Chapter 4 Part D:
Emission control systems

Contents

Degrees of difficulty

Easy, suitable for novice with little experience

Fairly easy, suitable for beginner with some experience

Fairly difficult, suitable for competent DIY mechanic

Difficult, suitable for experienced DIY mechanic

Very difficult, suitable for expert DIY or professional

1 General information

1 All models have various built-in fuel system features which help to minimise emissions, and all models have at least the crankcase emission-control system described below. Models with a catalytic converter are also fitted with the exhaust and evaporative emission control systems.

2 Most models are able to run on 95 RON unleaded fuel, but the following early engines must use 97 RON leaded fuel. However it may be possible to use unleaded fuel if the ignition is retarded by 3° - check with your Peugeot dealer.

a) TU3 (K1A)
b) TU3A (K1G)
c) XU92C (D2D)
d) XU9J2 (D6A)
e) XU9J4 (D6C)
f) XU52C (B2A)

Crankcase emission control

3 To reduce the emission of unburned hydrocarbons from the crankcase into the atmosphere, the engine is sealed, and the blow-by gases and oil vapour are drawn from the crankcase, through a wire-mesh oil separator, into the inlet tract, to be burned by the engine during normal combustion.

4 Under conditions of high manifold depression (idling, deceleration) the gases will be sucked positively out of the crankcase. Under conditions of low manifold depression (acceleration, full-throttle running) the gases are forced out of the crankcase by the (relatively) higher crankcase pressure; if the engine is worn, the raised crankcase pressure (due to increased blow-by) will cause some of the flow to return under all manifold conditions.

Exhaust emission control

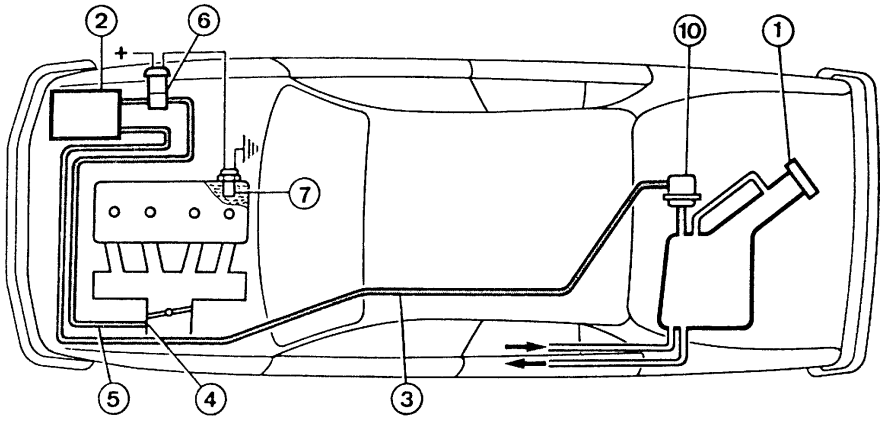
5 To minimise the amount of pollutants which escape into the atmosphere, some models are fitted with a catalytic converter in the exhaust system. On all models where a catalytic converter is fitted, the system is of the "closed-loop" type; a lambda (oxygen) sensor in the exhaust system provides the fuel injection/ignition system ECU with constant feedback, enabling the ECU to adjust the mixture to provide the best possible conditions for the converter to operate.

6 The lambda sensor has a built-in heating element, controlled by the ECU through the lambda sensor relay, to quickly bring the sensor's tip to an efficient operating temperature. The sensor's tip is sensitive to oxygen, and sends the ECU a varying voltage depending on the amount of oxygen in the exhaust gases. If the inlet air/fuel mixture is too rich, the exhaust gases are low in oxygen, so the sensor sends a low-voltage signal. The voltage rises as the mixture weakens and the amount of oxygen in the exhaust gases rises. Peak conversion efficiency of all major pollutants occurs if the inlet air/fuel mixture is maintained at the chemically-correct ratio for the complete combustion of petrol - 14.7 parts (by weight) of air to 1 part of fuel (the "stoichiometric" ratio). The sensor output voltage alters in a large step at this point, the ECU using the signal change as a reference point, and correcting the inlet air/fuel mixture accordingly by altering the fuel injector pulse width (the length of time that the injector is open).

Evaporative emission control

7 To minimise the escape into the atmosphere of unburned hydrocarbons, an evaporative emissions control system is fitted to later models **(see illustration)**. The fuel tank filler cap is sealed, and a charcoal canister, mounted underneath the front left-hand wing, collects the petrol vapours generated in the tank when the car is parked. The canister stores them until they can be cleared from the canister (under the control of the fuel injection/ignition system ECU) via the purge solenoid valve. When the valve is opened, the fuel vapours pass into the inlet tract, to be burned by the engine during normal combustion.

8 To ensure that the engine runs correctly when it is cold and/or idling, the ECU does not



1.7 Evaporative emissions control system

1 Fuel filler cap
2 Charcoal canister
3 Hose
4 Calibrated orifice
5 Hose
6 Solenoid valve
7 Coolant temperature sensor
10 Safety valve

open the purge control valve until the engine has warmed up and is under load; the valve solenoid is then modulated on and off, to allow the stored vapour to pass into the inlet tract.

2 Emission control systems - testing and component renewal

Crankcase emission control

1 The components of this system require no routine attention, other than to check that the hoses are clear and undamaged at regular intervals.

Evaporative emission control

Testing

2 If the system is thought to be faulty, disconnect the hoses from the charcoal canister and purge control valve, and check that they are clear by blowing through them. If the purge control valve or charcoal canister are thought to be faulty, they must be renewed.

Charcoal canister - renewal

3 Jack up the front of the car and support on axle stands (see *"Jacking and Vehicle Support"*). Remove the left-hand front wheel.
4 Remove the left-hand front wheel arch liner with reference to Chapter 11.
5 Disconnect the hoses from the canister, noting their locations to ensure correct refitting.
6 Unscrew the clamp bolt, and lift the canister from its clamp on the body panel. Alternatively, the complete clamp bracket/canister assembly can be removed if desired. Store or dispose of the canister carefully - it may contain fuel vapour.
7 Refitting is a reversal of removal, but ensure that the hoses are correctly reconnected as noted before removal.

Purge valve(solenoid valve) - renewal

8 The purge valve is located in the hose running from the carbon canister to the throttle body/inlet manifold. The valve may be mounted on a bracket, or may simply be attached to the hoses, depending on model.
9 To remove the valve, first disconnect the battery negative lead.
10 Where applicable, unbolt the valve bracket, then disconnect the wiring plug.
11 Disconnect the hoses from the valve, noting their locations to ensure correct refitting, then withdraw the valve.
12 Refitting is a reversal of removal, ensuring that the hoses are correctly reconnected, as noted before removal.

Exhaust emission control

Testing

13 The performance of the catalytic converter can be checked only by measuring the idle mixture setting (exhaust gas CO content) using an accurately calibrated exhaust gas analyser.
14 If the CO level at the tailpipe is too high, the vehicle should be taken to a Peugeot dealer so that the complete fuel injection and ignition systems, including the lambda sensor, can be thoroughly checked using the special diagnostic equipment.
15 Once this has been done, any fault must lie in the catalytic converter, which should be renewed as described below.

Catalytic converter - renewal

16 Refer to Part A of this Chapter, for the centre silencer.

Lambda sensor - renewal

Note: *The lambda sensor is fragile, and will not work if it is dropped or knocked, if its power supply is disrupted, or if any cleaning materials are used on it.*
17 According to model the Lambda sensor is located either in the exhaust downpipe or in the exhaust centre section.
18 Where necessary, jack up the front of the car and support on axle stands (see *"Jacking and Vehicle Support"*).
19 Trace the wiring back from the lambda sensor to the connector and disconnect it.
20 Unscrew the sensor and remove it along with its sealing washer.
21 Refitting is a reversal of the removal procedure, using a new sealing washer. Ensure that the sensor is securely tightened. Check that the wiring is correctly routed, and in no danger of contacting either the exhaust system or the engine.

3 Catalytic converter - general information and precautions

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

a) DO NOT use leaded petrol in a car equipped with a catalytic converter - the lead will coat the precious metals, reducing their converting efficiency, and will eventually destroy the converter.
b) Always keep the ignition and fuel systems well-maintained in accordance with the manufacturer's schedule.
c) If the engine develops a misfire, do not drive the car at all (or at least as little as possible) until the fault is cured.
d) DO NOT push- or tow-start the car - this will soak the catalytic converter in unburned fuel, causing it to overheat when the engine does start.
e) DO NOT switch off the ignition at high engine speeds.
f) DO NOT use fuel or engine oil additives - these may contain substances harmful to the catalytic converter.
g) DO NOT continue to use the car if the engine burns oil to the extent of leaving a visible trail of blue smoke.
h) Remember that the catalytic converter operates at very high temperatures. DO NOT, therefore, park the car in dry undergrowth, or over long grass or piles of dead leaves after a long run.
i) Remember that the catalytic converter is FRAGILE - do not strike it with tools during servicing work.
j) In some cases, a sulphurous smell (like that of rotten eggs) may be noticed from the exhaust. This is common to many catalytic converter-equipped cars, and once the car has covered a few thousand miles the problem should disappear.
k) The catalytic converter, used on a well-maintained and well-driven car, should last for between 50 000 and 100 000 miles - if the converter is no longer effective, it must be renewed.