

LGES LIB 주요 특징

안전성

Global No.1 Safety

- S-Frame 적용, UL9540A 인증 제품
- KEC 한국전기설비규정 개정안 충족

신뢰성

Global 시장 선도 기업

- Global No.1 국내 리튬이온 배터리 제조사
- 다양한 실적을 통한 설계/구축/운영 노하우

효율성

운영환경 제약사항 개선

- UPS Vendor/Model에 따른 Customizing
- 높은 에너지 밀도로 공간 활용성 극대화

친환경

친환경 설비실 구축

- 환경유해물질 미발생
- 높은 재용 경제성(높은 배터리 환경성 계수)

 LG Energy Solution

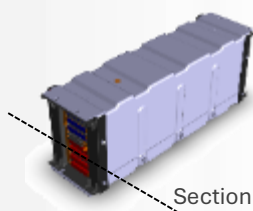


LGES JP5 UPS Battery

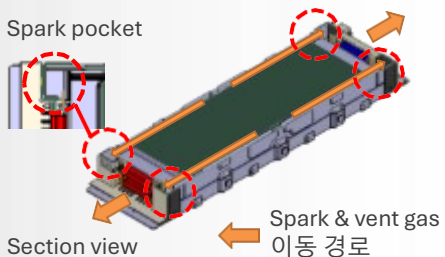
배터리 화재 안전 인증 (UL 9540A)

■ 스파크 제어 기술

CMA (cell module assembly)

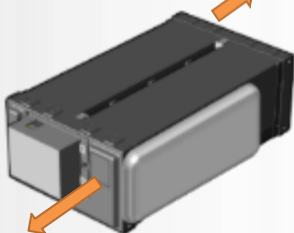


Spark pocket

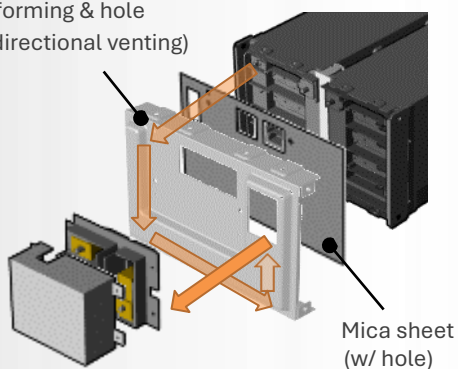


Pack

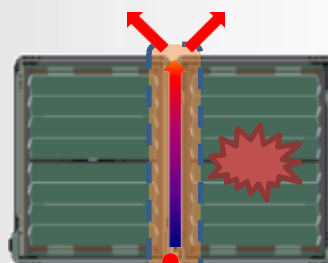
Vent Gas 경로



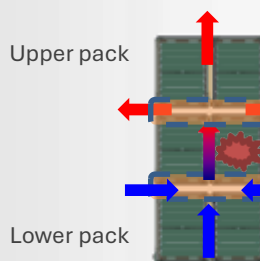
Front/Rear plate
(w/ forming & hole
for directional venting)



■ 전파 억제 기술



- CMA 사이에 공기 단열층을 형성하여 CMA/Pack의 전파 제어



- 최적의 팩간 간격을 적용하여 팩간 열전달을 억제

외부 (Between packs)



UL9540A Rack Level Test Video (x32)

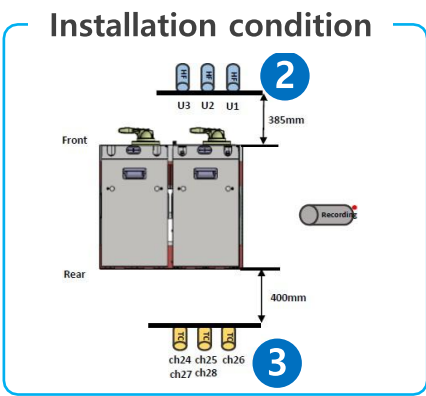
배터리 화재 안전 인증 (UL 9540A)

UL9540A Test Results (at LGES Research Center) (1/2)

Number	Item	criteria	Value	Remark	Result
①	Flame, Explosion	Not observed	Not observed	-	PASS
②	Heat releases rate	Under 1.3kw/m^2	0.0002kw/m^2	(by Heat flux gauges) (Clearance : 385mm)	PASS
③	Well temp. – Ambient temp.	Under 97°C	22°C	(37°C - 15°C) (Clearance : 400mm)	PASS

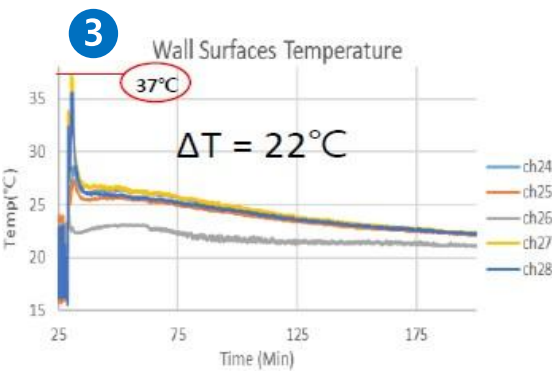
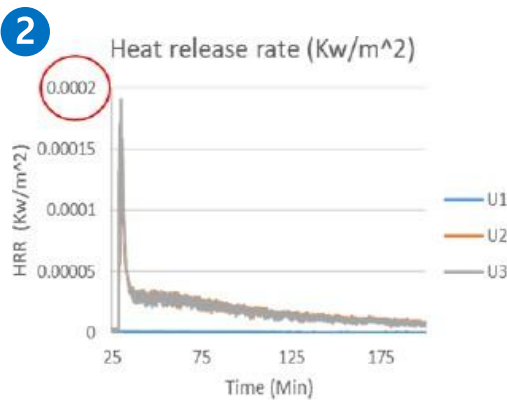
Test Condition. (UL9540A 4th Edition)

SOC 100%
DC 66.4V (pack)
Ignition method : External Heating PI Firm on Cell
Rate of temperature rise : 5~7 °C/min ↑ (by P/D Controller)



Result Data

Heat Release Rate in the center of the accessible means of egress shall not exceed 1.3 kW/m2 : PASS
Wall surface temperature do not exceed 97°C (175°F) of temperature rise above ambient : PASS



배터리 화재 안전 인증 (UL 9540A)

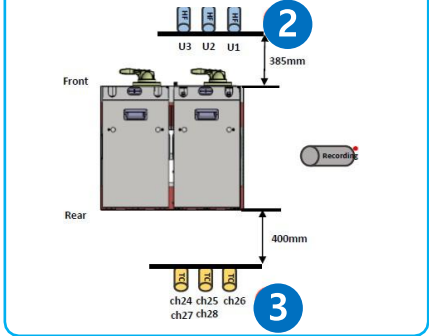
UL9540A Test Results (at LGES Research Center)

Number	Item	criteria	Value	Remark	Result
④	Surface temperature of Pack within the target unit adjacent to the initiating unit do not exceed the temperature at which thermally initiated cell venting occurs	Under temperature at cell venting	111°C (max)	Do not exceed 1 gas-off temperature in initiated cell (around over 140°C, not officially – TBD)	PASS

Test Condition. (UL9540A 4th Edition)

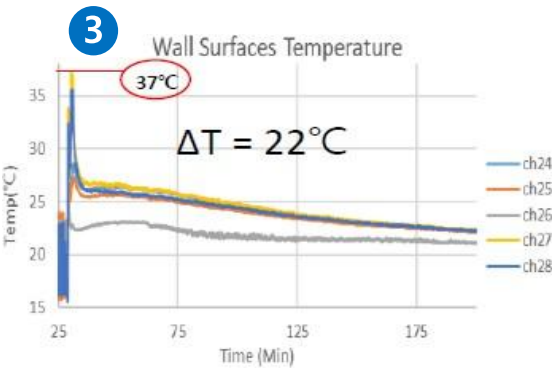
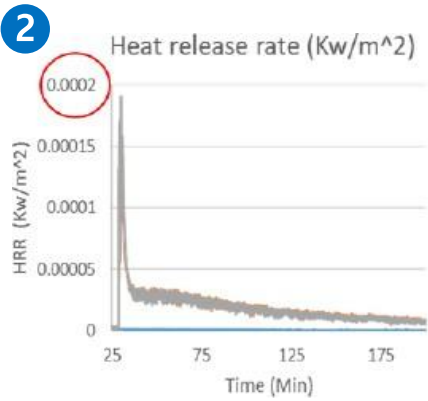
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Installation condition



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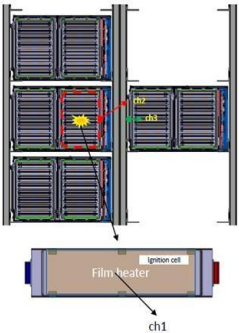
Installation condition



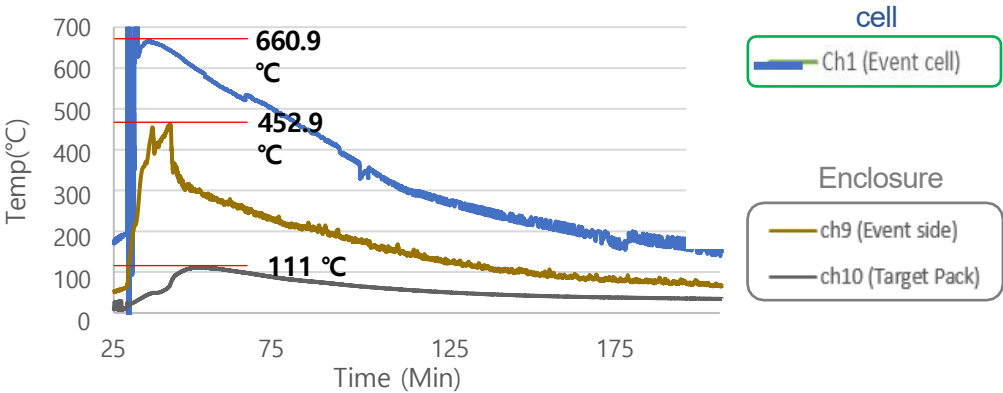
Result Data

In terms of isolated structure for fire protection, Target pack were protected from thermal propagation. Which cannot lead adjacent target pack to thermal runaway further. (No Flame, No Explosion)
Sparks and electrical arcs and other electrical events didn't occur.

TC(Thermo Couple) Position

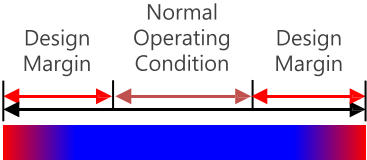
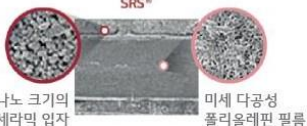


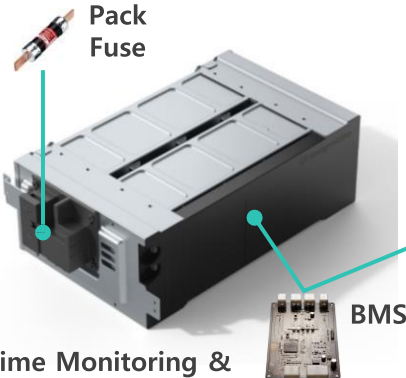
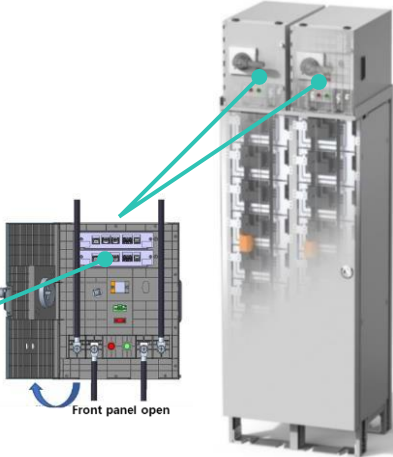
Temperature to target unit direction



제품 안정성 – Safety Design

과전압, 전류, 온도, 단락 등 주요 고장 시 보호 및 열 폭주 방지를 위해 BMS 및 BPU에 다중 안전 장치를 적용함

Cell Safety	BCB Safety
 Design Margin Normal Operating Condition Design Margin Design for Safety Margin ① Over-voltage ② Over-temperature 보다 안정적인 셀 구조  LG에너지솔루션 VS 타사 제품 최고의 안전성  나노 크기의 세라믹 입자 미세 다공성 폴리에틸렌 필름	 ① Surge Protective Device ② Residual Current Monitor ③ 원격지 제어 연동 가능 EPO + KEC 한국전기설비규정 준수 + 보호/감시 장치 확장을 위한 Gateway 솔루션

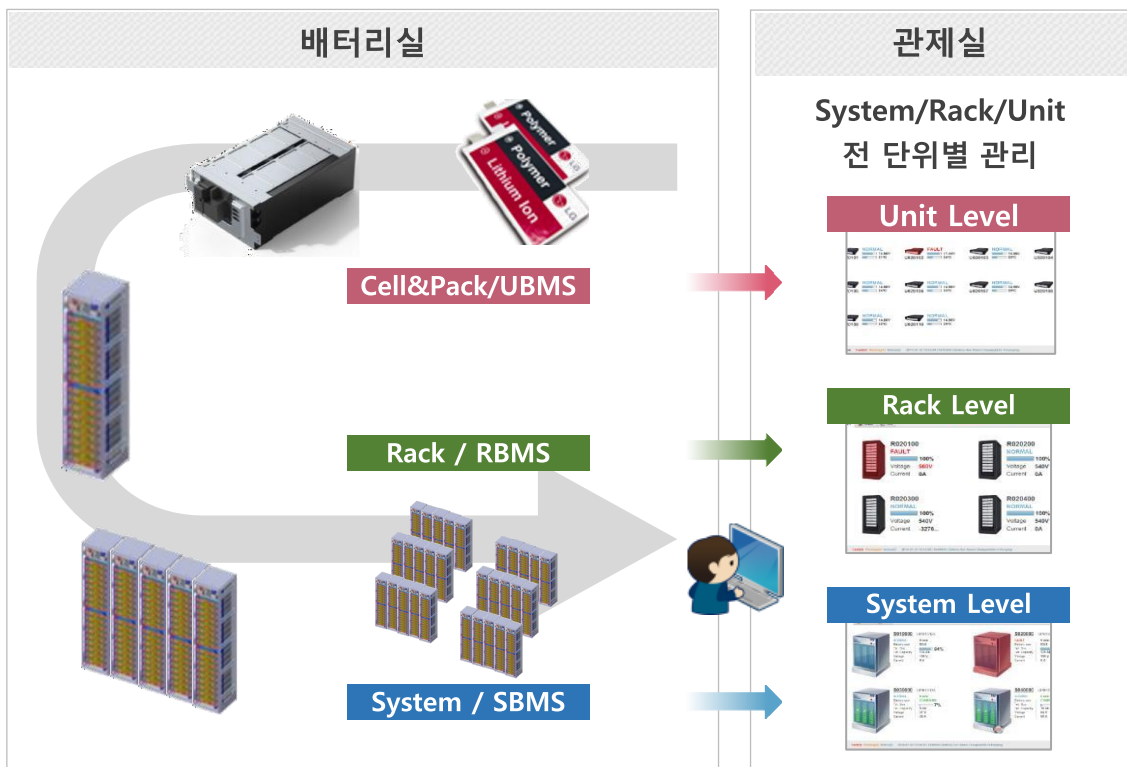
Module & Rack Safety
Protection by Fuse ① Over- and short-current  Pack Fuse BMS Real-time Monitoring & Protection by BMS ① Over-voltage / ② Over-current ③ Over-temperature / ④ Auto Cell Balancing Protection by Fuse, Contactor and CB ① Over-voltage / ② Over- and short-current ③ Over-temperature  Front panel open CB

BMS & LMS 특징점

BMS(Battery Management System)는 단위별(배터리 팩/배터리 랙(병렬)/시스템(UPS-Set)) 관리로 안전성, 신뢰성, 편의성을 제공

집적정보통신시설 보호조치 규정 준수

: 리튬 배터리 설치 시설은 셀의 온도,전압 등 상태를 확인할 수 있는 전지관리 시스템 (이하 BMS)을 갖추고 계측 주기를 10초 이내로 설정하여야 한다.



특징점

안전성

- 이벤트(과전압/과전류/전압편차 등) 감지
- 보호 기능 수행(과충전/과방전/과열 등)
- Cell Balancing 작업 수행

신뢰성

- 신뢰성 높은 SOC(State of Charge), SOH(State of Health) 계산
- 1~5초 단위 정보 전송
- 정확한 가용시간 계산

편의성

- 실시간 전송 및 상위프로그램(FMS)과 연동
- 모듈화를 통한 장애 시 간단한 교체
- 터치 패널 HMI와 경광등을 설치하여 현장에서 빠르게 상태와 이벤트 확인
- 주요 정보 요약 화면으로 인한 가시성 확보 및 리포트 출력 기능