Death Ray User Manual

OSU Capstone 2022-23

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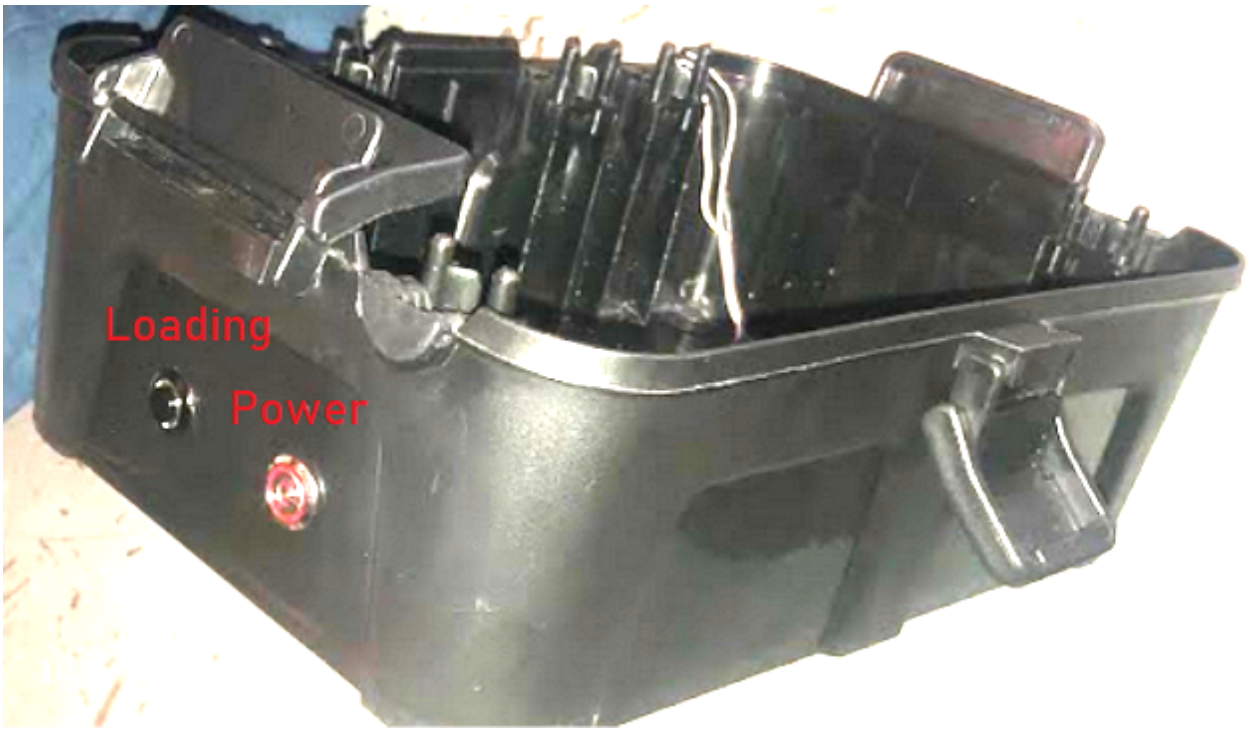
Operation Instructions:

Powering on:

1) Turn on the power button
2) Wait up to 5 minutes for the gps to find a satellite
3) The dish will then move three seconds away from the homing position, then home itself
4) Once homed, the dish will then pan to face the sun
5) The dish will then tilt to face the sun (during the winter the sun will be too low for tilt)

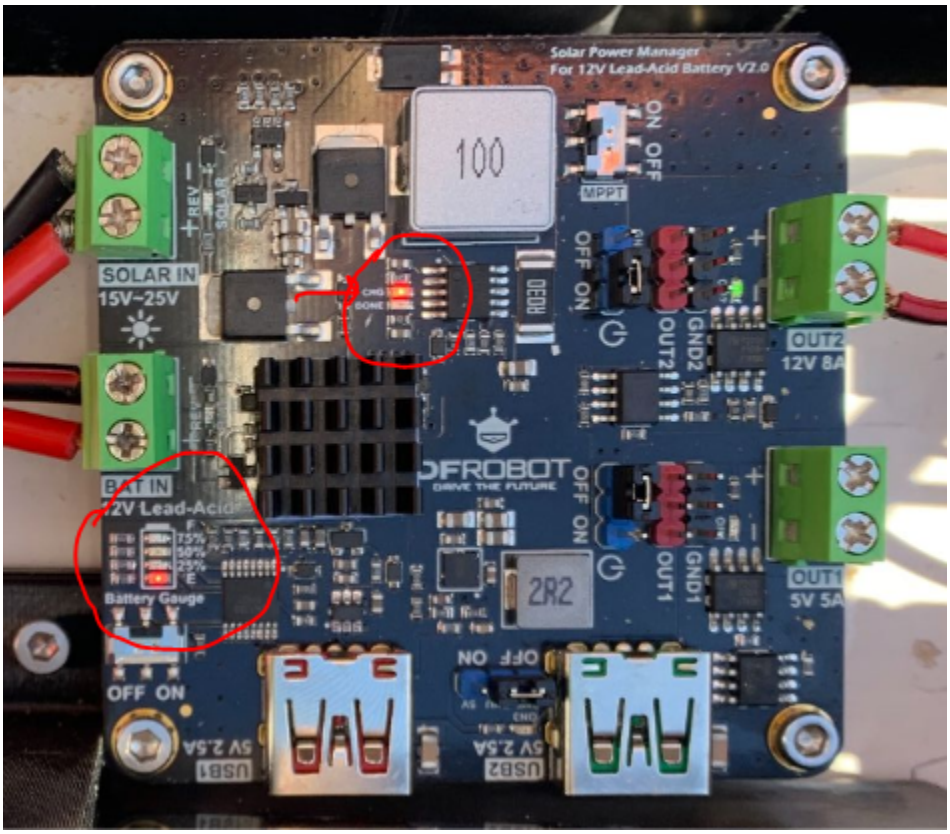
To load the keg:

1) After the system is powered on and pointing at the sun press the black loading button
2) The dish will raise and turn to the loading position
3) After the keg is loaded press the loading button again and the dish will return to the sun



Troubleshooting Potential Issues:

(This section is primarily for future capstone groups):

- *Power button does not light up*:
    - Battery may be dead, leave system powered off with the solar panel facing the sun
    - If the system still does not power on after 2h of sunlight open the electronics enclosure to look for the charging light(top) and battery capacity(bottom left)
    - 

    - Ensure All cables visible in the above photo are in their ports
    - If it still doesn't charge, solar module may need to be replaced
- *Chain skipping*
    - The four bolts on the bottom of the pan motor enclosure can be loosened in order for the chain to be pulled taut. Tighten these screws while the motor is being pulled back to ensure the chain is in tension. Prior to tightening bolts make sure tension is equal on both sides of the chain.

- Chain may stretch over time. This part of the system was from a prior capstone group and no engineering calculations or information was available regarding the strength of the chain. This chain may be insufficient for extended use which could call for replacement.
- Check integrity of spur gears- these teeth may be unsuitable for the required loads over time.
- To remove the chain find the removable linkage:
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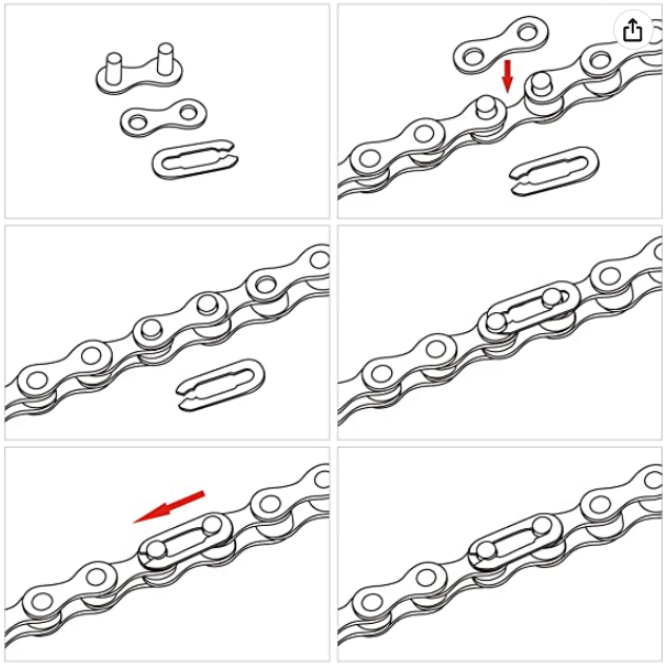
- The following steps indicate how this component can be installed and removed:
- 

- *Not pointing directly at the sun*
  - This capstone project's final term took place during the winter and as such was not able to be tested for all times of the year. If the dish does not point

directly at the sun then tolerances in the code may need to be changed. The code will be on the github, and attached to this handoff documentation.

- *Limit switch not functioning:*
    - Testing was performed to ensure the limit switch would be robust, however long cycle life testing was not conducted, and the weather resistance of the system- while verified as water resistant in the short term- may be insufficient over extended periods of time.
    - To check this system unscrew the bolts holding the switch in place. The limit switch housing consists of six components: the button, two springs, the outer housing, the inner housing, and the switch itself. Remove the inner housing from the outer housing- taking care not to lose the springs- and inspect that the limit switch is still held firmly in place by the housing. Also check that the soldering on the switch remains intact. If these components are damaged they will need to be replaced.

For all other issues an overall bill of materials, wiring diagram, and CAD package will be passed down to provide all information about the system. This information is also available at the following github link:

https://github.com/eawade7/Death_Ray_OSU_Capstone