Chapter 1
Routine maintenance and servicing

Contents

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

Servicing specifications

Lubricants and fluids

Refer to *"Weekly checks"*

Capacities

Engine oil

Including oil filter	8.0 litres

Cooling system

All models (approximate):

From dry	12.8 litres
Drain and refill	9.2 litres

Transmission

Automatic transmission (approximate):

From dry:	
3.2 litre model	7.4 litres
3.6 and 4.0 litre models	8.0 litres
Drain and refill	3.0 litres

Differential

All models (approximate)	2.1 litres

Cooling system

Antifreeze mixture:

50% antifreeze	Protection down to -37°C (5°F)
55% antifreeze	Protection down to -45°C (-22°F)

Note: *Refer to antifreeze manufacturer for latest recommendations.*

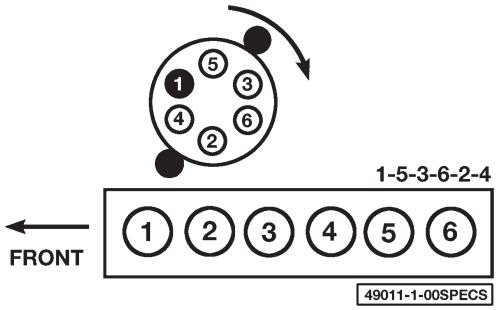
Ignition system

Spark plugs:

Type:	
3.2 litre model	RC12YCC
3.6 and 4.0 litre models	RC9YCC
Electrode gap	0.9 mm

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

Engine firing order	1-5-3-6-2-4
Distributor rotation	Clockwise
Ignition timing	See Chapter 5



Cylinder location and distributor rotation

Brakes

Disc brake pad friction material minimum thickness:

Front	4.0 mm
Rear	3.0 mm
Handbrake shoe friction material minimum thickness	1.5 mm
Handbrake adjustment	3 to 5 clicks

Torque wrench settings

	Nm	lbf ft
Automatic transmission sump pan bolts	8	6
Automatic transmission dipstick tube nut	20	15
Spark plugs	23 to 28	17 to 21
Wheel nuts	102	75

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 us 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.

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

Weekly, or every 250 miles (400 km)

☐ Carry out all the operations given in *"Weekly checks"* at the start of this manual.

Every 7500 miles (12 000 km) or 6 months, whichever comes first

In addition to the operations listed previously, carry out the following:

☐ Renew the engine oil and filter (Section 3)
☐ Check the spark plugs (Section 4)
☐ Check the power hydraulics fluid level (Section 5)
☐ Check the battery (Section 6)
☐ Check all pipes and hoses for signs of damage or leakage (Section 7)
☐ Check the automatic transmission fluid level (Section 8)
☐ Check the differential oil level (Section 9)
☐ Check the condition of the exhaust system (Section 10)
☐ Check the brake pads and discs for wear and adjust the handbrake (Section 11)
☐ Check the steering and suspension components for wear or damage and check the wheel nuts are tightened to the correct torque (Section 12)
☐ Check the condition of the seat belts (Section 13)
☐ Lubricate all locks and hinges, and exposed cables (Section 14)
☐ Carry out a road test (Section 15)

Every 15 000 miles (24 000 km) or 12 months, whichever comes first

In addition to the operations listed previously, carry out the following:

☐ Renew the spark plugs (Section 16)
☐ Renew the air cleaner element (Section 17)
☐ Renew the fuel filter (Section 18)
☐ Check the ignition system components (Section 19)
☐ Check the crankcase ventilation system (Section 20)
☐ Check the condition and tension of the drivebelt(s) (Section 21)
☐ Check the front wheel bearing adjustment and repack with grease (Section 22)
☐ Check the propshaft fasteners are tightened to the specified torque (Section 23)
☐ Check the front wheel alignment (Section 24)
☐ Check the headlight beam alignment (Section 25)

Every 30 000 miles (48 000 km) or 2 years, whichever comes first

In addition to the operations listed previously, carry out the following:

☐ Renew the automatic transmission fluid and filter (Section 26)
☐ Renew the differential oil (Section 27)
☐ Renew the brake fluid (Section 28)

Every 60 000 miles (96 000 km)

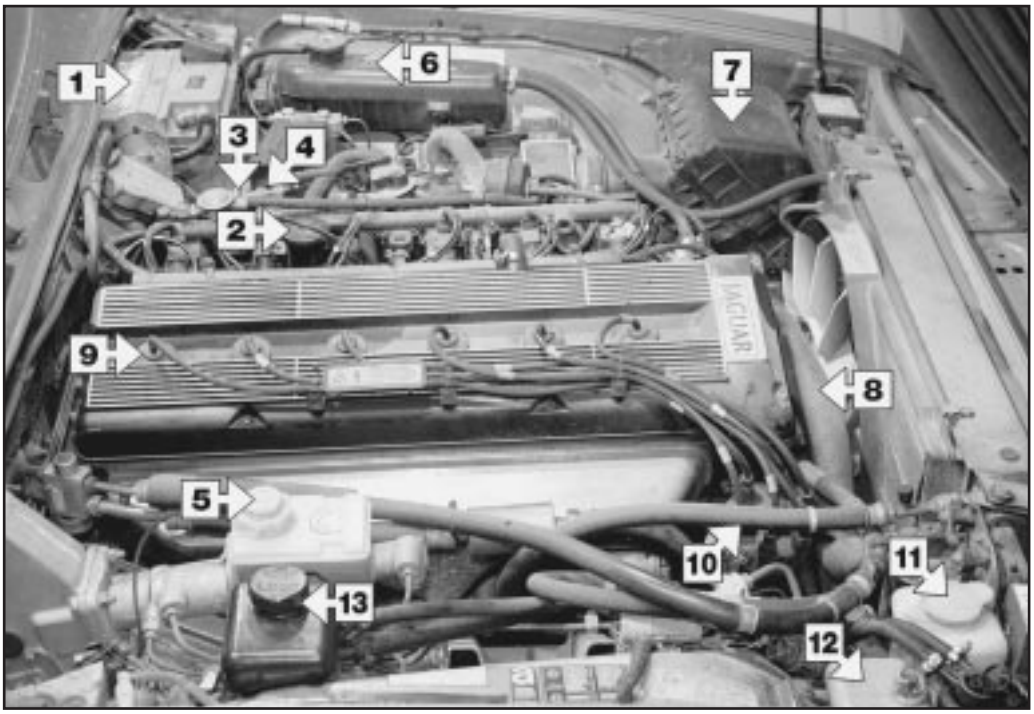
In addition to the operations listed previously, carry out the following:

☐ Check the handbrake shoes for wear (Section 29)

Every 2 years, regardless of mileage

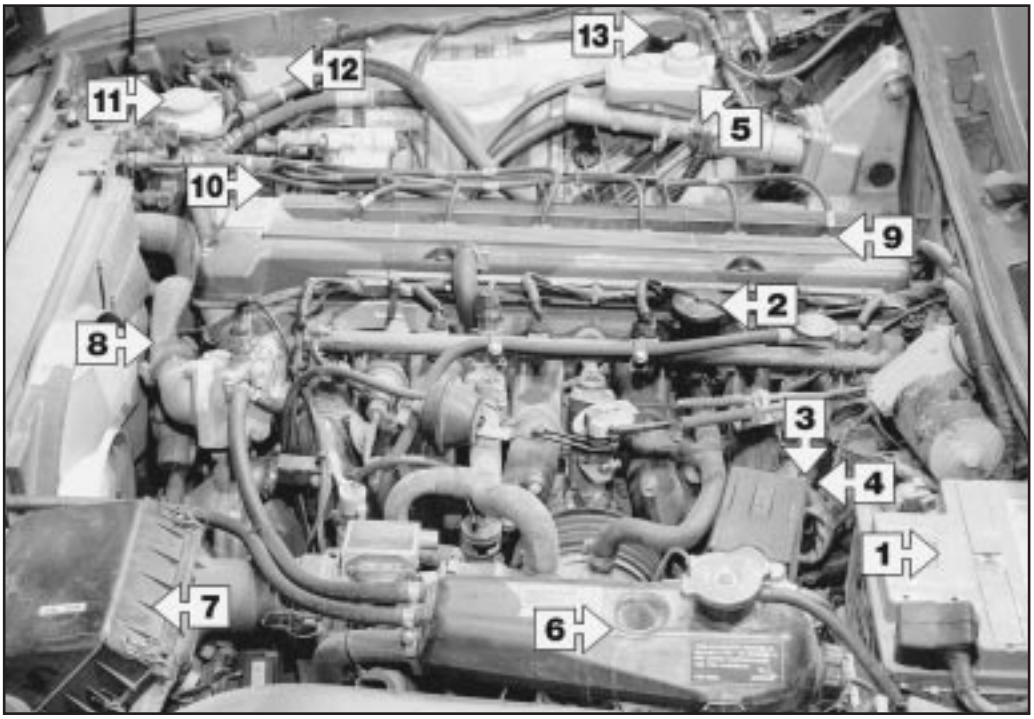
☐ Renew the coolant (Section 30)

Underbonnet view from the right-hand side of the vehicle



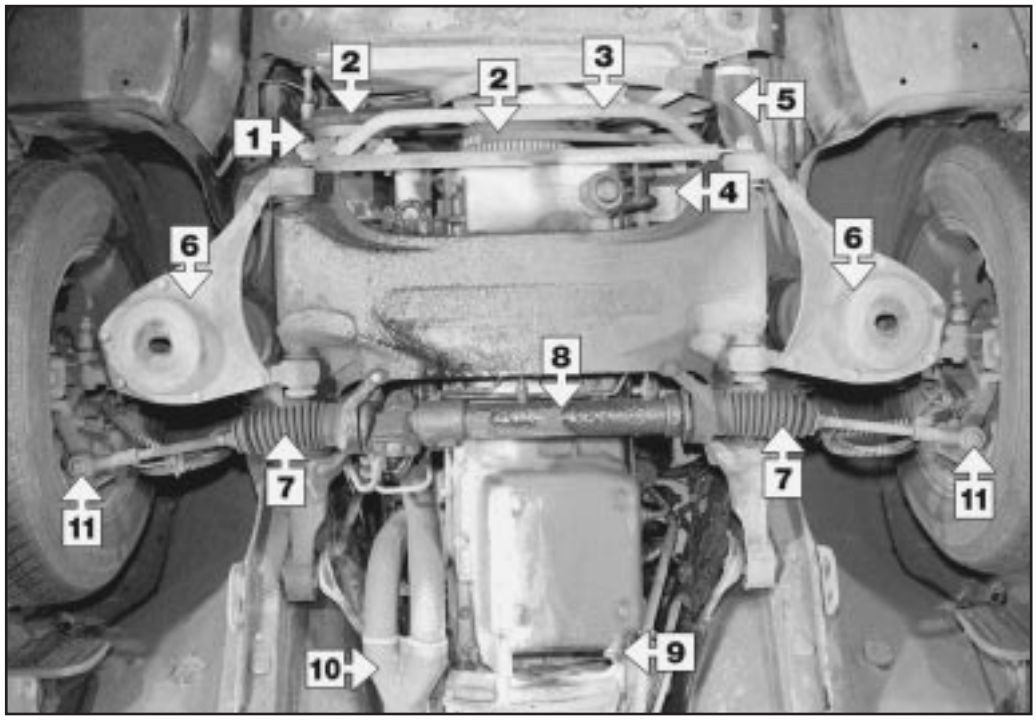
1 Battery
2 Oil filler cap
3 Engine oil dipstick (not visible)
4 Automatic transmission dipstick (not visible)
5 Brake fluid reservoir
6 Coolant reservoir (expansion tank)
7 Air cleaner housing
8 Upper radiator hose
9 Spark plugs
10 Distributor
11 Windscreen washer fluid reservoir
12 Power hydraulic system fluid reservoir
13 Power steering fluid reservoir

Underbonnet view from the left-hand side of the vehicle



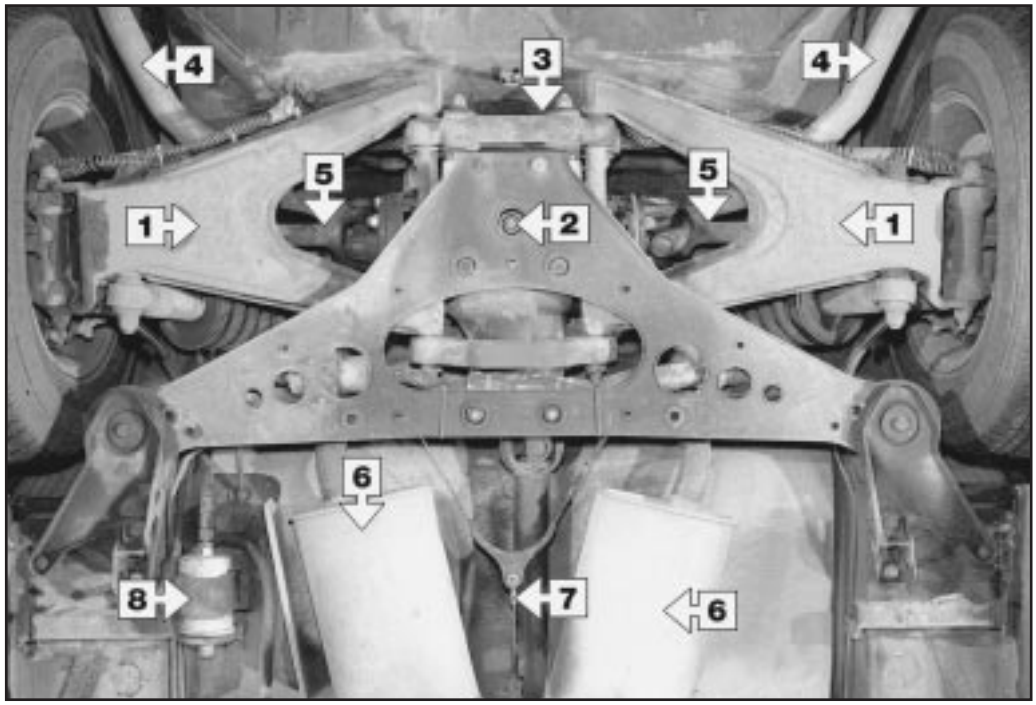
1 Battery
2 Oil filler cap
3 Engine oil dipstick (not visible)
4 Automatic transmission dipstick (not visible)
5 Brake fluid reservoir
6 Coolant reservoir (expansion tank)
7 Air cleaner housing
8 Upper radiator hose
9 Spark plugs
10 Distributor
11 Windscreen washer fluid reservoir
12 Power hydraulic system fluid reservoir
13 Power steering fluid reservoir

Front underbody view



1 Air conditioning compressor
2 Drivebelts
3 Anti-roll bar
4 Alternator
5 Lower radiator hose
6 Lower control arm
7 Steering gear boot
8 Steering gear
9 Engine sump drain plug
10 Exhaust system
11 Outer tie-rod end

Rear underbody view (typical)



1 Rear suspension control arms
2 Differential drain plug
3 Differential filler plug (not visible)
4 Exhaust pipe
5 Driveshaft
6 Silencers
7 Handbrake cable
8 Fuel filter

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.
4 As you service your vehicle, you will discover that many of the procedures can - and should - be grouped together, because of the particular procedure being performed, or because of the proximity of two otherwise-unrelated components to one another. For example, if the vehicle is raised for any reason, the exhaust can be inspected at the same time as the suspension and steering components.
5 The first step in this maintenance programme is to prepare yourself before the actual work begins. Read through all the Sections relevant to the work to be carried out, then make a list and gather all the parts and tools required. If a problem is encountered, seek advice from a parts specialist, or a dealer service department.

2 Intensive maintenance

1 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 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 is carried out first.
4 The following series of operations are those which are most often required to improve the performance of a generally poor-running engine:

Primary operations

a) Clean, inspect and test the battery (Section 6).
b) Check all the engine-related fluids (refer to "Weekly checks").
c) Check the condition and tension of the auxiliary drivebelt (Section 21).
d) Renew the spark plugs (Section 16).
e) Inspect the distributor cap and rotor arm (Section 19).
f) Check the condition of the air filter, and renew if necessary (Section 17).
g) Renew the fuel filter (Section 18).
h) Check the condition of all hoses, and check for fluid leaks (Section 7).
i) Check the exhaust gas emissions (see Chapter 6).

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

Secondary operations

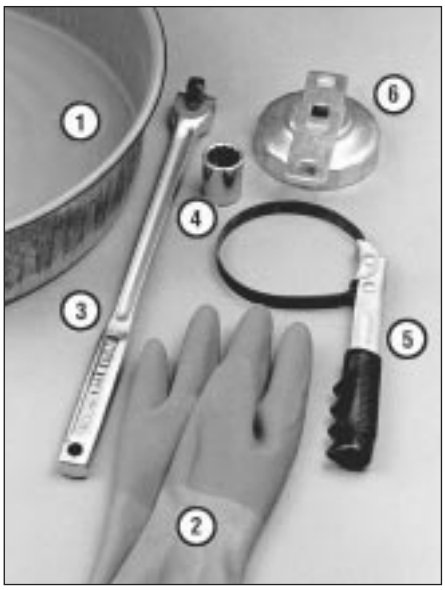
All items listed under "Primary operations", plus the following:

a) Check the charging system (refer to Chapter 5).
b) Check the ignition system (refer to Chapter 5).
c) Check the fuel system (refer to Chapter 4).
d) Renew the distributor cap and rotor arm (Section 19).
e) Renew the ignition HT leads (Section 19).

Every 7500 miles (12 000 km) or 6 months

3 Engine oil and filter renewal

1 Frequent oil changes are the best preventive maintenance the home mechanic can give the engine, because ageing oil becomes diluted and contaminated, which leads to premature engine wear.
2 Make sure that you have all the necessary tools before you begin this procedure **(see illustration)**. You should also have plenty of rags or newspapers handy for mopping up any spills.
3 Access to the underside of the vehicle is greatly improved if the vehicle can be lifted on a hoist, driven onto ramps or supported by axle stands.
4 If this is your first oil change, get under the vehicle and familiarise yourself with the location of the oil drain plug. The engine and



3.2 These tools are required when changing the engine oil and filter

1 Drain pan - It should be fairly shallow in depth, but wide in order to prevent spills
2 Rubber gloves - When removing the drain plug and filter, it is inevitable that you will get oil on your hands (the gloves will prevent burns)
3 Breaker bar - Sometimes the oil drain plug is pretty tight and a long breaker bar is needed to loosen it
4 Socket – To be used with the breaker bar or a ratchet (must be the correct size to fit the drain plug)
5 Filter wrench - This is a metal band-type wrench, which requires clearance around the filter to be effective
6 Filter wrench - This type fits on the bottom of the filter and can be turned with a ratchet or breaker bar (different size spanners are available for different types of filters)

3.7 The oil drain plug (arrowed) is located at the rear of the sump - use a ring spanner or socket to remove it

3.13 The oil filter is located on the left side of the engine - use a filter wrench for removal (tighten the new filter by hand)

3.15 Lubricate the oil filter gasket with clean engine oil before refitting the filter

exhaust components will be warm during the actual work, so try to anticipate any potential problems before the engine and accessories are hot.

5 Park the vehicle on a level spot. Start the engine and allow it to reach its normal operating temperature (the needle on the temperature gauge should be at least above the bottom mark). Warm oil and contaminates will flow out more easily. Turn off the engine when it's warmed up. Remove the oil filler cap located next to the valve cover.

6 Raise the vehicle and support it on axle stands.

Warning: To avoid personal injury, never get beneath the vehicle when it is supported by only by a jack. The jack provided with your vehicle is designed solely for raising the vehicle to remove and replace the wheels. Always use axle stands to support the vehicle when it becomes necessary to place your body underneath the vehicle.

7 Being careful not to touch the hot exhaust components, place the drain pan under the drain plug in the bottom of the pan and remove the plug **(see illustration)**. You may want to wear gloves while unscrewing the plug the final few turns if the engine is really hot.

8 Allow the old oil to drain into the pan. It may be necessary to move the pan farther under the engine as the oil flow slows to a trickle. Inspect the old oil for the presence of metal shavings and chips.

9 After all the oil has drained, wipe off the drain plug with a clean rag. Even minute metal particles clinging to the plug would immediately contaminate the new oil.

10 Clean the area around the drain plug opening, refit the plug and tighten it securely, but do not strip the threads.

11 Move the drain pan into position under the oil filter.

12 Remove all tools, rags, etc. from under the vehicle, being careful not to spill the oil in the drain pan, then lower the vehicle.

13 Loosen the oil filter **(see illustration)** by turning it anti-clockwise with the filter wrench. Any standard filter wrench should work. Once the filter is loose, use your hands to unscrew it from the block. Just as the filter comes away from the block, immediately tilt the open end up to prevent the oil inside the filter from spilling out.

Warning: The engine exhaust pipes may still be hot, so be careful.

14 With a clean rag, wipe off the mounting surface on the block. If a residue of old oil is allowed to remain, it will smoke when the block is heated up. It will also prevent the new filter from seating properly. Also make sure that the none of the old gasket remains stuck to the mounting surface. It can be removed with a scraper if necessary.

15 Compare the old filter with the new one to make sure they are the same type. Smear some engine oil on the rubber gasket of the new filter and screw it into place **(see illustration)**. Because over-tightening the filter will damage the gasket, do not use a filter wrench to tighten the filter. Tighten it by hand until the gasket contacts the seating surface. Then seat the filter by giving it an additional 3/4-turn.

16 Add new oil to the engine through the oil filler cap next to the valve cover. Use a spout or funnel to prevent oil from spilling onto the top of the engine. Pour three litres of fresh oil into the engine. Wait a few minutes to allow the oil to drain into the pan, then check the level on the oil dipstick (see *"Weekly checks"*). If the oil level is at or near the H mark, refit the filler cap hand tight, start the engine and allow the new oil to circulate.

17 Allow the engine to run for about a minute. While the engine is running, look under the vehicle and check for leaks at the sump drain plug and around the oil filter. If either is leaking, stop the engine and tighten the plug or filter slightly.

OIL CARE
FOLLOW THE CODE
OIL BANK LINE
0800 66 33 66

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.

18 Wait a few minutes to allow the oil to trickle down into the pan, then recheck the level on the dipstick and, if necessary, add enough oil to bring the level to the H mark.

19 During the first few trips after an oil change, make it a point to check frequently for leaks and proper oil level.

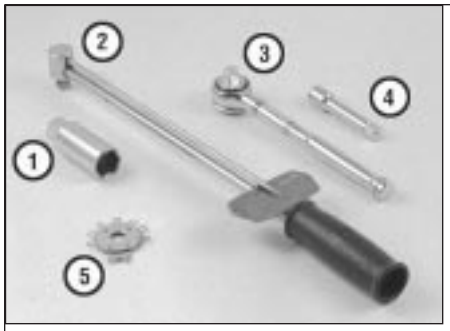
20 The old oil drained from the engine cannot be reused in its present state and should be disposed of. Check with your local authority, or with a local garage to see whether they will accept the oil for recycling. **Don't** pour used oil into drains or onto the ground. After the oil has cooled, it can be drained into a suitable container (capped plastic jugs, topped bottles, etc.) for transport to an approved disposal site.

1

4 Spark plug check

1 Spark plug renewal requires a spark plug socket which fits onto a ratchet spanner. This socket is lined with a rubber grommet to protect the porcelain insulator of the spark plug and to hold the plug while you insert it into the spark plug hole. You will also need a wire-type feeler gauge to check and adjust the spark plug gap and a torque wrench to tighten the new plugs to the specified torque **(see illustration)**.

2 If you are replacing the plugs, purchase the new plugs, adjust them to the proper gap and then replace each plug one at a time. **Note:** *When buying new spark plugs, it's essential that you obtain the correct plugs for your specific vehicle. This information can be found in the Specifications Section at the beginning of this Chapter, on the Vehicle Emissions Control Information (VECI) label located on the underside of the bonnet (where fitted)or in the owner's manual. If these sources specify different plugs, purchase the spark plug type specified on the VECI label because that information is provided specifically for your engine.*



4.1 Tools required for changing spark plugs

1 *Spark plug socket - This will have special padding inside to protect the spark plug porcelain insulator*
2 *Torque wrench - Although not mandatory, use of this tool is the best way to ensure that the plugs are tightened properly*
3 *Ratchet - to fit the plug socket*
4 *Extension - Depending on model and accessories, you may need special extensions and universal joints to reach one or more of the plugs*
5 *Spark plug gap gauge - This gauge for checking the gap comes in a variety of styles. Make sure the gap for your engine is included*

3 Inspect each of the new plugs for defects. If there are any signs of cracks in the porcelain insulator of a plug, don't use it.

4 Check the electrode gaps of the new plugs. Check the gap by inserting the wire gauge of the proper thickness between the electrodes at the tip of the plug **(see illustration)**. The gap between the electrodes should be identical to that listed in this Chapter's Specifications or on the VECI label (as applicable). If the gap is incorrect, use the notched adjuster on the feeler gauge body to bend the curved side electrode slightly **(see illustration)**.

5 If the side electrode is not exactly over the centre electrode, use the notched adjuster to align them.

Caution: If the gap of a new plug must be adjusted, bend only the base of the earth electrode - do not touch the tip.

Removal

6 To prevent the possibility of mixing up spark plug leads, work on one spark plug at a time. Remove the lead and boot from one spark plug. Grasp the boot - not the lead - as shown, give it a half twisting motion and pull straight up **(see illustration)**.

7 If compressed air is available, blow any dirt or foreign material away from the spark plug area before proceeding (a common bicycle pump will also work).

8 Remove the spark plug **(see illustration)**.

9 Whether you are replacing the plugs at this time or intend to re-use the old plugs, compare each old spark plug with the chart shown on the inside back cover of this manual to determine the overall running condition of the engine.

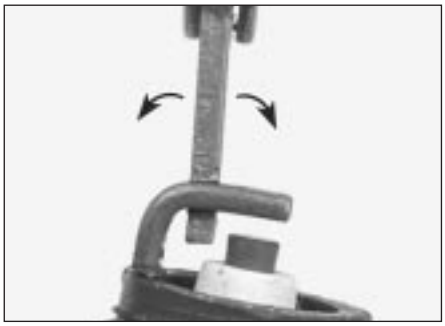
Refitting

10 Prior to refitting, apply a coat of anti-seize compound to the plug threads **(see illustration)**. It's often difficult to insert spark plugs into their holes without cross-threading them. To avoid this possibility, fit a short piece of 3/8-inch internal diameter (ID) rubber hose over the end of the spark plug **(see Haynes Hint)**. 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. Tighten the plug to the torque listed in this Chapter's Specifications. In the absence of a torque wrench, tighten each plug until you feel it seat, and then by a further quarter-turn only. Do not overtighten the spark plugs.

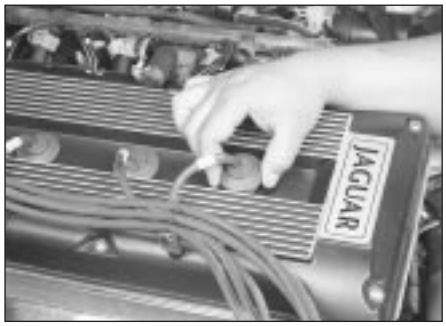
11 Attach the plug lead to the new spark plug, again using a twisting motion on the boot until it is firmly seated on the end of the spark plug.

12 Follow the above procedure for the remaining spark plugs, replacing them one at a time to prevent mixing up the spark plug leads.

4.4a Spark plug manufacturers recommend using a wire-type gauge when checking the gap - if the wire does not slide between the electrodes with a slight drag, adjustment is required



4.4b To change the gap, bend the side electrode only, as indicated by the arrows, and be very careful not to crack or chip the porcelain insulator surrounding the centre electrode

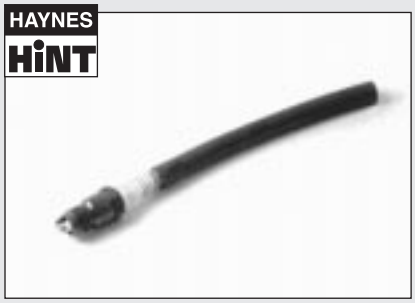


4.6 When removing the spark plug leads, grasp only the boot and use a twisting/pulling motion

4.8 Use a spark plug socket with a long extension to unscrew the spark plugs

4.10 Apply a coat of anti-seize compound to the spark plug threads

HAYNES HiNT



A length of 3/8-inch ID rubber hose will save time and prevent damaged threads when refitting the spark plugs

5.2 The power hydraulic system reservoir is located on the right-hand inner wing - to check the fluid level on 1988 and 1989 models simply look through the sight glass and note the colour of the indicator

5.3 To add fluid, remove the filler hole dust cap (arrowed)

5.7 On 1990 and later models remove the cap and check the fluid level on the dipstick

5 Power hydraulic system fluid level check

Caution: Use only Castrol or Jaguar hydraulic system mineral oil (HSMO) in the power hydraulic system (available at Jaguar dealer service departments).

1 The power hydraulic system controls the ride levelling and the brake servo systems. **The fluid reservoir also supplies the power steering system on some models.** The level of the fluid should be carefully maintained. Low fluid levels can adversely affect the riding and braking capabilities of your vehicle. The power hydraulic system fluid reservoir is located on the right inner wing of the engine compartment.

1988 and 1989 models

2 The fluid level can easily be checked by viewing the reservoir sight glass. A green indicator in the sight glass indicates an OK condition, while a red indicator in the sight glass requires fluid to be added **(see illustration)**.

3 If additional fluid is required, pop open the plastic tab located on top of the reservoir cap **(see illustration)**.

4 Insert the mineral oil dispensing tube into the reservoir filler hole. Push down and turn until the dispensing tube is locked in place.

5 Add fluid until the green indicator in the sight glass appears, then release the dispensing tube by pushing downward and turning the opposite direction of refitting.

1990 to 1994 models

6 The fluid level can be checked by removing the cap and observing the level of fluid on the dipstick.

7 Wipe off the fluid with a clean rag, reinsert it, then withdraw it and read the fluid level **(see illustration)**. The dipstick is marked so the fluid can be checked either cold or hot. The level should be at the HOT mark if the fluid was hot to the touch. It should be at the COLD mark if the fluid was cool to the touch. At no time should the fluid level drop below the add mark.

8 If additional fluid is required, pour the specified type directly into the reservoir, using a funnel to prevent spills.

6 Battery check and general information

Warning: Certain precautions must be followed when working with the battery. Hydrogen gas, which is highly flammable, is always present in the battery cells, so don't smoke, and keep naked flames and sparks away from the battery. The electrolyte in the battery is actually dilute sulphuric acid, which will cause injury if splashed on your skin or in your eyes. It will also ruin clothes and painted surfaces. When removing the battery cables, always detach the negative cable first and hook it up last!

1 A routine preventive maintenance program for the battery in your vehicle is the only way to ensure quick and reliable starts. But before performing any battery maintenance, make sure that you have the proper equipment necessary to work safely around the battery **(see illustration)**.

2 There are also several precautions that should be taken whenever battery maintenance is performed. Before servicing the battery, always turn the engine and all accessories off and disconnect the cable from the negative terminal of the battery.

3 The battery produces hydrogen gas, which is both flammable and explosive. Never create a spark, smoke or light a match around the battery. Always charge the battery in a ventilated area.

4 Electrolyte contains poisonous and corrosive sulphuric acid. Do not allow it to get in your eyes, on your skin or on your clothes, and

6.1 Tools and materials required for battery maintenance

1 *Face shield/safety goggles - When removing corrosion with a brush, the acidic particles can fly up into your eyes*
2 *Baking soda - A solution of baking soda and water can be used to neutralise corrosion*
3 *Petroleum jelly - A layer of this on the battery posts will help prevent corrosion*
4 *Battery post/cable cleaner - This wire brush cleaning tool will remove all traces of corrosion from the battery posts and cable clamps*
5 *Treated felt washers - Placing one of these on each post, directly under the cable clamps, will help prevent corrosion*
6 *Puller - Sometimes the cable clamps are difficult to pull off the posts, even after the nut/bolt has been completely loosened. This tool pulls the clamp straight up and off the post without damage*
7 *Battery post/cable cleaner - Here is another cleaning tool which is a slightly different version of number 4 above, but it does the same thing*
8 *Rubber gloves - Another safety item to consider when servicing the battery; remember that's acid inside the battery!*

6.6a Battery terminal corrosion usually appears as light, fluffy powder

6.6b Removing a cable from the battery post with a spanner - sometimes special battery pliers are required for this if corrosion has damaged the nut hex

6.7a Remove all the corrosion from the cable clamps (the inside of the clamp is tapered to match the taper on the post, so don't remove too much material)

6.7b Regardless of the type of tool used to clean the battery posts, a clean, shiny surface should be the result

never ingest it. Wear protective safety glasses when working near the battery. Keep children away from the battery.

5 Note the external condition of the battery. If the positive terminal and cable clamp on your vehicle's battery is equipped with a rubber protector, make sure it isn't torn or damaged. It should completely cover the terminal. Look for any corroded or loose connections, cracks in the case or cover or loose hold-down clamps. Also check the entire length of each cable for cracks and frayed conductors.

6 If corrosion, which looks like white, fluffy deposits **(see illustration)** is evident, particularly around the terminals, the battery should be removed for cleaning. Loosen the cable clamp bolts, being careful to remove the ground cable first, and slide them off the terminals **(see illustration)**. Then disconnect the hold-down clamp bolt and nut, remove the clamp and lift the battery from the engine compartment.

7 Clean the cable clamps thoroughly with a battery brush or a terminal cleaner and a solution of warm water and baking soda **(see illustration)**. Wash the terminals and the top of the battery case with the same solution but make sure that the solution doesn't get into the battery. When cleaning the cables, terminals and battery top, wear safety goggles and rubber gloves to prevent any solution from coming in contact with your eyes or hands. Wear old clothes too - even diluted, sulphuric acid splashed onto clothes will burn holes in them. If the terminals have been extensively corroded, clean them up with a terminal cleaner **(see illustration)**. Thoroughly wash all cleaned areas with plain water.

8 Make sure the battery tray is in good condition and the hold-down clamp bolt or nut is tight. If the battery is removed from the tray, make sure no parts remain in the bottom of the tray when the battery is reinstalled. When reinstalling the hold-down clamp bolt or nut, do not over-tighten it.

9 Information on removing and refitting the battery can be found in Chapter 5. Information on jump starting can be found at the front of this manual.

Cleaning

10 Corrosion on the hold-down components, battery case and surrounding areas can be removed with a solution of water and baking soda. Thoroughly rinse all cleaned areas with plain water.

11 Any metal parts of the vehicle damaged by corrosion should be covered with a zinc-based primer, then painted.

Charging

Warning: When batteries are being charged, hydrogen gas, which is very explosive and flammable, is produced. Do not smoke or allow open flames near a charging or a recently charged battery. Wear eye protection when near the battery during charging. Also, make sure the charger is unplugged before connecting or disconnecting the battery from the charger.

12 Slow-rate charging is the best way to restore a battery that's discharged to the point where it will not start the engine. It's also a good way to maintain the battery charge in a vehicle that's only driven a few miles between starts. Maintaining the battery charge is particularly important in the winter when the battery must work harder to start the engine and electrical accessories that drain the battery are in greater use.

13 It's best to use a one or two-amp battery charger (sometimes called a "trickle" charger). They are the safest and put the least strain on the battery. They are also the least expensive. For a faster charge, you can use a higher amperage charger, but don't use one rated more than 1/10th the amp/hour rating of the battery. Rapid boost charges that claim to restore the power of the battery in one to two hours are hardest on the battery and can damage batteries not in good condition. This type of charging should only be used in emergency situations.

14 The average time necessary to charge a battery should be listed in the instructions that come with the charger. As a general rule, a trickle charger will charge a battery in 12 to 16 hours.

7 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 **(see Haynes Hint)**. Should a

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

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.

4 Inspect all the cooling system components (hoses, joint faces etc.) for leaks. A leak in the cooling system will usually show up as white- or rust-coloured deposits on the area adjoining the leak. Where any problems of this nature are found on system components, renew the component or gasket with reference to Chapter 3.

5 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.

6 Also check the condition of the power steering fluid hoses and pipes.

8 Automatic transmission fluid level check

1 The level of the automatic transmission fluid should be carefully maintained. Low fluid level can lead to slipping or loss of drive, while overfilling can cause foaming, loss of fluid and transmission damage.

2 The transmission fluid level should only be checked when the transmission is at its normal operating temperature.

Caution: If the vehicle has just been driven for a long time at high speed or in city traffic in hot weather, or if it has been pulling a trailer, an accurate fluid level reading cannot be obtained. Allow the fluid to cool down for about 30 minutes.

3 If the vehicle has not been driven, park the vehicle on level ground, set the handbrake, then start the engine and bring it to operating temperature. While the engine is idling, depress the brake pedal and move the selector lever through all the gear ranges, beginning and ending in Park.

4 With the engine still idling, remove the dipstick from its tube **(see illustration)**. Check the level of the fluid on the dipstick **(see illustration)** and note its condition.

5 Wipe the fluid from the dipstick with a clean rag and reinsert it back into the filler tube until the cap seats.

8.4a The automatic transmission dipstick (arrowed) is located in a tube which extends forward from the transmission

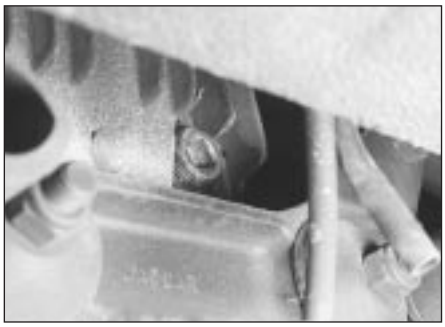
6 Pull the dipstick out again and note the fluid level. If the transmission is cold, the level should be in the COLD or COOL range on the dipstick. If it is hot, the fluid level should be in the HOT range. If the level is at the low side of either range, add the specified transmission fluid through the dipstick tube with a funnel.

7 Add just enough of the recommended fluid to fill the transmission to the proper level. It takes about one pint to raise the level from the low mark to the high mark when the fluid is hot, so add the fluid a little at a time and keep checking the level until it is correct.

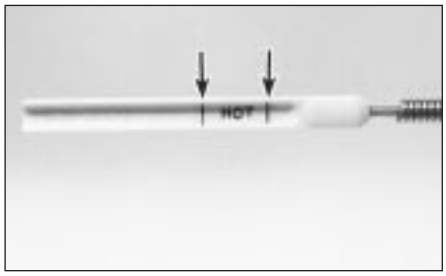
8 The condition of the fluid should also be checked along with the level. If the fluid at the end of the dipstick is black or a dark reddish brown colour, or if it emits a burned smell, the fluid should be changed (see Section 26). If you are in doubt about the condition of the fluid, purchase some new fluid and compare the two for colour and smell.

9 Differential oil level check

1 The differential has a check/fill plug which must be removed to check the lubricant level. If the vehicle is raised to gain access to the plug, be sure to support it safely on axle stands - DO NOT crawl under the vehicle when it's supported only by the jack!



9.2 The differential check/fill plug is located on the rear of the differential housing - place your finger in the filler plug hole to make sure the lubricant level is even with the bottom of the hole



8.4b Check the automatic transmission fluid with the engine idling at operating temperature and the gear selector in Park, then add fluid to bring the level to the upper mark

2 Remove the lubricant check/fill plug from the differential **(see illustration).** Use a 3/8-inch drive ratchet and a short extension to unscrew the plug.

3 Use your little finger as a dipstick to make sure the lubricant level is even with the bottom of the plug hole. If not, use a syringe or squeeze bottle to add the recommended lubricant until it just starts to run out of the opening.

4 Refit the plug and tighten it securely.

10 Exhaust system check

1 With the engine cold (at least three hours after the vehicle has been driven), check the complete exhaust system from its starting point at the engine to the end of the tailpipe. This should be done on a hoist where unrestricted access is available.

2 Check the pipes and connections for evidence of leaks, severe corrosion or damage. Make sure that all brackets and hangers are in good condition and tight **(see illustration)**.

3 At the same time, inspect the underside of the body for holes, corrosion, open seams, etc. which may allow exhaust gases to enter the passenger compartment. Seal all body openings with silicone or body putty.

4 Rattles and other noises can often be traced to the exhaust system, especially the mounts and hangers. Try to move the pipes,

10.2 Check the exhaust system hangers (arrowed) for damage and cracks

silencer and catalytic converter. If the components can come in contact with the body or suspension parts, secure the exhaust system with new mounts.

5 Check the running condition of the engine by inspecting inside the end of the tailpipe. The exhaust deposits here are an indication of engine state-of-tune. If the pipe is black and sooty or coated with white deposits, the engine is in need of a tune-up, including a thorough fuel system inspection.

11 Braking system - general check and adjustment

Warning: The dust created by the brake system may contain asbestos, which is harmful to your health. Never blow it out with compressed air and don't inhale any of it. An approved filtering mask should be worn when working on the brakes. Do not, under any circumstances, use petroleum-based solvents to clean brake parts. Use brake system cleaner only! Try to use non-asbestos replacement parts whenever possible.

Note: *For detailed photographs of the brake system, refer to Chapter 9.*

1 In addition to the specified intervals, the brakes should be inspected every time the wheels are removed or whenever a defect is suspected. Any of the following symptoms could indicate a potential brake system defect: The vehicle pulls to one side when the brake pedal is depressed; the brakes make squealing or dragging noises when applied; brake pedal travel is excessive; the pedal pulsates; brake fluid leaks, usually onto the inside of the tyre or wheel.

2 The disc brakes have built-in electrical wear indicators which cause a warning lamp to illuminate on the instrument panel when they're worn to the renewal point. When the warning light comes on, replace the pads immediately or expensive damage to the discs can result.

3 Loosen the wheel nuts.

4 Raise the vehicle and place it securely on axle stands.

5 Remove the wheels.

Disc brakes

6 There are two pads (an outer and an inner) in each caliper. The pads are visible through inspection holes in each caliper **(see Haynes Hint)**.

7 Check the pad thickness by looking at each end of the caliper and through the inspection hole in the caliper body. If the lining material is less than the thickness listed in this Chapter's Specifications, replace the pads. **Note:** *Keep in mind that the lining material is riveted or bonded to a metal backing plate and the metal portion is not included in this measurement.*

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You will find an inspection hole like this in each caliper - placing a ruler across the hole should enable you to determine the thickness of remaining pad material for both inner and outer pads

8 If it is difficult to determine the exact thickness of the remaining pad material by the above method, or if you are at all concerned about the condition of the pads, remove the caliper(s), then remove the pads from the calipers for further inspection (see Chapter 9).

9 Once the pads are removed from the calipers, clean them with brake cleaner and re-measure them with a ruler or a vernier caliper.

10 Measure the disc thickness with a micrometer to make sure that it still has service life remaining. If any disc is thinner than the specified minimum thickness, replace it (refer to Chapter 9). Even if the disc has service life remaining, check its condition. Look for scoring, gouging and burned spots. If these conditions exist, remove the disc and have it resurfaced (see Chapter 9).

11 Before refitting the wheels, check all brake lines and hoses for damage, wear, deformation, cracks, corrosion, leakage, bends and twists, particularly in the vicinity of the rubber hoses at the calipers **(see illustration)**. Check the clamps for tightness and the connections for leakage. Make sure that all hoses and lines are clear of sharp edges, moving parts and the exhaust system. If any of the above conditions are noted, repair, reroute or replace the lines and/or fittings as necessary (see Chapter 9).

11.11 Check along the brake hoses and at each fitting (arrowed) for deterioration and cracks

Hydraulic brake servo check

12 Sit in the driver's seat and perform the following sequence of tests.

13 Start the engine, run it for about a minute and turn it off. Then firmly depress the brake several times - the pedal travel should decrease with each application.

14 With the brake fully depressed, start the engine - the pedal should move down a little when the engine starts.

15 Depress the brake, stop the engine and hold the pedal in for about 30 seconds - the pedal should neither sink nor rise.

16 If your brakes do not operate as described above when the preceding tests are performed, the brake servo is either in need of repair or has failed. Refer to Chapter 9 for the removal procedure.

Handbrake

17 Slowly pull up on the handbrake and count the number of clicks you hear until the handle is up as far as it will go. The adjustment should be within the specified number of clicks listed in this Chapter's Specifications. If you hear more or fewer clicks, it's time to adjust the handbrake (refer to Chapter 9).

18 An alternative method of checking the handbrake is to park the vehicle on a steep hill with the handbrake set and the transmission in Neutral (be sure to stay in the vehicle during this check!). If the handbrake cannot prevent the vehicle from rolling, it is in need of adjustment (see Chapter 9). Whenever a fault is suspected, the brake discs should be removed and the handbrake assemblies themselves should be visually inspected.

12 Steering and suspension check

Note: *The steering linkage and suspension components should be checked periodically. Worn or damaged suspension and steering linkage components can result in excessive and abnormal tyre wear, poor ride quality and vehicle handling and reduced fuel economy. For detailed illustrations of the steering and suspension components, refer to Chapter 10.*

With the wheels on the ground

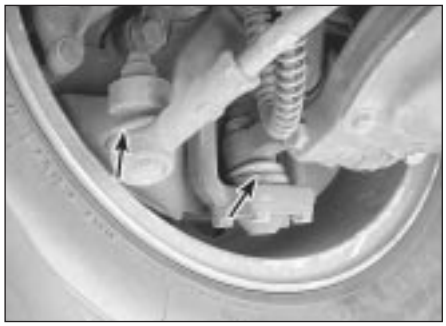
1 Park the vehicle on level ground, turn the engine off and set the handbrake. Check the tyre pressures and check that the wheel nuts are tightened to the specified torque.

2 Push down at one corner of the vehicle, then release it while noting the movement of the body. It should stop moving and come to rest in a level position with one or two bounces. When bouncing the vehicle up and down, listen for squeaks and noises from the suspension components.

3 If the vehicle continues to move up-and-down or if it fails to return to its original

12.8a Check the steering gear dust boots for cracks and leaking steering fluid

12.8b Check the anti-roll bar bushings (arrowed) for deterioration at the front and the rear of the vehicle



12.10 Inspect the balljoint and tie-rod end boots for tears - tears or damage in either boot will allow contamination of the grease which will lead to premature failure

position, a worn or weak shock absorber is probably the reason.

4 Repeat the above check at each of the three remaining corners of the vehicle.

Under the vehicle

5 Raise the vehicle with a trolley jack and support it securely on axle stands. See *"Jacking and towing"* for proper jacking points.

6 Check the shock absorbers for evidence of fluid leakage. Make sure that any fluid noted is from the shocks and not from any other source. Also check the rubber mounts at each end for deterioration If the shock absorbers fail any of the tests above replace the shocks as a set.

7 Check the tyres for irregular wear patterns and proper inflation. See *"Weekly checks"* for information regarding tyre wear.

8 Inspect the universal joint between the steering shaft and the steering gear housing. Check the steering gear housing for grease leakage. Make sure that the dust seals and boots are not damaged and that the boot clamps are not loose **(see illustration)**. Check the steering linkage for looseness or damage. Look for loose bolts, broken or disconnected parts and deteriorated rubber bushings on all suspension and steering components **(see illustration)**. While an assistant turns the steering wheel from side to side, check the steering components for free movement, chafing and binding. If the steering components do not seem to be reacting with the movement of the steering wheel, try to determine where the slack is located.

9 Check the balljoints moving each lower arm up and down with a crowbar to ensure that its balljoint has no play. If any balljoint does have play, replace it. See Chapter 10 for the front balljoint renewal procedure. Check the tie-rod ends for excessive play.

10 Inspect the balljoint and tie-rod end boots for damage and leaking grease **(see illustration**. Replace the balljoints and tie-rod ends with new ones if they are damaged (see Chapter 10).

13 Seat belt check

1 Check the seat belts, buckles, latch plates and guide loops for any obvious damage or signs of wear.

2 Make sure the seat belt reminder light comes on when the key is turned on.

3 The seat belts are designed to lock up during a sudden stop or impact, yet allow free movement during normal driving. The retractors should hold the belt against your chest while driving and rewind the belt when the buckle is unlatched.

4 If any of the above checks reveal problems with the seat-belt system, replace parts as necessary. **Note:** *Check with your local dealer service department; the seat belt system should be covered under the factory warranty*.

14 General lubrication

1 Obtain a good quality, multi-purpose lithium-base grease. You'll also need a grease gun and other materials to properly lubricate the chassis **(see illustration)**. Occasionally plugs will be installed rather than grease fittings. If so, grease fittings will have to be purchased and installed.

2 Look under the car and see if grease fittings or plugs are installed. If there are plugs, remove them and buy grease fittings, which will thread into the component. A dealer or motor factors will be able to supply the correct fittings. Straight, as well as angled, fittings are available.

3 For easier access under the car, raise it with a jack and place axle stands under the chassis. Make sure it's safely supported by the stands. If the wheels are to be removed at this interval for tyre rotation or brake inspection, loosen the wheel nuts slightly while the car is still on the ground.

4 Before beginning, force a little grease out of the nozzle to remove any dirt from the end of the gun. Wipe the nozzle clean with a rag.

5 With the grease gun and plenty of clean rags, crawl under the car and begin lubricating all the front suspension parts that are equipped with a grease fitting.

6 Lubricate the rear driveshafts **(see illustration)**. Wipe each fitting clean and push the nozzle firmly over it. Pump the gun until grease is expelled from the U-joint cap seal.

7 Wipe away any excess grease from the components and the grease fitting. Repeat the procedure for the remaining fittings.

14.1 Materials required for chassis and body lubrication

1 *Engine oil - Light engine oil in a can like this can be used for door and bonnet hinges*
2 *Graphite spray - Used to lubricate lock cylinders*
3 *Grease - Grease, in a variety of types and weights, is available for use in a grease gun.*
4 *Grease gun - A common grease gun, shown here with a detachable hose and nozzle, is needed for chassis lubrication. After use, clean it thoroughly*

14.6 Grease fittings for the rear driveshafts are located in the centre on each U-joint

8 Clean and lubricate the handbrake cable, along with the cable guides and levers. This can be done by smearing some of the chassis grease onto the cable and its related parts with your fingers.
9 Open the bonnet and smear a little chassis grease on the bonnet latch mechanism. Have an assistant pull the bonnet release lever from inside the car as you lubricate the cable at the latch.
10 Lubricate all the hinges (door, bonnet, etc.) with engine oil to keep them in proper working order.
11 The key lock cylinders can be lubricated with spray graphite or silicone lubricant, which is available at motor factors.
12 Lubricate the door weather-stripping with silicone spray. This will reduce chafing and retard wear.

15 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 car, 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 and transmission, listening for any unusual noises.
7 Make sure that the engine runs smoothly when idling, and that there is no hesitation when accelerating.
8 Check that the gear changing action of the transmission is smooth and progressive and that the drive is taken up smoothly from a standing start.

Braking system

9 Make sure that the car does not pull to one side when braking, and that the wheels do not lock prematurely when braking hard.
10 Check that there is no vibration through the steering when braking.
11 Check that the handbrake operates correctly without excessive movement of the lever, and that it holds the car stationary on a slope.
12 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 depressions, no further hissing should be heard, and the pedal should feel considerably harder.

Every 15 000 miles (24 000 km) or 12 months

16 Spark plug renewal

Refer to Section 4, renewing the plugs regardless of their apparent condition.

17 Air cleaner element renewal

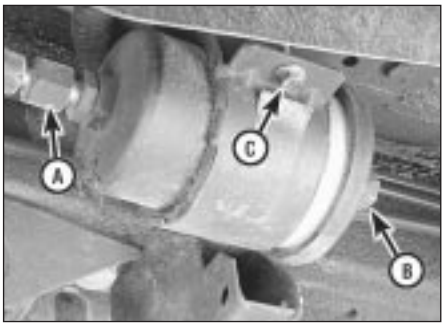
1 The air filter is located inside a housing at the left side of the engine compartment. To remove the air filter, release the four spring clips that secure the two halves of the air cleaner housing together, then lift the cover up and remove the air filter element **(see illustration)**.
Caution: Never drive the car with the air cleaner removed. Excessive engine wear could result and backfiring could even cause a fire under the bonnet.
2 Wipe out the inside of the air cleaner housing.
3 Place the new filter into the air cleaner housing, making sure it seats properly.
4 Refitting the cover is the reverse of removal.

18 Fuel filter renewal

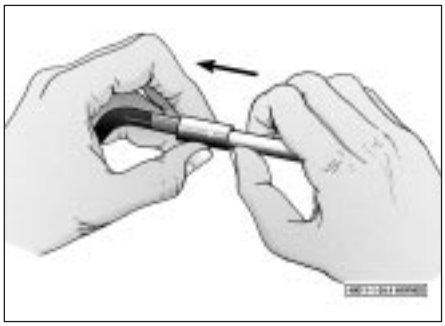
Warning: Petrol is extremely flammable, so take extra precautions when you work on any part of the fuel system. Don't smoke or allow open flames or bare light bulbs near the work area, and don't work in a garage where a natural gas-type appliance (such as a water heater or clothes dryer) with a pilot light is present. Since petrol is carcinogenic, wear latex gloves when there's a possibility of being exposed to fuel, and, if you spill any fuel on your skin, rinse it off immediately with soap and water. Mop up any spills immediately and do not store fuel-soaked rags where they could ignite. The fuel system is under constant pressure, so, if any fuel lines are to be disconnected, the fuel pressure in the system must be relieved first (see Chapter 4 for more information). When you perform any kind of work on the fuel system, wear safety glasses and have a Class B type fire extinguisher on hand.

17.1 Detach the clips and separate the cover, then slide the filter element out of the housing

1 The canister type filter is mounted underneath the car on the passenger's side frame rail just in front of the left rear tyre.
2 Depressurise the fuel system (refer to Chapter 4), then disconnect the cable from the negative terminal of the battery.
3 On 1988 to 1990 models, detach the banjo bolt from the outlet side of the filter then remove the union from the inlet side of the filter. Unscrew the filter mounting bolt and remove the filter **(see illustration)**.
4 On 1991 to 1994 models, the fuel filter has quick-disconnect fittings that do not require



18.3 Remove the banjo bolt from the outlet side (B), detach the fitting from the inlet side (A) and unscrew the filter mounting bolt (C)



18.4 On 1991 to 1994 models, slide back the locking collars and remove the inlet and outlet fuel lines

19.11a Unsnap the distributor cap retaining clips - pull the cap up and away to access the rotor

hand tools to remove. Simply slide back the locking collars and remove the inlet and outlet fuel lines **(see illustration)**. Detach the filter mounting bracket and discard the old filter in a proper container.

5 Note the direction of the arrow on the outside of the filter; it should be pointed towards the front of the car. Make sure the new filter is installed so that it's facing the proper direction. **Note:** *Always refit new copper washers where equipped.*

6 Refit the inlet and outlet fittings then tighten the filter mounting bracket. Reconnect the battery cable, start the engine and check for leaks.

19 Ignition system check

1 The spark plug leads should be checked whenever new spark plugs are installed.

2 Begin this procedure by making a visual check of the spark plug leads while the engine is running. In a darkened garage (make sure there is adequate ventilation) start the engine and observe each plug lead. Be careful not to come into contact with any moving engine parts. If there is a break in the lead, you will see arcing or a small spark at the damaged area. If arcing is noticed, make a note to obtain new leads, then allow the engine to cool and check the distributor cap and rotor.

3 The spark plug leads should be inspected one at a time to prevent mixing up the order, which is essential for proper engine operation. Each original plug lead should be numbered to help identify its location. If the number is illegible, a piece of tape can be marked with the correct number and wrapped around the plug lead.

4 Disconnect the plug lead from the spark plug. A removal tool can be used for this purpose or you can grasp the rubber boot, twist the boot half a turn and pull the boot free. Do not pull on the lead itself.

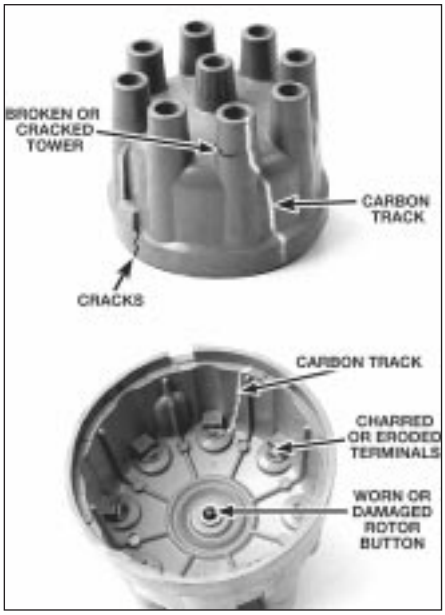
5 Check inside the boot for corrosion, which will look like a white crusty powder.

6 Push the lead and boot back onto the end of the spark plug. It should fit tightly onto the end of the plug. If it doesn't, remove the lead and use pliers to carefully crimp the metal connector inside the lead boot until the fit is snug.

7 Using a clean rag, wipe the entire length of the lead to remove built-up dirt and grease. Once the lead is clean, check for burns, cracks and other damage. Do not bend the lead sharply, because the conductor might break.

8 Disconnect the spark plug lead from the distributor cap. Again, pull only on the rubber boot. Check for corrosion and a tight fit. Reinsert the lead in the distributor cap.

9 Inspect the remaining spark plug leads, making sure that each one is securely fastened at the distributor and spark plug when the check is complete.



19.11b Shown here are some of the common defects to look for when inspecting the distributor cap (typical cap shown). If in doubt about its condition, fit a new one

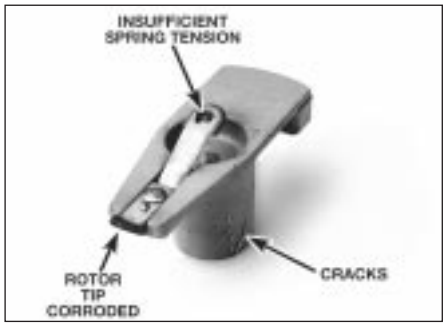
10 If new spark plug leads are required, purchase a set for your specific engine model. Remove and replace the leads one at a time to avoid mix-ups in the firing order.

11 Detach the distributor cap by unsnapping the cap retaining clips. Look inside it for cracks, carbon tracks and worn, burned or loose contacts **(see illustrations)**.

12 Pull the rotor off the distributor shaft and examine it for cracks and carbon tracks **(see illustrations)**. Replace the cap and rotor if any damage or defects are noted.

13 It is common practice to refit a new cap and rotor whenever new spark plug leads are installed. When refitting a new cap, remove the leads from the old cap one at a time and attach them to the new cap in the exact same location **Note:** *If an accidental mix-up occurs, refer to the firing order Specifications at the beginning of this Chapter.*

19.12a Pull off the rotor (arrowed) and inspect it thoroughly



19.12b Check the ignition rotor for wear and corrosion as indicated here (if in doubt about its condition, buy a new one)

20 Crankcase ventilation system check

Refer to Chapter 6.

21 Drivebelt check and renewal

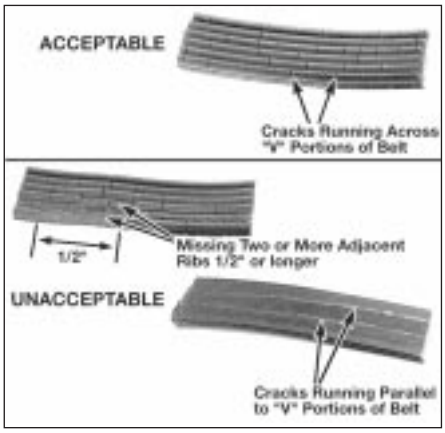
Check

1 The drivebelts, or V-belts as they are sometimes called, are located at the front of the engine and play an important role in the overall operation of the vehicle and its components. Due to their function and material make-up, the belts are prone to failure after a period of time and should be inspected and adjusted periodically to prevent major engine damage.

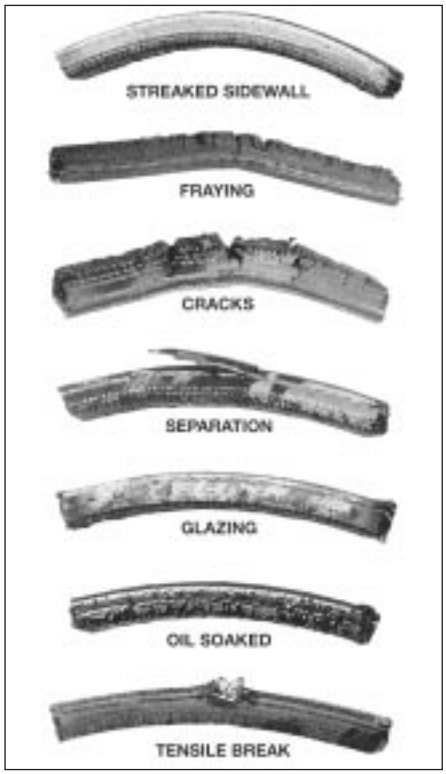
2 The number of belts used on a particular vehicle depends on the accessories installed. The main belt transmits power from the crankshaft to the water pump, alternator and the power steering pump. The second belt transmits power from the crankshaft to the air conditioning compressor.

3 With the engine off, open the bonnet and locate the drivebelts. With a flashlight, check each belt for separation of the adhesive rubber on both sides of the core, core separation from the belt side, a severed core, separation of the ribs from the adhesive rubber, cracking or separation of the ribs, and torn or worn ribs or cracks in the inner ridges of the ribs **(see illustrations)**. Also check for fraying and glazing, which gives the belt a shiny appearance. Both sides of the belt should be inspected, which means you will have to twist the belt to check the underside. Use your fingers to feel the belt where you can't see it. If any of the above conditions are evident, replace the belt (go to paragraph 7).

4 Check the belt tension by pushing firmly on the belt with your thumb at a distance halfway between the pulleys and note how far the belt can be pushed (deflected). Measure this deflection with a ruler **(see illustration)**. As a rule of thumb, if the distance from pulley centre-to- pulley centre is between 7 and 11 inches, the belt should deflect 1/4-inch. If the belt travels between pulleys spaced 12 to 16 inches apart, the belt should deflect 1/2-inch for a V-belt or 1/4-inch for a serpentine belt.



21.3a Small cracks in the underside of a serpentine belt are acceptable - lengthwise cracks, or missing pieces, are cause for replacement



21.3b Here are some of the more common problems associated with V-belts (check the belts very carefully to prevent an untimely breakdown)

Adjustment

5 There are two belt tensioning mechanisms. The first one adjusts the air conditioning compressor belt, which is accessible from underneath the car. The second tensioning mechanism is above the alternator - it adjusts the tension on the main belt (the water pump, alternator and power steering pump belt).

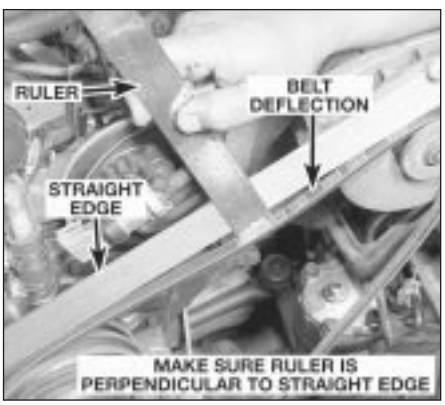
6 The air conditioning compressor and the alternator each have a belt tensioning mechanism and pivot bolt(s) which must be loosened slightly to enable you to move the component **(see illustrations)**.

7 After the bolts have been loosened, belt tension can be adjusted by either loosening or tightening the locknuts on the belt tensioning adjustment rod **(see illustration 21.6a and b).** Move the component away from the engine to tighten the belt or toward the engine to loosen the belt.

8 Measure the belt tension using the method described in paragraph 4. Repeat this procedure until the drivebelt is adjusted properly.

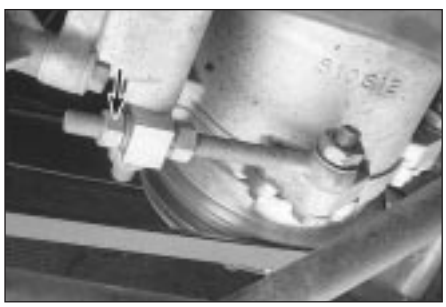
Renewal

9 To replace a belt, loosen the drivebelt adjustment rod and pivot bolt as described above, slip the belt off the crankshaft pulley and remove it. If you are replacing the alternator/power steering pump belt, you'll have to remove the air conditioning

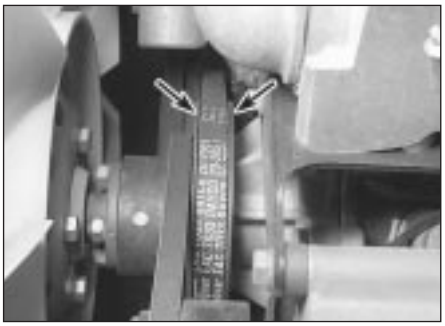


21.4 Measuring drivebelt deflection with a straightedge and ruler

21.6a To adjust the alternator/power steering drivebelt, loosen the outer locknut (arrowed) and the alternator pivot bolt - turn the inner locknut anti-clockwise to loosen or clockwise to tighten the belt



21.6b To adjust the air conditioning compressor drivebelt, loosen the outer locknut (arrowed) and the compressor pivot bolts - turn the inner locknut anti-clockwise to loosen or clockwise to tighten the belt



21.11 When refitting ribbed (serpentine) drivebelts, make sure the belt is centred between the pulley edges (arrowed) - it must not overlap either edge of the pulley

compressor belt first because of the way they are arranged on the crankshaft pulley. Because of this and because belts tend to wear out more or less together, it is a good idea to replace both belts at the same time. Mark each belt and its appropriate pulley groove so the new belts can be installed in their proper positions.

10 Take the old belts to the parts store in order to make a direct comparison for length, width and design.

11 After replacing a ribbed drivebelt, make sure that it fits properly in the ribbed grooves in the pulleys **(see illustration)**. It is essential that the belt be properly centred.

12 Adjust the belt(s) in accordance with the procedure outlined above.

22 Front wheel bearing check and adjustment

Check and repack

1 In most cases the front wheel bearings will not need servicing until the brake pads are changed. However, the bearings should be checked whenever the front of the vehicle is raised for any reason. Several items, including a torque wrench and special grease, are required for this procedure **(see illustration).**

22.1 Tools and materials needed for front wheel bearing maintenance

1 Hammer
2 Grease - High-temperature grease that is formulated specially for front wheel bearings should be used
3 Wood block - If you have a scrap piece of 2x4, it can be used to drive the new seal into the hub
4 Needle-nose pliers - Used to straighten and remove the cotter pin in the spindle
5 Torque wrench - This is very important in this procedure; if the bearing is too tight, the wheel won't turn freely - if it's too loose, the wheel will "wobble" on the spindle. Either way, it could mean extensive damage
6 Screwdriver - Used to remove the seal from the hub (a long screwdriver is preferred)
7 Socket/breaker bar - Needed to loosen the nut on the spindle if it's extremely tight
8 Brush - Together with some clean solvent, this will be used to remove old grease from the hub and spindle

2 With the vehicle securely supported on axle stands, spin each wheel and check for noise, rolling resistance and freeplay.

3 Grasp the top of each tyre with one hand and the bottom with the other. Move the wheel in-and-out on the spindle. If there's any noticeable movement, the bearings should be checked and then repacked with grease or renewed if necessary.

4 Remove the wheel.

5 Remove the brake caliper (see Chapter 9) and hang it out of the way on a piece of wire. A wood block of the appropriate width can be slid between the brake pads to keep them separated, if necessary. Also remove the brake disc.

6 Pry the dust cap out of the hub using a screwdriver or a hammer and chisel **(see illustration).**

7 Straighten the bent ends of the cotter pin, then pull the cotter pin out of the nut lock **(see illustration).** Discard the cotter pin and use a new one during reassembly.

8 Remove the locknut, nut and washer from the end of the spindle.

9 Pull the hub out slightly, then push it back into its original position. This should force the outer bearing off the spindle enough so it can be removed **(see illustration)**.

10 Pull the hub off the spindle. **Note:** *Sometimes the inner wheel bearing and grease seal remain attached to the spindle. Grasp the back of the seal with both hands and pull forward to remove them.*

11 If the grease seal is not already detached from the hub, use a screwdriver to pry the seal out of the rear of the hub. As this is done, note how the seal is installed.

12 If the inner wheel bearing is not already detached from the hub, remove it at this time.

13 Use solvent to remove all traces of the old grease from the bearings, hub and spindle. A small brush may prove helpful; however make sure no bristles from the brush embed themselves inside the bearing rollers. Allow the parts to air dry.

14 Carefully inspect the bearings for cracks, heat discoloration, worn rollers, etc. Check the bearing races inside the hub for wear and damage. If the bearing races are defective, the hubs should be taken to a machine workshop with the facilities to remove the old races and press new ones in. Note that the bearings and races come as matched sets

22.6 Dislodge the dust cap by working around the outer circumference with a hammer and chisel

22.7 Remove the cotter pin and discard it - use a new one when the hub is reinstalled

22.9 Pull the hub assembly forward slightly - then push it back into position to dislodge the outer wheel bearing

22.15 Work the grease completely into the bearing rollers

22.17 Apply a thin layer of grease to the inner and outer bearing races

22.19 After refitting the inner wheel bearing into the hub - press the grease seal into place

22.20 Refit the hub assembly onto the spindle - then push the grease-packed outer bearing into position

22.23 Position the nut lock on the spindle nut so that it lines up with the cotter pin hole - DO NOT loosen the spindle nut from its snug position

and old bearings should never be installed on new races.

15 Use high-temperature front wheel bearing grease to pack the bearings. Work the grease completely into the bearings, forcing it between the rollers, cone and cage from the back side **(see illustration).**

16 Apply a thin coat of grease to the spindle at the outer bearing seat, inner bearing seat, shoulder and seal seat.

17 Put a small quantity of grease inboard of each bearing race inside the hub. Using your finger, form a dam at these points to provide extra grease availability and to keep thinned grease from flowing out of the bearing **(see illustration).**

18 Place the grease-packed inner bearing into the rear of the hub and put a little more grease outboard of the bearing.

19 Place a new seal over the inner bearing and tap the seal evenly into place until it's flush with the hub **(see illustration)**.

20 Carefully place the hub assembly onto the spindle and push the grease-packed outer bearing into position **(see illustration)**.

Adjustment

21 Refit the washer and spindle nut. Tighten the nut only slightly (no more than 16Nm/12 lbf ft of torque).

22 Rotate the hub slowly in a forward direction while tightening the spindle nut to approximately 27Nm (20 lbf ft) to seat the bearings. Remove any grease or burrs which could cause excessive bearing play later.

23 Loosen the spindle nut 1/4-turn, then using your hand (not a spanner of any kind), tighten the nut until it's snug. Refit the nut lock and a new cotter pin through the hole in the spindle and the slots in the nut lock. If the nut lock slots don't line up, remove the nut lock and turn it slightly until they do **(see illustration)**.

24 Bend the ends of the cotter pin until they're flat against the nut. Cut off any extra length which could interfere with the dust cap.

25 Refit the dust cap, tapping it into place with a hammer.

26 Refit the brake disc and caliper in the reverse order of removal (see Chapter 9).

27 Refit the wheel on the hub and tighten the wheel nuts.

28 Grasp the top and bottom of the tyre and check the bearings in the manner described earlier in this Section.

29 Lower the vehicle and tighten the wheel nuts to the torque listed in this Chapter's Specifications.

23 Propshaft check

1 Referring to Chapter 8, check the propshaft centre bearing, universal joint and flexible coupling for signs of wear or damage and check that the propshaft fixings are tightened to the specified torque.

24 Front wheel alignment check

1 Accurate wheel alignment requires access to specialised test equipment and as such should be entrusted to a suitably equipped Jaguar dealer or a tyre specialist (refer to Chapter 10).

25 Headlight beam check

1 Accurate adjustment of the headlight beam is only possible using optical beam-setting equipment, and this work should therefore be carried out by a Jaguar dealer or garage with the necessary facilities (see Chapter 12).

26.5 Using an Allen spanner remove the drain plug located in the bottom of the transmission sump pan

26.6a Unscrew the dipstick tube collar

26.6b Detach the tube and let the remaining fluid drain

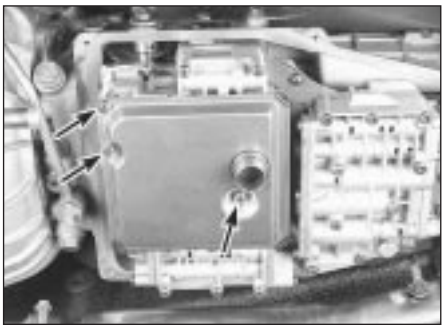
Every 30 000 miles (48 000 km) or 2 years

26 Automatic transmission fluid and filter renewal

1 At the specified time intervals, the transmission fluid should be drained and renewed. Since the fluid will remain hot long after driving, perform this procedure only after the engine has cooled down completely.
2 Before beginning work, purchase the specified transmission fluid and a new filter.
3 Other tools necessary for this job include axle stands to support the vehicle in a raised position, a drain pan capable of holding at least eight pints, newspapers and clean rags.
4 Raise the vehicle and support it securely on axle stands.
5 Place the drain pan under the drain plug in the bottom of the transmission sump pan. Remove the plug and allow the fluid to drain **(see illustration)**.
6 Refit the drain plug, then move the drain pan underneath the dipstick tube. Loosen the dipstick tube collar and let the remaining fluid drain **(see illustrations)**.
7 Remove the sump pan mounting bolts and brackets **(see illustration)**.
8 Detach the sump pan from the transmission and lower it, keeping it as horizontal as possible in order not to spill too much of the remaining fluid **(see illustration)**.
9 Drain the remaining fluid from the transmission sump pan, clean it with solvent and dry it with compressed air. Be sure to clean the metal filings from the magnet, if equipped.
10 Remove the screws and detach the filter from the valve body **(see illustrations)**.
11 Refit the new O-ring and filter, being sure to tighten the bolts securely.
12 Carefully clean the fluid pan-to-transmission sealing surface.
13 Make sure the gasket surface on the transmission sump pan is completely clean, then refit the gasket. Put the sump pan in place against the transmission and refit the brackets and bolts. working around the sump pan, tighten each bolt a little at a time until the torque listed in this Chapter's Specifications is reached. Don't overtighten the bolts! Connect the dipstick tube and tighten the collar securely.
14 Lower the vehicle and add the specified amount of fluid through the filler tube (see Section 8).
15 With the transmission in Park and the handbrake set, run the engine at fast idle, but don't race it.
16 Move the gear selector through each position, and then back to Park. Check the fluid level.
17 Be sure to check underneath the car for any leaks after the first few miles of driving.

26.7 Use a socket and extension to remove the transmission sump pan bolts and brackets

26.8 Lower the sump pan from the transmission



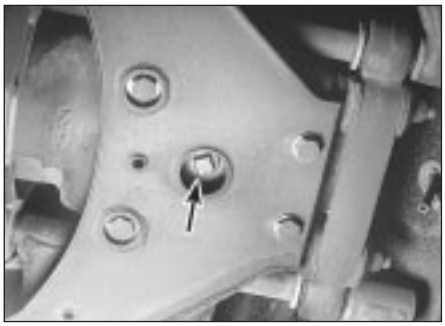
26.10a Use a Torx-head driver to remove the filter bolts (arrowed) . . .

26.10b . . . then remove the fluid filter from the transmission

26.10c Be sure to remove the old O-ring from the transmission - always use a new O-ring when replacing the filter

27 Differential oil renewal

1 Drive the car for several miles to warm up the differential lubricant, then raise the car and support it securely on axle stands.
2 Move a drain pan, rags, newspapers and the required tools under the car.
3 Remove the check/fill plug from the differential. If necessary refer to Section 9 for the check/fill plug location.
4 With the drain pan under the differential, use a ratchet and socket to loosen the drain plug **(see illustration)**. **Note:** *A special pipe plug socket may be required to complete this procedure.*
5 Once loosened, carefully unscrew it with your fingers until you can remove it from the case. Since the lubricant will be hot, wear a rubber glove to prevent burns.
6 Allow all of the oil to drain into the pan, then replace the drain plug and tighten it securely.
7 Refer to Section 9 and fill the differential with lubricant.
8 Refit the fill plug and tighten it securely.
9 Lower the vehicle. Check for leaks at the drain plug after the first few miles of driving.



27.4 The differential drain plug (arrowed) is accessible through a hole located in the middle of the differential support brace

28 Brake fluid renewal

Warning: Brake fluid can harm your eyes and damage painted surfaces, so use extreme caution when handling or pouring it. Do not use brake fluid that has been standing open or is more than one year old. Brake fluid absorbs moisture from the air. Excess moisture can cause a dangerous loss of braking effectiveness.

1 At the specified time intervals, the brake fluid should be drained and renewed. Since the brake fluid may drip or splash when pouring it, place plenty of rags around the master cylinder to protect any surrounding painted surfaces.
2 Before beginning work, purchase the specified type of brake fluid.
3 Remove the cap from the master cylinder reservoir.
4 Using a hand suction pump or similar device, withdraw the fluid from the master cylinder reservoir.
5 Add new fluid to the master cylinder until it rises to the base of the filler neck.
6 Bleed the brake system as described in Chapter 9 at all four brakes until new and uncontaminated fluid flows from the bleed screw.
7 Refill the master cylinder with fluid and check the operation of the brakes. The pedal should feel solid when depressed, with no sponginess.

Warning: Do not drive the car if you are in any doubt about the braking system.

Every 60 000 miles (96 000 km)

29 Handbrake shoes check

1 Remove the rear discs and inspect the handbrake shoes as described in Chapter 9. If the shoes are worn or damaged they must be renewed.

Warning: The dust created by the brake system may contain asbestos, which is harmful to your health. Never blow it out with compressed air and don't inhale any of it. An approved filtering mask should be worn when working on the brakes. Do not, under any circumstances, use petroleum-based solvents to clean brake parts. Use brake system cleaner only! Try to use non-asbestos replacement parts whenever possible.

Every 2 years, regardless of mileage

30 Coolant renewal

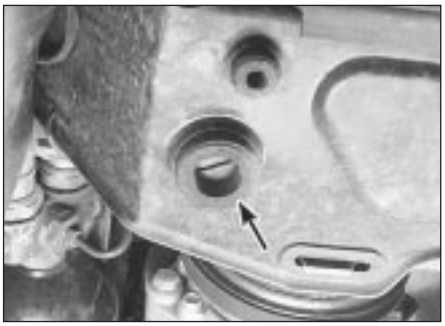
Warning: Do not allow engine coolant (antifreeze) to come in contact with your skin or painted surfaces of the vehicle. Rinse off spills immediately with plenty of water. Antifreeze is highly toxic if ingested. Never leave antifreeze laying around in an open container or in puddles on the floor; children and pets are attracted by it's sweet smell and may drink it. Check with local authorities about disposing of used antifreeze. Your local authority may have collection centres which will see that antifreeze is disposed of safely.

1 Periodically, the cooling system should be drained, flushed and refilled to replenish the antifreeze mixture and prevent formation of rust and corrosion, which can impair the performance of the cooling system and cause engine damage. When the cooling system is serviced, all hoses and the radiator cap should be checked and renewed if necessary.

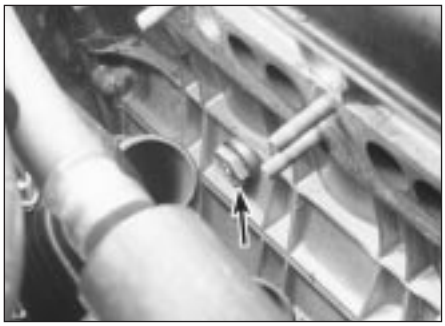
Draining

2 Apply the handbrake and block the wheels. If the vehicle has just been driven, wait several hours to allow the engine to cool down before beginning this procedure.
3 Remove the expansion tank pressure cap **(see illustration)**.
4 Move a large container under the radiator drain to catch the coolant. Then using a large screwdriver, open the radiator drain plug and direct the coolant into the container **(see illustration)**.

30.3 Push the expansion tank pressure cap downward and rotate anti-clockwise - never remove it when the engine is hot!



30.4 The radiator drain fitting (arrowed) located at the bottom of the radiator



30.5 The block drain plug (arrowed) is located on the right side of the block

5 After the coolant stops flowing out of the radiator, move the container under the engine block drain plug. Remove the plug and let the coolant in the block to drain **(see illustration).**
6 While the coolant is draining from the engine block, check the condition of the radiator hoses, heater hoses and clamps (refer to Section 7 if necessary).
7 Replace any damaged clamps or hoses (see Chapter 3).

Flushing

8 Once the system is completely drained, flush the radiator with fresh water from a garden hose until water runs clear at the drain. The flushing action of the water will remove sediments from the radiator but will not remove more serious rust and scale from the engine and cooling tube surfaces.
9 These deposits can be removed by using proprietary chemical cleaners. It should be stressed, however, that these should only need to be used if the system has been neglected. Follow the procedure outlined in their manufacturer's instructions. If the radiator is severely corroded, damaged or leaking, it should be removed (see Chapter 3) and taken to a radiator repair workshop.
10 On 1988 and 1989 models remove the overflow hose from the coolant recovery reservoir. Drain the reservoir and flush it with clean water, then reconnect the hose (see Chapter 3).

Refilling

11 Close and tighten the radiator drain. Refit and tighten the engine block drain plugs.
12 Make sure the heater temperature control is in the maximum heat position.
13 Slowly refill the expansion tank with a mixture of antifreeze and water until the coolant reaches the base of the filler neck.
14 Leave the expansion tank pressure cap off and run the engine in a well-ventilated area until the thermostat opens (coolant will begin flowing through the radiator and the upper radiator hose will become hot). Race the engine two or three times under no load.
15 Turn the engine off and let it cool. Add more coolant mixture to bring the level back up to the base of the filler neck.
16 Squeeze the upper radiator hose to expel air, then add more coolant mixture if necessary. Refit the expansion tank pressure cap.
17 Start the engine, allow it to reach normal operating temperature and check for leaks.