

# High Current Shut Down/Power Cycle Instructions

Version 2.0

# Overview

These instructions outline a safe shutdown and restart of the LCR electrical subsystems.

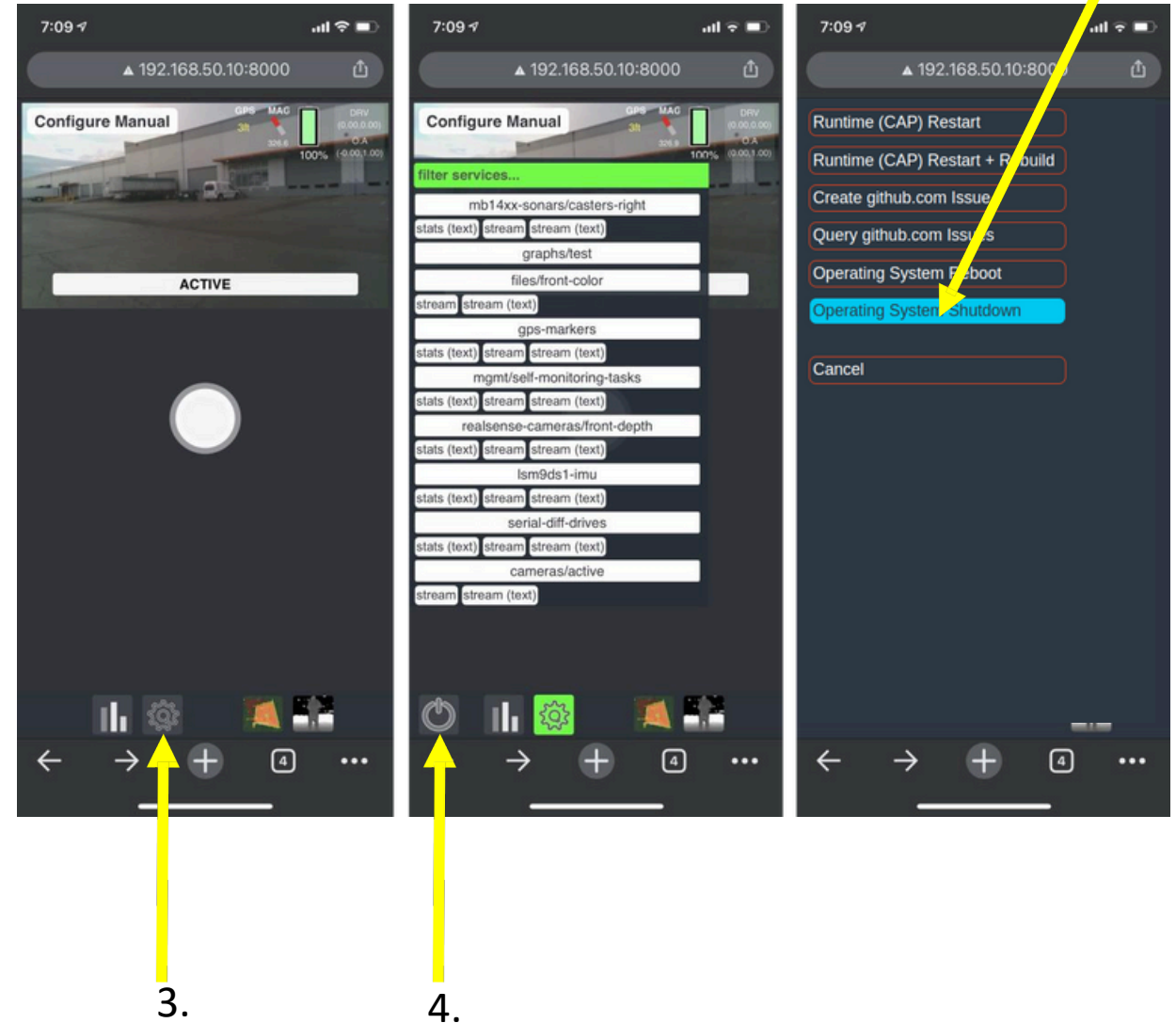
**Issue:** Need to power down for repairs or fully powercycle the electrical systems.

**PPE:** Wear eye protection and non conductive gloves

**Tools:** None Required

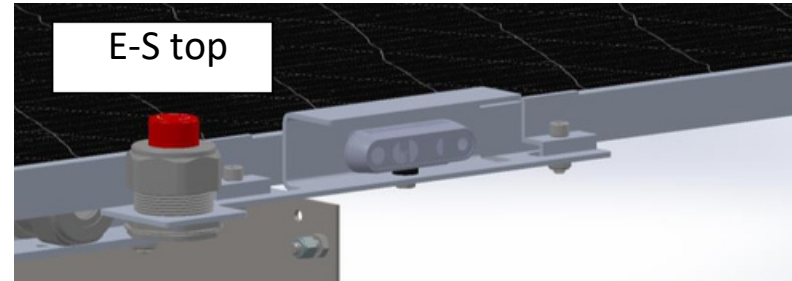
# Power Down CPU

1. Connect to robot Wifi
2. Bring up Manual Control UI
3. Touch Gear Icon (lower left corner)
4. Press Power Icon (lower left corner)
5. Click “Operating System Shutdown” three times. The button will turn from grey, to yellow, to red. Once red, shutdown is issued



# Engage Safety Shutoffs

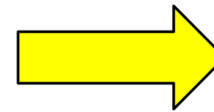
1. Engage e-stop button



2. Turn motor drive shutoff to "off"/vertical position.



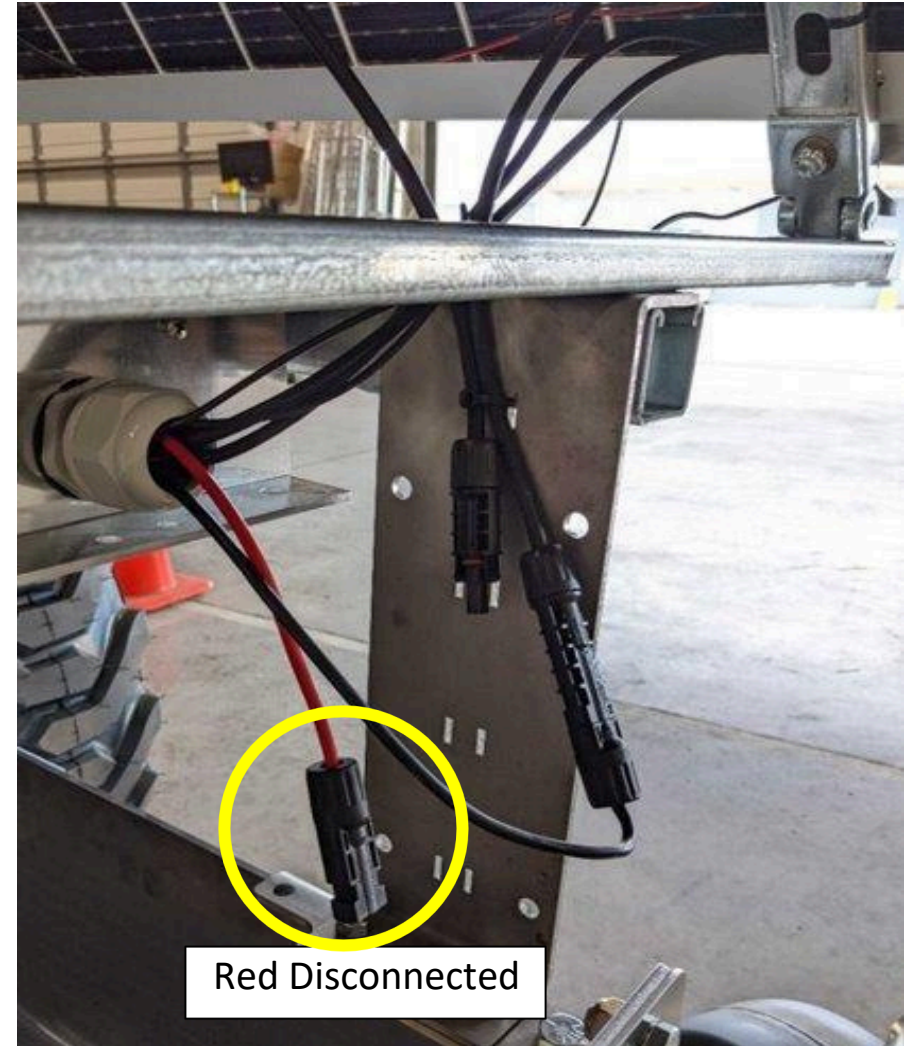
On position



Off position

# Disconnect Solar Input from LCR

1. Unplug the red MC4 connector from the solar panel



# Unplug AC Charging Cable

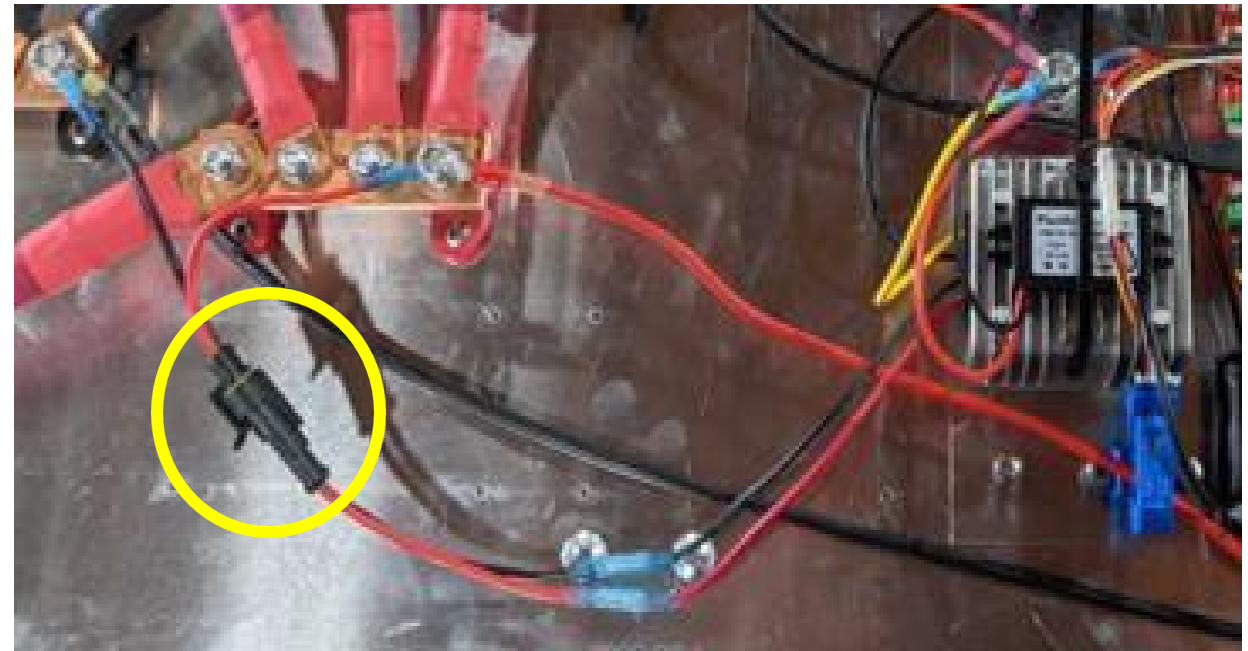
1. If the robot is charging, disconnect AC cable from plug on the side of robot frame





# Power Down Low-Current Electronics

1. Lift and prop up solar panel (if rigid panel) or unscrew 4 panel fasteners and lift panel off tray (if flex panel)
2. Remove clear polycarbonate electronics tray cover
3. Power down low-current electronics by unplugging the busbar connection plug shown to the right
4. The lights on the Pi board should turn off



# Remove Main Battery Terminal

1. Unplug the largest Anderson connector (green, grey, or blue) that connects to the batteries.
2. If there is a zip tie retaining it to a white support piece, preventing removal, cut zip tie

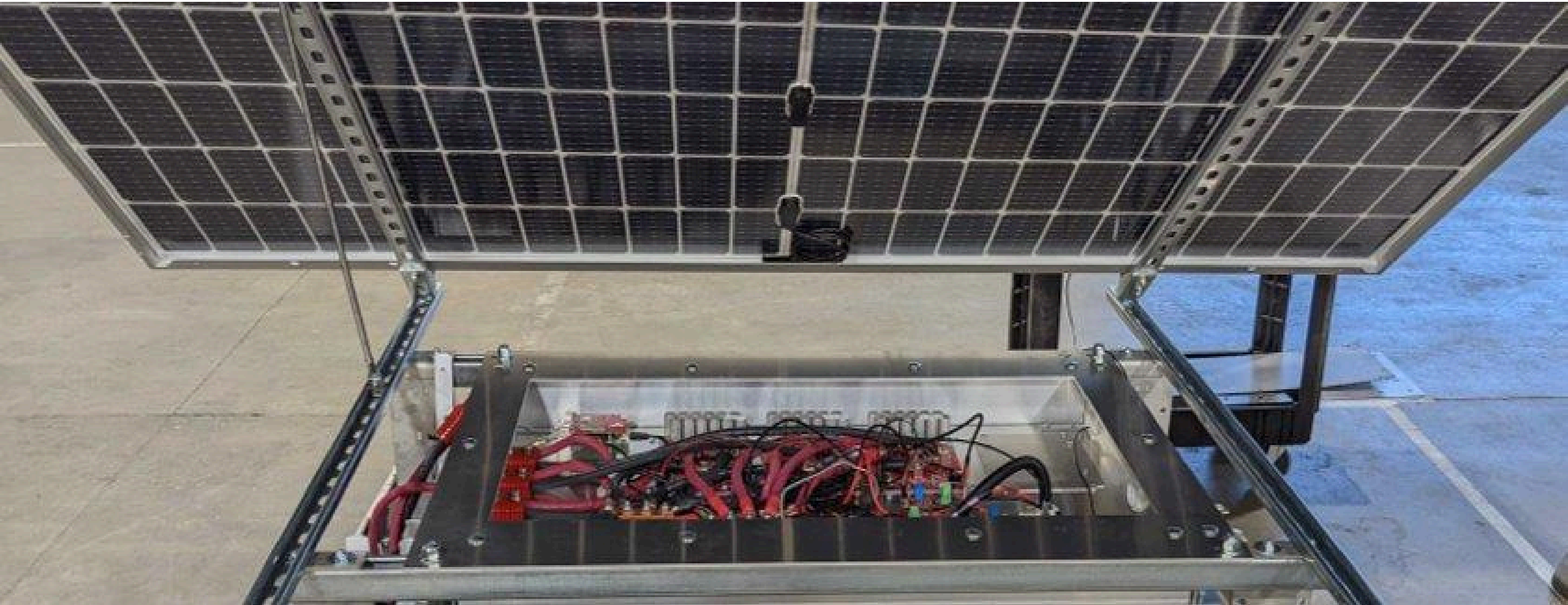




# Wait for all lights in the tray to turn off

1. With the main battery connector, AC, and solar connectors removed, all lights inside the electronics tray will turn off after about 1 minute

# Safe to Perform Electronics Tray Maintenance



# Check for Loose Wiring/Connections

If maintenance was done on the tray do the following before powering up,

1. Ensure no loose wiring (e.g., unplugged antennas, USB cables, screw
2. terminal wires)

Ensure all locknuts on busbars and motor controllers are tight

3. Ensure there are no tools resting on the top surface of the robot or  
anywhere in the tray

# Restore power (reverse steps)

1. Plug in main battery Anderson connector
2. Power-up low-current electronics
  1. Plug in black busbar connector
3. Plug in AC charging cable (if applicable)
4. Connect to solar
5.
  1. Connect red MC4 connector
6. Release e-stop and turn motor shutoff switch to "on"/horizontal.

Wait for software to restart and WiFi SSID to become visible. Approximately 2 minutes before robot UI is available.
7. Connect to the robot, enable drive motors and verify it can drive

# Low Current 12V Shut Down/Power Cycle Instructions

Version 1.0

# Overview

These instructions outline a safe shutdown and restart of the LCR low current 12V electrical subsystem.

**Issue:** Need to power down for repairs or fully powercycle the 5V electrical systems.

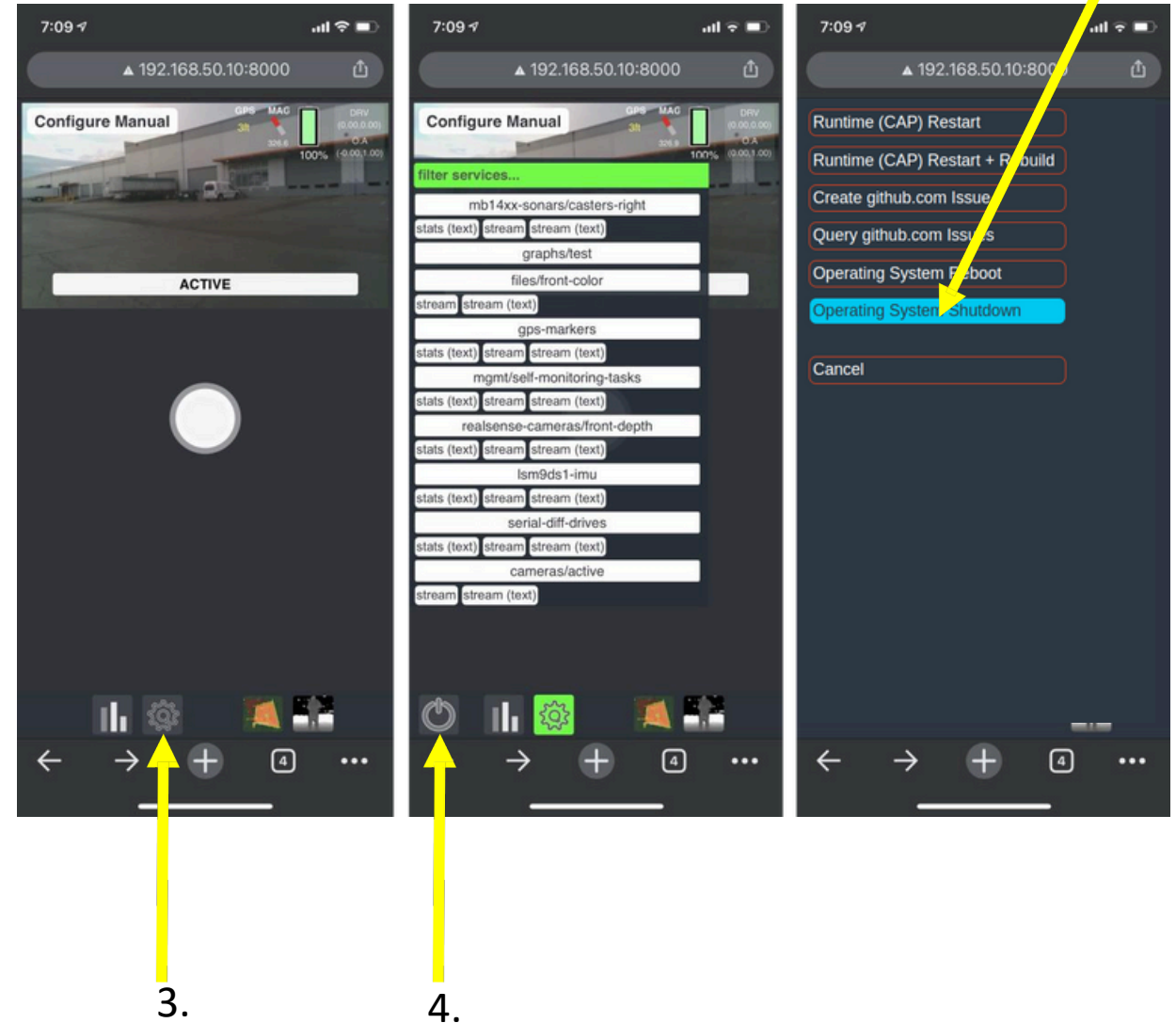
**PPE:** Wear eye protection and non conductive gloves

**Tools:** None Required



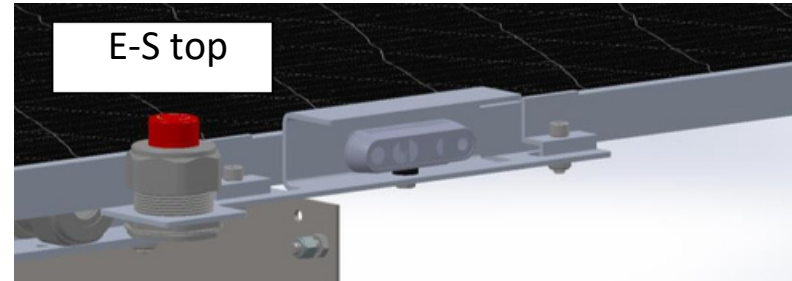
# Power Down CPU

1. Connect to robot Wifi
2. Bring up Manual Control UI
3. Touch Gear Icon (lower left corner)
4. Press Power Icon (lower left corner)
5. Click “Operating System Shutdown” three times. The button will turn from grey, to yellow, to red. Once red, shutdown is issued



# Engage Safety Shutoffs

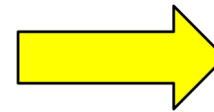
1. Engage e-stop button



2. Turn motor drive shutoff to "off"/vertical position.



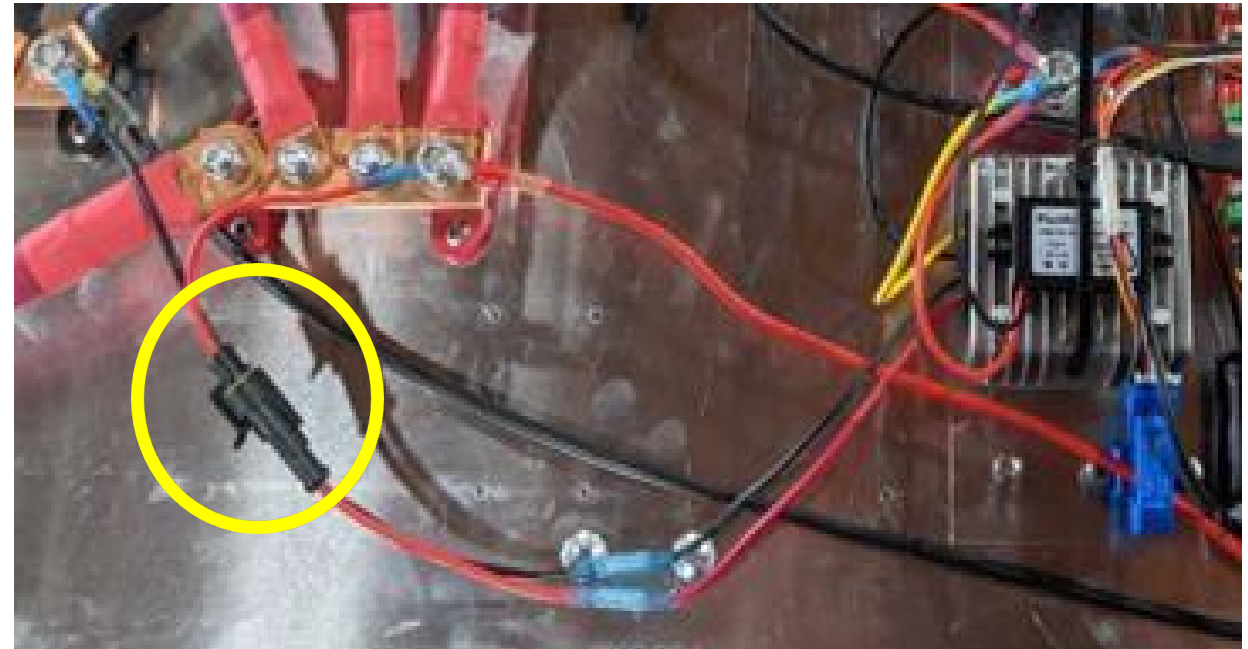
On position



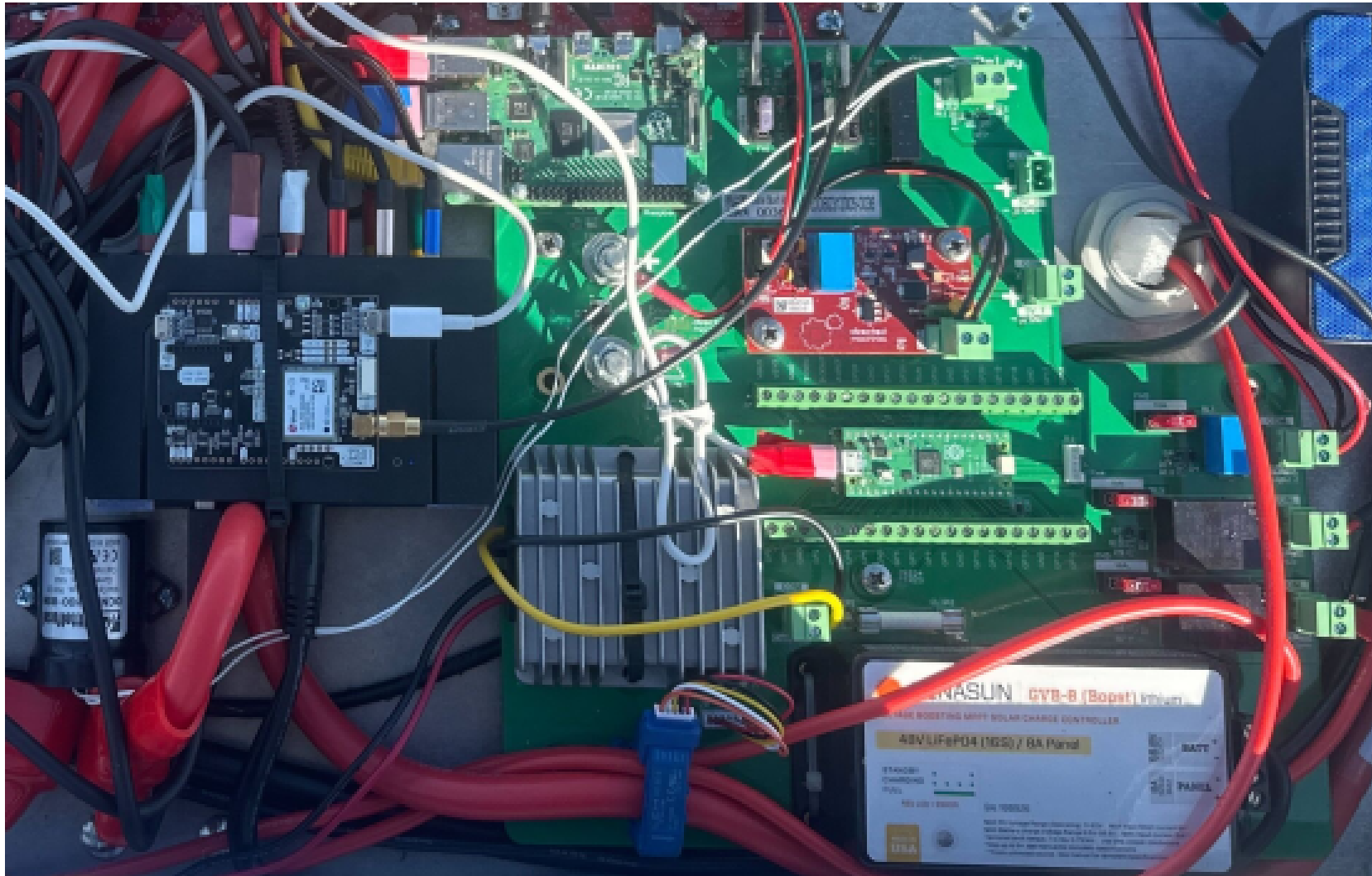
Off position

# Power Down 12V Low-Current Electronics

1. Lift and prop up solar panel (if rigid panel) or unscrew 4 panel fasteners and lift panel off tray (if flex panel)
2. Remove clear polycarbonate electronics tray cover
3. Power down 12V low-current electronics by unplugging the busbar-12V connection plug shown to the right
4. The lights on the Pi board should turn off



# Safe to Perform 12V Electronics Maintenance



# Restore power (reverse steps)

1. Plug in the busbar-12V connection plug
2. Release e-stop and turn motor shutoff switch to “on”/horizontal
3. Wait for software to restart and WiFi SSID to become visible.  
Approximately 2 minutes before robot UI is available.
4. Connect to the robot, enable drive motors, and verify it can drive

# Low Current 5V Shut Down/Power Cycle Instructions

Version 1.0



# Overview

These instructions outline a safe shutdown and restart of the LCR low current 5V electrical subsystem.

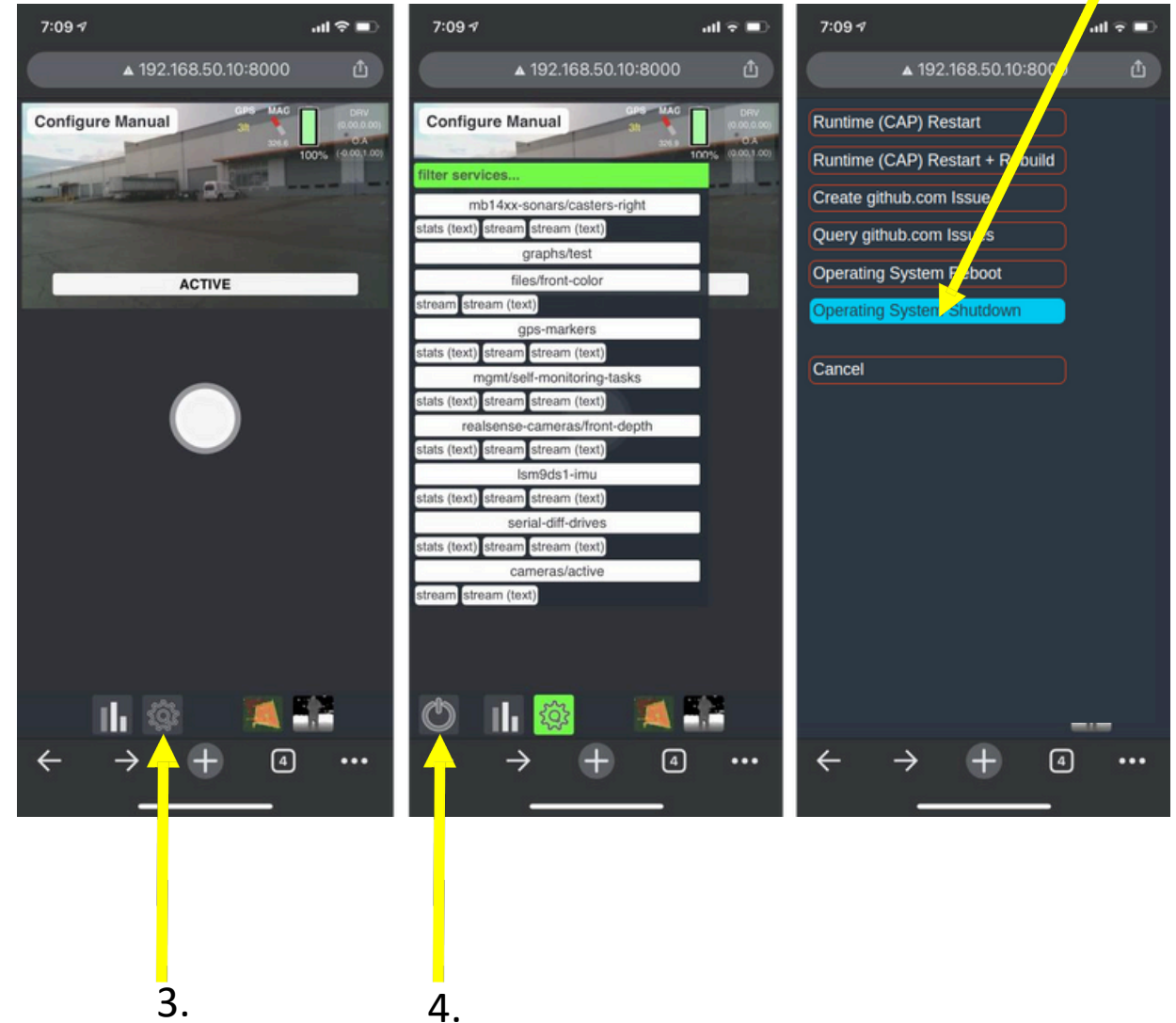
**Issue:** Need to power down for repairs or fully powercycle the 5V electrical systems.

**PPE:** Wear eye protection and non conductive gloves

**Tools:** None Required

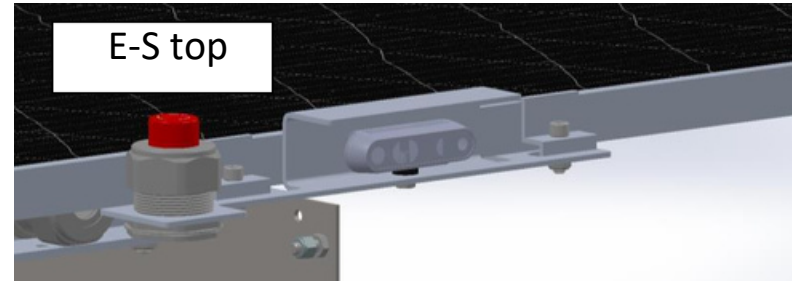
# Power Down CPU

1. Connect to robot Wifi
2. Bring up Manual Control UI
3. Touch Gear Icon (lower left corner)
4. Press Power Icon (lower left corner)
5. Click “Operating System Shutdown” three times. The button will turn from grey, to yellow, to red. Once red, shutdown is issued



# Engage Safety Shutoffs

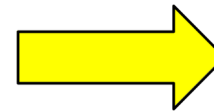
1. Engage e-stop button



2. Turn motor drive shutoff to "off"/vertical position.



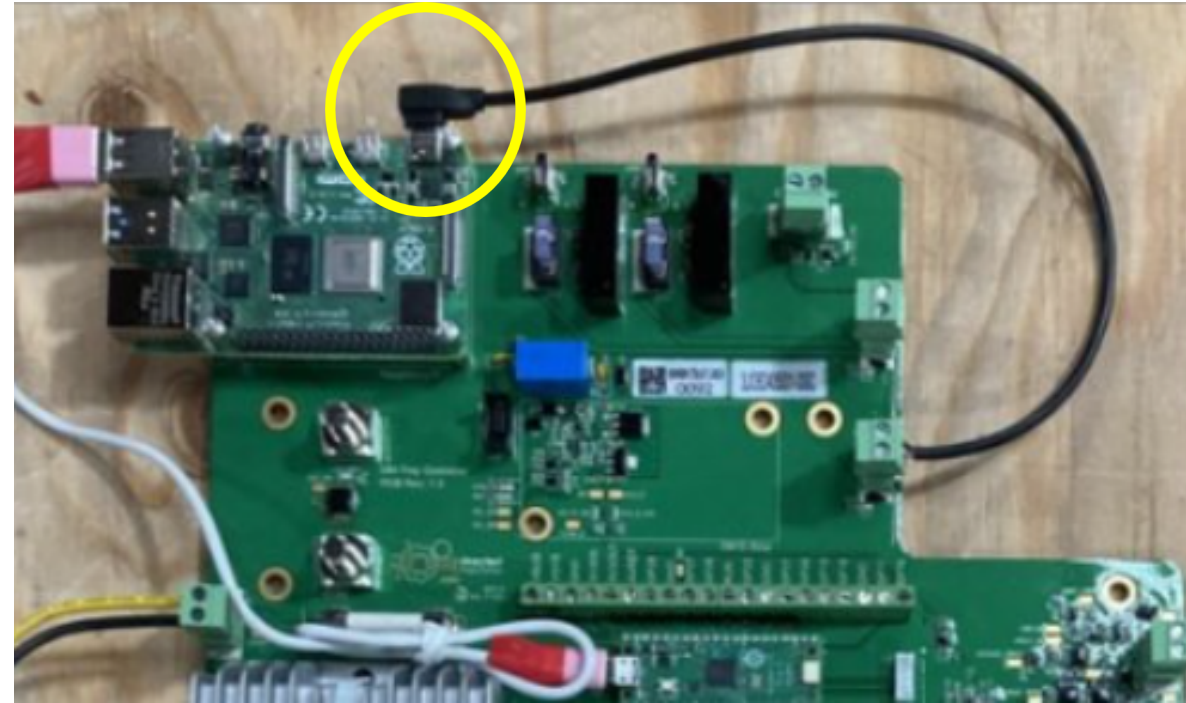
On position



Off position

# Power Down 5V Low-Current Electronics

1. Lift and prop up solar panel (if rigid panel) or unscrew 4 panel fasteners and lift panel off tray (if flex panel)
2. Remove clear polycarbonate electronics tray cover
3. Power down 5V low-current electronics by unplugging Raspberry Pi USB C power cable
4. The lights on the Pi board should turn off



# Safe to Perform 5V Electronics Maintenance



# Restore power (reverse steps)

1. Plug in the Raspberry Pi USB C power cable
2. Release e-stop and turn motor shutoff switch to “on”/horizontal
3. Wait for software to restart and WiFi SSID to become visible.  
Approximately 2 minutes before robot UI is available.
4. Connect to the robot, enable drive motors, and verify it can drive