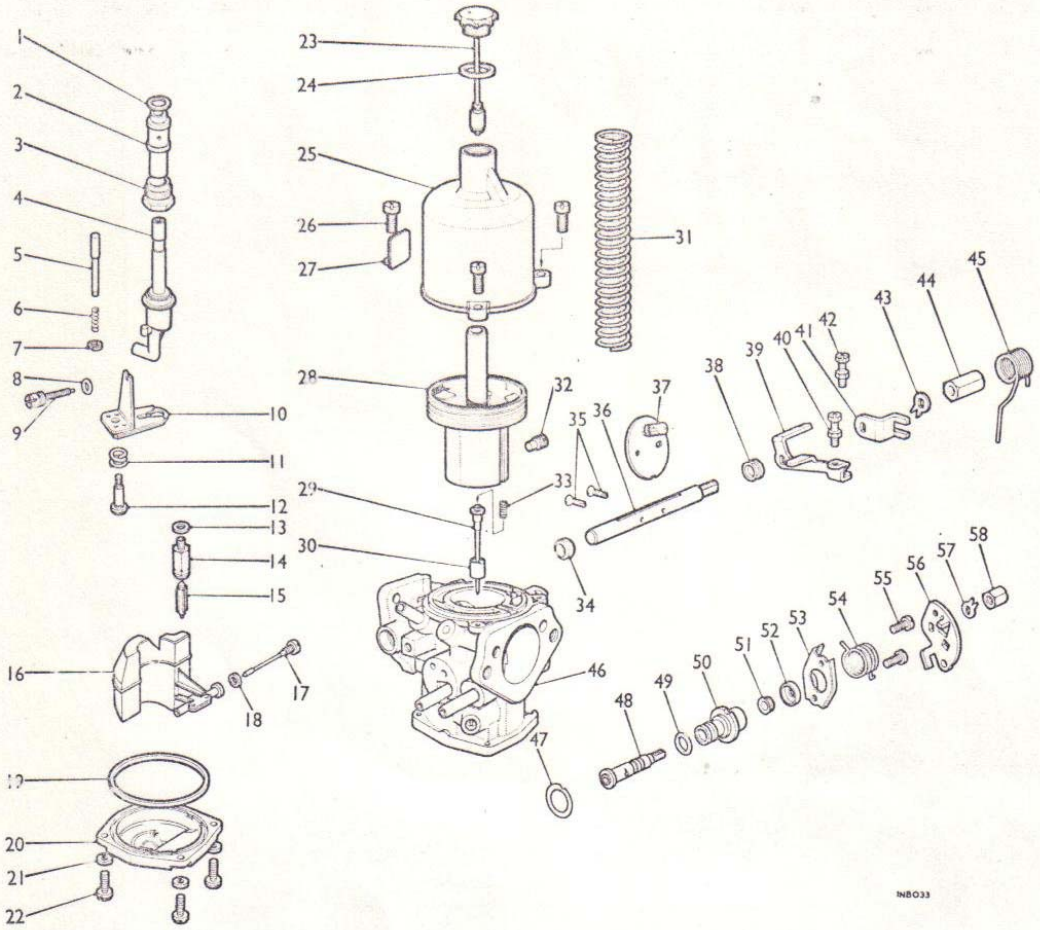


THE TYPE HIF CARBURETTER COMPONENTS

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

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INTRODUCTION

The type HIF (Horizontal Integral Float Chamber) carburetter has been designed primarily to meet the requirements of exhaust emission control carburation systems. Functionally similar to previous S.U. carburetters, the HIF uses the variable choke/constant depression principle to achieve the precise induction of mixture required to control the toxic elements of exhaust emission to within statutory requirements.

FEATURES:

- **Proved constant depression principle**
- **Integral float chamber**
- **Float concentric to jet**
- **Fuel viscosity compensator**
- **Part throttle by-pass emulsion system**
- **Rotary valve cold start enrichment device**
- **Overrun depression limiting valve**
- **Easy accessible mixture adjustment with sealing facility**
- **Spring-loaded jet needle assembly**
- **Crankcase ventilation control**

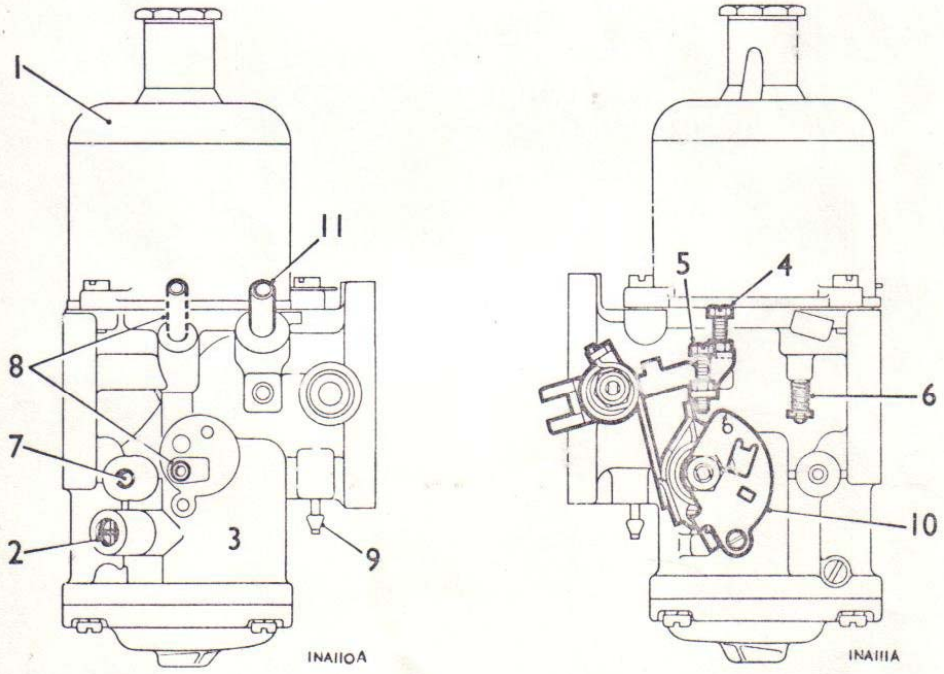


Fig. 1 The Type HIF Carburetter

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

3

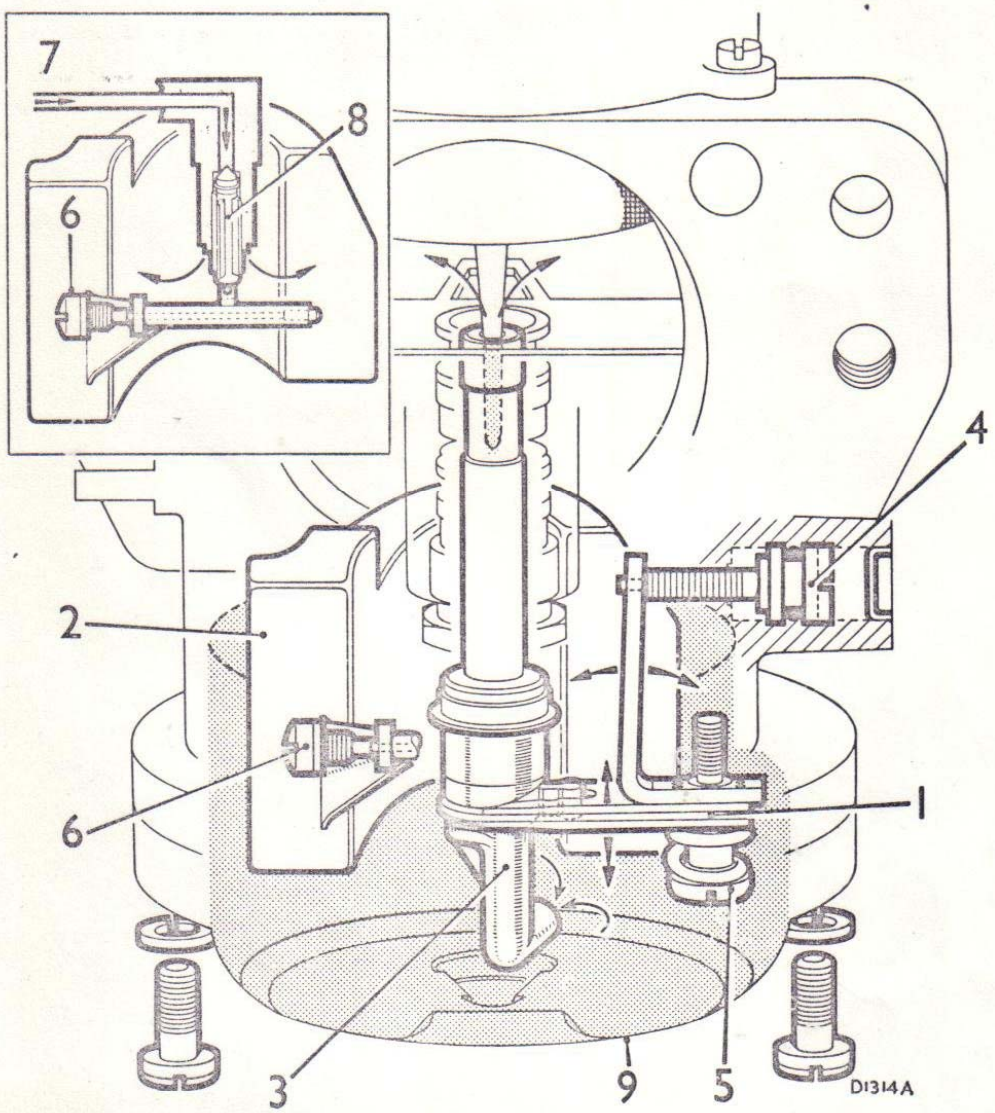


Fig. 2 An enlargement of the float-chamber layout

1. Bi-metal assembly
2. Concentric float
3. Jet head
4. Jet adjusting screw
5. Bi-metal pivot screw
6. Float fulcrum screw
7. Fuel inlet
8. Needle valve
9. Bottom cover-plate

FLOAT CHAMBER

The float chamber is incorporated in the main body casting (see Fig. 2); access to the chamber is obtained by removing the bottom cover-plate(9). The moulded float (2) is shaped so that it surrounds the jet tube and is pivoted along a line parallel to the inlet flange. The float is retained by a spindle (6) which screws into the body casting.

Entry of fuel into the float chamber is via a brass tube (7) in the side of the carburetter body to a needle valve assembly (8). The needle assembly is of a spring-loaded design to prevent engine vibration affecting seating of the valve.

The jet is pressed into the top of an aluminium tube which is in turn pressed into a plastic moulding (3). This hollow moulding known as the jet head is open at its lower end allowing fuel to enter the jet tube.

MIXTURE ADJUSTMENT

The jet tube of the HIF type carburetter is moved in the vertical plane to provide mixture adjustment only. Unlike previous types of S.U. carburetter the jet tube is not lowered down the jet needle to provide cold start enrichment.

The jet adjustment assembly is comprised of a right-angled adjusting lever of unequal length arms riveted to a bi-metal blade (1, Fig. 2).

The blade is cut out to accept the jet head (3) and the shape of the jet head is formed so that any movement of the bi-metal blade is transmitted to the jet head, moving it in the vertical plane.

The right-angled adjusting lever and bi-metal blade (1) is attached to the body casting by a spring-loaded retaining screw (5) positioned in the short arm of the lever. This attachment allows

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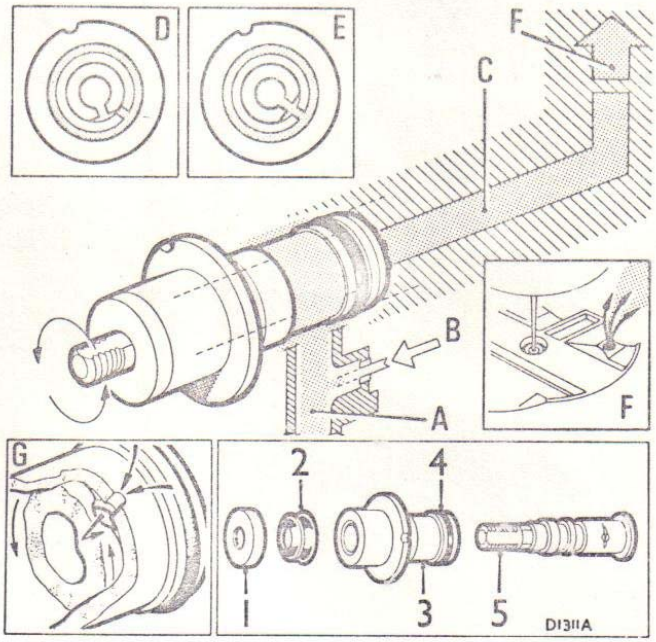


Fig. 3 Cold start enrichment device

1. End seal cover
2. End seal
3. Starter valve body
4. 'O' ring
5. Valve spindle

A. Fuel supply
B. Air bleed
C. Fuel delivery to jet bridge
D. Commencement of enrichment
E. Maximum enrichment
F. Enrichment outlet
G. Fuel flow through valve

the adjusting lever to be pivoted at the outer edge of its short arm and is loaded by the spring towards the jet adjusting screw (4).

The jet adjusting screw (4) is located at the outer end of the long arm of the adjusting lever; screwing the adjusting screw inward will lower the jet, enriching the mixture and unscrewing the adjusting screw will allow the spring to return the lever together with the jet, weakening the mixture.

After the mixture has been set the jet adjustment can be sealed by fitting a plug into the jet adjusting screw recess of the carburetter body.

FUEL TEMPERATURE COMPENSATION (Viscosity compensator)

This device alters the jet position in relation to the metering needle to compensate for changes in fuel viscosity which take place with changes in fuel temperature.

When the fuel temperature rises, the viscosity is lowered, and in an uncompensated assembly this would allow more fuel to flow for a given jet/needle relationship.

In the HIF jet assembly the jet head is attached to a bi-metal blade (1). This bi-metal is immersed in the fuel in the float chamber and will move in the vertical plane in response to changes in fuel temperature. The jet will be raised to a weaker position on the jet needle when the fuel temperature rises and will be lowered to a richer position when the temperature falls.

From this it will be seen that once the jet position has been selected by adjusting the mixture screw, alterations of fuel temperature will bring about slight alterations in jet position to compensate for the change in fuel viscosity.

The effect of this device is that drivability is improved over wide ranges of temperature, and that exhaust emissions can be kept within closer limits during cold starting and the warm-up period. Temperature compensation also allows carburetters to have the mixture setting pre-set and sealed before a vehicle is delivered.

COLD START ENRICHMENT DEVICE

In this carburetter additional mixture required for cold starting is supplied separately to that from the main jet.

The starting device (Fig. 3) is in the form of a rotary valve which emits extra fuel supplied from passage (A) located in the side of the float chamber to an outlet (F) behind the jet bridge.

The assembly consists of a cylindrical valve body (3) with a single entry hole drilled in its side, an inner spindle (5) bored out at one end and threaded externally at the other, two seals (2) and (4) and an end seal cover (1). The operating cam lever is bolted to the spindle which passes through the centre of the valve body. A hole in the side of the spindle communicates with its internal bore and at each side of the hole is a groove which varies in depth, starting shallow then deepening as the groove approaches the entry hole.

The valve body is positioned in the side of the float chamber and is retained by an external clamping plate and two screws. Fuel is fed from the bottom of the float chamber to the device via a passage (A). An air bleed (8) is situated in the feed passage.

When the engine is stopped fuel enters the feed passage (A) to the level of the float chamber which lies below the air bleed (B). When the mixture control rotates the cold start spindle (5) to a certain position and the engine is turned over for starting, a depression is transmitted from the outlet hole (F) to the bore of the spindle, through the entry holes in spindle and valve body to the feed passage (A). Fuel is drawn into the cavity between the valve body and the carburetter body casting together with air from the air bleed (B) and the emulsified mixture is led through the entry holes into the bore of the spindle and out to the carburetter outlet hole (F).

The varying depth of groove as it approaches the entry hole in the spindle ensures that the device is progressive. At the commencement of rotation of the spindle (Inset D) the shallow part of the groove meets the entry hole in the valve body and as the spindle is further rotated a progressively larger passage is exposed until the position is reached where maximum enrichment is provided (inset E).

Flow through the valve is shown (inset G).

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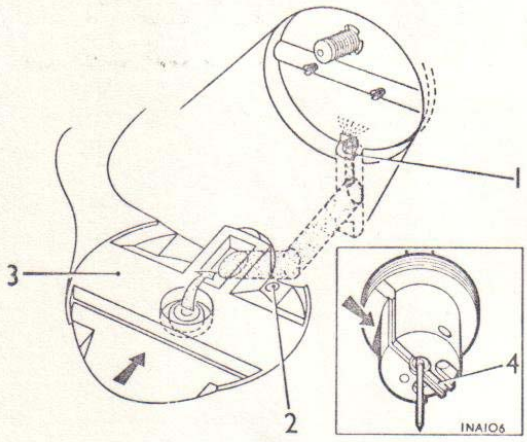


Fig. 4 Part throttle by-pass emulsion system

1. By-pass emulsion outlet
2. Cold start enrichment outlet
3. Carburetter bridge
4. Slot in piston

THE OVERRUN VALVE

The valve consists of a precisely set, spring-loaded plate valve located in the throttle butterfly disc.

This valve improves the combustion of fuel at high manifold depression conditions, i.e. overrun at closed throttle, by slightly reducing the depression and supplying a quantity of correct fuel/air mixture. This helps to maintain correct combustion and prevents high values of hydrocarbon emission being produced under these conditions.

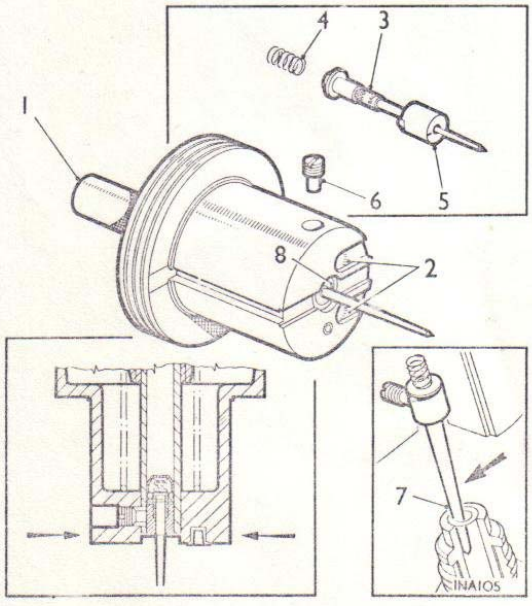


Fig. 5 The spring-loaded jet needle

1. Piston rod
2. Transfer holes
3. Jet needle
4. Needle spring
5. Needle guide
6. Needle locking screw
7. Needle biased in jet
8. Etch mark

PART THROTTLE BY-PASS EMULSION SYSTEM

This consists of a small-bore passageway leading from a duct adjacent to the jet orifice to a discharge point at the throttle edge.

The function of this passage is to deliver a quantity of mixture in a well-emulsified condition at small throttle openings. The mixture is drawn into this passageway in preference to being induced in the normal manner and is then discharged at the high depression point near to the edge of the throttle. Due to the relatively small area of this passageway in relation to the carburetter bore, the velocity of the mixture in the by-pass system will be greater than if drawn through the carburetter body; hence the breakdown of the mixture will be more complete. The mixture is guided into the by-pass passageway by means of a slot in the base of the piston mating up with the duct adjacent to the jet orifice.

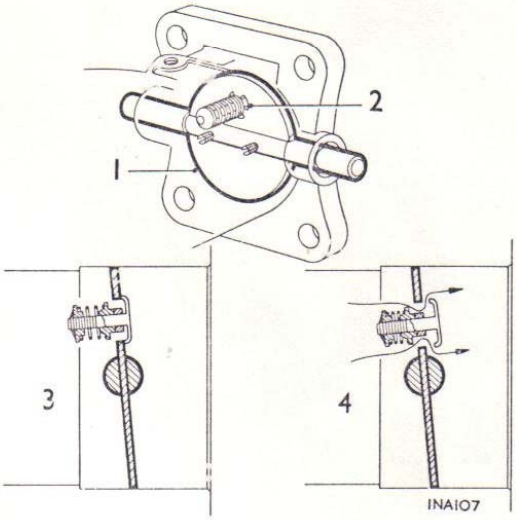


Fig. 6 The overrun valve

1. Throttle butterfly disc
2. Overrun valve
3. Overrun valve closed
4. Overrun valve open

SPRING-LOADED JET NEEDLE

The jet needle fitted to the HIF range of carburetters is biased towards a predetermined position in the jet orifice by means of a spring-loaded fixing.

The quantity of fuel discharged is affected by the shape, size and position of the metering orifice. By maintaining the same shape and position of the orifice in carburetters of the same specification, repeatability of emission values from one vehicle to another is achieved.

The shoulder of the needle abuts a protrusion formed on the needle guide. Under the pressure of a spring the needle is held permanently in one position relative to the air flow, the direction of this bias being either to the inlet or to the outlet of the carburetter. As the needle is retained in a predetermined position no jet centring is required and a non-centreable jet bearing is fitted. To ensure correct fitting the needle guide carries an etched alignment mark.

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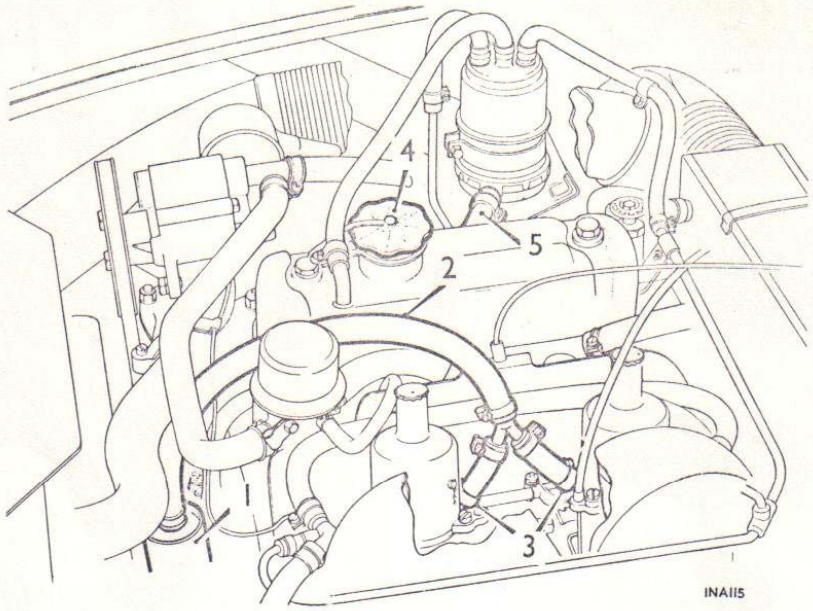


Fig. 7 Crankcase emission control

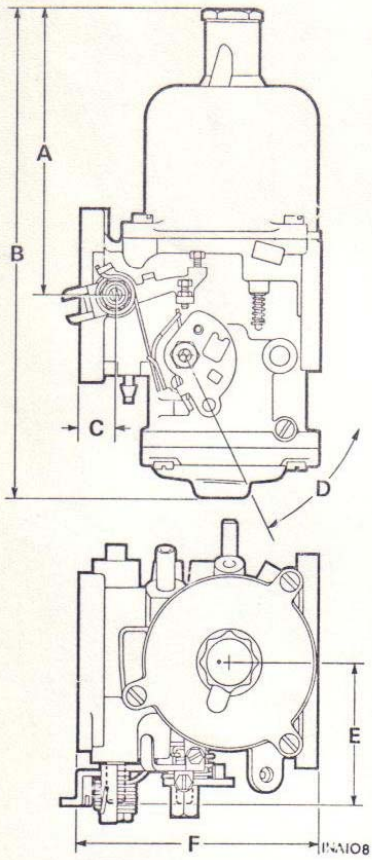
1. Oil separator
2. Breather hose.
3. Carburetter chamber connection.
4. Filtered filler cap.
5. Adsorption canister breather hose.

CRANKCASE EMISSION CONTROL

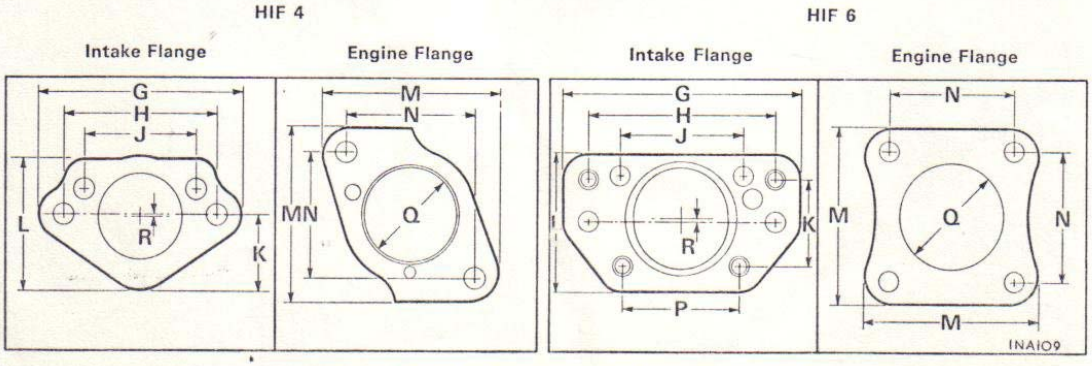
With this system the engine breather outlet is connected by hoses to the constant depression area between the piston and the throttle disc valve of the carburetter(s). Engine fumes and blow-by gases are drawn from the crankcase by the depression in this area, through an oil separator incorporated in the engine outlet connection, and from there to the inlet manifold. Fresh air is supplied to the engine through the combined oil filler cap and filter, or on cars fitted with fuel evaporative loss control systems through the breather hose of the adsorption canister.

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DIMENSIONS



	HIF 4		HIF 6	
A.	4·65 in	(118 mm)	4·78 in	(121·3 mm)
B.	8·05 in	(204·47 mm)	8·22 in	(208·79 mm)
C.	0·578 in	(14·68 mm)	0·578 in	(14·68 mm)
D.	81° 30′ total movement		81° 30′ total movement	
E.	2·33 in	(59 mm)	2·33 in	(59 mm)
F.	4·00 in	(101·6 mm)	4·00 in	(101·6 mm)
G.	3·268 in	(83 mm)	3·95 in	(100·33 mm)
H.	2·559 in	(65 mm)	3·15 in	(80 mm)
J.	1·874 in	(47·6 mm)	2·08 in	(52·83 mm)
K.	1·20 in	(30·48 mm)	1·417 in	(36 mm)
L.	2·12 in	(53·85 mm)	2·217 in	(56·31 mm)
M.	2·90 in	(73·66 mm)	2·90 in	(73·66 mm)
N.	2·126 in	(54 mm)	2·126 in	(54 mm)
P.			1·969 in	(50 mm)
Q.	1·50 in	(38·1 mm)	1·75 in	(44·45 mm)
R.	0·04 in	(1·02 mm)	0·11 in	(2·8 mm)



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