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.

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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 11935
   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
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.
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)
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.

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**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 carburettor  
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 carburettor  
16. Throttle stop vacuum actuator  
17. Air injection pump filter  
18. Weakener 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 straight-forward 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 Weakener 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 carburettet weaker unit, float chamber vent and fuel tank vent).

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

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

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**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. Weaken 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. U15).

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

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

1. Purge line restrictor
2. Weakener filter
3. Weakener 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.

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**Fig. U14 FUEL EVAPORATION EMISSION CONTROL SYSTEM - ENGINE COMPARTMENT**

**FITTINGS (Current Cars)**

1. Purge line restrictor
2. Weakener filter
3. Weakener unit
4. Bi-metal switch
5. Fuel receiver and float vent valve chamber
6. Weakener 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 canister.
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 carburetter '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 carburetter 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).

**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.
FIG. U16 POSITION OF MIXTURE WEAKENING DEVICE FILTER AND PURGE LINE FILTER
(Later and Current Cars)

1. Connections through valance to the fuel evaporation loss control canister
2. Fuel mixture weakening device filter
3. Purge line filter
4. Air injection system intake filter

Weakener filter — To remove

1. Remove the steel clips (if fitted) from the inlet and outlet hoses using special pliers (RH 8090).
2. Slacken the worm drive clip which retains the weakener filter to the bracket.
3. 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 Figs. U13 and U14).

Float chamber vent line

The carburettor float chambers are vented to the evaporation loss control canister through the float chamber vent line (see Figs. U13 and U14). 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

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 weakener 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
2 Connection to evaporation loss control canister
3 Filler neck vent
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. 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, 6-7 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, 6-7 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 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 fuel filler door release ring.

4. Unscrew and remove the three 2 B.A. setscrews securing the fuel trap assembly.

5. 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.
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 |
| Carburetter—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 carburetter 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 carburetter, 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 downstream and operates in a reduced diameter main jet; this jet does not require centralising.

The carburetter 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 carburetter 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 stove 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 Carburetter control linkage
15 Piston lift pin
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 carburetter (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 carburetter 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 carburetter 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.

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 carburetter 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 weakener 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 weakener 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 carburetter.

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.
Chapter U

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 weakener 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 weakener 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 down stream of the carburetter 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
Carburetters - 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.
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 micro-switch 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 carburetter.
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 stove 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 stove pipe to reveal the pipe connection. Disconnect the choke stove pipe.
14. Disconnect the hose(s) from the carburetter 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 carburetter ‘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 carburetter ‘Tee’ piece pipe. Also remove the top two nuts securing the ‘B’ bank carburetter 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 carburetter ‘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 weaker cut-off 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 carburetter 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 micro-switch 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 carburetter 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 carburetter
2 Air bleed
3 Body
4 Venturi
5 Hose
6 Filter
7 'B' bank carburetter
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 Carburetter 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 carburetter 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 carburetter.

**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 carburetter, should be placed in two boxes, one marked 'A' bank and the other 'B' bank.

2. **On current cars**, see page U1—Introduction. 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.

   **For carburetters fitted with a fixed needle and bias jet, carry out Operation 7 (see Fig. K17 in Chapter K).**

7. Remove the needle locking screw and withdraw the needle. If it cannot easily be removed, first tap the needle inwards then pull outwards. Do not bend the needle.

   If excessive force is required to remove the needle it should be discarded and a new one fitted.

   **For carburetters fitted with a spring loaded needle and centralised jet carry out Operations 8 and 9 (see Fig. U27).**

8. Remove the needle guide locking screw from the piston then withdraw the needle assembly taking care not to bend the needle.

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 carburetter 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 carburetter 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 carburetter 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 carburetter body using two screws.

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

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 carburetter 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 carburetter 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 carburetter. The tool and carburetter 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 carburetter 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

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**Fig. U23 CARBURETTER WEAKENING DEVICE (Current Cars)**

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 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 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 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.
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.

**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 ½ in. A/F nut and withdraw the bolt which retains the drain valve bracket to the engine mounting foot.

**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. (8.89 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, 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.
Chapter U

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 \(\frac{3}{4}\) 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 \(2\frac{3}{4}\) turns.

3. 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.

4. If a hot idle compensator valve is fitted remove the pipe from the hot idle compensator valve connection marked 'OUT'. Blank off the pipe.

5. 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 Disconneting the hoses at the check valves isolates the pump and renders the air injection system inoperative.

6. Connect a tachometer to the engine in accordance with the manufacturer's instructions.

7. 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).

   Run the engine in Neutral at 2 000 r.p.m. for \(\frac{1}{2}\) 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.
   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 'B' bank of carburettet float chamber.
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(b) An air leak at one or more of the following:
- Float chamber lid joint.
- Float chamber vent and drain pipes.
- Weakeners cut-off valve pipe unions.
- Vacuum take-off plate flange on 'B' bank carburetter.

c) A dirty or faulty float chamber drain valve.

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

A high reading may be caused by:
(a) An obstruction in the weakeners air bleed orifice or the weakeners hoses.
(b) A fouled weakeners 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 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 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 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 ⅛ 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 commences to fall, then turn both jet adjusting screws ⅛ 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 carburettter piston lift pin in turn then comparing engine response. The carburetters are balanced if the response is the same for each carburettter. 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 1 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 $5\%$ 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 $\frac{1}{4}$ 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.

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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 1 1/4 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 2 1/2 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 \( \frac{1}{2} \) 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 valance adapter 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


Tuning procedure

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

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. U31). 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. U31). 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 1⁄4 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 1⁄4 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 1⁄4 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 1⁄4 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 Efav 109

21. Idle the engine until a steady C.O. reading is obtained (minimum time 1⁄4 minute) then check the exhaust emission on the C.O. meter; the correct reading should be between 54% 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 1⁄4 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 K4.

Kick-down micro-switch – To set

Refer to Chapter K Section K4.
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.

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 carburetter 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.).
Fig. U33 CHECKING THE CHOKE STOVE PIPE DEPRESSION

1 Wooden board
2 Water
3 Rubber tube
4 Union-choke stove pipe connection
5 Choke stove pipe
6 Calibrated orifice
7 Polytene tube
8 Scale
9 Manometer

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.
Weaken solenoid hose connections.
Weaken tapping flange on 'B' bank carburettet.

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

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

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

If the reading at the weakenere unit is high, it may be caused by:

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

(b) A fouled weakenere filter or evaporation loss control canister filter.

(c) An incorrect connection of the weakenere hose to the valance connection or evaporation loss control canister filter.

(d) An incorrect purge flow rate (exceeding 70 cu. ft./hr.).

(e) Evaporation loss control canister obstructed.

If the float chamber depression is still incorrect after carrying out all the above checks, then the correct depression of 3-25 in. (8.26 cm.) of water may be set by turning the socket head adjustment screw (see Fig. U23) on the mixture weakening device. Turning the adjustment screw clockwise increases the depression.

Remove the manometer from the weakenere unit and connect the hose from the evaporation loss control canister.

Important Connect the manometer to the float chamber pressure tapping and finally check the reading at this point.

The adjustment screw is locked in position with 'Casco', therefore if adjustment is made the screw must again be locked in position by applying a coating of 'Casco' to the screw threads.

12. Raise the engine speed slowly, noting the manometer and tachometer readings. The maximum steady manometer reading should be obtained between 1 500 r.p.m. and 1 900 r.p.m. If the maximum depression occurs below 1 500 r.p.m. it is permissible to screw out the idle bleed screws by equal amounts up to a maximum of 2½ turns, to obtain the speed.

13. Stop the engine. Disconnect the distributor vacuum hose from the vacuum retard tap. Blank off the tap connection.

14. Remove air intake trunk and blank off the hot idle mixture compensator feed (see Fig. U34). Fit the air intake trunk.

15. Remove the air hoses from the check valves and fit blanks to the valves.

It is important to carry out Operation 14 ensuring that the check valves are blanked off.

16. Top-up both carburettet dampers with approved oil. The oil level should be approximately 0-50 in. (12.7 mm.) below the top of the piston rod.

Remove the cap from the pressure tapping on A bank carburettet to render the weakenere inoperative.
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 \( \frac{1}{2} \) 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 \( \frac{1}{2} \) 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 Mexa 200

21. Idle the engine until a steady C.O. reading is obtained (minimum time \( \frac{1}{2} \) 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 carburettor.

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 (\( \frac{1}{2} \) of a turn at a time), until the maximum r.p.m. is obtained.

Note Turning the screws clockwise richens 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 \( \frac{1}{2} \) 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 \( \frac{1}{2} \) 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 \( \frac{1}{4} \) turn) until the C.O. meter reading of \( 5\frac{1}{2} \) 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 blanks 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, weakener filter, weakener 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 withdrawing 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 **weakener 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 weakener 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 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 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.

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 weakener 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).
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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 weakener 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 2 000 r.p.m.; tighten the lock-nut, and check to ensure that the engine speed is still at 2 000 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 main fuse box.
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.
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 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) 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**

**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 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.).

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.
PERIODIC 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.

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 3000 miles or 3 months whichever is the earlier. Items marked * will be carried out free of charge.

INITIAL 3000 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 carburetter balance, mixture strength and idle speed. Check and if necessary reset the cold start fast-idle speed.

EVERY 3000 MILES OR 3 MONTHS WHICHEVER IS THE EARLIER

Engine

If the car is used for constant stop-start operation, change the engine oil.
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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 the 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 carburetter 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 carburetter 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.

EVE~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.
Chapter U

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.

Carburetter mixture weakening device
Renew air filter element for the carburetter 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 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 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 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. 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 thoroughly 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>
<tbody>
<tr>
<td><strong>Exhaust Emission Control</strong></td>
<td><strong>System</strong></td>
<td></td>
</tr>
<tr>
<td>1. Engine backfires on over-</td>
<td>(a) Pump drive belt slack.</td>
<td>1. (a) Tighten belt.</td>
</tr>
<tr>
<td>run.</td>
<td>(b) Severe air leak in system probably between control valve and carburettor 'Tee' piece.</td>
<td>(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.</td>
</tr>
<tr>
<td></td>
<td>(c) Control valve sticking in a closed position.</td>
<td>(c) Renew control valve.</td>
</tr>
<tr>
<td></td>
<td>(d) Gulp valve sticking in a closed position.</td>
<td>(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.</td>
</tr>
<tr>
<td></td>
<td>(e) Faulty check valves.</td>
<td>(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.</td>
</tr>
</tbody>
</table>

(Revised January 1972)
### Chapter U

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>POSSIBLE CAUSE</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Excessive pump noise.</td>
<td>2.(a) Slack belt. (b) Loose air silencer. (c) Relief valve failure.</td>
<td>2.(a) Tighten belt. (b) Check the air silencer. If the silencer is not securely mounted, normal pump noise will be amplified. (c) (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. (ii) Plug air delivery pipe and check that the relief valve blows at 5 lb/sq. in. (0,351 kg/sq. cm.) when 'Neutral' is engaged on the gear selection quadrant. Renew relief valve if necessary. (d) Renew pump. If the vanes have obviously been damaged by exhaust heat, examine the check valves for correct operation. (e) (i) If the air pump has been in Service for some time, remove pump and determine the cause, e.g. worn bearings. (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. (f) Renew pump.</td>
</tr>
<tr>
<td></td>
<td>(d) Damaged impeller vanes.</td>
<td>(d) Renew pump.</td>
</tr>
<tr>
<td></td>
<td>(e) Rubbing vanes (an intermittent 'chirping' noise, noticeable mainly at low engine speed).</td>
<td>(e) Renew pump.</td>
</tr>
<tr>
<td></td>
<td>(f) Worn bearing. Bearing noise is a rolling sound—noticeable at all speeds.</td>
<td>(f) Renew pump.</td>
</tr>
<tr>
<td>3. Engine idles very roughly.</td>
<td>3.(a) Control valve sticking in open position. (b) Air leaks between control valve and carburetter ‘Tee’ piece.</td>
<td>3.(a) Renew control valve. (b) See Symptom 1 Action b.</td>
</tr>
<tr>
<td>4. Unsatisfactory running of the engine.</td>
<td>4.(a) Air silencer cleaner element choked.</td>
<td>4.(a) Remove and clean element.</td>
</tr>
<tr>
<td>Malfunctioning mixture weakening system.</td>
<td>5.(a) Weakening device filter blocked or blockage in rubber hose or bleed orifice. (b) Dislodged venturi in 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. (d) Incorrect connection of weaner hose to valve adaptor or evaporation loss control canister. (e) Incorrect purge flow rate (greater than 1 cu. ft/minute). (f) Evaporation loss control canister obstructed.</td>
<td>5.(a) Renew filter or remove the blockage. (b) Renew the weakening device. (c) Renew filter or remove blockage. (d) Ensure connections are fitted correctly; rectify if necessary. (e) Renew purge line restrictor. (f) Remove obstruction.</td>
</tr>
<tr>
<td>5. High float chamber depression also spitting back in the carburetters.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Symptom

<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 weakener 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 weakener cut-off valve.  
(g) Faulty cut-off valve.  
(h) A dirty or faulty float chamber drain valve. | **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. |
| 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.** |
## Workshop Manual
### Rolls-Royce Silver Shadow & Bentley T Series
### Chapter U

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>POSSIBLE CAUSE</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Carburetters—continued</strong></td>
<td></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>
</tr>
<tr>
<td>(b) Sticking carburetter piston caused by a bent damper rod.</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 carburetter re-set.</td>
<td></td>
</tr>
<tr>
<td>(c) Sticking carburetter piston caused by dirt between the suction chamber and piston rod sticking in its bush.</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. K16 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 carburetter. If the needle is disturbed or renewed the carburetters must be reset and tuned.</td>
<td></td>
</tr>
</tbody>
</table>

### 8. Stalling

| 8.(a) Flooding of the float chamber or the jet. | 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. (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. |                                                                                                                                                                      |
| (b) Water or foreign matter in the float chamber. |                                                                                                                                                                      |                                                                                                                                                                      |
### Symptom: Engine stalls when idling or under light running conditions.

#### Possible Cause

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 the fuel system after prolonged storage of the fuel in the tank.

#### Action

1. 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).
2. 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).
3. 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.
4. 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 carburettors, 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 carburettors.

#### Action

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.

### Symptom: Engine shows serious power loss evident at high speeds and loading.

#### Possible Cause

10(a) Insufficient delivery of fuel.
   (b) Ignition timing
   (c) Sparking plugs.

#### Action

10(a) Check the fuel pumps for adequate delivery and the filters in the system for cleanliness.
10(b) Check and reset if necessary.
10(c) Clean, set gap, test or renew.
## 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>
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 PAGE
U1 Exhaust Emission Control System U 3
U2 Fuel Evaporation Emission Control System U 9
U3 Crankcase Emission Control System U 17
U4 Emission Control System (Electrical Components) U 19
U5 The Carburetters and Automatic Choke System U23
U6 Ignition System, Distributor, Ignition Coil and Sparking Plugs U39
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U8 Fault Diagnosis U51
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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.
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 carburetter
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 carburetter
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
Chapter U
Section U1
EXHAUST EMISSION CONTROL SYSTEM

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 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 (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
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 carburetter
3 Weakening device
4 'B' bank carburetter
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 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.

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**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.

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**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 \(\frac{3}{4}\) 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 carburetter 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.

If the valve has moved to the open position, stop the engine, and remove the tachometer as the test is complete. If however, the valve has not moved to the open position proceed as follows.

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 carburetter float chamber to vent the float chambers to atmosphere.
10. Start the 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.

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.

**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 \(\frac{3}{8}\) 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 carburetter '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.
Chapter U

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.
Section U2
FUEL EVAPORATION EMISSION CONTROL SYSTEM

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 carburettet weaker unit, float chamber vent and fuel tank vent).

The function of the activated carbon is to absorb and retain fuel vapour from the carburettet 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.

**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.

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

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

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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 ¼ 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](image)

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., 1,875 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 \pm 2 in. H\textsubscript{2}O) 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 EMISSION CONTROL SYSTEM

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

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**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 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. 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.

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 Lucar 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 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.
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 Lucar 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 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. 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.
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
Carburetter—
  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 carburetter 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 carburetter, 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 carburetters, which is biased down stream and operates in a reduced diameter main jet; this jet does not require centralising.

The carburetter 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 carburetter 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 carburettet (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 carburetter 7 Float chamber drain valve
2 Float chamber pressure tapping 8 Fuel receiver
3 Weakening device 9 Anti 'run-on' solenoid
4 Bi-metal switch 10 Bleed orifice
5 Float chamber vent valve 11 Venturi
6 Weakening device cut-off solenoid 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 con-
taining a venturi at one end which is pressed into a
drilling in the carburetter 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 com-
municates 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 con-
ditions.

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 carburetter 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 compen-
sated for in the design of the jet needle.

**Cruising**

With the throttle partly open, the weakener 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 weakener and therefore the float chamber depres-
sion. 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 tem-
perature is below 16°C. (60°F.), a bi-metal switch
activates a solenoid valve which vents the float cham-
ber to atmosphere via the evaporation loss control
kanister and renders the weakener inoperative.

**Hot idle mixture compensator valve**

At high ambient temperatures the idle quality deterior-
ates 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 carburetter 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 \( \frac{1}{8} \) 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 carburetter 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 $\frac{3}{8}$ 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.

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**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 (Weakener 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 carburettor.
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 carburettor 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 carburettor '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 carburettor 'Tee' piece pipe. Unstack and remove the top two 4 in. A/F nuts and washers from 'B' bank carburettor and withdraw the throttle stop vacuum actuator and bracket.
22. Remove the pipe fitted between the gulp valve and carburettor 'Tee' piece.
23. Disconnect the electrical connections from the two solenoid valves mounted on and bracket attached to 'B' bank carburettor.
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, 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 carburettor 'Tee' piece and located by two dowel pins.

**Dismantle the carburetters 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 carburettor 'Tee' piece. Withdraw the pipes and gaskets.
28. Slacken the pinch bolt and remove the fast-idle lever from the 'A' bank carburettor butterfly spindle (see Chapter K).

29. Unscrew and remove the two ¼ in. A/F nuts from the two setscrews securing the air horn to 'B' bank carburettor. Withdraw the solenoid mounting bracket.
30. Remove the four setscrews securing the two air horns to the carburetters, collect the full throttle stop bracket from 'A' bank carburettor.
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 carburettor spill pipe from each carburettor float chamber.
35. Remove the float chamber lids and floats, keeping them to their respective carburettor.
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 carburettor butterfly spindles; remove the levers.
39. Remove the nuts and washers securing both carburetters to the 'Tee' piece, remove the carburetters, together with the throttle damper bracket adjacent to 'A' bank carburettor.

**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 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. Fit the paper filter elements, spring retainers, springs and inlet unions to each float chamber lid. Secure the inlet unions with the retaining screws.
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 Carburetter 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 locking nut
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
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 carburetter, should be placed in two boxes, one marked 'A' bank and the other 'B' bank.

2. Unscrew and remove the two weakener unit retaining screws; withdraw the weakener 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 carburetter 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 carburetter 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 weakener 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.
FIG. U18 CORRECT POSITION OF SPRING-LOADED NEEDLE

1 Spring  
2 Collar  
3 Indentation  
4 Guide  
5 Needle and guide position  
6 Mark on guide  
7 Transfer holes and cut-outs

Carburetters—To assemble

1. Check that all the passages in the carburettor body are free from any obstruction.
2. Ensure that the venturi pressed into the carburettor body is not damaged. Fit the weaker unit together with a new gasket to the carburettor body using two screws.
3. Examine the butterfly valve spindle for scoring or signs of wear.
4. Fit the spindle in its bearings and check for slack in the bearings and freedom of operation.
5. 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.
6. 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.

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 fit 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 carburetter. 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 carburetter 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 carburetter body.

31. Fit the piston assembly to the carburetter 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 remove**

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 chamber 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 ½ 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 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, 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.

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 condition of the distributor contact breaker points.
3. Check the ignition timing (see Section U6).
4. Check the flow through the choke stove pipe (see Automatic choke stove pipe—To check).
5. Check the entire induction system for air leaks.
6. Check the purge line flow rate (see Section U2).
7. Ensure that the air conditioning system is switched off.
8. Start the engine and warm up; allow to run for at least 5 minutes after the thermostat has opened.
9. Stop the engine, ensure that the choke butterfly valve is fully open and the choke ‘fast-idle’ off.
10. Connect an electric impulse tachometer in accordance with manufacturer’s instructions.
11. Check the float chamber depression. (see Float chamber depression—To check).
12. 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.
   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).
   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.
2. Remove the pressure tapping cap from 'B' bank carburetter float chamber to vent the float chambers to atmosphere.
3. 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.
4. Set the engine idle speed to 600 r.p.m. by means of the fixed throttle stop screw.

Preliminary checks

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 U6).
4. Check the flow through the choke stove pipe (see Automatic choke stove pipe—To check).
5. Check the entire induction system for air leaks.
6. Check the purge line flow rate (see Section U2).
7. Ensure that the air conditioning system is switched off.
8. Start the engine and warm up; allow to run for at least 5 minutes after the thermostat has opened.
9. Stop the engine, ensure that the choke butterfly valve is fully open and the choke ‘fast-idle’ off.
10. Connect an electric impulse tachometer in accordance with manufacturer’s instructions.
11. Check the float chamber depression. (see Float chamber depression—To check).
12. 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.
   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).
   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.
2. Remove the pressure tapping cap from 'B' bank carburetter float chamber to vent the float chambers to atmosphere.
3. 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.
4. 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 carburetter 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 ½ 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 carburetter 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 carburetter. 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 carburetter 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 ½ 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 carburetter 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 carburetter. 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 carburetter 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 ¾ 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 ¼ 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 carburetter 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 ¾ minute and then resume tuning. Repeat
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. 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, weakener filter, weakener 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 (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 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 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 carburetter by unscrewing the \( \frac{3}{8} \) 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.
2. Remove the two wing nuts securing the scoop to the body; remove the scoop.
**FIG. U24 CHECKING THE CHOKE STOVE PIPE DEPRESSION**

1. Manometer  
2. Calibrated orifice  
3. Choke stove pipe  
4. Rubber tube

**Hot air scoop—To fit**

Fit the scoop by reversing the procedure given for removal.

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**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. Stop the engine and disconnect the air intake hose from the choke butterfly housing.
3. Connect a flowmeter to the choke stove pipe feed (see Fig. U24) using a suitable length of rubber tube.

**Note** The flowmeter for this operation consists of a calibrated orifice (RH 8095) and a water manometer capable of measuring up to 25 in. (63.50 cm.).

4. Start the engine and run at the idle speed.
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.).

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 carburetter 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
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 carburetter 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 is obtained on the manometer. Correct reading is between 2-0 in. and 2-25 in. of water depression.

A low or zero reading may be caused by:

a. 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.

Float chamber depression—To check

1. Disconnect the solenoid to exhaust gas recirculation valve hose at the valve end and blank off the hose.

2. Disconnect the weakener to vent canister hose at the weakener end and connect a manometer capable of measuring between 0 in. and 6 in. of water.

3. Run the engine at 2,500 r.p.m. in neutral until a steady reading is obtained on the manometer. Correct reading is between 2-0 in. and 2-25 in. of water depression.

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 carburetter.

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.
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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 1 500 r.p.m. and 1 900 r.p.m. If the maximum depression occurs below 1 500 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.