# Introduction

This project focuses on the development of a lithium battery charger type 14500, powered by solar and wind energy sources. When active, the system utilizes the battery to automatically orient the solar panel towards the sun, optimizing the efficiency of the charging process. In emergency situations or during power outages, the device can operate manually, allowing for manual adjustments to the orientation of the solar panel.

The objective of this manual is to provide a detailed guide on the definition, design, organization, and structure of the system. Due to the various applications that this product offers, it is not targeted at a specific population segment.

# Safety Instructions:

* Keep away from any contact with liquids.
* Use exclusively lithium 14500 batteries.

# Product Description:

## Solar Panel

Generates electricity directly from visible light.

* Power: 1W
* Voltage: 6V
* Current: 150 mA
* Dimensions: 6cm x 11cm
* Material: Polycrystalline silicon of grade
* Source: <https://articulo.mercadolibre.com.mx/MLM-647646775-celda-solar-6v-1w-_JM>

## Photoresistor (LDR) (x2)

Captures light and compares it to guide the servo motor to a point where both LDRs receive the same amount of light.

* Resistance: 2 MOhms
* Maximum alternating voltage capacity: 100 VAC
* Source: <https://www.steren.com.mx/fotoresistencia-de-2-mohms-100-vca.html>

## Wind Turbine

Generates electricity from the movement produced by the wind.

* Rated power: 0.55 W
* Output voltage: 0.01V ~ 5.5 V
* Output current: 0.01mA ~ 100mA
* Fan diameter (installed): 100 mm
* Rated wind speed: 5.5 m/s
* Rated speed: 100 ~ 6000 RPM
* Motor diameter: 24.5mm
* Motor height: 34.2mm
* Weight: 60 g (approx.)
* Source: <https://www.amazon.com.mx/Electricidad-Generador-vertical-Turbinas-enseñanza/dp/B07N7H95FD/ref=asc_df_B07N7H95FD/?tag=gledskshopmx-20&linkCode=df0&hvadid=365598233472&hvpos=&hvnetw=g&hvrand=7241366366307547894&hvpone=&hvptwo=&hvqmt=&hvdev=c&hvdvcmdl=&hvlocint=&hvlocphy=1010132&hvtargid=pla-892408264299&psc=1>

## Wind Regulator

Regulates the voltage received by the wind turbine.

* Operating voltage: 5V
* Recommended minimum-maximum input voltage: 3V – 6V
* Maximum input voltage limit: 3V – 12V
* Source: <https://articulo.mercadolibre.com.mx/MLM-1835156518-kit-generador-energia-eolica-cargador-celular-usb-5v-helice-_JM#position=12&search_layout=grid&type=item&tracking_id=fbffc140-14e8-4973-bda4-aba5d7e5afdb>

## Solar Power Management Module, for 6V~24V Solar Panel

Regulates the voltage received by the solar panel.

Charges the battery using solar and wind energy.

Provides power to the Arduino when it is on.

* Input voltage: 6V ~ 24V
* USB input: 5V
* Overcharge protection voltage: 2.9V ± 1%
* Solar recharge efficiency: ~78%
* USB recharge efficiency: ~82%
* Operating temperature: -40°C ~ 85°C
* Dimensions (MM): 65.2 × 56.2 × 22.9
* Source: <https://www.waveshare.com/solar-power-manager.html>

## Servo Motor

Rotates along with the solar panel guided by the LDRs.

* Torque: 1.8 kgf/cm
* Rotation of 180°
* Operating temperature: -30° to 60°
* Operating speed: <0.1 s
* Plastic gear
* Power supply: 3.5 - 6 VDC 20 mA
* Source: <https://www.cyberpuerta.mx/Computo-Hardware/Componentes/Placas-de-Desarrollo/Modulos-y-Motores/Steren-Micro-Servomotor-1-8-Kgf-cm-Multicolor.html?gad_source=1&gclid=CjwKCAiAvJarBhA1EiwAGgZl0Hhk68t13LAO9TYZ6h2Fe8LOakSuFeqF3II1Y-wVHbxUMKFaZ5Y72hoC7PcQAvD_BwE>

# Connections Image

Diagrama, Esquemático

Descripción generada automáticamente