Chapter 4 Part C: Fuel/exhaust systems - multi-point fuel injection models

ACAV inlet system (16-valve models) - general information, removal and refitting 19
Accelerator cable - removal, refitting and adjustment 3
Accelerator pedal - removal and refitting 4
Air cleaner assembly and inlet ducts - removal and refitting 2
Air cleaner filter element renewal . . . . . .See Chapter 1
Bosch L3.1-Jetronic system components - removal, refitting and adjustments 14
Bosch LU2-Jetronic system components - removal, refitting and adjustments 15
Bosch Motronic system components - removal, refitting and adjustments 16
Electronic control unit - removal and refitting 13
Exhaust manifold - removal and refitting 20
Exhaust system check . . . . . .See Chapter 1
Exhaust system - general information, removal and refitting 21
Fuel filter renewal . . . . . .See Chapter 1
Fuel gauge sender unit - removal and refitting 9
Fuel injection system - depressurisation 7
Fuel injection system - testing and adjustment 11
Fuel injection systems - general information 6
Fuel pump - removal and refitting 8
Fuel tank - removal and refitting 10
General information 1
Idle speed and mixture adjustment . . . . . .See Chapter 1
Inlet manifold - removal and refitting 18
Magneti Marelli system components - removal, refitting and adjustments 17
Throttle housing - removal and refitting 12
Unleaded petrol - general information and usage 5

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

System type

XU5 (BFZ), XU7 (LFZ), XU10 (RFX), XU10 (R6D) engine	Magneti Marelli 8P multi-point
XU5 (BFZ) engine	Sagem-Lucas 4GJ multi-point
XU7 (LFZ) engine	Bosch Motronic MP5.1 multi-point
XU9 (D6A and D6D) engine	Bosch L3.1-Jetronic multi-point
XU9 (D6D) engine	Bosch Motronic MP3.1 multi-point
XU9 (DKZ and DFZ) engine	Bosch LU2-Jetronic multi-point
XU9 (DKZ and DFV), XU9 (DFW 16-valve) engine	Bosch Motronic M1.3 multi-point
XU9 (D6C) 16-valve engine	Bosch Motronic ML4.1 multi-point
XU10 (RFY 16-valve), XU10 (RFT) engine	Bosch Motronic MP3.2 multi-point

Fuel system data

Fuel pump type	Electric, external (early models) or internal (later models)
Fuel pump regulated constant pressure (at specified idle speed):	
Bosch L3.1 system	2.5 bars
Other Bosch systems	3.0 ± 0.2 bars
Magneti Marelli system	2.5 ± 0.2 bars
Sagem-Lucas system	Not available
Specified idle speed:	
Bosch L3.1 system	925 ± 25 rpm
Other systems	850 ± 50 rpm (not adjustable - controlled by ECU)
Idle mixture CO content	Less than 1.0 % (not adjustable- controlled by ECU)

Recommended fuel

Minimum octane rating:	
TU3 (K1A), TU3A (K1G), XU92C (D2D), XU9J2 (D6A), XU9J4 (D6C), XU52C (B2A) engines	97 RON leaded*
All other engines	95 RON unleaded (UK unleaded premium). Leaded fuel must **not** be used on models with a catalytic converter

**It may be possible to use unleaded if the ignition is retarded by 3° - check with your Peugeot dealer.*

1 General information and precautions

The fuel supply system consists of a fuel tank (mounted under the rear of the car), with an electric fuel pump either mounted externally or internally in the tank, a fuel filter, fuel feed and return lines. The fuel pump supplies fuel to the fuel rail, which acts as a reservoir for the four fuel injectors which inject fuel into the inlet tracts. The fuel filter incorporated in the feed line from the pump to the fuel rail ensures that the fuel supplied to the injectors is clean.

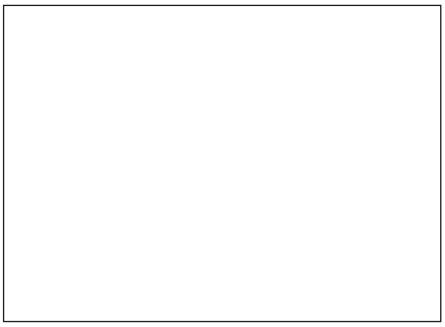
Refer to Section 6 for further information on the operation of each fuel injection system, and to Section 21 for information on the exhaust system. Throughout this Section, it is also occasionally necessary to identify vehicles by their engine codes rather than by engine capacity alone. Refer to the relevant Part of Chapter 2 for further information on engine code identification.

Note: Residual pressure will remain in the fuel lines long after the vehicle was last used. When disconnecting any fuel line, first depressurise the fuel system as described in Section 7.

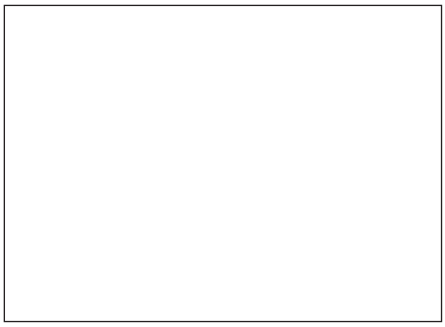
Note: At the time of writing little information was available for the Sagem-Lucas injection system.

2 Air cleaner assembly and inlet ducts - removal and refitting 2

Removal



3.1a Disconnecting accelerator cable from the throttle quadrant (Bosch L3.1 system)



3.1b Disconnecting the accelerator cable end fitting (Bosch L3.1 system)

information is thought to be required, check with a Peugeot dealer. If travelling abroad, consult one of the motoring organisations (or a similar authority) for advice on the fuel available.

The fuel recommended by Peugeot is given in the Specifications Section of this Chapter, followed by the equivalent petrol currently on sale in the UK.

All multi-point injection models are designed to run on fuel with a minimum octane rating of 95 (RON). All models with a catalytic converter must be run on unleaded fuel *only*. Under no circumstances should leaded fuel (UK "4-star") be used, as this may damage the converter.

6 Fuel injection systems - general information

Note: *On later models the fuel injection ECU is of the "self-learning" type, meaning that as it operates, it also monitors and stores the settings which give optimum engine performance under all operating conditions. When the battery is disconnected, these settings are lost and the ECU reverts to the base settings programmed into its memory at the factory. On restarting, this may lead to the engine running/idling roughly for a short while, until the ECU has re-learned the optimum settings. This process is best accomplished by taking the vehicle on a road test (for approximately 15 minutes), covering all engine speeds and loads, concentrating mainly in the 2500 to 3500 rpm region.*

Bosch L3.1 (Jetronic) system

1 The Bosch L3.1 fuel injection system is of the intermittent type operating under low pressure. Fuel is drawn from the rear-mounted fuel tank by an externally-mounted fuel pump and delivered through an in-line filter to the injectors. A pressure regulator mounted on the outlet side of the fuel rail, and connected by pipe to the inlet manifold to sense vacuum, maintains a constant pressure at the injectors according to the depression in the inlet manifold, returning excess fuel to the fuel tank.

2 A pulse damper on the inlet side of the fuel rail damps out the pressure pulses caused by the operation of the injectors.

3 The electronic control unit (ECU) and airflow meter are mounted on the air filter housing. The ECU uses signals from various sensors to determine the opening period of the injectors for any given engine operating condition. The inputs are as follows.

a) Amount of air being drawn in by the engine via the airflow meter.
b) Inlet air temperature via the thermistor mounted in the airflow meter.
c) Engine speed and angular position via the injection (coolant) thermistor.
d) Throttle position via the throttle switch unit.

4 The injectors operate simultaneously, spraying fuel onto the inlet side of the inlet valves.

5 A supplementary air device is fitted to the system to compensate for the extra fuel required during cold start conditions.

Bosch LU2-Jetronic system

6 The principle of operation of the LU2-Jetronic system is similar to that described for the L3.1-Jetronic system but with the following differences.

a) A single-barrel throttle body is fitted.
b) An oxygen sensor is fitted.
c) A catalytic converter is fitted.

7 The most significant difference is that the LU2-Jetronic system incorporates an oxygen sensor in the exhaust system, which enables the electronic control unit to carry out fine fuel/air mixture adjustment to allow the use of a catalytic converter.

Bosch Motronic MP3.1 system

8 The principle of operation of the Motronic MP3.1 system is similar to that described for the L3.1-Jetronic system but with the following differences.

a) The ECU controls the ignition system in addition to the fuel injection system, providing an integrated engine management system.
b) A static (distributorless)ignition system is used.
c) An inlet air temperature sensor and a manifold absolute pressure (MAP) sensor are used in place of the airflow meter.
d) An engine speed/position sensor is used to provide information on engine speed and crankshaft position.

Bosch Motronic M1.3 system

9 The principle of operation of the Motronic M1.3 system is similar to that described for the L3.1-Jetronic system but with the following differences.

a) The ECU controls the ignition system and the fuel injection system, providing an integrated engine management system.
b) An engine speed/position sensor is used to provide information on engine speed and crankshaft position.
c) The ECU controls the idle speed under all engine operating conditions, via an idle speed control valve. No supplementary air device is fitted.
d) An oxygen sensor is fitted to enable the ECU to control the air/fuel mixture very accurately, allowing the use of a catalytic converter.
e) A knock sensor, mounted in the cylinder block is used to detect the onset of engine knock, or pre-ignition. This enables the ECU to select the optimum ignition advance for the prevailing engine operating conditions without risk of damage to the engine.

Bosch Motronic ML4.1 system

10 The principle of operation of the Motronic ML4.1 system is similar to that described for the L3.1-Jetronic system but with the following differences.

a) The ECU incorporates a cold start function and a fault memory.
b) The mixture adjustment by-pass screw is replaced by an adjustment screw on the throttle potentiometer.
c) The throttle housing has a double body.
d) Idle speed is maintained at a predetermined level (regardless of load) by an idle speed valve.

Bosch Motronic MP5.1 system

11 The Bosch Motronic MP5.1 engine management (fuel injection/ignition) system incorporates a closed-loop catalytic converter and an evaporative emission control system, and complies with the very latest emission control standards. Refer to Chapter 5 for detaisl on the ignition side of the system; the fuel side of the system operates as follows.

12 The fuel pump (which is immersed in the fuel tank) supplies fuel from the tank to the fuel rail, via a filter mounted underneath the rear of the vehicle. Fuel supply pressure is controlled by the pressure regulator in the fuel rail. When the optimum operating pressure of the fuel system is exceeded, the regulator allows excess fuel to return to the tank.

13 The electrical control system consists of the ECU, along with the following sensors:

a) Throttle potentiometer - informs the ECU of the throttle position, and the rate of throttle opening/closing.

b) Coolant temperature sensor - informs the ECU of engine temperature.
c) Inlet air temperature sensor - informs the ECU of the temperature of the air passing through the throttle housing.
d) Lambda sensor - informs the ECU of the oxygen content of the exhaust gases (explained in Part D of this Chapter).
e) Crankshaft sensor - informs the ECU of crankshaft position and speed of rotation.
f) Manifold Absolute Pressure (MAP) sensor - informs the ECU of the load on the engine (expressed in terms of inlet manifold vacuum).
g) Vehicle speed sensor - informs the ECU of the vehicle speed.

14 All the above signals are analysed by the ECU which selects the fuelling response appropriate to those values. The ECU controls the fuel injectors (varying the pulse width - the length of time the injectors are held open - to provide a richer or weaker mixture, as appropriate). The mixture is constantly varied by the ECU, to provide the best setting for cranking, starting (with either a hot or cold engine), warm-up, idle, cruising and acceleration.

15 The ECU also has full control over the engine idle speed, via an auxiliary air valve which bypasses the throttle valve. When the throttle valve is closed, the ECU controls the opening of the valve, which in turn regulates the amount of air entering the manifold, and so controls the idle speed.

16 The ECU also controls the exhaust and evaporative emission control systems, which are described in Part D of this Chapter.

17 An electric heating element is fitted to the throttle housing; the heater is supplied with current by the ECU, and warms the throttle housing on cold starts to prevent possible icing of the throttle valve.

18 If there is an abnormality in any of the readings obtained from either the coolant temperature sensor, the inlet air temperature sensor or the lambda sensor, the ECU enters its back-up mode. In this event, it ignores the abnormal sensor signal and assumes a pre-programmed value which will allow the engine to continue running (albeit at reduced efficiency). If the ECU enters this back-up mode, the warning light on the instrument panel will come on, and the relevant fault code will be stored in the ECU memory.

19 If the warning light comes on, the vehicle should be taken to a Peugeot dealer at the earliest opportunity. A complete test of the engine management system can then be carried out, using a special electronic diagnostic test unit which is simply plugged into the system's diagnostic connector.

Magneti Marelli 8P system

20 The Magneti Marelli 8P engine management (fuel injection/ignition) system is very similar in operation to the Bosch MP5.1 system described above, apart from the idle speed control system.

21 On the Magneti Marelli system, the idle speed is controlled by the ECU via a stepper motor fitted to the throttle housing. The motor has a pushrod controlling the opening of an air passage which bypasses the throttle valve. When the throttle valve is closed, the ECU controls the movement of the motor pushrod, which regulates the amount of air which flows through the throttle housing passage, so controlling the idle speed. The bypass passage is also used as an additional air supply during cold starting.

7 Fuel injection system - depressurisation



Note: *Refer to the warning note in Section 1*



14.6a Secondary throttle adjusting screw (arrowed) . . .

14.6b . . . and viewed from underneath

14.13 Throttle switch unit mounting bolts (A) and plug terminal numbers

5 Remove the feeler blade then turn the screw in by a further quarter turn. Fit a new tamperproof cap.

Secondary barrel

6 The procedure is as described for the primary barrel but using the secondary throttle adjustment screw **(see illustrations)**.
7 On completion of the adjustment, apply a drop of thread locking compound to the head of the adjustment screw.
8 Adjust the throttle switch.
9 Reconnect the throttle switch and accelerator cable.

Throttle switch

10 To remove the unit, disconnect the multi-plug and unbolt the unit from the throttle housing.
11 To adjust the switch proceed as follows.
12 The throttle valve initial opening position must be correctly adjusted.

Idling switch

13 Loosen the switch bolts and turn it clockwise as far as it will go, then bring it back until the switch can be heard to operate **(see illustration)**.
14 Tighten the mounting bolts with the switch held in this position.
15 To check that the adjustment is correct, disconnect the multi-plug and connect an ohmmeter to terminals 2 and 18 on the switch.
16 The ohmmeter should read zero ohms.
17 Fully depress the accelerator pedal, when the ohmmeter should read infinity.
18 If these readings are incorrect, re-adjust the switch.

Full load switch

19 Connect the ohmmeter to terminals 3 and 18 on the switch. The reading should indicate infinity.
20 Fully depress the accelerator pedal, when the reading should be zero ohms.
21 If these readings are incorrect, renew the throttle switch.
22 Reconnect the multi-plug.

Airflow meter and ECU

23 The airflow meter and ECU are removed as described in Section 2.

Fuel rail and injectors

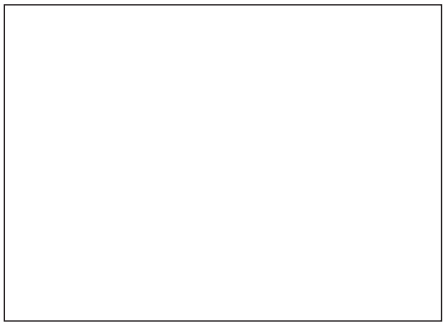
Note: *Refer to the warning note in Section 1 before proceeding.*
Note: *If a faulty injector is suspected, before condemning the injector, it is worth trying the effect of one of the proprietary injector-cleaning treatments.*
24 Depressurise the fuel system.
25 Disconnect the sensor pipe on the fuel pressure regulator and remove the bolt from the regulator support bracket on the inlet manifold.
26 Number the injector electrical plugs then disconnect them from the injectors.
27 Disconnect the inlet and outlet fuel hoses, being prepared for any fuel spillage.
28 Unbolt the fuel rail and pull it and the injectors upward to release them from the cylinder head **(see illustrations)**.
29 Pull out the clips securing the injectors to the fuel rail and pull out the injectors. Number them for refitting in the same positions **(see illustration)**.
30 Check the condition of the O-ring seals and renew them as necessary **(see illustration)**.
31 Clean the injector nozzles using injector cleaning fluid. **Note:** *Fouling of the injector nozzles can cause the following symptoms.*

a) Difficult hot starting.
b) Persistent stalling.
c) Misfiring when cold.
d) Misfire when hot between 1000 and 2000 rpm.
e) Loss of performance.

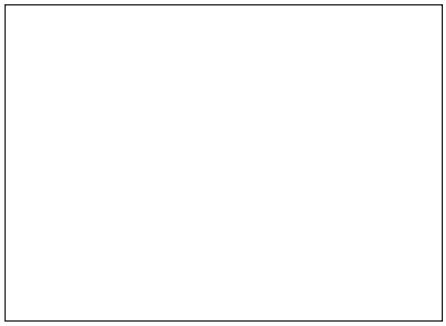
32 Refitting is a reversal of removal.

Fuel pressure regulator

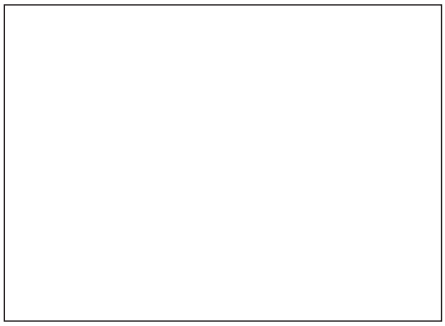
33 Depressurise the system.
34 Disconnect the sensor pipe.
35 Disconnect the fuel hose.



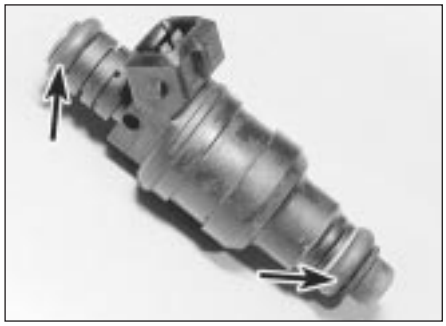
14.28a Removing a fuel rail bolt . . .



14.28b . . . and pulling up the rail and injectors



14.29 Removing an injector from the fuel rail



14.30 Injector O-ring seals (arrowed)



14.37 Regulator-to-fuel rail bolts (arrowed) - assembly removed for clarity



14.40 Fuel pump damper showing fuel hose connections



14.45 Disconnecting the supplementary air device plug

36 Remove the bolt from the support bracket on the inlet manifold.
37 Unbolt and remove the regulator from the fuel rail **(see illustration)**.
38 Refit in reverse order.

Fuel pump damper

39 Depressurise the fuel system.
40 Disconnect the fuel hose unions from the damper **(see illustration)**.
41 Unscrew the nut securing the damper to the support bracket and remove the damper.
42 Refit in reverse order.

Supplementary air device

43 Disconnect the battery then remove the battery and battery tray.
44 Remove the nuts securing the water housing to the cylinder head.
45 Disconnect the wiring and air hoses from the air device **(see illustration)**.
46 Tilt the water housing to gain access to the air device securing bolts and remove the bolts and air device.
47 Refit in reverse order.

Injection thermistor

48 Disconnect the wiring from the thermistor on the water housing **(see illustration)**.
49 Drain the cooling system.
50 Unscrew the thermistor from the water housing.
51 Refit in reverse order, using a new sealing washer.
52 Top-up and bleed the cooling system.



14.48 Disconnecting the injection thermistor wiring

Fuel filter

53 Disconnect the battery negative lead.
54 Depressurise the fuel system.
55 Disconnect the inlet and outlet hoses from the filter **(see illustration)**.
56 Loosen the rubber mounting strap clamp nut and slide the filter from the clamp.
57 Refit in reverse order, ensuring any directional arrows on the filter are facing the direction of fuel flow.

15 Bosch LU2-Jetronic system components - removal, refitting and adjustments

Throttle initial position

1 The throttle initial position is set in production, and will not normally require adjustment unless the throttle housing has been tampered with. Adjustment should be entrusted to a Peugeot dealer.

Throttle switch unit

2 Disconnect the battery negative lead.
3 Disconnect the wiring plug from the switch.
4 Remove the two securing screws, and withdraw the switch from the throttle body.
5 Commence refitting by initially adjusting the switch as described later.
6 Refitting is reversal of removal, but ensure that the switch wiper engages correctly with the flats on the end of the throttle spindle.
7 The throttle initial position must be correctly adjusted before attempting to adjust the throttle switch.
8 Slacken the throttle switch securing screws.
9 Turn the switch unit fully clockwise, then turn it slowly back until the idling contacts are heard to close.
10 Tighten the securing screws.
11 Pull the wiring from the switch, then connect an ohmmeter between terminals 2 and 18 in the switch - the ohmmeter should read zero.
12 Operate the throttle linkage, and the ohmmeter should read infinity.
13 If the readings are not correct, repeat the adjustment.
14 Connect an ohmmeter between switch terminals 3 and 18 - the ohmmeter should read infinity.
15 Fully open the throttle, and the ohmmeter should read zero.
16 If the specified readings cannot be obtained, renew the switch.
17 Reconnect the switch wiring plug on completion.

Airflow meter

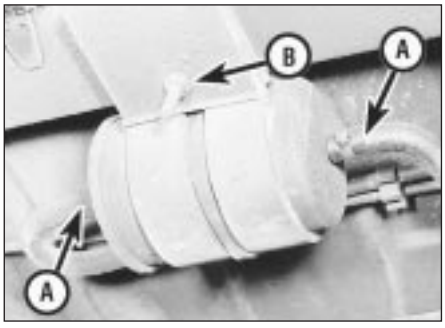
18 The airflow meter is removed as described in Section 2.

Electronic control unit (ECU)

19 Refer to Section 13.

Fuel injectors

Note: *Refer to the warning note in Section 1 before proceeding.*
Note: *If a faulty injector is suspected, before condemning the injector, it is worth trying the effect of one of the proprietary injector-cleaning treatments.*
20 Depressurise the fuel system.
21 Disconnect the battery negative lead.
22 Disconnect the wiring plugs from the fuel injectors, labelling them if necessary to ensure correct refitting.
23 Disconnect the vacuum hose from the top of the fuel pressure regulator.
24 Unscrew the four bolts securing the fuel rail to the inlet manifold then carefully lift the rail, complete with pressure regulator and fuel injectors, from the inlet manifold, taking care not to strain any of the hoses or pipes.



14.55 Fuel filter showing fuel hoses (A) and clamp bolt (B)

25 To remove a fuel injector from the fuel rail, carefully remove the metal securing clip, then pull the injector from the rail. Be prepared for fuel spillage.
26 Refitting is a reversal of removal, but use new injector O-rings.

Fuel pressure regulator

Note: *Refer to the warning note in Section 1 before proceeding.*
27 For improved access to the regulator lower securing nut, remove the fuel rail.
28 If not already done, disconnect the vacuum hose from the top of the pressure regulator.
29 Slacken the hose clip, and disconnect the fuel return hose from the bottom of the pressure regulator. Be prepared for fuel spillage.
30 Unscrew the two bolts securing the pressure regulator to the fuel rail bracket assembly, whilst counterholding the nuts. Note that on some models a hose bracket is secured by the upper bolt.
31 Pull the regulator from the end of the fuel rail, and recover the O-ring.
32 Refitting is a reversal of removal, but use a new O-ring when refitting the pressure regulator to the fuel rail, and where applicable, use new injector O-rings.

Oxygen sensor

33 The sensor is located in the exhaust downpipe. When handling the sensor, note that it is fragile; take care not to drop it, and do not allow it to contact fuel or silicone substances.
34 Start the engine and run it until it reaches normal operating temperature, then switch off and disconnect the battery negative lead.
35 If access is required from below, jack up the front of the car and support it on axle stands (see "*Jacking and Vehicle Support*).
36 Release the securing clips, and separate the two halves of the sensor wiring connector.
37 Using a suitable spanner, unscrew it from the exhaust downpipe.
38 Refitting is a reversal of removal, bearing in mind the following points.

a) Apply anti-seize compound to the threads of the sensor.
b) The sensor must be tightened securely; this will require the use of either a deep socket, slotted to allow for the sensor wiring, or of a spanner.

16 Bosch Motronic system components - removal, refitting and adjustments



Fuel rail and injectors

Note: *Refer to the warning note in Section 1 before proceeding. If a faulty injector is suspected, before condemning the injector, it is worth trying the effect of one of the proprietary injector-cleaning treatments.*



Warning: During the procedure described in this Section it is very important not to allow fuel to spill into the engine, otherwise a hydraulic lock may occur causing extensive engine damage.

1 Disconnect the battery negative terminal.
2 Disconnect the vacuum pipe from the fuel pressure regulator, then slacken and remove the retaining nut and bolt and release the wiring/hose retaining clip from the end of the fuel rail.
3 Bearing in mind the information given in Section 7, slacken the retaining clips and disconnect the fuel feed and return hoses from the fuel rail. Where the original crimped-type Peugeot hose clips are still fitted, cut them and discard; replace them with standard worm-type hose clips on refitting.
4 Depress the retaining tangs and disconnect the wiring connectors from the four injectors.
5 Slacken and remove the fuel rail retaining bolts and nuts, then carefully ease the fuel rail and injector assembly out from the inlet manifold and remove it from the vehicle. Remove the O-rings from the end of each injector and discard them; they must be renewed whenever they are disturbed.
6 Slide out the retaining clip(s) and remove the relevant injector(s) from the fuel rail. Remove the upper O-ring from each disturbed injector and discard; all disturbed O-rings must be renewed.
7 Refitting is a reversal of the removal procedure, noting the following points.

a) Fit new O-rings to all disturbed injector unions.
b) Apply a smear of engine oil to the O-rings to aid installation, then ease the injectors and fuel rail into position ensuring that none of the O-rings are displaced.
c) On completion, start the engine and check for fuel leaks.

Fuel pressure regulator

Note: *Refer to the warning note in Section 1 before proceeding.*
8 Disconnect the vacuum pipe from the regulator. Note that access to the regulator is poor with the fuel rail in position, if necessary, remove the fuel rail as described earlier, then remove the regulator.
9 Place a wad of rag over the regulator, to catch any fuel spray which may be released, then remove the retaining clip and ease the regulator out from the fuel rail.
10 Refitting is a reversal of the removal procedure. Examine the regulator seal for signs of damage or deterioration and renew if necessary.

Throttle potentiometer

11 Disconnect the battery negative terminal.
12 Depress the retaining clip and disconnect the wiring connector from the throttle potentiometer.
13 Slacken and remove the two retaining screws, then disengage the potentiometer from the throttle valve spindle and remove it from the vehicle.
14 Refitting is a reversal of the removal procedure ensuring that the potentiometer is correctly engaged with the throttle valve spindle.

Electronic Control Unit (ECU)

15 Refer to Section 13.

Idle speed auxiliary air valve

16 The auxiliary air valve is mounted onto the underside of the inlet manifold.
17 To remove it, first disconnect the battery negative terminal.
18 Depress the retaining clip and disconnect the wiring connector from the air valve.
19 Slacken the retaining clips and disconnect both vacuum hoses from the end of the auxiliary air valve.
20 Slide the valve out from its mounting rubber and remove it from the engine compartment.
21 Refitting is a reversal of the removal procedure. Examine the mounting rubber for signs of deterioration and renew it if necessary.

Manifold absolute pressure (MAP) sensor

22 The MAP sensor is situated on the right-hand side of the engine compartment where it is mounted onto the wing valance. To remove it, first disconnect the battery negative terminal.
23 Undo the retaining nut and free the MAP sensor from the body.
24 Disconnect the wiring connector and vacuum hose and remove the MAP sensor from the engine compartment.
25 Refitting is the reversal of the removal procedure.

Coolant temperature sensor

26 Refer to Chapter 3.

Inlet air temperature sensor

27 The inlet air temperature sensor is screwed into the top of the air cleaner housing. To remove the sensor first disconnect the battery negative terminal.
28 Disconnect the wiring connector, then unscrew the sensor and remove it from the vehicle.
29 Refitting is the reversal of removal.

Crankshaft sensor

30 The crankshaft sensor is situated on the front face of the transmission clutch housing.
31 To remove the sensor, first disconnect the battery negative terminal.
32 Trace the wiring back from the sensor to the wiring connector and disconnect it from the main harness.
33 Prise out the rubber grommet, then undo the retaining bolt and withdraw the sensor from the transmission.
34 Refitting is reversal of the removal

procedure ensuring that the sensor retaining bolt is securely tightened and the grommet is correctly seated in the transmission housing.

Fuel injection system relay unit

35 The relay unit is mounted onto the rear of the ECU plastic box which is situated directly behind the battery.
36 To remove the relay unit, first disconnect the battery.
37 Undo the retaining nut, then disconnect the wiring connector and remove the relay unit from the vehicle.
38 Refitting is the reverse of removal, ensuring that the relay unit is securely clipped in position.

17 Magneti Marelli system components - removal, refitting and adjustments



1.8 litre models

Fuel injectors

Note: *Refer to the warning note in Section 1 before proceeding. If a faulty injector is suspected, before condemning the injector, it is worth trying the effect of one of the proprietary injector-cleaning treatments.*
1 Disconnect the battery negative terminal.
2 Remove the air cleaner-to-throttle housing duct as described in Section 2.
3 Undo the two bolts securing the wiring tray to the top of the manifold, and position the tray clear of the injectors.
4 Depress the retaining clip(s) and disconnect the wiring connector(s) from the injector(s).
5 Slacken the retaining screw and remove the injector retaining plate; Nos 1 and 2 injectors are retained by one plate, Nos 3 and 4 by another.
6 Place a wad of clean rag over the injector, to catch any fuel spray which may be released, then carefully ease the relevant injector(s) out of the manifold. Remove the O-rings from the end of each disturbed injector, and discard them - these must be renewed whenever they are disturbed.
7 On refitting the injectors, fit new O-rings to the end of each injector. Apply a smear of engine oil to the O-ring, to aid installation, then ease the injector(s) back into position in the manifold.
8 Ensure each injector connector is correctly positioned, then refit the retaining plate and securely tighten its retaining screw. Reconnect the wiring connector(s) to the injector(s).
9 Refit the wiring tray to the top of the manifold and securely tighten its retaining bolts.
10 Refit the air cleaner-to-throttle body duct and reconnect the battery. Start the engine and check the injectors for signs of leakage.

Fuel pressure regulator

11 Refer to Section 13.

Throttle potentiometer

12 The throttle potentiometer is fitted to the right-hand side of the throttle housing. To remove the potentiometer, first disconnect the battery negative terminal.
13 Depress the retaining clip and disconnect the potentiometer wiring connector.
14 Slacken and remove the two retaining screws, and remove the potentiometer from the throttle housing.
15 Refitting is the reverse of removal, ensuring that the potentiometer is correctly engaged with the throttle valve spindle.

Electronic Control Unit (ECU)

16 Refer to Section 13.

Idle speed control stepper motor

17 The idle speed control stepper motor is located on the front of the throttle housing assembly. Before removing the motor, first disconnect the battery negative terminal.
18 Release the retaining clip and disconnect the wiring connector from the motor.
19 Slacken and remove the two retaining screws, and withdraw the motor from the throttle housing.
20 Refitting is a reversal of the removal procedure.

Manifold absolute pressure (MAP) sensor

21 Refer to Section 13.

Coolant temperature sensor

22 Refer to Chapter 3.

Inlet air temperature sensor

23 The inlet air temperature sensor is located in the throttle housing.
24 To remove the sensor, first remove the throttle potentiometer as described in paragraphs 12 to 14.
25 Depress the retaining clip and disconnect the wiring connector from the air temperature sensor.
26 Remove the screw securing the sensor connector to the top of the throttle housing, then carefully ease the sensor out of position and remove it from the throttle housing. Examine the sensor O-ring for signs of damage or deterioration, and renew if necessary.
27 Refitting is a reversal of the removal procedure, using a new O-ring where necessary, and ensuring that the throttle potentiometer is correctly engaged with the throttle valve spindle.

Crankshaft sensor

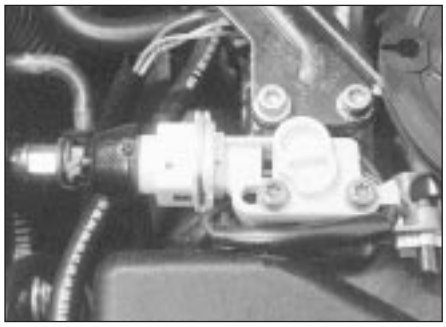
28 Refer to Section 13.

Fuel injection system relay unit

29 Refer to Section 13.

Throttle housing heating element

30 The throttle housing heating element is fitted to the top of the throttle housing. To remove the element, first disconnect the battery negative terminal.



17.32 Throttle housing heating element

31 Depress the retaining tangs and disconnect the wiring connector from the heating element.
32 Undo the screw(s) securing the wiring connector to the throttle housing, then displace the connector and carefully withdraw the heating element from the throttle housing **(see illustration)**. Examine the element O-ring (where fitted) for signs of damage or deterioration, and renew if necessary.
33 Refitting is a reversal of the removal procedure, taking great care to ensure that the element wiring does not become trapped as the wiring connector bolt(s) are tightened.

2.0 litre models

Fuel rail and injectors

Note: *Refer to the warning note in Section 1 before proceeding. If a faulty injector is suspected, before condemning the injector, it is worth trying the effect of one of the proprietary injector-cleaning treatments.*
34 Disconnect the battery negative terminal.
35 Remove the air cleaner-to-throttle housing duct, using the information in Section 2.
36 Disconnect the vacuum pipe from the fuel pressure regulator.
37 Release the retaining clip and free the various hoses from the top of the fuel rail.
38 Bearing in mind the information given in Section 7, slacken the retaining clip, and disconnect the fuel feed and return hoses from the ends of the fuel rail. Where the original crimped-type Peugeot hose clips are still fitted, cut them off and discard them; use standard worm-drive hose clips on refitting.
39 Depress the retaining clips and disconnect the wiring connectors from the four injectors.
40 Slacken and remove the three fuel rail retaining bolts, then carefully ease the fuel rail and injector assembly out from the inlet manifold, and remove it from the vehicle. Remove the O-rings from the end of each injector and discard them; these must be renewed whenever they are disturbed.
41 Slide out the retaining clip(s) and remove the relevant injector(s) from the fuel rail. Remove the upper O-ring from each injector as it is removed, and discard it; all O-rings must be renewed once they have been disturbed.

42 Refitting is a reversal of the removal procedure, noting the following points:

a) Fit new O-rings to all disturbed injectors.
b) Apply a smear of engine oil to the O-rings to aid installation, then ease the injectors and fuel rail into position, ensuring that none of the O-rings are displaced.
c) On completion, start the engine and check for fuel leaks.

Fuel pressure regulator

43 Refer to Section 13.

Throttle potentiometer

44 Remove the throttle housing as described in Section 12.
45 Undo the two retaining screws and remove the potentiometer from the base of the throttle housing.
46 On refitting, ensure that the potentiometer is correctly engaged with the throttle valve spindle, and securely tighten its retaining screws.
47 Refit the throttle housing as described in Section 12.

Electronic control unit (ECU)

48 The ECU is situated inside its own protective compartment in the battery tray. To remove the ECU, first disconnect the battery negative terminal.
49 Unclip the lid from the plastic box and disconnect the wiring connector from the ECU.
50 Slide the ECU out of the box and, if necessary, undo the retaining nuts and separate it from its mounting plate.
51 Refitting is the reverse of removal, ensuring that the wiring connector is securely reconnected.

Idle speed control stepper motor

52 Refer to the information given in paragraphs 17 to 20 of this Section.

Manifold absolute pressure (MAP) sensor

53 The MAP sensor is situated on the right-hand side of the engine compartment, mounted on the front suspension mounting turret. To remove the sensor, first disconnect the battery negative terminal.
54 Undo the three retaining nuts and free the sensor from the underside of the mounting bracket.
55 Depress the retaining clip, disconnect the wiring connector and vacuum hose from the sensor, and remove the sensor from the engine compartment.
56 Refitting is a reversal of the removal procedure.

Coolant temperature sensor

57 Refer to Chapter 3.

Inlet air temperature sensor

58 The inlet air temperature sensor is located in the base of the throttle housing.
59 To remove the sensor, first remove the throttle housing as described in Section 12, then undo the two retaining screws and remove the throttle potentiometer from the base of the housing.
60 Trace the wiring back from the sensor to its wiring connector, and remove the screw securing the connector to the throttle housing.
61 Carefully ease the sensor out of position, and remove it from the throttle housing. Examine the sensor O-ring for signs of damage or deterioration, and renew if necessary.
62 Refitting is a reversal of removal, using a new O-ring where necessary.

Crankshaft sensor

63 Refer to Section 13.

Fuel injection system relay unit

64 Refer to Section 13.

Throttle housing heating element

65 Refer to the information given in paragraphs 30 to 33 of this Section.

Vehicle speed sensor

66 The vehicle speed sensor is an integral part of the transmission speedometer drive assembly. Refer to Chapter 7A for removal and refitting details.

Knock sensor

67 The knock sensor is screwed onto the rear face of the cylinder block.
68 To gain access to the sensor, firmly apply the handbrake, then jack up the front of the vehicle and support it on axle stands (see *"Jacking and Vehicle Support"*). Access to the sensor can then be gained from underneath the vehicle.
69 Trace the wiring back from the sensor to its wiring connector, and disconnect it from the main loom.
70 Slacken and remove the bolt securing the sensor to the cylinder block, and remove it from underneath the vehicle.
71 Refitting is a reversal of the removal procedure, ensuring that the sensor wiring is correctly routed and its retaining bolt securely tightened.

18 Inlet manifold - removal and refitting



Removal

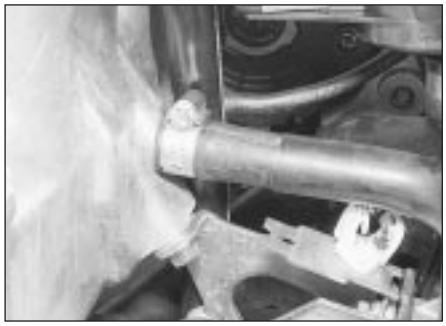
1 Disconnect the battery negative terminal and proceed as described under the relevant sub-heading.

Bosch L3.1-Jetronic system

2 Remove the fuel rail as described previously. There is no need to disconnect any fuel hoses. Lay the rail to one side.
3 Disconnect the brake servo vacuum hose **(see illustration)**.
4 Remove the throttle housing as described previously.
5 Disconnect and unbolt the ignition coil.
6 Disconnect the supplementary air device air hose from the manifold **(see illustration)**.
7 Remove the bolt from the starter bracket **(see illustration)**.
8 Unbolt the oil filler tube support bracket **(see illustration)**.



18.3 Disconnecting the brake servo vacuum hose



18.6 Supplementary air device air hose connection on inlet manifold



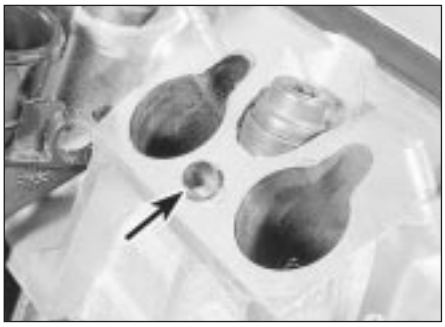
18.7 Removing the bolt from the starter bracket



18.8 Oil filler tube support bracket



18.12a Applying jointing compound to the inlet manifold



18.12b Ensure locating dowels (arrowed) are in position



18.12c Fitting the inlet manifold



18.12d Tightening the manifold securing bolts

9 Remove the manifold securing bolts and the two 5 mm Allen bolts (a long Allen key is required).

10 Lift off the manifold.

Bosch LU2-Jetronic, Motronic and Magneti Marelli systems

11 The procedure is similar to that described above, noting the following points.

a) Note that vacuum, coolant hose and wiring connections to the manifold and associated components vary depending on model. When disconnecting any pipes, hoses, or wires, take note of their locations to ensure correct refitting.

b) Where applicable, ignore the references to the coil, supplementary air device and/or starter bracket.

c) Ensure that any disturbed gaskets are renewed.

d) Note that not all manifolds are secured by Allen bolts.

Refitting

12 Refitting is a reversal of removal using a new gasket/seal or jointing compound as necessary. Ensure that the locating dowels are in position and tighten all bolts to their specified torque **(see illustrations)**.

Note: *The engine gasket kit contains gaskets for both carburettor and injection type manifolds. The injection type gasket has cut-outs for the injector ports. Ensure that the correct gasket is fitted. The carburettor type will partially obstruct the injector ports causing erratic running and loss of power.*

19 ACAV inlet system (16-valve models) - general information, removal and refitting

General information

1 To ensure optimum efficiency at high engine speeds, and maximum torque at lower engine speeds, 16-valve models have an inlet manifold with a variable inlet tract system. The system is called ACAV (variable acoustic characteristic induction).

2 The inlet manifold is divided into two tracts of different length and diameter; a long tract (for low-speed torque) which is 650 mm long, diameter 36 mm, and a short tract (for high-speed power) which is 370 mm long, diameter 45 mm.

3 Situated between the manifold and the cylinder head is a line of four butterfly valves, mounted in an alloy housing. Mounted on either end of the housing is a vacuum diaphragm assembly. Each diaphragm is connected to the butterfly valve spindles via a pushrod. The vacuum diaphragms are connected to an electrically-operated solenoid valve, which is in turn connected to the braking system vacuum pump. The pump is mounted on the end of the cylinder head, and is driven off the left-hand end of the inlet camshaft.

4 At engine speeds below 1800 rpm and above 5080 rpm, the ECU closes the solenoid valve, shutting off the vacuum supply to the diaphragms, and the butterfly valves are closed. With the valves closed, the short inlet tracts are closed, and the incoming air flows only through the long inlet tract, boosting the torque output.

5 At engine speeds between 1800 rpm and 5080 rpm, the ECU opens the solenoid valve. The vacuum present in the pump is then allowed to act on the vacuum diaphragms, which draws the pushrods into the diaphragm bodies, and opens up the four butterfly valves. With the valves open, the incoming air is allowed to flow through both the short and long inlet tracts, for maximum power.

6 To check the system, start the engine and allow it to idle. Slowly increase the engine speed, whilst observing the vacuum diaphragm pushrods. At approximately 1800 rpm, the pushrods should be drawn into the diaphragm bodies (valves open). Release the throttle cam, and allow the engine to idle again; the pushrods should extend from the diaphragms (valves closed).

7 To check the operation of the solenoid valve, disconnect the vacuum pipe from the diaphragm. Start the engine, and allow it to idle. Place your finger over the end of the pipe; no vacuum should be present in the pipe. Slowly increase the engine speed; at approximately 1800 rpm, vacuum should be felt in the pipe. Allow the engine to idle again, and check that the vacuum supply is switched off. If this is not the case, either the solenoid valve or its supply voltage is at fault.

8 To check the operation of either vacuum diaphragm assembly, disconnect the vacuum pipe, and suck hard at the control valve stub; the pushrod should be drawn into the diaphragm body, and the valve should open. If this is not the case, the vacuum diaphragm is faulty.

Removal and refitting

ACAV valve assembly

9 Remove the inlet manifold as described in Section 18.

10 Bearing in mind the information given in Section 7, slacken the retaining clip, and disconnect the fuel feed and return hoses from their unions on the fuel rail. Where the original crimped-type Peugeot hose clips are still fitted, cut them off and discard them; use standard worm-drive hose clips on refitting.

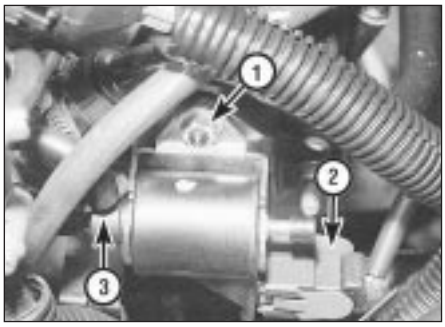
11 Depress the retaining tangs, and disconnect the wiring connectors from the four injectors. To avoid the possibility of the wiring connectors being incorrectly reconnected on refitting, mark each connector with its relevant cylinder number (No 1 is at the transmission end of the engine).

12 Disconnect the vacuum hoses from the fuel pressure regulator and the ACAV diaphragm hose T-piece.

13 Slacken and remove the nuts and three bolts securing the valve assembly to the cylinder head, then slide the assembly off its mounting studs and remove it from the engine compartment. Remove the valve assembly



19.16 ACAV vacuum diaphragm unit



19.19 ACAV solenoid valve retaining nut (1), wiring connector (2) and hose connections (3)

gasket from the head, and discard it - a new one must be used on refitting.

14 Examine the assembly, checking that the butterfly valves open freely and close smoothly. If not, the assembly must be renewed. The only components available separately are the vacuum diaphragm units - if either one is faulty, it must be renewed as described below.

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

a) Ensure that the valve assembly and cylinder head mating surfaces are clean and dry, and fit the new manifold gasket over the studs. Refit the valve assembly, and securely tighten its retaining nuts and bolts.

b) Ensure that all relevant hoses are reconnected to their original positions, and are securely held (where necessary) by the retaining clips.

c) Refit the inlet manifold as described in Section 18.

d) On completion, check the operation of the ACAV system as described above.

Vacuum diaphragm unit

16 Disconnect the vacuum hose from the diaphragm unit. Using a suitable flat-bladed screwdriver, carefully lever the unit pushrod off the valve linkage balljoint **(see illustration)**.

17 Slacken and remove the two bolts securing the diaphragm unit mounting bracket to the valve assembly, and remove the diaphragm from the engine.

18 Refitting is a reversal of the removal procedure, ensuring that the diaphragm pushrod is clipped firmly onto the linkage balljoint.

Solenoid valve

19 The solenoid control valve is mounted on the left-hand end of the cylinder head **(see illustration)**. Before removing the valve, first disconnect the battery negative terminal, and position it away from the battery.

20 Depress the retaining clip, and disconnect the wiring connector from the valve.

21 Undo the nut securing the valve to the cylinder head, then withdraw the valve, disconnecting its vacuum hoses as they become accessible.

22 Refitting is a reversal of the removal procedure. Test the system on completion, as described above.

20 Exhaust manifold - removal and refitting

Removal

1 Refer to Chapter 4A, Section 15, noting that where applicable the lambda (oxygen) sensor wiring connectors should be disconnected. Alternatively, care must be taken to support the front pipe, to avoid any strain being placed on the sensor wiring. Where applicable, jack up the front of the car and support on axle stands (see *"Jacking and Vehicle Support"*).

Refitting

2 Refitting is the reverse of the removal procedure, noting the following points:

a) Examine all the exhaust manifold studs for signs of damage and corrosion; remove all traces of corrosion, and repair or renew any damaged studs.

b) Ensure that the manifold and cylinder head sealing faces are clean and flat, and fit the new manifold gaskets. Tighten the manifold nuts to the specified torque.

c) Reconnect the front pipe to the manifold using the information given in Section 18.

21 Exhaust system - general information, removal and refitting

Refer to Chapter 4A, Section 16, however note that it will be necessary to disconnect the lambda (oxygen) sensor wiring connectors in order to remove the front pipe/complete system. On refitting, ensure that the sensor wiring is retained by all the relevant retaining clips so that it is in no danger of contacting the hot exhaust/engine.