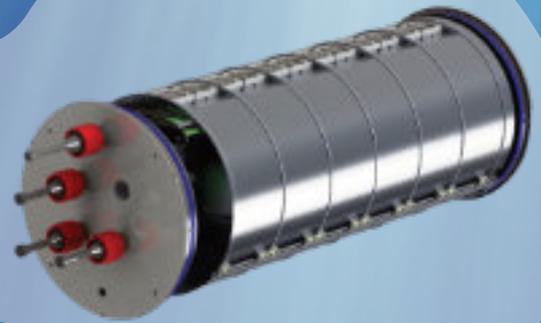


Ocean Power



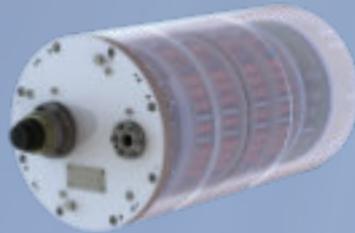
Standard



Vehicle



Subsea



Li-ion PowerPack™ - Underwater power solutions

Highly reliable, efficient and safe Li-ion batteries typically made for harsh offshore and subsea conditions met at offshore energy, scientific and AUV or ROV applications
Long track record, certified to int. standards



Standard Batteries

Rechargeable Li-ion batteries are one of the most efficient batteries to date and SubCtech further optimised them for the use in marine and offshore technology. Our batteries provide highest capacity combining lightweight with small volume.

Long-John

14.4 V 46 Ah / 60* Ah
 25.2 V 26 Ah / 33* Ah
 46.8 V 16 Ah / 20* Ah
 50.4 V 16 Ah / 20* Ah
 Other on request



*with optional "A" cell
 UN T38.3 certification

ø 90 mm

- Li-ion rechargeable battery, 16 A max.
- Titanium housing ø90 mm x 512 mm (see note)
- 8.5 kg in air, 5 kg in sea water (approx.)
- Operating depths 2000 m to full ocean depth
- Optional: ROV switch, DC/DC outputs, data interface
- NMEA-0183 or MODBUS RTU, LED control lights, customising

Note: length and weight increase when options such as BMS are installed.

Big-Jim

14.4 V 140 Ah / 180* Ah
 14.4 V 172 Ah
 25.2 V 70 Ah / 90* Ah
 46.8 V 33 Ah / 43* Ah
 50.4 V 33 Ah / 43* Ah



*with optional "A" cell
 UN T38.3 certification

ø 168 / 180 mm

- Li-ion rechargeable battery, 16 A, up to 50 A (more upon request)
- Titanium housing - 300m: ø168 mm x 350 mm (without options), 17 kg in air, 9 kg in sea water (approx.)
- Deepsea: ø180 mm x 384 mm (without options), 25 kg in air, 15 kg in sea water (approx.)
- Operating depths 300 m to full ocean depth
- Optional: ROV switch, DC/DC outputs, data interface
- NMEA-0183 or MODBUS RTU, LED control lights, customising

Note: length and weight increase when options such as BMS are installed.

Big-Jim XL

14.4 V 280 Ah / 361* Ah
 14.4 V 344 Ah
 25.2 V 140 Ah / 181* Ah
 46.8 V 70 Ah / 90* Ah
 50.4 V 70 Ah / 90* Ah



*with optional "A" cell
 UN T38.3 certification

ø 168 / 180 mm

- Li-ion rechargeable battery, 16 A, up to 50 A (more upon request)
- Titanium housing - 300m: ø168 mm x 612 mm (without options), 30 kg in air, 15 kg in sea water (approx.)
- Deepsea: ø180 mm x 634 mm (see note), 42 kg in air, 25 kg in sea water (approx.)
- Operating depths 300 m to full ocean depth
- Optional: ROV switch, DC/DC outputs, data interface
- NMEA-0183 or MODBUS RTU, LED control lights, customising

Note: length and weight increase when options such as BMS are installed.

Technology	Li-ion rechargeable batteries • High-power, high safety, high reliability industrial cells • SubCtech's electronics for high voltages, capacities and currents • UL/UN certified cells
Housing	Corrosion-free titanium • 300 m – full ocean depth • Customising upon request
Connectors	Standard SUBCONN® • High Power • Data • More upon request
Temperature	-20 °C... +60 °C operating • 0 °C... +45 °C charging • -20 °C ... +60 °C (short term) storage
Self-discharge	< 5% per year at +25 °C • Typ. < 2% per year at +4 °C
Charge cycles	>300 cycles for 80% remaining capacity • Optional >3000 cycles with special conditioning BMS
Protection	Overcharge • Deep discharge • Current limit • Overheating
Charging	Fully-automatic Li-Ion charger • 100 W to 750 W • Metal housing, IP65 water protected • Wide-input-range 90-264 VAC 50/60 Hz • Just plug 'n' charge - no control elements, 3 signal LEDs



Subsea Batteries

High-Performance, high reliability and high safety Li-ion rechargeable batteries for the subsea energy market. Design life up to 25 years, all electronics and Li-ion cells are extremely reliable. Certified according to API17F. Track record since 2006

Subsea battery 14/25/50 V

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



ø 90 mm

- Li-ion rechargeable battery
- 16 A max. continuous current
- Titanium housing ø90 mm
- weight 9 kg
- Operating depth 2000 m to full ocean depth
- Optional: ROV switch, DC/DC outputs, data interface
- LED control lights, customising

Subsea-UPS 24 V

63.3 - 300 Wh
API 17F



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, customising

Subsea-UPS up to 400 V

1 - 3.6 kWh HP
- 1,5 kW Li-Ion
- 15 kW LFP
UN T38.3
API 17F



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 @1 kw @EOL subsea
- 24V / 200 W cont. output
- OEM or SEM housing, optional full ocean depth
- RS-485 galvanic isolation, MODBUS RTU, CAN/SiS L2
- Optional LED control lights, customising

Energy Storage System ESS

1 MWh Skids
UN T38.3
API17F



Subsea Energy Storage and Backup System

- Up to 12 batteries in one skid - high redundancy 1 to 12
- 1 MWh per skid @BOL, 5.5 kW cont. output
- Super duplex: 23 t, 3 x 4 x 2.5 m, titanium optional
- Flexible battery control module BCM integrated
- Output Power Module OPM, scaled up to 6 skids
- Fast charging top-side up to 160 kW per skid or subsea
- Full API17F certification, UN T38.3 certificate

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 term) storage LFP: -30 °C... +60 °C operating • -40 °C... +60 °C (short term) storage
Self-discharge	< 5% per year at +25 °C , lower at subsea
Charge cycles	300 up to >3000 cycles with special adaptations
Protection	Overcharge • Deep discharge • Current limit • Overheating • Hot-spots
Certification	Certified to international standards • ISO 13628-6 and API17F qualification • DNV and UN T38.3 upon request

Vehicle Batteries

Proven and rechargeable Li-ion batteries are built into the Li-ion PowerPack™ for AUVs and other vehicles. SmartBMS™ observe the batteries + deliver data to the vehicle's host system.

PowerPack™ Series 260

1.5 - 20 kWh



ø 260 mm

- Li-ion rechargeable Batteries, 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 260 mm x 150 mm
- Options and customising upon request

PowerPack™ Series 310

10 - 50 kWh

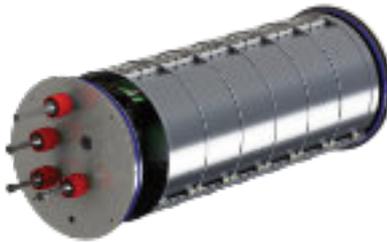


ø 310 mm

- Li-ion rechargeable Batteries, 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

PowerPack™ Series 416

10 - 100 kWh



ø 416 mm

- Li-ion rechargeable Batteries, divided into SmartPowerBlocks™ (SPB) connected via internal power and BMS bus
- Scalable in voltage, capacity, power
- Up to 600 V (battery)
- 2 x 75 A max. cont. current
- Single or redundant dual channel support
- 7 kWh per SPB module OD 416 mm x 150 mm
- Optional PDU Power Distribution and CIM high-level controller with data logger, to connect 12 batteries

Technology	Reliable high-capacity Li-ion rechargeable batteries with highest energy density, high safety by proven technology • Redundant design • UL & UN certified cells • Certifications to international standards
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 • Simple and accurate assembly ensured by guiding rails
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 qualification • NATO Codes • DNV VI-7 • UN T38.3
Housing	Pressure housing up to full ocean depth • Standard titanium, optionally others • Connectors SubConn, Glenair, GISMA etc.

