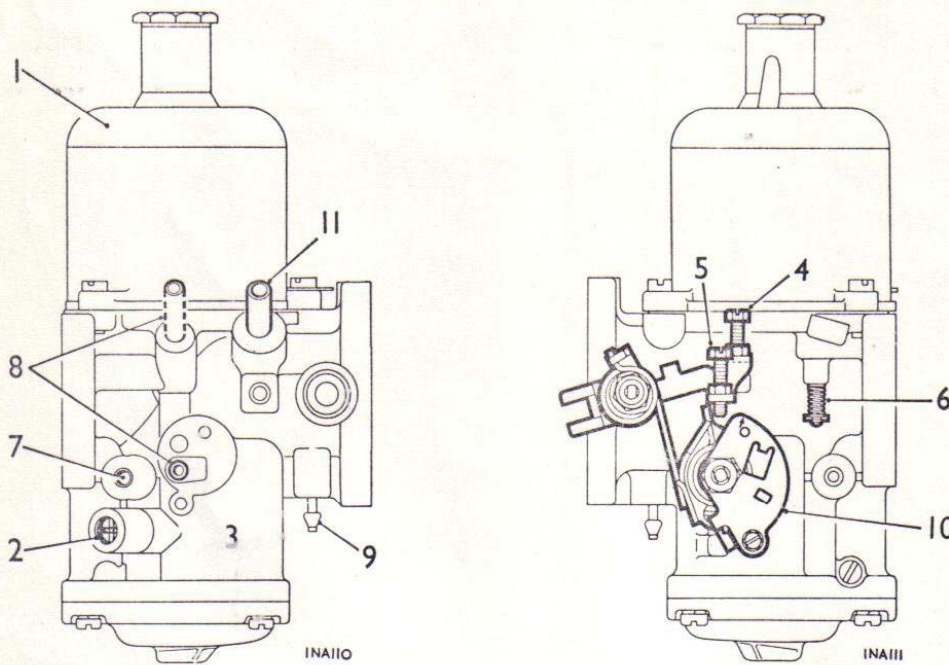


SU Booklets – AUC9939A (AKD7902): Type HIF carburettor tuning & servicing



The Type HIF Carburettor

- | | | |
|-----------------------------|--------------------------------------|---|
| 1. Suction chamber assembly | 5. Fast idle adjusting screw | 9. Auto ignition connection |
| 2. Jet adjusting screw | 6. Piston lifting pin | 10. Cold start enrichment lever (cam lever) |
| 3. Float chamber | 7. Fuel inlet | 11. Crankcase ventilation tube |
| 4. Throttle adjusting screw | 8. Vent tube (alternative positions) | |

TUNING—TYPE HIF CARBURETTERS

Foreword

These instructions are intended as a general guide for tuning and servicing 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 (CO meter of the infra-red non-dispersive type or equivalent) are required. **These instruments are essential when tuning vehicles equipped to conform with exhaust emission regulations.**

Before servicing or tuning a 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

NOTE: Each instruction in this leaflet has a sequence number, and to complete a tuning or servicing operation efficiently it is essential that the instructions are performed in numerical sequence. Where applicable, the sequence numbers identify the relevant components in the appropriate illustration.

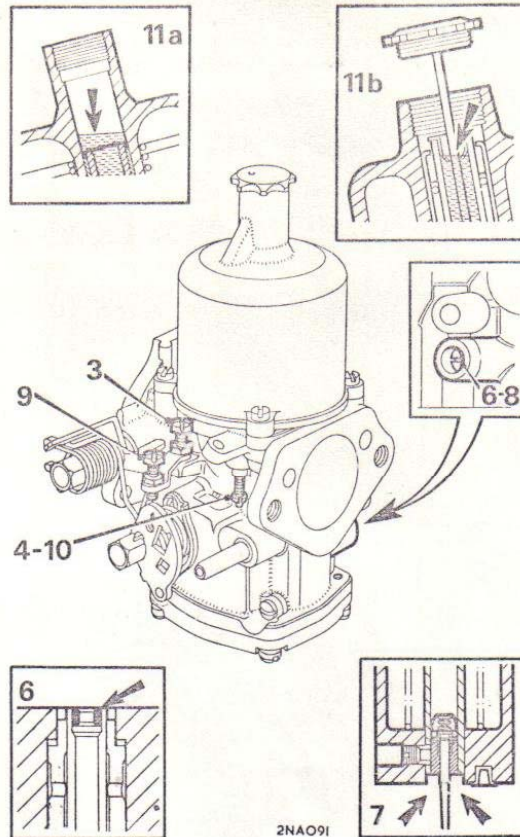
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Single and multi-carburettor installations

1. Remove the air cleaner(s).
2. Check the throttle for correct operation and signs of sticking.
3. Unscrew the throttle adjusting screw (each screw multi-carburetters) until it is just clear of the throttle lever with the throttle closed, then turn the screw clockwise $1\frac{1}{2}$ full turns (single), one turn on each (multi-).
4. Raise the piston of each carburettor with the lifting pin 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.
5. 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.
6. Turn the jet adjusting screw anti-clockwise until the jet is flush with the bridge or as high as possible without exceeding the bridge height. Ensure that the jets on multi-carburetters are in the same relative position to the bridge of their respective carburetters.
7. Check that the needle shank is flush with the underside of the piston.
8. Turn the jet adjusting screw two turns clockwise (each screw multi-carburetters).
9. Turn the fast idle adjusting screw anti-clockwise (each screw multi-carburetters) until it is well clear of the cam.
10. Refit the suction chamber assembly if it has been removed and, using the lifting pin, check that the piston falls freely onto the bridge.

NOTE: If ball bearing suction chambers are fitted take care not to wind up piston spring when refitting the suction chamber—see item 44 i, page 10.

11. 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 $\frac{1}{2}$ in (13 mm) above the top of the hollow piston rod, refit the damper and screw the cap firmly into the suction chamber.
 - b. *Ball bearing suction chambers.* Unscrew the cap and raise the piston and damper to the top of their travel. Fill the recess in the damper retainer with engine 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.

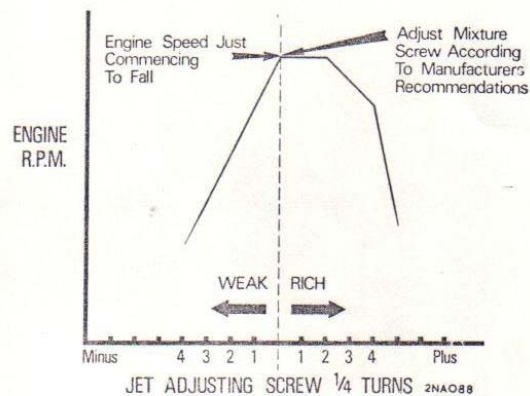
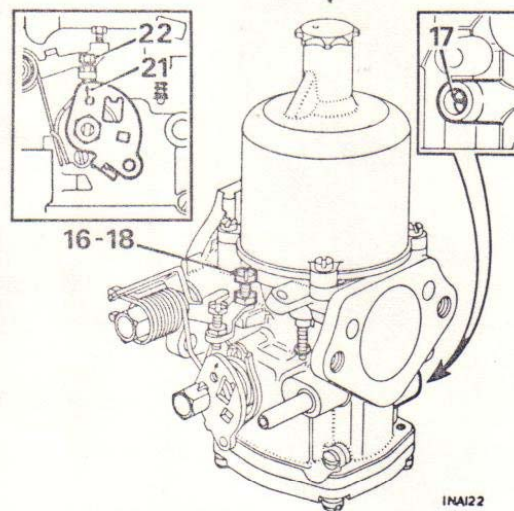


12. *Vehicles with emission control.* Connect a reliable tachometer to the engine in accordance with the instrument manufacturer's instructions.
13. Start the engine and run it at a fast idle speed until it attains normal running temperature, then run it for a further five minutes.
14. Increase the engine speed to 2,500 rev/min for 30 seconds.
15. *Vehicles with emission control.* Connect an exhaust gas analyser to the engine in accordance with the instrument manufacturer's instructions.

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

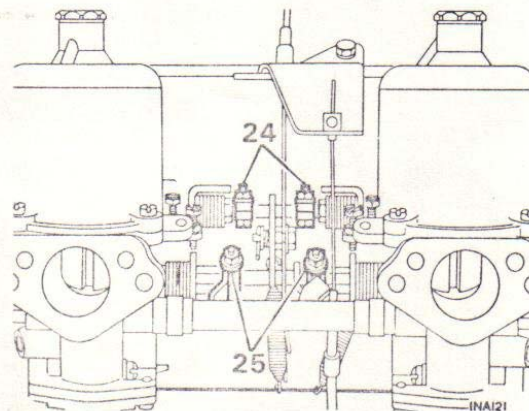
Single carburettors

16. Adjust the throttle adjusting screw until the correct idle speed (see vehicle manufacturer's tuning data) is obtained.
17. Turn the jet adjusting screw, clockwise to enrich or anti-clockwise to weaken, until the fastest speed is indicated; turn the screw anti-clockwise until the engine speed just commences to fall. Turn the screw 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.
18. Check the idle speed, and re-adjust it as necessary with the throttle adjusting screw to obtain the correct setting.
19. *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 screw by the minimum amount necessary to bring the reading just within the limits. If an adjustment exceeding half a turn of the adjusting screw is required to achieve this, the carburettor must be removed and serviced.
20. With the fast idle cam against its return stop, check that a $\frac{1}{16}$ in (1.5 mm) free movement of the mixture control (choke) cable exists before the cable moves the cam.
21. Pull out the mixture control (choke) until the arrow marked on the cam is positioned under the fast idle adjusting screw.
22. Turn the fast idle adjusting screw clockwise until the correct fast idle speed (see vehicle manufacturer's recommendations) is obtained.
23. Refit the air cleaner.



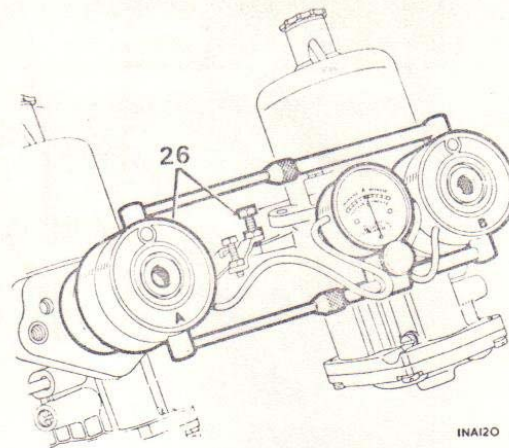
Multi-carburettors

24. Slacken both clamping bolts on the throttle spindle interconnections.
25. Slacken both clamping bolts on the cold start interconnections.



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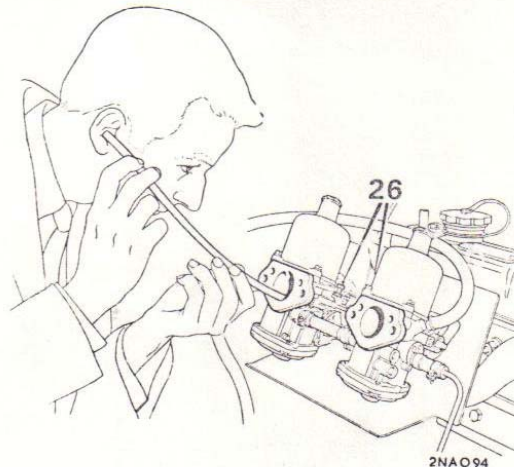
26. Using a balancing meter in accordance with the maker's instructions, balance the carburettors by altering the throttle adjusting screws until the correct idle speed and balance is achieved. Alternatively, use a 'listening tube' to compare the intensity of the intake hiss on all carburettors and turn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



27. Turn the jet adjusting screw on each carburettor clockwise to enrich or anti-clockwise to weaken, by the same amount until the fastest speed is indicated; turn each screw anti-clockwise until the engine speed just commences to fall. Turn each screw very slowly clockwise by the minimum amount until the maximum speed is regained. From this setting adjust the mixture screws according to the vehicle manufacturer's recommendations. (See graph—Single Carburettors).

28. Check the idle speed and re-adjust it as necessary with the throttle adjusting screws, turning each by the same amount.

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



30. Set the throttle interconnection clamping levers, in accordance with the vehicle manufacturer's instructions, so that a clearance exists between the link pin and the lower edge of the fork. Tighten the clamp bolts, ensuring that there is approximately $\frac{1}{32}$ in end-float on the interconnection rod.

31. Run the engine at 1,500 rev/min and check the throttle linkage for correct connection by re-checking the carburettor balance.

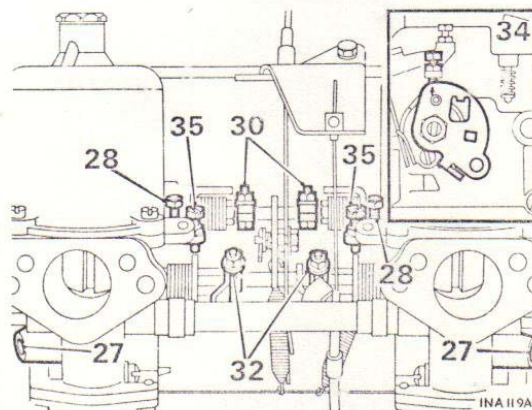
32. With the fast idle cams of each carburettor against their respective stops, set the cold start interconnections so that all cams begin to move simultaneously.

33. With the fast idle cams against their stops check that a $\frac{1}{16}$ in (1.5 mm) free movement of the mixture control (choke) cable exists before the cable moves the cams.

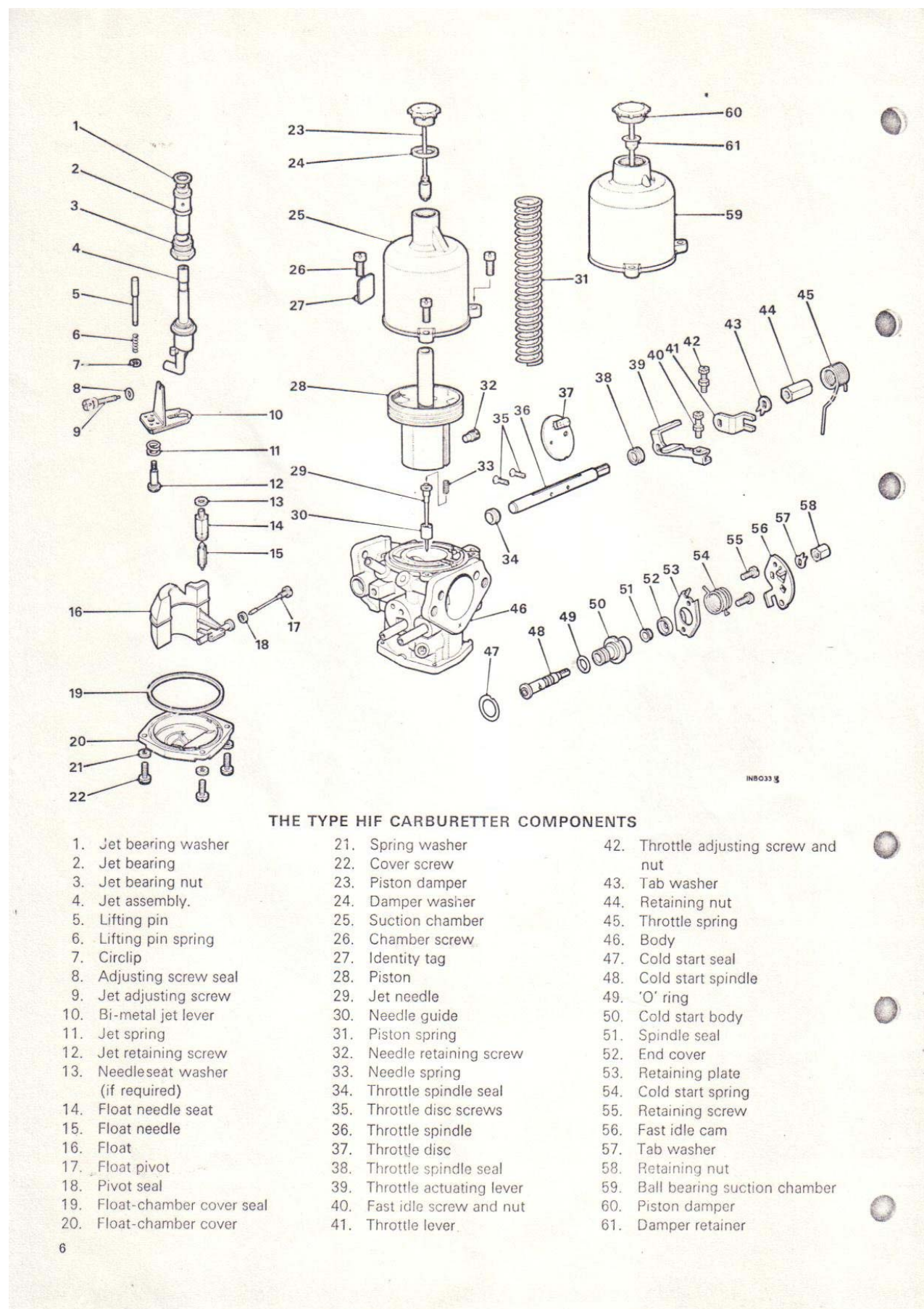
34. Pull out the mixture control (choke) until the arrow marked on the cam is positioned under the fast idle adjusting screw of each carburettor.

35. Using the balancing meter or listening tube to ensure equal adjustment, turn the fast idle adjusting screws to give the correct fast idle speed.

36. Refit the air cleaners.



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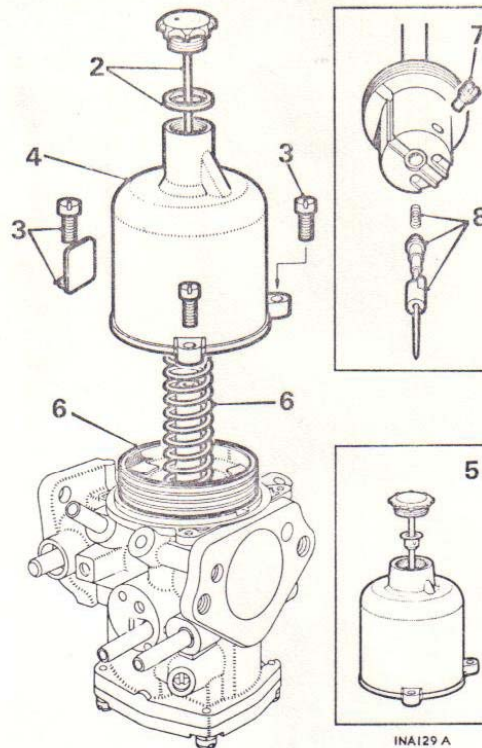
THE TYPE HIF CARBURETTOR COMPONENTS

- | | | |
|-------------------------------------|------------------------------|--------------------------------------|
| 1. Jet bearing washer | 21. Spring washer | 42. Throttle adjusting screw and nut |
| 2. Jet bearing | 22. Cover screw | 43. Tab washer |
| 3. Jet bearing nut | 23. Piston damper | 44. Retaining nut |
| 4. Jet assembly. | 24. Damper washer | 45. Throttle spring |
| 5. Lifting pin | 25. Suction chamber | 46. Body |
| 6. Lifting pin spring | 26. Chamber screw | 47. Cold start seal |
| 7. Circlip | 27. Identity tag | 48. Cold start spindle |
| 8. Adjusting screw seal | 28. Piston | 49. 'O' ring |
| 9. Jet adjusting screw | 29. Jet needle | 50. Cold start body |
| 10. Bi-metal jet lever | 30. Needle guide | 51. Spindle seal |
| 11. Jet spring | 31. Piston spring | 52. End cover |
| 12. Jet retaining screw | 32. Needle retaining screw | 53. Retaining plate |
| 13. Needleseat washer (if required) | 33. Needle spring | 54. Cold start spring |
| 14. Float needle seat | 34. Throttle spindle seal | 55. Retaining screw |
| 15. Float needle | 35. Throttle disc screws | 56. Fast idle cam |
| 16. Float | 36. Throttle spindle | 57. Tab washer |
| 17. Float pivot | 37. Throttle disc | 58. Retaining nut |
| 18. Pivot seal | 38. Throttle spindle seal | 59. Ball bearing suction chamber |
| 19. Float-chamber cover seal | 39. Throttle actuating lever | 60. Piston damper |
| 20. Float-chamber cover | 40. Fast idle screw and nut | 61. Damper retainer |
| | 41. Throttle lever | |

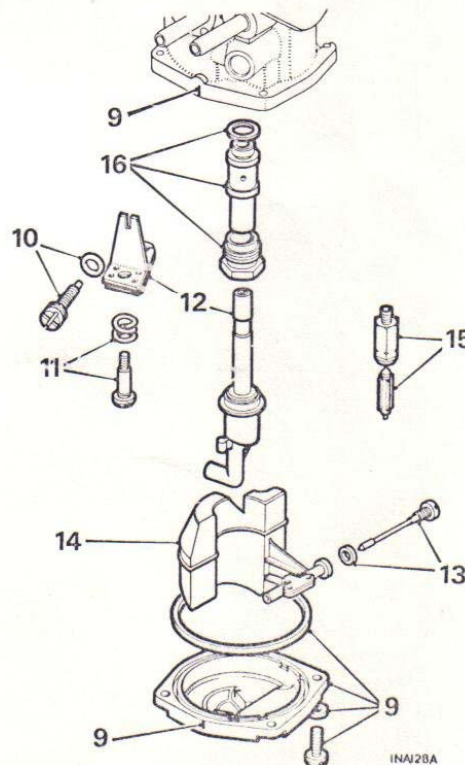
SERVICING—TYPE HIF CARBURETTERS

Dismantling

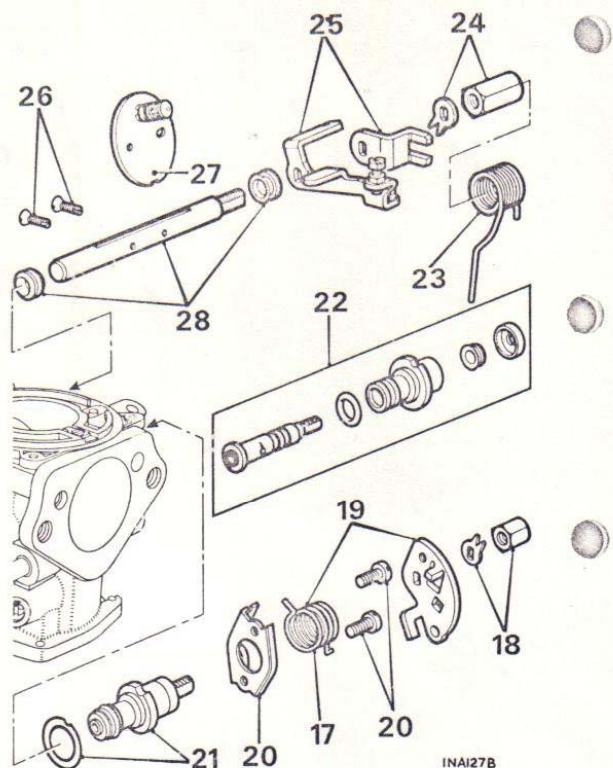
1. Thoroughly clean the outside of the carburetter.
2. *Standard suction chambers.* Remove the piston damper and its washer.
3. Unscrew the suction chamber retaining screws and remove the identity tag.
4. Lift the chamber assembly vertically from the body without tilting it.
5. *Ball bearing suction chambers:* Hold the piston firmly and pull the suction chamber, taking care not to bend the damper rod, until the damper retainer is freed from the piston rod. Remove the damper.
6. Remove the piston spring, lift out the piston assembly and empty the oil from the piston rod.
7. Note the position of the needle guide etch mark in relation to the piston transfer holes for correct reassembly and unscrew the needle guide locking screw.
8. Withdraw the needle, guide and spring.



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



17. Note the location of the ends of the fast idle cam lever return spring.
18. Unlock and remove the cam lever retaining nut and locking washer.
19. With the return spring held towards the carburettor body, prise off the cam lever and remove the return spring.
20. Unscrew the starter unit retaining screws and remove the cover-plate.
21. Withdraw the starter unit assembly and remove its gasket.
22. Withdraw the valve spindle and remove the 'O' rings, seals and dust cap.
23. Note the location and loading of the ends of the throttle lever return spring and remove the spring.
24. Unlock and remove the nut and tab washer retaining the throttle levers.
25. Remove the throttle lever and throttle actuating lever.
26. Remove the throttle disc retaining screws.
27. 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 over-run valve. Open the throttle and carefully withdraw the disc from the throttle spindle taking care not to damage the over-run valve.
28. Withdraw the throttle spindle and remove its seals, noting the way it is fitted in relation to the carburettor body to ensure correct reassembly.

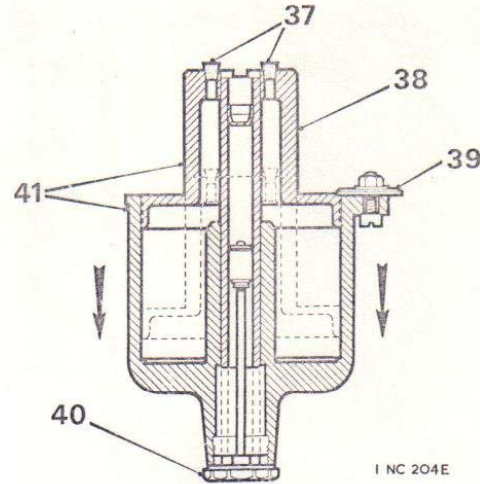


Inspection

29. Examine the throttle spindle and its bearings in the carburettor body: check for excessive play, and renew parts as necessary.
30. Examine the float needle and seating for damage and excessive wear: renew if necessary.
31. Examine all rubber seals and 'O' rings for damage or deterioration; renew as necessary. **The cover-plate sealing ring must be renewed.**
32. Check condition of all fibre washers and gaskets; renew as necessary.
33. Examine the carburettor body for cracks and damage and for security of the brass connections and the piston key.
34. Clean the inside of the suction chamber and piston rod guide with fuel or methylated spirit (denatured alcohol) and wipe dry. **Abrasives must not be used.**
35. Examine the suction chamber and piston for damage and signs of scoring.
36. *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.

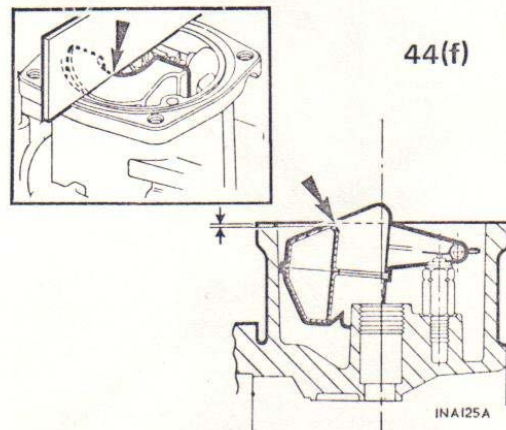
NOTE: The following timing check applies only to standard suction chambers and need only be carried out if the cause of the carburettor malfunction which necessitated the dismantling has not been located.

37. Temporarily plug the piston transfer holes.
38. Fit the piston into the chamber without its spring.
39. 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 the chamber bore.
40. Fit the damper and washer.
41. 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.
42. Check the time taken for the chamber to fall the full extent of the piston travel. For carburettors of $1\frac{1}{2}$ in (38 mm) to $1\frac{7}{8}$ in (47.6 mm) bore the time taken should be 5 to 7 seconds.
43. 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.



Reassembling

44. Reverse the procedure in 1 to 28, 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.
 - 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 (see illustration) is 0.04 ± 0.02 in (1.0 ± 0.5 mm) below the level of the float chamber face. Adjust the float position by carefully bending the brass pad. Check that the float pivots correctly about the spindle.



- g. Check that the small diameter of the jet adjusting screw engages the slot in the adjusting lever and set the jet flush with the bridge of the body.
- h. Use a **new** retaining screw when refitting the needle and ensure that the needle guide etch mark aligns correctly with the piston transfer holes (alternative specifications illustrated). After fitting the needle assembly, check that the shoulder of the needle aligns the full face of the piston.
- i. *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.

