

## **RJL C.15 Conquest Series Owners Guide**

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 requires 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.

Please read this manual as the Conquest engines may differ in operation from other model engines you have experience with.

This manual is written for modelers of all experience levels, so some of the information may seem very basic. Please read anyway.



***RJL Industries***

***P.O. Box 5 - Sierra Madre, CA 91010 --- (626) 359-0016***

# **BEFORE YOU HAVE PROBLEMS PLEASE READ THIS!**

**The R/JL C.15 engines use 2 cycle glow fuel.**

Use fuel that contains the proper amount of oil. 20% Castor or Castor/Synthetic mix.

**The R/JL C.15 engines use a long glow plug.**

Use a R/C Long plug for a reliable idle on carbureted engines. A Standard long on C/L, & FF versions.

**Break in your engine properly.**

The C.15 design requires break-in. Read breakin procedures in this manual.

**Don't let your engine hydraulic lock.**

This happens when the cylinder fills with liquid fuel which can not be compressed by the piston. Major damage can result, especially when bumped with an electric starter. This is very common when your engine is mounted on its side or inverted.

**Please read the  
detailed instructions  
on the following pages.**

For technical help call (626) 359-0016.

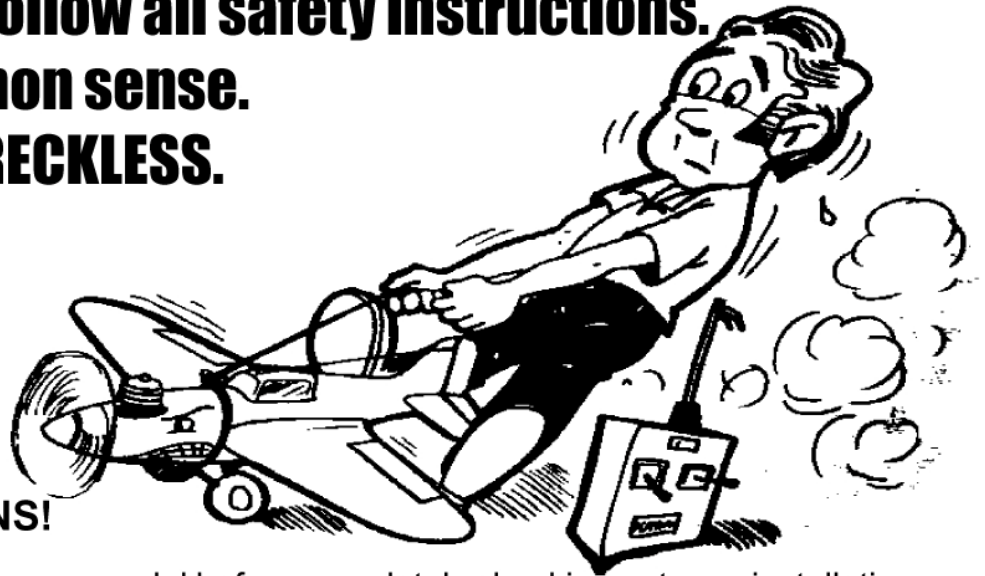
***R/JL Industries***

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**Always follow all safety instructions.  
Use common sense.  
DON'T BE RECKLESS.**

**PLEASE  
READ  
ALL  
SAFETY  
INSTRUCTIONS!**



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.

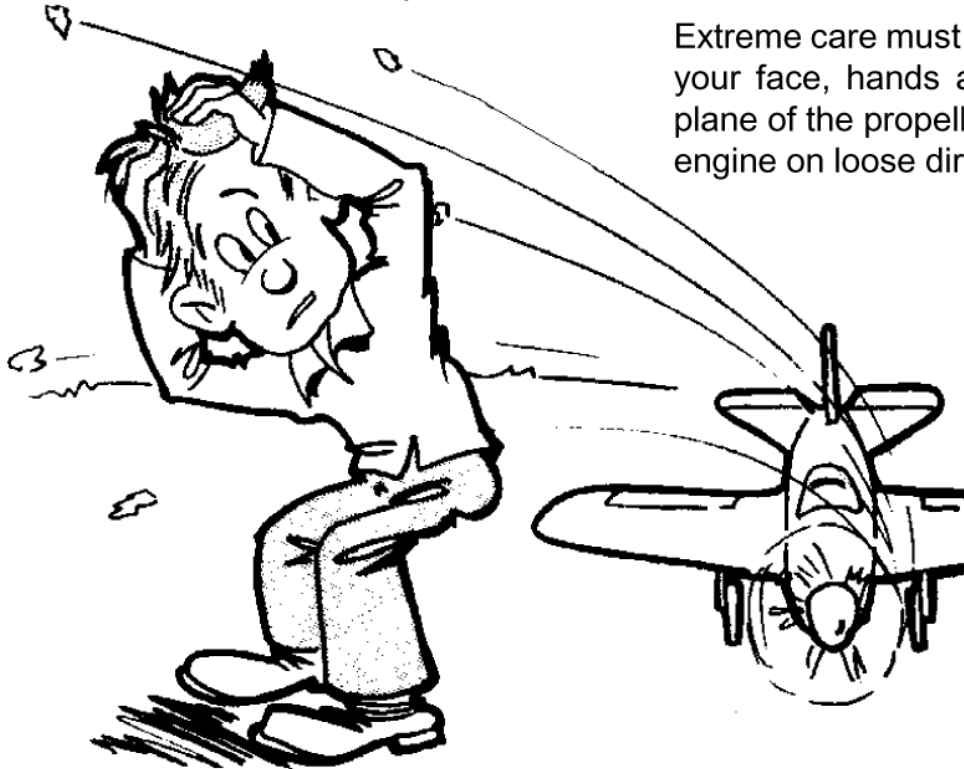
Never clamp your engine in a vice to test run. Mount your engine securely in your airplane or a commercial test stand. Never use wood screws to mount your engine. Use good quality machine screws and nuts.

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.



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 and 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!**

For help call or write:

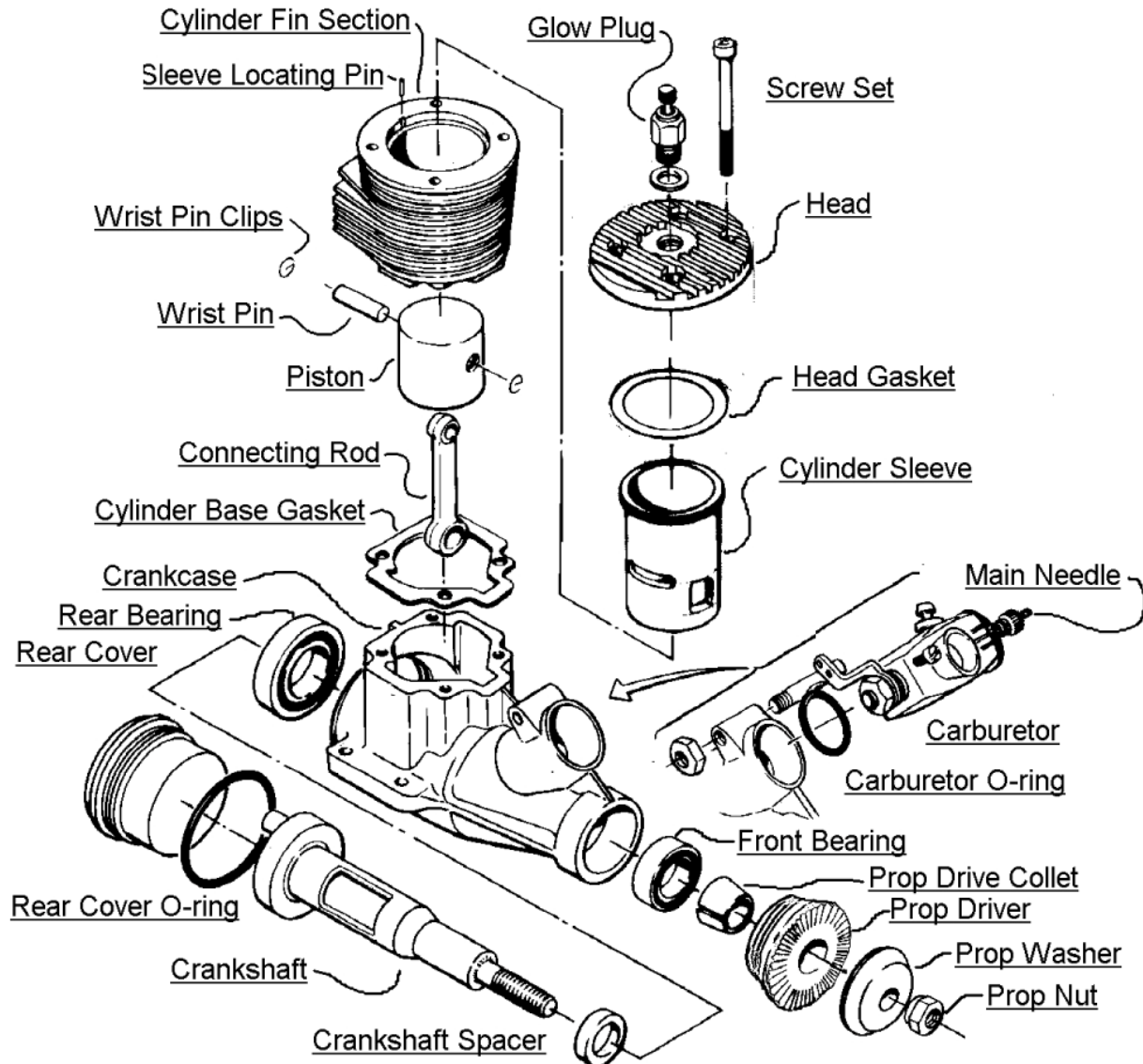
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# READ EVERYTHING FIRST! THEN START YOUR ENGINE.

Take a few moments to familiarize yourself with the various parts of the engine as shown in the view below.



## 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 30 minutes of 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 smoky and probably contain small droplets of oil. This condition is good for Break-in since the engine receives excess lubrication and runs cooler.

**SLIGHTLY RICH** type setting is fast enough to pull the airplane but is still too rich to achieve full RPM's. This is the setting you normally look for before launching the airplane because the engine will run leaner when airborne.

**PEAKED RUNNING** is obtained as the main needle is closed (clockwise), this 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 into a smooth, steady 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 and piston/cylinder fit 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.

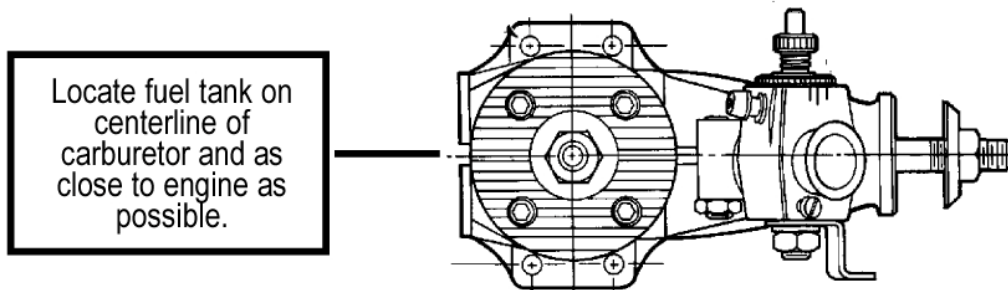
## STARTING PREPARATIONS

**USE A LONG GLOW PLUG!!!** USE A R/C OR IDLE BAR TYPE PLUG for R/C flying where a reliable idle is required. For FF or C/L flying use a standard long plug without idle bar for maximum performance. The heat range will be determined by many factors. Type fuel, prop size and compression ratio. Start with a medium heat range if the option is available.

You 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% to 15% nitro-methane (more helps in cold weather). Be sure the fuel contains the right percentage of oil (20%) and be sure the fuels oil contains at least a 50-50 mix of castor oil. Not all synthetic oil. Keep fuel clean and filter it during fueling. Keep exposure to air to a minimum as methanol will absorb moisture rapidly.

## PROPELLER SIZES

TYPE OF FLYING	EVENT	FUEL NITRO CONTENT	PROPELLER
Free Flight	FAI Power	0	7x3½, 7½x3½
	A Gas	20-50%	7x4, 8x4
Control Line	Scale Racing	30-70%	7x5, 7x6
	A Speed	50-70%	6x7, 6x7½
	FAI Speed	0	6x7, 6x7½
	FAI Combat	30-50%	7x5
Radio Control	Sport R/C	5-15%	8x3½, 8x4
	Quarter Midnet	10-15%	7x5



## ACTUAL STARTING

Open the high speed needle valve about 4 turns. DO NOT CONNECT GLOW PLUG TO BATTERY YET. With throttle at full open setting, choke the engine by placing your finger over the carburetor/venturi inlet and slowly turn the prop over six to ten times counterclockwise. 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 and unscrew the idle needle two turns and repeat the above. Don't allow engine to hydraulic lock (this means cylinder filling with fuel and piston being unable to compress it). If this occurs, remove glow plug and rotate propeller. Don't force it, serious internal damage can result. For throttle equipped engines, open the carburetor barrel about quarter-way. 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 electric starter. The C.15 engine has extremely high performance timing and may always require an 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 needle in 1/2 turn and restart. IF THE ENGINE DOES NOT FIRE AT ALL, refer to the TROUBLE SHOOTING section in this manual.

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### AIRBORNE BREAK-IN (Also see "aircraft installation" in this text.)

- 1> BREAK-IN running should be done with the recommended propeller (see chart) at a slightly rich setting. The needle valve should be set at a point just into this range from a rich setting. For throttle equipped models, fly the plane at maximum throttle for 2 minutes, then throttle back for approximately 30 seconds. Repeat this sequence until approximately 20 minutes of accumulated running time has been obtained. For FF & C/C models, set needle richer than described above. 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 20 minutes change to normal size prop and fly an additional 20 minutes. Continue to run the engine at a slightly rich 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. Higher nitro may be used.

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### 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 40 minutes (20 minutes bench and 20 minutes airborne). During this time, run the engine at a rich setting. It is best to run the engine for about 3 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 minute, if carburetor equipped, then let it fast idle (about 4000 rpm's) for 30 seconds. Repeat this sequence for about 10 minutes of running time.
- 2> Increase the full open throttle time to about 2 minutes followed by a 30 second idling period (about 3,500 rpm's). Do this for an additional for 10 minutes.
- 3> Install the engine in your aircraft. Using an normal size prop, proceed as described in step 2 of "AIRBORNE BREAK-IN".

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### ADJUSTING THE R/C CARBURETOR

RJL Conquest 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 mixture disc (located behind the main needle with + & - marks) clockwise if mixture is too rich and counterclockwise if too lean. Very slight movement is required.

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 until it is broken in.

# AIRCRAFT INSTALLATION

These engines are designed for beam type mounting. Securely mount the engine on 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.

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.

Fuel pressure is recommended if you are unable to obtain even run throughout the whole tank of fuel. FOR TANK PRESSURE INSTALL MUFFLER PRESSURE NIPPLE OR USE NIPPLE IN BACK COVER. For Back Cover pressure you will have to drill the back cover with a 1/32" diameter drill. Remove back cover before doing this. For muffler pressure you will have to drill through the muffler body in the large area in either the front or rear half. Don't drill on the joint area. Install nipple with nut.

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## 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 or plug is too hot of heat range 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 fuel tank should be located on the center line of the carburetor.
- 2> Fuel pick up in tank is not free.
- 3> Dirt or contaminants 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.

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## MAINTENANCE

When you finish 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. Running the engine dry removes any methanol residue from the internal engine components. This methanol attracts moisture and will result in rust and corrosion if this procedure is not followed. 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 on reverse side.)

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



To disassembly/assemble further (doing so will void warranty however):

- 6> Remove items indicated above.
- 7> Remove 4 head screws and lift cylinder/piston/rod off lower crankcase.
- 8> Slide crankshaft out rear of crankcase.
- 9> Ball bearings are press fitted into the crankcase and require heating of the crankcase and special tools to remove.
- 10> Clean all crankcase gasket surfaces with cleaning solvent. Do not use a knife or sharp edged tool or sand paper. Be sure rear cover o-ring is in perfect condition. A leaking rear cover can cause a variety of irregular running conditions.
- 11> Reassemble parts by reversing these directions.

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## LIMITED WARRANTY

Your RJL or HP 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. Retain your sales receipt as the as proof of purchase and date of purchase is required.

This warranty does no apply to damage 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 approved by RJL.
- 6> Any modification, alteration, or abuse of the engine.
- 7> Use for purposes other than engine was designed.
- 8> Use of improper type glow plug.
- 9> Running engine without adequate cooling.
- 10> Use of incorrect size propeller.
- 11> Rusted internal parts.
- 12> Damage caused by hydraulic lock.

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.

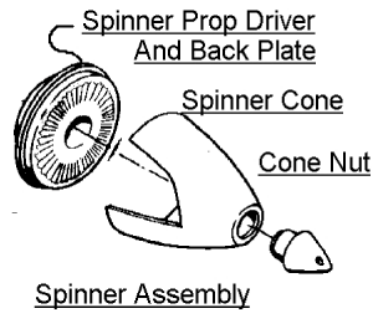
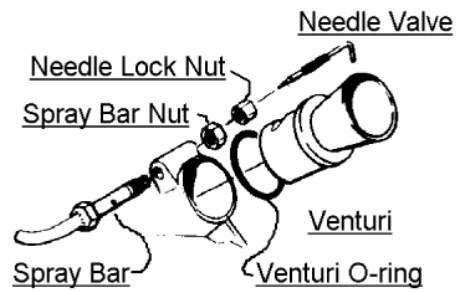
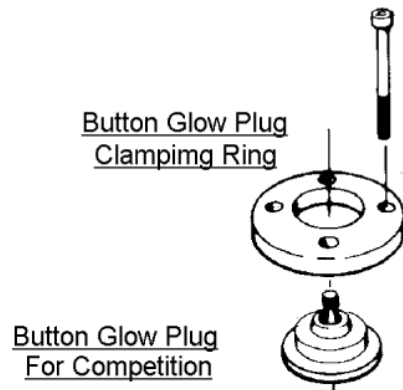
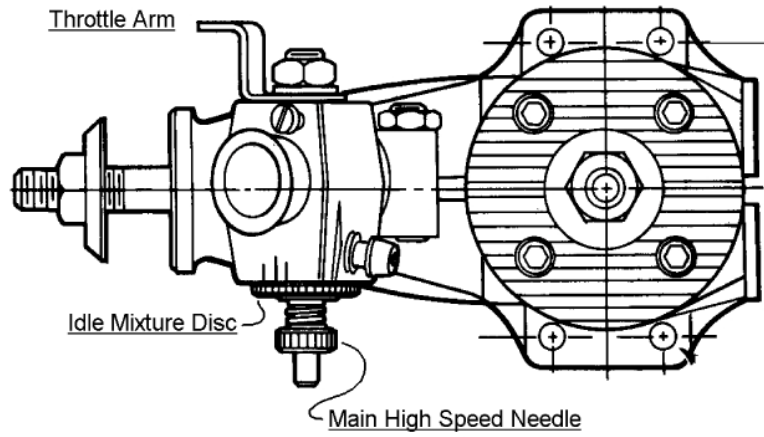
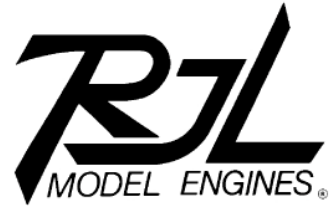
DO NOT DISASSEMBLE YOUR ENGINE! Doing so will void your warranty. No exceptions! Call us first and explain your problem.

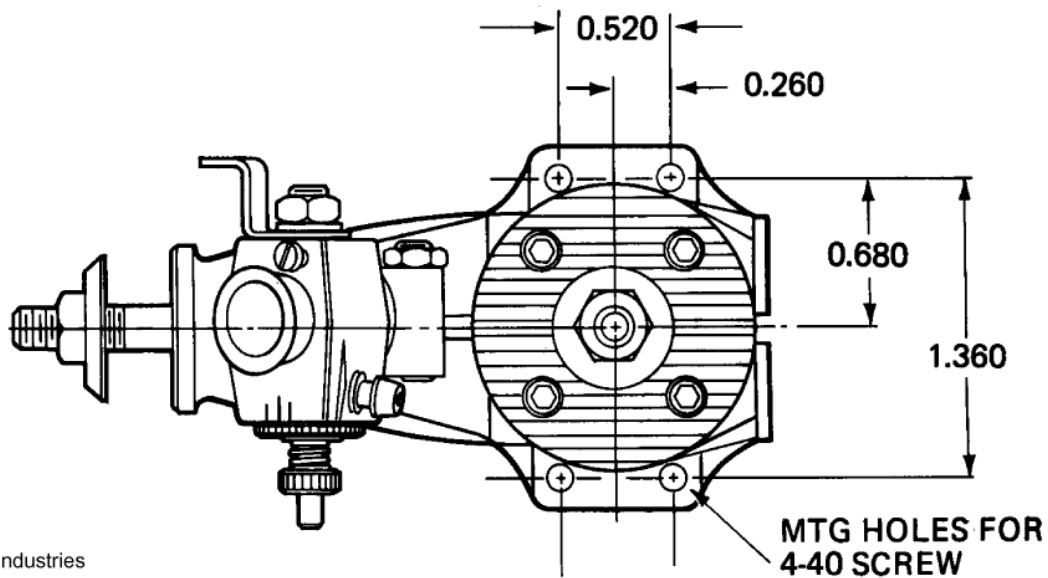
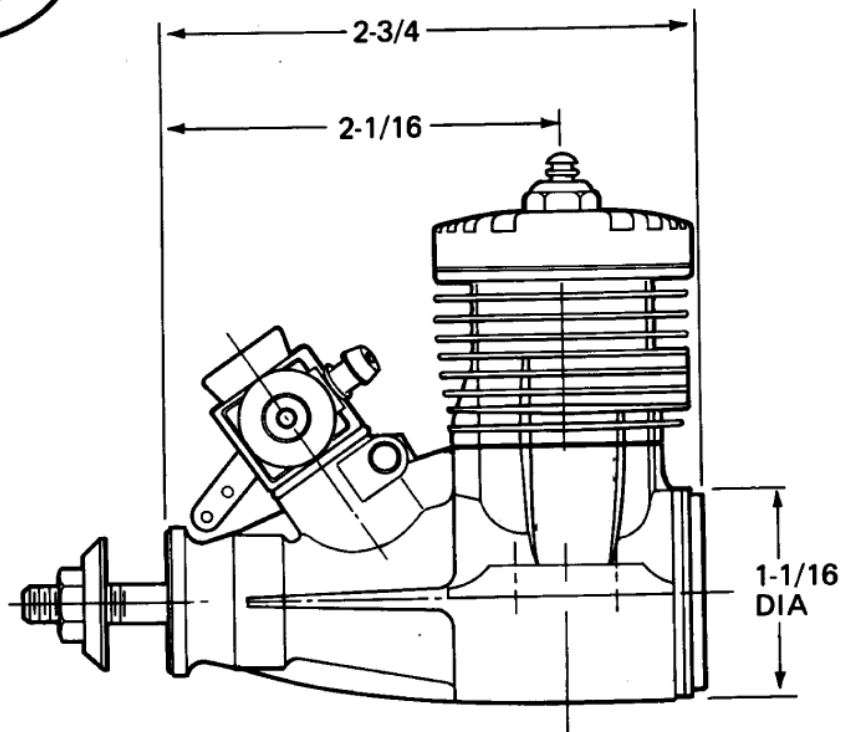
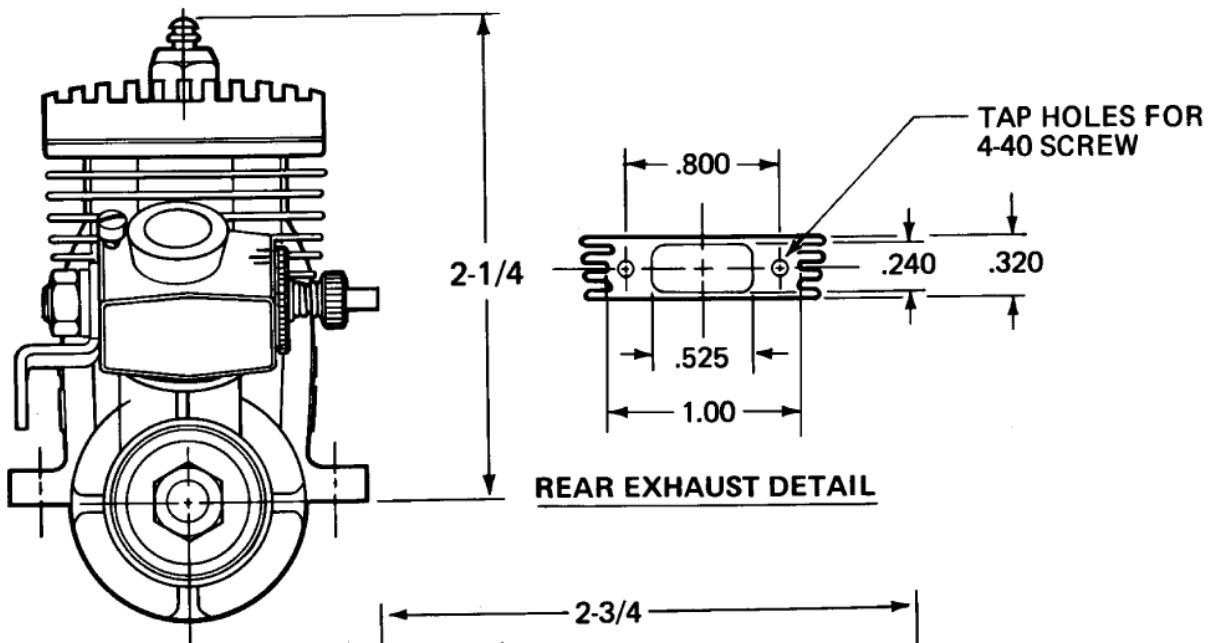
Our liability under this warranty is limited to the repair or replacement of the defect or defective part at our factory and does not include inbound shipping expenses. **Specifically, no responsibility is assumed for any damage to any model, accessory, radio control equipment, person or property resulting from a crash in which a RJL or HP model engine is used.**

**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

# Technical Data





## Parts List for RJL C.15 Conquest Series...

Be sure to order by description and part number.

PART NUMBER	DESCRIPTION
10-0501	CRANKCASE
11-0501	FINNED HEAD
11-0502	Button glow plug head ring
15-0501	WRIST PIN
16-0501	CON ROD
17-0501	CRANKSHAFT
17-0591	CREANKSHAFT SPACER
18-0005	REAR BEARING
18-0007	FRONT BEARING
19-0501	PROP DRIVE COLLET
20-0501	PROP DRIVER
21-0501	REAR COVER WITH O-RING
22-0501	CYLINDER FIN SECTION
23-0501	PROP WASHER
24-0501	PROP NUT
25-0501	SCREW SET
25-0531	MUFFLER SCREWS
25-0532	PIPE ADPT SCREWS
26-0501	WRIST PIN CLIPS
27-0521	REAR COVER O-RING
27-0531	PIPE ADPT O-RING
27-0581	VENTURI/CARB NECK O-RING
28-0501	CARB DRAW BAR
29-0501	CYL BASE GASKET SET
29-0511	HEAD GASKET
30-0501	MUFFLER W/SCREWS
30-0502	EXH ADAPTOR W/SCREWS
30-0593	MUFFLER BAFFLE
33-0501	PISTON/CYLINDER SET
68-0501	SPINNER COMPLETE
80-0501	CARBURETOR
81-0551	VENTURI
85-0501	NEEDLE FOR CARB
85-0551	VENTURI NEEDLE
87-0501	NEEDLE/SPRAY BAR ASSEMBLY
99-0050	BUTTON HEAD GLOW PLUG