2 in drive straight extension bar or similar into the square hole in the lug at the top of the outboard (moving) part of the tensioner assembly. Rotate the tensioner clockwise, against the spring tension, until the hole in the stop lug lines up with the corresponding

hole in the inboard (fixed) part of the tensioner assembly. Note that the tensioner spring is very strong, and considerable pressure is required to compress it, but do not try to force it beyond the limit of its travel, or allow it to snap back against spring pressure; it will break (see illustrations).

4 Hold the tensioner in that position and slide a 3 mm Allen key (or drill bit) through the holes in the stop lug and in the inboard (fixed) part



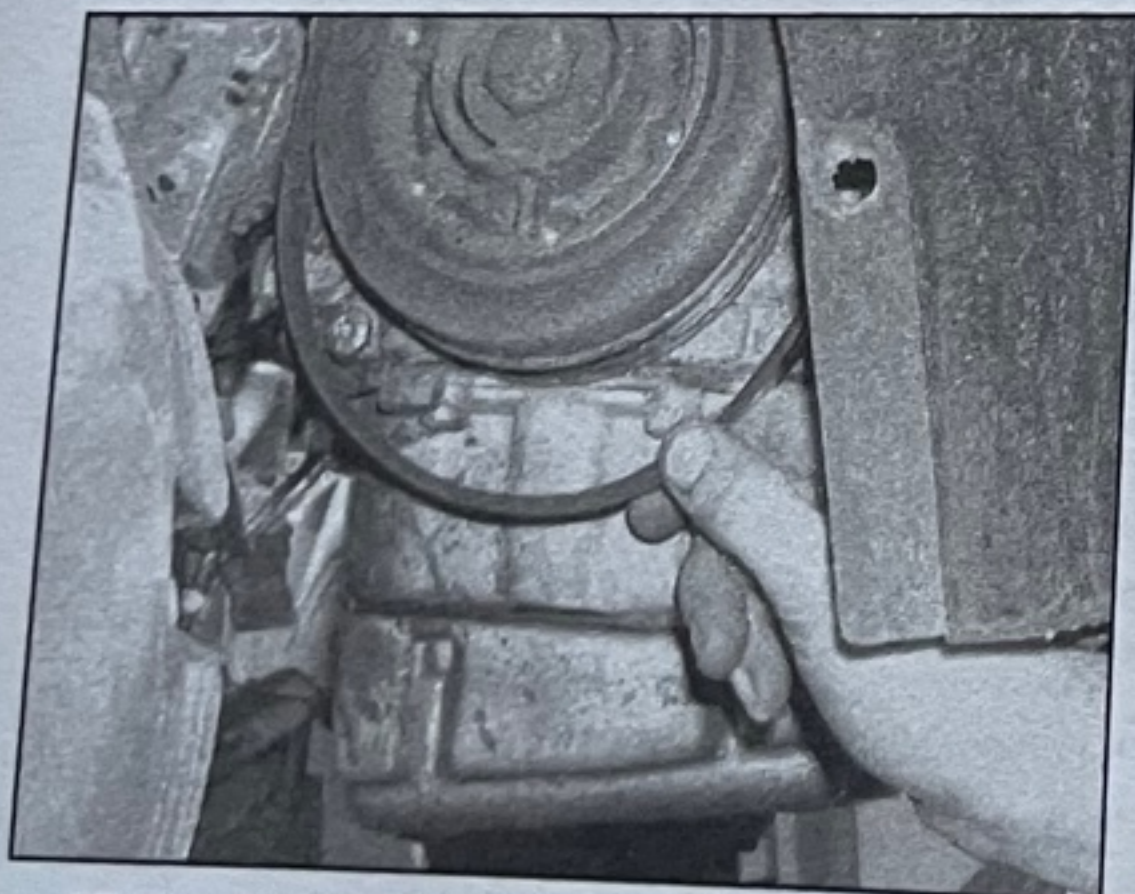
27.3a Insert a 1/2 in drive straight extension bar into lug at top of outboard (moving) part of tensioner ...



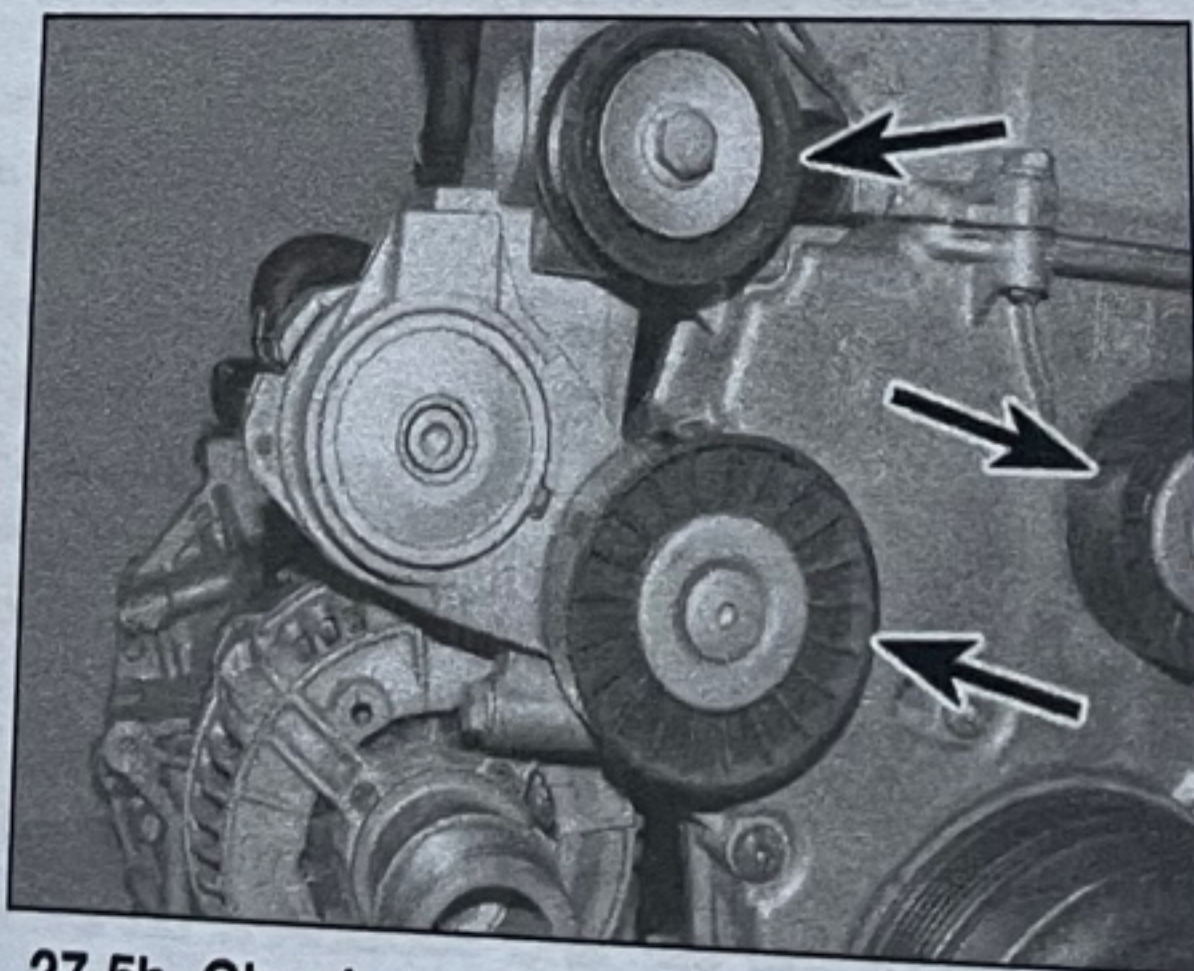
27.4 Insert 3 mm drill bit (or similar) to lock tensioner assembly in position

of the tensioner assembly (see illustration). Release slowly the effort on the straight extension bar, checking that the tensioner remains locked in position.

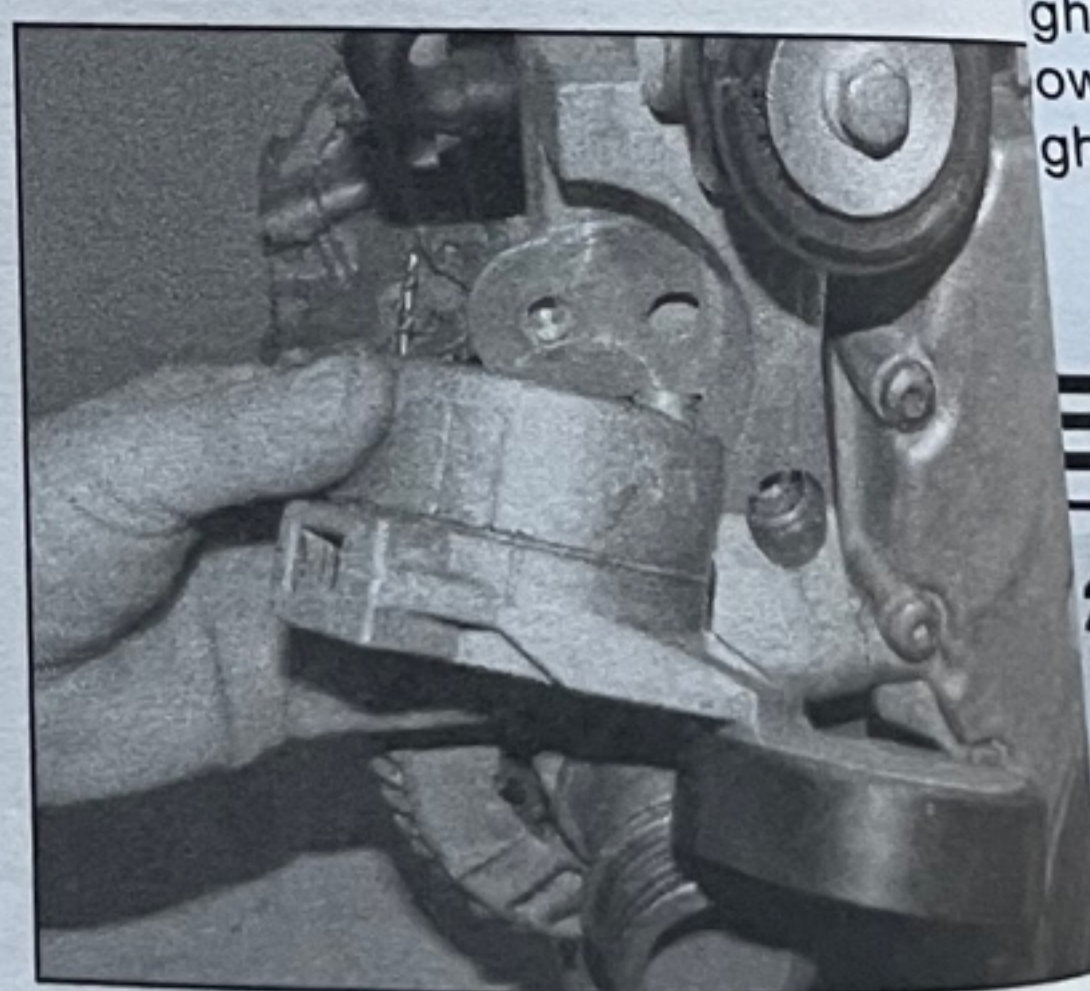
5 Slip the drivebelt from the pulleys. Remove it (see illustration). Carefully compress the pulleys (particularly the tensioner pulley and then the idlers) and renew any that are damaged, showing signs of roughness or jerking when rotated (see illustrations).



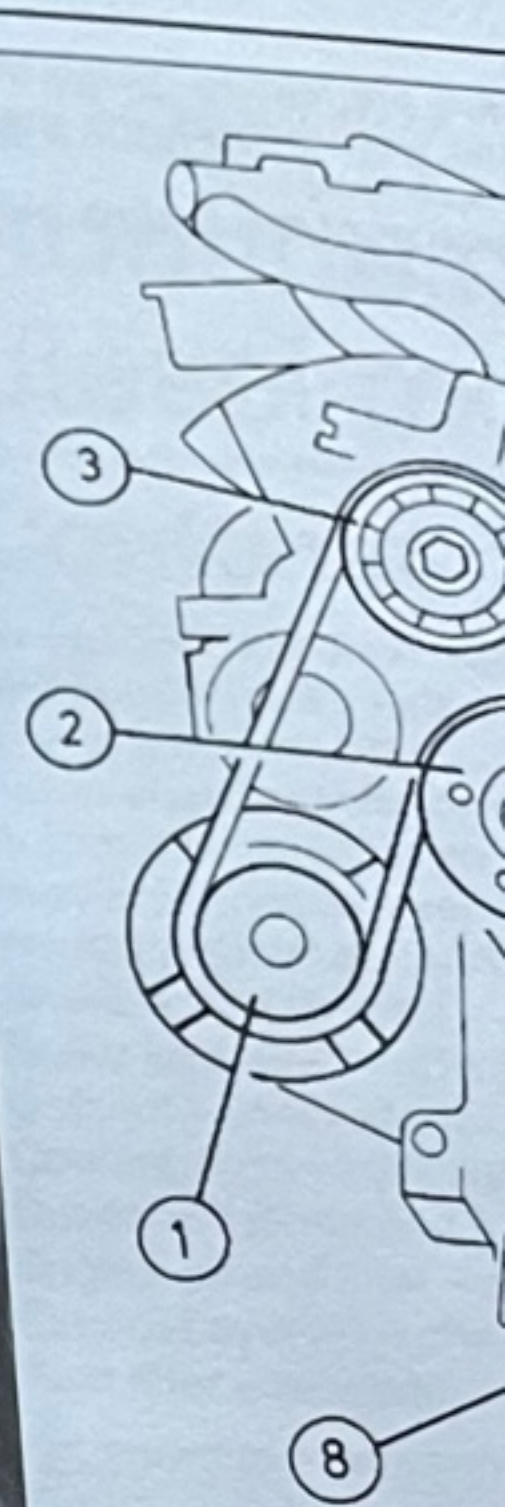
27.5a Removing the auxiliary drivebelt from the crankshaft pulley



27.5b Check carefully tensioner and idler pulleys ...



27.5c ... and renew any that are damaged or that rotate roughly or jerkily



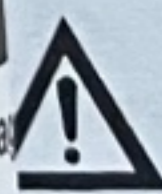
Note: A shorter drivebelt may be used to the power steering pump if the longer one is deleted.

- 1 Alternator
- 2 Tensioner
- 3 Upper idler
- 4 Lower idler

On refitting, route the pulleys as shown where applicable, ensuring that the belt is correctly engaged on all the pulleys. Compress the tensioner pulley and then slide the belt over the idlers, ensuring that it is not twisted. Ensure that the belt is tight on all the pulleys. Tighten the power steering pump mounting bolts.

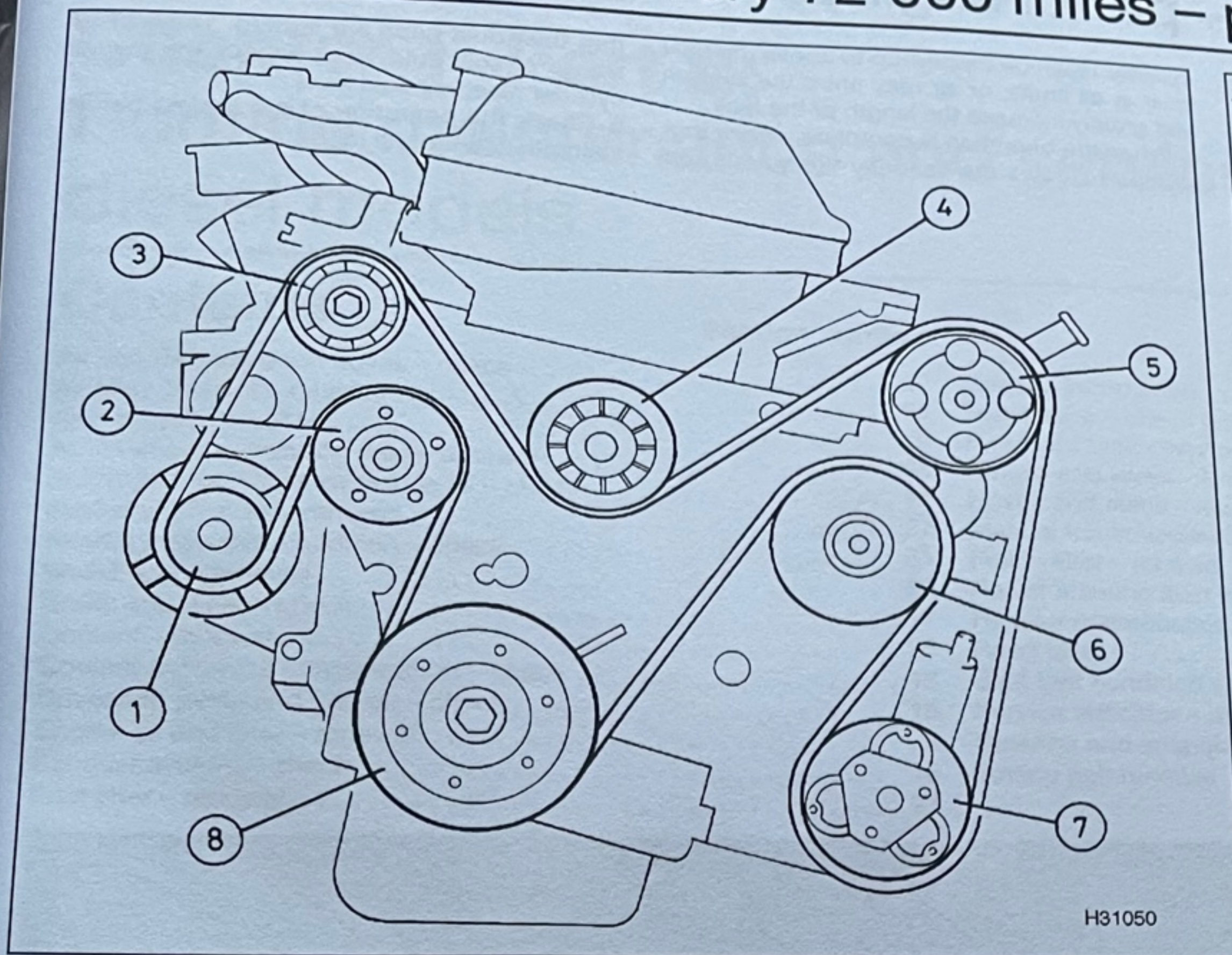
Every

29 Brake f...
renewa...



Wa...
ca...
pa...

Every 72 000 miles – petrol engines 1A•17



27.6 Auxiliary drivebelt correctly routed

Note: A shorter drivebelt is found on later vehicles, running straight from the upper idler (item 3) to the power steering pump pulley (item 5) – the lower, or centre, idler pulley (item 4) having been deleted.

- | | |
|--|-------------------------------|
| 1 Alternator | 5 Power steering pump |
| 2 Tensioner | 6 Coolant pump |
| 3 Upper idler pulley | 7 Air conditioning compressor |
| 4 Lower/centre idler pulley (where fitted) | 8 Crankshaft pulley |

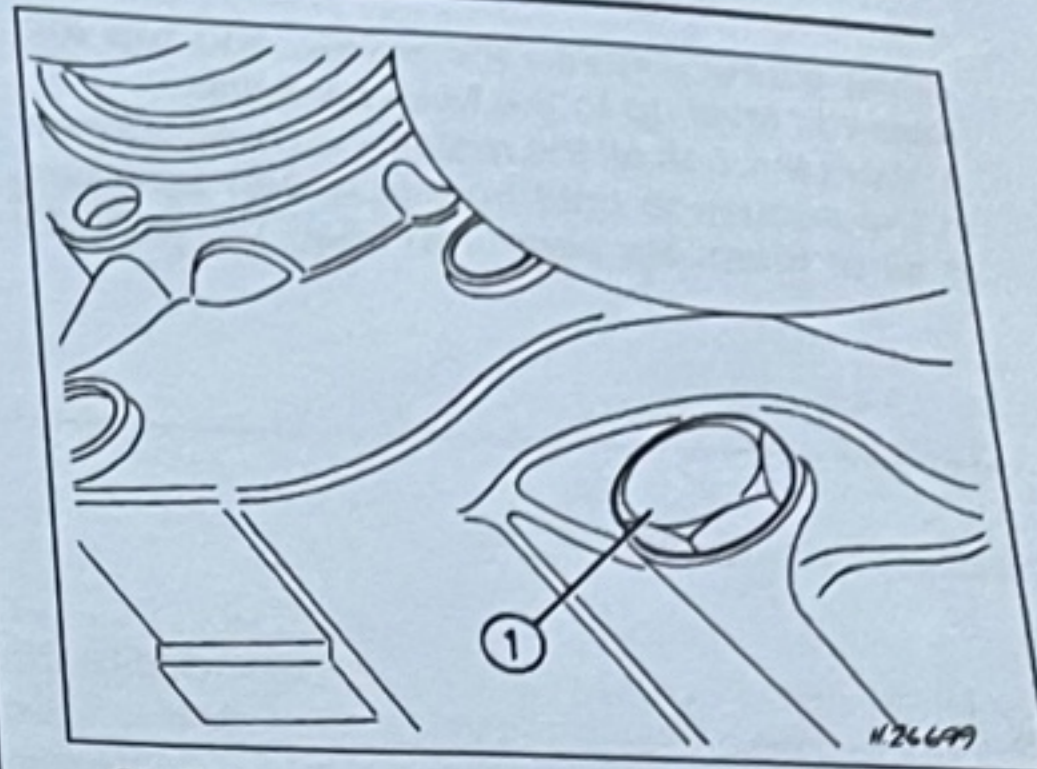
6 On refitting, route the drivebelt over all the pulleys as shown, making sure that, where applicable, the multi-grooved side is correctly engaged with the pulley grooves (**see illustration**). **Note:** A shorter drivebelt is found on later vehicles.

7 Compress the tensioner spring as described for the removal procedure. Remove the locking tool and then slowly release the tensioner, allowing it to apply pressure to the drivebelt.

8 Ensure that the belt is correctly seated on all the pulleys, and then refit the engine right-hand mounting bracket, clipping the power steering hose on its underside and tightening its nut and bolts to the torque

wrench settings specified (see Chapter 2A). Tighten securely the bolt securing the power steering hose clip to the subframe, and then refit the plastic wheel arch liner and its lower section. Refit the roadwheel and lower the car to the ground. Uncover the mass airflow sensor and refit its rubber intake hose, then refit the engine upper cover panel to the intake manifold.

9 On completion, start the engine and allow it to idle for a few minutes. This will allow the tensioner to settle in position and distribute the tension evenly throughout the belt. Stop the engine and check once again that the belt is correctly seated on all the pulleys.



28.2 Automatic transmission drain plug

28 Automatic transmission fluid – renewal

1 Take the car on a short journey to warm the transmission up to normal operating temperature. Position the car over an inspection pit, or alternatively jack up the front and rear of the car and support on axle stands (see *Jacking and vehicle support*). Whichever method is used, make sure that the car is level for checking the fluid level later. Where fitted, undo the fasteners and remove the engine under shield.

2 Position a suitable container beneath the transmission, then unscrew the drain plug and allow the fluid to drain (**see illustration**). Note that a special adapter key will be required to unscrew the plug.



Warning: The fluid will be very hot, so take necessary precautions to prevent scalding. The use of thick waterproof gloves is recommended.

3 With all the fluid drained, wipe clean the plug and refit it to the automatic transmission housing. Where applicable, fit a new sealing washer to the drain plug. Tighten the plug to the specified torque.

4 Fill the automatic transmission with the specified grade and quantity of fluid. Referring to Section 14, top it up to the correct level. Use the low temperature set of dipstick markings first, then take the car for a run. With the fluid at operating temperature, recheck the fluid level using the high temperature set of dipstick markings.

Every 4 years

29 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.

2 Working as described in Chapter 9, on the first bleed screw in the sequence, pump the brake pedal gently until no all the old fluid has been emptied from master cylinder reservoir. Top-up to the level with new fluid, and continue pump until only the new fluid remains in the reservoir and new fluid can be seen emerging from