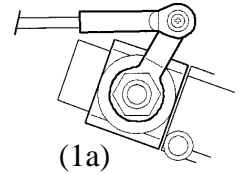


# Starting the engine for the first time.

The model engine is the single most difficult part of model helicopters to the beginner, second only to learning to fly. For this reason we have taken the time to go through starting the engine the first time with you to help you to understand the basic operation and tuning of the engine.

## Items to recheck:

**1) Servo direction for the throttle channel.** Turn on the transmitter switch, then the switch on the helicopter, move the throttle/collective stick to the low position, the carburetor arm should look exactly like the diagram (1a). Watch the throttle servo. As you raise (increase) the left stick the throttle pushrod will move towards the front of the helicopter, all carburetors work the same, as the throttle arm is rotated by the throttle pushrod, the barrel of the carburetor rotates counter-clockwise as it opens. If this does not happen you need to reverse the servo direction and reset the throttle arm in Step 17. Starting the engine at full power will possibly damage the engine and will damaged clutch components on the helicopter.



**2) Fueling the engine.** Open the gallon of fuel and insert draw line from the fuel pump into the fuel, remove the fuel line at the carburetor inlet and connect to the fueling line of the fuel pump. Fill the tank until you start to see bubbles moving in the pressure line to the muffler. Reverse the pump for 1 second and disconnect the lines starting with the fueling line and reconnect to the carburetor. Recap the fuel to keep moisture out. Only fuel the model when you are setup and actually ready to start the engine, it is common for the carburetor to fill with fuel while sitting on the bench over a brief period of time. More common is the engine flooding while trying to start. This the case as you are starting with an electric starter the engine initially turns easily but soon slows down.

**3) Last pre-flight checks.** Make sure that both the radio Tx and Rx have been charged overnight and the glow starter (if rechargeable). Do a range check, walk away from your helicopter with the antenna fully collapsed to 30 paces and have someone verify that all control surfaces are operating. If you do not make this distance have an experienced modeler check over your setup, do not fly until then.

**4) Cranking the engine over.** When a brand new engine does not start there are only three major possibilities: a) the glow plug is not hot enough or already burned out or b) fuel is not getting to the carburetor or c) too much fuel is entering the carburetor. This is assuming you have gone through step 1 in this page. Connect the starter to a 12Volt source and verify that the starter will turn the starting cone counter-clockwise. Connect the glow starter connector to a 1.5Volt source or use a rechargeable glow starter. Do not connect yet.

- Move the throttle stick to the low position with the trim in the center.
- Look at the fuel line entering the carburetor, is there fuel in the line, if not pull the fuel line off and check.
- If there is no fuel in the line, reconnect and push down on the start cone and turn the engine by hand until you see fuel entering the carb. make one more revolution. Putting a finger over the exhaust hole will help.
- Connect the glow starter to the glow plug, place one hand firmly on the rotor head, **absolutely** at all times keep your hand on the rotor head, should the engine start anywhere above idle you will only have a few seconds to put the starter down and pull the fuel line off the carburetor line going to the engine. It is a good idea to make sure you are standing/kneeling on the fuel line side.
- Place the starter on the starting cone and push down, before you start, rotate the cone with the engine engaged backwards (clock wise) until you feel the compression increase.
- Press the button on the electric starter, there will be an initial popping sound as the engine turns over and within a few seconds the engine should start. If it does, while holding the rotor head put down the electric starter and move the throttle trim down until the engine continues to run at the lowest speed without quitting. If the engine starts to die simply move the trim up one or two clicks. Do not move the throttle stick from the low position.

**5) The engine does not start.** Do not continue to crank the engine over if it does not start.

- a) Remove and check the glow plug, is the glow plug dry or wet? Connect to the glow starter or the glow connector and verify that the element glows a bright orange to a white color, if you get an orange glow then your glow starter is not supplying enough power to the glow plug.
- b) If the glow plug is wet, then the engine is receiving fuel. If the glow plug is dry, no fuel is reaching the engine. Try re-priming the engine, point #3 step 4. Again verify that the engine is receiving fuel.
- c) Is the engine very difficult to turn over, to the point that the electric starter is unable to turn the cone? If yes, you have successfully filled the engine and carburetor with fuel, do not force the starter as you can damage the starter and prematurely wear out the starting cone and ultimately the starting shaft will fail. First, disconnect the glow starter and pickup the helicopter and tip forwards and backwards with the muffler side down. This will drain the muffler of raw fuel. Next turn the cone until the half past the highest compression point, here the exhaust port will open and again drain through the muffler. Try to start again. Same problem, remove the glow plug and spin the engine (without) plug and any excess fuel will be expelled, replace glow plug and try again.

If the engine still doesn't start, contact an experience modeler to help you with starting the engine, the problem maybe very simple.