COMPETITION MARINE CARBURETORS
MODEL 4500 DOMINATOR
Installation and Adjustment Instructions

WARNING! **These instructions must be read and fully understood before beginning installation. Failure to follow these instructions may result in poor performance, watercraft damage, personal injury, or death. If these instructions are not fully understood, installation should not be attempted.**

APPLICATIONS:

P/N	*USE*	*IDLE SYSTEM*	*LEGAL REQUIREMENTS*	*CFM*	*LINKAGE*	*BOOSTER TYPE*
0-80340-1	Marine	Four Corner	Flame Arrestor	1050	Progressive	Annular

INTRODUCTION:

Congratulations on your purchase of a Holley marine carburetor! Holley Performance Products cannot and will not be responsible for any alleged or actual engine or other damage, or other conditions resulting from misapplication of the carburetor described herein. However, it is our intent to provide the best possible products for our customer; products that perform properly and satisfy your expectations. Should you need information or parts assistance, please contact our Technical Service Department at 1-270-781-9741, Monday through Friday, 7 a.m. to 5 p.m. Central Time; please have the part number of the product you purchased when you call.

REMOVAL OF OLD CARBURETOR:

DANGER! **FOR SAFETY AND PROTECTION OF PERSONS AND PROPERTY ALL UNITED STATES COAST GUARD (U.S.C.G.) AND OTHER MARINE SAFETY REQUIREMENTS AND RECOMMENDATIONS, AS WELL AS THE FOLLOWING INSTRUCTIONS, MUST BE CAREFULLY STUDIED AND APPLIED. FAILURE TO FOLLOW ANY OF THESE GUIDELINES WILL RESULT IN AN IMPROPER INSTALLATION, WHICH MAY LEAD TO PERSONAL INJURY, INCLUDING DEATH, AND/OR PROPERTY DAMAGE. IMPROPER INSTALLATION AND/OR USE WILL ALSO VOID WARRANTY.**

DANGER! **FOR THE SAFETY AND PROTECTION OF YOURSELF AND OTHERS, THE INSTALLATION, ADJUSTMENT AND/OR REPAIR MUST BE PERFORMED ONLY BE A TRAINED MECHANIC HAVING ADEQUATE MARINE FUEL SYSTEM EXPERIENCE. IT IS PARTICULARLY IMPORTANT TO REMEMBER ONE OF THE VERY BASIC PRINCIPLES OF MARINE SAFETY: FUEL VAPORS ARE HEAVIER THAN AIR AND TEND TO COLLECT IN LOWER PLACES. THIS MEANS THAT ANY FUEL SPILLED WILL VAPORIZE AND REMAIN IN THE LOWEST EXTREMES OF THE ENGINE COMPARTMENT OF YOUR VESSEL WHERE AN EXPLOSIVE AIR/FUEL MIXTURE MAY BE IGNITED BY ANY SPARK OR FLAME. GREAT CARE MUST BE TAKEN TO PREVENT SPILLAGE AND THUS ELIMINATE THE FORMATION OF SUCH FUEL VAPORS. IN ALL CASES IT IS NECESSARY TO HAVE AND PROPERLY OPERATE THE BILGE BLOWER FOR A LENGTH OF TIME SUFFICIENT TO REMOVE ALL VAPORS BEFORE STARTING YOUR VESSEL'S ENGINE.**

WARNING! **A United States Coast Guard approved fire extinguisher, in proper operating condition, should be nearby at all times during removal, installation, and/or repair of the marine fuel system, and during the starting procedure.**

WARNING! **Prior to and after installing your new carburetor, manually operate the throttle lever, checking for any sticking or binding. Failure to do so may result in a runaway engine or a wide open throttle condition, which could result in engine damage personal injury and/or death.**

NOTE: Due to the large distance between the helm and the engine in most boats, it is **STRONGLY** recommended that the mechanic have an assistant to operate the appropriate helm controls during removal, installation and/or repair of any marine fuel system component, as well as during the starting procedure.

1. Disconnect the battery and any other equipment, which may or can cause sparks.
2. Label and remove all hoses going to the flame arrestor.
3. Remove flame arrestor.
4. Carefully disconnect the fuel line. Catch all fuel left in the fuel line in a suitable container and remove container from vessel before proceeding any further. When removing the fuel line, slide a rubber cap plug over the end to prevent fuel from running out, which may create a fire hazard. Absorb any spilled fuel immediately with a shop towel or rag and remove from vessel.

DANGER! **DO NOT SMOKE WHEN WORKING AROUND GASOLINE OR GASOLINE VAPORS. EXTINGUISH ALL OPEN FLAMES. AN OPEN FLAME, SPARK, AND/OR EXTREME HEAT COULD RESULT IN A FIRE AND/OR EXPLOSION CAUSING SERIOUS INJURY, DEATH, AND/OR PROPERTY DAMAGE.**

5. Label and disconnect all vacuum lines attached to the carburetor.

6. Disconnect and remove the throttle linkage. Save the throttle return spring and all retaining clips.

7. Remove the two front and two rear attaching manifold flange nuts. Remove the throttle cable bracket, if so equipped, (located at the right rear attaching bolt). Remove the carburetor by lifting it straight upward. Sometimes the carburetor can stick to the manifold gasket, requiring it to be pried loose. Before prying, double check to make sure all the carburetor attaching bolts and connections have been removed.

WARNING! **Be extremely careful not to tilt the carburetor, which may cause fuel to spill. Remove carburetor from vessel. If fuel spillage occurs, see instruction 4 above.**

8. Place clean shop towels or rags into the manifold opening to prevent dirt or debris from entering the engine. Keep exposed ends of vacuum and fuel lines free from dirt.

WARNING! **Failure to cover the intake opening with a clean towel could result in dirt or debris entering the engine. Dirt or debris in the induction system can cause engine damage, which may require a complete engine overhaul.**

9. Remove the gasket from the intake. Remove any gasket material that may have adhered to the manifold. **DO NOT** gouge the intake manifold sealing surface during removal of old gasket material.

10. Remove the shop towels from the intake and vacuum out the intake channel to ensure no dirt or debris is left in the intake system. Place a clean shop towel over the entire intake opening until you are ready to install the new carburetor.

11. Perform any carburetor disassembly, service, and/or reassembly off the vessel.

FLUSHING YOUR FUEL LINE:

During fuel line installation, be careful to avoid introducing any dirt particles which could enter the fuel inlet and jam open the needle and seat resulting in the carburetor flooding, malfunctioning and/or possible engine fire. To prevent contamination from entering your new carburetor, the fuel line must be flushed of rust, dirt and other debris.

1. Disconnect the wire that runs from the ignition switch to the positive (+) side of the coil. **DO NOT** allow this terminal to contact any metal surfaces causing a ground. Cover the end of the wire terminal with electrical tape.

2. Reconnect the battery.

DANGER! **ALLOWING THE END OF THE COIL WIRE TO CONTACT A METAL SURFACE, CAUSING A GROUND, MAY LEAD TO A SPARK ALLOWING VOLATILE GASOLINE VAPORS TO IGNITE, CAUSING AN EXPLOSION OR FIRE, WHICH MAY RESULT IN SERIOUS INJURY AND/OR DEATH.**

3. Remove the shop towel placed over the intake manifold before cranking the engine.

WARNING! **Failure to remove the shop towel from the intake manifold before cranking may result in the shop towel being sucked into the engine resulting in serious engine damage.**

WARNING! **Wear eye protection when performing this step. Failure to wear eye protection can result in gasoline or other contaminants entering the eye, which could result in permanent eye damage or blindness.**

4. **Mechanical Fuel Pump:** Place the end of the fuel line in a clean metal container and crank the engine. When approximately 1 pint (16 ounces) of fuel has been flushed, examine the fuel for contamination, i.e. dirt, rust, rubber flakes, etc. Repeat process if necessary until the fuel is free of contamination.

DANGER! **DO NOT USE GLASS, STYROFOAM, OR PLASTIC TO CAPTURE FUEL. USE ONLY A CLEAN METAL CONTAINER. FAILURE TO USE A METAL CONTAINER MAY RESULT IN FUEL SPILLAGE, WHICH COULD CAUSE A FIRE OR EXPLOSION RESULTING IN SERIOUS INJURY AND/OR DEATH.**

DANGER! **FLUSH FUEL LINES ONLY IN A WELL-VENTILATED AREA AND AWAY FROM ALL SOURCES OF HEAT OR FLAME. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY CAUSE GASOLINE VAPORS TO IGNITE RESULTING IN A FIRE OR EXPLOSION, WHICH MAY RESULT IN SERIOUS INJURY AND/OR DEATH.**

5. **Electric Fuel Pump:** Place the end of the fuel line in a clean metal container. Activated the pump by turning on the ignition switch. When approximately 1 pint (16 ounces) of fuel has been flushed, examine the fuel for contamination, i.e. dirt, rust, rubber flakes, etc. Repeat process if necessary until the fuel is free of contamination. The fuel pump may turn off after running for a few seconds. In this case, turn the ignition switch off and on to cycle the pump and flush the line.

INSTALLATION OF NEW CARBURETOR:

WARNING! **Holley Performance Products highly recommends that a quality fuel filter be installed with any replacement carburetor to catch any dirt that may still remain in the system. Any dirt that may enter the carburetor can cause the carburetor to flood or malfunction. A carburetor that has a malfunction caused by dirt in the system due to negligence of the owner will void the warranty.**

1. Remove shop rags or towels from the manifold opening.

2. Install a flange gasket on the manifold. If a spacer is being used the order will be flange gasket, spacer and another flange gasket over the manifold stud bolts.

WARNING! **The carburetor should be installed directly onto its manifold without an adapter whenever possible. Sometimes an adapter can create problems with hood clearance, airflow, throttle linkage, fuel line attachment and/or fuel mixture distribution. However, if an adapter is required one is available through your Holley distributor under P/N 17-9, which adapts the model 4500 to AFB-Holley square flange manifolds. Adapter height is 2-1/4 inches.**

3. Place the carburetor in position over the four stud bolts and secure in place. Tighten in a criss-cross pattern to 60 in./lbs. Be careful not to overtighten the nuts.

WARNING! **Over tightening the carburetor manifold flange hold-down-nuts may result in a warped or cracked carburetor throttle body. The carburetor hold down nuts should be tightened down progressively in a criss-cross pattern to 60 in./lbs., so that vacuum leaks are prevented and to avoid causing damage to the throttle body. A carburetor that has been damaged due to negligence of the owner will void the warranty.**

4. Attach all vacuum lines where necessary. Not all model 4500's have vacuum connections, however some model 4500s are equipped with two vacuum tubes. The larger tube at the base of the carburetor provides full manifold vacuum at idle. Use this for PCV, power brake etc. The smaller tube attached to the metering block is timed spark (vacuum provided anytime after off idle). The distributor is usually attached here. Plastic "T's" (available through the Holley Performance Catalog) maybe used to complete the installation.

5. Connect the fuel lines, throttle linkage and return springs. Operate linkage to assure correct travel by fully opening and closing the throttle by hand.

WARNING! **Check the throttle linkage for sticking, binding or interference by having an assistant at the helm operate the throttle controls while an experienced mechanic watches the operation of the carburetor(s) to detect any malfunctions. If any binding, sticking, or interference is found, it must be corrected before proceeding any further.**

6. Reinstall the flame arrestor and reconnect all hoses.

7. Open all hatches and allow the bilge to ventilate naturally until no fuel vapors are present.

8. Reconnect the battery and operate the bilge blower for a minimum of ten (10) minutes.

WARNING! **The bilge blower should be operated until all fumes have been safely expelled from the bilge area. The blower should be run for at least ten minutes and longer, if necessary.**

STARTING:

1. Without operating the throttle, crank the engine. It may take 15 to 30 seconds of cranking to allow the fuel bowls of the carburetor to fill. If the engine does not start, stop cranking, open and close the throttle twice and crank again until the engine starts.

WARNING! **DO NOT crank the engine for more than 15 seconds at a time. Cranking longer than 15 seconds can overheat the starter, resulting in premature starter failure.**

2. After starting the engine check fuel lines and inlet fittings for possible fuel leaks.

WARNING! **If any fuel leakage or weeping is detected, shut off the engine immediately. Wipe up any leaked fuel and remove the rag or towel from the vessel. Operate the bilge blower as directed above before proceeding to correct the cause of the leakage. Be sure to operate the blower again before attempting to restart the engine.**

BOAT/FUEL SYSTEM STORAGE:

During extended periods of vessel storage (60 days or more) gasoline may deteriorate due to oxidation. Oxidation can damage rubber and other polymers in the fuel system. It may also clog small orifices such as main jets, and idle feed restrictions. A commercially available fuel stabilizer such as STA-BIL or an equivalent should be added to the vessel's fuel tank whenever actual or expected storage periods will exceed 60 days. Follow the product instructions for the amount of additive to use. Then engine should be operated at idle for a minimum of ten (10) minutes after the addition of the stabilizer to assure that it reaches the carburetor.

TUNING AND ADJUSTMENT:

Before you begin to tune your carburetor for your particular water craft, you must get a “FEEL” for your water craft performance so that any changes you make (Good or Bad) will be readily apparent. Be patient and make only one change at a time, so that only that change can be fully analyzed. This cannot be overemphasized, as there are no “short-cuts” to peak performance. Recording each change and the resulting performance increase or decrease will provide you with a “Handbook” of how watercraft performance is affected by individual carburetor adjustments. This may be helpful in the future or on other applications.

FUEL LEVEL (Float Level):

The float(s) controls the fuel delivery. However, if the float(s) is not properly adjusted, a fuel starvation or a flooding effect could result. This operation is difficult to do accurately on rough waters or on a rough idling watercraft.

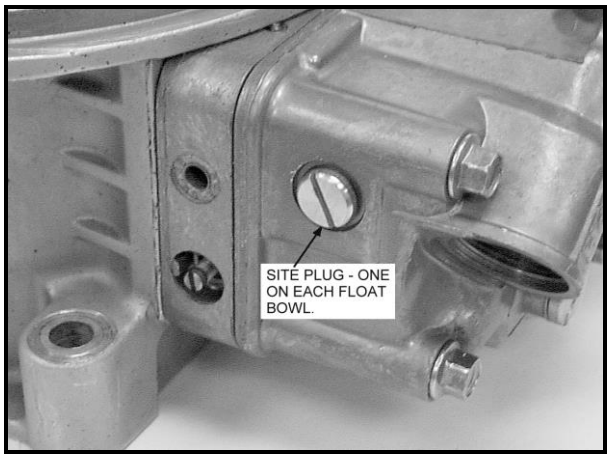

Figure 1

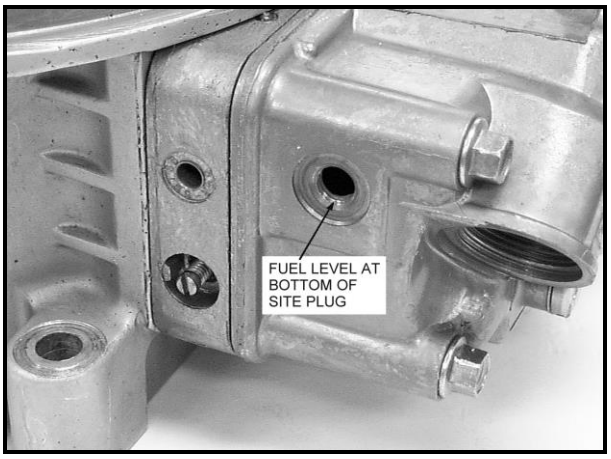

Figure 2

1. For a mechanical fuel pump, remove the coil wire and crank the engine over for 10 seconds to allow the fuel bowls to fill. This procedure can prevent a power valve blow out. Reconnect the coil wire when finished. For electric fuel pumps, let the fuel bowls fill in stages by turning the ignition on and then off. Let the fuel pump run for a few seconds at a time. This procedure can prevent the needle from being forced up at an angle, not allowing the needle to seat properly.
2. Remove the sight plug from the fuel bowl.
3. Start the watercraft.
4. Loosen the lock screw at the top of the assembly.
5. Turn the adjusting nut while holding the screw in place until the fuel level is at the bottom of the sight plughole even with the threads. A slight trickle can be seen at the threads. **Turn the adjusting nut clockwise to lower the fuel level and counter-clockwise to raise the fuel level.**

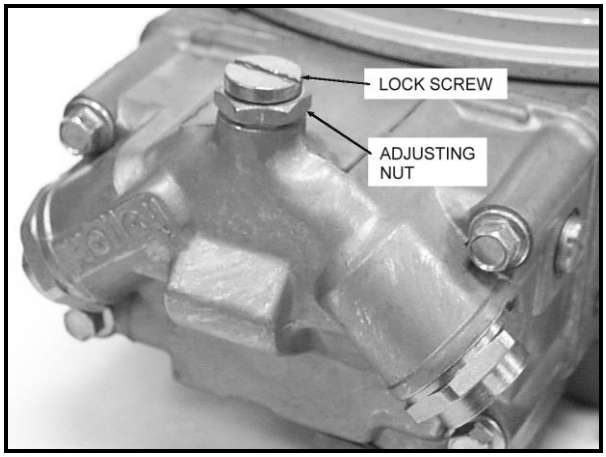

Figure 3

6. Tighten the lock screw while holding the adjustment nut.
7. Replace the sight plug and finger tighten.
8. Flush the fuel bowl by revving the engine a few times with the throttle control in neutral to confirm your setting.
9. Remove the sight plug to confirm your setting. A slight trickle should be seen at the threads. Adjust, if necessary.
10. Replace the sight plug.

IDLE SPEED SCREW:

The idle speed screw in most cases is the only screw you should adjust. The Idle screw controls the throttle plate position at idle which in turn raises or lowers the engine rpm by allowing more or less air/fuel mixture into the engine, it does not control the air/fuel mixture. Here are the proper steps for setting the engines idle speed.

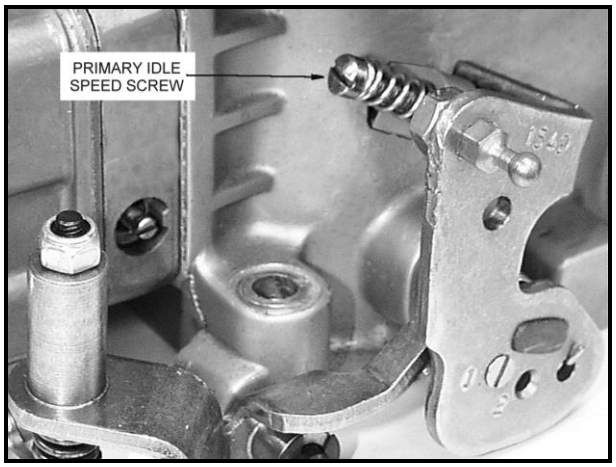

Figure 4

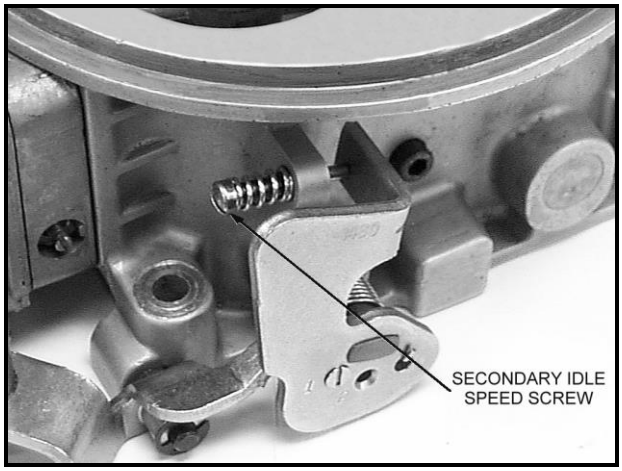

Figure 5

1. Find the proper idle required for your watercraft. If this RPM is not known consult a service manual or your water craft manufacturer for the recommended idle RPM.

2. Connect the tachometer, if your watercraft is not so equipped.

3. Start the engine and allow it to warm up.

4. Make sure the watercraft is in neutral and tied off to anchor.

5. If the idle speed is slower than recommended, turn the screw clockwise to speed up the rpm. If the idle speed is too fast, turn the idle screw clockwise to slow down. This adjustment should be made to both the primary and secondary screws in equal amounts, so that the throttle plates are opened the same amount.

IDLE MIXTURE NEEDLES:

Idle mixture needles control the air/fuel mixture at idle. The amount of air fuel mixture used at idle is controlled by engine vacuum. So when tuning the idle mixture, you are actually tuning for best manifold vacuum. Idle mixture needles are found on the metering blocks. Your carburetor will have four idle mixture needles, one for each venturi. This is known as four corner idle. If you change one idle mixture needle, you are required to change the other idle mixture needles the same amount. Here are the proper steps for setting the idle mixture needles.

1. Attach the vacuum gauge to the manifold vacuum port usually at the rear of the carburetor and on the throttle body.

2. Adjust each idle mixture screw the same amount to achieve the highest possible vacuum reading without increasing the idle speed screw.

3. Now that the idle mixture is set, it may be necessary to go back and reset the idle speed using the idle speed. Continue back and forth between the tuning of the idle mixture needles and idle speed screws until little change is noticed in manifold vacuum and idle speed is correct.

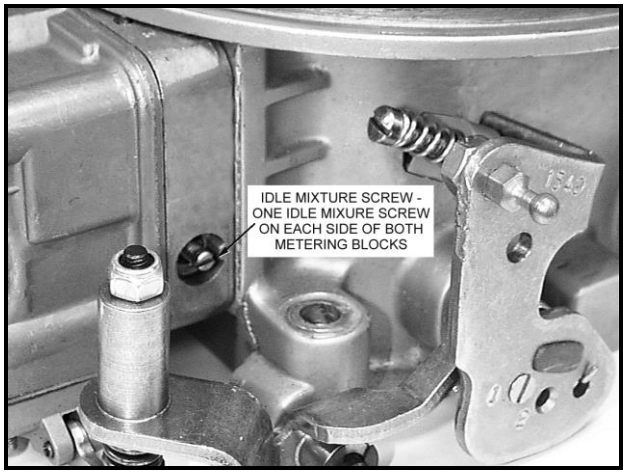

Figure 6

ACCELERATOR PUMP:

The accelerator pump's purpose is to make up for the lag in fuel delivery to enable the engine speed to increase in response to throttle opening. Differences in watercraft weight, vessel trim, hull condition, prop size, and condition, affect the amount of fuel and the delivery rate that should be provided by the accelerator pump. This may necessitate the customizing of your accelerator pump to your watercraft and its use.

NOTE: The old saying, "if a little is good, a lot is better", does not apply to the proper tuning of the accelerator pump. Your watercraft's performance can be just as bad if it receives "too much fuel too soon" as if it receives "too little fuel too late."

Two factors that affect the accelerator pump's delivery are the **pump cam** and the **pump shooter** (discharge nozzle). The pump cam determines the total volume of fuel and affects delivery rate; the pump shooter affects delivery rate and helps determine the duration of the shot.

The pump cams, (purchased separately) Holley P/N 20-80, have two operating locations and 20-81 has one operating location. This provides for several distinct delivery rates. The 20-80 pump cam is designed to give a quick early shot of fuel, but it does not empty the pump. The 20-81 pump cam design delivers an early fuel shot and continues until the pump empties.

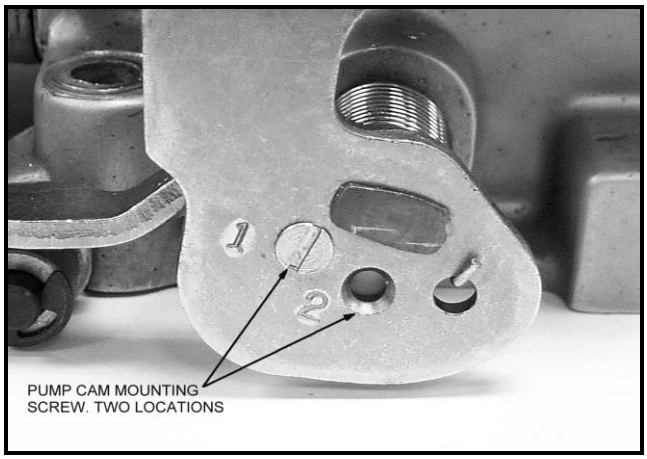

Figure 7

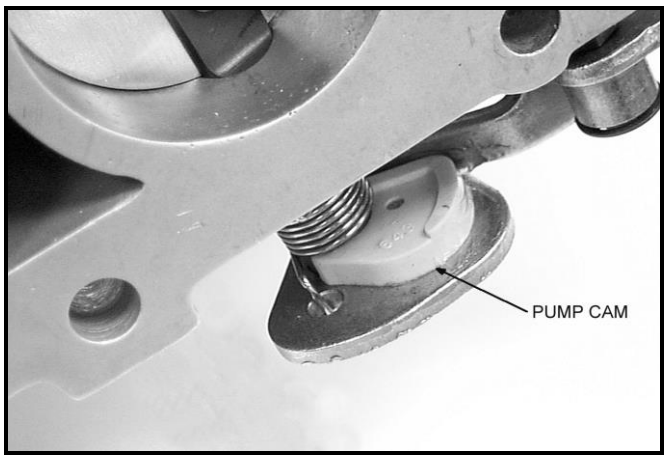

Figure 8

The pump shooters have a number stamped on their casting which designates the shooter size in thousandths of an inch, i.e., a #25 shooter has a .025" discharge orifice. The smaller diameter nozzles lengthen the pump shot duration and are used with heavier watercraft. Larger diameter nozzles (.035 - .037) shorten the pump shot duration, but deliver a greater initial volume of fuel. These sizes should be used on applications where engine speed will increase rapidly (watercraft with good power-to-weight ratios). Best acceleration is achieved when the accelerator pump delivers the lean best power air/fuel ratio to the engine; not when the maximum volume of fuel is supplied.

Keep in mind when tuning the secondary accelerator pump, it must supply fuel for a sufficient time so that the secondary main nozzles can "start up" and deliver fuel to the engine after the secondary throttles are opened. If the nozzles do not start by the time the pump shot expires, bogging will result. To apply the information above, follow these steps for tuning the accelerator pump.

1. Change pump shooters until the smallest diameter nozzle, which provides the crispest response, is found.

2. Then change the pump cams and locations until the right cam is found that provides even more response.

3. Finally, change the pump shooter once again until the crisp response is maximized.

NOTE: If a nozzle size is desired that seems "in between" the nozzle sizes provided, then the nozzle can be drilled to the desired size by using a wire drill held in a pin vise.

4. At this point, there should be no bogs, flat spots or black smoke (indicating excessive richness) when accelerating at wide open throttle from a standing start.

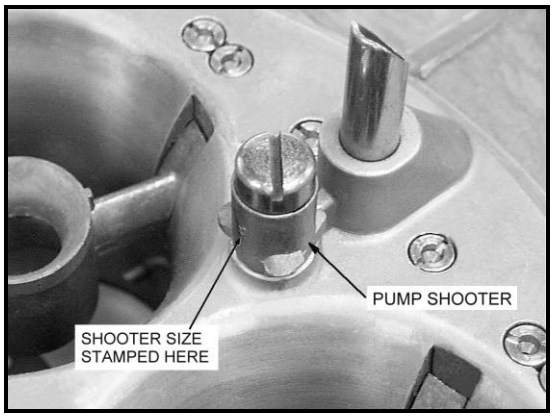

Figure 9

JETTING (MAIN JETS):

Due to varied applications that a universal performance carburetor will work with, no additional tuning jets have been included. However, a few tips on jetting are provided to help you understand their purpose. Holley's Quick Change Fuel Bowls (P/N 34-24) are recommended if repeated changes or experimentation with the main jets will be performed.

1. Out of the box jetting is extremely close for most applications.

2. In most cases it will be unnecessary to increase jet size more than four numbers greater than out of the box jetting. However, exceptions could arise when the carburetor is mounted on a very large volume, plenum-ram manifold.

3. Carburetors are calibrated at 70° at sea level. Decrease the jet size one number (approx. 0.002) for approximately every 2000 ft. increase in altitude. Increase jet size one number for every 35° drop in temperature.

4. Holley jets are broached, flowed, and stamped according to flow rate**. Never drill jets**, as this seriously alters flow characteristics. Stamped numbers are flow reference numbers and **DO NOT** indicate drill size.

5. Spark plugs provide the best indication of proper jetting. Allow plugs to cool before jumping to conclusions.

AIR BLEEDS:

Experimenting with air bleeds is not recommended and should only be attempted by an expert carb tuner. Countless hours of testing have been performed on expensive flow stands to obtain the proper bleed size for a given calibration. It is unlikely that a better air bleed calibration can be obtained. However, the 4500 Dominators are equipped with removable air bleeds. Here is some basic knowledge of how air bleeds work.

The main or high-speed air bleeds affect the entire range of the main metering system. The purpose of the main metering system and main air bleeds is to emulsify the fuel before entering the discharge nozzle to be outlet into the air stream in the venturi. The fuel/air mixture becomes leaner as air bleed size is increased. Decreasing the size of the main air bleeds will decrease pressure across the main jet, which in turn will pull more fuel through the main system creating a richer fuel/air mixture. The main or high speed air bleeds also act as an anti-siphon or siphon breaker so fuel does not continue to discharge or dribble into the venturi after airflow is reduced or stopped. At high speeds the fuel/air mixture must be on the rich side to prevent damage to the engine.

The idle system supplies fuel at idle and low speeds. The idle system requires a richer mixture than at cruise speed. Unless the idle mixture is richer a slow and irregular combustion will occur know as a rough idle. Decreasing the idle air bleed size richens the idle mixture by increasing the pressure drop in the system. Increasing idle air bleed size leans the idle mixture by reducing the pressure drop across the idle air bleeds. The same conditions can be created by backing out the idle mixture screws, which will increase the pressure across the idle air bleeds, pushing more fuel from the idle well creating a richer fuel/air ratio. The Idle mixture screw is the only adjustment recommended for controlling the idle fuel/air mixture richness or leanness.

The intermediate idle system (if equipped) is designed to provide extra fuel between idle and the main system operation. As the throttle is opened past idle transfer slot, the manifold vacuum signal in the idle circuit is reduced. Because of the large venturi in these carburetors air flow is not sufficient enough to start the main system; the intermediate system fills this gap eliminating any flat spots in transition from idle to wide open throttle. One thing to note about the intermediate system is that it will continue to operate even at wide open throttle. This must be considered when tuning the main jets. Since the intermediate system is activated by pressure, changing the air bleeds will adjust the richness of the fuel/air mixture. Decreasing the intermediate air bleed size richens the intermediate idle mixture by increasing the pressure drop in the system. Increasing the intermediate air bleed size leans the intermediate idle mixture by reducing the pressure drop across the intermediate air bleeds.

WARNING! **Adjustment of the air bleeds is not recommended. Only a competent mechanic should perform air bleed adjustments with a complete and thorough knowledge of carburetors, fuel system and engine requirements. Failure to follow these recommendations may result in a lean engine causing severe engine damage, property damage, serious injury, and/or death.**

WARNING! **Air bleed sizes should not be adjusted more than six (6) sizes in any one direction from the original air bleeds as shipped from Holley. Air bleed adjustment beyond six (6) sizes could result in a lean engine causing severe engine damage, property damage, serious injury, and/or death.**

NOTE: See Figure 10 for air bleed locations and identification. It is recommended that all jet sizes be documented before any tuning of the air bleeds or main jets is started. Below is a chart for recording the main jet and air bleed sizes for your 4500 Dominator carburetor, as shipped from Holley. Should you adjust the air bleed size or main jet size, this chart will allow the tuner to return the carburetor to the original jetting. Please place this information in a safe place along with any other documentation for your carburetor.

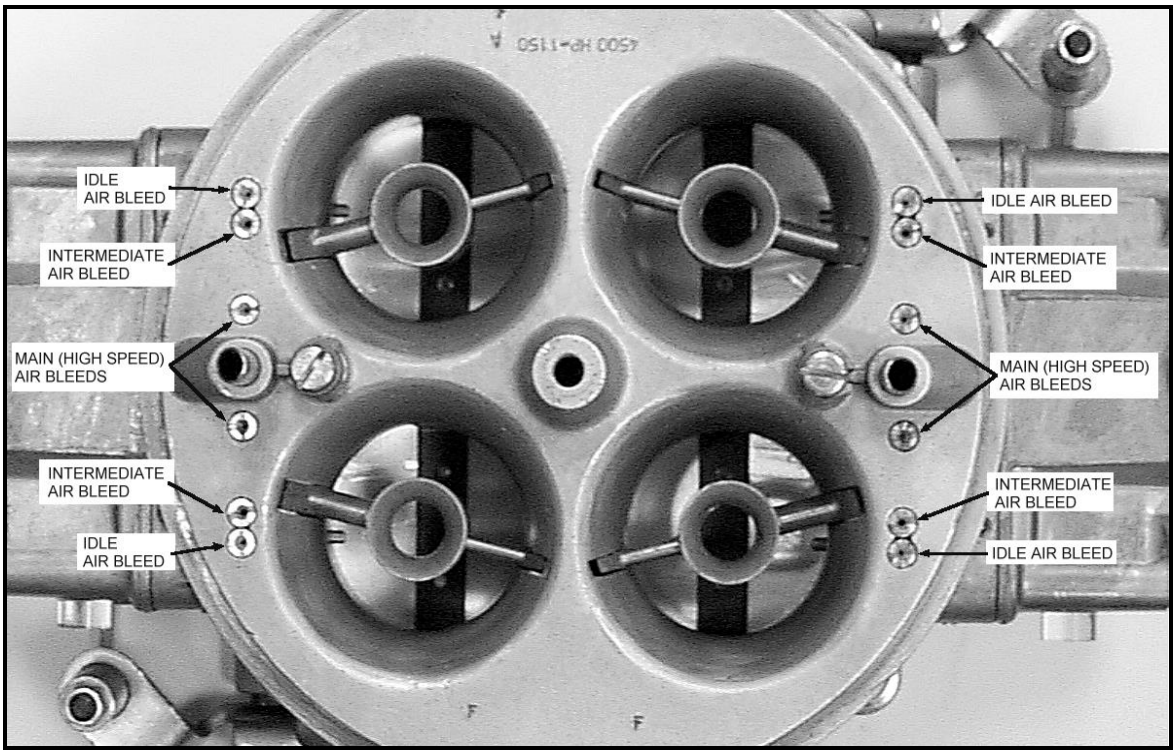

Figure 10

PRIMARY JETTING					*SECONDARY JETTING*			
P/N	Main	Idle	Intermediate	High Speed	Main	Idle	Intermediate	High Speed
0-80340-1								

GENERAL INFORMATION:

This instruction sheet cannot contain all of the information, which may be desired by some individuals. Also, see your local Holley retailer for the latest in tuning parts.

1. An in-line fuel filter should be installed between the fuel pump and the carburetor.

2. Recommended fuel pressure should be set at 7-1/2 psi maximum, 5 psi minimum. Fuel pressures above 7-1/2 psi can create severe fuel control problems and are not recommended.

3. Fuel lines should be a minimum of 3/8".

4. Flame arrestors are required by law for every boat. Flame arrestor size is very important to an engine's performance. Holley offers aluminum, chrome, and stainless steel flame arrestors in various sizes. See your local Holley retailer for information and correct sizing.

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