Case Study: PowerBattery Powers ERA Championship

Record-Breaking FIA-Tested Electric Racing

Client

ERA Championship
The world's first all-electric junior formula racing series
https://www.erachampionship.com/series-europe

Challenge

The transition from combustion engines to clean electric drivetrains is a major challenge for high-performance applications such as motorsport. For the ERA Championship—the world's first all-electric junior formula—this meant finding a battery partner capable of delivering:

- Racing performance and reliability equivalent to or better than petrol engines
- Compliance with strict FIA safety and technical regulations
- Compact, lightweight battery packs for high-speed race cars
- Advanced cooling technology to ensure safety and performance under extreme conditions
- The ability to charge immediately after a stint without the need for dry ice and other workarounds to cool the battery packs
- Seamless integration into existing formula car chassis, maintaining optimal weight and balance

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Solution

PowerBattery partnered with ERA Championship as the official battery supplier, engineering and manufacturing custom, liquid-cooled high-performance battery packs tailored to the demands of electric racing.

Key features of the PowerBattery solution:

- **Advanced Cooling Technology**
  Unique liquid cooling channels throughout the pack keep temperature rise (delta) to just 0.5°C, compared to 5°C in leading commercial EVs. This enables continuous high power output without overheating, maximizing both safety and battery lifespan. With the ability to charge the packs immediately after driving a stint at maximum power.

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- **Optimized Performance**
  - Capacity: 24.7 kWh
  - Continuous Power: 147 kW (200A)
  - Weight: 180 kg
  - Superior power-to-weight ratio compared to Formula E packs
- **Compact & Safe Design**
  - Custom form factor to fit within the space and mass constraints of the original race car chassis
  - Waterproof (IP54) enclosure and robust mechanical design for durability and crash safety
  - FIA-compliant safety systems: insulation monitoring, individual fuses, smart contactors, and advanced BMS
- **Scalable, Race-Proven Engineering**
  PowerBattery's solutions are engineered for real-world track performance, validated through rigorous FIA testing (including 18G deceleration crash tests) and continuous high-power operation at speeds up to 200 km/h.

Results

- **Record-Breaking Performance**
  In August 2021, ERA—powered by PowerBattery—shattered the lap record at Circuit Zolder by 3.5 seconds, outperforming previous electric race cars.
- **FIA-Tested & Race-Ready**
  The PowerBattery pack passed stringent FIA crash and safety tests, remaining fully functional after a simulated 18G deceleration.
- **Recognized by Industry & Fans**
  ERA's F4 electric race cars now star as the support event for the FIA ETCR e-Touring Car World Cup, with races broadcast on Eurosport and growing recognition from sponsors such as Discovery, Software AG, and Eurosport.
- **Technology Transfer**
  Insights and innovations from this project are now being applied to other high-performance, industrial, and maritime battery solutions.

Customer Quote

"The ERA Championship is a perfect test case for PowerBattery's technology. Thanks to their unique cooling and safety systems, our cars deliver continuous high performance without overheating—enabling race-winning speed and reliability. The fact that we smashed the lap record at Zolder says it all!"
— ERA Championship Team

POWER BATTERY

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About PowerBattery

PowerBattery specializes in designing and manufacturing advanced, custom battery packs for high-performance and industrial applications. Our expertise in thermal management, safety, and integration ensures maximum performance in the most demanding environments—from racetracks to heavy industry.

Interested in electrifying your high-performance project? Contact PowerBattery to discuss your requirements.