JULIOS – High Performance Battery Module

Industry leading Power Density with high cooling performance and very low temperature gradient via cell immersion cooling allows high continuous charge- and discharge rates with homogeneous temperature distribution.
JULIOS I Modular Battery for Industrial and Automotive

Immersed Cooling Architecture and optimized for mass production based on LION Light Battery Concept

**Features**

**LION Supercell**
- Designed for fully automated production
- Number of parts minimized to meet stringent cost targets
- Improved safety through single cell fusing and cells immersed in non-flammable coolant
- Based on 21700 cell due to superior energy density and cost

**LION Supercell Monitoring System**
- Capable of measuring voltage, temperature and impedance
- Electrochemical impedance spectroscopy
- Integrated Supercell balancing
- Cell temperature measurement without NTC
- Accurate SOH and SOC estimation
- Dimensions ~ 50 mm x 14 mm

**Configuration**
- 34P - 6S
- 21700 Li-ion (NMC I Graphite)
- Weight per cell: 69 g
- Energy content per cell: 18,2 Wh | 20,7 Wh
- Energy content per Module: 3,7 kWh | 4,2 kWh
- Capacity: 170 Ah | 190,4 Ah
- Dimension (LxWxH): 496 mm x 216 mm x 90 mm
- Mass excluding cells: 6,2 kg
- Total weight (including coolant): 20,8 kg
- Weight (excluding coolant): 19,3 kg
- Volume: 9 l
- Cont. current (charge/discharge): ~ 340 A
- Peak current discharge: ~ 680 A
- Peak current charge: ~ 510 A
- Gravimetric energy density: 180 Wh/kg (~230 Wh/kg possible)
- Volumetric energy density: 410 Wh/l

**IMMERSED COOLING**
- All cells fully immersed in dielectric coolant
- Maximized coolant parallelization
- Lower avg. temperature within battery reduces cell aging
- Lowest temperature gradient from cell to coolant allows high continuous power performance
- Non-cooled version available

**MODULAR**
- Adjustable module length (customizeable number of Supercells in series)
- Monitoring unit in each Supercell allows continuous temperature, voltage and impedance monitoring

**INTEGRATED**
- Low module height of ~ 90 mm (allow low profile skateboard architectures)
- Minimized wiring within the module significantly reduces cost and assembly effort
- Structural integration of modules in battery pack possible

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All electrical data based on preliminary LG M50 5,0 Ah 21700 cell data. Fast charging subject to further tests and detailed lifetime requirement specification.