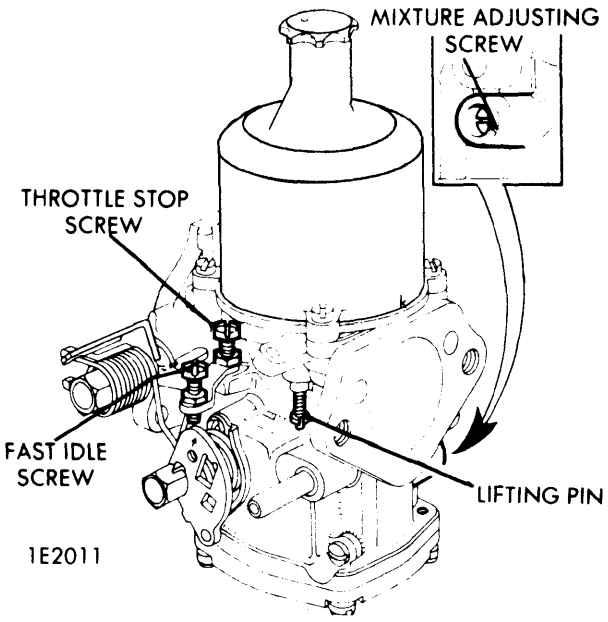
HIF6 TYPE 1-BARREL

Volvo 140 B20B Engine (1971-72)

NOTE — In 1972 B20B engine was sold in Canada only.

DESCRIPTION

Carburetor is a side draft emission control type. The vacuum chamber has a piston which moves up and down, depending upon manifold vacuum. This piston controls air flow through the 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 cold start valve provides an extra amount of air/fuel mixture and a fast idle cam increases engine RPM. Carburetor is also equipped with a temperature controlled fuel jet, overrun poppet valve (in throttle butterfly), and a hot start valve. Temperature controlled fuel jet, thermostatically controls air /fuel ratio over a wide range of operating temperatures. Overrun valve prevents overrich mixtures when throttle is closed suddenly (deceleration). Hot start valve vents hot fuel vapor from float chamber to prevent hard starting when engine is hot.



S.U. HIF6 TYPE 1-BARREL CARBURETOR

OPERATION

COLD STARTING

When choke is pulled, a cold start valve and a fast idle cam are actuated on front carburetor. Cold start valve spindle is hollow and has a V-slot linked to a transverse hole. As spindle is rotated, fuel flows from float chamber through spindle to venturi. The V-slot in spindle regulates amount of fuel passing through spindle, until spindle reaches a limit of rotation, at which time transverse hole aligns with passage to venturi allowing maximum flow of system. Also as spindle is rotated, a fast idle cam increases engine RPM.

HOT START VALVE

The purpose of hot start valve is to regulate an outlet from a passage in float chamber. When engine is hot or during high ambient temperatures, fuel vapors form in float chamber. With throttle set at idle, hot start valve is opened to allow fuel vapors to be vented from float chamber. When throttle is opened, hot start valve is closed to external venting and a passage is opened running to air cleaner. Fuel vapors are drawn into air cleaner and mixed with incoming air. By venting float chamber, hard starts are avoided when engine is hot.

NORMAL OPERATIONS

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

ACCELERATION

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

IDLING

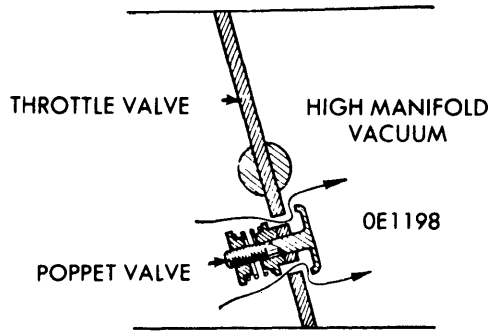
There is no separate idling system, as this is accomplished through normal running of carburetor. Due to up and down movement of piston in vacuum chamber, air volume is varied continuously. When engine is at idle, only a small amount of air/fuel mixture passes through carburetors. Throttle valves are held in a slightly open position by the idle stop screws. Idling of multiple carburetor systems is adjusted independently. Air/fuel mixture is adjusted by adjusting screws. These are located on front, right-hand side of carburetor. The air/fuel mixture screws are preset at factory to maintain a CO level of 2-3%. Screws are covered by plastic plugs and should not need adjustment.

AUTOMATIC MIXTURE CONTROL

A bi-metal spring located in float chamber controls height of fuel jet. As fuel temperature varies in float chamber, the bi-metal spring bends automatically varying fuel mixture ratio to compensate for different viscosities of fuel.

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 throttle closed), vacuum



OVERRUN VALVE (POPPET VALVE)

HIF6 TYPE 1-BARREL (Cont.)

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.

ADJUSTMENTS

IDLE ADJUSTMENT

NOTE — Check visually that both air valves have the same amount of lift after doing basic idle adjustment on Volvo 140. A more accurate synchronization is not required because of balance tube in intake manifold.

NOTE — Since carburetors are equipped with temperature controlled jets, floatchambers should be about the same temperature before starting adjustment. Prolong idling will cause loss of temperature regulation.

1) Remove air cleaner.

2) Lift air valve and screw in mixture adjusting screw until fuel jet is level with bridge in venturi. Then lower jet by turning mixture adjusting screw 2 1/2 turns clockwise. *NOTE — This is basic setting for a carburetor at 68°F (20°C). If temperature is above 68°F (20°) turn screw less than 2 1/2 turns and if lower turn more than 2 1/2 turns.*

3) Connect a tachometer and a CO meter. Run engine until water thermostat opens.

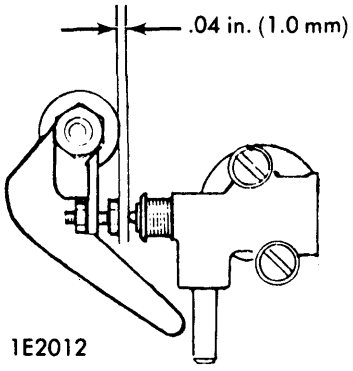
4) Adjust idle speed to 800 RPM (Man. Trans.), 700 RPM (Auto. Trans.) using throttle stop screws.

5) With CO meter, screw mixture adjusting screws in equally, until a CO value of 2-3% is reached. Before each adjustment briefly accelerate engine so that air valves are in their proper position.

6) Without CO meter, screw mixture adjusting screws in equally until maximum idling speed is obtained. Then unscrew until engine speed just begins to drop. Replace plastic plugs over mixture adjusting screws.

HOT START VALVE

With control rods pressed down to their bottom position, distance measured between rod and adjusting screw should be a maximum of .04" (1.0 mm) (see illustration).



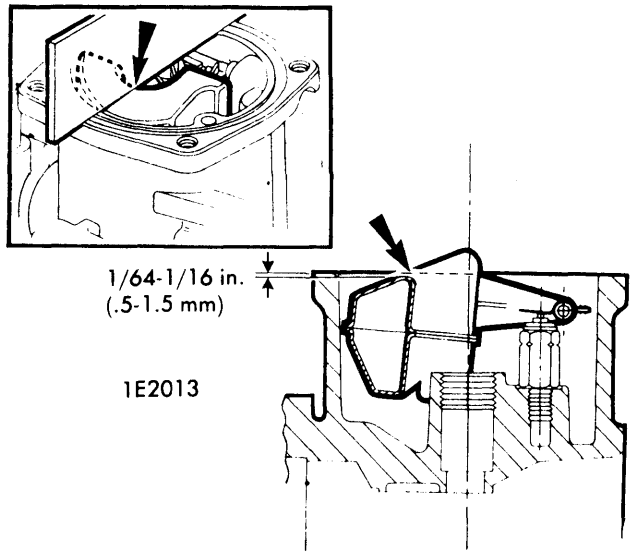
HOT START VALVE ADJUSTMENT

FAST IDLE

Pull choke knob out 1" (25 mm) from dash. Adjust fast idle to 1400 RPM (adjust on each carburetor equally).

FLOAT LEVEL

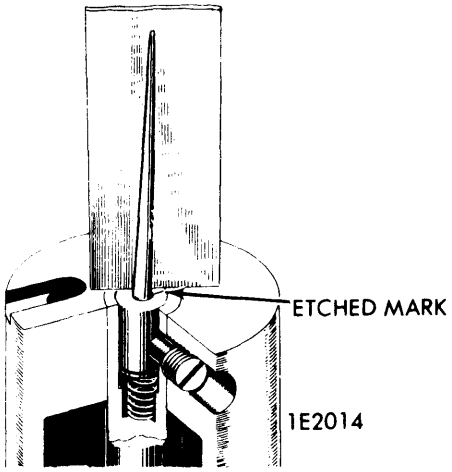
Invert carburetor and remove float chamber screws. Distance between float and flange is 1/64-1/16" (.5-1.5 mm) (see illustration).



FLOAT LEVEL ADJUSTMENT

METERING NEEDLE

Place needle in air valve with etched mark pointing away from holes in air valve (see illustration). Place guide bushing over needle and set flush with air valve. Take care not to over tighten setscrew.



METERING NEEDLE ADJUSTMENT

HIF6 TYPE 1-BARREL (Cont.)

OVERHAUL

DISASSEMBLY

1) Remove air cleaner and rod ball joints from carburetors. Remove all hoses and choke cable. Remove nuts and washers from mounting studs and take off carburetors.

2) Remove piston damper and its washer.

3) Unscrew piston suction chamber retaining screws and remove identification tag.

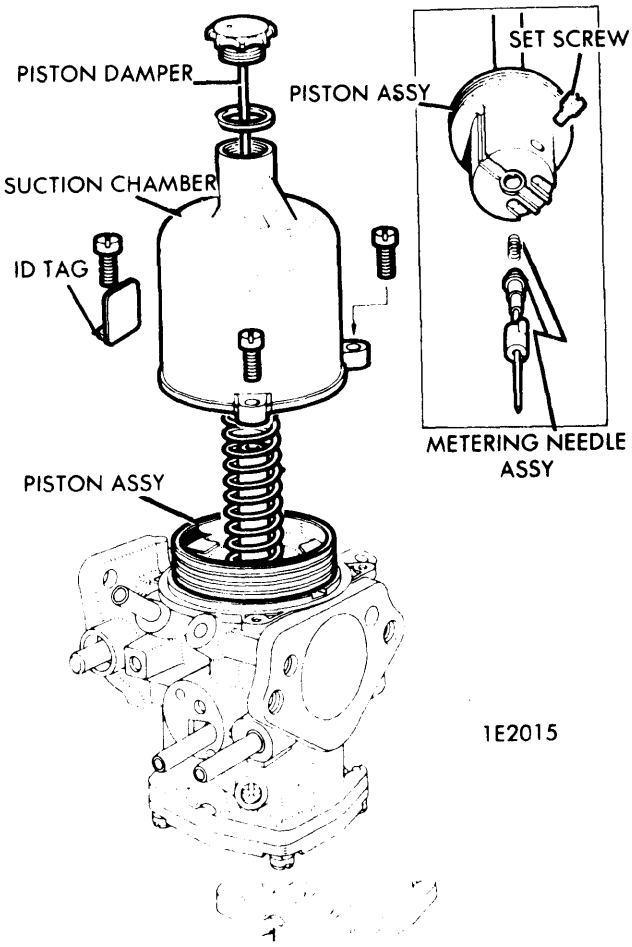
4) Lift chamber vertically from body without tilting it. Remove piston spring and piston assembly.

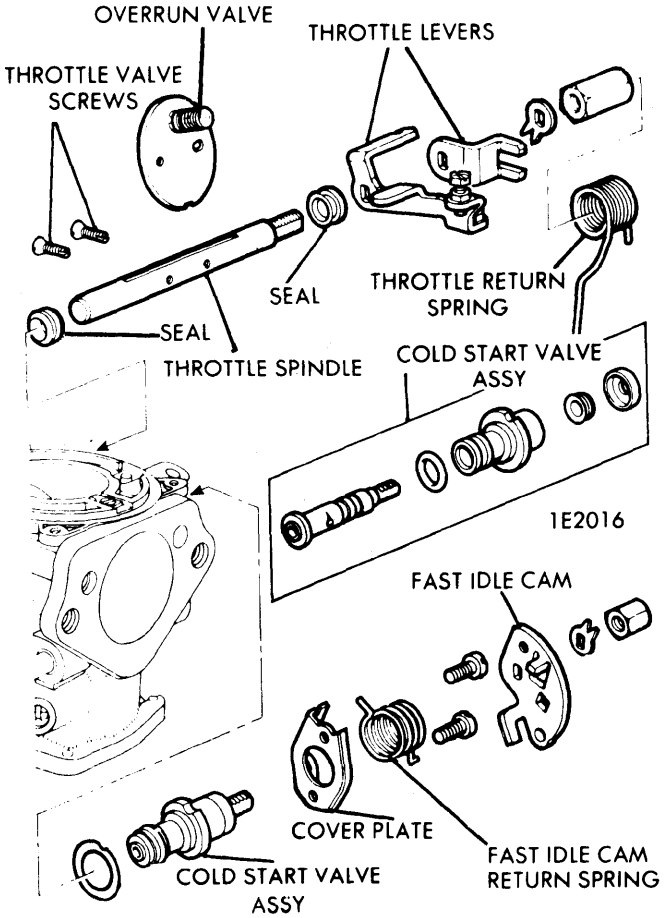
5) Unscrew needle guide locking screw. Withdraw needle guide and spring.

6) Mark bottom cover-plate and body to ensure correct reassembly. Remove screws and cover-plate complete with sealing ring.

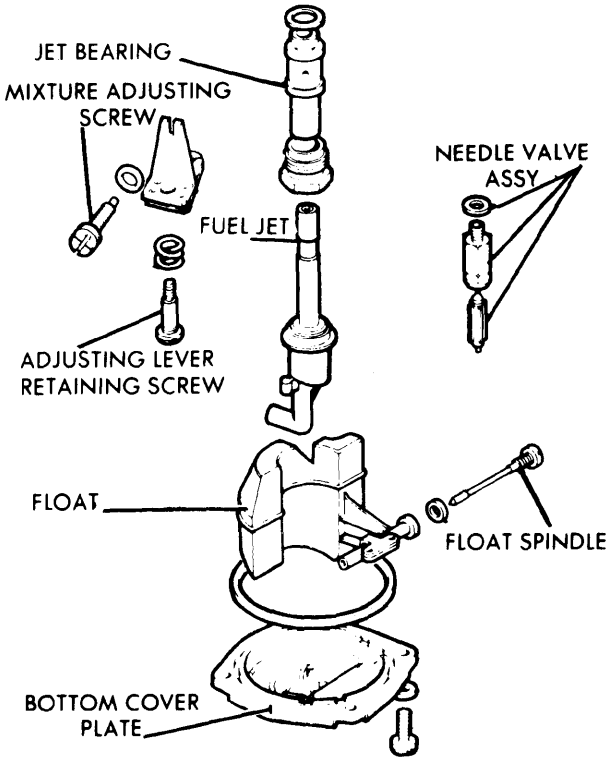
7) Remove mixture adjusting screw and "O" ring.

8) Remove jet adjusting lever retaining screw and spring.





S.U. HIF6 CARBURETOR DISASSEMBLY



S.U. HIF6 CARBURETOR DISASSEMBLY

HIF6 TYPE 1-BARREL (Cont.)

9) Withdraw jet complete with adjusting lever. Disengage lever and disengage bi-metal temperature control spring (Volvo 140) using care not to bend spring.

10) Remove float spindle and fiber washer. Then remove float and unscrew float needle and valve.

11) Unscrew jet bearing lock nut and withdraw bearing complete with fiber washer.

12) Remove fast idle cam retaining nut and washer. Note position of cam and lever.

13) With return spring held towards carburetor body, pry off cam lever and remove return spring.

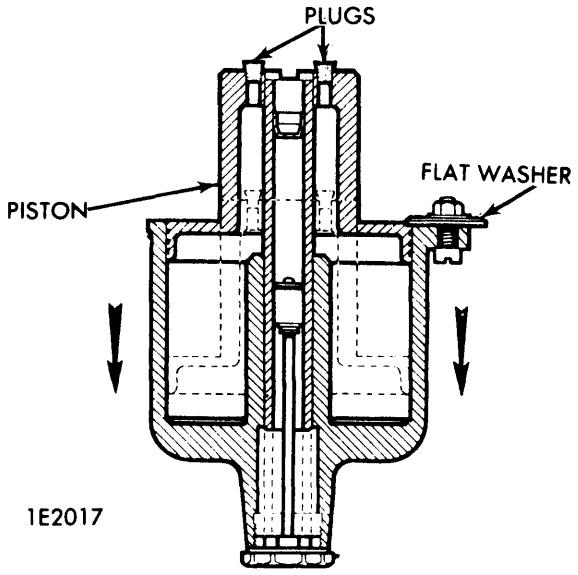
14) Remove screws from cover of cold start valve and withdraw cold start valve assembly. Pull out valve spindle, "O" ring, seals and dust cap.

15) Note location and loading of ends of throttle lever return spring and remove spring. Remove nut and tab washer retaining throttle levers.

16) Remove throttle lever and throttle actuating lever.

17) Remove throttle valve retaining screws. Withdraw throttle valve taking care not to damage throttle overrun poppet valve. *NOTE — New throttle valve retaining screws must be used on reassembly.*

18) Withdraw throttle spindle and seals.



AIR VALVE TIMING CHECK

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 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 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 bridge when released. Piston return spring should not be stretched or increased in tension to improve the rate of piston return. To check for proper function of air valve, remove suction chamber and air valve. Remove air valve spring and plug holes in bottom of air valve. Return air valve to chamber. Using a nut, screw and flat washer (see illustration), place flat washer so that it goes over edge of suction chamber to prevent air valve from being dropped. Raise air valve up against flat washer and then release. It should take 5-7 seconds for air valve to fall the full extent of its travel. If after thorough cleaning and checking for damage, timing doesn't fall within 5-7 seconds replace air valve and suction chamber.

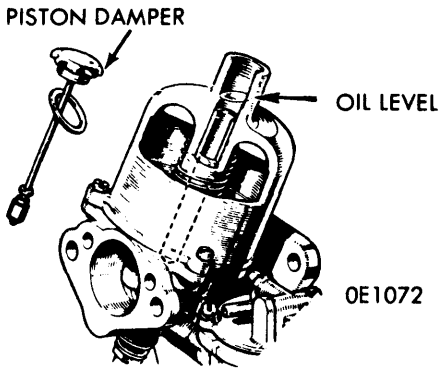
CARBURETOR FLOODING

If flooding occurs check float needle and float needle seat. Clean thoroughly and inspect for any signs of wear. If wear is found replace needle and needle seat. Recheck float level setting when replacing float needle assembly.

MAINTENANCE

CARBURETOR LUBRICATION

The reservoir on each carburetor must to filled periodically with automatic transmission fluid (Type A). Under no circumstances should a heavy oil be used. Unscrew reservoir cap, withdraw damper, add oil until oil level is 1/4" (7 mm) above top of hollow piston rod.



CARBURETOR LUBRICATION

MULTIPLE CARBURETOR LINKAGE LUBRICATION

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

AIR CLEANERS

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