

Servicing & Tuning Guide **IMPORTANT: Read Before Installing**

These instructions are intended as a general guide to servicing and tuning the type HD 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:

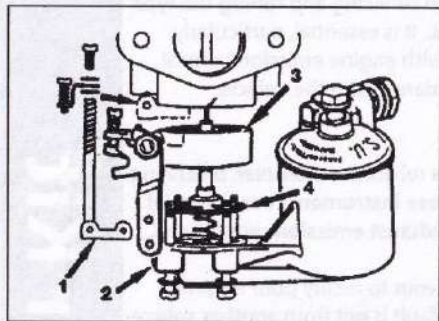
- Valve clearance
- Spark plug condition
- Contact breaker (dwell angle)
- Ignition timing and advance
- Presence of air leaks into the induction system

HD Type Carburettor Kit

Routine Servicing

Jet centering

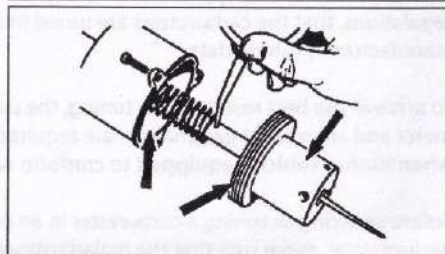
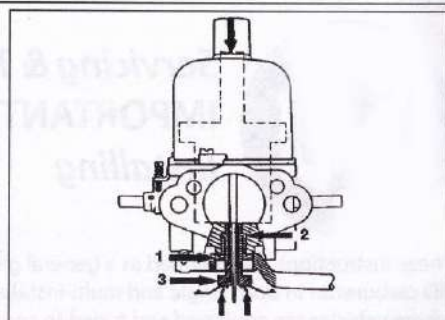
The piston should fall freely onto the carburettor bridge with a click when the lifting pin is released with the jet in the fully up position. If it will only do this with the jet lowered then the jet unit requires re-centering. This is done as follows:



- (a) Mark the position of the jet housing and float-chamber in relation to the carburettor body for reassembly.
- (b) Remove the plate retaining screw and withdraw the cam rod assembly (1).
- (c) Unscrew and remove the float-chamber securing screws.
- (d) Remove the float-chamber (2) and the jet housing (3) and then release the jet assembly (4).

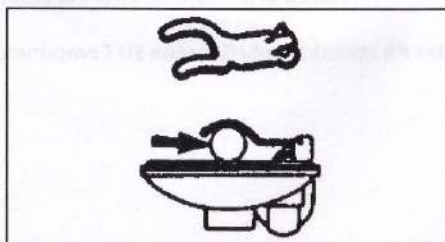
2.

- (a) Slacken the jet locking nut (1 in drawing top left), using a ring spanner, until the jet bearing (2) is just free to move.
- (b) Remove the piston damper, hold the jet (3) in the 'fully up' position and apply light pressure to the top of the piston rod. Tighten the jet locking nut (1).
- (c) Check again as in item 1 and ensure that the jet moves down the bearing freely.
- (d) Reassemble, ensuring that the jet and diaphragm are kept to the same angular position and that the beaded edge of the diaphragm is located in the housing groove.
- (e) Refill piston damper with oil (see tuning section for oil grade and level).



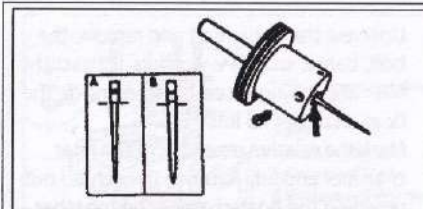
Cleaning

- (a) Remove the piston/suction chamber unit.
- (b) Using a petrol-moistened cloth, clean the inside bore of the suction chamber and the two diameters of the piston.
- (c) Lightly oil piston rod only and reassemble.



Float chamber fuel level

- (a) Remove and invert the float-chamber lid.
- (b) With the needle on its seating, insert a 11.0 mm (7/16 in) diameter bar between the forked lever and the lip of the float-chamber lid. (As diagram above)
- (c) The prongs of the lever should just rest on the bar. If they do not, carefully bend at the start of the pronged section until they do.



Needle size and position

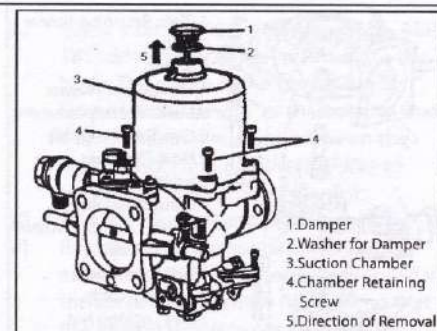
The needle size is determined during engine development and will provide the correct mixture strength except under the extremes of temperature, humidity, or altitude; e.g. a weaker needle will be necessary at altitudes exceeding 1800 m (6,000 ft). If modifications are made to the engine; (e.g. camshaft, compression ratio, air cleaner, or exhaust system) a different needle may be necessary to maintain performance.

- (a) To check the needle fitted, remove the piston/suction chamber unit.
- (b) Slacken the needle clamping screw, extract the needle, and check its identifying mark against the recommendation.
- (c) Fit the correct needle and lock it in position so that the shoulder on the shank (A), or the lower edge of the groove (B), is flush with the piston base.
- (d) Reassemble the piston/suction chamber unit.

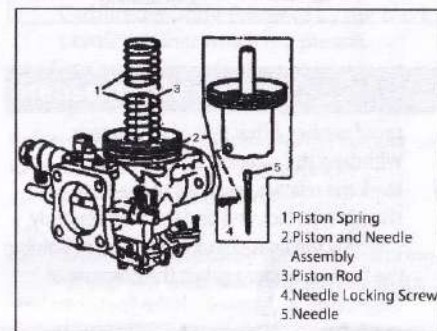
Dismantling

1.

- (a) Thoroughly clean the outside of the carburettor.
- (b) Unscrew and remove the damper and washer.
- (c) Remove the suction chamber retaining screws and remove the chamber without tilting it. Leaving the piston in the carburettor body.



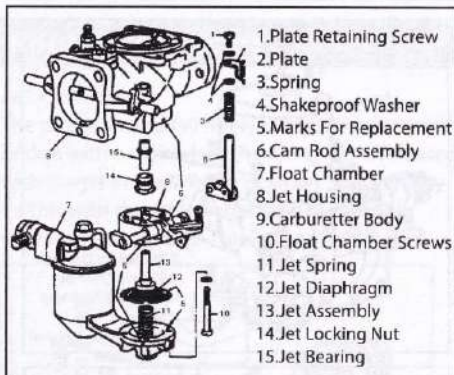
1. Damper
2. Washer for Damper
3. Suction Chamber
4. Chamber Retaining Screw
5. Direction of Removal



1. Piston Spring
2. Piston and Needle Assembly
3. Piston Rod
4. Needle Locking Screw
5. Needle

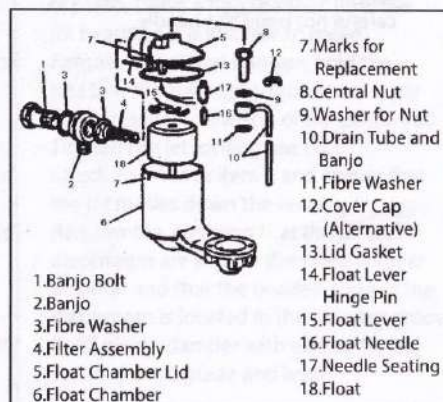
2.

- (a) Lift off the piston spring.
- (b) Carefully lift out the piston and needle assembly, and empty the damper oil from the piston rod.
- (c) Remove the needle locking screw and withdraw the needle. If it cannot be removed easily, tap the needle inwards first and then pull outwards. Being careful not to bend the needle.



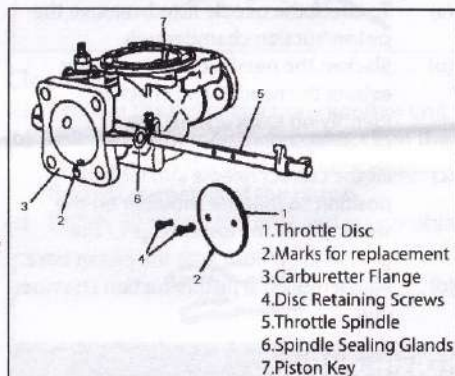
3.

- Remove the plate retaining screw(1) and lift off the plate and spring, noting the shake proof washer either side of the plate(4). Withdraw the cam rod assembly(6).
- Mark the relative positions of the float chamber, jet housing and Carburettor body. Unscrew the float-chamber screws(10), holding the float-chamber against the pressure of the jet spring, then detach the float chamber carefully.
- Lift out the jet spring. Mark the jet diaphragm opposite one of the screw holes in the jet housing with a white marker pen and withdraw the jet assembly, then lift off the jet housing.
- Using a ring spanner, slacken and remove the jet locking nut together with the jet bearing



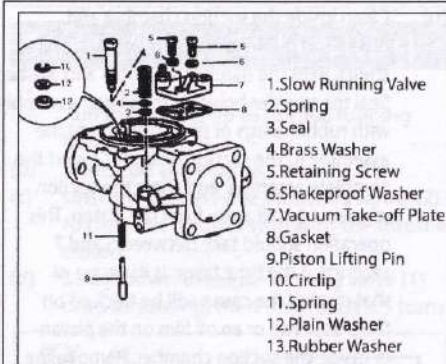
4.

- Unscrew the banjo bolt and remove the bolt, banjo, and fibre washers. Extract the filter and spring assembly from inside the float-chamber lid inlet.
- Mark the relative positions of the float chamber and lid. Remove the central nut retaining the float-chamber lid together with the drain-tube banjo and fibre washer, or cover cap, if fitted.
- Detach the lid and gasket. Push out the float lever hinge pin from the end opposite to the serrations, then detach the lever.
- Extract the float needle from its seating and unscrew the seating from the lid using a box spanner 8.58 mm (0.338 in) across the flats. Do not distort the seating.
- Invert the chamber to remove the float.



5.

- Close the throttle and mark the relative positions of the throttle disc and the carburettor flange.
- Slacken and remove the disc retaining screws.
- Withdraw the disc from its slot in the throttle spindle. The disc is oval and will jam if care is not taken.
- Slide out the spindle from its bearings.
- The throttle spindle sealing glands should not be removed as they require no servicing.

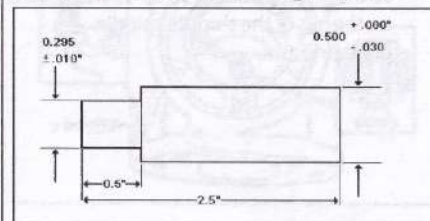


6.

- Unscrew and remove the slow-running valve complete with spring, seal and brass washer.
- Remove the two screws and shake proof washers retaining the vacuum ignition take off plate and union. Lift off the plate and gasket.
- Remove the piston lifting pin by extracting the circlip from its groove with the pin pressed upwards, then withdraw the pin downwards.

Throttle Spindle Bush Replacement

Throttle spindle bush replacement should be undertaken as follows. Note: Some HD8 Carburettors are fitted with plastic spindle bushes which are now no longer available.



- Dismantle the Carburettor as described. Remove P.T.F.E. bushes from Carburettor body where fitted.
- Line ream throttle spindle bores using a 9.5mm diameter reamer. Taking care not to break through into the venturi. Finished bore size should be 9.5mm in diameter.

- Using a service tool shown drive replacement bushes into the body. The depth of the bore must be limited to the length of the bush so that a lip of material remains between the reamed hole and carburettor bore to prevent air leaks around the disc.
- Remove all swarf and burr from body.
- Reassemble throttle spindle and disc assembly fitting spindle seals supplied in the service kit. Position the seals so that the sealing face is in contact with the Carburettor body, followed by the black plastic retainer which is a pressfit.

Reassembly

Before reassembling, examine all the components for damage and/or wear. Unserviceable components must be renewed.

1.

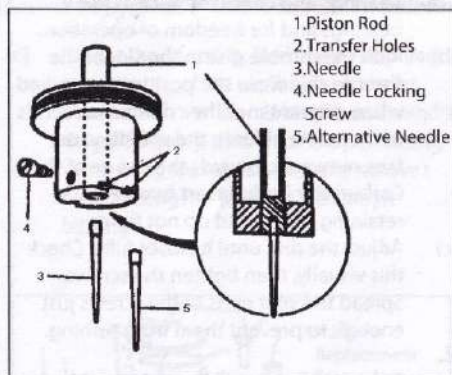
- Examine the throttle spindle for scoring or signs of wear. Refit the spindle in its bearings and check for slack in the bearings and for freedom of operation.
- Refit the throttle disc in the slot of the throttle spindle in the position as marked when dismantling. The countersunk ends of the screw holes in the spindle must face outwards towards the flange of the Carburettor body. Insert two new retaining screws but do not tighten.
- Adjust the disc until it closes fully. Check this visually, then tighten the screws. Spread the split ends of the screws just enough to prevent them from turning.

2.

- Examine the slow-running valve seal for serviceability. Check that the concave face of the brass washer is towards the seal. Refit the valve assembly.
- Check that the passages in the Carburettor body and the vacuum ignition takeoff plate are not obstructed. Examine the gasket for re-use and refit the gasket, plate and securing the screws. Tighten securely.
- Refit the piston lifting pin, spring, rubber washer, plain washer and circlip.

3.

- Examine the float needle and seating for damage or wear. Screw the seating into the float-chamber lid but do not over tighten. Refit the needle to the seating, coned-end first. Test the assembly for leakage with air pressure.
- Refit the float lever and insert the hinge pin. Check the float level.
- Examine the float for damage or punctures. Refit the float to the float-chamber.
- Examine the lid gasket for re-use. Fit the gasket to the lid and then replace the lid on the chamber as marked on dismantling. Fit the fibre washer, drain tube banjo, plain washer, and nut or cover cap and nut, as applicable. Do not over tighten the nut.
- Clean the filter assembly and examine for damage. Refit the filter to the lid inlet, spring end first. Refit the banjo, fibre washers and banjo bolt. The recessed face of the banjo must be towards the hexagon of the bolt.



4.

- Examine the piston assembly for damage to the piston rod and the outside surface of the piston. The piston assembly must be scrupulously clean. Use either petrol or methylated spirits as a cleaning. Do not use abrasives. Lightly oil the outside of the piston rod.

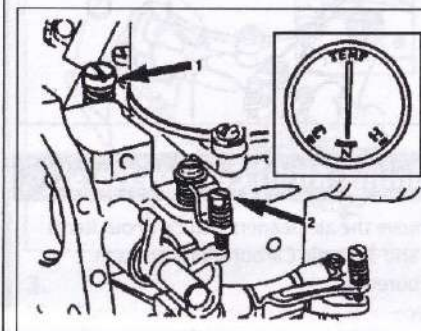
- Clean inside the suction chamber and piston rod guide using petrol or methylated spirits. Refit the damper assembly and washer. Seal the transfer holes on the piston assembly with rubber plugs or plasticine and fit the assembly to the suction chamber. Invert the complete assembly and allow the suction chamber to fall away from the piston. This operation should take between 5 and 7 seconds. If the time taken is in excess of that quoted the cause will be thick oil on the piston rod or an oil film on the piston or inside the suction chamber. Remove the oil from the points indicated and re-check.

5.

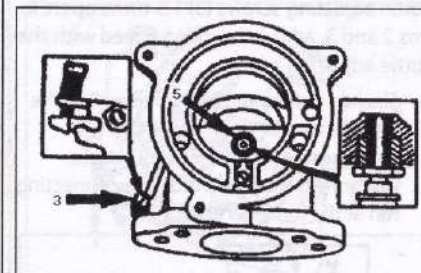
- Refit the jet bearing and jet locking nut. Leave the nut sufficiently slack to allow the bearing to be moved from side to side.
- Fit the jet assembly to the bearing in the same position as marked on dismantling. Centralize the jet.
- Remove the jet and refit the jet housing, jet, jet spring and float-chamber in the same relative positions as marked on dismantling. Fit and tighten the securing screws evenly.
- Replace the cam rod assembly and refit the spring, plate and plate retaining screw with a shake proof washer on either side of the plate. Ensure the plate is positioned so that its adjustment screw strikes squarely on the lug of the throttle spindle operating arm.

Tuning (single Carburetters)

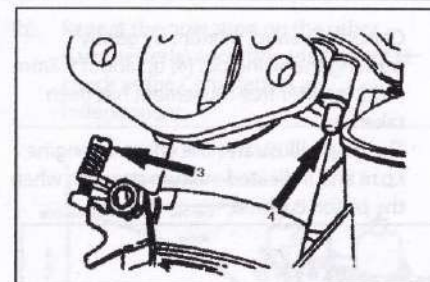
- Run the engine up to normal running temperature.
 - Switch off the engine.
 - Unscrew the fast-idle adjusting screw (2) to clear the throttle stop with the throttle closed.
 - Screw down the slow-running valve (1) onto its seating, then unscrew it 3.5 turns



- Remove the piston/suction chamber unit.
 - Turn the jet adjusting screw (3) until the jet (5) is flush with the bridge of the Carburetter

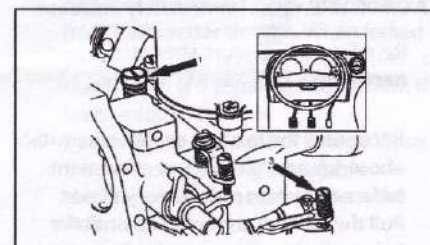


- Replace the piston/suction chamber unit.
 - Check that the piston falls freely onto the bridge when the lifting pin (4) is released.
 - Lower the jet by turning the jet adjusting screw (3) down 2.5 turns



4.

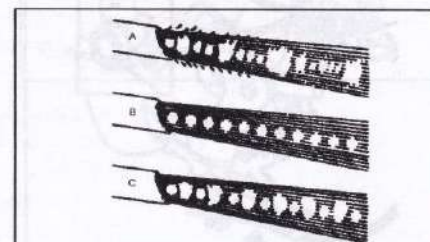
- Restart the engine and adjust the slow running valve (1) to give the desired idling speed.
- Turn the jet adjusting screw (3), up to weaken or down to enrich, until the fastest idling speed consistent with even running is obtained.
- Re-adjust the slow-running valve (1), if necessary, to give correct idling speed.



5.

The effect of mixture strength on exhaust smoke

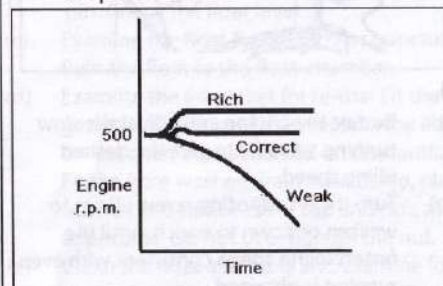
- TOO WEAK: Irregular note, splashy misfire, and colourless.
- CORRECT: Regular and even note
- TOO RICH: Regular or rhythmical misfire, blackish.



6.

- (a) Check for correct mixture by gently pushing the lifting pin (4) up about 0.8mm (1/32 in) after free movement has been taken up.
- (b) The graph illustrates the effect on engine r.p.m. and indicated mixture strength when the piston is raised.

The graph illustrates the effect on engine r.p.m. and indicated mixture strength when the piston is raised.

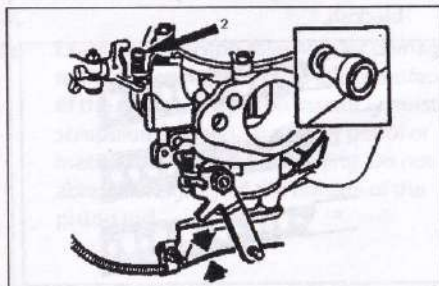


RICH MIXTURE: r.p.m. increase considerably.
CORRECT MIXTURE: r.p.m. increase very slightly.
WEAK MIXTURE: r.p.m. immediately decrease.

- (c) Re-adjust the mixture strength if necessary.

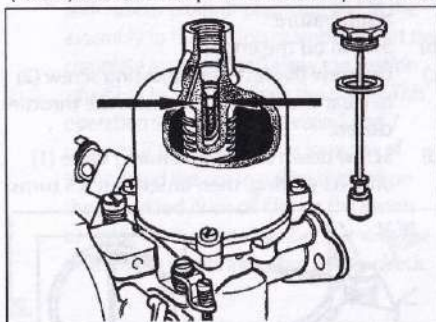
7.

- (a) Reconnect the mixture control wire with about 1.6mm (1/16 in) free movement before it starts to pull on the jet lever.
- (b) Pull the mixture control knob until the linkage is about to move the Carburettor jet operating arm and adjust the fast-idle screw (2) to give an engine speed of about 1,000 r.p.m. when hot.
- (c) Return the control knob and check that there is some clearance between the fast idle screw (2) and the throttle stop.



8.

- Finally top up the piston damper with thin engine oil of S.A.E. 20 until the level is 12.7mm (1/2 in) below the top of the hollow piston rod.



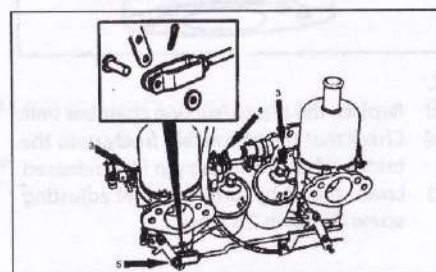
Tuning (Multi Carburetters)

Remove the air cleaners and carry out items 1, 2 and 3 (single Carburetters) on each Carburetter.

1.

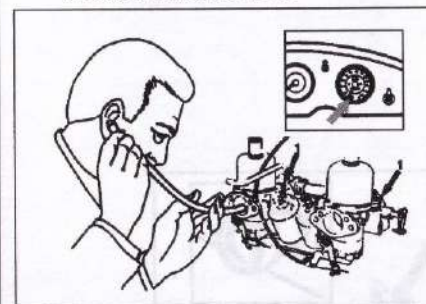
Note: Whenever the throttle adjusting screws (3) are fitted they, and not the slow running valves, must be used to adjust the idling speed. Screw down the slow running valves (which must remain closed) and set the throttle adjusting screws (3) 1.5 turns open. In items 2 and 3, adjust the idling speed with the throttle adjusting screws.

- (a) Slacken a clamping bolt (4) on one of the throttle spindle interconnection couplings between the Carburetters.
- (b) Disconnect the jet control interconnecting rod at the forked end (5).



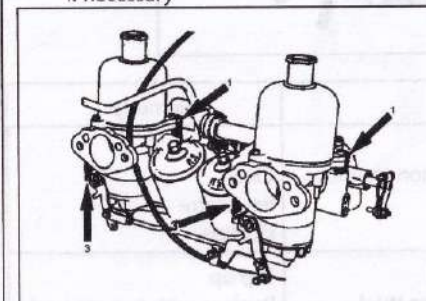
2.

- (a) Restart the engine and turn the slow running valve (1), or the throttle adjusting screw, an equal amount on each Carburetter to give the desired idling speed.
- (b) Compare the intensity of the intake hiss on all Carburetters and alter the slow running valves (1), or throttle adjusting screws, until each hiss is the same.



3.

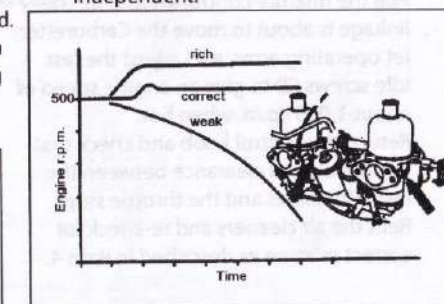
- (a) Turn the jet adjusting screw (3) an equal amount on all Carburetters, up to weaken or down to enrich, until the fastest idling speed consistent with even running is obtained.
- (b) Re-adjust the slow running valves (1), if necessary



4.

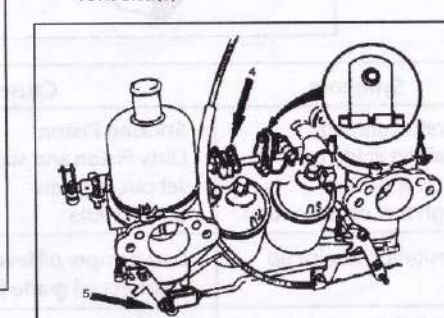
- (a) Check the mixture by raising the lifting pin (4) of the front Carburetter 0.8mm (1/32 in) after free movement has been taken up. The graph illustrates the possible effect on engine r.p.m.

- (b) Repeat the operation on the other Carburetter(s) and after adjustment re-check as the Carburetters are independent.



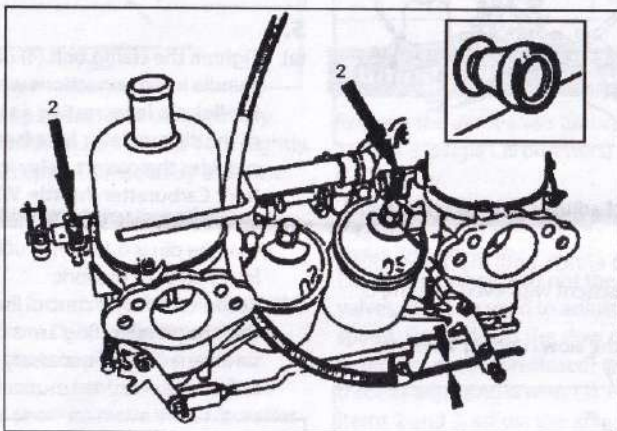
5.

- (a) Tighten the clamp bolt (4) of the throttle spindle interconnections with the pint of the link pin lever resting against the edge of the pick-up lever hole (see inset). This provides the correct delay in opening the front Carburetter throttle. When forked levers are fitted, set the cranked levers so that the pin is 0.15mm (0.006 in) from the lower edge of the fork.
- (b) Reconnect the jet control linkage (5) so that the jet operating arms move simultaneously; if necessary, turn the fork end(s).



6.

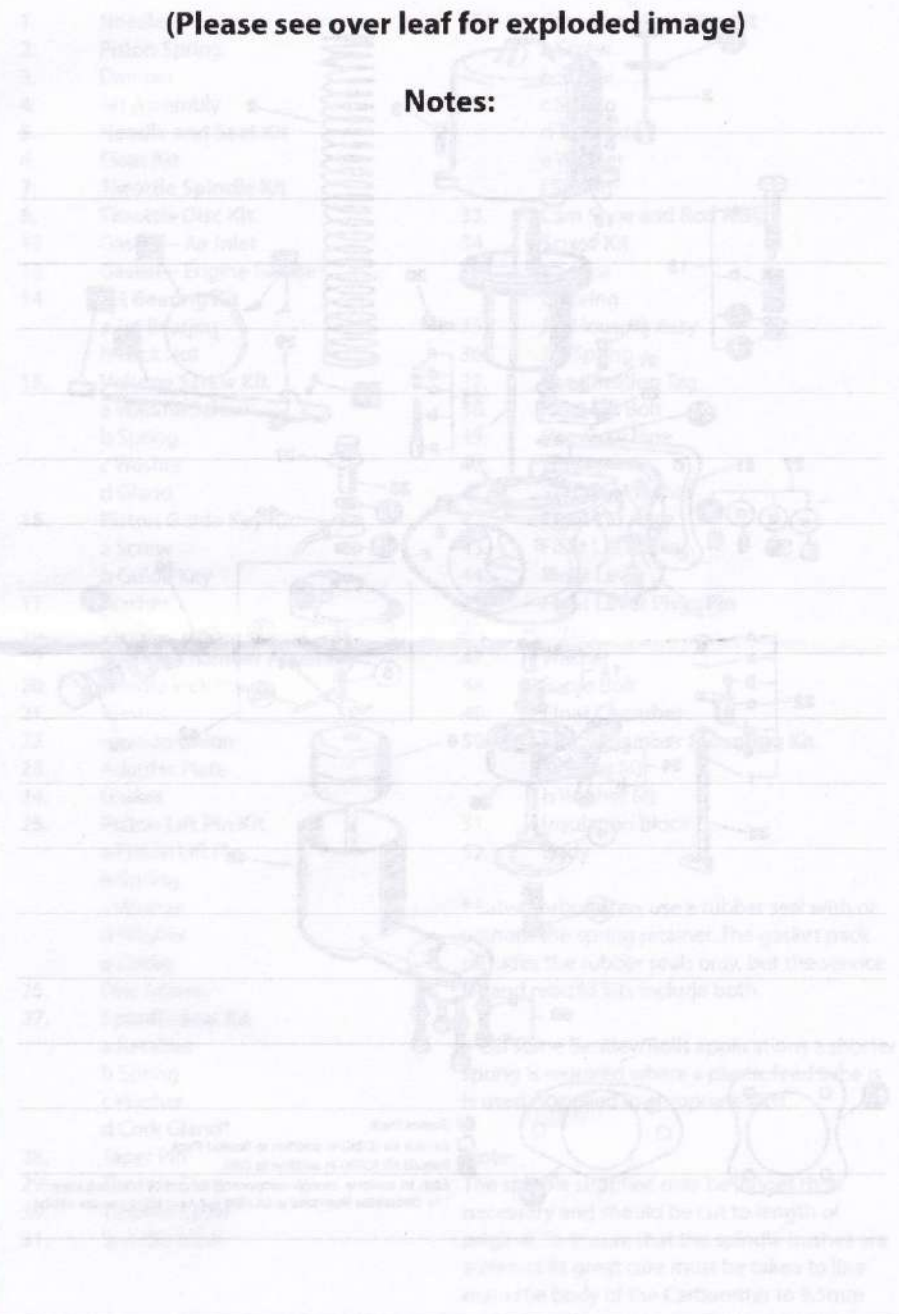
- (a) Reconnect the mixture control wire with about 1.6mm (1/16 in) free movement before it starts to pull on the jet levers.
- (b) Pull the mixture control knob until the linkage is about to move the Carburetter jet operating arms, and adjust the fast idle screws (2) to give an engine speed of about 1,000 r.p.m. when hot.
- (c) Return the control knob and check that there is a small clearance between the fast idle screws and the throttle stops.
- (d) Refit the air cleaners and re-check for correct mixture as described in item 4.

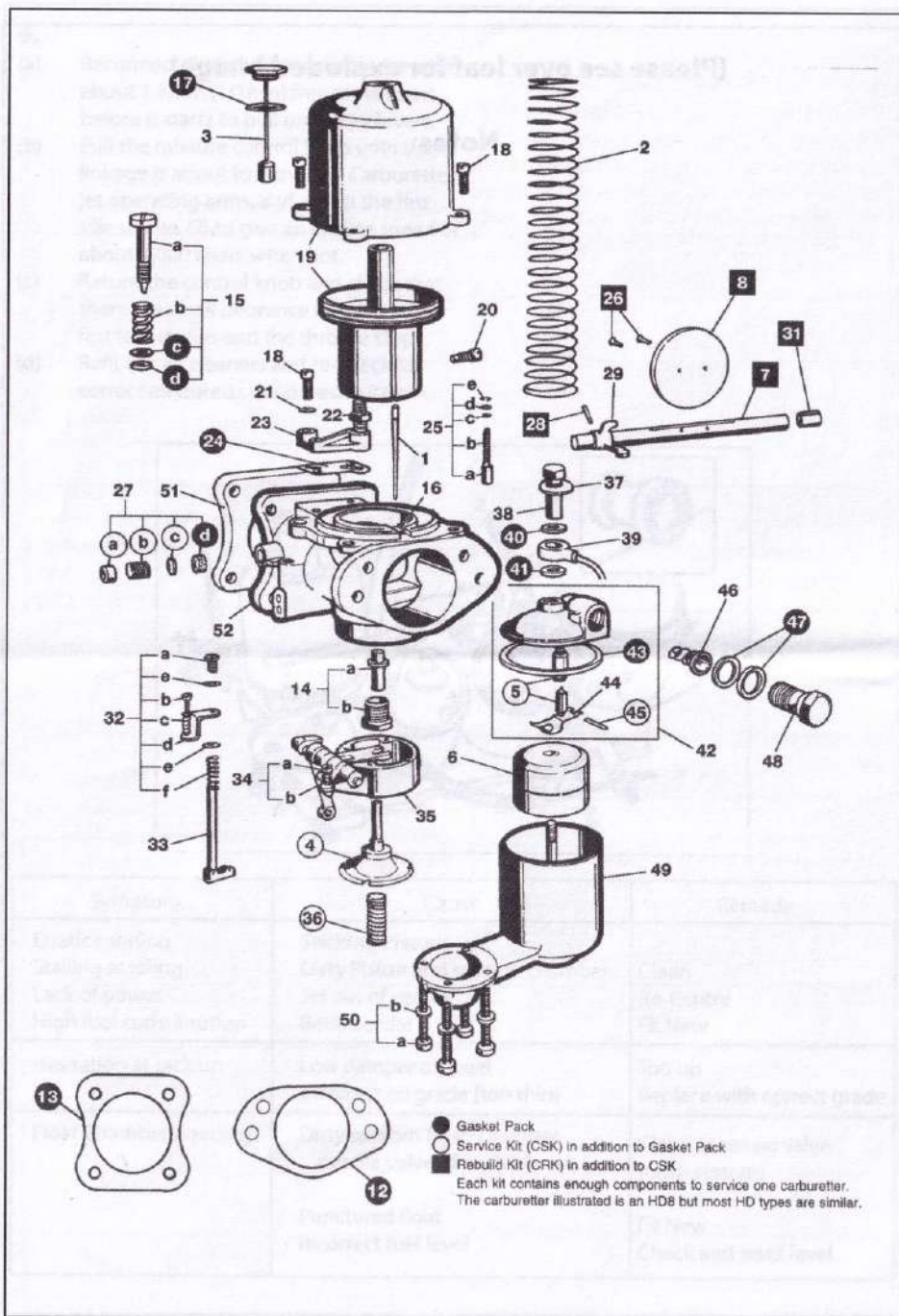


Symptom	Cause	Remedy
Erratic running Stalling at idling Lack of power High fuel consumption	Sticking Piston: Dirty Piston and suction chamber Jet out of centre Bent Needle	Clean Re-Centre Fit New
Hesitation at pick up	Low damper oil level Incorrect oil grade (too thin)	Top up Replace with correct grade
Float Chamber flooding	Dirty or worn float-chamber needle valve (dirty fuel) Punctured float Incorrect fuel level	Clean or renew valve (flush system) Fit New Check and reset level

(Please see over leaf for exploded image)

Notes:





1. Needle
2. Piston Spring
3. Damper
4. Jet Assembly
5. Needle and 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 Lock Nut
15. Volume Screw Kit
 - a Volume Screw
 - b Spring
 - c Washer
 - d Gland
16. Piston Guide Key Kit
 - a Screw
 - b Guide Key
17. Washer
18. Screw
19. Suction Chamber Assembly
20. Needle lock screw
21. Washer
22. Ignition Union
23. Adapter Plate
24. Gasket
25. Piston Lift Pin Kit
 - a Piston Lift Pin
 - b Spring
 - c Washer
 - d Washer
 - e Circlip
26. Disc Screws
27. Spindle Seal Kit
 - a Retainer
 - b Spring
 - c Washer
 - d Cork Gland*
28. Taper Pin
29. Throttle Stop
30. Throttle Lever
31. Spindle Bush
32. Cam Shoe Sundries Kit
 - a Screw
 - b Screw
 - c Spring
 - d Top Plate
 - e Washer
 - f Spring
33. Cam Shoe and Rod Assy
34. Screw Kit
 - a Screw
 - b Spring
35. Jet Housing Assy
36. Jet Spring +
37. Specification Tag
38. Float Lid Bolt
39. Overflow Pipe
40. Washer
41. Serrated Washer
42. Float Lid Assy
43. Float Lid Gasket
44. Float Lever
45. Float Lever Pivot Pin
46. Filter
47. Washer
48. Banjo Bolt
49. Float Chamber
50. Float Chamber Mounting Kit
 - a Screw (4)
 - b Washer (4)
51. Insulation Block
52. Body

* Later Carburettors use a rubber seal with or without the spring retainer. The gasket pack includes the rubber seals only, but the service kit and rebuild kits include both.

+ On some Bentley/Rolls applications a shorter spring is required where a plastic feed tube is used (supplied in appropriate kits).

Note:

The spindle supplied may be longer than necessary and should be cut to length of original. To ensure that the spindle bushes are a correct fit great care must be taken to line ream the body of the Carburettor to 9.5mm