FLYABILITY

ELIOS 2

SMART BATTERY SAFETY GUIDELINES

AND BEST PRACTICES

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1 ELIOS 2 Battery Overview


Fire hazard


Explosive hazard


Toxic hazard


Corrosive hazard


Only use batteries provided by Flyability and approved for the system. For additional batteries contact Flyability.


To avoid fire, serious injury, and property damage, observe the following safety guidelines when using, charging, transporting, or storing your batteries.

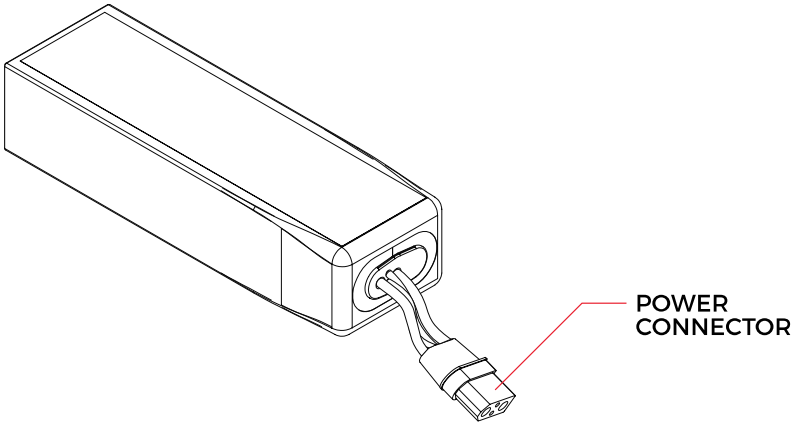


Figure 1.1: ELIOS 2 battery overview

Battery Pack Chemistry:	HV rechargeable lithium polymer
Battery Pack Weight:	530g
Battery Pack Capacity:	5200mAh
Battery Pack Energy	98.8Wh
Cell Count:	5 (5S1P)
Dimensions:	168x53x37mm

2 Battery Use

2.1 General Operation

1. At all-time store batteries between 15ºC and 30ºC.
2. The battery's performance and reliability is guaranteed for 40 charge/discharge cycles or 6 months. Do not use batteries with more than 40 charge/discharge cycles.
3. Make sure the batteries are fully charged before each flight.
4. Always check the battery and connector mechanical integrity before any operation. There should be no battery deformation or exposed conductive parts such as soldering or metal.
5. Immediately land the aircraft when the battery critical warning appears in Flyability Cockpit.
6. In addition to the battery percentage, pay attention at all time to the voltage displayed on Flyability Cockpit – land at 17.5V. At 17V, the aircraft must be on the ground, disarmed.
7. Do not wait for too long before unplugging the battery after a flight, as it will further discharge while the drone is idle on the ground.
8. If the battery's voltage drops at any time below 16V the battery might be damaged, do not try to charge or use the battery anymore and dispose of it as described in the Battery Disposal section below.
9. In case of any unusual behavior, keep the battery in a battery safe bag, store the LOG file for analysis, and contact Flyability.
10. The battery MUST solely be used with genuine Flyability products certified to work with this battery.

2.2 Battery Management System

The battery is equipped with a battery management system which keeps track of the number of various battery parameters:

1. Internal resistance
2. State of charge
3. Number of discharge cycles
4. Cell imbalance
5. Temperature

This information is available via the Cockpit app while the battery is connected to the drone.

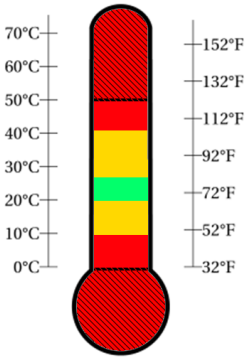
For reliability reasons, the drone will not arm if:

1. The internal resistance is over 140 mOhm
2. The battery temperature is lower than 5°C or higher than 50°C

2.3 Extreme Temperature Operations

The ELIOS 2 drone can be used from 0°C to 50°C, however, special precautions must be taken with regards to the battery when flying in temperatures below 10°C and above 40°C.

Ideally the battery must be between 20 and 25°C before a flight.



Low temperatures (Flight environment colder than 10°C):

1. Keep your battery temperature above at least 10ºC by keeping them in a warm place or a heated container.
2. Do not wait too long after removing the battery from a warm place so that it does not get colder than 10°C before the flight.
3. In addition to the battery percentage, pay attention to the voltage displayed on Cockpit – land at 20% or 17.5V, whichever comes first. At 10% or 17V, whichever comes first, the aircraft should be on the ground, disarmed. Do not wait before unplugging the battery.
4. In general, fly carefully and keep your flights short and change the battery between every flight.

High Temperatures (flight environment hotter than 40°C)

1. Keep your battery temperature below 40°C before the flight by keeping them in a cool place.
2. Do not wait too long before the flight so that the battery stays cool
3. In addition to the battery percentage, pay attention to the voltage displayed on Flyability Cockpit – land at 20% or 17.5V, whichever comes first. At 10% or 17V, whichever comes first, the aircraft should be on the ground, disarmed. Do not wait before unplugging the battery.
4. In general, fly carefully and keep your flights short and change the battery between every flight.

2.4 Safety guidelines

1. Do not allow the battery to come in contact with moisture, water, corrosive environment, or any kind of liquid as it may cause a short circuit or chemical deterioration, possibly resulting in the battery catching on fire, and may lead to an explosion. Failing to this point, dispose the battery as described in the Battery Disposal section below or contact Flyability for further assistance.
2. Never use or charge the battery if it presents any sign of damage, leakage, swelling, or other abnormal phenomena. Damage can be but not limited to puncture, deformation, damage to the wires or connectors, or exposed conductive material.
3. Do not use the battery if it fits too tightly into the aircraft's battery enclosure. If a battery is difficult to remove from the aircraft after a flight, do not use it anymore and dispose it.
4. Never use or charge a battery after being involved in an aircraft incident which caused damages to the battery, its connector or its enclosure.
5. Never use or charge an over-discharged battery being a battery voltage reaching 12.5V at any time of the aircraft operation,
6. The battery should be used in temperature from 10ºC to 50ºC.
7. If the usage of the aircraft is required in temperature from 0ºC to 10ºC, the battery shall be heated up to be in temperatures above 10ºC using a battery heating bag provided by Flyability. The use of a battery below 0ºC can lead to permanent damage. Contact Flyability for further assistance.
8. Use of the battery in temperatures above 50ºC can lead to fire or explosion. Contact Flyability for further assistance.
9. Never disassemble, puncture, drop, strike or place heavy object on top of the battery in anyway. The battery may leak, catch fire or explode.
10. Never let the battery be short-circuited by any means. Use individual plastic bag when you put several batteries in the same safety bag.
11. In case of battery leakage: do not allow the electrolyte to come in contact with clothing, skin, or eyes. In case of contact, immediately wash the affected area with fresh running water and then seek for medical assistance.
12. Avoid using the battery near strong electromagnetic sources or heating sources, such as microwaves oven.
13. In case of battery fire, use water or CO_2 extinguisher to put out the fire. Do not inhale the smoke coming off the battery. The smoke is toxic. Immediately alert qualified emergency services (e.g. firefighters).
14. Do not allow the battery to come in contact with conductive surfaces.
15. Do not place the battery into pressurized compartments. Do not place the battery in pockets, bags, or drawers in which it might come in contact with conductive, sharp or perforating items. If not in use, always keep the batteries in the provided battery safe bag with each battery individually wrapped
16. Clean the battery using a clean, dry, lint-free and antistatic cloth.

3 Battery Charging

3.1 Best practices

1. Charge batteries fully only if you plan to use them in the three followings days
2. After a flight, let the battery cool down to room temperature before charging them. It generally takes about 30 min.
3. Do not charge your batteries in temperatures below 15ºC or above 35ºC. The battery does not allow charge if the temperature is not in the range 10ºC – 40ºC.
4. The BMS tracks the battery discharge cycles. Batteries should not be used beyond 40 charge/discharge cycles.
5. Always place your batteries in a battery safe bag and in a safe area while charging. Never leave them unattended.
6. The charger stops charging when the battery is fully charged, but it is good practice to monitor the charging process and disconnect the battery when fully charged.

3.2 Safety guidelines

1. Do not connect the battery to wall power outlets, car power outlets or any power outlets directly. Always use Flyability approved battery chargers.
2. Never leave the battery unattended while charging.
3. Do not charge the battery near or on flammable objects such as paper of curtains.
4. Do not charge the battery immediately after a flight, the battery temperature may be too high. Do not charge the battery if its temperature is not between 15ºC to 30ºC.
5. Charge the battery in an open and ventilated area. Do not enclose or cover the charger with items such as cloth as it may lead to overheating.
6. Always place the battery in the provided battery safe bag while charging.
7. Disconnect the charger when not in use. Regularly examine the charger for damage to the wires, the enclosure or other parts. Never use a damaged charger.
8. Clean the charger using a clean, dry, lint-free and antistatic cloth.
9. Have close to the charger proper equipment to extinguish a battery fire and fire detection device.

4 Battery Storage

4.1 Best practices

1. Store batteries in their safety bag in a safe and dry place (with fire detection if possible)
2. Charge batteries before storage. Fully charge them at least once every 3 months.
3. The battery will automatically discharge itself to the optimal storage capacity of 50% if it is not used for several days.
4. Batteries have a lifespan of 1 year after the first use, do not use them beyond this period.
5. Never store a battery in the aircraft.

4.2 Safety guidelines

1. Keep the batteries out of the reach of children or animals.
2. Do not leave the batteries exposed to sunlight or near heat sources. Do not leave batteries inside a vehicle in hot weather. Store the batteries in temperatures between 15ºC and 30ºC. For best results, store the batteries at a temperature of 23ºC.
3. Keep the battery dry.
4. Keep the battery away from conductive objects.
5. Store the battery in the provided battery safe bag, with a maximum of 3 per battery safe bag.
6. Have close to the battery proper equipment to extinguish a battery fire and fire detection device.
7. If the battery is over discharged (voltage below 10V), the battery does not allow to charge.

5 Battery Transport

1. Batteries are considered as Dangerous Goods. If you need to transport your batteries into an airplane, please follow the latest IATA regulations. Do not hesitate to contact your airline before flying to get advice. Keep the batteries in your carry-on luggage and not as checked luggage.
2. Secure all connectors against short circuits using insulation tape, place the batteries in individual plastic bags, then store them in the provided battery safe bag.
3. Never transport your battery with a state of charge higher than 30%. The discharge can be done by using your aircraft until the battery state of charge reaches 30%. Once at your destination, put the battery back to the storage capacity (see Battery Storage).

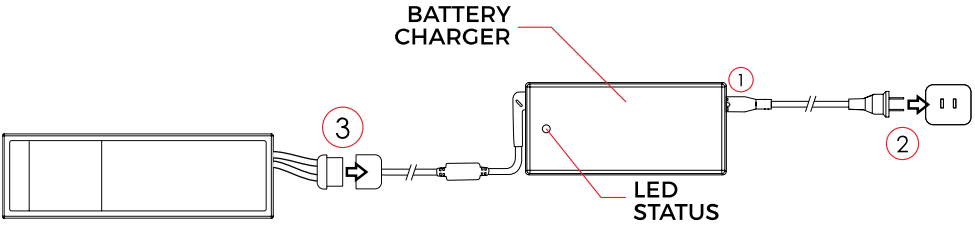
6 Battery Disposal

1. Discharge completely your battery.
2. Place insulating tape on the connectors and place the battery in a plastic bag.
3. Dispose of the battery in specific recycling boxes. Do not place the battery in regular trash. Comply with the local regulations regarding the disposal and recycling of LiPo batteries.

7 Flyability ELIOS 2 Battery Charger

7.1 Charging procedure

Flyability's charger comes with a built-in power supply. You can connect the AC power cord to a 100- 240V AC socket directly.



Please refer to the following steps to charge the battery:

1. Insert the AC power cord into the charger
2. Connect the AC power cord into a 100-240V AC socket. The LED will turn green
3. Connect the battery pack to the charger with the provided adapter.

The LED will turn RED, indicating that the charge is on going

4. The battery will be fully charged when the LED turns green again

If the LED remains green upon connection it might mean that either:

1. The battery is already fully charged, check the voltage of the battery using the Battery voltage checker
2. The battery is outside its temperature range
    a. If warm, let it cool down before re-trying to charge it
    b. If cold, warm the battery before re-trying to charge it
3. The battery is permanently damaged due to over-discharging. Please contact Flyability Professional Services at support@flyability.com

7.2 Safety Notes

1. Never connect the charger if the power cable has been pinched or shorted.
2. Never attempt to dismantle the charger or use a damaged charger.
3. Never cover the cooling slots.
4. Never use the charger with another battery than the LiPo battery provided by Flyability