

CARBURETED FUEL SYSTEM	8-3	REMOVAL & INSTALLATION	8-29
DECELERATION VALVE	8-34	ALL EXC. FORD V8	8-29
ELECTRIC FUEL PUMP	8-31	5.0L/5.8L FORD V8	8-30
HOLLEY 2300 2 BBL	8-16	7.5L FORD V8	8-30
HOLLEY 4150/4160/4175 4 BBL	8-22	VACUUM TEST	8-31
MECHANICAL FUEL PUMP	8-28	OPERATION	8-4
OPERATION	8-4	BASIC FUNCTIONS	8-4
ROCHESTER 2BBL	8-5	CARBURETOR CIRCUITS	8-5
ROCHESTER 4 BBL	8-10	FUEL & AIR METERING	8-4
SPECIFICATIONS	8-37	ROCHESTER 2 BBL	8-5
TROUBLESHOOTING	8-3	ADJUSTMENT	8-9
WIRING DIAGRAMS	8-34	AUTOMATIC CHOKE	8-10
DECELERATION VALVE	8-34	CHOKE UNLOADER	8-9
FUNCTION CHECK	8-34	ELECTRIC CHOKE	8-10
REMOVAL & INSTALLATION	8-34	FLOAT DROP	8-9
ELECTRIC FUEL PUMP	8-31	FLOAT LEVEL	8-9
COMPONENT REPLACEMENT	8-33	IDLE SPEED & MIXTURE	8-9
CIRCUIT BREAKER	8-33	INTERMEDIATE CHOKE ROD	8-10
RELAY & BRACKET	8-33	PUMP ROD	8-9
DESCRIPTION	8-31	VACUUM BREAK	8-10
FUEL SYSTEM CHECKS	8-33	ASSEMBLY	8-8
PRESSURE TEST	8-33	CLEANING & INSPECTION	8-8
REMOVAL & INSTALLATION	8-32	DISASSEMBLY	8-5
FUEL AND COMBUSTION	8-2	REMOVAL & INSTALLATION	8-5
COMBUSTION	8-2	ROCHESTER 4 BBL	8-10
FUEL	8-2	ADJUSTMENT	8-15
FUEL PUMP		ACCELERATOR PUMP ROD	8-15
ELECTRIC	8-31	CHOKE COIL ROD	8-16
MECHANICAL	8-28	FLOAT LEVEL	8-16
HOLLEY 2300 2 BBL	8-16	IDLE SPEED & MIXTURE	8-16
ASSEMBLY	8-19	VACUUM BREAK	8-16
CLEANING & INSPECTION	8-19	ASSEMBLY	8-11
DISASSEMBLY	8-17	CLEANING & INSPECTION	8-11
REMOVAL & INSTALLATION	8-16	DESCRIPTION	8-10
ADJUSTMENT	8-21	DISASSEMBLY	8-11
ACCELERATOR PUMP CLEARANCE	8-21	REMOVAL & INSTALLATION	8-11
ACCELERATOR PUMP STROKE	8-21	SPECIFICATIONS	8-37
CHOKE UNLOADER	8-21	TORQUE	8-37
CHOKE VACUUM	8-21	CARBURETOR APPLICATIONS	8-38
FLOAT LEVEL	8-21	1986-90	8-38
HOLLEY 4150/4160/4175 4 BBL	8-22	1991-96	8-39
ADJUSTMENT	8-26	1997-98	8-40
ACCELERATOR PUMP CLEARANCE	8-27	CARBURETOR 8-40	
ACCELERATOR PUMP STROKE	8-27	HOLLEY 2300 2 BBL	8-40
AUTOMATIC CHOKE	8-28	HOLLEY 4 BBL	8-40
CHOKE UNLOADER	8-28	ROCHESTER 2BBL	8-42
CHOKE VACUUM QUALIFICATION	8-27	ROCHESTER 4BBL	8-42
FLOAT LEVEL	8-26	TROUBLESHOOTING	8-3
SECONDARY THROTTLE		COMBUSTION RELATED	
VALVE PLATE	8-26	PISTON FAILURES	8-4
ASSEMBLY	8-25	COMMON PROBLEMS	8-3
CLEANING & INSPECTION	8-25	WIRING DIAGRAMS	8-34
DISASSEMBLY	8-22	1992-93 4.3L V6	8-34
REMOVAL & INSTALLATION	8-22	1994-96 4.3L V6 & 5.7L V8	8-35
MECHANICAL FUEL PUMP	8-28	1997 4.3L V6 & 5.7L V8	8-35
DESCRIPTION	8-28	1998 4.3L V6 & 5.0L/5.7L V8	8-36
FUEL LINE TEST	8-31	1994-96 7.4L V8	8-36
PRESSURE TEST	8-3	1997 7.4L V8	8-36

8

FUEL SYSTEMS CARBURETORS

FUEL AND COMBUSTION	8-2
CARBURETED FUEL SYSTEM	8-3
ROCHESTER 2 BBL	8-5
ROCHESTER 4 BBL	8-10
HOLLEY 2300 2 BBL	8-16
HOLLEY 4150/4160/4175 4 BBL	8-22
WIRING DIAGRAMS	8-34
SPECIFICATIONS	8-37

8-2 FUEL SYSTEMS—CARBURETORS

FUEL AND COMBUSTION

Fuel

Fuel recommendations have become more complex as the chemistry of modern gasoline changes. The major driving force behind the changes in gasoline chemistry is the search for additives to replace lead as an octane booster and lubricant. These new additives are governed by the types of emissions they produce in the combustion process. Also, the replacement additives do not always provide the same level of combustion stability, making a fuel's octane rating less meaningful.

In the 1960's and 1970's, leaded fuel was common. The lead served two functions. First, it served as an octane booster (combustion stabilizer) and second, in 4-stroke engines, it served as a valve seat lubricant. For 2-stroke engines, the primary benefit of lead was to serve as a combustion stabilizer. Lead served very well for this purpose, even in high heat applications.

Today, all lead has been removed from the refining process. This means that the benefit of lead as an octane booster has been eliminated. Several substitute octane boosters have been introduced in the place of lead. While many are adequate in an engine, most do not perform nearly as well as lead did, even though the octane rating of the fuel is the same.

OCTANE RATING

A fuel's octane rating is a measurement of how stable the fuel is when heat is introduced. Octane rating is a major consideration when deciding whether a fuel is suitable for a particular application. For example, in an engine, we want the fuel to ignite when the spark plug fires and not before, even under high pressure and temperatures. Once the fuel is ignited, it must burn slowly and smoothly, even though heat and pressure are building up while the burn occurs. The unburned fuel should be ignited by the traveling flame front, not by some other source of ignition, such as carbon deposits or the heat from the expanding gasses. A fuel's octane rating is known as a measurement of the fuel's anti-knock properties (ability to burn without exploding).

Usually a fuel with a higher octane rating can be subjected to a more severe combustion environment before spontaneous or abnormal combustion occurs. To understand how two gasoline samples can be different, even though they have the same octane rating, we need to know how octane rating is determined.

The American Society of Testing and Materials (ASTM) has developed a universal method of determining the octane rating of a fuel sample. The octane rating you see on the pump at a fuel dock is known as the pump octane number. Look at the small print on the pump. The rating has a formula. The rating is determined by the R+M/2 method. This number is the average of the research octane reading and the motor octane rating.

- The Research Octane Rating is a measure of a fuel's anti-knock properties under a light load or part throttle conditions. During this test, combustion heat is easily dissipated.
- The Motor Octane Rating is a measure of a fuel's anti-knock properties under a heavy load or full throttle conditions, when heat buildup is at maximum.

VAPOR PRESSURE

Fuel vapor pressure is a measure of how easily a fuel sample evaporates. Many additives used in gasoline contain aromatics. Aromatics are light hydrocarbons distilled off the top of a crude oil sample. They are effective at increasing the research octane of a fuel sample but can cause vapor lock (bubbles in the fuel line) on a very hot day. If you have an inconsistent running engine and you suspect vapor lock, use a piece of clear fuel line to look for bubbles, indicating that the fuel is vaporizing.

One negative side effect of aromatics is that they create additional combustion products such as carbon and varnish. If your engine requires high octane fuel to prevent detonation, de-carbon the engine more frequently with an internal engine cleaner to prevent ring sticking due to excessive varnish buildup.

ALCOHOL-BLENDED FUELS

When the Environmental Protection Agency mandated a phase-out of the leaded fuels in January of 1986, fuel suppliers needed an additive to improve the octane rating of their fuels. Although there are multiple methods currently employed, the addition of alcohol to gasoline seems to be favored because

of its favorable results and low cost. Two types of alcohol are used in fuel today as octane boosters, methanol (wood alcohol) or ethanol (grain alcohol).

When used as a fuel additive, alcohol tends to raise the research octane of the fuel. There are, however, some special considerations due to the effects of alcohol in fuel.

- Since alcohol contains oxygen, it replaces gasoline without oxygen content and tends to cause the air/fuel mixture to become leaner.
- On older engines, the leaching affect of alcohol may, in time, cause fuel lines and plastic components to become brittle to the point of cracking. Unless replaced, these cracked lines could leak fuel, increasing the potential for hazardous situations.
- When alcohol blended fuels become contaminated with water, the water combines with the alcohol then settles to the bottom of the tank. This leaves the gasoline on a top layer.

Modern fuel lines and plastic fuel system components have been specially formulated to resist alcohol leaching effects.

HIGH ALTITUDE OPERATION

At elevated altitudes there is less oxygen in the atmosphere than at sea level. Less oxygen means lower combustion efficiency and less power output. As a general rule, power output is reduced three percent for every thousand feet above sea level.

On carbureted engines, re-jetting for high altitude does not restore lost power, it simply corrects the air-fuel ratio for the reduced air density and makes the most of the remaining available power. The most important thing to remember when re-jetting for high altitude is to reverse the jetting when returning to sea level. If the jetting is left lean when you return to sea level conditions, the correct air/fuel ratio will not be achieved and possible engine damage may occur.

RECOMMENDATIONS

All engine covered here are designed to run on unleaded fuel. Never use leaded fuel in your boat's engine. The minimum octane rating of fuel being used for your engine must be at least 87 AKI (outside the US: 90 RON), which means regular unleaded, but some engines may require higher octane ratings. OMC actually recommends the use of 89 AKI (93 RON) fuel as the ideal—in fact, anything less than this on many 4.3L/5.7L engines will require a change to the ignition timing. Fuel should be selected for the brand and octane that performs best with your engine. Check your owner's manual if in doubt. Premium unleaded is more stable under severe conditions but also produces more combustion products. Therefore, when using premium unleaded, more frequent de-carboning is necessary.

The use of a fuel too low in octane (a measure of anti-knock quality) will result in spark knock. Newer systems have the capability to adjust the engine's ignition timing to compensate to some extent, but if persistent knocking occurs, it may be necessary to switch to a higher grade of fuel. Continuous or heavy knocking may result in engine damage.

Combustion

In a high heat environment like an modern engine, the fuel must be very stable to avoid detonation. If any parameters affecting combustion change suddenly (the engine runs lean for example), uncontrolled heat buildup will occur very rapidly.

The combustion process is affected by several interrelated factors. This means that when one factor is changed, the other factors also must be changed to maintain the same controlled burn and level of combustion stability.

- Compression—determines the level of heat buildup in the cylinder when the air-fuel mixture is compressed. As compression increases, so does the potential for heat buildup
- Ignition Timing—determines when the gasses will start to expand in relation to the motion of the piston. If the ignition timing is too advanced, gasses will be ignited and begin to expand too soon, such as they would during pre-ignition. The motion of the piston opposes the expansion of the gasses, resulting in extremely high combustion chamber pressures and heat. If the ignition timing is retarded, the gases are ignited later in relation to piston position. This means that the piston has already traveled back down the bore toward the bottom of the cylinder, resulting in less usable power.

- **Fuel Mixture**—determines how efficient the burn will be. A rich mixture burns slower than a lean one. If the mixture is too lean, it can't become explosive. The slower the burn, the cooler the combustion chamber, because pressure buildup is gradual.
 - **Fuel Quality (Octane Rating)**—determines how much heat is necessary to ignite the mixture. Once the burn is in progress, heat is on the rise. The unburned poor quality fuel is ignited all at once by the rising heat instead of burning gradually as a flame front of the burn passing by. This action results in detonation (pinging).
- There are two types of abnormal combustion—pre-ignition and detonation.

CARBURETED FUEL SYSTEM

Troubleshooting

Troubleshooting fuel systems requires the same techniques used in other areas. A thorough, systematic approach to troubleshooting will pay big rewards. Build your troubleshooting checklist, with the most likely offenders at the top. Use your experience to adjust your list for local conditions. Everyone has been tempted to jump into the carburetor on a vague hunch. Pause a moment and review the facts when this urge occurs.

In order to accurately troubleshoot a carburetor or fuel system problem, you must first verify that the problem is fuel related. Many symptoms can have several different possible causes. Be sure to eliminate mechanical and electrical systems as the potential fault. Carburetion is the number one cause of most engine problems but there are other possibilities.

One of the toughest tasks with a fuel system is the actual troubleshooting. Several tools are at your disposal for making this process very simple. A timing light works well for observing carburetor spray patterns. Look for the proper amount of fuel and for proper atomization in the two fuel outlet areas (main nozzle and bypass holes). The strobe effect of the lights helps you see in detail the fuel being drawn through the throat of the carburetor. On multiple carburetor engines, always attach the timing light to the cylinder you are observing so the strobe doesn't change the appearance of the patterns. If you need to compare two cylinders, change the timing light hookup each time you observe a different cylinder.

Pressure testing fuel pump output can determine whether the fuel spray is adequate and if the fuel pump diaphragms are functioning correctly. A pressure gauge placed between the fuel pump(s) and the carburetor(s) will test the entire fuel delivery system. Normally a fuel system problem will show up at high speed where the fuel demand is the greatest. A common symptom of a fuel pump output problem is surging at wide open throttle but normal operation at slower speeds. To check the fuel pump output, install the pressure gauge and accelerate the engine to wide-open throttle. Observe the pressure gauge needle. It should always swing up the value indicated in the specification charts and remain steady. This reading would indicate a system that is functioning properly.

If the needle gradually swings down toward zero, fuel demand is greater than the fuel system can supply. This reading isolates the problem to the fuel delivery system (fuel tank or line). To confirm this, an auxiliary tank should be installed and the engine re-tested. Be aware that a bad anti-siphon valve on a built-in tank can create enough restriction to cause a lean condition and serious engine damage.

If the needle movement becomes erratic, suspect a ruptured diaphragm in the fuel pump.

To check for air entering the fuel system, install a clear fuel hose between the fuel screen and fuel pump. If air is in the line, check all fittings back to the boat's fuel tank.

Spark plug tip appearance is a good indication of combustion efficiency. The tip should be a light tan. A white insulator or small beads on the insulator indicate too much heat. A dark or oil fouled insulator indicates incomplete combustion. To properly read spark plug tip appearance, run the engine at the RPM you are testing for about 15 seconds and then immediately turn the engine OFF without changing the throttle position.

Reading spark plug tip appearance is also the proper way to test jet verifications in high altitude.

COMMON PROBLEMS

Fuel Delivery

Many times fuel system troubles are caused by a plugged fuel filter, a defective fuel pump or by a leak in the line from the fuel tank to the fuel pump. A defective choke may also cause problems. Would you believe, a majority of starting troubles which are traced to the fuel system are the result of an empty fuel tank or aged sour fuel.

- **Pre-ignition**—occurs when the air-fuel mixture is ignited by some incandescent source other than the correctly timed spark from the spark plug.
 - **Detonation**—occurs when excessive heat and or pressure ignites the air/fuel mixture rather than the spark plug. The burn becomes explosive.
- In general, anything that can cause abnormal heat buildup can be enough to push an engine over the edge to abnormal combustion, if any of the four basic factors previously discussed are already near the danger point, for example, excessive carbon buildup raises the compression and retains heat as glowing embers.

Sour Fuel

Under average conditions (temperate climates), fuel will begin to break down in about four months. A gummy substance forms in the bottom of the fuel tank and in other areas. The filter screen between the tank and the carburetor and small passages in the carburetor will become clogged. The gasoline will begin to give off an odor similar to rotten eggs. Such a condition can cause the owner much frustration, time in cleaning components and the expense of replacement or overhaul parts for the carburetor.

Even with the high price of fuel, removing gasoline that has been standing unused over a long period of time is still the easiest and least expensive preventative maintenance possible. In most cases, this old gas can be used without harmful effects in an automobile using regular gasoline.

A gasoline preservative will keep the fuel fresh for up to twelve months. These products are available in most areas under various trade names.

Choke Problems

When the engine is hot, the fuel system can cause starting problems. After a hot engine is shut down, the temperature inside the fuel bowl may rise to 200°F and cause the fuel to actually boil. All carburetors are vented to allow this pressure to escape to the atmosphere. However, some of the fuel may percolate over the high-speed nozzle.

If the choke should stick in the open position, the engine will be hard to start. If the choke should stick in the closed position, the engine will flood, making it very difficult to start.

In order for this raw fuel to vaporize enough to burn, considerable air must be added to lean out the mixture. Therefore, the only remedy is to remove the spark plugs, ground the leads, crank the engine through about ten revolutions, clean the plugs, reinstall the plugs and start the engine.

If the needle valve and seat assembly is leaking, an excessive amount of fuel may enter the reed housing in the following manner. After the engine is shut down, the pressure left in the fuel line will force fuel past the leaking needle valve. This extra fuel will raise the level in the fuel bowl and cause fuel to overflow into the reed housing.

A continuous overflow of fuel into the reed housing may be due to a sticking inlet needle or to a defective float, which would cause an extra high level of fuel in the bowl and overflow into the reed housing.

Rough Engine Idle

If an engine does not idle smoothly, the most reasonable approach to the problem is to perform a tune-up to eliminate such areas as:

- Defective points
- Faulty spark plugs
- Timing out of adjustment

Other problems that can prevent an engine from running smoothly include:

- An air leak in the intake manifold
- Uneven compression between the cylinders

Of course any problem in the carburetor affecting the air/fuel mixture will also prevent the engine from operating smoothly at idle speed. These problems usually include:

- Too high a fuel level in the bowl
- A heavy float
- Leaking needle valve and seat
- Defective automatic choke
- Improper adjustments for idle mixture or idle speed

Excessive Fuel Consumption

Excessive fuel consumption can be the result of any one of four conditions or a combination of all.

- Inefficient engine operation.

8-4 FUEL SYSTEMS – CARBURETORS

- Faulty condition of the hull, including excessive marine growth.
- Poor boating habits of the operator.
- Leaking or out-of-tune carburetor.

If the fuel consumption suddenly increases over what could be considered normal, then the cause can probably be attributed to the engine or boat and not the operator.

Marine growth on the hull can have a very marked effect on boat performance. This is why sailboats always try to have a haul-out as close to race time as possible.

While you are checking the bottom, take note of the propeller condition. A bent blade or other damage will definitely cause poor boat performance.

If the hull and propeller are in good shape, then check the fuel system for possible leaks. Check the line between the fuel pump and the carburetor while the engine is running and the line between the fuel tank and the pump when the engine is not running. A leak between the tank and the pump many times will not appear when the engine is operating, because the suction created by the pump drawing fuel will not allow the fuel to leak. Once the engine is turned off and the suction no longer exists, fuel may begin to leak.

If a minor tune-up has been performed and the spark plugs, points (if equipped) and timing are properly adjusted, then the problem most likely is in the carburetor and an overhaul is in order.

Check the needle valve and seat for leaking. Use extra care when making any adjustments affecting the fuel consumption, such as the float level or automatic choke.

Engine Surge

If the engine operates as if the load on the boat is being constantly increased and decreased, even though an attempt is being made to hold a constant engine speed, the problem can most likely be attributed to the fuel pump or a restriction in the fuel line between the tank and the carburetor.

COMBUSTION RELATED PISTON FAILURES

When an engine has a piston failure due to abnormal combustion, fixing the mechanical portion of the engine is the easiest part of the equation. The hard part is determining what caused the problem in order to prevent a repeat failure. Think back to the four basic areas that affect combustion to find the cause of the failure.

Since you probably removed the cylinder head, inspect the failed piston and look for excessive deposit buildup that could raise compression or retain heat in the combustion chamber. Statically check the wide open throttle timing. Be sure that the timing is not over advanced. It is a good idea to seal these adjustments with paint to detect tampering.

Look for a fuel restriction that could cause the engine to run lean. Don't forget to check the fuel pump, fuel tank and lines, especially if a built in tank is used. Be sure to check the anti-siphon valve on built in tanks. If everything else looks good, the final possibility is poor quality fuel.

Operation

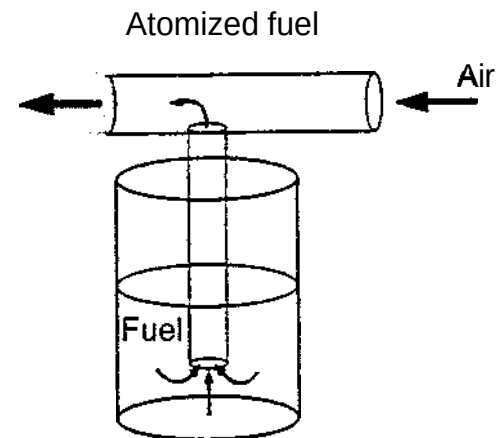
BASIC FUNCTIONS

◆ See Figure 1

Traditional carburetor theory often involves a number of laws and principles. The diagram illustrates several carburetor basics. If you blow air across a straw inserted into a container of liquid, a pressure drop is created in the straw column. As the liquid in the column is expelled, an atomized mixture (air and fuel droplets) is created. In a carburetor this is mostly air and a little fuel.

The actual ratio of air to fuel differs with engine conditions but is usually from 15 parts air to one part fuel at optimum cruise to as little as 7 parts air to one part fuel at full choke.

Using our example, what if the top of the container is covered and sealed around the straw, what will happen? No flow. This is typical of a clogged carburetor bowl vent. If the base of the straw is clogged or restricted what will happen? No flow or low flow. This represents a clogged main jet. If the liquid in the glass is lowered and you blow through the straw with the same force what will happen? Not as much fuel will flow. A lean condition occurs. If the fuel level is raised and you blow again at the same velocity what happens? The result is a richer mixture.



Carburetor operating principles

Fig. 1 If you blow air across a straw inserted into a container of liquid, a pressure drop is created in the straw column. As the liquid in the column is expelled, an atomized mixture (air and fuel droplets) is created

FUEL & AIR METERING

The carburetor is merely a metering device for mixing fuel and air in the proper proportions for efficient engine operation.

Float Systems

◆ See Figure 2

A small chamber in the carburetor serves as a fuel reservoir. A float valve admits fuel into the reservoir to replace the fuel consumed by the engine. If the carburetor has more than one reservoir, the fuel level in each reservoir (chamber) is controlled by identical float systems.

Fuel level in each chamber is extremely critical and must be maintained accurately. Accuracy is obtained through proper adjustment of the floats. This adjustment will provide a balanced metering of fuel to each cylinder at all speeds.

Following the fuel through its course, from the fuel tank to the combustion chamber of the cylinder, will provide an appreciation of exactly what is taking place. In order to start the engine, the fuel must be moved from the tank to the carburetor by a fuel pump installed in the fuel line.

After the engine starts, the fuel passes through the pump to the carburetor. All systems have some type of filter installed somewhere in the line between the tank and the carburetor. Most engines also have a filter as an integral part of the carburetor.

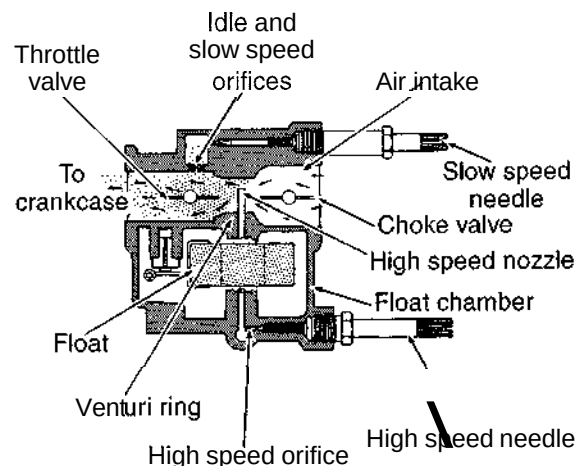


Fig. 2 Fuel flow through a venturi, showing principal and related parts controlling intake and outflow

At the carburetor, the fuel passes through the inlet passage to the needle and seat and then into the float chamber (reservoir). A float in the chamber rides up and down on the surface of the fuel. After fuel enters the chamber and the level rises to a predetermined point, a tang on the float closes the inlet needle and the flow entering the chamber is cut off. When fuel leaves the chamber as the engine operates, the fuel level drops and the float tang allows the inlet needle to move off its seat and fuel once again enters the chamber. In this manner, a constant reservoir of fuel is maintained in the chamber to satisfy the demands of the engine at all speeds.

A fuel chamber vent hole is located near the top of the carburetor body to permit atmospheric pressure to act against the fuel in each chamber. This pressure assures an adequate fuel supply to the various operating systems.

Air/Fuel Mixture

◆ See Figure 3

A suction effect is created each time the piston moves upward in the cylinder. This suction draws air through the throat of the carburetor. A restriction in the throat, called a venturi, controls air velocity and has the effect of reducing air pressure at this point.

The difference in air pressures at the throat and in the fuel chamber causes the fuel to be pushed out of metering jets extending down into the fuel chamber. When the fuel leaves the jets, it mixes with the air passing through the venturi. This fuel/air mixture should then be in the proper proportion for burning in the cylinders for maximum engine performance.

In order to obtain the proper air/fuel mixture for all engine speeds, some models have high and low speed jets. These jets have adjustable needle valves that are used to compensate for changing atmospheric conditions. In almost all cases, the high-speed circuit has fixed high-speed jets and is not adjustable.

A throttle valve controls the flow of air/fuel mixture drawn into the combustion chambers. A cold engine requires a richer fuel mixture to start and during the brief period it is warming to normal operating temperature. A choke valve is placed ahead of the metering jets and venturi. As this valve begins to close, the volume of air intake is reduced, thus enriching the mixture entering the cylinders. When this choke valve is fully closed, a very rich fuel mixture is drawn into the cylinders.

The throat of the carburetor is usually referred to as the barrel. Carburetors with single, double or four barrels have individual metering jets, needle valves, throttle and choke plates for each barrel. Single and two barrel carburetors are fed by a single float and chamber.

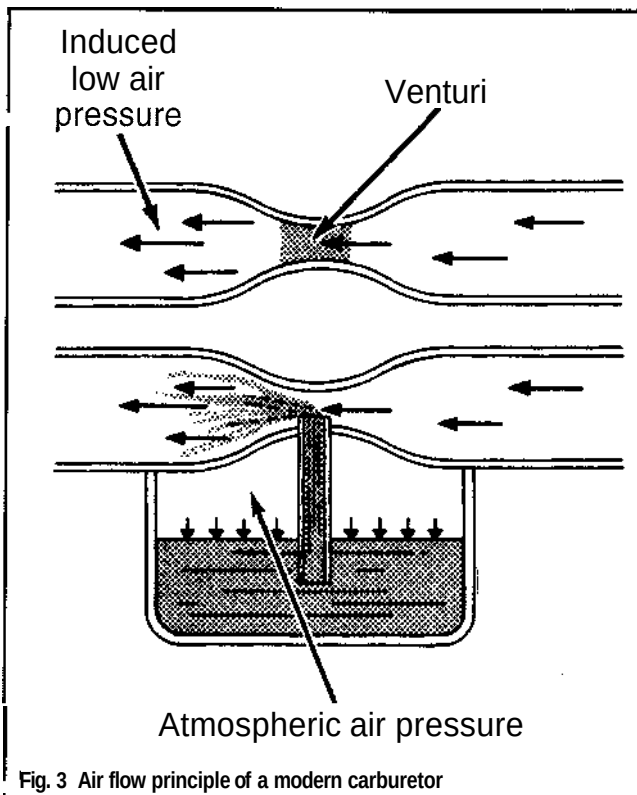


Fig. 3 Air flow principle of a modern carburetor

CARBURETOR CIRCUITS

The following section illustrates the circuit functions and locations of a typical marine carburetor.

Starting Circuit

† See Figure 4

The choke plate is closed, creating a partial vacuum in the venturi. As the piston rises, negative pressure in the crankcase draws the rich air-fuel mixture from the float bowl into the venturi and then on into the engine.

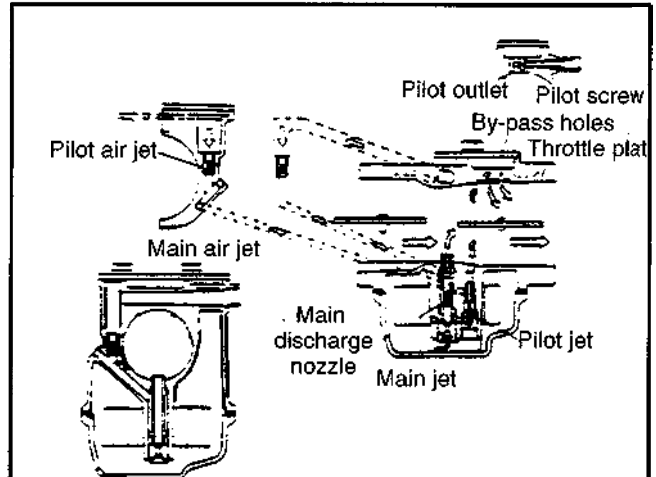


Fig. 4 Carburetor starting circuit

Low Speed Circuit

◆ See Figure 5

Zero-one-eighth throttle, when the pressure in the crankcase is lowered, the air-fuel mixture is discharged into the venturi through the pilot outlet because the throttle plate is closed. No other outlets are exposed to low venturi pressure. The fuel is metered by the pilot jet. The air is metered by the pilot air jet. The combined air-fuel mixture is regulated by the pilot air screw.

Mid-Range Circuit

◆ See Figure 6

One-eighth–three-eighthsthrottle, as the throttle plate continues to open, the air-fuel mixture is discharged into the venturi through the bypass holes. As the throttle plate uncovers more bypass holes, increased fuel flow results because of the low pressure in the venturi. Depending on the model, there could be two, three or four bypass holes.

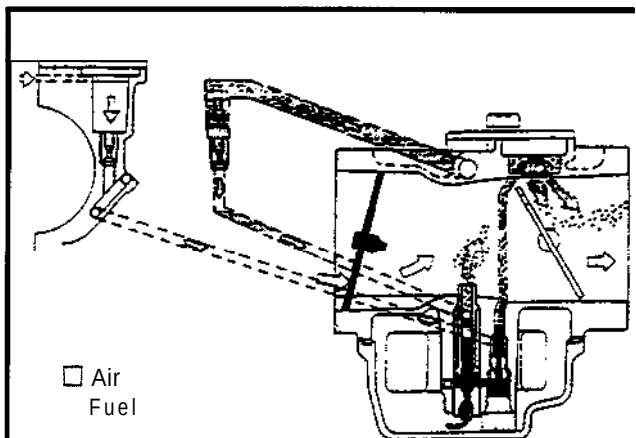


Fig. 5 Carburetor low speed circuit

8-6 FUEL SYSTEMS – CARBURETORS

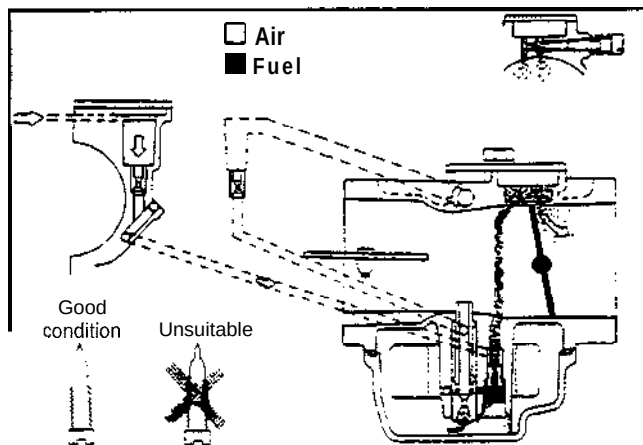


Fig. 6 Carburetor mid-range circuit

High Speed Circuit

◆ See Figure 7

Three-eighths-wide-open throttle, as the throttle plate moves toward wide open, we have maximum air flow and very low pressure. The fuel is metered through the main jet and is drawn into the main discharge nozzle. Air is metered by the main air jet and enters the discharge nozzle, where it combines with fuel. The mixture atomizes, enters the venturi and is drawn into the engine.

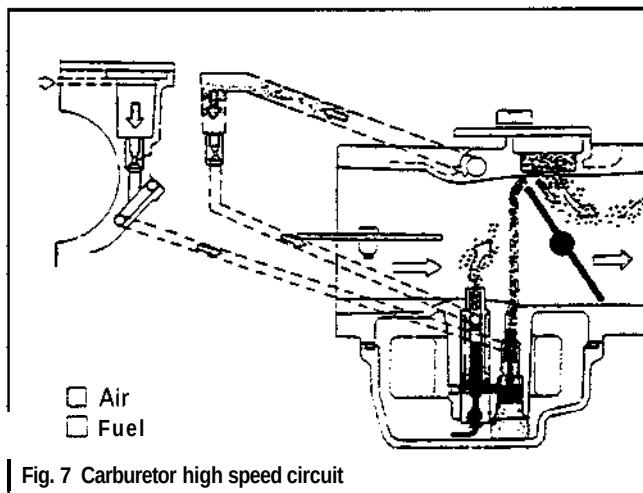


Fig. 7 Carburetor high speed circuit

Rochester 2bbl Carburetors

REMOVAL & INSTALLATION



*** WARNING

Always disconnect the battery cables before attempting to work on the fuel system. Never smoke or allow open flame near the engine—this sounds like an obvious precaution, but you'd be surprised at how many people forget!

No matter how much they look alike, marine carburetors are completely different from automotive carburetors. Never substitute an automotive carburetor for the one on your engine! Venting procedures are not the same and an automotive carburetor could allow dangerous vapors to escape into the bilge. Don't even think about it.

1. Open the engine hatch or remove the covers and then disconnect the battery cables. Turn the fuel petcock **OFF** and/or shut down the fuel supply at the tank.
2. Remove the flame arrestor after disconnecting the vent hose. It's always a good idea to plug the throttle bores with a clean, lint-free cloth.
3. Disconnect the throttle cable at the carburetor and carefully move it out of the way.
4. Using two open-end wrenches, hold the fuel inlet nut at the carburetor securely and loosen the fuel line nut. Disconnect the two and carefully move the line out of the way. Plug both the inlet and line open ends to prevent fuel seepage.
5. Tag and disconnect the electric choke lead (2.3L only).
6. Tag and disconnect any other lines, leads or hoses that may be in the way of removal.
7. Loosen and remove the carburetor mounting nuts (early models) or bolts and washers and lift the unit off the manifold. Plug the opening with a clean lint-free cloth.

To Install:

8. Clean the mating surfaces thoroughly of all residual gasket material.
9. Position a new gasket and then install the carburetor. On early models, tighten the nuts to 10-14 ft. lbs. (13-19 Nm). On all others, tighten the bolts to 12-15 ft. lbs. (16-20 Nm). Hopefully you remembered to remove the rag!
10. Reconnect the fuel line to the inlet line after removing the plugs and tighten it to 18 ft. lbs. (24 Nm). Don't forget to use two wrenches.
11. Connect the choke lead on the 2.3L engine.
12. Install and adjust the throttle cable as detailed in the Maintenance section. On the 2.5L and 3.0L engines, make sure that the distance between the centers of the two ball studs is 2 1/4 in. (57.2mm); on the 2.3L engines, the distance should be 2 3/32 in. (53.1mm).
13. Install the flame arrestor and reconnect the vent line.
14. Connect the battery cables. Start the engine and ensure there are no fuel leaks; shut down the engine immediately if there are. Check and adjust the idle speed and mixture.

DISASSEMBLY

◆ See Figures 8 thru 13



Always be certain that your carburetor rebuild kit is for marine applications.

1. Remove the carburetor.
2. Remove the idle vent valve and the pump link.
3. Remove the small screw at the end of the choke shaft. Remove the fast idle cam screw and then lift off the fast idle linkage as an assembly.
4. Remove the air horn attaching screws and lift the horn straight up and off the carburetor body.
5. Remove the two choke valve retaining screws—the ends of the screws are staked, so you may have to file the ends first. Lift out the valve.
6. Remove the choke cover with the coil attached. Pull up the gasket and lift out the baffle plate. Carefully (and slowly) rotate the choke shaft counterclockwise until the piston comes out of its bore and then lift out the entire assembly.
7. Turn the air horn upside down and pull out the float's hinge pin. Lift out the float and remove the needle.
8. Press down on the power piston shaft until the spring snaps, forcing the piston out of the casting. Remove the piston.
9. Remove the accelerator pump plunger and the pump lever/shaft assembly.
10. Remove the 2 choke housing screws and separate it from the horn. Discard the gasket.
11. Remove the pump plunger, return spring and main metering jets.
12. Remove the power valve from the body. Certain models will have an aluminum inlet ball in the bottom of the well—it will fall out when you turn the carb over, so don't lose it.
13. Loosen the mounting screws and pull out the venture cluster.
14. The discharge ball spring is held in place by a retainer; pull it out with needle-nose pliers and remove the spring and ball.
15. Turn the carburetor back over and remove the 3 throttle body screws. Separate the throttle body from the bowl.

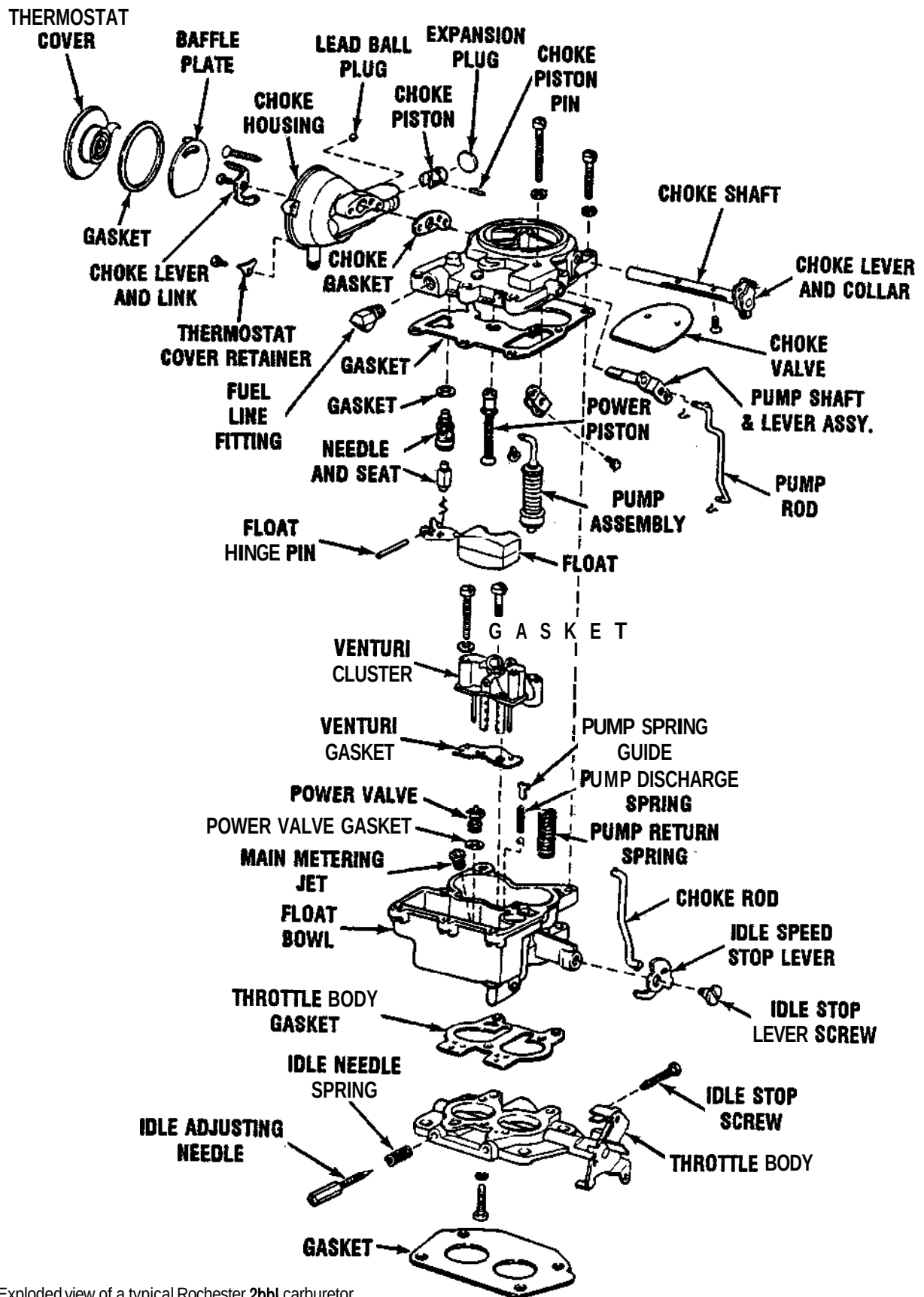


Fig. 8 Exploded view of a typical Rochester 2bb1 carburetor

8-8 FUEL SYSTEMS – CARBURETORS

⚠⚠ WARNING

Do not disassemble the throttle body — replacement parts are NOT available.

CLEANING & INSPECTION



Never use a wire brush or drill to clean jet passages or tubes in the carburetor.

Never allow the carburetor to soak in a cleaner bath for more than two hours. In fact, we recommend using spray cleaner.

Never immerse the float assembly, needle, accelerator pump plunger or fuel filter in cleaner. Wipe them carefully with a clean cloth.

Otherwise clean all allowable parts with carb cleaner and then dry with compressed air if at all possible.

Blow out and through all passages to ensure there is no foreign material clogging them.

Check the float needle and seat, if either is worn or damaged, replace them as a matched set.

Check the float assembly and hinge pin for wear or damage, replace as necessary.

Check the pump plunger, return spring, piston spring, idle mixture needle and all levers and linkages for wear or damage. Replace as necessary.

Check the throttle valve shaft for excessive looseness in the throttle body. Check that the valve and shaft do not bind through their range of operation and that the valve opens and closes fully. Replace the assembly if it fails any of these tests.

Check the choke valve lever and shaft for excessive looseness in the air horn. Check that the valve, lever and shaft do not bind through their range of operation and that the valve opens and closes fully. Replace the air horn assembly if it fails any of these tests.

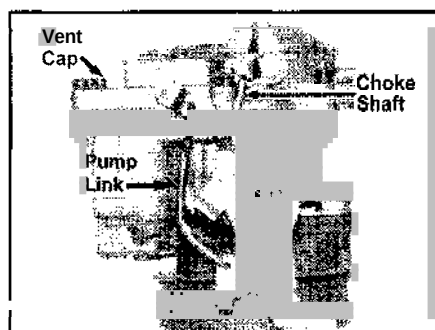


Fig. 9 Disconnect the pump link and the choke shaft

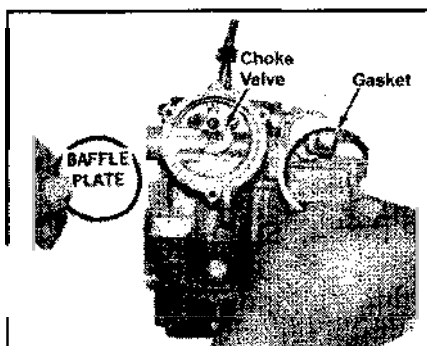


Fig. 10 Take apart the choke housing

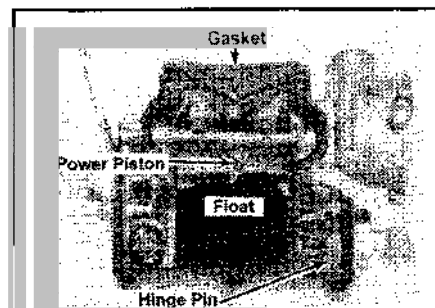


Fig. 11 After inverting the air horn, remove the float and power piston

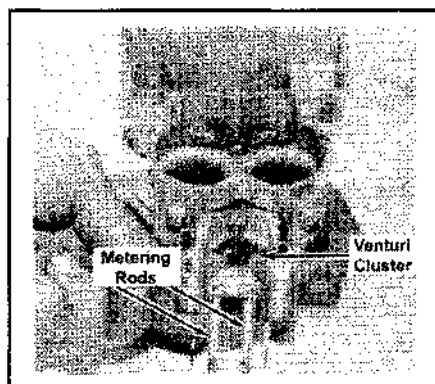


Fig. 12 Now you can remove the metering rods and the venturi cluster



Fig. 13 You'll need pliers to remove the discharge ball retainer

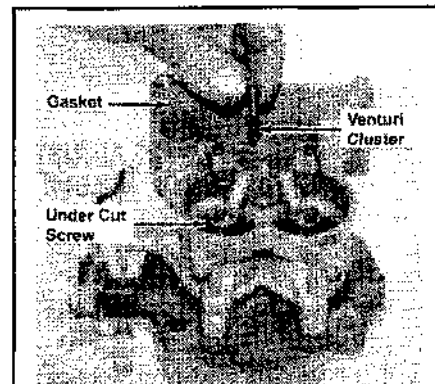


Fig. 14 Installing the venturi cluster

ASSEMBLY

♦ See Figures 8 and 14



1. Install the idle mixture adjusting needle into the throttle body and screw it down until it contacts the seat. Now back it out 1 1/2 turns.

2. Position a new gasket and install the throttle body. Tighten the screws to 50 inch lbs. (5.6 Nm).

Always use a non-vent gasket. Never use a vented automotive gasket.

3. Insert the steel discharge check ball and spring into the body and then insert the retainer.

4. Install the venturi cluster with a new gasket. Make sure that the under cut screw is installed in the center hole with a new gasket.

5. Install the main metering jets and the power valve using new gaskets.

6. Slide the pump return spring into the pump and then install the inlet screen on the bottom of the bowl.

7. Install the choke housing with a new gasket. Attach the choke piston to the shaft/link—the piston pin and the flat section on the side of the choke piston must face out toward the air horn. Push the shaft into the air horn and rotate it until the piston enters the bore.

8. Position the choke valve onto the shaft so the letters **RP** are facing up and screw in the retaining screws finger-tight. Install the choke rod lever and the trip lever to the end of the shaft. Center the valve so that the clearance between the lever and the air horn is 0.020 in. (0.51mm), tighten the retaining screws securely and then rough up their ends to prevent them from backing out.

9. Install the baffle plate, gasket (new) and thermostatic cover. Rotate the cover until the index marks align and then tighten the retainers and screws securely.

10. Install the outer pump lever into the air horn and then install the inner arm; tighten the screw securely.

11. Install the pump plunger to the inner arm so that the shaft is pointing inward. Install the retainer.

12. Position the screen on the float needle seat and then install the assembly onto the air horn.
13. Install the power piston into the vacuum cavity making sure that it can move without obstruction. Carefully stake the retainer to hold it in place.
14. Install a new air horn gasket and then attach the needle to the float. Carefully insert the needle into the float seat while, at the same time, guiding the float between the bosses. Insert the hinge pin and check the float level and drop.
15. Install the horn to the float bowl.
16. Install the carburetor.

ADJUSTMENT

Float Level



Floats With Vertical Seam

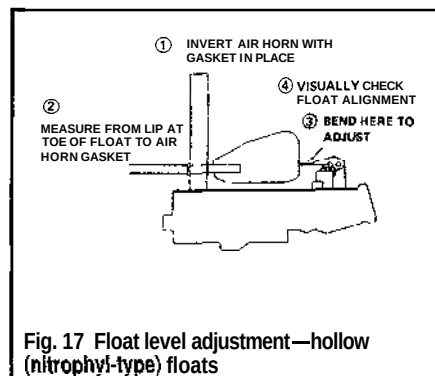
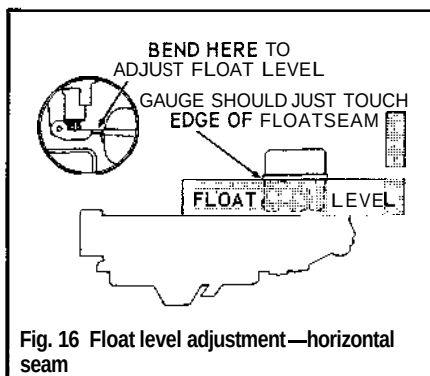
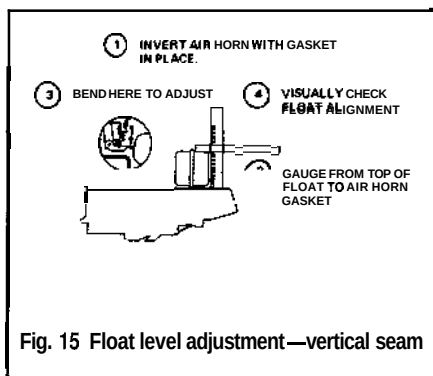
◆ See Figure 15

1. Following the disassembly procedure detailed previously, remove the bowl cover/air horn from the carburetor.
2. Turn the assembly upside down and check that the float pivots freely on the pin. Raise the float and let it fall--do not force it!
3. Using a standard carburetor gauge, measure the distance between the bottom of the air horn gasket (remember it's upside down, so this will be the top) and the top of the float; it should be within the specifications given in your rebuild kit. Carefully bend the float arm (at the rear of the float) with needle nose pliers to achieve the correct measurement. Make sure the float stays in alignment.
4. It's usually a good idea to check the float drop now.
5. Recheck your measurements one more time.
6. Reinstall the air horn and carburetor.

Floats With Horizontal Seam

◆ See Figure 16

1. Following the disassembly procedure detailed previously, remove the bowl cover/air horn from the carburetor.
2. Turn the assembly upside down and check that the float pivots freely on the pin. Raise the float and let it fall--do not force it!
3. Using a standard carburetor gauge, measure the distance between the bottom of the air horn gasket (remember it's upside down, so this will be the top) and the lower edge of the seam on the float; it should be within the specifications given in your rebuild kit. Carefully bend the float arm (at the rear of the float) with needle nose pliers to achieve the correct measurement. Make sure the float stays in alignment.
4. It's usually a good idea to check the float drop now.
5. Recheck your measurements one more time.
6. Reinstall the air horn while guiding the accelerator pump plunger into the well.
7. Slide the idle speed needle spring over the needle and screw it back into the throttle body.
8. Install the pump rod, choke rod and idle stop screw.
9. Install the carburetor.



Hollow Floats

◆ See Figure 17

1. Following the disassembly procedure detailed previously, remove the bowl cover/air horn from the carburetor.
2. Turn the assembly upside down and check that the float pivots freely on the pin. Raise the float and let it fall--do not force it!
3. Using a standard carburetor gauge, measure the distance between the bottom of the air horn gasket (remember it's upside down, so this will be the top) and the lip at the toe of the float; it should be within the specifications given in your rebuild kit. Carefully bend the float arm (at the rear of the float) with needle nose pliers to achieve the correct measurement. Make sure the float stays in alignment.
4. It's usually a good idea to check the float drop now.
5. Recheck your measurements one more time.
6. Reinstall the air horn and carburetor.

Float Drop

◆ See Figure 18



1. After checking the float level adjustment, turn the air horn over so it is right-side-up.
2. Allow the float to hang down freely and measure the distance between the bottom of the gasket and the lowest edge on the bottom of the float. On the 2.3L and 4.3L carburetor and later 3.0L carbs, measure to the gasket seam at the toe of the float.
3. If your measurement is not within the specification given in the kit, carefully bend the float tang with needle-nose pliers until it comes within spec.
4. Recheck your measurements one more time.
5. Reinstall the air horn and carburetor.

Idle Speed & Mixture

Please refer to the Maintenance section for adjustment procedures.

Pump Rod

◆ See Figure 19



1. Back out the idle stop screw and then close the throttle valves completely in their bores.
2. Position a pump gauge across the top of the air horn so that the leg is pointing down toward the top of the pump rod to the measurement listed in the Specifications chart.
3. If the lower edge of the gauge does not come in contact with the top of the rod, carefully bend the rod with needle-nose pliers until it does.

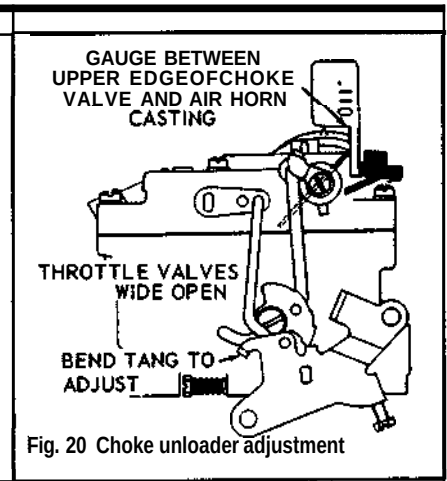
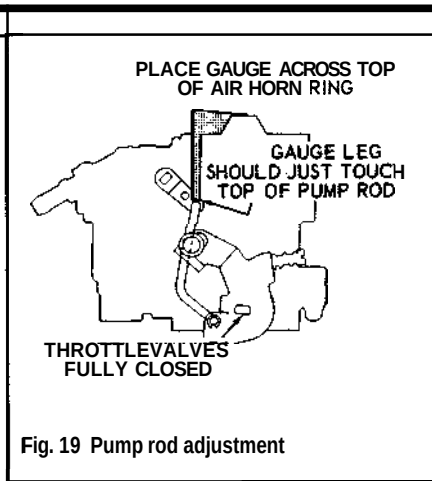
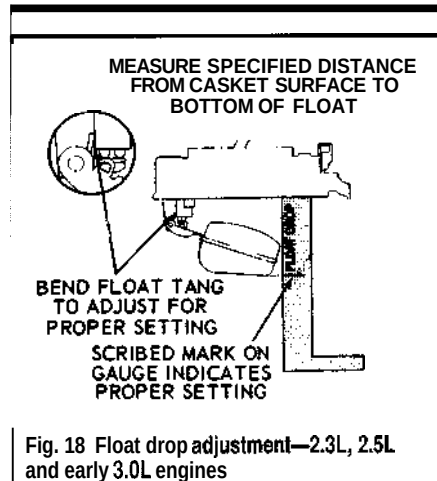
Choke Unloader

◆ See Figure 20



1. Remove the flame arrestor.
2. Move the linkage to position the throttle valves in the fully open position.
3. Insert the proper gauge (or drill bit) between upper edge of the plate and the inner side of the air horn wall. The gauge should just slide through—if not, bend the tang on the throttle lever until the measurement is correct.

8-10 FUEL SYSTEMS – CARBURETORS



Intermediate Choke Rod—2.3L and 4.3L Engines

1. Remove the flame arrestor.
2. Remove the 3 mounting screws and lift off the thermostat cover, gasket and baffle.
3. Hold the choke valve closed and check that the edge of the actuator lever in the housing is lined up with the edge of the casting. If not, bend the choke rod with needle nose pliers at the bend just below the lever.



Vacuum Break—2.3L and 4.3L Engines

1. Remove the flame arrestor.
2. Stretch a small rubber band over the vacuum break diaphragm plunger so that the diaphragm is fully seated. Make sure that the rubber band is not interfering with the vacuum break link's movement.
3. Pull up on the intermediate choke lever until the choke valve is fully closed and then insert the proper sized gauge/bit between the inner wall of the air horn and the upper edge of the valve.
4. Bend the vacuum break link at the 90° bend below the unit.



Automatic Choke—2.5L, 3.0L and 4.3L Engines

◆ See Figure 21

1. Remove the flame arrestor.
2. Loosen the 3 choke cover mounting screws and then rotate the cover until the mark on the cover is in alignment with the index line on the housing.
3. Tighten the screws.



Electric Choke—2.3L Engines

1. Remove the flame arrestor.
2. Loosen the choke cover mounting screws and then rotate the cover until the mark on the cover is in alignment with the index line on the housing.
3. If adjustment is necessary, move the cover one mark at a time, but never more than 2 marks in total from the index mark.
4. Tighten the screws.



Rochester 4 bbl Carburetor

DESCRIPTION

The Rochester Quadrajet carburetor has two stages. The primary (fuel inlet) side has small 1 3/8 in. bores with a triple venturi setup equipped with plain-tube nozzles. The carburetor operates much the same as other carburetors using the venturi principle. The triple venturi, plus the small primary bores, makes for a more stable and finer fuel control during idle and partial throttle operation. When the throttle is partially open, the fuel metering is accomplished with tapered metering rods, positioned by a vacuum-responsive piston and operating in specially designed jets.

The secondary side has two large, 2 1/4 in., bores. These large bores, when added to the primary side bores, provide enough air capacity to meet most engine requirements. The air valve is used in the secondary side for metering control and backs-up the primary bores to meet air and fuel demands of the engine.

The secondary air valve operates the tapered metering rods. These rods move in orifice plates and thus control fuel flow from the secondary nozzles in direct relation to the air flowing through the secondary bores.

The float bowl is designed to avoid problems of fuel spillage during sharp turns of the boat which could result in engine cutout and delayed fuel flow. The bowl reservoir is smaller than most four-barrel carburetors to reduce fuel evaporation during hot engine shut down.

The float system has one pontoon float and fuel valve which makes servicing much easier than on some other model carburetors. A fuel filter is located in the float bowl ahead of the float needle valve. This filter is easily removed for cleaning or replacement.

The throttle body is made of aluminum as part of a weight-reduction program and also to improve heat transfer away from the fuel bowl and prevent the fuel from "percolating" during hot engine shut down. A heat insulator gasket is used between the throttle body and bowl to help prevent "percolating".

*** WARNING

Always disconnect the battery cables before attempting to work on the fuel system. Never smoke or allow open flame near the engine—this sounds like an obvious precaution, but you'd be surprised at how many people forget!

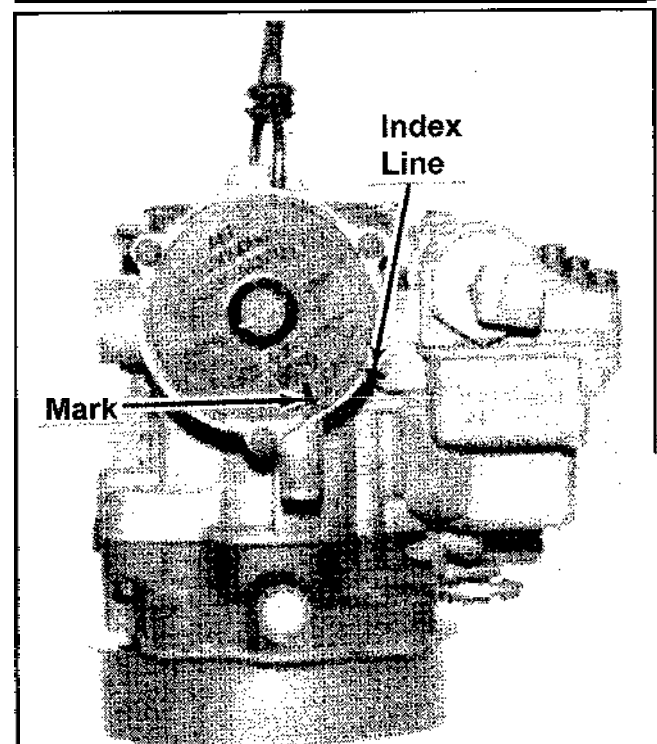


Fig. 21 Automatic choke adjustment

REMOVAL & INSTALLATION



No matter how much they look alike, marine **carburetors** are completely different from automotive carburetors. Never substitute an automotive carburetor for the one on your engine! Venting procedures are not the same and an automotive carburetor could **allow** dangerous vapors to escape into the bilge. Don't even think about it.

1. Open the engine hatch or remove the covers and then disconnect the battery cables. Turn the fuel petcock OFF and/or shut down the fuel supply at the tank.
2. Remove the flame arrestor after disconnecting the vent hose. It's always a good idea to plug the throttle bores with a clean, lint-free cloth.
3. Disconnect the throttle cable hardware from the throttle bracket and lever anchor studs. Remove the cable and carefully move it out of the way.
4. Remove the retaining clip and disconnect the choke spring rod.
5. Using two open end line nut wrenches, hold the fuel inlet nut at the carburetor securely and loosen the fuel line nut. Disconnect the two and carefully move the line out of the way. Plug both the inlet and line open ends to prevent fuel seepage.
6. Loosen and remove the carburetor mounting nuts/bolts (2 each) and washers, and lift the unit off the manifold. Plug the opening with a clean lint-free cloth. Remove the cable bracket.

To Install:

7. Clean the mating surfaces thoroughly of all residual gasket material, position a new gasket and then install the carburetor. Certain models may use an adaptor or wedge plate, install this first. Tighten the nuts to 10-14 ft. lbs. (13-19 Nm) and the bolts to 6-8 ft. lbs. (8-11 Nm). Hopefully you remembered to remove the rag!
8. Reconnect the fuel line to the inlet line after removing the plugs and tighten it to 18 ft. lbs. (24 Nm). Don't forget to use two wrenches.
9. Connect the choke spring rod and slide in the retaining clip.
10. Install and adjust the throttle cable as detailed later in this section.
11. Install the flame arrestor and reconnect the vent line.
12. Connect the battery cables. Start the engine and ensure there are no fuel leaks; shut down the engine immediately if there are. Check and adjust the idle speed and mixture.

DISASSEMBLY



- 1) See Figures 22 thru 30

Always be certain that your carburetor rebuild kit is for marine applications.

1. Remove the carburetor.
2. Place the carburetor on the workbench in the upright position. If servicing an older carburetor, remove the idle vent valve attaching screw, and then remove the idle vent valve assembly. Remove the clip from the upper end of the choke intermediate rod, disconnect the choke rod from the upper choke shaft lever, and then remove the intermediate choke rod from the air horn.
3. Drive back the roll pin at the upper end of the accelerator pump lever just enough to remove the lever, and then disconnect the pump rod and lever.
4. Disconnect and remove the accelerator pump rod and lever from the horn.
5. Hold the air valve wide open and then remove the secondary metering rods by tilting and sliding the rods from the holes in the hanger.
6. Remove the nine air horn-to-bowl attaching screws, 2 of the screws are counter-sunk next to the primary venturi.
7. Remove the retaining clip from the vacuum-break link at the vacuum-break diaphragm. Disconnect the vacuum-break link from the vacuum-break assembly. Gently push apart the retaining ears of the bracket to release the vacuum-break canister.
8. Now, lift straight up on the air horn and remove it, taking care not to bend the accelerator pump and air bleed tubes sticking out from the air horn.
9. Remove the dashpot piston from the air-valve link by rotating the bend through the hole, and then remove the dashpot from the air horn by rotating the bend through the air horn. Further disassembly of the air horn is not necessary. Do not remove the air valves, air valve shaft, and secondary metering rod hangers because they are calibrated. Do not attempt to remove the high-speed air bleeds and accelerating well tubes because they are pressed into position.

10. Remove the accelerator pump piston from the pump well. Release the air horn gasket from the dowels on the secondary side of the bowl, and then pry the gasket from around the power piston and primary metering rods. Remove the pump return spring from the pump well.

11. Pull off the insert block, remove the plastic filler from over the float valve. Use a pair of needle-nosed pliers and pull straight up on the metering rod hanger directly over the power piston and remove the power piston and the primary metering rods. Disconnect the tension spring from the top of each rod and then rotate the rod and remove the metering rods from the power piston. Pull up just a bit on the float assembly hinge pin until the pin can be removed by sliding it toward the pump well.

12. Insert a screwdriver into the slots on the fuel inlet seat and remove the seat and gasket.

13. Remove both primary metering rod jets. Remove the pump discharge check ball retainer and the check ball.

14. Remove the baffle plates from the secondary side of the bowl.

15. Disconnect the vacuum hose from the tube connection on the bowl and from the vacuum break assembly. Remove the retaining screw, and then lift the assembly from the float bowl.

16. Remove the fuel inlet filter retaining nut, gasket, filter, and spring.

17. Remove the throttle body by taking out the two throttle body-to-bowl attaching screws, and then lift off the insulator gasket.

18. Remove the idle mixture screws and springs. Take care not to damage the secondary throttle valves.

CLEANING & INSPECTION



Never use a wire brush or drill to clean jet passages or tubes in the carburetor.

Never allow the carburetor to soak in a cleaner bath for more than two hours. In fact, we recommend using spray cleaner.

Never immerse the float assembly, needle, accelerator pump plunger or fuel filter in cleaner. Wipe them carefully with a clean cloth.

Otherwise clean all allowable parts with carb cleaner and then dry with compressed air if at all possible.

Blow out and through all passages to ensure there is no foreign material clogging them.

Check the float needle and seat, if either is worn or damaged, replace them as a matched set.

Check the float assembly and hinge pin for wear or damage, replace as necessary.

Check the pump plunger, return spring, piston spring, idle mixture needle and all levers and linkages for wear or damage. Replace as necessary.

Check the throttle valve shaft for excessive looseness in the throttle body. Check that the valve and shaft do not bind through their range of operation and that the valve opens and closes fully. Replace the assembly if it fails any of these tests.

Check the choke valve lever and shaft for excessive looseness in the air horn. Check that the valve, lever and shaft do not bind through their range of operation and that the valve opens and closes fully. Replace the air horn assembly if it fails any of these tests.

ASSEMBLY



- 1) See Figures 22, and 31 thru 42

1. Turn the idle mixture adjusting screws in until they are barely seated, and then back them out two to three turns as a rough adjustment at this time. Never turn the adjusting screws down tight into their seats or they will be damaged.

2. Place a new insulator gasket on the bowl with the holes in the gasket indexed over the two dowels. Install, and then tighten the throttle body-to-bowl screws evenly.

3. Install the fuel inlet filter spring, filter, new gasket, and inlet nut. Tighten the nut.

4. Install the baffle plates in the secondary side of the bowl with the notches facing up.

5. Grasp the choke rod so that the intermediate choke lever is at the bottom. Suspend the assembly into the float bowl so that the hole with the flat side aligns with the hole in the side of the float bowl. Now, insert the choke shaft on the vacuum break through the hole until it engages the flat-sided hole in the choke lever. Install the screw and tighten it securely.

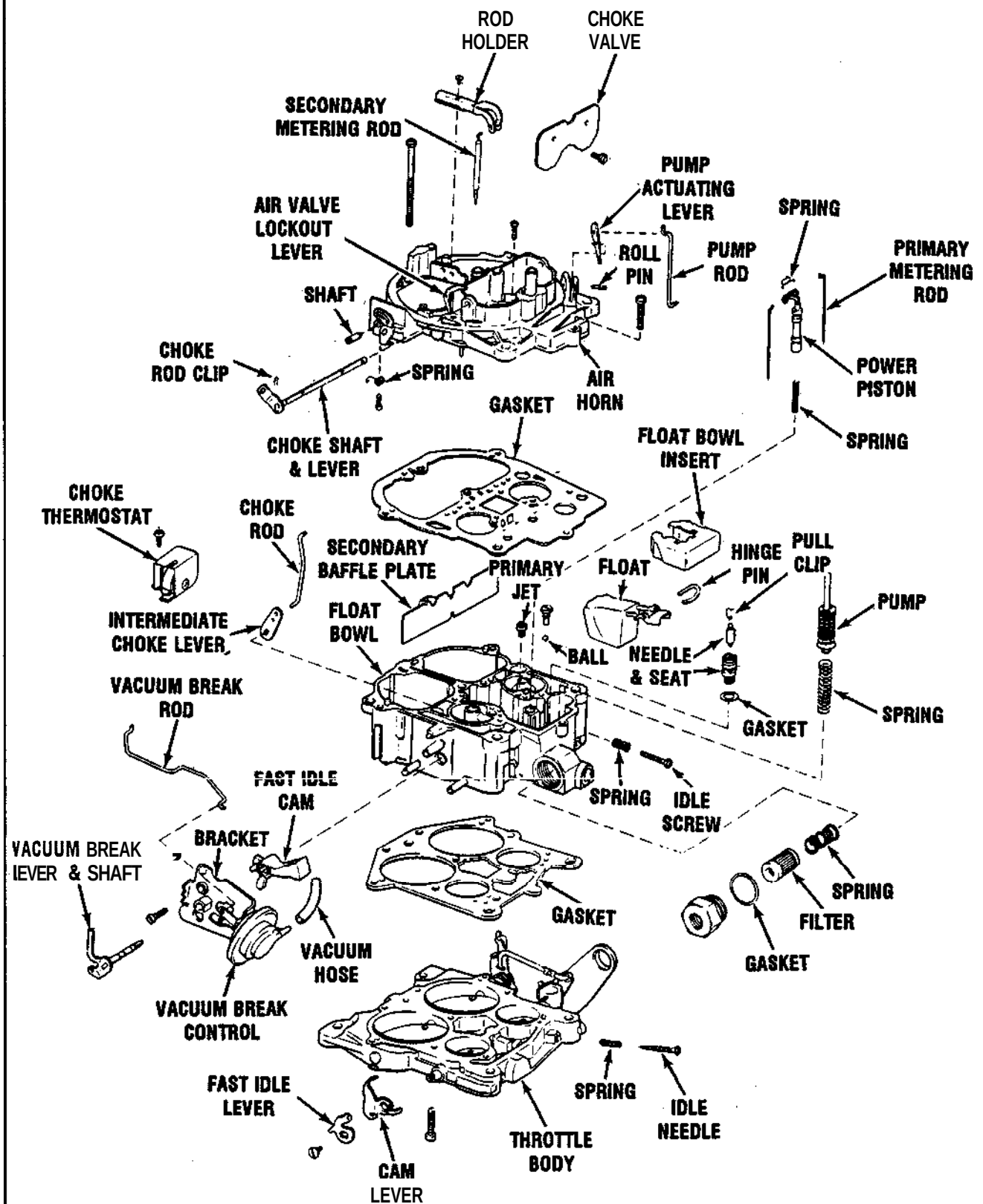


Fig. 22 Exploded view of a typical Rochester 4bbl carburetor

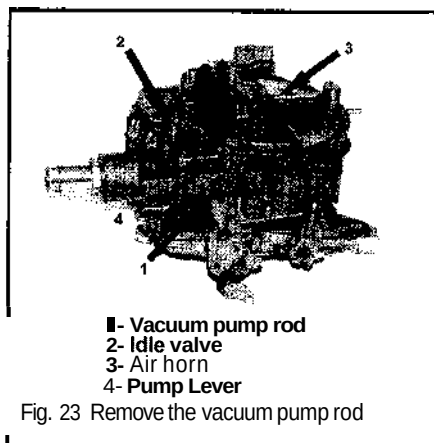


Fig. 23 Remove the vacuum pump rod

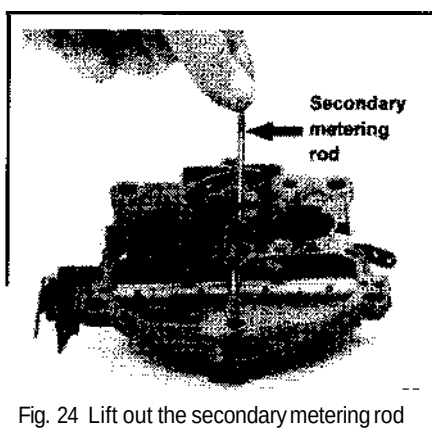


Fig. 24 Lift out the secondary metering rod

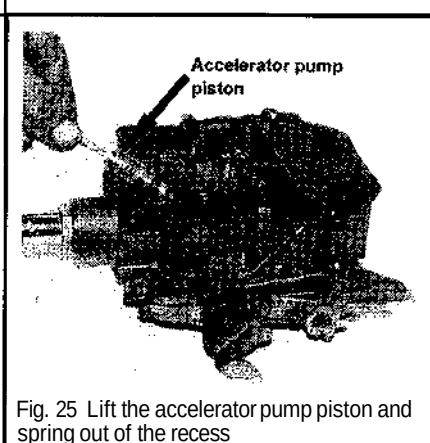


Fig. 25 Lift the accelerator pump piston and spring out of the recess

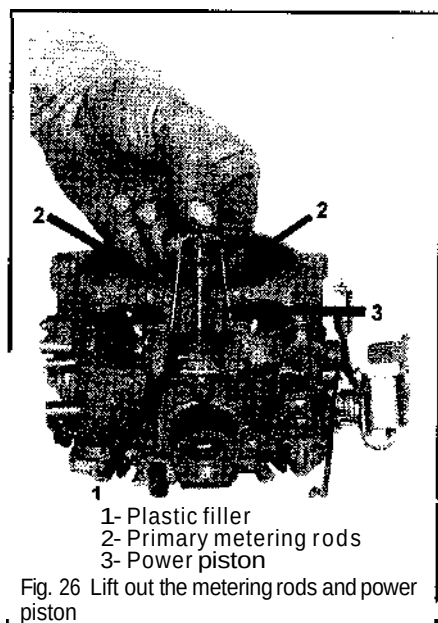


Fig. 26 Lift out the metering rods and power piston

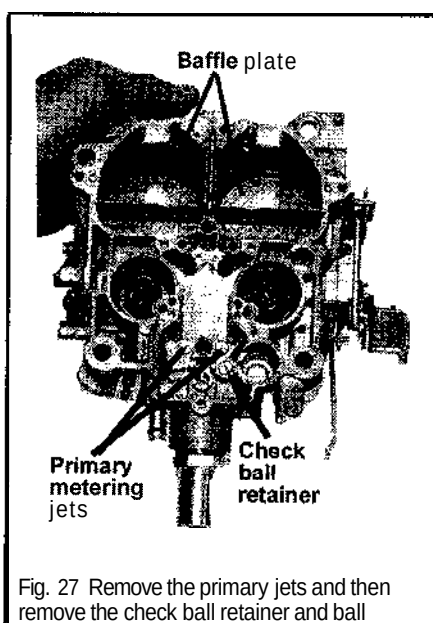


Fig. 27 Remove the primary jets and then remove the check ball retainer and ball

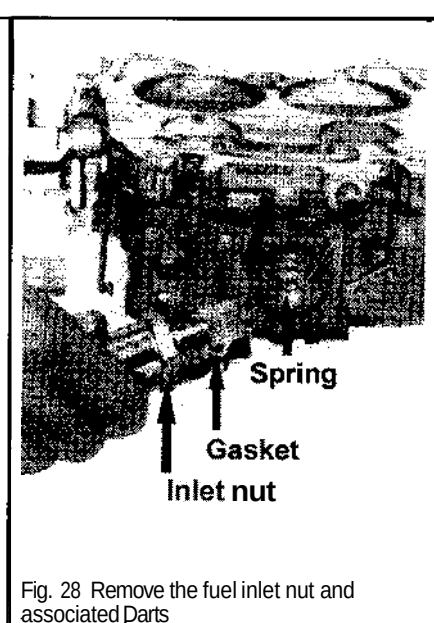


Fig. 28 Remove the fuel inlet nut and associated parts

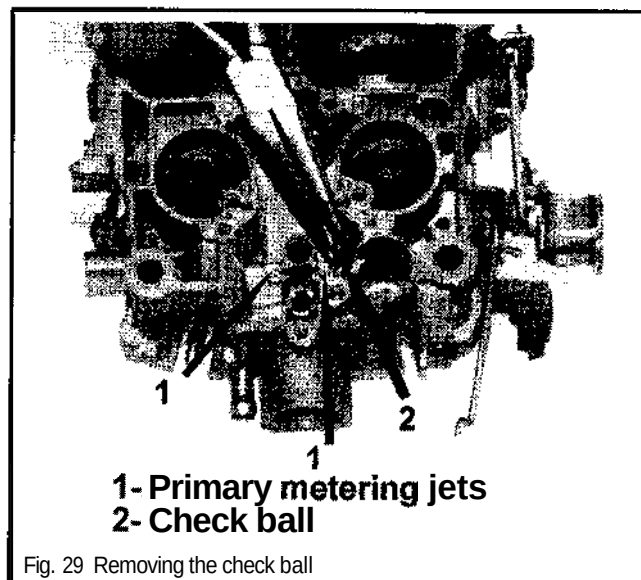


Fig. 29 Removing the check ball

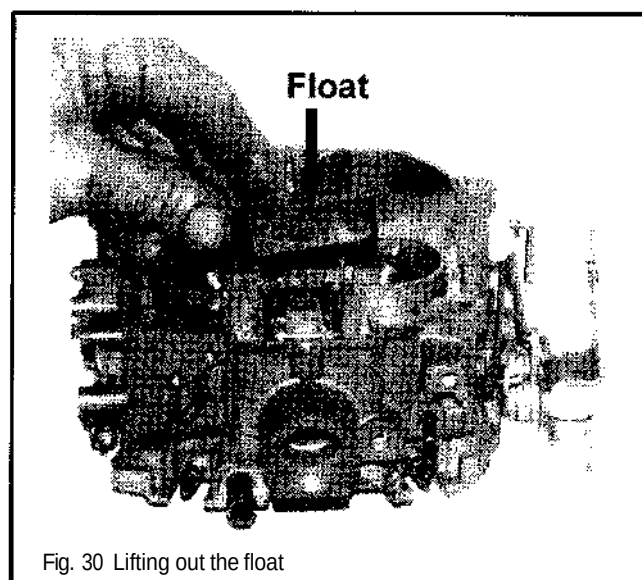
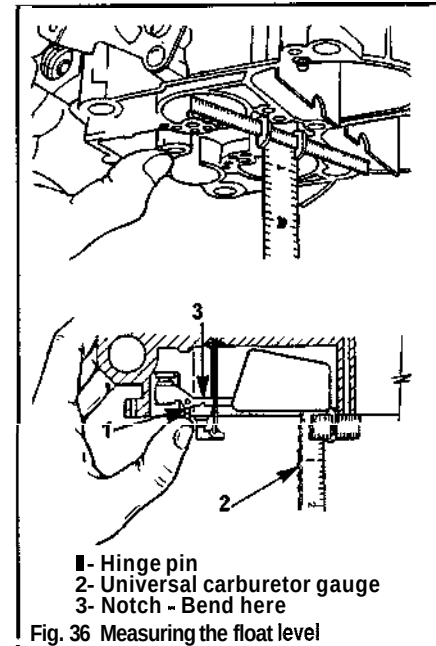
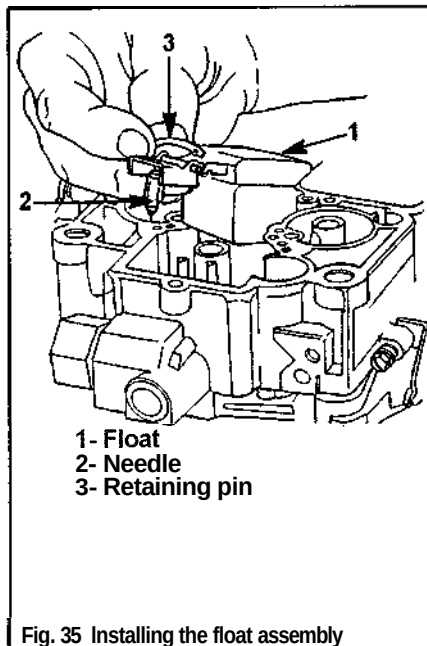
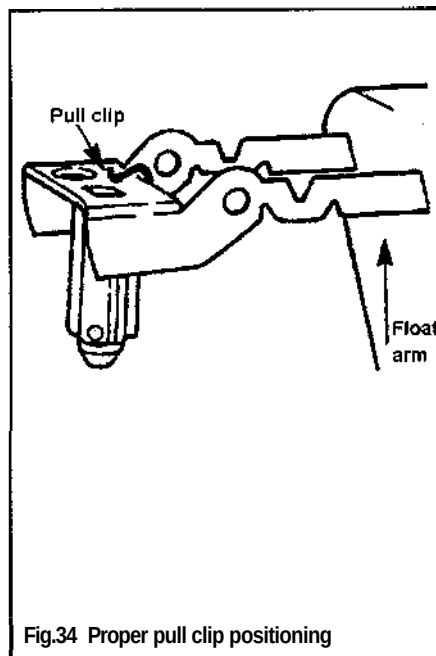
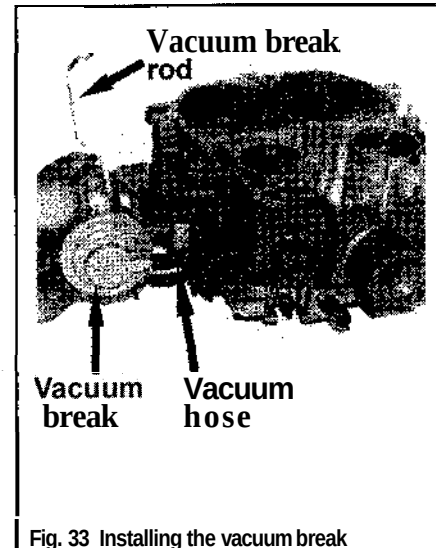
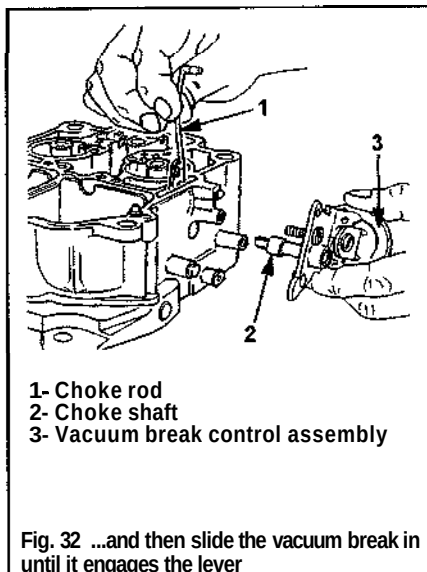
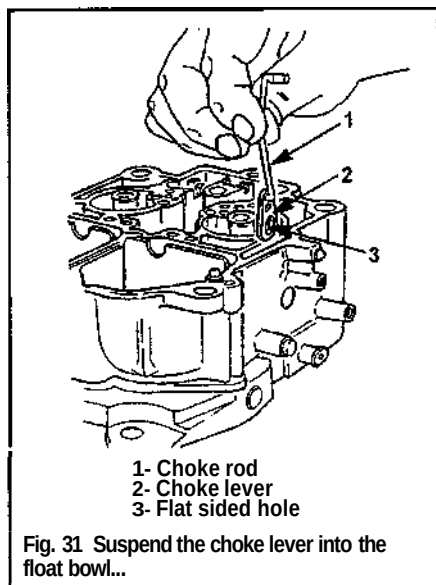


Fig. 30 Lifting out the float

8-14 FUEL SYSTEMS – CARBURETORS



6 Install the primary main metering jets. Install a new float needle seat and gasket. Install the pump discharge check ball and retainer in the passage next to the pump well.

7 Install the pull clip on the needle with the open end toward the front of the bowl. Install the float by sliding the float lever under the pull clip from the front to the back. Hold the float assembly by the toe and with the float lever in the pull clip, install the retaining pin from the pump well side. Take care not to distort the pull clip.

8 Measure the distance from the top of the float bowl gasket surface, with the gasket removed, to the top of the float at the toe end. Check to be sure the retaining pin is held firmly in place and the tang of the float is seated on the float needle when making the measurement. Check that your measurement is 15164 in. If not, carefully bend the float up or down until the correct measurement is reached.

9 Install the power piston spring in the power piston well. Install the primary metering jets, if they were removed during disassembly. Be sure the tension spring is connected to the top of each metering rod. Install the power-piston assembly in the well with the metering jets; the retainer should be flush with the casing. A sleeve around the piston holds the piston in place during assembly.

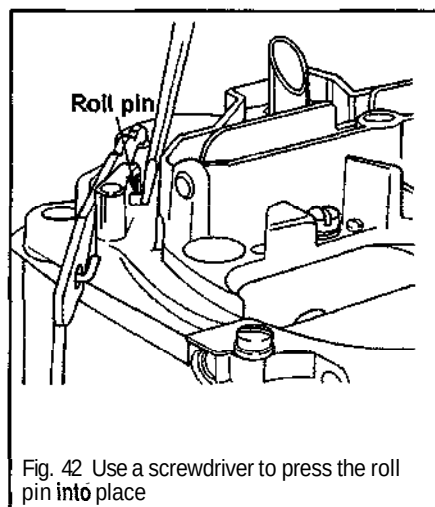
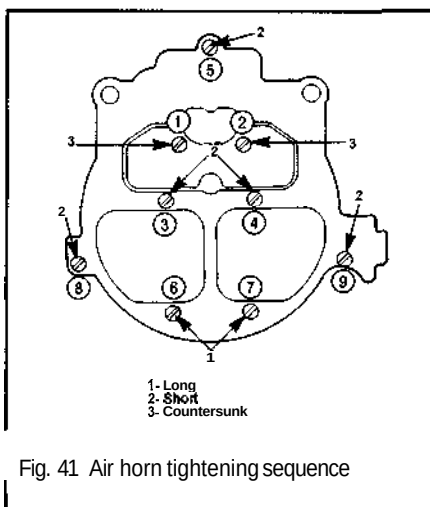
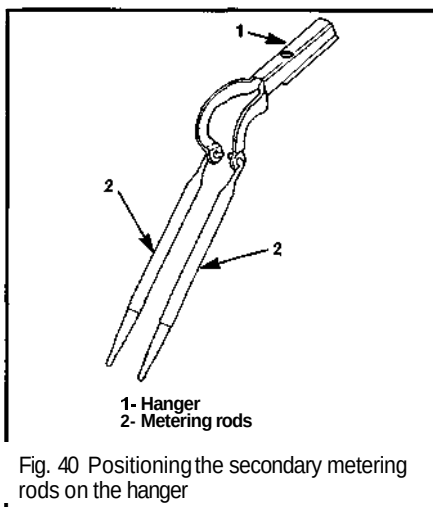
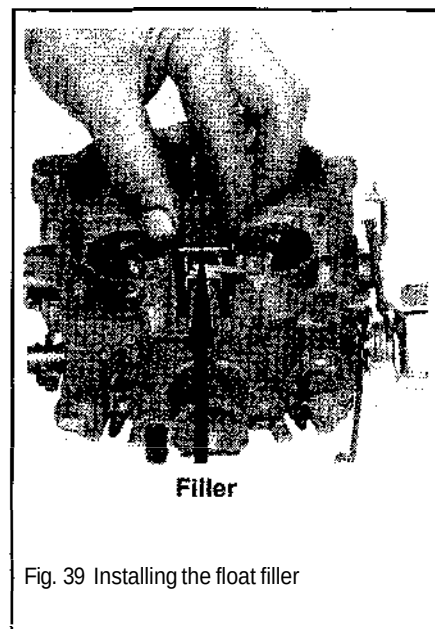
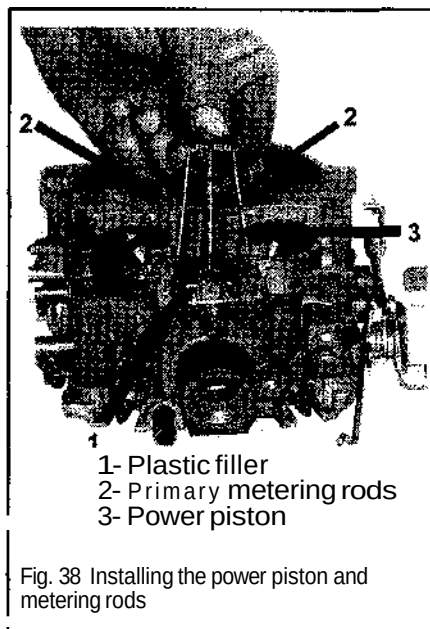
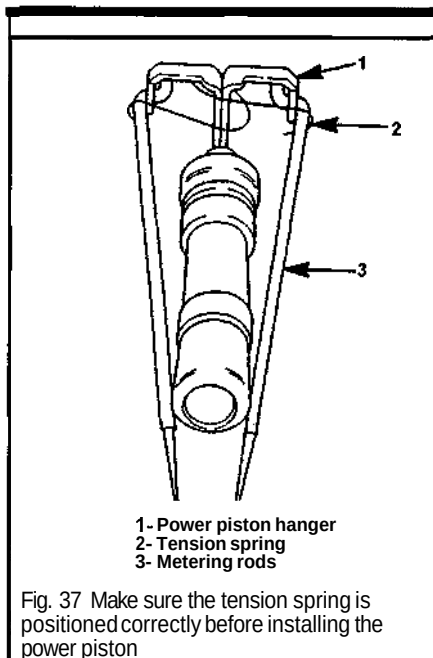
10 Install the plastic filler over the float needle. Press it down firmly until it is seated.

11 Place the accelerator pump return spring in the pump well. Install the air horn gasket around the primary metering rods and piston. Install the gasket on the secondary side of the bowl with the holes in the gasket indexed over the two dowels. Install the accelerating pump plunger in the pump well.

12 Install the secondary metering rods. Hold the air valve wide open and check to be sure the rods are positioned with their upper ends through the hanger holes and pointing toward each other. Hanger size may vary from the specifications chart due to inconsistencies in carburetor castings—the hole location may be different so make sure they are the same size as those originally installed.

13 Slowly position the air horn assembly on the bowl and carefully insert the secondary metering rods, the high-speed air bleeds, and the accelerating well tubes through the holes of the air horn gasket. Never force the air horn assembly onto the float bowl. Such action may distort the secondary metering plates. If the air horn assembly moves slightly sideways it will center the metering rods in the metering plates. Install the attaching screw.

14 Connect the pump rod to the inner hole of the pump lever and secure it with a spring clip. Position the lever into the casting mount on the carburetor and press the roll pin through the lever with a screwdriver.



15. Connect the bottom end of the choke shutter rod into the intermediate choke lever and secure it with a clip. Install the upper end of the rod into the choke blade lever and then press on the retaining clip.

16. Install the actuating rod into the air valve lever and then swivel the other end into the vacuum break arm and press on the retaining clip. Reconnect the vacuum line between the break and the carburetor.

17. Install the carburetor.

ADJUSTMENT

Accelerator Pump Rod

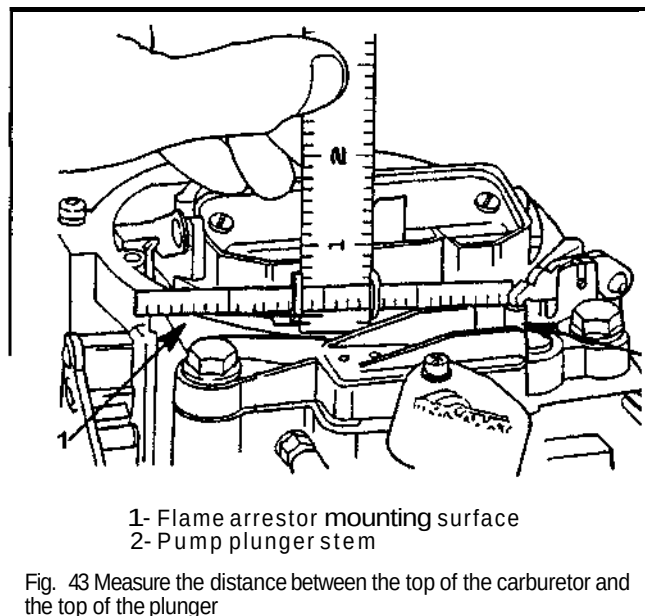
◆ See Figures 43 and 44



1. Back out the idle speed screw until it is no longer in contact with the throttle lever.

2. Move the pump rod to the inner hole on the lever if it's not already there.

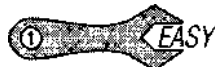
3. Ensure that the throttle valves are closed fully and then measure the distance between the top of the carburetor (flame arrestor mounting surface) and the top of the pump plunger stem. Grasp the tip of the pump lever with a pair of needle nose pliers and bend it (carefully) until the distance is equal to that listed in the Specifications chart while supporting the lever.



8-16 FUEL SYSTEMS – CARBURETORS

Choke Coil Rod

+ See Figures 45 and 46



1. Remove the flame arrestor.
2. Gently push the choke coil rod down into the housing.
3. The top of the choke coil rod must be even with the bottom of the hole in the vacuum break lever.
4. Bend the rod mid-way down at the kink to adjust it.

Float Level



◆ See Figures 47 and 47a

1. Press the float down lightly against the needle and hold the hinge pin in place securely.
2. Insert a float gauge (T-scale) into the hole near the flame arrestor stud. Measure from the top bowl casting to the top of the float at a point 3/16 in. (0.188mm) in from the end of the float at the toe.
3. If not within specifications, bend the float arm with needle nose pliers at the location shown in the illustration.

Idle Speed & Mixture

Please refer to the Maintenance section for adjustment procedures.

Vacuum Break

+ See Figures 48 and 49



4. Press in on the vacuum break control diaphragm until it is fully seated—attaching a small rubber band will sometimes help here.
5. Rotate the vacuum break choke lever counterclockwise until the left tang comes in contact with the vacuum break rod. The choke rod must be at the bottom of the slot in the choke lever.
6. Bend the tang on the choke lever until you can achieve the correct gap in the choke valve when checked with a drill bit between the inner wall of the air horn and the upper side of the valve.

Holley 2300 2 bbl Carburetors

REMOVAL & INSTALLATION

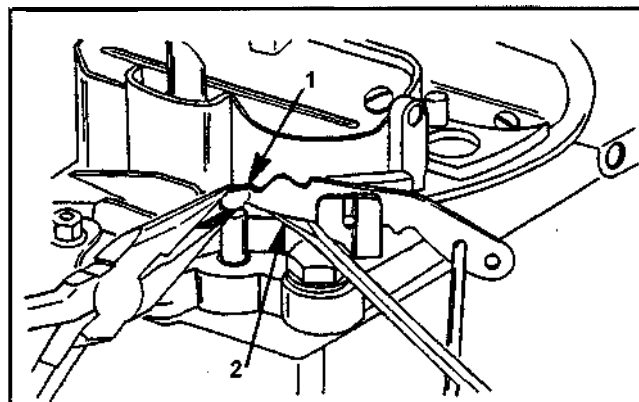


** WARNING

Always disconnect the battery cables before attempting to work on the fuel system. Never smoke or allow open flame near the engine—this sounds like an obvious precaution, but you'd be surprised at how many people forget!

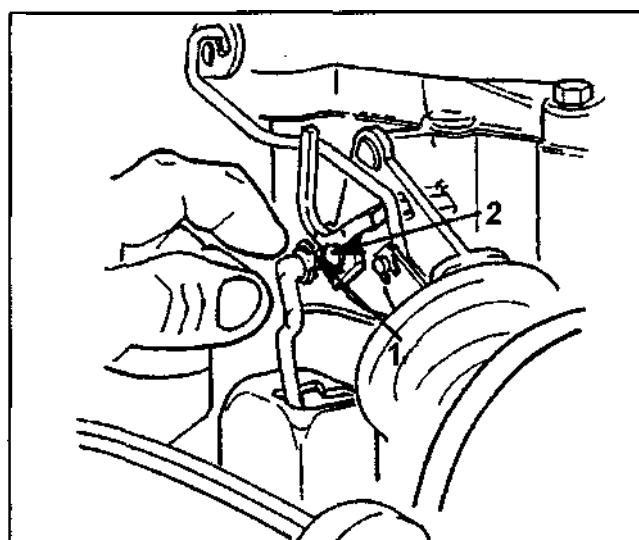
No matter how much they look alike, marine carburetors are completely different from automotive carburetors. Never substitute an automotive carburetor for the one on your engine! Venting procedures are not the same and an automotive carburetor could allow dangerous vapors to escape into the bilge. Don't even think about it.

1. Open the engine hatch or remove the covers and then disconnect the battery cables. Turn the fuel petcock OFF and/or shut down the fuel supply at the tank.
2. Remove the flame arrestor after disconnecting the vent hose. It's always a good idea to plug the throttle bores with a clean, lint-free cloth.
3. Unscrew the arrestor stud if the carburetor is to be replaced.
4. Pull out the cotter pin and disconnect the throttle cable at the carburetor and carefully move it out of the way.
5. Using two open-end wrenches, hold the fuel inlet nut at the carburetor securely and loosen the fuel line nut. Disconnect the two and carefully move the line out of the way. Plug both the inlet and line open ends to prevent fuel seepage.
6. Tag and disconnect the purple/white electric choke lead.
7. Tag and disconnect any other lines, leads or hoses that may be in the way of removal.
8. Loosen and remove the 4 carburetor mounting nuts/washers and lift the unit off the manifold. Plug the opening with a clean lint-free cloth.



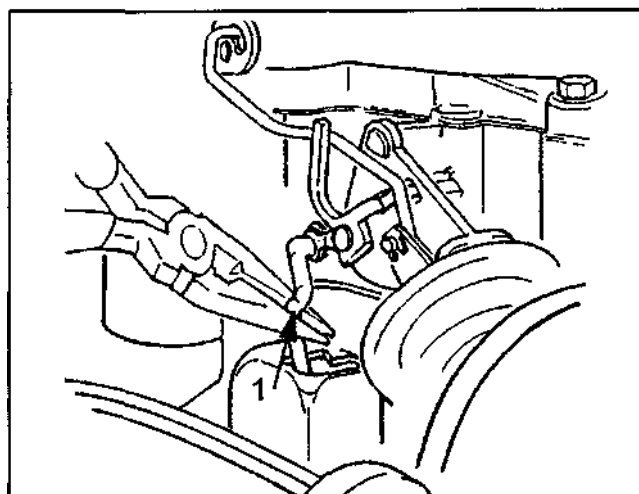
1- Tip of pump lever
2- Support as shown

Fig. 44 Bend the pump lever tip until the measurement is within specifications



1- Top of rod
2- Bottom of hole

Fig. 45 The top of the choke coil rod should be even with the bottom of the hole in the choke lever



1- Bend here

Fig. 46 Bend the choke coil rod here to adjust

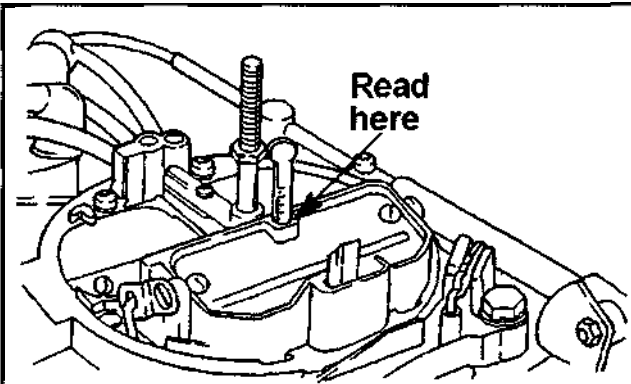


Fig. 47 Read the float gauge where it intersects the top of the carburetor casing

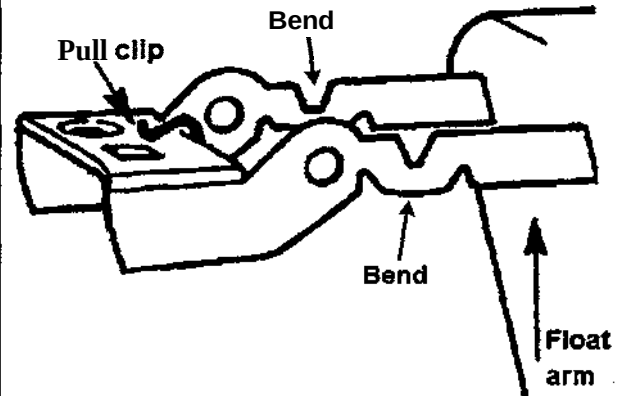
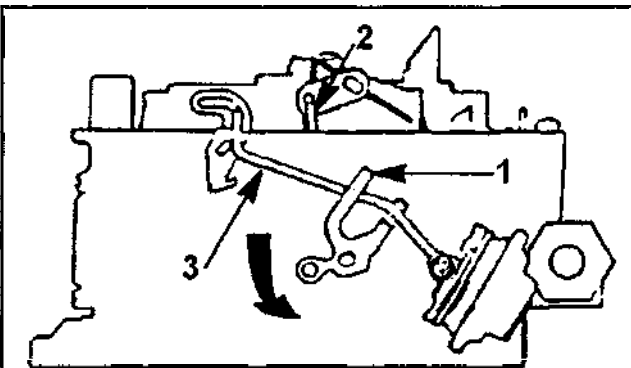
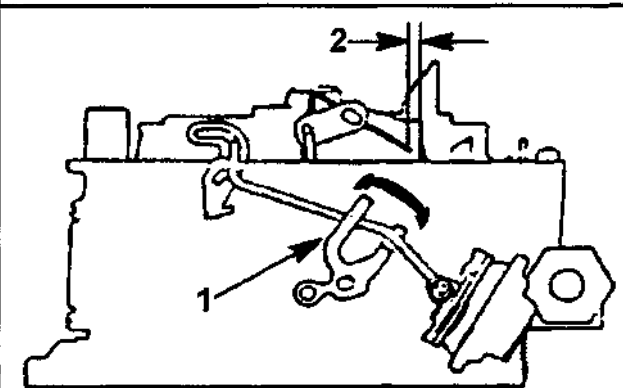


Fig. 47a Bend the float arm here



- 1- Tang
- 2- Choke rod
- 3- Vacuum break rod

Fig. 48 Rotate the lever until the tang comes in contact with the vacuum break rod



- 1- Tang
- 2- Gap

Fig. 49 Measure the gap and then bend the tang to adjust

☐ Remember which stud the flat washer and ground wire (from choke) were attached to.

To Install:

9. Clean the mating surfaces thoroughly of all residual gasket material.
10. Position a new gasket and then install the carburetor. Position the flat washer and ground wire on the stud from which they were removed. Tighten the nuts to 10-14 ft. lbs. (13-19 Nm). Hopefully you remembered to remove the rag!
11. Reconnect the fuel line to the inlet after removing the plugs and tighten it to 11-13 ft. lbs. (15-18 Nm). Don't forget to use two wrenches.
12. Connect the choke lead.
13. Install and adjust the throttle cable.
14. Install the flame arrestor and reconnect the vent line.
15. Connect the battery cables. Start the engine and ensure there are no fuel leaks; shut down the engine immediately if there are. Check and adjust the idle speed and mixture.

DISASSEMBLY

- ◆ See Figures 50 thru 64



Disassembly can be made much easier by fabricating a holding fixture out of four 5/16 x 2 in. bolts and eight nuts. Thread a nut about halfway onto each of the bolts, insert each one through the mounting holes on the carburetor and then screw on the remaining nuts. Voila, four little legs to keep your valuable carburetor off of whatever surface you are working on.

✱ ✱ WARNING

Before even thinking about beginning this procedure, make certain that you have the correct rebuild kit for your make and model!

1. Remove the flame arrestor stud if you haven't already done this during removal.
2. Remove the fuel inlet line filter adapter from the float bowl. Lift out the filter screen and the O-ring—throw away the O-ring.
3. Grab the spring clip retainer at the end of the choke plate lever and pull it off with a pair of needle nose pliers.
4. Remove the 3 Phillips screws from the thermostatic cover on the choke housing and lift off the retaining ring, the cover and the gasket. Make sure that you disengage the cover spring from the tang on the choke lever.
5. Remove the 3 Phillips screws, this time holding the choke housing to the main body. Pull off the housing while making sure that the choke linkage arm completely disengages from the horn linkage lever.
6. Turn over the carburetor and remove the 4 accelerator pump cover retaining screws at the bottom of the fuel bowl. Lift off the cover, its diaphragm and the spring. Make sure the inlet check ball moves freely. With the bowl still upside down and the check ball seated in the retainer, check that the clearance between the ball and retainer is 0.011-0.013 in. (0.279-0.330mm). If out of spec, bend the wire retainer very carefully to bring clearance back into range. Remember that this is not a serviceable item, so don't bend it too far, and don't remove the ball; otherwise you will need to replace the entire bowl.
7. Remove the four 5/16 in. primary fuel bowl retaining bolts and lift off the bowl and metering block assemblies. Discard the gaskets. You will most likely need to tap the bowl/block assembly lightly with a small rubber mallet to break the seal.

8-18 FUEL SYSTEMS – CARBURETORS

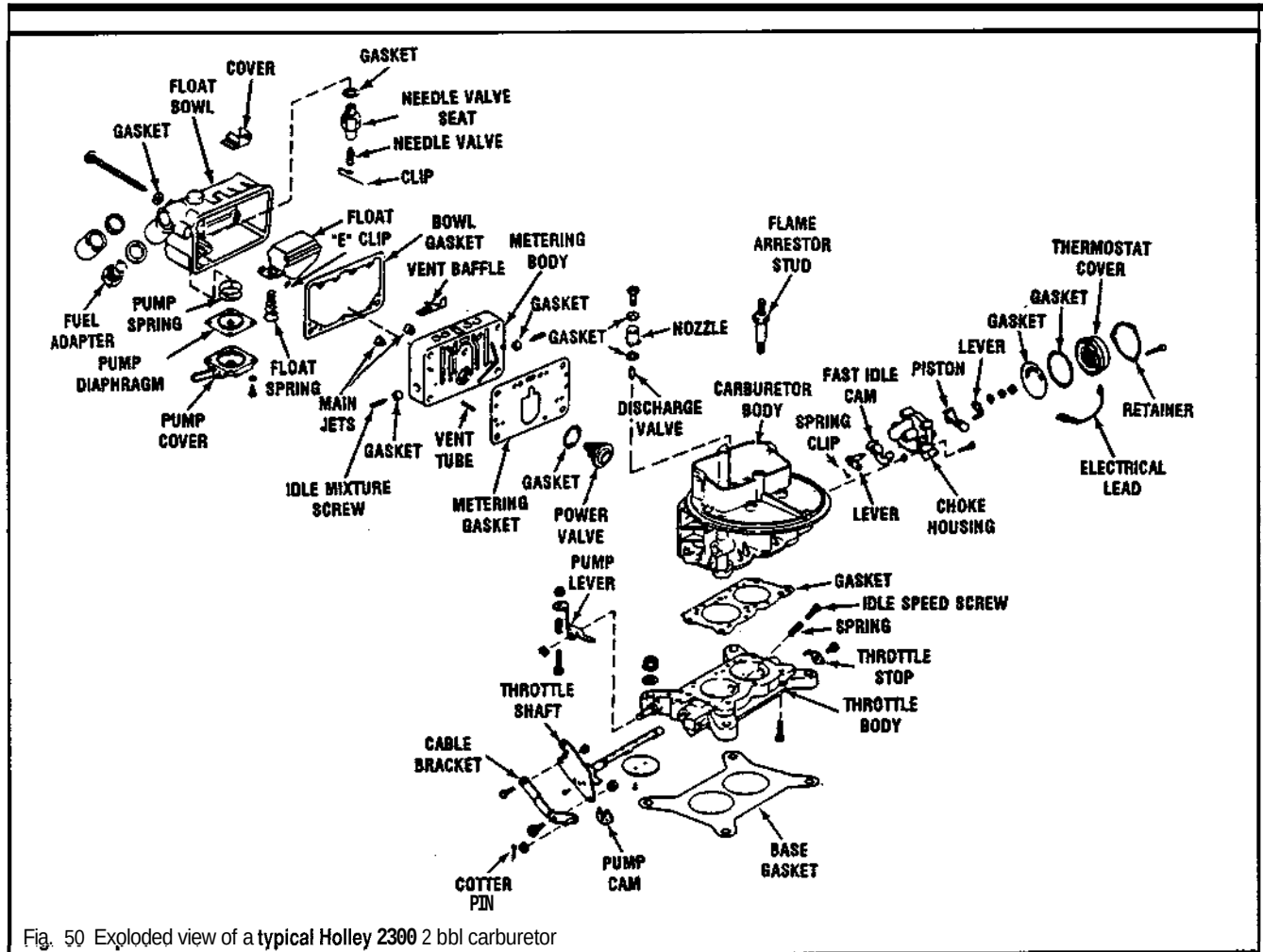


Fig. 50 Exploded view of a typical Holley 2300 2 bbl carburetor

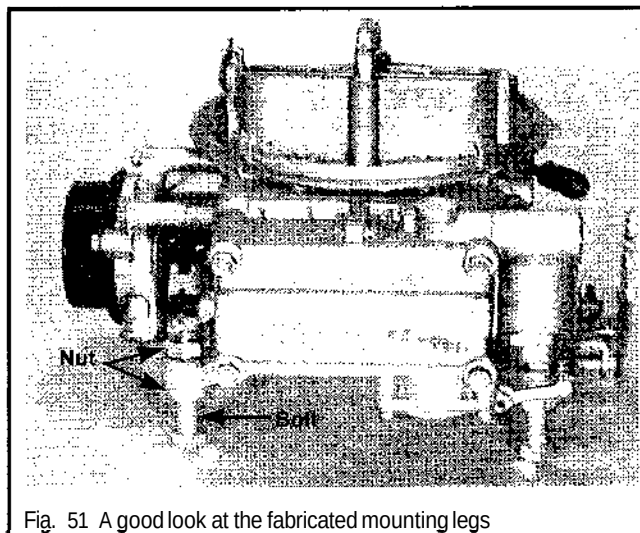


Fig. 51 A good look at the fabricated mounting legs

Make sure that you take note of the positioning of the wire on the end of the fuel valve and the metal tab on the float itself. This wire must hook **UNDER** the tab on reassembly or the inlet valve will not open during operation.

8. On 3.0L engines, remove the fuel inlet valve assembly. Loosen and remove the lock nut on the outer end of the float pin and then remove the inner hex nut and the two washers. Slide out the pin. Loosen the 2 screws holding the float and then remove it and the bracket.

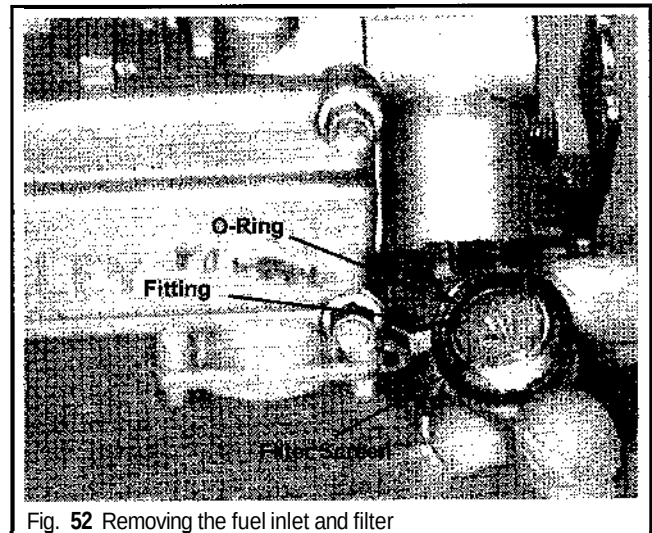


Fig. 52 Removing the fuel inlet and filter

9. On all other engines, pull off the float retainer (E-clip) with a pair of needle nose pliers and slide the float off of the hinge pin. Remove the spring from the float (or pin) and then lift the baffle out of the bowl. Remove the inlet needle from its seat and then unscrew the seat, discarding the gasket.

10. When removing the float on all engines, the needle valve will fall into the bowl; make sure you remove it. Slide out the small plastic cover and unscrew the needle valve seat, pull out the gasket and discard it.

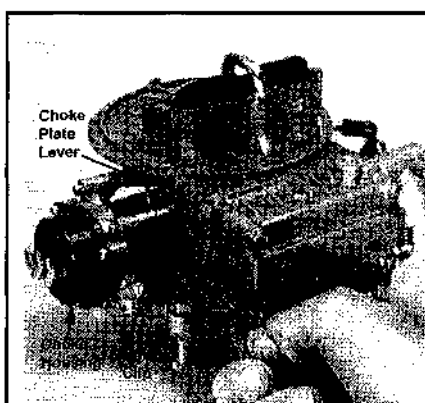


Fig. 53 Pull out the spring clip...



Fig. 54 ...remove the choke housing cover...

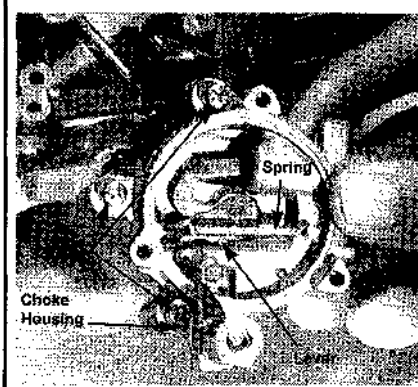


Fig. 55 ...and then remove the housing itself



Fig. 56 Remove the accelerator pump cover, diaphragm and spring



Fig. 57 Do not remove the check valve

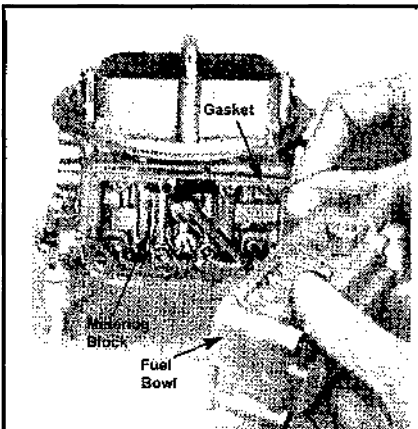


Fig. 58 Pull off the fuel bowl and its gasket

11. Remove the idle adjusting needles and their gaskets from the metering block (there should be one on each side of the block). It's never a bad idea to tighten them up while counting the turns until they make contact BEFORE you remove them as this will give you a decent benchmark for installation.

12. Remove the main jets with a screwdriver and then lift the vent baffle off of its pegs and throw away the two O-rings.

13. Unscrew the power valve with a 1 in. wrench. Discard the gasket.

14. Remove all old gasket material from the metering block and the float bowl mating surfaces.

15. Insert a small Phillips head screwdriver into the top of the carburetor and loosen the accelerator discharge nozzle so that you can pull out the nozzle. Make sure you get both gaskets out.

16. Turn the carburetor over (the discharge needle should fall out while you're doing this) and remove the 6 throttle body retaining screws and washers. Disconnect the vacuum hose from the choke and then lift off the throttle body.

17. Further disassembly should be unnecessary.

CLEANING & INSPECTION



Never use a wire brush or drill to clean jet passages or tubes in the carburetor.

Never allow the carburetor to soak in a cleaner bath for more than two hours. In fact, we recommend using spray cleaner.

Never immerse the throttle body, float assembly, needle, accelerator pump plunger or fuel filter in cleaner. Wipe them carefully with a clean cloth.

Otherwise clean all allowable parts with carb cleaner and then dry with compressed air if at all possible.

Blow out and through all passages to ensure there is no foreign material clogging them.

Check the float needle and seat, if either is worn or damaged, replace them as a matched set.

Check the float assembly and hinge pin for wear or damage, replace as necessary.

Check the pump plunger, return spring, piston spring, idle mixture needle and all levers and linkages for wear or damage. Replace as necessary.

Check the throttle valve shaft for excessive looseness in the throttle body. Check that the valve and shaft do not bind through their range of operation and that the valve opens and closes fully. Replace the assembly if it fails any of these tests.

Check the choke valve lever and shaft for excessive looseness in the air horn. Check that the valve, lever and shaft do not bind through their range of operation and that the valve opens and closes fully. Replace the air horn assembly if it fails any of these tests.

ASSEMBLY

4 See Figures 50 thru 64 and 65



Please refer to the Disassembly section for additional illustrations of the assembly procedure.

1. Position a new gasket over the bottom of the main body so that all six holes line up correctly. Install the throttle body and screws and tighten them to 50 inch lbs. (5.6 Nm).

2. Drop the accelerator pump discharge needle into its bore in the body. Slide a new gasket over the nozzle screw, followed by the nozzle and another new gasket. Now install the nozzle so that the notches on its body align with those in the bore and tighten the screw to 15 inch lbs. (1.7 Nm).

8-20 FUEL SYSTEMS – CARBURETORS

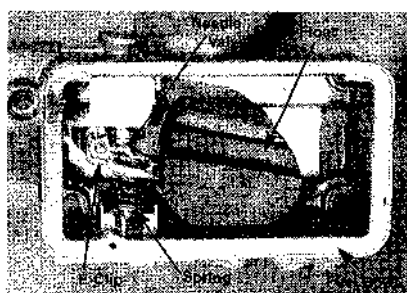


Fig. 59 A good look at the float assembly in the bowl

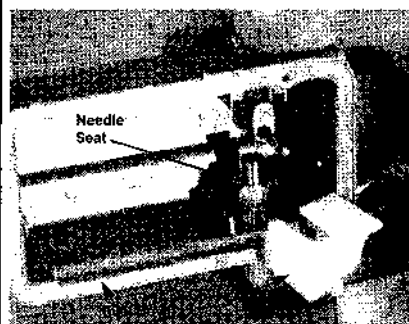


Fig. 60 Slide out the plastic cover

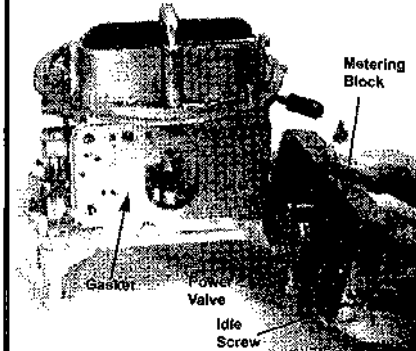


Fig. 61 Removing the metering block from the main body

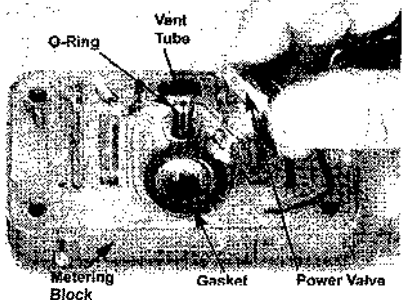


Fig. 62 Unscrewing the power valve

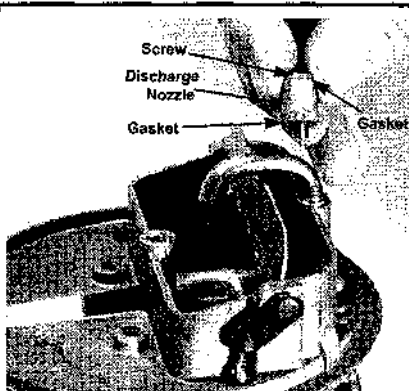


Fig. 63 Remove the accelerator discharge nozzle from inside the bore

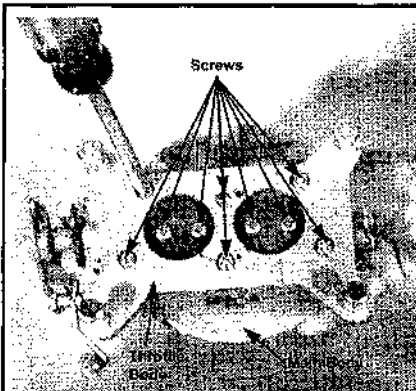


Fig. 64 The throttle body is attached to the bottom of the main body

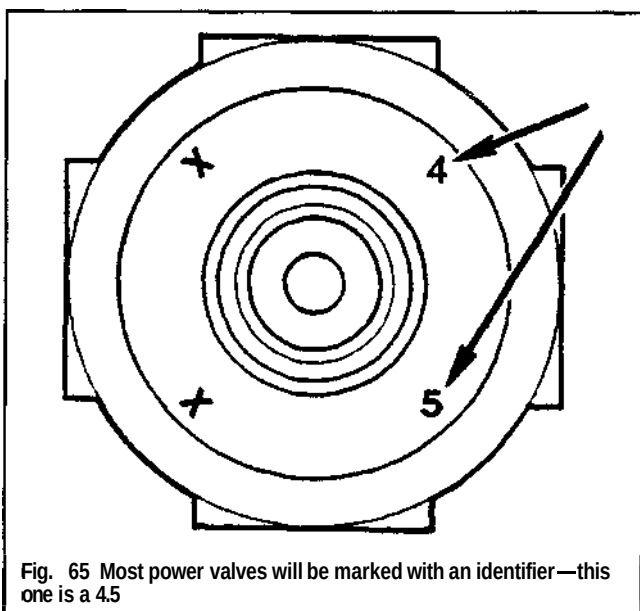


Fig. 65 Most power valves will be marked with an identifier—this one is a 4.5

3. Many rebuild kits will contain more than one power valve—check the number designated in the Carburetor specifications chart for your engine and make sure you grab a valve with the corresponding number stamped on it. Now look at the fuel ports on the valve. A valve with multiple fuel passages will require a gasket with three internal projections; while a valve with only two passages will require a gasket without any internal projections and a round gasket. Make sure you choose the correct one. Install the valve into the metering block and tighten it to 100 inch lbs. (11.3 Nm).

In some cases, but not all, if you're working on a 4.3GS, you've probably already figured out by now that you don't have a power valve.

4. Slide new O-rings over each end of the vent baffle, coat them lightly with engine oil and insert one end into the block. Install the jets.

5. Install a new gasket onto each of the idle mixture needles. Screw them until they just seat on the block and then back them out an equivalent number of turns as noted on removal.

6. Coat the inner mating surface of the metering block with a very thin film of grease and position a new gasket over the dowels. Position the block and gasket onto the carburetor and press it into place.

7. Position a new gasket (metal) onto the needle valve seat and then tighten it into the fuel bowl to 10 inch lbs. (1.1 Nm). Slide the small cover into position. Place a new needle valve into the seat so that the spring clip faces out.

8. Slide the float onto the hinge pin, making sure that the clip rides over the float tab. Position the float spring into the grooves on the bowl and then install the small e-clip retainer onto the hinge pin.

9. Turn over the fuel bowl so the float tab is resting on top of the needle valve. If the float is not level (parallel to the bowl), carefully bend the tab until it is.

10. Position the diaphragm spring into the accelerator pump cavity. Lay a new diaphragm over the spring so the raised disc is facing up and resting on the pump lever. Install the cover over the diaphragm and tighten the screws securely.

11. Coat the outer mating surface of the metering block with a very thin film of grease and position a new gasket over the dowels. Position the bowl onto the block and press it into place. Install the mounting bolts, with new gaskets, until each is just finger-tight. Now tighten them again to 45 inch lbs. (5.1 Nm).

12. Check that the choke lever, spring and piston all move smoothly with no sign of binding. Squeeze a drop of light weight oil into the piston bore and actuate the piston several times. Choke components are not available individually—if you detect problems, replace the entire assembly.

13. Position the choke assembly on the main body so that the choke plate lever and the choke lever align. Tighten the 3 screws securely.

14. Insert a new cover gasket over the housing so the piston is protruding through the gasket. Now install the cover while guiding the lever into the spring end. Make sure that the lever engages the spring or the choke will be useless. Rotate the cover until the index mark is in the same place as noted during removal (or, check the Specifications chart). Slide on the retaining ring and then tighten the screws securely. The ring has raised tabs at each hole to aid in pulling the cover in tight; if after tightening the 3 screws you notice that the cover is still loose, remove the screws and flip the retaining ring over.

15. Install the spring clip over the choke plate lever, securing it to the choke lever.

16. Insert a new (or cleaned) fuel filter screen into the adapter, thread the assembly into the fuel bowl and tighten it to 100 inch lbs. (11.3 Nm).

17. Thread the flame arrestor stud into the top of the unit, tightening it securely.

18. Remove the fabricated legs if you haven't already and then install the carburetor. Check the throttle cable and idle speed adjustments.

ADJUSTMENT

Float Level

3.0L Engines

❑ If attempting to perform this procedure without removing the carburetor, please make certain that you first drain all fuel from the carburetor.

1. Remove the fuel bowl as detailed in the Carburetor Disassembly section.
2. Turn the bowl upside down and loosen the float adjustment screw.
3. Turn the adjustment nut until the float is sitting level in the bowl.
4. Hold the nut and tighten the screw securely.
5. Install the fuel bowl.

All Other Engines

◆ See Figure 66

If attempting to perform this procedure without removing the carburetor, please make certain that you first drain all fuel from the carburetor.

1. Remove the fuel bowl as detailed in the Carburetor Disassembly section.
2. Remove the float baffle and then turn the bowl upside down.
3. Carefully bend the curved float arm that comes in contact with the inlet needle until the float is level and parallel with the fuel bowl.
4. Install the fuel bowl.

Accelerator Pump Stroke

Accelerator pump stroke is controlled by the position of the cam. The mounting screw must be positioned in the correct hole in the cam and throttle arm as detailed in the Carburetor Specifications chart.

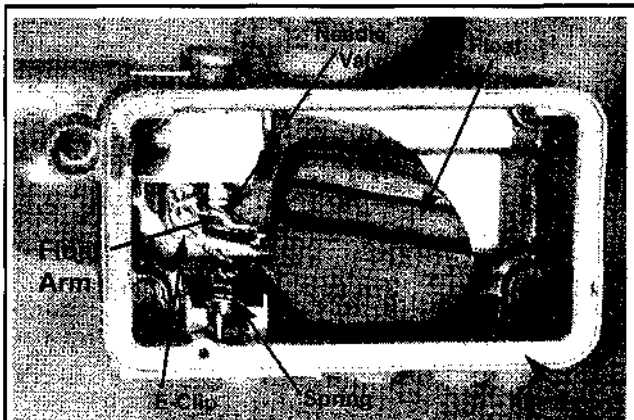


Fig. 66 Bend the arm to adjust the float level

Accelerator Pump Clearance

1. Remove the flame arrestor.
2. Move the throttle plates to the wide open position and hold them there.
3. Depress the pump arm and then check the clearance between the arm (still depressed) and the head of the pump lever screw.
4. If clearance is not within the specifications detailed in the chart, rotate the adjusting screw IN to increase the clearance, or OUT to decrease it.

5. Check the pump operation; the pump should begin to move immediately when moving the throttle shaft. Any indication of hesitation on the pump's part will lead to hesitation or lag felt when using the throttle. Check for bent or worn components. Recheck your clearance adjustment and then check the pump stroke.

6. Install the flame arrestor.

Choke Vacuum

◆ See Figures 67 and 68

1. Remove the flame arrestor.
2. Remove the 3 retaining screws and lift off the choke housing cover and retaining ring.
3. Using a paper clip or very small awl, press the choke piston down against the screw stop.
4. While holding the piston down against the stop, apply light pressure to the choke housing lever (as if you were closing it) until all free play is removed from the linkage.
5. Now insert the correct size drill bit into the choke opening and adjust it with the stop screw—tighten the screw to decrease the opening size and loosen it to increase the size of the opening.

✖ CAUTION

Be careful if you are increasing the size of the opening with the screw. Never back the screw out so far as to let the piston slip past it.

6. Reinstall the housing cover as detailed in the Carburetor Assembly procedures. Install the flame arrestor.

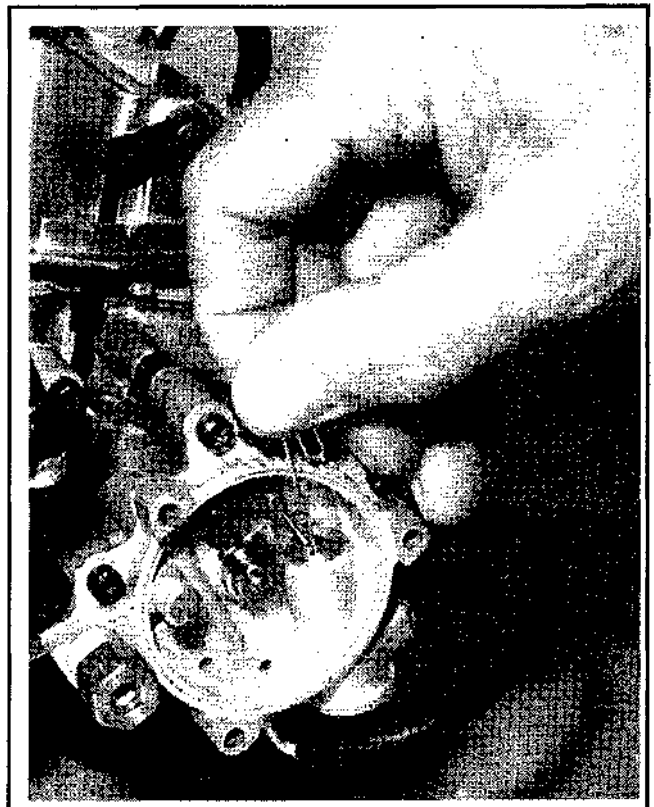
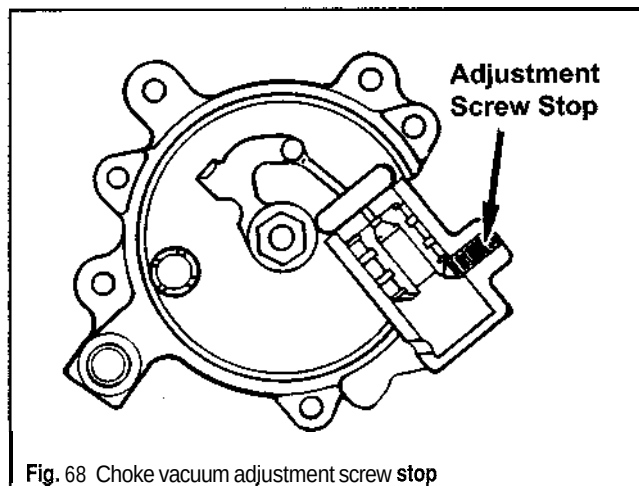


Fig. 67 Push the piston against the screw stop with a paper clip

8-22 FUEL SYSTEMS – CARBURETORS



Choke Unloader



1. Remove the flame arrestor.
2. With the throttle valves held in the wide open position, carefully insert the correct drill bit (see the Spec chart) between the lower edge of the plate and the inner wall of the air horn.
3. Now press lightly on the choke control lever while removing the bit. You should notice a very light drag on the bit as you are pulling it out. If not, or if you feel heavy pressure, use needle nose pliers to bend the tab on the throttle shaft kickdown lever (behind the choke housing) until you are satisfied with the drag.

Holley 4150/4160/4175 4 bbl Carburetors

REMOVAL & INSTALLATION



** WARNING

Always disconnect the battery cables before attempting to work on the fuel system. Never smoke or allow open flame near the engine—**this sounds like an obvious precaution, but you'd be surprised at how many people forget!**

■ No matter how much they look alike, marine carburetors are completely different from automotive carburetors. Never substitute an automotive carburetor for the one on your engine! Venting procedures are not the same and an automotive carburetor could allow dangerous vapors to escape into the bilge. Don't even think about it.

1. Open the engine hatch or remove the covers and then disconnect the battery cables. Turn the fuel petcock OFF and/or shut down the fuel supply at the tank.
2. Remove the flame arrestor after disconnecting the vent hose. It's always a good idea to plug the throttle bores with a clean, lint-free cloth.
3. Unscrew the arrestor stud if the carburetor is to be replaced.
4. Pull out the cotter pin and disconnect the throttle cable at the carburetor and carefully move it out of the way.
5. Using two open-end wrenches, hold the fuel inlet nut at the carburetor securely and loosen the fuel line nut. Disconnect the two and carefully move the line out of the way. Plug both the inlet and line open ends to prevent fuel seepage. On 5.8L Ford engines, cut the plastic tie and remove the vent hose.
6. Tag and disconnect the purple/white electric choke lead.
7. Tag and disconnect any other lines, leads or hoses that may be in the way of removal.
8. Loosen and remove the 4 carburetor mounting nuts/washers and lift the unit off the manifold. Plug the opening with a clean lint-free cloth.

■ Remember which stud the flat washer and ground wire (from choke) were attached to.

9. If replacing the carburetor, take note of the throttle lever bracket position and remove it.

To Install:

10. Clean the mating surfaces thoroughly of all residual gasket material.
11. Attach the throttle lever bracket from the old carburetor making sure its in the same position as on the original one.
12. Position a new gasket and then install the carburetor. Position the flat washer and ground wire on the stud from which they were removed. Tighten the nuts to 10-14 ft. lbs. (13-19 Nm). Hopefully you remembered to remove the rag!
13. Reconnect the fuel line to the inlet line after removing the plugs and tighten it to 11-13 ft. lbs. (15-18 Nm). Don't forget to use two wrenches. Don't forget to reinstall the vent hose on the 5.8L engine.
14. Connect the choke lead.
15. Install and adjust the throttle cable.
16. Install the flame arrestor stud and tighten it to 65-80 inch lbs. (7.3-9 Nm).
17. Install the flame arrestor and reconnect the vent line.
18. Connect the battery cables. Start the engine and ensure there are no fuel leaks; shut down the engine immediately if there are. Check and adjust the idle speed and mixture.

DISASSEMBLY



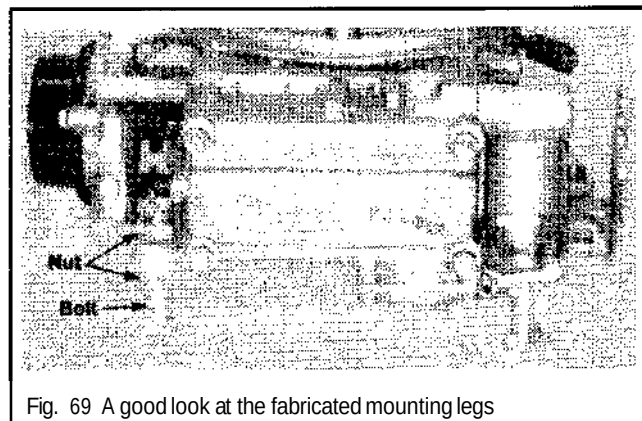
- See Figures 69 thru 77

□ Disassembly can be made much easier by fabricating a holding fixture out of four 5/16 x 2 in. bolts and eight nuts. Thread a nut about halfway onto each of the bolts, insert each one through the mounting holes on the carburetor and then screw on the remaining nuts. Voila, four little legs to keep your valuable carburetor off of whatever surface **you are working on.**

×× WARNING

Before even thinking about beginning this procedure, make certain that you have the correct rebuild kit for **your** make and model!

1. Remove the flame arrestor stud if you haven't already done this during removal.
2. Remove the four primary fuel bowl retaining bolts and lift off the bowl and metering block assemblies. Discard the gaskets and lay any plates aside. You will most likely need to tap the bowl/block assembly lightly with a small rubber mallet to break the seal.
3. Pull the transfer tube out of the inner side of the carburetor mating surface and discard the O-rings.
4. Remove the idle adjusting needles and their gaskets from the metering block (there should be one on each side of the block). It's never a bad idea to tighten them up while counting the turns until they make contact BEFORE you remove them as this will give you a decent benchmark for installation.
5. Remove the main jets with a jet wrench (a screwdriver should work here as well) and then lift the vent baffle off of its pegs and throw away the two O-rings. Make sure that you take note of the jet numbers and which bore they came out of.



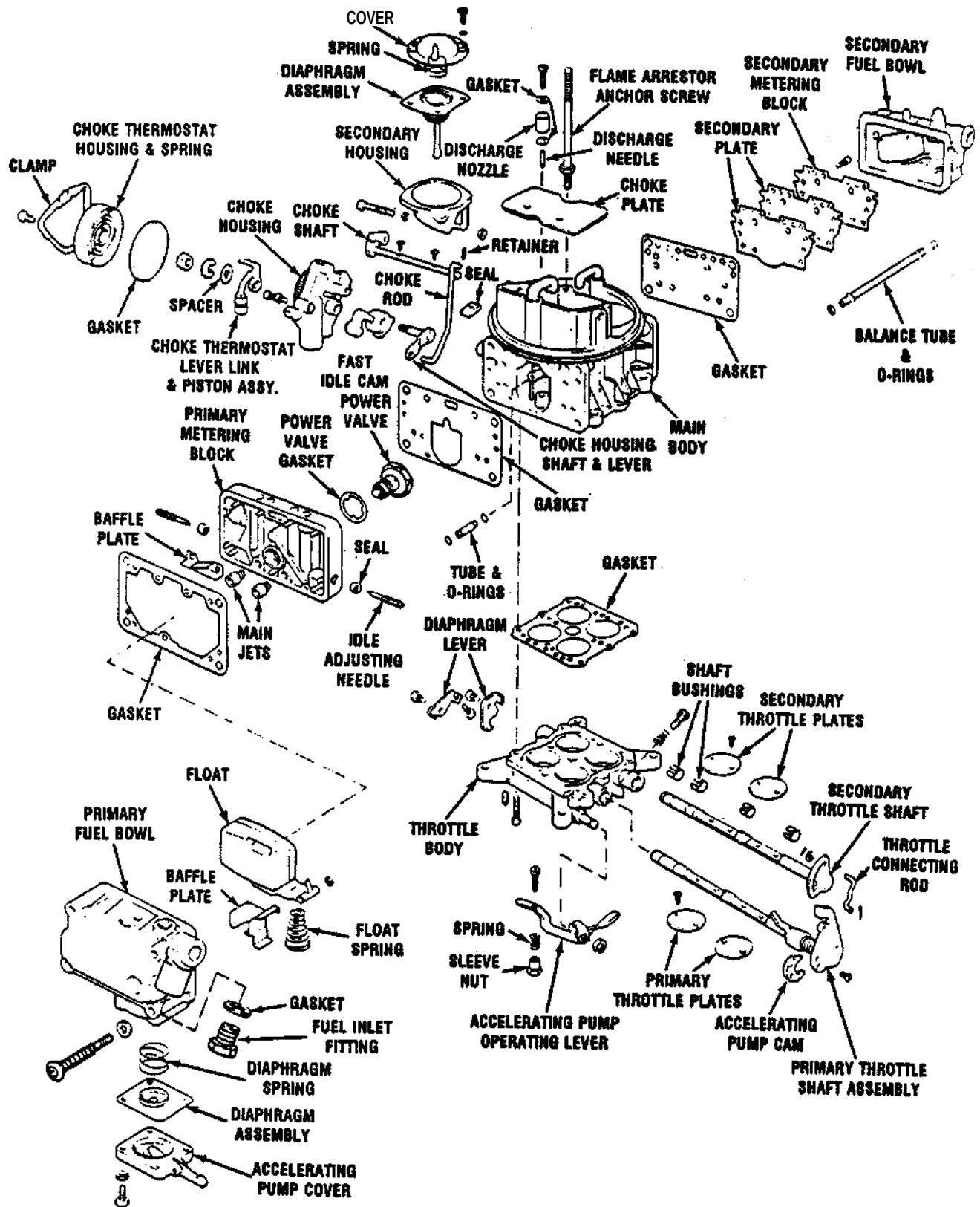


Fig. 70 Exploded view of a typical Holley 41501416014175bbl carburetor

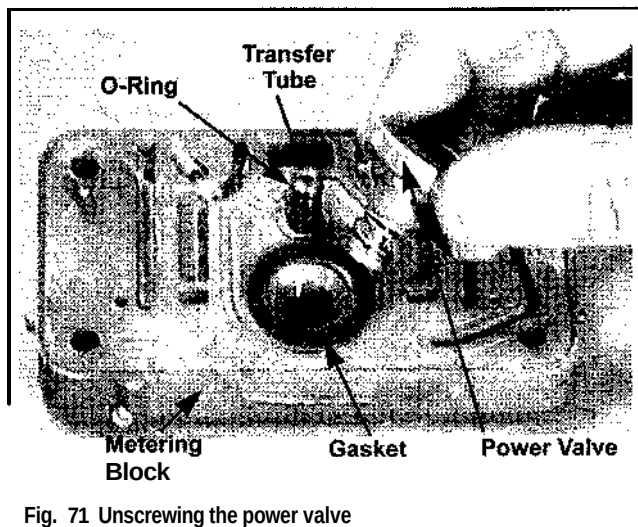


Fig. 71 Unscrewing the power valve

6. Unscrew the power valve from the inner side of the metering block with a 1/2 in. wrench. discard the gasket. Pull out the accelerator pump tube and discard the O-rings.

7. Working inside the primary bowl, pull off the float retainer (E-clip) with a pair of needle nose pliers and slide the float off of the hinge pin. Remove the spring from the float (or pin) and then lift the baffle (small plastic cover) out of the bowl. Remove the inlet needle from its seat and then unscrew the seat, discarding the gasket.

The needle valve will probably fall into the bowl; make sure you remove it.

8. Turn over the bowl and remove the 4 accelerator pump cover retaining screws at the bottom of the fuel bowl. Lift off the cover, its diaphragm and the spring. Make sure the inlet check ball moves freely. With the bowl still upside down and the check ball seated in the retainer, check that the clearance between the ball and retainer is 0.011-0.013 in. (0.279-0.330mm). If out of spec, bend the wire retainer very carefully to bring clearance back into range. Remember that this is not a serviceable item, so don't bend it too far, and don't remove the ball; otherwise you will need to replace the entire bowl.

9. Remove the fuel inlet line filter adapter from the float bowl. Lift out the filter screen and the O-ring—throw away the O-ring or gasket.

10. Remove any and all remaining gasket material from the bowl and block mating surfaces.

11. Remove the secondary fuel bowl and metering block by following the procedures above for the primary. Note that there will be no accelerator pump or power valve to remove here. Note also that if you are working on a V8 engine, you will probably need a 122 clutch-type screwdriver to remove the 4 bowl retaining screws.

12. Pull off the retaining clip at the bottom of the secondary vacuum diaphragm link rod.

13. Turn the carburetor over and remove the throttle body retaining screws and washers.

14. Pull the retaining clip off of the lower end of the choke rod with needle nose pliers. Remove the 3 retaining screws and lift off the choke housing cover and retaining ring. Now you can remove the 3 housing retaining screws and pull off the housing and vacuum passage gasket.

15. Remove the secondary vacuum housing from the main body—you should have disconnected the link rod in an earlier step. Remove the four cover screws and lift off the cover, spring, diaphragm and check ball from the housing.

16. Insert a small Phillips head screwdriver into the top of the carburetor and loosen the accelerator discharge nozzle so that you can pull out the nozzle. Make sure you get both gaskets out. Turn over the carburetor and let the needle fall into your hand.



Fig. 72 Remove the accelerator pump cover, diaphragm and spring

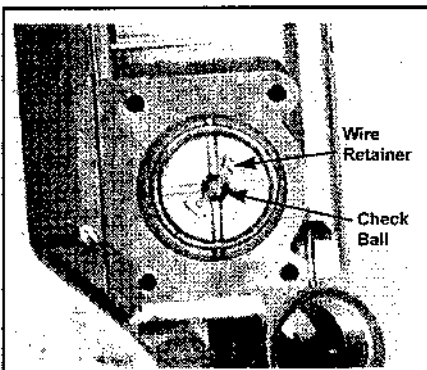


Fig. 73 Do not remove the check valve

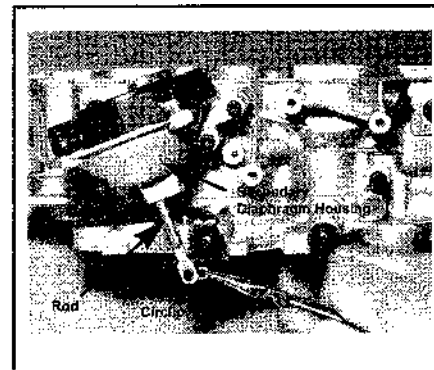


Fig. 74 Remove the secondary diaphragm rod circlip..

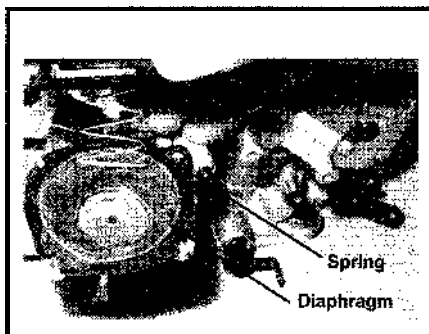


Fig. 75 ...the cover and diaphragm spring..



Fig. 76 ...and the diaphragm itself

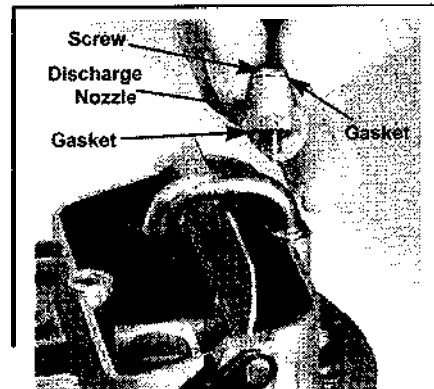


Fig. 77 Remove the accelerator discharge nozzle from inside the bore

Unless there is damage, do not remove the choke plate, shaft, rod or guide. The plate screws are staked and must be filed down to the shaft in order to remove anything.

17. Further disassembly should be unnecessary.

CLEANING & INSPECTION

◆ See Figures 78 and 79



Never use a wire brush or drill to clean jet passages or tubes in the carburetor.

Never allow the carburetor to soak in a cleaner bath for more than two hours. In fact, we recommend using spray cleaner.

Never immerse the throttle body, float assembly, needle, accelerator pump plunger or fuel filter in cleaner. Wipe them carefully with a clean cloth.

Otherwise clean all allowable parts with carb cleaner and then dry with compressed air if at all possible.

Blow out and through all passages to ensure there is no foreign material clogging them.

Check the float needle and seat, if either is worn or damaged, replace them as a matched set.

Check the float assembly and hinge pin for wear or damage, replace as necessary.

Check the pump plunger, return spring, piston spring, idle mixture needle and all levers and linkages for wear or damage. Replace as necessary.

Check the throttle valve shaft for excessive looseness in the throttle body. Check that the valve and shaft do not bind through their range of operation and that the valve opens and closes fully. Replace the assembly if it fails any of these tests.

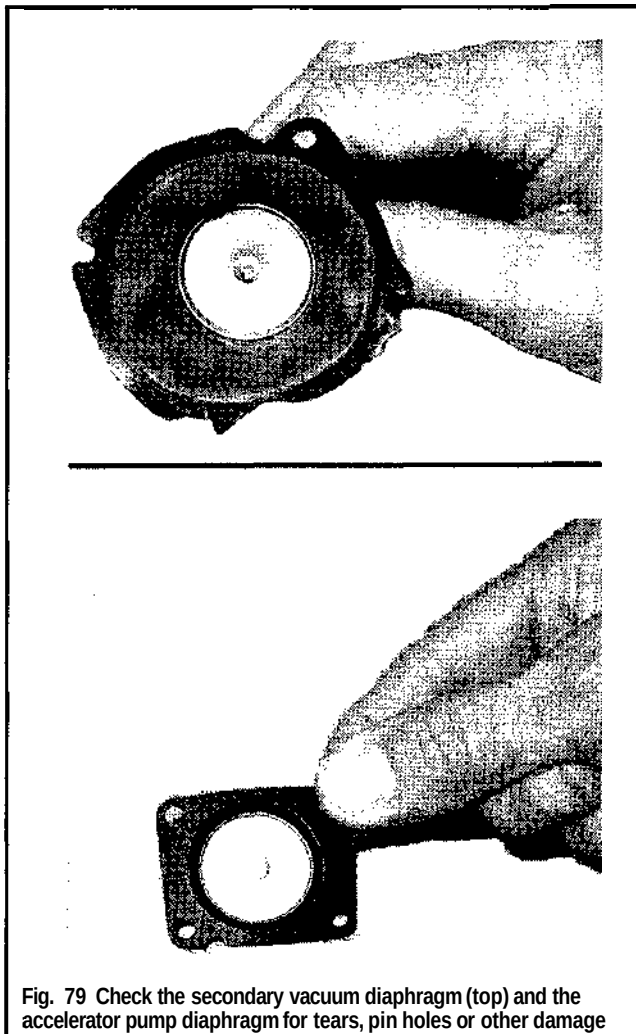


Fig. 79 Check the secondary vacuum diaphragm (top) and the accelerator pump diaphragm for tears, pin holes or other damage

Check the choke valve lever and shaft for excessive looseness in the air horn. Check that the valve, lever and shaft do not bind through their range of operation and that the valve opens and closes fully. Replace the air horn assembly if it fails any of these tests.

Always replace the seat valve assemblies. These components receive the most wear of any part in the carburetor and correct fuel level cannot be maintained if they are worn or damaged.

Check the secondary vacuum diaphragm by depressing the diaphragm stem and covering the vacuum fitting with your finger. Release the stem; if it moves out more than 1116 in. in ten seconds, there is a leak and it will require replacement.

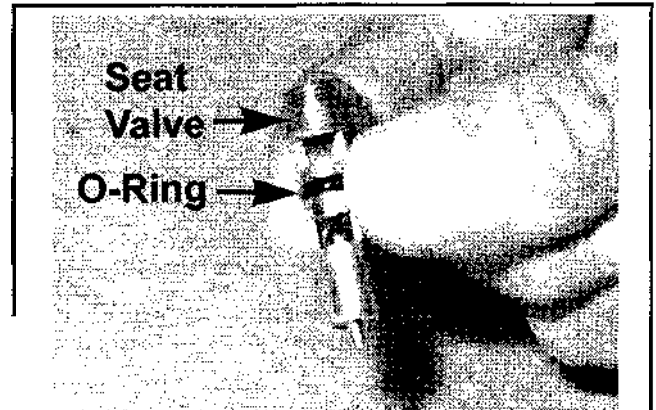


Fig. 78 Always replace the seat valves

ASSEMBLY



◆ See Figures 69 thru 77, 80 and 81

■ Please refer to the Disassembly section for additional illustrations of the assembly procedure.

1. Drop the accelerator pump discharge needle into its bore in the throttle throat. Position the nozzle (and gasket) over the needle so that the nozzles are down and the slot is facing the air/vent rib; install the retaining screw and tighten it securely.

2. Drop the check ball into the hole in the secondary vacuum diaphragm housing and then insert the diaphragm into the housing so that the vacuum hole lines up with the opening for the check ball. It's a good idea to squirt a drop of clean oil under each of the four corners on the diaphragm to keep it from moving when installing the cover. Place the spring onto the housing cover and then install the cover so that all screw and vacuum holes are in alignment. Tighten the cover screws securely while holding the diaphragm rod to keep the diaphragm from collapsing.

3. Position a new gasket over the secondary vacuum passage on the carburetor body and then install the housing onto the carburetor. Tighten the screws securely.

4. Position a new choke housing gasket on the carburetor. Install the housing while guiding the housing shaft lever onto the choke rod. The projection on the end of the choke rod must be under the fast idle cam so that the cam will be raised whenever the choke plate is closed. Tighten the mounting screws and lock washers and then slip the retaining clip onto the choke rod.

5. Install the choke housing cover with a new gasket. The small lever attached to the choke piston MUST index into the loop on the thermostatic coil. Position the retaining ring over the cover and then install the mounting screws finger-tight. Rotate the cover so that the index marks on the cover and housing line up as they were before removal; or check the Specifications chart. Tighten the screws.

6. Turn over the carburetor and install a new throttle body gasket. Position the throttle body while sliding the secondary vacuum diaphragm rod over operating lever. Tighten the mounting screws to 50 inch lbs. (5.6 Nm) and then press the retainer onto the diaphragm rod and operating lever.

7. Position a new gasket onto the fuel inlet nut, install the nut and tighten it securely.

8. Position the spring into the accelerator pump bore on the primary fuel bowl and then install the diaphragm so that the large end of the lever disc will be against the operating lever. Install the cover and tighten the screws securely. Move the operating lever so that it compresses the diaphragm to ensure that it has not been pinched and then tighten the cover screws to 5 inch lbs. (0.6 Nm).

9. On all models but the 5.8L Ford, insert the filter screen into the primary bowl and then install the inlet nut with a new gasket. On the 5.8L engine, install the inlet nut and filter with a new gasket.

10. Thread the fuel inlet needle seat into the bore with a new gasket. Drop in the needle and clip assembly and slide the plastic baffle into position.

11. Position the float into the bosses and then slide in the guide pin. Check the float setting as detailed in the Adjustments section.

12. Many rebuild kits will contain more than one power valve--check the number designated in the Carburetor Specifications chart for your engine and make sure you grab a valve with the corresponding number stamped on it. Now look at the fuel ports on the valve. A valve with multiple fuel passages will require a gasket with three internal projections; while a valve with **only two passages** will require a gasket without any internal projections and a round gasket. Make sure you choose the correct one. Install the valve into the metering block and tighten it to 100 inch lbs. (11.3 Nm).

13. Coat two new O-rings with clean engine oil and slide them onto the transfer tube. Press the tube into the primary metering block until it is fully seated.

14. Thread the main jets into their original bores. Remember that all jets should be marked with an individual number—refer to the Specifications chart for this number.

15. Install new gaskets on the idle mixture needles and then thread them into the block until they just come into contact with the surface and then back them out an equivalent number of turns to the figure recorded during the disassembly procedure; or check the Specification chart.

16. Coat the inner mating surface of the metering block with a very thin film of grease. Position a new gasket over the dowels. Position the block and gasket onto the carburetor and press it into place.

17. Coat the outer mating surface of the metering block with a very thin film of grease and position a new gasket over the dowels. Position the baffle plate. Make sure that the accelerator passages are not blocked and position the bowl onto the block and press it into place. Install the mounting bolts, with new gaskets, until each is just finger-tight. Now tighten them again to 45 inch lbs. (5.1 Nm).

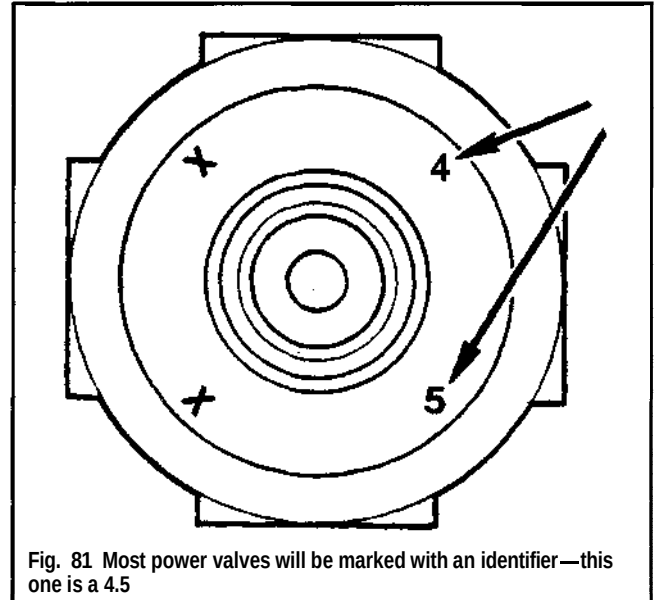
18. Coat two new transfer/balance tube O-rings with Vaseline and slide them onto the tube(s) so they're against the flange on each end. Press one end into the recess in the bowl being careful not to disturb the O-ring.

19. Assemble the secondary fuel bowl and metering block by following the procedures above for the primary. Note that there will be no accelerator pump or power valve to assemble here so skip those steps.

20. After assembling all components associated with the secondary bowl and metering block, position a new gasket over the dowels on the inner side of the metering block. Now position the metering plate and another inner gasket on the block and attach the assembly to the carburetor. Install the retaining screws and tighten them securely.

21. Position the bowl over the block and then install it so that the fuel/balance tube slides into the recess. Install and tighten the retaining screws. Note also that if you are working on a V8 engine, you will need a #2 clutch-type screwdriver to remove the 4 bowl retaining screws.

22. Install the carburetor.



ADJUSTMENT

■ If the carburetor has been rebuilt, please perform all adjustments in the following order; otherwise perform individual adjustments as necessary.

Secondary Throttle Valve Plate

● See Figure 82



□ The carburetor must be removed for this adjustment.

1. Remove the carburetor and turn it upside down. Carefully set it down on a clean surface.

2. Back out the secondary throttle shaft stop screw until the secondary throttle plates are fully closed. This screw is imbedded in the throttle body, just underneath the secondary vacuum diaphragm rod.

3. Snap the throttle plates closed, turn the stop screw in until it just comes into contact with the secondary lever and then turn the screw in another 1/4 of a turn. The plates should not stick in the bores—if they do, turn in the screw slightly until they stop sticking.

4. Install the carburetor.

Float Level

◆ See Figure 83



Primary and secondary fuel bowls are both adjusted in the same manner. Which one you start with is up to you.

1. Drain the fuel from the carburetor and then remove the fuel bowl and float assembly as detailed in the Disassembly procedures. Although not necessary, we recommend removing the carburetor.

2. Remove the float baffle and then turn the bowl upside down.

3. Carefully bend the curved float arm contacting the float inlet needle until the edge of the float is parallel with the edge of the fuel bowl.

4. Install the bowl with new gaskets. Install the carburetor if removed.

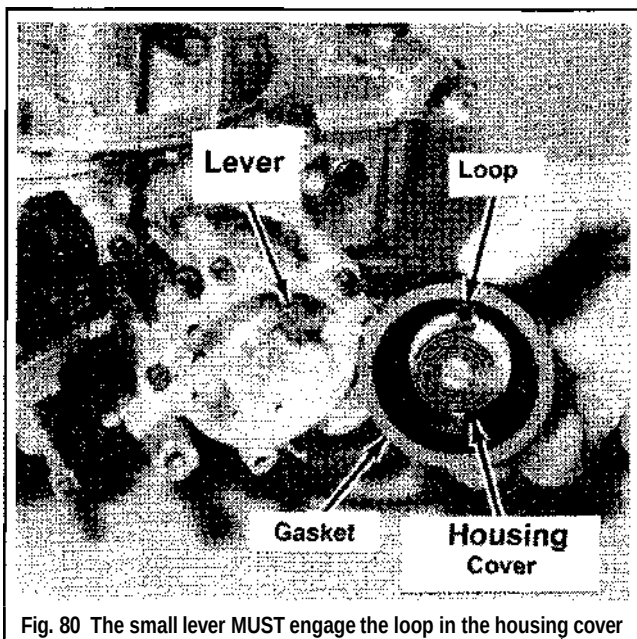


Fig. 80 The small lever **MUST** engage the loop in the housing cover

Secondary Throttle Stop Screw

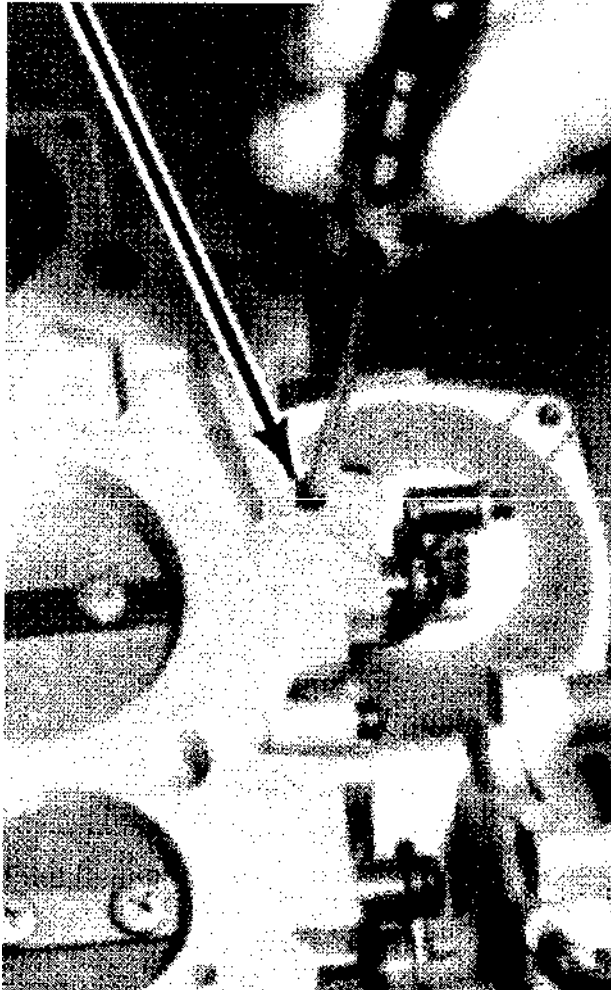


Fig. 82 Use a small screwdriver to turn the stop screw

Accelerator Pump Stroke



Accelerator pump stroke is fully controlled by the position of the **pump** cam—which is to say, the hole it is in on the throttle arm. Please refer to the Carburetor Specifications chart for the correct hole.

Accelerator Pump Clearance



1. Move the throttle to the wide open position and hold the **pump** lever down.
2. Insert a 0.0015 in. (0.038mm) flat feeler gauge between the bolt head under the pump lever and the pump arm. Turn the adjuster screw until you can obtain the correct clearance; turn it **in** to increase the clearance, or **out** to decrease the clearance.
3. The pump should begin to move as soon as the throttle shaft moves.

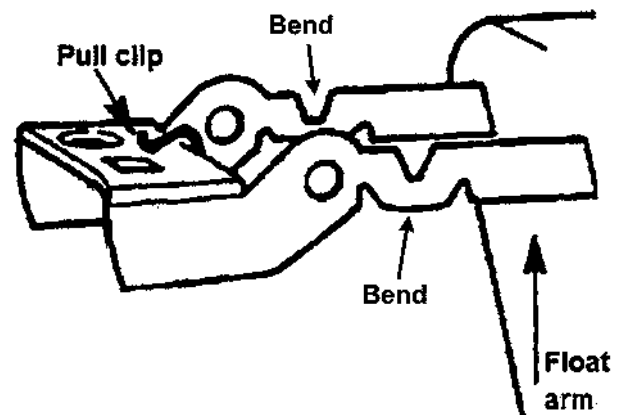


Fig. 83 Bend the float arm here

Choke Vacuum Qualification



◆ See Figures 84 and 85

1. Remove the choke housing and retaining ring.
2. Unbend a paper clip, insert it into the piston bore and push the piston down until it rests against the screw stop. Be careful that you do not scratch the piston or bore.
3. With the piston still against the stop, apply very light pressure to the choke housing lever in the closed position until all free-play has been removed from the linkage.
4. Refer to the Carburetor Specifications chart, and insert the correct size drill bit between the lower edge of the plate and the inner wall of the air horn. Tighten the screw stop to decrease clearance, or loosen the screw to increase clearance. The drill bit must slide through the opening with no drag.

⚠ CAUTION

Never back the screw out so far as to allow the piston to drop past the screw.

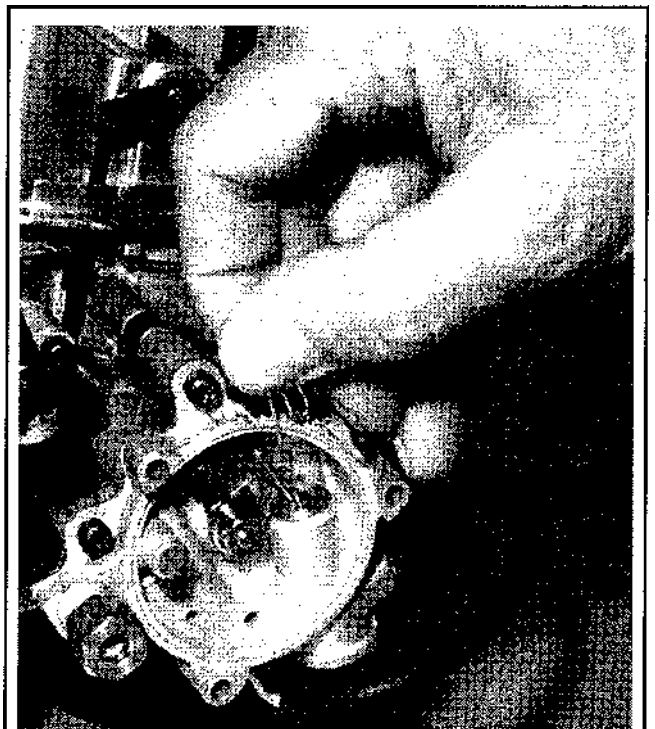


Fig. 84 Carefully force the piston down with a paper clip

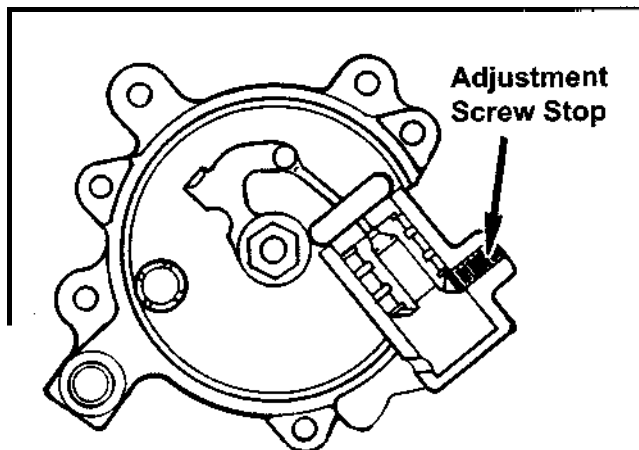


Fig. 85 Choke vacuum adjustment screw stop

Automatic Choke

◆ See Figure 86

The electric automatic choke has been set at the factory to give maximum performance under all operating and weather conditions. Index marks on the cover and housing should be aligned as specified in the Carburetor Specifications chart. A richer or leaner mixture can be obtained by loosening the cover screws and rotating the housing cover. Rotating the housing cover in a counterclockwise direction will richen the mixture, causing the choke to stay on for a longer time. Rotating the housing cover in the clockwise direction will lean out the mixture, causing the choke to kick off sooner.

It is a good idea to always keep alternative settings within two notched of the specified setting.

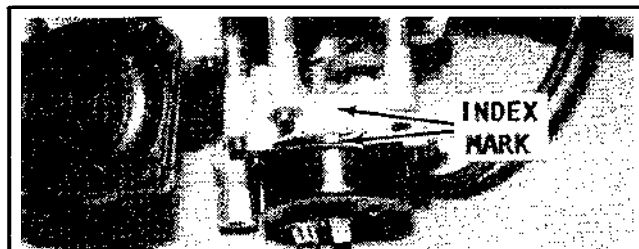


Fig. 86 Aligning the index marks will set the automatic choke for proper operation

Choke Unloader

Refer to the Carburetor Specifications chart for the proper size drill bit to use. Hold the throttle in the wide open position and insert the appropriate drill bit between the upper edge of the plate and the inner wall of the air horn. This will actually give the proper clearance at the lower edge of the plate.

Place your finger on the choke control lever and check that you can feel a very slight drag as the drill bit is moved through the opening. Carefully bend the tab on the kick down lever (under the housing) with needle nose pliers until the correct clearance is achieved and the drill bit passes through the opening with a slight drag.

Mechanical Fuel Pump

DESCRIPTION

◆ See Figures 87, 88, 89, 90 and 91

A mechanical-type fuel pump driven off the camshaft is utilized on all 2.3L, 2.5L and 3.0L engines, 1984-91 4.3L engines, 1986-92 5.0L/5.7L GM engines and all carbureted V8 Ford engines.

The fuel pump sucks gasoline from the fuel tank and delivers it to the carburetor in sufficient quantities, under pressure, to satisfy engine demands under all operating conditions.

The pump is operated by a two-part rocker arm. The outer part rides on an eccentric on the camshaft and is held in constant contact with the camshaft by a strong return spring. The inner part is connected to the fuel pump diaphragm by a short connecting rod. As the camshaft rotates, the rocker arm moves up and down. As the outer part of the rocker arm moves downward, the inner part moves upward, pulling the fuel diaphragm upward. This upward movement compresses the diaphragm spring and creates a vacuum in the fuel chamber below the diaphragm. The vacuum causes the outlet valve to close and permits fuel from the gas tank to enter the chamber by way of the fuel filter and the inlet valve.

Now, as the eccentric on the camshaft allows the outer part of the rocker arm to move upward, the inner part moves downward, releasing its hold on the connecting rod. The compressed diaphragm spring then exerts pressure on the diaphragm, which closes the inlet valve and forces fuel out through the outlet valve to the carburetor.

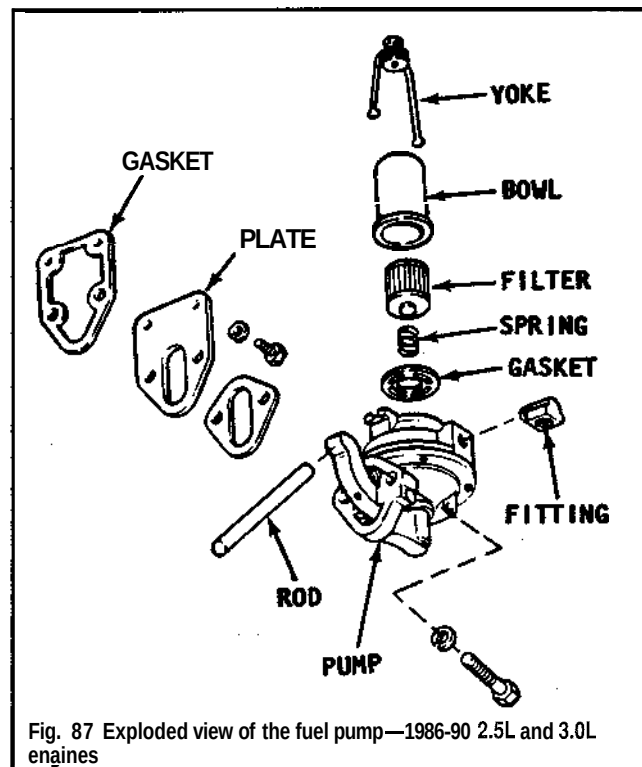


Fig. 87 Exploded view of the fuel pump—1986-90 2.5L and 3.0L engines

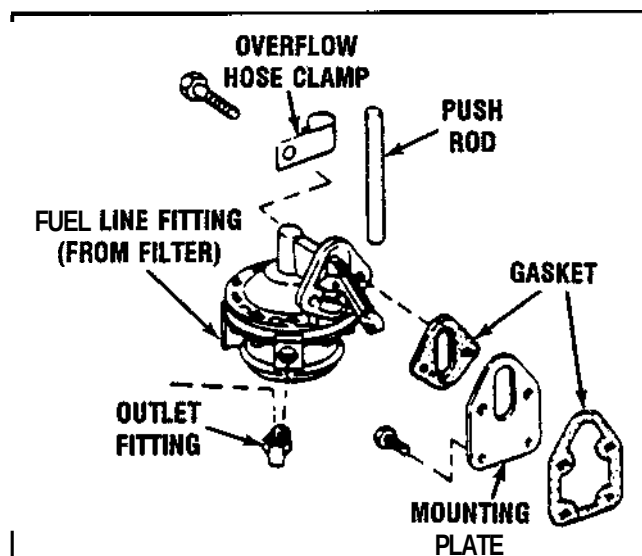


Fig. 88 Exploded view of the fuel pump—1991-92 3.0L engines, 2.3L engines and all GM V6/V8 engines

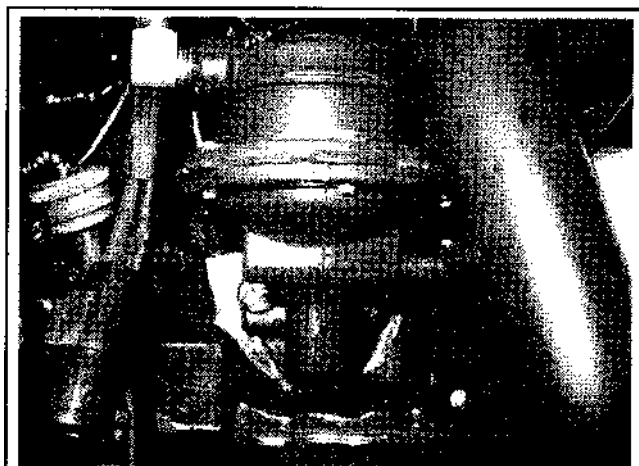


Fig. 89 A good shot of the pump on a 1993-94 3.0L engine

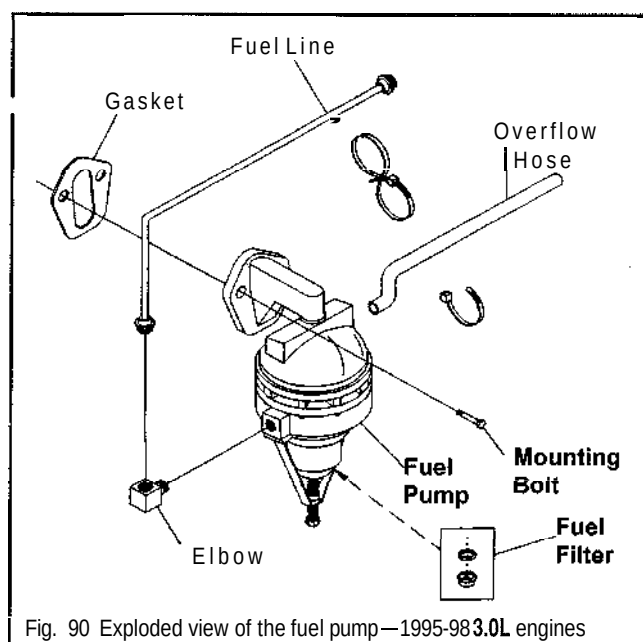


Fig. 90 Exploded view of the fuel pump—1995-98 3.0L engines

Because the fuel pump diaphragm(s) is(are) moved downward only by the diaphragm spring, the pump delivers fuel to the carburetor only when the pressure in the outlet line is less than the pressure exerted by the diaphragm spring. This lower pressure condition exists when the carburetor float needle valve is unseated and the fuel passages from the pump into the carburetor float chamber are open.

When the needle valve is closed and held in place by the pressure of the fuel on the float, the pump builds up pressure in the fuel chamber until it overcomes the pressure of the diaphragm spring. This pressure almost stops movement of the diaphragm until more fuel is needed in the carburetor float bowl.

REMOVAL & INSTALLATION

All Except Ford V8 Engines

◆ See Figures 87 thru 90

Always have a fire extinguisher handy when working on any part of the fuel system. Remember, a very small amount of fuel vapor in the bilge, has the tremendous potential explosive power.

1. Open or remove the engine hatch/covers. Disconnect the battery cables.

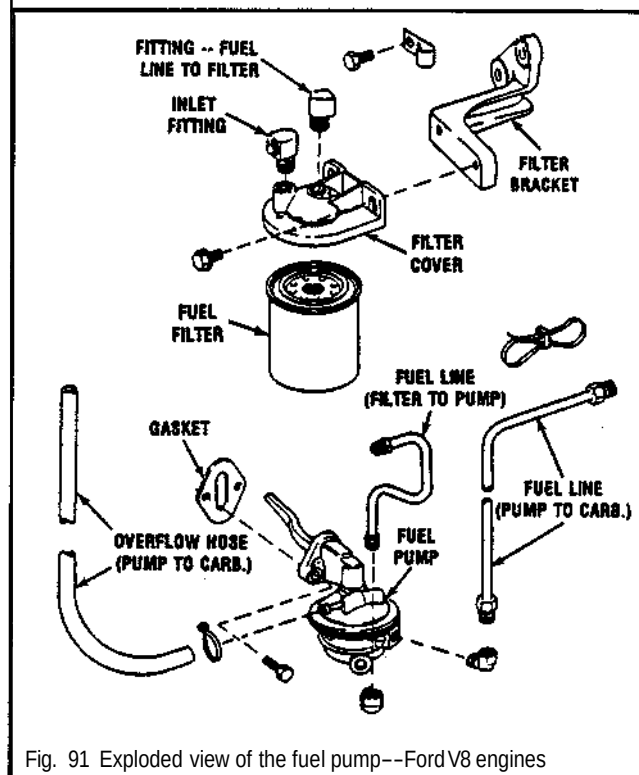


Fig. 91 Exploded view of the fuel pump—Ford V8 engines

2. Position a container under the pump and remove the fuel inlet and outlet lines. It is important to use two open-end wrenches; one to hold the fitting nut and the other to loosen the line nut. Plug the line with a golf tee or something similar to prevent additional fuel spillage. Take care not to spill fuel on a hot engine, because such fuel may ignite.

If your boat has a fuel shut-off valve, make sure it is turned OFF before disconnecting the fuel lines.

3. Disconnect the sight tube on engines so equipped.

4. Cut the plastic tie and pull off the vent/overflow line.

5. On the 3.0L engine, you may find that removing the starboard engine mount will be beneficial on many engines—you can be the judge by observing the working space.

6. Loosen the two pump mounting bolts/lock washers and carefully pull the pump out. Scrape any old gasket material from the pump and block mating surfaces. The pump pushrod may fall out of position when removing the pump; to prevent this, slip a small screwdriver in behind the pump and support the pushrod.

7. Take note of the pump elbow positioning and then remove it for use on a new pump.

To Install:

8. Check the pump pushrod for damage or wear.

9. Coat the threads of the elbow with Teflon® Pipe Sealant—DO NOT use Teflon® tape. Install the elbow to the pump and tighten it to 48-60 inch lbs. (5.4-6.7 Nm).

10. Coat BOTH sides of the new gasket with Gasket Sealing compound and position it on block. Swab the end of the pushrod with grease and insert the pump into the cylinder block so that the rod is riding on the camshaft eccentric. Tighten the mounting bolts to 12-14 ft. lbs. (16-19 Nm) on 2.5L and 1986-90 3.0L engines; 20-25 ft. lbs. (27-34 Nm) on 2.3L, 4.3L, 5.0L and 5.7L engines and 1991-98 3.0L engines.

11. Connect the vent line and tie it into position.

12. Coat the threads of the fuel line pump fittings with Pipe Sealant, thread them into the pump base and then tighten to 15-18 ft. lbs. (20-24 Nm) while holding the inlet fittings with another wrench. Do not over-tighten and do not use Teflon tape.

13. Install the sight tube if removed.

14. Install the engine mount if removed. Don't forget to check the engine alignment.

15. Remove the container and connect the battery cables. Start the engine and check for fuel leaks.



8-30 FUEL SYSTEMS – CARBURETORS

5.0L/5.8L Ford Engines

4 See Figures 91 and 92

Always have a fire extinguisher handy when working on any part of the fuel system. Remember, a very small amount of fuel vapor in the bilge, has the tremendous potential explosive power.

1. Open or remove the engine hatchcovers. Disconnect the battery cables
2. Unscrew and remove the fuel inlet line at the fuel filter. Unscrew the filter and remove it
3. Position a container under the pump and remove the fuel inlet and outlet lines. It is important to use two open-end wrenches, one to hold the fitting and the other to loosen the line nut. Plug the line with a golf tee or something similar to prevent additional fuel spillage. Take care not to spill fuel on a hot engine, because such fuel may ignite

■ If your boat has a fuel shut-off valve, make sure it is turned OFF before disconnecting the fuel lines.

4. Cut the plastic tie and pull off the vent line.
5. Remove the two mounting bolts and lift off the fuel filter bracket, securing it out of the way
6. Loosen the two pump mounting screws/lock washers and carefully pull the pump out. Scrape any old gasket material from the pump and block mating surfaces. The pump pushrod may fall out of position when removing the pump, to prevent this, slip a small screwdriver in behind the pump and support the pushrod
7. Take note of the pump elbow positioning and then remove it for use on a new pump.

To Install:

8. Check the pump pushrod for damage or wear
9. Coat the threads of the elbow with Teflon® Pipe sealant—DO NOT use Teflon® tape. Install the elbow to the pump and tighten it to 48-60 inch lbs. (5.4-6.7 Nm).
10. Coat BOTH sides of the new gasket with Gasket Sealing compound and position it on block. Swab the end of the pushrod with grease and insert the pump into the cylinder block so that the rod is riding on the camshaft eccentric. Tighten the mounting bolts to 18-20 ft. lbs. (24-27 Nm).
11. Install the filter bracket and tighten the bolts to 20-25 ft. lbs. (27-34 Nm).

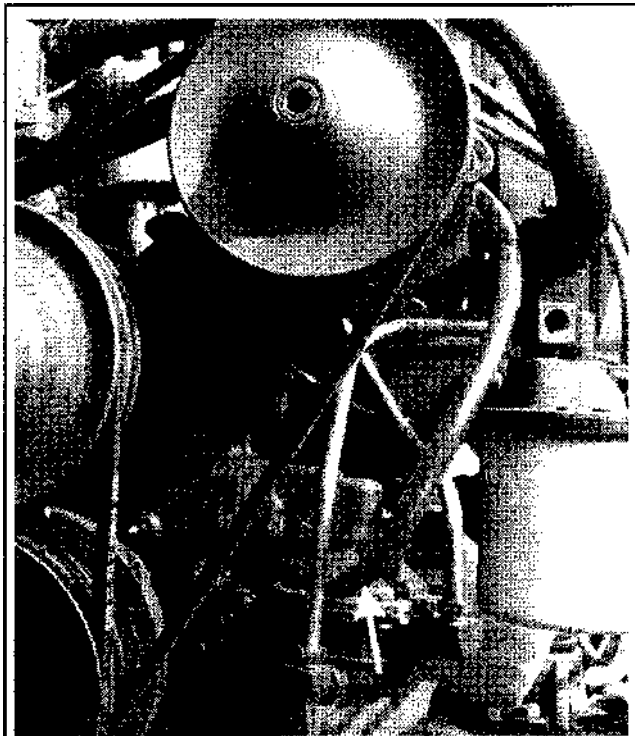


Fig. 92 A good shot of the fuel pump



12. Connect the vent line and tie it into position.
13. Coat the threads of the fuel line pump fittings with Pipe Sealant, thread them into the pump base and then tighten to 15-18 ft. lbs. (20-24 Nm) while holding the inlet fittings with another wrench. Do not over-tighten and do not use Teflon tape.
14. Install the filter and then reconnect the inlet line.
15. Remove the container and connect the battery cables. Start the engine and check for fuel leaks.

7.5L Ford Engines

4 See Figures 91 and 93

■ Always have a fire extinguisher handy when working on any part of the fuel system. Remember, a very small amount of fuel vapor in the bilge, has the tremendous potential explosive power.

1. Open or remove the engine hatchcovers. Disconnect the battery cables.
2. Unscrew and remove the fuel inlet and outlet lines at the fuel filter. On early models, you will need to drain the engine oil and then remove the oil filter to gain access here.
3. Unscrew and remove the filter fuel line at the fuel pump and remove it.
4. Remove the bolt, lock washer and plaster nut securing the dipstick clamp to the filter bracket. Remove the 2 mounting bolts and then lift off the bracket and filter. Carefully set it down upright as there will be fuel in the filter.
5. Position a container under the pump and remove the remaining fuel outlet line. It is important to use two open-end wrenches; one to hold the fitting and the other to loosen the line nut. Plug the line with a golf tee or something similar to prevent additional fuel spillage. Take care not to spill fuel on a hot engine, because such fuel may ignite.

If your boat has a fuel shut-off valve, make sure it is turned OFF before disconnecting the fuel lines.

6. Cut the plastic tie and pull off the vent line.
7. Remove the two mounting bolts and lift off the fuel filter bracket, securing it out of the way.
8. Loosen the two pump mounting bolts/lock washers and carefully pull the pump out. Scrape any old gasket material from the pump and block mating surfaces. The pump pushrod may fall out of position when removing the pump; to prevent this, slip a small screwdriver in behind the pump and support the pushrod.
9. Take note of the pump elbow positioning and then remove it for use on a new pump.

To Install:

10. Check the pump pushrod for damage or wear.
11. Coat the threads of the elbow with Teflon® Pipe sealant—DO NOT use Teflon® tape. Install the elbow to the pump and tighten it to 48-60 inch lbs. (5.4-6.7 Nm).
12. Coat BOTH sides of the new gasket with Gasket Sealing compound and position it on block. Swab the end of the pushrod with grease and insert the pump into the cylinder block so that the rod is riding on the camshaft eccentric. Tighten the mounting bolts to 20-25 ft. lbs. (27-34 Nm).
13. Connect the vent line and tie it into position.
14. Thread the pump outlet line in and tighten the line nut securely.
15. Install the filter and bracket and tighten the bolts finger-tight. Make sure that the long bolt goes in the upper hole.
16. Install the dipstick tube clamp and tighten it securely. Now go back and tighten the bracket mounting bolts to 20-25 ft. lbs. (27-34 Nm).
17. Coat the threads of the remaining fuel line fittings with Pipe Sealant, thread them into the pump base and then tighten to 15-18 ft. lbs. (20-24 Nm) while holding the fittings with another wrench. Do not over-tighten and do not use Teflon tape.
18. Install the oil filter if removed.
19. Remove the container and connect the battery cables. Start the engine and check for fuel leaks.



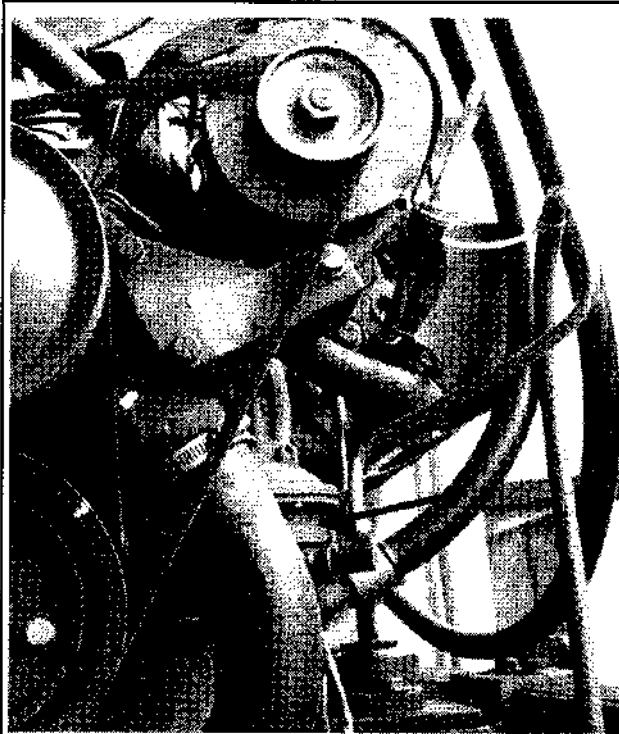


Fig. 93 A good shot of the fuel pump

PRESSURE TEST



■ Always have a fire extinguisher handy when working on any part of the fuel system. Remember, a very small amount of fuel vapor in the bilge, has the tremendous potential explosive power.

1. Open or remove the engine hatchcovers. Disconnect the battery cables.
2. Confirm that there is fuel in the tank. Also, make sure that the fuel filter and the carburetor inlet filter are clean and free of obstructions; we recommend replacing the filters before performing this test.
3. Position a container under the fuel pump and remove the outlet line (the line leading to the carburetor). It is important to use two open-end wrenches; one to hold the fitting elbow and the other to loosen the line nut. Plug the line with a golf tee or something similar to prevent additional fuel spillage.
4. Thread a 'tee' or a fuel pressure gauge connector into the fitting elbow on the pump and then reconnect the fuel line to the other end.
5. Connect a fuel pressure test gauge to the remaining fitting on the connector. Always follow the gauge manufacturer's instructions on set-up when installing the gauge.
6. Connect the battery cables, start the engine and let it idle. The fuel pressure should be 5 3/4-7 psi (39.6-48.3 kPa), except on the 7.5L Ford engine where it should be 5-6 psi (34.5-41.4 kPa).
7. Slowly run the engine up to 1,800 rpm and check that the pressure remains the same.
8. If pressure varies, or is off specification at all, replace the pump. All fuel pumps covered here are of the sealed variety; no adjustments or rebuilds are possible.
9. Turn off the engine, remove the pressure gauge and fuel line and then remove the connector. Reinstall the fuel line to the fitting and tighten to 18 ft. lbs. (24 Nm).

VACUUM TEST

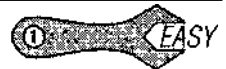


□ If experiencing slow starts or long cranking tests, perform this test after confirming that fuel pump pressure is acceptable.

□ Always have a fire extinguisher handy when working on any part of the fuel system. Remember, a very small amount of fuel vapor in the bilge, has the tremendous potential explosive power.

1. Open or remove the engine hatchcovers. Disconnect the battery cables.
2. Confirm that there is fuel in the tank. Also, make sure that the fuel filter and the carburetor inlet filter are clean and free of obstructions.
3. Position a container under the fuel filter and remove the inlet line. It is important to use two open-end wrenches; one to hold the fitting elbow and the other to loosen the line nut. Plug the line with a golf tee or something similar to prevent additional fuel spillage.
4. Tag and disconnect all electrical leads at the (+) terminal of the ignition coil; tape the ends and position them out of the way. Reconnect the battery cables.
5. Connect a vacuum gauge to the remaining fitting on the connector. Always follow the gauge manufacturer's instructions on set-up when installing the gauge.
6. Crank the engine and note the reading on the gauge. The vacuum should be 9-10 in. Hg. (30-34 kPa).
7. Replace the fuel pump if the vacuum reading is outside the specified range. All fuel pumps covered here are of the sealed variety; no adjustments or rebuilds are possible.
8. Turn off the engine, remove the gauge and fuel line and then remove the connector. Reinstall the fuel line to the fitting and tighten to 18 ft. lbs. (24 Nm). Reconnect the ignition coil leads.

FUEL LINE TEST



The fuel line, from the tank to the fuel pump, can be quickly tested by disconnecting the existing fuel line at the fuel pump and connecting a six-gallon portable tank and fuel line. This simple substitution eliminates the fuel tank and fuel lines in the boat. Now, start the engine and check the performance.

If the problem has been corrected, the fuel system between the fuel pump inlet and the fuel tank is at fault. This area includes the fuel line, the fuel pickup in the tank, the fuel filter, anti-siphon valve, the fuel tank vent, and excessive foreign matter in the fuel tank, and loose fuel fittings sucking air into the system. Improper size fuel fittings can also restrict fuel flow.

Possible cause of fuel line problems may be deterioration of the inside lining of the fuel line which may cause some of the lining to develop a blockage similar to the action of a check valve. Therefore, if the fuel line appears the least bit questionable, replace the entire line.

Another possible restriction in the fuel line may be caused by some heavy object lying on the line—a tackle box, etc.

Electric Fuel Pump

DESCRIPTION

◆ See Figure 94

All 1992-98 4.3L engines, 1993-98 5.0L/5.7L GM engines and all 7.4L/8.2L engines utilize an electric fuel pump with their carbureted fuel systems.

The electric fuel pump system includes the fuel tank/s, a water separating fuel filter, the electric fuel pump and a carburetor.

All pumps covered herein utilize a 12V motor running continuously at 4000 rpm during cranking or operation. The motor drives a conventional gear-type pump using incoming fuel as coolant. Fuel is supplied at varying pressures determined by both engine load and fuel consumption. A fuel pressure regulator eliminates the need for a return line.

Whenever the ignition switch is in the START position, voltage is supplied to the fuel pump relay via the 85 or S terminal on the starter relay. Once the relay is activated, voltage is applied to pump motor and then on to ground. This circuit is protected by a circuit breaker (12.5 amp on some models/years; 6 amp on others). Once the ignition switch is in the RUN position, voltage is supplied via the alternator "light" terminal.

Electric fuel pumps are not repairable, adjustable or rebuildable.

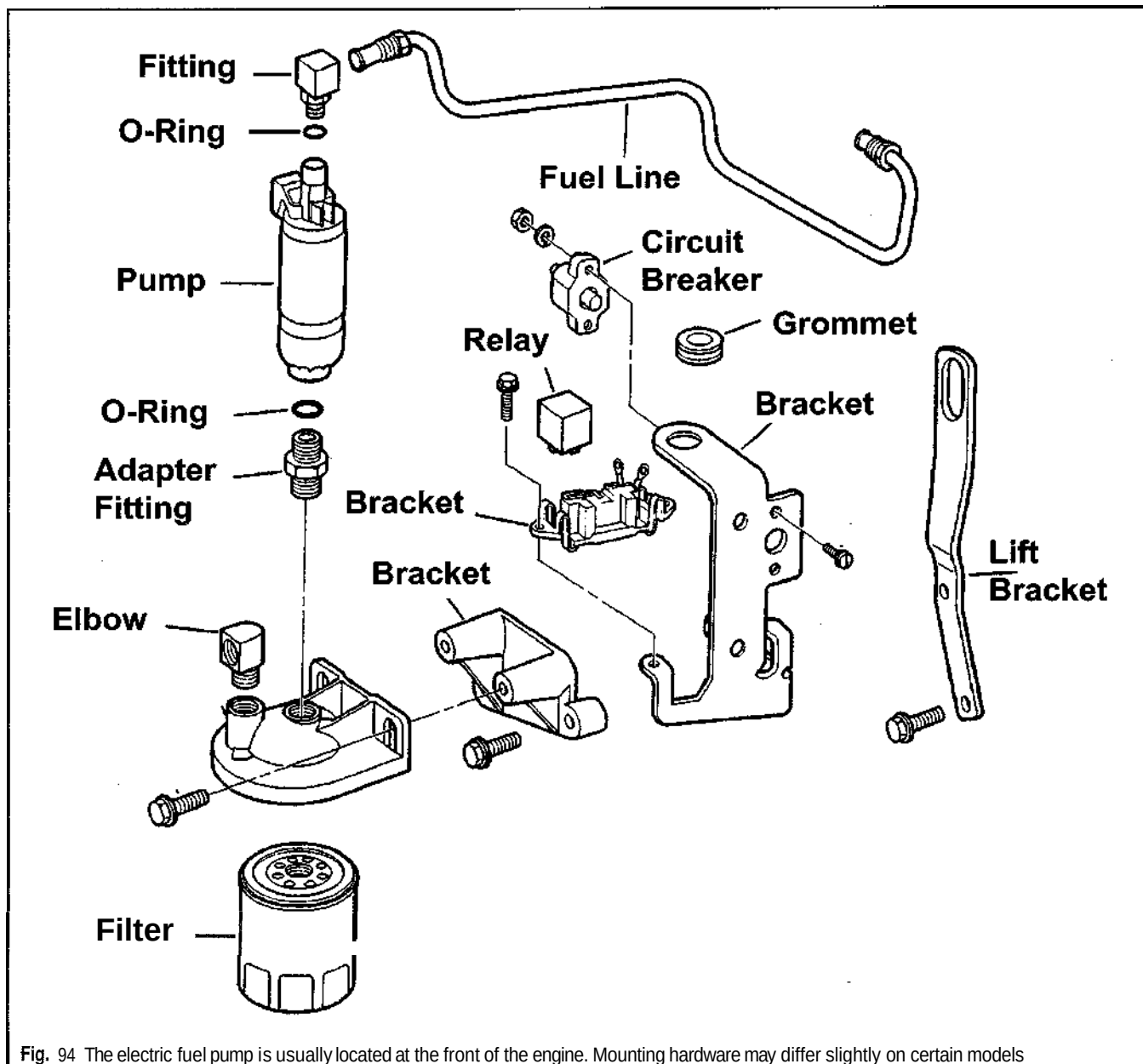


Fig. 94 The electric fuel pump is usually located at the front of the engine. Mounting hardware may differ slightly on certain models

REMOVAL & INSTALLATION

◆ See Figure 94



□ Always have a fire extinguisher handy when working on any part of the fuel system. Remember, a very small amount of fuel vapor in the bilge, has the tremendous potential explosive power.

** CAUTION

All OMC fuel pumps are designed to meet U.S. Coast Guard fuel system regulations. Never substitute an automotive style pump.

1. Open or remove the engine hatch/covers. Disconnect the battery cables.
2. Position a container under the pump/filter assembly and remove the fuel inlet line at the filter bracket and the outlet line at the top of the pump. It is important to use two open-end wrenches; one to hold the fuel fitting nut or elbow and the other to loosen the line nut. Plug the line with a golf tee or something similar to prevent additional fuel spillage. Take care not to spill fuel on a hot engine, because such fuel may ignite.

3. Cut the plastic tie holding the electrical leads to the body of the pump. Unplug the electrical harness at the pump suppressor connector and move it out of the way.

4. Hold the pump end cap (just under the lower edge of the upper retaining bracket) with a wrench while loosening the lock nut (on top of bracket, under elbow). Unscrew the upper elbow.

** CAUTION

Not holding the end cap while loosening the lock nut will damage the internal O-ring, causing fuel leakage during operation.

5. Remove the 2 fuel filter bracket mounting bolts and lift off the pump/bracket/filter as an assembly, sliding the pump out of the upper grommet. Be careful of spilling fuel.
6. Lay the assembly down, or carefully mount the bracket in a vise. Hold the lower pump end cap with a wrench and unscrew the filter bracket-to-pump adapter.

✖ CAUTION

Not holding the end cap while loosening the lock nut will damage the internal O-ring, causing fuel leakage during operation.

To Install:

❑ Electric fuel pumps all look familiar, but will usually have different flow rates—always make sure that you have the correct pump for your engine.

7. Slide a new O-ring over the threads of the adapter until it rests on the upper side of the hex nut.

8. Screw the adapter/bracket assembly into the pump while holding the lower end cap. Tighten the adapter to 8-10 ft. lbs. (11-14 Nm).

9. Slide the assembly up through the grommet in the bracket and position it so the mounting holes line up on the bracket. Tighten the filter bracket bolts to 20-25 ft. lbs. (27-34 Nm).

10. Thread the upper lock nut onto the elbow until it reaches the underside of the fitting. Slip on the washer and then a new O-ring. Thread the elbow into the top of the pump until it stops and then back it out just enough to align with the fuel line. Connect the line and tighten it securely.

11. Hold the upper end cap again and tighten the lock nut to 60-84 inch lbs. (6.8-9.5 Nm).

12. Reconnect the suppressor lead—push it in until the tabs click.

❑ If you notice any of the suppressor holes open, be sure to coat them with Liquid Neoprene to prevent water from entering.

13. Install a new plastic tie around the pump body and electrical leads.

14. Reconnect the inlet line and tighten it securely.

15. Install the pump guard if removed.

16. Remove the container and connect the battery cables. Start the engine and check for fuel leaks.

PRESSURE TEST

◆ See Fi 95



❑ This test MUST be performed with the boat in the water and the engine running. It is imperative that an assistant be with you in the boat also to check the pressure readings.

1. Open or remove the engine hatch/covers. Disconnect the battery cables.

2. Position a container under the fuel line connection at the carburetor (or the outlet side of the fuel pump) and remove the fuel line. It is important to use two open-end wrenches; one to hold the fitting nut/elbow and the other to loosen the line nut. Plug the line with a golf tee or something similar to prevent additional fuel spillage.

Engine Speed (rpm)	Fuel Pressure (psi)
Idle	4.9-8.5
1000	4.8-8.4
1500	4.7-8.3
2000	4.6-8.2
2500	4.5-8.1
3000	4.4-8.0
3500	4.3-7.9
4000	4.0-7.7
4500	--
4600	3.5-7.3

Fig. 95 Electric fuel pump pressure test specifications

3. Thread a 'tee' or a fuel pressure connector into the fitting nuffelbow on the carburetor or pump and then reconnect the fuel line to the other end.

4. Connect a fuel pressure test gauge to the remaining fitting on the connector. Always follow the gauge manufacturer's instruction when setting up the pressure gauge.

5. Connect the battery cables, start the engine and let it idle. The fuel pressure should be 4.9-8.5 psi.

6. Slowly run the engine up to 4600 rpm, checking the fuel pressure readings at each of the listed engine speed readings.

■ New engines will almost always have lower operating pressures than engines that have been broken in,

7. If pressure varies from specifications, replace the pump.

8. Turn off the engine, remove the pressure gauge and fuel line and then remove the connector. Reinstall the fuel line to the fitting and tighten to 18 ft. lbs. (24 Nm).

FUEL SYSTEM CHECKS



Check that the fuel filter is debris free and seals tightly against the mounting bracket and threads.

Check that the carburetor inlet filter screen is clean and free of debris.

Check for kinked, bent, crushed or damaged fuel lines.

Check for restricted anti-siphon valve; or incorrect valve.

Check for cracked, obstructed or damaged fuel pick-up screen in fuel tank.

Check for blocked or broken fuel tank vent.

COMPONENT REPLACEMENT

Circuit Breaker



1. Open or remove the engine hatch/covers. Disconnect the battery cables.

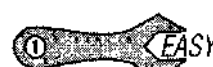
2. Locate the circuit breaker on the pump bracket. Tag and disconnect the electrical leads, remove the 2 mounting screws and lift off the breaker.

3. Install a new breaker and tighten the mounting bolts to 20-25 inch lbs. (2.3-2.8 Nm).

4. Attach the Red lead to one stud and the Red/Purple lead to the other. Tighten the nuts to 20-25 inch lbs. (2.3-2.8 Nm).

5. Coat both terminals with Liquid Neoprene. Reconnect the battery cables.

Relay And Bracket



1. Open or remove the engine hatch/covers. Disconnect the battery cables.

2. Cut the plastic tie, remove the wire retainer and then disconnect the Amphenol plug near the solenoid.

3. Tag and disconnect the two leads at the circuit breaker.

4. Tag and disconnect the Green electrical lead at the Light terminal on the rear of the alternator.

5. Cut the plastic tie holding the harness to the pump and then disconnect the connector at the pump suppressor.

6. Remove the two mounting screws and lift off the relay bracket. Unplug the relay.

To Install:

7. Pop the relay into the mounting bracket, position the bracket and tighten the screws to 20-25 inch lbs. (2.3-2.8 Nm).

8. Align the connector tabs and press the pump suppressor connector halves together until they click. Reattach the harness to the pump body with the plastic tie.

9. Reroute the green lead through the clamps on the front of the engine and connect it to the alternator.

10. Reattach the two circuit breaker leads and coat the terminals with Liquid Neoprene.

11. Reconnect the two halves of the Amphenol connector and press it into the wire retainer. Secure the connector to the retainer with a plastic tie.

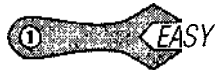
8-34 FUEL SYSTEMS – CARBURETORS

Deceleration Valve

In order to prevent the engine from stalling during high vacuum conditions, a deceleration (gulp) valve is used on all carbureted Ford engines. Air is allowed to flow into the intake manifold, entering the air/fuel mixture so as to lean out the rich condition frequently created by high vacuum when the throttle valves are closed on rapid deceleration.

Sudden vacuum acts to draw down the diaphragm in the valve, opening the valve and allowing air to flow through the screen and into the manifold.

FUNCTION CHECK



1. Start the engine and allow it to reach normal operating temperature at idle.
2. Remove the small vacuum signal line from the vacuum source on the manifold.

3. Reconnect the vacuum line and listen carefully for air flowing through the screen and into the manifold. Confirm also that there is a noticeable drop in engine speed (rpm) when reconnecting the vacuum line.

4. If the air flow through the screen does not persist for at least a second (1), or, if the idle speed does not drop, check all hoses and lines connected to the valve for damage or blockage.

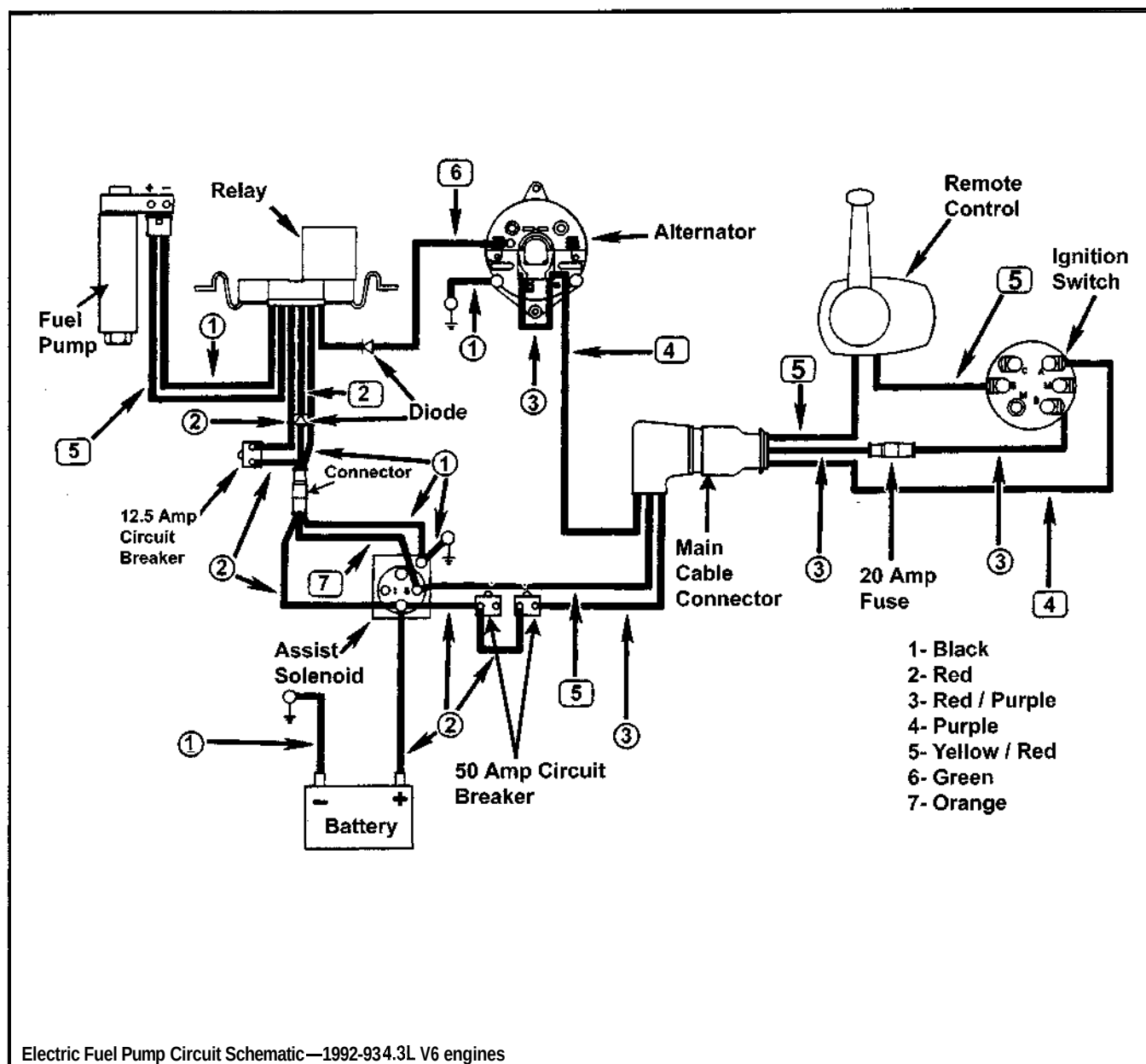
5. If the lines are OK, replace the valve.

REMOVAL & INSTALLATION

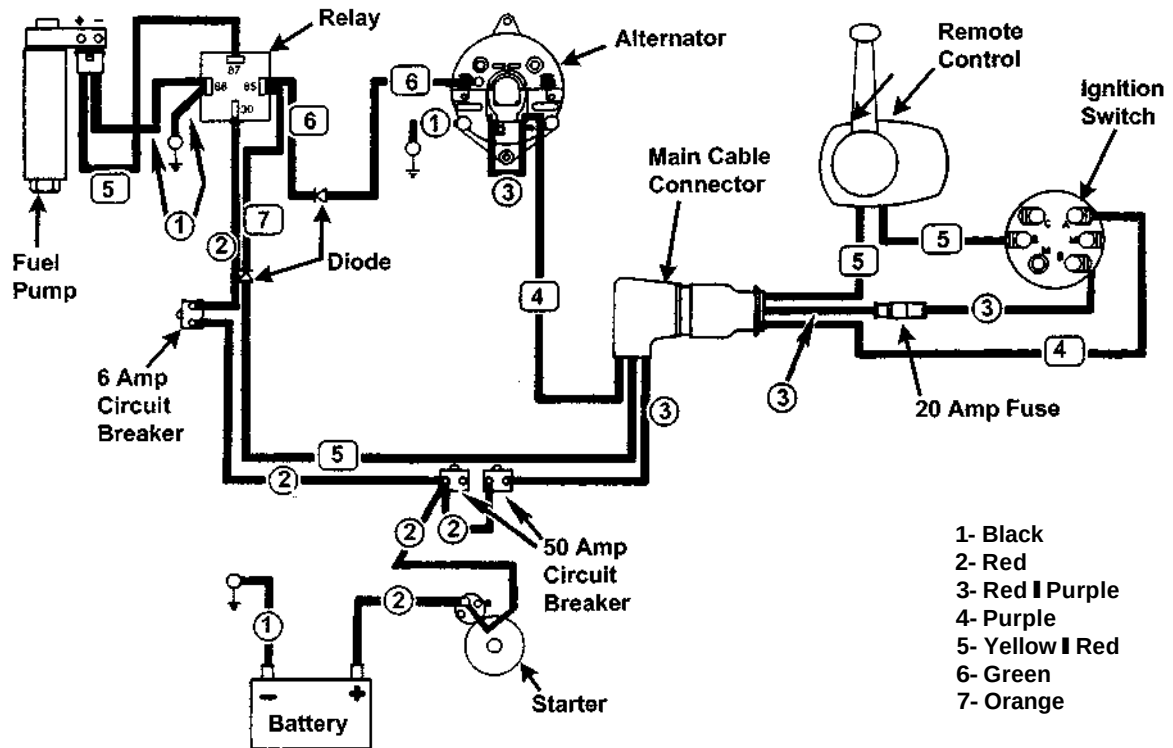


1. Open or remove the engine hatch/covers. Disconnect the battery cables.
2. Cut the plastic ties securing the vacuum lines and screen. Remove the 2 mounting screws and lift off the valve.
3. Install a new valve and tighten the screws securely.
4. Attach the two vacuum lines and the screen and secure them with plastic ties.

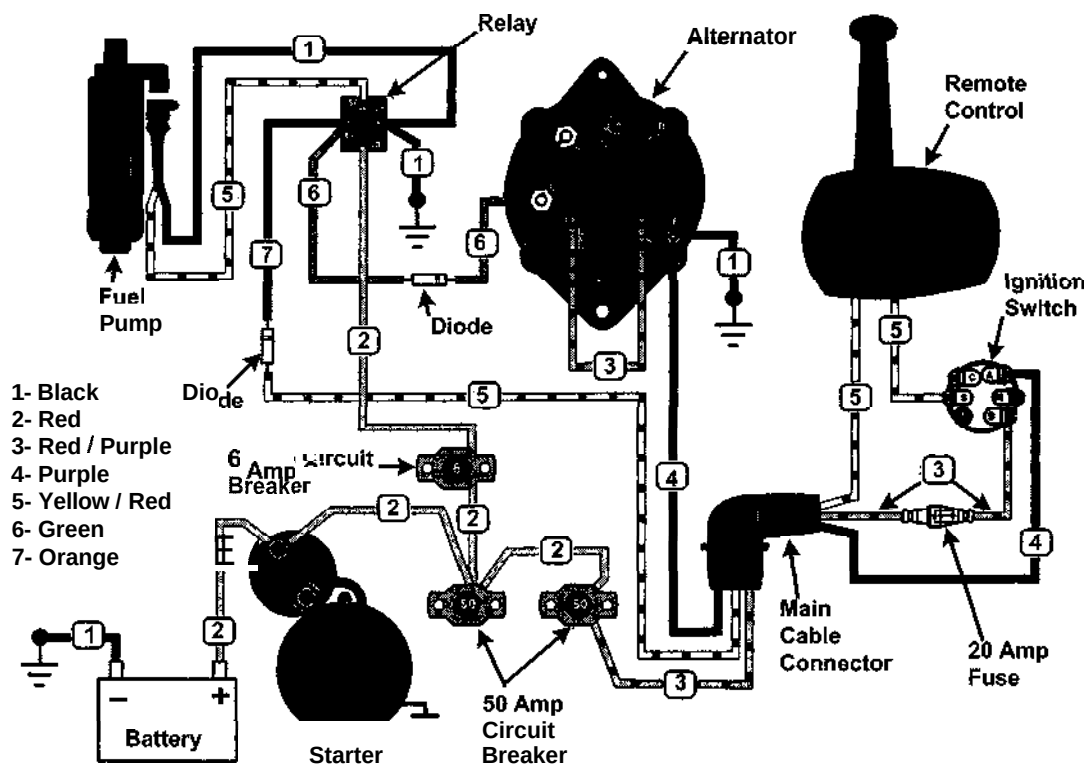
WIRING DIAGRAMS



Electric Fuel Pump Circuit Schematic—1992-93 4.3L V6 engines

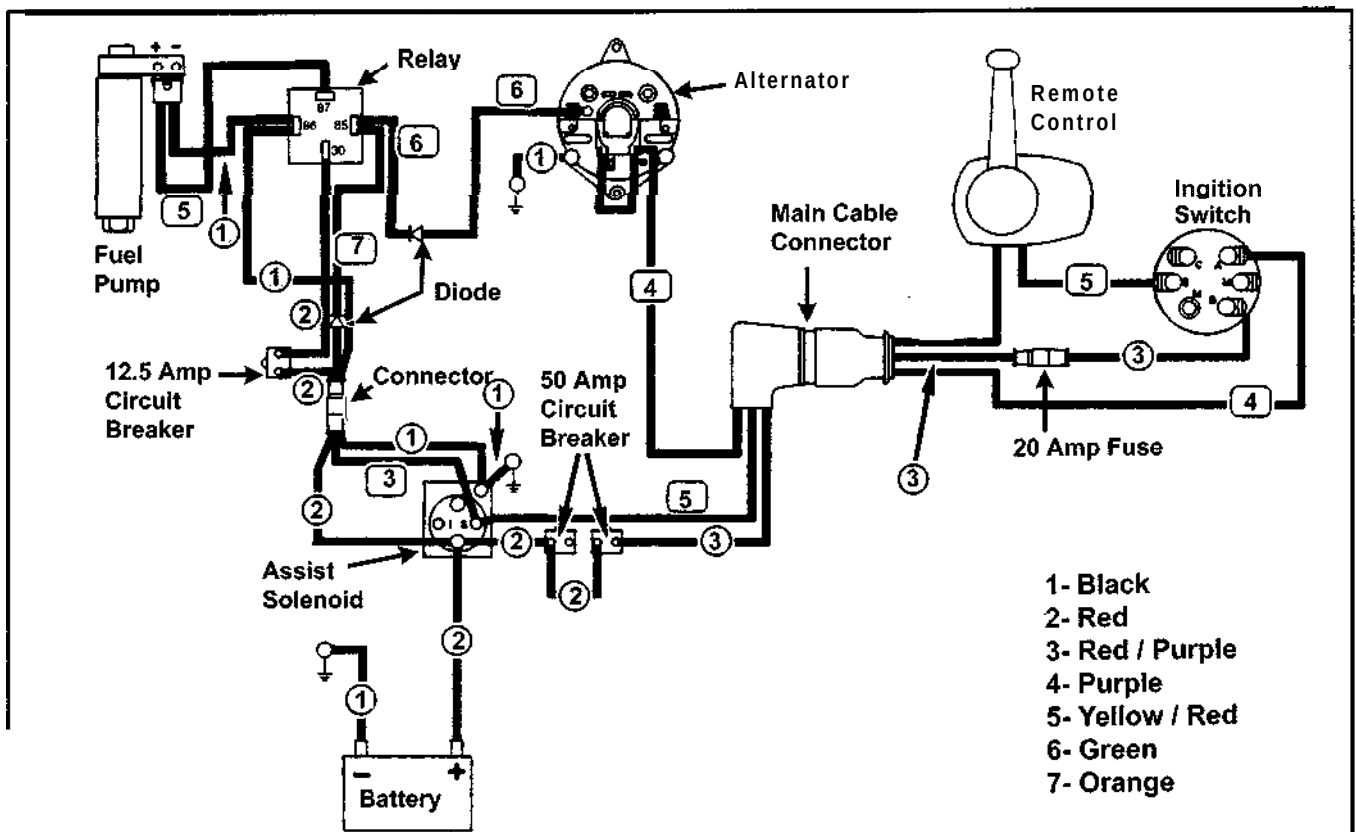
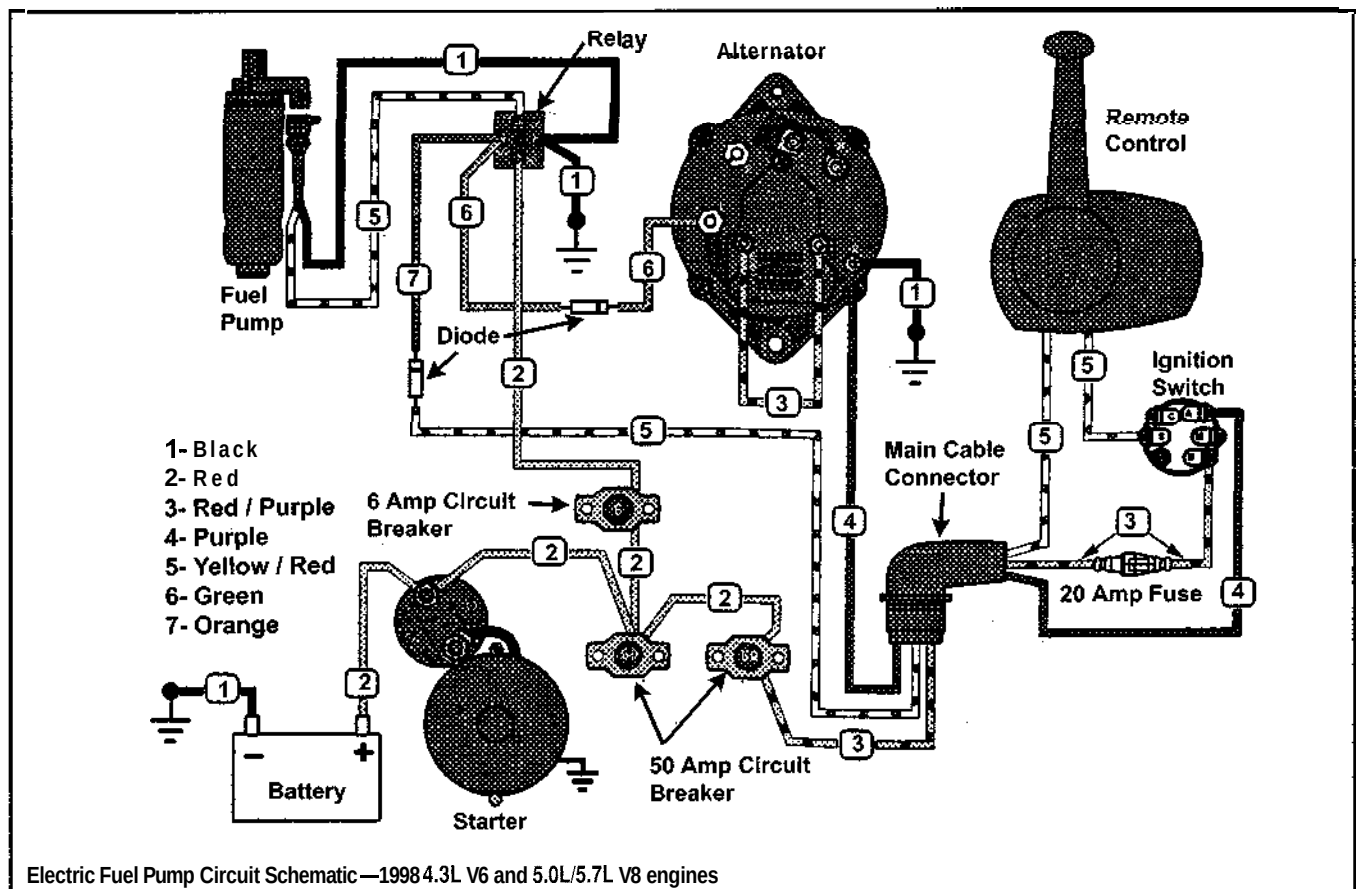


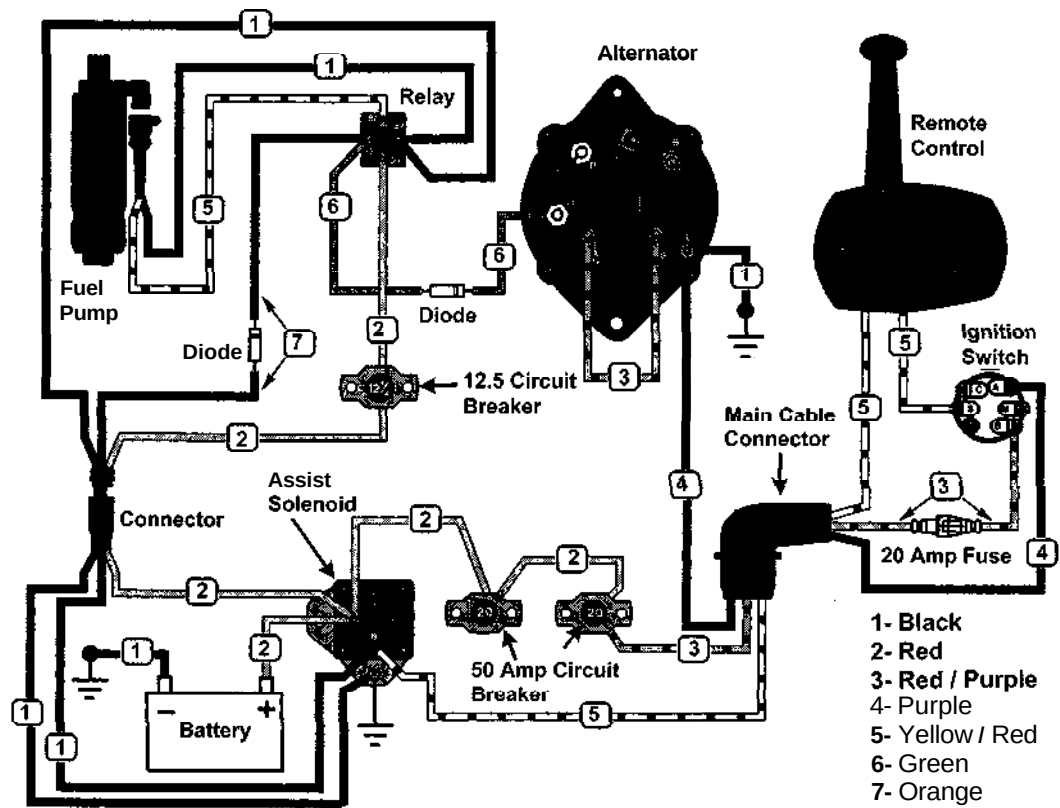
Electric Fuel Pump Circuit Schematic—1994-96 4.3L V6 and 5.7L V8 engines



Electric Fuel Pump Circuit Schematic—1997 4.3L V6 and 5.7L V8 engines

8-36 FUEL SYSTEMS – CARBURETORS





Electric Fuel Pump Circuit Schematic—1997 7.4L V8 engines

SPECIFICATIONS

TORQUE SPECIFICATIONS

Component			ft. lbs.	inch lbs.	Nm
Accelerator Pump Cover				5	0.6
Carburetor Mounting Nuts	Holley		10-14		13-19
	Rochester 2bbl	Early Models	10-14		13-19
		Later Models	12-15		16-20
	Rochester 4bbl	Nuts	10-14		13-19
		Bolts	6-8		8-11
Circuit Breaker			20-25		25-34
Fuel Bowl				45	5.1
Fuel Filter Bracket			20-25		25-34
Fuel Line Elbow				48-60	5.4-6.7
Fuel Line			15-18		20-24
Fuel Pump	Electric	Adapter	8-10		11-14
		Filter Bracket	20-25		25-34
		Lock Nut		60-84	6.8-9.5
	Mechanical	2.3L	20-25		25-34
		3.0L (1986-90)	12-14		16-19
		3.0L (1991-98)	20-25		25-34
		4.3L	20-25		25-34
		5.0L/5.7L (GM)	20-25		25-34
		5.0L/5.8L (Ford)	18-20		24-27
		7.5L	20-25		25-34
Inlet Needle seat				10	1.1
Power Valve				100	11.3

8-38 FUEL SYSTEMS – CARBURETORS

CARBURETOR APPLICATIONS

Year	Model	I L/Cu. In.	Engine Type	Horsepower (At Prop.)	Carburetor Type	Fuel Delivery
1986	2.5	2.51153	L4	NA	Rochester 2GC/GV IGE	2 bbl
	3.0	3.01181	L4	NA	Rochester 2GC/GV /GE	2 bbl
	4.3	4.3/262	V6	NA	Rochester 2GC/GV IGE	2 bbl
	4.3	4.3/262	V6	NA	Rochester Quadrajets	4 bbl
	5.0	5.01302	V8	185	Rochester Quadrajets	4 bbl
	5.7	5.71350	V8	230	Rochester Quadrajets	4 bbl
1987	2.3	2.31140	L4	NA	Rochester 2GC/GV ①	2 bbl
	3.0	3.01181	L4	NA	Rochester 2GC/GV IGE	2 bbl
	4.3	4.31262	V6	NA	Rochester 2GC/GV /GE	2 bbl
	4.3	4.31262	V6	NA	Rochester Quadrajets	4 bbl
	5.0	5.01302	V8	185	Rochester Quadrajets	4 bbl
	5.7	5.71350	V8	230	Rochester Quadrajets	4 bbl
	7.5 460	7.51460	V8	NA	Holley ①	4 bbl
1988	2.3	2.31140	L4	NA	Rochester 2GC/GV ①	2 bbl
	3.0	3.01181	L4	NA	Rochester 2GC/GV IGE	2 bbl
	4.3	4.31262	V6	NA	Rochester 2GC/GV IGE	2 bbl
	4.3	4.31262	V6	NA	Rochester Quadrajets	4 bbl
	5.0	5.0/302	V8	185	Rochester 2GC/GV IGE	2 bbl
	5.0	5.01302	V8	200	Rochester Quadrajets	4 bbl
	5.7	5.71350	V8	230	Rochester Quadrajets	4 bbl
	350	5.71350	V8	NA	Rochester Quadrajets	4 bbl
	7.5 460	7.51460	V8	NA	Holley ①	4 bbl
1989	2.3	2.3/140	L4	NA	Rochester 2GC/GV ①	2 bbl
	3.0	3.01181	L4	120	Rochester 2GC/GV /GE	2 bbl
	4.3	4.31262	V6	160	Rochester 2GC/GV IGE	2 bbl
	5.0	5.01302	V8	185/200	Holley 2300	2 bbl
	5.7	5.71350	V8	230	Rochester Quadrajets	4 bbl
	5.8	5.81351	V8	235	Holley	4 bbl
	262	4.31262	V6	NA	Rochester Quadrajets	4 bbl
	350	5.71350	V8	NA	Rochester Quadrajets	4 bbl
	460	7.51460	V8	NA	Holley ①	4 bbl
1990	2.3	2.31140	L4	NA	Holley 2300 (350 cfm)	2 bbl
	3.0	3.01181	L4	120	Holley 2300 (350 cfm) ②	2 bbl
	3.0 HO	3.01181	L4	NA	Holley 2300 (500 cfm)	2 bbl
	4.3	4.31262	V6	160	Holley 2300 (500 cfm)	2 bbl
	4.3 HO	4.31262	V6	NA	Holley 4160 (575 cfm)	4 bbl
	5.0	5.01302	V8	185	Holley 2300 (300 cfm)	2 bbl
	5.0 HO	5.01302	V8	200	Holley 2300 (300 cfm)	2 bbl
	5.7	5.71350	V8	230	Holley 4175 (650) ③	4 bbl
	5.7 LE	5.71350	V8	NA	Holley 4175 (650) ③	4 bbl
	5.8	5.8/351	V8	235	Holley 4160 (600 cfm)	4 bbl
	350	5.71350	V8	NA	Holley 4175 (650) ③	4 bbl
	454	7.41454	V8	NA	Holley 4150 (850 cfm) ④	4 bbl
	460	7.51460	V8	NA	Holley 4160 (750 cfm)	4 bbl

① Electric choke

② 3.0L PWC models used a Rochester 2 bbl carburetor

③ Spread bore

④ Dual feed

CARBURETOR APPLICATIONS

Year	Model	Displacement L/Cu. In.	Engine Type	Horsepower (At Prop.)	Carburetor Type	Fuel Delivery
1991	3.0	3.0/181	L4	120	Holley 2300 (350 dm)	2 bbl
	3.0 HO	3.0/181	L4	NA	Holley 2300 (500 cfm)	2 bbl
	4.3	4.3/262	V6	160	Holley 2300 (500 cfm)	2 bbl
	4.3 HO	4.3/262	V6	NA	Holley 4160 (575 cfm)	4 bbl
	5.0	5.0/302	V8	185	Holley 2300 (300 cfm)	2 bbl
	5.0 HO	5.0/302	V8	200	Holley 2300 (490 cfm)	2 bbl
	5.7	5.7/350	V8	230	Holley 4175 (650) O	4 bbl
	5.7 LE, 350	5.7/350	V8	NA	Holley 4175 (650) ①	4 bbl
	5.8	5.8/351	V8	235	Holley 4160 (600 cfm)	4 bbl
	7.4GL, 454	7.4/454	V8	300	Holley 4150 (750 cfm) ②	4 bbl
1992	454 HO	7.4/454	V8	390	Holley 4150 (850 cfm) ③	4 bbl
	3.0	3.0/181	L4	120	Holley 2300 (350 cfm)	2 bbl
	3.0 HO	3.0/181	L4	NA	Holley 2300 (500 cfm)	2 bbl
	4.3	4.3/262	V6	160	Holley 2300 (500 cfm)	2 bbl
	5.0	5.0/302	V8	185	Holley 2300 (300 cfm)	2 bbl
	5.0 HO	5.0/302	V8	200	Holley 2300 (490 cfm)	2 bbl
	5.7	5.7/350	V8	230	Holley 4175 (650) O	4 bbl
	5.7 LE	5.7/350	V8	NA	Holley 4175 (650) ①	4 bbl
	5.8	5.8/351	V8	235	Holley 4160 (600 cfm)	4 bbl
	5.8 LE, 351	5.8/351	V8	235	Holley 4160 (600 cfm)	4 bbl
1993	7.4GL, 454	7.4/454	V8	300	Holley 4150 (750 cfm) ②	4 bbl
	8.2GL, 502, 454 HO	8.2/502	V8	390	Holley 4150 (850 cfm) ②	4 bbl
	3.0	3.0/181	L4	120	Holley 2300 (350 cfm)	2 bbl
	3.0 HO	3.0/181	L4	130	Holley 2300 (500 cfm)	2 bbl
	4.3	4.3/262	V6	160	Holley 2300 (500 cfm)	2 bbl
	4.3 HO	4.3/262	V6	NA	Holley 4160 (575 cfm)	4 bbl
	5.0	5.0/302	V8	185	Holley 2300 (300 cfm)	2 bbl
	5.0 HO	5.0/302	V8	200	Holley 2300 (490 cfm)	2 bbl
	5.8	5.8/351	V8	235	Holley 4160 (600 cfm)	4 bbl
	7.4GL	7.4/454	V8	300	Holley 4150 (750 cfm) ②	4 bbl
1994	3.0GL	3.0/181	L4	120	Holley 2300 (350 cfm)	2 bbl
	3.0GS	3.0/181	L4	135	Holley 2300 (500 cfm)	2 bbl
	4.3GL	4.3/262	V6	160	Holley 2300 (500 cfm)	2 bbl
	5.0FL	5.0/302	V8	190	Holley 2300 (490 cfm)	2 bbl
	5.7GL	5.7/350	V8	225	Holley 2300 (500 cfm)	2 bbl
	5.8FL	5.8/351	V8	230	Holley 4160 (600 cfm)	4 bbl
	7.4GL	7.4/454	V8	300	Holley 4150 (750 cfm) ②	4 bbl
	7.4GL	7.4/454	V8	300	Holley 4150 (750 cfm) ②	4 bbl
1995	3.0GS	3.0/181	L4	130	Holley 2300 (500 cfm)	2 bbl
	4.3GL	4.3/262	V6	160	Holley 2300 (500 cfm)	2 bbl
	5.0FL	5.0/302	V8	190	Holley 2300 (490 cfm)	2 bbl
	5.8FL	5.8/351	V8	235	Holley 4160 (600 cfm)	4 bbl
	7.4GL	7.4/454	V8	300	Holley 4150 (750 cfm) ②	4 bbl
1996	3.0GS	3.0/181	L4	130	Holley 2300 (500 cfm)	2 bbl
	4.3GL	4.3/262	V6	160	Holley 2300 (500 cfm)	2 bbl
	4.3GS	4.3/262	V6	185	Holley 4160 (575 cfm)	4 bbl
	5.0FL	5.0/302	V8	190	Holley 2300 (490 cfm)	2 bbl
	5.8FL	5.8/351	V8	235	Holley 4160 (600 dm)	4 bbl
	7.4GL	7.4/454	V8	300	Holley 4150 (750 cfm) ②	4 bbl

① Spread bore

② Single feed

③ Dual feed

8-40 FUEL SYSTEMS – CARBURETORS

CARBURETOR APPLICATIONS

Year	Model	Displacement L/Cu. In.	Engine Type	Horsepower (At Prop.)	Carburetor Type	Fuel Delivery
1997	3.0GS	3.01181	L4	135	Holley 2300 (500 cfm)	2 bbl
	4.3GL	4.31262	V6	190	Holley 2300 (500 cfm)	2 bbl
	4.3GS	4.31262	V6	205	Holley 4160 (575 cfm)	4 bbl
	5.7GL	5.71350	V8	215	Holley 2300 (500 cfm)	2 bbl
	5.7GS	5.71350	V8	250	Holley 4175 (650 cfm) ①	4 bbl
	7.4GL	7.41454	V8	300	Holley 4150 (750 cfm) ②	4 bbl
1998	3.0GS	3.01181	L4	135	Holley 2300 (500 cfm)	2 bbl
	4.3GL	4.31262	V6	190	Holley 2300 (500 cfm)	2 bbl
	4.3GS	4.31262	V6	205	Holley 4160 (575 cfm)	4 bbl
	5.0GL	5.01305	V8	220	Holley 2300 (500 dm)	2 bbl
	5.7GS	5.71350	V8	250	Holley 2300 (500 cfm)	2 bbl

① Spread bore

② Single feed

CARBURETOR SPECIFICATIONS - HOLLEY 2300 2BBL

		Initial Idle							Accelerator		
Model		Choke Setting	Choke Unloader in. (mm) ①	Choke Vacuum in. (mm) ①	Float Setting	Mixture (Turns)	Main Jet	Power Valve	Pump Lever in. (mm)	Pump Cam Position	
300	5.0L	1989	1 notch lean	0.270-0.330 (6.8-8.4)	0.130-0.150 (3.3-3.9)	②	1 1/2 off seat	60	50	0.005-0.015 (0.130-0.381)	#1 Hole
		1990	1 notch lean	0.300 (7.6)	0.140 (3.6)	Level	1 1/2 off seat	60	50	0.010-0.015 (0.254-0.381)	#1 Hole
		1991	3 notches lean	0.300 (7.6)	0.228 (5.8)	②	1 1/8 off seat	61	3.5	0.010-0.015 (0.254-0.381)	#1 Hole
		1992-93	3 notches lean	0.300 (7.6)	0.228 (5.8)	②	1 1/8 off seat	61	3.5	0.010-0.015 (0.254-0.381)	Pink #1 Hole
350	3.0L, 3.0GL	1989-90	3 notches lean	0.380 (9.625)	0.250 (6.35)	Level	3/4 off seat	63	25	0.010-0.015 (0.254-0.381)	#2 Hole
		1991	3 notches lean	0.380 (9.625)	0.250 (6.35)	②	3/4 off seat	63	2.5	0.010-0.015 (0.254-0.381)	#1 Hole
		1992-94	3 notches lean	0.380 (9.625)	0.250 (6.35)	②	3/4 off seat	63	2.5	0.010-0.015 (0.254-0.381)	Orange #2 Hole
490	5.0 HO, 5.0FL	1992-96	3 notches lean	0.312 (7.93)	0.221 (5.6)	②	1 off seat	72	3.5	0.010-0.015 (0.254-0.381)	Orange #1 Hole
500	3.0 HO, 3.0GS	1990	5 notches lean	0.300 (7.62)	0.365 (9.3)	Level	③	75	25	0.010-0.015 (0.254-0.381)	#2 Hole
		1990-91	5 notches lean	0.300 (7.62)	0.365 (9.3)	②	③	75	2.5	0.010-0.015 (0.254-0.381)	#1 Hole
		1992-94	5 notches lean	0.300 (7.62)	0.365 (9.3)	②	③	75	2.5	0.010-0.015 (0.254-0.381)	Orange #2 Hole
		1995-98	5 notches lean	0.300 (7.62)	0.365 (9.3)	②	③	71	2.5	0.010-0.015 (0.254-0.381)	Orange #2 Hole
		4.3L, 4.3GL	1989-90	5 notches lean	3/8 (9.525)	0.250 (6.35)	Level	5/8 off seat	70	25	0.010-0.015 (0.254-0.381)
		1991	5 notches lean	3/8 (9.525)	0.250 (6.35)	②	5/8 off seat	70	2.5	0.010-0.015 (0.254-0.381)	#1 Hole
		1992-98	5 notches lean	3/8 (9.525)	0.250 (6.35)	②	5/8 off seat	70	2.5	0.010-0.015 (0.254-0.381)	Red #1 Hole
	5.7GL		5 notches lean	0.300 (7.62)	0.315 (8)	②	3/4-1 off seat	75	4.5	0.010-0.015 (0.254-0.381)	Red #1 Hole
	5.7GS		5 notches lean	0.300 (7.62)	0.315 (8)	②	3/4-1 off seat	69	4.5	0.010-0.015 (0.254-0.381)	Yellow #1 Hole

① Measured at lower edge of plate

② Parallel to fuel bowl when bowl inverted

③ 1 turn starboard to 112 turn port off seat

④ Level with fuel bowl inverted; Secondary: 1/8-1/4 turns in

⑤ 1998: Throttle lever side - 67; choke coil side - 68