Li-Ion PowerPack™ - Underwater power solutions

Highly reliable, efficient and safe Li-Ion batteries
Made for harsh offshore and subsea conditions such as Offshore energy, scientific and AUV or ROV equipment
Long track record, qualified to int. standards

www.subCtech.com
info@subctech.com
Rechargeable Li-ion batteries are amongst the most efficient batteries and SubCtech even optimized them for the use in marine and offshore technology. They provide highest capacity while being lightweight and of small volume.

Long-John

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.4 V</td>
<td>140 Ah / 180' Ah</td>
</tr>
<tr>
<td>14.4 V</td>
<td>172 Ah</td>
</tr>
<tr>
<td>25.2 V</td>
<td>70 Ah / 90' Ah</td>
</tr>
<tr>
<td>46.8 V</td>
<td>33 Ah / 43' Ah</td>
</tr>
<tr>
<td>50.4 V</td>
<td>33 Ah / 43' Ah</td>
</tr>
</tbody>
</table>

Other on request

- with optional "A" cell
- UN T38.3 certificate

Big-Jim

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.4 V</td>
<td>280 Ah / 361' Ah</td>
</tr>
<tr>
<td>14.4 V</td>
<td>344 Ah</td>
</tr>
<tr>
<td>25.2 V</td>
<td>140 Ah / 181' Ah</td>
</tr>
<tr>
<td>46.8 V</td>
<td>70 Ah / 90' Ah</td>
</tr>
<tr>
<td>50.4 V</td>
<td>70 Ah / 90' Ah</td>
</tr>
</tbody>
</table>

Other on request

- with optional "A" cell
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Big-Jim XL

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.4 V</td>
<td>280 Ah / 344 Ah</td>
</tr>
<tr>
<td>25.2 V</td>
<td>140 Ah / 181' Ah</td>
</tr>
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<td>46.8 V</td>
<td>70 Ah / 90' Ah</td>
</tr>
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</tr>
</tbody>
</table>

Other on request

- with optional "A" cell
- UN T38.3 certificate

<table>
<thead>
<tr>
<th>Technology</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Li-ion</td>
<td>rechargeable battery, High-power, high safety, highly reliable industrial cells</td>
</tr>
<tr>
<td>Battery</td>
<td>SubCtech’s electronic for high voltages, capacities and currents, UL/UN certified cells</td>
</tr>
<tr>
<td>Housing</td>
<td>Corrosion-free titanium, 300 m – full ocean depth, Customizing on request</td>
</tr>
<tr>
<td>Connectors</td>
<td>Standard SUBCONN®, High Power, Data, Others on request</td>
</tr>
<tr>
<td>Temperature</td>
<td>-20 °C... +60 °C operating, 0 °C... +45 °C charging, -20 °C... +60 °C (short time) storage</td>
</tr>
<tr>
<td>Self-discharge</td>
<td>&lt; 5% per year at +25 °C, Typ. &lt; 2% per year at +4 °C</td>
</tr>
<tr>
<td>Charge cycles</td>
<td>&gt;300 cycles for 80% remaining capacity, optional 3000+ cycles with special conditioning BMS</td>
</tr>
<tr>
<td>Protection</td>
<td>Overcharge, Deep discharge, Current limit, Overheating</td>
</tr>
<tr>
<td>Charging</td>
<td>Fully-automatic Li-ion charger, 100 W, 300 W, 750 W, Metal housing, IP65 water protected, Input wide-range 90-264 VAC 50/60 Hz, Just plug ‘n’ charge, no control elements, 3 signal LEDs</td>
</tr>
</tbody>
</table>

Note: length and weight increase when options such as BMS are installed.
**High-Performance, high reliable and high-safety Li-Ion rechargeable batteries for the subsea energy market.** Design life up to 25 years, the electronic and Li-Ion cells are extreme reliable. Qualified according API17F. Track record since 2006

### Subsea battery 14/25/50 V
- Ø 184 mm
- Li-Ion rechargeable battery
- 3 - 4 A input/output current,
- Optional automatic diagnostic test
- RS-485 MODBUS RTU, isolated
- LED control lights, customizing

**674 Wh (up to 4.5 kWh)**
- UN T38.3 (14v)
- API 17F on request

### Subsea-UPS 24 V
- Ø 184 mm
- Li-Ion rechargeable battery
- 3 - 4 A input/output current,
- Optional automatic diagnostic test
- RS-485 MODBUS RTU, isolated
- LED control lights, customizing

**63.3 - 300 Wh**
- API 17F

### Subsea-UPS 400 V
- Ø 298 mm
- Li-Ion or LFP rechargeable battery
- LFP: up to 15000 W 45s, 3 cycles, every 4h @EOL subsea
- Li-Ion: Buffer time 1 hour @1kw @EOL subsea
- OEM or SEM housing, optional full ocean depth
- RS-485 galvanic isolated MODBUS RTU, CAN/SiS L2
- LED control lights, customizing

**1 - 3.4 kWh HP**
- - 15 kW LFP
- UN T38.3
- API 17F

### Energy Storage System ESS
- 1 MWh Skids
- UN T38.3
- API 17F

#### Lifetime
- 10 years minimum, 25 or 30 years design life

#### Temperature
- Li-Ion: -20 °C... +60 °C operating ● 0 °C... +45 °C charging ● -20 °C... +60 °C (short time) storage
- LFP: -30 °C... +60 °C operating ● -40 °C... +60 °C (short time) storage

#### Self-discharge
- < 5% per year at +25 °C , lower subsea

#### Charge cycles
- 300 up to 3000+ cycles with special adoptions

#### Protection
- Overcharge ● Deep discharge ● Current limit ● Overheating ● Hot-spots

#### Certification
- Qualified to international standards ● ISO 13628-6 and API17F
  - DNV and UN T38.3 on request

www.subctech.com ● info@subCtech.com
Proven and rechargeable Li-ion batteries are built in the Li-Ion PowerPack™ for AUVs and other vehicles. SmartBMS™ observes the battery + delivers data to the vehicle host system.

### PowerPack™ Series 260
- 1.5 - 20 kWh
- Ø 260 mm
- Li-ion rechargeable Battery, divided into SmartPowerBlocks™ (SPB) connected via internal power and BMS bus
- Scalable in voltage, capacity, power
- Up to 600 V (battery)
- 2 x 50 A max. cont. current
- Single or redundant dual channel support
- 1.5 kWh per SPB module OD 310 mm x 150 mm
- Options and customizing on request

### PowerPack™ Series 310
- 10 - 50 kWh
- Ø 310 mm
- Li-ion rechargeable Battery, divided into SmartPowerBlocks™ (SPB) connected via internal power and BMS bus
- Scalable in voltage, capacity, power
- Up to 600 V (battery)
- 2 x 50 A max. cont. current
- Single or redundant dual channel support
- 3.5 kWh per SPB module OD 310 mm x 150 mm
- Optional PDU Power Distribution and CIM high-level controller with data logger, to connect 12 batteries

### Technology
<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliable high-capacity Li-Ion rechargeable</td>
<td>batteries with highest energy density, high</td>
</tr>
<tr>
<td>technology</td>
<td>safety by proven technology ● Redundant</td>
</tr>
<tr>
<td></td>
<td>design ● UL &amp; UN certified cells ●</td>
</tr>
<tr>
<td></td>
<td>Qualifications to international standards</td>
</tr>
</tbody>
</table>

### BMS
- Highly sophisticated Battery Management System SmartBMS™ ● Monitoring and control over all battery parameters ● Configurable functions ● Fail-safe

### Data Interface
- User friendly interface to host system with standardized data format for easy integration ● MODBUS RTU ● CAN, CANopen ● NMEA-0183 (ASCII) RS-485 or RS-232 ● Ethernet ● Fully isolated

### Handling
- Easy handling by single protected blocks SmartPowerBlocks™ (SPB) of 30 kg and max. 60 V each for personal maintenance ● Simply plug together on rails in the pressure housing

### Vehicle Safety
- Optional redundant battery concept guarantees 50% remaining capacity per battery in case of any fatal failure for emergency procedures ● Mechanical & electrical protections

### Certification
- Type approval examples: MIL-STD 810G (Shock & Vibration) ● MIL-STD 461F for EMC ● API17F ● NATO Codes ● DNV VI-7 ● UN T38.3

### Housing
- Pressure housing full ocean depth ● Standard titanium, optional others ● Connectors SubConn, Glenair, GISMA etc.