大连融科储能技术发展有限公司
DALIAN RONGKE POWER CO., LTD.

UPower储能模块出厂检验表

Energy Storage Module Quality Inspection Certification

系统系列号 Module SN:　　储能模块型号 Module Version: UPower- 104

集成日期 Assemble Date:　　记录编号 Record Code:RKPI/R-QC-A16

设备清单Module parts			
物品 Item	**型号 Version**	**系列号 SN**	**铭牌 Nameplate**
电堆 Stack			□有Y □无N
负极泵 Pump,Anolyte			□有Y □无N
正极泵 Pump,Catholyte			□有Y □无N
风扇 Cooling Fan			□有Y □无N
负极桶 Tank Anolyte			□有Y □无N
正极桶 Tank Catholyte			□有Y □无N
温度传感器 Sensor T,Qty2			□有Y □无N
漏液传感器 Sensor Leaking			□有Y □无N
SOC电池 OCV Cell			□有Y □无N
电池控制器eBMS			□有Y □无N

序号#	**检查项目Item**		**检查标准Criteria**	**是否通过 Accepted**	**备注 Remark**
1	系统信息&UL标识 Module Info & UL code		有 Present/清晰Legible/完整Complete/位置符合图纸要求Location comply with drawing	□	
2	公司标识 Company Logo			□	
3	高压警告标识 High Voltage Warning			□	
4	船级标识 IBC CCS	海洋污染 Marine Pollution 2个		□	
		腐蚀性Corrosion 2个		□	
		正负桶 Catholyte and Anolyte tank 各		□	
		电解液安全说明 Electrolyte MSDS 2		□	
		重量 Weight 1个		□	
		认证标识 CCS Certification 1个		□	

序号#	检查项目Item		检查标准Criteria	是否通过 Accepted	备注 Remark
5	负极管路标识 Anolyte Piping labels	进液 Feed	有 Present/易识别 Easily readable /方向正确 Correct orientation/颜色正确 Correct coloring (ANSI)//粘贴位置统一 Location in consistent	☐	
		回液 Return		☐	
6	正极管路标识 Catholyte Piping labels	进液 Feed		☐	
		回液 Return		☐	
7	管路外观 Piping Appearance	负极整洁度 Anolyte Tidiness	干净 Clean/无电解液 No electrolyte/无划痕 No scratch	☐	
		正极整洁度 Catholyte Tidiness		☐	
8	桶外观 Tank Appearance	负极桶-整洁度 Anolyte Tidiness	干净 Clean/无电解液 No electrolyte/无划痕 No scratch	☐	液位level /mm 重量Weight /kg
		正极桶-整洁度 Catholyte Tidiness		☐	液位level /mm 重量Weight /kg
9	泵铭牌 Pump Nameplate	负极 Anolyte	有 Present/清晰Legible/完整Complete	☐	
		正极 Catholyte		☐	
10	泵外观Pump Appearance	负极 Anolyte	干净 Clean/无电解液 No electrolyte	☐	
		正极 Catholyte		☐	
11	泵紧固螺栓 Pump Tightness Bolts	负极 Anolyte	有 Present/紧固 Tightness/钛螺栓和垫片 Bolts and shims are made of Titanium / 扭矩划线 Torque mark	☐	
		正极 Catholyte		☐	
12	泵管连接 Pump Connect Pipe	负极 Anolyte	进出液口均为承插接头Socket spigot joints/结合紧密 Fully seated/4个蓝色管夹 Blue retainer clips QTY 4	☐	
		正极 Catholyte		☐	
13	托架,系统和电堆支架 Tote and BOP	外观 Appearance	漆面光滑-无划痕&脱漆 Painting no chipping or peeling off and exposed metal	☐	
		螺栓紧固性 Tightness Bolts (10处 QTY10)	圆垫片 Present round shims / 紧固 Tightness/无间隙 No gap / 扭矩划线 Torque mark /10处灰色钛螺栓 Ti Bolts QTY10 / 8处垫片为钛材质 Ti shims for eight fix points	☐	

序号#	检查项目Item		检查标准Criteria	是否通过 Accepted	备注 Remark
13	托架,系统和电堆支架 Tote and BOP	导电垫片 Bonding Shims (2处 QTY2)	圆垫片 Present round shims/紧固无间隙 Tightness and no gap/铜垫片 Conductive material/接触处无漆涂层 Exposed metal making direct contact with shims/均匀涂抹防腐导电膏Good coverage with No-Ox Grease	☐	
14	堆连接 Stack Installation	定位 Position	稳定 Stabilization/紧固 Tightness/2个固定螺栓紧固电堆在支架上secure the stack on a stack bracket with two bolts/固定螺栓为钛材质 Both of bolts are made of Titanium	☐	
		管支撑 Pipe Support	有 present/ 进出液管各1个 1QTY for each inlet and outlet pipe/紧固 Tightness	☐	
15	堆外观 Stack Appearance	整洁度 Tidiness	端板&弹簧&帽涂层无损No painting off for endplate, spring and nut	☐	
		涂防腐油膏 No-Ox Grease	铜电极板处很好地涂沫防腐导电膏 good coverage on copper terminals	☐	
		电极连接螺栓Bolts for DC terminal connect	每个铜板上各一个Bolt on each of DC terminals/钛Ti/紧固在端板上 Securely positioned / 螺纹无损 No damage	☐	
		密封 Sealant	端板内侧有硅胶涂层确保集流板不暴露在空气中-8条 Good silicone coverage for current collector plates inside of end plates, 8 strips	☐	
			电堆管路接头&各节电极框没有电解液和固体沉淀No signs of electrolyte and other chemical impurity at stack surface and fluid connectors	☐	
16	SOC电池 OCV Cell	SOC固定 OCV Fitting	在电堆端板上Fix on the stack endplate/ 紧固 Tightness/无电解液 No electrolyte/	☐	
		SOC连接管 OCV Tube	有管支撑板在SOC电池上 Pipe support board on the OCV/与堆进出液管连接紧密 Tightly connect on the stack inlet and outlet pipeline /有4个蓝色管夹 Blue retainer clips for the socket and spigot joints QTY 4/ 同侧管夹开口两两相对 the Openings of retainer clips on the same side opposite to each other	☐	

序号#	检查项目Item		检查标准Criteria	是否通过 Accepted	备注 Remark
16	SOC电池 OCV Cell	SOC信号连接 SOC signal cable connection	线连接紧密 Tightness / 线路连接正确 Circuit correct/OCV端板与电堆端板出液的标识一致 The endplate label of stack and SOC consistent	☐	
		涂防腐油膏 No-Ox Grease	固定螺母Bonding nuts/固定螺钉 Bonding fasteners/弹簧螺杆Spring bolts except for with plastic cover /导电片 OCV cell terminal /很好地涂抹 Good coverage	☐	
17	密封条 Sealing Stips	整洁度 Tidiness	无电解液 No electrolyte	☐	
		紧密性 Sealing	无翘起 No rips / 密封合适无空气流进入 Sealing to block air flow through undesired path/ 有present-桶与托架间 Tank&Tote,两桶间 Between tanks /黑色 black	☐	
18	硬泡沫 Rigid Foam	桶安装后 After Tank Installing	有 Present-正极桶与泵底座 Catholyte tank and pump base between/溢流管下面 Crossover under/泵支架与托架间 pump BOP and tote between/风道底部 Vent hood base	☐	
19	U型管 U-tube	材质 Material	吹塑管 Blow molding tube/白色聚乙烯 White PE	☐	
		液体 Liquid	用量筒量取200ml液体 measure 200ml liquid with volumetric cylinder/测量pH值并记录 measure pH and record/记录U型管高度 measure liquid height in clear tube	自弯管处上边缘高度 Height /mm pH值pH value	
		排气管 Vent Tube	有 Present/紧固 Tightness/连接到风扇 Vented to fan shroud/管无打弯No bending	☐	
		紧固 Tightness	1个管支撑紧固在BOP上 Securely mounted to BOP with one pipe support / 3个蓝色管夹 Three retainer clips in blue	☐	
20	管路承插连接 Pipeline connection with socket and spigot joints	材质 Material	吹塑管 Blow molding tube/白色聚乙烯 White PE	☐	
		管支撑 Pipe Support	有 Present/负极泵进液管 Anolyte pump inlet/电堆正负进液管 stack feed pipe /U 型管 U tube/ 类型&颜色一致 material & color consistent	☐	

序号#	检查项目Item		检查标准Criteria	是否通过 Accepted	备注 Remark
20	管路承插连接 Pipeline connection with socket and spigot joints	管路水平度 Pipeline Levelness	竖直的管路垂直 Vertical about straight pipeline / 系统和电堆连接管路水平 horizontally aligned for stack pipes and system pipes	☐	
		适配器安装 Connector Fixing	有双O环 Double O-ring present /公头和母头完全结合在一起 Male connector fully seated within female connector/ 管夹完全卡公母适配器的凸台处 Clips full seated over both flanges	☐	
		管夹 Retainer Clips	蓝色 Black/水平夹开口向下Opening of horizontal retainer clips upward/ 垂直夹开口向里 Opening of vertical retainer clips inward	☐	
			负极桶进出液口Anolyte tank outlet and inlet	☐	
			正极桶进出液口Catholyte tank outlet and inlet	☐	
			负极泵进出液口Anolyte pump inlet and outlet	☐	
			正极泵进出液口Catholyte pump inlet and outlet	☐	
			U型管 U tube	☐	
			溢流管 Gas & liquid crossover	☐	
			堆进出液与主管路 Stack inlet and outlet with liquid pipeline	☐	
			泵出液管与主管路 Pump outlet with liquid pipeline	☐	
			文丘里管路Venturi pipeline	☐	
			负极桶气体排出管 Gas vent pipe from Anolyte tank	☐	
		桶回液接头安装 Tank Inlet Connector Installation	有方向划线 Orientation mark present/ 站在BMS柜前 Face to BMS/负极向右 Right for anolyte &正极向左 left for catholyte	☐	
21	BMS 外观 BMS Appearance	前面板 Front Panel	螺栓紧固 Tightness/扭矩划线 Torque mark/整洁 Tidiness /无划痕 No Scratch	☐	
		导电螺栓 Bonding Stud	铜材质 Copper/紧固 Tightness /涂防腐膏 Greasing/铜垫片Copper shims/2处 QTY2	☐	

序号#	检查项目Item		检查标准Criteria	是否通过 Accepted	备注 Remark
22	线缆连接 Cable Connection	直流电缆 DC Cable	有 Present/完好无损 intact /固定紧密 Secure with retainer/连接金属有防腐涂层 Greasing on terminals/固定螺栓扭矩划线 Torque mark/合适连接，与尖锐处无摩擦 Free direct contact (rubbing against corner and edges)	☐	
		信号线 Sensor Cable	合适地固定 Suitable fixing /无摩擦的风险 cable strain relief/线完好没有破损 No sign for damage	☐	
		插接器 Connector	插接器接头固定 Connector locking closely/标识正确 Label correct &从右往左依次为TT(温度传感器）→OCV（开路电压）→Leak(泄漏）→PC01（正极泵）→PA01(负极泵）→FAN(风扇）from right to left, temperature sensor, OCV, leaking, catholyte pump,anolyte pump	☐	
23	断电后状态 Power OFF After test	重置键 Reset	在断开的位置 Reset off	☐	
		以太网保护罩 Ethernet Cover	有present/2个Qty2/黑色Black	☐	
		存储卡 SD Card	有present/1个Qty1/固定Secured on position	☐	
		BMS 上盖 BMS cover	有present/固定Secured on position/固定螺丝齐全 no fasteners missing	☐	
24	上盖 Module Covers	上罩 Cover	浅灰Light gray/PE材质 PE material/下沿外扣在托架外面Edge of tote tucked within cover/无破损 No signs of damage/ 风扇顶部和上罩之间有硬泡沫环密封 rigid foam ring present on the top of fan	☐	
		吸风口 Service Window	2个百叶格 Grating Qty 2 /每个百叶格含1个空气过滤网 Air intake filter Qty 1 for each window-shades/固定紧固 Service window secured in position	☐	
		通风口 Exhaust Vent Grating	上罩顶部On the top of cover/畅通，无泡沫阻挡 Move air smoothly without disruption	☐	

序号#	检查项目Item		检查标准Criteria	是否通过 Accepted	备注 Remark
25	运输前包装状态 Package Status	电堆用扎带固定 Stack with packing strips	1条One strip/紧固Secured on position/ 有硬质垫在SOC处Corrugated paper between SOC and strip	☐	
		U型管 U-Tube	透明管中有可见的液位Visible Level at the clear side of U-Tube/液位大约为75mm左右 The liquid level around 75mm	☐	液位level /mm
		塑料薄膜 Plastic Film	缠绕Wrap on system/ 紧固Secured on position	☐	
		硬泡沫 Rigid Foam	有Present/固定在木板上 Secured on wood cover/上部1cm厚 1cm thickness for upper/下部2cm厚 2cm thickness for middle and lower	☐	
		木板 Wooden Packing Crates	有Present/固定 Secured /无缝隙 No gap	☐	
		包装标识 Packing Labels	防倾倒TILTXINK/防震动 ShockXinke/UL认证标识 UL certificated labels/电解液安全说明 Electrolyte SD/腐蚀 anti-corrosion	☐	
		温度记录仪 Temperature Recorder	可选Optional/有1个 Present QTY1 /固定 Secured	☐	Module No. #
检验结论 Quality			☐ 合格Qualified ☐ 不合格 Not Qualified		
质检员 Inspector 日期 Date			质量印章盖章处RKPI Quality Stamp		
审核者Audited by 日期 Date					

UPower储能单套系统性能检验报告

Energy Storage Module Single System Performance Certification

储能模块型号 Module Version: UPower- 104 记录编号 Record Code:RKPI/R-QC-A16

BMS版本号 BMS version： 模块系列编号 Module SN

序号#	检查项目Item	检查标准Criteria		是否通过 Accepted	备注 Remark
1	模块指令逻辑 Single Module Logic Command	泵指令 Pump Command	指令响应正确 Correct response/泵电流符合测试软件需求 Pump current meets the requirement of test software	☐	
		风扇指令 Fan Command	指令响应正确 Correct response	☐	
			有风running/ 风向正确-排风air movement out	☐	
		电源供电 Power Supply	供电Power on/BMS柜体Power 指示灯亮 Power-blue-on of BMS cabinet	☐	
		以太网 Ethernet Port	给指令 Command / 通讯正常 Communication normal	☐	
		从断开到连接状态 Connected	给连接指令并显示连接 Command "Connect" state and "Connected" display	☐	
			运行灯亮故障灯灭 Run-red-on Fault-yellow-off	☐	
		从连接到断开状态 Disconnected	给断开指令并显示断开 Command "Disconnect" state and "Disconnected" display	☐	
			运行灯灭故障灯亮 Run-red-off Fault-yellow-on	☐	
		故障状态Fault state	触发故障(急停或漏液)Trigger safety interlock or leak sensor/显示故障 "Fault" display	☐	
			运行灯灭故障灯亮 Run-red-off Fault-yellow-on	☐	
2	模块控制逻辑 Single Module Logic Control	直流接触器 DC contactors	串联(KM2)Series/控制接触器闭合和断开 Command “CLOSED” and ”OPEN”	☐	
			主(KM1) Main/控制接触器闭合和断开 Command “CLOSED” and ”OPEN”	☐	
			先测试电堆电压，确认无电 Before Bypass testing, confirm the stack voltage zero/旁路(KM3) Bypass/控制接触器闭合和断开 Command “CLOSED” and ”OPEN”	☐	

序号#	检查项目Item	检查标准Criteria		是否通过 Accepted	备注 Remark
3	模块控制逻辑 Single Module Logic Control	温度（槽壁） Temp Sensor (tank wall)	显示值在合格范围内 Reported value within acceptable range(5~52℃）	参考温度Reference Value ℃ 显示Displayed Value ℃	
		温度（槽壁） Temp Sensor (tank wall)	拔掉传感器,信号丢失Unplug sensor and signal loss/显示故障&温度值过高报警 Fault and Temp high alarm	☐	
		漏液传感器 Leak sensor	拔掉传感器,信号丢失Unplug sensor and signal loss/显示故障&其他报警-“漏液”Fault and Other Alarm-Leak Alarm	☐	
		泵 Pump	拔掉泵连接线,信号丢失Unplug pump connector and signal loss/显示故障&其他报警-“泵”Fault and Other Alarm-Pump differential Alarm	☐	
4	自供电性能 Self-powered Capacity	电网供电，连接状态 Connected state with grid supply	设定内部直流电源电压为47.3~47.7V,电堆电流显示±2A Set DC voltage of 47.3~47.7V and the reported stack current is between -2A and 2A	☐	
		电网断电，连接状态 While in Connected state whitou grid power	拔下BMS柜前的220VAC电源 Unplug 220AC power from front of BMS/系统仍处于运行状态没有故障报出The system remains in connted state without faulting	☐	
		电网断电，在自供电状态 While in self-powered Connected state whitou grid power	给系统断开指令没有故障报出 The system enters "Disconnect" state without faulting	☐	
			给系统连接指令没有故障报出 The system enters "Connect" state without faulting	☐	
4	反馈 Feedback	电堆电压 Stack voltage	连接（无电流）Connected(no current)/显示值在可接受的范围内Reported value within acceptable range	☐	
		OCV 响应 OCV Feedback	充电前Before initial charge:0~0.01	实测值Record Value	
			充电后After initial charge:1.25~1.54	实测值Record Value	
			拔掉传感器,信号丢失Unplug sensor and signal loss/显示故障&SOC过低 Fault and SOC low alarm	☐	

5	过充Overcharge (SOC)	在系统配置里修改过压保护值，修改的数值低于当前实际电压值;或者利用外部1.55V-1.60V的电压源接到OCV的接线 Modify “high fault” level in System Configuration to a value lower than present value or Apply external voltage to OCV cable,故障和SOC值过高报警Fault and SOC high alarm	☐	
6	溢流管 Crossover bridge	目视正极桶和负极桶的液位变化Electrolyte level change	☐	
7	SOC 状态 SOC%	发货时系统带电状态 SOC% when shipped		%
8	噪声测试 Noise	风扇运行时的噪音Record decibel when fan running		实测值Record Value

检验结论 Quality	☐ 合格Qualified ☐ 不合格 Not Qualified
测试员 Tester 日期 Date	质量印章盖章处RKPI Quality Stamp
审核者Audited by 日期 Date	

单套系统性能Single DC ReFlex module performance

1. Rated power 5.6kW, 7.2kW,10kW,12kW，14kW
2. Charging with constant power 10kW and constant voltage 57.6V to OCV 1.54V
3. Discharging with constant power to voltage 36V
3. Cycle number depend on the customer requirement, normally three repeatable cycles will be reported

循环数	充电Charge				放电Discharge				效率% Roundtrip Efficiency%
cycle	开始时间 Start Time	功率 Power/ Kw	容量Energy /kWh	充电时间 Duration/h	功率 Power / Kw	开始时间 Start Time	容量Energy /kWh	放电电时间 Duration/h	
		10kW			10kW				
					12kW				
					14kW				
					7.2kW				
					5.6kW				

备注 Remark		
绝缘测试 Insulation @1000V	电堆铜排与BMS接地柱间Between copper terminal of stack and copper shims of BMS	+ MΩ/ - MΩ
检验结论 Quality	☐ 合格 Qualified	☐ 不合格Not Qualified
测试人 Tester /日期date	审核人 Verified By/日期date	

Document Version	Release Date	Revision History
V1.0	2025-04-16	**Official Launch (V1.0)**