

## LITHIUM POLYMER (LI-PO) BATTERIES

Li-Po batteries offer significant performance advantages over Ni-Cd and Ni-Mh batteries in terms of weight, capacity and voltage. The technology that Li-Po uses to achieve those performance gains makes them more dangerous if they are not used properly. Therefore, it is very important to understand the instructions and operating characteristics of Li-Po batteries before using them. Failure to follow the instructions below could result in damage to the product, personal injury, damage to property, and possibly fire. HPI Racing battery packs are intended for use only in RC applications.

### BEFORE CHARGING

Inspect the battery for physical damage, ballooning or swelling, loose leads, damaged connectors, or other irregularities which could cause a short-circuit and possible fire.

Use a digital voltmeter to make sure the polarity of the plug is correct.

Use a digital voltmeter to make sure the voltage is between the following guidelines:

1S battery safe voltage range: minimum 3.1V and maximum 4.2V  
2S battery safe voltage range: minimum 6.2V and maximum 8.4V  
3S battery safe voltage range: minimum 9.3V and maximum 12.6V

4S battery safe voltage range: minimum 12.4V and maximum 16.8V  
5S battery safe voltage range: minimum 15.5V and maximum 21.0V  
6S battery safe voltage range: minimum 18.6V and maximum 25.2V

If the battery is below the minimum safe starting voltage, it has been overdischarged or has experienced a failure of one or more of the cells and it should not be charged. If the battery is above the maximum voltage, any additional charging could cause damage to the battery and possible fire.

The battery must be cooled to room temperature before charging. Charging the battery when it is hot increases the chances of damage to the cells and reduces its useful life.

DO NOT use the battery if any damage is found or if the voltage doesn't fall between the ranges listed above. Any battery that has been damaged should be discarded in a safe manner according to your local disposal regulations.

### CHARGING GUIDELINES AND WARNINGS

YOU MUST USE A CHARGER DESIGNED FOR LI-PO BATTERIES. Failure to use a proper charger may result in damage to the battery and possible fire. Follow the Li-Po charger instructions for safe operation and best results. DO NOT use a Ni-Cd or Ni-MH charger.

Li-Po batteries should always be charged in an open area away from flammable materials to reduce the chance of fire and property damage. THE BATTERY SHOULD NEVER BE CHARGED INSIDE THE R/C VEHICLE OR INSIDE A FULL-SIZE VEHICLE.

Charge and store the battery in a fireproof Li-Po sack to reduce the chance of short-circuiting and property damage from fire.

An "ABC" type fire extinguisher should be readily accessible in case of fire.

When charging the battery you should remain in constant observation to monitor the charging process and react to potential problems that could occur.

The charger should never be set at a rate greater than 1C (1 times the capacity of the battery in amp hours). For example, 3800mAh batteries should be charged at or below 3.8 amps. 5300mAh batteries should be charged at or below 5.3 amps.

Do not top-off a fully charged Li-Po battery. Attempting to do so will overcharge the battery, resulting in damage to the battery and possible fire.

Never trickle charge a Li-Po battery. Trickle charging will cause the cells to charge beyond 4.2V/cell, resulting in damage to the battery and possible fire.

Li-Po battery packs are generally equipped with a small plug for balancing the cells with a Li-Po charger. We recommend balance charging the cells at all times

If the battery begins to balloon or swell at any time, quickly and safely disconnect the battery and place it in a safe area away from flammable materials and observe it for at least 15 minutes. Continuing to charge or discharge a battery that has begun to balloon or swell could result in a fire. A battery that has ballooned or swollen should be discarded in a safe manner according to your local disposal regulations.

### DISCHARGE GUIDELINES AND WARNINGS

Li-Po batteries should not be discharged at rates higher than specified on the battery label. To determine how many amps the battery can supply, multiply the C rating by the mAh/1000. Example: 30C x (3800mAh/1000) = 114 amps continuous discharge rate

Do not allow the temperature of the battery to exceed 160 degrees Fahrenheit (71 degrees Celsius) during discharge. Adequate airflow and cooling for the battery is required, especially when discharging at or near maximum rates.

Li-Po cells should never be discharged to below 3.0V per cell under load. Any cell that is discharged to lower than 3.0V under load could be damaged, resulting in loss of performance and potential fire when the cell is charged. Always use an ESC with a Li-Po low voltage cutoff setting of 3.0V per cell. Any battery that has been overdischarged should be discarded in a safe manner according to your local disposal regulations.

### CONNECTOR TYPES AND COMPATIBILITY

Li-Po batteries are equipped with a high load connector on the large red and black main power wires. These connectors are compatible with many chargers, ESCs and other devices. It is critical that you confirm proper polarity and connector compatibility before using your Li-Po with any other device.

Li-Po batteries are generally equipped with a standard JST-XH series balancing connector (usually a white color connector housing) on the balancing leads (the multi-colored leads used for balancing and balance charging). These connectors are compatible with many balancing chargers, balancers and other devices. It is critical that you confirm proper polarity and connector compatibility before using these connectors with any other device.

## GUIDELINES AND WARNINGS

Li-Po batteries should always be handled with care to prevent them from being punctured, dented, scraped or otherwise damaged. Damaged batteries should be discarded in a safe manner according to your local disposal regulations.

Never short-circuit a Li-Po battery. Even a brief short-circuit can result in damage to the battery and possible fire. A battery that has been short-circuited should be placed in an open area away from flammable materials and observed for at least 15 minutes. It should also be removed from service. To help prevent short-circuits you should store and transport the battery in a fire-proof Li-Po sack.

For best results, STORE THE BATTERY AT ROOM TEMPERATURE AND APPROXIMATELY 1/2 CHARGE. Avoid storing the battery in environments that can reach high temperatures, like an automobile in direct sunlight. Storing the battery at minimum or maximum voltage will decrease the usable lifespan of the battery and may lead to cell damage, deterioration and swelling.

Do not allow the battery to come in contact with water or liquids. Submersing the battery could cause dangerous short-circuits and damage the battery.

Never place Li-Po batteries in your pocket or any other area where they could come into contact with objects that could cause shorting, puncturing or other forms of damage.

## SAFE DISPOSAL

For safety reasons, it is recommended that Lithium Polymer cells be fully discharged before disposal

- 1) If any cell in the pack has been physically damaged, resulting in a swollen cell or a split or tear in the a cell's foil covering, **DO NOT** discharge the battery. Go to step 4
- 2) Place the battery in a fire proof container (such as a Lipo Safe Bag) or bucket of sand.
- 3) Connect the battery to a battery discharger. Set the discharge cut-off voltage to the lowest possible value ideally below 1.0V. Set the discharge current to a C/10 value, with "C" being the capacity rating of the pack. For example for a 3000mAh battery the C/10 rating is 300mA. It's also possible to discharge the battery by connecting it to an ESC/motor system and allowing the motor to run indefinitely until no power remains to further cause the system to function.
- 4) Submerge the battery into a bucket or tub of salt water. This container should have a lid, but it does not need to be air-tight. Prepare a bucket or tub containing 3 to 5 gallons (15 to 25 Litres) of cold water, and mix in 1/2 cup of salt per gallon of water. Drop the battery into the salt water. Allow the battery to remain in the tub of salt water for at least 2 weeks. Remove and dispose of the battery according to your local disposal regulations.

## FIRST AID

If a damaged battery pack leaks liquid, vapor or smoke, do not inhale the leaked material or fumes. Leave the area and allow battery pack to cool and vapors to dissipate. Remove spilled liquid with absorbent material and wash area thoroughly with soap and water. If the leaked materials make contact with your skin, wash the affected areas with soap and water immediately. If the leaked materials come in contact with eyes, flush with large amounts of water for approximately 15 minutes and seek medical attention immediately.

## GUARANTEE

Your HPI product is guaranteed to be free from defects in materials and workmanship for a period of 3 months from the date of purchase. For verification please keep your original receipt in a safe place. If there are any defects with the materials, workmanship, or assembly of your product, we will gladly repair or replace it for you at our discretion. This guarantee does not cover: Normal wear, abuse, neglect, failure to follow user guidelines or any damage arising as a result of improper use.

Due to the complex nature of HPI Products and the legal requirements of different regions, guarantees issued by HPI Racing are only valid for products sold to and purchased in there respective regions and are not transferable to other parts of the world. Your guarantee is provided in addition to and does not affect your local consumer rights.

In order to be considered for guarantee claims contact the supplying retailer or dealer where your battery was purchased as they will be your quickest and best source of information and assistance. If they are unable to assist you, or unable to handle the particular problem you are having, then please locate & contact the distributor for your market area from the HPI Racing weblink [www.hpiracing.world/distributors](http://www.hpiracing.world/distributors)

**DO NOT** return product(s) to HPI Racing or your distributor without prior approval from HPI Racing and/or its distributor.

Please note that any returned product which is inspected by HPI Racing and/or our distributor and found to have an invalid claim may be subject to an inspection & handling fee before it can be returned. Any repairs made to HPI Racing products resulting from neglect or misuse will be charged (parts & labour) before the work is started. You will be contacted if this is required.

HPI Racing shall not be liable for any loss or damages, whether direct, indirect, special, incidental, or consequential, arising from the use, misuse, or abuse of this product and any accessory or chemical required to operate this product.



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