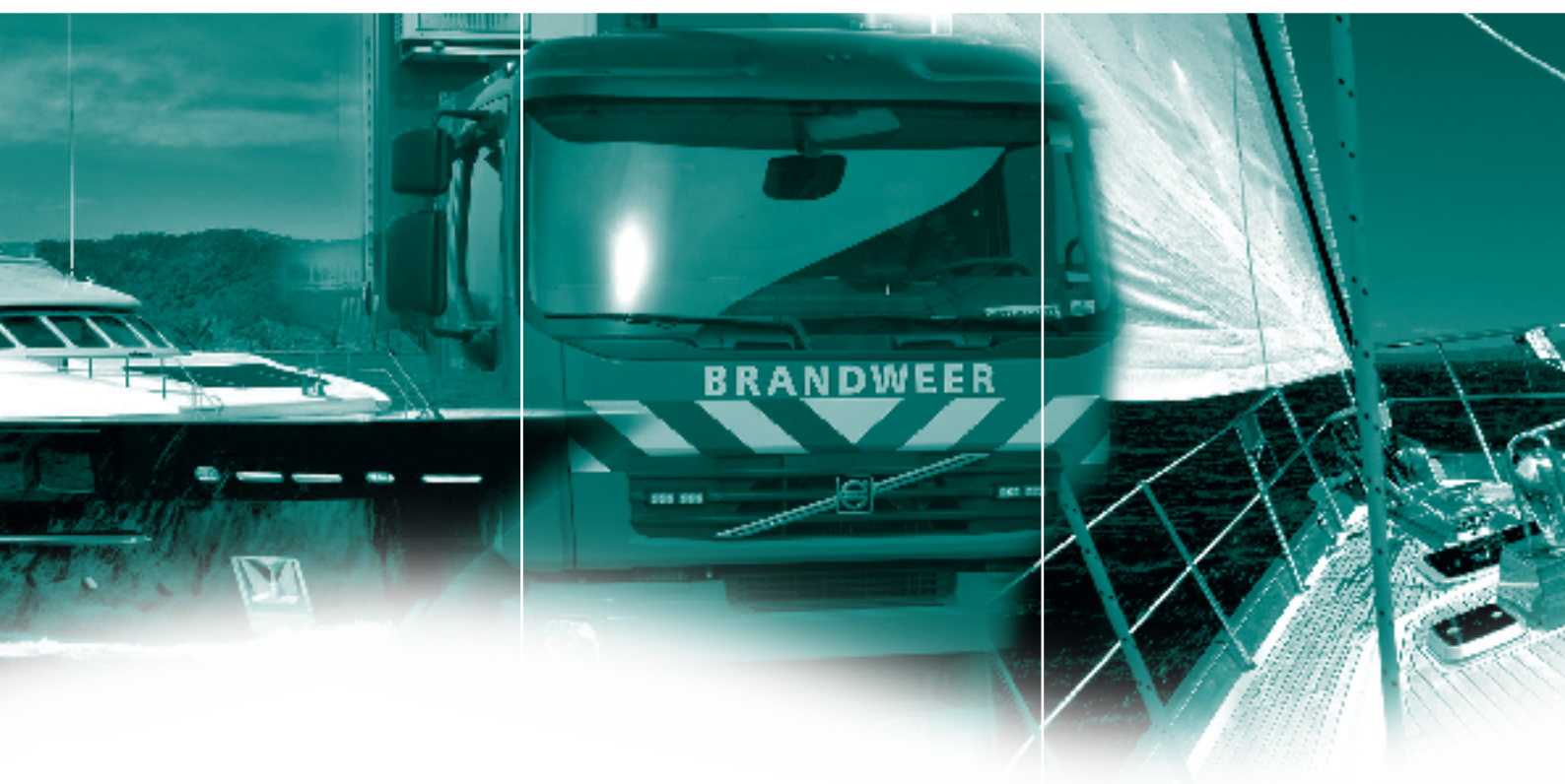


ION Power Battery Pack

Marine • Mobile • Land based • Solar • General use



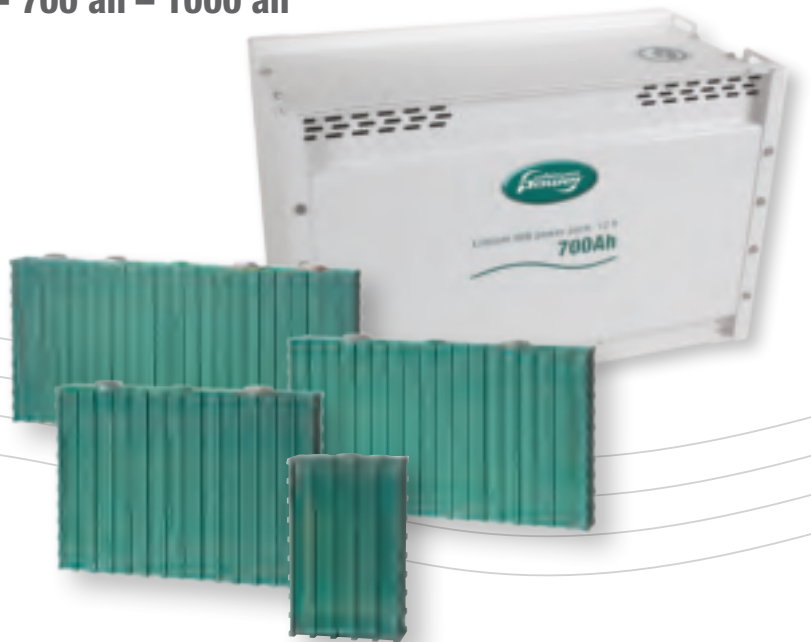
Datasheet ION
12 V - 24 V - 48 V



Lithium ION batteries

90 Ah – 100 Ah – 160 Ah – 200 ah - 400 ah - 700 ah – 1000 ah

- Extremely high energy density
- Less volume: 70% reduction on space
- Less weight: up to 70% reduction
- Long life span, 3 times more cycles
- Fast charging in combination with high DC discharging
- High charge efficiency factor
- Safe LiFeYPO⁴ chemistry for safe use
- Flexible configurations: from 12 V - to 750 V DC, and from 90 Ah to 1000 Ah
- Suitable for high voltage banks up to 1000 Ah



smart energy solutions

ION Power Battery Pack

Marine • Mobile • Land based • Solar • General use

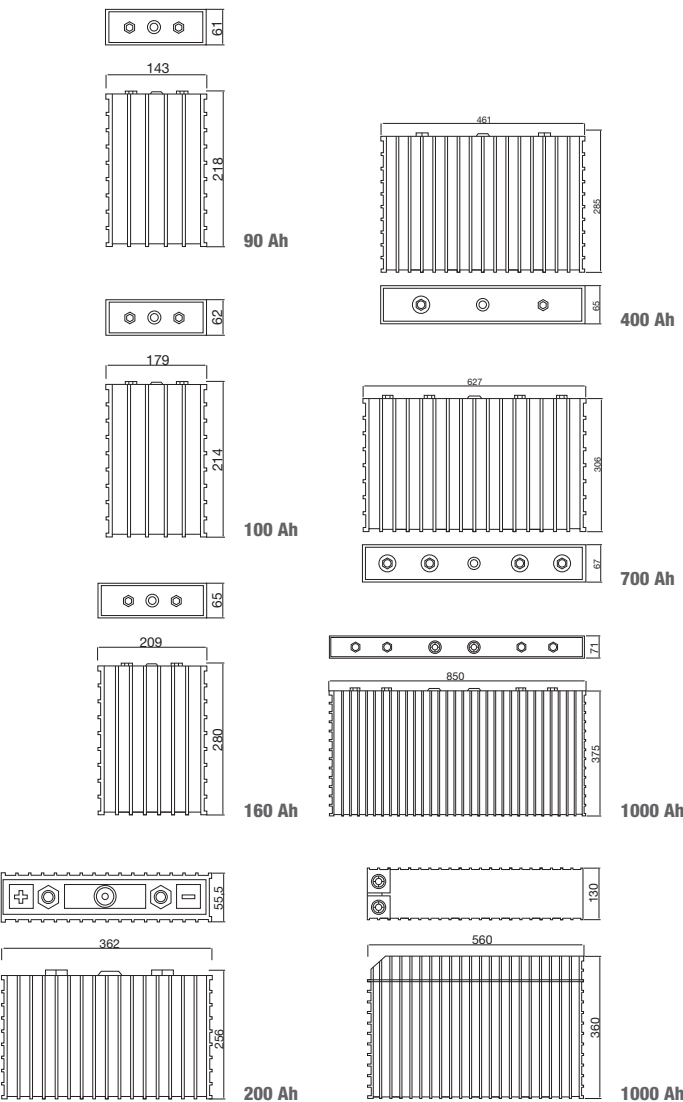
When excellent performance is needed, Ion Power is the best Choice

If you are looking for batteries that will survive strong charge and discharge currents, day by day, year after year, without carrying the weight of conventional batteries, our LiFeYPO⁴ battery is the only solution. Our ION power battery is the choice for electrical vehicles, hybrid systems for yachts and commercial craft and combined high capacity inverter/ generator systems.

Ion Power is the answer for weight topics with savings up to 70% on weight and space, providing much more electrical power as a result of it's LiFeYPO⁴ technology. Result: Six times more cycle life resulting in at least three times the life span of ordinary batteries. The integrated Battery Management and Cell Balancing System ensures safe use and protects your investment securely.

Ion Power is the only battery serving a greener and more durable future as the battery lasts longer, while the manufacturing and recycling processes are environmental much more friendly compared to ordinary lead acid batteries.

WhisperPower ION power is built from the safest Li-Ion chemistry available, LiFeYPO⁴, which has been tested by international independent Battery Testing Laboratory Authorities organizations.



3.2 V DC ION Power Single Cell Data



Single Cell

ION Power Battery Pack	Art. Nr.	40290058	40290051	40290052	40290053	40290054	40290055	40290056	40290057
Specifications									
Nominal capacity		90Ah	100Ah	160Ah	200Ah	400Ah	700Ah	1000Ah	1000Ah
Nominal voltage		3.2 V DC	3.2 V DC	3.2 V DC	3.2 V DC	3.2 V DC	3.2 V DC	3.2 V DC	3.2 V DC
Nominal power		288 Wh	320 Wh	512 Wh	640 Wh	1280 Wh	2240 Wh	3200 Wh	3200 Wh
Weight		3.0 Kg	3.5 Kg	5.6 Kg	7.3 Kg	13.5 Kg	21.0 Kg	33.0 Kg	35.0 Kg
Battery configuration		1 cell	1 cell	1 cell	1 cell	1 cell	1 cell	1 cell	1 cell
Series configuration		Yes up to 90 cells in stack							
Parallel configuration		Allowed, only with active and passive cell balancing, contact WhisperPower for details.							
Battery Management System (BMS)		Recommended WhisperPower Battery Management System for monitoring and protection, not integrated.							
Charge/discharge parameters									
Recommended charge voltage		3.6 V DC	3.6 V DC	3.6 V DC	3.6 V DC	3.6 V DC	3.6 V DC	3.6 V DC	3.6 V DC
Recommended operation voltage charge voltage		3.2 V DC	3.2 V DC	3.2 V DC	3.2 V DC	3.2 V DC	3.2 V DC	3.2 V DC	3.2 V DC
Discharge cut off voltage		2.8 V DC	2.8 V DC	2.8 V DC	2.8 V DC	2.8 V DC	2.8 V DC	2.8 V DC	2.8 V DC
Recommended charge/discharge current 0.5C		35 A	50 A	80 A	100 A	200 A	350 A	500 A	500 A
Max. charge/discharge current 1C		90 A	100 A	160 A	200 A	400 A	700 A	1000 A	1000 A
Rated capacity @ 25°C									
20 hrs discharge		100% - 90Ah	100% - 100Ah	100% - 160Ah	100% - 200Ah	100% - 400Ah	100% - 700Ah	100% - 1000Ah	100% - 1000Ah
10 hrs discharge		100% - 90Ah	100% - 100Ah	100% - 160Ah	100% - 200Ah	100% - 400Ah	100% - 700Ah	100% - 1000Ah	100% - 1000Ah
5 hrs discharge		100% - 90Ah	100% - 100Ah	100% - 160Ah	100% - 200Ah	100% - 400Ah	100% - 700Ah	100% - 1000Ah	100% - 1000Ah
1 hrs discharge		100% - 90Ah	100% - 100Ah	100% - 160Ah	100% - 200Ah	100% - 400Ah	100% - 700Ah	100% - 1000Ah	100% - 1000Ah
0.5 hrs discharge		80% - 72Ah	80% - 80Ah	80% - 128Ah	80% - 160Ah	80% - 320Ah	80% - 560Ah	80% - 800Ah	80% - 800Ah
Temperature variation		0.25% CA @ -1°C capacity deviation							
Cold cranking amps									
Pulse current (10 sec)		<1350 A	<1500 A	<2400 A	<3000 A	<6000 A	<10500 A	<15000 A	<15000 A
Cycle life @ 0.5Ca charge/discharge									
@ 80% depth of discharge		<2000 times	<2000 times	<2000 times	<2000 times	<2000 times	<2000 times	<2000 times	<2000 times
@ 70% depth of discharge		<3000 times	<3000 times	<3000 times	<3000 times	<3000 times	<3000 times	<3000 times	<3000 times
General									
Technology		LiFeYPO4, lithium iron phosphate							
Terminal type		M6	M6	M6	M6	M8	M8	M8	M8
Operating temperatures, above 25°C have effect on life time and cycle life		-20 to 60°C / -4 to 140°F							
Recommended operating temperature		25°C / 77°F							
Storage temperature		-20 to 75°C / -4 to 167°F							
Temperature durability of case		<200°C / <392°F							
Self discharge		<3% / month @ 20°C / 68°F							
Guarantee **)		5 years	5 years	5 years	5 years	5 years	5 years	5 years	5 years
Pack dimensions (l*w*h) [mm]		143*61*218	179*62*214	209*65*280	362*55.5*256	461*65*285	627*67*306	850*71*375	560*130*360
Installation angle		-90° to +90° angles allowed, preferred installation 0°							

**) 5 years limited warranty optional

Whisper Ion Power Battery Quality Assurance and Safety Reports available

General specifications Exterior condition, terminals, weight and size, discharge capacity at 20°C, high-rate discharge capacity at 20°C, cycle life of impulsive charge and discharge. 80% DOD cycle life test

Safety testing Short circuit, shooting and nail test , extrusion test, overcharge, over discharge, water immersion test, fire test, shock and vibration test

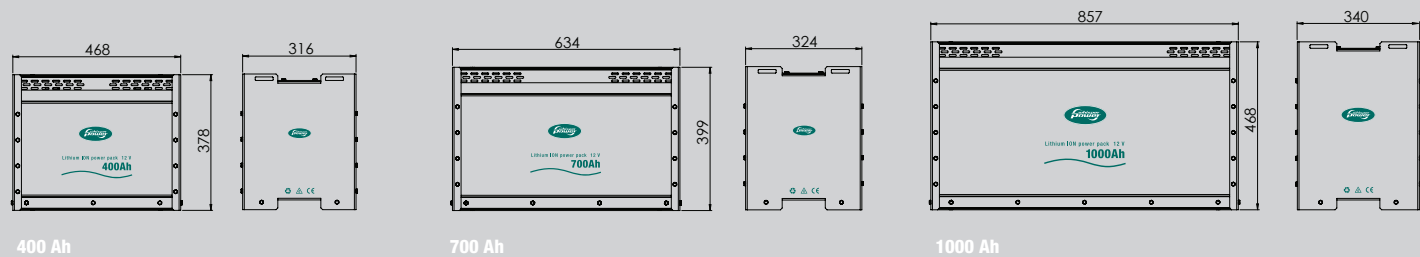
12 V DC ION Power Pack Data, 4 cell



12 Volt

ION Power Battery Pack	Art. Nr.	40290208	40290201	40290202	40290203	40290204	40290205	40290206	40290207
Specifications									
Nominal capacity		90Ah	100Ah	160Ah	200Ah	400Ah	700Ah	1000Ah	1000Ah
Nominal voltage		12.8 V DC	12.8 V DC	12.8 V DC	12.8 V DC	12.8 V DC	12.8 V DC	12.8 V DC	12.8 V DC
Nominal power		1.2 kWh	1.3 kWh	2.0 kWh	2.6 kWh	5.1 kWh	9.0 kWh	12.8 kWh	12.8 kWh
Weight*		12.0 Kg	14.0 Kg	22.4 Kg	29.2 Kg	54.0 Kg	84.0 Kg	132.0 Kg	140.0 Kg
Battery configuration		one stack of 4 cells	one stack of 4 cells	one stack of 4 cells	one stack of 4 cells	one stack of 4 cells	one stack of 4 cells	one stack of 4 cells	one stack of 4 cells
Series configuration		Yes up to 90 cells in stack							
Parallel configuration		Allowed, only with active and passive cell balancing, contact WhisperPower for details.							
Battery Management System (BMS)		Recommended WhisperPower Battery Management System for monitoring and protection.							
Charge/discharge parameters									
Recommended charge voltage		14.4 V DC	14.4 V DC	14.4 V DC	14.4 V DC	14.4 V DC	14.4 V DC	14.4 V DC	14.4 V DC
Operation voltage charge voltage		12.8 V DC	12.8 V DC	12.8 V DC	12.8 V DC	12.8 V DC	12.8 V DC	12.8 V DC	12.8 V DC
Discharge cut-off voltage		11.2 V DC	11.2 V DC	11.2 V DC	11.2 V DC	11.2 V DC	11.2 V DC	11.2 V DC	11.2 V DC
Recommended charge/discharge current 0.5C		35 A	50 A	80 A	100 A	200 A	350 A	500 A	500 A
Max. charge/discharge current 1C		90 A	100 A	160 A	200 A	400 A	700 A	1000 A	1000 A
Rated capacity @ 25°C									
20 hrs discharge		100% - 90Ah	100% - 100Ah	100% - 160Ah	100% - 200Ah	100% - 400Ah	100% - 700Ah	100% - 1000Ah	100% - 1000Ah
10 hrs discharge		100% - 90Ah	100% - 100Ah	100% - 160Ah	100% - 200Ah	100% - 400Ah	100% - 700Ah	100% - 1000Ah	100% - 1000Ah
5 hrs discharge		100% - 90Ah	100% - 100Ah	100% - 160Ah	100% - 200Ah	100% - 400Ah	100% - 700Ah	100% - 1000Ah	100% - 1000Ah
1 hrs discharge		100% - 90Ah	100% - 100Ah	100% - 160Ah	100% - 200Ah	100% - 400Ah	100% - 700Ah	100% - 1000Ah	100% - 1000Ah
0.5 hrs discharge		80% - 72Ah	80% - 80Ah	80% - 128Ah	80% - 160Ah	80% - 320Ah	80% - 560Ah	80% - 800Ah	80% - 800Ah
Temperature variation		0.25% CA @ -1°C capacity deviation							
Cold cranking amps									
Pulse current (10 sec)		<1350 A	<1500 A	<2400 A	<3000 A	<6000 A	<10500 A	<15000 A	<15000 A
Cycle life @ 0.5Ca charge/discharge									
@ 80% Depth of discharge		<2000 times	<2000 times	<2000 times	<2000 times	<2000 times	<2000 times	<2000 times	<2000 times
@ 70% Depth of discharge		<3000 times	<3000 times	<3000 times	<3000 times	<3000 times	<3000 times	<3000 times	<3000 times
General									
Pack dimensions (l*w*h) [mm]		148*300*311	184*304*307	214*316*377	367*278*349	468*316*378	634*324*399	857*340*468	567*576*453

*) Excl. lightweight aluminum cabinet



24 V DC ION Power Pack Data, 8 cell



24 Volt

ION Power Battery Pack	Art. Nr.	40290218	40290211	40290212	40290223	40290224	40290225	402902226	40290227
Specifications									
Nominal capacity		90Ah	100Ah	160Ah	200Ah	400Ah	700Ah	1000Ah	1000Ah
Nominal voltage		25.6 V DC	25.6 V DC	25.6 V DC	25.6 V DC	25.6 V DC	25.6 V DC	25.6 V DC	25.6 V DC
Nominal power		2.3 kWh	2.6 kWh	4.1 kWh	5.1 kWh	10.2 kWh	17.9 kWh	25.6 kWh	25.6 kWh
Weight*		24.0 Kg	28.0 Kg	44.8 Kg	58.4 Kg	108.0 Kg	168.0 Kg	264.0 Kg	280.0 Kg
Battery configuration		one stack of 8 cells	one stack of 8 cells	one stack of 8 cells	two stack of 4 cells	two stack of 4 cells	two stack of 4 cells	two stack of 4 cells	two stack of 4 cells
Series configuration		Yes up to 90 cells in stack							
Parallel configuration		Limited allowed, only with active and passive cell balancing, contact WhisperPower for details.							
Battery Management System (BMS)		Recommended WhisperPower Battery Management System for monitoring and protection.							
Charge/discharge parameters									
Recommended charge voltage		28.8 V DC	28.8 V DC	28.8 V DC	28.8 V DC	28.8 V DC	28.8 V DC	28.8 V DC	28.8 V DC
Operation voltage charge voltage		25.6 V DC	25.6 V DC	25.6 V DC	25.6 V DC	25.6 V DC	25.6 V DC	25.6 V DC	25.6 V DC
Discharge cut off voltage		22.4 V DC	22.4 V DC	22.4 V DC	22.4 V DC	22.4 V DC	22.4 V DC	22.4 V DC	22.4 V DC
Recommended charge/discharge current 0.5C		30 A	50 A	80 A	100 A	200 A	350 A	500 A	500 A
Max. charge/discharge current 1C		90 A	100 A	160 A	200 A	400 A	700 A	1000 A	1000 A
For the other information see the dimensions of the 12 Volt stack									

*) Excl. lightweight aluminum cabinet



48 Volt

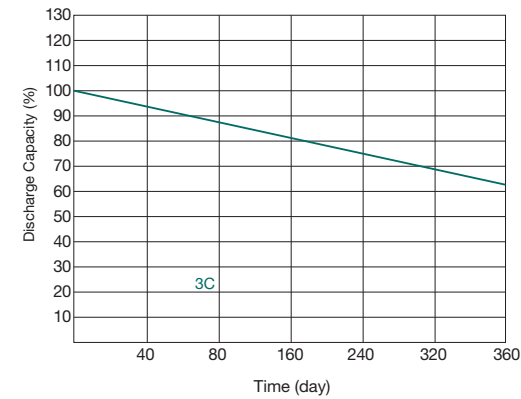
48 V DC ION Power Pack, 16 cell

ION Power Battery Pack	Art. Nr.	40290238	40290231	40290232	40290243	40290244	40290245	40290246	40290247
Specifications									
Nominal capacity		90Ah	100Ah	160Ah	200Ah	400Ah	700Ah	1000Ah	1000Ah
Nominal voltage		51.2 V DC	51.2 V DC	51.2 V DC	51.2 V DC	51.2 V DC	51.2 V DC	51.2 V DC	51.2 V DC
Nominal power		4.6 kWh	5.1 kWh	8.2 kWh	10.2 kWh	20.5 kWh	35.8 kWh	51.2 kWh	51.2 kWh
Weight*		48.0 Kg	56.0 Kg	89.6 Kg	116.8 Kg	216.0 Kg	336.0 Kg	528.0 Kg	560.0 Kg
Battery configuration		two stack of 8 cells	two stack of 8 cells	two stack of 8 cells	two stack of 8 cells	four stack of 4 cells	four stack of 4 cells	four stack of 4 cells	four stack of 4 cells
Series configuration		Yes up to 90 cells in stack							
Parallel configuration		Limited allowed, only with active and passive cell balancing, contact WhisperPower for details.							
Battery management Systems BMS		Recommended WhisperPower Battery Management System for monitoring and protection.							
Charge/discharge parameters									
Recommended charge voltage		57.6 V DC	57.6 V DC	57.6 V DC	57.6 V DC	57.6 V DC	57.6 V DC	57.6 V DC	57.6 V DC
Operation voltage charge voltage		51.2 V DC	51.2 V DC	51.2 V DC	51.2 V DC	51.2 V DC	51.2 V DC	51.2 V DC	51.2 V DC
Discharge cut off voltage		44.8 V DC	44.8 V DC	44.8 V DC	44.8 V DC	44.8 V DC	44.8 V DC	44.8 V DC	44.8 V DC
Recommended charge/discharge current 0.5C		30 A	50 A	80 A	100 A	200 A	350 A	500 A	500 A
Max. charge/discharge current 1C		90 A	100 A	160 A	200 A	400 A	700 A	1000 A	1000 A
For the other information see the dimensions of the 12 Volt stack									

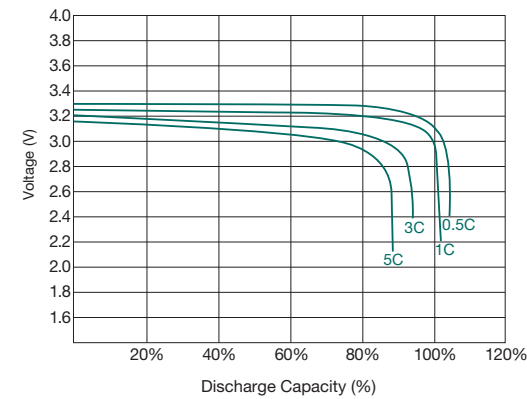
*) Excl. lightweight aluminum cabinet

Charge & Discharge chart

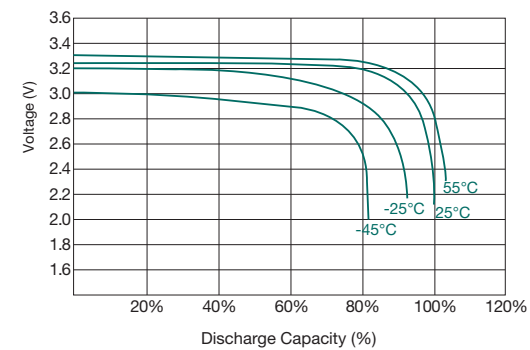
Self discharge at normal temperature



Discharge capacity at various discharge rates



Discharge capacity under different temperatures



Advanced technology

Lithium-ion batteries have the highest energy density of all batteries available in the market. From 2005 industrial quality Lithium-ion batteries emerged on the market. The LFP battery chemistry is robust and safe, designed for use in durable power storages and hybrid power-generation applications.

Fully charged in 60 to 120 minutes

With a Lithium-ion charge system a power bank can be recharged within 60 to 120 minutes. Running the generator only the time needed, no maintenance absorption time is required, unlike lead-acid batteries. A fast, safe and economical re-charge is the result.

No more maintenance

Conventional lead-acid batteries require periodical maintenance and water refill to prevent permanent damage to the battery. A Lithium-ion battery does not need any maintenance during its life cycle.

Long life time, 5 years warranty

To ensure proper battery functionality over the course of 5 years, an extended conditional product warranty is offered with the WhisperPower Batteries. This extended conditional product warranty is based on the assumed load balance for the battery banks as described below:

- Estimated annual number of cycles (80% DOD) : 375 cycles per year.
- Estimated SOH of 80% after 8 years (3000 cycles).

After our standard 24 months warranty period, the following extended conditional warranty terms are applicable:

- 2 – 3 years operation and cycles < 1125 = Battery replacement + 35 % invoice of kWh price 2012
- 3 – 4 years operation and cycles < 1500 = Battery replacement + 50 % invoice of kWh price 2013
- 4 – 5 years operation and cycles < 1875 = Battery replacement + 65 % invoice of kWh price 2014

Extended conditional product warranty includes the replacement of defective batteries (SOH < 80%) normal operation, excluding battery defects caused by abuse, poor maintenance, poor ambient under circumstances (dirt, dust, moisture etc) etc. Battery replacements includes the delivery of battery to customers land-based service location in Western-Europe, excluding service engineer field service costs (Travelling, working hours, accommodation, day expence) for replacing and re-commissioning the battery system.

45% better for environment

Lithium-ion batteries are the most environmentally friendly batteries to produce. A study at University of Brussels has shown that over the total life cycle of the battery lithium-ion is 45 % more sustainable than lead acid. Lithium-ion also offers approximately 15% of energy efficiency improvements compare to lead acid batteries and there common used low efficient charges.

10% Improved total cost of owner ship

Although the batteries are more expensive, the total lost of ownership (TCO) will be lower. No more maintenance, longer cyclic life and higher charge efficiency result in an overall improvement of owner cost. This includes the reduction of fuel.



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