



Starting & Troubleshooting Guide For The COX® Sure Start™ .049 Engine

KEEP FOR FUTURE REFERENCE

You will need 2 "D" Size Alkaline Batteries (not included).

Needle Valve

Adjusts the fuel flow into the engine. Turn the needle **clockwise (IN)** to **decrease or lean** the fuel flow and **increase the engine speed**. Turn the needle **counter-clockwise (OUT)** to **increase or richen** the fuel flow and **decrease the engine speed**.

Glow Head

The glow head contains a small coiled wire (the 'element') that ignites the fuel/air mixture above the piston. A 1.5 volt starting battery heats the element to start the engine. Never connect a battery with more than 1.5 volts to glow plug.

Choke Tube

Allows you to prime engine without squirting fuel into the exhaust ports.

Piston

Drives downward into the cylinder when the fuel and air mixture ignites.

Backplate

Seals the rear of the crankcase and mounts the engine to the model.

Cylinder

Contains the power of the explosion of the fuel and air.

Venturi

The fuel and air are mixed together in this tube.

Exhaust Ports

Allows the burnt gases to exit the cylinder.

Reed Valve

Opens and closes like a door. It opens during the intake cycle to allow fuel and air to enter the engine. It closes during the exhaust cycle to keep fuel and air out.

Connecting Rod

Transfers the downward force of the piston to the crankshaft.

Crankshaft

Converts the up and down motion of the piston to rotary motion which turns the propeller.

Crankcase

Housing for all the mechanical elements that make the engine work.

Propeller Driver

Engages the propeller at the crankshaft.

Spring Starter™

Used to spin the propeller around for easier engine starting.

Snap Starter® Collar

Engages the Spring Starter™.

WARNING

Improper use of this product may result in personal injury or damage to the product. **READ THE FOLLOWING INSTRUCTIONS CAREFULLY**. You are responsible for the safe operation of this product. **USE WITH ADULT SUPERVISION**

Using the COX® Engine Wrenches.

To remove, tighten or test the glow head:

A. To remove or tighten a glow head, place one wrench on the cylinder and use the other wrench to loosen or tighten the glow head as shown. Only tighten the glow head hand tight.

NOTE: Always install the glow head on the motor with the copper washer in place.

B. To test a glow head, remove from the engine, connect glow clip to glow head as shown. The small coil should 'glow' bright orange. If coil does not glow or is dim, replace the glow head.

NOTE: Be sure to test glow head using fresh batteries in the battery box.

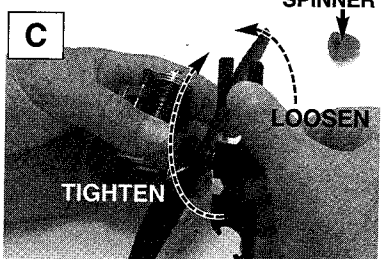
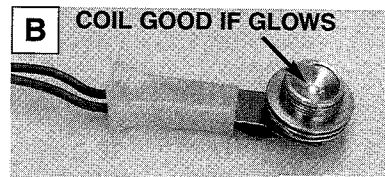
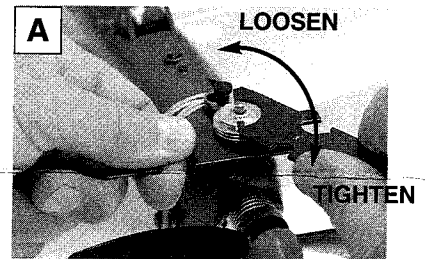
CAUTION: GLOW HEAD GETS HOT! USE CARE IN HANDLING.

LET COOL BEFORE INSTALLING ON ENGINE.

To remove and tighten the propeller:

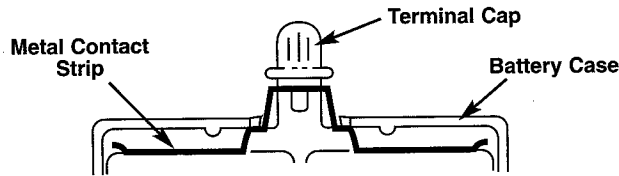
C. Remove the spinner and insert the wrench into the slots of the prop hub nut. Tighten the prop hub nut by turning wrench clockwise or loosen the prop hub nut by turning the wrench counter-clockwise as shown. Tighten prop hub nut hand tight.

NOTE: ALWAYS CHECK THE PROP HUB NUT FOR TIGHTNESS BEFORE THE BEGINNING OF EACH FLYING SESSION.

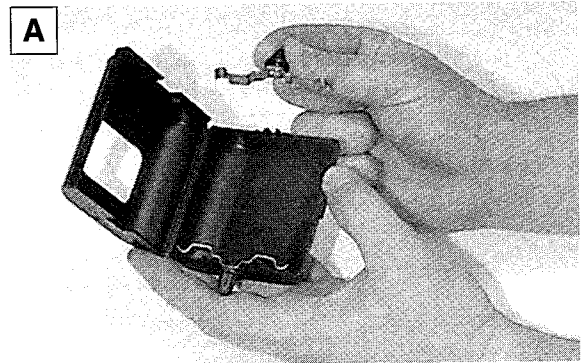


1. Assemble the battery box.

- A. Open the plastic battery case. Insert the metal contact strips into the slots and press them into place (see illustration). Unscrew the plastic terminal caps and set aside.

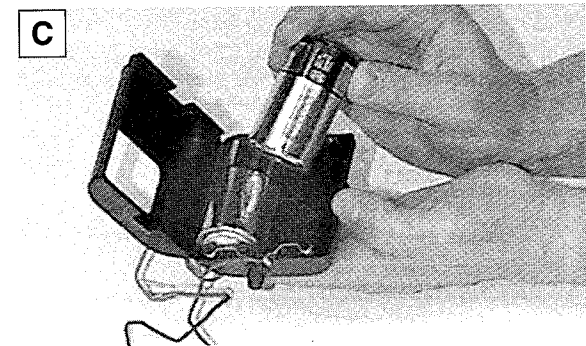
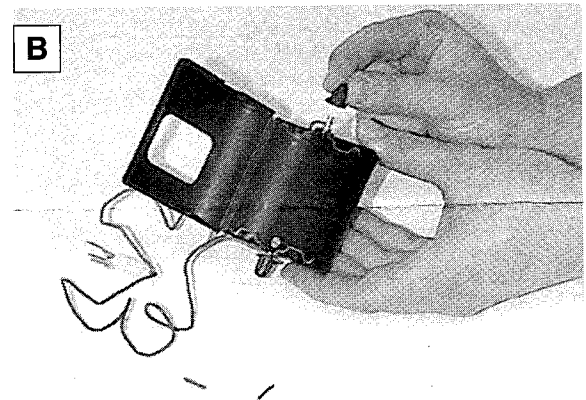


- B. Unroll the wire from around the glow head clip. Remove the pre-cut insulation from the end of each of the two wires. Wrap the exposed wire end from the blue lead around one of the threaded terminals and the red wire around the other. Screw the terminal caps over the wrapped wire. Make sure caps are tight.



- C. Install 2 "D" size alkaline batteries in the battery case. **Caution:** Make sure both batteries face the same direction. Close the battery case and snap the case shut.

- **Caution:** Never mix old and new batteries. Do not mix alkaline, standard and rechargeable batteries.
- Not recommended for use with rechargeable batteries.
- Non-rechargeable batteries are not to be recharged.



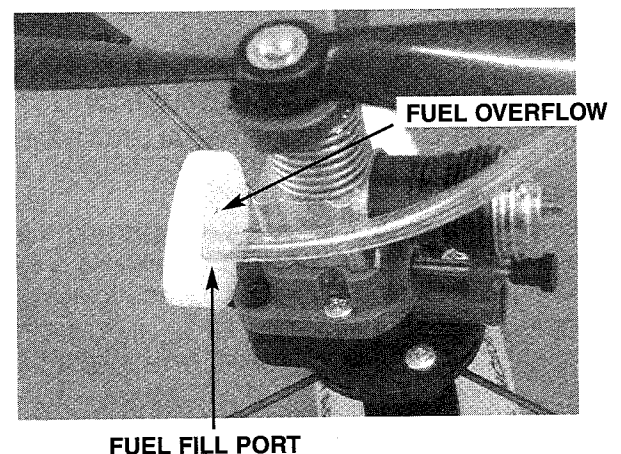
HOW TO START AND OPERATE YOUR NEW COX® ENGINE

Purchase a premium grade of Glow Fuel having between 10 and 15% nitro content from your local hobby store. (HINT: Using a Glow Fuel with a blend of Castor and Synthetic Oil will prolong the life of your engine). Before attempting to fly, 'Break In' the engine by running it slightly 'Rich' for at least 3 full tanks of fuel on the ground. Refer to the following steps to start and tune the engine for maximum flight performance.

1. Filling the fuel tank.

Close the needle valve by rotating it clockwise until it is finger tight: **Caution:** Take care not to over tighten as you could ruin the needle valve assembly. Then, open the needle valve 4 turns (counter-clockwise).

Next, slip the filler hose onto the fuel tank fill port and gently transfer fuel. The fuel tank is full when fuel starts to flow out of the fuel overflow. Wipe excess fuel off of aircraft with a cloth after fueling. Wash hands thoroughly after flying.

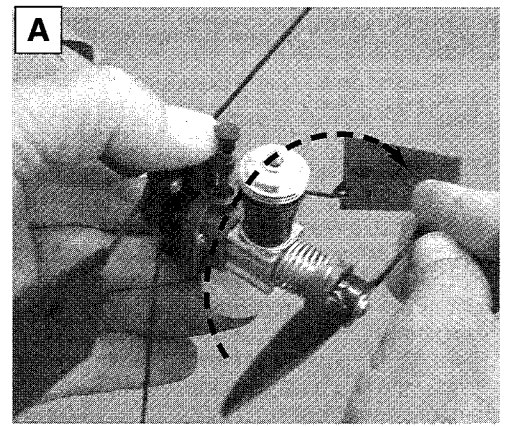


2. "Priming" the COX® .049 engine for starting.

'Priming' an engine means to start fuel flowing from the fuel tank to the engine prior to starting. Follow this procedure to 'prime' your COX® .049 engine.

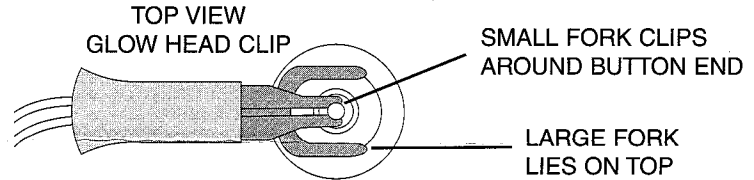
- A. Place finger over the choke tube. Wind the propeller clockwise and engage the hook of the spring snap starter onto the propeller blade. Continue to rotate the propeller with the spring starter hook engaged **one full turn clockwise** (NOTE: Rotating the propeller more than 1 full turn with the spring starter engaged will result in damage to the spring starter). Quickly release the propeller and repeat once more. The engine will be 'primed' and ready to start.
- B. Remove your finger from the top of the choke tube and prepare to start the engine.

Caution: Never 'prime' the engine with the glow head clip attached to engine.



3. Starting the COX® .049 engine.

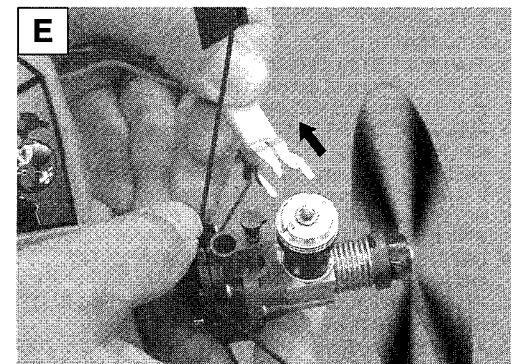
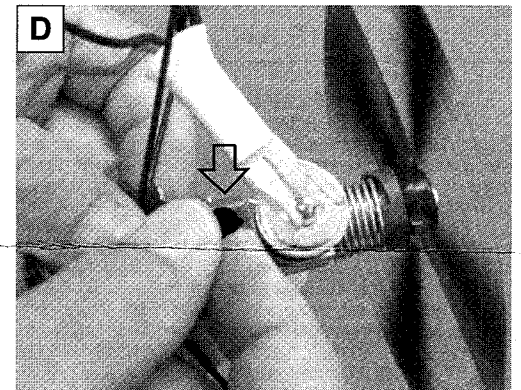
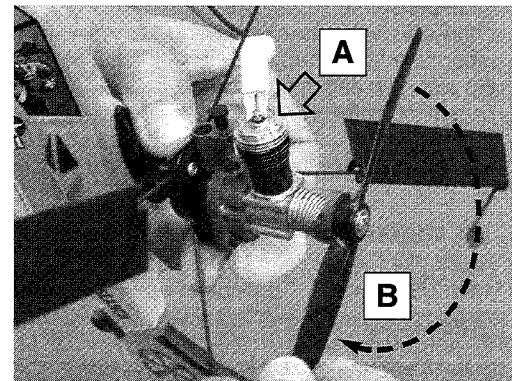
- A. Connect the glow head clip to the glow head as illustrated. **Check that glow clip wires are positioned away from propeller. Be sure to instruct your helper(s) to stay behind the propeller and model at all times during engine operation.**
- B. Hold the model securely with one hand and with the other hand wind the propeller clockwise (1 full turn) as before during 'priming', then quickly release the propeller to start the engine. Try to do this in one smooth step. The engine should start within the first three tries.
- C. If the engine does not start after three tries, disconnect the glow head clip and re-prime the engine, 'open' the needle valve 1/4 turn, then try again. **Caution: Never 'prime' the engine with the glow head clip attached to engine.**



Note: If the engine still won't start after repeated attempts, review the trouble-shooting portion of these instructions.

- D. When the engine starts, let it run a moment, then a little at a time 'close' (turn clockwise) the Needle Valve to 'lean' the fuel flow. You will hear the engine increase speed (RPM's). Continue to 'lean' the fuel flow until you hear the engine gain maximum speed then suddenly lose speed. Stop there and then slowly 'open' (turn counter-clockwise) the Needle Valve to 'richen' the fuel flow. You will hear the engine increase to its maximum speed again. At that point, the engine should be running smoothly and at maximum speed. If not, adjust the Needle Valve a small amount in either direction until the engine runs smooth.
- E. Disconnect the Glow Plug Clip. Pull it straight back and away from the propeller. If necessary, adjust the Needle Valve as required for the engine to run smooth and at maximum speed. Let the engine run until it is out of fuel. Allow the engine to cool, then restart and run 2 more tanks of fuel through the engine to 'break-in'. HINT: 'Open' the needle 1/2 turn to ease starting, then slowly 'close' until maximum speed is achieved again.
- F. After 3 tanks of fuel, your engine is ready for flying. Keep the engine clean and free of any dirt. When ready to fly, simply Prime and Start the engine adjusting the Needle Valve as required for maximum speed. (If you have any trouble refer to Troubleshooting Guide for further information.)

CAUTION! The engine gets very hot when running. DO NOT touch the engine after it stops. Allow the engine to cool before re-fueling or handling. Remove any fuel from the fuel tank when finished flying by running engine until it runs out of fuel.



TROUBLESHOOTING GUIDE

PLEASE DO NOT RETURN YOUR MODEL TO THE PLACE OF PURCHASE IF YOU HAVE ANY PROBLEMS. FIRST CALL THE COX® COURTESY LINE TOLL-FREE 800-451-0339 AND EXPLAIN YOUR PROBLEM. WE CAN HELP YOU SOLVE ANY PROBLEM YOU ENCOUNTER. THANK YOU.

- 1. The engine starts but only runs for a short burst, producing a powerful high-speed "BRAAAP!" sound, then quits.**

The probable reason is that the needle valve setting is too lean (the engine is not getting enough fuel). First, completely close (turn clockwise) the needle valve finger tight. Then open (turn counter clockwise) 4 full turns. Prime the engine and try again. If the problem persists, open the needle valve (counter-clockwise) another 1/4 - 1/2 turn, re-prime the engine and try again. Also, check to make sure you have filled the fuel tank and check the glow head for proper operation.
- 2. The engine starts but only runs for a short burst then quits, and a lot of excess fuel is coming from the exhaust port.**

Most likely the cause is similar to situation 1; an incorrectly set needle valve. However, this time the needle valve is set too rich, (the engine is getting too much fuel). In this case you want to 'lean' or turn the needle valve clockwise approximately 1/2 turn. DO NOT prime the engine. Since there is already too much fuel, adding more fuel will flood the engine. Connect your glow plug clip and attempt to start the engine again. This may require several attempts before the engine starts. If the problem continues, close the needle valve another 1/4 - 1/2 turn and try again. If this procedure fails to provide you with a successful start, disconnect the glow clip and then close the needle valve all the way until it just begins to tighten. Then open the needle valve 4 full turns and attempt to start. As before, do not prime the engine. If the engine still fails to start, check the glow head for proper operation.
- 3. The engine starts but will not run smoothly.**

Again, like the previous situations, the needle valve setting is probably incorrect. Continue to adjust the needle in (leaner) a little at a time (1/8 - 1/4 turn) or out until engine runs smoothly.
- 4. Bubbles appear under the glow head and the engine will not run smoothly.**

Check the tightness of the glow plug head using the head wrenches that have been provided. A loose glow head can lead to erratic engine performance.
- 5. If your engine will not fire or run at all, the probable reasons are:**

 - a) One or both of your "D" size alkaline batteries are weak or dead. Replace both with fresh batteries.
 - b) Bad connections of glow head clip wires to the battery terminals. Check to be sure glow clip is firmly and correctly attached to glow head. Reconnect wires to battery. Reattach glow plug clip.
 - c) The glow head has burned out. Replace with a new one.
 - d) Engine is not 'primed' or has lost 'prime'. Reprime engine.
 - e) Engine is 'flooded' (needle valve open too much). Go to #6.
 - f) Loose propeller. Remove propeller spinner and tighten propeller screw.
 - g) Out of fuel - refill fuel tank.
- 6. If your engine is flooded (too much fuel in cylinder).**

Indications of a 'flooded' engine is a hard-to-turn (or stiff) propeller or one that 'kicks' when winding clockwise to start. Fix by closing the needle valve completely and continue to start the engine (with glow head clip attached) until a short starting 'burst' occurs. Stop and open needle valve 4 turns, prime, and start again. Caution: Always disconnect glow head clip from glow head when priming engine.

PLEASE NOTE

Although these instructions were written for the "Surestart" engine that was included with the Cox "Comanche" helicopters, they apply equally to the engine that you have purchased from us.

The fuel tank that you will be using might differ from the one in the instructions and can be one attached to the engine itself or a separate tank mounted inside the aircraft. Either way, the filling instructions still apply.

Also, your engine will not have the depicted rotor blades and mounting wires.

If your engine is not equipped with a "choke tube", simply ignore any references to such.

If your engine is not equipped with a starter spring, simply start by hand using a "chicken stick" or similar item.