



SERVICING AND TUNING GUIDE

IMPORTANT: READ BEFORE COMMENCING WORK

These instructions are intended as a general guide to servicing and tuning the type HS Carburetter in both single and multi-installations. 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.

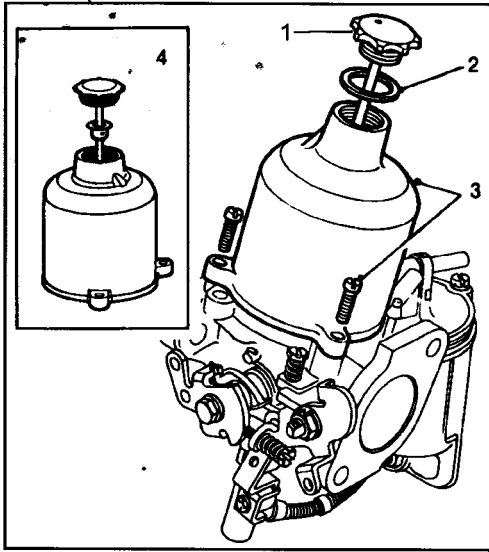
To achieve the best results when tuning, the use of a reliable tachometer, balancing meter and an exhaust gas analyser are required.

These instruments are essential when tuning vehicles equipped to conform with exhaust emission regulations.

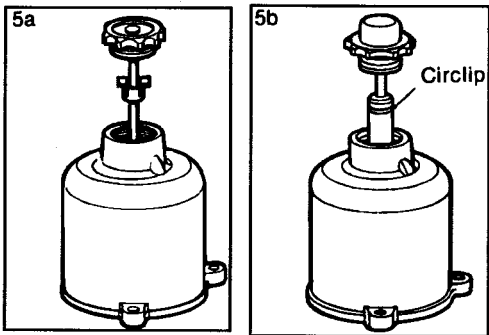
Before servicing or tuning a Carburetter in an endeavor to rectify poor engine performance, make sure that the maladjustment or fault is not from another source by checking the following:

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

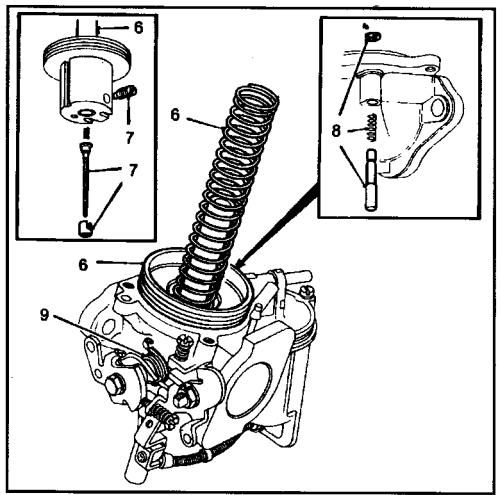
HS Type Carburetter Kit



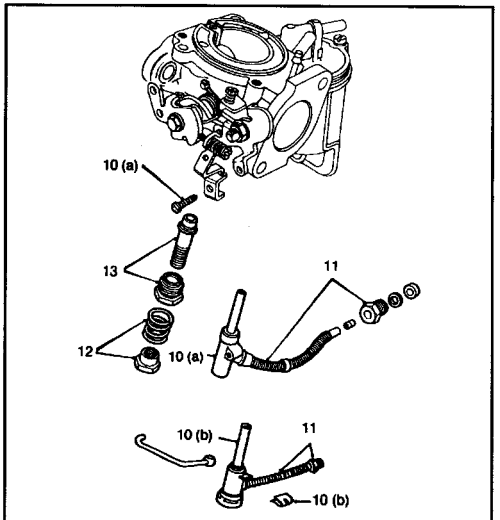
- 1.**
- (a) Thoroughly clean the outside of the Carburetters.
 - (b) Standard suction chambers. Remove the piston damper (1) and its washer (2), if fitted.
 - (c) Unscrew the suction chamber retaining screws (3).
 - (d) Lift the chamber assembly (4) vertically from the body without tilting it.



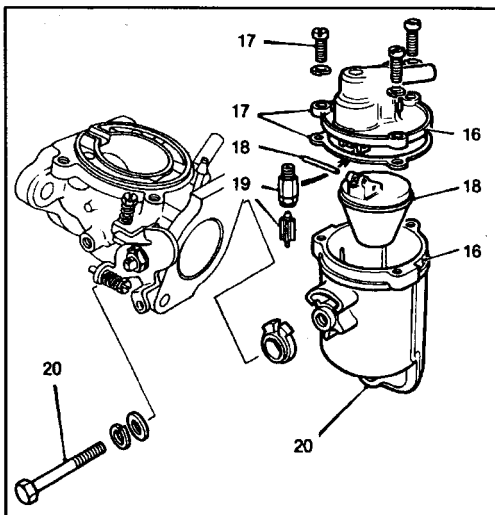
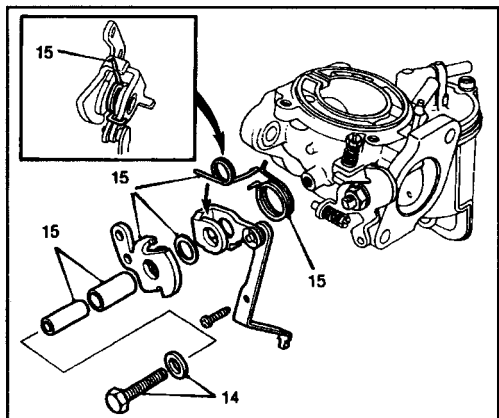
- 2.**
- Ball bearing suction chambers (early type).**
Hold the piston firmly and pull the suction chamber, taking care not to bend the damper rod, until the bearing retainer is freed from the piston rod (5a). Remove the damper.
- Ball bearing suction chambers (later type).**
Remove the piston damper. Lift the piston and remove the bearing retaining circlip (5b).



- 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). For fixed needle HS Carburetters, refer to pages 170-171 for needle fitment and jet centering.
 - (c) Remove the piston lifting pin circlip and spring and withdraw the pin from the body (8).
 - (d) Release the pick-up lever return spring from its retaining lug (9).

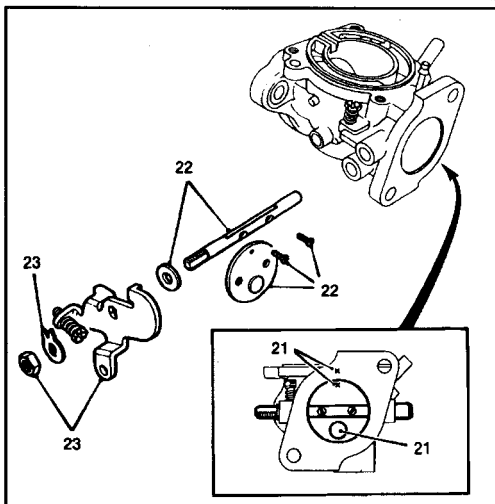


- 4.**
- (a) **Standard jet.** Support the plastic moulded base of the jet and remove the screw retaining the jet pick-up lever and link bracket (when fitted)(10a).
Capstat jet. Remove the clip holding the wire link to the jet housing (10b).
 - (b) Unscrew the jet tube sleeve nut from the float-chamber and withdraw the jet assembly (11). Note the gland, washer and ferrule at the end of the jet tube.
 - (c) Remove the jet adjusting nut and spring (12).
 - (d) Unscrew the jet-locking nut and detach the nut and jet bearing, withdraw the bearing from the nut (13).



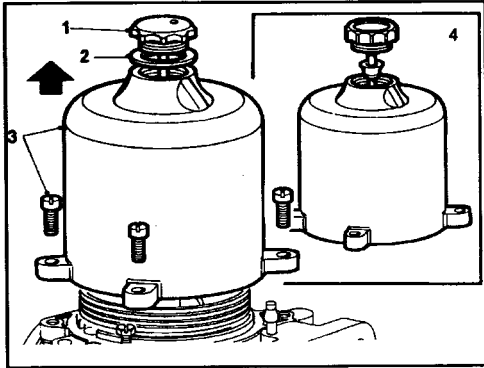
- 5.**
- (a) Unscrew and remove the lever pivot bolt and distance washer (14).
 - (b) Detach the cam lever assembly and return springs, noting the pivot bolt tubes, skid washer and the locations of the cam and pick-up lever springs (15).

- 6.**
- (a) Mark the float-chamber lid location to facilitate accurate reassembly (16).
 - (b) Remove the lid securing screws and detach the lid with its joint washer and float (17).
 - (c) Hold the float hinge pin at its serrated end and withdraw the pin and float (18).
 - (d) Extract the float needle from its seating and unscrew the seating from the lid (19).
 - (e) Remove the float-chamber securing bolt and the chamber (20).

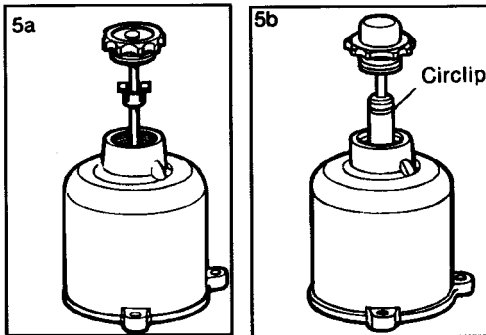


- 7.**
- (a) Close the throttle and mark the position of the throttle disc in relation to the Carburettor flange. Do not mark the disc in the vicinity of the overrun valve (21).
 - (b) Remove the throttle disc retaining screws, open the throttle and carefully withdraw the disc from the throttle spindle taking care not to damage the overrun valve (22).
 - (c) Tap back the tabs of the lock washer securing the spindle nut, remove the nut and detach the throttle lever, washer and the throttle spindle; note location of the lever in relation to the spindle and Carburettor body (23).
 - (d)

HS4C and HS8 Dismantling

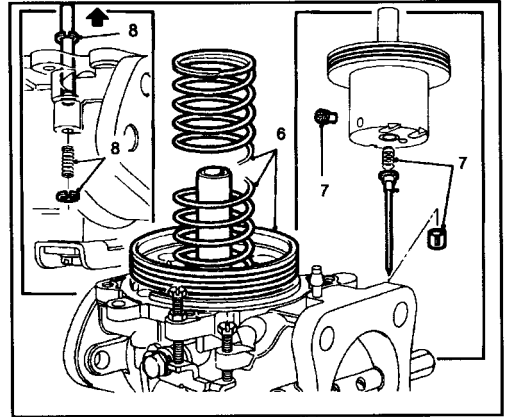


- 1.**
- (a) Thoroughly clean the outside of the Carburetter.
 - (b) Standard suction chambers. Remove the piston damper (1) and its washer (2), if fitted.
 - (c) Unscrew the suction chamber retaining screws (3).
 - (d) Lift the chamber assembly vertically from the body without tilting it (4)

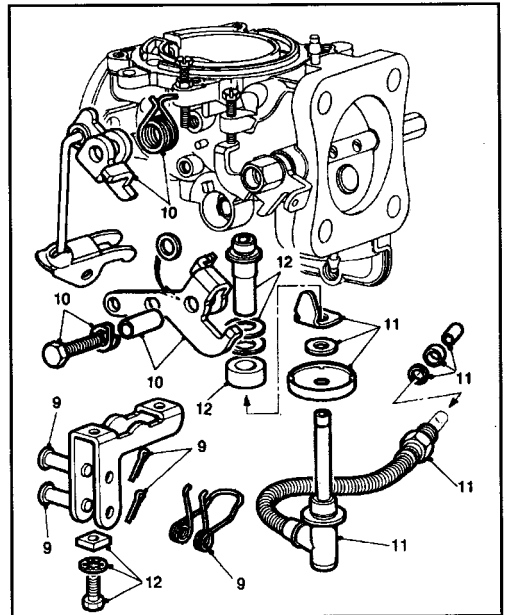


- 2.**
- Ball bearing suction chambers (early type).**
Hold the piston firmly and pull the suction chamber, taking care not to bend the damper rod, until the bearing retainer is freed from the piston rod (5a). Remove the damper.
- Ball bearing suction chambers (later type).**
Remove the piston damper. 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).

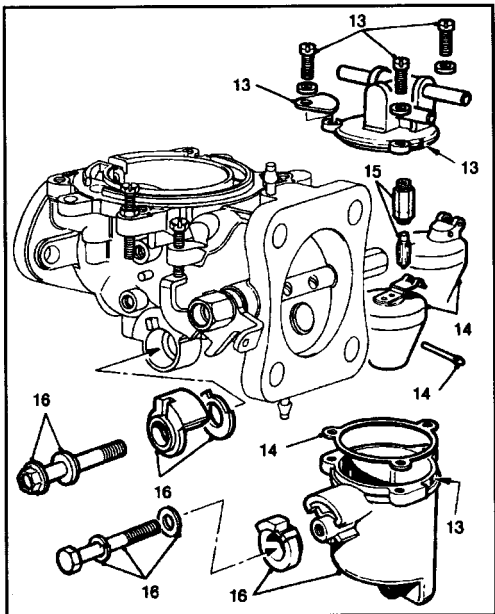


- (b) Unscrew the needle guide locking screw, then withdraw the needle, guide and spring (7).
- (c) Remove the piston lifting pin circlip and spring, withdraw the pin from the body (8).



4.

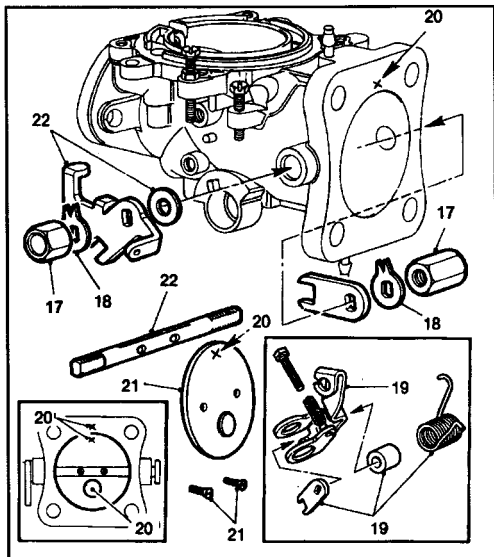
- (a) Remove the split pins retaining the jet spring anchor pin and jet fork pivot pin. Remove the pins, spring and jet fork from the bracket (9).
- (b) Release the cam lever return spring from its lug, remove the bolt, washers, cam lever, bush and link arm assembly (10).
- (c) Unscrew the jet tube sleeve nut from the float chamber and withdraw the jet assembly complete with centering 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 Carburettor 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).

- (a) Withdraw the float needle and unscrew the needle seat (15).
 - (b) 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 Carburettor 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).

All Types Inspection

1.

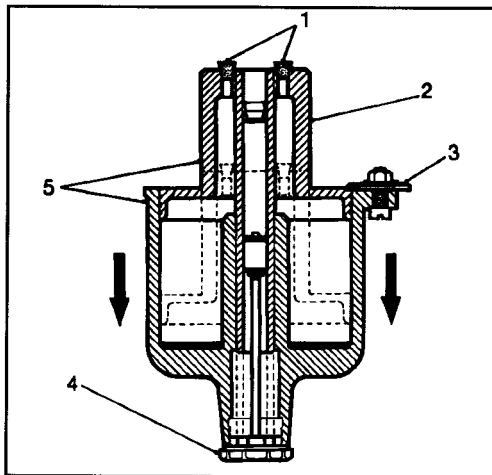
- (a) Examine the throttle spindle and its bearings in the Carburetter body; check for any excessive play, and renew any parts as necessary.
- (b) Examine the float needle and seating for any damage and excessive wear; renew if necessary.
- (c) Check condition of all gaskets; renew as necessary

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.



3.

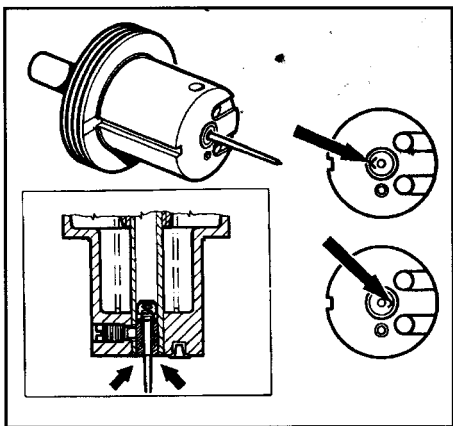
The following timing check applies only to standard suction chambers and need only be carried out if the cause of the Carburetter malfunction which necessitated the dismantling has not been located.

- (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 Carburettors 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

All Types Reassembly

After inspection, 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.



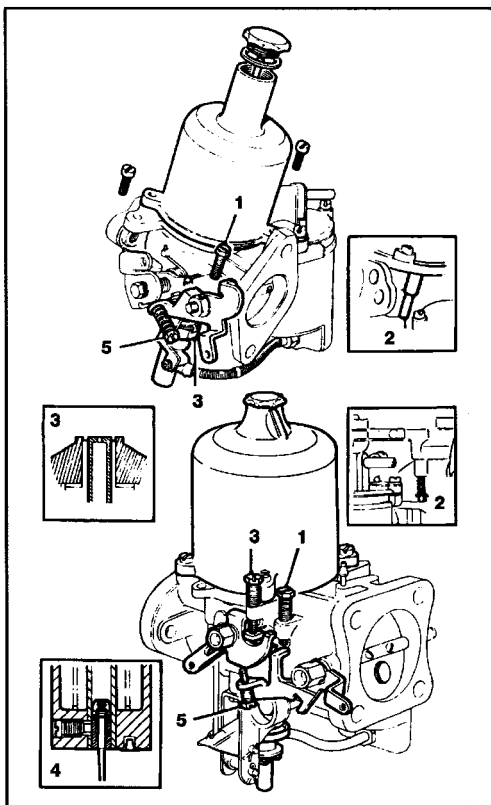
- (c) Use a new retaining screw and a new needle guide ensuring that the needle guide fitted gives the needle bias in the required sense (either toward throttle disc or toward air cleaner). Before tightening the retaining screw check that the needle guide is in its correct position relative to the piston 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

Replacement of Spindles & Spindle Bushes

If new bushes are required, we recommend the fitment of modern Teflon-coated steel backed type as supplied in our kits. Dismantle the carburetter as described. Do not remove existing brass bushes. The body needs to be bored out in line to 8mm (1/4" spindles) or 9.5mm (5/16" spindles). This is best achieved in a lathe.

For best results, the depth of the bore should be limited to the length of the bush, so that a lip of material remains between the reamed hole and the carburetter bore to prevent air leaks around the disc. Use a service tool (part No ABF185) to drive replacement bushes into the body until flush with the carburetter body.

All Types Tuning (General)



1.
 - (a) Remove the air cleaner(s)
 - (b) Check the throttle for the 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 (multi-carburetters) (1).

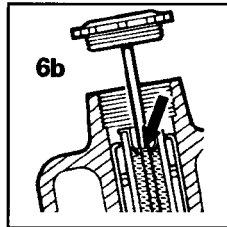
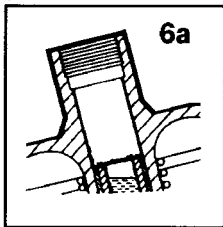
- (d) Raise the piston of each carburetter with the lifting pin (2) and check that it falls freely onto the bridge when the pin is released. If the piston shows any tendency to stick, the carburetter must be serviced.

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 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 multi-carburetters)
- (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.



4.

Check the piston damper oil level:

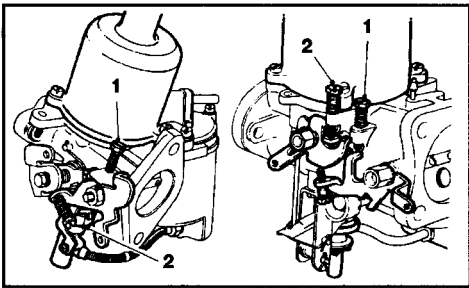
- (a) **Standard suction chambers.** Unscrew the cap and withdraw the damper. Top up with engine oil (preferably S.A.E 20) until the level is just below the top of the hollow piston rod, refit the damper and screw the cap firmly into the suction chamber (6a)
- (b) **Ball bearing suction chambers (early type).** Unscrew the cap to raise the piston and damper to the top of their travel. Fill the recess in the damper retainer with the engine oil (preferably S.A.E 20), lower the damper until the cap contacts the suction chamber, repeat the 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 engine oil (preferably S.A.E 20) to within 6.5mm (0.25 in) of the top of the hollow piston rod. Refit the damper and screw in firmly

5.

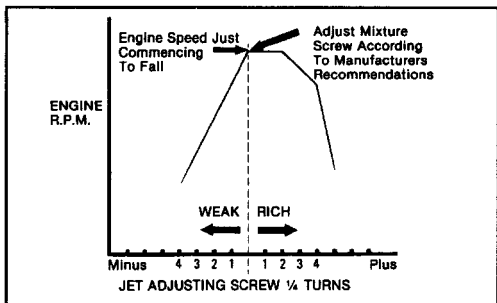
- (a) **Vehicles with emission control.** Connect a reliable tachometer to the engine in accordance with the instrument manufacturer's instructions.
- (b) Start the engine and run it at a fast-idle speed until it attains normal running temperature, then run it for a further five minutes.
- (c) Increase 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 3 minutes, increase the engine speed to 2,599 r.p.m for 30 seconds and then re-commence tuning. Repeat this clearing operation at three-minute intervals until tuning is complete

Single Carburettors



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 fasted 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.

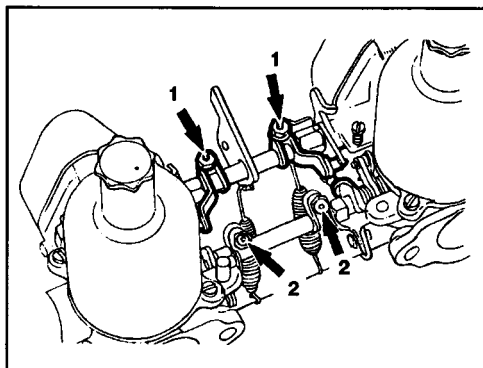


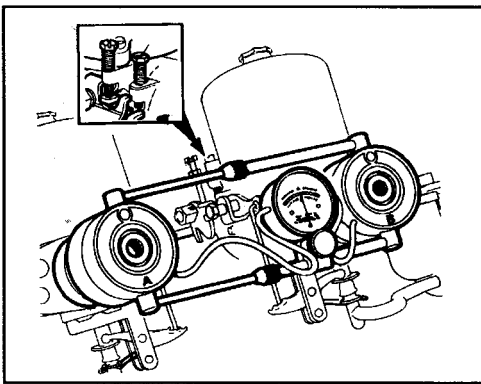
2. Vehicles with emission control. Using the exhaust gas analyser, check that the percentage CO reading is within the limits given by the vehicle manufacturer. If the reading falls outside the limits given, reset the jet adjusting nut/screw by the minimum amount necessary to bring the reading just within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

3.
 - (a) With the fast-idle cam against its return stop, check that a 1.6mm (1/16in) free movement of the mixture control 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 vehicle manufacturer's recommendations).
 - (d) Refit the air cleaner.

Multi - Carburettors

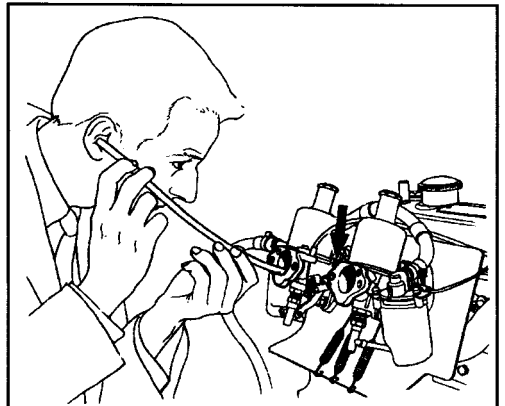
1.
 - (a) Slacken both clamping bolts (1) on the throttle spindle interconnections.
 - (b) Slacken both clamping bolts (2) on the cold start interconnections.



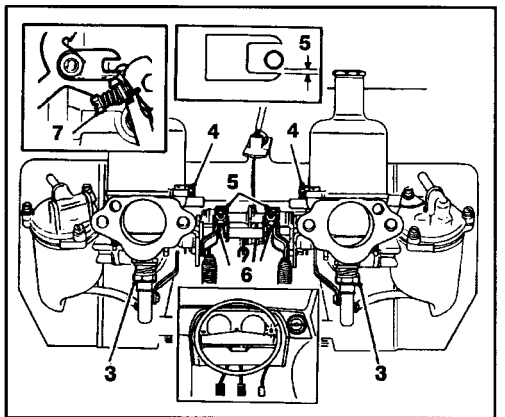


2. Using a balancing metre accordance with the makers instructions, balance the carburetters by altering the throttle adjusting screws until the correct idle speed and balance is achieved. Alternatively, use a 'listening tube' to compare the intensity of the intake hiss on all carburetters and turn the throttle adjusting screws until the hiss is the same.

- 3.**
- (a) Turn the jet adjusting nut/screw (3) on each carburettor 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 manufacturers recommendations (see graph)
 - (b) Check the idle speed and readjust it as necessary with the throttle adjusting screws (4), turning each by the same amount.



Using a 'listening tube' to balance multi-carburetters



- 4.**
- (a) **Vehicles with emission control.** Using the exhaust gas analyser, check that the reading is within the limits given in the vehicle manufacturers 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 free 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 manufacturers 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 0.8mm (1/32 in) end-float on the interconnection rod.
- (c) Run the engine at 1,500r.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 thier stops check that a 1.6mm (1/16 in) free movement of the mixture control (choke) cable exists before the cable moves the cam.
- (c) Pull out the mixture control (choke) until the linkage is about to move the jet.
- (d) Using the balancing metre 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.

ALT 9113



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