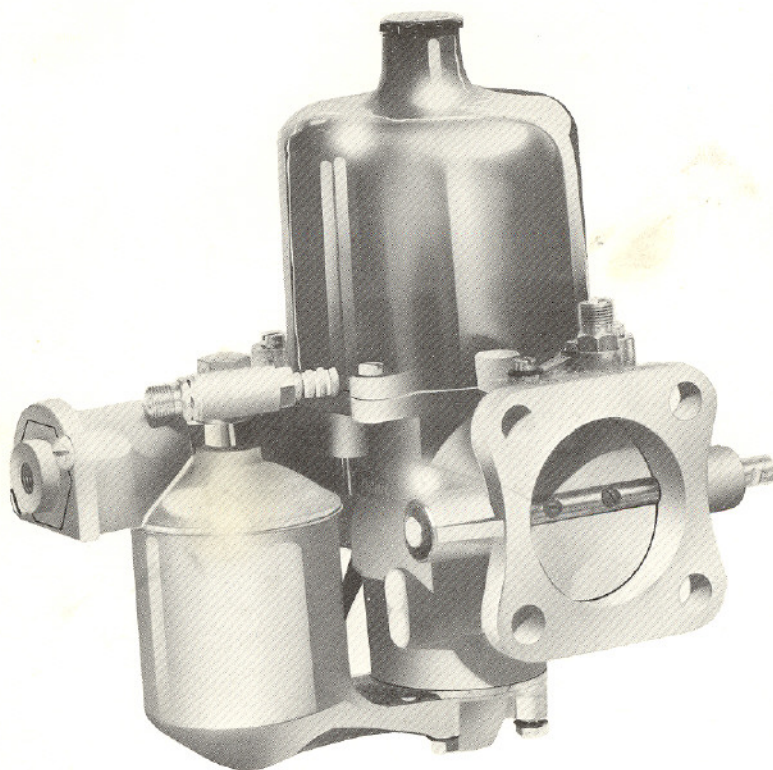


TYPE HD CARBURETTORS

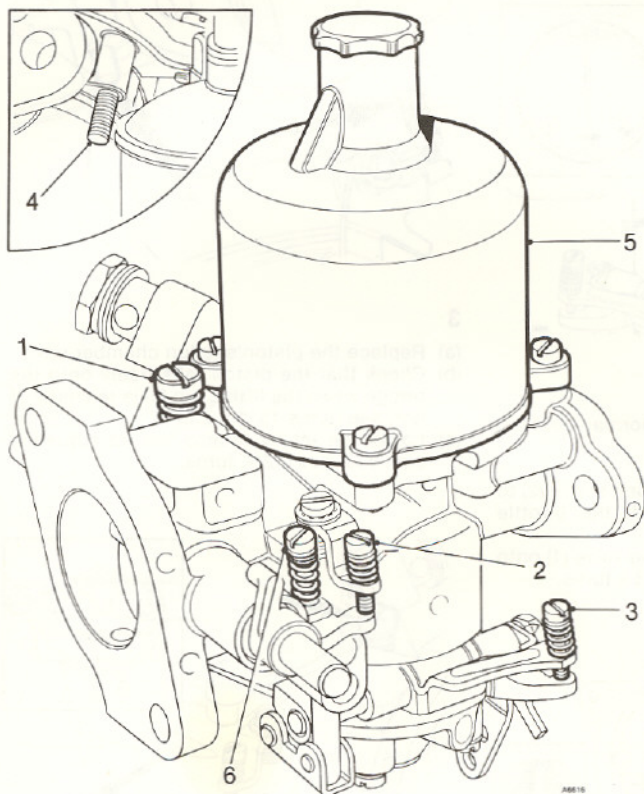
TUNING & SERVICING



SU BUTEC

DORMER ROAD, THAME, OXFORD OX9 3UB
TELEPHONE 084-421 4511

THE TYPE HD CARBURETTER



- 1 Slow-running valve
- 2 Fast-idle adjusting screw
- 3 Jet adjusting screw
- 4 Piston lifting pin
- 5 Piston/suction chamber
- 6 Throttle adjusting screw (when fitted)

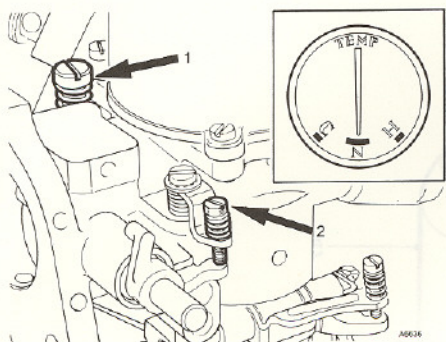
These instructions are intended as a general guide for tuning and servicing the type HD carburettor in both single and multi-installations.

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

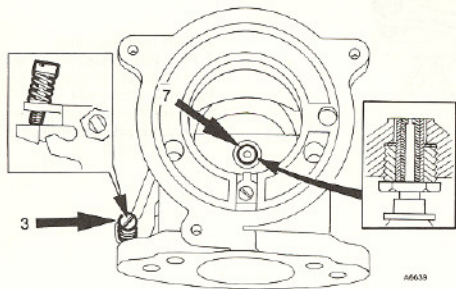
TUNING

Single carburetters



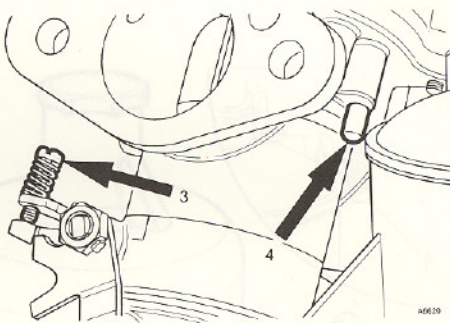
1

- 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 $3\frac{1}{2}$ turns.



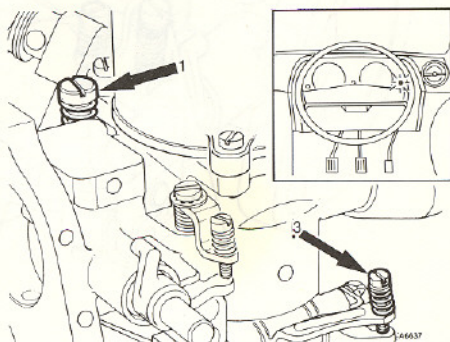
2

- Remove the piston/suction chamber unit.
- Turn the jet adjusting screw (3) until the jet (7) is flush with the bridge of the carburettor.



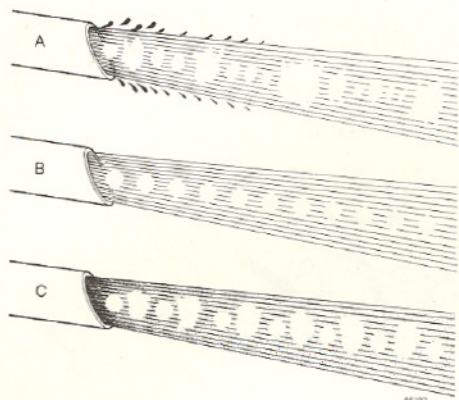
3

- Replace the piston/suction chamber unit.
- Check that the piston falls freely onto the bridge when the lifting pin (4) is released. If not, see items 15, 16, and 17.
- Lower the jet by turning the jet adjusting screw (3) down $2\frac{1}{2}$ turns.



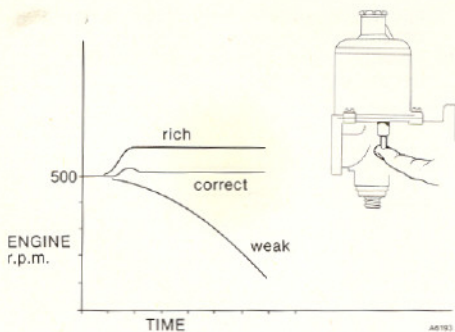
4

- 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.



5 The effect of mixture strength on exhaust smoke

- A. **TOO WEAK:** Irregular note, splashy mis-fire, and colourless.
- B. **CORRECT:** Regular and even note.
- C. **TOO RICH:** Regular or rhythmical mis-fire, blackish.

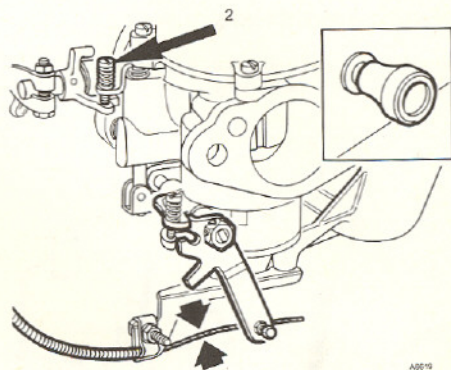


6

- (a) Check for correct mixture by gently pushing the lifting pin (4) up about 0.8 mm ($\frac{1}{32}$ 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.

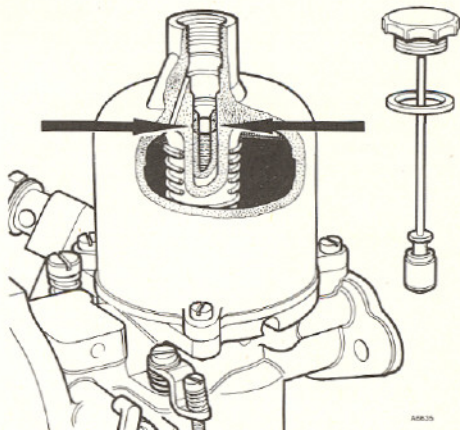
RICH MIXTURE:	r.p.m. increase considerably.
CORRECT MIXTURE:	r.p.m. increase very slightly.
WEAK MIXTURE:	r.p.m. immediately decrease.

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



7

- (a) Reconnect the mixture control wire with about 1.6 mm ($\frac{1}{16}$ 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.



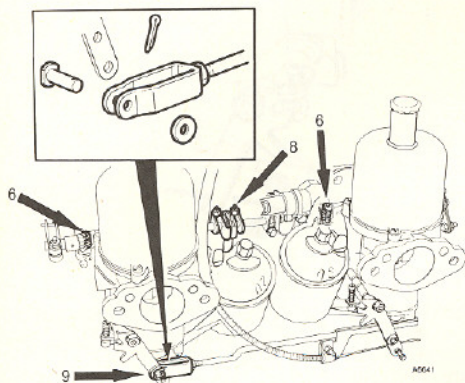
8

Finally top up the piston damper with thin engine oil of grade S.A.E. 20 until the level is 12.7 mm ($\frac{1}{2}$ in) below the top of the hollow piston rod.

Note: On non-dustproofed carburetters, identified by a vent hole in the piston damper top, the oil level should be 12.7 mm ($\frac{1}{2}$ in) above the top of the hollow piston rod.

Multi-carburettors

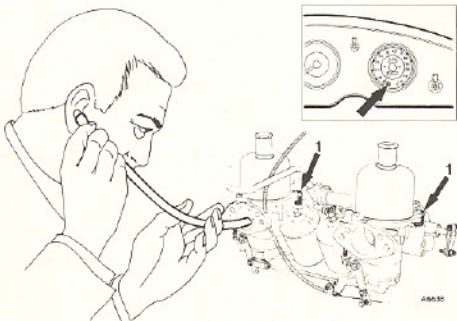
Remove the air cleaners and carry out items 1, 2 and 3 on each carburetter.



9

Note: Whenever the throttle adjusting screws (6) 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 (6) $1\frac{1}{2}$ turns open. In items 10, and 11, adjust the idling speed with the throttle adjusting screws.

- Slacken a clamping bolt (8) on one of the throttle spindle interconnection couplings between the carburettors.
- Disconnect the jet control interconnecting rod at the forked end (9).

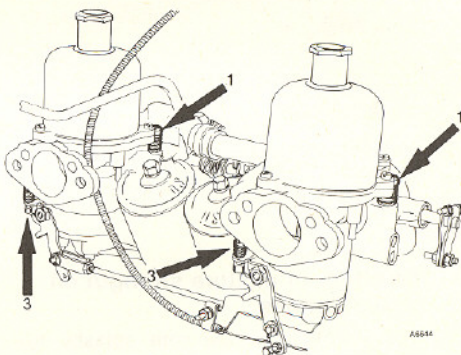


10

- Restart the engine and turn the slow-running valve (1), or the throttle adjusting

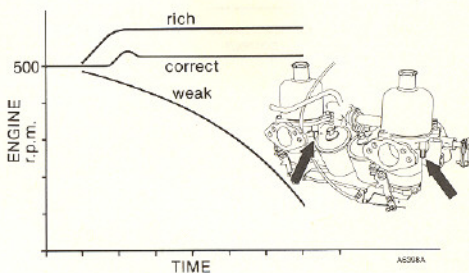
screw, an equal amount on each carburetter to give the desired idling speed.

- Compare the intensity of the intake hiss on all carburettors and alter the slow-running valves (1), or throttle adjusting screws, until each hiss is the same.



11

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



12

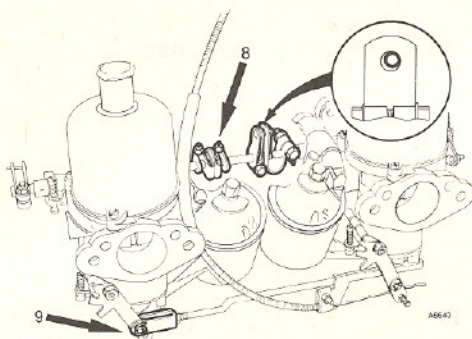
- Check the mixture by raising the lifting pin (4) of the front carburetter 0.8 mm ($\frac{1}{32}$ in) after free movement has been taken up. The graph illustrates the possible effect on engine r.p.m.
- Repeat the operation on the other carburetter(s) and after adjustment re-check as the carburettors are interdependent.
- Item 5 shows the effect of mixture on the exhaust smoke.

ROUTINE SERVICING

Jet centring

15

The piston should fall freely onto the carburetter 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-centring. This is done as follows:

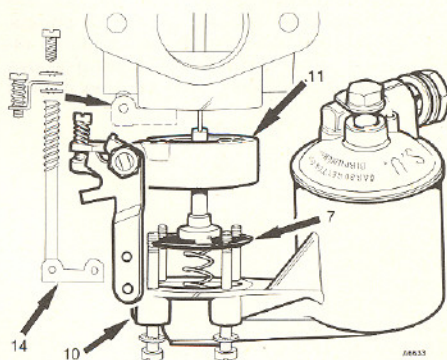


13

- (a) Tighten the clamp bolt (8) of the throttle spindle interconnections with the pin 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.

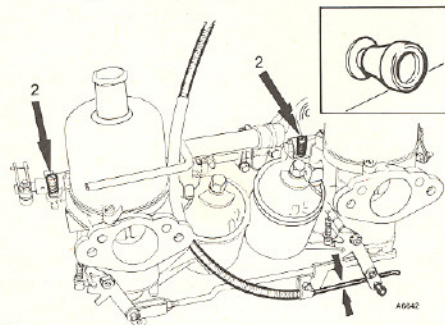
When forked levers are fitted, set the cranked levers so that the pin is 0.15 mm (0.006 in) from the lower edge of the fork.

- (b) Reconnect the jet control linkage (9) so that the jet operating arms move simultaneously; if necessary, turn the fork end(s).



16

- (a) Mark the position of the jet housing and float-chamber in relation to the carburetter body for reassembly.
- (b) Remove the plate retaining screw and withdraw the cam rod assembly (14).
- (c) Unscrew and remove the float-chamber securing screws.
- (d) Remove the float-chamber (10) and the jet housing (11) and then release the jet assembly (7).



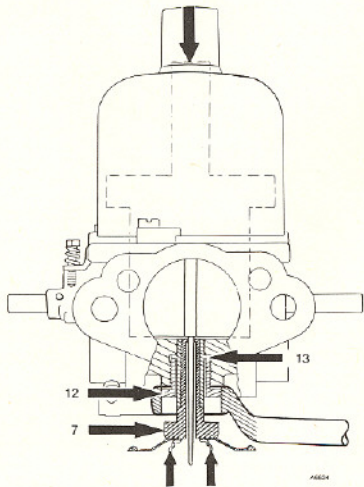
14

- (a) Reconnect the mixture control wire with about 1.6 mm (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 12.

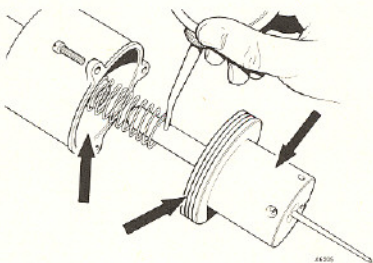
Note: When an auxiliary (thermo) carburetter is fitted refer to cold start enrichment section LTZ 2116.

17

- Slacken the jet locking nut (12), using a ring spanner, until the jet bearing (13) is just free to move.
- Remove the piston damper, hold the jet (7) in the 'fully up' position and apply light pressure to the top of the piston rod. Tighten the jet locking nut (12).
- Check again as in item 15 and ensure that the jet moves down the bearing freely.
- 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.
- Refill piston damper with oil (see item 8).



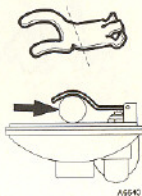
Cleaning



18

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

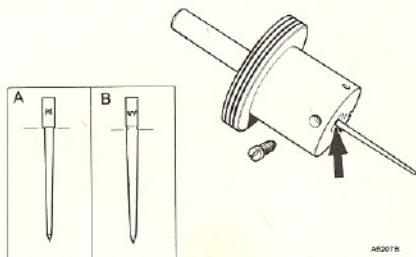
Float chamber fuel level



19

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

Needle size and position.



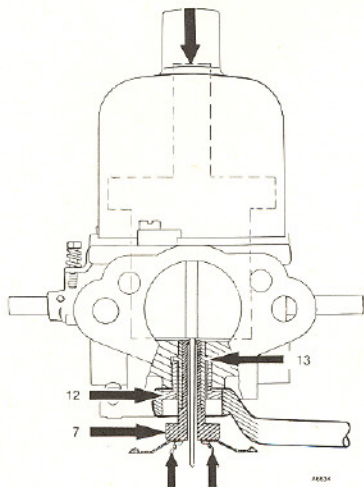
20

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.

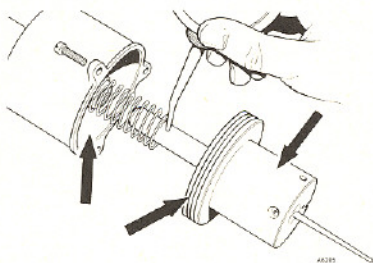
- To check the needle fitted, remove the piston/suction chamber unit.
- Slacken the needle clamping screw, extract the needle, and check its identifying mark against the recommendation.
- Fit the correct needle and lock it in position so that the shoulder on the shank (A), or the lower edge of the groove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

17

- Slacken the jet locking nut (12), using a ring spanner, until the jet bearing (13) is just free to move.
- Remove the piston damper, hold the jet (7) in the 'fully up' position and apply light pressure to the top of the piston rod. Tighten the jet locking nut (12).
- Check again as in item 15 and ensure that the jet moves down the bearing freely.
- 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.
- Refill piston damper with oil (see item 8).



Cleaning



18

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

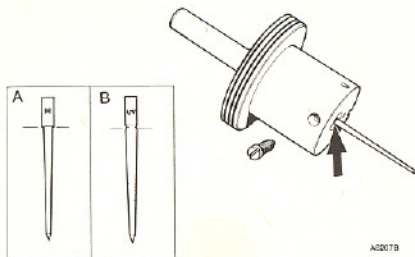
Float chamber fuel level



19

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

Needle size and position.



20

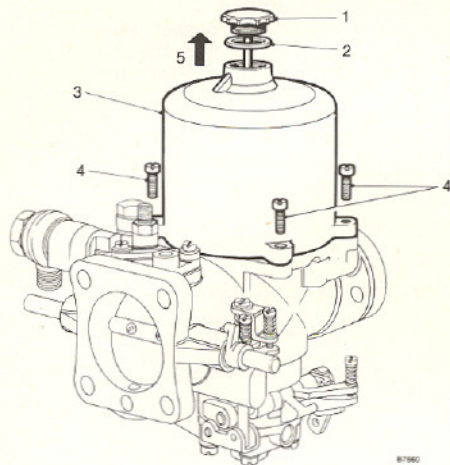
The needle size is determined during engine development and will provide the correct mixture strength except under the extremes of temperature, humidity, or altitude; e.g. a weaker needle will be necessary at altitudes exceeding 1800 m (6,000 ft). If modifications are made to the engine; (e.g. camshaft,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

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

DISMANTLING

21

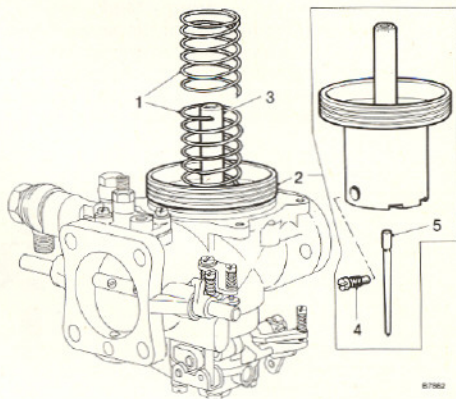
- (a) Thoroughly clean the outside of the carburetor.
- (b) Unscrew and remove the damper and washer.
- (c) Remove the suction chamber retaining screws and remove the chamber without tilting it.



- 1 Damper
- 2 Washer for damper
- 3 Suction chamber
- 4 Chamber retaining screws
- 5 Direction of removal

22

- (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. Do not bend the needle.

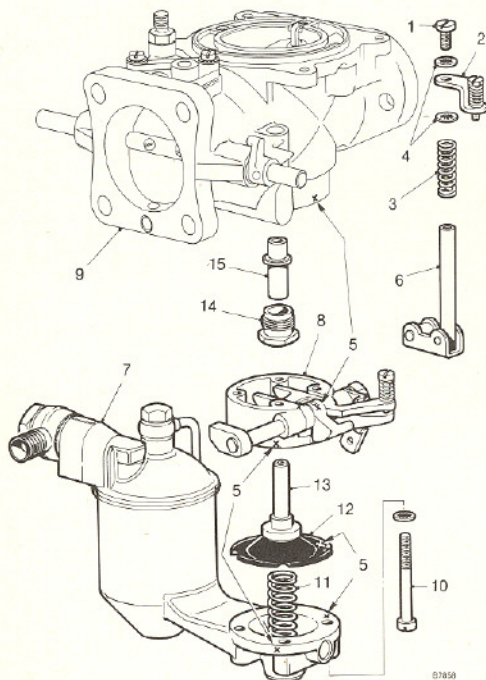


- 1 Piston spring
- 2 Piston and needle assembly
- 3 Piston rod
- 4 Needle locking screw
- 5 Needle



23

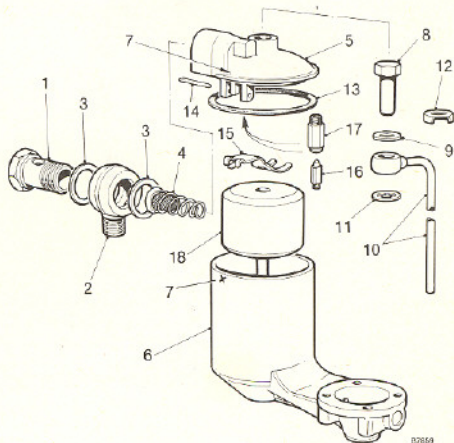
- Remove the plate retaining screw and lift off the plate and spring, noting the shakeproof washer either side of the plate. Withdraw the cam rod assembly.
- Mark the relative positions of the float-chamber, jet housing and carburettor body. Unscrew the float-chamber screws, holding the float-chamber 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 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.



- | | |
|-------------------------|-------------------------|
| 1 Plate retaining screw | 9 Carburettor body |
| 2 Plate | 10 Float-chamber screws |
| 3 Spring | 11 Jet spring |
| 4 Shakeproof washer | 12 Jet diaphragm |
| 5 Marks for replacement | 13 Jet assembly |
| 6 Cam rod assembly | 14 Jet locking nut |
| 7 Float-chamber | 15 Jet bearing |
| 8 Jet housing | |

24

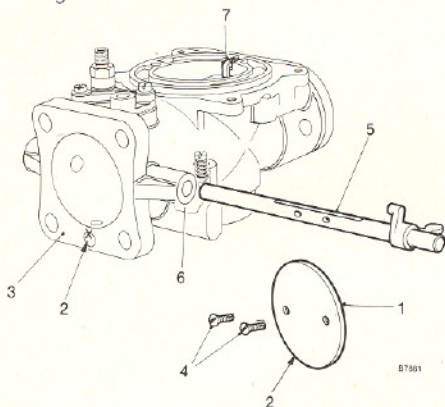
- Unscrew the banjo bolt and remove the bolt, banjo, and fibre washers. Extract the filter and spring assembly from inside the float-chamber lid inlet.
- Mark the relative positions of the float-chamber and lid. Remove the central nut retaining the float-chamber lid together with the drain-tube banjo 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.



- Banjo bolt
- Banjo
- Fibre washer
- Filter assembly
- Float-chamber lid
- Float-chamber
- Marks for replacement
- Central nut
- Washer for nut
- Drain tube and banjo
- Fibre washer
- Cover cap (alternative)
- Lid gasket
- Float lever hinge pin
- Float lever
- Float needle
- Needle seating
- Float

25

- Close the throttle and mark the relative positions of the throttle disc and the carburetter 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.

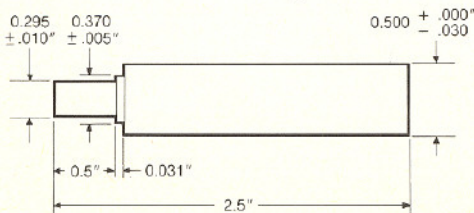


- | | |
|-------------------------|--------------------------|
| 1 Throttle disc | 5 Throttle spindle |
| 2 Marks for replacement | 6 Spindle sealing glands |
| 3 Carburetter flange | 7 Piston key |
| 4 Disc retaining screws | |

Note: Some HD8 carburetters are fitted with plastic spindle bushes which are now no longer available. In this case throttle spindle bush replacement should be undertaken as follows:

Service Kit Part No WZX 1054

- Dismantle the carburetter as described in this brochure. Remove P.T.F.E. bushes from carburetter body.
- Line ream throttle spindle bores using a 0.375 in \varnothing reamer. Finished bore size should be 0.375 $\pm \frac{+0.000}{-0.005}$ in \varnothing
- Using a service tool shown drive replacement bushes into the body.

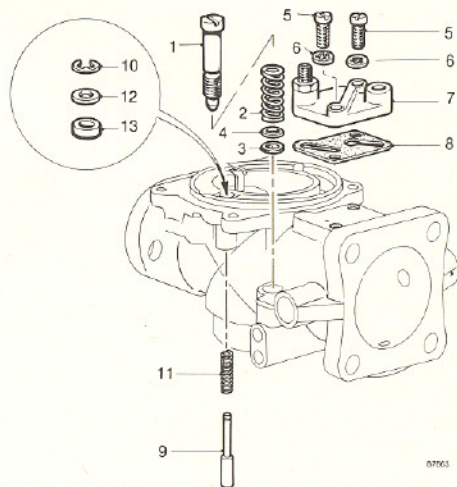


- Remove all swarf and burr from the body.
- Reassemble throttle spindle and disc assembly fitting spindle seals supplied in the service kit. Position the seals so that the sealing face is in contact with the carburetter body.

26

- Unscrew and remove the slow-running valve complete with spring, seal and brass washer.
- Remove the two screws and shakeproof 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.

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



- | | |
|----|-----------------------|
| 1 | Slow running valve |
| 2 | Spring |
| 3 | Seal |
| 4 | Brass washer |
| 5 | Retaining screw |
| 6 | Shakeproof washer |
| 7 | Vacuum take-off plate |
| 8 | Gasket |
| 9 | Piston lifting pin |
| 10 | Circlip |
| 11 | Spring |
| 12 | Plain washer |
| 13 | Rubber washer |

REASSEMBLING

27

- 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 carburetter 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.

28

- 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 carburetter body and the vacuum ignition take-off plate are not obstructed. Examine the gasket for re-use and refit the gasket, plate, and securing screws. Tighten securely.
- Refit the piston lifting pin, spring, rubber washer, plain washer and circlip.

29

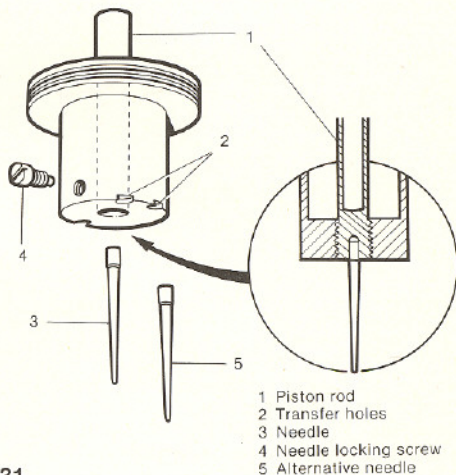
- Examine the float needle and seating for damage or wear. Screw the seating into the float-chamber lid but do not overtighten. Refit the needle to the seating, coned-end first. Test the assembly for leakage with air pressure.
- Refit the float lever and insert the hinge pin. Check the float level as described in item 19.
- 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 overtighten 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.

30

- 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 agent. **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 in 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.



31

- 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 as described in items 15, 16 and 17.
- 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 shakeproof washer 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.

FAULT DIAGNOSIS

Symptom	Cause	Remedy	Item No.
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	18 15, 16, and 17 20
Hesitation at pickup-up	Low damper oil level Incorrect oil grade (too thin)	Top up Replace with correct grade	8 8
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	24 and 29 24 and 29 19

