TTA Battery Use and Maintenance
V2.1

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Battery Use and Maintenance

1. Before Charging / Discharging

1.1 Inspect the battery for any damages. Do not charge / discharge a damaged battery.

1.2 Inspect the battery for any swelling and possible battery fluid leaks. Do not charge / discharge a malfunctional battery.

1.3 Inspect the voltage for each battery cell. If the voltage difference between cells is too large, please contact with TTA sales or engineers. (Normal range of voltage difference is 1mv-30mv). If voltage difference between cells is greater than 30mv, do not use the battery before balancing it by using storage function of charger.

1.4 The productive rubber plug of the battery balance port and charging port can effectively protect battery from water, pesticide, dust. Please use it carefully and prevent from falling off from battery.

1.5 Inspect the battery compartment of drone and clean the residual liquid before mounting battery to prevent the liquid from permeating the charging port and damaging the battery electronic board and cells. Use funnel to add liquid to prevent liquid splashing on drone parts.

Attention: Be aware of plugging the rubber plugs into the ports while discharging or not charging.

2. Drone Batteries Use

2.1 Use the SAME kind of Battery

If drone is mounted more than one piece of battery, never use batteries with different voltage and capacity. The differences would definitely damage your batteries and hard to calculate the endurance which would cause unexpected drone crash.

2.2 Check the Battery Status

Before take off, check the status of batteries, ensure they are fully charged and mounted firmly to the drone.

2.3 Caution with the Temperature

Battery should be used at a temperature between -10° C to 40° C (14° F to 104° F). LiPo batteries do not work well in cold weather. The colder it is, the shorter running times due to the slowing down of the chemical activity within the battery.
2.4 Battery Life Cycles

Battery has about 300~400 life cycles. Leaving them on a full charge all the time, running them completely out, or exposing them to high temperatures will shorten its lifespan definitely.

2.5 Make sure the wire connection polarity is correct; do not short circuit the battery.

3. Discharging

3.1 Set alarming voltage

Ensure the low-voltage protection has been opened, and set the alarming voltage as the following: 1st alarming voltage 45.6V, 2nd alarming voltage 44.4V.

When reaching the 1st alarming voltage, done should be prepared for Return-to-Home. When reaching the 2nd alarming voltage, drone should return to home immediately in case of over-discharging.

Battery over-discharging not only greatly decrease the battery lifespan, but also lead to crash because of out of power. Therefore, forbid continuing mission when reaching the 2nd alarming voltage.

3.2 Binding battery firmly

The battery shell is an important structure to prevent battery from explosion and flames caused by liquid leakage. When fixing the battery on the drone, the cable tie should be tightened. Battery may be fallen out from drone while flying violently or crash, which may easily causes shell breakage.

3.3 Inspection after discharging

3.2.1 After each day’s work, clean the residual liquid on battery

3.2.2 After each day's work, inspect the appearance of battery for damages, swelling, liquid permeating through the charging port etc. If find above malfunction conditions, stop using the battery immediately and contact with TTA engineer for instructions.

3.2.3 Inspect the balance & charging cable and power cable regularly for possible breakage, open circuit, short circuit etc. If find any, replace the broken parts immediately.

3.2.4 Place batteries on a cool and dry ground far away from flammable and explosive materials. It is suggested to store it in a fireproof and explosion-proof container.

4. Charging
The nominal voltage of a single Lipo cell is 3.7V. Voltage will increase to 4.2V approximately after full charge.

As a result, the nominal voltage of 6S battery \(=3.7V \times 6\), the fully charged voltage \(=4.2V \times 6\).

4.1 Do not charge while overheating

After battery is used, the battery cannot be directly charged due to overheating. Place the battery until the temperature drops to less than 40°C.

**Notice**: It is suggested to charge battery in 10 A current to protect it better and lengthen its lifespan.

4.2 Use Official Charger

Official charger is the best fit for batteries. Any consequences caused by three-party charger shall be undertaken by users.

4.3 NEVER Leave Batteries on Charge Unsupervised

NEVER leave your batteries on charge unsupervised. If a battery starts to become puffy, smoke, or catches fire you need to be able to immediately handle the situation. Battery do have overcharge protection, however user should be around for safe.

4.4 Remove Fully Charged Battery

Once the battery is fully charged, remove it from charger to avoid any over-charge possibilities.

5. Balancing

Battery balancing is the process by which the each of the cell voltages are equalized. Balancing is to ensure that each cell is performing in the same voltage, and discharging the same amount of energy. Balance charging will surely improve the performance and lifespan of battery.

The official charger will balance the battery automatically. Keep the balancing cable connected while charging.

After completing every phased tasks, maintain the battery via storage function to balance it.
6. How to deal with a burning battery?

Isolation and suffocation is the best way to deal with burning batteries. When battery is on fire, first cut off the power supply. Quickly try to find the location of the asbestos blanket and the asbestos gloves, use asbestos gloves or fire tongs to move the burning battery to a safe and open place, such as fire bucket.

- Cover the burning battery with asbestos blanket.
- Use fire sand to bury asbestos blankets for isolating the battery from the air.
7. Storage

7.1 Storage Voltage

Never leave your fully charged or low voltage battery for more than 3~4 days, because gases might build-up inside the cells or active material of poles decreased damage your battery. Therefore it need to be discharged to reach storage voltage.

If you are not going to use your LiPo battery for longer than two weeks, you need to prepare it for storage. The proper storage voltage for battery is 3.8V(3.7v~3.9V) per cell, can not greater than 4.0V. Switch the charger mode to storage, battery will be charged or discharged to storage voltage automatically.

During long time storage, battery should be charged and discharged in 10A current mode every 1~2 month to activate it and keep the voltage of each cell at 3.7V~3.9V.

7.2 Storage Conditions

Store LiPo batteries in a room temperature range-- 23±5℃, humidity--65±20%RH, a dry and cool place. Keep away from wet and high temperature resources. Put batteries in a fireproof, explosion-proof, waterproof industrial case for storage.

8. Transport

If battery needs to be long-distance transported, it need to be discharged to 50% of its capacity first. Place battery in a proper case(not flammable) and avoid any damages, such as collision, squeezing, and falling.
9. Safety Rules

1) Never remove or mount batteries from a power-on drone.

2) Keep a fire extinguishing device (extinguisher or sand) nearby for safety.

3) If drone encounter a crash, inspect the batteries carefully because they may have been damaged.

4) Never use a bulging battery which should be recycled according to local laws.

5) Never puncture a LiPo battery which will most certainly catch fire.

6) Charge battery in well-ventilated areas and firm surfaces.

7) Keep battery away from liquid, such as water, alcohol.

8) Do not expose to sunlight for long time in summer.

9) Do not charge the batteries and if its temperature is over 40℃. Otherwise it will damage its lifespan.

This content is subject to change.

If you have any questions, please contact TTA: tta_techsupport@ttaviation.com
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