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Guides and Resources: Hardware - QDrone

Battery

This document outlines information on the QDrone battery, as well as using and charging it.

Safety Guidelines

Caution: Before using any batteries, chargers/balancers, or power supplies, users must first read the manuals packaged with their equipment. Quanser supplies these guidelines for charging batteries but it is the users' responsibility to ensure they are operating their equipment safely and correctly. Quanser is not responsible for any damages resulting from use of batteries, power supplies, chargers, or balancers.

Caution: Prior to using the QDrone, visually check the battery for bloating or damage. If the battery exhibits bloating **DO NOT USE** it. Visual bloating of the battery is dangerous - discard it in accordance with your country's relevant recycling and disposal laws

Caution: A battery voltage below 10V increases the risk of uneven charge between the three cells. If you experience issues charging a battery that is consistently below 10V, discard it in accordance with your country's relevant recycling and disposal laws

Note: Use and store battery in a dry environment .

Caution: Do not charge battery under direct sunlight.

Caution: Do not charge battery when battery feels hot.

Caution: Always be present when charging batteries and do not leave batteries connected to the chargers or the QDrone overnight.

Caution: Charge and store LiPo batteries in a location where a battery fire or explosion (including smoke hazard) will not endanger life or property.

Caution: Keep LiPo batteries away from children and animals.

Caution: Never charge a LiPo battery that has ballooned or swelled due to overcharging, undercharging or from a crash.

Caution: Never charge a LiPo battery that has been punctured or damaged in a crash. After a crash, inspect the battery pack for signs of damage.

Caution: Never charge the LiPo battery in a moving vehicle.

Caution: Never overcharge the LiPo battery.

Caution: Never leave the LiPo battery unattended during recharging.

Caution: Do not charge LiPo batteries near flammable materials, liquids or objects.

Caution: Ensure that charging leads are connected correctly. Reversing polarity while charging can lead to battery damage, fire or explosion.

Caution: A LiPo battery fire is a chemical fire. Have a suitable fire extinguisher (class D/for electrical fires) or a large bucket of dry sand near the charging area. Do not try to extinguish electrical battery fires with water.

Caution: Reduce risks from fire/explosion by storing and charging LiPo batteries inside a suitable container: a LiPo storage sack/bag or metal/ceramic container is advised.

Caution: Protect your LiPo batteries from accidental damage during storage and transportation. Do not put battery packs in pockets or bags where they can short circuit or can come into contact with sharp or metallic objects.

Caution: If your LiPo battery is subjected to a shock (such as a crash) you should place it in a metal container and observe signs of swelling or heating for at least 30 minutes.

Ensure that the metal container doesn't short the leads of the battery, which may cause a fire!

Caution: Do NOT attempt to disassemble, modify or repair the LiPo battery.

Caution: Never use a battery that is warm from charging or charge a battery that is warm from usage.

Note: Consider how you would deal with a LiPo battery fire/explosion as part of your normal fire safety and evacuation planning.

Note: When discarding a LiPo battery, discard it in accordance with your country's relevant recycling and disposal laws.

Note: Monitor charging LiPo batteries for signs of overheating

QDrone battery characteristics

The QDrone is powered using a single pack Lithium-Polymer (LiPo) 3S 3300mAh batteries (Figure 1a). For safety, these batteries are shipped uncharged and must be charged prior to first use. Check the voltage of the supplied batteries using the RC battery voltage tester provided (Figure 1b). Note that the black cable (ground) goes to the first pin. For the supplied batteries the safe operating ranges are between 10.0V and 12.6V, with the latter being the maximum voltage. If the battery's voltage is below 12.4V, it must be charged prior to use with the QDrone. The battery's characteristics have been outlined in Table 1.

a. LiPo 3s 3300mAh with balancer cable (4 wire connector) and XT60 female connector (2 wire connector)

b. RC battery voltage tester

Figure 1: Battery Voltage Testing and Connection in QDrone

Table 1: Lithium Polymer (LiPo) Battery Characteristics for the QDrone		
#	**Item**	**Value**
1	Cells	3S (3 cells in series)
2	Battery capacity	3300 mAh
3	Continuous discharge rating	50C
4	Connector on battery side for QDrone	XT60 (Female)
5	Maximum voltage per cell	4.2 V
6	Nominal voltage per cell	3.7 V
7	Minimum voltage per cell	3.5 V
8	Battery weight	267 grams
9	Battery dimensions (LxWxH)	136.5 mm x 42.6 mm x 21.6 mm
10	Compatible battery dimensions (LxWxH)	105-137 mm x 35-50 mm x 17-25 mm

If you are considering using your own battery, ensure that it meets item #1 to #4. The minimum discharge rating is calculated based on the capacity. For example, a 3300 mAh battery implies 1C = 3.3 Amps, and given that the maximum motor amperage is 25 Amps per motor at full throttle, this would require a 4 x 25 = 100 Amps current draw, or 100/3.3 = 31 C discharge rating. Note that increasing the battery capacity may lead to an increased battery weight, which may reduce performance and flight time.

Charging the QDrone batteries

1. Power the battery charger/balancer (Figure 2a) with the supplied power supply (Figure 2b).
2. Connect the 4 pin battery balancer cable on the 4 pin connector for the battery charger (Figure 2.c).
3. The top LEDs on the EV-Peak charger will indicate the status of the battery from low to full charge.

a. charger/balancer

b. charger/balancer power supply cable

c. connections to charger

Figure 2: Wiring and using the RC battery charger/balancer

Note: When the charger/balancer beeps continuously, or the battery voltage reading is at 12.6V with the status on the charger flashing 100%, the battery is charged.