

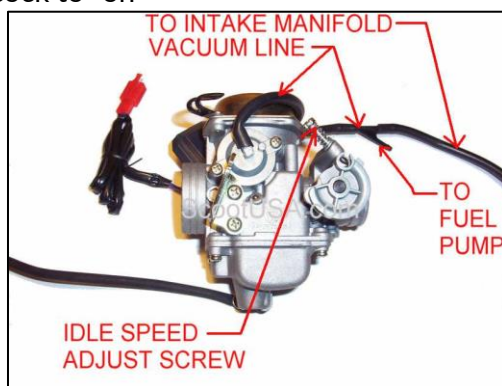
Engine Start-Up Guide

This guide is intended to provide a tutorial for getting the Internal Combustion Engine (ICE) operational for testing. It includes safety advice and step-by-step instructions for starting up the ICE.

- 1) Drain old gas (make sure you are in a well-ventilated area, i.e. outside)
 - a) On the side of the gas tank should be a hose that connects from the petcock to the carburetor.
 - i) On our engine, the petcock is the small red shut off valve on the blue fuel line, it looks like this



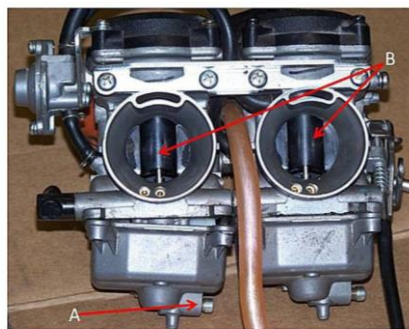
- ii) Make sure the petcock is turned to “off” before starting the next step
 - b) Disconnect fuel line (blue hose) from the carburetor and let it drain into a fuel waste container
 - i) Disconnect the hose from where it is connected to the carburetor, there may be some gas in there that needs to drain out
 - l) Make sure while you are completing this step you have a catch basin to prevent any spillage on the engine or work bench
 - c) Remove the gas tank and drain it completely into fuel waste container
 - i) Place hose so the end is inside the gas waste container and turn the petcock to “on”



- ii) If possible, a much more thorough way to do this would be to remove the gas tank from the setup and drain it either through the petcock holes or the gas cap
 - I) This will ensure that all fuel is removed completely from the tank
- 2) Do a thorough clean of the carburetor
 - a) It is recommended to completely remove the carburetor from the engine to empty out the old fuel, but this step isn't totally necessary
 - b) To clean out the carburetor without removing it...
 - i) First Option: Remove the bowls at the bottom of the carburetor
 - I) Once the bowls are removed, spray some carburetor cleaner up inside, wait a few minutes, and spray again to ensure coverage
 - II) Spray can be purchased at an auto parts store (*Gumout 800002231 Carb and Choke Cleaner* should work)



- III) Replace the bowls to see how the engine runs
- ii) Second Option: Remove air intake filters so the butterfly valves are visible and you have a better view of the carburetor
 - I) Take bowls off at the bottom of the carburetor, it will look like this:

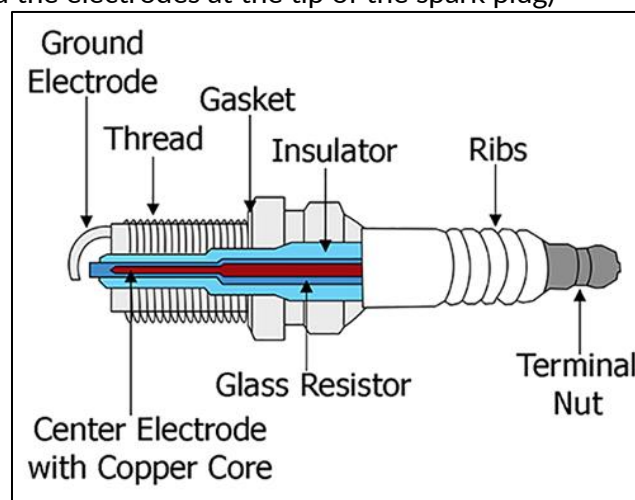


- II) There are usually screws around the side of the bowl that need to be taken off in order for the bowl to detach.
- III) When the bowl is off, you can spray the carburetor cleaner up inside to let any dirt and grime become loose
- 3) Check the spark plug
 - a) Pull the spark plug cable cap gently off the spark plug, by hand
 - i) Spark plug cable cap:



- ii) Unscrew the spark plug from the cylinder head, using a spark plug socket and socket wrench

- b) Inspect the condition of the spark plug insulator (the ceramic portion of the spark plug and the electrodes at the tip of the spark plug)



- i) Look specifically for cracks in the face of the insulator and the insulator tip near the electrodes, as well as bent or melted electrodes.
 - l) If any damage is found, replace spark plug
 - ii) The insulator should have a light tan color, which indicates that the engine fuel systems are operating properly
 - iii) If the insulator looks wet and has a dark-brown color, this indicates that the spark plug is not firing (i.e. too much fuel is being added into the cylinder's combustion chamber)
 - iv) If the insulator is an ashy white color, more air than fuel is being added into the combustion chamber, which can cause the cylinder to overheat
- c) Place the spark plug into the spark plug cable cap. Hold the spark by the cable cap and press the electrodes gently against the engine cylinder head
 - i) If the spark plug is undamaged, you should be able to see a spark appear between the electrode and the cylinder head when you start the engine

- ii) If there is no spark when the engine is started, the ignition coil may be causing the problem

Sources:

<https://motorcyclehabit.com/how-to-clean-a-motorcycle-carburetor-without-removing-it/>

<https://motorcyclehabit.com/how-to-drain-bad-gas-from-a-motorcycle/>

<https://itstillruns.com/test-spark-motorcycle-spark-plug-8773614.html>