K&B 8800 Series
K&B .18 Aero (Model # 8801)
Owners Guide

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 be in control of your engine and operating your model in a safe manner. YOU must assume all responsibility for your model and your actions in it's operation.

READ EVERYTHING FIRST BEFORE YOU START YOUR ENGINE!

This manual is written for a wide range of modelers, some information may seem elementary for expericenced operators. It is provided to cover key points of model engine operation which must be learned by beginners.

INSTALLATION

These engines are designed for beam type mounting. Securely mount the engine an hardwood mounts or on the beam of a good quality firewall mount. Be sure the mounting surface is flat and parallel and all mounting holes line up. Take care to maintain this parallel relationship in that the crankcase could become distorted if screws or mounting is forced.

We strongly advise against using a soft or rubber mount installation. Even though our engines are correctly balanced, these mounts can cause excessive vibrations from resonance frequencies. Do not use a back cover mounting plate as the engine backplate bosses and screws are not designed to withstand the torque of the engine.

The 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. Muffler pressure to the fuel tank must be provided.

STARTING PREPARATIONS

Use a LONG REACH PLUG (such as the K&B 7311) OR R/C IDLE BAR PLUG (such as K&B 4520). Your will also need a 1.5 volt battery, quality propeller (refer to prop chart below) and good, commercial grade, two cycle glow fuel with 5% nitro-methane (more helps in cold weather). Be sure the fuel contains the right percentage of oil (18-20%) and that the oil is made up of a blend of castor oil and synthetic oil (not all synthetic oil). Keep fuel clean and filter it during fueling. Keep the exposure of your fuel to the air at a minimum as methanol will absorb moisture rapidly.

FUEL RECOMMENDATIONS AND SPECIFICATIONS:

BREAK-IN FORMULA: A mixture of 22% Degummed castor oil (or castor/ synthetic oil blend), 5% nitro-methane, and 73% methanol.

AFTER BREAK-IN: The nitro-methane percentage may be increased to 15% and oil content may be decreased if desired. **However, never use fuel with less than 18% total oil content.**

NOTE - In spite of certain fuel manufacturer's claims, always be sure that your fuel contains at least some castor oil in it's fomulation. Even if as little as 12 to 15% of the the total quantity of oil in your fuel consists of castor, that small amount of castor oil will provide much needed protection for your engine when it is being called upon to provide you with its maximum output.

As the manufacturer of this engine, K&B specifies that some castor oil in your fuel is a necessary and essential fuel component and is a requirement for maximum protection of your engine during its life

LOW QUALITY FUELS OR FUELS WITH AN INADAQUATE OIL CONTENT CAN RUIN YOUR ENGINE IN A SHORT PERIOD OF TIME.

PROPELLER SIZES - K&B .18 Aero

SERVICE	Recommended Prop
Break-in	7x6 8x3 8X4
Normal Use	8x5 9X5

STARTING AND BREAK-IN

All K&B engines are produced to the highest standards and inspected before leaving the factory, but they are not "BROKEN-IN" and will require approximately 30~45 minutes running before the full potential of the engine is realized. Break-in can be achieved "on the bench" or in the air.

Model engines make sounds that will tell you how they are performing or what they are doing. You'll have to listen very carefully for these sounds, 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 **"RICH"** is a conditon when the engine has a very slow, sometimes irregular, sputtering and almost sloppy exhaust sound. The exhaust will be very smoky, will.probably contain small drops of oil and even drops of raw fuel. **RUNNING RICH IS NOT GOOD FOR BREAK-IN** of your K&B .18 Aero engine which is an ABC type. The engine, at this speed, runs much cooler than it should and is subject to premature wear.

"FOUR CYCLE" is a still a rich setting. Though slow, it is fast enough to properly heat the engine's components and will even pull the airplane in flight. **THE 4-CYCLE SPEED IS GOOD FOR BREAK-IN**. This is also the setting you normally look for before launching the airplane because the engine will run leaner when airborne.

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. At "two-cycle", the exhaust note will change quickly into a smooth, powerful note.

DON'T OVERDO IT! - Once at a "two-cycle" if the needle is closed further, the sound from the engine will stay smooth, but will weaken. The peak power of your engine occurs just at the break point from a rich "four cycle" setting and further, excessive leaning will ruin the engine. A too-lean setting raises the engine heat above the safe point, reduces lubrication, and destroys glow plugs due to high combustion temperature. This is very harmful to the engine and will shortly destroy your investment.

Learn to tune the engine before flying. Remember, "*a little on the rich side is always preferred for longer motor life*".

NOTE: The "high speed needle" is knurled knob and "idle mixture" is adjusted by the screw in the center of the moving barrel.

ACTUAL STARTING

- Open the carburetor barrel about half-way. Open the high speed needle valve about 3~4 turns.
- Choke the engine by placing your finger over the venturi 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 two more turns, unscrew the idle needle two turns and repeat the above.
- Connect the 1.5 volt battery to the glow plug and pull the prop through until you feel a bump before compression. Now the engine will start 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 bust 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 needle in 1/2 turn and restart.
- IF THE ENGINE DOES NOT FIRE AT ALL, refer to the TROUBLE SHOOTING section in this text.

ADJUSTING THE R/C CARBURETOR

NOTE: The high speed needle is knurled knob and idle mixture is adjusted by the screw located in the center of the moving barrel.

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.

- 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.
- Close the carburetor barrel slowly until the lowest possible speed is reached without the engine stopping.
- 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 needle 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 well broken in.

BENCH BREAK-IN

NOTE THAT THE ENGINE MUST BE **FIRMLY BOLTED** INTO OR ONTO A SOLID TEST STAND. **DO NOT CLAMP ENGINE IN A VISE**. The supplied muffler should be used during bench break-in.

The initial bench break-in period is also approximately 45 minutes (20 to 25 minutes bench and 30 minutes airborne). During this time, use the recommended break-in propeller and run the engine at a rich to slow "4 cycle" setting. It is best to run the engine for about 10 minutes at a stretch and then allow it to cool. This heating and cooling cycle aids in break-in.

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

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

AIRBORNE BREAK-IN

Care should be exercised when breaking in your engine using this method since you do not have "hands on" direct control of the engine should it run too lean too soon. Make certain that your radio equipment has the ability to "throttle down" your engine if needed.

- 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 30 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 MAXIMUM THROTTLE CLIMBING MANEUVERS.**
- After the first 30 minutes change to normal size prop and fly an additional 30 minutes. Continue to run the engine at a slightly rich four cycle setting and fly your normal pattern.
- After the above break-in period, 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.

TROUBLE SHOOTING

Generally most engine starting problems can be traced to bad glow plugs, weak starting batteries, or inadequate fuel systems. See our trouble shooting orverview "XX Reasons the Your Engine Won't Start" which has been included with your engine.

GLOW PLUGS

The glow plug, when connected to a 1.5 volt battery, should glow a bright orange.

- If the plug only glows weakly (dull orange) the the starting battery should be recharged or, if the battery is OK, replace the plug.
- If you see any leaks (bubbles) around the center post of your glow plug, replace the plug.
- The glow plug element should be examined after several flights. If the element is deformed or touching the side of the plug body, replace the plug.
- 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 which could cause engine running problems are:
- Improper fuel tank location. The center line of the carburetor should be located on the center line of the fuel tank. See illustration.
- Fuel pick up in tank is not free.
- Dirt or contaminates in the fuel, tank, lines, filter or carburetor.
- 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, this is also a sign of holes.

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. Squirt several drops of a good quality AFTER RUN OIL in the carburetor, then flip the propeller about 10 to 20 times. This oil will spead into the internal parts of the engine. Doing this religously will keep castor based fuels from gumming up in the engine. After run oil will also 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.

Preventive Maintenance Hint: Fora smoother running, less troublesome engine, check the tightness of all screws regularly.

OPERATION IN DIRTY OR DUSTY ENVIRONMENT

Dirt is the enemy of the model airplane engine. Your K&B engine is a precision piece or equipment with very close fitting metal components. The engine should always be protected from dirt or like foreign material. **IF FOR ANY REASON DIRT ENTERS THE ENGINE DO NOT TURN IT OVER UNTIL IT HAS BEEN FLUSHED OUT COMPLETELY.**

Alcohol is recommended for flushing. 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 limited disassembly and re-assembly guide: (See warranty warniing below about engine disassembly)

NOTE: TAKE CARE NOT TO DISASSEMBLE THE ENGINE BEYOND THE INSTRUCTIONS PROVIDED HERE. DOING SO WILL VOID YOUR WARRANTY COVERAGE

- Remove carburetor, muffler and glow plug
- Remove the back cover and cylinder head
- Flush engine out completely using alcohol or mild solvent
- Re-install back cover and head according to the instruction below.
- Insert screws into head and tighten until they just begin to become tightened up. Then tighten the screws in the sequence shown below. tighten the screws only slightly, repeating the sequence a number of times until the screws are tight
- Install the glow plug and carburetor

K&B LIMITED WARRANTY

Your K&B Model Engine is warranted to be free from defects in materials and workmanship for a period of 1 year from date of original purchase. In addition to completing and returning your warranty card, retain your bill of sale or sales receipt as <u>proof</u> of purchase date is required.

This warranty does no apply to damage caused by:

- Shipping and handling (carrier liability)
- Improper break-in (customer abuse)
- Use of fuel other than specified (customer abuse)
- Crash, misuse or abnormal service (customer abuse)
- Use of muffler or tuned pipe not provided (or approved) by K&B
- Any modification, alteration, or general customer abuse
- Use for purpose other than that for which the engine was designed
- Running engine with improper or inadequate cooling
- Use of incorrect propeller (diameter or pitch)
- Rusted internal parts (customer neglect)
- Customer disassembly (see below**)**

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

Other exclusions from warranty coverage are any 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.

REMEMBER - THE ENGINE WARRANTY CARD MUST BE <u>SIGNED</u> AND MAILED TO K&B WITHIN 10 DAYS OF PURCHASE TO BE VALID (EVEN IF YOUR ENGINE WAS PURCHASED DIRECT FROM K&B's FACTORY). TO BE BE CERTAIN OF QUALIFICATION FOR WARRANTY YOU SHOULD RETAIN YOUR ORGINAL MACHINE OR COMPUTER GENERATED RECEIPT AS PROOF OF PURCHASE.

Our liability under this warranty is limited to the repair or replacement of the defect or defective part at our factory and <u>does</u> <u>not</u> include inbound or outbound shipping expenses.

CUSTOMER RESPONSIBILITY REGARDING ENGINE OPERATION

The user of our products takes full responsibility and accountability for the proper and safe use of our engines. As the person using our product, the end user certifies that he/she has read our safety and operating information and has read these instructions prior to operatiing the engine. By using this engine, the end user also certifies that he/she has the mechanical ability and knowledge necessary to operate the engine being used in the prescribed and safe manner.

K&B RESPONSIBILITY REGARDING ENGINE OPERATION

Absolutely no responsibility or liability is accepted or assumed by K&B, MECOA, or affililiate company or by any officer of K&B, MECOA, or affiliate company for damage to any model, accessory, radio control equipment, property, or the injury or death of any person or animal which resuls from a crash or collision caused by any person operating a model aircraft in which a K&B model engine is being used for power.

K&B ENGINES ARE MANUFACTURED, SOLD, AND SERVICED BY

MECOA K&B Mfg

16015 ADELANTE ST

IRWINDALE, CA 91702

(626) 359-6972

ANY QUESTIONS? CALL OR WRITE

(INCLUDE YOUR PHONE NUMBER, ADDRESS INFORMATION OR E-MAIL CONTACT INFORMATION WITH ALL CORRESPONDENCE)

Rev 4 2/2016