

能量型超级电容器产品规格书

Energy Based Supercapacitor Product Specification

型 号 Model: 42000F 60*138mm

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规格书修订记录

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一、适用范围 Scope of application

本规格书对深圳市清研储能技术有限公司开发的 4.2V 42000F 60*138mm 能量型超级电容器的特性、外观、尺寸、性能、测试方法、及注意事项进行了说明。This specification describes the characteristics, appearance, dimensions, performance, test methods, and precautions of the 4.2V42000F60*138mm energy type supercapacitor developed by Shenzhen Qingyan .

二、产品通用特性General Product Characteristics

2.1 特点与优势Features & Benefits

- ❖ 高能量密度 High energy density
- ❖ 高功率密度 High power density
- ❖ 超低内阻 Ultra-low internal resistance
- ❖ 超长循环寿命 Ultra-long cycle life
- ❖ 绿色环保 Green environmental protection
- ❖ 安全性能好 Good safety performance
- ❖ 工作温度范围宽Wide operating temperature range

2.2 典型应用领域 Typical application areas

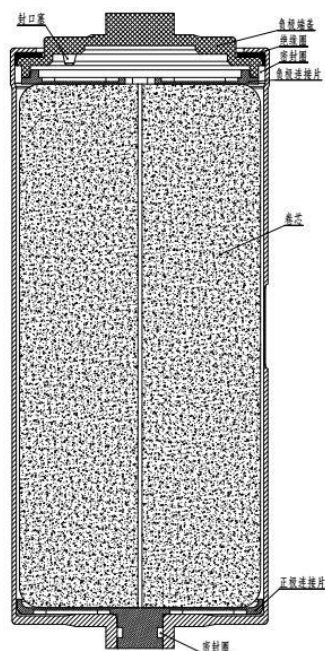
- ❖ 低温应急启动电源 Low Temperature Emergency Starting Power Supply
- ❖ 低速无人驾驶车辆 Low-speed unmanned vehicles
- ❖ 移动机器人 AGV Mobile robotic AGVs
- ❖ 电力调频储能 Electricity frequency regulation energy storage
- ❖ 风电、光伏调频储能 Wind power, photovoltaic FM energy storage
- ❖ 智能电网 Smart Grid
- ❖ 港口、叉车、工程车等重型机械 Port, forklift, construction vehicle and other heavy machinery

三、产品结构和尺寸 Product structure and dimensions

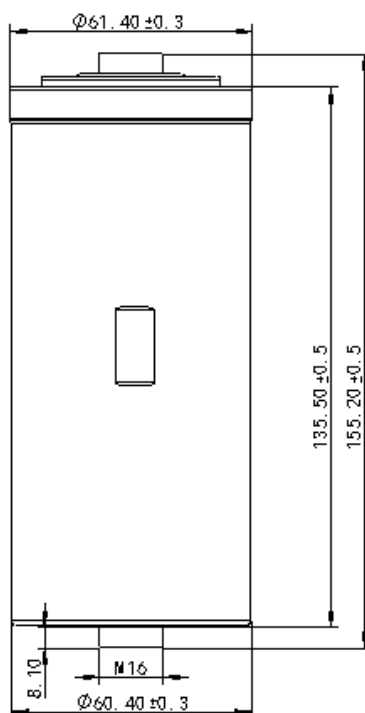
3.1、外观Appearance



3.2、结构Structure



3.3、尺寸Dimensions



四、主要技术参数 Main Technical Parameter

序号 NO.	项目 Item	规格Specifications
1	静电容量Electrostatic capacity	42000F
2	标称电量Nominal Capacity	20Ah (2.5-4.2V) 15Ah (2.5-3.8V)
3	上限电压Upper Capacity	4.2V
4	下限电压Lower Capacity	2.5V
5	容量偏差 Capacity tolerance	$\pm 10\%$
6	直流内阻（10ms） DC Internal Resistance	$\leq 0.5m\Omega$

7	交流内阻AC Internal Resistance	$\leq 0.3\text{m}\Omega$
8	标准充电电流Standard charging current	100A (5C)
9	最大充电电流Maximum Charging Current	500A (25C)
10	标准放电电流Standard charging current	100A (5C)
11	最大放电电流Standard Discharge Current	750A (50C)
12	能量密度Energy Density	$\sim 80\text{WH/kg}$
13	循环寿命Cycle life	50000 次
14	工作温度范围Operating Temperature Range	$-40\sim 65^{\circ}\text{C}$
15	储存温度范围Storage Temperature Range	$-40\sim 55^{\circ}\text{C}$
16	重量Weight	About 0.86kg

五、产品性能测试 Product function test

5.1、测试条件Test conditions

本产品规格书标准测试条件为：温度： $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 、相对湿度：25%~85%、大气压力： $86\text{KPa} \sim 106\text{KPa}$ 。
 The standard test conditions of this product specification are: temperature: $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$, relative humidity: 25%~85%, atmospheric pressure: $86\text{KPa} \sim 106\text{KPa}$.

5.2、依据标准 Standards

QC/T741—2017 《车用超级电容器》 Supercapacitors for Vehicles

GB/T36276—2018 《电力储能用锂离子电池》 Lithium-ion Batteries for Electrical Energy Storage

GB/T34870.1—2017 《超级电容器》 Supercapacitors

GB/T 31485-2015 《电动汽车用动力蓄电池安全要求及试验方法》 Safety Requirements and Test Methods for Power Storage Batteries for Electric Vehicles

5.3、产品可靠性、安全性测试方法及要求 Product reliability、safety test methods and requirements

序号 No.	项目 Item	测试方法 Test method	测试要求 Test Requirements
1	标准充电方式 Standard charging method	Under the condition of room temperature, charge with 5C constant current, when the product voltage reaches the charging limit voltage of 3.8V or 4.2V, it will be changed to constant voltage charging, and stop charging with constant voltage for 30min.	
2	Standard discharging method	Under the condition of room temperature, discharging with 5C constant current, when the product voltage reaches the discharge limit voltage of 2.5V, stop discharging.	
3	额定容量 Rated capacity	1.产品按标准充电方式充电 4.2V。 The product is charged at 4.2V according to the standard charging method. 2.搁置 30min。 Set aside for 30min 3.产品按标准放电方式放电至限制电压 2.5V。 The product is discharged to a limiting voltage of 2.5V in the standard discharge method.	产品容量应不低于 80% Product capacity should be no less than 80%
4	内阻 Internal resistance	交流内阻测试仪测试，精度：0.01mΩ AC internal resistance tester test, precision: 0.01mΩ	$\leq 1.5\text{m}\Omega$
5	高温放电 Thermal discharge	1.产品按标准充电方式充电至额定电压 3.8V。 The product is charged to the rated voltage of 3.8V according to the standard charging method. 2.将产品放入 60±2℃ 的高温箱中恒温箱 2H。 Put the product into the 60±2℃ high temperature box in the constant temperature box 2H. 3.产品按标准放电方式放电至限制电压 2.5V，记录 The product is discharged to the limiting voltage of 2.5V according to the standard discharge method, and recorded 放电容量。 Discharge Capacity. 4.放电结束后将产品取出放在常温条件下搁置 2H， At the end of the discharge remove the product and set it aside at room temperature for 2H.	放电容量应 $\geq 95\%$ 额定容量，产品外观无变形，无爆裂。 Discharge capacity should be $\geq 95\%$ of rated capacity. The appearance of the product shall not be deformed or cracked.

		然后目测外观。Then visually inspect the appearance.	
6	低温放电 Low temperature discharge	1.产品按标准充电方式充电至额定电压 3.8V。 The product is charged to the rated voltage of 3.8V according to the standard charging method. 2.将产品放入-30±2℃的低温箱中恒温箱 4H。 Put the product into the -30±2℃ low temperature box constant temperature box 4H 3.产品按标准放电方式放电至限制电压 2.5V，记录The product is discharged to the limiting voltage of 2.5V according to the standard discharge method , and recorded 放电容量。Discharge Capacity. 4.放电结束后将产品取出放在常温条件下搁置 2H， At the end of the discharge remove the product and set it aside at room temperature for 2H. 然后目测外观。Then visually inspect the appearance	放电容量应$\geq$60%额定容量，产品外观无变形，无爆裂。Discharge capacity should be $\geq$ 60% of rated capacity. The appearance of the product shall not be deformed or cracked.
7	循环寿命 Cycle life	1.The product should be at 25°C±5°C environment 2 The product is charged to the rated voltage of 3.8 V according to the standard charging method and set aside for 10min. 3.The product is discharged to the rated voltage of 2 .5V according to the standard charging method and set aside for 10min. 4. Repeat 2~3) 2000 times. 5. Test the capacity and internal resistance after standing for 12H. 6. Charge and discharge 25 cycles according to the above 2~5) charging and discharging methods until the Discharge capacity less than 80% of initial capacity , internal resistance $\geq$ 4 SPEC, stop cycle.	循环次数不低于 10000 次 Not less than 10,000 cycles
8	Security Testing	Reference to GB/T 31485-2015 "Safety Requirements and Test Methods for Power Storage Batteries for Electric Vehicles".	

六、使用注意事项Precautions for use

- ❖ High-energy supercapacitor with fixed polarity

- ❖ Do not touch metal objects when using supercapacitors to avoid short-circuiting the product due to positive and negative connections.
- ❖ Ambient temperature affects the life of ultracapacitors.
- ❖ Do not apply pressure on the outside of the product.
- ❖ No reverse charging.
- ❖ Products should be used at nominal voltage and current.
- ❖ Charging and discharging currents are suitable for standard charging and discharging methods up to 10C.
- ❖ Do not place the product near a heat source, the product should not be used in an environment exceeding 70C.
- ❖ The product is suitable to be stored with electricity when stored.

七、储存storage

- ❖ 产品不能储存在湿度超过 85%，或有毒气体的地方。

The product should not be stored in places where the humidity exceeds 85%, or where toxic gases are present.

- ❖ 最好储存在温度-10~45℃，湿度 60%的环境中。

It is best to store in an environment with a temperature of -10~45℃ and a humidity of 60%.