ELB ENERGY GROUP(SHENZHEN) LIMITED

亿科能源科技（深圳）有限公司

Sodium-ion Car Start-stop Battery
钠离子汽车启停电池

Model : H7/PN3-40Ah

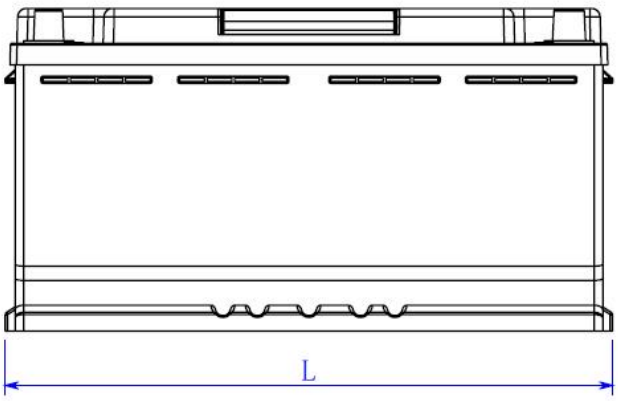
型　号: H7/PN3-40Ah

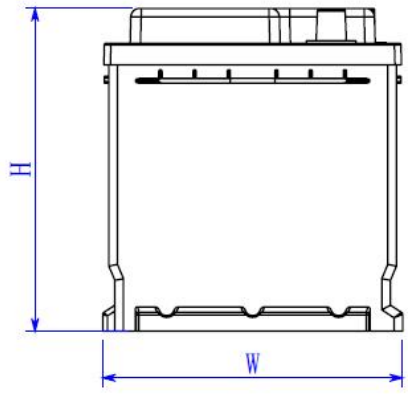
目录 Content

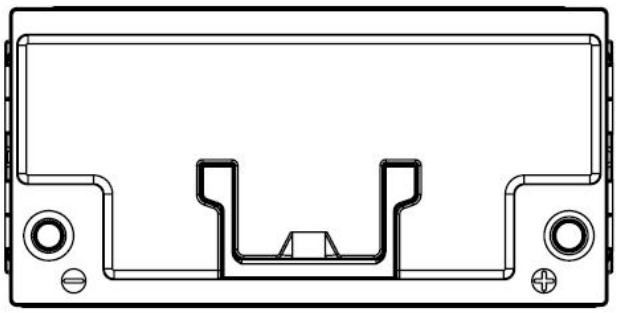
1. 概述 / General Information

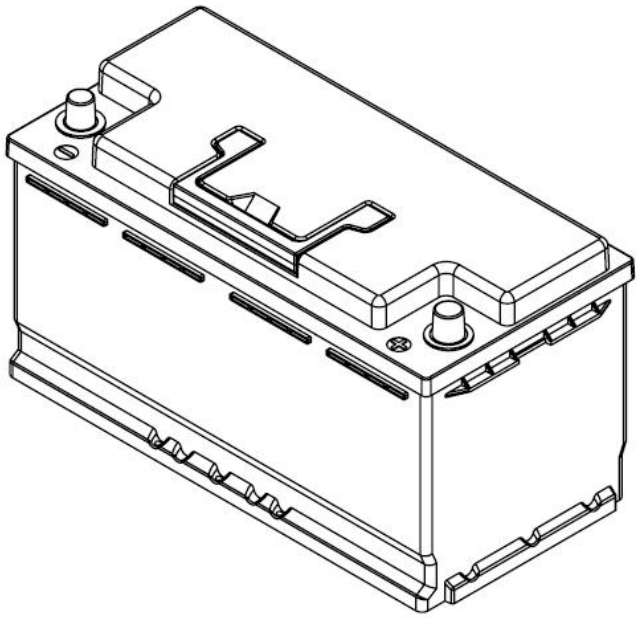
本规格书适用于亿科能源科技（深圳）有限公司生产的 12V-40Ah 钠离子可充电电池.
The specification shall be applied to Sodium-ion rechargeable battery pack of 12V-40Ah which is manufactured by ELB ENERGY GROUP (SHENZHEN) LIMITED.

2. 产品尺寸/Product dimension









H7/PN3　L*W*H=318*176*187mm
Unit：mm (tolerance±2mm)

3. 电池技术规格 / Battery Specification （@ 25±5℃）

序号 NO.	项目 Items		特性 Characteristics
3.1	额定容量 Nominal capacity		40.0Ah
3.2	最小容量 Min. capacity		39.0Ah
3.3	额定能量 Nominal energy		480Wh
3.3	电池组电芯组合结构 Combination structure of battery		4S
3.4	额定电压 Nominal voltage		12.0V
3.5	放电终止电压 End of discharge voltage		8V
3.6	标准充电电压 Standard charge voltage		15.8V
3.7	浮充充电电压 Float charge voltage		14.6V
3.8	标准充电电流 Standard charge current		20A
3.9	推荐充电电流 Recommended charge current		≤120A
3.10	最大持续充电电流 Allowed Max. charge current		120A
3.11	标准放电电流 Standard discharge current		40A
3.12	推荐放电电流 Recommended discharge current		≤120A
3.13	最大持续放电电流 Allowed Max. discharge current		120A
3.14	峰值电流 / 启停电流 Peak discharge current		750A,3Sec / **750CCA**
3.15	内阻 Internal Resistance		≤3.5mΩ
3.16	重量 Weight		Approx. 8.0kg
3.17	出货电量 Ex-factory capacity		Approx.50% SOC
3.18	循环次数 Cycle life		≥5000 @ 25℃ 0.5C DOD100%
3.19	工作温度 Operation temperature	放电 Discharge	-40℃~80℃
		充电 Charge	-10℃~55℃
3.20	储存环境 Storage environment	≤1Month	-20～+60℃、5～75%RH
		≤6Month	-10～+45℃、5～75%RH
		Recommend environment	15～+35℃、5～75%RH

4. 电气性能及测试条件 Electrical Characteristics & Test Condition

测试条件 Testing Conditions: Ambient Temperature: 25±5℃; Humidity:45%~75%.
标准充电：在 CC(0.2C)/CV(15.8V)模式下充电至电流减小至 0.02C，然后静置 1h。
Normal charge：Charge battery under CC(0.2C)/CV(15.8V) mode until the charge current reduce to 0.02C, and then rest for 1h.

序号 No.	项目 Items	标准 Standard	测试方法 Test condition
4.1	额定容量 Normal capacity	≥98%	电池经标准充电后，以0.2C 电流放电至截止电压。 After Normal charge, discharge @0.2C current to the end of discharge voltage.
4.2	初始内阻 Internal Impedance	≤3.5mΩ	在 50%SOC 条件下用 1kHz AC 的交流内阻测试仪。 @50% SOC @1kHz AC internal resistance test Instrument.
4.3	短路保护 Short circuit protection	短路后自动断开负载 Auto cutoff load when short circuit	用 0.1Ω的电阻短接电池的输出正、负极. Connect the positive and negative of this battery pack through a lead with 0.1Ω resistance.
4.4	放电温度特性 Discharge temperature Characteristic	-40℃/25℃≥75%	电池按标准规定充电，按 0.5C 的电流放电至 8V。电池必需先在不同的试验温度中放置 4 个小时后放电，百分比按放电容量比最小容量计算。 Battery shall be charged according to standard charge, discharged at 0.5C to 8V. Battery shall be stored for 4 hours at the test temperature prior to discharging and then shall be discharged at the test temperature, The percentage shall be calculated using discharging capacity compared to the minimum capacity.
		-20℃/25℃≥80%	
		0℃/25℃≥85%	
		25℃/25℃≥100%	
		55℃/25℃≥95%	
4.5	常温放电性能 Discharge performance in normal temperature	放电容量 Discharge capacity 0.2C ≥100% 1C ≥95%	在 25℃±2℃环境中，电池标准充电后，搁置 10min，然后以 0.2C、1C 放电至 8V。计算各倍率下的放电容量与额定容量的比值。 When the battery is in the environment of 25 ℃± 2 ℃, after standard charging, rest for 10min, and then discharge to 8V with 0.2C, 1C. Calculate the ratio of discharge capacity to rated capacity at each multiple.
4.6	容量保存率 Capacity retention rate	保持容量≥90% 恢复容量≥95% Capacity retention≥90% Capacity recovery ≥95%	测量电池的初始状态和初始容量，电池标准充电后，开路放置28天，测量电池最终状态；以 0.2 C 放电至8V，测量电池的剩余容量；电池再经标准充电后，以 0.2C 放电至8V，测量电池的恢复容量；可循环三次，当有一次达到标准，即达到标准要求。 Measure the initial state and capacity of the battery, after standard charge, then rest for 28

			days, measure the final state of the battery; discharge at 0.2C to 21.6V, measure the remaining capacity of the battery. After standard charging, the battery is discharged at 0.2C to 21.6V to measure its recovery capacity. It can be cycled three times.
4.7	循环寿命 Cycle life@ 25℃ 0.5C DOD100%	≥5000 cycles	电池标准充电后以 0.5C 电流放电至截止电压，静置 1h；重复上述步骤直至放电容量小于初始容量的 80%。 After Normal charge，discharge @0.5C current to the end of discharge voltage. Repeat above process until discharge capacity reduce to 80% of initial value.

5. 保护电路规格参数 Circuit Protection

本电池内部包含钠电池保护板，能实时监控电池运行状态，必要时提供过充、过放、过流、过温等保护，必要时切断动力电池的输入输出进行保护。

The batteries are supplied with a sodium Battery Management System (PCB)that can monitor and optimized each single prismatic cell during charge & discharge, to protect the battery pack overcharge, over discharge, short circuit. Overall, the BMS helps to ensure safe and accurate running.

序号 NO.	指标项目 Index items		参数 Parameters
1	单体过充保护 Single cell overcharge protection	单体过充保护电压 Single cell overcharge protection voltage	3950mV
		单体过充保护延时 Single cell overcharge protection delay	5S
	单体过压保护解除 Single cell overvoltage protection released	单体过充保护解除电压 Single cell overcharge protection release voltage	3700mV
		放电解除 Discharge release	Discharge current > 0.5A
2	总体过充保护 Overall overcharge protection	总体过充保护电压 Overall overcharge protection voltage	15.8V
		总体过充保护延时 Overall overcharge protection	5S

		delay	
	总体过压保护解除 Overall overvoltage protection released	总体过充保护解除电压 Overall overcharge protection release voltage	14.8V
		放电解除 Discharge release	Discharge current > 0.5A
3	充电过流保护 Charging overcurrent protection	充电过流保护电流 Charging overcurrent protection current	160A
		充电过流保护延时 Charging overcurrent protection delay	80mS
	充电过流保护解除 Charging overcurrent protection released	自动解除 Automatic release	Automatically released after 64 seconds
		放电解除 Discharge release	Discharge current > 0.5A
4	短路保护 Short circuit protection	短路保护功能 Short circuit protection function	I>2000A,80uS
		短路保护解除 Short circuit protection released	After the load is removed, the short circuit protection is released
5	均衡功能 Balance function	充电均衡开启 Charge balancing enabled	Voltage>3.433V, voltage difference> 76.8mV
		充电均衡停止 Charge balancing disabled	voltage difference <38.4mV
		静置均衡开启 Stationary balancing enabled	Voltage>3.433V, voltage difference>76.8mV
		静置均衡停止 Stationary balancing disabled	voltage difference < 38.4mV
6	电芯温度保护 Cell temperature protection	充电低温保护温度 Charging low temperature protection temperature	-40℃
		充电低温保护解除温度 Charging low temperature protection release temperature	-35℃
		充电高温保护温度 Charging high temperature protection temperature	85℃
		充电高温保护解除温度 Charging high temperature protection release temperature	70℃

6. 电池使用规范/Battery usage specification

6.1 电池单只使用时，可以直接使用。
6.2 电池需要并联或串联使用时，应先将每只电池按标准充电方式充满电后再并联或串联。
6.3 电池最大串联数不超过 1 串，并联数建议不要大于 2 并。

- When the battery is used alone, it can be used directly.
- When the battery needs to be used in parallel or in series, each battery shall be fully charged according to the standard charging method before parallel or in series.
- The maximum series number of batteries shall not exceed two, and the parallel number shall not exceed four.

7. 运输、存储注意 / Transport & Store

长期储存时，电池带电量一般在 30%~50%，高的带电量储存会加快电池容量衰减。
按规格书规定的方式每 6 个月需充放电循环一次。
运输过程装卸电池时请注意不要摔落，请勿超过 5 层堆积、翻转放置，保证正面朝上。
When long-time storage, the battery SOC is 30% ~ 50% , if high-SOC storage will accelerate the battery capacity degradation.
The battery need to be charged every 6 months if out of use.
No fall down, no pile up over 5 layers, and keep face up.

8. 警示及注意事项 / Warning & Tips.

使用电池前请仔细阅读规格书和电池箱表面的警示标志. 不当的使用电池可能会引起电池过热损坏，对于未按规格书操作造成的任何意外事故，亿科能源科技（深圳）有限公司不负担任何责任，为了使电池安全的使用及处理请在使用前认真的阅读操作说明：
Please read and follow the handling instructions before use. Improper use may cause heat, fire,rupture, damage or capacity deterioration of the battery. ELB ENERGY GROUP (SHENZHEN) LIMITED is not responsible for any accidents caused by the usage without following our handling instructions.

警告 Warning

- 电池请远离热源、高压场所、并避免长时间的日光暴晒；
- 不能将电池投入水或火中；
- 不要接反电池的正负极；
- 不要用金属短接电池正负极；
- 避免过分的物理震动和冲击电池，不要撞击、摔落、踩踏电池；
- 未经厂家许可和指导，严禁私自拆卸或组装电池；
- 不能将其它不同厂家，类型，型号的电池混合使用；

- Battery must be far away from heat source, high voltage, and no exposed in sunshine for long time.

- Never throw the battery into water or fire;
- Never reverse two electrodes when use the battery;
- Never connect the positive and negative of battery with metal;
- Never knock, throw or trample the battery;
- Never disassemble the battery without manufacturer's permission and guidance.
- Never use mixed with other type of battery;

注意 Attention

- 请不要高温环境下使用或储存，否则会引起电池发热、起火或使用寿命降低；
- 电池用完电后，请及时(15 天内)充电；
- 请使用专业的钠电池充电器；
- 电池有异味、变色、噪音、漏液、严重变形等异常情形时，请停止使用；
- 电解液泄露溅入皮肤、眼睛时，请用清水冲洗并立即找医生诊治；
- 请将电池放置在宠物和儿童接触不到的位置，禁止小孩接触电池；

- Keep the battery against high temperature. Otherwise it will cause battery heat, get into fire or lose some function and reduce the life.
- When battery run out of power, please charge your battery timely (≤15 days).
- Please use a dedicated sodium battery charger.
- If battery emit peculiar smell, heating, distortion or appear any abnormity, please stop using.
- If the battery leaks and get into the eyes or skin, do not wipe, instead, rinse it with clean water and see
- doctor immediately.
- Please far away from children or pets.