



# .61 ABC AERO Owners Guide Item #6150 & 6170



Thank You for selecting the finest American Made engine available. With simple care and common sense your engine will provide you years of trouble free service. This product does require mechanical ability and know-how to operate. You must be the judge of your own ability. **YOU are the person who will control your model and engine in a safe manner and must assume all responsibility for your activity.** Be sure to read and understand this entire owners guide including the LIMITED WARRANTY & LIABILITY INFORMATION.

PLEASE NOTE: THIS ENGINE IS OF ABC PISTON/CYLINDER CONSTRUCTION AND WILL FEEL AS IF IT IS BINDING WHEN THE PISTON IS MOVING THROUGH THE TOP OF THE STROKE. This is normal and will also cause you to feel the required clearance in the connecting rod ends. This clearance will feel like a dead or disconnected movement at the ends of the stroke. Both of these conditions are normal.

**WARNING!** PLEASE READ ALL SAFETY INSTRUCTIONS!

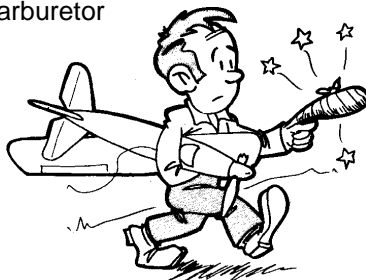
Failure to read, understand and follow these instructions could result in personal injury and/or property damage to yourself or others.

Do not attempt to fly your model before completely checking out your installation.



Keep your hands a safe distance from the propeller when making adjustments to the carburetor and when disconnecting the glow plug wire.

We stress the use of a chicken stick or electric starter to prevent injury when starting your engine. Do not use your fingers.



Engines get hot. Be careful as parts of the engine and muffler can cause burns during and after running the engine.

Never run your engine in an enclosed area. Engines produce dangerous exhaust gases and must be run outdoors only.

In case of difficulty, the safest and easiest way to stop the engine is to pinch off the fuel line or remove it from the carburetor. Never throw anything into the propeller (rags, etc.) to stop the engine.

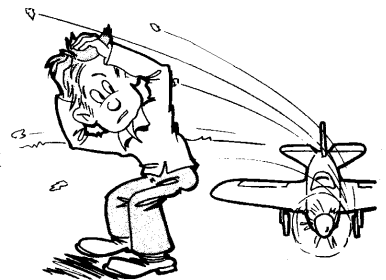
Never clamp your engine in a vice to test run. Mount your engine securely in your airplane or a commercial test stand. Never use wood screws to mount your engine. Use good quality machine screws and nuts.

Store your fuel in a tightly sealed container (metal or suitable plastic, NOT GLASS). Model fuel is poisonous and flammable. Keep it away from heat, flames, and the reach of children.

Never use propellers with nicks, scratches or cracks. Always use the correct size propeller for your engine. Be sure prop nut is tight and recheck it after each flight. Nylon props can be extremely dangerous if improperly used. Read prop manufacturers directions carefully.

Extreme care must be taken to protect your face, hands and body from the plane of the propeller. Don't start your engine on loose dirt, sand or gravel. A thrown blade or foreign objects drawn into the propeller could cause serious injury. NEVER LEAN OVER THE PROPELLER and wear eye protection when starting and running your engine.

Keep all loose articles (pencils, eyeglasses, etc.) out of shirt pockets, as they may fall out while adjusting your engine. Long hair, neck ties, loose shirt sleeves and clothing, etc. must be kept away from the prop.



Never operate any model aircraft near overhead electric or telephone lines. If your plane should get away from you a become caught in overhead lines, DO NOT ATTEMPT TO RETRIEVE IT! Call the telephone or electric company and they will be happy to retrieve it for you.

Use a muffler and fly in designated areas. Be considerate to others.

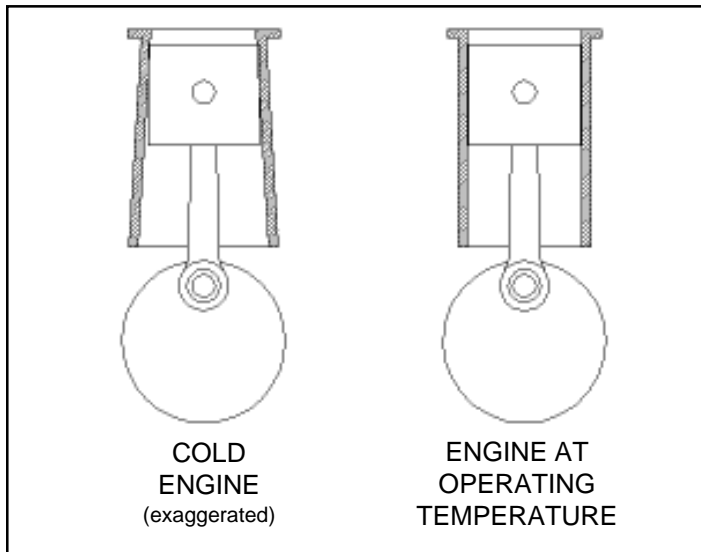
**YOUR ENGINE IS NOT A TOY!** It is a precision piece of machinery and must be treated as such.

If you are in doubt about anything, it is best to call our factory. Asking your hobby dealer or an experienced modeler for assistance may be helpful, but may not provide you with correct information.

## REMEMBER: SAFE OPERATION OF YOUR MODEL AND ENGINE IS YOUR RESPONSIBILITY!

## Important Information...

ABC type engines, like the K&B 61, are manufactured with tapered cylinders so a bind is normally felt while turning the engine over top dead center when cold. As the engine obtains operating temperature the cylinder becomes straight and the clearances between the piston and cylinder become correct. The straightening is due to the top of the cylinder running at a higher temperature than the bottom, thus the top expands more.



Displacement .....	.61 Cu. In (10ccm)
Bore .....	.940" (22.23mm)
Stroke .....	.875" (20.32mm)
Compression Ratio .....	7.5 to 1
R.P.M. Range .....	2,200 - 15,000
Power Output .....	1.8 H.P. @ 15,000
Engine Weight .....	14.25 oz.
Muffler Weight .....	3.7 oz.

### STARTING AND BREAK-IN

All K&B engines are produced to the highest industry standards and inspected before leaving the factory, but they are not "BROKEN-IN" and will require approximately 60 minutes running before the full potential of the engine is realized. Break-in can be accomplished by airborne or bench running.

It is also normal for compression to sometimes feel poor when the engine is stopped and turned over while still hot. This is due to the piston cooling faster than the cylinder. If the engine temperature is allowed to stabilize the compression will return to normal.

A model engine makes sounds that will tell you how it's performing. You'll have to listen very carefully for them, recognize their message, and make adjustments to the fuel control needle valves accordingly. The mixture of fuel and air is controlled by the amount of fuel metered by the needle valve.

**RUNNING THE ENGINE TOO RICH WILL RUIN THE FIT** as the operating temperature is not reached and piston is prematurely worn from lack of clearance. You do not want to "break-in" an ABC engine at a very rich setting. Just a slightly rich setting for the first 30 to 45 minutes of running is adequate.

**SLIGHTLY RICH MIXTURE** running is characterized by a slower, sometimes irregular, sputtering exhaust sound. The exhaust gas will be smoky and probably contain small droplets of oil. This condition is good for Break-in since the engine receives excess lubrication and runs slightly cooler.

Take a few moments to familiarize yourself with the various parts of the engine as shown in the view below. **DO NOT DISASSEMBLE**



This is the setting you normally look for before launching the airplane because the engine will run leaner when airborne.

**FOUR CYCLING** is a very rich type setting, but it is fast enough to pull the airplane. This setting should be avoided with an ABC type engine as the correct operating temperature may not be achieved.

**PEAKED OR TWO CYCLE.** As the main needle is closed (clockwise), it reduces the amount of fuel mixed with the air drawn into the engine. At a specific point, which varies with each engine, air temperature, altitude and relative humidity, the exhaust note will change quickly into a smooth, powerful note. If the needle is closed further, the note will stay smooth, but will weaken. The peak occurs just at the break point from a rich setting and further leaning will ruin the engine. A lean setting raises the engine heat above the safe point, reduces lubrication, and destroys glow plugs due to high combustion temperature.

It is important to recognize these settings as incorrect needle valve settings are very harmful to the engine and your investment. Learn to tune the engine before flying. Remember, a slightly rich setting is always preferred for long motor life.

## STARTING PREPARATIONS

USE A Standard (K&B #7311) or R/C IDLE BAR (K&B #4520) GLOW PLUG, 1.5 volt battery, quality propeller (refer to prop chart below) and good commercial grade two cycle glow fuel (K&B 100) with 5% nitro-methane (more helps in cold weather). Be sure the fuel contains the right percentage of oil (18-22% by volume) and the fuels oil contains at least a 50-50 mix of castor oil. Not all synthetic oil. Use only fuel that lists percentages on the label by volume.

Keep fuel clean and filter it during fueling. Keep exposure to air to a minimum as methanol will absorb moisture rapidly.

## FUEL SPECIFICATIONS:

BREAK-IN FORMULA: 20% castor oil, 5 to 10% nitro-methane, and the balance methanol.

AFTER BREAK-IN: The nitro-methane percentage may be increased to 15% if desired. **LOW QUALITY FUELS CAN RUIN THE ENGINE IN A SHORT PERIOD OF TIME.** Never use fuel with less than 18% oil content by volume.

## PROPELLER SIZES

Note engine shaft size 1/4"x28. Be sure prop and spinner is balanced. Vibrations are usually caused by these items.

	K&B .61				
Break-in	11-7				
Normal Models	11-7.5	11-8	12-7	13-6	

Use of smaller propellers can cause vibrations and damage to the engine. Too large a propeller can cause excessive wear as the engine is lugged below its designed operating R.P.M. range.

## PRESSURE LINE HOOK UP

MUFFLER PRESSURE SHOULD BE CONNECTED TO TANK.

## CARBURETOR SET UP

K&B engines are fitted with a variable mixture carburetor which automatically alters both fuel and air mixtures as it's closed. Best and most reliable carburetor settings are obtained after engine break-in.

The carburetor enables easy adjustment of the idle speed, idle and high speed mixture

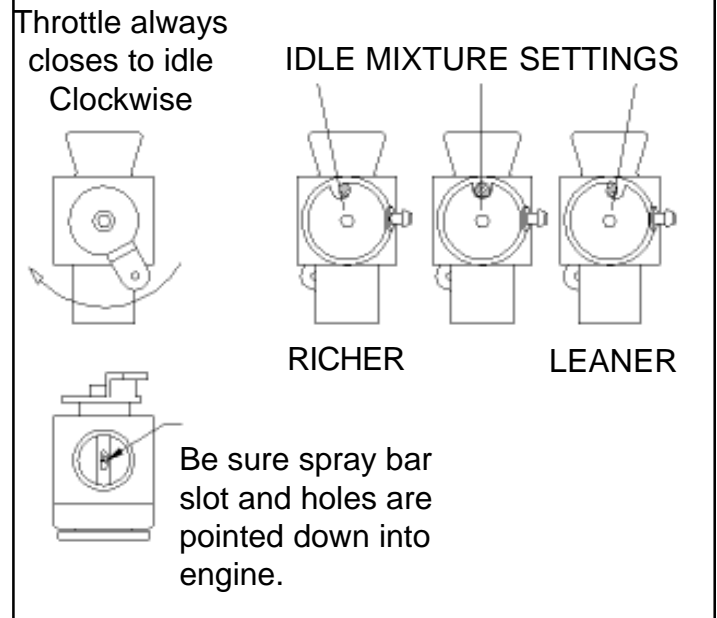


1. High Speed Needle Valve: Install the Remote Needle Valve assembly using the bracket provided. This may typically be attached to the firewall, cowl or rear engine mount lug area. The main needle assembly must be in the fuel line between the tank and the carburetor. This line should not exceed five (5) inches in total length. Either nipple on the remote needle may be used for inlet or outlet.

2. High Speed Needle Valve Adjustment: The needle, located on the Remote Needle Valve Assembly, controls all the fuel supply to the engine at the maximum throttle setting. It does not control the fuel at lower throttle settings.

As a starting point for the High Speed Needle adjustment, close the needle valve (clockwise) all the way closed, DO NOT force it, then open it (counterclockwise) 3 to 4 turns. This setting is an average and will require further adjustments.

3. LOW SPEED and MID-RANGE ADJUSTMENT: The low speed rich/lean adjustment is controlled by the brass disk located on the side of the carburetor. Using an Allen wrench turn the disc clockwise to 'lean' the mixture and counter clockwise to 'richen' the mixture. The rich / lean mixture control is set at the factory and may require only a fine adjustment for your application. Normally the maximum adjustment range is only 5 degrees in either direction.



## ACTUAL STARTING

**WITHOUT** battery connected, open the carburetor barrel to wide open position. Open the high speed needle valve as described above. Choke the engine by placing your finger over the carburetor air inlet and slowly turn the prop over three times counter clockwise. You should see fuel being drawn up the fuel line. If fuel is not drawn into the carburetor, open the main needle one more turn, and be sure the idle mixture disc notch is in the upright position, then repeat the above. Fuel should be drawn into carburetor.

Close the barrel to about the 1/3 open position and connect the 1.5 volt battery to the glow plug, start the engine with your chicken stick or electric starter. Once the engine starts, open the carburetor to full throttle. At this time the engine should be running very rich. Slowly turn the main needle valve in and the engine should start speeding up. If it slows, dies or only starts with a brief burst of power and stops, the needle valve setting is too lean. Unscrew the needle 1 more turn and try again. If engine starts, runs slowly and briefly the mixture is too rich. Turn the main needle in 1/2 turn and restart. **IF THE ENGINE DOES NOT FIRE AT ALL, refer to the TROUBLE SHOOTING section in this text.**

Now adjust the main needle as described in STARTING AND BREAK IN above.

## ADJUSTING THE R/C CARBURETOR

1. Start the engine and open the carburetor to the full open position, then adjust for peak R.P.M. with the main needle as previously described.

2. Close the carburetor barrel slowly until the lowest possible speed

is reached without the engine stopping.

3. Go to full throttle after about 10 seconds of idling. If the engine gains speed slowly, the idle mixture is too rich. If the engine stops, the idle mixture is too lean. Turn the idle disc clockwise if mixture is too rich and counterclockwise if too lean.

The engine will accelerate from idle to full throttle smoothly and instantaneously when properly adjusted. The engine may not idle well at a low setting or accelerate as quickly until it is broken in.

### AIRBORNE BREAK-IN

(Also see "aircraft installation" in this text.)

1. BREAK-IN running should be done with the recommended propeller (see chart above) at a slightly rich setting. The needle valve should be set at a point just into this range from a four cycle setting. Fly the plane at maximum throttle for 2 minutes, then throttle back for approximately 30 seconds. Repeat this sequence until approximately 45 minutes of accumulated running time has been obtained. Additionally, certain maneuvers, such as "CUBAN EIGHT'S", that allow the engine to load and unload are recommended. AVOID PROLONGED CLIMBING MANEUVERS AT MAXIMUM THROTTLE.

2. After the first 45 minutes change to normal size prop and run the engine at a normal peak needle valve setting. This should be a little on the rich side because engines run leaner in the air. 5% - 15% nitro may be used.

### BENCH BREAK-IN

NOTE THAT THE ENGINE MUST BE FIRMLY MOUNTED ON A SOLID TEST STAND. DO NOT CLAMP ENGINE IN A VISE. Muffler should be used during bench break-in.

The initial bench break-in period is also approximately 45 minutes. During this time, use the recommended break-in propeller and run the engine at a slightly rich setting. It is best to run the engine for about 10 minutes, then allow it to cool. The heating and cooling aid break-in.

1. Start the engine and run it at a slightly rich full throttle for about 1 to 2 minutes, then let it fast idle (about 3500 rpm's) for 30 seconds. Repeat this sequence for about 20 minutes of running time.

2. Increase the full open throttle time to about 3 minutes followed by a 30 second idling period. Do this for an additional for 20 minutes.

3. Install the engine in your aircraft. Using an normal size prop, proceed as described in step 2 of "AIRBORNE BREAK-IN".

### AIRCRAFT INSTALLATION

These engines are designed for beam type mounting. Securely mount the engine an hardwood mounts or firewall mount with a good quality motor mount. Be sure mounting surface is flat and parallel and all mounting holes line up, the crankcase could become distorted if screws or mounts are forced. We strongly advise against using a soft or rubber mount installation as our engines are correctly balanced and these mounts can cause excess vibrations from resonance frequencies. Do not use a back cover mounting plate as the screw bosses are not designed to take engine torque.

Fuel tank should be located as close to the engine as possible. The center line of the tank should be within 1/2 inch above or below the center of the carburetor. See illustration.

Muffler pressure is recommended as it provides an even run throughout the whole tank of fuel.

### TROUBLE SHOOTING

Generally most engine starting problems can be traced to bad glow plugs, weak starting batteries, or inadequate fuel systems.

### GLOW PLUGS

The glow plug when connected to a 1.5 volt battery should glow a bright orange. If the plug slightly glows the battery or plug should be replaced.

If the seal leaks around the center plug post, replace it.

The glow plug element should be examined after several flights. If the element is deformed or touching the side of the plug body, replace it. If the glow plug element is pitted or has a frosty look, the engine is running too lean and continued running will seriously harm the engine.

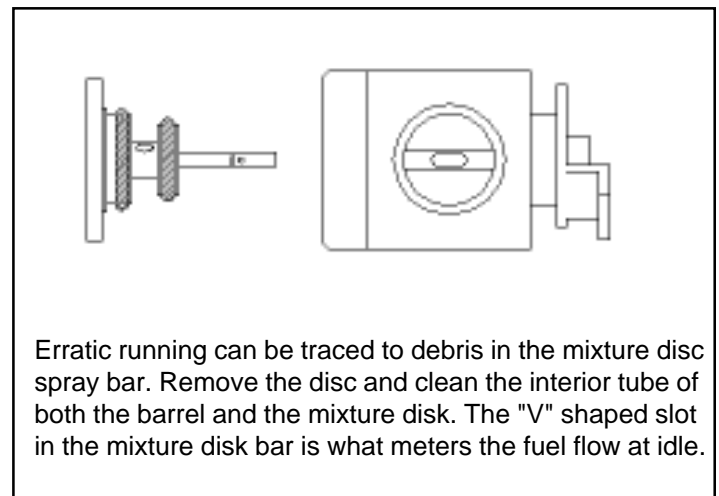
### FUEL SYSTEMS

The most frequent problems encountered with fuel systems are:

1. Improper fuel tank location. The center line of the carburetor should be located on the center line of the fuel tank. See illustration.

2. Fuel pick up in tank is not free.

3. Dirt or contaminates in the fuel, tank, lines, filter or carburetor. Many times a sliver of fuel line or other debris will cause the needle orifices to become plugged intermittently so a consistent mixture



Erratic running can be traced to debris in the mixture disc spray bar. Remove the disc and clean the interior tube of both the barrel and the mixture disk. The "V" shaped slot in the mixture disk bar is what meters the fuel flow at idle.

setting can not be obtained. Careful inspection and cleaning of these passages will usually solve the problem. Don't use silicone sealant on areas of the carburetor that involve fuel passages.

4. Holes in the fuel line. The tear resistance of silicon tubing is very low and it's not uncommon to develop a hole where the fuel line is assembled over the edges of brass tubing. If the engine runs well on the first half of tank and then quits, it's almost always caused by a hole in the pick up line inside the tank. Look for bubbles in the fuel line while the engine is running, this is a sign of holes somewhere in line.

5. Pressure tap in muffler plugged or restricted. Some fuels contain oil that can collect on the interior of the muffler and plug off the pressure tap causing the fuel tank to loose pressure and starve the engine for fuel. This will cause the engine to run lean then rich then lean. Try running the engine with the pressure line removed from the muffler to see if the problem still exists.

### MAINTENANCE

When you are finished flying for the day, run your engine dry by removing the fuel line at a moderate speed or allow the fuel tank to run dry. It is best to squirt some K&B AFTER RUN OIL in the carburetor, then flip the propeller about 10 to 20 times. This oil will keep castor based fuels from gumming and protect internal engine parts from rust and corrosion. When storing your model between flying sessions, it is best to wrap your engine in a rag or plastic to prevent dust, dirt and moisture from entering the engine. The engine should also be wrapped in a rag at the flying field between flights.

If dirt does enter the engine do not turn it over until it has been flushed out completely. Alcohol is recommended for this. DO NOT USE carburetor cleaner or chlorinated industrial solvents as they may attack the plastic parts of the engine. The following steps may be used as a disassembly/assemble guide: (See warranty on reverse side.)

- 1> Remove carburetor, muffler and glow plug.
- 2> Remove the back cover and head.
- 3> Flush engine out completely using alcohol or mild solvent.
- 4> Install back cover and head.
- 5> Install the glow plug and carburetor.

### SCREW ON HEAD

The screw on head on your new 61 ABC engine has been torqued to 26 foot pounds at the factory. After you have run 2 to 3 gallons of fuel through the engine, check the head for tightness with the spanner wrench supplied. Check the head immediately after a flight so the engine will be at running temperature. Support your engine by firmly holding the prop and front of the engine so as to not break engine mount loose from the fire wall. *NOTE: The head is installed at the factory with anti-seize compound. Before reinstalling head, make sure threads are clean and reapply anti-seize compound for aluminum (available at auto parts stores) to threads.*

### LIMITED WARRANTY & LIABILITY INFORMATION

Your K&B Model Engine has passed rigid factory inspections and is warranted to be free from defects in materials and workmanship for a period of two years from date of original purchase. If you use the engine or not, this is the time limit. Retain your bill of sale or sales receipt as proof of purchase date is required.

**PLEASE NOTE WE ONLY COVER DEFECTS, NOT OTHER FAILURES AS MENTIONED ON THE FIRST PAGE OF THIS MANUAL. DEFECTS WILL BE DETERMINED AT OUR FACTORY BY OUR PERSONNEL, NOT BY THE CUSTOMER.**



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This warranty does not apply to damage or loss caused by:

- 1 ... Shipping and handling.
- 2 ... Improper break-in.
- 3 ... Use of fuel other than specified.
- 4 ... Crash, misuse or abnormal service.
- 5 ... Use of muffler or tuned pipe not provided by K&B.
- 6 ... Any modification, alteration, or abuse of the engine.
- 7 ... Use for purposes other than engine was designed.
- 8 ... Running engine without adequate cooling.
- 9 ... Use of incorrect size propeller.
- 10 . Rusted internal parts.
- 11 . Customer disassembly.
- 12 . Striped threads caused by overtightening.
- 13 . Items that become loose and fall off engine or muffler.

Glow Plugs are not covered under any warranty .

Other exclusions from warranty are marring or scratching of the finish, any incidental or consequential damages caused by, or resulting from, a defect in material or workmanship, and normal wear.

**DO NOT DISASSEMBLE YOUR ENGINE!** Doing so will void your warranty. No exceptions! Call or write us first and explain your problem.

Our liability under this warranty is limited to the repair or replacement of the defect or defective part at our factory and **does not include inbound or outbound shipping expenses.** If you send an engine in for any reason, you are responsible for the shipping charges to have the engine returned to you. **Specifically, no responsibility is assumed for any damage to any model, accessory, radio control equipment, person or property resulting from use of or a crash in which a K&B model engine is used.**

This product does require mechanical ability and know-how to operate. You must be the judge of your own ability. **YOU are the person who will control your model and engine in a safe manner and must assume all responsibility for your activity.**

**This warranty is non transferable and is only valid if engine is purchased from a legitimate authorized dealer.**

**WARRANTY CARD MUST BE MAILED WITHIN 10 DAYS OF PURCHASE TO BE VALID.** If purchased directly from our factory or affiliate company, your warranty is automatically activated.

**IF YOU DO NOT AGREE TO THE TERMS OF OUR WARRANTY and USE AGREEMENT, PLEASE RETURN THE UNUSED ENGINE TO PLACE OF PURCHASE IN ACCORDANCE WITH TIME PERIOD ALLOWED FOR RETURN.**

**BY USING ENGINE, OR RETURNING WARRANTY CARD TO FACTORY, THE CUSTOMER AGREES TO ALL TERMS & CONDITIONS OF WARRANTY AND THE CUSTOMER ASSUMES ALL RESPONSIBILITY FOR ANY DAMAGE OR INJURY WHICH MAY RESULT FROM THE USE THIS PRODUCT and USER (CUSTOMER) AGREES TO HOLD HARMLESS MECOA/K&B and RJL, Affiliates and personnel from any liability or responsibility for ANY incidence that may occur.**