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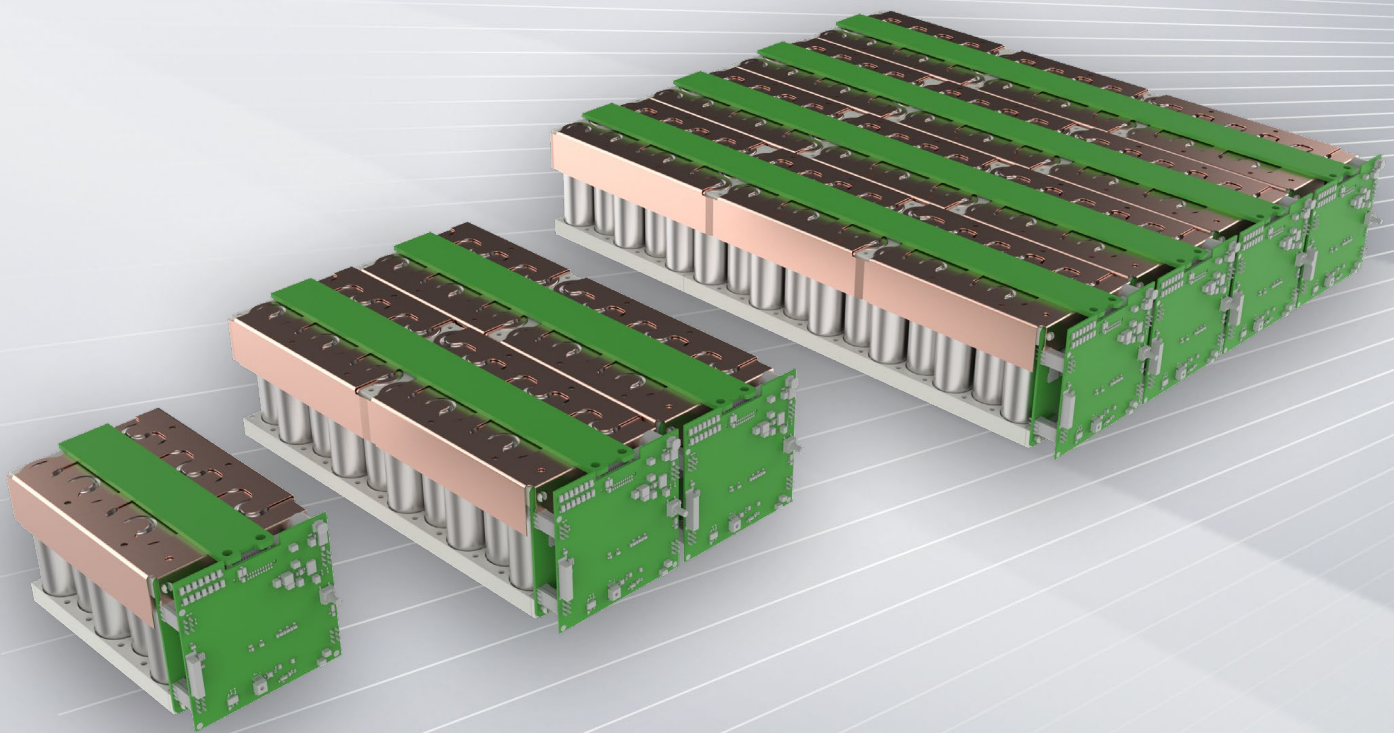
# Customised Battery Concept

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One concept. Many possibilities.

# LIEBHERR

**Components**  
Electronics Manufacturing Services



# Customised Battery Concept

## Technical data



### Battery specifications

<b>Configuration</b>	4S to 18S
<b>Cell size</b>	R21700
<b>Cell vendor</b>	<ul style="list-style-type: none"><li>- Depends on user requirements</li><li>- Compatible with several different cell types and vendors</li><li>- High end or cost optimized – fully made in Germany possible</li></ul>
<b>Nominal voltage</b>	10V to 80V
<b>Currents @ DC Link</b>	Up to 800A peak
<b>Battery energy density</b>	Up to 295 Wh/kg
<b>Battery power density</b>	Up to 5100 W/kg
<b>Working temperature range</b>	Up to -35 °C bis 75 °C
<b>Charging cycles</b>	Up to 1400 (80% of initial capacity)



### BMS features

<b>Monitoring functions</b>	<ul style="list-style-type: none"><li>- Simultaneous voltage supervisor for each cell</li><li>- Integrated passive cell balancing of up to 150mA peak</li><li>- Multiple temperature monitoring</li><li>- Humidity and air pressure sensors</li><li>- Redundant current monitoring</li><li>- Thermal runaway detection</li><li>- Ambient pressure monitoring</li><li>- SoC, SoH, SoP</li></ul>
<b>Safety/protection functions</b>	<ul style="list-style-type: none"><li>- High side safety switch/battery disconnect switch</li><li>- Pre-charge switch for heavy capacitive loads up to 15mF</li><li>- Integrated discharge option</li><li>- Hardware related safety disable path</li></ul>
<b>Configurability</b>	<ul style="list-style-type: none"><li>- Full configuration of cell parameters (cut of voltage, cut of current, end of charge voltage)</li><li>- Flight Termination System (FTS)</li><li>- Safe Torque Off (STO)</li></ul>

## Communication interfaces

### 1x CAN-FD (standard)

- Incl. wake-up (partial networking with sleep current < 100µA)
- Signal Improved CAN (SIC)
- Data rate configurable from 250 kbaud up to 2 Mbaud
- Support of different CAN protocols such as DroneCAN, SAE J1939 and others

### 1x IOBASE-T1S (option)

Includes TC10 wake-up (sleep current < 100µA)

### Configurable, 3-color RGB LED status display

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## Product quality

- AEC-Q (temp. grade 2 or better) from IATF 16949 fabs
  - ISO 9001/ISO 9100 electronics manufacturing site
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## Functional safety compliance

ISO 26262	Up to ASIL C
IEC 61508	Up to SIL 2
DIN EN IEC 62619	Certified

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## Regulatory and compliance standards

Transport safety possibilities	UN 38.3, CE
Product and environmental compliance possibilities	<ul style="list-style-type: none"><li>- LN800 (Liebherr international environmental standard)</li><li>- ISO 16750-2/ISO 7637-2</li><li>- CISPR 25 (electromagnetic compatibility)</li><li>- ISO 10605/DIN EN IEC 61000-6-2 (electrostatic discharge)</li><li>- DIN EN 60068-2 (shock and vibration)</li><li>- DIN EN ISO 19014-3 (environmental durability)</li></ul>
Procurement compliance	NDAA or made in Europe

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