

# battery safety



## ENSURING YOUR PEACE OF MIND

### COMPREHENSIVE SAFETY MEASURES

The OE Qikpac battery incorporates a custom Battery Management System (BMS) specifically designed to mitigate issues like thermal runaway, thereby preventing threats such as fire. Our advanced, in-house developed BMS features multi-level software, comprehensive cell monitoring, and condition-based charging to ensure optimal safety and performance.

### WHAT THIS MEANS FOR YOU

- **Constant Overwatch:** The BMS continuously monitors 16 critical parameters, performing nearly 3 billion checks daily—that's 32,000 checks every single second.
- **Temperature Monitoring:** Internal thermocouples measure battery cells and the printed circuit board four times per second, ensuring prompt detection of fluctuations with a safe shutdown above 40°C.
- **Protection Features:** The BMS provides overcharging protection, manages the charging cycle and ensures failsafe shutdown if any parameter exceeds safety limits.
- **Triple Redundancy:** Even if a critical component fails, the BMS can still monitor and shut down the battery as needed.
- **Safe Charging:** Our cutting-edge BMS ensures safe, unattended overnight charging. It automatically terminates the charging process once the batteries are full, eliminating the possibility of overcharging. This advanced safety feature removes the need for a dedicated storage area<sup>1</sup>
- **Rapid Response:** If a parameter exceeds its defined limit, the battery will shut down in as little as 100 microseconds<sup>2</sup> (0.0001 seconds).
- **Durable Housing:** The battery is enclosed in a UL94-VO fire retardant plastic housing, which has undergone strict testing, including a 1-meter drop test.
- **Controlled Charging:** We exclusively use trickle charging and avoid fast charging our batteries. Additionally, we maintain charge levels between 10% and 90% to enhance safety and preserve the battery's chemistry, thereby extending its overall cycle life.
- **Power supply unit:** The PSU provides 3 additional external levels of safety including over current, over temperature and short circuit with safe shutdown

<sup>1</sup> Unless local regulations require.

<sup>2</sup> Shutdown parameters are between 100µs and 320ms

## PRE-SHIPING QUALITY CONTROL

Before shipping, we conduct a 30-point automated quality control test to ensure all safety measures are functioning correctly.

## STRINGENT TESTING AND CERTIFICATION

The Qikpac battery has undergone rigorous testing and received several important independent certifications:

- **TÜV Certification** for Li-ion batteries
- **IEC 62133-2** Safety standard has 6 different tests including a 1-meter drop test
- **UL 62133-2** As above for the US market.
- **IEC 62368-1** Electronic safety standard has 6 different tests.
- **UN38.3** Certification Safe transportation has 8 different tests.

## POWER SUPPLY TESTING AND CERTIFICATION

EN61204 : 2018 Electromagnetic compatibility (EMC) for low voltage SMPS

EN 50121-3-2 EMC for railway

FCC part 15 (B) Radio frequency radiation

## 100% SAFETY RECORD

QIKPAC has never experienced failure, maintaining a flawless record of 100% safety and reliability. During manufacturing, OE conducts extensive quality control tests on every QIKPAC battery.

## CONCLUSION

The Qikpac battery is designed to ensure exceptional safety during use, charging, and being left unattended overnight. The internal BMS provides constant monitoring with immediate shutdown in as little as 100 microseconds if any anomaly is detected. Safety is our utmost priority.

