Chapter U

EMISSION CONTROL SYSTEMS

PART 1

Chapter U - Part 1 contains information which is applicable to cars fitted with Emission Control Systems and manufactured during the years 1967 to 1972 inclusive.

<table>
<thead>
<tr>
<th>SECTION</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>U1</td>
<td>Exhaust Emission Control System</td>
</tr>
<tr>
<td>U2</td>
<td>Fuel Evaporation Emission Control System</td>
</tr>
<tr>
<td>U3</td>
<td>The Carburetters and Automatic Choke System</td>
</tr>
<tr>
<td>U4</td>
<td>Ignition System, Distributor, Ignition Coil and Sparking Plugs</td>
</tr>
<tr>
<td>U5</td>
<td>Periodic Lubrication and Maintenance</td>
</tr>
<tr>
<td>U6</td>
<td>Fault Diagnosis</td>
</tr>
<tr>
<td>U7</td>
<td>Workshop Tools</td>
</tr>
</tbody>
</table>
INTRODUCTION

This Chapter has been written specifically for cars fitted with Exhaust Emission Control and Fuel Evaporation Emission Control Systems to meet North American regulations.

It is important therefore that Service Personnel fully understand the contents of this Chapter so that the special servicing can be correctly carried out.

Throughout Chapter U reference is made to EARLY, LATER and CURRENT cars, the Car Serial Numbers to which these classifications apply are as follows:

EARLY CARS All cars prior to Car Serial Number SRX 9001

LATER CARS

(a) Cars other than Long Wheelbase
Car Serial Number SRX 9001 up to SRA 12030
Including—SRX 12046 SRX 12062
Excluding—DRA 11808 DRA 11880
DRA 11809 DRA 11908
DRA 11839 DRA 11912
DRA 11841 DRA 11936
DRA 11875 DRA 11936
DRA 11879 CRA 11941
CRA 12025 DRA 12018
DRA 12022 DRA 12026

(b) Long Wheelbase cars
Car Serial Number LRX 9069 up to LRA 11922.
Including—LRX 11923

CURRENT CARS

(a) Cars other than Long Wheelbase
Car Serial Number SRA 12030 and onwards
Including—DRA 11808 DRA 11880
DRA 11809 DRA 11908
DRA 11839 DRA 11912
DRA 11841 DRA 11935
DRA 11875 DRA 11936
DRA 11879 CRA 11941
CRA 12025 DRA 12018
DRA 12022 DRA 12026
Excluding—SRX 12046 SRX 12062

(b) Long Wheelbase cars
Car Serial Number LRA 11922 and onwards
Excluding—LRX 11923
Fig. U1 EXHAUST EMISSION CONTROL SYSTEM AND IGNITION CONTROL SYSTEM

1 'A' bank air manifold  
2 Throttle damper  
3 Fixed throttle stop screw  
4 Vacuum retard tap  
5 Distributor retard capsule  
6 Vent to air trunking  
7 Thermal vacuum switch  
8 'B' bank air manifold  
9 Vacuum throttle stop screw  
10 Check valve  
11 Inlet manifold vacuum tapping  
12 Air pump intake silencer/filler  
13 Throttle stop vacuum actuator  
14 Air pump relief valve silencer  
15 Air pump  
16 Pressure control valve  
17 Deceleration control (gulp) valve  
18 Check valve
Chapter U

Section U1

EXHAUST EMISSION CONTROL SYSTEM

The Exhaust Emission Control System is designed to reduce the Carbon Monoxide and unburnt Hydrocarbon content in the exhaust gases to comply with U.S. Federal and California Emission Control regulations.

This system does not reduce the risk of inhaling exhaust gases in a confined area.

Air injection system – Description

Air from the atmosphere is drawn into the air pump through an intake silencer/filter. From the pump, the air passes through the check valves to the air manifolds then into the exhaust ports at a point just above the exhaust valve heads. This air combines with the exhaust gases from the combustion chamber and completes the oxidation of some of the unburnt gases. The discharge then passes along the exhaust system to atmosphere.

Air pump

Rotary vane air pump belt driven from the coolant pump.

Air pump relief valve

A relief valve is located in the discharge cavity of the air pump. This valve allows pump outlet air to by-pass the air injection system when the check valves are closed at high engine speeds or load, thus preventing damage to the pump and excessively high exhaust temperatures under extreme operating conditions.

Check valves

Check valves are fitted to the air manifolds to prevent the backflow of exhaust gases into the air lines or air pump. The valves operate when the exhaust back pressure exceeds the pump delivery pressure at high speed and load or in the case of failure of an air pump driving belt.

Gulp valve (anti-backfire valve)

The gulp valve which is triggered off by manifold depression allows a measured gulp of air from the pump discharge line to enter the inlet manifold following a rapid throttle closure. If air did not pass into the air manifold under these conditions, the mixture would be too rich to burn in the combustion chambers and would pass into the exhaust ports where it would combine with the injected air and when ignited produce severe backfiring.

Pressure control valve (P.C.V.)

At engine idling speed, i.e. when the air pump delivery pressure is low, the P.C.V. is closed preventing air from the pump discharge line passing into the gulp valve. This is necessary since inlet manifold depression at idle approaches the overrun figure and could trigger off the gulp valve and so cause uneven idling. On engine overrun, the air pressure from the pump opens the P.C.V. and allows air to pass to the gulp valve.
**Throttle damper**

The throttle damper prevents rapid throttle closure which would suddenly drop the intake manifold pressure causing vaporisation of fuel from the manifold walls and produce a sudden increase in mixture strength.

**Air silencer/filter – To clean**

1. Unscrew the end cap from the silencer/filter, then remove the filter element (see Fig. U6).
2. Wash in paraffin to remove any dirt. After washing, dip the element in clean engine oil then squeeze to remove excess oil. Fit the element and end cap.

---

**Fig. U2 VIEW INSIDE ENGINE COMPARTMENT (Early Cars)**

1. Air injection pump relief valve silencer
2. Control valve
3. Gulp Valve
4. Thermostat elbow
5. Hose—hot air scoop
6. Check valve
7. Air intake hose
8. Carburetter 'Tee' piece
9. 'A' bank carburetter
10. Weakening device
11. Hose to filter
12. Crankcase breather pipe connection
13. Weakened cut-off valve
14. Choke butterfly housing
15. Choke stove pipe (passing air to exhaust manifold)
16. Choke solenoid
17. Choke thermo-coil housing
18. Choke stove pipe (passing heated air to thermo-coil)
19. Carburetter jet adjusting screw
20. 'B' bank carburetter
21. Refrigeration fast-idle solenoid
22. Float chamber pressure tapping
23. Refrigeration vacuum unit
24. Check valve
25. Air injection pump
26. Air injection pump filter
Air injection pump belt – To set

Refer to Chapter L—Engine Cooling System.

Air injection pump (Saginaw 300-S-8) – To remove

1. Disconnect the battery.
2. Remove the two setscrews securing the gulp valve mounting bracket to the thermostat housing.
3. Detach the small rubber tube which fits between the manifold pipe and the gulp valve.
4. Slacken the two worm drive clips adjacent to the gulp valve. Slide the hose off the gulp valve.
5. Slacken the worm drive clip adjacent to the control valve. Disconnect the hose from the valve, then remove the gulp valve and control valve together with the hose connecting the two valves.
6. Slacken the worm drive clip securing the pump delivery hose to the pump; detach the hose from the pump.
7. Slacken the worm drive clip securing the hose to the air intake connection; detach the hose from the pump.
8. Slacken the two bolts on the pump belt adjustment strut; remove the upper bolt.
9. Slacken the remaining mounting bolt and allow the pump to move downward to remove any belt tension.

Fig. U3 VIEW INSIDE ENGINE COMPARTMENT (Later Cars)

1  Choke stove pipe (passing air to exhaust manifold)
2  Choke solenoid
3  Choke thermo-coil housing
4  'B' bank carburettor
5  Float chamber vent valve
6  Weaken filter
7  Air injection pump filter
8  Control valve
9  Gulp valve
10 Air intake hose
11 Check valves
12 'A' bank carburettor
13 Float Chamber Pressure Tapping
14 Crankcase breather pipe connection
15 Choke butterfly housing
16 Weaken cut-off valve
10. Remove the belt; if difficulty is experienced, the pulley should be removed by removing the four setscrews securing it in position.

11. Support the air injection pump, remove the remaining bolt then lift the pump clear of the engine.

**Air injection pump – To dismantle**
*(see Fig. U4)*

1. Support the drive hub in a soft jawed vice and remove the four housing cover bolts; do not clamp on the aluminium housing.

2. Remove the housing end cover by tapping the cover lightly with a soft headed mallet on alternate sides.

3. Remove the six socket headed screws from the rotor ring.

4. Remove the rotor ring and the carbon seal; discard the carbon seal.

5. Clean the bearing in petroleum solvent.

---

**Fig. U5 VIEW INSIDE ENGINE COMPARTMENT (Current Cars)**

1. Control valve
2. Gulp valve
3. Thermostat elbow
4. Check valves
5. Air intake hose
6. 'A' bank carburettet
7. Choke solenoid
8. Crankcase breather pipe connection
9. Bi-metal switch
10. Fuel receiver and float chamber vent valve
11. Choke butterfly housing
12. Choke stove pipe (passing air to exhaust manifold)
13. Choke thermo-coil housing
14. Choke stove pipe (passing heated air to thermo-coil)
15. 'B' bank carburettet
16. Throttle stop vacuum actuator
17. Air injection pump filter
18. Weaken filter
6. Inspect the bearing and if it is in good condition, thoroughly dry then lubricate with SSG Code 5124 grease.
7. Withdraw the vanes from the rotor.
8. Clean the vane bearings in petroleum solvent.
9. Inspect the bearings and if they are in good condition, thoroughly dry and lubricate the bearings with SSG 5124 grease.
10. Carefully remove the carbon shoes with tweezers and remove the shoe springs (see Fig. U7).
11. Press the rear bearing out of its ring, ensuring that adequate support is given to avoid distortion.
12. Using a suitable extractor and bridge piece, remove the relief valve from the housing.

Note: No further dismantling of the pump should be attempted as the rotor and housing are matched parts.

Air injection pump – To assemble

1. Fit the relief valve into the housing bore. Using a protective plate over the relief valve, tap the valve with a hammer until it is felt to abut the seat in the housing; care should be taken during this operation to ensure that the housing is not distorted.
2. Fit the vanes onto an assembly pin (see Fig. U9), thoroughly lubricating each bearing with SSG Code 5124 grease.
3. Work the grease well into each bearing to ensure adequate lubrication.
4. Clamp the pump drive hub in a vice then fit the vanes into the rotor, ensuring that one vane is positioned adjacent to the stripper as shown in Figure U8.

Note: Do not remove the assembly pin until later.
5. Fit a carbon shoe to each side of every vane, ensuring that the shoes are fitted with their bearing surface adjacent to the vanes and with the radiused point of contact toward the outside diameter of the rotor.
6. Fit the three shoe springs into each of the deepest shoe slots, ensuring that the curved portion of each spring is nearest to the shoe. Push the springs flush with or beneath the rotor surface.
7. Press the rear rotor bearing into the ring until the bearing is 0.031 in. (0.794 mm.) below the surface of the ring. Press the lettered end only of the bearing ensuring that adequate support is given to the ring to prevent distortion.
8. Thoroughly lubricate the bearing with SSG Code 5124 grease, working the grease well into the bearing to ensure adequate lubrication.
9. Fit the carbon ring and a new carbon seal onto the rotor end.

10. Apply a suitable thread locking compound to the socket headed cap screws then secure the rotor ring to the rotor; torque tighten the screws to between 30 lb. in. and 40 lb. in. (0.35 kg.m. and 0.456 kg.m.).

11. Remove the assembly pin from the vanes and start the end cover into position. Move the cover radially until the pivot pin is located in the vane bearings.

12. Fit the end cover retaining screws then progressively torque tighten the screws to between 10 lb. ft. and 16 lb. ft. (1.38 kg.m. and 2.21 kg.m.).

**Air injection pump – To fit**

Fit the air pump by reversing the procedure given for dismantling noting the following points.

1. The belt tension should be set as described in Chapter L.

2. If the pulley was removed, it should be fitted using the original setscrews as longer screws may foul the pump casing and cause damage.

**Air injection equipment – General fitting instructions**

The removal and fitting procedure for the remaining air injection equipment is straightforward provided that the following points are observed.

1. Rubber ‘O’ rings which are removed during dismantling should be discarded and new ones fitted.

2. The special wire hose clips securing the gulp valve and P.C.V. should be discarded once removed and new ones fitted; the tool number of the pliers for fitting these clips is (RH 8090).

3. If any of the valves are found to be damaged or faulty in service they should be renewed.

4. Any rubber hoses which appear to have deteriorated should be renewed.
Fig. U10 FUEL EVAPORATION EMISSION CONTROL SYSTEM - GENERAL VIEW (Later Cars)

1. Gulp valve pipe
2. Float chamber vent valve
3. Float chamber drain valve
4. Fuel trap assembly
5. Fuel tank including vent pipes and expansion tank
6. Fuel vapour line
7. Weaken filter
8. Purge line filter
9. Evaporation loss control canister
10. Purge line restrictor
In order to comply with regulations governing the emission of fuel vapour in the United States of America and Canada, an efficient Fuel Evaporation Emission Control System has been designed and is fitted to cars from Car Serial Number SRX 9001.

Modifications to the Fuel Evaporation Emission Control System have been incorporated to comply with the regulations governing cars produced after 1971. Therefore, all cars manufactured in 1972 and onwards, are fitted with this later system.

Both systems are described and illustrated in this Chapter.

The Fuel Evaporation Emission Control System eliminates direct venting of the fuel tank and carburetters, thus preventing the release of unburnt hydrocarbons into the atmosphere.

Fuel vapours are collected from the fuel tank and carburetters and stored in an activated charcoal canister. The canister is purged whenever the engine is running and the stored fuel vapours are extracted from the charcoal and burnt in the engine.

A diagrammatic illustration of the system can be seen in Figures U10 and U12.

The engine compartment components are clearly shown in Figures U13 and U14 and the fuel tank components in Figure U17.

**Fuel evaporation loss control canister**

The large centre section of the canister contains the dust free activated carbon and accommodates nylon filter connectors which connect the canister to the various fuel vapour emission sources on the car (i.e. the carburettor weaker unit, float chamber vent and fuel tank vent).

The function of the activated carbon is to absorb and retain fuel vapour from the carburettor float chambers and fuel tank.

At either end of this section of the canister are thin discs of polyurethane filter.

---

Fig. U11 FUEL EVAPORATION LOSS CONTROL CANISTER

1. Weakener connection
2. Polyurethane filter
3. Carbon
4. Float chamber vent connection
5. Fuel tank vent connection
6. Purge line connection
Fig. U12 FUEL EVAPORATION EMISSION CONTROL SYSTEM - GENERAL VIEW (Current Cars)

1. Gulp valve pipe
2. Weakening device
3. Bi-metal switch
4. Float chamber vent valve
5. Weakening device cut-off valve
6. Float chamber drain valve
7. Fuel trap assembly
8. Fuel tank including vent pipes and expansion tank
9. Fuel vapour line
10. Weaker filter
11. Evaporation loss control canister
12. Purge line filter
13. Purge line restrictor
The lower compartment of the canister is the purge chamber and is connected to the engine induction system via the purge line filter and line restrictor. It is operative whenever the engine is running, and its function is to draw air through the carbon, extracting the fuel vapour for consumption in the engine. The upper section of the canister is open to the atmosphere and houses a polyurethane foam filter to ensure that the air drawn through the carbon is clean.

Polyurethane foam filter element – To renew

It is not necessary to remove the canister from the car in order to extract the polyurethane foam filter element. A detachable cover is situated in the left-hand valance, adjacent to the blower motor resistances (see Fig. U 15).

1. Unscrew the four screws retaining the access cover, lift off the cover and withdraw the filter element from the top of the canister.

Fig. U13 FUEL EVAPORATION EMISSION CONTROL SYSTEM - ENGINE COMPARTMENT FITTINGS (Later Cars)

1. Purge line restrictor
2. Weaken filter
3. Weaken unit
4. Float chamber vent valve
5. Vent from fuel trap
6. Purge line filter
7. Evaporation loss control canister
8. Evaporation loss control canister polyurethane foam filter
When fitting a new filter element, ensure that it is correctly positioned inside the retaining rim of the canister. Fit the access cover and tighten the setscrews.

**Fuel evaporation loss control canister**

- **To remove**

The canister is mounted under the left-hand front wing and is removed as follows.

1. Remove the front left-hand road wheel as described in Chapter R—Wheel—To remove.

   **Note** Left-hand front is determined when viewed from the driver’s seat.

2. Position suitable stands under the raised portion of the car as a safety precaution.

3. Remove the front section of the underwing sheet by unscrewing the 7/16 in. A/F nut and bolt, and the 16 small screws situated around the sheet.

---

**Fig. U14 FUEL EVAPORATION EMISSION CONTROL SYSTEM - ENGINE COMPARTMENT FITTINGS (Current Cars)**

1. Purge line restrictor
2. Weaken filter
3. Weaken unit
4. Bi-metal switch
5. Fuel receiver and float vent valve chamber
6. Weakened cut-off valve
7. Float chamber drain valve
8. Vent from fuel trap
9. Purge line filter
10. Evaporation loss control canister
11. Evaporation loss control canister polyurethane foam filter
4. The canister will be clearly visible.
5. Using special pliers (RH 8090), remove the steel retaining clips and detach the four rubber hoses connected to the cannister.
6. Raise the bonnet.
7. Inside the engine compartment adjacent to the blower motor resistances (see Fig. U15), locate the six 7/16 in. A/F setscrews. Unscrew the lower four setscrews and withdraw the canister from beneath the wing.

**Fuel evaporation loss control canister – To fit**

Fit the canister by reversing the procedure described for removal, noting the following points.
1. Ensure that the rubber hoses are in a good condition and new hose retaining clips are used.
2. Ensure that the underwing sheet is sealed with Bostik Sealing Compound 771.

**Purge line**

The purge line consists of a rubber hose, passing from the lowest connection on the canister through the valance junction piece to the gulp air pipe situated between the gulp valve and carburettor ‘Tee’ piece. Incorporated into this hose is the purge line filter and restrictor.

When the engine is running, air drawn through the canister filter and carbon picks up the stored fuel vapours and passes them via the hose, to the induction manifold. The restrictor in the line controls the flow rate at between 50 cu. ft. per hr. and 70 cu. ft. per hr. to maintain carburettor metering accuracy and the paper element line filter is fitted to prevent blockage of the restrictor.

**Purge line filter – To remove**

1. Using special pliers (RH 8090) remove the two steel retaining clips (if fitted) situated on either side of the unit.
2. Slacken the 2 B.A. setscrew which secures the nylon retaining clip.
3. Withdraw the component from the clip.

**Purge line filter – To fit**

Fit the purge line filter by reversing the procedure given for removal noting the following points.
1. Ensure that the rubber hoses are in a good condition and new hose retaining clips are used (if fitted).

---

**Fig. U15 SETSCREWS SECURING CONTROL CANISTER AND ACCESS COVER**

1. Blower motor resistances
2. Bonnet hinge spring
3. Valance
4. Securing setscrew (hidden by blower motor resistances)

**Purge line restrictor – To remove**

1. Hold the restrictor firmly and slide the rubber hosing from both ends.

**Purge line restrictor – To fit**

Fit the restrictor by reversing the procedure given for removal, noting the following point.
1. Ensure that the purge line restrictor is fitted into the line correctly. This can be determined by comparing the diameters of the restrictor ends with those of the rubber hoses.

**Weakener line**

The weakener line connects the weakener unit with the evaporation loss control canister (see Figs. U13 and U14). With the engine running under light throttle opening a depression is created in this line, so allowing air to pass from the canister to the weakener unit.

A filter incorporated in the line prevents blockage of the weakener unit.

During 'hot soak' conditions fuel vapour can pass along this pipe from the float chamber to be stored in the carbon filled canister.
Float chamber vent valve — To remove

On later cars, see page U1—Introduction.
1. Remove the rubber hose from both the inlet and outlet connections.
2. Slacken the worm drive clip which secures the vent valve to its mounting bracket.
3. Remove the vent valve.

Float chamber vent valve — To fit

Fit the vent valve by reversing the procedure given for its removal noting the following point.
1. Ensure that the inlet and outlet connections of the vent valve are positioned so that the rubber hoses can be connected.

Float chamber vent valve — To remove

On current cars, see page U1—Introduction.
1. Remove the rubber hose connection.
2. Withdraw and discard the retaining split pin.
3. Withdraw the vent valve from the top of the fuel receiver.

Float chamber vent valve — To fit

Fit the vent valve by reversing the procedure given for its removal noting the following points.
1. Ensure that the rubber ‘O’ ring at the top of the fuel receiver is in good condition, renew if the slightest doubt exists.
2. Use a new split pin to retain the vent valve in position.

Fuel receiver

On Current cars, see page U1—Introduction.
The fuel receiver is situated adjacent to the ignition distributor and coil (see Fig. U30).
The unit should not require removal under normal circumstances. However, should the need arise the ignition distributor, coil and weakerener cut-off solenoid valve should all be removed before unscrewing the two $\frac{1}{4}$in. A/F setscrews which secure the fuel receiver bracket in position.
Fuel tank assembly

The fuel tank assembly consists of the fuel tank, expansion tank and fuel trap assembly (see Fig. U17).

The fuel tank is vented from three positions to a fuel trap assembly which is mounted above the fuel filler. One vent is from the fuel filler neck and the other two vents from the fuel tank.

From the fuel trap, a vent line passes under the floor of the car to the evaporation loss control canister.

Fig. U17 FUEL EVAPORATION EMISSION CONTROL SYSTEM - FUEL TANK

1 Fuel trap drain 4 Fuel filler box 7 Valve vent
2 Connection to evaporation loss control canister 5 Combined relief and vacuum valve 8 Vent pipe
3 Filler neck vent 6 Fuel trap drain 9 Expansion tank
10 Vent pipe
Fuel tank

The fuel tank (see Fig. U17) is similar to that fitted to standard cars, except that two vent pipes, 0.375 in. (9.525 mm.) diameter, are rigidly attached to the underside of the fuel tank top plate. The open ends of the vents terminate inside the tank at the front and rear. The outer ends of the two vent pipes terminate adjacent to the fuel filler neck.

A 5.5 Imp. pts. (3,125 litres, 67 U.S. pts.) capacity expansion tank situated within the main fuel tank inhibits complete filling and provides additional fuel expansion volume to contend with extreme temperature conditions.

When a vehicle is being filled with fuel, automatic cut-off could completely fill the tank leaving only the filler neck, vent connector pipes and fuel trap to accommodate the expansion of the fuel. The expansion tank is situated in the upper part of the fuel tank and as the fuel level rises above the lower part of the expansion tank it flows inside through the two small holes in the base. Two additional holes in the top of the expansion tank allow air to escape.

At normal rates of filling it takes approximately 3 minutes to fill an empty tank whereas it takes approximately 9 minutes for the levels in both the main and expansion tanks to stabilise. After this time the main tank will have transferred 5.5 Imp. pts. (3,125 litres, 67 U.S. pts.) to the expansion tank leaving the equivalent air space in the main tank for expansion.

Fuel tank—To remove

To remove the fuel tank proceed as described in Section K1—Fuel System (Early cars) noting that Operation 6 should be omitted and Operation 6 as follows should be carried out:

6. Using a pair of special pliers (RH 8090), remove the steel clips from the two rubber hoses situated one on either side of the fuel filler neck.

Withdraw the rubber hoses from the pipes.

Fuel tank—To fit

Fit the fuel tank by reversing the procedure given for its removal noting the following points:

1. Ensure that the two rubber vent hoses are in good condition.
2. New steel clips should be used to secure the rubber vent hoses to the metal pipes on either side of the filler neck base.

Fuel trap assembly

The fuel trap (see Fig. U17) has a capacity of 3.25 Imp. pts. (1,87 litres, 4.00 U.S. pts.).

The fuel trap acts as a liquid separator and prevents liquid fuel from being transferred to the control canister under severe driving manoeuvres when the fuel tank is full or during expansion of the fuel at high ambient temperatures.

The tank vent pipes are fed to the lower ends of the banana-shaped fuel trap. These pipes also serve as drain pipes for any fuel in the trap.

The filler tube is vented into the forward end of the fuel trap.

An outlet pipe is attached to the interior of the fuel trap and the other end is connected via metal and rubber pipes to the evaporation loss control canister.

A combined relief and vacuum valve in the fuel trap prevents any excessive pressure build-up due to vapourisation, or depression as the fuel is consumed, should the vent line to the evaporation loss control canister become blocked.

Fuel trap assembly—To remove

1. Disconnect the battery.
2. Remove the carpet and underlay in the luggage compartment.
3. Remove the tool kit (see Chapter R—Wheels and Tyres, Fig. R10).
4. Remove the fuel filler door release ring.
5. Unscrew the five ‘Phillips’ headed screws from the side carpet; four secure the brackets retaining the tool kit and the fifth is positioned at the front of the side carpet.
6. Release the ‘Tenax’ clip situated adjacent to the rear lamps access point.
7. Remove the side carpet and the carpet covering the fuel filler neck.
8. Using special pliers (RH 8090) remove the steel clips from the rubber hoses. Withdraw the hoses from their respective pipes.
9. Unscrew and remove the three 2 B.A. setscrews securing the fuel trap assembly.
10. Slowly move the fuel trap rearward and downward until the lower end can be turned into the luggage compartment and the assembly withdrawn from the car.

Fuel trap assembly—To fit

Fit the fuel trap assembly by reversing the procedure given for its removal noting the following points:

1. Ensure that the rubber hose connections are in good condition.
2. Ensure that new steel retaining clips are used.
Fuel trap relief and vacuum valve

To remove

1. Remove the fuel trap assembly as described in Fuel trap assembly—To remove.
2. Unscrew the retaining setscrews, taking care not to lose the washers.
3. Withdraw the relief and vacuum valve.

Fuel trap relief and vacuum valve – To fit

Fit the relief and vacuum valve by reversing the procedure given for its removal, noting the following points.

1. Ensure that the joint faces of the relief and vacuum valve and fuel trap assembly are clean and in good condition.
2. Fit a new gasket.
Section U3

THE CARBURETTERS
AND AUTOMATIC CHOKE SYSTEM

CARBURETTERS

Data

Carburetters . . . Two S.U. HD8 diaphragm type
Choke size . . . 2·00 in. (5·08 cm.)
Jet size—
fixed needle type . . . 0·125 in. (3·175 mm.)
Jet size—
spring loaded needle type . . . 0·100 in. (2·44 mm.)
Jet needle—
fixed type . . . UVU
Jet needle—
spring loaded type . . . BAE
Carburetters—
air valve piston spring Red/Blue

Description

Two S.U. HD8 diaphragm carburetters with 2·00 in. (5·08 cm.) choke bores are fitted to the engine on a central 'Tee' piece which is mounted over an eight branch induction manifold (see Figs. U18, U19 and U20).

This type of carburettter automatically adjusts both its choke and jet area to meet the demand of the engine which is dependent on engine speed and loading. As air is drawn through the carburettter, the piston acting as an obstruction will cause a depression to be formed in the area between the throttle and the piston. This depression is communicated by means of transfer holes in the base of the piston to the area above the piston, causing an upward force to be imposed on the piston. The piston will rise in response to this force relieving the depression in the area between the piston and the throttle as it does so until a point is reached where the force acting on the piston is balanced by the weight of the piston and the load exerted by the piston spring.

Early carburetters are fitted with a fixed main jet needle and the jet is biased in relation to the needle. On later carburetters, a spring-loaded jet needle is fitted which is biased down stream and operates in a reduced diameter main jet; this jet does not require centralising.

The carburettter is fitted with a synthetic rubber diaphragm which is clamped in position by the jet and jet return spring cup. The diaphragm is in turn secured at its outer edge between the diaphragm housing and the main jet well. The carburettter is fitted with a nylon block in the jet well and a nylon feed tube from the float chamber to prevent vaporisation of the fuel. This assembly is known as the anti-boiling device.

The jet is fed through its lower end from the main jet well, its movement being controlled by the jet return spring and the jet adjusting screw which actuates a rocking lever. This lever raises or lowers the jet as required and so controls the mixture. Turning the adjusting screw clockwise (inwards) lowers the jet and enrichens the mixture; turning the screw anti-clockwise (outwards) weakens the mixture.

The carburetters are balanced by adjustable volume screws which control the mixture output of the carburetters relative to each other under idling conditions.

Slow running speed is adjusted by means of the throttle stop screw, and is finally carried out after the carburetters have been tuned. The throttle stop screw is locked into position by a lock-nut.
CARBURETTER MIXTURE WEAKENING DEVICE

Introduction

An engine normally requires a richer mixture when running at full load than it does under cruising conditions. Normally the S.U. carburetters achieve this automatically due to the pulsating nature of the air flow at full load as compared with the steady flow when cruising with the throttles partly shut. This effect, known as mixture ratio spread, is also contrived by the design of the air intake and induction passages.

Fig. U18 VIEW OF CARBURETTERS (Early Cars)

1 'Fast-idle' linkage
2 Fixed throttle stop screw
3 Thermostat-weakening device cut-off valve
4 Choke stave pipe
5 Choke solenoid
6 Kick-diaphragm housing
7 Bi-metal coil housing
8 Carburetter volume screw
9 Refrigeration fast-idle adjusting screw
10 Air injection pipe
11 'A' bank butterfly lever
12 Throttle damper
13 Jet adjusting screw
14 Carburettor control linkage
15 Piston lift pin

U22
However, for optimum exhaust emission control a greater mixture ratio spread than can be met by the above factors is required. Therefore a weakening device is fitted.

Description

The rate of fuel discharge from the main jet is governed by the difference in air pressure between that existing over the fuel in the float chamber and that over the main jet.

The weakening device is fitted to the system in the following positions.

Prior to Car Serial Number SRX 9001. Attached to the 'A' bank float chamber lid (see Fig. U21).

On later cars, see page U1—Introduction. Attached to the 'B' bank float chamber lid.

On Current cars, see page U1—Introduction. Attached directly to the 'B' bank carburettet (see Fig. U23).

The weakening device is designed to reduce the air pressure (i.e. to create a depression) in the float chamber when the throttle is partly closed, thereby reducing the rate of fuel discharge from the jet. The lid is otherwise sealed by a gasket between the lid and the bowl.

On cars prior to Car Serial Number SRX 9001 and later cars, see page U1—Introduction. The weakening device consists of a venturi and a calibrated air bleed. The end containing the venturi is connected by pipes via the weakening device cut-off valve to a drilling in the 'B' bank carburettet body close to the edge of the throttle butterfly valve. The end containing the air bleed is connected to an air intake filter by a flexible rubber tube. A central drilling in the weakening device communicates with the float chamber. The depression existing in one float chamber is communicated to the other by means of a pressure balance pipe.

On current cars, see page U1—Introduction. The weakening device consists of a housing containing a venturi at one end which is pressed into a drilling in the carburettet body close to the edge of the throttle butterfly. The other end contains a pre-set air bleed and is connected to the weaker filter by means of a flexible hose. The central passage communicates via pipes with the float chambers.

On cars from Car Serial Number SRX 9001 and onwards to obtain adequate float chamber venting to cope with hot soak conditions there is an additional vent from the float chambers. This vent incorporates a low pressure non-return valve to maintain a float chamber depression under normal operation conditions.

On all cars, a petrol spill pipe incorporating a relief valve is fitted to the pressure balance pipe to provide an outlet for excess petrol in the unlikely event of a float chamber needle sticking.

Operation Idling

With the throttle in the normal idling position, the drilling in the carburettet body emerges upstream of the throttle butterfly and is only subjected to the slight depression exerted in that condition. This produces a small flow of air through the venturi but the effect on float chamber air pressure is small.

Full throttle

As with the idling position, the depression produced is slight and will have a negligible effect on air pressure in the float chamber. This small difference is compensated for in the design of the jet needle.

Cruising

With the throttle partly open, the weaken drilling is on the engine side of the throttle butterfly and the high manifold depression causes air to be drawn through the venturi. The size of the venturi is chosen so that the velocity will reach a maximum value which remains substantially constant once a pre-determined manifold depression figure has been reached.

The air bleed orifice controls the flow of air into the weakening and therefore the float chamber depression. The actual value of the float chamber depression reaches a maximum at the same time as the air velocity attains its maximum value.

Low temperatures

To improve engine starting when the engine temperature is below 16°C. (60°F.), a cut-off valve is incorporated in the weakening device suction line.

On cars prior to Car Serial Number SRX 9001 and later cars, see page U1—Introduction, the cut-off valve is closed at temperatures below 18°C. (64°F.) thus preventing any signal passing between the weakening device and 'B' bank carburettet.

On current cars, see page U1—Introduction, the cut-off valve switch opens the cut-off valve at temperatures below 16°C. (60°F.).

On all cars the action of the cut-off valve at the temperature quoted ensures that no depression occurs in the float chambers to weaken the mixture whilst the engine is warming up.
On cars prior to Car Serial Number SRX 9001 and later cars, see page U1—Introduction, a wax element thermostat responding to air temperature in the choke butterfly housing operates a cut-off valve in the weakenor vacuum line.

On current cars, see page U1—Introduction, a bi-metal switch activates a solenoid valve which vents the float chamber to atmosphere via the evaporation loss control canister and renders the weaker inoperative.

**Hot idle mixture compensator valve (if fitted)**

At high ambient temperatures the idle quality deteriorates after prolonged periods of idling unless a mixture compensator valve is fitted. The compensator assembly incorporates two bi-metallic valves which meter a small quantity of air, controlled by the inlet air temperature, to a point in the induction system downstream of the carburettor throttle valves. This has the

---

**Fig. U19 VIEW OF CARBURETTERS (Later Cars)**

1. Throttle damper
2. Vacuum retard tap
3. Fixed throttle stop screw
4. 'Fast-idle' linkage
5. Thermostat-weakening device cut-off valve
6. Choke stove pipe
7. Choke solenoid
8. Bi-metal coil housing
9. Hot idle compensator valve
10. Float chamber vent valve
11. Throttle stop vacuum actuator
12. Air injection pipe
13. 'A' bank butterfly lever
14. Jet adjusting screw
15. Piston lift pin
16. Kick-down micro-switch
dual effect of weakening the mixture and increasing the mass flow, thereby raising the idle speed slightly, and restoring normal idle speed.

On cars prior to Car Serial Number SRX 9001 and later cars, see page U1—Introduction, a separate unit is mounted on 'B' bank carburettor.

On current cars, see page U1—Introduction, the unit is integral with the choke housing.

Hot air intake

Air is drawn into the hot air intake from over the exhaust manifold and is then passed through the air silencer/filter. This permits the use of leaner mixtures under normal operating conditions together with a quickly opening automatic choke. The hose which connects the intake to air filter/silencer is shown in Figures U2 and U3.

Float chamber pressure tapping

On cars prior to Car Serial Number SRX 9001 a pressure tapping fitted to the 'B' bank float chamber lid enables the depression in the float chambers to be checked.

From car Serial Number SRX 9001 and onwards the pressure tapping is fitted to the 'A' bank float chamber lid.

OVERHAUL

Carburettors – To remove (see Figs. U2 and U18)

The following procedure applies to cars prior to Car Serial Number SRX 9001.

1. Disconnect the battery.

2. If a hot idle compensator valve is fitted remove the rubber pipe connected to the air intake rubber elbow, also the rubber pipe connected to the gulp valve to 'Tee' piece pipe.

3. Disconnect the hose from the air silencer and butterfly housing; remove the hose together with the bonding cable earth strip.

4. Move the spring clip away from the choke solenoid cover then disconnect the wires noting which terminal each wire was removed from to ensure correct assembly.

5. Disconnect the two rubber tubes which are connected to the refrigeration solenoid noting their respective connection for correct assembly.

6. Disconnect the wiring to the refrigeration solenoid noting the colour of wiring to ensure correct assembly.

7. Remove the engine oil dipstick.

8. Remove the split pin, washers and swivel pin, securing the throttle linkage to the fore and aft manifold shaft lever; this connection is adjacent to the 'A' bank carburettor.

9. Disconnect the petrol spill pipe at the union adjacent to the distributor.

10. Disconnect the main fuel feed pipe.

11. Disconnect the choke stove inlet pipe from the choke housing.

12. Remove the three small screws securing the small end cover to the bi-metal coil cover then withdraw the cover along the choke stove pipe to reveal the pipe connection. Disconnect the choke stove suction pipe.

13. Remove the crankcase breather pipe from the choke butterfly housing; withdraw the housing from the end of the pipe.

14. Disconnect the hose from the carburettor weakening device and discard the retaining clip.

15. Remove the pipe fitted between the gulp valve and the carburettor 'Tee' piece.

16. Remove the two wires connected to the kick-down micro-switch noting their respective position to ensure that they are connected correctly on assembly.

17. Remove the air horns, the choke butterfly housing, the carburetters and the 'Tee' piece as a complete assembly. This assembly is secured to the induction manifold by a setscrew, location being provided by two dowel pins.

18. Slacken the pinch bolt and remove the 'fast-idle' lever from the 'A' bank carburettor butterfly spindle (see Chapter K).

19. Remove the three setscrews and bolt securing the air horns to the carburetters; remove the kick-down switch, refrigeration 'fast-idle' solenoid and the hot idle compensator valve (if fitted) together with their brackets.

20. Remove the air horns.

21. Remove the petrol feed pipes from the float chambers.

22. Remove the weakening device pipes.

23. Disconnect the carburettor spill pipe from the two float chambers.
24. Remove the float chamber lids and floats keeping them with their respective banks.
25. Remove the nut securing the throttle damper to its bracket; remove the damper.
26. Remove the throttle spring.
27. Completely remove the two pinch bolts securing the levers to the 'A' and 'B' bank carburettor butterfly valve spindles; remove the levers.
28. Remove the nuts securing both carburetters to the 'Tee' piece; remove the carburetters.

**Fig. U20 VIEW OF CARBURETTERS (Current Cars)**

- 1. Throttle damper
- 2. Vacuum retard tap
- 3. 'Fast-idle' linkage
- 4. Fixed throttle stop screw
- 5. Fuel receiver and float chamber vent valve
- 6. Bi-metal switch
- 7. Choke stove pipe
- 8. Choke solenoid
- 9. Bi-metal coil housing
- 10. Weakening device
- 11. Throttle stop vacuum actuator
- 12. Worm Drive clip—correctly positioned to avoid possible foul with air hose
- 13. Air injection pipe
- 14. 'A' bank butterfly lever
- 15. Piston lift pin
- 16. Kick-down micro-switch
Carburetters – To remove
(see Figs. U3 and U19)

The following procedure applies to all cars from Car Serial Number SRX 9001 and onwards.

To avoid confusion on assembly, it is recommended that when the various rubber pipes and hoses are removed they are labelled.

1. Disconnect the battery.
2. Disconnect the rubber pipe connected to the choke butterfly housing rubber elbow.
3. Separate the thermal vacuum switch rubber pipe at the 'Tee' piece.
4. Remove the crankcase breather pipe from the choke butterfly housing; withdraw the housing from the end of the pipe.
5. Remove the air hose steady bracket noting that the small bracket retaining the kick-down microswitch wire is retained by one screw.
6. Disconnect the hose from the air silencer and butterfly housing; remove the hose together with the bonding cable earth strip.
7. Move the spring clip from the choke solenoid cover, then disconnect the wires noting the terminal from which each wire was removed to avoid incorrect assembly.
8. Remove the engine oil dipstick.
9. Remove the split pin, washers and swivel pin securing the throttle linkage to the fore and aft manifold shaft lever; this connection is adjacent to the 'A' bank carburettor.
10. Unscrew the worm drive clip from the hose adjacent to the distributor; remove the hose.
11. Disconnect the main fuel feed pipe.
12. Disconnect the choke stoke pipe from the choke butterfly housing.
13. Remove the three screws securing the small end cover to the bi-metal coil cover then withdraw the cover along the choke stoke pipe to reveal the pipe connection. Disconnect the choke stoke pipe.
14. Disconnect the hose(s) from the carburettor weakening device and discard the retaining clip (if fitted).

On current cars, see page U1—Introduction, also disconnect the hoses from the float chamber vents, remove the weaker to vent canister pipe, thermal vacuum switch pipe and the weaker to filter pipe.

15. Disconnect the two rubber pipes connected to the gulp valve to carburettor 'Tee' piece pipe.
16. Remove the pipe connected to the throttle stop vacuum actuator.
17. Remove the setscrew securing the throttle stop vacuum actuator bracket and the gulp valve to carburettor 'Tee' piece pipe. Also remove the top two nuts securing the 'B' bank carburettor and the throttle stop vacuum actuator bracket. Remove the throttle stop vacuum actuator together with its bracket.
18. Remove the pipe fitted between the gulp valve and the carburettor 'Tee' piece.
19. Remove the two wires connected to the kick-down micro-switch noting their respective position to avoid incorrect assembly.

On current cars, see page U1—Introduction, also remove the electrical connection of the weakeners cutoff bi-metal switch thermostat unit.

20. On later cars, see page U1—Introduction. Disconnect the hose connected to the float chamber vent valve. Discard the clip.
21. Disconnect the vacuum retard rubber pipe connected to the distributor.
22. Separate the rubber pipes from either side of the vacuum retard tap.
23. Remove the air horns, choke butterfly housing, carburetters and 'Tee' piece as a complete assembly. This assembly is secured to the induction manifold by a setscrew and located by two dowel pins.
24. Slacken the pinch bolt and remove the 'fast-idle' lever from the 'A' bank carburettor butterfly spindle (see Chapter K).

25. On later cars, see page U1—Introduction. Disconnect the rubber hose situated between the petrol spill pipe and the float chamber vent valve. Remove the vent valve.
26. Remove the three setscrews, and the nut and bolt securing the air horns to the carburetters; remove the hot idle compensator valve, kick-down microswitch and the retard tap together with their brackets.
27. Remove the air horns.
28. Disconnect the petrol feed pipe from the float chambers.
29. On later cars, see page U1—Introduction. Remove the weakening device pipes.
30. Disconnect the carburettor spill pipe from the two float chambers.
31. Remove the float chamber lids and floats keeping them in their respective banks.
Fig. U21 CARBURETTER WEAKENING DEVICE (Early Cars)

1 'A' bank carburettet
2 Air bleed
3 Body
4 Venturi
5 Hose
6 Filter
7 'B' bank carburettet
8 Weakening device cut-off valve
9 Pressure sensing fitting
10 Float chamber depression tapping
11 Adjusting washer
12 Valve
13 Valve cap
14 Circlip
15 Disc
16 Spring
17 Joint
18 Choke housing
19 Rubber 'O' ring
20 Thermostat element
21 Load transfer washer
22 Choke butterfly
23 Locking plate
24 Valve body
25 Rubber 'O' ring
26 Piston
27 Spring
28 Weakening device
29 Volume screw
30 Washer
31 Fibre washer
32 Banjo connection
33 Fibre washer
34 Float chamber lid
35 Pressure tapping body
36 Cap
37 Union
38 Plate
39 Joint
40 Pressure sensing drilling
41 Carburettet body
42 Petrol spill pipe (upper part)
43 Petrol spill pipe (lower part)
44 One way valve
45 Jet adjusting screw
32. Remove the nut securing the throttle damper to its bracket; remove the damper.
33. Remove the throttle spring.
34. Completely remove the two pinch bolts securing the levers to the 'A' and 'B' bank carburettor butterfly valve spindles; remove the levers.
35. Remove the nuts securing both carburetters to the 'Tee' piece; remove the carburetters together with the throttle damper bracket adjacent to 'A' bank carburettet.

9. Withdraw the needle guide from the needle and remove the spring.
Note The flanged collar pressed onto the jet needle is pre-set at the factory and must not be disturbed.

10. Mark the relative position of the float chamber, jet housing and carburettor body. Unscrew the float chamber screws, holding the float chamber against the pressure of the jet spring. Carefully detach the float chamber (see Fig. K13 in Chapter K).

11. Lift off the jet housing. Withdraw the jet assembly and jet spring.

12. Using a ring spanner remove the jet locking nut together with the jet bearing and lock-washer; discard the lock-washer.
Note Lock-washers are not fitted to carburetters with a spring loaded needle.

13. Cars prior to Car Serial Number SRX 9001. Unscrew the petrol inlet union from the float chamber lid, remove the union and aluminium washer; extract the filter and spring assembly.

Cars from Car Serial Number SRX 9001. Unscrew the two screws securing the fuel inlet union to the float chamber lid. Withdraw the union together with the spring, spring retainer and paper filter element.

14. Push out the float lever hinge pin from the end opposite to the serrations. Detach the lever.

15. Extract the float needle from its seating and unscrew the seating from the lid using a box spanner. Do not distort the seating.

16. Invert the chamber to remove the float.

17. Close the throttle and mark the relative positions of the throttle butterfly valve and the carburettor flange.

18. Slacken and remove the butterfly valve from its slot in the throttle spindle. The butterfly valve is oval and will jam if care is not taken.

19. Slide out the spindle from its bearing.

20. Cars prior to Car Serial Number SRX 9001. The throttle spindle sealing glands should not be removed as servicing is not required.

Cars from Car Serial Number SRX 9001. Remove the two rubber seals from the throttle spindle bore.

21. Unscrew and remove the slow-running valve complete with spring, seal and brass washer.

22. On later cars, see page U1—Introduction. Remove the two screws and shakeproof washers retaining the vacuum weakening device take-off plate and union. Lift off the plate and gasket.
Fig. U22 CARBURETTER WEAKENING DEVICE (Later Cars)

1  Cap
2  Pressure tapping body
3  Float chamber cover
4  Washer
5  Fibre washer
6  Banjo connection
7  Union
8  Plate
9  Joint
10 Choke butterfly
11 Valve body
12 Rubber 'O' ring
13 Piston
14 Spring
15 Valve
16 Disc
17 Circlip
18 Spring
19 Choke housing
20 Pressure sensing fitting
21 Weakening device
22 Drain valve
23 Venturi
24 Body
25 Air bleed
26 Jet adjusting screw
27 Float chamber depression tapping
28 'A' bank carburetter
23. Remove the piston lifting pin by extracting the circlip from its groove with the pin pressed upwards.

24. Withdraw the pin downwards.

**Carburetters — To assemble**

1. Check that all the passages in the carburettor body are free from any obstruction.

2. **Cars prior to Car Serial Number SRX 9001 and later cars,** see page U1—Introduction. Check to ensure that the vacuum weakening device take-off plate is not obstructed.
   
   Fit the plate together with a new gasket then secure the plate to the carburettor body using two screws.

3. **On current cars,** see page U1—Introduction. Ensure that the venturi pressed into the carburettor body is not damaged. Fit the weakener unit together with a new gasket to the carburettor body using two screws.

4. Examine the butterfly valve spindle for scoring or signs of wear.

5. Fit the spindle in its bearings and check for slack in the bearings and freedom of operation.

6. Fit the throttle butterfly valve to the slot in the butterfly valve spindle in the position marked during dismantling. The countersunk ends of the screw holes in the spindle must face outwards towards the flange of the carburettor body. Fit two new retaining screws but do not tighten.

7. Adjust the butterfly valve until it closes fully. Check this visually, then tighten the screws. Spread the split ends of the screws sufficiently to prevent turning.

8. **Cars from Car Serial Number SRX 9001.** Using tool (RH 8383) fit the seals to each end of the shaft. Ensure that the concave end of the seals enters the bores first.

9. Examine the slow running valve seal for service-ability.

10. Check that the concave face of the brass washer is towards the seal.

11. Fit the valve assembly.

12. Fit the piston lifting pin, spring, rubber washer, plain washer and circlip.

13. Examine the float needle and seating for damage or wear.

14. Screw the seating into the float chamber lid but do not overtighten.

15. Fit the needle to the seating, coned end first.

16. Using light finger pressure to hold the needle against its seating, test the assembly for leaks with an air pressure line. The pressure should be approximately 5 lb/sq. in. (0,35 kg/sq. cm.).

17. Fit the float chamber lid lever and fit the hinge pin.

18. Check the float level.

   With the needle on its seating, insert a 0·438 in. (11·11 mm.) diameter bar between the forked lever and the lip of the float chamber lid. The prongs of the lever should just rest on the bar (see Chapter K). If they do not, carefully bend the lever at the start of the pronged section until the correct setting is obtained.

19. Examine the piston rod and the outside surface of the piston for damage.

20. The piston assembly must be scrupulously clean. Use petrol or methylated spirits as a cleaning agent; do not use abrasives.

21. Clean inside the suction chamber and piston rod guide.

22. Fit the damper assembly and washer. Seal the transfer holes in the piston assembly with rubber plugs and fit the assembly to the suction chamber. Invert the complete assembly and check the time it takes for the suction chamber to fall away from the piston (see Chapter K). This should be between 5 and 7 seconds. Remove the plugs, damper assembly and washer.

   For carburetters fitted with a biased jet and fixed needle carry out Operations 23 to 38 inclusive (see Chapter K).

23. Fit the needle to the piston assembly. The shoulder or lower edge of the groove must be level with the lower face of the piston rod; fit the locking screw and tighten.

24. Invert the suction chamber and spin the piston assembly inside it to check for concentricity of the needle.

25. Check that the piston key is secure in the carburettor body.

26. Fit the piston assembly to the body then fit the piston spring over the piston rod then fit the suction chamber taking care not to 'wind-up' the piston spring; fit and tighten the suction chamber retaining screws.

27. Fit the jet bearing, a new lock-washer and lock-nut; do not tighten the nut.

28. To bias the jet proceed as follows.

29. Feed the jet into the jet bearing ensuring that the two noughts on the diaphragm are towards the inlet flange.
30. With the carburettor positioned with its inlet flange downwards, fit the jet biasing tool (RH 8089) into the damper tube at the top of the suction chamber and screw in until it is fully home (see Fig. U28). Screw the tool back until the arrow on the tool, points towards the inlet flange on the carburettor. The tool and carburettor must remain in this position throughout the biasing operation.

31. With the piston at the bottom of its travel (on the bridge) and the jet hard up against the jet bearing, slowly tighten the jet lock-nut. During the tightening operation, slide the jet back and forth in its bearing to ensure that it is not binding. It should be noted that the two noughts on the diaphragm should be positioned toward the inlet flange and the cut-outs aligned with the four threaded holes in the carburettor body. If any tightness between the jet and bearing is detected, the jet lock-nut must be removed and a new lock-washer fitted then the operation repeated.

32. Remove the jet biasing tool.

Note Dealers may already possess this biasing tool as it is used by other British Motor Vehicle Manufacturers.

33. Remove the jet.

34. Remove the suction chamber, spring and piston.

35. Fit the jet housing, jet, jet spring and float chamber complete with anti-boiling device ensuring that the jet and diaphragm are kept in the correct

---

Fig. U23 CARBURETTER WEAKENING DEVICE (Current Cars)

1. 'A' bank carburettor
2. Float chamber pressure tapping
3. Weakening device
4. Bi-metal switch
5. Float chamber vent valve
6. Weakening device cut-off valve
7. Float chamber drain valve
8. Fuel receiver
9. Float chamber vent valve
10. Bleed orifice
11. Venturi
12. Adjustment screw (set during initial assembly)
relationship to the body and that the raised edge of the diaphragm is located in the housing groove.

36. Before tightening the four screws securing the float chamber, ensure that the chamber is pushed toward the inlet flange of the carburetter. This is very important to prevent a foul with the throttle controls (see Chapter K Fig. 21, diagram C).

37. Set the jet flush with the bridge of the carburetter (see Chapter K) and turn the jet screw clockwise 2\(\frac{1}{4}\) turns.

38. Fit the piston assembly to the body, then fit the piston spring over the piston rod then fit the suction chamber taking care not to ‘wind-up’ the piston spring; fit and tighten the suction chamber retaining screws.

For carburetters fitted with a spring loaded needle and centralised jet carry out Operations 39 to 52 inclusive (see Fig. U27).

39. Fit the jet bearing and lock-nut; tighten the lock-nut.

40. Fit the jet housing, jet, jet spring and float chamber complete with anti-boiling device ensuring that the jet and diaphragm are kept in the correct relationship to the body and that the raised edge of the diaphragm is located in the housing groove.

41. Before tightening the four screws securing the float chamber, ensure that the chamber is pushed towards the inlet flange of the carburetter. This is very important to prevent a foul with the throttle controls (see Chapter K Fig. 21, diagram C); tighten the screws.

42. Check that the jet is not sticking in the guide. This can be carried out by moving the jet lever up and down.

43. Set the jet flush with the bridge of the carburetter and then turn the jet screw clockwise 2\(\frac{1}{4}\) turns.

44. Fit the spring onto the needle collar ensuring that the spring locates in the groove.

45. Fit the guide onto the needle so that the end with the indentation is towards the flange on the collar.

46. Fit the needle assembly and guide into the piston. The lower face of the guide must be flush with the face of the piston (for guidance refer to Fig. K17 in Chapter K) and the mark on the guide must be adjacent to the point mid-way between the two cutouts in the piston (see Fig. U27).

47. Fit and tighten a new guide locking screw to the piston.

48. Check that the piston key is secure in the carburetter body.

49. Fit the piston assembly to the carburetter body carefully guiding the needle into the jet.

50. Fit the piston spring over the piston rod.

51. Fit the suction chamber taking care not to ‘wind-up’ the piston spring; fit and tighten the suction chamber retaining screws.

52. Fit the piston damper and washer.

**Carburetters – To fit**

Fit the carburetters by reversing the procedure given for their removal noting the following points.

1. Fit new gaskets and washers to all joints.

2. Using pliers (RH 8090) renew the steel clips (if fitted) which secure the rubber hoses of the Evaporation Loss Control System on certain cars.

3. Examine the floats for damage or punctures; fit the floats to their respective float chamber.

4. Renew the lid gaskets.

5. Fit the gaskets to the lids then fit the lids to the chambers.

6. Secure the lids and pipes to the float chambers.

7. **Cars prior to Car Serial Number SRX 9001.** Clean the fuel filter assemblies and examine for damage; renew if necessary.

   **Cars from Car Serial Number SRX 9001.** Examine the paper filter elements for cleanliness and damage; renew if necessary.

8. **Cars prior to Car Serial Number SRX 9001.** Fit the filters to the lid inlets, spring end leading; fit the unions and new aluminium washers.

   **Cars from Car Serial Number SRX 9001.** Ensure that the ‘O’ ring on the petrol inlet unions are in good condition; renew if necessary. Fit the paper filter elements, spring retainers, springs and inlet unions to each float chamber lid. Secure the inlet unions with the retaining screws.

9. Fill the damper piston with an approved oil; the oil level should be approximately 0.5 in. (12.7 mm.) below the top of the piston rod. Do not overfill.

10. **Cars from Car Serial Number SRX 9001.** Check that the gap between the throttle stop vacuum actuator and the vacuum throttle stop screw is 0.070 in. (1.78 mm.).

**Fuel drain pipe – To remove**

The following procedures apply to cars prior to Car Serial Number SRX 9001.

1. Separate the pipe at the valve housing flange, then remove the one way valve.

2. Detach the upper part of the pipe from the clip secured to the distributor pedestal securing setscrew.
Fig. U24 'A' BANK
CARBURETTER (Early Cars)

1 Piston spring  
2 Suction chamber  
3 Damper  
4 Central nut  
5 Weakening device  
6 Communication pipe  
7 Float chamber lid ('A' bank)  
8 Butterfly valve  
9 Pressure tapping piece  
10 Slow running valve  
11 Union-weakening device  
12 Circlip  
13 Piston  
14 Needle locking screw  
15 Fixed needle  
16 Vacuum take-off plate  
17 Spring  
18 Brass washer  
19 Seal  
20 Banjo connection  
21 Fibre washer  
22 Spindle  
23 Float chamber lid ('B' bank)  
24 End cap  
25 Sealing gland  
26 Spring-piston lift pin  
27 Carburettor body  
28 Piston lift pin  
29 Bearing  
30 Float needle  
31 Float needle housing  
32 Spring and filter  
33 Fuel inlet union  
34 Hinge pin  
35 Lever  
36 Jet housing  
37 Jet locking nut  
38 Lockwasher  
39 Jet bearing  
40 Lock-nut  
41 Jet adjusting screw  
42 Jet diaphragm and jet assembly  
43 Float  
44 Float chamber  
45 Jet spring  
46 Anti-boiling device

Note: Item 38 is not fitted to carburetters with a spring loaded needle. Also, item 15 shows the fixed needle. For spring loaded needle arrangements, refer to Figure U27.
3. Disconnect the fuel drain pipe at the union adjacent to the distributor; remove the upper part of the pipe.
4. Detach the lower part of the pipe from the clip secured to one of the starter motor mounting bolts; remove the pipe.

**Fuel drain pipe – To fit**

Fit the pipe by reversing the procedure given for its removal.

**Fuel drain pipe – To remove**

*The following procedures apply to later cars, see page U1—Introduction.*

1. Unscrew the worm drive clip situated above the float chamber drain valve.
2. Unscrew the worm drive clip from the hose adjacent to the distributor.
3. Detach the upper part of the hose.
4. Unscrew the worm drive clip situated below the float chamber drain valve.
5. Detach the hose from the float chamber drain valve noting that it is attached to the induction manifold fuel drain pipe.
6. If the float chamber drain valve is to be removed, unscrew the starter motor mounting bolt securing the valve bracket and remove the bracket together with the valve.

*Note If a float chamber drain valve if faulty or damaged a new valve must be fitted.*

**Fuel drain pipe – To fit**

Fit the pipe by reversing the procedure given for its removal.

**Fuel drain pipe – To remove**

*The following procedures apply to current cars, see page U1—Introduction.*

1. Release the two rubber retaining clips which hold the fuel drain hose in position.
2. Withdraw the lower end of the fuel drain hose from the float chamber drain valve.

*Note A small quantity of fuel may be present in the fuel drain hose when it is withdrawn from the float drain valve.*
3. Withdraw the upper end of the fuel drain hose from its connection at the bottom of the fuel receiver.
4. If the float chamber drain valve is to be removed, unscrew the \( \frac{1}{4} \) in. A/F nut and withdraw the bolt which retains the drain valve bracket to the engine mounting foot.

*Note If a float chamber drain valve is faulty or damaged a new valve must be fitted.*

**Fuel drain pipe – To fit**

Fit the pipe by reversing the procedure given for its removal.

**Carburetters — To set**

The following procedures apply to cars prior to Car Serial Number SRX 9001.

- Having set the mechanical adjustments to the automatic choke (see Page U48 Automatic Choke—To set) set the carburetters by carrying out the following operations in the sequence given.
  
  A. Synchronise throttles and temporarily set idle screw.
  B. Set full throttle stop.
  C. Check linkage clearances.
  D. Tune carburetters.
  E. Set cold start 'fast-idle' (see Page U48—Cold start 'fast-idle'—To check).
  F. Set the throttle damper plunger.
  G. Set the kick-down micro-switch.
  H. Set the refrigeration 'fast-idle'.

**Throttle synchronisation**

Refer to Chapter K Section K4.

**Full throttle stop**

1. Adjust the full throttle stop screw so that it measures 0.350 in. (8.99 mm.) from the boss face (see Chapter K Fig. K21 diagram A).
2. Check that the clearance (x in Fig. K21 diagram A) between the fixed stop and the lever is correct. If the clearance is less than that specified, the throttle stop screw should be adjusted to give the correct clearance.

**Linkage clearances — To check**

Refer to Chapter K Section K4.

**CARBURETTER TUNING**

**Preliminary checks**

Before tuning the carburetters the following checks should be carried out.
1. Check the distributor contact point gaps; clean and re-set if necessary.
2. Check the ignition timing (see Section U4).
3. Check the choke stove pipe is not obstructed.
4. Check that the entire induction system is completely free from air leaks.
5. Check the sparking plug gaps.
6. Check that the throttle butterfly valves are synchronised.

Note Jet and volume screws fitted to new carburetters may be streaked with paint. This signifies that the carburetters have been flow checked. However, once the carburetters are in service it is permissible to alter this setting should the need arise.

---

**Fig. U25 ‘B’ BANK CARBURETTER (Later Cars)**

1. Air valve piston  
2. Suction chamber  
3. Damper cap  
4. Damper piston  
5. Weakening device  
6. Communication pipe  
7. Filter  
8. Needle  
9. Diaphragm  
10. Jet  
11. Volume adjusting screw  
12. Union-weakening device
Tuning conditions

To ensure that the engine temperature and mixture requirements are stabilised, tuning must be carried out in accordance with the following setting cycle.

1. Set the volume screws fully in, then back off 1½ turns.

2. With the carburettet dampers, suction chambers, springs and pistons already removed to enable throttle synchronisation to be checked, set the main jet screws as follows.

   Using spanner (RH 8050), slacken the carburettet jet screw lock-nuts then manipulate each screw until the jet in each carburettet body is level with its bridge piece (see Chapter K).

   Screw down each jet screw 2½ turns.

   Fit the air valves pistons, springs and suction chambers in a clean dry condition then top-up each damper piston with the approved oil; the oil level should be approximately 0.5 in. (12.7 mm.) below the top of the piston rod; do not overfill.

   **It is important that each suction chamber and air valve piston should be fitted to the carburettet from which it was removed.**

   Do not fit the damper at this stage.

3. If a hot idle compensator valve is fitted remove the pipe from the hot idle compensator valve connection marked ‘OUT’. Blank off the pipe.

4. Slacken the worm drive clip adjacent to each check valve then disconnect the hoses and temporarily seal the open ends of the check valves. Each blank should consist of a piece of rubber hose with one end sealed; the other end should be pushed over the end of the check valve.

   **Note** Disconnecting the hoses at the check valves isolates the pump and renders the air injection system inoperative.

5. Connect a tachometer to the engine in accordance with the manufacturer’s instructions.

6. Warm the engine at ‘fast-idle’ speed until normal operating temperature is attained. Preferably this should be carried out with the car standing in an ambient temperature of between 16°C. and 27°C. (60°F. and 80°F.). Run the engine for at least five minutes after the thermostat has opened; the thermostat opening point can be detected by a sudden rise in temperature of the thermostat elbow pipe.

   During the warm-up period, Operations 7, 8, and 9 should be carried out.

7. Ensure that the refrigeration system is switched off.

8. Check that the choke butterfly valve is fully open by feeling the tension at the operating levers and hearing it snap back on its stop when any tension which has been applied, is released.

9. Remove the cap from the pressure tapping on the ‘B’ bank carburettet float chamber then connect a manometer capable of measuring 6 in. (15.24 cm.) of water level difference to the tapping (see Fig. U16).

10. Run the engine in Neutral at 2000 r.p.m. for ½ minute to purge the system. During this period check the manometer reading; this should show between 2.75 in. and 3.25 in. (6.99 cm. and 8.25 cm.) difference in water levels. If this reading is not readily attained the system should be checked as follows (also refer to Section U6).

**A low or zero reading may be caused by:**

(a) An obstruction in one or more of the following:
   - The engine side of the weakener unit.
   - Weakeners unit to weaker cut-off valve pipe.
   - Vacuum take-off plate to weaker cut-off valve pipe.
   - Vacuum take-off plate.
   - Pressure tapping on ‘B’ bank of carburetter float chamber.
An air leak at one or more of the following:
- Float chamber lid joint.
- Float chamber vent and drain pipes.
- Weakened cut-off valve pipe unions.
- Vacuum take-off plate flange on 'B' bank carburettor.

A dirty or faulty float chamber drain valve.

Low engine temperature, below 18°C. (64°F.)
or a faulty weaken cut-off valve.

A high reading may be caused by:
(a) An obstruction in the weaken air bleed orifice
or the weaken hoses.
(b) A fouled weakener filter.

**Tuning Procedure**

11. Tuning operations may now be commenced
and must be carried out in the shortest time possible.
If the time for setting exceeds a three minute period,
open the throttle and run the engine at 2000 r.p.m. for
½ minute then resume tuning. Repeat this clearing
operation if further periods of three minutes are
exceeded.

Immediately after a clearing operation when the
engine is at idle speed, the suction chamber should be
tapped all the way round with a light weight, non-
metallic instrument (e.g. the wooden handle of a
screwdriver) to eliminate piston hysteresis (see Fig.
U31).

12. Set the idle speed by adjusting the fixed
throttle stop screw to between 550 r.p.m. and 600
r.p.m.

13. Run the engine at idle speed then balance the
carburetters using the volume screws; the carburetters
are balanced when the hiss heard at the small drilling
in the neck of each suction chamber (see Fig. U31)
is of equal intensity. A rubber or plastic tube of
approximately 0.125 in. (3.17 mm.) diameter bore and
2 ft. (60.96 cm.) long should be used for this purpose.
Fit the dampers.

14. Turn by equal amounts the jet adjusting
screw on both carburetters, approximately ½ of a
turn at a time until the fastest speed is recorded on
the tachometer.

Note Turning the screw clockwise richens the
mixture conversely turning the screw anti-
clockwise weakens the mixture.

Turn both jet adjusting screws very slowly anti-
clockwise (weaker) until the engine speed just com-
ences to fall, then turn both jet adjusting screws ½
turn clockwise (richer).

Tighten both jet adjusting screw lock-nuts using
spanner (RH 8050).
15. Check the engine idle speed and if necessary adjust to between 550 r.p.m. and 600 r.p.m. using the fixed throttle stop screw.

16. Check that the carburetters are balanced by raising and releasing each carburettor piston lift pin in turn then comparing engine response. The carburetters are balanced if the response is the same for each carburettor. If the carburetters are not balanced repeat Operations 13, 14 and 15.

17. Ensure that the engine has run 25 minutes since the thermostat has opened (see Operation 6) then fit the probe of a C.O. meter into the exhaust pipe. The C.O. meter should be set in accordance with the manufacturer’s instructions.

18. Purge the engine to 2 000 r.p.m. with no load for ½ minute.

19. Idle the engine for the period stated by the C.O. meter manufacturer then check the exhaust emission on the C.O. meter: the correct reading should be between 5½% and 6%.

If the C.O. meter reading is not within this limit, it is permissible to unlock the jet adjusting screws and turn them a maximum of ½ of a turn either clockwise or anti-clockwise whichever is appropriate so that the correct reading is given on the meter. Do not turn them in opposite directions (i.e. richen one and weaken the other). Lock the jet adjusting screws.

20. Re-connect the check valve hoses.

21. If necessary again adjust the idle speed to between 550 r.p.m. and 600 r.p.m.

If the correct C.O. meter reading is unobtainable at this setting, and settings have been carried out to the instructions given, the carburetters should be removed from the engine and overhauled as described previously.

22. Re-connect the hoses to the hot idle compensator valve (if fitted).

23. Remove the C.O. meter and the manometer from the float chamber pressure tapping.

Fit the cap using a new washer.

**Cold start 'fast-idle' — To set**

Refer to Page U48.

**Throttle damper plunger — To set**

Refer to Chapter K Section K4.

**Kick-down micro-switch — To set**

Refer to Chapter K Section K4.

**Refrigeration ‘fast-idle’ — To set**

Refer to Chapter K Section K4.

---

Fig. U29 CHECKING THE FLOAT CHAMBER DEPRESSION

1 Rule
2 Manometer
3 Pressure tapping
4 'B' bank float chamber

---

**Carburetters — To set**

The following procedures apply to later cars, see page U1—Introduction.

Having set the mechanical adjustments to the automatic choke (see Page U48, Automatic Choke—To set), set the carburetters by carrying out the following operations in the sequence given.

A. Synchronise throttles and temporarily set idle speed.
B. Set full throttle stop.
C. Check linkage clearances.
D. Tune carburetters.
E. Set cold start ‘fast-idle’ (see Page U48—Cold start ‘fast-idle’—To set).
F. Set the throttle damper plunger.
G. Set the kick-down micro-switch.

**Throttle synchronisation**

Refer to Chapter K Section K4.
CARBURETTER TUNING
Preliminary checks

Before tuning the carburetters the following checks should be carried out.

1. Check the distributor contact points gaps; clean and re-set if necessary. Renew the points if they are badly damaged.

2. Disconnect the vacuum pipe from the vacuum retard tap and blank off the connection at the tap. Adjust the fixed throttle screw to give an engine idle speed of 500 r.p.m. Using a dwell angle meter set the dwell angle to between 26° and 28° by means of the adjustment screw (see Figs. U37 and 38).

3. Check the ignition timing.

4. Check that the choke stove pipe is not obstructed.

5. Check that the entire induction system is completely free from air leaks.

6. If the Fuel Evaporation Emission Control System is fitted, check the purge flow rate.

7. Check the sparking plug gaps.

8. Check that the throttle butterfly valves are synchronised.

Note: Jet and volume screws fitted to new carburetters may be streaked with paint. This signifies that the carburetters have been flow checked. However, once the carburetters are in service, it is permissible to alter this setting should the need arise.

Tuning conditions

To ensure that the engine temperature and mixture requirements are stabilised, tuning must be carried out in accordance with the following setting cycle.

1. Screw the volume screws fully in, then back off 1½ turns.

2. With the carburettet dampers, suction chambers, springs and pistons already removed to enable throttle synchronisation to be checked, set the main jet screws as follows.

Using spanner (RH 8050), slacken the carburettet jet screw lock-nut then manipulate each screw until the jet in each carburettet body is level with the bridge piece.

Screw down the jet screw 2½ turns.

Fit the air valve pistons, springs and suction chambers in a clean dry condition then top-up each damper piston with the approved oil; the oil level should be approximately 0.5 in. (12.7 mm.) below the top of the piston rod. Do not overfill.

---

Fig. U30 FUEL RECEIVER AND DRAIN LINE
(Current Cars)

1. Float chamber vent valve
2. Fuel receiver
3. Drain line
4. Float chamber drain valve

Full throttle stop

1. Adjust the full throttle stop screw so that it measures 0.350 in. (8.89 mm.) from the boss face (see Chapter K Fig. K21 diagram A).

2. Check that the clearance (x in Fig. K21 diagram A) between the fixed stop and the lever is correct. If the clearance is less than that specified, adjust the throttle stop screw to give the correct clearance.

Linkage clearance – To check

Refer to Chapter K Section K4.
It is important that each suction chamber and air valve piston should be returned to the carburettor from which it was removed.

Do not fit the damper at this stage.

3. Connect an electric impulse tachometer in accordance with the manufacturer's instructions.

4. Warm the engine at 'fast-idle' speed until normal operating temperature is attained. Run the engine for at least five minutes after the thermostat has opened; the thermostat opening point can be detected by a sudden rise in temperature of the thermostat elbow pipe.

Note: It is important that engine tuning is carried out after the engine temperature has stabilised and at an ambient temperature of between 16°C and 27°C (60°F and 80°F).

During the warm-up period, Operations 5, 6 and 7 should be carried out.

5. Ensure that the refrigeration system is switched off.

6. Check that the choke butterfly valve is fully open by feeling the tension at the operating levers and hearing it snap back on its stop when any tension which has been applied is released.

7. Remove the cap from the pressure tapping on 'A' bank carburettor float chamber then connect a manometer to the tapping (see Fig. U29). The manometer must be capable of measuring 6 in. (15.24 cm.) of water level difference.

8. Run the engine in Neutral at 2,000 r.p.m. for ½ minute to purge the system. During this period check the manometer reading; this reading should show between 2.75 in. and 3.25 in. (6.99 cm. and 8.25 cm.) difference in water level. If this reading is not readily attained check the system as follows.

A low or zero reading may be caused by:

(a) An obstruction in one or more of the following:
- The engine side of the weakener unit.
- Weakener unit to weakener cut-off valve pipe.
- Vacuum take-off plate to weakener cut-off valve pipe.
- Vacuum take-off plate.
- Pressure tapping on 'A' bank carburettor float chamber.

(b) An air leak at one or more of the following:
- Float chamber lid joint.
- Float chamber vent and drain pipes.
- Weakener cut-off valve pipe unions.
- Vacuum take-off plate flange on 'B' bank carburettor.

(c) A dirty or faulty float chamber vent valve or float chamber drain valve.

(d) Low engine temperature, below 18°C (64°F) or a faulty weakener cut-off valve.

(e) Incorrect purge flow rate (less than 1 cu. ft./minute).

A high reading may be caused by:

(a) An obstruction in the weakener air bleed orifice or the weakener hoses.

(b) A foul in the weakener filter or evaporative loss control canister filter.

(c) Incorrect connection of weakener hose to valve plate or evaporative loss control canister.

(d) Incorrect purge flow rate (greater than 1 cu. ft./minute).

(e) Evaporative loss control canister obstructed.

9. Disconnect the vacuum pipe from the vacuum retard tap and blank off the connection on the tap. Also remove the pipe from the hot idle compensator valve connection marked 'OUT'. Blank off the pipe.

10. Slacken the worm drive clip adjacent to each check valve then disconnect the hoses and temporarily seal the open ends of the check valves. Each blank should consist of a piece of rubber hose with one end
sealed; the other end should be pushed over the end of the check valves.

Note Disconnecting the hoses at the check valves isolates the pump and renders the air injection system inoperative.

Tuning procedure

11. Tuning operations may then be commenced and must be carried out in the shortest time possible. If the time for setting exceeds a three minute period, open the throttle and run the engine at 2 000 r.p.m. for ½ minute then resume tuning. Repeat this clearing operation if further periods of three minutes are exceeded.

Immediately after a clearing operation when the engine is at idle speed, the suction chamber should be tapped all around to eliminate piston hysteresis (see Fig. U37). Use a light weight, non-metallic instrument (e.g. the wooden handle of a screwdriver).

12. Set the engine idle speed by adjusting the fixed throttle stop screw to 600 r.p.m.

13. Run the engine at idle speed then balance the carburetters using the volume screws; the carburetters are balanced when the hiss heard at the small drilling in the neck of each suction chamber is of equal intensity (see Fig. U37). A rubber or plastic tube of approximately 0·125 in. (3·17 mm.) diameter bore and 2 ft. (60·96 cm.) long should be used for this purpose. Fit the dampers.

14. Turn both jet adjusting screws by equal amounts in the same direction, approximately ¼ of a turn at a time until the maximum r.p.m. is recorded on the tachometer.

Note Turning the screw clockwise richens the mixture, conversely turning the screw anti-clockwise weakens the mixture.

15. Set the mixture balance on each carburettor individually using the jet adjusting screws approximately ¼ of a turn at a time in either direction until maximum r.p.m. is obtained.

16. Turn the jet adjusting screws anti-clockwise by equal amounts (weaker mixture) until the engine speed just begins to fall, then turn both adjusting screws ½ of a turn clockwise and tighten both jet adjusting screw lock-nuts using spanner (RH 8050).

17. Check the engine idle speed and if necessary readjust to 600 r.p.m. using the fixed throttle stop screw.

18. Check that the Carburetters are balanced by raising and releasing each carburettor piston lift pin in turn then comparing the engine response. The carburetters are balanced if the response is the same for each carburettor. If the carburetters are not balanced repeat Operations 13 to 17 inclusive until a satisfactory balance is obtained.

19. Purge the engine at 2 000 r.p.m. in Neutral for a period of ½ minute (see Operation 8).

20. Ensure that the engine has run a minimum period of 25 minutes since the thermostat has opened (see Operation 4) then fit the probe of a C.O. meter into the exhaust pipe. The C.O. meter should be set in accordance with the manufacturer’s instructions.

Note Suitable C.O. meters are:
1. Horiba Mexa 200
2. Bosch Model E7aw 109

21. Idle the engine until a steady C.O. reading is obtained (minimum time ½ minute) then check the exhaust emission on the C.O. meter; the correct reading should be between 51% and 6 %.

If the C.O. meter reading is not within this limit, it is permissible to unlock the jet adjusting screws and turn them a maximum of ¼ of a turn either clockwise or anti-clockwise whichever is necessary to give the correct reading on the meter. Do not turn them in the opposite directions (i.e. richen one and weaken the other). Lock the jet adjusting screws.

If the correct C.O. meter reading is unobtainable at this setting, and settings have been carried out to the instructions given, the carburetters should be removed from the engine and overhauled as described previously.

22. Remove the C.O. meter and manometer from the float chamber pressure tapping.

Fit the cap to the pressure tapping using a new washer.

23. Remove the blanks and re-connect the check valve hoses.

24. Set the engine idle speed to 680 r.p.m. using the fixed throttle stop screw and tighten the lock-nut.

25. Connect the vacuum hose to the vacuum retard tap.

26. Check the engine idle speed and using the vacuum throttle stop screw, reset to 600 r.p.m. if necessary.

27. Re-connect the hoses to the hot idle compensator valve.

Cold start ‘fast-idle’ – To set
Refer to Page U48.

Throttle damper plunger – To set
Refer to Chapter K Section K.4

Kick-down micro-switch – To set
Refer to Chapter K Section K.4.
Carburetters — To set

The following procedures apply to current cars, see page U1—Introduction.
The carburetters fitted to these cars are adjusted at the factory using special equipment to ensure that their settings comply with the current emission control regulations.

Under normal circumstances the carburetters should not require adjustment in service.

If however, adjustment is found necessary due to inadvertant disturbance or replacement of a component, proceed as follows.

Having set the mechanical adjustments to the automatic choke (see Page U48 Automatic Choke—To set), set the carburetters by carrying out the following operations in the sequence given.

A. Synchronise throttles and temporarily set engine idle speed.
B. Set full throttle stop.
C. Check linkage clearances.
D. Tune carburetters.
E. Set cold start 'fast-idle' (see Page U48—Cold start 'fast-idle'—To set).
F. Set the throttle damper plunger.
G. Set the kick-down micro switch.

Throttle synchronisation

Refer to Chapter K Section K4.

Ensure that when the throttles are synchronised the eccentric adjuster is in the upper mid-way position this will allow for adjustment of the eccentric in either direction at a later stage of setting the carburetters.

Full throttle stop

1. Adjust the full throttle stop screw so that it measures 0·350 in. (8·89 mm.) from the boss face (see Chapter K, Fig. K21 diagram A).
2. Check that the clearance (x in Fig. K21 diagram A) between the fixed stop and the lever is correct. If the clearance is less than that specified, adjust the throttle stop screw to give the correct clearance.

Linkage clearance — To check

Refer to Chapter K Section K4.

Fig. U32 POSITION OF MIXTURE WEAKENING DEVICE FILTER (Early Cars)

1 Accelerator pedal linkage
2 Fuel weakening device filter
3 Front sub-frame right-hand rear mounting

CARBURETTER TUNING

Preliminary checks

Before tuning the carburetters the following checks should be carried out.

Ensure that the vehicle is in Neutral and that the gear range actuator thermal cut-out has been removed from the main fusebox.

1. Check the condition of the spark plugs.
2. Check the condition of the distributor contact breaker points.
3. Check the ignition timing (see Section U4).
4. Check the flow through the choke stove pipe (see Automatic choke stove pipe—To check).
5. Check the purge line flow rate.
6. Ensure that the air conditioning system is switched off.
7. Start the engine and warm up; allow to run for at least 5 minutes after the thermostat has opened.
8. Stop the engine, ensure that the choke butterfly valve is fully open and the choke 'fast-idle' off.
9. Connect an electric impulse tachometer in accordance with manufacturer's instructions.
10. Remove the cap from the pressure tapping on 'B' bank carburettor float chamber, connect to the tapping a manometer capable of measuring 6 in. (15·24 cm.) of water.
11. Run the engine in Neutral at 2 000 r.p.m. until a steady reading is obtained on the manometer, an acceptable reading is between 3 in. and 3·5 in. (7·62 cm. and 8·89 cm.).
If the correct reading is not obtained, connect the manometer directly onto the weakener unit (i.e. in place of the hose to the evaporation loss control canister. A correct reading at the weakener unit but a low reading at the float chamber tapping may be caused by:

(a) An obstruction in one or more of the following:
   Weakener venturi
   Hoses from the weakener to the fuel receiver.
   Hoses from the float chamber to the fuel receiver.

(b) An air leak at one or more of the following:
   Float chamber lid joint.
   Float chamber vent and drain hoses.
   Weakener solenoid hose connections.
   Weakener tapping flange on ‘B’ bank carburettor.

(c) A dirty or faulty float chamber vent valve or drain valve.

(d) A low engine temperature below 16°C (60°F),
    a faulty weakener solenoid valve or cut-out switch.

(e) An incorrect purge flow rate (less than 50 cu.
    ft./hr.).
Tuning procedure

Tuning operations may now be commenced and must be carried out in the shortest possible time.

If the tuning time exceeds a three minute period open the throttle and run the engine at 2,000 r.p.m. for \(\frac{1}{4}\) minute then resume tuning. Repeat this clearing operation if further periods of three minutes are exceeded.

After each clearing operation when the engine is at idle speed, the suction chamber should be tapped all the way round with a light weight non-metallic instrument (e.g. the wooden handle of a screwdriver) to eliminate piston hysteresis (see Fig. U31).

17. Start and run the engine until the normal temperature is obtained and the automatic choke is off.

18. Set the engine idle speed by adjusting the fixed throttle stop screw to 600 r.p.m.

19. Purge the engine at 2,000 r.p.m. for \(\frac{1}{4}\) minute.

20. Ensure that the engine has run for a minimum of 25 minutes after the thermostat has opened.

Fit the probe of the C.O. meter into the exhaust pipe in accordance with the manufacturer's instructions.

Note A suitable C.O. meter is a Non-Dispersive Infra Red type of analyser such as:

1. Horiba Mropa 200

21. Idle the engine until a steady C.O. reading is obtained (minimum time \(\frac{1}{4}\) minute) then check the exhaust emission on the C.O. meter; the correct reading should be between 5\% and 6\%.

If the C.O. meter reading is not within this limit, proceed with the tuning as follows.

Air flow balance

22. Remove the air valve dampers and check if the carburetters are balanced for air flow by listening to the hiss from the small drilling in the neck of each suction chamber. The carburetters are balanced when the hiss from each suction chamber is of equal intensity. A rubber or plastic tube of 0.125 in. (3,175 mm.) bore 2 ft. (0,610 m.) long may be used for this purpose.

23. Balance the air flow through the carburetters by adjusting the eccentric pivot. Fit the dampers.

Mixture balance

Fully raise each piston lift pin in turn, if the mixture balance is correct the response will be the same for each carburetter.

24. To set the mixture balance slacken the jet adjusting screw lock-nuts using spanner (RH 8050).

25. Turn both jet adjusting screws equal amounts in the same direction (\(\frac{1}{4}\) of a turn at a time), until the maximum r.p.m. is obtained.

Note Turning the screws clockwise enriches the mixture and turning the screws anti-clockwise weakens the mixture.

26. Set the mixture balance by turning the jet adjusting screws individually by approximately \(\frac{1}{4}\) of a turn at a time in either direction until maximum r.p.m. is obtained.

27. Turn both jet adjusting screws equal amounts anti-clockwise until the engine speed just begins to fall, then turn both adjusting screws \(\frac{1}{4}\) turn clockwise and tighten the lock-nuts.

28. Check that the engine idle speed is 600 r.p.m., adjust the fixed throttle stop screw to obtain this figure.

Mixture strength

When both the air flow (volume) and mixture balance are satisfactory proceed to set the mixture strength.
29. Slacken the jet adjusting screw lock-nuts.
30. Turn both jet adjusting screws equal amounts in the same direction (up to a maximum of ¼ turn) until the C.O. meter reading of 5½% to 6% is obtained.

Note Turning the screws clockwise richens the mixture and turning the screws anti-clockwise weakens the mixture.

31. Tighten the lock-nuts.
32. Check that the engine idle speed is 600 r.p.m., adjust the fixed throttle stop screw to obtain this figure.
33. Check the mixture balance, adjust if necessary.
34. Remove the C.O. meter. Fit the cap to the pressure tapping using a new washer.
35. Remove blank and re-connect the check valve air hoses.
36. Set the engine idle speed to 680 r.p.m. by adjusting the fixed throttle stop screw. Tighten the lock-nut.
37. Connect the distributor vacuum hose to the vacuum retard tap.
38. Check that the engine idle speed is 600 r.p.m., if necessary, adjust the vacuum throttle stop screw to obtain this figure.
39. Remove the blank from the integral hot idle compensator valve.
40. Stop the engine and fit the gear range actuator thermal cut-out to the main fusebox.

Cold start ‘fast-idle’ – To set

Refer to Page U48. Fast-idle to be set with the cap on ‘A’ bank float chamber removed, this renders the weakener system inoperative.

Throttle damper plunger – To set

On current cars, see page U1—Introduction.
1. Move the cold start ‘fast-idle’ to its off position.
2. Move the ‘A’ bank throttle stop to its closed throttle position.
3. Slacken both nuts securing the throttle damper to its bracket. Back off the nuts until they are well clear of the bracket.
4. Press the damper towards the ‘A’ bank throttle lever until the damper is fully compressed and the lever is just clear of the throttle stop screw.
5. Screw the lower securing nut until it is 0.050 in. (1.27 mm.) clear of the underside of the bracket. Release the damper and tighten the upper securing nut.

6. Ensure that the damper spindle is resting on the centre of the throttle lever pad.

Kick-down micro-switch – To set

Refer to Chapter K Section K4.

Mixture weakening device fittings – To remove

On cars prior to Car Serial Number SRX 9001 and later cars, see page U1—Introduction

1. Disconnect and remove the pipes fitted to the carburettor float chambers, choke housing and carburettor butterfly housing connections, also disconnect the hose fitted to the weakening device; discard the clip.

2. Using spanner (RH 8087), remove the weakener cut-off valve assembly; do not dismantle the assembly.

Note The weakener cut-off valve assembly has a critical setting to ensure that the valve operates at very precise temperatures; therefore the assembly must not be dismantled. If the assembly is not operating correctly or if the wax capsule requires renewing, renew the complete assembly.

3. Remove the two screws securing the vacuum take-off plate to the ‘B’ bank butterfly housing; remove the plate and gasket.

4. Cars prior to Car Serial Number SRX 9001. To remove the weakener filter unit (see Fig. U32), grasp the unit in both hands and unscrew the unit by turning it anti-clockwise; take care not to lose the dished spring washer fitted between the container and adaptor.

Using pliers (RH 8090), remove the steel clip (if fitted) securing the rubber hose to the filter connection; detach the hose. Discard the steel clip.

On later cars, see page U1—Introduction. Using pliers (RH 8090), remove the steel clips (if fitted) securing the inlet and outlet hoses fitted to each end of the filter unit; detach the hoses. Discard the clips.

To remove the filter unit (see Fig. U16), slacken the worm drive clip securing the filter unit to its mounting bracket. Withdraw the filter unit from the securing clip.

Note The filter units are sealed and no attempt should be made to clean the elements.

Mixture weakening device fittings – To fit

Fit the weakening device fittings by reversing the procedures given for removal noting the following points.
1. Ensure that all pipes are in good condition.
2. Renew all sealing washers.
3. Renew all steel clips.
4. Cars prior to Car Serial Number SRX 9001.
Fit the dished part of the filter washer towards the filter container.
5. On later cars, see page U1—Introduction. It is essential that when fitting the filter unit, the inlet pipe which is off-set from the centre, is situated in its lowest position. If the filter is not fitted in this position it is possible for it to become obstructed by an accumulation of fuel.

**Mixture weakening device fittings — To remove**

On current cars, see page U1—Introduction.

1. Disconnect and remove all hoses fitted to the weakening device, weaker filter, weaker cut-off valve, fuel receiver, float chambers, float chamber vent valve and float chamber drain valve. As each hose is disconnected the open end of the unit should be blanked off and the hose labelled for identification.
2. Remove the float chamber vent valve by removing the retaining split pin and withdraw the valve from the top of the fuel receiver, note the rubber sealing ring around the top of the fuel receiver.
3. Remove the float chamber drain valve by unscrewing the nut and withdrawing the bolt from the engine mounting foot. Withdraw the valve.
4. Remove the weaker cut-off valve by unscrewing the two securing screws and nuts, one situated above and one below the valve. Disconnect the two electrical connections.
5. The fuel receiver should not under normal circumstances require removal, however, if the necessity arises proceed by removing the ignition distributor and coil; collect the distance pieces as the coil is withdrawn. Remove the weaker cut-off valve as described previously. Unscrew and remove the two bracket retaining setscrews. Withdraw the bracket and fuel receiver.
6. Remove the weaker cut-off valve temperature switch situated in the butterfly housing by disconnecting the electrical connection and unscrewing the three retaining screws. Withdraw the unit.

The above units mentioned in Operations 2 to 6 inclusive must not be dismantled, if any have suspect or faulty operation the unit must be discarded and a new one fitted.

7. Remove the mixture weakening device from 'B' bank carburettor by unscrewing the \( \frac{1}{4} \) in. A/F connection from the weakening device; unscrew the two retaining screws and withdraw the unit.
8. Remove the weaker filter by slackening the worm drive clip which retains the filter to the bracket; withdraw the filter.
9. Before removing the purge line filter remove the two steel retaining clips situated one on either side of the unit with the special pliers (RH 8090). Slacken the 2 B.A. setscrew which secures the retaining clip. Withdraw the filter from the clip.

Note The filter units are sealed and no attempt should be made to clean the elements.

**Mixture weakening device fittings — To fit**

Fit the weakening device fittings by reversing the procedure given for removal, noting the following points.

1. Ensure that all hoses and pipes are in a good condition and not obstructed.
2. Renew all sealing washers and gaskets.
3. Renew all steel clips (where fitted).
4. It is essential that when fitting the weaker filter the inlet pipe which is off-set from the centre is facing the front of the car and is in its lowest position.

**Hot air scoop — To remove**

1. Slacken the worm drive clip securing the rubber hose to the hot air scoop. The hose which connects the intake to the air filter/silencer is shown in Figure U2.
2. Remove the two wing nuts securing the scoop to the body; remove the scoop.

**Hot air scoop — To fit**

Fit the scoop by reversing the procedure given for removal.

**Automatic choke stove pipe — To check**

To check the stove pipe for any blockage, carry out the following procedure.

1. Disconnect the choke stove pipe at its choke butterfly housing connection.
2. Connect the calibrated orifice (RH 8095) to the open end of the choke stove pipe, then connect a manometer capable of measuring 25 in. (63.50 cm.) of water level difference to the orifice (see Fig. U33).
3. Run the engine until it reaches normal operating temperature then allow the engine to idle and observe the depression shown by the manometer reading. The correct reading should be between 16 in. and 20 in. (40,64 cm. and 50,80 cm.).

4. If the level difference is less than 16 in. (40,64 cm.), examine the pipe and remove any blockage. After removing the blockage, again check the manometer reading.

5. Remove the manometer and connect the choke stove pipe to the choke housing.

**AUTOMATIC CHOKE – TO SET**

**Adjustment to kick diaphragm**

Refer to Chapter K Section K4.

**Adjustment of the kick-gap**

Refer to Chapter K Section K4.

**Solenoid air gap**

Refer to Chapter K Section K4.

**Solenoid lever spring tension**

Refer to Chapter K Section K4.

**‘Fast-idle’ cam and vacuum retard tap**

Refer to Chapter K Section K4.

**Thermocoil**

Refer to Chapter K Section K4.

---

**Cold start ‘fast-idle’ – To check**

*(see Chapter K Fig. K21 diagram D)*

1. Set the cold start, ‘fast-idle’ speed with the engine at normal operating temperature.

2. With the engine stopped, depress the accelerator from within the bonnet and simultaneously close the choke butterfly against spring pressure by hand. Release the accelerator, so allowing the ‘fast-idle’ cam to turn, then release the choke butterfly, allowing the ‘fast-idle’ adjusting screw to rest on the high step of the cam; this will set the throttles in the cold start position.

3. Ensure that the gear range selector lever is in the Neutral ‘N’ position and that the handbrake is applied.

4. Remove the gear range actuator thermal cut-out from the main fusebox.

**On current cars,** see page U1—Introduction remove the cap from the pressure tapping on ‘A’ bank float chamber to render the weaker inoperative.

5. Start the engine.

6. Check to see that the ‘fast-idle’ adjusting screw is resting on the high step of the cam, unscrew the lock-nut and adjust the ‘fast-idle’ screw to set the engine speed at 2000 r.p.m.; tighten the lock-nut, and check to ensure that the engine speed is still at 2000 r.p.m. By slightly opening the throttles the cam will fall away; on releasing the throttles the engine will assume normal idling speed.

7. Stop the engine.

8. Fit the gear range actuator thermal cut-out to the mainfuse box.
Section U4
IGNITION SYSTEM, DISTRIBUTOR, IGNITION
COIL AND SPARKING PLUGS

The following procedures apply to cars prior to Car Serial Number SRX 9001.

Data
Ignition timing . . . . T.D.C. at 500 r.p.m. (using stroboscope) in Neutral.
For all other information refer to Chapter A—General Information.

Contact points – To clean and adjust
Refer to Chapter M—Electrical System.

Ignition – To time (using a stroboscope)
1. Run the engine until the normal operating temperature is obtained and the automatic choke is off.
2. Stop the engine.
3. Check that the octane selector is set to the ‘A’ mark on the scale (see Fig. U35) and adjust if necessary. Adjustment is carried out by slackening the octane selector adjusting screw lock-nut (9) and turning the adjusting screw (10). If adjustment has been necessary, the octane selector should not be re-set to its original position unless inferior fuels are being used thus causing cylinder detonation during heavy engine load.

Note (a) Inferior fuels should only be used as a last resort; revert to the correct fuel as soon as possible and re-adjust the octane selector to its correct position.

Fig. U35 INTERNAL VIEW OF DISTRIBUTOR (Early Cars)

1 2 3 4 5 6

12 11 10 9 8 7

1 Break contact breaker
2 Fixed contact plate securing screw
3 Contact breaker housing securing screw
4 Make contact breaker
5 Fixed contact plate securing screw
6 Vacuum unit securing screw
7 Contact breaker gap adjusting slot
8 Octane selector
9 Octane selector adjusting screw lock-nut
10 Octane selector adjusting screw
11 L.T. terminal
12 Capacitor
(b) Ignition timing is carried out on A1 cylinder and should be set to T.D.C. The ‘A’ and ‘B’ bank sides of the engine are the left-hand and right-hand sides respectively when viewed from the front of the engine. The cylinders are numbered from the front of the engine.

4. Connect a stroboscope and an electric impulse tachometer to the ignition system as described in the manufacturer’s instructions.

5. Start the engine then adjust the fixed throttle stop screw to give an idle speed of 500 r.p.m.

6. Direct the flashing light of the timer onto the crankshaft damper timing marks and timing pointer (see Fig. U36).

7. Check and adjust the ignition timing if necessary (i.e. T.D.C.).

8. To adjust the timing, release the clamp screw on the distributor and rotate the head of the distributor in the appropriate direction until the correct timing is obtained. Clockwise rotation of the distributor head advances the ignition and conversely anti-clockwise rotation retards the ignition. After adjustment has been carried out, tighten the clamp screw and again check the timing to ensure that it has not altered whilst tightening the clamp screw.

9. Adjust the throttle stop screw to give an idle speed of between 550 r.p.m. and 600 r.p.m.

10. Switch off the ignition.

11. Remove the tachometer and stroboscopic timing equipment.

Coil
Refer to Chapter M—Electrical System.

Sparking plugs
Refer to Chapter M—Electrical System.

Distributor overhaul
Refer to Chapter M—Electrical System.

The following procedures apply to later cars (see Fig. U37 for distributor identification).

In addition to the normal centrifugal advance, the ignition distributor is fitted with a vacuum retard mechanism.

A throttle operated tap controls the vacuum applied to the distributor, retarding the ignition timing at idle and over-run speeds for improved exhaust emission control.

A thermal vacuum switch is fitted to prevent engine
overheating during prolonged idling. This switch interrupts the vacuum line to the throttle operated tap when a predetermined coolant temperature is reached. The thermal vacuum switch de-activates the vacuum retard mechanism and advances the ignition timing to the normal setting.

A vacuum actuated throttle stop is fitted to prevent an excessive increase in idle speed. When idling at normal temperatures a depression is applied to both the distributor retard capsule and the throttle stop vacuum actuator. (The throttle stop vacuum actuator controls the idle speed). Both the retard capsule and the vacuum throttle stop are de-activated simultaneously when the throttle vacuum switch operates at high coolant temperatures. This permits the carburettor throttles to close until the throttle lever contacts the fixed throttle stop. The fixed throttle stop is set to maintain the normal idle speed.

Data

Ignition timing . . . . T.D.C. (static) 5° B.T.D.C. at 800 r.p.m. (using stroboscope) in Neutral with the vacuum retard disconnected.

For all other information refer to Chapter A—General Information.

Contact points – To clean and adjust

Refer to Chapter M—Electrical System.

Ignition – To time (using a stroboscope)

1. Run the engine until the normal operating temperature is obtained and the automatic choke is off.
2. Stop the engine.

Note Ignition timing is carried out on A1 cylinder and should be set to 5° B.T.D.C. A1 cylinder is the front cylinder on the left-hand side when viewed from the front of the engine.
3. Disconnect the vacuum pipe from the vacuum retard tap and blank off the connection at the tap.
4. Connect a stroboscope and an electric impulse tachometer to the ignition system as described in the manufacturer’s instructions.
5. Start the engine and adjust the fixed throttle stop screw to give an idle speed of 800 r.p.m.

Note The speed of 800 r.p.m. must be set by approach from a higher speed.
6. Direct the flashing light of the stroboscope onto the crankshaft damper timing marks and timing pointer; the pointer is positioned on the right-hand side of the crankshaft damper when viewed from the front of the engine (see Fig. U36).
7. Check and if necessary adjust the ignition timing (i.e. 5° B.T.D.C.).
8. To adjust the timing, release the clamp screw on the distributor and rotate the head of the distributor in the appropriate direction until the correct timing is obtained. Clockwise rotation of the distributor head advances the ignition and conversely anti-clockwise rotation retards the ignition. After adjustment has been carried out tighten the clamp screw and again check the ignition timing to ensure that it has not altered whilst tightening the clamp screw.
9. Connect the vacuum pipe to the vacuum retard tap.
10. Adjust the vacuum throttle stop screw to give an engine idle speed of 600 r.p.m.
11. Check the operation of the vacuum retard tap and reset if necessary (see Vacuum retard tap—To set).
12. Switch off the ignition.
13. Remove the tachometer and stroboscopic timing equipment.

Vacuum retard tap – To set

1. Connect an electric impulse tachometer to the ignition system as described in the manufacturer’s instructions.
2. Disconnect the vacuum line at the distributor retard connection and insert a vacuum gauge capable of measuring between Zero and 30 in. Hg. into the line, retaining the connection to the distributor.
3. Start and run the engine until the normal operating temperature is obtained and the automatic choke is off.
4. Set the vacuum retard tap (see Fig. U39) using the adjusting screw. Adjust the screw until the tap closes at the minimum throttle opening consistent with maintaining 14 in. Hg. at the distributor with the engine idling at 600 r.p.m.
5. Remove the vacuum gauge and connect the vacuum line to the distributor. Check and if necessary, using the vacuum throttle stop screw, re-adjust the idle speed to 600 r.p.m.
6. Switch off the ignition.
7. Remove the tachometer.

Coil

Refer to Chapter M.—Electrical System.

Sparking plugs

Refer to Chapter M.—Electrical System.

Distributor overhaul

Refer to Chapter M.—Electrical System.
The following procedures apply to current cars (see Fig. U38 for distributor identification).

In addition to the normal centrifugal advance, the ignition distributor is fitted with a vacuum retard timing control.

A throttle operated tap controls the vacuum applied to the distributor, retarding the ignition timing at idle and over-run speeds for improved exhaust emission control.

A thermal vacuum switch is fitted to prevent engine overheating during prolonged idling. This switch interrupts the vacuum line to the throttle operated tap when a predetermined coolant temperature is reached. The thermal vacuum switch deactivates the vacuum retard mechanism and advances the ignition timing to the normal setting.

A vacuum actuated throttle stop is fitted to prevent an excessive increase in idle speed. When idling at normal temperatures a depression is applied to both the distributor retard capsule and the throttle stop vacuum actuator. (The throttle stop vacuum actuator controls the idle speed). Both the retard capsule and the vacuum throttle stop are de-activated simultaneously when the throttle vacuum switch operates at high coolant temperatures. This permits the carburettor throttles to close until the throttle lever contacts the fixed throttle stop. The fixed throttle stop is set to maintain the normal idle speed.

Data

**Ignition timing**  
T.D.C. (Static) 5° B.T.D.C. at 800 r.p.m. (stroboscopic) in Neutral with vacuum retard disconnected. (approach 800 r.p.m. from a higher speed).

**Make and type**  
Lucas 35 D8. Eight lobe cam with single large contact breaker.

**Rotation**  
Anti-clockwise, viewed from the top.

**Advance mechanism**  
Automatic centrifugal advance with built-in vacuum retard timing control.

**Note**  
Vacuum control fitted to exhaust emission control engines only.

**Firing order**  
A1, B1, A4, B4, B2, A3, B3, A2.

**Dwell angle**  
26° to 28°.

**Contact arm spring pressure**  
18 oz. to 24 oz. (510 gm. to 680 gm.).

**Condenser capacity**  
0-18 mfd. to 0-25 mfd.

**Drive**  
Through camshaft skew gears.

Contact points – To adjust

Refer to Chapter M—Electrical System.

**Ignition – To time (using a stroboscope)**

The timing of the ignition is carried out an A1 cylinder (left-hand front cylinder as viewed from the front of the engine).

1. Check the condition of the contact breaker points and set the gap to a nominal 0·014 in. to 0·016 in. (0,356 mm. to 0,406 mm.). Fit new points if necessary.

2. Start the engine and run until normal operating temperature is obtained. Ensure that the choke fast-idle is off.
3. Stop the engine, disconnect the distributor vacuum pipe from the vacuum retard tap and blank off the connection on the tap.

4. Connect a stroboscope and impulse tachometer in accordance with the manufacturer's instructions.

5. Start the engine and set the speed to 800 r.p.m. by means of the fixed throttle stop screw. Ensure that the adjustment screw is clear of the throttle stop vacuum unit.

   **Note** The speed of 800 r.p.m. must be set by approach from a higher speed.

6. Using a dwell meter set the dwell angle to within limits of 26° and 28° by means of the adjusting screw (see Fig. U38).

   **Note** To remove any backlash from the distributor mechanism finally set the dwell angle by approaching from a minimum of 32°.

7. Direct the stroboscope light onto the crankshaft damper and timing pointer. Slacken the distributor clamp bolt and adjust the distributor to set the timing at 5° B.T.D.C. Tighten the clamp bolt and check that the timing is still 5° B.T.D.C.

8. Set the engine idle speed to 680 r.p.m. by adjusting the fixed throttle stop screw.

9. Connect the vacuum pipe to the vacuum retard tap.

10. Adjust the engine idle speed to 600 r.p.m. using the throttle stop vacuum unit adjusting screw, tighten the lock-nut.

11. Disconnect the vacuum line at the distributor retard capsule and 'Tee' in a vacuum gauge (0-30 in. Hg.) to the line; retain the connection to the distributor.

12. Set the vacuum retard tap by means of adjusting the screw, item 2 in Figure U39, so that the tap closes at the minimum throttle opening consistent with maintaining 14 in. Hg. minimum at the distributor when the engine is idling.

13. Reconnect the vacuum line to the distributor, check and re-adjust idle speed of necessary using the throttle stop vacuum unit adjusting screw.

---

**Fig. U39 VACUUM RETARD TAP ADJUSTMENT**

1. Vacuum retard tap
2. Vacuum retard tap adjusting screw
3. Fast-idle adjusting screw
The 'Essential' maintenance which is listed in the following schedules is the minimum servicing which must be carried out at the appropriate distance/time intervals, in order to comply with the Rolls-Royce Motors Limited warranty and the U.S. Federal and California Emission Regulations.

The 'Preventive' maintenance listed, is aimed at securing the maximum life and efficiency for the vehicle and will be carried out on request.

**ESSENTIAL MAINTENANCE**

This schedule is applicable to cars prior to Car Serial Number SRX 9001 and later cars, see page U1—Introduction.

**INITIAL SERVICE**

This service will be carried out by the Dealer after the first 3,000 miles or 3 months whichever is the earlier. Items marked * will be carried out free of charge.

**INITIAL 3,000 MILES OR 3 MONTHS WHICHEVER IS THE EARLIER**

**Engine**

Change engine oil.

**Torque converter transmission**

Check the fluid level and top-up if necessary, check the level with the engine running.

**Engine cooling system**

Tighten all coolant hose worm drive clips.

*Air injection pump*

Check the tension of the pump driving belt.

*Ignition system*

Check the distributor contact breaker gaps and adjust if necessary. Check the ignition timing and adjust if necessary.

*Choke stove pipe*

Check the depression in the choke stove pipe.

*Carburetters*

Check the oil level in the air valve dampers and top-up if necessary. Check the tightness of the float chamber covers.

Check float chamber depression. Check the exhaust C.O. emission and if necessary reset carburettor balance, mixture strength and idle speed. Check and if necessary reset the cold start fast-idle speed.

**EVERY 3,000 MILES OR 3 MONTHS WHICHEVER IS THE EARLIER**

**Engine**

If the car is used for constant stop-start operation, change the engine oil.
EVERY 6 000 MILES OR 6 MONTHS WHICHEVER IS THE EARLIER

**Engine**
Change the engine oil and renew the oil filter element.

**Brakes**
Inspect the brake pad linings for wear, including the handbrake pads. When renewing the footbrake pads examine the condition of the dust excluders on the calipers. Although it is normally recommended that the face of the footbrake pad should not be less than 0.125 in. (3.2 mm.) from the back-plate, the mechanic should be able to determine, through experience, whether or not the brake pad linings are of sufficient thickness to satisfactorily complete 6,000 miles to the next service. Should the lining back-plate ever contact the brake disc, the resultant damage will necessitate renewal of the disc. Manually adjust the handbrake pads. Inspect all 'Bundy' brake pipes and connections for signs of corrosion.

**Check the following level**
Check the fluid level of the torque converter transmission and top-up if necessary.

EVERY 12 000 MILES OR 12 MONTHS WHICHEVER IS THE EARLIER

**Engine**
Change the engine oil and renew the oil filter element.

**Torque converter transmission**
Drain the transmission sump and refill with an approved fluid.

**Brakes**
Inspect the brake pad linings for wear, including the handbrake pads. When renewing the footbrake pads, examine the condition of the dust excluders on the calipers. Although it is normally recommended that the face of the footbrake pad should not be less than 0.125 in. (3.2 mm.) from the back-plate, the mechanic should be able to determine, through experience, whether or not the brake pad linings are of sufficient thickness to satisfactorily complete 6,000 miles to the next service. Should the lining back-plate ever contact the brake disc, the resultant damage will necessitate renewal of the disc. Manually adjust the handbrake pads. Inspect all 'Bundy' brake pipes and connections for signs of corrosion.

**Ignition system**
Renew the sparking plugs, ensuring that the gaps are set to between 0.023 in. and 0.028 in. (0.58 mm. and 0.71 mm.). Lubricate the distributor spindle, automatic advance mechanism and the shaft bearings with engine oil. Smear the distributor cam with the approved grease. Renew the contact breaker points and set the gaps. Check the ignition timing and reset if necessary.

**Crankcase breather system**
Remove and clean the gauze flame traps in the crankcase breather tube and also clean the adaptor in the choke butterfly housing.

**Air injection pump belt tension**
Check the tension of the belt driving the air injection pump.

**Air injection pump intake filter**
Remove and clean the intake filter element.

**Air injection system**
Check the system for leaks and correct functioning; renew any defective items.

**Carburetters**
Clean the air valves in the carburetters. Check the oil level in the air valve dampers and top-up if necessary. Ensure that the float chamber lids are securely tightened. Remove the inlet unions from the float chambers and clean the filters. Reset the carburettor balance and engine idle speed. Check the cold start idle speed (and also the idle speed with the refrigeration system operating, if fitted); reset if necessary.

**Steering mechanism**
Lubricate the six grease nipples with the approved grease.

**Air silencer/filter**
Clean and oil the wire mesh filter elements (if fitted) or renew the paper filter elements (if fitted).

**Check the following oil level**
Check the oil level in the final drive unit and top-up if necessary.
EVERY 24 000 MILES OR 2 YEARS
WHICHEVER IS THE EARLIER

Air injection pump intake filter
Remove and clean the intake filter element.

Air injection system
Check the system for leaks and correct functioning; renew any defective items.

Fuel evaporation emission control canister
Renew the foam filter element in the canister.

Fuel evaporation emission control purge line filter
Fit a new purge line filter.

Carburetter mixture weakening device
Renew the air filter element for the fuel mixture weakening device.

Carburetters
Clean the air valves in the carburetters. Ensure that the float chamber lids are securely tightened. Check the oil level in the air valve dampers. Remove the inlet unions from the float chambers and clean the filters. Reset carburettet balance and engine idle speed. Check the cold start idle speed (and also the idle speed with the refrigeration system operating, if fitted); reset if necessary.

Air silencer/filter
Clean and oil the wire mesh filter elements (if fitted) or renew the paper filter elements (if fitted).

Steering mechanism
Lubricate the six grease nipples with the approved grease.

Final drive unit
Drain when hot and refill with an approved oil.
PREVENTIVE MAINTENANCE

This schedule is applicable to Cars prior to Car Serial Number SRX 9001 and later cars, see page U1—Introduction.

INITIAL SERVICE

This service should be carried out by the Dealer after the first 3,000 miles or 3 months whichever is the earlier.

INITIAL 3,000 MILES OR 3 MONTHS WHICHEVER IS THE EARLIER

Belt tension
Check the tension of the belts driving the following. Fan and steering pump, generator or alternator, and the refrigeration compressor (if fitted).

Steering pump
Check the level of the fluid in the power steering pump reservoir and top-up as required.

EVERY 6,000 MILES OR 6 MONTHS WHICHEVER IS THE EARLIER

Belt tension
Check the tension of the belts driving the following. Fan and steering pump, generator or alternator and the refrigeration compressor (if fitted). Renew any belts which show signs of wear.

Ignition system
Clean the sparking plugs and set the gaps to between 0.023 in. and 0.028 in. (0.58 mm. and 0.71 mm.). Test the sparking plugs. Lubricate the distributor spindle, automatic advance mechanism and shaft bearings with engine oil. Smear the contact breaker cam with the specified grease. Clean and check the contact breaker gaps and reset if necessary. Check, and if necessary, reset the ignition timing.

Control linkages
Apply a few drops of engine oil to the accelerator linkage and to the gear range selector controls adjacent to the transmission casing.

Carburetters
Check the oil level in the air valve dampers and top-up if necessary.

Electrical system
Ensure that all lamps, instruments and air conditioning controls are operating satisfactorily.

Check the following levels and pressures
Check the fluid level in the power steering pump reservoir and top-up if necessary.

Check the level and specific gravity of the engine coolant and correct if necessary.

Run the engine for four minutes then check the hydraulic reservoir fluid levels; top-up if necessary with the specified fluid.

Check the level of electrolyte in the battery and top-up with distilled water if necessary.

Check the tyre pressures and adjust if necessary.

EVERY 12,000 MILES OR 12 MONTHS WHICHEVER IS THE EARLIER

Belt tension
Check the tension of the belts driving the following. Fan and steering pump, generator or alternator and the refrigeration compressor (if fitted). Renew any belts which show signs of wear.

Control linkages
Apply a few drops of engine oil to the accelerator linkage and to the gear range selector controls adjacent to the transmission casing.

Handbrake linkage
Lubricate the pivot pins and pulleys in the handbrake system with the approved grease.

Spare wheel
Lubricate the spare wheel lowering bolt and mechanism.

Electrical system
Ensure that all lamps, instruments and air conditioning controls are operating satisfactorily.

Check the following levels and pressures
Check the fluid level in the power steering pump reservoir and top-up if necessary.
Check the level and specific gravity of the engine coolant and correct if necessary.

Check the fluid level in the steering idler box damper and top-up if necessary.

Check the level of electrolyte in the battery and top-up with distilled water if necessary.
Run the engine for four minutes then check the hydraulic fluid levels; top-up if necessary.
Check the tyre pressures and adjust if necessary.

EVERY 24 000 MILES OR 2 YEARS WHICHEVER IS THE EARLIER

Control linkages
Apply a few drops of engine oil to the accelerator linkage and to the gear range selector controls adjacent to the transmission casing.

Steering pump (Holbourn Eaton)
Renew the filter element in the pump reservoir.

Fuel pumps
Remove the fuel pump from the car and test on the bench. Fit a new pump unit if the performance is below the specified level (refer to Chapter K—Fuel System of this Workshop Manual T.S.D. 2476).

Handbrake linkage
Lubricate the pivot pins and pulleys in the handbrake system with the approved grease. On cars with exposed front cables, dismantle the pulley housings and pack with approved grease.

Spare wheel
Lubricate the spare wheel lowering bolt and mechanism.

Electrical system
Ensure that all lamps, instruments and air conditioning controls are operating satisfactorily.

Alternator (if fitted)
Examine the slip rings and brushes for wear and check the brushes for freedom of movement in their holders (refer to Chapter M—The Electrical Section of this Workshop Manual T.S.D. 2476).

Generator (if fitted)
Examine the commutator and brushes for wear and the brushes for freedom of movement in their holders (refer to Chapter M—The Electrical Section of this Workshop Manual T.S.D. 2476).

Fuel tank
Remove the drain plug and allow any accumulated water to drain away. Refit the drain plug and add four S.B.N. Inhibitors to the fuel tank.

Fuel filter
Renew the main line filter element and clean the filter bowl.

Height control mechanism
Disconnect the control valve linkage ball joints. Clean, grease and refit the ball joints.

Rear wheel drive-shafts
Lubricate the rear wheel drive-shaft outer universal couplings with an approved grease.

Check the following levels and pressures
Check the fluid level in the power steering pump reservoir and top-up if necessary.
Check the level and specific gravity of the engine coolant and correct if necessary.
Check the level of electrolyte in the battery and top-up with distilled water if necessary.
Check the fluid level in the steering idler box damper and top-up if necessary.
Run the engine for four minutes then check the hydraulic reservoir fluid levels; top-up if necessary.
On Convertible cars, check the fluid level in the hood mechanism reservoir and top-up if necessary.
Check the tyre pressures and adjust if necessary.

SEASONAL SCHEDULES
EVERY 12 MONTHS

Engine cooling system
Drain the coolant from the radiator and the engine crankcase. Clean any debris from the surfaces of the
refrigeration condenser and radiator matrices by reverse flushing with a hose. This should be carried out just prior to the Autumn. Fill the system with the correct anti-freeze mixture. (refer to Chapter L—The Engine Cooling System of this Workshop Manual T.S.D. 2476).

Air conditioning system

Ensure that the foam filter element fitted to the scuttle intake grille is free from obstruction. On Long Wheelbase cars fitted with a centre division, check that the foam filter element fitted to the intake grille in the rear decking panel is free from obstruction.

Refrigeration system (if fitted)

These operations should be carried out only by an experienced refrigeration engineer.

Check that the refrigeration system is functioning correctly. If necessary, top-up the system with refrigerant. If loss of refrigerant is evident, check the system for leakage. Visually check the refrigeration compressor for oil leakage, if oil leakage is apparent check the oil level and top-up if necessary. In the event of a major oil loss check and repair before topping-up (refer to Chapter C—Air Conditioning of this Workshop Manual T.S.D. 2476).

Body

Check that the body drain holes are free from foreign matter.

EVERY 2 YEARS

In addition to the 12 monthly schedule, carry out the following.

Engine cooling system

Drain the coolant from the radiator and engine crankcase. Thoroughly reverse flush the coolant passages with a continuous flow of water. Change the coolant hoses where necessary. Fit a new engine coolant thermostat. Fill the system with the correct anti-freeze mixture.

SERVICE RECOMMENDATIONS

BRAKE AND HYDRAULIC SYSTEM COMPONENTS

48 000 miles

At this mileage and under normal motoring conditions it is recommended that the following servicing is carried out.

Renew the following flexible high pressure hoses; the front and rear brake pumps to accumulator hoses, the front and rear accumulator to frame hoses. Examine the sub-frame to brake caliper hoses for chafing or surface cracking; renew if necessary. Renew the disc brake caliper seals, the deceleration conscious pressure limiting valve seals and the master cylinder seals. Completely drain the fluid from the hydraulic circuits and then fill with Castrol-Girling Brake Fluid Green. This fluid exceeds specification S.A.E. J 1703b in many respects. Bleed the braking systems and automatic height control system.

96 000 miles

At this mileage and under normal motoring conditions it is recommended that the following servicing is carried out.

Renew all the flexible hoses to the braking systems and the automatic height control system. Renew the disc brakes caliper seals, the deceleration conscious pressure limiting valve seals and the master cylinder seals. Completely drain the fluid from the hydraulic circuits and then fill with Castrol-Girling Brake Fluid Green. This fluid exceeds specifications S.A.E. J 1703b in many respects. Bleed the braking systems and automatic height control system.

SPECIAL PRECAUTIONS

Should the car be used in very cold temperatures, drain the engine sump when thoroughly warm and also drain the carburettor air valve dampers. The engine sump and carburettor air valve dampers should then be filled with oil having the following viscosity.

For constant temperatures of between 0°C. and -23°C. (32°F and -10°F.), use a 10W/30 grade oil.

For constant temperatures of -23°C. (-10°F.) and below, use a 5W/20 grade oil.
ESSENTIAL MAINTENANCE

This schedule is applicable to current cars, see page U1—Introduction.

INITIAL SERVICE

This service will be carried out by the Dealer after the first 3,000 miles or 3 months whichever is the earlier. Items marked * will be carried out free of charge.

INITIAL 3,000 MILES OR 3 MONTHS SERVICE WHICHEVER IS THE EARLIER

*Air injection pump
Check belt tension and reset if necessary.

*Automatic choke
Check the flow through the choke stove pipe, and check for correct operation.

*Carburetters
Check oil level in air valve dampers and if necessary top-up to correct level. Check tightness of float chamber covers. Check float chamber depression. Check and if necessary reset the idle speed. Check and if necessary reset the choke fast-idle speed.

*Fuel evaporation emission control system
Check the purge rate; this should be between 50 c.f.h. and 70 c.f.h. at 600 r.p.m. in neutral. Pressure test the fuel tank and evaporative loss line and if necessary rectify any leaks.

*Ignition system
Check distributor dwell angle and adjust if necessary. Correct dwell angle is 26° to 28°. Check ignition timing using stroboscope and reset if necessary; timing should be 5° B.T.D.C. at 800 r.p.m. with vacuum retard disconnected. Check operation of vacuum retard tap and reset if necessary.

Cooling system
Tighten worm-drive clips of all coolant hoses.

Engine
Change engine oil.

Torque control transmission
Check fluid level and top-up if necessary.

EVERY 3,000 MILES OR 3 MONTHS WHICHEVER IS THE EARLIER

Engine
If the car is used for constant stop/start operation, change the engine oil.

EVERY 6,000 MILES OR 6 MONTHS WHICHEVER IS THE EARLIER

Engine
Change engine oil and renew oil filter element.

Torque converter transmission
Check fluid level and top-up if necessary.

Brakes
Inspect footbrake and handbrake pad linings. When changing footbrake pads examine condition of dust excluders on calipers. Manually adjust the handbrake pads. Inspect pipes and connections.

EVERY 12,000 MILES OR 12 MONTHS SERVICE WHICHEVER IS THE EARLIER

Air injection pump
Check tension of pump pulley driving belt. Remove and clean pump intake filter element.

Air injection system
Check air injection system for leaks and correct functioning. Renew any defective items.

Carburetters
Top-up oil level in air valve dampers. Check tightness of float chamber covers. Check float chamber depression. Check and if necessary reset the idle speed. Check and if necessary, reset choke idle speed.

Engine breather system
Remove and clean gauze flame traps in the crankcase breather tube. Clean the adaptor in choke butterfly housing.
Fuel evaporation emission control system
Renew the foam filter element in the evaporation loss control canister.

Ignition system
Renew the sparking plugs ensuring that the gaps are set correctly. Renew contact breaker points and set dwell angle. Correct dwell angle is 26° to 28°. Replace distributor lubrication pad. Lubricate distributor spindle, automatic advance mechanism and shaft bearings with engine oil. Check ignition timing using stroboscope and reset if necessary; timing should be 5° B.T.D.C. at 800 r.p.m. with the vacuum retard disconnected.

Air silencer
Clean and oil the wire mesh filter elements.

Brakes
Inspect footbrake and handbrake pad linings. When changing footbrake pads examine condition of dust excluders on calipers. Manually adjust handbrake pads. Inspect pipes and connections.

EVERY 24 000 MILES OR 2 YEARS SERVICE WHICHEVER IS THE EARLIER
Air injection pump
Check tension of pump pulley driving belt. Remove and clean pump intake filter element.

Air injection system
Check air injection system for leaks and correct functioning. Renew any defective items.

Carburetters
Clean air valves. Top-up oil level in air valve dampers. Check tightness of float chamber covers. Check float chamber depression. Check and if necessary, reset the idle speed. Check and if necessary, reset choke idle speed.

Carburettor mixture weakening device
Renew air filter element for the carburettor mixture weakening device.

Choke stove pipe
Check the flow through the choke stove pipe and check the system for correct functioning.

Engine breather system
Remove and clean gauze flame traps in crankcase breather tube. Clean the adaptor in choke butterfly housing.

Fuel evaporation emission control system
Renew the foam filter element in the evaporation loss control canister. Check the purge rate; this should be between 50 c.f.h. and 70 c.f.h. at 600 r.p.m. in neutral. Renew the purge line filter if necessary.

Ignition system
Renew the sparking plugs ensuring that the gaps are set correctly. Renew contact breaker points and set...
dwell angle. Correct dwell angle is 26° to 28°. Replace distributor lubrication pad. Lubricate distributor spindle, automatic advance mechanism and shaft bearings with engine oil. Check ignition timing using stroboscope and reset if necessary; timing should be 5° B.T.D.C. at 800 r.p.m. with the vacuum retard disconnected.

**Air silencer**
Clean and oil the wire mesh filter elements.

**Brakes**
Inspect footbrake and handbrake pad linings. When changing footbrake pads examine condition of dust excluders on calipers. Manually adjust handbrake pads. Inspect pipes and connections.

**Engine**
Change engine oil and renew oil filter element.

**Final drive unit**
Change Oil.

**Steering mechanism**
Lubricate mechanism at the six grease nipples.

**Torque converter transmission**
Change transmission fluid after initial 24,000 miles 2 years whichever is the earlier, renew intake strainer.


**PREVENTIVE MAINTENANCE**

This schedule is applicable to current cars, see page U1—Introduction

**INITIAL SERVICE**

This service should be carried out by the Dealer after the first 3,000 miles or 3 months whichever is earlier.

**Belt tension**

Check the tension of the belts driving the following fan and steering pump, alternator and refrigeration compressor. Adjust the belt tension as necessary.

**Steering pump**

Check the oil level in the reservoir; top-up if necessary.

**EVERY 6,000 MILES OR 6 MONTHS WHICHEVER IS THE EARLIER**

**Air silencer**

Remove and clean the wire mesh filter elements.

**Carburetters**

Check the oil level in the air valve dampers and top-up if necessary.

**Ignition system**

Check the distributor dwell angle and adjust if necessary.

Check the ignition timing using a stroboscope and adjust if necessary.

**Steering pump**

Check for leaks. If necessary top-up the level in the steering pump reservoir.

**Belt tension**

Check the tension of the belts driving the following fan and steering pump, alternator and refrigeration compressor. Renew any belts which show signs of wear.

**Control linkages**

Apply a few drops of engine oil to the accelerator linkage and to the gear range selector controls adjacent to the transmission casing.

**Electrical system**

Ensure that all lamps, instruments and air conditioning controls are operating satisfactorily.

**Check the following levels and pressures**

Run the engine for four minutes then check the hydraulic reservoir fluid levels; top-up if necessary with the specified fluid.

Check the level of electrolyte in the battery and top-up with distilled water if necessary.

Check the tyre pressures and adjust if necessary.

**EVERY 12,000 MILES OR 12 MONTHS WHICHEVER IS THE EARLIER**

**Belt tension**

Check the tension of the belts driving the following fan and steering pump, alternator and the refrigeration compressor. Renew any belts which show signs of wear.

**Control linkage**

Apply a few drops of engine oil to the accelerator linkage and to the gear range selector controls adjacent to the transmission casing.

**Handbrake linkage**

Lubricate the pivot pins and pulleys in the handbrake system with approved grease.

**Spare wheel**

Lubricate the spare wheel lowering bolt and mechanism.

**Electrical system**

Ensure that all lamps, instruments and air conditioning controls are operating satisfactorily.

**Check the following levels and pressures**

Check the fluid level in the power steering pump reservoir and top-up if necessary.

Check the level and specific gravity of the engine coolant and correct if necessary.

Check the fluid level in the steering idler box damper and top-up if necessary.

Check the level of electrolyte in the battery and top-up with distilled water if necessary.
Run the engine for four minutes then check the hydraulic fluid levels; top-up if necessary.

Check the tyre pressures and adjust if necessary.

EVERY 24 000 MILES OR 2 YEARS WHICHEVER IS THE EARLIER

Belt tension
Check the tension of the belts driving the following fan and steering pump, alternator and the refrigeration compressor.
Renew any belts which show signs of wear.

Alternator
Check the slip rings and the brushes for wear; also check the brushes for freedom in their holders.

Control linkage
Apply a few drops of engine oil to the accelerator linkage and to the gear range selector controls adjacent to the transmission casing.

Fuel pump
Remove the fuel pump from the car and test on the bench. Fit a new pump unit if the performance is below the specified level. (refer to Chapter K—Fuel System of this Workshop Manual T.S.D. 2476).

Handbrake linkage
Lubricate the pivot pins and pulleys in the handbrake system with approved grease.

Spare wheel
Lubricate the spare wheel lowering bolt and mechanism.

Electrical system
Ensure that all lamps, instruments and air conditioning controls are operating satisfactorily.

Fuel tank
Remove the drain plug and allow any accumulated water to drain away. Fit the drain plug. Add four S.B.N. Inhibitors to the fuel tank.

Fuel filter
Renew the main line filter element and clean the filter bowl.

Height control mechanism
Disconnect the control valve linkage ball joints. Clean, grease and refit the ball joints.

Rear wheel drive-shaft
Lubricate the rear wheel drive-shaft outer universal couplings with an approved grease.

Check the following levels and pressures
Check the fluid level in the power steering pump reservoir and top-up if necessary.

Check the level and specific gravity of the engine coolant and correct if necessary.

Check the fluid level in the steering idler box damper and top-up if necessary.

Check the level of electrolyte in the battery and top-up with distilled water if necessary.

SEASONAL SCHEDULE EVERY 12 MONTHS

Engine cooling system
Drain the coolant from the radiator and the engine crankcase. Clean any debris from the surfaces of the refrigeration condenser and radiator matrices by reverse flushing with a hose. This should be carried out just prior to the Autumn. Fill the system with the correct anti-freeze mixture (refer to Chapter L—Engine Cooling System of this Workshop Manual T.S.D. 2476.)

Air conditioning system
Ensure that the foam filter element fitted to the scuttle intake grille is free from obstruction. On Long Wheelbase cars fitted with a centre division, check that the foam filter element fitted to the intake grille in the rear deck panel is free from obstruction.

Refrigeration system (if fitted)
These operations should be carried out only by an experienced refrigeration engineer.

Check that the refrigeration system is functioning correctly. If necessary, top-up the system with refrigerant. If loss of refrigerant is evident, check the system for leakage. Visually check the refrigerant compressor for oil leakage, if oil leakage is apparent check the oil level and top-up if necessary. In the event of a major oil loss check and repair before topping-up (refer to Chapter C—Air Conditioning of this Workshop Manual T.S.D. 2476.)
Chapter U

Body
Check that the body drain holes are free from foreign matter.

EVERY 2 YEARS
In addition to the 12 monthly schedule, carry out the following.

Engine cooling system
Drain the coolant from the radiator and engine crankcase. Thoroughly reverse flush the coolant passages with a continuous flow of water. Change the coolant hoses where necessary. Fit a new engine coolant thermostat. Fill the system with the correct anti-freeze mixture.

SERVICE RECOMMENDATIONS
BRAKE AND HYDRAULIC SYSTEM COMPONENTS

48 000 Miles
At this mileage and under normal motoring conditions it is recommended that the following servicing is carried out.

Renew the following flexible high pressure hoses; the front and rear brake pumps to accumulator hoses; the front and rear accumulator to frame hoses. Renew the disc brake caliper seals, the deceleration conscious pressure limiting valve seals, and the master cylinder seals. Completely drain the fluid from the hydraulic circuits and then fill with Castrol-Girling Brake Fluid Green. This fluid exceeds specification S.A.E. J 1703b in many respects. Bleed the braking systems and automatic height control system.

96 000 Miles
At this mileage and under normal motoring conditions it is recommended that the following servicing is carried out.

Renew all the flexible hoses to the braking systems and the automatic height control system. Renew the disc brakes caliper seals, the deceleration conscious pressure limiting valve seals and the master cylinder seals. Completely drain the fluid from the hydraulic circuits and then fill with Castrol-Girling Brake Fluid Green. This fluid exceeds specification S.A.E. J 1703b in many respects. Bleed the braking systems and automatic height control system.

SPECIAL PRECAUTIONS
Should the car be used in very cold temperatures, drain the engine sump when throughly warm and also drain the carburetter air valve dampers. The engine sump and carburetter air valve dampers should then be filled with oil having the following viscosity.

For constant temperatures of between 0°C. and —23°C. (32°F. and —10°F.), use a 10W/30 grade oil.

For constant temperatures of —23°C. (—10°F.) and below, use a 5W/20 grade oil.
### Section U6

**FAULT DIAGNOSIS**

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>POSSIBLE CAUSE</th>
<th>ACTION</th>
</tr>
</thead>
</table>
| **Exhaust Emission Control System**
1. Engine backfires on overrun. | 1.(a) Pump drive belt slack.  
(b) Severe air leak in system probably between control valve and carburettor 'Tee' piece.  
(c) Control valve sticking in a closed position.  
(d) Gulp valve sticking in a closed position.  
(e) Faulty check valves. | 1.(a) Tighten belt.  
(b) Check system for leaks. Air leaks in the pressure lines can be detected by carefully passing a hand over the pipework. If small leaks are suspected but cannot be located, soapy water should be spread over the pipework; air bubbles will then locate any leaks. Leaks in the lines subject to manifold depression can be detected by a whistling noise which is caused by the leak in the pipe.  
(c) Renew control valve.  
(d) (i) Check that the gulp valve is operating correctly. This may be carried out by running the engine at idle speed then disconnecting the small tube from the gulp valve; this tube senses manifold depression. Cover the now open end of the gulp valve connection with the thumb and note the response of the rubber pipe fitted between the control valve and gulp valve. If this tube tends to collapse and a clicking noise can be heard when the thumb is taken away from the connection then the gulp valve is operating satisfactorily. Fit the small rubber tube.  
(ii) Renew the gulp valve.  
(e) Run the engine at idle speed. If the valves are operating correctly they can usually be heard to 'flutter'. For a more definite check, remove the check valves and blow air through each valve; air should blow through the pump side only. |
**Exhaust Emission Control System—continued**

### Symptom: Excessive pump noise.

<table>
<thead>
<tr>
<th>Possible Cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>2(a) Slack belt.</td>
<td>2(a) Tighten belt. Check the air silencer.</td>
</tr>
<tr>
<td>(b) Loose air silencer.</td>
<td>If the silencer is not securely mounted, normal pump noise will be amplified.</td>
</tr>
<tr>
<td>(c) Relief valve failure.</td>
<td>(i) Check the relief valve. Relief valve failure will cause excessive noise. Failure has occurred if air escapes from the valve at engine idle speed.</td>
</tr>
<tr>
<td>(d) Damaged impeller vanes.</td>
<td>(ii) Plug air delivery pipe and check that the relief valve blows at 5 lb/sq.in. (0.35 kg/sq. cm.) when 'Neutral' is engaged on the gear selection quadrant. Renew relief valve if necessary.</td>
</tr>
<tr>
<td>(e) Rubbing vanes (an intermittent 'chirping' noise, noticeable mainly at low engine speed).</td>
<td>(d) Renew pump. If the vanes have obviously been damaged by exhaust heat, examine the check valves for correct operation.</td>
</tr>
<tr>
<td>(f) Worn bearing. Bearing noise is a rolling sound—noticeable at all speeds.</td>
<td>(e) (i) If the air pump has been in Service for some time, remove pump and determine the cause, e.g. worn bearings.</td>
</tr>
<tr>
<td></td>
<td>(ii) If the air pump has been in Service for only a short period, the vanes should be allowed more running-in time before renewing any pump parts.</td>
</tr>
</tbody>
</table>

### Engine idles very roughly.

| 3(a) Control valve sticking in open position. | 3(a) Renew control valve. |
| (b) Air leaks between control valve and carburettor 'Tee' piece. | (b) See Symptom 1 Action b. |

### Unsatisfactory running of the engine.

| 4(a) Air silencer cleaner element choked. | 4(a) Remove and clean element. |

### Malfunctioning mixture weakening system.

<p>| 5(a) Weakening device filter blocked or blockage in rubber hose or bleed orifice. | 5(a) Renew filter or remove the blockage. |
| (b) Dislodged venturi in weakening device. | (b) Renew the weakening device. |
| Items (c), (d), (e) and (f) are applicable only when a Fuel Evaporation Emission Control System is fitted. | |
| (c) Evaporation loss control canister filter blocked. | (c) Renew filter or remove blockage. |
| (d) Incorrect connection of weakening hose to balance adaptor or evaporation loss control canister. | (d) Ensure connections are fitted correctly; rectify if necessary. |
| (e) Incorrect purge flow rate (greater than 1 cu. ft/minute). | (e) Renew purge line restrictor. |
| (f) Evaporation loss control canister obstructed. | (f) Remove obstruction. |</p>
<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>POSSIBLE CAUSE</th>
<th>ACTION</th>
</tr>
</thead>
</table>
| 6. Low float chamber depression also small increase in fuel consumption. | On cars prior to Car Serial Number SRX 9001 and later cars, see page U1—Introduction.  
6.(a) Blockage in engine side of weakening device.  
On current cars, see page U1—Introduction.  
6.(a) A blockage in the weaken venturi, the hose from the weakener to vent canister, or the hoses from the float chambers to fuel receiver.  
(b) Float chamber and weakening device air leaks.  
(c) Float chamber connection air leaks as far as and including the one way valve in the fuel drain pipe.  
(d) Engine intake air temperature below 16°C (60°F).  
(e) Inoperative weakener cut-off valve.  
(f) Leaks between weakening device and tapping in carburettor body; this will include the weaker cut-off valve.  
(g) Faulty cut-off valve.  
(h) A dirty or faulty float chamber drain valve.  
Items (i) and (j) are applicable only when a Fuel Evaporation Emission Control System is fitted.  
(i) A dirty or faulty float chamber vent valve.  
(j) Incorrect purge flow rate (less than 1 cu. ft./minute). | 6.(a) Remove blockage.  
6.(a) Remove blockage.  
(b) Renew gaskets and washers. Ensure that both float chamber lids are tight also that all connections are tight.  
(c) Check that all pipe connections are tight and seating correctly. Check that the one way valve assembly is correctly seated also that it is tightly assembled.  
(d) Allow engine to warm up.  
(e) Renew valve.  
(f) Check and tighten any loose connections also check the condition of sealing washers and renew if necessary.  
(g) Disconnect the two pipes fitted to the cut-off valve then connect the pipes by fitting a small piece of thick-walled rubber tube over the two end nipples; a piece of tube similar to the type fitted to the refrigeration fast-idle solenoid would suffice. Run the engine and check the float chamber depression, if the depression is correct, the cut-off valve is faulty and should be renewed.  
(h) Remove blockage or renew valve.  
(i) Remove blockage or renew valve.  
(j) Remove any blockage in the purge line restrictor or renew the restrictor. Also remove any blockage in the purge line filter or the pipes situated between the gulp valve to carburettor "tee" piece pipe and evaporation loss control canister. |

Carburetters  
7. Stalling, poor slow running, lack of power and high fuel consumption. | 7.(a) Sticking carburettor piston caused by the needle bearing heavily on the jet. | 7.(a) Remove the air cleaner trunk hose from the butterfly housing. A spring-loaded pin, located on the right-hand side of the suction chamber, is provided for lifting the piston (see Fig. U24 Item 28). Normally, when the engine is not running, the piston rests on the buffer pin in the base of the piston just above the bridge of the main carburettor body. Raise the piston to its highest position, against the resistance of the damper piston, then release it and check that it drops freely. If the downward movement of the piston is sluggish or if the piston does not readily leave the bridge of the carburettor, lower the main jet by pushing the mixture adjusting screw lever upwards and repeat the check on the piston. |
<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>POSSIBLE CAUSE</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carburetters—continued</td>
<td>The elimination of sticking by lowering the jet indicates that the needle is bent and bearing heavily on the jet. After lowering the jet, if the piston continues to stick it is probable that the piston is fouling the side of the suction chamber or that the piston rod is not free to move within its bush (refer to Action 7 (b)). On completion of these checks re-set and tune the carburetters.</td>
<td>(b) Sticking carburetter piston caused by a bent damper rod.</td>
</tr>
<tr>
<td></td>
<td>(c) Sticking carburetter piston caused by dirt between the suction chamber and piston rod sticking in its bush.</td>
<td>(b) Remove the oil cap and damper piston assembly and repeat the check for a sticking piston (see Action 7 (a)). If it is determined that the damper rod is bent, a new damper rod should be fitted and carburettet re-set.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(c) Remove the suction chamber and damper piston assembly, then remove the air valve piston assembly. Clean the parts with clean petrol or methylated spirits and wipe dry with a clean lint free cloth. Apply a few drops of clean light oil to the piston rod. Fit the damper assembly and washer to the suction chamber. Seal the transfer holes in the piston assembly with rubber plugs and fit the assembly to the suction chamber. Invert the complete assembly and allow the suction chamber to fall away from the piston. Check the time it takes which should be between 5 and 7 seconds; remove the plugs and damper assembly (see Fig. K 16 in Chapter K). On no account should any attempt be made to increase the bore of the suction chamber, or to reduce the diameter of the enlarged part of the piston, as the maintenance of a limited clearance between these two parts is essential for the correct operation of the carburettet. If the needle is disturbed or renewed the carburettets must be reset and tuned.</td>
</tr>
<tr>
<td>8. Stalling</td>
<td>8.(a) Flooding of the float chamber or the jet.</td>
<td>8.(a) Examine the float to determine if it is punctured; renew if necessary. Examine the needle valve seating to ensure that it is clean and serviceable. Check that the float level is correct. Ensure that the cork gasket between the float chamber body and the lid is in good condition.</td>
</tr>
<tr>
<td></td>
<td>(b) Water or foreign matter in the float chamber.</td>
<td>(b) Remove the float chamber lid, then withdraw the float. Thoroughly clean the float chamber and the filter in the lid. If dirt is present in the float chamber, it is possible that the main jet may be choked. The following method should successfully clear a choked jet: (i) Remove the suction chamber and withdraw the piston assembly. (ii) Fit the suction chamber and seal the air intake.</td>
</tr>
<tr>
<td>SYMPTOM</td>
<td>POSSIBLE CAUSE</td>
<td>ACTION</td>
</tr>
<tr>
<td>---------</td>
<td>---------------</td>
<td>--------</td>
</tr>
<tr>
<td>Carburetters—continued</td>
<td>(iii) Disconnect the L.T. lead on the distributor then remove the thermal cut-out from the main fusebox (gear range selector lever to be in Neutral). (iv) Lower the jet to its bottom position by pushing the mixture adjusting screw lever upward, hold it in this position then proceed as described in Operation (v). (v) Rotate the engine by means of the starter motor. This should cause any foreign matter to be drawn out of the jet into the carburettor body. (vi) Should this fail to clear the blockage, remove and clean the jet, bearing in mind that all carburettor parts should be assembled in the same relative position from which they are removed. If globules of water are found in the carburetters, the fuel system should be cleaned thoroughly and the fuel tank drained in order to inspect the fuel for water content. On completion of this Operation, tune the carburetters.</td>
<td></td>
</tr>
<tr>
<td>9. Engine stalls when idling or under light running conditions.</td>
<td>9. Providing that there is a good supply of fuel available at the float chamber inlet unions, it is possible that the float needle valve has stuck to its seating. This results from a gum deposit which forms in fuel system after prolonged storage of the fuel in the tank.</td>
<td>9. Remove the float chamber lid and withdraw the needle valve, then clean the valve and its seating with a clean cloth soaked in alcohol. Cleaning of the seat will be facilitated by wrapping the cloth around a thin piece of wood. Repeated trouble of this nature can only be rectified by completely dismantling and thoroughly cleaning the fuel system and tank.</td>
</tr>
<tr>
<td>10. Engine shows serious power loss evident at high speeds and loading.</td>
<td>10. (a) Insufficient delivery of fuel. (b) Ignition timing (c) Sparking plugs.</td>
<td>10. (a) Check the fuel pumps for adequate delivery and the filters in the system for cleanliness. (b) Check and reset if necessary. (c) Clean, set gap, test or renew.</td>
</tr>
</tbody>
</table>
## Section U7

### WORKSHOP TOOLS

<table>
<thead>
<tr>
<th>Tool Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RH 8050</td>
<td>Spanner—Carburettor Jet Screw</td>
</tr>
<tr>
<td>RH 8087</td>
<td>Spanner—Weakener Cut-off Valve</td>
</tr>
<tr>
<td>RH 8089</td>
<td>Jet Centring Tool</td>
</tr>
<tr>
<td>RH 8090</td>
<td>Pliers—Wire Hose Clips</td>
</tr>
<tr>
<td>RH 8095</td>
<td>Restrictor—Manometer Check—Choke Stove Pipe</td>
</tr>
<tr>
<td>RH 8382</td>
<td>Spanner—Distributor Dwell Angle</td>
</tr>
<tr>
<td>RH 8383</td>
<td>Positioning Tool—Throttle Spindle Seal</td>
</tr>
</tbody>
</table>

(Revised January 1972)
Chapter U

EMISSION CONTROL SYSTEMS

PART 2

Chapter U - Part 2 contains information which is applicable to cars fitted with Emission Control Systems and manufactured during the year 1973.

Chapter U - Part 2 together with Supplement No. 2 (North America 1974) in Section U10 contains information which is applicable to cars fitted with Emission Control Systems and manufactured as 1974 model year cars.

SECTION

<table>
<thead>
<tr>
<th>SECTION</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>U1</td>
<td>U 3</td>
</tr>
<tr>
<td>U2</td>
<td>U 9</td>
</tr>
<tr>
<td>U3</td>
<td>U 17</td>
</tr>
<tr>
<td>U4</td>
<td>U 19</td>
</tr>
<tr>
<td>U5</td>
<td>U23</td>
</tr>
<tr>
<td>U6</td>
<td>U39</td>
</tr>
<tr>
<td>U7</td>
<td>U43</td>
</tr>
<tr>
<td>U8</td>
<td>U51</td>
</tr>
<tr>
<td>U9</td>
<td>U53</td>
</tr>
<tr>
<td>U10</td>
<td>U55</td>
</tr>
</tbody>
</table>

Important
Always consult Section U10 - Supplements, for information which is additional to that given in the Chapter.
INTRODUCTION

This Chapter has been written specifically for cars fitted with Emission Control Systems conforming to the U.S. Environmental Protection Agency regulations and to the California regulations applicable to 1973 model year new motor vehicles.

It is important therefore that Service Personnel fully understand the contents of this Chapter so that the special servicing can be correctly carried out.

Rolls-Royce and Bentley motor cars conforming to the above regulations and produced during 1973 can be readily identified as follows.

1. **Car Serial Number**
   A letter B as the last prefix letter of the Car Serial Number (e.g. SRB or LRB, etc.).

2. **Emission Control Certification Label**
   A 1973 Emission Control Certification Label (illustrated below) fitted to the wing valance to the rear of the right-hand front suspension spring cover.

![Emission Control Certification Label](image URL)
FIG. U1 VIEW INSIDE ENGINE COMPARTMENT (From Right-hand Side of Car)

1 Fuel receiver and float chamber vent valve
2 Exhaust gas recirculation valve
3 Crankcase emission control pipe connection
4 Exhaust gas recirculation distribution pipes
5 Vacuum retard tap
6 Float chamber pressure tapping
7 'A' bank carburettet
8 'A' bank air manifold
9 Deceleration control (gulp) valve
10 Check valve
11 Air pump
12 Air intake hose (engine)

FIG. U2 VIEW INSIDE ENGINE COMPARTMENT (From Left-hand Side of Car)

1 Weaken filter
2 Check valve
3 Anti 'run-on' solenoid
4 Throttle stop vacuum actuator
5 'B' bank carburettet
6 Exhaust gas recirculation solenoid
7 Choke thermo-coil housing
8 Choke solenoid
9 Choke stove pipe (passing air to exhaust manifold)
10 Weaken system cut-off switch
The Exhaust Emission Control System is designed to reduce the Carbon Monoxide unburnt Hydro-carbon and oxides of nitrogen content in the exhaust gases to comply with the current Emission Control regulations.

This system does not reduce the risk of inhaling exhaust gases in a confined area.

Air from the atmosphere is drawn into the engine-driven air pump through an intake filter. From the pump, the air passes through the check valves to the air manifolds then into the exhaust ports at a point just above the exhaust valve heads. This air combines with the exhaust gases discharged from the combustion chamber and completes the oxidation of most of the unburnt gases (see Fig. U3). The gases then pass through the exhaust system to atmosphere.

In addition, a small proportion of the exhaust gas from the 'A' bank exhaust manifold passes through a cooler and vacuum operated metering valve into the carburetter 'Tee' piece, just downstream of the throttles. The exhaust gas mixes with the inlet charge in the induction manifold and is distributed to the cylinders thus lowering the peak combustion temperature and reducing oxides of nitrogen emissions (see Fig. U4).

Air pump

A two-vane rotary air pump belt driven from the coolant pump.

Air pump relief valve

A relief valve is located in the discharge cavity of the air pump to permit the outlet air to by-pass the air injection system when the check valves are closed. The by-pass system prevents damage to the pump vanes and excessive exhaust temperatures under extreme operating conditions.

Check valves

Check valves are fitted to the air injection manifolds to prevent the backflow of exhaust gases into the air lines or air pump. The valves operate when the exhaust back pressure exceeds the pump delivery pressure at high speed and load or in the case of failure of an air pump driving belt.

Gulp valve (anti-backfire valve)

Following rapid throttle closure the inlet manifold pressure drops suddenly causing fuel to vapourise from the inlet manifold walls, resulting in a mixture which is too rich to burn in the cylinders. If this mixture was allowed to pass into the exhaust system it would combine with the injected air and cause severe backfiring. To prevent this, a gulp valve, triggered by manifold pressure, allows a measured gulp of air from the pump discharge line to enter the inlet manifold following rapid throttle closure; this results in a weaker mixture which is combustible in the cylinders.
FIG. U3 AIR INJECTION SYSTEM AND IGNITION CONTROL SYSTEM

1 'A' bank air manifold
2 Throttle damper
3 Fixed throttle stop
4 Vacuum retard tap
5 Distributor retard capsule
6 Exhaust gas recirculation solenoid
7 Vent to air trunking
8 Thermal vacuum switch
9 'B' bank air manifold
10 Anti 'run-on' solenoid
11 Vacuum throttle stop screw
12 Check valve
13 Inlet manifold vacuum tapping
14 Throttle stop vacuum actuator
15 Air pump
16 Air pump intake
17 Deceleration control (gulp) valve
18 Check valve

NORMAL AIR FLOW
(TO EXHAUST PORTS)
EXCESS AIR FLOW
(FROM PUMP RELIEF VALVE)
ADDITIONAL AIR FLOW
(FOLLOWING RAPID THROTTLE CLOSURE)
**Throttle damper**

The throttle damper prevents rapid throttle closure which would suddenly drop the intake manifold pressure causing vaporisation of fuel from the manifold walls and produce a sudden increase in mixture strength.

**Air injection pump belt—To set**

Refer to Chapter L—Engine Cooling System.

**Air injection pump—To remove**

1. Disconnect the battery.
2. Ensure that all the open ends of hoses and pipes are masked-off immediately they are disconnected, to prevent the ingress of dirt, etc.
3. Detach the small rubber tube which fits between the manifold pipe and the gulp valve.
4. Slacken the two worm drive clips adjacent to the gulp valve, situated on the gulp valve to carburettor ‘Tee’ piece pipe.

Slide the hose off the gulp valve.

---

**FIG. U4 EXHAUST GAS RECIRCULATION SYSTEM**

1. Exhaust gas recirculation valve
2. ‘A’ bank carburettet
3. Weakening device
4. ‘B’ bank carburettet
5. Exhaust gas recirculation solenoid
6. ‘A’ bank exhaust manifold
7. Cooler (exhaust gas recirculation)
5. Unscrew the two 'cheese-headed' screws securing the gulp valve to its mounting bracket on the thermostat housing.

6. Slacken the worm drive clip connecting the gulp valve 'U' pipe to the 4-way connector, at the connector end.

7. Withdraw the 'U' pipe and gulp valve from the 4-way connector.

8. Slacken the worm drive clip securing the pump delivery hose to the pump; detach the hose from the rear of the pump.

9. Slacken the two bolts on the pump belt adjustment strut; remove the upper bolt.

10. Slacken the remaining mounting bolt and allow the pump to move downward to remove any belt tension.

11. Remove the belt; if difficulty is experienced, the pulley should be removed by removing the three setscrews securing it in position.

12. Support the air injection pump, remove the remaining bolt then lift the pump clear of the engine.

**Air injection equipment—General fitting instructions**

The removal and fitting procedure for the remaining air injection equipment is straightforward provided that the following points are observed.

1. The special wire hose clip securing the gulp valve should be discarded once removed and a new one fitted; the tool number of the pliers for fitting these clips is RH 8090.

2. If any of the valves are found to be damaged or faulty in service they should be renewed.

3. Any rubber hoses which appear to have deteriorated should be renewed.

**Air injection pump—to fit**

Fit the air pump by reversing the procedure given for dismantling noting the following points.

1. The belt tension should be set as described in Chapter L.

2. If the pulley was removed, it should be fitted using the original setscrews as longer screws may foul the pump casing and cause damage.

**Air injection system—Leak check**

Check the air injection system for air leaks by carrying out the following sequence of operations.

1. Ensure that the ignition is switched off.

2. Visually inspect the condition of all hoses, pipes and joints associated with the air injection system.

3. Ensure that all worm drive clips are tight.

4. Start the engine and listen carefully for any evidence of an air leak from the system.

5. If an air leak is suspected it is permissible to coat the component or hose with a soap solution; soap bubbles will confirm an air leak.

**Air injection system—Fault diagnosis**

To diagnose malfunctioning of the air injection system refer to Section U8—Fault Diagnosis of this Chapter.

---

**FIG. U5 EXHAUST GAS RECIRCULATION VALVE**

1 Rubber diaphragm  
2 Spring  
3 Vacuum connection  
4 Sealing washer  
5 Pintle

**EXHAUST GAS RECIRCULATION SYSTEM**

An illustration of the exhaust gas recirculation system can be seen in Figure U4 and details of the servicing requirements are given below.

**Exhaust gas recirculation valve—to remove**

1. Detach the small diameter rubber hose from the valve.
2. Using a ½ in. A/F spanner unscrew and remove the two nuts and washers retaining the valve to the mounting flange.

3. Slacken the worm drive clip which secures the valve to the 'A' bank carburettor air horn.

4. Withdraw the valve and remove the gasket from the mounting flange face.

**Exhaust gas recirculation valve—To fit**

Fit the valve by reversing the procedure for removal, noting the following points.

1. Ensure that the valve pintle (see Fig. U5) is secure on the valve stem.

2. Ensure that the valve and mounting flange joint faces are clean and free from carbon deposits.

3. Always use a new mounting flange gasket.

**Exhaust gas recirculation valve—To clean**

1. Remove the valve as described in Exhaust gas recirculation valve — To remove.

2. Using a scraper, remove all carbon film from the valve and mounting flange faces; complete the operation with a wire brush.

3. Clean the carbon from the valve using a wire brush fitted into a portable drill. Take care not to damage the valve seating area.

4. Thoroughly blow out the valve with compressed air to ensure that all loose carbon particles are removed.

5. Upon completion of the cleaning operations, fit the valve to the engine mounting flange as described in Exhaust gas recirculation valve — To fit.

**Exhaust gas recirculation valve—To check**

1. Connect an electric impulse tachometer to the engine in accordance with the manufacturer’s instructions.

2. Ensure that the handbrake is firmly applied and that the gear range selector is in the Neutral position.

3. Start the engine and run until normal operating temperature is attained.

4. Allow engine to return to the idle speed.

5. Increase the engine speed slowly noting the operation of the exhaust gas recirculation valve.

6. When the engine speed has reached 2 000 r.p.m. the exhaust gas recirculation valve should have moved from the closed position to the open position.

7. Stop engine.

8. Disconnect the small diameter rubber hose from the exhaust gas recirculation valve and connect to a suitable vacuum gauge (0 to 10 in. Hg).

9. Remove the pressure tapping from 'A' bank carburettor float chamber to vent the float chambers to atmosphere.

10. Start the engine.

11. Run at 2 000 r.p.m. and check on the vacuum gauge that the exhaust gas recirculation valve signal strength is between 2·0 in. Hg. and 5·5 in. Hg.

12. Stop engine.

Possible causes of low signal strength are given in Section U5 — The Carburetters and Automatic Choke System.

If the signal strength is within the specified limits but the exhaust gas recirculation system does not function correctly proceed as follows.

13. Fit the small diameter rubber hose to the exhaust gas recirculation valve and disconnect the other end of the hose from the exhaust gas recirculation valve cut-off solenoid vent.

14. Apply a vacuum of 3·5 in. Hg. to 4·5 in. Hg. to the open end of the hose and check to ensure this vacuum does not leak away.

**Exhaust gas recirculation distribution pipes—To remove**

1. Unscrew the worm drive clip and withdraw the air intake hose from the choke butterfly housing; suitably cover the open choke butterfly housing.

2. Using a ½ in. A/F spanner unscrew and remove the two nuts and washers securing the distribution pipes to the mounting flange (see Fig. U2).

3. Free the joint face and discard the gasket.

4. Support the weight of the distribution pipes.

5. Unscrew and remove the four 2 B.A. setscrews and washers securing the two distribution pipe flanges to the carburettor 'Tee' piece.

6. Withdraw the distribution pipes and discard the gaskets.

**Exhaust gas recirculation distribution pipes—To fit**

Fit the distribution pipes by reversing the procedure given for removal, noting the following points.

1. Ensure that all joint faces are clean and free from carbon deposits.
2. Always fit new gaskets.
3. Coat the joint faces and gaskets at the carburettor 'Tee' piece with 'Wellseal'.
4. Ensure that the cover is removed from the choke butterfly housing before the air intake hose is fitted.

**Exhaust gas recirculation distribution pipes—To clean**

1. Remove the distribution pipes as described in Exhaust gas recirculation distribution pipes — To remove.
2. With a pointed scraper clean as much carbon deposit as possible from inside the distribution pipes and the joint faces. Particular attention should be given to the carburettor end of the pipes, because the majority of the carbon deposit will be found in this area.
3. Using wire brushes complete the cleaning operation on the distribution pipes.
4. With a pointed scraper remove the carbon deposits from the carburettor 'Tee' piece connection orifices.
5. Before fitting the distribution pipes thoroughly blow-out the pipes and carburettor 'Tee' piece connections with compressed air.
6. Fit the distribution pipes as described in Exhaust gas recirculation distribution pipes — To fit.
In order to comply with regulations governing the emission of fuel vapour in the United States of America and Canada, an efficient Fuel Evaporation Emission Control System has been designed and is fitted to cars produced during 1973.

The Fuel Evaporation Emission Control System eliminates direct venting of the fuel tank and carburetters, thus preventing the release of unburnt hydro-carbons into the atmosphere.

Fuel vapours are collected from the fuel tank and carburetters and stored in an activated charcoal canister. The canister is purged whenever the engine is running and the stored fuel vapours are extracted from the charcoal and burnt in the engine.

A diagrammatic illustration of the system can be seen in Figure U7.

The engine compartment components are clearly shown in Figure U8 and the fuel tank components in Figure U11.

**Fuel evaporation loss control canister**

The large centre section of the canister contains the dust-free activated carbon and accommodates nylon filter connectors which connect the canister to the various fuel vapour emission sources on the car (i.e. the carburettor weaker unit, float chamber vent and fuel tank vent).

The function of the activated carbon is to absorb and retain fuel vapour from the carburettor float chambers and fuel tank.

At either end of this section of the canister are thin discs of polyurethane filter.

The lower compartment of the canister is the purge chamber and is connected to the engine induction system via the purge line filter and line restrictor. It is operative whenever the engine is running, and its function is to draw air through the carbon, extracting the fuel vapour for consumption in the engine. The upper section of the canister is open to the atmosphere.

**FIG. U6 FUEL EVAPORATION LOSS CONTROL CANISTER**

1. Weaken connection
2. Polyurethane filter
3. Carbon
4. Float chamber vent connection
5. Fuel tank vent connection
6. Purge line connection
FIG. U7 FUEL EVAPORATION EMISSION CONTROL SYSTEM—GENERAL VIEW

1. Gulp valve pipe
2. Weakener valve
3. Float chamber vent valve
4. Float chamber vent valve
5. Weakener chamber vent valve
6. Float chamber vent valve
7. Fuel trap assembly
8. Relief valve hose
9. Luggage compartment pipe
10. Fuel tank assembly
11. Fuel tank pipe hose
12. Fuel tank line restrictor
13. Fuel vapour line
14. Canister to wing hose
15. Canister to wing hose
16. Evaporation loss control canister
17. Purge line restrictor
18. Anti-run-on solenoid
19. Anti-run-on solenoid
and houses a polyurethane foam filter to ensure that the air drawn through the carbon is clean.

**Polyurethane foam filter element—To renew**

It is not necessary to remove the canister from the car in order to extract the polyurethane foam filter element. A detachable cover is situated in the left-hand valance, adjacent to the blower motor resistances (see Fig. U9).

1. Unscrew the four screws retaining the access cover, lift off the cover and withdraw the filter element from the top of the canister.

When fitting a new filter element, ensure that it is correctly positioned inside the retaining rim of the canister. Fit the access cover and tighten the setscrews.

---

**FIG. U8 FUEL EMISSION CONTROL SYSTEM—ENGINE COMPARTMENT FITTINGS**

1. Purge line restrictor
2. Anti 'run-on' solenoid
3. Weakened unit
4. Bi-metal switch
5. Fuel receiver and float chamber vent valve
6. Weakened cut-off valve
7. Float chamber drain valve
8. Weakened filter
9. Vent from fuel trap
10. Purge line filter
11. Evaporation loss control canister
12. Polyurethane filter
Fuel evaporation loss control canister—To remove

The canister is mounted under the left-hand front wing and is removed as follows.

1. Remove the front left-hand road wheel as described in Chapter R—Wheel—To remove.

   Note  Left-hand front is determined when viewed from the driver’s seat.

2. Position suitable stands under the raised portion of the car as a safety precaution.

3. Remove the front section of the underwing sheet by unscrewing the \( \frac{1}{8} \) in. A/F nut and bolt, and the 16 small screws situated around the sheet.

4. The canister will be clearly visible.

5. Using special pliers (RH 8090), remove the steel retaining clips and detach the four rubber hoses connected to the canister.

6. Inside the engine compartment adjacent to the blower motor resistances (see Fig. U9), locate the six \( \frac{1}{8} \) in. A/F setscrews. Unscrew the lower four setscrews and withdraw the canister from beneath the wing.

Fuel evaporation loss control canister—To fit

Fit the canister by reversing the procedure described for removal, noting the following points.

1. Ensure that the rubber hoses are in a good condition and new hose retaining clips are used.

2. Ensure that the underwing sheet is sealed with Bostik Sealing Compound 771.

Purge line

The purge line consists of a rubber hose, passing from the lowest connection on the canister through the valance junction piece to the gulp air pipe situated between the gulp valve and carburettor ‘Tee’ piece. Incorporated into this hose is the purge line filter and restrictor.

When the engine is running, air drawn through the canister filter and carbon picks up the stored fuel vapours and passes them via the hose, to the induction manifold. The restrictor in the line controls the flow rate at between 50 cu. ft. per hr. and 70 cu. ft. per hr. to maintain carburettor metering accuracy and the paper element line filter is fitted to prevent blockage of the restrictor.

Purge line filter—To remove

1. Using special pliers (RH 8090) remove the two steel retaining clips (if fitted) situated on either side of the unit.

2. Slacken the 2 B.A. setscrew which secures the nylon retaining clip.

3. Withdraw the component from the clip.

Purge line filter—To fit

Fit the purge line filter by reversing the procedure given for removal noting the following points.

1. Ensure that the rubber hoses are in a good condition and new hose retaining clips are used.

Purge flow rate—To check

Check the purge flow rate as follows.

1. Disconnect the hose from the engine side of the purge line filter and insert a flowmeter and stand assembly (RH 8725) in to the line. The flowmeter is a rotameter type capable of measuring 50/70 cu. ft./hr. Pressure drop across the meter is not to exceed 2 in. Hg.

2. Check the flowmeter reading with the engine idling. The flow reading should be between 50 cu. ft./hr. and 70 cu. ft./hr.

3. If the flow is incorrect fit a new restrictor and repeat Operation 2.

4. Remove the flowmeter and reconnect the hose to the purge line filter.
Purge line restrictor—To remove
1. Hold the restrictor firmly and slide the rubber hosing from both ends.

Purge line restrictor—To fit
Fit the restrictor by reversing the procedure given for removal, noting the following point.
1. Ensure that the purge line restrictor is fitted into the line correctly. This can be determined by comparing the diameters of the restrictor ends with those of the rubber hoses.

Weakener line
The weakener line connects the weakener unit with the evaporation loss control canister (see Fig. U8). With the engine running under light throttle opening a depression is created in this line, so allowing air to pass from the canister to the weakener unit.

A filter incorporated in the line prevents blockage of the weakener unit.

During ‘hot soak’ conditions fuel vapour can pass along this pipe from the float chamber to be stored in the carbon filled canister.

Weakener filter—To remove
1. Slacken the worm drive clip which retains the weakener filter to the bracket.
2. Withdraw the filter.

Weakener filter—To fit
Fit the weakener filter by reversing the procedure given for its removal noting the following points.
1. Ensure that the rubber hoses are in good condition.
2. If clips have been fitted previously, ensure that new clips are fitted.
3. Ensure that the inlet pipe for the unit which is off-set from the centre is facing the front of the car and is in its lowest position (see Fig. U8).

Float chamber vent line
The carburettor float chambers are vented to the evaporation loss control canister through the float chamber vent line (see Fig. U8). Incorporated in the line is a non-return valve which maintains a depression in the float chamber during light throttle operation.

FIG. U10 POSITION OF MIXTURE WEAKENING DEVICE FILTER AND PURGE LINE FILTER
1 Connections through valance to the fuel evaporation loss control canister
2 Fuel mixture weakening device filter
3 Purge line filter
4 Alternator

The vent valve cannot be serviced and if its operation is suspect a new vent valve should be fitted.

Float chamber vent valve—To remove
1. Remove the rubber hose connection.
2. Withdraw and discard the retaining split pin.
3. Withdraw the vent valve from the top of the fuel receiver.

Float chamber vent valve—To fit
Fit the vent valve by reversing the procedure given for its removal noting the following points.
1. Ensure that the rubber ‘O’ ring at the top of the fuel receiver is in good condition, renew if the slightest doubt exists.
2. Use a new split pin to retain the vent valve in position.

Fuel receiver
The fuel receiver is situated adjacent to the ignition distributor and coil (see Fig. U23).

The unit should not require removal under normal circumstances. However, should the need arise the ignition distributor, coil and weakener cut-off solenoid valve should all be removed before unscrewing the two ½ in. A/F setscrews which secure the fuel receiver bracket in position.
Fuel tank assembly

The fuel tank assembly consists of the fuel tank, expansion tank and fuel trap assembly (see Fig. U11).

The fuel tank is vented from three positions to a fuel trap assembly which is mounted above the fuel filler. One vent is from the fuel filler neck and the other two vents from the fuel tank.

From the fuel trap, a vent line passes under the floor of the car to the evaporation loss control canister.

---

FIG. U11 FUEL EVAPORATION EMISSION CONTROL SYSTEM—FUEL TANK

1 Fuel trap drain  
2 Connection to evaporation loss control canister  
3 Filler vent neck  
4 Fuel filler box  
5 Combined relief and vacuum valve  
6 Fuel trap drain  
7 Valve vent  
8 Vent pipe  
9 Expansion tank  
10 Vent pipe
Fuel tank

The fuel tank (see Fig. U11) is similar to that fitted to standard cars, except that two vent pipes, 0·375 in. (9·525 mm.) diameter, are rigidly attached to the underside of the fuel tank top plate. The open ends of the vents terminate inside the tank at the front and rear. The outer ends of the two vent pipes terminate adjacent to the fuel filler neck.

A 6·7 U.S. pt. (5·5 Imp. pt., 3,125 litres) capacity expansion tank situated within the main fuel tank inhibits complete filling and provides additional fuel expansion volume to contend with extreme temperature conditions.

When a vehicle is being filled with fuel, automatic cut-off could completely fill the tank leaving only the filler neck, vent connector pipes and fuel trap to accommodate the expansion of the fuel. The expansion tank is situated in the upper part of the fuel tank and as the fuel level rises above the lower part of the expansion tank it flows inside through the two small holes in the base. Two additional holes in the top of the expansion tank allow air to escape.

At normal rates of filling it takes approximately 3 minutes to fill an empty tank whereas it takes approximately 9 minutes for the levels in both the main and expansion tanks to stabilise. After this time the main tank will have transferred 6·7 U.S. pt. (5·5 Imp. pt., 3,125 litres) to the expansion tank leaving the equivalent air space in the main tank for expansion.

Fuel tank—To remove

To remove the fuel tank proceed as described in Section K1—Fuel System (Early cars) noting that Operation 6 should be omitted and Operation 6 as follows should be carried out.

6. Using a pair of special pliers (RH 8090), remove the steel clips from the two rubber hoses situated one on either side of the fuel filler neck. Withdraw the rubber hoses from the pipes.

Fuel tank—To fit

Note Prior to assembly, apply ‘Hylomar’ sealing compound to the fuel tank filler head union and tube assembly. Also spray ‘Hylomar’ on both sides of the fuel tank level unit joint.

Fit the fuel tank by reversing the procedure given for its removal noting the following points.

1. Ensure that the two rubber vent hoses are in good condition.
2. New steel clips should be used to secure the rubber vent hoses to the metal pipes on either side of the filler neck base.

Fuel trap assembly

The fuel trap (see Fig. U11) has a capacity of 4·00 U.S. pt. (3·25 Imp. pt., 1·87 litres).

The fuel trap acts as a liquid separator and prevents liquid fuel from being transferred to the control canister under severe driving manoeuvres when the fuel tank is full or during expansion of the fuel at high ambient temperatures.

The tank vent pipes are fed to the lower ends of the banana-shaped fuel trap. These pipes also serve as drain pipes for any fuel in the trap.

The filler tube is vented into the forward end of the fuel trap.

An outlet pipe is attached to the interior of the fuel trap and the other end is connected via metal and rubber pipes to the evaporation loss control canister.

A combined relief and vacuum valve in the fuel trap prevents any excessive pressure build-up due to vaporisation, or depression as the fuel is consumed, should the vent line to the evaporation loss control canister become blocked.

Fuel trap assembly—To remove

1. Disconnect the battery.
2. Remove the carpet and underlay in the luggage compartment.
3. Remove the tool kit (see Chapter R—Wheels and Tyres, Fig. R10).
4. Remove the fuel filler door release ring.
5. Unscrew the five ‘Phillips’ headed screws from the side carpet; four secure the brackets retaining the tool kit and the fifth is positioned at the front of the side carpet.
6. Release the ‘Tenax’ clip situated adjacent to the rear lamps access point.
7. Remove the side carpet and the carpet covering the fuel filler neck.
8. Using special pliers (RH 8090) remove the steel clips from the rubber hoses. Withdraw the hoses from their respective pipes.
9. Unscrew and remove the three 2 B.A. setscrews securing the fuel trap assembly.
10. Slowly move the fuel trap rearward and downward until the lower end can be turned into the luggage compartment and the assembly withdrawn from the car.
Fuel trap assembly—To fit

Fit the fuel trap assembly by reversing the procedure given for its removal noting the following points.

1. Ensure that the rubber hose connections are in good condition.
2. Ensure that new steel retaining clips are used.

Fuel trap relief and vacuum valve
—To remove

1. Remove the fuel trap assembly as described in Fuel trap assembly—To remove.
2. Unscrew the retaining setscrews, taking care not to lose the washers.
3. Withdraw the relief and vacuum valve.

Fuel trap relief and vacuum valve—To fit

Fit the relief and vacuum valve by reversing the procedure given for its removal, noting the following points.

1. Ensure that the joint faces of the relief and vacuum valve and fuel trap assembly are clean and in good condition.
2. Fit a new gasket.

Fuel evaporation emission control system
—To leak check

To test the fuel evaporation emission control system and pipes (i.e. fuel tank, fuel trap assembly and pipes, etc.) for leaks, proceed as follows.

1. Blank off the lower end of the relief valve hose (see Fig. U8 item 8).
2. Connect an air pressure supply (with a manometer tapping) to the lower end of the fuel trap to boot pipe (item 9) in place of the vent pipe hose (item 12).
3. Using a pressure regulator apply a pressure of 1·5 lb/sq. in. (41 ± 2 in. H₂O) to the system and close the pressure supply.
4. Check manometer after 5 minutes. If the level has fallen by more than 0·5 in. check all joints including petrol level transmitter to tank joint with soap solution.
5. After rectifying any leaks repeat the pressure test. When the system is satisfactory connect the fuel trap to boot pipe (item 9) and the boot to sill pipe (item 11) using the rubber vent pipe hose (item 12).
6. Detach the canister to wing hose (item 15) from the evaporation loss control canister and connect to the test equipment. Repeat Operation 3 to the same acceptance limits.
7. Rectify any leaks and repeat the pressure test. If the system is now satisfactory connect the canister to wing hose (item 15) to the evaporation loss control canister.
Crankcase emissions are controlled by a recirculatory closed breather system (see Fig. U12).

An insulated draught tube connects the crankcase via the oil filler which is fitted with a sealed cap, to the choke housing upstream of both the choke butterfly and the carburetters. A flame trap capsule containing three wire mesh discs is fitted in a housing at the crankcase end of the draught tube. Engine emission (blow-by) is drawn into the induction system via the draught tube, due to the depression in the choke housing.

**Maintenance**

1. The flame trap fitted to the breather pipe should be cleaned in the following manner, at the mileage specified in Section U7.

2. Unscrew the setscrew securing the breather pipe connection to the oil filler pedestal; withdraw the connection from the pedestal (slight resistance may be felt due to the rubber ‘O’ ring connections).

3. Withdraw the connection from the pipe flange.

4. Wash the flame trap assembly in clean petrol, then dry with a high pressure air line. The flame trap assembly shall be dry before refitting.

**FIG. U12 EXPLODED VIEW OF CRANKCASE EMISSION CONTROL PIPE**

**Diagram A**

1. Pipe
2. ‘O’ ring
3. Connection
4. Washer
5. Setscrew
6. ‘O’ ring
7. Adapter

**Diagram B**

1. Pipe
2. Setscrew
3. Washer
4. ‘O’ ring
5. Flame trap
6. Connection
7. ‘O’ ring
assembly consists of either 6 separate gauzes or 3 gauzes crimped together as shown in Figure U12.

5. To clean the adapter fitted to the choke housing, remove the single setscrew from the breather pipe end connection and detach the pipe.

6. Clean the adapter fitted to the choke housing and ensure that the holes in the adapter are clear.

7. Assembly of the flame trap and breather pipe is in the reverse order, ensuring that the 'O' rings are in good condition.
Section U4
EMISSION CONTROL SYSTEMS
(ELECTRICAL COMPONENTS)

The electrical components described in this section would normally appear in Chapter M — Electrical System, however, as they are only used in connection with the emission control systems it is thought more practical to include the information in this Chapter.

The components concerned are as follows.
(i) The exhaust gas recirculation valve cut-in switch.
(ii) The exhaust gas recirculation valve cut-off solenoid.
(iii) The anti 'run-on' solenoid.
(iv) The weakener cut-off solenoid valve.
(v) The weakener cut-off solenoid switch.

Note: The temperatures quoted throughout this section for the various switches are nominal operating temperatures and in service, a plus or minus tolerance of a few degrees may be found.

Exhaust gas recirculation cut-in switch
—To remove

The bi-metal cut-in switch is situated in the engine coolant thermostat outlet elbow (see Fig. U13).
1. Remove the radiator filler cap and drain the engine coolant.
2. Disconnect the electrical lead.
3. Unscrew and remove the three 2 B.A. setscrews, spring washers and plain washers.
4. Free the joint and withdraw the cut-in switch.

Exhaust gas recirculation cut-in switch
—To fit

Fit the cut-in switch by reversing the procedure given for removal, noting the following points.
1. Each setscrew has one spring and one plain washer.
2. The joint faces must be clean and a new gasket fitted.

Exhaust gas recirculation cut-in switch
—To check

1. Disconnect the electrical connection from the switch connection.

2. Connect one side of a test lamp to the switch contact and the other side to a known good electrical supply (i.e. white wire connection on the ballast resistance).

3. Ensure that the engine is cold and switch on the ignition.

4. Check that the test lamp bulb is illuminated.

5. Start and run the engine, as the coolant temperature rises to 14°C. (57°F.) the test lamp bulb should extinguish.

6. Stop the engine and allow to cool, noting that as the coolant temperature drops to 12°C. (54°F.) the test lamp bulb again illuminates.

Note: Do not leave the ignition switched on for long periods of time when the engine is not running.
Exhaust gas recirculation cut-off solenoid
—To remove

The cut-off solenoid is situated on a small platform adjacent to the ‘B’ bank carburetter. The exhaust gas recirculation cut-off solenoid is the solenoid fitted with the vent (i.e. the rearmost of the two solenoids on the platform).

1. Detach the electrical connections, noting the position of the connections to assist identification when assembling.
2. Unscrew the two ‘cheese-headed’ mounting screws and withdraw the solenoid.

Exhaust gas recirculation cut-off solenoid
—To fit

Fit the cut-off solenoid by reversing the procedure given for removal.

Exhaust gas recirculation cut-off solenoid circuit wiring—To check

1. Connect a test lamp across the two Lucas connections to the solenoid.
   
   Note: Do not disconnect the two Lucas connections.

2. Ensure that the engine is cold.
3. Switch on the ignition and start the engine, noting that the bulb of the test lamp is illuminated.
   
   *4. Start and run the engine, as the coolant temperature rises to 14°C. (57°F.) the test lamp bulb should extinguish.

*5. Stop the engine and allow to cool, noting that as the coolant temperature drops to 12°C. (54°F.) the test lamp bulb again illuminates.

   Note: Do not leave the ignition switched on for long periods of time when the engine is not running.

Exhaust gas recirculation cut-off solenoid—To check

1. Detach the solenoid hose at the weaker unit.
2. Clean the end of the hose.
3. Switch on the ignition.
   
   Note: Do not leave the ignition switched on for long periods of time when the engine is not running.
4. Place the hose in the mouth and apply suction.
5. If the operation of the solenoid is correct note that the following conditions apply and connect the hose to the weaker.
   
   (i) With an engine coolant temperature of below 14°C. (57°F.) sucking on the hose should not prompt any movement of the exhaust gas recirculation valve.

   Disconnect the hose from the exhaust gas recirculation valve. Clean the end of the hose, place in the mouth and blow; it should be possible to blow down this hose as the solenoid is vented to atmosphere. Connect the hose to the exhaust gas recirculation valve.

   (ii) With an engine coolant temperature of above 14°C. (57°F.) sucking on the hose from the weaker unit should move the exhaust gas recirculation valve.

   (iii) As the engine coolant temperature falls to 12°C. (54°F.) the conditions described in (i) should again apply.

6. If the operation of the solenoid is suspect, fit a new unit.

Anti ‘run-on’ solenoid—To remove

The anti ‘run-on’ solenoid is situated on a platform adjacent to ‘B’ bank carburetter; it is the foremost of the two solenoids fitted on the platform.

1. Disconnect the rubber hose from either side of the solenoid.
2. Disconnect the two electrical leads at their Lucas connection.
3. Unscrew and remove the two screws situated one on either side of the solenoid body and through the mounting bracket.
4. Withdraw the anti ‘run-on’ solenoid.

Anti ‘run-on’ solenoid—To fit

Fit the anti ‘run-on’ solenoid by reversing the procedure given for removal.

Anti ‘run-on’ solenoid circuit wiring—To check

1. Connect a test lamp across the two Lucas connections to the solenoid.
   
   Note: Do not disconnect the two Lucas connections.

2. Switch on the ignition and check that the test lamp bulb illuminates.
3. Switch off the ignition and check that the test lamp bulb is extinguished.

Anti ‘run-on’ solenoid—To check

1. Detach the hose from the solenoid to the ‘Tee’ piece at the solenoid end and connect a piece of hose of identical internal diameter but of suitable length, to the solenoid.
2. Clean the open end of the hose.
3. Switch on the ignition.
4. Place the hose in the mouth and blow down the hose.
5. If the operation of the solenoid is correct note that the following conditions apply and connect the original hose to the solenoid.
   (i) With the ignition switched on the solenoid is energised and it should be possible to blow down the hose.
   (ii) With the ignition switched off it should not be possible to blow down the hose.
6. If the operation of the solenoid is suspect, fit a new unit.

**Weakener valve cut-off switch—To remove**
1. Disconnect the electrical supply lead.
2. Unscrew and remove the three 2 B.A. setscrews and washers.
3. Free the joint and withdraw the cut-in switch.

**Weakener valve cut-off switch—To fit**
Fit the weakener valve cut-off switch by reversing the procedure given for removal noting the following point.
1. Ensure that the joint faces are clean and that a new gasket is fitted.

**Weakener valve cut-off switch—To check**
1. Disconnect the electrical connection from the switch connection.
2. Connect one side of a test lamp to the switch contact and the other side to a known good electrical supply (i.e., white wire connection on the ballast resistance).
3. Ensure that the engine is cold and switch on the ignition.
4. Check that the test lamp bulb is illuminated.
5. Start the engine and warm-up; as the air intake temperature reached between 12°C and 16°C (54°F and 61°F) the test lamp bulb should extinguish.

**Weakener cut-off solenoid valve—To remove**
The weakener cut-off valve is situated on a bracket adjacent to the ignition coil.

1. Detach the rubber hose from either side of the weakener cut-off valve.
2. Disconnect the two electrical leads at their respective Lucas connections.
3. Unscrew and remove the two 2 B.A. screws, nuts and washers securing the weakener cut-off valve in position. Remove the valve.

**Weakener cut-off solenoid valve—To fit**
Fit the weakener cut-off valve by reversing the procedure given for removal.

**Weakener cut-off solenoid valve circuit wiring—To check**
1. Connect a test lamp across the two Lucas connections to the solenoid.

   **Note** Do not disconnect the two Lucas connections.
2. Ensure that the engine is cold.
3. Switch on the ignition and start the engine, noting that the bulb of the test lamp is illuminated.
4. When the air intake temperature has reached between 12°C and 16°C (54°F and 61°F) the test lamp bulb should extinguish.

**Weakener cut-off solenoid valve—To check**
1. Detach the hose to the weakener cut-off solenoid valve from the 'Tee' piece adjacent to the anti 'run-on' solenoid.
2. Clean the end of the hose.
3. Switch on the ignition.
4. Blow down the hose.
5. If the operation of the solenoid valve is correct note that the following conditions apply and connect the hose to the 'Tee' piece.
   (i) With the engine air intake temperature below 12°C to 16°C (54°F and 61°F), it should be possible to blow down the hose.
   (ii) With the engine air intake temperature above 12°C to 16°C (54°F and 61°F), it should not be possible to blow down the hose.
6. If the operation of the solenoid is suspect, fit a new unit.
Section U5
THE CARBURETTERS
AND AUTOMATIC CHOKE SYSTEM

CARBURETTER

Data

Carburetters . . . . Two S.U. HD8 diaphragm type
Choke size . . . . . . 2·00 in. (5·08 cm.)
Jet size—
  spring loaded needle type . . . . . . 0·100 in. (2·44 mm.)
Jet needle—
  spring loaded type . . BBS
Carburettor—
  air valve piston spring Red/Blue

Description

Two S.U. HD8 diaphragm carburetters with 2·00 in. (5·08 cm.) choke bores are fitted to the engine on a central 'Tee' piece which is mounted over an eight branch induction manifold (see Fig. U15).

This type of carburettor automatically adjusts both its choke and jet area to meet the demand of the engine which is dependent on engine speed and loading. As air is drawn through the carburettor, the piston acting as an obstruction will cause a depression to be formed in the area between the throttle and the piston. This depression is communicated by means of transfer holes in the base of the piston to the area above the piston, causing an upward force to be imposed on the piston. The piston will rise in response to this force relieving the depression in the area between the piston and the throttle as it does so until a point is reached where the force acting on the piston is balanced by the weight of the piston and the load exerted by the piston spring.

A spring-loaded jet needle is fitted to the carburettors, which is biased downstream and operates in a reduced diameter main jet; this jet does not require centralising.

The carburettor is fitted with a synthetic rubber diaphragm which is clamped in position by the jet and jet return spring cup. The diaphragm is in turn secured at its outer edge between the diaphragm housing and the main jet well. The carburettor is fitted with a nylon block in the jet well and a nylon feed tube from the float chamber to prevent vaporisation of the fuel. This assembly is known as the anti-boiling device.

The jet is fed through its lower end from the main jet well, its movement being controlled by the jet return spring and the jet adjusting screw which actuates a rocking lever. This lever raises or lowers the jet as required and so controls the mixture. Turning the adjusting screw clockwise (inwards) lowers the jet and enriches the mixture; turning the screw anti-clockwise (outwards) weakens the mixture.

The carburetters are balanced by adjustable volume screws which control the mixture output of the carburetters relative to each other under idling conditions.

Slow running speed is adjusted by means of the throttle stop screw, and is finally carried out after the carburetters have been tuned. The throttle stop screw is locked into position by a lock-nut.
CARBURETTER MIXTURE WEAKENING DEVICE

Introduction

An engine normally requires a richer mixture when running at full load than it does under cruising conditions. Normally the S.U. carburetters achieve this automatically due to the pulsating nature of the air flow at full load as compared with the steady flow when cruising with the throttles partly shut. This effect, known as mixture ratio spread, is also contrived by the design of the air intake and induction passages.

However, for optimum exhaust emission control a greater mixture ratio spread than can be met by the above factors is required. Therefore a weakening device is fitted.

Description

The rate of fuel discharge from the main jet is governed by the difference in air pressure between that existing over the fuel in the float chamber and that over the main jet.

The weakening device is fitted directly to the 'B' bank carburettor (see Fig. U17).

The weakening device is designed to reduce the air pressure (i.e. to create a depression) in the float chamber when the throttle is partly closed, thereby

---

**FIG. U14 CARBURETTER WEAKENING DEVICE**

1 'A' bank carburettter
2 Float chamber pressure tapping
3 Weakening device
4 Bi-metal switch
5 Float chamber vent valve
6 Weakening device cut-off solenoid
7 Float chamber drain valve
8 Fuel receiver
9 Anti 'run-on' solenoid
10 Bleed orifice
11 Venturi
12 Adjustment screw (set during initial assembly)
reducing the rate of fuel discharge from the jet. The lid is otherwise sealed by a gasket between the lid and the bowl.

The weakening device consists of a housing containing a venturi at one end which is pressed into a drilling in the carburettor body close to the edge of the throttle butterfly. The other end contains a pre-set air bleed and is connected to the weakener filter by means of a flexible hose. The central passage communicates via pipes with the float chambers.

To obtain adequate float chamber venting to cope with hot soak conditions there is an additional vent from the float chambers. This vent incorporates a low pressure non-return valve to maintain a float chamber depression under normal operating conditions.

A petrol spill pipe incorporating a relief valve is fitted to the pressure balance pipe to provide an outlet for excess petrol in the unlikely event of a float chamber needle sticking.

**Operation idling**

With the throttle in the normal idling position, the drilling in the carburettor body emerges upstream of the throttle butterfly and is only subjected to the slight depression exerted in that condition. This produces a small flow of air through the venturi but the effect on float chamber air pressure is small.

**Full throttle**

As with the idling position, the depression produced is slight and will have a negligible effect on air pressure in the float chamber. This small difference is compensated for in the design of the jet needle.

**Cruising**

With the throttle partly open, the weakenor drilling is on the engine side of the throttle butterfly and the high manifold depression causes air to be drawn through the venturi. The size of the venturi is chosen so that the velocity will reach a maximum value which remains substantially constant once a pre-determined manifold depression figure has been reached.

The air bleed orifice controls the flow of air into the weakenor and therefore the float chamber depression. The actual value of the float chamber depression reaches a maximum at the same time as the air velocity attains its maximum value.

**Low temperatures**

To improve engine starting when the engine temperature is below 16°C (60°F.), a bi-metal switch activates a solenoid valve which vents the float chamber to atmosphere via the evaporation loss control canister and renders the weakenor inoperative.

**Hot idle mixture compensator valve**

At high ambient temperatures the idle quality deteriorates after prolonged periods of idling unless a mixture compensator valve is fitted. The compensator assembly incorporates a bi-metallic valve which meters a small quantity of air, controlled by the inlet air temperature, to a point in the induction system down stream of the carburettor throttle valves. This has the dual effect of weakening the mixture and increasing the mass flow, thereby raising the idle speed slightly, and restoring normal idle speed.

The unit is integral with the choke housing.

**Hot air intake**

Air is drawn into the hot air intake from over the exhaust manifold and is then passed through the air silencer/filter. This permits the use of leaner mixtures under normal operating conditions together with a quickly opening automatic choke. The hose which connects the intake to air filter/silencer is shown in Figures U1 and U2.

**OVERHAUL**

**Carburetters—To remove**

Before commencing to remove the carburetters observe the following points.

1. When disconnecting the various hoses, pipes and wiring connections ensure that they are suitably labelled to assist identification when assembling.

2. Ensure that all open ends of pipes, hoses, etc. are suitably blanked off to prevent the ingress of dirt, etc.

**To remove the carburetters proceed as follows.**

1. Disconnect the battery.

2. Unscrew and remove the two 3/8 in. A/F nuts and washers securing the exhaust gas recirculation valve distribution pipes to the exhaust gas recirculation mounting flange. Free the joint faces.
3. Detach the rubber hose from the exhaust gas recirculation cut-off solenoid vent.

4. Unscrew the worm drive clip retaining the exhaust gas recirculation valve to the 'A' bank carburettor air horn. Slide the clip from the exhaust gas recirculation valve mounting.

5. Detach the electrical connection from the weaken cut-off bi-metal thermostat switch.

6. Remove the crankcase breather pipe from the choke butterfly housing; withdraw the housing from the end of the pipe.

7. Disconnect the choke stove pipe from the choke butterfly housing.

8. Unscrew and remove the two \( \frac{3}{4} \) in. A/F set-screws securing the support bracket for the air intake hose; collect the two washers and distance pieces.

9. Disconnect the air intake hose and elbow from the air silencer and butterfly housing; remove the hose and elbow together with the bonding cable earth strip.

10. Move the spring clip from the choke solenoid cover and disconnect the wires.

---

**FIG. U15 VIEW OF CARBURETTERS**

1. Throttle damper
2. Distribution pipes (Exhaust gas recirculation)
3. Fixed throttle stop screw
4. Vacuum retard tap
5. Fast-idle linkage
6. Bi-metal switch (Weaken system)
7. Choke solenoid
8. Fuel receiver and float chamber vent valve
9. Choke stove pipe
10. Bi-metal coil housing
11. Cut-off solenoid (Exhaust gas recirculation)
12. Solenoid vent
13. Anti 'run-on' solenoid
14. Weakening device
15. Volume screw
16. Throttle stop vacuum actuator
17. Air injection pipe
18. Worm drive clip — correctly positioned to avoid possible foul with air intake hose
19. 'A' bank butterfly lever
20. Jet adjusting screw
21. Bi-metal switch (Exhaust gas recirculation)
22. Piston lift pin
11. Remove the engine oil dipstick.
12. Unscrew and remove the 2 B.A. bolt, nut and washer securing the throttle linkage to the 'fore and aft' manifold shaft level; this connection is adjacent to the 'A' bank carburettet.
13. Withdraw the throttle linkage from the manifold shaft lever.
14. Disconnect the main fuel feed pipe.
15. Remove the three screws securing the small end cover to the bi-metal coil cover, withdraw the cover along the choke stove pipe to reveal the pipe connection. Disconnect the choke stove pipe.
16. Disconnect the hoses from the carburettet weakening device.
17. Disconnect the hoses from the float chamber vents.
18. Disconnect the hose from the anti run-on solenoid to the vent canister pipe.
19. Disconnect the two hoses connected to the gulp valve to carburettet ‘Tee’ piece pipe.
20. Disconnect the throttle stop vacuum actuator hose.
21. Remove the setscrew securing the throttle stop vacuum actuator bracket and the gulp valve to carburettet ‘Tee’ piece pipe. Unscrew and remove the top two ½ in. A/F nuts and washers from ‘B’ bank carburettet and withdraw the throttle stop vacuum actuator and bracket.
22. Remove the pipe fitted between the gulp valve and carburettet ‘Tee’ piece.
23. Disconnect the electrical connections from the two solenoid valves mounted on and bracket attached to ‘B’ bank carburettet.
24. Disconnect the vacuum retard rubber pipe from the distributor.
25. Separate the rubber hose from either side of the vacuum retard tap.
26. Remove the air horns, choke butterfly housing, carburettets and ‘Tee’ piece as one complete assembly. The assembly is secured to the induction manifold by a ½ in. A/F setscrew situated centrally on the carburettet ‘Tee’ piece and located by two dowel pins.

**Dismantle the carburettets from the ‘Tee’ piece and air horns as follows:**

27. Unscrew the four setscrews retaining the exhaust gas recirculation distribution pipes in position on the carburettet ‘Tee’ piece. Withdraw the pipes and gaskets.
28. Slacken the pinch bolt and remove the fast-idle lever from the ‘A’ bank carburettet butterfly spindle (see Chapter K).

29. Unscrew and remove the two ½ in. A/F nuts from the two setscrews securing the air horns to 'B' bank carburettet. Withdraw the solenoid mounting bracket.
30. Remove the four setscrews securing the two air horns to the carburettets, collect the full throttle stop bracket from 'A' bank carburettet.
31. Unscrew and remove the two 2 B.A. setscrews and washers securing the vacuum retard tap in position.
32. Remove the air horns.
33. Disconnect the petrol feed pipe from the float chambers.
34. Disconnect the carburettet spill pipe from each carburettet float chamber.
35. Remove the float chamber lids and floats, keeping them to their respective carburettet.
36. Remove the nut securing the throttle damper to its bracket; remove the damper.
37. Remove the throttle spring.
38. Completely remove the two pinch bolts securing the throttle levers to the ‘A’ and ‘B’ bank carburettet butterfly spindles; remove the levers.
39. Remove the nuts and washers securing both carburettets to the ‘Tee’ piece, remove the carburettets, together with the throttle damper bracket adjacent to ‘A’ bank carburettet.

**Carburettets—To fit**

Fit the carburettets by reversing the procedure given for their removal noting the following points.

1. Fit new gaskets and washers to all joints.
2. Examine the floats for damage or punctures; fit the floats to their respective float chamber.
3. Renew the lid gaskets.
4. Fit the gaskets to the lids then fit the lids to the chambers.
5. Secure the lids and pipes to the float chambers.
6. Examine the paper filter elements for cleanliness and damage; renew if necessary.
7. Ensure that the ‘O’ ring on the petrol inlet unions are in good condition; renew if necessary. Fit the paper filter elements, spring retainers, springs and inlet unions to each float chamber lid. Secure the inlet unions with the retaining screws.
8. Fill the damper piston with an approved oil; the oil level should be approximately 0.5 in. (12.7 mm.) below the top of the piston rod. Do not overfill.
9. Check that the gap between the throttle stop vacuum actuator and the vacuum throttle stop screw is 0.070 in. (1.78 mm.).
FIG. U16 'A' BANK CARBURETTER

1 Piston spring
2 Suction chamber
3 Damper
4 Butterfly valve
5 Pressure tapping piece
6 Volume screw
7 Piston
8 Needle locking screw
9 Needle spring
10 Needle guide
11 Needle
12 Spring
13 Seal
14 Overflow pipe
15 Spindle
16 Fibre washer
17 End cap
18 Sealing gland
19 Piston lift pin spring
20 Carburettor body
21 Filter retainer spring
22 Filter element retainer
23 Filter element
24 Float chamber cover
25 Float needle housing
26 Float needle
27 'O' ring
28 Float chamber cover adapter
29 Adapter elbow
30 Adapter screw
31 Bearing
32 Piston lift pin
33 Jet bearing
34 Jet locking nut
35 Jet housing
36 Hinge pin
37 Lever
38 Float
39 Jet diaphragm and jet assembly
40 Jet adjusting screw
41 Lock-nut
42 Anti boiling device
43 Jet spring
44 Float chamber

U28
Carburetters—To dismantle

1. Thoroughly clean the outside of the carburetters.

**Important**

Certain special parts are used for exhaust emission control carburetters and in some cases they differ from parts used for standard carburetters only in their dimensional tolerances, therefore when renewing parts ensure that the correct replacements are fitted (see Parts List T.S.D. 2201).

Parts from the two carburetters should not be interchanged. To prevent this, the parts as they are removed from each carburettor, should be placed in two boxes, one marked 'A' bank and the other 'B' bank.

2. Unscrew and remove the two weaker unit retaining screws; withdraw the weaker unit.

3. Unscrew and remove the damper and washer.

4. Remove the suction chamber retaining screws and remove the chamber without tilting it.

5. Remove the piston spring.

6. Carefully lift out the piston and needle assembly. Empty the damper oil from the piston rod.

7. Remove the needle guide locking screw from the piston then withdraw the needle assembly taking care not to bend the needle.

8. Withdraw the needle guide from the needle and remove the spring.

**Note** The flanged collar pressed onto the jet needle is pre-set at the factory and must not be disturbed.

9. Mark the relative position of the float chamber, jet housing and carburettor body. Unscrew the float chamber screws, holding the float chamber against the pressure of the jet spring. Carefully detach the float chamber (see Fig. K13 in Chapter K).

10. Lift off the jet housing. Withdraw the jet assembly and jet spring.

11. Using a ring spanner remove the jet locking nut together with the jet bearing and lock-washer; discard the lock-washer.

**Note** Lock-washers are not fitted to carburetters with a spring loaded needle.

12. Unscrew the two screws securing the fuel inlet union to the float chamber lid. Withdraw the union together with the spring, spring retainer and paper filter element.

13. Push out the float lever hinge pin from the end opposite to the serrations. Detach the lever.

14. Extract the float needle from its seating and unscrew the seating from the lid using a box spanner. Do not distort the seating.

15. Invert the chamber to remove the float.

16. Close the throttle and mark the relative positions of the throttle butterfly valve and the carburettor flange.

17. Slacken and remove the butterfly valve from its slot in the throttle spindle. The butterfly valve is oval and will jam if care is not taken.

18. Slide out the spindle from its bearing.

19. Remove the two rubber seals from the throttle spindle bore.

20. Unscrew and remove the slow-running valve complete with spring, seal and brass washer.

21. Remove the two screws and washers retaining the vacuum weekener unit, withdraw the unit and gasket.

22. Remove the piston lifting pin by extracting the circlip from its groove with the pin pressed upwards.

23. Withdraw the pin downwards.
7. Using tool RH 8383 fit the seals to each end of the shaft. Ensure that the concave end of the seals enters the bores first.

8. Examine the slow-running valve seal for serviceability.

9. Check that the concave face of the brass washer is towards the seal.

10. Fit the valve assembly.

11. Fit the piston lifting pin, spring, rubber washer, plain washer and circlip.

12. Examine the float needle and seating for damage or wear.

13. Screw the seating into the float chamber lid but do not overtighten.

14. Fit the needle to the seating, coned end first. Using light finger pressure to hold the needle against its seating, test the assembly for leaks with an air pressure line. The pressure should be approximately 5 lb/sq. in. (0,35 kg/sq. cm.).

15. Fit the float chamber lid lever and the hinge pin.

16. Check the float level.

With the needle on its seating, insert a 0.438 in. (11.11 mm.) diameter bar between the forked lever and the lip of the float chamber lid. The prongs of the lever should just rest on the bar (see Chapter K). If they do not, carefully bend the lever at the start of the pronged section until the correct setting is obtained.

17. Examine the piston rod and the outside surface of the piston for damage.

18. The piston assembly must be scrupulously clean. Use petrol or methylated spirits as a cleaning agent; do not use abrasives.

19. Clean inside the suction chamber and piston rod guide.

20. Fit the damper assembly and washer. Seal the transfer holes in the piston assembly with rubber plugs and fit the assembly to the suction chamber. Invert the complete assembly and check the time it takes for the suction chamber to fall away from the piston (see Chapter K). This should be between 5 and 7 seconds. Remove the plugs, damper assembly and washer.

21. Fit the jet bearing and lock-nut; tighten the lock-nut.

22. Fit the jet housing, jet, jet spring and float chamber complete with anti-boiling device ensuring that the jet and diaphragm are kept in the correct relationship to the body and that the raised edge of the diaphragm is located in the housing groove.
23. Before tightening the four screws securing the float chamber, ensure that the chamber is pushed towards the inlet flange of the carburettor. This is very important to prevent a foul with the throttle controls (see Chapter K Fig. 21, diagram C); tighten the screws.

24. Check that the jet is not sticking in the guide. This can be carried out by moving the jet lever up and down.

25. Set the jet flush with the bridge of the carburettor and then turn the jet screw clockwise 2½ turns.

26. Fit the spring onto the needle collar ensuring that the spring locates in the groove.

27. Fit the guide onto the needle so that the end with the indentation is towards the flange on the collar.

28. Fit the needle assembly and guide into the piston. The lower face of the guide must be flush with the face of the piston (for guidance refer to Fig. K17 in Chapter K) and the mark on the guide must be adjacent to the point mid-way between the two cutouts in the piston (see Fig. U18).

29. Fit and tighten a new guide locking screw to the piston.

30. Check that the piston key is secure in the carburettor body.

31. Fit the piston assembly to the carburettor body carefully guiding the needle into the jet.

32. Fit the piston spring over the piston rod.

33. Fit the suction chamber taking care not to 'wind-up' the piston spring; fit and tighten the suction chamber retaining screws.

34. Fit the piston damper and washer.

**Fuel drain pipe—To fit**

Fit the pipe by reversing the procedure given for its removal.

**Carburetters—To set**

The carburetters fitted to these cars are adjusted at the factory using special equipment to ensure that their settings comply with the current emission control regulations.

Under normal circumstances the carburetters should not require adjustment in service.

If however, adjustment is found necessary due to inadvertant disturbance or replacement of a component, proceed as follows.

Having set the mechanical adjustments to the automatic choke (see Page U36 Automatic Choke—To set), set the carburetters by carrying out the following operations in the sequence given.

A. Synchronise throttles and temporarily set engine idle speed.

B. Set full throttle stop.

C. Check linkage clearances.

D. Tune carburetters.

E. Set cold start 'fast-idle' (see Page U36—Cold start 'fast-idle'—To set).

F. Set the throttle damper plunger.

G. Set the kick-down micro switch.

**Throttle synchronisation**

Refer to Chapter K, Section K4.

Ensure that when the throttles are synchronised the eccentric adjuster is in the upper mid-way position, this will allow for adjustment of the eccentric in either direction at a later stage of setting the carburetters.

**Full throttle stop**

1. Adjust the full throttle stop screw so that it measures 0.350 in. (8.89 mm.) from the boss face (see Chapter K, Fig. K21, diagram A).
**CARBURETTER TUNING**

**Preliminary checks**

Before tuning the carburetters the following checks should be carried out.

1. Ensure that the vehicle is in Neutral and that the gear range actuator thermal cut-off has been removed from the main fusebox.
2. Check the condition of the spark plugs.
3. Check the condition of the distributor contact breaker points.
4. Check the ignition timing (see Section U6).
5. Check the flow through the choke stave pipe (see Automatic choke stave pipe—To check).
6. Check the entire induction system for air leaks.
7. Check the purge line flow rate (see Section U2).
8. Ensure that the air conditioning system is switched off.
9. Start the engine and warm up; allow to run for at least 5 minutes after the thermostat has opened.
10. Stop the engine, ensure that the choke butterfly valve is fully open and the choke ‘fast-idle’ off.
11. Connect an electric impulse tachometer in accordance with manufacturer’s instructions.
12. Check the float chamber depression. (see Float chamber depression—To check).
13. Check the exhaust gas recirculation signal strength. (see Exhaust gas recirculation signal strength—To check).

**Tuning procedure**

1. Disconnect the distributor vacuum pipe from the vacuum retard tap and blank off the connection on the tap. Remove the air intake hose and blank off the hot idle compensator feed drilling (see Fig. U19); replace the hose.
2. Disconnect the solenoid to exhaust gas recirculation valve hose at the valve and blank off the hose. Remove the air hoses from the check valves and fit blanks over the valves. (Suitable blanks may be produced from a short length of rubber hose with one end plugged).
3. Note Disconnecting air hoses from the check valves makes the air injection system inoperative. The valves must be blanked off to prevent air being drawn into the exhaust ports by pulsations in the exhaust system since this would affect the idle C.O. reading.
4. Remove the pressure tapping cap from ‘B’ bank carburetter float chamber to vent the float chambers to atmosphere.
5. Top-up both carburetter dampers with approved oil. The oil level should be approximately 0.5 in. (12.7 mm.) below the top of the piston rod.
6. Set the engine idle speed to 600 r.p.m. by means of the fixed throttle stop screw.
5. Balance the air flow through the carburetters by adjusting the eccentric pivot pin until the hiss from the small drilling in the neck of each suction chamber is of equal intensity.

6. The engine must be run for at least 25 mins. after the thermostat has opened.

7. To set 'A' bank carburettor mixture strength, remove the blanking plug (see Fig. U20, item 2) from 'A' bank air injection manifold. Fit adapter RH 8621 and connect to the C.O. meter.

8. Purge the engine at 2,000 r.p.m. in neutral for \( \frac{1}{2} \) minute. Check the engine idle speed and set to 600 r.p.m. if necessary by adjusting the fixed throttle stop screw.

9. Slacken the jet adjusting screw lock-nut on 'A' bank carburettor using spanner RH 8050 and set the C.O. meter reading to between 5-0% and 5-5% by setting the jet adjusting screw on 'A' bank carburettor. Tighten the lock-nut. (Turning screw clockwise richens mixture).

   Disconnect the C.O. meter, remove adapter RH 8621 and replace the blanking plug.

10. To set 'B' bank carburettor mixture strength remove the blanking plug (see Fig. U20, item 1) from 'A' bank air injection manifold. Fit adapter RH 8621 and connect to C.O. meter.

11. Purge the engine at 2,000 r.p.m. in neutral for \( \frac{1}{2} \) minute. Check the engine idle speed and set to 600 r.p.m. if necessary by adjusting the fixed throttle stop screw.

12. Slacken the jet adjusting screw lock-nut on 'B' bank carburettor using spanner RH 8050 and set the C.O. meter reading to between 5-0% and 5-5% by setting the jet adjusting screw on 'B' bank carburettor. Tighten the lock-nut. (Turning screw clockwise richens mixture).

   Disconnect the C.O. meter, remove the adapter RH 8621 and replace the blanking plug.

13. Again check the mixture balance by raising each piston lift pin in turn. If the mixture balance is correct, engine response for each carburettor piston lift will be the same. If response is not the same repeat Operations 4 to 13.

14. Fit probe of a C.O. meter into exhaust pipe in accordance with the manufacturer's instructions. (The Horiba Mexa 200 C.O. meter is suitable).

15. Idle the engine until a steady C.O. reading is obtained (minimum \( \frac{1}{2} \) minute). A correct reading is 5-0% to 5-5%. If the C.O. reading is not correct, slacken both jet adjusting screw lock-nuts with spanner RH 8050. Turn both jet adjusting screws by equal amounts in the same direction (up to a maximum of \( \frac{1}{4} \) turn) until a C.O. meter reading of between 5-0% and 5-5% is obtained. Tighten the lock-nuts (turning screws clockwise richens mixture).

16. Fit the pressure tapping cap to 'B' bank carburettor float chamber cover, remove the blanks from the air hoses and reconnect to check valves, remove the blank from solenoid to exhaust gas recirculation valve hose and connect to the exhaust gas recirculation valve.

17. Set the engine idle speed to 680 r.p.m. by adjusting the fixed throttle stop screw, tighten the lock-nut.

18. Connect the hose to the vacuum retard tap.

19. Check the idle speed and set if necessary to 600 r.p.m. by adjusting the vacuum actuator throttle stop screw.

20. Remove the air intake hose; remove the blank from the hot idle compensator feed drilling and fit the air intake hose.

**Note** The tuning operation should be carried out in the shortest possible time. If the time exceeds 3 minutes run engine at 2,000 r.p.m. in neutral for \( \frac{1}{2} \) minute and then resume tuning. Repeat
3. Slacken both nuts securing the throttle damper to its bracket. Back off the nuts until they are well clear of the bracket.

4. Press the damper towards the 'A' bank throttle lever until the damper is fully compressed and the lever is just clear of the throttle stop screw.

5. Screw the lower securing nut until it is 0.025 in. (0.63 mm.) clear of the underside of the bracket. Release the damper and tighten the upper securing nut.

6. Ensure that the damper spindle is resting on the centre of the throttle lever pad.

* Kick-down micro-switch—To set

1. Swing the micro-switch towards the base of the plunger until a 0.010 in. to 0.030 in. (0.254 mm. to 0.762 mm.) gap exists between the micro-switch button and the plunger.

2. Tighten the micro-switch securing nuts and afterwards, check that the gap set in Operation 1 has not been disturbed.

3. Slowly depress the plunger to obtain full stroke. Check that the switch operates (audible click) during this operation.

4. Ensure that with the main plunger fully depressed it is still clear of the micro-switch case (see Fig. U22).

5. Slowly release the plunger ensuring that the micro-switch contacts open (audible click).

6. Ensure that the clearance set between the plunger and the micro-switch button, remains as set in Operation 1.

Mixture weakening device fittings

—To remove

1. Disconnect and remove all hoses fitted to the weakening device, weaker filter, weaker cut-off valve, fuel receiver, float chambers, float chamber vent valve and float chamber drain valve. As each hose is disconnected the open end of the unit should be blanked off and the hose labelled for identification.

2. Remove the float chamber vent valve by removing the retaining split pin and withdraw the valve from the top of the fuel receiver, note the rubber sealing ring around the top of the fuel receiver.

21. Stop the engine and fit the gear range actuator thermal cut-out to the main fusebox.

Throttle damper plunger—To set

1. Move the cold start 'fast-idle' to its off position.

2. Move the 'A' bank throttle stop to its closed throttle position.
3. Remove the float chamber drain valve by unscrewing the nut and withdrawing the bolt from the engine mounting foot. Withdraw the valve.

4. Remove the weaken cut-off valve by unscrewing the two securing screws and nuts, one situated above and one below the valve. Disconnect the two electrical connections.

5. The fuel receiver (see Fig. U23) should not under normal circumstances require removal, however, if the necessity arises proceed by removing the ignition distributor and coil; collect the distance pieces as the coil is withdrawn. Remove the weaken cut-off valve as described previously. Unscrew and remove the two bracket retaining setscrews. Withdraw the bracket and fuel receiver.

6. Remove the weakener cut-off valve temperature switch situated in the butterfly housing by disconnecting the electrical connection and unscrewing the three retaining screws. Withdraw the unit.

The units referred to in Operations 2 to 6 inclusive must not be dismantled; if any have suspect or faulty operation the unit must be discarded and a new one fitted.

7. Remove the mixture weakening device from 'B' bank carburettor by unscrewing the ½ in. A/F connection from the weakening device; unscrew the two retaining screws and withdraw the unit.

8. Remove the weakener filter by slackening the worm drive clip which retains the filter to the bracket; withdraw the filter.

9. Before removing the purge line filter remove the two steel retaining clips situated one on either side of the unit with the special pliers (RH 8090). Slacken the 2 B.A. setscrew which secures the retaining clip. Withdraw the filter from the clip.

Note The filter units are sealed and no attempt should be made to clean the elements.

**Mixture weakening device fittings—To fit**

Fit the weakening device fittings by reversing the procedure given for removal, noting the following points.

**FIG. U23 FUEL RECEIVER AND DRAIN LINE**

1. Float chamber vent valve
2. Fuel receiver
3. Drain line
4. Float chamber drain valve

1. Ensure that all hoses and pipes are in a good condition and not obstructed.
2. Renew all sealing washers and gaskets.
3. Renew all steel clips (where fitted).
4. It is essential that when fitting the weaken filter the inlet pipe which is off-set from the centre is facing the front of the car and is in its lowest position.

**Hot air scoop—To remove**

1. Slacken the worm drive clip securing the rubber hose to the hot air scoop.
2. Remove the two wing nuts securing the scoop to the body; remove the scoop.
6. If the manometer level difference is less than 16 in. (40,64 cm.), remove and examine the choke stove pipes and choke stove assembly for any obstructions or blockage.

7. After removing the blockage, fit the components and repeat operations 1 to 5 inclusive; again check the manometer reading.

8. Remove the manometer and connect the air intake hose to the butterfly housing.

**AUTOMATIC CHOKE—TO SET**

### Adjustment to kick diaphragm
Refer to Chapter K, Section K4.

### Adjustment of the kick-gap
Refer to Chapter K, Section K4.

### Solenoid air gap
Refer to Chapter K, Section K4.

### Solenoid lever spring tension
Refer to Chapter K, Section K4.

### 'Fast-idle' cam and vacuum retard tap
Refer to Chapter K, Section K4.

### Thermocoil
Refer to Chapter K, Section K4.

### Cold start ‘fast-idle’—To set

1. Stop the engine and disconnect the solenoid to exhaust gas recirculation valve hose at the valve end. Blank the hose, remove the pressure tapping cap to vent the float chambers; open the throttles and close the choke butterfly against the bi-metal coil tension by means of the butterfly link lever, release throttles. The fast-idle adjusting screw will now be resting on the high step of the fast-idle cam and the throttles are in the cold start position.

2. Start the engine, slacken the lock-nut and turn the adjusting screw to obtain 2,000 r.p.m.

3. Tighten the lock-nut and check the fast-idle speed. If correct open the throttles to release fast-idle cam mechanism.

4. Remove the blank from the solenoid to the exhaust gas recirculation valve hose and connect the hose to the exhaust gas recirculation valve. Fit the tapping cap to 'A' bank carburettor float chamber cover.
Exhaust gas recirculation signal strength—To check

1. Remove the pressure tapping cap from ‘A’ bank carburettor to vent the float chambers.

2. Disconnect at the signal block the exhaust gas recirculation cut-out solenoid hose. Connect a vacuum gauge (0 to 10 in. Hg) to the signal line tube.

3. Run the engine at a steady 2 000 r.p.m. and check that the exhaust gas recirculation signal strength is between 2·0 in. Hg and 5·5 in. Hg.

A low or zero reading may be caused by an air leak at the signal block joint.

4. Disconnect the vacuum gauge and connect the hose to the signal tube.

5. Disconnect the solenoid to the exhaust gas recirculation valve hose at the valve and connect a hose to the vacuum gauge (0 to 10 in. Hg).

6. Run the engine at 2 000 r.p.m. and check that the signal strength is between 2·0 in. Hg and 5·5 in. Hg.

A low or zero reading may be caused by:

a. Blockage in the hose from the signal tube to the cut-out solenoid.

b. Blockage in the hose between the cut-out solenoid and valve.

c. Air leak at the signal block joint face or hose connections.

d. Low engine temperature (below 14°C. (57°F.)), a faulty exhaust gas recirculation cut-out solenoid or cut-in switch (in thermostat outlet).

7. Disconnect the vacuum gauge and connect the hose to the exhaust gas recirculation valve.

8. Check the operation of the valve by running the engine at 2 000 r.p.m. ensuring that the valve opens by observing the movement of the diaphragm.

A low zero reading may be caused by:—

a. A blockage in the weakener venturi.

b. Incorrect purge flow rate (less than 50 cu. ft./hr.).

A high reading may be caused by:—

a. An obstruction in the weakener bleed orifice or hoses.

b. Fouled weakener filter or evaporation loss control canister filter.

c. Incorrect connection of weakener hose to valance connection or to evaporation loss control canister.

d. Incorrect purge flow rate (greater than 70 cu. ft./hr.).

e. Evaporation loss control canister obstructed.

f. Incorrect operation of anti run-on solenoid.

4. If the float chamber depression is still incorrect after carrying out all the above checks turn the adjusting screw on the weakening device until the correct reading of between 2·0 in. and 2·25 in. of water is obtained. Turning the screw clockwise increases the depression.

Note The screw is locked with ‘Casco’ on assembly and if adjusted must again be locked by applying ‘Casco’ to the threads.

5. Connect the weakener to vent canister hose at the weakener and remove the cap from the pressure tapping on ‘A’ bank carburettor and connect manometer measuring between 0 in. and 6 in. of water.

6. Run the engine at 2 500 r.p.m. in neutral until a steady reading of between 2·0 in. and 2·25 in. of water is obtained on the manometer.

A low or zero reading may be caused by:—

a. A blockage in the hose from the weakener to vent canister.

b. A blockage in the hoses from float chambers to vent canister.

c. An air leak at the float chamber lid joint, float chamber vent and drain pipes and hoses, weakener solenoid connection or weakener flange on ‘B’ bank carburettor.

d. Dirty or faulty float chamber vent valve or float chamber drain valve.

e. Low engine temperature (below 16°C. (60°F.)), a faulty weakener solenoid valve or cut-in switch.
7. Remove the blank from the solenoid to the exhaust gas recirculation valve hose and connect the hose to the exhaust gas recirculation valve.

8. Raise the engine speed slowly noting the manometer and tachometer readings. The maximum steady manometer reading should be obtained between 1500 r.p.m. and 1900 r.p.m. If the maximum depression occurs below 1500 r.p.m. it is permissible to screw out the idle bleed screws on the carburetters by equal amounts (maximum 2.5 turns) to obtain this speed.

Note Idle bleed screws are fully closed after the blower rig setting.

9. Disconnect the manometer and fit the pressure tapping cap to 'A' bank carburettor float chamber cover.
Section U6
IGNITION SYSTEM, DISTRIBUTOR, IGNITION COIL AND SPARKING PLUGS

In addition to the normal centrifugal advance, the ignition distributor is fitted with a vacuum retard timing control.

A throttle operated tap controls the vacuum applied to the distributor, retarding the ignition timing at idle and over-run speeds for improved exhaust emission control.

A thermal vacuum switch is fitted to prevent engine overheating during prolonged idling. This switch interrupts the vacuum line to the throttle operated tap when a predetermined coolant temperature is reached. The thermal vacuum switch de-activates the vacuum retard mechanism and advances the ignition timing to the normal setting.

A vacuum actuated throttle stop is fitted to prevent an excessive increase in idle speed. When idling at normal temperatures a depression is applied to both the distributor retard capsule and the throttle stop vacuum actuator. (The throttle stop vacuum actuator controls the idle speed). Both the retard capsule and the vacuum throttle stop are de-activated simultaneously when the throttle vacuum switch operates at high coolant temperatures. This permits the carburettor throttles to close until the throttle lever contacts the fixed throttle stop. The fixed throttle stop is set to maintain the normal idle speed.

**Data**

**Ignition timing**

T.D.C. (Static) 5° B.T.D.C. at 800 r.p.m. (stroboscopic)

---

Fig. U25 INTERNAL VIEW OF DISTRIBUTOR

1. Felt lubrication pad
2. Contact breaker bearing plate
3. Dwell angle adjuster
4. Felt lubrication pad
5. Low tension lead
6. Capacitor
in Neutral with vacuum retard disconnected.
(Approach 800 r.p.m. from a higher speed).

Make and type ... Lucas 35 D 8. Eight lobe cam with single large contact breaker.

Rotation ... Anti-clockwise, viewed from the top.

Advance mechanism Automatic centrifugal advance with built-in vacuum retard timing control.

Note Vacuum control fitted to exhaust emission control engines only.

Firing order ... A1, B1, A4, B4, B2, A3, B3, A2.

Dwell angle ... 26° to 28°.

Contact arm spring pressure ... 18 oz. to 24 oz. (510 gm. to 680 gm.).

Condenser capacity ... 0·18 mfd. to 0·25 mfd.

Drive ... Through camshaft skew gears.

Contact points—To adjust
Refer to Chapter M—Electrical System.

Ignition—To time (using a stroboscope)
The timing of the ignition is carried out on A1 cylinder (left-hand front cylinder as viewed from the front of the engine).

1. Check the condition of the contact breaker points and set the gap to a nominal 0·014 in. to 0·016 in. (0·356 mm. to 0·406 mm.). Fit new points if necessary.

2. Start the engine and run until normal operating temperature is obtained. Ensure that the choke fast-idle is off.

3. Stop the engine, disconnect the distributor vacuum pipe from the vacuum retard tap and blank off the connection on the tap.

4. Connect a stroboscope and impulse tachometer in accordance with the manufacturer’s instructions.

5. Start the engine and set the speed to 800 r.p.m. by means of the fixed throttle stop screw. Ensure that the adjustment screw is clear of the throttle stop vacuum unit.

FIG. U26 VACUUM RETARD TAP ADJUSTMENT
1 Vacuum retard tap
2 Vacuum retard tap adjusting screw
3 Fast-idle adjusting screw

Note The speed of 800 r.p.m. must be set by approach from a higher speed.

6. Using a dwell meter set the dwell angle to within limits of 26° and 28° by means of the adjusting screw (see Fig. U25).

Note To remove any backlash from the distributor mechanism finally set the dwell angle by approaching from a minimum of 32°.

7. Direct the stroboscope light onto the crankshaft damper and timing pointer. Slacken the distributor clamp bolt and adjust the distributor to set the timing at 5° B.T.D.C. Tighten the clamp bolt and check that the timing is still 5° B.T.D.C.

8. Set the engine idle speed to 680 r.p.m. by adjusting the fixed throttle stop screw.

9. Connect the vacuum pipe to the vacuum retard tap.
10. Adjust the engine idle speed to 600 r.p.m. using the throttle stop vacuum unit adjusting screw, tighten the lock-nut.

11. Disconnect the vacuum line at the distributor retard capsule and 'Tee' in a vacuum gauge (0 to 30 in. Hg.) to the line; retain the connection to the distributor.

12. Set the vacuum retard tap by means of adjusting the screw, item 2 in Figure U26, so that the tap closes at the minimum throttle opening consistent with maintaining 14 in. Hg. minimum at the distributor when the engine is idling.

13. Reconnect the vacuum line to the distributor, check and re-adjust idle speed if necessary using the throttle stop vacuum unit adjusting screw.
Section U7
LUBRICATION AND MAINTENANCE

The 'Essential' maintenance which is listed in the following schedules is the minimum servicing which must be carried out at the appropriate distance/time intervals, in order to comply with the Rolls-Royce Motors Limited* warranty and the U.S. Federal and California Emission Regulations.

The 'Preventive' maintenance listed, is aimed at securing the maximum life and efficiency for the vehicle and will be carried out on request.

*In the U.S.A. this warranty is given by Rolls-Royce Inc.

ESSENTIAL MAINTENANCE
INITIAL SERVICE

This service will be carried out by the Dealer after the first 3,000 miles or 3 months whichever is the earlier. Items marked * will be carried out free of charge.

INITIAL 3,000 MILES OR 3 MONTHS SERVICE WHICHEVER IS THE EARLIER

*Carburetters
Check oil level in air valve dampers and if necessary top-up to correct level. Check tightness of float chamber covers. Check float chamber depression. Check and if necessary reset the idle speed. Check and if necessary reset the choke fast-idle speed.

Engine
Change engine oil.

*Exhaust gas recirculation system
Check the exhaust gas recirculation valve for correct operation.

*Fuel evaporation emission control system
Check the purge rate; this should be between 50 c.f.h. and 70 c.f.h. at 600 r.p.m. in neutral. Pressure test the fuel tank and evaporative loss line and if necessary rectify any leaks.

*Ignition system
Check distributor dwell angle and adjust if necessary. Correct dwell angle is 26° to 28°. Check ignition timing using stroboscope and reset if necessary; timing should be 5° B.T.D.C. at 800 r.p.m. with
vacuum retard disconnected. Check operation of vacuum retard tap and reset if necessary.

**Cooling system**
Tighten worm-drive clips of all coolant hoses.

**Torque converter transmission**
Check fluid level and top-up if necessary.
When checking the fluid level, avoid contact with the exhaust gas recirculation valve and associated pipes as these contain hot exhaust gases.

**EVERY 3 000 MILES OR 3 MONTHS WHICHEVER IS THE EARLIER**

**Engine**
If the car is used for constant stop/start operation, change the engine oil.

**EVERY 6 000 MILES OR 6 MONTHS WHICHEVER IS THE EARLIER**

**Engine**
Change engine oil and renew oil filter element.

**Ignition system**
Check system with an ignition analyser. If necessary, clean sparking plugs and reset gaps to 0·025 in. (0.635 mm.).

**Battery**
Check the level of the electrolyte in the battery; if necessary top-up with distilled water.

**Brakes**
Inspect footbrake and handbrake pad linings. When changing footbrake pads examine condition of dust excluders on calipers. Manually adjust the handbrake pads. Inspect pipes and connections.

**Torque converter transmission**
Check fluid level and top-up if necessary.
When checking the fluid level, avoid contact with the exhaust gas recirculation valve and associated pipes as these contain hot exhaust gases.

**EVERY 12 000 MILES OR 12 MONTHS SERVICE WHICHEVER IS THE EARLIER**

**Air injection pump**
Check tension of pump pulley driving belt.

**Air silencer**
Clean and oil the wire mesh filter elements.

**Carburetters**
Top-up oil level in air valve dampers. Check tightness of float chamber covers. Check float chamber depression. Check and if necessary reset the idle speed. Check and if necessary, reset choke fast-idle speed.

**Crankcase emission control system**
Remove and clean gauze flame traps in the crankcase breather tube. Clean the adapter in choke butterfly housing.

**Engine**
Change engine oil and renew oil filter element.

**Exhaust gas recirculation system**
Remove and clean the exhaust gas recirculation valve and feed pipes. Clean exhaust gas recirculation orifices in the carburettor 'Tee' piece. Check exhaust gas recirculation valve for correct operation.

**Fuel evaporation emission control system**
Renew the foam filter element in the evaporation loss control canister.

**Ignition system**
Renew the sparking plugs ensuring that the gaps are set to 0·025 in. (0.635 mm.). Renew contact breaker points and set dwell angle. Correct dwell angle is 26° to 28°. Replace distributor lubrication pad. Lubricate distributor spindle, automatic advance mechanism and shaft bearings with engine oil. Check ignition timing using stroboscope and reset if necessary; timing should be 5° B.T.D.C. at 800 r.p.m. with the vacuum retard disconnected.
Battery
Check the level of the electrolyte in the battery; if necessary top-up with distilled water.

Brakes
Inspect footbrake and handbrake pad linings. When changing footbrake pads examine condition of dust excluders on calipers. Manually adjust handbrake pads. Inspect pipes and connections.

Final drive unit
Check oil level and top-up if necessary.

Steering mechanism
Lubricate mechanism at the six grease nipples.

Torque converter transmission
Renew transmission fluid.
When checking the fluid level, avoid contact with the exhaust gas recirculation valve and associated pipes as these contain hot exhaust gases.

**EVERY 18 000 MILES OR 18 MONTHS SERVICE WHICHEVER IS THE EARLIER**

Engine
Change engine oil and renew oil filter element.

Ignition system
Check system with an ignition analyser. If necessary, clean sparking plugs and reset gaps to 0.025 in. (0.635 mm.).

Battery
Check the level of electrolyte in the battery; if necessary top-up with distilled water.

Brakes
Inspect footbrake and handbrake pad linings. When changing footbrake pads examine condition of dust excluders on calipers. Manually adjust the handbrake pads. Inspect pipes and connections.

Torque converter transmission
Check fluid level and top-up if necessary.
When checking the fluid level, avoid contact with the exhaust gas recirculation valve and associated pipes as these contain hot exhaust gases.

**EVERY 24 000 MILES OR 2 YEARS SERVICE WHICHEVER IS THE EARLIER**

Air injection pump
Check tension of pump pulley driving belt. Remove and clean pump intake filter element.

Air injection system
Check air injection system for leaks and correct functioning. Renew any defective items.

Air silencer
Clean and oil the wire mesh filter elements.

Automatic choke
Check the air flow through the choke stove pipe and check the system for correct functioning.

Carburetters
Clean air valves. Top-up oil level in air valve dampers. Check tightness of float chamber covers. Check float chamber depression. Check and if necessary, reset the idle speed. Check and if necessary, reset choke fast-idle speed.

Carburettet mixture weakening device
Renew air filter element for the carburettet mixture weakening device.

Crankcase emission control system
Remove and clean gauze flame traps in crankcase breather tube. Clean the adapter in choke butterfly housing.

Engine
Change engine oil and renew oil filter element.

Engine coolant system
Fit a new engine coolant thermostat and heater tap feed hose.

Exhaust gas recirculation system
Remove and clean the exhaust gas recirculation valve and feed pipes. Clean exhaust gas recirculation orifices in carburettet 'Tee' piece. Check system for correct operation.
Fuel evaporation emission control system
Renew the foam filter element in the evaporation loss control canister. Check the purge rate; this should be between 50 c.f.h. and 70 c.f.h. at 600 r.p.m. in neutral. Renew the purge line filter if necessary.

Ignition system
Renew the sparking plugs ensuring that the gaps are set to 0-025 in. (0,635 mm.). Renew contact breaker points and set dwell angle. Correct dwell angle is 26° to 28°. Replace distributor lubrication pad. Lubricate distributor spindle, automatic advance mechanism and shaft bearings with engine oil. Check ignition timing using a stroboscope and reset if necessary; timing should be 5° B.T.D.C. at 800 r.p.m. with the vacuum retard disconnected.

Battery
Check the level of the electrolyte in the battery; if necessary top-up with distilled water.

Brakes
Inspect footbrake and handbrake pad linings. When changing footbrake pads examine condition of dust excluders on calipers. Manually adjust handbrake pads. Inspect pipes and connections.

Final drive unit
Change Oil.

Steering mechanism
Lubricate mechanism at the six grease nipples.

Torque converter transmission
Change transmission fluid. After initial 24 000 miles/2 years whichever is the earlier, renew intake strainer.

When checking the fluid level, avoid contact with the exhaust gas recirculation valve and associated pipes as these contain hot exhaust gases.

SERVICING AFTER 24 000 MILES OR 2 YEARS WHICHEVER IS THE EARLIER
After 24 000 miles or 2 years, servicing is still due at 6 000 miles intervals and the respective service listed below should be carried out.

At 30 000 miles carry out the 6 000 miles service.
At 36 000 miles carry out the 12 000 miles service.
At 42 000 miles carry out the 18 000 miles service.
At 48 000 miles carry out the 24 000 miles service.
PREVENTATIVE MAINTENANCE

INITIAL SERVICE
This service should be carried out by the Dealer after the first 3,000 miles or 3 months whichever is earlier.

Belt tension
Check the tension of the belts driving the following fan and steering pump, alternator and refrigeration compressor. Adjust the belt tension as necessary.

Steering pump
Check the oil level in the reservoir; top-up if necessary.

EVERY 6,000 MILES OR 6 MONTHS WHICHEVER IS EARLIER

Air silencer
Remove and clean the wire mesh filter elements.

Carburetters
Check the oil level in the air valve dampers and top-up if necessary.

Ignition system
Check the distributor dwell angle and adjust if necessary.
Check the ignition timing using a stroboscope and adjust if necessary.

Steering pump
Check for leaks. If necessary top-up the level in the steering pump reservoir.

Belt tension
Check the tension of the belts driving the following; fan and steering pump, alternator and refrigeration compressor. Renew any belts which show signs of wear.

Control linkages
Apply a few drops of engine oil to the accelerator linkage and to the gear range selector controls adjacent to the transmission casing.

Electrical system
Ensure that all lamps, instruments and air conditioning controls are operating satisfactorily.

Check the following levels and pressures
Run the engine for four minutes then check the hydraulic reservoir fluid levels; top-up if necessary with the specified fluid.
Check the level of electrolyte in the battery and top-up with distilled water if necessary.
Check the tyre pressures and adjust if necessary.

EVERY 12,000 MILES OR 12 MONTHS WHICHEVER IS THE EARLIER

Belt tension
Check the tension of the belts driving the following; fan and steering pump, alternator and refrigeration compressor. Renew any belts which show signs of wear.

Control linkage
Apply a few drops of engine oil to the accelerator linkage and to the gear range selector controls adjacent to the transmission casing.

Handbrake linkage
Lubricate the pivot pins and pulleys in the handbrake system with approved grease.

Spare wheel
Lubricate the spare wheel lowering bolt and mechanism.

Electrical system
Ensure that all lamps, instruments and air conditioning controls are operating satisfactorily.

Check the following levels and pressures
Check the fluid level in the power steering pump reservoir and top-up if necessary.
Check the level and specific gravity of the engine coolant and correct if necessary.
Check the fluid level in the steering idler box damper and top-up if necessary.
Check the level of electrolyte in the battery and top-up with distilled water if necessary.
Chapter U

Run the engine for four minutes then check the hydraulic fluid levels; top-up if necessary.
Check the tyre pressures and adjust if necessary.

EVERY 24 000 MILES OR 2 YEARS WHICHEVER IS THE EARLIER

Belt tension
Check the tension of the belts driving the following: fan and steering pump, alternator and refrigeration compressor.
Renew any belts which show signs of wear.

Alternator
Check the slip rings and the brushes for wear; also check the brushes for freedom in their holders.

Control linkage
Apply a few drops of engine oil to the accelerator linkage and to the gear range selector controls adjacent to the transmission casing.

Fuel pump
Remove the fuel pump from the car and test on the bench. Fit a new pump unit if the performance is below the specified level. (refer to Chapter K—Fuel System of this Workshop Manual T.S.D. 2476).

Handbrake linkage
Lubricate the pivot pins and pulleys in the handbrake system with approved grease.

Spare wheel
Lubricate the spare wheel lowering bolt and mechanism.

Electrical system
Ensure that all lamps, instruments and air conditioning controls are operating satisfactorily.

Fuel tank
Remove the drain plug and allow any accumulated water to drain away. Fit the drain plug. Add four S.B.N. Inhibitors to the fuel tank.

Fuel filter
Renew the main line filter element and clean the filter bowl.

Height control mechanism
Disconnect the control valve linkage ball joints. Clean, grease and refit the ball joints.

Rear wheel drive-shaft
Lubricate the rear wheel drive-shaft outer universal couplings with an approved grease.

Check the following levels and pressures
Check the fluid level in the power steering pump reservoir and top-up if necessary.
Check the level and specific gravity of the engine coolant and correct if necessary.
Check the fluid level in the steering idler box damper and top-up if necessary.
Check the level of electrolyte in the battery and top-up with distilled water if necessary.

SEASONAL SCHEDULE
EVERY 12 MONTHS

Engine cooling system
Drain the coolant from the radiator and the engine crankcase. Clean any debris from the surfaces of the refrigeration condenser and radiator matrices by reverse flushing with a hose. This should be carried out just prior to the Autumn. Fill the system with the correct anti-freeze mixture (refer to Chapter L—Engine Cooling System of this Workshop Manual T.S.D. 2476).

Air conditioning system
Ensure that the foam filter element fitted to the scuttle intake grille is free from obstruction. On Long Wheelbase cars fitted with a centre division, check that the foam filter element fitted to the intake grille in the rear decking panel is free from obstruction.

Refrigeration system
These operations should be carried out only by an experienced refrigeration engineer.
Check that the refrigeration system is functioning correctly. If necessary, top-up the system with refrigerant. If loss of refrigerant is evident, check the system for leakage. Visually check the refrigerant compressor for oil leakage, if oil leakage is apparent check the oil level and top-up if necessary. In the event of a major oil loss, check and repair before topping-up (refer to Chapter C—Air Conditioning of this Workshop Manual T.S.D. 2476).
Body
Check that the body drain holes are free from foreign matter.

EVERY 2 YEARS
In addition to the 12 monthly schedule, carry out the following.

Engine cooling system
Drain the coolant from the radiator and engine crankcase. Thoroughly reverse flush the coolant passages with a continuous flow of water. Change the coolant hoses where necessary. Fill the system with the correct anti-freeze mixture.

SERVICE RECOMMENDATIONS
BRAKE AND HYDRAULIC SYSTEM COMPONENTS

48 000 Miles
At this mileage and under normal motoring conditions it is recommended that the following servicing is carried out.

Renew the following flexible high pressure hoses; the front and rear brake pumps to accumulator hoses; the front and rear accumulator to frame hoses. Renew the disc brake caliper seals, the deceleration conscious pressure limiting valve seals, and the master cylinder seals. Completely drain the fluid from the hydraulic circuits and then fill with Castrol-Girling Brake Fluid Green. This fluid exceeds specification S.A.E. J 1703b in many respects and complies with D.O.T. 3 grade of FMVSS 116. Bleed the braking systems and automatic height control system.

96 000 Miles
At this mileage and under normal motoring conditions it is recommended that the following servicing is carried out.

Renew all the flexible hoses to the braking systems and the automatic height control system. Renew the disc brakes caliper seals, the deceleration conscious pressure limiting valve seals and the master cylinder seals. Completely drain the fluid from the hydraulic circuits and then fill with Castrol-Girling Brake Fluid Green. This fluid exceeds specification S.A.E. J 1703b in many respects and complies with D.O.T. 3 grade of FMVSS 116. Bleed the braking systems and automatic height control system.

SPECIAL PRECAUTIONS
Should the car be used in very cold temperatures, drain the engine sump when thoroughly warm and also drain the carburettor air valve dampers. The engine sump and carburettor air valve dampers should then be filled with oil having the following viscosity.

For constant temperatures of between 0°C. and −23°C. (32°F. and −10°F.), use a 10W/30 grade oil.

For constant temperatures of −23°C. (−10°F.) and below, use a 5W/20 grade oil.
## Section U8
### FAULT DIAGNOSIS

<table>
<thead>
<tr>
<th>SYMPTOMS</th>
<th>POSSIBLE CAUSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Engine will not start.</td>
<td>1. (a) Fouled contact breaker points or incorrect dwell angle.</td>
</tr>
<tr>
<td>(Starter motor operating).</td>
<td>(b) Ignition circuit broken.</td>
</tr>
<tr>
<td></td>
<td>(c) Failed anti-run-on solenoid or failure of electrical supply circuit.</td>
</tr>
<tr>
<td></td>
<td>(d) Blocked fuel feed line or fouled float chamber filters.</td>
</tr>
<tr>
<td></td>
<td>(e) Faulty choke bi-metal coil.</td>
</tr>
<tr>
<td></td>
<td>(f) Fast-idle speed incorrect.</td>
</tr>
<tr>
<td></td>
<td>(g) Choke solenoid inoperative.</td>
</tr>
<tr>
<td></td>
<td>(h) Blocked weakener vent line or fouled filter.</td>
</tr>
<tr>
<td></td>
<td>(i) Blocked carburettor float chamber vent line.</td>
</tr>
<tr>
<td></td>
<td>(j) Exhaust gas recirculation valve failed in open position.</td>
</tr>
<tr>
<td>2. Engine idles very roughly.</td>
<td>2. (a) Fouled contact breaker points or incorrect dwell angle.</td>
</tr>
<tr>
<td></td>
<td>(b) Air leaks between control valve and carburettor “Tee” piece, or in exhaust gas recirculation pipes.</td>
</tr>
<tr>
<td></td>
<td>(c) Fouled spark plugs.</td>
</tr>
<tr>
<td></td>
<td>(d) Exhaust gas recirculation valve stuck in the open position.</td>
</tr>
<tr>
<td></td>
<td>(e) Damaged or contaminated ignition high tension circuit.</td>
</tr>
<tr>
<td></td>
<td>(f) Failed deceleration (gulp/anti backfire) valve.</td>
</tr>
<tr>
<td></td>
<td>(g) Damaged vacuum modulator pipe causing air leak (inlet manifold to transmission).</td>
</tr>
<tr>
<td></td>
<td>(h) Blocked carburettor float chamber vent line.</td>
</tr>
<tr>
<td>3. Engine stalls.</td>
<td>3. (a) Incorrect idle speed.</td>
</tr>
<tr>
<td></td>
<td>(b) Flooding of float chamber or the jet.</td>
</tr>
<tr>
<td></td>
<td>(c) Water or foreign matter in the float chamber.</td>
</tr>
<tr>
<td></td>
<td>(d) Faulty hot idle mixture compensator.</td>
</tr>
<tr>
<td></td>
<td>(e) Exhaust gas recirculation valve stuck open.</td>
</tr>
<tr>
<td>4. (i) Engine shows signs of power loss,</td>
<td>4. (a) Insufficient delivery of fuel (i.e. blocked float chamber cover filters).</td>
</tr>
<tr>
<td>evident at high speeds and loading.</td>
<td>(b) Incorrect ignition timing.</td>
</tr>
<tr>
<td>(ii) Engine misfires particularly on hard</td>
<td>(c) Incorrect spark plugs or gap settings.</td>
</tr>
<tr>
<td>acceleration from low speed.</td>
<td>(d) Incorrect dwell angle.</td>
</tr>
<tr>
<td></td>
<td>(e) Fouled spark plugs.</td>
</tr>
<tr>
<td>SYMPTOMS</td>
<td>POSSIBLE CAUSE</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>5. Engine hesitates or misfires under light</td>
<td>5. High float chamber depression due to:</td>
</tr>
<tr>
<td>load.</td>
<td>(a) Weakening device filter blocked or blockage in rubber</td>
</tr>
<tr>
<td></td>
<td>hosing or bleed orifice.</td>
</tr>
<tr>
<td></td>
<td>(b) Dislodged venturi in weakening device.</td>
</tr>
<tr>
<td></td>
<td>(c) Evaporation loss control canister filter blocked.</td>
</tr>
<tr>
<td></td>
<td>(d) Incorrect connection of weaker hoke to valve</td>
</tr>
<tr>
<td></td>
<td>(e) Incorrect purge flow rate.</td>
</tr>
<tr>
<td>6. Increase in fuel consumption.</td>
<td>6. Low float chamber depression due to:</td>
</tr>
<tr>
<td></td>
<td>(a) A blockage in the weaker hoke to vent canister or the hose from the</td>
</tr>
<tr>
<td></td>
<td>weaker chambers to the fuel receiver.</td>
</tr>
<tr>
<td></td>
<td>(b) Float chamber and weakening device air leaks.</td>
</tr>
<tr>
<td></td>
<td>(c) Float chamber connection air leaks as far as and including the one way</td>
</tr>
<tr>
<td></td>
<td>valve in the fuel drain pipe.</td>
</tr>
<tr>
<td></td>
<td>(d) Engine intake air temperature below 16°C (60°F.).</td>
</tr>
<tr>
<td></td>
<td>(e) Air leaks between weakening device and tapping in carburettor body;</td>
</tr>
<tr>
<td></td>
<td>including the weaker cut-off valve.</td>
</tr>
<tr>
<td></td>
<td>(f) Faulty cut-off valve.</td>
</tr>
<tr>
<td></td>
<td>(g) A dirty or faulty float chamber drain valve.</td>
</tr>
<tr>
<td></td>
<td>(h) A dirty or faulty float chamber vent valve.</td>
</tr>
<tr>
<td></td>
<td>(i) Incorrect purge flow rate.</td>
</tr>
<tr>
<td></td>
<td>(j) Incorrect ignition timing.</td>
</tr>
<tr>
<td>7. Poor slow running, lack of power and high</td>
<td>7. (a) Sticking carburettor piston caused by the needle bearing heavily on the</td>
</tr>
<tr>
<td>fuel consumption.</td>
<td>jet.</td>
</tr>
<tr>
<td></td>
<td>(b) Sticking carburettor piston caused by a bent damper rod.</td>
</tr>
<tr>
<td></td>
<td>(c) Sticking carburettor piston caused by dirt between the suction chamber</td>
</tr>
<tr>
<td></td>
<td>and piston.</td>
</tr>
<tr>
<td></td>
<td>(d) Piston rod sticking in bush.</td>
</tr>
<tr>
<td></td>
<td>(e) Ignition timing incorrect.</td>
</tr>
<tr>
<td></td>
<td>(f) Failed vacuum retard tap.</td>
</tr>
<tr>
<td></td>
<td>(g) Exhaust gas recirculation valve stuck open.</td>
</tr>
<tr>
<td></td>
<td>(h) Fouled spark plugs.</td>
</tr>
<tr>
<td></td>
<td>(i) Faulty hot idle mixture compensator.</td>
</tr>
<tr>
<td></td>
<td>(j) Incorrect idle speed.</td>
</tr>
<tr>
<td>8. Engine 'backfires' on over-run.</td>
<td>8. (a) Severe air leak in exhaust emission control system,</td>
</tr>
<tr>
<td></td>
<td>probably between control valve and carburettor 'Tee' piece.</td>
</tr>
<tr>
<td></td>
<td>(b) Leak in exhaust gas recirculation pipes, probably between valve and</td>
</tr>
<tr>
<td></td>
<td>carburetters.</td>
</tr>
<tr>
<td></td>
<td>(c) Deceleration (gulp/anti backfire) valve sticking in closed position.</td>
</tr>
<tr>
<td></td>
<td>(d) Exhaust gas recirculation valve stuck open.</td>
</tr>
<tr>
<td>9. Excessive noise from air injection pump.</td>
<td>9. (a) Relief valve failure.</td>
</tr>
<tr>
<td></td>
<td>(b) Damaged impeller vanes.</td>
</tr>
<tr>
<td></td>
<td>(c) Rubbing vanes (an intermittent 'chirping' noise noticeable mainly at low</td>
</tr>
<tr>
<td></td>
<td>engine speed).</td>
</tr>
<tr>
<td></td>
<td>(d) Worn bearing (a rolling sound noticeable at all engine speeds).</td>
</tr>
</tbody>
</table>
### Section U9
**WORKSHOP TOOLS**

<table>
<thead>
<tr>
<th>Tool Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RH 8050</td>
<td>Spanner—Carburetter Jet Screw</td>
</tr>
<tr>
<td>RH 8087</td>
<td>Spanner—Weakener Cut-off Valve</td>
</tr>
<tr>
<td>RH 8089</td>
<td>Jet Centring Tool</td>
</tr>
<tr>
<td>RH 8090</td>
<td>Pliers—Wire Hose Clips</td>
</tr>
<tr>
<td>RH 8095</td>
<td>Restrictor—Manometer Check—Choke Stove Pipe</td>
</tr>
<tr>
<td>RH 8382</td>
<td>Spanner—Distributor Dwell Angle</td>
</tr>
<tr>
<td>RH 8383</td>
<td>Positioning Tool—Throttle Spindle Seal</td>
</tr>
<tr>
<td>RH 8621</td>
<td>Adapter—Air Manifold to C.O. Meter</td>
</tr>
</tbody>
</table>
Rolls-Royce Silver Shadow and Bentley T Series motor cars and Rolls-Royce and Bentley Corniche motor cars destined for Japan after 1st April 1973 (i.e. Car Serial Numbers SRH 15522, SRH 15635, SRX 15637 and onwards), have a revised engine build specification.

Changes from the present engine build specification are as follows:

1. Engine compression ratio reduced to 8:1.
2. Engine fan diameter increased to 20 in. (50,80 cm).
3. Lower engine oil dipstick fitted.
5. Choke solenoid now held on during engine cranking.
6. Two vane air pump fitted to air injection system.
7. Exhaust gas recirculation system fitted.
8. Exhaust gas recirculation heat shield fitted.
9. Distributor with vacuum retard fitted.
10. Carburettor needles changed.

Changes 1 to 6 inclusive are basically component changes and workshop personnel should in addition to their normal duties, only have to ensure that the correct parts are obtained, if replacement becomes necessary.
Exhaust gas recirculation system

This is similar to the system detailed in Chapter U except that the ‘A’ bank exhaust manifold has the exhaust gas recirculation system take-off flange above the manifold as shown in Figure 1.

Changes 7 to 10 inclusive are necessary for engines to meet the 1973 Emission Control Regulations in Japan and workshop personnel will require the servicing details given in Workshop Manual T.S.D. 2476 — Chapter U (Part 2) with the following differences.

The exhaust gas recirculation system cooler is situated above the engine on the ‘A’ bank side as shown in Figure 2 and a large heat shield is fitted around the cooler as shown in Figure 3.

As a result of these changes the pipe run between the exhaust manifold and cooler has changed.

When carrying out any work in or around the area of the exhaust gas recirculation system cooler (e.g. when checking the torque converter transmission fluid level), avoid contact with the various components and pipes of the system as they contain hot exhaust gases when the engine is running.

For details of the remainder of the exhaust gas recirculation system see Chapter U (Part 2).

The carburettors and automatic choke system

The details for this section differ from Chapter U (Part 2) in two instances only.

The carburetter needles have been changed to BBY and when tuning the carburretters it should be noted that the engine idle speed C.O. setting has been revised from 5.0% — 5.5% to 3.0% — 4.0%.
Chapter U

Section U10
SUPPLEMENTS
No. 2 North America 1974

Rolls-Royce and Bentley motor cars conforming to the appropriate emission control regulations and produced during 1974 can be readily identified as follows.

1. Car Serial Number

A letter C as the last prefix of the Car Serial Number (e.g. SRC or LRC, etc.).

2. Emission Control Certification Label

A 1974 Emission Control Certification Label (illustrated below) fitted to the wing valance to the rear of the right-hand front suspension spring cover.
**FIG. 1 VIEW INSIDE ENGINE COMPARTMENT (From Right-hand side of Car)**

1. Fuel receiver and float chamber vent valve
2. Weakened system cut-off switch
3. Exhaust gas recirculation secondary valve cut-in solenoid
4. Exhaust gas recirculation secondary valve vacuum operated micro-switch assembly
5. Exhaust gas recirculation distribution pipes
6. 'B' bank carburettor
7. Anti 'run-on' solenoid
8. Check valve
9. Deceleration control (gulp) valve
10. Air pump

**FIG. 2 VIEW INSIDE ENGINE COMPARTMENT (From Left-hand side of Car)**

1. Weaken filter
2. Check valve
3. 'B' bank carburettor
4. Choke thermo-coil housing
5. 'A' bank carburettor
6. Exhaust gas recirculation secondary valve
7. Choke solenoid
8. Exhaust gas recirculation primary valve
FIG. U3 AIR INJECTION SYSTEM AND IGNITION CONTROL SYSTEM

1 'A' bank air manifold
2 Throttle damper
3 Fixed throttle stop
4 Vacuum retard tap
5 Distributor retard capsule
6 Exhaust gas recirculation solenoid
7 Vent to air trunking
8 Thermal vacuum switch
9 'B' bank air manifold
10 Anti 'run-on' solenoid
11 Vacuum throttle stop screw
12 Check valve
13 Inlet manifold vacuum tapping
14 Throttle stop vacuum actuator
15 Air pump
16 Air pump intake
17 Deceleration control (gulp) valve
18 Check valve
EXHAUST EMISSION CONTROL SYSTEM

A small proportion of the exhaust gas from the 'A' bank exhaust manifold passes through a cooler and vacuum operated metering valves into the carburettor 'Tee' piece, just downstream of the throttles.

The exhaust gas mixes with the inlet charge in the induction manifold and is distributed to the cylinders thus lowering the peak combustion temperature and reducing oxides of nitrogen emissions.

FIG. 3 EXHAUST GAS REcircULATION SYSTEM

1 Primary valve
2 Secondary valve
3 Secondary valve vacuum operated cut-in micro-switch assembly
4 Secondary valve solenoid assembly
5 Cut-out solenoid assembly
6 Weakening device
7 Cooler
8 'A' bank carburettor
FIG. 4. AIR INJECTION SYSTEM AND IGNITION CONTROL SYSTEM

1 'A' bank air manifold
2 Throttle damper
3 Fixed throttle stop
4 Vacuum retard tap
5 Distributor retard capsule
6 Exhaust gas recirculation secondary valve cut-in micro-switch and solenoid assembly
7 Thermal vacuum switch
8 'B' bank air manifold
9 E.G.R. cut-out solenoid
10 Anti 'run-on' solenoid
11 Restrictor
12 Check valve
13 Inlet manifold tappings
14 Relief valve
15 Air pump
16 Air pump intake
17 Deceleration control valve
18 Check valve

NORMAL AIR FLOW
(TO EXHAUST PORTS)

EXCESS AIR FLOW
(FROM PUMP RELIEF VALVE)

ADDITIONAL AIR FLOW
(FOLLOWING RAPID THROTTLE CLOSURE)
A 'dual valve' exhaust gas recirculation system is used, employing a primary valve with a tapered metering pintle which gives an increase in flow area for an increased valve lift, and a secondary valve which has a reverse tapered pintle and gives a minimum flow area at full valve lift.

The vacuum signal for the exhaust gas recirculation valves is taken from a series of drillings in the carburettor body just upstream of the throttle edge. As the throttle is opened the signal strength is progressively increased (see Fig. 3).

A direct connection is made between the primary valve and the vacuum signal. The secondary valve is connected to the vacuum signal via a solenoid valve which in turn is controlled by a vacuum switch; the secondary valve only receives the vacuum signal when a predetermined manifold depression is reached.

When the throttle is opened the primary valve opens progressively as the vacuum signal increases. The valve is fully open at the point where the vacuum signal equals manifold depression.

Continued opening of the throttle lowers the manifold depression and actuates the secondary valve which immediately moves to the full valve lift position. Further opening of the throttle continues to reduce the manifold depression and consequently, the signal to both exhaust gas recirculation valves.

The reduced signal and valve lift reduces the flow area through the primary valve and increases the flow area through the secondary valve.

At very low vacuum signal strength both valves are seated and the flow is zero; in this way the recirculated exhaust gas is metered in proportion to the engine requirements for a reduction of oxides of nitrogen whilst retaining acceptable drivability.

To improve starting and driveaway quality at low temperatures a solenoid valve interrupts the vacuum signal to both exhaust gas recirculation valves, ensuring that they remain in the closed position, until a predetermined coolant temperature is reached.

A micro-switch operated by the throttle lever (see Fig. 6) also controls the cut-off solenoid to provide exhaust gas recirculation cut-off at full throttle. This feature of the system prevents the secondary valve remaining open under full throttle, high speed operation, as this would be detrimental to performance and fuel consumption.

**Exhaust gas recirculation valve—To remove**

1. Detach the small diameter rubber hose from the valve.
2. Using a ½ in. A/F spanner slacken the three nuts which retain the heat shield.

![FIG. 5 EXHAUST GAS RECIRCULATION SYSTEM SECONDARY VALVE VACUUM OPERATED CUT-IN SWITCH](image)

1. Vacuum unit
2. Adjusting link
3. Micro-switch
4. Adjustment screws

![FIG. 6 EXHAUST GAS RECIRCULATION SYSTEM FULL THROTTLE CUT-OFF MICRO-SWITCH](image)

1. Micro-switch
2. Adjusting screws
3. Throttle lever
4. Full throttle stop
3. Withdraw the heat shield.

4. **Primary valve** Unscrew and remove the two \( \frac{1}{2} \) in. A/F nuts and washers retaining the valve to the mounting flange.
   
   **Secondary valve** Using a \( \frac{1}{2} \) in. A/F spanner slacken the remaining nut and then unscrew and remove both retaining nuts and washers. Unscrew the \( \frac{13}{16} \) in. A/F nut retaining the mounting bracket to the ‘A’ bank carburettet bracket; collect the washer and withdraw the bolt.

5. Withdraw the valve and remove the gasket from the mounting flange face.

---

### Exhaust gas recirculation valve—To fit

Fit the valve by reversing the procedure for removal, noting the following points:

1. Ensure that the valve pintle is secure on the valve stem.

2. Ensure that the valve and mounting flange joint faces are clean and free from carbon deposits.

3. Always use a new mounting flange gasket.

---

### Exhaust gas recirculation valve—To clean

1. Remove the valve as described in Exhaust gas recirculation valve — To remove.

2. Using a scraper, remove all carbon film from the valve and mounting flange faces; complete the operation with a wire brush.

3. Clean the carbon from the valve using a wire brush fitted into a portable drill. Take care not to damage the valve seating area.

4. Thoroughly blow out the valve with compressed air to ensure that all loose carbon particles are removed.

5. Upon completion of the cleaning operations, fit the valve to the engine mounting flange as described in Exhaust gas recirculation valve — To fit.

---

### Exhaust gas recirculation valves—Preliminary check

To carry out preliminary checks on the operation of both **primary** and **secondary** exhaust gas recirculation valves proceed as follows:

---

### Exhaust gas recirculation valve signal strength—To check

1. Remove the pressure tapping cap from ‘A’ bank carburettet float chamber to vent the float chambers to atmosphere (see Fig. 9).

2. Disconnect the small diameter rubber hose from the weakening device to the low temperature exhaust gas recirculation cut-off solenoid (see Fig. 3), at the weakening device.

3. Connect a suitable vacuum gauge (0 to 10 in. Hg.) to the exposed connection on the weakening device.

4. Start and run the engine until normal operating temperature is attained.

5. Adjust engine speed to 2 000 r.p.m. and ensure that the vacuum gauge shows a signal strength reading of between 2.0 in. Hg. and 5.5 in. Hg.

6. A low or zero reading may be caused by an air leak at the weakening device to carburettet joint.
7. Stop the engine; remove the vacuum gauge and fit the rubber hose to the weakening device.

**Primary valve**

8. Disconnect the exhaust gas recirculation cut-off solenoid to the primary valve rubber hose; at the primary valve.
9. Connect the hose to a vacuum gauge (0 to 10 in. Hg.); start and run the engine at 2 000 r.p.m.
10. Check to ensure that the signal strength reading on the vacuum gauge is between 2-0 in. Hg. and 5-5 in. Hg.
11. A low or zero reading may be caused by:
   a. Blockage in the hose from the weaken unit to the cut-off solenoid.
   b. Blockage in the hose between the cut-off solenoid and the primary valve.
   c. Air leak at the weaken unit joint face or hose connections.
   d. Low engine temperature (below 14°C. (57°F.), a faulty exhaust gas recirculation cut-off solenoid or cut-in switch (in thermostat outlet).
   e. Air leak in the exhaust gas recirculation secondary valve or connecting hoses.
   f. A faulty exhaust gas recirculation secondary valve solenoid.
12. Stop the engine, disconnect the vacuum gauge and reconnect the hose to the primary valve.

**Secondary valve**

8. Disconnect the rubber hose from the induction manifold to the vacuum operated micro-switch, at the micro-switch end and blank off the hose.
9. Detach the secondary valve to solenoid hose at the secondary valve.
10. Connect a suitable vacuum gauge (0 to 10 in. Hg.) to the hose.
11. Disconnect the hose from the low temperature exhaust gas recirculation solenoid to the primary valve, at the valve. Blank off the hose.
12. Start and run the engine at 2 000 r.p.m.
13. Check to ensure that the signal strength reading on the vacuum gauge is between 2-0 in. Hg. and 5-5 in. Hg.
14. A low or zero reading may be caused by:
   a. A blockage in the hose from the 'Tee' piece to the secondary valve.
   b. A blockage in the hose from the secondary valve solenoid to the exhaust gas recirculation secondary valve.
   c. A faulty exhaust gas recirculation secondary valve solenoid.
15. Stop the engine and disconnect the vacuum gauge; reconnect the hose to the secondary valve.
16. Remove the blank from the low temperature exhaust gas recirculation solenoid to primary valve hose and reconnect the hose to the primary valve.
17. Remove the blank from the induction manifold to vacuum operated micro-switch and reconnect the hose to the micro-switch.
CRANKCASE EMISSION CONTROL SYSTEM

Crankcase emissions are controlled by a recirculatory closed breather system (see Fig. 8).

An insulated draught tube connects the crankcase via the oil filler which is fitted with a sealed cap, to the choke housing upstream of both the choke butterfly and the carburetters. A flame trap capsule containing three wire mesh discs is fitted in a housing at the crankcase end of the draught tube. Engine emission (blow-by) is drawn into the induction system via the draught tube, due to the depression in the choke housing.

Maintenance

1. The flame trap fitted to the breather pipe should be cleaned in the following manner, at the specified mileage.

2. Unscrew the setscrew securing the breather pipe connection to the oil filler pedestal; withdraw the connection from the pedestal (slight resistance may be felt due to the rubber 'O' ring connections).
3. Withdraw the connection from the pipe flange and collect the restrictor.
4. Wash the flame trap assembly in clean petrol, then dry with a high pressure air line. The flame trap assembly consists of 3 gauzes crimped together as shown in Figure 8.
5. To clean the adapter fitted to the choke housing, remove the single setscrew from the breather pipe end connection and detach the pipe.
6. Clean the adapter fitted to the choke housing and ensure that the holes in the adapter are clear.
7. Assembly of the flame trap and breather pipe is in the reverse order, ensuring that the 'O' rings are in good condition.

---

**FIG. 8 EXPLODED VIEW OF CRANKCASE EMISSION CONTROL PIPE**

<table>
<thead>
<tr>
<th>Diagram A</th>
<th>Diagram B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Pipe</td>
<td>1 Pipe</td>
</tr>
<tr>
<td>2 'O' ring</td>
<td>2 Setscrew</td>
</tr>
<tr>
<td>3 Connection</td>
<td>3 'O' ring</td>
</tr>
<tr>
<td>4 Washer</td>
<td>4 Restrictor</td>
</tr>
<tr>
<td>5 Setscrew</td>
<td>5 Flame trap</td>
</tr>
<tr>
<td>6 'O' ring</td>
<td>6 Connection</td>
</tr>
<tr>
<td>7 Adapter</td>
<td>7 'O' ring</td>
</tr>
</tbody>
</table>
EMISSION CONTROL SYSTEMS
(ELECTRICAL COMPONENTS)

The electrical components described in this section would normally appear in Chapter M — Electrical System, however, as they are used in connection with the 1974 emission control systems it is thought more practical to include the information in this Chapter.

The components concerned are as follows.
(i) The exhaust gas recirculation cut-in switch.
(ii) The exhaust gas recirculation cut-off solenoid.
(iii) The anti 'run-on' solenoid.
(iv) The exhaust gas recirculation secondary valve cut-in solenoid and vacuum operated micro-switch.
(v) The exhaust gas recirculation full throttle cut-off micro-switch.
(vi) The weakerener cut-off solenoid.
(vii) The weakerener cut-off switch.

Note The temperatures quoted in this section for the various switches are nominal operating temperatures and in service, a plus or minus tolerance of a few degrees may be found.

Exhaust gas recirculation cut-in switch
Refer to page U19

Exhaust gas recirculation cut-off solenoid
The exhaust gas recirculation cut-off solenoid is the middle solenoid of three solenoids situated on a small platform, adjacent to the 'B' bank carburettor (see Fig. 9).

The servicing details for this component are given on Page U20 — Note the following additional test.

Exhaust gas recirculation cut-off solenoid circuit wiring—To check
4. Start and run the engine, as the coolant temperature approaches 14°C. (57°F.) the test lamp bulb should be extinguished.
5. Depress the full throttle cut-out micro-switch plunger and check to ensure that the test lamp bulb illuminates. Release the plunger and the test lamp bulb should be extinguished.
6. Stop the engine and allow to cool, noting that as the engine coolant temperature drops to 12°C. (54°F.) the test lamp bulb again illuminates.

Note Do not leave the ignition switched on for long periods of time when the engine is not running.

Anti 'run-on' solenoid
The use of low octane fuel often causes an engine to 'diesel' (i.e. to continue to run-on after the ignition has been switched off, particularly when the engine is hot). To prevent this condition arising an anti 'run-on' solenoid is connected to the weakerener unit signal line (see Fig. 10).

When the ignition is switched off the solenoid opens and connects the weakerener system to the induction manifold, thus creating a high float chamber depression which cuts off the supply of fuel.

The anti 'run-on' solenoid is situated on a platform adjacent to 'B' bank carburettor; it is the foremost of the three solenoids fitted on the platform.

The servicing details for this component are given on Page U20 — Note the following change to information.

Anti 'run-on' solenoid—To check
5. If the operation of the solenoid is correct note that the following conditions apply and connect the original hose to the solenoid.

(i) With the ignition switched on it should not be possible to blow the hose.

FIG. 9 SOLENOID PLATFORM
1 'B' bank carburettor
2 Micro-switch assembly
3 Vacuum unit
4 Distance piece
5 Secondary valve cut-in solenoid
6 Exhaust gas recirculation cut-out solenoid
7 Anti 'run-on' solenoid

U65
(ii) With the ignition switched off the solenoid is de-energised and it should be possible to blow down the hose.

**Exhaust gas recirculation secondary valve cut-in solenoid and vacuum operated micro-switch—To remove**

This assembly is situated rearmost of the three solenoid assemblies mounted on a platform, adjacent to the 'B' bank carburettor (see Figs. 1 and 9).

1. Detach the rubber hoses from the solenoid, solenoid vent and vacuum unit.
   
   **Note** Each rubber hose should be labelled as it is detached, to facilitate identification during assembly.

2. Disconnect the two electrical leads at their Lucifer connections.

3. Unscrew and remove the two B.A. screws which retain the micro-switch cover in position. Withdraw the cover.

4. Unscrew the two reach-nuts and withdraw the micro-switch assembly.

5. Unscrew and remove the two support pillars. Withdraw the solenoid assembly.

6. Collect the two distance pieces situated beneath the solenoid feet.

**Exhaust gas recirculation secondary valve cut-in solenoid and vacuum operated micro-switch—To fit**

Fit the secondary valve cut-in solenoid and vacuum operated micro-switch assembly by reversing the procedure given for removal.

---

**FIG. 10 CARBURETTER WEAKENING DEVICE**

1 'A' bank carburettet
2 Float chamber pressure tapping
3 Weakening device
4 Bi-metal switch
5 Fuel receiver
6 Float chamber vent valve
7 Weakening device cut-off solenoid
8 Float chamber drain valve
9 Anti 'run-on' solenoid
10 Restrictor
11 Inlet manifold tapping
12 Bleed orifice
13 Venturi
14 Adjustment screw (set during initial assembly)
Exhaust gas recirculation secondary valve
cut-in solenoid and vacuum operated
micro-switch circuit wiring—To check

1. Connect a test lamp across the two Lucas connections to the solenoid.
   Note Do not disconnect the two Lucas connections.

2. Switch on the ignition and note that the test lamp bulb remains extinguished.

3. Start the engine and run at the idle speed, noting that the bulb of the test lamp is illuminated.

Exhaust gas recirculation secondary valve
cut-in solenoid and vacuum operated
micro-switch—To check

1. Disconnect the rubber hose from the vacuum unit.

2. Connect a suitable hand operated vacuum pump with a scale calibrated in ins. of Hg. (RH 8800) to the vacuum unit connection.

3. Draw a vacuum of at least 12 in. Hg. and note that the micro-switch ‘clicks’ at approximately 10 in. Hg. vacuum.

4. Allow the 12 in. Hg. vacuum to decrease slowly and note that the micro-switch ‘clicks’ again as the vacuum falls to between 8·5 in. Hg. and 7·5 in. Hg.

5. Release the vacuum and remove the pump assembly. Re-connect the rubber hose.

Exhaust gas recirculation secondary valve
cut-in solenoid and vacuum operated
micro-switch—To set

1. Unscrew and remove the two 2 B.A. screws which retain the micro-switch cover in position.

2. Remove the cover.

3. Disconnect the rubber hose from the vacuum unit.

4. Connect a suitable hand operated vacuum pump with a scale calibrated in ins. of Hg. (RH 8800) to the vacuum unit connection.

5. Draw a vacuum of 12 in. Hg. with the pump. Allow the vacuum to decrease to 8 in. Hg. and then seal the vacuum line to maintain the vacuum at the micro-switch.

6. Release the lock-nut and screw the spring loaded plunger assembly in until the micro-switch is fully depressed (see Fig. 5).

7. Screw the spring loaded plunger assembly out until the micro-switch ‘clicks’. Tighten the lock-nut.

8. Check the operation of the vacuum operated micro-switch as detailed in Exhaust gas recirculation secondary valve cut-in solenoid and vacuum operated micro-switch — To check.

9. Fit the micro-switch cover. Remove the vacuum pump and re-connect the rubber hose to the vacuum unit.

Exhaust gas recirculation full throttle
cut-off micro-switch—To remove

1. Detach the two electrical leads at their Lucas connections.

2. Unscrew and remove the two small nuts and bolts which retain the micro-switch in position on the mounting bracket.

3. Withdraw the micro-switch.

Exhaust gas recirculation full throttle
cut-off micro-switch—To fit

Fit the micro-switch by reversing the procedure given for removal. Finally, set the micro-switch.

Exhaust gas recirculation full throttle
cut-off micro-switch circuit wiring—
To check

1. Start and run the engine until normal operating temperature is attained.

2. Switch off the ignition.

3. Connect a test lamp across the two Lucas connections to the exhaust gas recirculation cut-off solenoid.
   Note Do not disconnect the two Lucas connections.

4. Switch on the ignition and check that the test lamp bulb is extinguished.

5. Open the throttles to the full throttle position to activate the full throttle cut-off micro-switch and thereby, illuminate the test lamp bulb.

Exhaust gas recirculation full throttle
cut-off micro-switch—To set

Prior to setting the exhaust gas recirculation system cut-off micro-switch, ensure that the following are correctly set.

(i) Throttle linkage (refer to Chapter K).

(ii) Kick-down micro-switch (refer to Chapter U).
To set the cut-off micro-switch proceed as follows.

1. Depress the accelerator pedal until it touches the toeboard mounted kick-down micro-switch (further depression of the pedal requires increased effort).

2. Hold the throttle linkage in the position described in Operation 1 and release the lock-nut (item 2, Fig. 6) on the throttle lever (item 3).

3. Screw the spring loaded operating button away from the micro-switch.

4. When there is clearance at this point screw the spring loaded operating button toward the micro-switch until the micro-switch is heard to ‘click’.

5. Tighten the lock-nut.

6. Depress the accelerator pedal further to operate the toeboard mounted kick-down micro-switch.

7. Adjust the full throttle stop (item 4, Fig. 6) to prevent overloading of the kick-down micro-switch. The full throttle stop should be set so that all throttle movement is stopped just prior to the operating button spring becoming fully compressed.

Weakener cut-off solenoid
Refer to page U21

Weakener valve cut-off switch
Refer to page U21

THE CARBURETTERS AND AUTOMATIC CHoke SYSTEM

CARBURETTER

Data

Carburetters . . . Two S.U. HD8 diaphragm type

Choke size . . . 2.00 in. (5.08 cm.)

Jet size—
  spring loaded needle type . . . 0.100 in. (2.44 mm.)

Jet needle—
  spring loaded type . . . BCB

Carburettor—
  air valve piston spring Red/Blue

Temperature controlled air intake

To ensure rapid warm-up and improve control of the air/fuel ratio a temperature controlled air intake is fitted (see Fig. 1).

A vacuum operated blending valve attached to the air cleaner assembly is controlled by a thermal sensor in the air intake elbow. This valve blends hot air from a pick-up point (scoop) adjacent to the exhaust manifold with cold air from under the front wing; thus maintaining a constant temperature of the intake air as it enters the carburetters.

Throttle stop vacuum actuator assembly

The throttle stop vacuum actuator assembly has been deleted from cars produced to the 1974 specification.
OVERHAUL

Carburetters—To remove

Refer to Page U28 noting the following additional operations concerning the exhaust gas recirculation secondary valve micro-switch and vacuum unit assembly (see Fig. 5).

(i) After Operations 16-20 add:—
Also detach the hose from the exhaust gas recirculation secondary valve vacuum unit and the two hoses from the exhaust gas recirculation secondary valve solenoid.

(ii) Operation 23 should read:—
Disconnect the electrical connections from the three solenoid assemblies mounted on a bracket attached to ‘B’ bank carburetter.

Note On cars produced to the 1974 specification the vacuum actuator throttle stop assembly has been deleted.

Carburetters—To fit

Refer to Page U27 noting the additional remarks in this Supplement under the heading Carburetters — To remove.

CARBURETTER TUNING

Preliminary checks

Refer to Page U32.

Tuning procedure

Refer to Page U32 noting the following information.

(i) Operation 1

Delete — Remove the air intake hose and blank off the hot idle compensator feed drilling (see Fig. U19); replace the hose.

Insert — Remove the air intake hose, blank off the hot idle compensator feed drilling and the choke stave feed pipe (see Fig. U19); replace the hose.

Disconnect the solenoid to exhaust gas recirculation valve hose at the valve and blank off the hose.

(ii) Operations 2 and 16

The pressure tapping cap referred to in these two operations is fitted to ‘A’ bank carburetter float chamber cover.

(iii) Operations 9, 12 and 15

Delete — C.O. reading 5·0% to 5·5%.

Insert — C.O. reading 4·5% to 5·0%.

(iv) Operation 14

Delete — Fit probe of a C.O. meter into exhaust pipe in accordance with the manufacturer’s instructions (The Horiba Mexa 200 C.O. meter is suitable).

Insert — Remove the air intake hose and remove the blank from the choke stave feed pipe. Fit the air intake hose.

Fit the probe of a C.O. meter into the exhaust pipe in accordance with the manufacturer’s instructions (The Horiba Mexa 200 C.O. meter is suitable).

(v) Operation 16

Delete — Remove the blank from solenoid to exhaust gas recirculation valve hose and connect to the exhaust gas recirculation valve.

Insert — Remove the blank from the low temperature exhaust gas recirculation cut-off solenoid and connect to hose from the exhaust gas recirculation valves to the solenoid.

(vi) Operation 19:

Delete — Check the idle speed and set if necessary to 600 r.p.m. by adjusting the vacuum actuator throttle stop screw. Remove the air intake hose; remove the blank from the hot idle compensator feed drilling and fit the intake hose.

Insert — Check the idle speed and set if necessary to 600 r.p.m. by adjusting the fixed throttle stop screw. Remove the air intake hose and remove the blank from the hot idle compensator feed drilling. Fit the air intake hose.

Throttle damper plunger—To set

1. Move the cold start ‘fast-idle’ to its off position.
2. Slacken both nuts securing the throttle damper to its bracket. Back off the nuts until they are well clear of the bracket.
3. Press the damper towards the ‘A’ bank throttle lever until the damper is fully compressed and the lever is just clear of the throttle stop screw.
4. Screw the lower securing nut until it is 0·025 in. (0·63 mm.) clear of the underside of the bracket. Release the damper and tighten the upper securing nut.
5. Ensure that the damper spindle is at the maximum possible radius, whilst maintaining adequate contact with the throttle lever pad. This can be achieved by adjusting the angle of the bracket.
FIG. 11 TEMPERATURE CONTROLLED AIR INTAKE

1 Hot air scoop
2 Temperature sensor
3 Inlet manifold vacuum tapping
4 Air cleaner/silencer
5 Air blending valve
6 Cold air intake
Automatic choke stove pipe—To check
(i) Delete—5. Observe the depression shown by the manometer reading; the correct reading should be between 16 in. and 20 in. (40.64 cm. and 50.80 cm.).
(ii) Insert—5. Observe the depression shown by the manometer reading; the correct reading should be between 20 in. and 24 in. (50.80 cm. and 60.96 cm.).

Cold start 'fast-idle'—To set
Refer to Page U36 noting that the rubber hose referred to in Operations 1 and 4 should be the low temperature cut-off solenoid to exhaust gas recirculation valve hose at the solenoid and the solenoid should be blanked off.

Exhaust gas recirculation signal strength
—To check
Refer to Page U62 in this Supplement.

Float chamber depression—To check
Refer to Page U37 noting the following information.

(i) Operation 1
Delete — Disconnect the solenoid to exhaust gas recirculation valve hose at the valve end and blank off the hose.
Insert — Disconnect the low temperature cut-off solenoid to exhaust gas recirculation valves hose, at the solenoid and blank off the solenoid.

(ii) Operation 7
Delete — Remove the blank from the solenoid to the exhaust gas recirculation valve hose and connect the hose to the exhaust gas recirculation valve.
Insert — Remove the blank from the low temperature cut-off solenoid and connect the hose from the exhaust gas recirculation valves to the solenoid.

(iii) Operation 8
Delete — Note Idle bleed screws are fully closed after blower rig setting.

IGNITION SYSTEM, DISTRIBUTOR, IGNITION COIL AND SPARKING PLUGS

In addition to the normal centrifugal advance, the ignition distributor is fitted with a vacuum retard timing control.

A throttle operated tap controls the vacuum applied to the distributor, retarding the ignition timing at idle and over-run speeds for improved exhaust emission control.

A thermal vacuum switch is fitted to prevent engine overheating during prolonged idling. This switch interrupts the vacuum line to the throttle operated tap when a predetermined coolant temperature is reached. The thermal vacuum switch de-activates the vacuum retard mechanism and advances the ignition timing to the normal setting, resulting in a small increase in the engine idle speed.

Data

| Ignition timing | T.D.C. (Static) 15° B.T.D.C. at 1 500 r.p.m. (stroboscopic) in Neutral with vacuum retard disconnected. (Approach 1 500 r.p.m. from a higher speed). |

Ignition—To time (using a stroboscope)
The timing of the ignition is carried out on A1 cylinder (left-hand front cylinder as viewed from the front of the engine).

1. Check the condition of the contact breaker points and set the gap to a nominal 0.014 in. to 0.016 in. (0.356 mm. to 0.406 mm.).

Fit new points if necessary.
2. Start the engine and run until normal operating temperature is obtained. Ensure that the choke fast-idle is off.

3. Stop the engine, disconnect the distributor vacuum pipe from the vacuum retard tap and blank off the connection on the tap.

4. Connect a stroboscope and impulse tachometer in accordance with the manufacturer’s instructions.

5. Start the engine and set the speed to 1500 r.p.m. by means of the fixed throttle stop screw.

   **Note** The speed of 1500 r.p.m. must be set by approach from a higher speed.

6. Using a dwell meter set the dwell angle to within limits of 26° and 28° by means of the adjusting screw (see Fig. U25 on Page U39).

   **Note** To remove any backlash from the distributor mechanism finally set the dwell angle by approaching from a minimum of 32°.

7. Direct the stroboscope light onto the crankshaft damper and timing pointer. Slacken the distributor clamp bolt and adjust the distributor to set the timing at 15° B.T.D.C. Tighten the clamp bolt and check that the timing is still 15° B.T.D.C.

8. Set the engine idle speed to 680 r.p.m. by adjusting the fixed throttle stop screw.

9. Connect the vacuum pipe to the vacuum retard tap.

10. Remove the air intake hose and blank off the hot idle compensator feed (see Fig. U19, Page U32). Fit the air intake hose.

11. Adjust the engine idle speed to 600 r.p.m. using the fixed throttle stop screw, tighten the lock-nut.

12. Disconnect the vacuum line at the distributor retard capsule and 'Tee' in a vacuum gauge (0 to 30 in. Hg.) to the line; retain the connection to the distributor.

13. Set the vacuum retard tap by means of adjusting the screw, item 2 in Figure U26, so that the tap closes at the minimum throttle opening consistent with maintaining 14 in. Hg. minimum at the distributor when the engine is idling.

14. Reconnect the vacuum line to the distributor, check and adjust the idle speed if necessary using the fixed throttle stop screw.

15. Remove the air intake hose and remove the blank from the hot idle compensator feed. Fit the air intake hose.

---

**LUBRICATION AND MAINTENANCE**

The 'Essential' maintenance which is listed in the following schedules is the minimum servicing which must be carried out at the appropriate distance/time intervals, in order to comply with the Rolls-Royce Motors Limited* warranty and the U.S. Federal and California Emission Regulations.

The 'Preventive' maintenance listed, is aimed at securing the maximum life and efficiency for the vehicle and will be carried out on request.

*In the U.S.A. this warranty is given by Rolls-Royce Motors Inc.

**ESSENTIAL MAINTENANCE INITIAL SERVICE**

This service will be carried out by the Dealer after the first 3000 miles or 3 months whichever is the earlier. Items marked * will be carried out free of charge.

---

**INITIAL 3 000 MILES OR 3 MONTHS SERVICE WHICHEVER IS THE EARLIER**

*Air injection pump*

Check belt tension and reset if necessary.

*Automatic choke*

Check the flow through the choke stove pipe, and check for correct operation.

*Carburetters*

Check oil level in air valve dampers and if necessary top-up to correct level. Check tightness of float chamber covers. Check float chamber depression. Check and if necessary reset the idle speed. Check and if necessary reset the choke fast-idle speed.
Engine
Change engine oil.

*Exhaust gas recirculation system
Check the exhaust gas recirculation valves for correct operation.

*Fuel evaporation emission control system
Check the purge rate; this should be between 50 c.f.h. and 70 c.f.h. at 600 r.p.m. in neutral. Pressure test the fuel tank and evaporation loss line and if necessary rectify any leaks.

*Ignition system
Check distributor dwell angle and adjust if necessary. Correct dwell angle is 26° to 28°. Check ignition timing using stroboscope and reset if necessary; timing should be 15° B.T.D.C. at 1 500 r.p.m. with vacuum retard disconnected. Check operation of vacuum retard tap and reset if necessary.

Cooling system
Tighten worm-drive clips of all coolant hoses.

Torque converter transmission
Check fluid level and top-up if necessary.
When checking the fluid level, avoid contact with the exhaust gas recirculation valves, heat shield and associated pipes as these components will be hot.

**EVERY 3 000 MILES OR 3 MONTHS WHICHEVER IS THE EARLIER**

Engine
If the car is used for constant stop/start operation, change the engine oil.

**EVERY 6 000 MILES OR 6 MONTHS WHICHEVER IS THE EARLIER**

Engine
Change engine oil and renew oil filter element.

Ignition system
Check system with an ignition analyser. If necessary, clean sparking plugs and reset gaps to 0.025 in. (0.635 mm.).

Battery
Check the level of the electrolyte in the battery; if necessary top-up with distilled water.

Brakes
Inspect footbrake and parking brake pad linings. When changing footbrake pads examine condition of dust excluders on calipers. Manually adjust the parking brake pads. Inspect pipes and connections, rectify if necessary.

Torque converter transmission
Check fluid level and top-up if necessary.
When checking the fluid level, avoid contact with the exhaust gas recirculation valves, heat shield and associated pipes as these components will be hot.

**EVERY 12 000 MILES OR 12 MONTHS SERVICE WHICHEVER IS THE EARLIER**

Air injection pump
Check tension of pump pulley driving belt.

Air silencer
Clean and oil the wire mesh filter elements.

Carburetters
Top-up oil level in air valve dampers. Check tightness of float chamber covers. Check float chamber depression. Check and if necessary reset the idle speed. Check and if necessary, reset choke fast-idle speed.

Crankcase emission control system
Remove and clean gauze flame traps in the crankcase breather tube. Clean the adapter in choke butterfly housing.

Engine
Change engine oil and renew oil filter element.
Chapter U

Exhaust gas recirculation system
Remove and clean the exhaust gas recirculation valves and feed pipes. Clean exhaust gas recirculation orifices in the carburettor ‘Tee’ piece. Check exhaust gas recirculation valves for correct operation.

Fuel evaporation emission control system
Renew the foam filter element in the evaporation loss control canister. Check the condition of the pipes and connections.

Ignition system
Renew the sparking plugs ensuring that the gaps are set to 0.025 in. (0.635 mm.). Renew contact breaker points and set dwell angle. Correct dwell angle is 26° to 28°. Replace distributor lubrication pad. Lubricate distributor spindle (shaft bearings) and automatic advance mechanism with engine oil. Check ignition timing using stroboscope and reset if necessary; timing should be 15° B.T.D.C. at 1 500 r.p.m. with the vacuum retard disconnected.

Battery
Check the level of the electrolyte in the battery; if necessary top-up with distilled water.

Brakes
Inspect footbrake and parking brake pad linings. When changing footbrake pads examine condition of dust excluders on calipers. Manually adjust parking brake pads. Inspect pipes and connections, rectify if necessary.

Final drive unit
Check oil level and top-up if necessary.

Steering mechanism
Lubricate mechanism at the six grease nipples.

Torque converter transmission
Renew transmission fluid.
When checking the fluid level, avoid contact with the exhaust gas recirculation valves, heat shield and associated pipes as these components will be hot.

EVERY 18 000 MILES OR 18 MONTHS SERVICE WHICHEVER IS THE EARLIER

Engine
Change engine oil and renew oil filter element.

Ignition system
Check system with an ignition analyser. If necessary, clean sparking plugs and reset gaps to 0.025 in. (0.635 mm.).

Battery
Check the level of electrolyte in the battery; if necessary top-up with distilled water.

Brakes
Inspect footbrake and parking brake pad linings. When changing footbrake pads examine condition of dust excluders on calipers. Manually adjust the parking brake pads. Inspect pipes and connections, rectify if necessary.

Torque converter transmission
Check fluid level and top-up if necessary.
When checking the fluid level, avoid contact with the exhaust gas recirculation valves, heat shield and associated pipes as these components will be hot.

EVERY 24 000 MILES OR 2 YEARS SERVICE WHICHEVER IS THE EARLIER

Air injection pump
Check tension of pump pulley driving belt.

Air injection system
Check air injection system for leaks and correct functioning. Renew any defective items.

Air silencer
Clean and oil the wire mesh filter elements.

Automatic choke
Check the air flow through the choke stove pipe and check the system for correct functioning.
Carburetters
Clean air valves. Remove inlet unions from the float chamber covers and fit new paper filter elements. Top-up oil level in air valve dampers. Check tightness of float chamber covers. Check float chamber depression. Check and if necessary, reset the idle speed. Check and if necessary, reset choke fast-idle speed.

Carburettet mixture weakening device
Renew air filter element for the carburettet mixture weakening device.

Crankcase emission control system
Remove and clean gauze flame traps in crankcase breather tube. Clean the adapter in choke butterfly housing.

Engine
Change engine oil and renew oil filter element.

Engine coolant system
Fit a new engine coolant thermostat and heater tap feed hose.

Exhaust gas recirculation system
Remove and clean the exhaust gas recirculation valves and feed pipes. Clean exhaust gas recirculation orifices in carburettet 'Tee' piece. Check system for correct operation.

Fuel evaporation emission control system
Renew the foam filter element in the evaporation loss control canister. Check the purge rate; this should be between 50 c.f.h. and 70 c.f.h. at 600 r.p.m. in neutral. Renew the purge line filter if necessary.

Ignition system
Renew the sparking plugs ensuring that the gaps are set to 0.025 in. (0.635 mm.). Renew contact breaker points and set dwell angle. Correct dwell angle is 26° to 28°. Replace distributor lubrication pad.

Lubricate distributor spindle (shaft bearings) and automatic advance mechanism with engine oil. Check ignition timing using a stroboscope and reset if necessary; timing should be 15° B.T.D.C. at 1 500 r.p.m. with the vacuum retard disconnected.

Battery
Check the level of the electrolyte in the battery; if necessary top-up with distilled water.

Brakes
Inspect footbrake and parking brake pad linings. When changing footbrake pads examine condition of dust excluders on calipers. Manually adjust parking brake pads. Inspect pipes and connections, rectify if necessary.

Final drive unit
Change oil.

Steering mechanism
Lubricate mechanism at the six grease nipples.

Torque converter transmission
Change transmission fluid. After initial 24 000 miles/2 years whichever is the earlier, renew intake strainer.

When checking the fluid level, avoid contact with the exhaust gas recirculation valves, heat shield and associated pipes as these components will be hot.

SERVICING AFTER 24 000 MILES OR 2 YEARS WHICHEVER IS THE EARLIER
After 24 000 miles or 2 years, servicing is still due at 6 000 miles intervals and the respective service listed below should be carried out.

- At 30 000 miles carry out the 6 000 miles service.
- At 36 000 miles carry out the 12 000 miles service.
- At 42 000 miles carry out the 18 000 miles service.
- At 48 000 miles carry out the 24 000 miles service.
PREVENTATIVE MAINTENANCE

INITIAL SERVICE
This service should be carried out by the Dealer after the first 3,000 miles or 3 months whichever is earlier.

Belt tension
Check the tension of the belts driving the following: fan and steering pump, alternator and refrigeration compressor. Adjust the belt tension as necessary.

Steering pump
Check the oil level in the reservoir; top-up if necessary.

EVERY 6,000 MILES OR 6 MONTHS WHICHEVER IS EARLIER

Air silencer
Remove and clean the wire mesh filter elements.

Carburetters
Check the oil level in the air valve dampers and top-up if necessary.

Ignition system
Check the distributor dwell angle and adjust if necessary.
Check the ignition timing using a stroboscope and adjust if necessary.

Steering pump
Check for leaks. If necessary top-up the level in the steering pump reservoir.

Belt tension
Check the tension of the belts driving the following: fan and steering pump, alternator and refrigeration compressor. Renew any belts which show signs of wear.

Control linkages
Apply a few drops of engine oil to the accelerator linkage and to the gear range selector controls adjacent to the transmission casing.

Electrical system
Ensure that all lamps, instruments, warning devices and air conditioning controls are operating satisfactorily.

Check the following levels and pressures
Run the engine for four minutes then check the hydraulic reservoir fluid levels; top-up if necessary with the specified fluid.
Check the level and specific gravity of the engine coolant and correct if necessary.
Check the tyre pressures and adjust if necessary.
Check the tread depth of all tyres and inspect for signs of damage.

EVERY 12,000 MILES OR 12 MONTHS WHICHEVER IS THE EARLIER

Belt tension
Check the tension of the belts driving the following: fan and steering pump, alternator and refrigeration compressor. Renew any belts which show signs of wear.

Control linkage
Apply a few drops of engine oil to the accelerator linkage and to the gear range selector controls adjacent to the transmission casing.

Parking brake linkage
Lubricate the pivot pins and pulleys in the parking brake system with approved grease.

Spare wheel
Lubricate the spare wheel lowering bolt and mechanism.

Electrical system
Ensure that all lamps, instruments, warning devices and air conditioning controls are operating satisfactorily.

Check the following levels and pressures
Check the fluid level in the power steering pump reservoir and top-up if necessary.
Check the level and specific gravity of the engine coolant and correct if necessary.
Check the fluid level in the steering idler box damper and top-up if necessary.
Check the level of electrolyte in the battery and top-up with distilled water if necessary.
Run the engine for four minutes then check the hydraulic fluid levels; top-up if necessary.
Check the tyre pressures and adjust if necessary.
Check the tread depth of all tyres and inspect for signs of damage.

EVERY 24 000 MILES OR 2 YEARS WHICHEVER IS THE EARLIER

Belt tension
Check the tension of the belts driving the following; fan and steering pump, alternator and refrigeration compressor.
Renew any belts which show signs of wear.

Alternator
Check the slip rings and the brushes for wear; also check the brushes for freedom in their holders.

Control linkage
Apply a few drops of engine oil to the accelerator linkage and to the gear range selector controls adjacent to the transmission casing.

Fuel pump
Remove the fuel pump from the car and test on the bench. Fit a new pump unit if the performance is below the specified level. (refer to Chapter K—Fuel System of this Workshop Manual T.S.D. 2476).

Parking brake linkage
Lubricate the pivot pins and pulleys in the parking brake system with approved grease.

Spare wheel
Lubricate the spare wheel lowering bolt and mechanism.

Electrical system
Ensure that all lamps, instruments, warning devices and air conditioning controls are operating satisfactorily.

Fuel tank
Slacken the drain plug one or two turns and allow any accumulated water to drain away. Tighten the drain plug.

Fuel filter
Renew the main line filter element and clean the filter bowl.

Height control mechanism
Disconnect the control valve linkage ball joints. Clean, grease and refit the ball joints.

Rear wheel drive-shaft
Lubricate the rear wheel drive-shaft outer universal couplings with an approved grease.

Check the following levels and pressures
Check the fluid level in the power steering pump reservoir and top-up if necessary.
Check the level and specific gravity of the engine coolant and correct if necessary.
Check the fluid level in the steering idler box damper and top-up if necessary.
Check the tyre pressures and adjust if necessary.
Check the tread depth of all tyres and inspect for signs of damage.

SEASONAL SCHEDULE
EVERY 12 MONTHS

Engine cooling system
Drain the coolant from the radiator and the engine crankcase. Clean any debris from the surfaces of the refrigeration condenser and radiator matrices by reverse flushing with a hose. This should be carried out just prior to the Autumn. Fill the system with the correct anti-freeze mixture (refer to Chapter L—Engine Cooling System of this Workshop Manual T.S.D. 2476).

Air conditioning system
Ensure that the foam filter element fitted to the scuttle intake grille is free from obstruction. On Long Wheelbase cars fitted with a centre division, check that the foam filter element fitted to the intake grille in the rear decking panel is free from obstruction.

Refrigeration system
These operations should be carried out only by an experienced refrigeration engineer.
Check that the refrigeration system is functioning correctly. If necessary, top-up the system with refrigerant. If loss of refrigerant is evident, check the system for leakage. Visually check the refrigerant compressor for oil leakage, if oil leakage is apparent check the oil level and top-up if necessary. In the event of a major oil loss, check and repair before topping-up (refer to Chapter C—Air Conditioning of this Workshop Manual T.S.D. 2476).
Body
Check that the body drain holes are free from foreign matter.

EVERY 2 YEARS
In addition to the 12 monthly schedule, carry out the following.

Engine cooling system
Drain the coolant from the radiator and engine crankcase. Thoroughly reverse flush the coolant passages with a continuous flow of water. Change the coolant hoses where necessary. Fill the system with the correct anti-freeze mixture.

SERVICE RECOMMENDATIONS
BRAKE AND HYDRAULIC SYSTEM COMPONENTS

48 000 Miles
At this mileage and under normal motoring conditions it is recommended that the following servicing is carried out.

Renew the front and rear accumulator to frame connector block hoses.

Examine the sub-frame to brake caliper hoses for chafing or surface cracking; renew if necessary.

Renew the disc brake caliper seals, the deceleration conscious pressure limiting valve seals, and the master cylinder seals.

Completely drain the fluid from the hydraulic circuits. Thoroughly clean the brake fluid reservoirs and sight glasses, ensuring that no foreign matter is allowed to enter during the operation.

Fill the hydraulic system with Castrol RR 363 Brake Fluid. This fluid exceeds specification S.A.E. J 1703b in many respects and complies with D.O.T. 3 grade of FMVSS116. Bleed the braking systems and automatic height control system.

96 000 Miles
At this mileage and under normal motoring conditions it is recommended that the following servicing is carried out.

Renew all the flexible hoses to the braking systems and the automatic height control system. Renew the disc brakes caliper seals, the deceleration conscious pressure limiting valve seals and the master cylinder seals.

Completely drain the fluid from the hydraulic circuits. Thoroughly clean the brake fluid reservoirs and sight glasses, ensuring that no foreign matter is allowed to enter during the operation.

Fill the hydraulic system with Castrol RR 363 Brake Fluid. This fluid exceeds specification S.A.E. J1703b in many respects and complies with D.O.T. 3 grade of FMVSS116. Bleed the braking systems and automatic height control system.

SPECIAL PRECAUTIONS
Should the car be used in very cold temperatures, drain the engine sump when thoroughly warm and also drain the carburettor air valve dampers. The engine sump and carburettor air valve dampers should then be filled with oil having the following viscosity.

For constant temperatures of between 0°C. and —23°C. (32°F. and —10°F.), use a 10W/30 grade oil.

For constant temperatures of —23°C. (—10°F.) and below, use a 5W/20 grade oil.

<table>
<thead>
<tr>
<th>SYMPTOMS</th>
<th>POSSIBLE CAUSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Engine will not start.</td>
<td>1. (a) Fouled contact breaker points or incorrect dwell angle.</td>
</tr>
<tr>
<td>(Starter motor operating).</td>
<td>(b) Ignition circuit broken.</td>
</tr>
<tr>
<td></td>
<td>(c) Failed anti-run-on solenoid or failure of electrical supply circuit.</td>
</tr>
<tr>
<td></td>
<td>(d) Blocked fuel feed line or fouled float chamber filters.</td>
</tr>
<tr>
<td></td>
<td>(e) Faulty choke bi-metal coil.</td>
</tr>
<tr>
<td></td>
<td>(f) Fast-idle speed incorrect.</td>
</tr>
<tr>
<td></td>
<td>(g) Choke solenoid inoperative.</td>
</tr>
<tr>
<td></td>
<td>(h) Blocked weaker vent line or fouled filter.</td>
</tr>
<tr>
<td></td>
<td>(i) Blocked carburettor float chamber vent line.</td>
</tr>
<tr>
<td></td>
<td>(j) Exhaust gas recirculation valves failed in open position.</td>
</tr>
<tr>
<td>SYMPTOMS</td>
<td>POSSIBLE CAUSE</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>2. Engine idles very roughly.</td>
<td>2. (a) Fouled contact breaker points or incorrect dwell angle.</td>
</tr>
<tr>
<td></td>
<td>(b) Air leaks between control valve and carburettor 'Tee' piece, or in exhaust gas recirculation</td>
</tr>
<tr>
<td></td>
<td>pipes.</td>
</tr>
<tr>
<td></td>
<td>(c) Fouled spark plugs.</td>
</tr>
<tr>
<td></td>
<td>(d) Exhaust gas recirculation valves stuck in the open position.</td>
</tr>
<tr>
<td></td>
<td>(e) Damaged or contaminated ignition high tension circuit.</td>
</tr>
<tr>
<td></td>
<td>(f) Failed deceleration (gulp/anti backfire) valve.</td>
</tr>
<tr>
<td></td>
<td>(g) Damaged vacuum modulator pipe causing air leak (inlet manifold to transmission).</td>
</tr>
<tr>
<td></td>
<td>(h) Blocked carburettor float chamber vent line.</td>
</tr>
<tr>
<td>3. Engine stalls.</td>
<td>3. (a) Incorrect idle speed.</td>
</tr>
<tr>
<td></td>
<td>(b) Flooding of float chamber or the jet.</td>
</tr>
<tr>
<td></td>
<td>(c) Water or foreign matter in the float chamber.</td>
</tr>
<tr>
<td></td>
<td>(d) Faulty hot idle mixture compensator.</td>
</tr>
<tr>
<td></td>
<td>(e) Exhaust gas recirculation valves stuck open.</td>
</tr>
<tr>
<td>4. (i) Engine shows signs of power loss,</td>
<td>4. (a) Insufficient delivery of fuel (i.e. blocked float chamber cover filters).</td>
</tr>
<tr>
<td>evident at high speeds and loading.</td>
<td>(b) Incorrect ignition timing.</td>
</tr>
<tr>
<td>(ii) Engine misfires particularly on</td>
<td>(c) Incorrect spark plugs or gap settings.</td>
</tr>
<tr>
<td>hard acceleration from low speed.</td>
<td>(d) Incorrect dwell angle.</td>
</tr>
<tr>
<td></td>
<td>(e) Fouled spark plugs.</td>
</tr>
<tr>
<td>5. Engine hesitates or misfires under light</td>
<td>5. High float chamber depression due to:</td>
</tr>
<tr>
<td>load.</td>
<td>(a) Weakening device filter blocked or blockage in rubber hosing or bleed orifice.</td>
</tr>
<tr>
<td></td>
<td>(b) Dislodged venturi in weakening device.</td>
</tr>
<tr>
<td></td>
<td>(c) Evaporation loss control canister filter blocked.</td>
</tr>
<tr>
<td></td>
<td>(d) Incorrect connection of weaker hose to valance adapter or evaporation loss control canister.</td>
</tr>
<tr>
<td></td>
<td>(e) Incorrect purge flow rate.</td>
</tr>
<tr>
<td></td>
<td>(f) Failed exhaust gas recirculation secondary valve solenoid or cut-in vacuum switch.</td>
</tr>
<tr>
<td>6. Increase in fuel consumption.</td>
<td>6. Low float chamber depression due to:</td>
</tr>
<tr>
<td></td>
<td>(a) A blockage in the weaker venturi, the hose from the weaker to vent canister or the hose from</td>
</tr>
<tr>
<td></td>
<td>the float chambers to the fuel receiver.</td>
</tr>
<tr>
<td></td>
<td>(b) Float chamber and weakening device air leaks.</td>
</tr>
<tr>
<td></td>
<td>(c) Float chamber connection air leaks as far as and including the one way valve in the fuel</td>
</tr>
<tr>
<td></td>
<td>drain pipe.</td>
</tr>
<tr>
<td></td>
<td>(d) Engine intake air temperature below 16°C (60°F).</td>
</tr>
<tr>
<td></td>
<td>(e) Air leaks between weakening device and tapping in carburettor body; including the weaker</td>
</tr>
<tr>
<td></td>
<td>cut-off valve.</td>
</tr>
<tr>
<td></td>
<td>(f) Faulty cut-off valve.</td>
</tr>
<tr>
<td></td>
<td>(g) A dirty or faulty float chamber drain valve.</td>
</tr>
<tr>
<td></td>
<td>(h) A dirty or faulty float chamber vent valve.</td>
</tr>
<tr>
<td></td>
<td>(i) Incorrect purge flow rate.</td>
</tr>
<tr>
<td></td>
<td>(j) Incorrect ignition timing.</td>
</tr>
<tr>
<td>7. Poor slow running, lack of power and high</td>
<td>7. (a) Sticking carburettor piston caused by the needle bearing heavily on the jet.</td>
</tr>
<tr>
<td>fuel consumption.</td>
<td>(b) Sticking carburettor piston caused by a bent damper rod.</td>
</tr>
<tr>
<td></td>
<td>(c) Sticking carburettor piston caused by dirt between the suction chamber and piston.</td>
</tr>
<tr>
<td></td>
<td>(d) Piston rod sticking in bush.</td>
</tr>
<tr>
<td></td>
<td>(e) Ignition timing incorrect.</td>
</tr>
<tr>
<td></td>
<td>(f) Failed vacuum retard tap.</td>
</tr>
<tr>
<td></td>
<td>(g) Exhaust gas recirculation valves stuck open.</td>
</tr>
<tr>
<td></td>
<td>(h) Fouled spark plugs.</td>
</tr>
<tr>
<td></td>
<td>(i) Faulty hot idle mixture compensator.</td>
</tr>
<tr>
<td></td>
<td>(j) Incorrect idle speed.</td>
</tr>
</tbody>
</table>
### SYMPTOMS

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>8.</td>
<td>Engine 'backfires' on over-run.</td>
</tr>
<tr>
<td>9.</td>
<td>Excessive noise from air injection pump.</td>
</tr>
</tbody>
</table>

### POSSIBLE CAUSE

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
| 8. | (a) Severe air leak in exhaust emission control system, probably between control valve and carburettor 'Tee' piece.  
     | (b) Leak in exhaust gas recirculation pipes, probably between valves and carburetters.  
     | (c) Deceleration (gulp/anti backfire) valve sticking in closed position.  
     | (d) Exhaust gas recirculation valves stuck open. |
| 9. | (a) Relief valve failure.  
     | (b) Damaged impeller vanes.  
     | (c) Rubbing vanes (an intermittent 'chirping' noise noticeable mainly at low engine speed).  
     | (d) Worn bearing (a rolling sound noticeable at all engine speeds). |

---

**WORKSHOP TOOLS**

**Tool Number Description**

- **RH 8050** Spanner—Carburettor Jet Screw
- **RH 8087** Spanner—Weakener Cut-off Valve
- **RH 8089** Jet Centring Tool
- **RH 8090** Pliers—Wire Hose Clips
- **RH 8095** Restrictor—Manometer Check—Choke Stove Pipe
- **RH 8382** Spanner—Distributor Dwell Angle
- **RH 8383** Positioning Tool—Throttle Spindle Seal
- **RH 8621** Adapter—Air Manifold to C.O. Meter
- **RH 8800** Vacuum Pump—Hand Operated

U80
Chapter U

Section U10

SUPPLEMENTS

No. 3 North America 1975

Rolls-Royce motor cars conforming to the appropriate emission control regulations and produced during 1975 can be readily identified as follows.

1. Car Serial Number

A letter D as the last prefix of the Car Serial Number (e.g. SRD or LRD, etc.).

2. Emission Control Certification Label

A 1975 Emission Control Certification Label (illustrated below) fitted to the wing valance to the rear of the right-hand front suspension spring cover.
FIG. 1 VIEW INSIDE ENGINE COMPARTMENT (From Right-hand side of Car)

1 Weakener filter
2 Check valves
3 Anti 'run-on' solenoid
4 'B' bank carburettor
5 E.G.R. cut-out solenoid
6 E.G.R. secondary valve cut-in micro-switch assembly
7 Choke solenoid
8 Choke stove pipe
9 Crankcase emission control system breather tube

FIG. 2 VIEW INSIDE ENGINE COMPARTMENT (From Left-hand side of Car)

1 Weakener system cut-off switch
2 E.G.R. primary valve
3 'A' bank carburettor
4 E.G.R. secondary valve
5 E.G.R. full throttle cut-out micro-switch
6 Speed control system regulator
7 Hydraulic accumulator fluid pressure switches
8 Air diverter valve cut-out micro-switch assembly
9 Air diverter valve
10 Air pump
EXHAUST EMISSION CONTROL SYSTEM

AIR INJECTION SYSTEM

Air injection system relief valve

The relief valve located in the discharge cavity of the air pump is changed on 1975 model year cars and is as follows.

Air pump relief valve

A spring loaded relief valve is located within the diverter valve housing and permits excess air to bypass the air injection system when the check valves are closed. The by-pass system prevents damage to the pump vanes and excessive exhaust temperatures under extreme operating conditions.

Air diverter valve

The air diverter valve is located at the front of the engine above the air pump (see Fig. 2) and performs two important functions in addition to housing the pressure relief valve for the air pump.

(i) Backfire protection (see Fig. 3)

Following rapid throttle closure, the inlet manifold pressure drops suddenly, causing fuel to be vapourised from the manifold walls which results in a mixture too rich to burn in the cylinders. This mixture combined with the air injected into the exhaust ports could cause backfiring.

To prevent backfiring, the diverter valve, triggered by manifold depression diverts the injected air from the exhaust ports for a short period of time.

(ii) Catalyst overtemperature protection (see Fig. 3)

Under high load conditions the low manifold depression activates a vacuum switch controlling a solenoid valve. The solenoid valve is located in the pressure line connecting the diverter valve inlet to the lower diaphragm cover. When the vacuum switch is activated the solenoid opens and applies air pump delivery pressure to the lower diaphragm, thereby diverting the air from the exhaust ports. This prevents excessive temperatures which could result in catalyst failure.

Air diverter valve—To check

The air diverter valve is a non-serviceable component. If the operation of the component is suspect the following checks should be carried out before it is replaced.

(i) Relief valve failure or shuttle seizure

1. Ensure that the vehicle is in Neutral and the parking brake firmly applied.
2. Start and run the engine at 2000 r.p.m.
3. Ensure that air does not escape from the air diverter valve exhaust ports, situated around the body of the diverter valve (see Fig. 3).
4. Stop the engine.

Should air escape from the air diverter valve exhaust ports under these test conditions, the assembly must be replaced with a new component as either the relief valve has failed, or the shuttle has seized.

A failure of this nature would probably be accompanied by a complaint of excessive noise from within the engine compartment, due to the pressurised air escaping from the air diverter valve exhaust ports.
FIG. 3 AIR DIVERTER VALVE

A Normal operation  
B Catalyst over temperature protection  
C Backfire protection  
D Relief valve operation

1 Exhaust to internal silencer  
2 Timing valve  
3 Lower diaphragm  
4 Internal silencer  
5 Exhaust to atmosphere  
6 Air pump pressure via solenoid valve  
7 Manifold vacuum signal  
8 Excess air  
9 Relief valve  
10 Valve outlets restricted  
11 Valve inlet  
12 Valve outlets to air manifolds  
13 Metering valve  
14 Air pump pressure to solenoid valve
(ii) **Diaphragm and timing valve failure**

1. With the engine stationary and the ignition switched off withdraw the rubber hose from the pressure connection on the diaphragm cover (see Fig. 3, item 6).

2. Attach one end of a length of hose to the pressure connection and place the other end into the mouth. Gently blow down the hose.

3. If air will not pass down the hose the diaphragm and timing valve are intact. However, if air does pass down the hose under these test conditions, either the diaphragm or the timing valve has failed and the air diverter valve assembly must be replaced with a new component.

A failure of this nature would result in the air diverter valve no longer protecting the exhaust catalyst from either high load running or backfiring.

---

**Air diverter valve—To remove**

Before commencing to remove the air diverter valve observe the following points.

1. When disconnecting the various hoses ensure that each is suitably labelled to assist identification when assembling.

2. Ensure that all open ends of pipes and hoses are suitably blanked off to prevent the ingress of dirt, etc.

**To remove the air diverter valve proceed as follows**

1. Unscrew the three worm drive clips which secure the three larger diameter rubber hoses to the air diverter valve and withdraw the hoses. Two of the hoses connect to their respective air manifold check valves and the third hose to the air pump.

---

**FIG. 4 AIR INJECTION SYSTEM**

1. Air diverter valve
2. Air diverter valve vacuum operated control switch assembly
3. Check valve
4. 'A' bank air manifold
5. Anti 'run-on' solenoid
6. Ignition distributor
7. Secondary valve micro-switch assembly
8. Exhaust gas recirculation solenoids
9. 'B' bank air manifold
10. Check valve
11. Inlet manifold tappings
12. Vacuum manifold
13. Air pump
14. Air pump intake
FIG. 5 EXHAUST GAS RECIRCULATION SYSTEM

1 Primary valve
2 Secondary valve
3 Secondary valve vacuum operated micro-switch assembly
4 Secondary valve solenoid assembly
5 Fuel mixture weakening device
6 Primary valve solenoid assembly
7 Inlet manifold vacuum tappings

A Hoses to be detached when removing carburetters
2. Withdraw the three smaller diameter rubber hoses from the air diverter valve.

The hose fitted to the front of the air diverter valve connects to the solenoid of the air diverter valve vacuum operated micro-switch assembly. The hose fitted to the rear of the assembly connects to the solenoid inlet and the hose fitted on the top of the assembly connects to the vacuum manifold. The hose connections are illustrated in Figure 4.

3. Using a 3/8 in. A/F spanner unscrew and remove the two nuts which secure the air diverter valve to the mounting plate. Collect the two washers.

4. Hold the diverter valve and withdraw the two bolts from the mounting plate, taking care not to lose the washer situated under the head of each bolt.

5. Remove the air diverter valve together with the spacer plate and gasket.

**Air diverter valve—To fit**

Fit the air diverter valve by reversing the procedure given for removal, noting the following points.

1. Ensure that all joint faces are clean.

2. Ensure that the gasket is in a good condition.

3. Always ensure that the spacer plate is fitted with the spigot projecting through the mounting plate into the hose which connects to the air pump and that the gasket is fitted to the opposite side of the mounting plate from the spigot.

**EXHAUST GAS RECIRCULATION SYSTEM**

A proportion of the exhaust gas from the 'A' bank exhaust downtake pipe is recirculated through vacuum operated metering valves into the carburettet 'Tee' piece, just downstream of the throttle plates.

This exhaust gas mixes with the inlet charge in the induction manifold and is distributed to the cylinders thus lowering the peak combustion temperature and reducing the formation of oxides of nitrogen emissions.

A 'dual valve' exhaust gas recirculation system is used, employing a primary valve with a tapered metering pintle which gives an increase in flow area for an increased valve lift, and a secondary valve which has a reverse tapered pintle and gives a minimum flow area at full valve lift.

The vacuum signal for the primary exhaust gas recirculation valve is taken from a series of drillings in the carburettet body, just upstream of the throttle edge. As the throttle is opened the signal strength is progressively increased.

The secondary valve vacuum signal is taken from the induction manifold via a solenoid valve which is controlled by a vacuum switch; the secondary valve only receives the vacuum signal when a predetermined manifold depression is reached.

When the throttle is opened the primary valve opens progressively as the vacuum signal increases. The valve is fully open at the point where the vacuum signal equals manifold depression.

Continued opening of the throttle lowers the manifold depression and actuates the secondary valve which immediately moves to the full valve lift position. Further opening of the throttle continues to reduce the manifold depression and consequently, the signal to both exhaust gas recirculation valves.

The reduced signal and valve lift reduces the flow area through the primary valve and increases the flow area through the secondary valve.

At very low vacuum signal strength both valves are seated and the flow is zero; in this way the recirculated exhaust gas is metered in proportion to the engine requirements for a reduction of oxides of nitrogen whilst retaining acceptable drivability.

To improve starting and driveaway quality at low temperatures solenoid valves activated by lock-out switches (see Fig. 13), interrupt the vacuum signals to both exhaust gas recirculation valves, ensuring that
they remain in the closed position, until predetermined coolant temperatures are reached. The secondary valve cuts in at a higher coolant temperature than the primary valve.

A micro-switch operated by the throttle lever (see Fig. 7) also controls the cut-off solenoids to provide exhaust gas recirculation cut-off at full throttle. This feature of the system prevents the secondary valve remaining open under full throttle, high speed operation, as this would be detrimental to performance and fuel consumption.

**Exhaust gas recirculation valve—To remove**

1. Detach the small diameter rubber hose from the valve.
2. Using a ½ in. A/F spanner slacken the three nuts which retain the heat shield.
3. Withdraw the heat shield.
4. **Primary valve**—Unscrew and remove the two ½ in. A/F nuts and washers retaining the valve to the mounting flange.

**Secondary valve**—Using a ¾ in. A/F spanner slacken the remaining nut and then unscrew and remove both retaining nuts and washers. Unscrew the ⅛ in. A/F nut retaining the mounting bracket to the ‘A’ bank carburettor bracket; collect the washer and withdraw the bolt.

5. Withdraw the valve and remove the gasket from the mounting flange face.

**Exhaust gas recirculation valve—To fit**

Fit the valve by reversing the procedure given for removal, noting the following points.
1. Ensure that the valve pintle is secure on the valve stem.
2. Ensure that the valve and mounting flange joint faces are clean and free from carbon deposits.
3. Always use a new mounting flange gasket.

**Exhaust gas recirculation valve—To clean**

1. Remove the valve as described in Exhaust gas recirculation valve—To remove.
2. Using a scraper, remove all carbon film from the valve and mounting flange faces; complete the operation with a wire brush.
3. Clean the carbon from the valve using a wire brush fitted into a portable drill. Take care not to damage the valve seating area.
4. Thoroughly blow out the valve with compressed air to ensure that all loose carbon particles are removed.
5. Upon completion of the cleaning operations, fit the valve to the engine mounting flange as described in Exhaust gas recirculation valve—To fit.

**Exhaust gas recirculation valves—Preliminary check**

To carry out preliminary checks on the operation of both primary and secondary exhaust gas recirculation valves proceed as follows.

1. Connect an electric impulse tachometer to the engine in accordance with the manufacturer’s instructions.
2. Ensure that the parking brake is firmly applied and that the gear range selector is in the Neutral position.
3. Start the engine and run until normal operating temperature is attained.
4. Allow the engine to return to the idle speed.
5. Increase the engine speed slowly noting the operation of the exhaust gas recirculation valves.
6. When the engine speed has reached 2,000 r.p.m. the diaphragm of the primary exhaust gas recirculation valve should have moved to the 'full valve lift' position.

7. Stop the engine. Disconnect the hose from the secondary valve cut-in solenoid vacuum unit. Blank off the open end of both the unit and the hose.

8. Disconnect the hose from the primary valve and blank off the open end of both the valve and the hose.

9. Start the engine and note that the secondary valve also moves to the full lift position. It may be necessary to increase the engine speed to prevent stalling.

If both diaphragms have moved to 'full valve lift' position in their respective tests, stop the engine and remove the tachometer as the test is complete.

Remove the blanks from the hoses; fit the vacuum unit hose and primary valve hose to their respective connections.

If the diaphragms have not moved to the required position stop the engine and proceed as follows.

**Exhaust gas recirculation valve signal strength—To check**

1. Remove the pressure tapping cap from 'A' bank carburettor to vent the float chambers.

2. Disconnect at the signal block the exhaust gas recirculation cut-out solenoid hose. Connect a mercury manometer 0 to 10 in. Hg. (0 to 25.4 cm. Hg.) to the signal line tube.

3. Fit dial gauge assemblies RH8841 to the carburetters in place of the dampers.

4. Zero the gauges with the engine stationary.

5. Lightly tighten the clamp screws of the dial gauge assemblies.

6. Start the engine and allow to run at an idle speed of 600 r.p.m., ensure that the piston lift of the carburetters shown on the dial gauge assemblies is equal (within 10%), adjust by using the eccentric adjuster on the carburettor throttle linkage.

7. Raise the engine speed using the idle speed adjusting screw until 'B' bank carburettor dial gauge reads 0-25 in. (6.35 mm.). 'A' bank carburettor dial gauge should also read 0-25 in. (6.35 mm.) with a tolerance of plus or minus 0-010 in. (0.254 mm.).

**Note** The suction chambers of both carburetters should be lightly tapped with a non-metallic object (wooden handle of a small screwdriver) during this operation.

8. Adjust the exhaust gas recirculation signal to 3-2 in. Hg. (8.13 cm. Hg.) using the adjusting screw (see Fig. 17, item 15).

9. If difficulty is experienced in obtaining the signal reading, ensure that air is not leaking at the signal block joint.

10. Disconnect the manometer and connect the exhaust gas recirculation solenoid hose to the signal tube.

**Note** If it is necessary to adjust the E.G.R. signal by more than 0-2 in. Hg. (0.51 cm. Hg.), refer to Operation 8, Page U110—Float chamber depression—To check and ensure that the maximum steady manometer reading is still obtainable within an engine speed range of 1,300 r.p.m. to 1,600 r.p.m.

**Primary valve**

11. Disconnect the solenoid to exhaust gas recirculation primary valve hose at the valve. Connect the hose to the manometer.

12. Repeat Operation 7.

13. Ensure that the exhaust gas recirculation signal shown on the manometer is between 3-0 in. Hg. (7.6 cm. Hg.) and 3-4 in. Hg. (8.6 cm. Hg.).
14. Disconnect the hose from the inlet manifold tapping to the secondary valve solenoid at the solenoid. Blank off the hose.
15. Disconnect the hose from the low temperature exhaust gas recirculation solenoid to the primary valve, at the valve.
16. Connect the primary valve hose to the open connection on the secondary valve solenoid.
17. Repeat Operation 7.
18. Ensure that the exhaust gas recirculation signal shown on the manometer is between 3-0 in. Hg. (7.6 cm. Hg.) and 3-4 in. Hg. (8.6 cm. Hg.).

A low or zero reading may be caused by:

a. Blockage in the hose from the secondary valve solenoid to the exhaust gas recirculation secondary valve.

b. A faulty exhaust gas recirculation secondary valve solenoid.

c. Low engine temperature below 44°C. (111°F.), or a faulty exhaust gas recirculation lock-out switch (in thermostat housing).

19. Disconnect the mercury manometer and connect the hoses to their respective connections, leaving only the hose to the vacuum operated micro-switch disconnected and blanked off.
20. Check the operation of the valve by running the engine at 2,000 r.p.m. ensuring that the valve opens by observing the movement of the diaphragm.

If the secondary valve does not move, it may be due to a blockage in the hose from the manifold to the secondary valve solenoid.
21. Connect the hose to the vacuum operated micro-switch after first removing the blank.

**Oxidation Catalyst System**

A catalytic converter, in place of the conventional front silencer is situated in the exhaust system to the rear of the point in the system where both exhaust manifold downtake pipes combine.

The box unit contains three catalyst blocks and has sufficient volume to perform the dual functions of both converter and silencer (see Fig. 9). A platinum group metal catalyst on a ceramic monolith support is used for optimum conversion efficiency and rapid warm-up. Three separate blocks are used to minimise the effect of thermal shock and are positioned to ensure good gas distribution and effective utilisation of the catalyst volume.

The catalyst promotes reaction between the residual hydrocarbons and carbon monoxide in the exhaust
and the secondary air injected into the exhaust ports. After completion of the oxidation process the exhaust gas is discharged to the atmosphere from the tailpipe.

**Catalytic converter protection**

To protect the catalytic converter from possible damage the following precautions should be taken.

(i) **Unleaded gasoline**

Use unleaded gasoline only. The use of leaded gasoline will result in a **substantial reduction in the performance of the catalyst**. Under no circumstances add fuel system cleaning agents to either the fuel tank or carburetters for induction into the engine, as these materials may have a **detrimental effect on the catalytic converter**.

(ii) **Engine malfunction**

If the engine misfires or suffers from a lack of power which could be attributed to a malfunction of either the ignition or fuel systems, the vehicle **should be driven only at low speed** and the fault rectified as soon as possible by an authorised Dealer. Driving at high speeds with a malfunction in either of these systems could cause overheating and consequent damage to the catalyst.

(iii) **Fuel**

Do not allow the engine to run out of fuel. If the engine does run out of fuel at a high speed **possible damage to the catalyst could result**.

**Catalytic converter—To remove**

1. Unscrew the self-tapping screws that secure the shield below the catalytic converter assembly. Withdraw the shield.
2. Unscrew the \( \frac{7}{8} \) in. A/F nuts that secure the two shields to the exhaust pipe on either side of spherical joint, situated to the rear of the body cross-member.
3. Collect the washers, withdraw the bolts and remove the shields.

**Note** Take care when removing the shields as the edges are sharp and could cause injury to the hands.
4. Support the weight of the exhaust pipe which passes into the expansion box.
5. Using a \( \frac{1}{2} \) in. A/F spanner unscrew and remove the nut retaining the exhaust mounting around the exhaust pipe (situated behind the body cross-member).
6. Remove the nut and withdraw the bolt, collect the washer.
7. Open the mount and slide it over the exhaust pipe.
8. Slacken the two \( \frac{7}{8} \) in. A/F nuts retaining the exhaust clamp around the spherical joint to the rear of the body cross-member and catalytic converter assembly.
9. Unscrew the nuts completely and withdraw the bolts; collect the washers.
10. Remove the two halves of the clamp joint from the exhaust pipe. Free the two sections of the pipe from each other and collect the sealing ring.
11. Allow the forward section of the exhaust to rest on the body cross-member and repeat Operations 8 to 10 inclusive on the spherical exhaust joint situated in front of the catalytic converter assembly. Hold the forward end of the assembly as the front joint is freed.
12. Withdraw the catalytic converter assembly in a forward and downwards direction.

**Catalytic converter—To fit**

Fit the catalytic converter assembly by reversing the procedure given for removal, noting the following points.

1. The seal rings and pipe flares must be thoroughly clean and free from scale and may be lightly dressed with fine emery cloth if required.
2. The clamp bolt threads should be lightly oiled to prevent binding during assembly and the spherical faces of the sealing rings and the grooves in the clamps should be smeared with a graphite lubricant, to ensure correct alignment of the pieces on assembly.
3. Fit the pipe and catalytic converter assembly complete with seal rings, then loosely fit the joint clamps and the ‘handcuff’ clamp.
4. The joints must not be fully tightened until the pipe has been manoeuvred to obtain the best run (free from possible fouls) and good joint alignment.

**Note** The pipe joints must not be ‘sprung’ or ‘clamped’ into position.
5. When the pipe run is satisfactory, torque tighten the joint clamp nuts in accordance with the standard torque figures given in Chapter P then ‘set’ the ‘Vibrashock’ mount to allow for expansion in the exhaust system, when hot.

**‘Vibrashock’ exhaust mount—To set**

This exercise is carried out by holding the ‘handcuff’ clamp forward whilst tightening the pinch bolt. This has the effect of misaligning the centre of the mount and this misalignment should be approximately 0.187 in. (4.76 mm.) at the mount centre.
FUEL EVAPORATION EMISSION CONTROL SYSTEM

FIG. 10 FUEL EVAPORATION EMISSION CONTROL SYSTEM—GENERAL VIEW

1 Vacuum manifold
2 Anti 'run-on' solenoid
3 Float chamber vent valve
4 Weaken cut-off solenoid
5 Fuel trap assembly
6 Fuel tank assembly
7 Weaken filter
8 Evaporative loss control canister
9 Purge line filter
10 Float chamber drain valve
Purge line

The purge line consists of a rubber hose, passing from the lowest connection on the canister through the valance junction piece to the vacuum manifold. Incorporated into this hose is the purge line filter and restrictor.

When the engine is running, air drawn through the canister filter and carbon picks up the stored fuel vapours and passes them via the hose, to the induction manifold. The restrictor in the line controls the flow rate at between 50 cu. ft. per hr. and 70 cu. ft. per hr. (1,41 cu. m. per hr. and 1,98 cu. m. per hr.) to maintain carburettet metering accuracy and the paper element line filter is fitted to prevent blockage of the restrictor.

Purge line filter—To remove

1. Using special pliers (RH 8090) remove the two steel retaining clips situated on either side of the unit.
2. Slacken the setscrew which secures the nylon retaining clip.
3. Withdraw the component from the clip.

Purge line filter—To fit

Fit the purge line filter by reversing the procedure given for removal noting the following points.
1. Ensure that the rubber hoses are in a good condition and new hose retaining clips are used.

FIG. 11 POSITION OF MIXTURE WEAKENING DEVICE FILTER AND PURGE LINE FILTER

1. Weaken filter
2. Speed control system regulator
3. Hydraulic fluid accumulator pressure switches
4. Engine oil filter
5. Purge line filter
CRANKCASE EMISSION CONTROL SYSTEM

Crankcase emissions are controlled by a recirculatory closed breather system (see Fig. 12).

An insulated draught tube connects the crankcase via the oil filler which is fitted with a sealed cap, to the choke housing upstream of both the choke butterfly and the carburetters. A flame trap capsule containing three wire mesh discs is fitted in a housing at the crankcase end of the draught tube. Engine emission (blow-by) is drawn into the induction system via the draught tube, due to the depression in the choke housing.

Maintenance

1. The flame trap fitted to the breather pipe should be cleaned in the following manner, at the specified mileage.

2. Unscrew the setscrew securing the breather pipe connection to the oil filler pedestal; withdraw the connection from the pedestal (slight resistance may be felt due to the rubber 'O' ring connections).

3. Withdraw the connection from the pipe flange and collect the restrictor.

4. Wash the flame trap assembly in clean petrol, then dry with a high pressure air line. The flame trap assembly consists of 3 gauzes crimped together as shown in Figure 12.

5. To clean the adapter fitted to the choke housing, remove the single setscrew from the breather pipe end connection and detach the pipe.

6. Clean the adapter fitted to the choke housing and ensure that the holes in the adapter are clear.

7. Assembly of the flame trap and breather pipe is in the reverse order, ensuring that the 'O' rings are in good condition.

---

**FIG. 12 EXPLODED VIEW OF CRANKCASE EMISSION CONTROL PIPE**

Diagram A
1. Pipe
2. 'O' ring
3. Connection
4. Washer
5. Setscrew

Diagram B
1. Pipe
2. Setscrew
3. 'O' ring
4. Restrictor
5. Flame trap
6. Connection
7. 'O' ring

---
EMISSION CONTROL SYSTEMS (ELECTRICAL COMPONENTS)

The electrical components described in this section would normally appear in Chapter M—Electrical System, however, as they are only used in connection with the emission control system it is thought more practical to include the information in this Chapter.

The components concerned are as follows.

(i) The exhaust gas recirculation primary valve lock-out switch.
(ii) The exhaust gas recirculation secondary valve lock-out switch.
(iii) The exhaust gas recirculation valve cut-off solenoid.
(iv) The anti 'run-on' solenoid.
(v) The weakener cut-off solenoid valve.
(vi) The weakener cut-off solenoid switch.

Note: The temperatures quoted throughout this section for the various switches are nominal operating temperatures and in service, a plus or minus tolerance of a few degrees may be found.

Exhaust gas recirculation lock-out switch
—To fit

Fit the lock-out switch by reversing the procedure given for removal, noting the following points.

1. Each setscrew has one spring and one plain washer.
2. The joint faces must be clean and a new gasket fitted.

Exhaust gas recirculation lock-out switch
—To remove

The bi-metal lock-out switches are situated in the engine coolant thermostat housing and outlet elbow (see Fig. 13).

1. Remove the radiator filler cap and drain the engine coolant.
2. Disconnect the electrical lead.
3. Unscrew and remove the three 2 B.A. setscrews, spring washers and plain washers from the appropriate switch.
4. Free the joint and withdraw the respective lock-out switch.

FIG. 13 EXHAUST GAS RECIRCULATION LOCK-OUT SWITCHES
1 Secondary valve lock-out switch
2 Primary valve lock-out switch
3 Thermostat outlet elbow
4 Engine coolant thermostat
Exhaust gas recirculation primary valve cut-off solenoid

The exhaust gas recirculation primary valve cut-off solenoid is the middle solenoid of three solenoids situated on a small platform, adjacent to the 'B' bank carburettor (see Fig. 14).

Exhaust gas recirculation primary valve cut-off solenoid—To remove

1. Detach the electrical connections, noting the position of the connections to assist identification when assembling.
2. Unscrew the two 'cheese-headed' mounting screws and withdraw the solenoid.

Exhaust gas recirculation primary valve cut-off solenoid—To fit

Fit the cut-off solenoid by reversing the procedure given for removal.

Exhaust gas recirculation primary valve cut-off solenoid circuit wiring

—To check

1. Connect a test lamp across the two Lucas connections to the solenoid.
   Note Do not disconnect the two Lucas connections.
2. Ensure that the engine is cold.
3. Switch on the ignition and start the engine, noting that the bulb of the test lamp is illuminated.
4. Start and run the engine, as the coolant temperature rises to 14°C (57°F.) the test lamp bulb should extinguish.
5. Depress the full throttle cut-out micro-switch plunger and check to ensure that the test lamp bulb illuminates. Release the plunger and the test lamp bulb should be extinguished.
6. Stop the engine and allow to cool, noting that as the coolant temperature drops to 12°C. (54°F.) the test lamp bulb again illuminates.
   Note Do not leave the ignition switched on for long periods of time when the engine is not running.

Exhaust gas recirculation primary valve cut-off solenoid—To check

1. Detach the solenoid hose at the weaken case unit.
2. Clean the end of the hose.
3. Switch on the ignition.
   Note Do not leave the ignition switched on for long periods of time when the engine is not running.

Exhaust gas recirculation lock-out switch

—To check

1. Disconnect the electrical connection from the switch.
2. Connect one side of a test lamp to the switch contact of the lock-out switch to be tested and the other side to a known good electrical supply.
3. Ensure that the engine is cold and switch on the ignition.
4. Check that the test lamp bulb is illuminated.
5. **Primary valve lock-out switch**—Start and run the engine, as the coolant temperature rises to 14°C (57°F.) the test lamp bulb should extinguish.
6. Stop the engine and allow to cool, noting that as the coolant temperature drops to 12°C. (54°F.) the test lamp bulb again illuminates.
   Note Do not leave the ignition switched on for long periods of time when the engine is not running.
4. Place the hose in the mouth and apply suction.
5. If the operation of the solenoid is correct note that the following conditions apply and connect the hose to the weaker.
   (i) With an engine coolant temperature of below 14°C. (57°F.) sucking on the hose should not prompt any movement of the exhaust gas recirculation valve.
   Disconnect the hose from the exhaust gas recirculation valve. Clean the end of the hose, place in the mouth and blow; it should be possible to blow down this hose as the solenoid is vented to atmosphere. Connect the hose to the exhaust gas recirculation valve.
   (ii) With an engine coolant temperature of above 14°C. (57°F.) sucking on the hose from the weaker unit should move the exhaust gas recirculation valve.
   (iii) As the engine coolant temperature falls to 12°C. (54°F.) the conditions described in (i) should again apply.
6. If the operation of the solenoid is suspect, fit a new unit.

**Exhaust gas recirculation secondary valve cut-in solenoid and vacuum operated micro-switch**

This assembly is situated rearmost of the three solenoid assemblies mounted on a platform, adjacent to the "B" bank carburettor (see Figs. 5 and 14).

**Exhaust gas recirculation secondary valve cut-in solenoid and vacuum operated micro-switch—To remove**

1. Detach the rubber hoses from the solenoid, solenoid vent and vacuum unit.
   Note Each rubber hose should be labelled as it is detached, to facilitate identification during assembly.
2. Disconnect the two electrical leads at their Lucar connections.
3. Unscrew and remove the two 2 B.A. screws which retain the micro-switch cover in position. Withdraw the cover.
4. Unscrew the two reach-nuts and withdraw the micro-switch assembly.
5. Unscrew and remove the two support pillars. Withdraw the solenoid assembly.
6. Collect the two distance pieces situated beneath the solenoid feet.

**Exhaust gas recirculation secondary valve cut-in solenoid and vacuum operated micro-switch—To fit**

Fit the secondary valve cut-in solenoid and vacuum operated micro-switch assembly by reversing the procedure given for removal.

**Exhaust gas recirculation secondary valve cut-in solenoid and vacuum operated micro-switch circuit wiring—To check**

1. Connect a test lamp across the two Lucar connections to the solenoid.
   Note Do not disconnect the two Lucar connections.
2. Ensure that the engine is cold.
3. Switch on the ignition and start the engine, noting that the bulb of the test lamp is illuminated.
4. Start and run the engine until the coolant temperature rises to 44°C. (111°F.).
5. Stop the engine.
6. Switch on the ignition and note that the test lamp bulb is extinguished.
7. Start the engine and run at the idle speed, noting that the bulb of the test lamp is illuminated.

**Exhaust gas recirculation secondary valve cut-in solenoid and vacuum operated micro-switch—To set**

1. Unscrew and remove the two 2 B.A. screws which retain the micro-switch cover in position.
2. Remove the cover.
3. Disconnect the rubber hose from the vacuum unit.
4. Connect a suitable hand operated vacuum pump with a scale calibrated in ins. of Hg. (RH 8800) to the vacuum unit connection.
5. Draw a vacuum of 12 in. Hg. (30.5 cm. Hg.) with the pump. Allow the vacuum to decrease to 8.75 in. Hg. (22.2 cm. Hg.) and then seal the vacuum line to maintain the vacuum at the micro-switch.
6. Release the lock-nut and screw the spring loaded plunger assembly in until the micro-switch is fully depressed (see Fig. 6).
7. Screw the spring loaded plunger assembly out until the micro-switch 'clicks'. Tighten the lock-nut.
8. Check the operation of the vacuum operated micro-switch as detailed in Exhaust gas recirculation secondary valve cut-in solenoid and vacuum operated micro-switch—To check.
9. Fit the micro-switch cover. Remove the vacuum pump and re-connect the rubber hose to the vacuum unit.

**FIG. 15 CARBURETTER WEAKENING DEVICE**

A Hoses to be detached when removing carburetters
1 'A' bank carburetter
2 Float chamber pressure tapping
3 Weakening device
4 Bi-metal switch
5 Float chamber vent valve
6 Weakening device cut-off solenoid
7 Anti 'run-on' solenoid
8 Float chamber drain valve
9 Fuel receiver
10 Weakenier filter
11 Purge line filter
12 Purge line restrictor
13 Vacuum manifold
14 Restrictor
Exhaust gas recirculation full throttle cut-off micro-switch—To remove
1. Detach the two electrical leads at theirLucar connections.
2. Unscrew and remove the two small nuts and bolts which retain the micro-switch in position on the mounting bracket.
3. Withdraw the micro-switch.

Exhaust gas recirculation full throttle cut-off micro-switch—To fit
Fit the micro-switch by reversing the procedure given for removal. Finally, set the micro-switch.

Exhaust gas recirculation full throttle cut-off micro-switch circuit wiring—To check
1. Start and run the engine until normal operating temperature is attained.
2. Switch off the ignition.
3. Connect a test lamp in turn across the two Lucar connections to the primary and secondary exhaust gas recirculation cut-off solenoids.
   Note: Do not disconnect the Lucar connections.
4. Switch on the ignition and check that the test lamp bulb is extinguished.
5. Open the throttles to the full throttle position to activate the full throttle cut-off micro-switch and thereby, illuminate the test lamp bulb.

Exhaust gas recirculation full throttle cut-off micro-switch—To set
Prior to setting the exhaust gas recirculation system cut-off micro-switch, ensure that the following are correctly set.
   (i) Throttle linkage (refer to Chapter K).
   (ii) Carburettor linkage (refer to page U104 of this Supplement).
   (iii) Kick-down micro-switch (refer to Chapter U).
To set the cut-off micro-switch proceed as follows.
1. Depress the accelerator pedal until it touches the toboard mounted kick-down micro-switch (further depression of the pedal requires increased effort).
2. Hold the throttle linkage in the position described in Operation 1 and release the lock-nut (Fig. 7, item 2) on the throttle lever (item 3).
3. Screw the spring loaded operating button away from the micro-switch.
4. When there is clearance at this point screw the spring loaded operating button toward the micro-switch until the micro-switch is heard to ‘click’.
5. Tighten the lock-nut.
6. Depress the accelerator pedal further to operate the toboard mounted kick-down micro-switch.
7. Adjust the full throttle stop (Fig. 7, item 4) to prevent overloading of the kick-down micro-switch. The full throttle stop should be set so that all throttle movement is stopped just prior to the operating button spring becoming fully compressed.

Anti 'run-on' solenoid
The anti 'run-on' solenoid is situated on a platform adjacent to ‘B’ bank carburettor; it is the foremost of the three solenoids fitted on the platform.
The use of low octane fuel often causes an engine to 'diesel' (i.e. continue to run-on after the ignition has been switched off, particularly when the engine is hot). To prevent this condition arising an anti 'run-on' solenoid is connected to the weakener unit signal line (see Fig. 15).
When the ignition is switched off the solenoid opens and connects the weakener system to the induction manifold, thus creating a high float chamber depression which cuts off the supply of fuel.

Anti 'run-on' solenoid—To remove
1. Disconnect the rubber hose from either side of the solenoid.
2. Disconnect the two electrical leads at their Lucar connections.
3. Unscrew and remove the two screws situated one on either side of the solenoid body.
4. Withdraw the anti 'run-on' solenoid.

Anti 'run-on' solenoid—To fit
Fit the anti 'run-on' solenoid by reversing the procedure given for removal.

Anti 'run-on' solenoid circuit wiring—To check
1. Connect a test lamp across the two Lucar connections to the solenoid.
   Note: Do not disconnect the two Lucar connections.
2. Switch on the ignition and check that the test lamp bulb illuminates.
3. Switch off the ignition and check that the test lamp bulb is extinguished.

(ii) With the ignition switched on it should not be possible to blow down the hose.
(iii) With the ignition switched off the solenoid is de-energised and it should be possible to blow down the hose.
6. If the operation of the solenoid is suspect, fit a new unit.

**Anti ‘run-on’ solenoid—To check**
1. Detach the hose from the solenoid to the ‘Tee’ piece at the solenoid end and connect a piece of hose of identical internal diameter but of suitable length, to the solenoid.
2. Clean the open end of the hose.
3. Switch on the ignition.
4. Place the hose in the mouth and blow down the hose.
5. If the operation of the solenoid is correct note that the following conditions apply and connect the original hose to the solenoid.

**Weakener cut-off solenoid**
Refer to page U21

**Weakener valve cut-off switch**
Refer to page U21

---

**THE CARBURETTERS AND AUTOMATIC CHOKE SYSTEM**

**CARBURETTER**

<table>
<thead>
<tr>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carburetters</td>
</tr>
<tr>
<td>Choke size</td>
</tr>
<tr>
<td>Jet size—</td>
</tr>
<tr>
<td>spring loaded needle type</td>
</tr>
<tr>
<td>Jet needle—</td>
</tr>
<tr>
<td>air valve piston spring</td>
</tr>
</tbody>
</table>

**CARBURETTER MIXTURE WEAKENING DEVICE**

**Description**
In addition to the description given on pages U24 and U25, the following information is applicable.

**Anti-diesel device**
**[anti ‘run-on’ solenoid]**
The use of low octane fuel causes the engine to ‘diesel’ (i.e. continue to run-on after the ignition has been switched off) when it is hot. To prevent this from happening an anti ‘run-on’ solenoid valve is fitted into the weakener signal line. When the ignition is switched off this valve opens and connects the weakening system to the induction manifold thus creating a high float chamber depression which cuts off the fuel supply.
**Carburettor overrun valves**

During overrun (i.e. when decelerating with the throttles closed), insufficient mixture is supplied to the engine to maintain satisfactory combustion. The overrun valves alleviate this condition by allowing some mixture to pass through the throttle plates (butterflies) at high inlet manifold depressions.

An overrun valve consists of a small disc retained in each throttle plate by a spring loaded plunger. Under normal conditions the disc is seated against the throttle plate. When the throttle is suddenly closed, the increased inlet manifold depression lifts the disc from its seating and allows a metered quantity of air/fuel mixture to pass through the throttle plate.

The action of the overrun valves maintains satisfactory combustion on overrun, thus reducing hydrocarbon emissions and controlling catalyst temperatures.

After the sudden closure of the throttles and as soon as the manifold depression falls, the overrun valve disc returns to its seat on the throttle plate.

**Throttle damper**

The throttle damper prevents rapid throttle closure which would suddenly drop the inlet manifold...
1 'Swing' needle assembly
2 Piston
3 Suction chamber
4 Mixture weakening device ('B' bank carburettor only)
5 Volume screw
6 Damper
7 Overflow pipe
8 Throttle plate
   (incorporating overrun valve)
9 Spindle
10 Float needle
11 Float chamber
12 Anti-boiling device
13 Filter element
14 Jet diaphragm
15 E.G.R. signal adjusting screw
   ('B' bank carburettor only)
pressure causing vapourisation of fuel from the manifold walls and a sudden increase in mixture strength.

**Temperature controlled air intake**

To ensure rapid warm-up and improve control of the air/fuel ratio a temperature controlled air intake is fitted (see Fig. 20).

A vacuum operated blending valve attached to the air cleaner assembly is controlled by a thermal sensor in the air intake elbow. This valve blends hot air from a pick-up point (scoop) adjacent to the exhaust manifold with cold air from under the front wing; thus maintaining a constant temperature of the intake air as it enters the carburetters.

**Throttle stop vacuum actuator assembly**

The throttle stop vacuum actuator assembly is not fitted to cars produced to the 1975 specification.

---

**OVERHAUL**

**Carburetters—To remove**

Before commencing to remove the carburetters observe the following points.

1. When disconnecting the various hoses, pipes and wiring connections ensure that they are suitably labelled to assist identification when assembling.
2. Ensure that all open ends of pipes, hoses, etc. are suitably blanked off to prevent the ingress of dirt, etc.

**To remove the carburetters proceed as follows.**

1. Disconnect the battery.
2. Unscrew and remove the two \( \frac{7}{8} \) in. A/F nuts from the joint in the small diameter exhaust pipe, situated below the exhaust gas recirculation valves. Free the joint.
3. Detach the following rubber hoses (see Fig. 15).
   - (i) The hose from the weakening device cut-off solenoid to the small diameter 'tee' piece, at the solenoid.
   - (ii) The hose from the float chamber vent valve to the valance connection block, at both ends.
   - (iii) The hose from the weakening device to the 'tee' piece.
   - (iv) The hose from the vacuum manifold to the anti 'run-on' solenoid.
4. The overflow hoses from the carburetter float chambers to the fuel receiver.
5. Both hoses from the inlet manifold tappings (see Fig. 5).

4. Detach the following electrical connections.
   - (i) The two connections at the full throttle E.G.R. cut-out micro-switch, also release the two rubber clips which hold the loom to the 'B' bank float chamber fuel feed pipe.
   - (ii) The two connections to the anti 'run-on' solenoid, including the earth wires from beneath one of the solenoid mounting feet. Also, release the loom from the clip situated on the solenoid mounting platform.
   - (iii) The two connections to the E.G.R. secondary valve cut-in micro-switch and one connection above the micro-switch assembly.
   - (iv) The connections to both E.G.R. cut-out solenoids at the Lucas connection block.
   - (v) The choke solenoid connections, also release the wires from the adjacent clip.
   - (vi) The weaker cut-off bi-metal switch.

5. Remove the crankcase breather pipe from the choke butterfly housing; withdraw the connection from the end of the pipe.
6. Disconnect the choke stove pipe from the choke housing.
7. Disconnect the choke stove pipe from the choke bi-metal coil housing connection.
8. Unscrew the worm drive clips securing the air intake hose in position; remove the hose. Unscrew the worm drive clip securing the metal intake elbow to the butterfly choke housing. Disconnect the two rubber hoses connected to the thermal sensor situated inside the metal elbow. Withdraw the elbow.
9. Remove the engine oil dipstick.
10. Unscrew and remove the 2 B.A. bolt, nut and washer securing the throttle linkage to the 'fore and aft' manifold shaft lever; this connection is adjacent to the 'A' bank carburettet.
11. Withdraw the throttle linkage from the manifold shaft.
12. Disconnect the main fuel feed pipe.
13. Remove the air horns, choke butterfly housing, carburettets and 'Tee' piece as one complete assembly. The assembly is secured to the induction manifold by a \( \frac{1}{2} \) in. A/F setscrew situated centrally on the carburettet 'Tee' and located by two dowel pins.
14. Before lifting the carburettets assembly from the engine check to ensure that no wires, hoses or other joints have been left connected.
Dismantle the carburetters from the ‘Tee’ piece and air horns as follows.
15. Unscrew the four setscrews retaining the E.G.R. distribution pipes in position on the carburettor ‘Tee’ piece.
16. Remove the exhaust gas recirculation valves from the carburetters assembly (refer to Exhaust gas recirculation valves—To remove in this Supplement) noting that the distribution pipes can be left connected to the E.G.R. valves.
17. Slacken the pinch bolt and remove the fast-idle lever from the ‘A’ bank carburettor butterfly spindle.
18. Unscrew and remove the two \( \frac{1}{4} \) in. A/F nuts from the two setscrews securing the air horn to ‘B’ bank carburettor. Disconnect the rubber hoses from the solenoids. Unscrew the cheese-headed screw from the solenoid platform mounting foot adjacent the engine oil dipstick tube, collect the nut and washer, and withdraw the solenoid platform assembly.
19. Remove the four setscrews securing the two air horns to the carburetters, collect the full throttle stop bracket assembly with the throttle damper from ‘A’ bank carburettor. Remove the air horns.
20. Disconnect the fuel feed pipe from the float chambers.
21. Disconnect and remove the throttle spring.
22. Completely remove the two pinch bolts securing the throttle levers to the ‘A’ and ‘B’ bank carburettor butterfly spindles; remove the levers.
23. Remove the nuts and washers securing both carburetters to the ‘Tee’ piece, remove the carburetters.

8. Fill the damper piston with an approved oil; the oil level should be approximately 0.5 in. (12.7 mm.) below the top of the piston rod. Do not overfill.

Carburetters—To set

The carburetters fitted to these cars are adjusted at the factory using special equipment to ensure that their settings comply with the current emission control regulations.

Under normal circumstances the carburetters should not require adjustment in service.

If however, adjustment is found necessary due to inadvertent disturbance or replacement of a component, set the carburetters by carrying out the following operations in the sequence given.

A. Set throttle linkage and temporarily set engine idle speed. Check linkage clearances.
B. Set cold start ‘fast-idle’ cam.
C. Tune carburetters.
D. Set cold start ‘fast-idle’ speed.
E. Set the throttle damper plunger.
F. Set the kick-down micro-switch.
G. Set full throttle stop and full throttle E.G.R. cut-off micro-switch.

Contra-rotating throttles—To fit and set (see Fig. 18)

1. Assemble ‘A’ bank and ‘B’ bank throttle levers (items 7 and 13) onto the carburettor spindles.
2. Fit the setting jig (RH 8880) into position on the throttle levers.
3. Fully close ‘B’ bank carburettor butterfly (item 8).
4. Tighten the pinch bolt securing ‘B’ bank throttle lever.
5. Fully close ‘A’ bank carburettor butterfly (item 3).
6. Tighten the pinch bolt securing ‘A’ bank throttle lever.
7. Fit the throttle spring (item 4) to the throttle levers.
8. Remove the setting jig from the throttle levers.
9. Fit the cross link (item 12) and the eccentric throttle adjuster (item 5) onto the throttle levers, ensuring that both throttle butterflies are closed when adjusting and tightening the eccentric adjuster.

Note The eccentric pin should be set in the lowest position possible.
10. Ensure that the tang of the throttle guard (item 6) has a clearance of between 0.050 in. (1.27 mm.) and 0.070 in. (1.78 mm.) with the cross link and also that the tang does not foul the throttle spring. If necessary bend the tang to give these clearances.
11. Check that the throttle linkage moves freely.
12. Fit the idle stop screw (item 10) and adjust until it just contacts the stop bracket (item 11) with the throttle butterflies remaining in the closed throttle position.
13. Screw down the idle stop screw ½ turn and tighten the lock-nut.
14. Screw both of the carburettor volume screws (items 2 and 9) fully in.
15. Fit the throttle damper (item 1) with the damper spindle compressed 0.187 in. (4.75 mm.) when throttle lever (item 13) is in the closed position. Ensure that the damper rod contacts the throttle lever centrally 0.20 in. (5.1 mm.) from the outer edge.
16. Connect the drive link (item 14) to the manifold shaft lever (item 15).
17. Operate the linkage to ensure free movement.
18. With the throttles in the closed position check that the 'A' bank control shaft to control rod lever (item 16) on the rear of the manifold shaft is in line with the front manifold shaft lever (item 15). Tighten the securing bolts on both levers.
19. Operate the mechanism; check for freedom of movement within the linkage and also clearance with the various engine components.
20. To set the remainder of the linkage from the control rod lever on the rear of the manifold shaft to the accelerator pedal refer to Chapter T—Part 2.

**CARBURETTER TUNING**

**Preliminary checks**

Before tuning the carburetters the following checks should be carried out.

Ensure that the vehicle is in Neutral and that the gear range actuator thermal cut-off has been removed from the main fusebox.

1. Check the condition of the spark plugs.
2. Check the ignition timing.
3. Check the flow through the choke stove pipe.
4. Check the entire induction system for air leaks.

---

**FIG. 18 CONTRA-ROTATING THROTTLE CONTROLS**

A = Reference angle 22°
B = Reference angle 90°
1 Throttle damper
2 'A' bank carburettor volume screw
3 'A' bank carburettor throttle plate
4 Throttle spring
5 Eccentric throttle adjuster
6 Throttle guard
7 'B' bank carburettor throttle lever
8 'B' bank carburettor throttle plate
9 'B' bank carburettor volume screw
10 Idle stop screw
11 Closed throttle bracket
12 Cross link
13 'A' bank carburettor throttle lever
14 Drive link
15 Front manifold shaft lever
16 Rear manifold shaft lever
2. Remove the air hoses from the check valves and fit blanks over the valves (suitable blanks may be produced from two short lengths of rubber hose with one end plugged).

Note The air injection system is inoperative when the air hoses are disconnected from the check valves. The valves must be blanked to prevent air being drawn into the exhaust port by pulsations in the exhaust system since this would affect the idle CO reading.

3. Disconnect the exhaust gas recirculation (E.G.R.) cut-out solenoid to E.G.R. valve hoses at the E.G.R. valve ends and blank off the hoses.

4. Remove the pressure tapping cap from 'A' bank carburettor float chamber to vent the float chambers to atmosphere.

5. Remove the carburettor dampers and fit a dial gauge assembly (RH 8841) in place of the damper. Ensure that both gauges read zero with the engine stopped. Start the engine and allow to idle at 600 r.p.m. noting that the piston lift shown on the dial gauge assemblies is equal (within 10%) adjust using the eccentric adjuster on the carburettor throttle linkage.

Note The average carburettor piston lift is between 0.035 in. (0.89 mm.) and 0.050 in. (1.27 mm.).

6. Ensure that the engine has run for at least 25 minutes after the thermostat has opened.

7. To set 'A' bank carburettor mixture strength, remove the forward of the two blanks on the 'A' bank air manifold (see Fig. U20—Page U32); fit adapter (RH 8621) and connect to the CO meter.

8. Purge the engine at 2 000 r.p.m. in Neutral for ¹⁄₄ minute, check the idle speed and reset to 600 r.p.m. using the throttle stop screw (Fig. 16, item 7).

9. Slacken the jet adjusting screw lock-nut on 'A' bank carburettor using spanner RH 8050 and set the CO meter reading to between 3¼ % and 4½ % by adjusting the jet screw on 'A' bank carburettor (turning the screw clockwise enriches the mixture). Tighten the lock-nut.

10. Remove the adapter RH 8621 from the air manifold and fit the blanking plug.

11. To set the mixture strength of 'B' bank carburettor, remove the rear blanking plug of the two blanking plugs on the 'A' bank air manifold (see Fig. U20—Page U32); fit adapter RH 8621 and connect to the CO meter.

12. Purge the engine at 2 000 r.p.m. in Neutral for ¹⁄₄ minute, check the idle speed and reset to 600 r.p.m. using the throttle stop screw (Fig. 16, item 7).

13. Slacken the jet adjusting screw lock-nut on 'B' bank carburettor using spanner RH 8050 and set

5. Check the purge line flow rate.

6. Ensure that the air conditioning system is switched off.

7. Start the engine and warm up; allow to run for at least 5 minutes after the thermostat has opened.

8. Stop the engine, ensure that the choke butterfly valve is fully open and the choke 'fast-idle' off.

9. Connect an electric impulse tachometer in accordance with manufacturer's instructions.

10. Check the float chamber depression.

11. Check the exhaust gas recirculation signal strength.

12. Check the operation of the secondary exhaust gas recirculation valve and the vacuum operated micro-switch.

13. Check and set the full throttle exhaust gas recirculation cut-out micro-switch.

**Tuning procedure**

1. Remove the air intake hose, blank off the hot idle compensator feed drilling (see Fig. 19) and replace the hose.

---

**FIG. 19 HOT IDLE MIXTURE COMPENSATOR FEED**

1. Choke butterfly
2. Hot idle compensator feed
3. Butterfly housing
the CO meter reading to between 3⅓% and 4⅔% by adjusting the jet screw on ‘B’ bank carburettor (turning the screw clockwise thickens the mixture). Tighten the lock-nut.

14. Remove the adapter RH 8621 from the air manifold and refit the blanking plug.

15. If setting the mixture strength involves adjusting ‘B’ bank carburettor jet adjusting screw by more than 1/8 of a turn, the setting operations should be repeated again on ‘A’ bank carburettor (Operations 7 to 9 inclusive).

16. Check the mixture balance by raising each piston lift pin in turn. If the mixture balance is correct, the engine response for each carburettor piston lift will be identical.

   If the response from each carburettor is not identical repeat Operations 6 to 16 inclusive.

17. Stop the engine and fit the probe of a suitable CO meter into the exhaust pipe in accordance with the manufacturer’s instructions (a suitable CO meter is the Horiba MEXA 200).

18. Start the engine and run at idle speed until a steady CO reading is obtained (minimum time ¼ minute). The correct reading is between 3⅓% and 4⅔%.

19. If the CO reading is not correct, slacken both jet adjusting screw lock-nuts with spanner RH 8050. Turn both jet adjusting screws by equal amounts in the same direction (up to a maximum of ¼ turn) until a CO meter reading of between 3⅓% and 4⅔% is obtained (turning the screws clockwise thickens the mixture). Tighten the lock-nuts.

20. Fit the pressure tapping to ‘A’ bank carburettor float chamber, fitting a new washer if necessary. Remove the blanks from the air hoses and connect the hoses to the check valves. Remove the blanks from the E.G.R. cut-out hoses and connect the hoses to their respective E.G.R. valves.

21. Check the engine idle speed and if necessary adjust to 600 r.p.m. using the throttle stop screw.

22. Stop the engine. Remove the air intake hose and the blank from the hot idle compensator feed; fit the air intake hose.

23. Fit the gear range actuator thermal cut-out to the main fusebox.

**Note** The tuning operations should be carried out in the shortest possible time. If the time exceeds 3 minutes, run the engine at 2,000 r.p.m. in Neutral for ¼ minute and then resume the tuning operations. Repeat this purging operation if a further period of 3 minutes is exceeded.

After purging the system gently tap all around the neck of the carburettor suction chamber with a lightweight non-metallic object (i.e., the wooden handle of a small screwdriver), to eliminate carburettor piston hysteresis. The engine is to be run on Indolene Clear (HO) reference fuel or equivalent (Unleaded gasoline only).

**Throttle damper plunger—To set**

1. Move the cold start ‘fast-idle’ to the off position.

2. Slacken both nuts securing the throttle damper to its' bracket. Back off the nuts until they are well clear of the bracket.

3. Press the damper towards the ‘A’ bank throttle lever until the damper is fully compressed and the lever is just clear of the throttle stop screw.

4. Screw the lower securing nut until it is 0.025 in. (0.63 mm.) clear of the underside of the bracket. Release the damper and tighten the upper securing nut.

5. Ensure that the damper spindle is at the maximum possible radius, whilst maintaining adequate contact with the throttle lever pad. This can be achieved by adjusting the angle of the bracket.

**Automatic choke stove pipe—To check**

To check the stove pipe for any blockage, carry out the following procedure.

1. Start the engine and run until normal operating temperature is attained.

2. Disconnect the union at the butterfly housing and connect a flowmeter to the pipe via connector RH 8837. The flowmeter consists of a calibrated orifice (RH 8097) and a water manometer capable of reading up to 35 ins. (88.9 cm.).

3. Start the engine and run at idle speed (i.e., 600 r.p.m.); observe the manometer reading which should be between 20 in. (50.8 cm.) and 24 in. (61.0 cm.).

4. If the manometer reading is below 20 in. (50.8 cm.), stop the engine, remove the choke stove pipe and stove assembly to check for leaks.

5. Fit the choke stove pipe and stove assembly, start the engine and again observe the manometer reading at idle speed.
FIG. 20 TEMPERATURE CONTROLLED AIR INTAKE

1 Hot air scoop
2 Temperature sensor
3 Vacuum manifold
4 Air cleaner/silencer
5 Air blending valve
6 Cold air intake
6. Disconnect the flowmeter assembly and fit the choke stove pipe to the connection on the butterfly housing.

**Automatic Choke—To Set**

**Adjustment to kick diaphragm**
Refer to Chapter K, Section K4.

**Adjustment of the kick gap**
Refer to Chapter K, Section K4.

**Solenoid air gap**
Refer to Chapter K, Section K4.

**Solenoid lever spring tension**
Refer to Chapter K, Section K4.

*Fast-idle* cam—To set

1. Fit the 'fast-idle' mechanism; do not tighten the 'fast-idle' lever clamping bolt.

2. Ensure that the 'fast-idle' adjustment screw is directly over the cam.

3. With the throttles closed, insert a 0.100 in. (2.54 mm.) diameter rod between the top of the 'fast-idle' cam and the boss under the 'fast-idle' adjustment screw. Tighten the clamping bolt on the 'fast-idle' lever.

4. Ensure that the throttles are closed; screw in the 'fast-idle' adjustment screw until it just makes contact with the top step of the 'fast-idle' cam.

5. Insert a 0.050 in. (1.27 mm.) diameter drill between the leading edge of the choke butterfly valve and the choke housing.

6. With the butterfly valve in this position, adjust the length of the butterfly rod so that the tip of the 'fast-idle' screw is in line with the start of the top step of the 'fast-idle' cam, (i.e. the position when the tip of the adjustment screw is about to fall from the top step to the bottom step of the cam).

Remove the 0.050 in. (1.27 mm.) diameter drill from the choke housing.

7. With the throttles closed and the choke partly open, adjust the 'fast-idle' adjustment screw to just contact the start or bottom step of the 'fast-idle' cam, screw in further \( \frac{1}{2} \) turn and tighten the lock-nut ensuring that the adjustment screw does not move.

**FIG. 21 Checking the Choke Stove Pipe Depression**

1. Manometer
2. Choke stove pipe connection
3. Choke stove pipe
4. Adapter RH 8837
5. Restrictor RH 8095

*Thermocoil*

Refer to Chapter K, Section K4.

**Cold start ‘fast-idle’—To set**

1. Stop the engine and disconnect both solenoid to exhaust gas recirculation valve hoses at the valve ends. Blank the hoses, remove the pressure tapping cap to vent the float chambers; open the throttles and close the choke butterfly against the bi-metal coil tension by means of the butterfly link lever, release throttles. The 'fast-idle' adjusting screw will now be resting on the high step of the 'fast-idle' cam and the throttles are in the cold start position.

2. Start the engine and check the 'fast-idle' speed. If the speed is not between 1 900 r.p.m. and 2 100 r.p.m., stop the engine, open the throttles to gain access to the adjusting screw and adjust \( \frac{1}{2} \) turn for each 100 r.p.m. outside the required speed.
FIG. 22 'FAST-IDLE' MECHANISM

1 Butterfly rod
2 Lever clamp bolt
3 'Fast-idle' lever
4 Cam
5 Cam link
6 Adjusting screw

3. Tighten the lock-nut and check the 'fast-idle' speed. If correct open the throttles to release 'fast-idle' cam mechanism.

4. Remove the blanks from both solenoid to the exhaust gas recirculation valve hoses and connect the hoses to their respective exhaust gas recirculation valves. Fit the tapping cap to 'A' bank carburettor float chamber cover.

Exhaust gas recirculation secondary valve cut-in solenoid and vacuum operated micro-switch—To check and set

Refer to Page U97 in this Supplement

Exhaust gas recirculation signal strength
—To check

Refer to Page U89 in this Supplement

Float chamber depression—To check
Refer to Page U37 noting the following information.
(i) The hose referred to in Operations 1 and 7 is now two hoses, one for each exhaust gas recirculation valve.
(ii) The correct reading to be obtained on the manometer is 2.0 in. (5.08 cm.).
(iii) Operation 8 should read
8. Raise the engine speed slowly noting the manometer and tachometer readings. The maximum steady manometer reading should be obtained between 1 300 r.p.m. and 1 600 r.p.m. If the maximum depression occurs below 1 300 r.p.m. it is permissible to screw out the idle bleed screws on the carburetters by equal amounts (maximum 2-5 turns) to obtain this speed.

Ignition system, distributor, ignition coil and sparking plugs

Data

Ignition timing . . . T.D.C. (Static) 15° B.T.D.C. at 1 200 r.p.m. (stroboscopic) in Neutral.
(Approach 1 200 r.p.m. from a higher speed).

Ignition control system

The ignition system utilises an Opus distributor (in which a magnetic pick-up and control unit replace the conventional contact breaker), a low inductance ignition coil and a ballast resistor. The control unit comprises an electronic oscillator, amplifier and power transistor.
FIG. 23 EXPLODED VIEW OF DISTRIBUTOR

1. Pick-up module
2. Pick-up arm
3. Distributor cover/cap
4. High tension brush and spring
5. Rotor arm
6. Flash over shield (dust cover)
7. Timing rotor
8. Control unit
9. Lubrication pad
10. Driving dog and pin
11. Thrust washer
12. Distributor body
13. Automatic advance mechanism
14. Electronic module assembly

A drum with eight ferrite rods (one per cylinder) moulded into the outer edge is mounted onto the distributor drive-shaft. As the drum rotates a voltage is created each time a ferrite rod passes the magnetic pick-up, this signal is then amplified and used to switch-off the normally conducting power transistor in the primary coil circuit thus inducing a high voltage in the secondary winding which is distributed to the sparking plugs in the normal manner.

This ignition control system provides increased accuracy of timing and increased service life before maintenance is required.

**Ignition—To time (using a stroboscope)**

The ignition is timed on A1 cylinder which is located at the front left-hand side of the engine (viewed from the front of the car).

**Note**  If the ignition timing is to be set, ensure that the sparking plugs are in good condition before running the engine; if they require cleaning or renewal the sparking plugs gap should be set to 0.035 in. (0.9 mm.).

1. To check the ignition timing commence by running the engine until normal operating temperature is attained and the choke ‘fast-idle’ is in the off position. Switch off the engine.
2. Connect a stroboscope and a tachometer to the engine as described in the instructions supplied with the respective equipment.
3. Start the engine and adjust the throttle stop screw to give an idle speed of 1 200 r.p.m. When setting the engine idle speed reduce from a higher speed to 1 200 r.p.m.
4. Direct the flashing light of the stroboscope onto the crankshaft damper timing marks and timing pointer; the pointer is positioned on the right-hand side of the crankshaft damper when viewed from the front of the engine.
5. If the timing pointer does not coincide with the 15° B.T.D.C. mark on the crankshaft damper adjust the ignition timing as follows.
6. Release the clamp screw on the distributor and rotate the head of the distributor in the appropriate direction until the correct timing is obtained. Clockwise rotation of the distributor head advances the ignition and conversely anti-clockwise rotation retards the ignition. After adjustment has been carried out tighten the clamp screw and again check to ensure that the timing has not altered whilst tightening the clamp screw.

7. Set the engine idle speed to 600 r.p.m.

**Setting the engine idle speed**

Ensure that the engine is at normal operating temperature and that the choke ‘fast-idle’ is in the off position.

The air conditioning system must be switched off and a tachometer connected to the engine in accordance with the manufacturer’s instructions.

1. Stop the engine, remove the air intake hose and blank off the hot idle compensator feed drilling (see Fig. 19); replace the air intake hose.

2. Start the engine and, if necessary, adjust the engine idle speed to 600 r.p.m. using the throttle stop screw; tighten the lock-nut.

3. Stop the engine and remove the air intake hose. Remove the blank from the hot idle compensator feed drilling and detach the tachometer and stroboscopic timing equipment (if fitted). Fit the air intake hose.

**Sparking plugs**

The sparking plugs approved for this car are Champion N.14.Y. Before fitting the plugs, set the gaps with the aid of a feeler gauge to 0.035 in. (0.9 mm.) and lightly smear the threads with ‘Graphogen’ grease.

**LUBRICATION AND MAINTENANCE**

*Carburetters*

Check oil level in air valve dampers and if necessary top-up to correct level. Check tightness of float chamber covers. Check float chamber depression.

Check and if necessary reset the idle speed. Check and if necessary reset the choke ‘fast-idle’ speed.

**Carburetters**

Check oil level in air valve dampers and if necessary top-up to correct level. Check tightness of float chamber covers. Check float chamber depression.

Check and if necessary reset the idle speed. Check and if necessary reset the choke ‘fast-idle’ speed.

**Engine**

Change engine oil.

*Fuel evaporation emission control system*

Check the purge rate; this should be between 50 cu. ft. per hr. and 70 cu. ft. per hr. (1.41 cu. m. and 1.98 cu. m.) at 600 r.p.m. in neutral. Pressure test the fuel tank and evaporation loss line and if necessary rectify any leaks.

*Ignition system*

Check ignition timing using stroboscope and adjust if necessary; the ignition timing should be 15° B.T.D.C. with the engine running at 1 200 r.p.m.

**Engine cooling system**

Tighten worm-drive clips of all coolant hoses.
Torque converter transmission
Check fluid level and top-up if necessary.
When checking the fluid level, avoid contact with the exhaust gas recirculation valves, heat shield and associated pipes as these components will be hot.

EVERY 3 000 MILES (5 000 km.) OR 3 MONTHS WHICHEVER IS THE EARLIER
If the car is used for constant stop/start operation, change the engine oil.

EVERY 6 000 MILES (10 000 km.) OR 6 MONTHS WHICHEVER IS THE EARLIER

Engine
Change engine oil and renew oil filter element.

Battery
Check the level of the electrolyte in the battery; if necessary top-up with distilled water.

Brakes
Inspect footbrake and parking brake pad linings. When changing footbrake pads examine condition of dust excluders on calipers. Manually adjust the parking brake pads. Inspect pipes and connections, rectify if necessary.

Torque converter transmission
Check fluid level and top-up if necessary.
When checking the fluid level, avoid contact with the exhaust gas recirculation valves, heat shield and associated pipes as these components will be hot.

EVERY 12 500 MILES (20 800 km.) OR 12 MONTHS SERVICE WHICHEVER IS THE EARLIER

Air injection pump
Check tension of pump pulley driving belt.

Air silencer
Fit a new paper filter element.

Carburetters
Top-up oil level in air valve dampers. Check tightness of float chamber covers. Check float chamber depression. Check and if necessary reset the idle speed. Check and if necessary, reset choke ‘fast-idle’ speed.

Crankcase emission control system
Remove and clean gauze flame traps in the crankcase breather tube. Clean the adapter in choke butterfly housing.

Engine
Change engine oil and renew oil filter element.

Fuel evaporation emission control system
Check the condition of the pipes and connections.

Ignition system
Fit new sparking plugs ensuring that the gaps are set to 0.035 in. (0.9 mm.).

Lubricate distributor spindle (shaft bearings) and automatic advance mechanism with engine oil.

Check the ignition timing using a stroboscope and adjust if necessary; the ignition timing should be 15° B.T.D.C. with the engine running at 1 200 r.p.m.

Battery
Check the level of the electrolyte in the battery; if necessary top-up with distilled water.

Brakes
Inspect footbrake and parking brake pad linings. When changing footbrake pads examine condition of dust excluders on calipers. Manually adjust parking brake pads. Inspect pipes and connections, rectify if necessary.

Final drive unit
Check oil level and top-up if necessary.
Steering ball joints
Lubricate the six grease nipples. Inspect the rubber covers on the ball joints; if the covers are found to be damaged the joints should be dismantled and new parts fitted as necessary.

Front sub-frame and compliant front suspension
The front suspension ball joints are sealed for life and no maintenance is required until renewal is necessary or the ball joint rubber covers are damaged. Inspect the rubber covers on the front suspension ball joints; if the covers are found to be damaged new joints and covers should be fitted.

Torque converter transmission
Renew transmission fluid.
When checking the fluid level, avoid contact with the exhaust gas recirculation valves, heat shield and associated pipes as these components will be hot.

Every 25,000 miles (41,600 km.) or 2 years service whichever is the earlier

Air injection pump
Check tension of pump pulley driving belt.

Air injection system
Check air injection system for leaks and correct functioning. Renew any defective items.

Air silencer
Fit a new paper filter element.

Automatic choke
Check the air flow through the choke stove pipe and check the system for correct functioning.

Carburetters
Clean air valves. Remove inlet unions from the float chamber covers and fit new paper filter elements. Top-up oil level in air valve dampers. Check tightness of float chamber covers. Check float chamber depression. Check and if necessary, reset the idle speed. Check and if necessary, reset choke ‘fast-idle’ speed.

Carburettor mixture weakening device
Renew air filter element for the carburettor mixture weakening device.

Crankcase emission control system
Remove and clean gauze flame traps in crankcase breather tube. Clean the adapter in choke butterfly housing.

Engine
Change engine oil and renew oil filter element.

Engine cooling system
Fit a new engine coolant thermostat and heater tap feed hose.

Fuel evaporation emission control system
Renew the foam filter element in the evaporation loss control canister. Check the purge rate; this should be between 50 cu. ft. per hr. and 70 cu. ft. per hr. (1.41 cu. m. and 1.98 cu. m.) at 600 r.p.m. in neutral. Renew the purge line filter if necessary.
Ignition system

Fit new sparking plugs ensuring that the gaps are set to 0.035 in. (0.9 mm.).

Lubricate distributor spindle (shaft bearings) and automatic advance mechanism with engine oil.

Check the ignition timing using a stroboscope and adjust if necessary; the ignition timing should be 15° B.T.D.C. with the engine running at 1 200 r.p.m.

Battery

Check the level of the electrolyte in the battery; if necessary top-up with distilled water.

Brakes

Inspect footbrake and parking brake pad linings. When changing footbrake pads examine condition of dust excluders on calipers. Manually adjust parking brake pads. Inspect pipes and connections; rectify if necessary.

Final drive unit

Change oil.

Steering ball joints

Lubricate the six grease nipples. Inspect the rubber covers on the ball joints; if the covers are found to be damaged the joints should be dismantled and new parts fitted as necessary.

Front sub-frame and compliant front suspension

The front suspension ball joints are sealed for life and no maintenance is required until renewal is necessary or the ball joint rubber covers are damaged. Inspect the rubber covers on the front suspension ball joints; if the covers are found to be damaged new joints and covers should be fitted.

Torque converter transmission

Change transmission fluid.

Fit a new intake strainer.

When checking the fluid level, avoid contact with the exhaust gas recirculation valves, heat shield and associated pipes as these components will be hot.

Servicing after 25 000 miles (41 600 km.) or 2 years whichever is the earlier

After 25 000 miles (41 600 km.) or 2 years, servicing is still due at the following intervals.

31 000 miles (51 600 km.) 2½ years whichever is the earlier

Carry out the 6 000 miles (10 000 km.) service.

37 500 miles (62 400 km.) or 3 years whichever is the earlier

Carry out the 12 500 miles (20 800 km.) service.

43 500 miles (72 500 km.) or 3½ years whichever is the earlier

Carry out the 6 000 miles (10 000 km.) service.

50 000 miles (83 200 km.) or 4 years whichever is the earlier

Carry out the 25 000 miles (41 600 km.) service and in addition the following operations.

Exhaust gas recirculation system

Remove and clean the exhaust gas recirculation valves and feed pipes. Clean the orifices in the carburettor ‘Tee’ piece. Check the exhaust gas recirculation valves for correct operation.

Exhaust system

Fit a new catalytic converter assembly.
PREVENTATIVE MAINTENANCE

INITIAL SERVICE
This service should be carried out by the Dealer after the first 3 000 miles (5 000 km.) or 3 months whichever is earlier.

Belt tension
Check the tension of the belts driving the following; fan and steering pump, alternator and refrigeration compressor. Adjust the belt tension as necessary.

Steering pump
Check the oil level in the reservoir; top-up if necessary.

CHECK THE FOLLOWING LEVELS AND PRESSURES
Run the engine for four minutes then check the hydraulic reservoir fluid levels; top-up if necessary with the specified fluid.
Check the level and specific gravity of the engine coolant and correct if necessary.
Check the tyre pressures and adjust if necessary.
Check the tread depth of all tyres and inspect for signs of damage.

EVERY 6 000 MILES (10 000 km.) OR 6 MONTHS WHICHEVER IS EARLIER

Carburetters
Check the oil level in the air valve dampers and top-up if necessary.

Steering pump
Check for leaks. If necessary top-up the level in the steering pump reservoir.

Belt tension
Check the tension of the belts driving the following; fan and steering pump, alternator and refrigeration compressor. Renew any belts which show signs of wear.

EVERY 12 500 MILES (20 800 km.) OR 12 MONTHS WHICHEVER IS THE EARLIER

Control linkages
Apply a few drops of engine oil to the accelerator linkage and to the gear range selector controls adjacent to the transmission casing.

Parking brake linkage
Lubricate the pivot pins and pulleys in the parking brake system with approved grease.

Control linkages
Apply a few drops of engine oil to the accelerator linkage and to the gear range selector controls adjacent to the transmission casing.

Spare wheel
Lubricate the spare wheel lowering bolt and mechanism.

Electrical system
Ensure that all lamps, instruments, warning devices and air conditioning controls are operating satisfactorily.
Check the following levels and pressures

Check the fluid level in the power steering pump reservoir and top-up if necessary.
Check the level and specific gravity of the engine coolant and correct if necessary.
Check the fluid level in the steering idler box damper and top-up if necessary.
Run the engine for four minutes then check the hydraulic fluid levels; top-up if necessary.
Check the tyre pressures and adjust if necessary.
Check the tread depth of all tyres and inspect for signs of damage.

Electrical system

Ensure that all lamps, instruments, warning devices and air conditioning controls are operating satisfactorily.

Fuel tank

Slacken the drain plug one or two turns and allow any accumulated water to drain away. Tighten the drain plug.

Fuel filter

Renew the main line filter element and clean the filter bowl.

Height control mechanism

Disconnect the control valve linkage ball joints. Clean, grease and refit the ball joints.

Rear wheel drive-shafts

Lubricate the rear wheel drive-shaft outer universal couplings with an approved grease.

Check the following levels and pressures

Check the fluid level in the power steering pump reservoir and top-up if necessary.
Check the level and specific gravity of the engine coolant and correct if necessary.
Check the fluid level in the steering idler box damper and top-up if necessary.
Check the tyre pressures and adjust if necessary.
Check the tread depth of all tyres and inspect for signs of damage.

SEASONAL SCHEDULES

EVERY 12 MONTHS

Engine cooling system

Drain the coolant from the radiator and the engine crankcase. Clean any debris from the surfaces of the refrigeration condenser and radiator matrices by reverse flushing with a hose. This should be carried out just prior to the Autumn. Fill the system with the correct anti-freeze mixture (refer to Chapter L—Engine Cooling System of this Workshop Manual T.S.D. 2476).
**Chapter U**

**Air conditioning system**

Ensure that the foam filter element fitted to the scuttle intake grille is free from obstruction. On Long Wheelbase cars fitted with a centre division, check that the foam filter element fitted to the intake grille in the rear deck panel is free from obstruction.

**Refrigeration system**

These operations should be carried out only by an experienced refrigeration engineer.

Check that the refrigeration system is functioning correctly. If necessary, top-up the system with refrigerant. If loss of refrigerant is evident, check the system for leakage. Visually check the refrigerant compressor for oil leakage, if oil leakage is apparent check the oil level and top-up if necessary. In the event of a major oil loss, check and repair before topping-up (refer to Chapter C—Air Conditioning of this Workshop Manual T.S.D. 2476).

**Body**

Check that the body drain holes are free from foreign matter.

**EVERY 2 YEARS**

In addition to the 12 monthly schedule, carry out the following.

**Engine cooling system**

Drain the coolant from the radiator and engine crankcase. Thoroughly reverse flush the coolant passages with a continuous flow of water. Change the coolant hoses where necessary. Fill the system with the correct anti-freeze mixture.

Examine the sub-frame to brake caliper hoses for chafing or surface cracking; renew if necessary.

Fit new seals to the disc brake calipers, the deceleration conscious pressure limiting valve and the master cylinder.

Completely drain the fluid from the hydraulic circuits. Thoroughly clean the brake fluid reservoirs and sight glasses, ensuring that no foreign matter is allowed to enter during the operation.

Fill the hydraulic system with Castrol RR 363 Brake Fluid. This fluid exceeds specification S.A.E. J1703b in many respects and complies with D.O.T. 3 grade of FMVSS 116. Bleed the braking systems and automatic height control system.

**100 000 Miles (166 400 km.)**

At this mileage and under normal motoring conditions it is recommended that the following servicing is carried out.

Renew all the flexible hoses to the braking systems and the automatic height control system. Fit new seals to the disc brake calipers, the deceleration conscious pressure limiting valve and the master cylinder.

Completely drain the fluid from the hydraulic circuits. Thoroughly clean the brake fluid reservoirs and sight glasses, ensuring that no foreign matter is allowed to enter during the operation.

Fill the hydraulic system with Castrol RR 363 Brake Fluid. This fluid exceeds specification S.A.E. J1703b in many respects and complies with D.O.T. 3 grade of FMVSS 116. Bleed the braking systems and automatic height control system.

Fit a new convoluted rubber hose between the fuel filler head and fuel tank assembly. Examine all flexible fuel pipes and renew any which show signs of deterioration.

---

**SERVICE RECOMMENDATIONS**

**BRAKE AND HYDRAULIC SYSTEM COMPONENTS**

**50 000 Miles (83 200 km.)**

At this mileage and under normal motoring conditions it is recommended that the following servicing is carried out.

Renew the front and rear accumulator to frame connector block hoses.

**SPECIAL PRECAUTIONS**

Should the car be used in very cold temperatures, drain the engine sump when thoroughly warm and also drain the carburettor air valve dampers. The engine sump and carburettor air valve dampers should then be filled with oil having the following viscosity.

For constant temperatures of between 0°C and -23°C (32°F. and -10°F.), use a 10W/30 grade oil.

For constant temperatures of -23°C. (-10°F.) and below, use a 5W/20 grade oil.
## FAULT DIAGNOSIS

<table>
<thead>
<tr>
<th>SYMPTOMS</th>
<th>POSSIBLE CAUSE</th>
</tr>
</thead>
</table>
| 1. Engine will not start. (Starter motor operating). | 1. (a) Ignition circuit broken.  
(b) Failed anti ‘run-on’ solenoid or failure of electrical supply circuit.  
(c) Ignition system faulty.  
(d) Damaged or contaminated ignition high-tension circuit.  
(e) Blocked fuel feed line or fouled float chamber filters.  
(f) Faulty choke bi-metal coil.  
(g) Choke solenoid inoperative.  
(h) Faulty choke ‘fast-idle’ mechanism.  
(i) Air leak into induction system.  
(j) Faulty hot idle mixture compensator.  
(k) Weakening device filter blocked or blockage in rubber connecting hoses.  
(l) Faulty weakenner cut-off solenoid or failure of electrical supply circuit.  
(m) Faulty weakening device control switch or failure of electrical supply circuit.  
(n) Dislodged venturi in weakenner device.  
(o) Flooding of carburettor float chamber or jet.  
(p) Fouled carburettor float chamber or jet.  
(q) Exhaust gas recirculation valve(s) failed.  
(r) Faulty exhaust gas recirculation secondary valve control switch or failure of electrical supply circuit.  
(s) Failed secondary exhaust gas recirculation valve cut-out solenoid or electrical supply circuit. |
| 2. Engine idles very roughly.                 | 2. (a) Ignition system faulty.  
(b) Fouled sparking plugs.  
(c) Damaged or contaminated ignition high-tension circuit.  
(d) Air leak into induction system.  
(e) Faulty hot idle compensator.  
(f) Weakening device filter blocked or blockage in rubber connecting hoses.  
(g) Dislodged venturi in weakenner device.  
(h) Badly worn or damaged carburettor control linkage.  
(i) Flooding of carburettor float chamber or jet.  
(j) Sticking carburettor piston.  
(k) Fouled carburettor float chamber or jet.  
(l) Air leak into exhaust gas recirculation vacuum control circuit.  
(m) Exhaust gas recirculation valve(s) failed.  
(n) Faulty exhaust gas recirculation secondary valve control switch or failure of electrical supply circuit.  
(o) Failed secondary exhaust gas recirculation valve cut-out solenoid or electrical supply circuit.  
(p) Faulty air diverter valve.  
(q) Incorrect operation of temperature controlled air intake system. |
| 3. Engine stalls.                             | 3. (a) Ignition circuit broken.  
(b) Failed anti ‘run-on’ solenoid or failure of electrical supply circuit.  
(c) Ignition system faulty.  
(d) Damaged or contaminated ignition high-tension circuit.  
(e) Blocked fuel feed line or fouled float chamber filters.  
(f) Air leak into induction system.  
(g) Faulty hot idle mixture compensator.  
(h) Weakening device filter blocked or blockage in rubber connecting hoses.  
(i) Dislodged venturi in weakenner device.  
(j) Badly worn or damaged carburettor control linkage.  
(k) Flooding of carburettor float chamber or jet.  
(l) Sticking carburettor piston.  
(m) Fouled carburettor float chamber or jet.  
(n) Air leak into exhaust gas recirculation vacuum control circuit.  
(o) Exhaust gas recirculation valve(s) failed.  
(p) Faulty exhaust gas recirculation secondary valve control switch or failure of electrical supply circuit.  
(q) Failed secondary exhaust gas recirculation valve cut-out solenoid or electrical supply circuit.  
(r) Faulty air diverter valve. |
<table>
<thead>
<tr>
<th>SYMPTOMS</th>
<th>POSSIBLE CAUSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. (i) Engine shows signs of power loss, evident at high speeds and loading. (ii) Engine misfires particularly on hard acceleration from low speed.</td>
<td>4. (a) Ignition system faulty. (b) Fouled sparking plugs. (c) Damaged or contaminated ignition high-tension circuit. (d) Blocked fuel feed line or fouled float chamber filters. (e) Choke system operation incorrect. (f) Sticking carburettor piston. (g) Fouled carburettor float chamber or jet. (h) Faulty exhaust gas recirculation full throttle cut-out switch or failure of electrical supply circuit. (i) Exhaust gas recirculation valve(s) failed. (j) Failed primary exhaust gas recirculation valve cut-out solenoid or electrical supply circuit. (k) Failed secondary exhaust gas recirculation valve cut-out solenoid or electrical supply circuit.</td>
</tr>
<tr>
<td>5. Engine hesitates or misfires under light load.</td>
<td>5. (a) Failed anti 'run-on' solenoid or failure of electrical supply circuit. (b) Ignition system faulty. (c) Fouled sparking plugs. (d) Damaged or contaminated ignition high-tension circuit. (e) Blocked fuel feed line or fouled float chamber filters. (f) Air leak into induction system. (g) Faulty hot idle mixture compensator. (h) Weakening device filter blocked or blockage in rubber connecting hoses. (i) Diloged venturi in weakening device. (j) Flooding of carburettor float chamber or jet. (k) Sticking carburettor piston. (l) Fouled carburettor float chamber or jet. (m) Incorrect purge flow rate. (n) Exhaust gas recirculation valve(s) failed. (o) Faulty exhaust gas recirculation secondary valve control switch or failure of electrical circuit. (p) Failed secondary exhaust gas recirculation valve cut-out solenoid or electrical supply circuit. (q) Faulty air diverter valve. (r) Incorrect operation of temperature controlled air intake system.</td>
</tr>
<tr>
<td>6. Increase in fuel consumption.</td>
<td>6. (a) Ignition system faulty. (b) Faulty choke bi-metal coil. (c) Choke system operation incorrect. (d) Air leak into induction system. (e) Faulty hot idle mixture compensator. (f) Weakening device filter blocked or blockage in rubber connecting hoses. (g) Faulty weakening cut-off solenoid or failure of electrical supply circuit. (h) Faulty weakening device control switch or failure of electrical supply circuit. (i) Air leaks in mixture weakening system. (j) Flooding of carburettor float chamber or jet. (k) Sticking carburettor piston. (l) Incorrect purge flow rate. (m) Exhaust gas recirculation valve(s) failed. (n) Faulty exhaust gas recirculation secondary valve control switch or failure of electrical supply circuit. (o) Failed secondary exhaust gas recirculation valve cut-out solenoid or electrical supply circuit. (p) Faulty air diverter valve.</td>
</tr>
<tr>
<td>7. Decrease in fuel consumption.</td>
<td>7. (a) Air leaks in mixture weakening system. (b) Incorrect purge flow rate. (c) Faulty exhaust gas recirculation temperature control switch or failure of electrical supply circuit. (d) Air leak into exhaust gas recirculation vacuum control circuit. (e) Exhaust gas recirculation valve(s) failed. (f) Faulty exhaust gas recirculation secondary valve control switch or failure of electrical supply circuit.</td>
</tr>
<tr>
<td>SYMPTOMS</td>
<td>POSSIBLE CAUSE</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>8. Engine 'backfires' on overrun.</td>
<td>8. (a) Ignition system faulty.</td>
</tr>
<tr>
<td></td>
<td>(b) Air leak into induction system.</td>
</tr>
<tr>
<td></td>
<td>(c) Exhaust gas recirculation valve(s) failed.</td>
</tr>
<tr>
<td></td>
<td>(d) Failed secondary exhaust gas recirculation valve cut-out solenoid or electrical supply circuit.</td>
</tr>
<tr>
<td>9. Sudden increase in engine idle speed.</td>
<td>9. (a) Faulty choke 'fast-idle' mechanism.</td>
</tr>
<tr>
<td></td>
<td>(b) Failed carburettor overrun valve.</td>
</tr>
<tr>
<td>10. Excessive noise from air injection</td>
<td>10. (a) Faulty air diverter valve.</td>
</tr>
<tr>
<td>pump or system.</td>
<td>(b) Faulty or damaged air injection pump.</td>
</tr>
</tbody>
</table>

**WORKSHOP TOOLS**

*Tool Number Description*

- RH 8050  Spanner—Carburettor Jet Screw
- RH 8087  Spanner—Weakener Cut-off Valve
- RH 8089  Jet Centring Tool
- RH 8090  Pliers—Wire Hose Clips
- RH 8095  Restrictor—Manometer Check—Choke Stove Pipe
- RH 8383  Positioning Tool—Throttle Spindle Seal
- RH 8621  Adapter—Air Manifold to CO Meter
- RH 8800  Vacuum Pump—Hand Operated
- RH 8841  Dial Gauge—Carburettor Piston Lift
- RH 8880  Setting Jig—Throttle Levers
Chapter U

Section U10
SUPPLEMENTS
No. 4 Australia 1975

FUEL EVAPORATION EMISSION CONTROL SYSTEM

In order to comply with regulations in Australia governing the emission of fuel vapour, an efficient Fuel Evaporation Emission Control System has been designed and is fitted to cars produced from the beginning of 1975.

The Fuel Evaporation Emission Control System eliminates direct venting of the fuel tank and carburetters, thus preventing the release of unburnt hydro-carbons into the atmosphere.

Fuel vapours are collected from the fuel tank and carburetters and stored in an activated charcoal canister. The canister is purged whenever the engine is running and the stored fuel vapours are extracted from the charcoal and burnt in the engine.

A diagrammatic illustration of the system can be seen in Figure 2.

The engine compartment components are clearly shown in Figure 3 and the fuel tank components in Figure 6.

FIG. 1 FUEL EVAPORATION LOSS CONTROL CANISTER

1 Weakener connection
2 Polyurethane filter
3 Carbon
4 Float chamber vent connection
5 Fuel tank vent connection
6 Purge line connection
FIG. 2 FUEL EVAPORATION EMISSION CONTROL SYSTEM—GENERAL VIEW

1 'A' bank carburettor
2 Weakening device
3 Bi-metal switch
4 Float chamber vent valve
5 Weakening device cut-off valve
6 Float chamber drain valve
7 Fuel trap assembly
8 Relief valve hose
9 Luggage compartment pipe
10 Fuel tank assembly
11 Luggage compartment to sill pipe
12 Vent pipe hose
13 Fuel vapour line
14 Weaken filter
15 Canister to wing hose
16 Evaporation loss control canister
17 Purge line filter
18 Purge line restrictor
19 Anti 'run-on' solenoid
Fuel evaporation loss control canister

The large centre section of the canister contains the dust-free activated carbon and accommodates nylon filter connectors which connect the canister to the various fuel vapour emission sources on the car (i.e. the carburettor weakener unit, float chamber vent and fuel tank vent).

The function of the activated carbon is to absorb and retain fuel vapour from the carburettor float chambers and fuel tank.

At either end of this section of the canister are thin discs of polyurethane filter.

The lower compartment of the canister is the purge chamber and is connected to the engine induction system via the purge line filter and line restrictor. It is operative whenever the engine is running, and its function is to draw air through the carbon, extracting the fuel vapour for consumption in the engine. The upper section of the canister is open to the atmosphere and houses a polyurethane foam filter to ensure that the air drawn through the carbon is clean.

**FIG. 3 FUEL EMISSION CONTROL SYSTEM—ENGINE COMPARTMENT FITTINGS**

1 Purge line restrictor
2 Anti 'run-on' solenoid
3 Weakeners unit
4 Bi-metal switch
5 Fuel receiver and float chamber vent valve
6 Weakeners cut-off valve
7 Float chamber drain valve
8 Weakeners filter
9 Vent from fuel trap
10 Purge line filter
11 Evaporation loss control canister
12 Polyurethane filter
Polyurethane foam filter element—To renew

It is not necessary to remove the canister from the car in order to extract the polyurethane foam filter element. A detachable cover is situated in the left-hand valance, adjacent to the blower motor resistances (see Fig. 4).

1. Unscrew the four screws retaining the access cover, lift off the cover and withdraw the filter element from the top of the canister.

When fitting a new element, ensure that it is correctly positioned inside the retaining rim of the canister. Fit the access cover and tighten the setscrews.

Fuel evaporation loss control canister
—To remove

The canister is mounted under the left-hand front wing and is removed as follows.

1. Remove the front left-hand road wheel as described in Chapter R—Wheel—To remove.

   Note  Left-hand front is determined when viewed from the driver’s seat.

2. Position suitable stands under the raised portion of the car as a safety precaution.

3. Remove the front section of the underwing sheet by unscrewing the \( \frac{7}{8} \) in. A/F nut and bolt, and the 16 small screws situated around the sheet.

4. The canister will be clearly visible.

5. Using special pliers (RH 8090), remove the steel retaining clips and detach the four rubber hoses connected to the canister.

6. Inside the engine compartment adjacent to the blower motor resistances (see Fig. 4), locate the six \( \frac{1}{16} \) in. A/F setscrews. Unscrew the lower four setscrews and withdraw the canister from beneath the wing.

Fuel evaporation loss control canister
—To fit

Fit the canister by reversing the procedure described for removal, noting the following points.

1. Ensure that the rubber hoses are in a good condition and new hose retaining clips are used.

2. Ensure that the underwing sheet is sealed with Bostik Sealing Compound 771.

Purge line

The purge line consists of a rubber hose, passing from the lowest connection on the canister through the valance junction piece to the main suction line on the opposite side of the engine (see Fig. 3). Incorporated into this hose is the purge line filter and restrictor.

When the engine is running, air drawn through the canister filter and carbon picks up the stored fuel vapours and passes them via the hoses, to the induction system at a point just below the choke housing. The restrictor in the line controls the flow rate at between 1.41 cu. m. per hr. and 1.98 cu. m. per hr. (50 cu. ft. per hr. and 70 cu. ft. per hr.) to maintain carburettor metering accuracy and the paper element line filter is fitted to prevent blockage of the restrictor.

Purge line filter—To remove

1. Using special pliers (RH 8090) remove the two steel retaining clips situated on either side of the unit.

2. Slacken the setscrew which secures the nylon retaining clip.

3. Withdraw the component from the clip.

Purge line filter—To fit

Fit the purge line filter by reversing the procedure given for removal noting the following points.

1. Ensure that the rubber hoses are in a good condition and new hose retaining clips are used.
Purge flow rate—To check

Check the purge flow rate as follows.

1. Disconnect the hose from the engine side of the purge line filter and insert a flowmeter and stand assembly into the line. The flowmeter is a rotameter type capable of measuring 1.41/1.98 cu. m. per hr. (50/70 cu. ft./hr.). Pressure drop across the meter is not to exceed 2 in. Hg.

2. Check the flowmeter reading with the engine idling. The flow reading should be between 1.41 cu. m./hr. and 1.98 cu. m./hr. (50 cu. ft./hr. and 70 cu. ft./hr.).

3. If the flow is incorrect fit a new restrictor and repeat Operation 2.

4. Remove the flowmeter and reconnect the hose to the purge line filter.

Purge line restrictor—To remove

1. Hold the restrictor firmly and slide the rubber hosing from both ends.

Purge line restrictor—To fit

Fit the restrictor by reversing the procedure given for removal, noting the following point.

1. Ensure that the purge line restrictor is fitted into the line correctly. This can be determined by comparing the diameters of the restrictor ends with those of the rubber hoses.

Weakener line

The weakener line connects the weakener unit with the evaporation loss control canister (see Fig. 3). With the engine running under light throttle opening a depression is created in this line, so allowing air to pass from the canister to the weakener unit.

A filter incorporated in the line prevents blockage of the weakener unit.

During ‘hot soak’ conditions fuel vapour can pass along this pipe from the float chamber to be stored in the carbon filled canister.

Weakener filter—To remove

1. Slacken the worm drive clip which retains the weakener filter to the bracket.

2. Withdraw the filter.

Weakener filter—To fit

Fit the weakener filter by reversing the procedure given for its removal noting the following point.

1. Ensure that the rubber hoses are in good condition.

2. If clips have been fitted previously, ensure that new clips are fitted.

3. Ensure that the inlet pipe for the unit which is offset from the centre is facing the front of the car and is in its lowest position (see Fig. 3).

Float chamber vent line

The carburettor float chambers are vented to the evaporation loss control canister through the float
chamber vent line (see Fig. 3). Incorporated in the line is a non-return valve which maintains a depression in the float chamber during light throttle operation.

The vent valve cannot be serviced and if its operation is suspect a new vent valve should be fitted.

**Float chamber vent valve—To remove**

1. Remove the rubber hose connection.
2. Withdraw and discard the retaining split pin.
3. Withdraw the vent valve from the top of the fuel receiver.

---

**FIG. 6 FUEL EVAPORATION EMISSION CONTROL SYSTEM—FUEL TANK**

1. Fuel trap drain
2. Connection to evaporation loss control canister
3. Filler vent neck
4. Fuel filler box
5. Combined relief and vacuum valve
6. Fuel trap drain
7. Valve vent
8. Vent pipe
9. Expansion tank
10. Vent pipe
Float chamber vent valve—To fit
Fit the vent valve by reversing the procedure given for its removal noting the following points.

1. Ensure that the rubber ‘O’ ring at the top of the fuel receiver is in good condition, renew if the slightest doubt exists.
2. Use a new split pin to retain the vent valve in position.

Fuel receiver
The fuel receiver is situated adjacent to the ignition distributor and coil (see Fig. U23—Page U35).

The unit should not require removal under normal circumstances. However, should the need arise the ignition distributor, coil and weaker cut-off solenoid valve should all be removed before unscrewing the two ½ in. A/F setscrews which secure the fuel receiver bracket in position.

Fuel tank assembly
The fuel tank assembly consists of the fuel tank, expansion tank and fuel trap assembly (see Fig. 6).

The fuel tank is vented from three positions to a fuel trap assembly which is mounted above the fuel filler. One vent is from the fuel filler neck and the other two vents from the fuel tank.

From the fuel trap, a vent line passes under the floor of the car to the evaporation loss control canister.

Fuel tank
The fuel tank (see Fig. 6) is similar to that fitted to standard cars, except that two vent pipes 9.525 mm. (0.375 in.) diameter, are rigidly attached to the underside of the fuel tank top plate. The open ends of the vents terminate inside the tank at the front and rear. The outer ends of the two vent pipes terminate adjacent to the fuel filler neck.

A 3,125 litres (55 Imp. pt., 67 U.S. pt.) capacity expansion tank situated within the main fuel tank inhibits complete filling and provides additional fuel expansion volume to contend with extreme temperature conditions.

When a vehicle is being filled with fuel, automatic cut-off could completely fill the tank leaving only the filler neck, vent connector pipes and fuel trap to accommodate the expansion of the fuel. The expansion tank is situated in the upper part of the fuel tank and as the fuel level rises above the lower part of the expansion tank it flows inside through the two small holes in the base. Two additional holes in the top of the expansion tank allow air to escape.

At normal rates of filling it takes approximately 3 minutes to fill an empty tank whereas it takes approximately 9 minutes for the levels in both the main and expansion tanks to stabilise. After this time the main tank will have transferred 3,125 litres (55 Imp. pt., 67 U.S. pt.) to the expansion tank leaving the equivalent air space in the main tank for expansion.

Fuel tank—To remove
To remove the fuel tank proceed as described in Section K1—Fuel System (Early Cars) noting that Operation 6 should be omitted and Operation 6 as follows should be carried out.

6. Using a pair of special pliers (RH 8090), remove the steel clips from the two rubber hoses situated one on either side of the fuel filler neck.

Withdraw the rubber hoses from the pipes.

Fuel tank—To fit
Note Prior to assembly, apply ‘Hylomar’ sealing compound to the fuel tank filler head union and tube assembly. Also spray ‘Hylomar’ on both sides of the fuel tank level unit joint.

Fit the fuel tank by reversing the procedure given for its removal noting the following points.

1. Ensure that the two rubber vent hoses are in good condition.
2. New steel clips should be used to secure the rubber vent hoses to the metal pipes on either side of the filler neck base.

Fuel trap assembly
The fuel trap (see Fig. 6) has a capacity of 1.87 litres (3.25 Imp. pt., 4.00 U.S. pt.).

The fuel trap acts as a liquid separator and prevents liquid fuel from being transferred to the control canister under severe driving manoeuvres when the fuel tank is full or during expansion of the fuel at high ambient temperatures.

The tank vent pipes are fed to the lower ends of the banana-shaped fuel trap. These pipes also serve as drain pipes for any fuel in the trap.
The filler tube is vented into the forward end of the fuel trap.
An outlet pipe is attached to the interior of the fuel trap and the other end is connected via metal and rubber pipes to the evaporation loss control canister. A combined relief and vacuum valve in the fuel trap prevents any excessive pressure build-up due to vaporisation, or depression as the fuel is consumed, should the vent line to the evaporation loss control canister become blocked.

**Fuel trap assembly—To remove**

1. Disconnect the battery.
2. Remove the carpet and underlay in the luggage compartment.
3. Remove the tool kit (see Chapter R—Wheels and Tyres, Fig. R10).
4. Remove the filler door release ring.
5. Unscrew the five ‘Phillips’ headed screws from the side carpet; four secure the brackets retaining the tool kit and the fifth is positioned at the front of the side carpet.
6. Release the ‘Tenax’ clip situated adjacent to the rear lamps access point.
7. Remove the side carpet and the carpet covering the fuel filler neck.
8. Using special pliers (RH 8090) remove the steel clips from the rubber hoses. Withdraw the hoses from their respective pipes.
9. Unscrew and remove the three 2 B.A. setscrews securing the fuel trap assembly.
10. Slowly move the fuel trap rearward and downward until the lower end can be turned into the luggage compartment and the assembly withdrawn from the car.

**Fuel trap relief and vacuum valve—To remove**

1. Remove the fuel trap assembly as described in Fuel trap assembly—To remove.
2. Unscrew the retaining setscrews, taking care not to lose the washers.
3. Withdraw the relief and vacuum valve.

**Fuel trap relief and vacuum valve—To fit**

Fit the relief and vacuum valve by reversing the procedure given for its removal, noting the following points.

1. Ensure that the joint faces of the relief and vacuum valve and fuel trap assembly are clean and in good condition.
2. Fit a new gasket.

**Fuel evaporation emission control system—To leak check**

To test the fuel evaporation emission control system and pipes (i.e. fuel tank, fuel trap assembly and pipes, etc.) for leaks, proceed as follows.

1. Blank off the lower end of the relief valve hose (see Fig. 2 item 8).
2. Connect an air pressure supply (with a manometer tapping) to the lower end of the fuel trap to boot pipe (item 9) in place of the vent pipe hose (item 12).
3. Using a pressure regulator apply a pressure of 0.105 kg/sq. cm. (1.5 lb/sq. in.) to the system and close the pressure supply.
4. Check manometer after 5 minutes. If the level has fallen by more than 12.7 mm. (0.5 in.) check all joints including petrol level transmitter to tank joint with soap solution.
5. After rectifying any leaks repeat the pressure test. When the system is satisfactory connect the fuel trap to boot pipe (item 9) and the boot to sill pipe (item 11) using the rubber vent pipe hose (item 12).
6. Detach the canister to wing hose (item 15) from the evaporation loss control canister and connect to the test equipment. Repeat Operation 3 to the same acceptance limits.
7. Rectify any leaks and repeat the pressure test. If the system is now satisfactory connect the canister to wing hose (item 15) to the evaporation loss control canister.
LUBRICATION AND MAINTENANCE

In addition to the normal Service Schedules the following servicing must be carried out.

It is important that items marked with an asterisk (*) in the Service Schedules are carried out during the Warranty period by a Distributor or Retailer at the time specified in order to comply with the Rolls-Royce Motors Warranty and relevant Emission Control Regulations.

**EVERY 20 000 km. (12 000 MILES) OR 12 MONTHS SERVICE WHICHEVER IS THE EARLIER**

*Fuel evaporation emission control system*
Check the condition of the pipes and connections.

**INITIAL 5 000 km. (3 000 MILES) OR 3 MONTHS SERVICE WHICHEVER IS THE EARLIER**

*Fuel evaporation emission control system*
Check the purge rate; this should be between 1.41 cu. m. per hr. and 1.98 cu. m. per hr. (50 cu. ft. per hr. and 70 cu. ft. per hr.) at 600 r.p.m. in neutral. Pressure test the fuel tank and evaporation loss line and if necessary rectify any leaks.

**EVERY 40 000 km. (24 000 MILES) OR 2 YEARS SERVICE WHICHEVER IS THE EARLIER**

*Fuel evaporation emission control system*
Renew the foam filter element in the evaporation loss control canister. Check the purge rate; this should be between 1.41 cu. m. per hr. and 1.98 cu. m. per hr. (50 cu. ft. per hr. and 70 cu. ft. per hr.) at 600 r.p.m. in neutral. Renew the purge line filter if necessary.

WORKSHOP TOOLS

*Tool Number Description*

RH 8090  Pliers—Wire Hose Clips
Chapter U

Section U10
SUPPLEMENTS
No. 5 Japan 1975

Workshop personnel should refer to Chapter U (Part 2) for servicing information. However, the changes applicable to the 1975 model year cars and the relevant service details are given in this Supplement.

Rolls-Royce Silver Shadow and Bentley T Series motor cars and Rolls-Royce and Bentley Corniche motor cars destined for Japan and built to the 1975 specification, have the following changes.

Changes from the present 1974 build specification.
10. Air injection system with diverter valve but without external power mode function.
11. Carburettor needles changed and overrun valves fitted to throttle plates.
12. Contra-rotating throttles and new throttle linkage.
13. Sleeved choke butterfly housing.
14. Modified choke stove pipe from exhaust manifold.
15. Modified carburettor ‘tee’ piece.
16. Lucas Mk. II Opus ignition distributors.
17. New high tension (H.T.) harness.
18. New coil and ballast resistance.
20. Paper element fitted to air cleaner/silencer.
22. Exhaust tailpipe outlet modified.
23. Speedometer scale lined in red above 100 k.p.h., a buzzer will sound inside the car when it approaches this speed.
25. Modified head restraints.

Changes to the original build specification retained from the 1974 model.
1. Engine fan diameter increased to 50,80 cm. (20 in.).
2. Lower engine oil dipstick fitted.
3. Transmission modulator and T.V. vacuum pipe changed.
4. Choke solenoid held on during engine cranking.
5. Two vane air pump fitted to air injection system.
6. Exhaust gas recirculation system fitted (single valve system).
7. Exhaust gas recirculation heat shields fitted.
8. Under bonnet heat protection plates fitted.
FIG. 1 VIEW INSIDE ENGINE COMPARTMENT (From Right-hand side of Car)
1 Fuel receiver and float chamber vent valve
2 Weaken system cut-off switch
3 Exhaust gas recirculation valve
4 Exhaust gas recirculation distribution pipes
5 'B' bank carburetter
6 Check valve
7 Air diverter valve
8 Check valve

FIG. 2 VIEW INSIDE ENGINE COMPARTMENT (From Left-hand side of Car)
1 Weaken filter
2 Anti 'run-on' solenoid
3 Exhaust gas recirculation solenoid
4 Choke thermo-coil housing
5 'A' bank carburetter
6 Exhaust gas recirculation cooler
7 Choke solenoid
8 Ignition distributor
EXHAUST EMISSION CONTROL SYSTEM

AIR INJECTION SYSTEM

Air injection system relief valve

The relief valve located in the discharge cavity of the air pump is changed in 1975 model year cars and is as follows.

Air pump relief valve

A spring loaded relief valve is located within the diverter valve housing and permits excess air to bypass the air injection system when the check valves are closed. The bypass system prevents damage to the pump vanes and excessive exhaust temperatures under extreme operating conditions.

Air diverter valve

The air diverter valve is located at the front of the engine above the air pump (see Fig. 2) and performs the following important function in addition to housing the pressure relief valve for the air pump.

(i) Backfire protection (see Fig. 3)

Following rapid throttle closure, the inlet manifold pressure drops suddenly, causing fuel to be vaporised from the manifold walls which results in a mixture too rich to burn in the cylinders. This mixture combined with the air injected into the exhaust ports could cause backfiring.

To prevent backfiring, the diverter valve, triggered by manifold depression diverts the injected air from the exhaust ports for a short period of time.

Air diverter valve—To check

The air diverter valve is a non-serviceable component. If the operation of the component is suspect the following checks should be carried out before it is replaced.

(i) Relief valve failure or shuttle seizure

1. Ensure that the vehicle is in Neutral and the parking brake firmly applied.
2. Start and run the engine at 2000 r.p.m.
3. Ensure that air does not escape from the air diverter valve exhaust ports, situated around the body of the diverter valve (see Fig. 3).
4. Stop the engine.

Should air escape from the air diverter valve exhaust ports under these test conditions, the assembly must be replaced with a new component as either the relief valve has failed, or the shuttle has seized.

A failure of this nature would probably be accompanied by a complaint of excessive noise from within the engine compartment, due to the pressurised air escaping from the air diverter valve exhaust ports.

Air diverter valve—To remove

Before commencing to remove the air diverter valve observe the following points.

1. When disconnecting the various hoses ensure that each is suitably labelled to assist identification when assembling.
2. Ensure that all open ends of pipes and hoses are suitably blanked off to prevent the ingress of dirt, etc.

To remove the air diverter valve proceed as follows

1. Unscrew the three worm drive clips which secure the three larger diameter rubber hoses to the air diverter valve and withdraw the hoses. Two of the hoses connect to their respective air manifold check valves and the third hose to the air pump.
FIG. 3 AIR DIVERTER VALVE

A  Normal operation
B  Backfire protection
C  Relief valve operation
1  Exhaust to atmosphere
2  Exhaust to internal silencer
3  Timing valve
4  Lower diaphragm
5  Internal silencer
6  Manifold vacuum signal
7  Excess air
8  Relief valve
9  Valve outlets restricted
10  Valve inlet
11  Valve outlets to air manifolds
12  Metering valve
2. Withdraw the small diameter rubber hose from the air diverter valve.
3. Using a \( \frac{3}{8} \) in. A/F spanner unscrew and remove the two nuts which secure the air diverter valve to the mounting plate. Collect the two washers.
4. Hold the diverter valve and withdraw the two bolts from the mounting plate, taking care not to lose the washer situated under the head of each bolt.
5. Remove the air diverter valve together with the spacer plate and gasket.

3. Always ensure that the spacer plate is fitted with the spigot projecting through the mounting plate into the hose which connects to the air pump and that the gasket is fitted to the opposite side of the mounting plate from the spigot.

For details of the remainder of the air injection system see Workshop Manual T.S.D. 2476—Chapter U (Part 2).

**Air diverter valve—To fit**

Fit the air diverter valve by reversing the procedure given for removal, noting the following points.
1. Ensure that all joint faces are clean.
2. Ensure that the gasket is in a good condition.

**EXHAUST GAS RECIRCULATION SYSTEM**

This system is similar to the system detailed in Chapter U except that the 'A' bank exhaust manifold has the exhaust gas recirculation system take-off flange above the manifold as shown in Figure 5.

**FIG. 4 AIR INJECTION SYSTEM**

- 1: Air diverter valve
- 2: Check valve
- 3: 'A' bank air manifold
- 4: Anti 'run-on' solenoid
- 5: Ignition distributor
- 6: Exhaust gas recirculation solenoid
- 7: 'B' bank air manifold
- 8: Check valve
- 9: Vacuum manifold
- 10: Air pump
- 11: Air pump intake
The exhaust gas recirculation system cooler is situated above the engine on the 'A' bank side and a large heat shield is fitted around the cooler as shown in Figure 5.

As a result of these changes the pipe run between the exhaust manifold and cooler has changed.

**CAUTION**
When carrying out any work in or around the area of the exhaust gas recirculation system cooler (e.g. when checking the torque converter transmission fluid level), avoid contact with the various components and pipes of the system as they contain hot exhaust gases when the engine is running.

For details of the remainder of the exhaust gas recirculation system see *Workshop Manual T.S.D. 2476 — Chapter U (Part 2).*
FUEL EVAPORATION EMISSION CONTROL SYSTEM

Purge line

The purge line consists of a rubber hose, passing from the lowest connection on the canister through the valance junction piece to the vacuum manifold. Incorporated into this hose is the purge line filter and restrictor.

When the engine is running, air drawn through the canister filter and carbon picks up the stored fuel vapours and passes them via the hose, to the induction manifold. The restrictor in the line controls the flow rate at between 1.41 cu. m. per hr. and 1.98 cu. m. per hr. (50 cu. ft. per hr. and 70 cu. ft. per hr.) to maintain carburettor metering accuracy and the paper element line filter is fitted to prevent blockage of the restrictor.

Purge line filter—To remove

1. Using special pliers (RH 8090) remove the two steel retaining clips situated on either side of the unit.
2. Slacken the setscrew which secures the nylon retaining clip.
3. Withdraw the component from the clip.

Purge line filter—To fit

Fit the purge line filter by reversing the procedure given for removal noting the following points.
1. Ensure that the rubber hoses are in a good condition and new hose retaining clips are used.

FIG. 6 POSITION OF MIXTURE WEAKENING DEVICE FILTER AND PURGE LINE FILTER

1. Alternator
2. Weakener filter
3. Purge line filter
4. Hydraulic fluid accumulator pressure switches
CRANKCASE EMISSION CONTROL SYSTEM

Crankcase emissions are controlled by a recirculatory closed breather system (see Fig. 7).

An insulated draught tube connects the crankcase via the oil filler which is fitted with a sealed cap, to the choke housing upstream of both the choke butterfly and the carburetters. A flame trap capsule containing three wire mesh discs is fitted in a housing at the crankcase end of the draught tube. Engine emission (blow-by) is drawn into the induction system via the draught tube, due to the depression in the choke housing.

Maintenance

1. The flame trap fitted to the breather pipe should be cleaned in the following manner, at the specified mileage.

2. Unscrew the setscrew securing the breather pipe connection to the oil filler pedestal; withdraw the connection from the pedestal (slight resistance may be felt due to the rubber ‘O’ ring connections).

3. Withdraw the connection from the pipe flange and collect the restrictor.

4. Wash the flame trap assembly in clean petrol, then dry with a high pressure air line. The flame trap assembly consists of 3 gauzes crimped together as shown in Figure 7.

5. To clean the adapter fitted to the choke housing, remove the single setscrew from the breather pipe end connection and detach the pipe.

6. Clean the adapter fitted to the choke housing and ensure that the holes in the adapter are clear.

7. Assembly of the flame trap and breather pipe is in the reverse order, ensuring that the ‘O’ rings are in good condition.

---

**FIG. 7 EXPLDED VIEW OF CRANKCASE EMISSION CONTROL PIPE**

<table>
<thead>
<tr>
<th>Diagram A</th>
<th>Diagram B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Pipe</td>
<td>1 Pipe</td>
</tr>
<tr>
<td>2 ‘O’ ring</td>
<td>2 Setscrew</td>
</tr>
<tr>
<td>3 Connection</td>
<td>3 ‘O’ ring</td>
</tr>
<tr>
<td>4 Washer</td>
<td>4 Restrictor</td>
</tr>
<tr>
<td>5 Setscrew</td>
<td>5 Flame trap</td>
</tr>
<tr>
<td>6 ‘O’ ring</td>
<td>6 Connection</td>
</tr>
<tr>
<td>7 Adapter</td>
<td>7 ‘O’ ring</td>
</tr>
</tbody>
</table>
THE CARBURETTERS AND AUTOMATIC CHOKE SYSTEM

CARBURETTER

Data

Carburetters . Two S.U. HD8 diaphragm type
Choke size . 5.08 cm. (2.00 in.)
Jet size—
spring loaded needle type . 2.44 mm. (0.100 in.)
Jet needle—
spring loaded type . BDA
Carburetter—
air valve piston spring Red/Blue

CARBURETTER MIXTURE WEAKENING DEVICE

Description

In addition to the description given on pages U24 and U25, the following information is applicable.

Anti-diesel device (anti ’run-on’ solenoid)
The use of low octane fuel causes the engine to ‘diesel’ (i.e. continue to run-on after the ignition has been switched off) when it is hot. To prevent this from happening an anti ‘run-on’ solenoid valve is fitted into the weakener signal line. When the ignition is switched off this valve opens and connects the weakening system to the induction manifold thus creating a high float chamber depression which cuts off the fuel supply.

Carburettor overrun valves
During overrun (i.e. when decelerating with the throttles closed), insufficient mixture is supplied to the engine to maintain satisfactory combustion. The overrun valves alleviate this condition by allowing some mixture to pass through the throttle plates (butterflies) at high inlet manifold depressions.

An overrun valve consists of a small disc retained in each throttle plate by a spring loaded plunger. Under normal conditions the disc is seated against the throttle plate. When the throttle is suddenly closed, the increased inlet manifold depression lifts the disc from its seating and allows a metered quantity of air/fuel mixture to pass through the throttle plate.

The action of the overrun valves maintains satisfactory combustion on overrun, thus reducing hydrocarbon emissions.

After the sudden closure of the throttles and as soon as the manifold depression falls, the overrun valve disc returns to its seat on the throttle plate.

Throttle damper
The throttle damper prevents rapid throttle closure which would suddenly drop the inlet manifold pressure causing vapourisation of fuel from the manifold walls and a sudden increase in mixture strength.

Temperature controlled air intake
To ensure rapid warm-up and improve control of the air/fuel ratio a temperature controlled air intake is fitted.

A vacuum operated blending valve attached to the air cleaner assembly is controlled by a thermal sensor in the air intake elbow. This valve blends hot air from a pick-up point (scoop) adjacent to the exhaust manifold with cold air from under the front wing; thus maintaining a constant temperature of the intake air as it enters the carburetters.

Throttle stop vacuum actuator assembly
The throttle stop vacuum actuator assembly is not fitted to cars produced to the 1975 specification.
Contra-rotating throttles—To fit and set (see Fig. 8)

1. Assemble 'A' bank and 'B' bank throttle levers (items 7 and 13) onto the carburettor spindles.
2. Fit the setting jig (RH 8880) into position on the throttle levers.
3. Fully close 'B' bank carburettor butterfly (item 8).
4. Tighten the pinch bolt securing 'B' bank throttle lever.
5. Fully close 'A' bank carburettor butterfly (item 3).
6. Tighten the pinch bolt securing 'A' bank throttle lever.
7. Fit the throttle spring (item 4) to the throttle levers.
8. Remove the setting jig from the throttle levers.
9. Fit the cross link (item 12) and the eccentric throttle adjuster (item 5) onto the throttle levers, ensuring that both throttle butterflies are closed when adjusting and tightening the eccentric adjuster.

Note  The eccentric pin should be set in the lowest position possible.

10. Ensure that the tang of the throttle guard (item 6) has a clearance of between 1.27 mm. (0.050 in.) and 1.78 mm. (0.070 in.) with the cross link and also that the tang does not foul the throttle spring. If necessary bend the tang to give these clearances.
11. Check that the throttle linkage moves freely.
12. Fit the idle stop screw (item 10) and adjust until it just contacts the stop bracket (item 11) with the throttle butterflies remaining in the closed throttle position.
13. Screw down the idle stop screw ½ turn and tighten the lock-nut.
14. Screw both of the carburettor volume screws (items 2 and 9) fully in.
15. Fit the throttle damper (item 1) with the damper spindle compressed 4.75 mm. (0.187 in.) when throttle lever (item 13) is in the closed position. Ensure that the damper rod contacts the throttle lever centrally 5.1 mm. (0.20 in.) from the outer edge.
16. Connect the drive link (item 14) to the manifold shaft lever (item 15).
17. Operate the linkage to ensure free movement.
18. With the throttles in the closed position check that the 'A' bank control shaft to control rod lever

FIG. 8 CONTRA-ROTATING THROTTLE CONTROLS

A = Reference angle 22°
B = Reference angle 90°
1 Throttle damper
2 'A' bank carburettor volume screw
3 'A' bank carburettor throttle plate
4 Throttle spring
5 Eccentric throttle adjuster
6 Throttle guard
7 'B' bank carburettor throttle lever
8 'B' bank carburettor throttle plate
9 'B' bank carburettor volume screw
10 Idle stop screw
11 Closed throttle bracket
12 Cross link
13 'A' bank carburettor throttle lever
14 Drive link
15 Front manifold shaft lever
16 Rear manifold shaft lever
(item 16) on the rear of the manifold shaft is in line with the front manifold shaft lever (item 15). Tighten the securing bolts on both levers.

19. Operate the mechanism; check for freedom of movement within the linkage and also clearance with the various engine components.

20. To set the remainder of the linkage from the control rod lever on the rear of the manifold shaft to the accelerator pedal refer to Chapter T—Part 2.

**Tuning procedure**

The tuning procedure is given on page U32 with the following changes.

1. When blanking off the hot idle compensator feed drilling refer to Figure 9 in this Supplement.
2. The idle CO reading referred to should be 3-0% to 4% and not 5-0% to 5-5%.

**Throttle damper plunger—To set**

1. Move the cold start ‘fast-idle’ to the off position.
2. Slacken both nuts securing the throttle damper to its bracket. Back off the nuts until they are well clear of the bracket.
3. Press the damper towards the ‘A’ bank throttle lever until the damper is fully compressed and the lever is just clear of the throttle stop screw.
4. Screw the lower securing nut until it is 0.63 mm. (0-025 in.) clear of the underside of the bracket. Release the damper and tighten the upper securing nut.
5. Ensure that the damper spindle is at the maximum possible radius, whilst maintaining adequate contact with the throttle lever pad. This can be achieved by adjusting the angle of the bracket.

**Automatic choke stove pipe—To check**

To check the stove pipe for any blockage, carry out the following procedure.

1. Start the engine and run until normal operating temperature is attained.
2. Disconnect the union at the butterfly housing (see Fig. 10) and connect a flowmeter to the pipe via connector RH 8837. The flowmeter consists of a calibrated orifice (RH 8097) and a water manometer capable of reading up to 88.9 cm. (35 in.).
3. Start the engine and run at idle speed (i.e. 600 r.p.m.); observe the manometer reading which should be between 40.6 cm. (16 in.) and 50.8 cm. (20 in.).
4. If the manometer reading is below 16 in. (40.6 cm.), stop the engine, remove the choke stove pipe and stove assembly to check for leaks.
5. Fit the choke stove pipe and stove assembly, start the engine and again observe the manometer reading at idle speed.
6. Disconnect the flowmeter assembly and fit the choke stove pipe to the connection on the butterfly housing.

**‘Fast-idle’ cam—To set**

1. Fit the ‘fast-idle’ mechanism; do not tighten the ‘fast-idle’ lever clamping bolt.
2. Ensure that the 'fast-idle' adjustment screw is directly over the cam.

3. With the throttles closed, insert a 2.54 mm. (0-100 in.) diameter rod between the top of the 'fast-idle' cam and the boss under the 'fast-idle' adjustment screw. Tighten the clamping bolt on the 'fast-idle' lever.

4. Ensure that the throttles are closed; screw in the 'fast-idle' adjustment screw until it just makes contact with the top step of the 'fast-idle' cam.

5. Insert a 1.27 mm. (0-050 in.) diameter drill between the leading edge of the choke butterfly valve and the choke housing.

6. With the butterfly valve in this position, adjust the length of the butterfly rod so that the tip of the 'fast-idle' screw is in line with the start of the top step of the 'fast-idle' cam, (i.e. the position when the tip of the adjustment screw is about to fall from the top step to the bottom step of the cam).

Remove the 1.27 mm. (0-050 in.) diameter drill from the choke housing.

7. With the throttles closed and the choke partly open, adjust the 'fast-idle' adjustment screw to just contact the start or bottom step of the 'fast-idle' cam, screw in a further ½ turn and tighten the lock-nut ensuring that the adjustment screw does not move.

**Cold start 'fast-idle'—To set**

1. Stop the engine and disconnect both solenoid to exhaust gas recirculation valve hoses at the valve ends. Blank the hoses, remove the pressure tapping cap to vent the float chambers; open the throttles and close the choke butterfly against the bi-metal coil tension by means of the butterfly link lever, release throttles. The 'fast-idle' adjusting screw will now be resting on the high step of the 'fast-idle' cam and the throttles are in the cold start position.

2. Start the engine and check the 'fast-idle' speed. If the speed is not between 1 900 r.p.m. and 2 100 r.p.m., stop the engine, open the throttles to gain access to the adjusting screw and adjust ½ turn for each 100 r.p.m. outside the required speed.

3. Tighten the lock-nut and check the 'fast-idle' speed. If correct open the throttles to release 'fast-idle' cam mechanism.

4. Remove the blanks from both solenoid to the exhaust gas recirculation valve hoses and connect the hoses to their respective exhaust gas recirculation valves. Fit the tapping cap to 'A' bank carburettor float chamber cover.

**Float chamber depression—To check**

Refer to Page U37 noting the following information.

(i) The correct reading to be obtained on the manometer is 5.08 cm. (2-0 in.).

(ii) Operation 8 should read

8. Raise the engine speed slowly noting the manometer and tachometer readings. The maximum steady manometer reading should be obtained between 1 300 r.p.m. and 1 600 r.p.m. If the maximum depression occurs below 1 300 r.p.m. it is permissible to screw out the idle bleed screws on the carburetters by equal amounts (maximum 2.5 turns) to obtain this speed.
IGNITION SYSTEM, DISTRIBUTOR, IGNITION COIL AND SPARKING PLUGS

Data

Ignition timing ... T.D.C. (Static) 15° B.T.D.C. at 1,600 r.p.m. (stroboscopic) in Neutral.
(Approach 1,600 r.p.m. from a higher speed).

Ignition control system

The ignition system utilises an Opus distributor (in which a magnetic pick-up and control unit replace the conventional contact breaker), a low inductance ignition coil and a ballast resistor. The control unit comprises an electronic oscillator, amplifier and power transistor.

A drum with eight ferrite rods (one per cylinder) moulded into the outer edge is mounted onto the distributor drive-shaft. As the drum rotates a voltage is created each time a ferrite rod passes the magnetic pick-up, this signal is then amplified and used to switch-off the normally conducting power transistor in the primary coil circuit thus inducing a high voltage in the secondary winding which is distributed to the sparking plugs in the normal manner.

This ignition control system provides increased accuracy of timing and increased service life before maintenance is required.

Ignition—To time (using a stroboscope)

The ignition is timed on A1 cylinder which is located at the front left-hand side of the engine (viewed from the front of the car).

Note If the ignition timing is to be set, ensure that the sparking plugs are in good condition before running the engine; if they require cleaning or renewal the sparking plugs gap should be set to 0.9 mm. (0.035 in.).

1. To check the ignition timing commence by running the engine until normal operating temperature is attained and the choke 'fast-idle' is in the off position. Switch off the engine.

2. Connect a stroboscope and a tachometer to the engine as described in the instructions supplied with the respective equipment.

3. Start the engine and adjust the throttle stop screw to give an idle speed of 1,600 r.p.m. When setting the engine idle speed reduce from a higher speed to 1,600 r.p.m.

4. Direct the flashing light of the stroboscope onto the crankshaft damper timing marks and timing pointer; the pointer is positioned on the right-hand side of the crankshaft damper when viewed from the front of the engine.

5. If the timing pointer does not coincide with the 15° B.T.D.C. mark on the crankshaft damper adjust the ignition timing as follows.
FIG. 11 EXPLODED VIEW OF DISTRIBUTOR

1. Pick-up module
2. Pick-up arm
3. Distributor cover/cap
4. High tension brush and spring
5. Rotor arm
6. Flash over shield (dust cover)
7. Timing rotor
8. Control unit
9. Lubrication pad
10. Driving dog and pin
11. Thrust washer
12. Distributor body
13. Automatic advance mechanism
14. Electronic module assembly

6. Release the clamp screw on the distributor and rotate the head of the distributor in the appropriate direction until the correct timing is obtained. Clockwise rotation of the distributor head advances the ignition and conversely anti-clockwise rotation retards the ignition. After adjustment has been carried out tighten the clamp screw and again check to ensure that the timing has not altered whilst tightening the clamp screw.

7. Set the engine idle speed to 600 r.p.m.

Setting the engine idle speed

Ensure that the engine is at normal operating temperature and that the choke ‘fast-idle’ is in the off position.

The air conditioning system must be switched off and a tachometer connected to the engine in accordance with the manufacturer’s instructions.

1. Stop the engine, remove the air intake hose and blank off the hot idle compensator feed drilling (see Fig. 9); replace the air intake hose.

2. Start the engine and, if necessary, adjust the engine idle speed to 600 r.p.m. using the throttle stop screw; tighten the lock-nut.

3. Stop the engine and remove the air intake hose. Remove the blank from the hot idle compensator feed drilling and detach the tachometer and stroboscopic timing equipment (if fitted). Fit the air intake hose.

Sparking plugs

The sparking plugs approved for this car are Champion N.14.Y. Before fitting the plugs, set the gaps with the aid of a feeler gauge to 0.9 mm. (0.035 in.) and lightly smear the threads with ‘Graphogen’ grease.
LUBRICATION AND MAINTENANCE

Special attention should be paid to the following lubrication and maintenance schedules which Rolls-Royce Motors Distributors and Retailers are authorised to carry out.

It is important that items marked with an asterisk (*) in the Service Schedules are carried out during the Warranty period by a Distributor or Retailer at the time specified in order to comply with the Rolls-Royce Motors Warranty and relevant Emission Control Regulations.

The schedules marked 'REGULAR MAINTENANCE' should be carried out either by the Owner, his chauffeur, or by a Distributor or Retailer.

REGULAR MAINTENANCE

Carburetters
Monthly, check the oil level in the reservoirs of the automatic air valve dampers; top-up if necessary.

Engine
Weekly or every 800 km. (500 miles), whichever is the earlier, check the oil level by means of the dipstick; top-up if necessary.

Hydraulic reservoirs
Monthly, check the level of fluid in the reservoirs for the braking and automatic levelling systems; the engine should be run for 4 minutes before checking the fluid level. Top-up if necessary to the indicated level. If frequent topping-up is required check the hydraulic systems for leaks and rectify if necessary.

Lamp bulbs
Weekly, check all lamp bulbs for correct operation and replace any faulty bulbs.

Radiator
Every 3 months, check the level of coolant in the radiator header tank; if necessary, top-up with the correct anti-freeze/water mixture or inhibited solution.

Tyres
Weekly, check the tyre pressures; adjust if necessary. Also check the spare wheel tyre pressure; adjust if necessary. Check the tread depth of all tyres and inspect the tyres for signs of damage.

Windscreen washer
Weekly, top-up the reservoir if necessary.

INITIAL 5 000 km. (3 000 MILES) OR 3 MONTHS SERVICE WHICHEVER IS THE EARLIER

*Air injection pump
Check belt tension and reset if necessary.

*Automatic choke
Check the flow through the choke stove pipe and check for correct operation.

*Carburetters
Check oil level in air valve dampers and if necessary top-up to correct level. Check tightness of float chamber covers. Check float chamber depression. Check and if necessary reset the idle speed. Check and if necessary reset the choke 'fast-idle' speed.

*Engine
Change engine oil.

*Engine cooling system
Tighten worm-drive clips of all coolant hoses.

*Exhaust gas recirculation system
Check the exhaust gas recirculation valve for correct operation.
*Fuel evaporation emission control system

Check the purge rate; this should be between 1.41 cu. m. per hr. and 1.98 cu. m. per hr. (50 cu. ft. per hr. and 70 cu. ft. per hr.) at 600 r.p.m. in neutral. Pressure test the fuel tank and evaporation loss line and if necessary rectify any leaks.

*Ignition system

Check ignition timing using stroboscope and adjust if necessary; the ignition timing should be 15° B.T.D.C. with the engine running at 1 600 r.p.m.

*Torque converter transmission

Check fluid level and top-up if necessary.
When checking the fluid level, avoid contact with the exhaust gas recirculation valve and associated pipes as these contain hot exhaust gases.

Belt tension

Check the tension of the belts driving the following: fan and steering pump, alternator and refrigeration compressor. Adjust the belt tension as necessary.

Steering pump

Check the oil level in the reservoir; top-up if necessary.

EVERY 5 000 KM. (3 000 MILES) OR 3 MONTHS WHICHEVER IS THE EARLIER

If the car is used for constant stop/start operation, change the engine oil.

EVERY 10 000 KM. (6 000 MILES) OR 6 MONTHS WHICHEVER IS THE EARLIER

*Battery

Check the level of the electrolyte in the battery; if necessary top-up with distilled water.

*Brakes

Inspect footbrake and parking brake pad linings. When changing footbrake pads examine condition of dust excluders on calipers. Manually adjust the parking brake pads. Inspect pipes and connections, rectify if necessary.

*Engine

Change engine oil and renew oil filter element.

Belt tension

Check the tension of the belts driving the following: fan and steering pump, alternator and refrigeration compressor. Renew any belts which show signs of wear.

Carburetters

Check the oil level in the air valve dampers and top-up if necessary.
Check the idle speed.

Torque converter transmission

Check fluid level and top-up if necessary.
When checking the fluid level, avoid contact with the exhaust gas recirculation valve, heat shield and associated pipes as these components will be hot.

Control linkages

Apply a few drops of engine oil to the accelerator linkage and to the gear range selector controls adjacent to the transmission casing.

Electrical system

Ensure that all lamps, instruments, warning devices and air conditioning controls are operating satisfactorily.

Check the following levels and pressures

Run the engine for four minutes then check the hydraulic reservoir fluid levels; top-up if necessary with the specified fluid.
Check the level of fluid in the power steering pump reservoir.
Check the level and specific gravity of the engine coolant and correct if necessary.
Check the tyre pressures and adjust if necessary.
Check the tread depth of all tyres and inspect for signs of damage.

**Every 20,000 km. (12,000 miles) or 12 months service whichever is the earlier**

**Air injection pump**
Check tension of pump pulley driving belt.

**Air silencer**
Fit a new paper filter element.

**Battery**
Check the level of the electrolyte in the battery; if necessary top-up with distilled water.

**Brakes**
Inspect footbrake and parking brake pad linings. When changing footbrake pads examine condition of dust excluders on calipers. Manually adjust parking brake pads. Inspect pipes and connections; rectify if necessary.

**Carburetters**
Top-up oil level in air valve dampers. Check tightness of float chamber covers. Check float chamber depression. Check and if necessary reset the idle speed. Check and if necessary, reset choke ‘fast-idle’ speed.

**Crankcase emission control system**
Remove and clean gauze flame traps in the crankcase breather tube. Clean the adapter in choke butterfly housing.

**Engine**
Change engine oil and renew oil filter element.

**Exhaust gas recirculation system**
Remove and clean the exhaust gas recirculation valve and feed pipes. Clean exhaust gas recirculation orifices in the carburettor ‘Tee’ piece. Check exhaust gas recirculation valve for correct operation.

**Final drive unit**
Check oil level and top-up if necessary.

**Fuel evaporation emission control system**
Check the condition of the pipes and connections.

**Ignition system**
Fit new sparking plugs ensuring that the gaps are set to 0.9 mm. (0.035 in.).
Lubricate distributor spindle (shaft bearings) and automatic advance mechanism with engine oil.
Check the ignition timing using a stroboscope and adjust if necessary; the ignition timing should be 15° B.T.D.C. with the engine running at 1,600 r.p.m.

**Steering ball joints**
Lubricate the six grease nipples. Inspect the rubber covers on the ball joints; if the covers are found to be damaged the joints should be dismantled and new parts fitted as necessary.

**Front sub-frame and compliant front suspension**
The front suspension ball joints are sealed for life and no maintenance is required until renewal is necessary or the ball joint rubber covers are damaged. Inspect
the rubber covers on the front suspension ball joints; if the covers are found to be damaged new joints and covers should be fitted.

*Torque converter transmission
Renew transmission fluid.
When checking the fluid level, avoid contact with the exhaust gas recirculation valve, heat shield and associated pipes as these components will be hot.

Belt tension
Check the tension of the belts driving the following: fan and steering pump, alternator and refrigeration compressor. Renew any belts which show signs of wear.

Control linkage
Apply a few drops of engine oil to the accelerator linkage and to the gear range selector controls adjacent to the transmission casing.

Electrical system
Ensure that all lamps, instruments, warning devices and air conditioning controls are operating satisfactorily.

Hand brake/Parking brake linkage
Lubricate the pivot pins and pulleys in the parking brake system with approved grease.

Spare wheel
Lubricate the spare wheel lowering bolt and mechanism.

Check the following levels
Check the fluid level in the power steering pump reservoir and top-up if necessary.
Check the level and specific gravity of the engine coolant and correct if necessary.

*Battery
Check the level of electrolyte in the battery; if necessary top-up with distilled water.

*Brakes
Inspect footbrake and parking brake pad linings. When changing footbrake pads examine condition of dust excluders on calipers. Manually adjust the parking brake pads. Inspect pipes and connections, rectify if necessary.

*Engine
Change engine oil and renew oil filter element.

Belt tension
Check the tension of the belts driving the following: fan and steering pump, alternator and refrigeration compressor.
Renew any belts which shown signs of wear.

Carburetters
Check the oil level in the air valve dampers and top-up if necessary.
Check the idle speed.

*Torque converter transmission
Check fluid level and top-up if necessary.
When checking the fluid level, avoid contact with the exhaust gas recirculation valve, heat shield and associated pipes as these components will be hot.

Control linkages
Apply a few drops of engine oil to the accelerator linkage and to the gear range selector controls adjacent to the transmission casing.
Electrical system
Ensure that all lamps, instruments, warning devices and air conditioning controls are operating satisfactorily.

Check the following levels
Check the level of fluid in the power steering pump reservoir.
Check the level and specific gravity of the engine coolant and correct if necessary.

EVERY 40 000 KM. (24 000 MILES) OR 2 YEARS SERVICE WHICHEVER IS THE EARLIER

*Carburetters
Clean air valves. Remove inlet unions from the float chamber covers and fit new paper filter elements. Top-up oil level in air valve dampers. Check tightness of float chamber covers. Check float chamber depression. Check and if necessary, reset the idle speed. Check and if necessary, reset choke 'fast-idle' speed.

*Carburettor mixture weakening device
Renew air filter element for the carburettor mixture weakening device.

*Crankcase emission control system
Remove and clean gauze flame traps in crankcase breather tube. Clean the adapter in choke butterfly housing.

*Engine
Change engine oil and renew oil filter element.

*Engine cooling system
Fit a new engine coolant thermostat and heater tap feed hose.

*Exhaust gas recirculation system
Remove and clean the exhaust gas recirculation valve and feed pipe. Clean the orifices in the carburettor 'Tee' piece. Check the exhaust gas recirculation valve for correct operation.

*Final drive unit
Change oil.

*Fuel evaporation emission control system
Renew the foam filter element in the evaporation loss control canister. Check the purge rate; this should be between 1.41 cu. m. per hr. and 1.98 cu. m. per hr. (50 cu. ft. per hr. and 70 cu. ft. per hr.) at 600 r.p.m. in neutral. Renew the purge line filter if necessary.

*Air injection pump
Check tension of pump pulley driving belt.

*Air injection system
Check air injection system for leaks and correct functioning. Renew any defective items.

*Air silencer
Fit a new paper filter element.

*Automatic choke
Check the air flow through the choke stove pipe and check the system for correct functioning.

*Battery
Check the level of the electrolyte in the battery; if necessary top-up with distilled water.

*Brakes
Inspect footbrake and parking brake pad linings. When changing footbrake pads examine condition of dust excluders on calipers. Manually adjust parking brake pads. Inspect pipes and connections, rectify if necessary.
**Ignition system**

Fit new sparking plugs ensuring that the gaps are set to 0.9 mm (0.035 in.).

Lubricate distributor spindle (shaft bearings) and automatic advance mechanism with engine oil.

Check the ignition timing using a stroboscope and adjust if necessary; the ignition timing should be 15° B.T.D.C. with the engine running at 1600 r.p.m.

**Steering ball joints**

Lubricate the six grease nipples. Inspect the rubber covers on the ball joints; if the covers are found to be damaged the joints should be dismantled and new parts fitted as necessary.

**Front sub-frame and compliant front suspension**

The front suspension ball joints are sealed for life and no maintenance is required until renewal is necessary or the ball joint rubber covers are damaged. Inspect the rubber covers on the front suspension ball joints; if the covers are found to be damaged new joints and covers should be fitted.

**Torque converter transmission**

Change transmission fluid.

Fit a new intake strainer.

When checking the fluid level, avoid contact with the exhaust gas recirculation valve, heat shield and associated pipes as these components will be hot.

**Belt tension**

Check the tension of the belts driving the following:
fan and steering pump, alternator and refrigeration compressor. Renew any belts which show signs of wear.

**Control linkage**

Apply a few drops of engine oil to the accelerator linkage and to the gear range selector controls adjacent to the transmission casing.

**Electrical system**

Ensure that all lamps, instruments, warning devices and air conditioning controls are operating satisfactorily.

**Fuel filter**

Renew the main line filter element and clean the filter bowl.

**Fuel pump**

Remove the fuel pump from the car and test on the bench. Fit a new pump unit if the performance is below the specified level (refer to Chapter K—Fuel System of this Workshop Manual T.S.D. 247E).

**Fuel tank**

Slacken the drain plug one or two turns and allow any accumulated water to drain away. Tighten the drain plug.

**Hand brake/Parking brake linkage**

Lubricate the pivot pins and pulleys in the parking brake system with approved grease.

**Height control mechanism**

Disconnect the control valve linkage ball joints. Clean, grease and refit the ball joints.

**Rear wheel drive-shafts**

Lubricate the rear wheel drive-shaft outer universal couplings with an approved grease.

**Spare wheel**

Lubricate the spare wheel lowering bolt and mechanism.

**Check the following levels and pressures**

Check the fluid level in the power steering pump reservoir and top-up if necessary.
Check the level and specific gravity of the engine coolant and correct if necessary.
Check the tyre pressures and adjust if necessary.
Check the tread depth of all tyres and inspect for signs of damage.

**SERVICING AFTER 40 000 KM. (24 000 MILES) OR 2 YEARS WHICHEVER IS THE EARLIER**

After 41 600 km (24 000 miles) or 2 years, servicing is still due at the following intervals.

**50 000 KM. (30 000 MILES) OR 2\(\frac{1}{2}\) YEARS WHICHEVER IS THE EARLIER**

Carry out the 10 000 km (6 000 miles) service.

**60 000 KM. (36 000 MILES) OR 3 YEARS WHICHEVER IS THE EARLIER**

Carry out the 20 000 km (12 000 miles) service.

**70 000 KM. (42 000 MILES) OR 3\(\frac{1}{2}\) YEARS WHICHEVER IS THE EARLIER**

Carry out the 10 000 km (6 000 miles) service.

**80 000 KM. (48 000 MILES) OR 4 YEARS WHICHEVER IS THE EARLIER**

Carry out the 40 000 km (24 000 miles) service.

**SEASONAL SCHEDULES**

**EVERY 12 MONTHS**

**Engine cooling system**

Drain the coolant from the radiator and the engine crankcase. Clean any debris from the external surface of the refrigeration condenser and radiator matrices by reverse flushing with a hose. This should be carried out just prior to the Autumn. Fill the system with the correct anti-freeze mixture (refer to Chapter L—Engine Cooling System of this Workshop Manual T.S.D. 2476).

**Air conditioning system**

Ensure that the foam filter element fitted to the scuttle intake grille is free from obstruction. On Long Wheelbase cars fitted with a centre division, check that the foam filter element fitted to the intake grille in the rear decking panel is free from obstruction.

**Refrigeration system**

These operations should be carried out only by an experienced refrigeration engineer.

Check that the refrigeration system is functioning correctly. If necessary, top-up the system with refrigerant. If loss of refrigerant is evident, check the system for leakage. Visually check the refrigerant compressor for oil leakage, if oil leakage is apparent check the oil level and top-up if necessary. In the event of a major oil loss, check and repair before topping-up (refer to Chapter C—Air Conditioning of this Workshop Manual T.S.D. 2476).

**Body**

Check that the body drain holes are free from foreign matter.

**EVERY 2 YEARS**

In addition to the 12 monthly schedule, carry out the following.

**Engine cooling system**

Drain the coolant from the radiator and engine crankcase. Thoroughly reverse flush the coolant passages with a continuous flow of water. Change the coolant hoses where necessary. Fill the system with the correct anti-freeze mixture.
SERVICE RECOMMENDATIONS
BRAKE AND HYDRAULIC SYSTEM
COMPONENTS

80 000 KM. (48 000 MILES)
At this mileage and under normal motoring conditions it is recommended that the following servicing is carried out.

Renew the front and rear accumulator to frame connector block hoses.

Examine the sub-frame to brake caliper hoses for chafing or surface cracking; renew if necessary.

Completely drain the fluid from the hydraulic circuits. Thoroughly clean the brake fluid reservoirs and sight glasses, ensuring that no foreign matter is allowed to enter during the operation.

Fill the hydraulic system with Castrol RR363 Brake Fluid. This fluid exceeds specification S.A.E. J1703b in many respects and complies with D.O.T. 3 grade of FMVSS 116. Bleed the braking systems and automatic height control system.

160 000 KM. (96 000 MILES)
At this mileage and under normal motoring conditions it is recommended that the following servicing is carried out.

Renew all the flexible hoses to the braking systems and the automatic height control system. Fit new seals to the disc brake calipers, the deceleration conscious pressure limiting valve and the master cylinder.

Completely drain the fluid from the hydraulic circuits. Thoroughly clean the brake fluid reservoirs and sight glasses, ensuring that no foreign matter is allowed to enter during the operation.

Fill the hydraulic system with Castrol RR363 Brake Fluid. This fluid exceeds specification S.A.E. J1703b in many respects and complies with D.O.T. 3 grade of FMVSS 116. Bleed the braking systems and automatic height control system.

Fit a new convoluted rubber hose between the fuel filler head and fuel tank assembly. Examine all flexible fuel pipes and renew any which show signs of deterioration.

SPECIAL PRECAUTIONS
Should the car be used in very cold temperatures, drain the engine sump when thoroughly warm and also drain the carburettor air valve dampers. The engine sump and carburettor air valve dampers should then be filled with oil having the following viscosity.

For constant temperatures of between 0°C and −23°C (32°F. and −10°F.), use a 10W/30 grade oil.

For constant temperatures of −23°C (−10°F.) and below, use a 5W/20 grade oil.

WORKSHOP TOOLS

The tool listed, is in addition to those mentioned in Chapter U (Part 2).

Tool Number Description

RH 8880 Setting Jig—Throttle Levers
Chapter U

Section U10

SUPPLEMENTS

No. 6 North America 1976

Rolls Royce motor cars conforming to the appropriate emission control regulations and produced to the 1976 specification can be readily identified as follows.

1. Car Serial Number
   A letter E as the last prefix of the Car Serial Number (e.g. SRE or LRE, etc.).

2. Emission Control Certification Label
   A 1976 Emission Control Certification Label (illustrated below) fitted to the wing valance to the rear of the right-hand front suspension spring cover.
**FIG. 1 VIEW INSIDE ENGINE COMPARTMENT (From Left-hand side of Car)**

1. Weakener filter
2. Check valves
3. Anti 'run-on' solenoid
4. 'B' bank carburetter
5. E.G.R. cut-out solenoid
7. Choke solenoid
8. Choke stove pipe
9. Crankcase emission control system breather tube

**FIG. 2 VIEW INSIDE ENGINE COMPARTMENT (From Right-hand side of Car)**

1. Weakener system cut-off switch
2. E.G.R. primary valve
3. 'A' bank carburetter
4. E.G.R. secondary valve
5. E.G.R. full throttle cut-out micro-switch
6. Speed control system regulator
7. Hydraulic accumulator fluid pressure switches
8. Air diverter valve cut-out micro-switch assembly
9. Air diverter valve
10. Air pump
EXHAUST EMISSION CONTROL SYSTEM

AIR INJECTION SYSTEM

Air injection system relief valve

The relief valve located in the discharge cavity of the air pump is changed on 1976 model year cars and is as follows.

Air pump relief valve

A spring loaded relief valve is located within the diverter valve housing and permits excess air to bypass the air injection system when the check valves are closed. The by-pass system prevents damage to the pump vanes and excessive exhaust temperatures under extreme operating conditions.

Air diverter valve

The air diverter valve is located at the front of the engine above the air pump (see Fig. 2) and performs two important functions in addition to housing the pressure relief valve for the air pump.

(i) Backfire protection (see Fig. 3)

Following rapid throttle closure, the inlet manifold pressure drops suddenly, causing fuel to be vapourised from the manifold walls which results in a mixture too rich to burn in the cylinders. This mixture combined with the air injected into the exhaust ports could cause backfiring.

To prevent backfiring, the diverter valve, triggered by manifold depression diverts the injected air from the exhaust ports for a short period of time.

(ii) Catalyst overtemperature protection (see Fig. 3)

Under high load conditions the low manifold depression activates a vacuum switch controlling a solenoid valve. The solenoid valve is located in the pressure line connecting the diverter valve inlet to the lower diaphragm cover. When the vacuum switch is activated the solenoid opens and applies air pump delivery pressure to the lower diaphragm, thereby diverting the air from the exhaust ports. This prevents excessive temperatures which could result in catalyst failure.

Air diverter valve—To check

The air diverter valve is a non-serviceable component. If the operation of the component is suspect, the following checks should be carried out before it is replaced.

1. Ensure that the parking brake is firmly applied and the vehicle is in "Park".
2. Start and run the engine at 2 000 r.p.m.
3. Ensure that air does not escape from the air diverter valve exhaust ports situated around the body of the air diverter valve (see Fig. 3).

If air does escape from the air diverter valve during Operation 3 check the following.

(a) Check the setting of the air diverter valve vacuum operated micro-switch assembly, refer to Page U175 of this Supplement.
(b) Check the operation of the air diverter valve cut-out solenoid, refer to Page U176 of this Supplement.
(c) Check the hose (see Fig. 5) from the air diverter valve cover to the solenoid in the air diverter valve vacuum operated micro-switch assembly, rectify any air leaks.
FIG. 3 AIR DIVERTER VALVE

A Normal operation
B Catalyst over temperature protection
C Backfire protection
D Relief valve operation

1 Exhaust to internal silencer
2 Timing valve
3 Lower diaphragm
4 Internal silencer
5 Exhaust to atmosphere
6 Air pump pressure via solenoid valve
7 Manifold vacuum signal
8 Excess air
9 Relief valve
10 Valve outlets restricted
11 Valve inlet
12 Valve outlets to air manifolds
13 Metering valve
14 Air pump pressure to solenoid valve
(d) Repeat Operations 1 to 3 inclusive.

If air still escapes from the exhaust ports the air diverter valve assembly is faulty due to either a failed relief valve or a seized shuttle and must be replaced.

After fitting a new air diverter valve, ensure that the component operates satisfactorily.

4. Release the throttle linkage sharply so that the engine speed rapidly falls from 2000 r.p.m., ensure that air does escape from the air diverter valve exhaust ports for a short period of time.

If air does not escape from the exhaust ports of the air diverter valve during Operation 4 check the following.

(a) The condition of the hose (see Fig. 5) from the air diverter valve to the vacuum manifold.

(b) The condition of any hose connected to the vacuum manifold (see Fig. 5).

(c) Repeat Operation 4.

If air still does not escape during Operation 4 the air diverter valve assembly is faulty due to either a diaphragm or timing valve failure and must be replaced.

After fitting a new air diverter valve, ensure that the component operates satisfactorily.

5. Allow the engine to idle at 600 r.p.m. Ensure that no air escapes from the air diverter valve exhaust ports.

Air diverter valve—To remove

Before commencing to remove the air diverter valve observe the following points.

1. When disconnecting the various hoses ensure that each is suitably labelled to assist identification when assembling.

2. Ensure that all open ends of pipes and hoses are suitably blanked off to prevent the ingress of dirt, etc.

---

**FIG. 4 AIR INJECTION SYSTEM**

1. Air diverter valve
2. Air diverter valve vacuum operated micro-switch assembly
3. Check valve
4. 'A' bank air manifold
5. Anti 'run-on' solenoid
6. Ignition distributor
7. Secondary valve micro-switch assembly
8. Exhaust gas recirculation solenoids
9. 'B' bank air manifold
10. Check valve
11. Inlet manifold tappings
12. Vacuum manifold
13. Air pump
14. Air pump intake
FIG. 5 HOSE ROUTING DIAGRAM—1976 MODELS
To remove the air diverter valve proceed as follows

1. Unscrew the three worm drive clips which secure the three larger diameter rubber hoses to the air diverter valve and withdraw the hoses. Two of the hoses connect to their respective air manifold check valves and the third hose to the air pump.

2. Withdraw the three smaller diameter rubber hoses from the air diverter valve.

The hose fitted to the front of the air diverter valve connects to the solenoid of the air diverter valve vacuum operated micro-switch assembly. The hose fitted to the rear of the assembly connects to the solenoid inlet and the hose fitted on the top of the assembly connects to the vacuum manifold. The hose connections are illustrated in Figure 4.

3. Using a \( \frac{1}{8} \) in. A/F spanner unscrew and remove the two nuts which secure the air diverter valve to the mounting plate. Collect the two washers.

4. Hold the air diverter valve and withdraw the two bolts from the mounting plate, taking care not to lose the washer situated under the head of each bolt.

5. Remove the air diverter valve together with the spacer plate and gasket.

**Air diverter valve—To fit**

Fit the air diverter valve by reversing the procedure given for removal, noting the following points.

1. Ensure that all joint faces are clean.
2. Ensure that the gasket is in a good condition.
3. Always ensure that the spacer plate is fitted with the spigot projecting through the mounting plate into the hose which connects to the air pump and that the gasket is fitted to the opposite side of the mounting plate from the spigot.

**EXHAUST GAS RECIRCULATION SYSTEM**

A proportion of the exhaust gas from the ‘A’ bank exhaust downtake pipe is recirculated through vacuum operated metering valves into the carburettor ‘Tee’ piece, just downstream of the throttle plates. This exhaust gas mixes with the inlet charge in the induction manifold and is distributed to the cylinders thus lowering the peak combustion temperature and reducing the formation of oxides of nitrogen emissions.

A ‘dual valve’ exhaust gas recirculation system is used, employing a primary valve with a tapered metering pintle which gives an increase in flow area for an increased valve lift, and a secondary valve which has a reverse tapered pintle and gives a minimum flow area at full valve lift.

The vacuum signal for the primary exhaust gas recirculation valve is taken from a series of drillings in the carburettor body, just upstream of the throttle edge. As the throttle is opened the signal strength is progressively increased.

The secondary valve vacuum signal is taken from the induction manifold via a solenoid valve which is controlled by a vacuum switch; the secondary valve only receives the vacuum signal when a predetermined manifold depression is reached.

When the throttle is opened the primary valve opens progressively as the vacuum signal increases. The valve is fully open at the point where the vacuum signal equals manifold depression.

Continued opening of the throttle lowers the manifold depression and actuates the secondary valve which immediately moves to the full valve lift position. Further opening of the throttle continues to reduce the manifold depression and consequently, the signal to both exhaust gas recirculation valves.

The reduced signal and valve lift reduces the flow area through the primary valve and increases the flow area through the secondary valve.

At very low vacuum signal strength both valves are seated and the flow is zero; in this way the recirculated exhaust gas is metered in proportion to the engine requirements for a reduction of oxides of nitrogen whilst retaining acceptable drivability.
FIG. 7 EXHAUST GAS RECIRCULATION SYSTEM

A Hoses to be detached when removing carburetters
1 Primary valve
2 Secondary valve

3 Feed for distributor capsule
4 Secondary valve vacuum operated micro-switch assembly

5 Secondary valve solenoid assembly
6 Fuel mixture weakening device
7 Primary valve solenoid assembly
8 Inlet manifold vacuum tappings
To improve starting and driveaway quality at low temperatures solenoid valves activated by lock-out switches (see Fig. 15), interrupt the vacuum signals to both exhaust gas recirculation valves, ensuring that they remain in the closed position, until predetermined coolant temperatures are reached. The secondary valve cuts in at a higher coolant temperature than the primary valve.

A micro-switch operated by the throttle lever (see Fig. 8) also controls the cut-off solenoids to provide exhaust gas recirculation cut-off at full throttle. This feature of the system prevents the secondary valve remaining open under full throttle, high speed operation, as this would be detrimental to performance and fuel consumption.

**Exhaust gas recirculation valve—To remove**

1. Detach the small diameter rubber hose from the valve.
2. Using a ½ in. A/F spanner slacken the three nuts which retain the heat shield.
3. Withdraw the heat shield.
4. Primary valve—Unscrew and remove the two ½ in. A/F nuts and washers retaining the valve to the mounting flange.
5. Secondary valve—Using a ¼ in. A/F spanner slacken the remaining nut and then unscrew and remove both retaining nuts and washers. Unscrew the ⅜ in. A/F nut retaining the mounting bracket to the 'A' bank carburettor bracket; collect the washer and withdraw the bolt.
6. Withdraw the valve and remove the gasket from the mounting flange face.

**Exhaust gas recirculation valve—To fit**

Fit the valve by reversing the procedure given for removal, noting the following points.

1. Ensure that the valve pintle is secure on the valve stem.
2. Ensure that the valve and mounting flange joint faces are clean and free from carbon deposits.
3. Always use a new mounting flange gasket.

**Exhaust gas recirculation valve—To clean**

1. Remove the valve as described in Exhaust gas recirculation valve—To remove.
2. Using a scraper, remove all carbon film from the valve and mounting flange faces; complete the operation with a wire brush.

3. Clean the carbon from the valve using a wire brush fitted into a portable drill. Take care not to damage the valve seating area.
4. Thoroughly blow out the valve with compressed air to ensure that all loose carbon particles are removed.
5. Upon completion of the cleaning operations, fit the valve to the engine mounting flange as described in Exhaust gas recirculation valve—To fit.

**Exhaust gas recirculation valves—Preliminary check**

To carry out preliminary checks on the operation of both primary and secondary exhaust gas recirculation valves proceed as follows.

1. Connect an electric impulse tachometer to the engine in accordance with the manufacturer's instructions.
2. Ensure that the parking brake is firmly applied and that the gear range selector is in the 'Park' position.
3. Start the engine and run until normal operating temperature is attained.
4. Allow the engine to return to the idle speed.
5. Increase the engine speed slowly noting the operation of the exhaust gas recirculation valves.
FIG. 9 EXHAUST GAS RECIRCULATION VALVES

1. Secondary valve
2. Heat shield
3. Windscreen washer reservoir
4. Primary valve
5. Distribution pipes
6. ‘A’ bank carburetter

6. When the engine speed has reached 2,000 r.p.m., the diaphragm of the primary exhaust gas recirculation valve should have moved to the 'full valve lift' position.

7. Stop the engine. Disconnect the hose from the secondary valve cut-in solenoid vacuum unit. Blank off the open end of both the unit and the hose.

8. Disconnect the hose from the primary valve and blank off the open end of both the valve and the hose.

9. Start the engine and note that the secondary valve also moves to the full lift position. It may be necessary to increase the engine speed to prevent stalling.

   If both diaphragms have moved to 'full valve lift' position in their respective tests, stop the engine and remove the tachometer as the test is complete.

   Remove the blanks from the hoses; fit the vacuum unit hose and primary valve hose to their respective connections.

   If the diaphragms have not moved to the required position stop the engine and proceed as follows.

   **Exhaust gas recirculation valve signal strength—To check**

   1. Remove the pressure tapping cap from ‘A’ bank carburetter to vent the float chambers.

   2. Disconnect at the signal block the exhaust gas recirculation cut-out solenoid hose. Connect a mercury manometer 0 to 10 in. Hg. (0 to 25.4 cm. Hg.) to the signal line tube.

   3. Fit dial gauge assemblies RH8841 to the carburetters in place of the dampers.

   4. Zero the gauges with the engine stationary.

   5. Lightly tighten the clamp screws of the dial gauge assemblies.

   6. Start the engine and allow to run at an idle speed of 600 r.p.m., ensure that the piston lift of the carburetters shown on the dial gauge assemblies is equal (within 10%), adjust by using the eccentric adjuster on the carburetter throttle linkage.

   7. Raise the engine speed using the idle speed adjusting screw until ‘B’ bank carburetter dial gauge reads 0-25 in. (6.35 mm.). ‘A’ bank carburetter dial gauge should also read 0-25 in. (6.35 mm.) with a tolerance of plus or minus 0.01 in. (0.254 mm.).

   **Note** The suction chambers of both carburetters should be lightly tapped with a non-metallic object (wooden handle of a small screwdriver) during this operation.

   8. Adjust the exhaust gas recirculation signal to 3-2 in. Hg. (8.13 cm. Hg.) using the adjusting screw (see Fig. 19, item 15).

   9. If difficulty is experienced in obtaining the signal reading, ensure that air is not leaking at the signal block joint.

   10. Disconnect the manometer and connect the exhaust gas recirculation solenoid hose to the signal tube.

   **Note** If it is necessary to adjust the E.G.R. signal by more than 0-2 in. Hg. (0,51 cm. Hg.), refer to Operation 8, Page U187—Float chamber depression—To check and ensure that the maximum steady manometer reading is still obtainable within an engine speed range of 1,300 r.p.m. to 1,600 r.p.m.

**Primary valve**

11. Disconnect the solenoid to exhaust gas recirculation primary valve hose at the valve. Connect the hose to the manometer.

12. Repeat Operation 7.

13. Ensure that the exhaust gas recirculation signal shown on the manometer is between 3-0 in. Hg. (7.6 cm. Hg.) and 3-4 in. Hg. (8.6 cm. Hg.).
A low or zero reading may be caused by:

- Blockage in the hose from the signal tube to the cut-out solenoid.
- Blockage in the hose between the cut-out solenoid and primary E.G.R. valve.
- Air leak at the signal block joint face or hose connections.
- Low engine temperature below 14°C. (57°F.), a faulty exhaust gas recirculation cut-off solenoid or lock-out switch (in thermostat outlet).

14. Disconnect the manometer and connect the hose to the exhaust gas recirculation valve.

15. Check the operation of the valve by running the engine at 2 000 r.p.m. ensuring that the valve opens by observing the movement of the diaphragm.

Secondary valve

11. Disconnect the rubber hose from the induction manifold to the vacuum operated micro-switch, at the micro-switch end and blank off the hose.

12. Detach the secondary valve to solenoid hose at the secondary valve.

13. Connect a suitable mercury manometer 0 to 10 in. Hg. (0 to 25.4 cm. Hg.) to the hose.

14. Disconnect the hose from the inlet manifold tapping to the secondary valve solenoid at the solenoid. Blank off the hose.

15. Disconnect the hose from the low temperature exhaust gas recirculation solenoid to the primary valve at the valve.

16. Connect the primary valve hose to the open connection on the secondary valve solenoid.

17. Repeat Operation 7.

18. Ensure that the exhaust gas recirculation signal shown on the manometer is between 3-6 in. Hg. (7.6 cm. Hg.) and 3-4 in. Hg. (8.6 cm. Hg.).

A low or zero reading may be caused by:

- A blockage in the hose from the secondary valve solenoid to the exhaust gas recirculation secondary valve.
- A faulty exhaust gas recirculation secondary valve solenoid.
- Low engine temperature below 44°C. (111°F.), or a faulty exhaust gas recirculation lock-out switch (in thermostat housing).

19. Disconnect the mercury manometer and connect the hoses to their respective connections, leaving only the hose to the vacuum operated micro-switch disconnected and blanked off.

20. Check the operation of the valve by running the engine and observing the movement of the diaphragm.

If the secondary valve does not move, it may be due to a blockage in the hose from the manifold to the secondary valve solenoid.

21. Connect the hose to the vacuum operated micro-switch after first removing the blank.

OXIDATION CATALYST SYSTEM

A catalytic converter, in place of the conventional front silencer is situated in the exhaust system to the rear of the point in the system where both exhaust manifold downtake pipes combine.

The box unit contains three catalyst blocks and has sufficient volume to perform the dual functions of both converter and silencer (see Fig. 10). A platinum group metal catalyst on a ceramic monolith support is used for optimum conversion efficiency and rapid warm-up. Three separate blocks are used to minimise the effect of thermal shock and are positioned to ensure good gas distribution and effective utilisation of the catalyst volume.

The catalyst promotes reaction between the residual hydrocarbons and carbon monoxide in the exhaust and the secondary air injected into the exhaust ports. After completion of the oxidation process the exhaust gas is discharged to the atmosphere from the tailpipe.
Catalytic converter protection

To protect the catalytic converter from possible damage the following precautions should be taken.

(i) Unleaded gasoline
Use unleaded gasoline only. The use of leaded gasoline will result in a substantial reduction in the performance of the catalyst. Under no circumstances add fuel system cleaning agents to either the fuel tank or carburetters for induction into the engine, as these materials may have a detrimental effect on the catalytic converter.

(ii) Engine malfunction
If the engine misfires or suffers from a lack of power which could be attributed to a malfunction of either the ignition or fuel systems, the vehicle should be driven only at low speed and the fault rectified as soon as possible by an authorised Dealer. Driving at high speeds with a malfunction in either of these systems could cause overheating and consequent damage to the catalyst.

(iii) Fuel
Do not allow the engine to run out of fuel. If the engine does run out of fuel at a high speed possible damage to the catalyst could result.

Catalytic converter—To remove

1. Unscrew the self-tapping screws that secure the shield below the catalytic converter assembly. Withdraw the shield.
2. Unscrew the $\frac{7}{16}$ in. A/F nuts that secure the two shields to the exhaust pipe on either side of spherical joint, situated to the rear of the body crossmember.
3. Collect the washers, withdraw the bolts and remove the shields.
   Note Take care when removing the shields as the edges are sharp and could cause injury to the hands.
4. Support the weight of the exhaust pipe which passes into the expansion box.
5. Using a $\frac{3}{8}$ in. A/F spanner unscrew and remove the nut retaining the exhaust mounting around the exhaust pipe (situated behind the body crossmember).
6. Remove the nut and withdraw the bolt, collect the washer.
7. Open the mount and slide it over the exhaust pipe.

8. Slacken the two $\frac{1}{8}$ in. A/F nuts retaining the exhaust clamp around the spherical joint to the rear of the body cross-member and catalytic converter assembly.
9. Unscrew the nuts completely and withdraw the bolts; collect the washers.
10. Remove the two halves of the clamp joint from the exhaust pipe. Free the two sections of the pipe from each other and collect the sealing ring.
11. Allow the forward section of the exhaust to rest on the body cross-member and repeat Operations 8 to 10 inclusive on the spherical exhaust joint situated in front of the catalytic converter assembly. Hold the forward end of the assembly as the front joint is freed.
12. Withdraw the catalytic converter assembly in a forward and downwards direction.

Catalytic converter—To Fit

Fit the catalytic converter assembly by reversing the procedure given for removal, noting the following points.

1. The seal rings and pipe flares must be thoroughly clean and free from scale and may be lightly dressed with fine emery cloth if required.
2. The clamp bolt threads should be lightly oiled to prevent binding during assembly and the spherical faces of the sealing rings and the grooves in the clamps should be smeared with a graphite lubricant, to ensure correct alignment of the pieces on assembly.
3. Fit the pipe and catalytic converter assembly complete with seal rings, then loosely fit the joint clamps and the "handcuff" clamp.
4. The joints must not be fully tightened until the pipe has been manoeuvred to obtain the best run (free from possible fouls) and good joint alignment.
   Note The pipe joints must not be 'sprung' or 'clamped' into position.
5. When the pipe run is satisfactory, torque tighten the joint clamp nuts in accordance with the standard torque figures given in Chapter P then 'set' the 'Vibrashock' mount to allow for expansion in the exhaust system, when hot.

'Vibrashock' exhaust mount—To set

This exercise is carried out by holding the 'handcuff' clamp forward whilst tightening the pinch bolt. This has the effect of misaligning the centre of the mount and this misalignment should be approximately 0.187 in. (4.76 mm.) at the mount centre.
FIG. 11 FUEL EVAPORATION EMISSION CONTROL SYSTEM—GENERAL VIEW

1 Vacuum manifold
2 Anti 'run-on' solenoid
3 Float chamber vent valve
4 Weaken cut-off solenoid
5 Fuel trap assembly
6 Fuel tank assembly
7 Weaken filter
8 Evaporative loss control canister
9 Purge line filter
10 Float chamber drain valve
Fuel tank assembly
The fuel tank assembly consists of the fuel tank, expansion tank and fuel trap assembly (see Fig. 12).

The fuel tank is vented from three positions to a fuel trap assembly which is mounted above the fuel filler. One vent is from the fuel filler neck and the other two vents from the fuel tank.

The three vent lines join at a common junction block situated adjacent to the fuel filler neck, the main vent line then encircles the fuel tank before passing to the fuel trap assembly.

From the fuel trap, a vent line passes under the floor of the car to the evaporation loss control canister.

FIG. 12 FUEL EVAPORATION EMISSION CONTROL SYSTEM—FUEL TANK

1 Connection to evaporation loss control canister
2 Fuel filler box
3 Fuel trap
4 Combined relief and vacuum valve
5 Valve vent
6 Vent pipe
7 Expansion tank
8 Vent pipe
Purge line

The purge line consists of a rubber hose, passing from the lowest connection on the canister through the valance junction piece to the vacuum manifold. Incorporated into this hose is the purge line filter and restrictor.

When the engine is running, air drawn through the canister filter and carbon picks up the stored fuel vapours and passes them via the hose, to the induction manifold. The restrictor in the line controls the flow rate at between 50 cu. ft/hr. and 70 cu. ft/hr. (1.41 cu. m. per hr. and 1.98 cu. m. per hr.) to maintain carburettor metering accuracy and the paper element line filter is fitted to prevent blockage of the restrictor.

Purge line filter—To remove

1. Using special pliers (RH 8090) remove the two steel retaining clips situated on either side of the unit.
2. Slacken the setscrew which secures the nylon retaining clip.
3. Withdraw the component from the clip.

Purge line filter—To fit

Fit the purge line filter by reversing the procedure given for removal noting the following points.

1. Ensure that the rubber hoses are in a good condition and new hose retaining clips are used.

Purge flow rate—To check

Check the purge flow rate as follows.

1. Disconnect the hose from the engine side of the purge line filter and insert a flowmeter and stand assembly (RH 8725) into the line. The flowmeter is a rotameter type capable of measuring between 50 cu. ft/hr. and 70 cu. ft/hr. (1.41 cu. m/hr. and 1.98 cu. m/hr.). The pressure drop across the meter is not to exceed 2 in. Hg. (5.08 cm. Hg.).
2. Start and run engine at idle speed, the flowmeter reading should be between 50 cu. ft/hr. and 70 cu. ft/hr. (1.41 cu. m/hr. and 1.98 cu. m/hr.).
3. If the flow is less than 50 cu. ft/hr. (1.41 cu. m/hr.) stop the engine and remove the purge line restrictor (see Fig. 5). Fit a piece of straight metal pipe with an internal bore larger than 0.187 in. (4.76 mm.), in the place of the restrictor.
4. Start and run the engine at idle speed, ensure that the flow is now in excess of 70 cu. ft/hr. (1.98 cu. m/hr.).
5. If the flow is less than 70 cu. ft/hr. (1.98 cu. m/hr.) check the following.
   (i) an air leak in any of the vacuum hoses connected to the vacuum manifold (see Fig. 5).
   (ii) a blockage in the vacuum manifold or any of the connecting hoses (see Fig. 5).
6. Rectify any air leaks or blockages found in the system. Repeat Operation 4.
7. Stop the engine and fit the purge line restrictor.
8. Start the engine and check the flow rate as detailed in Operation 2.
9. If the flow is still incorrect fit a new restrictor and again repeat Operation 2.
10. Stop the engine, remove the flowmeter assembly and connect the hoses.

FIG. 13 POSITION OF MIXTURE WEAKENING DEVICE FILTER AND PURGE LINE FILTER

1 Weakener filter
2 Speed control system regulator
3 Hydraulic fluid accumulator
4 Pressure switches
5 Engine oil filler
6 Purge line filter
CRANKCASE EMISSION CONTROL SYSTEM

Crankcase emissions are controlled by a recirculatory closed breather system (see Fig. 14).

An insulated draught tube connects the crankcase via the oil filler which is fitted with a sealed cap, to the choke housing upstream of both the choke butterfly and the carburetters. A flame trap capsule containing three wire mesh discs is fitted in a housing at the crankcase end of the draught tube. Engine emission (blow-by) is drawn into the induction system via the draught tube, due to the depression in the choke housing.

Maintenance

1. The flame trap fitted to the breather pipe should be cleaned in the following manner, at the specified mileage.

2. Unscrew the setscrew securing the breather pipe connection to the oil filler pedestal; withdraw the connection from the pedestal (slight resistance may be felt due to the rubber 'O' ring connections).

3. Withdraw the connection from the pipe flange and collect the restrictor.

4. Wash the flame trap assembly in clean petrol, then dry with a high pressure air line. The flame trap assembly consists of 3 gauzes crimped together as shown in Figure 14.

5. To clean the adapter fitted to the choke housing, remove the single setscrew from the breather pipe end connection and detach the pipe.

6. Clean the adapter fitted to the choke housing and ensure that the holes in the adapter are clear.

7. Assembly of the flame trap and breather pipe is in the reverse order, ensuring that the 'O' rings are in good condition.

---

**FIG. 14 EXPLODED VIEW OF CRANKCASE EMISSION CONTROL PIPE**

Diagram A

1 Pipe  4 Washer
2 'O' ring  5 Setscrew
3 Connection  6 'O' ring

Diagram B

1 Pipe  4 Restrictor
2 Setscrew  5 Flame trap
3 'O' ring  6 Connection
7 'O' ring

---

U170
EMISSION CONTROL SYSTEMS
(ELECTRICAL COMPONENTS)

The electrical components described in this section would normally appear in Chapter M—Electrical System, however, as they are only used in connection with the emission control system it is thought more practical to include the information in this Chapter.

The components concerned are as follows.

(i) The exhaust gas recirculation primary valve lock-out switch.
(ii) The exhaust gas recirculation secondary valve lock-out switch.
(iii) The exhaust gas recirculation valve cut-off solenoids.
(iv) The air diverter valve vacuum operated micro-switch.
(v) The air diverter valve cut-out solenoid.
(vi) The anti 'run-on' solenoid.
(vii) The weaken cut-off solenoid valve.
(viii) The weaken cut-off solenoid switch.

Note: The temperatures quoted throughout this section for the various switches are nominal operating temperatures and in service, a plus or minus tolerance of a few degrees may be found.

Exhaust gas recirculation lock-out switch —To fit

Fit the lock-out switch by reversing the procedure given for removal, noting the following points.

1. Each setscrew has one spring and one plain washer.
2. The joint faces must be clean and a new gasket fitted.

Exhaust gas recirculation lock-out switch —To remove

The bi-metal lock-out switches are situated in the engine coolant thermostat housing and outlet elbow (see Fig. 15).

1. Remove the radiator filler cap and drain the engine coolant.
2. Disconnect the electrical lead.
3. Unscrew and remove the three 2 B.A. setscrews, spring washers and plain washers from the appropriate switch.
4. Free the joint and withdraw the respective lock-out switch.

FIG. 15 EXHAUST GAS RECIRCULATION LOCK-OUT SWITCHES

1 Secondary valve lock-out switch
2 Primary valve lock-out switch
3 Thermostat outlet elbow
4 Engine coolant thermostat
Exhaust gas recirculation primary valve cut-off solenoid

The exhaust gas recirculation primary valve cut-off solenoid is the middle solenoid of three solenoids situated on a small platform, adjacent to the ‘B’ bank carburettor (see Fig. 16).

Exhaust gas recirculation primary valve cut-off solenoid—To remove

1. Detach the electrical connections, noting the position of the connections to assist identification when assembling.
2. Unscrew the two ‘cheese-headed’ mounting screws and withdraw the solenoid.

Exhaust gas recirculation primary valve cut-off solenoid—To fit

Fit the cut-off solenoid by reversing the procedure given for removal.

Exhaust gas recirculation primary valve cut-off solenoid circuit wiring

—To check

1. Connect a test lamp across the two Lucar connections to the solenoid.
   Note Do not disconnect the two Lucar connections.
2. Ensure that the engine is cold.
3. Switch on the ignition and start the engine, noting that the bulb of the test lamp is illuminated.
4. Start and run the engine, as the coolant temperature rises to 14°C. (57°F.) the test lamp bulb should extinguish.
5. Depress the full throttle cut-out micro-switch plunger and check to ensure that the test lamp bulb illuminates. Release the plunger and the test lamp bulb should be extinguished.
6. Stop the engine and allow to cool, noting that as the coolant temperature drops to 12°C. (54°F.) the test lamp bulb again illuminates.
   Note Do not leave the ignition switched on for long periods of time when the engine is not running.

Exhaust gas recirculation primary valve cut-off solenoid—To check

1. Detach the solenoid hose at the weaker unit
2. Clean the end of the hose.
3. Switch on the ignition.
   Note Do not leave the ignition switched on for long periods of time when the engine is not running.
4. Place the hose in the mouth and apply suction.
5. If the operation of the solenoid is correct note that the following conditions apply and connect the hose to the weakener.
   (i) With an engine coolant temperature of below 14°C. (57°F.) sucking on the hose should not prompt any movement of the exhaust gas recirculation valve.
   Disconnect the hose from the exhaust gas recirculation valve. Clean the end of the hose, place in the mouth and blow; it should be possible to blow down this hose as the solenoid is vented to atmosphere. Connect the hose to the exhaust gas recirculation valve.
   (ii) With an engine coolant temperature of above 14°C. (57°F.) sucking on the hose from the weakener unit should move the exhaust gas recirculation valve.
   (iii) As the engine coolant temperature falls to 12°C. (54°F.) the conditions described in (i) should again apply.
6. If the operation of the solenoid is suspect, fit a new unit.

**Exhaust gas recirculation secondary valve cut-in solenoid and vacuum operated micro-switch**

This assembly is situated rearmost of the three solenoid assemblies mounted on a platform, adjacent to the 'B' bank carburetter (see Figs. 7 and 16).

**Exhaust gas recirculation secondary valve cut-in solenoid and vacuum operated micro-switch — To remove**

1. Detach the rubber hoses from the solenoid, solenoid vent and vacuum unit.
   **Note** Each rubber hose should be labelled as it is detached, to facilitate identification during assembly.
2. Disconnect the electrical leads at their Lucas connections.
3. Unscrew and remove the two 2 B.A. screws which retain the micro-switch cover in position. Withdraw the cover.
4. Unscrew the two reach-nuts and withdraw the micro-switch assembly.
5. Unscrew and remove the two support pillars. Withdraw the solenoid assembly.
6. Collect the two distance pieces situated beneath the solenoid feet.

**Exhaust gas recirculation secondary valve cut-in solenoid and vacuum operated micro-switch — To fit**

Fit the secondary valve cut-in solenoid and vacuum operated micro-switch assembly by reversing the procedure given for removal.

**Exhaust gas recirculation secondary valve cut-in solenoid and vacuum operated micro-switch circuit wiring — To check**

1. Connect a test lamp across the two Lucas connections to the solenoid.
   **Note** Do not disconnect the two Lucas connections.
2. Ensure that the engine is cold.
3. Switch on the ignition and start the engine, noting that the bulb of the test lamp is illuminated.
4. Start and run the engine until the coolant temperature rises to 44°C. (111°F.).
5. Stop the engine.
6. Switch on the ignition and note that the test lamp bulb is extinguished.
7. Start the engine and run at the idle speed, noting that the bulb of the test lamp is illuminated.

**Exhaust gas recirculation secondary valve cut-in solenoid and vacuum operated micro-switch — To check**

1. Disconnect the rubber hose from the vacuum unit.
2. Connect a suitable hand operated vacuum pump with a scale calibrated in ins. of Hg. (RH 8800) to the vacuum unit connection.
3. Draw a vacuum of at least 12 in. Hg. (30.5 cm. Hg.) and note that the micro-switch 'clicks' at approximately 10 in. Hg. (25.4 cm. Hg.) vacuum.
4. Allow the 12 in. Hg. (30.5 cm. Hg.) vacuum to decrease slowly and note that the micro-switch 'clicks' again as the vacuum falls to between 9-0 in. Hg. and 8-5 in. Hg. (22.9 cm. Hg. and 21.6 cm. Hg.).
5. Release the vacuum and remove the pump assembly. Re-connect the rubber hose.

**Exhaust gas recirculation secondary valve cut-in solenoid and vacuum operated micro-switch — To set**

1. Unscrew and remove the two 2 B.A. screws which retain the micro-switch cover in position.
2. Remove the cover.
3. Disconnect the rubber hose from the vacuum unit.

4. Connect a suitable hand operated vacuum pump with a scale calibrated in ins. of Hg. (RH 8800) to the vacuum unit connection.

5. Draw a vacuum of 12 in. Hg. (30.5 cm. Hg.) with the pump. Allow the vacuum to decrease to 8.75 in. Hg. (22.2 cm. Hg.) and then seal the vacuum line to maintain the vacuum at the micro-switch.

6. Release the lock-nut and screw the spring loaded plunger assembly in until the micro-switch is fully depressed (see Fig. 6).

7. Screw the spring loaded plunger assembly out until the micro-switch 'clicks'. Tighten the lock-nut.

8. Check the operation of the vacuum operated micro-switch as detailed in Exhaust gas recirculation secondary valve cut-in solenoid and vacuum operated micro-switch—To check.

9. Fit the micro-switch cover. Remove the vacuum pump and re-connect the rubber hose to the vacuum unit.

FIG. 17 CARBURETTER WEAKENING DEVICE

A Hoses to be detached when removing carburetters
1 'A' bank carburetters
2 Float chamber pressure tapping
3 Weakening device
4 Bi-metal switch
5 Anti 'run-on' solenoid
6 Float chamber vent valve

7 Weakening device cut-off solenoid
8 Float chamber drain valve
9 Fuel receiver
10 Weaken filter
11 Purge line filter
12 Purge line restrictor
13 Vacuum manifold
14 Restrictor
Exhaust gas recirculation full throttle cut-off micro-switch—To remove

1. Detach the two electrical leads at their Lucas connections.
2. Unscrew and remove the two small nuts and bolts which retain the micro-switch in position on the mounting bracket.
3. Withdraw the micro-switch.

Exhaust gas recirculation full throttle cut-off micro-switch—To fit

Fit the micro-switch by reversing the procedure given for removal. Finally, set the micro-switch.

Exhaust gas recirculation full throttle cut-off micro-switch circuit wiring—To check

1. Start and run the engine until normal operating temperature is attained.
2. Switch off the ignition.
3. Connect a test lamp in turn across the two Lucas connections to the primary and secondary exhaust gas recirculation cut-off solenoids.

Note: Do not disconnect the Lucas connections.
4. Switch on the ignition and check that the test lamp bulb is extinguished.
5. Open the throttles to the full throttle position to activate the full throttle cut-off micro-switch and thereby, illuminate the test lamp bulb.

Exhaust gas recirculation full throttle cut-off micro-switch—To set

Prior to setting the exhaust gas recirculation system cut-off micro-switch, ensure that the following are correctly set.

(i) Throttle linkage (refer to Chapter K).
(ii) Carburettor linkage (refer to page U181 of this Supplement).
(iii) Kick-down micro-switch (refer to Chapter U).

To set the cut-off micro-switch proceed as follows.
1. Depress the accelerator pedal until it touches the toeboard mounted kick-down micro-switch (further depression of the pedal requires increased effort).
2. Hold the throttle linkage in the position described in Operation 1 and release the lock-nut (Fig. 8, item 2) on the throttle lever (item 3).
3. Screw the spring loaded operating button away from the micro-switch.
4. When there is clearance at this point screw the spring loaded operating button toward the micro-switch until the micro-switch is heard to ‘click’.
5. Tighten the lock-nut.
6. Depress the accelerator pedal further to operate the toeboard mounted kick-down micro-switch.
7. Adjust the full throttle stop (Fig. 8, item 4) to prevent overloading of the kick-down micro-switch. The full throttle stop should be set so that all throttle movement is stopped just prior to the operating button spring becoming fully compressed.

Air diverter valve vacuum operated micro-switch

This assembly is situated adjacent to the air diverter valve and air injection pump assemblies (see Fig. 2, item 8). The purpose of the unit is to assist in the protection of the exhaust catalyst (see Catalyst over temperature protection on Page U157 of this Supplement).

Air diverter valve vacuum operated micro-switch—To remove

To remove the assembly, carry out the procedure given on Page U173 of this Supplement under the heading ‘Exhaust gas recirculation secondary valve cut-in solenoid and vacuum operated micro-switch—To remove’.

Air diverter valve vacuum operated micro-switch—To fit

Fit the assembly by reversing the procedure given for removal.

Air diverter valve vacuum operated micro-switch circuit wiring—To check

1. Connect a test lamp across the Lucas connections to the solenoid.

Note: Do not disconnect the Lucas connections.
2. Start and run the engine at idle speed, noting that under these conditions (i.e. idle speed which produces a high manifold depression) the test lamp bulb illuminates.
3. Stop the engine, switch on the ignition and note that the test lamp bulb is extinguished.
4. Remove the test lamp.

Air diverter valve vacuum operated micro-switch—To check

1. Disconnect the hose from the induction manifold to the vacuum operated micro-switch, at the switch.
2. Connect a suitable hand operated vacuum pump (RH 8800) to the vacuum switch.
3. Draw a vacuum of at least 6 in. Hg. (15,24 cm. Hg.) and note that the switch 'clicks' at approximately 3 in. Hg. (7.62 cm. Hg.).

4. Allow the 6 in. Hg. (15,24 cm. Hg.) vacuum to decrease slowly and note that the micro-switch 'clicks' again as the vacuum falls to between 2-7 in. Hg. (6.8 cm. Hg.) and 2-2 in. Hg. (5.58 cm. Hg.).

5. Release the vacuum and remove the pump assembly. Re-connect the rubber hose.

**Air diverter valve vacuum operated micro-switch—To set**

1. Unscrew and remove the two 2 B.A. screws which retain the micro-switch cover in position.

2. Remove the cover.

3. Disconnect the hose from the induction manifold to the vacuum operated micro-switch, at the switch.

4. Connect a suitable hand operated vacuum pump (RH 8800) to the vacuum switch.

5. Draw a vacuum of 6 in. Hg. (15,24 cm. Hg.) on the hand pump and then allow the vacuum to decrease to 2-5 in Hg. (6.35 cm. Hg.), seal the vacuum line to maintain this vacuum at the micro-switch.

6. Release the lock-nut (see Fig. 6) and screw the spring loaded plunger in until the micro-switch is fully depressed.

7. Screw the spring loaded plunger assembly out until the micro-switch 'clicks'. Tighten the lock-nut.

8. Check the operation of the vacuum operated micro-switch as detailed in Air diverter valve vacuum operated micro-switch—To check.

9. Fit the hose to the vacuum operated micro-switch.

**Anti 'run-on' solenoid**

The anti 'run-on' solenoid is situated on a platform adjacent to 'B' bank carburetter; it is the foremost of the three solenoids fitted on the platform.

The use of low octane fuel often causes an engine to ‘diesel’ (i.e. continue to run-on after the ignition has been switched off, particularly when the engine is hot). To prevent this condition arising an anti 'run-on' solenoid is connected to the weakener unit signal line (see Fig. 17).

When the ignition is switched off the solenoid opens and connects the weakener system to the induction manifold, thus creating a high float chamber depression which cuts off the supply of fuel.

**Anti 'run-on' solenoid—To remove**

1. Disconnect the rubber hose from either side of the solenoid.

2. Disconnect the two electrical leads at their Lucas connections.

3. Unscrew and remove the two screws situated one on either side of the solenoid body.

4. Withdraw the anti 'run-on' solenoid.

**Anti 'run-on' solenoid—To fit**

Fit the anti 'run-on' solenoid by reversing the procedure given for removal.

**Anti 'run-on' solenoid circuit wiring—To check**

1. Connect a test lamp across the two Lucas connections to the solenoid.

   **Note** Do not disconnect the two Lucas connections.

2. Switch on the ignition and check that the test lamp bulb illuminates.

3. Switch off the ignition and check that the test lamp bulb is extinguished.

**Anti 'run-on' solenoid—To check**

1. Detach the hose from the solenoid to the 'Tee' piece at the solenoid end and connect a piece of hose of identical internal diameter but of suitable length, to the solenoid.

2. Clean the open end of the hose.

3. Switch on the ignition.

4. Place the hose in the mouth and blow down the hose.
5. If the operation of the solenoid is correct note that the following conditions apply and connect the original hose to the solenoid.
   (i) With the ignition switched on it should not be possible to blow down the hose.
   (ii) With the ignition switched off the solenoid is de-energised and it should be possible to blow down the hose.

6. Replace hose that was removed in Operation 1.
   If the operation of the solenoid is suspect, carry out the following test before fitting a new unit.
   1. Remove the cap from the pressure tapping on 'A' bank carburetter float chamber. Connect a manometer, capable of measuring between 0 in. and 6 in. (0 cm. and 15.24 cm.), to the pressure tapping connection.
   2. Start and run the engine at idle speed (600 r.p.m.).

3. Switch off the ignition and observe the reading on the manometer. The reading should increase momentarily to approximately 6 in. (15.24 cm.) of H₂O as the engine stops.
   If the reading does not increase check the following.
   (a) A blockage in the hose from the 'Tee' piece in the weakener hose to the anti run-on solenoid.
   (b) A blockage in the hose route (2 hoses joined by a restrictor/connector from the anti 'run-on' solenoid to the vacuum manifold.
   (c) Incorrect wiring to the anti 'run-on' solenoid.

**Weakener cut-off solenoid**

Refer to page U21

**Weakener valve cut-off switch**

Refer to page U21

---

**THE CARBURETTERS AND AUTOMATIC CHOKE SYSTEM**

**CARBURETTER**

**Data**

- Carburetters: Two S.U. HD8 diaphragm type.
- Choke size: 2.00 in. (5.08 cm.).
- Jet size—
  - Spring loaded needle type: 0.100 in. (2.44 mm.).
- Jet needle—
  - Spring loaded type: BCQ.
- Carburettter—
  - Air valve piston spring Red/Blue.

**CARBURETTER MIXTURE WEAKENING DEVICE**

**Description**

In addition to the description given on pages U24 and U25, the following information is applicable.

**Anti-diesel device**

(anti 'run-on' solenoid)

The use of low octane fuel causes the engine to 'diesel' (i.e. continue to run-on after the ignition has been switched off) when it is hot. To prevent this from happening an anti 'run-on' solenoid valve is fitted into the weakener signal line. When the ignition is switched off this valve opens and connects the weakening system to the induction manifold thus creating a high float chamber depression which cuts off the fuel supply.
Carburettor overrun valves

During overrun (i.e. when decelerating with the throttles closed), insufficient mixture is supplied to the engine to maintain satisfactory combustion. The overrun valves alleviate this condition by allowing some mixture to pass through the throttle plates (butterflies) at high inlet manifold depressions.

An overrun valve consists of a small disc retained in each throttle plate by a spring loaded plunger. Under normal conditions the disc is seated against the throttle plate. When the throttle is suddenly closed, the increased inlet manifold depression lifts the disc from its seating and allows a metered quantity of air/fuel mixture to pass through the throttle plate.

The action of the overrun valves maintains satisfactory combustion on overrun, thus reducing hydrocarbon emissions and controlling catalyst temperatures.

After the sudden closure of the throttles and as soon as the manifold depression falls, the overrun valve disc returns to its seat on the throttle plate.

Throttle damper

The throttle damper prevents rapid throttle closure which would suddenly drop the inlet manifold

---

**FIG. 18 VIEW OF CARBURETTERS**

1. Throttle damper
2. ‘A’ bank carburettet
3. ‘B’ bank carburettet
4. Choke bi-metal housing
5. Anti 'run-on' solenoid
6. Mixture weakening device
7. Idle stop
8. Full throttle (E.G.R.) cut-off micro-switch
pressure causing vapourisation of fuel from the manifold walls and a sudden increase in mixture strength.

Temperature controlled air intake
To ensure rapid warm-up and improve control of the air/fuel ratio a temperature controlled air intake is fitted (see Fig. 22).
A vacuum operated blending valve attached to the air cleaner assembly is controlled by a thermal sensor in the air intake elbow. This valve blends hot air from a pick-up point (scoop) adjacent to the exhaust manifold with cold air from under the front wing; thus maintaining a constant temperature of the intake air as it enters the carburetters.

Temperature controlled air intake—To check
1. Disconnect the air intake hose at the butterfly housing and check that the correct temperature sensor is fitted, this should be colour coded green.
2. Disconnect the hose from the temperature sensor to the underwing air silencer, at the temperature sensor.
3. Clean the end of the hose, place in the mouth and apply a vacuum by sucking. Check that there is no air leak. Release the vacuum sharply and listen for the vacuum motor within the wing to ‘click’ open.
4. Reconnect the hoses.

Note: If there is an air leak or the operation of the temperature controlled air intake is suspect, remove the right-hand front underwing sheet and check the hose connection to the vacuum motor; also observe the operation of the temperature flap.

Throttle stop vacuum actuator assembly
The throttle stop vacuum actuator assembly is not fitted to cars produced to the 1976 specification.

OVERHAUL
Carburetters—To remove
Before commencing to remove the carburetters observe the following points.
1. When disconnecting the various hoses, pipes and wiring connections ensure that they are suitably labelled to assist identification when assembling.
2. Ensure that all open ends of pipes, hoses, etc., are suitably blanked off to prevent the ingress of dirt, etc.

To remove the carburetters proceed as follows.
1. Disconnect the battery.
2. Unscrew and remove the two \( \frac{1}{8} \) in. A/F nuts from the joint in the small diameter exhaust pipe, situated below the exhaust gas recirculation valves. Free the joint.
3. Detach the following rubber hoses (see Fig. 17).
   (i) The hose from the weakening device cut-off solenoid to the small diameter ‘tee’ piece, at the solenoid.
   (ii) The hose from the float chamber vent valve to the valve connection block, at both ends.
   (iii) The hose from the weakening device to the ‘tee’ piece.
   (iv) The hose from the vacuum manifold to the anti ‘run-on’ solenoid.
   (v) The overflow hoses from the carburettor float chambers to the fuel receiver.
   (vi) Both hoses from the inlet manifold tappings (see Fig. 7).
4. Detach the following electrical connections.
   (i) The two connections at the full throttle E.G.R. cut-out micro-switch, also release the two rubber clips which hold the loom to the ‘B’ bank float chamber fuel feed pipe.
   (ii) The two connections to the anti ‘run-on’ solenoid, including the earth wires from beneath one of the solenoid mounting feet. Also, release the loom from the clip situated on the solenoid mounting platform.
   (iii) The two connections to the E.G.R. secondary valve cut-in micro-switch and one connection above the micro-switch assembly.
   (iv) The connections to both E.G.R. cut-out solenoids at the Lucas connection block.
   (v) The choke solenoid connections, also release the wires from the adjacent clip.
   (vi) The weaker cut-off bi-metal switch.
5. Remove the crankcase breather pipe from the choke butterfly housing; withdraw the connection from the end of the pipe.
6. Disconnect the choke stove pipe from the choke housing.
7. Disconnect the choke stove pipe from the choke bi-metal coil housing connection.
8. Unscrew the worm drive clips securing the air intake hose in position; remove the hose.
   Unscrew the worm drive clip securing the metal intake elbow to the butterfly choke housing. Disconnect the two rubber hoses connected to the thermal sensor situated inside the metal elbow. Withdraw the elbow.
9. Remove the engine oil dipstick.
10. Unscrew and remove the 2 B.A. bolt, nut and washer securing the throttle linkage to the ‘fore and aft’ manifold shaft lever; this connection is adjacent to the ‘A’ bank carburettor.
11. Withdraw the throttle linkage from the manifold shaft.
12. Disconnect the main fuel feed pipe.
FIG. 19 'B' BANK CARBURETTER

1 'Swing' needle assembly
2 Piston
3 Suction chamber
4 Mixture weakening device
   ('B' bank carburetter only)
5 Volume screw
6 Damper
7 Overflow pipe
8 Throttle plate
   (incorporating overrun valve)
9 Spindle
10 Float needle
11 Float chamber
12 Anti-boiling device
13 Filter element
14 Jet diaphragm
15 E.G.R. signal adjusting screw
   ('B' bank carburetter only)
13. Remove the air horns, choke butterfly housing carburetters and ‘Tee’ piece as one complete assembly. The assembly is secured to the induction manifold by a ½ in. A/F setscrew situated centrally on the carburetter ‘Tee’ piece and located by two dowel pins.

14. Before lifting the carburetters assembly from the engine check to ensure that no wires, hoses or other joints have been left connected.

Dismantle the carburetters from the ‘Tee’ piece and air horns as follows.

15. Unscrew the four setscrews retaining the E.G.R. distribution pipes in position on the carburetter ‘Tee’ piece.

16. Remove the exhaust gas recirculation valves from the carburetters assembly (refer to Exhaust gas recirculation valves—To remove in this Supplement) noting that the distribution pipes can be left connected to the E.G.R. valves.

17. Slacken the pinch bolt and remove the fast-idle lever from the ‘A’ bank carburette butterfly spindle.

18. Unscrew and remove the two ½ in. A/F nuts from the two setscrews securing the air horn to ‘B’ bank carburette. Disconnect the rubber hoses from the solenoids. Unscrew the cheese-headed screw from the solenoid platform mounting foot adjacent to the engine oil dipstick tube, collect the nut and washer, and withdraw the solenoid platform assembly.

19. Remove the four setscrews securing the two air horns to the carburetters, collect the full throttle stop bracket assembly with the throttle damper from ‘A’ bank carburetter. Remove the air horns.

20. Disconnect the fuel feed pipe from the float chambers.

21. Disconnect and remove the throttle spring.

22. Completely remove the two pinch bolts securing the throttle levers to the ‘A’ and ‘B’ bank carburetter butterfly spindles; remove the levers.

23. Remove the nuts and washers securing both carburetters to the ‘Tee’ piece, remove the carburetters.

Carburetters—To fit

Fit the carburetters by reversing the procedure given for their removal noting the following points.

1. Fit new gaskets and washers to all joints.

2. Examine the floats for damage or punctures; fit the floats to their respective float chambers.

3. Renew the lid gaskets.

4. Fit the gaskets to the lids then fit the lids to the chambers.

5. Secure the lids and pipes to the float chambers.

6. Examine the paper filter elements for cleanliness and damage; renew if necessary.

7. Ensure that the ‘O’ rings on the petrol inlet unions are in good condition; renew if necessary. Fit the paper filter elements, spring retainers, springs and inlet unions to each float chamber lid. Secure the inlet unions with the retaining screws.

8. Fill the damper piston with an approved oil; the oil level should be approximately 0·5 in. (12·3 mm.) below the top of the piston rod. Do not overfill.

Carburetters—To set

The carburetters fitted to these cars are adjusted at the factory using special equipment to ensure that their settings comply with the current emission control regulations.

Under normal circumstances the carburetters should not require adjustment in service.

If however, adjustment is found necessary due to inadvertent disturbance or replacement of a component, set the carburetters by carrying out the following operations in the sequence given.

A. Set throttle linkage and temporarily set engine idle speed. Check linkage clearances.

B. Set cold start ‘fast-idle’ cam.

C. Tune carburetters.

D. Set cold start ‘fast-idle’ speed.

E. Set the throttle damper plunger.

F. Set the kick-down micro-switch.

G. Set full throttle stop and full throttle E.G.R. cut-off micro-switch.

Contra-rotating throttles—To fit and set

(see Fig. 20)

1. Assemble ‘A’ bank and ‘B’ bank throttle levers (items 7 and 13) onto the carburetter spindles.

2. Fit the setting jig (RH 8880) into position on the throttle levers.

3. Fully close ‘B’ bank carburetter butterfly (item 8).

4. Tighten the pinch bolt securing ‘B’ bank throttle lever.

5. Fully close ‘A’ bank carburetter butterfly (item 3).

6. Tighten the pinch bolt securing ‘A’ bank throttle lever.

7. Fit the throttle spring (item 4) to the throttle levers.

8. Remove the setting jig from the throttle levers.

9. Fit the cross link (item 12) and the eccentric throttle adjuster (item 5) onto the throttle levers, ensuring that both throttle butterflies are closed when adjusting and tightening the eccentric adjuster.

Note The eccentric pin should be set in the lowest position possible.
10. Ensure that the tang of the throttle guard (item 6) has a clearance of between 0.050 in. (1.27 mm.) and 0.070 in. (1.78 mm.) with the cross link and also that the tang does not foul the throttle spring. If necessary bend the tang to give these clearances.

11. Check that the throttle linkage moves freely.

12. Fit the idle stop screw (item 10) and adjust until it just contacts the stop bracket (item 11) with the throttle butterflies remaining in the closed throttle position.

13. Screw down the idle stop screw $\frac{1}{2}$ turn and tighten the lock-nut.

14. Screw both of the carburettor volume screws (items 2 and 9) fully in.

15. Fit the throttle damper (item 1) with the damper spindle compressed 0.187 in. (4.75 mm.) when throttle lever (item 13) is in the closed position. Ensure that the damper rod contacts the throttle lever centrally 0.20 in. (5.1 mm.) from the outer edge.

16. Connect the drive link (item 14) to the manifold shaft lever (item 15).

17. Operate the linkage to ensure free movement.

18. With the throttles in the closed position check that the 'A' bank control shaft to control rod lever (item 16) on the rear of the manifold shaft is in line with the front manifold shaft lever (item 15). Tighten the securing bolts on both levers.

19. Operate the mechanism; check for freedom of movement within the linkage and also clearance with the various engine components.

20. To set the remainder of the linkage from the control rod lever on the rear of the manifold shaft to the accelerator pedal refer to Chapter T—Part 2.

**CARBURETTER TUNING**

**Preliminary checks**

Before tuning the carburetters the following checks should be carried out.

1. Check the condition of the spark plugs.
2. Check the ignition timing.
3. Check the flow through the choke stove pipe.
4. Check the entire induction system for air leaks.

---

**FIG. 20 CONTRA-ROTATING THROTTLE CONTROLS**

- A = Reference angle 22°
- B = Reference angle 90°
- 1 = Throttle damper
- 2 = 'A' bank carburettor volume screw
- 3 = 'A' bank carburettor throttle plate
- 4 = Throttle spring
- 5 = Eccentric throttle adjuster
- 6 = Throttle guard
- 7 = 'B' bank carburettor throttle lever
- 8 = 'B' bank carburettor throttle plate
- 9 = 'B' bank carburettor volume screw
- 10 = Idle stop screw
- 11 = Closed throttle bracket
- 12 = Cross link
- 13 = 'A' bank carburettor throttle lever
- 14 = Drive link
- 15 = Front manifold shaft lever
- 16 = Rear manifold shaft lever
5. Check the purge line flow rate.
6. Ensure that the air conditioning system is switched off.
7. Start the engine and warm up; allow to run for at least 5 minutes after the thermostat has opened.
8. Stop the engine, ensure that the choke butterfly valve is fully open and the choke ‘fast-idle’ off.
9. Connect an electric impulse tachometer in accordance with manufacturer’s instructions.
10. Check the float chamber depression.
11. Check the exhaust chamber depression.
12. Check the operation of the secondary exhaust gas recirculation valve and the vacuum operated micro-switch.
13. Check and set the full throttle exhaust gas recirculation cut-out micro-switch.

**Tuning procedure**

1. Remove the air intake hose, blank off the hot idle compensator feed drilling (see Fig. 21) and replace the hose.
2. Remove the air hoses from the check valves and fit blanks over the valves (suitable blanks may be produced from two short lengths of rubber hose with one end plugged).

**Note** The air injection system is inoperative when the air hoses are disconnected from the check valves. The valves must be blanked to prevent air being drawn into the exhaust port by pulsations in the exhaust system since this would affect the idle CO reading.

3. Disconnect the exhaust gas recirculation (E.G.R.) cut-out solenoid to E.G.R. valve hoses at the E.G.R. valve ends and blank off the hoses.
4. Remove the pressure tapping cap from ‘A’ bank carburettor float chamber to vent the float chambers to atmosphere.
5. Remove the carburettet dampers and fit a dial gauge assembly (RH 8841) in place of the damper. Ensure that both gauges read zero with the engine stopped. Start the engine and allow to idle at 600 r.p.m. noting that the piston lift shown on the dial gauge assemblies is equal (within 10%) adjust using the eccentric adjuster on the carburettet throttle linkage.

**Note** The average carburettet piston lift is between 0.035 in. (0.89 mm.) and 0.050 in. (1.27 mm.).
6. Ensure that the engine has run for at least 25 minutes after the thermostat has opened.

![FIG. 21 HOT IDLE MIXTURE COMPENSATOR FEED](image)

1. Choke butterfly
2. Hot idle compensator feed
3. Butterfly housing

7. To set ‘A’ bank carburettet mixture strength, remove the forward of the two blanks on the ‘A’ bank air manifold (see Fig. U20—Page U32); fit adapter (RH 8621) and connect to the CO meter.
8. Purge the engine at 2 000 r.p.m. in Neutral for 1 minute, check the idle speed and reset to 600 r.p.m. using the throttle stop screw (Fig. 18, item 7).
9. Slacken the jet adjusting screw lock-nut on ‘A’ bank carburettet using spanner RH 8050 and set the CO meter reading to between 33% and 44% by adjusting the jet screw on ‘A’ bank carburettet (turning the screw clockwise richens the mixture). Tighten the lock-nut.
10. Remove the adapter RH 8621 from the air manifold and fit the blanking plug.
11. To set the mixture strength of ‘B’ bank carburettet, remove the rear blanking plug of the two blanking plugs on the ‘A’ bank air manifold (see Fig. U20—Page U32); fit adapter RH 8621 and connect to the CO meter.
12. Purge the engine at 2 000 r.p.m. in Neutral for 1 minute, check the idle speed and reset to 600 r.p.m. using the throttle stop screw (Fig. 18, item 7).
13. Slacken the jet adjusting screw lock-nut on ‘B’ bank carburettet using spanner RH 8050 and set
FIG. 22 TEMPERATURE CONTROLLED AIR INTAKE

1 Hot air scoop
2 Temperature sensor
3 Vacuum manifold
4 Air cleaner/silencer
5 Air blending valve
6 Cold air intake
the CO meter reading to between 3½% and 4½% by adjusting the jet screw on 'B' bank carburettet (turning the screw clockwise enriches the mixture). Tighten the lock-nut.

14. Remove the adapter RH 8621 from the air manifold and refit the blanking plug.

15. If setting the mixture strength involves adjusting 'B' bank carburettet jet adjusting screw by more than 1/8 of a turn, the setting operations should be repeated again on 'A' bank carburettet (Operations 7 to 9 inclusive).

16. Check the mixture balance by raising each piston lift pin in turn. If the mixture balance is correct, the engine response for each carburettet piston lift will be identical.

If the response from each carburettet is not identical repeat Operations 6 to 16 inclusive.

17. Stop the engine and fit the probe of a suitable CO meter into the exhaust pipe in accordance with the manufacturer's instructions (a suitable CO meter is the Horiba Mexa 200).

18. Start the engine and run at idle speed until a steady CO reading is obtained (minimum time ½ minute). The correct reading is between 3½% and 4½%.

19. If the CO reading is not correct, slacken both jet adjusting screws with spanner RH 8050. Turn both jet adjusting screws by equal amounts in the same direction (up to a maximum of ½ turn) until a CO meter reading of between 3½% and 4½% is obtained (turning the screws clockwise enriches the mixture). Tighten the lock-nuts.

20. Fit the pressure tapping to 'A' bank carburettet float chamber, fitting a new washer if necessary. Remove the blanks from the air hoses and connect the hoses to the check valves. Remove the blanks from the E.G.R. cut-out hoses and connect the hoses to their respective E.G.R. valves.

21. Check the engine idle speed and if necessary adjust to 600 r.p.m. using the throttle stop screw.

22. Stop the engine. Remove the air intake hose and the blank from the hot idle compensator feed; fit the air intake hose.

23. Fit the gear range actuator thermal cut-out to the main fusebox.

Note: The tuning operations should be carried out in the shortest possible time. If the time exceeds 3 minutes, run the engine at 2 000 r.p.m. in Neutral for ½ minute and then resume the tuning operations. Repeat this purging operation if a further period of 3 minutes is exceeded.

After purging the system gently tap all around the neck of the carburettet suction chamber with a lightweight non-metallic object (i.e. the wooden handle of a small screwdriver), to eliminate carburettet piston hysteresis. The engine is to be run on Indolene Clear (HO) reference fuel or equivalent (Unleaded gasoline only).

Throttle damper plunger—To set

1. Move the cold start 'fast-idle' to the off position.

2. Slacken both nuts securing the throttle damper to it's bracket. Back off the nuts until they are well clear of the bracket.

3. Press the damper towards the 'A' bank throttle lever until the damper is fully compressed and the lever is just clear of the throttle stop screw.

4. Screw the lower securing nut until it is 0.025 in. (0.63 mm.) clear of the underside of the bracket. Release the damper and tighten the upper securing nut.

5. Ensure that the damper spindle is at the maximum possible radius, whilst maintaining adequate contact with the throttle lever pad. This can be achieved by adjusting the angle of the bracket.

Automatic choke stove pipe—To check

To check the stove pipe for any blockage, carry out the following procedure.

1. Start the engine and run until normal operating temperature is attained.

2. Disconnect the union at the butterfly housing and connect a flowmeter to the pipe via connector RH 8945. The flowmeter must be a rotameter type capable of measuring up to 100 cu. ft/hr. (2.83 cu. m/hr.).

3. Start the engine and run at idle speed (i.e. 600 r.p.m.); observe the flowmeter reading which should be between 50 cu. ft/hr. and 55 cu. ft/hr. (1.41 cu. m/hr. and 1.55 cu. m/hr.).

4. If the flowmeter reading is below 50 cu. ft/hr. (1.41 cu. m/hr.), stop the engine, remove the choke stove pipe and stove assembly to check for leaks.

5. If the flowmeter reading is above 55 cu. ft/hr. (1.55 cu. m/hr.) fit a new restrictor in the end of the choke bi-metal housing (see Fig. 18).

6. Fit the choke stove pipe and stove assembly, start the engine and again observe the flowmeter reading at idle speed.
'Fast-idle' cam—To set

1. Fit the 'fast-idle' mechanism; do not tighten the 'fast-idle' lever clamping bolt.

2. Ensure that the 'fast-idle' adjustment screw is directly over the cam.

3. With the throttles closed, insert a 0.100 in. (2.54 mm.) diameter rod between the top of the 'fast-idle' cam and the boss under the 'fast-idle' adjustment screw. Tighten the clamping bolt on the 'fast-idle' lever.

4. Ensure that the throttles are closed; screw in the 'fast-idle' adjustment screw until it just makes contact with the top step of the 'fast-idle' cam.

5. Insert a 0.050 in. (1.27 mm.) diameter drill between the leading edge of the choke butterfly valve and the choke housing.

6. With the butterfly valve in this position, adjust the length of the butterfly rod so that the tip of the 'fast-idle' screw is in line with the start of the top step of the 'fast-idle' cam, (i.e. the position when the tip of the adjustment screw is about to fall from the top step to the bottom step of the cam.)

Remove the 0.050 in. (1.27 mm.) diameter drill from the choke housing.

7. With the throttles closed and the choke partly open, adjust the 'fast-idle' adjustment screw to just contact the start or bottom step of the 'fast-idle' cam. Screw in a further 1/2 turn and tighten the lock-nut ensuring that the adjustment screw does not move.

Thermocoiil
Refer to Chapter K, Section K4.

Cold start 'fast-idle'—To set

1. Stop the engine and disconnect both solenoid to exhaust gas recirculation valve hoses at the valve ends. Blank the hoses. Disconnect the signal hose to the distributor vacuum capsule at the capsule and blank off the hose. Remove the pressure tapping cap to vent the float chambers; open the throttles and close the choke butterfly against the bi-metal coil tension by means of the butterfly link lever, release the throttles. The 'fast-idle' adjusting screw will now be resting on the high step of the 'fast-idle' cam and the throttles are in the cold start position.

2. Start the engine and check the 'fast-idle' speed. If the speed is not between 1 900 r.p.m. and 2 100 r.p.m., stop the engine, open the throttles to gain access to the adjusting screw and adjust 1/2 turn for each 100 r.p.m. outside the required speed.
3. Tighten the lock-nut and check the ‘fast-idle’ speed. If correct open the throttles to release the ‘fast-idle’ cam mechanism.
4. Remove the blanks from both solenoid to the exhaust gas recirculation valve hoses and connect the hoses to their respective exhaust gas recirculation valves. Fit the pressure tapping cap to ‘A’ bank carburettet float chamber cover.
5. Remove the blank from the distributor advance vacuum signal hose and connect the hose to the capsule.

**Float chamber depression—To check**

*Refer to Page U37* noting the following information.

(i) The hose referred to in Operations 1 and 7 is now two hoses, one for each exhaust gas recirculation valve.

(ii) The correct reading to be obtained on the manometer is 2.0 in. (5.08 cm.).

(iii) Operation 8 should read.

8. Raise the engine speed slowly noting the manometer and tachometer readings. The maximum steady manometer reading should be obtained between 1 300 r.p.m. and 1 600 r.p.m. If the maximum depression occurs below 1 300 r.p.m. it is permissible to screw out the idle bleed screws on the carburetters by equal amounts (maximum 2.5 turns) to obtain this speed.

**Exhaust gas recirculation signal strength**

—to check

*Refer to Page U164 in this Supplement*

**Exhaust gas recirculation secondary valve cut-in solenoid and vacuum operated micro-switch—To check and set**

*Refer to Page U173 in this Supplement*

**Exhaust gas recirculation full throttle cut-off micro-switch—To set**

*Refer to Page U175 in this Supplement*

---

**IGNITION SYSTEM, DISTRIBUTOR, IGNITION COIL AND SPARKING PLUGS**

**Data**

*Ignition timing*

- 9° B.T.D.C. (Static) 15° B.T.D.C. at 1 200 r.p.m.
- (stroboscopic) in Neutral with the vacuum advance disconnected.
- (Approach 1 200 r.p.m. from a higher speed).

**Ignition control system**

The ignition system utilises an Opus distributor (in which an oscillator pick-up and control unit replace the conventional contact breaker), a low inductance ignition coil and a ballast resistor. The control unit comprises an electronic oscillator, amplifier and power transistor.
FIG. 25 EXPLODED VIEW OF DISTRIBUTOR

1. Pick-up module
2. Pick-up arm
3. Distributor cover/cap
4. High tension brush and spring
5. Rotor arm
6. Flash over shield (dust cover)
7. Timing rotor
8. Vacuum unit
9. Control unit
10. Lubrication pad
11. Driving dog and pin
12. Thrust washer
13. Automatic advance mechanism
14. Electronic module assembly

Pick-up, this signal is then amplified and used to switch-off the normally conducting power transistor in the primary coil circuit thus inducing a high voltage in the secondary winding which is distributed to the sparking plugs in the normal manner.

In addition to the normal centrifugal advance mechanism the ignition distributor is fitted with a vacuum advance capsule. The E.G.R. gated orifice vacuum signal is applied to the capsule to advance the ignition timing for part throttle fuel economy during open road cruising. The vacuum signal is inhibited by a solenoid valve until a predetermined coolant temperature is reached.

This ignition control system provides increased accuracy of timing and increased service life before maintenance is required.

Ignition—To time (using a stroboscope)

The ignition is timed on A1 cylinder which is located at the front left-hand side of the engine (viewed from the front of the car).

**Note** If the ignition timing is to be set, ensure that the sparking plugs are in good condition before running the engine; if they require cleaning or renewal the sparking plugs gap should be set to 0.035 in. (0.9 mm.).

1. To check the ignition timing commence by running the engine until normal operating temperature is attained and the choke ‘fast-idle’ is in the off position. Switch off the engine.

2. Connect a stroboscope and a tachometer to the engine as described in the instructions supplied with the respective equipment. Disconnect the feed hose at the vacuum advance capsule; blank off the feed hose.

3. Start the engine and adjust the throttle stop screw to give an idle speed of 1200 r.p.m. When setting the engine idle speed reduce from a higher speed to 1200 r.p.m.

4. Direct the flashing light of the stroboscope onto the crankshaft damper timing marks and timing
pointer; the pointer is positioned on the right-hand side of the crankshaft damper when viewed from the front of the engine.

5. If the timing pointer does not coincide with the 15° B.T.D.C. mark on the crankshaft damper adjust the ignition timing as follows.

6. Release the clamp screw on the distributor and rotate the head of the distributor in the appropriate direction until the correct timing is obtained. Clockwise rotation of the distributor head advances the ignition and conversely anti-clockwise rotation retards the ignition. After adjustment has been carried out tighten the clamp screw and again check to ensure that the timing has not altered whilst tightening the clamp screw.

7. Set the engine idle speed to 600 r.p.m.

8. Direct the flashing light of the stroboscope onto the crankshaft damper timing marks and timing pointer. Check that the ignition timing is approximately 9° B.T.D.C.

9. Stop the engine.

10. Disconnect the hose from the vacuum manifold to the purge line restrictor at the restrictor (see Fig. 5). Connect a suitable length of hose between this hose and the connection on the distributor vacuum capsule.

11. Start the engine and set the idle speed to 600 r.p.m.

12. Direct the flashing light of the stroboscope onto the crankshaft damper timing marks and timing pointer. Check that the ignition timing has advanced to approximately 19° B.T.D.C. If the ignition timing has not advanced, the distributor assembly is faulty.

13. Stop the engine.

14. Fit all hoses to their correct connections.

15. Start the engine and set the idle speed to 600 r.p.m.

16. Stop the engine and remove all the test equipment.

**Setting the engine idle speed**

Ensure that the engine is at normal operating temperature and that the choke ‘fast-idle’ is in the off position.

The air conditioning system must be switched off and a tachometer connected to the engine in accordance with the manufacturer’s instructions.

1. Stop the engine, remove the air intake hose and blank off the hot idle compensator feed drilling (see Fig. 21); replace the air intake hose.

2. Start the engine and, if necessary, adjust the engine idle speed to 600 r.p.m. using the throttle stop screw; tighten the lock-nut.

3. Stop the engine and remove the air intake hose. Remove the blank from the hot idle compensator feed drilling and detach the tachometer and stroboscopic timing equipment (if fitted). Fit the air intake hose.

**Sparking plugs**

The sparking plugs approved for this car are Champion RN, 14.Y. Before fitting the plugs, set the gaps with the aid of a feeler gauge to 0.035 in. (0.9 mm.) and lightly smear the threads with ‘Graphogen’ grease.

---

**LUBRICATION AND MAINTENANCE**

**INITIAL 3 000 MILES (5 000 km.) OR 3 MONTHS SERVICE WHICHEVER IS THE EARLIER**

*Air injection pump*

Check belt tension and reset if necessary.

*Automatic choke*

Check the flow through the choke stove pipe and check for correct operation.

*Carburetters*

Check oil level in air valve dampers and if necessary top-up to correct level. Check tightness of float chamber covers. Check float chamber depression. Check and if necessary reset the idle speed. Check and if necessary reset the choke ‘fast-idle’ speed.

---

**ESSENTIAL MAINTENANCE INITIAL SERVICE**

This service will be carried out by the Dealer after the first 3 000 miles (5 000 km.) or 3 months whichever is the earlier.

*Items marked * will be carried out free of charge.
Engine
Change engine oil.

*Fuel evaporation emission control system
Check the purge rate; this should be between 50 cu. ft. per hr. and 70 cu. ft. per hr. (1.41 cu. m. per hr. and 1.98 cu. m. per hr.) at 600 r.p.m. in Neutral. Pressure test the fuel tank and evaporation loss line and if necessary rectify any leaks.

*Ignition system
Check ignition timing using strobscope and adjust if necessary; the ignition timing should be 15° B.T.D.C. with the engine running at 1200 r.p.m., the vacuum capsule disconnected and the feed hose blanked off.

Belt tension
Check the tension of all driving belts.

Engine cooling system
Tighten wormdrive clips of all coolant hoses.

Torque converter transmission
Check fluid level and top-up if necessary.
When checking the fluid level, avoid contact with the exhaust gas recirculation valves, heat shield and associated pipes as these components will be hot.

EVERY 3 000 MILES (5 000 km.) OR 3 MONTHS WHICHEVER IS THE EARLIER
If the car is used for constant stop/start operation change the engine oil.

EVERY 6 000 MILES (10 000 km.) OR 6 MONTHS WHICHEVER IS THE EARLIER

Engine
Change engine oil and renew oil filter element.

Battery
Check the level of the electrolyte in the battery; if necessary top-up with distilled water.

Belt tension
Check the tension of all driving belts.

Brakes
Inspect footbrake and parking brake pad linings. When changing footbrake pads examine condition of dust excluders on calipers. Manually adjust the parking brake pads. Inspect pipes and connections, rectify if necessary.

Fluid levels
Check all fluid levels.

Torque converter transmission
Check fluid level and top-up if necessary.
When checking the fluid level, avoid contact with the exhaust gas recirculation valves, heat shield and associated pipes as these components will be hot.

EVERY 12 500 MILES (20 000 km.) OR 12 MONTHS SERVICE WHICHEVER IS THE EARLIER

Air injection pump
Check tension of pump pulley driving belt.

Air silencer
Fit a new paper filter element.

Carburetters
Top-up oil level in air valve dampers. Check tightness of float chamber covers. Check float chamber depression. Check and if necessary reset the idle speed. Check and if necessary, reset the choke ‘fast-idle’ speed.

Crankcase emission control system
Remove and clean gauze flame traps in the crankcase breather tube. Clean the adapter in the choke butterfly housing.

Engine
Change engine oil and renew oil filter element.

Fuel evaporation emission control system
Check the condition of the pipes and connections.

Ignition system
Fit new sparking plugs ensuring that the gaps are set to 0.035 in. (0.9 mm.).
Lubricate distributor spindle (shaft bearings) and automatic advance mechanism with engine oil.
Check the ignition timing using a stroboscope and adjust if necessary; the ignition timing should be 15° B.T.D.C. with the engine running at 1 200 r.p.m., the vacuum capsule disconnected and the feed hose blanked off.

**Battery**

Check the level of the electrolyte in the battery; if necessary top-up with distilled water.

**Belt tension**

Check the tension of all driving belts.

**Brakes**

Inspect footbrake and parking brake pad linings. When changing footbrake pads examine condition of dust excluders on calipers. Manually adjust parking brake pads. Inspect pipes and connections, rectify if necessary.

**Final drive unit**

Check oil level and top-up if necessary.

**Fluid levels**

Check all fluid levels.

**Front suspension**

The front suspension ball joints are sealed for life and no maintenance is required unless renewal is necessary or the ball joint rubber covers are damaged. Inspect the rubber covers on the front suspension ball joints; if the covers are found to be damaged new joints and covers should be fitted.

**Steering ball joints**

Lubricate the six grease nipples. Inspect the rubber covers on the ball joints; if the covers are found to be damaged the joints should be dismantled and new parts fitted as necessary.

**Torque converter transmission**

Renew transmission fluid.

When checking the fluid level, avoid contact with the exhaust gas recirculation valves, heat shield and associated pipes as these components will be hot.

**Every 25 000 miles (40 000 km.) or 2 years service whichever is the earlier**

**Air injection pump**

Check tension of pump pulley driving belt.

**Air injection system**

Check air injection system for leaks and correct functioning. Renew any defective items.

**Air silencer**

Fit a new paper filter element.

**Automatic choke**

Check the air flow through the choke stove pipe and check the system for correct functioning.

**Carburetters**

Clean air valves. Remove inlet unions from the float chamber covers and fit new paper filter elements. Top-up oil level in air valve dampers. Check tightness of float chamber covers. Check float chamber depression. Check and if necessary, reset the idle speed. Check and if necessary, reset choke 'fast-idle' speed.

**Carburettet mixture weakening device**

Renew air filter element for the carburettet mixture weakening device.
Crankcase emission control system
Remove and clean gauze flame traps in crankcase breather tube. Clean the adapter in choke butterfly housing.

Engine
Change engine oil and renew oil filter element.

Engine cooling system
Fit a new engine coolant thermostat and heater tap feed hose. Check the condition of all coolant hoses; fit new hoses as necessary.

Fuel evaporation emission control system
Renew the foam filter element in the evaporation loss control canister. Check the purge rate; this should be between 50 cu. ft. per hr. and 70 cu. ft. per hr. (1,41 cu. m. per hr. and 1,98 cu. m. per hr.) at 600 r.p.m. in Neutral. Renew the purge line filter if necessary.

Ignition system
Fit new sparking plugs ensuring that the gaps are set to 0.035 in. (0.9 mm.).
Lubricate distributor spindle (shaft bearings) and automatic advance mechanism with engine oil.
Check the ignition timing using a stroboscope and adjust if necessary; the ignition timing should be 15° B.T.D.C. with the engine running at 1,200 r.p.m.; the vacuum capsule disconnected and the feed hose blanked off. Check the vacuum advance mechanism.

Battery
Check the level of the electrolyte in the battery; if necessary top-up with distilled water.

Belt tension
Check the tension of all driving belts.

Brakes
Inspect footbrake and parking brake pad linings. When changing footbrake pads examine condition of dust excluders on calipers. Manually adjust parking brake pads. Inspect pipes and connections: rectify if necessary.

Final drive unit
Change oil.

Fluid levels
Check all fluid levels.

Front suspension
The front suspension ball joints are sealed for life and no maintenance is required until renewal is necessary or the ball joint rubber covers are damaged. Inspect the rubber covers on the front suspension ball joints; if the covers are found to be damaged new joints and covers should be fitted.

Fuel pumps
Remove the fuel pumps and check for pumping efficiency, fit new pumps if necessary.

Hydraulic systems
Completely drain the fluid from the hydraulic circuits. Thoroughly clean the brake fluid reservoirs and sight glasses, ensure that no foreign matter enters the systems. Fill the hydraulic systems with new approved fluid. Bleed the brakes and height control systems.

Rear wheel drive-shafts
Lubricate the rear wheel drive-shaft outer universal couplings with approved grease.

Steering ball joints
Lubricate the six grease nipples. Inspect the rubber covers on the ball joints; if the covers are found to be damaged the joints should be dismantled and new parts fitted as necessary.

Torque converter transmission
Change transmission fluid.
Fit a new intake strainer.
When checking the fluid level, avoid contact with the exhaust gas recirculation valves, heat shield and associated pipes as these components will be hot.

SERVICING AFTER 25 000 MILES
(40 000 km.) OR 2 YEARS
WHICHSOEVER IS THE EARLIER
After 25 000 miles (40 000 km.) or 2 years, servicing is still due at the following intervals.

31 000 MILES (50 000 km.) OR
2½ YEARS WHICHSOEVER IS THE EARLIER
Carry out the 6 000 miles (10 000 km.) service.
37 500 MILES (62 000 km.) OR 
3 YEARS WHICHEVER IS THE EARLIER
Carry out the 12 500 miles (20 000 km.) service.

43 500 MILES (70 000 km.) OR 
3 1/2 YEARS WHICHEVER IS 
THE EARLIER
Carry out the 6 000 miles (10 000 km.) service.

50 000 MILES (80 000 km.) OR 
4 YEARS WHICHEVER IS 
THE EARLIER
Carry out the 25 000 miles (40 000 km.) service and 
in addition the following operations.

Exhaust gas recirculation system
Remove and clean the exhaust gas recirculation valves 
and feed pipes. Clean the orifices in the carburettor ‘Tee’ piece. Check the exhaust gas recirculation valves 
for correct operation.

PREVENTIVE MAINTENANCE

INITIAL SERVICE
This service should be carried out by the Dealer after 
the first 3 000 miles (5 000 km.) or 3 months whichever is earlier.

Steering pump
Check the oil level in the reservoir; top-up if necessary.

Test
Road test the car for satisfactory performance.

EVERY 6 000 MILES (10 000 km.) OR 
6 MONTHS WHICHEVER IS 
THE EARLIER

Carburetters
Check the oil level in the air valve dampers and top-up if necessary.

Control linkages
Apply a few drops of engine oil to the accelerator linkage and to the gear range selector controls adjacent to the transmission casing.

Electrical system
Check all interior lamps, exterior lamps, instruments, warning lamps and devices for correct operation: rectify as necessary.

Parking brake linkage
Lubricate the pivot pins and pulleys in the parking brake system with approved grease.

Tyres
Check the tread depth of all tyres, inspect all tyres for signs of damage. Check all tyre pressures when cold, adjust if necessary.

Note Include the spare tyre.

Test
Road test the car for satisfactory performance.

EVERY 12 500 MILES (20 000 km.) OR 
12 MONTHS WHICHEVER IS 
THE EARLIER

Control linkage
Apply a few drops of engine oil to the accelerator linkage and to the gear range selector controls adjacent to the transmission casing.

Electrical system
Check all interior lamps, exterior lamps, instruments, warning lamps and devices for correct operation: rectify as necessary.

Parking brake linkage
Lubricate the pivot pins and pulleys in the parking brake system with approved grease.

Spare wheel
Lubricate the spare wheel lowering bolt and mechanism.

Tyres
Check the tread depth of all the tyres, inspect all tyres for signs of damage. Check all tyre pressures when cold, adjust if necessary.

Note Include the spare tyre.

Test
Road test the car for satisfactory performance.
EVERY 18 500 MILES (30 000 km.) OR 18 MONTHS WHICHEVER IS THE EARLIER

Carburetters
Check the oil level in the air valve dampers and top-up if necessary.

Control linkages
Apply a few drops of engine oil to the accelerator linkage and to the gear range selector controls adjacent to the transmission casing.

Electrical system
Check all interior lamps, exterior lamps, instruments, warning lamps and devices for correct operation; rectify as necessary.

Parking brake linkage
Lubricate the pivot pins and pulleys in the parking brake system with approved grease.

Tyres
Check the tread depth of all tyres, inspect all tyres for signs of damage. Check all tyre pressures when cold, adjust if necessary.

Note Include the spare tyre.

Test
Road test the car for satisfactory performance.

Fuel tank
Slacken the drain plug one or two turns and allow any accumulated water to drain away. Tighten the drain plug.

Height control mechanism
Disconnect the control valve linkage ball joints. Clean, grease and refit the ball joints.

Parking brake linkage
Lubricate the pivot pins and pulleys in the parking brake system with approved grease.

Spare wheel
Lubricate the spare wheel lowering bolt and mechanism.

Tyres
Check the tread depth of all the tyres, inspect all tyres for signs of damage. Check all tyre pressures when cold, adjust if necessary.

Note Include the spare tyre.

Test
Road test the car for satisfactory performance.

EVERY 25 000 MILES (40 000 km.) OR 2 YEARS WHICHEVER IS THE EARLIER

Control linkage
Apply a few drops of engine oil to the accelerator linkage and to the gear range selector controls adjacent to the transmission casing.

Electrical system
Check all interior lamps, exterior lamps, instruments, warning lamps and devices for correct operation; rectify as necessary.

Fuel filter
Renew the main line filter element and clean the filter bowl.

SERVICING AFTER 25 000 MILES (40 000 km.) OR 2 YEARS WHICHEVER IS THE EARLIER
After 25 000 miles (40 000 km.) or 2 years, servicing is still due at the following intervals.

31 000 MILES (50 000 km.) OR 2½ YEARS WHICHEVER IS THE EARLIER
Carry out the 6 000 miles (10 000 km.) service.

37 500 MILES (60 000 km.) OR 3 YEARS WHICHEVER IS THE EARLIER
Carry out the 12 500 miles (20 000 km.) service


43 500 MILES (70 000 km.) OR
3 \frac{1}{2} YEARS WHICHEVER IS
THE EARLIER

Carry out the 6 000 miles (10 000 km.) service.

50 000 MILES (80 000 km.) OR
4 YEARS WHICHEVER IS
THE EARLIER

Carry out the 25 000 miles (40 000 km.) service.

SEASONAL SCHEDULES
EVERY 12 MONTHS

Engine cooling system

Drain the coolant from the radiator and the engine
 crankcase. Clean any debris from the surfaces of the
 refrigeration condenser and radiator matrices by
 reverse flushing with a hose. This should be carried
 out just prior to the Autumn. Fill the system with
 the correct anti-freeze mixture (refer to Chapter L—
 Engine Cooling System of this Workshop Manual

Air conditioning system

Ensure that the foam filter element fitted to the
 scuttle intake grille is free from obstruction. On Long
 Wheelbase cars fitted with a centre division, check
 that the foam filter element fitted to the intake grille
 in the rear decking panel is free from obstruction.

Check the refrigerator system for correct
 operation, rectify as necessary. Any work must be
 carried out by an experienced engineer.

Body

Check that the body drain holes are free from foreign
 matter.

EVERY 2 YEARS

In addition to the 12 monthly schedule, carry out the
 following.

Engine cooling system

Drain the coolant from the radiator and engine
 crankcase. Thoroughly reverse flush the coolant
 passages with a continuous flow of water. Change the
 coolant hoses where necessary. Fill the system with
 the correct anti-freeze mixture.

SERVICE RECOMMENDATIONS

50 000 Miles (80 000 km.)

Brake and hydraulic system

At this mileage and under normal motoring conditions
 it is recommended that the following servicing is
carried out.

Renew the front and rear accumulator to frame
 connector block hoses.

Examine the sub-frame to brake caliper hoses for
 chafing or surface cracking; renew if necessary.

Completely drain the fluid from the hydraulic
 circuits. Thoroughly clean the brake fluid reservoirs
 and sight glasses, ensuring that no foreign matter is
 allowed to enter during the operation.

Fill the hydraulic system with Castrol RR 363
 Brake Fluid. This fluid exceeds specification S.A.E.
 J 1703b in many respects and complies with D.O.T. 3
 grade of FMVSS 116. Bleed the braking systems and
 automatic height control system.

100 000 Miles (160 000 km.)

Brake and hydraulic system

At this mileage and under normal motoring conditions
 it is recommended that the following servicing is
carried out.

Renew all the flexible hoses to the braking
 systems and the automatic height control system. Fit
 new seals to the disc brake calipers and the deceleration
 conscious pressure limiting valve.

Completely drain the fluid from the hydraulic
 circuits. Thoroughly clean the brake fluid reservoirs
 and sight glasses, ensuring that no foreign matter is
 allowed to enter during the operation.

Fill the hydraulic system with Castrol RR 363
 Brake Fluid. This fluid exceeds specification S.A.E.
 J 1703b in many respects and complies with D.O.T. 3
 grade of FMVSS 116. Bleed the braking systems and
 automatic height control system.

Fuel system

Fit a new convoluted rubber hose between the
 fuel filler head and fuel tank assembly. Examine all
 flexible fuel pipes and renew any which show signs of
deterioration.

SPECIAL PRECAUTIONS

Should the car be used in very cold temperatures,
 drain the engine sump when thoroughly warm and
 also drain the carburettor air valve dampers. The
 engine sump and carburettor air valve dampers should
 then be filled with oil having the following viscosity.

For constant temperatures of between 0°C. and
 —23°C. (32°F. and —10°F.), use a 10W/30 grade oil.

For constant temperatures of —23°C. (—10°F.)
 and below, use a 5W/20 grade oil.
# Fault Diagnosis

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Possible Cause</th>
</tr>
</thead>
</table>
| 1. Engine will not start.  
(Starter motor operating). | 1. (a) Ignition circuit broken.  
(b) Failed anti 'run-on' solenoid or failure of electrical supply circuit.  
(c) Ignition system faulty.  
(d) Damaged or contaminated ignition high-tension circuit.  
(e) Fault in fuel feed line or fouled float chamber filters.  
(f) Faulty choke bi-metal coil.  
(g) Choke solenoid inoperative.  
(h) Faulty choke 'fast-idle' mechanism.  
(i) Air leak into induction system.  
(j) Faulty hot idle mixture compensator.  
(k) Weakening device filter blocked or blockage in rubber connecting hoses.  
(l) Faulty weakener cut-off solenoid or failure of electrical supply circuit.  
(m) Faulty weakening device control switch or failure of electrical supply circuit.  
(n) Dislodged venturi in weakener device.  
(o) Flooding of carburettor float chamber or jet.  
(p) Fouled carburettor float chamber or jet.  
(q) Exhaust gas recirculation valve(s) failed.  
(r) Faulty exhaust gas recirculation secondary valve control switch or failure of electrical supply circuit.  
(s) Failed secondary exhaust gas recirculation valve cut-out solenoid or electrical supply circuit. |
| 2. Engine idles very roughly. | 2. (a) Ignition system faulty.  
(b) Fouled sparking plugs.  
(c) Damaged or contaminated ignition high-tension circuit.  
(d) Air leak into induction system.  
(e) Faulty hot idle compensator.  
(f) Weakening device filter blocked or blockage in rubber connecting hoses.  
(g) Dislodged venturi in weakener device.  
(h) Badly worn or damaged carburettor control linkage.  
(i) Flooding of carburettor float chamber or jet.  
(j) Sticking carburettor piston.  
(k) Fouled carburettor float chamber or jet.  
(l) Air leak into exhaust gas recirculation vacuum control circuit.  
(m) Exhaust gas recirculation valve(s) failed.  
(n) Faulty exhaust gas recirculation secondary valve control switch or failure of electrical supply circuit.  
(o) Failed secondary exhaust gas recirculation valve cut-out solenoid or electrical supply circuit.  
(p) Faulty air diverter valve.  
(q) Incorrect operation of temperature controlled air intake system. |
| 3. Engine stalls. | 3. (a) Ignition circuit broken.  
(b) Failed anti 'run-on' solenoid or failure of electrical supply circuit.  
(c) Ignition system faulty.  
(d) Damaged or contaminated ignition high-tension circuit.  
(e) Fault in fuel feed line or fouled float chamber filters.  
(f) Air leak into induction system.  
(g) Faulty hot idle mixture compensator.  
(h) Weakening device filter blocked or blockage in rubber connecting hoses.  
(i) Dislodged venturi in weakening device.  
(j) Badly worn or damaged carburettor control linkage.  
(k) Flooding of carburettor float chamber or jet.  
(l) Sticking carburettor piston.  
(m) Fouled carburettor float chamber or jet.  
(n) Air leak into exhaust gas recirculation vacuum control circuit.  
(o) Exhaust gas recirculation valve(s) failed.  
(p) Faulty exhaust gas recirculation secondary valve control switch or failure of electrical supply circuit.  
(q) Failed secondary exhaust gas recirculation valve cut-out solenoid or electrical supply circuit.  
(r) Faulty air diverter valve. |
<table>
<thead>
<tr>
<th>SYMPTOMS</th>
<th>POSSIBLE CAUSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. (i) Engine shows signs of power loss, evident at high speeds and loading. (ii) Engine misfires particularly on hard acceleration from low speed.</td>
<td>4. (a) Ignition system faulty. (b) Fouled sparking plugs. (c) Damaged or contaminated ignition high-tension circuit. (d) Fault in fuel feed line or fouled float chamber filters. (e) Choke system operation incorrect. (f) Sticking carburettor piston. (g) Fouled carburettor float chamber or jet. (h) Faulty exhaust gas recirculation full throttle cut-out switch or failure of electrical supply circuit. (i) Exhaust gas recirculation valve(s) failed. (j) Failed primary exhaust gas recirculation valve cut-out solenoid or electrical supply circuit. (k) Failed secondary exhaust gas recirculation valve cut-out solenoid or electrical supply circuit.</td>
</tr>
<tr>
<td>5. Engine hesitates or misfires under light load.</td>
<td>5. (a) Failed anti 'run-on' solenoid or failure of electrical supply circuit. (b) Ignition system faulty. (c) Fouled sparking plugs. (d) Damaged or contaminated ignition high-tension circuit. (e) Fault in fuel feed line or fouled float chamber filters. (f) Air leak into induction system. (g) Faulty hot idle mixture compensator. (h) Weakening device filter blocked or blockage in rubber connecting hoses. (i) Dislodged venturi in weakening device. (j) Flooding of carburettor float chamber or jet. (k) Sticking carburettor piston. (l) Fouled carburettor float chamber or jet. (m) Incorrect purge flow rate. (n) Exhaust gas recirculation valve(s) failed. (o) Faulty exhaust gas recirculation secondary valve control switch or failure of electrical circuit. (p) Failed secondary exhaust gas recirculation valve cut-out solenoid or electrical supply circuit. (q) Faulty air diverter valve. (r) Incorrect operation of temperature controlled air intake system.</td>
</tr>
<tr>
<td>6. Increase in fuel consumption.</td>
<td>6. (a) Ignition system faulty. (b) Faulty choke bi-metal coil. (c) Choke system operation incorrect. (d) Air leak into induction system. (e) Faulty hot idle mixture compensator. (f) Weakening device filter blocked or blockage in rubber connecting hoses. (g) Faulty weakener cut-off solenoid or failure of electrical supply circuit. (h) Faulty weakening device control switch or failure of electrical supply circuit. (i) Air leaks in mixture weakening system. (j) Flooding of carburettor float chamber or jet. (k) Sticking carburettor piston. (l) Incorrect purge flow rate. (m) Exhaust gas recirculation valve(s) failed. (n) Faulty exhaust gas recirculation secondary valve control switch or failure of electrical supply circuit. (o) Failed secondary exhaust gas recirculation valve cut-out solenoid or electrical supply circuit. (p) Faulty air diverter valve.</td>
</tr>
<tr>
<td>7. Decrease in fuel consumption.</td>
<td>7. (a) Air leaks in mixture weakening system. (b) Incorrect purge flow rate. (c) Faulty exhaust gas recirculation temperature control switch or failure of electrical supply circuit. (d) Air leak into exhaust gas recirculation vacuum control circuit. (e) Exhaust gas recirculation valve(s) failed. (f) Faulty exhaust gas recirculation secondary valve control switch or failure of electrical supply circuit.</td>
</tr>
<tr>
<td>SYMPTOMS</td>
<td>POSSIBLE CAUSE</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| 8. Engine 'backfires' on overrun. | 8. (a) Ignition system faulty.  
(b) Air leak into induction system.  
(c) Exhaust gas recirculation valve(s) failed.  
(d) Failed secondary exhaust gas recirculation valve cut-out solenoid or electrical supply circuit. |
| 9. Sudden increase in engine idle speed. | 9. (a) Faulty choke 'fast-idle' mechanism.  
(b) Failed carburettor overrun valve. |
| 10. Excessive noise from air injection pump or system. | 10. (a) Faulty air diverter valve.  
(b) Faulty or damaged air injection pump. |

**WORKSHOP TOOLS**

**Tool Number Description**

- RH 8050  Spanner—Carburettor Jet Screw
- RH 8087  Spanner—Weakener Cut-off Valve
- RH 8089  Jet Centring Tool
- RH 8090  Pliers—Wire Hose Clips
- RH 8383  Positioning Tool—Throttle Spindle Seal
- RH 8621  Adapter—Air Manifold to CO Meter
- RH 8800  Vacuum Pump—Hand Operated
- RH 8841  Dial Gauge—Carburettor Piston Lift
- RH 8880  Setting Jig—Throttle Levers
- RH 8945  Connector—Choke Stove Pipe

U198
Chapter U
Section U10
SUPPLEMENTS
No. 7 Japan 1976

Workshop personnel should refer to Chapter U (Part 2) and the Supplements Nos. 5 and 7 for servicing information applicable to 1976 model year cars.

Rolls-Royce Silver Shadow and Bentley T Series motor cars and Rolls-Royce and Bentley Corniche motor cars destined for Japan and built to the 1976 specification, have the following changes from the previous year’s specification.

1. Single exhaust system with a catalytic converter replacing the front silencer.
2. Heatshields for underside insulation above the catalytic converter.
3. New exhaust downtake pipe to match up with the catalytic converter.
4. Label for ‘unleaded fuel’ requirement fitted to the inner flap of the fuel filler compartment.
5. Unleaded gasoline only label fitted either in or adjacent to the fuel gauge on the facia.
6. Sensors fitted to the catalytic converter and body floor to activate a warning buzzer if overheating occurs.
7. Metal temperature switch fitted to ‘A’ bank cylinder head.
8. Additional electrically operated booster fan fitted between the radiator grille and refrigeration matrix.
9. Fuel cooler fitted adjacent to the refrigeration compressor
10. Positions of the fuel filter and fuel pump are reversed.
11. Thermostat outlet elbow with two lock-out switches fitted.
12. Radiator grille with modified vanes to accommodate booster fan mentioned in item 8.
13. Galvanised mesh heatshields beneath the exhaust system.
14. Fuel integrity system fitted to fuel tank.
FIG. 1 VIEW INSIDE ENGINE COMPARTMENT (From Right-hand Side of Car)

1 Fuel receiver and float chamber vent valve
2 Weakener system cut-off switch
3 E.G.R. valve
4 E.G.R. distribution pipes
5 'B' bank carburettor
6 Fuel cooler
7 Air diverter valve
8 Air pump

FIG. 2 VIEW INSIDE ENGINE COMPARTMENT (From Left-hand Side of Car)

1 Weaken filter
2 Anti 'run-on' solenoid
3 Check valve
4 E.G.R. cut-out solenoid
5 Choke thermo-coil housing
6 'A' bank carburettor
7 E.G.R. cooler
EXHAUST EMISSION CONTROL SYSTEM

AIR INJECTION SYSTEM

As 1975 Specification—see Supplement No. 5, except for the following.

The air diverter valve is not serviceable. If the operation of the component is suspect, the following checks should be carried out before it is replaced.

1. Ensure that the handbrake/parking brake is firmly applied and that the vehicle is in Park.
2. Start and run the engine at 2 000 r.p.m.
3. Ensure that air does not escape from the air diverter valve exhaust ports situated around the body of the air diverter valve.

If air escapes from the exhaust ports the air diverter valve assembly is faulty due to either a failed relief valve or a seized shuttle and must be replaced with a new unit.

4. Release the throttle linkage sharply so that the engine speed rapidly falls from 2,000 r.p.m., ensure that air escapes from the air diverter valve exhaust ports for a short period of time.

If air does not escape from the exhaust ports of the air diverter valve during Operation 4 check the following.

(a) The condition of the hose from the air diverter valve to the vacuum manifold.
(b) The condition of any hose connected to the vacuum manifold.
(c) Repeat Operation 4.

If air still does not escape during Operation 4 the air diverter valve assembly is faulty due to either a diaphragm or timing valve failure and must be replaced.

After fitting a new air diverter valve, ensure that the component operates satisfactorily.

5. Allow the engine to idle at 600 r.p.m. Ensure that air does not escape from the air diverter valve exhaust ports.

EXHAUST GAS RECIRCULATION SYSTEM

As 1975 Specification—see Supplement No. 5 except for Figure 4 which provides additional information.

OXIDATION CATALYST SYSTEM

A catalytic converter, in place of the conventional front silencer is situated in the exhaust system to the rear of the point in the system where both exhaust manifold downtake pipes combine.

The box unit contains three catalyst blocks and has sufficient volume to perform the dual functions of

FIG. 3 CATALYTIC CONVERTER

1 Monolithic catalyst
2 Catalyst retaining plates
3 Silencing chamber
4 Stainless steel wire mesh
5 Fireclay coating
6 Ceramic tape
7 Inlet pipe
FIG. 4 HOSE ROUTING DIAGRAM
Catalytic converter protection

To protect the catalytic converter from possible damage the following precautions should be taken.

(i) Unleaded gasoline

Use unleaded gasoline only. The use of leaded gasoline will result in a substantial reduction in the performance of the catalyst. Under no circumstances add fuel system cleaning agents to either the fuel tank or carburetters for induction into the engine, as these materials may have a detrimental effect on the catalytic converter.

(ii) Engine malfunction

If the engine misfires or suffers from a lack of power which could be attributed to a malfunction of either the ignition or fuel systems, the vehicle should be driven only at low speed and the fault rectified as soon as possible by an authorised dealer. Driving at high speeds with a malfunction in either of these systems could cause overheating and consequent damage to the catalyst.

(iii) Fuel

Do not allow the engine to run out of fuel. If the engine does run out of fuel at a high speed possible damage to the catalyst could result.

For information concerning the protection of the catalytic converter from damage due to overheating, refer to—Catalytic converter and body floor overheat warning system.

Catalytic converter—To remove

1. Unscrew the self-tapping screws that secure the shield below the catalytic converter assembly. Withdraw the shield.

2. Unscrew the \(\frac{7}{8}\) in. A/F nuts that secure the two shields to the exhaust pipe on either side of spherical joint, situated to the rear of the body cross-member.

3. Collect the washers, withdraw the bolts and remove the shields.

Note Take care when removing the shields as the edges are sharp and could cause injury to the hands.

4. Remove the thermocouple from the catalytic converter assembly [refer to Emission Control Systems (Electrical Components) in this Supplement].

5. Support the weight of the exhaust pipe which passes into the expansion box.

6. Using a \(\frac{3}{4}\) in. A/F spanner unscrew and remove the nut retaining the exhaust mounting around the exhaust pipe (situated behind the body cross-member).

7. Remove the nut and withdraw the bolt, collect the washer.

8. Open the mount and slide it over the exhaust pipe.

9. Slacken the two \(\frac{3}{8}\) in. A/F nuts retaining the exhaust clamp around the spherical joint to the rear of the body cross-member and catalytic converter assembly.

10. Unscrew the nuts completely and withdraw the bolts; collect the washers.

11. Remove the two halves of the clamp joint from the exhaust pipe. Free the two sections of the pipe from each other and collect the sealing ring.

12. Allow the forward section of the exhaust to rest on the body cross-member and repeat Operations 9 to 11 inclusive on the spherical exhaust joint situated in front of the catalytic converter assembly. Hold the forward end of the assembly as the front joint is freed.

13. Withdraw the catalytic converter assembly in a forward and downwards direction.

Catalytic converter—To fit

Fit the catalytic converter assembly by reversing the procedure given for removal, noting the following points.

1. The seal rings and pipe flares must be thoroughly clean and free from scale and may be lightly dressed with fine emery cloth if required.

2. The clamp bolt threads should be lightly oilied to prevent binding during assembly and the spherical faces of the sealing rings and the grooves in the clamps should be smeared with a graphite lubricant, to ensure correct alignment of the pieces on assembly.

3. Fit the pipe and the catalytic converter assembly complete with seal rings, then loosely fit the joint clamps and the "handcuff" clamp.
4. The joints must not be fully tightened until the pipe has been manoeuvred to obtain the best run (free from possible fouls) and good joint alignment.

Note The pipe joints must not be 'sprung' or 'clamped' into position.

5. When the pipe run is satisfactory, torque tighten the joint clamp nuts in accordance with the standard torque figures given in Chapter P then 'set' the 'Vibrashock' mount to allow for expansion in the exhaust system, when hot.

6. Fit the thermocouple to the catalytic converter assembly [refer to Emission Control Systems (Electrical Components) in this Supplement].

---

**Catalytic converter and body floor overheat warning system**

For all information associated with catalytic converter overheating and the overheat warning buzzer sounding, refer to Emission Control Systems (Electrical Components) in this Supplement.

---

**'Vibrashock' exhaust mount—To set**

This exercise is carried out by holding the 'handcuff' clamp forward whilst tightening the pinch bolt. This has the effect of misaligning the centre of the mount and this misalignment should be approximately 4.76 mm. (0.187 in.) at the mount centre.

---

**FIG. 5 FUEL EVAPORATION EMISSION CONTROL SYSTEM—GENERAL VIEW**

1. Vacuum manifold
2. Anti 'run-on' solenoid
3. Float chamber vent valve
4. Weakener cut-off solenoid
5. Fuel trap assembly
6. Fuel tank assembly
7. Weaken filter
8. Evaporative loss control canister
9. Purge line filter
10. Float chamber drain valve
**Fuel tank assembly**

The fuel tank assembly consists of the fuel tank, expansion tank and fuel trap assembly (see Fig. 6).

The fuel tank is vented from three positions to a fuel trap assembly which is mounted above the fuel filler. One vent is from the fuel filler neck and the other two vents from the fuel tank.

The three vent lines join at a common junction block situated adjacent to the fuel filler neck, the main vent line then encircles the fuel tank before passing to the fuel trap assembly.

From the fuel trap, a vent line passes under the floor of the car to the evaporation loss control canister.

---

**FIG. 6 FUEL EVAPORATION EMISSION CONTROL SYSTEM—FUEL TANK**

1. Connection to evaporation loss control canister
2. Fuel filler box
3. Fuel trap
4. Combined relief and vacuum valve
5. Valve vent
6. Vent pipe
7. Expansion tank
8. Vent pipe
FIG. 7 POSITION OF MIXTURE WEAKENING DEVICE FILTER AND PURGE LINE FILTER

1. Weaken filter
2. Speed control system regulator
3. Hydraulic fluid pressure switches
4. Purge line filter
5. Road spring top cover

Purge line
The purge line consists of a rubber hose, passing from the lowest connection on the canister through the valance junction piece to the vacuum manifold. Incorporated into this hose is the purge line filter and restrictor.

When the engine is running, air drawn through the canister filter and carbon picks up the stored fuel vapours and passes them via the hose, to the induction manifold. The restrictor in the line controls the flow rate at between 1.41 cu. m./hr. and 1.98 cu. m./hr. (50 cu. ft./hr. and 70 cu. ft./hr.) to maintain carburettet metering accuracy and the paper element line filter is fitted to prevent blockage of the restrictor.

Purge line filter—To remove
1. Using special pliers (RH 8090) remove the two steel retaining clips situated on either side of the unit.
2. Slacken the setscrew which secures the nylon retaining clip.
3. Withdraw the component from the clip.

Purge line filter—To fit
Fit the purge line filter by reversing the procedure given for removal noting the following point.
1. Ensure that the rubber hoses are in a good condition and new hose retaining clips are used.

Purge flow rate—To check
Check the purge flow rate as follows.
1. Disconnect the hose from the engine side of the purge line filter and insert a flowmeter and stand assembly (RH 8725) into the line. The flowmeter is a rotameter type capable of measuring between 1.41 cu. m./hr. and 1.98 cu. m./hr. (50 cu. ft/hr. and 70 cu. ft/hr.). The pressure drop across the meter is not to exceed 5.08 cm. Hg. (2 in. Hg.).
2. Start and run the engine at idle speed, the flowmeter reading should be between 1.41 cu. m/hr. and 1.98 cu. m/hr. (50 cu. ft/hr. and 70 cu. ft/hr.).
3. If the flow is less than 1.41 cu. m/hr. (50 cu. ft/hr.) stop the engine and remove the purge line restrictor (see Fig. 4). Fit a piece of straight metal pipe with an internal bore larger than 4.76 mm. (0.187 in.), in place of the restrictor.
4. Start and run the engine at idle speed, ensure that the flow is now in excess of 1.98 cu. m/hr. (70 cu. ft/hr.).
5. If the flow is less than 1.98 cu. m/hr. (70 cu. ft/hr.) check the following.
   (i) an air leak in any of the vacuum hoses connected to the vacuum manifold (see Fig. 4).
   (ii) a blockage in the vacuum manifold or any of the connecting hoses (see Fig. 4).
6. Rectify any air leaks or blockages found in the system. Repeat Operation 4.
7. Stop the engine and fit the purge line restrictor.
8. Start the engine and check the flow rate as detailed in Operation 2.
9. If the flow is still incorrect fit a new restrictor and again repeat Operation 2.
10. Stop the engine, remove the flowmeter assembly and connect the hoses.
CRANKCASE EMISSION CONTROL SYSTEM

For details of this system refer to Chapter U (Part 2) and the Supplement No. 5.

EMISSION CONTROL SYSTEMS (ELECTRICAL COMPONENTS)

For servicing details of the emission related electrical components fitted to the 1976 model year car, not listed in this Section, refer to Chapter U (Part 2)—Section U4.

(i) The exhaust gas recirculation valve cut-in switch.
(ii) Electrically operated cooling system booster fan.
(iii) Catalytic converter and body floor overheat warning system.

Exhaust gas recirculation cut-in switch
The servicing details for the component are identical to those given in Chapter U (Part 2)—Section U4. However, an additional switch has been added to the thermostat outlet elbow and therefore, reference should be made to Figure 4 in this Supplement for identification purposes.

3. Remove the four screws retaining the outer ends of the cross-stays that carry the booster fan assembly. Withdraw the fan assembly taking care not to damage the refrigeration condenser.

Cooling system booster fan—To dismantle
1. Release the clip securing the electrical feed cables to the upper cross-stay.
2. Remove the screws retaining the fan to the drive hub. Withdraw the fan.
3. Slacken the small grub screw and withdraw the fan drive hub from the fan motor shaft.

Cooling system booster fan
A cooling system booster fan is fitted to increase the flow of air through the radiator matrix at high coolant temperatures (e.g. if the engine is allowed to run at idle for long periods).

Important Under certain conditions it is possible for the cooling system booster fan to start when the engine is not running.
The fan installation is illustrated in Figure 9.
The switch to activate the fan is illustrated in Figure 8.

Cooling system booster fan—To remove
1. Disconnect the battery and remove the radiator grille (refer to Chapter S).
2. Disconnect the electrical feed to the fan by detaching the two ‘Lucar’ connections situated to the left of the steering pump oil cooler (see Fig. 9).

FIG. 8 THERMOSTAT ELBOW CUT-IN SWITCHES
1 Thermostat outlet elbow
2 Air diverter valve
3 Refrigeration compressor
4 Air pump
5 Cooling system booster fan switch
6 E.G.R. cut-in switch
Cooling system booster fan—To fit
Fit the fan assembly by reversing the procedure given for removal.

Cooling system booster fan—To check
1. Disconnect the electrical socket from the booster fan cut-in switch (see Fig. 8).
2. Connect a short length of cable between the two connections in the socket, the fan motor should start. Should this test prove satisfactory, but the operation of the system still be suspect, drain the coolant and replace the cut-in switch with a new unit.

Note When fitting a new cut-in switch, always ensure that the unit is the correct part as there may be similar switches fitted to the engine with different temperature settings.

Catalytic converter and body floor overheat warning system
To satisfy Japanese regulations an audible warning system is fitted to both the exhaust catalytic converter and car body floor (luggage compartment) to alert the driver if temperatures in these two areas become excessive.

The sensor for each system is shown in Figure 10 and 11 respectively.

Both warning systems utilise the same feed of the catalyst control unit (mounted under the front left-hand wing above the under wing sheet) and warning buzzer situated between the front seats (below the centre console on coach built cars or below the stowage compartment on Silver Shadow cars).

If the temperature of either the catalytic converter or the car floor become excessive a warning buzzer will sound inside the car.

Overheat warning
Should an exhaust overheat condition be signalled the speed of the vehicle must be reduced to 50 k.p.h. (30 m.p.h.) immediately and this speed must not be exceeded until the cause of the overheat warning has been investigated and corrected.

Before carrying out a full diagnostic inspection two possible causes should be explored as follows:
(a) Ensure that the vehicle did not run out of fuel.
(b) In an ambient air temperature of above 30°C. (86°F.) ensure that the air conditioning system upper air facia switch is turned towards the 'cold
quadrant' (situated on the left-hand side and coloured blue) to activate the fuel cooler.

If the overheat warning buzzer sounds for reasons other than those detailed above a fault has occurred in:

(a) The various systems that lead into the exhaust (i.e. fuel system, air injection system, etc.) or in the exhaust itself particularly the catalytic converter. Any faults in these areas can be determined as system faults.
(b) The overheat warning circuit (i.e. faulty converter thermocouple, wiring, connections, sensors, etc.) causing the buzzer to sound although the system is operating satisfactorily. These faults can be determined as circuit faults.

Further conditions may apply when investigating possible faults with the overheat warning system, as follows:
(a) The car has been returned with the warning buzzer sounding.
(b) The car has been returned for investigation when the warning buzzer has sounded, but is not sounding at the time of the investigation.

**Buzzer sounding**

1. Ensure that the normal safety precautions (i.e. handbrake or parking brake is firmly applied, etc.) are carried out and the ignition is switched on.

2. Carefully observe if the vehicle appears exceptionally hot particularly in the area of the catalyst converter. If hotter than is usual for a car fitted with a catalyst suspect a system fault.

3. Raise the car bonnet, locate the Lucar connections for the catalyst converter thermocouple and disconnect the brown cable. The connections are situated adjacent to the front left-hand road spring pot cover and the valance. The two cables one brown and one blue, together with the control box loom enter the engine compartment from under the front wing (see Fig. 13).

4. (a) If the buzzer ceases to operate a system fault can be suspected, proceed to Operation 5.
(b) If the buzzer continues to operate a circuit fault can be suspected, proceed to Operation 5.

   After Operation 4 connect the brown cable.

5. Open the luggage compartment and carefully pull the carpet and felt from the floor at the forward end to determine if the metal floor in the area of the sensor is hot (see Fig. 11).

   **Note** The floor temperature in this area could be extremely high and therefore, care must be taken when carrying out this test to avoid personal injury.

6. (a) If the luggage compartment floor is very hot a system fault could be causing excessively high temperatures in the exhaust.
(b) If the luggage compartment floor is cool or warm proceed to Operation 7.

7. Remove the metal cover fitted over the luggage compartment floor sensor and disconnect one of the Lucar connections to the sensor. If the buzzer ceases to operate the sensor should be tested (see Service Checks—Luggage compartment floor temperature sensor) and if found suspect in any way, renewed.

8. If the buzzer continues to operate refit all components in the luggage compartment.

9. Position the car on a ramp and carry out Operation 1.

10. From beneath the car, carefully observe the area around the catalyst converter assembly. The catalytic converter and surrounding area will normally be very hot, however, excessive temperature caused by a system fault will result in the overheat warning buzzer sounding.

11. Switch off the ignition and allow the car to cool down. When the car is cold switch on the ignition and check the buzzer as follows.
(a) If the buzzer is still sounding suspect a warning circuit fault and check out the circuits as detailed in the service checks.
(b) If the buzzer is not sounding suspect a fault in one of the systems feeding into the exhaust (system fault).

From the evidence gained by carrying out Operations 1 to 11 inclusive it can be determined if the vehicle has a system fault or a warning circuit fault and the information listed in the appropriate section should be consulted.

**Buzzer not sounding at the time of investigation**

1. Ensure that the normal safety precautions (i.e. handbrake or parking brake is firmly applied, etc.) are carried out and the ignition is switched on.
2. Raise the car bonnet and carry out service checks on the catalytic converter thermocouple and control box.
3. Open the luggage compartment and carry out service checks on the floor overheat warning system wiring and switch.
4. If all the service checks on the warning circuits prove satisfactory a system fault should be suspected.

From the evidence gained by carrying out Operations 1 to 4 inclusive it can be determined if the vehicle has a system fault or a warning circuit fault and the information listed in the appropriate section should be consulted.

**System faults**

The following is a list of components and systems that may contribute to a malfunction in the exhaust resulting in overheating of the catalytic converter or luggage compartment floor.

**Note** Any condition resulting in an engine misfire or uneven running should always be investigated first as this condition could result in the catalytic converter overheating.

1. Faulty air injection system.
2. Faulty air diverter valve.
3. Ignition system faulty (including ignition timing).
4. Fouled sparking plugs.
5. Incorrect float chamber depression.
6. Air conditioning system faulty.
7. Blocked fuel feed line.
8. Fouled float chamber filters.
9. Choke system operation incorrect (including choke hold solenoid).
10. Sticking carburettor piston.
11. Fouled carburettor float chamber or jet.
13. Air leak into induction system.
14. Failed exhaust gas recirculation cut-in solenoid, cut-in switch or electrical supply circuit.
15. Failed anti 'run-on' solenoid or electrical supply circuit.
16. Faulty hot idle mixture compensator.

**FIG. 12 OVERHEAT WARNING SYSTEM**

1 Control unit  2 Warning buzzer  3 Catalyst thermocouple probe  4 Luggage compartment floor temperature sensor
17. Weakening device filter blocked or blockage in rubber connecting hoses.
18. Flooding of carburettor float chamber or jet.
19. Incorrect operation of temperature controlled air intake system.
20. Incorrect purge flow rate.

Note Should the overheat warning buzzer sound while testing is in progress, disconnect and blank off the air injection system check valves. This action should prevent overheating of the catalyst whilst the remaining tests are completed.

Warning circuit faults

The following is a list of components within the overheat warning system that may contribute to a malfunction of the warning system.

A theoretical wiring diagram of the warning circuits is illustrated in Figure 12.
1. Catalyst overheat warning control box and wiring.
2. Catalyst thermocouple probe and wiring.
3. Luggage compartment floor temperature sensor and wiring.
4. Warning buzzer.

These components together with the necessary wiring and connections can be checked by carrying out the relevant service checks.

SERVICE CHECKS
Catalyst overheat warning control box and buzzer—To check

1. Raise the car bonnet, locate the control box loom and the two catalyst thermocouple cables on the left-hand valance adjacent to the front road spring pot cover (see Fig. 13).
2. Identify the two catalyst thermocouple cables, one is brown and the other is blue.
3. Disconnect the blue cable at the Lucas connection and connect the end from the control box through a 9 k resistor to Positive (this can be the white wire in the control box loom).
4. Switch on the ignition, if the control and wiring is correct the warning buzzer will sound.
5. Remake the electrical connections.

Catalyst thermocouple probe—To check

1. Raise the car bonnet, locate the control box loom and the two catalyst thermocouple cables on the left-hand valance adjacent to the front road spring pot cover (see Fig. 13).
2. Identify the two catalyst thermocouple cables, one is brown and the other blue.
3. Disconnect the two cables at their Lucas connections and using suitable equipment (e.g. an Ammeter) ensure that the thermocouple probe is not open circuit.
4. Providing the thermocouple probe is not open circuit it is considered serviceable, however, should it be suspect for other reasons a new unit must be fitted.
5. Remake the electrical connections.

Luggage compartment floor temperature sensor—To check

1. Open the luggage compartment and pull the carpet and felt from the floor of the luggage compartment at the forward end (see Fig. 11).
2. Remove the four screws and withdraw the cover from above the sensor.
3. Detach the two cables from the sensor and using an additional short length of cable, connect the two together. If the buzzer sounds, the wiring and buzzer are satisfactory.
4. Remove the sensor from the car.
5. Using suitable test facilities (e.g. heated oil bath, oven, etc.) ensure that the sensor will operate at 110°C ± 5°C (230°F ± 10°F).
   Should the switch operate within the prescribed limits it is satisfactory.
6. Fit the switch and the other components to the luggage compartment.

**Catalyst thermocouple probe—To remove and fit**

Refer to Page U203 of this Supplement, Catalytic converter—To remove, noting that the lock-nuts on the thermocouple mounting in front of the converter must be released and the thermocouple freed from the mounting.

**Luggage compartment floor temperature sensor—To remove and fit**

Refer to Page U211 of this Supplement, Luggage compartment floor temperature sensor—To check.

**Catalyst overheating warning control box—To remove**

1. Ensure that the normal safety precautions (i.e. handbrake or parking brake is firmly applied, etc.) are carried out. Firmly check the wheels.
2. Raise the front of the car on a jack and position stands beneath the car.
3. Remove the front left-hand road wheel.
4. Remove the underwing sheet.
5. Raise the car bonnet, locate the control box loom and two catalyst thermocouple cables on the left-hand valance adjacent to the front road spring pot cover (see Fig. 13).
6. Disconnect the cables mentioned at their Lucar connectors and carefully feed them through the valance.
7. Remove the mounting setscrews and withdraw the control box from beneath the wing.

**Catalyst overheating warning control box—To fit**

1. Fit the control box by reversing the procedure given for removal, ensuring that the rubber grommet is correctly fitted to the hole in the wing valance and the cables are correctly connected in the engine compartment.

**Overheat warning buzzer—To remove**

The warning buzzer is situated between the front seats either beneath the centre console (Coachbuilt cars) or stowage compartment (4 Door Saloons).
1. To gain access to the buzzer it will be necessary to remove the front seats and stowage compartment/centre console (see Chapter 5).
2. Detach the two electrical connections from the buzzer and unscrew the retaining screw.

**Overheat warning buzzer—To fit**

Fit the warning buzzer by reversing the procedure given for removal.

**Anti 'run-on' solenoid—To check**

1. Detach the hose from the solenoid to the 'Tee' piece at the solenoid end and connect a piece of hose of identical internal diameter, but of suitable length, to the solenoid.
2. Clean the open end of the hose.
3. Switch on the ignition.
4. Place the hose in the mouth and blow down the hose.
5. If the operation of the solenoid is correct note that the following conditions apply and connect the original hose to the solenoid.
   (i) With the ignition switched on it should not be possible to blow down the hose.
   (ii) With the ignition switched off the solenoid is de-energised and it should be possible to blow down the hose.
6. Replace the hose removed in Operation 1. If the operation of the solenoid is suspect, carry out the following test before fitting a new unit.
7. Remove the cap from the pressure tapping on 'A' bank carburettor float chamber. Connect a manometer, capable of measuring between 0 cm. and 15,24 cm. (0 in. and 6 in.), to the pressure tapping connection.
8. Start and run the engine at idling speed (600 r.p.m.).
9. Switch off the ignition and observe the reading on the manometer. The reading should increase momentarily to approximately 15,24 cm. (6 in.) of H₂O as the engine stops.
   If the reading does not increase check the following:
   (a) Blockage in the hose from the 'Tee' piece in the weaker hose to the anti 'run-on' solenoid.
   (b) Blockage in the hose route (2 hoses joined by a restrictor/connector) from the anti 'run-on' solenoid to the vacuum manifold.
   (c) Incorrect wiring to the anti 'run-on' solenoid.
THE CARBURETTERS
AND AUTOMATIC CHOKE SYSTEM

Automatic choke stove pipe—To check

To check the stove pipe for any blockage, carry out the following procedure:
1. Start the engine and run until normal operating temperature is attained.
2. Disconnect the union at the butterfly housing (see Fig. 14) and connect a flowmeter to the pipe via connector RH 8945. The flowmeter must be a rotameter type capable of measuring up to 2,83 cu. m/hr. (100 cu. ft/hr.).
3. Start the engine and run at idle speed (i.e. 600 r.p.m.); observe the manometer reading which should be between 1,41 cu. m/hr. and 1,55 cu. m/hr. (50 cu. ft/hr. and 55 cu. ft/hr.).
4. If the manometer reading is below 1,41 cu.m/hr. (50 cu. ft/hr.), stop the engine, remove the choke stove pipe and stove assembly to check for leaks.
5. If the flowmeter reading is above 1,55 cu. m/hr. (55 cu. ft/hr.) fit a new restrictor in the end of the choke bi-metal housing.
6. Fit the choke stove pipe and stove assembly, start the engine and again observe the flowmeter reading at idle speed.
7. Disconnect the flowmeter assembly and fit the choke stove pipe to the connection on the butterfly housing.

Temperature controlled air intake

To ensure rapid warm-up and improve control of the air/fuel ratio a temperature controlled air intake is fitted (see Fig. 15).

A vacuum operated blending valve attached to the air cleaner assembly is controlled by a thermal sensor in the air intake elbow. This valve blends hot air from a pick-up point (scoop) adjacent to the exhaust manifold with cold air from under the front wing; thus maintaining a constant temperature of the intake air as it enters the carburetters.

Fuel cooler

A cooler is fitted into the fuel system and using the same refrigerant as the air conditioning system, cools the fuel before it enters the carburetter float chambers. The fuel cooler is situated adjacent to the refrigeration compressor and is illustrated in Figure 16.

Fuel cooler—To remove

1. Discharge the refrigerant (see Chapter C).
2. Unscrew the two unions connecting the cooler to the fuel pipes.

FIG. 14 CHECKING THE CHOKE STOVE PIPE DEPRESSION
1 Flowmeter
2 Choke stove pipe connection
3 Choke stove pipe
4 Adapter
5 "B" bank carburetter
**FIG. 15 TEMPERATURE CONTROLLED AIR INTAKE**

1. Hot air scoop
2. Temperature sensor
3. Vacuum manifold
4. Air cleaner/silencer
5. Air blending valve
6. Cold air intake
3. Disconnect the refrigeration pipe from the front of the cooler.
4. Unscrew and remove the setscrew that secures the clamp plate to the rear face of the compressor.
5. Withdraw the clamp plate from the rear face of the compressor.
6. Unscrew and remove the cooler mounting setscrews situated at the forward end of the assembly; free the refrigeration pipes from the rear of the assembly. Withdraw the cooler.

Fuel cooler—To fit

To fit the fuel cooler reverse the procedure given for removal noting the following points.
1. Fit new rubber 'O' rings between the rear face of the compressor and the unions of the refrigeration pipes.
2. After fitting the cooler the full procedure of evacuation and sweeping must be carried out before the refrigeration system is charged, details are given in Chapter C.

Cold start 'fast-idle'—To set

1. Stop the engine and disconnect the solenoid to exhaust gas recirculation valve hose at the valve end. Blank the hoses. Disconnect the signal hose to the distributor vacuum capsule at the capsule and blank off the hose.
   Remove the pressure tapping cap to vent the float chambers; open the throttles and close the choke butterfly against the bi-metal coil tension by means of the butterfly link lever, release the throttles.
   The 'fast-idle' adjusting screw should now be resting on the high step of the 'fast-idle' cam and the throttles in the cold start position.
2. Start the engine and check the 'fast-idle' speed. If the speed is not between 1 900 r.p.m. and 2 100 r.p.m., stop the engine, open the throttles to gain access to the adjusting screw and adjust ¼ turn for each 100 r.p.m. outside the required speed.
3. Tighten the lock-nut and check the 'fast-idle' speed. If the speed is correct open the throttles to release the 'fast-idle' cam mechanism.
4. Remove the blank from the solenoid to exhaust gas recirculation valve hose and connect the hose to exhaust gas recirculation valve. Fit the tapping cap to 'A' bank carburettor float chamber cover.
5. Remove the blank from the distributor advance vacuum signal hose and connect the hose to the capsule.
IGNITION SYSTEM, DISTRIBUTOR, IGNITION COIL AND SPARKING PLUGS

Data

Ignition timing

4° B.T.D.C. (static) 15° B.T.D.C. at 1 600 r.p.m. (stroboscopic) in Neutral vacuum advance disconnected and the feed hose blanked off.
(Approach 1 600 r.p.m. from a higher speed).

Ignition—To time (using a stroboscope)

The ignition is timed on A1 cylinder which is located at the front left-hand side of the engine (viewed from the front of the car).

Note If the ignition timing is to be set, ensure that the sparking plugs are in good condition before running the engine; if they require cleaning or renewal the sparking plugs gap should be set to 0.9 mm. (0.035 in.).

1. To check the ignition timing commence by running the engine until normal operating temperature is attained and the choke 'fast-idle' is in the off position. Switch off the engine.
2. Connect a stroboscope and a tachometer to the engine as described in the instructions supplied with the respective equipment. Disconnect the feed hose at the vacuum advance capsule; blank off the feed hose.
3. Start the engine and adjust the throttle stop screw to give an idle speed of 1 600 r.p.m. When setting the engine idle speed reduce from a higher speed to 1 600 r.p.m.
4. Direct the flashing light of the stroboscope onto the crankshaft damper timing marks and timing pointer; the pointer is positioned on the right-hand side of the crankshaft damper when viewed from the front of the engine.
5. If the timing pointer does not coincide with the 15° B.T.D.C. mark on the crankshaft damper adjust the ignition timing as follows.
6. Release the clamp screw on the distributor and rotate the head of the distributor in the appropriate direction until the correct timing is obtained. Clockwise rotation of the distributor head advances the ignition and conversely anti-clockwise rotation retards the ignition. After adjustment has been carried out tighten the clamp screw and again check to ensure that the timing has not altered whilst tightening the clamp screw.
7. Set the engine idle speed to 600 r.p.m.

Ignition control system

The ignition system utilises an Opus distributor (in which an oscillator pick-up and control unit replace the conventional contact breaker), a low inductance ignition coil and a ballast resistor. The control unit comprises an electronic oscillator, amplifier and power transistor.

A drum with eight ferrite rods (one per cylinder) moulded into the outer edge is mounted onto the distributor drive-shaft. As the drum rotates a voltage is created each time a ferrite rod passes the oscillator pick-up, this signal is then amplified and used to switch-off the normally conducting power transistor in the primary coil circuit thus inducing a high voltage in the secondary winding which is distributed to the sparking plugs in the normal manner.

In addition to the normal centrifugal advance mechanism the ignition distributor is fitted with a vacuum advance capsule. The E.G.R. gated orifice vacuum signal is applied to the capsule to advance the ignition timing for part throttle fuel economy during open road cruising. The vacuum signal is inhibited by a solenoid valve until a predetermined coolant temperature is reached.

This ignition control system provides increased accuracy of timing and increased service life before maintenance is required.
FIG. 17 IGNITION DISTRIBUTOR

1. Pick-up module
2. Pick-up arm
3. Distributor cover cap
4. High tension brush and spring
5. Rotor arm
6. Flash over shield (dust cover)
7. Timing rotor
8. Vacuum unit
9. Control unit
10. Lubrication pad
11. Driving dog and pin
12. Thrust washer
13. Automatic advance mechanism
14. Electronic module assembly

8. Direct the flashing light of the stroboscope onto the crankshaft damper timing marks and timing pointer. Check that the ignition timing is approximately 4° B.T.D.C.

9. Stop the engine.

10. Disconnect the hose from the vacuum manifold to the purge line restrictor at the restrictor (see Fig. 4). Connect a suitable length of hose between this hose and the connection on the distributor vacuum capsule.

11. Start the engine and set the idle speed to 600 r.p.m.

12. Direct the flashing light of the stroboscope onto the crankshaft damper timing marks and timing pointer. Check that the ignition timing has advanced to approximately 14° B.T.D.C. If the ignition timing has not advanced, the distributor assembly is faulty.

13. Stop the engine.

14. Fit all hoses to their correct connections.

15. Start the engine and set the idle speed to 600 r.p.m.

16. Stop the engine and remove all the test equipment.

Setting the engine idle speed

Ensure that the engine is at normal operating temperature and that the choke ‘fast-idle’ is in the off position.

The air conditioning system must be switched off and a tachometer connected to the engine in accordance with the manufacturer’s instructions.

1. Stop the engine, remove the air intake hose and blank off the hot idle compensator feed drilling; replace the air intake hose.

2. Start the engine and, if necessary, adjust the engine idle speed to 600 r.p.m. using the throttle stop screw; tighten the lock-nut.

3. Stop the engine and remove the air intake hose. Remove the blank from the hot idle compensator feed drilling and detach the tachometer and stroboscopic timing equipment (if fitted). Fit the air intake hose.

The sparking plugs approved for this car are Champion RN.14.Y. Before fitting the plugs, set the gaps to 0.9 mm. (0.035 in.) and lightly smear the threads with ‘Graphogen’ grease.
LUBRICATION AND MAINTENANCE

The ‘Essential’ maintenance which is listed in the following schedules is the minimum servicing which must be carried out at the appropriate distance/time intervals in order to comply with the Rolls-Royce new car Warranty and the Japanese Emission Regulations.

The ‘Preventive’ maintenance listed, is aimed at securing the maximum life and efficiency for the vehicle and will be carried out on request.

The schedules marked ‘Regular’ maintenance should be carried out either by the Owner, his chauffeur, or by a Distributor or Retailer.

REGULAR MAINTENANCE

**Hydraulic reservoirs**

Monthly, check the level of fluid in the reservoirs for the braking and automatic levelling systems; the engine should be run for 4 minutes before checking the fluid level. Top-up if necessary to the indicated level. If frequent topping-up is required check the hydraulic systems for leaks and rectify if necessary.

**Lamp units**

Weekly, check all lamp bulbs for correct operation and replace any faulty bulbs.

**Radiator**

Every 3 months, check the level of coolant in the radiator header tank; if necessary, top-up with the correct anti-freeze/water mixture or inhibited solution.

**Tyres**

Weekly, check the tyre pressures; adjust if necessary. Also check the spare wheel tyre pressure; adjust if necessary. Check the tread depth of all tyres and inspect the tyres for signs of damage.

**Windscreen washer**

Weekly, top-up the reservoir if necessary.

**Carburetters**

Monthly, check the oil level in the reservoirs of the automatic air valve dampers; top-up if necessary.

**Engine**

Weekly or every 800 km. (500 miles), whichever is the earlier, check the oil level by means of the dipstick; top-up if necessary.
ESSENTIAL MAINTENANCE

INITIAL SERVICE
This service will be carried out by the Distributor/Retailer after the first 5,000 km. (3,000 miles) or 3 months whichever is the earlier.
Items marked * will be carried out free of charge.

INITIAL 5 000 KM. (3 000 MILES) OR 3 MONTHS SERVICE WHICHEVER IS THE EARLIER

*Air injection pump
Check belt tension and reset if necessary.

*Automatic choke
Check the flow through the choke stove pipe and check for correct operation, rectify if necessary.

*Carburetters
Check oil level in air valve dampers and if necessary top-up to correct level. Check tightness of float chamber covers. Check float chamber depression, rectify if necessary. Check and if necessary reset the idle speed. Check and if necessary reset the choke ‘fast-idle’ speed.

Engine
Change engine oil.

*Fuel evaporation emission control system
Check the purge rate; this should be between 1.41 cu. m/hr. and 1.98 cu. m/hr. (50 cu. ft/hr. and 70 cu. ft/hr.) at 600 r.p.m. in Neutral. Pressure test the fuel tank and evaporation loss line and if necessary rectify any leaks.

*Ignition system
Check ignition timing using stroboscope and adjust if necessary; the ignition timing should be 15° B.T.D.C. with the engine running at 1,600 r.p.m. with the vacuum capsule disconnected and the feed hose blanked off.

Belt tension
Check the tension of all driving belts.

Engine cooling system
Tighten worm-drive clips of all coolant hoses.

Torque converter transmission
Check fluid level and top-up if necessary.
When checking the fluid level, avoid contact with the exhaust gas recirculation valve, heat shield and associated pipes as these components will be hot.

EVERY 5 000 KM. (3 000 MILES) OR 3 MONTHS WHICHEVER IS THE EARLIER
If the car is used for constant stop/start operation, change the engine oil.

EVERY 10 000 KM. (6 000 MILES) OR 6 MONTHS WHICHEVER IS THE EARLIER

Air conditioning system
Check the refrigeration system for correct operation, rectify as necessary. Any work must be carried out by an experienced engineer.

Engine
Change engine oil and renew oil filter element.

Exhaust system
Check grass-fire heat shields for damage. Rectify or renew shields to ensure that a minimum clearance of 5 mm. (0.20 in.) is maintained between the heat shields and exhaust pipes.

Battery
Check the level of the electrolyte in the battery; if necessary top-up with distilled water.

Belt tension
Check the tension of all driving belts.
Brakes
Inspect footbrake and handbrake/parking brake pad linings. When changing footbrake pads examine condition of dust excluders on calipers. Manually adjust the handbrake/parking brake pads. Inspect pipes and connections, rectify if necessary.

Fluid levels
Check all fluid levels.

Torque converter transmission
Check fluid levels and top-up if necessary.
When checking the fluid level, avoid contact with the exhaust gas recirculation valve, heatshield and associated pipes as these components will be hot.

Every 20 000 km. (12 000 miles) or 12 months service whichever is the earlier

Air conditioning system
Check the refrigeration system for correct operation, rectify as necessary. Any work must be carried out by an experienced engineer.

Air injection pump
Check tension of pump pulley driving belt.

Air silencer
Fit a new paper filter element.

Carburetters
Top-up oil level in air valve dampers. Check tightness of float chamber covers. Check float chamber depression, rectify if necessary. Check and if necessary reset the idle speed. Check and if necessary, reset choke 'fast-idle' speed.

Crankcase emission control system
Remove and clean gauze flame traps in the crankcase breather tube. Clean the adapter in choke butterfly housing.

Engine
Change engine oil and renew oil filter element.

Exhaust system
Check grass-fire heatshields for damage. Rectify or renew shields to ensure that a minimum clearance of 5 mm. (0.20 in.) is maintained between the heatshields and exhaust pipes.

Fuel evaporation emission control system
Check the condition of the pipes and connections.

Ignition system
Fit new sparking plugs ensuring that the gaps are set to 0.9 mm. (0.035 in.).
Lubricate distributor spindle (shaft bearings) and automatic advance mechanism with engine oil.
Check the ignition timing using a stroboscope and adjust if necessary; the ignition timing should be 15° B.T.D.C. with the engine running at 1 600 r.p.m.
the vacuum capsule disconnected and the feed hose blanked off.

Battery
Check the level of the electrolyte in the battery; if necessary top-up with distilled water.

Belt tension
Check the tension of all driving belts.

Brakes
Inspect footbrake and handbrake/parking brake pad linings. When changing footbrake pads examine condition of dust excluders on calipers. Manually adjust handbrake/parking brake pads. Inspect pipes and connections, rectify if necessary.

Final drive unit
Check oil level and top-up if necessary.

Fluid levels
Check all fluid levels.

Front suspension
The front suspension ball joints are sealed for life and no maintenance is required until renewal is necessary or the ball joint rubber covers are damaged. Inspect the rubber covers on the front suspension ball joints; if the covers are found to be damaged new joints and covers should be fitted.
Steering ball joints
Lubricate the six grease nipples. Inspect the rubber covers on the ball joints; if the covers are found to be damaged the joints should be dismantled and new parts fitted as necessary.

Torque converter transmission
Renew transmission fluid.
When checking the fluid level, avoid contact with the exhaust gas recirculation valve, heatshield and associated pipes as these components will be hot.

Fluid levels
Check all fluid levels.

Torque converter transmission
Check fluid level and top-up if necessary.
When checking the fluid level, avoid contact with the exhaust gas recirculation valve, heatshield and associated pipes as these components will be hot.

EVERY 30 000 KM. (18 000 MILES) OR 18 MONTHS SERVICE WHICHEVER IS THE EARLIER

Air conditioning system
Check the refrigeration system for correct operation, rectify as necessary. Any work must be carried out by an experienced engineer.

Engine
Change engine oil and renew oil filter element.

Exhaust system
Check grass-fire heatshields for damage. Rectify or renew shields to ensure that a minimum clearance of 5 mm. (0.20 in.) is maintained between the heatshields and exhaust pipes.

Battery
Check the level of electrolyte in the battery; if necessary top-up with distilled water.

Belt tension
Check the tension of all driving belts.

Brakes
Inspect footbrake and handbrake/parking brake pad linings. When changing footbrake pads examine condition of dust excluders on calipers. Manually adjust the handbrake/parking brake pads. Inspect pipes and connections, rectify if necessary.

EVERY 40 000 KM. (24 000 MILES) OR 2 YEARS SERVICE WHICHEVER IS THE EARLIER

Air conditioning system
Check the refrigeration system for correct operation, rectify as necessary. Any work must be carried out by an experienced engineer.

Air injection pump
Check tension of pump pulley driving belt.

Air injection system
Check air injection system for leaks and correct functioning. Renew any defective items.

Air silencer
Fit a new paper filter element.

Automatic choke
Check the flow through the choke stove pipe and check the system for correct functioning.

Carburetters
Clean air valves. Remove inlet unions from the float chamber covers and fit new paper filter elements. Top-up oil level in air valve dampers. Check tightness of float chamber covers. Check float chamber depression. Check and if necessary, reset the idle speed. Check and if necessary, reset choke 'fast-idle' speed.

Carburettter mixture weakening device
Renew air filter element for the carburettter mixture weakening device.
Chapter U

Crankcase emission control system
Remove and clean gauze flame traps in crankcase breather tube. Clean the adapter in choke butterfly housing.

Engine
Change engine oil and renew oil filter element.

Engine cooling system
Fit a new engine coolant thermostat and heater tap feed hose. Check the condition of all coolant hoses. Fit new hoses as necessary.

Exhaust system
Check grass-fire heatshields for damage. Rectify or renew shields to ensure that a minimum clearance of 5 mm. (0.20 in.) is maintained between the heatshields and exhaust pipes.

Fuel evaporation emission control system
Renew the foam filter element in the evaporation loss control canister. Check the purge rate; this should be between 1.41 cu. m/hr. and 1.98 cu. m/hr. (50 cu.ft/hr. and 70 cu. ft/hr.) at 600 r.p.m. in Neutral. Renew the purge line filter if necessary.

Ignition system
Fit new sparking plugs ensuring that the gaps are set to 0.9 mm. (0.035 in.).
Lubricate distributor spindle (shaft bearings) and automatic advance mechanism with engine oil.
Check the ignition timing using a stroboscope and adjust if necessary; the ignition timing should be 15° B.T.D.C. with the engine running at 1 600 r.p.m. the vacuum capsule disconnected and the feed hose blanked off. Check the vacuum advance mechanism.

Battery
Check the level of the electrolyte in the battery; if necessary top-up with distilled water.

Belt tension
Check the tension of all driving belts.

Brakes
Inspect footbrake and handbrake/parking brake pad linings. When changing footbrake pads examine condition of dust excluders on calipers. Manually adjust handbrake/parking brake pads. Inspect pipes and connections; rectify if necessary.

Final drive unit
Change oil.

Fluid levels
Check all fluid levels.

Front suspension
The front suspension ball joints are sealed for life and no maintenance is required until renewal is necessary or the ball joint rubber covers are damaged. Inspect the rubber covers on the front suspension ball joints; if the covers are found to be damaged new joints and covers should be fitted.

Fuel pumps
Remove the fuel pumps and check for pumping efficiency, fit new pumps if necessary.

Hydraulic systems
Completely drain the fluid from the hydraulic circuits. Thoroughly clean the brake fluid reservoirs and sight glasses, ensure that no foreign matter enters the systems. Fill the hydraulic systems with new approved fluid. Bleed the brakes and height control systems.

Rear wheel drive-shafts
Lubricate the rear wheel drive-shaft outer universal couplings with approved grease.

Steering ball joints
Lubricate the six grease nipples. Inspect the rubber covers on the ball joints; if the covers are found to be damaged the joints should be dismantled and new parts fitted as necessary.

Torque converter transmission
Change transmission fluid.
Fit a new intake strainer.
When checking the fluid level, avoid contact with the exhaust gas recirculation valve, heatshield and associated pipes as these components will be hot.
ROLLS-ROYCE SILVER SHADOW & BENTLEY T SERIES WORKSHOP MANUAL

CHAPTER U

SERVICING AFTER 40 000 KM. (24 000 MILES) OR 2 YEARS WHICHEVER IS THE EARLIER

After 40 000 km. (24 000 miles) or 2 years, servicing is still due at the following intervals.

50 000 KM. (30 000 MILES) OR 2 1/2 YEARS WHICHEVER IS THE EARLIER

Carry out the 10 000 km. (6 000 miles) service.

60 000 KM. (36 000 MILES) OR 3 YEARS WHICHEVER IS THE EARLIER

Carry out the 20 000 km. (12 000 miles) service.

70 000 KM. (42 000 MILES) OR 3 1/2 YEARS WHICHEVER IS THE EARLIER

Carry out the 10 000 km. (6 000 miles) service.

80 000 KM. (48 000 MILES) OR 4 YEARS WHICHEVER IS THE EARLIER

Carry out the 40 000 km. (24 000 miles) service and in addition the following operations.

Exhaust gas recirculation system
Remove and clean the exhaust gas recirculation valve and feed pipes. Clean the orifices in the carburettor ‘Tee’ piece. Check the exhaust gas recirculation valve for correct operation.

Exhaust system
Fit a new catalytic converter assembly. Inspect the condition of the catalytic converter thermocouple and wiring, renew if there is visual evidence of damage.

PREVENTIVE MAINTENANCE

INITIAL SERVICE
This service should be carried out by the Distributor/Retailer after the first 5 000 km. (3 000 miles) or 3 months which ever is earlier.

Steering pump
Check the oil level in the reservoir; top-up if necessary.

Test
Road test the car for satisfactory performance.

EVERY 10 000 KM. (6 000 MILES) OR 6 MONTHS WHICHEVER IS THE EARLIER

Carburetters
Check the oil level in the air valve dampers and top-up if necessary.

Control linkages
Apply a few drops of engine oil to the accelerator linkage and to the gear range selector controls adjacent to the transmission casing.

Electrical system
Check all interior lamps, exterior lamps, instruments, warning lamps and devices for correct operation, rectify as necessary.

Handbrake/Parking brake
Lubricate the pivot pins and pulleys in the handbrake/parking brake system with approved grease.

Tyres
Check the tread depth of all tyres, inspect all tyres for signs of damage. Check all tyre pressures when cold, adjust if necessary.

Note Include the spare tyre.

Test
Road test the car for satisfactory performance.
EVERY 20 000 KM. (12 000 MILES) OR 12 MONTHS WHICHEVER IS THE EARLIER

Control linkage
Apply a few drops of engine oil to the accelerator linkage and to the gear range selector controls adjacent to the transmission casing.

Handbrake/Parking brake
Lubricate the pivot pins and pulleys in the handbrake/parking brake system with approved grease.

Spare wheel
Lubricate the spare wheel lowering bolt and mechanism.

Electrical system
Check all interior lamps, exterior lamps, instruments, warning lamps and devices for correct operation, rectify as necessary.

Tyres
Check the tread depth of all tyres, inspect all tyres for signs of damage. Check all tyre pressures when cold, adjust if necessary.
   Note  Include the spare tyre.

Test
Road test the car for satisfactory performance.

EVERY 40 000 KM. (24 000 MILES) OR 2 YEARS WHICHEVER IS THE EARLIER

Control linkage
Apply a few drops of engine oil to the accelerator linkage and to the gear range selector controls adjacent to the transmission casing.

Electrical system
Check all interior lamps, exterior lamps, instruments, warning lamps and devices for correct operation, rectify as necessary.

Fuel filter
Renew the main line filter element and clean the filter bowl.

Fuel tank
Slacken the drain plug one or two turns and allow any accumulated water to drain away. Tighten the drain plug.

Height control mechanism
Disconnect the control valve linkage ball joints. Clean, grease and refit the ball joints.
Handbrake/Parking brake
Lubricate the pivot pins and pulleys in the handbrake/parking brake system with approved grease.

Spare wheel
Lubricate the spare wheel lowering bolt and mechanism.

Tyres
Check the tread depth of all tyres, inspect all tyres for signs of damage. Check all tyre pressures when cold, adjust if necessary.
  Note  Include the spare tyre.

Test
Road test the car for satisfactory performance.

SEASONAL SCHEDULES

EVERY 12 MONTHS

Air conditioning system
Ensure that the foam filter element fitted to the scuttle intake grille is free from obstruction. On Long Wheelbase cars fitted with a centre division, check that the foam filter element fitted to the intake grille in the rear deck panel is free from obstruction.

Body
Check that the body drain holes are free from foreign matter.

Engine cooling system
Drain the coolant from the radiator and the engine crankcase. Clean any debris from the surfaces of the refrigeration condenser and radiator matrices by reverse flushing with a hose. This should be carried out just prior to the Autumn. Fill the system with the correct anti-freeze mixture (refer to Chapter L—Engine Cooling System of this Workshop Manual T.S.D. 2476 and the latest Service Bulletin).

EVERY 2 YEARS

In addition to the 12 monthly schedule, carry out the following.

Engine cooling system
Drain the coolant from the radiator and engine crankcase. Thoroughly reverse flush the coolant passages with a continuous flow of water. Change the coolant hoses where necessary. Fill the system with the correct anti-freeze mixture.

SERVICE RECOMMENDATIONS

80 000 KM. (48 000 MILES)
At this mileage and under normal motoring conditions it is recommended that the following servicing is carried out.
Hydraulic systems
Renew the front and rear accumulator to frame connector block hoses.
Examine the sub-frame to brake caliper hoses for chafing or surface cracking; renew if necessary.

160 000 KM. (96 000 MILES)
At this mileage and under normal motoring conditions it is recommended that the following servicing is carried out.

Hydraulic systems
Renew all the flexible hoses to the braking systems and the automatic height control system. Fit new seals to the disc brake calipers and the deceleration conscious pressure limiting valve.

Fuel system
Fit a new convoluted rubber hose between the fuel filler head and fuel tank assembly. Examine all flexible fuel pipes and renew any which show signs of deterioration.

SPECIAL PRECAUTIONS
Should the car be used in very cold temperatures, drain the engine sump when thoroughly warm and also drain the carburettor air valve dampers. The engine sump and carburettor air valve dampers should then be filled with oil having the following viscosity.
For constant temperatures of between 0°C. and −23°C. (32°F. and −10°F.), use a 10W/30 grade oil.
For constant temperatures of −23°C. (−10°F.) and below, use a 5W/20 grade oil.
## FAULT DIAGNOSIS

<table>
<thead>
<tr>
<th>SYMPTOMS</th>
<th>POSSIBLE CAUSE</th>
</tr>
</thead>
</table>
| 1. Engine will not start. (Starter motor operating). | 1. (a) Ignition circuit broken.  
(b) Failed anti 'run-on' solenoid or failure of electrical supply circuit.  
(c) Ignition system faulty.  
(d) Damaged or contaminated ignition high-tension circuit.  
(e) Fault in fuel feed line or fouled float chamber filters.  
(f) Faulty choke bi-metal coil.  
(g) Choke solenoid inoperative.  
(h) Faulty choke 'fast-idle' mechanism.  
(i) Air leak into induction system.  
(j) Faulty hot idle mixture compensator.  
(k) Weakening device filter blocked or blockage in rubber connecting hoses.  
(l) Faulty weakener cut-off solenoid or failure of electrical supply circuit.  
(m) Faulty weakening device control switch or failure of electrical supply circuit.  
(n) Dislodged venturi in weakener device.  
(o) Flooding of carburettor float chamber or jet.  
(p) Fouled carburettor float chamber or jet.  
(q) Exhaust gas recirculation valve failed. |
| 2. Engine idles very roughly. | 2. (a) Ignition system faulty.  
(b) Fouled sparking plugs.  
(c) Damaged or contaminated ignition high-tension circuit.  
(d) Air leak into induction system.  
(e) Faulty hot idle compensator.  
(f) Weakening device filter blocked or blockage in rubber connecting hoses.  
(g) Dislodged venturi in weakener device.  
(h) Badly worn or damaged carburettor control linkage.  
(i) Flooding of carburettor float chamber or jet.  
(j) Sticking carburettor piston.  
(k) Fouled carburettor float chamber or jet.  
(l) Air leak into exhaust gas recirculation vacuum control circuit.  
(m) Exhaust gas recirculation valve failed.  
(n) Faulty air diverter valve.  
(o) Incorrect operation of temperature controlled air intake system. |
| 3. Engine stalls. | 3. (a) Ignition circuit broken.  
(b) Failed anti 'run-on' solenoid or failure of electrical supply circuit.  
(c) Ignition system faulty.  
(d) Damaged or contaminated ignition high-tension circuit.  
(e) Fault in fuel feed line or fouled float chamber filters.  
(f) Air leak into induction system.  
(g) Faulty hot idle mixture compensator.  
(h) Weakening device filter blocked or blockage in rubber connecting hoses.  
(i) Dislodged venturi in weakening device.  
(j) Badly worn or damaged carburettor control linkage.  
(k) Flooding of carburettor float chamber or jet.  
(l) Sticking carburettor piston.  
(m) Fouled carburettor float chamber or jet.  
(n) Air leak into exhaust gas recirculation vacuum control circuit.  
(o) Exhaust gas recirculation valve failed.  
(p) Faulty air diverter valve. |
<table>
<thead>
<tr>
<th>SYMPTOMS</th>
<th>POSSIBLE CAUSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. (i) Engine shows signs of power loss, evident at high speeds and loading. (ii) Engine misfires particularly on hard acceleration from low speed.</td>
<td>4. (a) Ignition system faulty. (b) Fouled sparking plugs. (c) Damaged or contaminated ignition high-tension circuit. (d) Fault in fuel feed line or fouled float chamber filters. (e) Choke system operation incorrect. (f) Sticking carburettor piston. (g) Fouled carburettor float chamber or jet. (h) Exhaust gas recirculation valve failed. (i) Failed exhaust gas recirculation valve cut-out solenoid or electrical supply circuit.</td>
</tr>
<tr>
<td>5. Engine hesitates or misfires under light load.</td>
<td>5. (a) Failed anti ‘run-on’ solenoid or failure of electrical supply circuit. (b) Ignition system faulty. (c) Fouled sparking plugs. (d) Damaged or contaminated ignition high-tension circuit. (e) Fault in fuel feed line or fouled float chamber filters. (f) Air leak into induction system. (g) Faulty hot idle mixture compensator. (h) Weakening device filter blocked or blockage in rubber connecting hoses. (i) Dislodged venturi in weakening device. (j) Flooding of carburettor float chamber or jet. (k) Sticking carburettor piston. (l) Fouled carburettor float chamber or jet. (m) Incorrect purge flow rate. (n) Exhaust gas recirculation valve failed. (o) Faulty air diverter valve. (p) Incorrect operation of temperature controlled air intake system.</td>
</tr>
<tr>
<td>6. Increase in fuel consumption.</td>
<td>6. (a) Ignition system faulty. (b) Faulty choke bi-metal coil. (c) Choke system operation incorrect. (d) Air leak into induction system. (e) Faulty hot idle mixture compensator. (f) Weakening device filter blocked or blockage in rubber connecting hoses. (g) Faulty weaker cut-off solenoid or failure of electrical supply circuit. (h) Faulty weakening device control switch or failure of electrical supply circuit. (i) Air leaks in mixture weakening system. (j) Flooding of carburettor float chamber or jet. (k) Sticking carburettor piston. (l) Incorrect purge flow rate. (m) Exhaust gas recirculation valve failed. (n) Faulty air diverter valve.</td>
</tr>
<tr>
<td>7. Decrease in fuel consumption.</td>
<td>7. (a) Air leaks in mixture weakening system. (b) Incorrect purge flow rate. (c) Faulty exhaust gas recirculation temperature control switch or failure of electrical supply circuit. (d) Air leak into exhaust gas recirculation vacuum control circuit. (e) Exhaust gas recirculation valve failed.</td>
</tr>
<tr>
<td>8. Engine ‘backfires’ on overrun.</td>
<td>8. (a) Ignition system faulty. (b) Air leak into induction system. (c) Exhaust gas recirculation valve failed.</td>
</tr>
<tr>
<td>9. Sudden increase in engine idle speed.</td>
<td>9. (a) Faulty choke ‘fast-idle’ mechanism. (b) Failed carburettor overrun valve.</td>
</tr>
<tr>
<td>10. Excessive noise from air injection pump or system.</td>
<td>10. (a) Faulty air diverter valve. (b) Faulty or damaged air injection pump.</td>
</tr>
</tbody>
</table>
## WORKSHOP TOOLS

<table>
<thead>
<tr>
<th>Tool Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RH 8050</td>
<td>Spanner—Carburetter Jet Screw</td>
</tr>
<tr>
<td>RH 8087</td>
<td>Spanner—Weakener Cut-off Valve</td>
</tr>
<tr>
<td>RH 8089</td>
<td>Jet Centring Tool</td>
</tr>
<tr>
<td>RH 8090</td>
<td>Pliers—Wire Hose Clips</td>
</tr>
<tr>
<td>RH 8383</td>
<td>Positioning Tool—Throttle Spindle Seal</td>
</tr>
<tr>
<td>RH 8621</td>
<td>Adapter—Air Manifold to CO Meter</td>
</tr>
<tr>
<td>RH 8841</td>
<td>Dial Gauge—Carburetter Piston Lift</td>
</tr>
<tr>
<td>RH 8880</td>
<td>Setting Jig—Throttle Levers</td>
</tr>
<tr>
<td>RH 8945</td>
<td>Connector—Choke Stove Pipe</td>
</tr>
</tbody>
</table>
For general details of the emission control systems Workshop Personnel should refer to Chapter U (Part 2). However, changes from Chapter U (Part 2) applicable to cars destined for Australia and built to the 1976 Specification are contained within this Supplement.

Information contained within this Supplement includes the following:
3. Crankcase Emission Control System.
5. Carburetters and Automatic Choke System.
6. Ignition System, Distributor, Ignition Coil and Sparking Plugs.
7. Lubrication and Maintenance.

It should also be noted that the engine compression ratio has been reduced to 8:0:1 on cars produced to this specification.

Vehicle identification
Rolls-Royce motor cars conforming to the appropriate emission control regulations and produced to the 1976 specification can be readily identified as follows.

A 1976 Emission Control Certification Label (illustrated) fitted to the wing valance to the rear of the right-hand front suspension spring cover.
FIG. 1 VIEW INSIDE ENGINE COMPARTMENT (From Left-hand side of Car)

1 Weakener filter
2 Anti 'run-on' solenoid
3 Exhaust gas recirculation solenoid
4 Choke thermo-coil housing
5 'A' bank carburettor
6 Exhaust gas recirculation cooler
7 Choke solenoid
8 Ignition distributor

FIG. 2 VIEW INSIDE ENGINE COMPARTMENT (From Right-hand side of Car)

1 Fuel receiver and float chamber vent valve
2 Weakener system cut-off switch
3 Exhaust gas recirculation valve
4 Exhaust gas recirculation distribution pipes
5 'B' bank carburettor
6 Check valve
7 Air diverter valve
8 Check valve
EXHAUST EMISSION CONTROL SYSTEM

AIR INJECTION SYSTEM

Air injection system relief valve

The relief valve located in the discharge cavity of the air pump is changed from Chapter U (Part 2) and is as follows.

Air pump relief valve

A spring loaded relief valve is located within the diverter valve housing and permits excess air to bypass the air injection system when the check valves are closed. The by-pass system prevents damage to the pump vanes and excessive exhaust temperatures under extreme operating conditions.

Air diverter valve

The air diverter valve is located at the front of the engine above the air pump (see Fig. 2) and performs the following important function in addition to housing the pressure relief valve for the air pump.

(i) Backfire protection (see Fig. 3)

Following rapid throttle closure, the inlet manifold pressure drops suddenly, causing fuel to be vapourised from the manifold walls which results in a mixture too rich to burn in the cylinders. This mixture combined with the air injected into the exhaust ports could cause backfiring.

To prevent backfiring, the diverter valve, triggered by manifold depression diverts the injected air from the exhaust ports for a short period of time.

Air diverter valve—To check

The air diverter valve is a non-serviceable component. If the operation of the component is suspect, the following checks should be carried out before it is replaced.

1. Ensure that the parking brake is firmly applied and the vehicle is in ‘Park’.
2. Start and run the engine at 2,000 r.p.m.
3. Ensure that air does not escape from the air diverter valve exhaust ports situated around the body of the air diverter valve (see Fig. 3).

If air still escapes from the exhaust ports the air diverter valve assembly is faulty due to either a failed relief valve or a seized shuttle and must be replaced.

After fitting a new air diverter valve, ensure that the component operates satisfactorily.

4. Release the throttle linkage sharply so that the engine speed rapidly falls from 2,000 r.p.m., ensure that air escapes from the air diverter valve exhaust ports for a short period of time.

If air does not escape from the exhaust ports of the air diverter valve during Operation 4 check the following.

(a) The condition of the hose from the air diverter valve to the vacuum manifold (see Fig. 5).
(b) The condition of any hose connected to the vacuum manifold (see Fig. 5).
(c) Repeat Operation 4.

If air still does not escape during Operation 4 the air diverter valve assembly is faulty due to either a diaphragm or timing valve failure and must be replaced.

After fitting a new air diverter valve, ensure that the component operates satisfactorily.
FIG. 3 AIR DIVERTER VALVE

A Normal operation
B Backfire protection
C Relief valve operation

1 Exhaust to atmosphere
2 Exhaust to internal silencer
3 Timing valve
4 Lower diaphragm

5 Internal silencer
6 Manifold vacuum signal
7 Excess air
8 Relief valve
9 Valve outlets restricted
10 Valve inlet
11 Valve outlets to air manifolds
12 Metering valve

AIR PUMP PRESSURE
HIGH MANIFOLD VACUUM (Overrun)
5. Allow the engine to idle at 600 r.p.m. Ensure that air does not escape from the air diverter valve exhaust ports.

**Air diverter valve—To remove**

Before commencing to remove the air diverter valve observe the following points.

1. When disconnecting the various hoses ensure that each is suitably labelled to assist identification when assembling.
2. Ensure that all open ends of pipes and hoses are suitably blanked off to prevent the ingress of dirt, etc.

**To remove the air diverter valve proceed as follows**

1. Unscrew the three worm drive clips which secure the three larger diameter rubber hoses to the air diverter valve and withdraw the hoses. Two of the hoses connect to their respective air manifold check valves and the third hose to the air pump.
2. Withdraw the small diameter rubber hose from the air diverter valve.
3. Using a \(\frac{3}{16}\) in. A/F spanner unscrew and remove the two nuts which secure the air diverter valve to the mounting plate. Collect the two washers.
4. Hold the air diverter valve and withdraw the two bolts from the mounting plate, taking care not to lose the washer situated under the head of each bolt.
5. Remove the air diverter valve together with the spacer plate and gasket.

**Air diverter valve—To fit**

Fit the air diverter valve by reversing the procedure given for removal, noting the following points.

---

**FIG. 4 AIR INJECTION SYSTEM**

1. Air diverter valve
2. Check valve
3. ‘A’ bank air manifold
4. Anti 'run-on' solenoid
5. Ignition distributor
6. Exhaust gas recirculation solenoid
7. ‘B’ bank air manifold
8. Check valve
9. Vacuum manifold
10. Air pump
11. Air pump intake
FIG. 5 HOSE ROUTING DIAGRAM—1976 MODELS
1. Ensure that all joint faces are clean.
2. Ensure that the gasket is in a good condition.
3. Always ensure that the spacer plate is fitted with the spigot projecting through the mounting plate into the hose which connects to the air pump and that the gasket is fitted to the opposite side of the mounting plate from the spigot.

For details of the remainder of the Air Injection System see Workshop Manual T.S.D. 2476—Chapter U (Part 2).

EXHAUST GAS RECIRCULATION SYSTEM

This system is similar to the system detailed in Chapter U except that the 'A' bank exhaust manifold has the exhaust gas recirculation system take-off flange above the manifold as shown in Figure 6.

The exhaust gas recirculation system cooler is situated above the engine on the 'A' bank side and a large heat shield is fitted around the cooler as shown in Figure 2.

As a result of these changes the pipe run between the exhaust manifold and cooler has changed.

CAUTION
When carrying out any work in or around the area of the exhaust gas recirculation system cooler (e.g. when checking the torque converter transmission fluid level), avoid contact with the various components and pipes of the system as they contain hot exhaust gases when the engine is running.

A second change from Chapter U (Part 2) is the E.G.R. Full Throttle Cut-off Micro-switch, details of which are as follows.

A micro-switch operated by the throttle lever (see Fig. 7) controls the cut-off solenoid to provide exhaust gas recirculation cut-off at full throttle. This feature of the system prevents the E.G.R. valve remaining open under full throttle high speed operation, as this would be detrimental to performance and fuel consumption.

For details of the remainder of the Exhaust Gas Recirculation System see Workshop Manual T.S.D. 2476—Chapter U (Part 2).
FUEL EVAPORATION EMISSION CONTROL SYSTEM

FIG. 8 FUEL EVAPORATION EMISSION CONTROL SYSTEM—GENERAL VIEW

1 Vacuum manifold
2 Anti 'run-on' solenoid
3 Float chamber vent valve
4 Weaken cut-off solenoid
5 Fuel trap assembly
6 Fuel tank assembly
7 Weaken filter
8 Evaporative loss control canister
9 Purge line filter
10 Float chamber drain valve
**Fuel tank assembly**

The fuel tank assembly consists of the fuel tank, expansion tank and fuel trap assembly (see Fig. 9).

The fuel tank is vented from three positions to a fuel trap assembly which is mounted above the fuel filler. One vent is from the fuel filler neck and the other two vents from the fuel tank.

The three vent lines join at a common junction block situated adjacent to the fuel filler neck, the main vent line then encircles the fuel tank before passing to the fuel trap assembly.

From the fuel trap, a vent line passes under the floor of the car to the evaporation loss control canister.

---

**FIG. 9 FUEL EVAPORATION EMISSION CONTROL SYSTEM—FUEL TANK**

1. Connection to evaporation loss control canister
2. Fuel filler box
3. Fuel trap
4. Combined relief and vacuum valve
5. Valve vent
6. Vent pipe
7. Expansion tank
8. Vent pipe
Chapter U

Purge line

The purge line consists of a rubber hose, passing from the lowest connection on the canister through the valance junction piece to the vacuum manifold. Incorporated into this hose is the purge line filter and restrictor.

When the engine is running, air drawn through the canister filter and carbon picks up the stored fuel vapours and passes them via the hose, to the induction manifold. The restrictor in the line controls the flow rate at between 1,41 cu. m. per/hr. and 1,98 cu. m. per/hr. (50 cu. ft. per/hr. and 70 cu. ft. per/hr.) to maintain carburettor metering accuracy and the paper element line filter is fitted to prevent blockage of the restrictor.

Purge line filter—To fit

Fit the purge line filter by reversing the procedure given for removal noting the following points.

1. Ensure that the rubber hoses are in a good condition and new hose retaining clips are used.

Purge line filter—To remove

1. Using special pliers (RH 8090) remove the two steel retaining clips situated on either side of the unit.

2. Slacken the setscrew which secures the nylon retaining clip.

3. Withdraw the component from the clip.

Purge flow rate—To check

Check the purge flow rate as follows.

1. Disconnect the hose from the engine side of the purge line filter and insert a flowmeter and stand assembly (RH 8725) into the line. The flowmeter is a rotameter type capable of measuring between 1,41 cu. m/hr. and 1,98 cu. m/hr. (50 cu. ft/hr. and 70 cu. ft/hr.). The pressure drop across the meter is not to exceed 5,08 cm. Hg. (2 in. Hg.).

2. Start and run the engine at idle speed, the flowmeter reading should be between 1,41 cu. m/hr. and 1,98 cu. m/hr. (50 cu. ft/hr. and 70 cu. ft/hr.).

3. If the flow is less than 1,41 cu. m/hr. (50 cu. ft/hr.) stop the engine and remove the purge line restrictor (see Fig. 5). Fit a piece of straight metal pipe with an internal bore larger than 4,76 mm. (0-187 in.), in the place of the restrictor.

4. Start and run the engine at idle speed, ensure that the flow is now in excess of 1,98 cu. m/hr. (70 cu. ft/hr.).

5. If the flow is less than 1,98 cu. m/hr. (70 cu. ft/hr.) check the following.

(i) an air leak in any of the vacuum hoses connected to the vacuum manifold (see Fig. 5).

(ii) a blockage in the vacuum manifold or any of the connecting hoses (see Fig. 5).

6. Rectify any air leaks or blockages found in the system. Repeat Operation 4.

7. Stop the engine and fit the purge line restrictor.

8. Start the engine and check the flow rate as detailed in Operation 2.

9. If the flow is still incorrect fit a new restrictor and again repeat Operation 2.

10. Stop the engine, remove the flowmeter assembly and connect the hoses.

FIG. 10 POSITION OF MIXTURE WEAKENING DEVICE FILTER AND PURGE LINE FILTER

1 Alternator
2 Weakener filter
3 Purge line filter
4 Hydraulic fluid accumulator pressure switches
CRANKCASE EMISSION CONTROL SYSTEM

Crankcase emissions are controlled by a recirculatory closed breather system (see Fig. 11).

An insulated draught tube connects the crankcase via the oil filler which is fitted with a sealed cap, to the choke housing upstream of both the choke butterfly and the carburetters. A flame trap capsule containing three wire mesh discs is fitted in a housing at the crankcase end of the draught tube. Engine emission (blow-by) is drawn into the induction system via the draught tube, due to the depression in the choke housing.

Maintenance

1. The flame trap fitted to the breather pipe should be cleaned in the following manner, at the specified mileage.

2. Unscrew the setscrew securing the breather pipe connection to the oil filler pedestal; withdraw the connection from the pedestal (slight resistance may be felt due to the rubber ‘O’ ring connections).

3. Withdraw the connection from the pipe flange and collect the restrictor.

4. Wash the flame trap assembly in clean petrol, then dry with a high pressure air line. The flame trap assembly consists of 3 gauzes crimped together as shown in Figure 11.

5. To clean the adapter fitted to the choke housing, remove the single setscrew from the breather pipe end connection and detach the pipe.

6. Clean the adapter fitted to the choke housing and ensure that the holes in the adapter are clear.

7. Assembly of the flame trap and breather pipe is in the reverse order, ensuring that the ‘O’ rings are in good condition.

**Fig. 11 Exploded View of Crankcase Emission Control Pipe**

<table>
<thead>
<tr>
<th>Diagram A</th>
<th>4 Washer</th>
<th>Diagram B</th>
<th>4 Restrictor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Pipe</td>
<td></td>
<td>1 Pipe</td>
<td>5 Flame trap</td>
</tr>
<tr>
<td>2 ‘O’ ring</td>
<td></td>
<td>2 Setscrew</td>
<td>6 Connection</td>
</tr>
<tr>
<td>3 Connection</td>
<td></td>
<td>3 ‘O’ ring</td>
<td>7 ‘O’ ring</td>
</tr>
</tbody>
</table>
Chapter U

EMISSION CONTROL SYSTEMS
(ELECTRICAL COMPONENTS)

The electrical components covered by this section would normally appear in Chapter M — Electrical System, however, as they are only used in connection with the emission control systems it is thought more practical to include the information in this Chapter.

The components concerned are as follows.
(i) The exhaust gas recirculation valve cut-in switch.
(ii) The exhaust gas recirculation valve cut-off solenoid.

(iii) The anti ‘run-on’ solenoid.
(iv) The weaker cut-off solenoid valve.
(v) The weaker cut-off solenoid switch.

For details of the remainder of the Emission Control Systems (Electrical Components) see Workshop Manual T.S.D. 2476 — Chapter U (Part 2).

THE CARBURETTERS AND AUTOMATIC CHOKE SYSTEM

CARBURETTER

Data

Carburetters Two S.U. HD8 diaphragm type.
Choke size 5.08 cm. (2-00 in.).
Jet size—
spring loaded needle type 2.44 mm. (0-100 in.).
Jet needle—
spring loaded type BDD
Carburetter—
air valve piston spring Red/Blue.

CARBURETTER MIXTURE WEAKENING DEVICE

Description

In addition to the description given on pages U24 and U25, the following information is applicable.

Anti-diesel device (anti ‘run-on’ solenoid)

The use of low octane fuel causes the engine to ‘diesel’ (i.e. continue to run-on after the ignition has been switched off) when it is hot. To prevent this from happening an anti ‘run-on’ solenoid valve is fitted into the weaker cut-off solenoid valve. When the ignition is switched off this valve opens and connects the weakening system to the induction manifold thus creating a high float chamber depression which cuts off the fuel supply.

Carburetter overrun valves

During overrun (i.e. when decelerating with the throttles closed), insufficient mixture is supplied to the engine to maintain satisfactory combustion. The overrun valves alleviate this condition by allowing some mixture to pass through the throttle plates (butterflies) at high inlet manifold depressions.

An overrun valve consists of a small disc retained in each throttle plate by a spring loaded plunger. Under normal conditions the disc is seated against the throttle plate. When the throttle is suddenly closed, the increased inlet manifold depression lifts the disc from its seating and allows a metered quantity of air/fuel mixture to pass through the throttle plate.
The action of the overrun valves maintains satisfactory combustion on overrun, thus reducing hydrocarbon emissions.

After the sudden closure of the throttles and as soon as the manifold depression falls, the overrun valve disc returns to its seat on the throttle plate.

**Throttle damper**
The throttle damper prevents rapid throttle closure which would suddenly drop the inlet manifold pressure causing vapourisation of fuel from the manifold walls and a sudden increase in mixture strength.

**Temperature controlled air intake**
To ensure rapid warm-up and improve control of the air/fuel ratio a temperature controlled air intake is fitted.

A vacuum operated blending valve attached to the air cleaner assembly is controlled by a thermal sensor in the air intake elbow. This valve blends hot air from a pick-up point (scoop) adjacent to the exhaust manifold with cold air from under the front wing; thus maintaining a constant temperature of the intake air as it enters the carburetters.

**Throttle stop vacuum actuator assembly**
The throttle stop vacuum actuator assembly is not fitted to cars produced to the 1976 specification.

**Contra-rotating throttles—To fit and set (see Fig. 12)**

1. Assemble 'A' bank and 'B' bank throttle levers (items 7 and 13) onto the carburettor spindles.
2. Fit the setting jig (RH 8880) into position on the throttle levers.
3. Fully close 'B' bank carburettor butterfly (item 8).
4. Tighten the pinch bolt securing 'B' bank throttle lever.
5. Fully close 'A' bank carburettor butterfly (item 3).
6. Tighten the pinch bolt securing 'A' bank throttle lever.
7. Fit the throttle spring (item 4) to the throttle levers.
8. Remove the setting jig from the throttle levers.

---

**FIG. 12 CONTRA-ROTATING THROTTLE CONTROLS**

A = Reference angle 22°
B = Reference angle 90°
1 Throttle damper
2 'A' bank carburettor volume screw
3 'A' bank carburettor throttle plate
4 Throttle spring
5 Eccentric throttle adjuster
6 Throttle guard
7 'B' bank carburettor throttle lever
8 'B' bank carburettor throttle plate
9 'B' bank carburettor volume screw
10 Idle stop screw
11 Closed throttle bracket
12 Cross link
13 'A' bank carburettor throttle lever
14 Drive link
15 Front manifold shaft lever
16 Rear manifold shaft lever
FIG. 13 TEMPERATURE CONTROLLED AIR INTAKE

1 Hot air scoop
2 Temperature sensor
3 Vacuum manifold
4 Air cleaner/silencer
5 Air blending valve
6 Cold air intake
9. Fit the cross link (item 12) and the eccentric throttle adjuster (item 5) onto the throttle levers, ensuring that both throttle butterflies are closed when adjusting and tightening the eccentric adjuster.

**Note**  The eccentric pin should be set in the lowest position possible.

10. Ensure that the tang of the throttle guard (item 6) has a clearance of between 1.27 mm. (0.050 in.) and 1.78 mm. (0.070 in.) with the cross link and also that the tang does not foul the throttle spring. If necessary bend the tang to give these clearances.

11. Check that the throttle linkage moves freely.

12. Fit the idle stop screw (item 10) and adjust until it just contacts the stop bracket (item 11) with the throttle butterflies remaining in the closed throttle position.

13. Screw down the idle stop screw 1⁄4 turn and tighten the lock-nut.

14. Screw both of the carburettor volume screws (items 2 and 9) fully in.

15. Fit the throttle damper (item 1) with the damper spindle compressed 4.75 mm. (0.187 in.) when throttle lever (item 13) is in the closed position. Ensure that the damper rod contacts the throttle lever centrally 3.1 mm. (0.20 in.) from the outer edge.

16. Connect the drive link (item 14) to the manifold shaft lever (item 15).

17. Operate the linkage to ensure free movement.

18. With the throttles in the closed position check that the 'A' bank control shaft to control rod lever (item 16) on the rear of the manifold shaft is in line with the front manifold shaft lever (item 15). Tighten the securing bolts on both levers.

19. Operate the mechanism; check for freedom of movement within the linkage and also clearance with the various engine components.

20. To set the remainder of the linkage from the control rod lever on the rear of the manifold shaft to the accelerator pedal refer to Chapter T—Part 2.

**Figure 14** Hot Idle Mixture Compensator Feed

1. Choke butterfly
2. Hot idle compensator feed
3. Butterfly housing

**Throttle damper plunger—To set**

1. Move the cold start ‘fast-idle’ to the off position.
2. Slacken both nuts securing the throttle damper to its bracket. Back off the nuts until they are well clear of the bracket.
3. Press the damper towards the ‘A’ bank throttle lever until the damper is fully compressed and the lever is just clear of the throttle stop screw.
4. Screw the lower securing nut until it is 0.63 mm. (0.025 in.) clear of the underside of the bracket. Release the damper and tighten the upper securing nut.
5. Ensure that the damper spindle is at the maximum possible radius, whilst maintaining adequate contact with the throttle lever pad. This can be achieved by adjusting the angle of the bracket.

**Automatic choke stove pipe—To check**

To check the stove pipe for any blockage, carry out the following procedure.
Chapter U

'Fast-idle' cam—To set

1. Fit the 'fast-idle' mechanism; do not tighten the 'fast-idle' lever clamping bolt.
2. Ensure that the 'fast-idle' adjustment screw is directly over the cam.
3. With the throttles closed, insert a 2.54 mm. (0.100 in.) diameter rod between the top of the 'fast-idle' cam and the boss under the 'fast-idle' adjustment screw. Tighten the clamping bolt on the 'fast-idle' lever.
4. Ensure that the throttles are closed; screw in the 'fast-idle' adjustment screw until it just makes contact with the top step of the 'fast-idle' cam.
5. Insert a 1.27 mm. (0.050 in.) diameter drill between the leading edge of the choke butterfly valve and the choke housing.
6. With the butterfly valve in this position, adjust the length of the butterfly rod so that the tip of the 'fast-idle' screw is in line with the start of the top step of the 'fast-idle' cam, (i.e. the position when the tip of the adjustment screw is about to fall from the top step to the bottom step of the cam).

Remove the 1.27 mm. (0.050 in.) diameter drill from the choke housing.
7. With the throttles closed and the choke partly open, adjust the 'fast-idle' adjustment screw to just contact the start or bottom step of the 'fast-idle' cam. Screw in a further \( \frac{1}{2} \) turn and tighten the lock-nut ensuring that the adjustment screw does not move.

Cold start 'fast-idle'—To set

1. Stop the engine and disconnect the solenoid to exhaust gas recirculation valve hose at the valve end. Blank the hose. Disconnect the signal hose to the distributor vacuum capsule at the capsule and blank off the hose. Remove the pressure tapping cap to vent the float chambers; open the throttles and close the choke butterfly against the bi-metal coil tension by means of the butterfly link lever, release the throttles. The 'fast-idle' adjusting screw will now be resting on the high step of the 'fast-idle' cam and the throttles are in the cold start position.
2. Start the engine and check the 'fast-idle' speed. If the speed is not between 1 900 r.p.m. and 2 100 r.p.m., stop the engine, open the throttles to gain access to the adjusting screw and adjust \( \frac{1}{2} \) turn for each 100 r.p.m. outside the required speed.
3. Tighten the lock-nut and check the 'fast-idle' speed. If correct open the throttles to release the 'fast-idle' cam mechanism.
4. Remove the blank from the solenoid to the exhaust gas recirculation valve hose and connect the
hose to the exhaust gas recirculation valve. Fit the tapping cap to 'A' bank carburettor float chamber cover.

5. Remove the blank from the distributor advance vacuum signal hose and connect the hose to the capsule.

**Float chamber depression—To check**

Refer to Page U37 noting the following information.

(i) The correct reading to be obtained on the manometer is 7.62 cm. (3-0 in.).

(ii) Operation 8 should read

8. Raise the engine speed slowly noting the manometer and tachometer readings. The maximum steady manometer reading should be obtained between 1 300 r.p.m. and 1 600 r.p.m. If the maximum depression occurs below 1 300 r.p.m. it is permissible to screw out the idle bleed screws on the carburetters by equal amounts (maximum 2.5 turns) to obtain this speed.

For details of the remainder of The Carburetters and Automatic Choke System see Workshop Manual T.S.D. 2476—Chapter U (Part 2).

---

**IGNITION SYSTEM, DISTRIBUTOR, IGNITION COIL AND SPARKING PLUGS**

**Data**

Ignition timing .. 4° B.T.D.C. (Static) 15° B.T.D.C. at 1 600 r.p.m. (stroboscopic) in Neutral with the vacuum advance disconnected and the feed hose blanked off. (Approach 1 600 r.p.m. from a higher speed).

**Ignition control system**

The ignition system utilises an Opus distributor (in which an oscillator pick-up and control unit replace the conventional contact breaker), a low inductance ignition coil and a ballast resistor. The control unit comprises an electronic oscillator, amplifier and power transistor.

A drum with eight ferrite rods (one per cylinder) moulded into the outer edge is mounted onto the distributor drive-shaft. As the drum rotates a voltage is created each time a ferrite rod passes the oscillator pick-up, this signal is then amplified and used to switch-off the normally conducting power transistor in the primary coil circuit thus inducing a high voltage in the secondary winding which is distributed to the sparking plugs in the normal manner.

In addition to the normal centrifugal advance mechanism the ignition distributor is fitted with a vacuum advance capsule. The E.G.R. gated orifice vacuum signal is applied to the capsule to advance the ignition timing for part throttle fuel economy during open road cruising. The vacuum signal is inhibited by a solenoid valve until a predetermined coolant temperature is reached.

This ignition control system provides increased accuracy of timing and increased service life before maintenance is required.

**Ignition—To time (using a stroboscope)**

The ignition is timed on A1 cylinder which is located at the front left-hand side of the engine (viewed from the front of the car).

**Note** If the ignition timing is to be set, ensure that the sparking plugs are in good condition before running the engine; if they require cleaning or renewal the sparking plugs gap should be set to 0.76 mm. (0.030 in.).

1. To check the ignition timing commence by running the engine until normal operating temperature is attained and the choke 'fast-idle' is in the off position. Switch off the engine.

2. Connect a stroboscope and a tachometer to the engine as described in the instructions supplied with the respective equipment. Disconnect the feed hose at the vacuum advance capsule; blank off the feed hose.
FIG. 16 EXPLODED VIEW OF DISTRIBUTOR

1. Pick-up module
2. Pick-up arm
3. Distributor cover/cap
4. High tension brush and spring
5. Rotor arm
6. Flash over shield (dust cover)
7. Timing rotor
8. Vacuum unit
9. Control unit
10. Lubrication pad
11. Driving dog and pin
12. Thrust washer
13. Automatic advance mechanism
14. Electronic module assembly

4. Direct the flashing light of the stroboscope onto the crankshaft damper timing marks and timing pointer; the pointer is positioned on the right-hand side of the crankshaft damper when viewed from the front of the engine.

5. If the timing pointer does not coincide with the 15° B.T.D.C. mark on the crankshaft damper adjust the ignition timing as follows.

6. Release the clamp screw on the distributor and rotate the head of the distributor in the appropriate direction until the correct timing is obtained. Clockwise rotation of the distributor head advances the ignition and conversely anti-clockwise rotation retards the ignition. After adjustment has been carried out tighten the clamp screw and again check to ensure that the timing has not altered whilst tightening the clamp screw.

7. Set the engine idle speed to 600 r.p.m.

8. Direct the flashing light of the stroboscope onto the crankshaft damper timing marks and timing pointer. Check that the ignition timing is approximately 4° B.T.D.C.

9. Stop the engine.

10. Disconnect the hose from the vacuum manifold to the purge line restrictor at the restrictor (see Fig. 5). Connect a suitable length of hose between this hose and the connection on the distributor vacuum capsule.

11. Start the engine and set the idle speed to 600 r.p.m.

12. Direct the flashing light of the stroboscope onto the crankshaft damper timing marks and timing pointer. Check that the ignition timing has advanced to approximately 14° B.T.D.C. If the ignition timing has not advanced, the distributor assembly is faulty.

13. Stop the engine.

14. Fit all hoses to their correct connections.

15. Start the engine and set the idle speed to 600 r.p.m.

16. Stop the engine and remove all the test equipment.
Setting the engine idle speed

Ensure that the engine is at normal operating temperature and that the choke ‘fast-idle’ is in the off position.

The air conditioning system must be switched off and a tachometer connected to the engine in accordance with the manufacturer’s instructions.

1. Stop the engine, remove the air intake hose and blank off the hot idle compensator feed drilling (see Fig. 14). Replace the air intake hose.

2. Start the engine and, if necessary, adjust the engine idle speed to 600 r.p.m. using the throttle stop screw; tighten the lock-nut.

3. Stop the engine and remove the air intake hose. Remove the blank from the hot idle compensator feed drilling and detach the tachometer and stroboscopic timing equipment (if fitted). Fit the air intake hose.

Sparking plugs

The sparking plugs approved for this car are Champion RN. 14.Y. Before fitting the plugs, set the gaps with the aid of a feeler gauge to 0.75 mm. (0.030 in.) and lightly smear the threads with ‘Graphogen’ grease.

LUBRICATION AND MAINTENANCE

The ‘Essential’ maintenance which is listed in the following schedules is the minimum servicing which must be carried out at the appropriate distance/time intervals in order to comply with the Rolls-Royce new car Warranty and the Australian Emission Regulations.

The ‘Preventive’ maintenance listed, is aimed at securing the maximum life and efficiency for the vehicle and will be carried out on request.

The schedules marked ‘Regular’ maintenance should be carried out either by the Owner, his chauffeur, or by a Distributor or Retailer.

REGULAR MAINTENANCE

Carburetters

Monthly, check the oil level in the reservoirs of the automatic air valve dampsers; top-up if necessary.

Engine

Weekly or every 800 km. (500 miles), whichever is the earlier, check the oil level by means of the dipstick; top-up if necessary.

Hydraulic reservoirs

Monthly, check the level of fluid in the reservoirs for the braking and automatic levelling systems; the engine should be run for 4 minutes before checking the fluid level. Top-up if necessary to the indicated level. If frequent topping-up is required check the hydraulic systems for leaks and rectify if necessary.

Lamp units

Weekly, check all lamp bulbs for correct operation and replace any faulty bulbs.

Radiator

Every 3 months, check the level of coolant in the radiator header tank; if necessary, top-up with the correct anti-freeze/water mixture or inhibited solution.

Tyres

Weekly, check the tyre pressures; adjust if necessary. Also check the spare wheel tyre pressure; adjust if necessary. Check the tread depth of all tyres and inspect the tyres for signs of damage.

Windscreen washer

Weekly, top-up the reservoir if necessary.
Chapter U

ESSENTIAL MAINTENANCE

INITIAL SERVICE
This service will be carried out by the Distributor/Retailer after the first 5 000 km. (3 000 miles) or 3 months whichever is the earlier.
Items marked * will be carried out free of charge.

INITIAL 5 000 km. (3 000 MILES) OR 3 MONTHS SERVICE WHICHEVER IS THE EARLIER

*Air injection pump
Check belt tension and reset if necessary.

*Automatic choke
Check the flow through the choke stove pipe and check for correct operation, rectify if necessary.

*Carburetters
Check oil level in air valve dampers and if necessary top-up to correct level. Check tightness of float chamber covers. Check float chamber depression, rectify if necessary. Check and if necessary reset the idle speed. Check and if necessary reset the choke 'fast-idle' speed.

Engine
Change engine oil.

*Fuel evaporation emission control system
Check the purge rate; this should be between 1,41 cu. m/hr. and 1,98 cu. m/hr. (50 cu. ft/hr. and 70 cu. ft/hr.) at 600 r.p.m. in Neutral. Pressure test the fuel tank and evaporation loss line and if necessary rectify any leaks.

*Ignition system
Check ignition timing using strobeoscope and adjust if necessary; the ignition timing should be 15° B.T.D.C. with the engine running at 1 600 r.p.m. the vacuum capsule disconnected and the feed hose blanked off.

Belt tension
Check the tension of all driving belts.

Engine cooling system
Tighten wormdrive clips of all coolant hoses.

Torque converter transmission
Check fluid level and top-up if necessary.
When checking the fluid level, avoid contact with the exhaust gas recirculation valve, heatshield and associated pipes as these components will be hot.

EVERY 5 000 KM. (3 000 MILES) OR 3 MONTHS WHICHEVER IS THE EARLIER
If the car is used for constant stop/start operation, change the engine oil.

EVERY 10 000 KM. (6 000 MILES) OR 6 MONTHS WHICHEVER IS THE EARLIER

Engine
Change engine oil and renew oil filter element.

Battery
Check the level of the electrolyte in the battery; if necessary top-up with distilled water.

Belt tension
Check the tension of all driving belts.
Brakes
Inspect footbrake and handbrake pad linings. When changing footbrake pads examine condition of dust excluders on calipers. Manually adjust handbrake pads. Inspect pipes and connections, rectify if necessary.

Fluid levels
Check all fluid levels.

Torque converter transmission
Check fluid levels and top-up if necessary.
When checking the fluid level, avoid contact with the exhaust gas recirculation valve, heatshield and associated pipes as these components will be hot.

Fuel evaporation emission control system
Check the condition of the pipes and connections.

Ignition system
Fit new sparking plugs ensuring that the gaps are set to 0.75 mm. (0.030 in.).
Lubricate distributor spindle (shaft bearings) and automatic advance mechanism with engine oil.
Check the ignition timing using a stroboscope and adjust if necessary; the ignition timing should be 15° B.T.D.C. with the engine running at 1 600 r.p.m., the vacuum capsule disconnected and the feed hose blanked off.

Battery
Check the level of the electrolyte in the battery; if necessary top-up with distilled water.

Belt tension
Check the tension of all driving belts.

Brakes
Inspect footbrake and handbrake pad linings. When changing footbrake pads examine condition of dust excluders on calipers. Manually adjust handbrake pads. Inspect pipes and connections, rectify if necessary.

Final drive unit
Check oil level and top-up if necessary.

Fluid levels
Check all fluid levels.

Crankcase emission control system
Remove and clean gauze flame traps in the crankcase breather tube. Clean the adapter in choke butterfly housing.

Front suspension
The front suspension ball joints are sealed for life and no maintenance is required until renewal is necessary or the ball joint rubber covers are damaged. Inspect the rubber covers on the front suspension ball joints; if the covers are found to be damaged new joints and covers should be fitted.
Chapter U

Steering ball joints
Lubricate the six grease nipples. Inspect the rubber covers on the ball joints; if the covers are found to be damaged the joints should be dismantled and new parts fitted as necessary.

Torque converter transmission
Renew transmission fluid.
When checking the fluid level, avoid contact with the exhaust gas recirculation valve, heatshield and associated pipes as these components will be hot.

EVERY 40 000 KM. (24 000 MILES) OR 2 YEARS SERVICE WHICHEVER IS THE EARLIER

Air injection pump
Check tension of pump pulley driving belt.

EVERY 30 000 KM. (18 000 MILES) OR 18 MONTHS SERVICE WHICHEVER IS THE EARLIER

Air injection system
Check air injection system for leaks and correct functioning. Renew any defective items.

Air silencer
Fit a new paper filter element.

Battery
Check the level of the electrolyte in the battery; if necessary top-up with distilled water.

Belt tension
Check the tension of all driving belts.

Automatic choke
Check the air flow through the choke stave pipe and check the system for correct functioning.

Brakes
Inspect footbrake and handbrake pad linings. When changing footbrake pads examine condition of dust excluders on calipers. Manually adjust handbrake pads. Inspect pipes and connections, rectify if necessary.

Fluid levels
Check all fluid levels.

Carburetters
Clean air valves. Remove inlet unions from the float chamber covers and fit new paper filter elements. Top-up oil level in air valve dampers. Check tightness of float chamber covers. Check float chamber depression. Check and if necessary, reset the idle speed. Check and if necessary, reset choke ‘fast-idle’ speed.

Carburetter mixture weakening device
Renew air filter element for the carburetter mixture weakening device.
Chapter U

Fuel evaporation emission control system
Check the condition of the pipes and connections.

Ignition system
Fit new sparking plugs ensuring that the gaps are set to 0.75 mm (0.030 in.).
Lubricate distributor spindle (shaft bearings) and automatic advance mechanism with engine oil.
Check the ignition timing using a stroboscope and adjust if necessary; the ignition timing should be 15° B.T.D.C. with the engine running at 1600 r.p.m., the vacuum capsule disconnected and the feed hose blanked off.

Battery
Check the level of the electrolyte in the battery; if necessary top-up with distilled water.

Belt tension
Check the tension of all driving belts.

Brakes
Inspect footbrake and handbrake pad linings. When changing footbrake pads examine condition of dust excluders on calipers. Manually adjust handbrake pads. Inspect pipes and connections, rectify if necessary.

Final drive unit
Check oil level and top-up if necessary.

Fluid levels
Check all fluid levels.

Front suspension
The front suspension ball joints are sealed for life and no maintenance is required until renewal is necessary or the ball joint rubber covers are damaged. Inspect the rubber covers on the front suspension ball joints; if the covers are found to be damaged new joints and covers should be fitted.
Chapter U

Steering ball joints
Lubricate the six grease nipples. Inspect the rubber covers on the ball joints; if the covers are found to be damaged the joints should be dismantled and new parts fitted as necessary.

Torque converter transmission
Check fluid level and top-up if necessary.
When checking the fluid level, avoid contact with the exhaust gas recirculation valve, heatshield and associated pipes as these components will be hot.

Torque converter transmission
Renew transmission fluid.
When checking the fluid level, avoid contact with the exhaust gas recirculation valve, heatshield and associated pipes as these components will be hot.

Engine
Change engine oil and renew oil filter element.

Battery
Check the level of the electrolyte in the battery; if necessary top-up with distilled water.

Belt tension
Check the tension of all driving belts.

Brakes
Inspect footbrake and handbrake pad linings. When changing footbrake pads examine condition of dust excluders on calipers. Manually adjust handbrake pads. Inspect pipes and connections, rectify if necessary.

Fluid levels
Check all fluid levels.

Windshield wipers
Check the movement and fluid level.

Every 30 000 km. (18 000 miles) or 18 months service whichever is the earlier

Air injection pump
Check tension of pump pulley driving belt.

Air injection system
Check air injection system for leaks and correct functioning. Renew any defective items.

Air silencer
Fit a new paper filter element.

Automatic choke
Check the air flow through the choke stove pipe and check the system for correct functioning.

Carburetters
Clean air valves. Remove inlet unions from the float chamber covers and fit new paper filter elements. Top-up oil level in air valve dampers. Check tightness of float chamber covers. Check float chamber depression. Check and if necessary, reset the idle speed. Check and if necessary, reset choke ‘fast-idle’ speed.

Carburetter mixture weakening device
Renew air filter element for the carburetter mixture weakening device.
Crankcase emission control system
Remove and clean gauze flame traps in crankcase breather tube. Clean the adapter in choke butterfly housing.

Engine
Change engine oil and renew oil filter element.

Engine cooling system
Fit a new engine coolant thermostat and heater tap feed hose. Check the condition of all coolant hoses; fit new hoses as necessary.

Fuel evaporation emission control system
Renew the foam filter element in the evaporation loss control canister. Check the purge rate; this should be between 1.41 cu. m/hr. and 1.98 cu. m/hr. (50 cu.ft/hr. and 70 cu. ft/hr.) at 600 r.p.m. in Neutral. Renew the purge line filter if necessary.

Ignition system
Fit new sparking plugs ensuring that the gaps are set to 0.75 mm. (0.030 in.).
Lubricate distributor spindle (shaft bearings) and automatic advance mechanism with engine oil.
Check the ignition timing using a stroboscope and adjust if necessary; the ignition timing should be 15° B.T.D.C. with the engine running at 1,600 r.p.m., the vacuum capsule disconnected and the feed hose blanked off. Check the vacuum advance mechanism.

Battery
Check the level of the electrolyte in the battery; if necessary top-up with distilled water.

Belt tension
Check the tension of all driving belts.

Brakes
Inspect footbrake and handbrake pad linings. When changing footbrake pads examine condition of dust excluders on calipers. Manually adjust handbrake pads. Inspect pipes and connections, rectify if necessary.

Final drive unit
Change oil.

Fluid levels
Check all fluid levels.

Front suspension
The front suspension ball joints are sealed for life and no maintenance is required until renewal is necessary or the ball joint rubber covers are damaged. Inspect the rubber covers on the front suspension ball joints; if the covers are found to be damaged new joints and covers should be fitted.

Fuel pumps
Remove the fuel pumps and check for pumping efficiency, fit new pumps if necessary.

Hydraulic systems
Completely drain the fluid from the hydraulic circuits. Thoroughly clean the brake fluid reservoirs and sight glasses, ensure that no foreign matter enters the systems. Fill the hydraulic systems with new approved fluid. Bleed the brakes and height control systems.

Rear wheel drive-shafts
Lubricate the rear wheel drive-shaft outer universal couplings with an approved grease.

Steering ball joints
Lubricate the six grease nipples. Inspect the rubber covers on the ball joints; if the covers are found to be damaged the joints should be dismantled and new parts fitted as necessary.

Torque converter transmission
Change transmission fluid.
Fit a new intake strainer.
When checking the fluid level, avoid contact with the exhaust gas recirculation valve, heatshield and associated pipes as these components will be hot.
Chapter U

SERVICING AFTER 40 000 KM. (24 000 MILES) OR 2 YEARS WHICHEVER IS THE EARLIER

After 40 000 km. (24 000 miles) or 2 years, servicing is still due at the following intervals.

50 000 KM. (30 000 MILES) OR 2½ YEARS WHICHEVER IS THE EARLIER

Carry out the 10 000 km. (6 000 miles) service.

60 000 KM. (36 000 MILES) OR 3 YEARS WHICHEVER IS THE EARLIER

Carry out the 20 000 km. (12 000 miles) service.

70 000 KM. (42 000 MILES) OR 3½ YEARS WHICHEVER IS THE EARLIER

Carry out the 10 000 km. (6 000 miles) service.

80 000 KM. (48 000 MILES) OR 4 YEARS WHICHEVER IS THE EARLIER

Carry out the 40 000 km. (24 000 miles) service and in addition the following operation.

Exhaust gas recirculation system

Remove and clean the exhaust gas recirculation valve and feed pipes. Clean the orifices in the carburettor ‘Tee’ piece. Check the exhaust gas recirculation valve for correct operation.

PREVENTIVE MAINTENANCE

INITIAL SERVICE

This service should be carried out by the Distributor/Retailer after the first 5000 km. (3 000 miles) or 3 months whichever is the earlier.

Steering pump

Check the oil level in the reservoir; top-up if necessary.

Test

Road test the car for satisfactory performance.

EVERY 10 000 KM. (6 000 MILES) OR 6 MONTHS WHICHEVER IS THE EARLIER

Carburetters

Check the oil level in the air valve dampers and top-up if necessary.

Control linkages

Apply a few drops of engine oil to the accelerator linkage and to the gear range selector controls adjacent to the transmission casing.

Electrical system

Check all interior lamps, exterior lamps, instruments, warning lamps and devices for correct operation. Rectify as necessary.

Handbrake

Lubricate the pivot pins and pulleys in the handbrake system with approved grease.

Tyres

Check the tread depth of all the tyres, inspect all tyres for signs of damage. Check all tyre pressures when cold, adjust if necessary.

Note Include the spare tyre.

Test

Road test the car for satisfactory performance.
Chapter U

Every 20,000 km. (12,000 miles) or 12 months whichever is the earlier

Control linkage
Apply a few drops of engine oil to the accelerator linkage and to the gear range selector controls adjacent to the transmission casing.

Handbrake
Lubricate the pivot pins and pulleys in the handbrake system with approved grease.

Spare wheel
Lubricate the spare wheel lowering bolt and mechanism.

Electrical system
Check all interior lamps, exterior lamps, instruments, warning lamps and devices for correct operation. rectify as necessary.

Tyres
Check the tread depth of all the tyres, inspect all tyres for signs of damage. Check all tyre pressures when cold, adjust if necessary.

Control linkage
Apply a few drops of engine oil to the accelerator linkage and to the gear range selector controls adjacent to the transmission casing.

Height control mechanism
Disconnect the control valve linkage ball joints. Clean, grease and refit the ball joints.

Fuel tank
Slacken the drain plug one or two turns and allow any accumulated water to drain away. Tighten the drain plug.

Electronic system
Check all interior lamps, exterior lamps, instruments, warning lamps and devices for correct operation, rectify as necessary.

Test
Road test the car for satisfactory performance.

Every 40,000 km. (24,000 miles) or 2 years whichever is the earlier

Every 30,000 km. (18,000 miles) or 18 months whichever is the earlier

Carburetters
Check the oil level in the air valve dampers and top-up if necessary.

Control linkages
Apply a few drops of engine oil to the accelerator linkage and to the gear range selector controls adjacent to the transmission casing.
Chapter U

Handbrake
Lubricate the pivot pins and pulleys in the handbrake system with approved grease.

Spare wheel
Lubricate the spare wheel lowering bolt and mechanism.

Tyres
Check the tread depth of all tyres, inspect all tyres for signs of damage. Check all tyre pressures when cold, adjust if necessary.
Note Include the spare tyre.

Test
Road test the car for satisfactory performance.

SEASONAL SCHEDULES

EVERY 12 MONTHS

Air conditioning system
Ensure that the foam filter element fitted to the scuttle intake grille is free from obstruction. On Long Wheelbase cars fitted with a centre division, check that the foam filter element fitted to the intake grille in the rear deck panel is free from obstruction.

Body
Check that the body drain holes are free from foreign matter.

Engine cooling system
Drain the coolant from the radiator and the engine crankcase. Clean any debris from the surfaces of the refrigeration condenser and radiator matrices by reverse flushing with a hose. This should be carried out just prior to the Autumn. Fill the system with the correct anti-freeze mixture (refer to Chapter L—Engine Cooling System of this Workshop Manual T.S.D. 2476 and the latest Service Bulletin).

SERVICING AFTER 40 000 KM. (24 000 MILES) OR 2 YEARS WHICHEVER IS THE EARLIER

After 40 000 km. (24 000 miles) or 2 years, servicing is still due at the following intervals.

50 000 KM. (30 000 MILES) OR 2½ YEARS WHICHEVER IS THE EARLIER

Carry out the 10 000 km. (6 000 miles) service.

60 000 KM. (36 000 MILES) OR 3 YEARS WHICHEVER IS THE EARLIER

Carry out the 20 000 km. (12 000 miles) service.

70 000 KM. (42 000 MILES) OR 3½ YEARS WHICHEVER IS THE EARLIER

Carry out the 10 000 km. (6 000 miles) service.

80 000 KM. (48 000 MILES) OR 4 YEARS WHICHEVER IS THE EARLIER

Carry out the 40 000 km. (24 000 miles) service.

EVERY 2 YEARS

In addition to the 12 monthly schedule, carry out the following.

Engine cooling system
Drain the coolant from the radiator and engine crankcase. Thoroughly reverse flush the coolant passages with a continuous flow of water. Change the coolant hoses where necessary. Fill the system with the correct anti-freeze mixture.

SERVICE RECOMMENDATIONS

80 000 KM. (48 000 MILES)

At this mileage and under normal motoring conditions it is recommended that the following servicing is carried out.
Chapter U

Hydraulic systems
Renew the front and rear accumulator to frame connector block hoses.
Examine the sub-frame to brake caliper hoses for chafing or surface cracking; renew if necessary.

160 000 KM. (96 000 MILES)
At this mileage and under normal motoring conditions it is recommended that the following servicing is carried out.

Hydraulic systems
Renew all the flexible hoses to the braking systems and the automatic height control system. Fit new seals to the disc brake calipers and the deceleration conscious pressure limiting valve.

Fuel system
Fit a new convoluted rubber hose between the fuel filler head and fuel tank assembly. Examine all flexible fuel pipes and renew any which show signs of deterioration.

SPECIAL PRECAUTIONS
Should the car be used in very cold temperatures, drain the engine sump when thoroughly warm and also drain the carburettor air valve dampers. The engine sump and carburettor air valve dampers should then be filled with oil having the following viscosity.
For constant temperatures of between 0°C. and −23°C. (32°F. and −10°F.), use a 10W/30 grade oil.
For constant temperatures of −23°C. (−10°F.) and below, use a 5W/20 grade oil.
## FAULT DIAGNOSIS

<table>
<thead>
<tr>
<th>SYMPTOMS</th>
<th>POSSIBLE CAUSE</th>
</tr>
</thead>
</table>
| 1. Engine will not start. (Starter motor operating). | 1. (a) Ignition circuit broken.  
(b) Failed anti 'run-on' solenoid or failure of electrical supply circuit.  
(c) Ignition system faulty.  
(d) Damaged or contaminated ignition high-tension circuit.  
(e) Fault in fuel feed line or fouled float chamber filters.  
(f) Faulty choke bi-metal coil.  
(g) Choke solenoid inoperative.  
(h) Faulty-choke 'fast-idle' mechanism.  
(i) Air leak into induction system.  
(j) Faulty hot idle mixture compensator.  
(k) Weakening device filter blocked or blockage in rubber connecting hoses.  
(l) Faulty weakener cut-off solenoid or failure of electrical supply circuit.  
(m) Faulty weakening device control switch or failure of electrical supply circuit.  
(n) Dislodged venturi in weakener device.  
(o) Flooding of carburettor float chamber or jet.  
(p) Fouled carburettor float chamber or jet.  
(q) Exhaust gas recirculation valve failed. |
| 2. Engine idles very roughly. | 2. (a) Ignition system faulty.  
(b) Fouled sparking plugs.  
(c) Damaged or contaminated ignition high-tension circuit.  
(d) Air leak into induction system.  
(e) Faulty hot idle compensator.  
(f) Weakening device filter blocked or blockage in rubber connecting hoses.  
(g) Dislodged venturi in weakener device.  
(h) Badly worn or damaged carburettor control linkage.  
(i) Flooding of carburettor float chamber or jet.  
(j) Sticking carburettor piston.  
(k) Fouled carburettor float chamber or jet.  
(l) Air leak into exhaust gas recirculation vacuum control circuit.  
(m) Exhaust gas recirculation valve failed.  
(n) Faulty air diverter valve.  
(o) Incorrect operation of temperature controlled air intake system. |
| 3. Engine stalls. | 3. (a) Ignition circuit broken.  
(b) Failed anti 'run-on' solenoid or failure of electrical supply circuit.  
(c) Ignition system faulty.  
(d) Damaged or contaminated ignition high-tension circuit.  
(e) Fault in fuel feed line or fouled float chamber filters.  
(f) Air leak into induction system.  
(g) Faulty hot idle mixture compensator.  
(h) Weakening device filter blocked or blockage in rubber connecting hoses.  
(i) Dislodged venturi in weakening device.  
(j) Badly worn or damaged carburettor control linkage.  
(k) Flooding of carburettor float chamber or jet.  
(l) Sticking carburettor piston.  
(m) Fouled carburettor float chamber or jet.  
(n) Air leak into exhaust gas recirculation vacuum control circuit.  
(o) Exhaust gas recirculation valve failed.  
(p) Faulty air diverter valve. |
<table>
<thead>
<tr>
<th>SYMPTOMS</th>
<th>POSSIBLE CAUSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. (i) Engine shows signs of power loss,</td>
<td>4. (a) Ignition system faulty.</td>
</tr>
<tr>
<td>evident at high speeds and loading.</td>
<td>(b) Fouled sparking plugs.</td>
</tr>
<tr>
<td>(ii) Engine misfires particularly on hard</td>
<td>(c) Damaged or contaminated ignition high-tension circuit.</td>
</tr>
<tr>
<td>acceleration from low speed.</td>
<td>(d) Fault in fuel feed line or fouled float chamber filters.</td>
</tr>
<tr>
<td></td>
<td>(e) Choke system operation incorrect.</td>
</tr>
<tr>
<td></td>
<td>(f) Sticking carburettor piston.</td>
</tr>
<tr>
<td></td>
<td>(g) Fouled carburettor float chamber or jet.</td>
</tr>
<tr>
<td></td>
<td>(h) Exhaust gas recirculation valve failed.</td>
</tr>
<tr>
<td></td>
<td>(i) Failed exhaust gas recirculation valve cut-out solenoid or</td>
</tr>
<tr>
<td></td>
<td>electrical supply circuit.</td>
</tr>
<tr>
<td>5. Engine hesitates or misfires under light</td>
<td>5. (a) Failed anti 'run-on' solenoid or failure of electrical supply circuit.</td>
</tr>
<tr>
<td>load.</td>
<td>(b) Ignition system faulty.</td>
</tr>
<tr>
<td></td>
<td>(c) Fouled sparking plugs.</td>
</tr>
<tr>
<td></td>
<td>(d) Damaged or contaminated ignition high-tension circuit.</td>
</tr>
<tr>
<td></td>
<td>(e) Fault in fuel feed line or fouled float chamber filters.</td>
</tr>
<tr>
<td></td>
<td>(f) Air leak into induction system.</td>
</tr>
<tr>
<td></td>
<td>(g) Faulty hot idle mixture compensator.</td>
</tr>
<tr>
<td></td>
<td>(h) Weakening device filter blocked or blockage in rubber connecting hoses.</td>
</tr>
<tr>
<td></td>
<td>(i) Dislodged venturi in weakening device.</td>
</tr>
<tr>
<td></td>
<td>(j) Flooding of carburettor float chamber or jet.</td>
</tr>
<tr>
<td></td>
<td>(k) Sticking carburettor piston.</td>
</tr>
<tr>
<td></td>
<td>(l) Fouled carburettor float chamber or jet.</td>
</tr>
<tr>
<td></td>
<td>(m) Incorrect purge flow rate.</td>
</tr>
<tr>
<td></td>
<td>(n) Exhaust gas recirculation valve failed.</td>
</tr>
<tr>
<td></td>
<td>(o) Faulty air diverter valve.</td>
</tr>
<tr>
<td></td>
<td>(p) Incorrect operation of temperature controlled air intake system.</td>
</tr>
<tr>
<td>6. Increase in fuel consumption.</td>
<td>6. (a) Ignition system faulty.</td>
</tr>
<tr>
<td></td>
<td>(b) Faulty choke bi-metal coil.</td>
</tr>
<tr>
<td></td>
<td>(c) Choke system operation incorrect.</td>
</tr>
<tr>
<td></td>
<td>(d) Air leak into induction system.</td>
</tr>
<tr>
<td></td>
<td>(e) Faulty hot idle mixture compensator.</td>
</tr>
<tr>
<td></td>
<td>(f) Weakening device filter blocked or blockage in rubber connecting hoses.</td>
</tr>
<tr>
<td></td>
<td>(g) Faulty weaner cut-off solenoid or failure of electrical</td>
</tr>
<tr>
<td></td>
<td>supply circuit.</td>
</tr>
<tr>
<td></td>
<td>(h) Faulty weakening device control switch or failure of electrical</td>
</tr>
<tr>
<td></td>
<td>supply circuit.</td>
</tr>
<tr>
<td></td>
<td>(i) Air leaks in mixture weakening system.</td>
</tr>
<tr>
<td></td>
<td>(j) Flooding of carburettor float chamber or jet.</td>
</tr>
<tr>
<td></td>
<td>(k) Sticking carburettor piston.</td>
</tr>
<tr>
<td></td>
<td>(l) Incorrect purge flow rate.</td>
</tr>
<tr>
<td></td>
<td>(m) Exhaust gas recirculation valve failed.</td>
</tr>
<tr>
<td></td>
<td>(n) Faulty air diverter valve.</td>
</tr>
<tr>
<td>7. Decrease in fuel consumption.</td>
<td>7. (a) Air leaks in mixture weakening system.</td>
</tr>
<tr>
<td></td>
<td>(b) Incorrect purge flow rate.</td>
</tr>
<tr>
<td></td>
<td>(c) Faulty exhaust gas recirculation temperature control switch or</td>
</tr>
<tr>
<td></td>
<td>failure of electrical supply circuit.</td>
</tr>
<tr>
<td></td>
<td>(d) Air leak into exhaust gas recirculation vacuum control circuit.</td>
</tr>
<tr>
<td></td>
<td>(e) Exhaust gas recirculation valve failed.</td>
</tr>
<tr>
<td>8. Engine 'backfires' on overrun.</td>
<td>8. (a) Ignition system faulty.</td>
</tr>
<tr>
<td></td>
<td>(b) Air leak into induction system.</td>
</tr>
<tr>
<td></td>
<td>(c) Exhaust gas recirculation valve failed.</td>
</tr>
<tr>
<td>9. Sudden increase in engine idle speed.</td>
<td>9. (a) Faulty choke 'fast-idle' mechanism.</td>
</tr>
<tr>
<td></td>
<td>(b) Failed carburettor overrun valve.</td>
</tr>
<tr>
<td>10. Excessive noise from air injection pump or system.</td>
<td>10. (a) Faulty air diverter valve.</td>
</tr>
<tr>
<td></td>
<td>(b) Faulty or damaged air injection pump.</td>
</tr>
</tbody>
</table>
## WORKSHOP TOOLS

<table>
<thead>
<tr>
<th>Tool Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RH 8050</td>
<td>Spanner—Carburetter Jet Screw</td>
</tr>
<tr>
<td>RH 8087</td>
<td>Spanner—Weakener Cut-off Valve</td>
</tr>
<tr>
<td>RH 8089</td>
<td>Jet Centring Tool</td>
</tr>
<tr>
<td>RH 8090</td>
<td>Pliers—Wire Hose Clips</td>
</tr>
<tr>
<td>RH 8383</td>
<td>Positioning Tool—Throttle Spindle Seal</td>
</tr>
<tr>
<td>RH 8621</td>
<td>Adapter—Air Manifold to CO Meter</td>
</tr>
<tr>
<td>RH 8841</td>
<td>Dial Gauge—Carburetter Piston Lift</td>
</tr>
<tr>
<td>RH 8880</td>
<td>Setting Jig—Throttle Levers</td>
</tr>
<tr>
<td>RH 8945</td>
<td>Connector—Choke Stove Pipe</td>
</tr>
</tbody>
</table>
Chapter U
Section U10
SUPPLEMENTS
No. 6 North America 1976

FUEL EVAPORATION EMISSION CONTROL SYSTEM

The 1976 Running Change is now incorporated into the North American 1976 model year build specification and consists of a new fuel tank fitted at the forward end of the luggage compartment behind the carpet covered sealing panel (see Fig. 1).

The new design of fuel tank does not have a fuel trap assembly. Adequate expansion volume for the fuel is provided within the fuel tank and the combined pressure/vacuum relief valve is located in the fuel filler cap. The fuel tank is illustrated in Figure 2.

A rollover valve is incorporated in the vent line from the fuel tank to the evaporative loss control canister. The purpose of this valve is to prevent fuel from reaching the canister in the event of vehicle inversion.

The nominal capacity of the fuel tank is 22.5 U.S. galls. (18.5 Imp. galls., 85 litres).

Evaporation loss control canister

The evaporation loss control canister is mounted under the front left-hand wing (fender). It is a cylindrical container filled with activated carbon granules and has the following four connections.

(i) The mixture weakening device
(ii) The float chamber vent
(iii) The fuel tank vent
(iv) The purge line

The top of the container is open to atmosphere and contains a foam air filter element.

FIG. 1 POSITION OF FUEL TANK

1 Fuel tank
2 Gauge unit
3 Retaining strap
**Chapter U - 1976 Running Change**

**Fig. 2 Fuel Tank Assembly**

1. Expansion tank and overfill limiter
2. Rollover valve
3. Fuel filler cap (incorporating combined pressure and vacuum relief valve)
4. Pipe to evaporation loss control canister

**Fuel tank vent (see Fig. 2)**

The fuel tank is vented via two connections to the filler neck which allows adequate venting of the tank when it is being filled.

A separate vapour line from the fuel tank passes via a rollover valve (situated on the top of the fuel tank), under the floor on the left-hand side of the car to the evaporation loss control canister.

The rollover valve prevents fuel from entering the evaporation emission control canister during harsh manoeuvres or in the event of vehicle inversion. Fuel vapour passes freely through the valve.

In the event of a blockage in the vapour line to the evaporation loss control canister, a combined pressure and vacuum relief valve in the fuel filler cap prevents any excessive build-up of pressure due to fuel vapourisation or depression as the fuel is consumed.

An expansion tank situated within the main fuel tank inhibits complete filling and thereby provides fuel expansion volume to cope with extreme temperature conditions.

**Fuel tank - To remove**

1. Disconnect the battery.
2. Drain the fuel from the tank; this is best achieved by disconnecting the fuel pipe from the tank to the filter at the filter end.
   
   Fit the fuel pipe to the fuel filter.
3. Unscrew the four ‘Pozidrive’ screws situated across the carpet covered sealing panel. Remove the screws and collect the washers.
4. Withdraw the carpet covered seal panel to reveal the fuel tank assembly.
5. Unscrew the worm drive clip securing the rollover valve assembly to the crossmember. Detach the rollover valve from the crossmember.
6. Remove the crossmember (see Figs. 4 and 5); this is secured by a $\frac{1}{4}$ in. A/F nut, bolt and washer to the bottom of each luggage compartment lid hinge assembly.
7. Disconnect the three electrical cables from the fuel tank level gauge (see Fig. 5).
8. Remove the tape from the electrical loom by peeling it back from the fuel tank. Tape the electrical loom away from the vicinity of the fuel tank.
9. Unscrew the worm drive clips securing the three rubber vent hoses to their respective connections on the fuel tank (see Fig. 6); withdraw the hoses.
10. Unscrew the worm drive clip securing the rubber filler neck hose to the fuel tank (see Fig. 5); withdraw the hose.

Blank off the fuel tank connection.
11. From beneath the car, unscrew and detach the fuel pipe. This connection is an olive and threaded union.

Blank off the fuel tank connection.

12. Unlock and unscrew the half-nut from each of the two tank retaining strap bolts (see Fig. 6).

13. Unscrew the full nut from each of the two tank retaining strap bolts (see Fig. 6).

14. Withdraw the bolts and collect the four bridge pieces from the end of the retaining straps (see Fig. 6).

15. Bend the retaining straps and carefully withdraw the fuel tank assembly.

**Fuel tank—To fit**

1. Sweep clean the forward end of the luggage compartment, between the road spring pots.

If blanking plugs, nuts, washers, etc., remain in this area when the fuel tank is fitted, they could become the cause of noise which may prove difficult to eradicate once the fuel tank is in position.

Also ensure that the battery is disconnected and the usual standard workshop precautions carried out.

2. Ensure that the self-tapping screws that secure the pipe retaining clips beneath the car do not protrude too far into the luggage compartment. Extra long self-tapping screws could puncture the fuel tank.

3. Position the strips of ‘Compriband’ in position. Also fit the ‘Compriband’ pad around the hole in the luggage compartment floor.

The ‘Compriband’ and the two rubber blocks [that fit approximately 5.08 cm (2.0 in.) above the luggage compartment floor on the panel dividing the compartment from the car interior] should be secured in position using an appropriate adhesive such as ‘Dunlop S81’.

The position of all mounting strips are shown in Figure 7.

4. Fit the four fuel tank securing straps to the body (see Fig. 7). The two upper mountings are similar and are shown in Figure 7—inset A. The two lower mountings are different, the left-hand mounting is shown in Figure 7—inset B, where the bolt passes through the body and is retained by a nut. The right-hand mount is shown in Figure 7—inset C, where the bolt has a distance piece and screws directly into a threaded bush attached to the body.

5. Fit the 4.8 mm (0.19 in.) internal diameter rubber hose to the metal pipe situated on the left-hand side of the luggage compartment, adjacent to the panel dividing the luggage compartment from the car interior. (see Fig. 5).

Temporarily attach the open end of the rubber hose high in the luggage compartment so that it will be above the fuel tank.
6. Fit the soundproofing panel to the fuel tank and secure in position with tape (see Fig. 5). In addition, fit two pieces of tape around the fuel tank so that the securing straps will sit on the tape when the tank is secured in position (see Fig. 5).
7. Bend the securing straps to enable the fuel tank to be fitted.
8. Fit the fuel tank into position, ensuring that the boss on the base of the tank fits into the hole in the luggage compartment floor.
9. Secure the fuel tank in position as follows (see Fig. 5).
10. Fit a bridge piece to the end of each securing strap and secure the fuel tank in position by fitting a long \( \frac{1}{16} \) in. A/F bolt, downwards, through the upper and lower securing strap bridge pieces. Screw a full nut onto the bolt.
11. Repeat Operation 10 to the second set of securing straps.
12. Tighten the full nut of each set of securing straps and lock in position by fitting an additional half nut to each of the two bolts.
13. From beneath the car fit the fuel pipe to the fuel tank, this connection is provided by an olive and a threaded union.
14. Fit the rubber intake pipe to the fuel tank neck and secure the end of the hose with a worm drive clip.
15. Fit the two 8,0 mm. (\( \frac{1}{4} \) in.) internal diameter rubber hoses of the fuel intake assembly to the fuel tank vents. One hose connects directly to the vent, whilst the second hose, connects to the vent on the other side of the fuel tank via a metal pipe which is fitted across the top of the tank (see Fig. 6).
   Secure the ends of the hoses with worm drive clips.
16. Fit the open end of the 4,8 mm. (\( \frac{1}{8} \) in.) diameter hose referred to in Operation 5 to the top of the rollover valve assembly. Fit an 8,0 mm. (\( \frac{1}{4} \) in.) internal diameter hose between the centre vent in the top of the fuel tank and the bottom connection of the rollover valve (see Fig. 6).
   Secure the ends of the hose with worm drive clips.
17. Fit the crossmember (see Fig. 5), attaching it to the bottom bracket of each of the two luggage compartment lid hinge assemblies with a \( \frac{1}{4} \) in. A/F bolt, washer and nut (see Fig. 4).
18. Locate the fuel gauge sender unit electrical loom situated above the right-hand rear wheel arch; there are three cables in the loom and these are coloured black, green/orange and green/purple.
   Tape the cables across the fuel tank until they are adjacent to the fuel gauge sender unit, as shown in Figure 5.
19. Connect the cables to the fuel gauge sender unit as shown in the inset of Figure 5.
20. Locate the base of the carpet covered panel into the wooden runner slots (see Fig. 5) and
secure the top of the panel with four 'Pozidrive' screws and washers to the crossmember.
21. Connect the battery.

Fuel filler—To remove (Saloon cars)

1. Disconnect the battery.
2. Unscrew and remove the four 'Pozidrive' screws situated across the carpet covered sealing panel at the forward end of the luggage compartment.
3. Withdraw the carpet covered seal panel to reveal the fuel tank assembly.
4. Unscrew the worm drive clips securing the two 8.0 mm. (7/32 in.) internal diameter rubber hoses to the two outer vents on the top of the fuel tank, one hose fits directly onto a vent while the other hose fits to a metal pipe which extends across the width of the fuel tank; withdraw the hoses.
5. Unscrew the worm drive clip securing the fuel inlet hose to the fuel tank; withdraw the hose and blank off the fuel tank inlet.
6. From inside the car remove the trim panel that covers the filler assembly, this is situated adjacent to the rear window.

On 4 door saloons (except Long Wheelbase Saloons with the small rear window) unscrew the two screws from the wood finisher fitted around the rear window. Carefully withdraw the trim panel to reveal the upper connection for the fuel filler.
7. Unscrew the worm drive clip securing the fuel filler hose to the fuel filler head. Withdraw the fuel filler neck assembly downwards into the luggage compartment.
8. Open the fuel filler flap; unscrew and remove the fuel filler cap.

9. Using a screwdriver, unscrew and remove the six screws securing the fuel filler head to the body, collect the washers from the retaining screws and withdraw the fuel filler head assembly.

Fuel filler—To fit (Saloon cars)

Fit the fuel filler assembly by reversing the procedure given for removal, noting the following.
1. When fitting the fuel filler head to the body, ensure that the restrictor is in its lowest position.

Fuel filler—To remove (Convertible cars)

1. Remove the carpet covered sealing panel from the forward end of the luggage compartment.
2. Locate the fuel filler neck assembly situated on the left-hand side of the fuel tank.
3. Disconnect the two rubber hoses from the outer vents on top of the fuel tank.
4. Unscrew the upper and lower worm drive clips from the fuel filler neck assembly, withdraw the assembly and blank off the fuel tank.
5. Open the fuel filler flap and unscrew the fuel filler cap.
6. Using a screwdriver, unscrew and remove the six screws securing the fuel filler head to the body, collect the washers from beneath the heads of the screws. Withdraw the assembly.

Fuel filler—To fit (Convertible cars)

Fit the fuel filler assembly by reversing the procedure given for removal.
EMISSION CONTROL SYSTEMS
(ELECTRICAL COMPONENTS)

Fuel gauge—Air cored

The fuel gauge fitted to these cars is an 'air cored' instrument. The gauge operates on a slightly different principle to its predecessors in that it does not have the iron core.

The main advantage of this new type of instrument is that it is effectively damped, this characteristic does mean however, that the engine oil sump level indications on the fuel gauge will not be instantaneous and operators are advised to keep the test button on the facia depressed for approximately 5 seconds until the gauge needle has stabilized.

In the past, the facia button mentioned also tested the engine overheat buzzer (with the low coolant warning lamp also being illuminated), however, this feature is no longer included in the test circuit.

Engine overheat warning buzzer—To test

At the intervals specified in the Service Schedules the engine overheat warning buzzer should be tested for operation as follows.

1. Locate the warning buzzer sender unit situated on 'A' bank cylinder head, between the sparking plugs of cylinders A3 and A4.
2. Detach the 'Lucar' connection (green/purple cable).
3. Switch on the ignition, the buzzer should sound whenever the 'Lucar' connection (green/purple cable) is earthed.

THE CARBURETTERS AND AUTOMATIC CHOKE SYSTEM

Fuel cooler

A cooler is fitted into the fuel system and using the same refrigerant as the air conditioning system, cools the fuel before it enters the carburettor float chambers. The fuel cooler is situated adjacent to the refrigeration compressor.

Fuel cooler—To remove

1. Discharge the refrigerant (see Chapter C).
2. Unscrew the two unions connecting the cooler to the fuel pipes.
3. Disconnect the refrigeration pipe from the front of the cooler.
4. Unscrew and remove the setscrew that secures the clamp plate to the rear face of the compressor.
5. Withdraw the clamp plate from the rear face of the compressor.
6. Unscrew and remove the cooler mounting setscrews situated at the forward end of the assembly; free the refrigeration pipes from the rear of the assembly. Withdraw the cooler.

Fuel cooler—To fit

To fit the fuel cooler reverse the procedure given for removal noting the following points:
1. Fit new rubber 'O' rings between the rear face of the compressor and the unions of the refrigeration pipes.
2. After fitting the cooler the full procedure of evacuation and sweeping must be carried out before the refrigeration system is charged, details are given in Chapter C.
Regulations concerning the provision of altitude performance adjustments, applying to all 'model years' from 1968 to 1981 inclusive, necessitate the fitting of new needles to the carburetters to improve the exhaust emissions.

These adjustments concern vehicles being operated at altitudes other than that for which the vehicle was originally certified.

High Altitude Areas are defined in the Federal Register - Volume 41 - Number 46 - Dated Monday, March 8th 1976 - as a County or Counties in the U.S.A. wholly located above 1 219 metres (4 000 feet).

These altitude performance adjustment instructions are applicable to all Rolls-Royce and Bentley vehicles manufactured for initial sale in North America (1968 - 1976 'model years' inclusive).

The following is a list of the kits available, applicable to the appropriate model year(s).

<table>
<thead>
<tr>
<th>Kit Number</th>
<th>Model Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>RH 2819</td>
<td>1968</td>
</tr>
<tr>
<td>RH 2820</td>
<td>1969-1972 (inclusive)</td>
</tr>
<tr>
<td>RH 2821</td>
<td>1973</td>
</tr>
<tr>
<td>RH 2822</td>
<td>1974</td>
</tr>
<tr>
<td>RH 2823</td>
<td>1975-1976 (inclusive)</td>
</tr>
</tbody>
</table>

The kits consist of a pair of needles and an 'Update' label.

After the new needles have been fitted, the idle CO (carburettor mixture strength) will have to be checked and reset if necessary. Reference should be made to the appropriate 'model year' of Chapter U, for the relevant settings.

When the above work has been carried out, the Vehicle Emission Control Information Update label supplied with the kit, should be fitted under the bonnet alongside the existing emission control certification label, but must not be fitted to any part that can be easily detached from the vehicle.
Chapter U

Needles - To remove

1. Thoroughly clean the outside of the carburetter.
2. Mark the suction chamber and carburetter body with a pencil, to aid assembly.
3. Unscrew and remove the damper and washer.
4. Remove the suction chamber retaining screws and remove the chamber without tilting it.
5. Remove the piston spring.
6. Carefully lift out the piston and needle assembly. Empty the oil from the piston rod.
7. Carburetters fitted with a fixed needle.
   Remove the needle locking screw and withdraw the needle. If it cannot easily be removed, first tap the needle inwards, then pull outwards.
   Carburetters fitted with a spring loaded needle.
   Remove the needle guide locking screw from the piston, then withdraw the needle assembly taking care not to bend the needle.
   Withdraw the needle guide from the needle and remove the spring.

Needles - To fit

Carburetters fitted with a fixed needle

1. Fit the needle to the piston assembly. The shoulder or lower edge of the groove must be level with the lower face of the piston rod (see Fig. 1). Fit and tighten the locking screw.
2. Invert the suction chamber and spin the piston assembly to check for concentricity of the needle.
3. Check that the piston key is secure in the carburetter body.
4. Fit the piston assembly to the body, then fit the piston spring over the piston rod. Fit the suction chamber taking care not to 'wind up' the piston spring. Fit and tighten the suction chamber retaining screws.
5. Ensure the upper portion of the piston rod in each carburetter is filled with the same type of oil as used in the engine. The correct level is approximately 13 mm. (0.50 in.) from the top of the tube.
6. Fit the piston damper and washer.

Carburetters fitted with a spring loaded needle

1. Fit the spring of the spring loaded needle onto the needle collar ensuring that the spring locates in the groove (see Fig. 2).
2. Fit the guide onto the needle so that the end with the indentation is towards the flange on the collar.

---

**FIG.2 CORRECT POSITION OF THE SPRING LOADED NEEDLE**

1. Spring
2. Collar
3. Indentation
4. Guide
5. Needle and guide position
6. Guide mark
7. Transfer holes and cut-outs
3. Fit the needle and guide into the piston. The lower face of the guide must be flush with the face of the piston (see Fig. 2), and the mark on the guide must be adjacent to the point midway between the two cut-outs in the piston.
4. Fit and tighten the guide locking screw to the piston.
5. Check that the piston key is secure in the carburetter body.
6. Fit the piston assembly to the carburetter body, carefully guiding the needle into the jet.
7. Fit the piston spring over the piston rod.
8. Fit the suction chamber, taking care not to 'wind up' the piston spring. Fit and tighten the suction chamber retaining screws.
9. Ensure the upper portion of the piston rod in each carburetter is filled with the same type of oil as used in the engine. The correct level is approximately 15 mm. (0.50 in.) from the top of the tube.
10. Fit the piston damper and washer.

Tuning the carburetters

For the tuning and setting of the idle CO, reference should be made to the relevant 'model year' of Chapter U.

Carburetter tamperproofing (if fitted)

If during the tuning of the carburetter it is necessary to adjust the idle CO setting, then retamperproofing of the carburetter adjusters will be necessary.