Chapter 4 Part B:
Fuel and exhaust systems - fuel injection

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 

4B

Specifications

General

Fuel tank capacity (all models)	60.0 litres (13.1 gallons)
Fuel octane rating:	
Leaded	97 RON (4-star)
Unleaded	95 RON (Premium)

Models fitted with a catalytic converter must be operated on unleaded fuel at all times.* **Do not *use leaded fuel in such models, as the catalyst will be destroyed:*

System control pressure	2.5 bar

System type:

2.0 litre SOHC models	Bosch L-Jetronic
2.0 litre DOHC models	Multi-point fuel injection system, controlled by EEC IV engine management system
1.6 and 1.8 litre (R6A type) CVH models	Central fuel injection (CFI) controlled by EEC IV engine management system

Idle adjustments

All models except 2.0 litre DOHC

Idle speed (dependent on idle speed adjustment wire):	
Manual gearbox	875 rpm
Automatic transmission	800 rpm
Idle mixture (CO content)	0.5 to 1.0%

2.0 litre DOHC

Idle speed (not adjustable)	875 + 50 rpm
Idle mixture (CO content) - models without catalytic converter	1.0 to 1.5%

Torque wrench settings	Nm	lbf ft
2.0 litre SOHC models		
Refer to Chapter 4, Part A Specifications for items not listed here		
Fuel pressure regulator fuel feed union nut	15 to 20	11 to 15
Fuel pressure regulator securing nut	20 to 25	15 to 18
Fuel rail securing bolts	8 to 10	6 to 7
Idle speed control valve nuts	8 to 10	6 to 7
2.0 litre DOHC models		
Inlet manifold nuts and bolts	20 to 24	15 to 18
Exhaust manifold nuts	21 to 25	15 to 18
Exhaust gas oxygen sensor	50 to 70	37 to 52
Throttle body bolts	9 to 11	7 to 8
Fuel rail bolts	21 to 26	15 to 19
Idle speed control valve bolts	9 to 11	7 to 8
Fuel pressure regulator bolts	9 to 12	7 to 9
Fuel filter unions	14 to 20	10 to 15
1.6 and 1.8 litre (R6A type) CVH models		
Inlet manifold nuts and bolts	16 to 20	12 to 15
Exhaust manifold nuts:		
1.6 litre	14 to 17	10 to 13
1.8 litre	21 to 27	15 to 20
Exhaust downpipe-to-manifold nuts	35 to 40	26 to 30
CFI unit bolts	9 to 11	7 to 8
Exhaust gas oxygen sensor	50 to 70	37 to 52
EGR valve	20 to 30	15 to 22
Fuel filter unions	14 to 20	10 to 15
Pulse-air tube unions	29 to 35	21 to 26

1 General information and precautions

General information

2.0 litre SOHC models

The fuel injection system fitted to these models is of the Bosch L-Jetronic type. The system is under the overall control of an EEC IV engine management system which also controls the ignition timing.

Fuel is supplied from the rear-mounted fuel tank by an electric fuel pump mounted next to the tank, via a pressure regulator, to the fuel rail. The fuel rail acts as a reservoir for the four fuel injectors, which inject fuel into the cylinder inlet tracts, upstream of the inlet valves. The fuel injectors receive an electrical pulse once per crankshaft revolution, which operates all four injectors simultaneously. The duration of the electrical pulse determines the quantity of fuel injected, and pulse duration is computed by the EEC IV module on the basis of information received from the various sensors.

Inducted air passes from the air cleaner through a vane type airflow meter before passing to the cylinder inlet tracts via the throttle valve. A flap in the vane airflow meter is deflected in proportion to the airflow; this deflection is converted into an electrical signal and passed to the EEC IV module. An adjustable air bypass channel provides the means of idle mixture adjustment.

A throttle position sensor enables the EEC IV module to compute not only throttle position, but also its rate of change. Extra fuel can thus be provided for acceleration when the throttle is opened suddenly. Information from the throttle position sensor is also used to cut off fuel on the overrun, thus improving fuel economy and reducing exhaust gas emissions.

Idle speed is controlled by a variable orifice solenoid valve which regulates the amount of air bypassing the throttle valve. The valve is controlled by the EEC IV module; there is no provision for adjustment of the idle speed.

Additional sensors inform the EEC IV module of engine coolant and air temperature. On models fitted with automatic transmission, a sensor registers the change from “P” or “N” to a drive position, and causes the idle speed to be adjusted accordingly to compensate for the additional load. Similarly on models fitted with air conditioning, a sensor registers when the compressor clutch is in operation.

A “limited operation strategy” (LOS) means that the vehicle is still driveable, albeit at reduced power and efficiency, in the event of a failure in the EEC IV module or its sensors.

A fuel filter is incorporated in the fuel supply line to ensure that the fuel supplied to the injectors is clean.

On models produced from mid-1986 onwards, a fuel pump inertia cut-off switch is fitted. This switch breaks the electrical circuit to the fuel pump in the event of an accident or similar impact, cutting off the fuel supply to the engine.

2.0 litre DOHC models

The fuel injection system fitted to these models is under the overall control of an EEC IV engine management system which also controls the ignition timing.

Fuel is supplied from the rear-mounted fuel tank by an electric fuel pump, which is integral with the fuel level sender unit mounted inside the fuel tank. Fuel passes via a fuel filter and a pressure regulator to the fuel rail. The fuel rail acts as a reservoir for the four fuel injectors, which inject fuel into the cylinder inlet tracts, upstream of the inlet valves. The fuel injectors are operated in pairs by electrical pulses supplied by the EEC IV module, and fuel is injected by one pair of injectors every half-revolution of the crankshaft. The duration of each electrical pulse determines the quantity of fuel injected, and pulse duration is computed by the EEC IV module on the basis of information received from the various sensors.

Inducted air passes through the air cleaner, and through a plenum chamber, before passing on to the cylinder inlet tracts via the throttle valve and inlet manifold. The volume of air entering the engine is calculated by the EEC IV module from information supplied by various sensors. These sensors include an air charge temperature sensor mounted in the inlet manifold, which measures the temperature of the air entering the engine; a manifold absolute pressure (MAP) sensor, which measures the pressure of the air entering the engine; a throttle position sensor; and a crankshaft speed/position sensor, which supplies information on engine speed and provides a timing reference.

Additional sensors inform the EEC IV module of fuel temperature, engine coolant temperature, and vehicle speed (from a gearbox-mounted sensor).

Idle speed is controlled by a variable-orifice solenoid valve, which regulates the amount of air bypassing the throttle valve. The valve is controlled by the EEC IV module; there is no provision for direct adjustment of the idle speed.

On models without a catalytic converter, idle mixture adjustment is by means of a potentiometer connected directly to the EEC IV module. On models with a catalytic converter, an exhaust gas oxygen (HEGO) sensor enables the EEC IV module to control the fuel/air mixture to suit the operating parameters of the catalytic converter; no

manual mixture adjustment is possible.

On models with a catalytic converter, an evaporative emission control (EVAP) system is fitted. This prevents the release of fuel vapour into the atmosphere. With the ignition switched off, vapours from the fuel tank are fed to a carbon canister, where they are absorbed. When the engine is started, the EEC IV module opens a purge solenoid valve, and the fuel vapours are fed into the inlet manifold and mixed with fresh air. This cleans the carbon filter. A blow-back valve prevents inlet air being forced back into the fuel tank.

A fuel pump inertia switch is fitted. This switch breaks the electrical circuit to the fuel pump in the event of an accident or similar impact, cutting off the fuel supply to the engine.

A "limited operation strategy" (LOS) means that the vehicle will still be driveable, albeit at reduced power and efficiency, in the event of a failure in the EEC IV module or its sensors.

1.6 and 1.8 litre (R6A type) CVH models

The fuel injection system fitted to these models is under the overall control of an EEC IV engine management system which also controls the ignition timing.

Fuel is supplied from the rear-mounted fuel tank by an electric fuel pump which is integral with the fuel level sender unit mounted inside the fuel tank. Fuel passes via a fuel filter to the Central Fuel Injection (CFI) unit. A fuel pressure regulator, mounted on the CFI unit, maintains a constant fuel pressure to the fuel injector. Excess fuel is returned from the regulator to the tank.

The CFI unit, resembling a carburettor, houses the throttle valve, throttle valve control motor, throttle position sensor, air charge temperature sensor, fuel injector, and pressure regulator.

The duration of the electrical pulse supplied to the fuel injector determines the quantity of fuel injected, and pulse duration is computed by the EEC IV module on the basis of information received from the various sensors. The fuel injector receives a pulse twice per crankshaft revolution under normal operating conditions, and once per crankshaft revolution under engine idle conditions. A ballast resistor is used in the fuel injector control circuit on 1.6 litre engines.

Inlet air passes through the air cleaner into the CFI unit. The volume of air entering the engine is calculated by the EEC IV module from information supplied by various sensors. These sensors include the air charge temperature sensor and throttle position sensor, mounted in the CFI unit; a crankshaft speed/position sensor which supplies information on engine speed; and a manifold absolute pressure (MAP) sensor which measures the pressure of the air entering the engine.

Additional sensors inform the EEC IV module of engine coolant temperature, and vehicle speed (from a gearbox-mounted sensor).

An exhaust gas oxygen (HEGO) sensor enables the EEC IV module to control the fuel/air mixture to suit the operating parameters of the catalytic converter. No manual mixture adjustment is possible.

Idle speed is controlled by a throttle valve control motor, which controls the position of the throttle valve under conditions of idling, deceleration/part-throttle, and engine start-up and shut-down.

On 1.6 litre engines, a pulse-air system is fitted to reduce the exhaust gas emissions during engine warm-up. The system is controlled by a vacuum-operated valve, which is operated by the EEC IV module via a solenoid. The system introduces air into the exhaust manifold to increase the exhaust gas temperature, which oxidises more of the pollutants, and brings the catalyst up to working temperature more quickly. The system operates until the catalyst reaches operating temperature, when the control solenoid shuts off the system.

On 1.8 litre engines, an exhaust gas recirculation (EGR) system is used to recirculate a small amount of exhaust gas into the inlet manifold. This process lowers the combustion temperature, resulting in a reduction of NOx (oxides of nitrogen) emissions. The EGR system is controlled by the EEC IV module in conjunction with an Electronic Pressure Transducer (EPT) and an Electronic Vacuum Regulator (EVR).

On certain models, an evaporative emission control system may be fitted. This prevents the release of fuel vapour into the atmosphere. With the ignition switched off, vapours from the fuel tank are fed to a carbon canister, where they are absorbed. When the engine is started the EEC IV module opens a purge solenoid valve, and the fuel vapours are fed into the inlet manifold and mixed with fresh air. This cleans the carbon filter. A blow-back valve prevents inlet air being forced back into the fuel tank.

A fuel pump inertia switch is fitted. This switch breaks the electrical circuit to the fuel pump in the event of an accident or similar impact cutting off the fuel supply to the engine.

A "limited operation strategy" (LOS) means that the vehicle will still be driveable, albeit at reduced power and efficiency, in the event of a failure in the EEC IV module or its sensors.

Precautions

Many of the procedures in this Chapter require the removal of fuel lines and connections which may result in some fuel spillage. Before carrying out any operation on the fuel system refer to the precautions given in "Safety first!" at the beginning of this Manual and follow them implicitly. Petrol is a highly dangerous and volatile liquid and the precautions necessary when handling it cannot be overstressed.

Residual pressure will remain in the fuel lines long after the vehicle was last used, therefore extra care must be taken when disconnecting a fuel line hose. Loosen any fuel hose slowly to avoid a sudden release of pressure which may cause fuel spray. As an added precaution place a rag over each union as it is disconnected to catch any fuel which is forcibly expelled.

Certain adjustment points in the fuel system (and elsewhere) are protected by "tamperproof" caps, plugs or seals. The purpose of such tamperproofing is to discourage, and to detent, adjustment by unqualified operators.

In some EEC countries (though not yet in the UK) it is an offence to drive a vehicle with missing or broken tamperproof seals. Before disturbing a tamperproof seal, satisfy yourself that you will not be breaking local or national anti-pollution regulations by doing so. Fit a new seal when adjustment is complete when this is required by law.

Do not break tamperproof seals on a vehicle which is still under warranty.

Catalytic converter - precautions

The catalytic converter is a reliable and simple device which needs no maintenance in itself, but there are some facts of which an owner should be aware if the converter is to function properly for the full service life.

a) DO NOT use leaded petrol in a car equipped with a catalytic converter the lead will coat the precious metals, reducing their converting efficiency and will eventually destroy the converter.

b) Always keep the ignition and fuel systems well-maintained in accordance with the manufacturers schedule, ensure that the air cleaner filter element, the fuel filter (where fitted) and the spark plugs are renewed at the correct interval if the inlet air/fuel mixture is allowed to become too rich due to neglect, the unburned surplus will enter and burn in thecatalytic converter, overheating the element and eventually destroying the converter.

c) If the engine develops a misfire, do not drive the car at all (or at least as little as possible) until the fault is cured - the misfire will allow unburned fuel to enter the converter, which will result in overheating, as noted above.

d) DO NOT push- or tow-start the car - this will soak the catalytic converter in unburned fuel, causing it to overheat when the engine does start - see b) above.

e) DO NOT switch off the ignition at high engine speeds - if the ignition is switched off at anything above idle speed, unburned fuel will enter the (very hot) catalytic converter, with the possible risk of igniting on the element and damaging the converter.

f) DO NOT use fuel or engine oil additives - these may contain substances harmful to the catalytic converter.

g) DO NOT continue to use the car if the engine burns oil to the extent of leaving a visible trail of blue smoke - the unburned carbon deposits will clog the converter passages and reduce the efficiency; in severe cases the element will overheat.

h) Remember that the catalytic converter operates at very high temperatures - hence the heat shields on the car's underbody and the casing will become hot enough to ignite combustible materials which brush against it - DO NOT, therefore, park the car in dry undergrowth, over long grass or piles of dead leaves.

i) Remember that the catalytic converter is FRAGILE, do not strike it with tools during servicing work, take great care when

working on the exhaust system, ensure that the converter is well clear of any jacks or other lifting gear used to raise the car and do not drive the car over rough ground, road humps, etc., in such a way as to "ground" the exhaust system.

j) In some cases, particularly when the car is new and/or is used for stop/start driving, a sulphurous smell (like that of rotten eggs) may be noticed from the exhaust. This is common to many catalytic converter-equipped cars and seems to be due to the small amount of sulphur found in some petrols reacting with hydrogen in the exhaust to produce hydrogen sulphide (H_2S) gas; while this gas is toxic, it is not produced in sufficient amounts to be a problem. Once the car has covered a few thousand miles the problem should disappear - in the meanwhile a change of driving style or of the brand of petrol used may effect a solution.

k) The catalytic converter, used on a well-maintained and well-driven car, should last for between 50 000 and 100 000 miles - from this point on, careful checks should be made at all specified service intervals of the CO level to ensure that the converter is still operating efficiently - if the converter is no longer effective it must be renewed.

EEC IV module - warning

Following disconnection of the battery, the information stored in the EEC IV module memory will be erased. After reconnecting the battery, the engine should be allowed to idle for three minutes. Once the engine has reached normal operating temperature, the idle speed should be increased to 1200 rpm and maintained for approximately 2 minutes, which will allow the module to "re-learn" the optimum idle values. It may be necessary to drive the vehicle in order for the module to "re-learn" the values under load. The module should complete its learning process after approximately 5 miles (8 kilometres) of varied driving.

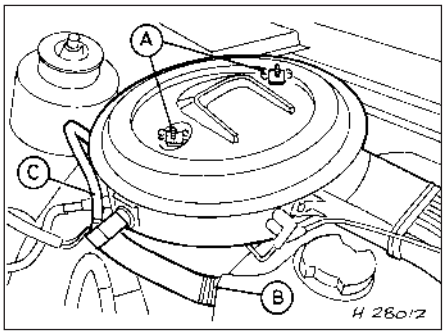
2 Air cleaner element - renewal

Refer to Chapter 1, Section 38.

3 Air cleaner - removal and refitting

2.0 litre SOHC models

1 Disconnect the battery negative lead.
2 Depress the locking clip on the airflow meter wiring plug and disconnect the plug. Pull on the plug, not the wiring.
3 Loosen the securing clip and disconnect the air inlet hose from the airflow meter.
4 Release the four securing clips and lift off the air cleaner lid with the airflow meter.
5 Remove the left-hand front wheel arch liner.
6 Working under the wheel arch, unscrew the three air cleaner securing nuts and washers.
7 Disconnect the air inlet tube, and withdraw the air cleaner from the engine compartment.
8 Refitting is a reversal of removal.



3.26a Air cleaner cover and hose attachments - 1.8 litre (R6A) CVH

A Cover retaining nuts
B Engine breather hose
C Oil separator hose

2.0 litre DOHC models

9 Disconnect the battery negative lead.
10 Disconnect the wiring plug from the idle speed control valve at the front of the plenum chamber.
11 Loosen the clamp, and detach the air inlet hose from the air inlet tubing.
12 Unscrew the securing nut, and release the air inlet tube from the bracket on the engine compartment front panel.
13 Release the air cleaner lid securing clips, then lift away the air inlet tube, plenum chamber and air cleaner lid as an assembly, disconnecting the breather hose from the air inlet tube.
14 Lift out the air cleaner element then wipe the inside of the air cleaner lid and casing clean.
15 Remove the left-hand front wheel arch liner.
16 Working under the wheel arch, unscrew the three air cleaner securing nuts and washers.
17 Disconnect the air inlet tube, and withdraw the air cleaner from the engine compartment.
18 Refitting is a reversal of removal.

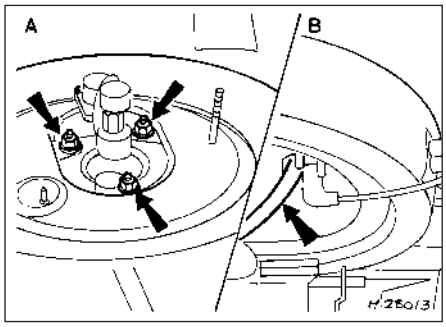
1.6 and 1.8 litre (R6A type) CVH models

1.6 litre

19 Remove the screws from the top of the air cleaner cover.
20 Disconnect the cold air inlet hose from the air cleaner spout or the inlet on the front body panel. The hose is secured by toggle clips.
21 Disconnect the hot air inlet hose from the air cleaner spout or the hot air shroud on the exhaust manifold.
22 Where applicable, remove the screw securing the air cleaner body to the camshaft cover.
23 Withdraw the air cleaner and disconnect the breather hose from the camshaft cover.
24 Refitting is a reversal of removal, ensure the disturbed hoses are securely connected.

1.8 litre

25 Undo the two nuts, lift off the air cleaner cover, and remove the element.



3.26b Air cleaner casing attachments - 1.8 litre (R6A) CVH

A Casing retaining nuts (arrowed)
B Vacuum hose (arrowed)

26 Disconnect the engine breather hose and the oil separator hose, then undo the three nuts and lift up the air cleaner casing **(see illustrations)**.
27 Disconnect the yellow striped vacuum hose from the underside of the casing, detach the air inlet hose, and remove the air cleaner assembly.
28 Refitting is a reversal of removal, ensuring all hoses are correctly attached.

4 Fuel system (1.6 and 1.8 litre (R6A type) CVH) - depressurisation

Remember to depressurise the fuel system before loosening any connections.
Refer to the precautions in Section 1 before proceeding. The fuel system will remain pressurised after the engine is switched off.

1 Disconnect the battery negative lead.
2 Remove the air cleaner assembly.
3 Position a suitable container (or a sufficient quantity of absorbent cloth) beneath the fuel inlet connection on the CFI unit.
4 Use an open-ended spanner on the flats of the inlet union screwed into the CFI unit, to prevent it from turning while the inlet pipe union is loosened **(see illustration)**. Allow all pressure/fuel seepage to dissipate before fully unscrewing the union if it is to be disconnected, or tightened if another part of the system is to be worked on.

4.4 CFI unit fuel inlet union (arrowed)

5 The system will remain depressurised until the fuel pump is primed prior to starting the engine. Remove the container or cloth, as applicable, on completion.

5 Fuel filter - renewal

Refer to Chapter 1, Section 41.

6 Fuel pressure regulator - removal and refitting

Caution: Refer to the precautions in Section 1 before proceeding.

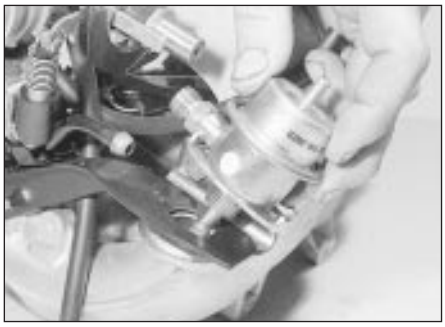
2.0 litre SOHC models

1 Disconnect the battery negative lead.
2 Slowly loosen the fuel feed union to relieve the pressure in the fuel lines.
3 Disconnect the fuel feed and return lines. Be prepared for petrol spillage.
4 Disconnect the vacuum pipe from the top of the pressure regulator.
5 Unscrew the securing nut from the base of the pressure regulator and withdraw the unit **(see illustration)**.
6 Refitting is a reversal of removal, but if the fuel return line was originally secured with a crimped type clip, discard this and use a new worm drive clip.
7 On completion check the fuel line connections for leaks. Pressurise the system by switching the ignition on and off several times.

2.0 litre DOHC models

Note: *A new pressure regulator seal will be required on refitting.*
8 Disconnect the battery negative lead.
9 Slowly loosen the fuel rail fuel feed union to relieve the pressure in the system **(see illustration)**. Be prepared for fuel spillage, and take adequate fire precautions.
10 Disconnect the fuel return hose from the pressure regulator **(see illustration)**. Again, be prepared for fuel spillage.
11 Disconnect the vacuum pipe from the top of the pressure regulator.
12 Unscrew the two securing bolts, and withdraw the regulator from the fuel rail. Recover the seal.

6.10 Disconnecting the fuel return hose (arrowed) from the pressure regulator



6.5 Withdrawing the fuel pressure regulator

6.9 Fuel rail fuel feed union (arrowed)

13 Fit a new seal to the regulator, and lubricate with clean engine oil.
14 Fit both the securing bolts to the regulator, then position the regulator on the fuel rail, and tighten the securing bolts.
15 Further refitting is a reversal of removal. If the fuel return line was originally secured with a crimped-type clip, discard this, and use a new worm-clip clip.
16 On completion, pressurise the system by switching the ignition on and off several times, and check the fuel line connections for leaks.

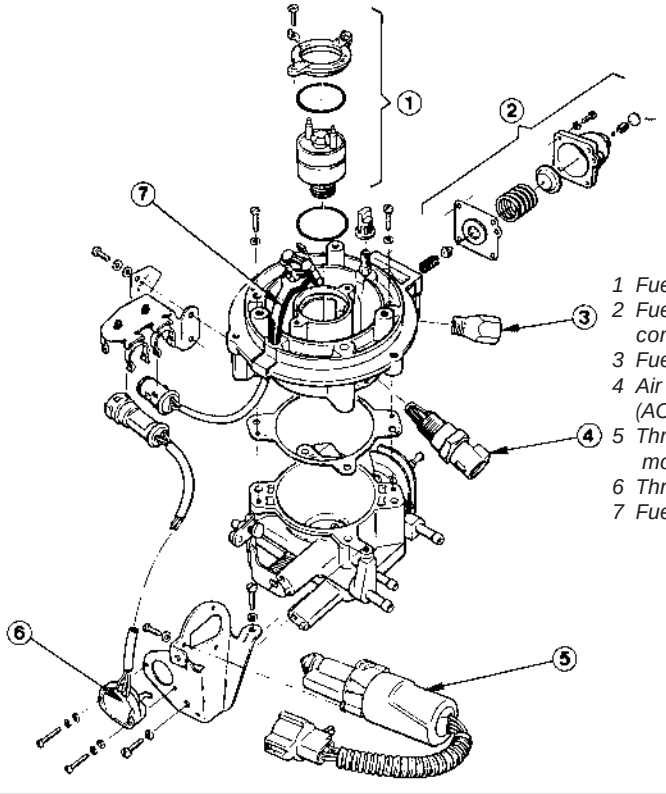
1.6 and 1.8 litre (R6A type) CVH models

Note: *On completion of refitting, the fuel system pressure should be checked by a Ford dealer at the earliest opportunity.*

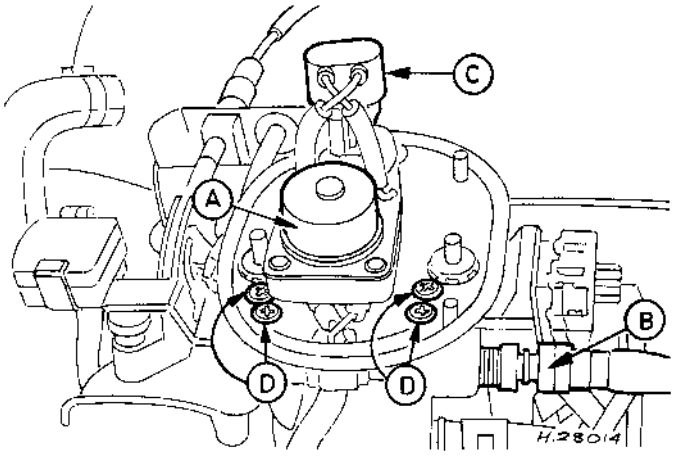
1.6 litre

17 Remove the CFI unit.
18 Remove the four screws securing the regulator housing to the CFI unit, then carefully lift off the housing and recover the ball, cup, large spring, diaphragm, valve, and small spring, noting the position and orientation of all components **(see illustration)**. Do not attempt to prise the plug from the regulator housing, or adjust the Allen screw (if no plug is fitted); this will alter the fuel system pressure.
19 Check all components, and renew any faulty items as necessary.
20 Commence reassembly by supporting the CFI unit on its side, so that the regulator components can be fitted from above.

6.18 Exploded view of Central Fuel Injection (CFI) unit
1.6 litre CVH engine application shown - 1.8 litre similar



1 Fuel injector assembly
2 Fuel pressure regulator components
3 Fuel inlet connector
4 Air charge temperature (ACT) sensor
5 Throttle valve control motor
6 Throttle position sensor
7 Fuel injector wiring



6.28 Fuel injector/pressure regulator attachments - 1.8 litre (R6A) CVH

A Pressure regulator assembly
B Fuel inlet pipe
C Injector/regulator wiring plug
D Injector/regulator screws

21 Fit the small spring, valve, diaphragm (ensuring that it locates correctly), large spring, and the spring cup.
22 Carefully place the ball into position on the spring cup, and ensure that it locates correctly.
23 Refit the regulator housing, taking great care to avoid disturbing the ball, and once correctly in position, tighten the screws evenly to avoid distorting the diaphragm.
24 Refit the CFI unit.
25 On completion, the fuel system pressure should be checked by a Ford dealer at the earliest opportunity.

1.8 litre

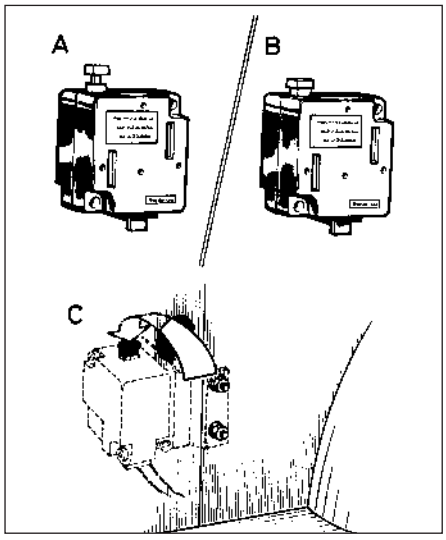
26 Disconnect the battery negative lead.
27 Remove the air cleaner assembly.
28 Depressurise the fuel system and disconnect the fuel inlet pipe from the CFI unit **(see illustration)**.
29 Disconnect the fuel injector/regulator wiring plug, and move the wiring harness clear.
30 Undo the four screws, and carefully lift the injector/regulator assembly off the CFI unit.

7.3b Fuel pump inertia cut-off switch location (arrowed) under spare wheel

31 Refitting is a reversal of removal. On completion, the fuel system pressure should be checked by a Ford dealer at the earliest opportunity.

7 Fuel pump - testing

1 If the fuel pump is functioning, it should be possible to hear it "buzzing" by listening under the rear of the vehicle when the ignition is switched on. Unless the engine is started, the fuel pump should switch off after approximately one second. If the noise produced is excessive, this may be due to a faulty fuel flow damper (not fitted to 2.0 litre DOHC models). The damper can be renewed by unscrewing it from the pump outlet union.
2 If the pump appears to have failed completely, check the appropriate fuse and relay, and where applicable check the state of the fuel pump inertia cut-off switch as follows.
3 The inertia cut-off switch is fitted to all models from mid-1986 onwards, and can be found behind the passenger compartment left-hand side trim panel on Hatchback and Estate models up to the 1987 model year **(see illustration)**. The location of the switch for all other models is in the spare wheel well **(see illustration)**. The switch incorporates a reset button, which should normally be in the depressed position. Check the position of the reset button before assuming that a fault exists in the fuel pump.
4 To test the fuel pump, special equipment is required, and it is recommended that any suspected faults are referred to a Ford dealer.



7.3a Fuel pump inertia cut-off switch - pre-1987 SOHC Hatchback and Estate models

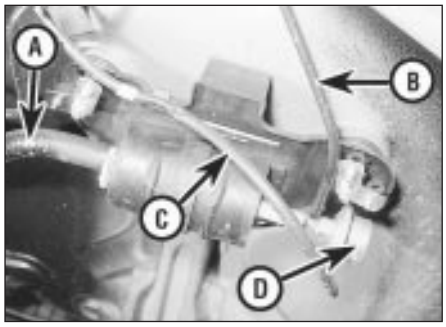
A Activated mode (fuel cut-off)
B Normal mode (fuel flowing)
C Trim panel access hole

8 Fuel pump (2.0 litre SOHC) - removal and refitting

Caution: Refer to the precautions in Section 1 before proceeding.

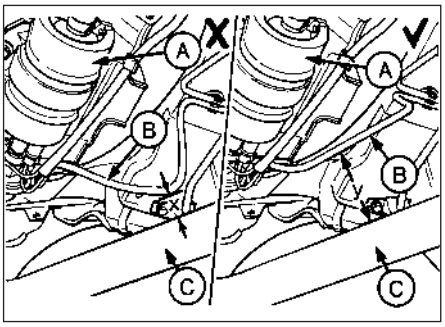
Removal

1 The fuel pump is located under the rear of the vehicle next to the fuel tank **(see illustration)**.
2 Disconnect the battery negative lead.
3 Chock the front wheels, then jack up the rear of the vehicle and support on axle stands (see "*Jacking and Vehicle Support*").
4 Clean the area around the pump mounting, and position a suitable container under the pump.
5 Using a hose clamping tool or self-locking pliers, clamp the fuel tank-to-pump hose to prevent excessive petrol spillage, or



8.1 Fuel pump location

A Inlet hose
B Outlet hose
C Electrical feed
D Flow damper



8.9 Correct and incorrect routing of fuel pump outlet pipe

A Fuel pump
B Outlet pipe
C Exhaust pipe
X = 30.0 mm (1.2 in)
Y = 100.0 mm (3.9 in)

alternatively make arrangements to collect the contents of the fuel tank which will otherwise be released. Disconnect the hose from the pump.

6 Slowly loosen the fuel flow damper fitted to the pump outlet union, to relieve the pressure in the fuel line, then remove the damper and disconnect the outlet pipe from the pump. Plug the end of the pipe to prevent excessive petrol spillage.

7 Disconnect the wiring plug(s), then slacken the clamp bolt and slide the pump from the bracket assembly.

Refitting

8 Refitting is a reversal of removal, noting the following.

9 When refitting the flow damper to the pump ensure that the pump outlet pipe is correctly routed **(see illustration)**. It is possible to inadvertently rotate the banjo union through 180º, which routes the outlet pipe too close to the exhaust.

10 After refitting and securing the pump, but before lowering the vehicle, reconnect the battery and switch the ignition on and off several times to pressurise the fuel system. Check for leaks around the pump; if all is satisfactory, switch off the ignition and lower the vehicle.

9 Fuel pump/fuel level sender unit (2.0 litre DOHC/1.6 & 1.8 litre (R6A type) CVH) - removal and refitting

Caution: Refer to the precautions in Section 1 before proceeding.

1 Remove the fuel tank.

2 Unscrew the fuel pump/fuel level sender unit by engaging two crossed screwdrivers in the slots on either side of the unit mounting flange. Recover the seal.

3 Refitting is a reversal of removal but fit a new seal.

10 Fuel tank - removal and refitting

Refer to Chapter 4 Part A, Section 9.

11 Fuel level sender unit (2.0 litre SOHC) - removal and refitting

Refer to Chapter 4 Part A, Section 10.

12 Idle speed and mixture - adjustment

Refer to Chapter 1, Sections 15 and 16.

13 Idle speed control valve - removal and refitting

Note: *A new gasket must be used when refitting the valve.*

2.0 litre SOHC models

1 Disconnect the battery negative lead.

2 Disconnect the idle speed control valve wiring plug by releasing the retaining clip and pulling on the plug, not the wiring **(see illustration)**.

3 Unscrew the two retaining nuts and withdraw the valve from the inlet manifold **(see illustration)**. Recover the gasket.

4 Clean the valve and manifold mating faces before refitting, taking care not to allow dirt to enter the manifold.

5 Refitting is a reversal of removal, using a new gasket.

6 On completion, start the engine and check that the idle speed is stable if not, check for air leaks around the valve. Switch on all available electrical loads and check that the idle speed is maintained - if not, suspect a faulty valve.

2.0 litre DOHC models

7 Disconnect the battery negative lead.

8 Loosen the securing clip, and disconnect the air inlet hose from the throttle body.

9 Unscrew the securing nut, and release the air inlet tube from the bracket on the engine compartment front panel.

10 Disconnect the wiring plug from the idle speed control valve.

11 Release the air cleaner lid securing clips then remove the air inlet tube, plenum chamber, and air cleaner lid as an assembly, disconnecting the breather hose from the air inlet tube.

12 Unscrew the two securing bolts, and withdraw the valve from the air inlet tube. Recover the gasket **(see illustration)**.

13 Clean the valve and air inlet tube mating faces before refitting, taking care not to allow dirt to enter the air inlet tube.

14 Refitting is a reversal of removal, using a new gasket.

15 On completion, start the engine and check that the idle speed is stable if not, check for air leaks around the valve. Switch on all available electrical loads, and check that the idle speed is maintained - if not, suspect a faulty valve.

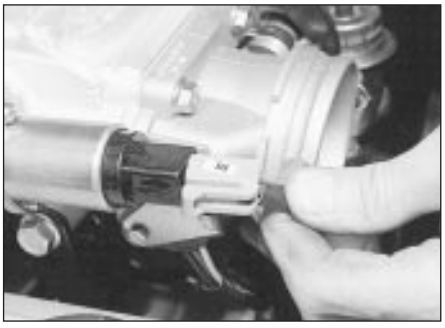
14 Mixture adjustment potentiometer (2.0 litre DOHC) - removal and refitting

1 The potentiometer is located at the rear right-hand side of the engine compartment, behind the MAP sensor.

2 Disconnect the battery negative lead.

3 Remove the screw, then withdraw the potentiometer and disconnect the wiring plug.

4 Refitting is a reversal of removal.



13.2 Disconnecting the idle speed control valve wiring plug

13.3 Unscrewing an idle speed control valve retaining nut

13.12 Withdrawing the idle speed control valve and gasket

15.5 Airflow meter-to-air cleaner lid bolts (arrowed)

15 Airflow meter - removal and refitting

Note: *A tachometer and an exhaust gas analyser will be required to check the idle mixture on completion.*

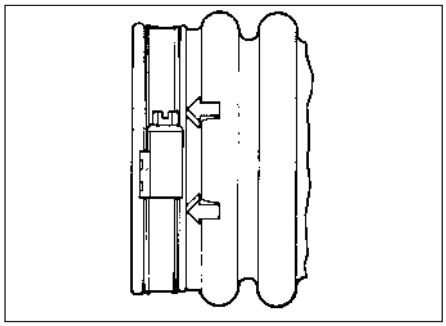
1 Disconnect the battery negative lead.
2 Depress the locking clip on the airflow meter wiring plug and disconnect the plug. Pull on the plug, not the wiring.
3 Loosen the securing clip and disconnect the air inlet hose from the airflow meter.
4 Release the four securing clips and lift off the air cleaner lid with the airflow meter.
5 Remove the four securing bolts and separate the airflow meter from the air cleaner lid **(see illustration)**. Recover the seal.
6 Refitting is a reversal of removal, ensuring that the seal is correctly located on the air cleaner lid, and that the air inlet hose clip is correctly aligned **(see illustration)**.
7 On completion, check and if necessary adjust the idle mixture.

16 Fuel injector (1.6 and 1.8 litre (R6A type) CVH) - removal and refitting

Caution: Refer to the precautions in Section 1 before proceeding.

1.6 litre

Note: *New fuel injector seals must be used on refitting.*
1 Disconnect the battery negative lead.
2 Remove the air cleaner.
3 Depressurise the fuel system.
4 Release the securing lugs, and disconnect the fuel injector wiring plug **(see illustration)**.
5 Bend back the injector retaining collar securing bolt locktabs, then unscrew the bolts. Remove the injector retaining collar **(see illustrations)**.
6 Withdraw the injector from the CFI unit **(see illustration)**, noting its orientation, then withdraw the injector seals.
7 Remove the seal from the injector retaining collar **(see illustration)**.
8 Refitting is a reversal of removal, noting the following points.
9 Use new injector seals, and lubricate them with clean engine oil before fitting.
10 Ensure that the locating peg on the injector is correctly positioned **(see illustration)**.



15.6 Air intake hose clip correctly aligned

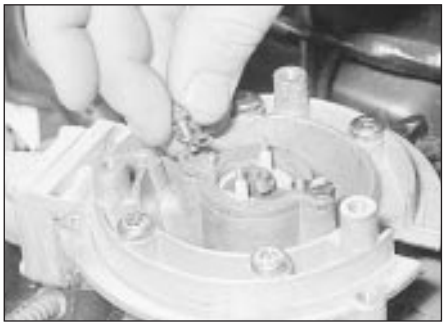
1.8 litre

11 On these engines, the fuel pressure regulator and injector are one assembly. Proceed as described for the fuel pressure regulator.

17 Fuel injector ballast resistor (1.6 litre CVH) - removal and refitting

1 The ballast resistor is located on the right-hand side of the engine compartment, and is only fitted to 1.6 litre engines **(see illustration)**.
2 Disconnect the battery negative lead.
3 Disconnect the ballast resistor wiring connector, then remove the securing screw, and withdraw the ballast resistor from the body panel.
4 Refitting is a reversal of removal.

16.4 Disconnecting the fuel injector wiring plug

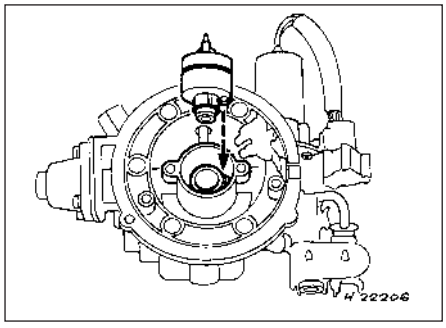


16.5a Removing an injector retaining collar securing bolt and locktab

16.5b Removing the injector retaining collar

16.6 Withdrawing the fuel injector

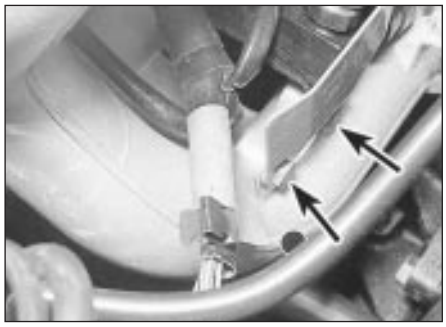
16.7 Removing the seal from the injector retaining collar



16.10 Align locating peg on injector with slot in CFI unit on refitting - 1.6 litre CVH

17.1 Fuel injector ballast resistor location (arrowed)

18.9a Fuel rail front securing bolt (arrowed) . . .



18.9b . . . and rear securing bolts

18 Fuel injectors - removal and refitting

Caution: Refer to the precautions in Section 1 before proceeding.

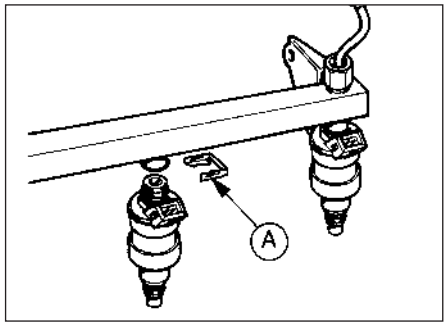
Note: *A tachometer and an exhaust gas analyser will be required to check the idle mixture on completion. New seals and retaining clips must be used when refitting the injectors, and special grease will be required - see relevant paragraph. If the injectors are thought to be faulty, it may be worth trying the effect of a fuel injector cleaning agent before removing them.*

2.0 litre SOHC models

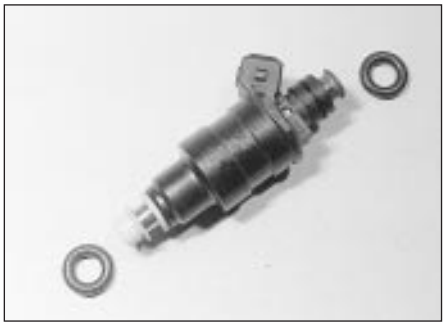
1 Disconnect the battery negative lead.
2 Disconnect the crankcase ventilation hose from the air inlet hose, then disconnect the air inlet hose from the inlet manifold and the airflow meter.
3 Disconnect the HT lead from the coil, then remove the distributor cap and position the cap and HT leads clear of the fuel rail assembly.
4 Disconnect the wiring plugs from the idle speed control valve, the throttle position sensor and the engine coolant temperature sensor.
5 Remove the fuel pressure regulator.
6 Unscrew the securing bolt and remove the throttle return spring bracket. Disconnect the throttle return spring.
7 Disconnect the fuel supply hose from the fuel rail. Be prepared for petrol spillage.
8 Disconnect the wiring plugs from the fuel injectors, noting their locations for use when refitting.
9 Remove the three securing bolts and withdraw the fuel rail and fuel injectors from the inlet manifold as an assembly **(see illustrations)**.
10 To remove a fuel injector from the fuel rail, remove the retaining clip and withdraw the injector **(see illustration)**.
11 Overhaul of the fuel injectors is not possible, as no spares are available. If faulty, an injector must be renewed.
12 Commence refitting by fitting new seals to both ends of each fuel injector. Even if only one injector has been removed, new seals must be fitted to all four injectors **(see illustration)**. Coat the seals with silicone grease to Ford specification ESEM - ICI71 A. Similarly, renew all four fuel injector retaining clips.
13 Further refitting is a reversal of removal, ensuring that all hoses, wiring plugs and leads are correctly connected. When reconnecting the air inlet hose, make sure that the hose clips are correctly aligned - see illustration, Section 15.
14 On completion, check and if necessary adjust the idle mixture.

2.0 litre DOHC models

15 Disconnect the battery negative lead.
16 If desired, to improve access, disconnect the wiring from the inlet air temperature sensor in the inlet manifold. Similarly, the throttle cable can be moved to one side by disconnecting the cable from the throttle linkage. The spark plug HT leads can be disconnected and moved to one side, noting their locations and routing to aid refitting.
17 Slowly loosen the fuel rail fuel feed union to relieve the pressure in the system. Be prepared for fuel spillage, and take adequate fire precautions.
18 Disconnect the fuel feed hose from the fuel rail **(see illustration)**.
19 Disconnect the fuel return hose from the fuel pressure regulator. Again, be prepared for fuel spillage.
20 Disconnect the vacuum pipe from the top of the fuel pressure regulator.
21 Disconnect the wiring plugs from the fuel temperature sensor and the fuel injectors, noting their locations to assist with refitting.
22 Unscrew the two securing bolts, and withdraw the fuel rail.
23 Lift the fuel injectors from their locations in the cylinder head **(see illustration)**.
24 Overhaul of the fuel injectors is not possible, as no spares are available. If faulty, an injector must be renewed (refer to the note at the start of this procedure before condemning an injector).
25 Commence refitting by fitting new seals to both ends of each fuel injector. It is advisable to fit new seals to all the injectors, even if only one has been removed. Lubricate the seals with clean engine oil.



18.10 Fuel injector retaining clip (A)



18.12 Fuel injector with seals removed

18.18 Disconnecting the fuel feed hose from the fuel rail

18.23 Lifting a fuel injector from the cylinder head

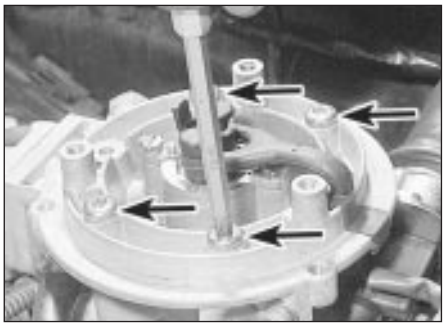
26 Further refitting is a reversal of removal, ensuring that all hoses, pipes and wiring plugs are correctly connected.
27 On completion, where applicable, check and if necessary adjust the idle mixture.

19 CFI unit (1.6 and 1.8 litre (R6A type) CVH) - removal and refitting

Caution: Refer to the precautions in Section 1 before proceeding. A new gasket must be used on refitting.

Removal

1 Disconnect the battery negative lead.
2 Remove the air cleaner assembly.
3 Depressurise the fuel system and disconnect the fuel inlet pipe from the CFI unit.
4 Disconnect the fuel return pipe from the CFI unit. Be prepared for fuel spillage.
5 Disconnect the throttle cable from the linkage on the CFI unit.
6 On 1.6 litre models, either partially drain the cooling system or clamp the coolant hoses as close as possible to the CFI unit to minimise coolant loss, then disconnect the hoses from the unit.
7 Disconnect the wiring plugs for the throttle position sensor, throttle valve control motor, fuel injector and, on 1.6 litre models, the air charge temperature sensor.
8 Disconnect the vacuum pipe from the CFI unit.



19.9 CFI unit securing bolts (arrowed) - 1.6 litre CVH

9 Unscrew the four (1.6 litre), or three (1.8 litre) securing bolts, and lift the CFI unit from the inlet manifold **(see illustration)**. Recover the gasket.

Refitting

10 Refitting is a reversal of removal, bearing in mind the following points.
11 Ensure that all mating faces are clean, and use a new gasket.
12 Top-up the cooling system.
13 On completion, turn the ignition on and off five times to pressurise the system, and check for fuel leaks.

20 Pulse-air filter element (1.6 litre CVH) - renewal

Refer to Chapter 1, Section 37.

21 Pulse-air system vacuum-operated air valve (1.6 litre CVH) - removal and refitting

1 The valve is mounted at the end of the pulse-air filter housing **(see illustration)**.
2 Disconnect the vacuum hose from the top of the valve, then loosen the hose clips at either end of the valve, and remove the valve. Note the orientation of the arrow on the valve body, which denotes the direction of flow.
3 Refitting is a reversal of removal, ensuring that the arrow on the valve body is orientated as noted before removal.

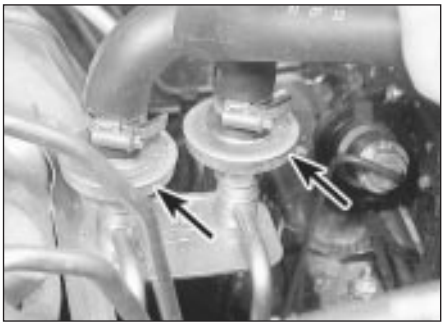
21.1 Pulse air system vacuum-operated air valve (arrowed)

22 Pulse-air delivery tubing (1.6 litre CVH) - removal and refitting

1 Remove the air cleaner assembly.
2 Loosen the hose clips, and disconnect the air hoses from the check valves next to the exhaust manifold **(see illustration)**.
3 Remove the two bolts securing the check valve bracket to the exhaust manifold.
4 Unscrew the unions securing the air tubes to the manifold, then carefully withdraw the tubing assembly, taking care not to distort the tubes **(see illustration)**.
5 Refitting is a reversal of removal.

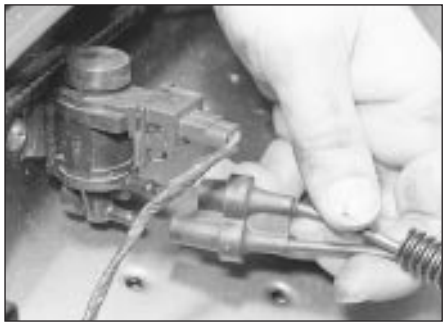
23 Pulse-air control solenoid (1.6 litre CVH) - removal and refitting

1 The solenoid is located at the right-hand side of the engine compartment.
2 Disconnect the battery negative lead.
3 Disconnect the vacuum pipe connector from the pulse-air control solenoid **(see illustration)**.
4 Disconnect the solenoid wiring plug, pulling on the plug, not the wiring.
5 Unscrew the securing screw, and withdraw the solenoid from the body panel.
6 Refitting is a reversal of removal, ensuring that the locating lug is correctly positioned, and noting that the vacuum pipes will only fit in one position.

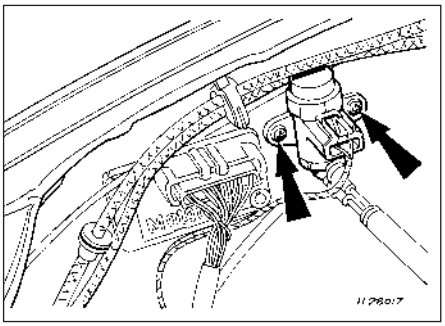


22.2 Pulse-air delivery check valves (arrowed)

22.4 Unscrewing a pulse-air delivery tube union



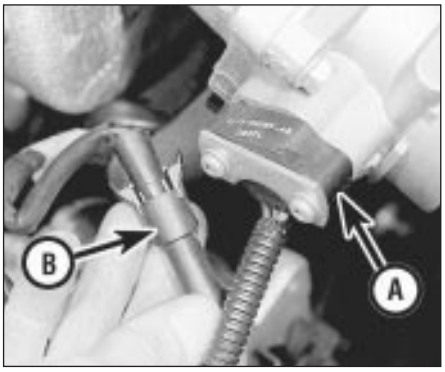
23.3 Disconnect the vacuum pipe connector from the solenoid



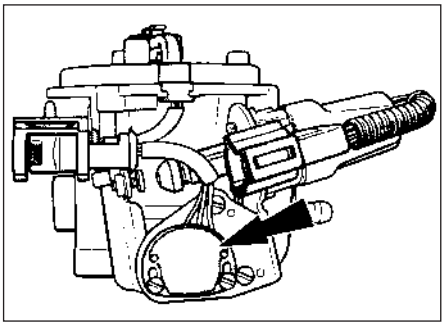
24.4 Electronic vacuum regulator retaining screws (arrowed) - 1.8 litre (R6A) CVH

24 Electronic vacuum regulator (1.8 litre (R6A type) CVH) - removal and refitting

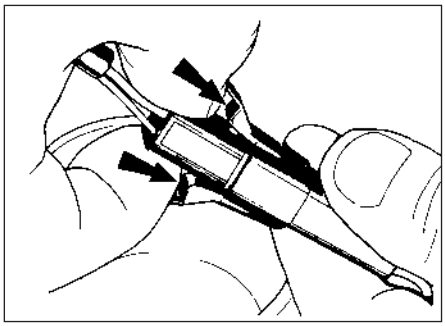
1 The EVR unit is located on the right-hand side of the engine compartment, near the front of the car.
2 Disconnect the battery negative lead.
3 Disconnect the EVR wiring plug, and detach the two vacuum hoses, noting their correct location for refitting.
4 Undo the retaining screws, and remove the EVR unit from the car **(see illustration)**.
5 Refitting is a reversal of removal.



27.6 Throttle position sensor (A) and wiring plug (B)



27.11a Throttle position sensor location (arrowed) on CFI unit - 1.6 litre CVH



27.2 Releasing locktabs to disconnect throttle position sensor wiring plug halves

25 Throttle pedal - removal and refitting

Refer to Chapter 4 Part A, Section 11.

26 Throttle cable - removal, refitting and adjustment

Refer to Chapter 4 Part A, Section 12.

27 Throttle position sensor - removal and refitting

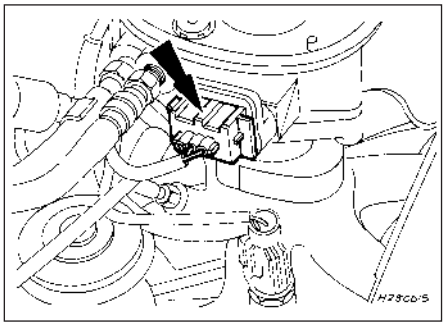
Note: *During this procedure ensure that the sensor wiper is not rotated beyond its normal operating arc.*

2.0 litre SOHC models

1 Disconnect the battery negative lead.
2 Free the throttle position sensor wiring plug from the retaining clip located on the underside of the throttle body. Disconnect the wiring plug halves by releasing the locktabs and pulling on the plug halves **(see illustration)**.
3 Bend back the locktabs and unscrew the two sensor retaining bolts **(see illustration)**. Withdraw the locking plate and sensor from the throttle shaft.
4 Refitting is a reverse of removal, ensuring that the moulded side of the sensor faces towards the inlet manifold. The flat on the sensor wiper engages with the flat on the throttle shaft.

2.0 litre DOHC models

5 Disconnect the battery negative lead.



27.11b Throttle position sensor location (arrowed) on CFI unit - 1.8 litre (R6A) CVH

27.3 Unscrewing the throttle position sensor retaining bolts

6 Free the throttle position sensor wiring plug from the retaining clip located on the underside of the throttle body. Disconnect the wiring plug halves by releasing the locktabs and pulling on the plug halves **(see illustration)**.
7 Unscrew the two sensor securing screws, and withdraw the sensor from the throttle shaft.
8 Refitting is a reversal of removal, noting that the sensor fits with the wiring at the bottom. Ensure that the sensor actuating arm engages correctly with the throttle spindle.

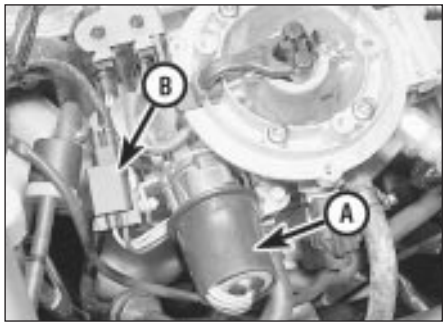
1.6 and 1.8 litre (R6A type) CVH models

9 Disconnect the battery negative lead.
10 Remove the air cleaner.
11 Unclip and disconnect the sensor wiring connector, pulling on the plug, not on the wiring **(see illustrations)**.
12 Remove the two screws, and withdraw the sensor from the throttle valve shaft.
13 Refitting is a reversal of removal, but ensure that the sensor actuating arm locates correctly on the throttle valve spindle.

28 Throttle valve control motor (1.6 and 1.8 litre (R6A type) CVH) - removal and refitting

1.6 litre

1 Disconnect the battery negative lead.
2 Remove the air cleaner.
3 Disconnect the wiring connectors from the throttle valve control motor, and the throttle position sensor, pulling on the plugs, not on the wiring **(see illustration)**.



28.3 Throttle valve control motor (A) and wiring plug (B)

4 Remove the three screws securing the motor and the throttle position sensor assembly mounting bracket to the CFI unit, and withdraw the assembly.
5 Remove the three motor securing screws, and withdraw the motor from the bracket.
6 Refitting is a reversal of removal, bearing in mind the following points.
7 Ensure that the throttle position sensor actuating arm locates correctly on the throttle valve spindle, and that the mounting bracket aligns with its locating pegs.
8 On completion, the idle speed should be checked by a Ford dealer at the earliest opportunity.

1.8 litre

9 Disconnect the battery negative lead.
10 Remove the air cleaner assembly.
11 Disconnect the wiring connector from the throttle valve control motor.
12 Remove the three screws securing the motor and the mounting bracket to the CFI unit, and withdraw the assembly.
13 Remove the three motor securing screws, and withdraw the motor from the bracket.
14 Refitting is a reversal of removal, ensuring that the motor is located on the throttle linkage, and that the bracket and locating pegs are aligned.

29 **Throttle body** - removal and refitting

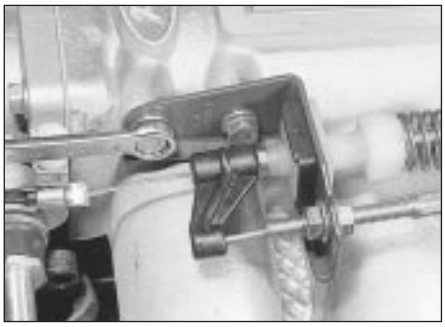
Note: *A tachometer and an exhaust gas analyser will be required to check the idle mixture on completion. A new gasket must be used when refitting the throttle body.*

2.0 litre SOHC models

1 Disconnect the battery negative lead.
2 Free the throttle position sensor wiring plug from the retaining clip on the underside of the throttle body. Disconnect the wiring plug halves by releasing the locktabs and pulling on the plug halves, not the wiring.
3 Disconnect the throttle cable from the lever.
4 Disconnect the crankcase ventilation hose from the air inlet hose, then disconnect the air inlet hose from the throttle body and the airflow meter.
5 Remove the four securing bolts and withdraw the throttle body from the inlet manifold. Recover the gasket.
6 Refitting is a reversal of removal, bearing in mind the following points.
7 Ensure that all mating faces are clean, and fit a new gasket.
8 When reconnecting the air inlet hose, make sure that the hose clips are correctly aligned, see illustration, Section 15.
9 On completion, adjust the throttle cable and check and if necessary adjust the idle mixture.

2.0 litre DOHC models

10 Disconnect the battery negative lead.
11 Free the throttle position sensor wiring plug from the retaining clip located on the underside of the throttle body. Disconnect the wiring plug halves by releasing the locktabs and pulling on the plug halves, not the wiring.
12 Disconnect the throttle cable from the linkage.
13 Loosen the securing clip, and disconnect the air inlet hose from the throttle body.
14 Unscrew the four securing bolts, and withdraw the throttle body from the inlet manifold. Recover the gasket.
15 Refitting is a reversal of removal, bearing in mind the following points.
16 Ensure that the mating faces of the throttle body and the inlet manifold are clean, and fit a new gasket.
17 On completion, adjust the throttle cable. Where applicable, check and if necessary adjust the idle mixture.



30.5 Unscrew the securing bolts and remove the throttle cable bracket

30.6 Disconnecting a fuel injection harness wiring plug

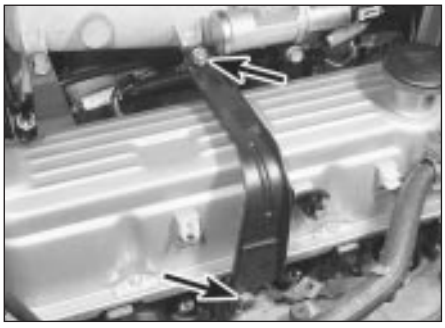
30 **Inlet manifold** - removal and refitting

Caution: Refer to the precautions in Section 1 before proceeding.

Note: *A tachometer and an exhaust gas analyser will be required to check the idle mixture on completion. A new gasket must be used when refitting the manifold.*

2.0 litre SOHC models

1 Disconnect the battery negative lead.
2 Partially drain the cooling system.
3 Disconnect the crankcase ventilation hose from the air inlet hose. Disconnect the air inlet hose from the inlet manifold and the airflow meter.
4 Disconnect the HT lead from the coil, then remove the distributor cap and position the cap and HT leads clear of the inlet manifold assembly.
5 Unscrew the two securing bolts and remove the throttle cable bracket **(see illustration)**. Disconnect the cable end from the throttle lever, and move the bracket to one side.
6 Disconnect the fuel injection harness wiring plugs at the bulkhead end of the manifold **(see illustration)**.
7 Disconnect the oil pressure warning lamp switch wire from below the manifold.
8 Disconnect the fuel supply hose from the fuel rail. Loosen the union nut slowly to relieve the pressure in the fuel system, and be prepared for petrol spillage.
9 Disconnect the fuel return hose from the fuel pressure regulator. Be prepared for fuel spillage.
10 Disconnect the coolant hose and the brake servo vacuum hose from the inlet manifold.
11 Unscrew the two securing nuts and remove the bracing strut which runs from the manifold to the right-hand side of the cylinder head **(see illustration)**.
12 Unscrew the two bolts securing the lower manifold bracket to the left-hand side of the cylinder block **(see illustration)**.
13 Remove the four bolts and two nuts securing the inlet manifold to the cylinder head, and carefully withdraw the manifold. If the distributor obstructs removal, extract the front manifold stud by locking two nuts



30.11 Unscrew the two securing nuts (arrowed) and remove the inlet manifold bracing strut

30.12 Lower inlet manifold bracket (arrowed)

30.13 Where necessary use two nuts locked together (arrowed) to remove the front inlet manifold stud

together and using them to unscrew the stud **(see illustration)**. Alternatively, the distributor can be removed, although this is not recommended unless absolutely essential. Recover the gasket. Note that an earth strap may be located on one of the manifold securing bolts or studs; where applicable, note its location as an aid to refitting.

14 With the manifold removed, the various fuel injection system components can be separated from the manifold with reference to the relevant Sections of this Chapter.

15 Refitting is a reversal of removal, bearing in mind the following points.

16 Renew the gasket, and apply a bead of sealant at least 5.0 mm (0.2 in) wide around the central coolant aperture on both sides of the gasket. Ensure that all mating faces are clean.

30.25a Disconnect the throttle cable from the securing bracket . . .

30.25b . . . and the throttle linkage

17 Tighten the manifold securing nuts and bolts progressively to the specified torque, where applicable ensuring that the earth strap is in position.

18 Make sure that all hoses, cables, wires and leads are correctly reconnected. When reconnecting the air inlet hose, make sure that the hose clips are correctly aligned, see illustration, Section 15.

19 On completion, refill the cooling system, adjust the throttle cable and check and if necessary adjust the idle mixture.

2.0 litre DOHC models

Note: *New fuel injector seals must be used on refitting.*

20 Disconnect the battery negative lead.

21 Partially drain the cooling system.

22 Disconnect the coolant hoses from the thermostat housing and the inlet manifold.

23 Disconnect the air inlet hose from the front of the inlet manifold.

24 Disconnect the breather hoses and the vacuum hoses from the inlet manifold noting their locations when disconnecting the brake servo vacuum hose.

25 Disconnect the throttle cable from the throttle linkage **(see illustrations)**.

26 Disconnect the HT leads from the spark plugs, noting their locations to aid refitting, and move them to one side.

27 Disconnect the wiring from the cooling fan switch, the engine coolant temperature sensor, and the temperature gauge sender.

28 Release the throttle position sensor wiring connector from the clip under the throttle body, and separate the two halves of the connector.

29 Remove the fuel injectors.

30 Check that all relevant wiring, hoses and pipes have been disconnected, to facilitate removal of the manifold.

31 Unscrew the ten bolts and two nuts securing the inlet manifold to the cylinder head, and carefully withdraw the manifold. Recover the gasket.

32 Recover the two plastic spark plug spacers from the recesses in the cylinder head **(see illustration)**.

33 If desired, the manifold can be dismantled with reference to the relevant paragraphs of this Chapter.

34 Refitting is a reversal of removal, bearing in mind the following points.

30.32 Removing a spark plug spacer from the cylinder head recess

35 Ensure that the spark plug spacers are in position in the cylinder head recesses before refitting the manifold.

36 Renew all gaskets.

37 Tighten all manifold securing nuts and bolts progressively to the specified torque.

38 Make sure that all hoses, pipes and wires are securely reconnected in their original positions.

39 On completion, refill the cooling system. Check the adjustment of the throttle cable and if necessary adjust the idle speed and mixture (as applicable).

1.6 and 1.8 litre (R6A type) CVH models

40 Disconnect the battery negative lead.

41 Remove the air cleaner assembly.

42 Depressurise the fuel system and disconnect the fuel inlet pipe from the CFI unit.

43 Disconnect the fuel return pipe from the CFI unit. Be prepared for fuel spillage.

44 Disconnect the throttle cable from the linkage on the CFI unit.

45 Partially drain the cooling system.

46 Disconnect the coolant hoses from the thermostat housing and, where applicable, the CFI unit.

47 Disconnect the vacuum and breather hoses from the inlet manifold and the CFI unit, noting their locations.

48 Disconnect the wiring from the following components, according to engine type.

Air charge temperature sensor.
Throttle position sensor.
Fuel pressure regulator/injector.
Throttle valve control motor.
Engine coolant temperature sensor.
Cooling fan switch.
Temperature gauge sender.

49 Unbolt the dipstick tube from the inlet manifold, and withdraw the dipstick and dipstick tube from the cylinder block.

50 Make a final check to ensure that all relevant wires, hoses and pipes have been disconnected to facilitate removal of the manifold.

51 Unscrew the seven nuts, or six securing nuts and the single bolt, securing the inlet manifold to the cylinder head, then lift the manifold from the cylinder head. Recover the gasket.

52 If desired, the CFI unit can be removed from the inlet manifold.

53 If necessary, the thermostat and housing can be removed from the manifold.

54 Refitting is a reversal of removal, noting the following points.

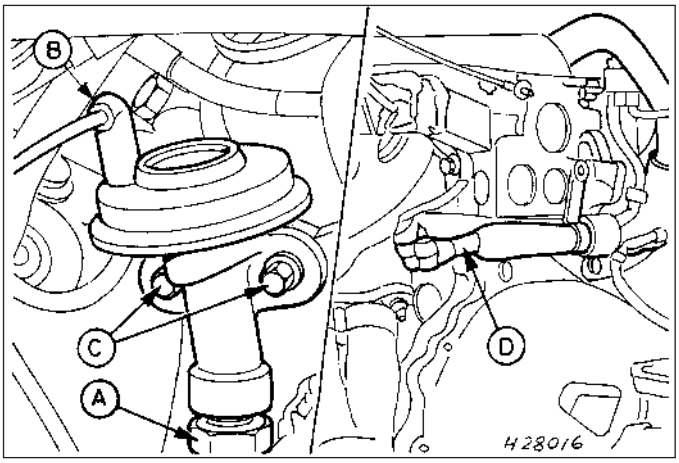
55 Ensure that all mating faces are clean, and renew all gaskets.

56 Tighten the manifold nuts (and bolt, where applicable) progressively to the specified torque.

57 Make sure that all wires, hoses and pipes are reconnected as noted before removal.

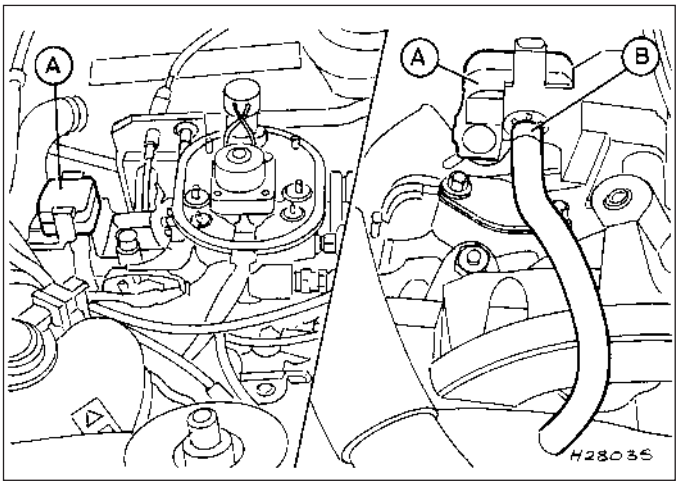
58 Top-up the cooling system.

59 On completion, turn the ignition on and off five times to pressurise the system, and check for fuel leaks.



31.3 Exhaust gas recirculation valve attachments - 1.8 litre (R6A) CVH

A Metal tube-to-EGR valve retaining nut
B Vacuum hose
C EGR valve retaining bolts
D EGR valve metal tube location



32.1 Exhaust pressure transducer attachments - 1.8 litre (R6A) CVH

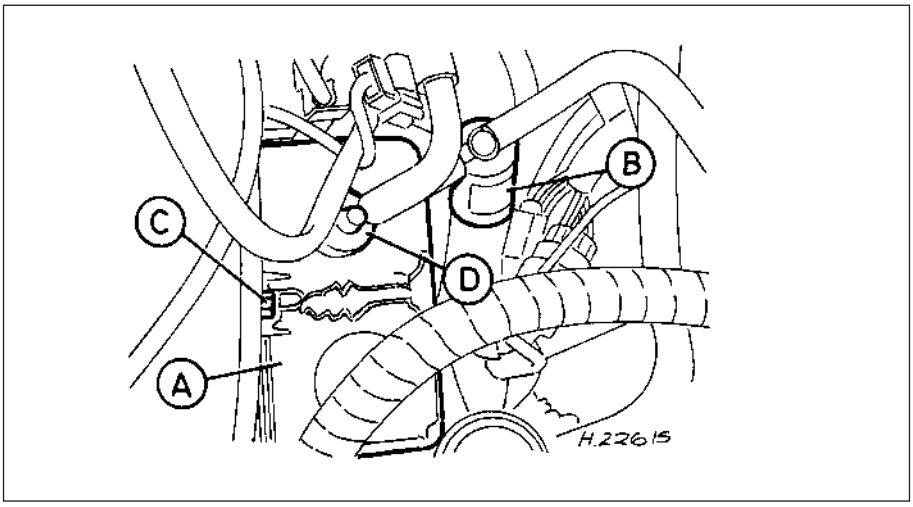
A Exhaust pressure transducer
B Vacuum hose

31 Exhaust gas recirculation valve (1.8 litre (R6A type) CVH) - removal and refitting

1 The EGR valve is located on the right-hand side of the engine, below the CFI unit.
2 Disconnect the battery negative lead.
3 Disconnect the vacuum hose connecting the EGR valve to the electronic vacuum regulator **(see illustration)**.
4 Undo the nut securing the metal tube to the underside of the valve. Undo the two bolts, and remove the valve from the engine.
5 Refitting is a reversal of removal, but loosely fit the metal tube securing nut to the EGR valve before fitting the valve in position. Tighten the nut securely on completion.

32 Exhaust pressure transducer (1.8 litre (R6A type) CVH) - removal and refitting

1 The EPT unit is located on the right-hand side of the engine, behind the CFI unit **(see illustration).**
2 Disconnect the battery negative lead.
3 Remove the air cleaner assembly.
4 Disconnect the EPT wiring plug, and slip the unit out of its mounting bracket.
5 Detach the vacuum hose, and remove the unit from the car.
6 Refitting is a reversal of removal.



33.3 Carbon canister and purge solenoid locations - DOHC

A Carbon canister
B Purge solenoid
C Canister retaining bolt
D Pipe

33 Carbon canister (models with catalytic converter) - removal and refitting

2.0 litre DOHC models

1 Where fitted, the carbon canister is located on the right-hand side of the engine compartment, underneath the coolant expansion tank.
2 Disconnect the battery negative lead.
3 Pull the plastic pipe from the canister (the connector is a push-fit in the canister) **(see illustration)**.
4 Unscrew the securing bolt, and lift the canister from its location.
5 Refitting is a reversal of removal.

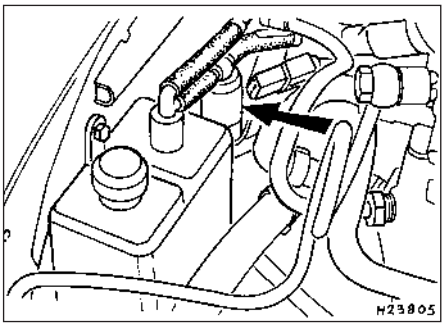
1.6 and 1.8 litre (R6A type) CVH models

6 The carbon canister (where fitted) is located on the right-hand side of the engine compartment.
7 Proceed as detailed in paragraphs 2 to 5 inclusive.

34 Carbon canister-purge solenoid (models with catalytic converter) - removal and refitting

2.0 litre DOHC models

1 The purge solenoid is located next to the carbon canister, on the right-hand side of the engine compartment.
2 Disconnect the battery negative lead.
3 Disconnect the solenoid wiring plug halves by releasing the locktabs and pulling on the plug halves, not the wiring.



34.7 Carbon canister-purge solenoid location (arrowed) - 1.6/1.8 litre (R6A) CVH

4 Note the locations of the two solenoid pipes, and the orientation of the solenoid, to assist with refitting.
5 Disconnect the two pipes from the solenoid, and withdraw the solenoid from its location.
6 Refitting is a reversal of removal. Ensure that the solenoid pipes are correctly reconnected, and that the solenoid is correctly orientated, as noted before removal.

1.6 and 1.8 litre (R6A type) CVH models

7 On 1.6 litre engines, the purge solenoid is located to the rear of the carbon canister, on the right-hand side of the engine compartment. On 1.8 litre engines, the location varies according to model and equipment, but can be traced by following the solenoid pipes back from the carbon canister **(see illustration).**
8 Proceed as detailed in paragraphs 2 to 6 inclusive.

35 Exhaust gas oxygen (HEGO) sensor (2.0 litre DOHC/1.6 & 1.8 litre (R6A type) CVH) - removal and refitting

Note: *Do not touch the tip of the HEGO sensor as this will drastically shorten its service life.*
Note: *A new sealing ring should be used on refitting.*

Removal

1 Ensure that the engine and the exhaust system are cold.
2 Disconnect the battery negative lead.
3 Apply the handbrake, then jack up the front of the vehicle, and support it securely on axle stands (see "*Jacking and Vehicle Support*").
4 Disconnect the sensor wiring plug halves by releasing the locktabs and pulling on the plug halves, not the wiring.
5 Where fitted, slide the heat shield from the sensor **(see illustration)**.
6 Unscrew the sensor from the exhaust downpipe, and recover the sealing ring. Do not touch the tip of the sensor if it is to be refitted.

Refitting

7 Commence refitting by ensuring that the sensor threads and the corresponding threads in the downpipe are clean.
8 Refit the sensor using a new sealing ring, and tighten it to the specified torque.
9 Further refitting is a reversal of removal, but on completion start the engine, and check for leaks around the sensor sealing ring.

36 Exhaust manifold - removal and refitting

2.0 litre SOHC models

1 Refer to Chapter 4 Part A, Section 26, but note the following points.
2 Ignore the references to removal and refitting of the air cleaner and hot air pick-up pipe, and note that a heat shield is fitted in place of the hot air shroud.
3 Note the location of the inlet manifold bracing strut which is secured to one of the manifold studs by an extra nut.

2.0 litre DOHC models

Note: *A new manifold gasket must be used on refitting.*
4 Disconnect the battery negative lead.
5 Disconnect the wiring plug from the idle speed control valve at the front of the plenum chamber.
6 Loosen the clamp, and detach the air inlet hose from the air inlet tubing.
7 Unscrew the securing nut, and release the air inlet tube from the bracket on the engine compartment front panel.
8 Release the air cleaner lid securing clips, then lift away the air inlet tube, plenum chamber and air cleaner lid as an assembly disconnecting the breather hose from the air inlet tube.
9 On models with a catalytic converter, disconnect the exhaust gas oxygen sensor wiring plug.
10 Unscrew the securing nuts, and disconnect the exhaust downpipe from the manifold. Recover the gasket. Support the exhaust downpipe from underneath the vehicle (eg with an axle stand) to avoid placing unnecessary strain on the exhaust system.
11 Unscrew the six securing nuts, and lift the manifold from the cylinder head. Recover the gasket.
12 Refitting is a reversal of removal, bearing in mind the following points.
13 Ensure that all mating faces are clean, and use a new gasket.
14 Tighten the manifold securing nuts and the downpipe securing nuts progressively to the specified torque (where given).

1.6 and 1.8 litre (R6A type) CVH models

Note. *A new manifold gasket and downpipe gaskets must be used on refitting.*
15 Disconnect the battery negative lead.

35.5 Sliding the heat shield from the exhaust gas oxygen sensor

16 Remove the air cleaner and, where fitted, pull the hot-air pick-up pipe from the exhaust manifold hot-air shroud.
17 On 1.6 litre engines, remove the pulse-air delivery tubing.
18 Remove the securing bolts, and withdraw the hot-air shroud from the manifold.
19 Disconnect the exhaust gas oxygen sensor wiring plug. Unscrew the securing nuts, and disconnect the exhaust downpipe from the manifold. Recover the gasket. Support the exhaust downpipe from underneath the vehicle (eg with an axle stand) to avoid placing unnecessary strain on the exhaust system.
20 Unscrew the securing nuts, and lift the manifold from the cylinder head. Recover the gasket.
21 Refitting is a reversal of removal, bearing in mind the following points.
22 Ensure that all mating faces are clean, and renew all gaskets.
23 Tighten the manifold securing nuts progressively to the specified torque, and similarly tighten the exhaust downpipe securing nuts.

37 Exhaust system - inspection, removal and refitting

1 Refer to Chapter 4 Part A, Section 27.
2 On all models except 2.0 litre SOHC, flanged joints incorporating gaskets may be used to join exhaust sections on certain models. Where applicable, renew the gaskets on refitting.
3 On models fitted with a catalytic converter, disconnect the battery negative lead and disconnect the exhaust gas oxygen (HEGO) sensor wiring plug before removing the downpipe.