Chapter 4 Part B: Fuel/exhaust systems - single-point fuel injection models

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Degrees of difficulty

Easy, suitable for novice with little experience 

Fairly easy, suitable for beginner with some experience 

Fairly difficult, suitable for competent DIY mechanic 

Difficult, suitable for experienced DIY mechanic 

Very difficult, suitable for expert DIY or professional 

Specifications

System type

XU5 (BDZ and BDY) engine	Magneti Marelli G5 single-point
XU5 (BDY) engine	Magneti Marelli G6 single-point
TU3 (KDX) and XU9 (DDZ) engine	Solex Fenix 1B single-point
TU3 (KDX) engine	Bosch Monotronic MA3.0 single-point

Fuel pump

Type	Electric, external (early models) or internal (later models)
Pump delivery pressure:	
Fenix 1B, MM G5 and MM G6 systems	0.7 to 0.8 bars
Bosch MA3.0 system	1.0 ± 0.1 bars
Pump delivery:	
Fenix 1B and Bosch MA3.0 systems	370 cc per 15 seconds
MM G5 and G6 systems	360 cc per 15 seconds

Fuel system data

Specified idle speed (not adjustable)	850 ± 50 rpm
Idle mixture CO content*	Less than 0.5%

**Mixture is controlled by the electronic control unit, and cannot be adjusted.*

Recommended fuel

Minimum octane rating	95 RON unleaded (UK unleaded premium). Leaded fuel must **not** be used on models with a catalytic converter

Torque wrench settings

	Nm	lbf ft
Inlet manifold nuts	8	6
Exhaust manifold nuts	16	12
Exhaust system fasteners:		
Front pipe-to-manifold nuts	30	22
Front pipe mounting bolt	35	26
Front pipe-to-catalytic converter nuts	10	7
Clamping ring nuts	20	15

1 General information and precautions

The fuel system consists of a fuel tank (which is mounted under the rear of the car, with an electric fuel pump immersed in it), a fuel filter, fuel feed and return lines, and the throttle body assembly (which incorporates the single fuel injector and the fuel pressure regulator). In addition, there is an Electronic Control Unit (ECU) and various sensors, electrical components and related wiring. The air cleaner contains a disposable paper filter element, and incorporates a flap valve air temperature control system. This allows cold air from the outside of the car and warm air from around the exhaust manifold to enter the air cleaner in the correct proportions.

Refer to Section 7 for further information on the operation of each fuel injection system, and to Section 18 for information on the exhaust system.

Throughout Part B, it is occasionally necessary to identify vehicles by their engine codes rather than by engine capacity. Refer to the relevant Part of Chapter 2 for further information on engine code identification.

Warning: 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.

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 8.*

2 Air cleaner assembly and inlet ducts - removal and refitting

Refer to Chapter 4A, Section 2, substituting "throttle body" for all references to the carburettor.

3 Air cleaner air temperature control system - information and component renewal

Refer to Chapter 4A, Section 3, substituting "throttle body" for all references to the carburettor.

4 Accelerator cable - removal, refitting and adjustment

Note: *For automatic transmission models refer to Chapter 7B.*

Removal and refitting

1 Refer to Chapter 4A, Section 7 substituting "throttle body" for all references to the carburettor. Adjust the cable as described below.

Adjustment

2 Remove the spring clip from the accelerator outer cable then, ensuring that the throttle cam is fully against its stop, gently pull the cable out of its grommet until all free play is removed from the inner cable.

3 With the cable held in this position, ensure that the flat washer is pressed securely against the grommet, then fit the spring clip to the third outer cable groove visible in front of the rubber grommet and washer **(see illustration)**. This will leave a fair amount of freeplay in the inner cable which is necessary to ensure correct operation of the idle control stepper motor (see Section 14).



4.3 Adjust the accelerator cable as described in text

4 Have an assistant depress the accelerator pedal and check that the throttle cam opens fully and returns smoothly to its stop.

5 Accelerator pedal - removal and refitting

Refer to Chapter 4A, Section 8.

6 Unleaded petrol - general information and usage

Note: *The information given in this Chapter is correct at the time of writing. If updated 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 Peugeot 405 single-point injection models are designed to run on fuel with a minimum octane rating of 95 (RON). All models are equipped with catalytic converters, and therefore must be run on unleaded fuel *only*. Under no circumstances should leaded (UK "4-star") fuel be used, as this may damage the catalytic converter.

Super unleaded petrol (98 octane) can also be used in all models if wished, though there is no advantage in doing so.

7 Fuel injection systems - general information

Note: *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.*

Fenix 1B system

1 The Fenix 1B system is an integrated single-point fuel injection/ignition system. Using inputs from various sensors, the electronic control unit computes the optimum fuel injector pulse duration, and ignition advance setting, to suit the prevailing engine operating conditions.

2 The electronic control unit receives signals from the following sensors.

a) Engine speed/position sensor.
b) Manifold absolute pressure (MAP) sensor.
c) Inlet air temperature sensor.
d) Throttle position sensor.
e) Coolant temperature sensor.
f) Oxygen sensor.

3 The fuel injection unit houses the fuel injector, the fuel pressure regulator, the throttle position switch, and the idle speed control valve. The single fuel injector injects fuel upstream of the throttle valve.

4 Idle speed is controlled by the electronic control unit, via the idle speed control valve.

5 The oxygen sensor allows the electronic control unit to control the air/fuel mixture within very fine limits, to enable the use of a catalytic converter.

6 All the information supplied to the electronic control unit is computed and compared with pre-set values stored in the

module memory, to determine the required period of injection.

7 The electronic control unit constantly varies the fuel mixture, engine idle speed, and ignition timing to provide optimum engine efficiency under all operating conditions, and to reduce exhaust gas emissions. The mixture strength is accurately controlled to maintain it within the operating limits of the catalytic converter.

Bosch Monopoint MA3.0 system

8 The Bosch Monopoint MA3.0 engine management (fuel injection/ignition) system incorporates a closed-loop catalytic converter and an evaporative emission control system, and complies with the latest emission control standards. The system operates as follows.

9 The fuel pump, immersed in the fuel tank, pumps fuel from the fuel tank to the fuel injector, via a filter mounted underneath the rear of the vehicle. Fuel supply pressure is controlled by the pressure regulator in the throttle body assembly. The regulator operates by allowing excess fuel to return to the tank.

10 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 or 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 body.
d) Lambda sensor - informs the ECU of the oxygen content of the exhaust gases (explained in Part D of this Chapter).
e) Microswitch (built into the idle speed stepper motor) - informs the ECU when the throttle valve is closed (ie when the accelerator pedal is released).
f) Crankshaft sensor - informs the ECU of engine speed and crankshaft position
g) Vehicle speed sensor (fitted to the gearbox) - informs the ECU of road speed.

11 All the above information is analysed by the ECU and, based on this, the ECU determines the appropriate ignition and fuelling requirements for the engine. The ECU controls the fuel injector by varying its pulse width - the length of time the injector is 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. Refer to Chapter 5 for further information on the ignition system.

12 The ECU also has full control over the engine idle speed, via a stepper motor which is fitted to the throttle body. The motor pushrod rests against a cam on the throttle valve spindle. When the throttle valve is closed, the ECU uses the motor to vary the opening of the throttle valve and so controls the idle speed.

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

14 If there is an error 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, the ECU 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.

15 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 G5 and G6 systems

16 A Magneti Marelli engine management (fuel injection/ignition) system is fitted to 1580 cc XU5 engines.

17 The fuel injection side of the system operates as described in the following paragraphs. Refer to Chapter 5 for information on the ignition side of the system.

18 The fuel pump, immersed in the fuel tank, pumps fuel from the fuel tank to the fuel injector, via a filter. Fuel supply pressure is controlled by the pressure regulator in the throttle body assembly. The regulator operates by allowing excess fuel to return to the tank. To reduce emissions and to improve driveability when the engine is cold, engine coolant is passed through the manifold and around the throttle body assembly.

19 The electrical control system consists of the ECU, along with the following sensors.

a) Manifold absolute pressure (MAP) sensor - informs the ECU of the load on the engine (expressed in terms of inlet manifold vacuum).
b) Crankshaft sensor - informs the ECU of the crankshaft position and engine speed.
c) Throttle potentiometer - informs the ECU of the throttle position, and the rate of throttle opening/closing.
d) Coolant temperature sensor - informs the ECU of the engine temperature.
e) Fuel/air mixture temperature sensor - informs the ECU of the fuel/air mixture charge temperature entering the engine.
f) Lambda (oxygen) sensor - informs the ECU of the oxygen content of the exhaust gases (explained in greater detail in Part D of this Chapter).

20 In addition, the ECU senses battery voltage (adjusting the injector pulse width to suit, and using the stepper motor to increase the idle speed and, therefore, the alternator output if the voltage is too low). Short-circuit protection and diagnostic capabilities are incorporated into the ECU, and it can both receive and transmit information via the engine management circuit diagnostic connector, thus permitting engine diagnosis and tuning by special diagnostic equipment.

21 All the above signals are compared by the ECU, using digital techniques, with set values pre-programmed (mapped) into its memory. Based on this information, the ECU selects the response appropriate to those values and controls the ignition HT coil (see Chapter 5), and the fuel injector (varying its pulse width - the length of time the injector is held open - to provide a richer or weaker mixture, as appropriate). The mixture, idle speed and ignition timing are constantly varied by the ECU, to provide the best settings for cranking, starting (with either a hot or cold engine), warm-up, idle, cruising and acceleration.

22 The ECU regulates the engine idle speed via a stepper motor which is fitted to the throttle body. 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 body passage, and so controls the idle speed. The bypass passage is also used as an additional air supply during cold starting.

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

24 If there is an error in any of the readings obtained from any of the engine management circuit sensors, the ECU enters its back-up mode. In this event, the ECU ignores the abnormal sensor signal, and assumes a pre-programmed value which will allow the engine to continue running (albeit at reduced efficiency). On entering this back-up mode, the engine management warning light in the instrument panel will come on, informing the driver of the fault, and the relevant fault code will be stored in the ECU memory.

25 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.

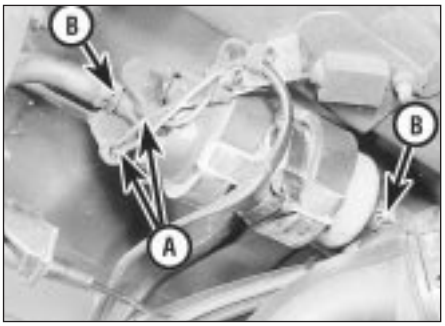
8 Fuel injection system - depressurisation



Note: *Refer to the warning note in Section 1 before proceeding.*



Warning: The following procedure will merely relieve the pressure in the fuel system - remember that fuel will still be present in the system components, and take precautions accordingly before disconnecting any of them.



9.4 Fuel pump showing electrical connections (A) and fuel hoses (B)



9.9 Unplug the wiring connector then release the fuel feed and return hoses (arrowed) from the fuel pump



9.11 Unscrew the locking ring . . .

1 The fuel system referred to in this Section is defined as the tank-mounted fuel pump, the fuel filter, the fuel injector and the pressure regulator in the injector housing, and the metal pipes and flexible hoses of the fuel lines between these components. All these contain fuel which will be under pressure while the engine is running, and/or while the ignition is switched on. The pressure will remain for some time after the ignition has been switched off, and it must be relieved in a controlled fashion when any of these components are disturbed for servicing work.
2 Disconnect the battery negative terminal.
3 Place a suitable container beneath the connection or union to be disconnected, and have a large rag ready to soak up any escaping fuel not being caught by the container.
4 Slowly loosen the connection or union nut to avoid a sudden release of pressure, and position the rag around the connection, to catch any fuel spray which may be expelled. Once the pressure is released, disconnect the fuel line. Plug the pipe ends, to minimise fuel loss and prevent the entry of dirt into the fuel system.
5 An alternative method of depressurising the fuel system is to remove either the fuel pump fuse or the fuel pump relay and start the engine. Allow the engine to idle until it stops. Turn the engine over on the starter once or twice to ensure that all pressure is released, then switch off the ignition. Always disconnect the battery negative lead before carrying out work on the fuel system, and do not forget to refit the fuse or relay when work is complete.

9 Fuel pump - removal and refitting

Note: *Refer to the warning note in Section 1 before proceeding. The fuel pump is mounted either on the outside of the fuel tank (external) or on the inside of the fuel tank (internal) according to model.*

Removal

External mounted

1 Depressurise the fuel system (Section 8).
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 Disconnect the electrical connections on the pump **(see illustration)**.
5 Loosen the clips and disconnect the inlet and outlet fuel hoses.
6 Cut through the plastic cable-tie and slide the pump from the rubber mounting straps.

Internal mounted

7 For access to the fuel pump, tilt or remove the rear seat as described in Chapter 11.
8 Using a screwdriver, carefully prise the plastic access cover from the floor to expose the fuel pump. The pump is located under the right-hand cover.
9 Disconnect the wiring connector from the fuel pump, and tape the connector to the vehicle body, to prevent it from disappearing behind the tank **(see illustration)**.
10 Mark the hoses for identification purposes, then slacken the feed and return hose retaining clips. Where the crimped-type Peugeot hose clips are fitted, cut the clips and discard them; use standard worm-drive hose clips on refitting. Disconnect both hoses from the top of the pump, and plug the hose ends.
11 Noting the alignment marks on the tank, pump cover and the locking ring, unscrew the ring and remove it from the tank **(see illustration)**. This is best accomplished by using a screwdriver on the raised ribs of the locking ring. Carefully tap the screwdriver to turn the ring anti-clockwise until it can be unscrewed by hand.
12 Displace the pump cover, then reach into the tank and unclip the pump from the tank base. Lift the fuel pump assembly out of the fuel tank, taking great care not to damage the filter, or to spill fuel onto the interior of the vehicle. Recover the rubber sealing ring and discard it - a new one must be used on refitting **(see illustrations)**.
13 Note that the fuel pump is only available as a complete assembly - no components are available separately.

Refitting

External mounted

14 Slide the pump into the rubber mounting straps and secure with a new plastic cable-tie.
15 Reconnect the fuel inlet and outlet hoses.
16 Reconnect the electrical connections.
17 Lower the vehicle to the ground and reconnect the battery negative lead.
18 Start the engine and check for leaks.

Internal mounted

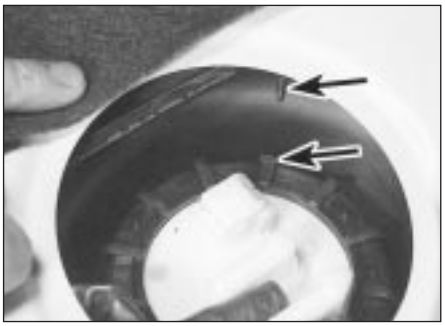
19 Ensure that the fuel pump pick-up filter is clean and free of debris. Fit the new sealing ring to the top of the fuel tank.
20 Carefully manoeuvre the pump assembly into the fuel tank, and clip it into position in the base of the tank.
21 Align the mark on the fuel pump cover with the centre of the three alignment marks on the fuel tank, then refit the locking ring. Securely tighten the locking ring, then check



9.12a . . . then lift out the fuel pump . . .



9.12b . . . and recover the rubber sealing ring



9.21 On refitting tighten the locking ring until it is correctly aligned with the fuel tank mark (arrowed)

that the locking ring, pump cover and tank marks are all correctly aligned **(see illustration)**.

22 Reconnect the feed and return hoses to the top of the fuel pump, using the marks made on removal to ensure that they are correctly reconnected, and securely tighten their retaining clips.

23 Reconnect the pump wiring connector.

24 Reconnect the battery negative terminal and start the engine. Check the fuel pump feed and return hoses unions for signs of leakage.

25 If all is well, refit the plastic access cover. Tilt or refit the rear seat as described in Chapter 11 (as applicable).

10 Fuel gauge sender unit - removal and refitting

Refer to Chapter 4A, Section 5, noting that there where the fuel pump is mounted externally there are no fuel pipe connections to the sender unit **(see illustration)**.

11 Fuel tank - removal and refitting

Refer to Chapter 4A, Section 6, noting that it will be necessary to depressurise the fuel system before the feed and return hoses are disconnected (see Section 8). It will also be necessary to disconnect the wiring connector from the internal fuel pump before lowering the tank out of position.



10.1 Removing the fuel gauge sender unit

12 Throttle body - removal and refitting

Note: *Refer to the warning note in Section 1 before proceeding.*

Removal

1 Disconnect the battery negative terminal.

2 Remove the air cleaner housing-to-throttle body duct, using the information given in Section 2 **(see illustration)**.

3 Depress the retaining clips and disconnect the wiring connectors from the throttle potentiometer, the idle control stepper motor (where fitted), and the injector wiring loom connector which is situated on the side of the throttle body **(see illustrations)**.

4 Bearing in mind the information in Section 8 about depressurising the fuel system, release the retaining clips and disconnect the fuel feed and return hoses from the throttle body assembly. If the original crimped-type Peugeot clips are still fitted, cut the clips and discard them; use standard worm-drive hose clips on refitting **(see illustration)**.

5 Disconnect the accelerator inner cable from the throttle cam, then withdraw the outer cable from the mounting bracket, along with its flat washer and spring clip.

6 Disconnect the idle control auxiliary air valve and/or purge valve hose from the throttle body (as applicable).

7 Slacken and remove the bolts securing the throttle body assembly to the inlet manifold, then remove the assembly along with its gasket **(see illustration)**.

8 If necessary, with the throttle body removed, undo the retaining screws and separate the upper and lower sections, noting the gasket which is fitted between the two.

Refitting

9 Refitting is a reverse of the removal procedure, bearing in mind the following points:

a) Where applicable, ensure that the mating surfaces of the upper and lower throttle body sections are clean and dry. Fit a new gasket and reassemble the two sections, tightening the retaining screws securely.



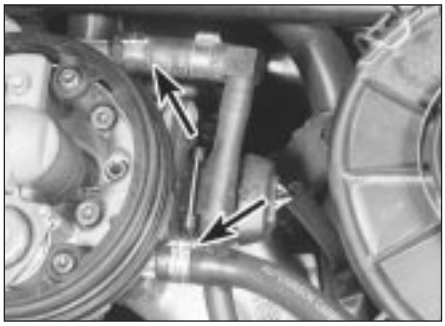
12.2 Air cleaner housing-to-throttle body duct (Magneti Marelli fuel injection system)



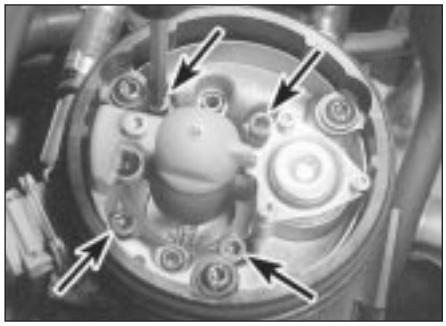
12.3a Disconnect the wiring connectors from the throttle potentiometer . . .



12.3b . . . the injector wiring loom connector and the stepper motor



12.4 Fuel feed and return hose connections (arrowed) - later model shown



12.7 Throttle body retaining screws (arrowed) on the Bosch Monopoint system

b) Ensure that the mating surfaces of the manifold and throttle body are clean and dry, then fit a new gasket. Securely tighten the throttle body retaining bolts.
c) Ensure that all hoses are correctly reconnected and, where necessary, that their retaining clips are securely tightened.
d) On completion, adjust the accelerator cable using the information given in Section 4.

13 Fuel injection system - testing and adjustment

Testing

1 If a fault appears in the fuel injection system, first ensure that all the system wiring connectors are securely connected and free of corrosion. Ensure that the fault is not due to poor maintenance; ie, check that the air cleaner filter element is clean, the spark plugs are in good condition and correctly gapped, the valve clearances are correctly adjusted, the cylinder compression pressures are correct, the ignition timing is correct, and that the engine breather hoses are clear and undamaged, referring to Chapters 1, 2 and 5 for further information.
2 If these checks fail to reveal the cause of the problem, the vehicle should be taken to a Peugeot dealer for testing. A wiring block connector is incorporated in the engine management circuit, into which a special electronic diagnostic tester can be plugged. The connector is clipped to the rear of the ECU mounting box. The tester will locate the fault quickly and simply, alleviating the need to test all the system components individually, which is a time-consuming operation that also carries a risk of damaging the ECU.

Adjustment

3 Experienced home mechanics with a considerable amount of skill and equipment (including a tachometer and an accurately calibrated exhaust gas analyser) may be able to check the exhaust CO level and the idle speed. However, if these are found to be in need of adjustment, the car *must* be taken to a Peugeot dealer for further testing.
4 On the Fenix and Bosch systems, no adjustment is possible. Should the idle speed or exhaust gas CO level be incorrect, then a fault must be present in the fuel injection system.
5 On the Magneti Marelli system, it is possible to adjust the mixture setting (exhaust gas CO level) and ignition timing. However, adjustments can be made only by re-programming the ECU, using special diagnostic equipment connected to the system via the diagnostic connector.

14 Fenix system components - removal and refitting

Throttle position sensor

1 Disconnect the battery negative lead, then disconnect the wiring plug from the sensor.
2 Remove the two securing screws, then carefully withdraw the sensor from the fuel injection unit.
3 Refitting is a reversal of removal. No adjustment of the sensor is possible. A self-adjusting system is incorporated in the electronic control unit.

Fuel injector

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.*
4 Depressurise the fuel system with reference to Section 8
5 Disconnect the battery negative lead.
6 Unscrew the two securing nuts, and remove the air box from the top of the throttle housing.
7 Release the securing clip and disconnect the injector wiring plug.
8 Remove the screw securing the injector retaining plate to the top of the fuel injection unit, lift off the retainer, then withdraw the injector.
9 Recover and discard the injector sealing rings (check to ensure that new sealing rings can be obtained before discarding the old ones).
10 Refitting is a reversal of removal, bearing in mind the following points.

a) Always renew both sealing rings, and apply a smear of grease to each to ease injector refitting.
b) Refit the injector so that its wiring terminals point towards the front of the vehicle, and locate the edge of the retainer securely in the groove at the top of the injector.
c) Before refitting the injector securing screw, apply a few drops of locking fluid to the threads.
d) On completion, switch on the ignition and check carefully for signs of fuel leaks; if any signs of leakage are detected, the problem must be rectified before the engine is started.

Idle speed control valve

11 Disconnect the battery negative lead, then release the securing clip, and disconnect the wiring plug from the valve.
12 Loosen the clamps, and disconnect the two air hoses from the base of the valve, noting their locations in relation to the flow direction arrow marked on the valve body.
13 Loosen the two clamp nuts or bolts (as applicable), then withdraw the valve (it may be necessary to remove the clamp completely, to provide sufficient clearance to remove the valve).
14 Refitting is a reversal of removal, ensuring that the valve is positioned correctly, with the air hoses connected as noted before removal.

Fuel pressure regulator

15 The fuel pressure regulator (consisting of a valve operated by a spring-loaded diaphragm and a metal cover) is secured by four screws to the top of the throttle housing. Although the unit can be dismantled for cleaning, if required (once the air box has been removed for access), it should not be disturbed unless absolutely necessary.
16 At the time of writing, it was not clear whether the pressure regulator components were available separately from the complete throttle housing.
17 Always depressurise the fuel system before disturbing any components. If the regulator cover is removed, note its orientation on the throttle housing before removal, to ensure correct refitting.

Inlet air temperature sensor

18 The sensor is screwed into the top of the inlet manifold.
19 Disconnect the battery negative lead.
20 Release the securing clip, and disconnect the wiring plug from the sensor.
21 Unscrew the sensor and withdraw it.
22 Refitting is a reversal of removal.

Manifold absolute pressure (MAP) sensor

23 The sensor is mounted on the body front panel.
24 Disconnect the battery negative lead, then release the securing clip and disconnect the wiring plug from the sensor.
25 Disconnect the vacuum hose from the sensor.
26 Unscrew the two securing nuts, or bolts (as applicable), then withdraw the sensor from the body front panel.
27 Refitting is a reversal of removal.

Coolant temperature sensor

28 Disconnect the electrical plug from the sensor on the water housing.
29 Drain the cooling system as described in Chapter 1.
30 Unscrew the sensor from the water housing.
31 Refit in the reverse order using a new sealing washer, then top-up and bleed the cooling system with reference to Chapter 1.

Engine speed/position sensor

32 Disconnect the wiring lead and release it from the clips.
33 Unscrew the bolt and withdraw the sensor from the engine.
34 Refitting is a reversal of removal. It is not possible to adjust the position of the sensor.



15.3a Undo the injector cap screw, noting the use of rag to catch fuel spray . . .



15.3b . . . then lift off the cap and withdraw the injector



15.3c On refitting, ensure cap terminals are aligned with injector pins (arrowed)

15 Bosch Monopoint system components - removal and refitting

Note: *Check the availability of individual components with your Peugeot dealer before dismantling.*

Fuel injector

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 Remove the inlet air temperature sensor as described later in this Section.

2 Lift out the injector and recover its lower sealing ring.

3 Refitting is a reversal of the removal procedure ensuring that the injector sealing ring(s) and injector cap O-ring are in good condition. When refitting the injector cap ensure that the injector pins are aligned with the cap terminals, the terminals are marked "+" and "-" for identification **(see illustrations)**.

Fuel pressure regulator

Note: *Refer to the warning note in Section 1 before proceeding. At the time of writing, the fuel pressure regulator assembly was not available separately from the throttle body assembly. Refer to a Peugeot dealer for the latest information. Although the unit can be dismantled for cleaning, if required, it should not be disturbed unless absolutely necessary.*

4 Disconnect the battery negative terminal.

5 Remove the air cleaner-to-throttle body duct, using the information given in Section 2.

6 Using a marker pen, make alignment marks between the regulator cover and throttle body, then slacken and remove the cover screws **(see illustration)**. As the screws are slackened, place a clean rag over the cover to catch any fuel spray which may be released.

7 Lift off the cover, then remove the spring and withdraw the diaphragm, noting its correct fitted orientation. Remove all traces of dirt and examine the diaphragm for signs of splitting. If damage is found, it will probably be necessary to renew the throttle body assembly.

8 Refitting is a reverse of the removal procedure, ensuring that the diaphragm and cover are fitted the correct way round, and that the retaining screws are securely tightened.

Idle control stepper motor

9 Disconnect the battery negative terminal.

10 Depress the retaining clip and disconnect the wiring connector from the idle control stepper motor.

11 Undo the retaining screws and remove the motor from the front of the throttle body **(see illustration)**.

12 Refitting is a reverse of the removal procedure, ensuring that the motor retaining screws are securely tightened.

Throttle potentiometer

13 The throttle potentiometer is a sealed unit, and *under no circumstances* should it be disturbed. For this reason, on some models, it is secured to the throttle body assembly by tamperproof screws. If the throttle potentiometer is faulty, the complete throttle body assembly must be renewed - refer to your Peugeot dealer for the latest information.

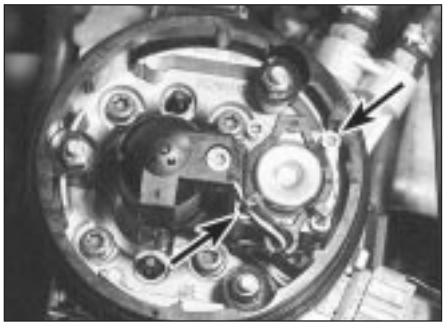
Inlet air temperature sensor

Note: *Refer to the warning note in Section 1 before proceeding.*

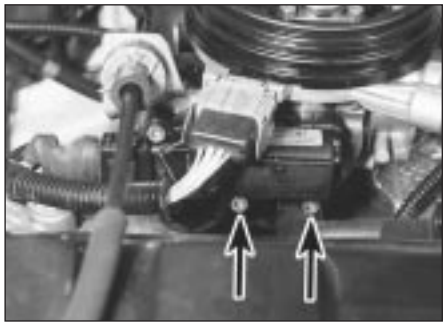
14 The inlet air temperature sensor is an integral part of the throttle body injector cap. To remove the cap, first disconnect the battery negative terminal, then remove the air cleaner-to-throttle body duct using the information given in Section 2.

15 Undo the three retaining screws and remove the circular plastic ring from the top of the throttle body and recover its sealing ring **(see illustrations)**.

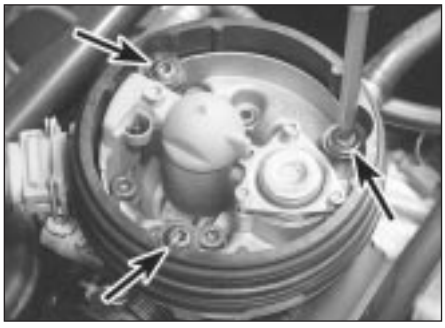
16 Depress the retaining clip and disconnect



15.6 Fuel pressure regulator retaining screws (arrowed)



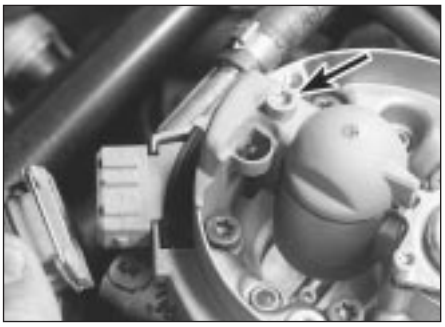
15.11 Idle control stepper motor retaining screws (arrowed)



15.15a Undo the three retaining screws (arrowed) . . .



15.15b . . . then lift off the plastic ring and recover the sealing ring



15.16 Disconnecting the injector wiring connector. Injector screw is arrowed

the wiring connector from the injector wiring connector **(see illustration)**.

17 Undo the injector cap retaining screw, then lift off the cap and recover the gasket and/or sealing ring (as applicable). Note that as the cap screw is slackened, place a rag over the injector to catch any fuel spray which may be released.

18 Refitting is a reversal of the removal procedure ensuring that the injector cap gasket and/or O-ring is in good condition. Take care to ensure that the cap terminals are correctly aligned with the injector pins and securely tighten the cap retaining screw.

Coolant temperature sensor

19 Refer to Chapter 3.

Electronic control unit (ECU)

20 The ECU is located in the plastic box which is mounted onto the rear of the battery mounting tray.

21 To remove the ECU, first disconnect the battery.

22 Unclip the cover from the box, then lift the retaining clip and disconnect the wiring connector from the ECU.

23 Undo the retaining nut and release the relay unit from the rear of the ECU box.

24 Undo the retaining screws and remove the ECU and box assembly from the battery tray. If necessary, undo the retaining screws and separate the ECU and box.

25 Refitting is a reverse of the removal procedure ensuring that the wiring connector is securely reconnected.

Fuel injection system relay unit

26 The relay unit is mounted onto the rear of the ECU plastic box which is situated directly behind the battery.

27 To remove the relay unit, first disconnect the battery.

28 Undo the retaining nut, then disconnect the wiring connector and remove the relay unit from the vehicle.

29 Refitting is the reverse of removal, ensuring that the relay unit is securely clipped in position.

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 a reverse of the removal procedure. Ensure that the sensor retaining bolt is securely tightened, and that the grommet is correctly seated in the transmission housing.

Vehicle speed sensor

35 The vehicle speed sensor is an integral part of the speedometer drive housing. Refer to Chapter 7A, Section 7 for removal and refitting details.

16 Magneti Marelli system components - removal and refitting



Note: *Check the availability of individual components with your Peugeot dealer before dismantling.*

Fuel injector

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. If this fails, the vehicle should be taken to a Peugeot dealer for testing using the appropriate specialist equipment. At the time of writing, it appears that neither the fuel injector nor its seals are available separately and, if faulty, the complete upper throttle body assembly must be renewed. Refer to your Peugeot dealer for further information on parts availability.*

1 Disconnect the battery negative terminal.

2 Remove the air cleaner-to-throttle body duct using the information given in Section 2.

3 Release the retaining tangs and disconnect the injector wiring connector **(see illustration)**.

4 Undo the retaining screw, then remove the retaining clip and lift the injector out of the housing, noting its sealing ring. Note that as the screw is slackened, place a rag over the injector to catch any fuel spray which may be released.



16.3 Injector wiring connector (arrowed)

5 Refitting is a reverse of the removal procedure ensuring that the injector sealing ring is in good condition.

Fuel pressure regulator

Note: *Refer to the warning note at the start of this Section before proceeding.*

Note: *At the time of writing, it appears that the fuel pressure regulator is not available separately. If the fuel pressure regulator assembly is faulty, the complete upper throttle body assembly must be renewed. Refer to a Peugeot dealer for further information on parts availability. Although the unit can be dismantled for cleaning, if required, it should not be disturbed unless absolutely necessary.*

6 Disconnect the battery negative terminal.

7 Remove the air cleaner-to-throttle body duct using the information given in Section 2.

8 Using a suitable marker pen, make alignment marks between the regulator cover and throttle body, then undo the four retaining screws. Note that as the screws are slackened, place a rag over the cover to catch any fuel spray which may be released.

9 Lift off the cover, then remove the spring and withdraw the diaphragm whilst noting its correct fitted orientation. Remove all traces of dirt and examine the diaphragm for splitting. If damage is found, it will be necessary to renew the complete upper throttle body assembly as described earlier in this Section.

10 Refitting is a reverse of the removal procedure ensuring that the diaphragm and cover are fitted the correct way around and the retaining screws are securely tightened.

Idle control stepper motor

11 Disconnect the battery negative terminal.

12 To remove the stepper motor, depress the retaining tabs and disconnect the wiring connector. Undo the two retaining screws and withdraw the motor from the side of the throttle body assembly.

13 Refitting is a reverse of removal.

Throttle potentiometer

14 Disconnect the battery negative terminal, then depress the retaining tabs and disconnect the wiring connect from the throttle potentiometer **(see illustration)**.

15 Undo the two retaining screws and remove the throttle potentiometer from the side of the throttle body assembly.

16 Refitting is a reversal of the removal procedure ensuring that the throttle potentiometer tang is correctly engaged with the throttle spindle.

Inlet air temperature sensor

17 The inlet air temperature sensor is screwed into the underside of the upper throttle body where it is situated on the left-hand side of the fuel injector.



16.14 Throttle potentiometer wiring connector (arrowed)

18 To remove the sensor, first disconnect the battery negative terminal.
19 Disconnect the wiring connector, then undo the retaining screw and remove the inlet air temperature sensor from the throttle body.
Note: *The sensor retaining screw is very difficult to reach. If it proves impossible to unscrew, the throttle body will have to be removed to permit sensor removal.*
20 Refitting is a reverse of removal.

Manifold absolute pressure (MAP) sensor

21 The MAP sensor is mounted onto a bracket which is situated on the engine compartment bulkhead, behind the throttle body.
22 To remove the sensor, first disconnect the battery negative terminal.
23 Slacken and remove the three retaining bolts, then free the MAP sensor from the bracket. Disconnect the wiring connector and vacuum hose and remove the sensor from the engine compartment.
24 Refitting is a reversal of the removal procedure.

Coolant temperature sensor

25 Refer to Chapter 3.

Crankshaft sensor

26 Refer to Section 14.

Electronic control unit (ECU)

27 Refer to Section 14.

Fuel injection system relay unit

28 Refer to Section 14.

Throttle body heating element

29 The throttle body heating element is situated in the front of the throttle body.
30 To remove the element, first disconnect the battery negative terminal.
31 Remove the air cleaner housing-to-throttle body duct using the information given in Section 2.
32 Disconnect the wiring connectors from the inlet air temperature sensor and the injector. Also disconnect the main wiring connector from the throttle body and free the connector from its mounting bracket.
33 Undo the retaining screws and free the accelerator mounting bracket from the throttle body. As the bracket is released, recover the spring from the front of the heating element.
34 Ease the heating element out from the throttle housing and remove it along with the wiring connector and wiring harness. Examine the O-ring for signs of damage or deterioration and renew if necessary.
35 Refitting is a reversal of removal; where necessary, use a new O-ring.

17 Inlet manifold - removal and refitting

Removal

1 Remove the throttle body (Section 12).
2 Drain the cooling system (see Chapter 1).
3 Slacken the retaining clip and disconnect the coolant hose(s) from the manifold.
4 Slacken the retaining clip and disconnect the vacuum servo unit hose from the left-hand side of the manifold.
5 Make a final check that all the necessary vacuum/breather hoses have been disconnected from the manifold.
6 Unscrew the retaining nuts, then manoeuvre the manifold away from the head and out of the engine compartment. Note that there is no manifold gasket.

Refitting

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

a) Ensure that the manifold and cylinder head mating surfaces are clean and dry, and apply a thin coating of suitable sealing compound to the manifold mating surface. Refit the manifold and tighten its retaining nuts to the specified torque.
b) Ensure that all relevant hoses are reconnected to their original positions and securely held (where necessary) by their retaining clips.
c) Refit the throttle body as described in Section 12.
d) On completion, refill the cooling system as described in Chapter 1.

18 Exhaust manifold - removal and refitting

Removal

1 Refer to Chapter 4A, Section 15, noting that 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.

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 retaining nuts to the specified torque.
c) Reconnect the front pipe to the manifold.

19 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.