FPV battery

User manual

PILOTIX™

2026

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Universal fpv battery manual & safety guide

IMPORTANT: Read all instructions and precautions carefully before use. Improper handling of Lithium batteries can result in fire, serious injury, and property damage.

1. Product overview & specifications

This manual covers high-performance Lithium Polymer (LiPo) and Lithium-Ion (Li-Ion) batteries used in Unmanned Aircraft Systems (UAS).

Voltage reference table

Type	Storage voltage	Max charge (standard)	Max charge (LiHV)	Min. Cut-off (Load)
LiPo	3.80V - 3.85V	4.20V	4.35V	3.50V
Li-Ion	3.60V - 3.70V	4.10V	N/A	2.80V

Li-ion exception: Li-Ion packs (e.g., 6S2P) can be discharged safely down to 2.8V - 3.0V per cell.

Parallel (P): 6S2P or 8S4P packs increase capacity (mAh) but follow the same voltage rules as their "S" count.

Universal voltage reference table

Configuration	Nominal (3.7V)	Storage (3.85V)	Full Charge (4.2V)	Max LiHV (4.35V)
1S	3.7V	3.85V	4.2V	4.35V
2S	7.4V	7.70V	8.4V	8.70V
4S	14.8V	15.4V	16.8V	17.4V
6S	22.2V	23.1V	25.2V	26.1V
8S	29.6V	30.8V	33.6V	34.8V
12S	44.4V	46.2V	50.4V	52.2V
14S	51.8V	53.9V	58.8V	60.9V

2. Installation & connectors

Connection schematic

1. Main power lead: Connects to the ESC/PDB.
2. Balance lead (JST-XH): Must be secured during flight (use a strap or clip) to avoid prop strikes.
3. Anti-spark requirement: For systems 6S and above (8S, 12S, 14S), you MUST use anti-spark connectors (e.g., XT90-S, AS150, or QS8). Connecting high-voltage packs without anti-spark protection will cause electrical arcing that damages terminals.

Series linking (e.g., 2x 6S to make 12S)

- Both packs must be the same brand, age, capacity (mAh), and C-rating.
- Both packs must be at the same voltage level before connection (<0.05V difference per cell).

3. Charging instructions

Safe charge rates (1C rule)

To maximize battery life and safety, always charge at 1C. Use the table below to set your charger amperage:

Charge rate

Battery capacity	Charge current (1C)
500 mAh	0.5A
1100 mAh	1.1A
1500 mAh	1.5A
4500 mAh	4.5A
10000 mAh	10.0A

- **Dedicated charger:** Use ONLY chargers designed for LiPo/Li-Ion. Never use NiMH or Lead Acid settings.
- **Charge rate:** The recommended rate is **1C** (e.g., 1.5A for a 1500mAh battery) unless the label specifies otherwise. Never exceed the rated C-rate.
- **Balance charging:** Always use the balance lead (JST-XH). This ensures every cell in the pack is equalized.

Power Connectors (Main Leads)

Connector	Max current (cont./burst)	Typical battery range	Application
PH 2.0 / BT 2.0	2A/ 5A	1S	Tinywhoops and nano drones.
XT30	30A/ 60A	2S - 4S	Micro drones, toothpicks, 2-3" builds.
XT60	60A/ 140A	4S – 6S	Standard 5" freestyle and racing drones.
XT90/ XT90-S	90A/ 180A	6S – 12S	Large 7-10" drones, cinelifters.
AS150/ QS8	150A+	12S - 14S	Industrial heavy-lift platforms (X8).

Balance connector (JST-XH)

The JST-XH is the industry standard for balancing FPV batteries. It has N+1 pins (where N is the number of cells).

- 1S: Usually no balance lead (balanced via main lead).
- 4S: 5-pin JST-XH.
- 6S: 7-pin JST-XH.
- 14S: 15-pin JST-XH (Note: Many chargers require two 7S leads for 14S balancing).

Safety rule: The balance lead is fragile. **Always** secure it under the battery strap or use a 3D-printed "Balance Lead Protector." A balance lead chopped by a propeller can cause a short circuit and an immediate mid-air fire.

Specialized series: "defender" connectors

- **Defender series (2S/3S/4S/6S):** Some modern "Ready-to-Fly" drones use proprietary "Defender" style batteries. These often combine the power and balance leads into one rugged, plug-and-play connector.
- **Warning:** These batteries require specific brand-authorized chargers or adapters. Do not attempt to force a standard XT60 into a Defender-style port.

- **Environment:** Charge in an open, well-ventilated area away from flammable materials. Never charge inside a vehicle or a drone.
- **Temperature:** Do not charge batteries that are hot to the touch (above 38°C/100°F).

4. Discharge & flight rules

- **Continuous monitoring:** Never leave a discharging battery unattended.
- **Temperature limits:** Ensure batteries do not exceed 60°C (140°F) during use. High temperatures indicate an over-propped motor or an undersized battery.
- **Low voltage cut-off:**
    - **For LiPo:** Stop flying when cells reach **3.5V** under load.
    - **For Li-Ion:** Stop flying when cells reach **2.8V - 3.0V** under load.
- **Emergency:** If a battery begins to swell or smoke, disconnect it immediately and place it in a safe, open area (outside) for at least one hour.

5. Storage & maintenance

- **Storage voltage:** For any storage longer than 24 hours, discharge or charge cells to their designated storage level (typically **3.80V - 3.85V** for LiPo).
- **Conditions:** Store in a cool, dry place (-10°C to 45°C). If storing for over 3 months, keep at 23 +- 5°C.
- **Physical protection:** Use a non-conductive, fireproof container (LiPo safe bag or ammo can).
- **Short circuit prevention:** Never store loose batteries together where terminals can touch. Do not alter or puncture the battery casing.

6. Physical safety & handling

- **Inspection:** Before every use, check wires, connectors, and the battery jacket for damage or swelling.
- **Mechanical stress:** Do not strike, bend, or disassemble the cells. Internal shorts can cause immediate fire.
- **Chemical exposure:** If electrolyte contacts skin or eyes, flush with fresh water immediately and seek medical advice.
- **Disposal:** Do not dispose of batteries in household waste. Fully discharge the battery (using a salt-water bath or dedicated discharger) and take it to a certified battery recycling collection point.

7. Safety & emergency procedures

- **Electrical hazard:** 14S packs (60V+) can deliver a painful shock. Handle with dry hands and ensure insulation is perfect.
- **Punctures/cracks:** If a battery is damaged in a crash, place it in a safe, outdoor area for at least 1 hour to observe for fire.
- **Fire:** If a LiPo ignites, DO NOT USE WATER. Use sand, a fire blanket, or a Class D extinguisher.
- **Disposal:** Fully discharge the battery to 0.0V and take it to a designated battery recycling point. Do not dispose of in household trash.

8. Disclaimer of liability

The user assumes all responsibility for the setup, assembly, and use of this product. The manufacturer/distributor is not liable for any collateral damage, loss of profits, or personal injury resulting from improper use, charging, or storage of these batteries.

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