| Component | Power (mW) | Usage |
|---|---|---|
| ESP32 | | |
| Active | 194.5mW | 20% |
| Idle | 37mW | 30% |
| Sleep | 0.037mW | 50% |
| | | |
| BME280 | | |
| Active | 0.6mW | 5% |
| Idle | 0.1mW | 45% |
| Sleep | 0.01mW | 50% |
| | | |
| OLED SSD1306 | | |
| On | 20mW | 5% |
| off | 1mw | 95% |
| | | |
| LED | | |
| On | 10mW | 1% |
| | | |
| Moto-Gauge | | |
| On | 50mW | 1% |

| Average Power | mW | Daily Energy Usage | Required Battery Capability |
|---|---|---|---|
| ESP32 | 50mW | 1200.4mW | 363.77mAh |
| BME280 | 0.08mW | 1.92mW | 0.58mAh |
| OLED | 1.95mW | 46.8mW | 14.18mAh |
| LED | 0.1mW | 2.4mW | 0.73mAh |
| Motor-Gauge | 0.08mW | 12.0mW | 3.64mAh |

| Sensor Device: Total Battery Capability/day |
|---|
| 364.35mAh |
| Display Device: Total Battery Capability/day |
| 382.32mAh |

## Reflection

- The device's usage days are calculated based on the ratio of battery capacity to daily energy consumption, with the Sensor Device consuming approximately 364.35mAh per day and the Display Device consuming around 382.32mAh per day.
- The Activity Usage for each component is set according to its actual operating mode: ESP32 wakes up every 10 minutes for 2 minutes, spending 50% of the time in Sleep mode; BME280 measures every 10 seconds and enters Sleep mode when temperature stabilizes; OLED lights up only when the user views the display, staying on for about 48 minutes per day; The LED indicator lights up only in low humidity or low battery conditions, operating for 30 seconds per hour; The motor-driven gauge updates once per hour for 30 seconds.
- I choose to use PKCELL Flat 3.7V 2000mAh Rechargeable Lithium Polymer 803860 Battery with JST Type PH 2.0 Plug. I can use it for 5 days.
- Allow users to turn on the OLED only when necessary, such as through button presses, to reduce power consumption.