灯板

使用维护说明书

Light panel

Operation and maintenance manual

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1. 产品简介（Product Introduction）

本模块是专为储能电池管理系统（BMS）量身打造的 RGB-LED 灯板，采用高亮度 5050-RGB-LED 灯珠，可呈现丰富的色彩显示效果。该模块通过 RS485 协议与保护板建立通信连接，能实现电池 SOC（荷电状态）、充电状态、放电状态及故障类型等关键信息的可视化显示，为储能电池运行状态的实时监测提供直观便捷的解决方案。

This module is an RGB-LED light panel specifically designed for energy storage Battery Management Systems (BMS). It features high-brightness 5050-RGB-LED beads, enabling a wide range of vivid color displays. Communicating with the protection board via the RS485 protocol, the module visually presents critical information such as battery SOC (State of Charge), charging status, discharging status, and fault types. This offers an intuitive and efficient solution for real-time monitoring of energy storage battery operation.

2. 灯板外观（Light panel appearance）

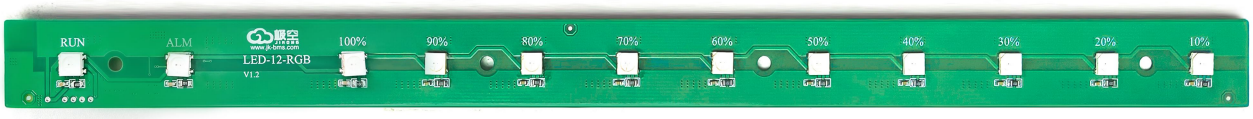




图 1/Figure1

3. 接口与线缆（Interface and cables）

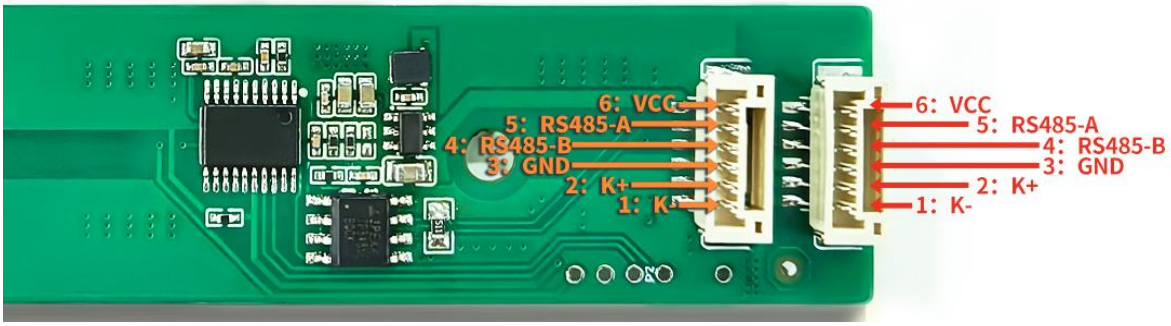


图 2-1/Figure2-1



图 2-2/Figure2-2

表 1-接口定义/List1-interface definition

连接器 Connector	序号	说明
用户接口 User Interface GH1.25-6P	1	K-
	2	K+
	3	GND，接地 Ground connection
	4	RS485-B
	5	RS485-A
	6	VCC，接 12V 供电 Connect to 12V power supply
用户接口 User Interface GH1.25-6P	1	K-
	2	K+
	3	GND，接地 Ground connection
	4	RS485-B
	5	RS485-A
	6	VCC，接 12V 供电 Connect to 12V power supply

4. 接线方式(Connection diagram)

灯条提供了两个用户接口，其中一个接口将配线一端接灯板的用户接口，另一端接保护板的显示屏接口即可，无需分辨方向。另一个用户接口可以接开关按钮(可实现开关机功能)，或接显示屏(可显示电池详细参数)。

The light strip is provided with two user interfaces. For one interface, you only need to connect one end of the wiring to the user interface of the light board and the other end to the display interface of the protection board, with no need to distinguish the direction. The other user interface can be connected to a switch button (which enables the power on/off function) or a display screen (which can show detailed battery parameters).

5. 灯带分布（LED strip distribution）

表 2-灯带分布/LED strip distribution

Run-Led	Alarm-Led	Led-10	Led-09	Led-08	Led-07	Led-06	Led-05	Led-04	Led-03	Led-02	Led-01
运行灯 Operation indicator light	告警灯 Alarm light	电量灯(Battery level light)									
		100%	90%	80%	70%	60%	50%	40%	30%	20%	10%

6. 灯用途分类(Classification of lamps by purpose)

灯板上一共 12 个 R-G-LED 灯, 每个灯可以显示红色、蓝色、绿色等多种颜色。按灯用途分为 3 大类：

表 3-状态灯指示表/Status light indicator table

状态 status	Led1	Led2	Led3	Led4	Led5	Led6	Led7	Led8	Led9	Led10	ALM	RUN
开机自检 Power-On Self-Test	LED 颜色依次点亮，全亮后全灭换下一种颜色，方向从右到左 The LED colors light up sequentially from right to left. After all LEDs are fully lit, they turn off completely before switching to the next color.											
故障状态 Failure status	电量指示灯处，SOC 状态与故障类型依次显示 5 秒,故障类型显示为红色 At the battery indicator, the SOC status and fault type will be displayed alternately for 5 seconds each. Fault types will be shown in red.										常亮 Steady on	红/绿 Red/Green
充电状态 Charging status	显示 SOC, 最大 SOC 灯到满充 SOC 灯流水 Display SOC. The lights from maximum SOC to full-charge SOC flow sequentially.											闪烁 1S Flash once per second
放电状态 Discharge status	显示 SOC，最大 SOC 灯闪烁，2 秒闪一次 Display SOC. The maximum SOC light flashes once every two seconds.											闪烁 1S Flash once per second
空闲状态 Idle status	显示 SOC Display SOC											常亮 Steady on

电量 Leds 亮灯指示(Power LED indicator)

表 4-充电状态/Charging status

SOC	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	ALM	RUN
0 ＜ S ≤ 10%	流水 Flowing											蓝闪① Blue flash①
10% ＜ S ≤ 20%	蓝 Blue	流水 Flowing										蓝闪① Blue flash①
20% ＜ S ≤ 30%	蓝 Blue	蓝 Blue	流水 Flowing								---	蓝闪① Blue flash①
30% ＜ S ≤ 40%	蓝 Blue	蓝 Blue	蓝 Blue	流水 Flowing							---	蓝闪① Blue flash①
40% ＜ S	蓝 Blue	蓝 Blue	蓝 Blue	蓝 Blue	流水 Flowing						---	蓝闪① Blue flash①
≤ 50%												
50% ＜ S ≤ 60%	蓝 Blue	蓝 Blue	蓝 Blue	蓝 Blue	蓝 Blue	流水 Flowing					---	蓝闪① Blue flash①
60% ＜ S ≤ 70%	蓝 Blue	蓝 Blue	蓝 Blue	蓝 Blue	蓝 Blue	蓝 Blue	流水 Flowing				---	蓝闪① Blue flash①
70% ＜ S ≤ 80%	蓝 Blue	蓝 Blue	蓝 Blue	蓝 Blue	蓝 Blue	蓝 Blue	蓝 Blue	流水 Flowing			---	蓝闪① Blue flash①
80% ＜ S ≤ 90%	蓝 Blue	蓝 Blue	蓝 Blue	蓝 Blue	蓝 Blue	蓝 Blue	蓝 Blue	蓝 Blue	流水 Flowing		---	蓝闪① Blue flash①
90% ＜ S ≤ 100%	蓝 Blue	蓝 Blue	蓝 Blue	蓝 Blue	蓝 Blue	蓝 Blue	蓝 Blue	蓝 Blue	蓝 Blue	流水 Flowing	---	蓝闪① Blue flash①

表 5-放电状态/Discharge status

SOC	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	ALM	RUN
0 ＜ S ≤ 10%	绿闪 Green flash ②	---	---	---	---	---	---	---	---	---		绿闪① Green flash ①
10% ＜ S ≤ 20%	绿 Green	绿闪 Green flash ②	---	---	---	---	---	---	---	---		绿闪① Green flash ①
20% ＜ S ≤ 30%	绿 Green	绿 Green	绿闪 Green flash ②	---	---	---	---	---	---	---	---	绿闪① Green flash ①
30% ＜ S ≤ 40%	绿 Green	绿 Green	绿 Green	绿闪 Green flash ②	---	---	---	---	---	---	---	绿闪① Green flash ①
40% ＜ S ≤ 50%	绿 Green	绿 Green	绿 Green	绿 Green	绿闪 Green flash ②	---	---	---	---	---	---	绿闪① Green flash ①
50% ＜ S ≤ 60%	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	绿闪 Green flash ②	---	---	---	---	---	绿闪① Green flash ①
60% ＜ S ≤ 70%	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	绿闪 Green flash ②	---	---	---	---	绿闪① Green flash ①
70% ＜ S ≤ 80%	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	绿闪 Green flash ②	---	---	---	绿闪① Green flash ①
80% ＜ S ≤ 90%	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	绿闪 Green flash	---	---	绿闪① Green flash

									②			①
90% ＜ S ≤ 100%	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	绿闪 Green flash ②	---	绿闪① Green flash ①

表 6-不充电不放电静止状态/Static state without charging or discharging

SOC	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	ALM	RUN
0 ＜ S ≤ 10%	绿 Green	---	---	---	---	---	---	---	---	---		绿 Green
10% ＜ S ≤ 20%	绿 Green	绿 Green	---	---	---	---	---	---	---	---		绿 Green
20% ＜ S ≤ 30%	绿 Green	绿 Green	绿 Green	---	---	---	---	---	---	---	---	绿 Green
30% ＜ S ≤ 40%	绿 Green	绿 Green	绿 Green	绿 Green	---	---	---	---	---	---	---	绿 Green
40% ＜ S ≤ 50%	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	---	---	---	---	---	---	绿 Green
50% ＜ S ≤ 60%	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	---	---	---	---	---	绿 Green
60% ＜ S ≤ 70%	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	---	---	---	---	绿 Green
70% ＜ S ≤ 80%	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	---	---	---	绿 Green
80% ＜ S ≤ 90%	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	---	---	绿 Green
90% ＜ S ≤ 100%	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	绿 Green	---	绿 Green

表 7-故障类型/Fault type

故障类型 Fault type	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	ALM	RUN
单体过放报警 Single cell over-discharge alarm	红 Red ①	---	---	---	---	---	---	---	---	---	---	绿 Green
过流报警	---	红	---	---	---	---	---	---	---	---	红	红

overcurrent alarm		Red									Red	Red
MOS 过温报警 MOS overtemperature alarm	---	---	红 Red	---	---	---	---	---	---	---	红 Red	红 Red
电池过温报警 Battery overtemperature alarm	---	---	---	红 Red	---	---	---	---	---	---	红 Red	红 Red
短路报警 Short circuit alarm	---	---	---	---	红 Red	---	---	---	---	---	红 Red	红 Red
协处理器异常 Coprocessor exception	---	---	---	---	---	红 Red	---	---	---	---	红 Red	绿 Green
均衡线电阻过大 Excessive resistance of the balancing wire	---	---	---	---	---	---	红 Red	---	---	---	红 Red	绿 Green
串数不符合 Inconsistent number of series	---	---	---	---	---	---	---	红 Red	---	---	红 Red	红 Red
其他报警 Other alarms	---	---	---	---	---	---	---	---	红 Red	---	红 Red	红 Red

注：闪① （闪烁频率：1 次/秒）； 闪② (闪烁频率：0.5 次/秒)

Note:Flash ① (Flicker frequency: 1 time/second);Flash ② (Flicker frequency: 0.5 times/second)

出现其他报警类型时，可以通过连接蓝牙 APP，在“实时状态”界面点击右上角三个点的“系统日志”查看。

When other types of alarms occur, you can check them by connecting to the Bluetooth app, going to the "Real-time Status" interface, and clicking "System Log" via the three dots in the upper right corner.

当多种报警一起出现时相对应的故障灯一起亮起，RUN 灯以“有红亮红，无红亮绿”的方式显示。

When multiple alarms occur simultaneously, the corresponding fault lights will illuminate together, and the RUN light will display in the manner of "lighting red if there is a red alarm, otherwise lighting green".

开机自检(Power-On Self-Test)

以流水灯方式自检所有的 LED 灯，（红蓝绿）,开机所有 LED 自检显示，如下：

Self-check all LED lights (red, blue, green) in a running-light manner during startup. The LED self-check sequence is as follows:

- 红色流水灯，红色显示从电量指示灯 Led-01 开始一次递增，最后全亮，然后全灭，进入下一轮；
- Red running light: Starts from the power indicator LED-01, increments one by one until all red LEDs are fully lit, then turns off all before proceeding to the next color.
- 蓝色流水灯，黄色显示从电量指示灯 Led-01 开始一次递增，最后全亮，然后全灭，进入下一轮；
- Blue running light: Starts from LED-01, increments one by one until all blue LEDs are fully lit, then turns off all before proceeding to the next color.
- 绿色流水灯，绿色显示从电量指示灯 Led-01 开始一次递增，最后全亮，然后进入工作模式；
- Green running light: Starts from LED-01, increments one by one until all green LEDs are fully lit, then enters the normal working mode.

7. 尺寸图（Dimension drawing ）

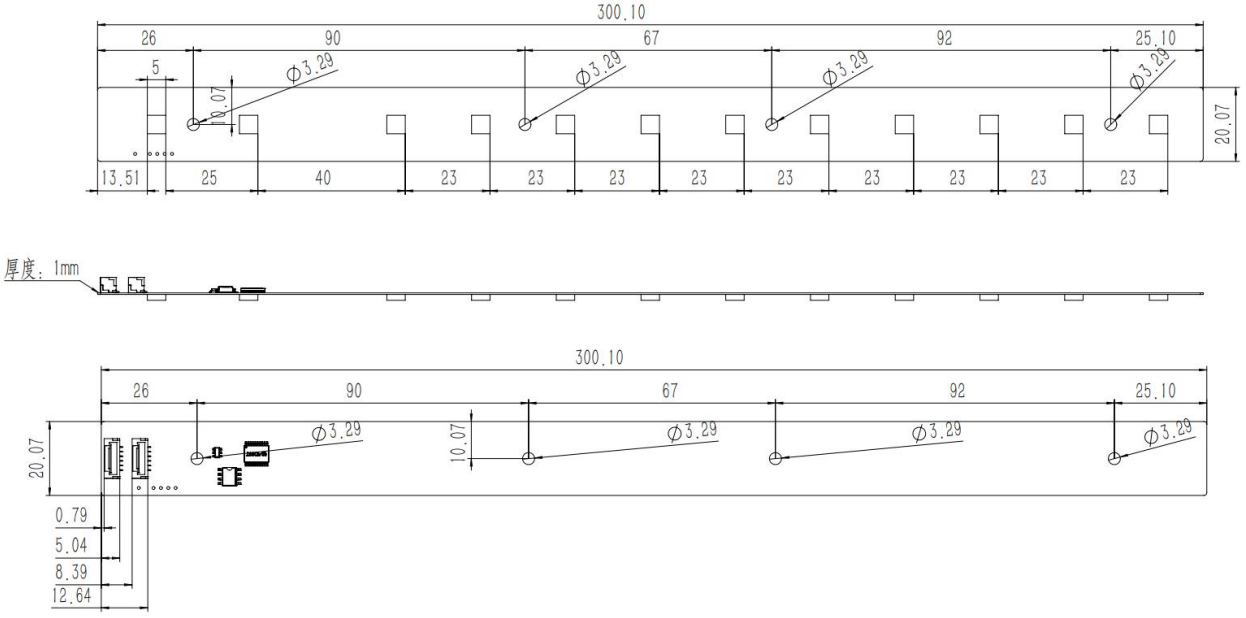


图 3/Figure3