



Starting & Troubleshooting Guide For Your Cox Sure Start™.049 Engine

Needle Valve

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

Choke Tube

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

Backplate

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

Venturi

The fuel and air are mixed together in this tube.

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.

Crankcase

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

Glow Head

The glow head ignites the fuel/air mixture above the piston. Always use fresh 1.5 Volt batteries for proper engine starting. Never connect a battery that is more than 1.5 Volts to the glow plug.

Cylinder

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

Piston

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

Connecting Rod

Transfers the downward force of the piston to the crankshaft.

Exhaust Ports

Allow the burnt gases to exit the cylinder.

Crankshaft

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

Propeller Driver

Engages the propeller at the crankshaft.

Spring Starter™

'Snaps' the propeller around for easier engine starting. Never wind clockwise more than 1 full turn.

Snap Starter® Collar

Engages the Spring Starter™.

COX COURTESY LINE



TOLL FREE
(800) 451-0339

**AT YOUR SERVICE FOR
PERFORMANCE TIPS AND PARTS**

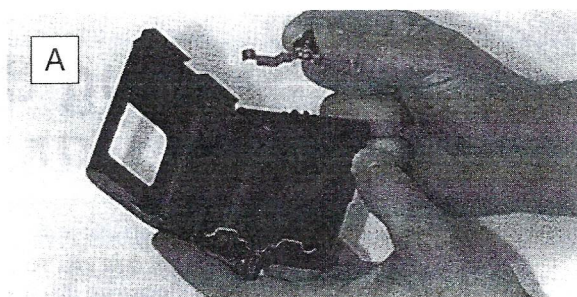
WARNING

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

1. Assemble the battery box

- A. Open the plastic battery case. Insert the metal contact strips into the slots and press them into place.

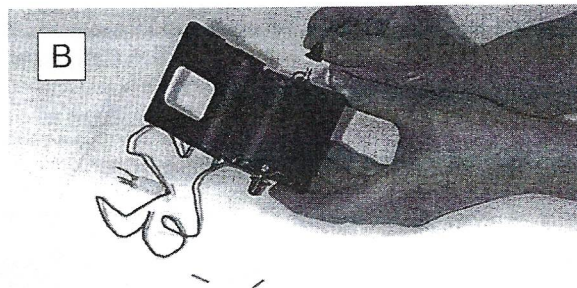
Unscrew the plastic terminal caps and set aside.



- B. Unroll the wire from around the glow head clip. Remove the 1/2" (1.3 cm) of insulation (which has been pre-cut for your convenience) 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.

Note: Never mix old and new batteries. Do not mix alkaline, standard and rechargeable batteries.



2. Attaching the fuel filler hose

- A. Locate the plastic filler hose. Remove the fuel can cap and push the filler hose over the small tube on the safety seal cap.



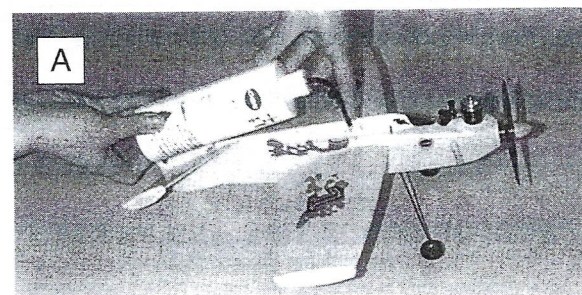
HOW TO START AND OPERATE YOUR NEW COX ENGINE

Note: Since your new COX engine is fresh from the factory, a brief "break-in" period is required. Like any new engine, a short amount of time spent running your engine on the ground will save you some frustration later. Please follow the instructions below for starting your engine, but allow the engine to run on the ground for at least three tankfuls of fuel. (Be sure to anchor your plane to prevent movement.) This will allow the engine to seat the moving parts and provide you with a more reliable operation when you are ready to fly.

1. Filling the fuel tank

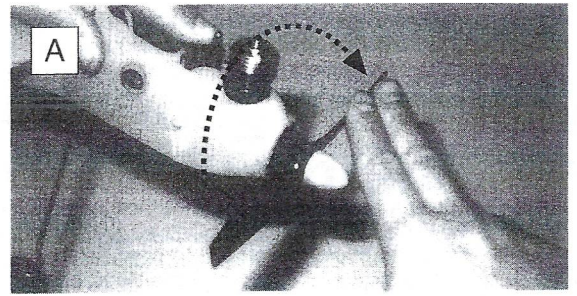
Close the needle valve by rotating it clockwise until it begins to tighten. **Caution:** Take care not to over tighten as you could ruin the needle valve assembly. Next, open the needle valve 4 turns (counter clockwise).

- A. Next, slip the plastic filler hose onto the fuel tank inlet tube and gently squeeze the fuel can to transfer fuel into the fuel tank. The engine's fuel tank is full when fuel starts to flow from the overflow vent. The location of the fuel tank inlet tube will vary from model to model.



2. "Priming" the engine for starting

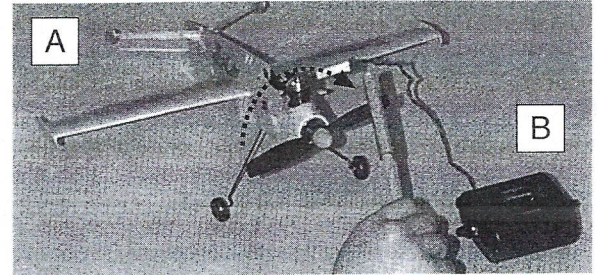
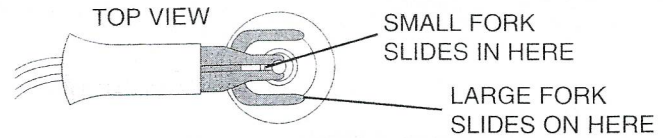
- A. Place finger over the top of the choke tube. Wind propeller clockwise 2 full revolutions, then quickly release propeller. Repeat procedure once more to draw fuel from tank to cylinder. The engine should now be ready to start.
- B. STOP! Your engine is now primed with fuel. Remove your finger from the choke tube.



3. To start the engine

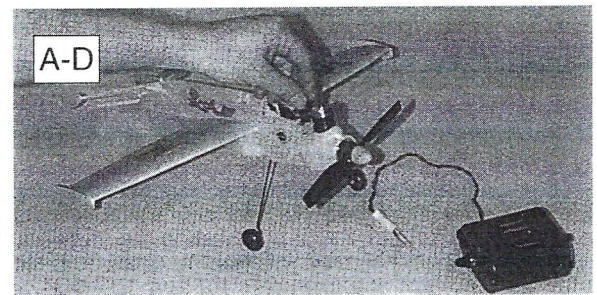
- A. Connect the glow head clip to the glow head. Note the correct location of the clip. **Make sure the glow clip wires are positioned away from the propeller as shown in picture B.**
- B. Use the starter stick to turn the propeller clockwise so that the notch on the propeller hub catches the hook of the starter spring. Complete **one full turn only**. To start, hold the top of the fuselage and release the propeller tip by quickly pulling starter stick outward and away from the propeller. The engine should start. If engine won't start after three tries, re-prime once and try again.

Note: If your engine should fail to start even after repeated attempts, review the trouble shooting portion of the instructions.



4. After the engine starts

- A. After the engine starts you should slowly close (turn clockwise) or "lean" the needle valve. You should be able to notice an increase in the noise of the engine. This is increasing the engine's RPM's. As you continue to close the needle valve the engine will reach a point where the RPM's begin to decrease. You should then open (turn counter clockwise) or richen the mixture until you hear the maximum RPM's again. At that point, your engine should run steadily. If not, adjust the needle valve a small amount in either direction until the engine runs smoothly.
- B. Disconnect the glow plug clip by pulling it straight away from the spinning propeller. Allow your engine to run out its full tank of fuel.
- C. Allow approximately 10 minutes for your engine to cool, refuel the tank and repeat the engine start procedure. Do not readjust the needle valve. Since you set the engine for maximum RPM's on the first run very little adjustment should be required on subsequent runs. Remember to run at least 3 tankfuls of fuel through your new engine.
- D. After you have run 3 tankfuls of fuel through your engine and set it for maximum RPM's, your Cox® engine should be ready to fly your model.



Troubleshooting engine starting problems

Please note: 2 cycle model engines are very simple in design and manufacture. It can be stated that if a 2 cycle model engine has air, fuel and spark (a good glow plug), it will run. However, if any one of these elements is missing or not in proper ratio (air and fuel), the engine can be difficult to start and keep running. Since the glow plug is initially ignited by the battery, checking the battery condition first can avoid some degree of difficulty with starting. Experience will show you how to set the correct air/fuel ratio, which is controlled by the needle valve. If the needle valve is adjusted incorrectly, the engine will not start, or if it starts, it may not run because the mixture is too rich or lean. So, making certain the needle valve is set correctly is critical to the starting and running of your Cox engine. Learning what the engine sounds like during any phase of starting or running your engine will become second nature with practice.

WHAT TO CHECK FOR:

Battery

The majority of .049 engine starting problems can be prevented by ensuring the freshness of your starting batteries. A simple test to determine if your batteries are providing the correct amount of energy is to remove the glow head from the engine (using the supplied head wrench). After removal of the glow head, attach it to the glow head clip and note the glow element located in the glow head. If the color of the coil is a bright orange, then your batteries and glow head are fine. If the color of the coil is a dull orange, then your batteries are probably too weak to ignite the fuel mixture. Replace the batteries with two fresh "D" size alkaline batteries and repeat the test. If the glow head does not change color with the addition of fresh batteries, you might try a new glow plug. Glow plug coils are made from rare earth metals and are quite brittle. This means that they sometimes fail due to excessive voltage or vibration.

All glow plugs eventually burn out or fail. When an engine seems nearly impossible to start, it can usually be traced to one of the two previously mentioned problems. **Note:** *Never use a battery that delivers more than 1.5 volts.*

Fuel

The next area to consider when your Cox engine fails to start is the type of fuel you are using. Cox engines run best on Cox fuel. Cox fuel is specially blended to provide the correct amount of lubricant and other ingredients to obtain the best possible performance from your engine. Use of other brands of fuel is not recommended and can cause some degree of difficulty in starting and running your Cox engine.

Caution: DO NOT disassemble your engine to determine what's "wrong" with it. You may lose some of the very small parts or you may forget how to reassemble the engine. Please use the following guide to answer or solve your engine starting problems. If your problems continue, then call the Cox Customer Service line at (800) 451-0339 for assistance.

Needle Settings

1. *The engine starts but only runs for a short time, producing a powerful high-pitched burst of power. Then it quits.*

The probable reason is the needle valve setting is not correct and the engine is not getting enough fuel. First, completely close (turn clockwise) the needle valve until it tightens. Do not over tighten. Then open (turn counter clockwise) a full 4 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. It is very easy to forget to refill the tank either for the first flight of the day or after an engine run.

2. *The engine starts but only runs for a short burst, making a "BRAAAP" sound and quits.*

Most likely the cause is similar to situation 1; an incorrectly set needle valve. However, this time the needle valve is set too rich, meaning there is too much fuel in the engine for the incoming air. In this case you want to close (turn clockwise) the needle valve approximately 1/2 turn. DO NOT prime the engine. Since there is already too much fuel, adding more 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, then we suggest that you disconnect the glow clip, close the needle valve all the way until it just begins to tighten. Try again by opening the needle valve 4 full turns and attempt to start. As before, do not prime the engine. And, just to be sure, check the tightness of the glow plug head using a head wrench. A loose glow head can also lead to erratic engine performance.

3. *The engine starts but will not run smoothly.*

Again, like the previous situations, the needle valve setting is probably incorrect, leading to an incorrect air/fuel mixture ratio. Close the needle valve 1/2 turn and try again. DO NOT prime the engine.

4. *Bubbles appear under the glow head and the engine will not run smoothly.*

Check the tightness of the glow plug head using a head wrench. 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:*

- One or both of your "D" size alkaline batteries are weak or dead. Replace both with fresh batteries.
- You are using the wrong kind of fuel. Empty the fuel tank and refill with Cox Super Power Fuel.
- The glow head has burned out. Replace with a new one.

- The top of the glow head or the glow clip have become dirty. Clean the glow head and glow head clip with a clean, dry cloth.
- The engine backplate has become loose. Remove the engine from the model and carefully re-tighten the four backplate screws. DO NOT disassemble the engine. Mount the engine again and attempt to start.

SAFETY PRECAUTIONS

FIRE AND FUEL SAFETY



DANGER - POISON
VAPOR HARMFUL - FLAMMABLE - EYE IRRITANT -
MAY BE FATAL OR CAUSE BLINDNESS IF SWALLOWED



Contains Methanol and Nitro Methane. Cannot be made non-poisonous. Avoid contact with eyes. Use only in a well-ventilated area. Keep away from heat and open flame. Do not store in open or unlabeled container. Do not throw empty can in fire.

FIRST AID: In case of contact with eyes flush eyes thoroughly for 15 minutes with warm water. If swallowed, induce vomiting. Call physician immediately.

KEEP FROM SMALL CHILDREN - USE WITH ADULT SUPERVISION

- NEVER USE GASOLINE!** Use only Cox model fuel. Gasoline can explode and burn, causing injury to YOU AND OTHERS and will not work with your Cox model.
- Cox model fuel works only because it is **FLAMMABLE** - it burns with an almost invisible flame. It can burn you if not used with common sense - be careful and follow these rules.
 - ☐ WIPE EXCESS FUEL FROM MODEL WITH CLOTH AFTER FUELING OR PRIMING.
 - ☐ KEEP FUEL AWAY FROM OPEN FLAME.
 - ☐ DO NOT OPERATE ENGINE INDOORS.
 - ☐ DO NOT SMOKE WHEN FUELING OR OPERATING MODEL.
 - ☐ NEVER USE COX FUEL CAN TO STORE OTHER CHEMICALS OR FUELS.
 - ☐ DO NOT THROW EMPTY CAN IN FIRE.
- IF AN ACCIDENTAL FIRE DOES OCCUR** - Flame can be put out with a fire extinguisher or it can be smothered by covering with a heavy, clean cloth. Do not use a cloth with fuel on it. If fire continues, Get AWAY!
- FUEL ONLY WITH SAFETY SPOUT IN CAN.** Never use a syringe or other device. Never remove safety spout from can.
- FUEL IS AN EYE IRRITANT.** Fuel only in a well ventilated outdoor area. Keep face away from model when fueling.
- FUEL IS POISON AND CAN CAUSE DEATH OR BLINDNESS. NEVER DRINK IT.** If swallowed, induce vomiting and call a physician immediately.
- NEVER PLAY WITH FUEL. USE IT ONLY FOR YOUR MODEL'S ENGINE.**
- NEVER LEAVE CAP OFF FUEL CAN WHEN NOT IN USE.**
- DISPOSE OF EMPTY CAN IN ACCORDANCE WITH LOCAL REGULATIONS AND LAWS.**

PROPELLER SAFETY

- DO NOT ALTER, MODIFY OR CUSTOMIZE YOUR PROPELLER. DISCARD WORN OR DAMAGED PROPELLERS.
- Powered spinning propellers can inflict injury to you and others, if handled carelessly. A propeller which has been damaged with nicks, chips or cracks, or a propeller which has been altered in any way can break apart during operation of the engine and cause serious injury to you and others.
- KEEP YOUR FACE, FINGERS, CLOTHING AND ALL OTHER OBJECTS AWAY FROM SPINNING PROPELLER.
- INSPECT PROPELLER BEFORE EACH USE.
- USE ONLY PROPELLERS APPROVED FOR USE WITH YOUR ENGINE.
- DISCARD AND REPLACE NICKED, CHIPPED, CRACKED OR ALTERED PROPELLERS.
- Each propeller sold by Cox is carefully engineered and tested for maximum reliable performance for only the plane and engine for which it was designed. If a propeller is altered or damaged in the slightest degree, its aerodynamics and balance are jeopardized and you have created a serious risk of the propeller flying apart and causing injury to you and others.
- PLAY IT SAFE - replace propeller if you suspect any damage.
- Check and tighten the propeller before each run. A loose propeller will cause loss of power and poor flight performance, as well as possible injury to you.
- NEVER WIND THE SNAP STARTER MORE THAN ONE TURN AFTER IT ENGAGES.**
- RELEASE THE PROPELLER AND PULL YOUR HAND BACK AWAY FROM THE PROPELLER QUICKLY TO AVOID INJURY.**

FLYING SAFETY

- ☐ Have all spectators stand clear when engine is running.
- ☐ Do not touch engine immediately after running; the hot engine can burn your fingers.
- ☐ DO NOT fly models in wind over 10 MPH.
- ☐ Fly models in an open area. Never fly models near power lines or trees.
- ☐ If model lands with the engine running, DO NOT pick up until the engine has stopped!