

AQUACRAFT™

Models by Hobbico®



Thank you for purchasing the AquaCraft PRO .46 BB ABC engine. This engine is designed for use with model airboats as well as model airplanes. This manual contains the instructions you need to safely operate and maintain your AquaCraft engine. Like all model engines, care must be taken in operation as severe injury can result from improper or careless use.

Important: Please read through this manual thoroughly before operating your engine.

WARRANTY

- AquaCraft will warrant this engine for 90 days after the purchase from defects in materials or workmanship. AquaCraft will either repair or replace, at no charge, the incorrectly made part.
- Make sure you save the receipt or invoice you were given when you bought your engine! It is your proof of purchase and we must see it before we can honor the warranty.
- To return your Pro .46 BB ABC for repairs covered under warranty you should send it to:

Hobby Services
 1610 Interstate Drive
 Champaign, Illinois 61822
 Attn: Service Department
 Phone: (217) 398-0007 9:00 am - 5:00 pm Central Time M-F
 E-mail: hobbyservices@hobbico.com

REPAIR SERVICE

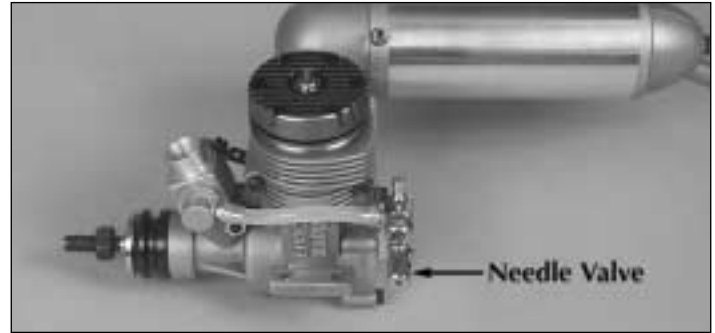
Repair service is available anytime.

After the 90-day warranty, you can still have your engine repaired for a small charge by the experts at AquaCraft's authorized repair facility, **Hobby Services**, at the address above.

To speed up the repair process, please follow these instructions:

1. Under all circumstances return the **ENTIRE** engine.
2. Send written instructions which include a **THOROUGH** explanation of the problem, the service needed and your phone number during the day. If you expect the repair to be covered under warranty, be sure to include a proof-of-purchase date (your store receipt or purchase invoice).
3. Also be sure to send your full return address.

CARBURETOR



Needle Valve: The needle valve controls the ratio of fuel to air as it enters the carburetor.



Idle Mixture Screw: The idle mixture screw controls the ratio of fuel to air at idle.

Idle Stop Screw: The idle stop screw adjusts how far the throttle closes. It should be set to allow the throttle to close completely. This will allow you to stop the engine using the throttle trim on your transmitter.

Throttle Arm: This is the arm that is connected to the carburetor barrel and is operated by the throttle servo. As the carburetor barrel opens, the power of the engine increases. Power is decreased as it closes.

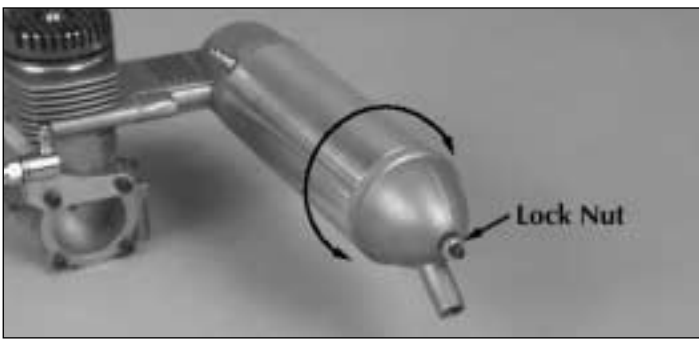
RECOMMENDED FUELS

It is important to use only fuels that are specifically designed for use with model airplane engines. The AquaCraft Pro .46 BB ABC engine will run best on fuel with a 5% to 15% nitromethane content containing castor oil or a castor-synthetic blend. The engine can overheat or will not get hot enough for the cylinder to expand properly if the fuel type is incorrect. **Important: Do not use model fuels with 100% synthetic oil.**

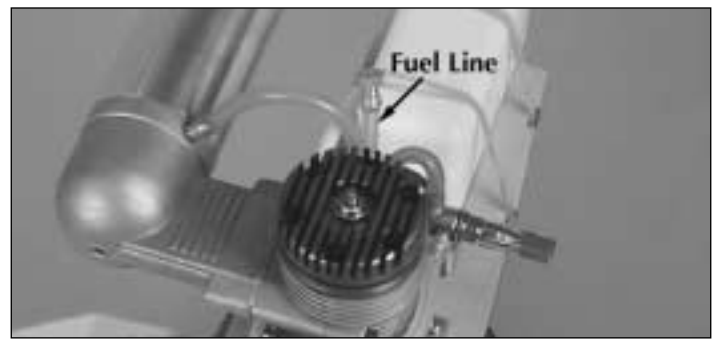
MUFFLER INSTALLATION



After installing the engine into your R/C vehicle, attach the muffler. Thread the two muffler screws through the crankcase and into the muffler. Tighten the muffler screws firmly, being careful not to strip the threads in the muffler.

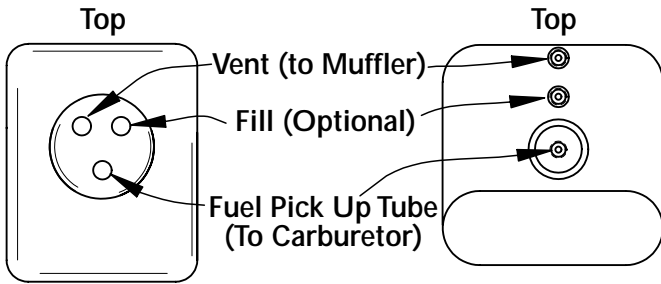


In the event that you need to adjust the orientation of the exhaust outlet, loosen the lock nut at the rear of the muffler and rotate the exhaust outlet away from the vehicle. Re-tighten the lock nut at the rear of the muffler.



Fill Line (Optional): This is the line that allows you to fill your tank with fuel. It is important to be able to access this line easily. Use a fuel line stopper (not included) to close off the end of the line after filling the tank. **Note:** Most people just use the carb line to fill the tank.

FUEL LINE INSTALLATION



Attach fuel tubing to your fuel tank and route the tubing to the engine. Use a minimum of tubing but be careful not to crimp the lines.

INSTALL THE SPINNER AND PROP



1. Place the spinner back plate onto the crankshaft so that it rests against the drive washer. **Be sure to balance your propeller before installation using a prop balancer such as the Top Flite® Precision Magnetic Balancer™ (TOPQ5700).**



Pressure Line: The carburetor of your model engine requires consistent fuel pressure when running. Pressure is created in the muffler by the exhaust. Some of the pressure is used to pressurize the fuel tank. Attach a piece of fuel tubing from the pressure fitting on the muffler to the vent tube on the fuel tank.



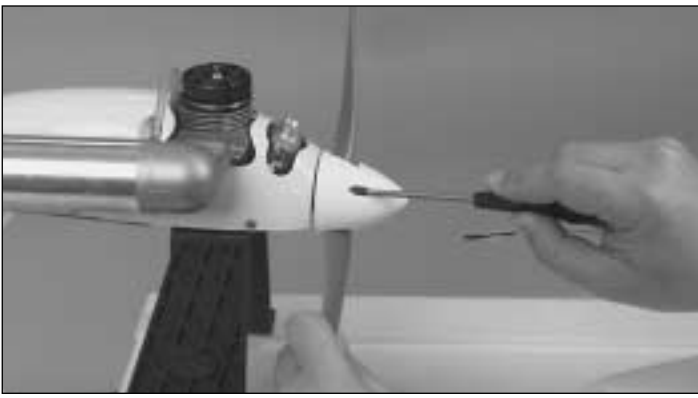
2. Place the propeller onto the crankshaft so the blades rest against the alignment pegs of the back plate and replace the prop washer.



Fuel Line: Connect the fuel line from the pick-up tube on the tank to the fuel inlet on the carburetor.



3. Replace the prop nut. **IMPORTANT: Tighten the prop nut firmly.**



4. Place the spinner cone over the prop so that the blades of the prop fit into the notches of the cone. Replace the two spinner assembly screws. The cone should sit flush against the back plate.



4. Fill the tank almost to the top. Leave a little air at the top of the tank. Excess fuel will flow out of the tank pressure line when full.

5. Replace the fuel lines.

STARTING THE ENGINE

There are Several Simple Steps to Starting the Engine

1. Install a glow plug. The glow plug threads into the top of the cylinder head. We recommend the O.S. #8 glow plug (OSMG2691).



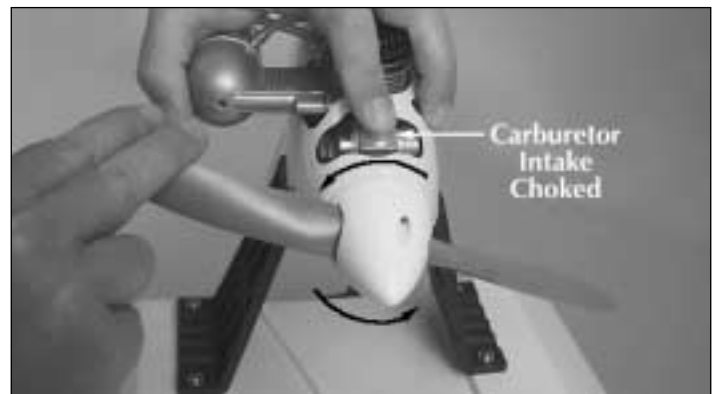
2. Remove the fuel tank pressure line from the muffler.



3. Remove the fuel line stopper from the fill line and insert the filler nozzle (not included) or remove the carb line.



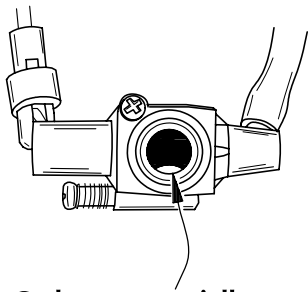
6. Open the high-speed needle valve 3 turns out (counterclockwise) from fully closed. The high-speed needle is sticking out the left side of the engine (looking at it from behind the prop). If you have previously run the engine, keep the same needle valve setting that you used on your last run.



7. Prime the engine by flipping the propeller counterclockwise with the intake choked. Stop when you see the fuel reach the carburetor. This will take approximately 3-4 revolutions. **DO NOT ENERGIZE THE GLOW PLUG DURING THIS STEP.**



8. Secure the glow starter onto the engine's glow plug.



Carburetor partially open

9. Check that the throttle is 1/8 open from the fully closed position. Bring the electric starter into contact with the spinner and depress the starter switch for one or two seconds. Repeat, if necessary. When the engine fires, withdraw the starter immediately. **If using a safety stick to start the engine**, flip the propeller counterclockwise using quick flips. After 10 flips, if the engine fails to start there is a chance that there may not be enough fuel in the engine. Remove the glow starter and repeat step 7. If the propeller becomes difficult to rotate, the engine has become flooded. If this occurs, simply remove the glow plug and turn the engine upside down. Flip the propeller and the excess fuel will drain out. Re-install the glow plug, re-attach the glow starter and try starting the engine again. **DO NOT ATTEMPT TO START THE ENGINE WITH YOUR FINGERS.**

10. Once the engine starts, remove the glow starter after 10-15 seconds.

IMPORTANT NOTE: Never place your finger over the carburetor intake when applying the starter. Such an action will cause an excess quantity of fuel to be forced into the cylinder and result in a hydraulic lock that may damage the engine.

BREAKING IN THE ENGINE

*In order to perform adjustments as needed, the break-in procedure should be performed with your engine and vehicle held **securely** in place.*

To insure long life and good performance from your AquaCraft Pro .46 engine, you **MUST** break-in the engine. The break-in period is critical for long life of the internal parts of the engine. This should be done over the first 5 or 6 tanks of fuel.

Some Things to Remember During Break-In

1. Use the same fuel that you will use for normal running.
2. Resist the urge to accelerate and decelerate quickly.
3. Break-in puts stress on the glow plug and you can burn it out during break-in. Make sure you have an extra plug or two on hand.

The First Tank

Your first tank of fuel should be running the engine at a very rich high-speed needle valve setting. This allows the fuel to carry as much oil as possible into the engine to lubricate the internal parts during the break-in.

1. Open the needle valve 3 turns out from fully closed (**counterclockwise**). When closing the high-speed needle, close the needle until you feel some resistance. **DO NOT** over tighten or you will damage the engine.
2. Start the engine.

3. Once the engine is started, open the high-speed needle valve around 1/8 turn at a time, finding the setting where the engine just barely runs. This may take a few times adjusting the needle. The engine will perform sluggishly and stall from time to time – this is normal during the break-in process.

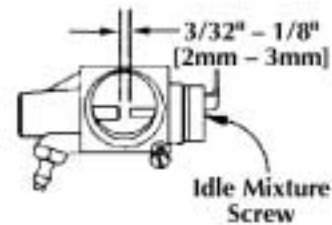
4. Run the engine at a medium speed, periodically accelerating and decelerating. **Do not give the engine full throttle at this time.**

5. Continue running the engine until the tank is almost out of fuel. Do not allow the engine to run out of fuel. This leans out the engine and can cause overheating.

Tanks 2-6

Turn in the needle valve (clockwise) around 1/8 turn each tank from the previous setting. You should notice that the engine performs better during each run. After the 6th tank, you should be near to the peak performance of the engine.

Adjusting The Idle



From time to time you will have to make adjustments to keep your engine running smoothly. Factors such as humidity, altitude and temperature will all affect engine performance. If your engine will not idle smoothly, try adjusting the idle mixture screw. With the engine stopped and the throttle barrel open, adjust the idle mixture screw so that the gap between the idle mixture needle and the spray nozzle is 2mm-3mm (3/32"-1/8"). Start the engine and close the throttle to a point just short of where the engine stops running. Pinch the fuel line. If the engine speeds up, the mixture is too rich. Stop the engine and turn the idle mixture screw clockwise 1/8 of a turn. Repeat this process until there is no change when pinching the fuel line.

If the engine slows down when pinching the fuel line, the mixture is set too lean. Richen the idle mixture screw 1/8 turn counter clockwise. Once again, repeat this process until there is no change when pinching the fuel line.

How To Stop Your Engine

BOAT USE: Just as squeezing the throttle trigger on your transmitter increases power, pushing the trigger the opposite way decreases power. Pushing the throttle trigger forward should close off the throat of the carburetor completely, cutting off air intake and stopping the engine.

AIRPLANE USE: Set up the throttle linkage so that simply moving the throttle trim down will close off the throat of the carburetor, stopping the engine.

If the above methods fail, simply pinch the fuel line leading to the carburetor. This will keep the engine from getting fuel and the engine will stop.

ENGINE MAINTENANCE

Ways To Ensure A Long Life For Your Engine.

1. Keep your engine clean. Dirt will act as insulation on an engine. It will not be able to shed heat as easily.
2. Do not over-lean your engine.
3. Do not run your engine without a propeller.
4. Do not over heat the engine. This goes along with keeping it clean and not over-leaning the engine.
5. Do not use a fuel with low oil content. Make sure that you use a fuel from a reputable manufacturer that is labeled as model airplane fuel.
6. Avoid using old fuels in the engine. Always run all of the fuel out of the engine. After running for the day, use after-run oil and work it into the engine by turning the prop 3-4 times.
7. Do not use a fuel with a nitromethane (often called nitro) content over 15%.
8. Do not use silicone sealer on the engine joints. Silicone sealer contains acetic acid, which is corrosive if it gets inside your engine.
9. Store your engine someplace where it will not be subjected to extreme temperature changes.

Glow Plug

The glow plug is an item that will wear out and need replacement from time to time. It is a good idea to remove the glow plug before your first run, heat it and see how well it glows. You should see a bright orange glow from the filament. If a coil or two will not glow or the plug will not glow at all, replace the plug. If the engine quits when you remove the glow starter, the plug might need to be changed, although this may be because you are running too rich and need to screw in your high-speed needle some. Look at the glow plug when you are running the engine. If you see some bubbles coming from around the plug, replace the glow plug (copper) gasket, or both the plug and the gasket. Make sure you have a spare plug or two on hand every time you run the AquaCraft Pro .46.

Fuel Storage

Fuel can go bad. The main ingredient in model fuel is methanol, which is basically a form of alcohol. Alcohols can absorb water out of the air, so keep your fuel jug capped at all times. Store your fuel out of the sunlight and in a cool place. Bad fuel is one of the most difficult problems to diagnose in engines. If you have tried everything you can think of to remedy an engine that is not running correctly, try using some fresh fuel.

Fuel Line

Fuel line is susceptible to pinhole leaks. You cannot see the hole in the fuel line, but if you see bubbles in the line going to the carburetor, replace the fuel line. Another symptom of a leak in the fuel line is a surging engine. The properly tuned engine will surge when the air bubbles enter the carburetor. It is basically leaning out the mixture.

Overheating

One of the worst things you can do to your engine is overheat it. The oils that lubricate the engine are carried in the fuel. If your engine is set too lean, there will not be enough oil in the engine to lubricate the internal parts and your engine will overheat. This will cause premature wear in the engine and cause damage.

SAFETY PRECAUTIONS

- Use care to avoid touching the propeller anytime the engine is running. Pay equally close attention to items such as loose clothing, shirtsleeves, ties, scarves, long hair or loose objects such as screwdrivers or pencils that may fall out of shirt or jacket pockets on to the spinning prop. If your fingers, hands, etc. come in contact with the spinning propeller, you may be severely injured. **Make all engine adjustments from behind the rotating propeller.**

- Because of the speed and mass of R/C vehicles, they are capable of inflicting property damage and severe personal injury if a collision occurs. Never run this engine when the possibility of collision with people or property exists.

- R/C vehicles are controlled by radio signals, which are subject to possible interference from other R/C transmitters, paging systems or other electrical noise. Before turning your radio on, make sure no one else in the area is operating a radio on the same frequency (channel).

- A weakened or loose propeller may disintegrate or be thrown off. Since propeller tip speeds with powerful engines may exceed 600 feet per second, it must be understood that such a failure can result in serious injury.

- Model engine fuel is poisonous. Do not allow it to come into contact with the eyes or mouth. **Always store fuel in a clearly marked container and out of the reach of children.**

- Model engine fuel is highly flammable. Keep it away from open flame, excessive heat, sources of sparks, or anything else that might ignite it. **Do not smoke or allow anyone else to smoke** in close proximity to open fuel. Make sure that fuel lines are in good condition so that fuel will not leak onto a hot engine causing a fire.

- Never operate your engine in an enclosed space. Model engines, like automobile engines, exhaust deadly carbon monoxide. **Run your engine only in an open area.**

- Model engines generate considerable heat. Do not touch any part of your engine until it has cooled. Touching the muffler, cylinder head, or exhaust header may result in a serious burn.

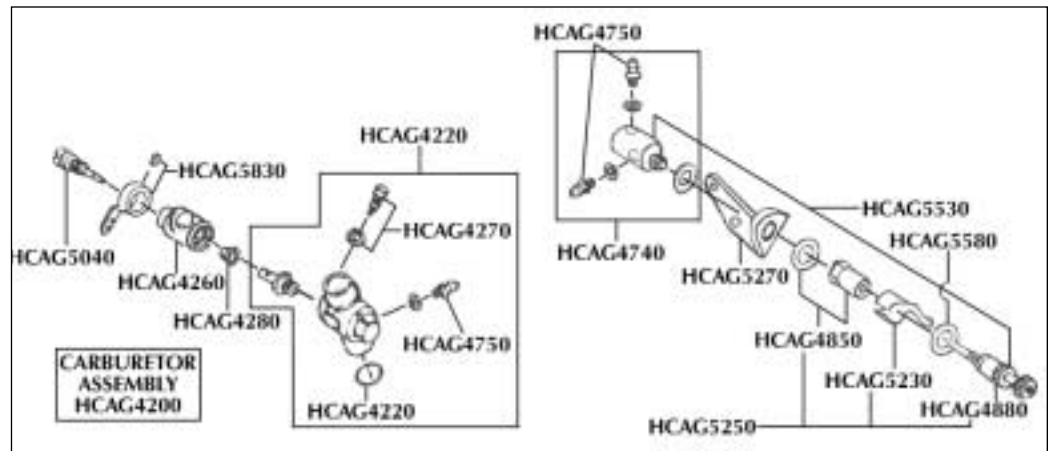
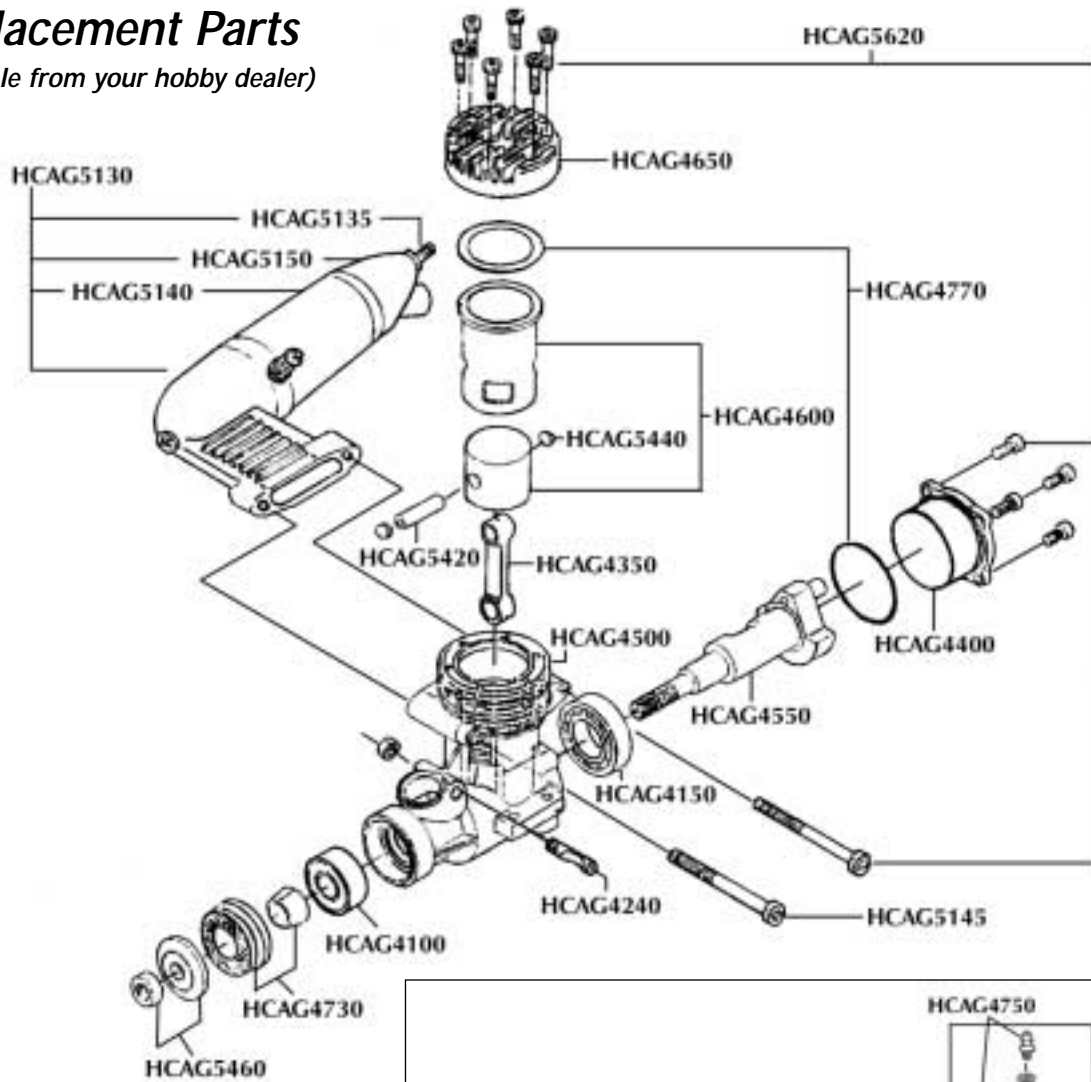
- Use safety glasses when starting or running engines. The propeller may throw loose material such as sand or gravel into your face.

- Use a "safety stick" or electric starter to start the engine. Do not use your fingers to flip the propeller. Make certain that the glow plug clip or connector is securely in place so that it does not pop off or otherwise get into the running propeller.

If the buyer is not prepared to accept the liability associated with the use of this product, the buyer is advised to return this engine immediately in new and unused condition to the place of purchase.

Replacement Parts

(available from your hobby dealer)



STOCK #	DESCRIPTION	STOCK #	DESCRIPTION
HCAG4100	BEARING FRONT	HCAG4850	HI-SPEED NDL HOLDER
HCAG4150	BEARING REAR	HCAG4880	HI-SPEED NDL VALVE
HCAG4200	CARB ASSY	HCAG5040	IDLE NEEDLE
HCAG4220	CARB BODY W/SPRAY BAR	HCAG5130	MUFFLER ASSEMBLY
HCAG4240	CARB RETAINER W/NUT	HCAG5135	MUFF ASSY SCR W & NUT
HCAG4260	CARB ROTOR	HCAG5140	MUFF MID PORTION
HCAG4270	CARB SCREW IDLE STOP	HCAG5145	MUFF MOUNT SCREWS
HCAG4280	CARB SPRING	HCAG5150	MUFF REAR PORTION
HCAG4350	CONNECTING ROD	HCAG5230	NEEDLE RACHET CLIP
HCAG4400	COVER PLATE	HCAG5250	NEEDLE VALVE ASSEMBLY
HCAG4500	CRANKCASE	HCAG5270	NEEDLE VALVE MOUNT
HCAG4550	CRANKSHAFT	HCAG5420	PISTON PIN
HCAG4600	CYL LINER & PISTON	HCAG5440	PISTON PIN RETAINERS
HCAG4650	CYLINDER HEAD	HCAG5460	PROP WASHER & NUT
HCAG4730	DRIVE WASHER & CONE	HCAG5530	REMOTE NEEDLE VALVE ASSY
HCAG4740	FUEL INLET BODY	HCAG5580	RUBBER O-RING
HCAG4750	FUEL NIPPLE W/GASKET	HCAG5620	SCREW SET 12 PCS
HCAG4770	GASKET SET 2 PCS	HCAG5830	THROTTLE ARM & SCREW