

## SPECIFICATION FOR APPROVAL

### 承认书

客户 / CUSTOMER : \_\_\_\_\_

客户型号 / CUSTOMER P/N : \_\_\_\_\_

产品名称 / ITEM : DC 1-4 串平衡充 16.8V2A 充电器 / DC 1-4 series 16.8V2A balance charger

产品种类 / DESCRIPTION : 平衡充 / balance charger

本公司产品型号 / OUR MODEL NO. : CH-RLi031-03

标准 / STANDARD : \_\_\_\_\_

额定 / RATING : I/P:DC15V 2.6A

: O/P 4.2V,8.4,12.6,16.8V/2A

: O/P 3.6V,7.2,10.8,14.4V/2A


备注 / REMARKS : \_\_\_\_\_

注意:在贵司出单前,请确认签回以下项目 / Attention: Before placing orders, please confirm to sign back the followings:

- ☐ 产品规格(首页) / Production Spec(Front Page)
- ☐ 铭牌规格(如有) / Nameplate Spec(if any)
- ☐ 包装规格(如有) / Packing Spec(if any)

版本 REV	描述/DESCRIPTION	日期 DATE
A0	首次发行/FIRST RELEASE	
A1	修改格式/CHANGE FORMAT	2019-1-28

瑞鼎电子/ Ryder Electronics	
	批准/Approved by
签名 Signature	衣绍鹏
日期/DATE	2019-1-28

客户/ CUSTOMER	
确认	
Approved by	
	(签字或公司盖章)
日期/DATE	

产品型号/MODEL NO.	受控编号/CONTROLLED DOCUMENTS NO.	版本 /VERSION	拟制/Drawn by	审核 /Verified by	页码/PAGE
CH-RLi031-03	JE-KF-GGS-142	A1	张风明	彭荣忠	PAGE1 / 9

## 目 录 Contents

<b>1 产品特点 PRODUCT CHARACTERISTICS</b> .....	<b>3</b>
<b>2 电气性能 ELECTRICAL CHARACTERISTICS</b> .....	<b>3</b>
2.1 输入特性 INPUT CHARACTERISTICS .....	3
2.2 输出特性 OUTPUT CHARACTERISTICS .....	3
<b>3 充电 LED 指示状态及使用方法 LED INDICATION AND OPERATION GUIDE</b> .....	<b>4</b>
3.1 LED 指示 LED INDICATION.....	4
3.2 使用方法与功能描述 USAGE AND FUNCTION DESCRIPTION .....	5
<b>4 适用环境 APPLICABLE ENVIRONMENTS</b> .....	<b>6</b>
4.1 工作温度 WORKING TEMPERATURE .....	6
4.2 工作湿度 WORKING HUMIDITY .....	6
4.3 贮存温度 STORAGE TEMPERATURE .....	6
4.4 存储湿度 STORAGE HUMIDITY .....	6
4.5 大气压力 ATMOSPHERIC PRESSURE .....	6
<b>5 机械 MECHANICS</b> .....	<b>6</b>
5.1 外观图 APPEARANCE .....	6
<b>6 可靠性能 RELIABLE CHARACTERISTICS</b> .....	<b>7</b>
<b>7 外观要求 APPEARANCE REQUIREMENTS</b> .....	<b>8</b>
<b>8 体积与重量 VOLUME AND WEIGHT</b> .....	<b>9</b>
8.1 体积 VOLUME .....	9
8.2 重量 WEIGHT.....	9
<b>9 抽样标准 SAMPLING STANDARD</b> .....	<b>9</b>
<b>10 包装 PACKING</b> .....	<b>9</b>
<b>11 使用注意事项 CAUTION</b> .....	<b>9</b>

产品型号/MODEL NO.	受控编号/CONTROLLED DOCUMENTS NO.	版本 /VERSION	拟制/Drawn by	审核 /Verified by	页码/PAGE
CH-RLi031-03	JE-KF-GGS-142	A1	张风明	彭荣忠	PAGE2 / 9

## 1 产品特点 Product Characteristics

1. 宽电压输入，适合车充和大部分常用适配器。Wide input voltage range. It is suitable for car charger and the most of common adapters.
2. 内置可选式平衡充电电路，能快速充满不平衡的电池组，不需要漫长的等待。Optional balance charge circuit inside. It can charge battery pack in unbalance state quickly.
3. 输入，输出有反接保护功能，能长时间接反不损坏，并有提示功能。There are reverse connection protection and indication function both in input and output circuit, to protect charger and battery.
4. 自动实现涓流，恒流，恒压充电。It applies trickle charge, constant current charge and constant voltage charge automatically.
5. 输入电压过低，过高保护功能。当电压不符合要求时，停止充电并提示。Low or high input voltage protection. When input voltage is out of the setting value, charger will stop charge and show an indication.
6. 坏电池检测功能。Bad battery detection.
7. 高温保护功能。High temperature protection.
8. 自检功能。Self-check function.
9. 双色发光二极管指示充电状态，显示直观。Bicolor LED.
10. 可充锂电和磷酸铁锂电池。It is suitable for rechargeable Li-ion and LiFePO4 battery.

注意：本产品虽能适用于 1-4 节的电池组，但是不能同时接入任何两个电池组。

**Caution: the charger is suitable for 1-4 series battery pack, but it can not charge two groups of battery pack at the same time.**

## 2 电气性能 Electrical Characteristics

### 2.1 输入特性 Input characteristics

#### 2.1.1 输入电压 Input voltage

输入电压：input voltage

DC 15V

#### 2.1.2 输入功率 Input power

输入功率：input power  $\geq 22.5W$

### 2.2 输出特性 Output characteristics

#### 2.2.1 空载电压 Output no-load voltage

空载电压：output no-load voltage

$< 0.2V$

#### 2.2.2 额定充电电流：(正常充电条件下) Rated charge current(normal condition)

额定充电电流：Rated charge current

$2000mA \pm 200mA$

#### 2.2.3 涓流充电电流 Trickle charge current

涓流充电电流：trickle charge current

$200mA \pm 50mA$

#### 2.2.4 充电方式 Charge method

采用恒流,恒压充电方式。Constant current and constant voltage charge method.

产品型号/MODEL NO.	受控编号/CONTROLLED DOCUMENTS NO.	版本 /VERSION	拟制/Drawn by	审核 /Verified by	页码/PAGE
CH-RLi031-03	JE-KF-GGS-142	A1	张风明	彭荣忠	PAGE3 / 9

### 2.2.5 充满检测精度 Full-charged detection accuracy

充满检测精度 : Full-charge detection accuracy

LIPO 4.20v±0.02v LIFE 3.60v±0.02v

### 2.2.6 输出短路保护 Output short circuit protection

当充电器输出端短路, 无电流输出。When output short circuit occurs, there is no current output.

### 2.2.7 电池反接保护 Battery reversely connected protection

结构防反接 battery reversely connected protection by shell mechanism.

### 2.2.8 输出反向漏电流 Output reverse leakage current

当无 DC 输入时, 充电器输出反向漏电流: ≤10mA, 以保持已充入电池的电量。

When there is no DC power supply input, charger's output reverse leakage current≤10mA to maintain battery's electricity power.

### 2.2.9 适用电池 Suitable battery

锂离子和磷酸铁锂电池组, 1-4 串, 容量在 1000mAh-6600mAh 之间。

Li-ion and LiFeO4 battery pack, 1-4 series, volume range from 1000mAh to 6600mAh.

## 3 充电 LED 指示状态及使用方法 LED indication and operation guide

### 3.1 LED 指示 LED indication

输入电源正常, 不接电池	电源指示灯--绿灯常亮	状态指示灯--熄灭
输入电源接反, 不接电池	电源指示灯--红灯常亮	状态指示灯--熄灭
输入电源正常, 正常充电	电源指示灯--绿灯常亮	状态指示灯—红灯常亮
输入电源正常, 电池充满	电源指示灯--绿灯常亮	状态指示灯—绿灯常亮
输入电源异常, 不接电池	电源指示灯--绿灯常亮	状态指示灯—绿灯慢闪
输入电源正常, 电池异常	电源指示灯--绿灯常亮	状态指示灯—红灯慢闪
输入电源正常, 电池接反	电源指示灯--绿灯常亮	状态指示灯—红绿灯交替闪
输入电源正常, 充电器自检失败	电源指示灯--绿灯常亮	状态指示灯—红灯快闪

Normal input, no battery

Power LED--- green light      State LED--- light off

Input reversely connected, no battery

Power LED---red light      State LED--- light off

Normal input, normal charge period

Power LED---green light      State LED--- red light

Normal input, battery was fully charged

Power LED---green light      State LED--- green light

Abnormal input, no battery

Power LED---green light      State LED---green light flash slowly

Normal input, abnormal battery

Power LED--- green light      State LED---red light flash slowly

Normal input, battery reversely connected

Power LED---green light      State LED---red and green light flash alternately

产品型号/MODEL NO.	受控编号/CONTROLLED DOCUMENTS NO.	版本 /VERSION	拟制/Drawn by	审核 /Verified by	页码/PAGE
CH-RLi031-03	JE-KF-GGS-142	A1	张风明	彭荣忠	PAGE4 / 9

Normal input, charger self-check failed  
 Power LED--- green light     State LED--- red light flash quickly

### 3.2 使用方法与功能描述 Usage and function description

#### 3.2.1 使用 DC15V , 2.6A 的适配器。

Use DC 15V, 2.6A adapter.

适配器正常时, 电源灯亮绿灯, 状态灯熄灭。可以充电。

Adapter is in normal state, power LED--- green light, state LED---light off. Charge is enabled.

适配器插反时, 电源灯亮红灯, 提示适配器插反, 状态灯熄灭。不能充电。

Adapter is reversely connected, power LED---red light, state LED---light off. Charge is disabled.

适配器电压不正常时, 低于 10v 或高于 16v, 电源等亮绿灯, 状态灯绿灯闪烁。不能充电。

Adapter's voltage is abnormal (lower than 10V or higher than 16V), power LED---green light, state LED---green light flash. Charge is disabled.

#### 3.2.2 在插入电池前请确定电池的种类, 如果能选择电流, 请确定电流。出于安全考虑, 在电池组插入后这两个参数不能再改变。

Check the type of battery before charging. Determine the current if current could be choose. For safety, the battery type and current cannot be changed if battery was placed in.

#### 3.2.3 插入合适的电池组, 进行充电。Battery must be suitable

根据你选择的电池类型, 插入合适的电池组, LIOP 或者 LIFE

Use the suitable battery. Li-ion or LiFeO4 battery.

充电器能自动识别电池组的串数, 自动为电池组充电。

Charger can detect battery's series automatically.

充电过程中能自动进入涓流, 恒流, 恒压充电。当电池组有电池电压低于 2.7v 时, 进入涓流状态, 电流 200mA 左右, 保护电池不被充坏。高于 2.7v 时, 进入恒流状态快速充电。

It applies trickle charge, constant current charge and constant voltage charge automatically. When there is a battery's voltage is lower than 2.7V, charger turns into trickle charge period (current is equal to 200mA). When there is a battery's voltage is higher than 2.7V, charger turns into constant current fast charge period.

充电后期, 当某节电池电压相差过大时, 充电器能快速补充这节电池, 进行快速平衡充电。

If a battery's voltage is different from other batteries, charger can supplement this battery's electricity power and apply fast balance charging.

充电状态为状态灯红灯常亮。

State LED keeps red in charge period.

电池组充满时状态灯绿灯常亮。

State LED keeps green in full-charged period.

#### 3.2.4 坏电池检测 Bad battery detection

当电池组中有某节电池低过 1.8v, 将认为是坏电池, 安全起见不能进行充电。状态灯红灯闪烁提示。

If a battery's voltage is lower than 1.8V, charger will judge it bad battery and stop charging for safety. State LED will flash in red.

#### 3.2.5 电池组接反检测 Battery pack reverse connection detection

当电池组接反时, 充电器能检测并提示。状态灯红绿灯将交替闪烁提示。

State LED will flash in red and green alternately to indicate battery is reversely connected.

#### 3.2.6 高温保护功能 High temperature protection

产品型号/MODEL NO.	受控编号/CONTROLLED DOCUMENTS NO.	版本 /VERSION	拟制/Drawn by	审核 /Verified by	页码/PAGE
CH-RLi031-03	JE-KF-GGS-142	A1	张风明	彭荣忠	PAGE5 / 9

能监控内部主要器件的温度并保护。如果某些不良原因导致内部温度过高，在温度达到 75 度时，充电电流减半。当达到 100 度时，充电停止。预防损坏。

Charge can supervise main components' temperature. If temperature reach to 75℃, the charge current will be halved. If temperature reach to 100℃, charger will stop charging for safety.

### 3.2.7 数据自检功能 Data self-check function

充电器能在整个充电过程中监控校验充电数据。预防数据出差造成的充电参数误差。

Charger can supervise charge data during whole charging period so as not to lead to error.

## 4 适用环境 Applicable environments

### 4.1 工作温度 Working temperature

0~+40℃

### 4.2 工作湿度 Working humidity

工作湿度 working humidity: ≤90% （不结露 no condensation）

### 4.3 贮存温度 Storage temperature

贮存温度 storage temperature: -20~+80℃

### 4.4 存储湿度 Storage humidity

相对湿度 relative humidity: Storage humidity ≤85%

### 4.5 大气压力 Atmospheric pressure

大气压力 atmospheric pressure: 70~106KPa

## 5 机械 Mechanics

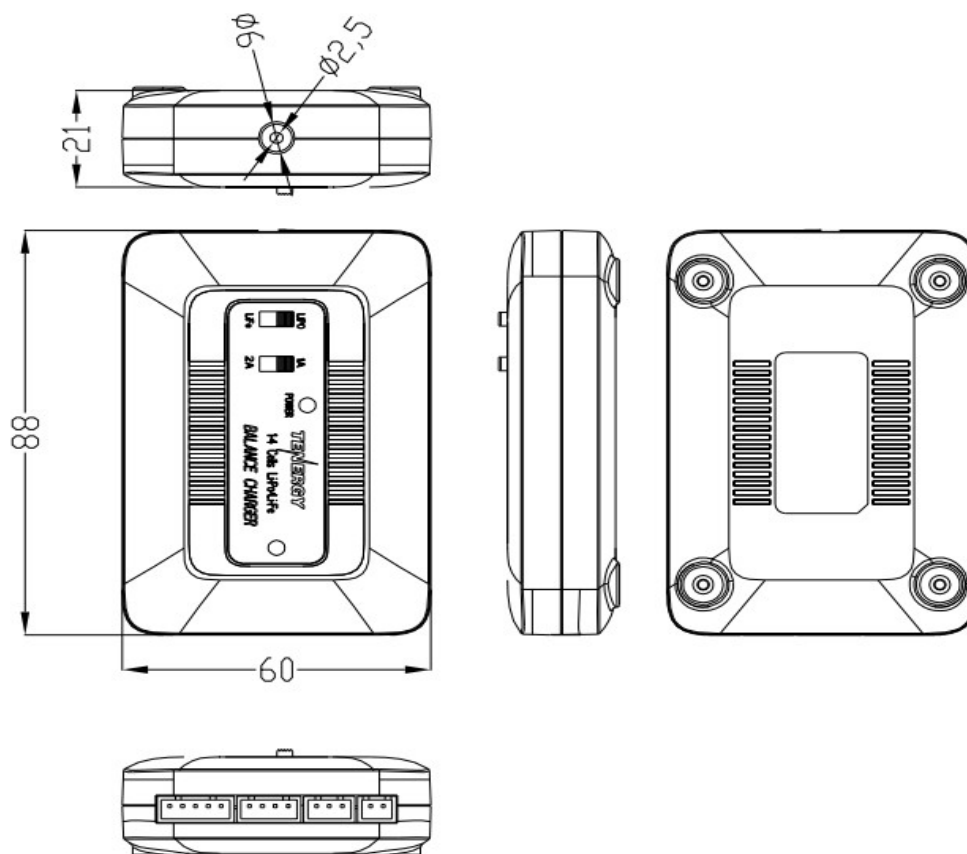
### 5.1 外观图 Appearance

当参数不一样时，外观会有些少区别。

Appearance will have some difference if parameters are not the same.

产品型号/MODEL NO.	受控编号/CONTROLLED DOCUMENTS NO.	版本 /VERSION	拟制/Drawn by	审核 /Verified by	页码/PAGE
CH-RLi031-03	JE-KF-GGS-142	A1	张风明	彭荣忠	PAGE6 / 9





## 6 可靠性能 Reliable characteristics

1. 高温试验：实验温度为  $65^{\circ}\text{C} \pm 2^{\circ}\text{C}$ ，产品不包装，持续时间为 5 小时。在常温下放置待恢复后对其外观、绝缘强度、指示功能及电气性能进行重新测试；外观应平整无划痕、毛刺以及其它机械损伤；外露金属部分不应有锈蚀；绝缘测试无击穿、飞弧现象；LED 指示功能及电气性能正常。  
High temperature test: under  $65^{\circ}\text{C} \pm 2^{\circ}\text{C}$ , the charger without packing, last for 5 hours. Then take it into the room temperature, test its appearance, LED and electrical specification. The appearance should have no scratches, burrs and other mechanical damage, metal parts rust should have no corrosion. Insulation test has no breakdown or arcing phenomenon .LED indication function and electrical performance works normally.
2. 低温试验：实验温度为  $-20^{\circ}\text{C} \pm 3^{\circ}\text{C}$ ，产品不包装，持续时间为 8 小时。在常温下放置待恢复后对其外观、绝缘强度、指示功能及电性能进行重新测试；外观应平整无划痕、毛刺以及其它机械损伤，外露金属部分不应有锈蚀；绝缘测试无击穿、飞弧现象；LED 指示功能及电气性能正常。  
Low temperature test: under  $-20^{\circ}\text{C} \pm 3^{\circ}\text{C}$ , the charger without packing, last for 8 hours. Then take it into the room temperature, test its appearance, LED and electrical specification. The appearance should have no scratches, burrs and other mechanical damage, metal parts rust

产品型号/MODEL NO.	受控编号/CONTROLLED DOCUMENTS NO.	版本 /VERSION	拟制/Drawn by	审核 /Verified by	页码/PAGE
CH-RLi031-03	JE-KF-GGS-142	A1	张风明	彭荣忠	PAGE7 / 9

should have no corrosion. Insulation test has no breakdown or arcing phenomenon. LED indication function and electrical performance works normally.

3. 恒定湿热试验：实验温度为  $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ ，湿度为 90%~95%，产品不包装，持续时间为 48 小时。测试后对其外观、绝缘强度、指示功能及电性能进行重新测试。外观应平整无划痕、毛刺以及其它机械损伤，外露金属部分不应有锈蚀；绝缘测试无击穿、飞弧现象；LED 指示功能及电气性能正常。

The constant humidity and heat test: under  $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ , humidity 90%~95%, the charger without packing, last for 48 hour. Then test its appearance, LED and electrical specification.

The appearance should have no scratches, burrs and other mechanical damage, metal parts rust should have no corrosion. Insulation test has no breakdown or arcing phenomenon. LED indication function and electrical performance works normally.

4. 振动试验：频率为 10~55HZ，振幅为 0.35mm，每个方向上扫频循环次数为 10 次。实验后对其外观、绝缘强度、指示功能及电性能进行重新测试。外观应平整无划痕、毛刺以及其它机械损伤，外露金属部分不应有锈蚀；绝缘测试无击穿、飞弧现象；LED 指示功能及电气性能正常。

Vibration test: 10~55HZ, amplitude 0.35mm, Sweep cycles in each direction 10 times. Then test its appearance, LED and electrical specification. The appearance should have no scratches, burrs and other mechanical damage, metal parts rust should have no corrosion.

Insulation test has no breakdown or arcing phenomenon. LED indication function and electrical performance works normally.

5. 跌落试验：高度为 1 米，实验台厚度为 20mm 的硬木板，6 个表面，每个方向 1 次。实验后对其外观、绝缘强度、指示功能及电性能进行重新测试。产品内部无异响，外观无机械破损，外露金属部分不应有锈蚀；绝缘测试无击穿、飞弧现象；LED 指示功能及电气性能正常。

Drop test: from 1M, the test platform is the hardboard with 20mm thickness. 6 surface, once in each direction. Then test its appearance, Dielectric strength, LED and electrical specification.

The appearance should have no damage, no abnormal noise inside; metal parts rust should have no corrosion. Insulation test has no breakdown or arcing phenomenon. LED indication function and electrical performance works normally.

6. 认证要求：暂无

Authentication: none

## 7 外观要求 Appearance requirements

充电器外壳表面平整无划痕，毛刺及其它机械损伤，丝印完整清晰，外露金属部份无锈蚀。

Charger case should be smooth and have no scratches, burrs and other mechanical damage, complete and clear screen, the exposed metal parts no rust

产品型号/MODEL NO.	受控编号/CONTROLLED DOCUMENTS NO.	版本 /VERSION	拟制/Drawn by	审核 /Verified by	页码/PAGE
CH-RLi031-03	JE-KF-GGS-142	A1	张风明	彭荣忠	PAGE8 / 9



## 8 体积与重量 Volume And Weight

### 8.1 体积 Volume

L 87 \* W 60\* H 22 mm<sup>3</sup>

### 8.2 重量 Weight

net: 58.4g

## 9 抽样标准 Sampling Standard

产品抽样检验参照 MIL-STD-105E 标准制定满足本公司产品品质检验之抽样计划，并严格督导实施。

当客户或合同有特殊要求时。可按客户和合同要求执行。

Product sampling reference MIL-STD-105E standards to meet the company's products quality inspection of the sampling plan, and implement strict supervision. Standard also can be based on the customer requirement.

## 10 包装 Packing

产品配套吸塑包装。

Product can be packed with blister. Packing can be customized

## 11 使用注意事项 Caution

1. 不可以拿本充电器充规格要求以外的电池组。

This charger is only suitable for 1-4 series Li-ion and LiFeO<sub>4</sub> battery pack.

2. 不可在超过 40℃ 环境使用本充电器对电池充电；建议在 35℃ 以下的环境下充电，电池在充足的时候有轻微的发热，属正常现象，请放心使用。

Do not use the charger to charge when temperature is over 40℃, temperature below 35℃ is recommended. It is normal that there is some heat when battery was fully charged.

3. 充电时远离热源和火源。

Far away from heat and fire.

4. 不得在酸、碱、和有腐蚀的环境中使用本充电器及电池。

Do not use the charger under the environment of acids, alkalis, and corrosion.

5. 不得让充电器进水或淋雨，以免引起安全问题。

Do not place the charger into rain or water, or may cause problems.

6. 不得拆解充电器和电池，以免引起危险。

Do not disassemble charger and battery, to avoid danger

7. 不得让小孩单独使用本充电器；请勿将充电器放置于小孩可接触到的地方，以免发生危险。

Do not let children use the charger alone. Please place the charger out of the reach of children, or it may cause dangerous.

产品型号/MODEL NO.	受控编号/CONTROLLED DOCUMENTS NO.	版本 /VERSION	拟制/Drawn by	审核 /Verified by	页码/PAGE
CH-RLi031-03	JE-KF-GGS-142	A1	张风明	彭荣忠	PAGE9 / 9