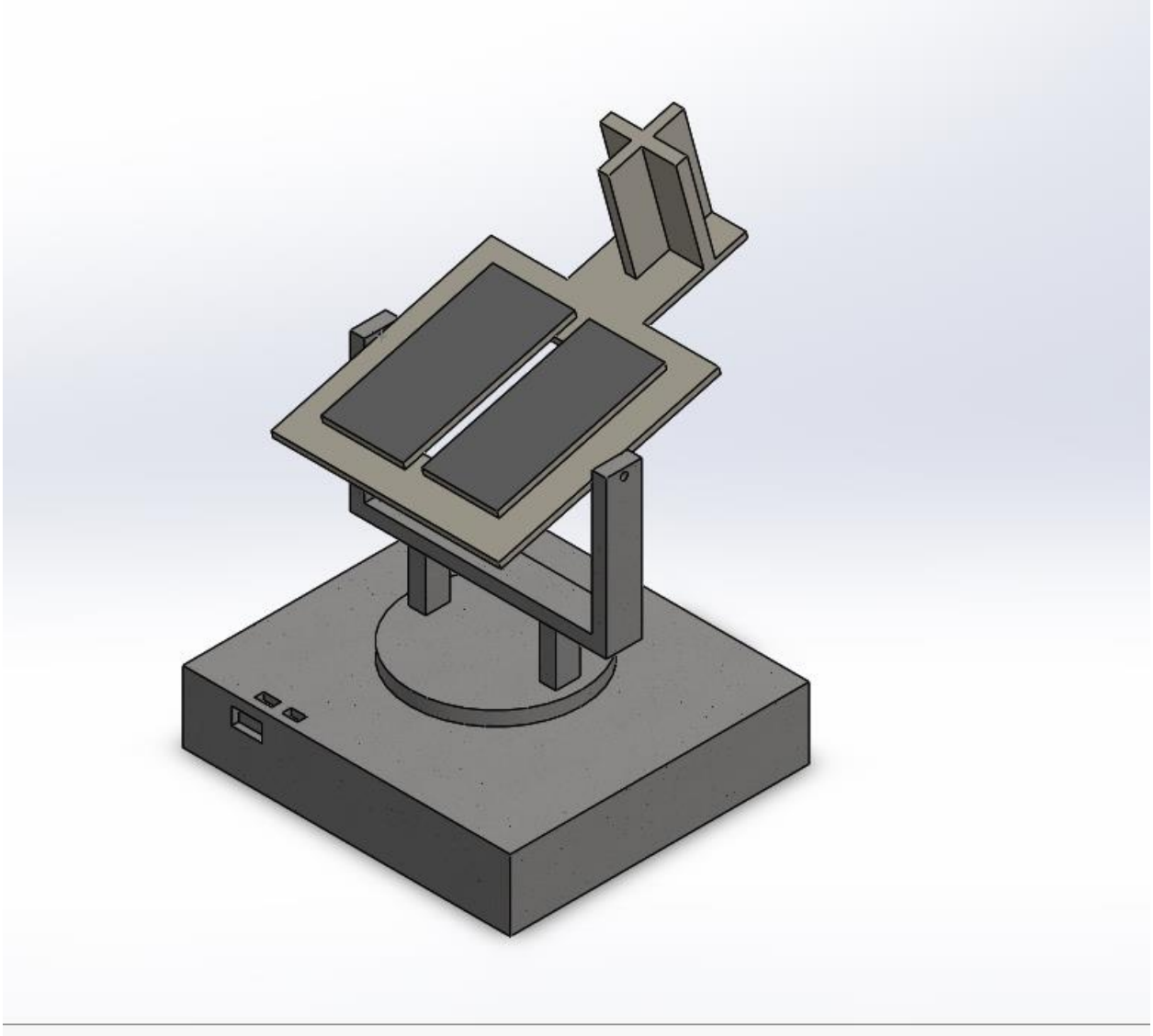
SOLAR POWER PHONE CHARGING STATION



USER MANUAL

SOLAR POWER PHONE CHARGING STATION

- Product Name: **SOL-TRACK POWER HUB**
- Model Number: **HTTJ02024**
- Introduction:

  Thank you for choosing the Solar Tracking Power Charging Hub. This user manual provides detailed instructions for the safe, efficient, and optimal operation of your solar-powered energy system. The Solar Tracking Power Charging Hub is designed to maximize solar energy capture by automatically adjusting its position to follow the sun throughout the day, ensuring the most efficient charging of connected devices.

  With its innovative solar tracking system, powered by two SG90 servo motors, and intelligent light detection using an LDR sensor, this hub offers an automated solution for continuous, sustainable power generation. Controlled by Arduino, this system brings together cutting-edge technology for energy optimization, making it ideal for off-grid applications and renewable energy projects

- Product Overview

  The **Solar Tracking Power Charging Hub** is an innovative energy system designed to enhance solar power efficiency by automatically following the sun's path throughout the day. This ensures maximum sunlight capture and continuous power generation, making it ideal for off-grid applications, renewable energy setups, and eco-conscious projects.

  The system features:

  - **Two SG90 servo motors** for precise vertical and horizontal sun tracking.
  - **An LDR sensor** for detecting the sun's position and adjusting the panel accordingly.
  - **Arduino-based control** for intelligent automation of the tracking and charging processes.

  By optimizing solar energy capture, the Solar Tracking Power Charging Hub offers a reliable solution for charging devices, powering small appliances, and promoting sustainable energy usage.

- Key Features:
  - Solar panels to convert solar energy into electrical energy
  - Light-sensing LDR sensor
  - S90 Servo Motors that can adjust model directions to suit sunlight
  - Arduino controls apps that can be redirected to sunlight
  - Power Charging Modules
  - Battery

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- Safety Precautions
    - **Read and understand all instructions** before operating the Solar Tracking Power Charging Hub.
    - **Ensure all electrical connections are secure** and properly insulated to prevent short circuits or electrical hazards.
    - **Keep children and pets away** from the system during operation to avoid accidents or interference with moving parts.
    - **Do not place your hands or any objects** near the moving servo motors or the rotating solar panel during operation.
    - **Avoid operating the system near water** or in wet conditions to prevent electrical damage or shock.
    - **Do not expose the system to extreme heat** or open flames, as this may damage electronic components or cause fire hazards.
    - **Regularly inspect the components** for wear, damage, or loose connections, and perform maintenance as needed to ensure safe operation.
    - **Disconnect the power supply** before performing any maintenance or adjustments to the system

Installation

1. Unpack the Solar Tracking Power Charging Hub and verify that all components (solar panel, SG90 servo motors, LDR sensor, Arduino, wiring, and mounts) are included.
2. Mount the solar panel securely on the rotating base, ensuring the servo motors are properly positioned for horizontal and vertical movement.
3. Connect the SG90 servo motors to the Arduino according to the wiring diagram, ensuring the correct pins are used for motor control and power.
4. Install the LDR sensor at the designated position to accurately detect sunlight and feed input to the Arduino.
5. Ensure all electrical connections (including power supply, LDR sensor, and servo motors) are properly secured and insulated to prevent short circuits or loose connections.
6. Upload the control code to the Arduino using a USB cable connected to a computer with the Arduino IDE installed.
7. Power the system by connecting it to the power source (such as a rechargeable battery or direct power input), and ensure that the panel begins tracking the sun.
8. Test the system by observing the movement of the solar panel as it tracks light sources and adjusts both vertically and horizontally.

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User Interface Description

The user interface software provides a graphical interface for monitoring and controlling the Solar Power Charging Hub.

1. **Connection**:
    - On the Solar Power Charging Hub switch.
2. **Main Features**:
    - **Light Intensity Display**:
        - Real-time feedback from the LDR sensor, showing the intensity of sunlight detected. This can help users identify optimal tracking positions or troubleshoot in low-light conditions.
    - **Power Output Display**:
        - Monitors the current power output of the solar panel, displaying voltage and current readings to track the efficiency of the charging process.
    - **Battery Status Display**:
        - Shows the current battery level, charging status, and estimated time to full charge based on current sunlight conditions.

Operating Instructions

- After placing the device in a sunny place and pressing the button on the back, the device will start working and then you can charge the mobile device normally through the USB port.

Troubleshooting

Problem	**Possible Cause**	**Solution**
Solar panel not rotating	Servo motor disconnected, or Arduino code malfunction	Check servo connections and re-upload the Arduino code.
Lighting not turning on/off	LDR sensor faulty or Arduino misconfiguration	Verify the LDR sensor connections and check the code logic.
Device not charging	Insufficient stored power or faulty wiring	Check battery charge level and inspect wiring to the charging ports.

Maintenance

- **Clean the Solar Panels:** Ensure the panels are free from dirt or debris to maximize sunlight absorption.
- **Check Servo Motors:** Periodically verify that the servo motors are functioning co rrectly and that the connections are secure.
- **Inspect the LDR Sensor:** Ensure the sensor is clean and unobstructed for accurate light detection.
- **Monitor the Battery:** Keep the battery in good condition and replace it when it loses efficiency.

Appendix:

1. Troubleshooting Guide

Issue 1: Solar Panel Not Tracking the Sun

- **Solution**:
  - Check connections between the LDR sensor and the Arduino.
  - Verify the servo motors are functioning properly by using manual control through the interface.
  - Reset the system by turning it off and on again.

Issue 2: Low Power Output from the Solar Panel

- **Solution**:
  - Inspect the solar panel for dust or debris that may block sunlight. Clean the panel if necessary.
  - Check for any loose or corroded connections between the panel and the battery.
  - Verify the LDR sensor is correctly detecting light and re-position the panel manually if needed.

Issue 3: Battery Not Charging

- **Solution**:
  - Ensure the solar panel is receiving enough sunlight and producing adequate power.
  - Check the battery connections for any loose wiring or corrosion.
  - If the battery is old, consider replacing it with a new one.

Issue 4: Servo Motors Not Responding

- **Solution**:
  - Verify the motor wiring is correctly connected to the Arduino.
  - Check the power supply to ensure it is providing adequate voltage to the servos.
  - Use the manual control sliders in the UI to test motor movement. If there is no response, replace the servo motors.

2. Maintenance Instructions

Sensor Cleaning:

- Regularly clean the LDR sensor using a soft, dry cloth to ensure accurate light detection. Avoid using any liquids or chemicals that may damage the sensor.

Solar Panel Cleaning:

- Clean the solar panel regularly using a damp cloth to remove dust and dirt. Avoid using abrasive materials that could scratch the panel's surface.

Component Inspection and Replacement:

- **LDR Sensor**: If the sensor fails to detect light properly even after cleaning, replace it with a new one.
- **Servo Motors**: Periodically check the servo motors for wear and tear. Replace them if they become unresponsive or noisy during operation.
- **Wiring and Connections**: Check all electrical connections for signs of corrosion or wear. Replace damaged wires or connectors as needed.

Battery Care:

- Inspect the battery regularly for signs of swelling, leakage, or corrosion. If any of these issues are present, replace the battery to ensure efficient power storage.

Contact Support

For any technical support or further inquiries, please contact:

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