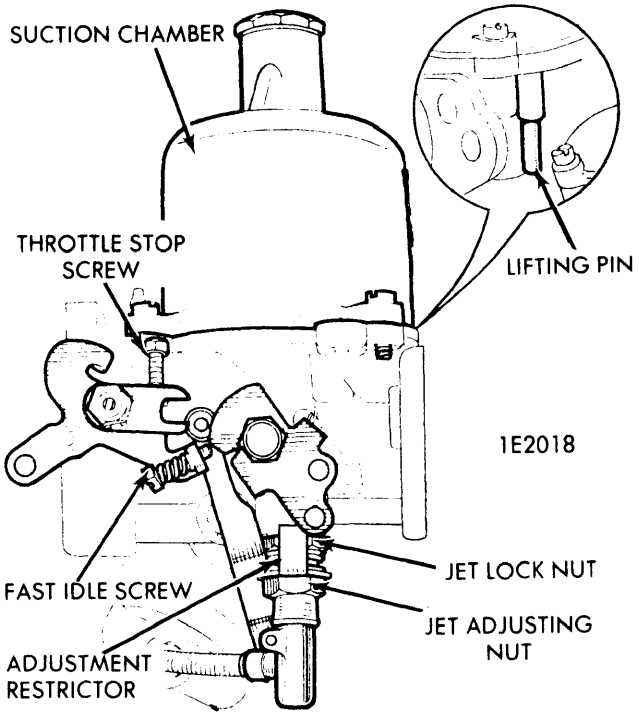
S.U. Carburetors

H.S. TYPE 1-BARREL

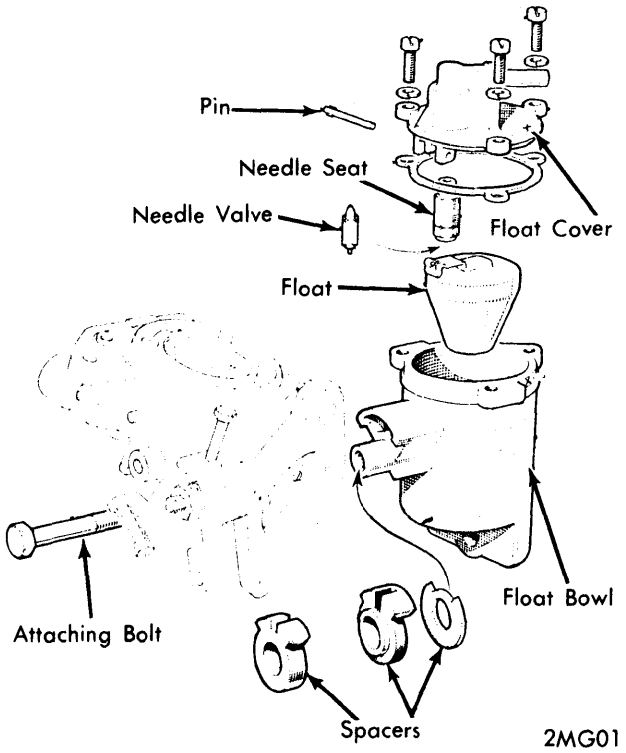
Austin America (1971)
MG Midget (1971-73)
MGB (1971-72)
Rover 3500S (1971-72)

DESCRIPTION

Carburetor is side draft design. Vacuum chamber has a piston which slides up and down, depending on manifold vacuum. This piston controls air flow through carburetor, and therefore controls acceleration. Piston is damped by oil filled chamber; which prevents piston from rising too rapidly on acceleration and yet allows mixture to increase in richness for sudden acceleration. For cold starts, a manual choke enriches air/fuel mixture by lowering jet away from needle. *NOTE – Some models (Rover 3500S) use an auxiliary carburetor for cold starts.* Function of this auxiliary carburetor is to provide richer mixture to intake manifold; and it replaces other conventional choke systems.



S.U. HS TYPE CARBURETOR



FLOAT CHAMBER

OPERATION

COLD STARTING

Choke lever lowers jet away from needle, and increases fuel flow. This system is activated by a manual choke cable, which also operates fast idle cam.

NORMAL OPERATION

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

ACCELERATION

Movement of piston in vacuum chamber is damped by oil. This damper prevents piston from rising to rapidly. Delay (or dampening) allows fuel from jet to be mixed with a smaller amount of air than usual, and enriches mixture. This enriched state is necessary for sudden throttle increase.

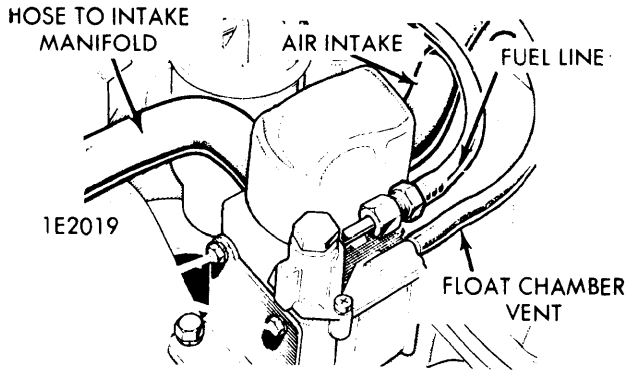
IDLING

There is no separate idling system, since this is accomplished through normal running of carburetor. When engine is at idle, only a small amount of air/fuel mixture passes through carburetors. Throttle valves are held open slightly by throttle stop screws. Idling of multiple carburetor systems is adjusted separately. Air/fuel mixture is adjusted by adjusting nuts on jets, which are located on bottom of carburetor.

FAST IDLE

When choke is pulled out, a choke lever (on bottom of carburetor) lowers jet, which causes air/fuel mixture to be enriched. At same time, throttle is opened more by fast idle cam. Both operations are controlled in amount and time, by choke control on dash.

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



AUTOMATIC ENRICHMENT CARBURETOR (ROVER 3500S)

AUXILIARY ENRICHMENT CARBURETOR

On Rover 3500S, this carburetor takes place of any other fuel enrichment device (choke). Carburetor is mounted on exhaust manifold and controls enrichment of fuel through use of a bi-metal, heat sensing valve. As engine warms up fuel flow stops; but air continues to flow into intake manifold. Therefore, even when engine has reached normal operating temperature, there is air flowing into intake manifold through this auxiliary carburetor. For this reason, a manual shut-off valve is incorporated to disable this carburetor, when making idle adjustments. To set fast idle, there is an adjustment screw on top of the carburetor.

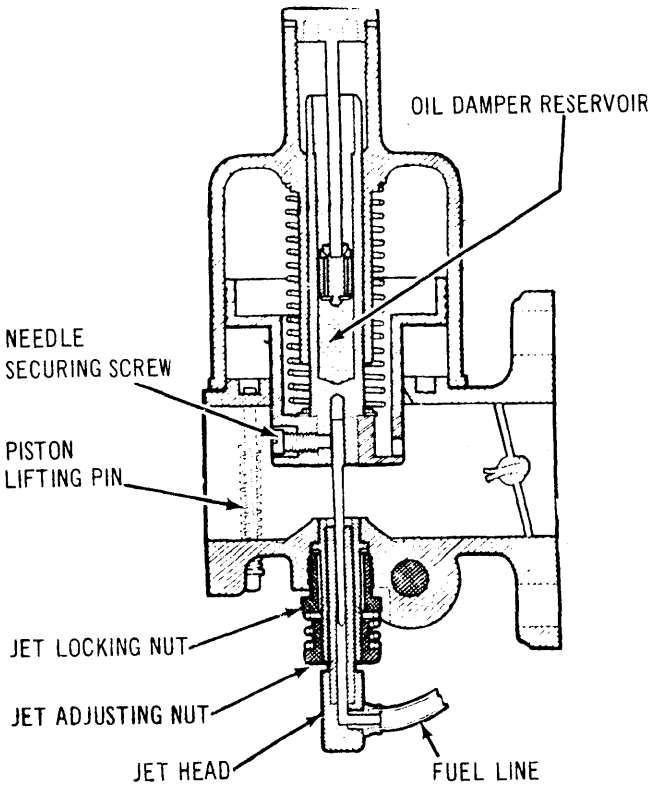
OVERHAUL

DISASSEMBLY

Remove carburetors from engine. Remove damper plungers, suction chambers and pistons. Unscrew 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

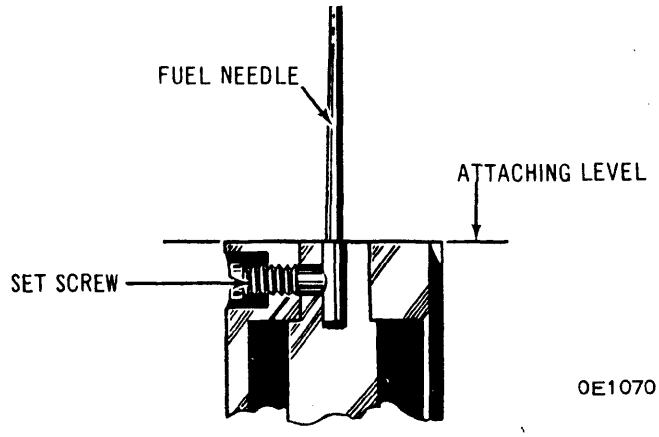
Remove float bowl cover, turn upside down and remove float lever pin and float. Screw out valve and fit a new valve. Replace float and pin. Refit cover, making sure that gasket is in good condition.



S.U. MODEL HS4 SECTIONAL VIEW (TYPICAL)

REPLACING FIXED NEEDLE

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

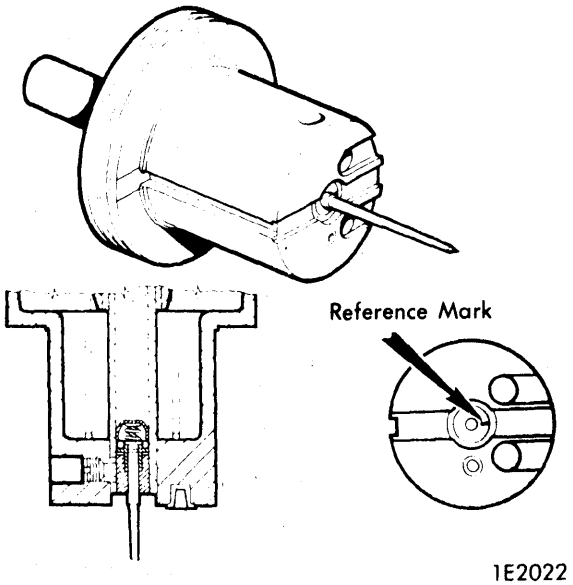


REPLACING FIXED NEEDLE

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

REPLACING SPRING LOADED NEEDLE

Loosen set screw and remove bushing, spring, and needle. Install new needle and spring, with bushing positioned so mark faces holes in bottom of piston (see illustration). Set screw in spring loaded piston is shorter than in fixed needle type. The spring is used to maintain needle in its correct relationship with carburetor jet, improving control of emissions.



REPLACING SPRING LOADED NEEDLE

THROTTLE SPINDLE BEARINGS

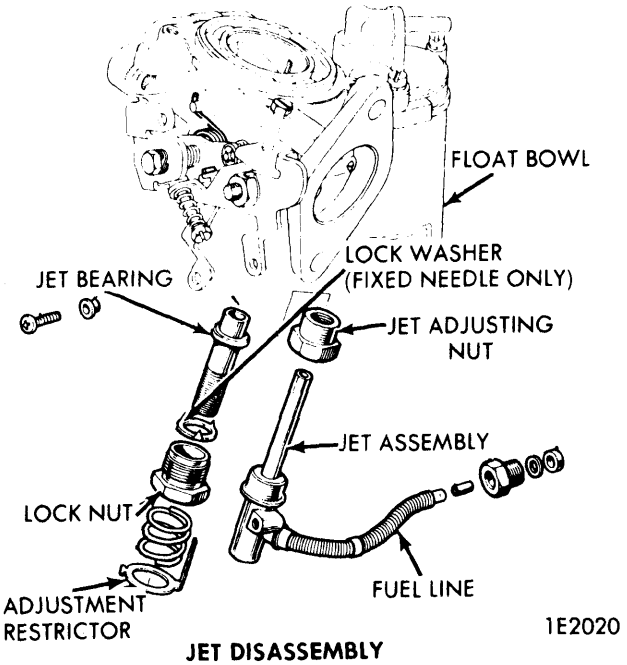
When new, there is about .0025" (.063 mm) clearance between diameter of spindle and its bearing bores. Any less clearance and distortion from engine heat may cause jamming. If wear causes this clearance to increase appreciably, resulting air leak will alter engine performance. To correct, a new body casting will be needed. As an alternative, bearing bores may be reamed to oversize and suitable oversize throttle spindle will be required. Any levers or fittings connected to 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 outer end. Take care not to strike too hard as this may distort casting in area of piston bore.

THROTTLE VALVE ASSEMBLY

Turn throttle spindle so that slot is in line with main bore. Slide valve into place. Turn spindle until throttle is closed and adjust until holes in valve match up with those in spindle. Insert 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 throttle bore. Place tension on spindle to hold valve shut and tighten attaching screws. Hold carburetor up to light to check that throttle valve closes completely and is centered. After tightening screws, open out slit end of the screws a small amount. This will prevent loosening of screws.



JET DISASSEMBLY

JET UNIT ASSEMBLY

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

INVICTA JET

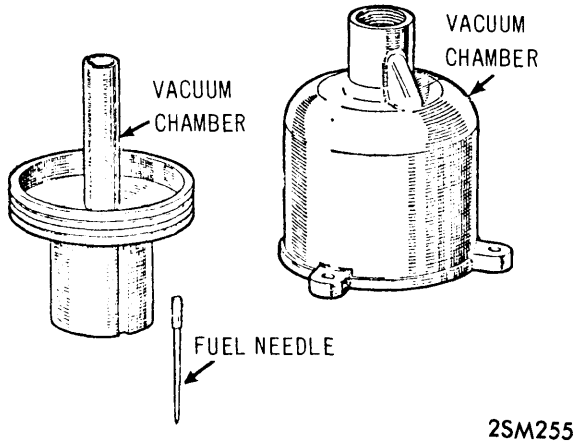
Used only when a separate cold start valve is used. This jet has limited movement and is not lowered, as is standard jet, for cold starting. Its movement is only sufficient for general mixture adjustment.

TROUBLE SHOOTING

PISTON STICKING

Vacuum disc, piston, and needle all have suitable clearances to prevent sticking. If sticking does occur, the whole assembly should be carefully cleaned and piston rod should be lubricated with a spot of thin oil. *NOTE — Do not apply oil to any part except piston rod.* To test for 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 bridge when released. Piston return spring should not be stretched or increased in tension to improve rate of piston return.

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



PISTON & VACUUM CHAMBER

FLOAT CHAMBER FLOODING

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

FLOAT NEEDLE STICKING

When engine stops from lack of fuel, check that fuel is being delivered to carburetor. To accomplish this, remove fuel line at carburetor and activate fuel pump. If sufficient fuel is noted, then fault is probably a sticking float needle. To correct, remove float chamber lid and throughly clean needle and seat. It is advisable to clean entire fuel system, as this problem is caused by foreign matter in fuel system.

FUEL LEAKAGE FROM JET

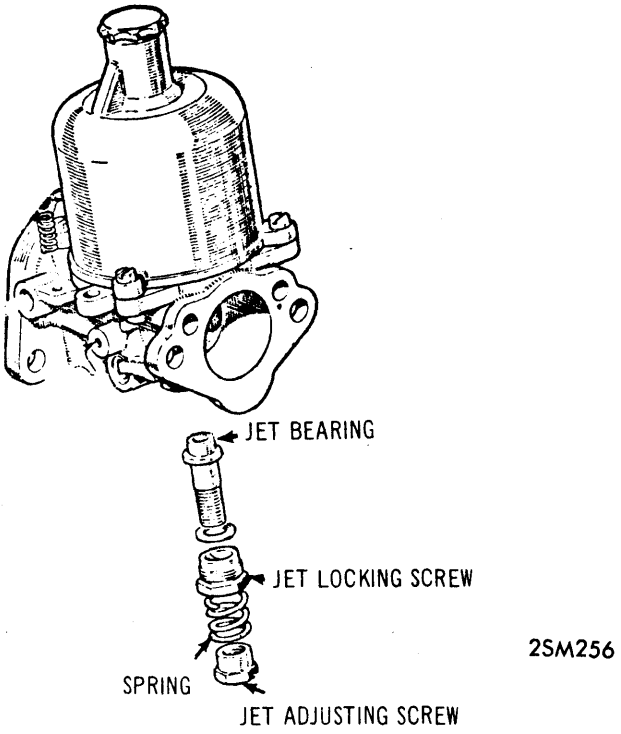
If continual leakage is observed at base of jet unit, it is probable that the two small jet washers (nylon or cork), and large sealing ring need replacement. Remove jet unit, disassemble and replace with new parts. After reassembly, jets must be recentered. *See Centering the Jet in this section.*

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. *NOTE — No jet centering is required with spring-loaded type jet needle.*

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

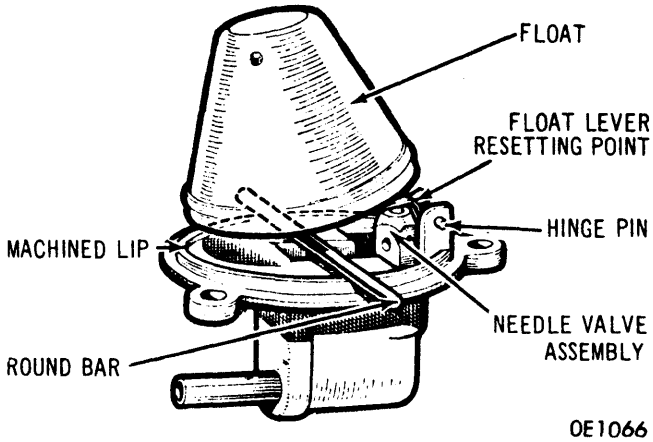


CENTERING THE JET

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, 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.



CHECKING FLOAT LEVEL

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

FLOAT LEVEL

1) The position of forked lever in float chamber must be such that level of 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 machined lip of float chamber cover. On those models with metal floats use a 5/16 in. (7.94 mm) round bar.

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

IDLE ADJUSTMENT

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

NOTE – Shut off manual control valve on "Automatic Enrichment Carburetor" on Rover 3500S before attempting idle adjustments.

NOTE – On emission control carburetor, jet adjustment limiters are fitted. Only a narrow range of jet adjustment is possible.

NOTE – On Rover 3500S make sure that vacuum pipe, air cleaner thermostatic switch to intake manifold, is securely plugged before starting tuning adjustments.

1) Remove air cleaners and loosen actuating rods on multi-carburetor systems. Close all throttle completely by unscrewing throttle adjusting screws. Then turn each adjusting screw in one full turn.

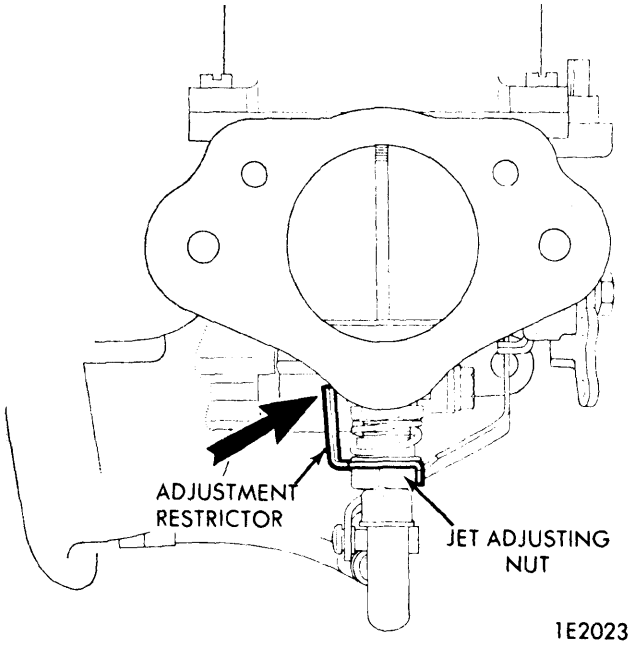
2) Start engine and adjust throttle adjusting screws to give desired idle speed. Turn each adjusting screw an equal amount. On multi-carburetor systems this is necessary to insure a relative synchronization of throttle valves.

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

4) Adjust each jet adjusting nut up or down by the same amount until fastest idling speed is obtained which is consistent with even running.

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

6) Using an accurate tachometer and CO meter, check CO level. If CO level doesn't fall within specified limits at proper RPM, hold jet adjusting nut to prevent it from turning, and rotate adjustment restrictor around nut until vertical tab contacts carburetor body on left-hand side, when viewed from air cleaner flange (see illustration). In this position, bend down small tab on adjustment restrictor so that restrictor locks nut and will follow its rotation. Recheck CO level.



CO LEVEL ADJUSTMENT

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

FAST IDLE

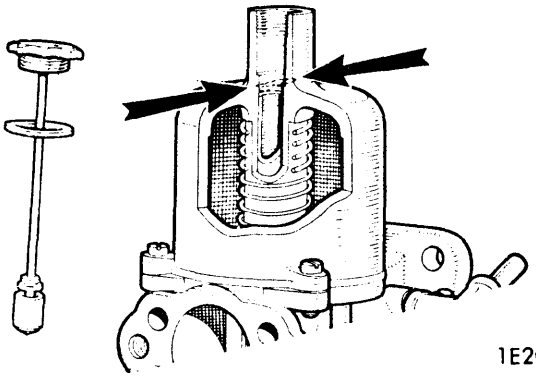
Reconnect choke cable and make sure that jet heads return against lower face of adjusting nuts when choke control is fully pushed in. Pull out control knob on dash until linkage is about to move jets (about 1/4"), and adjust fast idle screw to give approximately 1000 RPM when engine is hot.

MAINTENANCE

CARBURETOR LUBRICATION

The reservoir on each carburetor must be topped up periodically with light engine oil. Under no circumstances should 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 1/2" (13 mm) **above** top of hollow piston rod. On dust proofed carburetors identified by a transverse hole drilled in neck of vacuum chambers and no vent hole in damper cap, oil level must be 1/2" (13 mm) **below** top of hollow piston rod.

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



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DAMPER OIL LEVEL

MULTIPLE CARBURETOR LINKAGE

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

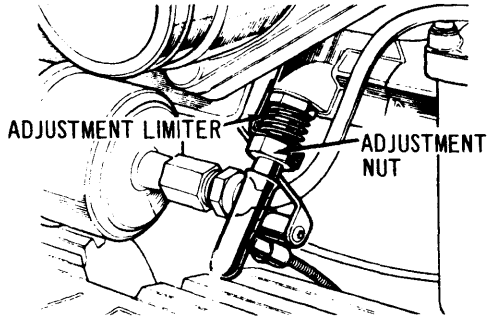
AIR CLEANERS

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

EXHAUST EMISSION CONTROL FEATURES

JET ADJUSTMENT LIMITERS

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

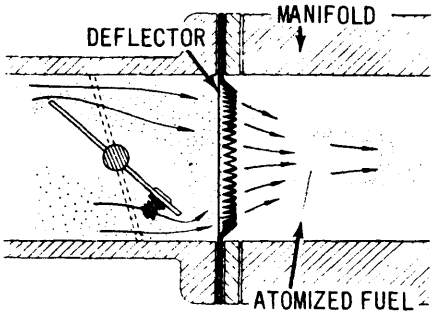


OE1195

JET ADJUSTMENT LIMITER – SINGLE

FUEL RETURN SYSTEMS

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



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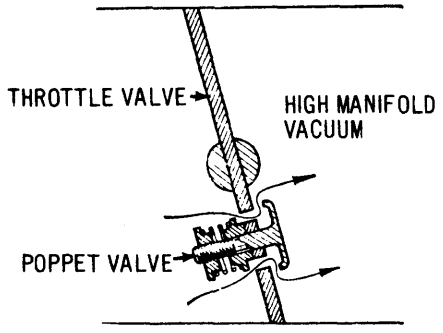
FUEL DEFLECTOR

FUEL DEFLECTOR DEVICE

Deflector consists of a thin plate of metal with a punched hole approximately same diameter as carburetor bore. The punched hole contains a complete circle of teeth spaced around its inner perimeter (see illustration). The teeth face inward toward manifold. This allows engine to operate with leaner mixtures.



OE1198

THROTTLE POPPET VALVE

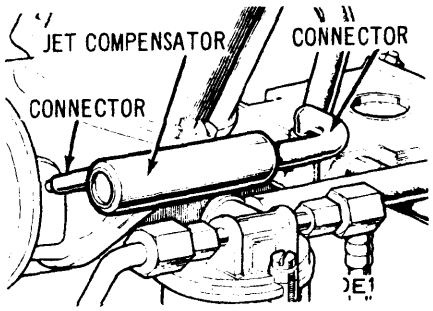
OVERRUN VALVE (POPPET VALVE)

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

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

JET COMPENSATOR

An independently mounted device connected by rubber tubes to intake manifold below throttle valve. Compensator contains a bi-metallic valve which is sensitive to air intake temperature and provides an air bleed which by-passes fuel jet and obtains a leaner mixture at high air intake temperatures (see illustration). Replace valve if faulty.



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JET COMPENSATOR

IDLE RETARD DASHPOT

A conventional spring and diaphragm type. It acts to prevent throttle from snapping completely closed when decelerating, or when shifting gears on manual transmission equipped models. It effectively controls hydrocarbon emissions during gear changes. This device is unnecessary on automatic transmission models, since there is no high emissions during gear changes.