

17 - EMISSION CONTROL

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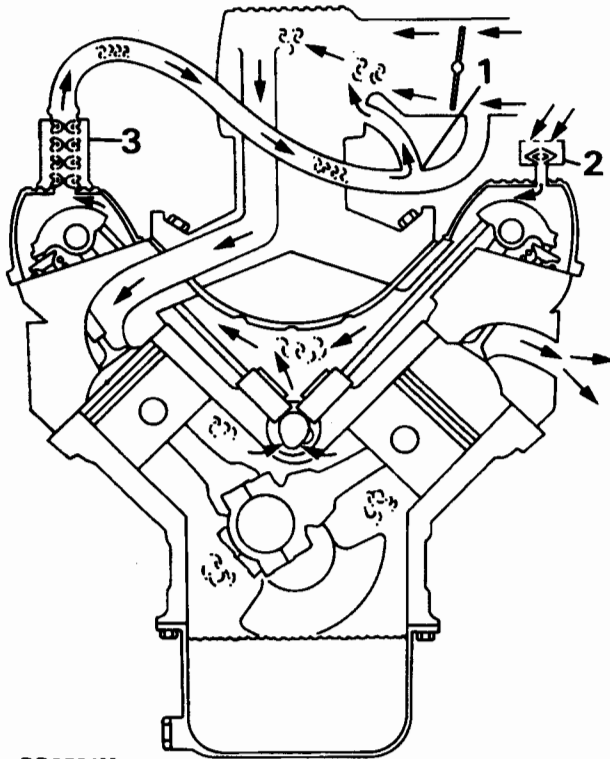
EMISSION CONTROL

Three systems are used to control the vehicle atmospheric emissions these are:

- Engine crankcase fume emissions.
- Fuel tank Evaporative emissions
- Engine exhaust gas emissions.

Crankcase ventilation system

The crankcase ventilation system which is an integral part of the air supply to the engine combustion chambers, is often overlooked when diagnosing problems associated with engine performance. A blocked ventilation pipe or filter or excessive air leak into the inlet system through a damaged pipe or leaking gasket can effect the mixture, performance and economy of the engine.



RR3534M

1. Three way connector
2. Air filter
3. Oil separator

The purpose of the crankcase ventilation system is to ensure that any noxious gas generated in the engine crankcase is rendered harmless by burning in the combustion chambers as follows:

Oil laden noxious gas in the engine crankcase is drawn through an oil separator 3 located on the right cylinder head rocker cover, where the oil is separated and returned to the sump. The gas flows through a restrictor in the three way connection 1 and into the inlet plenum chamber where it is drawn into the combustion chambers and burned. The volume of fresh air which is drawn from the atmospheric side of the throttle butterfly to mix with the gas, depends on the position of the throttle and the engine speed.

The air filter 2 fitted to the left cylinder head rocker cover, must be maintained in clean condition to ensure sufficient air enters the crankcase under varying throttle openings and manifold depression, to prevent excessive crankcase pressure or depression developing.

Exhaust emission control.

The multiport fuel injection system provides accurately metered quantities of fuel to the combustion chambers to ensure the most efficient air to fuel ratio under all conditions of operation. A further improvement to combustion is made by measuring the oxygen content of the exhaust gases to enable the quantity of fuel injected to be varied, according to conditions, to correct any unsatisfactory composition of the exhaust.

The main components of the exhaust emission system are two Catalytic converters which are an integral part of the front exhaust pipe assembly. The Catalytic converters are included in the system to reduce the emission, to atmosphere, of carbon monoxide, oxides of nitrogen, and hydrocarbons. The active constituents of the converters are platinum and rhodium. The correct functioning of the converters is dependent upon close control of the oxygen concentration in the exhaust gas entering the catalyst. The oxygen content of the exhaust gas is signalled to the Engine Control Module (ECM) by oxygen sensors (Lambda sensors) located in the exhaust front pipes between the manifold and converter. The ECM can then make an appropriate adjustment to the fuel supply to correct the composition of the exhaust.

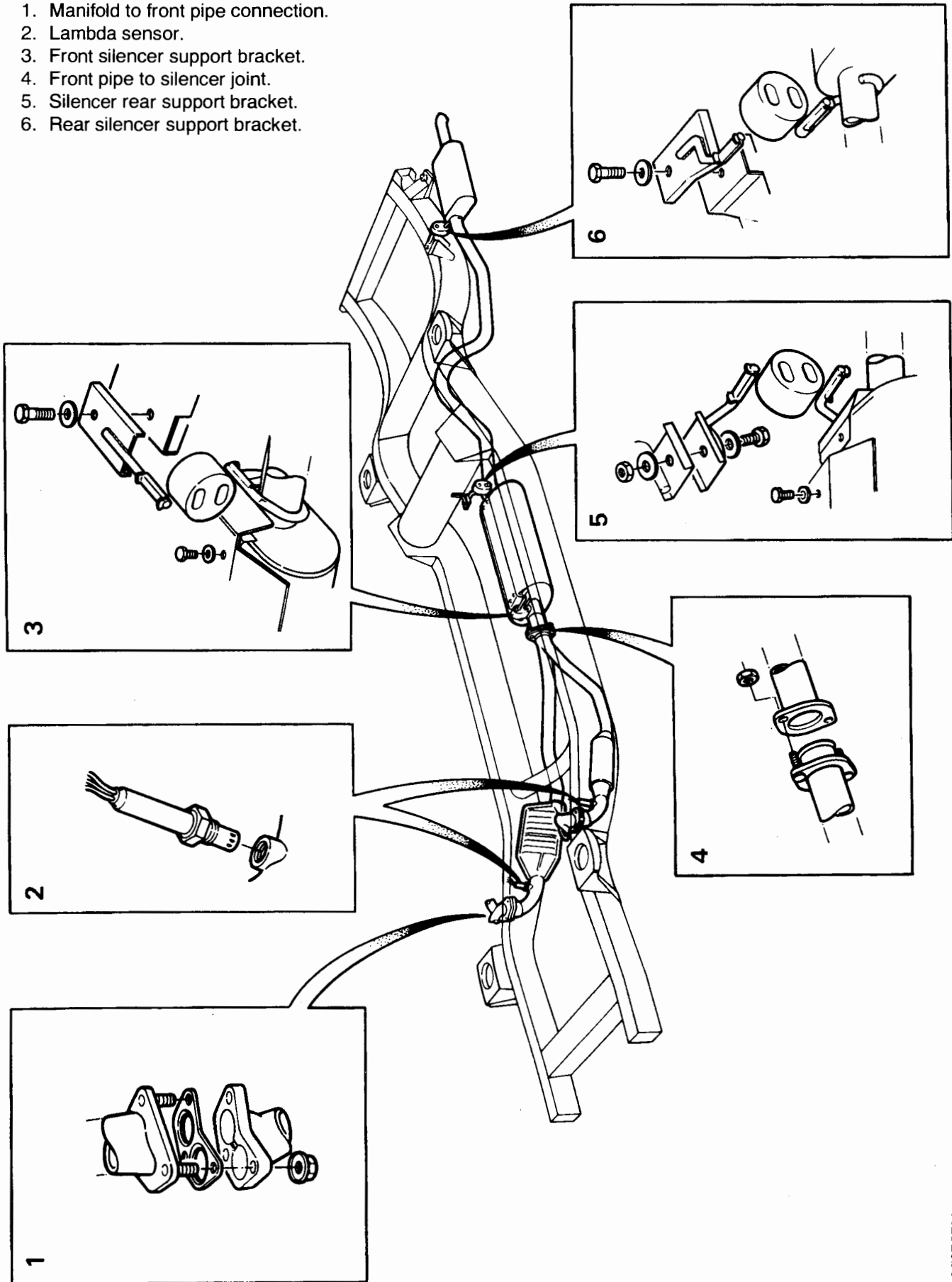


CAUTION: Unleaded fuel only must be used on vehicles fitted with catalytic converters. As a reminder, a label to indicate this is adhered to the inside of the fuel filler flap. Furthermore the filler neck is designed to accommodate only unleaded fuel pump nozzles.



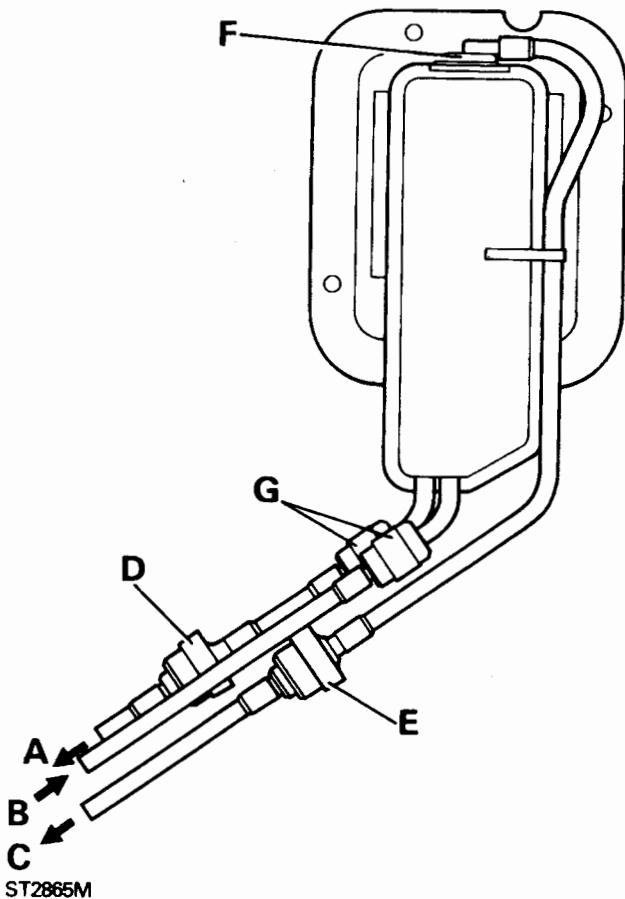
EXHAUST SYSTEM

1. Manifold to front pipe connection.
2. Lambda sensor.
3. Front silencer support bracket.
4. Front pipe to silencer joint.
5. Silencer rear support bracket.
6. Rear silencer support bracket.



Evaporative emission control system.

The system is designed to prevent harmful fuel vapour from escaping to the atmosphere. The system consists of a vapour separator tank, connected to the fuel tank and located between the body inner and outer panels on the right hand side of the vehicle near the rear wheel arch. An adsorbtion canister, containing activated charcoal, is positioned in the engine compartment attached to the front right valance. The two components are connected by a pipe running the length of the chassis.



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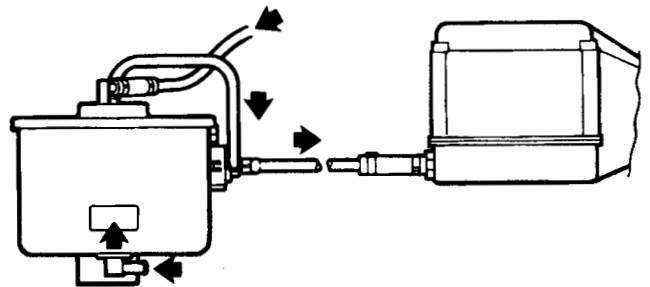
- A Pressure relief to atmosphere.
- B From fuel tank to separator.
- C To adsorbtion canister.
- D Pressure relief valve.
- E Pressure relief valve.
- F Shut-off valve.
- G "Speed Fit" connectors.

A pressure relief valve is fitted in the hose which is open to atmosphere. This valve acts as a safety valve should a build-up of pressure occur in the system, for example if a hose became blocked or kinked. The volume of vapour emitted, in such an instance, would be acceptable.

A pressure relief valve is also fitted in the hose connected to the adsorbtion canister and releases vapor to the canister when the pressure in the separator reaches between 5 and 7 Kpa.

In the top of the separator a shut-off valve is incorporated in the vapor exit port to prevent the possible presence of any liquid fuel being transmitted to the adsorbtion canister should the vehicle roll over.

The adsorbtion canister, which is connected by a hose to the plenum chamber, absorbs and stores the fuel vapour from the fuel tank while the engine is not running. When the engine is started, the vapour is purged from the canister by air drawn through an orifice in the base of the canister and by the influence of vacuum at the top. The vapour drawn into the plenum chamber through a solenoid operated purge valve is finally burnt in the combustion chambers.



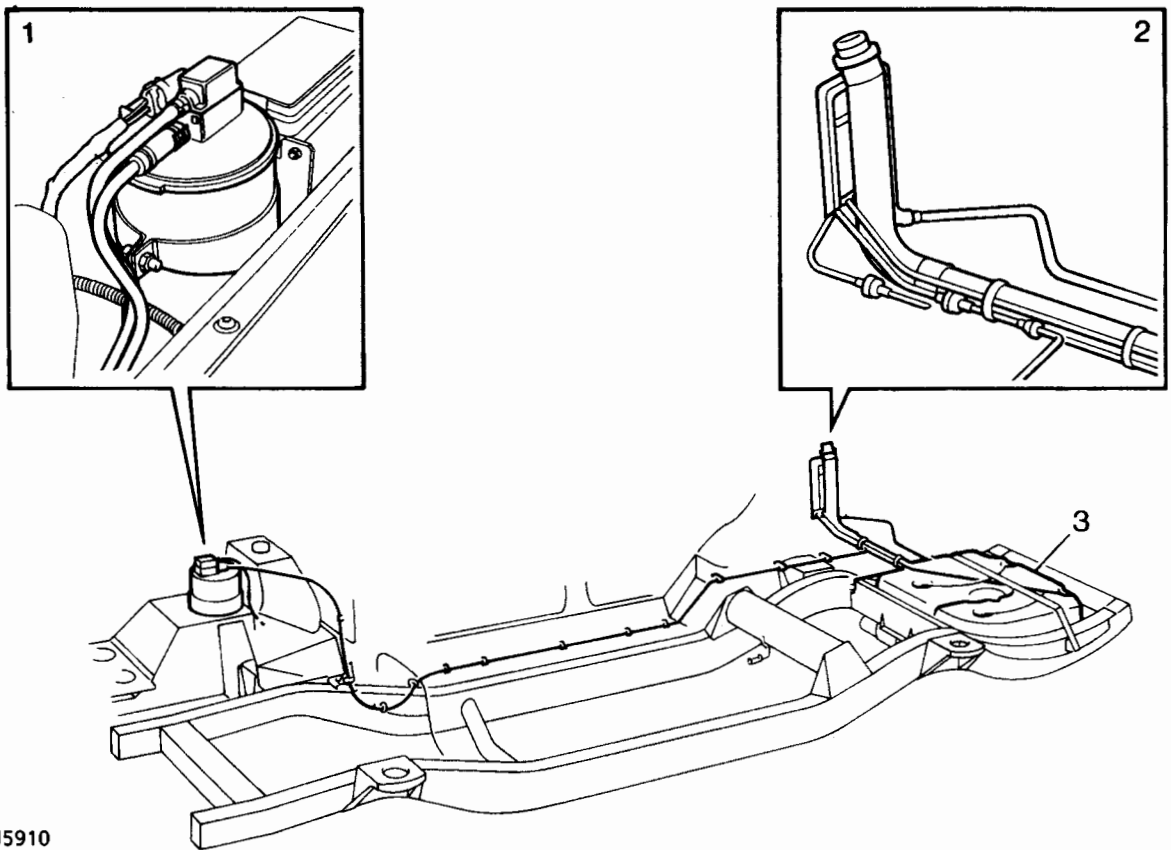
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The purge valve, which is attached to the adsorbtion canister support bracket, is controlled by the Engine Control Module ECM which determines the most emission acceptable time at which purging should take place. This will normally be at engine speeds above idle and when the vehicle is in motion. A signal from the ECM to the purge valve operates the solenoid and opens the valve to purge the canister of fuel vapour.



EVAPORATIVE CONTROL SYSTEM

1. Adsorption canister and purge valve.
2. Location of vapour separator and pipes.
3. Fuel tank.





TESTING EVAPORATIVE EMISSION CONTROL

The following pressure test procedure is intended to provide a method for ensuring that the system does not leak excessively and will effectively control evaporative emissions.

Equipment required.

Nitrogen cylinder (compressed air may be used to pressure the system when there has NEVER been fuel present in the fuel or evaporative control systems).

Water manometer (0 - 30" H₂O or more).

Pipework and a "T" piece.

Method.

1. Ensure that there is at least two gallons of fuel in the petrol tank unless there has never been any fuel in the system.
2. Disconnect, at the adsorption canister, the pipe to the vapour separator.
3. Connect this pipe to the nitrogen cylinder and the water manometer using the "T" piece.
4. Pressurize the system to between 26.5 and 27.5 inches of water, allow the reading to stabilize, then turn off the nitrogen supply.
5. Measure the pressure drop within a period of 2 minutes 30 seconds. If the drop is greater than 2.5 inches of water the system has failed the test. Note that a fully sealed system will show a slight increase in pressure.
6. Should the system fail the test, maintain the pressure in the system and apply a soap solution round all the joints and connections until bubbles appear to reveal the source of the leak.
7. Repeat the test and if successful, dismantle the test equipment and reconnect the pipe to the adsorption canister.



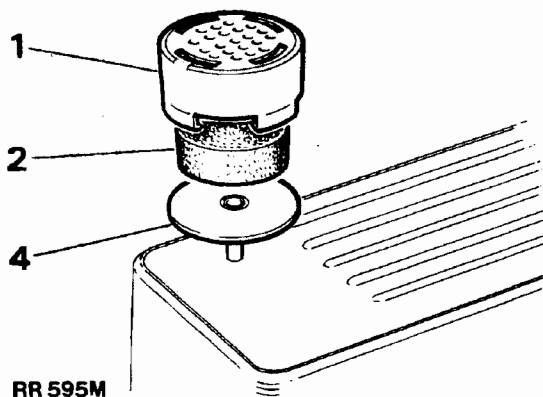
POSITIVE CRANKCASE VENTILATION AIR INTAKE FILTER

Service repair no - 17.10.02

The PCV air intake filter is located at the rear of the left hand rocker cover, beneath the throttle linkage bracket.

Remove

1. Pry the filter outer cover upwards to release it from its mounting.
2. Remove the sponge filter from the cover and discard the sponge.



Refit

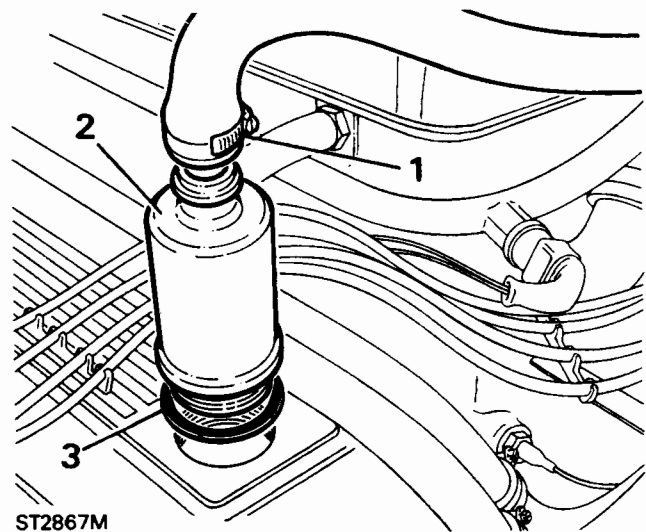
3. Insert a new filter into the filter cover.
4. Press the filter onto its mounting until it clips firmly into position.

POSITIVE CRANKCASE VENTILATION BREATHER FILTER

Service repair no - 17.10.03

Remove

1. Release the hose clamp and pull the hose off the canister.
2. Unscrew the canister and remove it from the rocker cover.
3. Remove the large rubber 'O' ring and inspect for deterioration.



4. Visually inspect the condition of the wire screen within the canister, if in poor condition, replace the whole assembly, if the filter unit is in an acceptable condition, clean as follows.
5. Immerse the canister in a small amount of solvent (mineral spirits) and allow time for the solvent to dissolve or loosen any debris.
6. Remove the canister from the solvent bath and allow to dry in still air.



WARNING: Do not use a compressed air line to dry, clean or remove any remaining particles of debris within the canister as this could cause fire or personal injury.

Refit

7. If the original canister is being refitted, fit a new 'O' ring.
8. Screw the canister into the rocker cover securely - hand tight only.
9. Refit the hose and tighten the hose clamp securely.

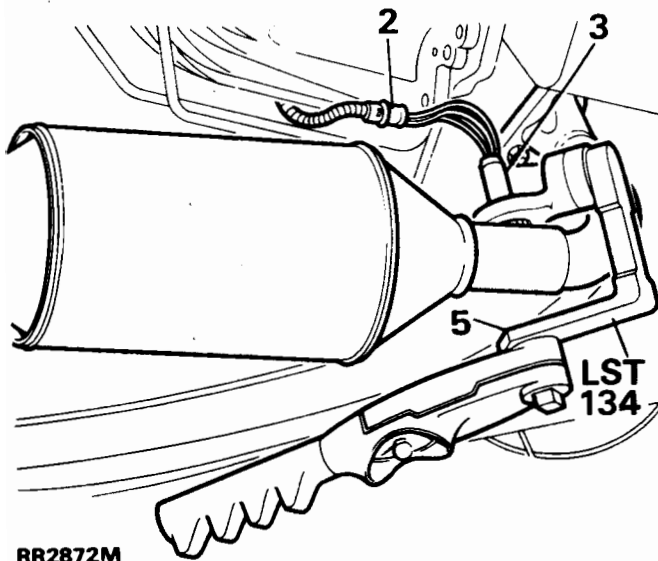
HEATED OXYGEN SENSOR

Service repair no - 19.26.16

The removal of the sensors from the exhaust system must only be carried out when the engine is cold.

Remove

1. Disconnect battery negative lead.
2. Disconnect the electrical plugs from the sensors.
3. Unscrew and remove the sensors from the two exhaust downpipes.



RR2872M

Refit

4. Coat the threads of the sensors with anti-seize compound.



CAUTION: To ensure that the efficiency of the sensor is not impaired, DO NOT allow anti-seize compound to come into contact with the sensor nose.

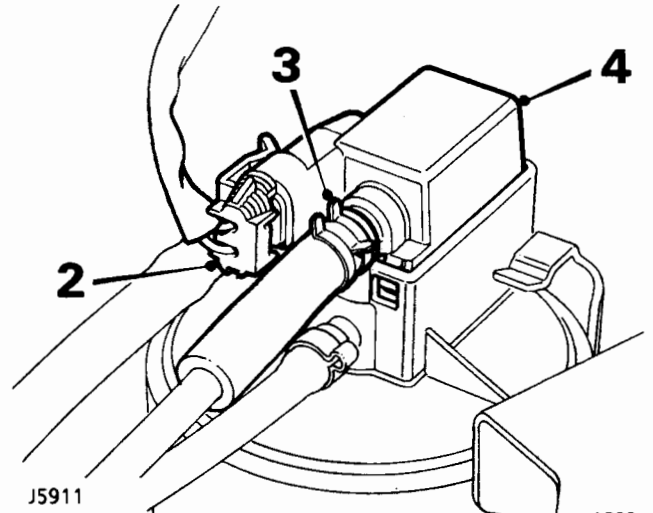
5. Screw in the sensor and tighten to the correct torque using special tool LST134.
6. Connect the electrical plugs and battery lead.

PURGE CONTROL VALVE

Service repair no - 17.15.39

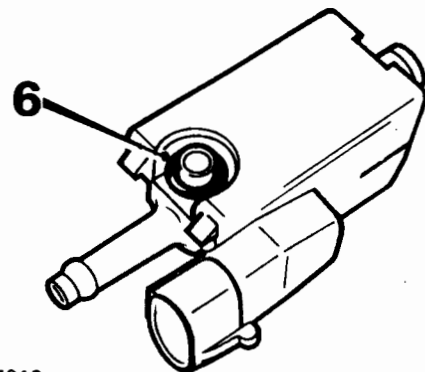
Remove

1. Disconnect battery negative lead.



J5911

2. Disconnect multiplug from purge control valve.
3. Release clip and disconnect hose from valve.
4. Release valve from charcoal canister.
5. Remove valve.



J5912

6. Discard 'O' ring.

Refit

7. Clean valve and valve location.
8. Fit new 'O' ring to purge valve.
9. Position and secure valve to charcoal canister.
10. Connect hose to purge valve and secure with clip.
11. Connect multiplug to valve.
12. Reconnect battery negative lead.

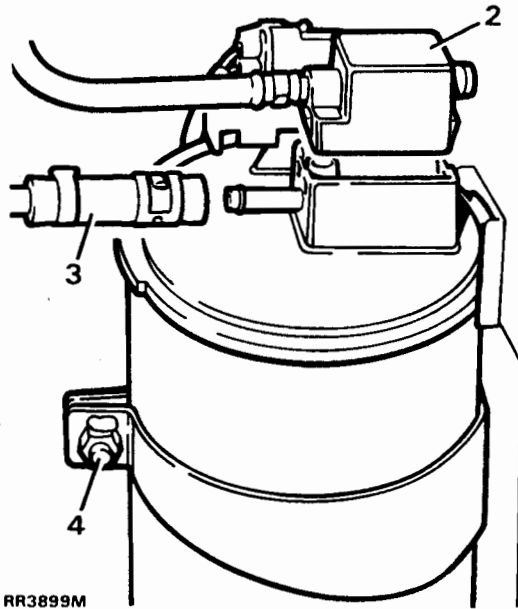


CHARCOAL CANISTER

Service repair no - 17.15.13

Remove

1. Disconnect battery negative lead.
2. Pry out purge valve.
3. Disconnect pipe.



4. Loosen bolt.
5. Remove charcoal canister.

Refit

6. Reverse removal procedure.