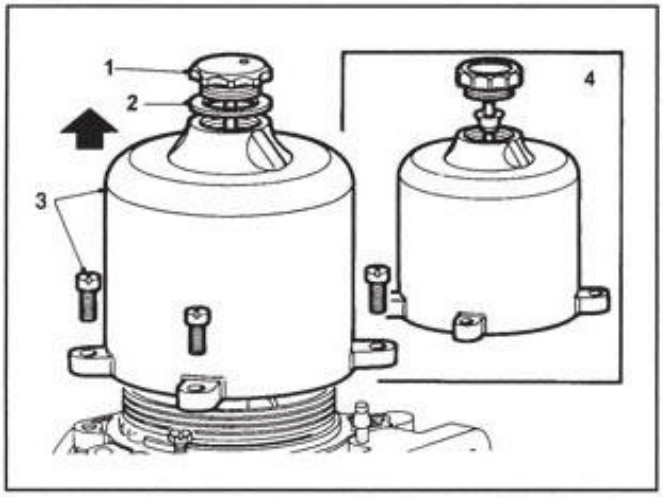
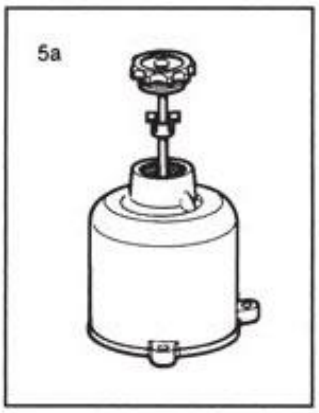
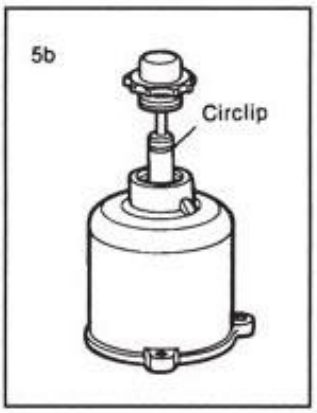
HS4C and HS8 Carburetter: Dismantling



1

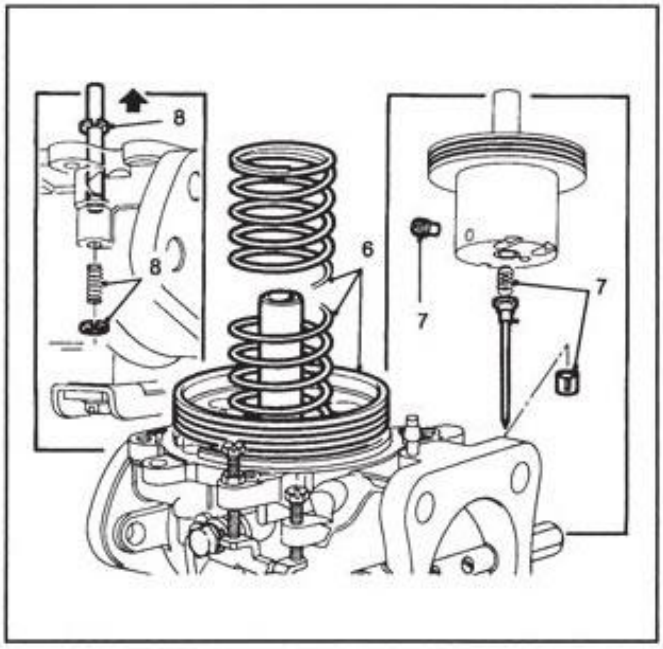
(a) Thoroughly clean the outside of the carburetter.
(b) **Standard suction chambers**. Remove the piston damper (1) and its washer (2), if fitted.
(c) Unscrew the suction chamber retaining screws (3).
(d) Lift the chamber assembly vertically from the body without tilting it (4).





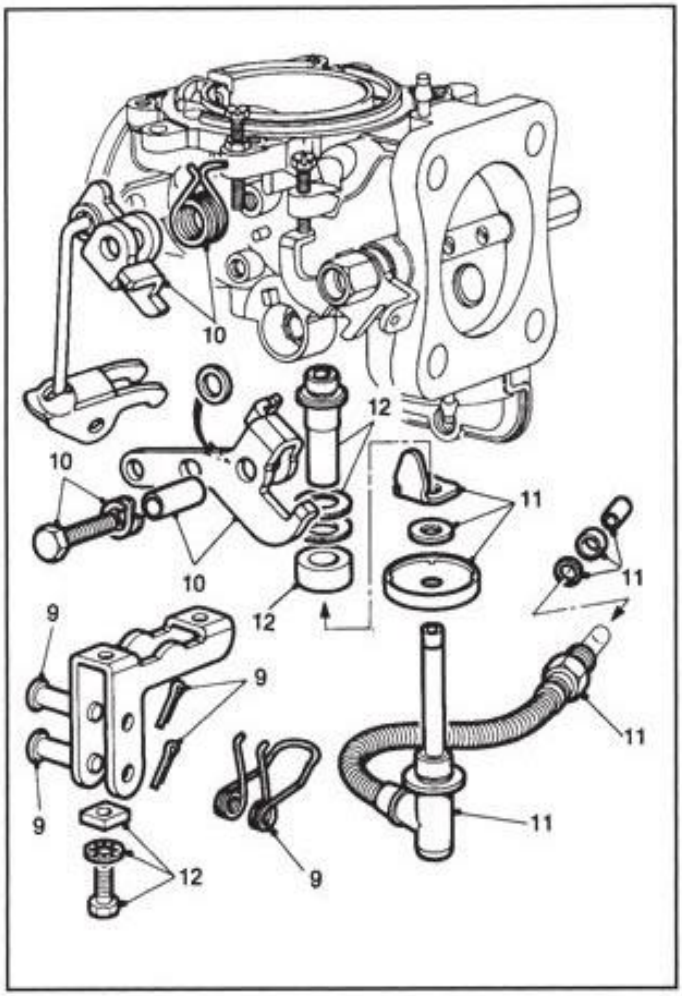
2

Ball bearing suction chambers (early type). Hold the piston firmly and pull the suction chamber, taking care not to bend the damper rod, until the bearing retainer is freed from the piston rod (5a). Remove the damper.
Ball bearing suction chambers (later type). Remove the piston damper. Lift the piston and remove the bearing retaining circlip (5b). Note: ball bearing suction chambers are not available for HS8 carburetters.



3

(a) Separate the suction chamber, the spring and the piston assembly and empty the oil from the piston rod (6).
(b) Unscrew the needle guide locking screw, then withdraw the needle, guide and spring (7).
(c) Remove the piston lifting pin circlip and spring, withdraw the pin from the body (8).



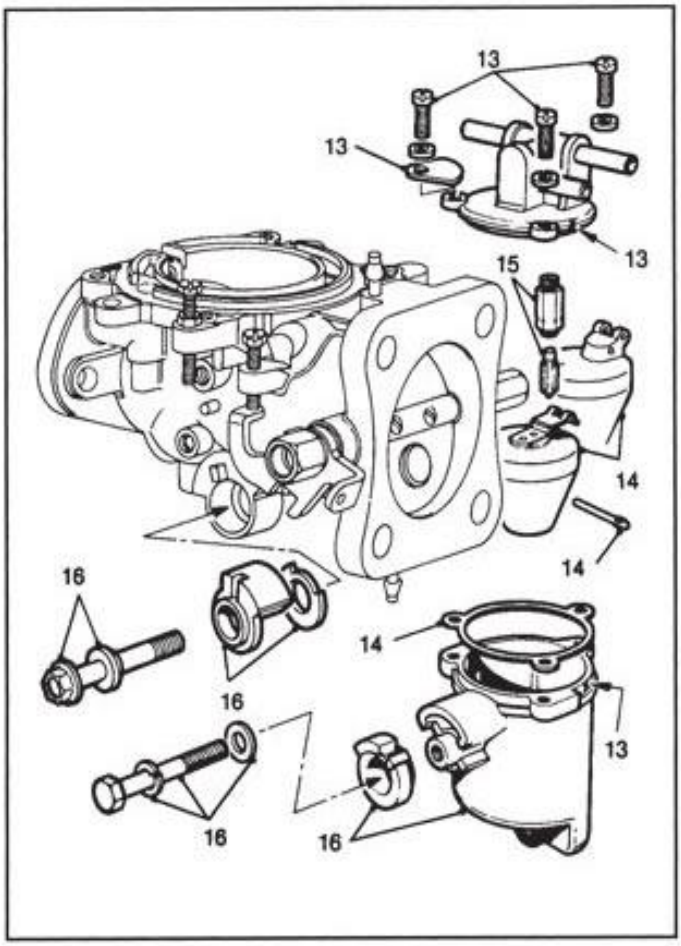
4

(a) Remove the split pins retaining the jet spring anchor pin and jet fork pivot pin. Remove the pins, spring and jet fork from the bracket (9).

(b) Release the cam lever return spring from its lug, remove the bolt, washers, cam lever, bush and link arm assembly (10).

(c) Unscrew the jet tube sleeve nut from the float chamber and withdraw the jet assembly complete with centring washer, copper washer and ferrule at the end of the jet tube (11).

(d) Remove the bolts, starlock washers and spacers securing the fork bracket to the carburetter body and withdraw the jet bearing together with the bush and Bellville washers (12).



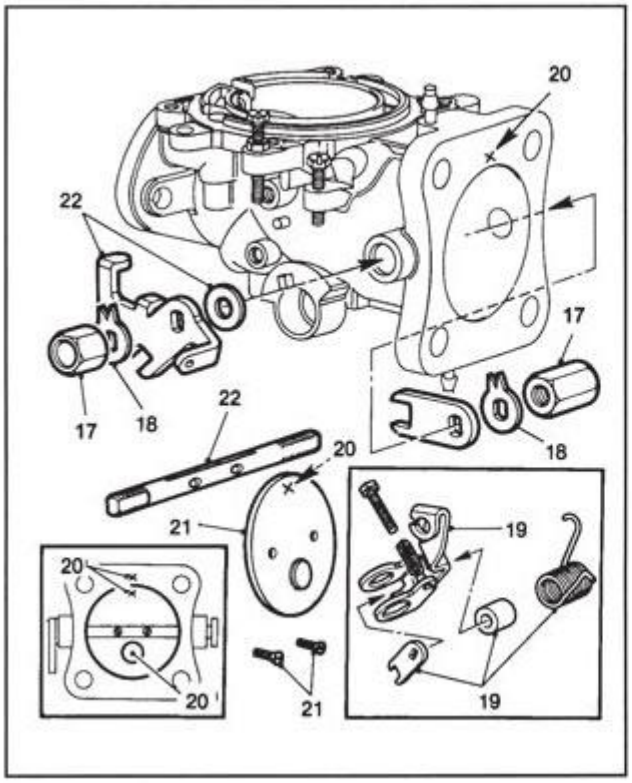
5

(a) Mark the relative position of the float lid and chamber, remove the float lid retaining screws, washers and identification tag (13).

(b) Remove the float lid and gasket, withdraw the float hinge pin and remove the float (14).

(c) Withdraw the float needle and unscrew the needle seat (15).

(d) Remove the float chamber securing bolt, float chamber and metal spacer or rubber mounting and backing washer (16).



6

(a) HS4C - release the return spring from the throttle lever.

(b) Bend back the tabs and remove the throttle spindle nut(s) (17) and tab washer(s) (18).

(c) HS4C - withdraw the lost motion lever, throttle actuating lever, return spring and spacer (19).

(d) Close the throttle and mark the position of the throttle disc in relation to the carburetter flange (20). Do not mark the disc in the vicinity of the overrun valve.

(e) Unscrew the disc retaining screws, open the throttle and ease the disc from its slot in the throttle spindle (21) taking care not to damage the overrun valve.

(f) Remove the throttle lever and washer and withdraw the spindle from the body (22).

HS Type Carburetter: Inspection

1

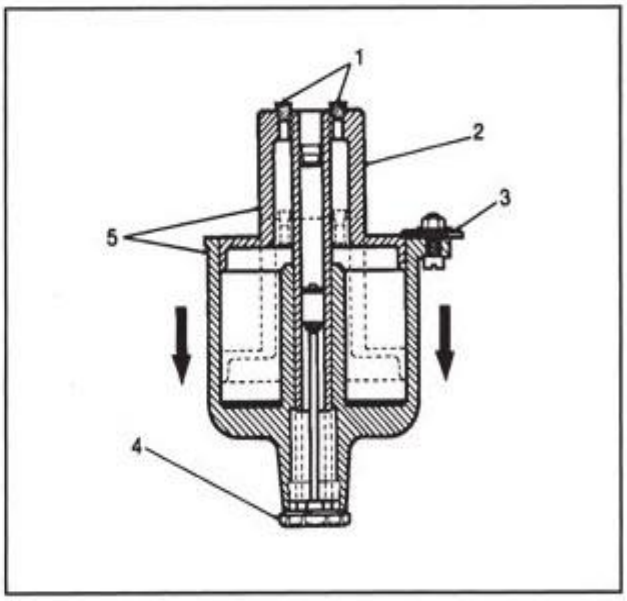
(a) Examine the throttle spindle and its bearings in the carburetter body; check for any excessive play, and renew any parts as necessary.
(b) Examine the float needle and seating for any damage and excessive wear; renew if necessary.
(c) Check condition of all gaskets; renew as necessary.

2

(a) Examine the carburetter body for cracks and damage, and for security of the brass connections and the piston key.
(b) Clean the inside of the suction chamber and the piston rod guide with fuel or methylated spirit (denatured alcohol) and wipe dry. Abrasives must not be used.
(c) Examine the suction chamber and piston for damage and signs of scoring.

3

Ball bearing suction chambers. Check that all the balls are in the piston ball race (2 rows, 6 per row). Fit the piston into the suction chamber, without the damper and spring, hold the assembly in a horizontal position and spin the piston. The piston should spin freely in the suction chamber without any tendency to stick.

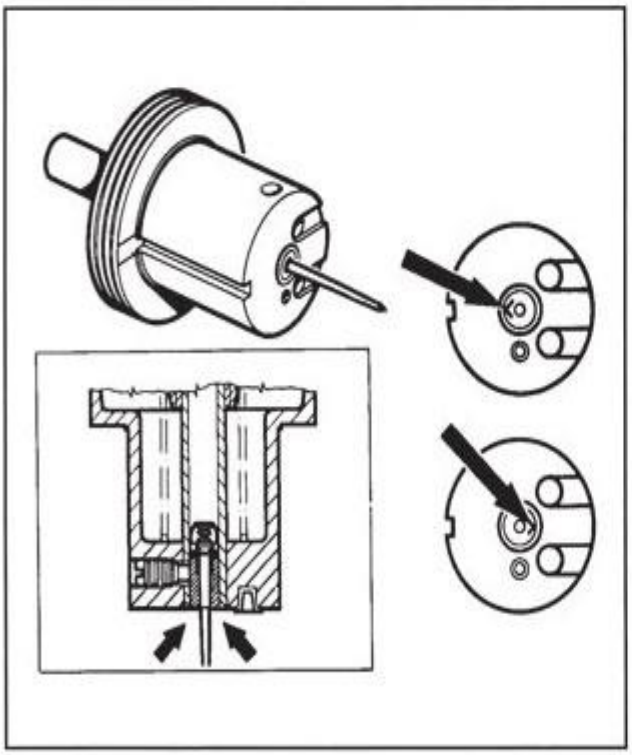


4

The following timing check applies only to standard suction chambers and need only be carried out if the cause of the carburetter malfunction which necessitated the dismantling has not been located.

(a) Temporarily plug the piston transfer holes (1).
(b) Fit the piston into the chamber without its spring (2).
(c) Fit a nut and screw, with a large flat washer under the nut, into one of the suction chamber fixing holes, positioning the washer so that it overlaps chamber bore (3).
(d) Fit the damper and washer, if fitted (4).
(e) Check that the piston is fully home in the chamber, invert the assembly to allow the chamber to fall away until the piston contacts the washer (5).
(f) Check the time taken for the chamber to fall the full extent of the piston travel. For carburetters 38.0 mm (1.5 in) to 47.6 mm (1 7/8 in) bore, the time taken should be 5 to 7 seconds.
(g) If the times are exceeded check the piston and chamber for presence of oil, foreign matter and damage. If after re-checking the time is still not within these limits, renew the suction chamber assembly.

HS Type Carburetter: Reassembly



After inspection (see following page), reassemble by reversing the procedure used to dismantle the carburetter, noting the following:

(a) Ensure that the throttle disc is fitted in its original position.

(b) New throttle disc retaining screws must be used when refitting the disc. Ensure that the throttle disc is correctly positioned and closes correctly before tightening the retaining screws. Spread the split ends of the screws sufficiently to prevent turning.

(c) Use a new retaining screw and a new needle guide ensuring that the needle guide fitted gives the needle bias in the required sense (either toward throttle disc or toward air cleaner). Before tightening the retaining screw check that the needle guide is in its correct position relative to the piston face, either flush with the bottom of the piston on standard pistons or flush with the recess on recessed pistons.

(d) **Ball bearing suction chambers.** To prevent the piston spring from being 'wound up' during reassembly, temporarily fit the piston and suction chamber, less the piston spring, to the body and pencil mark their relative positions to each other. Fit the spring to the piston, hold the suction chamber above the piston, align the pencil marks and lower the chamber over the spring and piston. It is essential that the bearing retention clip (early type) or the bearing retention circlip (later type) is correctly fitted.

HS Type Carburetter: Tuning (General)

It is essential, particularly where vehicles are equipped and tuned to comply with engine emission control regulations, that the carburetters are tuned in accordance with the vehicle manufacturer's tuning data. To achieve the best results when tuning, the use of a reliable tachometer, balancing meter and an exhaust gas analyzer (CO meter of the infra-red non-dispersive type or equivalent are required). These instruments are essential when tuning vehicles equipped to conform with exhaust emission regulations.

Before servicing or tuning a carburetter in an endeavour to rectify poor engine performance, make sure that the maladjustment or fault is not from another source by checking the following:

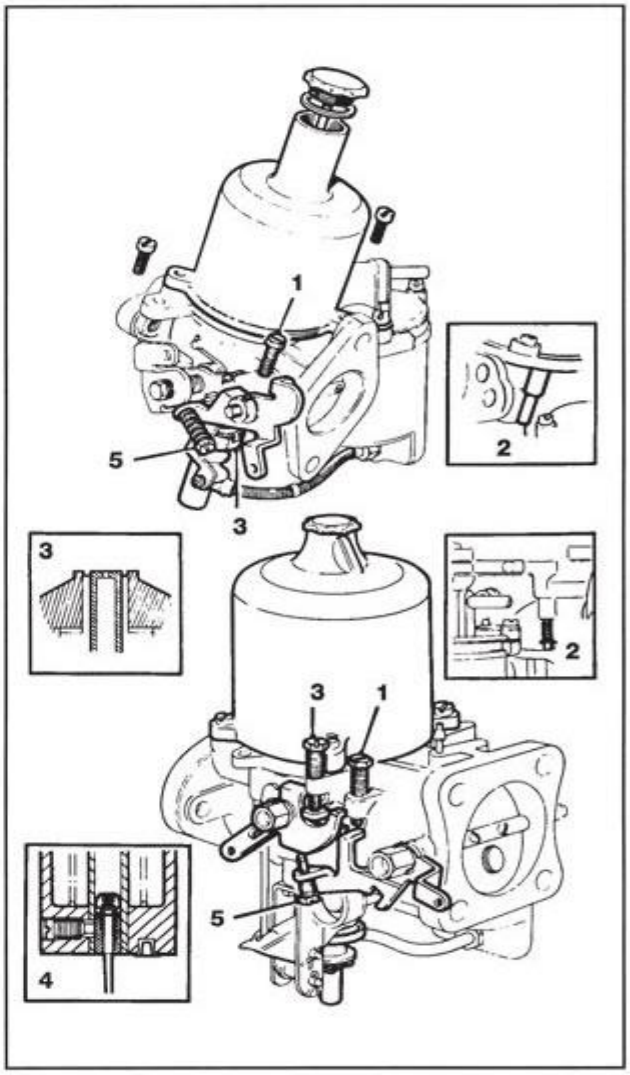
Valve clearance
Spark plug condition
Contact breaker (dwell angle)
Ignition timing and advance
Presence of air leaks into the induction system

1

(a) Remove the air cleaner(s).
(b) Check the throttle for correct operation and signs of sticking.
(c) Unscrew the throttle adjusting screw (each screw on multi-carburetters) until it is just clear of the throttle lever with the throttle closed, then turn the screw clockwise 1.5 full turns (single), one turn on each (multicarburetters) (1).
(d) Raise the piston of each carburetter with the lifting pin (2) and check that it falls freely onto the bridge when the pin is released. If the piston shows any tendency to stick, the carburetter must be serviced.

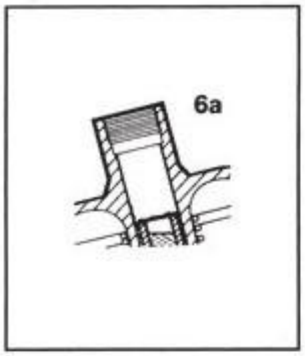
2

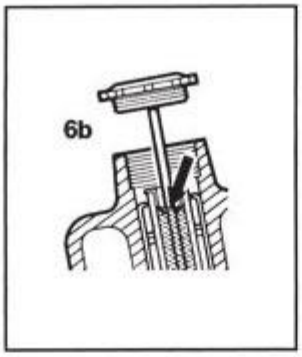
(a) Lift and support the piston clear of the bridge so that the jet is visible; if this is not possible due to the installed position of the carburetter, remove the suction chamber assembly.
(b) Turn the jet adjusting nut/screw up/anti-clockwise, until the jet is flush with the bridge or as high as possible without exceeding the bridge height (3). Ensure that the jets on multi-carburetters are in the same relative position to the bridge of their respective carburetters.
(c) Check that the sintered needle guide is flush with the underside face of the piston (4).
(d) Turn the jet adjusting nut/screw (3) two turns down/clockwise (each nut/screw on multicarburetters).
(e) Turn the fast-idle adjusting screw anti-clockwise (each screw multi-carburetters) until it is well clear of the cam (5).



3

Refit the suction chamber assembly if it has been removed and, using the lifting pin (2), check that the piston falls freely onto the bridge.
Note: If ball bearing suction chambers are fitted take care not to wind up the piston spring when refitting the suction chamber - see reassembly section.





4

Check the piston damper oil level:

(a) **Standard suction chambers.** Unscrew the cap and withdraw the damper. Top up with oil (preferably S.A.E. 20) until the level is just below the top of the hollow piston rod, refit the damper and screw the cap firmly into the suction chamber (6a).

(b) **Ball bearing suction chambers (early type).** Unscrew the cap and raise the piston and damper to the top of their travel. Fill the recess in the damper retainer with oil (preferably S.A.E. 20), lower the damper until the cap contacts the suction chamber, repeat this procedure until the oil level is just visible at the bottom of the retainer recess. Screw the cap firmly into the suction chamber. It is essential that the bearing retainer is not displaced from its position in the piston rod (6b).

(c) **Ball bearing suction chambers (later type).** Unscrew the damper cap and withdraw the damper. Top up with oil (preferably S.A.E. 20) to within 6.5 mm (0.25 in) of the top of the hollow piston rod. Refit the damper and screw in firmly.

5

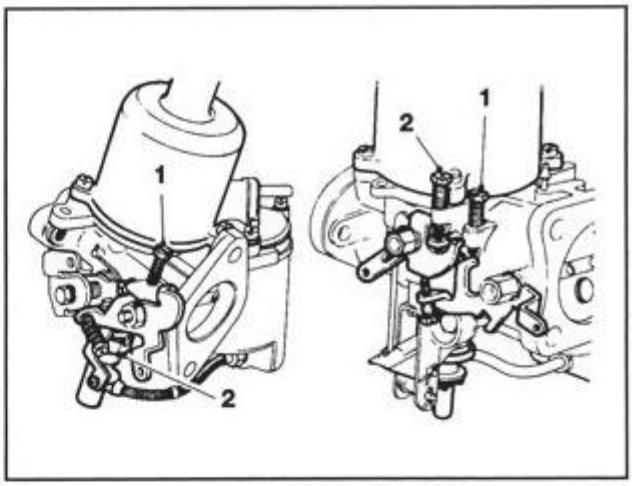
(a) **Vehicles with emission control.** Connect a reliable tachometer to the engine in accordance with the instrument manufacturer's instructions.

(b) Start the engine and run it at a fast-idle speed until it attains normal running temperature, then run it for a further five minutes.

(c) Increase the engine speed to 2,500 r.p.m. for 30 seconds.

(d) **Vehicles with emission control.** Connect an exhaust gas analyser to the engine in accordance with the instrument manufacturer's instructions.

Setting can now commence. If the correct setting cannot be obtained within three minutes, increase the engine speed to 2,500 r.p.m. for 30 seconds and then re-commence tuning. Repeat this clearing operation at three-minute intervals until tuning is completed.

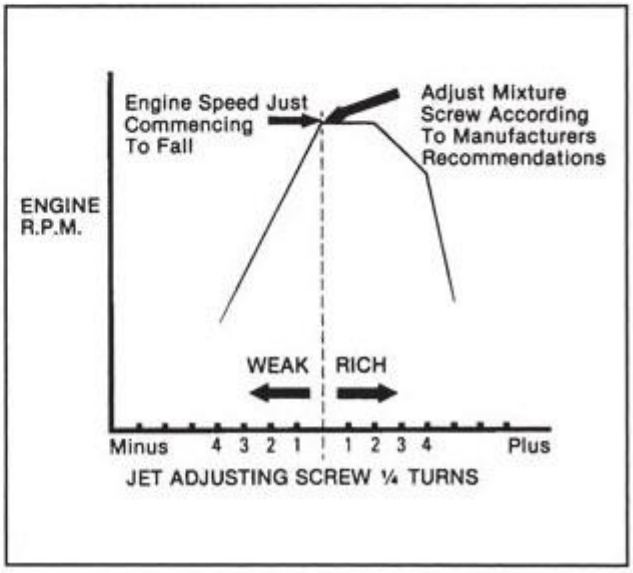


1

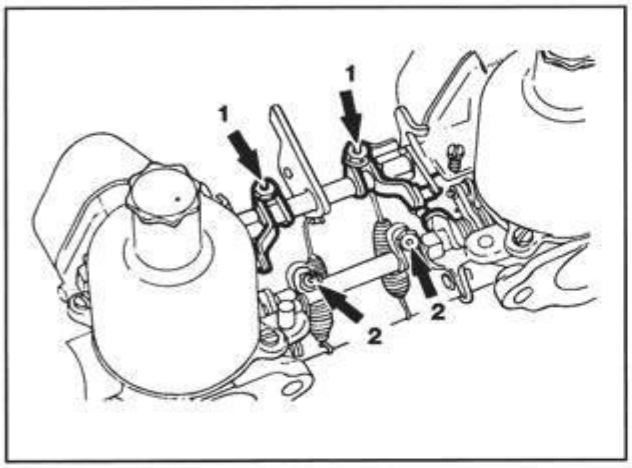
(a) Adjust the throttle adjusting screw (1) until the correct idle speed is obtained (see vehicle manufacturer's tuning data).

(b) Turn the jet adjusting nut/screw (2) down/clockwise, to enrich or up/anti-clockwise to weaken, until the fastest speed is indicated; turn the nut/screw up/anti-clockwise until the engine speed just commences to fall. Turn the nut/screw down/clockwise very slowly the minimum amount until the maximum speed is regained. From this setting adjust the mixture screw according to the vehicle manufacturer's recommendations.

(c) Check the idle speed, and readjust it as necessary with the throttle adjusting screw to obtain the correct setting.

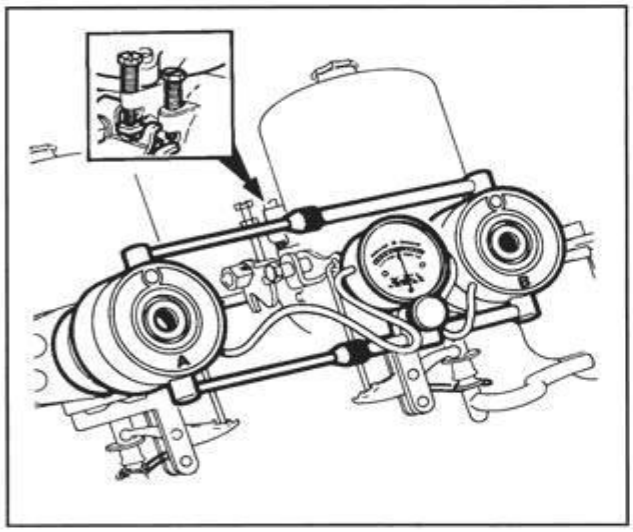


HS Type Carburetter: Tuning (Multi-Carbs)



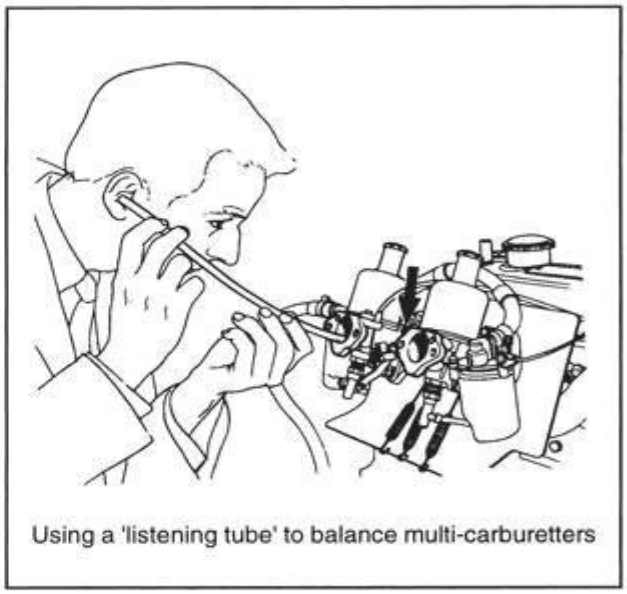
1

(a) Slacken both clamping bolts (1) on the throttle spindle interconnections.
(b) Slacken both clamping bolts (2) on the cold start interconnections.

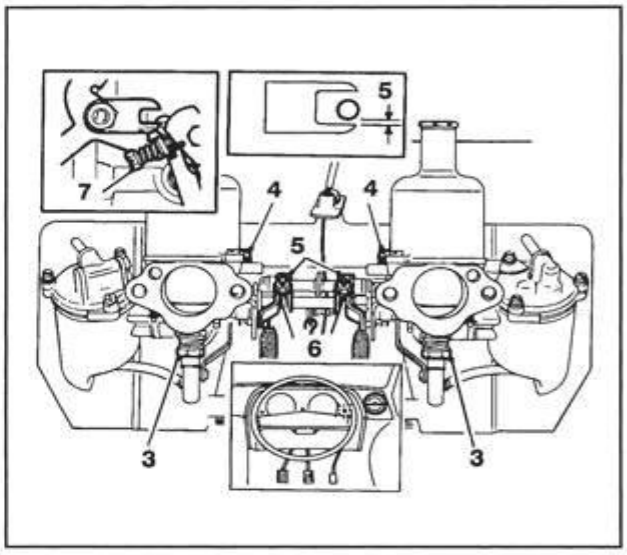


2

Using a balancing meter in accordance with the maker's instructions, balance the carburetters by altering the throttle adjusting screws until the correct idle speed and balance is achieved. Alternatively, use a 'listening tube' to compare the intensity of the intake hiss on all carburetters (see diagram on following page) and turn the throttle adjusting screws until the hiss is the same.



Using a 'listening tube' to balance multi-carburetters



3

(a) Turn the jet adjusting nut/screw (3) on each carburetter down/clockwise to enrich or up/anti-clockwise to weaken, by the same amount until the fastest speed is indicated; turn each nut/screw up/anticlockwise until the engine speed just commences to fall. Turn each screw very slowly down/clockwise by the minimum amount until the maximum speed is regained. From this setting adjust the mixture screws according to the vehicle manufacturer's recommendations. (See graph on page 39).
(b) Check the idle speed and readjust it as necessary with the throttle adjusting screws (4), turning each by the same amount.

4

(a) **Vehicles with emission control**. Using the exhaust gas analyser, check that the reading is within the limits given in the vehicle manufacturer's tuning data. If the reading falls outside the limits given, reset both the jet adjusting nuts/screws by the minimum amount necessary to bring the readings just within the limits. If an adjustment exceeding three flats/half a turn is required to achieve this, the carburetters must be removed and serviced.

(b) Set the throttle interconnection clamping levers (5), in accordance with the vehicle manufacturer's instructions, so that a clearance exists between the link pin and the lower edge of the fork. Tighten the clamp bolts, ensuring that there is approximately 0.8 mm (1/32 in) end-float on the interconnection rod.

(c) Run the engine at 1,500 r.p.m. and check the throttle linkage for correct connection by rechecking the carburetter balance.

5

(a) With the fast-idle cams of each carburetter against their respective stops, set the cold start interconnections, so that all cams begin to move simultaneously (6).

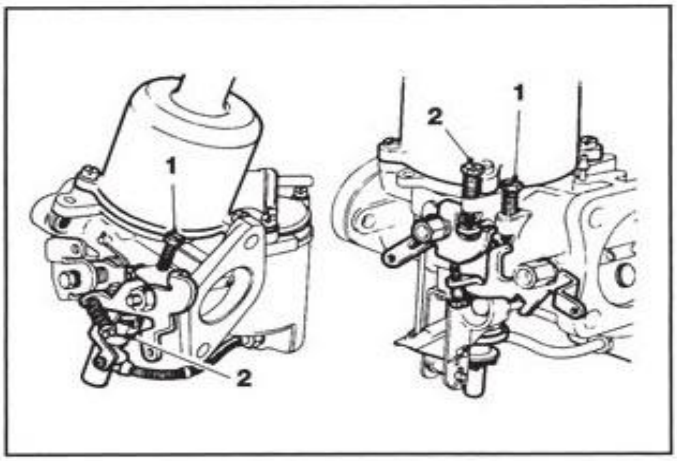
(b) With the fast-idle cams against their stops check that a 1.6 mm (1/16 in) free movement of the mixture control (choke) cable exists before the cable moves the cams.

(c) Pull out the mixture control (choke) until the linkage is about to move the jet.

(d) Using the balancing meter or listening tube to ensure equal adjustment, turn the fast idle adjusting screws (7) to give the correct fast-idle speed.

(e) Refit the air cleaners.

HS Type Carburetter: Tuning (General, Single Carbs)

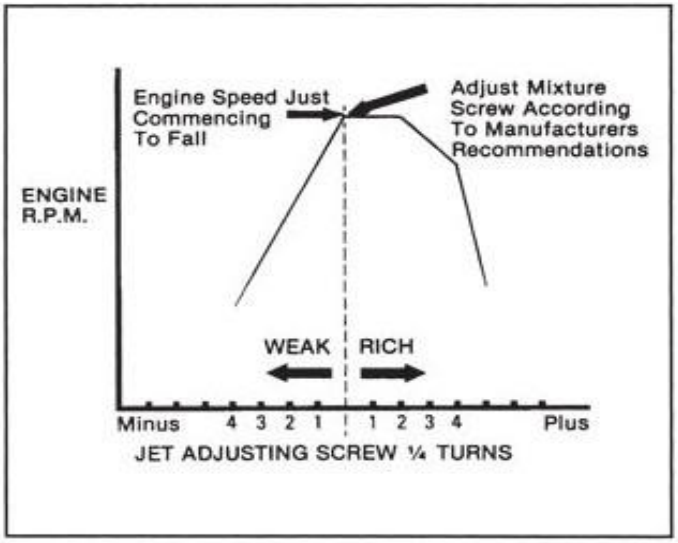


1

(a) Adjust the throttle adjusting screw (1) until the correct idle speed is obtained (see vehicle manufacturer's tuning data).

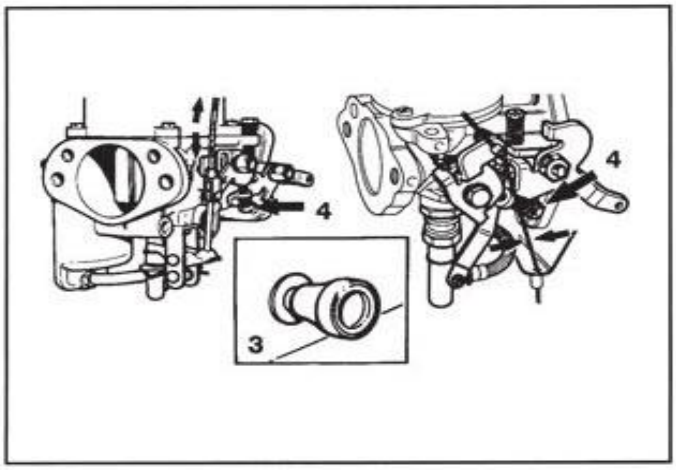
(b) Turn the jet adjusting nut/screw (2) down/clockwise, to enrich or up/anti-clockwise to weaken, until the fastest speed is indicated; turn the nut/screw up/anti-clockwise until the engine speed just commences to fall. Turn the nut/screw down/clockwise very slowly the minimum amount until the maximum speed is regained. From this setting adjust the mixture screw according to the vehicle manufacturer's recommendations.

(c) Check the idle speed, and readjust it as necessary with the throttle adjusting screw to obtain the correct setting.



2

Vehicles with emission control. Using the exhaust gas analyser, check that the percentage CO reading is within the limits given by the vehicle manufacturer. If the reading falls outside the limits given, reset the jet adjusting nut/screw by the minimum amount necessary to bring the reading just within the limits given. If an adjustment exceeding three flats of the nut/half a turn of the adjusting screw is required to achieve this, then the carburetters must be removed and serviced.



3

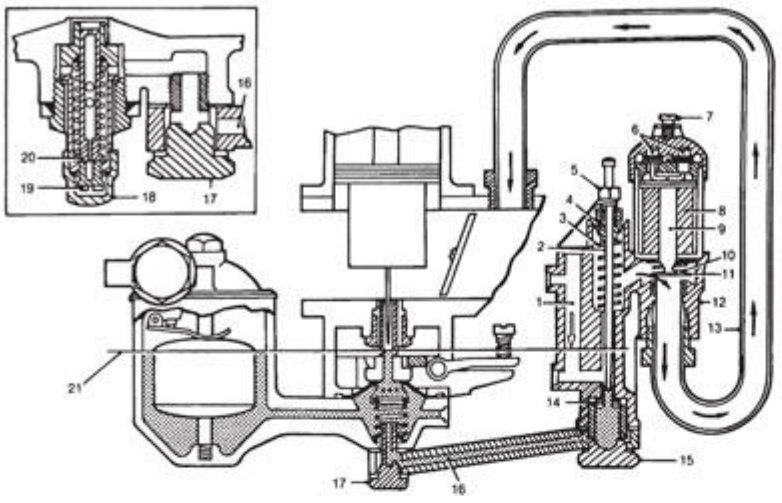
(a) With the fast-idle cam against its return stop, check that a 1.6 mm (1/16 in) free movement of the mixture control (choke) cable exists before the cable moves the cam.

(b) Pull out the mixture control (choke) (3) until the linkage is about to move the jet.

(c) Turn the fast-idle adjusting screw (4) clockwise until the correct fast-idle speed is obtained (see the vehicle manufacturer's recommendations).

(d) Refit the air cleaner.

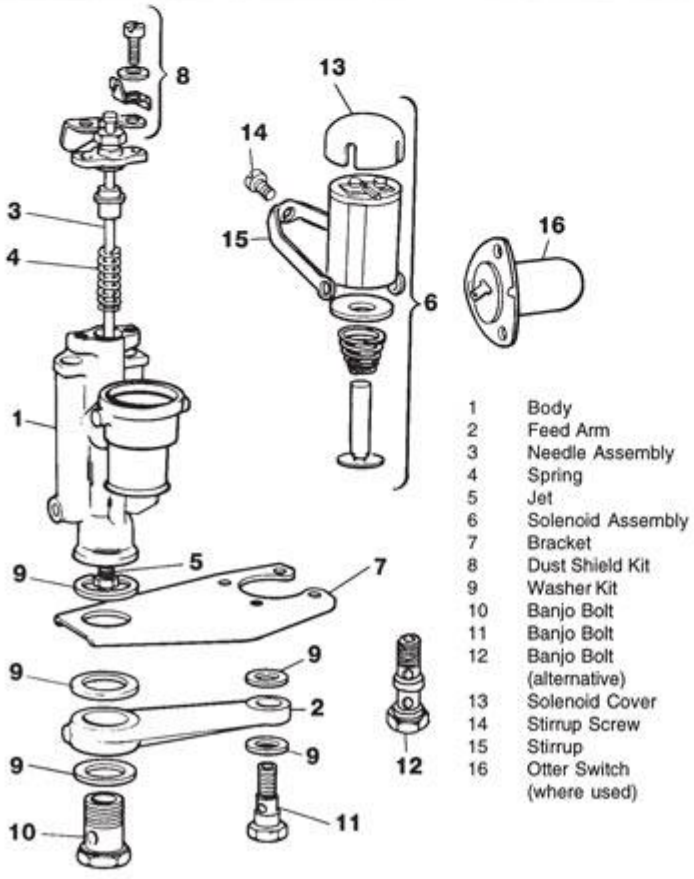
Auxiliary Enrichment Carburetter (Thermo)



1 Intake Passage
2 Tapered Needle
3 Spring (and Needle Disc Chamber)
4 Suction Disc - Needle Stop
5 Adjustable Stop Nut
6 Terminals
7 Securing Strap Screw
8 Solenoid
9 Plunger - Iron Core
10 Conical Spring
11 Valve - Ball Jointed
12 Auxiliary Carburetter Body
13 Feed Pipe - External
14 Auxiliary Jet
15 Bolt - Pipe to Body
16 Fuel Passage
17 Bolt - Pipe to Carburetter
18 Cap Nut*
19 Adjusting Screw*
20 Jet with Flanged End*
21 Fuel Level

*Type H jet assembly used with auxiliary carburetter.

Typical installation of the auxiliary enrichment (thermo) carburetter in conjunction with a type HD carburetter. Inset: type H carburetter jet assembly when used with thermo carburetter.



1 Body
2 Feed Arm
3 Needle Assembly
4 Spring
5 Jet
6 Solenoid Assembly
7 Bracket
8 Dust Shield Kit
9 Washer Kit
10 Banjo Bolt
11 Banjo Bolt
12 Banjo Bolt (alternative)
13 Solenoid Cover
14 Stirrup Screw
15 Stirrup
16 Otter Switch (where used)

The auxiliary carburetter is used on certain installations to provide automatically differing degrees of mixture enrichment at:

a) Starting

b) Idling and light cruising conditions

c) Full throttle conditions.

It may be used with single- or multi-carburetter installations.

The unit may be controlled by either:

a) A thermostatically operated switch housed in the cylinder head coolant jacket and set to bring the apparatus into operation below 35°C (95°F).

b) A manually operated switch, which is generally provided with a warning light.

The auxiliary carburetter is a separate unit attached to the main carburetter. When fitted to type H carburetters the construction of the main carburetter jet assembly differs from normal in the method of mixture adjustment.

The device consists of a solenoid-operated valve and a fuel metering needle which draws its fuel from the base of the auxiliary jet supplied from the main carburetter.

When the device is operated, air is drawn from the atmosphere through the air intake into a chamber and is mixed with fuel as it passes the jet. The mixture then passes upwards past the shank of the needle, through a passage, and so past the aperture provided between the valve and its seating. From here it passes directly to the main induction manifold through the external feed pipe as shown in the diagram (top left).

The device is brought into action by energizing the solenoid. The iron core is thus raised carrying with it the ball-jointed disc valve against the load of the conical spring, thereby opening the aperture between valve and seating.

A cup washer is fitted against the solenoid face to centralise the conical spring. Any leakage between the valve and its seating would allow the device to operate and affect the idling setting of the main carburetter(s).

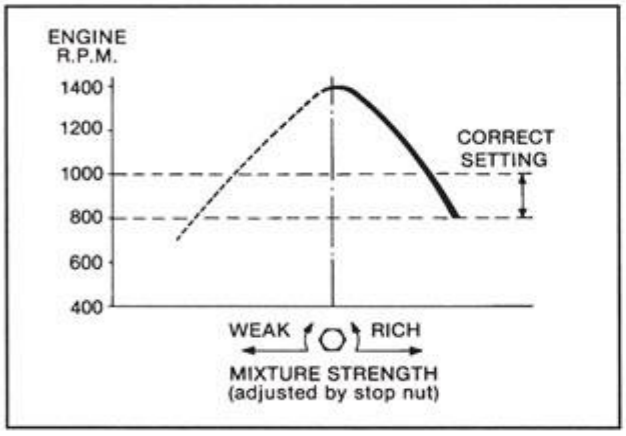
If the solenoid is energized while the engine is idling the valve will not normally lift owing to the high manifold depression; the act of opening the throttle will reduce manifold depression and allow the device to operate.

The fuel level in the auxiliary carburetter is controlled by the main carburetter float chamber. It can be seen from the illustration that this results in a reservoir of fuel remaining in the well of the auxiliary carburetter.

When starting with the device in operation, this fuel is drawn into the induction manifold to provide the rich mixture necessary for instant cold starting.

When the valve has lifted, the needle disc chamber is in direct communication with the inlet manifold and the depression, dependent on throttle opening, varies the position of the needle by exerting a downward force upon the suction disc and needle assembly. Thus:

a) At idling the relatively high depression will draw the needle into the jet until the needle head abuts against the adjustable stop.
b) At larger throttle openings a reduced depression is communicated to the needle disc chamber and the spring will tend to overcome the downward movement of the needle, thus increasing mixture strength.



Tuning and Adjustment

Main Carburetter(s)

As both the main and auxiliary carburetters operate when starting from cold, the main carburetter(s) must be tuned correctly before attempting any adjustment to the auxiliary carburetter. Refer to the appropriate tuning guide in this manual, and to the following mixture adjustment instructions for type H carburetters.

Mixture Adjustment - Type H Carburetter

The procedure for mixture adjustment is the same as for normal type H carburetters except that a jet adjusting screw is used in place of the normal jet adjusting nut (see inset diagram) as follows:

(a) Remove the cap nut
(b) Adjust the jet as required, by turning the slotted screw up to weaken or down to enrich the mixture. The slight leakage of fuel through the jet during this operation can be ignored.
(c) Replace the cap nut with its sealing washer.

Auxiliary Carburetter

Tuning of the auxiliary carburetter is confined to adjustment of the stop nut which limits the downward movement of the needle, and is carried out with the engine running at normal temperature and the main carburetter(s) tuned. Proceed as follows:

1

(a) Switch on the auxiliary carburetter.
(b) Where the thermostat has automatically broken the circuit, energize the solenoid by short-circuiting the thermostat switch to earth, or if this is inaccessible, earth the appropriate terminal of the auxiliary carburetter with a separate wire.
(c) Where a manual switch is fitted, switch on.

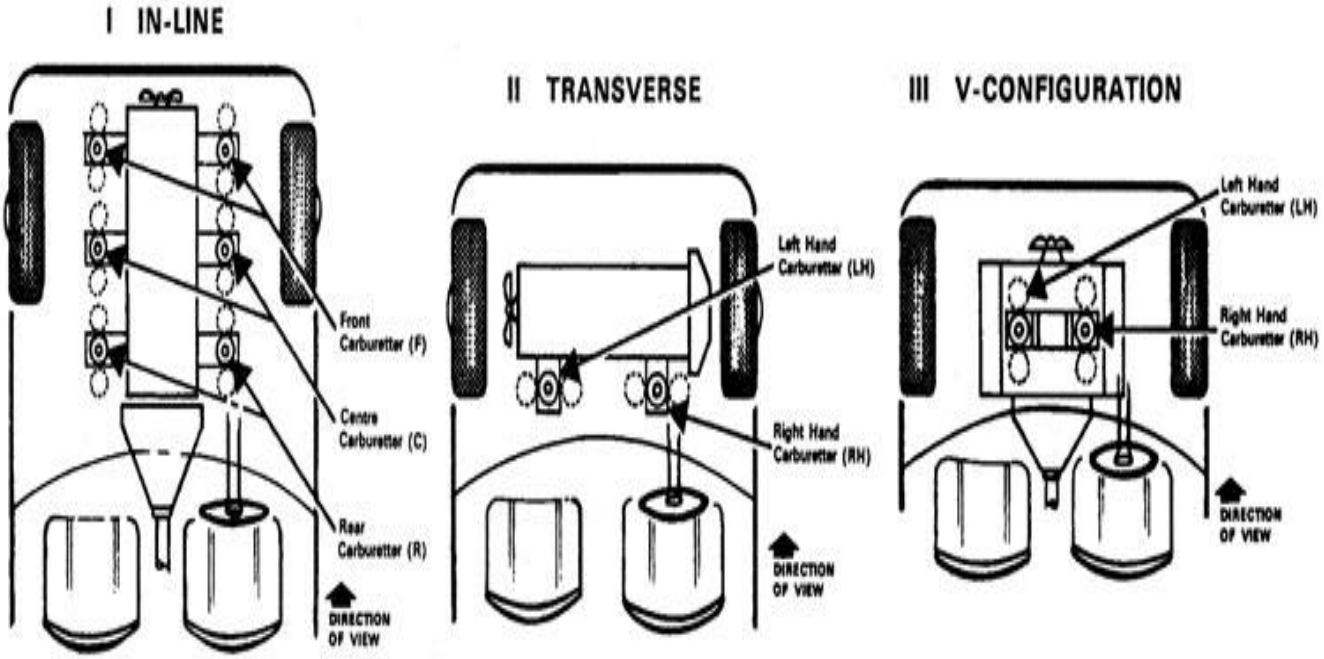
2

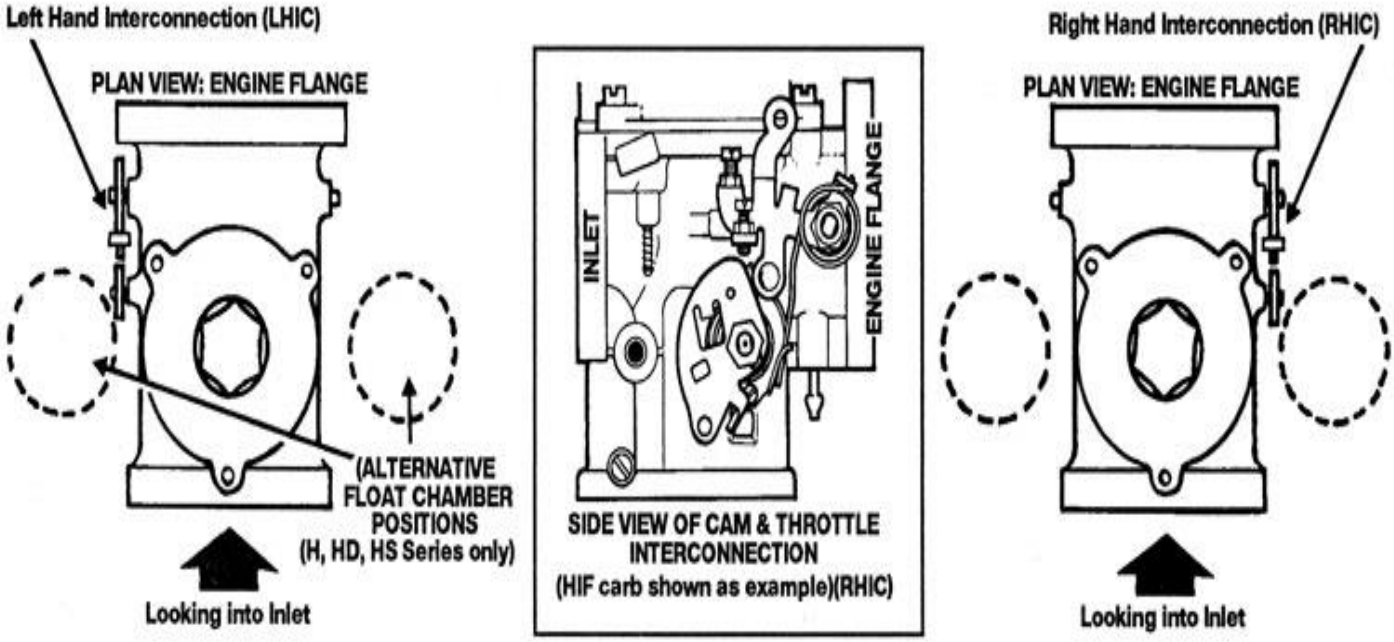
Open the throttle momentarily to allow the valve to lift.

3

(a) Adjust the stop nut(s) with reference to the graph.
(b) Initially clockwise (to weaken) until the engine begins to run erratically.
(c) Then anti-clockwise (to enrich) through the phase where the engine speed has risen markedly to the point where overrichness results in the engine speed dropping to between 800 and 1,000 rpm with the exhaust gases noticeably black in colour.

CARBY ID


I IN-LINE
Front Carburettor (F)
Centre Carburettor (C)
Rear Carburettor (R)
DIRECTION OF VIEW
II TRANSVERSE
Left Hand Carburettor (LH)
Right Hand Carburettor (RH)
DIRECTION OF VIEW
III V-CONFIGURATION
Left Hand Carburettor (LH)
Right Hand Carburettor (RH)
DIRECTION OF VIEW


Left Hand Interconnection (LHIC)
PLAN VIEW: ENGINE FLANGE
(ALTERNATIVE FLOAT CHAMBER POSITIONS (H, HD, HS Series only)
Looking into Inlet
INLET
ENGINE FLANGE
SIDE VIEW OF CAM & THROTTLE INTERCONNECTION
(HIF carb shown as example)(RHIC)
Right Hand Interconnection (RHIC)
PLAN VIEW: ENGINE FLANGE
Looking into Inlet