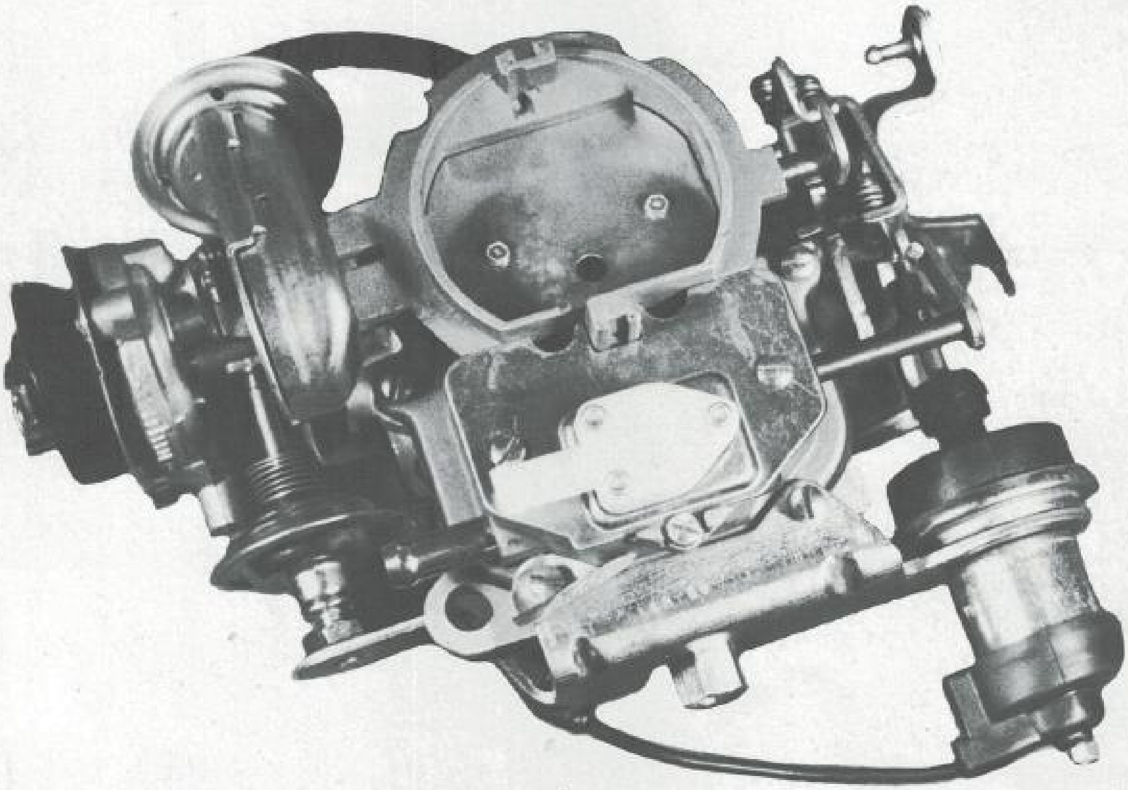
BBD-1¼"

SERVICE MANUAL

CARTER CARBURETOR



acf CARTER®

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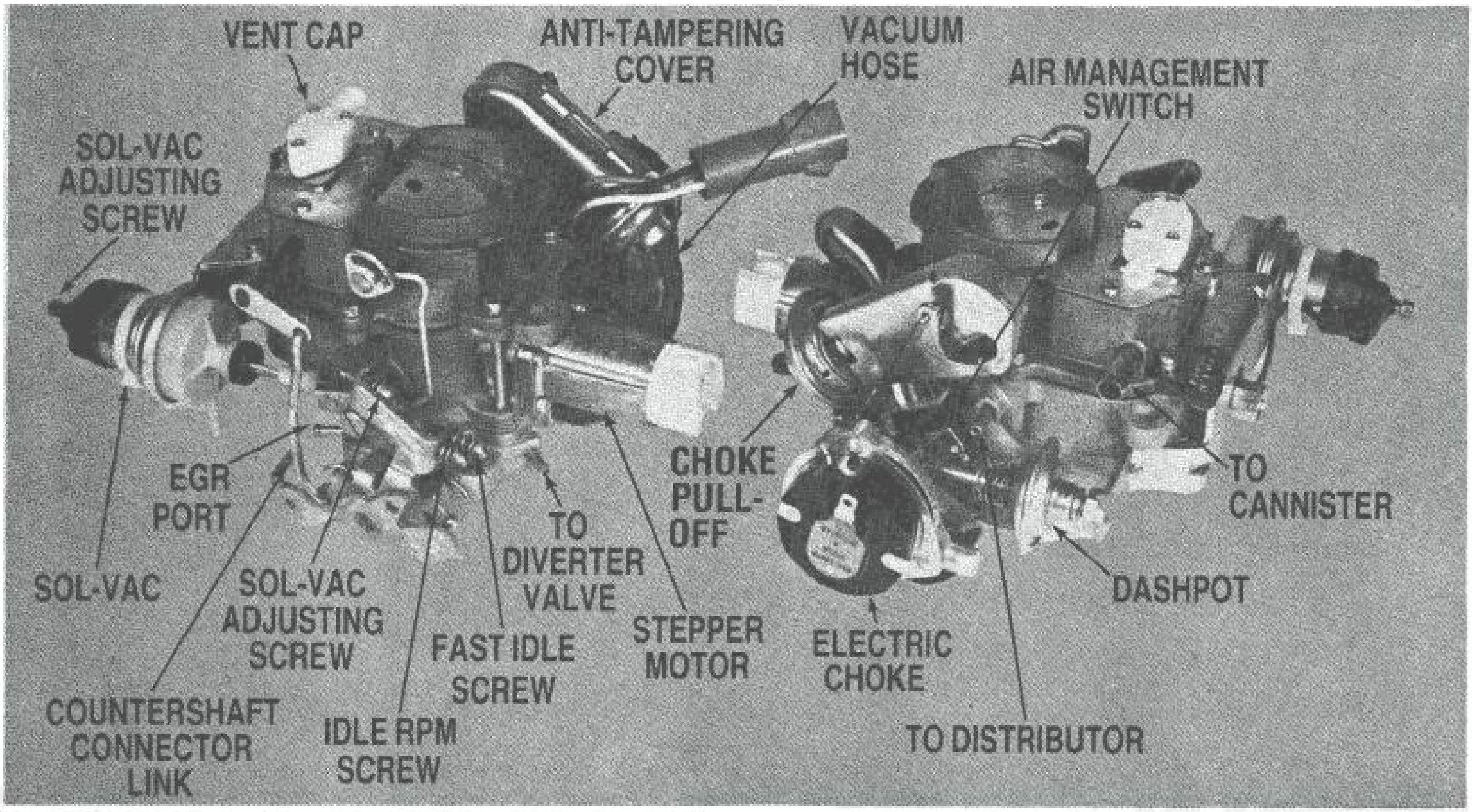
CARTER MODEL BBD 1¼"



DESCRIPTION

The model BBD is a BB design, dual carburetor with low overall height, accessible adjustments and removable subassemblies.

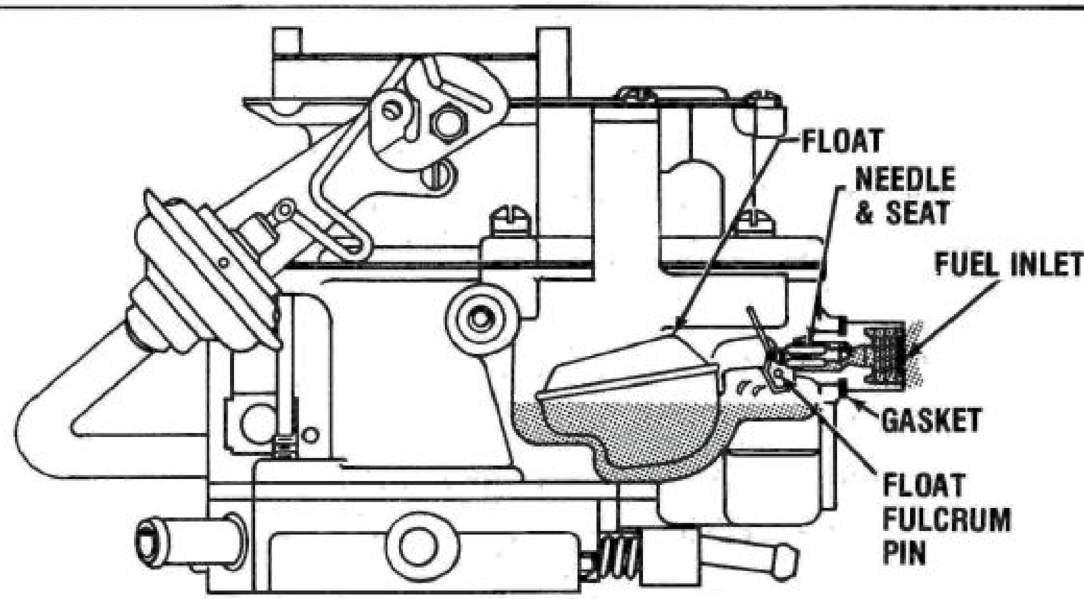
It has been supplied in both 1¼ and 1½ inch SAE flange sizes

Five conventional circuits are used. They are:

1. Float circuit
2. Low speed circuit
3. High speed circuit
4. Pump circuit
5. Choke circuit

All BBD carburetors prior to 1974 are of the air bled design incorporating downhill nozzles. 1974 and later models are of solid fuel design with uphill nozzles. The solid fuel design prevides more precise fuel metering to meet emission standards while still maintaining maximum response and driveability. For increased life and smooth operation the solid fuel design uses a teflon-coated throttle shaft.

CIRCUITS

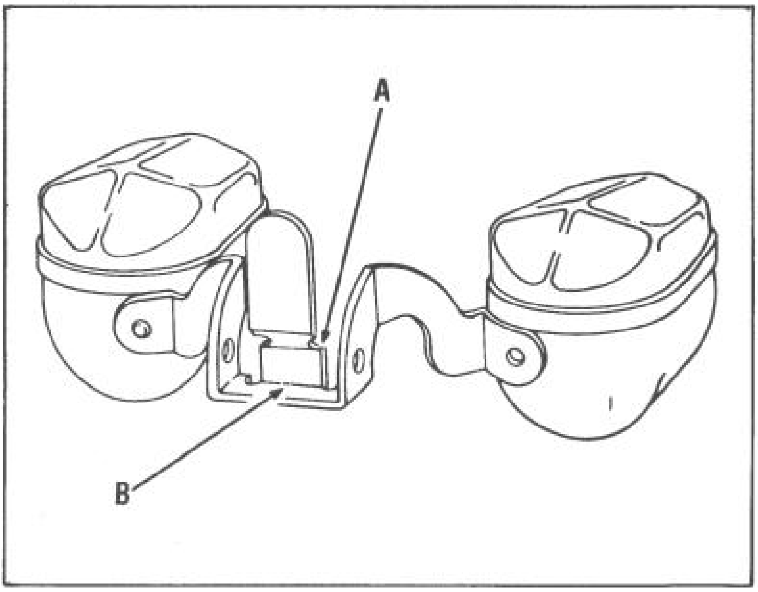


FLOAT CIRCUIT

All fuel enters through the fuel inlet fitting in the bowl. The fuel inlet needle seats directly in this brass fitting and is controlled by the twin or dual floats which are hinged by a float fulcrum pin. The fulcrum pin is held in position by the "horseshoe" retainer. The twin floats follow the contours of the fuel bowl and are designed to provide a stable fuel supply under all conditions. Only a minimum of fuel is maintained in the carburetor, preventing excessive fuel evaporization. This tends to improve warm engine starts.

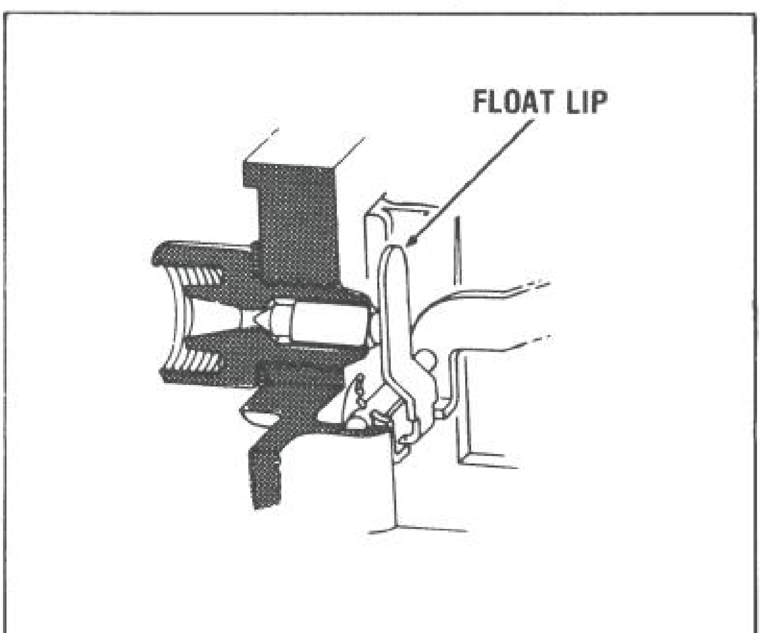
The float circuit must constantly maintain the specified fuel level as the other circuits are calibrated to deliver the proper mixture only when the fuel is at this specified level. When the fuel level in the bowl drops, the float also drops permitting additional fuel to flow past the inlet needle into the bowl.

The bowl is vented to the inside of the air horn. The bowl vent is calibrated to provide proper air pressure above the fuel at all times. To assure a positive seal, always use a new bowl cover gasket when reassembling. An air leak at this point can result in a mileage complaint.

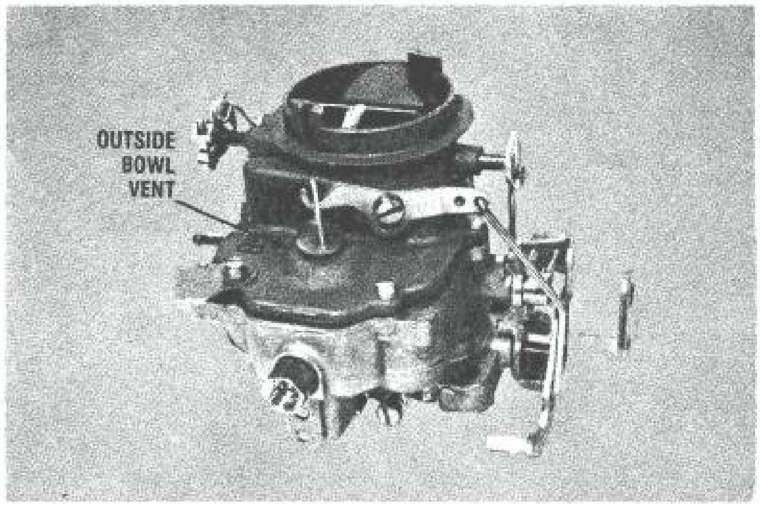


Float Adjustment

Remove float to adjust. **NOTE:** To obtain the proper alignment it may be necessary to bend float lip at either or both arrows "A" and "B". **CAUTION:** Never allow needle to be pressed into seat when making the adjustment.

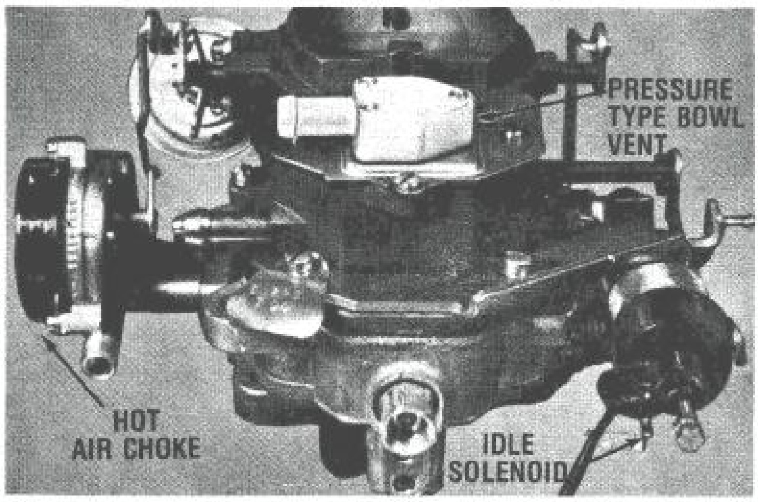


After the float adjustment has been made and set to the manufacturer's specifications, the float lip must be in the vertical position with the needle lightly seated.



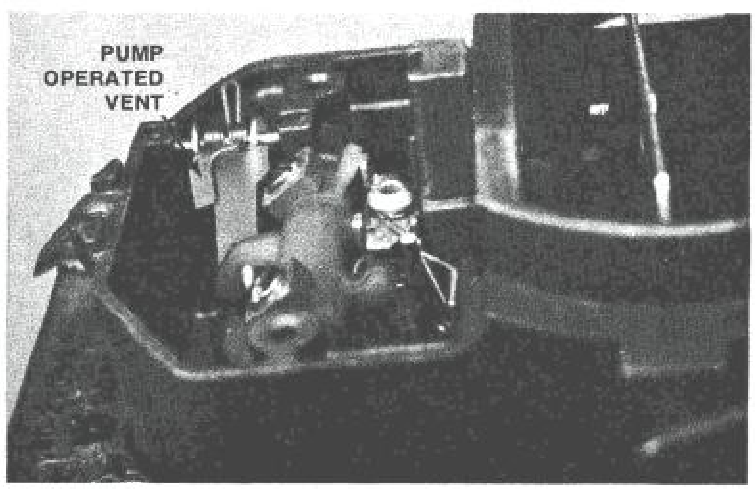
Venting the System

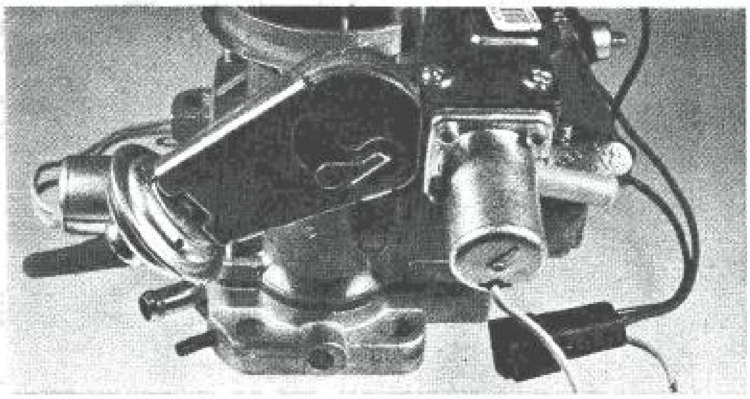
The BBD carburetor also uses an outside bowl vent that opens at the closed throttle position. When the engine is turned off, underhood temperatures increase causing vapors to rise from the fuel in the bowl. The outside vent improves starting characteristics as it prevents vapors from entering the bore of the carburetor by way of the inside vent.



Bowl vapor vent adjustment must be to specifications. If valve does not open to specifications with throttle valves seated, bowl vapors cannot escape freely and this may cause "hard-hot-starting." If it opens too far, or hangs open, it will allow an external vent to the bowl, resulting in poor mileage.

Emission Laws effective in 1971 required all outside vents to be routed to a canister to prevent evaporative emissions.



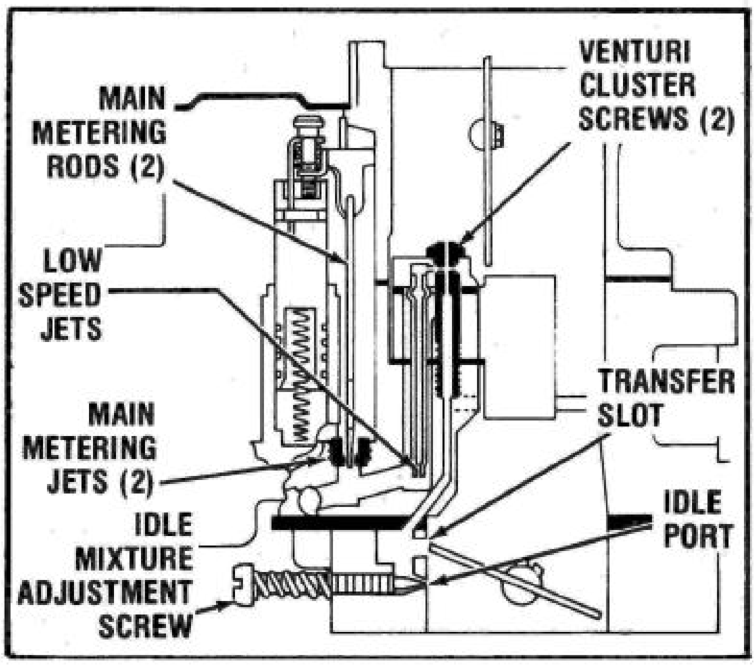


TWO WAY BOWL VENT

To meet evaporative emission regulations, late model BBD's use a solenoid controlled two way bowl vent.

When the ignition switch is in the off position, the spring loaded diaphragm forces the puck valve to its upper position, thus closing the inside carburetor vent and opening the canister vent. When the ignition switch is turned on, the solenoid is energized moving the puck to its downward position, thus closing the canister vent and opening the inside carburetor vent.

If the solenoid should fail, venting to the carburetor fuel bowl would be by way of the canister. This change in bowl pressure would effect driveability. An increase in bowl pressure causes a rich condition, lowering bowl pressure results in a lean condition.



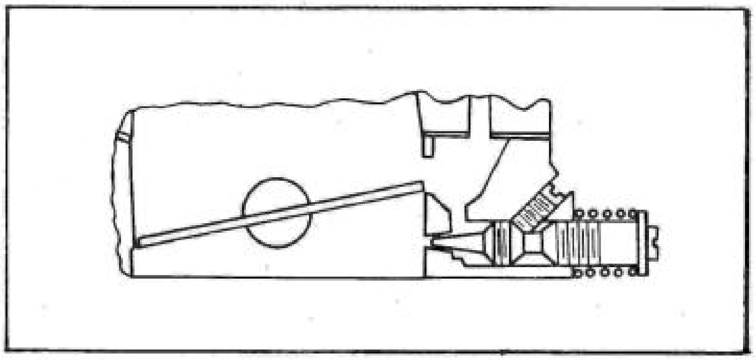
LOW SPEED CIRCUIT

Fuel for idle and early part throttle operation is metered through the low speed circuit.

Fuel enters the idle and high speed wells through the main metering jets. The low speed jets measure the amount of fuel for idle and early part throttle operation. The by-pass, idle air bleeds and economizers located in the venturi attaching screws, are carefully calibrated and serve to break up the liquid fuel and mix it with air as it moves through the passage to the idle ports and idle adjustment screw ports. Turning the idle adjustment screws toward their seats reduces the quantity of fuel mixture supplied by the idle circuit.

The idle ports are slot shaped. As the throttle valves are opened, more of the idle ports are uncovered allowing a greater quantity of fuel and air mixture to enter the carburetor bores.

The by-pass, idle air bleeds, economizers, low speed jets, idle ports, idle adjustment screw ports, as well as the bores of the carburetor flange, must be clean and free of dirt and carbon. Obstructions will cause poor low speed engine operation.



Idle Adjusting Screw

The idle bleed is into the bore of the carburetor on the atmospheric side of the closed throttle valve. The amount of bleed varies with throttle position.

Idle adjusting screws are used for trimming the idle mixture to individual engine requirements for satisfactory idle.

Emission Laws require use of idle adjusting screws with limited adjustability. This allows for proper idle adjustment while assuring the emission limits will not be exceeded.

One design uses an allen screw as a stop as it makes contact with the shoulder on the recessed portion of the idle adjusting screw.

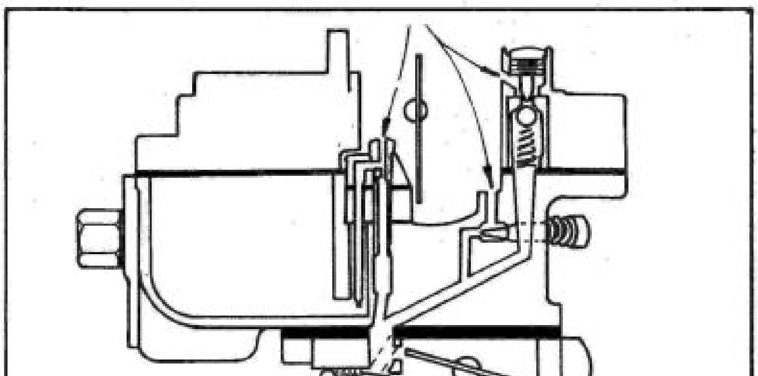
On flow test, the idle adjusting screw is turned in the counterclockwise direction to the mean rich limit. The allen screw is then turned in against the recessed shoulder of the idle adjusting screw. The allen screw hole is then filled with a lead plug.

Another version uses an idle adjusting screw which is completely recessed in the flange of the carburetor.

After final adjustment, it is sealed with a lead plug.

The upper adjusting screw is an air adjustment screw and adjusts the mixtures for both bores.

This air adjustment screw has left-handed threads. Turning the adjusting screw counterclockwise moves the screw inward to richen the air-fuel mixture.



Adjustable Off-Idle Air Bleed

Some older BBD models use an "adjustable off-idle air bleed" which is adjusted during flow test. This adjustment should never be changed as it cannot be adjusted in the field.

The purpose of the "adjustable off-idle air bleed" is greater control of the air-fuel ratio at flow rates above curb idle, resulting in substantial reduction in hydrocarbons.

The circuit consists of an adjustable spring loaded ball check valve located in an air passage to the low speed circuit.

Closer calibration can be attained by being able to adjust the idle fuel mixture at two different points in the air-fuel ratio curve.

The air bleed valve is set to open at an idle port vacuum of 7 to 12 inches of water which is slightly above the three to four inches at curb idle.

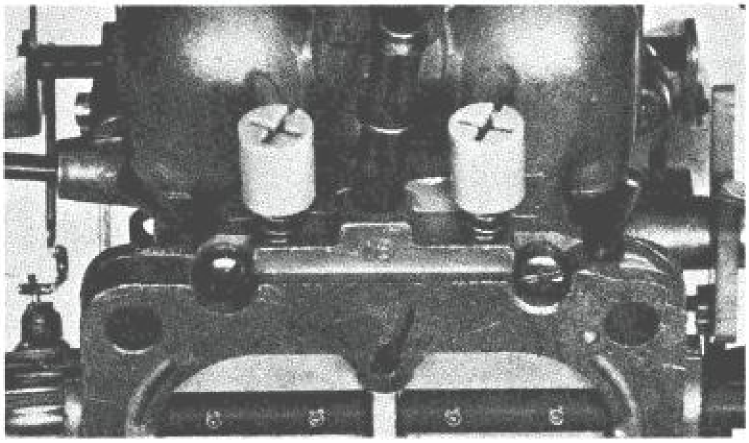
When the throttle is opened slightly, the lower pressure at the idle port opens the air bleed valve to control the air-fuel ratio.

If the rate of acceleration reaches a certain maximum, the vacuum at the idle port will drop below the 7 to 12 inches of vacuum allowing the air bleed valve to seat. This enrichment of the air-fuel mixture is desirable for a high rate of acceleration.

As the bleed port is below the closed position of the choke valve, air will not enter the air bleed valve until the choke valve is partly open, thus making the automatic air bleed inoperative during the early stages of engine warm-up.

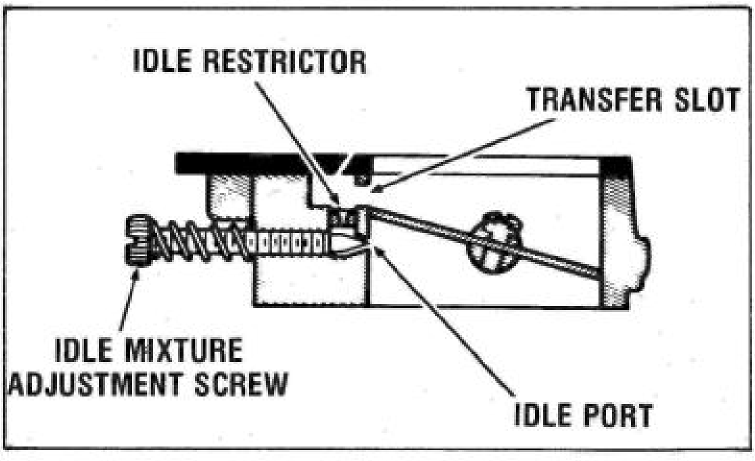
The air bleed valve will open on deceleration from high speed to prevent rich mixtures.

The "adjustable off-idle air bleed" is also used on some AVS models.



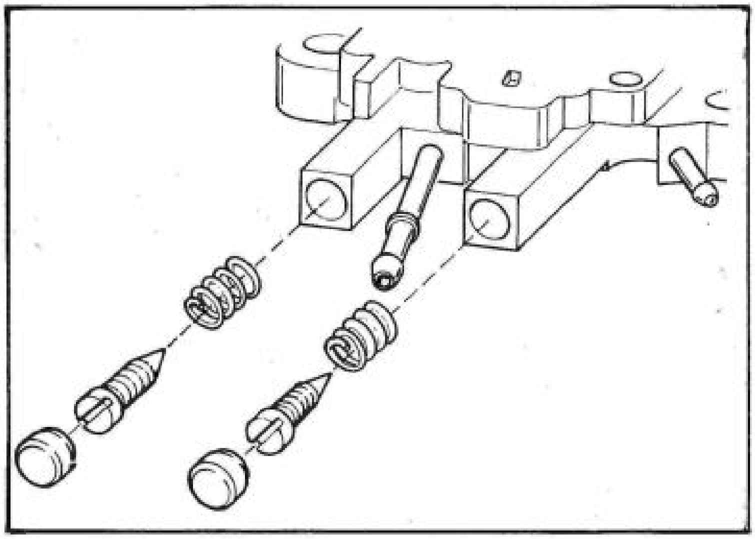
Idle Limiter Caps

All late model carburetors use idle limiter caps to prevent over-rich idle adjustments.



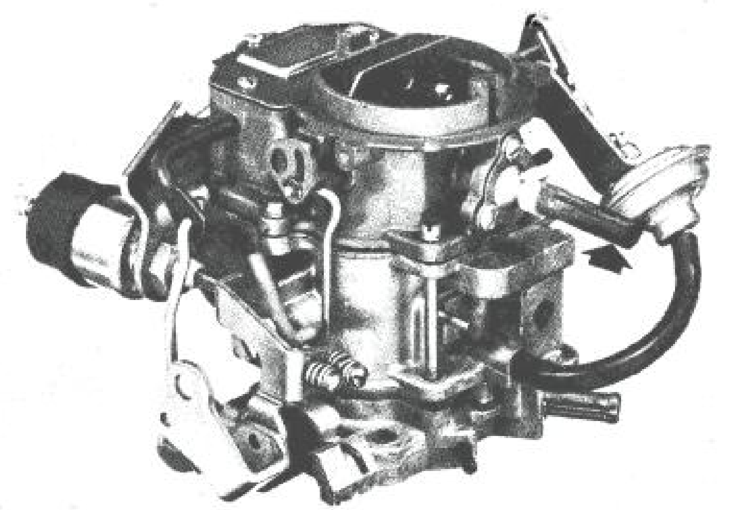
Idle Restrictors

In addition to limiter caps, some late models use idle restrictors located in the throttle body. The purpose of the restrictor is to limit the maximum air-fuel enrichment available at idle.



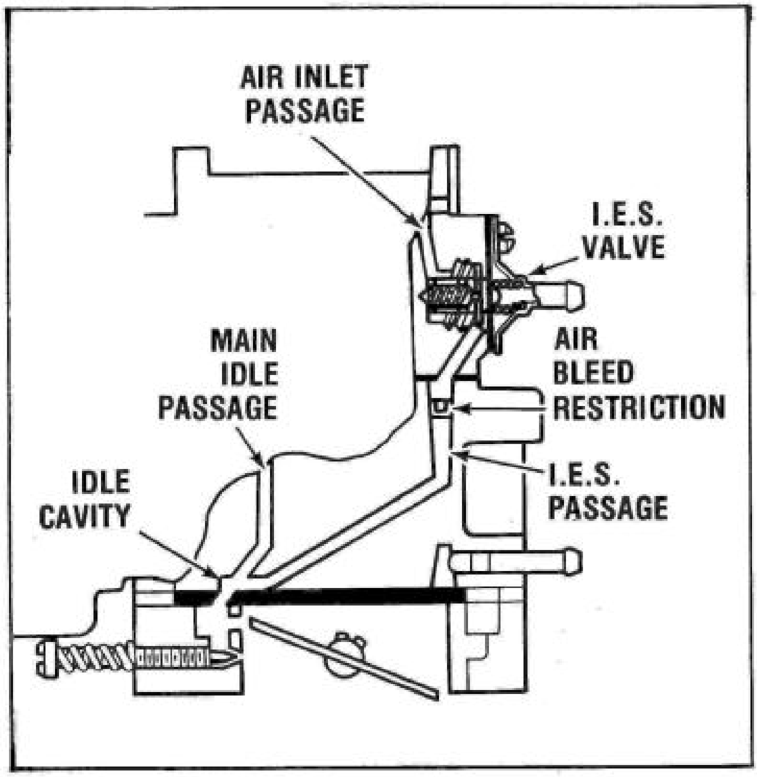
Tamperproof Mixture Screws

Some 1979 and later model carburetors will use the hidden "tamperproof idle mixture screws." These screws are adjusted and sealed at the factory. Adjustment of the sealed idle mixture screws should be performed only when the carburetor will not meet specifications or when a major carburetor overhaul is necessary.

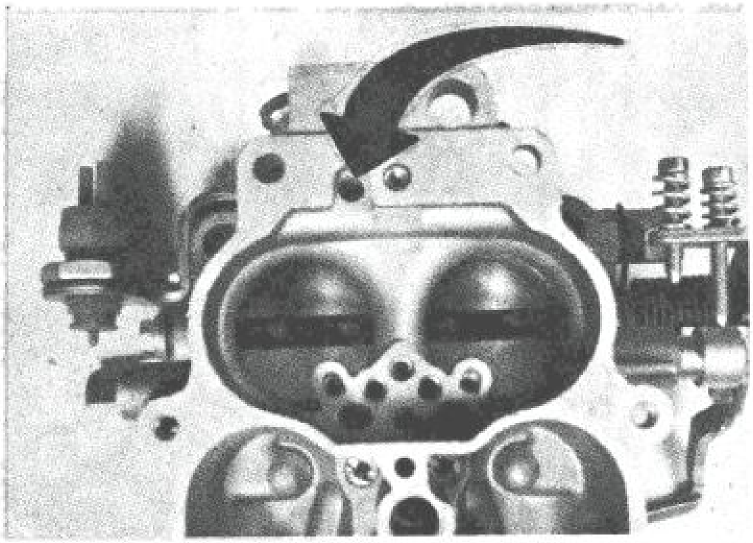


Idle Enrichment System

Some models use an IES, "Idle Enrichment System," to improve cold engine performance at initial starting of the engine. Along with this carburetor circuit or system, an electronic timer and vacuum solenoid valve are also used. The timer energizes the solenoid valve during starting and for 35 seconds after start. When the solenoid is energized it cuts off the EGR system which eliminates any exhaust gas recirculation from taking place. Secondly, it applies manifold vacuum to the idle enrichment diaphragm when the engine coolant is below a predetermined temperature. The manifold vacuum overcomes the spring tension and pulls the diaphragm away from the seat and valve, thereby allowing the valve to seat closing off the air passage. Cutting off the air supply enriches the idle mixture which allows more fuel to be delivered during starting

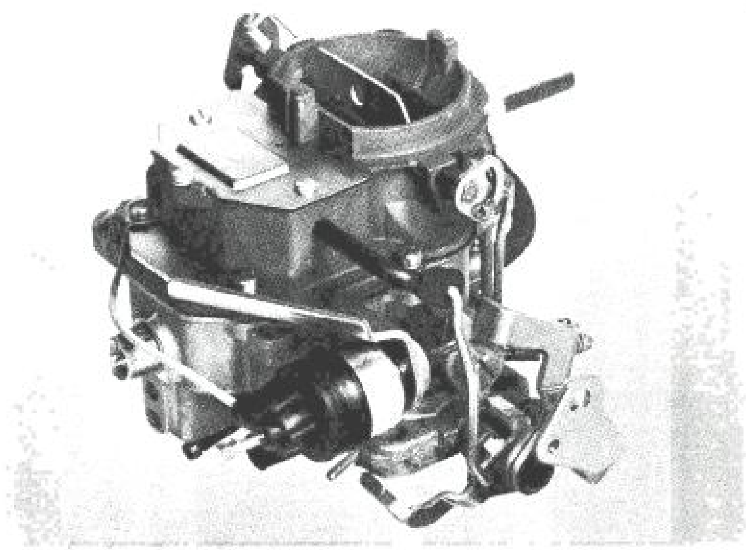


and for 35 seconds after start. After the 35 second delay period, the electronic timer de-energizes the solenoid valve which allows the EGR system to function and also cuts off the manifold vacuum to the idle enrichment diaphragm. The spring then pushes the diaphragm against the valve and seat assembly causing the valve to unseat. This in turn allows air to flow through the system and normal air-fuel ratio to be delivered to the cylinders. The purpose and results are improved hot engine starting by delaying the EGR for 35 seconds and improved cold engine performance after starting by initiating idle enrichment for 35 seconds.



Idle By-Pass Assist

Some BBD units incorporate an idle by-pass assist. This passage goes through the main body, the body gasket, through a passage in the throttle body and enters below the throttle valve. This extra air through the by-pass allows the throttle valve to close a little more for a given idle RPM. This reduces the CFM air flow over the nozzle tips and prevents the possibility of taking fuel from the nozzles during fast idle operation. It also causes a turbulence below the throttle valves to aid air-fuel mixture and distribution.

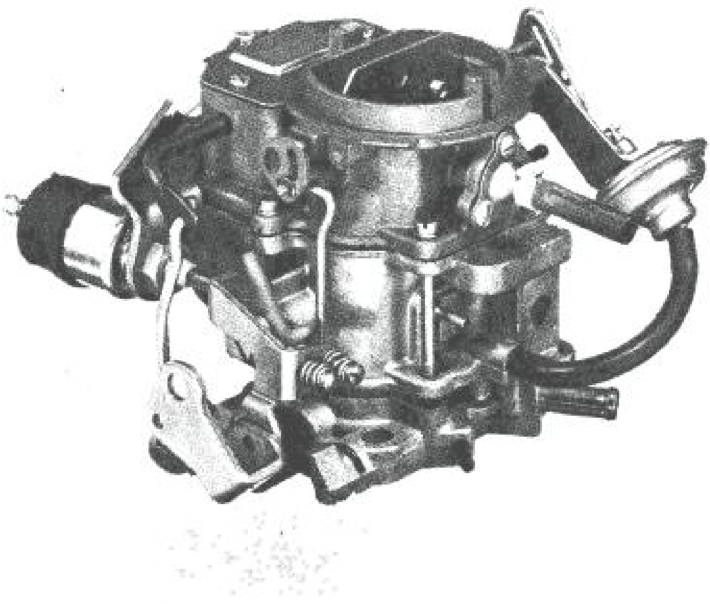


Idle Solenoid

Many carburetor models use an idle solenoid to prevent "dieseling" or "after run."

Many things that have been done to lower emissions have enhanced the possibility of dieseling. Higher idle speeds, leaner air-fuel mixtures, retarded ignition timing, higher operating temperature, all contribute to dieseling.

When the ignition is turned on, the solenoid is energized moving the plunger outward. The idle RPM is adjusted at the solenoid. When the ignition is turned off the solenoid is de-energized, the plunger moves inward allowing the throttle valves to close enough to virtually shut off the air supply, causing the engine to stop running immediately. Some units have a second adjustment to prevent the throttle valves from closing too tightly.

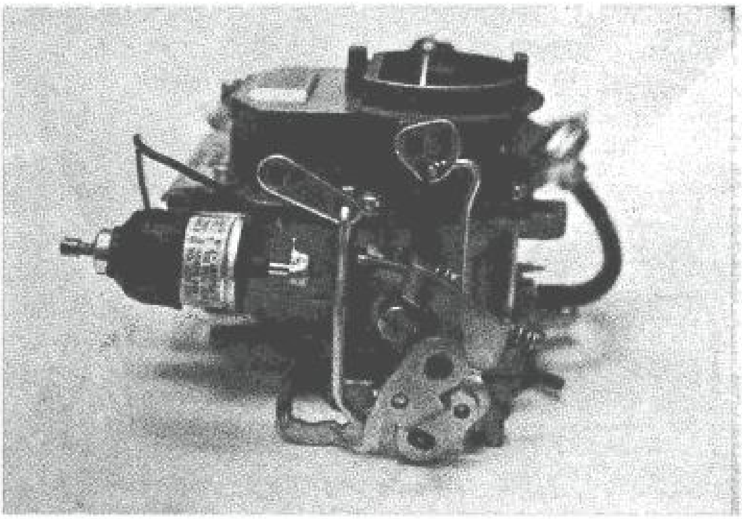


Air Conditioner Solenoid

The air conditioner solenoid is used on many applications to maintain idle RPM.

The extra load on the engine when the air conditioner is turned on causes a drop in idle RPM.

The solenoid is energized moving the solenoid plunger outward. This outward movement opens the throttle valves (as specified) to maintain idle RPM.

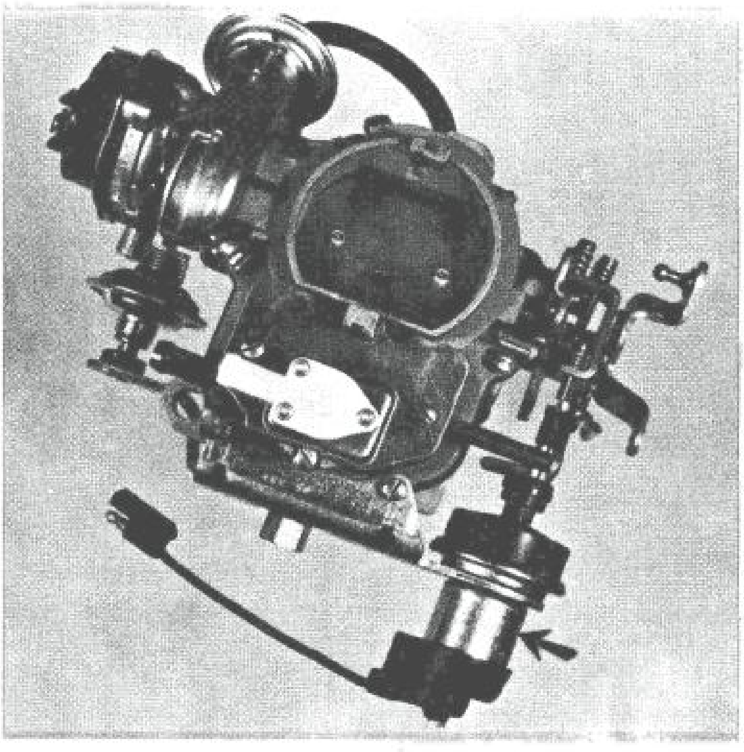


SIS SOLENOID

Some later models use a S.I.S. (solenoid idle stop) solenoid. When the air conditioning, rear window defogger or any accessory with a heavy load is turned on, the S.I.S. solenoid is energized and the plunger moves outward to open the throttle valves slightly.

The adjustment of the S.I.S. solenoid is on its inward travel rather than the conventional outward travel. Two adjustments are required and must be made in proper sequence, as specified on the solenoid decal.

When the accessory is turned off, a timer gives a two second delay in de-energizing the solenoid to prevent engine die out.



SOL-VAC

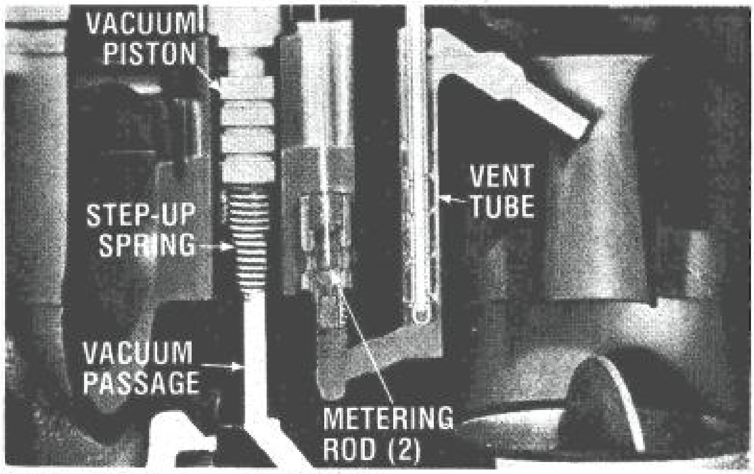
The sol-vac is also used on many applications. The electrical solenoid is energized when the air conditioning is on, when the hedge hog is in operation, rear window defroster or any heavy electrical load.

The vacuum portion is activated anytime the air temperature in the air cleaner is below 55 degrees, or anytime the idle drops to 450 R.P.M. At 450 R.P.M. the vacuum section is activated and opens the throttle valves to specifications which is above normal idle. A time delay is used to return the throttle valve to normal idle. If idle drops to 450 R.P.M. the second time, the vacuum unit is again activated, however the time delay is not in operation. A return to idle then requires increasing engine speed to 1150 R.P.M.

The hedge hog replaces the heat riser. It is a finned type heater element located in the manifold just below the carburetor. It is controlled by a wax pellet type temperature switch located in the engine block. The hedge hog is on any time the water temperature is below 160 degrees.

Three adjustments are required and must be made in the proper sequence.

AIR BLEED CIRCUIT

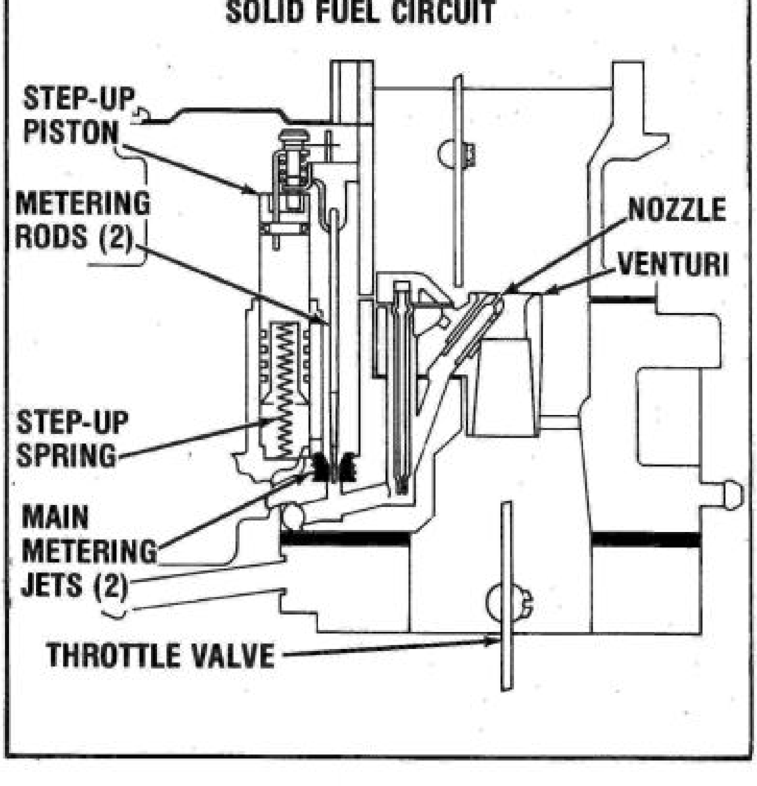


HIGH SPEED CIRCUIT

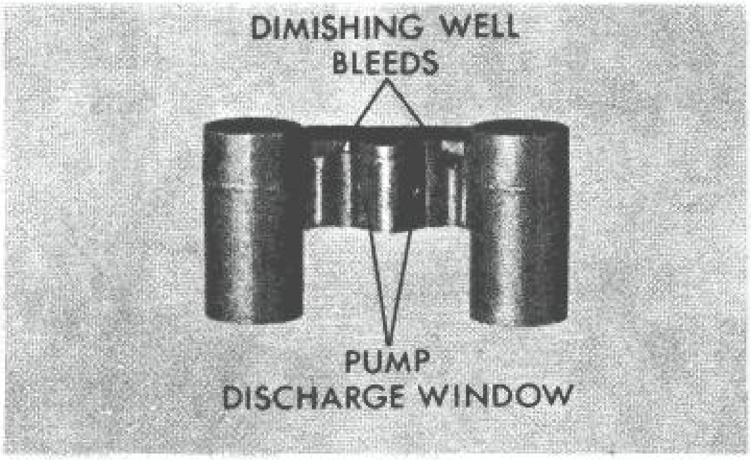
Fuel for part throttle and full throttle operation is supplied through the high speed circuit.

The air bled circuit used prior to 1974 has an emulsion tube or vent tube that extends downward into the high speed well. This tube mixes air with the fuel before it leaves the high speed well. The air bled design always uses "down hill" nozzles. The air bleed in the high speed circuit also serve as an anti-percolator passage.

SOLID FUEL CIRCUIT



The solid fuel design, 1974 and later, takes solid fuel from the high speed well and bleeds air into the circuit at the top through the extended vent tubes located in the cluster, closer to the tip of the nozzle. The solid fuel design always uses "uphill" nozzles and gives a closer calibration to meet the emission standards and also serves as an anti-percolator passage.



Diminishing Well Bleeds

Some solid fuel models use diminishing well bleeds. This bleed is subjected to venturi pressure changes that follow engine load conditions. They serve as self adjusting air bleeds and at or near wide open throttle, could deliver fuel.

The two center holes are the pump discharge windows and also the air bleed to prevent pump pull over.

Metering Rod

The position of the metering rod in the main metering jet controls the amount of fuel admitted to the discharge nozzle.

The metering rod has varying step diameters which controls the effective size of the main metering jet in which it operates.

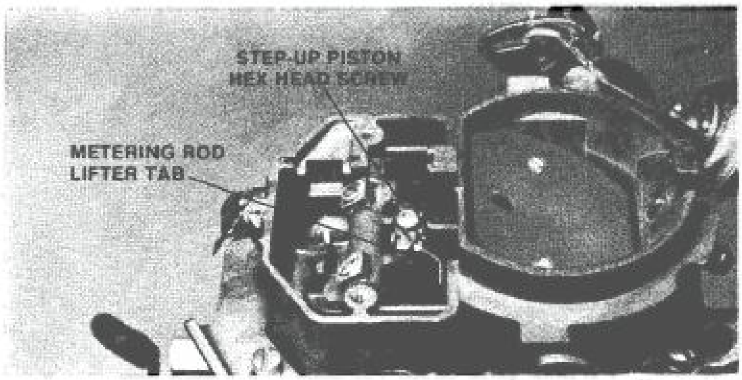
Function of the Metering Rod

The two metering rods are yoked to a single step-up piston assembly which rides in a cylinder in the bowl casting. The jets which work with the metering rods are located in the fuel bowl. Note the solid fuel jets are different than those used in the air bled system.

At part throttle and cruising speeds, increased air flow through the venturi creates a low pressure area in the venturi. Since the air above the fuel level in the bowl is near atmospheric pressure, fuel flows to the lower pressure area created by the venturi. The fuel flow moves through the main jets to the main nozzle as it picks up air from the air bleeds.

During heavy road load or high speed operation, the air-fuel mixture must be enriched to provide increased engine power. Power enrichment is accomplished by movement of the metering rods which are attached to a single yoke and piston actuated by the manifold vacuum. The metering rod piston rides on a calibrated spring which attempts to keep the piston at the top of the cylinder. At idle, part throttle or cruise conditions when manifold vacuum is high, the piston is drawn down into the vacuum cylinder, compressing the vacuum piston spring. The larger diameter of the metering rods will be positioned in the main jets allowing a calibrated amount of fuel flow to the nozzle. Under any operating condition where the tension of the vacuum piston spring overcomes the pull of vacuum under the piston, the metering rods will move upward so the smaller diameter step is in the jet. This permits the necessary additional fuel flow to be metered through the jets.

The metering rods in the air bled units are vacuum controlled, no adjustment required.

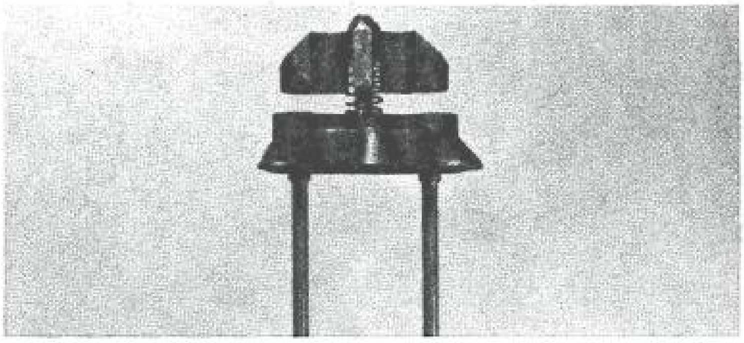


The metering rods in the solid fuel unit are both mechanically and vacuum operated and must be adjusted. The lifter tab lifts the metering rods mechanically and also limits the amount of lift from the vacuum piston.

Vacuum Step-Up Piston Hex-Head Screw

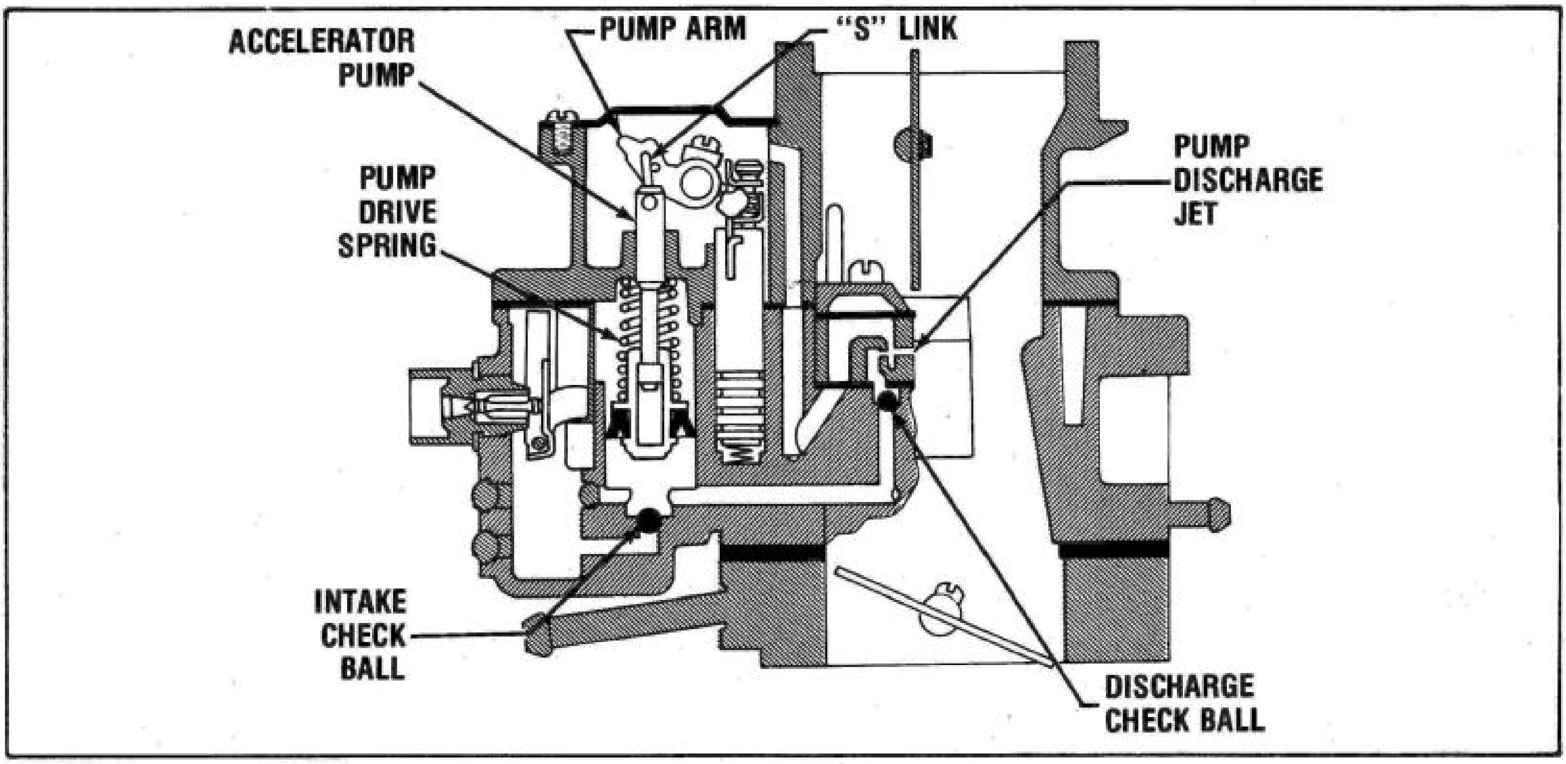
Never attempt to change the factory setting of the vacuum step-up piston hex-head screw as it will seriously affect performance. This adjustment is made during flow testing and cannot be duplicated in the field.

An air leak past the gaskets sealing the venturi cluster, venturi cover and tube assembly or the venturi cluster screws will affect both low speed and high speed performance. To assure a positive seal always use new gaskets and be sure venturi cluster screws are tightened securely.



Manual Altitude Compensator

To meet emission standards at 4,000 feet above sea level, some BBD carburetors use a manual alcomp or "altitude compensator." It consists of a spring-loaded adjustable cap added to the venturi cluster. During predelivery of the vehicle for altitude use, the adjusting screw is turned in the counterclockwise direction. The spring forces the cap upwards uncovering the auxiliary air bleeds to the low speed circuit. In addition to the auxiliary air bleeds, there is an oversized air bleed drilled into the lower section of the venturi cluster assembly and with the cap in its upward position, air is bled into both the low speed and high speed circuits to lean out to the altitude calibration required. There is no adjustment. The cap merely opens or closes these additional air bleeds.



PUMP CIRCUIT

The accelerating pump circuit provides a measured amount of fuel which is necessary to insure smooth engine operation for acceleration.

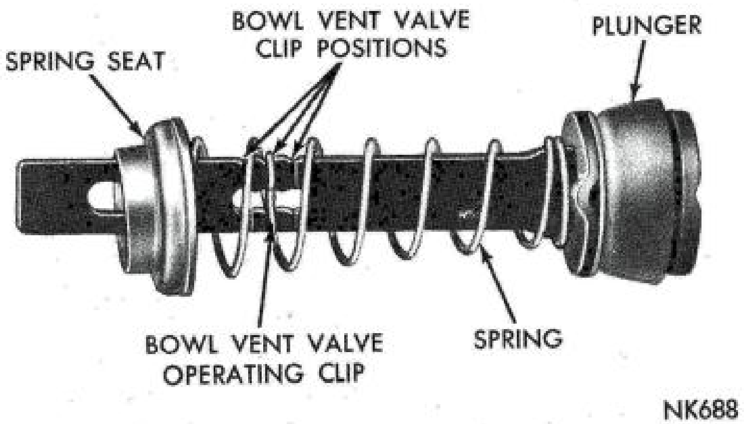
When the throttle is closed, the pump plunger moves upward in its cylinder and fuel is drawn into the cylinder through the intake check. The discharge check is seated at this time to prevent air being drawn into the cylinder. When the throttle is opened, the pump plunger moves downward forcing fuel out through the discharge check and out of the pump jets. As the plunger moves downward, the intake check is closed preventing fuel from being forced back into the bowl.

The discharge check ball is 5/32". The intake check is 3/16."

The calibration of the pump spring and the size of the jets provide a pump discharge of the desired duration.

The accelerating pump stroke adjustment provides a means to assure the proper pump discharge volume.

High air velocity passing over the pump jets causes a low pressure area. An air bleed located between the discharge windows and the pump jets prevent pump pull-over.



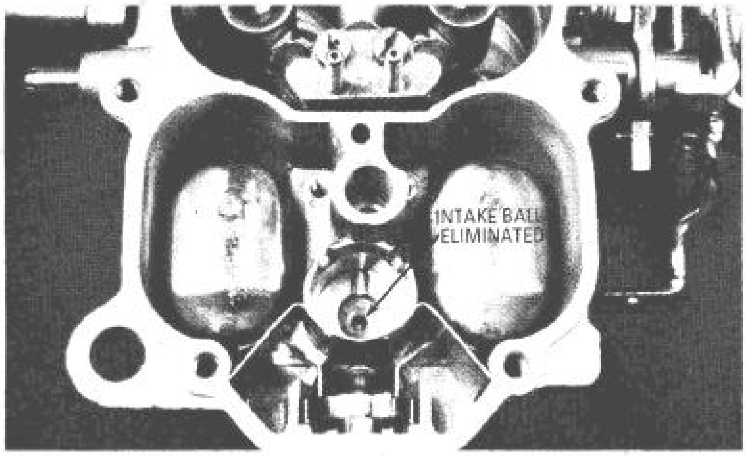
Pump Plungers

Solid Cup Plunger

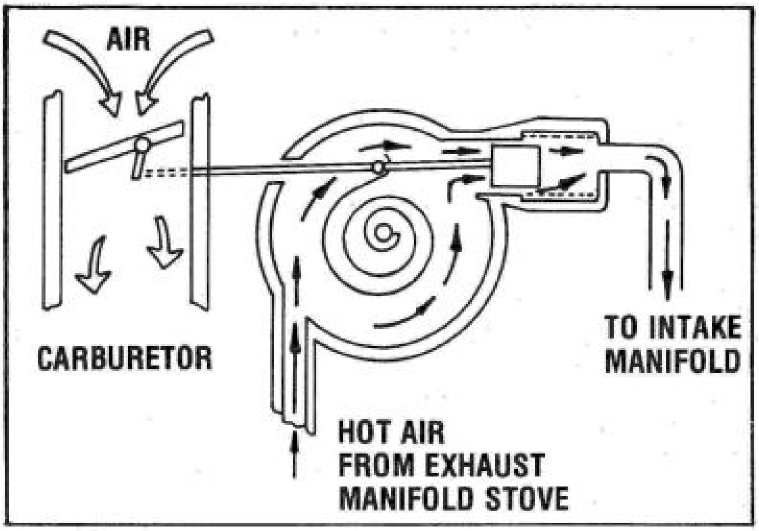
After engine shutdown heat can cause vapors to accumulate within the pump cylinder. The BBD pump plunger is designed to relieve this vapor pressure and to maintain solid fuel in the pump cylinder at all times.

Sliding Cup Plunger

The air bled unit uses a "solid pump plunger" with a vapor vent passage through the plunger. The solid fuel unit takes advantage of a sliding cup that gives no bleed during acceleration. When at rest, it serves as a release for any vapor pressure in the pump cyliner.



Some 1978 models do not use the intake pump circuit or intake check ball. These models take advantage of the sliding "pump plunger cup" and fill from the slots at the top of the pump cylinder.



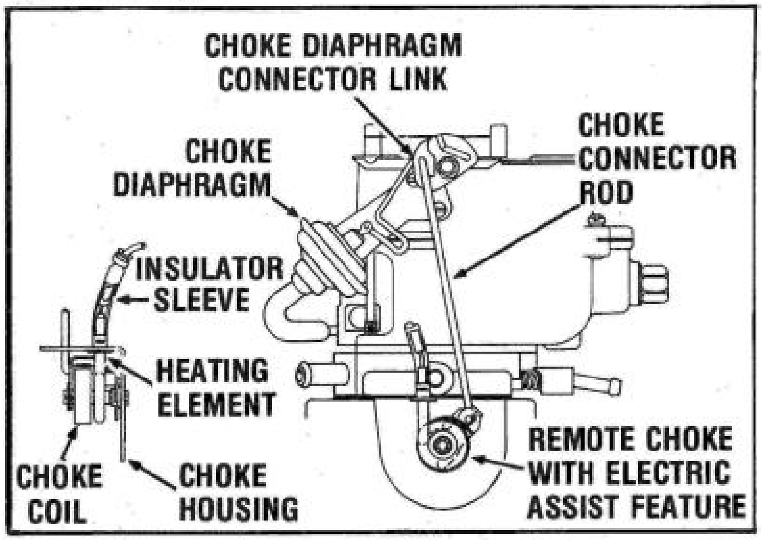
CHOKE CIRCUIT

The automatic choke circuit provides a correct mixture necessary for quick cold engine starting and warm-up. Some BBD carburetors use an integral choke, while others use the cross-over (Remote mounted type).

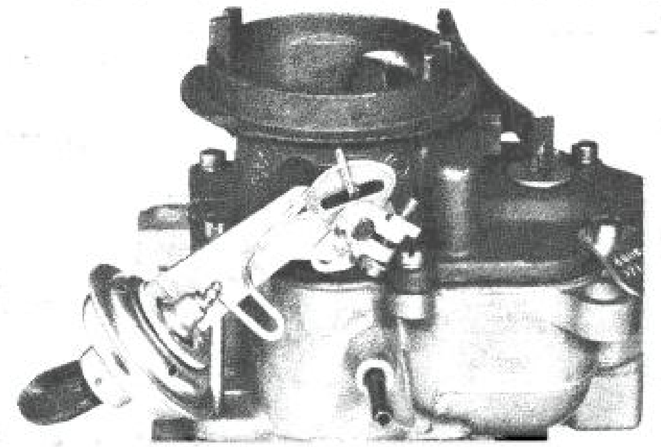
When the engine is cold, tension of the thermostatic coil holds the choke valve closed. When the engine is started, air velocity against the offset choke valve causes the valve to open slightly against the thermostatic coil tension. The intake manifold vacuum applied to the choke piston also tends to pull the choke valve open. The choke valve assumes a position where tension of the thermostatic coil is balanced by the pull of vacuum on the piston and force of air velocity on the offset valve.

When the engine starts, slots located in the sides of the choke piston cylinder are uncovered, allowing the intake manifold vacuum to draw warm air heated by the exhaust manifold through the choke housing. The flow of warm air in turn heats the thermostatic coil and causes it to lose some of its tension. The thermostatic coil loses its tension gradually until the choke valve reaches full open position.

If the engine is accelerated during the warm-up period, the corresponding drop in the manifold vacuum allows the thermostatic coil to slightly close the choke which provides a richer mixture.



When the cross-over type choke is used, the carburetor mounting gasket is most important. If it is not to specified thickness, it upsets choke calibration due to the length of the choke rod. Most cross over chokes are non adjustable.

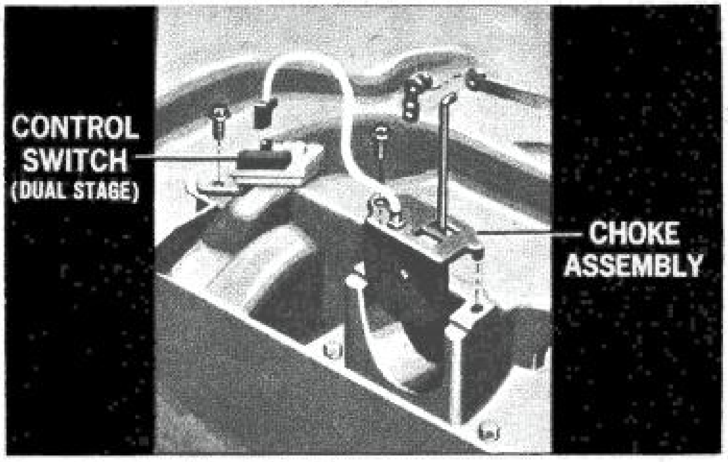


Choke Pull-Off

On many BBD units, the choke piston is replaced by a device called a choke pull-off. The choke pull-off is a diaphragm-type unit that performs the same function as the choke piston. It opens the choke valve to a predetermined opening when the engine starts. The amount of pull-off is adjusted by shortening or lengthening the choke pull-off rod.

Modulated Choke Pull-Off

Many units use a modulated-type choke pull-off. In addition to the regular diaphragm spring, the diaphragm shaft incorporates a spring within the shaft to provide better warm-up fuel economy by allowing the amount of choke valve opening to vary with the torque of the choke coil spring. This spring-loaded diaphragm shaft merely allows a temporary tighter closed choke valve during the very early stage of the warm-up period.

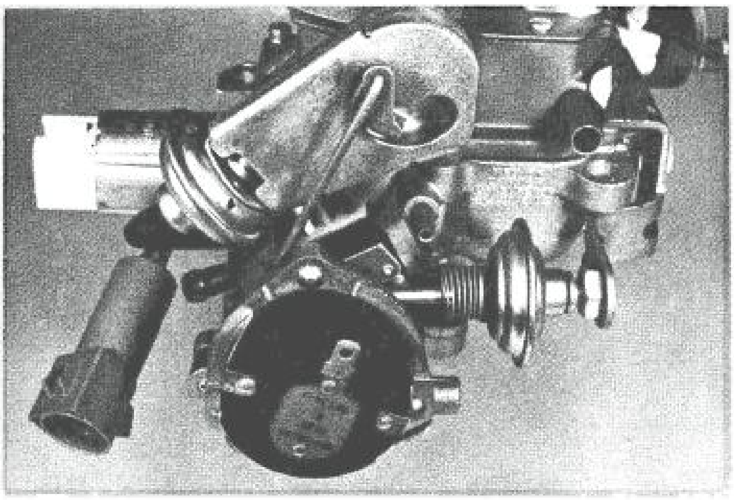


Electric Assist Choke

Electric assist chokes are used to help reduce HC and CO emissions during starting and warm-up. It gives a closer choke calibration during the warm-up period. This device consists of a heating element located in the choke cap on integral chokes, or is built into the remote choke assembly on manifold mounted chokes. A wire from the heater element is connected to an electric control switch. It is designed to shorten choke duration at temperatures above approximately 60 degrees. The switch serves several purposes. Below 60 degrees it will provide the choke heater with partial power or heat, allowing it to stay on longer. Above 60 degrees it provides full heat to get the choke off quicker. The switch temperature is controlled by engine temperature and a small internal electrical heater.

To check the electrical heating element an ohmmeter is used. Resistance of 4 to 12 ohms is normal; check specs for particular application.

Some models use a 100 percent electric choke.

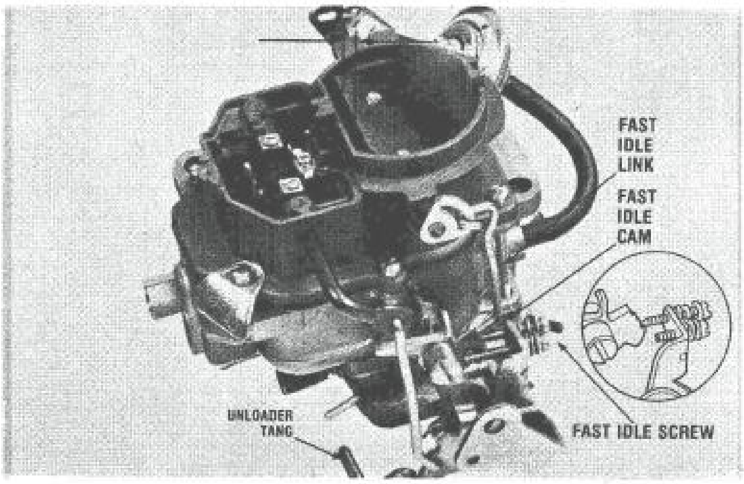


TAMPER PROOF CHOKE

To meet federal regulations on tamperproofing, some late models use rivets or breakaway screws to attach the thermostatic choke coil and housing.

For a period of time, regulations required tamperproofing the choke pull-off linkage. On these units the choke pull-off is spot welded to a housing which serves as the mounting bracket and also a part of the tamperproof enclosure.

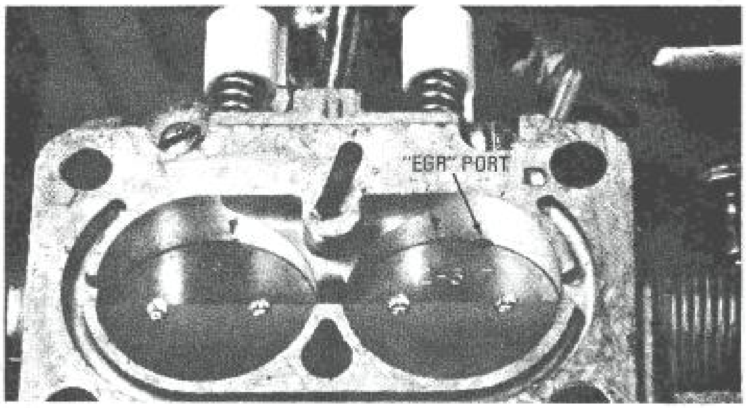
The outside cover plate is riveted on to enclose the choke pull-off link.



Fast Idle and Unloader

During the warm-up period it is necessary to provide a fast idle speed to prevent engine stalling. This is accomplished by a fast idle cam connected to the choke shaft. The choke trip lever contacts the fast idle cam. The fast idle link attached to the throttle lever contacts the choke trip lever and prevents the throttle valve from returning to a normal warm engine idle position while the automatic choke is in operation.

If during the starting period the engine becomes flooded, the choke valve may be opened manually to clean out any excessive fuel in the intake manifold. This may be accomplished by depressing the accelerator pedal to the floor mat and engaging the starter. The unloader projection on the fast idle link will contact the unloader lug on the choke trip lever and in turn partially open the choke valve.



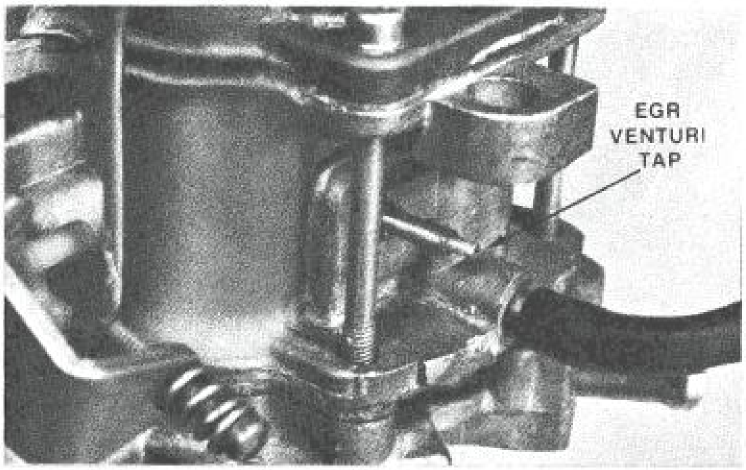
EGR Control

All vehicles since 1973 have used an EGR, or "Exhaust Gas Recirculation," system to lower emissions of nitrogen oxides.

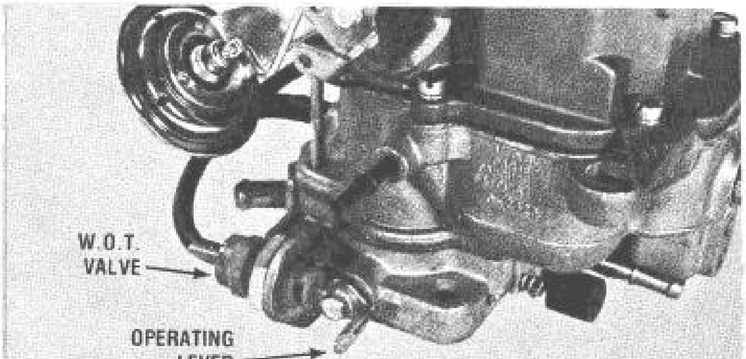
The EGR valve is controlled either by a port in the throttle body above the closed throttle valve or by venturi vacuum.

The ported EGR conrol takes advantage of throttle valve position to open the EGR valve. At idle, the port is on the atmospheric side of the throttle valve keeping the EGR valve closed. As the throttle valves are opened, the port is exposed to the manifold vacuum which opens the EGR valve.

The ported EGR uses a notched throttle valve to reduce sensitivity for smoother EGR operation.



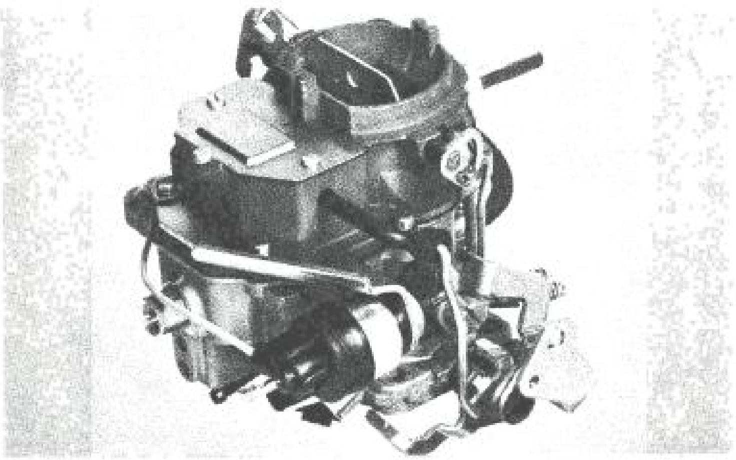
Some models use the venturi vacuum control system whereby a vacuum tap at the throat of the carburetor venturi is used to provide a control signal.



Wide Open Throttle Dump Valve

Some applications use a WOT, or "Wide Open

Throttle," dump valve for the EGR system. The dump valve will "kill" the venturi signal to atmosphere. The dump valve is in series with the EGR venturi port in the carburetor and the amplifier. At wide open throttle, the arm on the throttle shaft opens the dump valve cutting off the EGR and giving full horsepower.



THROTTLE POSITIONER SOLENOID

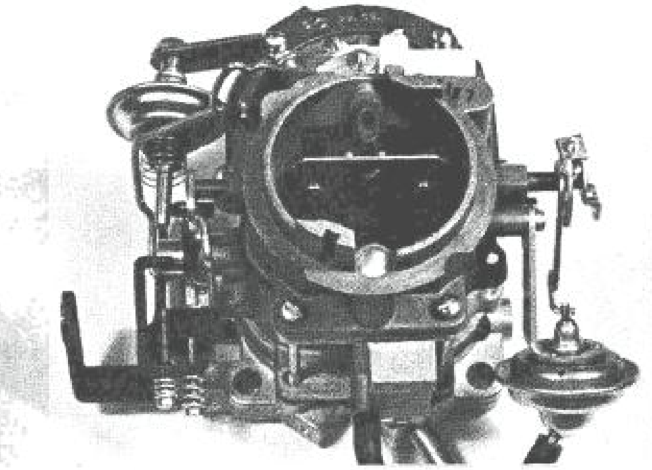
On some applications the BBD carburetor uses a throttle positioner solenoid as part of a catalyst protection system. The system's function is to prevent unburned hydrocarbons from entering the atmosphere through the vehicle's exhaust system when the engine is decelerated from a high RPM.

The solenoid works in conjunction with an electronic speed switch and positions the throttle valves during rapid deceleration to prevent over– rich mixtures contaminating the catalytic converter.

The electronic speed switch senses the pulses from the electronic ignition system. When the engine is operating above approximately 2,000 R.P.M., the electronic speed switch energizes the throttle positioner solenoid. On deceleration, the throttle positioner solenoid holds the throttle valves to approximately 1,800 R.P.M. When engine speed drops below 2,000 R.P.M., the throttle positioner solenoid is de-energized allowing the throttle valves to close. Thus, the converter is protected from overheating.

Some California units use a vacuum throttle positioner which consist of an electronic speed switch, an electrically controlled vacuum solenoid valve and a vacuum activated positioner.

Its function and operation is the same as the solenoid-type positioner above.



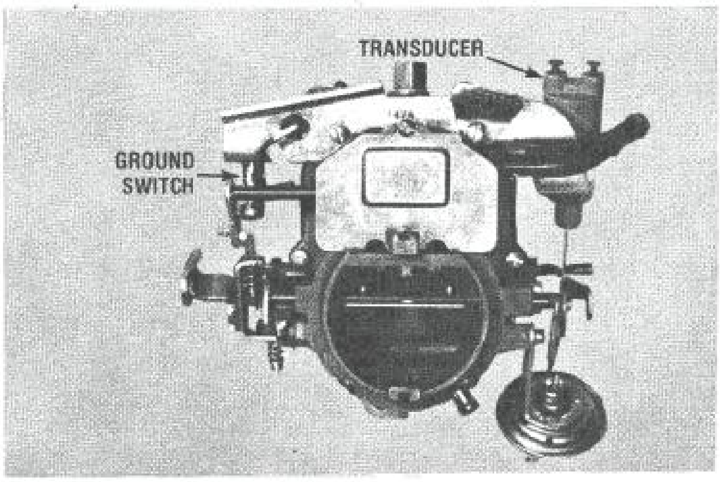
DASHPOT

Some applications use a slow closing throttle device commonly called a dashpot. They are used to delay or slow the throttle closing the last few degrees to prevent engine stalling at the lower speeds and also to eliminate a sudden peak of hydrocarbon emissions on sudden deceleration. At idle, the manifold pressure is very low and results in good vaporization of the air-fuel mixture in the intake manifold. When the throttle valve is opened, manifold pressure increases. This increase in pressure increases the boiling point of the liquid and prevents 100% vaporization of the air-fuel mixture. During these periods of high manifold pressures, there are some wet particles of fuel clinging to the inside of the intake manifold which is known as "wet manifold." During sudden deceleration, the manifold pressure goes back to a low pressure state, the wet particles clinging to the inside of the intake manifold go back to a vapor state and are taken into the engine as a rich mixture. This is known as "manifold flash" and can cause the engine to die out, especially at low speeds. The dashpot slows the closing of the throttle the last few degrees to give the engine time to clear itself of manifold flash.

PURGE PORT

Starting in 1971 all outside carburetor vents had to be routed to a cannister to prevent evaporative emissions to atmosphere. A purge port has been added to the carburetor to purge the cannister of these fuel vapors. The purge port is located above the throttle valve. As the throttle valves open, the purge port is exposed to low pressure which gives a predetermined air flow to scavange these vapors from the cannister.

Port relation is the position of the throttle valve relative to the idle port. Anything that changes this relationship will seriously affect idle, acceleration, EGR, spark and purge timing. Proper idle adjustment for correct positioning of the throttle valves is most important.



TRANSDUCER AND GROUND SWITCH

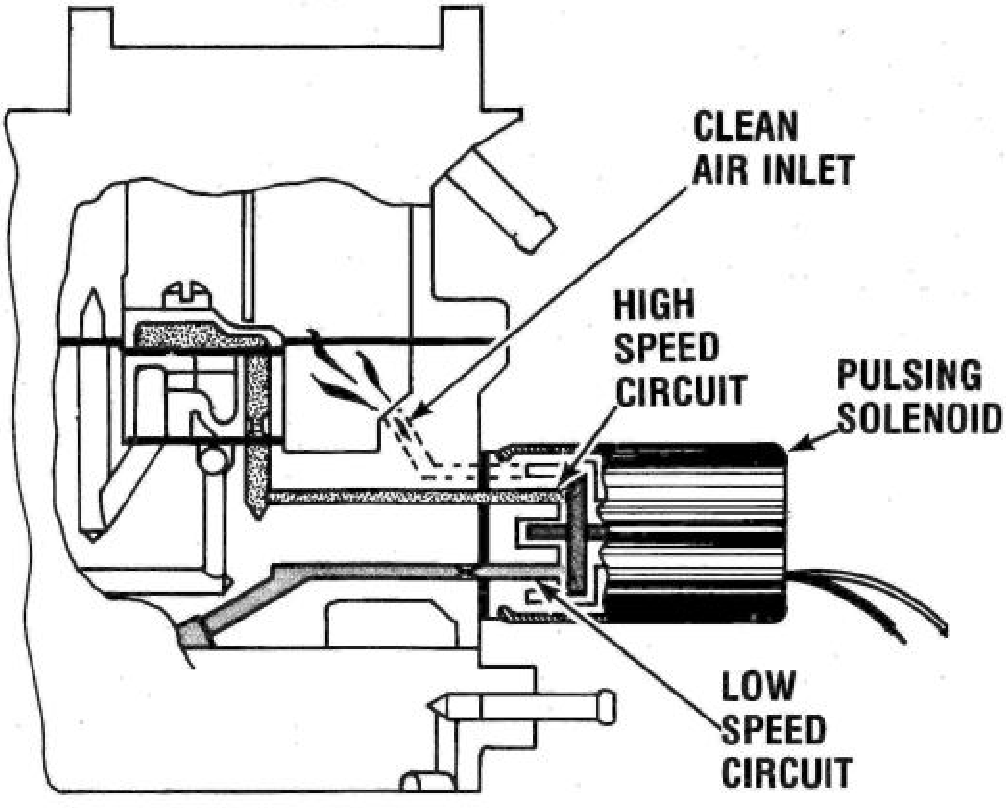
Carburetors used on the lean burn engines use a throttle position transducer and a ground switch. The transducer is simply a device that changes mechanical motion to an electrical signal. It consists of a coil enclosed in plastic with a moveable iron core which is attached by linkage to the throttle lever. Its movement and position is always relative to throttle position and throttle movement. The transducer signals the ESA, or "Electronic Spark

Advance," computer the position and rate of change of the throttle. The ESA then adjusts ignition timing to coincide with throttle position and rate of opening.

The function of the ground switch is to signal the ESA computer when the throttle valves are closed. The ESA retards timing at closed throttle position.

Some models incorporate a grounding switch to control the distributor solenoid. When the throttle valves are at idle position, the grounding switch grounds the distributor solenoid which retards ignition timing.

THE O_2 FEEDBACK SYSTEM USING VARIABLE AIR BLEEDS



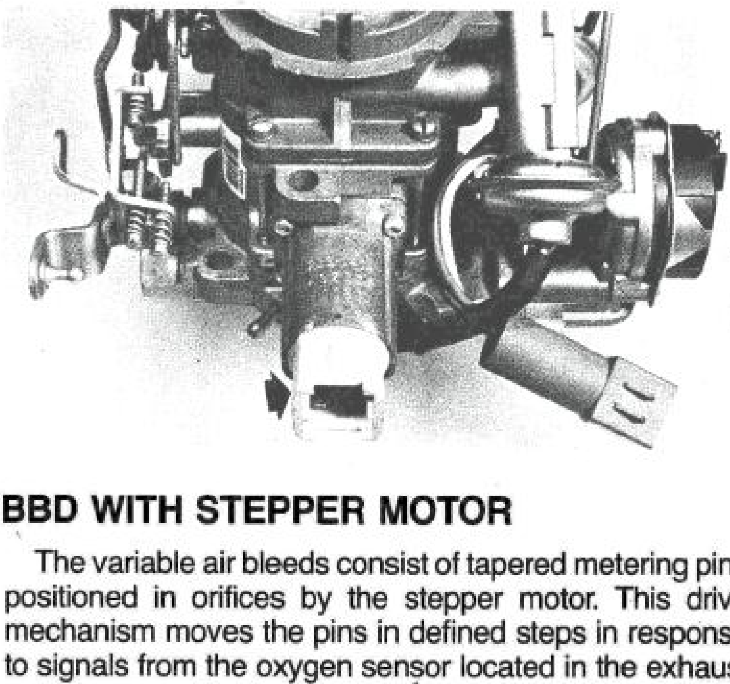
Carburetor Operation

The basic carburetor contains two fuel supply subsystems, the high speed system and the low-speed system. The high-speed system meters fuel with a tapered metering rod positioned in the jet by the throttle. Fuel is metered into the main nozzle well where air from the feedback controlled variable air bleed is introduced. Since this air is delivered above the fuel level, it reduces the vacuum signal on the fuel, consequently reducing the amount of fuel delivered from the nozzle.

The idle system is needed at low air flows through the venturi because there is insufficient vacuum at the nozzle to draw fuel into the air stream. After leaving the main jet, fuel is supplied to the idle system by the low-speed jet. It is then mixed with air from the idle by-pass, then accelerated through the economizer and mixed with additional air from the idle bleed before being discharged from the idle ports below the throttle. Air from the variable air bleed is introduced between the economizer and idle bleed. This air reduces the vacuum signal on the low-speed jet and consequently the amount of fuel delivered to the idle system.

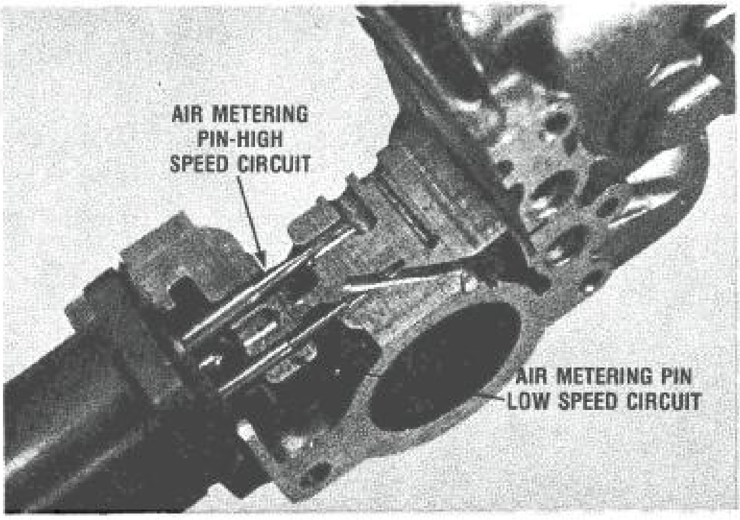
The variable air bleeds change the pressure difference which controls fuel flow thru the jets.

Two types of air metering control are used on the BBD O_2 feedback system. The stepper motor with air metering pins are used on some applications, while others use a pulse solenoid.



BBD WITH STEPPER MOTOR

The variable air bleeds consist of tapered metering pins positioned in orifices by the stepper motor. This drive mechanism moves the pins in defined steps in response to signals from the oxygen sensor located in the exhaust and processed by the electronic control unit. The stepper motor moves the pins until the exhaust sensor indicates that the desired air-fuel ratio has been reached. Thus the pin movement adjusts the air-fuel ratio to compensate for changes detected in the exhaust gases.



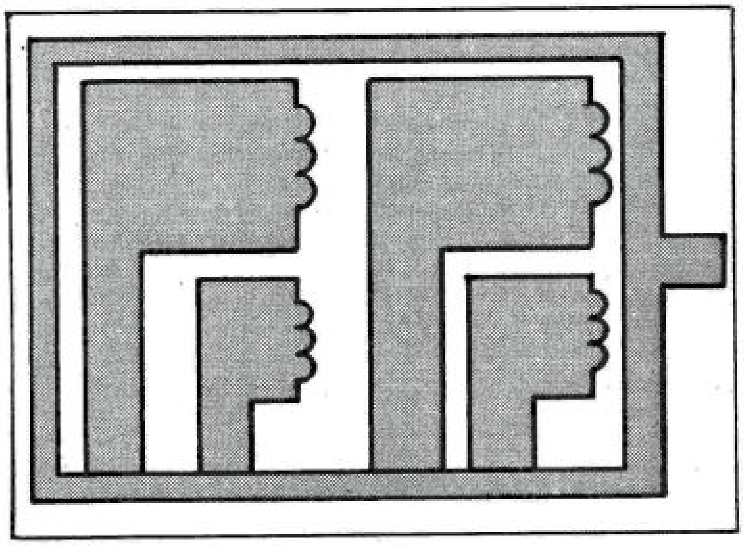
Stepper Motor & Air Metering Pins

The digital linear actuator or stepper motor moves the metering pins, .400 inch from full lean to full rich. Full movement requires 100 steps at .004 inch per step.

Fast speed is 100 steps per second, slow speed is 12 steps per second.

During initial power-up of the stepper motor, the metering pins must be sent to an end stop to give the electronic control unit a stable reference. The metering pins must then be backed off to the desired position.

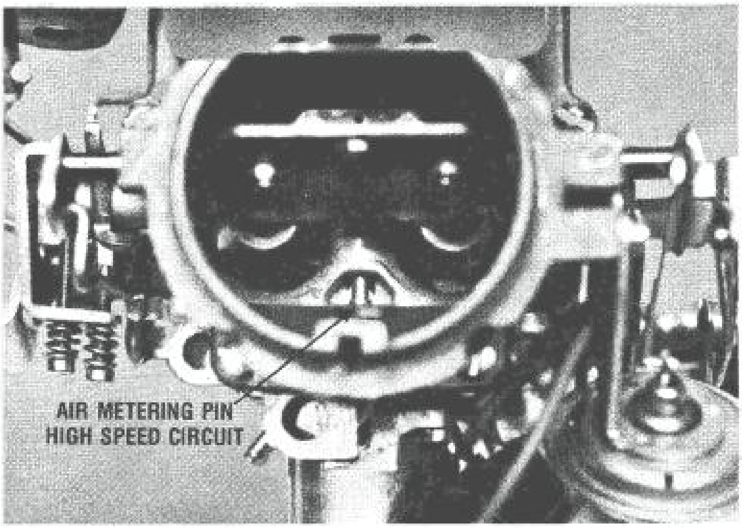
This initialization of the metering pins occurs on open loop mode. When the ignition is turned on, and again when the starter is engaged, the metering pins move inward (rich position) 127 steps and outward (lean position) 35 steps. This locates the pins near the position to give the average air-fuel ratio for complete fuel combustion (stoichiometric ratio).



Coil Windings

The stepper motor incorporates a unipolar winding which has 2 coils wound on the same bobbin per stator half for a total of 4 coils.

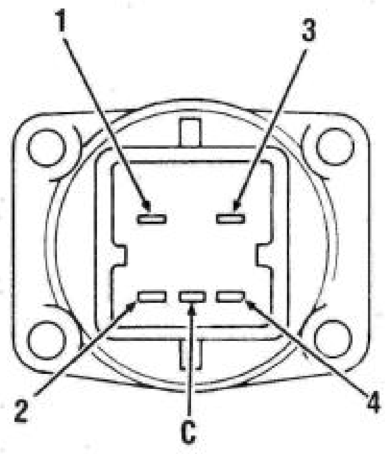
A threaded shaft provides linear movement which is bidirectional. Movement and direction is controlled by motor phasing sequence.



Checking Stepper Motor

To check stepper operation, remove the air cleaner from the carburetor. The air metering pin for the high speed circuit is visible looking into the air horn of the carburetor.

Turning the ignition switch on should cause initialization of the air metering pins. If no movement is observed, check electrical connections and windings.



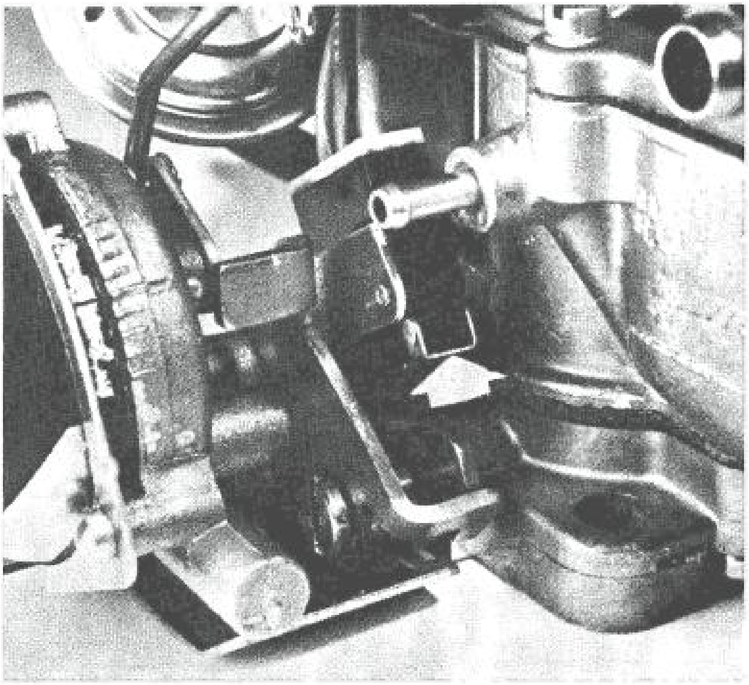
MOTOR PHASING SEQUENCE

EXTEND					RETRACT				
STEP	TERMINAL				STEP	TERMINAL			
	4	3	2	1		4	3	2	1
1	G	G	—	—	1	—	—	G	G
2	—	G	G	—	2	—	G	G	—
3	—	—	G	G	3	G	G	—	—
4	G	—	—	G	4	G	—	—	G
5	G	G	—	—	5	—	—	G	G

Checking Coils

Check each winding of the stepper motor by disconnecting the wiring harness from the stepper motor. With an ohmmeter, check each coil by connecting to "C" terminal and to ground terminal of each coil. There should be 78 ohms, plus or minus 25 ohms at room temperature.

Movement of the air metering pins can be accomplished by applying 12 volts to the "C" terminal and grounding the coils as per the phasing sequence.



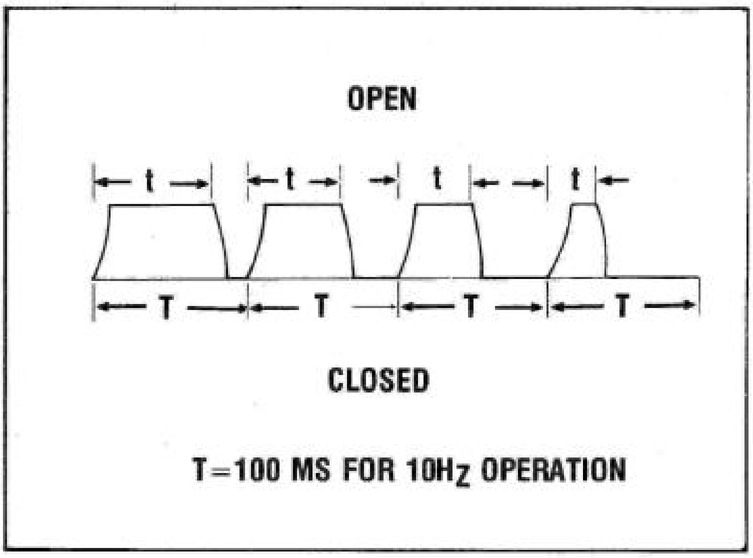
Air Management Switch

On some applications with O_2 feedback system, a micro switch is incorporated which is operated by the throttle shaft. It is part of the air management system and makes contact at 25 degrees before wide open throttle. When contact is made, it dumps the air pump air to atmosphere.

BBD WITH PULSE SOLENOID

Some models use a pulse solenoid to control the variable air bleeds. This eliminates the metering pins, as the pulse cycle controls the air-fuel ratio.

The solenoid has only two positions of operation, opened when energized to bleed air to both the high speed and low speed circuits, or closed when de-energized, cutting off the air bleeds.



Pulse Width Modulation

During normal operation, the solenoid goes thru one open and one closed period in each cycle. The pulse solenoid is a 10 Hz. frequency (10 cycles per second) which adds up to 100 Mil/sec. per cycle.

Each cycle has a particular time period, "T", from beginning of one cycle to the next and is held constant during operation (always 10 cycles per second).

During any one cycle, the solenoid is open for some fractional period of time, "t". The duration of "t" can be varied, thus varying the duty cycle and amount of air bleed to the carburetor circuits.

100% duty cycle means full air bleed for approximately 100 Mil/sec. per cycle. This duty cycle may be varied from zero percent to one hundred percent.

Pulse width modulation of the air flow is controlled by the solenoid duty cycle as signaled by the computer.

Specification:

Resistance 22 ± 1 ohms at room temperature

Checking Pulse Solenoid

Checking the pulse solenoid is very quick and easy. With engine at operating temperature, merely place hand on solenoid. If not pulsing, shut off engine and disconnect pulse solenoid wires.

Check for open or shorted coil winding by using an ohmmeter across the two blue wires. (The coil is not grounded to the case). Should be 22 ohms resistance at room temperature.

If winding checks good, momentarily flash 12 volts to pulse solenoid to check armature movement.

A dwell meter can be used with the pulse solenoid to give an overall indication of operation. The dwell reading would be indicative of the ratio of "on" to "off" time which is referred to as pulse width modulation. With engine warmed up, place fast idle cam to obtain approximately 1200 R.P.M. and check dwell reading. Closing the choke valve slightly to richen air fuel mixture should give an increase in dwell.

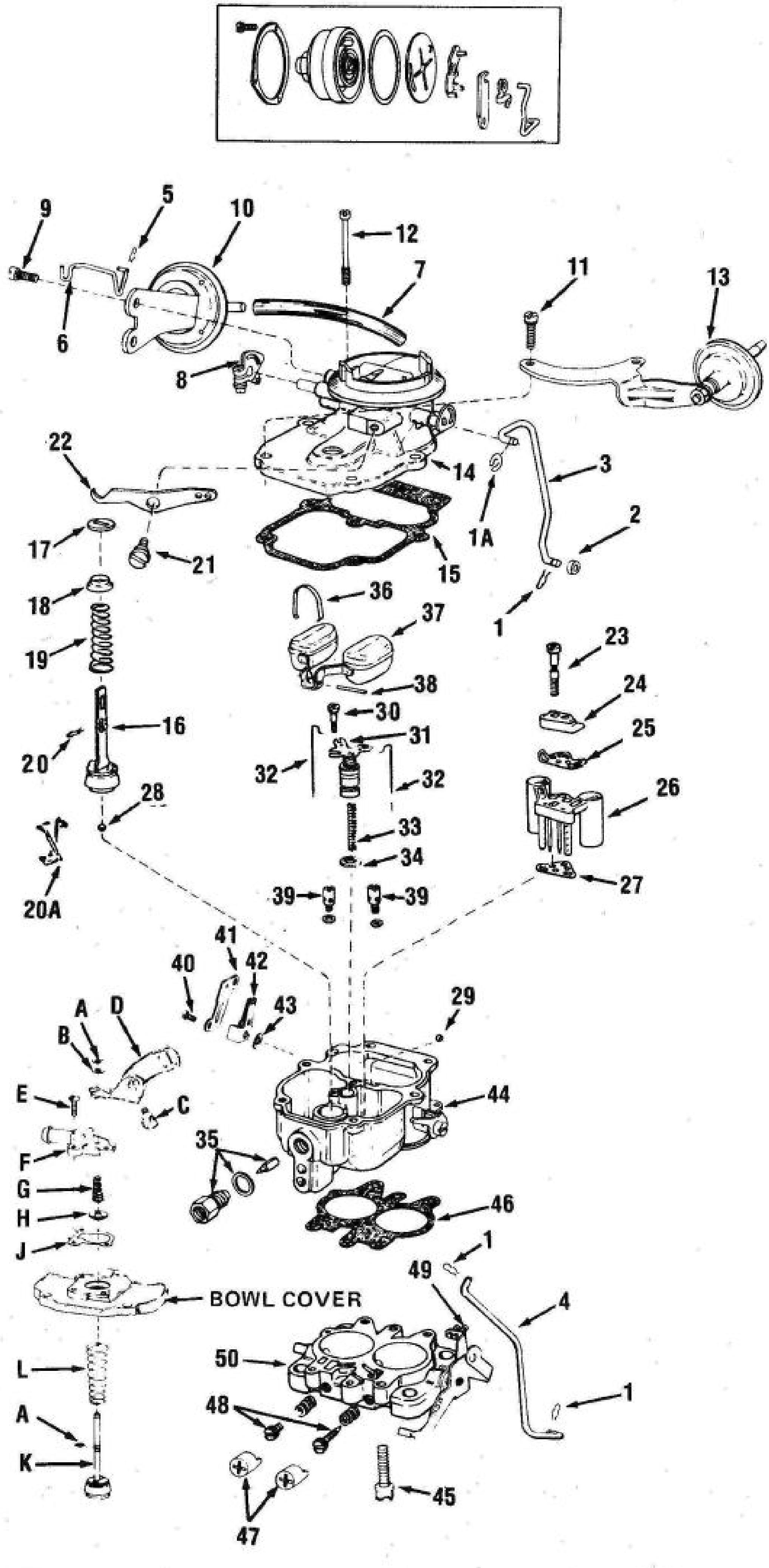
A command from the computer to "lean out" would give a dwell reading between 30 to 60 degrees dwell, a rich command would read between 0 to 30 degrees dwell. An ideal reading would be between 28 to 32 degrees.

The dwell meter should always be set on the 6 cylinder scale.

EXPLODED VIEW — AIR BLED DESIGN

PARTS LISTS

1. Pin spring
1A. Retainer
2. Spacer
3. Choke connector rod
4. Throttle connector rod
5. Pin spring (small)
6. Choke diaphragm connector link
7. Hose
8. Choke shaft lever
9. Choke diaphragm screws
10. Choke diaphragm assembly
11. Air horn screws (short)
12. Air horn screws (long)
13. Dash pot and bracket assy.
14. Air horn
15. Air horn gasket
16. Pump plunger assembly
17. Pump plunger washer
18. Pump plunger bushing
19. Pump plunger spring
20. Pin spring (plunger rod)
20A. Plunger shaft retainer
21. Pump arm screw
22. Pump arm
23. Venturi cluster screw
25. Venturi cover
25. Venturi cover gasket
26. Venturi cluster assembly
27. Venturi cluster gasket
28. Pump intake check ball (large)
29. Pump discharge check ball (small)
30. Step-up piston plate screw
31. Step-up piston plate
32. Step-up piston rod (2)
33. Step-up piston spring (2)
34. Step-up piston gasket
35. Needle & seat assembly
36. Float lever pin retainer
37. Float & lever assembly
38. Float lever pin
39. Main jets
40. Compensator valve screw
41. Compensator valve cover
42. Compensator valve
43. Compensator gasket
44. Main body casting
45. Body flange screw
46. Body flange gasket
47. Idle limiter cap
48. Idle mixture screw
49. Throttle speed screw
50. Flange assembly
A. Retainer (2)
B. Washer
C. Pump arm screw
D. Pump arm
E. Cover plate screw
F. Cover plate
G. Vent valve spring
H. Vent valve
J. Cover plate gasket
K. Pump plunger
L. Pump plunger spring



EXPLODED VIEW — SOLID FUEL DESIGN

PARTS LISTS

1. Choke shaft lever screw
2. Choke shaft lever
3. Choke pull-off rod
4. Choke pull-off bracket screw
5. Choke pull-off and bracket

5A. Choke pull-off housing—if equipped

5B. Choke pull-off housing rivets—if equipped

6. "E" retainer
7. Throttle connector rod
8. Fast idle cam screw
9. Fast idle cam
10. Fast idle rod
11. Dust cover screw
12. Dust cover
13. Dust cover gasket
14. Pump and metering rod arm screw (2)
15. Pump and metering rod arm washer (2)
16. Pump counter shaft
17. Metering rod arm
18. Pump arm
19. Pump "S" link
20. Vacuum piston assembly
21. Metering rod (2)
22. Vent valve grommet seal—if equipped
23. Choke pull-off hose
24. E.G.R. Dump valve hose
25. Bowl cover screw
26. Carburetor identification tag
27. Bowl cover and bracket screw (2)
28. Bowl cover (2)
29. Bowl cover gasket
30. Solenoid & bracket

30A. Vacuum modulator

30B. Transducer, bracket & idle ground post—if equipped

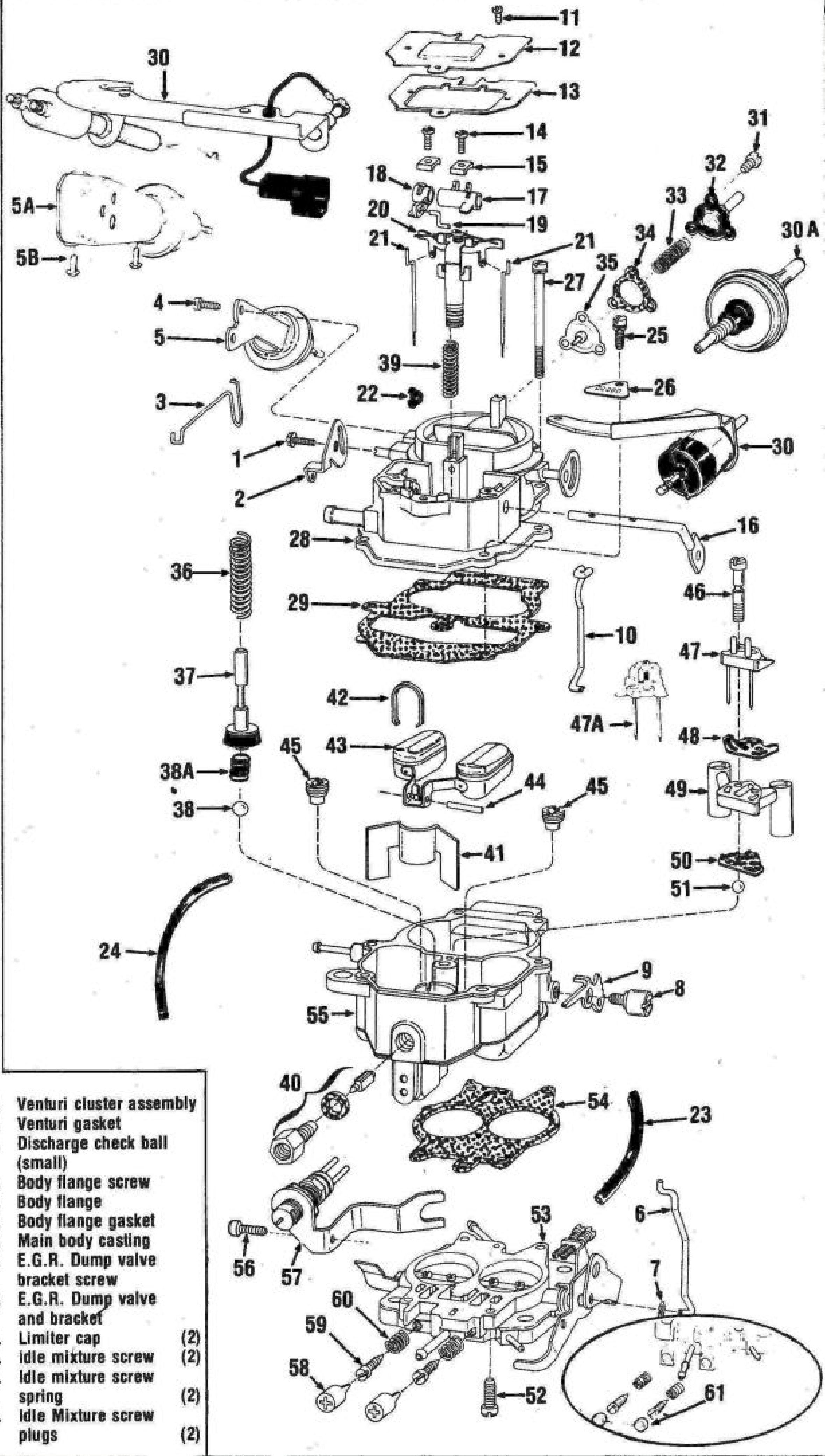
31. Idle enrichment cover screw (3)
32. Idle enrichment cover
33. Idle enrichment cover spring
34. Idle enrichment cover gasket
35. Idle enrichment diaphragm
36. Plunger spring
37. Plunger assembly
38. Intake check ball (large)

38A. (See note 5, Pg. 4)

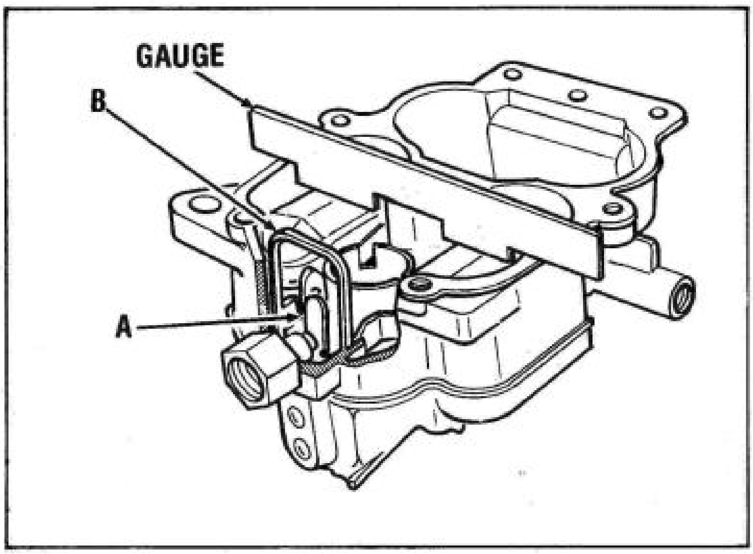
39. Vacuum piston spring
40. Needle, seat, and gasket
41. Baffle
42. Float pin retainer
43. Float
44. Float pin
45. Main metering jets (2)
46. Venturi Cluster screw (2)
47. Venturi cover assembly

47A. Venturi cover assembly (Alt.)

48. Venturi cover gasket
49. Venturi cluster assembly
50. Venturi gasket
51. Discharge check ball (small)
52. Body flange screw
53. Body flange
54. Body flange gasket
55. Main body casting
56. E.G.R. Dump valve bracket screw
57. E.G.R. Dump valve and bracket
58. Limiter cap (2)
59. Idle mixture screw (2)
60. Idle mixture screw spring (2)
61. Idle Mixture screw plugs (2)

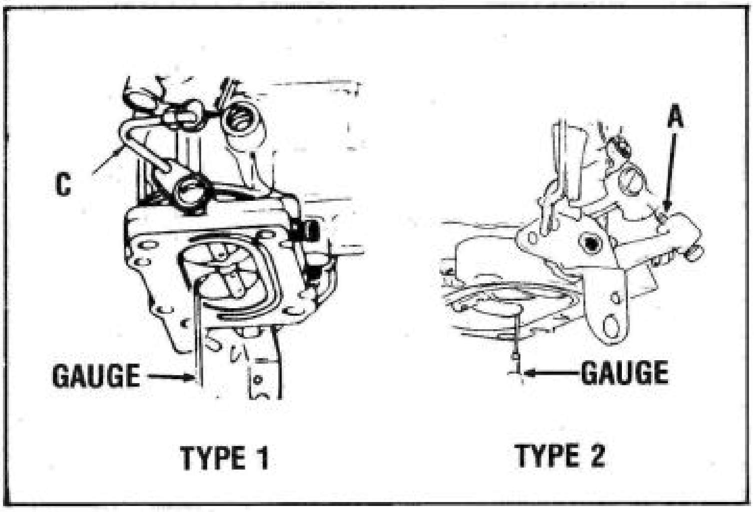


ADJUSTMENTS — AIR BLED DESIGN



FLOAT SETTING

Invert casting and hold finger against float fulcrum pin retainer to assure fulcrum pin is bottomed in its guide slots. Measure the dimension as shown in specifications from surface of fuel bowl to the top of crown at center of each float (1955-56 at outer ends of float). To adjust bend lip of float.
NOTE: Never allow the needle to be pressed into seat when adjusting.



FAST IDLE TYPE I — OFF ENGINE

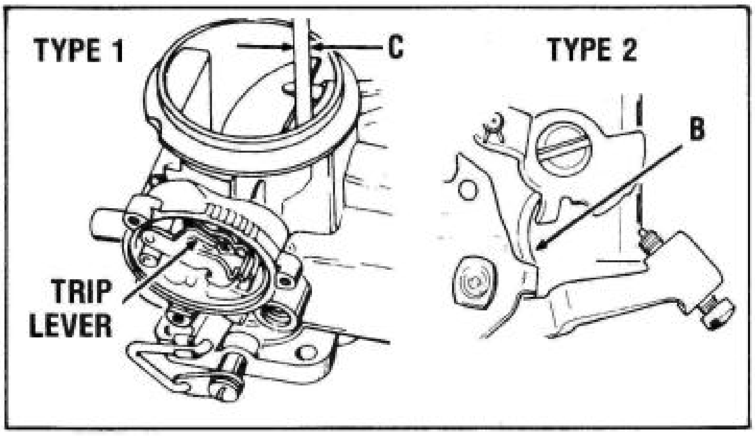
Open throttle valve slightly and hold choke valve fully closed to allow fast idle cam (in piston housing) to rotate to fast idle position. The dimension between lower edge of throttle valve and bore of casting should be as specified. To adjust, bend connector rod (C).

TYPE II — OFF ENGINE

Place fast idle screw (A) on the index mark (or highest step) of fast idle cam and adjust the screw to the dimension as specified, between lower edge of throttle valve and edge of casting.

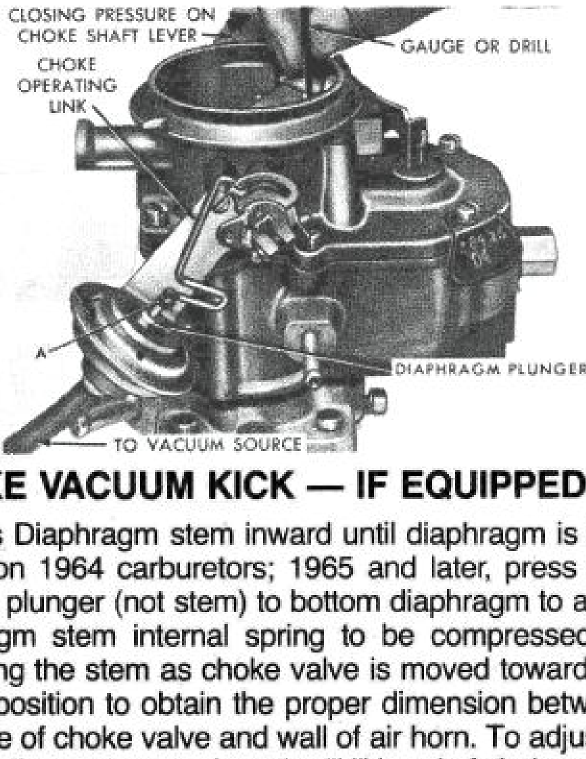
TYPE III — ON ENGINE

With engine running at operating temperature, place fast idle screw on step of cam as shown in specifications, then adjust fast idle screw to RPM specifications.



UNLOADER

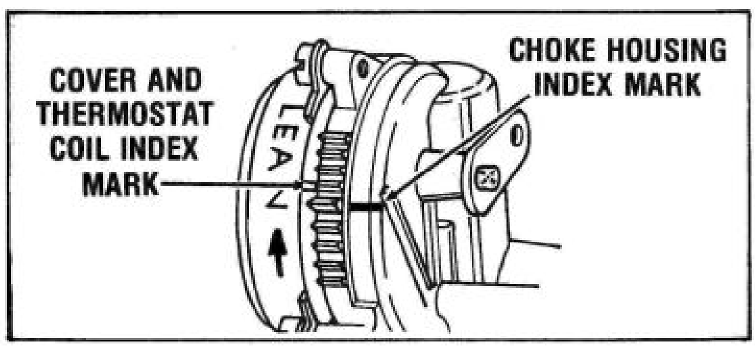
Hold throttle valves wide open and close choke valve as far as possible without forcing. The dimension between top edge of choke valve and inner wall of air horn, should be as specified. To adjust (1955 and early 1956 carburetors) bend trip lever arm in housing; (late 1956 and later - see insert) bend unloader arm (B) on throttle lever.



CHOKE VACUUM KICK — IF EQUIPPED

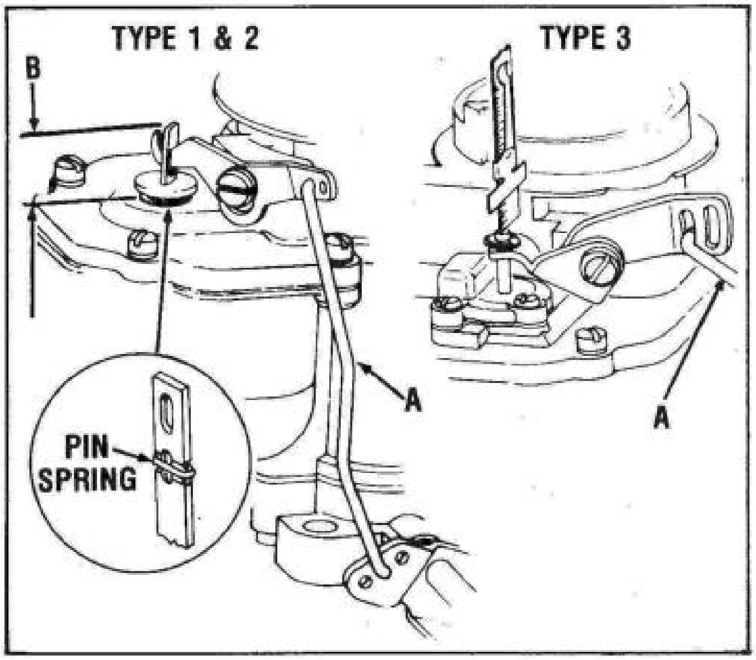
Press Diaphragm stem inward until diaphragm is bottomed on 1964 carburetors; 1965 and later, press diaphragm plunger (not stem) to bottom diaphragm to allow diaphragm stem internal spring to be compressed by extending the stem as choke valve is moved toward the closed position to obtain the proper dimension between top edge of choke valve and wall of air horn. To adjust to specifications, open or close the "U" bend of choke operating link.

NOTE: Optional method of bottoming diaphragm is to apply at least 10" of vacuum from an outside source to diaphragm assembly.



AUTOMATIC CHOKE

Carburetors equipped with integral choke. Rotate cover against spring tension until specified mark on thermostatic coil housing is aligned with mark on choke piston housing.



PUMP

With throttle valves at curb idle and throttle connector rod (A) in center hole of throttle lever and inner hole of pump arm (unless otherwise noted in specifications).

TYPE I

The dimension (B) from surface of casting to top of plunger shaft should be as listed in specifications. To adjust, bend connector rod (A).

TYPE II

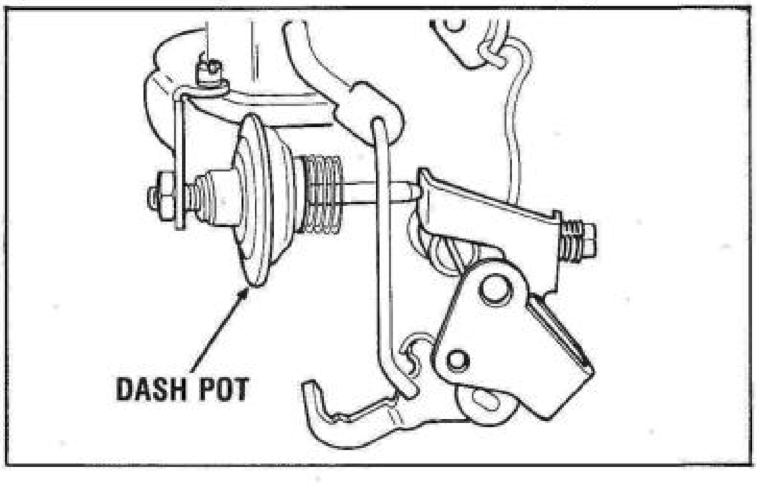
The pin spring should be in center groove of plunger shaft to support vent valve for standard setting, unless otherwise noted in specifications.

NOTE: Change pin in accord with pump stroke.

To adjust, bend connector rod (A).

TYPE III

The retainer should be in center groove of plunger shaft. The dimension from the air cleaner gasket surface of air horn to top of plunger rod, should be as specified. To adjust, bend connector rod (A).



DASHPOT — IF EQUIPPED

With throttle valves at curb idle, hold dash pot stem fully depressed. Loosen lock nut and adjust dashpot in or out of bracket to obtain 1/16" between diaphragm stem and throttle lever tang.

Tighten locknut.

IDLE SPEED AND MIXTURE

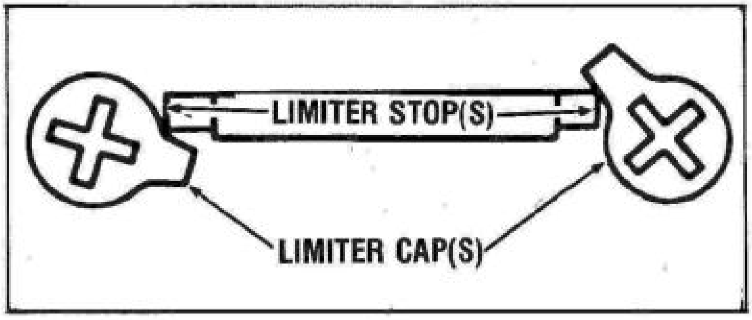
Non-Emission Carburetors

Turn throttle speed screw in until throttle valves are opened slightly. Start engine and allow to warm up thoroughly. Turn mixture screws either way until the best idle is obtained. Readjust throttle speed screw to 450-500 RPM and again check mixture screws. 1968 and later carburetors see tune up decal in engine compartment for the proper RPM.

Emission Carburetors

Follow idle mixture adjusting procedure as outlined in car manufacturer's service manual. If not available, make temporary adjustment as follows:

1. Check ignition timing.
2. With engine at normal operating temperature, air cleaner installed where possible, and all transmissions in neutral.
3. Turn throttle speed screw for speed of 500-550 RPM. For (C.A.P.) carburetors turn throttle speed screw to 700 RPM for Manual Transmissions, and 650 RPM for Auto Transmissions. For 1968 and later carburetors see tune up decal in engine compartment for specified RPM.
4. Turn idle mixture screws for the highest RPM using a tachometer.
5. Readjust throttle speed screw if necessary.
6. Turn each mixture screw clockwise (leaner) slowly, to obtain 10 to 20 RPM drop with each screw. Then turn each screw 1/4 turn counterclockwise (richer) for final adjustment.

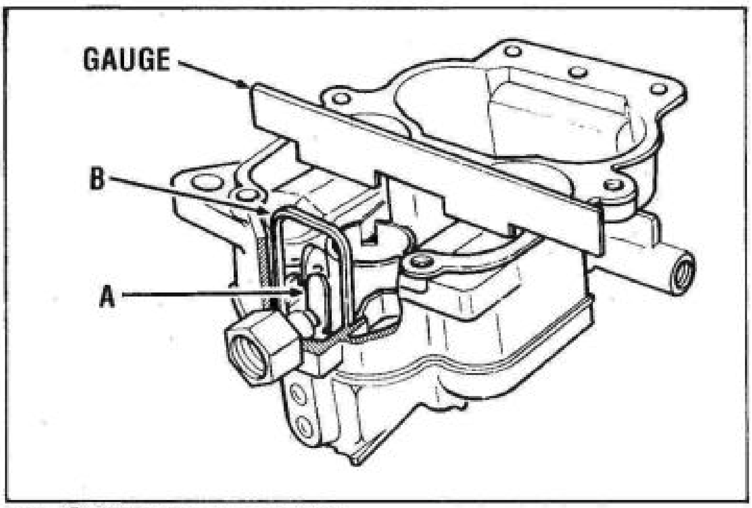


LIMITER CAP INSTALLATION — IF EQUIPPED

If the original limiter caps have been removed from the carburetor, the new service idle limiter caps must be installed after properly adjusting the idle speed and mixture screw to comply with existing State and Federal regulations regarding Exhaust Emissions.

Soak caps in hot water for a few minutes to aid in installation. Place caps on mixture screw heads and press firmly using care not to turn mixture screws when forcing caps in place, with the tab in the maximum counterclockwise position against the limiter stops.

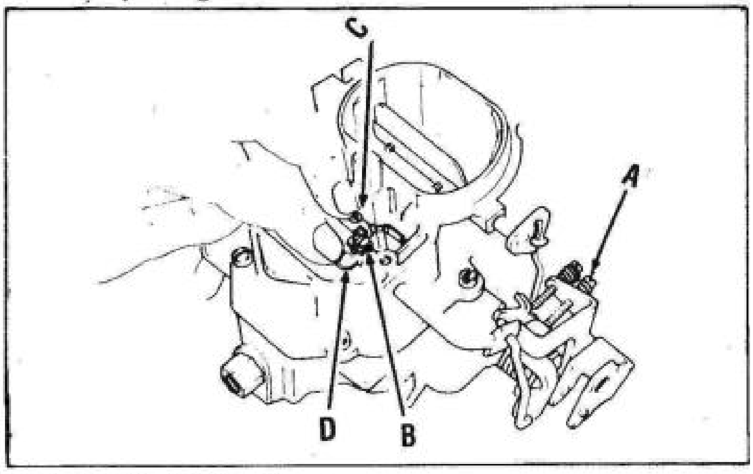
ADJUSTMENTS — SOLID FUEL DESIGN



FLOAT SETTING

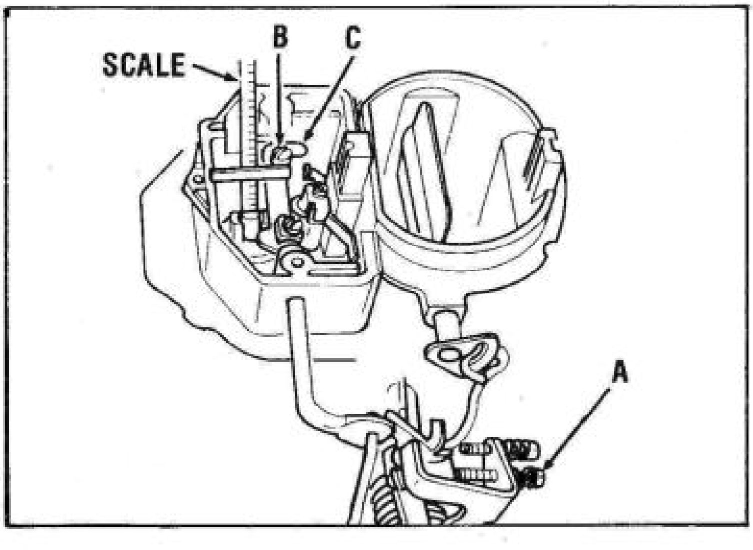
Hold float lip (A) against seated needle lightly while holding retainer (B) in bottom of guide slot. The dimensions between top of float (at center) and top of bowl should be as listed in specifications. To adjust remove float and bend lip (A).

NOTE: Never allow the needle to be pressed into seat when adjusting.



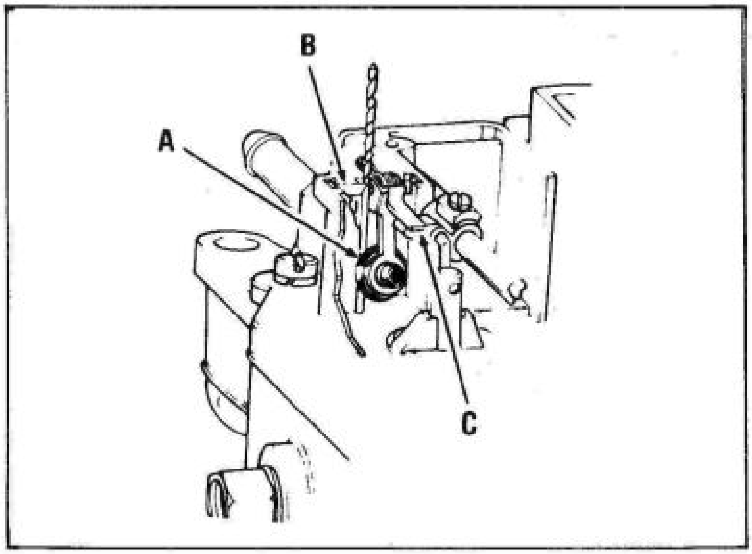
METERING ROD

Back out the throttle speed screw to allow the throttle valves to close completely. Loosen the rod lifter lock screw (B). Fully depress the step-up piston (C) to bottom the metering rods. Apply light pressure on rod lifter tab (D) until the lip of tab contacts piston plate. Tighten screw (B).



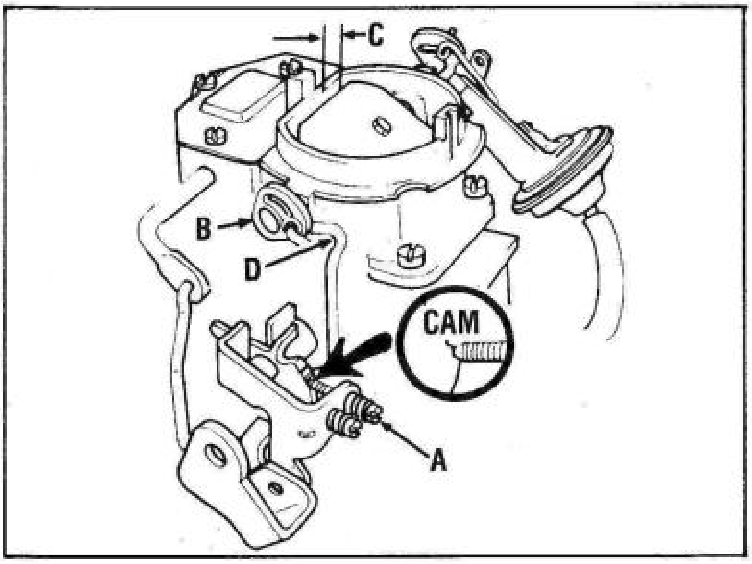
PUMP

Turn curb idle screw two full turns clockwise after it just contacts stop, then hold throttle closed. Using a "T" scale, measure the dimension from the top of accelerator pump shaft to the top of bowl cover. It should be as shown in specifications. To adjust, loosen pump arm lock screw (B) and revolve pump arm (C). Tighten screw (B).



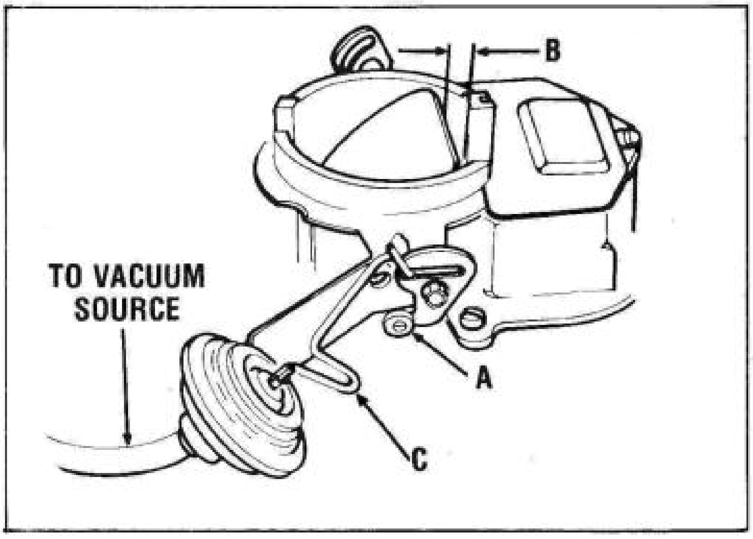
BOWL VENT — IF EQUIPPED

Turn curb idle screw two turns clockwise after it just contacts stop. With throttle held closed, a 3/32" drill should fit between the grommet seal (A) and its seat, with only a slight drag on the drill. Drill gauge must be positioned to touch the roll valve pin (B) while gauging the valve. To adjust, bend tang (C).



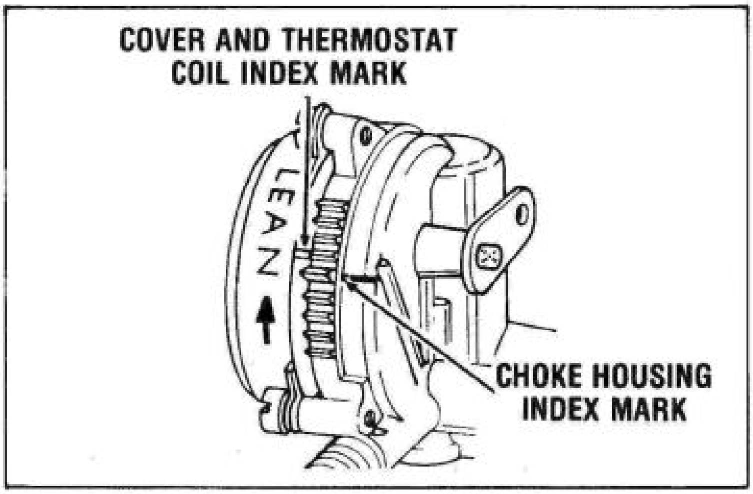
FAST IDLE CAM

Place fast idle speed adjusting screw (A) on the second highest step of cam. Apply a light closing pressure on choke lever (B) to move the choke valve toward the closed position. The dimension (C) between the upper edge of choke valve and air horn wall should be as listed in specifications. To adjust, bend connector rod (D).



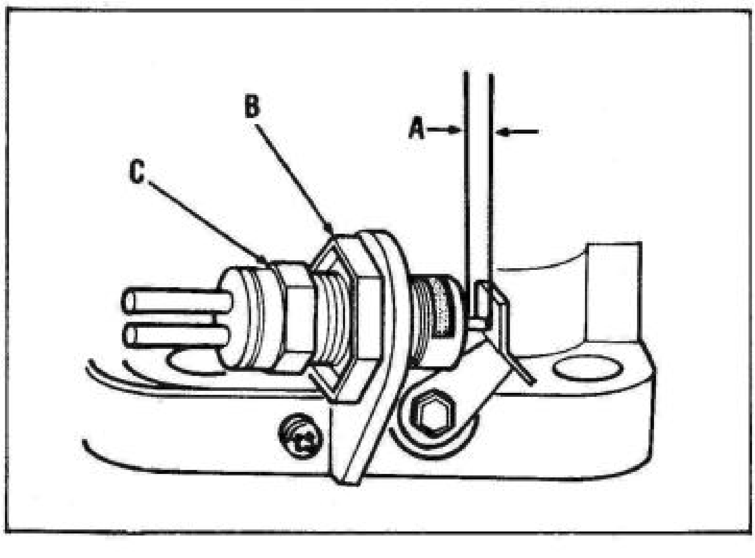
CHOKE PULL-OFF

Use an outside vacuum source to retract diaphragm stem fully. Apply a light closing pressure to choke lever (A), to move the choke valve toward the closed position as far as possible without forcing. The dimension (B) between the upper edge of choke valve and wall of air horn should be as listed in specifications. To adjust, open or close the "U" bend of connector rod at (C).



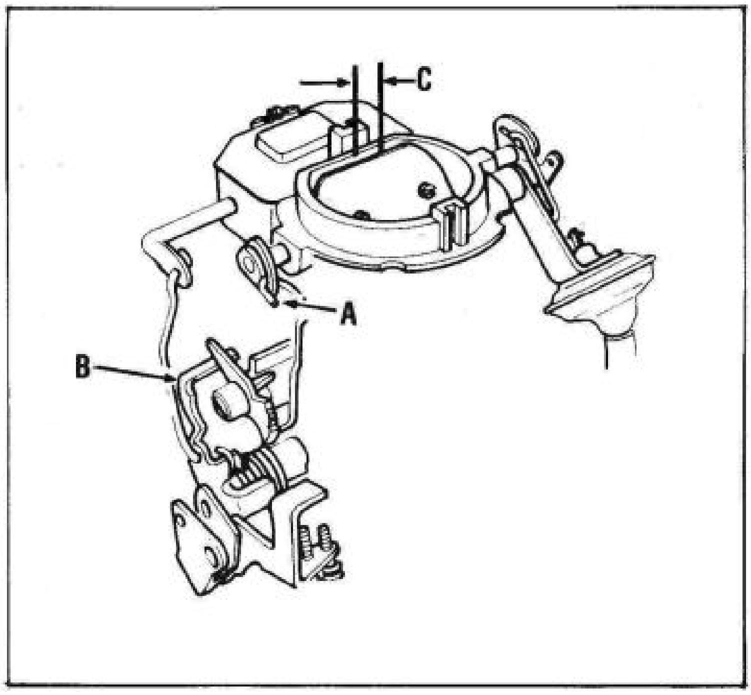
AUTOMATIC CHOKE

Rotate cover against spring tension until specified mark on thermostatic coil housing is aligned with mark on choke piston housing.



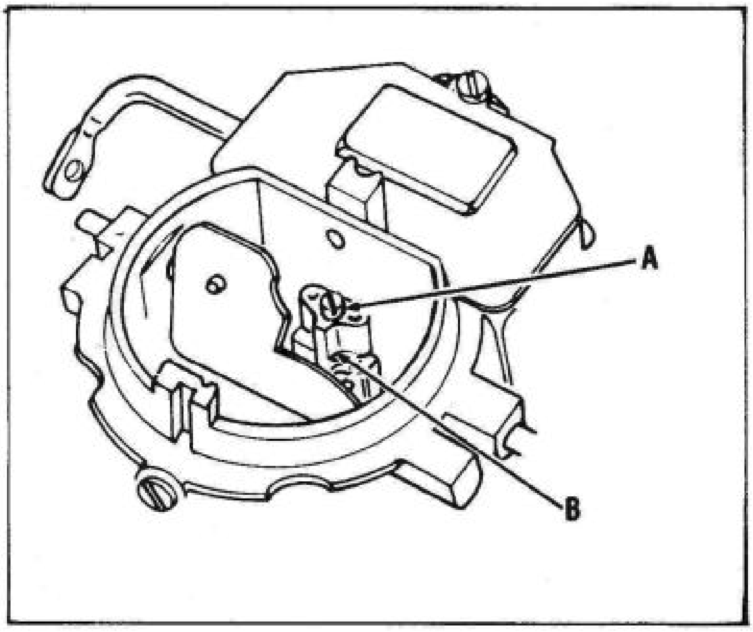
E.G.R. DUMP VALVE - IF EQUIPPED

With throttle valves held wide open and plunger stem fully depressed, the dimension (A) between operating lever and valve body should be 1/32". To adjust, loosen locknut (B) on body and turn valve (C) in or out to proper dimension. Tighten locknut.



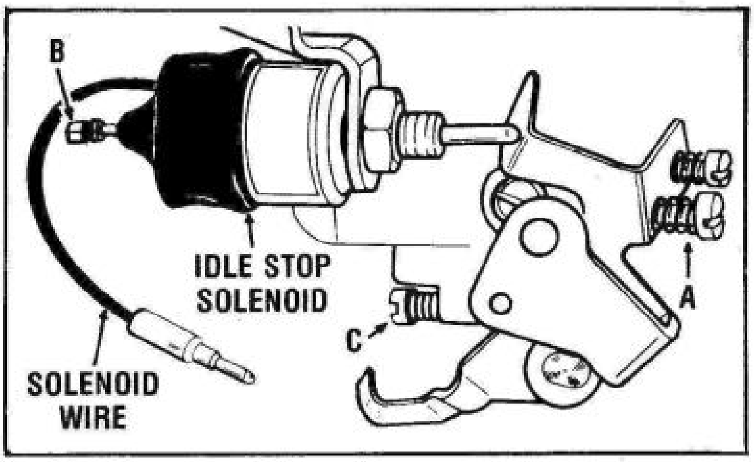
UNLOADER

With throttle in wide open position, apply light closing pressure on choke lever (A) to move choke valve toward the closed position. The dimension (C) between the upper edge of choke valve and wall of air horn should be as listed in specifications. To adjust, bend tang (B) on throttle lever.



HIGH ALTITUDE ADJUSTMENT - IF EQUIPPED

Turn screw (A) counterclockwise from seated position for high altitude operation. For sea level operation turn screw (A) clockwise to seal venturi cluster bleed cap (B). Refer to decal in engine compartment for proper specifications.



IDLE SPEED AND MIXTURE

Use exhaust analyzer if available. If not available make temporary adjustment as follows:

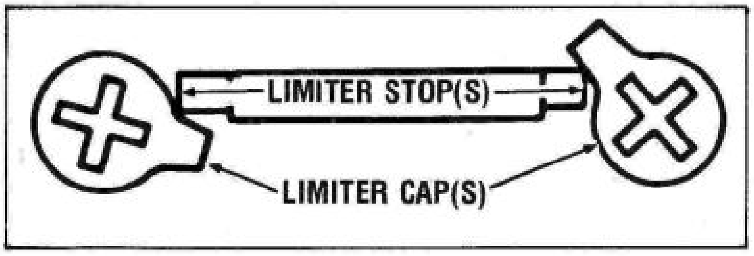
1. Refer to the "Emission Control Decal" in engine compartment for the proper engine RPM.
2. With engine at normal operaing temperature, choke fully open, air cleaner installed, automatic transmission in neutral, and air conditioner turned off.
3. Connect a tachometer and turn idle speed screw (A) or if equipped with the idle stop solenoid, turn solenoid speed screw (B) to the specified engine RPM, with the solenoid wire connected to energize the solenoid.

NOTE: The 1975 models equipped with the Catalyst Protection System will include a throttle solenoid positioner, and can be identified by a printed decal on the solenoid which states DO NOT USE solenoid or screw to set idle speed.

4. Turn the mixture screws (C) counterclockwise (richer) until a loss if engine RPM is indicated on tachometer. Turn the mixture screws (C) clockwise (leaner) until the highest RPM is obtained, then continue turning clockwise until engine RPM starts to decrease. Turn the mixture screws counterclockwise (richer) until the lean best idle setting is obtained. Readjust speed screw if needed. If equipped with the idle stop solenoid, and with engine running, turn speed screw (A) inward until end of screw just touches stop, now back off one full turn to obtain low speed setting.

1977 AND LATER IDLE MIXTURE AND SPEED ADJUSTMENT

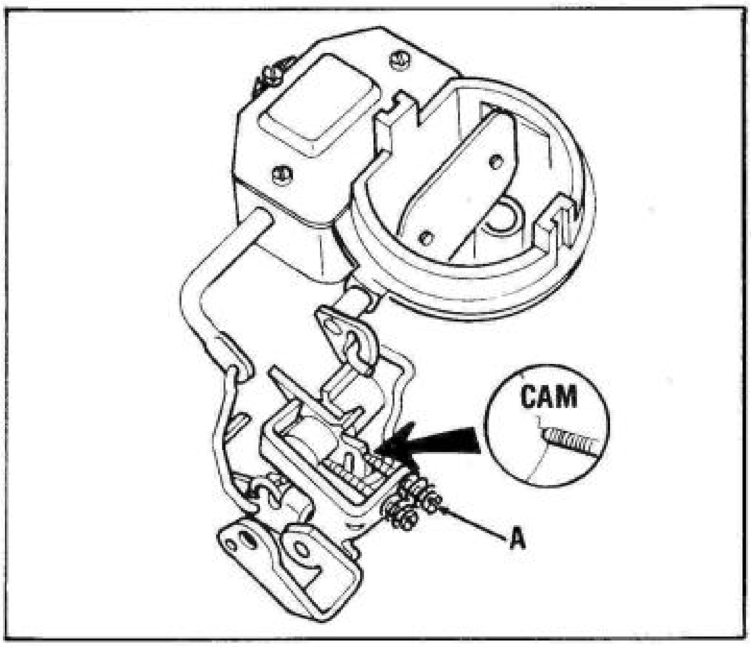
Refer to decal in engine compartment for proper procedures and specifications. On models equipped with idle mixture screw plugs install replacement plugs.



LIMITER CAP INSTALLATION — IF EQUIPPED

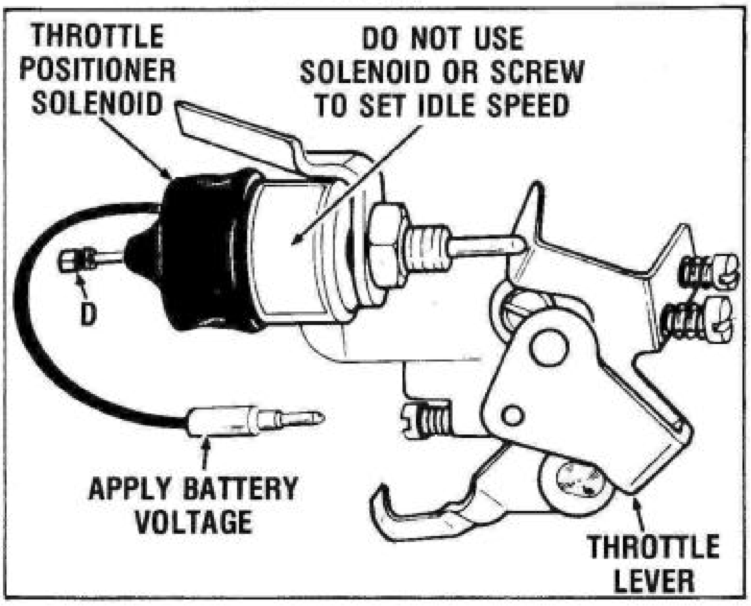
The new idle limiter caps must be installed, after properly adjusting the idle speed and mixture to comply with existing State and Federal regulations regarding Exhaust Emission.

Soak caps in hot water for a few minutes to aid in installation. Place caps on mixture screw heads and press firmly to seat, with the tab in the maximum counterclockwise position against the limiter stops.



FAST IDLE — ON CAR

With the fast idle speed screw (A) placed on the second highest step of fast idle cam, turn the screw to obtain the RPM as listed in specifications.



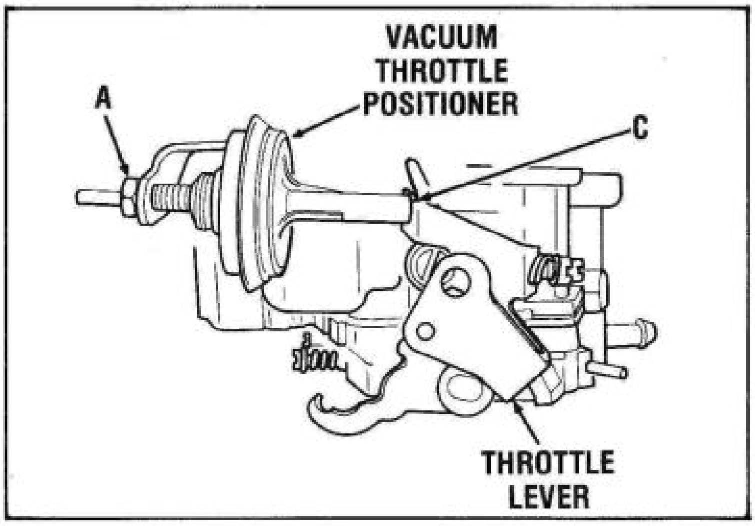
THROTTLE POSITIONER SOLENOID — IF EQUIPPED

(Catalyst Protection System)

1. Engine off, disconnect the solenoid wire and hold throttle wide open. Apply battery voltage with a jumper lead to solenoid wire. The solenoid stem should extend its full length and maintain its extended position. If it does not, replace unit. Remove the jumper lead from solenoid wire and release throttle.
2. Connect a tachometer, start engine, again apply battery voltage, with jumper lead to solenoid wire. Adjust engine speed screw (D), if needed, to approximately 1500 RPM, allow time for O.S.A.C. valve to provide

vacuum spark advance and engine speed to stabilize. Disconnect the jumper lead and reconnect the solenoid wire.

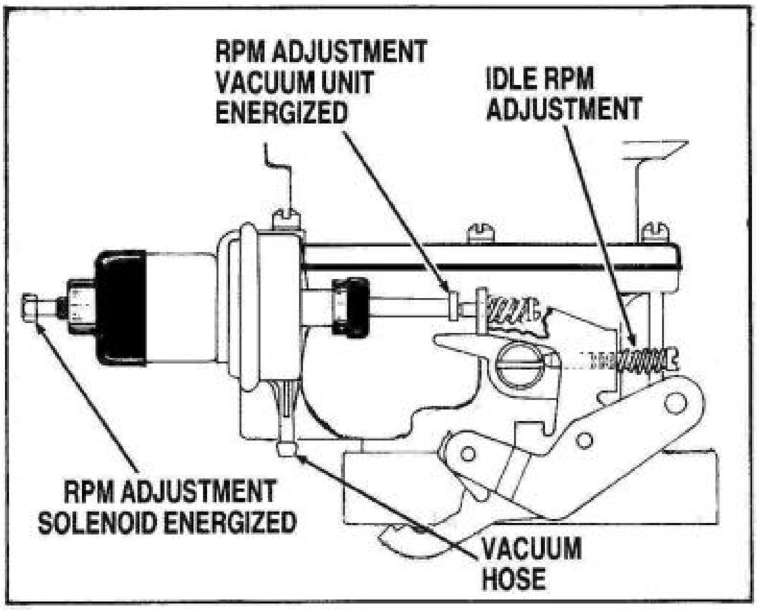
3. Accelerate engine manually to approximately 2500 RPM and release throttle. Engine should return to normal idle.



VACUUM THROTTLE POSITIONER — IF EQUIPPED

(Catalyst Protection System)

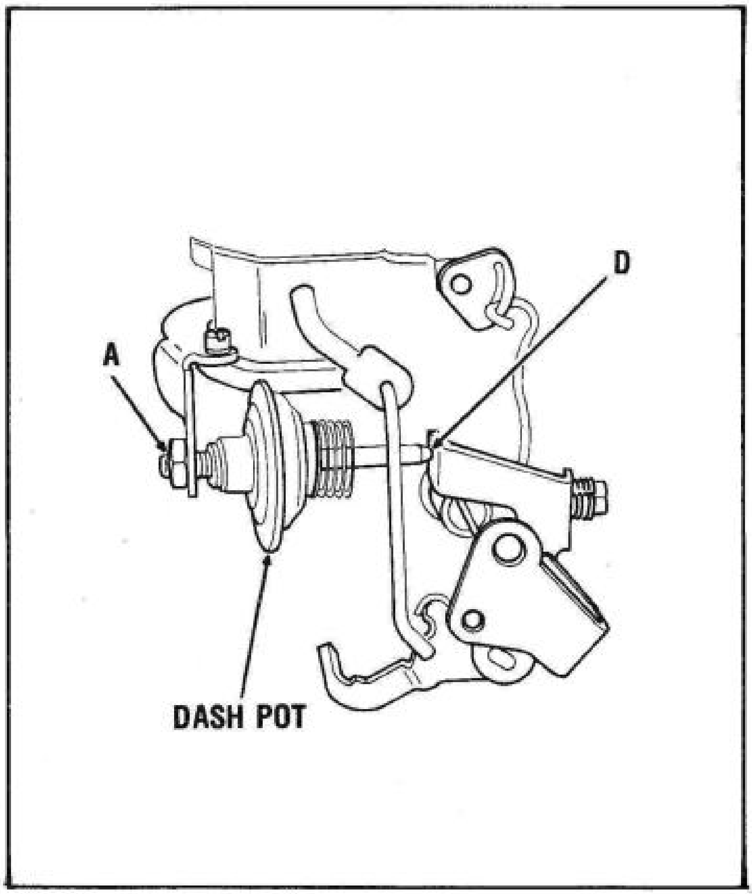
1. Accelerate engine manually to speed of approximately 2500 RPM.
2. Loosen nut (A) and rotate vacuum throttle positioner until positioner stem just contacts at tang (C) on throttle lever. Release throttle, then slowly rotate the solenoid throttle positioner to decrease engine speed until a sudden drop in speed occurs (above 1000 RPM). At this point continue adjusting the vacuum positioner in the decreasing direction 1/4 additional turn and tiahten nut (A).



SOL-VAC

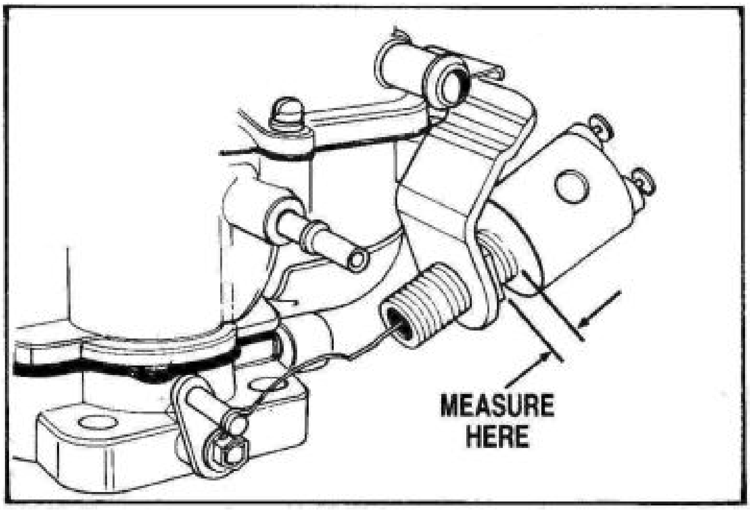
Three adjustments are required and must be made in the proper sequence.

1. Disconnect vacuum hose from solenoid vacuum unit and plug hose. Also disconnect the electric wire to the solenoid. Adjust normal curb idle with R.P.M. screw.
2. Using a hand vacuum pump, apply vacuum to the solenoid vacuum unit and adjust to the proper R.P.M. with the screw located on the throttle lever. Remove pump.
3. Energize solenoid and adjust R.P.M. to specifications using the adjusting screw on rear of solenoid.



DASHPOT — IF EQUIPPED

Loosen lock nut (A). Start engine and connect a tachometer. Position throttle lever to 2500 RPM. Adjust dashpot until the stem just contacts tang at (D) on throttle lever. Tighten nut (A). Check to make sure engine returns to idle after making this adjustment.



TRANSDUCER — IF EQUIPPED

To adjust the transducer, measure distance between outer portion of transducer and transducer mounting bracket. Turn transducer clockwise or counterclockwise to obtain distance as specified.

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'76 November Reference Book

TWO BARRELS FOR SIX CYLINDERS

SERVICE CONFERENCE

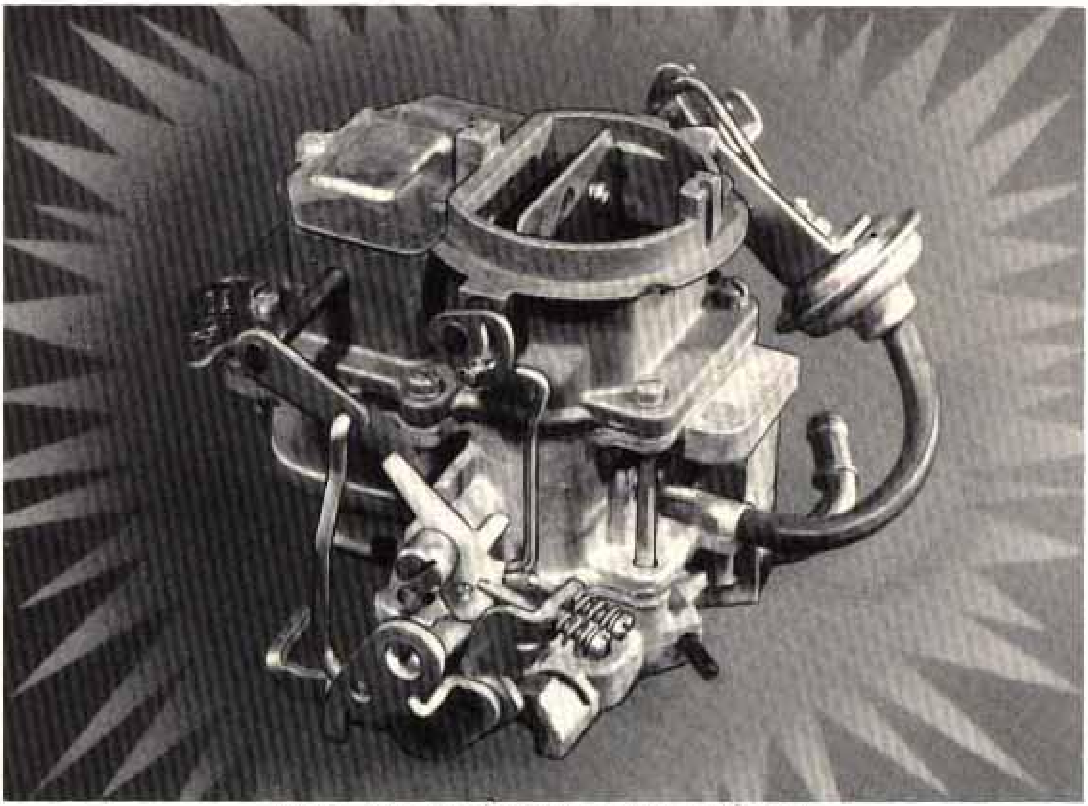
Fig. 1 — The new Super Six carburetor for 1977

ONE GOOD CARBURETOR DESERVES ANOTHER

For the past several years we've had the familiar and reliable Carter two-barrel carburetor for our 318 engines. Now, for 1977, this same basic carburetor (with modifications) is also installed on the 225 Super Six powerplants.

Although both Carters look alike, there are important differences between them that you should know about since they affect service. Some are major, others of a minor nature. For one thing, the Carter for the Super Six and the Carter for the 318 engine are not interchangeable. Poor driveability, poor fuel economy, and reduced performance will result if this is attempted.

There are a number of other features regarding the new Super Six carburetor that are also discussed in this Reference Book. And, in the following pages, we've also covered the reasons for these changes and step-by-step procedures for making all external checks and adjustments. As you may well know, many of the engineering modifications you'll find in this Super Six carburetor have been incorporated simply because control of exhaust emissions is so critical in our drive for clean air.

CONTENTS

1 NEW FEATURES

THE THROTTLE BODY RESTRICTORS

One of the more important changes made to the throttle body on the Super Six carburetors is the addition of idle mixture restrictors. These restrictors are simply small brass plugs with a calibrated drilled hole. With the throttle body separated from the main body, you'll find them pressed into position just above the idle discharge ports and in line with the idle mixture screws.

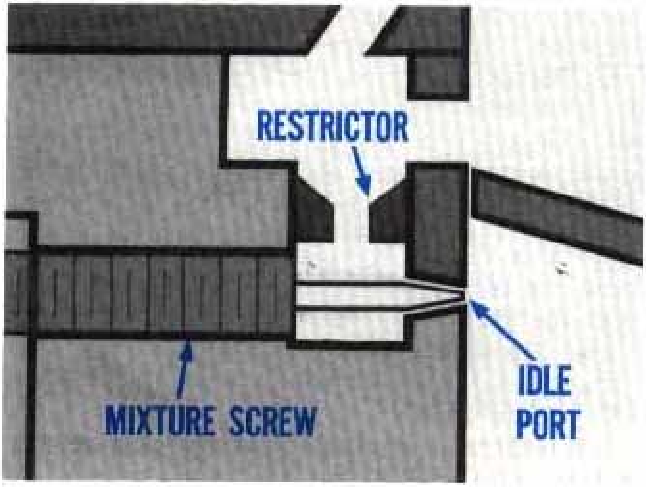

Fig. 2 — Idle mixture restrictors are calibrated

These restrictors act much like main metering jets. That is, only so much fuel mixture can flow through the drilled passage, regardless of how far the idle mixture screws are turned outward. On the other hand, leaner idle speed mixtures can be easily achieved by turning the mixture screws inward until you get the proper HC and CO emission readings called for on the underhood Emission Label.

CAUTION: Under no circumstances should these restrictors be removed or the calibrated drilled passages enlarged.

THROTTLE BORE AND VENTURI DIMENSIONS

Although the throttle body bore for the 1977 Carter Super Six and 318 engines are identical (1-7/16"), there is a difference in the main body venturi size. Since the Super Six has less cubic inch displacement than the 318, the main venturi needed for the Super Six is smaller (1-1/16") than the venturi for the 318 (1-3/16"). This is one of the primary reasons for non-interchangeability of the two-barrel Carter for the Super Six and the 318 engines.

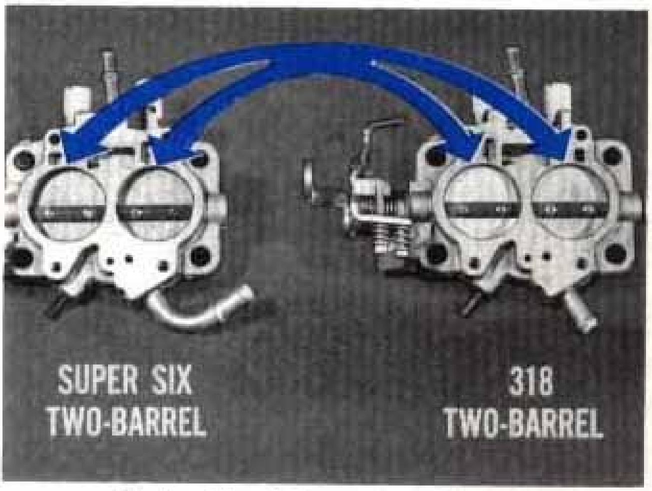

Fig. 3 — Throttle bore size is identical

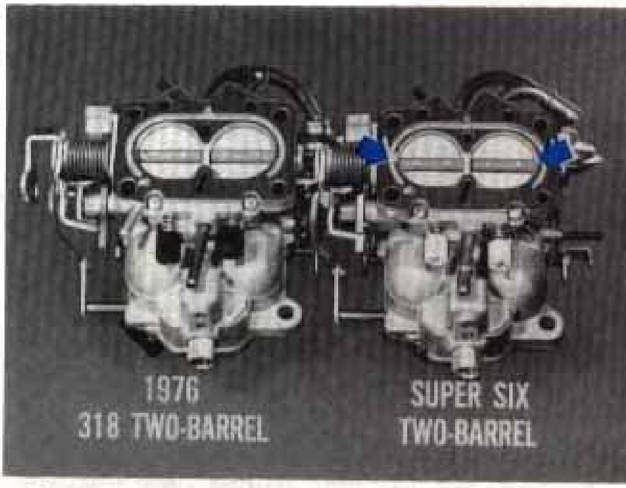

Fig. 4 — Notches provide source for vacuum signals

THROTTLE BODY NOTCHES

Both the throttle body for the Super Six Carter carburetor and the Carter two-barrel carburetor for the 318 for 1977 have notches cast into the underside section. Prior models of the Carter two-barrel do not have notches. Through these notches, intake manifold vacuum is applied to the vacuum kick diaphragm and to the inlet air door diaphragm which is part of the heated air system.

FLANGE GASKET

This design change in the throttle body dictated the need for a new carburetor flange to intake manifold gasket. If the 1977 gasket is used on a 1976 or prior model two-barrel Carter carburetor, the vacuum source for vacuum kick and the heated air system will be blocked off.

Fig. 5 — The Super Six "bathtub" design base gasket

In other words, remember to use the solid gasket (without notches) with the carburetor that does have notches in the throttle body. And, use the gasket (with notches) on Carter two-barrel carburetors that do not have notches in the throttle body.

IDLE MIXTURE SCREWS

For many years idle mixture screws have had very little change. But now for 1977 there's a difference.

Although the screw threads remain identical in size and pitch, the tip of the new mixture screw has a slimmer, more gradual taper and the end of the tip is not pointed. These new mixture screws are not interchangeable with those

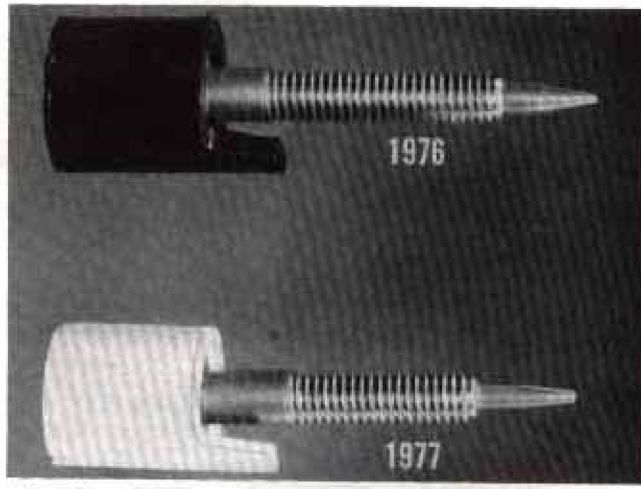

Fig. 6 — 1977 mixture screws have a slimmer needle tip

used in prior model Carter two-barrel carburetors.

If a prior model mixture screw is installed in a 1977 Carter two-barrel carburetor, damage to the idle ports can result because internal machining of the throttle body is also different to accommodate the new taper of the mixture screws.

AIR HORN

There are two differences in the air horn used on Carter Super Six carburetors as compared to the one used on the 318 engine. First, the choke valve for the Super Six has more offset than the one used with the 318 engine. Because of this, engineers increased the thickness of the air horn inner wall. By increasing the amount of choke offset, air velocity rushing past the par-

Fig. 7 — The Super Six air horn wall is thicker

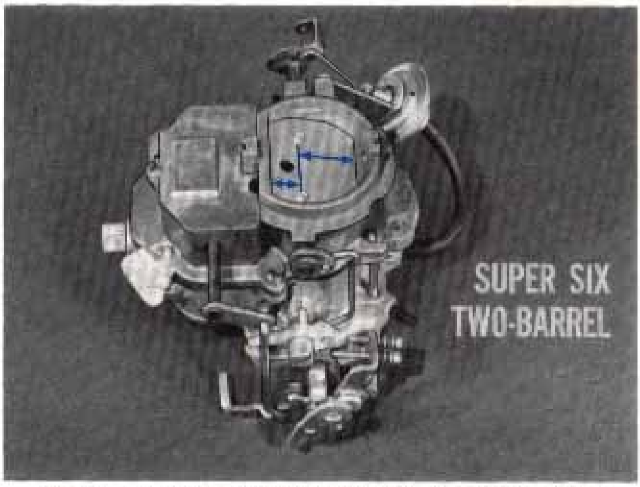

Fig. 8 — The Super Six choke valve has more offset

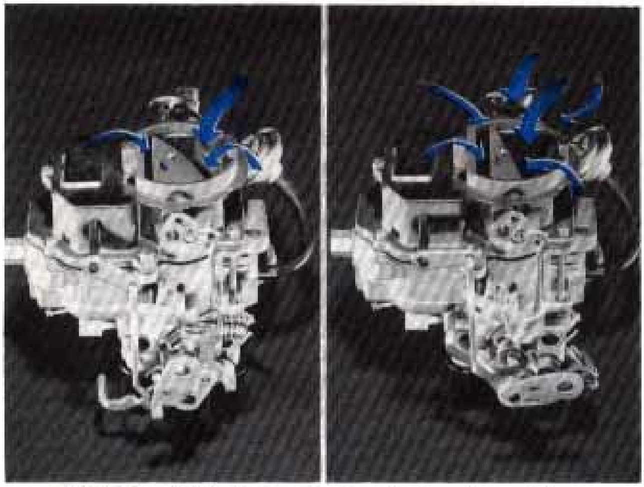

Fig. 9 — Air velocity opens choke valve wider

tially closed choke valve when the throttles are opened during cold engine operation, causes the choke to open slightly more than it would if there was less choke offset. As a result, the engine receives a leaner warm-up mixture under the engine operating condition described in order to help keep emissions down.

VACUUM STEP-UP PISTON

While we're on the subject of emission control, engineers have made some minor but significant modifications in the vacuum step-up piston assembly for the Super Six carburetor.

Two things have been changed: the plastic lifter tabs are somewhat larger and the dimension between the upper and lower stops of the step-up piston is reduced. As a result, the vacuum step-up piston now has a restricted amount of free travel as compared to the 318 version.

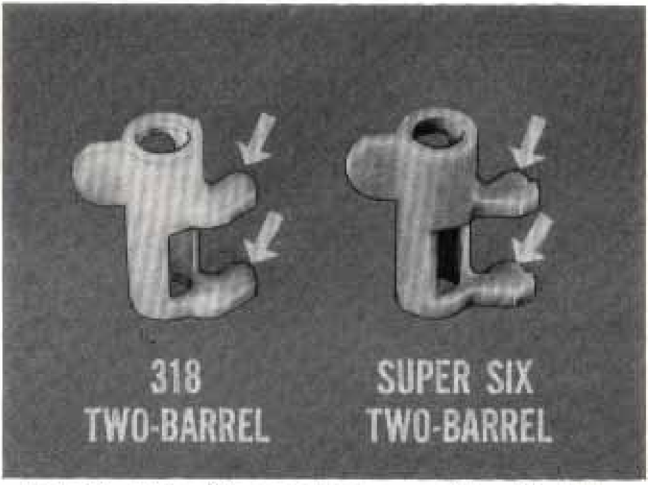

Fig. 10 — Note difference in step-up piston lifter tabs

LIMITED STEP-UP PISTON TRAVEL

Now, when manifold vacuum drops during part throttle, heavy-load operation, the weak vacuum signal applied to the piston permits the piston spring to push the piston and metering rods upward only a slight amount. This limited piston travel helps keep mixture levels from becoming excessively rich during the engine operating condition described. Again, there is no interchangeability between the vacuum step-up piston assembly used on the Super Six Carter carburetor and the one for the 318. Otherwise, flat spots, hesitation, and possibly stallout will result.

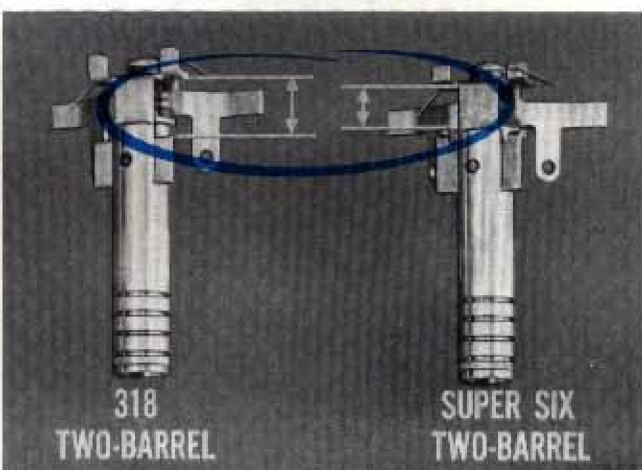

Fig. 11 — Vacuum step-up piston stops are different

2 EXTERNAL ADJUSTMENTS

A WORD ABOUT LINKAGE

The external operating linkage connecting the various cams and levers that are part of the Carter two-barrel carburetor are purposely designed to operate in somewhat "loose" manner. The basic reason is to ensure unrestricted "smooth" operation over many thousands of miles even when dirt or gum deposits accumulate on the linkage. Because this "looseness" is "built in" to the carburetor design, some Service Technicians feel that if the setting is "close-enough" it's okay to leave it alone. But remember, under all engine operating conditions, this "slack" is taken up so that the settings are correct. As a result, you can easily see the need for PRECISE and ACCURATE settings. And, of course, misadjustments of the carburetor linkage can upset emission levels almost faster than any other component on the engine. Therefore, trying to invent your own specifications or making the adjustments without the proper special gauges can only lead to driveability problems.

Fig. 12 — Special gauges eliminate "guesswork"

If you use "guesswork" you might just as well call the whole thing off.

Let's agree on one thing . . . carburetors need PRECISE adjustments in order for the engine to deliver GOOD DRIVEABILITY and of course provide good customer satisfaction.

By the way, all of the following external adjustments can be made when the carburetor is on the bench or on the car, including the "wet" check of float level. In either case, it is suggested that you perform these adjustments in the order in which they are presented in this Reference Book.

CHECKING FAST IDLE CAM POSITION

Before making any checks or adjustments to the carburetor, first get the carburetor model number stamped on the small tag attached to the air horn. Then refer to the Service Manual in order to select the right gauges you'll need.

The first check should be made to make sure the fast idle cam position is correct. Here's why: Since the choke valve and the fast idle cam are linked together, we must be certain that at every stage of choke valve opening the cam is repositioned properly in order to insure correct engine RPM all during engine warm-up.

THE SECOND HIGHEST STEP OF THE CAM

To make this check, first place the fast idle speed screw on the high step of the cam. Then, carefully rotate the fast idle cam by hand so that the fast idle speed screw slides and drops down to the SECOND HIGHEST STEP.

With the choke coil rod disconnected, push the choke valve towards the closed position. While

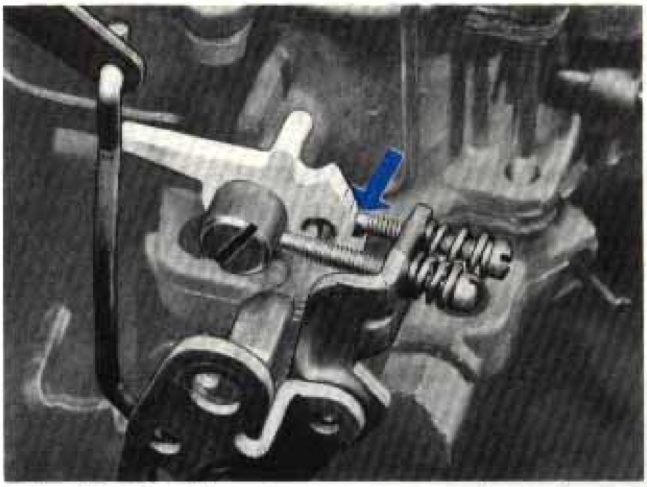

Fig. 13 — Fast idle screw rests on second step of cam

maintaining closing pressure on the choke lever, insert the correct gauge between the air horn wall and upper edge of the choke valve. You should feel a slight drag on the gauge as you move it up and down.

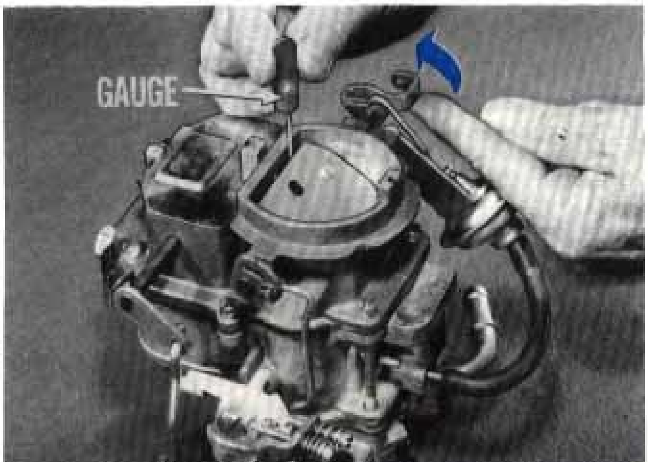

Fig. 14 — Checking fast idle cam position with gauge

CHOKE VALVE CLEARANCE

If there is too much clearance (no drag on the gauge) then the connector rod length will have to be INCREASED.

Increasing the rod length DECREASES the choke valve opening. Now, if on the other hand, the choke valve has too little clearance (gauge cannot be inserted between the choke valve and the air horn wall), then the connector rod length will have to be DECREASED. Bend the rod as necessary until there's a slight drag on the gauge, as it is moved up or down. Recheck your adjustment so that it is set right to specifications.

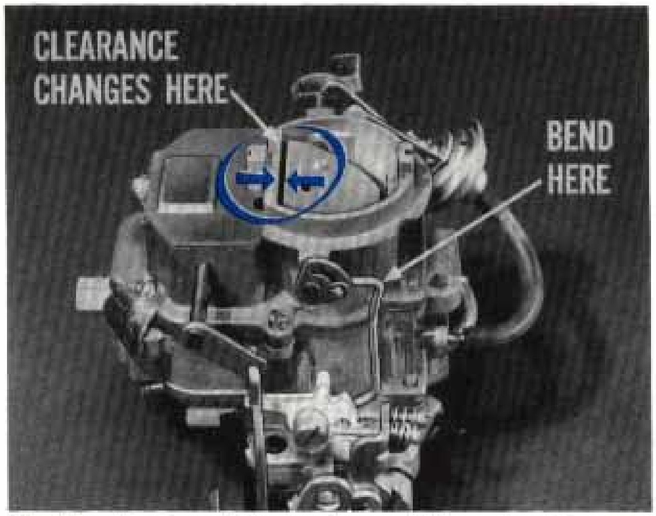

Fig. 15 — Bend carefully to change choke valve clearance

Too little or too much choke valve clearance caused by the connector rod being too long or too short has a direct effect on driveability during engine warm-up. With the choke valve opening not synchronized with throttle valve opening, stumbling, stalling and engine misfiring generally results.

CHECKING VACUUM KICK DIAPHRAGM

When you are certain that the fast idle cam position is set accurately, proceed to the check of vacuum kick. Of course, make sure the vacuum kick diaphragm is not punctured, ruptured or torn. You can do this by disconnecting the vacuum hose at the carburetor. Then, push the stem of the diaphragm into the metal case so that it bottoms. While holding the stem bottomed, place your finger tight against the open end of the vacuum hose and release finger pressure on the vacuum kick stem.

If the diaphragm is not damaged or ruptured, the stem will remain bottomed in the metal case. Any small leakage in the diaphragm will cause the stem to release and move outward. You can also check the vacuum diaphragm condition by applying vacuum through a vacuum pump to the diaphragm. At about fifteen inches of vacuum the stem should hold its "pull-in" position for at least 30 seconds or more. If not, then install a new vacuum kick

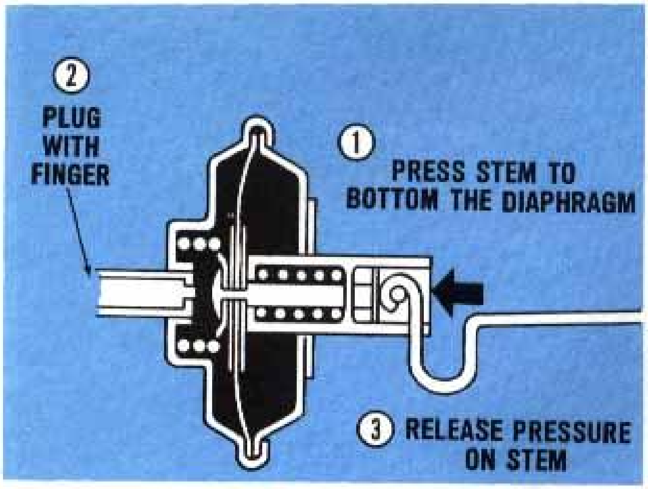

Fig. 16 — Checking vacuum kick diaphragm condition

diaphragm assembly before you begin the vacuum kick check.

GAUGE CHECK VACUUM KICK

Now, select the vacuum kick gauge called for in the Service Manual. Then with a vacuum hand pump connected into the vacuum diaphragm hose, pump up about fifteen inches of vacuum. Open the throttle to clear the fast idle cam and release the throttle. Close the choke by hand by applying pressure to the choke lever.

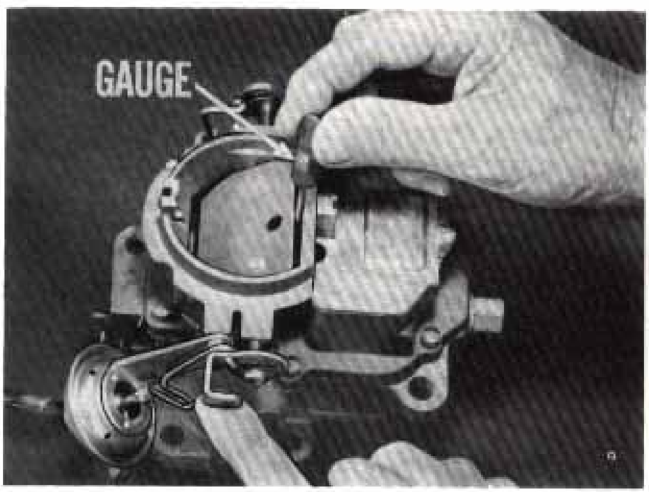

Fig. 17 — Checking vacuum kick clearance with gauge

As you're doing this, the center of the vacuum kick stem will pull out of the diaphragm with little resistance. When the small internal spring becomes fully compressed and you feel resistance to further closing of the choke, STOP RIGHT THERE.

If too much pressure is applied to the choke lever when closing the choke valve, the diaphragm will become overextended causing the choke valve to close more than it should.

As a rule of thumb . . . take it easy on choke valve closing. Never use excessive force. Once the diaphragm stem extends and you feel a resistance to further movement of the stem, hold that position and make the gauge check.

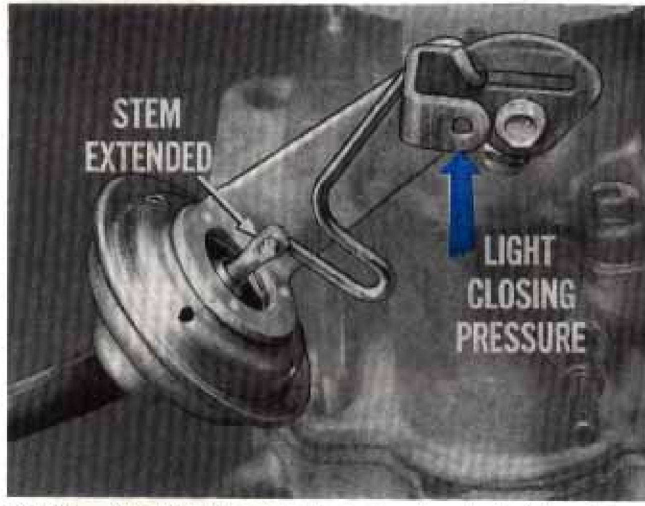

Fig. 18 — Vacuum kick diaphragm extended without force

Using the correct gauge, insert it between the choke valve and the inner wall of the air horn. Excessive clearance causes too lean a fuel/air mixture and results in engine stalling. On the other hand, too little clearance between the gauge and the air horn wall will cause exces-

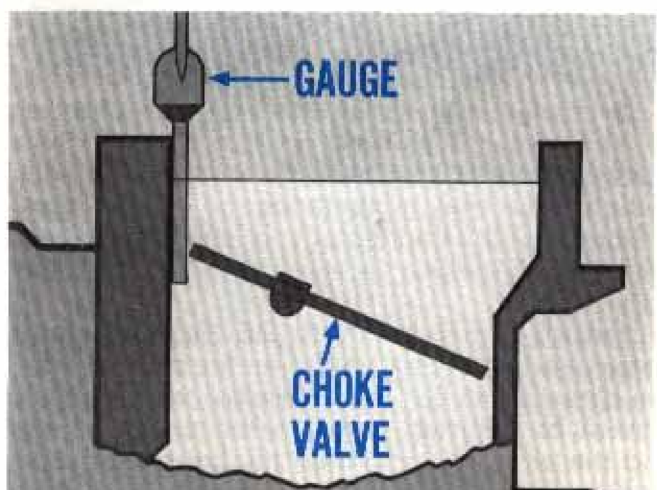

Fig. 19 — Vacuum kick clearance correctly set

sively rich mixtures which results in high exhaust emissions during engine warm-up.

CHANGING VACUUM KICK CHOKE VALVE CLEARANCE

To increase the amount of choke valve clearance for vacuum kick, CLOSE the "U"-shaped link. To decrease the clearance, OPEN the link using a wide-bladed screwdriver. Once the vacuum kick adjustment is correct, reconnect the choke rod. Now for the Choke Unloader.

CHECKING THE CHOKE UNLOADER — WIDE OPEN KICK

This is often called the "Wide Open Kick" check. When properly set and throttle valves are wide open, the right amount of extra intake air enters the cylinders during engine cranking to help clear a flooding condition that is usually caused by improper starting procedures during cold engine start-up.

With the throttle valves held firmly in the wide-open position (and finger pressure holding the choke valve towards the closed position), insert the proper gauge between the choke valve and the inner wall of the air horn.

The gauge should have a slight drag as it is moved up and down. If the gauge falls through the gap without any drag or if it cannot be inserted without forcing the choke valve to open wider, then the tang on the throttle shaft will have to be bent up or down a slight amount. You may have to do this several times in order to get the setting correct.

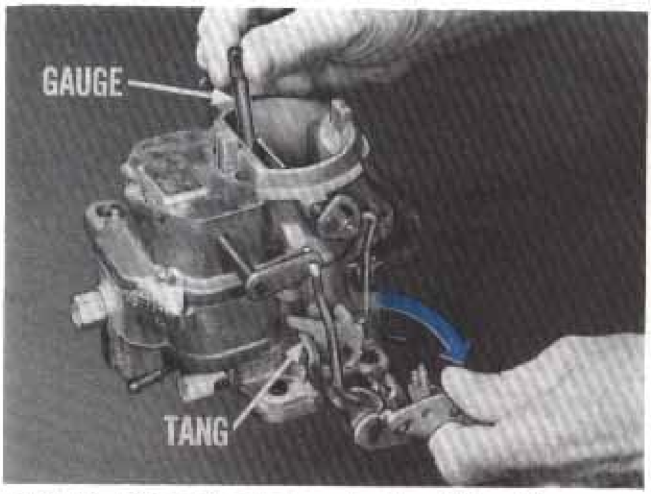

Fig. 20 — Checking choke unloader setting with gauge

CHECKING VACUUM STEP-UP PISTON

This check must be made with the throttle valves completely closed. To do this, back off the idle speed screw until the tip of the screw clears the idle speed stop. Press downward on the step-up piston assembly and loosen the plastic lifter lock screw about one turn. While maintaining downward pressure on the step-up piston, also push the outer tab of the plastic sleeve downward as far as it will travel. Tighten the lock screw.

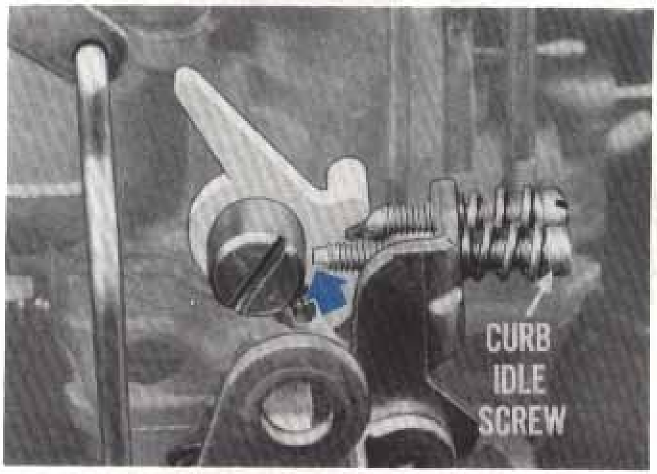

Fig. 21 — Throttle valves must be completely closed

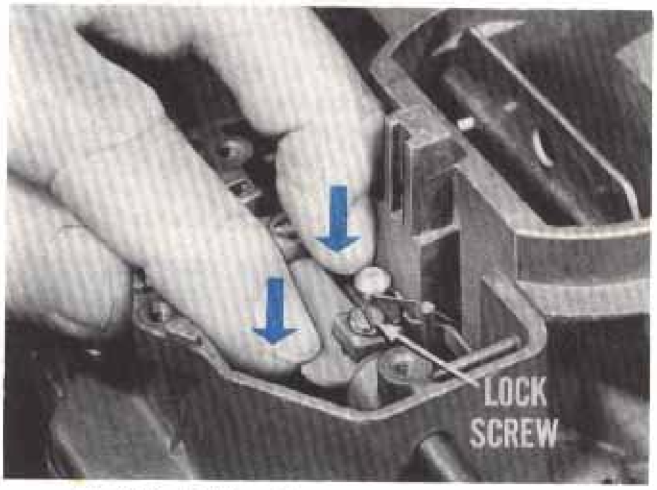

Fig. 22 — Setting the vacuum step-up piston

That's all there is to setting the vacuum step-up piston.

NEVER CHANGE HEX HEAD SCREW ADJUSTMENT

As a word of caution, never attempt to change the factory setting of the vacuum step-up piston hex-head screw because performance can be seriously affected. Calibration of this assembly is accomplished by using special equipment during production and cannot be duplicated in the field.

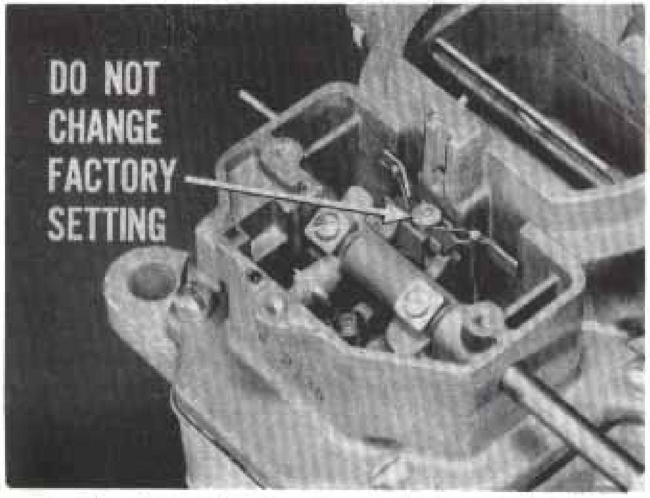

Fig. 23 — Never change vacuum step-up piston screw

CHECKING ACCELERATOR PUMP STROKE

This check must be made with the throttle valves set in the curb idle position. To do this, back-off the idle speed screw until it clears the idle speed stop, then turn the curb idle speed screw inward until it just touches the idle stop. Give it TWO additional turns inward. This will place the throttle valves in an approximate curb idle position. Now, measure the distance between the top of the pump shaft and the top surface of the air horn casting, without the gasket.

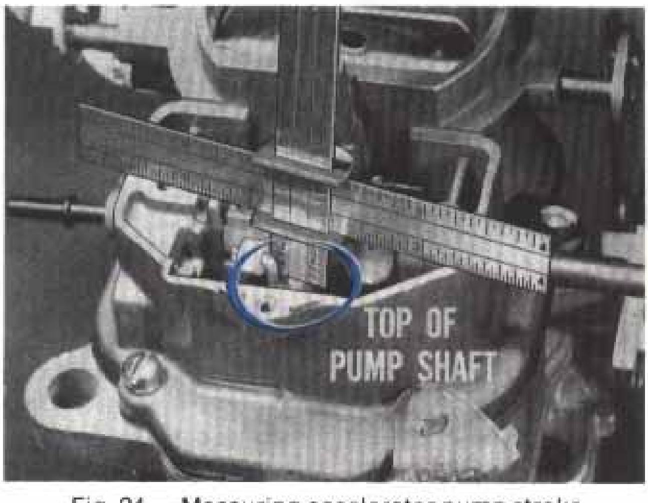

Fig. 24 — Measuring accelerator pump stroke

The vertical section of the "T" scale should touch the top of the pump shaft while the horizontal crosspiece should be resting on the casting. A pump shaft set down too far reduces pump stroke travel.

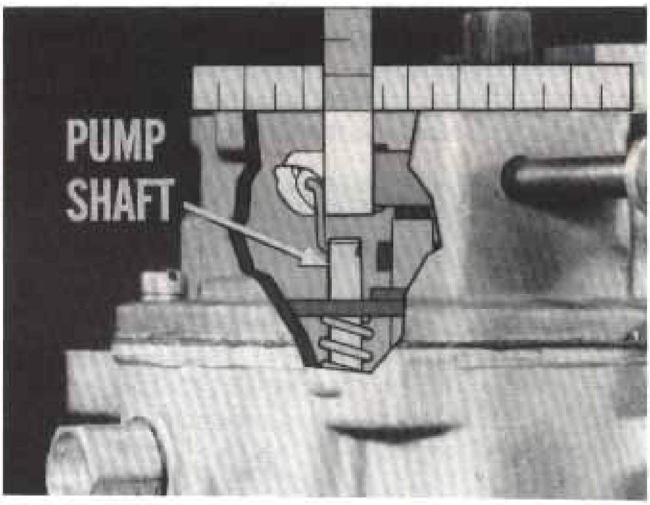

Fig. 25 — Accelerator pump shaft set down too far

As a result, too little fuel is discharged on acceleration causing flat spots and hesitation. On the other hand, a pump shaft set too high will cause too much fuel to be discharged on acceleration. Fuel economy suffers. In either case, loosen the small lock screw on the plastic sleeve and rotate the sleeve as necessary until the pump shaft height is set to the specifications called for in the Service Manual. Once the setting is correct, hold the position and snug the screw down tightly. Recheck measurement.

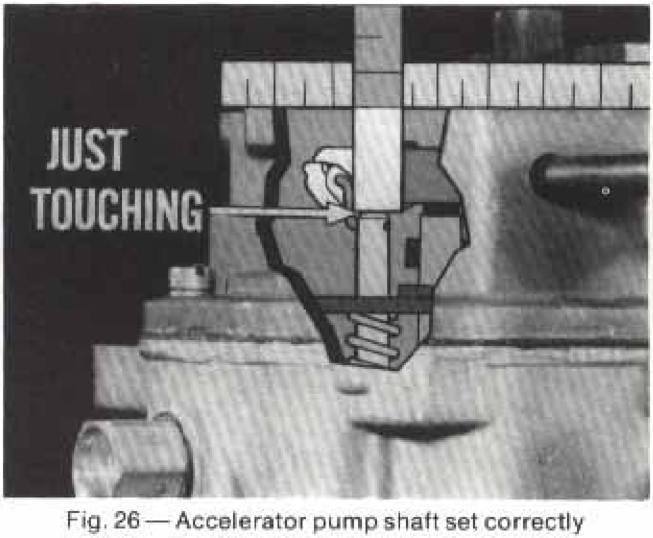

Fig. 26 — Accelerator pump shaft set correctly

3 WET FLOAT LEVEL SETTING

Checking the float level is not generally done when performing the external checks of linkage adjustments. However, depending upon the driveability problem (or customer complaint), you can make this check either by the dry method or the "wet" method. The "wet" method can be performed on-the-car or on-the-bench. After removing the vacuum step-up piston assembly, disconnect the accelerator pump rod, the fast idle cam connector rod and the thermostatic coil connecting rod. Separate the vacuum kick hose from its connection at the throttle body. Remove the air horn by lifting straight upwards. With your fingers, push the floats down to the bottom of the float bowl.

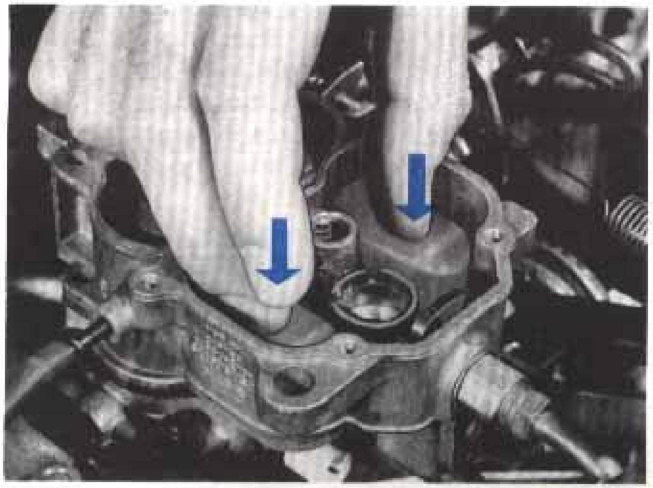

Fig. 27 — Allowing extra fuel to enter the float bowl

Extra fuel will enter the float bowl because of pump pressure maintained in the line. If this "wet" method is performed on-the-bench, pour enough gasoline into the float bowl to create an unusually high fuel level. By doing this, you can make sure the fuel level is extra high so that the floats press the needle snug against its seat. With a higher than normal fuel level you'll get a more accurate check of true float height.

CHECK FUEL INLET FITTING TIGHTNESS

Before checking float height, make sure the fuel inlet fitting is tight. Specifications call for 200 inch-pounds. This may seem too simple to even mention but when you realize there's about a ten-to-one ratio of movement between the float needle and the floats, you can see why this check is important. As an example: if there is only FIFTEEN THOUSANDTHS (.015) of an inch of inward movement of the float needle when the inlet fitting is tightened, the float height will change almost ONE-HUNDRED AND FIFTY THOUSANDTHS (.150").

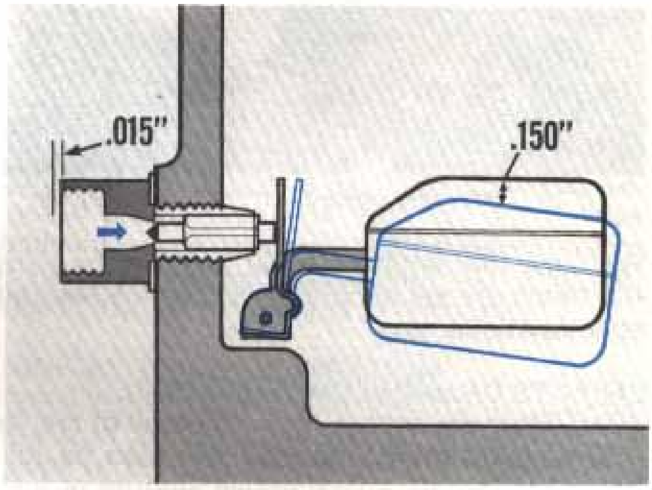

Fig. 28 — Tightening inlet fitting changes float height

Incidentally, for maximum protection of the brass inlet fitting (the line fitting as well), use two flare-nut-type wrenches to avoid crushing or distorting either one.

MEASURING FLOAT HEIGHT

Using a "T" type of metal scale, measure the distance between the metal surface of the main body casting and the crown section of each float . . . at their centers. As you are doing this, press down on the float pin retainer so that you get an accurate check. If the floats are set too high or too low, remove the float baffle, then push the floats down to the bottom of the float bowl and carefully bend the metal float tab one way or the other as needed.

Fig. 29 — Be sure to press down on float pin retainer

Recheck the setting several times to be sure the floats are set according to Service Manual specifications.

EFFECTS OF HIGH/LOW FUEL LEVEL

If the floats are set too high, the level of fuel in the main discharge nozzles will also be too high. As a result, an excessive amount of fuel will be discharged during normal driving conditions, and fuel economy will suffer.

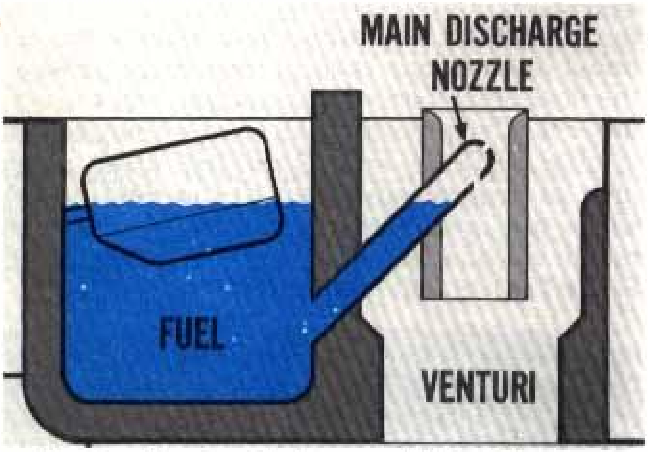

Fig. 30 — More fuel discharges with high float level

On the other hand, if the float level is set too low, the level of fuel in the main discharge nozzles will also be too low. If this is the case, the fuel must lift and travel a greater distance before discharging into the intake air stream. The result will be excessively lean mixtures and driveability problems.

CHECKING THE FLOAT NEEDLE

As you know, the float needle tip is a synthetic rubber material to help ensure a tight seal

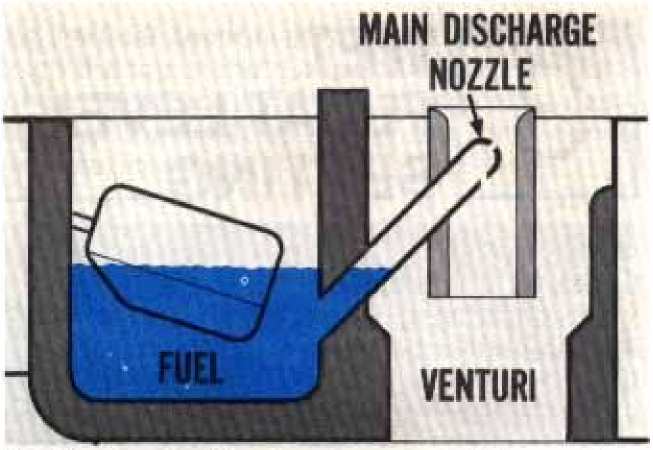

Fig. 31 — Low float level causes excessively lean mixtures

against fuel pump pressure when the fuel level reaches the correct height in the float bowl. Some swelling of the synthetic rubber may occur because of the chemical composition of some fuels on the market. When swelling occurs the fuel level lowers because the floats are lowered. But, if there is no damage to the float needle tip (no cuts or scoring), it is not necessary to install a new needle and seat assembly. Simply reinstall the original needle and seat and reset the float level as called for in the Service Manual specifications. Once the float level is set to the correct height, reinstall the float baffle and make sure the floats move freely.

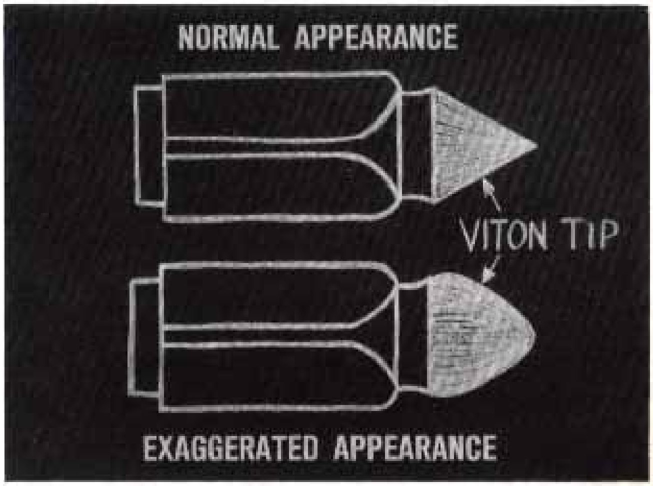

Fig. 32 — Some swelling of needle tip may occur

Reinstall the air horn with a new gasket. Reconnect all the linkage rods, the vacuum kick hose, and tighten the cover screws. Reinstall the vacuum step-up piston and metering rods, and reset as described earlier.

4 ADDITIONAL CARBURETOR INFORMATION

Although this Reference Book is primarily concerned with the Carter two-barrel carburetor for the 1977 Super Six engine, the two-barrel Carter for the 318 also has some engineering features you should know about in order to service them properly.

THE THROTTLE DUMP VALVE

This wide-open throttle dump valve was first introduced about the middle of March, 1976 on some selected 318 engines. Its purpose is to "dump" the carburetor venturi signal to the vacuum amplifier by bleeding off the venturi signal to atmosphere. When the venturi vacuum signal to the amplifier is "killed," the Exhaust Gas Recirculation valve closes (and cannot open). With the EGR valve closed, there is no dilution of the fuel/air mixture with exhaust gases during wide-open throttle driving conditions.

DUMP VALVE ADJUSTMENT

If the dump valve had to be removed from its bracket or you suspect that it is not set properly, it's a simple job to check the adjustment.

First, move the throttle valves so they are wide open and hold this throttle position. Next, place a .060" round feeler gauge between the valve operating lever and the plastic face of the valve body. There should be a slight drag on the gauge. If the gauge is too tight or too loose, loosen the locknut, then turn the dump valve body inward or outward until the measurement is correct. Tighten the lock nut. No other service to this unit is required or necessary.

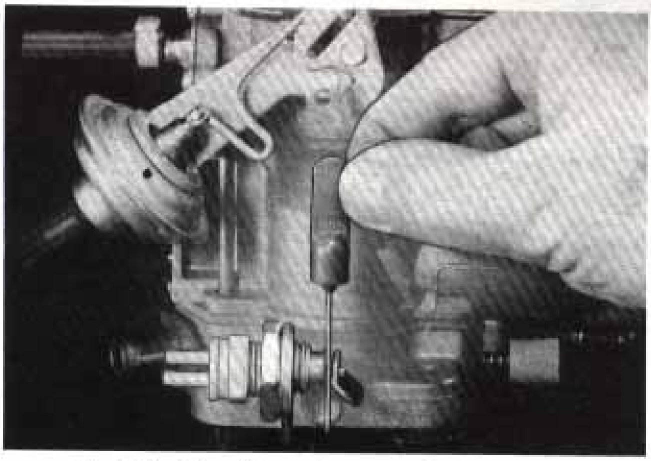

Fig. 33 — Checking clearance of dump valve

HIGH-ALTITUDE CALIBRATION

Some truck models with the 318 engine that are sold for principal usage in high-altitude areas of the country (altitudes of 4000 feet or more above sea level) have an idle and main fuel system compensation device. Basically, it is a manually adjusted "cap" that is part of the venturi cluster assembly. It is spring loaded and adjustable by means of a small screw extending through the center section.

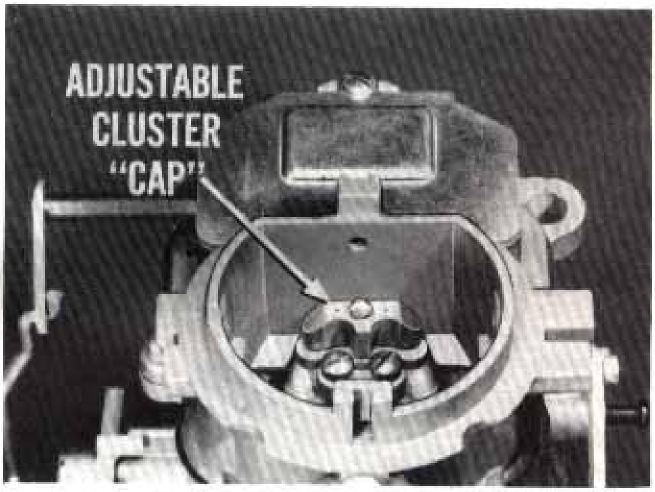

Fig. 34 — Manually adjusted high altitude compensator

PURPOSE OF HIGH-ALTITUDE CALIBRATION

Engines equipped with the high-altitude calibration carburetor are shipped from the factory with the cluster "cap" pulled down snug by means of the adjusting screw. As a result, the auxiliary idle air bleeds are blocked and the engine receives sea level fuel/air mixtures.

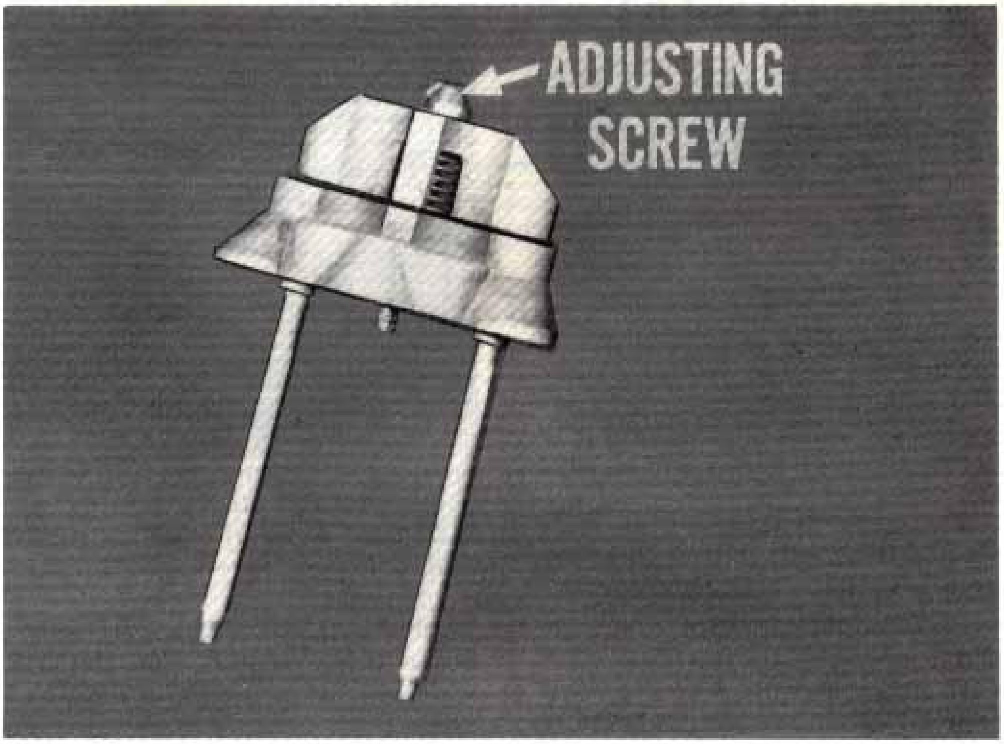

Fig. 35 — Adjusting screw is spring-loaded

ADJUSTMENT

During pre-delivery of the vehicle, the small adjusting screw should be checked to first make sure it is turned down (clockwise) snug BUT NOT OVERLY TIGHT. Then back-off on the adjusting screw at least one-and-one-half turns (1-1/2) but not more than two complete turns. The small spring will force the "cap" upwards. As a result, the auxiliary bleeds are now opened and auxiliary air can enter the idle system. Idle and off-idle mixtures lean-out to the altitude calibration required.

Besides the auxiliary air bleed there is an oversize main air bleed drilled into the lower section of the venturi cluster assembly. At sea level, when the "cap" is down snug against the venturi cluster, the oversize main air bleeds are covered. When the "cap" is adjusted (backed-off 1-1/2 to 2 turns) for high-altitude vehicle operation, the main air bleeds are also uncovered along with the auxiliary idle air bleeds. Incidentally, the main air bleeds have larger drilled passages than the auxiliary air bleeds.

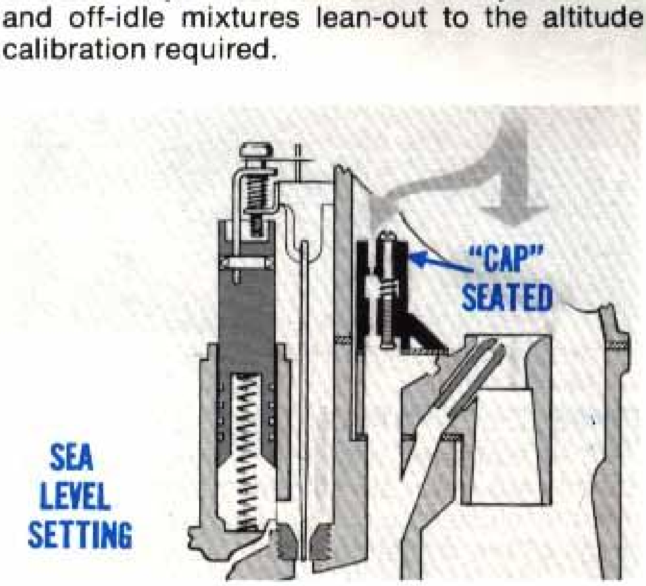

Fig. 36 — Adjustable cluster "cap" seated

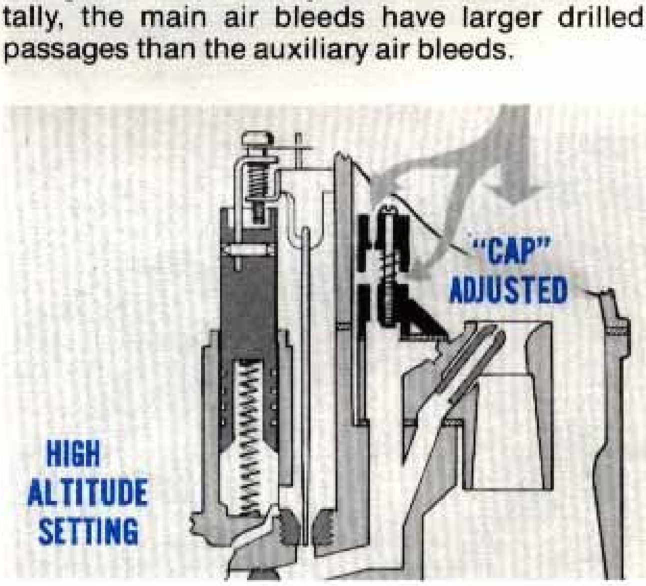

Fig. 37 — Adjusting screw backed-off two turns

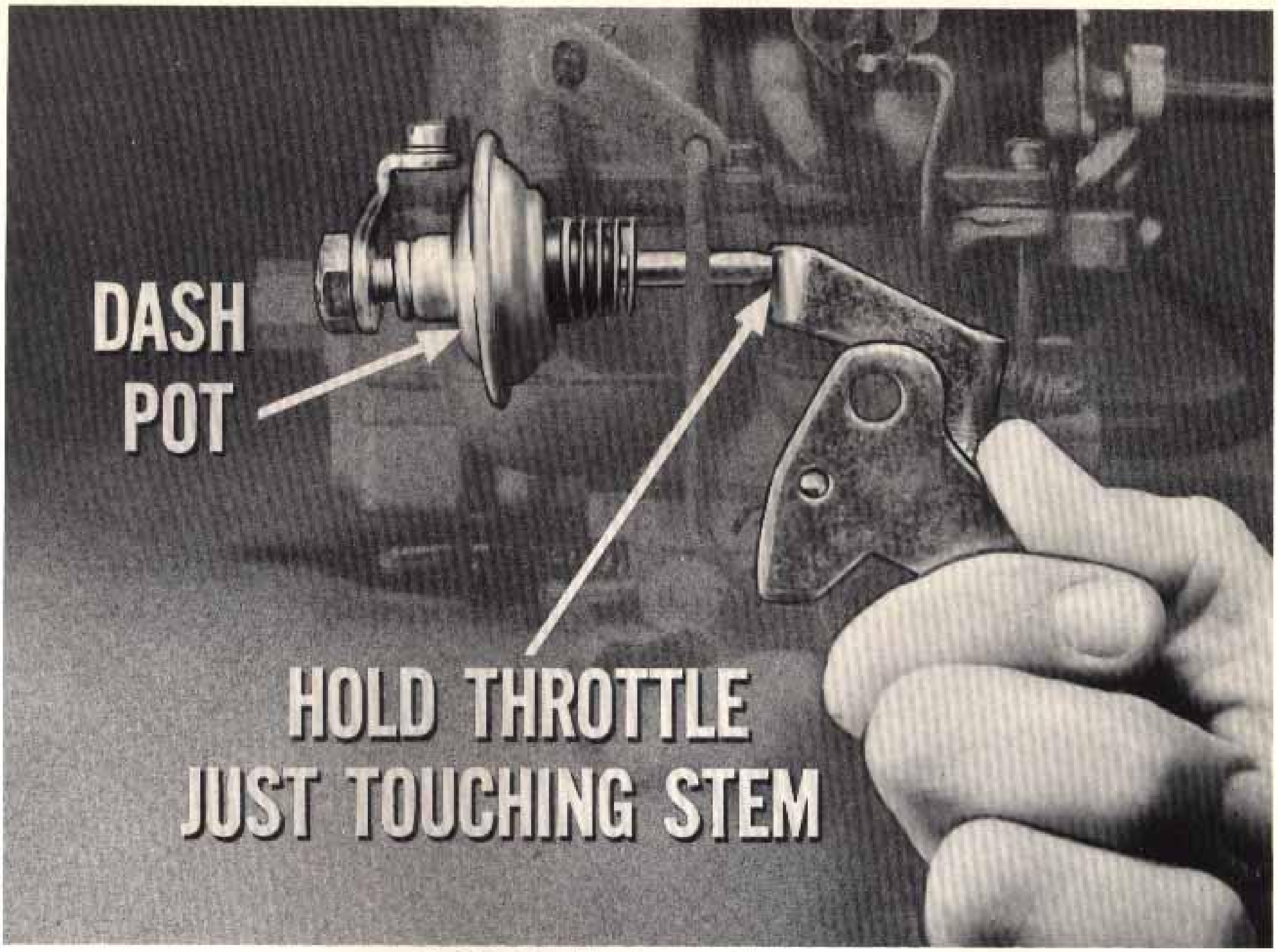

Fig. 38 — Checking dashpot adjustment

THE DASHPOT

When a 1977 engine is mated to a manual transmission, the Carter two-barrel carburetor is equipped with a mechanical dashpot. This device simply "slows down" the rate of throttle closing in order to help prevent engine stall-out when the accelerator pedal is released quickly during rapid stops. Controlled air leakage inside the unit is timed to permit gradual retraction of the stem and diaphragm when the throttle valves are released. When the throttles are opened, the stem moves outward away from the metal shell. When the throttle valves close, an actuating tab on the throttle lever presses against the stem and forces it to retract progressively, balancing throttle return spring pull against controlled air leakage.

DASHPOT ADJUSTMENT

To make a dashpot adjustment, the engine must be at normal operating temperature and curb idle speed and mixture set to the specifications listed on the underhood emission label.

Then, with a tachometer installed, start the engine and open the throttle valves just enough to allow the dashpot stem to become fully extended.

Then slowly release the throttle lever until the actuating tab on the lever contacts the stem of the dashpot . . . BUT NOT depressing it. If the dashpot is correctly set, the tachometer should read 2500 RPM after engine speed stabilizes.

If the RPM is above or below specs, loosen the lock nut on the bracket and turn the dashpot in or out as necessary. Once the setting is correct, then open the throttle and release it to make sure the engine returns to the curb idle speed called for on the emission label.

TEST QUESTIONS

INSTRUCTIONS: The first three questions are multiple-choice type. Circle the letter in front of the statement which you think is correct. For example, if your choice in question number 1 is C, put a circle around it, like this Ⓒ. Questions 4 through 10 are TRUE OR FALSE type. Put a mark after TRUE ☒ if you think the statement is correct. Put a mark after FALSE ☒ if you think the statement is incorrect. Be sure to write your name in the space provided. After completing the quiz, turn it in to your Meeting Leader.

1. The idle speed mixture restrictors located in the throttle body just above the mixture screws have been added to the 1977 Carter two-barrel carburetors so that:

A. Inward movement of the idle mixture screws is restricted.

B. Idle speed mixtures are prevented from becoming excessively lean during idle mixture adjustment.

C. Idle speed mixtures are prevented from becoming excessively rich during idle mixture adjustment.

2. The two notches cast into the underside section of the carburetor flange on the 1977 Carter two-barrel carburetor are needed to:

A. Supply heated air from the exhaust manifold to warm the carburetor base.

B. Supply a source for a vacuum signal to the PCV system.

C. Supply a vacuum source for the vacuum kick diaphragm and the inlet air door diaphragm located on the air cleaner assembly.

3. If you compare the "free travel" movement of the vacuum step-up piston on 1977 Super Six carburetors with that of the 1977 Carter two-barrel carburetor on the 318 engine, you will find:

A. The same amount of "free travel" on both Carter two-barrel carburetor models.

B. There's more "free travel" movement on the Super Six two-barrel carburetor than there is on the Carter two-barrel carburetor used with the 318 engines.

C. There's a restricted amount of "free travel" of the vacuum step-up piston on Super Six carburetors as compared to that of the two-barrel Carter used on 318 engines.

4. Because of the greater amount of choke offset on the Carter two-barrel carburetor for the 1977 Super Six, air velocity rushing into the intake manifold helps to keep the choke closed during engine warm-up.

TRUE ☐ *FALSE* ☐

5. When making the fast idle cam position check, be sure the fast idle screw remains on the high step of the cam.

TRUE ☐ *FALSE* ☐

6. When you check the setting of the vacuum step-up piston on the Carter two-barrel carburetor on the Super Six, always make sure the tip of the idle speed screw is backed off far enough so as not to contact the idle stop.

TRUE ☐ *FALSE* ☐

7. You should make the check of the accelerating pump stroke with the throttle valves completely closed.

TRUE ☐ *FALSE* ☐

8. When making an on-the-car "wet" check of float height, make sure extra fuel enters the fuel bowl by pressing down on the floats. Doing this ensures that the needle valve is properly seated.

TRUE ☐ *FALSE* ☐

9. Let's say that the fuel inlet fitting is somewhat loose. By tightening it, the float needle also moves inward. However, the float level does not change.

TRUE ☐ *FALSE* ☐

10. If the float level is set too low, the level of fuel in the main discharge nozzles will also be too low causing excessively lean mixtures.

TRUE ☐ *FALSE* ☐

NAME ______________________________