MANUAL KAGE-RM-5150

Brand	KAGE
Product Model	KAGE-RM-5150
Product Code	KAGE-RM-5150
Cell Type	Lithium Iron Phosphate
Pack Mode	16S1P
Nominal Voltage	51.2V
Nominal Capacity	52Ah

1. Scope

This specification only applies to the reference battery pack 51.2V52Ah.

2. Rating

Item	Rating	Note
Type	LiFePO$_4$ Battery	
Pack Method	16S1P	
Nominal capacity	52Ah (Min 49.4Ah)	Charge/Discharge: 0.5C Cut-off Voltage: 43.2V
Nominal voltage	51.2V	
Energy	2662.4Wh (Min 2529.3)	
Charge method	CC/CV	
Charge cut-off voltage	58.4V	
Discharge cut-off voltage	43.2V	
Standard charge current	20A	
Max. charge current	50A	
Standard discharge current	20A	
Max. continues discharge current	50A	
Cycle life	≥2000times （周）	80% 25。C
Internal impedance	≤50mΩ	
Dimension	L420(460)*W482*H133.5 mm	
Communication Mode	CAN, RS485, RS232	
Weight	Approx. 40kg	
Working temperature range	Charge: 0。C–55。C Discharge: -20。C–55。C	
Storage Temperature	0。C–35。C	

3. BMS - BMS Parameter

3.1 Function Characteristics

With single cell voltage, battery pack voltage detection, over-charge, over-discharge alarm and protection functions. The sampling accuracy of static voltage at room temperature is less than or equal to 30mV.

With charge and discharge current detection, over-charge and over-discharge current warning and protection functions. The charging current is shown as positive, and the discharge current is shown as negative. The sampling accuracy of the current at room temperature is less than or equal to 2% @fs.

With cell, environment, MOS temperature detection, cell high and low temperature alarm and protection function, MOS

high temperature alarm and protection function, environment high and low temperature alarm function. At room temperature, the sampling accuracy is less than or equal to 4℃.

Short Circuit Protection.

With charging balance function.

Cell capacity estimation function. The full charge capacity, current capacity and designed capacity of the battery pack can be set by the upper computer, and the capacity can be automatically updated after the complete charge and discharge cycle.

LED state indicator function.

Upper computer software control function. Through the upper computer software can easily set the over charge, over discharge, charge and discharge over current, over temperature, under temperature and other protective parameters, also the capacity, sleep, balance, storage and other parameters.

RS232 communication interface, using isolation communication.

RS485 communication interface, using isolation communication.

There are various modes of dormancy and awakening.

3.2   Functional Schematic Diagram
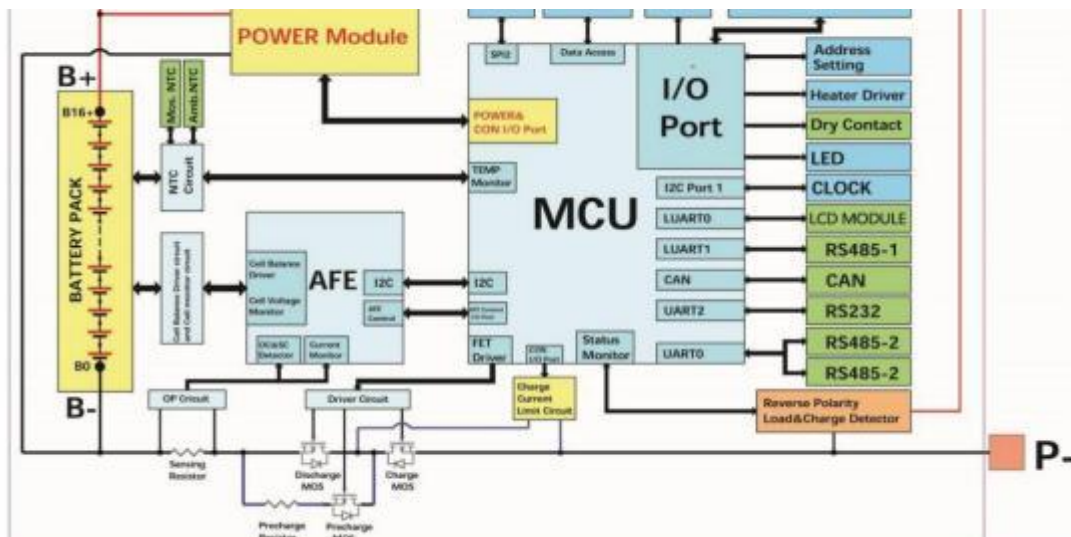
3.3. Electrical Characteristics

3.3.1. Basic Parameter Setting (Note: The following parameters are tested at 25℃ environment temperature unless otherwise specified).

序号 No	检测内容 **Test content**		出厂默认参数 Factory default parameters	单位 Unit	备注 Remark
1	放电 Discharge	额定放电电流 Rated discharge current	50	A	
	充电 Charging	满充电压 Full charge voltage	> 56	V	同时满足后停止充电并更新SOC 为100%；当SOC＜96%或有放电电流时允许再次充电。 At the same time, stop charging and update SOC to 100%; when SOC < 96% or there is discharge current, it is allowed to charge again.
		截止电流 Cut-off current	<2	A	
		建议充电电流 Recommended charging current	50	A	
2	被动均衡功能 Passive balance	均衡开启电压 Balanced turn-on voltage	3.4	V	
		均衡开启压差 Balanced opening voltage difference	30	mV	
		均衡电流 Balance current	150±30	mA	
		均衡开启条件 Equilibrium opening condition	1.有充电电流/With charging current 2.达到设定均衡开启压差/Reach the set equilibrium opening pressure difference 3.达到设定均衡开启电压/Reach the set balanced turn-on voltage		
3	单体过充告警 Cell overcharge warning	单体过充告警电压 Single overcharge warning voltage	3.60±0.05	V	
		单体过充告警延时 Cell overcharge alarm delay	1±0.8	S	
		单体过充告警解除电压 Cell overcharge alarm release voltage	3.50±0.05	V	
	单体过充保护 Single Cell over-charge protection	单体过充保护电压 Single Cell over-charge protection voltage	3.65±0.05	V	
		单体过充保护延时 Single Cell over-charge protection delay	1±0.8	S	
		单体过充保护解除电压 Single Cell over-charge protection release voltage	3.5±0.05	V	

	单体过充保护解除 Single overcharge protection released	剩余容量 SOC 解除 Remaining capacity SOC released	<96%		
		放电电流解除 Discharge current release	>1	A	
4	单体过放告警 Single Cell over-discharge warning	单体过放告警电压 Single Cell over-discharge warning voltage	2.8±0.05	V	
		单体过放告警延时 Single cell over-discharge alarm delay	1±0.8	S	
		单体过放告警解除电压 Cell over-discharge alarm release voltage	2.9±0.05	V	
	单体过放保护 Single Cell over discharge protection	单体过放保护电压 Single Cell over-charge protection voltage	2.7±0.05	V	过放保护30秒后，仍无法恢复时，将进入休眠模式。 After 30 seconds of over-discharge protection, if it still cannot be recovered, it will enter sleep mode.
		单体过放保护延时 Single Cell over-charge protection delay	1±0.8	S	
	单体过放保护解除 Single Cell over-discharge protection released	单体过放保护解除电压 Single over-discharge protection release voltage	2.9±0.05	V	
		充电电流解除 Charge current release	>1	A	
5	总压过充告警 Total voltage overcharge warning	总体过充告警电压 Overall overcharge warning voltage	57.6±0.5	V	
		总体过充告警延时 Overall overcharge warning delay	1±0.8	S	
		总体过充告警解除电压 Overall overcharge warning release voltage	56±0.5	V	
	总压过充保护 Total voltage overcharge protection	总体过充保护电压 Overall voltage overcharge protection	58.4±0.8	V	
		总体过充保护延时 Overall voltage overcharge protection delay	1±0.8	S	
	总压过充保护解除 Total voltage overcharge protection released	总体过充保护解除电压 Overall overcharge protection release voltage	56±0.8	V	
		剩余容量 SOC 解除 Remaining capacity SOC released	<96%		
		放电电流解除 Discharge current release	>1	A	
	总压过放告警	总体过放告警电压 Overall over-discharge warning voltage	44.8±0.8	V	

6	Total voltage over-discharge alarm	总体过放告警延时 Overall over-discharge alarm delay	1±0.8	S	过放保护30秒后，仍无法恢复时，将进入休眠模式. After 30 seconds of over-discharge protection, if it still cannot be recovered, it will enter sleep mode.
		总体过放告警解除电压 Overall over-discharge alarm release voltage	46.4±0.8	V	
	总压过放保护 Total voltage over-discharge protection	总体过放保护电压 Overall over-discharge protection voltage	43.2±0.8	V	
		总体过放保护延时 Overall over-discharge protection delay	1±0.8	S	
	总压过放保护解除 Total voltage over-discharge protection released	总体过放保护解除电压 Overall over-discharge protection release voltage	46.4±0.8	V	
		充电电流解除 Charge current release	> 1	A	
7	放电过流保护 Discharge overcurre nt protection	放电过流一级告警电流 Discharge overcurrent level 1 alarm current	53±3	A	<2%FSR 放电过流二级保护 Discharge overcurrent secondary protection
		放电过流一级告警延时 Discharge overcurrent level 1 alarm delay	1±0.8	S	
		放电过流一级保护电流 Discharge overcurrent primary protection current	55±3	A	
		放电过流一级保护延时 Discharge overcurrent primary protection delay	1±0.8	S	
		放电过流二级保护电流 Discharge overcurrent secondary protection current	75±3	A	
		放电过流二级保护延时 Discharge overcurrent secondary protection delay	1±0.8	S	
		解除条件 Cancellation conditions	1、1 min 后自动解除，连续出现 10 次将锁定该状态 ，不再自动解除。 It will be automatically released after 1 minute. If it occurs 10 times in a row, the status will be locked, and it will no longer be automatically released. 2、充电解除：充电电流 > 1A。 Charging release: charging current > 1A. 3、达到以上任一条件可解除。 Can be canceled when any condition is met.		
		充电过流一级告警电流 Charging overcurrent level 1 alarm current	53±3	A	
		充电过流一级告警延时 Charging overcurrent first level alarm delay	1±0.8	S	

8	充电过流保护 Charging overcurrent protection	充电过流一级保护电流 Charging overcurrent level 1 protection current	55±3	A	<2%FSR
		充电过流一级保护延时 Charge overcurrent first level protection delay	1±0.8	S	
		充电过流二级保护电流 Charging overcurrent secondary protection current	75±3	A	
		充电过流二级保护延时 Charge overcurrent secondary protection delay	1±0.8	S	
		解除条件 Cancellation conditions	1、1min 后自动解除，连续出现 10 次将锁定该状态，不再自动解除. It will be automatically released after 1 minute. If it occurs 10 times in a row, the Status will be locked and will not be automatically released. 2、放电解除：放电电流＞1A。 Discharge release: discharge current > 1A。 3、无限流模块时自动解除功能有效，达到以上任 一条件可解除，有限流模块时要放电才能解除。 When there is no "current limiting module", the automatic release function is valid, and it can be released when any of the above conditions is met. When there is a "current limiting module", it needs to be discharged to release it.		
9	短路保护 Short circuit protection	短路保护电流 Short circuit protection current	1000A		
		短路保护延时 Short circuit protection delay	10-500	uS	实际以客户寄回我司测试为准 The actual test shall be subject to the customer sending back to our company for testing
		短路保护解除 Short circuit protection released	移除负载解除/充电解除 Remove load release/charge release		
	充电高温保护 Charging high temperature protection	充电高温告警温度 Charging high temperature, alarm temperature	55±2	℃	
		充电高温告警延时 Charging high temperature, alarm delay	1±0.8	S	
		充电高温告警释放温度 Charging high temperature alarm release temperature	52±2	℃	
		充电高温保护温度 Charging with high temperature protection temperature	60±2	℃	
		充电高温保护延时 Charging with a high-temperature protection delay	1±0.8	S	

10		充电高温保护释放温度 Charging high temperature protection release temperature	57±2	℃	
	充电低温保护 Charging low temperature protection	充电低温告警温度 Charging low temperature alarm temperature	5±2	℃	
		充电低温告警延时 Charging low temperature, alarm delay	1±0.8	S	
		充电低温告警解除 Charging at low temperature, the alarm is lifted	8±2	℃	
		充电低温保护温度 Charging for the low-temperature protection temperature	0±2	℃	
		充电低温保护延时 Charging with a low-temperature protection delay	1±0.8	S	
		充电低温释放温度 Charging at low temperature release temperature	3±2	℃	
	放电高温保护 Discharge high temperature protection	放电高温告警温度 Discharge high temperature alarm temperature	60±2	℃	
		放电高温告警延时 Discharge at high temperature, and alarm delay	1±0.8	S	
		放电高温告警解除 Discharge at a high temperature, and the alarm is relieved	57±2	℃	
		放电高温保护温度 Discharge at a high-temperature protection temperature	65±2	℃	
		放电高温保护延时 Discharge with high-temperature protection delay	1±0.8	S	
		放电高温释放温度 Discharge at a high-temperature release temperature	62±2	℃	
	放电低温保护 Discharge low temperature protection	放电低温告警温度 Discharge low-temperature alarm temperature	-15±2	℃	
		放电低温告警延时 Discharge at low temperature, and alarm delay	1±0.8	S	
		放电低温告警解除 Discharge at low temperature, and the alarm is discharged	-12±2	℃	
		放电低温保护温度 Discharge at a low-temperature protection temperature	-25±2	℃	
		放电低温保护延时 Discharge with low-temperature protection time delay	1±0.8	S	
		放电低温释放温度 Discharge at a low-temperature release temperature	-22±2	℃	
11	环境温度保护 Protection of the ambient temperature	环境高温告警温度 Ambient high temperature alarm temperature	65±2	℃	
		环境高温保护温度 Environmental high-temperature protection temperature	70±2	℃	
		环境高温保护延时 Environmental high temperature protection delay	1±0.8	S	

		环境高温保护解除温度 Environmental high temperature protection to release the temperature	65±2	℃	
12	MOS 温度保护 The MOS temperature protection	MOS 高温告警温度 MOS high temperature alarm temperature	90±2	℃	
		MOS 高温告警解除温度 MOS high temperature alarm release temperature	85±2	℃	
		MOS 过温保护温度 The MOS over-temperature protection temperature	100±2	℃	
		MOS 保护解除温度 MOS protection release temperature	65±2	℃	
13	压差告警 Voltage differential alarm	压差大一级告警 Voltage difference level 1 alarm	0.3	V	压差＞1V（不可设置）为电芯失效保护，不允许充放电 Pressure difference＞ 1V (not set) is the cell failure protection, charge and discharge are not allowed
		压差大一级告警恢复 Voltage difference level 1 recovery	0.25	V	
		压差大二级告警 Voltage difference level 2 alarm	0.5	V	
		压差大二级告警恢复 Voltage difference level 2 recovery	0.45	V	
14	温差告警 Temperature difference alarm	温差大一级告警 An alarm with a large temperature difference	10±2	℃	
		温差大一级告警恢复 An alarm with a large temperature difference	7±2	℃	
		温差大二级告警 Large temperature difference and a secondary alarm	15±2	℃	
		温差大二级告警恢复 Recovery of secondary alarm for large temperature difference	12±2	℃	
15	SOC 告警 SOC report an emergency	电量低告警门槛 Power quantity is low for alarm threshold	＜10%		
16	NTC	电池温度检测路数 Battery temperature detection path number	4		
17	内阻 Internal resistance	主回路导通内阻 The main loop has an open internal resistance	＜20	mΩ	
18	消耗电流 Consumption of current	工作时自耗电电流 Self-consuming current at operation	≤60	mA	带显示屏 With a display
			≤45	mA	不带显示屏 Without display
		休眠模式自耗电电流 Dormant mode consumption current	＜800	uA	默认 default
		休眠时间 Sleep time	3600	S	

| 19 | 通讯方式 Communication | ☑UART ☑485 | ☑CAN ☑232 | | | |

3.4 LED indicator instruction

指示灯工作状态 Indicator operating Status

状态 Status	正常/告警/保护 Normal / Alarm / Protection	RUN 🟢	ALM 🔴	电量指示 LED Power quantity indicates the LED 🟢		🟢	🟢	说明 description
关机 Shut down	休眠 Sleep	灭 OFF	灭 OFF	灭 OFF	灭 OFF	灭 OFF	灭 OFF	全灭 OFF
待机 Standby	正常 Normal	闪1 Flash 1	灭 OFF	依据电量指示 According to the electric quantity indication				待机状态 Standby status
	告警 Alarm	闪1 Flash 1	闪3 Flash 3					模块低压 Module low pressure
充电 Charge	正常 Normal	常亮 Solid Green	灭 OFF	依据电量指示 According to the electric quantity indication (电量指示最高 LED 闪2) (Power indicates maximum LED flash 2)				最高电量 LED 闪动(闪2)，过充告警时 ALM 闪烁(闪3) Maximum power LED flash (flash 2),ALM flashing during overcharge alarm (flash 3)
	告警 Alarm	常亮 Solid Green	闪3 Flash 3					
	过充保护 Overcharge protection	常亮 Solid Green	灭 OFF	常亮 Solid Green	常亮 Solid Green	常亮 Solid Green	常亮 Solid Green	若无市电，指示灯转为待机状态 If there is no mains supply, the indicator turns to standby
	温度、过流、失效保护 Temperature 、 Overcurrent 、 Failure protection	灭 OFF	常亮 Solid Green	灭 OFF	灭 OFF	灭 OFF	灭 OFF	停止充电 Stop charging
放电 Discharge	正常 normal	闪3 Flash 3	灭 OFF	依据电量指示 According to the electric quantity indication				
	告警 alarm	闪3 Flash 3	闪3 Flash 3					
	欠压保护 Under-voltage protection	灭 OFF	灭 OFF	灭 OFF	灭 OFF	灭 OFF	灭 OFF	停止放电 Stop discharging

温度、过流、短路、反接`失效保护 Temperature,overcurrent, short circuit, reverse connection, failure protection	灭 OFF	常亮 Solid Green	灭 OFF	灭 OFF	灭 OFF	灭 OFF	停止放电 Stop discharging
失效 Lose efficacy	灭 OFF	常亮 Solid Green	灭 OFF	灭 OFF	灭 OFF	灭 OFF	停止充、放电 Stop charging and discharging

指示灯 SOC 说明 Indicator lamp SOC instructions

状态 Status		充电 Charge				放电 Discharge			
容量指示灯 Capacity indicator light		L4 🟢	L3 🟢	L2 🟢	L1 🟢	L4 🟢	L3 🟢	L2 🟢	L1 🟢
电量（%）	0~25%	灭 OFF	灭 OFF	灭 OFF	闪 2 Flash 2	灭 OFF	灭 OFF	灭 OFF	常亮 Solid Green
	25~50%	灭 OFF	灭 OFF	闪 2 Flash 2	常亮 Solid Green	灭 OFF	灭 OFF	常亮 Solid Green	常亮 Solid Green
	50~75%	灭 OFF	闪 2 Flash 2	常亮 Solid Green	常亮 Solid Green	灭 OFF	常亮 Solid Green	常亮 Solid Green	常亮 Solid Green
	75~100%	闪 2 Flash 2	常亮 Solid Green	常亮 Solid Green	常亮 Solid Green	常亮 Solid Green	常亮 Solid Green	常亮 Solid Green	常亮 Solid Green
运行指示灯 🟢 Running indicator light		常亮 Solid Green				闪烁(闪 3) Flash (Flash 3)			

3.5 Reliability Parameters

序号 numerical order	项 目 project	条 件 condition
1	检测精度 detection precision	电流检测精度： ≤2%FSR Current detection accuracy:≤2%FSR 电压检测精度： ≤15mV Voltage detection accuracy:≤15mV 温度检测精度： ≤2℃（常温下） Temperature detection accuracy:≤2℃(at normal temperature) SOC 精度(≤5%@50%容量量程以上) SOC accuracy(≤5%@50% capacity range or above)

3	信息存储 information storage	最大存储 10000 条履历信息，含保护次数，当前总电压、电流、温度、SOC、等 Maximum 10000 pieces of resume information can be stored, including protection times, current total voltage, current, temperature, SOC, etc	
4	SOC 计量 SOC metering	采用电流积分法，精度≤10%（受环境温度影响） Adopting current integration method, accuracy ≤10% (affected by ambient temperature)	
5	工作环境条件 Working environment condition	工作温度:-40℃ ~ 85℃ Operating temperature :-40℃ ~85℃	
		相对湿度:5% ~ 90%RH Relative humidity :5% ~ 90%RH	
6	存储环境条件 Storage environment condition	存储温度:-40℃ ~ 85℃ Storage temperature :-40 ℃ to 85 ℃	
		相对湿度:5% ~ 90%RH Relative humidity :5% ~ 90%RH	

3.6 Button description

3.6.1 BMS 处于休眠状态时，按下按键（3~6S）后松开，保护板被激活，LED 指示灯从"RUN"开始依次点亮 0.5 秒。

When the BMS is in sleep mode, press the button for 3 to 6S and release it. The protection board is activated and the LED indicator lights up successively for 0.5 seconds from "RUN".

3.6.2 BMS 处于激活状态时，按下按键（3~6S）后松开，保护板被休眠，LED 指示灯从最低电量灯开始依次点亮 0.5 秒。

When the BMS is activated, press the button for 3 to 6S and release it. The protection board is put to sleep and the LED indicator lights up successively for 0.5 seconds from the lowest power indicator.

3.6.3 BMS 处于激活状态时，按下按键（6~10S）后松开，保护板被复位，LED 灯全部同时熄灭。

When the BMS is activated, press the button (6-10s) and release it. The protection board is reset and all LED

lights are off at the same time.

When the BMS is in a sleep state, press the reset button for 3-6 seconds and release it. The protection board is activated, and the LED indicator lights turn on for 0.5 seconds starting from "L1". Then, the battery status is displayed based on the BMS detection.

3.7 Buzzer logic

3.7.1 故障时，每 1S 鸣叫 0.25S ；

When the fault occurs, the sound is 0.25S every 1S.

3.7.2 保护时，每 2S 鸣叫 0.25S (过压保护除外，欠压时 3S 响 0.25S) ；

When protecting, chirp 0.25S every 2S (except for overvoltage protection, 3S ring 0.25S when undervoltage);

3.7.3 告警时，每 3S 鸣叫 0.25S (过压告警除外) ；

When an alarm is generated, the alarm buzzes for 0.25S every 3S (except the overvoltage alarm).

3.7.4 蜂鸣器功能可通过上位机使能或禁止，出厂默认是禁止的

The buzzer function can be enabled or disabled by the upper computer, but is forbidden by factory default

3.7 Sleep and Wake-up

3.7.1 Sleep

When any of the following conditions are met, the system enters the sleep mode:

1) Cell or total undervoltage protection is not removed within 30 seconds.

2) Press the button (for 3~6S) and release the button.

3) No communication, no protection, no balance, no current, and the duration reaches the sleep delay time.

Before entering hibernation mode, ensure that no external voltage is connected to the input terminal. Otherwise, the hibernation mode cannot be entered.

3.7.2 Wake-up

When the system is in sleep mode and any of the following conditions are met, the system exits the hibernation mode and enters the normal operation mode:

1) Connect the charger, and the output voltage of the charger must be greater than 48V.

2) Press the button (for 3~6S) and release the button.

3) With 485, CAN communication activation.

Note: After cell or total undervoltage protection, the device enters sleep mode, wakes up periodically every 4 hours, and starts charging and discharging MOS. If it can be charged, it will exit the resting status and enter normal charging;If the automatic wake up fails to charge for 10 consecutive times, it will no longer wake up automatically.

3.8 Description of communication

3.8.1 RS232 communication

BMS can communicate with the upper computer through RS232 interface, so that the upper computer can monitor

various information of the battery, including battery voltage, current, temperature, status and battery production information, etc. The default baud rate is 9600bps.

3.8.2 CAN communication

The BMS CAN communicate with the upper computer through the CAN interface, so that the upper computer can monitor various information of the battery, including battery voltage, current, temperature, status, and battery

production information. The default baud rate is 250K, and the communication rate is 500K when interconnecting with the inverter.

3.8.3 RS485 communication

With dual RS485 ports, you can view PACK information. The default baud rate is 9600bps. If you need to

communicate with the monitoring device over the RS485 port, the monitoring device serves as the host. The address range is 1 to 16 based on the address polling data.

3.8.4 Dial switch Settings
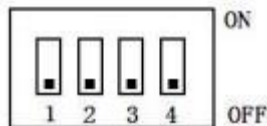
地址 address	拨码开关位置 Dip switch position				说明 Introductions	
	#1	#2	#3	#4		
0	OFF	OFF	OFF	OFF	设为主 PACK1 Let PACK1 set to be host	无级联，单机使用 PACK1 Uncascade, single machine using PACK 1
1	ON	OFF	OFF	OFF	设为从 PACK2 Let PACK2 set to be slave	
2	OFF	ON	OFF	OFF	设为从 PACK3 Let PACK3 set to be slave	
3	ON	ON	OFF	OFF	设为从 PACK4 Let PACK4 set to be slave	
4	OFF	OFF	ON	OFF	设为从 PACK5 Let PACK5 set to be slave	
5	ON	OFF	ON	OFF	设为从 PACK6 Let PACK6 set to be slave	

| 6 | OFF | ON | ON | OFF | 设为从 PACK7
Let PACK7 set to be slave | |
7	ON	ON	ON	OFF	设为从 PACK8 Let PACK8 set to be slave	
8	OFF	OFF	OFF	ON	设为从 PACK9 Let PACK9 set to be slave	
9	ON	OFF	OFF	ON	设为从 PACK10 Let PACK10 set to be slave	
10	OFF	ON	OFF	ON	设为从 PACK11 Let PACK11 set to be slave	
11	ON	ON	OFF	ON	设为从 PACK12 Let PACK12 set to be slave	
12	OFF	OFF	ON	ON	设为从 PACK13 Let PACK13 set to be slave	
13	ON	OFF	ON	ON	设为从 PACK14 Let PACK14 set to be slave	
14	OFF	ON	ON	ON	设为从 PACK15 Let PACK15 set to be slave	
15	ON	ON	ON	ON	设为从 PACK16 Let PACK16 set to be slave	

3.9 Inverter communication

The protection board supports the inverter protocol of RS485 and CAN communication interface. The engineering mode of the upper computer can be set.
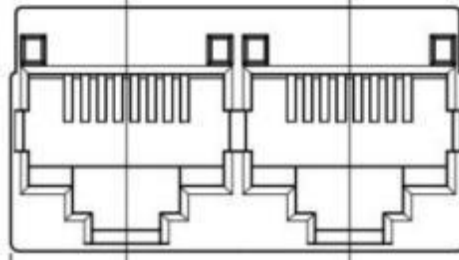
RS485 协议　**RS485 protocol**		CAN 协议　**can protocol**	
协议名称 **Agreement name**	适配逆变器 **Adaptive inverter**	协议名称 **Agreement name**	可兼容逆变器 **Compatible with inverters**
Voltronic power	日月元协议	Growatt	古瑞瓦特协议	Sacolar、 Growatt
Growatt	古瑞瓦特协议	Voltronicpower	Victronenergy	威通协议	荷兰 Victron
Srne	硕日协议	Srne	Pylon	派能协议	固德威 (Goodwe)、 Solark、 Xtender （ Xmt ）
Pylon	派能协议	Pylon、 首航	SMA	SMA	SMA
DeYe	德业协议	DeYe、 Sacolar	Aiswei	爱士惟	Aiswei
			DeYe	德业协议	DeYe
			Must	美克协议	SOFAR、MUST

3.10 Interface definition

3.10.1 Description of the interface pin
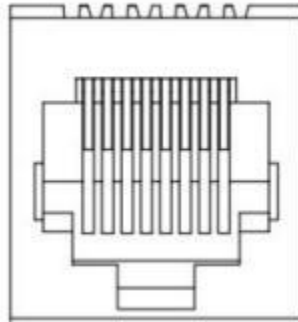
RS232--采用 8P 立式插座	
RS232-- 8P vertical socket	
RJ45 引脚 **RJ45 pin**	定义说明 **defined declaration**
1	485B1
2	481A1
3	ISO_GND
4	CAN1_H
5	CAN1_L
6	ISO_GND
7	232T
8	232R

CAN1+4851 外部通讯接口 **CAN1+4851 External communication port**			
RJ45 引脚 **RJ45 pin**	定义说明 **defined declaration**	RJ45 引脚 **RJ45 pin**	定义说明 **defined declaration**
1	485B1	9	485B1
2	485A1	10	485A1
3	ISO-GND	11	ISO-GND
4	CAN1 H	12	CAN1 H
5	CAN1 L	13	CAN1 L
6	ISO-GND	14	ISO-GND
7	485A1	15	NC
8	485B1	16	NC

CAN2+4852 内部通讯并联接口 **CAN2+4852 Parallel port for internal communication**			
RJ45 引脚 **RJ45 pin**	定义说明 **defined declaration**	RJ45 引脚 **RJ45 pin**	定义说明 **defined declaration**
1	485B2	9	485B2
2	485A2	10	485A2
3	ISO-GND	11	ISO-GND
4	CAN2 H	12	CAN2 H
5	CAN2 L	13	CAN2 L
6	ISO-GND	14	ISO-GND
7	485A2	15	485A2
8	485B2	16	485B2

4. Appearance and structural dimensions

It shall be free from any defects such as scratch, distortion, contamination and leakage.
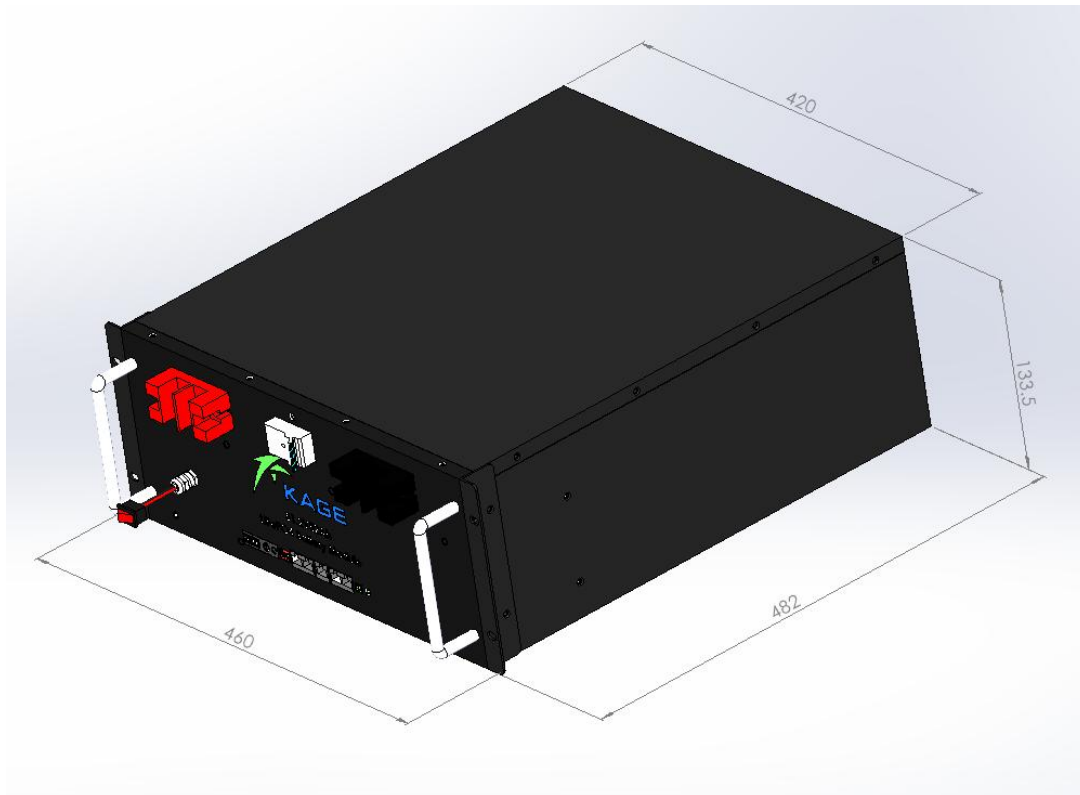
Unit (mm)					
L	420(460)±1	W	482±1	H	133.5±1

5. Delivery Condition

Approx. 50%±5% charged.

Shipment voltage: 51.2-54.4V.

If there are special requirements, please confirm before release open order.

6. Warnings

To prevent the possibility of the battery from leaking, heating, fire, Please READ this specification carefully before usage and observe the following precautions:

◎Prohibit to let battery pack bareness on outdoor for rain.

◎Do not use and leave the battery near a heat source as fire or heater.

◎Do not reverse the position and negative terminals.

◎Do not connect the battery to an electrical outlet.

◎Do not discard the battery in fire or heat it.

◎Do not transport and store the battery together with metal objects such as necklaces, hairpins etc.

◎Do not directly solder the battery and pierce the battery with a nail or other sharp object. ◎To avoid battery in version when carriage, assemble, test.

◎Do not allow others objects on battery cabinet when charge and discharge, or it will cause hot accumulation, leading to battery performance decline or leakage issue and so on.

◎Users cannot open the battery cabinet without permit, prohibit to break down battery pack, to avoid break insulation to short circuit and effect on usage.

◎Prohibit to refit battery pack. The manufacturer install protection system for it in order to prevent danger, if protect system broken, it leads that charge cannot control properly, or charge and discharge current is beyond than the set value, to its leakage, heat and fracture.

7. Battery operation instruction

7.1 Charge

Charging current： Do not surpass the biggest charging current which in this specification.

Charging voltage： Do not surpass the highest voltage which in this specification.

Charge temperature： The charge temperature is in according to this specification.

7.2 Discharge

Discharge current: Do not surpass the biggest discharge current which in this specification.

Discharge voltage: Do not be less than the lowest voltage which is in this specification.

Discharge temperature: The discharge temperature is in according to this specification.

7.3 Over-discharge

After the short time excessively discharges charges immediately cannot affect the use, but the long time excessively discharges can cause the battery the performance, battery function losing. The battery long-term has not used, has the possibility to be able to be at because of its automatic flashover characteristic certain excessively discharges the condition, for prevented excessively discharges the occurrence, the battery should maintain the certain electric quantity.

7.4 Storage

The battery should store in the product specification book stipulation temperature range. If has surpasses above for 3

months the longtime storage, suggested you should carry on additional charge to the battery. **10.5**

Please do not continuously charge the battery over 8hours.

8. Others

◎The customer is requested to contact KAGE in advance, if and when the customer needs other applications or operating conditions than those described in this document. Additional experimentation may be required to verify performance and safety under such conditions.

◎KAGE will take no responsibility for any accident when the battery is used under other conditions than those described in this Document.

◎KAGE will inform, in a written form, the customer of improvement(s) regarding proper use and handing of the battery, if it is deemed necessary.