

58V17142F Specification for supercapacitors

48V1766F 超级电容器

产品规格书

Revision History

规格书修订记录

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1、Scope 适用范围

This specification describes the characteristics, appearance, dimensions, performance, test methods and precautions of the HESC(58V_17142F_MAA014161718DB1) developed by Shenzhen Tsingyan Energy Storage Co., Ltd.

本规格书对深圳市清研储能技术有限公司开发的 58V_17142F_MAA014161718DB1 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。

2、General characteristics 产品通用特性

2.1 Features and advantages 特点与优势

- ❖ High energy density 高能量密度
- ❖ High power density 高功率密度
- ❖ Ultra-low internal resistance 超低内阻
- ❖ Ultra Long Cycle Life 超长循环寿命
- ❖ Good safety performance 安全性能好
- ❖ Wide operating temperature range 工作温度范围宽

2.2 Typical application areas 典型应用领域

- ❖ Smart grid FM energy storage, high frequency energy saving energy storage
- ❖ 智能电网调频储能、高频节能储能
- ❖ Super Capacitor Tourist Vehicle, AGV Vehicle
- ❖ 超级电容观光车、AGV 车
- ❖ Low-temperature emergency starting power supply, backup power supply
- ❖ 低温应急启动电源, 后备电源
- ❖ Other working conditions with high power and energy requirements
- ❖ 其他对功率和能量要求比较高的工况

3、Main components,appearance,and dimensions 主要部件、外观尺寸

3.1 Main components 主要部件

Table 1 Main Components

表 1 主要部件

NO. 序号	Items 项目	Specification 规格	Quantity 数量	Remark 备注
1	Cell 单体电容	HESC 4.2V/15000F	224PCS	130*65*13mm
2	Terminal 端子	WL-CN1-250-C-R/ WL-CN1-250-C-B	4 PCS	
3	BMS Board BMS 板	58V17142F_14S16P BMS BOARD	1 PCS	Plug-in type 插拔式
4	Display Type 显示屏	3.5",TFT-LCD,65K COLORS	1 PCS	
5	Housings 外壳	936.5×561×210mm	1 PCS	

3.2 Appearance 外观

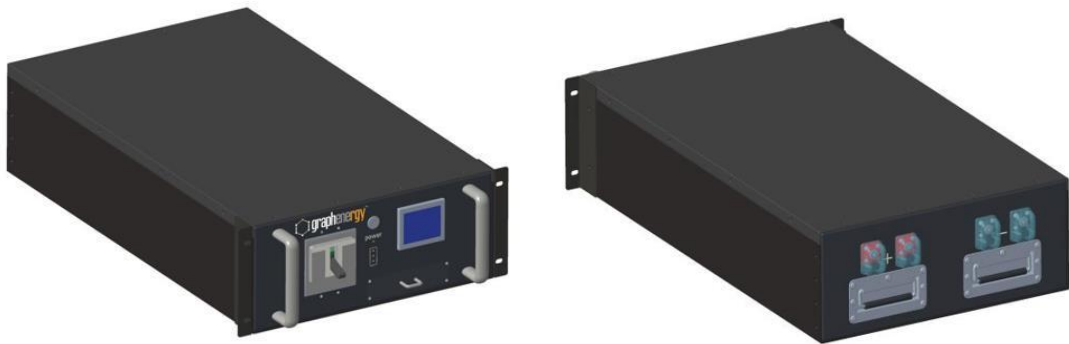


Figure 1 Appearance

图 1 外观

3.3 Panel and indicator light instructions 面板及指示灯说明

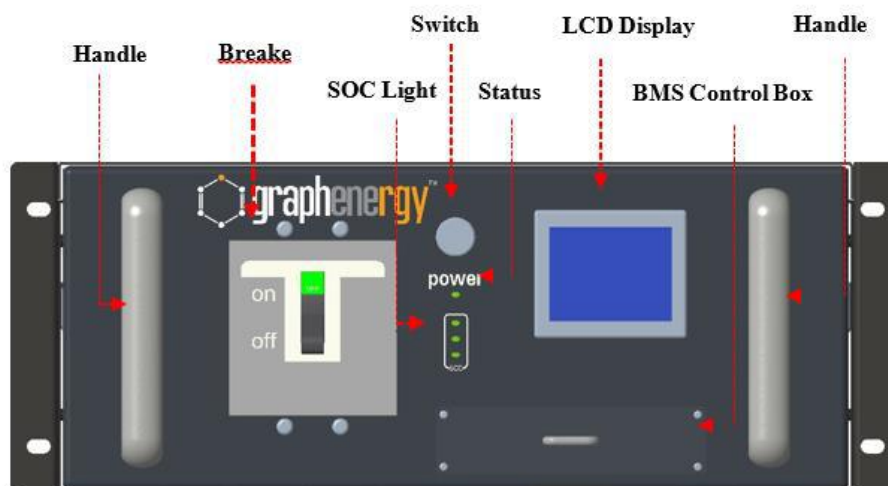


Figure 2 Module panel description

图 2 模组面板说明

1. 按键开关: 按下按键开关 BMS 通电, 通电后, BMS 完成自检, 此时闭合断路器, 模组即可正常对外输出。

2. 状态指示灯: 模组正常工作时, 此灯常亮; 模组有异常告警时, 此灯闪烁 (亮一秒灭一秒)。

3. 容量指示灯: 容量指示灯包含三个绿色指示灯, 从上至下依次为 1 号, 2 号, 3 号, 关于容量显示如下:

100%≥SOC > 90%: 1 号, 2 号, 3 号指示灯全亮;

90%≥SOC > 70%: 1 号亮一秒, 灭两秒闪烁, 2 号, 3 号常亮;

70%≥SOC > 50%: 1 号常灭, 2 号, 3 号常亮;

50%≥SOC > 30%: 1 号常灭, 2 号亮一秒, 灭两秒闪烁, 3 号常亮;

30%≥SOC > 20%: 1 号常灭, 2 号常灭, 3 号常亮;

20%≥SOC > 0%: 1 号常灭, 2 号常灭, 3 号亮一秒, 灭两秒闪烁;

3.4 Dimensions 尺寸

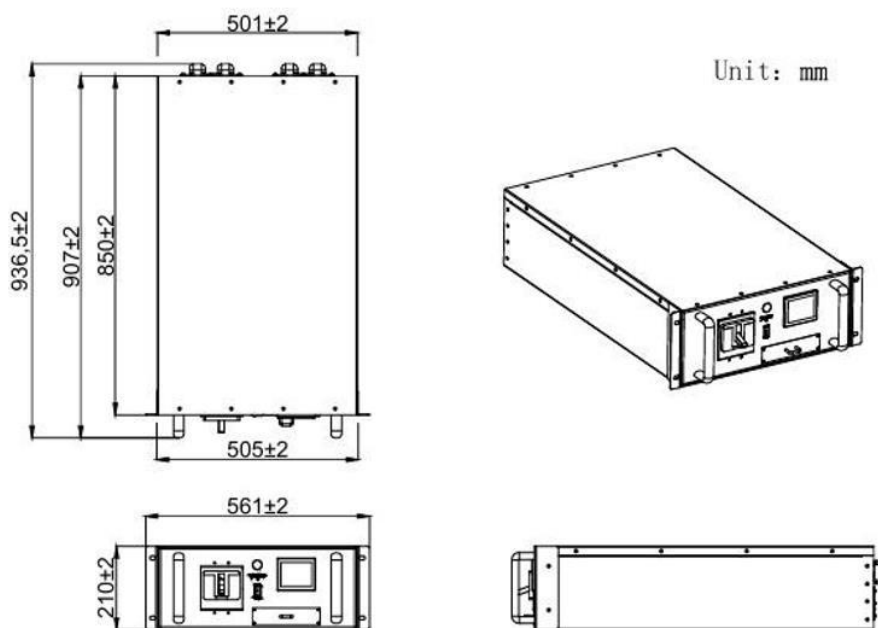


Figure 3 Dimensional drawing

图 3 尺寸图

4、Specification 主要技术参数

Table2 Specification

表 2 主要技术参数

NO. 序号	Items 项目	Specification 规格
1	Electrostatic capacity 静电容量	17142F/109.42Ah(-10%+30%)
2	Nominal capacity 标称电量	≥109.42Ah/5252Wh (35.0-58.8V)
3	Module composition 模组构成	14S16P (Cell:4.2V15000F)
4	Nominal voltage 标称电压	48V
5	Surge voltage 浪涌电压	58.8V
6	Minimum working voltage 最低电压	35V

7	Internal AC Resistance 交流内阻	$\leq 20\text{m}\Omega @ 25^\circ\text{C}$
8	Internal DC Resistance 直流内阻	$\leq 30\text{m}\Omega @ 25^\circ\text{C}$
9	Max. continuous charge current 最大持续充电电流	250A
10	Max. continuous discharge current 最大持续放电电流	250A
11	Storage voltage Range 储存电压范围	47.04 ($\pm 2\%$)
12	Cell cycle life 电芯循环寿命	50000 times (35V-58.8V) 80000 times (35V-56V)
13	Operation temperature 工作温度	-40~65°C (Between 40~65 °C, if the working current is too high, the over temperature protection will be triggered) -40~65°C (在 40~65°C时, 如工作电流过大, 就会触发过温保护)
14	Storage temperature 贮存温度	-10°C~45°C
15	Self Discharge 自放电	$\leq 5\%$ (every 3 months later at 25°C) $\leq 5\%$ (每 3 个月在 25°C下)
16	Size 尺寸	936.5×561×210mm
17	Parallel connection 可并联数量	≤ 20

5、Product Circuit 产品电路

5.1 Circuit Diagram 电路原理图

(略)

5.2 Capacitor management system parameters 电容管理系统参数

Table3 BMS Specification

表 3 BMS 技术参数

No. 序号	Items 项目	Detail 详细内容	Standard 标准
1	Overcharge protection 过充保护	Overcharge detection voltage 过充电检测电压	$58.8 \pm 0.21V$
		Overcharge detection delay time 过充电检测延迟时间	$2 \pm 0.3S$
		Overcharge release voltage 过充电解除电压	$56 \pm 0.21V$
2	Overdischarge protection 过放保护	Over discharge detection voltage 过放电检测电压	$32.2 \pm 0.21V$
		Over discharge detection delay time 过放电检测延迟时间	$2 \pm 0.3S$
		Over discharge release voltage 过放电解除电压	$40.6 \pm 0.21V$
3	Charging overcurrent protection 充电过流保护	Charging overcurrent protection current 充电过流保护电流	$270 \pm 10A$
		Charging overcurrent detection delay time 充电过流检测延迟时间	$3 \pm 0.3S$
		Protection release conditions 保护解除条件	Restart and release value release 重启和释放值释放
4	Discharge overcurrent protection 放电过流保护	Discharge over current protection current 放电过流保护电流	$270 \pm 10A$
		Discharge overcurrent detection delay time 放电过流检测延迟时间	$3 \pm 0.3S$
		Protection release conditions 保护解除条件	Restart and release value release 重启和释放值释放
5	Temperature protection 温度保护	High temperature protection conditions for charging 充电高温保护条件	$65^{\circ}C \pm 5^{\circ}C$

		High temperature recovery conditions for charging 充电高温恢复条件	60°C ± 5°C
		Low temperature protection conditions for charging 充电低温保护条件	-45°C ± 5°C
		Low temperature recovery conditions for charging 充电低温恢复条件	-30°C ± 5°C
		High temperature protection conditions for discharge 放电高温保护条件	65°C ± 5°C
		High temperature recovery conditions for discharge 放电高温恢复条件	60°C ± 5°C
		Low temperature protection conditions for discharge 放电低温保护条件	-45°C ± 5°C
		Low temperature recovery conditions for discharge 放电低温恢复条件	-30°C ± 5°C
6	Max. Continuously passing current 持续通过电流		250A (Max.)
7	Standby power 待机功耗		不含继电器≤1.3W (含继电器≤10W)

6、Product performance testing 产品性能测试

6.1 Test conditions 测试条件

Standard test conditions for this product specification:

Temperature: 25°C ± 5°C, relative humidity: 25% ~ 85%, atmospheric pressure: 86KPa ~ 106 KPa.

本产品规格书标准测试条件为：

温度：25°C ± 5°C、相对湿度：25% ~ 85%、大气压力：86KPa ~ 106 KPa。

6.2 According to standards 依据标准

- GB/T34870.1—2017 《超级电容器》
- DL/T 2080-2020 《电力储能用超级电容器》
- GB/T 31485-2015 《电动汽车用动力蓄电池安全要求及试验方法》

6.3 Reliability and safety testing methods and requirements 可靠性、安全性测试方法及要求

Table4 test method
表 4 测试方法

No. 序号	Items 项目	Testing methods 测试方法	Testing requirements 测试要求
1	Standard charging method 标准充电方式	Under normal temperature conditions, charge at a constant current of 250A. When the product voltage reaches the charging limit voltage of 58.8V, switch to constant voltage charging until the charging current is less than 300mA and stop charging. 在常温条件下, 以 250A 恒流充电,当产品电压达到充电限制电压 58.8V 时, 改为恒压充电, 直到充电电流小于 300mA 停止充电。	/
2	Standard discharge method 标准放电方式	Under normal temperature conditions, discharge at a constant current of 250A. When the product voltage reaches the discharge limit voltage of 35V, stop discharging. 在常温条件下, 以 250A 恒流放电,当产品电压达到放电限制电压 35V 时, 停止放电。	/
3	Rated capacity 额定容量	The product is charged to the rated voltage of 58.8V according to the standard charging method. 产品按标准充电方式充至电压 58.8V。 Leave for 10 minutes.	The product capacity should not be less than 90% 产品容量应不低于

		2. 搁置 10min。 3. The product is discharged to the limit voltage of 35V according to the standard discharge method. 3. 产品按标准放电方式放电至限制电压 35V。	90%
4	Internal resistance 内阻	AC internal resistance testing instrument testing, accuracy:0.01mΩ 交流内阻测试仪测试, 精度: 0.01mΩ	≤20mΩ
5	High temperature discharge 高温放电	1.The product is charged to the rated voltage of 58.8V according to the standard charging method. 1.产品按标准充电方式充电至额定电压 58.8V。 Place the product in a high-temperature oven at 60±2°C for 2 hours. 2. 将产品放入 60±2°C的高温箱中恒温箱 2H。 3. The product is discharged to the limit voltage of 35V according to the standard discharge method, and the discharge capacity is recorded. 3. 产品按标准放电方式放电至限制电压 35V, 记录放电容量。 4. After discharge, take out the product and place it at room temperature for 2 hours, then visually inspect its appearance. 4. 放电结束后将产品取出放在常温条件下搁置 2H, 然后目测外观。	The discharge capacity shall be ≥ 95% of the Nameplate capacity, and the product appearance shall be free of deformation and burst. 放电容量应 ≥ 95%额定容量, 产品外观无变形, 无爆裂。
6	Low temperature discharge 低温放电	1.The product is charged to the rated voltage of 58.8V according to the standard charging method. 2.产品按标准充电方式充电至额定电压 58.8V。 Place the product in a low-temperature oven at -40±2°C for a constant temperature of 4 hours. 2. 将产品放入 -40±2°C的低温箱中恒温 4H。 3. The product is discharged to the limit voltage of 35V according to the standard discharge method, and the discharge capacity	The discharge capacity shall be ≥ 60% of Nameplate capacity, and the product appearance shall be free of deformation and burst. 放电容量应 ≥ 60%额定容量, 产品外观无变形, 无爆裂。

		<p>is recorded.</p> <p>3. 产品按标准放电方式放电至限制电压 35V, 记录放电容量。</p> <p>4. After discharge, take out the product and place it at room temperature for 2 hours, then visually inspect its appearance.</p> <p>4. 放电结束后将产品取出放在常温条件下搁置 2H, 然后目测外观。</p>	
7	Safety testing 安全性测试	参照 GB/T 31485-2015 《电动汽车用动力蓄电池安全要求及试验方法》	

7、Notice 使用注意事项

- ❖ High energy super capacitors have fixed polarity.
高能量型超级电容器具有固定的极性。
- ❖ Do not touch metal objects when using supercapacitors to avoid short circuits caused by positive and negative pole connections.
使用超级电容器时请勿接触金属物体, 以免正负极连接引起产品短路。
- ❖ The ambient temperature affects the lifespan of supercapacitors.
环境温度影响超级电容器的寿命。
- ❖ Do not apply pressure outside the product.
请勿在产品外部施压。
- ❖ Reverse charging is not allowed.
不可以反向充电。
- ❖ The product should be used at nominal voltage and current.
产品应在标称电压、电流下使用。
- ❖ Please do not place the product near a heat source. The product should not be used in an environment exceeding 65 °C.
请勿将产品靠近热源, 产品不宜在超过 65°C 的环境中使用。
- ❖ The product is suitable for live storage during storage.

储存时产品适宜带电存储。

- ❖ If the product is not used for more than three months, charge it once every three months or disconnect the product switch and BMS protection board interface, auxiliary power supply, etc.

产品超过三个月不使用的，每 3 个月充一次电或断开产品开关和 BMS 保护板接口，辅助电源等。

8、Requirements for storage and transportation 储运要求

- ❖ The capacitor cannot be stored in place with humidity over 85%RH or place with toxic gas.

产品不能储存在湿度超过 85%，或有毒气体的地方。

- ❖ The capacitor should be best stored in the environment within -10~45°C temperature with relative humidity less than 60%.

最好储存在温度-10~45°C，湿度 60%的环境中。

- ❖ The product should be stored semi-electrically when it is not used for a long time.

产品长期不用时应半电储存。

- ❖ Handle gently during loading and unloading, inversion, extrusion, impact, vibration, etc. are strictly prohibited.

装卸过程中轻拿轻放、严禁倒置、挤压、冲击、震动等。

- ❖ Can be transported by car, train, ship, and other means of transportation.

可使用汽车、火车、轮船等交通工具运。

- ❖ Failure to store as required may cause irreversible capacity loss of the product or cause the product to be unable to be used normally.

未按要求存储的，可能会造成产品不可逆的容量损失或导致产品无法正常使用。

9. Product Liability 产品责任

- ❖ We are not responsible for accidents caused by operations in violation of the provisions of this specification.

对违反本规格书规定操作而导致的意外，本公司概不负责。

- ❖ Users are requested to dispose of the supercapacitors after use by following the environmental protection regulations of the local country.

使用后的超级电容器请用户按照当地国家的环保法规进行处置。