



VP-Racing Li-Po Battery User Guide

Thank you for choosing VP-Racing Li-Po batteries!

With its overwhelming advantage than NiMH Battery, our goal is to provide R/C enthusiasts with the best batteries on the market!

Have fun! Enjoy from Vapex-racing world! Please visit our website of <http://www.vapex-racing.com> or <http://www.vapex-flight.com> for more details about our products.

WARNING: You must read this document before charging or using your battery. Failure to read the following instructions may result in property damage, personal injury, and/or loss of life.

- While the use of Li-Po batteries in radio-controlled models is practical and desirable, there are certain dangers associated with their use. It is important to follow these instructions to limit those dangers. Li-Po batteries store a large amount of energy and should be treated with extreme caution. Additionally, it has been determined that Li-Po batteries, when not properly used, may burst and catch fire. Failure to comply with these instructions will void all warranties and may result in property damage, personal injury, and/or loss of life.
- Vapex Technology Limited, and its distributors, or its retailers assume no liability for failure to comply with these safety instructions and warnings.

General Guidelines and Warnings

- a) Stop using or charging the battery immediately if the battery becomes or appears damaged, gives off an odor, becomes discolored or deformed, starts to balloon or swell, leaks, exceeds a temperature of 160 °F (71 °C), or if anything else abnormal occurs. Disconnect the battery and observe it in a safe place. These abnormalities may cause the battery to leak, and the reaction with air may cause the chemical materials inside to ignite and possibly result in fire. Because delayed chemical reactions may occur (a battery can still ignite even after 10 minutes), you should continue observing the battery for at least 15 minutes as a safety precaution. Battery observation should be conducted in a safe area outside of any building or vehicle and away from any combustible materials.
 - b) Only charge Li-Po batteries with chargers specifically designed to charge Li-Po batteries. **NEVER use a Ni-MH or Ni-Cd charger.** Failure to use a proper charger may cause a fire which may result in personal injury and property damage. Some Li-Po chargers on

the market may have technical deficiencies which may result in incorrect charging or charging at an improper rate. It is your responsibility to determine that your charger works properly.

- c) Always charge batteries through a balancer or use a charger with a balance function. Otherwise, an unbalanced cell may become over charged. This may reduce the life of the battery, and possibly cause a fire which may result in personal injury and property damage.
- d) Never charge battery unattended. During the entire process of charging your Li-Po battery, you must constantly observe and monitor the charging process so that you can quickly react to any problems that may occur and to be certain that the battery is being charged properly.
- e) Do not discharge a Li-Po battery at a rate exceeding the maximum continuous discharge current specified for it. Otherwise, the battery will overheat and result in battery deterioration, bursting, ballooning, or possibly cause a fire or explosion.
- f) Never store or charge the battery inside your car or in extreme temperature. Extreme temperatures might ignite the battery and cause fire.
- g) Store the battery in a location inaccessible to children. Be sure that children do not remove the battery from the charger or model.

Handling and Caring for Your Li-Po Battery

- a) Never disassemble, modify, puncture, mechanically shock, crash and/or short circuit the battery. Leakage, smoke emission, ignition, explosion, or fire, which may result in personal injury and property damage, can occur.
- b) Never remove the battery from its protective plastic case. The battery inside the hard case is only protected by a heat shrink. The Li-Po cell is directly under this heat shrink. If the outer skin of the cell gets damaged, the battery can no longer be used. Therefore take special care, that no sharp objects like knives, tools, carbon fibre edges or similar items can damage the hard case and /or the cells within it.
- c) Short circuits may cause fire and injury! If you need to cut the terminal wires of the battery, you must cut each wire individually, making sure the wires not to touch each other. Otherwise, a short circuit may occur and potentially cause a fire. To install a connector, remove the insulating tape from one wire and solder it to the appropriate terminal of a connector, then remove insulating tape of the other wire and solder to the appropriate terminal of the connector. If you accidentally cause the battery to short circuit, place it in a safe open space and observe it for at least 15 minutes. The battery may swell or possibly catch fire during this time. Additionally, the powerful electric current may cause severe injuries if the battery leads come in contact with rings or jewelry.
- d) Dispose of used or damaged Li-Po batteries at your local

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Hazardous Waste Facility.

SAVE THESE INSTRUCTIONS

Balance Connector for VP-Racing Batteries:

We are using JST-XH balance connectors for **Motor Batteries**, below is the port pin assignment:

Balance-Port (1S / 3.7V Packs)	
Black (Battery-Negative)	Cell 1 -
Red (Battery-Positive)	Cell 1+

Balance-Port (2S / 7.4V Packs)	
Black (Battery-Negative)	Cell 1 -
Blue (cell connection)	Cell 1+ (Cell 2-)
Red (Battery-Positive)	Cell 2+

Balance-Port (3S / 11.1V Packs)	
Black (Battery-Negative)	Cell 1 -
Yellow (cell connection)	Cell 1+ (Cell 2-)
Blue (cell Connection)	Cell 2+ (Cell 3-)
Red (Battery-Positive)	Cell 3+

We are using TP balance connectors for **Flight Batteries**, below is the port pin assignment:

Balance-Port (2S~5S / 7.4V~18.5V Packs)	
Black (Battery-Negative)	Cell 1 -
Red (Battery-Positive)	Cell 1, 2, 3, 4, 5+

Balance-Port (6S / 22.2V Packs)	
Black (Battery-Negative)	Cell 1 -
Red (Battery-Positive)	Cell 1, 2, 3+
Red (Battery-Negative)	Cell 4 -
Red (Battery-Positive)	Cell 4, 5, 6+

Charging Process & Precautions

All VP-Racing Li-Po battery packs can be charged with a maximum current of 2C by specially designed and developed chargers for Li-Po batteries. These chargers charge the battery with the max. current till the battery reaches the max. charging voltage. The charger then reduces the charging current until the battery is fully charged. This charging method is called CC/CV (Constant Current/Constant Voltage).

- a) Never charge batteries unattended. Only charge Li-Po batteries with chargers specifically designed to charge Li-Po batteries. NEVER use a Ni-MH or Ni-Cd charger. Battery temperatures should not be allowed to fall below 32 °F (0 °C) or exceed 113 °F (45 °C).
- b) Always charge the battery in an isolated safe area away from any flammable/combustible materials.

Never charge a Li-Po battery on a wooden workbench, inside an automobile, or on any flammable surface. Charge Li-Po batteries on a concrete surface where there are no flammable objects within 10 feet (3 meters) of the charging area.

- c) Always charge your LiPo battery in a fireproof container.
- d) Always remove your Li-Po battery from your model while charging. Remove the battery from you model and allow it to cool to ambient temperature before re-charging.
- e) Check the voltage of the pack or cells before charging. Do not attempt to charge any pack if the open voltage is lower than the Lowest Open Voltage (Please refer to Chart 1). Check the voltage of each cell before charging via the balance connector. If the voltage of any cell is less than 3.0V/cell, stop charging the battery, remove it from service, and dispose of it properly.
- f) Reverse Charging is prohibited! You must verify polarity before connecting the battery to the charger. Do not reverse the positive (+) and negative (-) terminals when charging. Otherwise, the battery pack will be reverse-charged, abnormal chemical reactions will occur, and the excessively high current will cause damage, overheating, smoke emission, bursting, and/or fire.
- g) When selecting the cell count or voltage for charging purposes, select the cell count and voltage as it appears on the battery label. As a safety precaution, please confirm that the information printed on the battery or label is correct. (Please refer to Chart 1). Selecting the wrong cell count or charging voltage may cause fire.
- h) Never charge the battery at a current exceeding 2C (2 x the capacity of the battery). A higher charge rate may cause fire.
- i) If the charging operation fails to complete even when a specified recharging time has elapsed, stop further recharging immediately.

Chart1 Battery Voltage Guidance:

Cell Configuration	Lowest. Open Voltage	Max. Charging Voltage	Voltage after Charging	Lowest. Discharging Voltage
3.7V-1S (all types)	3.1V	4.25V	4.15V ~4.22V	3.0V
7.4V-2S (all types)	6.2V	8.5V	8.30V~8.44V	6.0V
11.1V-3S (all types)	9.3V	12.75V	12.45V ~12.66V	9.0V
14.8V-4S (all types)	12.4V	17.0V	16.60V ~16.88V	12.0V
18.5V-5S (all types)	15.5V	21.25V	20.75V ~21.10V	15.0V
22.2V-6S (all types)	18.6V	25.5V	24.90V ~25.32V	18.0V

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Usage & Discharging Warning:

- a) Please check cell voltage after the first charge to verify that the voltage has not exceeded the range specified in Chart 1. Check the voltage of each cell via the balance connector to verify that the voltage of each cell is between 4.15V and 4.22V.
- b) The discharge temperature range is between 32 F (0 C) and 140 F (60 C).
- c) During discharging and handling the batteries, do not exceed 160 F (71 C). Otherwise, the battery may be damaged and a fire may result.
- d) During the first discharge, use low current and divide the discharge time into 6-minute sessions with 15-minute breaks in between.
- e) Do not discharge the battery at a higher current than the maximum continuous discharging current specified in Chart 2. A higher discharging current may cause overheating which will lead to ballooning, swelling, or possibly result in fire. For example, a 5000mAh battery with a designed maximum 40C discharge current must not have a continuous discharge rate or load of more than 200 Amps. For longer cycle life, a continuous discharging current of 70%-80% of the designed maximum discharging current is acceptable and recommended.
- f) Never discharge your Li-Po battery below the Lowest Discharge Voltage (Please refer to Chart 1). This may cause irreversible damage which will deteriorate battery performance and cycle life.

Chart 2: Max Continuous Discharge Current

Continuous discharge current	Burst discharge current
20C	40C
25C	50C
30C	60C
40C	80C
50C	100C
60C	120C
65C	130C

Operation Temperature Range:

Operating Temperature Range	Charge	0°C~45°C
	Discharge	-20°C~60°C
	Storage	-20°C~40°C
	Storage (recommended)	-5°C~25°C

Storage & Transportation

- a) Always disconnect and remove Li-Po batteries from your model when not in use. Store Li-Po batteries in an airtight and flame resistant container when not in use.
- b) Store batteries in a location with low humidity, free

from corrosive gas & combustible materials, within the temperature range of 14 F (-10 C) and 104 F (40 C). For best results, storage between from 41 F (5 C) and 77 F (25 C) is recommended.

- c) Do not expose Li-Po batteries to direct sunlight or leave in a hot environment (inside an automobile in hot weather) for extended periods of time.
- d) When batteries are transported or temporarily stored in a vehicle, temperatures should be higher than 14 F (-10 C) but not over 140 F (60 C).
- e) Storing Li-Po batteries at temperatures higher than 170 F (76 C) for more than 2 hours may result in battery damage or possibly fire.
- f) Higher cell voltage during storage will increase the self-discharge rate of the battery, which may lead to over-discharge and deteriorate battery performance. It is recommended that the battery remain at a lower voltage (about 3.8V/cell) throughout the period of storage. If the battery is to be stored for longer than one year, the user should charge the battery at least once per year to 3.8V/cell to prevent over-discharge.

Battery Life & Disposal note

Batteries that lose 20% of their stated capacity must be removed from service. Discharge the battery to 3.0V/cell, insulate the output wires, and then wrap the battery in a bag for disposal at your local Hazardous Waste Facility.

In The Event of a Severe Crash

Whenever a Li-Po battery pack is subjected to a severe crash, immediately do the following:

- a) Remove the Li-Po battery pack from the model in which it is used.
- b) Place the Li-Po battery pack in a safe open area away from any flammable/combustible materials and monitor the pack for at least 30 minutes. Watch for swelling of the pack and/or unnatural heat build-up. These are signs of internal damage.
- c) Damage to your Li-Po battery pack may not be readily apparent upon visual inspection. Carefully check the battery for any shorts and other damage. You should inspect it thoroughly for damage before attempting to use it again.



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