

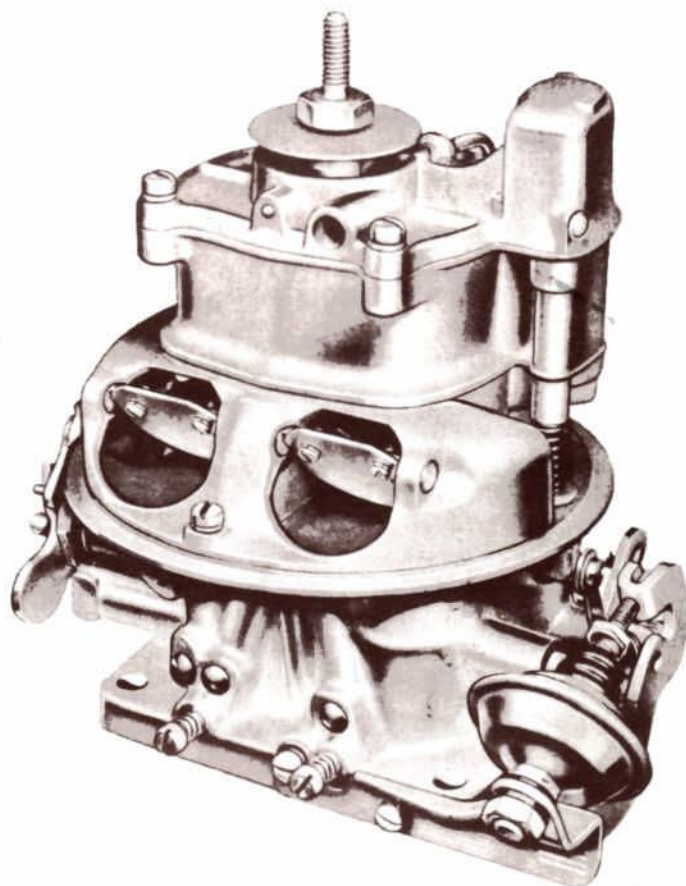
FORM NO. C-228

HOLLEY

CARBURETOR MODEL 4000

FOR

LINCOLN, MERCURY,
AND FORD



FOUR BARREL DOWNDRAFT

FEBRUARY 1955

SERVICE MANUAL



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CARBURETOR MODEL 4000

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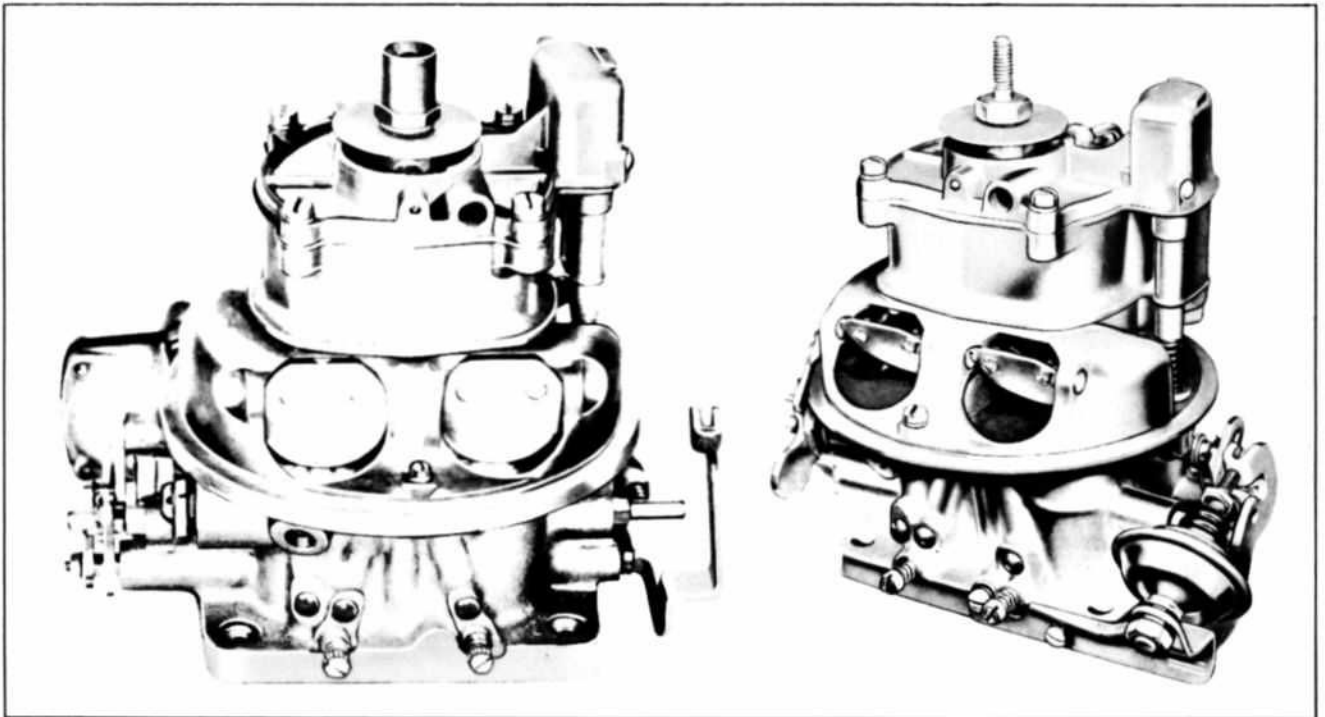
INTRODUCTION

Latest in Holley's line of true concentric flow carburetors, the Model 4000 represents another significant engineering advancement. It combines many new features with items of time proved design for improved performance and greater driving satisfaction.

From the earlier Holley four barreled units, the Model 4000 retains the revolutionary feature which allows the carburetor to increase its capacity whenever engine requirements demand it. Design changes have resulted in added efficiency of this system.

Numerous engineering refinements incorporated in the Model 4000 provide improved operating characteristics and extended service life, even under adverse conditions. Precision manufacturing and thorough, exacting inspection insure this long lasting carburetor performance. The carburetor service mechanic, however, is the final link in this chain of service to the customer. His is the responsibility for maintaining Holley's high standard of performance after the carburetor has been placed in use. Instructions and suggestions in this Service Manual should prove a helpful guide to efficient, profitable carburetor service.

DESCRIPTION



HOLLEY CARBURETOR MODEL 4000

1. DESIGN

Like other Holley four barreled units, the Model 4000 is a variable capacity concentric down-draft carburetor. Recent design refinements, however, provide improved performance and greater efficiency. In effect, the Model 4000 may be considered as two dual concentric carburetors, one supplying a fuel-air mixture throughout the entire range of engine operation and the other functioning only when required. Carburetor vac-

uum, an accurate indication of engine requirements, controls the latter system. Alterations in the design of this secondary system's fuel passages also contribute to its effectiveness.

In contrast with earlier four barrel models, this carburetor employs an air horn of reduced size which conveys air only to the two primary bores. With highly offset choke plates at its entrance, the air horn is mounted between the main body and the throttle body. The choke plates are



controlled by a thermostatic automatic choke mechanism. Responsiveness of the automatic choke is augmented by the changed design of the choke plates. Attached to the air horn is a casting incorporating a small "boost" venturi which is located in the throat of each primary bore venturi.

Practically surrounded by the air cleaner, the carburetor uses only filtered air for protection from dirt. The Holley concentric fuel and air flow design, with centrally located fuel metering jets and passages, has been retained. Even under severe operating conditions such as rounding curves at high speed or driving over steep grades, this feature assures proper metering.

Hot starting and idling difficulties are minimized by a selective method of internally or externally venting the carburetor in accordance with seasonal weather conditions and prevailing fuel requirements. By uncovering vent holes in the hollow pump rod, fuel vapors will be allowed to pass harmlessly outside the carburetor when the engine is idling or stopped. Routing of the fuel flow at idle to all four throttle bores aids in effecting an equalized fuel distribution. Percolation is prevented by the manner in which the main body is projected into the airstream above the throttle body, cooling the fuel in the float chamber.

Manifold vacuum, a true indication of power demands placed on the engine, controls the fully automatic Power Enrichment System which supplies a richer mixture only when high power is required. In the accelerating pump, an "override" feature prolongs the discharge of fuel for smoother acceleration. The pump linkage is adjustable to allow a varying amount of discharge to compensate for climatic changes. Also incorporated in this carburetor is a spark control valve which is calibrated to provide the correct degree of spark advance upon acceleration. A dashpot which prevents stalling upon sudden deceleration is added to carburetors used on vehicles having automatic transmissions or power brakes.

OPERATION

Modern high compression automotive engines are required to go from idling to high power operation within seconds. This transition must occur rapidly, smoothly, and efficiently. To be fully effective, the carburetor must automatically vary the mixture delivered in immediate response to the engine's changing fuel requirements.

To provide the correct mixture during all phases of engine operation, the Holley Carburetor Model 4000 is equipped with four basic fuel meter-

2. APPLICATION

All 1955 Lincoln and Mercury passenger cars as well as Ford "Thunderbird" sport cars and police cars use the Holley Carburetor Model 4000. For complete application data, parts lists, specifications and further information, consult the current Holley carburetor catalog sheet covering the specific vehicle.

3. MAJOR SUBASSEMBLIES

Three major subassemblies constitute the Model 4000 Carburetor. They are the main body assembly, the air horn assembly, and the throttle body assembly.

The main body and its cover, two zinc die castings, contain the fuel inlet needle valve and float, most of the carburetor's fuel metering jets, tubes, and passages, and the accelerating pump. Located in the cover are various air bleeds, vents, the economizer diaphragm assembly and secondary fuel jets.

The die cast air horn contains the two choke plates which are controlled through a linkage to the automatic choke unit. Attached to the air horn is a die casting which provides a secondary "boost" venturi for each primary bore venturi.

Incorporated in the throttle body are the two primary and two secondary barrels, or bores, of the carburetor. The upper portion of each bore is formed into a venturi. Idle adjusting needles, primary and secondary throttle plates, idle and secondary system fuel passages, and the fuel line fitting and filter screen are components of the throttle body. Vacuum passages for the power enrichment system, secondary throttle operating system, and pressure distributor are also included. The spark control valve assembly, secondary throttle operating diaphragm assembly, and where required, the dashpot and its bracket are attached to the carburetor throttle body.

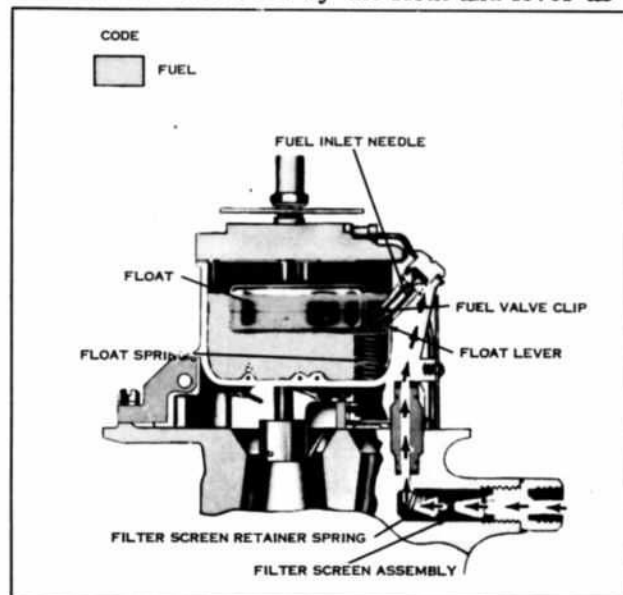
ing systems. They are the main metering system, the idle system, the power enrichment system and the accelerating pump system. These four systems are calibrated to deliver an economical mixture for normal cruising conditions, a richer mixture when high power output is desired, and a still richer mixture for smooth idle and low speed performance. In addition to these four basic systems, there is a secondary system which increases the capacity of the carburetor when a greater quantity of fuel-air mixture is required.

There is also a fuel inlet system which provides the various fuel metering systems with a constant supply of fuel, and a thermostatically controlled automatic choke which provides a means of temporarily enriching the mixture to aid in starting and running a cold engine. Passages within the carburetor supply vacuum for control of the spark advance mechanism of the Holley pressure distributor used with Lincoln, Mercury, and Ford engines.

When the engine is running, differences in air pressure within the carburetor cause the proper discharge of fuel for the various engine speed and load conditions, as explained in the following paragraphs. In the explanation of the basic fuel metering systems, the air in the carburetor float chamber will be considered as being at normal atmospheric pressure. It may actually be at a pressure very slightly less than atmospheric, due to the restriction to air flow through the air cleaner. However, to simplify the explanation of the function of the fuel metering systems, this factor will be disregarded and the pressure will be considered as being atmospheric.

1. FUEL INLET SYSTEM

All of the fuel metered to the engine enters the float chamber through the fuel inlet valve, frequently referred to as the fuel inlet needle and seat. For protection from foreign matter, the fuel must pass through a fine mesh filter screen before reaching the fuel inlet valve. The amount of fuel entering the carburetor is determined by the space between the tip of the movable needle and its seat. Movement of the needle in relation to the seat is controlled by the float and lever as-



FUEL INLET SYSTEM

sembly which rises and falls with the fuel level. As the fuel level drops, the float drops, opening the needle valve to allow fuel to enter the float chamber.

When the fuel in the float chamber reaches a specified level, the float moves the needle valve to a position where it restricts the flow of fuel, admitting only enough to replace that being used. Thus, any change in the fuel level causes a corresponding movement of the float, opening or closing the needle valve to immediately restore the proper fuel level. The fuel inlet system must constantly maintain this specified level of fuel as the four basic fuel metering systems are calibrated to deliver the proper mixture only when the fuel is at this level.

A fuel valve clip is attached to the needle valve and fits under the tab of the float lever. This clip assures accurate reaction of the needle valve to any float movement.

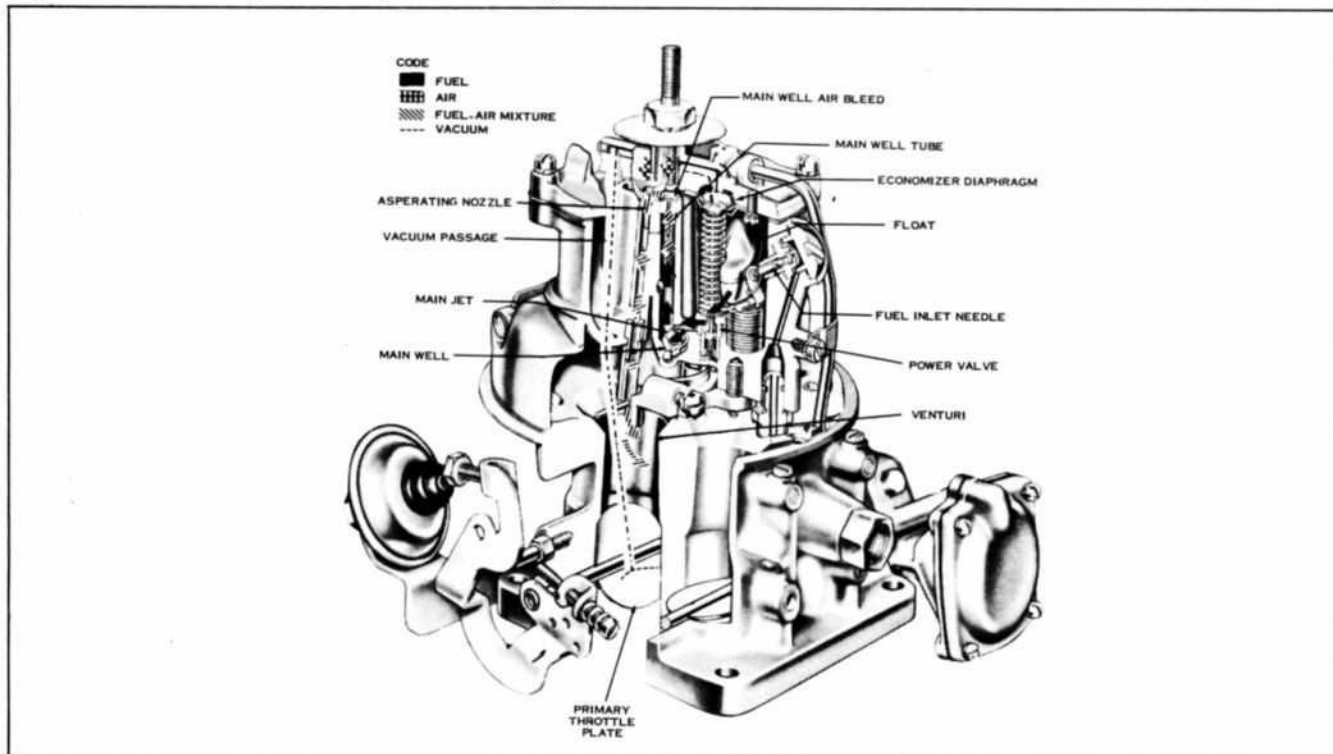
2. MAIN METERING SYSTEM

Air drawn in by the downward movement of the pistons during each intake stroke passes through the primary venturi of the carburetor. This creates a low pressure area, commonly called a vacuum, in the venturi. The strength of this vacuum is determined principally by the velocity of the air which, in turn, is affected by engine speed and power output. In the area of greatest vacuum in the throat of the primary venturi, a small "boost" venturi is located. A vacuum is created in this smaller venturi which is stronger than that in the primary venturi but still proportional to the air flow through the carburetor. The difference in pressure between the vacuum in the "boost" venturi and the normal air pressure in the float chamber causes fuel to flow through the main metering system.

At cruising speed, the fuel flows from the float chamber through the main jet, which measures or meters the fuel flow, into the bottom of the main well. The fuel moves up the main well and past the narrow air bleed holes in the side of the main well tube. Filtered air, which enters the main well tube from the main well bleed, is added to the fuel by these air bleed holes. This mixture of fuel and air, being lighter than raw fuel, responds faster to any change in venturi vacuum and vaporizes more readily than raw fuel when discharged into the air stream in the venturi. Additional air from the aspirating nozzle enters the fuel as it passes from the top of the main well to the vertical passage leading to the main discharge nozzle. This mixture of fuel and air is

then discharged into the air stream at the throat of the "boost" venturi in the primary barrel. The throttle plate controls the amount of the fuel-air mixture admitted to the intake manifold, regulating the speed and power output of the engine in

accordance with accelerator pedal movement. There are identical main metering system passages for both primary barrels of this carburetor and they function simultaneously.



MAIN METERING AND POWER ENRICHMENT SYSTEMS

3. IDLE SYSTEM

At normal cruising speeds, venturi vacuum in the primary barrels causes the main metering system to discharge fuel. However, at idle and low speeds, the engine does not draw sufficient air through the venturi to create a vacuum strong enough to operate the main metering system. The idle system provides the required fuel for efficient operation while low speed or idle conditions exist.

At idle and low speeds, intake manifold vacuum is high, due to the almost closed primary throttle plates which greatly restrict air flow into the manifold. This high manifold vacuum provides a pressure difference which will operate the idle system. In this carburetor are two identical idle system passages, one for each primary barrel. Since the two passages function identically, only one side will be considered in this explanation.

At idle, the normal air pressure in the float chamber causes fuel to flow through the idle system to the greatly reduced pressure area below the throttle plates. Fuel flows from the float chamber through the main jet and into the bottom of the main well. From the main well, it flows

into the idle well. The fuel moves upward through the idle tube in the idle well and passes into the idle passage in the main body. The calibrated restriction in the lower tip of the idle tube meters the flow of fuel in the idle system.

Directly above the horizontal channel at the top of the idle passage in the main body is the idle air bleed. This air bleed admits a metered flow of air to the idle system and also acts as a vent to prevent any siphoning effect through the idle system at high speeds or when the engine is stopped. The fuel continues down the idle passage in the throttle body past the two idle transfer holes which act as additional air bleeds at idle.

Next, the fuel flows past the pointed tip of the idle adjusting needle which controls the mixture delivered at idle. Turning the needle in toward its seat restricts the flow of fuel, thus providing a leaner idle mixture. Turning the needle out enriches the mixture by allowing a greater flow of fuel.

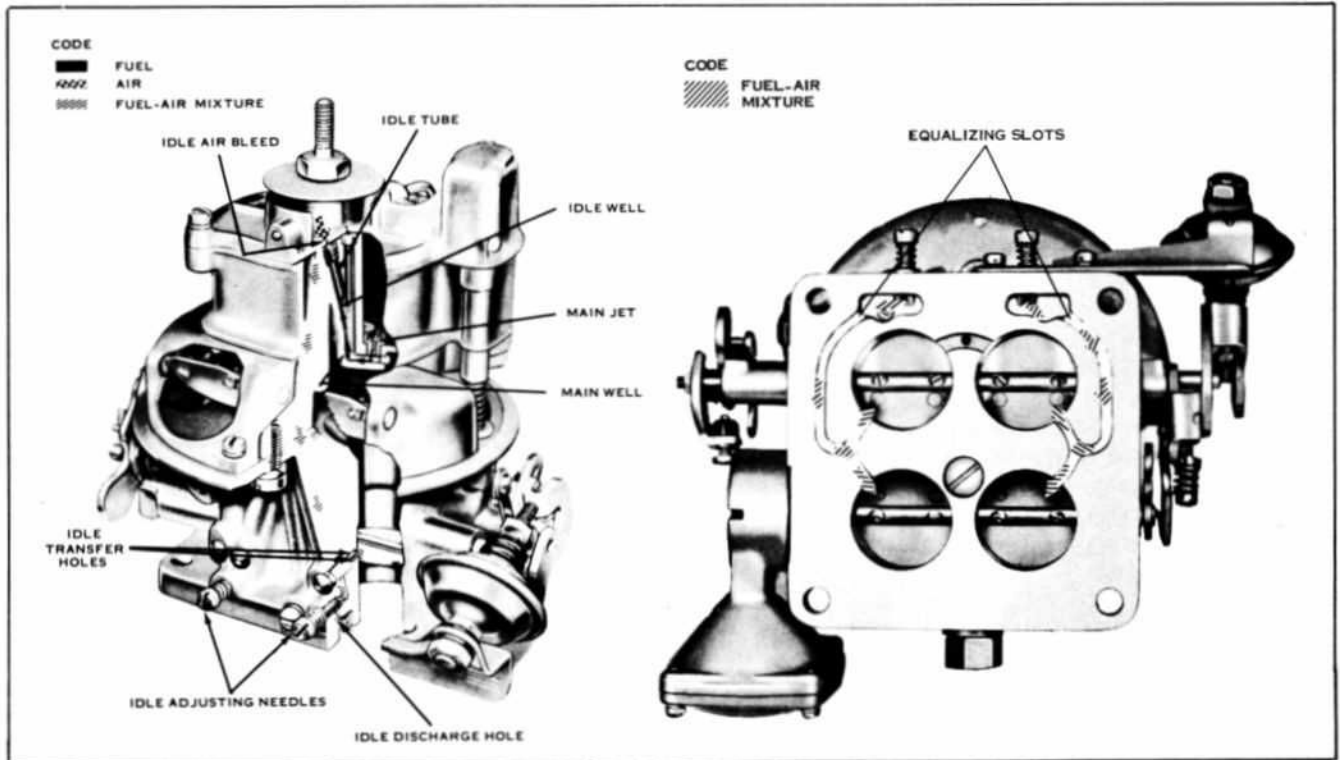
From the idle adjusting needle chamber, the fuel goes through a short diagonal passage to a groove in the bottom surface of the carburetor. The groove leads to a point midway between the



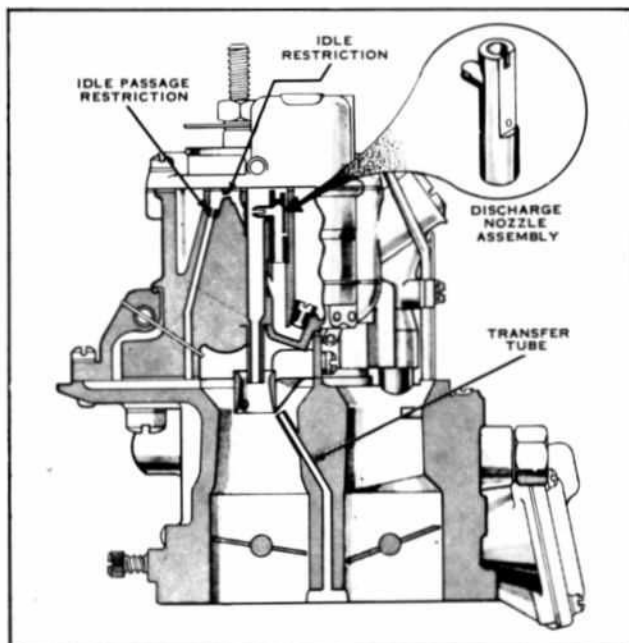
primary throttle bore and its corresponding secondary bore. At this point, the groove branches in two directions, discharging fuel into both the primary and secondary throttle bores. This insures an even distribution of fuel throughout the manifold at idle.

During off-idle operation when the throttle plate is moved slightly past the idle transfer holes, the idle transfer holes begin discharging fuel as

they are exposed to manifold vacuum. As the throttle plate is opened still wider and engine speed increases, the air flow through the carburetor is also increased. This creates a vacuum in the venturi strong enough to bring the main metering system into operation. The flow from the idle system tapers off as the main metering system begins discharging fuel. The two systems are engineered to provide a smooth gradual transition from idle to cruising speeds.



IDLE SYSTEM



CURRENT IDLE AND MAIN METERING SYSTEMS

Current Idle and Main Metering Systems

Previous pages describe Model 4000 Carburetors originally released for 1955 applications. Current production models incorporate the following changes in the Idle and Main Metering Systems.

Main Metering System fuel now flows up the newly-designed main well tube called a discharge nozzle assembly, while air from the main well bleed passes down outside the tube. The air passes through a calibrated passage on the wall of the discharge nozzle assembly, mixing with the fuel flow at that point. A short horizontal nozzle discharges fuel into the vertical passage leading downward to the main discharge nozzle in each "boost" venturi.

In the Idle System, the removable idle tube assemblies have been eliminated. Their functions have been taken over by calibrated horizontal permanent restrictions at the top of the idle fuel passages in the main body.

Immediately below the "boost" venturi in each primary barrel, a transfer tube is located. During the transition period as the Main Metering System begins to supply fuel, this tube will collect any fuel droplets which may collect on the venturi surfaces. These droplets pass down to the idle fuel groove in the bottom surface of the carburetor, from where they are discharged into the primary and secondary throttle bores.

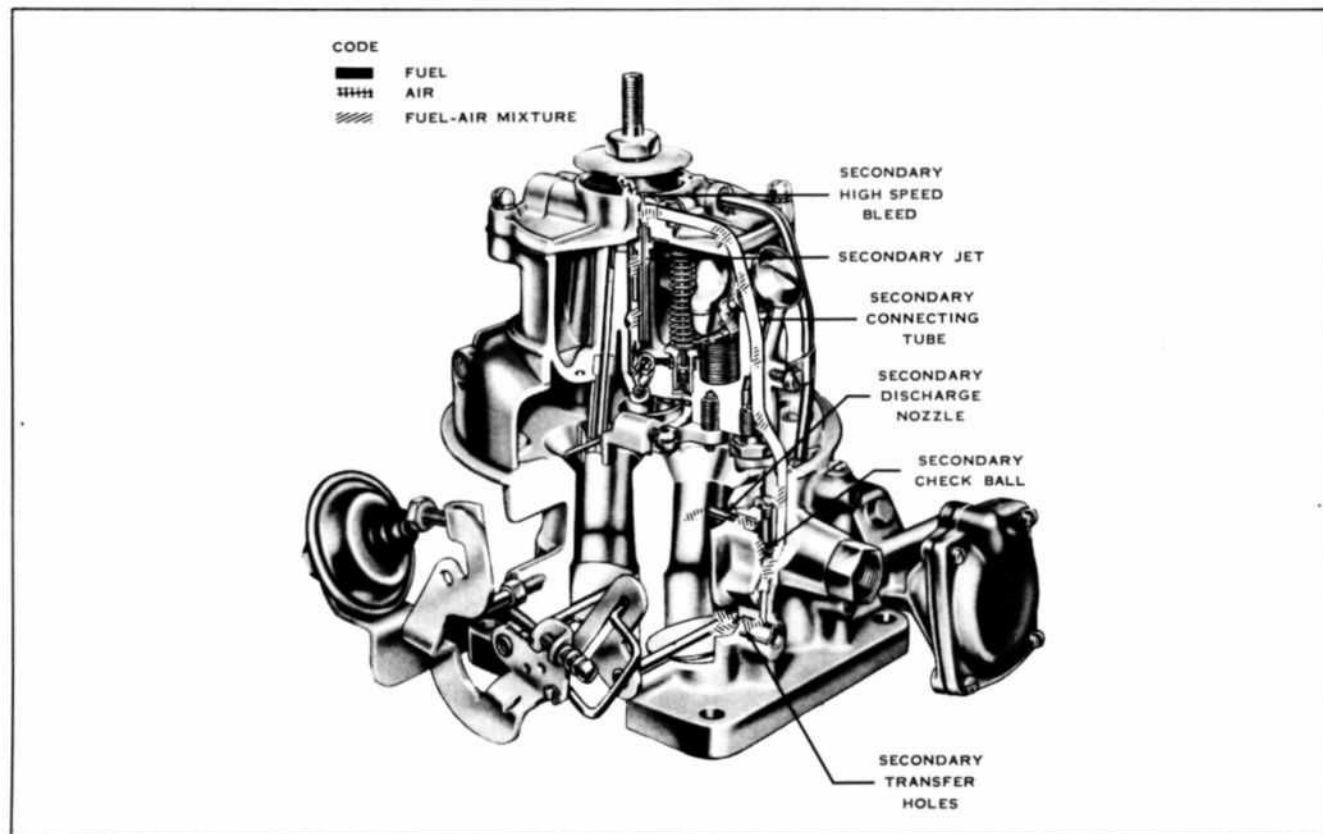
4. POWER ENRICHMENT SYSTEM

During high power operation, the carburetor must deliver a richer mixture than is needed when the engine is running at cruising speed with no great power output required. The added fuel for efficient operation is supplied by the power enrichment system, sometimes referred to as the economizer system.

The power enrichment system is controlled by manifold vacuum, which gives an accurate indication of the power demands placed upon the engine. Manifold vacuum is strongest at idle and decreases as the load on the engine is increased. As the load on the engine is increased, the throttle plates must be opened wider to maintain any given speed. Manifold vacuum is reduced because the opened throttle plates offer less restriction to air entering the intake manifold.

Manifold vacuum from below the two primary throttle plates is transmitted through a vacuum passage in the throttle body, main body, and main body cover to the top of the economizer diaphragm in the vacuum chamber. The manifold vacuum acting on the economizer diaphragm at idle and normal load conditions is strong enough to hold the economizer diaphragm and stem up, compressing the economizer spring on the stem. When high power demands place a greater load on the engine and manifold vacuum drops below a predetermined point, the economizer spring overcomes the reduced vacuum and expands, forcing the economizer stem down. This depresses the pin in the center of the power valve, opening the power valve. Fuel from the float chamber flows into the power valve and through the small holes in the side of the power valve into passages leading to both main wells. A restriction in both passages insures even distribution of fuel to the main wells and reduces the effects of pulsation. In each main well, the fuel joins the fuel flow in the main metering system, enriching the mixture for full power.

As engine power demands are reduced, manifold vacuum increases. The increased vacuum overcomes the tension of the economizer spring and draws the economizer diaphragm and stem up. This allows the power valve pin to move up



SECONDARY SYSTEM

and shut off the added supply of fuel which is no longer required.

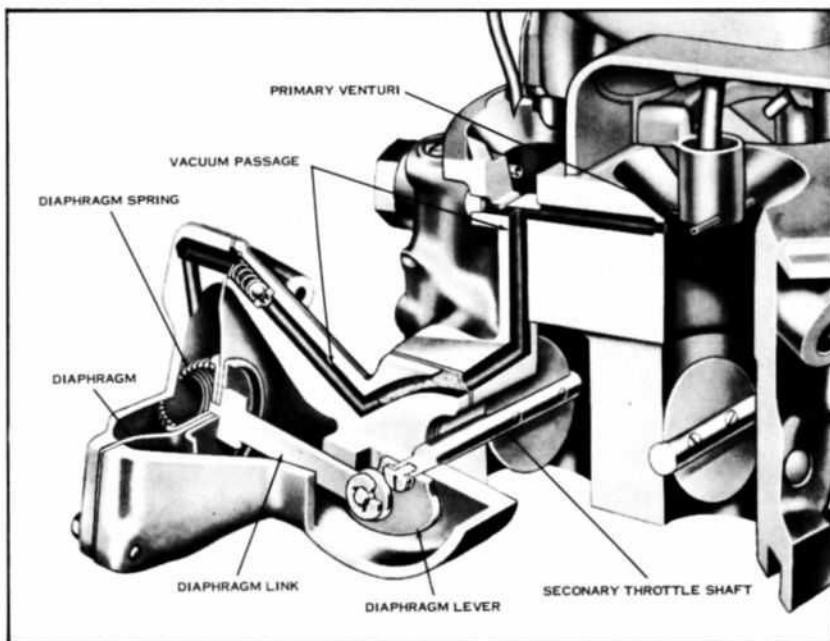
5. SECONDARY SYSTEM

At lower speeds, the secondary throttle plates remain closed, allowing the engine to maintain satisfactory fuel air velocities and distribution. When engine speed increases to a point where additional breathing capacity is needed, the vacuum controlled secondary throttle plates open automatically.

Vacuum taken from one primary venturi acts upon a diaphragm which controls the secondary throttle plates. At high speeds when engine requirements approach the capacity of the two primary bores, the strong primary venturi vacuum moves the diaphragm, compressing the diaphragm spring. The diaphragm, acting through the diaphragm link and lever, will commence to open the secondary throttle plates. The amount which the secondary throttle plates are opened depends on the strength of the vacuum from the primary venturi. This in turn, is determined by the airflow through the primary bore to the engine. As the airflow increases, a greater secondary throttle plate opening will result and the secondary barrels will supply a larger portion of the engine's requirements. In some carburetors, vacuum from the secondary venturi is transmitted through a small passage, supplementing the primary venturi vacuum as the secondary throttle plates open. As top speed is reached, the secondary throttle plates will be wide open.

The ball check valve in the vacuum passage of some versions of this carburetor limits the rate at which the secondary throttle plates are allowed to open. Any rapid increase in vacuum which would tend to open the secondary throttle plates too suddenly merely holds the ball check valve securely against its seat. The opening of the throttle plates is slowed to a rate governed by the amount of air passing through an air bleed in the check valve seat. This allows the vacuum to build up comparatively slowly at the diaphragm and opening of the secondary throttle plates is retarded correspondingly.

As the secondary throttle plates begin to open, a vacuum is created in the secondary barrels, first at the throttle plates and then, as air flow increases, at the throat of the secondary venturi.



SECONDARY THROTTLE OPERATING SYSTEM

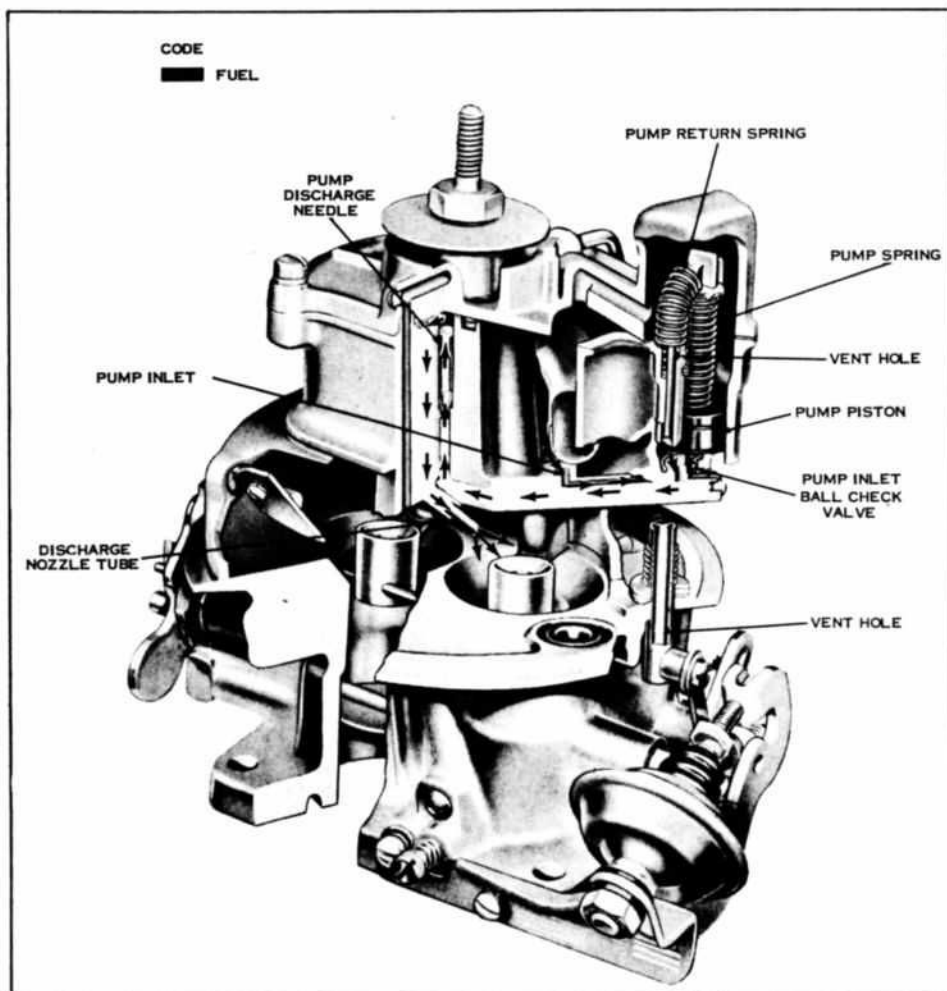
Fuel is discharged into this vacuum by the secondary system. To simplify the explanation, the following paragraphs describe only one of the two identical sides of the secondary system fuel passages.

From the float chamber, fuel is drawn up through the vertical secondary jet and past the secondary air bleed where air is admitted to the fuel. The secondary air bleed also vents the fuel passage to prevent a siphoning effect when the secondary system is not in operation.

The fuel flow continues down the secondary connecting tube and through a short angle passage in the throttle body. From this point, the fuel will flow in either of two directions, depending on the position of the secondary throttle plate.

As the throttle plate begins to open, fuel moves down to the secondary transfer holes. Each of the three secondary transfer holes begins to discharge fuel as the throttle plate moves past the hole, exposing it to manifold vacuum. The secondary check ball is seated, preventing an air bleed effect from the secondary nozzle which would reduce the fuel discharge from the transfer holes.

As the secondary throttle plate is opened wider, the airflow through the secondary barrel is increased. This creates a vacuum in the secondary venturi strong enough to lift the check ball from its seat and draw a flow of fuel from the secondary nozzle.



ACCELERATING PUMP SYSTEM

When engine speed is reduced, venturi vacuum in the primary bore becomes weaker. The momentarily stronger vacuum at the secondary throttle operating diaphragm moves the ball check valve off its seat in the vacuum passage, permitting an immediate flow of air into the diaphragm chamber. As the vacuum acting on the diaphragm is lessened, the tension of the diaphragm spring will commence closing the secondary plates. The diaphragm spring is assisted by the design of the secondary plates. Each secondary plate is slightly offset. When the plates are nearly closed, the combined force of manifold vacuum and the air stream has greater effect on the larger, upstream area of the plates. This helps to close them. The secondary plates are retained in the closed position when the primary plates are fully closed by the secondary throttle connecting rod. This rod, which is fastened to the primary throttle lever, rides in a slot in the secondary throttle lever.

From the foregoing description it may be seen that the secondary system is virtually a separate dual carburetor in many respects. The

secondary transfer holes are comparable to components of the idle system in the primary bores. The secondary nozzle in the throat of the secondary venturi has its counterpart in the main discharge nozzle at the throat of each "boost" venturi of the primary bores. The tube-like secondary jet, although different in physical appearance from its equivalent part in the main metering system, functions in much the same manner as the main jet. It is the principal fuel metering component of the secondary system when the secondary nozzle is discharging fuel. Understanding the operation of the secondary system is easier if these comparisons are kept in mind.

6. ACCELERATING PUMP SYSTEM

Upon acceleration, the air flow through the carburetor responds almost immediately to the increased throttle opening. There is, however, a brief interval before the fuel, which is heavier than the air, can gain speed and maintain the desired balance of fuel and air. During this interval, the accelerating pump supplies fuel until the other

systems can once again provide the proper mixture.

The accelerating pump, which is connected by the pump link to the throttle lever, is actuated by throttle movement. A larger or smaller accelerating pump discharge can be obtained by varying the position of the pump link in the holes in the throttle lever. When the throttle is closed, the pump piston moves upward, drawing fuel from the float chamber through the pump inlet and into the pump chamber. The pump inlet check valve opens to permit fuel to enter the pump chamber, and closes to prevent a reverse flow of fuel when the pump is operated.

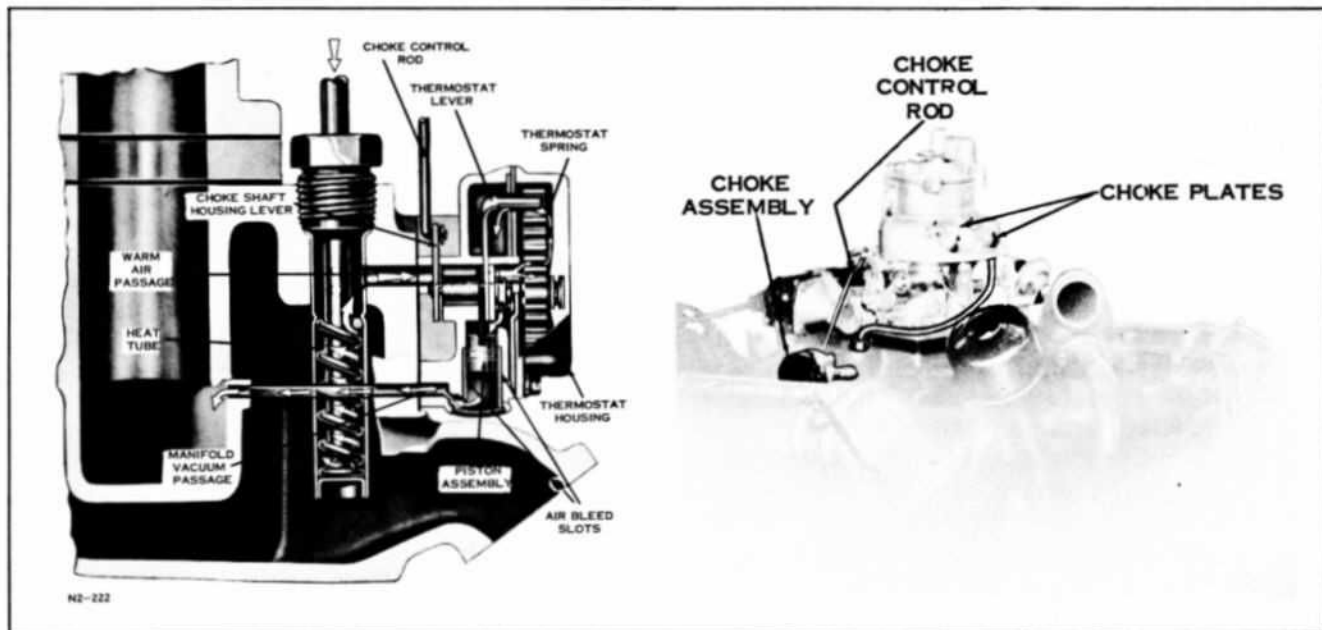
The upper end of the pump operating rod fits within a vertical slot in the pump piston stem and moves independently of the pump piston upon acceleration. When the throttle is opened, the pump operating rod is pulled down, compressing the pump spring. The pressure of the spring moves the pump piston downward, forcing fuel through the accelerating pump system. The spring overriding feature provides a sufficiently long interval of discharge, regardless of how suddenly the throttle is opened.

Pressure of the pump spring acting on the fuel in the pump discharge passage raises the pump discharge needle. The fuel then flows up-

ward past the unseated needle and down a vertical passage in the main body to the two pump discharge nozzles. From each nozzle, the fuel is discharged into the airstream entering its corresponding primary venturi.

The pump discharge needle seals the passage when the pump is not discharging fuel. This prevents the siphoning of fuel from the pump chamber by the suction of the airstream at high engine speeds. It also prevents air from being drawn into the system when the throttle is again closed and the pump draws in another charge of fuel.

Holes in the top and bottom of the hollow pump operating rod permit fuel vapors to pass harmlessly from the carburetor. By this method of externally venting the float chamber, percolation, hot starting and idling difficulties are minimized. Any fuel vapors in the float chamber pass through a channel in the main body cover to the pump housing. The upper hole in the pump rod is located so as to be exposed only when the throttle is at the idle position. When the engine is idling or stopped, the fuel vapors move down inside the hollow pump operating rod and pass harmlessly from the carburetor. An adjustable clip at the lower end of the pump operating rod can be set to open or close the vent holes at the discretion of the service mechanic or owner.



AUTOMATIC CHOKE SYSTEM

7. AUTOMATIC CHOKE SYSTEM

On this carburetor, the richer mixture required for starting and operating a cold engine is supplied through the use of an automatic choke. Much of the vaporized fuel from the carburetor condenses to a liquid upon contact with the cold

surfaces of the intake manifold. The fuel in this liquid form burns too slowly and incompletely in the cylinders, causing loss of power and stalling. The choke is a method of enriching the fuel discharge so that enough vaporized fuel reaches the cylinders to permit the engine to run smoothly during the warm-up period.



More positive operation of the automatic choke has been insured by mounting the thermostatic choke control mechanism directly on the intake manifold. The choke shaft in the carburetor is linked to the choke mechanism with a choke control rod. This type of mounting gives a faster and more accurate reaction of the choke to changes in manifold temperature. Two offset choke plates at the entrance of the air horn control the airflow into the primary barrels. Since the secondary barrels remain closed at the lower speeds where choking is necessary during engine warm-up, no method of choking the secondary barrels is required.

The bi-metallic thermostat spring in the choke control mechanism will expand when cold, loosening and unwinding its coils. When warm, it will contract, winding the coils tighter. When the engine is cold, the thermostat spring expands, holding the choke plates in the closed position. When the engine is started, manifold vacuum acts directly on the choke plates, immediately moving them against the tension of the thermostat spring to a partially open position to prevent stalling. The choke shaft does not pass through the center of the choke plates. Instead, it is offset, thus exposing a much larger area at one side of the closed choke plates to manifold vacuum. It is this offset feature which enables manifold vacuum to move the choke plates toward the open position. Manifold vacuum channeled through a passage in the choke control mechanism acts to draw the choke vacuum piston downward, thus exerting another opening force upon the choke plates. These two features allow enough air to enter the engine to enable it to run smoothly. As the engine continues to run, the vacuum acting on the choke vacuum piston draws filtered air from the carburetor through the heat tube in the intake manifold where the air is warmed by the engine heat, and then through the thermostat housing where the air warms the thermostat spring, causing it to contract. This gradually decreases the tension of the thermostat spring as manifold temperature rises, permitting the vacuum acting on the choke vacuum piston to further open the choke plate. The air then flows through the manifold vacuum passage and is exhausted into the air stream in the intake manifold.

If the engine should approach a stall at any time during the warm-up period, manifold vacuum will become weak. The tension of the thermostat spring then overcomes the reduced force acting on the vacuum piston and the choke plates will be moved toward the closed position, providing a richer mixture to allow the engine to "catch" and run smoothly again.

When the engine reaches its normal operating temperature, the thermostat spring no longer exerts an opposing tension on the choke vacuum piston, allowing the vacuum piston to pull the choke plates to the full open position.

In the full open position the vacuum piston is in its lowest position in the cylinder. Slots in the cylinder wall permit sufficient air to bleed past the piston and into the intake manifold to allow a continual flow of warm air to pass through the thermostat housing. This keeps the thermostat spring warm and the choke plates fully open until the engine is shut down and allowed to cool.

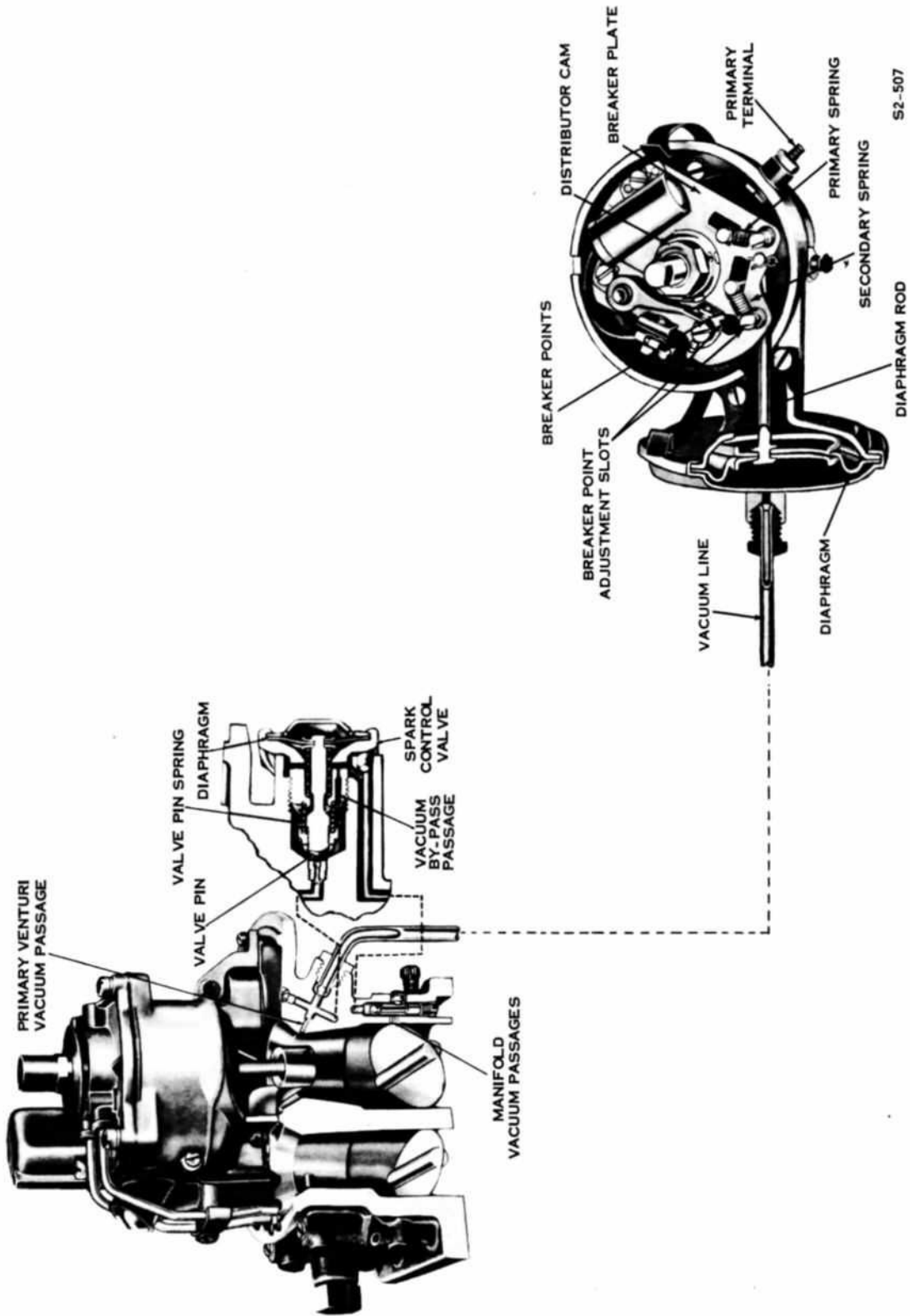
During the warm-up period, the air flow past the partially opened offset choke plates acts upon the plates in much the same manner as manifold vacuum does upon starting. As air flow increases with increased engine speed, the engine requires less choking and the force of the increased air flow holds the choke plates closer to the open position. The offset choke plates, vacuum piston, and thermostat spring are engineered to provide the correct degree of choking for all conditions of engine speed, power output, and temperature.

The choke lever at the carburetor actuates a fast idle cam during choking. Designed to increase the idle rpm for smoother running when the engine is cold, the fast idle cam has a series of steps in one edge. As the choke lever is moved through its range of travel from the closed position to the open position, the fast idle cam rotates, presenting successive steps to a throttle stop screw. Each step permits a slower idle rpm as engine temperature rises and choking is reduced.

8. DISTRIBUTOR VACUUM PASSAGES

A Holley pressure distributor is used in conjunction with this carburetor. In the distributor, the spark advance mechanism is controlled by a vacuum operated diaphragm operating against the tension of calibrated springs. The degree of spark advance is primarily regulated by the strength of the vacuum acting on the diaphragm. The vacuum is transmitted from two interconnected passages within the carburetor through tubing to the distributor diaphragm chamber. One of the passages is open to the throat of one primary venturi and the other opens into the primary throttle bore. The two passages are calibrated to provide a precise, effective spark advance in all phases of engine operation.

Any time the vacuum from the venturi becomes stronger than the vacuum from the throttle bore, the distributor passage ball in the vertical passage from the throttle bore will be drawn up



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DISTRIBUTOR VACUUM PASSAGES

to its seat, closing off the lower passage. This prevents any reduction in the venturi vacuum due to air bleeding from the lower passage.

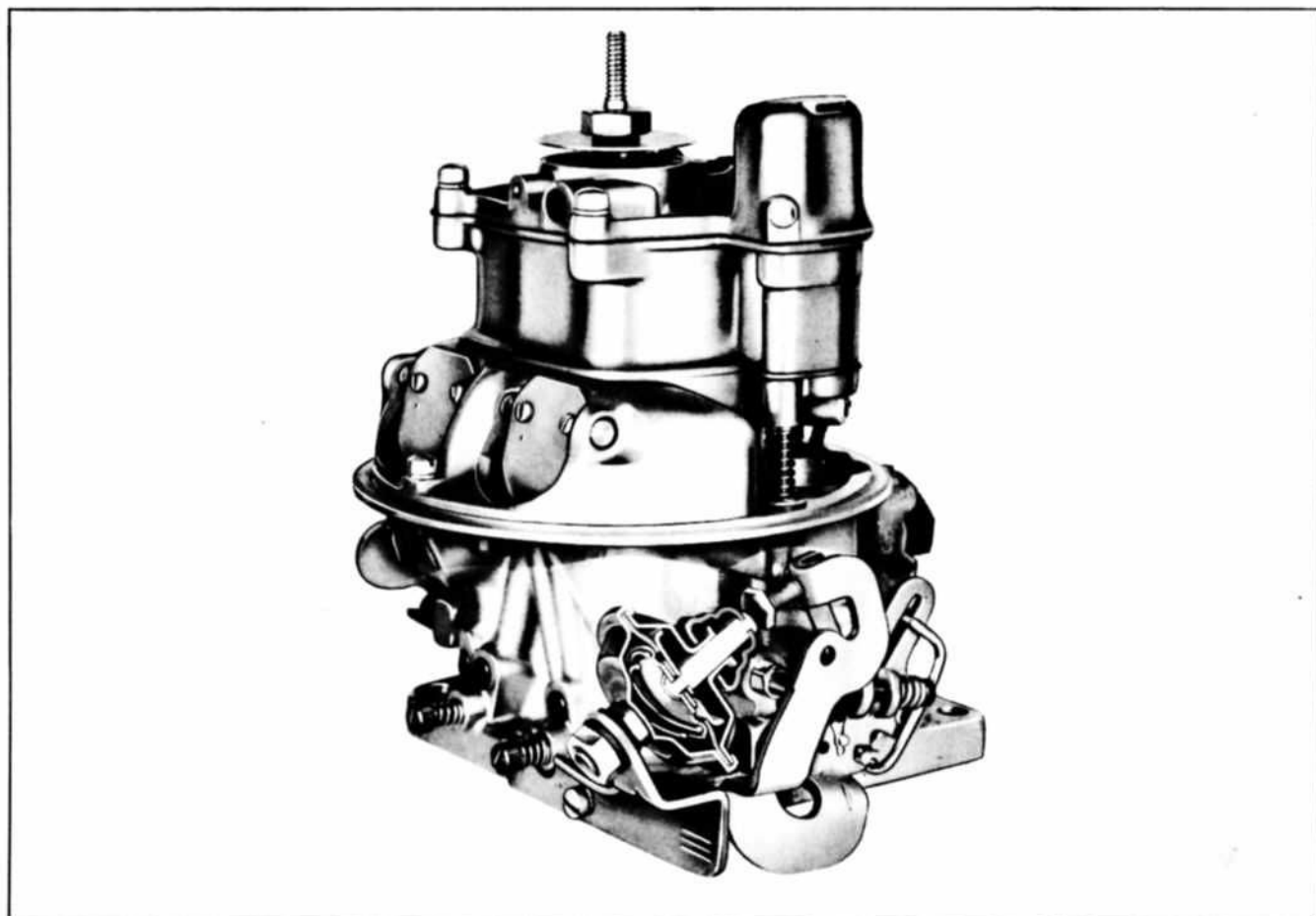
The spark control valve in the passage from the throttle bore provides an efficient degree of spark advance during periods of acceleration by momentarily providing a partially retarded spark. This partially retarded spark minimizes detonation (or pinging) and increases engine responsiveness while accelerating. In effect, the spark valve provides an intermediate spark advance curve between a fully retarded spark and the normal spark advance which would be excessive when the engine is suddenly accelerated. The spark control valve accomplishes this by controlling the manifold vacuum admitted to the distributor vacuum line.

All manifold vacuum to the distributor passes through the spark control valve. Under normal road load conditions, the spark valve is held open against the pressure of a pre-set factory calibrated spring by a combination of atmospheric pressure outside of the diaphragm and manifold vacuum from within. When accelerating, manifold vacuum momentarily drops below a prede-

termined point and the calibrated spring closes the spark valve, shutting off the largest of two passages through the spark valve. The passage left open is a calibrated by-pass which permits a small amount of manifold vacuum to reach the distributor vacuum line. Closing the valve prevents excessive spark advance, while the manifold vacuum passing through the spark valve by-pass prevents full spark retard.

As engine speed approaches the throttle setting, manifold vacuum increases sufficiently to open the spark valve and allow a higher vacuum to operate the distributor. By use of the spark valve, more efficient spark advance upon acceleration is obtained without the excessive "ping" of the normal road load part throttle spark advance or the sluggishness of wide-open throttle spark retard.

The spark valve functions in a similar manner to provide an intermediate spark retard whenever the load on the engine is increased to a degree where the normal road load spark advance would be too great and the wide-open throttle spark retard would reduce the efficiency of the engine.



DASHPOT



9. THE DASHPOT

A dashpot is incorporated on carburetors for vehicles fitted with automatic transmissions or power brakes. The dashpot is an anti-stall device which prevents the engine being loaded when the accelerator pedal is suddenly depressed and released. It accomplishes this by slowing the closing rate of the throttle as it approaches the idle position. This allows the engine to dissipate the raw fuel discharged into the intake manifold by the accelerating pump.

The dashpot uses a spring-loaded diaphragm to slow the final phases of throttle plate closing. When the accelerator pedal is released, the throttle return spring in the throttle linkage simultaneously closes the throttle plates. As the throttle lever moves closed, its initial travel is unimpeded. The throttle lever will close nearly to the idle position before it engages the dashpot. Then the dashpot adjusting screw located in the extension of the throttle lever contacts the end of the diaphragm rod of the dashpot. The remaining few degrees of throttle plate travel are slowed to a rate governed by the air bleeding from the upper chamber of the dashpot to the lower chamber.

When the closing throttle lever begins to press the diaphragm rod inward, air in the bellows side of the dashpot, being compressed, will attempt to flow to the spring side through the holes in the two diaphragm washers. The small flat impregnated cloth washer fitted loosely between the bellows and spring side of the diaphragm washers acts as a valve. Compressed air from the bellows side forces this valve tightly against the large hole in the lower diaphragm washer, restricting the air flow through the washers. A small groove in the surface of the diaphragm washer leads to the hole, permitting a limited flow of air to bleed past the valve to the spring side. This allows the dashpot diaphragm rod to move comparatively slowly, retarding the closing rate of the throttle plates as they approach the idle position.

When the throttle is opened, the return spring in the chamber returns the diaphragm and rod to their original position. The flat valve moves up, allowing a flow of cushioning air to return immediately to the bellows side. By this process, the dashpot recovers immediately to prepare for repeated sudden deceleration.

OVERHAUL

1. INTRODUCTION

The overhaul procedure which follows can be accomplished with ordinary tools and a reasonable amount of care. However, factory approved tools are available to facilitate overhaul and protect parts which might be damaged by ordinary tools. Use of these tools is strongly recommended.

Proper overhaul of a carburetor can only be accomplished if the unit is completely disassembled and each part is thoroughly cleaned. The clean parts should then be carefully inspected for signs of wear, damage or deterioration. Any parts which are defective must be replaced only with genuine Holley replacement parts. The carburetor must then be carefully rebuilt and accurately adjusted to insure the power, economy and performance which is built into every Holley Carburetor.

2. SPECIAL TOOLS

The special tools recommended for use in overhauling this carburetor are listed below.

	<u>Holley No.</u>	<u>Snap-On No.</u>
Main Jet Socket	82R-49	TMC-36 A
Inlet Plug Remover	82R-28	FMC-38
Fuel Inlet Valve Seat Socket	82R-31	MC-125

Power Valve Socket	82R-33	MC-127
Float Gauge	82R-43	MC-137

3. MASTER REPAIR KITS

The Holley Master Repair Kits contain replacements for parts which are subject to wear and damage during disassembly. The disassembly procedure includes instructions to discard all items for which replacements are provided in the Master Repair Kit. The proper Master Repair Kit for this carburetor is listed in the current Holley Parts Catalog sheets.

4. DISASSEMBLY

A. PREPARATION

It is advisable to use separate containers for parts and castings of the three major subassemblies: the main body assembly, the air horn assembly and the throttle body assembly. The use of separate containers will facilitate cleaning, inspection, and reassembly.

B. DISASSEMBLY - THREE MAJOR SUBASSEMBLIES

This carburetor consists of three major subassemblies, the main body assembly, the air horn assembly, and the throttle body assembly.

Separation of the three subassemblies is the first step in the disassembly procedure.

The following list contains all the parts removed in separating the main body, the air horn, and the throttle body. Parts which are to be discarded and replaced from a Master Repair Kit are marked with an asterisk.

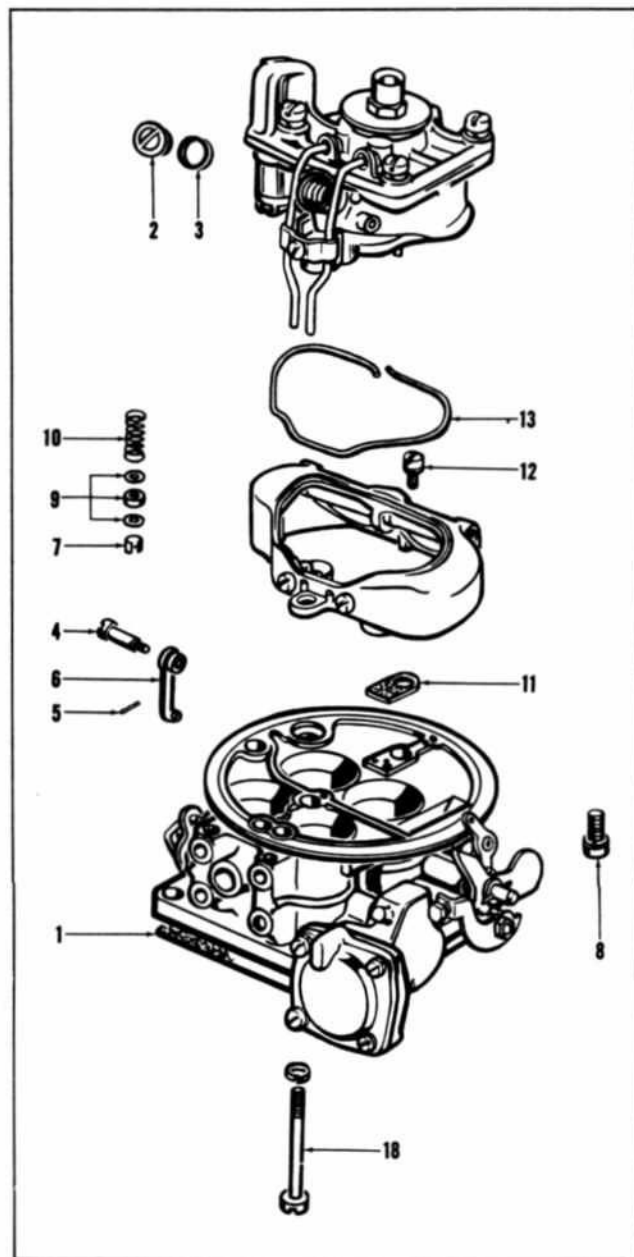


Figure 1. Disassembly - Three Major Subassemblies

REFER TO FIGURE NO.	ORDER OF REMOVAL	PART NAME
1	1	Flange gasket*
1	2	Fuel inlet plug
1	3	Fuel inlet plug gasket*
1	4	Pump link stud

REFER TO FIGURE NO.	ORDER OF REMOVAL	PART NAME
1	5	Pump link retainer*
1	6	Pump link assembly*
1	7	Bowl vent selector
1	8	(2) Throttle body to main body screws and lockwashers
1	9	Accelerating pump rod felt seal* and (2) washers
1	10	Accelerating pump rod spring
1	11	Throttle body to main body gasket*
2	12	Air horn to throttle body screw and washer
1	13	Air horn seal*

1. Remove and discard flange gasket.

2. Remove the fuel inlet plug and gasket, using Snap-On Tool No. FMC-38. Discard the gasket.

3. Remove the pump link stud from the operating rod. Remove and discard the pump link retainer and the pump link assembly.

4. Remove the bowl vent selector from the pump operating rod.

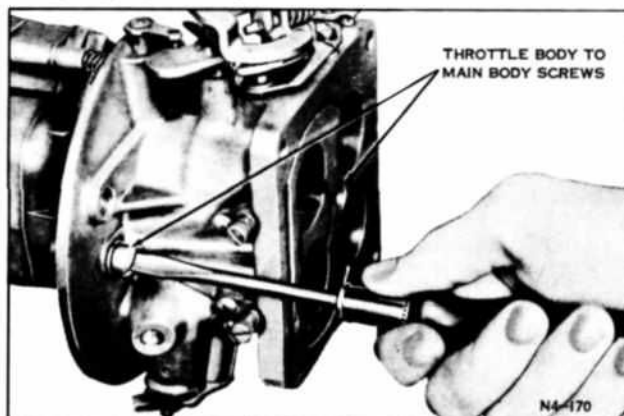


Figure 2. Removing Throttle Body to Main Body Screws

5. Remove the two throttle body to main body screws and lockwashers.

6. Remove the air horn to throttle body screw and lockwasher.

7. Carefully lift the main body off the air horn and throttle body assembly, tilting the main body slightly towards the choke plates. Remove the accelerating pump rod felt seal, two washers, and pump rod spring. Discard the felt seal. Remove and discard the main body to throttle body gasket.

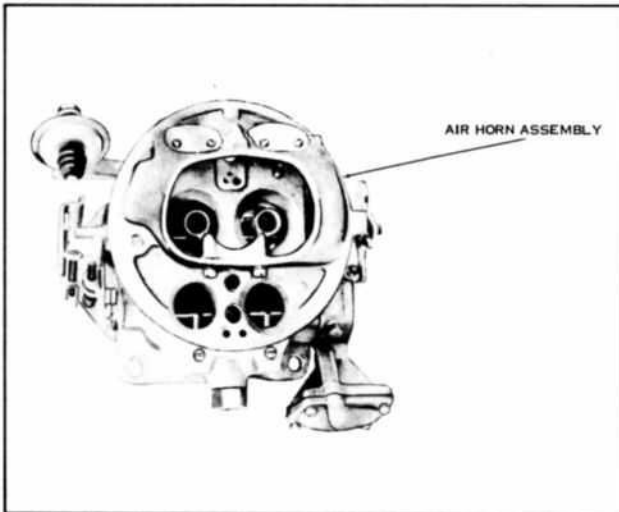


Figure 3. Remove Air Horn Assembly

8. Disengage the choke plate lever and link assembly from the choke plate. Remove the air horn assembly from the throttle body assembly. Remove and discard the air horn seal.

C. DISASSEMBLY - MAIN BODY ASSEMBLY

The following list contains all the parts of the main body assembly in order of their removal. Parts which are to be replaced from a Master Repair Kit are marked with an asterisk.

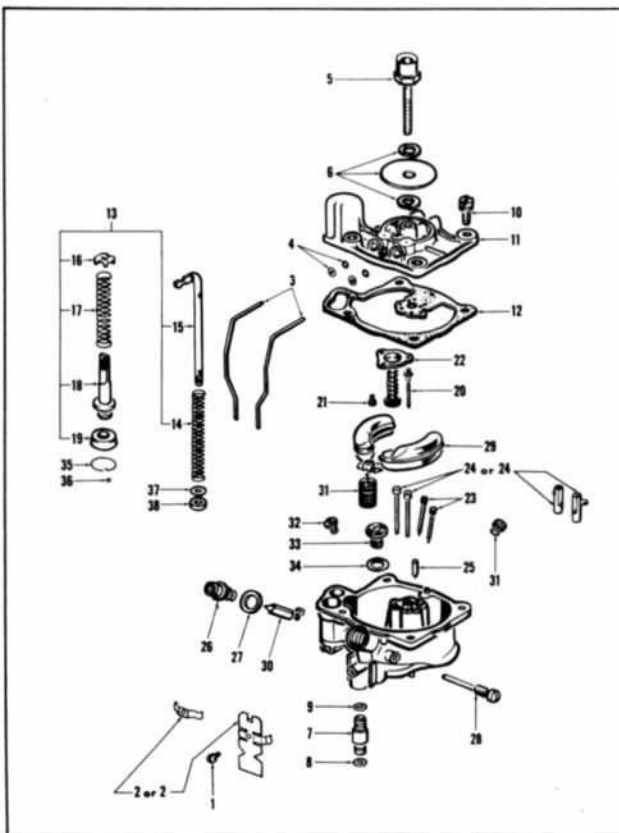


Figure 4. Disassembly - Main Body Assembly

REFER TO FIGURE NO.		ORDER OF REMOVAL	PART NAME
4	1		Secondary connecting tube screw and washer
4	2		Secondary connecting tube bracket
4	3		(2) Secondary connecting tubes
4	4		(2) Secondary connecting tube seal washers and seals*
5	5		Air cleaner anchor screw
5	6		Bleeder screen washer and (2) lock-washers
4	7		Fuel inlet fitting
4	8		Fuel inlet fitting gasket* - or "O" rings (2)*
4	9		Fuel inlet fitting seal*
4	10		(4) Main body cover screws and lock-washers
4	11		Main body cover
4	12		Main body cover gasket
6	13		Accelerating pump assembly
4	14		Accelerating pump return spring
4	15		Accelerating pump operating rod
4	16		Accelerating pump spring washer
4	17		Accelerating pump spring
4	18		Accelerating pump piston assembly
4	19		Accelerating pump piston cup*
7	20		(2) Secondary jet assembly*
4	21		(1) Economizer cover screw
7	22		Economizer diaphragm and stem assembly*
8	23		(2) Idle tubes* (Early Models Only)
8	24		(2) Main well tubes* or discharge nozzle assemblies*
4	25		Pump discharge needle valve*
9	26		Fuel inlet seat*
4	27		Fuel inlet seat gasket*
10	28		Float shaft*
11	29		Float assembly
4	30		Fuel inlet needle*
11	31		Float spring*
12	32		(2) Main jets*
12	33		Power valve assembly*
4	34		Power valve gasket*
13	35		Pump check valve retainer spring*
4	36		Pump check valve ball*
4	37		Pump rod lubricating ring washer
4	38		Pump rod lubricating ring*

1. Remove secondary connecting tube bracket screw and washer. Remove secondary connecting tube bracket.

2. Slide the secondary connecting tubes out of the main body cover. Remove and discard the two secondary connecting tube seals and washers.



Figure 5. Removing Air Cleaner Anchor Screw

3. Remove the air cleaner anchor screw, bleeder screen washer and lock washers.

4. Using a half-inch box-end wrench, remove the fuel inlet fitting and gasket. Discard the gasket. Remove and discard the fuel inlet fitting seal. Some models have a pressed in fuel fitting and two "O" rings.

5. Remove the four main body cover screws and lock washers. Lift the main body cover carefully off the main body. Discard the main body cover gasket.

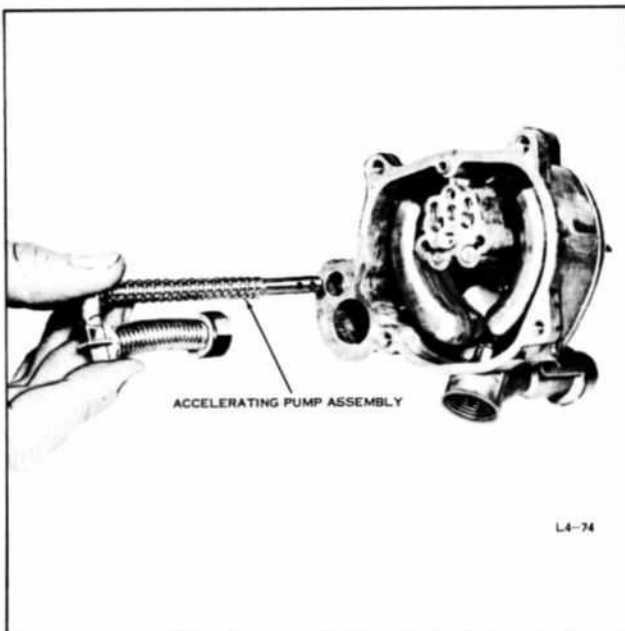


Figure 6. Removing Accelerating Pump Assembly

6. Lift the accelerating pump assembly out of the main body and remove the pump return spring.

7. Depress the pump spring and washer and separate the pump operating rod from the pump piston assembly. Remove the spring and washer from the pump piston assembly. Remove and discard the pump piston cup.

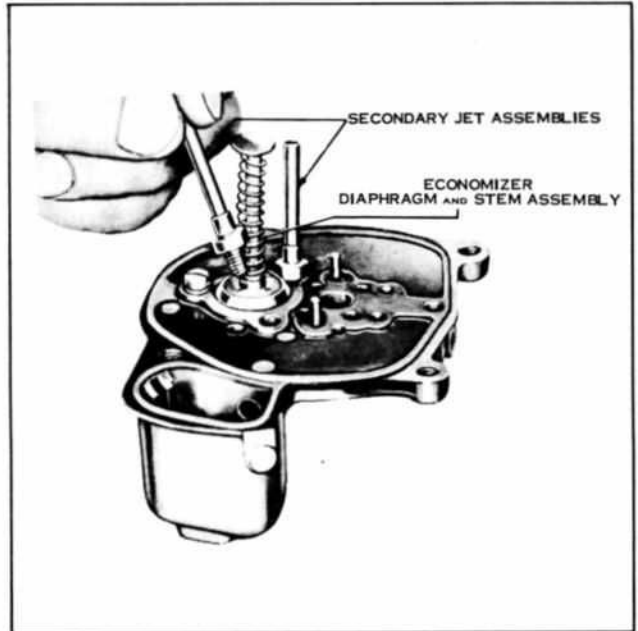


Figure 7. Removing Secondary Jet Assembly

8. Remove and discard the two secondary jet assemblies. Remove the economizer cover screw, and separate the economizer diaphragm and stem assembly from the main cover. Discard the economizer diaphragm and stem assembly.

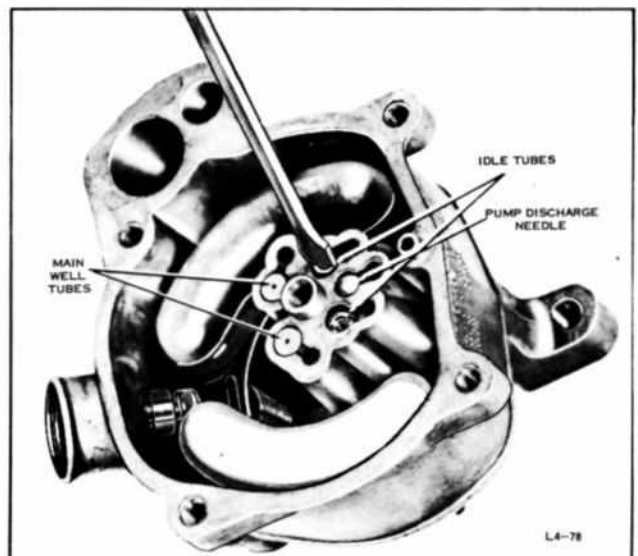


Figure 8. Loosening Idle Tubes

9. Loosen the two idle tubes.

10. Tilt the main body and remove the two idle tubes, two main well tubes, and the pump discharge needle valve. Discard these parts.

NOTE

Later models have a discharge nozzle assembly which replaces the main well tube. No idle tube is used in these models.

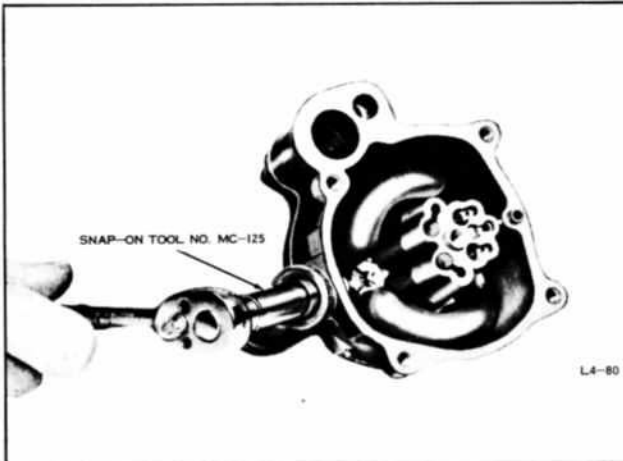


Figure 9. Removing Fuel Inlet Needle Seat

11. Using Snap-On Tool number MC-125, remove and discard the fuel inlet seat and gasket.

12. Remove the float shaft and carefully remove the float assembly, fuel inlet needle, and float spring. Discard the float shaft, float spring, and fuel inlet needle.

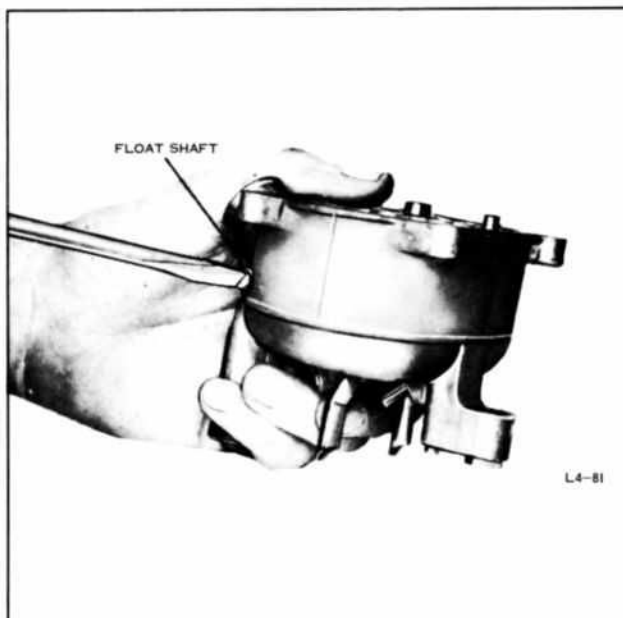


Figure 10. Removing Float Shaft

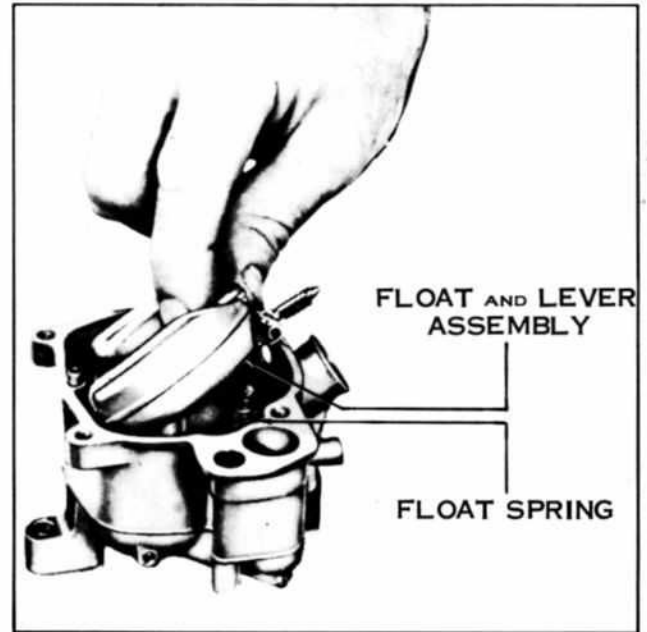


Figure 11. Removing Floats

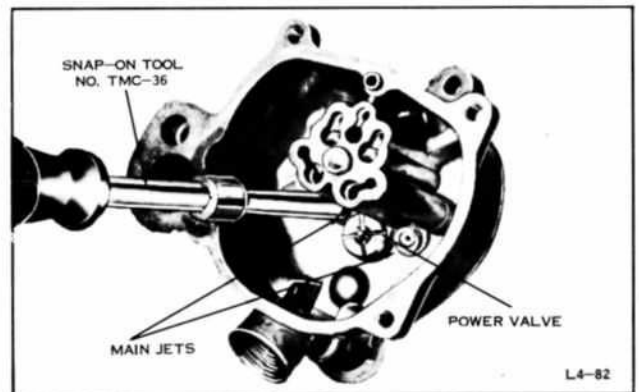


Figure 12. Removing Main Jets

13. Using Snap-On Tool number TMC-36A, remove and discard the two main jets. Remove and discard the power valve assembly and gasket, using Snap-On Tool number MC-127.

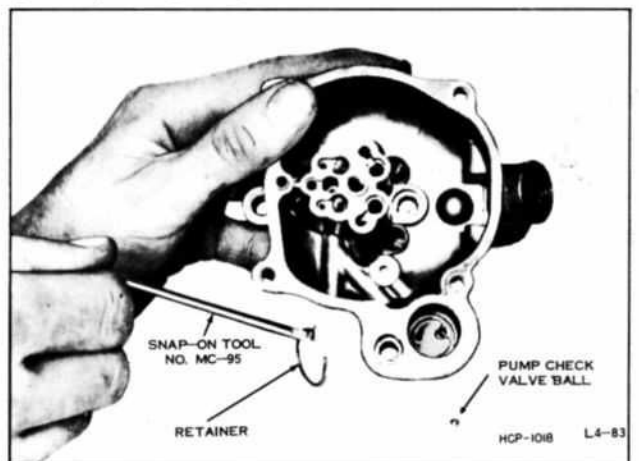


Figure 13. Removing Pump Check Valve and Retainer

14. With Snap-On Tool number MC-95, remove the pump check valve retainer spring. Tilt the main body to remove the pump check valve ball. Discard the retainer and ball.

15. Remove and discard the pump rod lubricating ring and washer, using Snap-On Tool number MC-95.

D. DISASSEMBLY - AIR HORN ASSEMBLY

The following list contains all the parts to be removed from the air horn assembly in the order of removal. Parts marked with an asterisk are to be discarded and replaced from a Master Repair Kit.

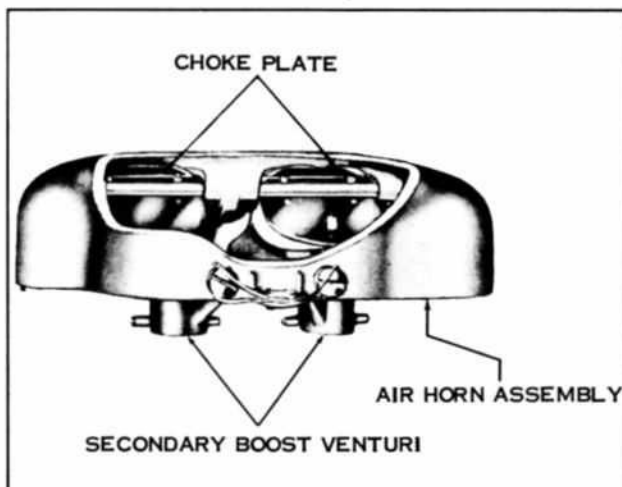


Figure 15. Air Horn Assembly - Removed

E. DISASSEMBLY - THROTTLE BODY ASSEMBLY

The following list contains all the parts of the throttle body assembly in the order of their removal. Parts which are to be replaced from a Master Repair Kit are marked with an asterisk.

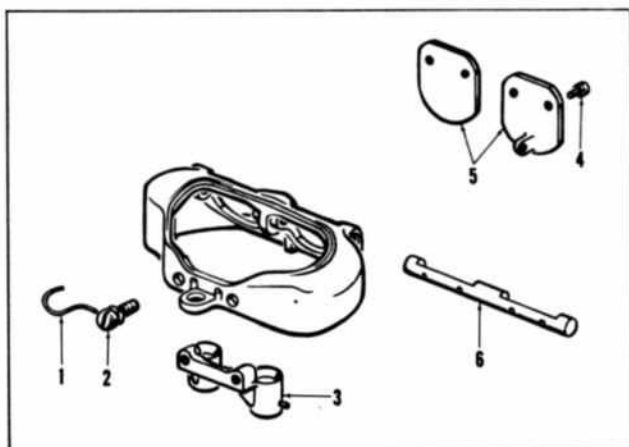


Figure 14. Disassembly - Air Horn Assembly

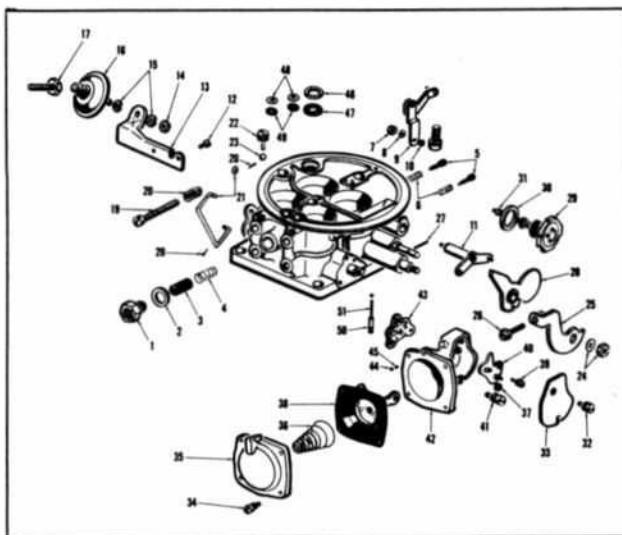


Figure 16. Disassembly - Throttle Body Assembly

REFER TO FIGURE NO. ORDER OF REMOVAL		PART NAME
15	1	Lock wire*
15	2	(2) Secondary venturi screws and washers
15	3	Secondary venturi assembly
14	4	(4) Choke plate screws
15	5	(2) Choke plates
14	6	Choke plate shaft

1. Remove lock wire from the secondary venturi screws.

2. Remove the two secondary venturi screws and washers. Remove the secondary venturi assembly.

3. Remove the four choke plate screws and washers. Remove the two choke plates and slide the choke plate shaft out of the air horn.

NOTE

The left hand choke plate has a swivel in which the choke plate link fits.

REFER TO FIGURE NO. ORDER OF REMOVAL		PART NAME
16	1	Fuel inlet fitting
16	2	Fuel inlet fitting gasket*
16	3	Filter screen assembly
16	4	Filter screen retainer spring
17	5	(2) Idle adjusting needles*
17	6	(2) Idle adjusting needle springs
16	7	Choke plate lever nut
16	8	Choke plate lever nut washer
16	9	Choke plate lever and link assembly

REFER TO FIGURE NO.		ORDER OF REMOVAL	PART NAME	
16	10		Choke shaft thrust washer	
16	11		Choke shaft assembly	
16	12		(2) Dashpot bracket screws	} Automatic Trans- missions
16	13		Dashpot bracket	
16	14		Dashpot locknut	
16	15		(2) Dashpot washers	
16	16		Dashpot	
16	17		Dashpot lever adjusting screw	
16	18		Throttle stop screw	
16	19		Throttle stop screw spring	
16	20		(2) Secondary throttle connecting rod cotter pins*	
16	21		Secondary throttle connecting rod and washer	
16	22		(2) Secondary check ball retainers	
16	23		(2) Secondary check balls*	
16	24		Throttle lever nut and washer	
16	25		Throttle lever (cam) and locknut assembly	
16	26		Throttle adjusting (cam) screw	
16	27		Fast idle cam retainer	
16	28		Fast idle cam assembly	
16	29		Spark valve*	
16	30		Spark valve gasket*	
16	31		Spark valve restriction	
16	32		Diaphragm housing cover screw and lockwasher	
16	33		Diaphragm housing cover	
16	34		(4) Diaphragm cover screw and washers	
16	35		Diaphragm cover	
16	36		Diaphragm spring	
18	37		Diaphragm link retainer*	
18	38		Diaphragm assembly*	
18	39		Diaphragm lever screw and lockwasher	
18	40		Diaphragm lever	
18	41		(3) Diaphragm housing screws and washers	
16	42		Diaphragm housing	
16	43		Diaphragm housing gasket*	
19	44		Diaphragm ball retainer*	
16	45		Diaphragm ball check valve*	
16	46		Air tube washer* - or grommet*	
16	47		Air tube seal*	
16	48		(2) Secondary jet tube washers*	
16	49		(2) Secondary jet tube seals*	
16	50		Distributor check valve retainer	
16	51		Distributor check valve*	

1. Using an 11/16 inch box-end wrench, remove the fuel inlet fitting, fuel inlet fitting gasket, filter screen assembly and the filter screen retainer spring. Discard the gasket.

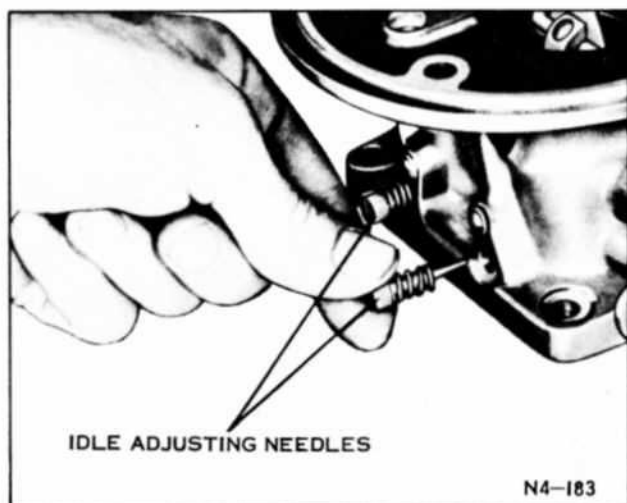


Figure 17. Removing Idle Adjusting Needles

2. Remove the two idle adjusting needles and springs. Discard the idle adjusting needles.

3. With a 5/16 inch open-end wrench, remove the choke plate lever nut, choke plate lever nut washer, choke plate lever and link assembly, and the choke shaft thrust washer.

4. Remove the choke shaft assembly from the throttle body.

5. Remove the two dashpot bracket screws and washers. Remove the dashpot bracket from the throttle body.

6. Remove the dashpot locknut and the two washers. Remove the dashpot from the dashpot bracket.

7. Remove the dashpot lever adjusting screw and the throttle stop screw and spring from the primary throttle lever assembly.

8. Remove and discard the two secondary throttle connecting rod cotter pins. Remove the secondary throttle connecting rod and washer.

9. Remove and discard the two secondary check balls and their retainers.

10. Remove the throttle lever nut and washer, throttle lever (cam) and locknut assembly, and the throttle adjusting (cam) screw.

11. Using a small drift pin, drive out the fast idle cam retainer and remove the fast idle cam assembly. It is necessary to perform this step only if the fast idle cam requires replacement.

12. Remove the diaphragm housing screw and lockwasher. Lift off the diaphragm housing cover.

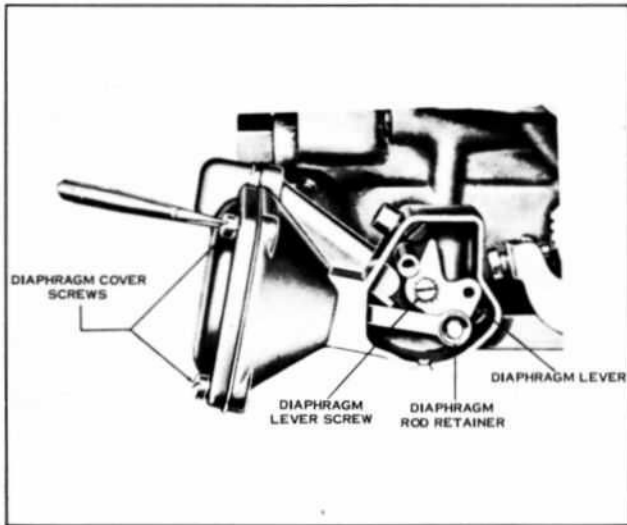


Figure 18. Removing Diaphragm Cover Screws

13. Remove the four diaphragm cover screws and washers. Remove the diaphragm cover and diaphragm spring.

14. Remove and discard the diaphragm link retainer. Slide the diaphragm assembly out of the housing and discard.

15. Remove the diaphragm lever screw and lockwasher. Slide the diaphragm lever off the throttle shaft.

16. Remove the three diaphragm housing screws and washers. Remove the diaphragm housing from the throttle body. Remove and discard the diaphragm housing gasket.

17. Remove and discard the diaphragm ball check valve and retainer.

18. Remove and discard the spark valve and gasket.

19. Using a proper size screwdriver, remove the spark valve restriction.

20. Remove and discard the air tube seal and washer, or grommet.

21. Remove and discard the secondary jet tube seals and washers.

22. Invert the throttle body and remove the distributor check valve retainer and check valve. Discard the check valve.

NOTE

Do not remove the throttle plates or shafts. If the shaft is bent, or the throttle plates damaged, replace the throttle body assembly.

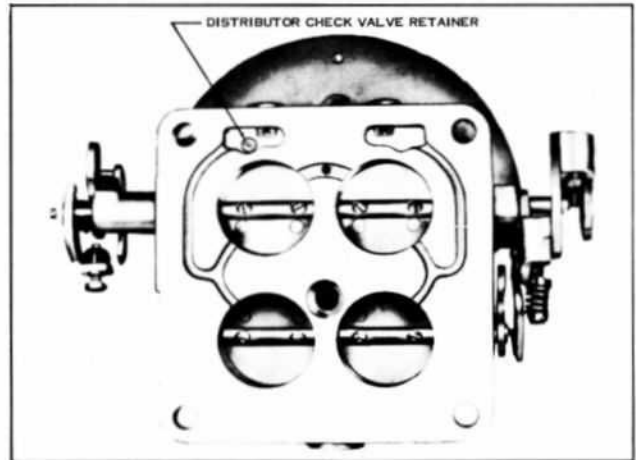


Figure 19. Distributor Check Valve and Retainer Location

2. AUTOMATIC CHOKE UNIT

The automatic choke unit should be removed from the manifold and overhauled at the same time the carburetor is overhauled. The following list contains all of the parts to be removed from the automatic choke unit in the order of their removal. Parts marked with an asterisk are to be discarded and replaced from a Master Repair Kit.

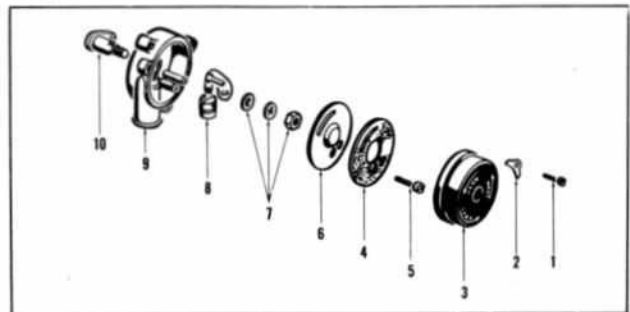


Figure 20. Disassembly - Automatic Choke Assembly

ORDER OF REMOVAL	PART NAME
1	(3) Thermostat housing screws
2	(3) Thermostat housing clamp
3	Thermostat housing assembly
4	Thermostat housing gasket*
5	Choke housing plate screw
6	Choke housing plate
7	Choke housing shaft nut and lockwashers
8	Thermostat lever shaft
9	Choke housing shaft and lever assembly
10	Thermostat lever, link, and piston assembly



a. Remove the three thermostat housing screws and clamps, and remove the thermostat housing assembly.

b. Remove and discard the thermostat housing gasket. Remove the choke housing plate screw and remove the plate.

c. Remove the choke housing shaft nut, lockwasher and the thermostat lever spacer. Lift the choke housing shaft and lever assembly out of the choke housing.

d. Remove the thermostat lever, link, and piston assembly by turning the lever to raise the piston out of its chamber in the choke housing.

5. CLEANING AND INSPECTION

A. CLEANING

1. All castings and metal parts, except those with diaphragms, seals, or other neoprene, felt, fibre, or leather parts, should be soaked in a cleaning solution to loosen all foreign deposits. The parts and castings should be placed in a metal basket suspended in the solution and agitated. The sediment will collect in the bottom of the container. If a commercial solvent is not available, lacquer thinner or denatured alcohol may be used. After the parts have soaked sufficiently, rinse them in hot water to remove all traces of the cleaning solution. Scrub all the parts and castings with a stiff bristle brush while rinsing.

2. Soak each part and casting in clean gasoline for a few seconds, then rinse them in hot water to remove all traces of the cleaning solution. Dry all parts with compressed air. Compressed air should also be directed through all passages in the castings and through all jets and tubes.

3. The spark valve, the economizer diaphragm assembly, the secondary diaphragm assembly and nylon spark ball should not be exposed to the solvent, as most commercial solvents will deteriorate these units. Their exteriors may be cleaned with a rag that has been dipped in gasoline and wrung almost dry. Do not dry with compressed air as the air may rupture the diaphragms.

CAUTION

Carburetor passages and jets should never be cleaned with a drill, wire or similar object. This method of cleaning may distort jets and passages, and adversely affect carburetor performance. A buffing wheel, wire

brush, file, or other sharp instrument should not be used to remove carbon deposits, as the protective plating on the part might be removed by scratching or filing.

NOTE

All parts such as the gaskets, seals, leather cups or diaphragms should never be exposed to the cleaning solvent. Most solvents will deteriorate these parts.

4. The air cleaner should be cleaned at this time to insure proper carburetor performance.

B. INSPECTION

1. MAJOR CASTINGS

All major castings must be checked for cracks, stripped threads, damaged gasket mating surfaces, and other damage. The passages in the castings should be checked with compressed air to make sure they are free of obstructions. Refer to the "Operation" section of this manual for location of passages in the castings. If any irregularities are found, replace the casting with a new one.

2. FLOAT ASSEMBLY

Discard and replace the float assembly if the floats leak, or if the assembly is corroded or damaged in any way. Shake floats to determine if fuel has leaked into them.

3. CHOKE PLATES

Choke plates should be discarded if edges are nicked or if the protective plating has been damaged, exposing bare metal to corrosion.

4. THROTTLE PLATES AND THROTTLE SHAFTS

If plates are damaged, or if the throttle shafts are bent, replace with a complete throttle body assembly.

5. DISTRIBUTOR CHECK VALVE RETAINER

Discard and replace if any damage or distortion is noted.

6. CHOKE AND THROTTLE LINKAGE

Discard and replace fast idle cam and choke lever if they are bent or worn. Check all linkages for worn surfaces.



7. SPRINGS

Distorted or broken springs must be replaced.

8. THERMOSTAT LEVER, LINK, AND PISTON ASSEMBLY

Discard the automatic choke thermostat lever, link, and piston assembly if the piston sides are scored or nicked in any manner that would cause the piston to bind, or if any part of the assembly is damaged.

9. SCREWS, LOCKWASHERS, AND NUTS

If stripped threads, or other damage are found on screws, lockwashers, and nuts, they should be discarded and replaced with new ones.

6. REBUILDING

A. REASSEMBLY - THROTTLE BODY ASSEMBLY

1. AUTOMATIC CHOKE ASSEMBLY

a. Slide the thermostat lever, link, and piston assembly into its chamber in the choke housing.

b. Place the choke housing shaft and lever assembly in position and install the spacer, washer and nut.

c. Install the choke housing plate and screw. Install a new thermostat housing gasket.

d. Install the thermostat housing assembly and install the three housing screws and clamps. Be sure the toes of the clamps press against the thermostat housing rim. Align the index mark scribed on the rim of the thermostat housing with the large center indicator on the choke housing before tightening the three clamp screws. To be sure the thermostat lever properly engages the thermostat spring, rotate the choke lever at the back of the housing. It should snap back to its original position when released.

e. Install the automatic choke unit in position on the manifold.

2. THROTTLE BODY ASSEMBLY

a. Install the new distributor check valve ball and retainer.

b. Install the new air tube seal and washer. Stake the washer to prevent loosening. If carburetor has grommet, replace with a new one.

c. Install the two new secondary jet tube seals and washers. Stake the washers to prevent loosening.

d. Install the spark valve restriction, then install the new spark valve with the new spark valve gasket.

e. Insert the new diaphragm ball check valve and retainer, in the diaphragm cover.

f. Place the diaphragm housing in position on the throttle body using a new gasket. Install the three housing screws and washers.

g. Install the diaphragm lever, using the diaphragm lever screw and lockwasher.

h. Slide the new diaphragm assembly into the diaphragm housing. Place the diaphragm link on the link pin of the diaphragm lever and secure it with the new diaphragm link retainer.

i. Position the diaphragm spring, with the wide end of the spring against the metal disc on the diaphragm. Insert the four cover screws and washers in the diaphragm cover. Align the screws with the holes in the diaphragm housing, and install the cover. Do not tighten the screws until a check has been made of the alignment of the diaphragm. If the installation has been correctly made, the secondary throttle plates will be held in the fully closed position by the diaphragm spring.

j. Install the diaphragm housing cover with the diaphragm housing cover screw and lockwasher.

k. Only if it has been removed, place the fast idle cam on the long stop pin extending from the throttle body on the diaphragm side, then insert fast idle cam retainer.

l. Place the throttle lever (cam) and locknut assembly on the throttle shaft and install the throttle lever nut and lockwasher. Install the throttle adjusting (cam) screw.

m. Install the two new secondary check balls and retainers.

n. Install the secondary throttle connecting rod and washer. Secure with two new

throttle connecting rod cotter pins.

o. Replace the throttle stop screw and spring. Install the dashpot lever adjusting screw on the primary throttle lever assembly.

p. Place the dashpot assembly and the two washers on the dashpot bracket, and tighten the dashpot locknut.

q. Install the dashpot bracket on the throttle body, using the two dashpot bracket screws and washers. Adjust the dashpot in accordance with step 3 of the dashpot adjustment instructions on page 26. Consult the current Holley Catalog sheets for dashpot clearance.

r. Insert the choke shaft assembly into the throttle body. Install the choke shaft thrust washer choke plate lever and link assembly, and the choke plate lever nut and washer.

s. Install the two new idle adjusting needles with the original springs.

t. Install the filter screen retainer spring, filter screen assembly, the new fuel inlet fitting gasket and the fuel inlet fitting.

B. REASSEMBLY - AIR HORN ASSEMBLY

1. Insert choke shaft. Install the choke plates, making sure the choke plate with the swivel is on the correct side. Install the four choke plate screws and washers. Before tightening the screws, check to make sure the choke plates do not rub or bind on the air horn.

2. Place the secondary venturi assembly in position and install the two secondary venturi screws and lockwashers.

3. Install the new lock wire on the secondary venturi screws.

C. REASSEMBLY - MAIN BODY ASSEMBLY

1. Insert the new pump rod lubricating ring and washer.

2. Install the new pump check valve ball. Care must be taken to insure the proper seating of the ball. Install the new check valve retainer in the accelerating pump well. The bent-in portion of the retainer holds the check ball in place.

3. Using Snap-On Tool number TMC-36, install the two new main jets. Also install the new power valve and new power valve gasket, using Snap-On Tool number MC-127.

4. Install the new fuel inlet valve seat and new inlet valve seat gasket, using Snap-On Tool number MC-125.

5. Place the new fuel inlet needle, with clip attached, in the fuel inlet needle seat.

CAUTION

Fuel inlet needles and seats are matched assemblies, factory tested to insure proper operation and their component parts are not interchangeable.

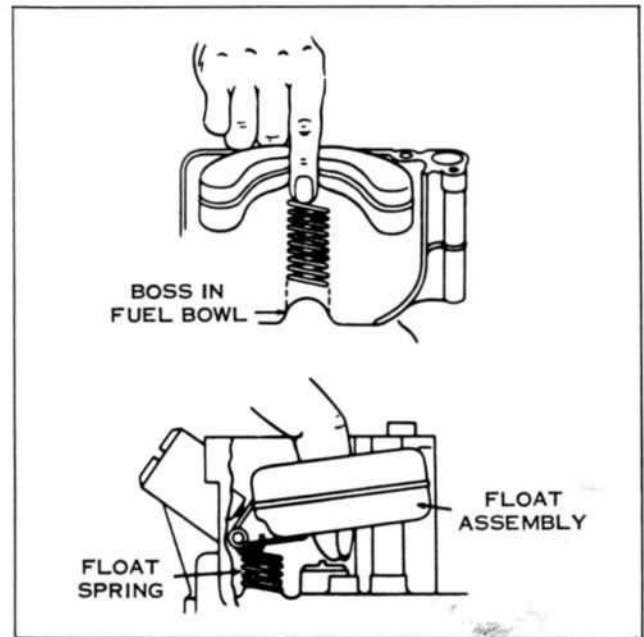


Figure 21. Installing Float Assembly

6. Tilt the main body slightly to keep the fuel inlet needle from falling out of its seat. Carefully place the float assembly and float spring in the fuel bowl. To install the float and float spring in the main body, insert the long end of the float spring into the small hole in the float lever. Holding the spring with the index finger, ease the float into the bowl and slip the spring over the boss at the bottom of the fuel bowl. Install the new float shaft and fit the fuel inlet needle clip over the float tab.

7. Lift the float to completely close the fuel inlet valve. While holding the floats in the closed position, place the float gauge across the float chamber, resting one end of the rim on the float chamber and the other on the center of the main body. The tab on the gauge should just touch the flat top surface of the float at the end of the float, away from the fuel inlet valve. Check both floats in this manner. If one of the floats is lower than the other, slightly bend the portion of the float lever adjacent to the float to correct the

misalignment. A light pressure must be used, as a small bend will result in a considerable change in the height of the toe of the float. The float level can be adjusted by bending the tab on the float lever which contacts the fuel inlet needle. Bend the tab up to lower the floats, or down to raise them.

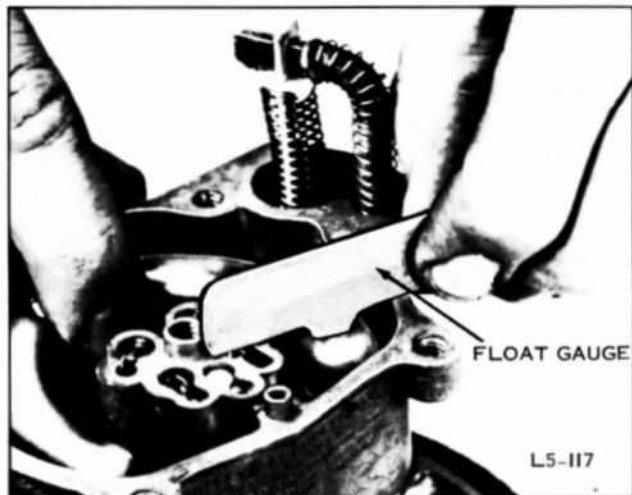


Figure 22. Checking Float Level

8. In early models of this carburetor, install the two new idle tubes. To insure proper metering, turn the idle tubes down tightly on their seats.

NOTE

Later models have no idle tubes.

9. Install the two assemblies or new main well tubes (early models) and the new accelerating pump discharge needle. To insure proper seating, place a brass rod on top of the needle and tap gently a few times with a fiber mallet. Be sure the needle is free in its chamber after this operation has been done.

10. Reassemble the accelerating pump assembly. Place the new pump piston cup on the accelerating pump piston. Place the accelerating pump spring on the pump piston, compress the spring and position the washer, then slide the pump operating rod through the slot in the pump piston stem. Slip the pump return spring over the pump operating rod.

11. Carefully slide the pump assembly into the accelerating pump well. Do not allow the pump piston cup to catch on the edge of the pump chamber.

12. Place the new economizer diaphragm and stem assembly on the main body cover and carefully install the two new secondary jet as-

semblies, and the economizer screw and lockwasher.

CAUTION

To insure full travel of the economizer stem, the secondary jets and screws should be tightened while the economizer stem is in the fully compressed position.

13. Install the two new secondary connecting tube seals and washers in the main body cover. Stake the washers to prevent loosening.

14. Place the new main body cover gasket in position on the main body and install the main body cover with the four main body cover screws and lockwashers.

15. Install the new fuel inlet seal on the fuel inlet fitting. Install the fuel inlet fitting with the new gasket in position and tighten securely. The models that have the pressed-in type fuel fitting have an "O" ring on both ends.

16. Install the fuel inlet plug with a new fuel inlet plug gasket.

17. Install the air cleaner anchor screw, bleeder screen washer, and lockwashers.

D. REASSEMBLY - THREE MAJOR SUBASSEMBLIES

1. Cement a new air horn to main body seal to the groove in the top of the air horn.

2. Place the air horn assembly on the throttle body assembly. Care must be taken not to damage the aligning pins on the air horn.

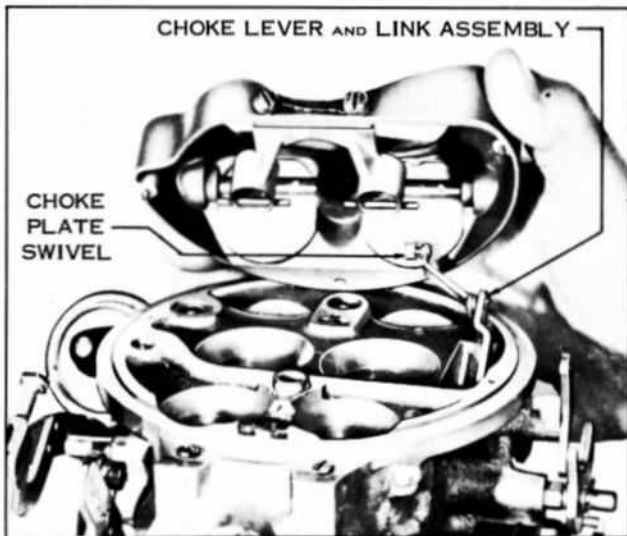


Figure 23. Choke Linkage Installed

3. Place the choke plate lever and link assembly in position in the choke plate swivel.

4. Insert the air horn to throttle body screw but do not tighten. The air horn must remain loose in order to install the main body.

5. Fit the new main body to throttle body gasket to the protruding foot of the main body.

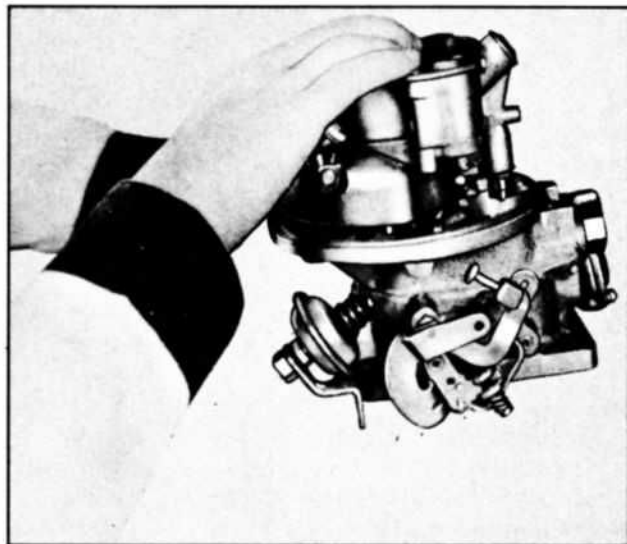


Figure 24. Installing Air Horn and Main Body

6. Slide the pump rod seal spring, the two pump rod seal washers and the new pump rod felt seal in position.

7. Tilt the main body slightly and fit into position, make sure the accelerator pump rod, the fuel inlet fitting and the secondary connecting tubes are aligned with their mating holes in the throttle body.

8. Tighten the air horn to throttle body screw and washer. Install the two main body to throttle body screws and lockwashers.

9. Slide the bowl vent selector in position on the accelerating pump rod. Consult adjustment section of this manual for correct adjustment on bowl vent selector.

10. Install the pump link assembly into the throttle lever, using a new pump link retainer.

11. Align the hole in the new pump link assembly with the hole in the accelerating pump rod and insert the pump link stud.

12. Install the two secondary tubes in the main cover and replace the secondary connecting tube bracket, screw and lockwasher.

INSTALLATION

1. PREPARATION

Make a visual inspection of the exterior of the carburetor before installation. Check to make sure the unit has not been damaged due to improper storage or mishandling.

2. INSTALLATION

Check the mating surface of the intake manifold for dirt and rust. If surface is clean, secure the carburetor, using a new flange gasket, with the four mounting nuts and lockwashers. Tighten the mounting nuts alternately, a little at a time, to evenly compress the flange gasket. The nuts must be drawn down tight to prevent leakage between the carburetor and manifold. Connect the distributor vacuum line, the fuel line, and the throttle and choke linkages. Make certain there are no worn or loose connections.

3. ADJUSTMENTS

A. ADJUSTING THE IDLE

1. Before adjusting the idle, make sure the vehicle is on level ground.

2. Seat the idle adjusting needles lightly, then back them off exactly one full turn.

NOTE

Do not seat the idle adjusting needles too tightly as this will groove the tips of the needles and prevent a smooth idle. If the needles become grooved, they must be discarded and replaced with new ones.

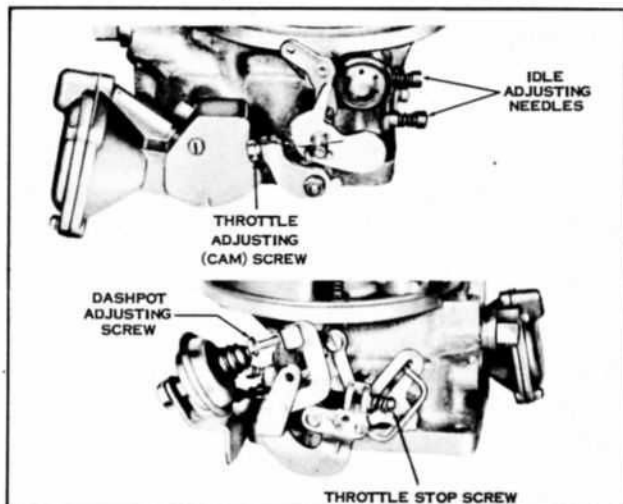


Figure 25. Adjustment



3. With the engine running, allow the operating temperature to reach normal. Adjust the throttle stop screw, located on the side opposite the diaphragm, if necessary to obtain an idle rpm fast enough to prevent stalling during the warm-up period.

4. When the choke plates are wide open and the fast idle cam (located on the diaphragm side) in the position where the idle speed screw contacts the lowest step of the cam, back the screw off $1/2$ to $3/4$ of a turn.

5. Set the idle adjusting needles to give the highest steady manifold vacuum reading, or the smoothest running and maximum idle speed, if no vacuum gage is available. This can be accomplished by turning one idle adjusting needle in until the engine begins to slow down, then backing the needle off over the "high spot" until the engine again begins to slow down. Setting the idle adjusting needle halfway between these two points, or a little towards a richer setting, will result in a satisfactory idle mixture setting. Repeat this procedure with the other needle. If this adjustment results in an increased idle rpm, reset the throttle stop screw to obtain the specified idle rpm, and again adjust both idle adjusting needles.

B. ADJUSTING THE AUTOMATIC CHOKE

1. The automatic choke is accurately set at the factory to give the best possible all weather operation. To return the choke to the original setting, line up the index mark on the rim of the thermostat cover with the large center indicator on the choke housing.

2. If for some reason a richer or leaner mixture during the warm-up period is desired, it can be obtained by rotating the thermostat cover. Never set the index mark on the cover more than two graduations off the large center indicator on the housing.

C. ADJUSTING THE DASHPOT

1. Adjust only when engine has reached operating temperature, making sure the drive selector is set at "neutral".

2. Turn in the dashpot adjusting screw until it no longer contacts dashpot stem. It is important that the adjusting screw does not interfere with the normal idle setting of the carburetor. If the adjusting screw prevents the throttle lever from reaching the idle position, an excessive idle speed will result. The dashpot adjustment will be performed after the idle adjustments have been completed.

3. Set the dashpot adjusting screw to obtain the specified clearance between the dashpot adjusting screw and dashpot. This setting should be made with the dashpot stem in the fully compressed position. Consult the current Holley Catalog sheets for correct clearance.

D. BOWL VENT SELECTOR

The bowl vent selector is used to convert the external vented carburetor to an internal vented carburetor. In cold weather the selector should cover the two vents on the rod, while in warm weather the selector should be moved up, exposing both vents. One vent can be covered during intermediate temperatures.

SERVICE HINTS

Carburetor service should be performed only with the proper equipment. This equipment should include float setting gauges, and special carburetor tools. In addition, the proper specifications must be utilized. Refer to the current Holley Carburetor Catalog sheet for the carburetor being overhauled for the proper engine and carburetor specifications.

NOTE

Many performance complaints attributed to the carburetor may be the result of poor driving habits. It will be impossible to obtain fuel economy if the engine is needlessly raced, the throttle is opened suddenly and harshly, or if the vehicle is kept too long in low and second gear.

A. INSPECTING THE VEHICLE

Road check the vehicle, if possible, before making any adjustments on the carburetor to improve performance. Dragging brakes, poor wheel alignment, low tire pressures, and other causes of undue friction should be remedied. Evidences of leakage, dents, or clogging in the exhaust system should be corrected. Check the color of the exhaust for indications of an over-rich mixture, or excessive oil consumption. Improper engine temperatures should be corrected. Many faults may be detected by a visual inspection of the engine in operation. Remedy loose or disconnected wiring, leaking fuel and water connections, possible short circuits, and other faults. A further check can be made for faults by listening to the engine while it is operating in all speed ranges.

B. INSPECTING THE ENGINE

After a check has been made of the vehicle, the engine should be examined. Check or set the following in accordance with the manufacturer's



specifications: distributor breaker points, spark plug gap, ignition timing, condenser capacity, valve settings, intake manifold for leaks, compression, all gaskets, carburetor body and flange screws, and inlet fuel pressure.

C. INSPECTING THE FUEL SYSTEM

The fuel system should also be inspected. Examine all fuel lines for clogging, collapsed sections, and other damage. Make a manual check of fuel line connections for looseness or leakage. Check the fuel tank vent to insure that it is unobstructed. Even a partially clogged vent may cause the engine to cut out after a few minutes of high-speed operation. Clean the fuel pump sediment chamber and the fuel filter, if one is used. Using a vacuum gauge, check the fuel pump for air leaks. Connect the gauge pump, vacuum reading less than normal at the idle indicates an air leak or a faulty fuel pump. A careful check should be made of the fuel pump pressure. Excessive fuel pump pressure may lead to the engine being flooded and will result in poor fuel economy.

Low pump pressure leads to a lean mixture and poor performance.

D. INSPECTING THE CARBURETOR

Make a preliminary inspection of the carburetor with the air cleaner removed. Be sure all linkages are correctly connected and operate without binding. If it becomes apparent that none of the previous items are at fault, the following trouble shooting chart should be helpful in isolating the defective component and correcting the difficulty. Trouble shooting procedures are not a substitute for the periodic overhaul of the carburetor. They will, however, enable the service mechanic to correct minor troubles without resorting to a complete overhaul, if the carburetor is otherwise in apparent good condition.

Inspection of many metering components can be made without removing the carburetor from the engine, simply by removing the main body cover to expose these parts. To remove the main body cover, first remove the secondary connecting tubes, air cleaner anchor screw, and the four main body cover screws. When replacing the main body cover, use a new gasket.



POSSIBLE CAUSE	DIAGNOSIS	CORRECTION
COMPLAINT: Hard Starting or Stalling		
Excessive choking.	Rough running engine from over-rich mixture on starts and warm-up. Black exhaust, fouled plugs, loss of power, poor economy may result.	Check choke linkage for binding or damage. Check thermostat setting. (Must be within two marks of center index.) Check condition of fresh air tube from carburetor. With engine idling, check for air leaks between choke housing and manifold. Be sure choke housing is mounted tightly to manifold. Use new gasket when installing choke.
Insufficient choking.	Sluggish rough running engine on cold starts. Stalling, back-firing into carburetor may result.	Check for all of above items. Also check for damaged or distorted thermostat spring.
Improperly set or defective dashpot.	Stalling when accelerator is suddenly depressed and released. (Automatic transmission and/or power brake equipped vehicles only.)	Check dashpot response by depressing dashpot rod and releasing suddenly. A definite resistance should be felt when the rod is depressed, but it should snap back immediately when it is released. Be sure dashpot adjusting screw is set to specifications.
COMPLAINT: Rough Idle		
Idle adjusting needle(s) improperly set.	May be particularly noticeable following seasonal weather changes. Turn needle(s) off present setting in both directions and check for increases in rpm.	Readjust both idle adjusting needles as outlined in "Adjustments" section of this manual. Be sure that idle adjusting needle springs are tight.
Damaged tip on idle adjusting needle(s).	Impossible or extremely difficult to set idle mixture correctly. Remove idle adjusting needles and inspect tips.	Replace damaged needle(s) with authorized Holley replacement parts. Adjust as outlined in "Adjustments" section of this manual.
Loose or damaged idle tubes, clogged air bleeds, and restricted idle fuel passages.	Idle is erratic or insensitive to adjustment.	Check and clean idle air bleeds. Remove and clean idle tubes. Inspect idle tubes and replace damaged or distorted idle tubes with authorized Holley replacement parts. Tighten idle tubes securely when installing.
Carbon deposits in throttle bores.	Deposits indicated if engine will idle for even a short time after turning both idle adjusting needles down on their seats.	Remove carburetor from engine and overhaul as described in this manual.
Restricted vent holes.	Idle is rough in hot weather operation.	Inspect vent holes in pump operating rod. Set vent selector clip to expose vent holes.



POSSIBLE CAUSE	DIAGNOSIS	CORRECTION
COMPLAINT: Poor Low Speed Operation (off-idle)		
Idle adjusting needles unequally set.	Engine idles satisfactorily but falters at low speeds just above idle rpm.	Readjust idle adjusting needles as outlined in "Adjustments" section of this manual. Be sure both needles are set an equal distance off their seats.
Idle transfer holes clogged or damaged.	Poor low speed performance regardless of idle adjusting needle setting.	Remove carburetor. Inspect idle transfer holes visually for cleanliness. Check with wire gage for specified size.
COMPLAINT: Faulty Acceleration		
Inoperative pump inlet check valve.	Sluggish engine response. Little or no fuel discharged at pump discharge nozzles upon acceleration.	With main body cover removed, hold finger lightly over pump discharge needle, and pump throttle repeatedly. If inlet check ball does not seat, fuel will bubble back into float chamber from pump inlet passage. Replace pump inlet ball check valve with authorized Holley replacement parts. If seat is scored or marked it will be necessary to stake ball into seat with a brass rod to form a new seat.
Inoperative pump discharge needle valve.	Continual discharge from pump discharge nozzles at higher speeds. Economy complaint usually accompanies this.	Check pump discharge needle and its seat for damage or foreign matter which would prevent needle from seating properly. Replace damaged or worn needle with authorized Holley replacement part. Stake needle as described in "Reassembly" section of this manual.
Worn, distorted, or damaged pump piston.	Weak fuel discharge from pump discharge nozzles upon acceleration. Fuel leaks over top of piston in well when throttle is pumped.	Replace pump piston with authorized Holley replacement part.
COMPLAINT: Full Power and High Speed Difficulties		
Clogged or undersize main jets and/or low fuel level.	Poor performance in entire range from slow cruising speeds to top speed. Economy may also be affected.	Remove main jets and inspect for foreign matter and proper size stamped on side. Never attempt to gauge or clean jet orifice with wire gauge, drill, or similar object. Replace damaged or improper main jets with authorized Holley replacement parts. Crank engine (ignition "off") with main body cover removed to fill float chamber. Check for specified fuel level and re-set floats if necessary. See "Reassembly" section of this manual.



POSSIBLE CAUSE	DIAGNOSIS	CORRECTION
COMPLAINT: Full Power and High Speed Difficulties (Cont'd)		
Clogged or undersize secondary jets.	Poor performance at high speeds when secondary barrels are operative.	Remove secondary jets and inspect for foreign matter and proper size stamped on side. Never attempt to gauge or clean jet orifice with wire gauge, drill, or similar object. Replace damaged or improper secondary jets with authorized Holley replacement parts.
Economizer stem binding or power valve clogged or damaged.	Poor performance under high loads at normal cruising speeds as well as reduced top speed.	Check economizer stem for freedom of movement and damaged parts. Check power valve for cleanliness, proper operation, and correct size stamped on valve body.
Secondary throttles not opening.	Reduced top speed.	Remove secondary throttle operating diaphragm cover and inspect for evidence of air leaks or other damage. Check diaphragm for holes, tears, or other damage. Check for clogged vacuum passage to venturi.
Secondary vacuum passage ball check valve obstructed.	Speed not reduced simultaneously with release of accelerator pedal at high speeds.	Remove secondary throttle operating diaphragm cover. Inspect ball check valve and its chamber in vacuum passage in housing.

COMPLAINT: Poor Fuel Economy

Obstructed air bleeds and/or high fuel level.	High fuel consumption due to rich mixtures. In extreme cases, fouled spark plugs may result.	Inspect air bleeds for cleanliness and correct size. Inspect main well tubes and replace damaged tubes with authorized Holley replacement parts. Crank engine (ignition "off") with main body cover removed to fill float chamber. Check for specified fuel level and re-set floats if necessary. See "Reassembly" procedure in this manual.
Worn or improper main jets.	Mixture too rich <u>or</u> too lean, possibly resulting in sluggish operation.	Remove main jets and inspect for proper size stamped on jet. Never use wire gauge to check jet orifice. Egg-shaped orifice indicates wear. Replace worn, damaged, or improper size main jets with authorized Holley replacement main jets of the specified size. Too small a main jet will also adversely affect fuel economy.



POSSIBLE CAUSE	DIAGNOSIS	CORRECTION
COMPLAINT: Poor Fuel Economy (Cont'd)		
Economizer stem held down or power valve stuck open.	Satisfactory high load performance but high fuel consumption at normal cruising conditions.	Check economizer stem for freedom of movement. Check for damage to economizer diaphragm and other evidence of air leaks past diaphragm. Remove power valve and inspect for cleanliness, damage, proper operation, and correct size stamped on valve body. Check power valve gasket for splits or other evidence of leakage. Use new gasket when installing power valve. In extreme cases, remove carburetor and check entire vacuum passage in throttle body, main body, and cover for clogging. Replace faulty parts only with authorized Holley replacement parts.
Fuel bleeding from accelerating pump nozzles.	Race engine at constant high speed and observe both pump nozzles. Even the slightest continual discharge affects economy.	Check pump discharge needle and its seat for damage or foreign matter which would prevent needle from seating properly. Replace damaged or worn needle with authorized Holley replacement part. Stake needle as described in "Reassembly" section of this manual.
Faulty automatic choke operation.	Choke plates not fully opened when engine is warmed up.	Check choke linkage for binding or damage. Check thermostat setting. (Must be within two marks of center index.) Check condition of fresh air tube from carburetor. With engine idling, check for air leaks between choke housing and manifold. Be sure choke housing is mounted tightly to manifold. Use new gasket when installing choke.

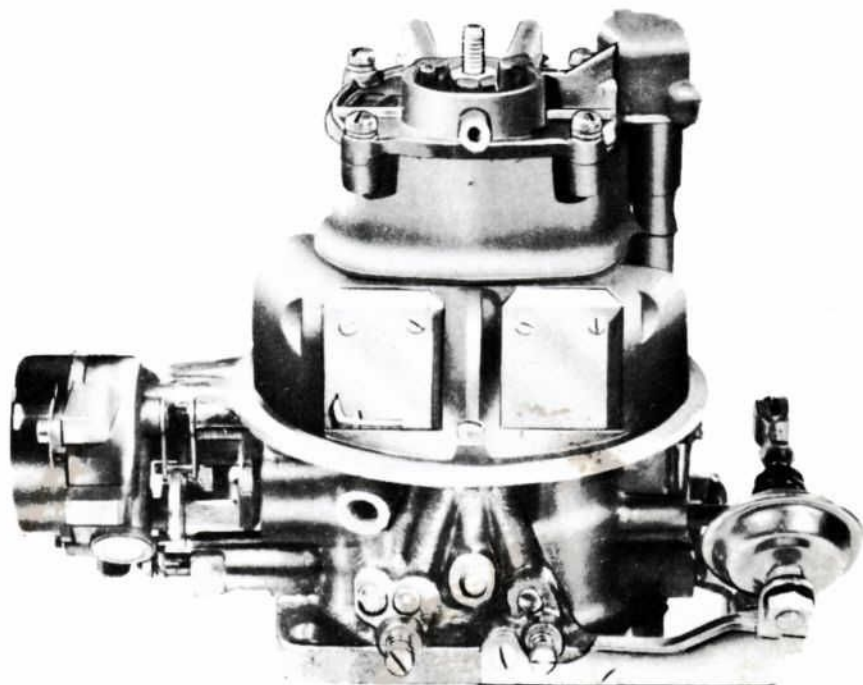


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Classic Thunderbird Club Int., P.O. Box 2398, Culver City, CA 90230
(1979)

HOLLEY

**CARBURETOR MODEL 4000
FOR
LINCOLN, MERCURY
AND FORD**



1956

FOUR BARREL DOWNDRAFT

OCTOBER



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SERVICE MANUAL

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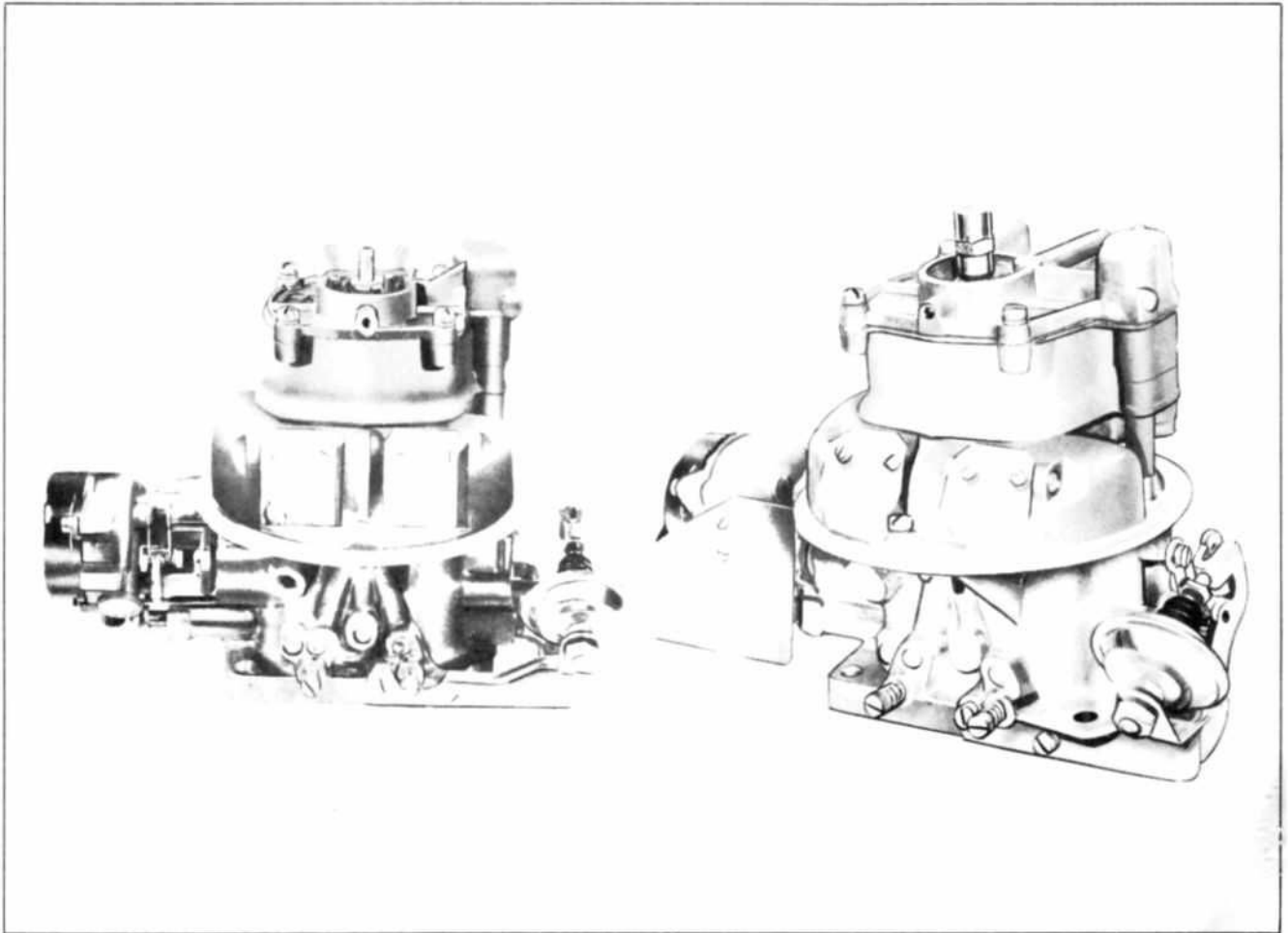
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SERVICE HINTS

TROUBLE SHOOTING CHART

INTRODUCTION

This Supplement covers the 1956 applications of the Holley Carburetor Model 4000. It is intended to be used with the Service Manual for the 1955 versions of this carburetor. Most of the procedures and overhaul instructions in the 1955 Service Manual (Form No. C-228) are still applicable. Refer to this Supplement for the points of difference between the 1955 and 1956 versions of the Carburetor Model 4000.



HOLLEY MODEL 4000

DESCRIPTION

1. DESIGN

The Model 4000 Carburetor used on the 1956 Lincoln, Mercury and Ford is basically the same as the unit used on the 1955 vehicles. It differs principally with the addition of the automatic choke as an integral part of the carburetor. In the 1955 applications the automatic was divorced from the carburetor and mounted on the manifold.

There have also been revisions on the fuel

inlet valve, the pump piston assembly, discharge nozzle assembly, and the secondary jet tubes.

2. APPLICATION

The Holley Carburetor Model 4000 will be found on 1956 Lincoln, Mercury, Ford "Thunderbird", and police cars. For complete application data, parts lists, specifications and further information, consult the Holley carburetor catalog sheet covering the specific vehicle.

OPERATION

The Holley Carburetor Model 4000 is equipped with four basic fuel metering systems. They are the main metering system, the idle system, the power enrichment system, and the accelerating pump system. These systems are calibrated to supply an efficient mixture of fuel and air during all phases of engine operation. In addition to those basic systems, there is a secondary system. This system increases the capacity of the carburetor to meet increases in the engine's fuel air-requirements.

There are two additional systems, the fuel inlet system and the automatic choke system. The fuel inlet system provides the fuel metering systems with a constant supply of fuel at constant head. The choke system automatically provides a means of enriching the fuel-air mixture temporarily to aid in starting and running a cold engine.

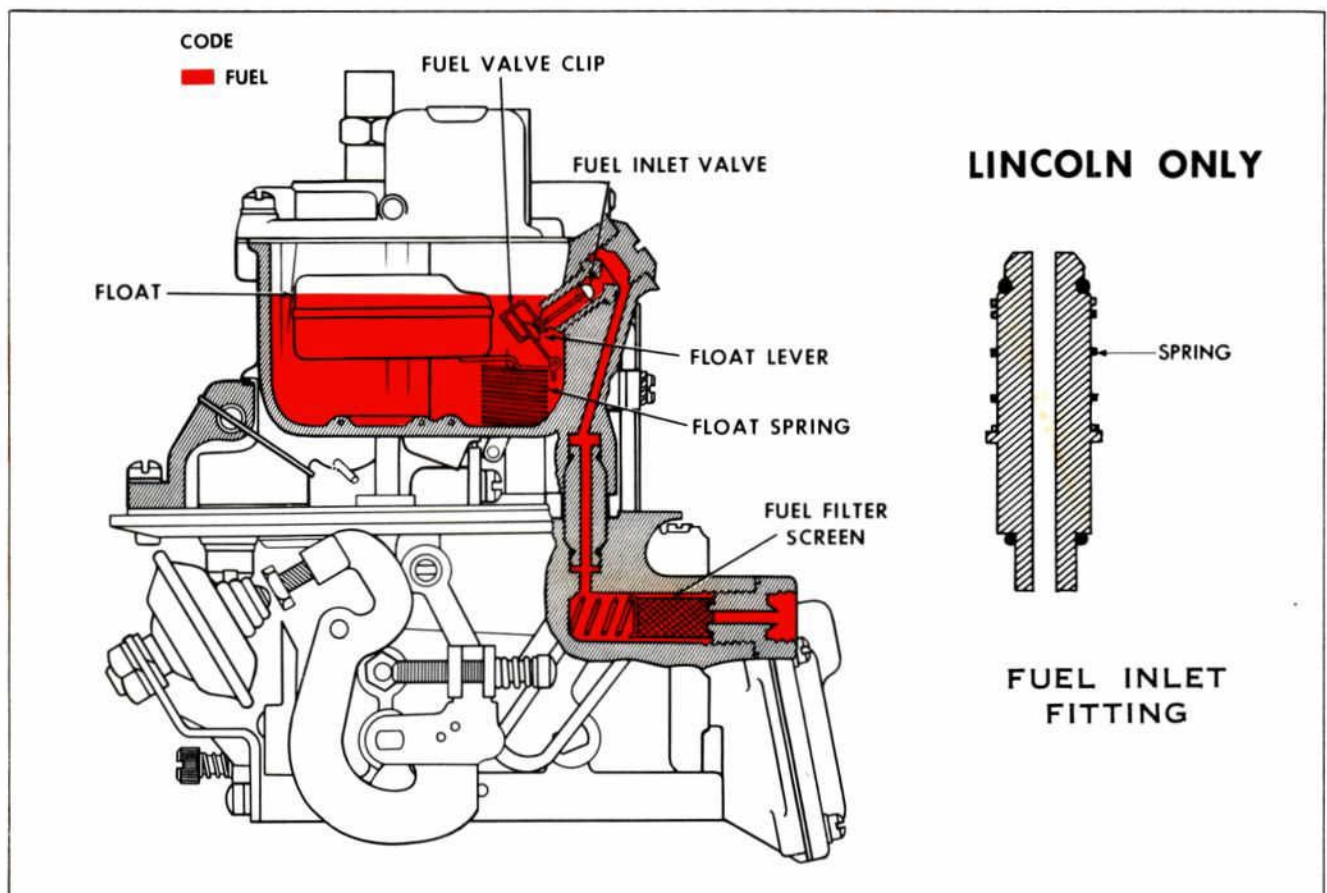
A thorough and detailed explanation of the various fuel metering systems will be found in

the 1955 Service Manual (Form No. C-228). A complete explanation of the various systems, therefore, will not be given in this supplement. To avoid duplication, only the points of difference between the 1955 and 1956 applications will be discussed in detail.

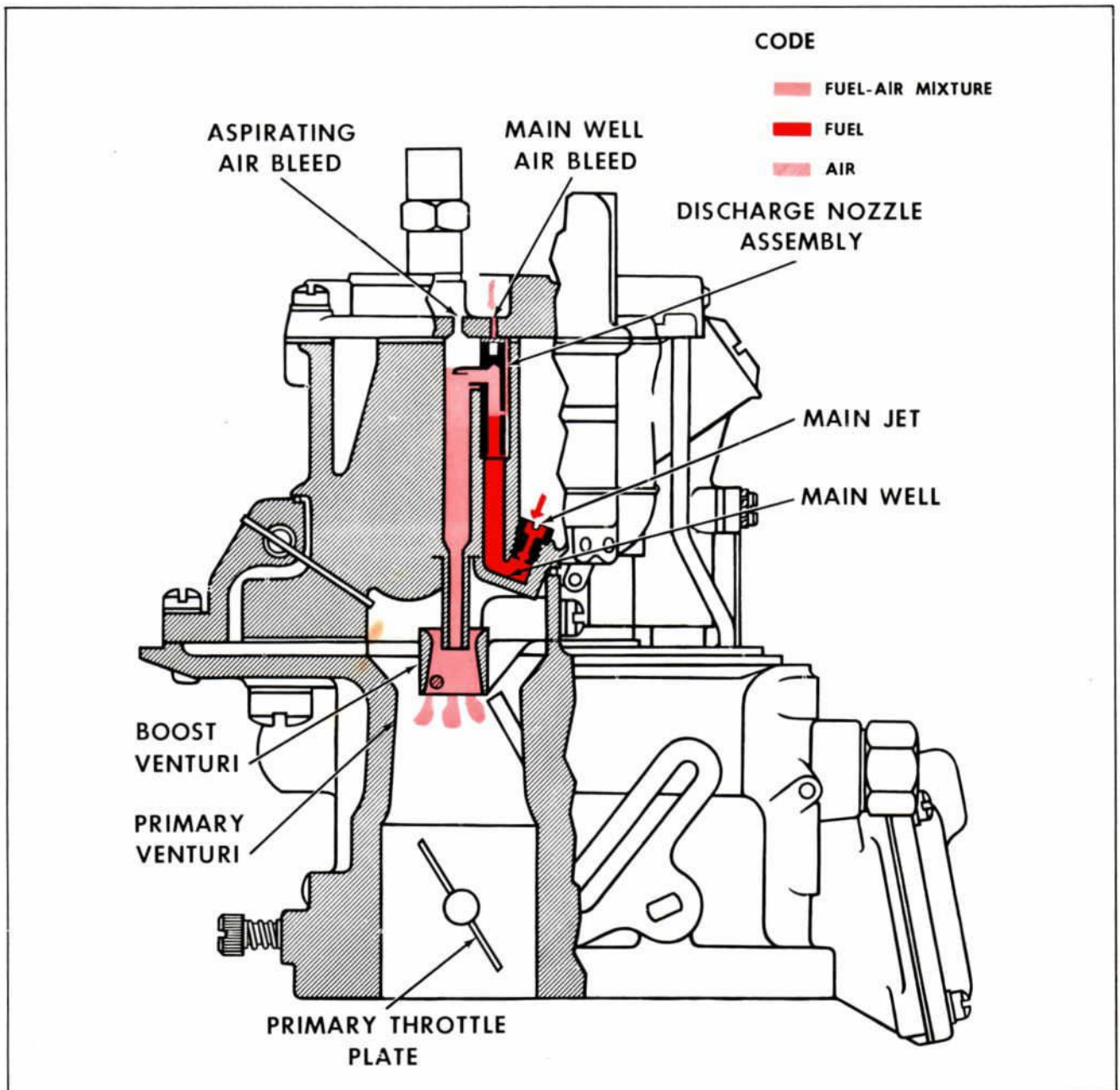
1. FUEL INLET SYSTEM

The fuel inlet system remains basically unchanged. The only difference is the introduction of the new ball point needle valve. This ball point valve gives a more positive means of maintaining the proper fuel level in the float chamber.

The action of the float and the fuel inlet valve must maintain the proper level, as the four basic metering systems are calibrated to deliver the proper mixture to the engine only when the fuel is at that level.



FUEL INLET SYSTEM

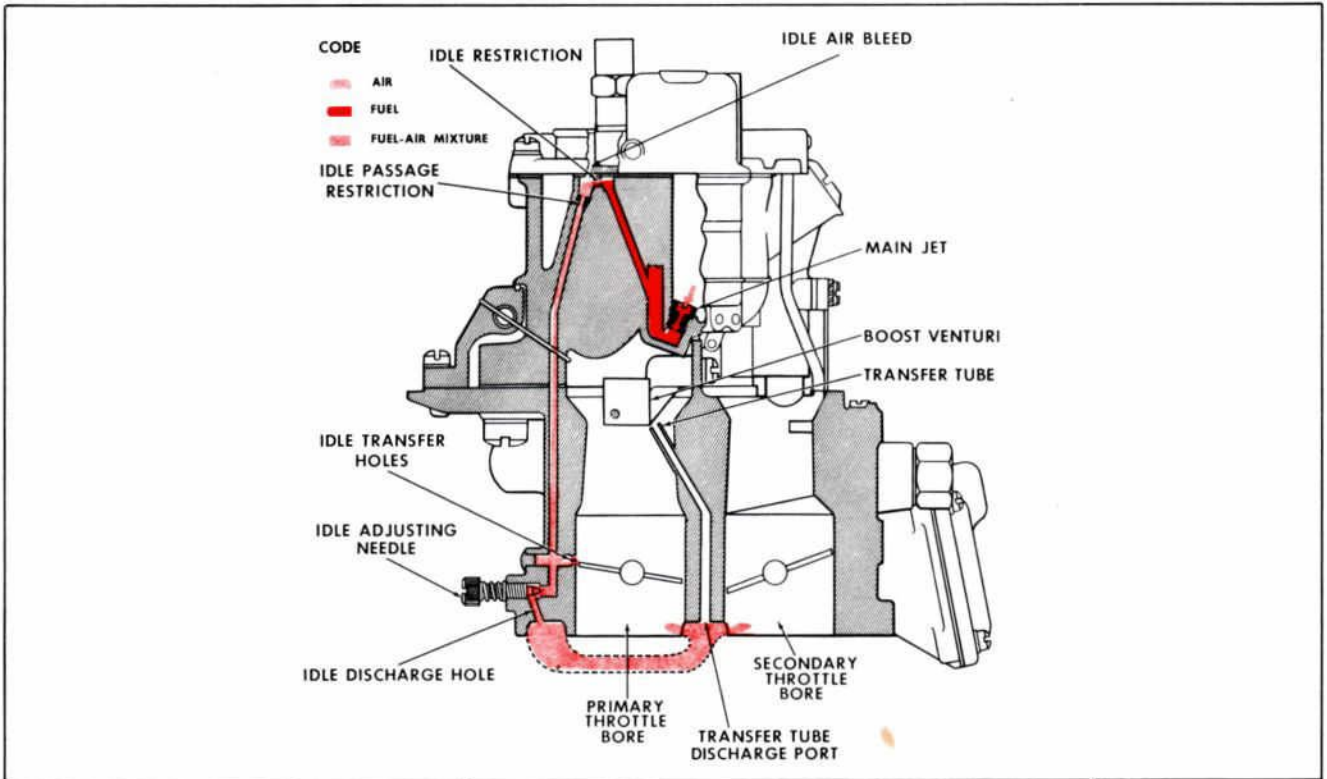


MAIN METERING SYSTEM

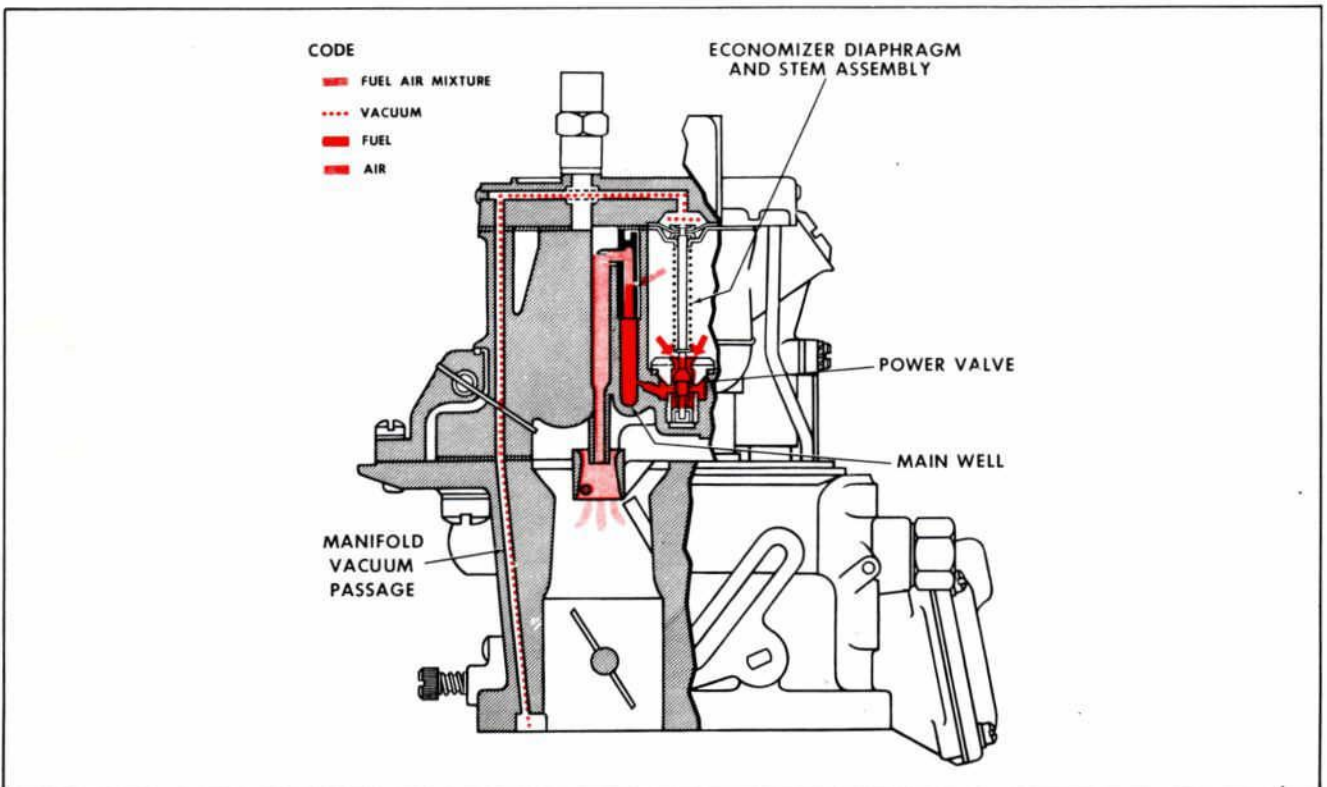
2. MAIN METERING SYSTEM

The main metering system remains basically the same. The fuel for this system now flows up the newly-designed discharge nozzle assembly, while air from the main well bleed passes down outside the tube. The air passes through two calibrated passages in the back wall of the discharge nozzle assembly, mixing with

the fuel flow at this point. A short horizontal nozzle discharges fuel into the vertical passage leading downward to the main discharge nozzle in each "boost" venturi. Below each "boost" venturi a transfer tube has been installed. This transfer tube collects any fuel droplets that may accumulate on the venturi surfaces during the transition period as the main metering system begins to supply fuel.



IDLE SYSTEM



POWER ENRICHMENT SYSTEM

3. IDLE SYSTEM

The idle system remains basically unchanged. The main difference is the eliminating of the removable idle tubes. Their functions have been taken over by the calibrated horizontal permanent restrictions at the top of the idle fuel passages in the main body.

4. POWER ENRICHMENT SYSTEM

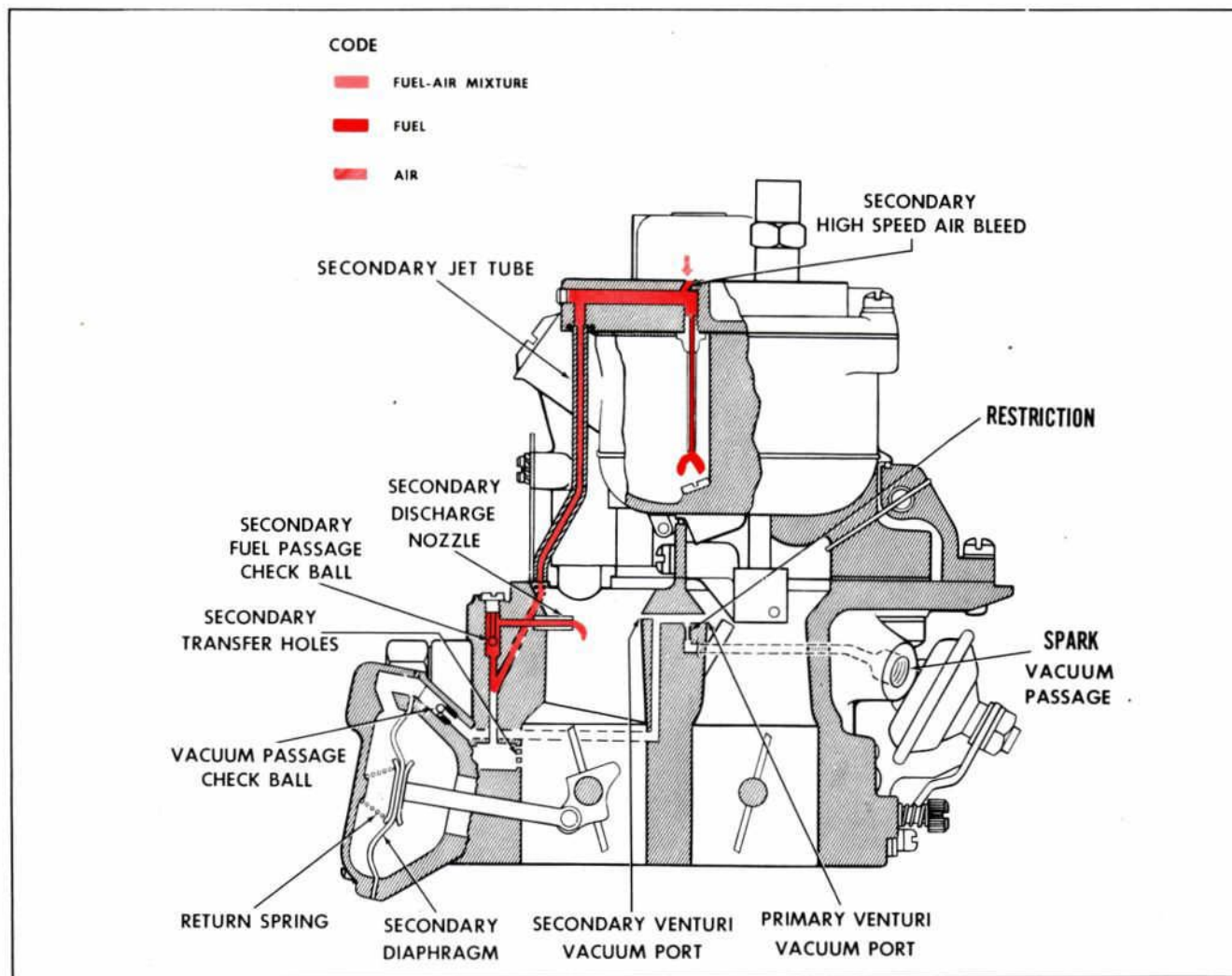
The power enrichment system has not been changed. This system furnishes the enriched mixture needed for efficient performance during high power operation. Manifold vacuum, which is strongest at the idle, decreases as the load on the engine is increased. The power enrichment system is operated by this decreased manifold vacuum. If there is a strong manifold vacuum, it

acts on the economizer diaphragm to keep the power valve closed. When manifold vacuum is reduced below a certain point, the power valve is opened, enriching the mixture.

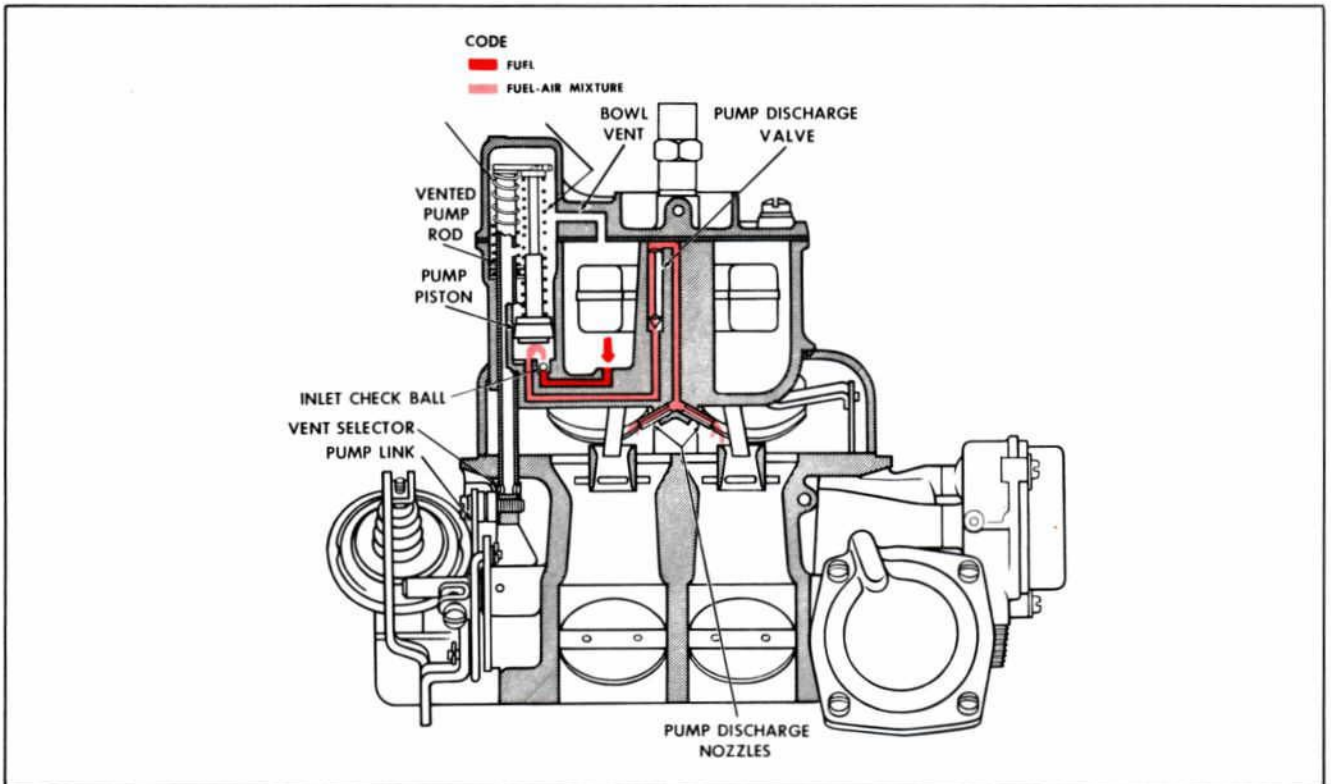
The secondary metering system is controlled by the secondary throttle plate position. That, in turn, is controlled by combination of primary and secondary venturi vacuum.

5. SECONDARY SYSTEM

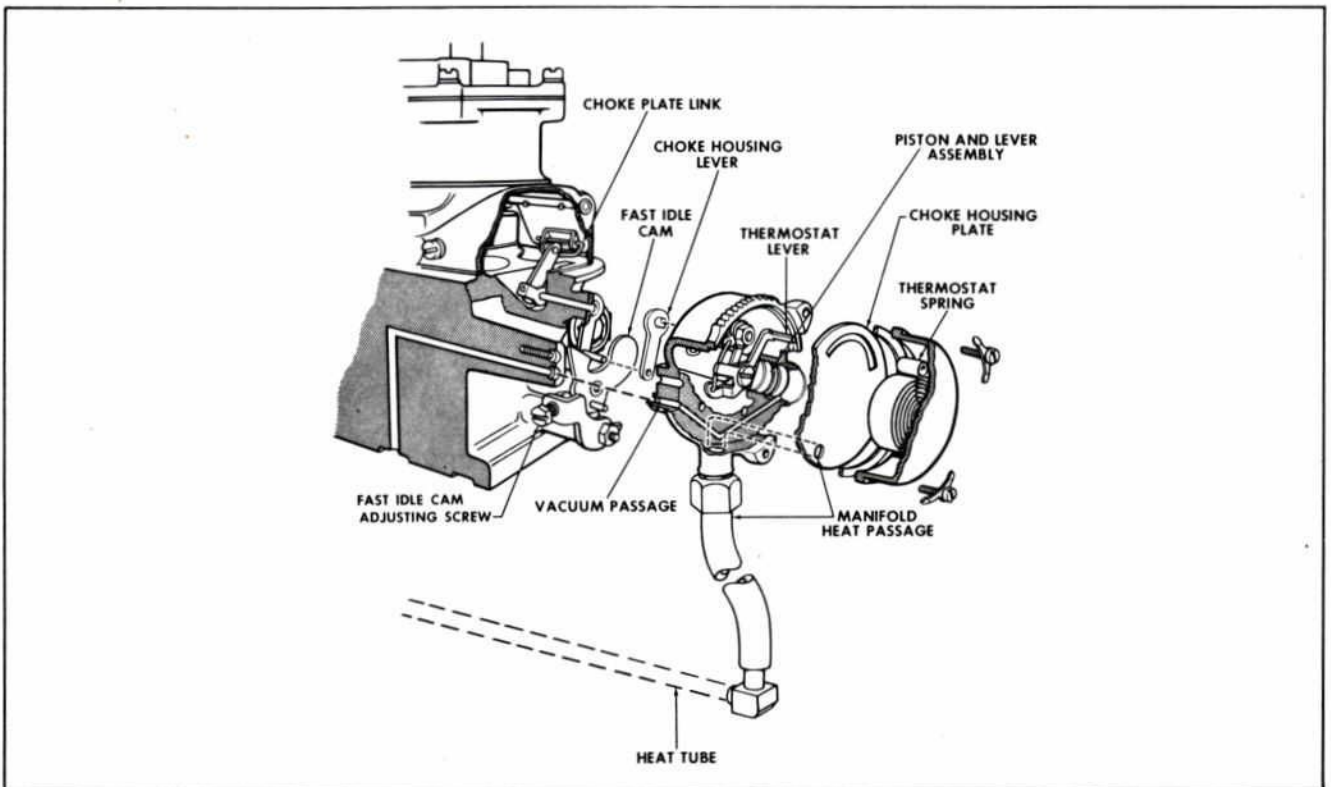
The secondary system remains the same. The secondary throttle plates of this model carburetor are controlled by a vacuum operated diaphragm. At high speed and power conditions the pressure differential acting on the diaphragm will open the secondary throttle plates, while at idle and lower speeds, the plates are closed.



SECONDARY SYSTEM



ACCELERATING PUMP SYSTEM



CHOKE SYSTEM



6. ACCELERATING PUMP SYSTEM

The accelerating pump system remains unchanged. It supplies an initial charge of raw fuel when the throttle opening is increased. This charge of raw fuel prevents the power lag. The accelerating pump is linked to the primary throttle lever and is actuated by it. Fuel enters the pump chamber from the float chamber when the throttle is closed. When the throttle is opened, this charge of fuel is pumped into the airstream passing through the primary bores of the carburetor.

7. AUTOMATIC CHOKE

The 1956 Model 4000 Carburetor is equipped with an automatic choke which is an integral part of the carburetor.

The automatic choke supplies the richer fuel-air mixture required for starting and operating a cold engine. Most of the vaporized fuel from the carburetor condenses to a liquid upon contact with the cold surfaces of the intake manifold. This fuel in liquid form burns too slowly and incompletely, causing loss of power and stalling. The automatic choke enriches enough vaporized fuel so that it reaches the cylinders permitting the engine to run smoothly during the warm-up period.

The automatic choke which is mounted on the throttle body is linked to the choke plates through the choke mechanism. Two offset choke plates at the entrance of the air horn control the airflow into the primary barrels. Since the secondary barrels remain closed at the lower speeds where choking is necessary during engine warm-up, no method of choking the secondary barrels is required.

The bi-metallic thermostat spring in the choke control mechanism will expand when cold, loosening and unwinding its coils. When warm, it will contract, winding the coils tighter. When the engine is cold, the thermostat spring expands, holding the choke plates in the closed position. When the engine is started or at idle, manifold vacuum is not sufficiently strong to open the choke plates, but the impact of air against the choke plates partially opens the plates and prevents stalling. The choke shaft does not pass through the center of the choke plates. Instead, it is offset, thus exposing a much larger area at one side of the closed choke plates to onrushing air. It is this offset feature which also enables

manifold vacuum to move the choke plates toward the open position. Manifold vacuum channeled through a passage in the choke control mechanism acts to draw the choke vacuum piston downward, thus exerting another opening force upon the choke plates. These two features allow enough air to enter the engine to enable it to run smoothly. As the engine continues to run, the vacuum acting on the choke vacuum piston draws filtered air from the carburetor through the heat tube in the intake manifold where the air is warmed by the engine heat, and then through the thermostat housing where the air warms the thermostat spring, causing it to contract. This gradually decreases the tension of the thermostat spring as manifold temperature rises, permitting the vacuum acting on the choke vacuum piston to further open the choke plate. The air then flows through the manifold vacuum passage and is exhausted into the air stream in the intake manifold.

When the engine reaches its normal operating temperature, the thermostat spring no longer exerts an opposing tension on the choke vacuum piston, allowing the vacuum piston to pull the choke plates to the full open position.

In the full open position the vacuum piston is in its lowest position in the cylinder. Slots in the cylinder wall permit sufficient air to bleed past the piston and into the intake manifold to allow a continual flow of warm air to pass through the thermostat housing. This keeps the thermostat spring warm and the choke plates fully open until the engine is shut down and allowed to cool.

During the warm-up period, the air flow past the partially opened offset choke plates acts upon the plates in much the same manner as manifold vacuum does upon starting. As air flow increases with increased engine speed, the engine requires less choking and the force of the increased air flow holds the choke plates closer to the open position. The offset choke plates, vacuum piston, and thermostat spring are engineered to provide the correct degree of choking for all conditions of engine speed, power output, and temperature.

The choke lever at the carburetor actuates a fast idle cam during choking. Designed to increase the idle rpm for smoother running when the engine is cold, the fast idle cam has a series of steps in one edge. As the choke lever is moved through its range of travel from the closed position to the open position, the fast idle cam rotates, presenting successive steps to a throttle

stop screw. Each step permits a slower idle rpm as engine temperature rises and choking is reduced.

If the engine should approach a stall at any time during the warm-up period, manifold vacuum will become less. The tension of the thermostat spring then overcomes the reduced force acting on the vacuum piston and the choke plates will be moved toward the closed position, providing a richer mixture to allow the engine to recover and run smoothly again.

8. DISTRIBUTOR VACUUM PASSAGES

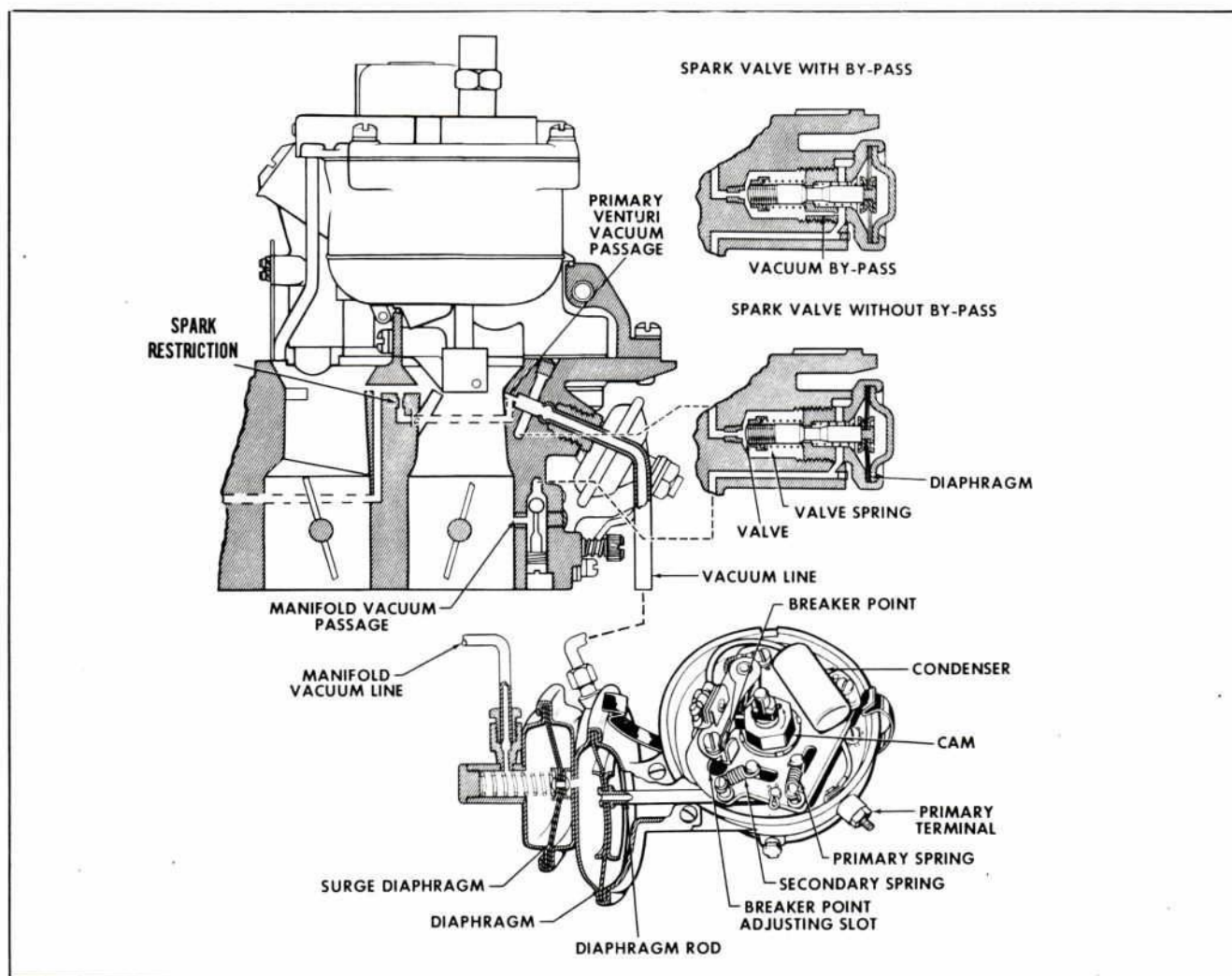
There has been no change in the distributor vacuum passages. The interconnected passages within the carburetor transmit the venturi vacuum which controls the spark valve diaphragm,

which in turn controls the amount of manifold vacuum entering the tube to the distributor diaphragm chamber. The spark control valve provides an efficient degree of spark advance during periods of acceleration.

Both single and double-diaphragm distributors are used on the 1956 applications of this carburetor.

9. THE DASHPOT

The dashpot remains unchanged. The dashpot is used with all automatic transmissions and power brakes vehicles. The dashpot is an anti-stall device, it prevents the engine being loaded when the accelerator pedal is depressed suddenly and then released.



SPARK CONTROL VALVE

OVERHAUL

1. INTRODUCTION

Follow the recommendations and overhaul procedures given in the 1955 Service Manual (Form No. C-228). This Supplement will list all exceptions to those procedures.

2. SPECIAL TOOLS

See the list of recommended tools in the 1955 Service Manual.

3. MASTER REPAIR KITS

Refer to the Holley Carburetor Parts Catalog for the carburetor being overhauled.

4. DISASSEMBLY

A. PREPARATION

Follow the recommendations contained in the 1955 Service Manual.

B. DISASSEMBLY - THREE MAJOR SUBASSEMBLIES

The following list contains all parts removed in separating the main body, the air horn, and the throttle body. During disassembly discard all gaskets, also all parts which have replacements in the Master Repair Kit.

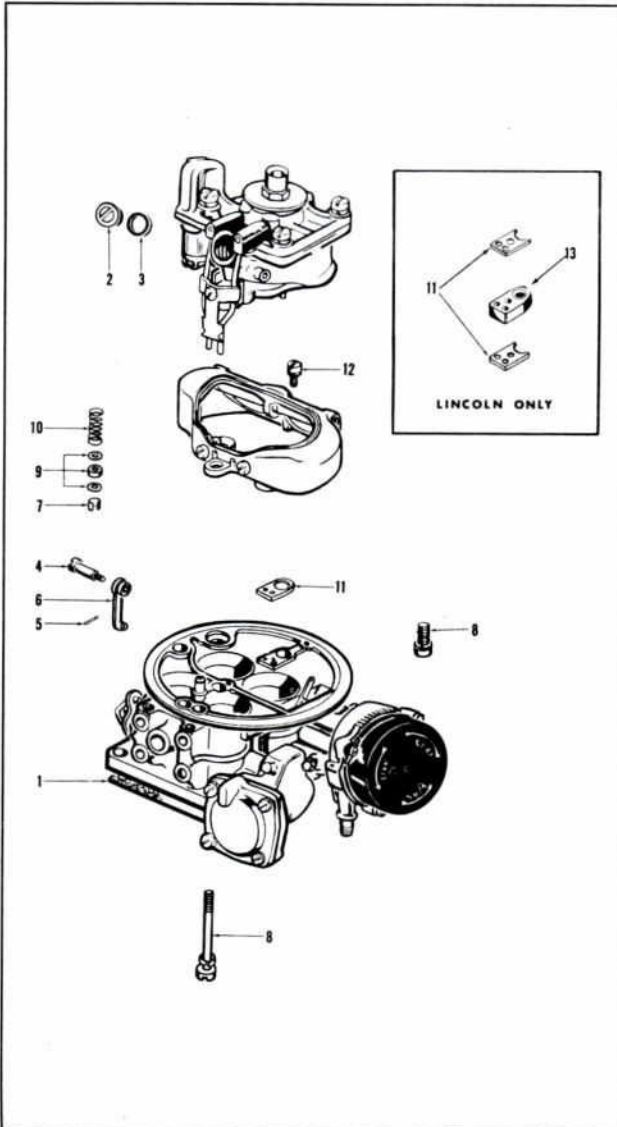


Figure 1. Disassembly - Three Major Subassemblies

ORDER OF REMOVAL	PART NAME
1	Flange gasket
2	Fuel inlet plug
3	Fuel inlet plug gasket
4	Pump link stud
5	Pump link retainer
6	Pump link assembly
7	Bowl vent selector
8	Throttle body to main body screws and lockwashers (2)
9	Accelerating pump rod felt seal and (2) washers
10	Accelerating pump rod spring
11	Throttle body to main body gaskets (2)
12	Air horn to throttle body screw and lockwasher
13	Main body to throttle body spacer

Follow the procedure given in the 1955 Service Manual for the disassembly of the three major subassemblies with the following addition:

a. Step 8 is revised as follows: Disengage the choke plate link from the choke shaft assembly. Lift the air horn assembly off the throttle body assembly.

b. Remove the main body to throttle body spacer and two gaskets. Discard the washers. (Lincoln only.)

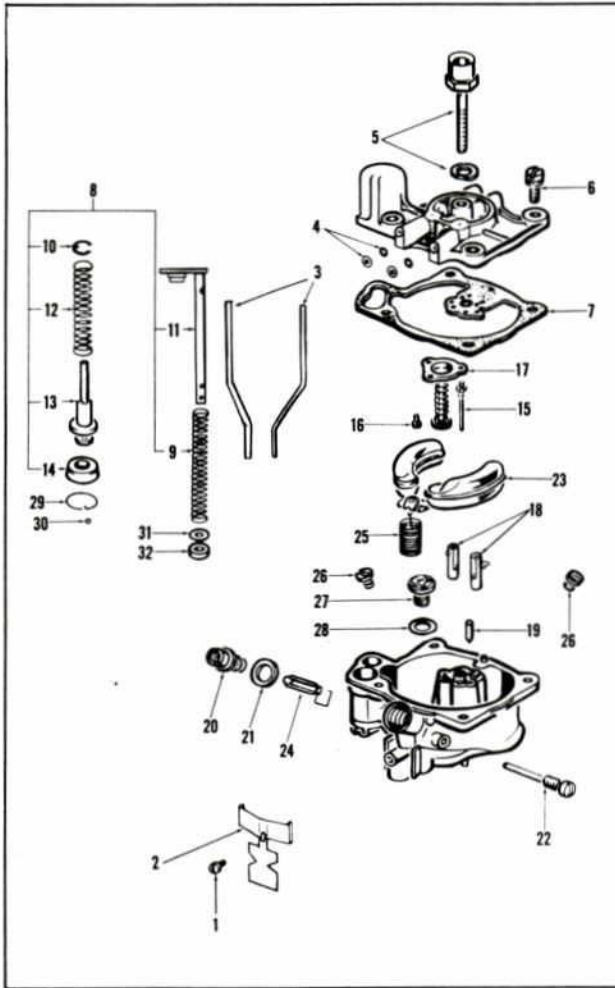


Figure 2. Disassembly - Main Body Assembly

C. DISASSEMBLY - MAIN BODY ASSEMBLY

The following list contains all the parts of the main body assembly in order of their removal. During disassembly discard all gaskets, also all parts which have replacements in the Master Repair Kit.

ORDER OF REMOVAL	PART NAME
1	Secondary connecting tube bracket screw and washer
2	Secondary connecting tube bracket
3	Secondary connecting tubes (2)
4	Secondary connecting tube seal washers and seals (2)
5	Air cleaner screw and lockwasher

ORDER OF REMOVAL	PART NAME
6	Main body cover screws and lockwashers (4)
7	Main body cover gasket
8	Accelerating pump assembly
9	Accelerating pump return spring
10	Accelerating pump rod retainer
11	Accelerating pump rod
12	Accelerating pump spring
13	Accelerating pump piston assembly
14	Accelerating pump piston cup
15	Secondary jet assembly (2)
16	Economizer screw and lockwasher
17	Economizer diaphragm and stem assembly
18	Discharge nozzle assembly (2)
19	Pump discharge needle valve
20	Fuel inlet seat
21	Fuel inlet seat gasket
22	Float shaft
23	Float assembly
24	Fuel inlet valve
25	Float spring
26	Main jets (2)
27	Power valve assembly
28	Power valve gasket
29	Pump check valve retainer spring
30	Pump check valve ball
31	Pump rod lubricating ring washer
32	Pump rod lubricating ring

Follow the procedure given in the 1955 Service Manual for the disassembly of the main body assembly with the following variations:

a. Step 3 is revised as follows: Remove air cleaner anchor screw and lockwasher.

b. Omit Step 4.

c. Step 7 is revised as follows: Depress the pump piston and spring assembly and remove the pump piston retainer. Slide the pump piston and spring assembly out of the accelerating rod. Remove the spring from the pump piston assembly. Remove and discard the pump piston cup.

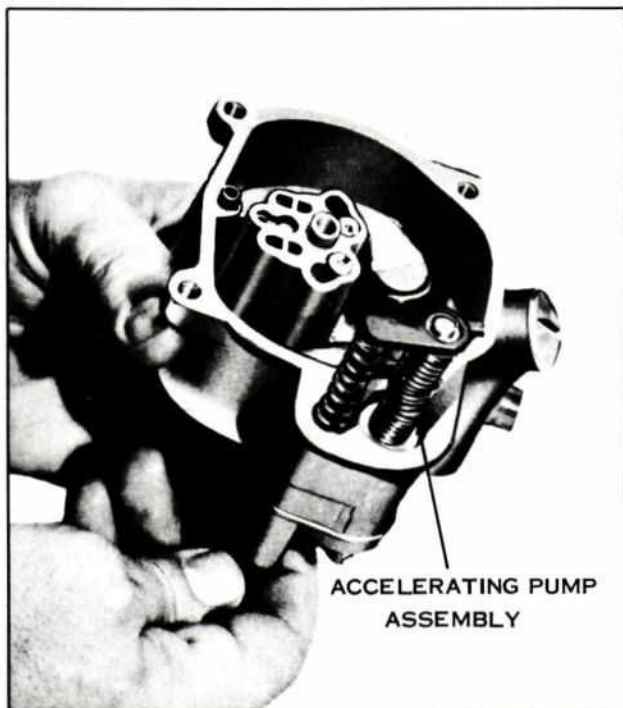


Figure 3. Removing Accelerating Pump Assembly

d. Omit Step 9.

e. Step 10 is revised as follows: tilt the main body and remove the two discharge nozzle assemblies and the pump discharge needle valve.

f. Complete the disassembly of the main body assembly.

D. DISASSEMBLY - AIR HORN ASSEMBLY

The following list contains all parts to be removed from the air horn assembly in the order of removal. During disassembly discard all gaskets, also all parts which have replacements in the Master Repair Kit.

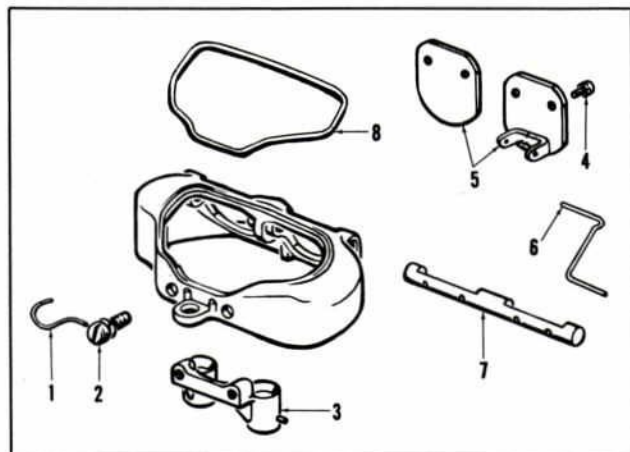


Figure 4. Disassembly - Air Horn Assembly

ORDER OF REMOVAL	PART NAME
1	Lock wire
2	Secondary venturi screws and washers (2)
3	Secondary venturi assembly
4	Choke plate screws and washers (4)
5	Choke plates
6	Choke plate link (Lincoln only)
7	Choke shaft
8	Air horn seal

Follow the procedure given in the 1955 Service Manual for the disassembly of the air horn assembly with the following variations:

a. Omit note after Step 3.

b. After Step 3 is completed, slide the choke plate link out of the left hand choke plate. (Lincoln only.)

c. Remove and discard the air horn seal.

E. DISASSEMBLY - THROTTLE BODY ASSEMBLY

The following list contains all parts to be removed from the throttle body assembly in the

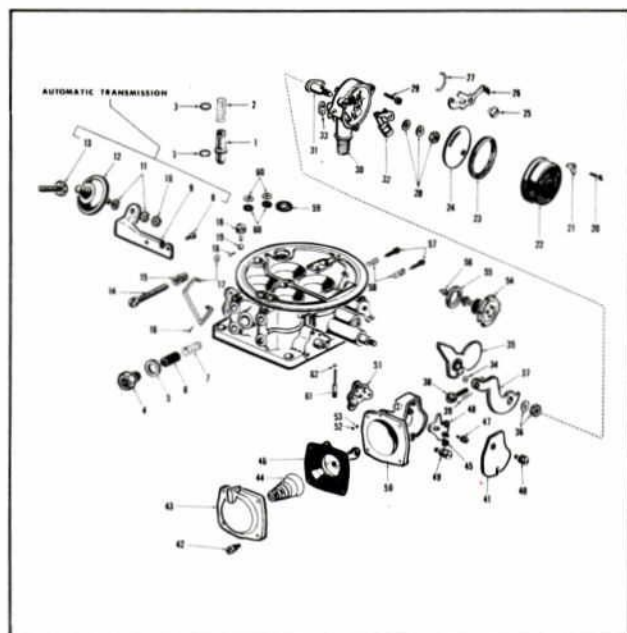


Figure 5. Disassembly - Throttle Body Assembly

order of their removal. During disassembly discard all gaskets, also all parts which have replacements in the Master Repair Kit.

ORDER OF REMOVAL	PART NAME
1	Fuel inlet fitting
2	Fuel inlet fitting spring (Lincoln only)
3	Fuel inlet fitting "O" rings (2)
4	Fuel inlet fitting
5	Fuel inlet fitting gasket
6	Filter screen assembly
7	Filter screen retainer spring
8	Dashpot bracket screws and lockwashers (2)
9	Dashpot bracket
10	Dashpot locknut
11	Dashpot washers (2)
12	Dashpot
13	Dashpot lever adjusting screw
14	Throttle stop screw
15	Throttle stop screw spring
16	Secondary throttle connecting rod cotter pins (2)
17	Secondary throttle connecting rod and washer
18	Secondary check ball retainers (2)
19	Secondary check balls (2)

Automatic
Trans-
mission

ORDER OF REMOVAL	PART NAME
20	Thermostat housing screws (3)
21	Thermostat housing clamps (3)
22	Thermostat housing assembly
23	Thermostat housing gasket
24	Choke housing plate cover
25	Choke thermostat lever stud
26	Choke thermostat lever
27	Choke thermostat lever link
28	Choke shaft nut and washers
29	Choke housing to throttle body screws and lockwashers (3)
30	Choke housing
31	Choke housing lever assembly
32	Choke piston and lever assembly
33	Choke housing to throttle body gasket
34	Fast idle cam bearing
35	Fast idle cam
36	Throttle lever nut and lockwasher
37	Throttle lever (cam)
38	Throttle lever (cam) adjusting screw
39	Throttle lever (cam) adjusting screw spring
40	Diaphragm housing cover screw and lockwasher
41	Diaphragm housing cover
42	Diaphragm cover screws and washers (4)
43	Diaphragm cover
44	Diaphragm spring
45	Diaphragm link retainer
46	Diaphragm assembly
47	Diaphragm lever screw and lockwasher
48	Diaphragm lever
49	Diaphragm housing screws and lockwashers (3)
50	Diaphragm housing
51	Diaphragm housing gasket
52	Diaphragm ball retainer
53	Diaphragm ball check valve
54	Spark valve
55	Spark valve gasket
56	Spark valve restriction
57	Idle adjusting needles (2)
58	Idle adjusting needle springs (2)
59	Air tube grommet
60	Secondary jet tube washers and seals (2)
61	Distributor check valve retainer
62	Distributor check valve

Lincoln
only

The disassembly of the throttle body differs from the procedure given in the 1955 Service Manual.

1. Lift the fuel inlet fitting out of the throttle body, remove and discard the two "O" rings. NOTE: The Lincoln carburetor has a fuel inlet fitting spring.

2. Using a box-end wrench, remove the fuel inlet fitting, fuel inlet fitting gasket, filter screen assembly and the filter screen retainer spring. Discard the gasket.

3. Remove the two dashpot bracket screws and washers.

4. Disassemble the dashpot assembly. Remove the dashpot locknut and two washers and separate from the dashpot bracket.

5. Remove the dashpot lever adjusting screw and the throttle stop screw and spring from the spring throttle lever assembly.

6. Remove the two secondary throttle connecting rod cotter pins. Remove the secondary throttle connecting rod and washer.

7. Remove the two secondary check ball retainers and check balls.

8. Remove the three thermostat housing screws and clamps.

9. Remove the thermostat housing assembly and gasket. Discard the gasket. Remove the choke plate cover.

10. Remove the choke thermostat lever stud, lever and link.

11. Remove the choke shaft nut and two washers.

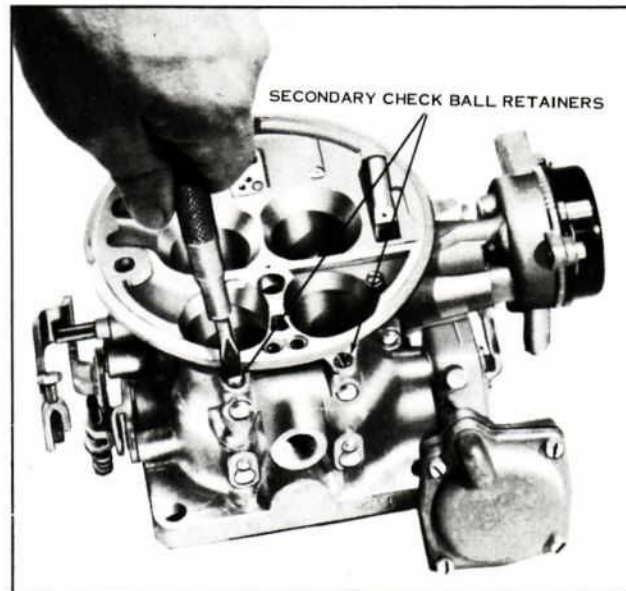


Figure 6. Removing Secondary Check Ball Retainers

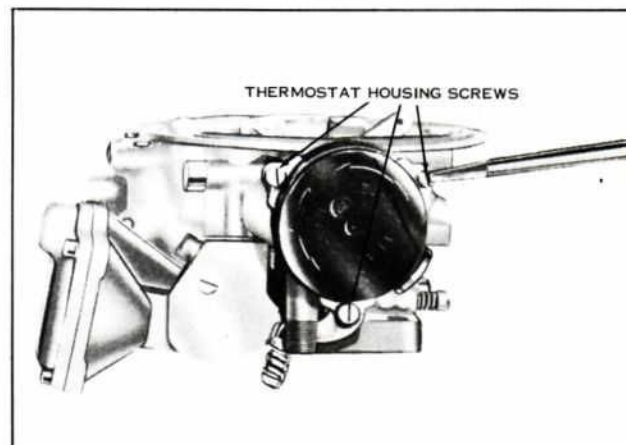


Figure 7. Removing Thermostat Housing Screws

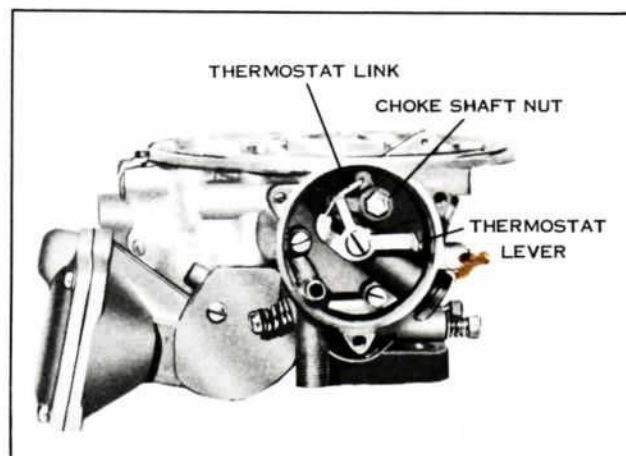


Figure 8. Choke Housing Interior

12. Remove the three choke housing to throttle body screws and lockwashers and remove the choke housing from the throttle body.

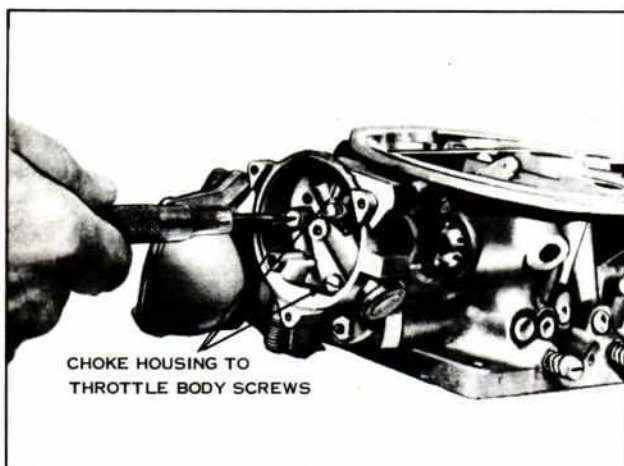


Figure 9. Removing Choke Housing to Throttle Body Screw

13. Disassemble the choke housing. Remove the choke housing lever assembly, the choke piston and lever assembly and choke housing to throttle body gasket. Discard the gasket.

14. Slide the fast idle cam off the fast idle cam stud. Lift the fast idle cam off the throttle body.

15. Remove the throttle lever (cam) nut and lockwasher. Slide the throttle lever (cam) off the throttle shaft. Remove the throttle lever (cam) adjusting screw and spring from the throttle lever (cam).

16. Remove the diaphragm housing screw and lockwasher. Lift off the diaphragm housing cover.

17. Remove the four diaphragm cover screws and washers. Remove the diaphragm cover and diaphragm spring.

18. Remove the diaphragm link retainer. Slide the diaphragm assembly out of the housing.

19. Remove the diaphragm lever screw and lockwasher. Slide the diaphragm lever off the throttle shaft.

20. Remove the three diaphragm housing screws and lockwashers. Remove the diaphragm housing from the throttle body. Remove and discard the diaphragm housing gasket.

21. Remove the diaphragm ball retainer and ball check valve from the diaphragm housing.

22. Remove the spark valve, spark valve gasket and restriction from the throttle body. Discard the gasket.

NOTE

It is not necessary to remove the choke shaft assembly, unless damaged.

23. Remove the two idle adjusting needles and springs.

24. Remove and discard the air tube grommet.

25. Remove and discard the two secondary jet tube washers and seals.

26. Remove the distributor check valve retainer and the distributor check valve. (Lincoln only.)

5. CLEANING AND INSPECTION

A. CLEANING

Adhere to the instructions and procedures given in the 1955 Service Manual. Note that parts such as the diaphragm assembly and the dashpot should never be exposed to the cleaning solvent. Most commercial solvents will deteriorate these parts. Care must be taken never to use compressed air near the diaphragm.

B. INSPECTION

Inspect all parts as described in the 1955 Service Manual. In addition, check all parts in the automatic choke. Examine all linkage and dashpot for freedom of movement.

6. REBUILDING

A. REASSEMBLY - THROTTLE BODY ASSEMBLY

1. Install the distributor check ball and retainer. (Lincoln only.)

2. Install the two new secondary jet seals and washers.

3. Install the new air tube grommet.

4. Install the two idle adjusting needles and springs. Turn the needles in with the fingers until they seat, then back off two turns.

5. Install the choke shaft assembly, if removed during disassembly.

6. Install the spark valve restriction, new spark valve gasket and spark valve.

7. Install the diaphragm ball check valve and retainer, in the diaphragm housing.

8. Place the diaphragm housing in position on the throttle body using a new gasket. Install the three diaphragm to throttle body screws and washers.

9. Place the diaphragm lever in position and install the lever screw and lockwasher.

10. Slide the diaphragm assembly into the diaphragm housing. Place the diaphragm link on the link pin of the diaphragm lever and secure it with the diaphragm link retainer.

11. Position the diaphragm spring, with the wide end of the spring against the metal disc on the diaphragm. Insert the four cover screws and washers in the diaphragm cover. Align the screws with the holes in the diaphragm housing, and install the cover. Do not tighten the screws until a check has been made of the alignment of the diaphragm. If the installation has been correctly made, the secondary throttle plates will be held in the fully closed position by the diaphragm spring.

12. Install the diaphragm housing cover with the diaphragm housing cover screw and lockwasher.

13. Install the fast idle cam and place the fast idle cam bearing on the fast idle cam pin.

14. Slide the throttle lever (cam) on the throttle shaft and install the throttle lever (cam) lockwasher and nut. Install the throttle lever (cam) adjusting screw and spring on the throttle lever.

15. Reassemble the automatic choke. Slide the choke piston and lever assembly into its chamber. Insert the choke housing lever into the choke housing.

16. Place the choke housing in position using a new gasket, on the throttle body. Insert the three choke housing to throttle body screws and lockwashers. Make sure the choke housing lever hole is in position on the choke shaft assembly pin.

17. Place the choke piston and lever on the choke housing shaft and install the two shaft washers and the choke shaft nut.

18. Install the thermostat lever and link in position with one end of the link in the thermostat lever and the other end in the choke piston assembly. Install the thermostat lever stud.

19. Install the choke plate cover. Install the new housing gasket and install the thermostat housing assembly. The loop end of the thermostat spring is to be placed over the lever protruding through the choke plate cover. Install the three screws and clamps.

NOTE

Align the index mark on the rim of the thermostat with the large center indicator on the choke housing.

20. Install the two secondary check balls and their retainers.

21. Install the secondary throttle connecting rod. Place one end in the groove of the secondary throttle lever, secure with the washer and cotter pin. Insert the other end in the first hole of the primary throttle lever and secure with a cotter pin.

22. Install the throttle stop screws and spring also the dashpot lever adjusting screw in the throttle lever.

23. Reassemble the dashpot. Place one washer on the dashpot and then place the dashpot on the dashpot bracket. Install the dashpot washer and locknut on the dashpot.

24. Place the dashpot bracket on the throttle body and install the two screws and lockwashers.

25. Install the filter screw retainer spring, filter screen assembly new fuel inlet fitting gasket and the fuel inlet fitting.



26. Place a new "O" ring in position in the throttle body and insert the fuel inlet fitting with a new "O" ring. With a Lincoln carburetor install a fuel inlet spring on the fitting.

B. REASSEMBLY - AIR HORN ASSEMBLY

The reassembly procedure given in the 1955 Service Manual should be followed with the following variations:

a. Before starting Step 1, cement a new air horn seal to the groove in the top of the air horn.

b. After completing Step 1, insert the choke plate link into the swivel of the choke plate.

c. Complete the reassembly of the air horn assembly.

C. REASSEMBLY - MAIN BODY ASSEMBLY

The reassembly procedure given in the 1955 Service Manual should be followed with the following variations:

a. Omit Step 8.

b. Step 9 is revised as follows: Insert the discharge nozzles in position in the main body. Install the pump discharge needle. To insure proper seating of the needle, place a brass rod on top of the needle and tap gently a few times with a fiber mallet. Be sure the needle is

free in its chamber after this operation has been completed.

c. Step 10 is revised as follows: Reassemble the accelerating pump assembly. Place the new pump piston cup on the pump piston. Place the accelerating pump spring on the pump piston, compress the spring and insert the end of the pump piston into the pump operating rod. Install the pump rod retainer on the pump piston. Slide the pump return spring over the pump operating rod.

d. Omit Step 15 and Step 16.

e. Step 17 is revised as follows: Install the air cleaner anchor screw and lockwasher.

D. REASSEMBLY - THREE MAJOR SUBASSEMBLIES

The reassembly procedure given in the 1955 Service Manual should be followed with the following variations:

a. Step 1 is revised as follows: Place the two new main body to throttle body gaskets and the main body to throttle body spacer in position. (Lincoln only.)

b. Step 3 is revised as follows: Place the choke link in position in the choke shaft assembly.

c. Complete the reassembly of the three major subassemblies.

INSTALLATION

1. PREPARATION

Check the carburetor as described in the 1955 Service Manual.

2. INSTALLATION ON VEHICLE

Follow the installation procedure given in the 1955 Service Manual.

3. ADJUSTMENTS

Follow the adjustments procedures given in the 1955 Service Manual for the idle, the automatic choke, the dashpot and the bowl vent selector.

SERVICE HINTS

Follow the procedure given in the 1955 Service Manual.

TROUBLE SHOOTING CHART

Use the trouble shooting chart shown in the 1955 Service Manual (Form No. C-228).



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(1979)