

BIODIESEL GENERATOR

Standard Operating Procedure

Procedure: Biodiesel Generator

Department: BEI

Building/ Room Number: Biorenewables Education Laboratory (BRL) 1115

Supervisor: Jacquelyn Baughman

Procedure Overview: The biodiesel generator is a diesel engine with an electric AC/DC generator. It has been modified with a Teflon plug and tygon piping. This allows the use of biodiesel and diesel to be switched when needed. Biodiesel must be loaded into the separatory funnel and NOT in the tank holding diesel.

Health and safety information for materials used:

- Should be run outside in an open area.
- If motor is ran in a building, a high rate of air exchange should be present or a high powered vacuum that will ventilate out what the motor produces.
- **It is not allowed to be run in Biorenewables Laboratory.**

Hazard Control Measures:

- safety glasses
- lab coat
- latex or nitrile gloves for handling biodiesel

Waste Disposal Procedures: The processor does not produce waste that needs handling; if any of the biodiesel needs to be disposed of it should be done so properly in amber glass bottles located in room 1115. All should be done according to EH&S procedures and labeled properly

Decontamination Procedures: Contact with biodiesel and oil; a thorough wash of the hands with soap and water should be sufficient.

Spill containment and clean up procedures: If biodiesel is spilled; Absorbent is available by the BioBus processor. Spread absorbent on the spill and dispose of the material in the trash.

Using substances requiring special procedures? No

Written By: Adrian Ramirez

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Revised By: Gabriel Domingues & Matt Schul

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Detailed procedures, instrument operation and maintenance, emergency contact information and a list of those trained for this procedure are attached.

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Equipment Description

The DuroPower® Diesel Generator is used to run samples of biodiesel done by students in the lab. Generally, the generator is used for demonstrations with four groups.

Pre-Run Checklist

- 1) Load the biodiesel into the separatory funnel setup vertically on the generator.

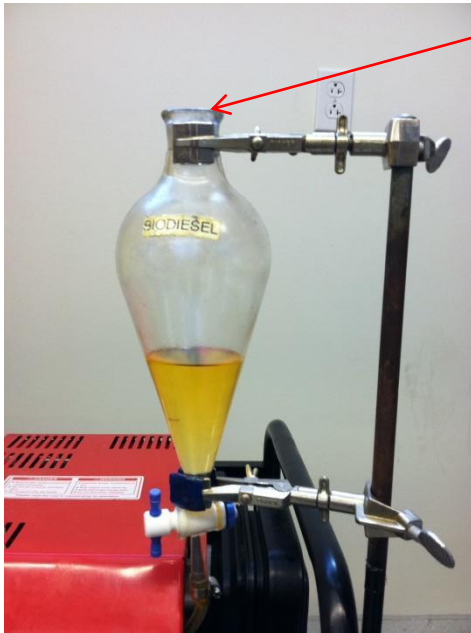


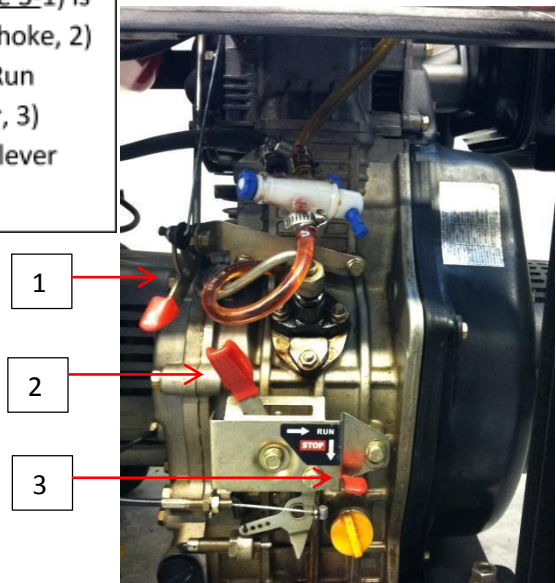
Figure 1- Separatory funnel
Pour biodiesel into this opening.

- 2) Open the door (Fig. 2) the door containing the pull chord and choke/run/stop levers (Fig. 3).

Figure 2- Press button identified by the arrow. Lift and pull lever to open the door.



Figure 3-1) is the choke, 2) The Run Lever, 3) Stop lever



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- 3) Check the tapered Teflon valve: It should already be in the position to receive diesel for start-up, if not turn to make sure the holes line up to the left (diesel) line.



Figure 4



Figure 5

Figure 4 and 5-Make sure the diesel line is lined up with the hole. If not, like the picture in the right the engine will not have fuel pumped.

4. Make sure the electric circuit breaker, that powers the electric generator is off (down). Otherwise, the jump in electricity could break any electrical appliance connected to the generator.

Generator Set-up

The generator must be setup outside. An appropriate place to run the engine is the west sidewalk just outside the BRL. MAKE SURE THE CIRCUIT BREAKER IS TURNED OFF (ENABLES THE ELECTRIC ENGINE)

Engine Start-up and Shutdown

Startup: Now it is time for starting. Lines should be checked to make sure diesel is running once again. You must prime the engine once by holding the choke lever. Next, push the run lever from the left position to the right. It is now time to turn the key to start the generator (Shown in Figure 6), when the engine starts to turn, release the choke lever, and the engine will start. After succeeding with starting the engine you should let it warm up for a minute before switching to biodiesel. Then turn the Teflon two way valve to receive fuel from the biodiesel line (180 degrees from previous position). You will notice the engine might not run as smooth in the transition but will not produce black smoke.

Figure 6:
Starter Key.



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Shutdown: To shutdown you must first switch back the two way valve to diesel fuel for 2 minutes to clean out the biodiesel from the engine (lines, injector and diesel pump) because it is not fuel grade biodiesel). After letting that run for a bit it is not good to shut down. This is done by pressing the stop lever down and holding the choke lever down as well. This will bring the generator to a halt.

Powering Electronics

The generator has to produce electricity and power electronics. To use this you must flip the circuit breaker into the up position to turn on the electricity (Figure 7). You can then plug the chord in the desired slot to use the produced power. ALWAYS MAKE SURE TO TURN THE CIRCUIT BREAKER FIRST THEN TURN OFF THE DIESEL ENGINE!

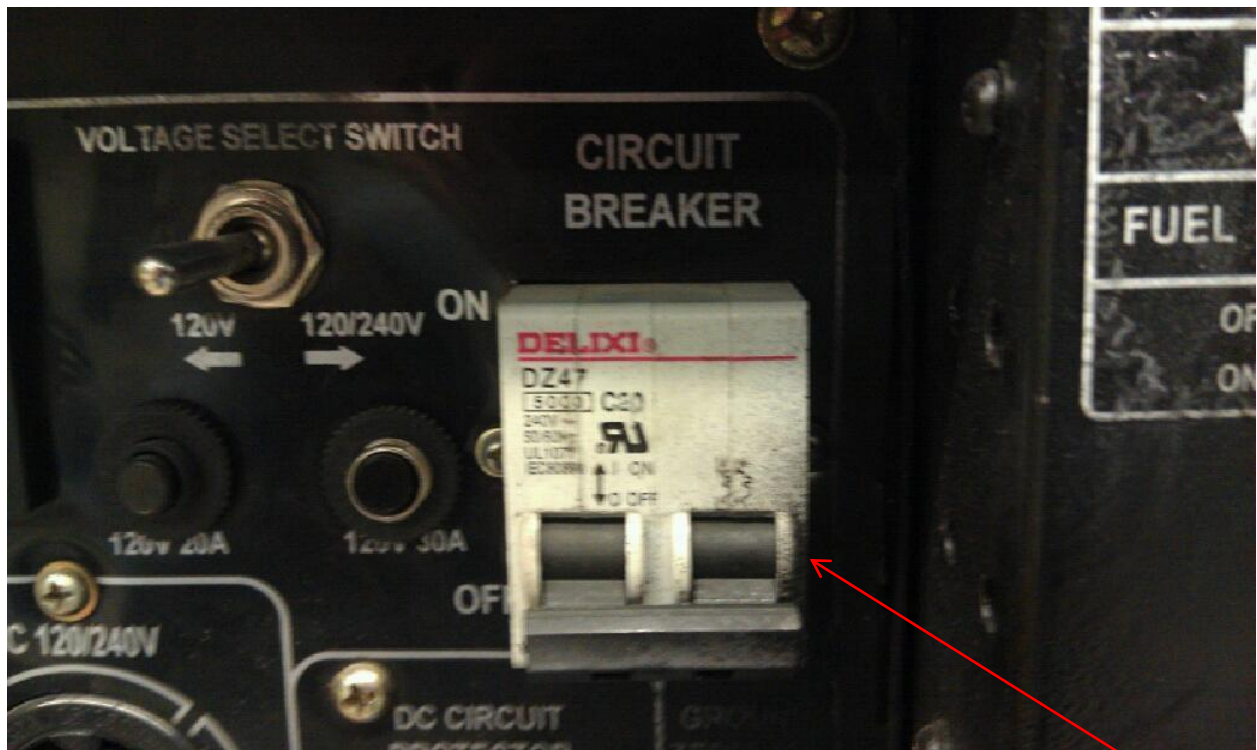


Figure 7

Emergency Contacts

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Approved Trainers:

Adrian Ramirez, Zach Bartlett

Training Sign-Off

<u>Trainee</u>	<u>Date</u>	<u>Trainer</u>
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