ROVER 214 & 414

214 Oct 1989 to Mar 1996 (G to N registration) Petrol
414 Mar 1990 to 1995 (G to N registration) Petrol

Haynes Service and Repair Manual

Includes **Roadside Repairs** and **MOT Test Checks**

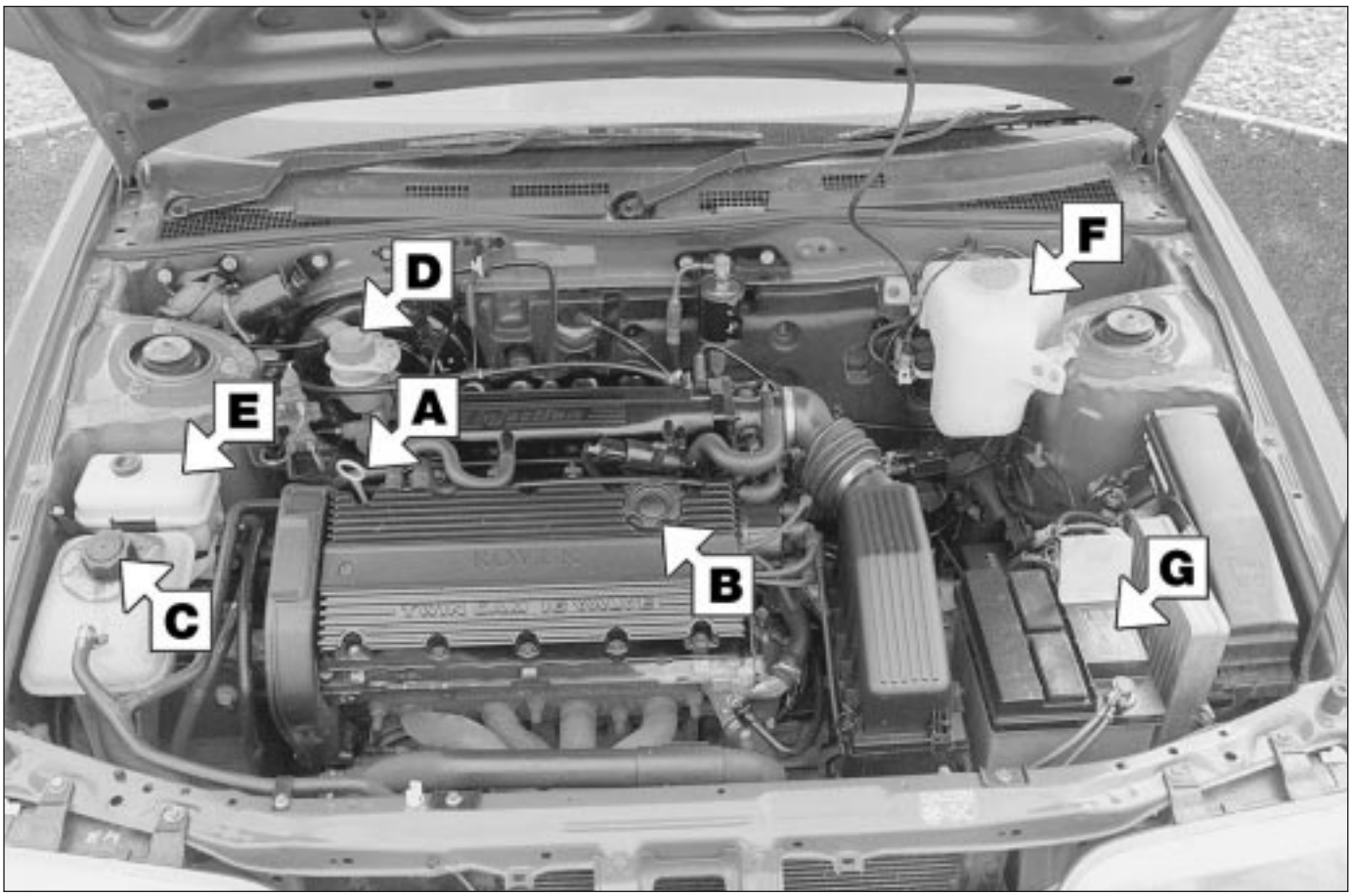
Introduction

There are some very simple checks which need only take a few minutes to carry out, but which could save you a lot on inconvenience and expense.
These *"Weekly Checks"* require no great skill or special tools, and the small amount of time they take to perform could well prove to be very well spent, for example:

☐ Keeping an eye on tyre condition and pressures, will not only help to stop them wearing out prematurely but could also save your life.
☐ Many breakdowns are caused by electrical problems. Battery-related faults are particularly common and a quick check on a regular basis will often prevent the majority of these.

☐ If your car develops a brake fluid leak, the first time you might know about it is when your brakes don't work properly. Checking the level regularly will give advance warning of this kind of problem.
☐ If the oil or coolant levels run low, the cost of repairing any engine damage will be far greater than fixing the leak.

Underbonnet Check Points



K16 MPi engine with plastic inlet manifold

A *Engine oil level dipstick*
B *Engine oil filler cap*
C *Coolant expansion tank*
D *Brake fluid reservoir*
E *Power steering fluid reservoir*
F *Screen washer fluid reservoir*
G *Battery*

Torque wrench settings	Nm	lbf ft
Spark plug (HT) lead clip screws - K8	9	7
Air intake duct support bracket-to-cylinder head screws	4	3
Spark plug cover screws - K16	2	1.5
Cylinder head cover bolts	9	7
Camshaft bearing cap/carrier-to-cylinder head bolts	9	7
Cylinder head bolts:		
1st stage	20	15
2nd stage	Tighten through 180°	
3rd stage	Tighten through (a further) 180°	
Timing belt cover fasteners:		
Upper right-hand (outer) cover	4	3
Lower and upper left-hand (inner) covers	9	7
Timing belt tensioner backplate clamp bolt	25	19
Timing belt tensioner pulley Allen screw	45	33
Camshaft sprocket bolt	33	24
Crankshaft pulley bolt	160	118
Oil pump-to-cylinder block/crankcase bolt and screws	9	7
Alternator mounting bracket-to-cylinder block/crankcase bolts	45	33
Dipstick tube-to-cylinder block/crankcase bolts	9	7
Flywheel bolts	85	63
Transmission-to-engine bolts	85	63
Flywheel cover plate screws	9	7
Flywheel rear cover plate bolt and nut	38	28
Big-end bearing cap bolts:		
1st stage	20	15
2nd stage	Tighten through 45°	
Main bearing ladder-to-cylinder block/crankcase bolts	10	7
Oil rail-to-main bearing ladder nuts	9	7
Oil pump pick-up/strainer pipe bolts	9	7
Sump bolts	10	7
Engine oil drain plug	42	31
Engine/transmission right-hand mounting:		
Bracket-to-cylinder block/crankcase bolts	45	33
Mounting-to-bracket nuts	100	74
Mounting-to-body through-bolt and nut	85	63
Engine/transmission left-hand mounting:		
Mounting-to-body bolts	45	33
Mounting-to-transmission bracket bolts	60	44
Transmission bracket bolts	100	74
Engine/transmission rear mounting:		
Mounting bracket-to-transmission bolt	85	63
Connecting link-to- transmission bracket bolt	60	44
Connecting link-to-body bolt	85	63
Anti-beaming bracket-to-support bracket bolt	45	33

1 General information and precautions

How to use this Chapter

This Part of the Chapter describes those repair procedures that can reasonably be carried out on the engine whilst it remains in the vehicle. If the engine has been removed from the vehicle and is being dismantled as described in Part B of this Chapter, any preliminary dismantling procedures can be ignored.

Note that whilst it may be possible physically to overhaul items such as the piston/connecting rod assemblies with the engine in the vehicle, such tasks are not usually carried out as separate operations and usually require the execution of several additional procedures (not to mention the cleaning of components and of oilways). For this reason, all such tasks are classed as major overhaul procedures and are described in Part B of this Chapter.

Engine information

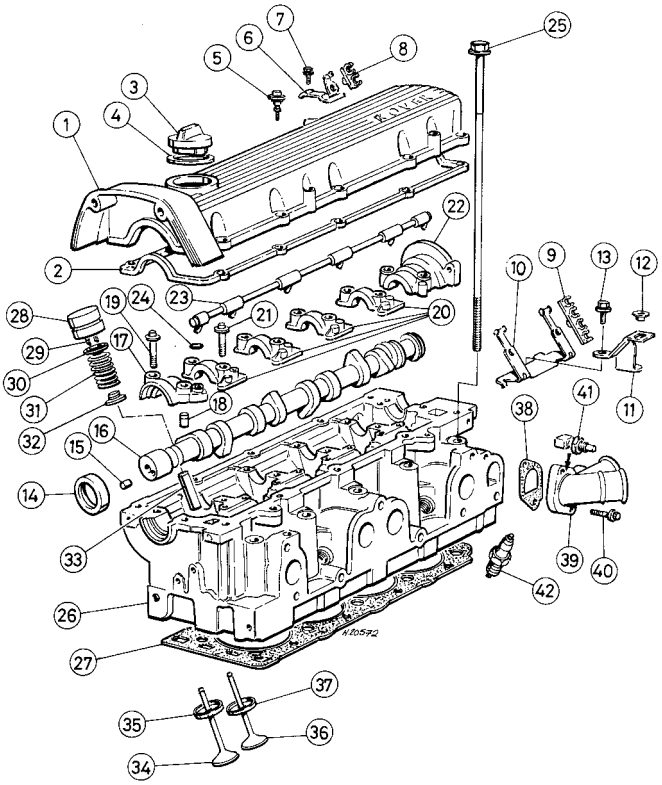
The engine is of four-cylinder, in-line type, mounted transversely at the front of the vehicle with the clutch and transmission on its left-hand end. The engine is available in two forms - the K8 engine, which is the eight-valve single overhead camshaft engine fitted to the carburettor-equipped 214 S model, and the K16 engine, which is a sixteen-valve double overhead camshaft engine which is fitted to all fuel-injected models. Apart from the different cylinder head designs, both engines are of identical construction.

Apart from the pressed steel sump, the plastic timing belt covers and the aluminium alloy cylinder head cover, the engine consists of three major castings which are the cylinder head, the cylinder block/crankcase and the crankshaft main bearing ladder. There is also an oil rail underneath the main bearing ladder and the camshaft carrier/bearing caps.

All major castings are of aluminium alloy and are clamped together by ten long through-bolts which perform the dual role of cylinder head bolts and crankshaft main bearing fasteners. Since these bolts pass through the cylinder block/crankcase and the main bearing ladder, the oil rail is secured also to the main bearing ladder (by two nuts) and the main bearing ladder is secured also to the cylinder block/crankcase (by ten smaller bolts) so that the cylinder head can be removed without disturbing the rest of the engine. The passages provided for the bolts in the major castings are used as breather passages or as returns for the oil to the sump.

1 Cylinder head cover
2 Seal
3 Engine oil filler cap
4 Seal
5 Bolt
6 HT lead retaining clip bracket
7 Screw
8 HT lead retaining clip
9 HT lead retaining clip
10 HT lead retaining clip bracket
11 Air intake duct support bracket
12 Fastener insert
13 Bolt
14 Oil seal
15 Roll pin
16 Camshaft
17 Camshaft right-hand bearing cap*
18 Dowel
19 Bolt
20 Camshaft intermediate bearing cap*
21 Bolt
22 Camshaft left-hand bearing cap*
23 Oil feed tube
24 O-ring
25 Cylinder head bolt
26 Cylinder head
27 Cylinder head gasket
28 Hydraulic tappet
29 Split collets
30 Spring retainer
31 Valve spring
32 Valve stem seal/ spring lower seat
33 Valve guide
34 Inlet valve
35 Valve seat insert
36 Exhaust valve
37 Valve seat insert
38 Gasket
39 Coolant outlet elbow
40 Bolt
41 Coolant temperature gauge sender unit
42 Spark plug

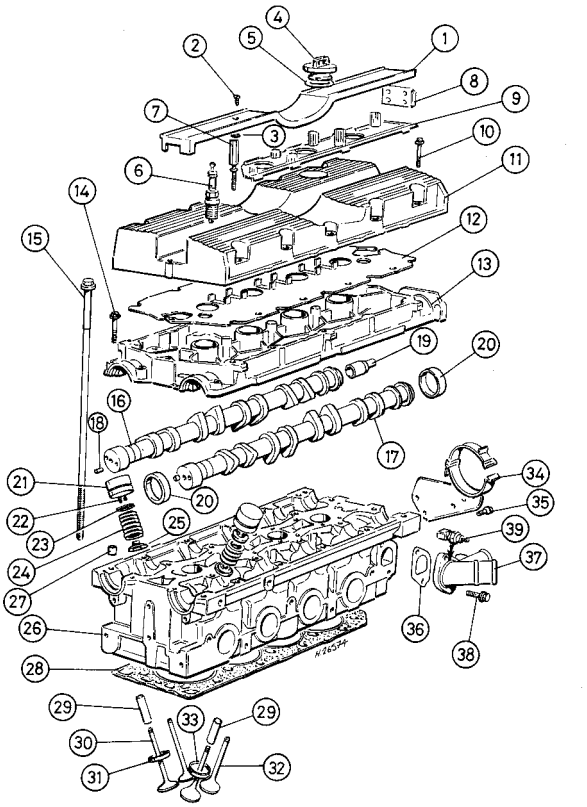
* ***Note***: *Camshaft bearing caps shown for reference only - not available separately from cylinder head*



11.0a Top end components - K8 engine

1 Spark plug cover
2 Screw
3 Retaining washer
4 Engine oil filler cap
5 Seal
6 Spark plug
7 Pillar bolt
8 HT lead grommet
9 HT lead clip plate
10 Bolt
11 Cylinder head cover
12 Gasket
13 Camshaft carrier*
14 Bolt
15 Cylinder head bolt
16 Inlet camshaft
17 Exhaust camshaft
18 Roll pin
19 Rotor arm drive spindle
20 Oil seal
21 Hydraulic tappet
22 Split collets
23 Spring retainer
24 Valve spring
25 Valve stem seal/spring lower seat
26 Cylinder head
27 Dowel
28 Cylinder head gasket
29 Valve guide
30 Inlet valves
31 Valve seat insert
32 Exhaust valves
33 Valve seat insert
34 Air intake duct support bracket
35 Bolt
36 Gasket
37 Coolant outlet elbow
38 Bolt
39 Coolant temperature gauge sender unit

* ***Note***: *Camshaft carrier shown for reference only - not available separately from cylinder head*



11.0b Top end components - K16 engine

Chapter 2 Part B Engine removal and general overhaul procedures

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 

Specifications

Refer to Part A of this Chapter

1 General information

Included in this part of the Chapter are details of removing the engine/gearbox unit from the vehicle and general overhaul procedures for the cylinder head, cylinder block/crankcase and all other engine internal components.

The information given ranges from advice concerning preparation for an overhaul and the purchase of replacement parts to detailed step-by-step procedures covering removal, inspection, renovation and refitting of engine internal components.

After Section 5, all instructions are based on the assumption that the engine has been removed from the vehicle. For information concerning in-car engine repair, as well as the removal and refitting of those external components necessary for full overhaul, refer to Part A of this Chapter and to Section 5. Ignore any preliminary dismantling operations described in Part A that are no longer relevant once the engine has been removed from the vehicle.

2 Engine overhaul - general information

It is not always easy to determine when, or if, an engine should be completely overhauled, as a number of factors must be considered.

High mileage is not necessarily an indication that an overhaul is needed, while low mileage does not preclude the need for an overhaul. Frequency of servicing is probably the most important consideration. An engine which has had regular and frequent oil and filter changes, as well as other required maintenance, should give many thousands of miles of reliable service. Conversely, a neglected engine may require an overhaul very early in its life. If a complete service does not remedy any problems, major mechanical work is the only solution.

Excessive oil consumption is an indication that piston rings, valve seals and/or valve guides are in need of attention. Make sure that oil leaks are not responsible before deciding that the rings and/or guides are worn. Perform a compression test to determine the likely cause of the problem.

Check the oil pressure with a gauge fitted in place of the oil pressure switch and compare it with that specified. If it is extremely low, the main and big-end bearings and/or the oil pump are probably worn out.

14.6 Using a penny to check crankshaft journal condition

14.8 Measuring crankshaft journal diameter

bearing journals for uneven wear, scoring, pitting and cracking.

6 Rub a penny across each journal several times. If a journal picks up copper from the penny, it is too rough **(see illustration)**.

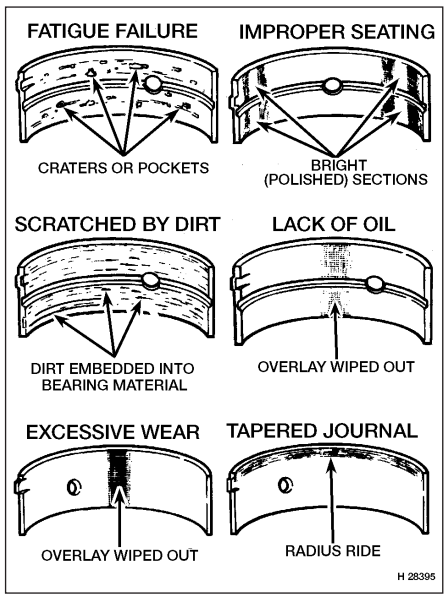
7 Remove any burrs from the crankshaft oil holes with a stone, file or scraper.

8 Using a micrometer, measure the diameter of the main bearing and crankpin (big-end) journals and compare the results with those specified **(see illustration)**. Check carefully that each journal's diameter is within the tolerances of the size grade corresponding to the code number on the crankshaft right-hand web (main bearing) or indicated by the code letter on the left-hand web (crankpin/big-end bearing). If any diameter measured is incorrect for the grade indicated, re-check the measurement carefully. If the journal is fit for further service, the correct grade code should be substituted when selecting new bearing shells.

9 By measuring the diameter at a number of points around each journal's circumference, you will be able to determine whether or not the journal is out-of-round. Take the measurement at each end of the journal (near the webs) to determine if the journal is tapered.

10 If the crankshaft journals are damaged, tapered, out-of-round or worn beyond the limits specified, the crankshaft must be renewed unless an engine overhaul specialist can be found who will regrind it and supply the necessary undersize bearing shells.

11 Check the oil seal journals at each end of the crankshaft for wear and damage. If either seal has worn an excessive groove in its journal, consult an engine overhaul specialist who will be able to advise whether a repair is possible or whether a new crankshaft is necessary.



15.2 Typical bearing shell failures

15 Main and big-end bearings - inspection

1 Even though the main and big-end bearings should be renewed during the engine overhaul, the old bearings should be retained for close examination, as they may reveal valuable information about the condition of the engine. The bearing shells are graded by thickness, the grade of each shell being indicated by the colour code marked on it.

2 Bearing failure occurs because of lack of lubrication, the presence of dirt or other foreign particles, overloading the engine and corrosion. Regardless of the cause of bearing failure, it must be corrected before the engine is reassembled to prevent it from happening again **(see illustration)**.

3 When examining the bearing shells, remove them from the cylinder block/crankcase, the main bearing ladder, the connecting rods and the connecting rod big-end bearing caps, then lay them out on a clean surface in the same general position as their location in the engine. This will enable you to match any bearing problems with the corresponding crankshaft journal. Do not touch any shell's bearing surface with your fingers while checking it, or the delicate surface may be scratched.

4 Dirt and other foreign particles get into the engine in a variety of ways. It may be left in the engine during assembly, or it may pass through filters or the crankcase ventilation system. It may get into the oil and from there into the bearings. Metal chips from machining operations and normal engine wear are often present. Abrasives are sometimes left in engine components after reconditioning, especially when parts are not thoroughly cleaned by using the proper cleaning methods. Whatever the source, these foreign objects often end up embedded in the soft bearing material and are easily recognized. Large particles will not embed in the bearing but will score or gouge the bearing and journal. The best prevention for this cause of bearing failure is to clean all parts thoroughly and keep everything spotlessly clean during engine assembly. Frequent and regular engine oil and filter changes are also recommended.

5 Lack of lubrication (or lubrication breakdown) has a number of interrelated causes. Excessive heat (which thins the oil), overloading (which squeezes the oil from the bearing face) and oil leakage (from excessive bearing clearances, worn oil pump or high engine speeds) all contribute to lubrication breakdown. Blocked oil passages, which usually are the result of misaligned oil holes in a bearing shell, will also oil starve a bearing and destroy it. When lack of lubrication is the cause of bearing failure, the bearing material is wiped or extruded from the steel backing of the bearing. Temperatures may increase to the point where the steel backing turns blue from overheating.

6 Driving habits can have a definite effect on bearing life. Full throttle, low speed operation (labouring the engine) puts very high loads on bearings, which tends to squeeze out the oil film. These loads cause the bearings to flex, which produces fine cracks in the bearing face (fatigue failure). Eventually, the bearing material will loosen in pieces and tear away from the steel backing. Short-distance driving leads to corrosion of bearings because insufficient engine heat is produced to drive off the condensed water and corrosive gases. These products collect in the engine oil, forming acid and sludge. As the oil is carried to the engine bearings, the acid attacks and corrodes the bearing material.

7 Incorrect bearing installation during engine assembly will lead to bearing failure as well. Tight fitting bearings leave insufficient bearing running clearance and will result in oil starvation. Dirt or foreign particles trapped behind a bearing shell result in high spots on the bearing which lead to failure. Do not touch any shell's bearing surface with your fingers during reassembly as there is a risk of scratching the delicate surface or of depositing particles of dirt on it.

Expansion tank

8 Slacken and remove the three bolts securing the expansion tank to the body. Unscrew the expansion tank cap and tip out its contents into a suitable container.
9 Slacken the retaining clips then disconnect both the hoses from the expansion tank and remove the tank from the vehicle.

Inspection

Radiator

10 If the radiator was removed because of clogging (causing overheating) then try reverse flushing or, in severe cases, use a radiator cleanser strictly in accordance with the manufacturer's instructions. Ensure that the cleanser is suitable for use in a copper/brass radiator. Refer to Chapter 1 for further information
11 Use a soft brush and an air line or garden hose to clear the radiator matrix of leaves, insects etc.

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Minor leaks from the radiator can be cured using a suitable sealant with the radiator in situ.

12 Major leaks or extensive damage should be repaired by a specialist, or the radiator should be renewed or exchanged for a reconditioned unit.
13 Examine the mounting rubbers for signs of damage or deterioration and renew if necessary.

Expansion tank

14 Empty any remaining coolant from the tank and flush it with fresh water to clean it. If the tank is leaking it must be renewed but it is worth first attempting a repair using a proprietary sealant or suitable adhesive.
15 The expansion tank cap should be cleaned and checked whenever it is removed. Check that its sealing surfaces and threads are clean and undamaged and that they mate correctly with those of the expansion tank.
16 The cap's performance can only be checked by using a cap pressure-tester (cooling system tester) with a suitable adaptor. On applying pressure, the cap's pressure relief valve should hold until the specified pressure is reached, at which point the valve should open.
17 If there is any doubt about the cap's performance, then it must be renewed. Ensure that the replacement is of the correct type and rating.

Refitting

Radiator

18 Refitting is the reverse of the removal procedure whilst noting the following:
a) Ensure that the radiator is seated correctly and without strain on its mountings.
b) Ensure that the radiator hoses are securely held by the retaining clips.
c) Ensure that all wiring connectors are correctly routed so that they are clear of the cooling fan and are retained by any necessary clips or ties.
d) Refill the cooling system as described in Chapter 1.

Expansion tank

19 Refitting is the reverse of the removal procedure whilst noting the following:
a) Ensure that all hoses are correctly routed with no kinks or sharp bends and are securely held by the retaining clips.
b) Top up the expansion tank as described in Chapter 1.

6 Thermostat - removal, testing and refitting

Removal

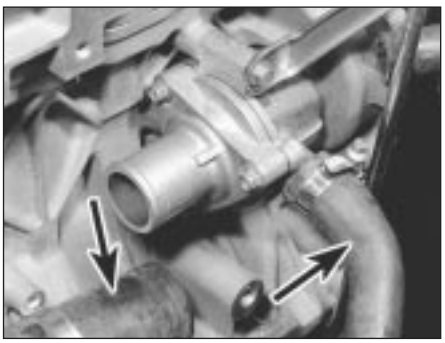
1 Note that access to the thermostat is very limited. Depending on the tools available, it may be easier to raise the front of the vehicle and to work from underneath, ensuring that the vehicle is securely supported on axle stands. In most cases, access is better if the air cleaner and carburettor (or throttle body on SPi engines) are removed and is best if the complete inlet manifold is removed. If the inlet manifold is removed, the thermostat housing

6.1 Thermostat can be removed without disturbing housing if inlet manifold is first removed

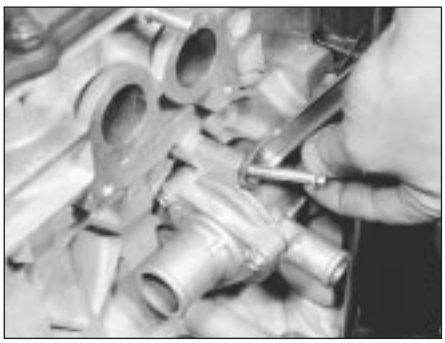
cover can be unbolted to remove the thermostat without disturbing the housing itself **(see illustration)**. Whichever method is used, first drain the cooling system.
2 On carburettor models equipped with a catalytic converter, either remove the thermostatically-operated vacuum switch or disconnect the vacuum pipes from the switch so that it can be removed with the thermostat housing.
3 Unbolt the coolant rail from the rear of the cylinder block/crankcase, then slacken the clips and disconnect the coolant rail hose and heater/inlet manifold return hose from the thermostat housing **(see illustration)**.
4 Undo the thermostat housing/dipstick tube-to-cylinder block/crankcase bolt and remove the thermostat housing from the cylinder block/crankcase. Remove the housing O-ring which must be renewed whenever it is disturbed **(see illustrations)**.
5 Slacken and remove the three thermostat housing cover bolts and lift off the housing cover. Discard the gasket and remove the thermostat.

Testing

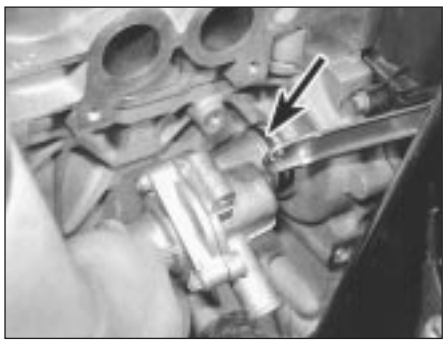
6 If the thermostat remains in the open position at room temperature, then it is faulty and must be renewed.
7 To test it fully, suspend the (closed) thermostat on a length of string in a container of cold water, with a thermometer beside it.



6.3 Disconnect coolant rail and heater/inlet manifold hoses (arrowed) . . .



6.4a . . . unscrew dipstick tube retaining bolt . . .



6.4b . . . and withdraw thermostat housing (O-ring arrowed) – inlet manifold removed for clarity

Chapter 3
Cooling, heating and ventilation systems

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 

Specifications

System

Type	Pressurised, pump-assisted thermo-syphon with front mounted radiator and thermostatically-controlled electric cooling fan

Thermostat

Type	Wax
Start to open temperature	76 to 80°C
Fully open temperature	82 or 88°C (actual value stamped in unit end)
Full lift height	9.0 mm

Expansion tank

Cap pressure	0.9 to 1.0 bar

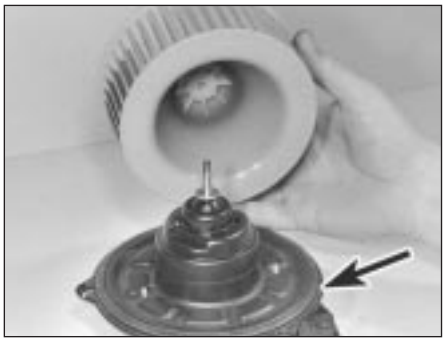
Cooling fan

Operating temperature	88 to 92°C

Torque wrench settings

	Nm	lbf ft
Cooling system		
Fan motor nuts	5	4
Temperature gauge sender unit	15	11
Thermostat housing cover bolts	9	7
Thermostat housing/dipstick tube-to-cylinder block/crankcase bolt	9	7
Coolant rail-to-cylinder block/crankcase bolts	9	7
Coolant pump-to-timing belt upper left-hand (inner) cover bolt	9	7
Coolant pump-to-cylinder block/crankcase bolts	10	7
Heating system		
Heater lower mounting nut	21	15
Heater blower motor mounting bolts	10	7
Air conditioning system		
Compressor mounting bolts	45	33
Condenser unions	17	13
Evaporator inlet union (from receiver drier)	17	13
Evaporator outlet union	33	24
Receiver drier union	17	13
Trinary switch	12	9

10.20d Remove fan retaining nut . . .



10.20e . . . and lift off fan (seal arrowed)

valve and free the cable outer from the retaining clip.

24 Slacken and remove the bolt securing the heater valve mounting bracket to the engine compartment bulkhead.

25 Either drain the cooling system or clamp the coolant hoses on each side of the coolant valve to minimise the loss of coolant.

26 Slacken the hose retaining clips, then disconnect both hoses from the coolant valve and remove the valve from the engine compartment. Mop up any spilt coolant immediately.

Refitting

Heater unit

27 Refitting is a reverse of the removal procedure, noting the following:

a) Ensure that the heater ducts are securely connected to the unit so that there are no air leaks or gaps.

b) Check the operation of all heater cables before refitting the facia, ensuring that the relevant component moves smoothly from the fully open to the fully closed position. If necessary, adjustments can be made by releasing the relevant retaining clip and repositioning the cable outer.

c) Ensure that the heater hoses are correctly reconnected and are securely held by the retaining clips.

d) Tighten the heater lower mounting nut to the specified torque setting.

e) Refill the cooling system as described in Chapter 1.

Heater matrix

28 Refitting is a reverse of the removal procedure.

Heater blower motor

29 Refitting is a reversal of the removal sequence, noting the following:

a) Ensure that the foam rubber seal is refitted correctly so that the blower motor-to-bulkhead aperture is closed off.

b) Tighten the blower motor mounting bolts to the specified torque setting.

c) Ensure that the air recirculation cable and flap functions correctly before refitting the glovebox. If necessary, adjust by releasing the cable retaining clip and repositioning the cable outer.

Heater blower motor resistor

30 Refitting is a reverse of the removal procedure.

Heater valve

31 Refitting is a reversal of the removal procedure. On completion, check the heater cable operates smoothly and replenish the cooling system.

11 Heater ducts and vents - removal and refitting

Removal

Facia ducts

1 Remove the facia.

12.2a Disconnect control cables from heater unit . . .

12.2b . . . and remove heater control panel with cables

2 The ducts are mounted on the facia assembly and can be removed individually, once the retaining screws have been removed.

Heater unit ducts

3 The left-hand heater unit to blower motor duct is removed as described in paragraphs 15 to 17 of Section 10.

4 To remove the right-hand duct, first remove the facia. Slacken and remove the retaining screw which secures the right-hand end of the duct to the mounting bracket and release the radio aerial from the retaining clips on the underside of the duct. The duct can then be manoeuvred out of position.

5 Removal of the lower ducts which supply air to the rear passenger footwells is a complex job, requiring the removal of the front seats, centre console and the various trim panels so that the floor carpet can be peeled back, and is therefore not recommended.

Centre console vents

6 Remove the centre console.

7 The vents can then be unclipped from the rear of the front console section and removed.

Facia vents

8 The adjustable face-level vents can be removed by prising them gently out of the facia until the clips are released, taking care not to mark the facia.

9 The door window demister vents, fitted to the sides of the facia, can also be prised out of position once the relevant door has been opened.

Refitting

10 Refitting is a reverse of the removal procedure.

12 Heater controls - removal, refitting and adjustment

Removal

1 Remove the heater unit.

2 Disconnect the heater control cables from the heater unit and unclip the control panel. Remove the panel assembly complete with cables **(see illustrations)**.

Refitting and adjustment

3 Refit the heater control panel to the heater unit and reconnect the necessary control cables to their original positions.

4 Check the operation of the control cables, ensuring that they operate smoothly and move the necessary component from the fully open to the fully closed position. Adjustments can be made by releasing the cable retaining clip and repositioning the cable outer.

5 Once the necessary control cables are functioning correctly, refit the heater unit.

possible to purchase a reconditioned carburettor of the relevant type.
6 If it is decided to go ahead and service a carburettor, check the cost and availability of spare parts before commencement. Obtain a carburettor repair kit, which will contain the necessary gaskets, diaphragms and other renewable items.
7 When working on carburettors, scrupulous cleanliness must be observed and care must be taken not to introduce any foreign matter into components. Carburettors are delicate instruments and care should be taken not to disturb any components unnecessarily.
8 Referring to the relevent exploded view of the carburettor **(see illustration on previous page),** remove each component part whilst making a note of its fitted position. Make alignment marks on linkages, etc.
9 Reassemble the carburettor in the reverse order to dismantling, using new gaskets, O-rings, etc. Be careful not to kink any diaphragms.

Adjustments

Idle speed and mixture

10 Refer to Chapter 1.

Fast idle speed

11 Check the accelerator and choke cables are correctly adjusted.
12 Warm the engine up to normal operating temperature and check that the idle speed and mixture are correctly set.
13 Pull out the choke control to the first detent position and check that the engine speed increases to the specified amount.
14 If adjustment is required, screw the fast idle adjusting screw in or out until the engine speed is correct.

Fuel level

15 The carburettor fuel level is adjusted by bending the float arm to alter the float height, usually measured with the carburettor inverted. However, since the necessary information is not provided by the manufacturer, the vehicle should be taken to a Rover dealer or SU carburettor specialist if the fuel level is thought to be incorrect.

Jet adjustment

16 Accurate jet adjustment is not easy for the inexperienced and can only be carried out using an exhaust gas analyser. If the jet adjustment is thought to be incorrect or is to be checked, owners without the required equipment and the skill to use it are advised to have the work carried out by a Rover dealer or SU carburettor specialist, otherwise proceed as follows.
17 Warm the engine up to normal operating temperature and check that the ignition timing, idle speed and mixture are correctly set and that the carburettor piston damper is topped-up, see Chapter 1.
18 Remove the tamperproof cap from the jet adjusting screw recess at the front left-hand corner of the carburettor body.
19 Counting the exact number of turns required to do so, screw the idle air bypass screw clockwise until it seats lightly, then start the engine, switch on the headlamps, heated rear window and heater blower motor (first speed only) and adjust the idle speed to 700 to 750 rpm.
20 Connect the exhaust gas analyser following its manufacturer's instructions.
21 Turning the jet adjusting screw either way (clockwise to richen the mixture) by half a turn at a time and waiting for the analyser reading to respond and stabilise before making a further alteration, set the mixture to a base CO level of 5.5 % ± 0.5 %. When the analyser reading is steady at the correct level, switch off all electrical loads.
22 Screw the idle air bypass screw anti-clockwise by the number of turns previously noted to return it to its original setting, then set the true idle mixture to the specified value.
23 Stop the engine when the adjustment is correct, disconnect the test equipment and fit a new tamperproof cap to the jet adjusting screw recess.

Idle bypass system

24 As well as the carburettor idle air bypass passage and screw, the system incorporates the solenoid and the accelerator pedal switch.
25 When the accelerator is closed and the ignition is switched on the solenoid is energised, its plunger being retracted to open the bypass passage. This allows air to bypass the carburettor piston and thus makes the idle mixture independent of the needle metering. Screwing in (clockwise) the idle air bypass screw reduces the amount of air bypassing the piston and richens the idle mixture.
26 As soon as the accelerator pedal is depressed, the accelerator pedal switch opens, the solenoid is de-energised and the bypass passage is shut off.
27 To check the system, listen closely by the carburettor while an assistant switches on the ignition and depresses and releases the accelerator pedal several times. The solenoid should be heard to be clicking in and out.
28 If no clicking is heard, remove the air cleaner assembly and use a meter or similar to check the solenoid earth and feed, see Chapter 12. Use a meter to check that the accelerator pedal switch contacts open and close. If the solenoid or switch is faulty, then it must be renewed. Note that if trouble is encountered with an ignition system fuse blowing repeatedly, and the fault cannot otherwise be traced, the solenoid may be at fault.

15 Inlet manifold pre-heater - operation, removal and refitting

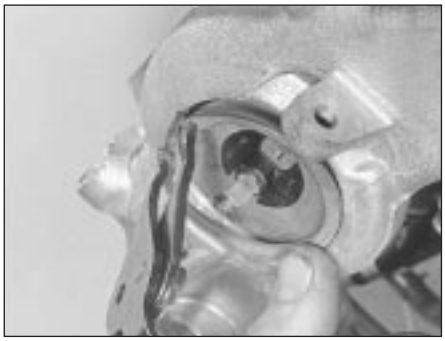
Operation

1 The system incorporates the manifold PTC (Positive Temperature Coefficient) heater, the relay and the manifold temperature switch.
2 When the ignition is switched on and the engine is cold (coolant below 50°C), the relay-energising current flows through the closed manifold temperature switch contacts, which then closes the relay contacts and allows current to flow from the battery to the heater. This ensures that the inlet manifold is warm enough, even before the effect of the coolant heating becomes apparent, to prevent fuel droplets condensing in the manifold, thus improving driveability and reducing exhaust emissions when the engine is cold.
3 As soon as the engine warms up to temperatures above 50°C, the switch contacts open and the relay cuts off the power supply to the manifold heater.
4 If the engine suddenly develops flat spots when cold, the system may be faulty.

PTC heater

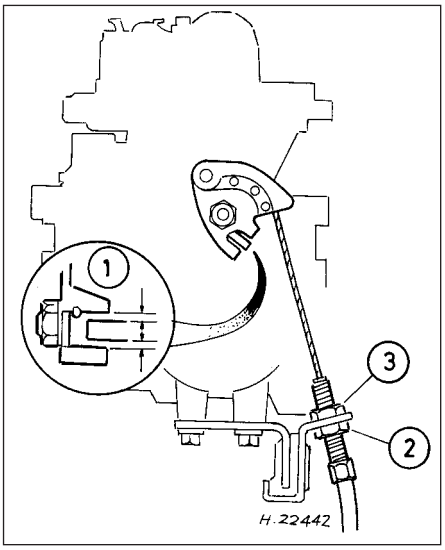
Removal

5 Drain the cooling system.
6 Apply the handbrake then jack up the front of the vehicle and support it on axle stands. Access to the PTC heater can then be gained from underneath the vehicle, via the gap between the engine and engine compartment bulkhead.
7 Disconnect the wiring connector from the heater terminal then extract the heater retaining circlip. Withdraw the heater from the underside of the manifold **(see illustrations)**.



15.7a Extract circlip . . .

15.7b . . . and remove PTC heater from inlet manifold - manifold removed for clarity



11.7 Accelerator cable adjustment

1 Throttle lever to lost motion link clearance should be equal on each side
2 Adjuster nut
3 Adjuster locknut

(Chapter 12) and prior to tightening the cable locknuts, adjust the cable as follows.

Adjustment

7 With the pedal fully released, check that there is equal clearance on each side of the throttle lever at the lost motion link **(see illustration)** and no slack in the cable. Have an assistant fully depress the pedal and check that the throttle cam opens fully, then check that it returns to the at-rest position when released.
8 To adjust the cable, switch on the ignition and position the stepper motor by moving the cam only to open, and fully close the throttle. Note that it is essential for accurate positioning of the stepper motor that the accelerator pedal switch contacts remain closed, so that the ECU recognises the throttle movement as a command and indexes the stepper motor to 25 steps.
9 Slacken the adjuster locknut (upper nut), then tighten the adjuster (lower) nut until the clearance is equal on each side of the throttle lever at the lost motion link. Tighten the locknut without disturbing this setting. Recheck the adjustment and switch off the ignition.

12 Accelerator pedal - removal and refitting

Refer to Section 10 in Part A of this Chapter.

13 Throttle housing - removal and refitting

Removal

1 Depressurise the fuel system.
2 Disconnect the battery negative terminal and remove the air cleaner assembly.
3 Examine the injector housing fuel pipe feed and return unions for signs of leakage, then wipe them clean.
4 Using a spanner to hold each adaptor, unscrew the pipe union nuts and release the fuel feed and return pipes from the adaptors. Plug each pipe and adaptor to minimise the loss of fuel and prevent the entry of dirt into the system.
5 Release the wire retaining clips then disconnect the wiring connectors from the injector housing, the throttle potentiometer and the stepper motor.
6 Slacken the accelerator cable locknuts and free the cable outer from its mounting bracket. Release the cable inner from the throttle cam.
7 Using a suitable pair of pliers, release the retaining clips and disconnect the breather hoses from the throttle housing **(see illustration)**.
8 Slacken and remove the four nuts securing the throttle housing to the inlet manifold, then remove the throttle housing from the vehicle. Remove the throttle housing insulating spacer and examine it for signs of wear or damage, renewing it if necessary **(see illustrations)**.
9 If leakage was detected from the feed and return pipes or their union nuts, check the sealing surfaces of the nuts and adaptors and renew the adaptor or the pipe assembly, as necessary.
10 If leakage is detected from the adaptors, unscrew each through one turn with a spanner, then through two turns by hand. If the adaptor is still a tight fit in the housing, the threads are damaged and the housing and adaptors must be renewed as a set. If the threads are sound, fit new sealing washers to the adaptors and refit them, tightening them to their specified torque wrench setting.

Refitting

11 Refitting is a reverse of the removal sequence, noting the following:
a) Ensure that the mating surfaces of the throttle housing and inlet manifold are clean then fit the insulating spacer.
b) Tighten the throttle housing and fuel pipe union nuts to their specified torque settings.
c) On completion, reconnect and adjust the accelerator cable.

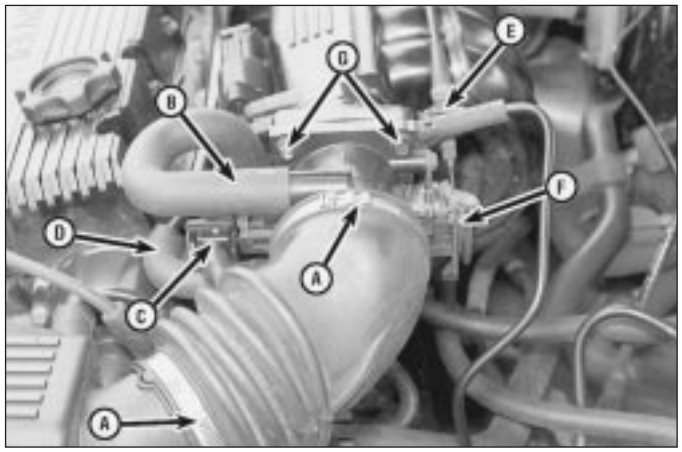
14 Fuel injection system components - testing

1 If a fault appears in the engine management (ignition/fuel injection) system, first ensure that the fault is not due to poor maintenance. That is, check that the air cleaner filter element is clean, the spark plugs are in good condition and correctly gapped, and that the engine breather hoses are clear and undamaged. Also check that the throttle cable is correctly adjusted. If the engine is running very roughly, check its compression pressures, bearing in mind that possibly one of the hydraulic tappets might be faulty, producing an incorrect valve clearance.
2 If these checks fail to reveal the cause of the problem, the vehicle should be taken to a suitably-equipped Rover dealer for testing. A wiring block connector is incorporated in the engine management circuit into which a special electronic diagnostic tester can be plugged. The tester will locate the fault quickly and simply, thereby alleviating the need to test all the system components individually

13.7 Disconnecting breather hoses from throttle housing

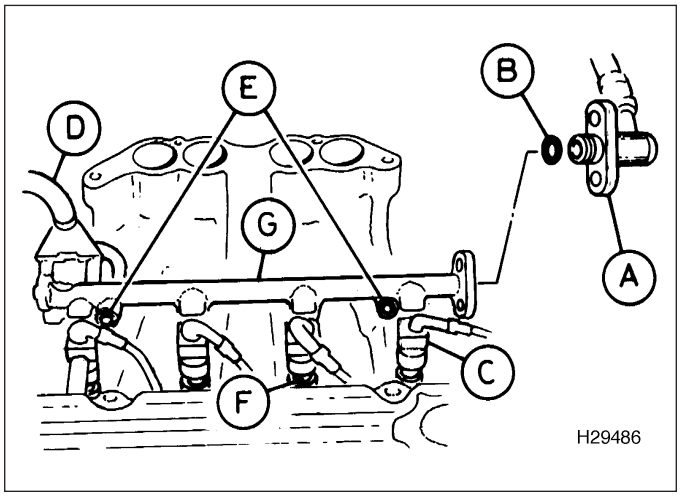
13.8a Lift throttle body assembly away from inlet manifold . . .

13.8b . . . and remove throttle body gasket spacer



12.9 Throttle housing assembly - plastic inlet manifold

A Hose securing clips
B Stepper motor hose
C Throttle potentiometer multiplug
D Throttle housing breather hose
E Throttle cable adjuster
F Throttle cam
G Throttle housing securing bolts (two shown)



14.4 Fuel rail/injector assembly - alloy inlet manifold

A Fuel feed hose connection
B O-ring
C Injector multiplug (1 of 4)
D Fuel pressure regulator
E Fuel rail securing bolts
F Fuel injector (1 of 4)
G Fuel rail

detach the connecting hose from between the throttle housing and air cleaner **(see illustration)**.

10 Loosen the stepper motor hose-to-throttle housing retaining clip and detach the hose from the housing.

11 Disconnect the multiplug from the throttle potentiometer.

12 Disconnect the breather hose from the throttle housing after loosening its retaining clip.

13 Pull the accelerator cable adjuster nut from its abutment bracket and release the cable inner from the throttle cam.

14 Remove the four bolts securing the throttle housing to the inlet manifold, detach the throttle housing from the manifold and discard the sealing ring.

15 Refitting is the reverse of the removal procedure, noting the following.

a) Thoroughly clean all component parts, paying particular attention to the mating surfaces.
b) Fit a new throttle housing sealing ring, lubricating it with silicone grease.
c) Tighten the housing securing bolts to the specified torque wrench settings.
d) Check all hose connections are secure.
e) Check accelerator cable adjustment.

13 Fuel injection system components - testing

Refer to Section 14 in Part B of this Chapter.

14 Fuel injection system components - removal and refitting

Fuel rail/injectors

Alloy inlet manifold

1 Disconnect the battery earth lead.

2 Depressurise the fuel system.

3 Detach the inlet manifold chamber and discard the gasket.

4 Remove the two bolts securing the fuel feed hose to the fuel rail and release the hose from the rail, discarding the O-ring **(see illustration)**.

5 Disconnect the four injector multiplugs.

6 Release the retaining clip and disconnect the hose from the fuel pressure regulator.

7 Remove the two bolts securing the fuel rail to the inlet manifold.

8 Pull each injector from its location in the inlet manifold and remove the fuel rail, complete with injectors and pressure regulator, from the vehicle, placing it on a clean surface.

9 Remove and discard the O-ring fitted to the base of each injector, then cover the exposed end of each injector to prevent the ingress of dirt or moisture **(see illustration)**.

10 To remove the injectors from the fuel rail, first remove the spring clip which secures each injector to the rail **(see illustration)**. Pull each injector from the rail and discard the O-ring fitted to its upper end. Again, cover the exposed end of each injector to prevent the ingress of dirt or moisture.

11 Refitting of the injectors and rail is the reverse of the removal procedure, noting the following:

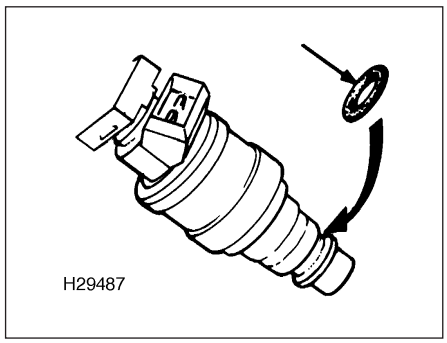
a) Thoroughly clean all component parts, paying particular attention to the mating surfaces.
b) Fit new O-rings, lubricating them with clean fuel.
c) Where applicable, tighten all securing bolts to the specified torque wrench settings.

Plastic inlet manifold

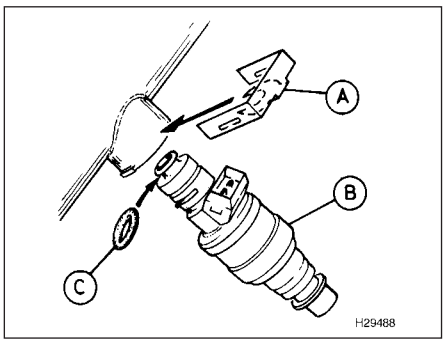
12 Disconnect the battery earth lead.

13 Depressurise the fuel system.

14 Loosen the throttle housing breather



14.9 Discard O-ring (arrowed) fitted to injector base



14.10 Remove spring clip (A), pull injector (B) from rail and discard O-ring (C)

1 General information and precautions

General information

The cooling system is of the pressurised, pump-assisted thermo-syphon type. It consists of the front-mounted radiator, a translucent expansion tank mounted on the right-hand inner wing, a thermostatically-controlled electric cooling fan mounted on the rear of the radiator, a thermostat and a centrifugal coolant pump, as well as the connecting hoses **(see illustration)**. The coolant pump is driven by the engine timing belt.

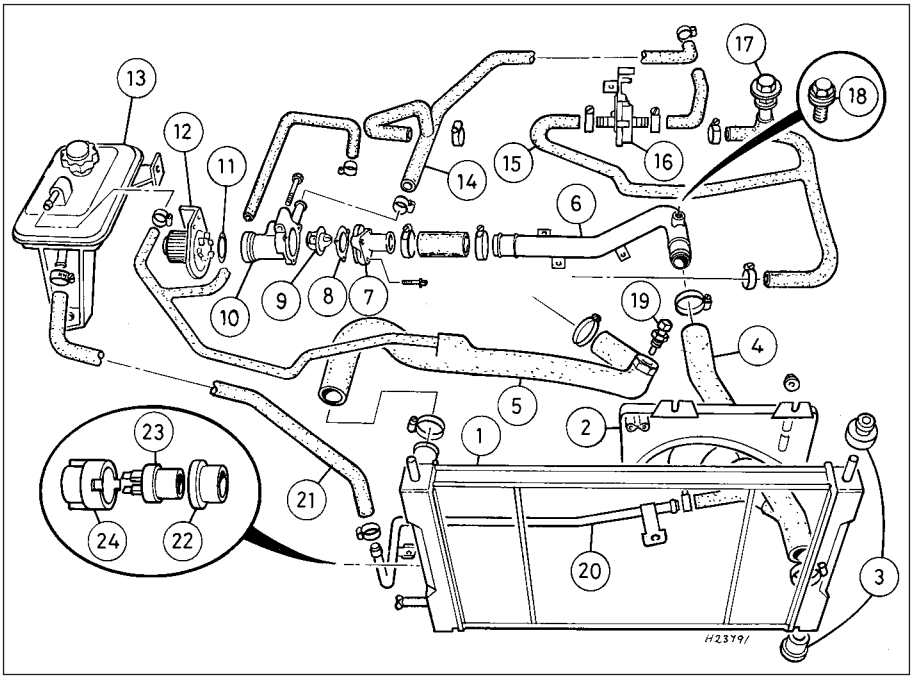
The system is of the by-pass type, allowing coolant to circulate around the engine while the thermostat is closed. With the engine cold, the thermostat closes off the coolant feed from the bottom radiator hose. Coolant is then drawn into the engine via the heater matrix, inlet manifold and from the top of the cylinder block. This allows some heat transfer, by convection, to the radiator through the top hose whilst retaining the majority of heat within the cylinder block.

The siting of the thermostat in the intake rather than the outlet side of the system ensures that the engine warms up quickly by circulating a small amount of coolant around a shorter tract. This also prevents temperature build-up in the cylinder head prior to the thermostat opening.

When the coolant reaches a predetermined temperature, the thermostat opens and the coolant is allowed to flow freely through the top hose to the radiator. As the coolant circulates through the radiator, it is cooled by the inrush of air when the vehicle is in forward motion. Airflow is supplemented by the action of the electric cooling fan when necessary. Upon reaching the bottom of the radiator, the coolant is now cooled and the cycle is repeated.

With the engine at normal operating temperature, the coolant expands and some of it is displaced into the expansion tank. This coolant collects in the tank and is returned to the radiator when the system cools.

The electric cooling fan mounted behind the radiator is controlled by a thermostatic switch located in the radiator side tank. At a predetermined coolant temperature the switch contacts close, thus actuating the fan.



1.0 Cooling system components

1 *Radiator*
2 *Cooling fan and cowling*
3 *Radiator mounting rubbers*
4 *Bottom hose*
5 *Top hose*
6 *Coolant pipe - bottom hose to thermostat housing*
7 *Thermostat housing cover*
8 *Gasket*
9 *Thermostat*
10 *Thermostat housing*
11 *O-ring*
12 *Coolant pump*
13 *Expansion tank*
14 *Hose - heater matrix and manifold return*
15 *Hose - heater matrix and manifold feed*
16 *Heater temperature control valve*
17 *Coolant filler stem*
18 *Cooling system bleed screw*
19 *Engine overheat switch - where fitted*
20 *Coolant pipe - expansion tank to bottom hose*
21 *Hose - expansion tank return*
22 *Sealing ring*
23 *Cooling fan thermostatic switch*
24 *Locking ring*

Precautions

Cooling system

Do not attempt to remove the expansion tank filler cap or to disturb any part of the cooling system whilst it or the engine is hot, as there is a very great risk of scalding. If the expansion tank filler cap must be removed before the engine and radiator have fully cooled down (even though this is not recommended) the pressure in the cooling system must first be released. Cover the cap with a thick layer of cloth, to avoid scalding, and slowly unscrew the filler cap until a hissing sound can be heard. When the hissing has stopped, showing that pressure is released, slowly unscrew the filler cap until it can be removed. If more hissing sounds are heard, wait until they have stopped before unscrewing the cap completely. At all times keep well away from the filler opening.

Do not allow antifreeze to come in contact with your skin or painted surfaces of the vehicle. Rinse off spills immediately with plenty of water. Never leave antifreeze lying around, it is fatal if ingested.

If the engine is hot, the electric cooling fan may start rotating even if the engine is not running, so be careful to keep hands, hair and loose clothing well clear when working in the engine compartment.

Air conditioning system

On models equipped with an air conditioning system, it is necessary to observe special precautions whenever dealing with any part of the system, its associated components and any items which necessitate disconnection of the system. If for any reason the system must be disconnected, entrust this task to your Rover dealer or a refrigeration engineer.

Refrigerant must not be allowed to come in contact with a naked flame, otherwise a poisonous gas will be created. Do not allow the fluid to come in contact with the skin or eyes.

2 **Cooling system** - draining, flushing and refilling

Refer to Chapter 1.

3 **Cooling system** - general inspection

Refer to "*Weekly Checks"* and Chapter 1.

13 Air conditioning compressor drivebelt - inspection, adjustment and renewal

Refer to Chapter 1 (alternator drivebelt check).

14 Air conditioning refrigerant - level check

Refer to Chapter 1.

15 Air conditioning system components - removal and refitting

Warning: The air conditioning system must be professionally discharged before carrying out any of the following work. Cap or plug the pipe lines as soon as they are disconnected to prevent the entry of moisture.

Compressor

Removal

1 Remove the alternator/air conditioning compressor drivebelt as described in Chapter 1.
2 Disconnect the air conditioning pipes from the compressor **(see illustration)**.
3 Slacken and remove the four bolts securing the compressor to the mounting bracket and manoeuvre it downwards and away from the engine.

Refitting

4 Refitting is a reverse of the removal sequence, tightening the compressor mounting bolts to the specified torque setting. Ensure that the compressor pipe unions are securely tightened then refit and adjust the drivebelt as described in Chapter 1. On completion, have the air conditioning system recharged by a refrigeration specialist or suitably-equipped Rover dealer.

Condenser

Removal

5 Remove the front bumper.
6 Slacken and remove the bolts securing the power steering oil cooler to the body, then undo the bonnet lock mounting bracket bolts and position the lock assembly clear of the condenser unit.
7 Unscrew the air conditioning pipe union nuts from the condenser unit then disconnect the pipes. Discard the union pipe O-rings as these must be renewed whenever they are disturbed.
8 Slacken and remove the four retaining bolts and withdraw both the condenser upper mounting brackets. Release the condenser from its lower mounting points and manoeuvre it away from the vehicle.

Refitting

9 Prior to refitting, check the condenser lower mounting rubbers for signs of damage or deterioration and renew as necessary. Renew the pipe union O-rings.
10 Refitting is a direct reversal of the removal procedure, tightening the pipe union nuts to the specified torque setting. On completion, have the air conditioning system recharged by a refrigeration specialist or a suitably equipped Rover dealer.

Condenser cooling fan

Removal

11 Drain the cooling system.
12 Disconnect the wiring connector from the engine overheat switch, located in the top coolant hose, then slacken the clips securing the hose to the radiator and engine. Disconnect the hose from the radiator and engine and position it clear of the condenser so that it does not hinder removal.
13 Disconnect the condenser fan electrical wiring connector then undo the four fan cowling retaining nuts and manoeuvre the assembly out of the engine compartment.
14 To dismantle the assembly, first undo the fan retaining nut then lift the fan off the motor spindle. Undo the two screws which secure the motor assembly to the cowling then release the motor wiring and connector and separate the motor and cowling.

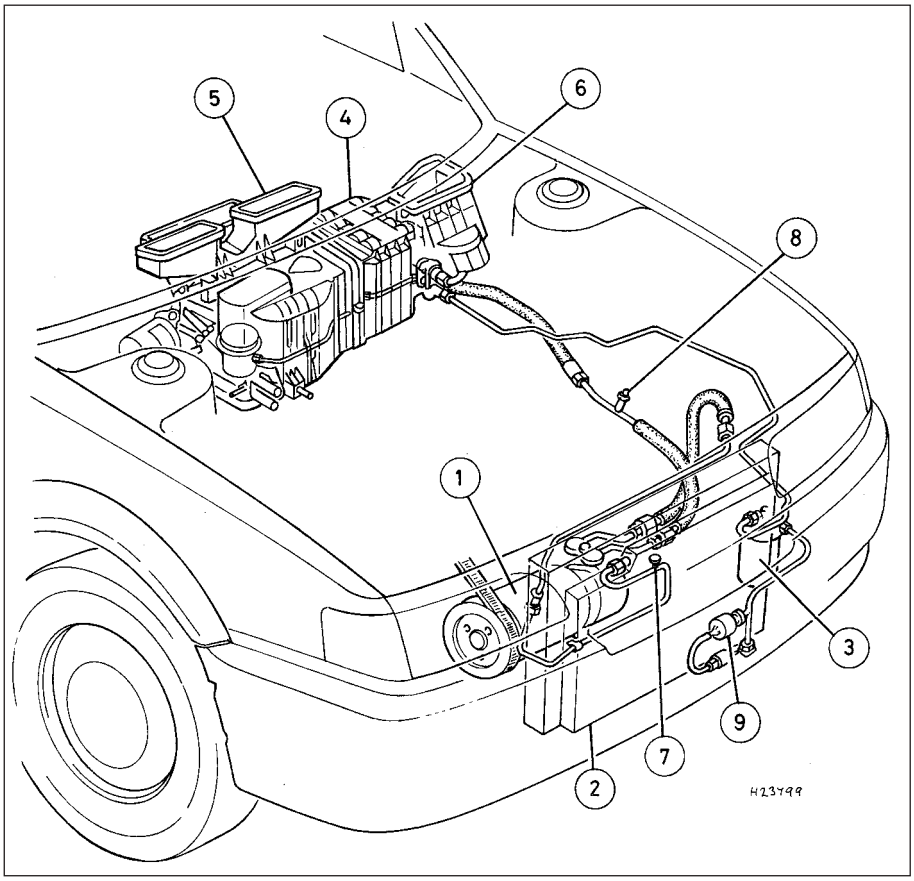
Refitting

15 Refitting is a reverse of the removal procedure, noting the following points:
a) Ensure that the motor wiring is securely retained by the cowling clips and is clear of the condenser fan.
b) Ensure that the radiator hose is securely held by its retaining clips.
c) On completion, refill the cooling system.

Evaporator

Removal

16 Undo the three bolts which secure the washer system reservoir to the engine compartment bulkhead and move the reservoir to gain access to the two evaporator union nuts. Slacken both the union nuts and disconnect the pipes from the evaporator. Remove the O-rings from the union nuts and discard them.



15.2 Air conditioning system layout

1 Compressor
2 Condenser
3 Receiver drier
4 Evaporator
5 Heater unit
6 Blower unit
7 High pressure servicing connection
8 Low pressure servicing connection
9 Trinary switch

6.3 Removing crankshaft sensor (wiring lead screw arrowed)

6.6 Reluctor ring-to-flywheel screws (arrowed)

6 Crankshaft sensor and reluctor ring - removal and refitting

Removal

Crankshaft sensor

1 Disconnect the battery negative terminal.
2 Disconnect the sensor wiring at its connector plug on the flywheel rear cover plate, then undo the retaining screw to release the wiring lead.
3 Remove the two retaining screws and withdraw the sensor from the cylinder block/crankcase **(see illustration)**.
4 Inspect the sensor for obvious signs of wear or damage and renew it if necessary. No data is available to enable the sensor to be tested. If thought to be faulty, it can be checked only by substitution with a new component.

Reluctor ring

5 Remove the flywheel.
6 Undo the two screws securing the reluctor ring to the rear of the flywheel and withdraw it **(see illustration)**.
7 Check the ring for obvious signs of wear or damage and renew it if necessary.

Refitting

Crankshaft sensor

8 Ensure that the sensor and cylinder block/crankcase mating surfaces are clean then refit the sensor and tighten its retaining screws to the specified torque.
9 Connect the sensor wiring connector and tighten the connector mounting screw to the specified torque.
10 Reconnect the battery negative terminal.

Reluctor ring

11 Refitting is a reversal of the removal procedure. Tighten the reluctor retaining screws to the specified torque.

7 Engine management electronic control unit (ECU) - removal and refitting

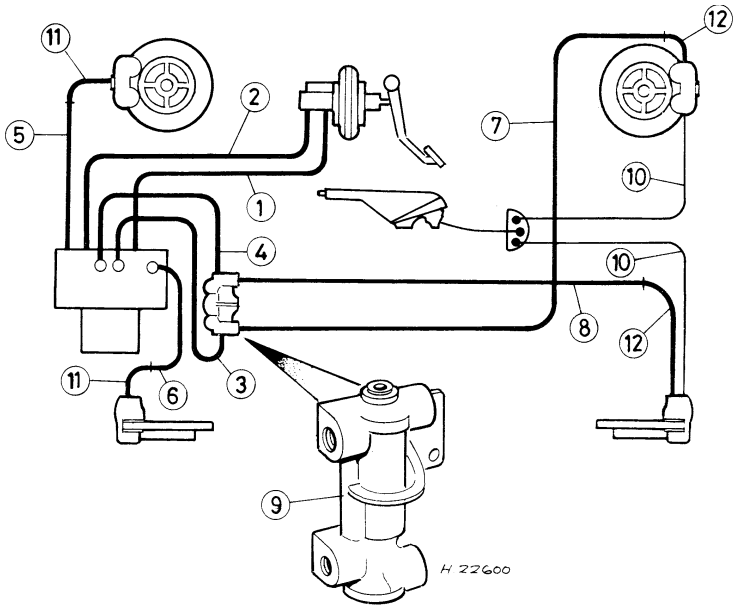
Refer to Chapter 4.

8 Ignition timing - checking and adjustment

Refer to Chapter 1.

9 Ignition system - testing

1 If a fault appears in the engine management (ignition/fuel) system, first ensure that the fault is not due to poor maintenance. Check that the air cleaner filter element is clean, the spark plugs are in good condition and correctly gapped, and that the engine breather hoses are clear and undamaged. Also check that the accelerator cable is correctly adjusted. If the engine is running very roughly, check the compression pressures, bearing in mind that possibly one of the hydraulic tappets might be faulty, producing an incorrect valve clearance.
2 If these checks fail to reveal the cause of the problem, the vehicle should be taken to a suitably-equipped Rover dealer for testing. A wiring block connector is incorporated in the engine management circuit into which a special electronic diagnostic tester can be plugged. The tester will locate the fault quickly and simply, alleviating the need to test all the system components individually, which is a time-consuming operation that carries a high risk of damaging the ECU.
3 The only ignition system checks which can be carried out by the home mechanic are those described for the spark plugs, HT leads, rotor arm and distributor cap (Chapter 1), and the ignition HT coil (this Chapter). If necessary, the system wiring and wiring connectors can be checked as described in Chapter 12, ensuring that the ECU wiring connectors have first been disconnected.



1 Primary hydraulic circuit
2 Secondary hydraulic circuit
3 Brake pipe - modulator to pressure regulating valve
4 Brake pipe - modulator to pressure regulating valve
5 Brake pipe - modulator to right-hand front hose
6 Brake pipe - modulator to left-hand front hose
7 Brake pipe - modulator to right-hand rear hose
8 Brake pipe - modulator to left-hand rear hose
9 Pressure regulating valve
10 Handbrake cable
11 Brake flexible hose - brake pipe to front brake caliper
12 Brake flexible hose - brake pipe to rear brake caliper

1.0b ABS braking system component layout

1 General information and precautions

General information

The braking system is of the servo-assisted, dual circuit hydraulic type. The arrangement of the hydraulic system is such that each circuit operates one front and one rear brake from a tandem master cylinder. Under normal circumstances both circuits operate in unison. However, in the event of hydraulic failure in one circuit, full braking force will still be available at two wheels **(see illustrations)**.

On models not equipped with an Anti-lock Braking System (ABS), a pressure regulating valve is also incorporated in the hydraulic circuit to regulate the pressure applied to the rear brakes and reduce the possibility of the rear wheels locking under heavy braking. On models equipped with ABS, the pressure regulating valve is fitted is but it is non-operational.

All models are fitted with front disc brakes. Models equipped with ABS are fitted with ventilated discs, whereas non-ABS models are fitted with solid discs. The disc brakes are actuated by single piston sliding type calipers which ensure that equal pressure is applied to each disc pad.

Non-ABS models are fitted with rear drum brakes, incorporating leading and trailing shoes which are actuated by twin piston wheel cylinders. A self-adjust mechanism is incorporated to automatically compensate for brake shoe wear. As the brake shoe linings wear, the footbrake operation automatically operates the adjuster mechanism quadrant which effectively lengthens the shoe strut and repositions the brake shoes to remove the lining-to-drum clearance.

ABS models are equipped with rear disc brakes. The disc brakes are actuated by a single piston sliding caliper which incorporates a mechanical handbrake mechanism.

On all models, the handbrake provides an independent mechanical means of rear brake application. Full details of ABS system operation are as follows.

Anti-lock Braking System (ABS) - operation

ABS is available as an option on all models covered in this Manual. The system comprises a modulator block which contains an ABS Electronic Control Unit (ECU), hydraulic solenoid valves and accumulators, and an electrically-driven return pump. One sensor is fitted to each roadwheel. The purpose of this system is to prevent wheel locking during heavy braking. This is achieved by automatic release of the brake on the relevant wheel, followed by reapplication of the brake.

The solenoids are controlled by the ECU which receives signals from the four roadwheel sensors, which in turn monitor the speed of rotation of each wheel. By comparing these speed signals from the four wheels, the ECU can determine the speed at which the vehicle is travelling. It can then use this speed to determine when a wheel is decelerating at an abnormal rate compared to the speed of the vehicle and therefore predict when a wheel is about to lock. During normal operation, the system functions in the same way as a non-ABS braking system.

If the ECU senses that a wheel is about to lock, the ABS system enters the 'pressure maintain' phase. The ECU operates the relevant solenoid valve in the modulator block which then isolates the brake caliper on the wheel which is about to lock from the master cylinder, effectively sealing in the hydraulic pressure.

If the speed of rotation of the wheel continues to decrease at an abnormal rate, the ABS system then enters the 'pressure decrease' phase, where the electrically-driven return pump operates and pumps the hydraulic fluid back into the master cylinder, releasing pressure on the brake caliper so that the brake is released. Once the speed of rotation of the wheel returns to an acceptable rate, the pump stops and the solenoid valve opens thereby allowing the hydraulic master cylinder pressure to return to the caliper which then reapplies the brake. This cycle can be carried out at up to 10 times a second.

The action of the solenoid valves and return pump creates pulses in the hydraulic circuit. When the ABS system is functioning, these pulses can be felt through the brake pedal.

The solenoid valves connected to the front calipers operate independently, but the valve connected to the rear calipers, together with the pressure regulating valve, operates both calipers simultaneously.

Operation of the ABS system is entirely dependent on electrical signals. To prevent the system responding to any inaccurate signals, a built-in safety circuit monitors all signals received by the ECU. If an inaccurate signal or low battery voltage is detected, the ABS system is automatically

16.14 Reset adjuster strut prior to refitting drum

knurled wheel are situated on the underside of the strut assembly. Using a screwdriver, move the quadrant away from the knurled wheel and set it in the minimum adjustment position.

12 Fit the upper return spring to its respective location on the leading shoe. Fit the trailing shoe to the upper return spring and carefully ease the shoe into position in the adjuster strut slot. Once in position, fit the small spring which secures the trailing shoe to the strut assembly.

13 Remove the elastic band fitted to the wheel cylinder and manoeuvre the shoe and strut assembly into position on the backplate. Locate the upper end of both shoes with the wheel cylinder pistons and fit the handbrake cable to the trailing shoe operating lever. Fit the lower return spring to both shoes and ease the shoes into position on the lower pivot point.

14 Tap the shoes to centralise them with the backplate, then refit the shoe retainer pins and springs and secure them in position with the retainer clips. Check that the adjuster quadrant is still in the minimum adjuster position and if necessary, reset as follows. Place a block of wood between the trailing shoe and hub, to prevent the shoe moving forwards, then lever the leading shoe away from the hub to release the brake shoe return spring pressure on the adjuster quadrant. With the shoe held in this position, reset the quadrant to the minimum adjustment setting **(see illustration)**. Once the adjuster strut is correctly set, ease the leading shoe back into position then remove the block of wood and check that the shoes are still central.

17.3 Removing brake drum retaining screws (jacking holes arrowed)

15 Refit the brake drum and repeat the above operation on the remaining rear brake assembly.

16 On completion, apply the footbrake repeatedly to set the shoe-to-drum clearance, until normal (non-assisted) brake pedal operation returns.

17 Check handbrake cable operation and, if necessary, adjust as described in Chapter 1.

18 Refit the roadwheels then lower the vehicle to the ground and tighten the roadwheel nuts to the specified torque.

19 Check the hydraulic fluid level.

17 Rear brake drum - removal, inspection and refitting

Note: *If either brake drum requires renewal, both should be renewed at the same time to ensure even and consistent braking.*

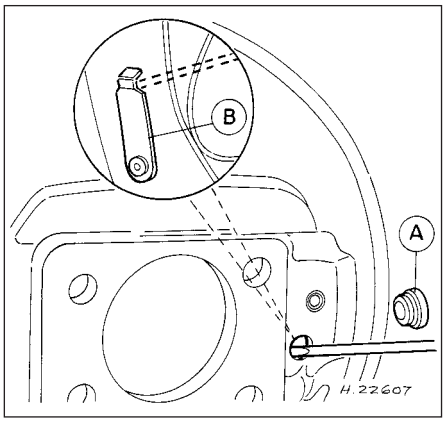
Removal

1 Chock the front wheels then jack up the rear of the vehicle and support it on axle stands. Remove the appropriate rear wheel.

2 Use chalk or paint to mark the relationship of the drum to the hub.

3 With the handbrake firmly applied to prevent drum rotation, unscrew the drum retaining screws **(see illustration)**. Fully release the handbrake cable and withdraw the drum.

4 If the drum will not pull away, first check that the handbrake is fully released. If the drum will still not come away, remove the grommet from the rear of the backplate and, using a small screwdriver, disengage the handbrake lever stop from behind the lever to increase the shoe to drum clearance. If removal still proves troublesome, the brake drum can be drawn off by screwing two bolts into the jacking holes provided **(see illustrations)**.



17.4a Releasing handbrake mechanism stop lever

Remove rubber grommet (A) and use small screwdriver to depress handbrake lever stop (B)

Inspection

5 Working carefully, remove all traces of brake dust from the drum. Avoid inhaling the dust as it is injurious to health.

6 Scrub clean the outside of the drum and check it for obvious signs of wear or damage such as cracks around the road-wheel stud holes. Renew the drum if necessary.

7 Examine carefully the inside of the drum. Light scoring of the friction surface is normal but if heavy scoring is found, the drum must be renewed. It is usual to find a lip on the drum's inboard edge which consists of a mixture of rust and brake dust. This should be scraped away to leave a smooth surface which can be polished with fine (120 to 150 grade) emery paper. If, however, the lip is due to the friction surface being recessed by excessive wear, then the drum must be renewed.

8 If the drum is thought to be excessively worn or oval, its internal diameter must be measured at several points by using an internal micrometer. Take measurements in pairs, the second at right angles to the first, and compare the two to check for signs of ovality. Provided that it does not enlarge the drum to beyond the specified maximum diameter, it may be possible to have the drum refinished by skimming or grinding but if this is not possible, the drums on both sides must be renewed

.

Refitting

9 Refitting is the reverse of the removal procedure, noting the following:

a) On fitting a new brake drum, use a suitable solvent to remove any preservative coating that may have been applied to its interior.

b) Use a clean wire brush to remove all traces of dirt, brake dust and corrosion from the mating surfaces of the drum and the hub flange.

c) Align (if applicable) the marks made on removal.

d) Tighten the drum retaining screws and the roadwheel nuts to their specified torque wrench settings.

17.4b Brake drum can be drawn off hub by using two 8 mm bolts

Refitting

9 Refitting is reversal of the removal procedure noting the following:

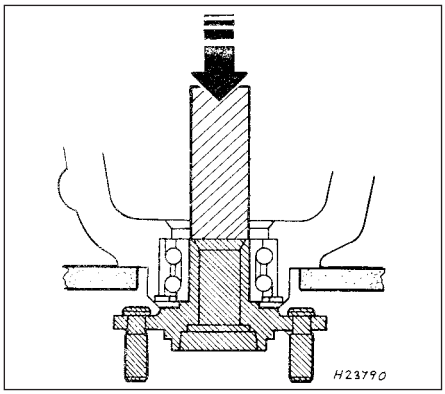
a) Ensure that the lug on the base of the suspension strut correctly engages with the slot in the swivel hub assembly clamp.
b) Tighten all nuts and bolts to the specified torque.
c) Where necessary, refit the brake disc and/or ABS wheel sensor as described in Chapter 9.
d) Use new split pins to secure the track rod and lower suspension arm balljoint retaining nuts in position.
e) When fitting the new driveshaft retaining nut, tighten it to the specified torque then stake it firmly into the groove in the constant velocity joint by using a suitable punch.

3 Front hub bearings - removal and refitting

Note: *The front hub bearing is a sealed, pre-adjusted and pre-lubricated, double-row roller type, and is intended to last the vehicle's entire service life without maintenance or attention. Do not attempt to remove the bearing unless absolutely necessary, as it will probably be damaged during the removal operation. Never overtighten the driveshaft nut beyond the specified torque wrench setting in an attempt to 'adjust' the bearing.*
Note: *A press will be required to dismantle and rebuild the hub assembly. If such a tool is not available, a large bench vice and suitable spacers (such as large sockets) will serve as an adequate substitute. The service tool numbers for the special Rover mandrels are given in the accompanying illustrations. The bearing's inner races are an interference fit on the hub. If the outboard inner race remains on the hub when it is pressed out of the hub carrier, a proprietary knife-edged bearing puller will be required to remove it.*

Removal

1 Remove the swivel hub assembly, then undo the brake disc shield retaining screws and remove the shield from the hub.
2 Press the hub out of the swivel hub using a tubular spacer **(see illustration)**. If the bearing's outboard inner race remains on the hub, remove it using a suitable bearing puller.
3 Extract both circlips from the swivel hub and discard them as they should be renewed whenever disturbed.
4 Press the bearing out of the swivel hub by using a suitable tubular spacer **(see illustration)**.
5 Thoroughly clean the hub and swivel hub, removing all traces of dirt and grease. Polish away any burrs or raised edges which might hinder reassembly. Check both for cracks or any other signs of wear or damage and renew the hub if necessary. The bearing and its circlips must be renewed whenever they are disturbed. A replacement bearing kit is available from Rover dealers which consists of the bearing and both circlips.

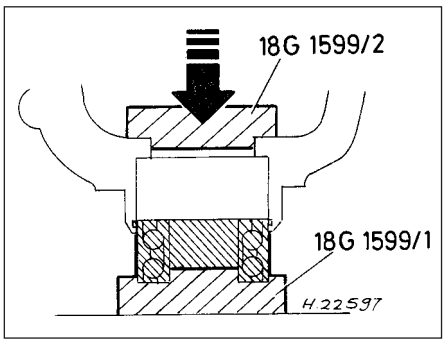


3.2 Pressing out hub from swivel hub

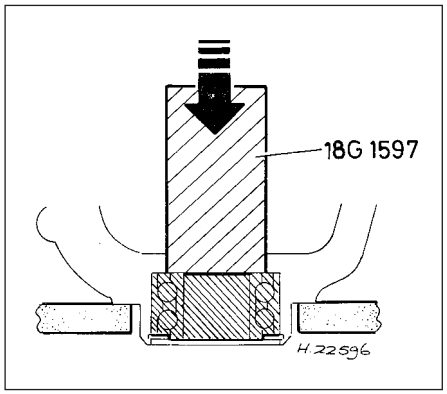
6 Check the condition of the roadwheel studs in the hub flange. If any are sheared off, stretched or have damaged threads, they can be pressed out of the hub providing that its flange is fully supported. On refitting, support the hub flange and press in the new stud until it seats fully.

Refitting

7 On reassembly, check (if possible) that the new bearing is packed with grease and fit the new circlip to the swivel hub outboard groove. Apply a light film of oil to the bearing inner and outer races and to the matching surfaces in the hub and swivel hub to aid fitting of the bearing.
8 Support the swivel hub outboard face and, using a suitable tubular spacer which bears only on the bearing's outer race, press in the new bearing until it seats against the circlip **(see illustration)**. Secure the bearing in position by fitting the second new circlip to the swivel hub's inboard groove.
9 Fully supporting the bearing inner race, press the hub into the bearing and swivel hub until the hub shoulder seats against the bearing's inner race **(see illustration)**. Wipe off any surplus oil or grease.



3.8 Pressing new hub bearing into swivel hub



3.4 Pressing hub bearing out of swivel hub

10 Refit the brake disc shield to the swivel hub and tighten its retaining screws securely.
11 Refit the swivel hub assembly.

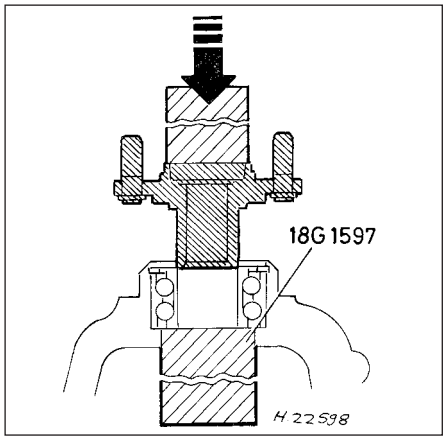
4 Suspension - inspection

Refer to Chapter 1.

5 Front suspension strut - removal and refitting

Removal

1 Chock the rear wheels, firmly apply the handbrake, then jack up the front of the vehicle and support on axle stands. Remove the appropriate roadwheel.
2 Extract the split pin and undo the nut securing the steering gear track rod balljoint to the swivel hub. Release the balljoint shank, using a suitable balljoint separator tool whilst taking care not to damage the balljoint gaiter.
3 Slacken and remove the bolt and washer securing the anti-roll bar connecting link to the lower suspension arm, then undo the two



3.9 Pressing hub into swivel hub - note support for bearing inner race

19.5 Combination switch assembly is retained by two screws (arrowed)

19.7a Remove retaining clips . . .

19.7b . . . and withdraw lower steering column cover

4 Lift the indicator cancelling cam off the steering column and disconnect the wiring connectors from the rear of the steering column combination switch assembly.
5 Undo the two combination switch retaining screws and slide the assembly off the end of the steering column **(see illustration)**.
6 Trace the ignition switch wiring back to its wiring connectors and disconnect them from the main wiring loom.
7 Pull back the driver's footwell carpet and remove the two studs securing the lower column cover to the floor. Remove the two retaining clips from the upper end of the cover and withdraw the cover **(see illustrations)**.
8 Using a hammer and punch, white paint or similar, mark the exact relationship between the steering column shaft and shaft-to-steering gear universal joint, then slacken and remove the pinch-bolt securing the joint to the column shaft.
9 Undo the nut and bolt securing the lower steering column mounting clamp in position and remove the clamp **(see illustration)**. Slacken and remove the two nuts and bolts securing the upper mounting assembly to the vehicle then disengage the column from its mounting studs and universal joint then remove it from the vehicle.

Refitting

10 Before refitting the steering column, closely examine the upper mounting assembly for damage or misalignment.

19.9 Steering column lower mounting clamp components

11 Align the marks made on dismantling and engage the steering column shaft splines with those of the universal joint.
12 Locate the upper mounting bracket assembly over its mounting studs and refit the upper mounting nuts and bolts. Refit the lower mounting clamp and tighten its retaining nut and bolt to the specified torque setting, then tighten the upper mounting nuts and bolts to their specified torque settings.
13 Refit the universal joint to steering column pinch-bolt and tighten it to the specified torque. Refit the lower cover over the steering column and secure it in position with the retaining clips and studs.
14 Refit the combination switch to the column and tighten its screws securely. Refit the indicator cancelling cam to the steering column, ensuring that it is correctly located with the switch assembly, and reconnect the combination and ignition switch wiring connectors **(see illustration)**. Ensure that the wiring is correctly routed and secured by any relevant clips.
15 Offer up the two halves of the steering column shroud and refit the three retaining screws to the lower shroud. Ensure the shroud halves are clipped firmly together, then refit the snap ring to its groove.
16 Refit the lower facia panel, tightening its retaining screws securely, then refit the steering wheel.

19.14 Ensure that indicator cancelling cam is correctly engaged with combination switch assembly

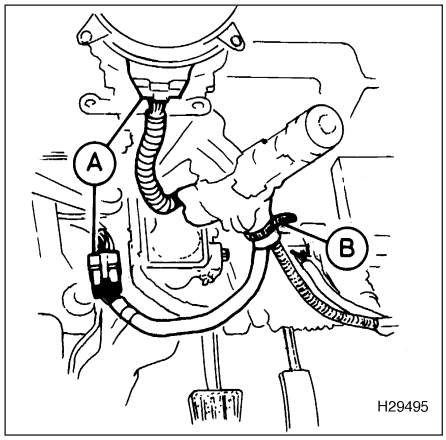
Models with airbag (SRS)

Removal

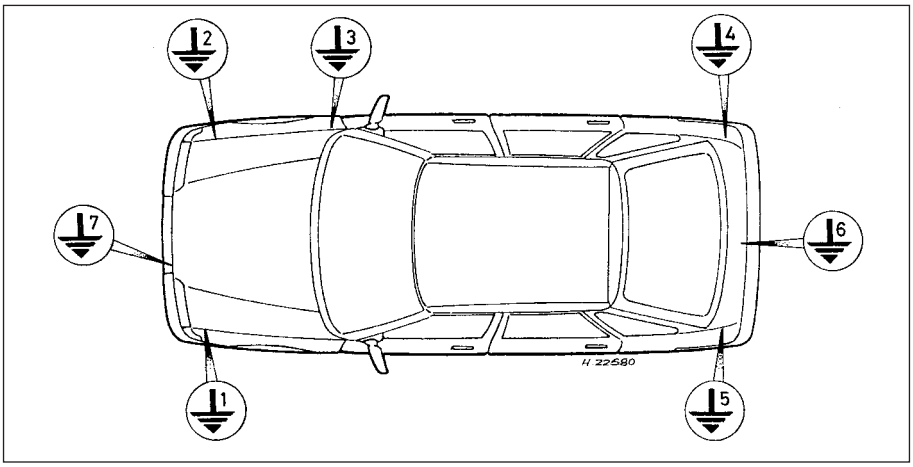
17 Remove the ignition key and wait at least ten minutes to allow the SRS system backup circuit to fully discharge. Disconnect both battery leads, earth lead first, to avoid accidental detonation of the airbag.
18 Set the steering in the straight-ahead position then lock the steering column in its lowest position.
19 Remove the airbag unit, see Chapter 12.
20 Remove the steering wheel.
21 Remove the steering column combination switch, see Chapter 12.
22 Disconnect the combination switch and ignition switch multiplugs, then release the cable tie securing the wiring harness to the steering column **(see illustration)**.
23 Carry out the sequence given in paragraphs 7 to 9 inclusive.

Refitting

24 Carry out the sequence given in paragraphs 10 to 13 inclusive.
25 Reconnect the combination switch and ignition switch multiplugs, then secure the wiring harness to the steering column.
26 Refit the steering column combination switch, see Chapter 12.
27 Refit the steering wheel, then refit the airbag unit, see Chapter 12.



19.22 Disconnect switch multiplugs (A) then release cable tie (B)



2.9 Electrical system earth points

1 Behind left-hand headlamp - E1
2 Behind right-hand headlamp - E2
3 Base of right-hand front door pillar - E3
4 Beneath right-hand rear lamp cluster - E4
5 Beneath left-hand rear lamp cluster - E5
6 Centre of tailgate/boot lid - E6
7 Bonnet lock platform - E7

voltage. Most problems can be traced to a loose connection. Bear in mind that some circuits are only live when the ignition switch is switched to a particular position.

Finding a short circuit

6 One method of finding a short circuit is to remove the fuse and connect a test light or voltmeter to the fuse terminals with all the relevant electrical components switched off. There should be no voltage present in the circuit. Move the wiring from side to side while watching the test light. If the bulb lights up, there is a short to earth somewhere in that area, probably where the insulation has rubbed through. The same test can be performed on each component in the circuit, even a switch.

Earth check

7 Perform an earth test to check whether a component is properly earthed. Disconnect the battery and connect one lead of a self-powered test light, known as a continuity tester, to a known good earth point. Connect the other lead to the wire or earth connection being tested. If the bulb lights up, the earth is good. If not, the earth is faulty.

8 If an earth connection is thought to be faulty, dismantle the connection and clean back to bare metal both the bodyshell and the wire terminal or the component's earth connection mating surface. Be careful to remove all traces of dirt and corrosion, then use a knife to trim away any paint, so that a clean metal-to-metal joint is made. On reassembly, tighten the joint fasteners securely; if a wire terminal is being refitted, use serrated washers between the terminal and the bodyshell to ensure a clean and secure connection. When the connection is remade, prevent the onset of corrosion in the future by applying a coat of petroleum jelly or silicone-based grease or by spraying on a proprietary ignition sealer or a water dispersant lubricant at regular intervals.

9 The vehicle's wiring harness has seven multiple-earth connections, each one being identified in the wiring diagrams by a reference number (E1 to E7). Each of these earth connections serves several circuits and are located are as follows **(see illustration)**:

E1 Behind left-hand headlamp.
E2 Behind right-hand headlamp.
E3 Base of right-hand front door pillar.
E4 Beneath right-hand rear lamp cluster.
E5 Beneath left-hand rear lamp cluster.
E6 Centre of tailgate/boot lid.
E7 Bonnet lock platform.

Continuity check

10 A continuity check is necessary to determine if there are any breaks in a circuit. With the circuit off (ie: no power in the circuit), a self-powered continuity tester can be used to check the circuit. Connect the test leads to both ends of the circuit, or to the positive end and a good earth. If the test light comes on, the circuit is passing current properly. If the light does not come on, there is a break somewhere in the circuit. The same procedure can be used to test a switch, by connecting the continuity tester to the switch terminals. With the switch turned on, the test light should come on.

Finding an open circuit

11 When checking for possible open circuits, it is often difficult to locate them by sight because oxidation or terminal misalignment are hidden by the connectors. Merely moving a connector on a sensor or in the wiring harness may correct the open circuit condition. Remember this when an open circuit is indicated when fault finding in a circuit. Intermittent problems may also be caused by oxidized or loose connections.

General

12 Electrical fault finding is simple if you keep in mind that all electrical circuits are basically electricity flowing from the battery, through the wires, switches, relays, fuses and fusible links to each electrical component (light bulb, motor, etc.) and to earth, from which it is passed back to the battery. Any electrical problem is an interruption in the flow of electricity from the battery.

3 Fuses, fusible links and relays - location and renewal

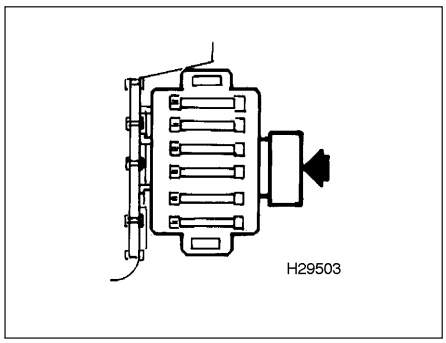
Fuses

1 Most of the fuses are located behind the panel in the right-hand lower facia panel, with a few odd fuses being located in the fusebox on the left-hand side of the engine compartment.

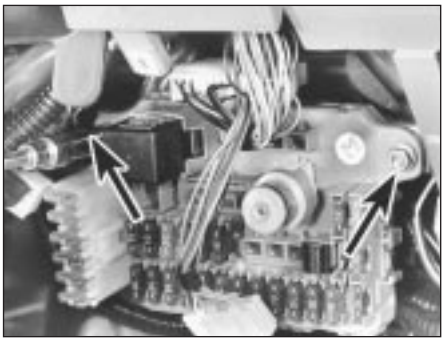
2 Access to the fuses is gained by removing the fusebox lid/cover. Symbols on the reverse of the lid/cover indicate the circuits protected by the fuses and five spare fuses are supplied, together with plastic tweezers to remove and fit them **(see illustration)**. Further details on fuse ratings and circuits protected are given in the Specifications.

3 On vehicles equipped with airbags, the fuse protecting the airbag circuit is located on the side of the main fuse box **(see illustration)**.

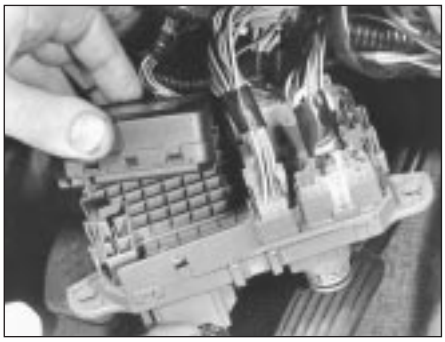
3.2 Remove fuses with plastic tweezers supplied (arrowed)



3.3 Airbag circuit fuse (arrowed) is located on side of main fusebox



14.8 Fusebox retaining nuts (arrowed)



14.9a Release Multi-Function Unit from rear of fusebox . . .

14.9b . . . and disconnect wiring connector

upper wiring block connector(s) can be disconnected **(see illustration)**.

9 Carefully turn the fusebox assembly around and disconnect the block connector from the MFU. Release the MFU from the rear of the fusebox and remove it from the vehicle **(see illustrations)**.

Refitting

10 Refitting is a reversal of the removal procedure. Ensure that all wiring connectors are correctly refitted. On completion, reconnect the battery terminal and check that all electrical circuits function correctly.

15 Supplementary Restraint System (SRS) - operation

1 At vehicle start-up, a warning light located in the steering wheel centre pad will illuminate when the system electrical circuits are activated by turning the ignition switch to position "II" and will stay illuminated for 3 seconds whilst the system performs a self-diagnosis test. If this test is satisfactory, the light will extinguish. If the test is unsatisfactory, the light will remain on or fail to illuminate at all, denoting that the system must be serviced as soon as possible. System operation is as follows:

2 Upon the vehicle suffering a frontal impact over a specified force, a sensor inside the airbag control unit, which is located in the steering wheel centre, activates the system. A sensor (fitted to discriminate between actual impact and driving on rough road surfaces, etc.) is also activated and power is supplied to the airbag ignitor from the battery or a backup circuit, causing the airbag to inflate within 30 milliseconds.

3 As the driver of the vehicle is thrown foward into the inflated airbag it immediately discharges its contents through a vent, thereby providing a progressive deceleration and reducing the risk of injury from contact with the steering wheel, facia or windscreen. The total time taken from the start of airbag inflation to its complete deflation is approximately 0.1 seconds.

16 Supplementary Restraint System (SRS) - component removal and refitting

Warning: Under no circumstances, attempt to diagnose problems with SRS components using standard workshop equipment.

Note: *For safety reasons, owners are strongly advised against attempting to diagnose problems with the SRS using standard workshop equipment. The information in this Section is therefore limited to those components in the SRS which must be removed to gain access to other components on the vehicle. Read carefully the precautions given in Section 1 of this Chapter before commencing work on any part of the system.*

Note: *All SRS system wiring can be identified by its yellow protective covering.*

Airbag unit

Removal

1 Remove the ignition key and wait at least ten minutes to allow the system backup circuit to fully discharge. Disconnect **both** battery leads, earth lead first, to avoid accidental detonation of the airbag.

2 Remove the two airbag unit retaining screws which are accessed from behind the steering wheel **(see illustration)**.

3 Carefully prise the airbag unit away from the steering wheel to gain access to its wiring behind. Do not allow the unit to hang from its wiring.

4 Unplug the wiring connector from the rear of the airbag unit and carefully remove the unit from the vehicle, placing it in safe storage.

Refitting

5 Refit the airbag unit by reversing the removal procedure, noting the following:

a) The cable connector must face uppermost when refitted to the airbag unit.

b) Observe the specified torque wrench setting when tightening the airbag retaining screws (TX30 Torx type) and take care not to cross-thread them.

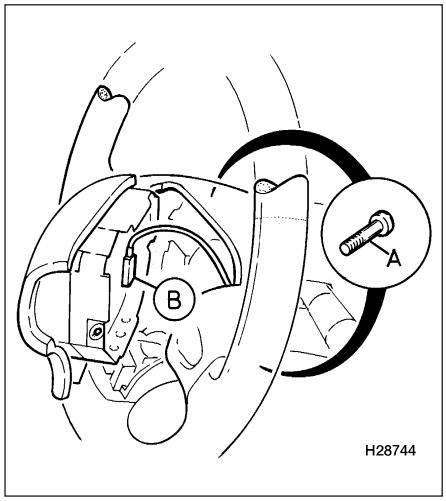
c) With the airbag unit in position, press either side of the steering wheel to allow the ridge on the wheel to engage in the groove of the airbag unit.

d) Reconnect both battery leads, negative lead last, and turn the ignition switch to the "II" position. Check the condition of the system by observing the SRS warning light located in the steering wheel centre pad. The light should stay illuminated for 3 seconds whilst the system performs a self-diagnosis test. If the test is satisfactory, the light will extinguish. If the test is unsatisfactory, the light will remain on or fail to illuminate at all, denoting that the system must be serviced as soon as possible.

Airbag control unit

Removal

6 Remove the airbag unit.



16.2 Remove retaining screws (A) to release airbag unit (B)