



## *Servicing & Tuning Guide* **IMPORTANT: Read Before Commencing Work**

These instructions are intended as a general guide to servicing and tuning the type HIF carburettor 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 carburettors are tuned in accordance with the vehicle manufacturer's tuning data.

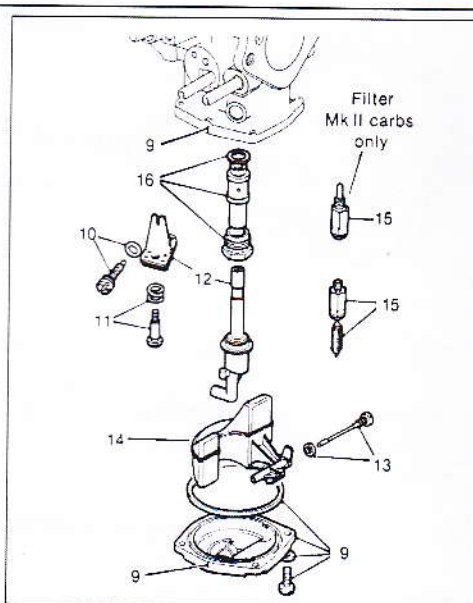
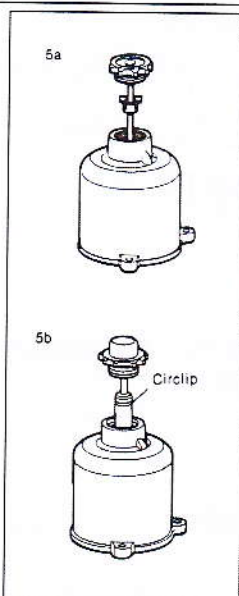
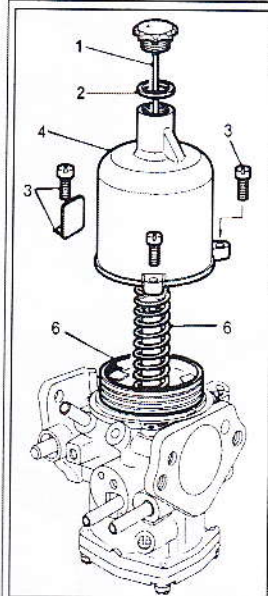
To achieve the best results when tuning, the use of a reliable tachometer, balancing meter and an exhaust gas analyser are required. **These instruments are essential when tuning vehicles equipped to conform with exhaust emission regulations.**

Before servicing or tuning a carburettor 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

**This Kit contains only Genuine SU Components**

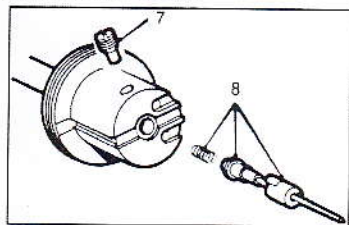
**HIF Type Carburettor Kit**



- 1**
- After removing from the engine, thoroughly clean the outside of the carburetters
  - Standard suction chambers. Remove the piston damper (1) and its washer (2), if fitted.
  - Unscrew the suction chamber retaining screws (3) and remove the identity tag.
  - Lift the chamber assembly (4) vertically from the body without tilting it.

- 4**
- Mark the bottom cover plate and body to ensure correct reassembly (9), unscrew the retaining screws and remove the cover complete and sealing ring.
  - Remove the jet adjusting screw complete with 'O' ring (10).
  - Remove the jet adjusting lever retaining screw and spring (11)
  - Withdraw the jet complete with adjusting lever and disengage the lever (12)
  - Remove the float pivot spindle and fibre washer (13)
  - Withdraw the float (14)
  - Remove the needle valve (15) and unscrew the valve seat. (Complete with the filter, types HIF38 & HIF44 only).
  - Unscrew the jet bearing locking nut and withdraw the bearing complete with its washer (16)

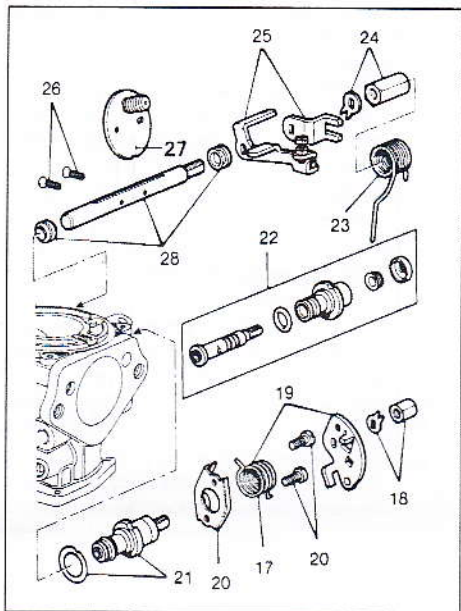
- 2**
- Ball bearing suction chambers (early type).**  
Hold the piston firmly and pull the suction chamber, taking care not to bend the damper rod, until the bearing retainer is freed from the piston rod (5a). Remove the damper.
- Ball bearing suction chambers (later type).**  
Remove the piston damper.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



- 3**
- Separate the suction chamber, the spring and the piston assembly (6) and empty the oil from the piston rod.
  - Unscrew the needle guide locking screw (7)
  - Withdraw the needle, guide and spring (8)

- 5**
- Note the location of the ends of the fast-idle cam lever return spring (17)
  - Unlock and remove the cam lever retaining nut and locking washer (18)
  - With the return spring held towards the carburettor body, prise off the cam lever and remove the return springs (19)
  - Unscrew the starter unit retaining screws and remove the cover plate (20)

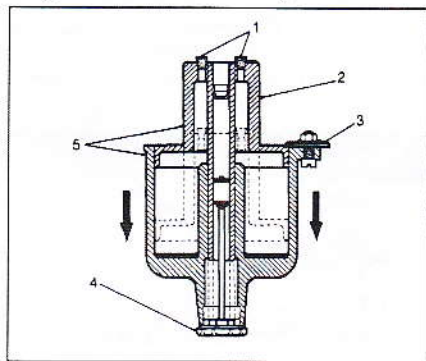
- (e) Withdraw the starter unit assembly and remove its gasket (21) Note: on later starter units the cover plate and starter body are designed not to be separated.  
This ensures greater accuracy of starter operation.
- (f) Withdraw the valve spindle and remove the 'O'ring, seal and dust cap (22)



- 6**
- (a) Note the location and loading of the ends of the throttle lever return spring and remove the spring (23)
- (b) Unlock and remove the nut and tab washer retaining the throttle levers (24)
- (c) Remove the throttle lever and throttle actuating lever (25). These may vary quite considerably from those shown
- (d) Remove the throttle disc retaining screws (26)
- (e) 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. Open the throttle and carefully withdraw the disc from the throttle spindle taking care not to damage the overrun valve (27)
- (f) Withdraw the throttle spindle and remove its seals (28), noting the way it is fitted in relation to carburettor body to ensure the correct reassembly.

## Inspection

- 1**
- (a) Examine the throttle spindle and its bearings in the carburetters body; check for any worn parts as necessary.
- (b) Examine the float needle, seating and filter where fitted for damage, renew if necessary.
- (c) Examine all rubber seals and 'O' rings for any damage or deterioration; renew as necessary. The cover-plate sealing ring and starter 'O'ring must be renewed.
- (d) Check condition of all fibre washers and gaskets; renew as necessary



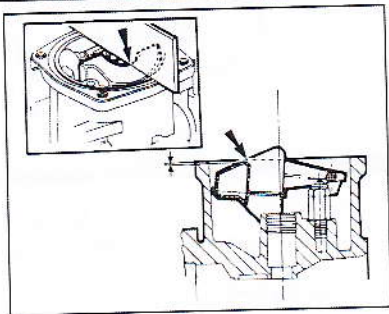
- 2**
- (a) Examine the carburettor body for cracks and damage, and for security of the brass connections and piston key.
- (b) Clean the inside of the suction chamber and the piston rod guide with fuel or methylated spirit (denatured alcohol) and wipe dry. Abrasives must not be used.
- (c) Examine the 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 carburettor 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 chambers fixing holes, positioning the washer so that it overlaps chamber bore (3)
- (d) Fit the damper and washer (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 carburettor 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 rechecking the time is still not within these limits, renew the suction chamber assembly.

## Reassembly

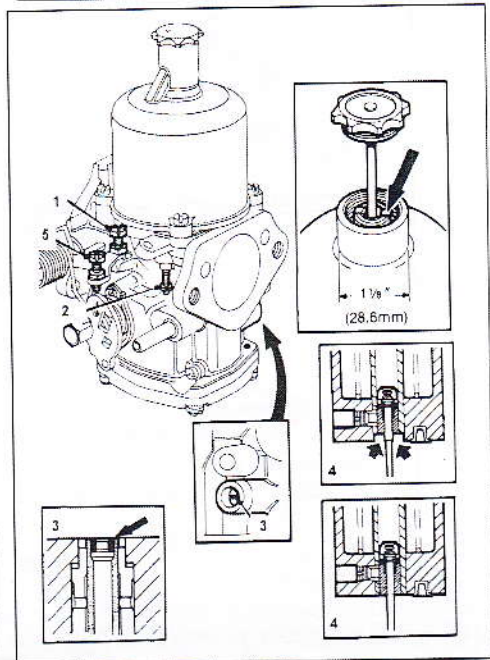


Reassemble by reversing the procedure used to dismantle the carburettor, noting the following:

- (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) Position the throttle spindle end seals just below the spindle housing flange.
- (d) The starter unit valve is fitted with the cut-out towards the top retaining screw hole and its retaining plate is positioned with the slotted flange towards the throttle spindle. Apply a smear of oil to starter 'O' ring prior to assembly, the starter should then enter the carburettor body with ease. If force has to be used this will invariably result in damage to the 'O' ring.

- (e) When fitting the jet assembly to the adjusting lever ensure that the jet head moves freely in the bi-metal cut out.
- (f) After fitting the float and valve, invert the carburettor so that the needle valve is held in the shut position by the weight of the float only. Check that the point indicated on the float is  $1.0 \pm 0.5\text{mm}$  ( $0.04 \pm 0.02\text{in}$ ) below the level of the float position by carefully bending the brass pad. Check that the float pivots correctly about the spindle.
- (g) Ensure that the needle guide fitted gives the needle bias in the required direction (either toward throttle disc or toward air cleaner). Before tightening the retaining screw, check that the needleguide 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
- (h) Ball bearing suction chambers. To prevent the piston spring from being 'wound up' during assembly, 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 over the spring and 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.

## Tuning (General)

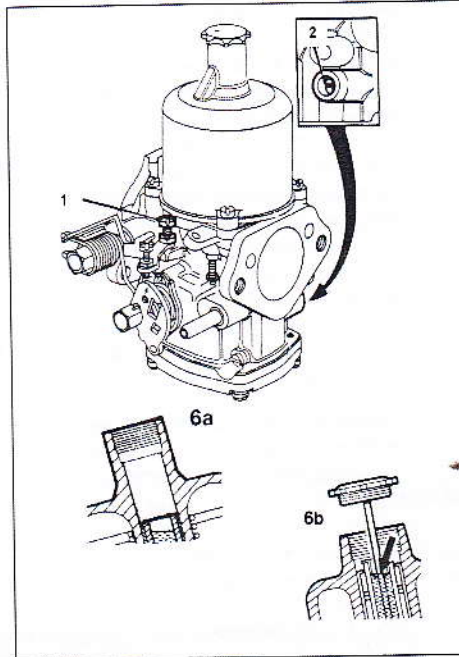


**1**

- (a) Remove 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 (multi-carburetters) (1)
- (d) Raise the piston of each carburettor 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 carburettor 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 carburettor, remove the suction chamber assembly
- (b) Turn the jet adjusting nut/screw up/anticlockwise, 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 anticlockwise (each screw multicarburetters) 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 reassemble section.

**4**

Check the piston damper oil level:

(a)

Standard Suction Chambers. Unscrew the damper 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, reinsert the damper and screw the cap firmly into the suction chamber (6a)

- (b) Ball bearing suction chambers (early type). unscrew the cap and carefully 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 6.5mm (0.25in) of the top of the hollow piston rod. Refit the damper and screw in firmly.

## 5

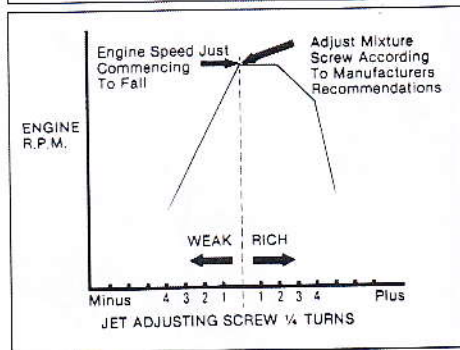
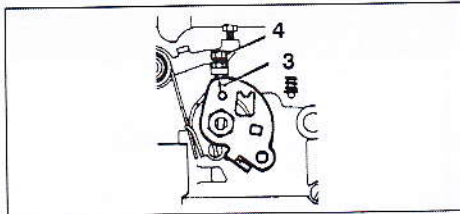
- (a) Vehicles with emission control. Connect a reliable tachometer to the engine in accordance with the instrument manufacturers instructions. (b) Start the engine and run it at a fast idle speed until it attains normal running temperature, then run it for a further five minutes. (c) Increase the engine 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 manufacturers instructions.

Setting can now commence. If the correct setting cannot be obtained within 3 minutes, increase the engine speed to 2,500 r.p.m for 30 seconds and then recommence tuning. Repeat this clearing operation at 3 minute intervals until tuning is complete.

## Tuning (Single Carburetters)

### 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.



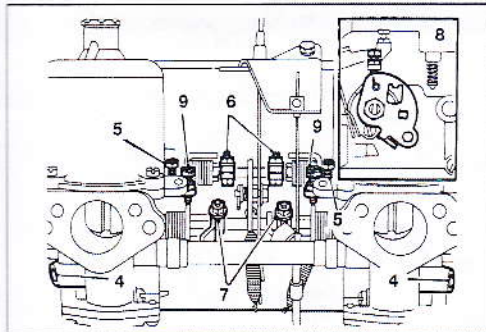
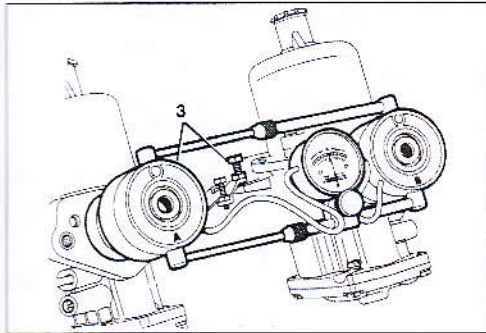
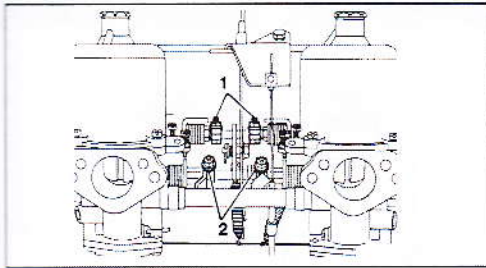
### 2

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 the 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 1.6mm (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 vehicles manufacturers recommendations). (d) Refit the air cleaner.

## Tuning (Multi-Carburetters)



**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 top 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.

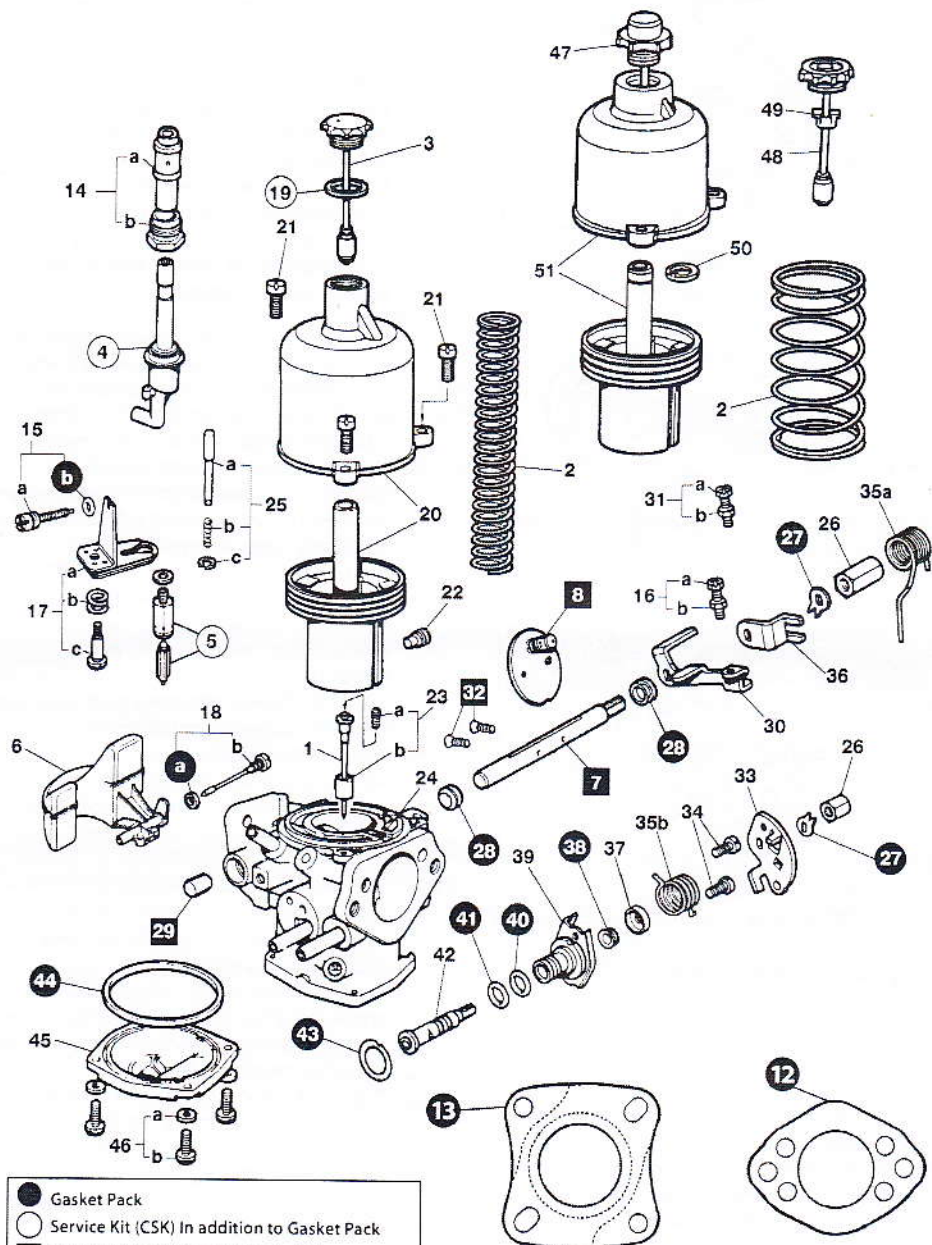
**4.**

- (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 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 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 carburettor balance.

**5**

- (a) With the fast-idle cams of each carburettor 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.

# HIF Type Carburettor Kit - ALT 9110 Servicing & Tuning Guide



- Gasket Pack
  - Service Kit (CSK) In addition to Gasket Pack
  - Rebuild Kit (CRK) in addition to CSK
- Each kit contains enough components to service one carburettor.  
The carburettor illustrated is an HIF4 but most HIF types are similar.



- 1 Needle
- 2 Piston Spring
- 3 Damper
- 4 **Jet Assembly Kit**
- 5 **Needle & Seat Kit**
- 6 **Float Kit**
- 7 **Throttle Spindle Kit**
- 8 **Throttle Disc Kit**
- 12 Gasket - Air Inlet
- 13 Gasket - Engine Flange
- 14 **Jet Bearing Kit**
  - a Jet Bearing
  - b Jet Lock Nut
- 15 **Mixture Screw Kit**
  - a Mixture Screw
  - b Mixture Screw Seal
- 16 **Idle Adjusting Screw Kit**
  - a Idle Adjusting Screw
  - b Idle Adjusting Screw Seal
- 17 **Bi-Metal Assembly Kit**
  - a Bi-Metal Assembly
  - b Bi-Metal Assembly Spring
  - c Bi-Metal Assembly Screw
- 18 **Float Spindle Kit**
  - a Float Spindle Washer
  - b Float Spindle
- 19 Damper Washer (where used)
- 20 Suction Chamber & Piston Assembly
- 21 Suction Chamber Screws
- 22 Needle Lock Screw
- 23 **Needle Guide Kit**
  - a Needle Spring
  - b Needle Guide
- 24 **Piston Guide Key Kit**
  - a Screw
  - b Guide Key
- 25 **Lift Pin Kit**
  - a Lift Pin
  - b Spring
  - c Circlip
- 26 Spindle Nut
- 27 Tab Washer
- 28 Throttle Spindle Seal
- 29 Throttle Spindle Bush
- 30 Throttle Lever
- 31 **Fast Idle Screw Kit**
  - a Screw
  - b Nut
- 32 Throttle Disc Screws
- 33 Starter Lever/Cam
- 34 Retaining Screws
- 35 **Throttle/Starter Return Spring Kit**
  - a Throttle Spring
  - b Starter Spring
- 36 Lost Motion Lever
- 37 Seal Cap
- 38 Spindle Seal
- 39 Starter Body Assembly
- 40 Starter'O' Ring
- 41 Starter'O' Ring
- 42 Starter Spindle
- 43 Paper Seal
- 44 Float Lid Seal
- 45 Float Lid
- 46 **Float Lid Screw Kit**
  - a Washer
  - b Screw
- 47 Damper (late type - ball-bearing)
- 48 Damper (early type - ball-bearing)
- 49 Clip
- 50 Circlip
- 51 Ball-Bearing Type Suction Chamber

**Note:**

The Needle (1) is unique to your car and should be renewed to ensure the best results. The spindle supplied may be longer than necessary and should be cut to the length of the original. To ensure that the spindle bushes are a correct fit, great care must be taken to line ream the body of the carburettor 9.5 mm. The cold start assembly is not used where an automatic choke is fitted.