RJL K.61 AERO Owners Guide

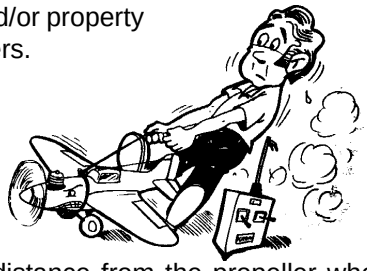
Item #99-0101 & 99-0102

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 responsibiliy for your activity.

WARNING!

PLEASE READ ALL SAFETY INSTRUCTIONS!

Falure 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.

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.

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

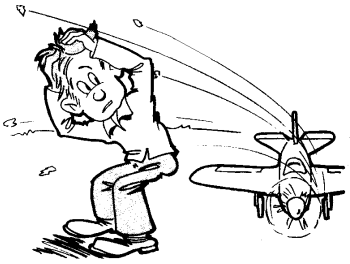
Store your fuel in a tightly sealed container (metal or suitable plastic, NOT GLASS). Model fuel is poisonous and flammable. Keep it away from heat, flames, and the reach of children.

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.

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

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.

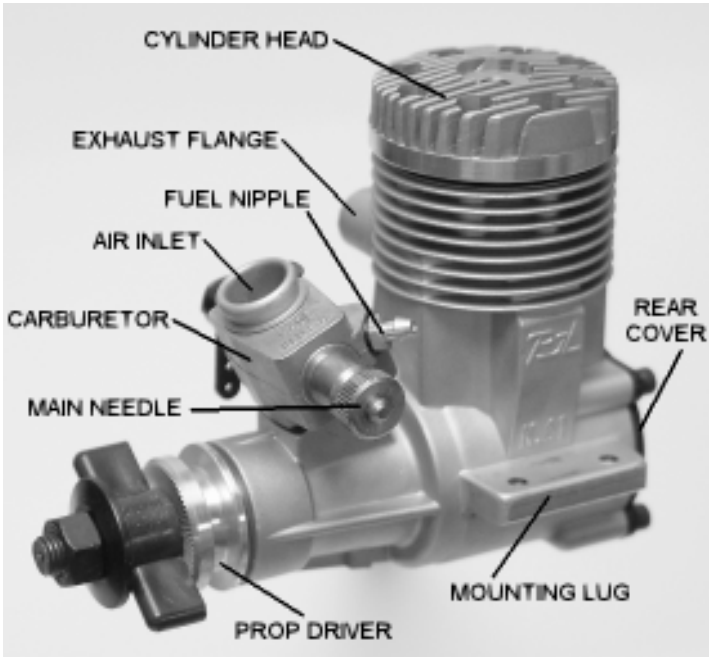
YOUR ENGINE IS NOT A TOY! It is a precision piece of machinery and must be treated as such.

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!

Take a few moments to familiarize yourself with the various parts of

the engine as shown in the view below. The engine may not have high compression until the piston ring is seated. **DO NOT DISASSEMBLE YOUR ENGINE!** Doing so may void your warranty.



Displacement ..... .608 Cu. In (10ccm)
Bore ..... .940" (23.88mm)
Stroke ..... .875 (22.35mm)
Compression Ratio ..... 7.5 to 1
R.P.M. Range ..... 2,200 - 15,000
Power Output ..... 1.8 H.P. @ 13,000
Engine Weight ..... 18 oz w/o muffler
Muffler Weight .....

STARTING AND BREAK-IN
All RJL engines are produced to the highest standards and inspected before leaving the factory, but they are not "BROKEN-IN" and will require approximately 90 minutes running before the full potential of the engine is realized. Break-in can be accomplished by airborne or bench running.

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.

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

FOUR CYCLING is a rich type setting, but it is fast enough to pull the airplane. This is 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, 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. This is very harmful to the engine and your investment. Learn to tune the engine before flying. Remember, a little rich 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. Buy only fuel thay lists percentages on the lable by volume. Keep fuel clean and filter it during fueling. Keep exposure to air to a minimum as methanol will absorb moisture rapidly.

FUEL SPECIFACITIONS:
BREAK-IN FORMULA: 22% Degummed castor oil, 5 to 10% nitromethane, 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 5/16" x 24. Be sure prop is balanced.

Break-in	12x6	11x7	
Normal Models	11x8	12x7	13x6

PRESSURE LINE HOOK UP

ACTUAL STARTING
WITHOUT battery connected to the glow plug open the carburetor barrel about half-way. Open the high speed needle valve about 2 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.

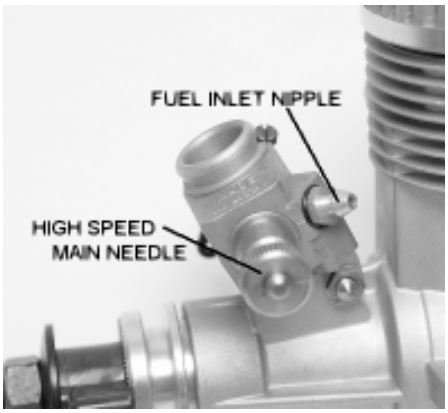
NOW connect the 1.5 volt battery to the glow plug and pull the prop through until you feel a bump before compression. Now the engine will start with your chicken stick or electric starter. Once the engine starts, open the carburetor to full throttle. At this time the engine should be running very rich. 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.

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

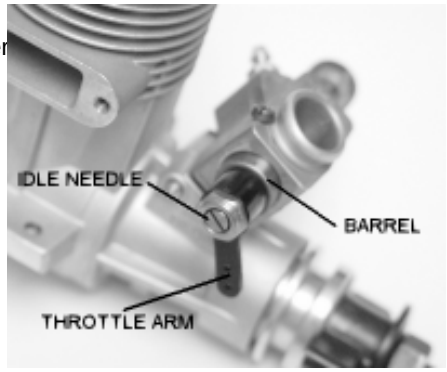
ADJUSTING THE R/C CARBURETOR

RJL 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.



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 needle clockwise if mixture is too rich and counter-clockwise 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.

AIRBORNE BREAK-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 fly an additional 45 minutes. Continue to run the engine at a slightly rich four cycle setting and fly your normal pattern.

3> 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..

BENCH BREAK-IN

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

The initial bench break-in period is also approximately 90 minutes (40 to 45 minutes bench and 45 minutes airborne). During this time, use the recommended break-in propeller and run the engine at a 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 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.

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. See illustration.

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.

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, 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. It is best to squirt some RJL 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 warnings.)

1> Remove carburetor, muffler and glow plug.
2> Remove the back cover and cylinder head.
3> Flush engine out completely using alcohol or mild solvent.
4> Install back cover and head. Insert screws into head and tighten until they just touch the head. Then tighten them in the sequence shown below. tighten the screws only slightly, repeating the sequence a number of times until the screws are tight.
5> Install the glow plug and carburetor.

LIMITED WARRANTY

Your RJL Model Engine has passed rigid factory inspections and is warranted to be free from defects in materials and workmanship for a period of 2 years from date of original purchase.

PLEASE NOTE WE ONLY COVER DEFECTS, NOT FAILURES FOR OTHER REASONS. DEFECTS WILL BE DETERMINED AT OUR FACTORY BY OUR PERSONNEL, NOT BY THE CUSTOMER.

Retain your bill of sale or sales receipt as proof of purchase date is required.

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 RJL.
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.

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 may 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. 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 or mishap in which a RJL model engine is used.

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, 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 PROPERTY DAMAGE OR INJURY WHICH MAY RESULT FROM THE USE THIS PRODUCT.

ANY QUESTIONS? CALL OR WRITE
(INCLUDE YOUR PHONE NUMBER WITH ALL CORRESPONDENCE)

RJL INDUSTRIES USA
P.O. BOX 5 SIERRA MADRE, CA 91025
(626) 359-0016
www.mecoa.com

Parts List for RJL K.61...

Crankcase	10-0101
Cylinder head	11-0101
Cylinder liner	12-0101
Piston	13-0101
Piston Ring	14-0101
Wrist Pin	15-0101
Connecting Rod	16-0101
Crankshaft	17-0101
Front Bearing	18-0002
Rear Bearing	18-0001
Prop Drive Collet	19-0101
Prop Driver	20-0101
Back Cover w/o-ring	21-0101
Prop Washer	23-0101
Prop Nut	24-0101
Engine Screws	25-0101
Wrist pin snap rings	26-0101
Back Cover 0-ring	27-0121
Carb Draw Bar	28-0101
Std Muffler complete	30-0101
Std Muffler tip	30-0189
Hush Muffler complete	30-0102
Hush Muffing tip	30-0190
Carburetor	80-0101
Carb Body	81-0101
Carb Barrel	82-0101
Barrel cam screw	84-0103
Main Needle w/knob	85-0101
Idle Needle w/o-ring	85-0102
Main needle o-ring	27-0182
Idle needle o-ring	27-0183
Carb neck o-ring	27-0181
Fuel nipple	84-0101
Throttle arm (nylon)	86-0101
Throttle arm o-ring	27-0182
Throttle arm C clip	83-0103
Barrel spring	83-0102

Be sure to order by description and part number.