PEUGEOT

USA Models (1973 Standards)

504 A91 - 504 A93
504 D91 - 504 D93

APPARATUS FOR

- EXHAUST EMISSION CONTROL
- POSITIVE CRANKCASE VENTILATION
- GASOLINE EVAPORATION CONTROL

DESCRIPTION
OPERATING PRINCIPLE
AND
REPAIR MANUAL

CONTENTS

FOREWORD

In order to comply with regulations in force in the U.S.A., the " 1973 Standards " 504 models for the American market are fitted with :

– **An exhaust emission control system,** which reduces the quantities of unburnt hydrocarbons, oxide of carbon and oxides of nitrogen discharged through the exhaust system, consisting of :

- an air pump which injects air into the exhaust manifold continuously and into the inlet manifold when decelerating,

- two carburetors, mounted in compound, which give a precise mixture for :

  - optimum consumption during acceleration due to use of the first carburetor only,

  - maximum power at the end of gas pedal stroke due to cutting in of the second carburetor.

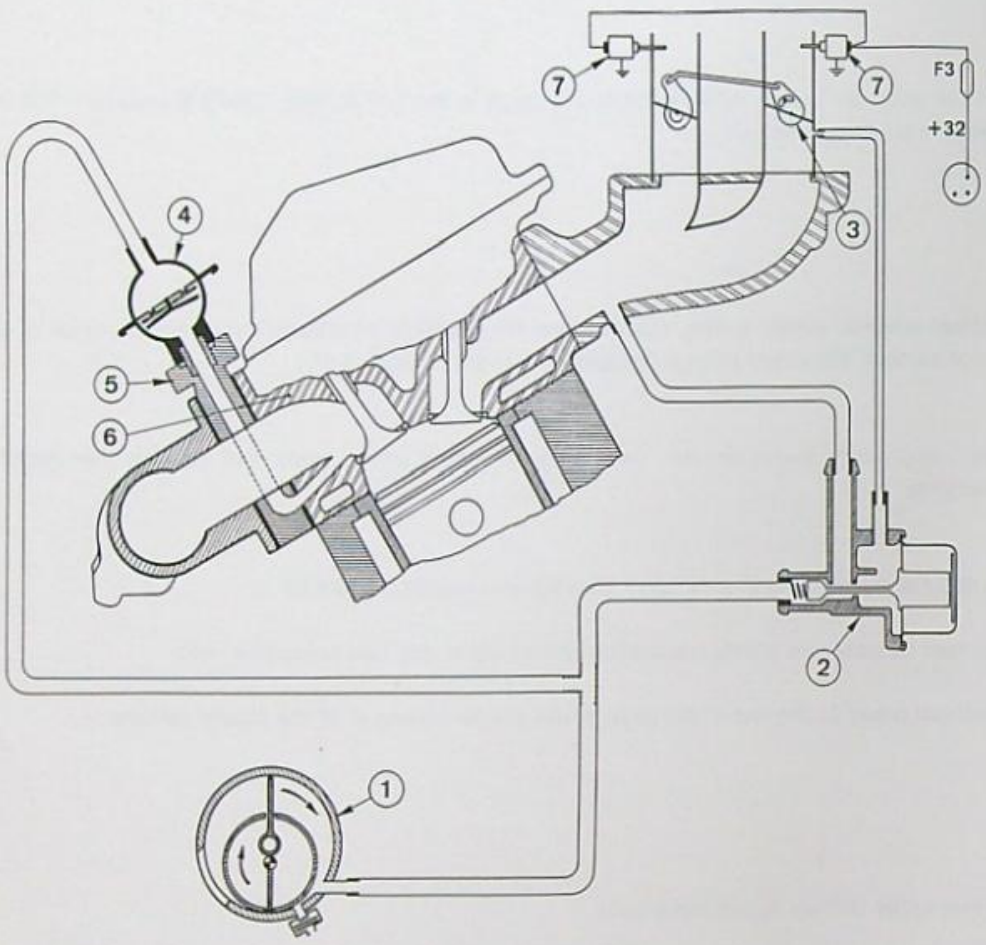
– **Maximum values** defined by the regulations :

- unburnt hydrocarbons : 3.2 g/mile
- oxide of carbon : 39 g/mile
- oxides of nitrogen : 3 g/mile
- gasoline evaporation : 2 g/test

– **Positive crankcase ventilation,** preventing discharge into the atmosphere of gases (a mixture of oil vapor, combustion gas, unburnt petrol vapor and water vapor) while at the same time preventing over pressure in the crankcase which would cause oil leakage at the bearings and seals.

– **A gasoline evaporation control system,** preventing gasoline vapor escaping into the atmosphere when the temperature of the fuel increases (while the car is being driven or due to atmospheric conditions).

EXHAUST EMISSION CONTROL DEVICE



EXHAUST EMISSION CONTROL DEVICE

DESCRIPTION

This system consists of :

- **Two carburetors,** mounted in compound ; the second carburetor cuts in when the first carburetor throttle flap is already open (at approximately 1/3 of gas pedal stroke).

- **An air pump (1),** driven by a belt from the crankshaft pulley, which ensures the air supply to the complete system.

- **An injection valve (2),** controlled by the depression downstream from the 1st carburetor throttle flap **(3),** which enables air to be injected into the inlet manifold during deceleration.

- **A non-return valve (4)** which allows air to enter the exhaust manifold and prevents exhaust gas blowing back into the air supply line.

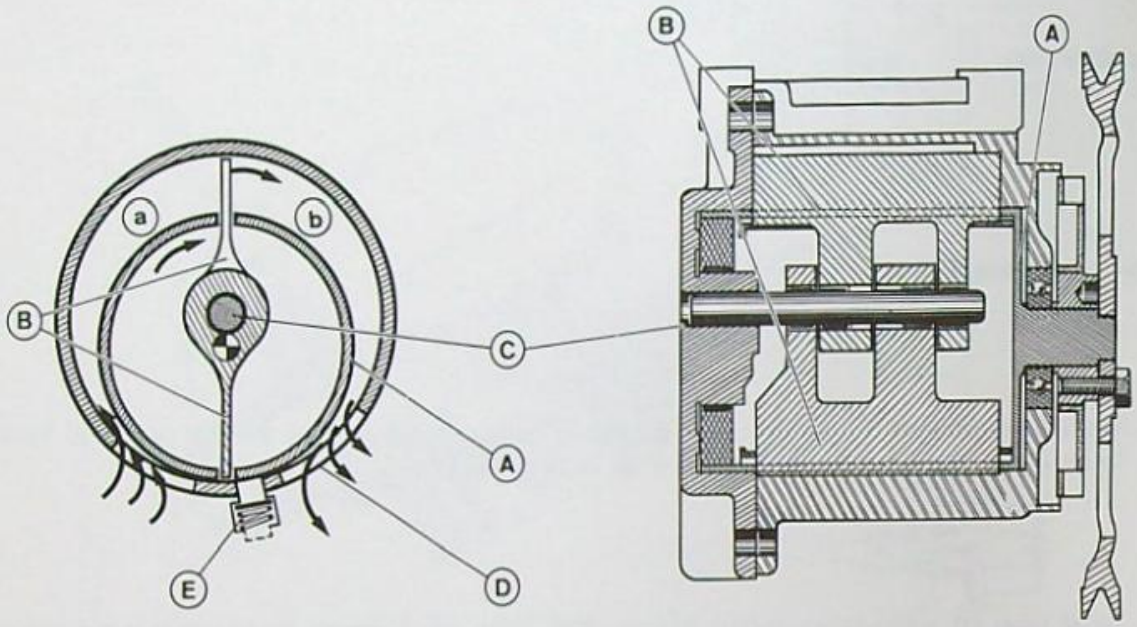
- **A diffuser plate (5)** which, located between the cylinder head and the exhaust manifold, channels the air towards the four exhaust ports.

- **A special cylinder head (6)** which incorporates 4 air ducts leading to the exhaust ports.

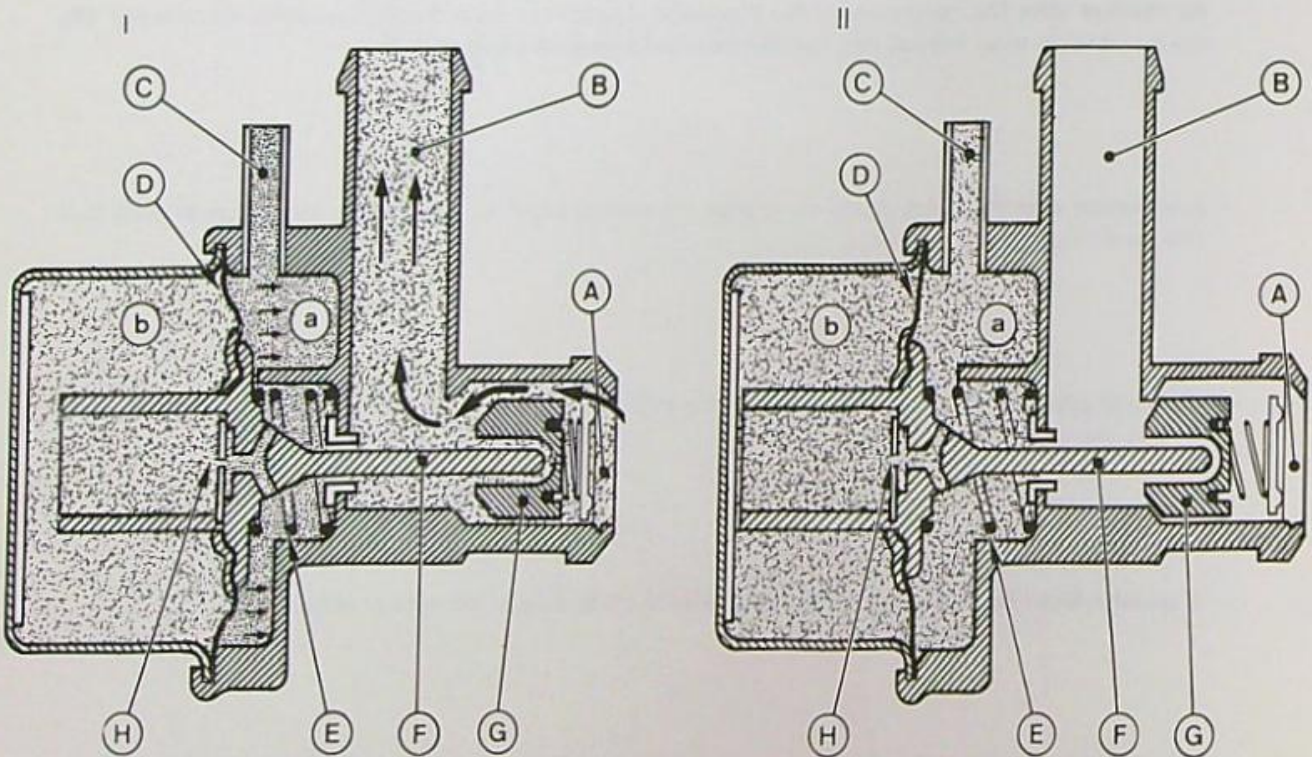
- **Two idling electrovalves (7)** which seal off the idling jets when the engine is switched off, to prevent fuel entering the combustion chambers while the engine is stopping.

DIAGRAMS OF OPERATING PRINCIPLE

AIR PUMP



INJECTION VALVE



OPERATING PRINCIPLE OF MAIN COMPONENTS

AIR PUMP

The rotor **(A)**, mounted on bearings in the front and rear cheeks of the pump, is driven by a belt from the crankshaft pulley.

The two pallets **(B)** turn around the off centered stud **(C)**, which is fixed in the rear cheek of the pump, following the curve of the pump body. Driven by the rotor **(A)**, they slide in the slots and form two chambers.

The air, filtered centrifugally, is sucked into the chamber **(a)**. During rotation of the pallet, the volume of the chamber diminishes and the air is compressed in chamber **(b)** before leaving the pump through outlet **(D)**.

A safety valve **(E)**, rated at 3.5 p.s.i., prevents over pressure in the pump.

INJECTION VALVE

Pipe connections

A - air inlet from pump.

B - air outlet towards the inlet manifold.

C - vacuum line from inlet manifold (downstream from throttle flaps).

Operating principle

The vacuum in chamber **(a)** acts on diaphragm **(D)**, compressing the spring **(E)**. The thrust rod **(F)** opens valve **(G)**, allowing the air to pass (fig. I).

At this moment, chambers **(a)** and **(b)** are in communication through jet **(H)**. The depression tends to equalize on both sides of the diaphragm. The spring **(E)** returns the diaphragm to its rest position and valve **(G)** closes, shutting off the intake, cutting the supply of air to the inlet manifold (fig. II).

The cycle begins again as soon as the depression in chamber **(a)** increases.

DIAGRAM I

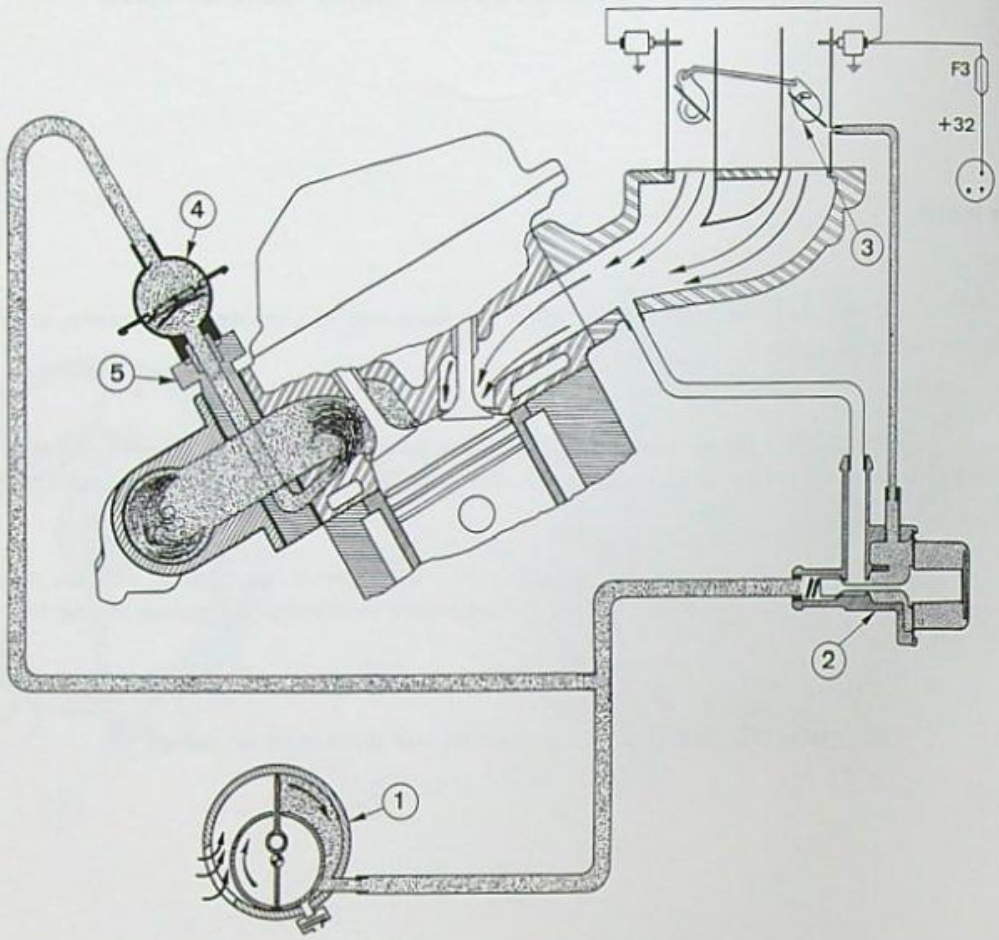
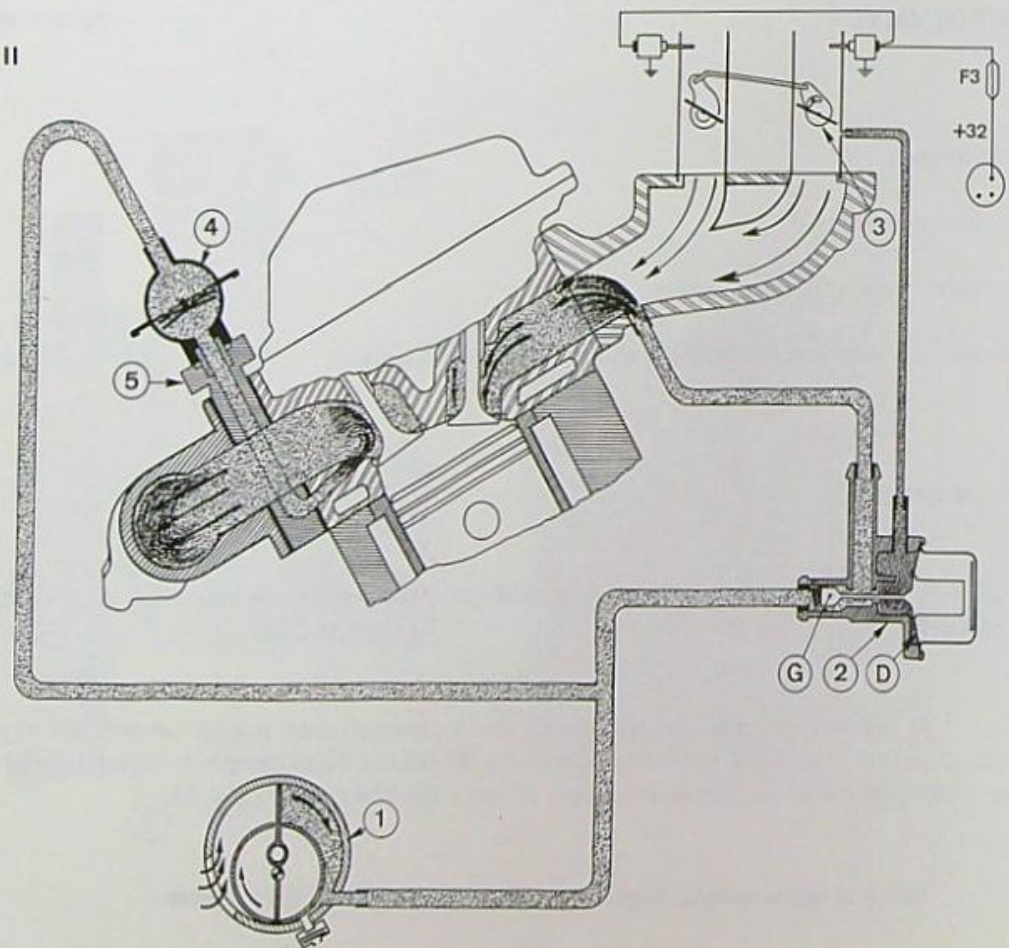


DIAGRAM II



OPERATING PRINCIPLE OF THE EXHAUST EMISSION CONTROL SYSTEM

1 - Vehicle accelerating or at stable speed (Diagram I).

The output of the pump **(1)** increases as the engine speed increases.

As soon as the engine is switched on, the air pressure from the pump opens the non-return valve **(4).** The air is channeled through plate **(5)** to the exhaust valves.

The air thus added provokes a thermal reaction on the exhaust gas emitted from the cylinders.

The thermal reaction is improved by the single outlet manifold which maintains a sufficiently high temperature and retains the gas and the added air long enough to complete the combustion of the hydrocarbons and oxides of carbon.

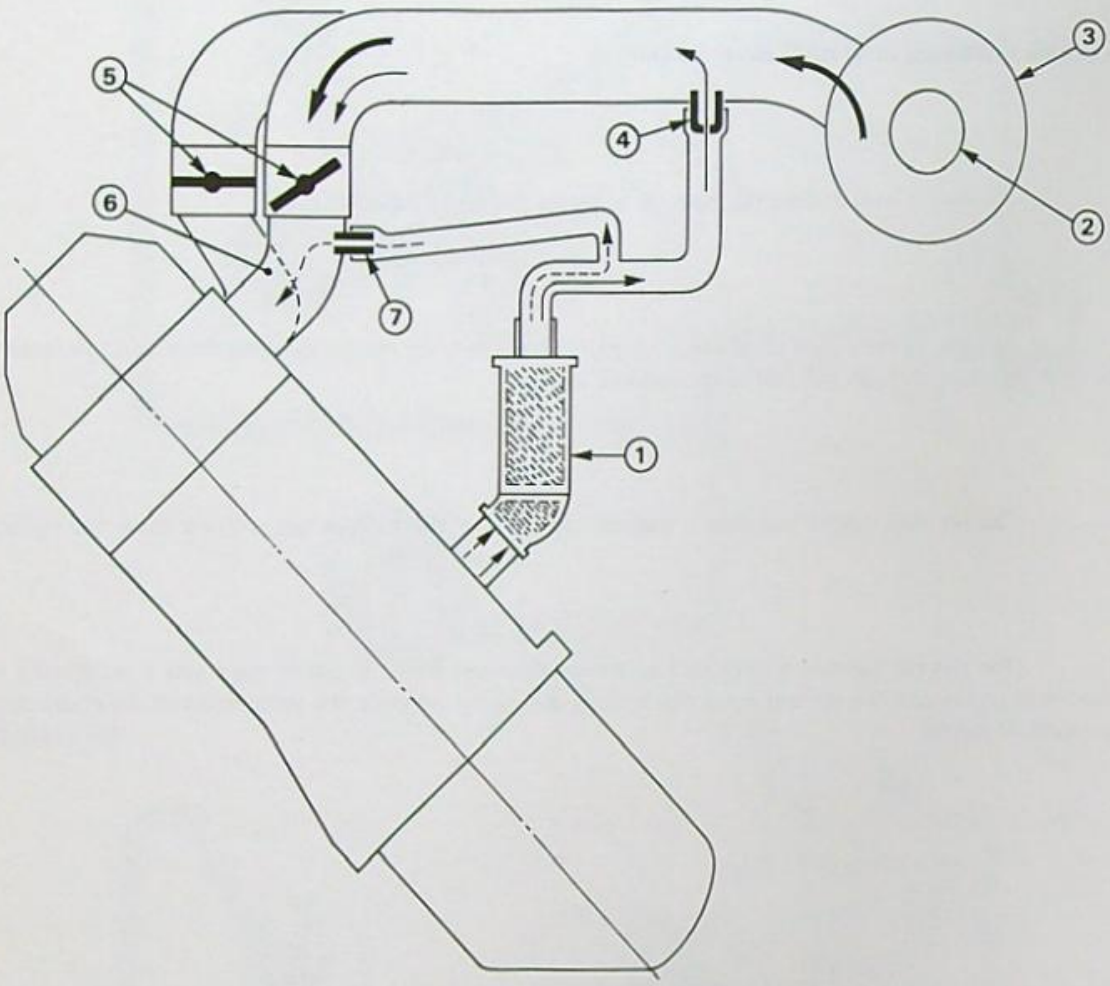
2 - Vehicle decelerating (Diagram II).

When the accelerator is released, the increase in engine vacuum below the throttle flap of the 1st carburetor **(3)** causes the diaphragm **(D)** in the injection valve **(2)** to move and open the valve **(G).** Air from the pump is then injected into the inlet manifold for a given time (see operating principle of the injection valve).

The temporary injection of air at beginning of deceleration corrects the excess richness of the mixture due to vaporization of the petrol, in liquid form, on the walls of the inlet ports and manifold.

The proportion of unburnt hydrocarbons in the exhaust gas is thus reduced.

OPERATING PRINCIPLE



1 - Oil sump "gas" re-circulating tube with oil stop.
2 - Air inlet.
3 - Silencer- filter on the intake.
4 - Diaphragm.
5 - Carburetor throttles.
6 - Inlet manifold.
7 - Calibrated hole.

Flow of air : ——→
Flow of sump gas :
Primary circuit (throttle closed) - - - - - - →
Secondary circuit (throttle open) ——→

OIL VAPOR RE-CIRCULATION DEVICE

This device is intended to prevent the escape into the atmosphere of oil sump "gas" (mixture of oil vapor, exhaust fumes, unburnt gasoline fumes and water vapor) whilst avoiding a build up of pressure in the sump which would show itself in oil leaks at the bearings and seals.

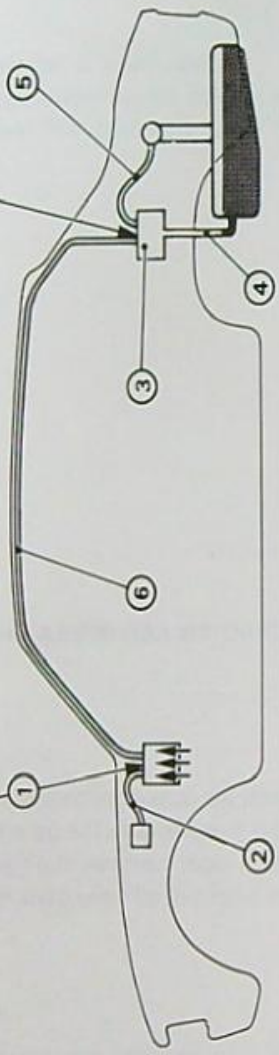
DESCRIPTION AND OPERATING PRINCIPLE

1 - When the carburetor throttles are closed, the vacuum is very weak above the carburetors and very strong in the inlet manifold **(6)**. The oil sump gases pass through the re-circulation tube **(1)**, which is fitted with a metallic pad which stops the drops of oil,and arrive in the inlet manifold through the calibrated hole **(7)**. This hole, controlling the output of oil sump gases, enables the idling speed to remain unaffected.

2 - When the throttles are open, the vacuum is weak below the carburetors and sufficiently strong above it to "suck" the gas through the diaphragm **(4)**. This diaphragm enables the obtaining of the re-circulation demanded, by creating a loss of "charge", and the limiting of vacuum in the sump at high engine speeds, thus avoiding air intake into the sump and the admission of oil into the re-circulating system.

3 - In the intermediate throttle positions, the two circuits (primary and secondary) operate together.

GASOLINE EVAPORATION CONTROL



GASOLINE EVAPORATION CONTROL

DESCRIPTION

This device includes :

– **An air tight gas filler cap :**

– **A canister (1),** containing active charcoal, mounted on the front scuttle and linked by a tube **(2)** to a calibrated carburetor jet,

– **A separator (3),** of approximately 4 1/4 pints capacity, mounted on the rear L.H. wing valance and linked to the gas tank and filler hose by the tubes **(4)** and **(5),**

– **A tube (6),** linking the canister and separator, which is secured along the top of the L.H. one piece side.

OPERATING PRINCIPLE

Engine stopped.

Gasoline vapor from the tank passes through the filler tube and the tube **(5)** to the separator **(3)** where any liquid which it may contain is deposited. This liquid drains back to the tank through the tube **(4).**

The vapor passes through the tube **(6)** to the canister and is "absorbed" by the charcoal (the absorption capacity of the canister is sufficient for the amount of vapor normally emitted from the tank).

Engine running.

– When the engine is running it sucks in an amount of air through the calibrated jet in the carburetor and tube **(2).** The quantity of air sucked **through the canister** is always proportional to the amount coming from the air filter. This air, filtered when it enters the canister, picks up the "stored" gas vapor.

– The more or less carburated mixture is added to that passing through the carburetor and thus burnt. This mixture is sufficiently weak as not to disturb the carburation regardless of the saturation point of the canister.

MAINTENANCE

CHECKS AND ADJUSTMENTS

ON THE VEHICLE

SERVICING OF EMISSION CONTROL SYSTEM

EXHAUST EMISSION CONTROL SYSTEM

MAINTENANCE

Every 12.000 miles :

Clean the electrovalve contacts

Every 24.000 miles :

Check :

- pump output
- injection valve operation (replace if necessary)
- sealing of the non return valve (replace if defective).

TROUBLE SHOOTING

DEFECT	CAUSE	REMEDY
Poor idling	Bad connections of the electro-valve wire	Clean the connections and check the contacts
	Inefficient operation of the injection valve	Check and if necessary replace the valve.

PRECAUTIONS

To ensure correct operation of the air pump the following precautions must be taken during maintenance and servicing of the emission control system :

– Do not run the engine with the pump or its drive belt removed.

– Do not lubricate the pump.

– Do not clean the centrifugal filter (protect the filter when cleaning the engine).

– When tightening the drive belt do not lever on the pump body (see page 24 for instructions)

– Do not clamp the pump in a vice.

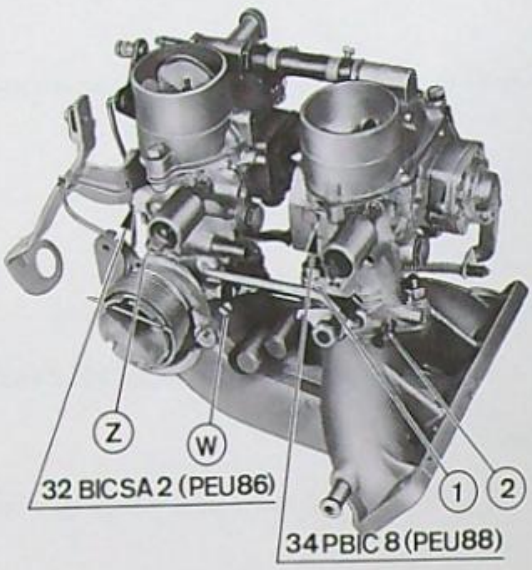
– Do not attempt to dismantle the pump ; only the safety valve, centrifugal filter and pulley can be replaced.

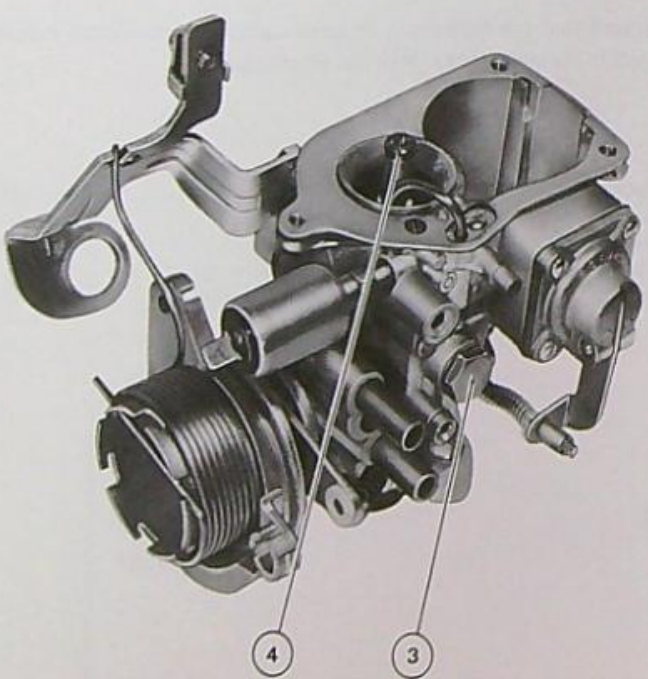
If the pump is not operating correctly (lack of output, noise), change the pump.

Do not turn the new pump over by hand and **never rotate the rotor in the opposite direction to operational rotation.**

In order to ensure that the regulations in force concerning maximum emission values are respected, the main jets and correction jets in the carburetors must not be changed.

If ever the evaporation control canister has to be replaced , only fit a Tecalemit replacement.





ADJUSTING THE CARBURETORS

IDLE RUNNING

Tools - An R.P.M. gauge, graduated from 0 to 2000 r.p.m.

- accuracy ± 2.5 %
- sensitivity ± 0.5 %

-- The idling must be adjusted at 3000, 9000, 18000, the every 18000 miles, after checking and correcting the dwell angle and the initial advance.

The engine must be hot (cooling fan engaged).

WARNING - The idling must be adjusted using the screws **(W)** and **(Z)** on the **1st carburetor** only. Never alter the setting of screws **(1)** and **(2)** on the second carburetor.

– Adjust, in the following order :

- screw **(Z)** to obtain 800 r.p.m.
- screw **(W)** until the engine speed is stable (unscrew)
- screw **(W)**, unscrew one complete turn.
- screw **(Z)** to obtain an engine speed of 830 to 880 r.p.m.
- screw in screw **(W)** to obtain a drop in engine speed of 30 r.p.m. to give an idling speed of 800 to 850 r.p.m.

TABLE OF CARBURETOR SETTINGS

		32 BICSA 2 (PEU86)	34 PBIC 8 (PEU 88)
Choke tube (venturi)	K	24	26
Main jet	Gk	(3)* 122.5 ± 2.5	(3)* 122.5 ± 2.5
Correction jet	A	(4)* 180 ± 5	(4)* 210 ± 5
Emulsion tube	S	136	137
Idling electrovalve	12 V	55 ± 5	50 ± 5
Idling air jet (fixed in K)		120	210
Idling air intake jet		90	–
Pump injector		Ø 40	Ø 50
Diffuser		4 holes	4 holes
Pump stroke		3.5 ± 0.5 mm	6 ± 0.5 mm
By pass holes (2)		Ø 130	Ø 110
Needle valve		1.2	1.5
Float		5.7 g	5.7 g
Throttle flap diameter		Ø 32	Ø 34
Econostat			90 ± 05

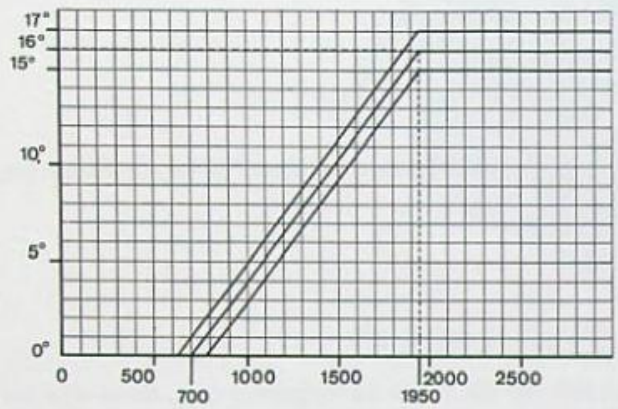
* **WARNING** - The calibration is determined on a test bench, within the limits indicated. For this reason, the main jets **(3)** and correction jets **(4)** must not be altered.

SETTING THE IGNITION

– Distributor.

Ducellier M74 without vacuum advance corrector

CENTRIGUGAL ADVANCE CURVE
M74



Points gap : 0.017" ± 0.002".

Dwell angle : 57° ± 2°.

(Dwell % : 63 ± 3 %).

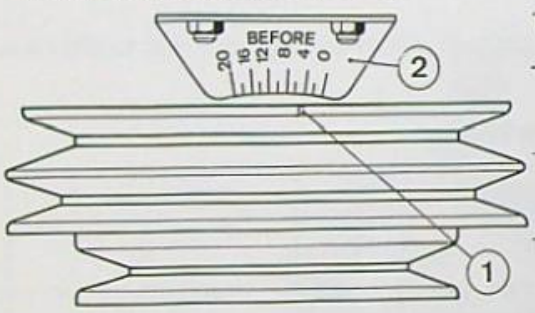
– Spark plugs

- AC 44 XL - Marchal 35 HS - Champion N7Y.
- Electrode gap : 0.023" to 0.027".

– Ignition coil.

Ducellier 2781 A.

– Initial ignition advance : 5° (BTDC).



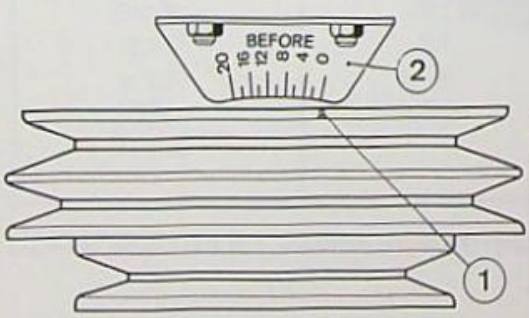
This is set :

- using a stroboscope connected to the plug lead of n° 1 or n° 4 cylinder,
- with the engine turning at less than 1,200 r.p.m. so that the centrifugal advance does not start to operate,
- so that, under the flash, the mark **(1)** on the pulley is between **4** and **6** on the graduated plate.

WARNING - It is forbidden to adjust the ignition advance with the 8 mm feeler in the hole in the clutch housing, as the ignition advance thus obtained (0°) is different to the one recommended.

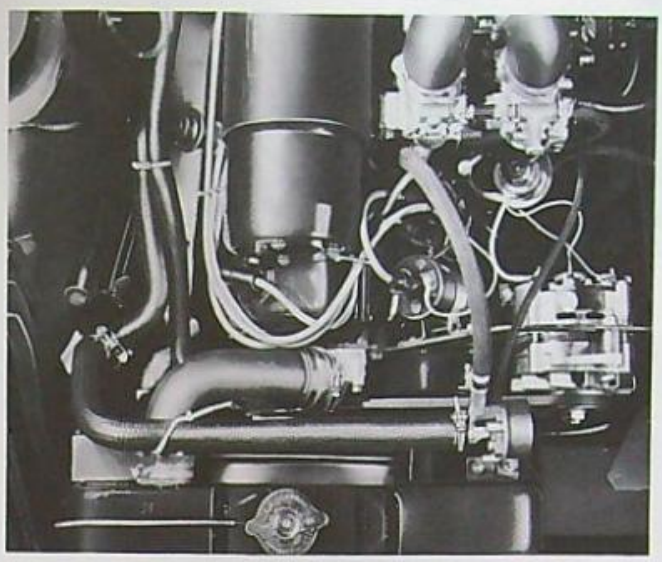
– The ignition advance must be checked and, if necessary, corrected whenever the points gap is reset.

– Checking the position of the graduated plate on the timing gear housing



The graduated plate **(2)** has two attachment holes. After each intervention the **0** mark must be exactly in line with the slot on the pulley **(1)** when the pistons 1 and 4 are at T.D.C. (Use the feeler **8.0126** and a dial indicator).

CHECKING THE COMPONENTS OF THE EXHAUST EMISSION CONTROL SYSTEM



PIPING

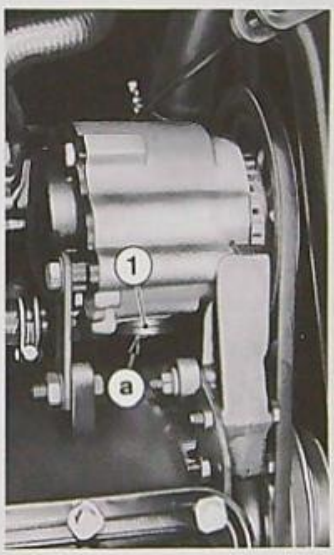
– Check :

- the tightening
- for vibration
- for leaks

N.B. - *To check for leaks :*

– Smear soapy water over the areas supposed defective.

– If there are any leaks, bubbles will form.



AIR PUMP

– Before checking make sure :

- that the drive belt is tight and in good condition
- that the pipes are installed correctly.

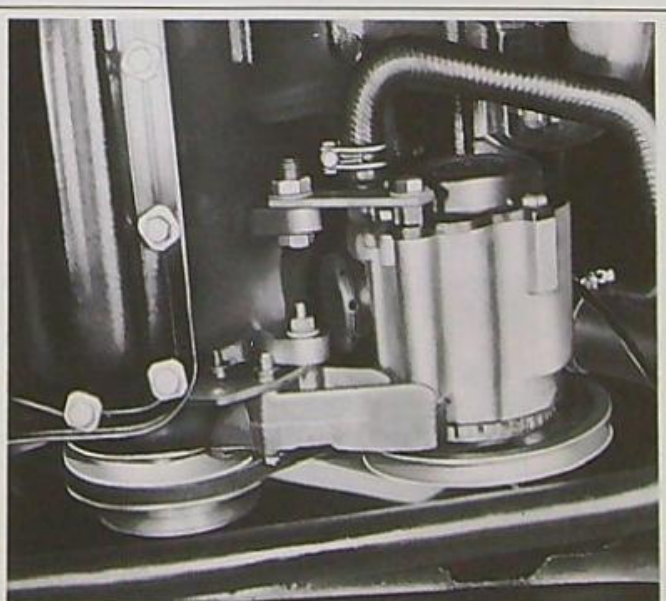
Checking air flow

– The safety valve **(1)** must not discharge air when the engine is idling. *

– Make sure that the spacer **(a)** is in place (green).

– Disconnect pipe **(2)** and make sure that air flow increases with engine speed.

* At high engine speed it is normal if this valve discharges air.



Checking for noise

– If the pump is noisy:

– Disconnect the drive belt.

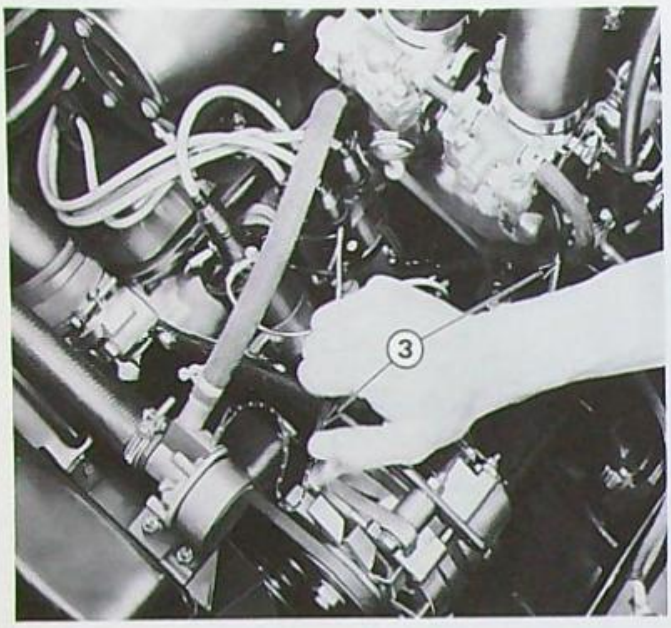
– Run the engine, at the speed at which the noise is loudest, for a very short time.

– If the noise has disappeared the pump is the cause.

N.B. - *At low engine speed, a slight whine is normal.*

PEUGEOT

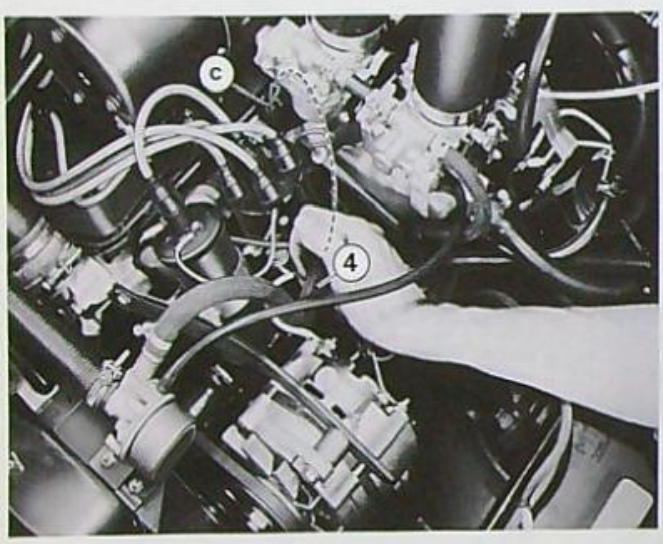
CHECKING THE COMPONENTS OF THE EXHAUST EMISSION CONTROL SYSTEM



INJECTION VALVE

– Start the engine

– Make sure that depression is reaching the valve (line **(3)**)



– Disconnect the air line **(4)** from the inlet manifold.

– Plug the end **(C)**.

- Engine idling, there should be no flow of air.

- When the throttle is opened and shut sharply air should flow for approximately 1 second.

Fig. I

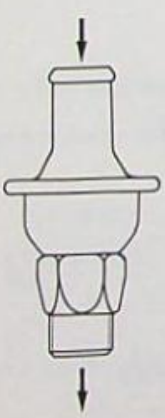
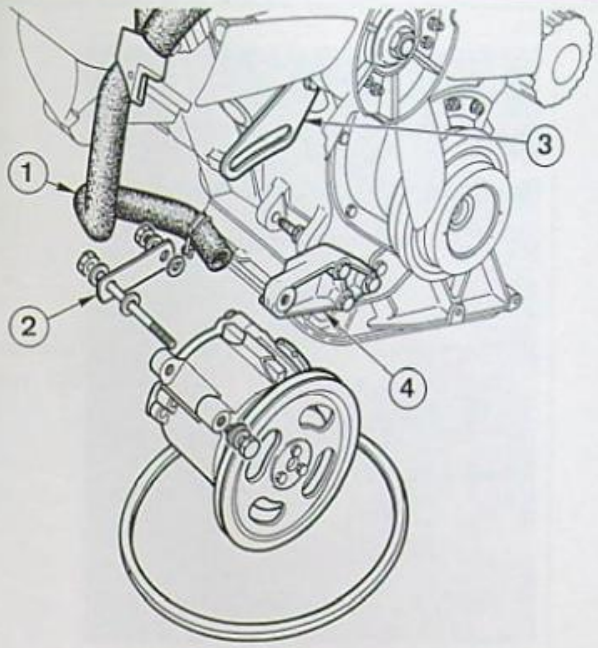


Fig. II

NON RETURN VALVE

– Air should flow from the pump to the manifold (Fig. I).

– The valve should be air tight in the other direction (Fig. II).



SERVICING THE AIR PUMP

REMOVAL

– Disconnect pipe **(1)**

– Slacken and remove the drive belt

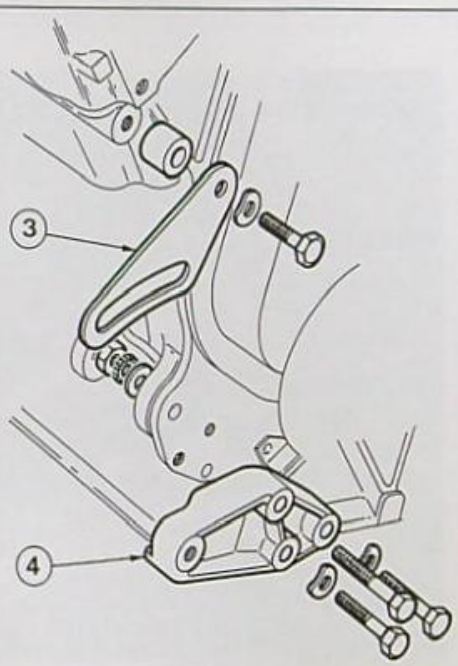
– Remove the rear support **(2)**

– Remove the air pump

– If necessary, remove :

- the slide lug **(3)**

- the pump support **(4)**.

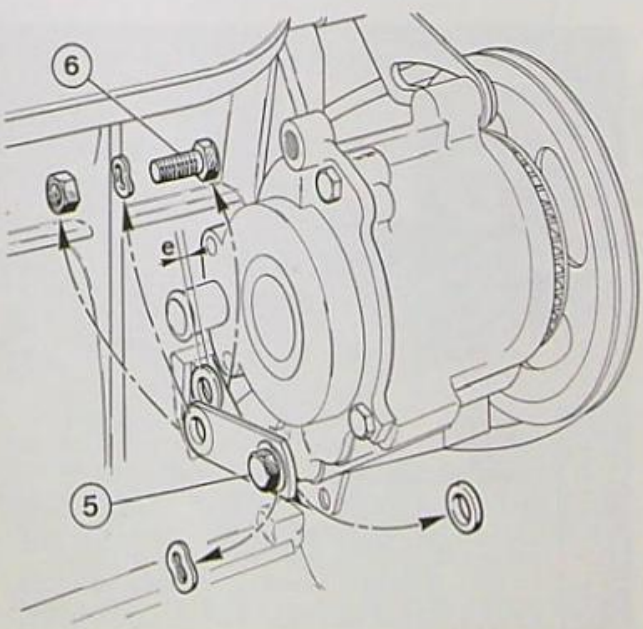


REFITTING

– Refit :

- the pump support **(4)**

- the slide lug **(3)**.



– Install the pump on its support (bolt **(5)**)

– Refit the drive belt

WARNING - Do not rotate the pump shaft counter clockwise

– Fit the slide lug bolt

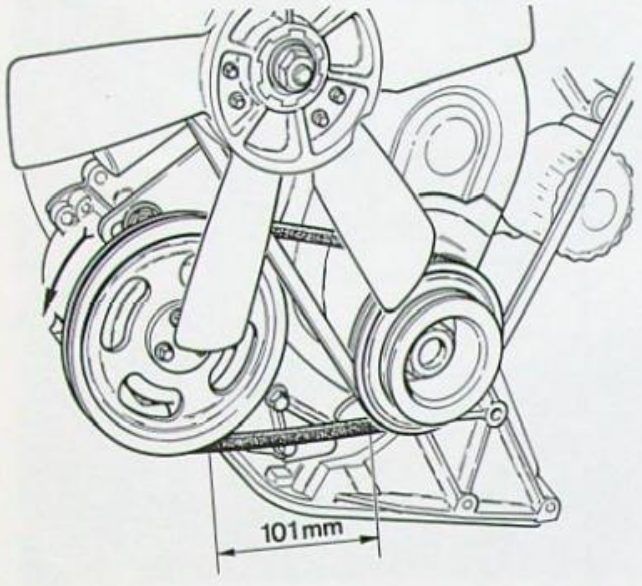
– Tighten the bolts moderately

– Select the thickness of washer required to compensate the gap at **(e)** between lug and rear support.

– Fit and tighten the bolt **(6)**

– Tension the drive belt and fully tighten all the bolts.

PEUGEOT



SERVICING THE AIR PUMP

ADJUSTING DRIVE BELT TENSION

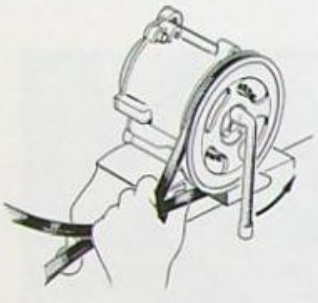
WARNING :

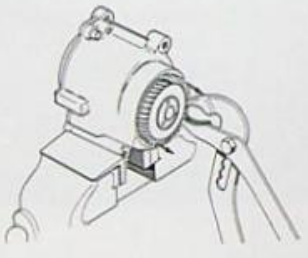
Do not lever against the pump body.

– When the correct tension is obtained the reference marks, 100 mm apart, should be at 101 mm (1 % stretch).

– Tighten :

- the slide lug bolt
- the pump securing bolt to 25 ft.lbs.





REPLACING THE CENTRIFUGAL FILTER

WARNING

– Install the pump in a vice **without tightening it.**

– Make sure that no particles fall into the air intake.

– Slacken the pulley bolts, retaining the pulley by its belt.

– Remove the pulley.

– Remove the filtering unit.

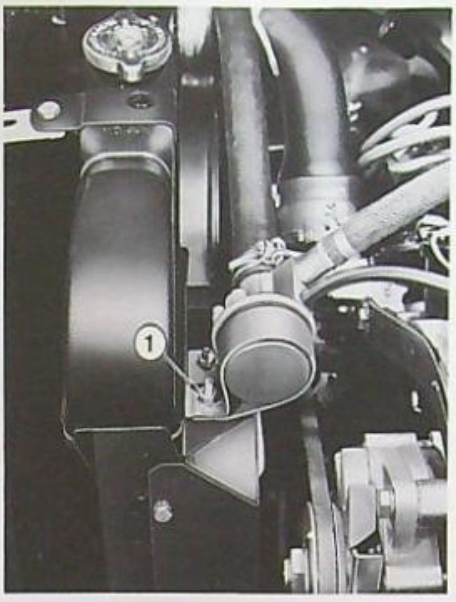
– Install the new filtering unit on the pump hub.

– Secure it in position, using the pulley, and tightening the 3 bolts alternately.

– Tighten the pulley bolts to 7.25 ft.lbs.

– When new the filter may squeak slightly. The noise will disappear when the filter is bedded in.

SERVICING THE INJECTION VALVE
NON RETURN VALVE AND CANISTER



INJECTION VALVE

– Removal :

- disconnect the piping
- unscrew nut **(1)**
- disengage the valve

– Refitting :

- Refitting is a reversal of the removal procedure.

NON RETURN VALVE

– Removal :

- disconnect the piping
- hold the union **(2)** while unscrewing the valve.

– Refitting :

- fit a **new** washer
- tighten the valve to 25 ft.lbs. while holding the union **(2)**
- reconnect the piping

CANISTER

– Removal :

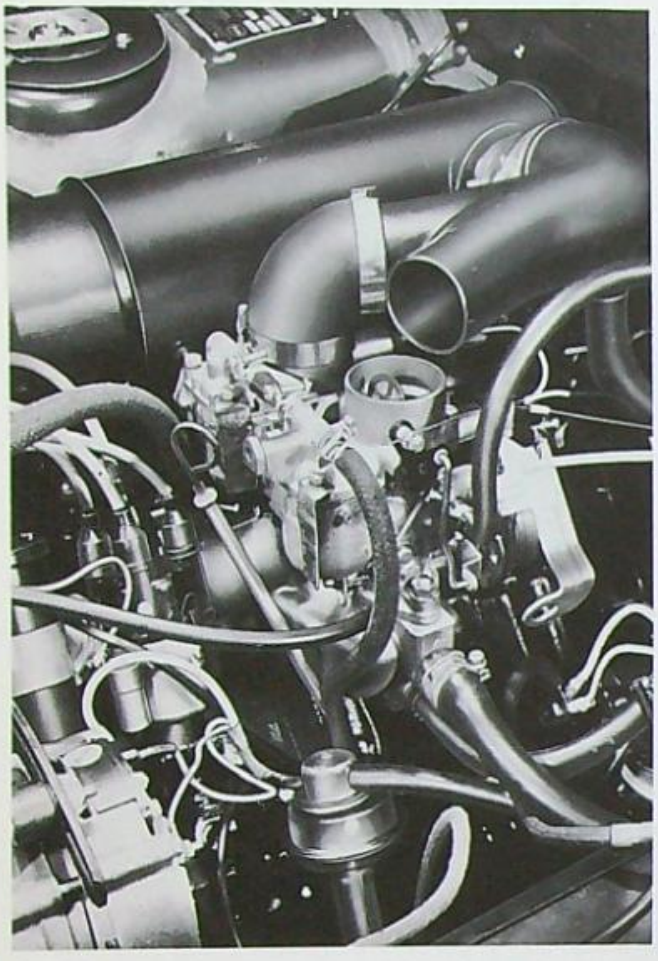
- disconnect the piping
- remove the bolt **(3)**

– Refitting :

- Refitting is a reversal of the removal procedure.

PEUGEOT

SERVICING THE CARBURETORS

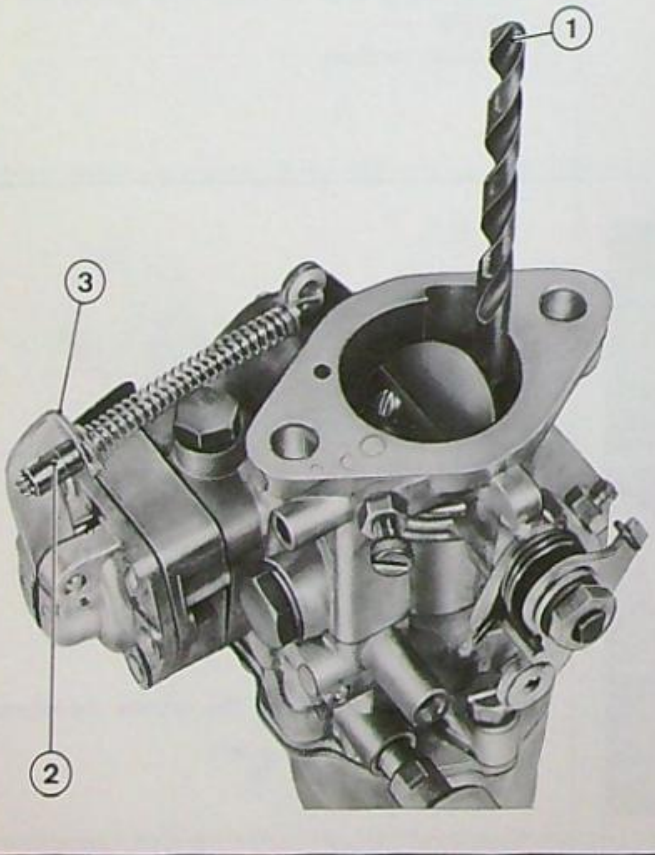


REMOVAL

– Remove the air intake hoses
– Disconnect :
  - the following control cables :
    - accelerator
    - choke
    - kickdown (on automatic vehicles)
  - the hoses :
    - fuel intake
    - vacuum
    - heating
  - the electrovalve leads
– Remove the retaining nuts and remove the carburetors.

REFITING

– Refit and secure the carburetors, fitting new gaskets.
– Connect :
  - the hoses :
    - fuel intake
    - vacuum
    - heating
  - the following control cables :
    - kickdown (on automatic vehicles)
    - choke
    - accelerator
– Refit the air intake hoses
– Run the engine until the fan engages and adjust the idling
– Check the level of the radiator.



ADJUSTING ACCELERATOR PUMP STROKE

– Remove the carburetors
– Insert a rod **(1)** :
  - for 32 BICSA2 carburetor : 3.5 mm diameter
  - for 34 PBIC 8 carburetor : 6 mm diameter
– Unscrew adjuster **(2)** a number of turns then screw it down until it is just bearing on lever **(3)**.

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