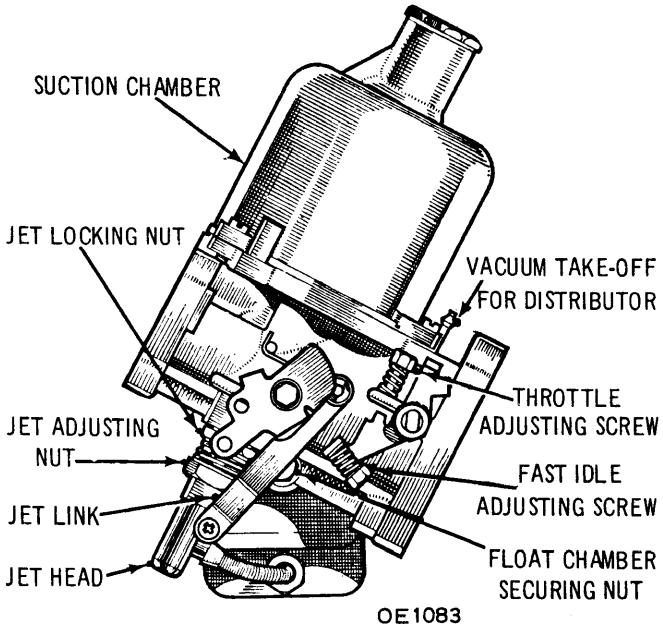
S.U. Carburetors

H.S. & H.D. TYPE 1-BARREL

Austin America (1968-70)
Austin Healey 3000 (1962-67)
Austin Healey Sprite (1962-69)
Jaguar (1962-70)
MG 1100 (1968-70)
MGB (1962-70)
MGC (1969)
MG Midget (1968-70)
Rover 2000 (1963-69)
Rover 3500S (1970)
Triumph Spitfire (1963-69)
Triumph TR4 (1962-69)
Volvo B18 & 20 Engines (1962-70)

DESCRIPTION

Carburetors are of side draft design. Vacuum chamber has a piston which slides up and down, depending on manifold vacuum. Piston is damped by oil filled chamber, which prevents piston from fluctuating too rapidly. Enrichment for cold starting is accomplished by manual choke, which lower the jet away from its needle to provide richer air/fuel mixture ratio.



S.U. NON EMISSION TYPE H.S. 4 (OTHERS SIMILAR)

OPERATION

Cold Starting

The jet of each carburetor, located at the bottom of the unit, is lowered through a link system. This system is activated by a choke control on the instrument panel. The fuel needle is tapered, and lowering the jet increases the fuel flow area. The fast idle screw is also contacted by a cam on the carburetor choke lever.

Normal Operation

Air entering the carburetor intake increases in speed when it crosses a constrictive area called the bridge. Fuel from the jet is supplied at this point. Movement of the piston is determined by the amount of vacuum in the intake system. As vacuum increases, the piston rises, allowing greater fuel from the jet, and air from the intake to be admitted to the engine.

Acceleration

The movement of the piston in the suction chamber is damped by a plunger in an oil filled cylinder at the top of the carburetor. This damper prevents the piston from rising too rapidly. This delay or dampening allows fuel from the jet to be mixed with a smaller amount of air than usual, and enriches the mixture. This enriched state is necessary for sudden throttle increase.

Idling

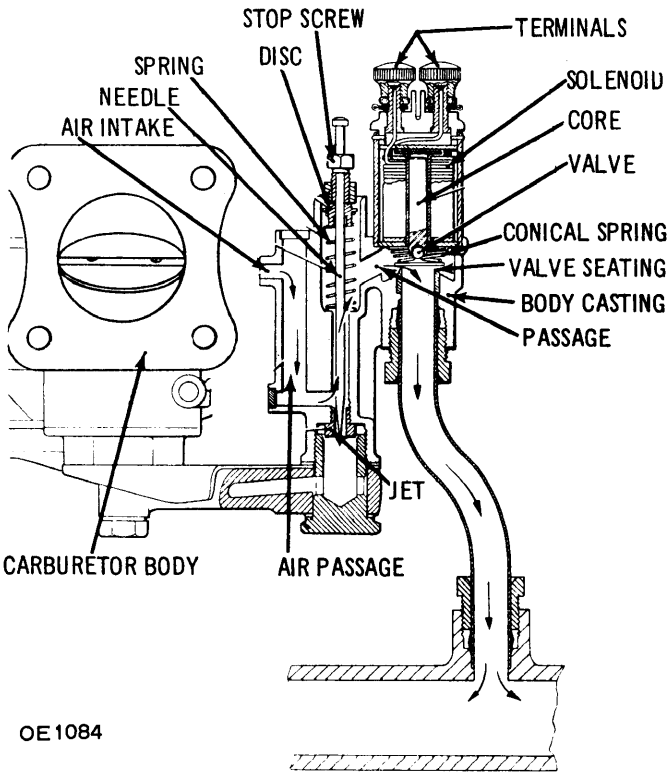
There is no separate idling system as this is accomplished through the normal running system of the carburetor. Due to the up and down movement of the piston in the suction chamber, the air volume is varied continuously. When the engine is at idle, only a small amount of fuel/air mixture passes through the carburetors. The throttle valves are held in a slightly open position by the idle stop screws. The idling of multiple carburetor systems is adjusted independently. The fuel/air mixture is adjusted by adjusting nuts on the jets. These are located at the bottom of the carburetor.

Fast Idle

When the choke lever is pulled out, a lever acts on the jet. This causes the mixture to be enriched. The throttle valve is also influenced by a cam which presses against a fast idle screw. This allows a higher idling RPM as well as a richer mixture. The further the choke control is pulled out, the more rich the mixture, and the higher the idle speed.

Auxiliary Enrichment Carburetor

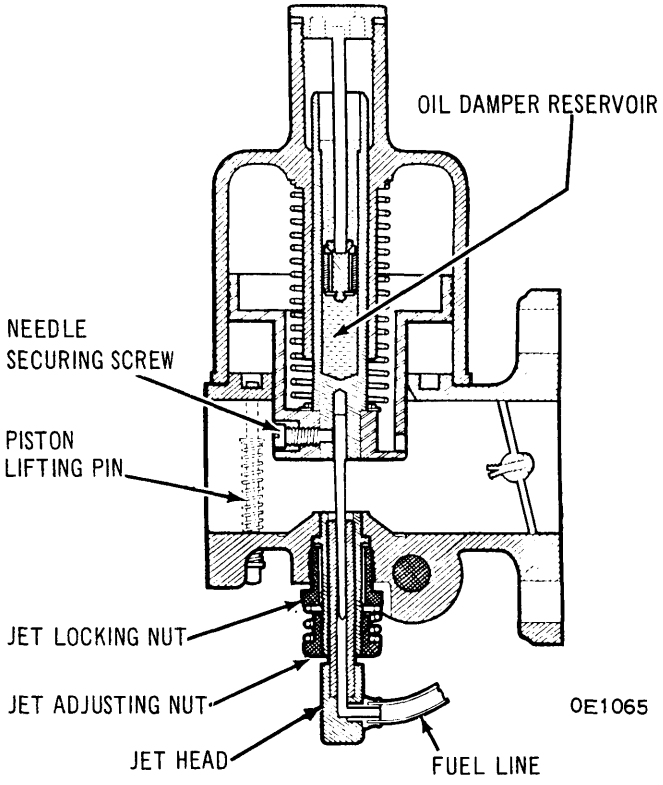
On some installations of the S.U. Carburetor, an electrical thermostatic carburetor is incorporated. It may be controlled by either a thermostatic or manually operated switch.



AUXILIARY ENRICHMENT CARBURETOR

H.S. & H.D. TYPE 1-BARREL (Cont.)

When this device is incorporated, the manual choke operation is omitted. Fuel from the float chamber is supplied to the jet and the flow is controlled by a tapered needle in the carburetor. Air is drawn in and mixed with fuel as it passes this jet. The mixture is then carried through a passage past a solenoid operated valve. From here it passes directly to the intake manifold. The device is brought into action by the energizing of a solenoid. When activated, the solenoid opens a disc valve against spring pressure. This uncovers the passage to the intake manifold, and allows the mixture to pass to the engine.



S.U. MODEL HS4 SECTIONAL VIEW (OTHERS SIMILAR)

OVERHAUL

Disassembly

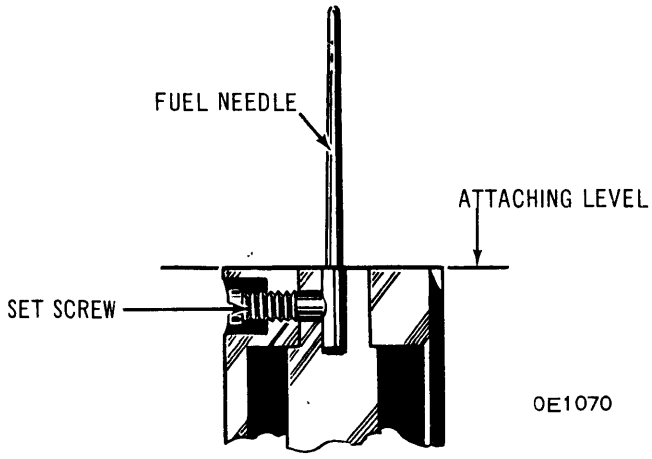
Remove carburetors from engine. Remove damper plungers, suction chambers and pistons. Unscrew the float bowl cover and lift it up, remove housing. Loosen screws which retain choke lever and fast idle cam, remove levers and jet. Remove jet adjusting nut, locknut, and jet sleeve. Wash all parts in suitable cleaner and blow dry with compressed air.

Replacing Float Valve

Remove float bowl cover, turn upside down and remove float lever pin and float. Screw out the valve and fit a new valve. Replace float and pin. Refit cover, making sure that gasket is in good condition.

Replacing Needle

Remove piston and suction chamber assembly. Loosen set screw which holds the needle in place. Remove needle. Install a new needle so that shoulder is flush with the base of the piston. Tighten set screw.



FUEL NEEDLE ATTACHMENT

Throttle Spindle Bearings

When new, there is about .0025 in. (.063 mm) clearance between diameter of the spindle and its bearing bores. Any smaller clearance and distortion from engine heat may cause jamming. If wear causes this clearance to increase appreciably, the resulting air leak will alter engine performance. To correct, a new body casting will be needed. As an alternative, the bearing bores may be reamed to oversize and suitable oversize throttle spindle will be required. Any levers or fittings connected to the spindle will also have to be changed to oversize.

Loose Piston Guide Key

If key is riveted type, it can be retightened by lightly riveting over the outer end. Take care not to strike too hard as this may distort the casting in the area of the piston bore.

Throttle Valve Assembly

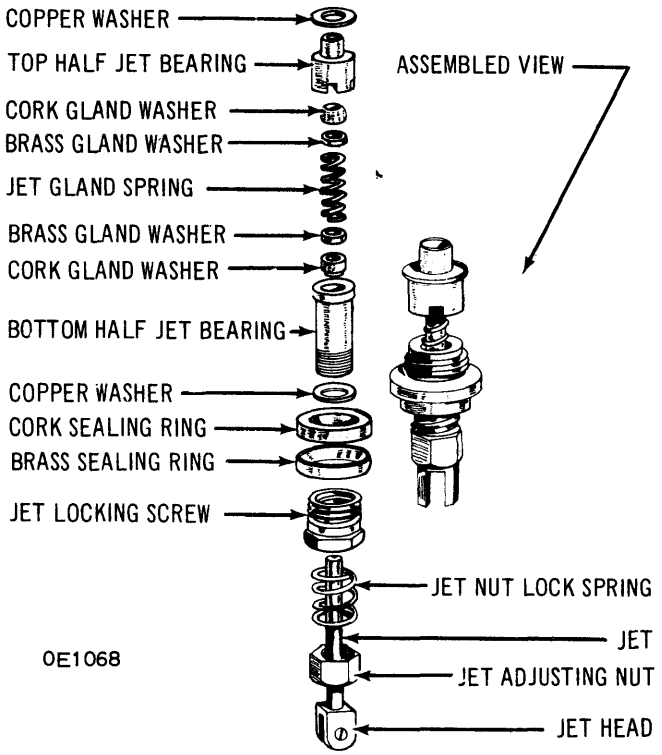
Turn throttle spindle so that the slot is in line with the main bore. Slide the valve into place. Turn the spindle until the throttle is closed and adjust until the holes in the valve match up with those in the spindle. Insert the attaching screws in these holes but do not tighten. Open throttle and close it again with some force. This will exactly center the valve in relation to the throttle bore. Place tension on spindle to hold valve shut and tighten the attaching screws. Hold carburetor up to light to check that throttle valve closes completely and is centered. After tightening screws, open out the split end of the screws a small amount. This will prevent loosening of the screws.

Jet Unit Assembly (Early Type Standard)

Assemble the bottom half jet bearing, its mating copper washer, the jet screw, the jet adjusting nut and its locking spring. By hand, screw up as far as it will go. Then insert the jet upwards into the bottom half bearing and slide one of the small cork glands with its mating brass washer (dished side down) into the bottom of the jet bearing, using the spring to push them there. Drop large coned metal sealing ring over the jet screw (cone up) and add large cork sealing ring (sometimes rubber). Slide second small brass washer (dished side up) and the second small cork gland. Install the top half bearing and the top copper washer. The complete unit can then be screwed into the carburetor casting finger tight. Jet must be centered before it is tightened. *See "Centering the Jet" in this section.*

H.S. & H.D. TYPE 1-BARREL (Cont.)

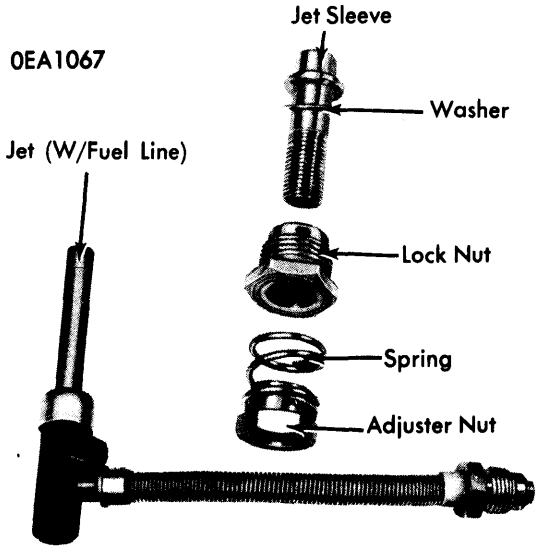
NOTE – There are two other types of jet assemblies, the "Thermo" jet and the "Invicta" jet. They differ only slightly from the standard jet.



EXPLODED VIEW OF JET (EARLY MODELS)

Jet Unit Assembly (Later Type Standard)

This unit is considerably simplified when compared to the early jets. The early model jets were fed through fuel line passages in the carburetor body, however the later models have a fuel line connected to the bottom of the jet itself. The jet units are not interchangeable although their functions are identical. The later type jet consists of the jet with its fuel line, a jet sleeve and washer, a jet locknut, the adjuster spring, and the adjuster nut. Adjustment of mixture is the same as the early unit.



JET DISASSEMBLY (LATE MODELS)

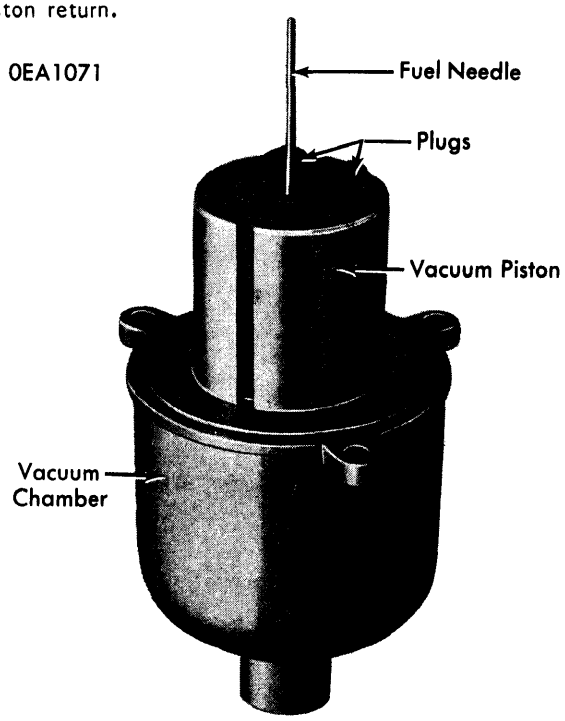
Invicta Jet – This jet has very limited movement and is not lowered, as is the standard jet, for cold starting. Its movement is only sufficient for general mixture strength adjustment. Jet is used only when a separate cold start device is installed.

Thermo Jet – This jet is used in conjunction with the electrically controlled cold starting auxiliary unit. The main difference between this and the standard jet is a much stronger internal spring and no second gland in the lower half jet bearing.

TROUBLE SHOOTING & TESTING

Piston Sticking

The suction disc, piston, and needle all have suitable clearances to prevent sticking. If sticking does occur, the whole assembly should be carefully cleaned and the piston **rod** should be lubricated with a spot of thin oil. *NOTE – Do not apply oil to any part except the piston rod.* To test for a sticking piston, remove piston damper and lift piston with a pencil or similar instrument. The piston should come up freely and fall freely back on the bridge when released. The piston return spring should not be stretched or increased in tension to improve the rate of piston return.



PISTON & SUCTION CHAMBER

Float Chamber Flooding

When fuel flows from the breather hole in the top of the float chamber lid below the main fuel feed pipe, the float bowl is flooding with too much fuel. This is usually caused by dirt between the float chamber needle and its guide. To correct, remove float chamber lid, and clean lid and guide thoroughly.

Float Needle Sticking

If engine stops, seemingly from lack of fuel, although there is fuel in the tank and the fuel pump is working properly, the most usual cause is float needle sticking. Check that fuel is being delivered to the float chamber by removing the fuel line and activating the pump. To correct, remove float chamber lid and thoroughly clean the needle and seating.

H.S. & H.D. TYPE 1-BARREL (Cont.)

It is advisable to clean the entire fuel system if float needle sticking is detected, as this problem is caused by foreign matter in the fuel.

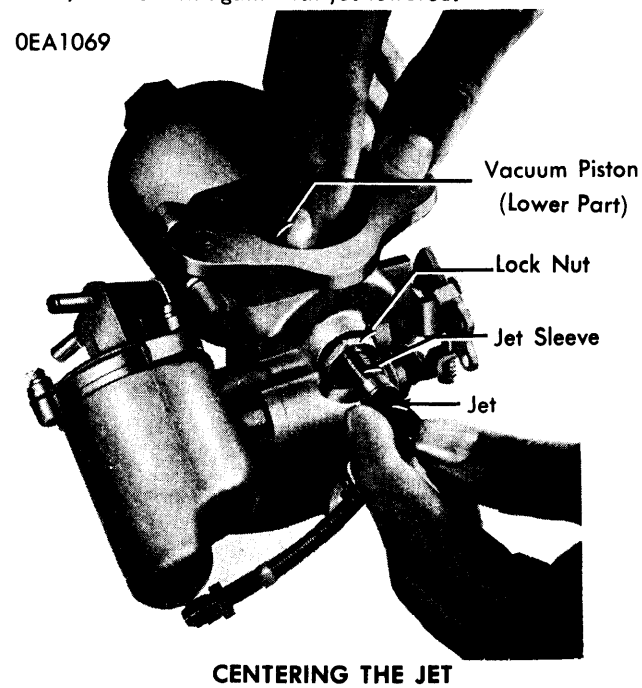
Fuel Leakage From Jet

If continual leakage is observed at the base of the jet unit, it is probable that the two small jet washers (nylon or cork), and the large sealing ring need replacement. Remove jet unit, disassemble and replace with new parts. After reassembly, jets must be recentered. *See "Centering the Jet" in this section.*

ADJUSTMENTS

Centering The Jet

1) Lift piston with piston lifting pin and allow piston to fall. If piston falls freely and a definite soft metallic click is heard, jet is centered. Check operation first with jet raised, then check again with jet lowered.



CENTERING THE JET

2) If piston does not fall freely with jet raised, but does fall freely with jet lowered, the jet bearing and jet must be recentered. *NOTE – Jet centering is best accomplished when carburetors are removed and placed on a bench for servicing.*

3) Disconnect lever between jet head and interconnecting lever, unscrew fuel line connection at float bowl, and remove tube and jet as a unit. Unscrew jet adjusting nut, remove spring, and screw nut up to its fullest extent. Refit jet head and feed tube. Loosen jet locking nut until jet bearing is just free to rotate with finger pressure.

4) Remove piston damper from top of suction chamber and gently press piston down onto jet bridge. Tighten jet locking nut, making sure jet head remains in correct position.

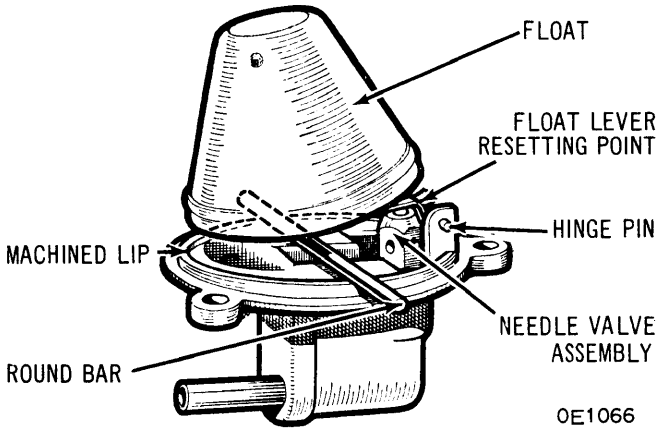
5) Lift piston and check that it falls freely with jet in raised and lowered positions. When operation is satisfactory, and adjustments are completed, replace adjusting lock spring and jet operating lever. Reconnect fuel line to float bowl.

Float Level

1) The position of the forked lever in the float chamber must be such that the level of the float insures a correct fuel level.

2) Insert a 1/8-3/16 in. (3.18-4.76 mm) round bar between forked lever and the machined lip of the float chamber cover. On those models with metal floats use a 5/16 in. (7.94 mm) round bar.

3) The prongs of the lever should rest on this bar when needle is on its seat. If not, the lever should be reset at the point where the prongs meet the shank. *NOTE – Do not bend shank. It must be flat and at a right angle to the needle when needle is on its seat.*



CHECKING FLOAT LEVEL

Idle Adjustment

NOTE – Engine must be at normal operating temperature before adjustments are made.

1) Loosen actuating rods on multi-carburetor systems. Close all throttles completely by unscrewing throttle adjusting screws. Then turn each adjusting screw in one full turn.

2) Remove piston and suction chambers, disconnect jet control cables and turn each jet adjusting nut until each jet is flush with the bridge of its carburetor, or as near this as possible. (The jets of multi-carburetor systems must be in the same relative positions).

3) Replace pistons and suction chamber assemblies and check that pistons fall freely to the bridge of the carburetor. Turn each jet adjusting nut down two complete turns (12 flats).

4) Start engine and adjust throttle adjusting screws to give desired idle speed. Turn each adjusting screw an equal amount. On multi-carburetor systems this is necessary to insure a relative synchronization of throttle valves.

5) Use a suitable balance meter to insure proper synchronization of throttle valves. Adjust each throttle stop screw so that the same amount of air is passing through the intakes.

6) Adjust each jet adjusting nut up or down by the same amount until the fastest idling speed is obtained which is

H.S. & H.D. TYPE 1-BARREL (Cont.)

consistent with even running. During this adjustment it is necessary to press jets upwards to ensure that they are in contact with the adjusting nuts.

7) As the mixture is adjusted the engine will probably run faster and it may be necessary to unscrew the throttle adjusting screws a little, each by the same amount, to reduce engine speed.

8) Check for proper mixture strength by lifting piston of front carburetor by approximately 1/32 in. (1 mm). If the engine speed momentarily increases very slightly, the mixture of that carburetor is correct.

9) If the engine speed increases, the mixture of that carburetor is too rich; if engine speed immediately decreases, the mixture of that carburetor is too lean.

10) On multi-carburetor system, repeat operation for other carburetors. Recheck each carburetor as the subsequent carburetors are adjusted. When the mixture is correct the exhaust note of the car should be regular and even. If it is irregular with a "splashy" type of misfire and colorless exhaust, the mixture is too lean. If there is a regular or rhythmical type of misfire, with a blackish exhaust, the mixture is too rich.

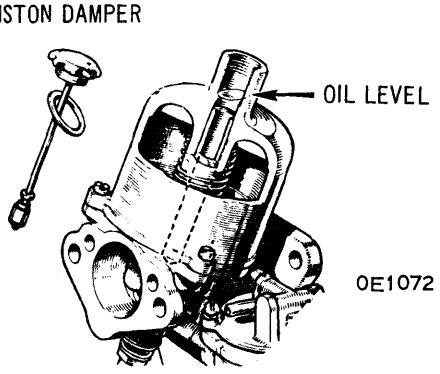
Fast Idle

Reconnect choke cable and make sure that the jet heads return against lower face of adjusting nuts when choke control is fully pushed in. Pull out control knob on dash until the linkage is about to move the jets (about ¼ in.), and adjust fast idle screw to give approximately 1000 RPM when engine is hot.

MAINTENANCE

Carburetor Lubrication

The reservoir on each carburetor must be topped up periodically with light engine oil. Under no circumstances should a heavy lubricant be used. SAE 30 is the heaviest oil that should be used. Unscrew reservoir cap, withdraw damper, add oil until oil level is ½ in. (13 mm) above top of hollow piston rod.



CARBURETOR LUBRICATION

Multiple Carburetor Linkage Lubrication

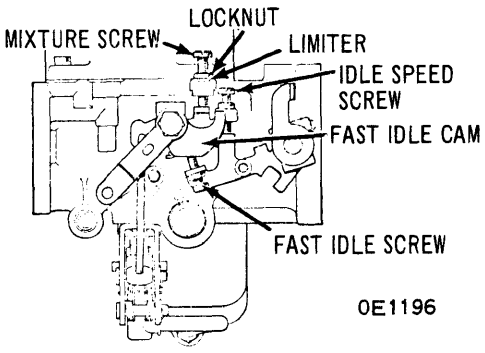
Periodically lubricate the moving parts of the linkage with a light visocosity oil (engine oil of the same weight as used to lubricate the carburetor damper reservoir.

Air Cleaners

Follow vehicle manufacturers recommendations for proper mileage intervals for either cleaning or replacing the air cleaners.

EXHAUST EMISSION CONTROL FEATURES

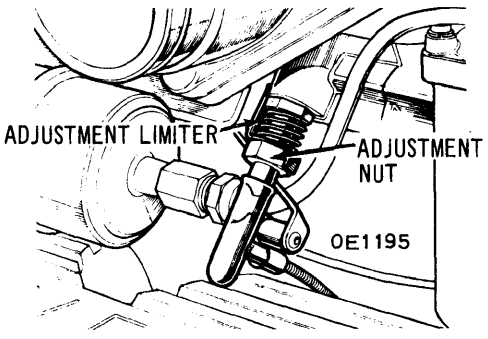
H.S. and H.D. carburetors built after 1967 incorporate modifications and features which obtain lower emission values and permit vehicles to conform to government standards. Depending on whether carburetor installation is twin or single, the following listed devices or modifications may be used.



JET ADJUSTMENT LIMITER - TWIN

Jet Adjustment Limiters

Carburetors on both twin and single installations are equipped with a limiting or locking feature on the jet adjustment screws or nuts (see illustrations). The limiters are set at the factory at a point which will permit maximum richness in compliance with emission standards. Adjustment of the jets further can only be made in a leaner direction.



JET ADJUSTMENT LIMITER - SINGLE

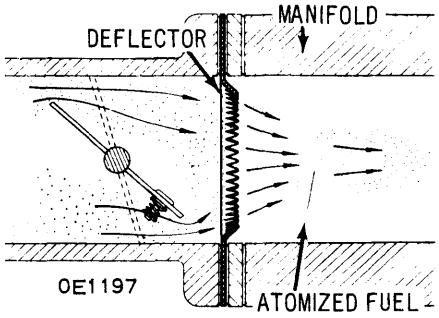
H.S. & H.D. TYPE 1-BARREL (Cont.)

Fuel Return System

Due to the relatively small fuel flow from fuel pump to carburetor, especially at low speeds or idling in traffic, the fuel may become overheated by high under-hood temperatures. To prevent such an occurence, the fuel is kept under a pressure of 3-4 psi and continually circulated between the fuel pump and fuel tank. The carburetor takes fuel from this continuous flow as it is needed.

Fuel Deflector Device

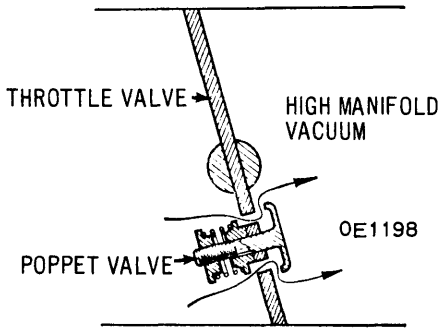
Deflector consists of a thin metal plate with a punched hole approximately the same diameter as the carburetor bore. The punched hole contains a complete circle of teeth spaced around its inner perimeter (see illustration). The teeth face inward toward the manifold. Purpose of the device is to prevent wet fuel from accumulating on the walls of the manifold. This allows the engine to operate with leaner mixtures.



FUEL DEFLECTOR

Poppet Valve (In Throttle Valve)

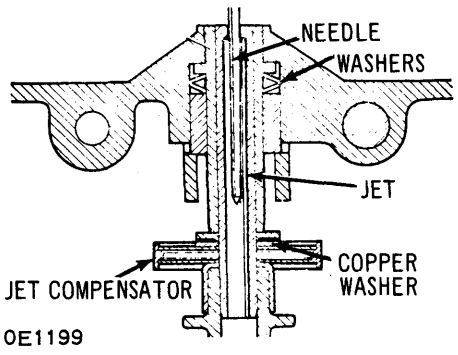
This small air-operated spring-loaded valve is set in the throttle valve (see illustration). At high intake manifold vacuum (such as engine overrun or coasting with closed throttle), the vacuum overcomes the valve spring to open the valve. With the valve open the normal volume of air/fuel mixture is supplemented, and with a retarded ignition timing setting correct combustion is obtained.



THROTTLE POPPET VALVE

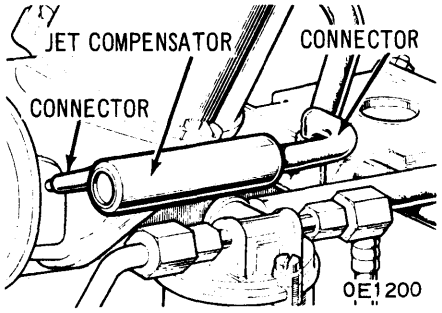
Jet Compensator

Type I – Small bi-metal discs are fitted between each jet assembly and the carburetor body. These discs (see illustration) compensate for changes in air intake temperature, and provide the correct air/fuel ratio to obtain lowered exhaust emission.



JET COMPENSATOR – TYPE I

Type II – An independently mounted device connected by rubber pipes to the intake manifold below the throttle valve. The compensator contains a bi-metallic valve which is sensitive to air intake temperature and provides an air bleed which by-passes the fuel jet and obtains a leaner mixture at high air intake temperatures (see illustration).



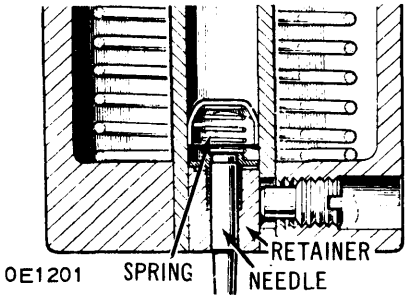
JET COMPENSATOR – TYPE II

Idle Retard Dashpot

A conventional spring and diaphragm type. Acts to prevent throttle valve from snapping completely closed when throttle pedal is completely released while shifting gears on manual transmission equipped vehicles. Effectively controls hydrocarbon emission during gear changes. The device is unnecessary on automatic transmission models since there are no high emissions during gear changes.

Spring-Loaded Needle

Carburetors may be equipped with a spring-loaded needle. The spring is used to maintain the needle in its correct relationship with the carburetor jet, improving the control of emissions (see illustration).



SPRING-LOADED NEEDLE