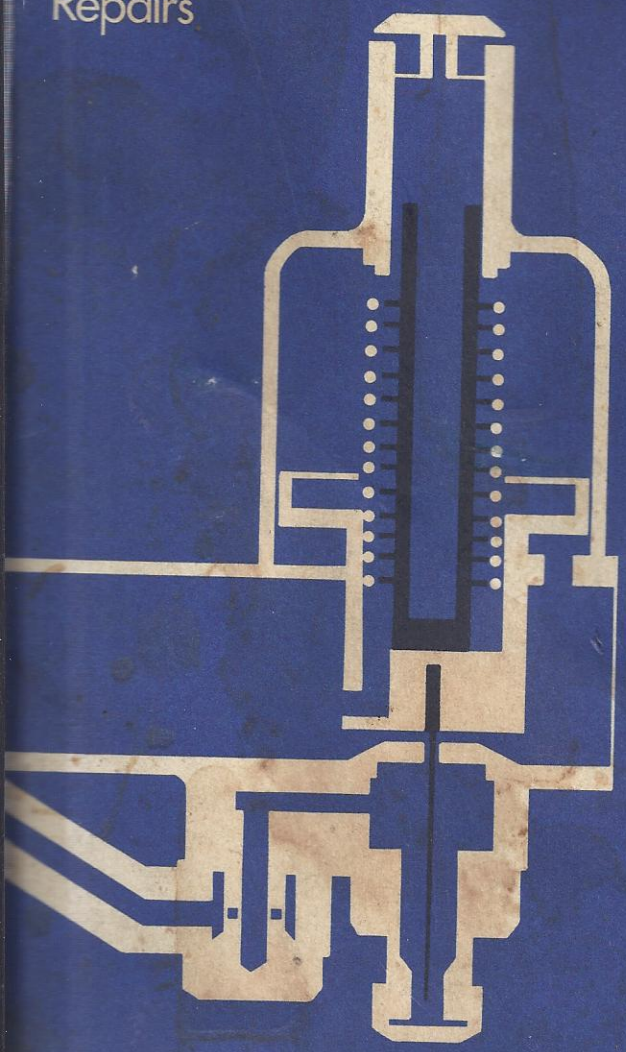
S.U. Carburetter Manual

Function, Servicing, Testing and Repairs



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1. INTRODUCTION

The purpose of this manual is to set out the working, testing procedure, tuning and maintenance of the carburetter as applied to the spark ignition multi-cylinder internal combustion automobile engine. Before getting into such detail however, the duty of the carburetter will be considered in general terms, also the engine requirements and the influence of the induction system will be commented upon.

2. CARBURETTER DUTY

Literally, to carburet means to chemically combine another element with carbon. In the present context the term carburetter defines an apparatus designed to physically mix air and (usually) a hydrocarbon fuel in metered proportions to ensure ready ignition and complete combustion. This definition over-simplifies the true duty of the carburetter which is to proportion the petroleum vapour/combustion air (i.e. fuel/air) mixture according to the demand of engine load/speed requirements at any time.

2.1. Basic Form

Basically the carburetter consists of an arrangement of an air inlet passage with a restriction (choke), throttle valve, and a constant fluid level fuel chamber. A fuel metering jet or jets submerged by the fuel are connected by passages to the choke. Air flow through the duct creates a pressure differential across the choke causing fuel to flow through the jets. The pressure differential (and hence fuel flow) is regulated by the throttle valve position.

Mixture strength adjustments for cold starting, idling, acceleration and cruising are automatically controlled by various design and operational features depending upon the type and make of carburetter. Difficulties arise however from the disimilar physical properties of fuel and air, and from the need to provide a negative head of fuel from the fuel chamber to prevent flooding.

2.2. Mixture Response

Whereas fuel is practically incompressible and has a high density, air is readily compressible and is of low density. Consequently, there is not an equal response between the fuel and air to differential pressure changes occurring throughout the operating range; the fuel will also lag relative to air movement and resist changes in flow direction. Difference in flow response are illustrated in Fig. 1.

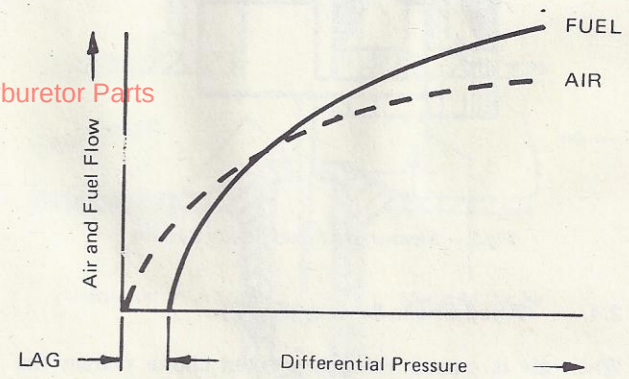


Fig.1– Differences in Flow Response

As the volumetric proportion of liquid fuel to air required is approximately 1 to 9000 the need for a high degree of accuracy of carburetters as metering instruments will be appreciated.

2.3. Carburetter Basic Designs

Developments by various manufacturers to meet performance requirements have resulted in a variety of carburetter designs which, though differing considerably in matters of detail, invariably operate according to one of two basic principles, or (occasionally) these in combination. The principles are:-

variable pressure differential.
constant pressure differential.

in practice these are referred to as a fixed choke (or fixed venturi) system, and a variable choke system, respectively.

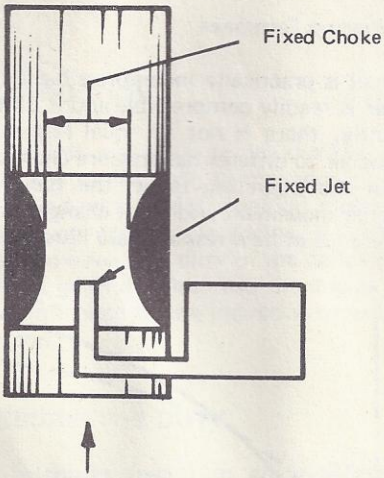


Fig.2 — Elementary Fixed Choke System

2.4. Fixed Choke System (Fig. 2)

When air is passed through a fixed choke system the pressure differential acting on the fuel jets will vary with engine demand . This variation in pressure differential requires compensating devices to produce the correct fuel flow, and a compromise on the size of choke to satisfy performance at the extremes of the engine operating range.

2.5. Variable Choke System (Fig. 3)

The variable choke system uses a method by which the effective choke and fuel jet areas increase as engine demand increases, and reduce when the demand is reduced. The variation in choke area results in a constant air velocity and pressure differential across the jet. Compensating devices are not normally required.

3. ENGINE REQUIREMENTS

The duty of the carburetter to proportion the fuel/air mixture according to engine demands has been stated.

These demands are that the engine should be supplied with an ignitable mixture of appropriate strength (fuel/air ratio) to suit the load/speed requirement at any time.

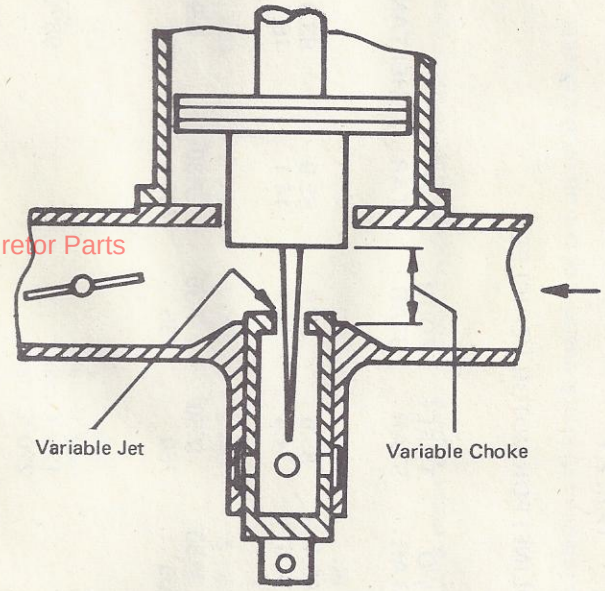


Fig.3 — Elementary Variable Choke System

3.1. Mixture Ratio — Theoretical

The mixture strength is conventionally defined by its fuel to air ratio, usually expressed on a weight basis. The theoretically correct ratio (releasing maximum energy potential) can be calculated from principles of fuel combustion if the hydrogen and carbon content of the fuel are known.

3.1.1. Normal Fuels

For the grades of fuel normally used (Table I) this ratio does not vary widely and is usually in the range 1:14.8 to 1:15.2. Generalising, approximately fifteen parts of air to one part of fuel by weight are required for theoretically optimum combustion.

TABLE I

PETROL (GASOLINE) FOR MOTOR VEHICLES [a]

GRADE DESIGNATION	TWO STAR	THREE STAR	FOUR STAR	FIVE STAR	HEPTANE [d]
COMPOSITION					
% Carbon	85.4	85.6	85.8	85.9	83.9
% Hydrogen	14.6	14.4	14.2	14.1	16.1
DENSITY – 15.5°C					
lb per gallon	7.55	7.50	7.35	7.30	6.91
grams per litre	755	750	735	730	691
DISTILLATION					
10% Evaporation at		70°C max.			–
50% Evaporation at		125°C max.			98°C
90% Evaporation at		220°C max.			–
LATENT HEAT OF EVAPORATION					
Cal/gram – 100°C		approx. 70			76
BTU/lb		approx. 126			137
COMBUSTION AIR REQUIRED [b]					
Weight/unit weight fuel	14.84	14.79	14.75	14.72	15.18
Volume cubic ft/lb fuel	184.2	183.6	183.1	182.8	188.5
RESEARCH OCTANE NUMBER [c] (R.O.N.)					
Not less than	90	94	97	100	–

NOTES:

a. Typical values only are listed; variations occur depending upon crude source, refinery processing and seasonal requirements.

b. At 0°C and 760 mm. Hg.

c. The R.O.N. gives an indication of the relative anti-knock qualities of petrols on the market.

d. Heptane is often used as a standard fuel in engine tests.

·090 JET NEEDLES

AY	AZ	* AAA	* AAB	* AAC	* AAD	* AAE
·089	·089	·089	·089	·089	·089	·089
·085	·085	·085	·085	·0855	·0855	·085
·0805	·0815	·0814	·0824	·0835	·0827	·0833
·0768	·079	·0785	·0785	·0811	·0807	·0803
·0741	·0755	·0755	·0752	·0788	·0787	·0773
·072	·071	·072	·0715	·0765	·077	·0745
·0694	·0662	·0674	·067	·0742	·0753	·0715
·0669	·0615	·063	·061	·072	·074	·068
·0643	·0575	·060	·056	·0698	·073	·0653
·0617	·0532	·058	·0537	·0676	·072	·0627
·059	·0490	·056	·0516	·0655	·071	·060
·0565	·0445	·0540	·0493	·0631	·070	·059
·0538	·0405	·052	·047	·061	·069	·058
		·050	·0448	·059	·068	·057
		·048	·0448	·057	·067	·056
		·046	·0448	·055	·066	·055

* AAF	* AAG			BA	BB	BD
·089	·089			·090	·089	·090
·0855	·085			·0856	·085	·0856
·0827	·083			·0822	·0825	·0822
·080	·080			·0805	·080	·0805
·0775	·0773			·0794	·0775	·0794
·075	·0745			·0777	·075	·0777
·0715	·0715			·0760	·0725	·0760
·068	·0686			·0743	·070	·0750
·0653	·0658			·0727	·0675	·0740
·0627	·0647			·0710	·065	·0730
·060	·0636			·0694	·0625	·0720
·059	·0625			·0677	·060	·0710
·058	·0614				·0575	
·057	·0605					
·056	·0595					
·055	·0584					

BE	BF	BG	BH	BI	BJ	BK
·089	·089	·089	·089	·089	·089	·089
·084	·085	·085	·0855	·0855	·0855	·0855
·0805	·082	·0815	·0812	·0808	·0824	·0815
·0773	·0796	·0782	·0775	·0777	·0794	·0785
·074	·0764	·0745	·0753	·0751	·0769	·0762
·0705	·072	·0695	·074	·073	·0749	·0738
·067	·068	·0647	·0731	·0714	·0734	·0722
·0634	·0635	·060	·0722	·0705	·0725	·0715
·060	·0591	·0557	·0714	·0701	·0721	·071
·0565	·0549	·0515	·0705	·0697	·0717	·0706
·053	·0505	·0474	·0696	·0694	·0714	·0703
·0495	·0463	·043	·0688	·069	·071	·070
·046	·042	·039	·068			·0695

BL	BM	BN	BO	BP	BQ	BR
·089	·089	·089	·089	·089	·089	·089
·0855	·0855	·0855	·0855	·085	·085	·085
·081	·0805	·0816	·0835	·0814	·082	·0817
·0777	·0768	·0784	·0815	·078	·079	·0785
·075	·074	·0758	·080	·074	·075	·0757
·073	·072	·0738	·0787	·0715	·0725	·075
·0715	·0705	·0724	·077	·0695	·0705	·0741
·0707	·0695	·0714	·0757	·0673	·0685	·0735
·070	·0692	·0707	·075	·065	·0662	·0728
·0698	·0688	·0703	·074	·0625	·064	·072
·0693	·0684	·0701	·073	·060	·0616	·071
·069	·068	·070	·072	·058	·0594	·070
·0688			·071	·056	·057	·069

·090 JET NEEDLES

BS	BT	BU	BV	BW	BX	BX1
·088	·088	·090	·089	·089	·089	·089
·0856	·0856	·085	·0845	·0855	·085	·085
·0836	·0835	·080	·081	·0818	·0805	·0827
·0817	·0813	·077	·0785	·079	·077	·081
·0798	·0792	·0745	·076	·0765	·075	·0792
·0778	·0771	·072	·074	·0742	·0735	·0777
·076	·0749	·0695	·072	·0718	·072	·076
·074	·0726	·0675	·070	·0693	·0705	·075
·072	·0705	·0655	·068	·067	·0687	·074
·0701	·0684	·0625	·066	·0645	·067	·073
·0683	·0663	·0602	·064	·062	·0655	·072
·0664	·064	·058	·062	·0596	·064	·071
		·056	·060	·057		

BY	BZ	BB2	BB3	BB4		
·088	·089	·0890	·0890	·0890		
·084	·0843	·085	·085	·085		
·0805	·081	·081	·081	·081		
·0775	·0752	·0787	·078	·078		
·0745	·0719	·0762	·075	·0742		
·0725	·0686	·0735	·0718	·0706		
·0709	·0653	·0712	·0687	·067		
·069	·0622	·0685	·0654	·0638		
·067	·059	·0659	·0622	·0602		
·0653	·056	·0632	·0589	·0564		
·0635	·053	·0604	·0554	·0528		
·062	·050	·0577	·0526	·0495		
·060	·047	·055	·0494	·046		

C	CA	CB	CC	CD	CE	CF
·089	·089	·089	·089	·089	·089	·089
·0845	·0855	·085	·085	·085	·085	·085
·081	·084	·0805	·081	·0815	·082	·083
·077	·0825	·077	·078	·0775	·0795	·0805
·0742	·081	·0745	·075	·0735	·0777	·0787
·071	·0807	·0725	·070	·076	·076	·0767
·0683	·0803	·071	·0698	·069	·0745	·0747
·066	·0803	·0695	·067	·0678	·0735	·0727
·0635	·0803	·068	·064	·0666	·072	·0707
·0613	·0803	·0665	·061	·0654	·071	·0687
·0594	·0803	·065	·058	·0643	·0695	·0667
·0575	·0803	·0635	·055	·063	·0682	·0647
·056	·0803	·062	·052	·062	·067	

CG	CH	CJ	CK	CL	CM	CN
·090	·090	·090	·090	·090	·088	·089
·084	·084	·084	·084	·084	·084	·085
·081	·0805	·0815	·081	·080	·0805	·0812
·079	·0782	·0795	·079	·0775	·0775	·078
·0765	·0767	·0775	·0775	·076	·074	·075
·075	·076	·0761	·077	·075	·0718	·072
·0735	·0756	·0747	·0766	·0746	·070	·069
·0722	·0752	·0734	·0762	·0742	·0685	·0665
·0707	·0747	·072	·0757	·0737	·0668	·064
·0693	·0743	·0705	·0753	·0733	·0652	·062
·0678	·0738	·0692	·0749	·0728	·0635	·060
·0664	·0723	·0677	·0745	·0724	·062	·058
·065	·073	·0664	·074	·072	·060	·056

3.1.2. Special Fuels

Exceptions to the above ratio occur for special fuels comprising alcohol derivations, or blends thereof with petroleum spirit. In these cases the chemically correct fuel to air ratio by weight may range between 1:6.5 to 1:11.5 i.e. so different from the general case of their use to need special engine design considerations. In fact the use of these fuels is usually limited to racing engines and they are unlikely to be found satisfactory for normal purposes.

3.2. Mixture Ratio — Practical

Although combustion at the chemically optimum ratio (fuel/air approximately 1:15) releases the maximum energy potential of the fuel, in practice variations from this ratio are required either to the rich side or weak side to give a mixture strength appropriate to the engine needs:-

Engine State	Mixture Required
Cold starting, idling, acceleration, maximum power.	Rich (more than 1:15)
Part throttle conditions, cruising, maximum economy	Weak (less than 1:15)

3.2.1. Maximum Power: Maximum Economy

When the accelerator is fully depressed to give full throttle opening maximum power is obviously being called for and this is obtained at the expense of economy. At part throttle conditions (which cover approximately 80% of the engine running time) only that amount of fuel should be supplied to meet the condition and so achieve maximum economy.

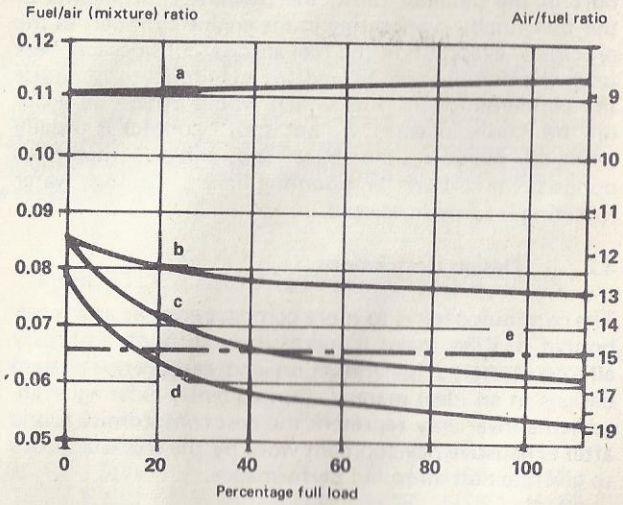
3.2.2. Slow Speed Conditions - Cold Start: Idling

The requirement for enrichment at varying slow engine speed conditions arises from several factors. Under the cold standing regime (virtually closed throttle) low air velocities result in poor fuel atomisation further aggravating mixture condensation on the inlet manifold walls;

insufficient light fractions of the fuel reach the cylinders to evaporate and sustain ignition unless enrichment is provided. At the somewhat higher (yet still relatively low) engine idling speed condition carburation is better, but poor scavenging at this speed leaves a higher percentage of exhaust gases in the cylinder resulting in poor combustion of the mixture unless considerable enrichment has been given.

3.3. Mixture Ratios — Operating Limits

The need for a readily ignitable mixture at varying fuel/air ratio throughout the engine load range has been described. The relationship at any time between these factors is typically illustrated in Fig. 4 (actual values vary from engine to engine). The upper and lower limits of flammability will be noted; whereas the upper limit is well above normal operating requirements and is therefore of little concern, the lower limit is close to the maximum economy line of operation and also indicates the ultimate limit of ignition of the cylinder receiving the weakest mixture.



a Rich limit of flammability.
b Max. Power
c Max. Economy
d Lean limit of flammability.
e Chemically optimum ratio

Fig.4 — Mixture Ratios — Operating Limits

Figure 4 also shows a line representing the chemically optimum mixture ratio, clearly indicating that for the greater part of the load range this ratio would be too rich for maximum economy and too weak for maximum power. The need for progressive enrichment (because of reduced exhaust products clearance) as the load is decreased will also be noted.

4. INFLUENCE OF INDUCTION SYSTEM

The carburetter is an integral part of the air induction system; upstream of the unit air flow is conditioned by the air inlet pipe and filter/silencer arrangement whilst downstream, evaporation of the mixture and its distribution to individual cylinders is governed by the air inlet manifold geometry.

4.1. Conditioning of Mixture

It should be noted that the carburetter is responsible for atomisation, not vaporisation of the fuel; vaporisation occurs largely in the induction manifold and air inlet port in the cylinder head, the heaviest components of the fuel finally evaporating in the engine cylinder. In the process of evaporation the fuel absorbs considerable heat from the combustion air and the manifold; to minimise the condensation of fuel which would otherwise occur on the manifold walls, a "hot spot" contact is usually arranged between the inlet and exhaust manifolds opposite the carburetter mounting flange, although water jacketing is sometimes used.

4.2. Design Restrictions

The continuing trend to more compact engines and lower bonnet profiles make it increasingly difficult to satisfy all requirements for induction and carburetter system designs in an ideal manner. Consequently existing arrangements invariably represent the best compromise found after exhaustive development work by the manufacturers to give the best all-round performance.

As the physical arrangement and air flow characteristics of the system are for all practical purposes fixed, best performance can only be realised by testing, tuning and maintenance of the carburetter as indicated in this manual.

5. OTHER FACTORS

Other factors controlling combustion performance are certain mechanical and electrical features of the engine. Briefly, these are:-

Battery	Advance/retard mechanism
High tension coil	Spark plug gap
Distributor	Ignition timing
Contact breaker gap	Valve clearances
Cylinder compressions	Elimination of air leaks if present - inlet manifold

These should be checked against the engine manufacturers recommendations and corrected if required BEFORE carrying out work on the carburetter.

6. THE S.U. CARBURETTER

S.U. carburetters have been designed in a range of five throttle diameters, with variants of four main types (H, HD, HS, HIF) as indicated in the table below, for installation singly, or in multiples. Type HIF, designed to meet exhaust emission control requirements, is the subject of a seperate publication.

THROTTLE/CARBURETTER COMBINATIONS

THROTTLE DIAMETER, INCHES.	CARBURETTER TYPES			
1.125	H1			
1.250	H2		HS2	
1.500	H4	HD4	HS4	H1F4
1.750	H6	HD6	HS6	H1F6
2.000		HD8	HS8	

The carburetters are fitted in many popular and high performance U.K. and European cars; a list of car models so fitted from 1960 is given in Appendix I.

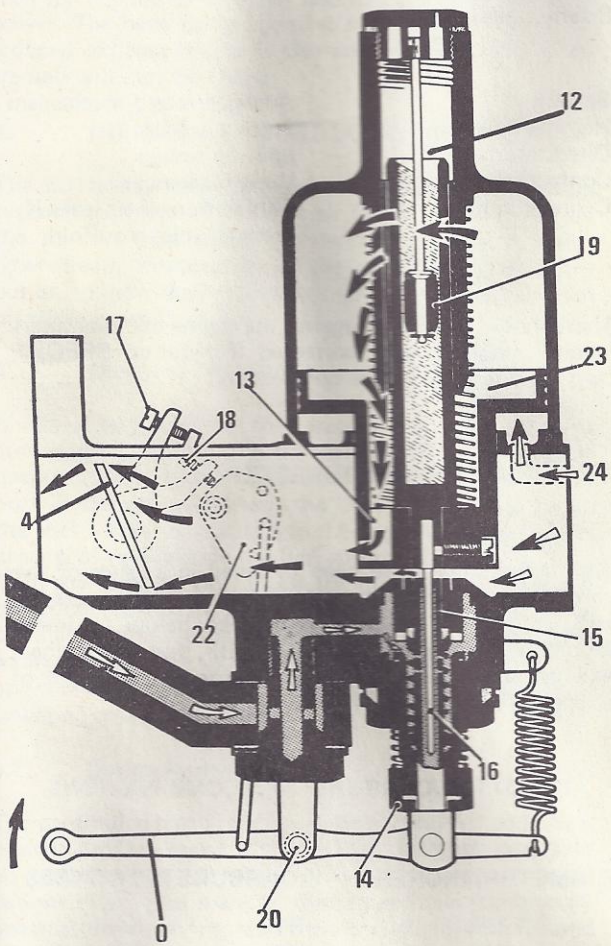


Fig.5 — S.U. Carburetter — Basic Principle

6.1. Operating Principle

S.U.'s are variable choke units and all models operate on the same basic principle illustrated in Fig. 5 which shows a sectioned view of an H type model. The variable choke is obtained by vertical movement of spring loaded piston 23 which carries tapered jet needle 15 freely centred in the orifice of jet 16 so providing an annular fuel orifice of variable width.

6.2. Automatic Jet Control

The space below the suction disc of the piston is in communication 24 with the air supply upstream of the choke whereas the space above communicates 13 with the mixture passage downstream of the choke. This passage is at a depression under engine running conditions so that a pressure differential exists across the fuel jet and choke, and hence across the piston, causing this to rise against its spring to a position of balance with the differential force.

The amount of the differential force (and therefore extent of piston and jet needle movement) is determined by the air mass flow required by the engine at any time, together with the corresponding throttle position controlling the passage depression. As the tapered needle is withdrawn from the jet the increasing width of the annular orifice allows more fuel to flow. The fuel/air requirements throughout the engine load/speed range are thus automatically controlled.

6.3. Jet Needle Variations

Each size of jet needle is specific to the carburetter/engine duty. For some applications variations from the standard needle are available (see Appendix I) to give alternatively richer or weaker mixtures. The weaker setting is for operation at altitudes above 6,000 ft; richer setting is for when modifications have been carried out, such as air cleaner removal etc.

Specific dimensions of the jet needles are given in Appendix II — note that the needle profiles do not taper uniformly but consist of a series of different tapers usually at 0.125 in. intervals.

6.4. Mixture Control — Cold Start, Warm Up and Idling. (For types other than H.I.F.)

The rich mixtures required for the cold start, fast idling and warm up periods are obtained by movement of the jet lever 9 pivoted at 20 by use of the dashboard cold start control. The large clearance at the pivot results in the throttle disc 4 being moved first by means of fast idle cam 22 followed by downward movement of the jet 15 relative to the needle 16 resulting in a larger fuel annulus and hence increased fuel flow; continued movement of the cold start control results in further downward movement of the jet and opening of the throttle disc.

Fast Idle (warm-up) throttle opening is set by adjustment of the fast idle adjusting screw 18.

Overall adjustment of mixture strength is obtained by rotation of adjusting nut 14. This positions the jet 15 in relation to the needle 16.

Normal engine idling speed is set by adjustments of the throttle adjusting screw 17.

6.5. Acceleration Enrichment

For satisfactory acceleration "pick-up" during rapid opening of the throttle, temporary mixture enrichment is required. This is obtained by slowing down the speed of the piston lift thereby increasing the choke depression, resulting in greater fuel flow.

The piston is retarded by the oil-filled dash-pot arrangement formed by the piston rod 12 and damper plunger 19. The plunger restricts the speed with which the piston lifts; a one-way valve assembly in the plunger allows the piston to fall freely when the throttle is closed.

With a cold engine condition, the oil in the damper will have increased resistance to flow and will still further retard piston movement resulting in greater enrichment than when the damper oil is warm. Note that the degree of enrichment obtained is relative to the viscosity of the oil used.

7. "H" TYPE CARBURETTER

7.1. Dismantling and Assembly

7.1.1. Dismantling

7.1.1.1.

Thoroughly clean the outside of the carburetter. Remove the banjo bolt, banjo union and fibre washers. Extract the filter and spring assembly from inside the inlet of the float-chamber lid.

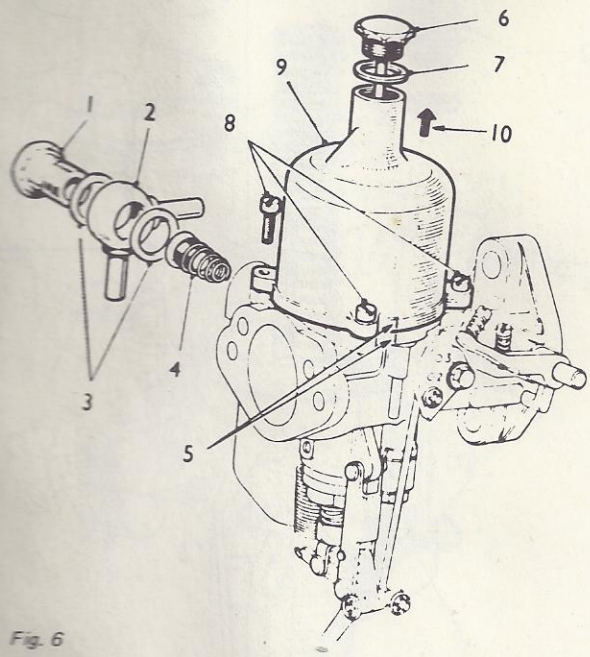


Fig. 6

1. Banjo bolt.
2. Banjo union.
3. Fibre washers.
4. Filter assembly.
5. Marks for replacement.
6. Damper.
7. Washer for damper.
8. Suction chamber retaining screws.
9. Suction chamber.
10. Direction of removal.

Mark the relative positions of the suction chamber and the body.

Remove the damper and its washer. Unscrew the chamber retaining screws. Lift off the chamber without tilting it.

7.1.1.2.

Remove the piston spring and washer (when fitted) and carefully lift out the piston assembly and empty the damper oil from the piston rod.

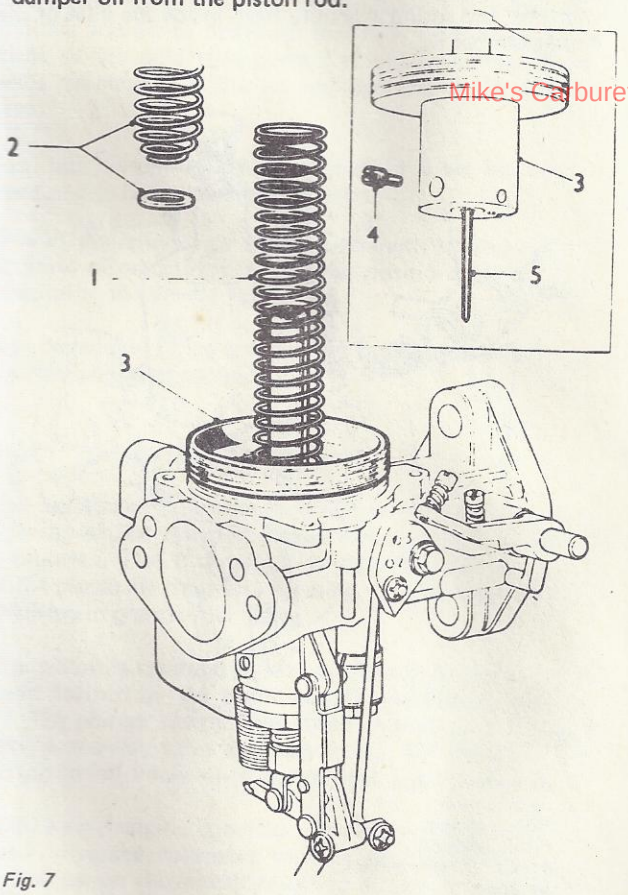


Fig. 7

1. *Piston spring.*
2. *Alternative spring and washer.*
3. *Piston assembly.*
4. *Needle locking screw.*
5. *Needle.*

Remove the needle locking screw and the needle. If the needle cannot be easily removed, first tap it inwards and then pull it out; do not bend it.

7.1.1.3.

Unhook the lever return spring. Remove the split pins and clevis pins. Remove the fast-idle cam pivot bolt. Note the positions of the double-coil spring washer and the aluminium spacing washer.

Detach the linkage assembly. Press up the piston lifting pin, extract the circlip from its groove and withdraw the pin and its spring downwards.

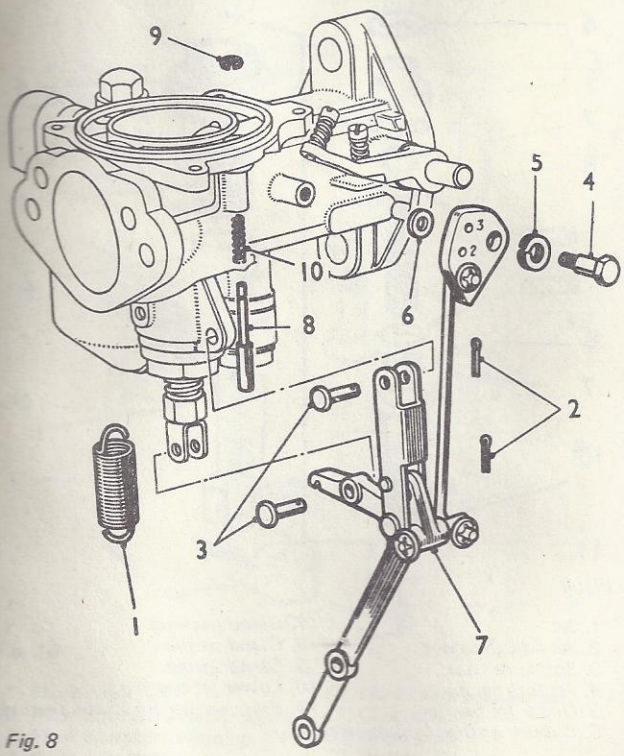


Fig. 8

1. *Lever return spring.*
2. *Split pins.*
3. *Clevis pins.*
4. *Cam plate pivot bolt.*
5. *Spring washer.*
6. *Spacing washer.*
7. *Lever assembly.*
8. *Piston lifting pin.*
9. *Circlip for pin.*
10. *Spring for pin.*

7.1.1.4.

Withdraw the jet downwards and detach the jet adjusting nut and spring.

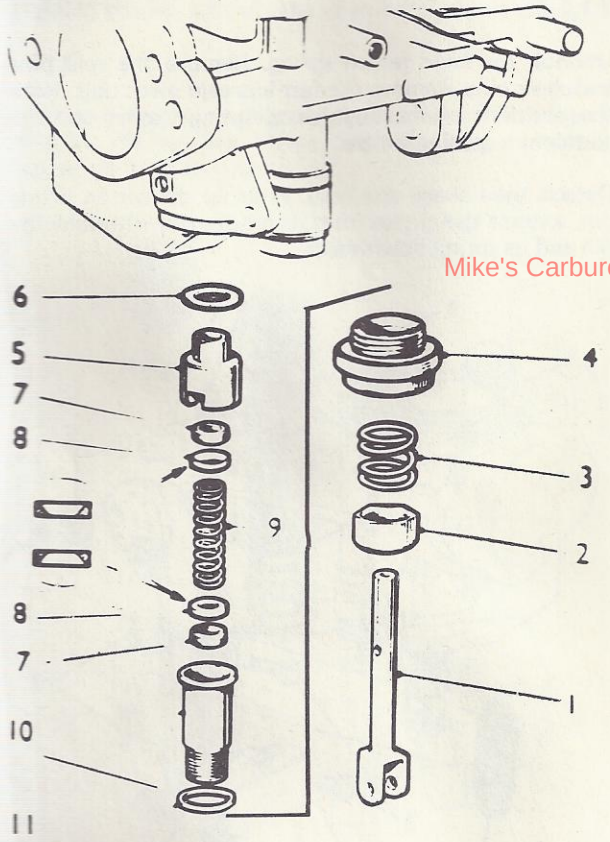


Fig. 9

1. Jet
2. Jet adjusting nut.
3. Spring for nut.
4. Jet locking nut.
5. Upper jet bearing.
6. Copper washer for upper bearing.
7. Gland packing.
8. Gland washer.
9. Gland spring.
10. Lower jet bearing.
11. Brass washer for lower bearing.

Unscrew the jet locking nut and withdraw the assembly carefully. Lift off the upper jet bearing and copper washer. From inside the bearing extract the gland and brass gland washer.

Remove the gland spring and withdraw the lower jet bearing from the jet locking nut. Note the brass washer under the shoulder of the bearing. Extract the gland and brass gland washer from inside the bearing. Do not disturb the jet locking nut cork washer.

7.1.1.5.

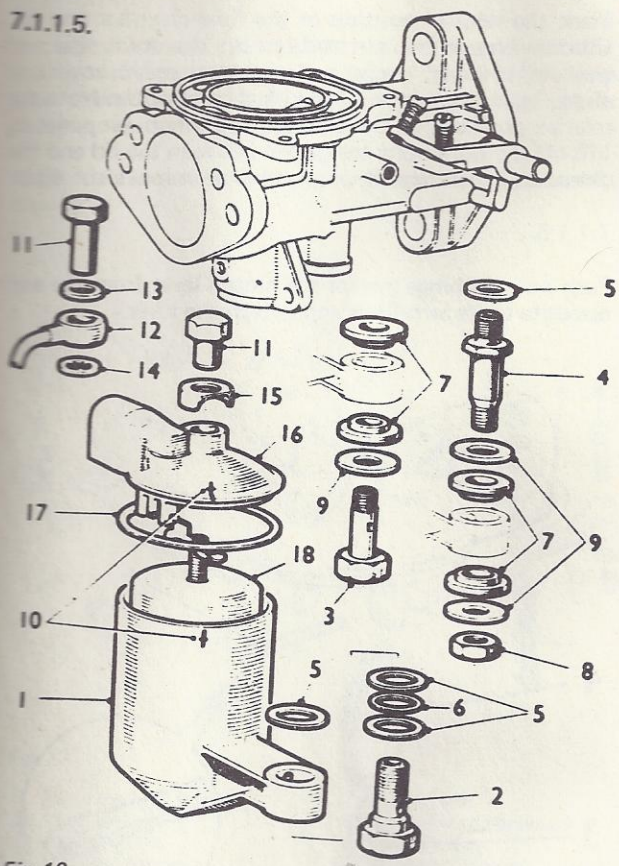


Fig. 10

1. Float-chamber.
2. Float-chamber retaining bolt.
3. Float-chamber retaining.
4. Bolts (alternative).
5. Fibre washer.
6. Brass washer.
7. Rubber grommet (alternative).
8. Nut (alternative).
9. Steel washer (alternative).
10. Marks for replacement.
11. Central nut.
12. Drain pipe.
13. Washer for nut.
14. Fibre washer.
15. Cover cap.
16. Float-chamber lid.
17. Lid gasket.
18. Float.

Remove the screw retaining the stay to the carburetter body (when fitted). Remove the bolt or nut retaining the float-chamber to the body. Note the positions of the three fibre washers and the brass washer, or alternatively, the position of the rubber grommets and steel washers.

Mark the relative position of the float-chamber and lid. Unscrew the central nut and remove the drain pipe and washers; the stay, washer and cover cap, or the cover cap alone, as is fitted to the individual carburetter. Note the relative positions of the washers and other components. Lift off the lid, noting the gasket between the lid and the chamber. Invert the float-chamber to remove the float.

7.1.1.6.

Push out the hinge pin for the hinged lever from the end opposite to its serrations and detach the lever.

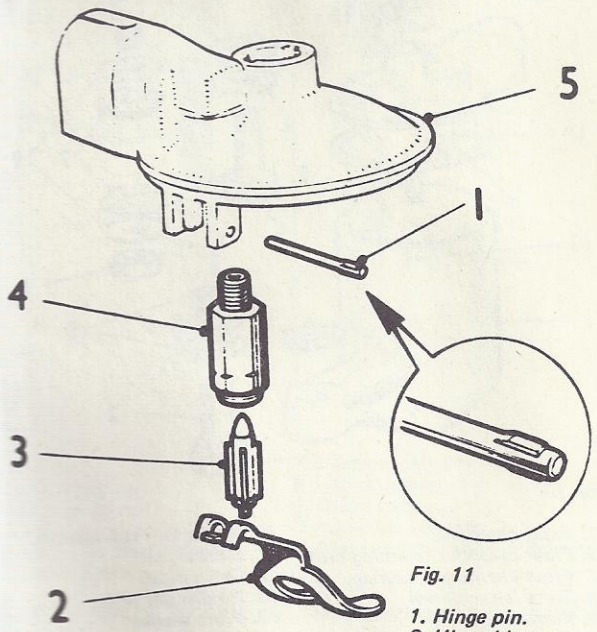


Fig. 11

1. *Hinge pin.*
2. *Hinged lever.*
3. *Needle.*
4. *Seating.*
5. *Float-chamber lid.*

Lift out the needle from its seating and unscrew the seating from the lid using a box spanner 0.338 in. (8.58 mm) across the flats. Take great care not to distort the seating.

7.1.1.7.

Slacken the return spring clip bolt and remove the clip, spring, and return spring plate (when fitted). If a clamp type operating lever is fitted, slacken the clamping bolt and remove the lever.

Close the throttle and mark the position of the throttle disc.

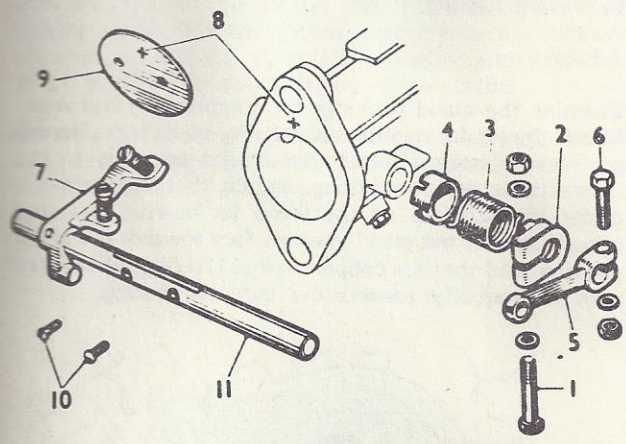


Fig. 12

1. *Return spring clip bolt.*
2. *Clip.*
3. *Return spring.*
4. *Plate for spring.*
5. *Operating lever.*
6. *Lever clamping bolt.*
7. *Fixed lever.*
8. *Marks for replacement.*
9. *Throttle disc.*
10. *Retaining screws.*
11. *Throttle spindle.*

Unscrew the two disc retaining screws. Open the throttle and ease out the disc from its slot in the throttle spindle. The disc is oval and will jam if not withdrawn carefully. Withdraw the spindle from the carburetter body.

7.1.2. Assembly

7.1.2.1.

Check the throttle spindle and its bearings in the carburetter body for wear or scoring. Renew any parts as necessary.

Refit the spindle to the body, ensuring that the fixed operating arm is in its correct position. Slide the throttle disc into its slot in the spindle until the two securing screws can be entered. Use two new screws. Manoeuvre the disc until it is a snug fit in the body with the throttle closed. Check the fit visually, and tighten the screws fully. Spread the split ends of the screws just sufficient to prevent turning.

7.1.2.2.

Examine the gland packings for compression and wear. Check the jet for ovality and security of its fork. Renew parts as necessary. Reassemble the jet assembly in the reverse order to dismantling. Ensure that the washer is under the shoulder of the lower jet bearing, that the coned faces of the gland washers face towards the gland packing, and that the copper washer (16, Fig. 9) is fitted with its sharp edge towards the upper jet bearing.

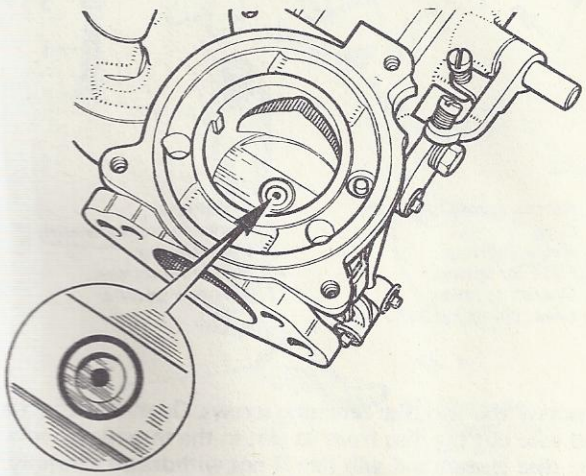


Fig. 13

Refit the assembly to the carburetter body but leave the jet locking nut slack. When the jet is correctly centred, see Fig. 13, it may appear offset from the centre of the jet bearing drilling.

7.1.2.3.

Examine the piston assembly for damage to the piston rod and the outside surfaces of the piston. Check the piston key for security in the carburetter body. The piston must be scrupulously clean. Use petrol or methylated spirits. Do not use abrasives.

Examine the needle for damage or signs of wear. Refit the needle to the piston. The shoulder should be level with the face of the piston rod. Fit and tighten the locking screw. Fit the piston assembly to the suction chamber, invert the complete assembly and spin the piston to check for concentricity of the needle.

Refit the piston assembly to the carburetter body, taking care not to damage the needle. Replace the washer (when fitted) and piston spring in position over the piston rod.

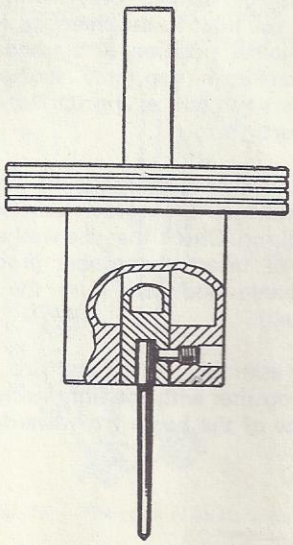


Fig. 14

The shoulder must be flush with the bottom face of the piston rod

7.1.2.4.

Clean inside the suction chamber and the piston rod guide using petrol or methylated spirit.

Lightly oil the outside of the piston rod, and refit the suction chamber in its original position as marked on dismantling. Fit and tighten the securing screws.

Centralize the jet according to 7.2.3.1. and refit the damper and washer. Do not fill with oil at this stage.

7.1.2.5.

Examine the float needle and seating; renew if faulty. Refit the seating to the float-chamber lid, taking care not to distort or overtighten. Put the needle into the seating, coned end first. Test for leakage with air pressure. Refit the hinged lever and hinge pin. Check the float level according to 7.2.3.5.

7.1.2.6.

Examine the float-chamber lid gasket; renew if necessary. Check the float for damage or puncturing; renew if necessary. Refit the float to the chamber. Fit the lid and gasket in its original position as marked. Replace the cover cap and nut cover cap, stay, washer and nut; or drain pipe, washers and nut, as appropriate to the carburetter. Do not overtighten.

Refit the float-chamber assembly to the carburetter body. Ensure that the fibre washers or rubber grommets are in good condition. Check that the washers are in their correct positions. Insert the rubber grommets in the float-chamber banjo and then push the bolt through them (when fitted).

Insert the filter assembly, spring end first, and refit the banjo and bolt together with the fibre washers. Note that the recessed face of the banjo fits towards the hexagon end of the bolt.

7.1.2.7.

Refit the return spring plate, return spring and return spring clip to the throttle spindle. Tension the spring by

turning the clip on the spindle and tighten the clip pinch-bolt. Refit the operating lever, and tighten the clamping bolt.

Refit the linkage assembly; use new split pins. Ensure that the distance washer and double-coil spring washer are in their correct positions in relation to the fast-idle cam.

7.2. Tuning, Adjusting and Servicing

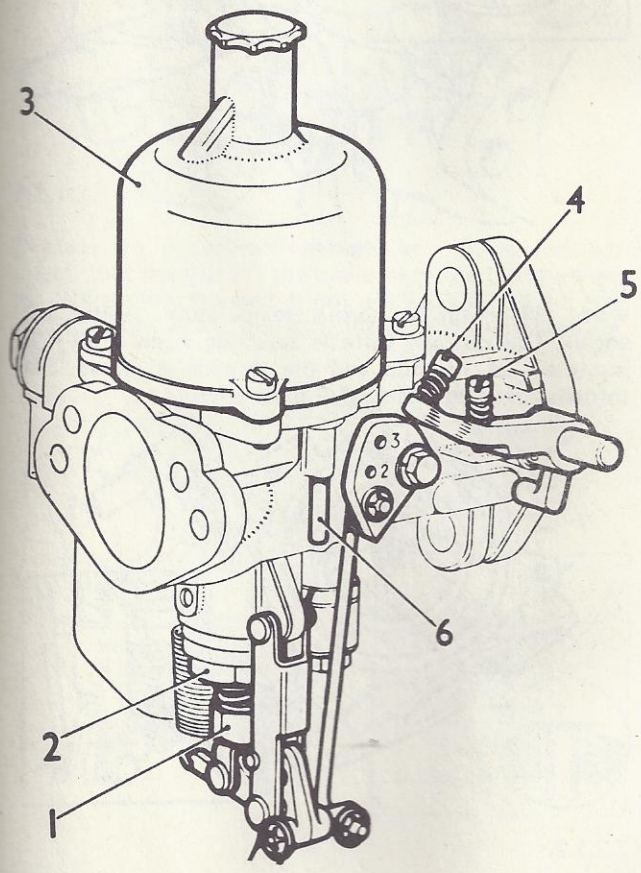


Fig. 15 — The type H carburetter

1. Jet adjusting nut.
2. Jet locking nut.
3. Piston/suction chamber.
4. Fast-idle adjusting screw.
5. Throttle adjusting screw.
6. Piston lifting pin.

7.2.1. Tuning Single Carburetters

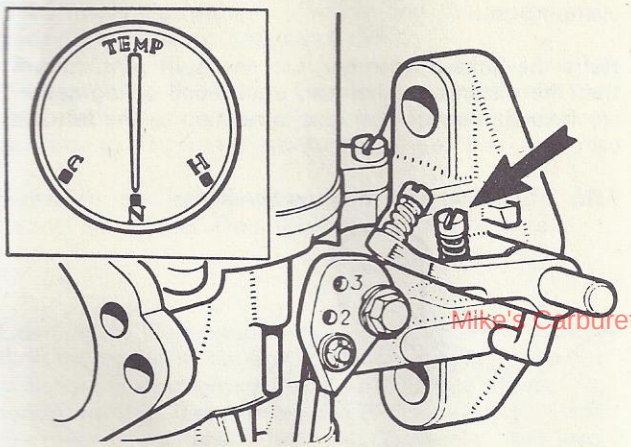


Fig. 16

7.2.1.1.

Warm engine up to normal temperature. Switch off engine. Unscrew the throttle adjusting screw until it is just clear of its stop and the throttle is closed. Set throttle adjusting screw 1.1/2 turns open.

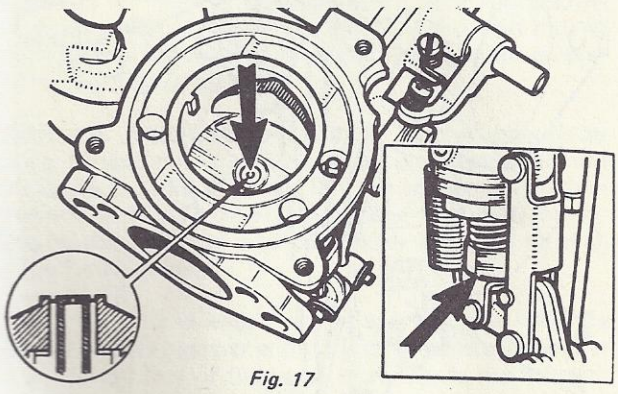


Fig. 17

7.2.1.2.

Mark for reassembly and remove piston/suction chamber unit. Disconnect mixture control wire. Screw the jet adjusting nut until the jet is flush with the bridge of the carburetter or fully up if this position cannot be obtained.

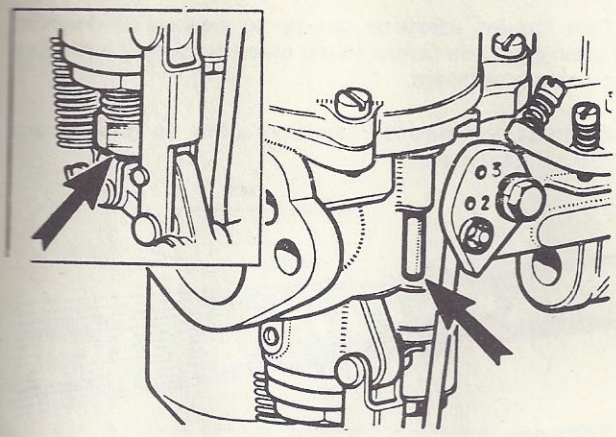


Fig. 18

7.2.1.3.

Replace the piston/suction chamber unit as marked. Check that the piston falls freely onto the bridge when the lifting pin is released. If not, see 7.2.3.1., 7.2.3.2 and 7.2.3.3. Turn down the jet adjusting nut two complete turns.

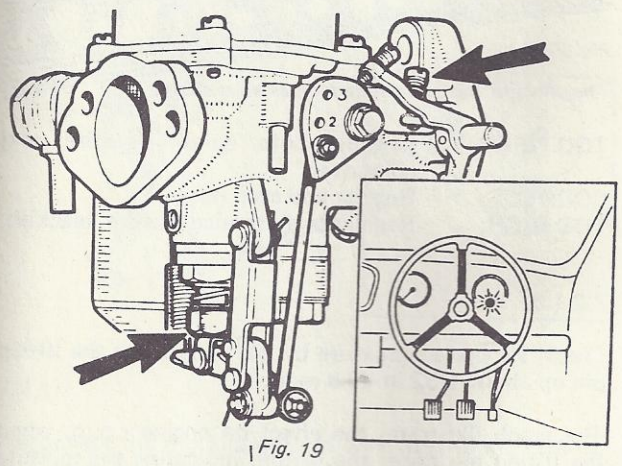


Fig. 19

7.2.1.4.

Restart the engine and adjust the throttle adjusting screw to give desired idling as indicated by the glow of the ignition warning light.

Turn the jet adjusting nut up to weaken or down to richen until the fastest idling speed consistent with even running is obtained.

Re-adjust the throttle adjusting screw to give correct idling if necessary.

7.2.1.5.

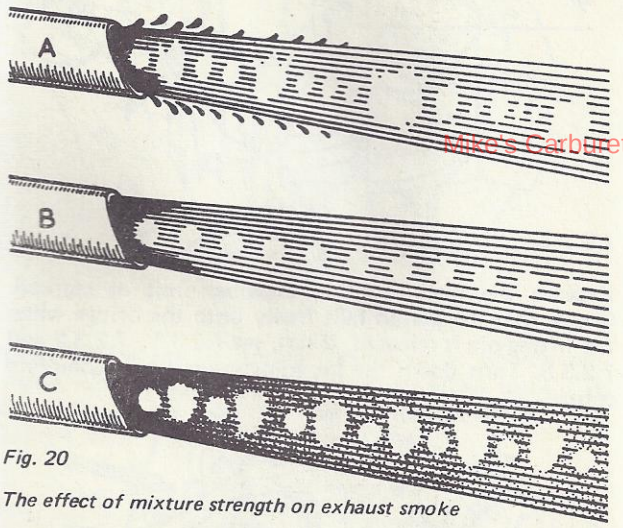


Fig. 20

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.

7.2.1.6.

Check for correct mixture by gently pushing the lifting pin up about 1/32 in. (0.8 mm).

The graph illustrates the effect on engine r.p.m. when the lifting pin raises the piston, indicating the mixture strength.

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

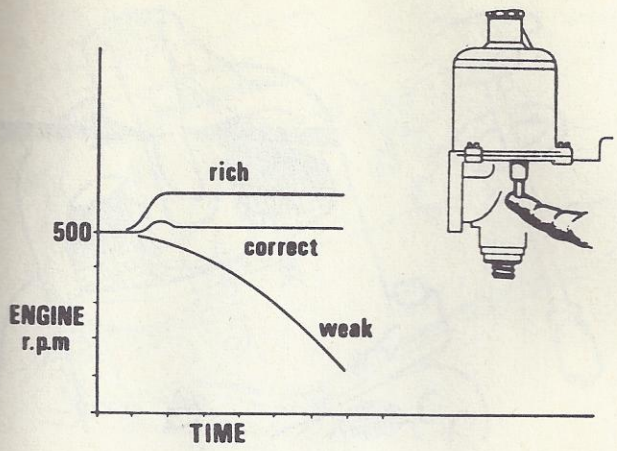


Fig. 21

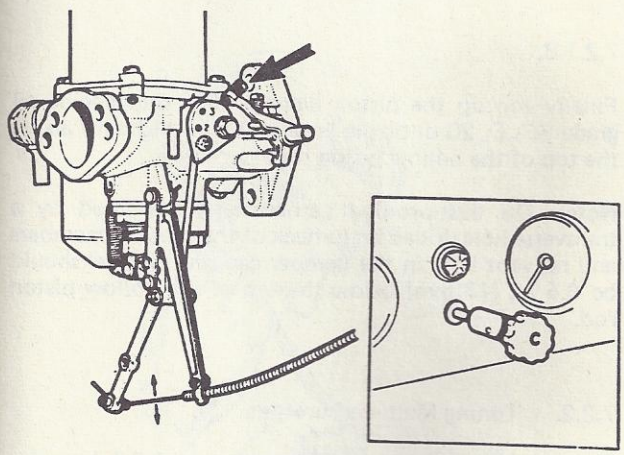


Fig. 22

7.2.1.7.

Reconnect the mixture control wire with about 1/16 in. (1.6 mm) free movement before it starts to pull on the jet lever.

Pull the mixture control knob until the linkage is about to move the carburetter jet and adjust the fast-idle screw to give an engine speed of about 1,000 r.p.m. when hot.

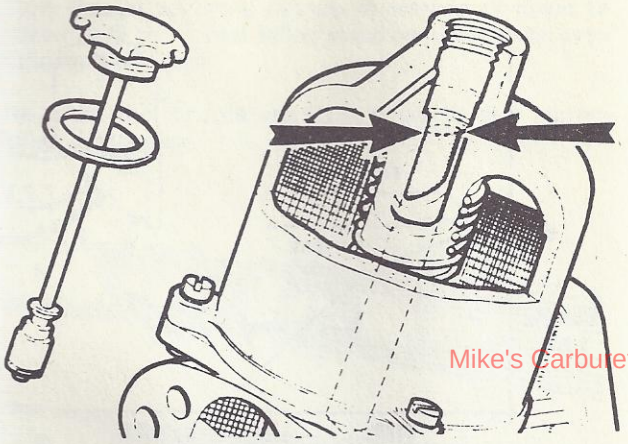


Fig. 23

7.2.1.8.

Finally top up the piston damper with thin engine oil grade S.A.E. 20 until the level is 0.5 in. (13 mm) above the top of the hollow piston rod.

Note:- On dust-proofed carburetters, identified by a transverse hole drilled in the neck of the suction chambers and no vent hole in the damper cap, the oil level should be 0.5 in. (13 mm) below the top of the hollow piston rod.

7.2.2. Tuning Multi-carburetters

Remove the air cleaners and carry out 7.2.1.1. as for single on all carburetters then:

7.2.2.1.

Slacken one of the clamping bolts on the throttle spindle interconnections.

Disconnect the jet control linkage by removing one or, in the case of triple carburetters, two of the linkage swivel pins.

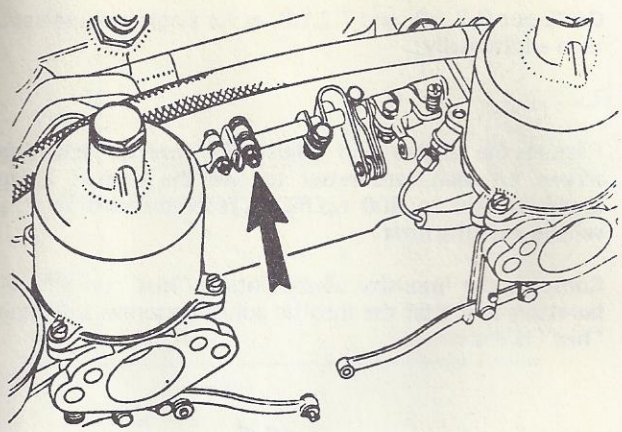


Fig. 24

Fig. 25

Carry out 7.2.1.2. and 7.2.1.3. as for single carburetters, then additionally:

7.2.2.2.

Restart the engine and adjust the throttle adjusting screws on each carburetter to give the desired idling speed of 500 to 600 r.p.m. as recommended by the vehicle manufacturer.

Compare the intensity of the intake "hiss" on all carburetters and alter the throttle adjusting screws until the "hiss" is the same.

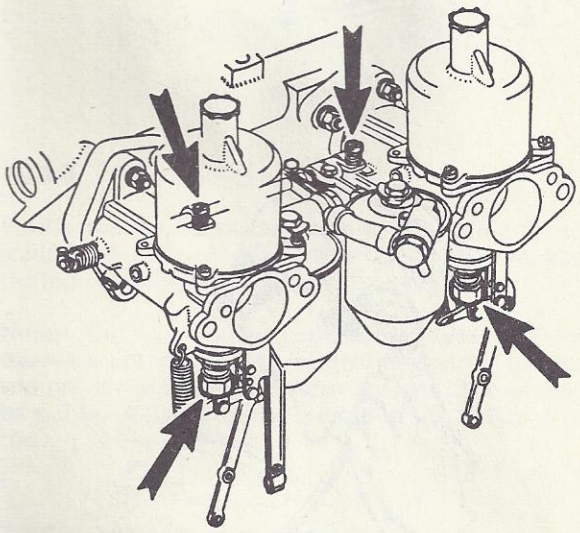


Fig. 26

7.2.2.3.

Turn the jet adjusting nuts on all carburetters up to weaken or down to richen the same amount until the fastest idling speed consistent with even running is obtained.

Re-adjust the throttle adjusting screws to give correct idling if necessary.

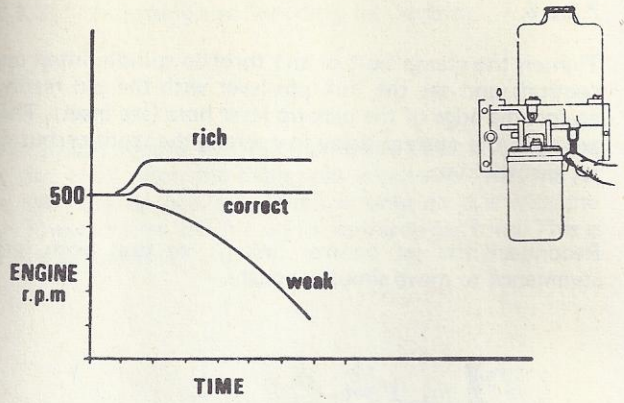


Fig. 27

7.2.2.4.

Check for correct mixture by gently pushing the lifting pin of the front carburetter up 1/32 in. (0.8 mm) Fig. 27 illustrates the possible effect on engine r.p.m.

Repeat the operation on the rear carburetter and after adjustment re-check the front carburetter since the two are inter-dependent. 7.2.1.5. shows the correct type of exhaust smoke.

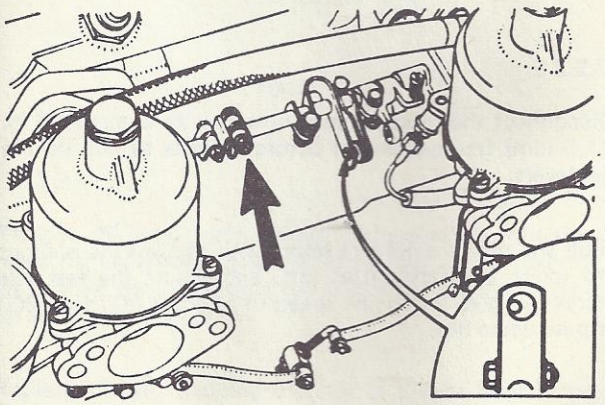


Fig. 28

7.2.2.5.

Tighten the clamp bolt of the throttle spindle interconnections and set the link pin lever with the pin resting against the edge of the pick-up lever hole (see inset). This provides the correct delay in opening the front carburetter throttle disc.

Reconnect the jet control linkage, so that both jets commence to move simultaneously.

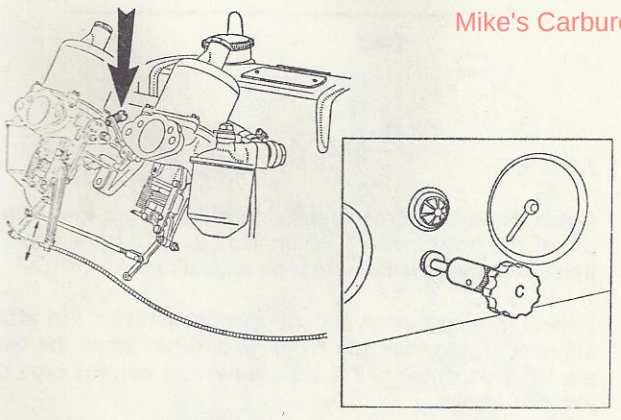


Fig. 29

7.2.2.6.

Reconnect the mixture control wire with about 1/16 in. (1.6 mm) free movement before it starts to pull on the jet levers.

Pull the mixture control knob until the linkage is about to move the carburetter jets, and adjust the fast idle screw to give an engine speed of about 1,000 to 1,200 r.p.m. when hot.

Refit the air cleaners and re-check for correct mixture as described in 7.2.2.4.

7.2.3. Adjusting and Servicing Jet Centring

7.2.3.1.

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 jut unit requires re-centring. This is donw as follows:

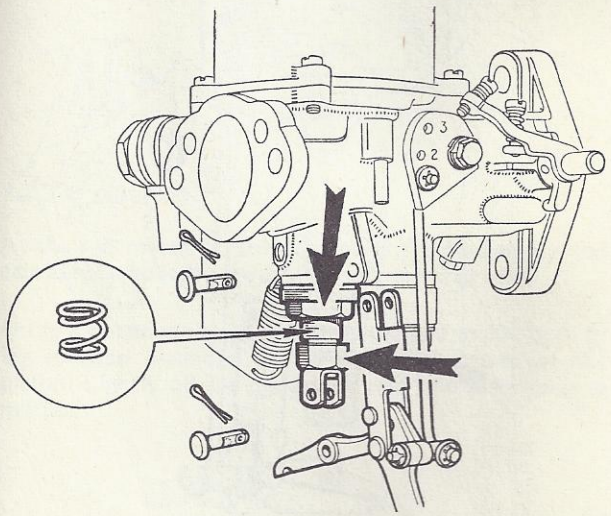


Fig. 30

7.2.3.2.

Remove the jet control linkage and swing it to one side. Mark for reassembly and withdraw the jet, remove the jet locking spring, replace the adjusting nut and screw it up as far as it will go.

Replace the jet, keeping the slot in the jet head in the correct relative position to the control. Slacken the jet locking nut until the assembly is free to rotate.

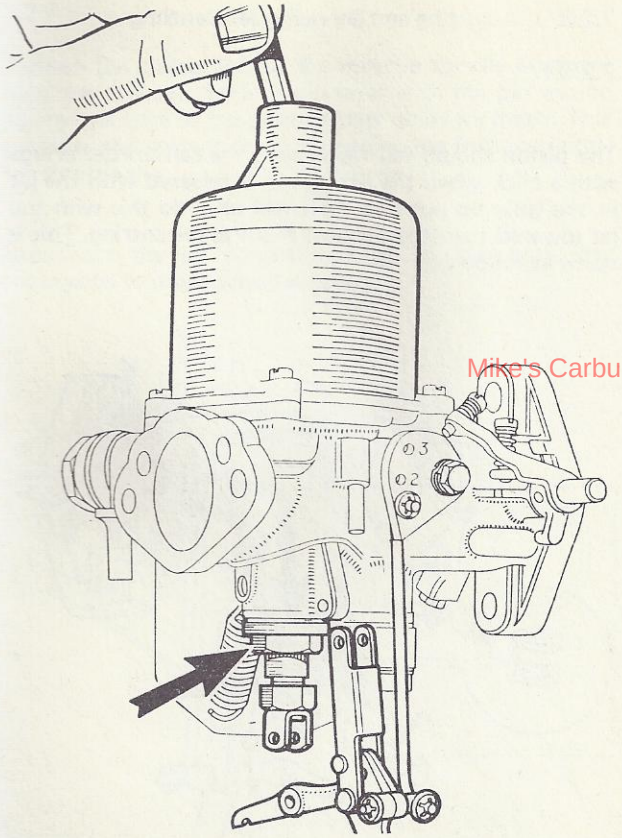


Fig. 31

7.2.3.3.

Remove the piston damper and apply pressure to the top of the piston rod with a pencil.

Tighten the jet locking nut keeping the slot in the jet head in the correct position and the jet hard up against the adjusting nut.

Finally check again as in 7.2.2.1. Reassemble the controls. Refill the piston dampers with thin engine oil. (See 7.2.1.8.).

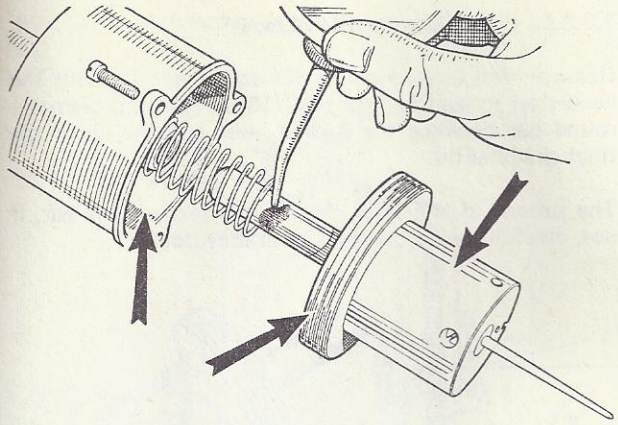


Fig. 32

7.2.3.4. Cleaning

At the recommended intervals mark for reassembly and carefully 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 the piston rod only and reassemble as marked.

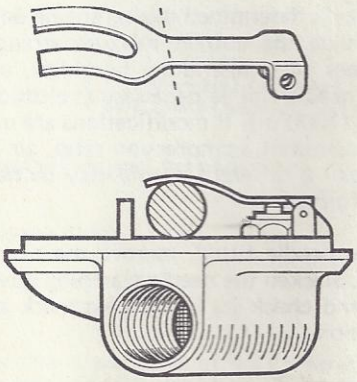


Fig. 33

7.2.3.5. Float Chamber Fuel Level

Remove the float chamber lid and invert it. With the needle on its seating insert a 7/16 in. (11 mm) diameter round 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 not, carefully bend the lever until they do.

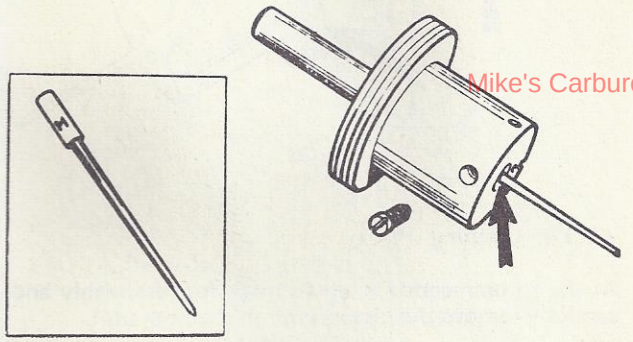


Fig. 34

7.2.3.6. Needle Size and Position

The needle size is determined during engine development and will provide the correct mixture strength except under extremes of temperature, humidity, or altitude; e.g. a weaker needle will be necessary at altitudes exceeding 6,000 ft. (1800 m). 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 is flush with the piston base. Reassemble the piston/suction chamber unit.

8. "HD" TYPE CARBURETTER

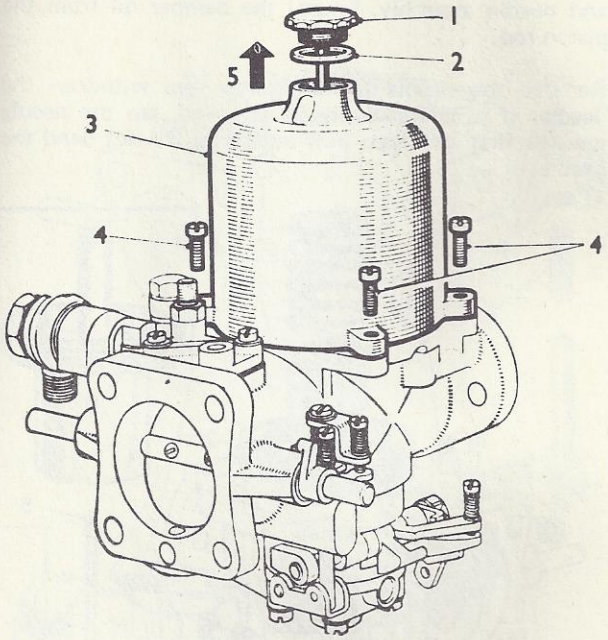


Fig. 35

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

8.1. Dismantling and Assembly

8.1.1. Dismantling

8.1.1.1.

Thoroughly clean the outside of the carburetter. Unscrew and remove the damper and washer. Remove the suction chamber retaining screws and remove the chamber without tilting it.

8.1.1.2.

Lift off the piston spring. Carefully lift out the piston and needle assembly. Empty the damper oil from the piston rod.

Remove the needle locking screw and withdraw the needle. If it cannot easily be removed, tap the needle inwards first and then pull outwards. Do not bend the needle.

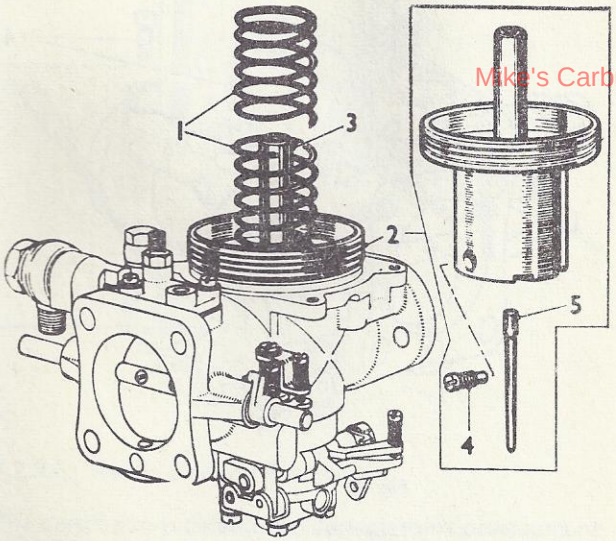


Fig. 36

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

8.1.1.3.

Remove the plate retaining screw and lift off the plate and spring. Note the shakeproof washer either side of the plate. Withdraw the cam rod assembly.

Mark the relative position of the float-chamber, jet housing, and carburetter body. Unscrew the float-chamber screws, holding the float-chamber against the pressure of the jet spring. Detach the float-chamber carefully.

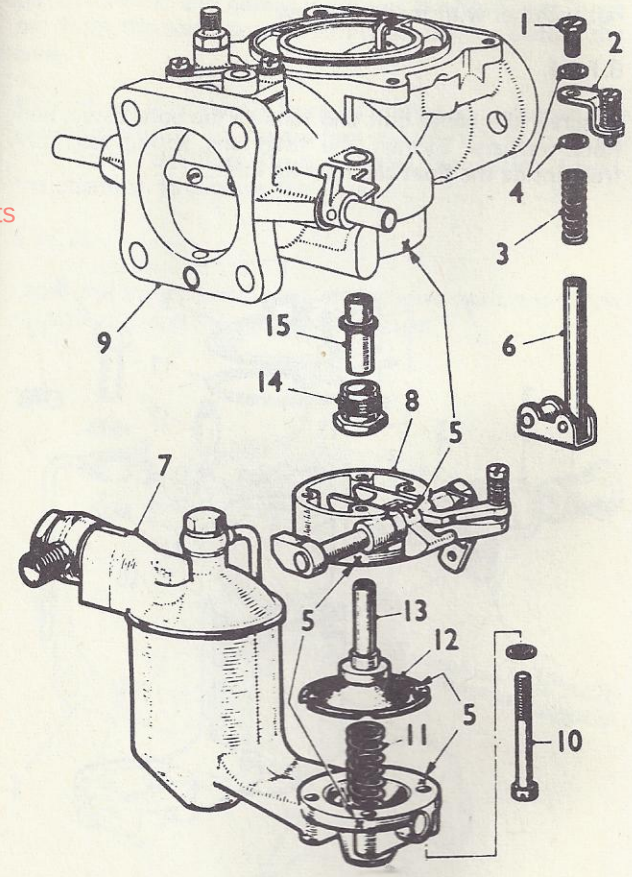


Fig. 37

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

Lift out the jet spring. Mark the jet diaphragm opposite one of the screw holes in the jet housing and withdraw the jet assembly. Lift off the jet housing.

Using a ring spanner slacken and remove the jet locking nut together with the jet bearing.

8.1.1.4.

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.

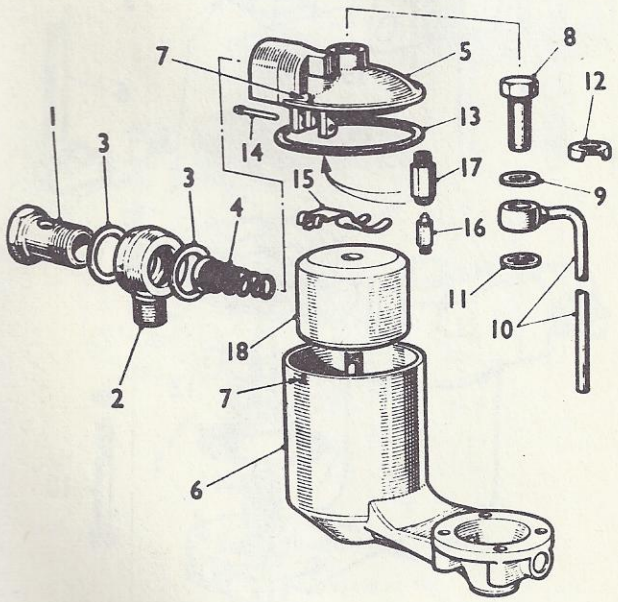


Fig. 38

1. *Banjo bolt.*
2. *Banjo.*
3. *Fibre washer.*
4. *Filter assembly.*
5. *Float-chamber lid.*
6. *Float-chamber.*
7. *Marks for replacement.*
8. *Central nut.*
9. *Washer for nut.*
10. *Drain tube and banjo.*
11. *Fibre washer.*
12. *Cover cap (alternative).*
13. *Lid gasket.*
14. *Float lever hinge pin.*
15. *Float lever.*
16. *Float needle.*
17. *Needle seating.*
18. *Float.*

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, as fitted.

Detach the lid and gasket. Push out the float lever hinge pin from the end opposite to the serrations. Detach the lever.

Extract the float needle from its seating and unscrew the seating from the lid using a box spanner 0.338 in. (8.58 mm) across the flats. Do not distort the seating. Invert the chamber to remove the float.

8.1.1.5.

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

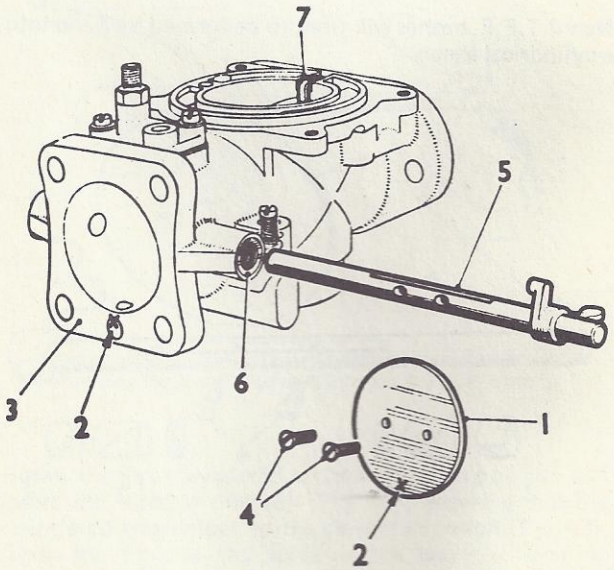


Fig. 39

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

fully tighten the disc screws and spread their ends. Finally check that the gaps in the inner spring clips (1) are not likely to foul the throttle disc and that the outer spring clips (3) are hard against the P.T.F.E. bushes.

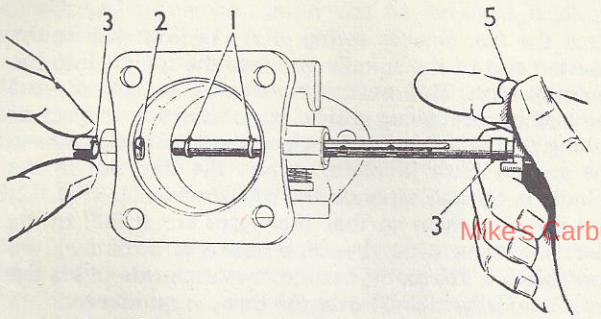


Fig. 42

The small clips (1) fitted to the throttle spindle

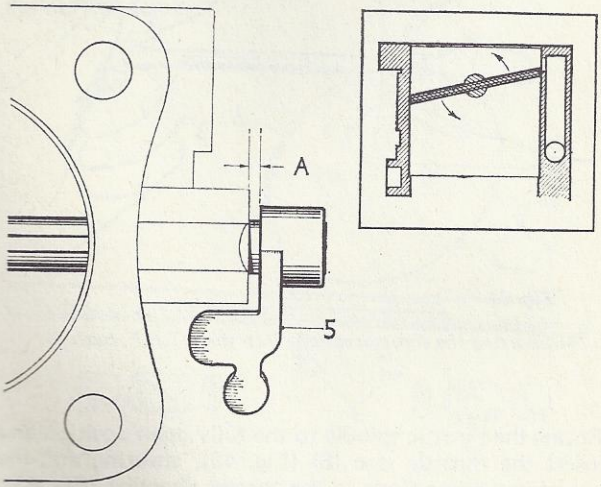


Fig. 43

Setting the clearance between the stop lever and carburetter body before tightening the disc screws. (Inset) the correct throttle disc position.

A = 0·015 to 0·030 in. (0·4 to 0·8 mm).

8.1.1.7.

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

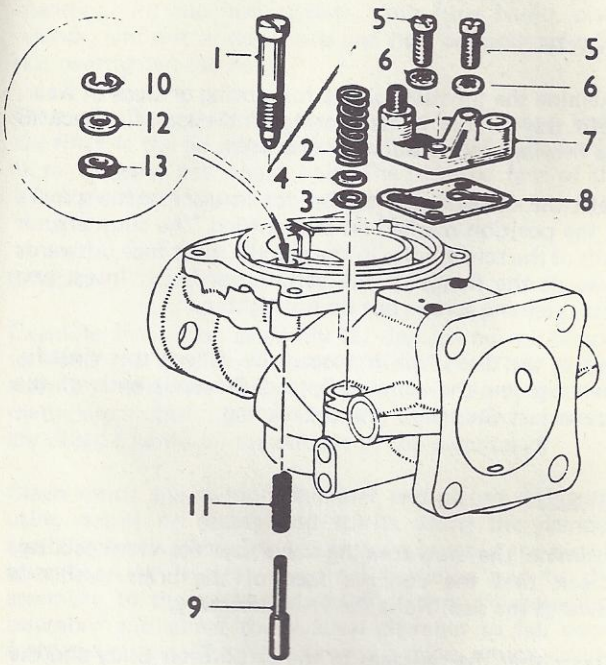


Fig. 44

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.*

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. Withdraw the pin downwards.

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

8.1.2. Assembly

8.1.2.1.

Examine the throttle spindle for scoring or signs of wear. Refit the spindle in its bearings and check for slack in the bearings and freedom of operation.

Refit the throttle disc to the slot in the throttle spindle in the position marked on 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 turning.

8.1.2.2.

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 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.

8.1.2.3.

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 8.2.3.5.

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 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.

8.1.2.4.

Examine the piston assembly for damage on the piston rod and the outside surface of the piston. The piston assembly must be scrupulously clean. Use 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 slugs 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. Check the time this takes, which should be between 5 and 7 seconds. If the time taken is in excess of that cuoted 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.

Refit the needle to the piston assembly. The shoulder or lower edge of the groove must be level with the lower face of the piston rod. Fit a new needle locking screw and tighten. Invert the suction chamber and spin the piston assembly inside it to check for concentricity of the needle.

Check the piston key for security in the carburetter body. Refit the piston assembly to the body and replace the piston spring over the piston rod. Fir the suction chamber and retaining screws. Tighten the screws evenly.

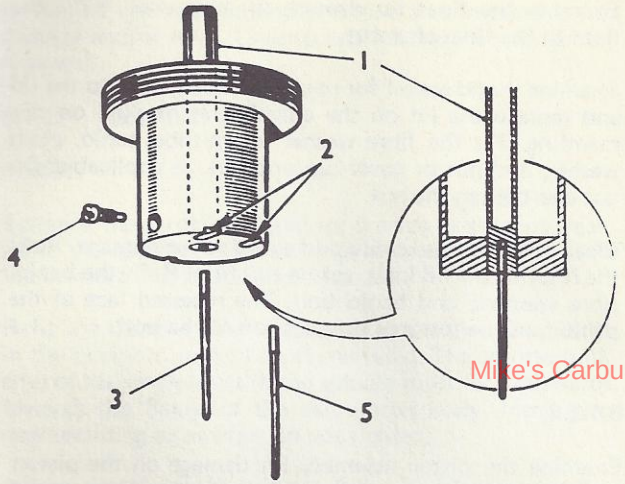


Fig. 45

1. Piston rod.
2. Transfer holes.
3. Needle.
4. Needle locking screw.
5. Alternative needle.

8.1.2.5.

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 as described in 8.2.3.1.

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.

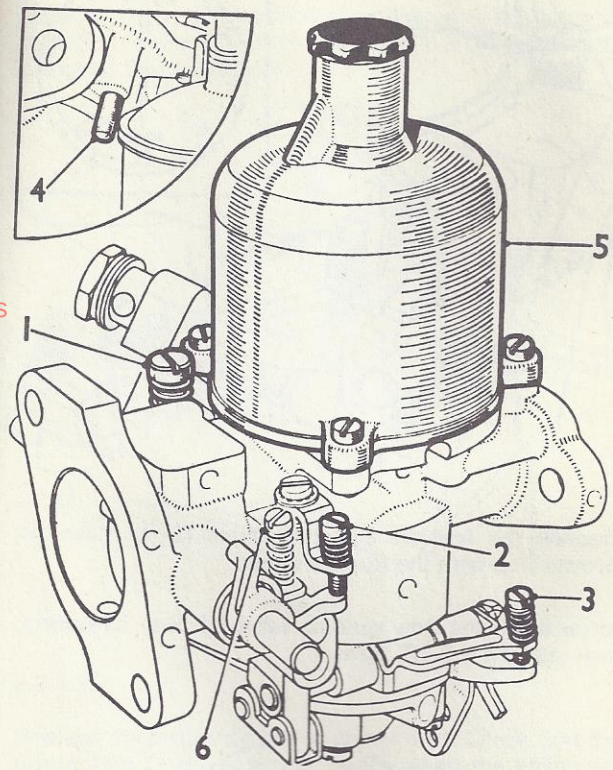


Fig. 46 — The type HD carburetter

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).

8.2.1. Tuning Single Carburetters

8.2.1.1.

Run the engine up to normal running temperature. Switch off the engine.

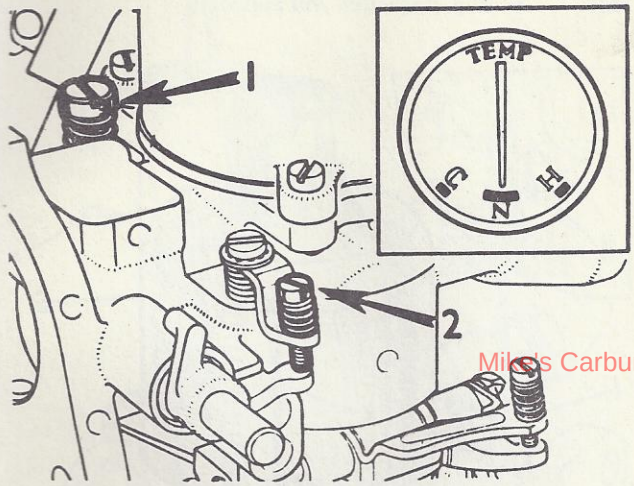


Fig. 47

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 3.1/2 turns.

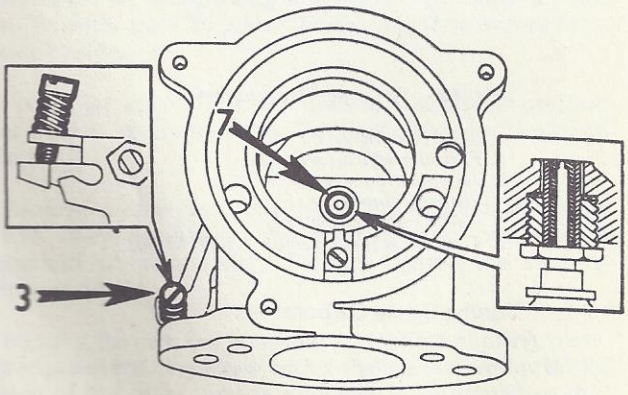


Fig. 48

8.2.1.2.

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

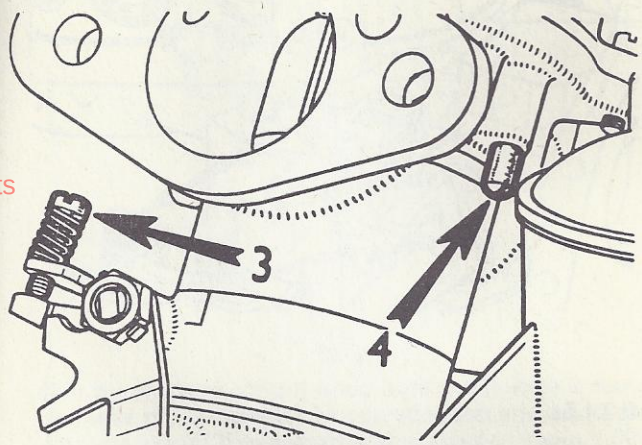


Fig. 49

8.2.1.3.

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 8.2.3.1., 8.2.3.2. and 8.2.3.3.

Lower the jet by turning the jet adjusting screw (3) down 2.1/2 turns.

8.2.1.4.

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.

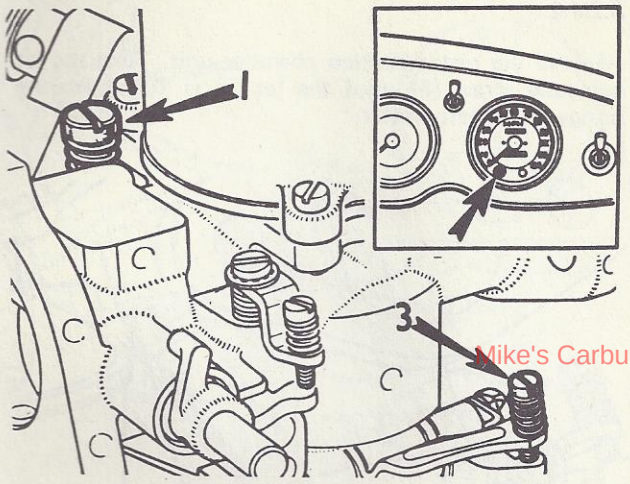


Fig. 50

8.2.1.5.

Fig. 20 shows the effect of various mixture strengths on the exhaust gases.

8.2.1.6.

Check for correct mixture by gently pushing the lifting pin (4) up about 1/32 in. (1 mm) after free movement has been taken up.

Fig. 21 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

Re-adjust the mixture strength if necessary.

8.2.1.7.

Reconnect the mixture control wire with about 1/16 in. (2 mm) free movement before it starts to pull on the jet lever.

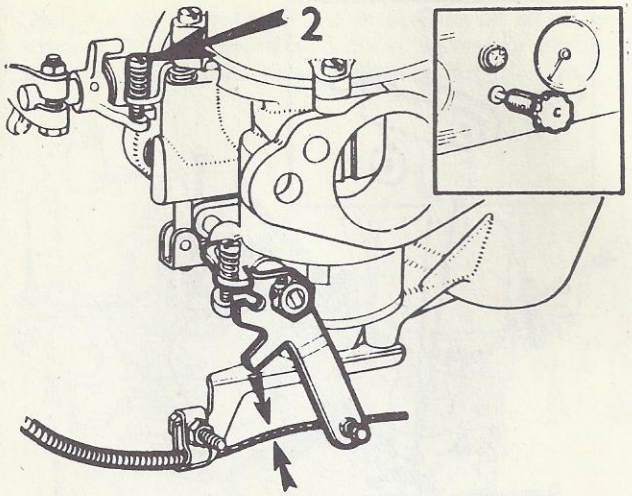


Fig. 51

Pull the mixture control knob until the linkage is about to move the carburetter jet operating arm and adjust the fast-idle screw (2) to give an engine speed of about 1,000 r.p.m. when hot.

Return the control knob and check that there is some clearance between the fast-idle screw (2) and the throttle stop.

8.2.1.8.

Finally top up the piston damper with the recommended engine oil until the level is 1/2 in. (13 mm) below the top of the hollow piston rod, Fig. 23.

On non-dustproofed carburetters, identified by a vent hole in the piston damper cap, the oil level should be 1/2 in. (13 mm) above the top of the hollow piston rod.

8.2.2. Tuning Multi-carburetters

8.2.2.1.

Multi-carburetter installations cannot be successfully tuned unless the tappets; points, and plugs are correctly adjusted.

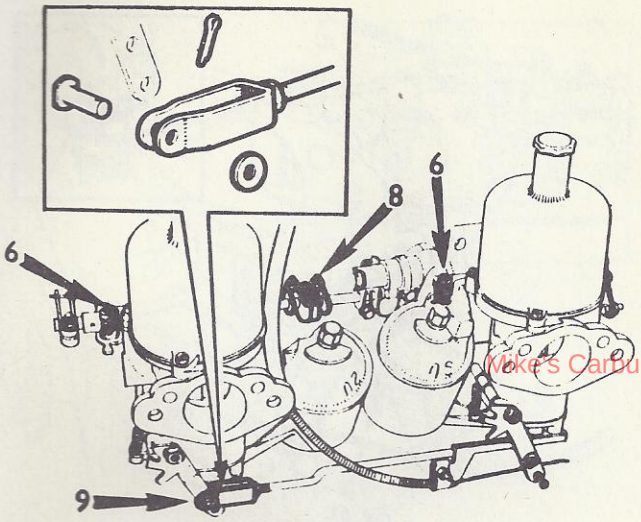


Fig. 52

Remove the cleaners and carry out item 8.2.1.1., 8.2.1.2. and 8.2.1.3. on each carburetter.

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) 1.1/2 turns open. In 8.2.2.2. and 8.2.2.3. adjust the idling speed with the throttle adjusting screws.

Slacken a clamping bolt (8) on one of the throttle spindle interconnection couplings between the carburetters.

Disconnect the jet control interconnecting rod at the forked end (9).

8.2.2.2.

Restart the engine and turn the slow-running valve (1), or throttle adjusting screws, an equal amount on each carburetter to give the desired idling speed.

Compare the intensity of the intake hiss on all carburetters and alter the slow-running valves, or throttle adjusting screws, until the hiss is the same.

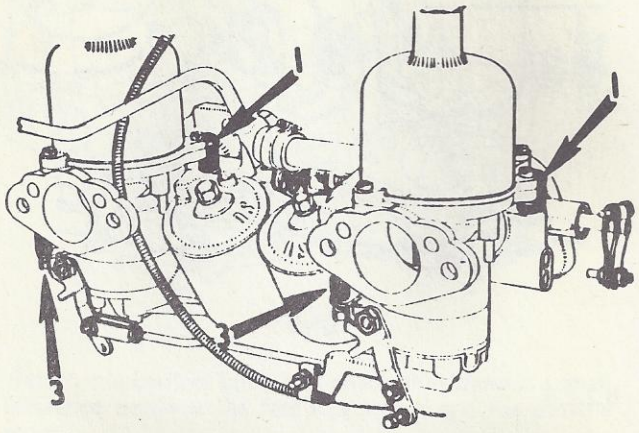


Fig. 53

8.2.2.3.

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. Re-adjust the slow-running valves (1), if necessary.

8.2.2.4.

Check the mixture by raising the lifting pin (4) of the front carburetter 1/32 in. (1 mm) after free movement has been taken up. Fig. 27 illustrates the possible effect on engine r.p.m.

Repeat the operation on the other carburetter(s) and after adjustment re-check as the carburetters are interdependent. 8.2.1.5. shows the effect of mixture on the exhaust smoke.

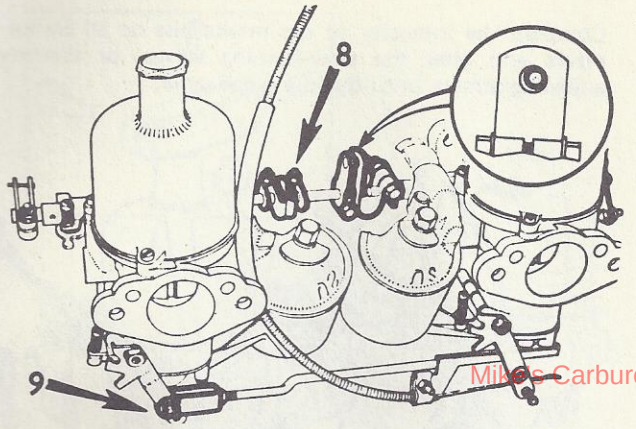


Fig. 54

8.2.2.5.

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 0.006 in. (0.15 mm) from the lower edge of the fork.

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

8.2.2.6

Reconnect the mixture control wire with about 1/16 in. (2 mm.) free movement before it starts to pull on the jet levers.

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.

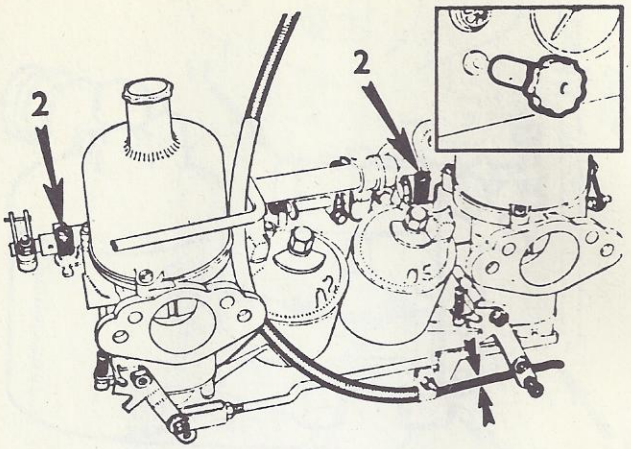


Fig. 55

Return the control knob and check that there is a small clearance between the fast idle screws and the throttle stops.

Refit the air cleaners and re-check for correct mixture as described in 8.2.2.4.

8.2.3 Adjusting and Servicing

8.2.3.1

Jet centring. The piston should fall freely onto the carburetter bridge with a click when the lifting pin is released with the jet in the 'full up' position, if it will only do this with the jet lowered then the jet unit requires re-centring. This is done as follows:

8.2.3.2

Mark the position of the jet housing and float-chamber in relation to the carburetter body for reassembly.

Remove the plate retaining screw and withdraw the cam rod assembly (14).

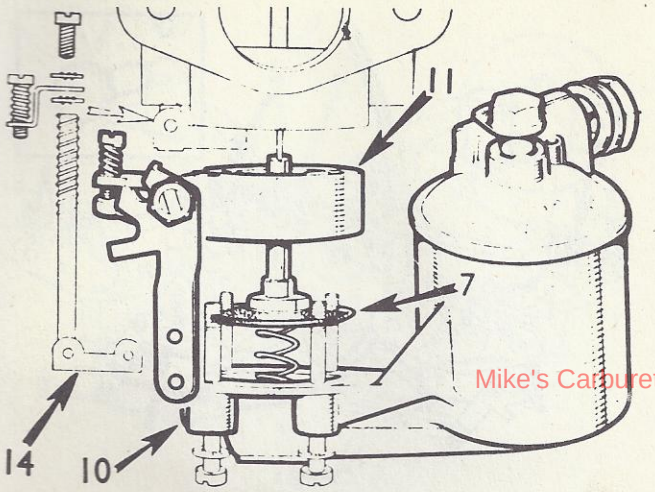


Fig. 56

Unscrew and remove the float-chamber securing screws.

Remove the float-chamber (10) and the jet housing (11) and release the jet assembly (7).

8.2.3.3

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 8.2.3.1 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 the piston damper with oil (see 8.2.1.8).

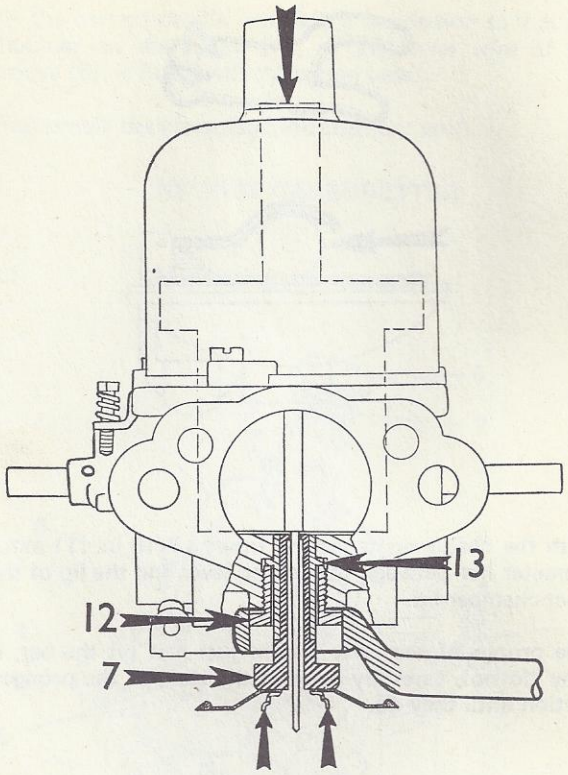


Fig. 57

8.2.3.4

Cleaning. 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 the piston rod only and reassemble.

8.2.3.5

Float-chamber fuel level. Remove and invert the float-chamber lid.

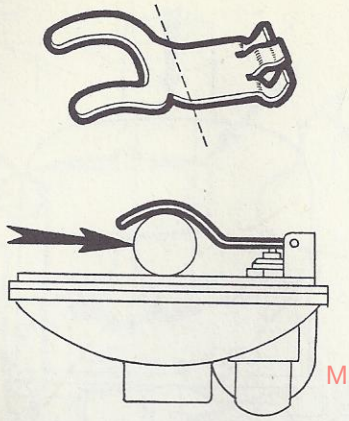


Fig. 58

With the needle on its seating, insert a 7/16 in. (11 mm.) 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.

8.2.3.6

Needle size and position. The needle size is determined during engine development and will provide the correct mixture strength except under extremes of temperature, humidity, or altitude; e.g. a weaker needle will be necessary at altitudes exceeding 6,000 ft. (1800 m.). 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.

9. 'HS' TYPE CARBURETTER

9.1 Dismantling and Assembly

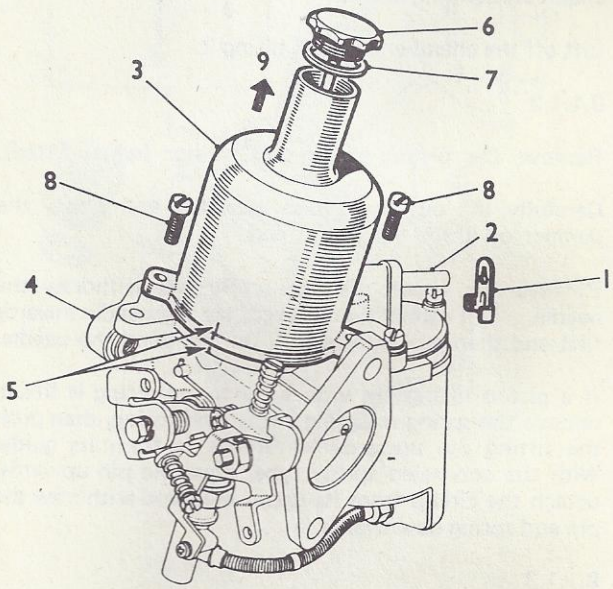


Fig. 59

1. Baffle plate
2. Inlet nozzle.
3. Suction chamber.
4. Carburetter body.
5. Marks for replacement.
6. Damper.
7. Damper washer.
8. Chamber retaining screws.
9. Direction of removal.

9.1.1 Dismantling

9.1.1.1

Remove the baffle plate from the inlet nozzle.

Thoroughly clean the outside of the carburetter.

Mark the relative positions of the suction chamber and the carburetter body.

Remove the damper and its washer. Unscrew the chamber retaining screws.

Lift off the chamber without tilting it.

9.1.1.2

Remove the piston spring and washer (when fitted).

Carefully lift out the piston assembly and empty the damper oil from the piston rod.

Remove the needle locking screw and withdraw the needle. If it cannot be removed, tap the needle inwards first and then pull outwards. Do not bend the needle.

If a piston lifting pin with an external spring is fitted, remove the spring retaining circlip and spring, then push the lifting pin upwards to remove it from its guide. With the concealed spring type, press the pin upwards, detach the circlip from its upper end, and withdraw the pin and spring downwards.

9.1.1.3

Support the moulded base of the jet and slacken the screw retaining the jet pick-up link.

Relieve the tension of the pick-up lever return spring from the screw and remove screw and brass bush (when fitted).

Unscrew the brass sleeve nut retaining the flexible jet tube to the float-chamber and withdraw the jet assembly from the carburetter body. Note the gland, washer, and ferrule, at the end of the jet tube.

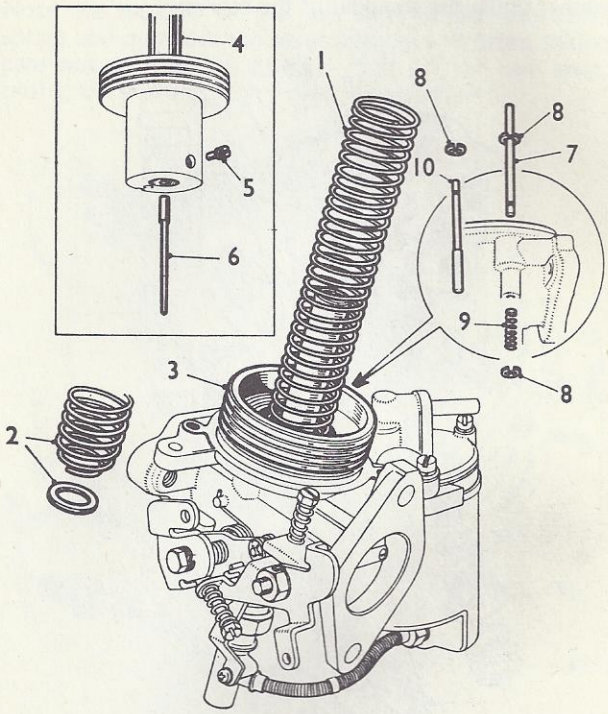


Fig. 60

1. *Piston spring.*
2. *Alternative spring with washer.*
3. *Piston assembly.*
4. *Piston rod.*
5. *Needle locking screw.*
6. *Needle.*
7. *Piston lifting pin.*
8. *Circlip for pin.*
9. *Spring for pin.*
10. *Alternative lifting pin.*

Remove the jet adjusting nut and screw. Unscrew the jet locking nut and detach the nut and jet bearing. Withdraw the bearing from the nut, noting the brass washer under the shoulder of the bearing.

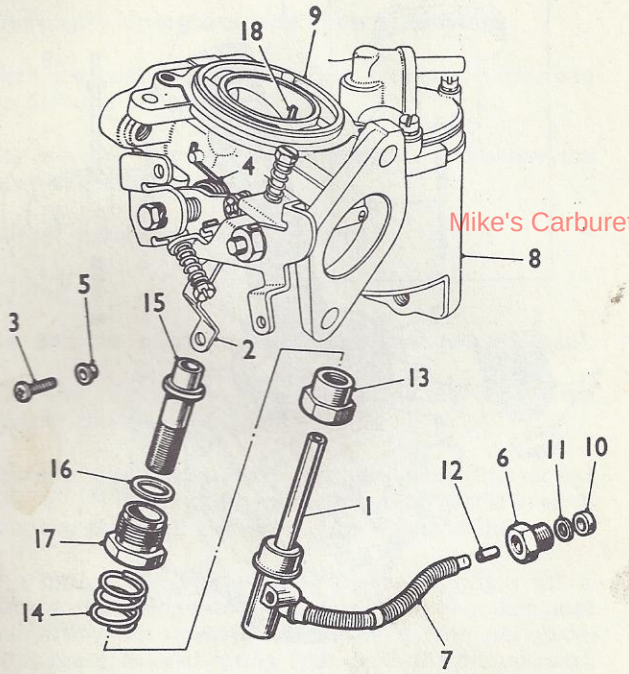


Fig. 61

1. *Jet assembly.*
2. *Pick-up link.*
3. *Link retaining screw.*
4. *Pick-up lever return spring.*
5. *Brass bush.*
6. *Sleeve nut.*
7. *Flexible jet tube.*
8. *Float-chamber.*
9. *Carburetter body.*
10. *Gland.*
11. *Washer.*
12. *Ferrule.*
13. *Jet adjusting nut.*
14. *Spring for nut.*
15. *Jet bearing.*
16. *Brass washer.*
17. *Jet locking nut.*
18. *Piston key.*

9.1.1.4

Note the location points of the two ends of the pick-up lever return spring. Unscrew the lever pivot bolt

together with its double-coil spring washer, or spacer. Detach the lever assembly and return spring.

Note the location of the two ends of the cam lever spring and push out the pivot bolt tube or tubes, taking care not to lose the spring. Lift off the cam lever, noting the skid washer between the two levers.

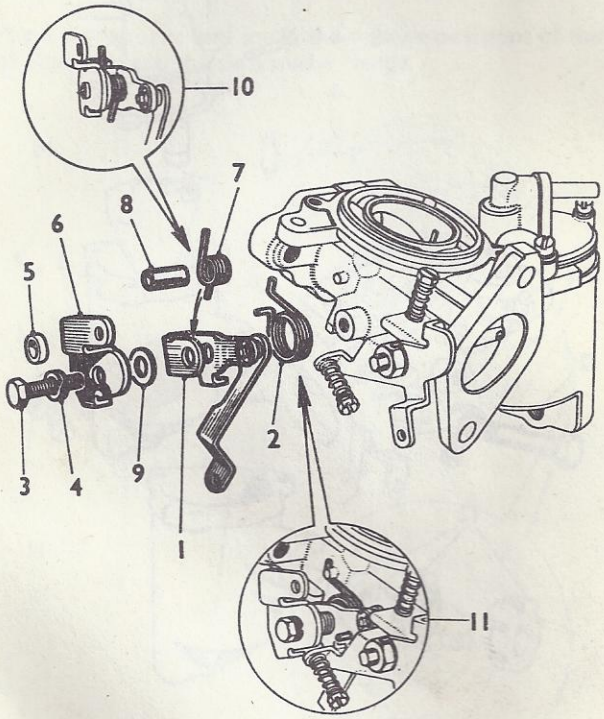


Fig. 62

1. *Pick-up lever.*
2. *Lever return spring.*
3. *Lever pivot bolt.*
4. *Double-coil spring washer.*
5. *Spacer (alternative).*
6. *Cam lever.*
7. *Lever spring.*
8. *Pivot bolt tube.*
9. *Skid washer.*
10. *Cam lever spring location.*
11. *Pick-up lever spring location.*

9.1.1.5

Slacken and remove the bolt retaining the float-chamber to the carburetter body. Note the component sequence with flexibly mounted chambers.

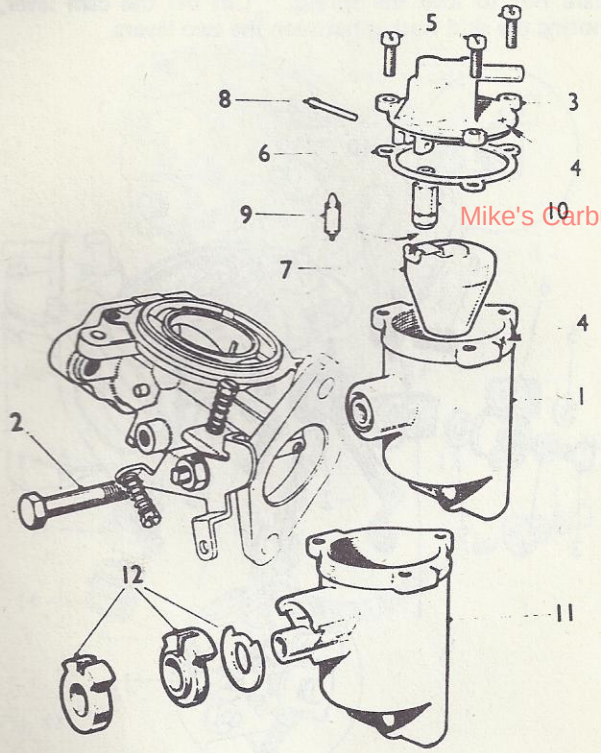


Fig. 63

1. *Float-chamber.*
2. *Retaining bolt.*
3. *Float-chamber lid.*
4. *Marks for replacement.*
5. *Lid retaining screws.*
6. *Lid gasket.*
7. *Float assembly.*
8. *Float hinge pin.*
9. *Float needle.*
10. *Needle seating.*
11. *Alternative float-chamber.*
12. *Alternative spacers.*

Mark the location of the float-chamber lid. Unscrew the lid retaining screws and detach the lid and its gasket, complete with float assembly.

Push out the float hinge pin from the end opposite its serrations and detach the float.

Extract the float needle from its seating and unscrew the seating from the lid, using a box spanner 0.338 in. (8.58 mm.) across the flats. Do not distort the seating.

9.1.1.6

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

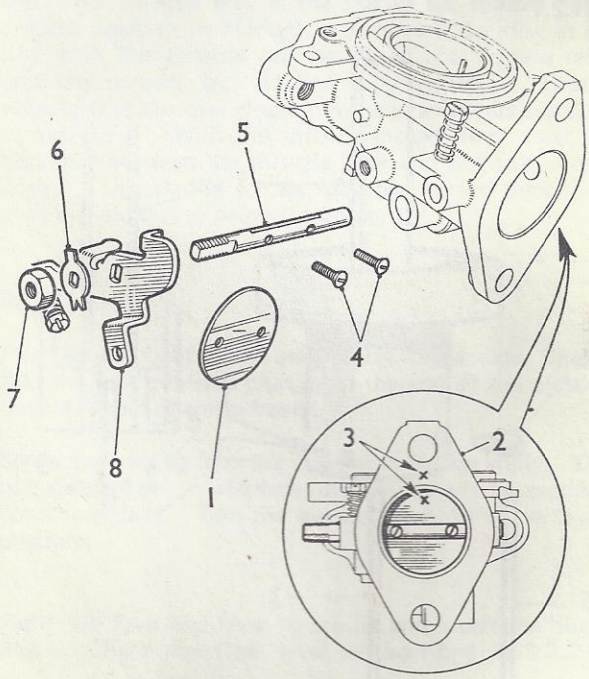


Fig. 64

1. *Throttle disc.*
2. *Carburetter flange.*
3. *Marks for replacement.*
4. *Disc retaining screws.*
5. *Throttle spindle.*
6. *Tab washer.*
7. *Spindle nut.*
8. *Lever arm.*

Unscrew the two disc retaining screws. Open the throttle and ease out the disc from its slot in the throttle spindle. The disc is oval and will jam if care is not taken.

Tap back the tabs of the tab washer securing the spindle nut. Note the location of the lever arm in relation to the spindle and carburetter body; remove the nut and detach the arm.

9.1.2 Assembly

9.1.2.1

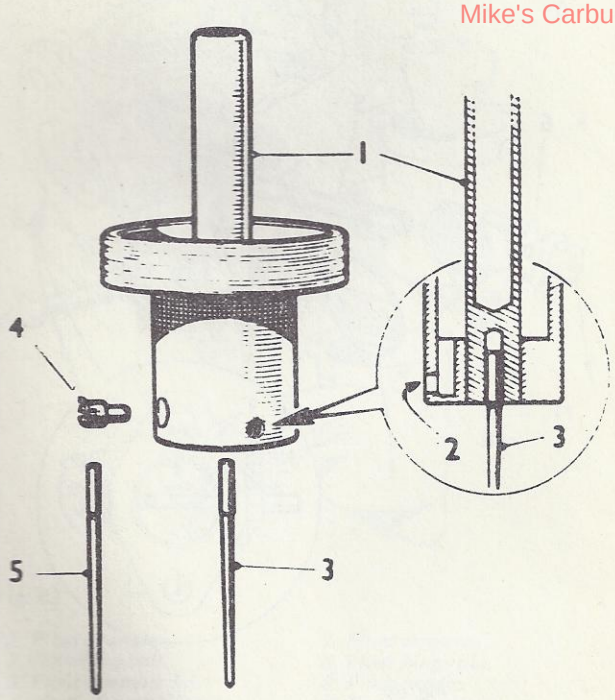


Fig. 65

1. Piston rod.
2. Transfer holes.
3. Needle.
4. Needle locking screw.
5. Alternative needle.

Examine the throttle spindle and its bearings in the carburetter body. Check for excessive play. Renew parts as necessary.

Refit the spindle to the body. Assemble the operating lever with tab washer and spindle nut, to the spindle. Ensure that when the stop on the lever is against the abutment on the carburetter body; i.e. throttle closed position, the countersunk ends of the holes in the spindle face outwards. Tighten the spindle nut and lock with the tab washer.

Insert the throttle disc in the slot in the spindle in its original position as marked. Manoevre the disc in its slot until the throttle can be closed and fit two new retaining screws, but do not fully tighten. Check visually that the disc closes fully, and adjust its position as necessary. With the throttle closed there must be clearance between the throttle lever and the carburetter body. Tighten the screws fully and spread their split ends just enough to prevent turning.

9.1.2.2

Examine the float needle and seating for damage. Check that the spring-loaded plunger in the end of the plastic-bodied needle operates freely.

Screw the seating into the float-chamber carefully. Do not overtighten. Replace the needle in the seating. coned end first. Test the assembly for leakage with air pressure.

Refit the float and lever to the lid and insert the hinge pin. Check the float level as described in 9.2.3.5.

Examine the lid gasket for re-use. Assemble the gasket on the lid and refit the lid to the float-chamber in the position marked on dismantling. Tighten the securing screws evenly.

Refit the float-chamber assembly to the carburetter body and tighten the retaining bolt fully, making sure that the registers on the body and the chamber engage correctly.

9.1.2.3

Refit the piston lifting pin, spring and circlip.

Examine the piston assembly for damage on the piston rod and the outside surface of the piston. The piston assembly must be scrupulously clean. Use petrol or methylated spirit 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 spirit. 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. Check the time this takes, which should be 3 to 5 seconds for HS2-type carburetters of 1 1/4 in. (31·75 mm.) bore, or 5 to 7 seconds for larger carburetters. 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.

Refit the needle to the piston assembly. The shoulder or lower edge of the groove must be level with the bottom face of the piston rod. Fit a new needle locking screw and tighten. Invert the suction chamber and spin the piston assembly inside it to check for concentricity of the needle.

Check the piston key for security in the carburetter body. Refit the piston assembly to the body and replace the piston spring over the piston rod. Fit the suction chamber and retaining screws. Tighten the screws evenly.

9.1.2.4

Refit the jet bearing, washer, and locking nut; do not tighten the nut. Refit the jet in its bearing and the flexible tube to the base of the float-chamber without the gland and washer.

Centralize the jet as described in 9.2.3.1.

Withdraw the jet and tube; refit the spring and jet adjusting nut. Fit the gland washer and ferrule to the flexible tube. The end of the tube should project a minimum of 3/16 in. (4·8 mm.) beyond the gland. Refit the jet and tube. Tighten the sleeve nut until the neoprene gland is compressed. Overtightening can cause leakage.

Refit the damper and washer.

9.1.2.5

Reassemble the pick-up lever, cam lever, cam lever spring, skid washer, and pivot bolt tube or tubes in the positions noted on dismantling.

Place the pick-up lever return spring in position over its boss and secure the lever assembly to the carburetter body with the pivot bolt. Ensure that the double-coil spring washer or spacer fits over the projecting end of the pivot bolt tube.

Register the angled end of the return spring in the groove in the pick-up lever, and hook the other end of the spring around the moulded peg on the carburetter body.

Fit the brass ferrule to the hole in the end of the pick-up link. Relieve the tension of the return spring and fit the link to the jet with its retaining screw. When finally tightening the screw, support the moulded end of the jet.

Refit the baffle plate to the float-chamber lid nozzle.

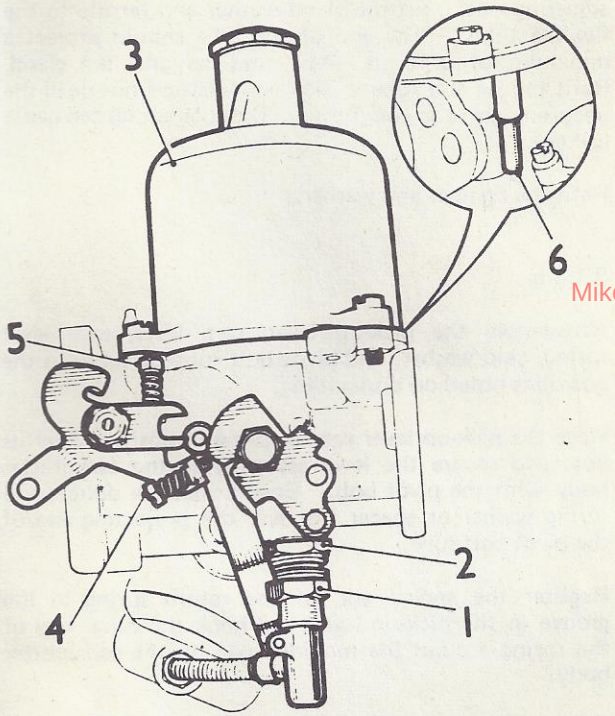


Fig. 66 — The type HS carburetter

1. Jet adjusting nut.
2. Jet locking nut.
3. Piston/suction chamber.
4. Fast-idle adjusting screw.
5. Throttle adjusting screw.
6. Piston lifting pin.

9.2.1 Tuning Single Carburetters

9.2.1.1

Warm engine up to normal temperature.

Switch off engine.

Unscrew the throttle adjusting screw until it is just clear of its stop and the throttle is closed.

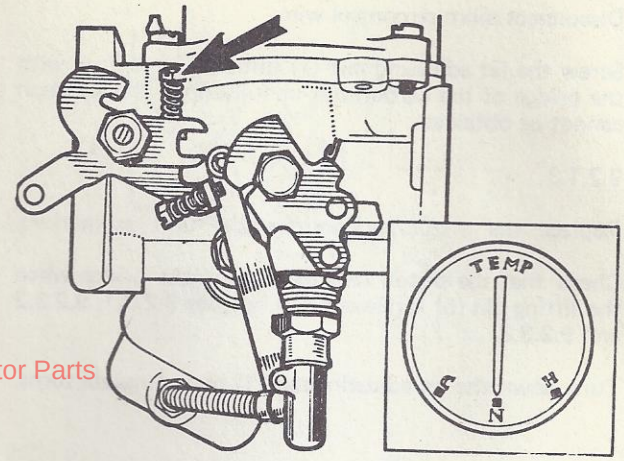


Fig. 67

Set throttle adjusting screw 1 1/2 turns open.

9.2.1.2

Mark for reassembly and remove piston/suction chamber unit.

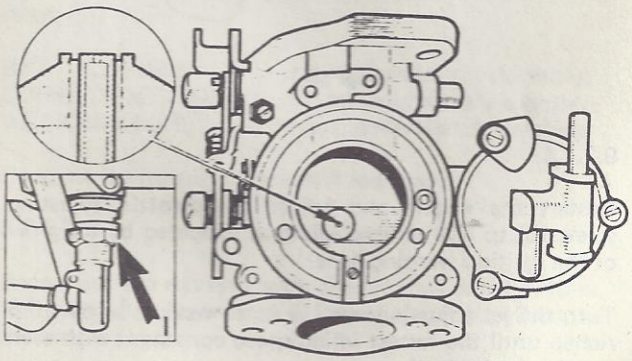


Fig. 68

Disconnect mixture control wire.

Screw the jet adjusting nut (1) until the jet is flush with the bridge of the carburetter or fully up if this position cannot be obtained.

9.2.1.3

Replace the piston/suction chamber unit as marked.

Check that the piston falls freely onto the bridge when the lifting pin (6) is released. If not, see 9.2.3.1, 9.2.3.2 and 9.2.3.3.

Turn down the jet adjusting nut (1) two complete turns.

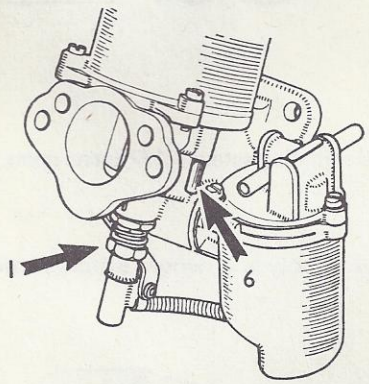


Fig. 69

9.2.1.4

Restart the engine and adjust the throttle adjusting screw (5) to give desired idling as indicated by the glow of the ignition warning light.

Turn the jet adjusting nut (1) up to weaken or down to richen until the fastest idling speed consistent with even running is obtained.

Readjust the throttle adjusting screw (5) to give correct idling if necessary.

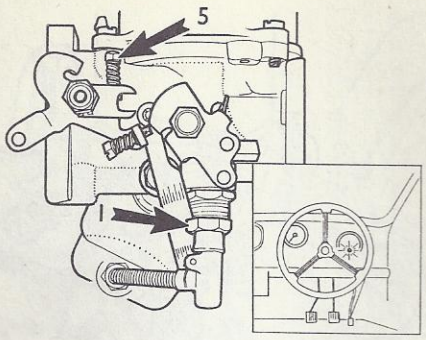


Fig. 70

9.2.1.5

Figure 20 shows the effect of various mixtures on the exhaust gases.

9.2.1.6

Check for correct mixture by gently pushing the lifting pin up about 1/32 in. (·8 mm.) after free movement has been taken up.

Figure 21 illustrates the effect on engine r.p.m. when the lifting pin raises the piston, indicating the mixture strength.

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

Readjust the mixture strength if necessary.

9.2.1.7

Reconnect the mixture control wire with about 1/16 in. (1·6 mm.) free movement before it starts to pull on the jet lever.

Pull the mixture control knob until the linkage is about to move the carburetter jet and adjust the fast-idle screw to give an engine speed of about 1,000 r.p.m. when hot.

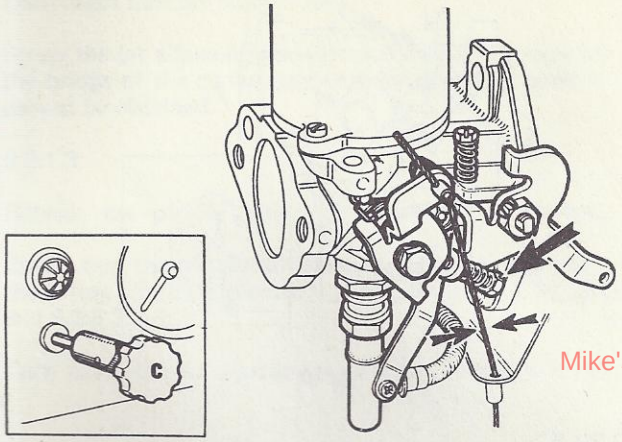


Fig. 71

9.2.1.8

Finally top up the piston damper with the recommended engine oil until the level is 1/2 in. (13 mm.) above the top of the hollow piston rod, Figure 23.

Note.

On dust-proofed carburetters, identified by a transverse hole drilled in the neck of the suction chambers and no vent hole in the damper cap, the oil level should be 1/2 in. (13 mm.) below the top of the hollow piston rod.

9.2.2 Tuning Multi-carburetters

9.2.2.1

Remove the air cleaners and carry out 9.2.1.1 as for single on all carburetters then:

Slacken both of the clamping bolts (7) on the throttle spindle interconnections.

Disconnect the jet control interconnection by slackening the clamping bolts (8).

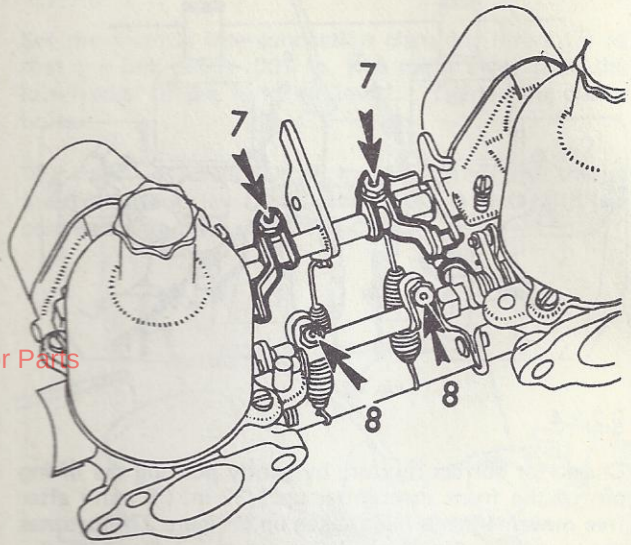


Fig. 72

Carry out 9.2.1.2 and 9.2.1.3 as for single carburetters, then additionally:

9.2.2.2

Restart the engine and adjust the throttle adjusting screws on each carburetter to give the desired idling speed as indicated by the glow of the ignition warning light.

Compare the intensity of the intake 'hiss' on all carburetters and alter the throttle adjusting screws until the 'hiss' is the same.

9.2.2.3

Turn the jet adjusting nuts (1) on all carburetters up to weaken or down to richen the same amount until the fastest idling speed consistent with even running is obtained.

Readjust the throttle adjusting screws (5) to give correct idling if necessary.

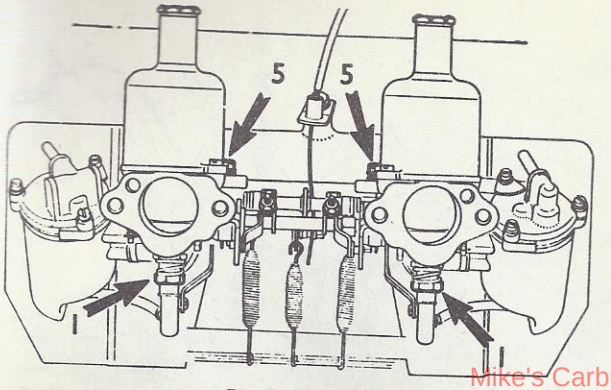


Fig. 73

9.2.2.4

Check for correct mixture by gently pushing the lifting pin of the front carburetter up 1/32 in. (·8 mm.) after free movement has been taken up. Figure 27 illustrates the possible effect on engine r.p.m. Readjust the mixture strength if necessary.

Repeat the operation on the other carburetters and after adjustment re-check since they are all inter-dependent.

Fig.20 shows the correct type of exhaust smoke.

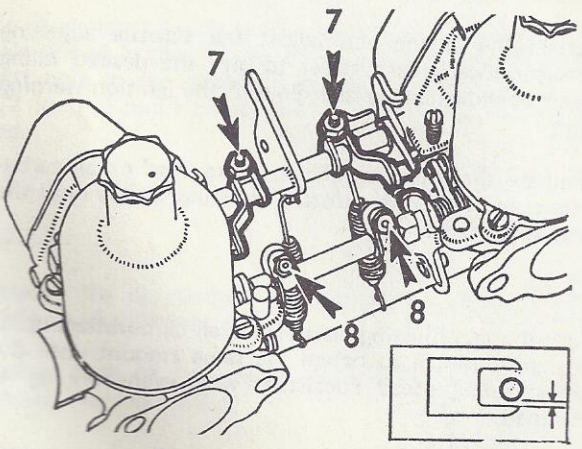


Fig. 74

9.2.2.5

Set the throttle interconnection clamping levers (7) so that the link pin is ·006 in. (·15 mm.) away from the lower edge of the fork (see inset). Tighten the clamp bolts.

With both jet levers at their lowest position, set the jet interconnection lever clamp bolts (8) so that both jets commence to move simultaneously.

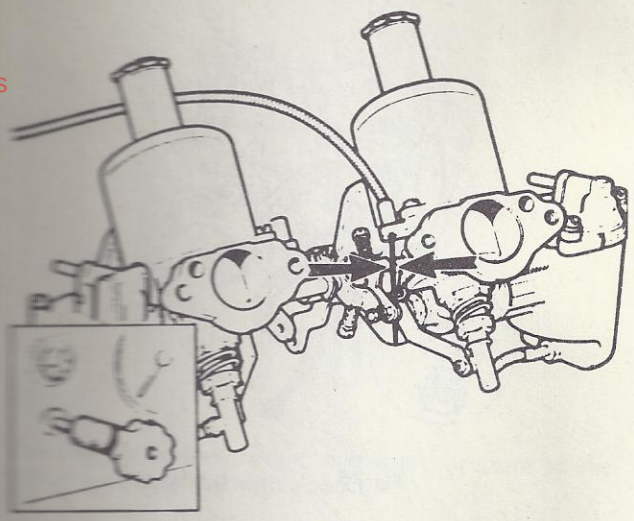


Fig. 75

9.2.2.6

Reconnect the mixture control wire with about 1/16 in. (1·6 mm.) free movement before it starts to pull on the jet levers.

Pull the mixture control knob until the linkage is about to move the carburetter jets, and adjust the fast idle screws, comparing the intensity of the air intake 'hiss' to give an engine speed of about 1,000 r.p.m. when hot.

Refit the air cleaners and re-check for correct mixture as described in 9.2.2.4.

9.2.3 Adjusting and Servicing

9.2.3.1

Jet centring. 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:

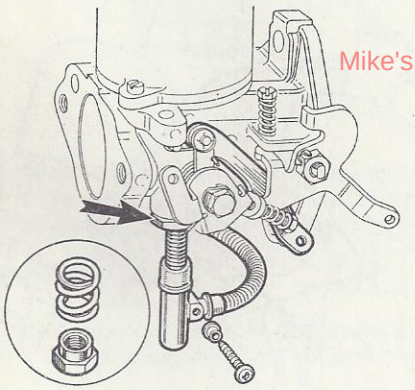


Fig. 76

9.2.3.2

Remove the jet head screw to release the control linkage.

Withdraw the jet, disconnecting the fuel pipe union in the float-chamber, and removing the rubber sealing washer. Remove the jet locking spring and adjusting nut.

Replace the jet and insert the fuel feed pipe connection into the float-chamber.

Slacken the jet locking nut until the assembly is free to rotate.

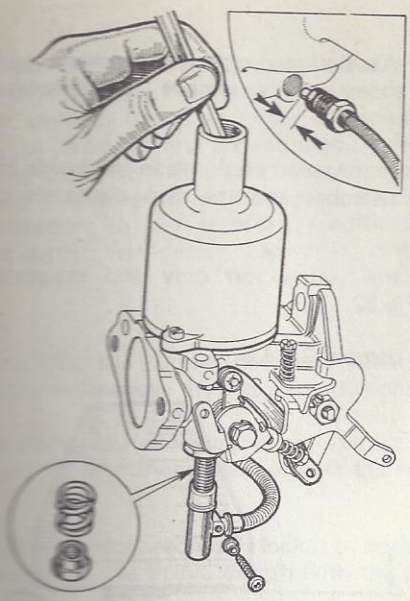


Fig. 77

9.2.3.3

Remove the piston damper and apply pressure to the top of the piston rod with a pencil.

Tighten the jet locking nut keeping the jet hard up against the jet bearing.

Finally check again as in 9.2.3.1.

Refit the jet locking spring and adjusting nut. Before replacing the fuel pipe into the float-chamber, fit the rubber sealing washer over the end of the plastic pipe so that at least 3/16 in. (4·8 mm.) of pipe protrudes (see inset). Reassemble the controls.

Refill the piston dampers with the recommended engine oil 9.2.1.8.

9.2.3.4

Cleaning. At the recommended intervals mark for reassembly and carefully 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 the piston rod only and reassemble as shown in Fig.32.

Refill piston damper 9.2.1.8.

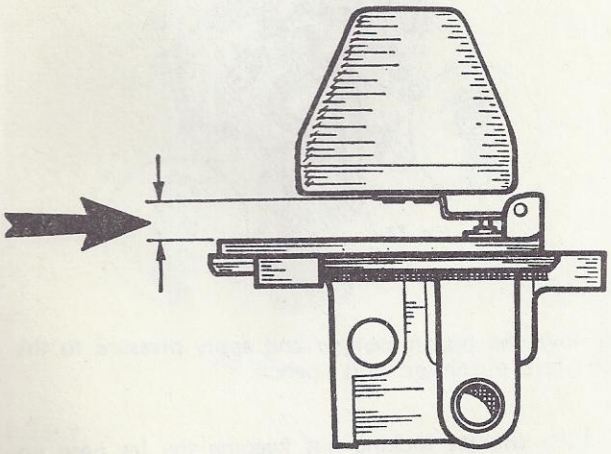


Fig. 78

9.2.3.5

Float-chamber fuel level. Remove and invert the float-chamber lid.

With the needle valve held in the shut-off position by the weight of the float only, there should be a 1/8 to 3/16 in. (3·2 to 4·8 mm.) gap between the float lever and the rim of the float-chamber lid.

The float may be set by bending at the crank.

9.2.3.6

Needle size and position. The needle size is determined during engine development and will provide the correct mixture strength unless extremes of temperature, humidity, or altitude are encountered. At altitudes exceeding 6,000 ft. (1830 m.) a weaker needle will be necessary. A different needle may also be necessary if any alteration to the standard specification of the exhaust system, air cleaner, cam-shaft, or compression ratio is made.

To check that the correct needle is fitted: mark for reassembly and remove the piston/suction chamber unit.

Slacken the needle clamping screw, extract the needle, and check its identifying mark against the recommendation.

Replace the correct needle and lock it in position so that the shoulder on the shank is flush with the piston base.

Reassemble the piston/suction chamber unit as marked.

10. 'HS8' TYPE CARBURETTER

10.1 Dismantling and Assembly

10.1.1 Dismantling

10.1.1.1

Thoroughly clean the outside of the carburetter.

Unscrew and remove the damper and washer.

10.1.1.2

Remove the suction chamber securing screws and detach the chamber without tilting it.

Lift off the piston spring.

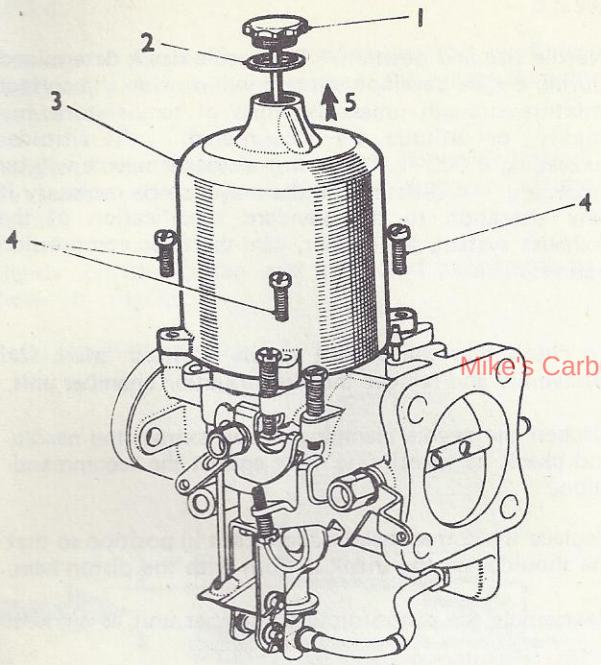


Fig. 79

1. Damper assembly.
2. Washer for damper.
3. Suction chamber.
4. Chamber securing screws.
5. Direction of removal.

Carefully lift out the piston and needle assembly and empty the oil from inside the piston rod.

Remove the needle locking screw and withdraw the needle. If it cannot be removed, tap the needle inwards first and then pull outwards. Do not bend the needle.

10.1.1.3

Note the location of the jet return spring. Remove the split pins and plain washers retaining the jet spring anchor pin and the jet fork pivot pin. Withdraw the pins and jet return spring.

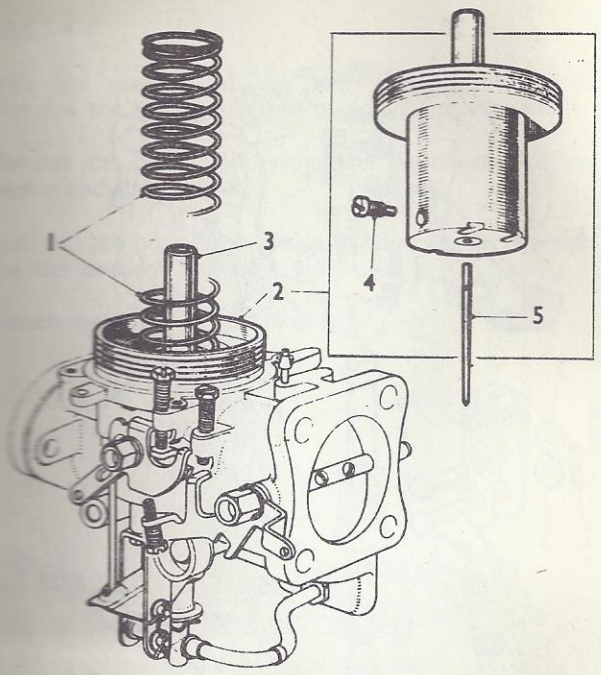


Fig. 80

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

Withdraw the jet fork from the fork bracket, unscrew the bracket retaining screw and detach the brackets.

Unscrew the sleeve nut retaining the flexible jet tube to the base of the float-chamber, and withdraw the tube, noting the gland, washer, and ferrule.

Withdraw the jet assembly complete with copper washer from the jet bearing.

Unscrew the jet locking nut and withdraw the nut and bearing. Note the brass washer under the shoulder of the bearing.

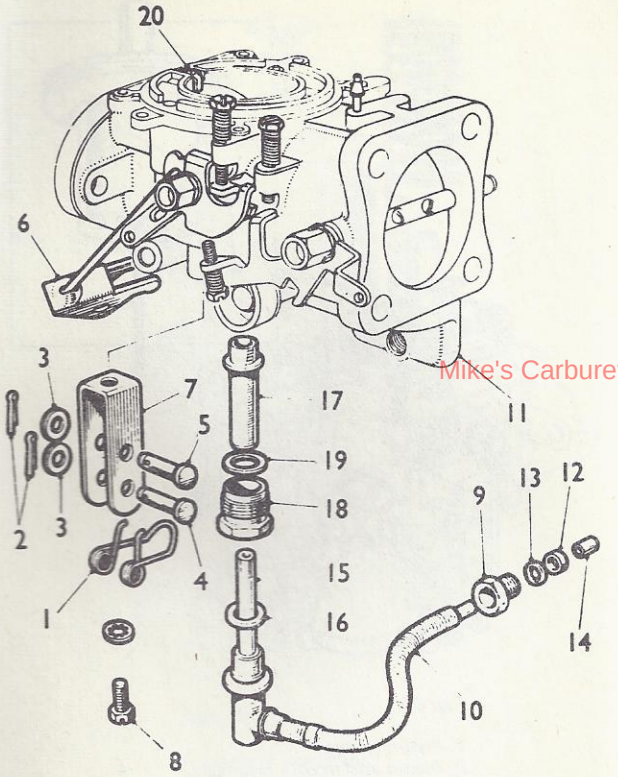


Fig. 81

1. *Jet return spring.*
2. *Split pin.*
3. *Plain washer.*
4. *Jet spring anchor pin.*
5. *Jet fork pivot pin.*
6. *Jet fork.*
7. *Fork bracket.*
8. *Bracket retaining screw.*
9. *Sleeve nut.*
10. *Flexible jet tube.*
11. *Float-chamber.*
12. *Gland.*
13. *Washer.*
14. *Ferrule.*
15. *Jet assembly.*
16. *Copper washer.*
17. *Jet bearing.*
18. *Jet locking nut.*
19. *Brass washer.*
20. *Piston key.*

10.1.1.4

Note the position of the cam lever return spring. Unscrew the lever pivot bolt and detach the assembly.

Remove the pivot bolt noting the double coil spring washer and plain washer.

Push out the pivot tube noting the skid washer between the cam lever and link arm.

Detach the cam lever return spring.

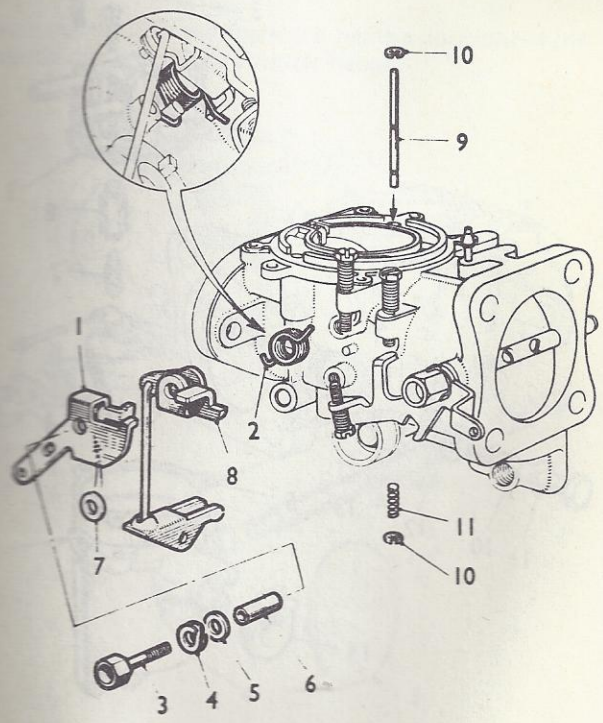


Fig. 82

1. *Cam lever.*
2. *Lever return spring.*
3. *Lever pivot bolt.*
4. *Spring washer.*
5. *Plain washer.*
6. *Pivot tube.*
7. *Skid washer.*
8. *Link arm.*
9. *Piston lifting pin.*
10. *Circlip.*
11. *Spring*

To remove the piston lifting pin extract the lower circlip from its groove, detach the spring and push the pin upwards.

10.1.1.5

Mark the location of the float-chamber lid. Remove the float-chamber lid retaining screws and lift off the lid and float assembly together with the lid gasket.

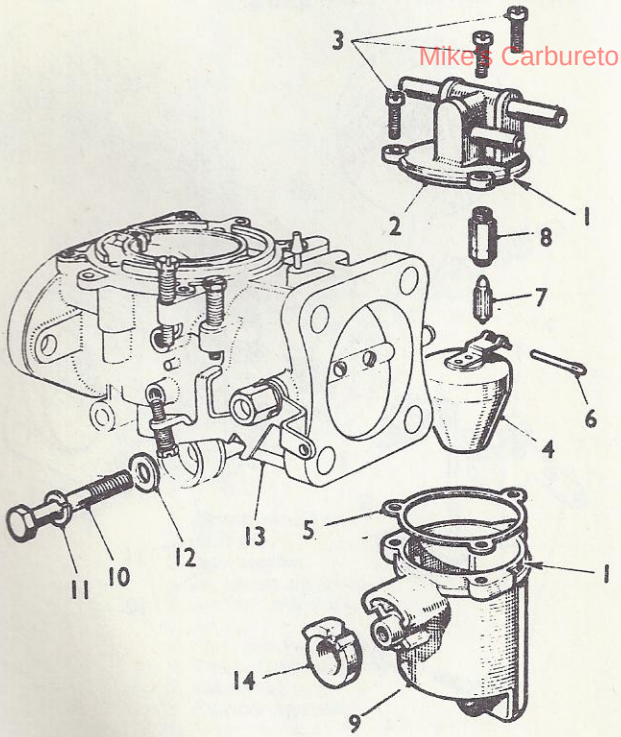


Fig. 83

1. *Marks for replacement*
2. *Float-chamber lid.*
3. *Lid retaining screws.*
4. *Float assembly.*
5. *Lid gasket.*
6. *Float hinge pin.*
7. *Float needle.*
8. *Needle seating.*
9. *Float-chamber.*
10. *Retaining bolt.*
11. *Spring washer.*
12. *Plain washer.*
13. *Carburetter body.*
14. *Distance piece.*

Push out the float hinge pin from the end opposite to its serrations and detach the float.

Extract the float needle from its seating and unscrew the seating from the lid using a box spanner ·338 in. (8·58 mm.) across the flats. Do not distort the seating.

Slacken and remove the bolt retaining the float-chamber to the carburetter body.

10.1.1.6

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

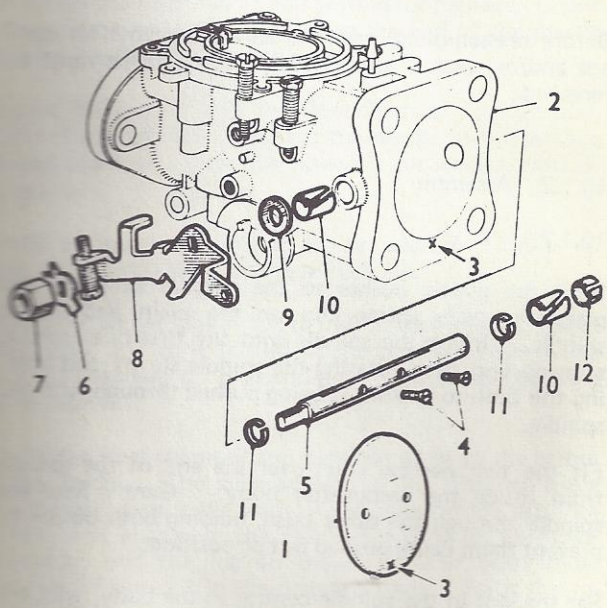


Fig. 84

1. *Throttle disc.*
2. *Carburetter flange.*
3. *Marks for replacement.*
4. *Disc retaining screws.*
5. *Throttle spindle.*
6. *Tab washer.*
7. *Spindle nut.*
8. *Lever arm.*
9. *Brass washer.*
10. *Plastic bush.*
11. *Narrow clip.*
12. *Wide clip.*

Slacken and remove the two disc retaining screws. Open the throttle and carefully withdraw the disc from its slot in the throttle spindle. The disc is oval and will jam if care is not taken when removing.

Tap back the tabs of the tab washer retaining the spindle nut. Remove the nut and tab washer.

Remove the lever arm, noting its position in relation to the spindle. Lift off the brass washer.

Withdraw the throttle spindle from the body, noting the plastic bush in each side of the carburetter body, the two narrow clips, one on the inside of each bush, and the wide clip on the plain end of the spindle.

Note.

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

10.1.2 Assembly

10.1.2.1

Refit the plastic bushes to the carburetter body and place the wide spring clip on the plain end of the spindle. Insert the spindle into the first bush gently, screwed end first, rotating the spindle slowly and holding the bush to prevent it being pushed through with the spindle.

Fit the two narrow clips over the end of the spindle from inside the carburetter body. Gently feed the spindle through the other bush, holding both bushes to prevent them being pushed out of position.

Set the slot in the spindle central in the body, with the gaps in the narrow clips at 90 degrees to the slot. Slide the clips outwards until they are concealed in the carburetter body at either side.

Fit the brass washer, lever arm, tab washer, and spindle nut in their original locations. The countersunk ends of the screw holes must face outwards when the lever arm

is in the closed throttle position. Tighten the spindle nut and lock it with the tab washer.

Insert the throttle disc in the spindle slot as marked on dismantling. Fit two new securing screws but do not tighten. Adjust the position of the disc until it closes fully. Check this visually, then tighten the securing screws, at the same time ensuring that there is clearance bewteen the throttle lever and the carburetter body. Spread the split ends of the screws just enough to prevent turning, and push the wide clip hard up against the plastic bush.

10.1.2.2

Examine the float needle and seating for damage. Check that the spring-loaded plunger in the end of the plastic bodied needle operates freely.

Screw the seating into the float-chamber lid carefully, Do not overtighten. Replace the needle in the seating, coned end first. Test the assembly for leakage with air pressure.

Refit the float assembly to the lid and insert the hinge pin. Check the float level; see 10.2.3.5.

Examine the lid gasket for re-use. Assemble the gasket to the lid and refit the lid to the float-chamber in the position marked on dismantling. Tighten the securing screws evenly.

Refit the float-chamber and distance piece to the carburetter body. The stepped face of the distance piece must face towards the body. The lugs on the distance piece must engage in the radiused casting on the float-chamber, and the lug on the carburetter body must register in the slot in the distance piece. Refit the retaining bolt, plain washer, and spring washer. Tighten securely.

10.1.2.3

Refit the piston lifting pin, spring, and circlip to the carburetter body.

Examine the piston assembly for damage on the piston rod and the outside surface of the piston. The piston assembly must be scrupulously clean. Use petrol or methylated spirit 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. Check the time this takes, which should be between 5 and 7 seconds. If the time taken is in excess of that quoted the cause wil 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.

Refit the needle to the piston assembly. The shoulder or lower edge of the groove must be level with the bottom face of the piston rod. Fit a new needle locking screw and tighten. Invert the suction chamber and spin the piston assembly inside it to check for concentricity of the needle.

Check the piston key for security in the carburetter body. Refit the piston assembly to the body and replace the piston spring over the piston rod. Fit the suction chamber and retaining screws. Tighten the screws evenly.

10.1.2.4

Refit the jet bearing, washer, and locknut. Leave the locknut slack enough to enable the bearing to be moved sideways by hand. Refit the jet in its bearing and the flexible tube to the base of the float-chamber without the gland, spring, washer, and ferrule.

Centralize the jet as in 10.2.3.1.

Withdraw the jet and tube. Fit the spring, gland, washer, and ferrule to the end of the tube. The end of the tube should project a minimum of 3/16 in. (4·76

mm.) beyond the gland. Refit the jet, copper washer, and flexible tube. Tighten the sleeve nut until the gland is compressed. Overtightening can cause leakage.

10.1.2.5

Refit the fork bracket and retaining screws. Replace the cam lever spring over its boss on the carburetter body. Refit the pivot bolt tube to the lever assembly, with the skid washer between the cam lever and link arm.

Refit the lever assembly to the carburetter body with the pivot bolt, spacing washer, and double coil spring washer.

Insert the jet fork in the fork bracket with the fork ends resting on the copper jet washer. Refit the fork pivot pin, washer, and split pin. Position the jet return spring and refit the jet spring anchor pin, washer, and split pin.

10.2 Tuning, Adjusting and Servicing

10.2.1 Tuning Single Carburetters

10.2.1.1

Warm up engine to normal temperature.

Switch off engine.

Unscrew the throttle adjusting screw until the face of the screw is just clear of the lever stop and the throttle is closed.

Set throttle adjusting screw 1 1/2 turns open.

10.2.1.2

Mark for reassembly and remove piston/suction chamber unit.

Disconnect mixture control wire.

Screw the jet adjusting screw (2) until the jet is flush with the bridge of the carburetter, or fully up if this position cannot be obtained.

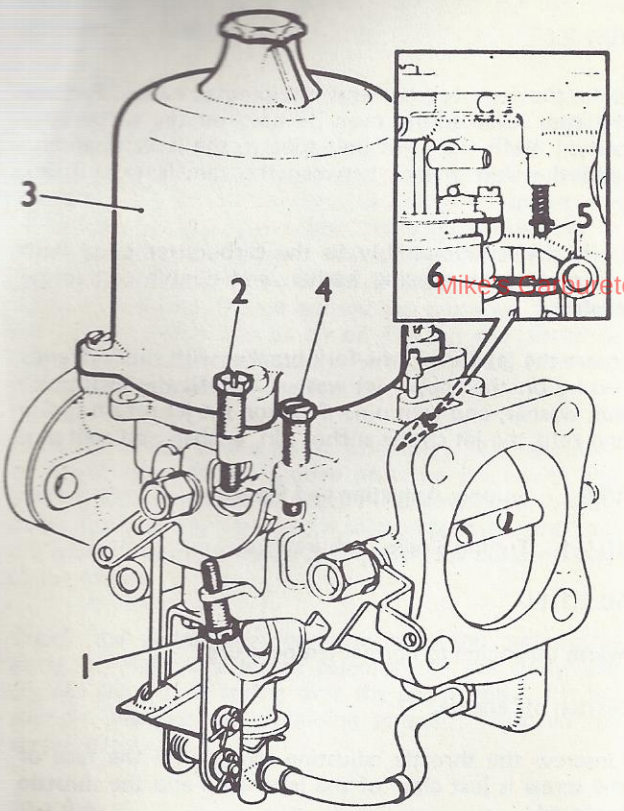


Fig. 85 — The type HS8 carburetter

1. *Fast idling adjusting screw.*
2. *Jet adjusting screw.*
3. *Piston/suction chamber.*
4. *Throttle adjusting screw.*
5. *Piston lifting pin.*
6. *Jet locking nut.*

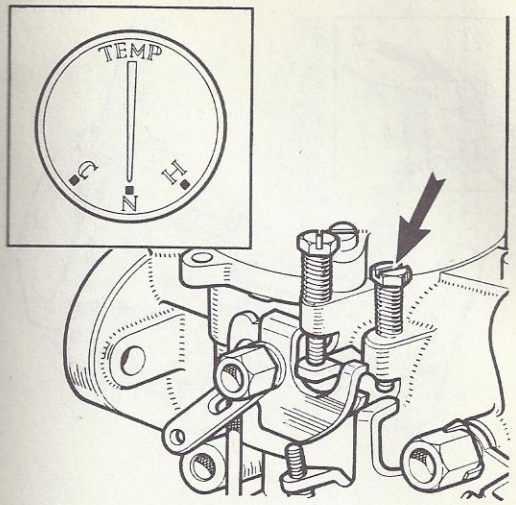


Fig. 86

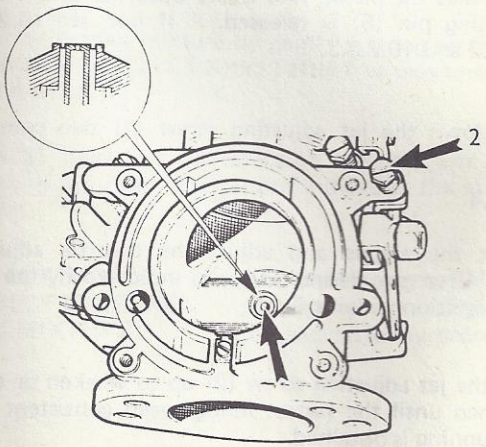


Fig. 87

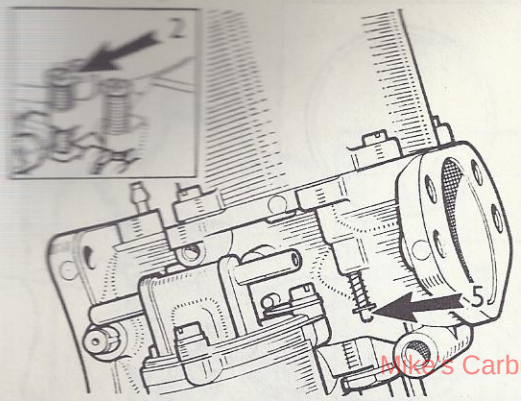


Fig. 88

10.2.1.3

Replace the piston/suction chamber unit as marked.

Check that the piston falls freely onto the bridge when the lifting pin (5) is released. If not, see 10.2.3.1, 10.2.3.2 and 10.2.3.3.

Turn down the jet adjusting screw (2) two complete turns.

10.2.1.4

Restart the engine and adjust the throttle adjusting screw (4) to give desired idling as indicated by the glow of the ignition warning light.

Turn the jet adjusting screw (2) up to weaken or down to richen until the fastest idling speed consistent with even running is obtained.

Re-adjust the throttle adjusting screw (4) to give correct idling if necessary.

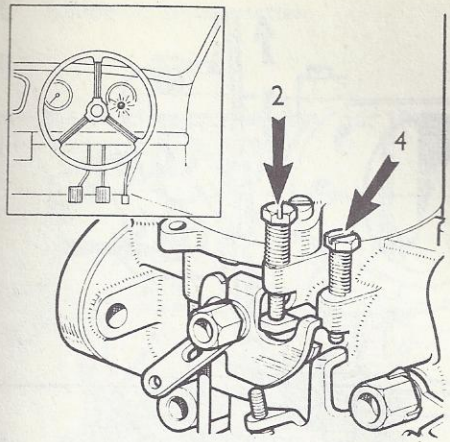


Fig. 89

10.2.1.5

Figure 20 shows the effect of various mixture strengths on the exhaust gases.

10.2.1.6

Check for correct mixture by gently pushing up the lifting pin about 1/32 in. (·8 mm.) after free movement has been taken up.

Figure 21 illustrates the effect on engine r.p.m. when the lifting pin raises the piston, indicating the mixture strength.

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

10.2.1.7

Reconnect the mixture control wire with about 1/16 in. (1·6 mm.) free movement before it starts to pull on the jet lever.

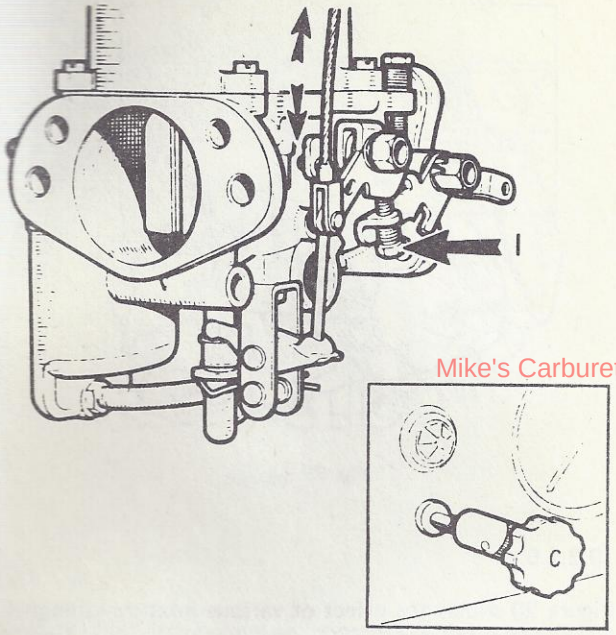


Fig. 90

Pull the mixture control knob until the linkage is about to move the carburetter jet, and adjust the fast idling screw (1) to give the desired engine speed. Normally this will be about 1,000 r.p.m., but may be as high as 1,4000 r.p.m. in some installations.

10.2.1.8

Finally, top up the piston damper with engine oil grade S.A.E. 20 until the level is 1/2 in. (13 mm.) below the top of the hollow piston ron, Figure 23.

Note.

On non-dust-proofed carburetters identified by not having a transverse hole drilled in the neck of the suction chamber and with a vent hole in the damper cap, the oil level should be 1/2 in. (13 mm.) above the top of the hollow piston rod.

10.2.2 Tuning Multi-carburetters

10.2.2.1

Remove the air cleaners and carry out 10.2.1.1. as for single on all carburetters, then:

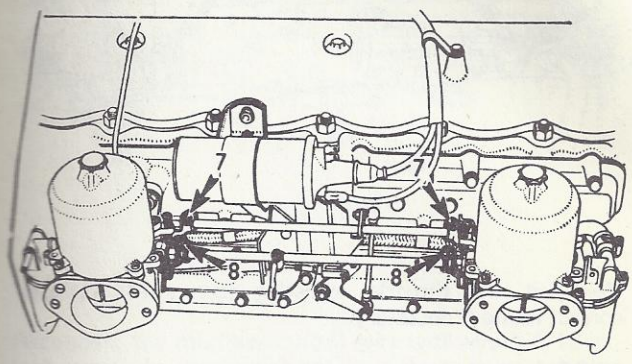


Fig. 91

Slacken the clamping bolts (7) on the throttle spindle interconnection.

Disconnect the jet control interconnection by slackening the clamping bolts (8).

Carry out 10.2.1.2 and 10.2.1.3 as for single carburetters, then additionally:

10.2.2.2

Restart the engine and adjust the throttle adjusting screws on each carburetter to give the desired idling speed as indicated by the glow of the ignition warning light.

Compare the intensity of the intake 'hiss' on all carburetters and alter the throttle adjusting screws until the 'hiss' is the same.

10.2.2.3

Turn the jet adjusting screws (2) on all carburetters up to weaken or down to richen the same amount until the

faster idling speed consistent with even running is obtained.

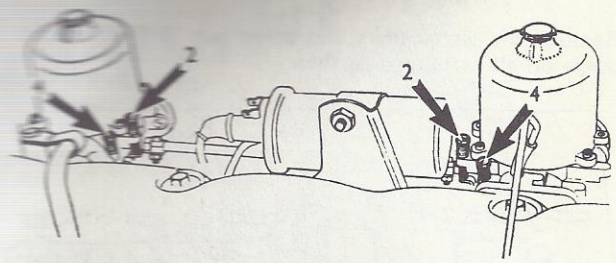


Fig. 92

Re-adjust the throttle adjusting screws (4) to give correct idling if necessary.

10.2.2.4

Check for correct mixture by gently pushing up the lifting pin of the front carburetter 1/32 in. (·8 mm.) after free movement has been taken up. Figure 27 illustrates the possible effect on engine r.p.m.

Repeat the operation on the rear carburetter and after adjustment re-check the front carburetter since the two are inter-dependent.

Figure 20 shows the correct type of exhaust smoke.

10.2.2.5

Set the throttle interconnection clamping levers (7) so that the actuating pegs (see inset) are ·006 in. (·15 mm.) away from the actuating fork, allowing ·015 to ·030 in. (·38 to ·76 mm.) end-float on the interconnection rod. Tighten the clamp bolts.

With both jet levers at their lowest position, set the jet interconnection lever clamp bolts (8) so that the interconnection rod has an end-float of ·015 to ·030 in. (·38 to ·76 mm.) overall, and that both jets commence to move simultaneously.

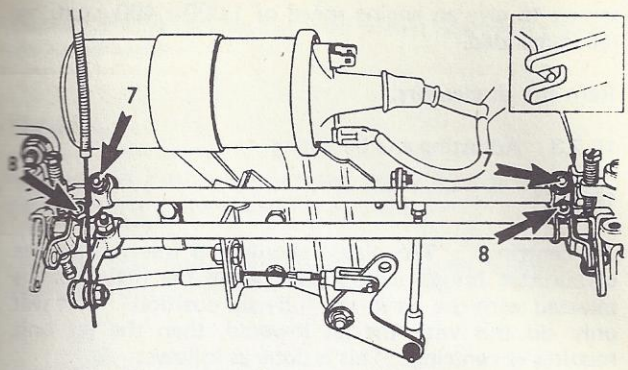


Fig. 93

10.2.2.6

Reconnect the mixture control wire with about 1/16 in. (1·6 mm.) free movement before it starts to pull on the jet levers.

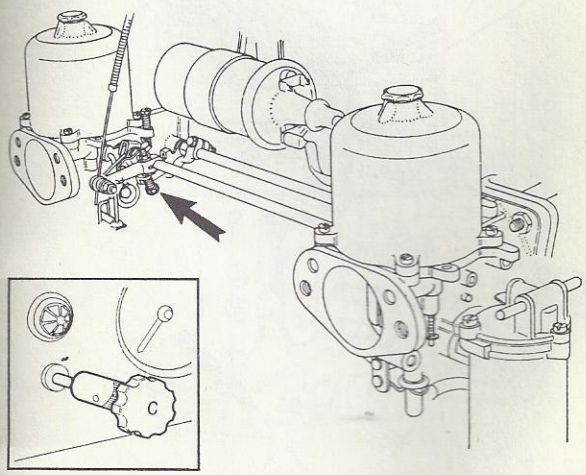


Fig. 94

Pull the mixture control knob until the linkage is about to move the carburetter jets, and adjust the fast idling

screws to give an engine speed of 1,000-1,400 r.p.m. as recommended.

Refit the air cleaners.

10.2.3 Adjusting and Servicing

10.2.3.1

Jet centring. 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:

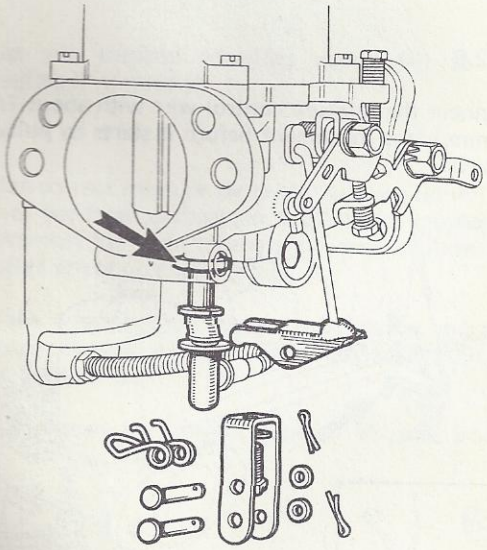


Fig. 95

10.2.3.2

Remove the jet spring anchor pin and the jet fork pivot pin.

Remove the fork bracket and allow the linkage to swing to one side.

Slacken the jet locking nut until the jet bearing is free to rotate by hand.

10.2.3.3

Remove the piston damper and apply light pressure to the top of the piston rod with a pencil.

Ensuring that the jet is pressed fully home, tighten the jet locking nut.

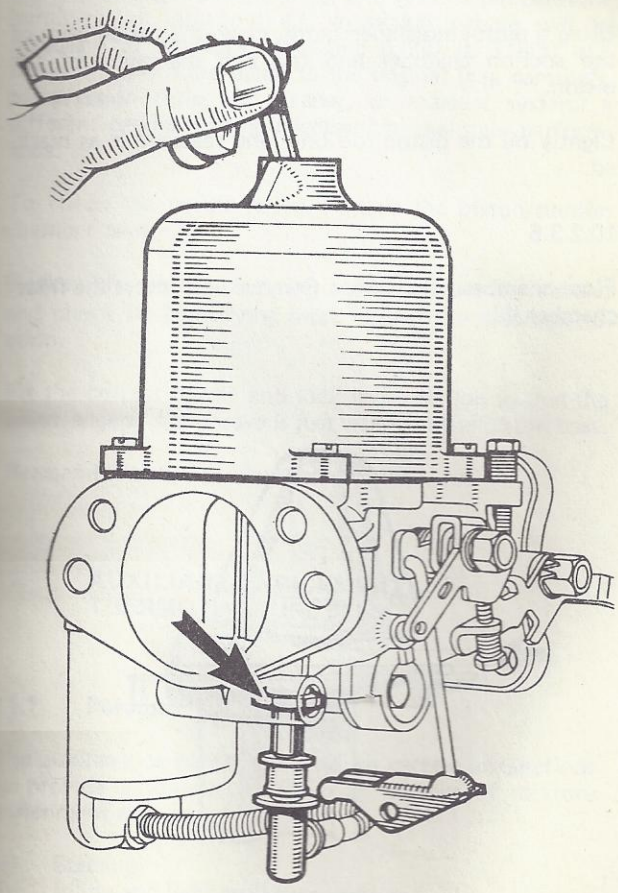


Fig. 96

Finally check again as in 10.2.3.1.

Reassemble the controls.

Refill the piston dampers with engine oil 10.2.1.8.

10.2.3.4

Cleaning. At the recommended intervals mark for re-assembly and carefully 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 the piston rod only and reassemble as marked.

10.2.3.5

Float-chamber fuel level. Remove and invert the float-chamber lid.

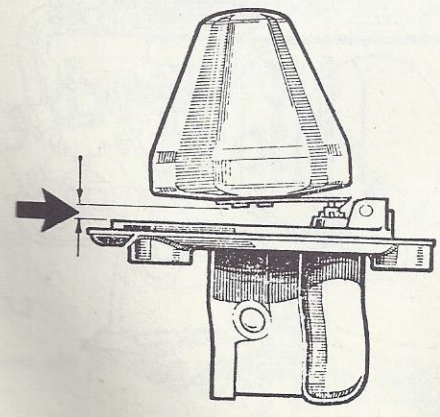


Fig. 97

With the needle valve held in the shut-off position by the weight of the float only, there should be a 1/8 to 3/16in. (3·18 to 4·76 mm.) gap between the float lever and the rim of the float-chamber lid.

The float-chamber may be set by bending at the crank.

10.2.3.6

Needle size and position. The needle size is determined during engine development and will provide the correct mixture strength except under extremes of temperature, humidity, or altitude; e.g. a weaker needle will be necessary at altitudes exceeding 6,000 ft. (1800 m.). 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 lower edge of the groove is just visible at the piston base.

Reassemble the piston/suction chamber unit.

11. AUXILIARY ENRICHMENT THERMO CARBURETTER

11.1 Purpose

The auxiliary carburetter is used on certain installations to provide automatically differing degrees of mixture enrichment at:

(a) Starting.
(b) Idling and light cruising conditions.
(c) Full throttle conditions.

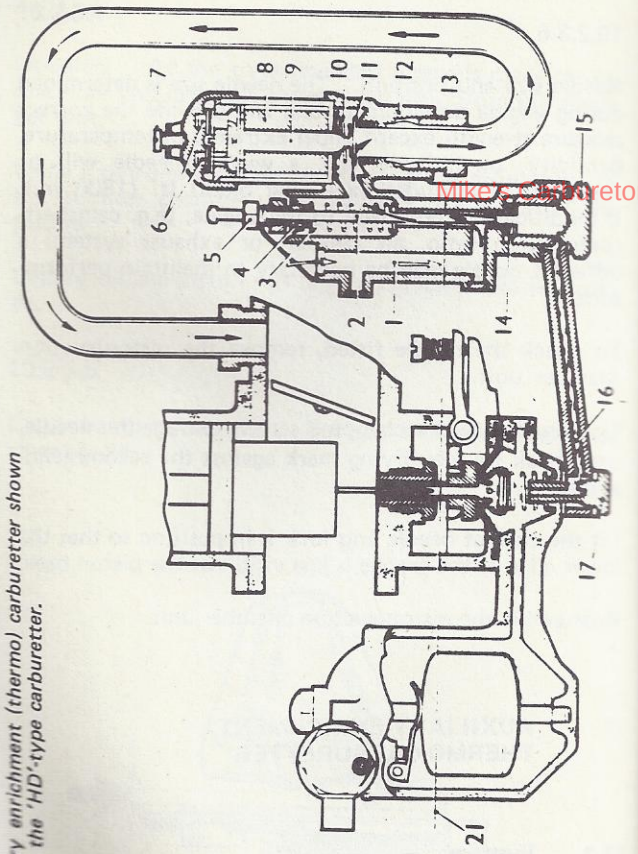


Fig.98 – The auxiliary enrichment (thermo) carburetter shown as fitted to the 'HD'-type carburetter.

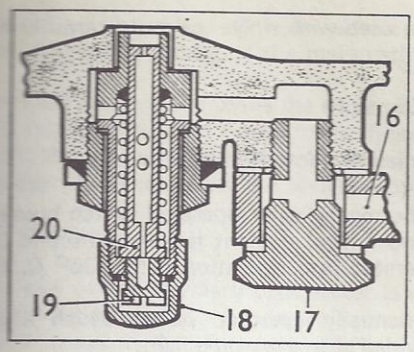


Fig. 99

Key to Figs. 98 and 99

1. *Intake passage.*
2. *Tapered needle.*
3. *Spring (and needle disc chamber).*
4. *Suction disc – needle stop.*
5. *Adjustable stop nut.*
6. *Terminals.*
7. *Securing strap screw.*
8. *Solenoid.*
9. *Plunger – iron core.*
10. *Conical spring.*
11. *Valve – ball jointed.*
12. *Auxiliary carburetter body.*
13. *Feed pipe – external.*
14. *Auxiliary jet.*
15. *Bolt – pipe to body.*
16. *Fuel passage.*
17. *Bolt – pipe to carburetter.*
18. *Cap nut.**
19. *Adjusting screw.**
20. *Jet with flanged end.**
21. *Fuel level.*

** 'H'-type jet assembly used with auxiliary carburetter.*

It may be used with single- or multi-carburetter installations.

11.2 Control

The unit may be controlled by either:

(a) A thermostatically operated switch housed in the cylinder head coolant jacket and set to bring the apparatus into operation below 35° C. (95° F.).

(b) A manually operated switch which is generally provided with a warning light.

11.3 Operation

The auxiliary carburetter is a separate unit attached to the main carburetter. When fitted to 'H'-type carburetters the construction of the main carburetter jet assembly differs from normal in the method of mixture adjustment.

The device consists of a solenoid operated valve and a fuel metering needle which draws its fuel from the base of the auxiliary jet supplied from the main carburetter.

When the device is operated, air is drawn from the atmosphere through the air intake into a chamber and is mixed with fuel as it passes the jet. The mixture then passes upwards past the shank of the needle, through a passage, and so past the aperture provided between the valve and its seating. From here it passes directly to the main induction manifold through the external feed pipe as shown.

11.3.1 Solenoid and Valve

The device is brough into action by energizing the solenoid. The iron core is thus raised carrying with it the ball-jointed disc valve against the load of the conical spring, thereby opening the aperture between valve and seating.

11.3.2 Valve Seating

A cup washer is fitted against the solenoid face to centralize the conical spring. Any leakage between the

valve and its seating would allow the device to operate and affect the idling setting of the main carburetter(s).

If the solenoid is energized while the engine is idling the valve will not normally lift owing to the high manifold depression; the act of opening the throttle will reduce manifold depression and allow the device to operate.

11.3.3 Fuel Level

The fuel level in the auxiliary carburetter is controlled by the main carburetter float-chamber. It can be seen from the illustration that this results in a reservoir of fuel remaining in the well of the auxiliary carburetter.

11.3.4 Fuel Well

When starting with the device in operation, this fuel is drawn into the induction manifold to provide the rich mixture necessary for instant cold starting.

11.3.5 Needle and Disc

When the valve has lifted, the needle disc chamber is in direct communication with the inlet manifold and the depression, dependent on throttle opening, varies the position of the needle by exerting a downward force upon the suction disc and needle assembly. Thus:

(a) At idling the relatively high depression will draw the needle into the jet until the needle head abuts against the adjustable stop.

(b) At larger throttle openings a reduced depression is communicated to the needle disc chamber and the spring will tend to overcome the downward movement of the needle, thus increasing mixture strength.

11.4 Tuning and Adjustment

11.4.1 Main Carburetter(s)

As both the main and auxiliary carburetters operate when starting from cold, the main carburetter(s) must be tuned correctly before attempting any adjustment to

the auxiliary carburetter. Reference should be made to the appropriate carburetter type and to the mixture adjustment instructions given below for 'H'-type carburetters.

Mixture adjustment - 'H'-type carburetter

The procedure for mixture adjustment is the same as for normal 'H'-type carburetter except that a jet adjusting screw is used in place of the normal jet adjusting nut (see inset figure) as follows:

(1) Remove the cap nut.

(2) Adjust the jet as required, by turning the slotted screw up to weaken or down to enrich the mixture. The slight leakage of fuel through the jet during this operation can be ignored.

(3) Replace the cap nut with its sealing washer.

11.4.2 Auxiliary Carburetter

Tuning of the auxiliary carburetter is confined to adjustment of the stop nut which limits the downward movement of the needle, and is carried out with the engine running at normal temperature and the main carburetter(s) tuned.

Proceed as follows:

(1) Switch on the auxiliary carburetter:

(a) Where the thermostat has automatically broken the circuit, energize the solenoid by short-circuiting the thermostatic switch to earth, or if this is inaccessible, earth the appropriate terminal of the auxiliary carburetter with a separate wire.

(b) Where a manual switch is fitted, switch on.

(2) Open the throttle momentarily to allow the valve to lift.

(3) Adjust the stop nut (see diagram below):

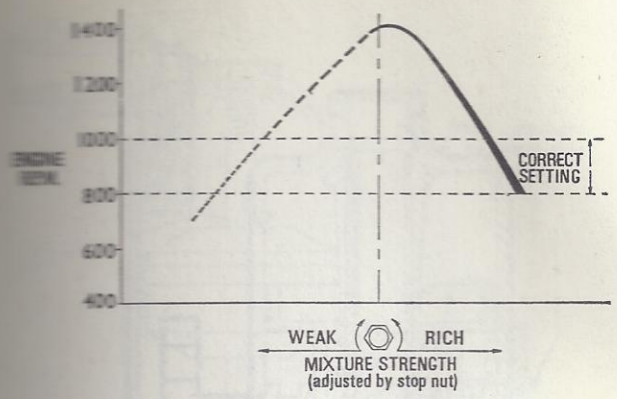


Fig. 100

(a) Initially clockwise (to weaken) until the engine begins to run erratically.

(b) Then anti-clockwise (to enrich) through the phase where the engine speed has risen markedly to the point where over-richness results in the engine speed dropping to between 800-1,000 r.p.m. with the exhaust gases noticeably black in colour.

12. 'MC2' TYPE CARBURETTER (MOTOR CYCLE)

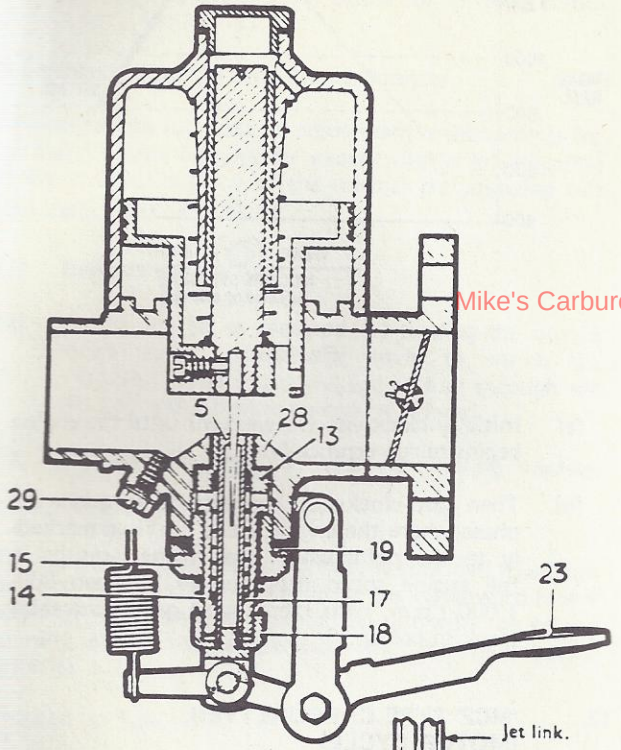
12.1 Mixture and Idling Speed Adjustment

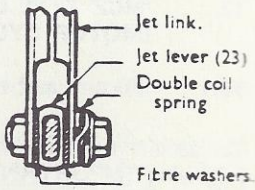
To obtain the best results from the carburetter the following IMPORTANT POINTS MUST BE OBSERVED.

1. Carry out adjustments only AFTER engine has been THOROUGHLY WARMED UP.

2. Use the jet lever for COLD STARTING and if necessary for warming up.

3. Use the jet adjustment nut for setting the IDLING MIXTURE ONLY.





Jet lever friction loading assembly.

Fig. 101

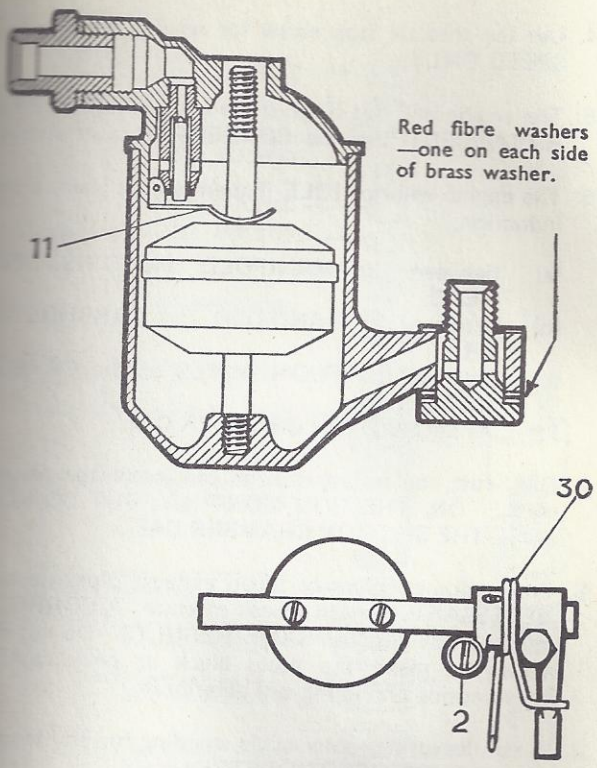


Fig. 102

Key to Figs 101 and 102

2. Throttle stop screw.
5. Jet.
11. Hinged fork lever.
13. Jet bearing — top half.
14. Lower jet bush.
15. Jet locking screw.
17. Jet gland.
18. Jet adjusting nut,
19. Locking screw washer.
23. Jet lever.
28. Jet bridge.
29. 2 B.A. plug screw.
30. Throttle return spring.

4. Use the throttle stop screw for setting the IDLING SPEED ONLY.

5. The engine will not IDLE if the ignition is TOO FAR ADVANCED - use the CORRECT ignition setting.

6. The engine will not IDLE if there are air leaks in the induction;

   (a) between the MANIFOLD and CYLINDER HEAD.
   (b) between the MANIFOLD and CARBURETTER.
   (c) between the TWO HALVES of the CARBURETTER.
   (d) At the SUCTION CHAMBER CAP.

7. Dirt, rust, or maladjustment can make the piston stick. OIL THE ROD MONTHLY, BUT DO NOT LOSE THE SUCTION CHAMBER CAP.

8. Grey coloured plugs or blued exhaust pipes do not NECESSARILY mean a weak mixture. A CORRECT mixture can give the SAME RESULTS. Do not re-adjust to make the plugs black or performance, consumption and idling will deteriorate.

9. If you leave the motor-cycle standing for any length of time TURN OFF THE PETROL.

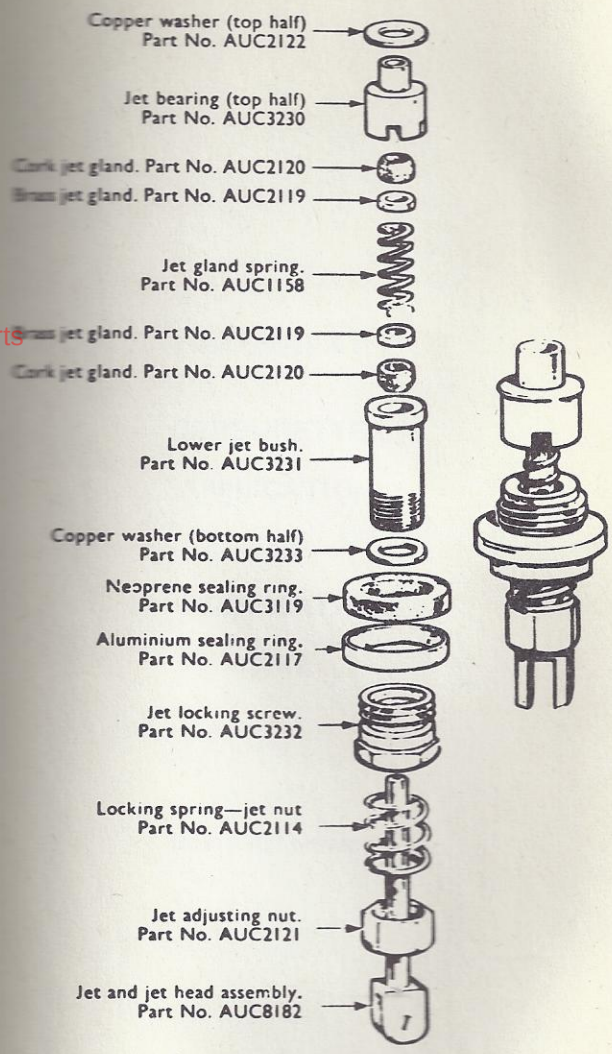


Fig. 103

The exploded illustration on the right shows the jet components and the complete jet assembly.

APPENDIX I

CARBURETTER APPLICATION AND SPECIFICATION LIST

from 1960 onwards

CAR MODEL			YEAR	CARB. SPEC.	TYPE No.	NEEDLE			SPRING COLOUR
						RICH	STD.	WEAK	
ALVIS									
	6-cyl.	TD21	1959/63	AUC 908	Pair HD6 Thermo		TA		Red
	6-cyl.	TD21	1963/4	AUD 128	Pair HD6		KA		Red
3-litre	6-cyl.	TF21 Series IV	1965/6	AUD 226	Three HD6 Thermo		SC	KA	Red
ASTON MARTIN									
3·7-litre	6-cyl.	DB4	1960	AUC 965	Pair HD8		UJ		Red/Blue
3·7-litre	6-cyl.	DB4	1961/2	AUC 995	Pair HD8		UN		Red/Blue
3·7-litre	6-cyl.	DB4 Special	1961/2	AUD 53	Three HD8		UP		Blue/Black
3·7-litre	6-cyl.	DB5 (PTFE bushes)	1962/4	AUD 88	Three HD8		UX		Red/Green
4-litre	6-cyl.	DB6	1965/7	AUD 88	Three HD8		UX		Red/Green
AUSTIN									
4-litre	6-cyl.	Princess DM4	1957/61	AUC 817	Pair HD6	RD	CV	SQ	Red
948-c.c.		Austin-Healey Sprite	1959	AUC 863	Pair H1	EB	GG	MOW	
	6-cyl.	A99	1959/61	AUC 905	Pair H4		MS	HA	Yellow
848-c.c.		Seven	1959†	AUC 912*	Single HS2	M	EB	GG	Red
1498-c.c.		A55	1959	AUC 928*	Single HS2	AH2	M	EB	Red
2·6-litre		Austin-Healey BN7 (RC)	1960	AUC 963	Pair HD6	RD	CV	SQ	Green
2·6-litre		Austin-Healey BN7 (Mk. II)	1961/2	AUD 18	Three HS4	DK	DJ	DH	Red
848-c.c.		Seven & Super	1961/2	AUC 976	Single HS2	M	EB	GG	Red
997-c.c.		Mini Cooper	1961/2	AUD 15	Pair HS2	AH2	GZ	EB	Red
1622-c.c.		A60	1961/4	AUD 40	Single HS2	M	GX	GG	Yellow
948-c.c.		A40 (Mk. II)	1961/2	AUC 980	Single HS2	AH2	M	EB	Red
948-c.c.		Austin-Healey Sprite (Mk. II)	1961/2	AUC 990	Pair HS2	V2	V3	GX	Blue
2912 c.c.	6-cyl.	A110 Westminster H.C. & L.C.	1961/3	AUD 43	Pair H4	3	AR	HA	Yellow
1098-c.c.		Austin-Healey Sprite (Mk. II)	1962/3	AUD 73	Pair HS2	M	GY	GG	Blue

1098-c.c.		Austin-Healey Sprite (Mk. III)	1963/4	AUD 136	Pair HS2	H6	AN	GG	Blue
	6-cyl.	Austin-Healey 3000 (Mk. II)	1962/3	AUC 981	Pair H56	RD	BC	TZ	Green
		A35 Van	1962/3	AUD 72	Single HS2	H6	AN	EB	Red
1098-c.c.		A40 and Austin 1100	1962/7	AUD 13	Single HS2	H6	AN	EB	Red
1070-c.c.		Mini-Cooper 'S'	1963/4	AUD 99	Pair HS2	3	H6	EB	Red
	6-cyl.	Austin-Healey BJ8	1964	AUD 124	Pair HD8	UN	UH	UL	Red/Green
1275-c.c.		Mini-Cooper	1964/7	AUD 146	Pair HS2	AH2	M	EB	Red
970-c.c.		Mini-Cooper 'S'	1964	AUD 151	Pair HS2	H6	AN	EB	Red
998-c.c.		Mini-Cooper	1964/7	AUD 104	Pair HS2	M	GY	GG	Blue
1800-c.c.		Austin 1800	1964	AUD 147	Single HS6	SW	TW	C1W	Yellow
850-c.c.		A35 Van	1965/7	AUD 120	Single HS2	M	EB	GG	Red
850-c.c.		Mini Automatic	1965/7	AUD 170	Single HS4	H6	AN	EB	Red
1098-c.c.		1100 Automatic	1965/7	AUD 185	Single HS4	BQ	DL	ED	Red
1798-c.c.		1800	1966/7	AUD 223*	Single HS6	SW	TW	C1W	Yellow
850-c.c.		Mini Automatic	1967/8	AUD 250	Single HS4	H6	AN	EB	Red
1098-c.c.		1100 Automatic (Mk. II)	1967/8	AUD 251	Single HS4	BQ	DL	ED	Red
2912-c.c.		A110 Westminster	1967	AUD 240	Pair H4	3	AR	HA	Yellow
2912-c.c.	6-cyl.	A110 (Police)	1967	AUD 259	Pair H4	3	AR	HA	Yellow
1098-c.c.		1100 (Mk. II)	1967/8	AUD 13	Single HS2	H6	AN	EB	Red
998-c.c.		Mini (Mk. II)	1967/8	AUD 86	Single HS2	M	GX	GG	Red
998-c.c.		Mini (Mk. II) Automatic	1967/8	AUD 184	Single HS4	M1	AC	HA	Red
1275-c.c.		1300	1967/8	AUD 186	Single HS4	BQ	DZ	CF	Red
1275-c.c.		1300 Automatic	1967/8	AUD 271	Single HS4	BQ	DZ	CF	Red
2912-c.c.	6-cyl.	3-litre	1967/8	AUD 217	Pair HS6	TU	C1	C1W	Yellow
1275-c.c.		Austin-Healey Sprite (Mk. III)	1967/8	AUD 136	Pair HS2	H6	AN	GG	Blue
1275-c.c.		Austin-Healey Sprite (Mk. III) (U.S.A.)	1968	AUD 266	Pair HS2		AN		Blue

CAR MODEL		YEAR	CARB. SPEC.	TYPE No.	NEEDLE RICH	NEEDLE STD.	NEEDLE WEAK	SPRING COLOUR
Austin—continued								
1275-c.c.	Austin-America Automatic (U.S.A.) ..	1968	AUD 296	Single HS4		DZ		Red
1798-c.c.	1800 (Mk. II) Manual	1968	AUD 280	Single HS6	SA	ZH	C1W	Yellow
1798-c.c.	1800 (Mk. II) Automatic	1968	AUD 291	Single HS6	SA	ZH	C1W	Yellow
1798-c.c.	1800 Mk. II (Australia)	1968	AUD 381	Single HS6		SL		Yellow
1798-c.c.	1800 Mk. II Automatic (Australia)	1968	AUD 382	Single HS6		SL		Yellow
1798-c.c.	1500/1800 (Australia)	1968	AUD 385	Pair HS6		KS		Blue
1485-c.c./1798-c.c.	Austin-Healey Sprite	1968	AUD 327	Pair HS2	H6	AN	GG	Blue
1275-c.c.	Austin-Healey Sprite (U.S.A.)	1968	AUD 328	Pair HS2		AAC		Blue
1275-c.c.	1800 Automatic (Canada)	1968/70	AUD 315	Single HS6		BAJ		Yellow
1798-c.c.	1500 (Australia)	1969	AUD 288	Single HS6		TD		Red
1485-c.c.	Austin America (U.S.A.)	1969	AUD 345	Single HS4		AAG		Red
1275-c.c.	Austin America Automatic (U.S.A.) ..	1969	AUD 346	Single HS4		AAG		Red
1275-c.c.	1300	1969/70	AUD 374	Single HS4	BQ	DZ	CF	Red
1275-c.c.	1300 Automatic	1969/70	AUD 376	Single HS4	BQ	DZ	CF	Red
1275-c.c.	1800 (Canada)	1969/70	AUD 314	Single HS6		BAJ		Yellow
1798-c.c.	Austin-Healey Sprite (U.S.A.)	1969/70	AUD 404	Pair HS2		AAC		Blue
1275-c.c.	1800 'S'	1969/71	AUD 171	Pair HS6	CI	TZ	CIW	Red
1798-c.c.	Maxi	1969/71	AUD 258	Single HS6		KP		Red
1485-c.c.	1300 GT	1969/71	AUD 344	Pair HS2	M	GY	GG	Blue
1275-c.c.	1100 Mk. II Automatic	1969/71	AUD 370	Single HS4	BQ	DL	ED	Red
1098-c.c.	Austin America (U.S.A.)	1969/71	AUD 379	Single HS4		AAG		Red
1275-c.c.	Austin America Automatic (U.S.A.) ..	1969/71	AUD 380	Single HS4		AAG		Red
1275-c.c.	1300 Automatic (S. Africa)	1970/1	AUD 317	Single HS4	BQ	DZ	CF	Red
1748-c.c.	Maxi	1970/1	AUD 462	Single HS6		BAR		Red
1275-c.c.	1300 (S. Africa)	1970/1	AUD 469	Single HS4	BQ	DZ	CF	Red
1275-c.c.	1300	1971	AUD 472	Single HS4	BQ	DZ	CF	Red
1275-c.c.	1300 GT	1971	AUD 431	Pair HS2	M	GY	GG	Blue
1097-c.c.	Leykor (S. Africa)	1971	AUD 481	Single HS4	DL	CZ	GY	Red
1485-c.c.	Maxi	1971	AUD 468	Single HS6		BAS		Red

1275-c.c.	1300	1971/2	AUD 480	Single HS4	BQ	DZ	CF	Red
1275-c.c.	1300 GT .. .. (ECE)	1971/2	AUD 454	Pair HS2		AAP		Blue
1622-c.c.	A60 10-cwt. Van	1971/2	AUD 523	Single HS2	M	GX	GG	Yellow
1798-c.c.	1800 Mk. II	1971/2	AUD 524	Single HS6	SA	ZH	CIW	Yellow
1798-c.c.	1800 Mk. II Automatic	1971/2	AUD 525	Single HS6	SA	ZH	CIW	Yellow
1098-c.c.	1100 Mk. II	1971/2	AUD 368	Single HS2	H6	AN	EB	Red
1275-c.c.	1300 .. .. (ECE)	1971/2	AUD 453	Single HS4		AAR		Red
1275-c.c.	1300 Automatic .. .. (ECE)	1971/2	AUD 486	Single HS4		AAR		Red
1275-c.c.	1300 GT .. .. (ECE)	1971/2	AUD 496	Pair HS2		AAP		Blue
1485-c.c.	Maxi .. .. (ECE)	1971/2	AUD 498	Single HS6		BAS		Red
998-c.c.	Mini Mk. II	1968/70	AUD 298	Single HS2	M	GX	GG	Red
848-c.c.	Mini Mk. II	1968/70	AUD 299	Single HS2	M	EB	GG	Red
1275-c.c.	Mini Clubman	1969/71	AUD 317	Single HS4	BQ	DZ	CF	Red
848-c.c.	Mini Mk. II Automatic	1969/71	AUD 360	Single HS4	H6	AN	EB	Red
998-c.c.	Mini Mk. II	1970/71	AUD 363	Single HS2	M	GX	GG	Red
998-c.c.	Mini Clubman	1969/71	AUD 363	Single HS2	M	GX	GG	Red
998-c.c.	Mini Mk. II Automatic	1969	AUD 366	Single HS4	M1	AC	HA	Red
998-c.c.	Mini Mk. II Automatic	1970	AUD 367	Single HS4	M1	AC	HA	Red
998-c.c.	Mini Clubman (Canada)	1969/70	AUD 398	Single HS4		AAG		Red
1275-c.c.	Mini Clubman (Canada)	1969/70	AUD 399	Single HS4		AAG		Red
1275-c.c.	Mini Cooper 'S'	1970/1	AUD 440	Pair HS2	AH2	M	EB	Red
998-c.c.	Mini Mk. II Automatic	1971	AUD 461	Single HS4		AAG		Red
NOTE.—Replacement for AUC 928			AUC 978	Single HS2	M	GY	GG	Red
Replacement for AUC 912			AUC 976	Single HS2	M	EB	GG	Red
Replacement for AUD 223			AUD 147	Single HS6	SW	TW	C1W	Yellow

CAR MODEL			YEAR	CARB. SPEC.	TYPE No.	NEEDLE RICH	NEEDLE STD.	NEEDLE WEAK	SPRING COLOUR
BENTLEY									
6230-c.c.	6-cyl.	'S2'	1960/2	AUC 988	Pair HD6		SH		Yellow
6230-c.c.		'S3'-'V' Eight	1963/4	AUD 54	Pair HD8		US		Red/Blue
6230-c.c.		'SY'-'V' Eight	1965/8	AUD 177	Pair HD8		UZ		Red/Blue
6230-c.c.		'T' Series 'SY'-'V' Eight (U.S.A.)	1968	AUD 269	Pair HD8		UVU		Red/Blue
6750-c.c.	V8	'T' Series (U.S.A.)	1969	AUD 389	Pair HD8		BAE		Red/Blue
6750-c.c.	V8	'T' Series (U.S.A./General)	1969/71	AUD 387	Pair HD8		BAE		Red/Blue
CITROEN (Conversion)									
2·6-litre	6-cyl.		1950/4	AUC 712	Pair H4	MME	CP4	CQ	Red
CONVERSION SETS									
		M.G.—Elva	1959/61	AUC 892	Pair H4		GS		Red
		BMC 'A' Series—Turner	1959/61	AUC 911	Pair H1		BX1		
948-c.c.		Minor 1000—Speedwell	1959/61	AUC 919	Pair H2		M8		Blue
948-c.c.		BMC 'A' Series—Turner	1959/61	AUC 927	Pair H2		M6		Red
948-c.c.		Sprite—Sebring	1960	AUC 930	Pair H2		GX		Blue
948-c.c.		BMC—FJ Cooper	1960	AUC 951	Pair H4		AM		Blue
		Sprite	1960	AUC 989	Pair H4		A5		Blue
1098 c.c.		Mangoletsi Remix	1961/3	AUD 25	Pair H1		M8		
		Healey 3000 Competition	1961	AUD 19	Three HD8		UH		Blue/Black
2912-c.c.	6-cyl.	Mini-Cooper (Thermo jets)	1961/3	AUD 59	Pair H4		MME		Blue
997-c.c.		Sprite—Speedwell	1962/3	AUD 103	Pair H4		AO		Red
1098-c.c.		Mini Competition	1962/3	AUD 106	Pair H4		MME		Blue
		Mini-Cooper 'S' Group II	1964/8	AUD 164	Pair H4		CP4		Blue
970-c.c.		Mini-Cooper 'S' Group II	1964/8	AUD 108	Pair H4		MME		Blue
1070-c.c.									
1275-c.c.		Mini-Cooper 'S' Group II	1964/8	AUD 165	Pair H4		BG		Blue
		Formula III BMC-Cooper	1964/8	AUD 143	Single HS6		SS		Red
1098-c.c.		Morris 1100 (Downton)	1964/8	AUD 137	Pair H4		AM		Blue
848-c.c.		Mini—W.H.M.B. Ltd.	1958/71	AUD 489	Single H4		AO		Blue
1485-c.c.		Maxi—BLMC (Special Tuning)	1969/71	AUD 438	Pair HS4		AAB		Red
DAIMLER									
2½-litre		V8 SP250 Sports		AUC 909	Pair HD6		TS	TR	Yellow
2½-litre		V8 SP250 Sports		AUC 964	Pair HD6		TS	TR	Yellow
4½-litre		V8 Majestic Major and Majestic		AUC 949*	Pair HD8		UL		Red/Green
2½-litre		V8 Saloon		AUD 70	Pair HD6		C1		Red
4½-litre		V8 Majestic Major and Majestic (PTFE Bushes)	1964	AUD 139	Pair HD8		UL		Red/Green
2½-litre		V8 Saloon	1964/8	AUD 180	Pair HD6	TL	TZ		Red
4½-litre		V8 Majestic Major	1964/8	AUD 181	Pair HD8		UL		Red/Green
4·2-litre	6-cyl.	Sovereign	1967/8	AUD 245	Pair HD8		UM		Blue/Black
2½-litre		V8 Saloon, Manual gearbox	1967/8	AUD 180	Pair HD6	TL	TZ		Red
2·8-litre	6-cyl.	Sovereign	1968/71	AUD 321	Pair HD8 Thermo		UVV		Blue/Black
4·2-litre	6-cyl.	Sovereign	1968/71	AUD 357	Pair HD8 Thermo		UM		Red/Green
2·8-litre	6-cyl.	Sovereign	1971/2	AUD 415	Pair HS8 (AED)		BAU		Blue/Black
4·2-litre	6-cyl.	Sovereign	1971/2	AUD 397	Pair HS8 (AED)		BAW		Red/Green
4·2-litre	6-cyl.	Limousine	1970/1	AUD 357	Pair HD8 Thermo		UM		Red/Green

*Use AUD139 for Service Replacement

CAR MODEL			YEAR	CARB. SPEC.	TYPE No.	NEEDLE RICH	NEEDLE STD.	NEEDLE WEAK	SPRING COLOUR
FORD (Conversions)									
1172-c.c.		E93A	1949/53	AUC 557	Pair HV1 (or HD)	M9	EK	MOW	
1172-c.c.		100E Aquasport	1953/7	AUC 717	Pair MC2	M1	A5	HA	Red
1172-c.c.		100E Prefect & Anglia	1953	AUC 736	Pair H1		M6		
1172-c.c.		100E Lotus	1954/60	AUC 762	Pair H2	M5	M6	M7	Red
1·7-litre		Consul—Aquaplane (Series I)	1954/7	AUC 727	Pair H4	4	3	L	Red
1·7-litre		Consul—W.H.M.B. Ltd.	1955/7	AUC 819	Pair H2	H2	QA	QW	Red
	6-cyl.	Zephyr—Aquaplane (Series I)	1954/7	AUC 753	Three H4	4	3	L	Red centre, Yellow front and rear
	6-cyl.	Zephyr—W.H.M.B. Ltd.	1955/7	AUC 820	Three H2	EM	ES	AP	Red
	6-cyl.	Zephyr—Raymond Mays (Series I)	1954/6	AUC 771	Pair H4	CN	5	GE	Yellow
	6-cyl.	Zephyr—Raymond Mays (Series II)	1957/62	AUC 836	Pair H4	MME	7	AO	Yellow
1·7 litre		Consul—R. Owen (Series II) 4 or 6 port head	1958/60	AUC 902	Single H6		RB		Red
		105E FJ	1960/2	AUC 951	Pair H4		AM		Blue
1172 c.c.		100E Aquaplane	1960/2	AUC 952	Pair H2		GX		Blue
		105E/107E Aquaplane	1960/2	AUC 953	Pair H2		A5		Blue
1·7 litre		Consul—R. Owen (Series II) 4 port head	1962	AUD 20	Single H6		RB		Red
	6-cyl.	Zephyr—Raymond Mays	1962	AUD 21	Pair H4		AY		Yellow
1172 c.c.		E93A—Dellow	1950	AUC 565	Single HV3		RLS		Red
1·7 litre		Consul (Series I)—Dellow	1953	AUC 729	Pair H2		M5		Red
	6-cyl.	Zephyr (Series I)—Dellow	1954	AUC 752	Three H2		M5		Red
1172 c.c.		100E Prefect and Anglia—Dellow	1955	AUC 769	Pair H1	M9	EK	MOW	
30-h.p.		V8 (special adaptor) (Side valve)	1950	AUC 586	Pair H4	RO	6		Red
1·7 litre		Consul (Series I)	1952	AUC 716	Pair H4		61		Yellow
1·7 litre		Consul (Series I)	1953	AUC 732	Pair H2		62		Yellow
		Zephyr (Series I)	1953	AUC 733	Three H2		WX		Yellow

30-h.p.		Allard & Jensen (Side valve)	1937	AUC 332	Pair D3		6		Brown
		Lotus 105E	1961/2	AUD 38	Pair H2		A5		Blue
		Turner/Classic	1961/2	AUD 57	Single HS4		DJ		Red
		Formula III (Hulbay-Ford)	1964	AUD 149	Single HS6		UVP		Red
HILLMAN (Conversions)									
1390-c.c.		Minx	1956/8	AUC 825	Pair H2	CU	CZ	CF	Blue
1600-c.c.		Alexander Minx	1959/61	AUC 923	Pair H2		GR		Blue
875-c.c.		Imp	1964	AUD 140	Pair HS2		H4		Blue
1600-c.c.		Minx	1964	AUD 145	Pair H4		QA		Red
INNOCENTI									
1098-c.c.		1M3	1963/4	AUD 132	Pair HS2	D6	D3	GV	Blue
1098-c.c.		1100	1964	AUD 160	Pair HS2	D6	D3	GV	Blue
1098-c.c.		1M4	1964	AUD 168	Single HS2	H6	AN	EB	Red
848-c.c.		Mini	1965/6	AUD 210	Single HS2	M	EB	GG	Red
848-c.c.		Mini Automatic	1967/8	AUD 262	Single HS4	H6	AN	EB	Red
1098-c.c.		JM 14 Automatic	1967/8	AUD 263	Single HS4	BQ	DL	ED	Red
998-c.c.		Mini	1968/9	AUD 324	Pair HS2	M	GY	GG	Blue
998-c.c.		Mini Clubman	1970/1	AUD 365	Pair HS2	M	GY	GG	Blue
998-c.c.		Mini Clubman Automatic	1970/1	AUD 460	Single HS4	DL	CZ	GY	Red
1098-c.c.		IM3–1100	1970/1	AUD 490	Pair HS2	M	EB	GG	Blue

CAR MODEL	YEAR	CARB. SPEC.	TYPE No.	NEEDLE RICH	NEEDLE STD.	NEEDLE WEAK	SPRING COLOUR
JAGUAR							
3·4-litre 6-cyl. XK150S	1959/62	AUC 865	Three HD8 Thermo		UE		Blue/Black
3·4-litre 6-cyl. Mk. I	1959	AUC 894	Pair HD6 Thermo		WO3	SJ	Red
3·4-litre 6-cyl. Mk. I (oil bath cleaner)	1959	AUC 894	Pair HD6 Thermo		SC		Red
3·4-litre 6-cyl. Mk. VIII	1959	AUC 895	Pair HD6 Thermo	WO3	TL	SJ	Red
3·4 litre 6-cyl. Mk. IX	1959	AUC 896	Pair HD6 Thermo		TU		Red
3·4 litre 6-cyl. XK150	1959	AUC 897	Pair HD6 Thermo	WO3	TL	SJ	Red
3·4- & 3·8-litre 6-cyl. Mk. II	1960/1	AUC 954	Pair HD6 Thermo		SC		Red
Mk. IX 7 : 1 & 8 : 1 C.R.	1960/2	AUC 956	Pair HD6 Thermo		TU		Red
3·4-litre 6-cyl. XK150	1960/2	AUC 957	Pair HD6 Thermo	WO3	TL	SJ	Red
3·8-litre 6-cyl. XK150	1960/2	AUC 985	Pair HD6 Thermo		TU		Red
3·8-litre 6-cyl. Mk. II 7 : 1 C.R.	1960/2	AUD 8	Pair HD6 Thermo		TM		Red
3·8-litre 6-cyl. Mk. II 8 : 1 & 9 : 1 C.R.	1960/2	AUC 992	Pair HD6 Thermo		C1		Red
6-cyl. Mk. IX 7 : 1 C.R. (Cooper paper air cleaner)	1960/2	AUC 993	Pair HD6 Thermo		TM		Red
6-cyl. Mk. IX 8 : 1 & 9 : 1 C.R. (Cooper paper air cleaner)	1960/2	AUC 956	Pair HD6 Thermo		TU		Red
3·4-litre 6-cyl. Mk. II 7 : 1 C.R. (Cooper paper air cleaner)	1960/3	AUD 8	Pair HD6 Thermo		TM		Red
3·8-litre 6-cyl. 'E' type	1961/3	AUC 946	Three HD8		UM		Blue/Black
3·8-litre 6-cyl. Mk. X 8 : 1 & 9 : 1 C.R.	1961/3	AUD 37	Three HD8 Thermo		UM		Blue/Black
3·8- and 3·4-litre 6-cyl. Mk. III	1963/4	AUD 109	Pair HD6 Thermo		TL		Red
3·8-litre 6-cyl. Mk. X	1963/4	AUD 111	Three HD8 Thermo		UM		Blue/Black
3·8-litre 6-cyl. 'E' type	1963/4	AUD 112	Three HD8		UM		Blue/Black
3·8- and 4·2-litre 6-cyl. Mk. X 8 : 1 and 9 : 1 C.R.	1964	AUD 144	Three HD8 Thermo		UM		Blue/Black
3·8-litre 6-cyl. 'S' type Mk. III 8 : 1 and 9 : 1 C.R. (paper cleaner)	1964	AUD 153	Pair HD6 Thermo		TL		Red
3·8-litre 6-cyl. 'S' type Mk. III 8 : 1 and 9 : 1 C.R. (oil bath cleaner)	1964	AUD 154	Pair HD6 Thermo		C1		Red

3·8-litre 6-cyl. 7 : 1 C.R. (Cooper cleaner)	1964	AUD 155	Pair HD6 Thermo		TM		Red
3·8- and 4·2-litre 6-cyl. Mk. X Automatic and O/D	1964	AUD 156	Three HD8 Thermo		UM		Blue/Black
3·8- and 4·2-litre 6-cyl. Mk. X Standard Transmission	1964	AUD 157	Three HD8 Thermo		UM		Blue/Black
2·4-litre 6-cyl. '240' Manual	1967/8	AUD 256	Pair HS6		TL		Red
2·4-litre 6-cyl. '240' Automatic	1967/8	AUD 297	Pair HS6		TL		Red
3·4-litre 6-cyl. '340' Manual 7 : 1 C.R. and Automatic (AC paper cleaner)	1967/8	AUD 241	Pair HD6 Thermo		TM		Red
3·4-litre 6-cyl. '340' Manual and Automatic 8 : 1 and 9 : 1 C.R. (AC paper cleaner)	1967/8	AUD 242	Pair HD6 Thermo		TL		Red
3·4- and 3·8-litre 6-cyl. 'S' type Manual and Auto. 8 : 1 and 9 : 1 C.R. (AC paper cleaner)	1967/8	AUD 243	Pair HD6 Thermo		TL		Red
4·2-litre 6-cyl. '420' Manual 8 : 1 and 9 : 1 C.R. (AC paper cleaner)	1967/8	AUD 239	Pair HD8 Thermo		UM		Blue/Black
4·2-litre 6-cyl. '420' Automatic 8 : 1 and 9 : 1 C.R. (AC paper cleaner)	1967/8	AUD 245	Pair HD8 Thermo		UM		Blue/Black
4·2-litre 6-cyl. '420G' Manual 8 : 1 and 9 : 1 C.R. (AC paper cleaner)	1967/8	AUD 157	Three HD8 Thermo		UM		Blue/Black
4·2-litre 6-cyl. '420G' Automatic 8 : 1 and 9 : 1 C.R. (AC paper cleaner)	1967/8	AUD 156	Three HD8 Thermo		UM		Blue/Black
4·2-litre 6-cyl. 'E' type 8 : 1 and 9 : 1 C.R.	1967/8	AUD 227	Three HD8		UM		Blue/Black
2·4-litre 6-cyl. '240'	1968/9	AUD 309	Pair HS6		TL		Red
2·4-litre 6-cyl. '240' Automatic	1968/9	AUD 310	Pair HS6		TL		Red

CAR MODEL		YEAR	CARB. SPEC.	TYPE No.	NEEDLE			SPRING COLOUR
					RICH	STD.	WEAK	
Jaguar—*continued*								
2·8-litre	6-cyl. 'XJ6'	1968/71	AUD 321	Pair HD8 Thermo		UVV		Blue/Black
4·2-litre	6-cyl. 'XJ6'	1968/71	AUD 357	Pair HD8 Thermo		UM		Red/Green
2·8-litre	6-cyl. 'XJ6'	1971/2	AUD 415	Pair HS8 (AED)		BAU		Blue/Black
4·2-litre	6-cyl. 'XJ6'	1971/2	AUD 397	Pair HS8 (AED)		BAW		Red/Green
5·3-litre	V12-cyl. 'E' Type	1971/2						
JENSEN								
	541/541R	1954/60	AUC 763	Three H4 Thermo		CZ	CF	Red
	541S	1960/2	AUC 994	Three H4 Thermo		CF		Red
M.G.								
	Magnette III	1960/1	AUC 961	Pair HD4	FT	FU	M9	Red
1588-c.c.	'A' (Mks. I & II)	1959/62	AUC 943	Pair H4	RO	6	AO	Red
1622-c.c.	Magnette (Mk. IV)	1961/3	AUD 41	Pair HD4	FU	HB	FK	Red
948-c.c.	Midget	1961/2	AUC 990	Pair HS2	V2	V3	GX	Blue
1098-c.c.	1100	1962/8	AUD 69	Pair HS2	D6	D3	GV	Blue
1098-c.c.	Midget	1962/3	AUD 73	Pair HS2	M	GY	GG	Blue
1798-c.c.	'MGB'	1962/3	AUD 52	Pair HS4	6	MB	21	Red
1798-c.c.	'MGB' Competition	1963/4	AUD 129	Pair HD8		UVD		Blue/Black
1798-c.c.	'MGB' and GT	1966	AUD 135	Pair HS4	6	5	21	Red
1098-c.c.	Midget Mk. II	1964	AUD 136	Pair HS2	H6	AN	GG	Blue
1798-c.c.	'MGB' and GT GHN4, GHD4	1967/8	AUD 278	Pair HS4	5	FX	GZ	Red
1275-c.c.	M.G. 1300	1967	AUD 186	Single HS4	BQ	DZ	CF	Red
1275-c.c.	M.G. 1300 Automatic	1967/8	AUD 271	Single HS4	BQ	DZ	CF	Red
1275-c.c.	M.G. Midget (Mk. III)	1967/8	AUD 136	Pair HS2	H6	AN	GG	Blue
2912-c.c.	'MGC'	1967/8	AUD 150	Pair HS6	SQ	ST	C1W	Yellow
1275-c.c.	Sedan (U.S.A.)	1967/8	AUD 281	Single HS4		DZ		Red
1275-c.c.	Midget (Mk. III) (U.S.A.)	1968	AUD 266	Pair HS2		AN		Blue
1798-c.c.	'MGB' (U.S.A.)	1968	AUD 265	Pair HS4		FX		Red
2912-c.c.	6-cyl. 'MGC' (U.S.A.)	1968	AUD 287	Pair HS6		KM		Yellow
1275-c.c.	Sedan Automatic (U.S.A.)	1968	AUD 296	Single HS4		DZ		Red
1275-c.c.	1300	1969	AUD 318	Pair HS2	M	EB	GG	Blue
1798-c.c.	'MGB' Mk. II	1969/71	AUD 325	Pair HS4	5	FX	GZ	Red
1798-c.c.	MGB Mk. II (U.S.A.)	1968/9	AUD 326	Pair HS4		AAE		Red
1275-c.c.	Midget Mk. III	1968/71	AUD 327	Pair HS2	H6	AN	GG	Blue
1275-c.c.	Midget Mk. III (U.S.A.)	1968/9	AUD 328	Pair HS2		AAC		Blue
2912-c.c.	6-cyl. 'MGC'	1969	AUD 341	Pair HS6		ST		Yellow
2912-c.c.	6-cyl. 'MGC' (U.S.A.)	1969	AUD 342	Pair HS6		BAD		Yellow
1275-c.c.	1300	1969	AUD 374	Single HS4	BQ	DZ	CF	Red
1275-c.c.	Midget Mk. III (U.S.A.)	1969/70	AUD 404	Pair HS2		AAC		Blue
1275-c.c.	1300 Mk. II	1969/71	AUD 344	Pair HS2	M	GY	GG	Blue
1798-c.c.	'MGB' Mk. II (U.S.A.)	1970/1	AUD 405	Pair HS4		AAE		Red
1798-c.c.	'MGB' Mk. II (U.S.A.)	1971	AUD 465	Pair HS4		AAL		Red
1275-c.c.	1300 Mk. II	1971	AUD 431	Pair HS2	M	GY	GG	Blue
1275-c.c.	1300 Mk. II .. .. (ECE)	1971/2	AUD 454	Pair HS2		AAP		Blue
	1300 Mk. II .. .. (ECE)	1971/2	AUD 496	Pair HS2		AAP		Blue
MORRIS								
1498-c.c.	Oxford (Series V)	1959/60	AUC 928*	Single HS2	AH2	M	EB	Red
848-c.c.	Mini-Minor	1959/62	AUC 912*	Single HS2	M	EB	GG	Red

CAR MODEL		YEAR	CARB. SPEC.	TYPE No.	NEEDLE RICH	NEEDLE STD.	NEEDLE WEAK	SPRING COLOUR
Morris—*continued*								
948-c.c.	Mini-Minor	1962	AUC 976	Single HS2	M	EB	GG	Red
948-c.c.	Minor 1000	1960/2	AUC 944*	Single HS2	AH2	M	EB	Red
997-c.c.	Mini-Cooper	1961/2	AUD 15	Pair HS2	AH2	GZ	EB	Red
1622-c.c.	Oxford VI	1961/2	AUD 40	Single HS2	M	GX	GG	Yellow
1098-c.c.	1100	1962	AUD 13	Single HS2	H6	AN	EB	Red
1098-c.c.	Minor	1962/3	AUD 13	Single HS2	H6	AN	EB	Red
1070-c.c.	Mini-Cooper 'S'	1963	AUD 99	Pair HS2	3	H6	EB	Red
	Hindustan Oxford	1963/4	AUD 65	Single HS2		M		Yellow
1275-c.c.	Mini-Cooper 'S'	1964	AUD 146	Pair HS2	AH2	M	EB	Red
970-c.c.	Mini-Cooper 'S'	1964	AUD 151	Pair HS2	H6	AN	EB	Red
998-c.c.	Mini-Cooper	1964	AUD 104	Pair HS2	M	GY	GG	Blue
848-c.c.	Mini Automatic	1965/6	AUD 170	Single HS4	H6	AN	EB	Red
1098-c.c.	1100 Automatic	1965/6	AUD 185	Single HS4	BQ	DL	ED	Red
1798-c.c.	1800	1966	AUD 223†	Single HS6	SW	TW	C1W	Yellow
848-c.c.	Mini Automatic	1967	AUD 250	Single HS4	H6	AN	EB	Red
1098-c.c.	1100 Automatic	1967	AUD 251	Single HS4	BQ	DL	ED	Red
1098-c.c.	1100 (Mk. II)	1967/8	AUD 13	Single HS2	H6	AN	EB	Red
998-c.c.	Mini (Mk. II)	1967/8	AUD 86	Single HS2	M	GX	GG	Red
998-c.c.	Mini (Mk. II) Automatic	1967/8	AUD 184	Single HS4	M1	AC	HA	Red
1275-c.c.	1300	1967/8	AUD 186	Single HS4	BQ	DZ	CF	Red
1275-c.c.	1300 Automatic	1967/8	AUD 271	Single HS4	BQ	DZ	CF	Red
1798-c.c.	1800 (Mk. II)	1968	AUD 280	Single HS6	SA	ZH	C1W	Yellow
1798-c.c.	1800 (Mk. II) Automatic	1968	AUD 291	Single HS6	SA	ZH	C1W	Yellow
998-c.c.	Mini Mk. II	1968/71	AUD 298	Single HS2	M	GX	GG	Red
848-c.c.	Mini	1968/71	AUD 299	Single HS2	M	EB	GG	Red
1275-c.c.	Mini Clubman	1969	AUD 317	Single HS4	BQ	DZ	CF	Red
848-c.c.	Mini Automatic	1969	AUD 360	Single HS4	H6	AN	EB	Red
998-c.c.	Mini Mk. II	1969	AUD 363	Single HS2	M	GX	GG	Red
998-c.c.	Mini Clubman	1969	AUD 363	Single HS2	M	GX	GG	Red
998-c.c.	Mini Mk. II Automatic	1969	AUD 366	Single HS4	M1	AC	HA	Red
998-c.c.	Mini Mk. II Automatic	1970	AUD 367	Single HS4	M1	AC	HA	Red
998-c.c.	Mini Clubman (Canada)	1969/70	AUD 398	Single HS4		AAG		
1275-c.c.	Mini Clubman (Canada)	1969/70	AUD 399	Single HS4		AAG		Red
1275-c.c.	Mini Cooper 'S'	1970/1	AUD 440	Pair HS2	AH2	M	EB	Red
998-c.c.	Mini Mk. II Automatic	1971	AUD 461	Single HS4		AAG		Red
1275-c.c.	1300	1969/70	AUD 374	Single HS4	BQ	DZ	CF	Red
1275-c.c.	1300 Automatic	1969/70	AUD 376	Single HS4	BQ	DZ	CF	Red
1798-c.c.	1800 'S'	1969/71	AUD 171	Pair HS6	C1	TZ	C1W	Red
1275-c.c.	1300 GT	1969/71	AUD 344	Pair HS2	M	GY	GG	Blue
1098-c.c.	1100 Mk. II Automatic	1969/71	AUD 370	Single HS4	BQ	DL	ED	Red
1275-c.c.	1300	1971	AUD 472	Single HS4	BQ	DZ	CF	Red
1275-c.c.	1300 GT	1971	AUD 431	Pair HS2	M	GY	GG	Blue
1275-c.c.	1300	1971	AUD 480	Single HS4	BQ	DZ	CF	Red
1275-c.c.	1300 Traveller (ECE)	1971/2	AUD 453	Single HS4		AAR		Red
1275-c.c.	1300 Automatic Traveller (ECE)	1971/2	AUD 486	Single HS4		AAR		Red
1275-c.c.	Marina 1·3	1971/2	AUD 354	Single HS4		AAQ		Red
1798-c.c.	Marina 1·3 Automatic	1971/2	AUD 436	Single HS4		AAQ		Red
1798-c.c.	Marina 1·8	1971/2	AUD 428	Single HS6		BAQ		Yellow
1798-c.c.	Marina 1·8 Automatic	1971/2	AUD 479	Single HS6		BAQ		Yellow
1798-c.c.	Marina 1·8 TC	1971/2	AUD 445	Pair HS4		AAS		Red
1798-c.c.	Marina 1·8 TC Automatic	1971/2	AUD 464	Pair HS4		AAS		Red
* **NOTE.**—Replacement for AUC 928			AUC 978		M	GY	GG	Red
Replacement for AUC 944			AUC 980		AH2	M	EB	Red
Replacement for AUC 912			AUC 976	Single HS2	M	EB	GG	Red

CAR MODEL		YEAR	CARB. SPEC.	TYPE No.	NEEDLE RICH	NEEDLE STD.	NEEDLE WEAK	SPRING COLOUR
RELIANT								
1·7-litre	Sabre–Ford (Alexander)	1962/3	AUD 75	Pair HS4		CZ		Red
1·7-litre	Sabre–Ford (Zephyr 4)	1963/4	AUD 118	Pair HS4		DH		Red
2·5-litre	Scimitar (in-line 6-cyl.)	1965/6	AUD 161	Three HS4		GE/R		Red
RENAULT								
1565-c.c.	16T (R.H.D.)	1969/71						
RILEY								
1498-c.c.	One-Point-Five	1957/64	AUC 864	Pair H4	AR	AD	HA	Red
1498-c.c.	One-Point-Five (LHD)	1957/62	AUC 870	Pair H4	AR	AD	HA	Red
1498-c.c.	4/68	1959/60	AUC 901	Pair HD4	FT	FU	M9	Red
1498-c.c.	4/68	1960/61	AUC 961	Pair HD4	FT	FU	M9	Red
848-c.c.	Elf	1961/2	AUC 976	Single HS2	M	EB	GG	Red
1622-c.c.	4/72 Saloon	1961/4	AUD 41	Pair HD4	FU	HB	FK	Red
998-c.c.	Elf Mk. II	1963/4	AUD 86	Single HS2	M	GX	GG	Red
12-h.p.	Service replacement for post-war cars		AUC 715	Pair H2		AK		Weighted piston
1098-c.c.	Kestrel	1965/6	AUD 69	Pair HS2	D6	D3	GV	Blue
1275-c.c.	Kestrel	1967 8	AUD 186	Single HS4	BQ	DZ	CF	Red
1275-c.c.	Kestrel Automatic	1967/8	AUD 271	Single HS4	BQ	DZ	CF	Red
998-c.c.	Elf Mk. III	1968/9	AUD 298	Single HS2	M	GX	GG	Red
1275-c.c.	Kestrel Mk. II	1968	AUD 318	Pair HS2	M	EB	GG	Blue
1275-c.c.	Kestrel Mk. II	1968/9	AUD 344	Pair HS2	M	GY	GG	Blue

ROLLS-ROYCE								
6230-c.c.	Silver Cloud and Phantom V	1960/2	AUC 988	Pair HD6	C1W	SH		Yellow
4887-c.c.	6-cyl. B61—Power Unit	1964/9	AUD 55	Pair HS6		TV		Green
6230-c.c.	V8-cyl. 'S3'	1963/4	AUD 54	Pair HD8		US		Red/Blue
6230-c.c.	V8-cyl. Silver Shadow	1965/8	AUD 177	Pair HD8		UZ		Red/Blue
6230-c.c.	V8-cyl. Silver Shadow (U.S.A.)	1968	AUD 269	Pair HD8		UVU		Red/Blue
6230-c.c.	V8-cyl. Phantom V	1969	AUD 384	Pair HD8		US		Red/Blue
6750-c.c.	V8-cyl. Silver Shadow (U.S.A.)	1969	AUD 389	Pair HD8		BAE		Red/Blue
6750-c.c.	V8-cyl. Silver Shadow (U.S.A. & General)	1969/71	AUD 387	Pair HD8		BAE		Red/Blue
6230-c.c.	V8-cyl. Phantom VI	1970/1	AUD 474	Pair HD8		US		Red/Blue
4887-c.c.	6-cyl. B61—Power Unit	1971	AUD 477	Pair HS6		C1W		Green
6750-c.c.	V8-cyl. 'Corniche'	1971	AUD 474	Pair HD8		BAM		Red/Blue
6750-c.c.	V8-cyl. Silver Shadow (U.S.A. & General)	1972	AUD 526	Pair HD8		BAE		Red/Blue
6750-c.c.	V8-cyl. 'Corniche'	1972	AUD 530	Pair HD8		BBJ		Red/Blue
ROVER								
2·6-litre	105R/105S	1959	AUC 906	Pair HD6		TM		Yellow
2·6-litre	100 and 95	1960/2	AUC 960	Single HD6†		SS		Yellow
3-litre	P5	1958/9	AUC 860	Single HD8*		UF		Red/Green
3-litre	P5	1959	AUC 939‡	Single HD8*		UF		Red/Green
3-litre	P5	1960/2	AUC 959	Single HD8*		UF		Red/Green
3-litre	Coupé P5	1963	AUC 982	Single HD8*		UR		Red/Green
2·6-litre	P5 (PTFE bushes)	1963	AUD 58	Single HD8†		UG		Red/Green
2·6-litre	110 P4	1963	AUD 62	Single HD6†		UG		Red/Green
2·4-litre	P5	1963	AUD 64	Single HD8†		UT		Red/Green
2-litre	'2000'	1963/4	AUC 968	Single HS6		RN		Green

*Air jet 0.116 in diameter †Air jet 0.102 in diameter
‡AUC 939 replaced by AUC 959 for service

CAR MODEL			YEAR	CARB. SPEC.	TYPE No.	NEEDLE			SPRING COLOUR
						RICH	STD.	WEAK	
Rover—*continued*									
3-litre		P5	1963/4	AUD 114	Single HD8*		UR		Red/Green
3-litre		NADA (Smith's valve)	1963/4	AUD 115	Single HD8*		UR		Red/Green
2-litre		'2000' (Smith's valve)	1963/4	AUD 141	Single HS6		RR		Green
2-litre		2000 TC	1966	AUD 92	Pair HD8		U1		Black/Blue
2-litre		2000	1967/8	AUD 211	Single HS6		RN		Green
2-litre		2000 (U.S.A.)	1967/8	AUD 267	Single HS6		RR		Green
2-litre		2000 TC	1967/8	AUD 264	Pair HS8		AAA		Blue/Black
2-litre		2000 TC (U.S.A.)	1967/8	AUD 254	Pair HS8		AAA		Blue/Black
3·5-litre	V8 cyl.	P5	1967/8	AUD 233	Pair HS6		KL		Yellow
3·5-litre	V8 cyl.	3500 P6	1968	AUD 313	Pair HS6		KO		Yellow
3·5-litre	V8-cyl.	P5	1968/9	AUD 270	Pair HS6 (AED)		KL		Yellow
2-litre		2000 TC (U.S.A.)	1968	AUD 329	Pair HS8		AAB		Blue/Black
2-litre		2000 TC	1968	AUD 330	Pair HS8		AAA		Blue/Black
3·5-litre	V8-cyl.	3500 P6	1968	AUD 350	Pair HS6 (AED)		KO		Yellow
2-litre		2000	1969/71	AUD 401	Single HS6		KU		Green
2-litre		2000 TC (U.S.A.)	1969/71	AUD 411	Pair HS8		AAB		Blue/Black
3·5-litre	V8-cyl.	3500 P6 (U.S.A.)	1969/70	AUD 312	Pair HS6		BAC		Yellow
3·5-litre	V8-cyl.	3500 P6	1971/2	AUD 467	Pair HS6		BAK		Yellow
2-litre		2000 (ECE)	1971	AUD 475	Single HS6		BAF		Green
LAND ROVER									
2·6-litre	6-cyl.	109 FWD, Forward control	1963	AUD 81	Single HD6*		SS		Yellow
2·6-litre	6-cyl.	Station Wagon 109 WB (LC)	1967	AUD 247	Single HD6*		SS		Yellow
2·6-litre	6-cyl.	109 WB (LHD)	1967/8	AUD 201	Single HD8†		UG		Red/Green

*Air jet 0.116 in diameter †Air jet 0.102 in diameter

TRIUMPH									
950-c.c.		Herald	1959/61	AUC 874	Pair H1	EB	GV	CA	
2·2½-litre		TR3; TR3A & TR4	1959/62	AUC 878	Pair H6	RH	SM	SL	Red
950-cc		Spitfire Mk. I & II	1962/6	AUC 983	Pair HS2	H6	AN	EB	Red
2·2½-litre		TR4A	1965/6	AUD 209	Pair HS6	SW	TW	C1W	Red
950-c.c.		Spitfire Group II	1966	AUD 235	Pair H4		DB		Blue
1296-c.c.		Spitfire (Mk. III)	1967/8	AUD 257	Pair HS2		BO		Red
1296-c.c.		1300 TC Saloon	1967/8	AUD 257	Pair HS2		BO		Red
1296-c.c.		Spitfire (Mk. III) (U.S.A.)	1968	AUD 285	Pair HS2		DD		Red
		TR4A (U.S.A.)	1968	AUD 284	Pair HS6		QW		Red
1296-c.c.		Spitfire Mk. III	1967/8	AUD 278	Pair HS2		DD		Red
1296-c.c.		Spitfire Mk. III (U.S.A.)	1967/8	AUD 290	Pair HS2		DD		Red
1493-c.c.		1500	1970/1	AUD 392	Single HS4		AAK		Red
1296-c.c.		Toledo	1970/1	AUD 392	Single HS4		AAK		Red
1296-c.c.		Spitfire Mk. IV	1970/1	AUD 441	Pair HS2		AAN		Red
2997-c.c.	V8-cyl.	Stag	1970/1	—	—	—	—	—	—
TRIUMPH (Conversions)									
	6-cyl.	Vitesse	1963/4	AUD 98	Pair HS2		MO		Red
		Alexander Herald	1960, 61	AUD 986	Pair H2	—	M6	—	Blue
SUNBEAM									
	V8-cyl.	Tiger	1964	—	—	—	—	—	—
UNIVERSAL POWER DRIVES									
		Unipower		AUD 104	Pair HS2	M	GY	GG	Blue

CAR MODEL	YEAR	CARB. SPEC.	TYPE No.	NEEDLE RICH	NEEDLE STD.	NEEDLE WEAK	SPRING COLOUR
VANDEN PLAS							
3-litre 6-cyl. Princess	1960	AUC 905	Pair H4		M5	HA	Yellow
3-litre 6-cyl. Princess	Oct. 1960	AUC 905	Pair H4		M5	HA	Yellow
3-litre 6-cyl. Princess L.C.	1961/2	AUD 45‡	Pair H4		3		Yellow
3-litre 6-cyl. Princess H.C. and L.C.	1961/3	AUD 44	Pair H4	3	AR	HA	Yellow
1098-c.c. Princess 1100	1964	AUD 69	Pair HS2	D6	D3	GV	Blue
4-litre 6-cyl. Princess R	1964	AUD 97§	Pair HS8		UV		Red/Blue
4-litre 6-cyl. Princess DM4	1956/64	—	—	—	—	—	—
4-litre 6-cyl. Princess R	1965/6	AUD 215*	Pair HS8		UV		Red/Blue
1275-c.c. Princess 1300	1967/8	AUD 186	Single HS4	BQ	DZ	CF	Red
1275-c.c. Princess Automatic	1967/8	AUD 271	Single HS4	BQ	DZ	CF	Red
1275-c.c. Princess 1300	1968/9	AUD 318	Pair HS2	M	EB	GG	Blue
4-litre 6-cyl. Princess 'R' (Service Replacement)	1964/6	AUD 418	Pair HS8		UV		Red/Blue
1275-c.c. Princess 1300	1969/71	AUD 344	Pair HS2	M	GY	GG	Blue
1275-c.c. Princess 1300	1971	AUD 431	Pair HS2	M	GY	GG	Blue
1275-c.c. Princess 1300 (ECE)	1971/2	AUD 454	Pair HS2		AAP		Blue
1275-c.c. Princess 1300 (ECE)	1971/2	AUD 496	Pair HS2		AAP		Blue
VOLVO							
B16B, B16B, B16B 1·6-litre: 544, 122, 210	1958/62	AUC 835	Pair H4	6	GT	CR	Red
B16B, B16B, B16B 1·6-litre: 122 (Saxomat)	1960	AUC 997	Pair H4	6	GT	CR	Red
B16B, B16B, B16B 1·6-litre: 544, 122, 210 (oil bath cleaner)	1961/2	AUD 9	Pair H4	CE	GW	HB	Red
B18D, B18D, B18D 1·8-litre: 544, 122	1961/2	AUD 33†	Pair HS6	TZ	KA	TG	Red
B18D, B18D, B18D 1·8-litre: 544, 1200 (oil bath cleaner)	1961/2	AUD 50	Pair HS6		KB	SG	Red
B18D, B18D, B18D 1·8-litre: P1800	1961/2	AUC 966	Pair HS6		TZ	K.A	Red
P1800	1963	AUD 94	Pair HS6		ZH		Red
B18D P544 & P122S (pancake filter)	1965/6	AUD 94	Pair HS6		ZH		Red
B18B Snow Weasel (pancake filter)	1965/6	AUD 95	Pair HS6		ZH		Red
B18B P1800S (pancake filter)	1965/6	AUD 93	Pair HS6		KD		Red
B18D P544 & P122S (oil bath filter)	1965/6	AUD 200	Pair HS6		KE		Red
B18B P1800S (silencer, paper element)	1965/6	AUD 204	Pair HS6		KF		Red
B18B Pancake filter 144	1967/8	AUD 230	Pair HS6		KD		Red
B18B Silencer filter 144	1967/8	AUD 231	Pair HS6		KF		Red
B18D Pancake filter 144	1967/8	AUD 232	Pair HS6		SM		Red
B18B 144 (U.S.A.)	1967/8	AUD 252	Pair HS6		DX		Red
1788-c.c. B18D (silencer filter)	1966/7	AUD 202	Pair HS6		KG		Red
1788-c.c. B18B Snow Weasel	1967	AUD 277	Pair HS6		ZH		Red
1788-c.c. B18B 144	1968	AUD 305	Pair HS6		KN		Red
1788-c.c. B18B 144 (U.S.A.)	1968	AUD 331	Pair HS6		KN		Red
1990-c.c. B20A 144/142	1969/70	AUD 403	Single HS6		BAH		Green
1990-c.c. B20B 144 (U.S.A.)	1971	AUD 388	Pair HIF6		BAL		Red
1990-c.c. B20D 144	1971	AUD 433	Pair HIF6		BAL		Red
WOLSELEY							
1485-c.c. 1500	1959/62	AUC 929§	Single HS2	AH2	M	EB	Red
1485-c.c. 15/60	1959/61	AUC 928§	Single HS2	AH2	M	EB	Red
6-cyl. 6/99	1959/61	AUC 905	Pair H4		M5	HA	Yellow
6-cyl. 6/99	1960/61	AUC 905	Pair H4		M5	HA	Yellow
848-c.c. Hornet	1961/2	AUC 976	Single HS2	M	EB	GG	Red
1622-c.c. 16/60	1961/2	AUD 40	Single HS2	M	GX	GG	Yellow
2912-c.c. 6-cyl. 6/110 H.C. & L.C.	1961/3	AUD 43	Pair H4	3	AR	HA	Yellow
2912-c.c. 6-cyl. 6/110 L.C.	1961/2	AUD 27‡	Pair H4		3		Yellow
1485-c.c. 1500	1962/4	AUC 979	Single HS2	M	GY	GG	Red
998-c.c. Hornet	1963	AUD 86	Single HS2	M	GX	GG	Red
1098-c.c. 1100	1965/6	AUD 69	Pair HS2	D6	D3	GV	Blue

†Use AUD 94 for service
*Use AUD 418 for service
‡Use AUD 44 for service
§See NOTE on page 11.

CAR MODEL		YEAR	CARB. SPEC.	TYPE No.	NEEDLE			SPRING COLOUR
					RICH	STD.	WEAK	
Wolseley—*continued*								
1798-c.c.	18/85 Automatic	1967	AUD 273	Single HS6	SW	TW	C1W	Yellow
2912-c.c.	6/110	1967	AUD 240	Pair H4	3	AR	HA	Yellow
1275-c.c.	1300	1967/8	AUD 186	Single HS4	BQ	DZ	CF	Red
1275-c.c.	1300 Automatic	1967/8	AUD 271	Single HS4	BQ	DZ	CF	Red
998-c.c.	Hornet Mk. III	1968/9	AUD 298	Single HS2	M	GX	GG	Red
1798-c.c.	18/85 Mk. II Automatic	1969/71	AUD 291	Single HS6	SA	ZH	C1W	Yellow
1798-c.c.	18/85 Mk. II 'S' Manual	1969/71	AUD 171	Pair HS6	C1	TZ	C1W	Red
1275-c.c.	1300	1968/9	AUD 318	Pair HS2	M	EB	GG	Blue
1275-c.c.	1300 Mk. II	1969/71	AUD 344	Pair HS2	M	GY	GG	Blue
1275-c.c.	1300 Mk. II	1971	AUD 431	Pair HS2	M	GY	GG	Blue
1275-c.c.	1300 Mk. II .. .. (ECE)	1971/2	AUD 454	Pair HS2		AAP		Blue
1275-c.c.	1300 Mk. II .. .. (ECE)	1971/72	AUD 496	Pair HS2		AAP		Blue
1798-c.c.	18/85 Mk. II Automatic	1971/2	AUD 525	Single HS6	SA	ZH	C1W	Yellow
NOTE.—Replacement for AUC 928			AUC 978		M	GY	GG	Red
" " AUC 929			AUC 979		M	GY	GG	Red
" " AUD 27		1961/4	AUD 43		3	AR	HA	Yellow

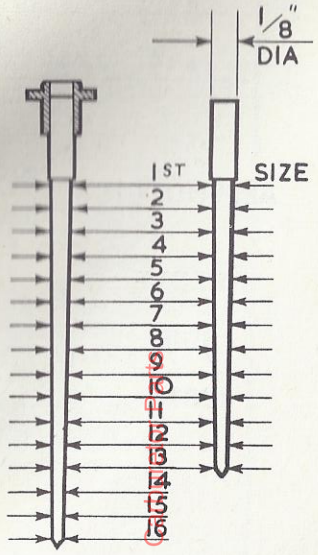
APPENDIX II

NEEDLE SIZE LISTS

NEEDLE SIZES

(FOR ·090" ·100", AND ·125" DIA. JETS)

Spring-loaded Standard



Sizes taken every 1/8" from top shoulder

*The 'AAA' needle is also available without collar as a standard 0.090 needle.

Needles marked thus * are supplied with collar attached to shank for use as spring-loaded needles

·090 JET NEEDLES						
A5	AA	AB	AC	AC2	AD	AE
·089 ·085 ·0826 ·080 ·0782 ·0765 ·0746 ·073 ·0711 ·0694 ·0676 ·066	·089 ·0845 ·080 ·0767 ·0735 ·071 ·0689 ·0661 ·0638 ·0614 ·0591 ·0566 ·054	·089 ·085 ·080 ·0785 ·0738 ·075 ·0732 ·0718 ·0702 ·0688 ·0671 ·0657 ·064	·089 ·085 ·082 ·080 ·0783 ·0765 ·0746 ·073 ·071 ·0694 ·0676 ·066 ·064	·088 ·084 ·082 ·080 ·0783 ·0765 ·0746 ·073 ·071 ·0694 ·0676 ·066 ·064	·089 ·085 ·082 ·080 ·0780 ·0760 ·0740 ·0720 ·070 ·0680 ·066 ·064 ·062	·089 ·085 ·081 ·078 ·0763 ·0754 ·0745 ·0737 ·0728 ·0718 ·071 ·070
AF	AG	AH	AH1	AH2	A1	AJ
·089 ·085 ·0814 ·078 ·0758 ·0727 ·071 ·0695 ·068 ·0665 ·065 ·0632	·089 ·085 ·0795 ·0745 ·0702 ·0665 ·063 ·0598 ·0567 ·054 ·051 ·0485 ·046	·088 ·0862 ·083 ·0803 ·0775 ·0756 ·0733 ·0711 ·069 ·067 ·065 ·063 ·061	·088 ·086 ·082 ·079 ·0765 ·075 ·073 ·071 ·069 ·067 ·065 ·063 ·061	·089 ·085 ·082 ·0794 ·077 ·0748 ·0726 ·0704 ·0683 ·0662 ·064 ·062 ·060	·089 ·085 ·0817 ·0798 ·078 ·0765 ·075 ·0732 ·0712 ·0693 ·0685 ·0675	·089 ·085 ·0815 ·079 ·0767 ·0745 ·0723 ·0703 ·0683 ·0663 ·064 ·062
AK	AL	AM	AN	AO	AP	AQ
·089 ·086 ·0825 ·0795 ·0786 ·078 ·077 ·0764 ·0755 ·0747 ·0738 ·073	·089 ·085 ·0816 ·0796 ·0781 ·077 ·076 ·0748 ·0738 ·0726 ·0715 ·0705	·089 ·085 ·081 ·078 ·0753 ·073 ·0704 ·068 ·0655 ·063 ·0606 ·0583 ·056	·089 ·0855 ·0827 ·0807 ·0787 ·077 ·0753 ·074 ·073 ·072 ·071 ·070 ·069	·089 ·085 ·082 ·0793 ·0766 ·0737 ·0705 ·0673 ·064 ·0608 ·0576 ·0544 ·051	·089 ·085 ·0817 ·0796 ·0777 ·0765 ·0752 ·0745 ·0736 ·0727 ·072 ·071	·089 ·085 ·080 ·076 ·0724 ·0694 ·0668 ·0642 ·062 ·060 ·058 ·0558 ·0536
AR	AS	AT	AU	AV	AW	AX
·089 ·085 ·082 ·0795 ·0771 ·0748 ·073 ·0712 ·0696 ·068 ·066 ·064	·089 ·0845 ·079 ·075 ·072 ·0692 ·0665 ·0635 ·061 ·0586 ·056 ·0533 ·051	·088 ·0856 ·0833 ·0809 ·0785 ·0761 ·0738 ·0714 ·069 ·0666 ·0643 ·0619	·089 ·084 ·0815 ·079 ·0773 ·0755 ·0737 ·0717 ·0698 ·068 ·066 ·064	·089 ·085 ·0805 ·0773 ·0742 ·0717 ·070 ·0675 ·065 ·0625 ·060 ·059 ·058	·090 ·085 ·0807 ·078 ·0757 ·0735 ·0713 ·0693 ·0674 ·0655 ·0637 ·0618 ·060	·089 ·0843 ·0807 ·0775 ·075 ·073 ·071 ·0692 ·0675 ·066 ·0645 ·063 ·0615

·090 JET NEEDLES

AY	AZ	* AAA	* AAB	* AAC	* AAD	* AAE
·089	·089	·089	·089	·089	·089	·089
·085	·085	·085	·085	·0855	·0855	·085
·0805	·0815	·0814	·0824	·0835	·0827	·0833
·0768	·079	·0785	·0785	·0811	·0807	·0803
·0741	·0755	·0755	·0752	·0788	·0787	·0773
·072	·071	·072	·0715	·0765	·077	·0745
·0694	·0662	·0674	·067	·0742	·0753	·0715
·0669	·0615	·063	·061	·072	·074	·068
·0643	·0575	·060	·056	·0698	·073	·0653
·0617	·0532	·058	·0537	·0676	·072	·0627
·059	·0490	·056	·0516	·0655	·071	·060
·0565	·0445	·0540	·0493	·0631	·070	·059
·0538	·0405	·052	·047	·061	·069	·058
		·050	·0448	·059	·068	·057
		·048	·0448	·057	·067	·056
		·046	·0448	·055	·066	·055

* AAF	* AAG			BA	BB	BD
·089	·089			·090	·089	·090
·0855	·085			·0856	·085	·0856
·0827	·083			·0822	·0825	·0822
·080	·080			·0805	·080	·0805
·0775	·0773			·0794	·0775	·0794
·075	·0745			·0777	·075	·0777
·0715	·0715			·0760	·0725	·0760
·068	·0686			·0743	·070	·0750
·0653	·0658			·0727	·0675	·0740
·0627	·0647			·0710	·065	·0730
·060	·0636			·0694	·0625	·0720
·059	·0625			·0677	·060	·0710
·058	·0614				·0575	
·057	·0605					
·056	·0595					
·055	·0584					

BE	BF	BG	BH	BI	BJ	BK
·089	·089	·089	·089	·089	·089	·089
·084	·085	·085	·0855	·0855	·0855	·0855
·0805	·082	·0815	·0812	·0808	·0824	·0815
·0773	·0796	·0782	·0775	·0777	·0794	·0785
·074	·0764	·0745	·0753	·0751	·0769	·0762
·0705	·072	·0695	·074	·073	·0749	·0738
·067	·068	·0647	·0731	·0714	·0734	·0722
·0634	·0635	·060	·0722	·0705	·0725	·0715
·060	·0591	·0557	·0714	·0701	·0721	·071
·0565	·0549	·0515	·0705	·0697	·0717	·0706
·053	·0505	·0474	·0696	·0694	·0714	·0703
·0495	·0463	·043	·0688	·069	·071	·070
·046	·042	·039	·068			·0695

BL	BM	BN	BO	BP	BQ	BR
·089	·089	·089	·089	·089	·089	·089
·0855	·0855	·0855	·0855	·085	·085	·085
·081	·0805	·0816	·0835	·0814	·082	·0817
·0777	·0768	·0784	·0815	·078	·079	·0785
·075	·074	·0758	·080	·074	·075	·0757
·073	·072	·0738	·0787	·0715	·0725	·075
·0715	·0705	·0724	·077	·0695	·0705	·0741
·0707	·0695	·0714	·0757	·0673	·0685	·0735
·070	·0692	·0707	·075	·065	·0662	·0728
·0698	·0688	·0703	·074	·0625	·064	·072
·0693	·0684	·0701	·073	·060	·0616	·071
·069	·068	·070	·072	·058	·0594	·070
·0688			·071	·056	·057	·069

·090 JET NEEDLES

BS	BT	BU	BV	BW	BX	BX1
·088	·088	·090	·089	·089	·089	·089
·0856	·0856	·085	·0845	·0855	·085	·085
·0836	·0835	·080	·081	·0818	·0805	·0827
·0817	·0813	·077	·0785	·079	·077	·081
·0798	·0792	·0745	·076	·0765	·075	·0792
·0778	·0771	·072	·074	·0742	·0735	·0777
·076	·0749	·0695	·072	·0718	·072	·076
·074	·0726	·0675	·070	·0693	·0705	·075
·072	·0705	·0655	·068	·067	·0687	·074
·0701	·0684	·0625	·066	·0645	·067	·073
·0683	·0663	·0602	·064	·062	·0655	·072
·0664	·064	·058	·062	·0596	·064	·071
		·056	·060	·057		

BY	BZ	BB2	BB3	BB4		
·088	·089	·0890	·0890	·0890		
·084	·0843	·085	·085	·085		
·0805	·081	·081	·081	·081		
·0775	·0752	·0787	·078	·078		
·0745	·0719	·0762	·075	·0742		
·0725	·0686	·0735	·0718	·0706		
·0709	·0653	·0712	·0687	·067		
·069	·0622	·0685	·0654	·0638		
·067	·059	·0659	·0622	·0602		
·0653	·056	·0632	·0589	·0564		
·0635	·053	·0604	·0554	·0528		
·062	·050	·0577	·0526	·0495		
·060	·047	·055	·0494	·046		

C	CA	CB	CC	CD	CE	CF
·089	·089	·089	·089	·089	·089	·089
·0845	·0855	·085	·085	·085	·085	·085
·081	·084	·0805	·081	·0815	·082	·083
·077	·0825	·077	·078	·0775	·0795	·0805
·0742	·081	·0745	·075	·0735	·0777	·0787
·071	·0807	·0725	·070	·076	·076	·0767
·0683	·0803	·071	·0698	·069	·0745	·0747
·066	·0803	·0695	·067	·0678	·0735	·0727
·0635	·0803	·068	·064	·0666	·072	·0707
·0613	·0803	·0665	·061	·0654	·071	·0687
·0594	·0803	·065	·058	·0643	·0695	·0667
·0575	·0803	·0635	·055	·063	·0682	·0647
·056	·0803	·062	·052	·062	·067	

CG	CH	CJ	CK	CL	CM	CN
·090	·090	·090	·090	·090	·088	·089
·084	·084	·084	·084	·084	·084	·085
·081	·0805	·0815	·081	·080	·0805	·0812
·079	·0782	·0795	·079	·0775	·0775	·078
·0765	·0767	·0775	·0775	·076	·074	·075
·075	·076	·0761	·077	·075	·0718	·072
·0735	·0756	·0747	·0766	·0746	·070	·069
·0722	·0752	·0734	·0762	·0742	·0685	·0665
·0707	·0747	·072	·0757	·0737	·0668	·064
·0693	·0743	·0705	·0753	·0733	·0652	·062
·0678	·0738	·0692	·0749	·0728	·0635	·060
·0664	·0723	·0677	·0745	·0724	·062	·058
·065	·073	·0664	·074	·072	·060	·056

.090 JET NEEDLES

CO	CP	CP4	CQ	CR	CS	CS1
.089	.089	.088	.088	.088	.089	.089
.085	.085	.0852	.0852	.0852	.085	.085
.081	.0813	.0825	.0825	.083	.0822	.081
.0787	.0793	.079	.0798	.0805	.0792	.077
.0765	.0775	.0757	.0768	.078	.0765	.073
.0747	.0757	.0725	.0737	.0754	.0725	.0692
.073	.074	.069	.0706	.0725	.0706	.066
.0725	.0735	.0655	.0676	.0697	.069	.063
.072	.073	.062	.0646	.067	.0672	.060
.0717	.0725	.0585	.0615	.064	.0655	.057
.0714	.072	.0545	.0585	.0613	.0638	.054
.071	.0715	.051	.0555	.0585	.062	.051
		.047	.0525	.0556	.0605	.048

CS2	CT	CU	CW	CX	CY	CZ
.089	.089	.089	.089	.089	.089	.089
.085	.085	.085	.085	.085	.085	.085
.081	.081	.0825	.081	.081	.080	.0827
.077	.077	.080	.079	.0796	.076	.0806
.073	.0738	.0775	.078	.0788	.0738	.0785
.069	.0706	.0735	.077	.078	.0715	.0745
.065	.0675	.0715	.0763	.0771	.0695	.0727
.0615	.0643	.070	.0754	.0763	.068	.071
.058	.061	.0683	.0745	.0755	.067	.0693
.0546	.058	.0665	.0736	.0748	.066	.0675
.051	.0547	.0647	.0727	.074	.0655	.0657
.0475	.0515	.0630	.0718	.073	.065	.064
.044	.0485	.0610			.0645	.0625

		D1	D2	D3	D4	D6
		.089	.089	.089	.089	.089
		.085	.085	.085	.0855	.0855
		.082	.0815	.083	.0825	.0825
		.0802	.0800	.081	.0805	.0805
		.0793	.0795	.080	.079	.0793
		.0785	.0790	.0794	.078	.0785
		.0776	.0785	.0785	.0767	.0776
		.077	.0780	.0778	.0756	.077
		.0764	.0775	.0772	.0745	.0764
		.0759	.0770	.0764	.0733	.0759
		.0752	.0765	.0757	.0721	.0752
		.0748	.0760	.075	.071	.0748

D7	D8	D9	DA	DB	DC	DD
.089	.089	.089	.089	.089	.089	.089
.0855	.085	.0852	.084	.085	.084	.0855
.0817	.0817	.0825	.082	.082	.082	.0835
.0795	.0785	.0806	.080	.080	.0805	.0817
.0785	.0767	.0791	.0788	.078	.0796	.0798
.0778	.076	.0778	.0784	.0753	.0794	.0782
.077	.075	.0764	.0780	.0717	.0792	.0767
.0765	.074	.075	.0776	.0674	.0790	.0752
.0759	.073	.0736	.0773	.062	.0787	.0740
.0752	.072	.0723	.0769	.0557	.0785	.0730
.0747	.071	.071	.0765	.0493	.0783	.0720
.074	.070	.0696	.0761	.043	.0780	.0710
				.0368		

.090 JET NEEDLES

DE	DH	DJ	DK	DL	DM	DN
.089	.089	.089	.089	.089	.089	.0885
.0855	.085	.085	.085	.085	.084	.085
.0825	.0822	.0822	.0817	.082	.081	.082
.0802	.080	.0795	.0787	.0795	.0791	.080
.0772	.0775	.0765	.0755	.077	.0780	.0782
.0745	.074	.073	.072	.0745	.0775	.077
.0734	.072	.071	.070	.0715	.0770	.076
.0729	.071	.070	.069	.070	.0765	.075
.0723	.070	.069	.068	.0685	.0760	.074
.0717	.069	.068	.067	.067	.0755	.0728
.0712	.068	.067	.066	.0655	.0750	.0717
.0707	.067	.066	.065	.064	.0745	.0705
	.066	.065	.064	.0625		

DP	DQ	DR	DS	DT	DU	DV
.089	.089	.088	.089	.088	.089	.089
.085	.085	.085	.085	.084	.085	.084
.081	.0815	.080	.0805	.081	.081	.0822
.0777	.0785	.0768	.0776	.078	.0775	.081
.075	.076	.0735	.0759	.076	.0755	.0792
.0735	.073	.0705	.074	.074	.074	.0781
.0723	.071	.0675	.0725	.0723	.073	.078
.0715	.070	.065	.071	.0712	.072	.078
.071	.069	.0635	.0695	.0709	.071	.078
.0703	.068	.0627	.068	.0705	.070	.078
.0698	.067	.0618	.067	.0703	.069	.078
.069	.066	.0608	.066	.0701	.068	.078
.0688	.065	.060		.070		

DW	DY	DZ			E2	E2/1
.089	.089	.089			.088	.089
.085	.085	.085			.0845	.085
.0815	.079	.0827			.081	.0826
.0795	.0765	.0795			.0775	.0788
.0780	.074	.077			.075	.0763
.0765	.0715	.0745			.0725	.0736
.0752	.069	.0715			.070	.0711
.074	.0665	.070			.0675	.0685
.0728	.0643	.0685			.0646	.066
.0714	.062	.067			.0626	.064
.070	.061	.0655			.0605	.062
.0686	.060	.064			.059	.060
	.059	.0625			.057	.058

E3	E3/1	E4	EA	EB	EC	ED
.088	.088	.088	.089	.089	.089	.089
.0862	.0845	.084	.085	.0855	.085	.085
.083	.0817	.080	.081	.0835	.081	.0825
.0803	.079	.078	.078	.0815	.0775	.0805
.0775	.076	.076	.075	.0795	.0740	.0785
.0747	.073	.0739	.072	.0777	.0705	.076
.072	.070	.0718	.0695	.0762	.0675	.074
.0693	.0675	.0695	.067	.075	.0645	.072
.0665	.0646	.0673	.0645	.074	.0625	.070
.0638	.0626	.0651	.062	.073	.0605	.068
.062	.0605	.063	.0595	.072	.0585	.066
.060	.059	.061	.057	.071	.0570	.064
.0582	.057	.059	.0545		.0555	.062

·090 JET NEEDLES

EE	EF	EG	EH	EI	EJ	EK
·089	·089	·088	·089	·089	·089	·089
·085	·085	·085	·085	·085	·085	·085
·080	·082	·080	·082	·081	·0805	·0827
·0777	·0795	·0768	·0805	·0775	·076	·081
·075	·077	·074	·0788	·073	·0715	·0792
·0735	·074	·071	·0775	·069	·068	·0777
·072	·072	·0685	·077	·066	·065	·0762
·0715	·071	·0665	·077	·0635	·0625	·075
·0709	·070	·065	·077	·0618	·0605	·075
·0703	·069	·0637	·077	·060	·059	·075
·0696	·068	·062	·077	·059	·058	·075
·069	·067	·061	·077	·058	·057	·075
	·066	·060	·077	·057	·056	

EL	EM	EN	EO	EP	EQ	ER
·089	·089	·089	·088	·089	·089	·089
·085	·085	·085	·085	·085	·085	·085
·080	·081	·0813	·0806	·0835	·0817	·0833
·0775	·078	·0778	·0773	·0815	·0785	·081
·0747	·0763	·074	·0746	·0795	·076	·0777
·072	·0747	·0706	·072	·0775	·0746	·074
·070	·073	·068	·0697	·0755	·0732	·0725
·068	·0725	·0657	·0677	·075	·072	·0712
·066	·072	·0643	·0668	·075	·071	·0706
·064	·0715	·0632	·0659	·075	·070	·0706
·062	·071	·062	·065	·075	·069	·0706
·060	·0705	·061	·064	·075	·068	
·058		·060	·063			

ES	ET	EU	EV	EW	EX	EX/1
·089	·088	·089	·090	·089	·088	·088
·085	·086	·085	·0855	·085	·0862	·0865
·0818	·0845	·0825	·0815	·0825	·0835	·084
·079	·0825	·0805	·078	·081	·081	·0816
·077	·0803	·0785	·075	·079	·0785	·0794
·0755	·0781	·077	·0725	·0775	·076	·077
·0748	·0773	·0755	·0705	·0755	·0735	·0745
·074	·077	·0745	·069	·0745	·071	·072
·073	·077	·074	·068	·074	·0685	·0698
·073	·077	·074	·067	·074	·066	·0675
·073	·077	·074	·066	·074	·0635	·065
			·065		·061	·0627
					·058	·0602

EY	EZ			FA	FB	FC
·088	·088			·089	·089	·090
·0856	·0865			·085	·085	·0865
·0835	·0838			·081	·0806	·083
·0812	·0798			·077	·0767	·0795
·0789	·0775			·072	·0729	·076
·0741	·0751			·067	·070	·073
·0716	·0737			·063	·0687	·071
·0708	·0726			·060	·0676	·070
·0704	·0716			·0585	·0667	·069
·0701	·0706			·0576	·0658	·068
·0698	·0696			·0567	·065	·067
				·056	·0643	·066
				·055	·0635	·065

·090 JET NEEDLES

FD	FE	FF	FG	FH	FI	FJ
·088	·089	·089	·089	·089	·089	·090
·0865	·085	·0856	·085	·085	·085	·085
·084	·081	·0822	·0795	·082	·0825	·081
·0805	·0775	·079	·075	·080	·079	·0775
·078	·074	·0757	·071	·079	·076	·076
·076	·071	·0722	·0678	·078	·073	·0745
·075	·0695	·0700	·065	·077	·0705	·0725
·074	·0686	·0672	·0625	·076	·0693	·071
·073	·0678	·0651	·060	·075	·0682	·070
·072	·0671	·0639	·058	·074	·067	·068
·071	·0664	·0622	·056	·073	·0656	·0665
	·0657		·054	·072	·064	·065
	·065		·052		·063	

FK	FL	FM	FN	FO	FP	FQ
·089	·089	·090	·089	·089	·0898	·0890
·085	·085	·083	·085	·085	·0855	·0850
·083	·079	·0796	·081	·0818	·0826	·0820
·0812	·0765	·0772	·0775	·0785	·0799	·0795
·0796	·074	·075	·0735	·076	·0778	·0774
·0784	·0715	·0727	·069	·0745	·0762	·0758
·0772	·069	·0703	·066	·0731	·0754	·0745
·076	·0665	·068	·063	·0729	·0750	·0735
·0748	·065	·0657	·061	·0727	·0743	·0725
·0736	·065	·0635	·058	·0725	·0735	·0715
·0724	·065	·0612	·055	·0723	·0728	·0705
·0712		·060		·0721	·0720	·0695

FR	FS	FT	FU	FV	FW	FX
·089	·089	·089	·089	·089	·089	·089
·085	·085	·085	·085	·085	·085	·0855
·081	·0827	·082	·082	·083	·081	·0827
·078	·081	·0795	·080	·080	·0775	·080
·075	·0785	·0772	·078	·0773	·075	·0775
·0728	·076	·0753	·0763	·0745	·0725	·075
·0705	·075	·0738	·075	·0715	·070	·0715
·0685	·074	·0728	·074	·0686	·0675	·068
·0663	·073	·0724	·0733	·0658	·0665	·0653
·0642	·072	·072	·0728	·0647	·0665	·0627
·0622	·071	·072	·0724	·0636	·0665	·060
·060	·070	·072	·0714	·0625	·0665	·059
				·0614	·0665	·058

FY	FZ			G2	GA	GB
·090	·089			·0875	·089	·089
·085	·085			·0835	·085	·085
·081	·0813			·081	·0795	·082
·0775	·0789			·0785	·077	·0795
·075	·077			·0765	·074	·0771
·0735	·0756			·0745	·0715	·0748
·072	·0748			·0725	·069	·073
·071	·074			·0705	·067	·0712
·070	·0735			·069	·065	·0696
·068	·073			·0674	·0633	·0685
·066	·0725			·066	·0615	·068
·064	·072			·0642	·0597	·067
·062					·058	

·090 JET NEEDLES

GC	GD	GE	GE/R	GF	GG	GH
·089	·089	·089	·089	·089	·089	·089
·085	·085	·0845	·085	·085	·087	·0845
·083	·0833	·082	·0825	·0795	·0845	·082
·080	·081	·0793	·0795	·077	·0825	·0786
·0773	·079	·0766	·076	·0745	·0808	·0753
·0740	·0766	·0739	·0725	·073	·079	·0695
·0705	·0705	·0712	·069	·072	·078	·0635
·0665	·0743	·0686	·066	·0715	·077	·0586
·0630	·0738	·0656	·064	·071	·0758	·0570
·0605	·0738	·0643	·062	·0703	·0745	·0565
·0590	·0738	·0627	·0615	·0696	·0732	·0565
·0575	·0738	·0627	·061	·069	·072	·0565
·0560		·0627	·0605			

GI	GJ	GL	GM	GN	GO	GP
·089	·089	·089	·089	·089	·089	·089
·085	·084	·084	·086	·0855	·086	·085
·0825	·0817	·082	·0842	·0835	·0845	·080
·079	·0792	·0795	·0817	·081	·0825	·076
·075	·0770	·0772	·0782	·078	·0792	·075
·0715	·0745	·075	·0770	·0755	·0777	·0725
·069	·0717	·0727	·0758	·0725	·0765	·0696
·067	·0696	·0706	·0750	·070	·0755	·0666
·0665	·0675	·0685	·0745	·0675	·0750	·0636
·0665	·0654	·0664	·0740	·0650	·0745	·0606
·0665	·0632	·0642	·0735	·0625	·0740	·0577
·0665	·0611	·0621	·0730	·060	·0735	·055
	·059	·060		·0575	·0730	·052

GR	GS	GT	GU	GV	GW	GX
·089	·089	·089	·089	·089	·089	·089
·085	·085	·085	·0855	·0855	·085	·0855
·082	·0815	·082	·083	·0836	·083	·0835
·079	·0785	·0795	·0805	·082	·080	·0815
·077	·0755	·077	·0775	·0804	·0775	·0795
·075	·0725	·0745	·0745	·080	·076	·0775
·073	·070	·071	·0705	·0796	·0745	·0755
·071	·0675	·0675	·067	·0793	·073	·0735
·069	·0650	·0640	·0635	·0793	·0715	·072
·067	·0625	·0605	·060	·0793	·070	·070
·065	·060	·0570	·0565	·0793	·0685	·068
·063	·0575	·0535	·053	·0793	·067	·066
·061	·055	·050		·0793	·066	·064

GY	GZ			H1	H2	H4
·089	·089			·088	·088	·089
·0855	·0855			·085	·085	·085
·0832	·0835			·082	·082	·081
·0812	·0811			·0792	·0792	·0778
·079	·0788			·0762	·0762	·076
·077	·0765			·0735	·0735	·0741
·0753	·0742			·0707	·0707	·072
·074	·072			·0686	·0684	·0702
·073	·0698			·0665	·0661	·0683
·072	·0676			·0644	·0638	·0663
·071	·0655			·0622	·0615	·064
·070	·0631			·0601	·0592	·062
·069	·061			·058	·057	

·090 JET NEEDLES

H6	HA	HB	HC	HD	HE	HF
·089	·089	·089	·089	·089	·090	·090
·0855	·085	·085	·0855	·0855	·0845	·0845
·082	·0825	·0825	·0822	·0825	·0817	·082
·080	·0805	·0805	·0805	·081	·080	·0805
·078	·0785	·0785	·0785	·0795	·0787	·0797
·076	·077	·0776	·077	·078	·078	·079
·074	·0756	·0764	·0755	·0766	·0776	·0787
·072	·074	·0752	·0751	·0762	·0772	·0784
·070	·0727	·0743	·0747	·0758	·0769	·078
·068	·0711	·0732	·0743	·0754	·0766	·0776
·066	·0698	·072	·0739	·0751	·0763	·0774
·064	·068	·071	·0735	·0748	·0759	·077
	·067	·070			·0755	·0766

HG	HV2	HV3	HV4			JM
·089	·089	·089	·089			·089
·0845	·084	·084	·084			·085
·0823	·080	·080	·080			·081
·0802	·0778	·078	·0782			·078
·0782	·0756	·076	·0764			·0752
·0753	·0734	·074	·0746			·0729
·0737	·0712	·072	·0728			·0702
·072	·069	·070	·071			·068
·070	·0668	·068	·0692			·0653
·068	·0646	·066	·0674			·0627
·066	·0626	·064	·0656			·060
·064	·0602	·062	·0638			·059
·062	·058	·060	·062			·058

		L	L11	L12	LS	LS1
		·089	·089	·089	·088	·088
		·085	·084	·085	·085	·085
		·081	·0801	·081	·080	·080
		·079	·0772	·078	·077	·0765
		·077	·0745	·0755	·0735	·073
		·075	·0722	·073	·0705	·071
		·0735	·0702	·0702	·068	·0798
		·072	·0675	·0675	·0658	·0678
		·071	·065	·065	·0636	·066
		·070	·0625	·0625	·0613	·064
		·069	·060	·060	·059	·062
		·068	·0575	·0575	·057	·060
			·055	·055	·055	·058

		M	M1	M2	M5	M6
		·089	·089	·089	·089	·089
		·0855	·085	·085	·085	·085
		·0832	·0817	·0817	·0817	·0817
		·0808	·0796	·080	·0792	·0801
		·0785	·0777	·0785	·0776	·0786
		·0763	·0757	·0765	·076	·077
		·0745	·0737	·0745	·0745	·0754
		·0726	·0717	·0725	·0729	·0738
		·0707	·0698	·0705	·0712	·0723
		·0688	·0678	·0688	·0696	·0707
		·0669	·0659	·0669	·068	·0691
		·065	·064	·0665	·0666	·0676

.090 JET NEEDLES

M7	M8	M9	MA	MB	MME	MO
.089	.089	.089	.089	.089	.089	.089
.085	.086	.085	.085	.085	.085	.0855
.0822	.0827	.0827	.0817	.0815	.0813	.0835
.0807	.0812	.081	.0795	.079	.078	.0815
.0792	.0797	.0792	.078	.0767	.074	.080
.0777	.0782	.0777	.0765	.074	.0707	.07875
.0762	.0767	.0762	.075	.0715	.0673	.0775
.0747	.0752	.0747	.0735	.068	.0636	.07625
.0732	.0737	.0732	.072	.0653	.060	.075
.0717	.0722	.0717	.0705	.0627	.0563	.07375
.0702	.0707	.0702	.069	.060	.053	.0725
.0687	.0692	.0687	.0675	.059	.0495	.07125
				.058	.046	

MOW	MW			1	2	3
.089	.089			.089	.089	.089
.0855	.0855			.085	.085	.085
.0837	.084			.0814	.0814	.0814
.082	.0825			.0785	.0785	.0785
.0808	.0813			.077	.0767	.0765
.0795	.0803			.0755	.0749	.0744
.0783	.0792			.074	.0732	.0723
.077	.078			.0725	.0714	.0703
.0758	.0768			.071	.0696	.0683
.0745	.0757			.0695	.0678	.0661
.0732	.0746			.068	.066	.064
.072	.0735			.067	.065	.063
				.066	.064	.062

4	5	6	7	20	21	24
.089	.089	.089	.089	.089	.089	.088
.085	.085	.085	.085	.0855	.0855	.0845
.0814	.0814	.0814	.0814	.0822	.0827	.0815
.0785	.0785	.0785	.0785	.0792	.080	.0785
.0761	.0758	.0755	.0755	.076	.0775	.0755
.0737	.0733	.0725	.072	.073	.075	.0725
.0714	.0705	.0696	.0686	.0703	.0723	.0702
.0692	.068	.0666	.065	.0677	.0697	.0682
.0668	.0653	.0636	.062	.0647	.0671	.0667
.0645	.0627	.0606	.0587	.0624	.0646	.065
.062	.060	.0577	.0553	.060	.0628	.0636
.061	.059	.055	.052	.058	.0608	.0625
.060	.058	.052	.049	.056	.059	.061

24A	24B	61	62	69	80	81
.088	.088	.089	.089	.089	.089	.089
.0845	.0845	.085	.085	.085	.085	.085
.0815	.0815	.0805	.081	.0805	.080	.080
.0785	.0795	.0775	.078	.0785	.078	.077
.076	.0775	.0745	.075	.0765	.0758	.0742
.0738	.0755	.0725	.0734	.075	.0733	.0719
.0716	.0735	.0709	.0719	.074	.0705	.0699
.0698	.0715	.069	.070	.073	.068	.068
.068	.0695	.067	.0685	.072	.0653	.0653
.066	.0675	.0635	.067	.071	.0627	.0627
.064	.0655	.0635	.065	.070	.060	.060
.062	.0635	.062	.0635	.069	.059	.059
.060	.0615	.060	.062		.058	.058

.090 JET NEEDLES

		O7			P4	P6
		.089			.088	.088
		.085			.0845	.0845
		.0815			.081	.081
		.0795			.0785	.0775
		.078			.0755	.0738
		.077			.073	.0703
		.076			.070	.067
		.075			.0675	.0638
		.074			.0645	.0603
		.073			.06175	.057
		.072			.059	.054
		.071			.0562	.0505
					.0535	.0473

P61	PJ			QA	QW	
.088	.089			.089	.089	
.0845	.085			.085	.085	
.081	.0822			.082	.0825	
.077	.0807			.0796	.0802	
.0746	.0795			.077	.0781	
.0715	.079			.0745	.0755	
.0684	.0785			.072	.0731	
.0653	.078			.0695	.0708	
.062	.0775			.0668	.0685	
.059	.077			.0642	.066	
.056	.0765			.0615	.0636	
.053	.076			.059	.0613	
.050				.0565	.059	

	R3	R3-2	R6	RLB	RLS	RO
	.089	.088	.089	.089	.089	.089
	.085	.084	.085	.085	.085	.085
	.0805	.0805	.081	.081	.0804	.081
	.0776	.0776	.077	.077	.076	.077
	.0759	.0759	.0732	.0732	.0725	.074
	.074	.074	.070	.0693	.0692	.071
	.0722	.0722	.0665	.066	.066	.0685
	.0703	.0703	.063	.0626	.0626	.066
	.0687	.0687	.060	.0592	.0592	.0633
	.067	.067	.057	.056	.056	.0605
	.065	.065	.054	.0526	.0526	.058
	.0632	.0632	.051	.0495	.0495	.0558
			.048	.046	.046	.053

RS			S	S4	S5	S6
.089			.089	.0895	.0895	.089
.085			.085	.0852	.0852	.085
.0823			.0822	.082	.0815	.0805
.081			.0806	.079	.078	.077
.0803			.079	.0765	.0753	.0743
.0795			.0774	.0744	.073	.0715
.0786			.0758	.0722	.0707	.069
.078			.074	.070	.0684	.0666
.0775			.0724	.0677	.0663	.064
.077			.0708	.0656	.0639	.062
.0765			.069	.0634	.0616	.059
.076			.0675	.0612	.0593	.0568
				.059	.057	.0545

·090 JET NEEDLES

		TB			V2	V3
		·089			·089	·089
		·085			·085	·085
		·081			·082	·0826
		·078			·0795	·0804
		·075			·0775	·0783
		·073			·0756	·0764
		·071			·0738	·0746
		·0698			·0718	·0726
		·0678			·0698	·0706
		·066			·0678	·0686
		·064			·0658	·0666
		·062			·064	·0646
		·060				

VS			WJ	WW	WXI	
·089			·088	·089	·089	
·085			·083	·085	·085	
·081			·0805	·0814	·082	
·077			·078	·0785	·0795	
·0748			·0763	·0775	·0777	
·0725			·0745	·0765	·0765	
·071			·073	·0755	·0755	
·0695			·071	·0746	·0746	
·068			·0694	·0736	·0736	
·0665			·0677	·0728	·0728	
·065			·066	·0718	·0718	
·0635			·065	·0709	·0709	

·100 JET NEEDLES

A9			• BAA	• BAB	• BAC	• BAD
·098			·099	·099	·099	·099
·0946			·095	·095	·095	·095
·0913			·0925	·0924	·0932	·0928
·088			·0895	·0897	·0907	·090
·085			·087	·0876	·0875	·0873
·0834			·085	·0858	·0852	·0852
·0818			·0823	·084	·0823	·083
·0802			·0792	·0822	·0763	·0808
·0787			·076	·0803	·0703	·0782
·077			·0729	·0784	·0642	·0755
·0755			·0697	·0759	·058	·073
·074			·0665	·0734	·052	·0702
·0722			·0633	·071	·046	·0675
·0706			·060	·069	·040	·065
			·0567	·067	·040	·0624
			·0534	·065	·040	·0598

BC			CI	CIW	CV	
·099			·099	·099	·099	
·095			·095	·0955	·094	
·091			·0916	·093	·090	
·088			·0889	·0905	·0867	
·085			·0861	·0875	·084	
·0825			·084	·0856	·0815	
·0803			·0818	·0836	·0795	
·0785			·0796	·0819	·0775	
·0765			·0778	·080	·076	
·075			·076	·078	·0745	
·073			·074	·076	·0732	
·072			·073	·0752	·072	
·071			·072	·0746	·071	
·070			·071	·074	·070	

	DF	DG	DX			GK
	·100	·100	·099			·100
	·098-1/16	·098-1/16	·0958			·094
	·096	·096	·0926			·089
	·091	·0905	·0888			·085
	·088	·087	·0859			·081
	·085	·0836	·0830			·078
	·082	·0804	·0775			·075
	·0782	·0772	·0740			·072
	·075	·074	·0705			·069
	·0725	·071	·0670			·066
	·070	·0689	·0635			·063
	·0685	·067	·0600			·060
	·067	·0653	·0565			·057
	·0655	·0636	·0530			·054
	·064	·062				

		K	KA	KB	KC	KD
		·100	·099	·099	·099	·099
		·095	·095	·095	·0935	·095
		·0905	·092	·0917	·090	·0908
		·0865	·0895	·090	·087	·0883
		·083	·0876	·0886	·084	·0856
		·080	·0855	·0872	·082	·083
		·0777	·0835	·086	·080	·0775
		·076	·0814	·085	·0785	·074
		·074	·0793	·0845	·0765	·0705
		·0722	·0784	·084	·075	·067
		·0705	·078	·0835	·073	·0635
		·0865	·078	·083	·0715	·060
		·0667	·078	·0825	·0695	·0565
		·065	·078		·0675	·053

·100 JET NEEDLES

KE	KF	KG	KH	KI	KK	KL
·099	·099	·099	·099	·098	·099	·099
·095	·095	·095	·0935	·094	·095	·095
·0917	·091	·0915	·0883	·090	·0925	·0925
·090	·089	·0895	·0863	·0865	·0893	·0895
·0885	·0875	·0875	·0843	·083	·086	·087
·087	·0855	·0855	·0825	·080	·0828	·085
·0848	·0835	·0841	·0805	·0777	·0795	·0823
·0838	·082	·0834	·0785	·076	·0738	·0792
·083	·081	·0827	·076	·074	·0615	·076
·0822	·080	·0820	·0735	·0722	·0517	·0729
·0815	·0795	·0810	·071	·0705	·042	·0697
·0808	·079	·0800	·0685	·0685	·042	·0665
·080	·079	·0790	·066	·0667	·042	·0633
·0792	·079	·0780		·065	·042	·060

KM	KN	KN cont.	KO	KP	KQ	KR
·099	·099	·066	·099	·099	·099	·099
·095	·0976	·063	·095	·095	·095	·095
·0924	·0962	·060	·0925	·092	·093	·0932
·0897	·0949	·057	·0895	·0893	·0903	·0907
·0876	·0933	·054	·087	·0867	·088	·0875
·0858	·092	·051	·085	·0842	·0855	·0852
·084	·0905		·0825	·0817	·082	·0823
·0822	·0888		·0795	·078	·0795	·077
·0803	·087		·0765	·070	·0775	·071
·0784	·082		·074	·0635	·0755	·0658
·0759	·0782		·0715	·058	·0735	·0603
·0734	·0747		·069	·0523	·0715	·057
·071	·0718		·067	·0465	·0695	·0534
·069	·069		·065	·0418	·0675	·050

KS	KT	KTA	KW	KW1	KW2	KWR
·099	·100	·100	·100	·100	·100	·100
·095	·095	·095	·095	·095	·095	·095
·092	·0905	·0895	·091	·0915	·0905	·090
·0892	·087	·0865	·0877	·0885	·0875	·087
·0875	·0845	·0835	·084	·0851	·0845	·084
·085	·0822	·0815	·0805	·082	·0815	·081
·079	·0802	·0802	·077	·079	·0788	·0786
·075	·079	·0788	·073	·076	·076	·076
·070	·0775	·0775	·0695	·0728	·0728	·0728
·065	·076	·076	·0661	·0695	·0695	·0695
·060	·075	·075	·063	·0663	·0663	·0663
·055	·074	·074	·060	·063	·063	·063
·050	·073	·073	·057	·060	·060	·060
·045	·072	·072	·054	·057	·057	·057

		LB1	LB2	LFN	LBA	
		·100	·100	·099	·100	
		·096	·095	·094	·096	
		·0925	·091	·0885	·093	
		·0895	·0895	·085	·0906	
		·087	·086	·0815	·0883	
		·085	·084	·078	·0863	
		·083	·0825	·075	·0848	
		·082	·0815	·0723	·0839	
		·081	·0805	·0695	·0830	
		·080	·0795	·0668	·0821	
		·079	·0785	·064	·0812	
		·078	·0775	·061	·0804	
		·077	·0765	·0585	·0796	
		·076	·0755	·0556	·0788	

·100 JET NEEDLES

	MC			53	55	58
	·100			·100	·100	·100
	·095			·095	·095	·095
	·0915			·090	·090	·090
	·0885			·0858	·0858	·0858
	·0851			·0815	·0815	·0815
	·082			·0777	·078	·078
	·079			·0738	·074	·0744
	·076			·070	·070	·0712
	·0728			·0668	·067	·0685
	·0684			·0636	·064	·066
	·064			·0606	·062	·064
	·060			·0579	·060	·062
	·0555			·0552	·057	·060
	·051			·053	·055	·058

		OA6	OA7	OA8		
		·100	·100	·100		
		·096	·096	·097		
		·0917	·093	·094		
		·0887	·0902	·0913		
		·0856	·0872	·0888		
		·0825	·0843	·086		
		·0794	·0814	·0835		
		·0762	·0786	·0808		
		·0731	·0757	·0782		
		·070	·0727	·0755		
		·067	·070	·073		
		·064	·067	·0702		
		·061	·064	·0675		
		·058	·061	·065		

RA	RB	RC	RD	RE	RF	RG
·100	·099	·099	·099	·099	·100	·100
·094	·095	·0946	·095	·095	·095	·095
·088	·0907	·090	·090	·092	·090	·0905
·083	·0866	·0855	·0865	·089	·0863	·087
·0785	·0825	·081	·0835	·0856	·0825	·0836
·0753	·0784	·0765	·081	·0805	·0788	·0802
·0722	·074	·072	·079	·0753	·075	·0768
·069	·070	·0674	·077	·0712	·0712	·0732
·0658	·0657	·0627	·0757	·0670	·0675	·070
·0627	·0615	·0583	·0742	·0628	·0637	·0665
·0595	·0575	·0537	·073	·0587	·060	·0630
·0564	·0532	·0492	·0715	·0543	·057	·060
·053	·049	·0446	·0703	·0501	·054	·057
·050	·045	·040	·069	·0460	·051	·054

RH	RI	RJ	RK	RL	RN	RP
·100	·099	·100	·100	·100	·099	·099
·095	·095	·095	·095	·095	·095	·095
·0915	·0912	·0910	·0915	·0920	·092	·0905
·0878	·0881	·087	·088	·089	·089	·087
·0846	·0846	·0844	·0854	·086	·0859	·085
·0813	·0804	·0818	·0830	·0835	·0808	·0832
·078	·0763	·0792	·0805	·0810	·076	·082
·075	·0722	·0766	·7080	·0785	·0721	·0815
·072	·067	·0740	·0756	·0760	·0688	·0809
·069	·0605	·0714	·0732	·0735	·0651	·080
·066	·0567	·0688	·0708	·0710	·0617	·0794
·063	·0525	·0662	·0683	·0685	·0581	·0786
·060	·049	·0630	·066	·0660	·0547	·0778
·057		·0610	·0635	·0635	·0510	·077

·100 JET NEEDLES

RR	RU	RV			SA	SB
·099	·100	·100			·099	·099
·095	·095	·095			·095	·095
·0922	·089	·089			·0915	·091
·0895	·084	·084			·0885	·0875
·086	·081	·081			·086	·084
·0808	·0785	·0785			·084	·080
·076	·0756	·0755			·0815	·076
·0721	·0733	·073			·079	·072
·0688	·071	·070			·0768	·0695
·0651	·0688	·067			·0743	·067
·0617	·066	·0645			·072	·064
·0581	·0636	·0618			·070	·062
·0547	·061	·059			·068	·059
·051	·059	·056			·066	·057

SC	SD	SE	SF	SG	SH	SJ
·100	·100	·100	·100	·100	·099	·099
·095	·095	·095	·095	·095	·0952	·095
·0915	·0912	·0915	·09125	·0917	·0917	·092
·0882	·088	·0903	·0895	·090	·0885	·0895
·0865	·0862	·0888	·08825	·0887	·0865	·0875
·0845	·0842	·087	·087	·0878	·0845	·0855
·0823	·0822	·0852	·08575	·0869	·082	·0835
·080	·080	·0845	·085	·0862	·0793	·0815
·079	·079	·084	·0845	·0859	·077	·0792
·078	·078	·084	·084	·0855	·0743	·077
·077	·077	·084	·084	·0855	·0722	·075
·076	·076	·084	·084	·0855	·070	·073
·075	·075	·084	·084	·0855	·068	·071
·074	·074	·084	·084	·0855	·066	·069

SK	SL	SM	SN	SO	SP	SQ
·099	·099	·099	·099	·100	·099	·100
·0954	·095	·095	·095	·096	·095	·095
·093	·092	·0915	·0915	·092	·0915	·0915
·090	·089	·0885	·0885	·089	·0892	·088
·0867	·0867	·0855	·0865	·086	·0871	·0854
·0833	·0833	·0825	·0845	·083	·0852	·083
·080	·080	·0795	·0835	·0804	·0834	·0812
·077	·077	·0765	·082	·0778	·0810	·0794
·074	·074	·0735	·080	·075	·0786	·0775
·0714	·0714	·071	·078	·0743	·0762	·0757
·0695	·0695	·069	·0765	·0737	·0738	·0738
·0676	·0676	·067	·075	·073	·0714	·0719
·065	·065	·065	·074	·0722	·069	·070
	·063	·063	·073		·0666	·068

SR	SS	ST	SU	SV	SW	SX
·099	·099	·099	·099	·099	·099	·099
·095	·0945	·095	·095	·0955	·0955	·095
·092	·0905	·0925	·0992	·0923	·0925	·0902
·089	·086	·0895	·0868	·089	·088	·0868
·086	·084	·087	·0834	·0867	·086	·084
·083	·080	·0852	·0802	·0845	·084	·0808
·0804	·0755	·0831	·0764	·0818	·082	·0774
·0778	·0715	·0805	·0728	·079	·0795	·0744
·075	·0655	·0787	·069	·0755	·077	·0713
·0743	·059	·077	·0655	·072	·0745	·0686
·0737	·0535	·0753	·062	·0685	·072	·0657
·073	·0485	·0737	·0586	·0665	·0695	·063
·0722	·045	·071	·0552	·0635	·067	·060
·0715	·042	·069	·0518	·064	·0645	·0572

·100 JET NEEDLES

SY	SZ			TA	TC	TD
·099	·099			·099	·099	·099
·095	·0945			·095	·095	·095
·091	·0903			·0915	·0915	·0925
·0875	·0858			·0882	·089	·090
·0855	·0837			·0867	·087	·0875
·0825	·0798			·0852	·085	·0845
·078	·0753			·0831	·0832	·0803
·075	·0707			·0805	·0825	·077
·069	·0643			·0787	·0815	·073
·063	·0570			·0770	·0805	·0678
·0575	·0508			·0753	·0795	·0631
·0525	·0470			·0737	·0785	·0585
·049	·0445			·0710	·0775	·0538
·046	·0420			·0690	·0765	·049

TE	TF	TG	TH	TJ	TK	TL
·099	·099	·099	·096	·099	·099	·099
·095	·096	·095	·092	·095	·095	·095
·092	·0925	·0922	·0908	·092	·092	·092
·0895	·089	·0895	·0893	·0895	·090	·089
·087	·0855	·0878	·0878	·0877	·0885	·086
·0837	·082	·0862	·0863	·086	·087	·0835
·0805	·0782	·0847	·0848	·0845	·086	·081
·076	·0748	·0837	·0825	·084	·0855	·0793
·0715	·0714	·0827	·074	·083	·0845	·0776
·067	·068	·0818	·065	·082	·0835	·0759
·0625	·0645	·0812	·055	·081	·0825	·0746
·058	·061	·0806	·049	·080	·0815	·0733
·0535	·0575	·0800	·044	·079	·0805	·072
·049	·054	·0794	·040	·078	·0795	·071

TM	TN	TO	TP	TR	TS	TT
·099	·099	·099	·099	·099	·099	·0989
·095	·0945	·095	·0955	·095	·095	·0941
·092	·091	·092	·092	·092	·0915	·0904
·0894	·087	·0893	·090	·089	·088	·0883
·0867	·085	·0865	·0875	·0869	·0853	·0861
·0842	·082	·0845	·0856	·084	·0823	·0825
·0814	·078	·083	·0836	·0817	·0812	·0799
·0785	·073	·082	·0819	·0791	·0782	·078
·0775	·0665	·081	·080	·0765	·0742	·0766
·077	·060	·080	·078	·0738	·0710	·0748
·077	·0535	·079	·076	·071	·0675	·0733
·077	·050	·078	·0752	·0685	·061	·0721
·077	·0475	·077	·0746	·063	·055	·0715
·077	·045	·076	·074	·062	·049	

TU	TV	TW	TX	TY	TZ	
·099	·099	·099	·099	·099	·099	
·095	·095	·095	·095	·095	·095	
·091	·0925	·0925	·091	·0918	·0915	
·088	·090	·0895	·0894	·0887	·0893	
·085	·088	·087	·0867	·086	·087	
·083	·086	·0852	·0842	·0836	·0847	
·081	·084	·0831	·0814	·0825	·0827	
·0793	·0825	·0805	·0785	·0805	·0805	
·0776	·081	·0775	·078	·0775	·0787	
·0759	·080	·075	·078	·075	·077	
·0746	·0795	·0722	·078	·0722	·0753	
·0733	·0785	·070	·078	·070	·0737	
·072	·0775	·068	·078	·068	·071	
·071	·0765	·066	·078	·066	·069	

·100 JET NEEDLES

	WO2	WO3	WO4			ZB
	·100	·100	·100			·099
	·095	·095	·095			·095
	·091	·091	·090			·0915
	·087	·08775	·086			·089
	·0835	·0845	·082			·0865
	·081	·0822	·0794			·084
	·0785	·080	·0768			·082
	·076	·078	·074			·0795
	·0732	·0755	·0712			·0775
	·071	·0735	·069			·0755
	·0683	·0712	·066			·0735
	·0657	·069	·0634			·071
	·063	·067	·061			·067
	·061	·065	·058			·063
						·059

ZC	ZD	ZE	ZF	ZG	ZH	
·099	·099	·099	·099	·099	·099	
·095	·095	·095	·095	·095	·095	
·091	·090	·0895	·089	·089	·0915	
·088	·865	·0858	·085	·0845	·0893	
·0855	·084	·083	·0821	·0815	·087	
·083	·0815	·0805	·0798	·079	·0847	
·081	·079	·0782	·0775	·0765	·082	
·0785	·077	·076	·075	·074	·0795	
·0765	·0745	·0732	·072	·071	·0775	
·0745	·072	·0703	·0687	·0675	·0755	
·0725	·069	·0673	·065	·063	·0735	
·0695	·065	·0629	·0608	·059	·0715	
·065	·0605	·0584	·0563	·054	·0695	
·0605	·056	·054	·052	·050	·0675	
·056	·0515	·0495	·0475	·045		

·125 JET NEEDLES

NA			UA	UB	UC	UD
·124			·124	·124	·124	·124
·1205			·1205	·120	·1205	·1205
·1170			·1175	·1165	·118	·1178
·1144			·1146	·113	·1153	·1158
·1125			·1117	·111	·1128	·114
·1108			·1074	·109	·1107	·1126
·1090			·1023	·107	·1086	·1115
·1078			·0974	·1055	·107	·1104
·1068			·0931	·104	·1056	·1092
·1065			·0890	·103	·1046	·108
·1065			·0849	·102	·104	·1069
·1065			·0808	·101	·1032	·1064
·1065			·0767	·100	·1025	·1058
·1065			·0726	·099	·1018	·1047
·1065			·0685	·098	·101	·1036
·1065			·0644	·097	·1002	·1025

·125 JET NEEDLES

UE	UF	UG	UH	UI	UJ	UK
·124	·124	·124	·124	·124	·124	·124
·1205	·1205	·1205	·1205	·1205	·1205	·1205
·1155	·1163	·116	·1165	·1172	·1165	·116
·1135	·113	·112	·1135	·114	·1135	·113
·1112	·1106	·1084	·1105	·1114	·1105	·1106
·109	·1073	·1054	·1085	·1092	·108	·1073
·107	·1035	·1023	·1065	·107	·1055	·1035
·105	·0997	·099	·104	·1051	·103	·0997
·103	·0960	·0954	·1015	·1032	·100	·0960
·1015	·0926	·0923	·099	·1018	·097	·0927
·100	·089	·0895	·0965	·1006	·094	·090
·099	·0854	·0875	·094	·0995	·091	·0875
·098	·0819	·086	·0915	·0985	·0875	·0860
·0965	·0783	·0845	·0915	·0985	·0875	·0860
·095	·0748	·083	·089	·0975	·0845	·0845
·0935	·0713	·0815	·0865	·0965	·0815	·0830
			·084	·0955	·080	·0815

UL	UM	UN	UO	UP	UR	US
·124	·124	·124	·124	·124	·124	·124
·1205	·1205	·1205	·1205	·1205	·1205	·1205
·1173	·1165	·1165	·1155	·116	·116	·1172
·1140	·114	·113	·1135	·114	·1128	·1133
·1113	·1123	·110	·110	·1105	·1094	·1105
·1090	·1104	·107	·108	·1075	·106	·1092
·1076	·1086	·104	·1055	·1045	·103	·1085
·106	·107	·1005	·103	·1025	·0997	·1068
·1035	·1056	·0985	·101	·101	·096	·1043
·1006	·1046	·0965	·0985	·0995	·0927	·102
·098	·104	·0945	·0965	·0985	·090	·1006
·0956	·1032	·0915	·094	·0975	·0875	·0995
·0937	·1025	·0885	·093	·096	·0860	·0985
·0937	·1025	·0885	·0915	·0945	·0845	·0975
·0917	·1018	·0855	·090	·093	·083	·0965
·0897	·101	·0830	·089	·0915	·0815	·0955
·0877	·1002	·0805				

UT	UU	UV	UW	UX	UY	UZ
·124	·124	·124	·124	·124	·124	·124
·1205	·1205	·1205	·1205	·1205	·1205	·1205
·1147	·1165	·1182	·1175	·1165	·1174	·1172
·1114	·114	·1160	·1146	·114	·1145	·1135
·1084	·112	·1135	·1117	·112	·1128	·1113
·1054	·1095	·1112	·1074	·1095	·1107	·1095
·1023	·107	·1095	·1023	·107	·1086	·1084
·0990	·105	·108	·0974	·105	·107	·1066
·0954	·1025	·1065	·092	·1025	·1056	·1048
·0917	·100	·1053	·0865	·100	·1046	·103
·088	·099	·1047	·081	·099	·104	·102
·0858	·098	·1042	·0755	·098	·1032	·101
·0836	·097	·1036	·070	·0955	·1025	·100
·0813	·096	·1029	·064	·0931	·1018	·099
·079	·0945	·1029	·058	·091	·101	·098
·0768	·093	·1029	·052	·089	·1002	·097

APPENDIX 3

SPRING IDENTIFICATION

Piston

Paint colour on end coil	Load at length		Part No.
Black and green	5¼ oz.	2.500 in.	AUC 5028 +
Light blue	2½ oz.	2.625 in.	AUC 4587
Red	4½ oz.	2.635 in.	AUC 4387
Yellow	8 oz.	2.750 in.	AUC 1167
Green	12 oz.	3.000 in.	AUC 1170
Brown	14 oz.	3.000 in.	AUC 1168
White	18 oz.	3.562 in.	AUC 1166
Red and yellow	24 oz.	4.812 in.	AUC 4478%
Red and white	40½ oz.	3.875 in.	AUC 4869%
Red and green	11¼ oz.	3.875 in.	AUC 4826%
Light blue and black	4½ oz.	3.875 in.	AUC 2107*%
Light blue and red	18 oz.	3.875 in.	AUC 4818†%

* Used in place of AUC 5014 Red and Black
† Used in place of AUC 2091 Blue and Green
\+ H1 horizontal carburetters only (special)
% 2 in. diameter throttle carburetters only

AUXILIARY (THERMO

Paint colour on end coil	Load at length		Part No.
White	1¾ oz.	1 in.	AUC 1195
Blue	2¼ oz.	1 in.	AUC 1041
Yellow	2¾ oz.	1 in.	AUC 5021
Red	3¼ oz.	1 in.	AUC 3427
Green	3¾ oz.	1 in.	AUC 3127

APPENDIX 4

S.U. CARBURETTER FAULT FINDING

Erratic running, stalling at idling, lack of power, high fuel consumption

Cause	Remedy
Sticking piston:	
Dirty piston and suction chamber	Clean
Jet out of centre	Re-centre
Bent needle	Fit new

Hesitation at pick-up

Cause	Remedy
Low damper oil level	Top up
Incorrect oil grade (too thin)	Replace with correct grade

Fuel leak from float-chamber/feed pipe union

Cause	Remedy
Rubber sealing washer displaced or damaged	Renew

Float-chamber flooding

Cause	Remedy
Dirty or worn float-chamber needle vlave (dirty fuel)	Clean or renew valve (flush system)
Punctured float	Fit new
Incorrect fuel level	Check and reset level

Too rich at idling

Cause	Remedy
Jet gland leakage:	
Faulty top gland	Fit new
Dirt under top gland washer	Clean
Faulty bottom gland	Fit new

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