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# MODELS H, HV CARBURETOR SERVICE MANUAL

Delco Rochester

PRICE 25 cents

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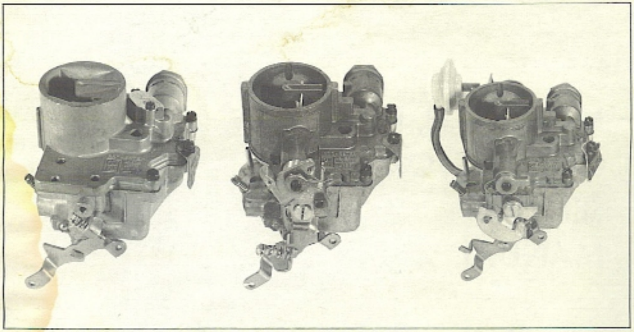
# MODEL H, HV - ROCHESTER CARBURETORS



H – 1960 H – MANUAL CHOKE HV

## GENERAL DESCRIPTION

The Rochester Model H and HV carburetors are used on the Chevrolet Corvair six cylinder opposed air cooled engine. They are used in identical pairs with each carburetor supplying fuel for three of the six cylinders. A common vacuum tube is connected to each intake manifold bank to aid in balancing intake air between the two banks of engine cylinders.

The Model H and HV carburetors are of the single bore downdraft type featuring a dual pontoon float, removable venturi cluster and a unitized aluminum throttle body and float bowl casting. Some models use internal and fixed external float bowl vents while others have internal venting only, plus the addition of an idle vent valve on later units.

The 1960 Model H does not have a choke valve in the air horn. A single automatic choke controlling air and fuel intake through both carburetors is located in the air inlet to the air cleaner. In 1961 manually operated chokes were incorporated in each carburetor air horn controlled by a single control cable leading to a hand control on the dashboard.

Separate automatic chokes were added to each carburetor on 1962 models and continue to be used on present units. The model designation on these units is HV. The "V" means the carburetor has a vacuum diaphragm operated choke control with a choke thermostatic coil mounted beneath the engine on the exhaust manifold. The choke coil is connected to the carburetor choke valve by an adjustable rod.

## SERVICE FEATURES

The Model H and HV carburetors have been kept basically simple for ease in servicing.

The removable venturi cluster provides easy cleaning and inspection of air bleeds, idle tube and main well tube. The unitized aluminum throttle body and float bowl simplifies maintenance and reduces weight. A slotted off-idle port is used to supply fuel in the off-idle range. Radial type fuel discharge nozzles centered in the main venturi provide good fuel metering and atomization during part throttle and power ranges. They are used in place of the conventional boost venturi. An anti-percolation tube is used in the main well to control fuel percolation, caused by engine heat, from entering the main well tubes. The insert helps provide a smooth continuous fuel flow through the radial discharge nozzles.

A replaceable fuel filter is built into the fuel inlet in the carburetor air horn. It can be easily removed for cleaning, inspection or replacement.

## OPERATING SYSTEMS

There are six basic systems used in the Model H and HV carburetors. They are float, idle, main metering, power, pump and choke. The power system is not used in early models. There are several variations in choke systems dependent upon the particular application. The following text describes the operation of these systems for ease in servicing and trouble shooting.

*For specific adjustment procedures and specifications, refer to the "C" section of the parts and service manual.*

### FLOAT SYSTEM—Fig. 1

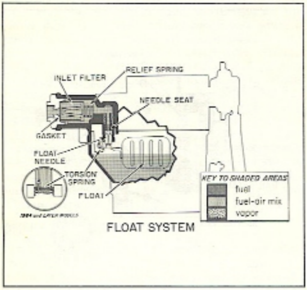



FIGURE 1

The Model H and HV carburetors use the conventional float system to control fuel level in the carburetor float bowl. Fuel level is very important because it must be maintained to give proper carburetor metering throughout all ranges of engine operation. If the fuel level is higher than specified, problems such as rich mixtures, fuel spillage from the main discharge nozzles on turns, and engine loading can result. If the fuel level is lower than specified it can cause lean mixtures, hesitation on acceleration, engine misfire and engine cut-out on heavy acceleration. The float system consists of a dual pontoon float, float needle and seat, fuel inlet filter and a pressure relief spring. The float bowl is designed so that the fuel is centrally located around and as close to the main venturi area as possible. This provides ample fuel at all times for good carburetor metering during all driving conditions.

The float system operates as follows: Fuel from the engine fuel pump first passes through the fuel inlet filter and on through the float needle seat, past the float needle into the carburetor float bowl. Fuel flow continues until the fuel raises the float pontoons to a position where it forces the float needle against the float needle seat and shuts off fuel flow. As fuel is used from the carburetor bowl during engine operation, the float drops downward allowing the float needle to move off its seat which lets more fuel enter the float bowl to keep the fuel level constant. This is a continuing operation as long as the engine demands fuel and the fuel pump supplies fuel to the carburetor.

The float drop tang located at the rear of the float arm next to the needle seat controls the maximum float drop in the float bowl. Sufficient float drop must be maintained to allow maximum fuel flow into the carburetor bowl.

### FLOAT ASSIST SPRING—See inset Fig. 1

The 1964 and later Model HV carburetors use a torsion spring to increase the holding power of the float needle against the float needle seat. The float assist spring was added to maintain a constant fuel level during extreme rough road operation. Changes in the float pontoons and hanger were necessary with the addition of the torsion assist spring. The float torsion assist spring should not be used on earlier models as float settings and float levels differ.

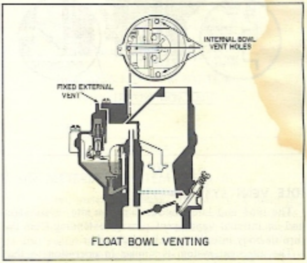



FIGURE 2

### FLOAT BOWL VENTING—Fig. 2

There are several types of venting used on the Model H and HV carburetors dependent upon the model and application.

Both an external and internal vent are used in the early units. The external vent is a fixed orifice on the early models and is located on the top of the air horn. This vents vapors which may form in the fuel bowl to the outside, during periods of hot engine operation. This helps prevent fuel vapors formed in the float bowl from being forced into the engine upsetting idle and starting mixtures.

The internal float bowl vent is located inside the air horn bore just beneath the air cleaner. It is used to balance the air pressure from inside the air horn bore to the air pressure acting on the fuel in the float bowl.

With this feature efficient metering can be maintained at all times because the air pressure causing air to flow through the carburetor venturi is balanced with the air pressure acting on the fuel in the float bowl.

In 1961 and later models the fixed external vent was removed to prevent fuel vapors from entering the engine compartment. With the removal of the external vent, two additional internal float bowl vents were added into the air horn. They were located as shown in inset Figure 2. This improved the internal venting sufficiently to keep fuel vapors from forcing fuel out of the center internal vent, thereby, preventing engine cut out on severe turns.

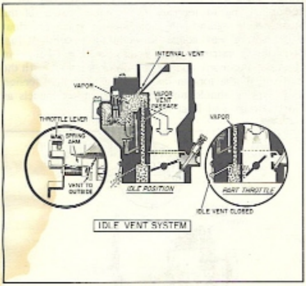



FIGURE 3

## IDLE VENT SYSTEM—Fig. 3

The 1964 and later models have an idle vent system and an internal vapor vent passage extending from the throttle body into the float bowl chamber.

The idle vent system is similar in operation to that used on other Rochester carburetor models. The idle vent valve is located next to the throttle valve at the base of the carburetor. The vent valve seats on a passage which leads from a point in the carburetor bore just above the throttle valve to an external bleed hole at the side of the throttle body casting. The vent valve has a spring arm and is operated by a tang on the throttle lever. The vent valve is normally closed except when the throttle is in the engine idle position. In the idle position, the vent valve is held open to vent any fuel vapors out of the carburetor bore during periods of hot engine idle or hot soak. This feature improves hot engine idle and hot restart.

The float bowl vapor vent passage which was added to improve float bowl venting leads from the idle vent vapor vent hole up through the throttle body and float bowl casting to a point in the float bowl chamber just beneath the air horn casting. The bowl vent passage vents vapors from above the fuel in the float bowl to the outside through the idle vent holes during periods of hot engine idle and "hot soak". During part throttle and power operation when the idle vent valve is closed, the vapors formed in the float bowl are removed through the vapor vent passage and drawn through the hole into the carburetor bores located just above the throttle valve. Here the vapors pass on into the engine and are burned as a combustible mixture. Removing the vapors from the fuel bowl prevents them from being forced out the internal vents during idle operation. This feature improves hot engine starting and prevents stalling after initial start.

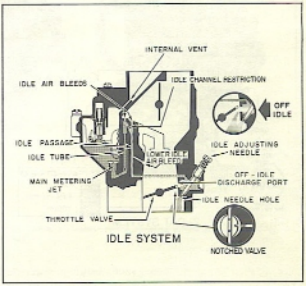



FIGURE 4

## IDLE SYSTEM—Fig. 4

The idle system is an independent system and is used to meter small amounts of fuel during slow engine speeds when engine air and fuel requirements are very low.

The idle system consists of an idle tube, idle passages, idle restriction, idle air bleeds, an off-idle discharge port, idle mixture adjusting needles and the idle discharge hole.

During engine idle operation, air flow through the carburetor venturi is not large enough to meter fuel properly through the main discharge nozzle. Therefore, the idle system is used to provide the proper mixture ratios during engine idling and low speed operation.

## OPERATION

During engine idle, the throttle valve is slightly open, allowing a small amount of air to pass between the carburetor bore and the edge of the throttle valve. Since the air flow is not enough for venturi action, the fuel is made to flow by the application of vacuum directly through the idle system to the fuel in the carburetor bowl.

With the idle needle discharge hole located in a high vacuum (low pressure) area below the throttle valve and the fuel in the float bowl vented to atmospheric or higher pressure, the idle system operates as follows.

The fuel in the float bowl passes through the main metering jet into the main fuel well where it is picked up and metered at the lower tip of the idle tube. It passes up the idle tube and is mixed with air at the top of the idle tube by a calibrated air bleed. The mixture then passes down through a calibrated idle channel restriction (early models) and is again mixed with more air by another calibrated air bleed just below the channel restriction. The mixture continues down and across the idle passage to the off-idle discharge port. Here the mixture is again mixed with air and moves down to the idle mixture needle hole where it enters the carburetor bore and is combined with the air bypassing the slightly open throttle valve. The discharge is now delivered to the intake manifold as a combustible mixture. The lower section of the off-idle discharge port also feeds fuel to supplement the fuel discharging from the idle mixture needle hole during curb (slow) idle.

The adjustable idle mixture needle regulates the amount of fuel mixture which enters the carburetor bore. This provides a means of regulating the idle fuel mixture so that it can be blended with the idle air to obtain a smooth stable idle at the desired engine idle RPM.

## OFF-IDLE OPERATION—Fig. 4

As the engine speed increases when the throttle valves are gradually opened from the idle position, additional fuel is needed to meet the increased engine air demands. The off-idle discharge port supplies additional fuel in the transition period between curb (slow) idle operation and when the main discharge nozzle begins to feed fuel at higher engine air flow demands.

The Model H & HV carburetors use a slotted off-idle discharge port. The slotted port increases the fuel supply for off-idle engine demands by the gradual exposure of the slot to engine vacuum as the throttle valve is progressively opened.

On some models, the idle channel restriction and second idle air bleed have been removed from the venturi cluster. These will vary dependent upon the fuel requirements of a particular engine. The throttle valve on some models is notched on the side toward the mixture adjusting screw. This provides a smooth fuel flow from the idle cavity and prevents fuel slugging which could cause an intermittent rough idle. The notched throttle valve also helps maintain a smooth idle during icing conditions, as ice will not be able to build up in this area causing rough idle and stalling.

In the 1966 models a lower idle air bleed was added to the idle system. This bleeds additional air in the idle circuit for improved metering in the off-idle range. Normally the air bleed will feed fuel only at very high air flow rates through the carburetor at which time it supplements fuel flow from the main discharge nozzle.

The Model H and HV carburetors have a vacuum advance port drilled just above the throttle valves to provide a timed distributor vacuum advance. As the throttle valve is opened, the spark port is exposed to manifold vacuum which acts on the distributor vacuum advance unit. This varies the advance unit so that the correct spark timing can be maintained in relation to engine load. This helps give maximum economy under varying road load conditions. Both carburetors have a spark port, however, the right unit is used to operate the distributor advance unit. The left carburetor spark port is blocked off by a plastic cap.

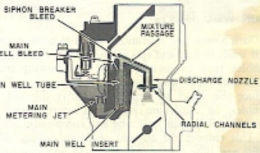



FIGURE 5

## MAIN METERING SYSTEM—Fig. 5

The main metering system consists of a main jet, main well tube, main well insert, main well bleed, siphon breaker bleed, mixture passage, discharge nozzle and radial discharge channels. The radial arm discharge type venturi cluster aids in fuel distribution in the main venturi area. This type cluster is used in place of the conventional venturi cluster and greatly improves overall operation of the main metering system.

The main metering system supplies fuel from off-idle to wide open throttle operation. Its purpose is to provide efficient fuel metering during the cruising range of the automobile. Its operation is dependent upon air flow through the carburetor venturi which, in turn, creates a low pressure in the venturi, causing fuel to flow in the following manner.

Fuel from the float bowl passes through the main metering jet into the main fuel well, through holes in the main well insert and rises in the main well tube. Air entering the main fuel well through the main well air bleed is mixed with the fuel passing through the calibrated holes in the main well tube. The mixture then moves up the main well tube and enters the mixture passage in the venturi cluster. A calibrated restriction at the rear of the mixture passage supplies additional air to mix with the fuel at this point. The fuel mixture then moves down the passage to discharge nozzle and is discharged into main venturi from the main discharge nozzle and the four radial channels which feed from the main nozzle. The four radial discharge channels provide good overall distribution in the main venturi and a quicker, smoother cut-in of fuel from the main metering system.

The calibrated restriction located at the rear of the mixture passage acts as a fuel siphon breaker during periods when the main metering system is not in operation.

The venturi cluster was changed on 1964 and later models by off setting the radial arms. This was done to further improve fuel mixture distribution in the engine intake manifolds.

### MAIN WELL INSERTS

During very hot operation, the fuel in the main fuel well tends to boil and this produces vapor bubbles. The bubbles tend to interfere with fuel flowing into the main well tube which upsets good metering. To help reduce the effect of heat and remove the fuel vapor bubbles, an aluminum main well insert is used. This resembles the main well tube and completely surrounds it. This reduces the amount of vapor getting into the main well tube, helps dissipate heat and improves hot operation of the system.

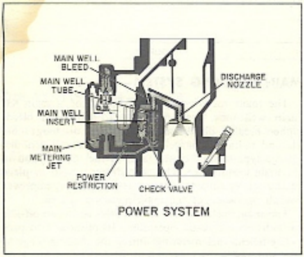



FIGURE 6

## POWER SYSTEM — Fig. 6

In 1965 and later models a power system is used in the Model HV carburetor. The purpose of the power system is to add additional fuel during high carburetor air flows to supplement fuel flow from the main metering system. In the later engines, the power system makes it possible to use leaner mixtures in the part throttle (economy) ranges and still maintain the correct air/fuel mixture ratios for higher speed and power operation.

The power system consists of a horizontal fuel passage which leads from the side of the float bowl chamber (near the bottom) into a vertical passage next to the main fuel well. The vertical fuel passage leads to the cavity in the venturi cluster and feeds fuel directly in the main fuel well area. A calibrated fuel restriction is used in the horizontal passage from the fuel bowl and a piloted check valve seats at the bottom of the vertical fuel passage.

### OPERATION

In operation, vacuum (low pressure) from the carburetor venturi is transmitted through the venturi cluster to the main fuel well as was explained in the operation of the main metering system. The power system passage being open to main well area also receives this vacuum signal. At a predetermined point when extra enrichment is needed for power the check valve is lifted off its seat. Fuel then flows from the float bowl through the calibrated power restriction in the horizontal passage. It passes the open check valve and up the vertical passage and on into the main fuel well. At this point it mixes with fuel from the main metering system and passes up the main well tube and out through the venturi cluster discharge nozzles into the carburetor venturi. The extra fuel added by the power system gives the desired enrichment needed for higher speed power operation.

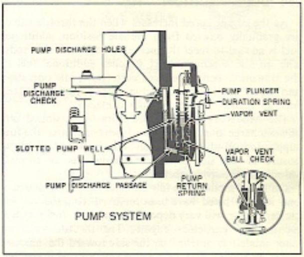



FIGURE 7

## PUMP SYSTEM — Fig. 7

The pump system consists of a pump plunger assembly, pump return spring, discharge check valve, fuel passages and pump discharge jets.

The purpose of the pump is to supply extra fuel during engine acceleration. When the throttle is opened rapidly, the air flow and manifold vacuum change almost instantly while the heavier fuel tends to lag behind causing momentary leanness. The accelerator pump system supplies the extra fuel needed at this point.

## OPERATION

Fuel for acceleration is supplied by the spring loaded pump plunger. The top (pump discharge spring) and bottom (pump return spring) are calibrated so that during downward motion of the pump plunger, a smooth sustained charge of fuel is delivered to the engine manifold.

When the pump plunger moves upward, fuel enters the slotted pump well, flows past the pump plunger head and fills the pump well.

Downward motion of the pump plunger seats the vapor vent ball in the pump plunger head. Fuel is forced through the pump discharge passage where it unseats the pump discharge needle and passes on to the pump jets where it sprays into the venturi area.

The check ball in the pump plunger head serves as a vapor vent from the pump well. Without the vent, vapor pressure build-up in the pump well can cause fuel to be forced into the venturi area during hot engine operation causing hard hot engine starting. This would also tend to deplete the pump system of fuel resulting in engine hesitation during initial acceleration.

The pump discharge needle valve in the pump discharge passage prevents any "pull over" or discharge of fuel from the pump jets when the accelerator pump is not in operation. It also keeps the discharge passage filled with fuel to prevent pump discharge lag.

Early model carburetors used a pump discharge ball, spring and retainer in place of the discharge needle. The discharge ball type was used with a single pump jet. The later discharge needle is used with two pump discharge jets.

## CHOKE SYSTEMS—Figs. 8, 9, 10

Three type choke systems are used on different applications of the Model H and HV carburetors.

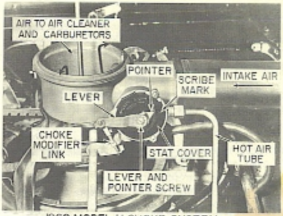
The 1960 Model H automatic choke (Figure 8) is mounted separately from the carburetor units. It is a single automatic choke unit which controls choke operation to each carburetor. It is located at the center of the engine above the cooling fan. Air to the carburetors passes through the choke housing-air inlet, past the choke valve and up through the air cleaner. It then passes from the cleaner to each carburetor through separate intake air tubes.

A choke modifier is used on the choke thermostatic coil to regulate the tension of the coil so that fuel mixtures during choke operation can be varied with engine load. The tension on the coil changes dependent upon the amount of throttle opening.

## OPERATION—Fig. 8

The choke system consists of a choke valve, choke thermostatic coil, choke modifier, a choke vacuum piston, vacuum tubes, choke hot air tube, fast idle cam and connecting choke linkage.

When the engine is cold the thermostatic coil closes the choke valve. This restricts the incoming air to the carburetors so that richer fuel mixtures can be obtained




1960 MODEL H CHOKE SYSTEM

FIGURE 8

from the carburetor units during the engine cranking period. Rotation of the choke valve closed also positions the fast idle screw on the highest portion of the fast idle cam. This provides a faster than normal idle to keep the engine from stalling during cold engine starting and driveaway.

After the engine starts the choke vacuum piston opens the choke valve against coil tension to a predetermined point so that the engine will keep running smoothly. As the engine warms up, manifold heat supplied to the choke coil housing gradually relaxes the choke coil tension. Vacuum pull on the choke piston and air pushing on the offset choke valve continues to open the choke valve until the engine is warm enough to operate on normal carburetor mixtures. At this point the choke valve is wide open and the fast idle cam is rotated so that the fast idle screw no longer contacts the cam and the engine idle is controlled by the idle speed screw.

The choke modifier is used to prevent engine "loading" and excessively rich mixtures during the engine warm up period. The choke modifier operates as follows.

When the engine is started cold and the throttle is opened considerably (such as going up a steep hill) vacuum pull on the choke piston is lessened. The choke valve tends to close because the balance between the thermostatic coil and vacuum pull on the choke piston is upset. The modifier lever being attached to the throttle linkage and connected to the center of the thermostatic coil shaft, varies the coil tension according to throttle opening. In this manner the coil tension can be decreased on throttle opening and increased for good cold starting.

The choke modifier is adjusted at the thermostatic coil shaft by loosening the screw and rotating the pointer to the specified mark on the choke cover with choke valve fully open and throttle levers against the slow idle speed screws.

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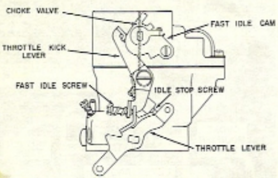
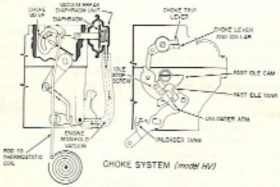



MANUAL CHOKE SYSTEM

FIGURE 9

## MANUAL CHOKE OPERATION—Fig. 9

The 1961 Model H carburetors use a conventional manual choke. The chokes for both carburetors are synchronized and controlled by a single "push-pull" type control on the dash board. A fast idle speed adjustment is required on each choke. The choke control cables must be adjusted so that the choke valves close and open together. During engine warm up the fast idle speed is controlled by a fast idle cam located on the end of the choke shaft. When the choke valve is closed manually, the fast idle cam rotates and pushes on a "kick" lever which opens the throttle valve to a fast idle position. When the choke valve is manually rotated open, as the engine warms up, the fast idle cam also rotates allowing the "kick" lever to return the throttle lever to slow idle position.




CHOKE SYSTEM *(model HV)*

FIGURE 10

## MODEL HV CHOKE SYSTEM—Fig. 10

The 1962 and later Model HV carburetors have an individual choke mechanism in each carburetor. The thermostatic coil for each carburetor is located beneath the engine cylinders in the hot air stream and is connected to the choke shaft by an adjustable rod. The thermostatic coil operates in conjunction with a choke vacuum break diaphragm assembly mounted on each carburetor air horn. The fast idle cam assembly is mounted on the side of carburetor opposite from the vacuum break unit.

The choke operates as follows:

With the engine cold, prior to starting, opening of the carburetor throttle allows the thermostatic coil to close the choke valve and rotate the fast idle cam so that the high step is in line with the fast idle tang on the throttle lever. As the throttle is released, the fast idle tang comes to rest on the high step of the cam. This gives the engine enough fast idle to keep the engine running cold.

When the engine is started, manifold vacuum is applied to the spring loaded vacuum break diaphragm. This moves the diaphragm plunger into the assembly until it strikes the cover, which in turn, opens the choke valve to a point where the engine runs without loading or stalling. The length of the connecting link determines the amount of choke valve opening.

As the engine warms up the choke thermostatic coil is heated, it relaxes its tension, thereby, allowing air velocity to open the choke valve. This continues until the engine is warm. At this point the choke coil tension is completely relaxed and the choke valve is wide open.

The fast idle cam has graduated steps so that fast idle speed can be lowered gradually during the engine warm up period. The fast idle cam follows rotation of the choke valve. When the choke valve is completely open and the engine is warm the fast idle tang on the throttle lever will be off the steps of the fast idle cam. At this point the idle stop screw controls normal idle speed.

## MAJOR SERVICE OPERATIONS

***Disassembly, Cleaning, Inspection and Assembly Procedures***

The following disassembly and assembly procedures may vary somewhat between models due to specific design features. However, the following will basically pertain to all Rochester Model H and HV units explained in the foregoing text.

## AIR HORN REMOVAL AND DISASSEMBLY—Fig. 11

### MODELS H AND HV

1. Remove fuel inlet nut and gasket, then remove filter element, filter gasket and pressure relief spring.
2. Remove pump rod by removing upper spring clip at pump lever end and "hair pin" clip from lower end of rod at throttle lever.

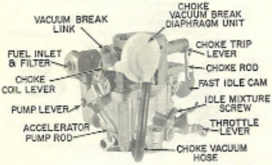



FIGURE 11

3. (Early Model H) Remove external vent cover screw, then remove cover.
4. HV only—Remove fast idle cam screw.
5. Remove choke trip lever screw located on end of choke shaft. Remove choke trip lever, then remove choke lever and collar, choke rod and fast idle cam as an assembly. Further disassembly can be made by removing choke rod. (Note location of levers on rod for ease in assembly).
6. Remove vacuum break hose from vacuum break unit and tube on throttle body.
7. Remove horseshoe clip which holds vacuum break link to slotted choke lever. Remove connecting link from choke lever and vacuum diaphragm plunger stem by rotating links to align retaining "squirt" with slot in plunger stem.

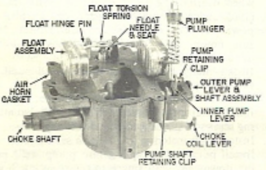



FIGURE 12

8. Remove six remaining air horn attaching screws. Remove vacuum break unit from air horn (HV only). Then carefully lift air horn from float bowl.
9. Place air horn inverted on a flat surface (Figure 12). Remove float hinge pin and lift float assembly from air horn. *Note:* A float assist torsion spring is used on 1964 and later models. This is held in place by the float hinge pin. Observe position for ease in reassembly.
10. Remove float needle, needle seat and gasket from air horn. Use a wide blade screw driver or needle seat removing tool (BT-3006) to prevent damage to needle seat.
11. Remove clip on end of pump plunger stem, then remove pump plunger from inner pump lever. The outer pump lever and shaft may be removed by removing clip on inner end of shaft, then remove outer pump lever and shaft from inner lever.
12. Remove air horn gasket.
13. The choke valve and shaft may be removed by removing the two choke valve screws. Then remove choke valve and choke shaft from air horn.

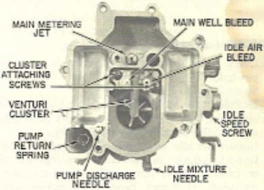



FIGURE 13

## FLOAT BOWL AND THROTTLE BODY DISASSEMBLY—Fig. 13

1. Remove pump plunger return spring from pump well.
2. Remove main metering jet.
3. Remove two venturi cluster attaching screws, then remove venturi cluster and gasket.
4. Remove main well insert tube from main fuel well beneath cluster. (Figure 14)
5. Remove pump discharge needle valve by inverting bowl assembly. *Note:* 1965 and later models have a power valve in the power system channel beneath the venturi cluster. This may be removed at this time.

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*Note:* Some early models use a pump discharge ball, spring and "T" retainer. This can be removed by removing "T" retainer with needle nose pliers and inverting bowl to remove spring and discharge ball.

6. Remove idle mixture adjusting needle and spring.
7. (1964 and later models) Remove idle vent valve on throttle body next to main throttle lever by removing attaching screw.
8. No further disassembly of the throttle body is necessary. Do not remove the throttle valve.

### CLEANING OF PARTS

The carburetor should be cleaned in a cold immersion type cleaner.

1. Thoroughly clean carburetor casting and metal parts in carburetor cleaning solvent such as (Carbon X-55).

   Caution: Any rubber parts, plastic parts, diaphragms, leather seals and pump plunger should not be in commercial carburetor cleaner. Clean with dry type cleaning fluid.
2. Blow all passages in castings dry with compressed air.

   *Do not pass drills through jets or metering passages.*

### INSPECTION OF PARTS

1. Check floats for dents or excessive wear at hinge pin holes.
2. Shake floats to check for leaks..
3. Examine float needle and seat for excessive wear, nicks or burrs. Replace if necessary with factory matched float needle and seat assembly.
4. Inspect the idle mixture needle for ridges or burrs.
5. Inspect surfaces of carburetor castings for nicks or burrs to make sure small sealing beads are not damaged. Damaged beading or nicked surfaces may result in fuel or air leaks at this point.
6. Inspect holes in pump lever, fast idle cam and throttle lever. If the holes are worn excessively or out of round to the extent of improper operation of the carburetor the parts should be replaced.
7. Inspect the steps on the fast idle cam for excessive wear. If worn, the cam should be replaced to insure proper fast idle operation during the engine warm up and choking periods.
8. Inspect the pump plunger. If pump plunger cup is worn excessively or damaged, the plunger should be replaced. Shake pump plunger to make sure vapor vent check ball (where used) in plunger head is free. It should rattle to operate freely.
9. Inspect throttle body assembly. Make sure all vacuum channels and passages are clean.
10. Check throttle valve screws for tightness. If loose, seat valves, tighten and stake properly.
11. Inspect power valve for freedom of operation in power system channel. Check power valve seat to make sure it is free of nicks or burrs.

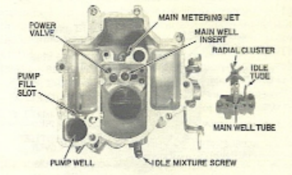


FIGURE 14

## CARBURETOR ASSEMBLY

### FLOAT BOWL AND THROTTLE BODY ASSEMBLY—Fig. 14

### MODEL H AND HV

1. Install idle vent valve assembly on throttle body with attaching screw. (1964 and later models).
2. Install idle mixture adjusting needle and spring until lightly seated. Back out mixture screw 1½ turns as a temporary idle adjustment.
3. Install idle stop screw and spring in boss on float bowl, if removed.
4. Install lower pump lever on end of throttle shaft, if removed. "D" slot in lever must slide over milled slots on throttle shaft and lever points towards idle mixture needle side. RP on lever faces outward. Install lever attaching screw and tighten securely.
5. Install pump discharge needle into discharge hole. Needle end of valve points downward.

   *Note:* On early 1960 models a pump discharge ball, spring and "T" shaped retainer are used. These are replaced by the discharge needle on all later models. The late type valve should be used when overhauling early units for best operation.
6. (1965 and later models) Install power valve into power valve channel next to main fuel well. Make sure power valve falls freely and seats at bottom of channel.
7. Install main well insert tube into main well, beneath venturi cluster.
8. Install venturi cluster gasket on cluster, then carefully install cluster into fuel bowl with two attaching screws. Tighten evenly and securely.
9. Install main metering jet. Tighten securely.
10. Install pump return spring into pump well, pushing downward with finger to center spring in well.

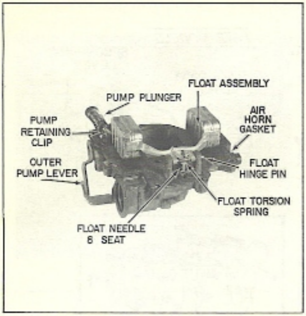


FIGURE 15

## AIR HORN ASSEMBLY AND INSTALLATION—Fig. 15

1. Install choke shaft and lever assembly into air horn, then install choke valve (RP faces up) using two attaching screws. Center choke valve in air horn. Tighten choke valve screws and stake securely.
2. Install the outer pump shaft and lever assembly into shaft hole in air horn.
3. Install inner pump lever on pump shaft, retaining with spring clip.
4. Attach pump plunger stem to the inner pump lever, retaining with clip. End of pump plunger stem points outward away from venturi area.
5. Install air horn gasket on air horn casting.
6. Install float needle seat and gasket into air horn using a wide bladed screw driver or tool BT 3006. Tighten securely.
7. Install float needle in the float needle seat, then install float assembly on air horn over float needle using hinge pin provided.
   *Note:* On 1964 and later models which use the float torsion spring, install spring between bearings on float arm. The straight end of spring goes through hole provided in float arm. The other angled end of spring rests against the float needle seat. The float hinge pin goes through center of spring coils. Figure 15.
8. Adjust float as outlined in the "C" section of Parts and Service Manual.
9. Carefully place air horn on float bowl, making certain that the accelerator pump plunger is centered in pump well and moves freely. Lower air horn gently straight down, to prevent bending float assembly.
10. Install air horn attaching screws. The two longer screws must be installed in raised pump housing area. (On units which have the vacuum break unit, this must also be installed under the two longer screws). Tighten all screws evenly and securely.
11. Install vacuum break hose pushing over tubes on throttle body and vacuum break unit.
12. Install vacuum break link into hole in the diaphragm plunger stem and opposite end of link into slotted choke shaft lever. Ends of vacuum break link point outward. Install retaining clip on choke lever end of link. Tighten securely.
13. Assemble fast idle cam and choke lever to choke rod. Ends of choke rod point outward.
14. Attach choke lever to air horn, install choke trip lever to end of choke shaft (tang on trip lever points inward and is above tang on choke lever and collar assembly). Install choke trip lever screw and tighten securely.
15. Assemble fast idle cam to float bowl using cam attaching screw. Tighten securely.
16. (Early models). Install external vent cover to air horn, attaching with attaching screw. Tighten securely.
17. Install pump rod to lever on end of throttle shaft. Attach with spring clip. Install upper end of rod into pump lever using spring clip.
18. Install fuel inlet filter spring into air horn, then install filter gasket between filter element and fuel inlet nut. Install filter nut, gasket and element into air horn. Tighten fuel inlet nut securely.

### ADJUSTMENT PROCEDURES AND SPECIFICATIONS

Refer to "C" section of Parts and Service Manual for all float, pump, idle vent, and choke adjustment procedures and specifications.

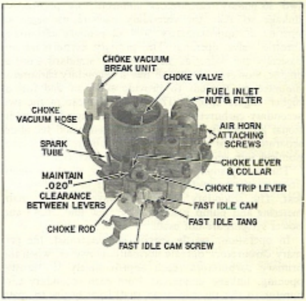


FIGURE 16

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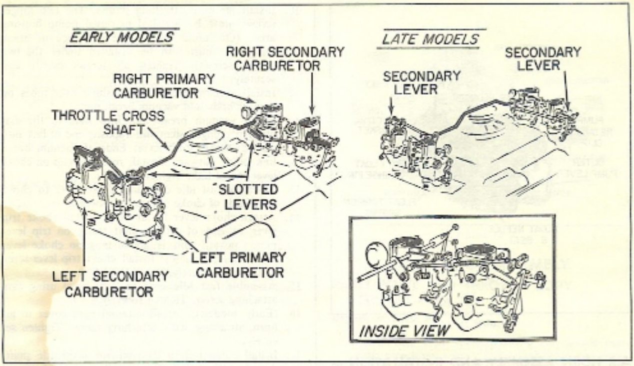


FIGURE 17

## TYPICAL MODEL H (4) CARBURETOR INSTALLATION
### Fig. 17

## OPERATION

Starting with the 1965 Corvair, on hi-performance models, a "4x1" (4-Model H carburetors) carburetor installation is used. This consists of two primary and two secondary carburetors connected by progressive linkage so that the secondary carburetors begin to operate at approximately 50% of primary carburetor throttle valve opening. The primary carburetors are basically the same as used on the standard Corvair engine, however, each one has a secondary carburetor mounted in tandem to provide extra air and fuel at higher engine speeds. This is the purpose of the two secondary carburetors, to supply the engine with additional air and fuel for extra performance and yet allow separate use of the two primary carburetors for economical low speed and part throttle operation.

The two primary carburetors have all the conventional operating systems as explained in the foregoing text. The secondary carburetors have the float, main metering and pump systems only. The idle, choke and power systems are not used.

In operation, as the engine is accelerated, the primary carburetors operate normally. However, when the primary carburetors reach approximately ½ throttle opening, linkage connected from each secondary carburetor to the throttle cross shaft lever begins to open the secondary carburetor throttle valve. As the primary carburetor throttles are opened further to wide open throttle the secondary carburetor throttle valves continue to open until both primary and secondary carburetors reach wide open throttle at the same time. Thus, metered air and fuel supplements the primary carburetor fuel mixture to provide the extra breathing capacity needed for the engine performance desired.

Synchronization of the two primary carburetors is made in the normal manner and must be done before adjusting the secondary carburetor throttle linkage. The secondary throttle linkage is adjusted so that each carburetor reaches wide open throttle simultaneously with the two primary carburetors.

Starting midyear 1965 and later production, a secondary carburetor lockout mechanism is used to prevent the secondary carburetors from operating during the engine warm up (choking) period.

The secondary lockout mechanism is operated by the primary chokes and keeps the secondary carburetors out of operation until the choke is fully open, at which point the engine is at normal operating temperature.

Because the lockout mechanism is operated by the primary chokes, it is very important to make sure they are properly adjusted before attempting to synchronize the secondary carburetors.

*Complete carburetor linkage adjustments are covered in the "C" section of the Parts and Service manual.*

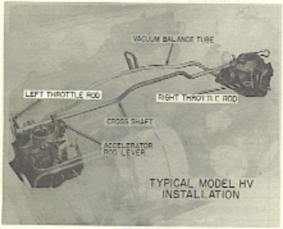


FIGURE 18

## MODEL H AND HV CARBURETOR SYNCHRONIZATION PROCEDURE

### SYNCHRONIZING CARBURETORS—Fig. 18

To insure proper operation of the dual installation of the Model H and HV carburetors, it is essential that the carburetor throttle valves operate together (be synchronized). By carefully following the procedure listed below, conditions such as surging, stalling, rough idle and poor overall engine operation will be minimized.

1. Initial Adjustments
   a. With engine off, disconnect both carburetor throttle rods at cross-shaft and choke coil rod at choke shaft lever.
   b. On both carburetors, back idle speed screw away from throttle lever. Open the choke valve so throttle lever does not contact fast idle cam. With the throttle valve held closed, place a .003 inch feeler gauge (or paper) between idle speed adjusting screw and throttle lever. Turn the screw until it just contacts the gauge; then remove gauge and turn 1½ more turns to set the throttle valve.
   c. Turn idle mixture screw lightly to its seat and back out 1½ turns.
2. Connect Throttle Rods
   a. Right Carburetor—Connect throttle rod to carburetor cross-shaft lever using retainer clip.
   b. Left Carburetor—Rotate cross-shaft (with accelerator rod) to assure positive closing of right carburetor throttle valve. Adjust throttle rod length in swivel until rod freely enters hole on carburetor cross-shaft lever. THEN SHORTEN THE ROD ONE TURN FURTHER TO REMOVE LASH IN LINKAGE SYSTEM. Secure rod with retainer clip.


FIGURE 19

*Note:* The carburetors are now mechanically synchronized. Any further idle speed or mixture adjustment MUST be duplicated on both carburetors.

3. Carburetor Balance—Vacuum Check Figure 19
   a. Remove choke diaphragm hose from each carburetor vacuum pipe and connect vacuum gauge to the pipe. (Best results can be obtained using two equally calibrated gauges.) On 1960-61 carburetors, connect vacuum gauges to the distributor vacuum take-off tubes on the carburetors.
   b. Operate engine at idle speed. Check vacuum at each carburetor and note difference. If difference is one inch or less, the carburetors are satisfactorily synchronized. If difference is more than one inch, adjust left carburetor throttle rod (A) one turn (up to increase left carburetor vacuum and down to decrease) and recheck vacuum readings. On 1960-61 carburetors, it is necessary to operate engine at higher than idle speed to obtain vacuum readings. These units should be checked for equal vacuum at off-idle speeds and at 1200 RPM.
   *Note:* It is preferable to have a higher reading on the right carburetor (spark advance side). CAUTION: When making linkage adjustments, move the cross-shaft by grasping accelerator rod only. Do not open throttle only by grasping other parts of the linkage as this will upset geometry and synchronization.
   c. Remove vacuum gauges and replace choke diaphragm hoses or spark hose and plastic cap.

When making final idle speed and mixture adjustment, turn adjustment screws same amount on each carburetor.

*NOTE:* Air cleaners should be installed.

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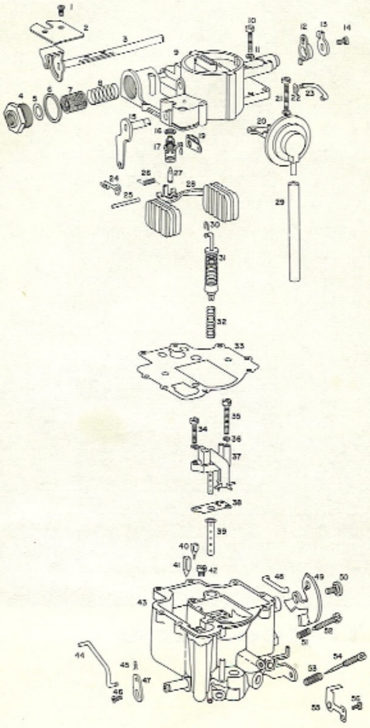
# TROUBLE SHOOTING CHART
## MODELS H, HV

**ALWAYS CHECK FIRST:**
**Heat Riser, Intake Manifold Bolts, Compression, Ignition System, Fuel Pump Pressure and Volume, Crankcase Vent System.**

| COMPLAINT | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FLOODING | ROUGH IDLE | ECONOMY | HESITATION | ACCELERATION FLATNESS | SURGE | LOW TOP SPEED OR POWER | COLD OPERATION | STALLING | HARD HOT STARTING | CHECK POINTS* | WHAT TO LOOK FOR |
| | 1 | ★ | ★ | 1 | ★ | | ★ | 1 | ★ | IDLE ADJUSTMENT | Correct speed and mixture, carbs. not synchronized |
| 3 | | 3 | | ★ | 2 | 2 | | 2 | 4 | FLOAT ADJUSTMENT | Use gauge and set to specifications |
| | | | 1 | ★ | | | ★ | | | PUMP ADJUSTMENT | Use correct setting, throttle valves closed |
| | ★ | ★ | | | | | | | 2 | IDLE VENT ADJUSTMENT | Dirt, wear, sticking open; must be closed except at idle |
| | | ★ | | | | | 1 | ★ | 1 | AUTOMATIC CHOKE ADJ. | Set to specification |
| | | | | | | | 2 | ★ | | VACUUM BREAK ADJ. | Set to specification |
| | | | | | | | 3 | ★ | | CHOKE ROD ADJUSTMENT | Use correct gauge, fast idle tang on 2nd step of cam, next to high step |
| | | | | | | | 4 | | 3 | UNLOADER ADJUSTMENT | Use correct gauge, throttle valves wide open; check to see that throttle linkage allows wide open position on car |
| | | | | | | | 5 | ★ | | FAST IDLE ADJUSTMENT | Set with warm engine, use tachometer, set to information specification |
| | | | | ★ | | ★ | | ★ | | SECONDARY CARB. LINKAGE | Proper adjustment — synchronized (4 x 1) |
| | | | | | | | 6 | ★ | | SECONDARY CARB. LOCKOUT | Proper adjustment (4 x 1) |
| | | 1 | | 2 | 4 | 1 | ★ | | | POWER VALVE | Dirty, sticking, not seating, missing |
| | | 2 | | 3 | 1 | 3 | ★ | | | METERING JETS | Loose, plugged, incorrect part |
| 1 | ★ | ★ | | | | 4 | | 4 | 5 | NEEDLE & SEAT | Worn, damaged, dirty, loose or incorrect part |
| | ★ | ★ | 5 | 4 | 3 | ★ | | | | VENTURI CLUSTER | Dirty, loose screws, incorrect part |
| 2 | | ★ | | | ★ | | | ★ | ★ | FLOAT | Bent, leaky, distorted float arms, damaged torsion springs |
| | 3 | | | | | | | ★ | | IDLE NEEDLES | Worn, damaged |
| | 4 | | ★ | ★ | | ★ | ★ | ★ | | THROTTLE VALVES | Sticking open or closed, damaged, not aligned properly |
| 4 | ★ | ★ | ★ | ★ | ★ | ★ | ★ | 3 | ★ | GASKETS | Improper seal, hard or brittle material, loose screws |
| | 2 | | | | | | | ★ | ★ | IDLE PASSAGES | Dirty or Plugged |
| | ★ | ★ | | | | | 8 | | | CHOKE VACUUM PASSAGE | Plugged or vacuum leaks |
| | | | 3 | ★ | | | ★ | | | PUMP JETS | Plugged, missing |
| | | | 2 | | | | ★ | | ★ | PUMP PLUNGER | Hard or worn leather, distorted spring, stuck vent ball check |
| | ★ | ★ | 4 | | | | ★ | | ★ | PUMP DISCHARGE CHECK | Out-of-round, damaged seat, stuck, distorted spring |
| | ★ | ★ | | ★ | | | 7 | ★ | ★ | CHOKE DIAPHRAGM, CHOKE-VALVE, LINKAGE | Dirty, damaged, sticking, vacuum leaks |

* Numbers indicate most probable causes, ★ indicates other check points.

| TYPICAL EXPLODED VIEW—MODELS H, HV | PARTS |
|---|---|



1. Screw—Choke Valve
2. Valve—Choke
3. Choke Shaft and Lever Assm.
4. Fuel Inlet Nut
5. Gasket—Fuel Inlet Filter
6. Gasket—Fuel Inlet Nut
7. Filter—Fuel Inlet
8. Spring—Fuel Inlet Filter
9. Air Horn Assembly
10. Screw—Air Horn—Short
11. Lockwasher—Air Horn Screws
12. Choke Lever and Collar Assm.
13. Trip Lever
14. Screw—Trip Lever
15. Pump Shaft and Lever Assembly
16. Gasket—Needle Seat
17. Float Needle Seat
18. Springclip—Pump lever Inside
19. Lever—Pump Inside
20. Vacuum Break Control Assembly
21. Screw—Air Horn—Long
22. Clip—Control Rod
23. Vacuum Control Rod
24. Retainer—Pump Rod—Upper
25. Pin—Float Hinge
26. Torsion Spring
27. Float Needle
28. Float Assembly
29. Hose—Vacuum Control
30. Clip—Pump Plunger
31. Pump Assembly
32. Spring—Pump Return
33. Gasket—Air Horn
34. Screw—Vent Cluster—Short
35. Screw—Venturi Cluster—Long
36. Lockwasher—Cluster Screws
37. Venturi Cluster Assembly
38. Gasket—Venturi Cluster
39. Insert—Main Well Tube
40. Power Valve
41. Valve—Pump Discharge
42. Jet—Main Metering
43. Body and Bowl Assembly
44. Pump Rod
45. Retainer—Pump Rod—Lower
46. Screw—Pump Lever Attaching
47. Lever—Pump Actuating
48. Rod—Choke
49. Cam—Fast Idle
50. Screw—Cam Attaching
51. Spring—Slow Idle Screw
52. Screw—Slow Idle Adjustment
53. Spring—Idle Needle
54. Idle Needle
55. Valve—Idle Vent
56. Screw—Idle vent attaching

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