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 filter:	
1.4 litre	3.0 litres
1.6 litre	3.5 litres
1.8 and 2.0 litre SOHC models	4.0 litres
20 XEJ and C 20 XE	4.5 litres
X 20 XEV	4.0 litres
Quantity of oil required to raise level on dipstick from “MIN” to “MAX”:	
1.4 litre	0.8 litre
All other models	1.0 litre

Cooling system (approx.)

1.4 litre models	5.6 litres
1.6 litre models (except C 16 NZ2) - manual transmission	5.8 litres
1.6 litre models (except C 16 NZ2) - automatic transmission	5.6 litres
C 16 NZ2, 1.8 and 2.0 litre SOHC models - manual transmission	7.2 litres
C 16 NZ2, 1.8 and 2.0 litre SOHC models - automatic transmission	7.1 litres
DOHC models	7.2 litres

Transmission

Manual transmission codes:	
F10 and F13	1.6 litres
F16, F18 and F20	1.9 litres
Automatic - at fluid change	3.0 to 3.5 litres
Difference between dipstick MAX and MIN marks - approximate:	
+ 20°C side	0.25 litre
+ 80°C side	0.40 litre

Power steering fluid

Approximately	1.0 litre

Fuel tank

All models	63.0 ± 2 litres

Washer fluid

Without headlamp washers	2.6 litres
With headlamp washers	4.5 litres

Engine

Oil filter	Champion G102

Cooling system

Antifreeze mixture:	
28% antifreeze	Protection down to -15°C (5°F)
50% antifreeze	Protection down to -30°C (-22°F)

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

Fuel system

Note: *Ignition timing adjustment is not possible on some models, shown for information only. For further details refer to Chapters 4A or 4B, as applicable.*

Idle speed:

14 NV	925 ± 25 rpm
16 SV	
Manual transmission models	925 ± 25 rpm
Automatic transmission models	825 ± 25 rpm
18 SV	925 ± 25 rpm
C 16 NZ and X 16 SZ	850 ± 80 rpm
C 16 NZ2	880 ± 80 rpm
C 18 NZ	
Manual transmission models	880 ± 80 rpm
Automatic transmission models	830 ± 80 rpm
20 NE, C 20 NE and 20 SEH	800 ± 80 rpm
20 XEJ and C 20 XE	940 ± 80 rpm
X 20 XEV	850 ± 160 rpm

Idle mixture CO content:	
All carburettor models	0.5 to 1.5%
20 NE and 20 SEH	1.0 max.
20 XEJ	0.7 to 1.2%
All other injection models	0.3 % (at 2800 to 3200 rpm)
Air filter element:	
1.4 and 1.6 litre 'round type'	Champion W103
1.6 and 1.8 litre 'square type'	Champion U512
1.8 litre 'round type'	Champion type not available
2.0 litre	Champion U554
Fuel filter:	
1.6, 1.8 and 2.0 litre 'in-line'	Champion L201

Ignition system:

Ignition timing	Refer to Chapter 5
Spark plugs	
SOHC models	Champion RN9YCC or RN9YC
DOHC models:	
except C20 XE and X20 XEV	Champion RC9MCC *
C20 XE and X20 XEV	Vauxhall P/N 90444724 (FR8LDC)
Plug gap:	
RN9YCC and RC9MCC *	0.8 mm
RN9YC *	0.7 mm
FR8LDC	0.7 to 0.8 mm

** Information on spark plug types and electrode gaps is as recommended by Champion Spark Plug. Where alternative types are used, refer to the manufacturer's recommendations*

Brakes

Minimum pad friction material thickness (including backing plate):	
All models	7.0 mm
Minimum shoe friction material thickness:	
All models	0.5 mm above rivet heads

Tyres

Tyre size:	
51/2 J x 13 wheels	165 R13-82T
51/2 J x 14 wheels	175/70 R14-82T, 195/60 R14-85H, or 195/60 R14-85V
6J x 15 wheels	195/60 R15-87V or 205/55 R15-87V
Pressures	**See "Weekly checks"**

Torque wrench settings

	Nm	lbf ft
Automatic transmission drain plug	45	33
Roadwheel	110	81
Spark plugs	25	18
Engine oil (sump) drain plug	55	41

Maintenance schedule

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

If the vehicle is driven in dusty areas, used to tow a trailer, or driven frequently at slow speeds (idling in traffic) or on short journeys, more frequent maintenance intervals are recommended. Vauxhall recommend that the service intervals are halved for vehicles that are used under these conditions.

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

Maintenance is essential for ensuring safety and for getting the best in terms of performance and economy from your vehicle. Over the years, the need for periodic lubrication - oiling, greasing, and so on - has been drastically reduced, if not eliminated. This has unfortunately tended to lead some owners to think that because no action is required, components either no longer exist, or will last for ever. This is certainly not the case; it is essential to carry out regular visual examination comprehensively to spot any possible defects at an early stage before they develop into major expensive repairs.

The following service schedules are a list of the maintenance requirements, and the intervals at which they should be carried out, as recommended by the manufacturers. Where applicable, these procedures are covered in greater detail near the beginning of each relevant Chapter.

Every 250 miles (400 km) or weekly

☐ Refer to "*Weekly checks*"

Basic service, every 9000 miles (15 000 km) or 12 months - whichever comes sooner

Along with the items in "*Weekly checks*", carry out the following:

☐ Renew the engine oil and oil filter (Section 3).
☐ Check all hoses and other components for fluid leaks (Section 4).
☐ Check the steering and suspension components (Section 5).
☐ Check the condition of the driveshaft rubber gaiters (Section 6).
☐ Check the automatic transmission fluid level (if applicable), (Section 7).
☐ Check the radiator for blockage (e.g. dead insects) and clean as necessary (Section 8).
☐ Check and adjust the idle speed and mixture (if applicable), (Section 9).
☐ Check the throttle linkage and lubricate if necessary (Section 10).
☐ Check the exhaust system for corrosion, leaks and security (Section 11).
☐ Check all wiring for condition and security (Section 12).
☐ Check and adjust the ignition timing (if applicable), (Section 13).
☐ Renew the brake fluid (Section 14).
☐ Check the brake pad friction material for wear (Section 15).
☐ Check the handbrake linkage (Section 16).
☐ Check the power steering fluid level (if applicable), (Section 17).
☐ Check the power steering pump drivebelt (if applicable), (Section 18).
☐ Check the rear suspension level control system height, if fitted (Section 19).
☐ Check the bodywork (Section 20).
☐ Lubricate all locks and hinges (Section 21).
☐ Check the alternator V-belt (Section 22).
☐ Check the headlamp alignment (Section 23).
☐ Replace battery in the door-lock key (if applicable), (Section 24).
☐ Carry out a road test (Section 25).

Note: *Vauxhall specify that an Exhaust Emissions Test should be carried out at least annually. However, this requires special equipment, and is performed as part of the MOT test (refer to the end of the manual).*

Full service, every 18 000 miles (30 000 km) or 24 months - whichever comes sooner

Along with the 'basic service', carry out the following:

☐ Renew the coolant (Section 26).
☐ Renew the air cleaner element (Section 27).
☐ Check the operation of the air cleaner air inlet temperature control (carburettor models only), (Section 28).
☐ Renew the fuel filter (Section 29).
☐ Renew the spark plugs (SOHC only), (Section 30) *.
☐ Inspect and clean the distributor cap and HT leads (Section 31).
☐ Check the clutch cable adjustment (Section 32).
☐ Check the manual transmission oil level (Section 33).
☐ Check the automatic transmission (Section 34).
☐ Check the brake drum shoe for wear (Section 35).

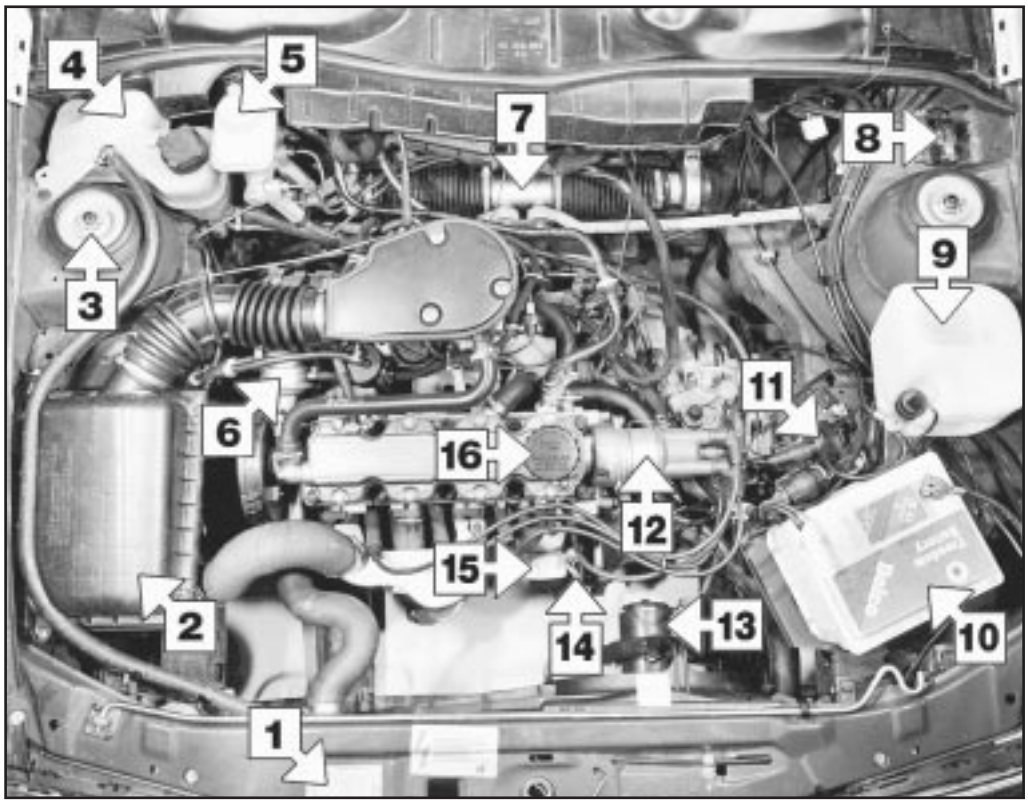
Major service, every 36 000 miles (60 000 km) or 48 months - whichever comes sooner

Along with the 'full service', carry out the following:

☐ Renew timing belt (Section 36).
☐ Renew the spark plugs (DOHC models only), (Section 37).
☐ Renew automatic transmission fluid (Section 38) *.

*** Note:** *If a vehicle is used for heavy-duty work (e.g. taxi work, caravan/trailer towing, mostly short-distance, stop-start city driving) the fluid must be changed every 36 months or 27 000 miles (45 000 km), whichever occurs first.*

Underbonnet view of a 1989 1.6 L model (16 SV engine)



1 VIN plate
*2 Air cleaner casing **
3 Suspension strut top
4 Coolant expansion tank
5 Brake fluid reservoir
6 Fuel pump
7 Steering rack
8 Octane rating plug
9 Washer fluid reservoir
10 Battery
11 Ignition coil
12 Distributor (Bosch type)
13 Cooling fan motor
14 Engine oil level dipstick
15 Oil filter
16 Oil filler cap
** Refer to Chapter 4A for alternative type*

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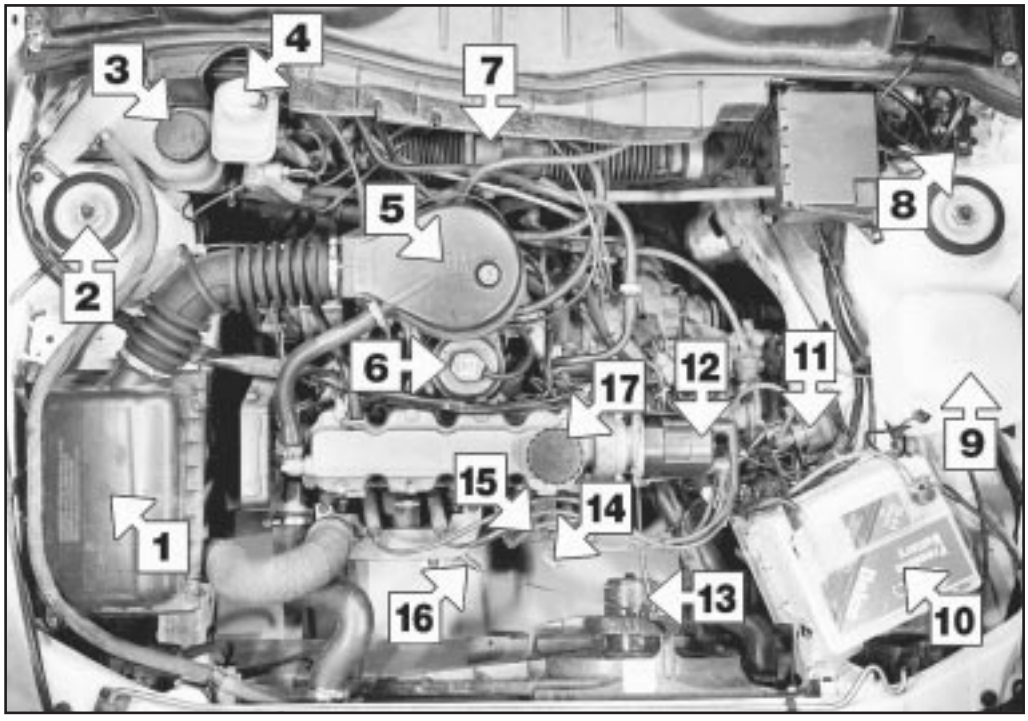
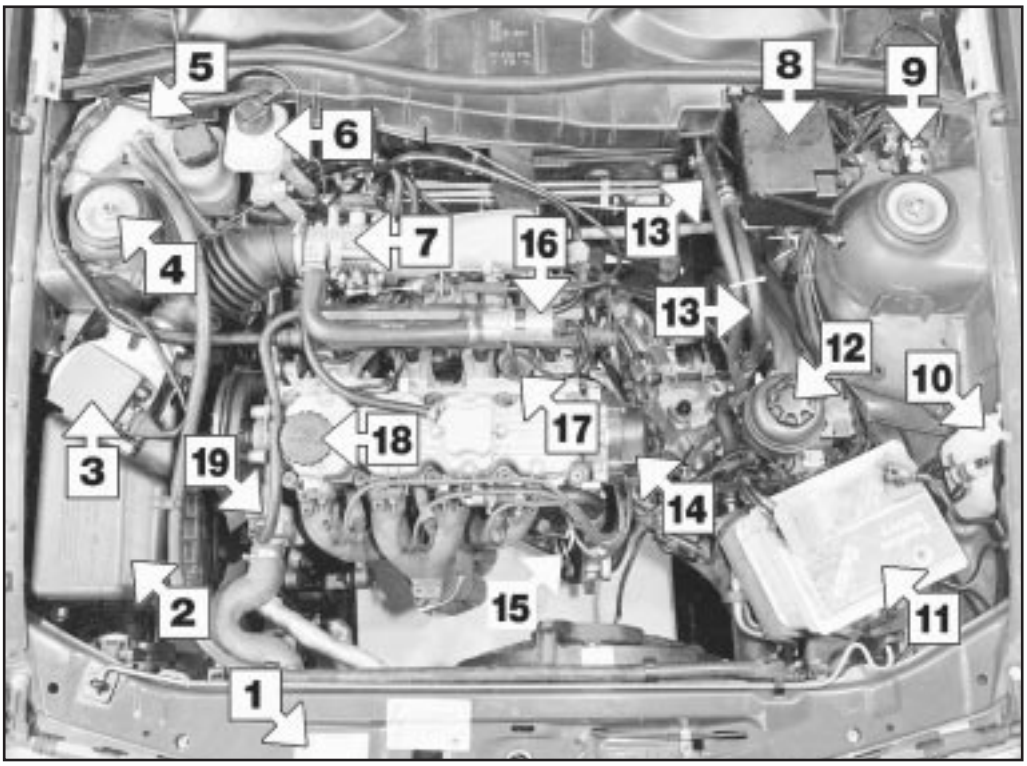
Underbonnet view of a 1991 model Cavalier 1.6 L (C16 NZ engine)



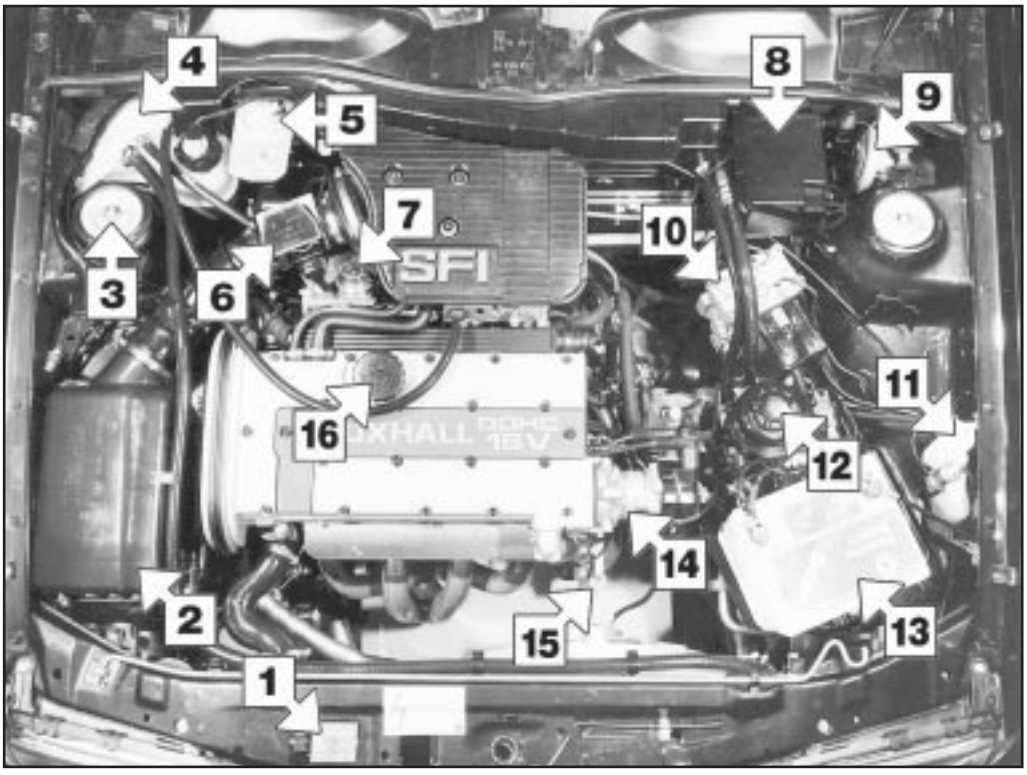
1 Air cleaner casing
2 Suspension strut top
3 Coolant expansion tank
4 Brake fluid reservoir
5 Air box
6 Exhaust gas recirculation valve
7 Steering gear
8 Octane coding plug
9 Washer fluid reservoir
10 Battery
11 Ignition coil
12 Distributor
13 Cooling fan motor
14 Engine oil level dipstick
15 Engine oil filter
16 Oxygen sensor
17 Engine oil filler cap

Underbonnet view of a 1989 2.0 SRi model (20 SEH engine)



1 VIN plate
2 Air cleaner casing
3 Airflow meter
4 Suspension strut top
5 Coolant expansion tank
6 Brake fluid reservoir
7 Throttle body
8 Relay box
9 Octane rating plug
10 Washer fluid reservoir
11 Battery
12 Power steering fluid reservoir
13 Power steering fluid hoses
14 Distributor cap
15 Engine oil level dipstick
16 Idle speed adjuster
17 Fuel pressure regulator
18 Oil filler cap
19 Thermostat housing

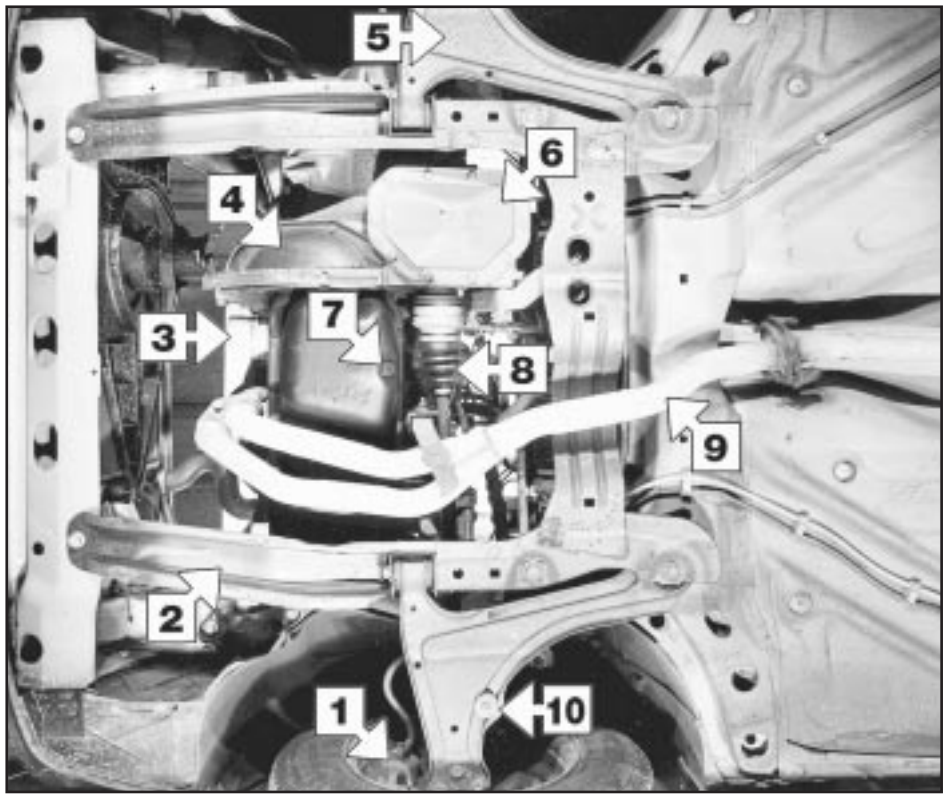
Underbonnet view of a 1990 GSi 2000 model (20 XEJ engine)



1 VIN plate
2 Air cleaner casing
3 Suspension strut top
4 Coolant expansion tank
5 Brake fluid reservoir
6 Air mass meter
7 Fuel pressure regulator
8 Relay box
9 Anti-theft alarm horn
10 ABS hydraulic modulator
11 Washer fluid reservoir
12 Power steering fluid reservoir
13 Battery
14 Distributor
15 Engine oil level dipstick
16 Oil filler cap

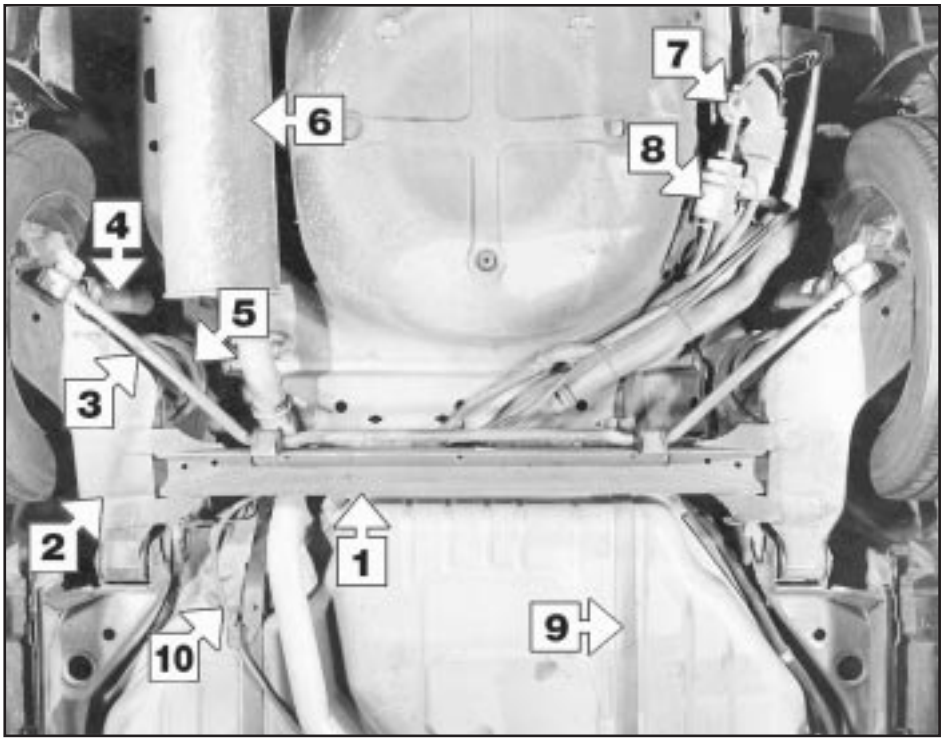
Front underbody view of a 1989 1.6 L model (16 SV engine)

1 Brake caliper
2 Subframe
3 Oil filter
4 Clutch cover plate
5 Suspension lower arm
6 Differential cover plate
7 Engine oil drain plug
8 Driveshaft gaiter
9 Exhaust pipe
10 Anti-roll bar securing nut

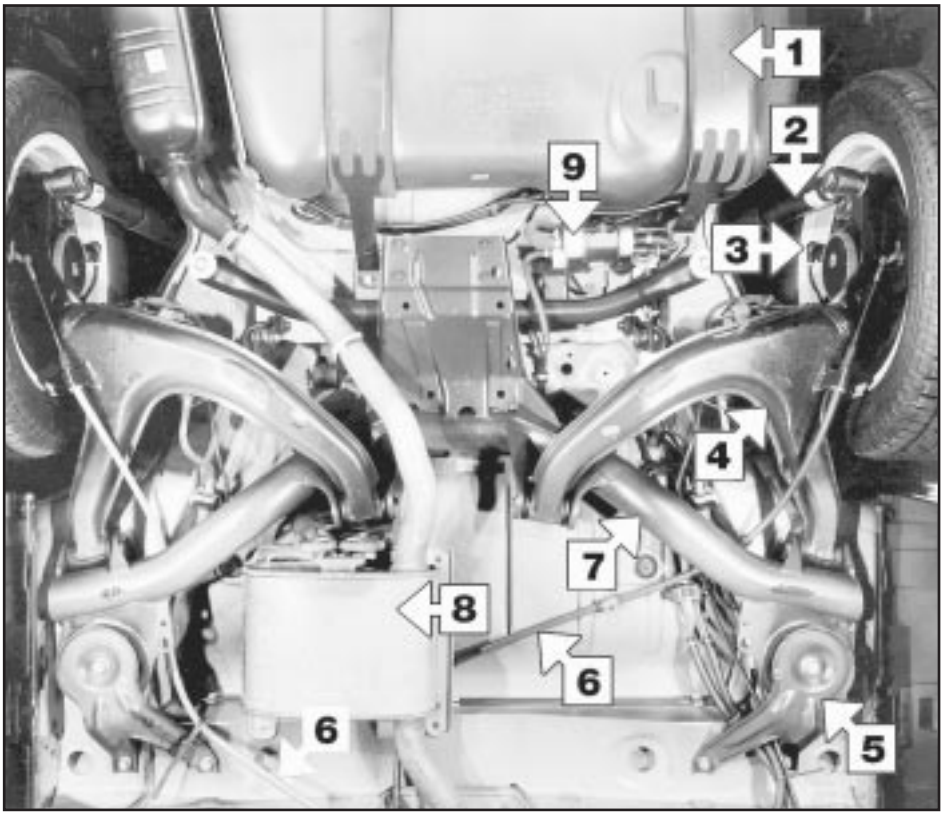


Rear underbody view of a 1989 2.0 SRi model (semi-independent rear suspension)

1 Torsion beam
2 Trailing arm
3 Anti-roll bar
4 Shock absorber
5 Coil spring
6 Exhaust expansion box
7 Fuel flow damper
8 Fuel filter
9 Fuel tank securing strap
10 Handbrake cable



Rear underbody view of a 1990 GSi 2000 model (fully independent rear suspension)



1 Fuel tank securing strap
2 Shock absorber
3 ABS wheel sensor
4 Semi-trailing arm
5 Suspension crossmember mounting bracing bracket
6 Handbrake cable
7 Suspension crossmember
8 Exhaust expansion box
9 Fuel pump

Maintenance procedures

1 Introduction

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

The Chapter contains a master maintenance schedule, followed by Sections dealing specifically with each task 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.

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

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

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

2 Intensive maintenance

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

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

If engine wear is suspected, a compression

test (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. It may also prove a waste of time and money, unless extensive overhaul work is carried out first.

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 (See "Weekly Checks")
b) Check all the engine related fluids (See "Weekly Checks")
c) Check the condition and tension of the auxiliary drivebelt (Sections 18 and 22, as appropriate).
d) Renew the spark plugs (Sections 30 and 37, as appropriate).
e) Inspect the distributor cap, rotor arm and HT leads, as applicable (Section 31).
f) Check the condition of the air filter, and renew if necessary (Section 27).
g) Check the fuel filter (Section 29).
h) Check the condition of all hoses, and check for fluid leaks (Section 4).
i) Check the idle speed and mixture settings, as applicable (Section 9).

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 (Chapter 5).
b) Check the ignition system (Chapter 5).
c) Check the fuel system (Chapters 4A and 4B).
d) Renew the distributor cap and rotor arm (Section 31).
e) Renew the ignition HT leads (Section 31).

Basic service, every 9000 miles (15 000 km) or 12 months

3 Engine oil and filter - renewal

1 Ideally, the oil should be drained with the engine hot, just after the vehicle has been driven.
2 On DOHC models, remove the engine undershield to expose the sump drain plug and the oil filter.
3 Place a container beneath the oil drain plug at the rear of the sump.
4 Remove the oil filler cap from the camshaft cover, then using a socket or spanner, unscrew the oil drain plug, and allow the oil to drain **(see illustration)**. Take care to avoid scalding if the oil is hot.

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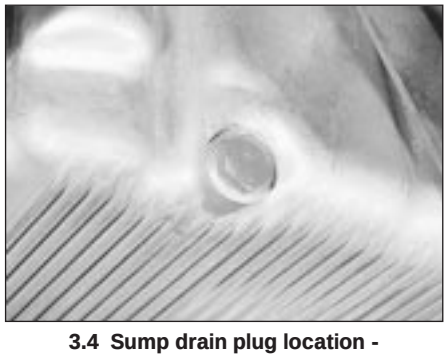
As the drain plug releases from the threads, move it away quickly so the stream of oil, running out of the sump, goes into the container not up your sleeve (see illustration).

5 Allow ten to fifteen minutes for the oil to drain completely, then move the container and position it under the oil filter.
6 On 1.8 and 2.0 litre models, improved access to the oil filter can be gained by jacking up the front of the vehicle and removing the right-hand roadwheel **(see illustration)**. Ensure that the handbrake is applied, and that the vehicle is securely supported on axle stands (see "*Jacking and Vehicle Support*"). Note that further oil may drain from the sump as the vehicle is raised.
7 Using a strap wrench or a filter removal tool if necessary, slacken the filter and unscrew it from the mounting. Alternatively, if the filter is very tight, a screwdriver can be driven through the filter casing and used as a lever. Discard the filter.
8 Wipe the mating face on the filter mounting with a lint-free rag, then smear the sealing ring of the new filter with clean engine oil of the specified grade.
9 Screw the new filter into position and tighten it by hand only, do not use any tools.
10 Where applicable, refit the roadwheel and lower the vehicle to the ground. Fully tighten the roadwheel bolts with the vehicle resting on its wheels.
11 Examine the condition of the oil drain plug sealing ring and renew if necessary, then refit the drain plug and tighten it to the specified torque.
12 Refill the engine through the filler on the camshaft cover, using the specified grade and quantity of oil. Fill until the level reaches the "MAX" mark on the dipstick, allowing time for the oil to drain through the engine to the sump.
13 Refit the oil filler cap, then start the engine and check for leaks. Note that the oil pressure warning lamp may stay illuminated for a few seconds when the engine is started as the oil filter fills with oil.
14 Stop the engine and recheck the oil level, topping-up if necessary.
15 On DOHC models, refit the engine undershield.
16 Dispose of the old engine oil safely; do not pour it down a drain.

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.



3.4 Sump drain plug location - 2.0 litre DOHC model (engine undershield removed)

3.6 Oil filter viewed through right-hand wheel arch - SOHC model

4 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. Remember that, over a period of time, some very slight seepage from these areas is to be expected - what you are really looking for is any indication of a serious leak. Should a leak be found, renew the offending gasket or oil seal by referring to the appropriate Chapters in this manual.

2 Also check the security and condition of all the engine related pipes and hoses. Ensure that all cable-ties or securing clips are in place, and in good condition. Clips that 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 that 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. It is always beneficial to renew hose clips whenever possible.

4 Inspect all the cooling system components (hoses, joint faces, etc.) for leaks.

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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

5 Where any problems are found on system components, renew the component or gasket with reference to Chapter 3.

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

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

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

9 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.

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

5 Steering and suspension check

Front suspension and steering check

1 Raise the front of the car, and support on axle stands ("*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 wear of the balljoints or steering gear.

3 On vehicles with power steering, check the 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 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 inner or outer balljoint is worn, the visual movement will be obvious.

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 Inspect the front suspension lower arms for distortion or damage (Chapter 10, Section 5).

8 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, but in addition, check the steering column universal joints for wear, and the rack-and-pinion steering gear itself.

Suspension strut/shock absorber check

Note: *Suspension struts/shock absorbers should always be renewed in pairs on the same axle.*

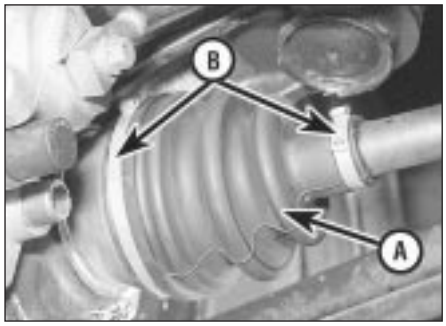
5.4 Check for wear in the hub bearings by grasping the wheel and trying to rock it

9 Check for any signs of fluid leakage around the suspension strut/shock absorber body, or from the rubber gaiter around the piston rod. Should any fluid be noticed, the suspension strut/shock absorber is defective internally, and should be renewed.

10 The efficiency of the suspension strut/shock absorber may be checked by bouncing the vehicle at each corner. The body will return to its normal position and stop after being depressed. If it rises and returns on a rebound, the suspension strut/shock absorber is probably suspect. Examine also the suspension strut/shock absorber upper and lower mountings for any signs of wear.

6 Driveshaft gaiter check

With the vehicle raised and securely supported on stands, turn the steering onto full lock, then slowly rotate the roadwheel. 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 the rubber, which may allow the grease to escape, and lead to water and grit entry into the joint. Also check the security and condition of the retaining clips. Repeat these checks on the inner CV joints. If any damage or deterioration is found, the gaiters should be renewed as described in Chapter 8.



6.1 Check the condition of the driveshaft gaiters (A) and clips (B)

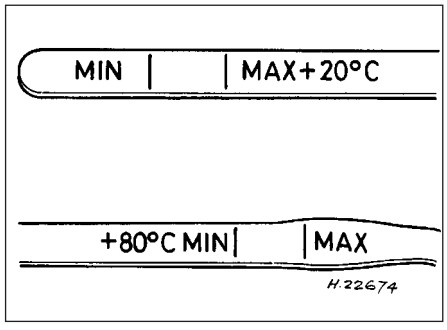
At the same time, check the general condition of the CV joints themselves by first holding the driveshaft and attempting to rotate the wheel. Repeat this check by holding the inner joint and attempting to rotate the driveshaft. Any appreciable movement indicates wear in the joints, wear in the driveshaft splines, or a loose driveshaft retaining nut.

7 Automatic transmission fluid level check

Note: *The transmission fluid level can be checked either when it is cold (only below 35ºC (100ºF) outside temperature) or when it is fully warmed up to normal operating temperature (after driving for a distance of approximately 12 miles/20 km). Since the fluid level must be checked with the engine running, ensure that the vehicle is parked on level ground with the handbrake firmly applied before leaving the driver's seat. Be careful to keep loose clothing, long hair, etc., well clear of hot or moving components when working under the bonnet*

Transmission cold

1 Park the vehicle on level ground and apply the handbrake firmly. With the engine running at no more than idle speed and your foot firmly on the brake pedal, move the selector lever through all positions, ending in position "P". Allow the engine to idle for one minute, then check the level within two minutes.
2 With the engine still idling and position "P" still selected, open the bonnet and withdraw the transmission dipstick from the filler tube located in the front of the transmission casing, at the left-hand end of the engine.
3 Note the fluid's condition (see below), then wipe clean the dipstick using a clean, non-fluffy rag, insert it fully back into the tube and withdraw it again.
4 The level should be up to the "MAX" mark on the "+20°C" side of the dipstick **(see illustration)**.
5 If topping-up is required, switch off the ignition and add only good quality fluid of the specified type through the filler tube. If significant amounts of fluid are being lost (carefully note the amounts being added, and how often), check the transmission for leaks and either repair the fault or take the vehicle to a Vauxhall dealer for attention.
6 When the level is correct, ensure that the dipstick is pressed firmly into the filler tube.



7.4 When checking the fluid level, ensure side of dipstick used corresponds with fluid temperature

Transmission fully warmed up

7 Work exactly as described above, but take the level reading from the "+ 80°C" side of the dipstick. In this case, the level must be between the dipstick "MAX" and "MIN" marks.

Checking the fluid's condition

8 Whenever the fluid level is checked, examine the condition of the fluid and compare its colour, smell and texture with that of new fluid.
9 If the fluid is dark, almost black, and smells burnt, it is possible that the transmission friction material is worn or disintegrating. The vehicle should be taken to a Vauxhall dealer or automatic transmission specialist for immediate attention.
10 If the fluid is milky, this is due to the presence of emulsified droplets of water. This may be caused either by condensation after a prolonged period of short journeys or by the entry of water through the dipstick/filler tube or breather. If the fluid does not revert to its normal appearance after a long journey it must be renewed or advice should be sought from a Vauxhall dealer or automatic transmission specialist.
11 If the fluid is varnish-like (i.e. light to dark brown and tacky) it has oxidised due to overheating or to over or under filling. If renewal of the fluid does not cure the problem, the vehicle should be taken to a Vauxhall dealer or automatic transmission specialist for immediate attention.
12 If at any time on checking the fluid level or on draining the fluid, particles of dirt, metal chips or other foreign matter are found in the fluid, the vehicle must be taken to a Vauxhall dealer or automatic transmission specialist for immediate attention. It may be necessary to strip, clean and reassemble at least the valve body, if not the complete transmission, to rectify any fault.

8 Radiator inspection and cleaning

1 Inspect radiator for leaks or corrosion, especially around the outlet or inlet connectors.
2 Clean the radiator with a soft brush or compressed air. Remove any debris, like dead insects or leaves.
3 If leaks are visible, replace radiator. Refer to Chapter 3, if necessary.

9 Idle speed and mixture - adjustment

Note: *On certain models, the idle and mixture are automatically adjusted by a control unit, therefore cannot be altered.*

Refer to Chapters 4A or 4B as applicable.

10 Throttle linkage maintenance

On models built before 1992, lubricate the throttle linkage, as described in Chapters 4A or 4B, as applicable.

11 Exhaust system check

1 With the engine off, check the security of the exhaust system. Pay particular attention to the rubber mountings that suspend the exhaust.
2 Start the engine and check underneath for leaks, which can be heard. This job is made easier if you have access to a ramp.
3 Listen for exhaust leaks from around the front pipe to exhaust manifold joint.
4 For further information, refer to Chapter 4C

12 Wiring check

1 Check all wiring in both the engine compartment and under the car.
2 Ensure that all wiring clips/clamps are secure.
3 Pay particular attention to wiring near components that get hot, i.e. exhaust systems.
4 Make sure that electrical connections are secure and undamaged.

13 Ignition timing

Warning: Voltages produced by an electronic ignition system are considerably higher than those produced by conventional ignition systems. Extreme care must be taken when working on the system with the ignition switched on. Persons with surgically implanted cardiac pacemaker devices should keep away from the ignition circuits, components and test equipment.

Refer to Chapter 5 for details.

14 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.

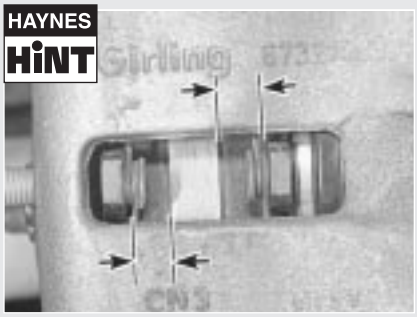
HAYNES HINT

Old hydraulic fluid is usually darker in colour than new fluid.

Renew the brake and bleed the system. Refer to Chapter 9 for full details.

15 Brake pad check

HAYNES HINT



For a quick check, the thickness of the friction material on each brake pad can be measured through the aperture in the caliper body.

With the front or rear (as applicable) of the vehicle raised, remove the wheels and check brake pads for wear. Renew the pads if the lining is below that specified. See Chapter 9, for specifications and full details.

16 Handbrake linkage check

With the vehicle raised, check the operation of the handbrake and lubricate the linkages. Refer to Chapter 9, for further details.

17 Power steering fluid check

1 With the engine off, remove the cap from the power steering reservoir. It is fitted with a dipstick.
2 The fluid should be visible up to the 'MAX' mark (1), **(see illustration)**. If not, top it up using specified fluid.
3 Start the engine and immediately top-up the fluid to the 'MIN' mark (2).
4 Do not allow the reservoir to run dry.
5 For details on how to bleed the system, refer to Chapter 10.

18 Power steering pump drivebelt check

Note: *Vauxhall specify the use of a special gauge. Checking values for use with this gauge are given in the Specifications in Chapter 10, for reference.*

Checking

1 The correct belt tension can be approximated by adjusting the length of the threaded rod. This should give a belt deflection of approximately 10.0 mm (0.4 in) under moderate thumb pressure at the midpoint of the belt run between the pulleys. If in doubt, err on the slack side, as an excessively tight belt may cause pump damage.
2 Check the condition of the belt and renew it if there are any signs of damage or excessive wear

Adjustment

3 Slacken the adjuster and mounting bolts.
4 Slacken the adjuster nuts, and adjust the length of the threaded rod to remove or tension the belt as desired **(see illustration)**.
5 Tighten the adjuster nuts, and tighten the adjuster and mounting bolts to the specified torque (see Chapter 10), on completion.
6 If a new drivebelt has been fitted, recheck the tension after a few hundred miles.

18.4 Adjusting the length of the power steering pump threaded rod

17.2 Topping-up the power steering fluid level

19 Rear suspension level control system check

Refer to Chapter 10, for details.

20 Bodywork check

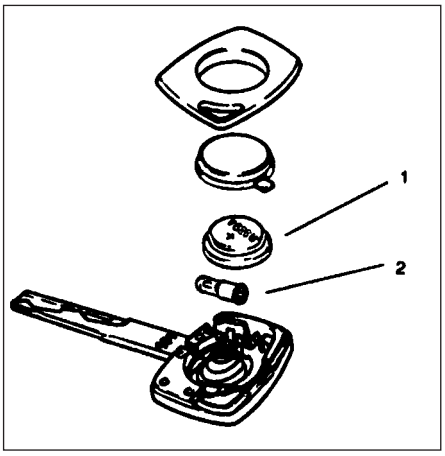
1 Clean the outside of the vehicle. If possible, clean underneath as well. If using a pressure cleaner take care not to damage any electrical components, especially in the engine compartment.
2 Check all around for signs of damage or corrosion and treat accordingly. Repair stone chips when you can to prevent rusting.
3 Read Chapter 11, for more details.

21 Lock and hinge check

1 Lubricate locks and hinges on all doors, tailgates (or boot lid) and bonnet.
2 Check for wear or damage and ensure correct operation of safety catches.
3 Check security of the bonnet stay and it's securing clip.
4 Read Chapter 11, for further details.

22 Alternator V-belt check

Note: *The new ribbed V-belt, fitted to later models, can not be adjusted.*
1 Although special tools are available for measuring the belt tension, a good approximation can be achieved. Tension the belt so that there is approximately 13.0 mm (0.5 in) of free movement under firm thumb pressure at the mid-point of the longest run between pulleys.
2 With the mounting bolts just holding the unit, lever the alternator away from the engine using a wooden lever at the mounting bracket end until the correct tension is achieved. Then



24.3 Replacing the battery in the door lock key

1 Battery (note, positive '+' side up)
2 Bulb

tighten the mounting nuts and bolts. On no account lever at the free end of the alternator, as serious internal damage could be caused.
3 For details of replacement, see Chapter 5.

23 Headlamp alignment

Refer to Chapter 12 for details.

24 Door lock key battery - replacement

1 Carefully prise open the outer cover from the key. Take care not to lose any of the internal components, as they are loose.
2 Remove the battery and discard it safely.
3 Place the new battery, "+" side up **(see illustration)**. Check the operation of the key. If the bulb does not light obtain a replacement.
4 Replace the outer cover.

25 Road test

Instruments and electrical equipment

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

Steering and suspension

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

Drivetrain

6 Check the performance of the engine, clutch, transmission and driveshafts.
7 Turn the radio/cassette off and listen for any unusual noises from the engine, clutch and transmission.
8 Make sure that the engine runs smoothly when idling, and that there is no hesitation when accelerating.
9 Check that the clutch action is smooth and progressive, that the drive is taken up smoothly, and that the pedal travel is not excessive. Also listen for any noises when the clutch pedal is depressed.
10 Check that all gears can be engaged smoothly, without noise, and that the gear lever action is not abnormally vague or "notchy".
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, the complete driveshaft must be renewed (see Chapter 8).

1

Full service, every 18 000 miles (30 000 km) or 24 months

26 Coolant renewal

Warning: Wait until the engine is cold before starting the procedure. Do not allow antifreeze to come in contact with your skin or with painted surfaces of the vehicle. Rinse off spills with plenty of water. Never leave antifreeze lying around in an open container. Always clean spilt fluids, as it can be harmful if swallowed.

Refer to Chapter 3 for details.

27 Air cleaner element - renewal

Early round type

1 Release the spring clips from the perimeter of the air cleaner cover.
2 Unscrew and remove the small cross-head screw securing the cover extension to the main body near the inlet duct.
3 Unscrew and remove the three central cross-head cap nuts securing the air cleaner to the carburettor, taking care not to drop the washers and seals **(see illustration)**.
4 Separate the cover from the main body, then lift out the element **(see illustration)**.
5 Wipe clean the inside surfaces of the cover and main body.
6 Locate the new element in the air cleaner body, and refit the cover using a reversal of the removal procedure.

Square type with air box

7 If desired, to improve access, unclip the coolant expansion tank hose from the air cleaner cover.
8 Release the two clips from the left-hand side of the cover, and unscrew the two screws from the right-hand side, then lift the cover sufficiently to remove the element.
9 Wipe clean the inside surfaces of the cover and main body.
10 Refitting is a reversal of removal, noting that the element fits with the rubber locating flange uppermost.

27.3 Air cleaner-to-carburettor mounting cap nuts

27.4 Removing the air cleaner element - note clip for crankcase ventilation hose (arrowed)

28 Air inlet temperature control check (carburettor models only)

Refer to Chapter 4A for details.

29 Fuel filter renewal

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.

Fuel filters are fitted in various locations throughout the range. Some may be 'in-line' in the fuel tank itself, or fitted into the carburettor.

Refer to Chapters 4A or 4B, as appropriate.

30 Spark plug renewal (SOHC)

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. Refer to the specifications in Chapter 5. If this type is used and the engine is in good condition, the spark plugs should not need attention between scheduled service replacement intervals. Spark plug cleaning is rarely necessary and should not be attempted unless specialised equipment is available, as damage can easily be caused to the firing ends.

2 Identify each HT lead for position so that the leads can be refitted to their correct cylinders. Then disconnect the leads from the plugs by pulling on the connectors, not the leads.

3 Clean the area around each spark plug using a small paintbrush, then using a plug spanner (preferably with a rubber insert), unscrew and remove the plugs **(see illustration)**. Cover the spark plug holes with a clean rag to prevent the ingress of any foreign matter.

30.3 Removing a spark plug

4 The condition of the spark plugs will tell much about the overall condition of the engine.

5 If the insulator nose of the spark plug is clean and white, with no deposits, this is a sign 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 is covered with hard black-looking deposits, then this is indicative that the mixture is too rich. Should the plug be black and oily, then it is likely that the engine is fairly worn, as well as the mixture being too rich.

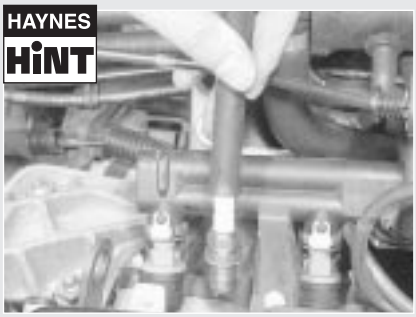
7 If the insulator nose is covered with light tan to greyish brown deposits, then the mixture is correct, and it is likely that the engine is in good condition.

8 The spark plug gap is of considerable importance, because if it is either too large or too small, the size of the spark and its efficiency will be seriously impaired. The spark plug gap should be set to the figure given in the Specifications, in Chapter 5.

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

10 Before fitting new spark plugs check that their threaded connector sleeves are tight.

HAYNES HiNT



It is very often difficult to insert spark plugs into their holes without cross-threading them. To avoid this, fit a short length of 8 mm (internal diameter), rubber hose over the end of the spark plug. The flexible hose acts as a universal joint to help align the plug correctly. Should the plug begin to cross-thread, the hose will slip on the spark plug, preventing damage to the thread in the cylinder head.

11 Screw in the plugs by hand, then tighten them to the specified torque. Do not exceed the torque figure.

12 Push the HT leads firmly onto the spark plugs, ensuring that they are connected to their correct cylinders.

31 Distributor cap and HT lead check

1 Remove the distributor cap and HT leads, and wipe them clean.

HAYNES HiNT

Number the HT leads before removal to ensure correct refitting.

2 Also wipe clean the coil connections. Remove the rotor arm, then visually check the distributor cap, rotor arm and HT leads for hairline cracks, and signs of arcing.

30.9A Tools required for spark plug removal, gap adjustment and refitting

30.9B Measuring the spark plug gap with wire gauge

30.9C Measuring the spark plug gap with feeler blade

3 When refitting the distributor cap, check that the ends of the HT leads are fitted securely to the cap, plugs and coil. Also make sure that the spring-tensioned carbon brush in the centre of the distributor cap moves freely, and that the HT segments are not worn excessively.
4 Inspect the electrical and vacuum connections of the ignition/engine management systems, and make sure that they are clean and secure.

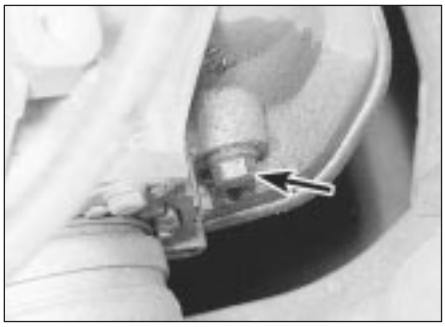
32 Clutch cable check

Check the clutch cable adjustment, as described in Chapter 6.

Check also, the condition of the cable. Inspect the cable strands for fraying, and ensure that the cable is correctly routed, to avoid chafing against surrounding components. Renew the cable, as described in Chapter 6, if excessive wear or damage is evident.

33 Manual transmission fluid check

Note: *Models built after 1994 it is no longer necessary to check levels.*
1 Ensure that the vehicle is on level ground.
2 Unscrew the transmission oil level plug, which is located in the rear left of the differential housing on F10 and F13 transmissions, and in the rear right of the differential housing on F16 and F20 transmissions **(see illustrations)**. The oil level should be up to the bottom of the level plug orifice.
3 If necessary, top-up the oil level through the breather/filler orifice in the gear selector cover. Unscrew the breather/filler plug, and top-up with the specified grade of oil, until oil just begins to run from the level plug orifice. Refit the level plug and the breather/filler plug on completion **(see illustrations)**.
4 Renewal of the transmission oil is not specified by the manufacturers, and no drain plug is provided. If it is desired to renew the oil as a precaution, the oil may be drained by removing the differential cover plate. Use a new gasket when refitting the cover plate. Fill the transmission through the breather/filler orifice, as described previously in this Section.
5 Periodically inspect the transmission for oil leaks, and check the gear selector linkage components for wear and smooth operation.



33.2A Transmission oil level plug (arrowed) - F13 type transmission (viewed from above)

33.2B Transmission oil level plug (arrowed) - F16 type transmission (viewed from below, with driveshaft removed)

33.3A Transmission breather/filler plug (arrowed) - F16 type transmission

33.3B Topping-up the transmission oil level - F13 type transmission

34 Automatic transmission check

1 Carry out a thorough road test, ensuring that all gearchanges occur smoothly, without snatching and with no increase in engine speed between changes.
2 Check the operation of the kickdown. Check that all gear positions can be engaged at the appropriate movement of the selector lever and with the vehicle at rest, check that the operation of the parking pawl in position "P" prevents it from being moved. Ensure that the starter motor will work only with the selector lever in positions "P" or "N", and that the reversing lamps light only when position "R" is selected.
3 The manufacturer's schedule calls for a regular check of the electrical control system using the special Vauxhall test equipment; owners will have to have this check carried out by a Vauxhall dealer.
4 Periodically inspect the transmission casing, checking all joint surfaces and seals for signs of fluid leaks. If any are found, the fault must be rectified immediately.
5 Check also that the transmission breather hose (under the battery mounting bracket) is clear and not blocked, kinked or twisted.

35 Brake shoe check

Note: *On models fitted with rear brake pads, the handbrake operates brake shoes that are located inside the rear brake discs.*

Refer to Chapter 9, for details.

Major service, every 36 000 miles (60 000 km) or 48 months

36 Timing belt renewal

1 To minimise risk of major damage to the engine the timing belt (or cambelt, as it is sometimes called), needs replacing at least, on every major service.
2 It is good practise however, not only to renew the belt whenever major engine work is carried out, but also if you buy a used car with unclear service history.
3 Some models are fitted with an inspection cover to view the condition of the belt. Whilst others involve a lot more work.
4 Full details on checking and replacement are shown in Chapters 2A or 2B, as appropriate.

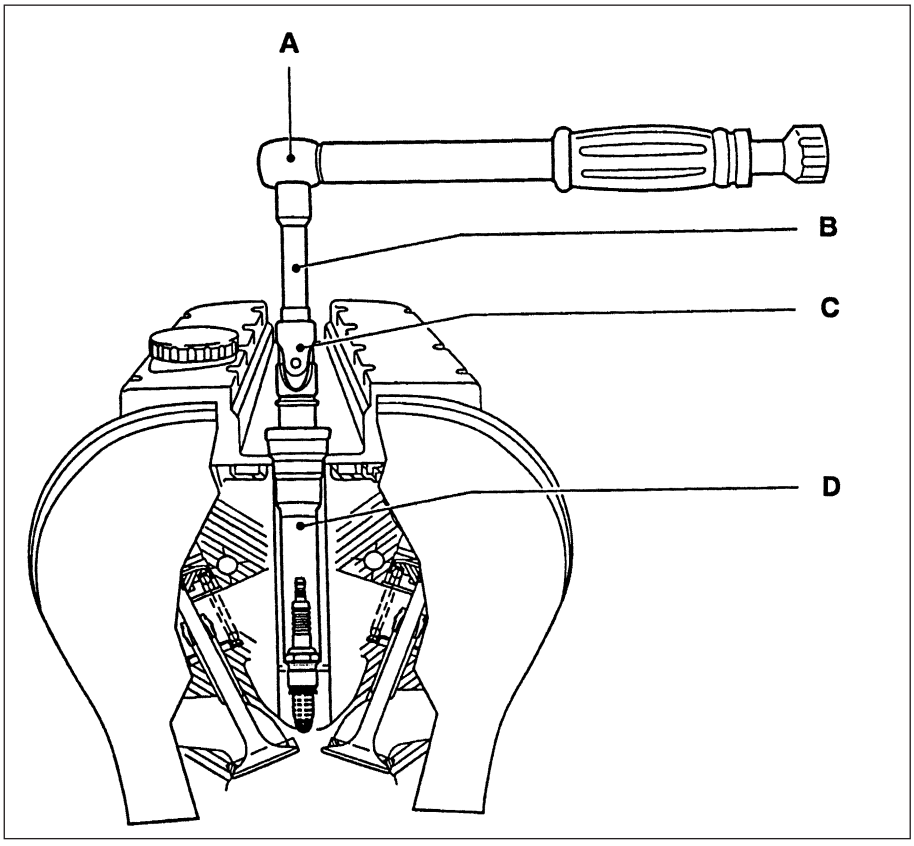
37 Spark plug renewal (DOHC)

1 This procedure is basically the same shown in Section 30. However on these models, a spark plug cover needs to be removed from the camshaft cover before the plugs can be removed.
2 Take great care when removing and refitting spark plugs on these engines **(see illustration)**. Hairline cracks in the ceramic of the plug can cause occasional or complete ignition failure. Damage to the catalytic converter may also occur.
3 Special tool (Vauxhall No. KM-194-B), with a 3 part conical sliding element have been made available, to reduce the risk of plug damage **(see illustration)**.
4 After refitting the spark plugs, remember to replace the plug cover.

38 Automatic transmission fluid renewal

Renew the transmission fluid as detailed in Chapter 7B.

37.2 Removing a spark plug - DOHC model



37.3 Removing spark plugs using special adapter (DOHC models)

A Torque wrench
B Extension
C Joint
D Special adapter (P/N KM-194-B)