



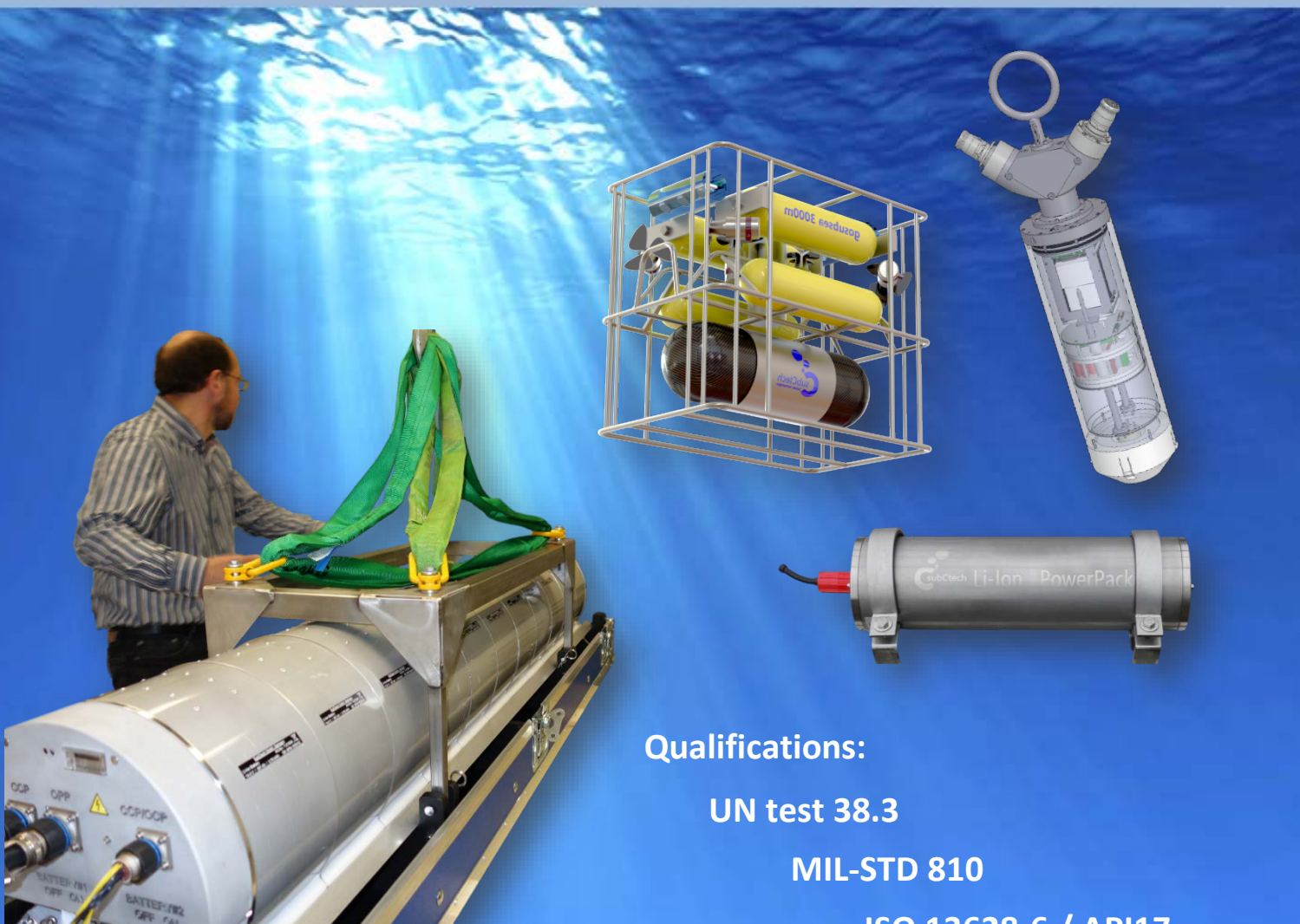
Ocean Batteries

PowerPack™ - Underwater power solutions

Highly reliable, efficient and safe Li-Ion batteries

Made for harsh offshore and subsea conditions

such as Offshore oil and gas, scientific and AUV or ROV equipment




Qualifications:

UN test 38.3

MIL-STD 810

ISO 13628-6 / API17

	STATIONARY	STANDARD PRODUCT SPECIFICATION
<p>LONG-JOHN</p> <p>14.4V – 46/60* Ah 25.2V – 26/33* Ah 46.8V – 16/20* Ah 50.4V – 16/20* Ah Other on request</p> <p>*) Option "A" cell</p>	 <p>Long-John \varnothing90 mm titanium housing</p> <p>Subsea ROV Switch installed</p>	<p>Standard battery – \varnothing 90 mm</p> <ul style="list-style-type: none"> Li-Ion rechargeable battery 10 A max. continuous current Titanium housing \varnothing90 mm x 530 mm (without options) 8 kg in air, 5 kg in sea water (approx.) Operating depths 2000 m, 3000 m, 6000 m Optional: ROV rotary switch, DC/DC outputs, data interface NMEA-0183 or MODBUS, LED control lights, customizing <p>Note: higher weight and length if options installed</p>
<p>BIG-JIM</p> <p>14.4V – 140/180* Ah 25.2V – 70/90* Ah 46.8V – 33/43* Ah 50.4V – 33/43* Ah</p> <p>*) Option "A" cell</p> <p>NEW:</p> <p>14V, 172Ah with UN T38.3</p>	 <p>Big-Jim 180\varnothing titanium housing with small 100W SmartCharger™</p>	<p>Standard battery – \varnothing 168/180 mm</p> <ul style="list-style-type: none"> Li-Ion rechargeable battery 10 A continuous current, up to 100 A Titanium housing: \varnothing168 mm x 350 mm, 15 kg in air, 7 kg in sea water water (300 m), \varnothing180 mm x 360 mm (all other depths) Operating depth 300 m, 1000 m, 3000 m, 4000 m, 6000 m Optional: ROV rotary switch, DC/DC outputs, data interface, high current output up to 100 A NMEA-0183 or MODBUS, LED control lights, customizing <p>Note: higher weight and length if options installed</p>
<p>BIG-JIM XL</p> <p>14.4V – 280/361* Ah 25.2V – 140/181* Ah 46.8V – 70/90* Ah 50.4V – 70/90* Ah</p> <p>*) Option "A" cell</p>	 <p>SmartCharger™ production</p>	<p>Standard SmartCharger™</p> <ul style="list-style-type: none"> Li-Ion fully-automatic battery charger 100W, 300W, 500W, 1000W – others on request Metal housing, IP65 water protected Input wide-range 90-264 VAC 50/60 Hz Just plug 'n' charge - no control elements, 3 control LEDs Optional: standby with emergency fast-charge, PowerCharger™ with high charge current see AUV batteries

STANDARD LI-ION BATTERIES: COMMON SPECIFICATION	
Technology	Li-Ion rechargeable battery • High-power, high safety, highly reliable industrial cells • SubCtech's electronic for high voltages, capacities and currents • UL/UN certified cells
Housing	Corrosion-free titanium or POM • 300 m – 6000 m operating depth • Customizing on request
Connectors	SUBCONN® e.g. BH-4F SeaBattery™ compatible • High Power • Data • Others on request
Temperature	-20 ... +60°C operating • 0 ... +40°C charging • -20 ... +50°C (short time) storage
Self-discharge	< 10% per year at +25°C • Typ. 3% per year at +4°C
Charge cycles	>500 cycles for 80% remaining capacity • 3000+ cycles with special conditioning BMS
Protection	Over-charge • Under discharge • Current limiting • Over-temperature
Charging	SmartCharger™ can remain connected at all time • Don't open the housing for charging – charge underwater • Special procedure to revive deeply discharged batteries • Signal LEDs for power, charging, 100%, Error • IP65 protected for on-board usage • No controls: just plug in and out • Charge or start working at any state of charge (SOC)

	AUV-BATTERY	SPECIFICATION
<p>AUV POWERPACK™</p> <p>1 ... 10+ kWh</p> <p>14.4 V – 61.2 V</p>	 <p>Small AUV PowerPack™ 48V, 4kWh with titanium housing 3000m</p>	<p>AUV battery with SmartBMS™ - standard configuration</p> <ul style="list-style-type: none"> • Li-Ion rechargeable Battery • 14.4 V, 25.2 V, 46.8 V, 50.4 V, 61.2 V – others on request • 50 A max. current – others on request • Pressure housings for depths up to 6000 m • SmartBMS™ with optional logging to 32 GB SD card • Optional redundant design for highest safety
<p>AUV POWERPACK™</p> <p>10 ... 100+ kWh</p> <p>14.4 V – 400 V</p>	 <p>AUV PowerPack™</p>	<p>AUV battery with SmartBMS™ - SmartPowerBlocks™</p> <ul style="list-style-type: none"> • Li-Ion rechargeable Battery, divided into SmartPowerBlocks™ • (SPB) connected via internal power and BMS bus. • Typ. SPB e.g. ø320 mm x 150 mm length, 18 kg, 3.5 kWh • Master-BMS module on the top side • 14.4 V, 25.2 V, 46.8 V, 50.4 V up to 400 V • 50 A max. current – others on request • Pressure housings up to 6000 m on request • SmartBMS™ with logging to 32 GB µSD card • Optional redundant design for highest safety
<p>AUV SMARTCHARGER™</p> <p>1 ... 3 x 10 kWh</p>		<p>AUV PowerCharger™ with SmartBMS™</p> <ul style="list-style-type: none"> • 19" Rack or OEM on request • 90-260 VAC 50/60Hz input single phase or 3-phases • Touchscreen with simple control elements • SmartBMS™ with monitoring to 32 GB SD card • Diagnostic tool • Optional discharge unit • Optional power supply to operate during charging • Optional ruggedized IP54 on-board, MIL-STD certified
<p>TRANSPORT</p>		<p>AUV transport and storage box</p> <ul style="list-style-type: none"> • Incl. heavy lugs for handling on board • UL / UN / LBA approvals on request • Optional temperature control (cooling device)

AUV BATTERIES: COMMON SPECIFICATION

Technology	Reliable high-capacity Lithium-Ion rechargeable batteries with highest energy density by proved technology • Collaboration with battery cell manufacturer • UL & UN certified cells
BMS	Highly sophisticated Battery Management System SmartBMS™ • Redundant safety design • Full monitoring and control over all battery parameters • Configurable functions • Fail safe
Data Interface	User friendly interface to host system with RS-485 or RS-232 • Fully isolated • NMEA-0183 (ASCII) or MODBUS RTU data format for easy integration into your system
Handling	Easy handling by single blocks SmartPowerBlocks™ (SPB) of max. 30 kg and max. 60V each for personal maintenance • Mechanical support for installation • Standard industrial connectors
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 • ISO 13628-6 and API17f Offshore Oil+Gas • NATO AECTP-400 and AQAP • DNV-GL VI-7

Highest industrial standard

Safety during production, installation, operation and service is a major concern for the design. With a long-time experience SubCtech not only develops technology, but also procedures for all components to guarantee high safety and high quality standards.

The manufacturing of the batteries is based on our strict quality guidelines ISO 9001. To achieve this objective, SubCtech is member of the German FED (*Fachverband für Design, Leiterplatten- und Baugruppenfertigung*) to meet the IPC requirements. Our leading electronics engineer is certified by the FED for IPC-A-600/610/620 class 3 and IPC J-STD-001 production. For subsea, we provide SIL-1, optional SIL-2.



SubCtech GmbH is a proved battery manufacturer of the German UBA (Umweltbundesamt) registration no. 21002655. For air transport of dangerous goods UN3480 class 9, SubCtech is certified by the German LBA (Luftfahrtbundesamt) approval no. B32F/439.50/15 for our standard products. Please note that sea transport is required for all none-standard products.

Our production and safety standards are under control by external audits on a regular base. SubCtech is certified as proved vendor for critical components in the Oil+Gas Offshore industry following ISO 13628-6 or API17f.

Test procedures

Additional tests and certifications are available:

- UN transport test 38.3 T1 – T8
- Environmental tests e.g. MIL-STD 810G, ISO 13628-6 Q1, Q2
- MTTF calculations e.g. MIL-HDBK-217F
- EMC and ESD test e.g. GLD NV VI-2, MIL-STD 461F
- Magnetic signatures or special tests as requested

Transport boxes



Customized solutions



Towed vehicle for exploration. We provide the Li-Ion battery and additional instruments. Photo IFREMER / Pature



Customized 280V DC AUV-Battery system is replacing existing battery and provides 50% more capacity and higher safety



New space AUV project to discover the Jupiter moon Europe. AUV battery by SubCtech.



"Now we can operate 4 weeks instead of 2 days." Scott Lafferty, GEMS, UK



Complete monitoring system consists of data logger, Li-Ion battery and sensors



40kWh AUV battery, fully redundant for long-term AUV deployments



Subsea control units consist of our Li-Ion battery and controller



ROV Inspection Sensor Pack, powered by our AUV PowerPack™

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