






# Chapter 4 Part A: Fuel and exhaust systems – Single-point injection engines

## Contents

Accelerator cable - removal, refitting and adjustment	3	Fuel injection system - testing and adjustment	11
Accelerator pedal - removal and refitting	4	Fuel injection system components - removal and refitting	12
Accelerator cable and linkage check and lubrication	See Chapter 1	Fuel pump - removal and refitting	6
Air cleaner assembly - removal and refitting	2	Fuel system - depressurisation	5
Air cleaner element renewal	See Chapter 1	Fuel tank - removal, inspection and refitting	8
Exhaust manifold - removal and refitting	See Chapter 2A	General information and precautions	1
Exhaust system - general information and component renewal	13	Inlet manifold - removal and refitting	See Chapter 2A
Exhaust system check	See Chapter 1	Underbody fuel/brake line check	See Chapter 1
Fuel filter renewal	See Chapter 1	Underbonnet check for fluid leaks and hose condition	See Chapter 1
Fuel gauge sender unit - removal and refitting	7	Unleaded petrol - general information and usage	9
Fuel injection system - general information	10		

## 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

### General

System type	Indirect single-point injection with microprocessor control
ECU-controlled idle speed:	
Manual transmission models	700 to 800 rpm
Automatic transmission models	650 to 750 rpm
Base idle speed:	
Manual transmission models	625 to 675 rpm
Automatic transmission models	575 to 625 rpm
Idle mixture CO content	2.0 to 3.0%
Throttle potentiometer voltage	315 to 335 mV
Throttle lever lost motion gap	0.5 to 0.9 mm
Fuel octane rating	97 RON leaded or 95 RON unleaded

### Fuel Pump

Type	Nippon Denso, electric
Output pressure	4.1 bar
Regulated pressure	1.2 bar
Delivery rate (at 1.2 bar and 12 volts)	85 litres/hour
Voltage at pump	9.0 to 10.0 volts

### Torque wrench settings

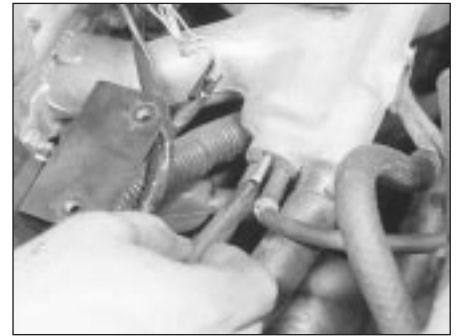
	Nm	lbf ft
Inlet air temperature sensor	7	5
Fuel filter banjo union bolts	50	37
Throttle body to manifold nuts	25	18
Fuel pump banjo union bolt	22	16
Fuel tank drain plug	50	37
Fuel tank strap locknuts	18	13
Inlet manifold heater bolts	10	7
Exhaust front pipe to manifold	30	22
Exhaust section flange nuts	30	22
Exhaust heat shield retaining bolts	25	18



2.3a Lift up the air box . . .



2.3b . . . and disconnect the air temperature sensor multiplug



2.4a Disconnect the vacuum hose at the inlet manifold . . .

## 1 General information and precautions

The fuel system used on Rover 820e and Se models consists of a centrally-mounted fuel tank, electric fuel pump and single-point fuel injection (SPI) system, together with its related electrical and mechanical components. A more detailed description of the SPI system is contained in Section 10.

The exhaust system consists of a front, intermediate and rear section, suspended from the underbody on rubber mountings, and bolted to a cast iron manifold at the front. A ball-and-socket universal joint is incorporated in the front section, to allow for engine and exhaust system movement.

### Precautions



**Warning:** Many of the procedures in this Chapter require the removal of fuel lines and connections, which may result in some fuel spillage. Petrol is extremely flammable, so take extra precautions when you work on any part of the fuel system. Don't smoke, or allow open flames or bare light bulbs, near the work area. Don't work in a garage where a natural gas-type appliance (such as a water heater or clothes dryer) with a pilot light is present. If you spill any fuel on your skin, rinse it off immediately with soap and water. When you perform any kind of work

on the fuel system, wear safety glasses, and have a Class B type fire extinguisher on hand. Before carrying out any operation on the fuel system, refer also 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.

Reference must also be made to Chapter 5, Section 1 for precautionary notes concerning the ignition system and battery disconnection, and to any further safety-related text contained within the appropriate Section, before working on the vehicle.

Certain adjustment points in the fuel system are protected by tamperproof caps, plugs or seals. In some territories, it is an offence to drive a vehicle with broken or missing tamperproof seals. Before disturbing a tamperproof seal, first check that no local or national laws will be broken by doing so, and fit a new tamperproof seal after adjustment is complete, where required by law. Do not break tamperproof seals on any vehicle whilst it is still under warranty.

When working on fuel system components, scrupulous cleanliness must be observed and care must be taken not to introduce any foreign matter into the fuel lines or components. The throttle body in particular is a delicate instrument and care must be taken not to disturb any components unnecessarily. Before attempting work on the throttle body,

ensure that the relevant spares are available; it should be noted that a complete throttle body strip down is unlikely to cure a fault which is not immediately obvious, without introducing new problems. If persistent problems occur, it is recommended that the services of a Rover dealer or fuel injection specialist is sought.

## 2 Air cleaner assembly - removal and refitting



**Note:** Air cleaner element renewal is described in Chapter 1.

### Removal

1 Slacken the hose clip securing the intake trunking to the air cleaner body, and release the HT cable from the support clip.

2 Undo the five upper bolts securing the air box to the injector housing and support bracket.

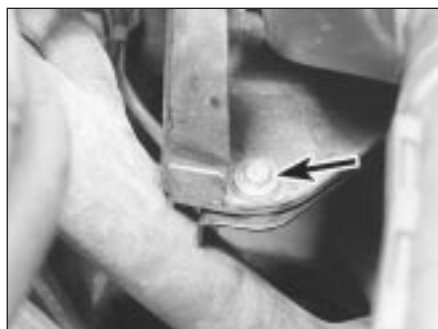
3 Lift up the air box, and disconnect the wiring multiplug at the air temperature sensor, and the vacuum hose at the fuel trap (see illustrations).

4 Disconnect the vacuum hose from the inlet manifold connection, and from the vacuum motor on the air cleaner (see illustrations). Remove the air box and intake trunking assembly.

5 Undo the bolts securing the air cleaner body and the forward air trunking assembly to their support brackets (see illustrations). Lift



2.4b . . . and at the vacuum motor



2.5a Undo the air cleaner body left-hand retaining bolt (arrowed) . . .



2.5b . . . right-hand retaining bolt . . .



2.5c ... and the air cleaner trunking to support bracket bolt (arrowed)



2.7 Side intake to body retaining bolt (arrowed)



3.2 Undo the accelerator cable locknut ...

the body and trunking, disconnect the hot air intake tube, and release the trunking from the connecting duct at the front of the car. Remove the air cleaner body and trunking.

6 If the cold air side intake is to be removed, refer to Chapter 5, and remove the battery.

7 Undo the bolt securing the side intake to the body, and remove the intake and duct (see illustration).

### Refitting

8 Refitting is a reversal of removal, but ensure that all the ducts and trunking are fully engaged before tightening the various retaining bolts.

5 Prise the retaining clip from the top of the accelerator pedal, and disconnect the inner cable.

6 Release the cable from the engine compartment bulkhead and from the support clips, and withdraw the complete cable from the car.

### Refitting and adjustment

7 Refitting is a reversal of removal. Adjust the cable initially by means of the outer cable locknuts, to give a small amount of free play with the throttle closed. On completion, check the base idle speed as described in Section 11.

5 If the accelerator pedal switch is to be removed, prise off the retaining C-clip and remove the switch and washer.

### Refitting

6 Refitting is a reversal of removal.

## 5 Fuel system - depressurisation



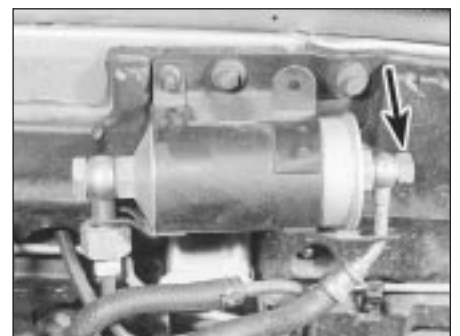
**Warning:** Refer to the precautions contained in Section 1 before proceeding.

1 The fuel system referred to in this Chapter is defined as the fuel tank and tank-mounted fuel pump/fuel gauge sender unit, the fuel filter, the throttle body, and the metal pipes and flexible hoses of the fuel lines between these components. Most of these contain fuel which will be under pressure while the engine is running and/or while the ignition is switched on.

2 The pressure will remain for some time after the ignition has been switched off, and must be relieved before any of these components are disturbed for servicing or repair work.

3 Disconnect the battery negative (earth) lead (refer to Chapter 5, Section 1).

4 Place absorbent rags around the fuel filter outlet union banjo bolt, then slowly unscrew the bolt to release the pressure (see illustration).



5.4 Place absorbent rags around the fuel filter outlet union banjo bolt (arrowed), then slowly unscrew the bolt to release the system pressure

## 3 Accelerator cable - removal, refitting and adjustment



### Removal

1 Refer to Section 2 and remove the air cleaner air box.

2 Unscrew the accelerator cable locknut nearest to the cable end, pull the outer cable upwards, and slide the inner cable out of the slot in the support bracket (see illustration).

3 Release the inner cable end from the slot in the throttle cam (see illustration).

4 From inside the car, release the turnbuckles and lift out the trim panel over the clutch, brake and accelerator pedals.



3.3 ... and release the cable end (arrowed) from the throttle cam

## 4 Accelerator pedal - removal and refitting



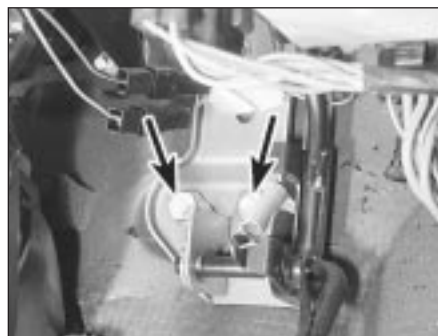
### Removal

1 From inside the car, release the turnbuckles and lift out the trim panel over the clutch, brake and accelerator pedals.

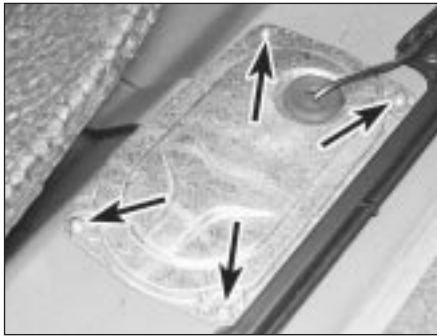
2 Prise the retaining clip from the top of the accelerator pedal, and disconnect the inner cable from the pedal arm.

3 Undo the bolts securing the pedal bracket to the bulkhead, and withdraw the bracket and pedal assembly (see illustration).

4 Disconnect the switch wiring and remove the bracket and pedal.



4.3 Accelerator pedal bracket retaining bolts (arrowed)



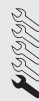
6.8a Undo the four screws (arrowed) . . .



6.8b . . . and lift off the fuel pump access panel

5 Once the system pressure has been completely relieved, tighten the banjo bolt and dispose of the rags safely.

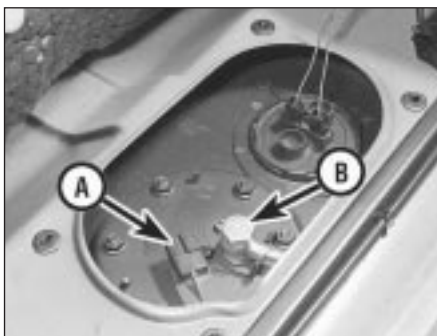
### 6 Fuel pump - removal and refitting



**Warning:** Refer to the precautions contained in Section 1 before proceeding.

#### Removal

- 1 Disconnect the battery negative (earth) lead (refer to Chapter 5, Section 1).
- 2 Release the fuel system pressure as described in Section 5.
- 3 Remove the floor carpet from the luggage compartment.
- 4 Refer to Chapter 11 and remove the rear seats.
- 5 Release the eight studs and remove the seat squab backing from the body.
- 6 Release the two studs and remove the luggage compartment backboard from the body.
- 7 Remove the cover board over the spare wheel, and remove the tool kit.
- 8 Undo the four screws and lift off the pump access panel (**see illustrations**). Move the panel to one side.
- 9 Disconnect the pump wiring multiplug, then unscrew the fuel hose banjo union bolt and recover the copper washers (**see illustration**).



6.9 Fuel pump wiring multiplug connection (A) and fuel hose banjo union (B)

10 Slacken the clip and disconnect the fuel return hose.

11 Undo the pump retaining nuts, and withdraw the pump from the tank. Remove the seal from the pump flange.

#### Refitting

12 Refitting is a reversal of removal, but renew the flange seal if it shows any sign of deterioration.

### 7 Fuel gauge sender unit - removal and refitting



**Warning:** Refer to the precautions contained in Section 1 before proceeding.

#### Removal

- 1 Follow the procedure given in Section 6, paragraphs 1 to 8 inclusive, with the exception of paragraph 2.
- 2 Disconnect the two leads at the sender unit.
- 3 Engage a screwdriver, flat bar or other tool with the lugs of the locking ring, and turn the ring anti-clockwise to release it.
- 4 Withdraw the locking ring, seal and sender unit.

#### Refitting

5 Refitting is a reversal of removal, but renew the seal if it shows any sign of deterioration.



8.12 Fuel tank retaining strap and locknut

### 8 Fuel tank - removal, inspection and refitting



**Warning:** Refer to the precautions contained in Section 1 before proceeding.

#### Removal

- 1 Follow the procedure given in Section 6, paragraphs 1 to 8 inclusive.
- 2 Disconnect the fuel pump wiring multiplug, and the two leads at the fuel gauge sender unit.
- 3 Remove the fuel tank filler cap.
- 4 With sealed containers handy, undo the drain plug at the base of the tank, and drain the fuel into the containers. Recover the drain plug sealing washer. When all the fuel has drained, refit the plug, using a new sealing washer if necessary.
- 5 Chock the front wheels, remove the rear wheel trim and slacken the wheel nuts. Jack up the rear of the car and support it on axle stands. Remove the left-hand rear roadwheel.
- 6 Slacken the retaining clip and disconnect the filler hose from the filler neck. Move the hose aside.
- 7 Slacken the retaining clips and disconnect the five breather hoses from the breather pipes.
- 8 Refer to Section 13 and remove the exhaust system rear and intermediate sections, together with the rear heat shield.
- 9 Slacken the retaining clip and disconnect the fuel return hose from the pipe on the side of the tank. Plug the disconnected pipe and hose.
- 10 Undo the union connector and disconnect the fuel feed hose from the pipe. Plug the disconnected pipe and hose.
- 11 Support the tank on a jack with interposed block of wood.
- 12 Slacken the two tank retaining strap locknuts, release the hook bolts from the body slots, and move the straps clear (**see illustration**).
- 13 Lower the tank and remove it from under the car.
- 14 If the tank is contaminated with sediment or water, remove the sender unit as described in Section 7, and swirl the tank out with clean fuel. If the tank is damaged, or leaks, it should be repaired by a specialist, or renewed. **Do not** under any circumstances solder or weld the tank.

#### Refitting

15 Refitting is a reversal of removal.

### 9 Unleaded petrol - general information and usage

**Note:** The information given in this Chapter is correct at the time of writing, and applies only to petrols currently available in the UK. If updated information is thought to be required, check with a Rover dealer. If travelling abroad,



consult one of the motoring organisations (or a similar authority) for advice on the petrols available and their suitability for your vehicle.

1 The fuel recommended by Rover is given in the Specifications at the beginning of this Chapter, followed by the equivalent petrol currently on sale in the UK.

2 RON and MON are different testing standards.; RON stands for Research Octane Number (also written as RM), while MON stands for Motor Octane Number (also written as MN).

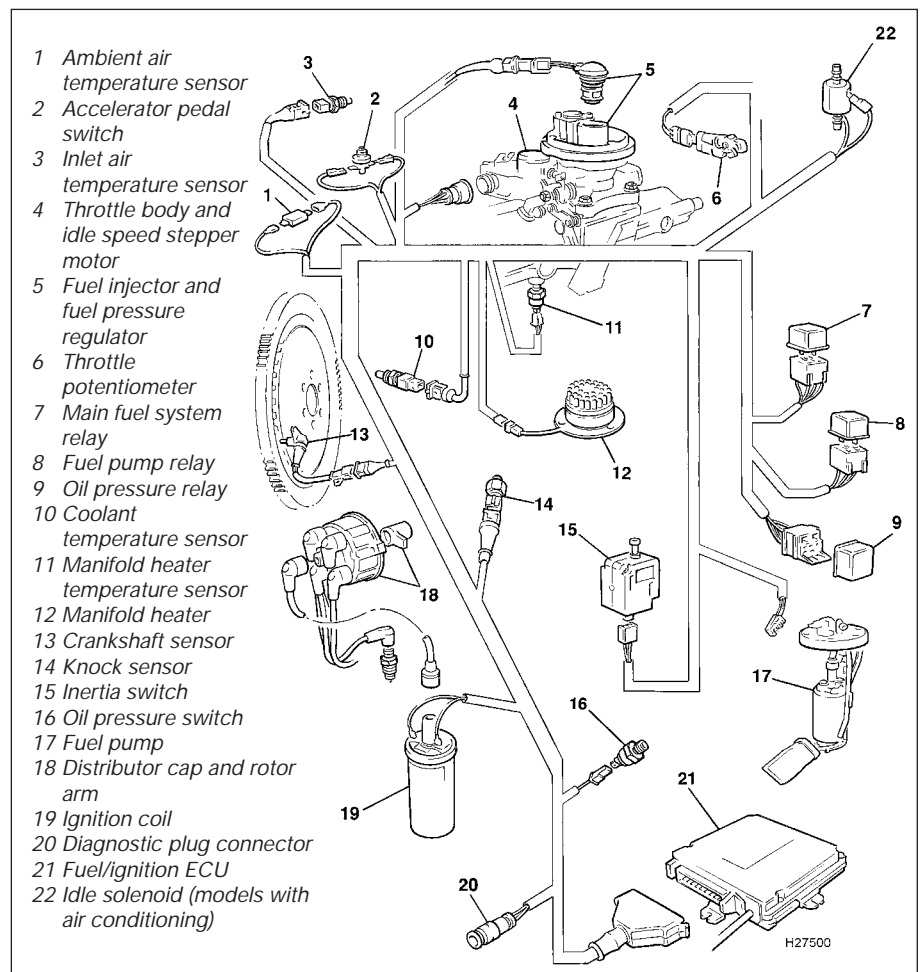
3 All non-catalyst equipped 4-cylinder engine models covered by this manual are designed to run on leaded or unleaded petrols without modification. Only unleaded petrol may be used in those models fitted with a catalytic converter.

## 10 Fuel injection system - general information

The single-point fuel injection (SPI) system is a microprocessor-controlled fuel management system, designed to overcome the limitations associated with conventional carburettor induction (see illustration). This is achieved by continuously monitoring the engine using various sensors, whose data is input to the fuel system Electronic Control Unit (ECU). Based on this information, the ECU program and memory then determine the exact amount of fuel necessary, which is injected into the throttle body by a single injector, for all actual and anticipated driving conditions.

The main components of the system and their individual operation is as follows.

**Fuel/ignition ECU:** The fuel ECU is a microprocessor which controls the injector opening time, and therefore the amount of fuel supplied. Contained in the ECU memory is a program from which a pulse is derived, the length of which determines the fuel injector opening duration. Information received from the various engine sensors will cause the ECU to alter the fuel requirements, by changing the pulse length. Airflow measurement is based on the speed/density method, in which the inlet air temperature and inlet manifold pressure are measured under the assumption that the engine is a calibrated vacuum pump, with its characteristics stored in the ECU memory. The air/fuel ratio requirements for all engine speeds and loads are also stored in the ECU. This information on the engine's basic fuel requirements is constantly amended, according to the information received from the various sensors. In addition to this, the engine idle speed is also controlled by the ECU, which uses a stepper motor to open or close the throttle as required. Two separate programs control the ECU functions. One program operates under cruise conditions, and the other at idle. The idle program can be altered completely using



10.1 Main components of the single-point fuel injection system

electronic test equipment, or partially by using the procedures described in Section 11. Any changes to this program do not affect the cruise program, which cannot be accessed. Whenever the battery is disconnected, the idle program is lost, and the ECU reverts back to a set of nominal parameters until the information is reintroduced into the memory. This can only be done using the manufacturer's test equipment, but the performance of the engine at idle is only marginally affected in this condition. As well as control of the fuel injection system, the ECU is also used to control the ignition timing.

**Fuel injector:** The single fuel injector is a solenoid-operated ball valve, containing a fine gauze filter and a nozzle with six spray holes for complete fuel atomization. When a pulse is received from the ECU, the injector sprays fuel into the air stream through the throttle body.

**Throttle potentiometer:** The potentiometer is a variable resistor, attached to the throttle shaft on the throttle body. The unit is supplied with a constant input voltage, and as the resistance of the potentiometer varies with throttle shaft movement, the output voltage is proportionally affected. This allows the ECU

to determine throttle valve position, and rate of change.

**Idle speed stepper motor:** This is a small electric motor, having four control windings to enable it to rotate in either direction. Under a signal from the ECU, the stepper motor will rotate in whichever direction is necessary, to open or close the throttle by means of pushrod acting directly against the base idle speed adjusting screw.

**Inlet air temperature sensor:** Located in the airflow through the air cleaner air box, the sensor is a thermistor (resistive device whose resistance quickly decreases with temperature increase).

**Coolant temperature sensor:** This resistive device is screwed into the thermostat housing, where its element is in direct contact with the engine coolant. Changes in coolant temperature are detected by the ECU as a change in the sensor resistance.

**Ambient air temperature sensor:** The sensor is located behind the left-hand headlight, and responds to changes in ambient temperature with a corresponding change in resistance.

**Manifold heater:** A manifold heater, to improve atomization of the fuel/air mixture

during warm-up conditions, is fitted to the underside of the inlet manifold. The heater is of the positive temperature coefficient (PTC) type, in which the current consumption of the heating element is high while it heats up, but is greatly reduced at operating temperature. The unit is controlled by a temperature sensor, screwed into the coolant jacket of the inlet manifold. When coolant temperature reaches 50°C, the sensor switches the manifold heater off. To avoid a heavy drain on the battery, current for the heater is supplied via the oil pressure switch relay, and consequently only switches on after the engine has started.

**Fuel pressure regulator:** The fuel pressure regulator is attached to the throttle body, and maintains fuel pressure at a constant 1.0 bar. When the pressure exceeds this value, the regulator returns excess fuel to the tank via the fuel return line.

**Inertia switch:** An inertia switch is fitted in the ignition switch feed to the fuel pump relay, and is situated inside the car behind the left-hand side of the radio cassette player. In the event of sudden impact, the switch trips out, thus switching off the fuel pump relay. The switch can be reset by pressing down the reset button on the switch body.

**Relays:** The main fuel system relay is energised when the ignition is switched on, and supplies current to the ignition coil and the fuel system ECU. The relay remains energised for approximately five seconds after the ignition is switched off, to enable the stepper motor to cycle to the correct position for engine starting. The fuel pump relay is energised when the oil pressure relay is de-energised by the low oil pressure switch. When the engine is cranking, the fuel pump is fed from the starter solenoid via the de-energised fuel pump relay.

**Fuel pump:** The fuel pump is a self-priming centrifugal unit, located in the fuel tank, and totally submerged in the fuel. Fuel is supplied under pressure from the pump, through a non-return valve and in-line filter, to the fuel pressure regulator, and then to the fuel injector. The high capacity output of the pump is reduced by a resistive wire in the harness which reduces the supply voltage.

**Accelerator pedal switch:** When the

accelerator pedal is at rest, the pedal switch is closed, and a signal is sent to the ECU indicating that the engine is idling. On receipt of this information, the ECU selects the idle program from its memory, and automatic idle speed control via the stepper motor is implemented.

### 11 Fuel injection system - testing and adjustment



#### Testing

**1** If a fault appears in the fuel injection system, first ensure that all the system wiring connectors are securely connected and free of corrosion. Then ensure that the fault is not due to poor maintenance; ie, check that the air cleaner filter element is clean, the spark plugs are in good condition and correctly gapped, the cylinder compression pressures are correct, and that the engine breather hoses are clear and undamaged, referring to the relevant Sections of this Chapter, and to Chapters 1 and 2 for further information.

**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 on Rover dedicated test equipment. This equipment 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 an element of risk of damaging the ECU.

#### Adjustment

##### Engine tuning procedure

**3** Before making any changes to the settings of the fuel injection system, ensure that the spark plug gaps are correctly set, the air cleaner element is clean, there are no leaks in the exhaust system, and the ignition system is operating correctly. Ensure that all breather and vacuum hoses are connected, and that none are perished or kinked.

**4** Temperature effects, and engine and transmission oil drag, can adversely influence the base idle speed setting, and it is important that the following warm-up procedure is adopted before attempting any adjustments.

**5** Drive the car on the road for approximately two to four miles, dependent on summer or winter conditions, in a normal manner, without excessive load, engine speed or road speed.

**6** Return the car to the working area, switch off and connect a tachometer, following the equipment manufacturer's instructions.

**7** Start the engine again, and run it at 2000 rpm for ten seconds to stabilise the mixture. The adjustment procedure described in the following paragraphs can now commence. If during the procedure the cooling fan operates, or if adjustment is not completed within two minutes, accelerate the engine to 2000 rpm again, by means of the throttle linkage (not the accelerator pedal) and hold this speed for a further ten seconds. Repeat this every two minutes until the adjustments are completed.

#### Base idle speed and mixture adjustment

**8** The function of the fuel injection system is such that the base idle speed and idle mixture settings are controlled by the ECU, and of these two, only the base idle speed can be adjusted without the use of the manufacturer's test equipment. Should poor idle quality be experienced, the base idle speed should be checked, and if necessary adjusted, using the following procedure. The idle mixture setting will not normally require attention unless the battery is disconnected, in which case the settings in the ECU memory will be lost. If the battery is disconnected for any reason, the ECU can be recalibrated using the procedure described in paragraphs 21 to 28 as a temporary measure.

**9** Refer to the engine tuning procedure above before starting.

**10** Switch off the engine, and ensure also that all electrical circuits are switched off throughout the procedure.

**11** Undo the five bolts and lift off the air cleaner box. Place the air box alongside the engine, without disconnecting any of the hoses or ducts.

**12** Operate the throttle by hand, and check that it opens fully and returns to rest against the stepper motor pushrod.

**13** Start the engine and using the throttle linkage, not the accelerator pedal, increase the engine speed to 1200 rpm, and hold it at this speed. Check that the stepper motor pushrod has retracted fully, then disconnect the stepper motor multiplug (the round plug on the side of the throttle body below the accelerator cable).

**14** Release the throttle and allow the engine to stabilise at idle speed.

**15** Check the engine base idle speed on the tachometer, and compare the reading with the figure given in the Specifications. If adjustment is required, slacken the adjusting screw locknut and turn the adjusting screw as necessary to obtain the correct setting (see illustrations). Tighten the locknut when the speed is correct.



11.15a Slacken the base idle speed adjusting screw locknut . . .



11.15b . . . and turn the adjusting screw (arrowed) to obtain the correct setting



11.16a Insert a feeler gauge between the throttle lever and peg . . .

16 Check the lost motion gap by inserting a feeler gauge of the specified size between the forked end of the throttle lever and the peg on the linkage. If the gap requires adjustment, slacken the accelerator cable locknuts and reposition the outer cable until the correct setting is achieved (**see illustrations**). Tighten the locknuts when the gap is correct.

17 Reconnect the stepper motor multiplug.

18 Switch off the ignition, wait three seconds and switch the ignition on once more. After a further three seconds, switch off the ignition again. The stepper motor will now be in the correct position for the next engine start.

19 On cars equipped with automatic transmission, refer to Chapter 7, Part B and check the kickdown cable adjustment.

20 Refit the air cleaner air box and disconnect the tachometer on completion.

### Electronic control unit calibration

21 As previously stated, whenever the battery is disconnected, the idle mixture setting stored in the ECU memory will be lost. On reconnection of the battery, the following procedure may be used to recalibrate the unit temporarily, until such time as the car can be taken to a dealer for accurate setting on Rover dedicated test equipment.

22 Run the engine with all electrical circuits switched off, until the engine cooling fan operates then stops.

23 Switch off the engine immediately the cooling fan stops.

24 Switch the ignition on to position two of the key.



11.16b . . . and adjust the lost motion gap at the accelerator cable

25 Depress the accelerator pedal through at least half its travel, then release it, five times.

26 Wait until the high engine temperature warning light starts to flash.

27 As soon as the high engine temperature warning light stops flashing, start the engine **without depressing the accelerator pedal**, and allow it to idle. If the accelerator pedal is depressed, or if an electrical unit is switched on, the calibration will cease. (This also applies to the interior lights operated by the door pillar switches, so keep the doors closed).

28 Wait for two to three minutes until the warning light flashes again, indicating that calibration is complete.

## 12 Fuel injection system components - removal and refitting



**Note:** Refer to the precautions contained in Section 1 before proceeding.

### Thermac switch

#### Removal

1 Refer to Section 2 and remove the air cleaner air box.

2 Disconnect the two vacuum hoses at the thermac switch on the base of the air box (**see illustration**).

3 Remove the air box intake trunking for access to the switch.

4 Carefully prise off the switch retaining clip, and remove the switch from inside the air box.

### Refitting

5 Refitting is a reversal of removal, but position the unit so that the large diameter pipe is towards the air temperature sensor. Connect the vacuum hose from the manifold to the pipe with the small diameter hole, and the vacuum hose from the air cleaner vacuum motor to the pipe with the large diameter hole.

### Inlet air temperature sensor

#### Removal

6 Refer to Section 2 and remove the air cleaner air box.

7 Unscrew the sensor from the adaptor on the base of the air box. If the adaptor unscrews with the sensor, unscrew the adaptor and refit it to the air box.

### Refitting

8 Refit the sensor to the adaptor, and refit the air box.

### Throttle potentiometer

#### Removal

9 Refer to Section 2 and remove the air cleaner air box.

10 Disconnect the multiplug from the side of the potentiometer body.

11 Using a dab of paint, mark the position of the throttle potentiometer in relation to the mounting adaptor.

12 Undo the two screws, remove the potentiometer, and lift off the adaptor (**see illustration**).

### Refitting

13 Refitting is a reversal of removal. Ensure that the potentiometer lever engages to the right of the throttle lever, and align the previously-made mark before tightening the retaining screws. Have the potentiometer position adjusted accurately by a Rover dealer on completion.

### Injector housing

#### Removal

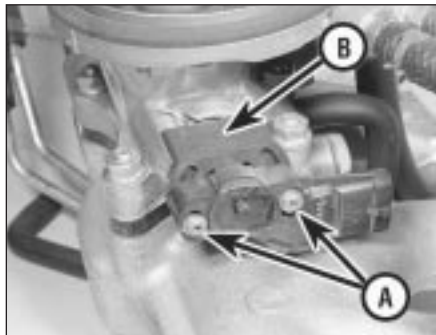
14 Relieve the fuel system pressure as described in Section 5.

15 Refer to Section 2 and remove the air cleaner air box.

16 Using pliers, release the two fuel hose retaining clips at the injector housing, and disconnect the two hoses (**see illustration**). Plug the hoses after removal.



12.2 Thermac switch vacuum hoses (arrowed)

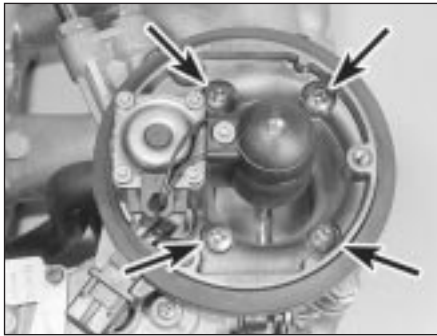


12.12 Throttle potentiometer retaining screws (A) and adaptor (B)

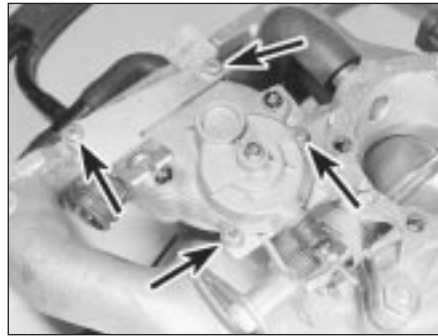


12.16 Release the two fuel hose retaining clips at the injector housing, and disconnect the two hoses

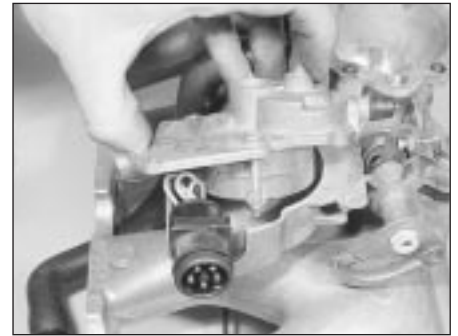




12.18 Injector housing retaining screws (arrowed)



12.28 Undo the four stepper motor retaining screws (arrowed) . . .



12.30 . . . and lift off the stepper motor

17 Disconnect the injector wiring multiplug.  
18 Undo the four screws securing the injector housing to the throttle body, and lift off the housing (see illustration). The housing may be initially tight, due to the two locating dowels. Recover the gasket from the throttle body.  
19 This is the limit of dismantling that can be undertaken on the injector housing assembly. Should it be necessary to renew the fuel injector or fuel pressure regulator, a complete injector housing assembly must be obtained.  
20 Clean the mating faces of the injector housing and throttle body, and remove all the old locking compound from the threads of the retaining screws. Obtain a new gasket if the original shows any signs of deterioration.

#### Refitting

21 Place the gasket in position on the throttle body, and locate the injector housing over the gasket.  
22 Apply a thread-locking compound to the four retaining screws, then fit and tighten the screws securely.  
23 Reconnect the injector wiring multiplug.  
24 Reconnect the two fuel hoses, then locate the retaining clips 3.0 mm from the hose ends.  
25 Refit the air cleaner air box, then adjust the engine base idle speed as described in Chapter 1.

#### Stepper motor unit

##### Removal

26 Remove the injector housing as previously described.  
27 Disconnect the wiring multiplug from the side of the stepper motor.  
28 Undo the four outermost screws that secure the stepper motor to the throttle body (see illustration). Do not remove the two screws near the centre of the unit.  
29 Lift off the accelerator cable support bracket, with cable still attached, and place it to one side.  
30 Carefully lift off the stepper motor unit and, where fitted, recover the gasket (see illustration). Note that the gasket was only fitted to early models, and if present, discard it, and do not fit another on reassembly.

31 Clean the components with a clean cloth, and remove all the old locking compound from the threads of the retaining screws.

#### Refitting

32 Refitting is a reversal of removal, but use a thread-locking compound on the retaining screw threads.

#### Throttle body

##### Removal

33 Remove the injector housing as previously described.  
34 Disconnect the wiring multiplugs to the stepper motor and throttle potentiometer.  
35 Disconnect the two breather hoses on the side of the throttle body (see illustration).  
36 Slacken the accelerator cable locknuts, open the throttle fully and slip the cable end out of the throttle cam. Unscrew the lower cable locknut fully, and remove the accelerator cable from the support bracket.  
37 On automatic transmission models, disconnect the kickdown cable, using the same procedure as for the accelerator cable.  
38 Undo the four nuts securing the throttle body to the manifold.  
39 Lift off the throttle body, and recover the manifold spacer, with gaskets.  
40 Clean the mating faces on the manifold and throttle body, and renew the gaskets on the spacer if they show any sign of deterioration. If the gaskets are being renewed, attach them to the spacer using non-drying jointing compound.



12.35 Breather hose attachments at the throttle body

#### Refitting

41 Place the spacer with gaskets over the manifold studs, then place the throttle body in position. Secure the throttle body with the four nuts tightened securely.  
42 Reconnect the breather hoses and the wiring multiplugs.  
43 Refit the accelerator cable and adjust it, by means of the locknuts, to give a small amount of free play in the throttle-closed position.  
44 On automatic transmission models, refit and adjust the kickdown cable as described in Chapter 7, Part B.  
45 Refit the injector housing as described previously.

#### Electronic control unit (ECU)

##### Removal

46 Disconnect the battery negative (earth) lead (refer to Chapter 5, Section 1).  
47 Disconnect the wiring multiplug from the ECU, which is located on the left-hand side of the engine compartment behind the battery. To do this, press the retaining tab upwards, release the bottom of the multiplug, then disengage the top lug (see illustration).  
48 Disconnect the vacuum supply hose.  
49 Undo the two retaining screws, disengage the locating lug and remove the unit from its mounting bracket.

#### Refitting

50 Refitting is a reversal of removal.



12.47 Disconnect the ECU wiring multiplug



## Resonator unit

### Removal

- 51 Apply the handbrake, jack up the front of the car and support it on axle stands.
- 52 Undo the two screws and one bolt securing the access panel to the underside of the front wheelarch on the left-hand side.
- 53 Disengage the access panel from the front spoiler, and remove it from under the car.
- 54 Undo the two bolts and withdraw the resonator from under the front wheelarch.
- 55 Remove the spacers and rubber mountings from the resonator.

### Refitting

- 56 Refitting is a reversal of removal.

## Inertia switch

### Removal

- 57 From inside the car, remove the stud from the centre console side cover on the left-hand side, and remove the cover.
- 58 Undo the two screws securing the inertia switch to the mounting plate, disconnect the wiring multiplug and remove the switch.
- 59 Check the operation of the switch by striking the forward-facing side hard against the palm of your hand. The setting button should trip out when this is done. If not, renew the switch.

### Refitting

- 60 Refitting is a reversal of removal. Press the button down to reset the switch after installation.

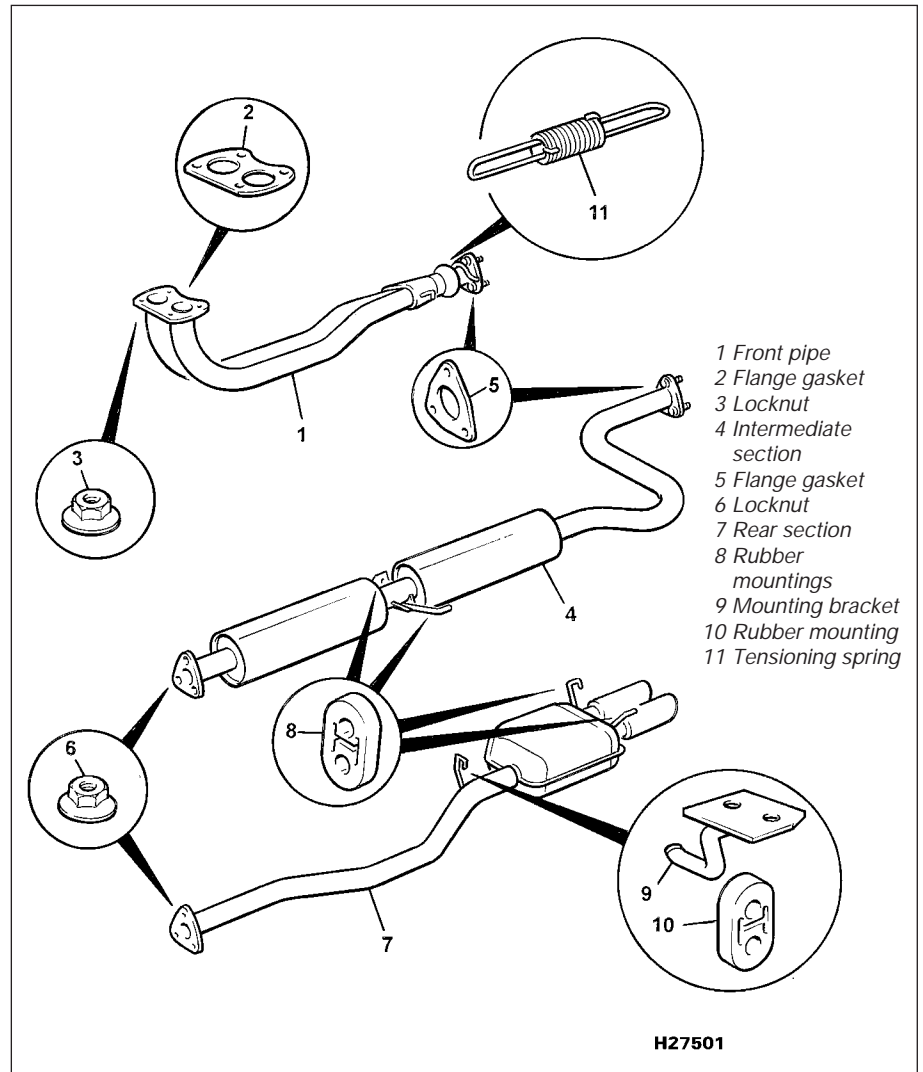
## Manifold heater

### Removal

- 61 Disconnect the battery negative (earth) lead (refer to Chapter 5, Section 1).
- 62 Refer to Section 2 and remove the air cleaner air box.
- 63 Relieve the fuel system pressure as described in Section 5.
- 64 Release the clips and disconnect the two fuel hoses at the injector housing.
- 65 Disconnect the manifold heater wiring connector.
- 66 Undo the two bolts securing the fuel pipe clips and the heater to the manifold, and move the pipes aside.
- 67 Undo the remaining heater retaining bolt.
- 68 Open the throttle fully, and remove the heater by pushing down with a long screwdriver through the throttle aperture.
- 69 Remove the O-ring and gasket from the heater.
- 70 Clean the mating faces of the heater and manifold, and renew the gasket and O-ring if they show any sign of deterioration.

### Refitting

- 71 Refitting is a reversal of removal.



13.1 Exhaust system components

## 13 Exhaust system - general information and component renewal



**Warning:** Inspection and repair of exhaust system components should be done only after enough time has elapsed after driving the vehicle to allow the system components to cool completely. Also, when working under the vehicle, make sure it is securely supported on axle stands.

### General information

- 1 The exhaust system consists of a front, intermediate and rear section, suspended from the underbody on rubber mountings, and bolted to a cast iron manifold at the front. A ball-and-socket universal joint is incorporated in the front section, to allow for engine

and exhaust system movement (see illustration).

2 The exhaust system should be examined for leaks, damage and security at regular intervals (see Chapter 1). To do this, apply the handbrake, and allow the engine to idle in a well-ventilated area. Lie down on each side of the car in turn, and check the full length of the system for leaks, while an assistant temporarily places a wad of cloth over the end of the tailpipe. If a leak is evident, stop the engine and use a proprietary repair kit to seal it. If the leak is excessive, or damage is evident, renew the section. Check the rubber mountings for deterioration, and renew them if necessary.

### Component renewal

#### Removal

- 3 To renew the system components, raise the vehicle by means of axle stands or ramps to provide adequate working clearance underneath.

## 4A•10 Fuel and exhaust systems - single-point injection engines

---

**4** To remove the rear section, undo the three nuts securing the rear section to the intermediate section at the flange joint, and separate the joint. Recover the flange gasket. Disengage the rubber mountings at the side and rear, and remove the section from under the car.

**5** To remove the intermediate section, undo the nuts securing the intermediate section to the front and rear sections at the flange joints

and separate the joints. Recover the flange gaskets. Disengage the side rubber mountings and remove the section from under the car.

**6** To remove the front section, undo the nuts securing the front section to the manifold and intermediate section, separate the flange joints and remove the section from under the car. Recover the flange gaskets.

**7** If necessary, the front and rear heat shields

can be removed after removing the relevant exhaust section, then undoing the heat shield retaining bolts.

### Refitting

**8** Refitting is a reversal of removal, but use new gaskets if the originals show any sign of deterioration. Tighten the flange retaining nuts to the specified torque.