User Manual

Remotely Accessible Portable Solar

Charging Evaluation System

Table of Contents

1. Quick Start Guide

Turning on the system
1) After the assembly is complete, first, turn on the Arduino by turning the red knob in the "on" position.
2) Check to see that the touchscreen is powered on. If not, then turn off and turn on the Arduino switch again.
3) After 15 seconds, push the black H-Bridge button: a green light should appear.
4) Press the reset button next to the touch screen.
5) The system should now be fully operational.

Powering off the system
1) First, press the black H-Bridge button: the light should take about a minute to fully turn off.
2) Once the light is off, flip the red Arduino knob to the "off" position.
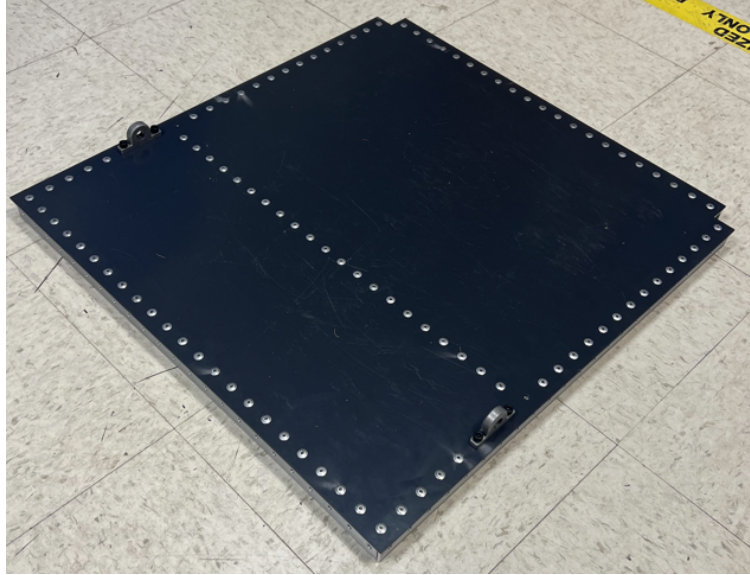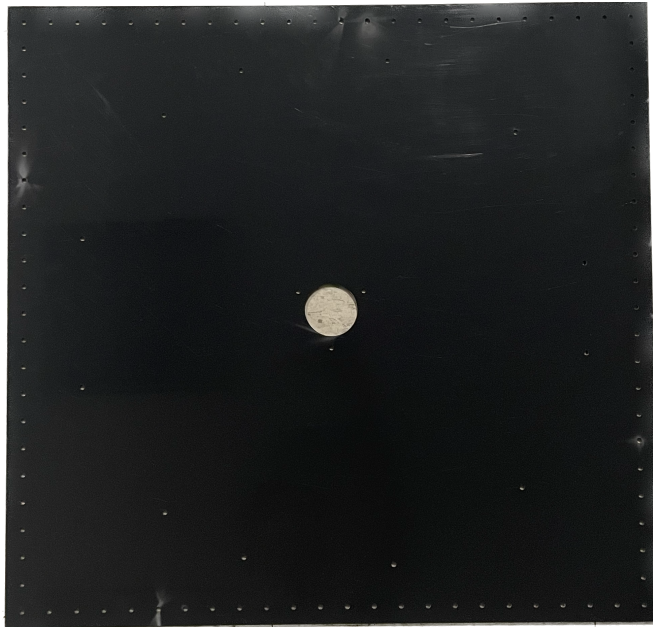3) The system should now be off.
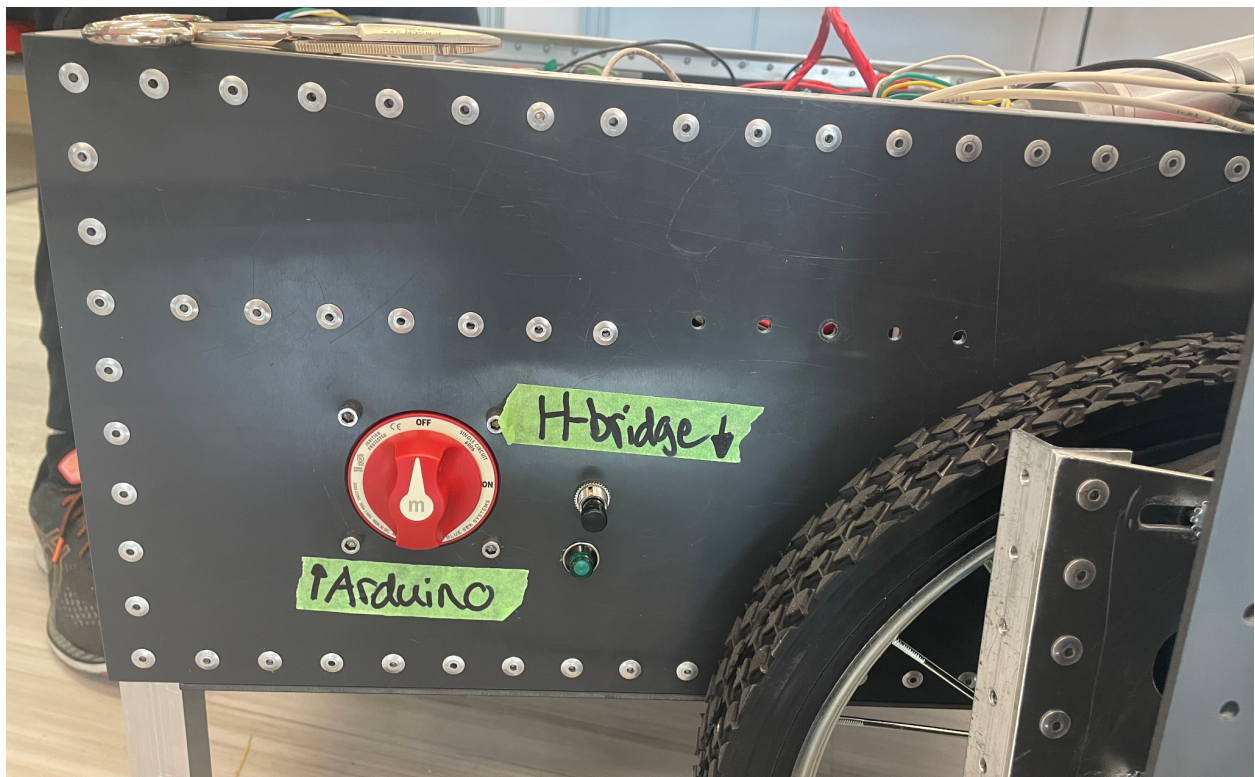
2. Mechanical Structure Assembly

2.1. Parts and Technical Specifications

Below are the pictures of important parts for the assembly process.

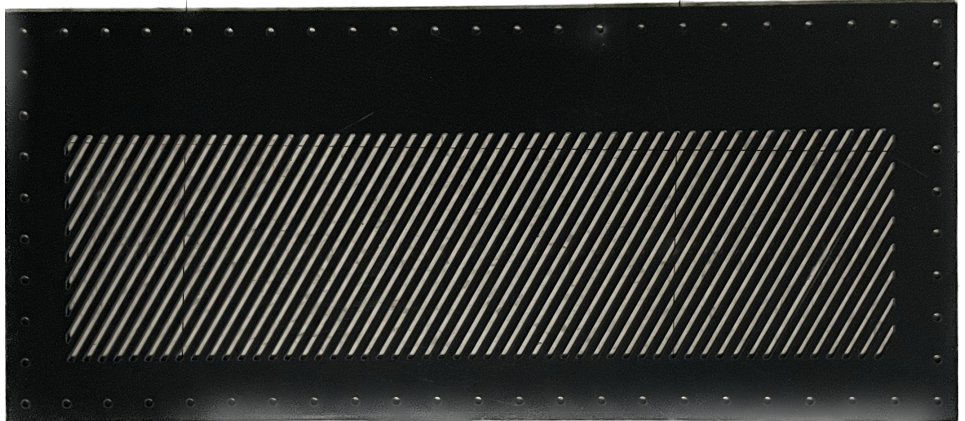|	
Base Panel Bottom	
Base Panel Top	

Base Panel Front	
Base Panel Back	
Base Panel Left	
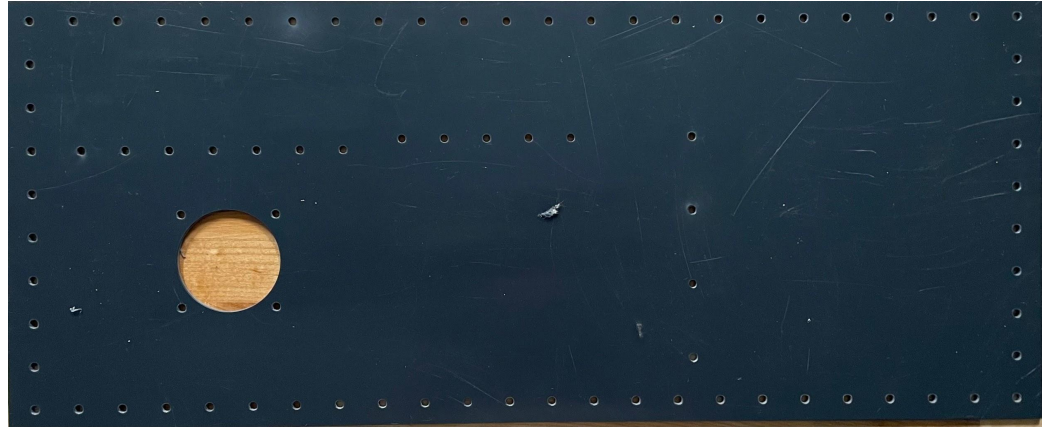
Base Panel Right	
Electronics Holder Board	
Motor Mount	

Base Mounted Turret Sliders	
Turret Shaft (key mounted)	

Turret Shaft Bushing	
Front Legs	
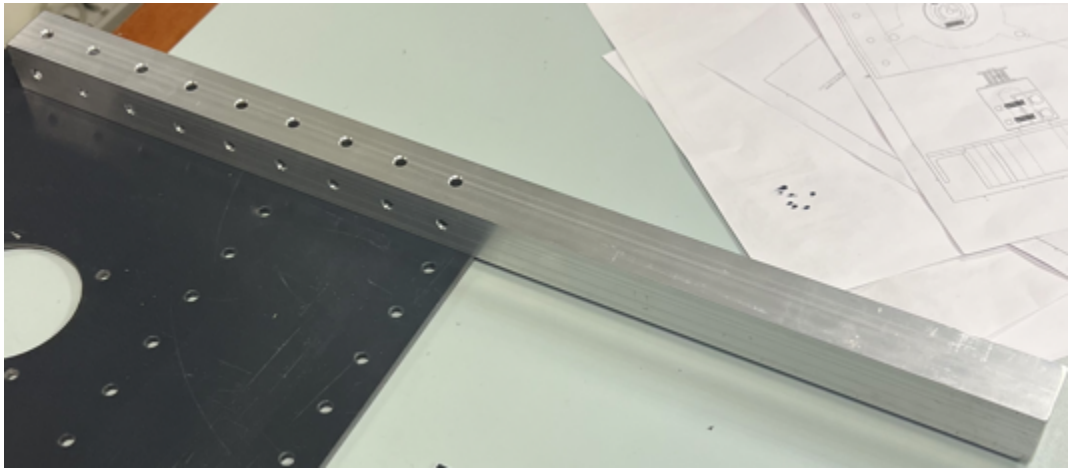
Turret Mounted Turret Sliders	

2.2. Assembly Instructions

Prior to assembly please familiarize yourself with the base and turret drawings. The front page of each pdf contains part numbers and their descriptions.

Base Drawings
Turret Drawings

Afterwards, follow these files to complete the assembly process. You can find the instructions on the bottom right corner of each page.
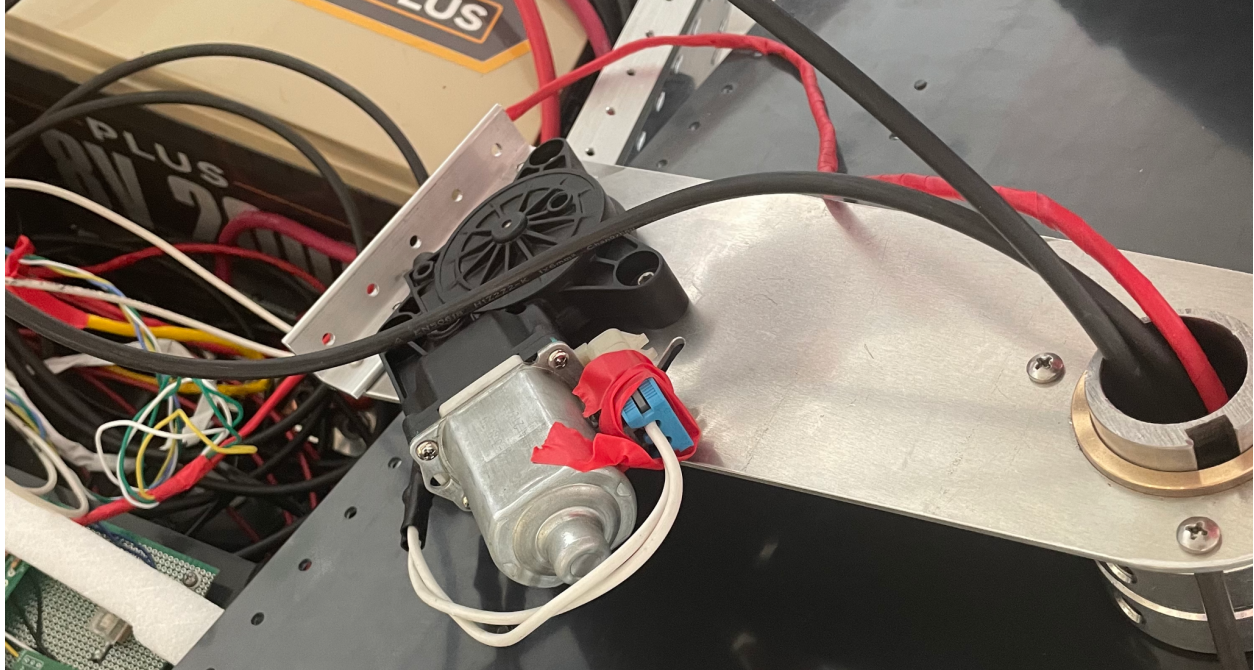
Base Assembly
Turret Assembly

2.3. Common issues and fixes

Issue: The motor connector sometimes can become loose
Fix: Push the blue connector within the motor connector and wrap the tape around it for extra stability. See figure below.

Blue motor connector

Issue: The turret's base sometimes can not move as expected.
Fix: The roller bearing might need lubrication to allow smoother rotation. See figure below.
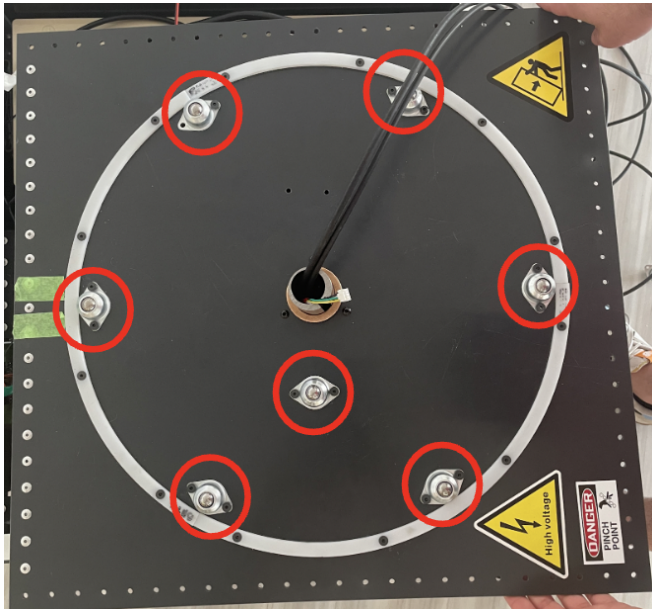
Roller bearings are circled in red.

Issue: The pulley does not have enough tension.
Fix: Move screws (in red) to desired distance. The screw holes are designed for various tension lengths. The blue gear has set screws after wear and tear might pop off. Reput screw.
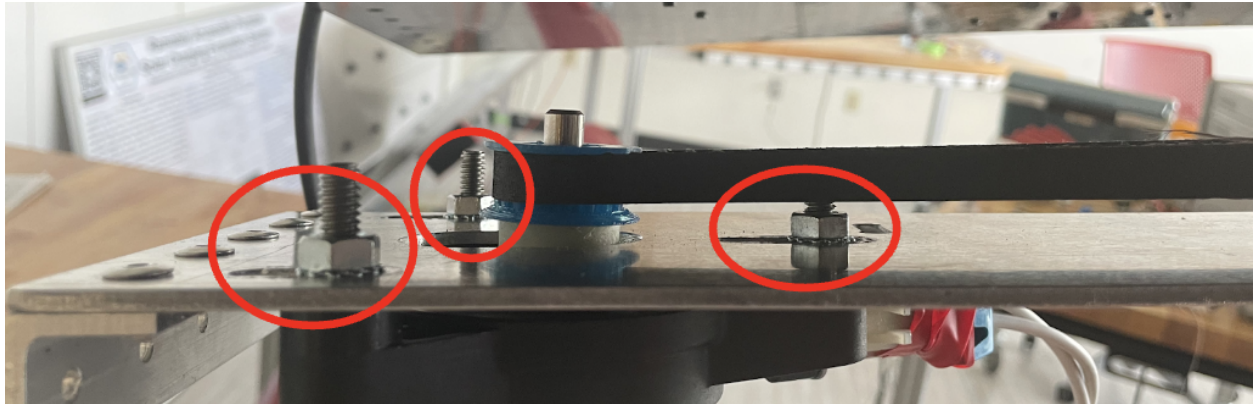
Motor mount. Tension screws circled in red.

3. Solar Panel Assembly and Disassembly Guide

ALWAYS CONNECT BATTERY BEFORE CONNECTING SOLAR PANELS!!!

How to assemble?
1. Gather a screwdriver for charge controller connections and insulating gloves for safety
2. Make sure solar panels are not in the light and are covered
3. Connect battery to charge controller and inverter
   a. Connect positive first
   b. Connect negative second
4. Ensure proper connection with indicator LED's on charge controller
5. When prompted, select battery type(lithium)
6. Connect solar panel(Panel's should be connected in series, using included connectors)
   a. Connect positive first
   b. Connect negative second
7. Ensure proper connections through the info screens on the charger controller

How to disassemble?
1. Turn the inverter off
2. Disconnect the solar panel connectors and ensure solar panel is out of the light and covered

      a. Disconnect negative first

      b. Disconnect positive second

3. Disconnect battery, charge controller and inverter

      a. Disconnect negative first

      b. Disconnect positive second

4. Safely store all components

4. Touchscreen Display

The figure above shows the home screen of the GUI. It consists of 6 function buttons: stats, power, record, WiFi, reset, and Auto. On the left-hand side of the screen, there are four navigation buttons: up, down, left, right. These are used to move the solar panel manually.

Stats button leads you to a list of sensors with their respective values (see figure below). You can press up and down arrows to navigate the list. You can also press the Home button to go back to the main screen.
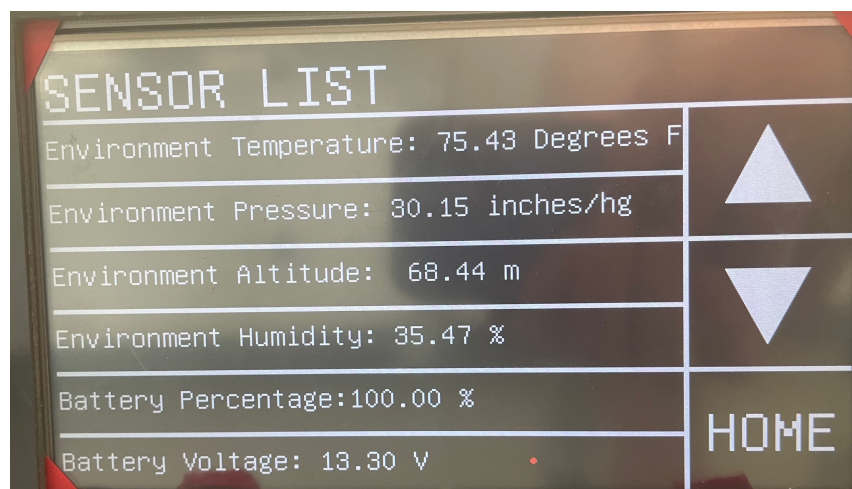
If you press the Auto button, the closed-loop solar tracking approach will turn on. You can press it again to turn it off and return to manual control. See figure below.
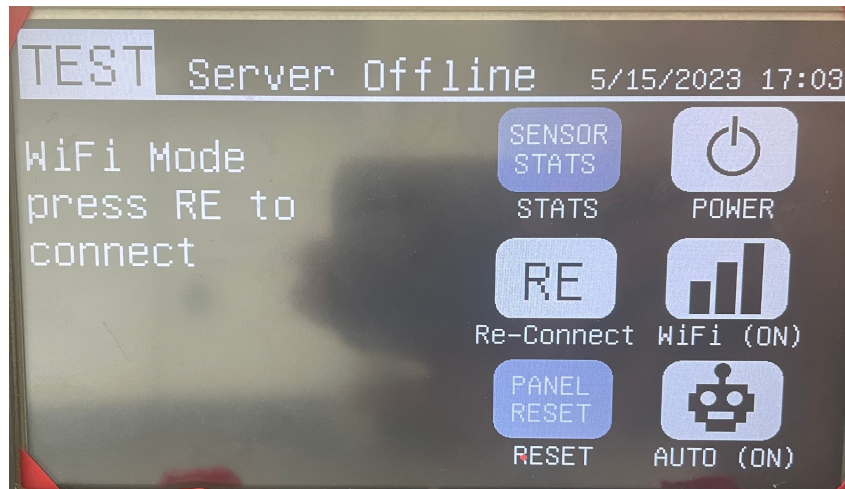
If you press the Record button on the main screen, you can designate a certain time to record sensor data (see figure below). Use up and down arrows to set the starting hour and ending hour (in military time). The home button leads back to the main page.
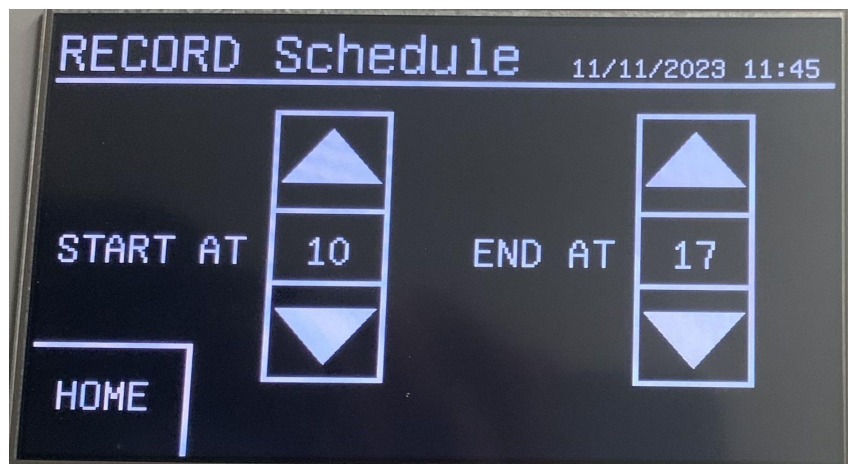
5. Remote Dashboard

Follow this link to the remote dashboard documentation for your reference:

Remote Dashboard